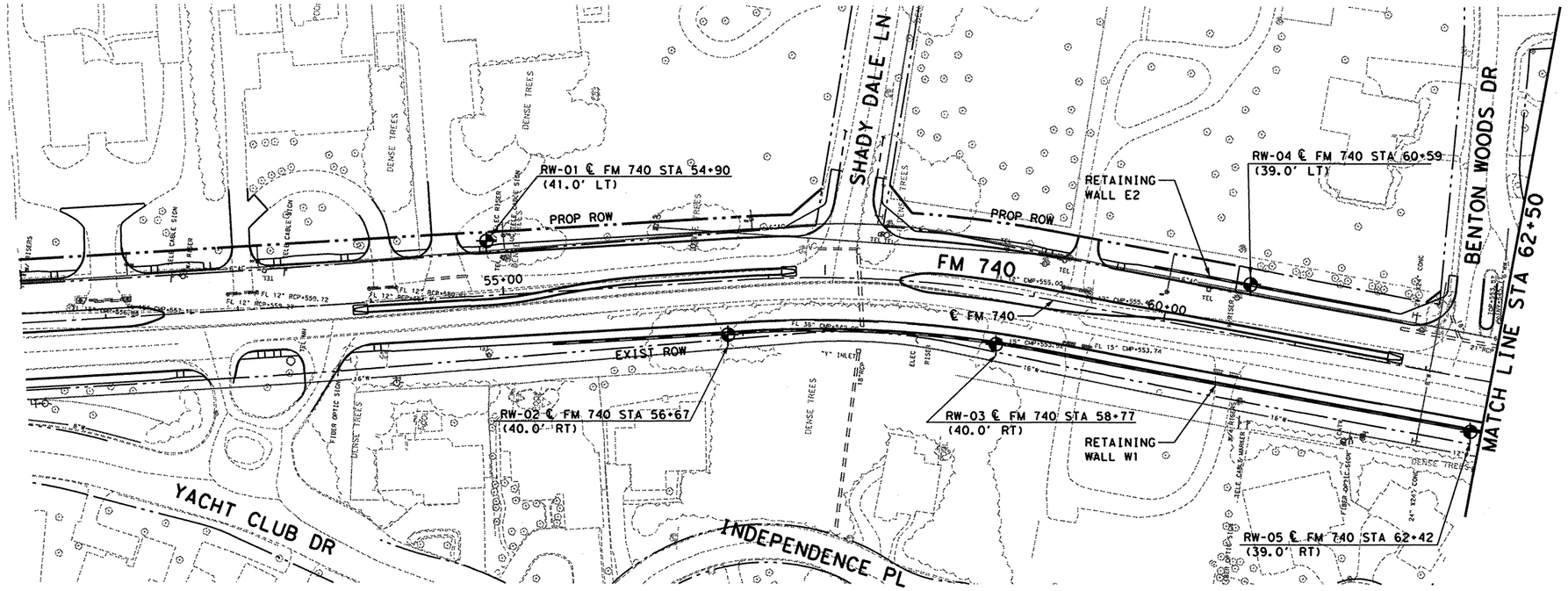
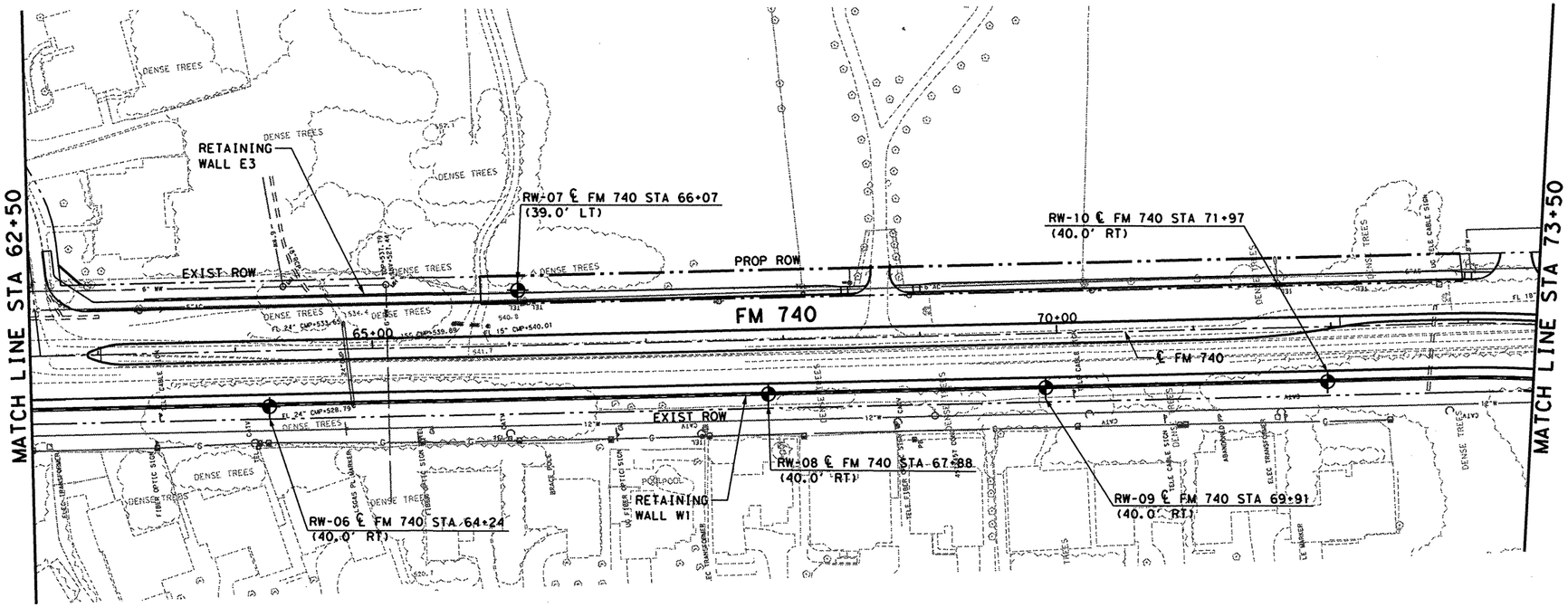




0 25 50 75 100
SCALE IN FEET

GENERAL

GEOTECHNICAL INVESTIGATION AND EVALUATION PERFORMED BY KLEINFELDER CENTRAL, INC.

SEE BORING LOG DATA SHEETS FOR ADDITIONAL INFORMATION.

LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON DRAWINGS ARE APPROXIMATE AND SHALL NOT BE RELIED ON FOR ACTUAL LOCATION. CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LOCATIONS INCLUDING THOSE SHOWN PRIOR TO CONSTRUCTION.

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED
PROFESSIONAL ENGINEER
5/21/2009

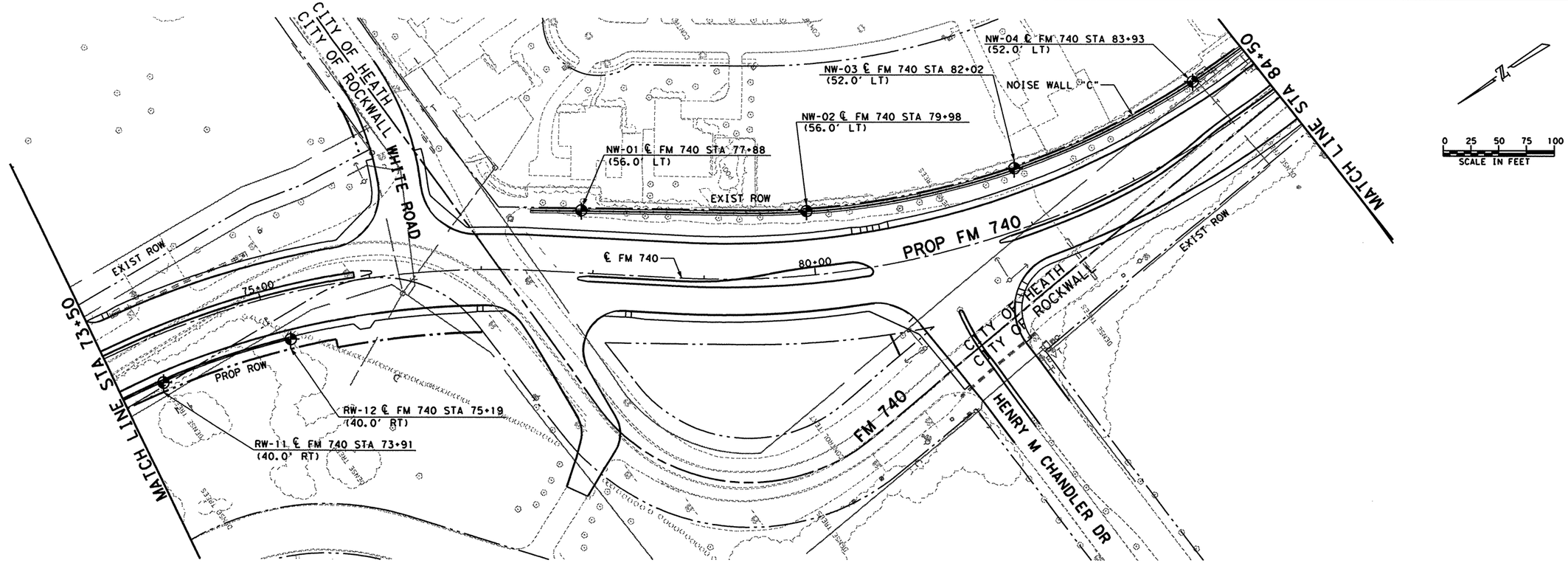
Huitt-Zollars, Inc. - Firm Registration No. F-761

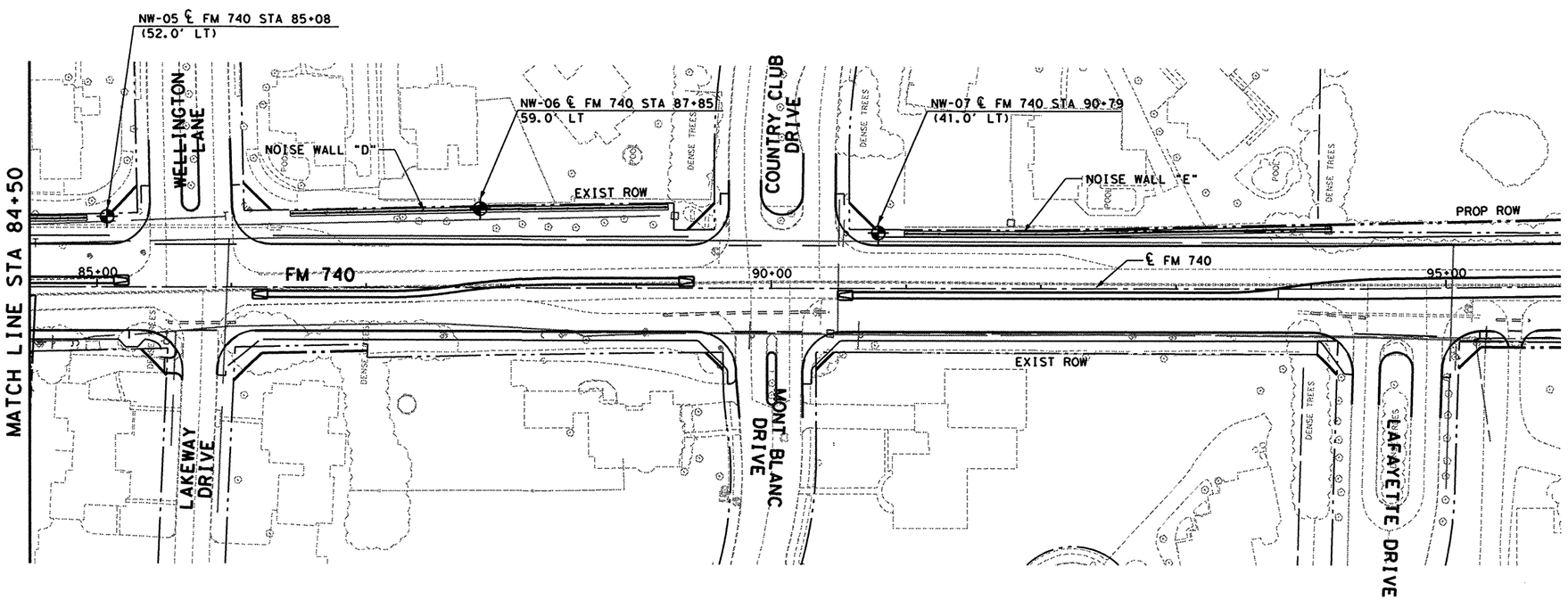
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
BORING LOCATION PLAN

SCALE: 1"=100' SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LEG	TEXAS	DALLAS	ROCKWALL	178
CHECK DAN	CONTROL	SECTION	JOB	
CHECK CEQ	1014	03	039	





CHARLES E. QUADE
69396
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

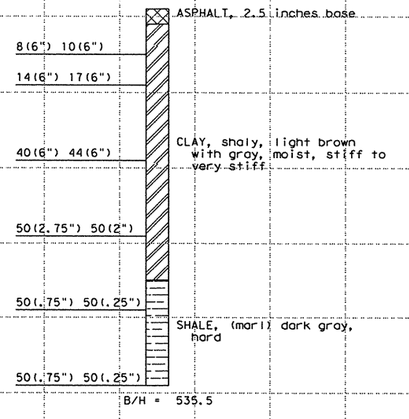
FM 740
BORING LOCATION PLAN

SCALE: 1"=100' SHEET 2 OF 2

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	179
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	

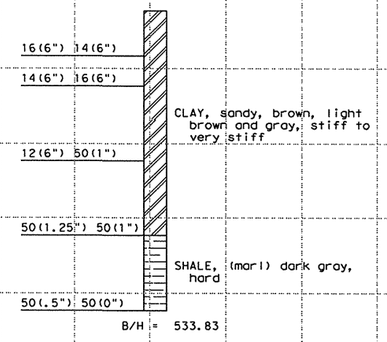
TEST HOLE NO. RW-01

℄ FM 740 STA 54+90
OFFSET = 41.0' LT
GROUND ELEV. 560.5
BORE DEPTH = 25'



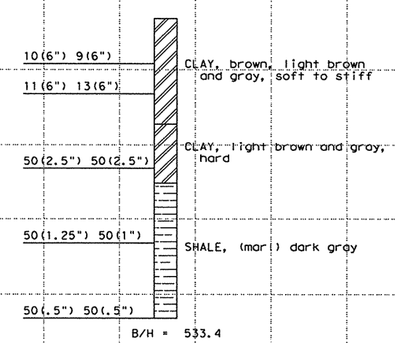
TEST HOLE NO. RW-02

℄ FM 740 STA 56+67
OFFSET = 40.0' RT
GROUND ELEV. 553.83
BORE DEPTH = 20'



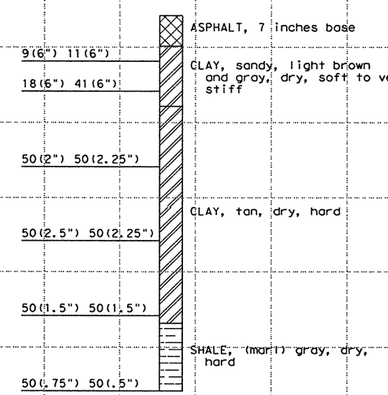
TEST HOLE NO. RW-03

℄ FM 740 STA 58+77
OFFSET = 40.0' RT
GROUND ELEV. 553.4
BORE DEPTH = 20'



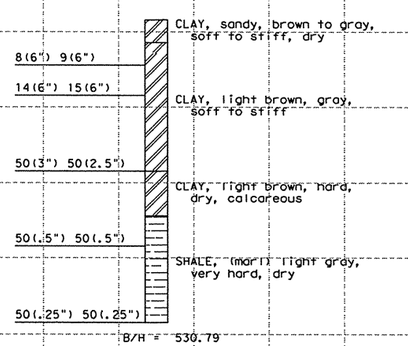
TEST HOLE NO. RW-04

℄ FM 740 STA 60+59
OFFSET = 39.0' LT
GROUND ELEV. 557.08
BORE DEPTH = 25'



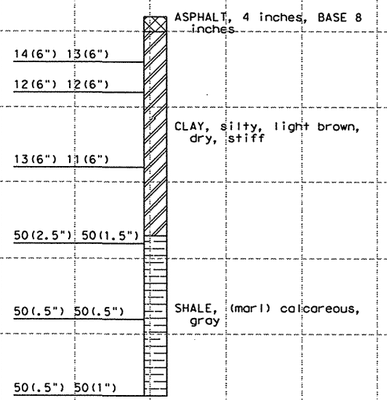
TEST HOLE NO. RW-05

℄ FM 740 STA 62+42
OFFSET = 39.0' RT
GROUND ELEV. 550.79
BORE DEPTH = 20'



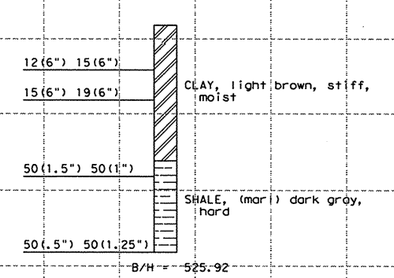
TEST HOLE NO. RW-06

℄ FM 740 STA 64+24
OFFSET = 40.0' RT
GROUND ELEV. 545.88
BORE DEPTH = 25'



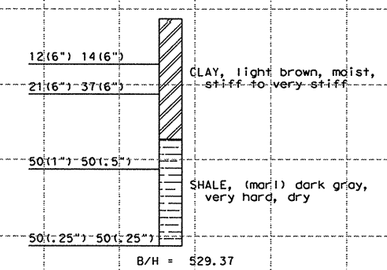
TEST HOLE NO. RW-07

℄ FM 740 STA 66+07
OFFSET = 39+00' LT
GROUND ELEV. 540.92
BORE DEPTH = 15'



TEST HOLE NO. RW-08

℄ FM 740 STA 67+88
OFFSET = 40.0' RT
GROUND ELEV. 544.37
BORE DEPTH = 15'



GENERAL NOTE:

KLEINFELDER CENTRAL, INC., PREPARED A GEOTECHNICAL STUDY (KCI REPORT NO. 72910-11) IN APRIL 2009. THE BORING LOG DATA SHOWN HERE IS REPRODUCED FROM THE NOTED REPORT.

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740

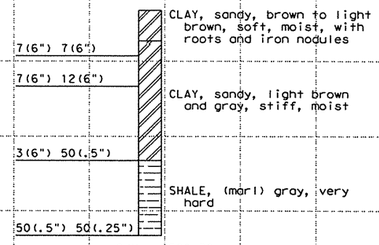
BORING LOG DATA

SHEET 1 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
.	6			FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	180
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

TEST HOLE NO. RW-09

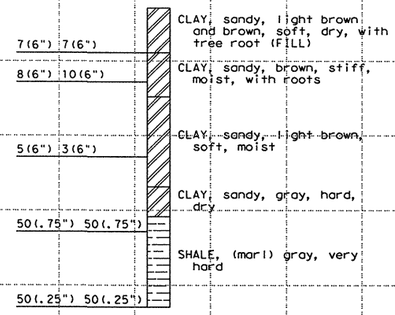
℄ FM 740 STA 69+91
OFFSET = 40.0' RT
GROUND ELEV. 543.36
BORE DEPTH = 15'



B/H = 528.36

TEST HOLE NO. RW-10

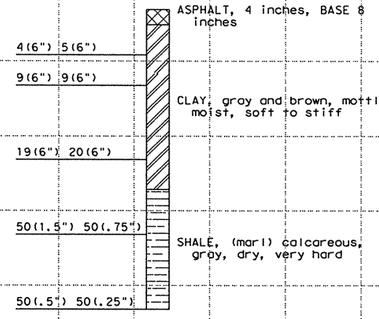
℄ FM 740 STA 71+97
OFFSET = 40.0' RT
GROUND ELEV. 538.57
BORE DEPTH = 20'



B/H = 518.57

TEST HOLE NO. RW-11

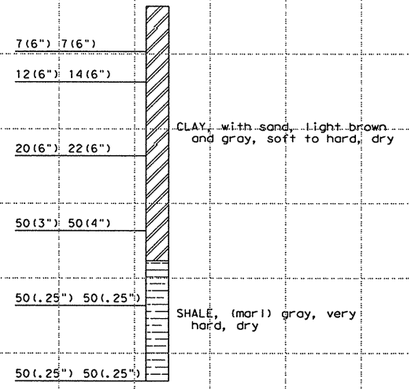
℄ FM 740 STA 73+91
OFFSET = 40.0' RT
GROUND ELEV. 543.45
BORE DEPTH = 20'



B/H = 523.45

TEST HOLE NO. RW-12

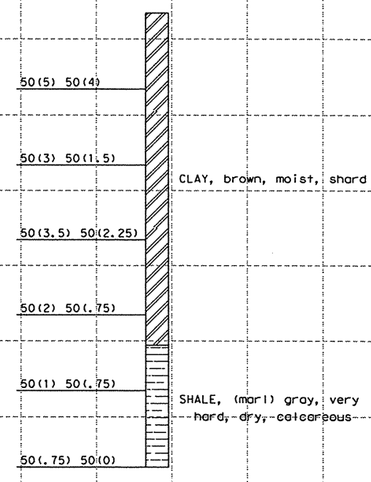
℄ FM 740 STA 75+19
OFFSET = 40.0' RT
GROUND ELEV. 543.17
BORE DEPTH = 25'



B/H = 518.17

TEST HOLE NO. NW-01

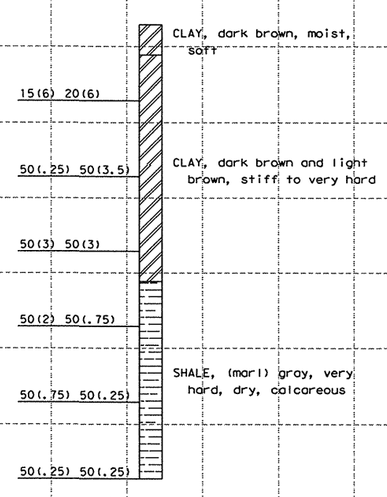
℄ FM 740 STA 77+88
OFFSET = 56.0' LT
GROUND ELEV. 551.72
BORE DEPTH = 30'



B/H = 521.72

TEST HOLE NO. NW-02

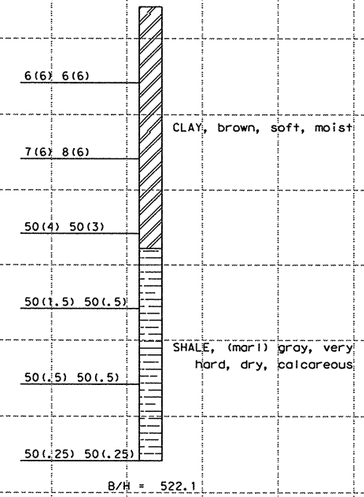
℄ FM 740 STA 79+98
OFFSET = 56.0' LT
GROUND ELEV. 551.45
BORE DEPTH = 30'



B/H = 521.45

TEST HOLE NO. NW-03

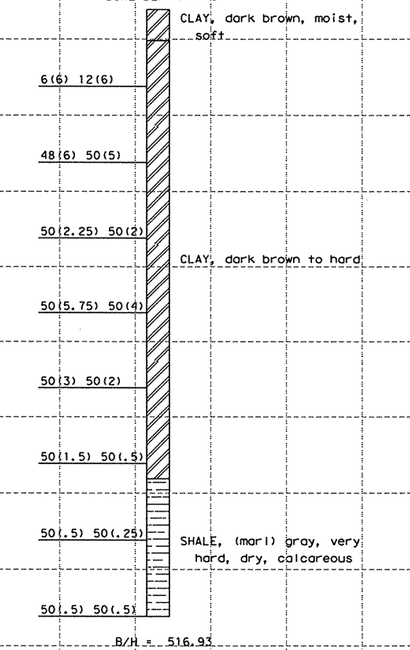
℄ FM 740 STA 82+02
OFFSET = 52.0' LT
GROUND ELEV. 552.10
BORE DEPTH = 30'



B/H = 522.1

TEST HOLE NO. RW-04

℄ FM 740 STA 83+93
OFFSET = 52.0' LT
GROUND ELEV. 556.93
BORE DEPTH = 40'



B/H = 516.93

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740

BORING LOG DATA

SHEET 2 OF 3

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	181
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

ugarte
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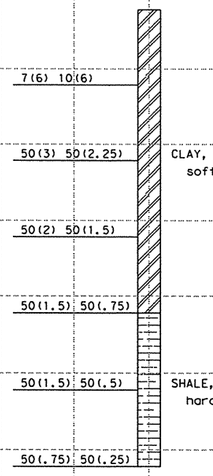
5/21/2009
12:53:34 PM

TEST HOLE NO. NW-05

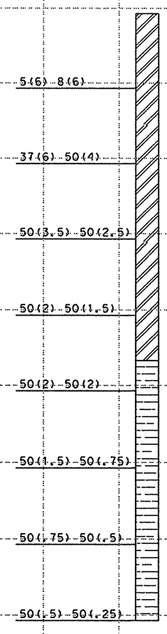
℄ FM 740 STA 85+08
OFFSET = 52.0' LT
GROUND ELEV. 558.72
BORE DEPTH = 30'



B/H = 528.93

TEST HOLE NO. NW-06

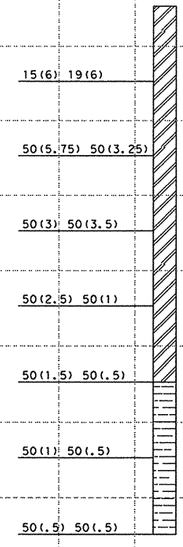
℄ FM 740 STA 87+85
OFFSET = 59.0' LT
GROUND ELEV. 564.65
BORE DEPTH = 40'



B/H = 524.65

TEST HOLE NO. NW-07

℄ FM 740 STA 90+79
OFFSET = 41.0' LT
GROUND ELEV. 572.66
BORE DEPTH = 35'



B/H = 537.66

HUITT-ZOLLARS
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Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740

BORING LOG DATA

SHEET 3 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	182
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

ugarte
SCALE=1:10
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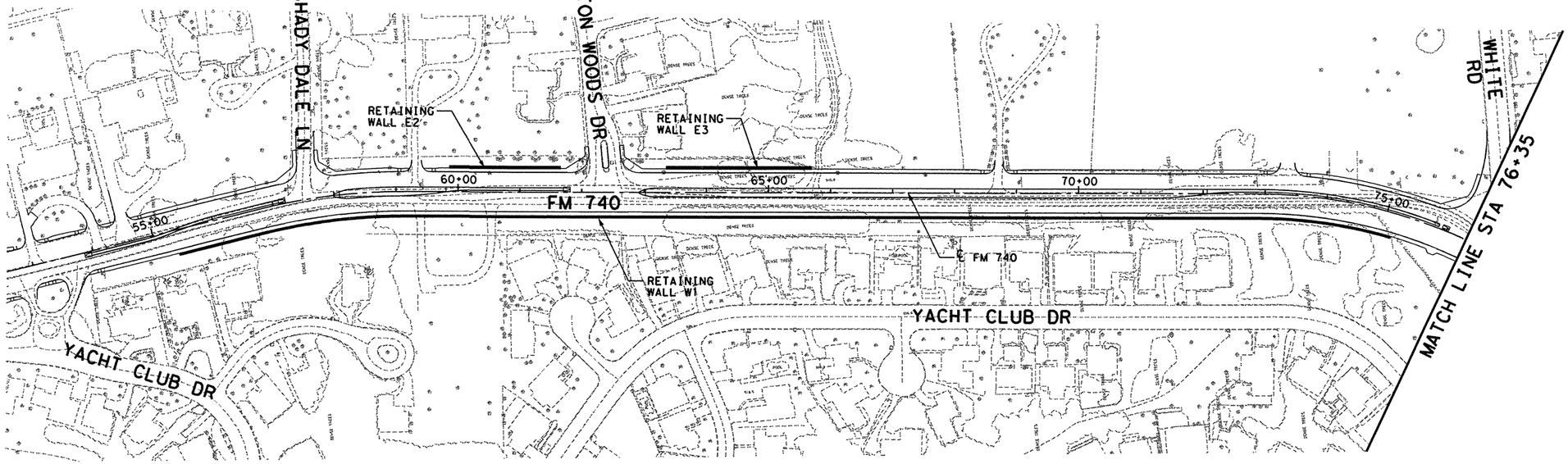
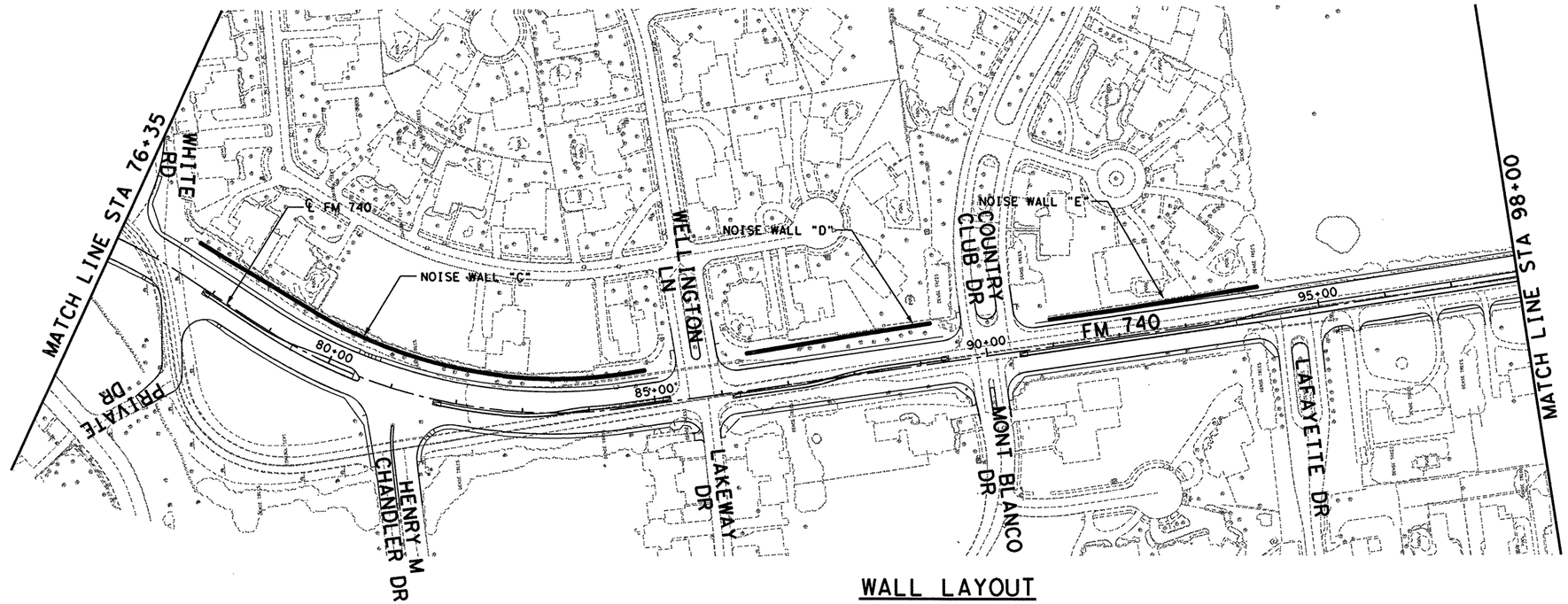
5/21/2009 12:53:35 PM



WALL LAYOUT



WALL LAYOUT

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED
PROFESSIONAL ENGINEER
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

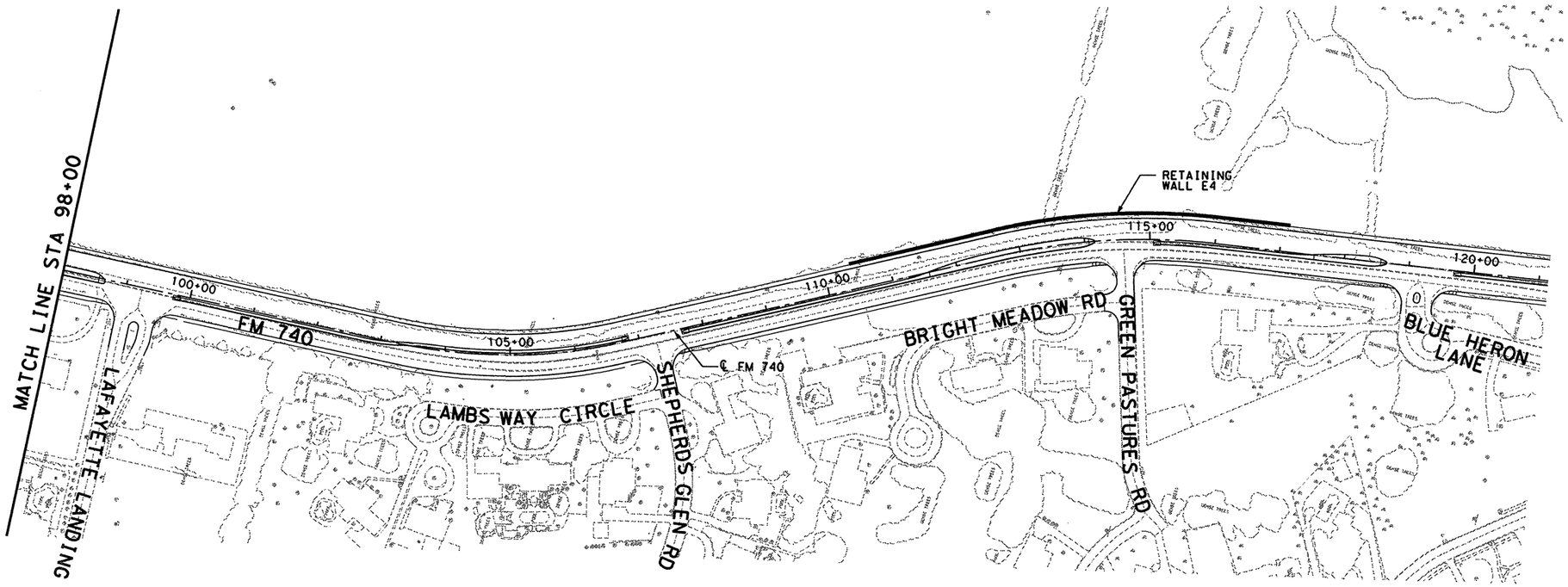
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
RETAINING WALL AND NOISE WALL LAYOUT

SCALE: 1"=200' SHEET 1 OF 2

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JAM	TEXAS	DALLAS	ROCKWALL	183
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	



WALL LAYOUT

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED
PROFESSIONAL ENGINEER
5/26/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation
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FM 740
RETAINING WALL AND NOISE WALL LAYOUT

SCALE: 1"=200' SHEET 2 OF 2

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JAM	TEXAS	DALLAS	ROCKWALL	184
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	

ugarte
SCALE=1:200
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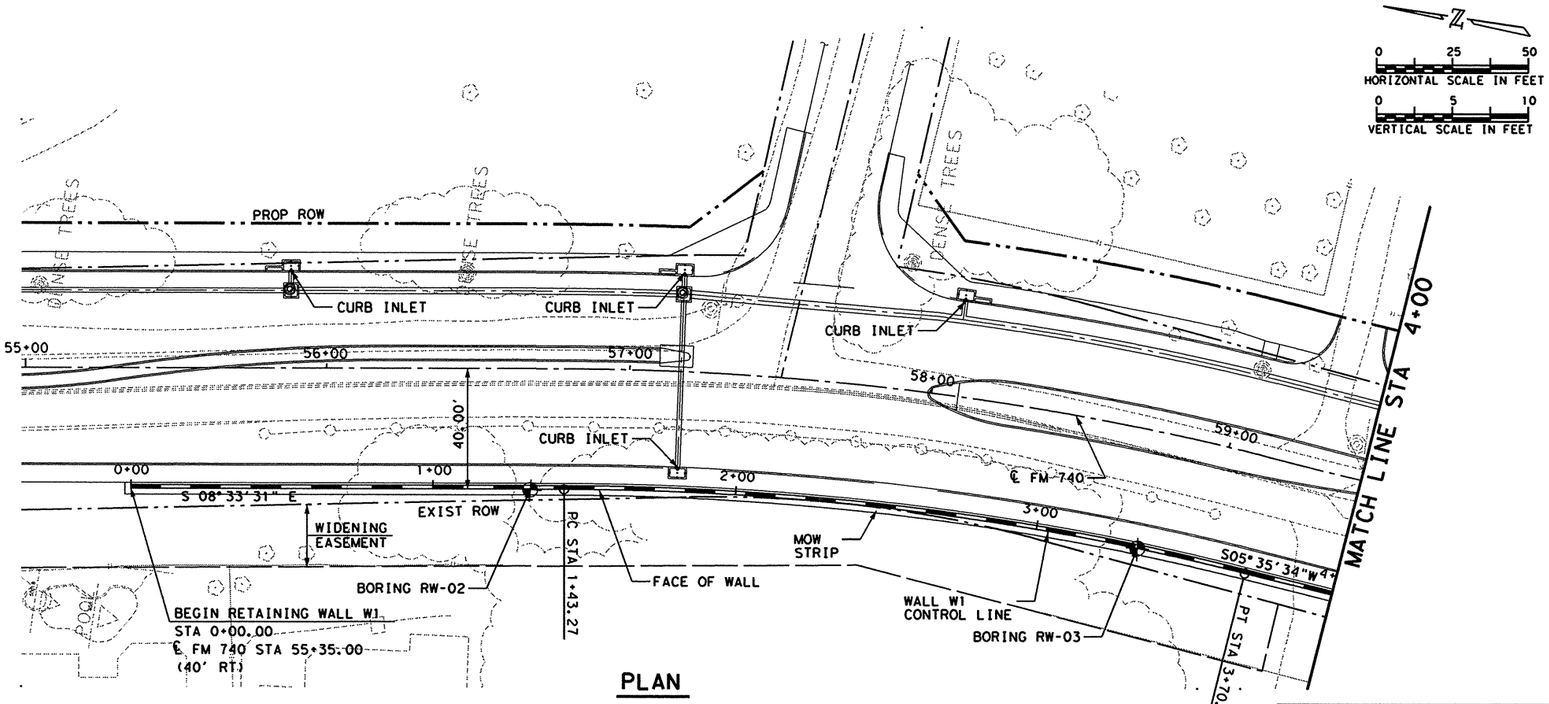


PLAN

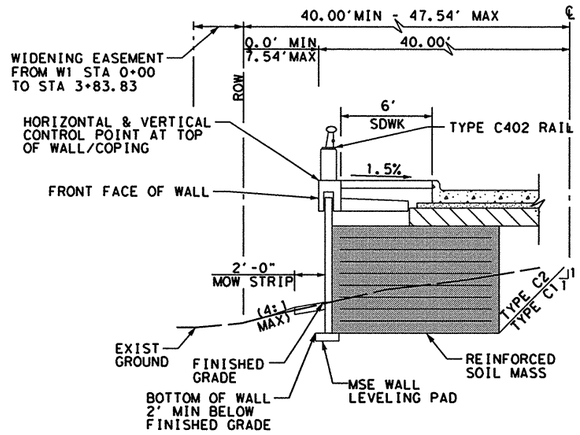
RETAINING WALL W1 CURVE DATA

No.	Δ	R	T	L	D	PI STA
WALL W1	14° 09' 04.99" RT	920.00'	114.20'	227.23'	6° 13' 40.09"	2+57.46

ELEVATION

ESTIMATED QUANTITIES

QTY	UNIT	DESCRIPTION
18,222	SF	RETAINING WALL (MSE)
1960	LF	RAIL (TY C402)
48.6	CY	RIPRAP (MOW STRIP) (4 IN)



TYPICAL SECTION

NTS

GENERAL NOTES:

1. SQUARE FOOT SURFACE AREA OF RETAINING WALL IS MEASURED FROM TOP OF RETAINING WALL AND 2'-0" BELOW PROPOSED GROUND LINE.
2. FOOTING ADJUSTMENTS MADE TO ACCOMMODATE THE AVAILABLE OPTIONAL RETAINING WALLS WILL NOT BE MEASURED.
3. PROVIDE BACKFILL MEETING THE SPECIFICATIONS FOR BACKFILL, SELECT, TYPE A. CEMENT STABILIZED BACKFILL IS NOT PERMITTED.
4. PROVIDE EMBANKMENT EARTH REINFORCEMENTS WITH A LENGTH GREATER THAN OR EQUAL TO 80 PERCENT OF THE WALL HEIGHT OR 8', WHICHEVER IS LARGER.
5. FOR MSE WALL DETAILS SEE TXDOT STANDARD PLAN RW(MSE).
6. CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
7. FOR ADDITIONAL BORING DATA, SEE BORING LOCATION PLAN AND BORING LOG DATA SHEETS.

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED PROFESSIONAL ENGINEER
5/21/2009

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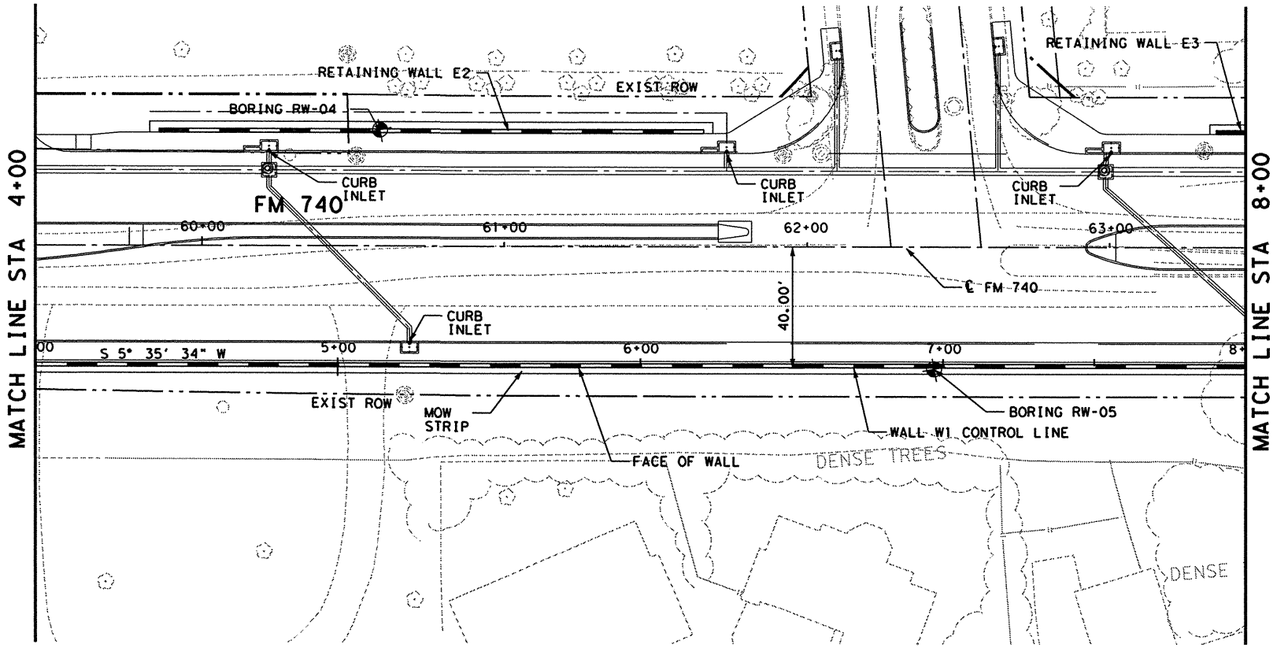
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

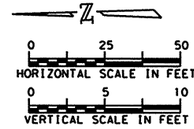
FM 740
RETAINING WALL W1
PLAN AND PROFILE

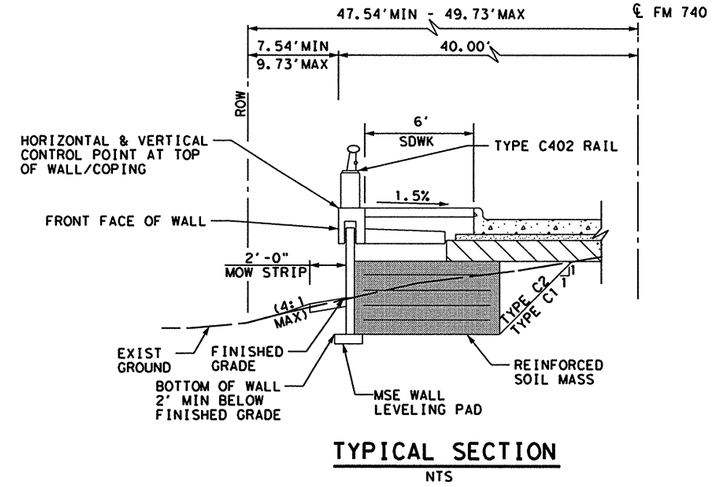
SHEET 1 OF 5

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LEG	TEXAS	DALLAS	ROCKWALL	185
CHECK	CONTROL	SECTION	JOB	
DAN	1014	03	039	
CHECK				
CEQ				

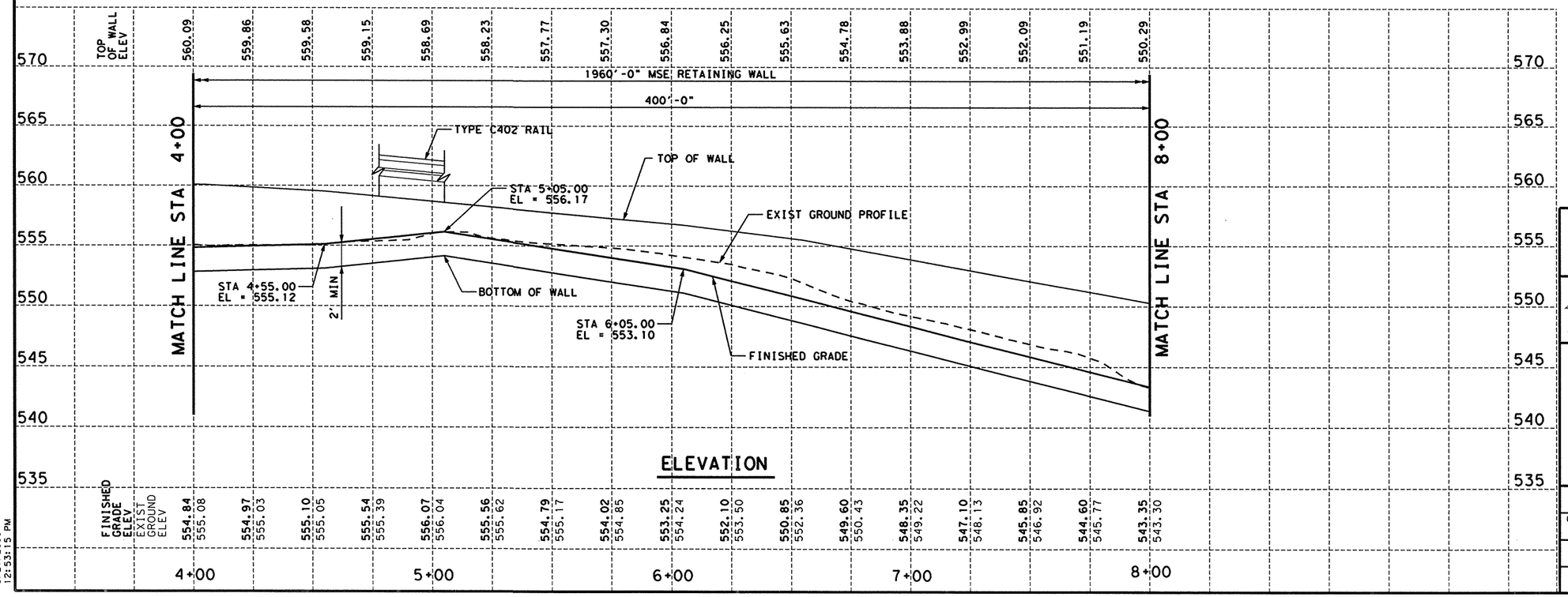


PLAN





TYPICAL SECTION
NTS



ELEVATION

Huitt-Zollars, Inc. - Firm Registration No. F-761

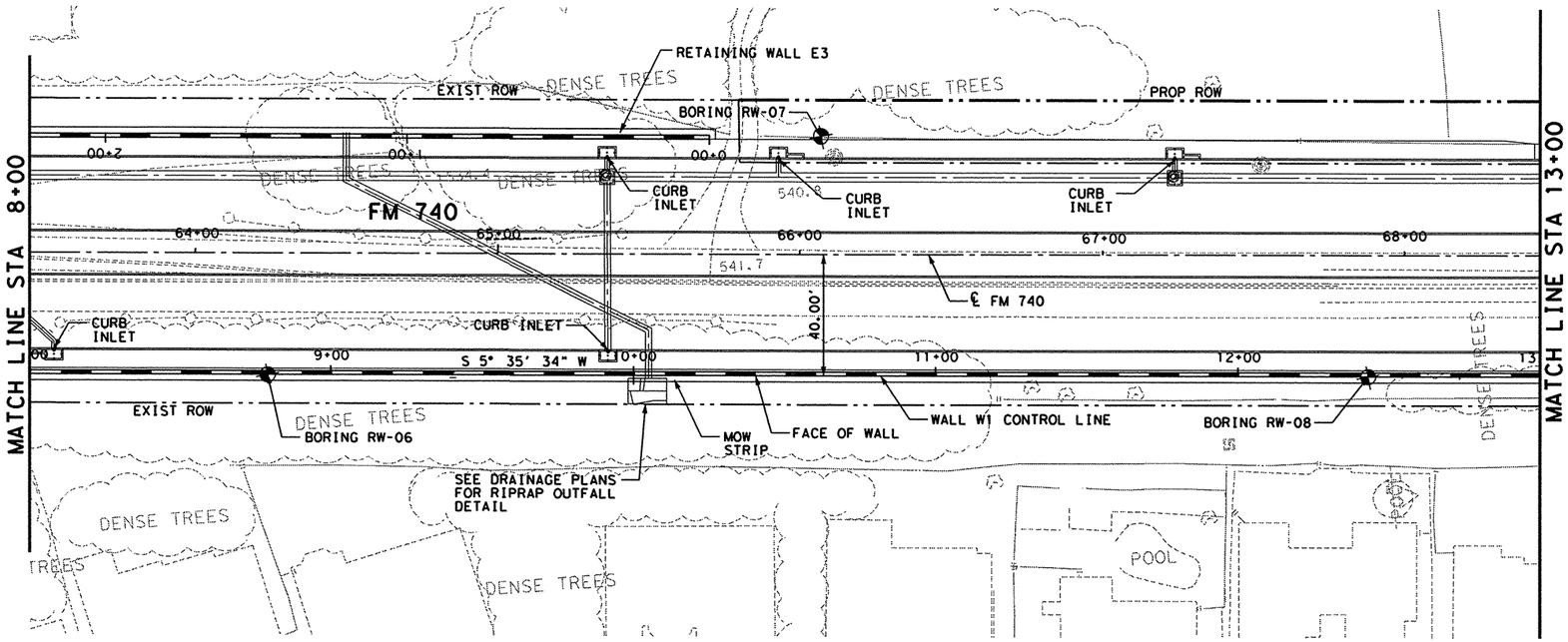
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

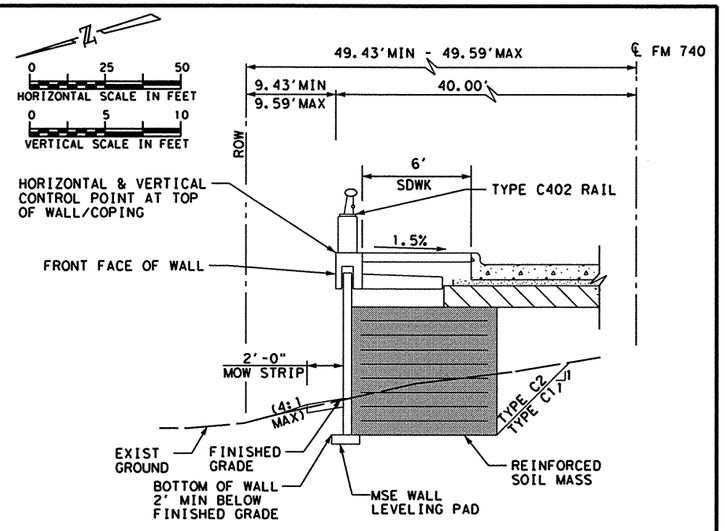
FM 740
RETAINING WALL W1
PLAN AND PROFILE

SHEET 2 OF 5

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	186
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	

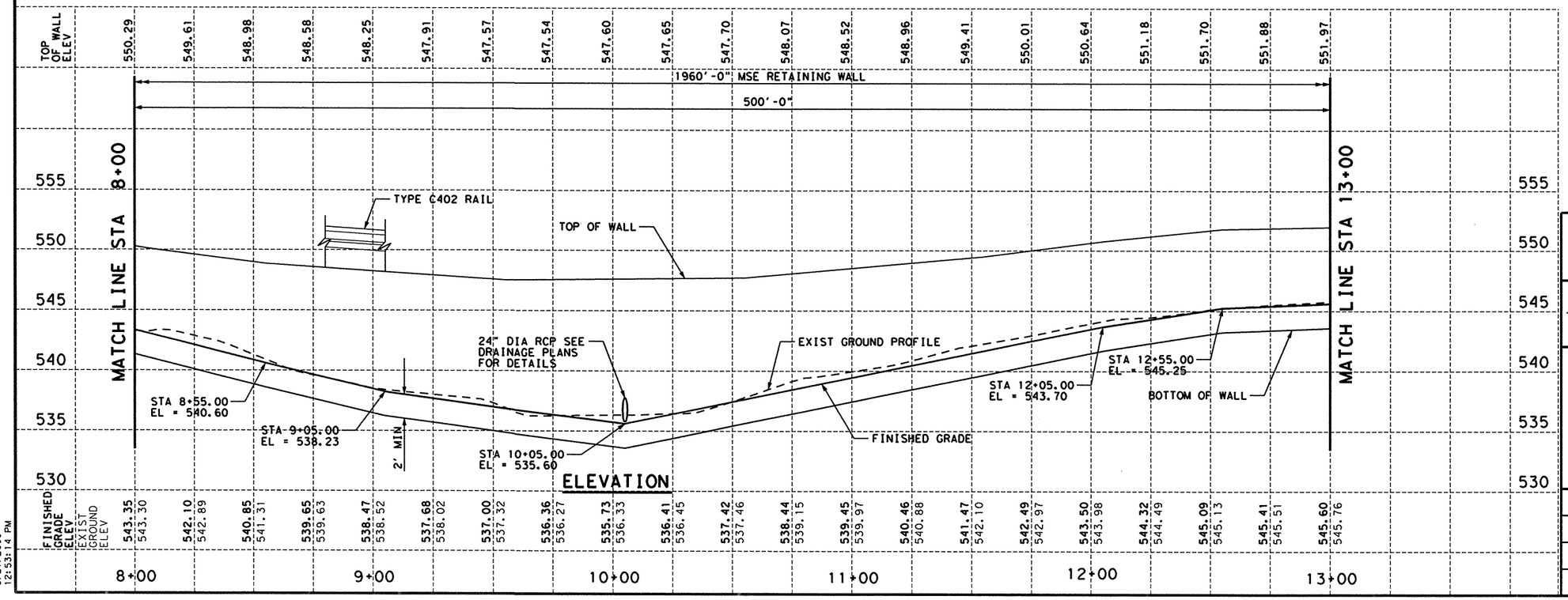


PLAN



TYPICAL SECTION

NTS



ELEVATION

Charles E. Quade

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED
PROFESSIONAL ENGINEER
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

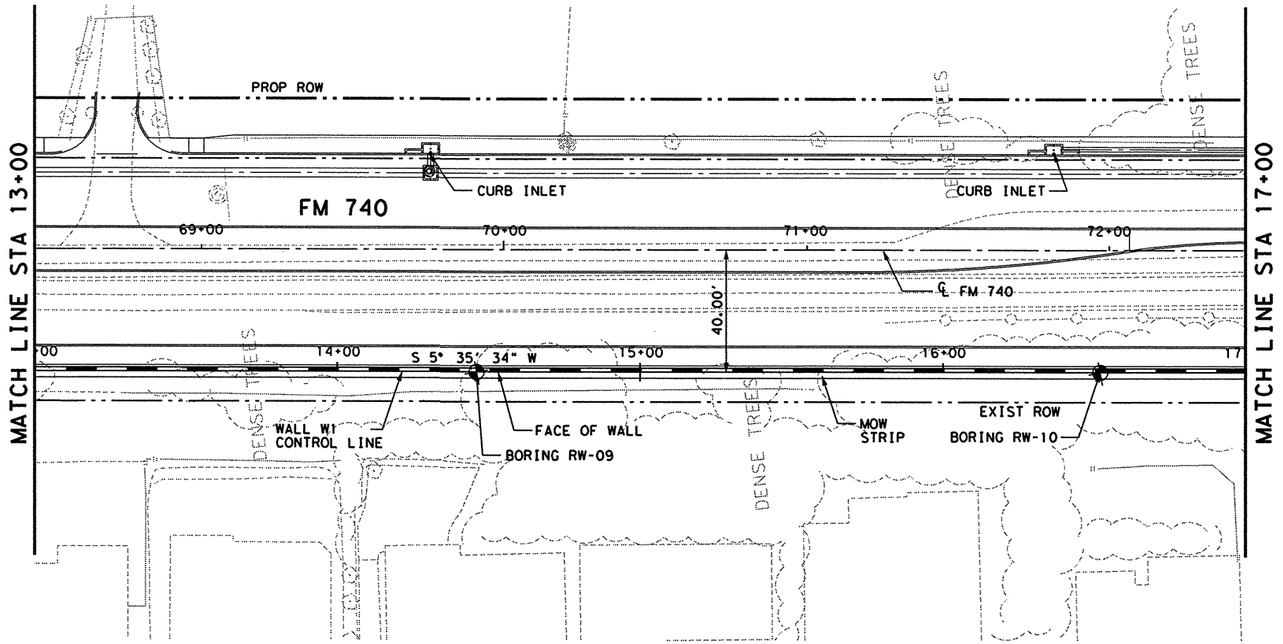
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

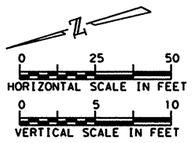
FM 740
RETAINING WALL W1
PLAN AND PROFILE

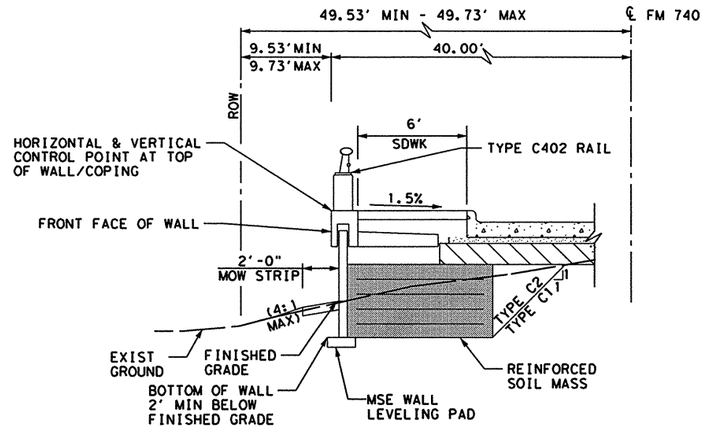
SHEET 3 OF 5

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	187
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	



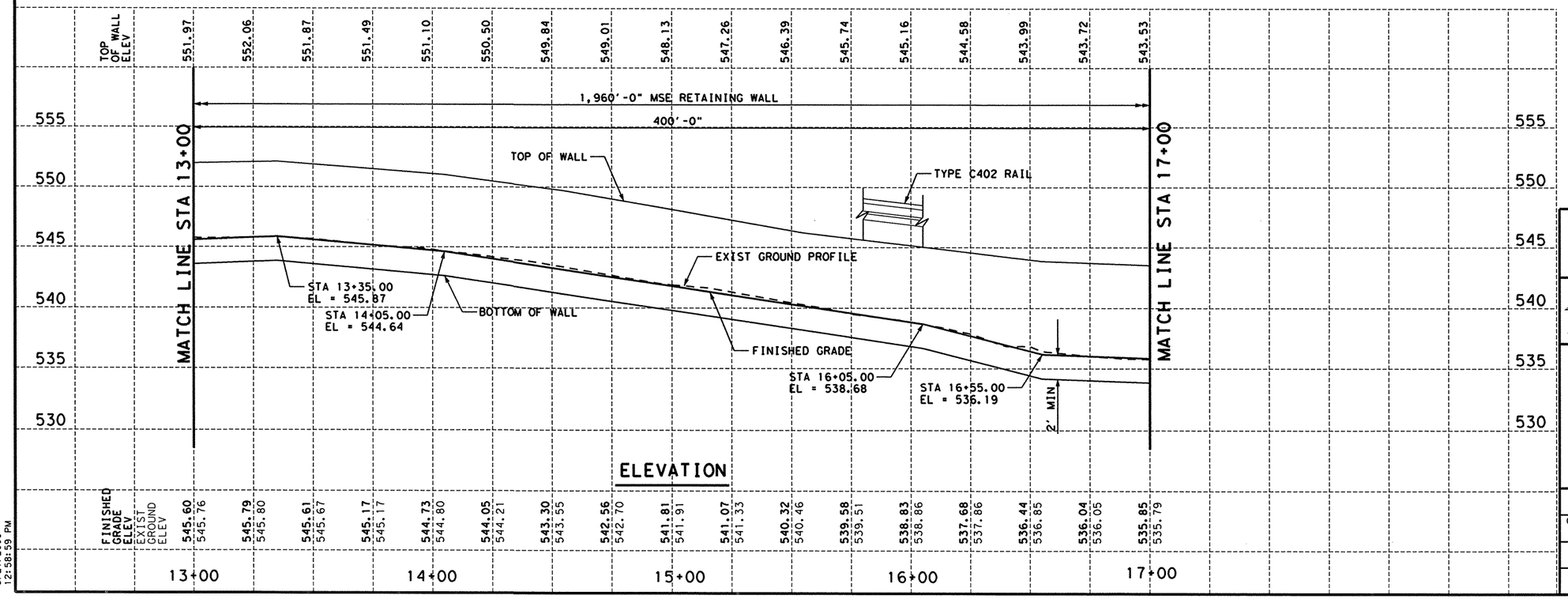
PLAN





TYPICAL SECTION

NTS



ELEVATION

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Dallas, Texas 75204-2489

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FM 740
RETAINING WALL W1
PLAN AND PROFILE

SHEET 4 OF 5

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	188
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	

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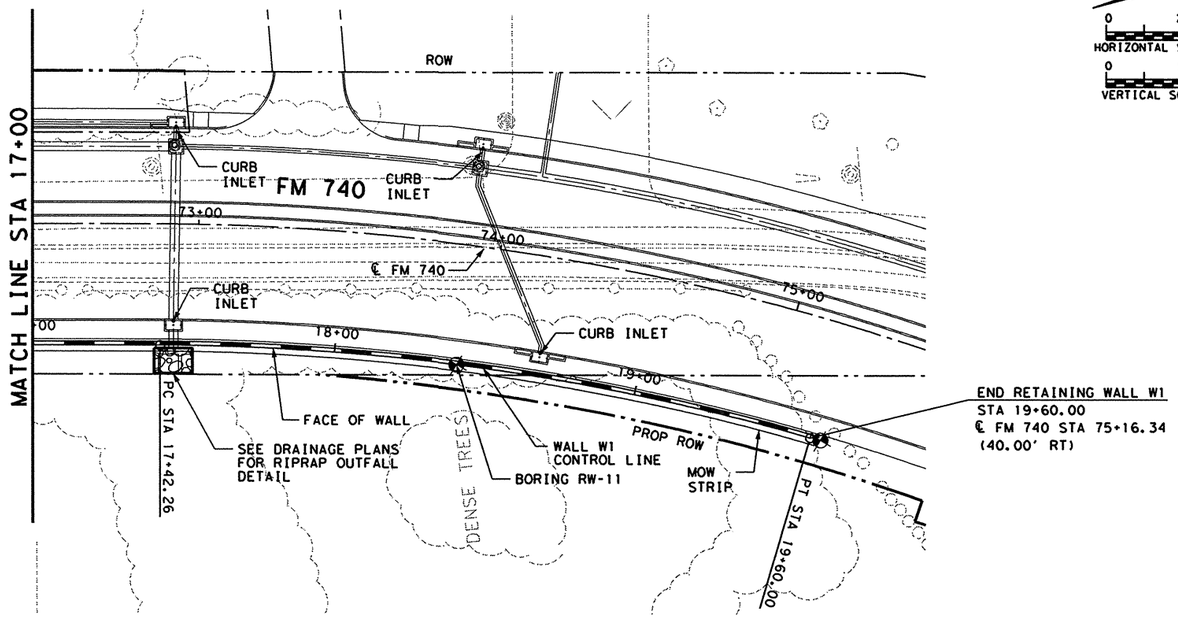

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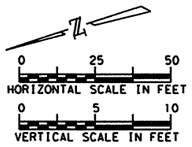
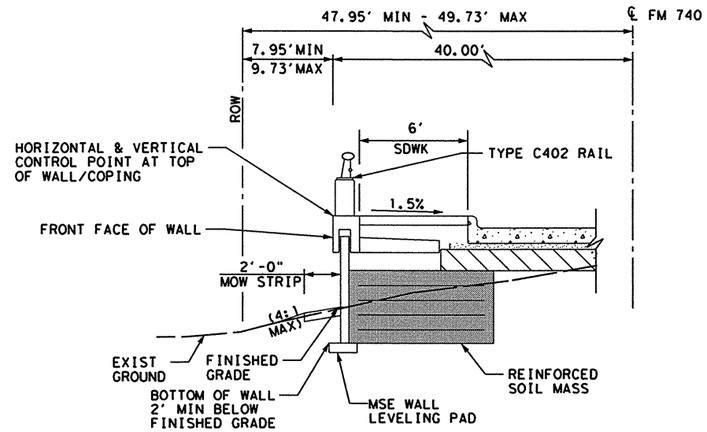




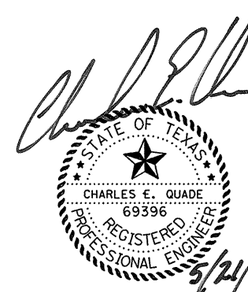
TYPICAL SECTION

NTS

RETAINING WALL W1 CURVE DATA

No.	Δ	R	T	L	D	PI STA
WALL W1	16° 24' 54.64" RT	760.00'	109.62'	217.74'	7° 32' 20.11"	18+51.88

ELEVATION



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Texas Department of Transportation

FM 740
RETAINING WALL W1
PLAN AND PROFILE

SHEET 5 OF 5

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LEG	TEXAS	DALLAS	ROCKWALL	189
CHECK	CONTROL	SECTION	JOB	
DAN / CEQ	1014	03	039	

ugorte
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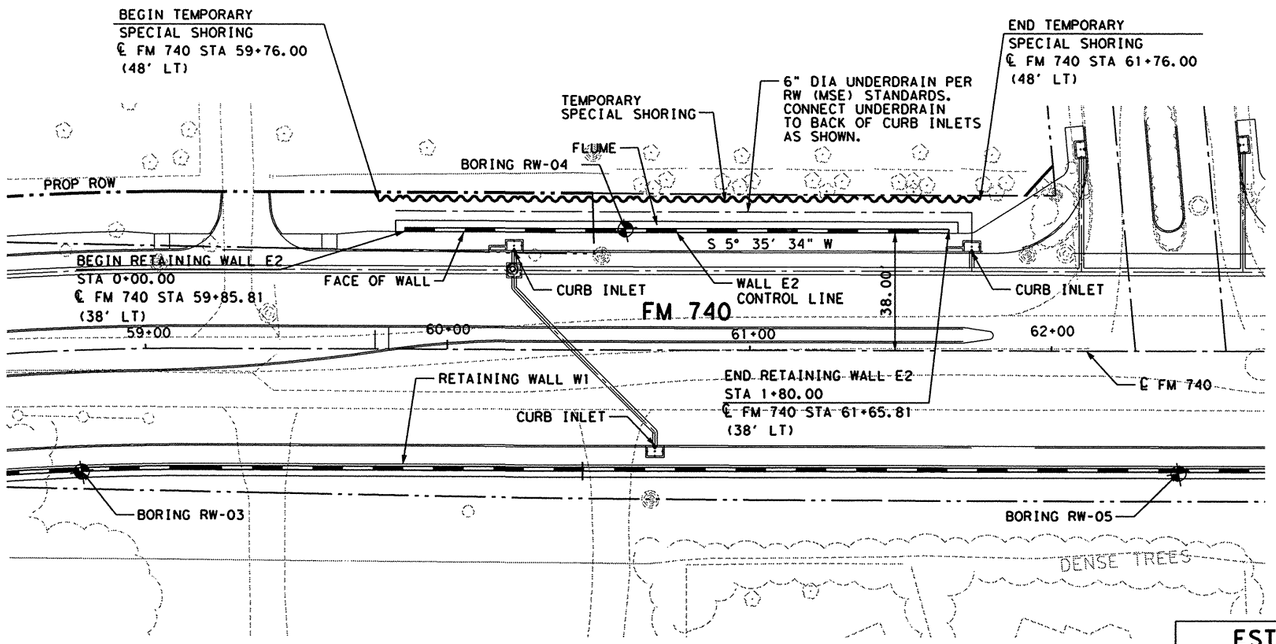
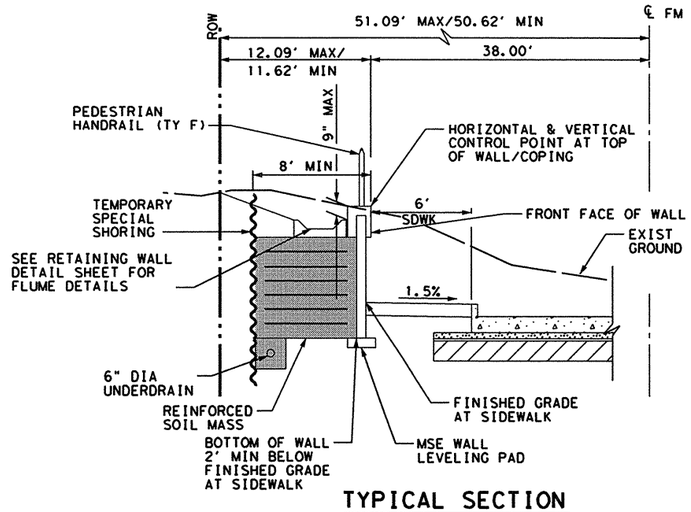


PLAN

0 25 50
HORIZONTAL SCALE IN FEET
0 5 10
VERTICAL SCALE IN FEET



TYPICAL SECTION

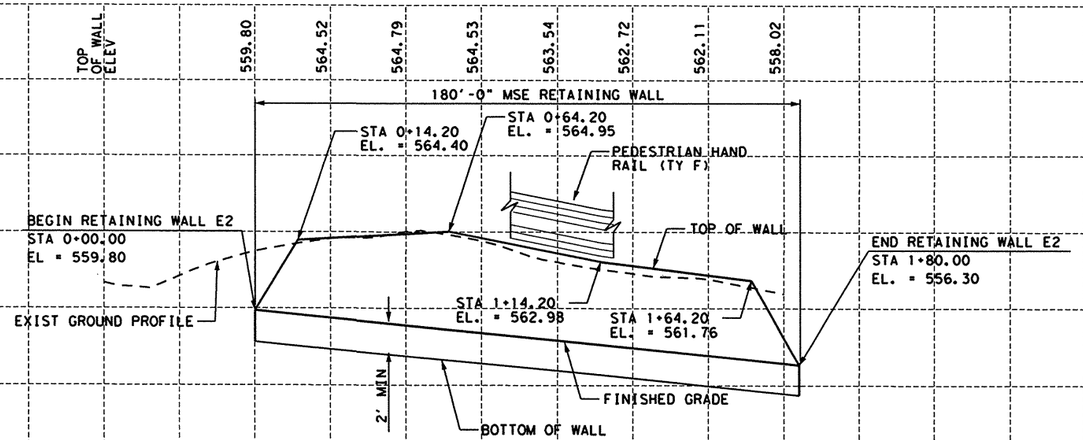
NTS

GENERAL NOTES:

1. SQUARE FOOT SURFACE AREA OF RETAINING WALL IS MEASURED FROM TOP OF RETAINING WALL AND 2'-0" BELOW PROPOSED GROUND LINE.
2. FOOTING ADJUSTMENTS MADE TO ACCOMMODATE THE AVAILABLE OPTIONAL RETAINING WALLS WILL NOT BE MEASURED.
3. PROVIDE BACKFILL MEETING THE SPECIFICATIONS FOR BACKFILL, SELECT, TYPE A. CEMENT STABILIZED BACKFILL IS NOT PERMITTED.
4. PROVIDE EMBANKMENT EARTH REINFORCEMENTS WITH A LENGTH GREATER THAN OR EQUAL TO 80 PERCENT OF THE WALL HEIGHT OR 8', WHICHEVER IS LARGER.
5. FOR MSE WALL DETAILS SEE TXDOT STANDARD PLAN RW(MSE).
6. CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
7. FOR ADDITIONAL BORING DATA, SEE BORING LOCATION PLAN AND BORING LOG DATA SHEETS.

ESTIMATED QUANTITIES

QTY	UNIT	DESCRIPTION
1,272	SF	RETAINING WALL (MSE)
180	LF	RAIL (HANDRAIL) (TY F)
13.9	CY	RIPRAP CONC (FLUME)
1,813	SF	TEMPORARY SPECIAL SHORING



ELEVATION

Charles E. Quade
STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED PROFESSIONAL ENGINEER
5/21/2009

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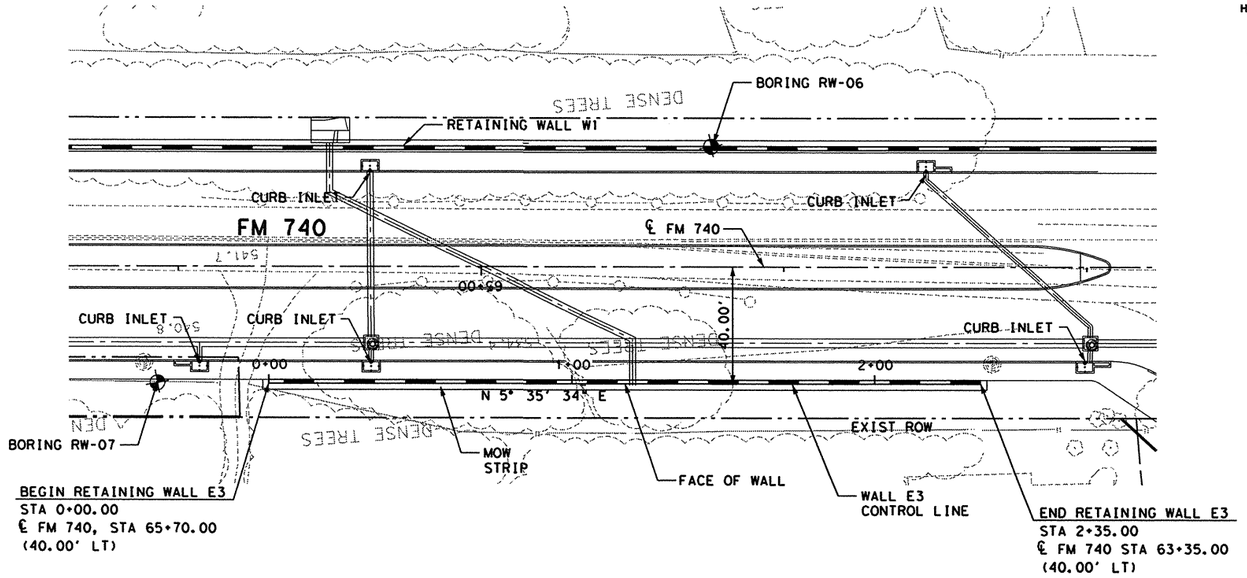
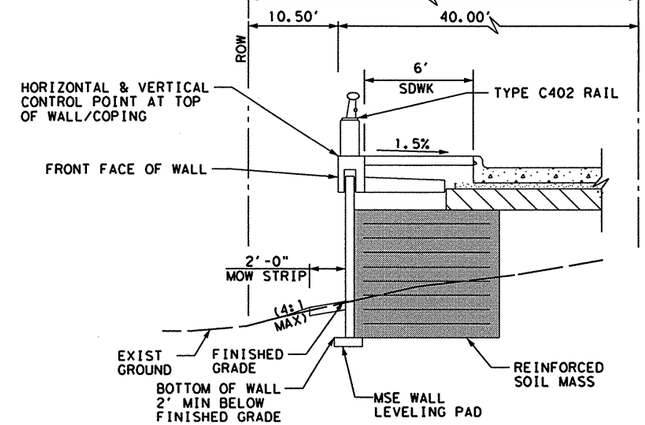
FM 740
RETAINING WALL E2
PLAN AND PROFILE

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	190
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	



PLAN



TYPICAL SECTION

NTS

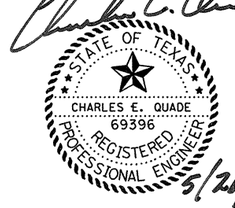
0 25 50
HORIZONTAL SCALE IN FEET
0 5 10
VERTICAL SCALE IN FEET

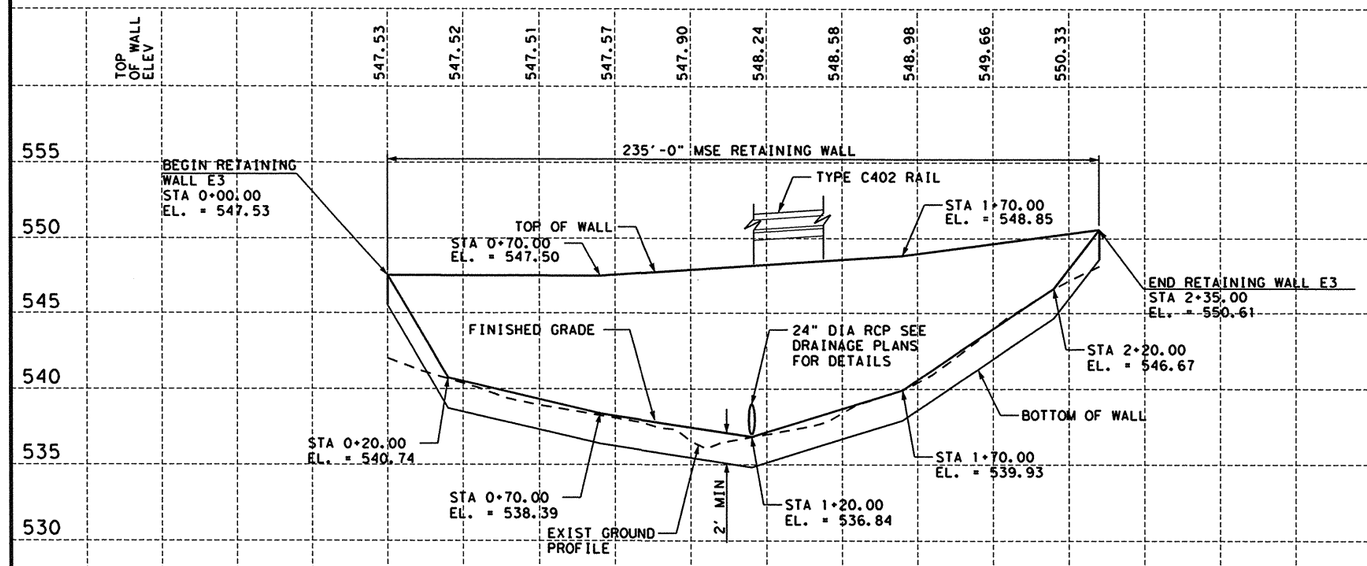
ESTIMATED QUANTITIES

QTY	UNIT	DESCRIPTION
2,292	SF	RETAINING WALL (MSE)
235	LF	RAIL (TY C402)
6.0	CY	RIPRAP (MOW STRIP) (4 IN)

GENERAL NOTES:

1. SQUARE FOOT SURFACE AREA OF RETAINING WALL IS MEASURED FROM TOP OF RETAINING WALL AND 2'-0" BELOW PROPOSED GROUND LINE.
2. FOOTING ADJUSTMENTS MADE TO ACCOMMODATE THE AVAILABLE OPTIONAL RETAINING WALLS WILL NOT BE MEASURED.
3. PROVIDE BACKFILL MEETING THE SPECIFICATIONS FOR BACKFILL, SELECT, TYPE A. CEMENT STABILIZED BACKFILL IS NOT PERMITTED.
4. PROVIDE EMBANKMENT EARTH REINFORCEMENTS WITH A LENGTH GREATER THAN OR EQUAL TO 80 PERCENT OF THE WALL HEIGHT OR 8', WHICHEVER IS LARGER.
5. FOR MSE WALL DETAILS SEE TXDOT STANDARD PLAN RW(MSE).
6. CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
7. FOR ADDITIONAL BORING DATA, SEE BORING LOCATION PLAN AND BORING LOF DATA SHEETS.





ELEVATION

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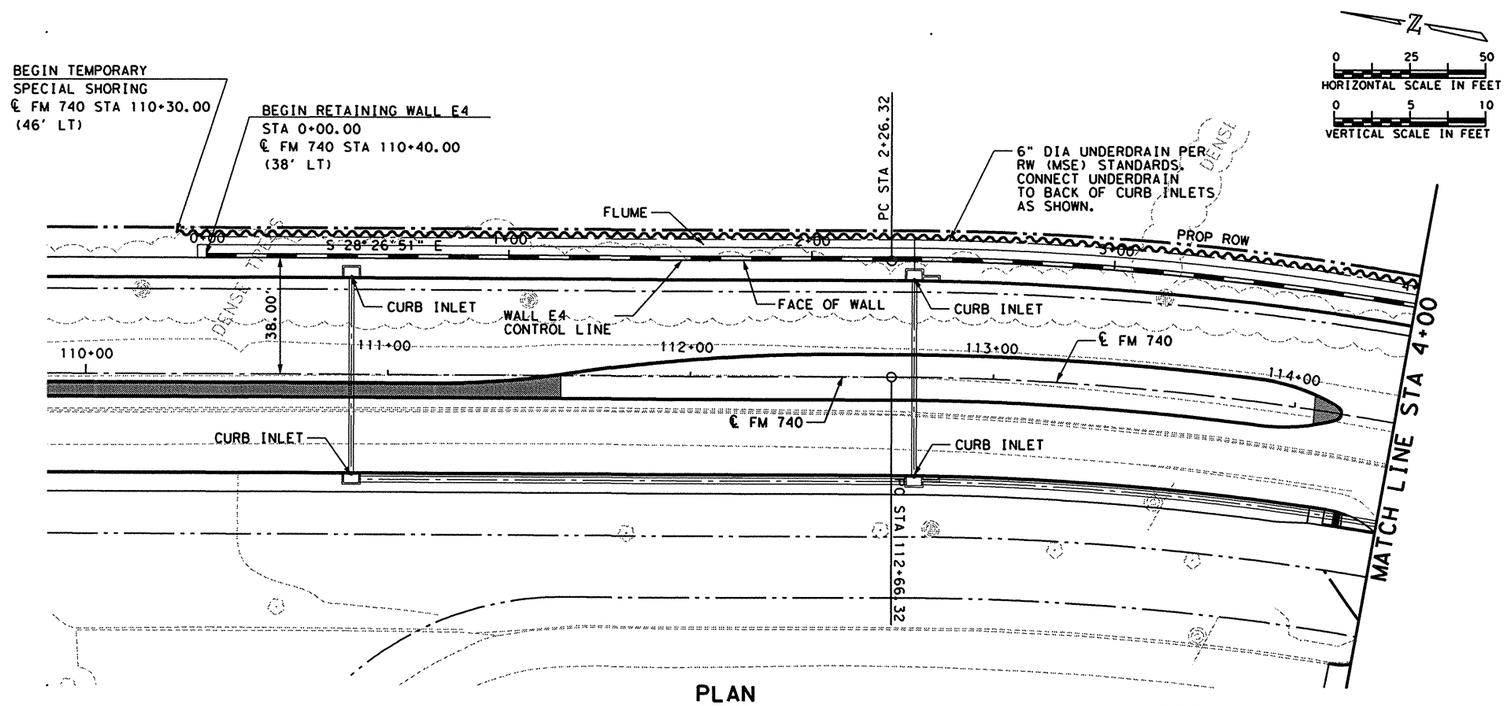
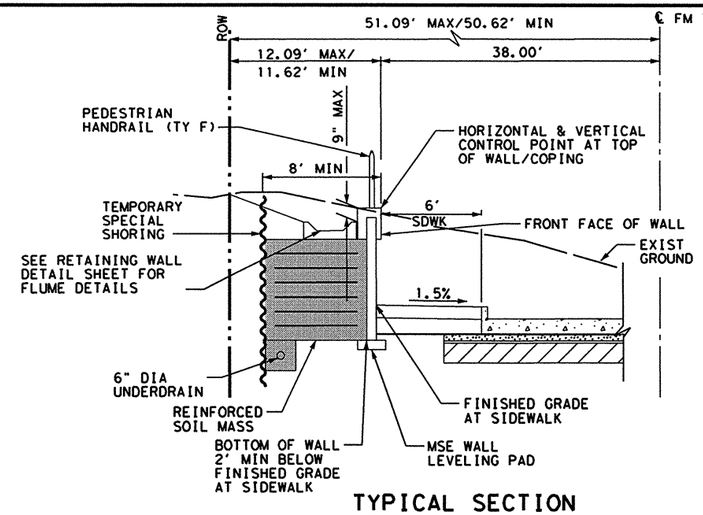
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
RETAINING WALL E3
PLAN AND PROFILE

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	191
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	



PLAN



TYPICAL SECTION

NTS

RETAINING WALL E4 CURVE DATA

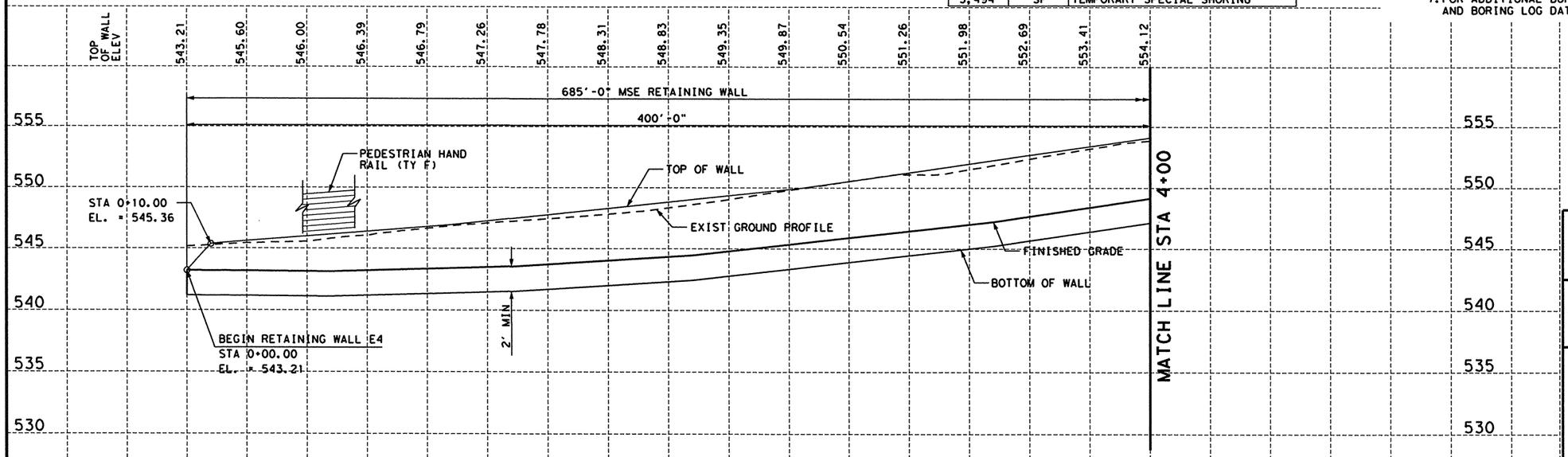
No.	Δ	R	T	L	D	PI STA
WALL E4	19° 12' 59.31" RT	1038.00'	175.72'	348.14'	5° 31' 11.37"	4+02.04

ESTIMATED QUANTITIES

QTY	UNIT	DESCRIPTION
4,121	SF	RETAINING WALL (MSE)
685	LF	RAIL (HANDRAIL) (TY F)
51.3	CY	RIPRAP CONC (FLUME)
5,494	SF	TEMPORARY SPECIAL SHORING

GENERAL NOTES:

1. SQUARE FOOT SURFACE AREA OF RETAINING WALL IS MEASURED FROM TOP OF RETAINING WALL AND 2'-0" BELOW PROPOSED GROUND LINE.
2. FOOTING ADJUSTMENTS MADE TO ACCOMMODATE THE AVAILABLE OPTIONAL RETAINING WALLS WILL NOT BE MEASURED.
3. PROVIDE BACKFILL MEETING THE SPECIFICATIONS FOR BACKFILL, SELECT, TYPE A. CEMENT STABILIZED BACKFILL IS NOT PERMITTED.
4. PROVIDE EMBANKMENT EARTH REINFORCEMENTS WITH A LENGTH GREATER THAN OR EQUAL TO 80 PERCENT OF THE WALL HEIGHT OR 8', WHICHEVER IS LARGER.
5. FOR MSE WALL DETAILS SEE TXDOT STANDARD PLAN RW(MSE).
6. CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
7. FOR ADDITIONAL BORING DATA, SEE BORING LOCATION PLAN AND BORING LOG DATA SHEETS.



ELEVATION

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
RETAINING WALL E4
PLAN AND PROFILE

SHEET 1 OF 2

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	192
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	

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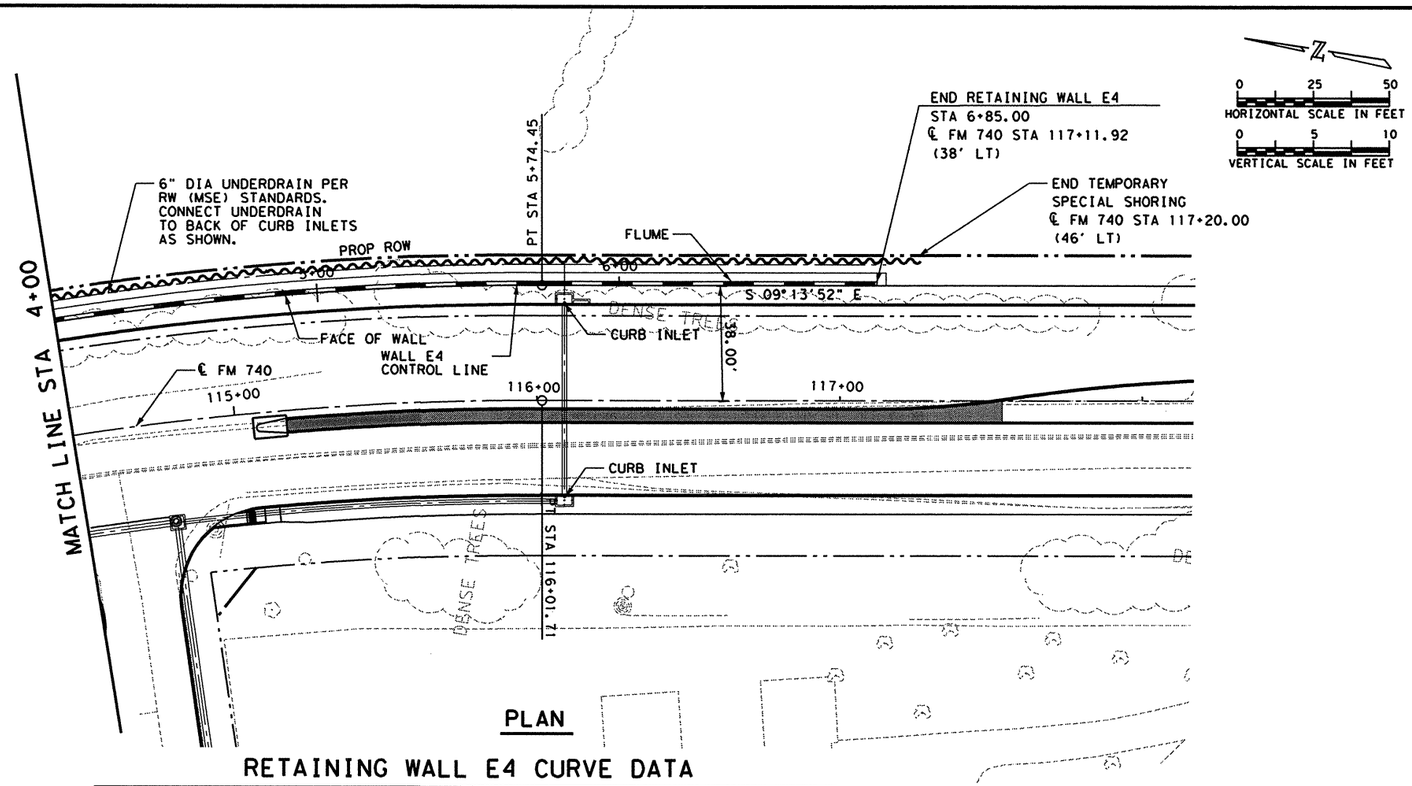
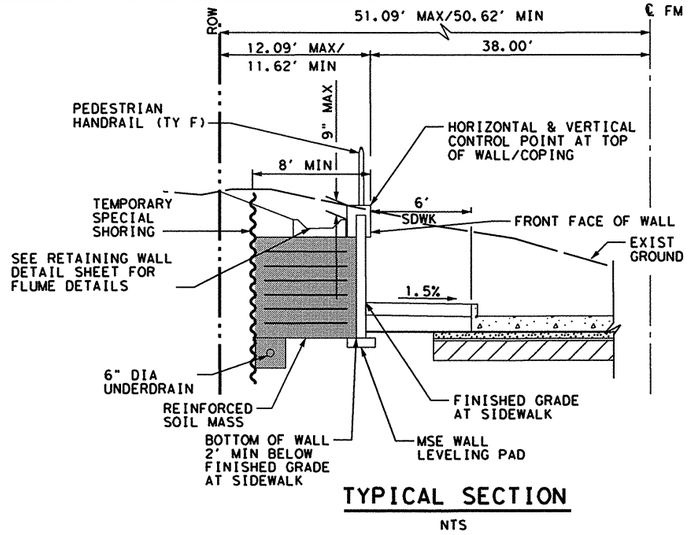


PLAN

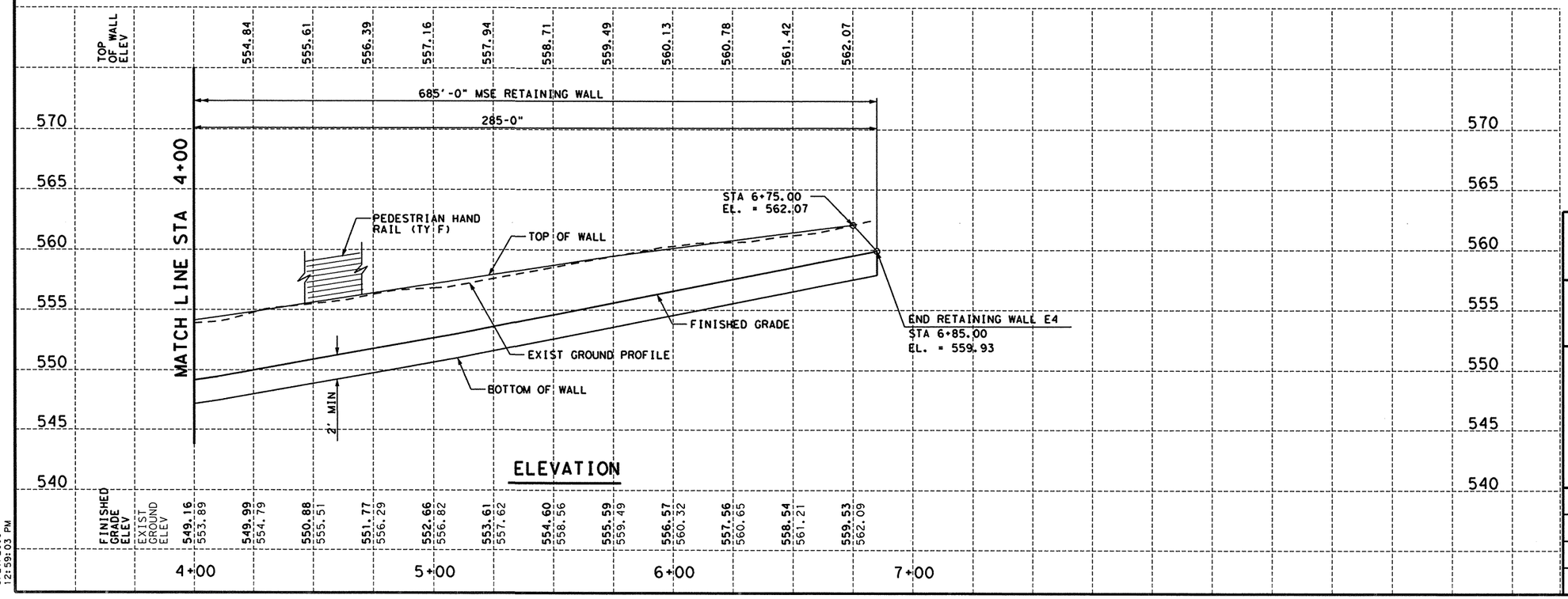


TYPICAL SECTION

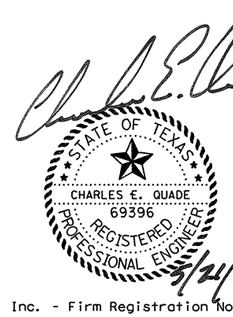
NTS

RETAINING WALL E4 CURVE DATA

No.	Δ	R	T	L	D	PI STA
WALL E4	19° 12' 59.31" RT	1038.00'	175.72'	348.14'	5° 31' 11.37"	4+02.04



ELEVATION



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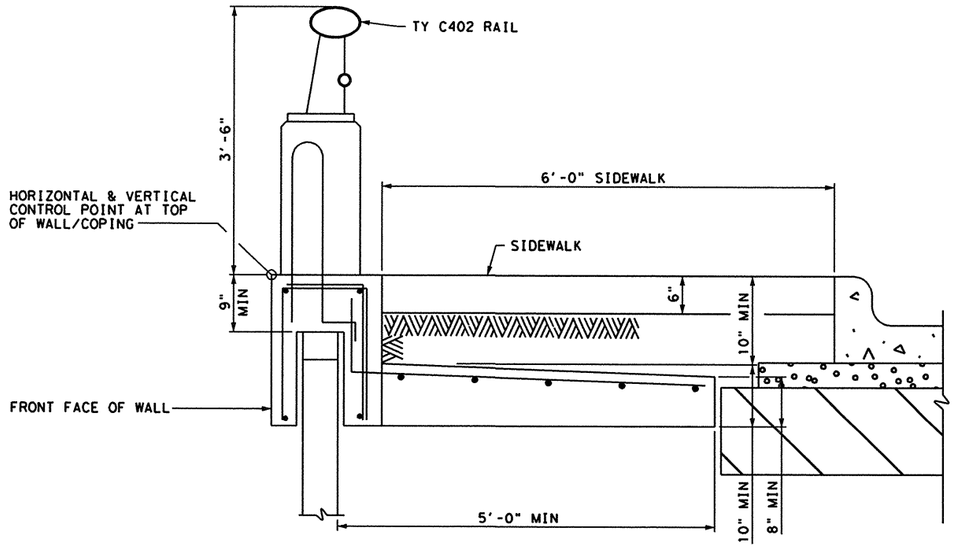
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
RETAINING WALL E4
PLAN AND PROFILE

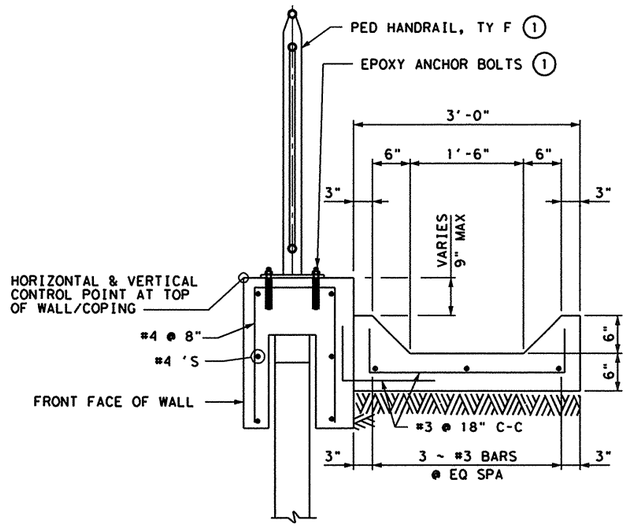
SHEET 2 OF 2

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	193
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	



SIDEWALK/COPING DETAIL

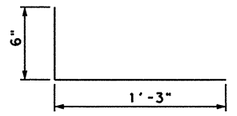
SCALE: ½"=1'-0"



(1) SEE TxDOT STD PRD-06 FOR DETAILS

COPING/CONCRETE FLUME DETAIL

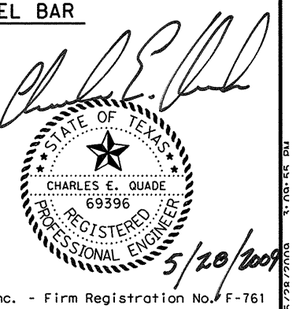
SCALE: ½"=1'-0"



#3 DOWEL BAR

GENERAL NOTES:

REFER TO THE RW(TRF) STANDARD FOR ADDITIONAL NOTES AND DETAILS.



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Texas Department of Transportation

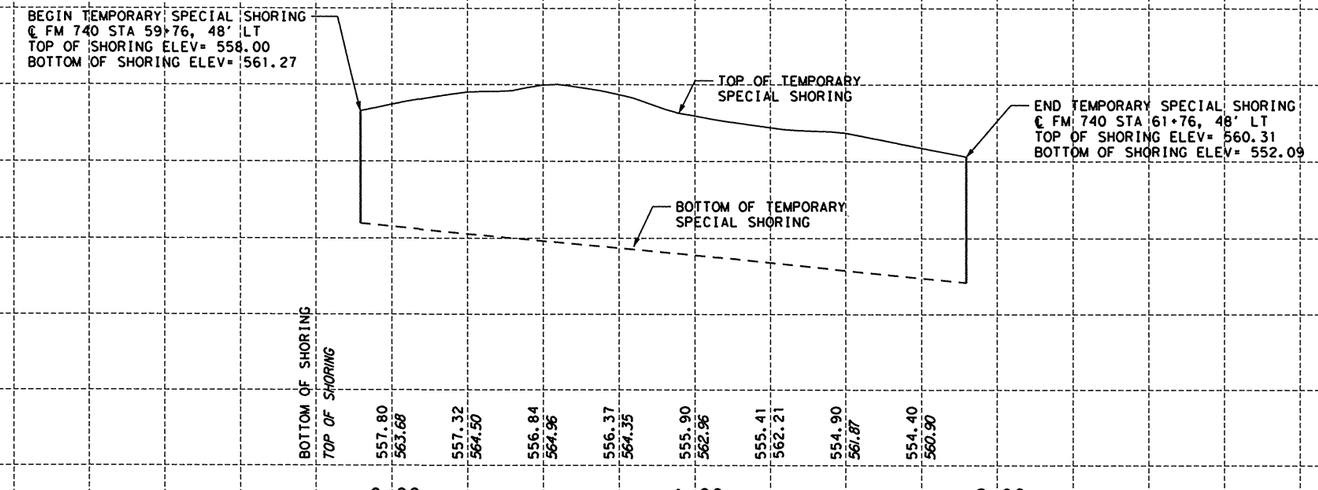
FM 740

RETAINING WALL MISCELLANEOUS DETAILS

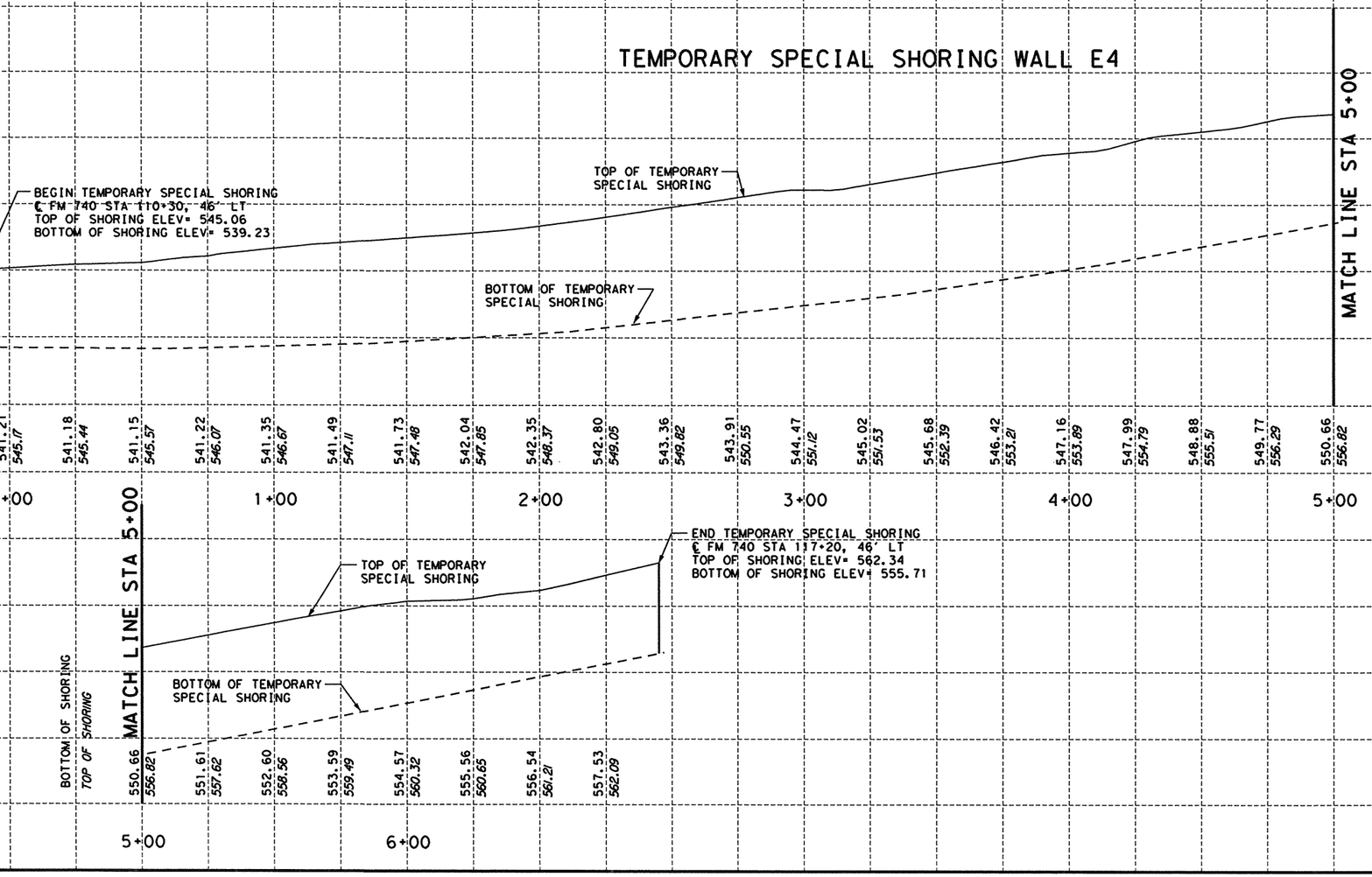
SHEET 1 OF 1

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS JBC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	194
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	

TEMPORARY SPECIAL SHORING WALL E2



TEMPORARY SPECIAL SHORING WALL E4



GENERAL NOTE:

SEE RETAINING WALL E2 AND E4 PLAN AND PROFILE DRAWINGS FOR TEMPORARY SPECIAL SHORING ESTIMATES QUANTITY

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED PROFESSIONAL ENGINEER
5/21/2009

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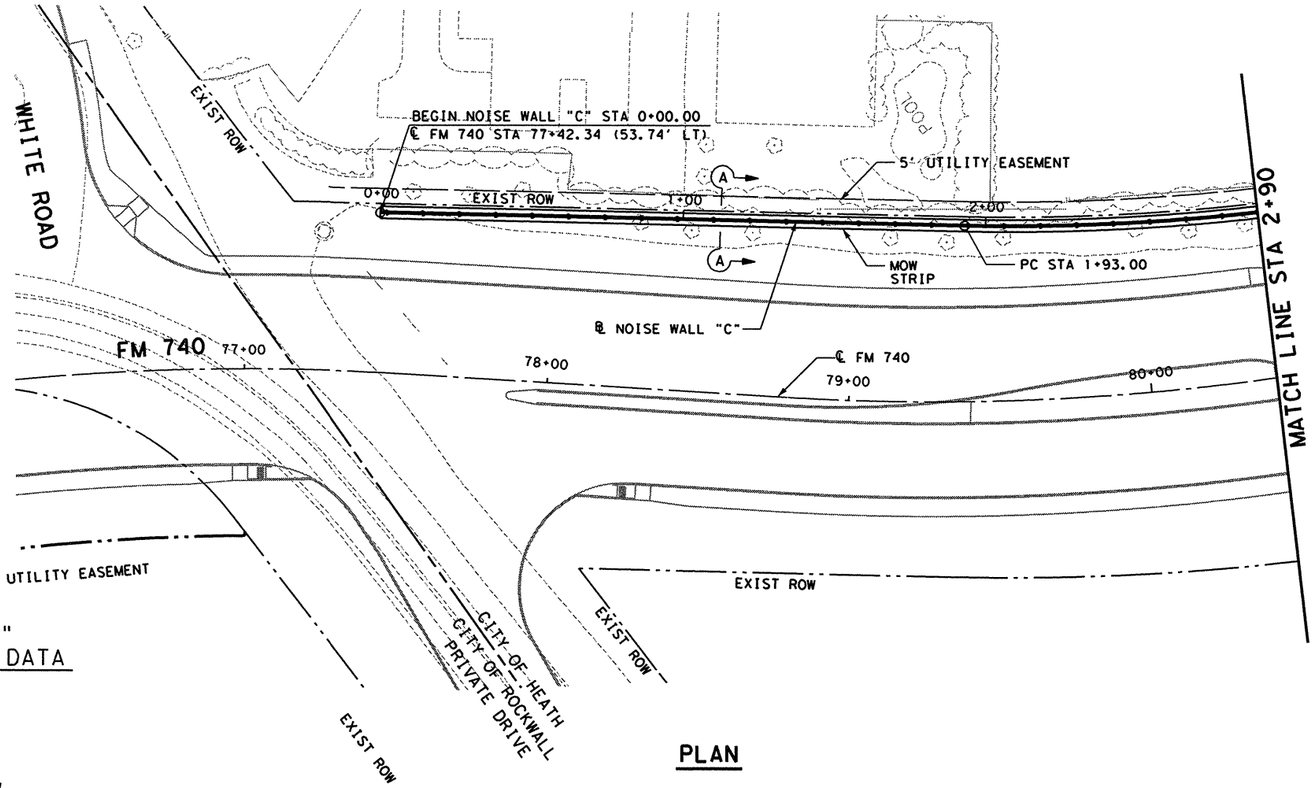
Texas Department of Transportation

FM 740
TEMPORARY SPECIAL SHORING

RETAINING WALLS E2 & E4

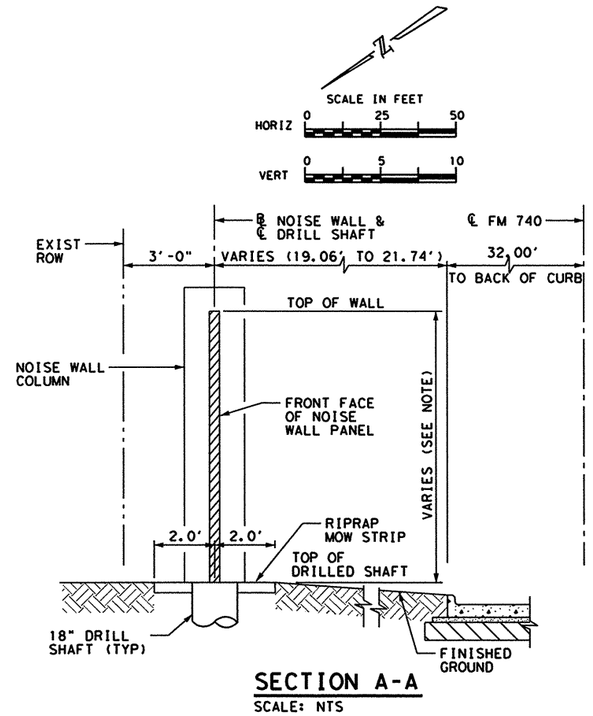
DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CEQ	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	195
CHECK CEQ	CONTROL	SECTION	JOB	
	1014	03	039	



PLAN

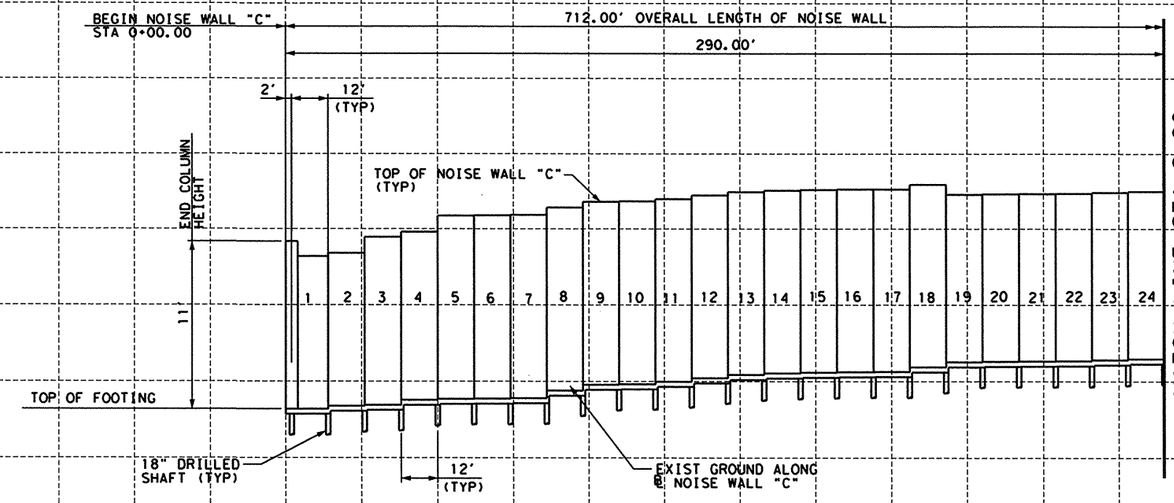
NOISE WALL "C" HORIZONTAL CURVE DATA

PI STA 4+53.25
Δ = 40°25'04.99" LT
D = 8°06'14.65"
R = 707.00'
T = 260.25'
L = 498.74'
PC STA 1+93.00
BK BRNG S 36°34'23.51" W
PT STA 6+91.74
AHD BRNG S 3°50'41.48" E



SECTION A-A
SCALE: NTS

NOTE:
SEE NOISE WALL DETAIL SHEET FOR WALL PANEL DATA AND DETAILS NOT SHOWN.



ELEVATION

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Texas Department of Transportation

FM 740
NOISE WALL "C"
PLAN & PROFILE

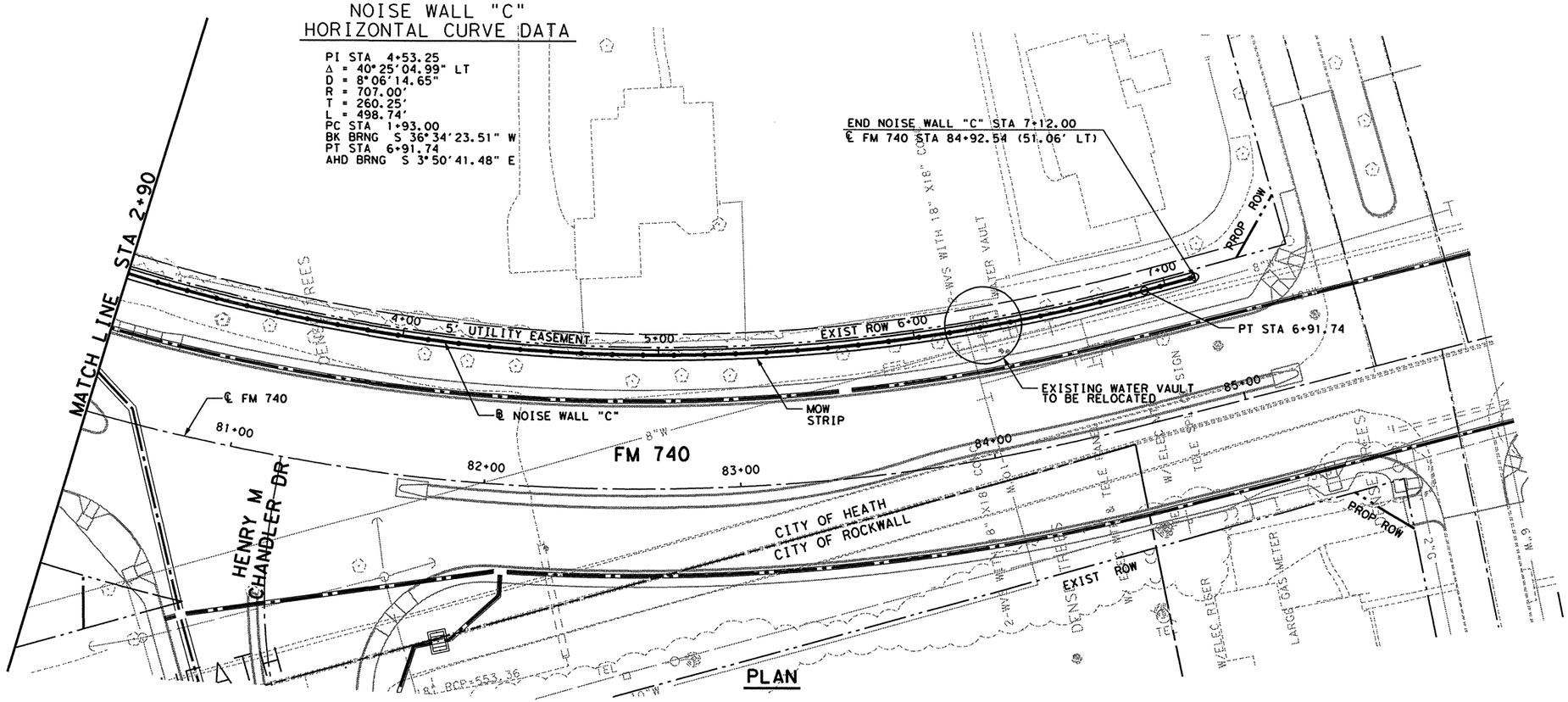
SCALE: H: 1"=50'
V: 1"=10'

SHEET 1 OF 2

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JAM	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CEQ	TEXAS	DALLAS	ROCKWALL	196
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	

NOISE WALL "C"
HORIZONTAL CURVE DATA

PI STA 4+53.25
Δ = 40°25'04.99" LT
D = 8°06'14.65"
R = 707.00'
T = 260.25'
L = 498.74'
PC STA 1+93.00
BK BRNG S 36°34'23.51" W
PT STA 6+91.74
AHD BRNG S 3°50'41.48" E



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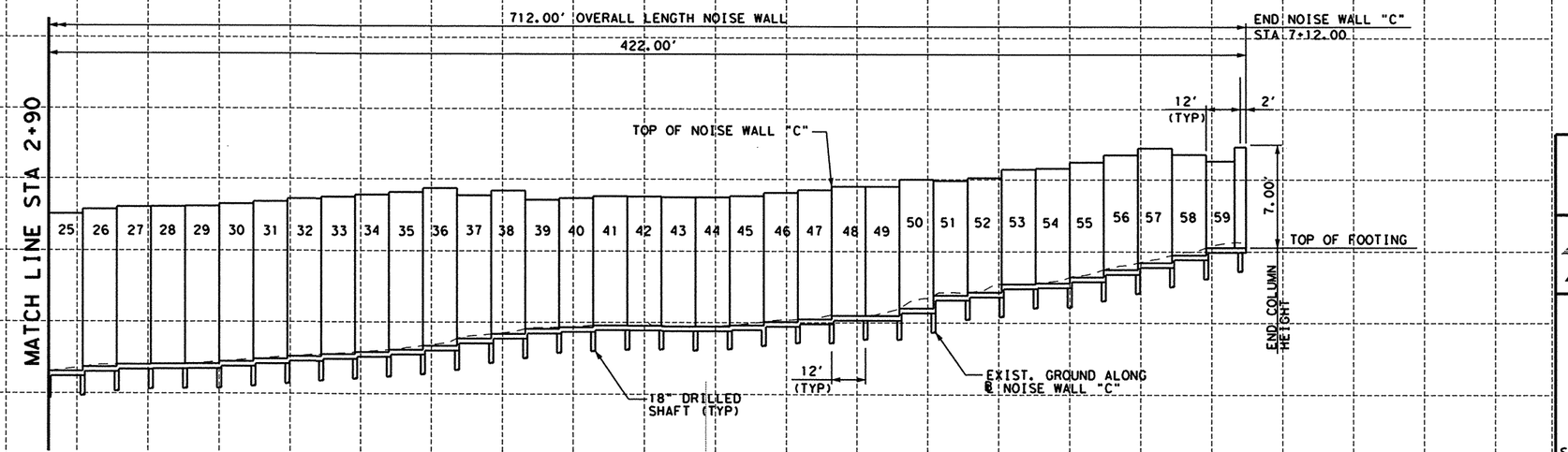
VERT 0 5 10



STATE OF TEXAS
JASON ARTHUR MARTWIG
99295
LICENSED PROFESSIONAL ENGINEER
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

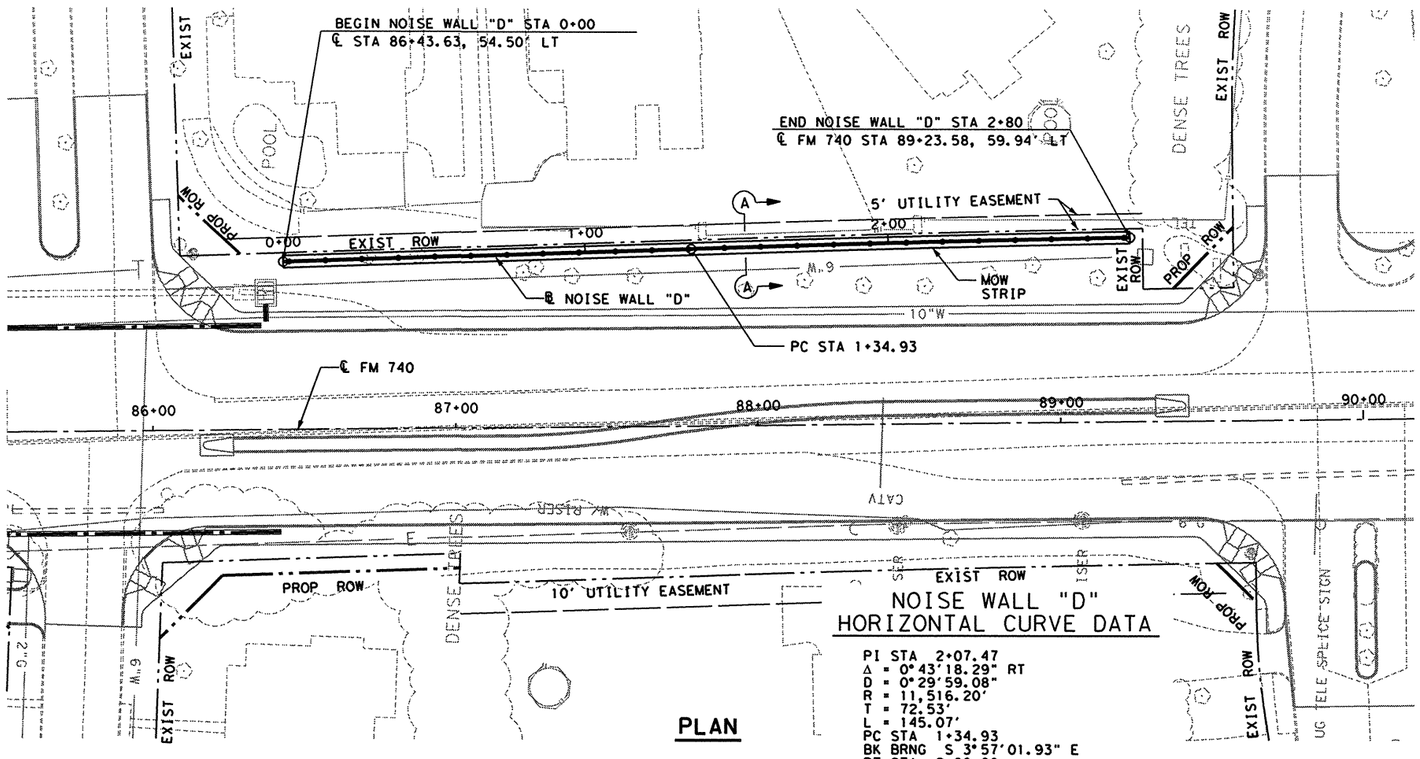
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
NOISE WALL "C"
PLAN & PROFILE

SCALE: H: 1"=50'
V: 1"=10'

SHEET 2 OF 2

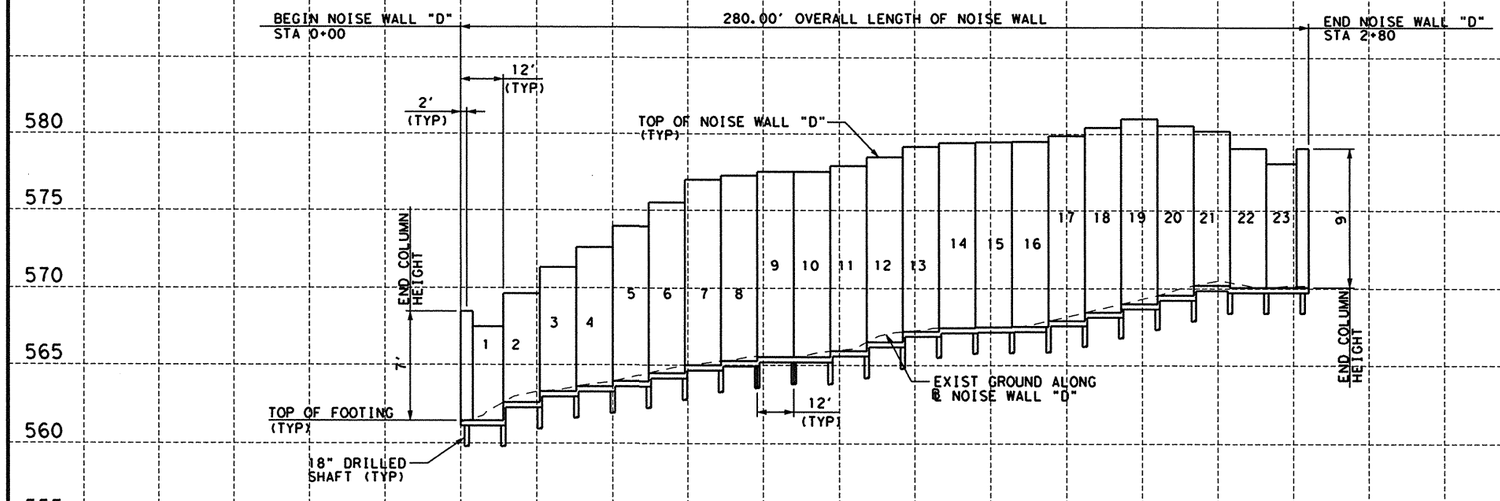
DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JAM	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CEQ	TEXAS	DALLAS	ROCKWALL	197
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	



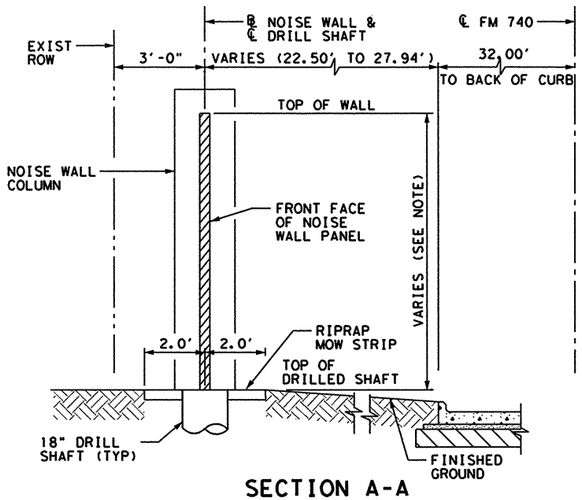
PLAN

NOISE WALL "D" HORIZONTAL CURVE DATA

PI STA 2+07.47
Δ = 0°43'18.29" RT
D = 0°29'59.08"
R = 11,516.20'
T = 72.53'
L = 145.07'
PC STA 1+34.93
BK BRNG S 3°57'01.93" E
PT STA 2+80.00
AHD BRNG S 3°13'43.64" E



ELEVATION



SECTION A-A

SCALE: NTS

NOTE:
SEE NOISE WALL DETAIL SHEET FOR WALL PANEL DATA AND DETAILS NOT SHOWN.

STATE OF TEXAS
JASON ARTHUR MARTWIG
99295
LICENSED PROFESSIONAL ENGINEER
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

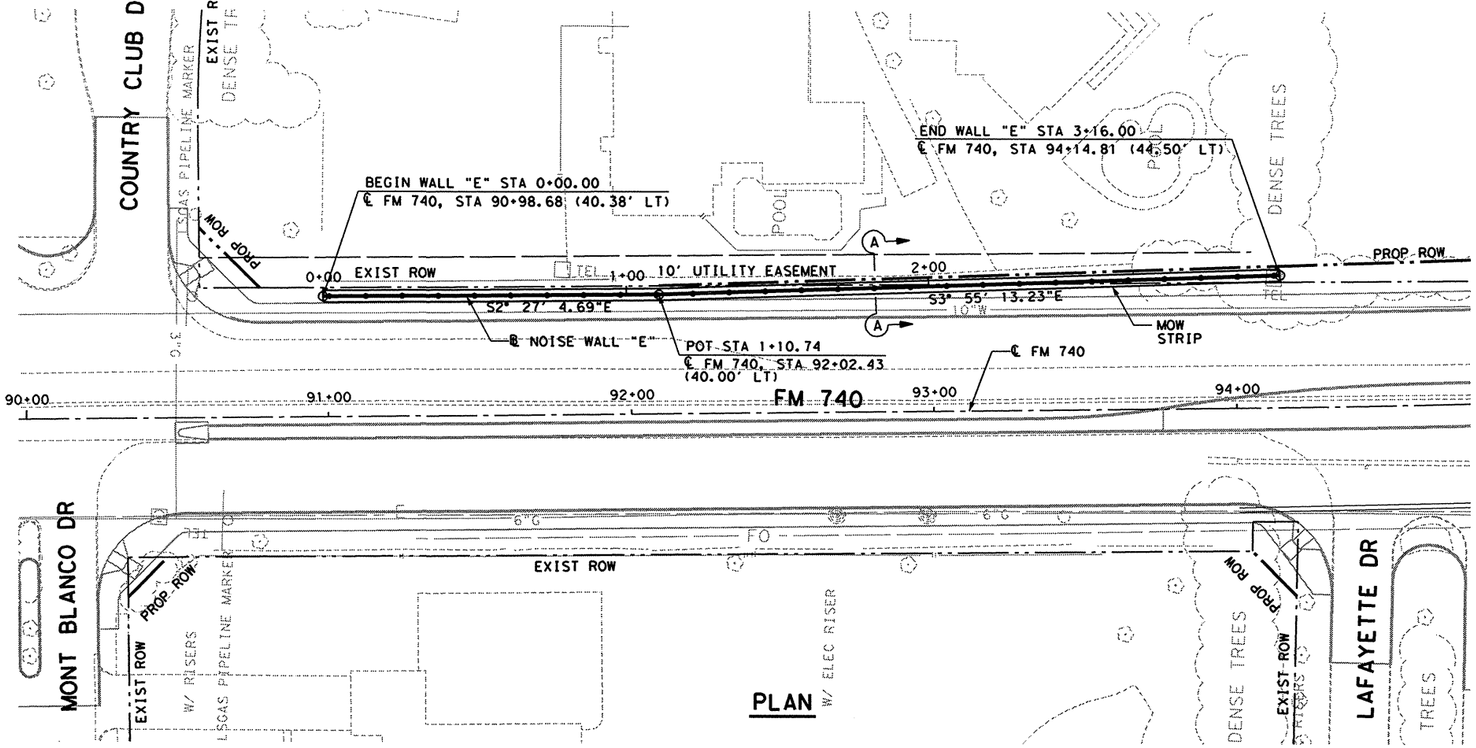
Texas Department of Transportation

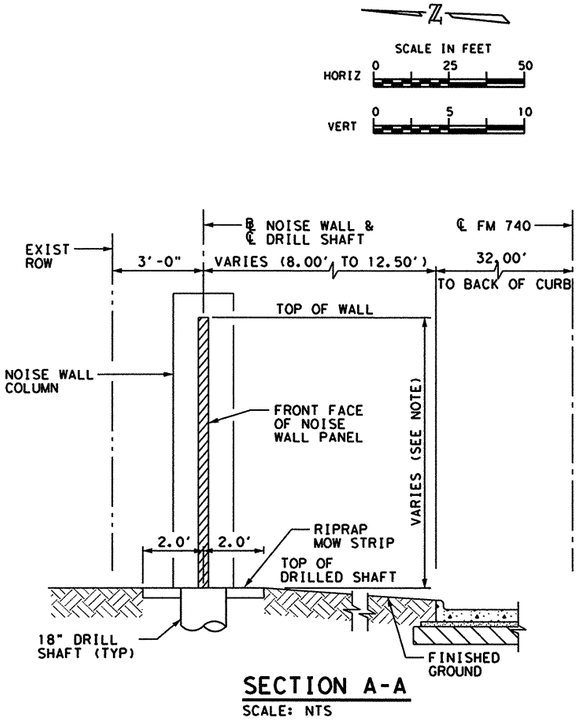
FM 740
NOISE WALL "D"
PLAN & PROFILE

SCALE: H: 1"=50'
V: 1"=10'

SHEET 1 OF 1

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JAM	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CEQ	TEXAS	DALLAS	ROCKWALL	198
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	

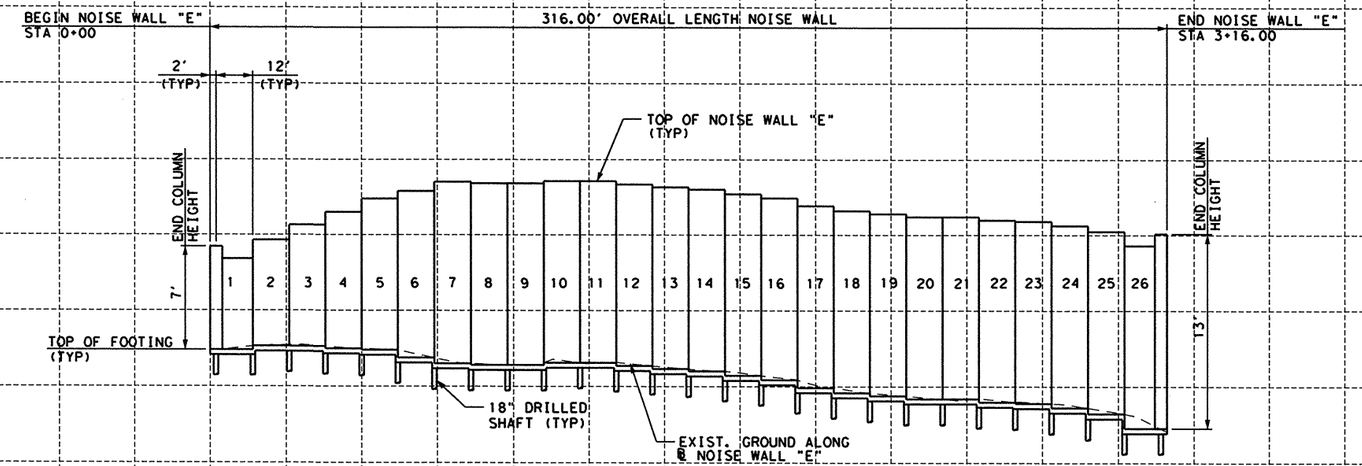




SECTION A-A

SCALE: NTS

NOTE:
SEE NOISE WALL DETAIL SHEET FOR WALL PANEL DATA AND DETAILS NOT SHOWN.



ELEVATION

Huitt-Zollars, Inc. - Firm Registration No. F-761

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3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
NOISE WALL "E"
PLAN & PROFILE

SCALE: H: 1"=50'
V: 1"=10'

SHEET 1 OF 1

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JAM	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CEQ	TEXAS	DALLAS	ROCKWALL	199
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	

ugorte
SCALE=1:50
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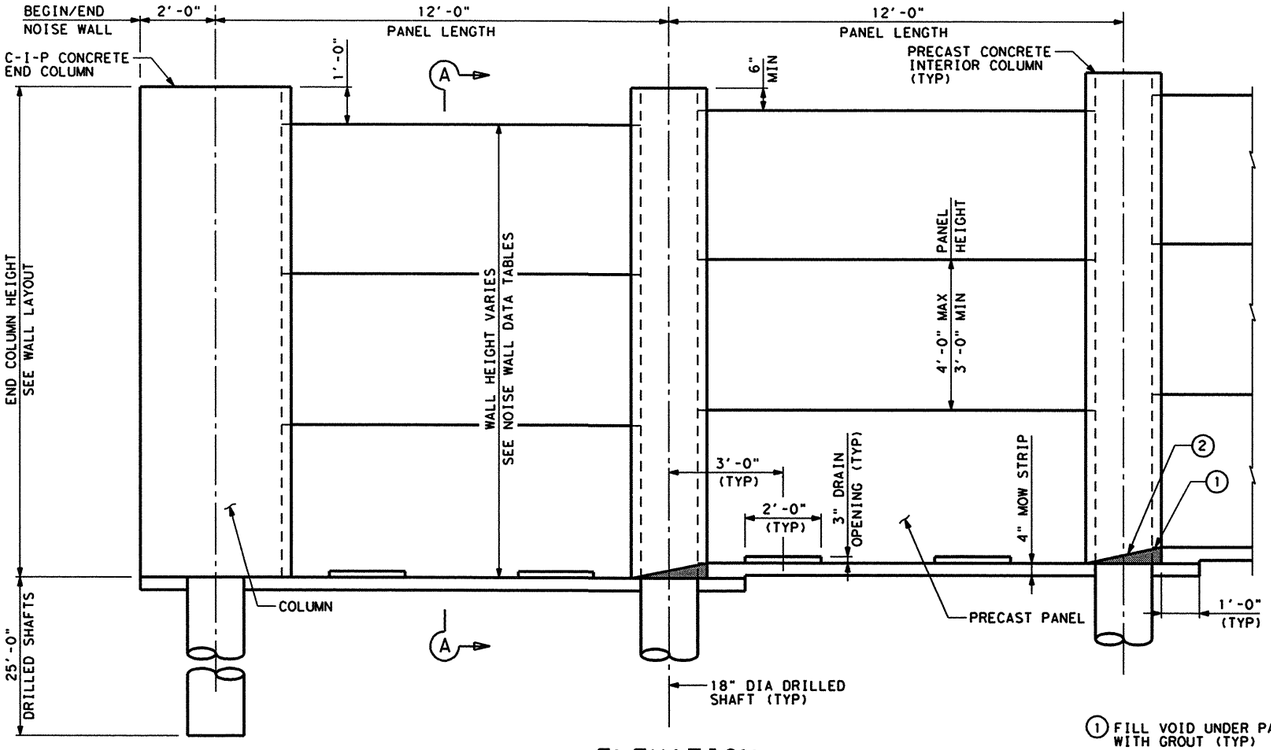
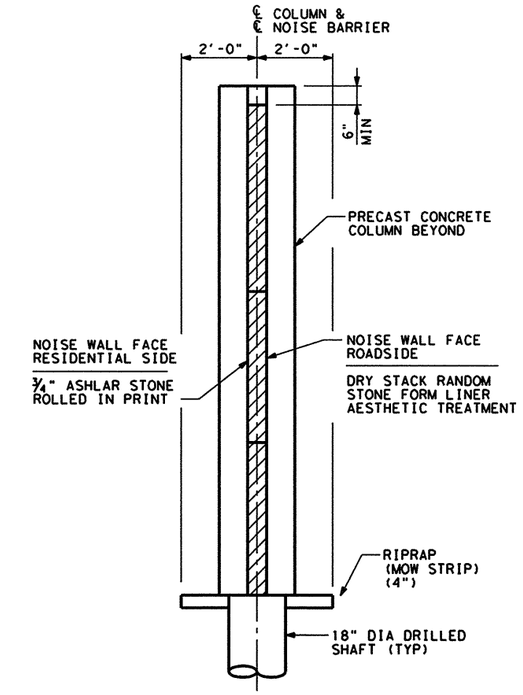


ELEVATION

SCALE: 1/4" = 1'-0"

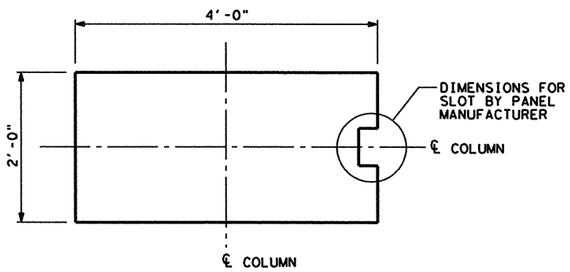


SECTION A-A

SCALE: 1/4" = 1'-0"

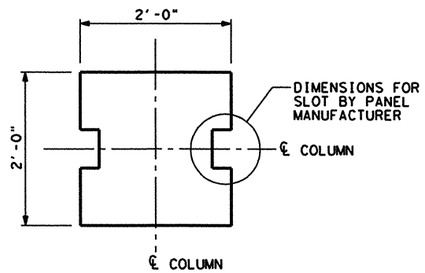
① FILL VOID UNDER PANEL WITH GROUT (TYP)

② 2'-0" LENGTH OF GROUT FOR STEPPED RIPRAP. SLOPE AS SHOWN FRONT/ BACK SIDE OF WALL



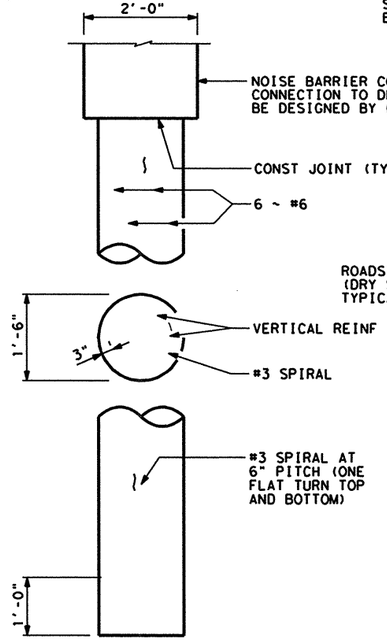
END COLUMN PLAN

SCALE: 1/2" = 1'-0"



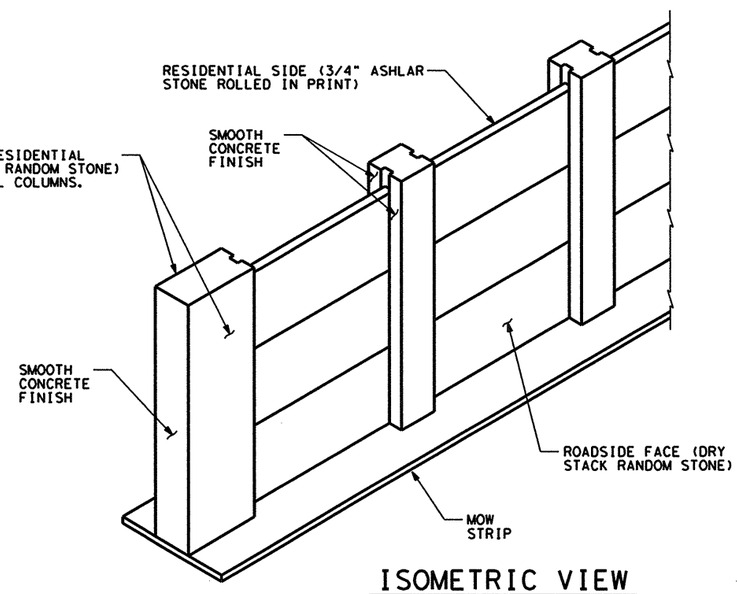
INTERIOR COLUMN PLAN

SCALE: 1/2" = 1'-0"



DRILLED SHAFT DETAIL

SCALE: 3/4" = 1'-0"



ISOMETRIC VIEW

ARCHITECTURAL FINISH NOTES:

ARCHITECTURAL CONCRETE TREATMENT WILL BE PLACED AS SHOWN AND WILL BE SUBSIDIARY TO THE BID ITEM.

THE ROADSIDE FACE OF THE NOISE BARRIER AND CONCRETE COLUMN WILL RECEIVE A DRY STACK RANDOM FORM LINER IN ACCORDANCE WITH THE FOLLOWING OR AN APPROVED EQUIVALENT:

GREEN STREAK FORM LINER NUMBER 328
"DRY STACK RANDOM STONE"

THE RESIDENTIAL FACE OF THE NOISE BARRIER WILL RECEIVE A 3/4" ASHLAR STONE ROLLED IN PRINT FINISH.

THE FORM LINERS WILL RELEASE WITHOUT LEAVING PIECES OF LINER MATERIAL ON THE CONCRETE AND WITHOUT PULLING OR BREAKING CONCRETE FROM THE TEXTURED SURFACE. FORM RELEASE AGENTS WILL BE AS RECOMMENDED BY THE MANUFACTURER. FORM LINERS THAT HAVE, IN THE OPINION OF THE ENGINEER, BECOME DAMAGED OR WORN WILL BE REPLACED BY THE CONTRACTOR. REPLACEMENT OF FORM LINERS WILL BE CONSIDERED INCIDENTAL TO THE WORK AND WILL NOT ENTITLE THE CONTRACTOR TO ADDITIONAL COMPENSATION.

AT LEAST TEN DAYS IN ADVANCE OF STARTING CONSTRUCTION OF THE TEXTURED CONCRETE SURFACES, THE CONTRACTOR WILL CONSTRUCT A TEST PANEL USING EACH TYPE OF FORM LINER AS APPROVED BY THE ENGINEER. THE PANELS WILL MEET REQUIREMENTS OF THE PLANS AND SPECIFICATIONS AND WILL BE APPROVED BY THE ENGINEER BEFORE ANY CONSTRUCTION FORM LINERS MAY BE ORDERED, OBTAINED OR USED. THE TEXTURED PORTION OF THE PANEL WILL BE AT LEAST 4'-0" BY 4'-0" WITH A REPRESENTATIVE UNTEXTURED SURROUNDING SURFACE. IF ORDERED BY THE ENGINEER, ADDITIONAL TEST PANELS WILL BE CONSTRUCTED AND FINISHED UNTIL A SATISFACTORY CONCRETE SURFACE TEXTURE IS OBTAINED.

THE TEST PANEL WILL THEN BE THE STANDARD OF COMPARISON FOR THE PRODUCTION CONCRETE SURFACE TEXTURE. IF REQUIRED BY THE ENGINEER, A NEW TEST PANEL WILL BE BUILT TO DEMONSTRATE ACCEPTABILITY OF ANY PROPOSED CHANGE IN CONSTRUCTION METHOD.

AREAS SHOWN TO RECEIVE SURFACE TEXTURE THAT DO NOT EXHIBIT THE SURFACE SPECIFIED WILL BE TOOLED OR REPLACED AT THE CONTRACTOR'S EXPENSE SO AS TO EXHIBIT THE SPECIFIED FINISH.

Huitt-Zollars, Inc. - Firm Registration No. F-761

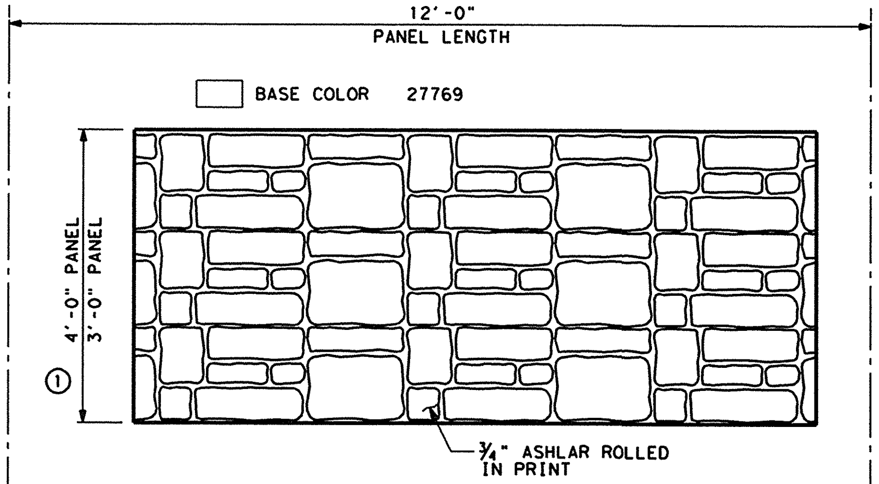
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

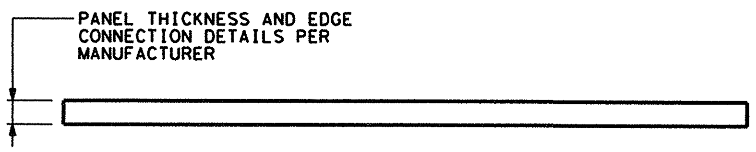
FM 740
NOISE WALL DETAILS

SHEET 1 OF 3

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JAM	6	SEE TITLE SHEET		FM 740
GRAPHICS KKQ	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CEQ	TEXAS	DALLAS	ROCKWALL	200
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	

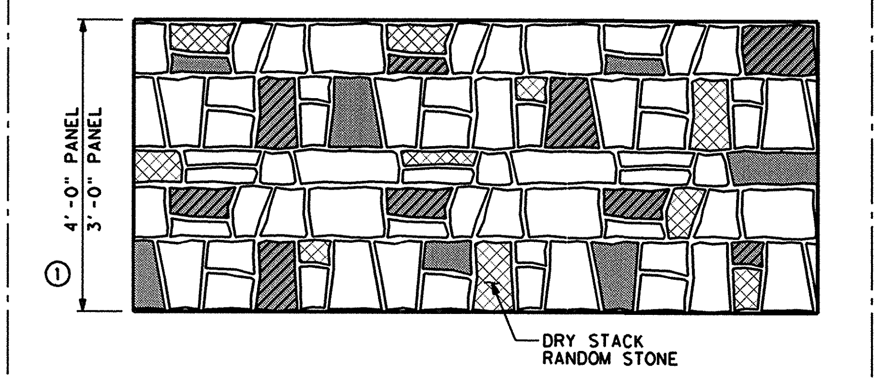


RESIDENTIAL VIEW
SCALE: ⅜" = 1'-0"

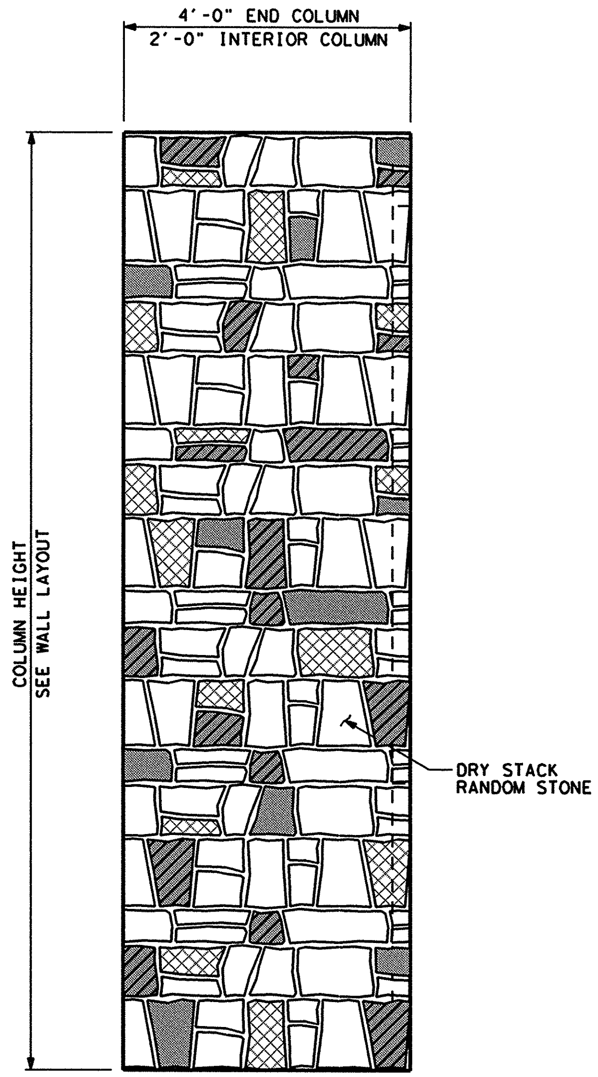


SECTION
SCALE: ⅜" = 1'-0"

BASE COLOR	27769
ROCK COLOR 1	20266
ROCK COLOR 2	20095
ROCK COLOR 3	23448

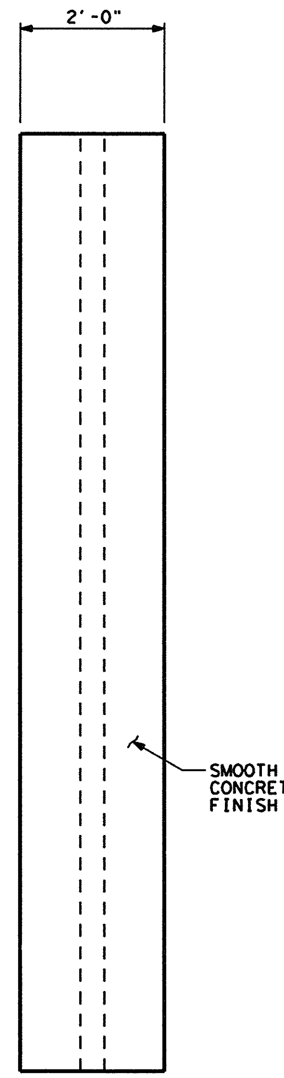


ROADSIDE VIEW
SCALE: ⅜" = 1'-0"



BASE COLOR	27769
ROCK COLOR 1	20266
ROCK COLOR 2	20095
ROCK COLOR 3	23448

FRONT/BACK VIEW



BASE COLOR 27769

END VIEW

COLUMN
SCALE: ⅜" = 1'-0"

① FORMLINER PATTERN SHALL BE FULL HEIGHT FOR BOTH A 36" AND A 48" PANEL. FOR A 36" PANEL HEIGHT, IT WILL NOT BE PERMISSIBLE TO CUT A 48" FORMLINER TO FIL A 36" PANEL HEIGHT.

FORMLINER PATTERN AND "ROCK" COLOR SCHEME IS FOR ILLUSTRATIVE PURPOSES ONLY AND IS NOT NECESSARILY REPRESENTATIVE OF THE ACTUAL FORMLINER.

COLOR FINISH NOTES:

THE NOISE WALL WILL HAVE THE FOLLOWING BASE COLOR APPLIED TO ALL EXPOSED CONCRETE SURFACES:

BASE COLOR 27769

ON TOP OF THE BASE COLOR, THE ROADSIDE OF THE COLUMNS AND PANELS WILL BE SPONGE PAINTED IN A RANDOM PATTERN TO MATCH THE EXISTING NEIGHBORHOOD NATURAL STONE WALLS. THE SECONDARY "ROCK" COLORS ARE:

- ROCK COLOR 1 20266 (APPROXIMATELY 10 %)
- ROCK COLOR 2 20095 (APPROXIMATELY 5 %)
- ROCK COLOR 3 23448 (APPROXIMATELY 15 %)

THE CONTRACTOR WILL VERIFY IN CONJUNCTION WITH THE ENGINEER THAT THE SPECIFIED COLORS ARE CONSISTENT WITH EXISTING NATURAL STONE WALLS PRIOR TO ORDERING MATERIALS.

FORMLINER WALL SHALL SIT 30 DAYS MIN PRIOR TO ANY COLOR APPLICATION. THE CONTRACTOR WILL APPLY THE SECONDARY "ROCK" COLORS TO ONE FULL HEIGHT NOISE WALL PANEL AND ADJACENT COLUMNS AS A REPRESENTATIVE PANEL FOR APPLYING THE SECONDARY "ROCK" COLORS. THIS REPRESENTATIVE PANEL WILL BE AGREED UPON BY TxDOT PRIOR TO COMPLETION OF THE REMAINING NOISE WALL PANELS FOR COLORING.

IT IS ESTIMATED THAT APPROXIMATELY 30 % OF THE ROADSIDE NOISE WALL SURFACE AREA WILL RECEIVE THE SECONDARY COLORS. COLOR TO BE APPLIED TO ENTIRE AREA OF AN INDIVIDUAL STONE.

ALL EXPOSED SURFACES TO RECEIVE A TYPE III ANTI-GRAFFITI COATING IN ACCORDANCE WITH DMS-8111.

STATE OF TEXAS
CHARLES E. QUADE
69396
REGISTERED PROFESSIONAL ENGINEER
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
NOISE WALL DETAILS

SHEET 2 OF 3

JAM	6	SEE TITLE SHEET		FM 740
KKQ				
CEQ	TEXAS	DALLAS	ROCKWALL	201
JAM	1014	03	039	

lgibson
SCALE: 1:4
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NOISE WALL "C" DATA TABLE

PANEL	BEGIN/END PANEL STATIONS		PANEL LENGTH FT	TOP OF FOOTING ELEV	TOP OF WALL ELEV	WALL HEIGHT FT	PANEL AREA SF
1	0+02.00	0+14.00	12	548.05	558.05	10	120
2	0+14.00	0+26.00	12	548.26	558.26	10	120
3	0+26.00	0+38.00	12	548.33	559.33	11	132
4	0+38.00	0+50.00	12	548.66	559.66	11	132
5	0+50.00	0+62.00	12	548.73	560.73	12	144
6	0+62.00	0+74.00	12	548.74	560.74	12	144
7	0+74.00	0+86.00	12	548.77	560.77	12	144
8	0+86.00	0+98.00	12	549.28	561.28	12	144
9	0+98.00	1+10.00	12	549.65	561.65	12	144
10	1+10.00	1+22.00	12	549.70	561.70	12	144
11	1+22.00	1+34.00	12	549.85	561.85	12	144
12	1+34.00	1+46.00	12	550.10	562.10	12	144
13	1+46.00	1+58.00	12	550.31	562.31	12	144
14	1+58.00	1+70.00	12	550.41	562.41	12	144
15	1+70.00	1+82.00	12	550.47	562.47	12	144
16	1+82.00	1+94.00	12	550.50	562.50	12	144
17	1+94.00	2+06.00	12	550.50	562.50	12	144
18	2+06.00	2+18.00	12	550.81	562.81	12	144
19	2+18.00	2+30.00	12	551.15	562.15	11	132
20	2+30.00	2+42.00	12	551.18	562.18	11	132
21	2+42.00	2+54.00	12	551.19	562.19	11	132
22	2+54.00	2+66.00	12	551.21	562.21	11	132
23	2+66.00	2+78.00	12	551.28	562.28	11	132
24	2+78.00	2+90.00	12	551.34	562.34	11	132
25	2+90.00	3+02.00	12	551.53	562.53	11	132
26	3+02.00	3+14.00	12	551.84	562.84	11	132
27	3+14.00	3+26.00	12	552.00	563.00	11	132
28	3+26.00	3+38.00	12	552.03	563.03	11	132
29	3+38.00	3+50.00	12	552.06	563.06	11	132
30	3+50.00	3+62.00	12	552.22	563.22	11	132
31	3+62.00	3+74.00	12	552.40	563.40	11	132
32	3+74.00	3+86.00	12	552.59	563.59	11	132
33	3+86.00	3+98.00	12	552.73	563.73	11	132
34	3+98.00	4+10.00	12	552.88	563.88	11	132
35	4+10.00	4+22.00	12	553.05	564.05	11	132
36	4+22.00	4+34.00	12	553.34	564.34	11	132
37	4+34.00	4+46.00	12	553.83	563.83	10	120
38	4+46.00	4+58.00	12	554.17	564.17	10	120
39	4+58.00	4+70.00	12	554.54	563.54	9	108
40	4+70.00	4+82.00	12	554.66	563.66	9	108
41	4+82.00	4+94.00	12	554.78	563.78	9	108
42	4+94.00	5+06.00	12	554.77	563.77	9	108
43	5+06.00	5+18.00	12	554.72	563.72	9	108
44	5+18.00	5+30.00	12	554.72	563.72	9	108
45	5+30.00	5+42.00	12	554.81	563.81	9	108
46	5+42.00	5+54.00	12	555.05	564.05	9	108
47	5+54.00	5+66.00	12	555.25	564.25	9	108
48	5+66.00	5+78.00	12	555.49	564.49	9	108
49	5+78.00	5+90.00	12	555.49	564.49	9	108
50	5+90.00	6+02.00	12	556.00	565.00	9	108
51	6+02.00	6+14.00	12	556.91	564.91	8	96
52	6+14.00	6+26.00	12	557.11	565.11	8	96
53	6+26.00	6+38.00	12	557.71	565.71	8	96
54	6+38.00	6+50.00	12	557.77	565.77	8	96
55	6+50.00	6+62.00	12	558.21	566.21	8	96
56	6+62.00	6+74.00	12	558.73	566.73	8	96
57	6+74.00	6+86.00	12	559.21	567.21	8	96
58	6+86.00	6+98.00	12	559.76	566.76	7	84
59	6+98.00	7+10.00	12	560.29	566.29	6	72
		TOTAL	708			TOTAL	7260

NOISE WALL "D" DATA TABLE

PANEL	BEGIN/END PANEL STATIONS		PANEL LENGTH FT	TOP OF FOOTING ELEV	TOP OF WALL ELEV	WALL HEIGHT FT	PANEL AREA SF
1	0+02.00	0+14.00	12	561.47	567.47	6	72
2	0+14.00	0+26.00	12	562.63	569.63	7	84
3	0+26.00	0+38.00	12	563.34	571.34	8	96
4	0+38.00	0+50.00	12	563.65	572.65	9	108
5	0+50.00	0+62.00	12	563.98	573.98	10	120
6	0+62.00	0+74.00	12	564.50	575.50	11	132
7	0+74.00	0+86.00	12	565.00	577.00	12	144
8	0+86.00	0+98.00	12	565.26	577.26	12	144
9	0+98.00	1+10.00	12	565.52	577.52	12	144
10	1+10.00	1+22.00	12	565.52	577.52	12	144
11	1+22.00	1+34.00	12	565.90	577.90	12	144
12	1+34.00	1+46.00	12	566.48	578.48	12	144
13	1+46.00	1+58.00	12	567.18	579.18	12	144
14	1+58.00	1+70.00	12	567.43	579.43	12	144
15	1+70.00	1+82.00	12	567.47	579.47	12	144
16	1+82.00	1+94.00	12	567.51	579.51	12	144
17	1+94.00	2+06.00	12	567.88	579.88	12	144
18	2+06.00	2+18.00	12	568.44	580.44	12	144
19	2+18.00	2+30.00	12	569.00	581.00	12	144
20	2+30.00	2+42.00	12	569.56	580.56	11	132
21	2+42.00	2+54.00	12	570.21	580.21	10	120
22	2+54.00	2+66.00	12	570.07	579.07	9	108
23	2+66.00	2+78.00	12	570.07	578.07	8	96
		TOTAL	276			TOTAL	2940

NOISE WALL "E" DATA TABLE

PANEL	BEGIN/END PANEL STATIONS		PANEL LENGTH FT	TOP OF FOOTING ELEV	TOP OF WALL ELEV	WALL HEIGHT FT	PANEL AREA SF
1	0+02.00	0+14.00	12	572.41	578.41	6	72
2	0+14.00	0+26.00	12	572.65	579.65	7	84
3	0+26.00	0+38.00	12	572.63	580.63	8	96
4	0+38.00	0+50.00	12	572.50	581.50	9	108
5	0+50.00	0+62.00	12	572.40	582.40	10	120
6	0+62.00	0+74.00	12	571.89	582.89	11	132
7	0+74.00	0+86.00	12	571.50	583.50	12	144
8	0+86.00	0+98.00	12	571.41	583.41	12	144
9	0+98.00	1+10.00	12	571.41	583.41	12	144
10	1+10.00	1+22.00	12	571.56	583.56	12	144
11	1+22.00	1+34.00	12	571.55	583.55	12	144
12	1+34.00	1+46.00	12	571.35	583.35	12	144
13	1+46.00	1+58.00	12	571.16	583.16	12	144
14	1+58.00	1+70.00	12	571.00	583.00	12	144
15	1+70.00	1+82.00	12	570.72	582.72	12	144
16	1+82.00	1+94.00	12	570.44	582.44	12	144
17	1+94.00	2+06.00	12	569.93	581.93	12	144
18	2+06.00	2+18.00	12	569.59	581.59	12	144
19	2+18.00	2+30.00	12	569.39	581.39	12	144
20	2+30.00	2+42.00	12	569.18	581.18	12	144
21	2+42.00	2+54.00	12	569.18	581.18	12	144
22	2+54.00	2+66.00	12	568.98	580.98	12	144
23	2+66.00	2+78.00	12	568.90	580.90	12	144
24	2+78.00	2+90.00	12	568.60	580.60	12	144
25	2+90.00	3+02.00	12	568.22	580.22	12	144
26	3+02.00	3+14.00	12	567.28	579.28	12	144
		TOTAL	312			TOTAL	3492

GENERAL NOTES

NOISE BARRIER SHALL BE DESIGNED IN ACCORDANCE WITH AASHTO GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS.

MEASUREMENT AND PAYMENT OF NOISE WALLS SHALL BE IN ACCORDANCE WITH ITEM SS5296 "NOISE WALLS".

PRECAST BARRIER SEGMENTS MAY BE CAST FULL HEIGHT IN LIEW OF USING THE INDICATED 3 AND 4' PANELS. THE WALL MAY BE CAST MONOLITHICALLY WITH THE COLUMN. SEGMENTALLY PRECAST COLUMN JOINTS SHALL BE GROUTED.

ALL EXPOSED STEEL PARTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE ITEM "GALVANIZING".

THE NOISE BARRIER SHALL BE DESIGNED TO WITHSTAND A MINIMUM WIND SPEED OF 100 MILES PER HOUR, AND SHALL BE DESIGNED OF EXPOSURE B2.

ALL CONNECTIONS OF THE NOISE BARRIER TO THE FOUNDATIONS SHALL BE DESIGNED USING A FACTOR OF SAFETY OF TWO (2) AGAINST WIND LOAD ALONE, IN ADDITION TO OTHER LOAD COMBINATIONS SPECIFIED. ALL CONNECTIONS UTILIZING THREADED RODS OR ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF THE ITEM "ANCHOR BOLTS". ALL CONNECTIONS UTILIZING POST TENSIONING SHALL CONFORM TO THE REQUIREMENTS OF THE ITEM "PRESTRESSING". NO UNGROUTED TENDONS WILL BE ALLOWED, EXCEPT PRESTRESSING USED TO TEMPORARILY SECURE THE WALL.

WIRE MESH MAY BE USED IN LIEU OF DEFORMED BARS.

ALL DRILLED SHAFT CONCRETE SHALL BE CLASS "C".
ALL REINFORCING STEEL SHALL BE GRADE 60.

STATE OF TEXAS
JASON ARTHUR MARTWIG
99295
LICENSED PROFESSIONAL ENGINEER
5/21/2009

Huitt-Zollars, Inc. - Firm Registration No. F-761

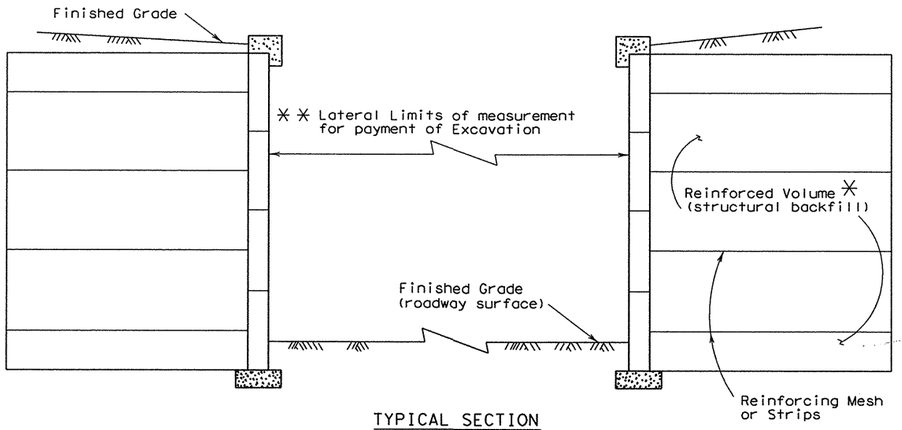
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
NOISE WALL DETAILS

SHEET 3 OF 3

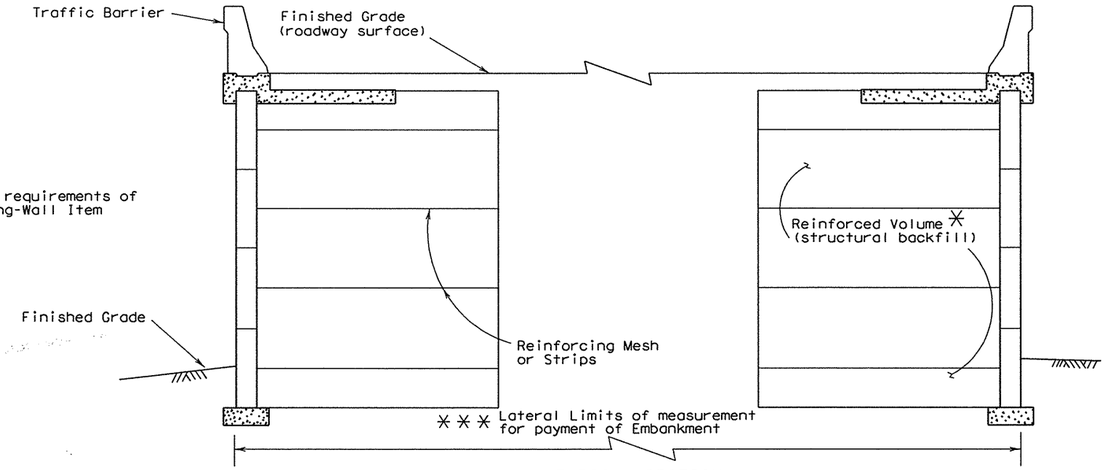
DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JAM	6	SEE TITLE SHEET		FM 740
GRAPHICS LEG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CEQ	TEXAS	DALLAS	ROCKWALL	202
CHECK JAM	CONTROL	SECTION	JOB	
	1014	03	039	



TYPICAL SECTION

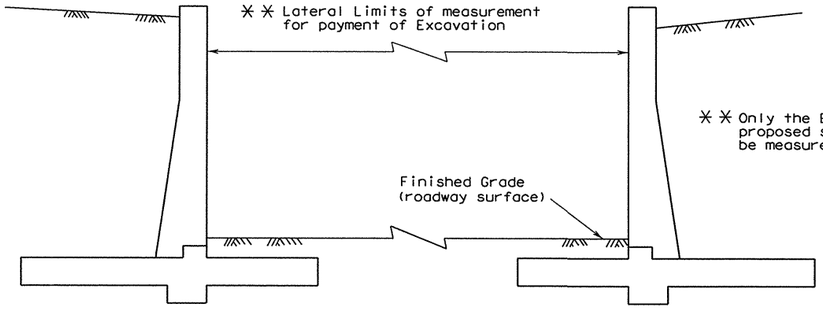
Excavation Between Retained Earth or Reinforced Earth Retaining Walls

⁑ Meeting requirements of Retaining-Wall Item



TYPICAL SECTION

Embankment Between Retained Earth or Reinforced Earth Retaining Walls

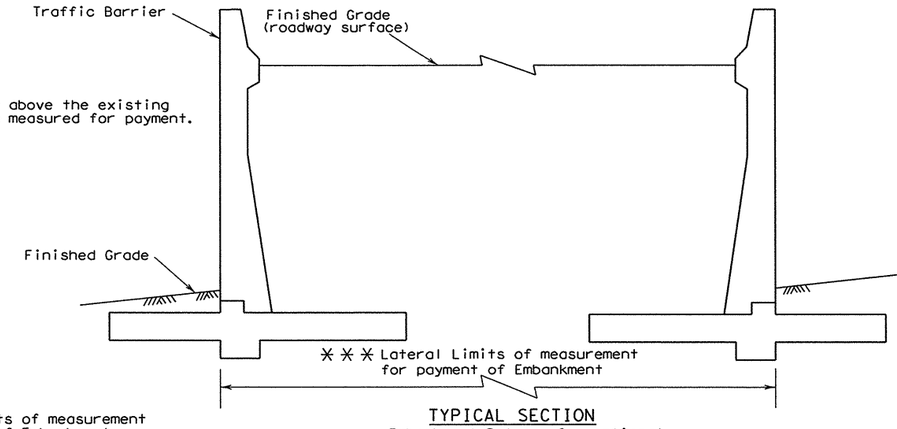


⁑⁑ Only the Excavation above the proposed subgrade elevation will be measured for payment.

TYPICAL SECTION

Excavation Between Conventional Retaining Walls

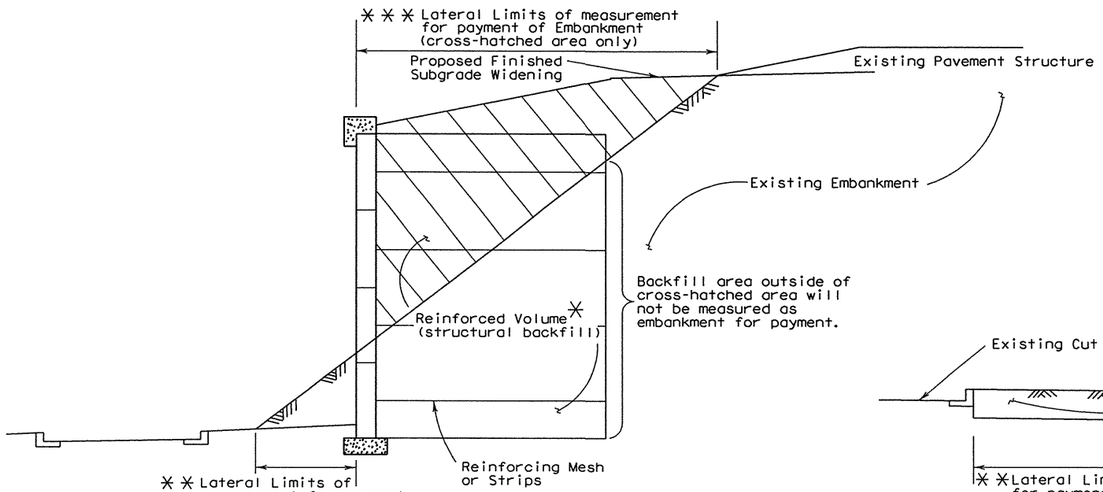
Earthwork measurement with other designs of retaining walls will be made to the outside finished face in the same manner.



⁑⁑⁑ Only the Embankment above the existing ground line will be measured for payment.

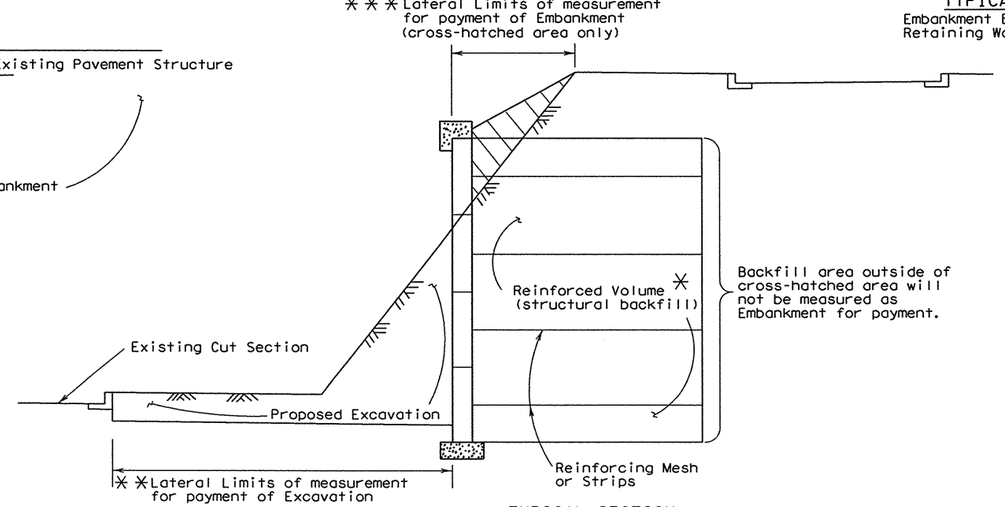
TYPICAL SECTION

Embankment Between Conventional Retaining Walls



TYPICAL SECTION

Widening Embankment with Retained Earth or Reinforced Earth Retaining Walls



TYPICAL SECTION

Widening Cut Section with Retained Earth or Reinforced Earth Retaining Walls

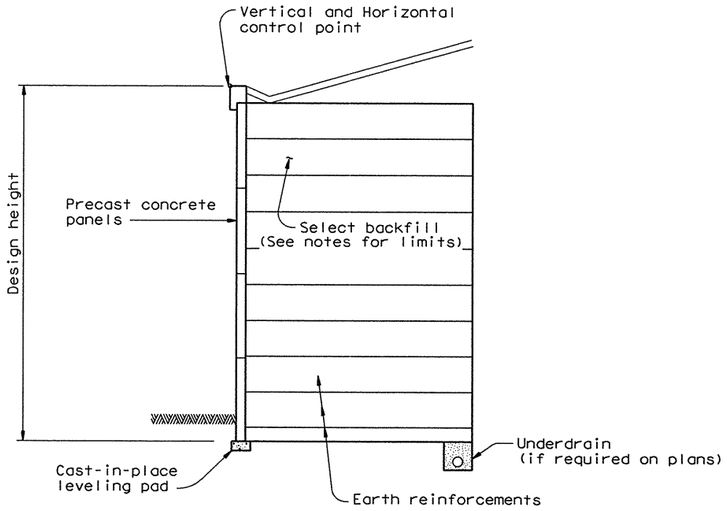
Texas Department of Transportation
Design Division (Roadway)

EARTHWORK MEASUREMENT AT RETAINING WALLS

EMRW-94

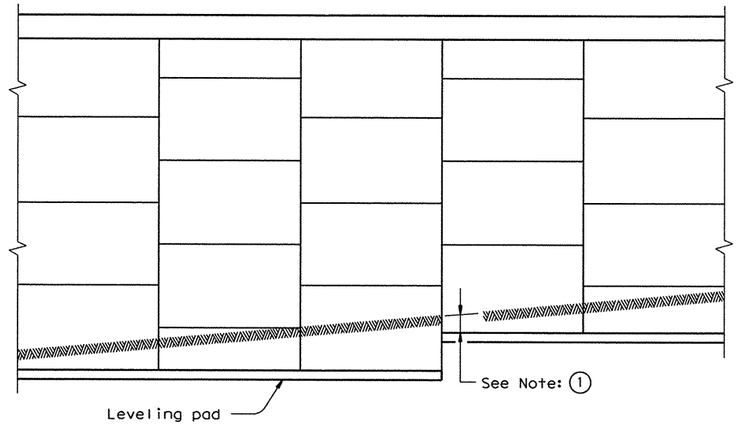
ORIG DRAW DATE: MARCH 1994	DN: TGM	CK: TGM	DW: BGD	CK:		
©TxDOT 1994	DISTRICT	FEDERAL AID PROJECT				SHEET
MODIFICATIONS	DALLAS	(SEE TITLE SHEET)				203
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

LEVELS DISPLAYED
1



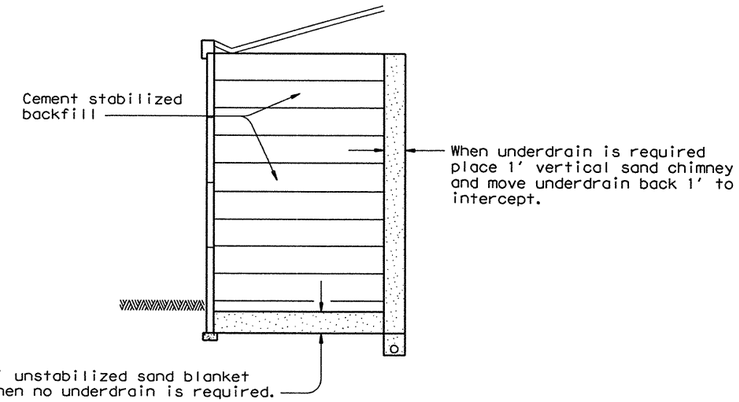
TYPICAL SECTION

(Wall at bottom of slope)



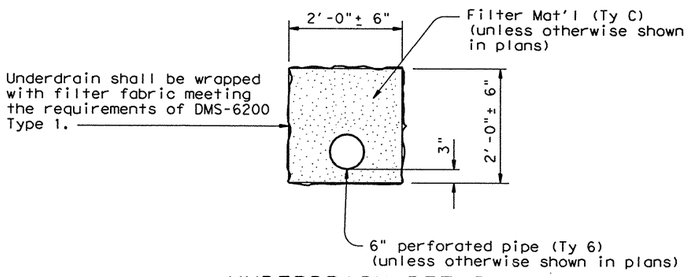
ELEVATION

(1) NOTE: Unless noted elsewhere in the plans, 1′ minimum cover shall be provided from the top of leveling pad to finish grade.

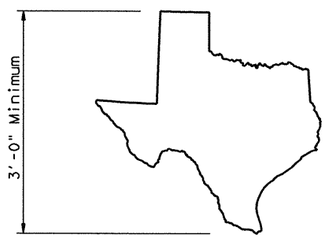


SPECIAL DRAINAGE PROVISIONS

(For use when cement stabilized backfill is used)



UNDERDRAIN DETAIL



MAP OF TEXAS EMBLEM

Map of Texas emblem shall be formed into a wall panel next to each bridge abutment. The exact location of each emblem shall be approved by the Engineer. The cost of forming the emblems will not be paid for directly, but shall be incidental to the Item "Retaining Wall".

The map of Texas shall be inset a minimum of ¾" into the face of the panel, and shall receive a smooth finish. The inset area shall be finished in a contrasting color as approved by the Engineer.

DESIGN PARAMETERS:

Design of retaining walls shall be based on the following design parameters:

Random Backfill (Embankment of Existing Soils)	unit weight = 125 pcf Ø = 30° c = 0 psf
Select Backfill	unit weight = 125 pcf Ø = 34° c = 0 psf
Cement Stabilized Select Backfill	unit weight = 125 pcf Ø = 45° c = 0 psf

Stress in steel and concrete shall be in accordance with current AASHTO Standard and Interim Specifications.

The minimum length of earth reinforcements shall be 8′-0".

STABILITY CRITERIA:

Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5.

Factor of safety in overturning shall be greater than or equal to 2.0.

The base pressure resultant shall fall within the middle third of the retaining wall.

The factor of safety against pullout of the earth reinforcements shall be greater than or equal to 1.5 at each level. Pullout resistance shall be determined from test data evaluated at ¾ inch strain.

CORROSION CRITERIA:

The earth reinforcement elements shall be designed to have a corrosion resistance - durability to ensure a minimum design life of 75 years. Maximum loss per side due to corrosion shall be computed by assuming a uniform loss model based on the following

Zinc corrosion rate (First 2 years) - 15 µm/yr.
Zinc corrosion rate (subsequent years) - 4 µm/yr.
Carbon steel corrosion rate - 12 µm/yr.

All stress and pullout calculations shall be done on the calculated earth reinforcement section remaining after 75 years.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information.

The select backfill specified for use within the mechanically stabilized earth volume shall extend horizontally from the back of the panels to the end of the earth reinforcements. The select backfill shall extend vertically from the top of the leveling pad or 4" below the lowest earth reinforcement, whichever is lower, to the top of panels.

The uppermost earth reinforcements shall be no more than 3.0′ below the top of wall.

The lowest level of earth reinforcements shall be no more than 2.0′ above the top of the leveling pad.

Minimum wire size for earth reinforcements shall be W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire shall have at least 50% of the cross sectional area of the larger wire.

Standard precast concrete panels shall have a maximum height of 6′, and a maximum surface area of 50 sq ft. Minimum panel thickness shall be 5". Panels shall be arranged to provide offset horizontal joints.

An open joint shall be provided around the perimeter of the concrete panels. The nominal joint opening shall be between ⅜" and ¾". The joint configuration shall be such that the filter fabric or pad materials are not exposed at the wall face.

A one-piece corner panel shall be provided for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.

Concrete coping shall be provided along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall. The joints between all coping segments shall be sealed to prevent infiltration of water into the retaining wall backfill. Sealing shall be in accordance with the Item "Joint Sealants and Fillers", using Class 4 joint sealant.

Texas Department of Transportation
Bridge Division

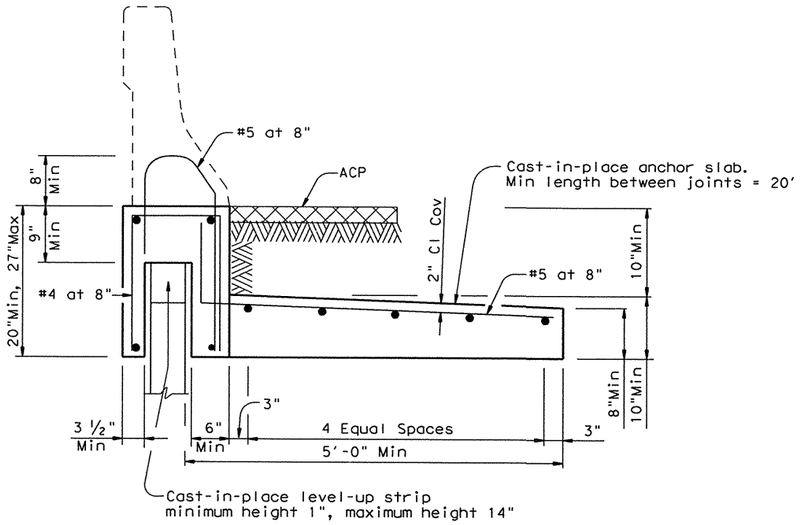
MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: rwstde01.dgn	DN: TxDOT	CK: TxDOT	DW: GHO		CK: MPM		
©TxDOT April 2002	DISTRICT	FEDERAL AID PROJECT				SHEET	
REVISIONS	DALLAS	(SEE TITLE SHEET)				204	
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	ROCKWALL		1014	03	039	FM 740	

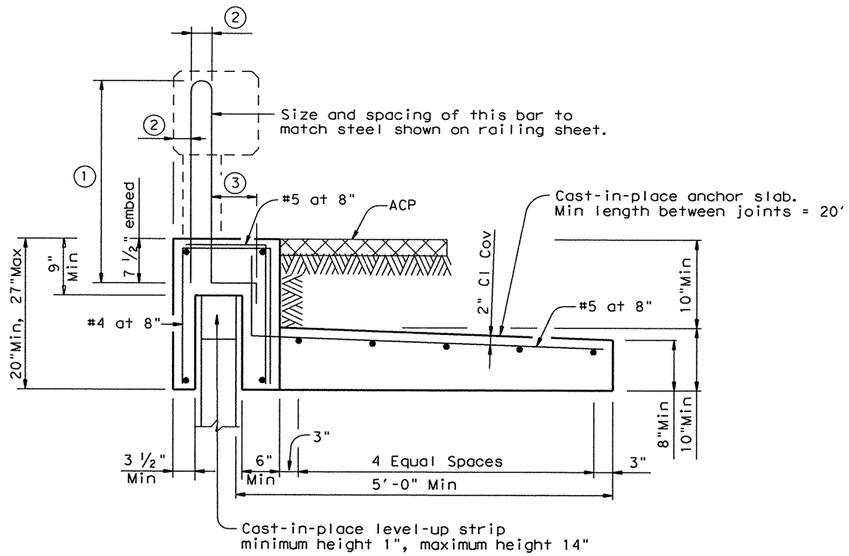
PATH:

LEVELS DISPLAYED



"WIDE BASED" RAILING
T501, T502, C501, C502 & SSTR
ADJACENT TO ACP

(Showing T501 Rail, other rails listed similar)



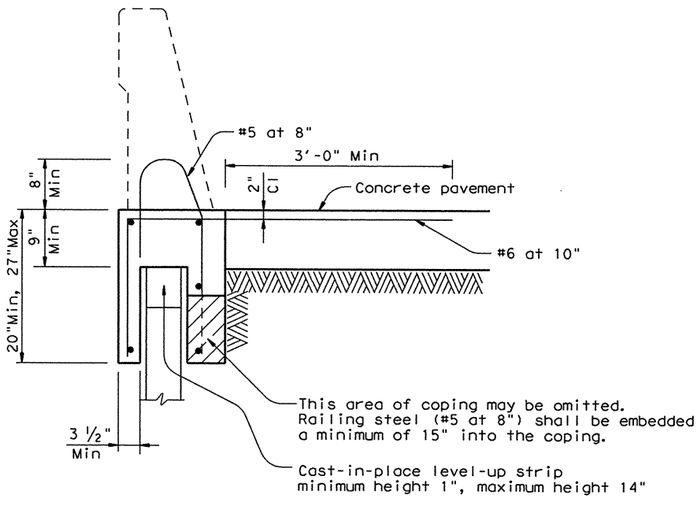
"NARROW BASED" RAILING
T221, T203, T401, T402, T411, C221, C203, C402, C411
ADJACENT TO ACP

(Showing T203 Rail, other rails listed similar)

① Reinforcement length equal to length shown on the appropriate Rail standard plus 1".

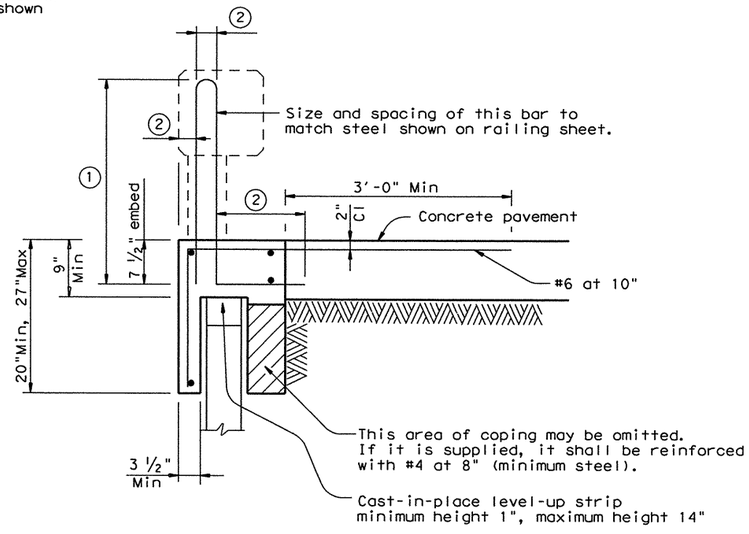
② Match dimension on the appropriate Rail standard.

③ Match dimension on the appropriate Rail standard. Bend end of rail anchorage reinforcing as shown as required to maintain Clear Cover.



"WIDE BASED" RAILING
T501, T502, C501, C502 & SSTR
ADJACENT TO CONCRETE PAVEMENT

(Showing SSTR Rail, other rails listed similar)



"NARROW BASED" RAILING
T221, T203, T401, T402, T411, C221, C203, C402, C411
ADJACENT TO CONCRETE PAVEMENT

(Showing T203 Rail, other rails listed similar)

CAST-IN-PLACE COPINGS:
Casting of the coping directly against the precast panel sides will not be permitted, as this may result in panel cracking. The contractor shall use a ¼"(Min) compressible material on both sides of the panel to isolate the coping from the precast panel.
When cast-in-place coping is anchored to reinforced concrete pavement, a smooth level-up strip shall be provided on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.
Railing and coping joints shall be provided at 33' maximum spacing. Railing and coping joints shall be placed to coincide with precast panel joints.

PRECAST COPINGS:
A smooth level-up strip shall be provided on top of the precast panels prior to installation of the coping. Shims may be used on top of the level-up strip to facilitate alignment.
Precast coping shall be provided in 10' minimum lengths.

JOINTED CONCRETE PAVEMENT:
When coping is adjacent to and anchored into jointed concrete pavement, the coping joints shall coincide with the pavement joints.

JOINT SEALER:
The joints between coping segments shall be sealed in accordance with the Item "Joint Sealants and Fillers", joint sealing material, Class 4. The joint shall be sealed 3" below and 6" above the adjoining pavement surface, or as directed by the Engineer. The purpose of the joint sealing is to contain surface drainage and prevent infiltration into the retaining wall backfill.

GENERAL NOTES:
Details on this sheet are to be used in development of specific details for mounting traffic railing on mechanically stabilized earth (MSE) walls.
The specific details proposed shall have strengths equivalent to those shown on this sheet. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.
Shop drawings for the traffic railing foundations shall be submitted to the Engineer in accordance with the Item "Retaining Wall". The shop drawings shall include bar bending details.
Precasting of the coping or coping and railing will be allowed. The anchor slab, when required, shall be cast-in-place.
The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The contractor shall provide for use of these systems in accordance with Article 7.3.
Concrete shall be Class "C".
All reinforcing steel shall be Grade 60.
Longitudinal bars shall be #4.
Coping and anchor slabs shall be considered subsidiary to the Item "Retaining Wall". The traffic railing will be paid for by the linear foot for the appropriate railing type.

LEVELS DISPLAYED
PATH:

Texas Department of Transportation
Bridge Division

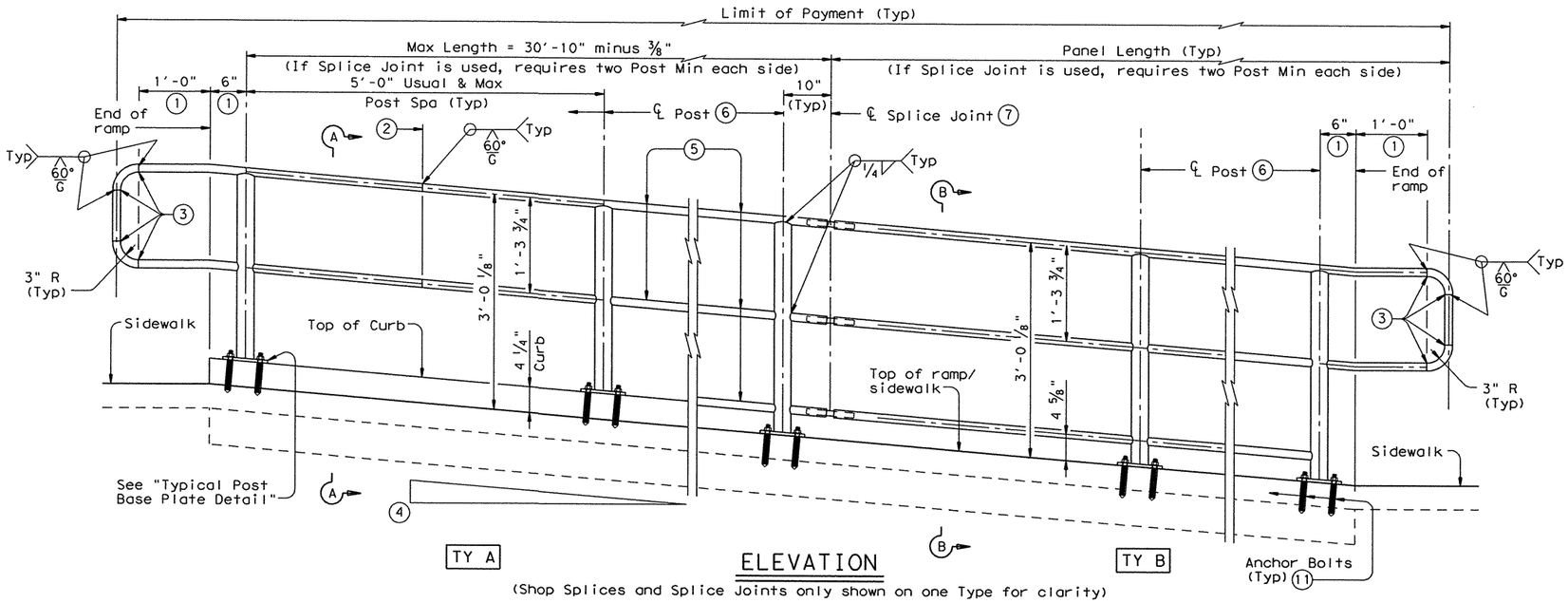
RETAINING WALL TRAFFIC RAILING FOUNDATIONS

RW(TRF)

FILE: rwstde03.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT		CK: MPM	
©TxDOT April 2002	DISTRICT	FEDERAL AID PROJECT				SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)				205
4-05: Updated Rail names, anchorage.	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

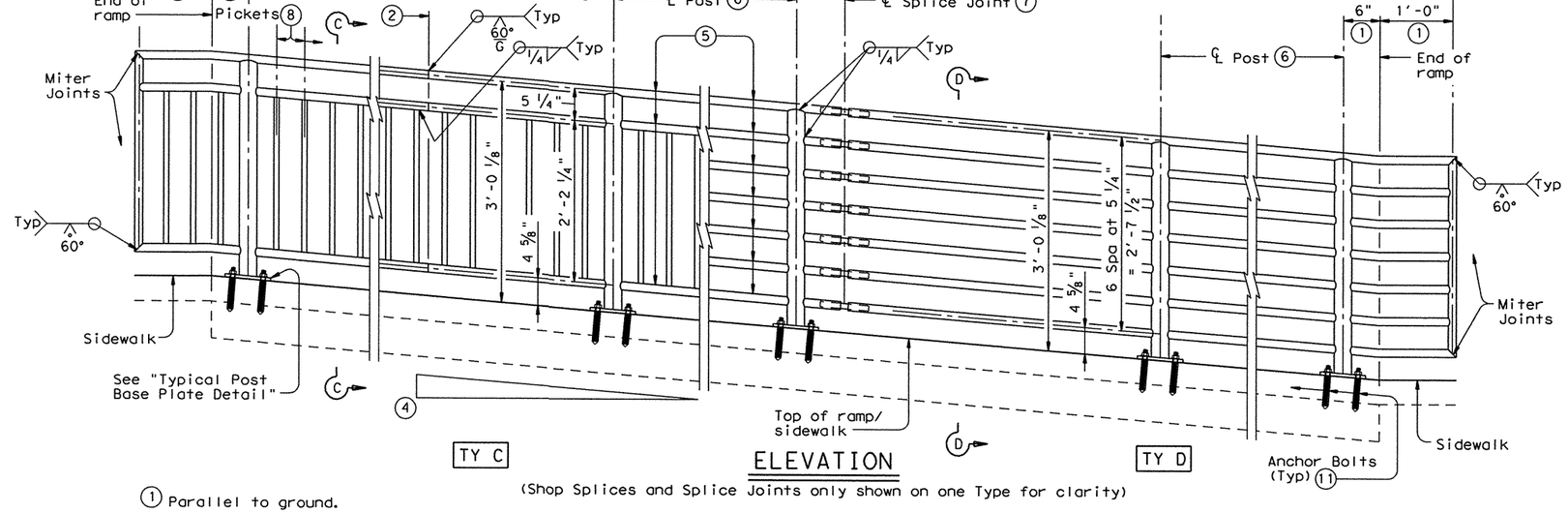
LEVELS DISPLAYED
1 | 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 | 63

PATH:



ELEVATION

(Shop Splices and Splice Joints only shown on one Type for clarity)

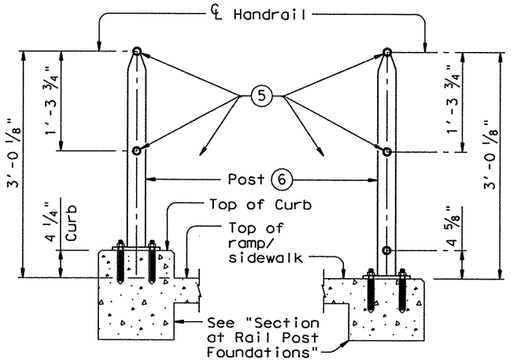


ELEVATION

(Shop Splices and Splice Joints only shown on one Type for clarity)

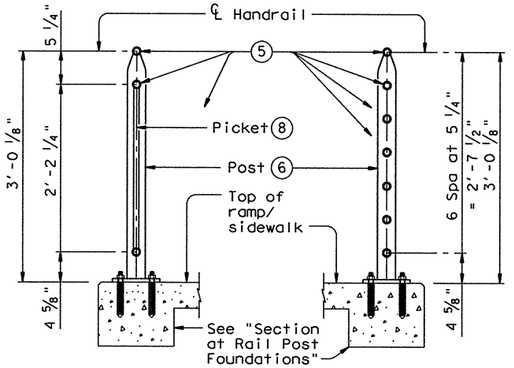
1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1" Dia Extra Heavy Pipe (1.315" O.D., 0.179" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1" Dia pipe for galvanizing drainage and venting.
6. 2 ½" Dia Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit Dia of top rail. Provide holes as needed in post for galvanizing drainage and venting.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia Round Bar Eq Spa at 4 ½" Max. Plumb all pickets.
9. When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
10. Not to be used on bridges.
11. See "General Notes" for anchor bolt information.

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



SECTION A-A
(Showing Handrail Ty A)

SECTION B-B
(Showing Handrail Ty B)



SECTION C-C
(Showing Handrail Ty C)

SECTION D-D
(Showing Handrail Ty D)

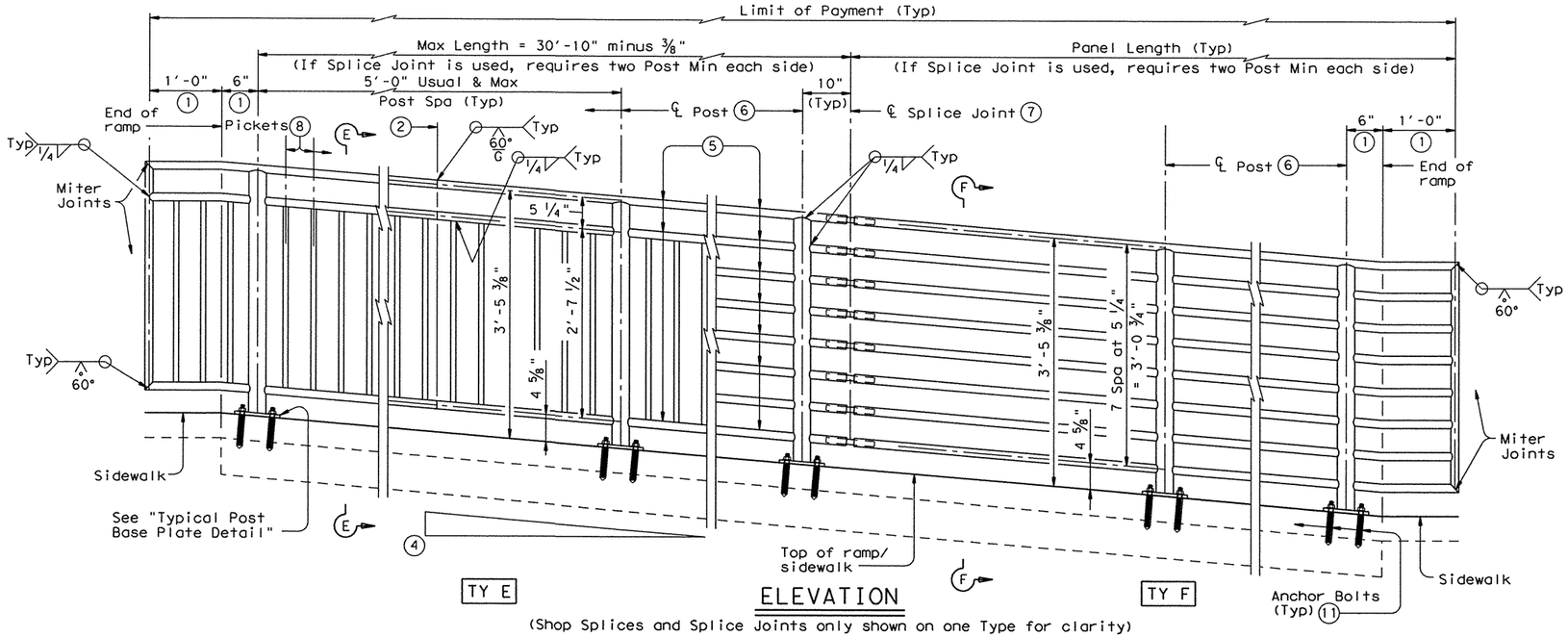
Texas Department of Transportation
Design Division (Roadway)

PEDESTRIAN HANDRAIL DETAILS

PRD-06

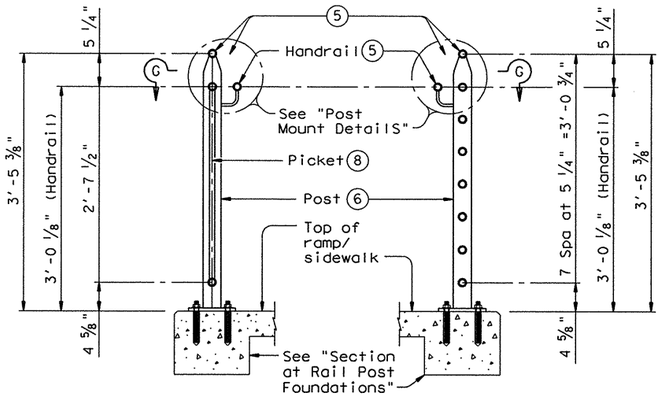
SHEET 1 OF 3

FILE: prd06.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT December 2006	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)		200
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740



ELEVATION

(Shop Splices and Splice Joints only shown on one Type for clarity)

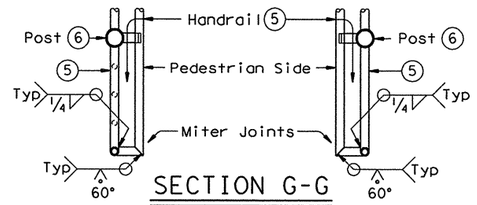


SECTION E-E

(Showing Handrail Ty E)

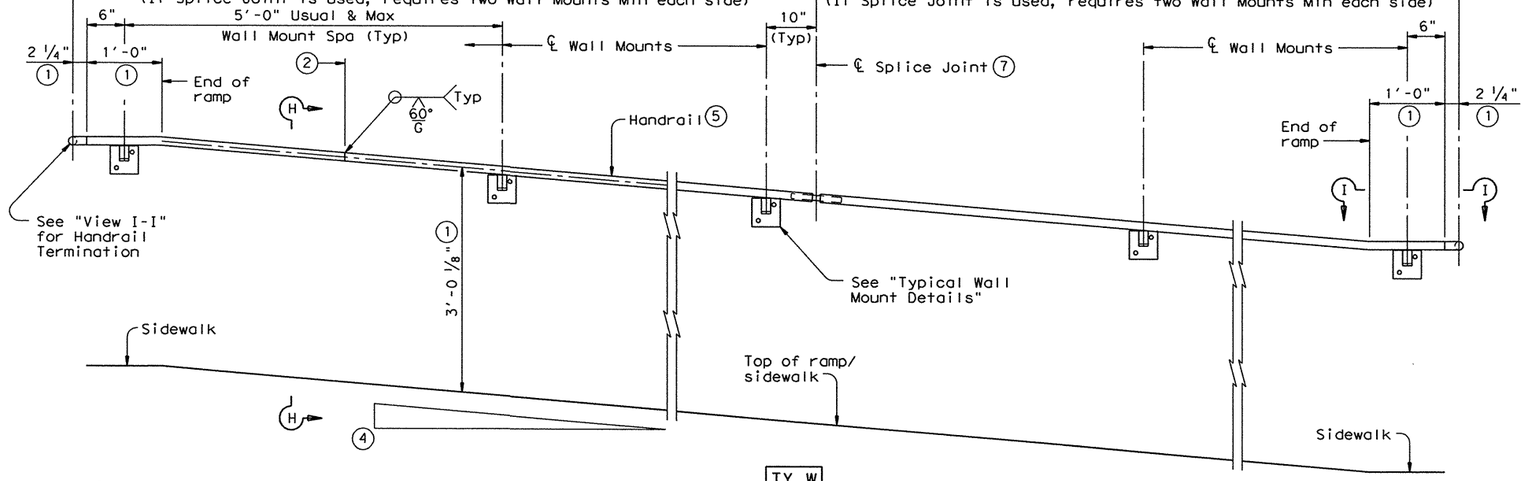
SECTION F-F

(Showing Handrail Ty F)

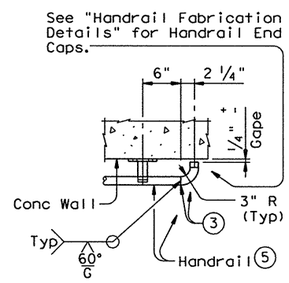


SECTION G-G

(Showing Handrail Termination)

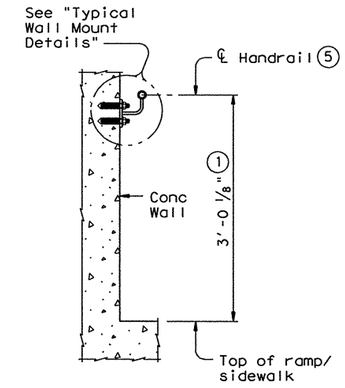


ELEVATION



VIEW I-I

(Showing Handrail Termination)



SECTION H-H

(Showing Handrail Ty W)

(1) Parallel to ground.

(2) One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(3) Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(4) See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

(5) 1" Dia Extra Heavy Pipe (1.315" O.D., 0.179" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1" Dia pipe for galvanizing drainage and venting.

(6) 2 ½" Dia Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit Dia of top rail. Provide holes as needed in post for galvanizing drainage and venting.

(7) See "Handrail Fabrication Details" for Splice Joints.

(8) ℄ ⅝" Dia Round Bar Eq Spa at 4 ½" Max. Plumb all pickets.

(11) See "General Notes" for anchor bolt information.

LEVELS DISPLAYED
PATH:

Texas Department of Transportation
Design Division (Roadway)

PEDESTRIAN HANDRAIL DETAILS

PRD-06

SHEET 2 OF 3

FILE: prd06.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
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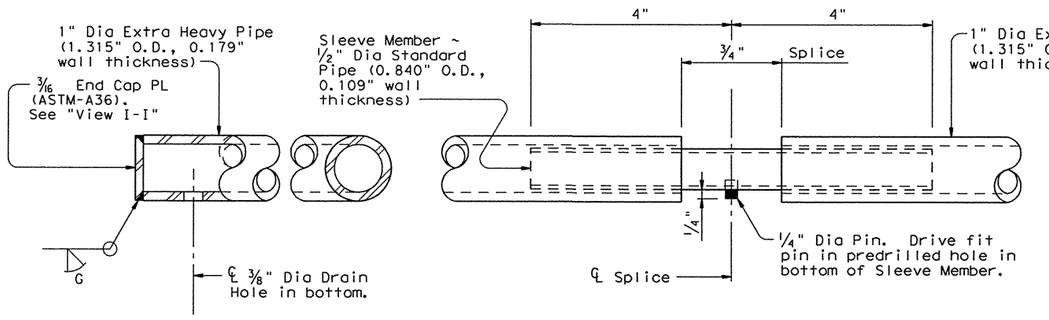
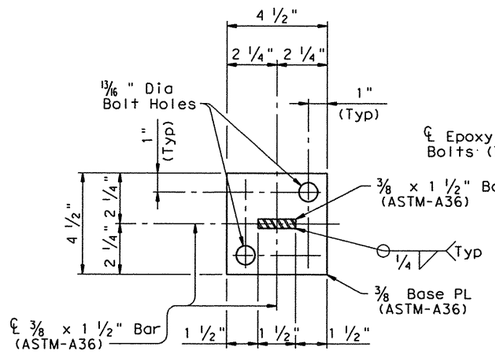
REVISIONS	DALLAS	(SEE TITLE SHEET)		202
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM740



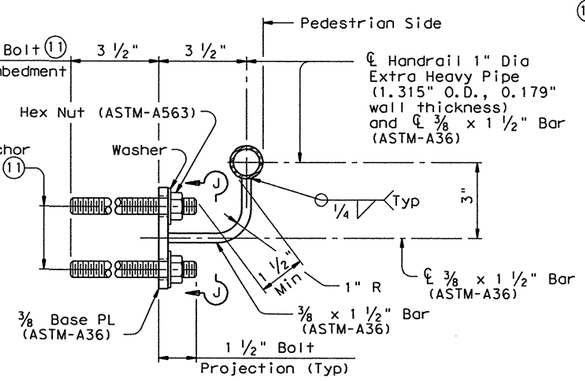
AT TYPE W HANDRAIL END CAPS

AT SPLICE JOINTS

HANDRAIL FABRICATION DETAILS



SECTION J-J
(Anchor Bolts not shown for clarity)



SECTION AT WALL MOUNT

TYPICAL WALL MOUNT DETAILS

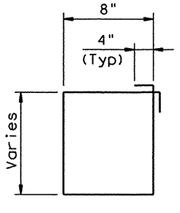
(5) 1" Dia Extra Heavy Pipe (1.315" O.D., 0.179" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1" Dia pipe for galvanizing drainage and venting.

(6) 2 1/2" Dia Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit Dia of top rail. Provide holes as needed in post for galvanizing drainage and venting.

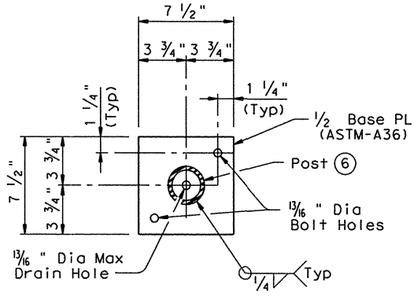
(11) See "General Notes" for anchor bolt information.

(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

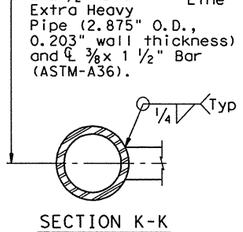
(13) Provide 1 1/2" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



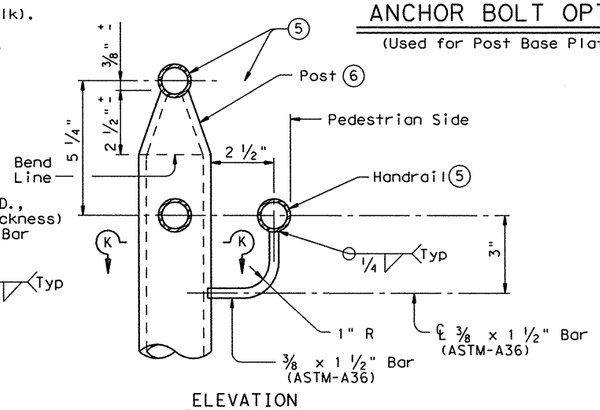
BARS S (#3)



TYPICAL POST BASE PLATE DETAIL

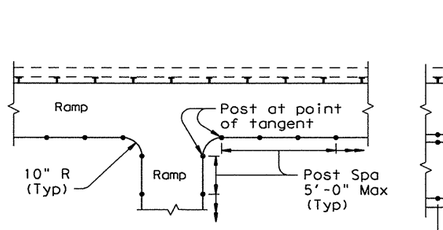


SECTION K-K

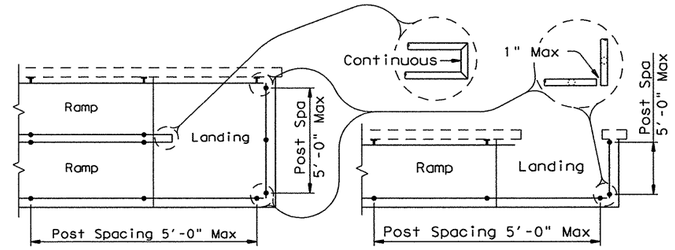


ELEVATION

POST MOUNT DETAILS



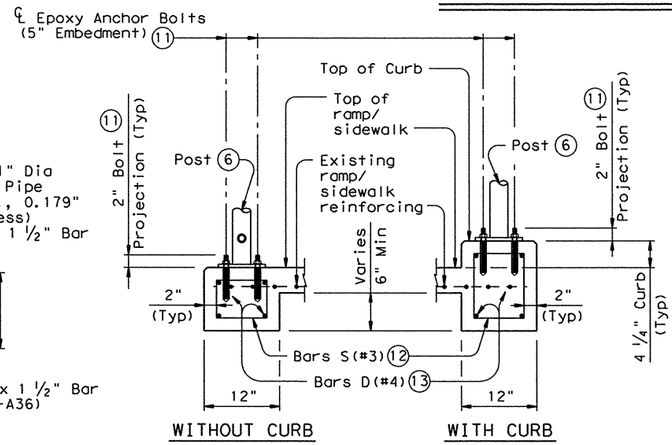
RAMP INTERSECTION



MULTI-LEVEL RAMP

SINGLE-LEVEL RAMP

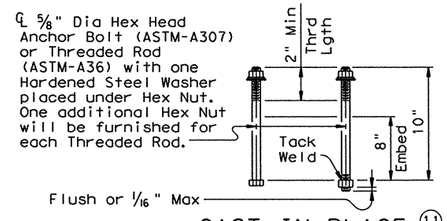
PLAN SHOWING RAIL AT RAMP CONDITIONS



WITHOUT CURB

WITH CURB

SECTION AT RAIL POST FOUNDATIONS



CAST-IN-PLACE (11) ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)

GENERAL NOTES:

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

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

Pipe will conform to ASTM-A53 Grade B, A500 Grade B or A501. Steel plates and steel bars will conform to ASTM-A36.

Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks".

All reinforcing steel must be Grade 60.

Bar laps, where required, will be as follows:
Uncoated ~ #4 = 1'-5"
Epoxy coated ~ #4 = 2'-1"

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

Epoxy Anchor bolts for wall mount and post base plate will be 5/8" Dia ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. 5/8" Dia threaded rod embedment depth for wall mounts is 3 1/2" and embedment depth for post base plate is 5". Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

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

Optional cast-in-place anchor bolts will be 5/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

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

Submit shop drawings to the Engineer unless otherwise noted.

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

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation. Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

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

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

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

PATH:

LEVELS DISPLAYED

1	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	49	50	51	52	53	54	55	56	57	58	59	60	61			63

Texas Department of Transportation
Design Division (Roadway)

PEDESTRIAN HANDRAIL DETAILS

PRD-06

SHEET 3 OF 3

FILE: prd06.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
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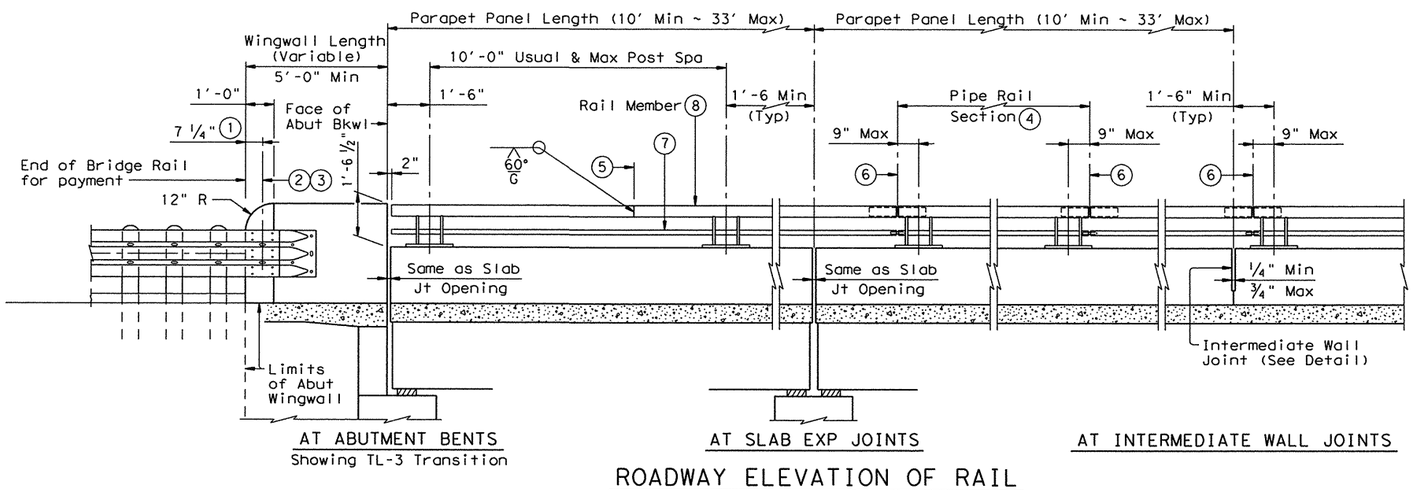
REVISIONS	DALLAS	(SEE TITLE SHEET)		208
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

ACC:

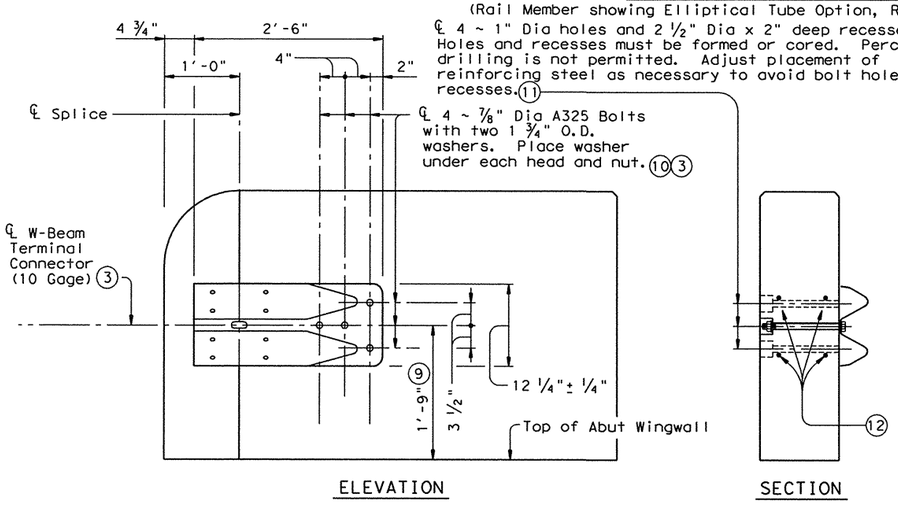
LEVELS DISPLAYED

1

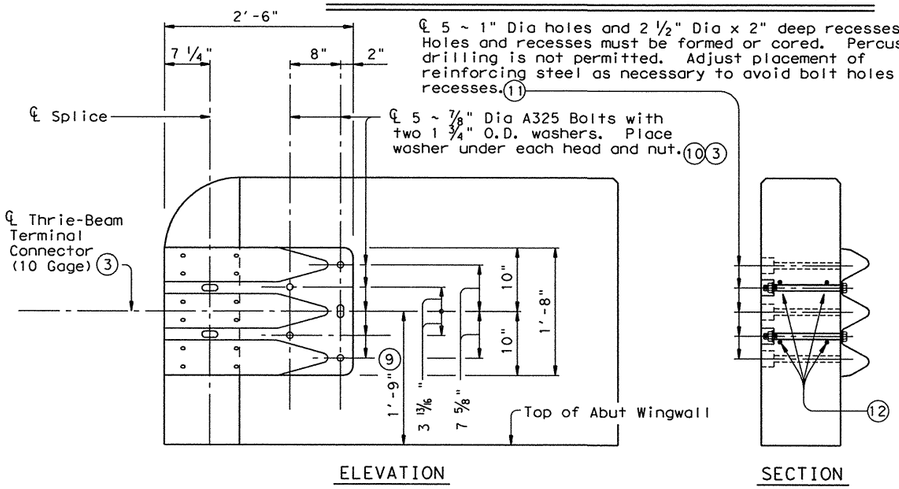


ROADWAY ELEVATION OF RAIL

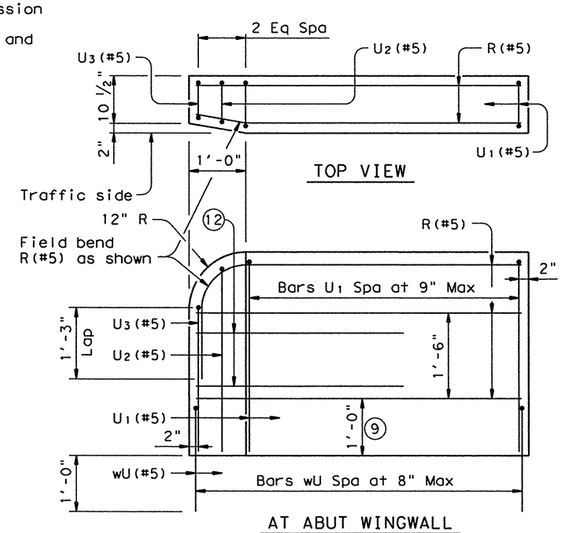
(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).

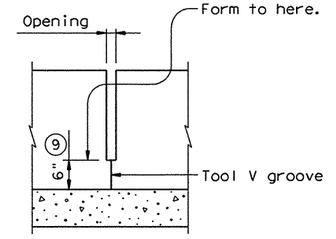


TL-2 TERMINAL CONNECTION DETAILS



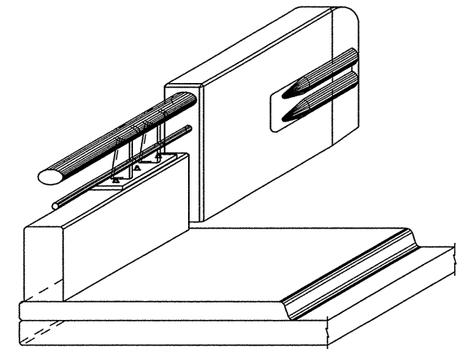
TL-3 TERMINAL CONNECTION DETAILS

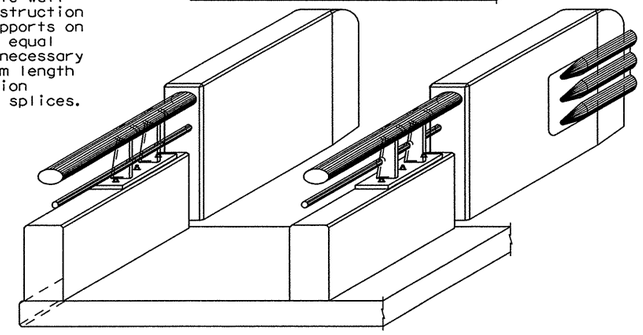




INTERMEDIATE WALL JOINT DETAIL

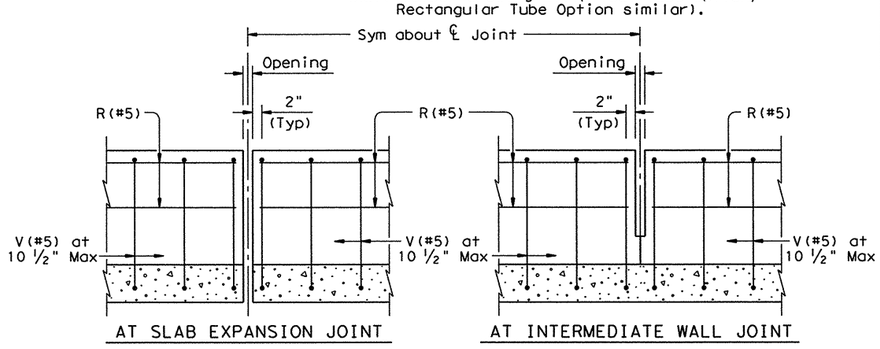
Note: Provide intermediate wall joints over all slab construction joints, over interior supports on continuous units, and at equal intervals in between as necessary to maintain a 33' maximum length of unbroken wall. Location independent of pipe rail splices.





ISOMETRIC VIEWS AT END OF BRIDGE

(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

(1) Showing TL-3 Splice location, TL-2 Splice location is 1'-0".

(2) ℄ Splice ~ Metal Beam Guard Fence Transitions must be attached to the bridge rail and extended along the embankment unless otherwise shown in the plans.

(3) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence".

(4) Pipe rail sections must have at least two posts but not more than four.

(5) One shop splice per pipe rail section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(6) ℄ Exp Jt or Splice Jt as required.

(7) 2" Dia Std Pipe (2.375" O.D., 0.154" wall thickness) ASTM-A53 Gr B or A500 Gr B. Placed on sidewalk side of rail.

(8) Unless directed otherwise by the Engineer, the fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(9) Increase 2" for structures with overlay.

(10) Bolts must be of sufficient length to extend 1/2" to 3/4" beyond nut.

(11) Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

(12) 4 additional Bars R(#5) 3'-8" in length shall be placed inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

SHEET 1 OF 4

Texas Department of Transportation
Bridge Division

COMBINATION RAIL

TYPE C402

FILE: rlstd020.dgn	DN: TxDOT	CK: TxDOT	DW: JTR		CK: JMH	
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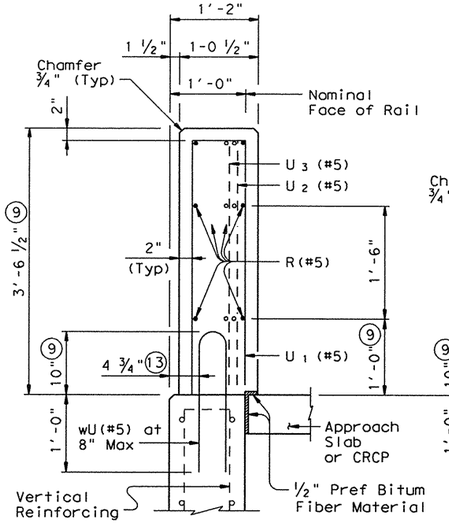
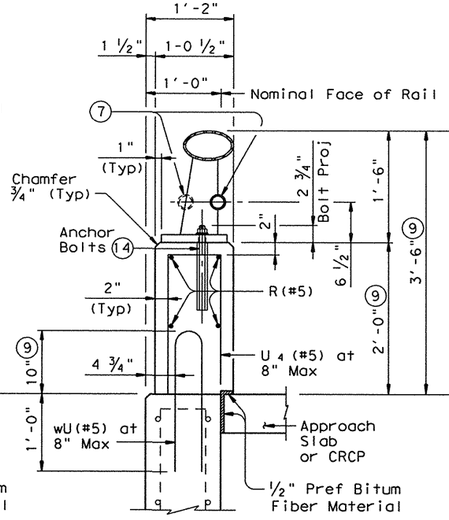
REVISIONS	DALLAS	(SEE TITLE SHEET)				209
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

ACC:

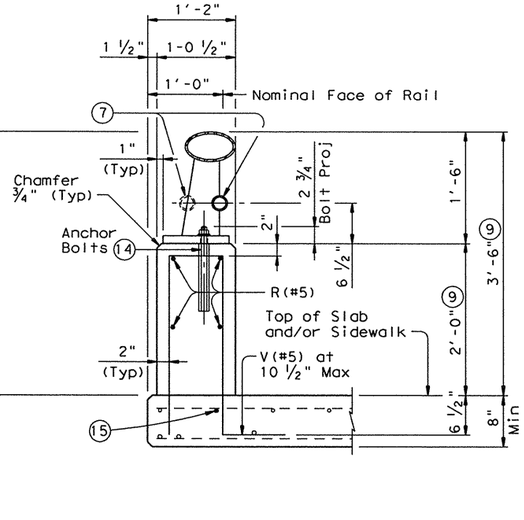
LEVELS DISPLAYED



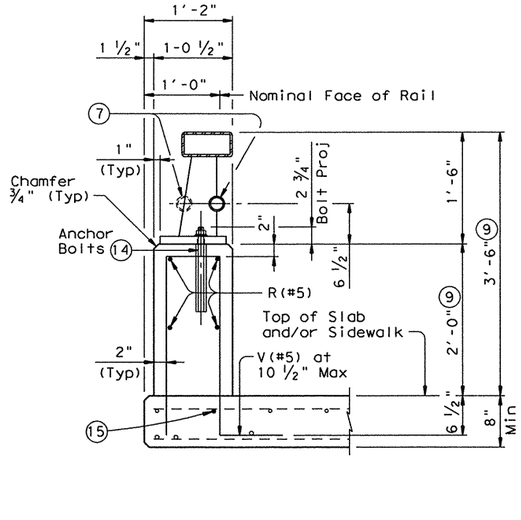
ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON CIP RETAINING WALLS
(Showing Elliptical Tube Option)



ON BRIDGE SLAB
(Showing Elliptical Tube Option)



ON BRIDGE SLAB
(Showing Rectangular Tube Option)

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK (8)

ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

ON CIP RETAINING WALLS
(Showing Elliptical Tube Option)

ON BRIDGE SLAB
(Showing Elliptical Tube Option)

ON BRIDGE SLAB
(Showing Rectangular Tube Option)

SECTIONS THRU RAIL WITH RAISED SIDEWALK (8)

(7) 2" Dia Std Pipe (2.375" O.D., 0.154" wall thickness) ASTM-A53 Gr B or A500 Gr B. Placed on sidewalk side of rail.

(8) Unless directed otherwise by the Engineer, the fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(9) Increase 2" for structures with overlay.

(13) 5 ½" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(14) See "General Notes" for anchor bolt information.

(15) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(16) Raised Sidewalk

Texas Department of Transportation
Bridge Division

COMBINATION RAIL

TYPE C402

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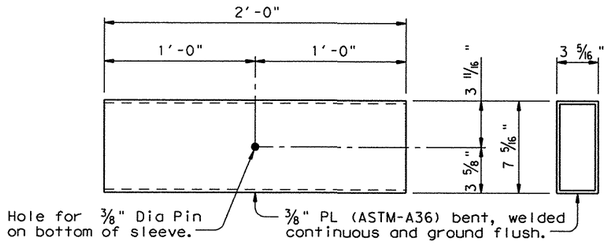
REVISIONS	DALLAS	(SEE TITLE SHEET)		210
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

ACC:

LEVELS DISPLAYED

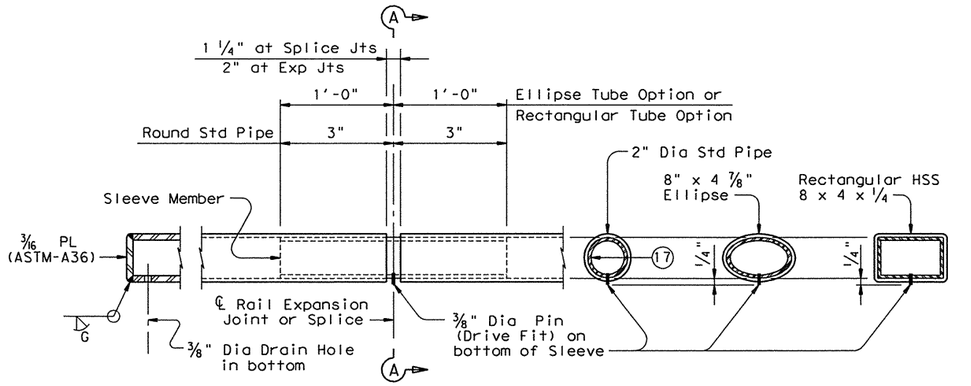
1



PLAN END VIEW

RECTANGULAR TUBE SLEEVE MEMBER DETAIL

(See Tube Fabrication Detail)

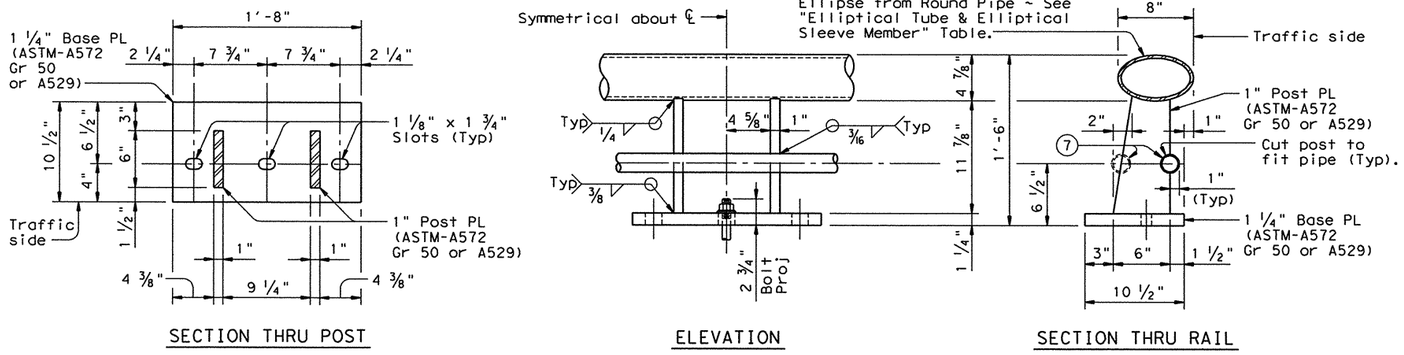


AT RAIL ENDS | AT SPLICE OR EXP JTS | SECTION A-A (Showing Round Std Pipe) | SECTION A-A (Showing Ellipse Tube Option) | SECTION A-A (Showing Rectangular Tube Option)

TUBE FABRICATION DETAILS ⑧

ELLIPTICAL TUBE & ELLIPTICAL SLEEVE MEMBER		
8" x 4 7/8" Ellipse	Elliptical Sleeve Member	
Material	Material	Thickness
6" Dia Std Pipe ASTM-A53 E or S Gr B)	ASTM-A53 Gr B	0.353"
	A36 or A500 Gr B	0.339"
	API-5LX52	0.224"
6 5/8" O.D. Pipe x 0.188" API-5LX52	ASTM-A53 Gr B	0.339"
	A36 or A500 Gr B	0.325"
	API-5LX52	0.188"

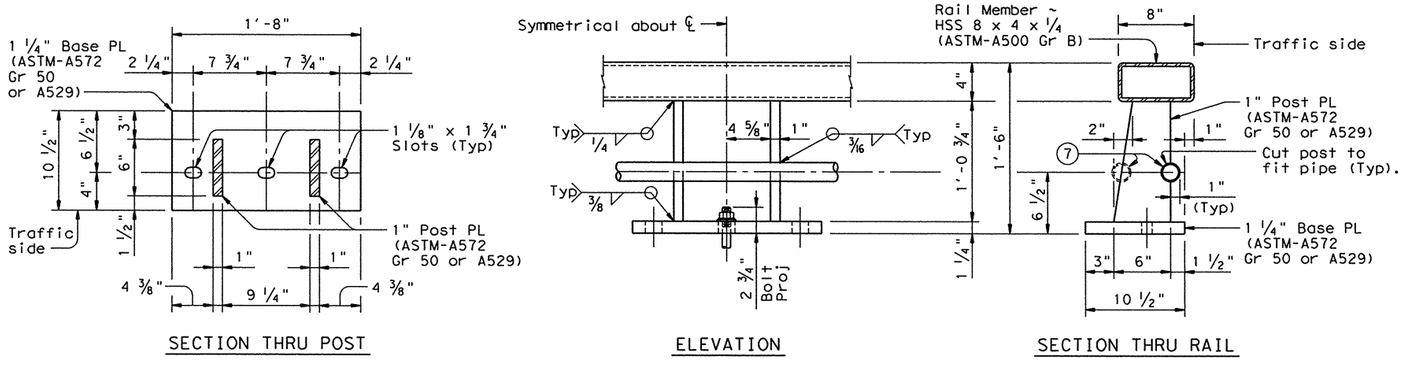
Notes: Other sections of equal or greater strength are acceptable for elliptical sleeves. The major and minor diameters of the rail member may vary +/- 0.1875" from plan dimension. However, the difference between the outside diameters of the elliptical sleeve and the inside diameters of the rail member must not exceed 0.25 inches.



SECTION THRU POST | ELEVATION | SECTION THRU RAIL

ELLIPTICAL TUBE WITH RAIL POST & ANCHORAGE DETAILS

(Showing Elliptical Tube Option)



SECTION THRU POST | ELEVATION | SECTION THRU RAIL

RECTANGULAR TUBE WITH RAIL POST & ANCHORAGE DETAILS ⑧

(Showing Rectangular Tube Option)

⑦ 2" Dia Std Pipe (2.375" O.D., 0.154" wall thickness) ASTM-A53 Gr B or A500 Gr B. Placed on sidewalk side of rail.

⑧ Unless directed otherwise by the Engineer, the fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

⑰ Sleeve Member 1 1/2" Dia Std Pipe (1.90" O.D., 0.145" wall thickness) ASTM-A53 Gr B or A500 Gr B.

Texas Department of Transportation
Bridge Division

COMBINATION RAIL

TYPE C402

FILE: rlstd020.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
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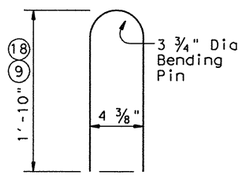
REVISIONS	DALLAS	(SEE TITLE SHEET)		211
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

ACC:

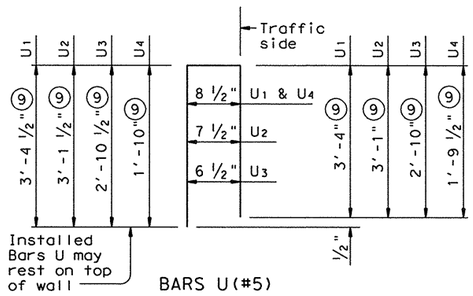
LEVELS DISPLAYED

1	

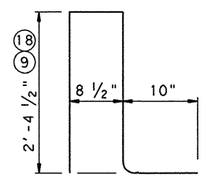
RAIL DATA FOR HORIZONTAL CURVES			
	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
Rail Members	Over 2800'	29'-0"	Straight rail sections
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown (21)
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius (21)



BARS wU(#5)



BARS U(#5)



BARS V(#5)

(9) Increase 2" for structures with overlay.

(18) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(19) Slots are not allowed in areas where there is a joint in the concrete parapet between rail post.

(20) See "General Notes" for anchor bolt information.

(21) Shop drawings for approval required for tubular steel sections.

CONSTRUCTION NOTES:

This rail may be slip-formed if approved by the Engineer when epoxy adhesive anchor bolts are used.

Cap all open ends of tubular steel sections.

At the contractor's option anchor bolts may be cast with the parapet (See Cast-in-Place Anchor Bolt Options).

Slip-forming parapet is not allowed if anchor bolts are cast with parapet wall.

Rail parapet must be plumb unless otherwise approved by the Engineer. Steel posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Pipe rail sections must have at least two posts but not more than four.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

MATERIAL NOTES:

Galvanize all steel components except reinforcing steel.

Anchor bolts must be ⅞" Dia ASTM A193 Grade B7 fully threaded rods with heavy hex nuts, one hardened washer and one (2 ¼" OD) washer each. Embed threaded rods into parapet wall with a Type III Class C epoxy anchorage system. Minimum embedment depth is 8". Anchorage system chosen must be able to achieve an ultimate tensile resistance of 34 kips per bolt. The Contractor must provide evidence to the Engineer that this can be achieved. Evidence of adequate tensile resistance can be based on the manufacturer's published values of ultimate tensile strength (anchor spacing and edge distance must be accounted for). Anchor installation, including hole size, drilling, and clean-out, must be in accordance with the manufacturer's instructions.

Optional cast-in-place anchor bolts must be ⅞" Dia ASTM A325 or A449 bolts (or A193 Gr B7 threaded rods with one tack welded heavy hex nut each) with one heavy hex nut and one hardened steel washer plus one 2 ¼" O.D. steel washer at each bolt. Nuts must conform to A563 requirements.

Use Class "C" concrete. Use Class "C" (HPC) if required elsewhere. Chamfer all exposed corners.

Reinforcing steel must be Grade 60.

Epoxy coat all rail reinforcement if slab bars are epoxy coated.

GENERAL NOTES:

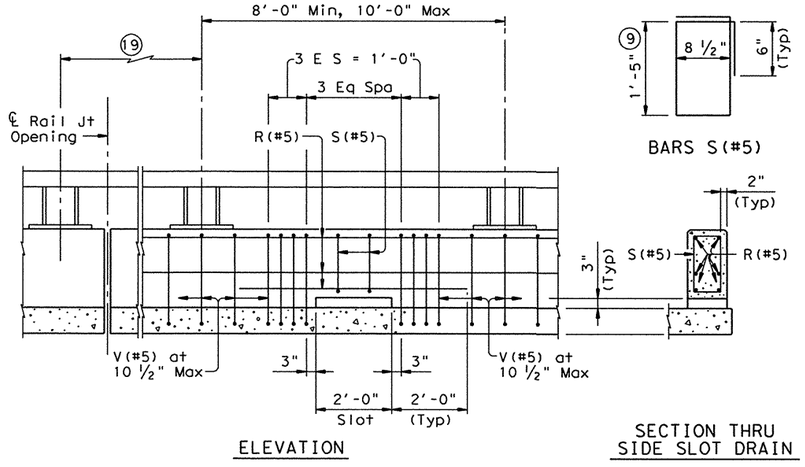
This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet NCHRP Report 350 TL-3 criteria. This rail can be used for design speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for design speeds of 45 mph and less.

This railing cannot be used on bridges with expansion joints providing more than 5" movement.

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

Erection drawings showing panel lengths, rail post spacing, and anchor bolt setting must be submitted to the Engineer for approval.

Average weight of railing with no overlay: 347 plf total
313 plf (Conc)
34 plf (Steel).

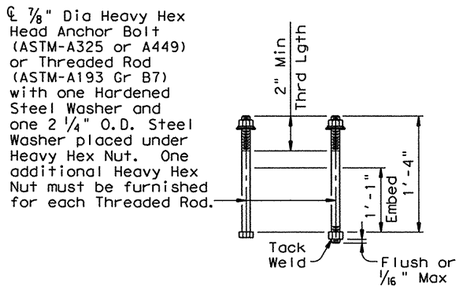


ELEVATION

SECTION THRU SIDE SLOT DRAIN

OPTIONAL SIDE SLOT DRAIN DETAILS

Note: Side Slot Drains must be centered between rail posts within the limits shown. Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (20)

SHEET 4 OF 4

Texas Department of Transportation
Bridge Division

COMBINATION RAIL

TYPE C402

FILE: rlstd020.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH	
©TxDOT April 2009	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)			212
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-A1	0.96	0.38	10.00	10.00	6.93	0.000	2.527
	0.96	0.38	Pavement				
CI-A2	0.96	0.35	10.00	10.00	6.93	0.000	2.307
	0.96	0.35	Pavement				
CI-A3	0.81	0.66	10.00	10.00	6.93	0.000	3.713
	0.96	0.21	Pavement				
	0.74	0.45	Industrial				
CI-A4	0.902	0.61	10.00	10.00	6.93	0.000	3.786
	0.96	0.45	Pavement				
	0.74	0.16	Industrial				
CI-A4A	0.96	0.21	10.00	10.00	6.93	0.000	1.396
	0.96	0.21	Pavement				
CI-A4B	0.96	0.18	10.00	10.00	6.93	0.000	1.170
	0.96	0.18	Pavement				
CI-A5	0.96	0.39	10.00	10.00	6.93	0.000	2.587
	0.96	0.39	Pavement				
CI-A6	0.96	0.37	10.00	10.00	6.93	0.000	2.487
	0.96	0.37	Pavement				
CI-A7	0.96	0.28	10.00	10.00	6.93	0.000	1.888
	0.96	0.28	Pavement				
CI-A8	0.96	0.27	10.00	10.00	6.93	0.000	1.775
	0.96	0.27	Pavement				
CI-A9	0.96	0.38	10.00	10.00	6.93	0.000	2.514
	0.96	0.38	Pavement				
CI-A11	0.96	0.60	10.00	10.00	6.93	0.000	3.976
	0.96	0.60	Pavement				
CI-A10	0.96	0.19	10.00	10.00	6.93	0.000	1.230
	0.96	0.19	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
CI-A7	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	564.15
CI-A1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	563.94
CI-A8	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	560.50
CI-A2	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	559.47
CI-A5	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	560.00
CI-A10	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	559.94
CI-A11	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	561.35
CI-A4	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	564.35
CI-A4A	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	567.38
CI-A4B	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	567.38
CI-A3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	567.50

On Grade Inlets Comnputation 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)
CI-A7	Curb	1.888	1.888	0.250	0.000	CI-A8	7.47	10.00	9.90
CI-A1	Curb	2.527	2.527	0.250	0.000	CI-A2	8.84	10.00	11.05
CI-A8	Curb	1.775	1.775	0.250	0.000	CI-A9	7.21	10.00	9.70
CI-A2	Curb	2.307	2.307	0.250	0.000	CI-A6	8.39	10.00	10.70
CI-A5	Curb	2.587	2.587	0.250	0.000	CI-A6	8.97	10.00	11.15
CI-A10	Curb	1.230	1.191	0.250	0.039	CI-A9	5.86	5.00	8.45
CI-A11	Curb	3.976	3.976	0.250	0.000	CI-A10	11.55	15.00	13.10
CI-A4	Curb	3.950	3.950	0.250	0.000	CI-A5	11.50	15.00	13.05
CI-A4A	Curb	1.396	1.316	0.250	0.081	CI-A4	6.29	5.00	8.85
CI-A4B	Curb	1.170	1.143	0.250	0.027	CI-A4	5.70	5.00	8.30
CI-A3	Curb	3.713	3.657	0.250	0.057	CI-A4	11.09	10.00	12.75

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
CI-A9	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	558.86
CI-A6	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	558.86

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
CI-A9	Curb	5.00	n/a	n/a	2.552	6.261	0.275	8.55	8.55
CI-A6	Curb	5.00	n/a	n/a	2.487	6.261	0.270	8.45	8.45

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)
CI-A7	Curb	0.960	0.28	10.00	6.93	0.000	0.00	1.888
MH-A1	BoxMh	0.960	0.66	10.22	6.86	0.000	0.00	4.375
CI-A1	Curb	0.960	0.38	10.00	6.93	0.000	0.00	2.527
MH-A2	BoxMh	0.960	0.93	10.93	6.67	0.000	0.00	5.961
CI-A8	Curb	0.960	0.27	10.00	6.93	0.000	0.00	1.775
JCT-A2	JnctBx	0.960	1.28	11.25	6.59	0.000	0.00	8.082
CI-A2	Curb	0.960	0.35	10.00	6.93	0.000	0.00	2.307
MH-A3	BoxMh	0.960	2.03	11.68	6.48	0.000	0.00	12.624
CI-A9	Curb	0.960	0.38	10.00	6.93	0.000	0.00	2.514
CI-A6	Curb	0.960	0.37	10.00	6.93	0.000	0.00	2.487
MH-A4	BoxMh	0.932	4.86	11.84	6.44	0.000	0.00	29.152
MH-A5	BoxMh	0.912	2.83	11.46	6.53	0.000	0.00	16.845
CI-A5	Curb	0.960	0.39	10.00	6.93	0.000	0.00	2.587
CI-A10	Curb	0.960	0.19	10.00	6.93	0.000	0.00	1.230
MH-A6	BoxMh	0.900	2.25	11.06	6.64	0.000	0.00	13.453
CI-A11	Curb	0.960	0.60	10.00	6.93	0.000	0.00	3.976
MH-A7	BoxMh	0.879	1.65	10.44	6.80	0.000	0.00	9.886
CI-A4	Curb	0.902	0.61	10.00	6.93	0.000	0.00	3.786
CI-A4A	Curb	0.960	0.21	10.00	6.93	0.000	0.00	1.396
JCT-A4A	JnctBx	0.865	1.05	10.37	6.82	0.000	0.00	6.184
JCT-A4B	JnctBx	0.841	0.84	10.26	6.85	0.000	0.00	4.831
CI-A4B	Curb	0.960	0.18	10.00	6.93	0.000	0.00	1.170
MH-A8	BoxMh	0.810	0.66	10.00	6.93	0.000	0.00	3.713
CI-A3	Curb	0.810	0.66	10.00	6.93	0.000	0.00	3.713
OUT	Outlt	0.932	4.86	11.84	6.44	0.000	0.00	29.152

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	CI-A7	MH-A1	560.15	559.55	Circ 1	0.00	1.50	59.76	1.00	0.013
2	CI-A1	MH-A1	560.44	560.05	Circ 1	0.00	1.50	6.50	6.01	0.013
3	MH-A1	MH-A2	559.55	556.10	Circ 1	0.00	1.50	266.67	1.29	0.013
4	CI-A8	MH-A2	557.00	556.10	Circ 1	0.00	1.50	57.50	1.57	0.013
5	MH-A2	JCT-A2	556.10	554.96	Circ 1	0.00	1.50	115.13	0.99	0.013
6	CI-A2	JCT-A2	555.97	554.96	Circ 1	0.00	1.50	6.50	15.73	0.013
7	JCT-A2	MH-A3	554.96	553.27	Circ 1	0.00	1.50	169.62	1.00	0.013
8	CI-A9	MH-A3	555.36	554.91	Circ 1	0.00	1.50	57.50	0.78	0.013
9	CI-A6	MH-A3	555.36	554.91	Circ 1	0.00	1.50	6.50	6.94	0.013
10	MH-A3	MH-A4	552.77	552.00	Circ 1	0.00	2.00	71.23	1.08	0.013
11	MH-A5	MH-A4	554.42	553.00	Circ 1	0.00	2.00	154.63	0.92	0.013
12	CI-A10	MH-A5	556.44	555.62	Circ 1	0.00	1.50	57.50	1.43	0.013
13	CI-A5	MH-A5	556.50	555.62	Circ 1	0.00	1.50	6.50	13.66	0.013
14	MH-A6	MH-A5	556.46	554.62	Circ 1	0.00	2.00	181.30	1.01	0.013
15	CI-A11	MH-A6	557.85	556.96	Circ 1	0.00	1.50	57.50	1.55	0.013
16	MH-A7	MH-A6	558.74	556.46	Circ 1	0.00	2.00	249.98	0.91	0.013
17	CI-A4	MH-A7	560.00	559.74	Circ 1	0.00	1.50	6.50	4.00	0.013
18	JCT-A4A	MH-A7	560.39	559.85	Circ 1	0.00	1.50	29.62	1.82	0.013
19	CI-A4A	JCT-A4A	563.88	560.39	Circ 1	0.00	1.50	75.41	4.63	0.013
20	JCT-A4B	JCT-A4A	561.26	560.39	Circ 1	0.00	1.50	48.05	1.81	0.013
21	CI-A4B	JCT-A4B	564.28	561.26	Circ 1	0.00	1.50	75.44	4.01	0.013
22	MH-A8	JCT-A4B	563.12	561.26	Circ 1	0.00	1.50	102.09	1.82	0.013
23	CI-A3	MH-A8	563.40	563.12	Circ 1	0.00	1.50	6.50	4.31	0.013
24	MH-A4	OUT	552.00	551.30	Circ 1	0.00	2.25	20.00	3.50	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	560.58	560.18	0.032	0.43	0.63	4.50	2.70	1.89	10.53	0.000
2*	560.76	560.37	0.058	0.32	0.32	9.28	9.28	2.53	25.76	0.000
3*	560.18	556.91	0.173	0.63	0.81	6.25	4.48	4.38	11.95	0.000
4*	557.37	556.91	0.029	0.37	0.81	5.20	1.82	1.78	13.14	0.000
5*	556.91	555.95	0.322	0.81	0.99	6.11	4.82	5.96	10.45	0.000
6*	556.29	555.95	0.048	0.24	0.99	12.68	1.86	2.31	41.67	0.000
7*	555.95	554.26	0.592	0.99	0.99	6.53	6.53	8.08	10.49	0.000
8*	555.89	555.44	0.057	0.53	0.53	4.46	4.46	2.51	9.29	0.000
9*	555.66	555.21	0.056	0.30	0.30	9.70	9.70	2.49	27.68	0.000
10*	553.82	553.13	0.311	1.04	1.13	7.62	6.90	12.62	23.52	0.000
11*	555.75	554.33	0.554	1.33	1.33	7.60	7.60	16.84	21.68	0.000
12*	556.76	555.94	0.014	0.32	0.32	4.52	4.52	1.23	12.55	0.000
13*	556.76	555.88	0.061	0.26	0.26	12.42	12.42	2.59	38.83	0.000
14*	557.57	555.75	0.354	1.11	1.13	7.55	7.37	13.45	22.79	0.000
15*	558.42	557.57	0.143	0.57	0.61	6.48	5.95	3.98	13.07	0.000
16*	559.69	557.57	0.191	0.95	1.11	6.73	5.55	9.89	21.61	0.000
17*	560.43	560.17	0.130	0.43	0.43	9.00	9.00	3.79	21.02	0.000
18*	561.08	560.54	0.346	0.69	0.69	7.75	7.75	6.18	14.19	0.000
19*	564.13	561.08	0.018	0.25	0.69	7.10	1.75	1.40	22.61	0.000
20*	561.87	561.08	0.211	0.60	0.69	7.24	6.04	4.83	14.14	0.000
21*	564.52	561.87	0.012	0.24	0.61	6.40	1.73	1.17	21.03	0.000
22*	563.64	561.87	0.125	0.52	0.61	6.75	5.48	3.71	14.18	0.000
23*	563.88	563.64	0.125	0.42	0.52	9.20	6.75	3.71	21.81	0.000
24*	553.13	552.43	0.886	1.13	1.13	14.59	14.59	29.15	57.97	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Discharge decreased downstream node Id= MH-A8 Previous intensity used.
Tailwater set to uniform depth elevation = 552.43(ft)
Drop flowline elevation. Downstream HGL set to uniform depth elevation at Run# 17
Drop flowline elevation. Downstream HGL set to uniform depth elevation at Run# 18

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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HYDRAULIC COMPUTATION SHEET

LINE A

SHEET 1 OF 10

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				213
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

cpyprinter-ANSIB.plt 4/15/2009 8:42:45 AM GBRANICK cpyb&w-ANSIB.tbl pw:/Active Projects/TXD9546/common/546comp01.999

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-B1	0.695	0.82	10.00	10.00	6.93	0.000	3.954
	0.96	0.12	Pavement				
	0.65	0.70	Multi family				
CI-B2	0.875	0.55	10.00	10.00	6.93	0.000	3.322
	0.96	0.40	Pavement				
	0.65	0.15	Multi family				
CI-B3	0.743	0.50	10.00	10.00	6.93	0.000	2.564
	0.96	0.15	Pavement				
	0.65	0.35	Multi family				
CI-B4	0.96	0.44	10.00	10.00	6.93	0.000	2.893
	0.96	0.44	Pavement				
CI-B6	0.96	0.59	10.00	10.00	6.93	0.000	3.923
	0.96	0.59	Pavement				
CI-B5	0.698	1.39	10.00	10.00	6.93	0.000	6.704
	0.96	0.50	Pavement				
	0.55	0.89	Single family				

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 Allowed (ft)	Critic Elev. (ft)
CI-B1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	567.77
CI-B2	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	563.88
CI-B4	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	560.59
CI-B3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	560.45

On Grade Inlets Conmputation 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)
CI-B1	Curb	3.954	3.852	0.250	0.102	CI-B2	11.50	10.00	13.05
CI-B2	Curb	3.423	3.405	0.250	0.018	CI-B3	10.58	10.00	12.40
CI-B4	Curb	2.893	2.893	0.250	0.000	CI-B6	9.58	10.00	11.65
CI-B3	Curb	2.583	2.583	0.250	0.000	CI-B5	8.96	10.00	11.15

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
CI-B6	Curb	15.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	555.78
CI-B5	Curb	15.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	556.00

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
CI-B6	Curb	15.00	n/a	n/a	3.923	14.393	0.210	10.05	10.05
CI-B5	Curb	15.00	n/a	n/a	6.704	14.393	0.300	12.30	12.30

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)
CI-B1	Curb	0.695	0.82	10.00	6.93	0.000	0.00	3.954
MH-B1	BoxMh	0.695	0.82	10.00	6.93	0.000	0.00	3.954
JCT-B2	Junct	0.767	1.37	10.36	6.82	0.000	0.00	7.168
CI-B2	Curb	0.875	0.55	10.00	6.93	0.000	0.00	3.322
MH-B2	BoxMh	0.799	2.30	10.65	6.74	0.000	0.00	12.397
CI-B4	Curb	0.960	0.44	10.00	6.93	0.000	0.00	2.893
CI-B3	Curb	0.743	0.50	10.00	6.93	0.000	0.00	2.564
MH-B3	BoxMh	0.761	3.69	11.27	6.58	0.000	0.00	18.468
CI-B6	Curb	0.788	4.28	11.44	6.54	0.000	0.00	22.050
CI-B5	Curb	0.698	1.39	10.00	6.93	0.000	0.00	6.704
MH-B4	JnctBx	0.788	4.28	11.44	6.54	0.000	0.00	22.050
OUT	Outlt	0.788	4.28	11.44	6.54	0.000	0.00	22.050

Conveyance Configuration Data

Run#	Node US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	CI-B1	MH-B1	564.27	563.88	Circ 1	0.00	1.50	6.50	6.01	0.013
2	MH-B1	JCT-B2	563.88	560.17	Circ 1	0.00	1.50	158.92	2.34	0.013
3	CI-B2	JCT-B2	560.38	559.99	Circ 1	0.00	1.50	6.50	6.01	0.013
4	JCT-B2	MH-B2	560.17	556.57	Circ 1	0.00	1.50	153.85	2.34	0.013
5	CI-B3	MH-B2	556.95	556.57	Circ 1	0.00	1.50	6.50	5.86	0.013
6	CI-B4	MH-B2	557.09	556.57	Circ 1	0.00	1.50	57.50	0.90	0.013
7	MH-B2	MH-B3	556.07	549.12	Circ 1	0.00	2.00	351.16	1.98	0.013
8	CI-B5	MH-B3	550.00	549.90	Circ 1	0.00	1.50	6.50	1.54	0.013
9	MH-B3	CI-B6	549.12	548.63	Circ 1	0.00	2.00	69.97	0.70	0.013
10	CI-B6	MH-B4	548.63	544.88	Circ 1	0.00	2.00	45.10	8.34	0.013
11	MH-B4	OUT	544.88	544.70	Circ 1	0.00	2.00	9.00	2.00	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	564.73	564.39	0.142	0.40	0.51	10.54	7.53	3.95	25.76	0.000
2*	564.39	560.87	0.142	0.51	0.70	7.53	4.87	3.95	16.06	0.000
3*	560.88	560.87	0.100	0.36	0.88	10.03	3.09	3.32	25.76	0.000
4*	560.87	557.27	0.466	0.70	0.70	8.84	8.84	7.17	16.06	0.000
5*	557.30	556.94	0.060	0.32	0.37	9.23	7.65	2.56	25.42	0.000
6*	557.64	557.12	0.076	0.55	0.55	4.88	4.88	2.89	9.99	0.000
7*	556.94	550.71	0.300	0.87	1.59	9.49	4.62	12.40	31.83	0.000
8*	550.80	550.71	0.407	0.76	0.81	7.44	6.85	6.70	13.03	0.000
9	550.71	550.18	0.666	1.59	1.59	6.88	6.88	18.47	18.93	0.000
10*	549.52	546.10	0.950	0.80	1.22	18.77	10.99	22.05	65.35	0.000
11*	546.10	545.92	0.950	1.22	1.22	11.00	11.00	22.05	32.00	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Discharge decreased downstream node Id= MH-B1 Previous intensity used.
Discharge decreased downstream node Id= MH-B4 Previous intensity used.
Tailwater set to uniform depth elevation = 545.92(ft)

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE B

SHEET 2 OF 10

Designed: JCM	FED. RD. DIV. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO.			SHEET NO. 2.14
Checked: RRH						
Drawn: GBG	DIST. DALLAS	COUNTY ROCKWALL	CONTROL NO. 1014	SECTION NO. 03	JOB NO. 039	HIGHWAY NO. FM 740
Checked: RRH						

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-D1	0.691	0.52	10.00	10.00	6.93	0.000	2.504
	0.96	0.18	Pavement				
	0.55	0.34	Single family				
CI-D12	0.55	0.53	10.00	10.00	6.93	0.000	2.031
	0.55	0.53	Single family				
CI-D10	0.96	0.09	10.00	10.00	6.93	0.000	0.618
	0.96	0.09	Pavement				
CI-D11	0.96	0.13	10.00	10.00	6.93	0.000	0.844
	0.96	0.13	Pavement				
CI-D14	0.739	0.52	10.00	10.00	6.93	0.000	2.663
	0.96	0.24	Pavement				
	0.55	0.28	Single family				
CI-D16	0.55	0.65	10.00	10.00	6.93	0.000	2.476
	0.55	0.65	Single family				
CI-D2	0.95	0.62	10.00	10.00	6.93	0.000	4.047
	0.96	0.60	Pavement				
	0.55	0.02	Single family				
CI-D3	0.807	1.42	10.00	10.00	6.93	0.000	7.951
	0.96	0.89	Pavement				
	0.55	0.53	Single family				
CI-D17	0.55	0.48	10.00	10.00	6.93	0.000	1.829
	0.55	0.48	Single family				
CI-D18	0.632	0.55	10.00	10.00	6.93	0.000	2.408
	0.96	0.11	Pavement				
	0.55	0.44	Single family				
CI-D19	0.614	1.09	10.00	10.00	6.93	0.000	4.635
	0.96	0.17	Pavement				
	0.55	0.92	Single family				
CI-D20	0.592	1.57	10.00	10.00	6.93	0.000	6.436
	0.96	0.16	Pavement				
	0.55	1.41	Single family				
CI-D4	0.96	0.42	10.00	10.00	6.93	0.000	2.793
	0.96	0.42	Pavement				
CI-D5	0.664	0.70	10.00	10.00	6.93	0.000	3.200
	0.96	0.19	Pavement				
	0.55	0.50	Single family				
CI-D7	0.618	0.46	10.00	10.00	6.93	0.000	1.957
	0.96	0.08	Pavement				
	0.55	0.38	Single family				
CI-D9	0.96	0.65	10.00	10.00	6.93	0.000	4.342
	0.96	0.65	Pavement				
CI-D8	0.96	0.14	10.00	10.00	6.93	0.000	0.898
	0.96	0.14	Pavement				
CI-D13	0.96	0.26	10.00	10.00	6.93	0.000	1.729
	0.96	0.26	Pavement				
CI-D15	0.96	0.43	10.00	10.00	6.93	0.000	2.859
	0.96	0.43	Pavement				
CI-D21	0.96	0.49	10.00	10.00	6.93	0.000	3.272
	0.96	0.49	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
CI-D1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	559.25
CI-D2	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	559.52
CI-D5	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	557.62
CI-D8	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	556.30
CI-D7	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	556.53
CI-D9	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	555.46
CI-D10	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	556.23
CI-D11	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	554.54
CI-D16	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	547.55
CI-D17	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	550.00
CI-D18	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	550.25
CI-D19	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	544.00
CI-D13	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	549.94
CI-D12	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	551.71

On Grade Inlets Computation Data.

Inlet ID	Inlet Type	Total Q (cfs)	Intercept Capacity (cfs)	Bypass Allow (cfs)	Bypass Actual (cfs)	To Inlet ID	Required Length (ft)	Actual Length (ft)	Ponded Width (ft)
CI-D1	Curb	2.504	2.504	0.250	0.000	CI-D2	8.79	10.00	11.00
CI-D2	Curb	4.047	3.924	0.250	0.123	CI-D3	11.68	10.00	13.20
CI-D5	Curb	3.200	3.198	0.250	0.002	CI-D6	10.15	10.00	12.05
CI-D8	Curb	0.898	0.898	0.250	0.000	CI-D13	4.92	5.00	7.50
CI-D7	Curb	1.957	1.957	0.250	0.000	CI-D9	7.63	10.00	10.05
CI-D9	Curb	4.342	4.146	0.250	0.196	CI-D12	12.18	10.00	13.55
CI-D10	Curb	0.618	0.618	0.250	0.000	CI-D12	4.03	5.00	6.50
CI-D11	Curb	0.844	0.844	0.250	0.000	CI-D12	4.76	5.00	7.30
CI-D16	Curb	2.476	2.476	0.250	0.000	CI-D14	8.73	10.00	10.95
CI-D17	Curb	1.829	1.829	0.250	0.000	CI-D16	7.34	10.00	9.80
CI-D18	Curb	2.408	2.408	0.250	0.000	CI-D19	8.60	10.00	10.85
CI-D19	Curb	4.635	4.635	0.250	0.000	CI-D20	12.67	15.00	13.90
CI-D13	Curb	1.729	1.729	0.250	0.000	CI-D15	7.10	10.00	9.60
CI-D12	Curb	2.226	2.226	0.250	0.000	CI-D14	8.22	10.00	10.55

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
CI-D4	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	558.28
CI-D3	Curb	10.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	558.17
CI-D15	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	547.31
CI-D14	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	547.31
CI-D20	Curb	10.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	542.33
CI-D21	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	542.33

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
CI-D4	Curb	5.00	n/a	n/a	2.793	6.261	0.292	8.85	8.85
CI-D3	Curb	10.00	n/a	n/a	8.074	10.327	0.424	13.15	13.15
CI-D15	Curb	5.00	n/a	n/a	2.859	6.261	0.297	8.90	8.90
CI-D14	Curb	5.00	n/a	n/a	2.663	6.261	0.283	8.70	8.70
CI-D20	Curb	10.00	n/a	n/a	6.436	10.265	0.297	12.10	12.10
CI-D21	Curb	5.00	n/a	n/a	3.272	6.261	0.324	9.40	9.40

5/21/09

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE D

SHEET 3 OF 10

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					215
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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)
MH-B3	BoxMh	0.000	0.00	0.00	0.00	0.000	0.01	0.010
MH-D1	BoxMh	0.691	0.52	10.00	6.93	0.000	0.01	2.514
CI-D1	Curb	0.691	0.52	10.00	6.93	0.000	0.00	2.504
MH-D2	BoxMh	0.831	1.14	11.63	6.49	0.000	0.01	6.148
CI-D2	Curb	0.950	0.62	10.00	6.93	0.000	0.00	4.047
MH-D3	BoxMh	0.838	2.98	12.12	6.37	0.000	0.01	15.917
CI-D4	Curb	0.960	0.42	10.00	6.93	0.000	0.00	2.793
CI-D3	Curb	0.807	1.42	10.00	6.93	0.000	0.00	7.951
JCT-D5	Junct	0.805	3.68	12.39	6.31	0.000	0.01	18.667
CI-D5	Curb	0.664	0.70	10.00	6.93	0.000	0.00	3.200
MH-D4	BoxMh	0.790	4.27	13.04	6.16	0.000	0.01	20.772
CI-D8	Curb	0.960	0.14	10.00	6.93	0.000	0.00	0.898
CI-D7	Curb	0.618	0.46	10.00	6.93	0.000	0.00	1.957
JCT-D9	Junct	0.812	4.92	13.36	6.09	0.000	0.01	24.357
CI-D9	Curb	0.960	0.65	10.00	6.93	0.000	0.00	4.342
JCT-D10	Junct	0.815	5.01	13.43	6.07	0.000	0.01	24.838
CI-D10	Curb	0.960	0.09	10.00	6.93	0.000	0.00	0.618
JCT-D11	Junct	0.819	5.14	13.53	6.05	0.000	0.01	25.483
CI-D11	Curb	0.960	0.13	10.00	6.93	0.000	0.00	0.844
MH-D5	BoxMh	0.801	5.93	13.60	6.04	0.000	0.01	28.698
MH-D6	BoxMh	0.806	6.88	14.18	5.92	0.000	0.01	32.853
CI-D15	Curb	0.960	0.43	10.00	6.93	0.000	0.00	2.859
CI-D14	Curb	0.739	0.52	10.00	6.93	0.000	0.00	2.663
JCT-D16	Junct	0.784	7.53	14.30	5.89	0.000	0.01	34.821
CI-D16	Curb	0.550	0.65	10.00	6.93	0.000	0.00	2.476
MH-D7	CircMh	0.770	8.01	14.59	5.84	0.000	0.01	36.032
CI-D17	Curb	0.550	0.48	10.00	6.93	0.000	0.00	1.829
MH-D8	BoxMh	0.761	8.56	15.09	5.74	0.000	0.01	37.429
CI-D18	Curb	0.632	0.55	10.00	6.93	0.000	0.00	2.408
CI-D19	Curb	0.614	1.09	10.00	6.93	0.000	0.00	4.635
CI-D20	Curb	0.601	2.66	10.24	6.86	0.000	0.00	10.959
MH-D9	BoxMh	0.723	11.22	15.61	5.65	0.000	0.01	45.835
CI-D21	Curb	0.733	11.72	15.74	5.62	0.000	0.01	48.300
CI-D13	Curb	0.960	0.26	10.00	6.93	0.000	0.00	1.729
CI-D12	Curb	0.550	0.53	10.00	6.93	0.000	0.00	2.031
OUT	Outlt	0.733	11.72	15.74	5.62	0.000	0.01	48.300

Conveyance Configuration Data

Run#	Node US	I.D. DS	Flowline Elev. US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
2	MH-B3	MH-D1	550.21	549.16	Circ 1	0.00	1.50	225.60	0.47	0.013
3	CI-D1	MH-D1	554.00	553.80	Circ 1	0.00	1.50	6.50	3.08	0.013
4	MH-D1	MH-D2	549.16	547.84	Circ 1	0.00	1.50	335.08	0.39	0.013
5	CI-D2	MH-D2	554.00	553.80	Circ 1	0.00	1.50	6.50	3.08	0.013
6	MH-D2	MH-D3	547.84	547.36	Circ 1	0.00	2.00	126.66	0.38	0.013
7	CI-D4	MH-D3	552.50	551.90	Circ 1	0.00	1.50	57.50	1.04	0.013
8	CI-D3	MH-D3	552.50	552.30	Circ 1	0.00	1.50	6.50	3.08	0.013
9	MH-D3	JCT-D5	547.36	546.99	Circ 1	0.00	2.50	92.60	0.40	0.013
10	CI-D5	JCT-D5	548.99	547.49	Circ 1	0.00	1.50	6.50	23.72	0.013
13	JCT-D5	MH-D4	546.99	546.13	Circ 1	0.00	2.50	220.90	0.39	0.013
14	CI-D7	MH-D4	551.00	549.90	Circ 1	0.00	1.50	6.50	17.17	0.013
15	CI-D8	MH-D4	551.64	550.50	Circ 1	0.00	1.50	73.93	1.54	0.013
16	MH-D4	JCT-D9	546.13	544.80	Circ 1	0.00	2.50	151.74	0.88	0.013
17	CI-D9	JCT-D9	545.96	545.30	Circ 1	0.00	1.50	6.50	10.21	0.013
18	JCT-D9	JCT-D10	544.80	544.47	Circ 1	0.00	2.50	35.98	0.90	0.013
19	CI-D10	JCT-D10	549.24	544.97	Circ 1	0.00	1.50	37.00	11.62	0.013
20	JCT-D10	JCT-D11	544.47	544.00	Circ 1	0.00	2.50	53.29	0.90	0.013
21	CI-D11	JCT-D11	549.20	544.50	Circ 1	0.00	1.50	38.00	12.46	0.013
22	JCT-D11	MH-D5	544.00	543.68	Circ 1	0.00	2.50	35.59	0.90	0.013
23	CI-D13	MH-D5	545.94	544.78	Circ 1	0.00	1.50	78.78	1.47	0.013
24	CI-D12	MH-D5	545.71	544.78	Circ 1	0.00	1.50	6.50	14.46	0.013
25	MH-D5	MH-D6	543.68	542.52	Circ 1	0.00	3.00	237.41	0.49	0.013
26	CI-D15	MH-D6	543.31	542.62	Circ 1	0.00	2.00	57.50	1.20	0.013
27	CI-D14	MH-D6	543.31	542.62	Circ 1	0.00	1.50	6.50	10.68	0.013
28	MH-D6	JCT-D16	542.52	542.20	Circ 1	0.00	3.00	56.75	0.57	0.013
29	CI-D16	JCT-D16	543.55	542.70	Circ 1	0.00	1.50	6.50	13.19	0.013
30	JCT-D16	MH-D7	542.20	541.44	Circ 1	0.00	3.00	130.96	0.58	0.013
31	CI-D17	MH-D7	544.45	543.80	Circ 1	0.00	1.50	6.50	10.05	0.013
32	MH-D7	MH-D8	541.44	539.72	Circ 1	0.00	3.00	251.87	0.68	0.013
33	CI-D18	MH-D8	542.00	541.90	Circ 1	0.00	2.00	6.50	1.54	0.013
34	MH-D8	MH-D9	539.72	536.02	Circ 1	0.00	3.00	316.71	1.17	0.013
35	CI-D19	CI-D20	540.50	538.83	Circ 1	0.00	1.50	101.52	1.65	0.013
36	CI-D20	MH-D9	537.33	537.00	Circ 1	0.00	1.50	6.50	5.08	0.013
37	MH-D9	CI-D21	536.02	535.72	Circ 1	0.00	3.00	59.20	0.51	0.013
38	CI-D21	OUT	534.17	534.08	Circ 1	0.00	3.00	14.08	0.60	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline 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)
2*	550.25	549.80	0.000	0.04	0.64	0.72	0.01	0.01	7.17	0.000
3*	554.37	554.17	0.057	0.37	0.37	7.29	7.29	2.50	18.43	0.000
4	549.80	548.88	0.057	0.64	1.04	3.46	1.92	2.51	6.59	0.000
5*	554.48	554.28	0.148	0.48	0.48	8.36	8.36	4.05	18.43	0.000
6	548.88	548.79	0.074	0.93	1.43	4.30	2.56	6.15	13.93	0.000
7*	553.02	552.42	0.071	0.52	0.52	5.11	5.11	2.79	10.73	0.000
8*	553.19	552.99	0.573	0.69	0.69	10.05	10.05	7.95	18.43	0.000
9	548.79	548.57	0.151	1.41	1.58	5.60	4.86	15.92	25.93	0.000
10*	549.33	548.57	0.093	0.25	1.08	16.14	2.34	3.20	51.16	0.000
13	548.57	547.59	0.207	1.58	1.58	5.70	5.70	18.67	25.60	0.000
14*	551.22	550.12	0.035	0.22	0.22	12.49	12.49	1.96	43.53	0.000
15*	551.91	550.77	0.007	0.27	0.27	4.23	4.23	0.90	13.05	0.000
16*	547.44	546.24	0.256	1.31	1.45	7.99	7.06	20.77	38.48	0.000
17*	546.46	546.24	0.171	0.36	0.94	13.11	3.71	4.34	33.56	0.000
18*	546.24	545.94	0.353	1.44	1.47	8.35	8.13	24.36	38.93	0.000
19*	549.38	545.94	0.003	0.14	0.97	7.69	0.51	0.62	35.81	0.000
20*	545.94	545.52	0.367	1.46	1.52	8.38	7.93	24.84	38.89	0.000
21*	549.36	545.52	0.006	0.16	1.02	8.67	0.66	0.84	37.09	0.000
22*	545.52	545.39	0.386	1.47	1.71	8.46	7.12	25.48	38.90	0.000
23*	546.31	545.39	0.027	0.37	0.61	5.03	2.59	1.73	12.75	0.000
24*	546.00	545.39	0.037	0.23	0.61	11.83	3.04	2.03	39.94	0.000
25*	545.39	544.29	0.185	1.71	1.77	6.89	6.61	28.70	46.49	0.000
26*	544.30	544.29	0.016	0.46	1.67	5.25	1.02	2.86	24.79	0.000
27*	544.30	544.29	0.064	0.28	1.50	11.56	1.51	2.66	34.33	0.000
28*	544.29	544.03	0.243	1.77	1.83	7.57	7.28	32.85	50.25	0.000
29*	544.03	544.03	0.056	0.26	1.33	12.19	1.50	2.48	38.16	0.000
30*	544.03	543.26	0.272	1.83	1.83	7.72	7.72	34.82	50.95	0.000
31*	544.69	544.04	0.030	0.24	0.24	10.14	10.14	1.83	33.31	0.000
32*	543.21	541.49	0.292	1.77	1.77	8.31	8.31	36.03	55.05	0.000
33*	542.40	542.30	0.011	0.40	0.40	5.45	5.45	2.41	28.07	0.000
34*	541.26	538.41	0.315	1.54	2.39	10.28	6.20	37.43	72.12	0.000
35*	541.11	539.44	0.195	0.61	0.61	6.92	6.92	4.64	13.48	0.000
36*	538.48	538.41	1.088	0.72	1.41	13.14	6.36	10.96	23.69	0.000
37	538.41	537.93	0.472	2.39	2.39	7.59	7.59	45.83	47.41	0.000
38	536.46	536.38	0.524	2.30	2.30	8.32	8.32	48.30	51.83	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Discharge decreased downstream node Id= MH-D1 Previous intensity used.
Tailwater set to uniform depth elevation = 536.38(ft)

5/21/09

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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HYDRAULIC COMPUTATION SHEET

LINE D

SHEET 4 OF 10

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				216
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

cpyprinter_ANSIB.plt 5/21/2009 9:36:58 AM AADAMS $PENTBLS$ $PWFILE$

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
C1-E1	0.789	0.67	10.00	10.00	6.93	0.000	3.660
	0.96	0.39	Pavement				
	0.55	0.28	Single family				
C1-E2	0.96	0.51	10.00	10.00	6.93	0.000	3.391
	0.96	0.51	Pavement				
C1-G1	0.96	0.29	10.00	10.00	6.93	0.000	1.928
	0.96	0.29	Pavement				
C1-G2	0.769	0.60	10.00	10.00	6.93	0.000	3.195
	0.96	0.32	Pavement				
	0.55	0.28	Single family				
C1-G3	0.96	0.51	10.00	10.00	6.93	0.000	3.391
	0.96	0.51	Pavement				
D1-G4	0.96	0.45	10.00	10.00	6.93	0.000	2.959
	0.96	0.45	Pavement				
D1-E3	0.55	1.22	10.00	10.00	6.93	0.000	4.648
	0.55	1.22	Single family				
C1-E5	0.96	0.42	10.00	10.00	6.93	0.000	2.793
	0.96	0.42	Pavement				
D1-E6	0.35	2.93	10.00	10.00	6.93	0.000	7.103
	0.35	2.93	Undeveloped				
C1-E4	0.96	0.38	10.00	10.00	6.93	0.000	2.527
	0.96	0.38	Pavement				
C1-H1	0.96	0.42	10.00	10.00	6.93	0.000	2.793
	0.96	0.42	Pavement				
D1-H2	0.35	3.41	10.00	10.00	6.93	0.000	8.267
	0.35	3.41	Undeveloped				
C1-H3	0.96	0.41	10.00	10.00	6.93	0.000	2.726
	0.96	0.41	Pavement				
C1-H4	0.96	0.47	10.00	10.00	6.93	0.000	3.152
	0.96	0.47	Pavement				
C1-E4	0.96	0.27	10.00	10.00	6.93	0.000	1.795
	0.96	0.27	Pavement				
C1-E7	0.96	0.38	10.00	10.00	6.93	0.000	2.527
	0.96	0.38	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
C1-E1	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	542.32
C1-E2	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	542.62
C1-E4	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	549.92
C1-E5	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	552.02
C1-G1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	552.72
C1-G2	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	554.70
C1-G3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	562.18
C1-H4	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	562.37
C1-H3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	553.75
C1-H1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	555.94
C1-E7	Curb	15.00	2.18	2.00	0.014	0.25	n/a	n/a	13.50	555.23

On Grade Inlets Conmputation 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)
C1-E1	Curb	3.660	3.660	0.000	0.000		11.00	15.00	12.70
C1-E2	Curb	3.391	3.391	0.000	0.000		10.52	15.00	12.35
C1-E4	Curb	1.795	1.795	0.000	0.000		7.25	10.00	9.70
C1-E5	Curb	2.793	2.793	0.000	0.000		9.37	10.00	11.45
C1-G1	Curb	1.931	1.931	0.000	0.000		7.57	10.00	10.00
C1-G2	Curb	3.210	3.207	0.250	0.002	C1-G1	10.18	10.00	12.10
C1-G3	Curb	3.391	3.376	0.250	0.015	C1-G2	10.52	10.00	12.35
C1-H4	Curb	3.152	3.152	0.250	0.000	C1-H3	10.07	10.00	12.00
C1-H3	Curb	2.727	2.727	0.250	0.000	C1-H1	9.24	10.00	11.35
C1-H1	Curb	2.793	2.793	0.000	0.000		9.37	10.00	11.45
C1-E7	Curb	2.527	2.527	0.000	0.000		12.30	15.00	8.40

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
D1-E3	Grate	13.00	8.26	0.50	2.00	0.50	2.00	0.014	n/a	0.50	548.00
D1-E6	Grate	13.00	8.26	0.50	4.00	0.50	4.00	0.014	n/a	0.50	550.25
D1-G4	Grate	13.00	8.26	0.50	2.00	0.50	2.00	0.014	n/a	0.50	557.59
D1-H2	Grate	13.00	8.26	0.50	4.00	0.50	4.00	0.014	n/a	0.50	553.28

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
D1-E3	Grate	n/a	13.00	8.26	4.648	7.094	0.238	10.70	10.70
D1-E6	Grate	n/a	13.00	8.26	7.103	7.094	0.315	8.15	8.15
D1-G4	Grate	n/a	13.00	8.26	2.959	7.094	0.176	9.05	9.05
D1-H2	Grate	n/a	13.00	8.26	8.267	7.094	0.349	8.63	8.63

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)
MH-D9	BoxMh	0.000	0.00	0.00	0.00	0.000	0.01	0.010
C1-E1	Curb	0.789	0.67	10.00	6.93	0.000	0.00	3.660
MH-E1	BoxMh	0.863	1.18	10.17	6.88	0.000	0.01	7.012
C1-E2	Curb	0.960	0.51	10.00	6.93	0.000	0.00	3.391
JCT-E2A	Junct	0.863	1.18	10.17	6.88	0.000	4.91	11.912
MH-E2	BoxMh	0.739	2.78	11.23	6.59	0.000	4.91	18.449
D1-E3	Grate	0.550	1.22	10.00	6.93	0.000	0.00	4.648
C1-E4	Curb	0.647	1.60	10.07	6.91	0.000	0.00	7.154
JCT-E5	Junct	0.568	6.13	11.64	6.49	0.000	4.91	27.503
D1-E6	Grate	0.350	2.93	10.00	6.93	0.000	0.00	7.103
C1-E5	Curb	0.426	3.35	10.07	6.91	0.000	0.00	9.868
MH-E3	BoxMh	0.644	7.98	12.05	6.39	0.000	4.91	37.735
C1-G1	Curb	0.898	1.85	11.49	6.52	0.000	0.00	10.807
C1-G2	Curb	0.886	1.56	10.75	6.72	0.000	0.00	9.257
C1-G3	Curb	0.960	0.96	10.03	6.92	0.000	0.00	6.343
D1-G4	Grate	0.960	0.45	10.00	6.93	0.000	0.00	2.959
C1-H4	Curb	0.960	0.47	10.00	6.93	0.000	0.00	3.152
C1-H3	Curb	0.519	4.71	11.10	6.62	0.000	0.00	16.199
C1-H1	Curb	0.960	0.42	10.00	6.93	0.000	0.00	2.793
D1-H2	Grate	0.417	3.83	10.09	6.90	0.000	0.00	11.018
MH-E4	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E5	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E6	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E7	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E8	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E9	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
C1-E7	Curb	0.960	0.38	10.00	6.93	0.000	0.00	2.527
⚠ MH-E10	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
OUT	Outlt	0.608	13.07	12.39	6.31	0.000	4.91	55.043

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Grate inlet in sag Id=D1-E3 has a % reduction safety factor = 50
Grate inlet in sag Id=D1-E6 has a % reduction safety factor = 50
Grate inlet in sag Id=D1-G4 has a % reduction safety factor = 50
Grate inlet in sag Id=D1-H2 has a % reduction safety factor = 50
Tailwater set to uniform depth elevation = 433.31(ft)

⚠ REVISED 07.30.09 VN

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	MH-D9	MH-E1	538.41	537.39	Circ 1	0.00	1.50	114.53	0.89	0.013
2	C1-E2	MH-E1	538.59	537.39	Circ 1	0.00	1.50	66.80	1.80	0.013
3	C1-E1	MH-E1	538.32	537.39	Circ 1	0.00	1.50	8.20	11.42	0.013
4	MH-E1	JCT-E2A	537.39	537.31	Circ 1	0.00	2.50	20.71	0.40	0.013
5	JCT-E2A	MH-E2	537.31	536.09	Circ 1	0.00	2.50	303.26	0.40	0.013
6	D1-E3	C1-E4	545.50	544.00	Circ 1	0.00	1.50	39.18	3.83	0.013
7	C1-E4	MH-E2	544.00	543.80	Circ 1	0.00	1.50	8.20	2.44	0.013
8	MH-E2	JCT-E5	536.09	535.52	Circ 1	0.00	3.00	143.83	0.40	0.013
9	D1-E6	C1-E5	540.00	538.75	Circ 1	0.00	1.50	40.24	3.11	0.013
10	C1-E5	JCT-E5	538.25	536.02	Circ 1	0.00	2.00	59.20	3.77	0.013
11	JCT-E5	MH-E3	535.52	534.89	Circ 1	0.00	3.00	157.32	0.40	0.013
12	D1-G4	C1-G3	554.80	554.59	Circ 1	0.00	1.50	10.61	2.00	0.013
13	C1-G3	C1-G2	554.59	551.13	Circ 1	0.00	1.50	288.48	1.20	0.013
14	C1-G2	C1-G1	551.13	547.26	Circ 1	0.00	1.50	322.51	1.20	0.013
15	C1-G1	MH-E3	544.53	544.41	Circ 1	0.00	1.50	8.20	1.50	0.013
16	MH-E3	MH-E4	534.89	534.33	Circ 1	0.00	3.00	138.88	0.40	0.013
17	C1-H4	C1-H3	557.00	548.17	Circ 1	0.00	1.50	441.67	2.00	0.013
18	C1-H1	D1-H2	553.44	550.78	Circ 1	0.00	1.50	49.91	5.34	0.013
19	D1-H2	C1-H3	550.78	548.17	Circ 1	0.00	1.50	41.34	6.33	0.013
20	C1-H3	MH-E4	548.17	544.33	Circ 1	0.00	1.50	130.68	2.93	0.013
22	MH-E4	MH-E5	534.33	533.01	Circ 1	0.00	3.50	330.23	0.40	0.013
23	MH-E5	MH-E6	533.01	521.73	Circ 1	0.00	3.50	376.04	3.00	0.013
24	MH-E6	MH-E7	521.73	500.50	Circ 1	0.00	3.50	442.24	4.81	0.013
25	MH-E7	MH-E8	498.50	467.50	Circ 1	0.00	3.50	414.26	7.50	0.013
26	MH-E8	MH-E9	463.50	442.00	Circ 1	0.00	3.50	400.76	5.37	0.013
⚠ 27	MH-E9	MH-E10	442.00	441.33	Circ 1	0.00	3.50	49.74	1.35	0.013
⚠ 21	C1-E7	MH-E4	547.23	544.33	Circ 1	0.00	1.50	8.11	38.29	0.013
⚠ 28	MH-E10	OUT	435.58	432.00	Circ 1	0.00	3.50	264.73	1.35	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	538.50	538.50	0.000	0.04	1.11	0.91	0.01	0.01	9.91	0.000
2*	539.10	538.50	0.104	0.50	1.11	6.56	2.41	3.39	14.08	0.000
3*	538.75	538.50	0.121	0.33	1.11	12.92	2.60	3.66	35.49	0.000
4	538.50	538.50	0.029	0.89	1.19	4.48	3.04	7.01	25.97	0.000
5	538.50	537.50	0.084	1.19	1.41	5.16	4.18	11.91	25.94	0.000
6*	546.00	544.69	0.196	0.48	0.69	9.40	5.81	4.65	20.56	0.000
7*	544.69	544.49	0.464	0.69	0.69	8.97	8.97	7.15	16.41	0.000
8	537.50	537.42	0.076	1.38	1.90	5.80	3.90	18.45	42.18	0.000
9*	540.65	539.39	0.457	0.64	0.64	9.79	9.79	7.10	18.52	0.000
10*	538.92	537.42	0.190	0.64	1.40	11.28	4.19	9.87	43.93	0.000
11	537.42	537.23	0.170	1.76	2.34	6.39	4.66	27.50	42.18	0.000
12*	555.39	555.38	0.079	0.45	0.80	6.55	3.10	2.96	14.85	0.000
13*	555.38	552.15	0.365	0.80	1.02	6.65	4.96	6.34	11.51	0.000
14*	552.15	548.28	0.776	1.02	1.02	7.24	7.24	9.26	11.51	0.000
15*	545.59	545.46	1.058	1.05	1.05	8.14	8.14	10.81	12.87	0.000
16	537.23	536.85	0.320	2.20	2.52	6.78	5.96	37.73	42.21	0.000
17*	557.47	549.28	0.090	0.47	1.11	6.68	2.24	3.15	14.86	0.000
18*	553.79	551.51	0.071	0.34	0.73	9.15	3.25	2.79	24.27	0.000
19*	551.51	549.28	1.100	0.68	1.11	14.28	7.83	11.02	26.44	0.000
20*	549.28	545.45	2.378	1.11	1.11	11.52	11.52	16.20	18.00	0.000
22	536.85	535.34	0.299	2.52	2.52	7.44	7.44	55.04	63.64	0.000
23*	534.36	523.08	0.299	1.35	1.35	16.05	16.05	55.04	174.32	0.000
24*	522.92	501.69	0.299	1.19	1.19	19.06	19.06	55.04	220.61	0.000
25*	499.56	468.56	0.299	1.06	1.06	22.37	22.37	55.04	275.65	0.000
26*	464.66	443.69	0.299	1.16	1.69	19.83	11.97	55.04	233.23	0.000
⚠ 27*	443.69	443.02	0.299	1.69	1.69	11.98	11.98	55.04	116.79	0.000
⚠ 21*	547.43	544.53	0.058	0.20	0.20	17.86	17.86	2.53	65.01	0.000
⚠ 28*	437.27	433.69	0.299	1.69	1.69	11.98	11.98	55.04	117.02	0.000

END

7/15/09

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE E, G & H

SHEET 5 OF 10

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				217
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

$PLTDRV$$ 7/15/2009 1:48:19 PM adams $PENTBL$$ $PWFILE$$

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-E1	0.789	0.67	10.00	10.00	6.93	0.000	3.660
	0.96	0.39	Pavement				
	0.55	0.28	Single family				
CI-E2	0.96	0.51	10.00	10.00	6.93	0.000	3.391
	0.96	0.51	Pavement				
CI-G1	0.96	0.29	10.00	10.00	6.93	0.000	1.928
	0.96	0.29	Pavement				
CI-G2	0.769	0.60	10.00	10.00	6.93	0.000	3.195
	0.96	0.32	Pavement				
	0.55	0.28	Single family				
CI-G3	0.96	0.51	10.00	10.00	6.93	0.000	3.391
	0.96	0.51	Pavement				
DI-G4	0.96	0.45	10.00	10.00	6.93	0.000	2.959
	0.96	0.45	Pavement				
DI-E3	0.55	1.22	10.00	10.00	6.93	0.000	4.648
	0.55	1.22	Single family				
CI-E5	0.96	0.42	10.00	10.00	6.93	0.000	2.793
	0.96	0.42	Pavement				
DI-E6	0.35	2.93	10.00	10.00	6.93	0.000	7.103
	0.35	2.93	Undeveloped				
CI-E7	0.96	0.38	10.00	10.00	6.93	0.000	2.527
	0.96	0.38	Pavement				
CI-H1	0.96	0.42	10.00	10.00	6.93	0.000	2.793
	0.96	0.42	Pavement				
DI-H2	0.35	3.41	10.00	10.00	6.93	0.000	8.267
	0.35	3.41	Undeveloped				
CI-H3	0.96	0.41	10.00	10.00	6.93	0.000	2.726
	0.96	0.41	Pavement				
CI-H4	0.96	0.47	10.00	10.00	6.93	0.000	3.152
	0.96	0.47	Pavement				
CI-E4	0.96	0.27	10.00	10.00	6.93	0.000	1.795
	0.96	0.27	Pavement				
CI-E7	0.96	0.38	10.00	10.00	6.93	0.000	2.527
	0.96	0.38	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
CI-E1	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	542.32
CI-E2	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	542.62
CI-E4	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	549.92
CI-E5	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	552.02
CI-G1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	552.72
CI-G2	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	554.70
CI-G3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	562.18
CI-H4	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	562.37
CI-H3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	553.75
CI-H1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	555.94
CI-E7	Curb	15.00	2.18	2.00	0.014	0.25	n/a	n/a	13.50	555.23

On Grade Inlets Conmputation 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)
CI-E1	Curb	3.660	3.660	0.000	0.000		11.00	15.00	12.70
CI-E2	Curb	3.391	3.391	0.000	0.000		10.52	15.00	12.35
CI-E4	Curb	1.795	1.795	0.000	0.000		7.25	10.00	9.70
CI-E5	Curb	2.793	2.793	0.000	0.000		9.37	10.00	11.45
CI-G1	Curb	1.931	1.931	0.000	0.000		7.57	10.00	10.00
CI-G2	Curb	3.210	3.207	0.250	0.002	CI-G1	10.18	10.00	12.10
CI-G3	Curb	3.391	3.376	0.250	0.015	CI-G2	10.52	10.00	12.35
CI-H4	Curb	3.152	3.152	0.250	0.000	CI-H3	10.07	10.00	12.00
CI-H3	Curb	2.727	2.727	0.250	0.000	CI-H1	9.24	10.00	11.35
CI-H1	Curb	2.793	2.793	0.000	0.000		9.37	10.00	11.45
CI-E7	Curb	2.527	2.527	0.000	0.000		12.30	15.00	8.40

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
DI-E3	Grate	13.00	8.26	0.50	2.00	0.50	2.00	0.014	n/a	0.50	548.00
DI-E6	Grate	13.00	8.26	0.50	4.00	0.50	4.00	0.014	n/a	0.50	550.25
DI-G4	Grate	13.00	8.26	0.50	2.00	0.50	2.00	0.014	n/a	0.50	557.59
DI-H2	Grate	13.00	8.26	0.50	4.00	0.50	4.00	0.014	n/a	0.50	553.28

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
DI-E3	Grate	n/a	13.00	8.26	4.648	7.094	0.238	10.70	10.70
DI-E6	Grate	n/a	13.00	8.26	7.103	7.094	0.315	8.15	8.15
DI-G4	Grate	n/a	13.00	8.26	2.959	7.094	0.176	9.05	9.05
DI-H2	Grate	n/a	13.00	8.26	8.267	7.094	0.349	8.63	8.63

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)
MH-D9	BoxMh	0.000	0.00	0.00	0.00	0.000	0.01	0.010
CI-E1	Curb	0.789	0.67	10.00	6.93	0.000	0.00	3.660
MH-E1	BoxMh	0.863	1.18	10.17	6.88	0.000	0.01	7.012
CI-E2	Curb	0.960	0.51	10.00	6.93	0.000	0.00	3.391
JCT-E2A	Junct	0.863	1.18	10.17	6.88	0.000	4.91	11.912
MH-E2	BoxMh	0.739	2.78	11.23	6.59	0.000	4.91	18.449
DI-E3	Grate	0.550	1.22	10.00	6.93	0.000	0.00	4.648
CI-E4	Curb	0.647	1.60	10.07	6.91	0.000	0.00	7.154
JCT-E5	Junct	0.568	6.13	11.64	6.49	0.000	4.91	27.503
DI-E6	Grate	0.350	2.93	10.00	6.93	0.000	0.00	7.103
CI-E5	Curb	0.426	3.35	10.07	6.91	0.000	0.00	9.868
MH-E3	BoxMh	0.644	7.98	12.05	6.39	0.000	4.91	37.735
CI-G1	Curb	0.898	1.85	11.49	6.52	0.000	0.00	10.807
CI-G2	Curb	0.886	1.56	10.75	6.72	0.000	0.00	9.257
CI-G3	Curb	0.960	0.96	10.03	6.92	0.000	0.00	6.343
DI-G4	Grate	0.960	0.45	10.00	6.93	0.000	0.00	2.959
CI-H4	Curb	0.960	0.47	10.00	6.93	0.000	0.00	3.152
CI-H3	Curb	0.519	4.71	11.10	6.62	0.000	0.00	16.199
CI-H1	Curb	0.960	0.42	10.00	6.93	0.000	0.00	2.793
DI-H2	Grate	0.417	3.83	10.09	6.90	0.000	0.00	11.018
MH-E4	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E5	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E6	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E7	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E8	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E9	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
CI-E7	Curb	0.960	0.38	10.00	6.93	0.000	0.00	2.527
MH-E10	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-DC	CircMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
MH-E11	BoxMh	0.608	13.07	12.39	6.31	0.000	4.91	55.043
OUT	Outlt	0.608	13.07	12.39	6.31	0.000	4.91	55.043

Conveyance Configuration Data

Run#	Node US	Node DS	I.D.	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	MH-D9	MH-E1		538.41	537.39	Circ 1	0.00	1.50	114.53	0.89	0.013
2	CI-E2	MH-E1		538.59	537.39	Circ 1	0.00	1.50	66.80	1.80	0.013
3	CI-E1	MH-E1		538.32	537.39	Circ 1	0.00	1.50	8.20	11.42	0.013
4	MH-E1	JCT-E2A		537.39	537.31	Circ 1	0.00	2.50	20.71	0.40	0.013
5	JCT-E2A	MH-E2		537.31	536.09	Circ 1	0.00	2.50	303.26	0.40	0.013
6	DI-E3	CI-E4		545.50	544.00	Circ 1	0.00	1.50	39.18	3.83	0.013
7	CI-E4	MH-E2		544.00	543.80	Circ 1	0.00	1.50	8.20	2.44	0.013
8	MH-E2	JCT-E5		536.09	535.52	Circ 1	0.00	3.00	143.83	0.40	0.013
9	DI-E6	CI-E5		540.00	538.75	Circ 1	0.00	1.50	40.24	3.11	0.013
10	CI-E5	JCT-E5		538.25	536.02	Circ 1	0.00	2.00	59.20	3.77	0.013
11	JCT-E5	MH-E3		535.52	534.89	Circ 1	0.00	3.00	157.32	0.40	0.013
12	DI-G4	CI-G3		554.80	554.59	Circ 1	0.00	1.50	10.61	2.00	0.013
13	CI-G3	CI-G2		554.59	551.13	Circ 1	0.00	1.50	288.48	1.20	0.013
14	CI-G2	CI-G1		551.13	547.26	Circ 1	0.00	1.50	322.51	1.20	0.013
15	CI-G1	MH-E3		544.53	544.41	Circ 1	0.00	1.50	8.20	1.50	0.013
16	MH-E3	MH-E4		534.89	534.33	Circ 1	0.00	3.00	138.88	0.40	0.013
17	CI-H4	CI-H3		557.00	548.17	Circ 1	0.00	1.50	441.67	2.00	0.013
18	CI-H1	DI-H2		553.44	550.78	Circ 1	0.00	1.50	49.91	5.34	0.013
19	DI-H2	CI-H3		550.78	548.17	Circ 1	0.00	1.50	41.34	6.33	0.013
20	CI-H3	MH-E4		548.17	544.33	Circ 1	0.00	1.50	130.68	2.93	0.013
22	MH-E4	MH-E5		534.33	533.01	Circ 1	0.00	3.50	330.23	0.40	0.013
23	MH-E5	MH-E6		533.01	521.73	Circ 1	0.00	3.50	376.04	3.00	0.013
24	MH-E6	MH-E7		521.73	500.50	Circ 1	0.00	3.50	442.24	4.81	0.013
25	MH-E7	MH-E8		498.50	467.50	Circ 1	0.00	3.50	414.26	7.50	0.013
26	MH-E8	MH-E9		463.43	441.79	Circ 1	0.00	3.50	400.76	5.41	0.013
27	MH-E9	MH-E10		441.79	440.79	Circ 1	0.00	3.50	50.01	2.00	0.013
21	CI-E7	MH-E3		547.23	544.33	Circ 1	0.00	1.50	8.01	36.29	0.013
28	MH-E10	MH-DC		437.18	435.50	Circ 1	0.00	3.50	336.74	0.50	0.013
29	MH-DC	MH-E11		435.50	432.58	Circ 1	0.00	3.50	418.39	0.70	0.013
30	MH-E11	OUT		432.58	432.00	Circ 1	0.00	3.50	128.78	0.45	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	538.50	538.50	0.000	0.04	1.11	0.91	0.01	0.01	9.91	0.000
2*	539.10	538.50	0.104	0.50	1.11	6.56	2.41	3.39	14.08	0.000
3*	538.75	538.50	0.121	0.33	1.11	12.92	2.60	3.66	35.49	0.000
4	538.50	538.50	0.029	0.89	1.19	4.48	3.04	7.01	25.97	0.000
5	538.50	537.50	0.084	1.19	1.41	5.16	4.18	11.91	25.94	0.000
6*	546.00	544.69	0.196	0.48	0.69	9.40	5.81	4.65	20.56	0.000
7*	544.69	544.49	0.464	0.69	0.69	8.97	8.97	7.15	16.41	0.000
8	537.50	537.42	0.076	1.38	1.90	5.80	3.90	18.45	42.18	0.000
9*	540.65	539.39	0.457	0.64	0.64	9.79	9.79	7.10	18.52	0.000
10*	538.92	537.42	0.190	0.64	1.40	11.28	4.19	9.87	43.93	0.000
11	537.42	537.23	0.170	1.76	2.34	6.39	4.66	27.50	42.18	0.000
12*	555.39	555.38	0.079	0.45	0.80	6.55	3.10	2.96	14.85	0.000
13*	555.38	552.15	0.365	0.80	1.02	6.65	4.96	6.34	11.51	0.000
14*	552.15	548.28	0.776	1.02	1.02	7.24	7.24	9.26	11.51	0.000
15*	545.59	545.46	1.058	1.05	1.05	8.14	8.14	10.81	12.87	0.000
16	537.23	536.85	0.320	2.20	2.52	6.78	5.96	37.73	42.21	0.000
17*	557.47	549.28	0.090	0.47	1.11	6.68	2.24	3.15	14.86	0.000
18*	553.79	551.51	0.071	0.34	0.73	9.15	3.25	2.79	24.27	0.000
19*	551.51	549.28	1.100	0.68	1.11	14.28	7.83	11.02	26.44	0.000
20*	549.28	545.45	2.378	1.11	1.11	11.52	11.52	16.20	18.00	0.000
22	536.85	535.34	0.299	2.52	2.52	7.44	7.44	55.04	63.64	0.000
23*	534.36	523.08	0.299	1.35	1.35	16.05	16.05	55.04	174.32	0.000
24*	522.92	501.69	0.299	1.19	1.19	19.06	19.06	55.04	220.61	0.000
25*	499.56	468.56	0.299	1.06	1.06	22.37	22.37	55.04	275.65	0.000
26*	464.59	443.30	0.299	1.16	1.51	13.87	13.83	55.04	233.99	0.000
27*	443.30	442.30	0.299	1.51	1.51	13.84	13.84	55.04	142.37	0.000
21*	547.43	544.53	0.058	0.20	0.20	1.36	1.36	2.53	55.01	0.000
28*	439.48	437.80	0.299	2.30	2.30	8.22	8.22	55.04	71.16	0.000
29*	437.56	434.99	0.299	2.06	2.41	9.32	7.81	55.04	84.06	0.000
30	434.99	434.41	0.299	2.41	2.41	7.80	7.80	55.04	67.47	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Grate inlet in sag id=DI-E3 has a % reduction safety factor = 50
Grate inlet in sag id=DI-E6 has a % reduction safety factor = 50
Grate inlet in sag id=DI-G4 has a % reduction safety factor = 50
Grate inlet in sag id=DI-H2 has a % reduction safety factor = 50
Tailwater set to uniform depth elevation = 433.31(ft)

No.	DATE	REVISION	APPROVED
△	11-02-10	NEW MANHOLE, CDS	

11/15/2010

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE E, G & H

SHEET 5 OF 10

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				21A
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-I1	0.96	0.32	10.00	10.00	6.93	0.000	2.121
	0.96	0.32	Pavement				
CI-I2	0.96	0.27	10.00	10.00	6.93	0.000	1.795
	0.96	0.27	Pavement				
CI-I3	0.96	0.27	10.00	10.00	6.93	0.000	1.795
	0.96	0.27	Pavement				
CI-I4	0.96	0.40	10.00	10.00	6.93	0.000	2.653
	0.96	0.40	Pavement				
CI-J1	0.96	0.23	10.00	10.00	6.93	0.000	1.496
	0.96	0.23	Pavement				
CI-J2	0.96	0.33	10.00	10.00	6.93	0.000	2.194
	0.96	0.33	Pavement				
CI-J3	0.96	0.31	10.00	10.00	6.93	0.000	2.061
	0.96	0.31	Pavement				
CI-J4	0.96	0.48	10.00	10.00	6.93	0.000	3.159
	0.96	0.48	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
CI-I1	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	566.00
CI-I2	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	556.99
CI-I3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	548.09
CI-J1	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	568.36
CI-J2	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	559.13
CI-J3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	550.69

On Grade Inlets Conmputation 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)
CI-I1	Curb	2.121	1.760	0.250	0.361	CI-I2	7.99	5.00	10.35
CI-I2	Curb	2.157	1.779	0.250	0.377	CI-I3	8.06	5.00	10.40
CI-I3	Curb	2.173	2.173	0.250	0.000	CI-I4	8.10	10.00	10.45
CI-J1	Curb	1.496	1.385	0.250	0.111	CI-J2	6.54	5.00	9.10
CI-J2	Curb	2.306	1.854	0.250	0.451	CI-J3	8.39	5.00	10.70
CI-J3	Curb	2.513	2.513	0.250	0.000	CI-J4	8.82	10.00	11.05

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
CI-I4	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	545.70
CI-J4	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	545.70

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
CI-I4	Curb	5.00	n/a	n/a	2.653	6.261	0.282	8.70	8.70
CI-J4	Curb	5.00	n/a	n/a	3.159	6.261	0.317	9.25	9.25

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)
CI-I1	Curb	0.960	0.32	10.00	6.93	0.000	0.00	2.121
CI-I2	Curb	0.960	0.59	10.73	6.72	0.000	0.00	3.802
CI-I3	Curb	0.960	0.86	11.34	6.56	0.000	0.00	5.412
CI-I4	Curb	0.960	1.26	11.84	6.44	0.000	0.00	7.775
CI-J4	Curb	0.960	1.73	12.03	6.39	0.000	0.00	10.634
MH-J3	BoxMh	0.960	2.60	12.27	6.33	0.000	0.00	15.800
CI-J1	Curb	0.960	0.23	10.00	6.93	0.000	0.00	1.496
CI-J2	Curb	0.960	0.56	10.85	6.69	0.000	0.00	3.565
CI-J3	Curb	0.960	0.87	11.42	6.54	0.000	0.00	5.432
OUT	Outlt	0.960	2.60	12.27	6.33	0.000	0.00	15.800

Conveyance Configuration Data

Run#	Node US	Node DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	CI-I1	CI-I2	562.00	552.99	Circ 1	0.00	1.50	300.11	3.00	0.013
2	CI-I2	CI-I3	552.99	544.09	Circ 1	0.00	1.50	299.32	2.97	0.013
3	CI-I3	CI-I4	544.09	541.20	Circ 1	0.00	1.50	204.61	1.41	0.013
4	CI-I4	CI-J4	540.70	540.20	Circ 1	0.00	2.00	67.00	0.75	0.013
5	CI-J4	MH-J3	540.20	539.80	Circ 1	0.00	2.00	78.29	0.51	0.013
6	CI-J1	CI-J2	563.65	555.00	Circ 1	0.00	1.50	309.65	2.79	0.013
7	CI-J2	CI-J3	555.00	546.00	Circ 1	0.00	1.50	281.27	3.20	0.013
8	CI-J3	MH-J3	546.00	540.30	Circ 1	0.00	1.50	215.46	2.65	0.013
9	MH-J3	OUT	539.80	539.00	Circ 1	0.00	2.00	8.73	9.20	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	562.35	553.46	0.041	0.35	0.47	6.89	4.53	2.12	18.21	0.000
2*	553.46	544.78	0.131	0.47	0.69	8.11	4.78	3.80	18.12	0.000
3*	544.78	541.89	0.265	0.69	0.69	6.80	6.80	5.41	12.49	0.000
4*	541.58	541.39	0.118	0.88	1.19	5.88	4.00	7.77	19.55	0.000
5	541.39	540.97	0.221	1.19	1.19	5.47	5.47	10.63	16.17	0.000
6*	563.95	555.44	0.020	0.30	0.44	6.06	3.44	1.50	17.56	0.000
7*	555.44	546.58	0.115	0.44	0.58	8.19	5.63	3.56	18.80	0.000
8*	546.58	540.88	0.267	0.58	0.58	8.58	8.58	5.43	17.09	0.000
9*	540.45	539.65	0.488	0.65	0.65	17.72	17.72	15.80	68.64	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Capacity of grade inlet exceeded at inlet Id= CI-I1
Capacity of grade inlet exceeded at inlet Id= CI-I2
Capacity of grade inlet exceeded at inlet Id= CI-J1
Capacity of grade inlet exceeded at inlet Id= CI-J2
Tailwater set to uniform depth elevation = 539.65(ft)

4/15/09

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE I & J

SHEET 6 OF 10

Designed: JCM	FED. RD. DIV. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO.	SHEET NO. 218
Checked: RRH				
Drawn: GBG	DIST. DALLAS	COUNTY ROCKWALL	CONTROL NO. 1014	SECTION NO. 03	JOB NO. 039	HIGHWAY NO. FM 740
Checked: RRH				

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-L1	0.96	0.64	10.00	10.00	6.93	0.000	4.276
	0.96	0.64	Pavement				
CI-L4	0.96	0.31	10.00	10.00	6.93	0.000	2.061
	0.96	0.31	Pavement				
CI-L6	0.96	0.31	10.00	10.00	6.93	0.000	2.061
	0.96	0.31	Pavement				
CI-L2	0.96	0.65	10.00	10.00	6.93	0.000	4.322
	0.96	0.65	Pavement				
CI-L3	0.96	0.30	10.00	10.00	6.93	0.000	1.995
	0.96	0.30	Pavement				
CI-L7	0.35	0.32	10.00	10.00	6.93	0.000	0.776
	0.35	0.32	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
CI-L4	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	544.80
CI-L3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	544.81
CI-L6	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	555.73
CI-L7	Curb	5.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	555.73

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)
CI-L4	Curb	2.061	2.061	0.250	0.000	CI-L1	7.86	10.00	10.25
CI-L3	Curb	1.995	1.995	0.250	0.000	CI-L2	7.70	10.00	10.10
CI-L6	Curb	2.061	2.061	0.000	0.000		7.86	10.00	10.25
CI-L7	Curb	0.776	0.776	0.000	0.000		4.55	5.00	7.10

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
CI-L1	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	543.04
CI-L2	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	543.04

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
CI-L1	Curb	5.00	n/a	n/a	4.276	6.261	0.388	10.40	10.40
CI-L2	Curb	5.00	n/a	n/a	4.322	6.261	0.391	10.40	10.40

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)
CI-L1	Curb	0.960	0.64	10.00	6.93	0.000	0.00	4.276
CI-L2	Curb	0.960	1.29	10.29	6.85	0.000	0.00	8.497
CI-L4	Curb	0.960	0.31	10.00	6.93	0.000	0.00	2.061
CI-L3	Curb	0.960	1.90	10.96	6.66	0.000	0.00	12.171
MH-L5	BoxMh	0.883	2.53	11.61	6.50	0.000	0.00	14.527
CI-L6	Curb	0.960	0.31	10.00	6.93	0.000	0.00	2.061
CI-L7	Curb	0.650	0.63	10.34	6.83	0.000	0.00	2.797
OUT	Outlt	0.883	2.53	11.61	6.50	0.000	0.00	14.527

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	CI-L1	CI-L2	539.54	539.28	Circ 1	0.00	1.50	67.00	0.39	0.013
2	CI-L2	CI-L3	538.78	538.10	Circ 1	0.00	2.00	185.59	0.37	0.013
3	CI-L4	CI-L3	541.30	538.60	Circ 1	0.00	1.50	67.00	4.03	0.013
4	CI-L3	MH-L5	538.10	537.35	Circ 1	0.00	2.00	196.16	0.38	0.013
5	CI-L6	CI-L7	552.23	551.97	Circ 1	0.00	1.50	67.00	0.39	0.013
6	CI-L7	MH-L5	549.62	543.82	Circ 1	0.00	1.50	127.94	4.54	0.013
7	MH-L5	OUT	537.35	526.80	Circ 1	0.00	2.00	312.61	3.38	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1	540.43	540.07	0.166	0.89	0.89	3.91	3.91	4.28	6.54	0.000
2	539.93	539.54	0.141	1.14	1.44	4.59	3.52	8.50	13.70	0.000
3*	541.62	539.54	0.038	0.32	0.94	7.57	1.77	2.06	21.10	0.000
4	539.54	538.60	0.289	1.44	1.44	5.04	5.04	12.17	13.99	0.000
5	552.81	552.51	0.038	0.58	0.58	3.27	3.27	2.06	6.54	0.000
6*	549.98	544.18	0.071	0.36	0.36	8.64	8.64	2.80	22.38	0.000
7*	538.17	527.62	0.412	0.82	0.82	12.05	12.05	14.53	41.58	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Tailwater set to uniform depth elevation = 527.62(ft)
Drop flowline elevation. Downstream HGL set to uniform depth elevation at Run# 6
Drop flowline elevation. Downstream HGL set to critical depth elevation at Run# 5

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STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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HYDRAULIC COMPUTATION SHEET

LINE L

SHEET 7 OF 10

Designed: JCM	FED. RD. DIV. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO.				SHEET NO. 219
Checked: RRH							
Drawn: GBG	DIST. DALLAS	COUNTY ROCKWALL	CONTROL NO. 1014	SECTION NO. 03	JOB NO. 039		HIGHWAY NO. FM 740
Checked: RRH							

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
C1-M1	0.96	0.21	10.00	10.00	6.93	0.000	1.396
	0.96	0.21	Pavement				
C1-M2	0.96	0.55	10.00	10.00	6.93	0.000	3.657
	0.96	0.55	Pavement				
C1-M3	0.96	0.19	10.00	10.00	6.93	0.000	1.263
	0.96	0.19	Pavement				
C1-M4	0.96	0.32	10.00	10.00	6.93	0.000	2.128
	0.96	0.32	Pavement				
N1	0.437	1.47	10.00	10.00	6.93	0.000	4.451
	0.96	0.21	Pavement				
	0.35	1.26	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)	Grate Type	Pond Width Allowed (ft)	Critic Elev. (ft)
C1-M1	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	561.00
C1-M3	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	561.07
C1-M4	Curb	10.00	0.70	2.00	0.014	0.33	n/a	n/a	12.00	553.55

On Grade Inlets Conmputation 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)
C1-M1	Curb	1.396	1.396	0.250	0.000	C1-M2	6.29	10.00	8.85
C1-M3	Curb	1.263	1.263	0.250	0.000	C1-N2	5.94	10.00	8.50
C1-M4	Curb	2.128	2.128	0.000	0.000		7.18	10.00	9.75

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
C1-M2	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	553.55

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
C1-M2	Curb	5.00	n/a	n/a	3.657	5.133	0.335	9.80	9.80

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)
C1-M1	Curb	0.960	0.40	10.30	6.84	0.000	0.00	2.628
MH-M1	BoxMh	0.960	0.40	10.30	6.84	0.000	0.00	2.628
C1-M2	Curb	0.960	0.95	11.90	6.42	0.000	0.00	5.859
C1-M3	Curb	0.960	0.19	10.00	6.93	0.000	0.00	1.263
JCT-M4	Junct	0.960	1.27	12.08	6.38	0.000	0.00	7.777
C1-M4	Curb	0.960	0.32	10.00	6.93	0.000	0.00	2.128
OUT	Outlt	0.960	1.27	12.08	6.38	0.000	0.00	7.777

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	C1-M1	MH-M1	556.00	552.48	Circ 1	0.00	1.50	234.84	1.50	0.013
2	MH-M1	C1-M2	552.48	551.05	Circ 1	0.00	1.50	229.29	0.62	0.013
3	C1-M2	JCT-M4	549.55	547.67	Circ 1	0.00	1.50	90.26	2.08	0.013
4	C1-M3	C1-M1	556.57	556.00	Circ 1	0.00	1.50	67.00	0.85	0.013
5	C1-M4	JCT-M4	549.37	547.67	Circ 1	0.00	1.50	89.70	1.90	0.013
6	JCT-M4	OUT	547.67	546.25	Circ 1	0.00	1.50	68.36	2.08	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	556.46	553.06	0.063	0.46	0.58	5.72	4.16	2.63	12.86	0.000
2*	553.06	551.63	0.063	0.58	0.58	4.16	4.16	2.63	8.30	0.000
3*	550.20	548.43	0.311	0.65	0.76	8.02	6.49	5.86	15.16	0.000
4*	556.94	556.46	0.014	0.37	0.46	3.78	2.75	1.26	9.69	0.000
5*	549.76	548.43	0.041	0.39	0.76	5.85	2.36	2.13	14.46	0.000
6*	548.43	547.01	0.548	0.76	0.76	8.63	8.63	7.78	15.14	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Discharge decreased downstream node Id= MH-M1 Previous intensity used.
Tailwater set to uniform depth elevation = 547.01(ft)

STATE OF TEXAS
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86931
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PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE M & N

SHEET 8 OF 10

Designed: JCM	FED. RD. DIV. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO.			SHEET NO. 220
Checked: RRH						
Drawn: GBG	DIST. DALLAS	COUNTY ROCKWALL	CONTROL NO. 1014	SECTION NO. 03	JOB NO. 039	HIGHWAY NO. FM 740
Checked: RRH						

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
CI-01	0.96	0.32	10.00	10.00	6.93	0.000	2.128
	0.96	0.32	Pavement				
CI-02	0.96	0.36	10.00	10.00	6.93	0.000	2.394
	0.96	0.36	Pavement				
CI-03	0.96	0.28	10.00	10.00	6.93	0.000	1.862
	0.96	0.28	Pavement				
CI-P1	0.641	1.48	17.48	17.48	5.33	0.000	5.058
	0.96	0.33	Pavement				
	0.55	1.15	Single family				
CI-P2	0.562	3.12	24.36	24.36	4.44	0.000	7.782
	0.96	0.09	Pavement				
	0.55	3.03	Single family				
CI-P3	0.634	1.46	25.67	25.67	4.31	0.000	3.988
	0.96	0.30	Pavement				
	0.55	1.16	Single family				
CI-P4	0.595	1.81	18.68	18.68	5.14	0.000	5.543
	0.96	0.20	Pavement				
	0.55	1.61	Single family				
CI-P5	0.561	2.25	24.36	24.36	4.44	0.000	5.603
	0.96	0.06	Pavement				
	0.55	2.19	Single family				

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 Allowed (ft)	Critic Elev. (ft)
CI-P1	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	547.67
CI-P4	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	543.26
CI-P5	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	543.30
CI-P3	Curb	15.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	544.18
CI-01	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	547.65
CI-03	Curb	10.00	0.50	2.00	0.014	0.25	n/a	n/a	13.50	544.19

On Grade Inlets Conmputation 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)
CI-P1	Curb	5.058	5.058	0.250	0.000	CI-P4	13.34	15.00	14.35
CI-P4	Curb	5.543	5.543	0.250	0.000	CI-P2	14.08	15.00	14.85
CI-P5	Curb	5.603	5.603	0.250	0.000	CI-P2	14.17	15.00	14.90
CI-P3	Curb	3.988	3.988	0.250	0.000	CI-P5	11.57	15.00	13.10
CI-01	Curb	2.128	2.128	0.250	0.000	CI-02	8.00	10.00	10.35
CI-03	Curb	1.862	1.862	0.250	0.000	CI-02	7.41	10.00	9.85

Sag Inlets Configuration Data.

Inlet ID	Inlet Type	Length/ Perim. (ft)	Grate Area (sf)	Left-Slope Long (%)	Left-Slope Trans (%)	Right-Slope Long (%)	Right-Slope Trans (%)	Gutter n	Gutter DeprW (ft)	Depth Allowed (ft)	Critic Elev. (ft)
CI-P2	Curb	15.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	543.11
CI-02	Curb	5.00	n/a	0.50	2.00	0.50	2.00	0.014	1.50	0.50	543.11

Sag Inlets Computation Data.

Inlet ID	Inlet Type	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)
CI-P2	Curb	15.00	n/a	n/a	7.782	15.398	0.251	13.00	13.00
CI-02	Curb	5.00	n/a	n/a	2.394	6.261	0.263	8.35	8.35

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)
CI-P1	Curb	0.641	1.48	17.48	5.33	0.000	0.00	5.058
CI-P4	Curb	0.616	3.29	18.68	5.14	0.000	0.00	10.427
CI-P2	Curb	0.590	10.12	25.98	4.28	0.000	0.00	25.523
CI-P5	Curb	0.590	3.71	25.87	4.29	0.000	0.00	9.381
CI-P3	Curb	0.634	1.46	25.67	4.31	0.000	0.00	3.988
CI-01	Curb	0.960	0.32	10.00	6.93	0.000	0.00	2.128
CI-02	Curb	0.622	11.08	26.12	4.26	0.000	0.00	29.374
CI-03	Curb	0.960	0.28	10.00	6.93	0.000	0.00	1.862
STUB	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.001
OUT	Outlt	0.622	11.08	26.12	4.26	0.000	0.00	29.374

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	CI-01	CI-02	543.00	540.24	Circ 1	0.00	1.50	276.33	1.00	0.013
2	CI-03	CI-02	541.00	540.22	Circ 1	0.00	1.50	129.61	0.60	0.013
3	CI-P1	CI-P4	543.00	540.51	Circ 1	0.00	1.50	225.97	1.10	0.013
4	CI-P4	CI-P2	540.51	539.74	Circ 1	0.00	1.50	45.63	1.69	0.013
5	CI-P3	CI-P5	541.00	540.24	Circ 1	0.00	1.50	68.97	1.10	0.013
6	CI-P5	CI-P2	540.24	539.46	Circ 1	0.00	1.50	51.78	1.51	0.013
7	CI-P2	CI-02	538.84	538.36	Circ 1	0.00	4.00	64.00	0.75	0.013
8	CI-02	OUT	538.94	538.84	Circ 1	0.00	4.00	20.00	0.50	0.013
9	STUB	CI-P2	538.94	538.84	Circ 1	0.00	4.00	13.00	0.77	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	543.46	540.70	0.041	0.46	0.46	4.67	4.67	2.13	10.50	0.000
2*	541.49	540.71	0.031	0.49	0.49	3.75	3.75	1.86	8.15	0.000
3*	543.71	541.49	0.232	0.71	0.98	6.09	4.12	5.06	11.03	0.000
4*	541.49	540.72	0.985	0.98	0.98	8.51	8.51	10.43	13.65	0.000
5*	541.62	541.19	0.144	0.62	0.95	5.73	3.37	3.99	11.03	0.000
6*	541.19	540.43	0.797	0.95	0.97	7.96	7.77	9.38	12.89	0.000
7*	540.43	540.41	0.032	1.23	2.05	7.81	3.94	25.52	124.42	0.000
8*	540.41	540.31	0.042	1.47	1.47	7.02	7.02	29.37	101.59	0.000
9*	540.43	540.43	0.000	0.01	1.59	0.34	0.00	0.00	126.00	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Tailwater set to uniform depth elevation = 540.31(ft)

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

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Firm Registration Number: 1741

HYDRAULIC COMPUTATION SHEET

LINE O AND LINE P

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				22
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
01	0.492	1.37	10.00	10.00	6.93	0.000	4.673
	0.96	0.32	Pavement				
	0.35	1.05	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)
01	Junct	0.492	1.37	10.00	6.93	0.000	0.00	4.673
OUT	Outlt	0.492	1.37	10.00	6.93	0.000	0.00	4.673

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	01	OUT	535.90	535.66	Circ 1	0.00	2.00	69.74	0.34	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1	536.72	536.48	0.043	0.82	0.82	3.85	3.85	4.67	13.27	0.000

END

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Tailwater set to uniform depth elevation = 536.48(ft)
Upstream hydraulic gradeline exceeds critical elevation at node Id= 01

PROJECT NAME : FM740
JOB NUMBER : TXD9546
PROJECT DESCRIPTION : 1014-03-039
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)
R1	0.519	3.04	30.00	30.00	3.92	0.000	6.187
	0.96	0.84	Pavement				
	0.35	2.20	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)
R1	Junct	0.519	3.04	30.00	3.92	0.000	0.00	6.187
OUT	Outlt	0.519	3.04	30.00	3.92	0.000	0.00	6.187

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	R1	OUT	532.23	529.48	Circ 1	0.00	2.50	81.27	3.39	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline 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)
1*	532.71	529.96	0.023	0.48	0.48	9.27	9.27	6.19	75.48	0.000

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Warning Messages for current project:

Runoff Frequency of: 5 Years
Tailwater set to uniform depth elevation = 529.96(ft)
Upstream hydraulic gradeline exceeds critical elevation at node Id= R1

STATE OF TEXAS
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4/15/09

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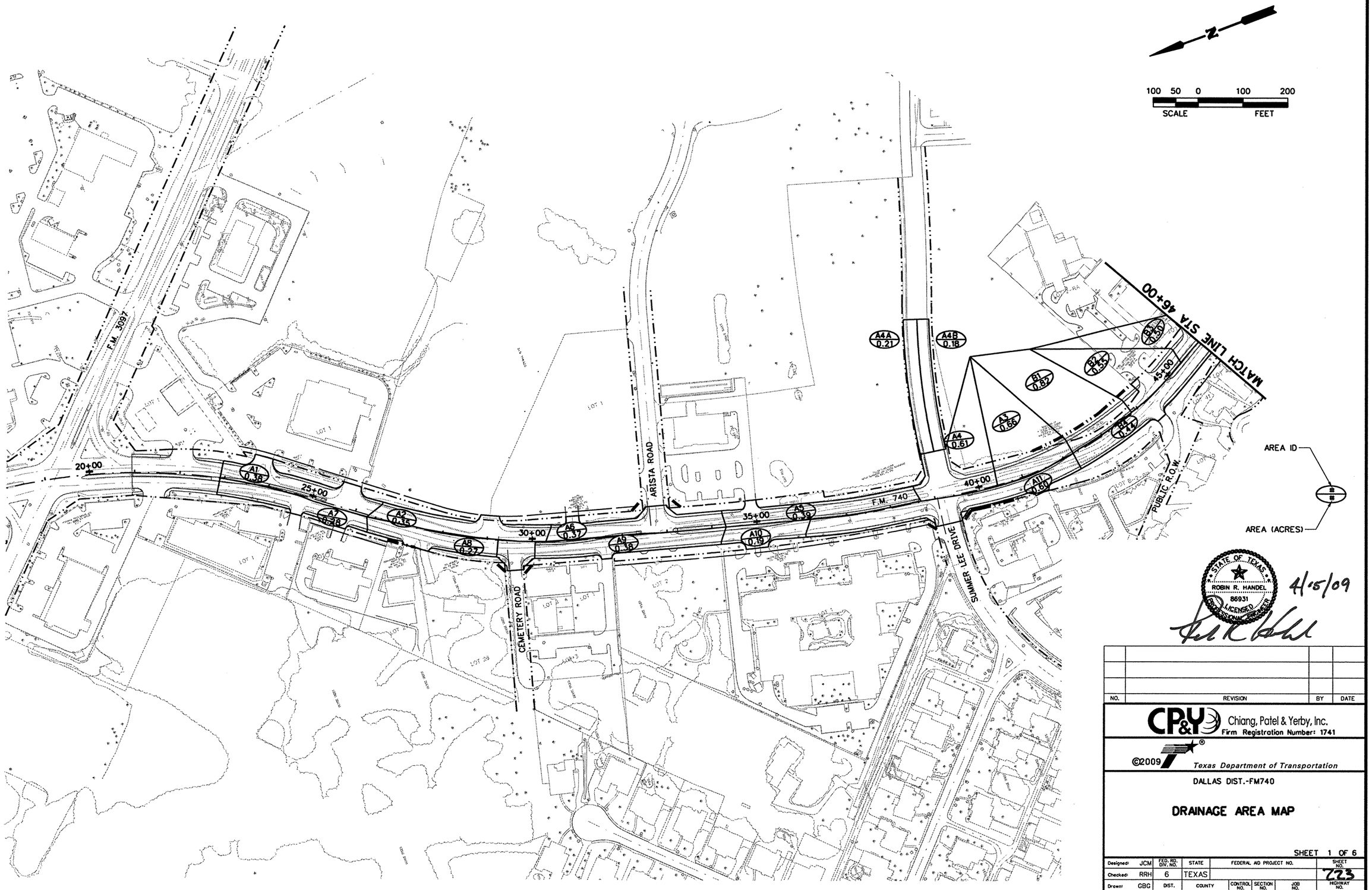
HYDRAULIC COMPUTATION SHEET

LINE Q AND LINE R

SHEET 10 OF 10

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					222
Drawn:	GBC	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740



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DALLAS DIST.-FM740

DRAINAGE AREA MAP

SHEET 1 OF 6

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					223
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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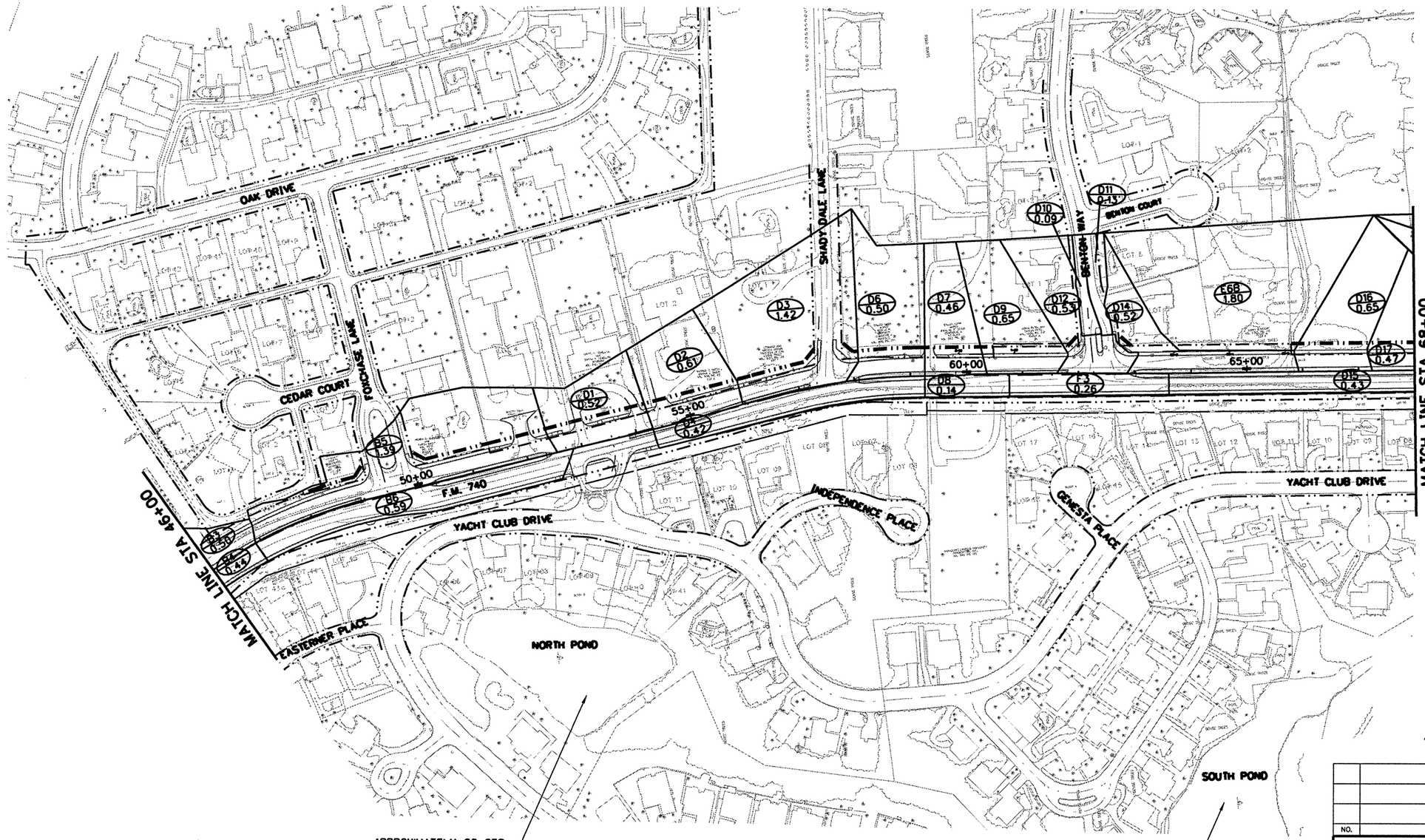

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DALLAS DIST.-FM740

DRAINAGE AREA MAP

SHEET 2 OF 6

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					224
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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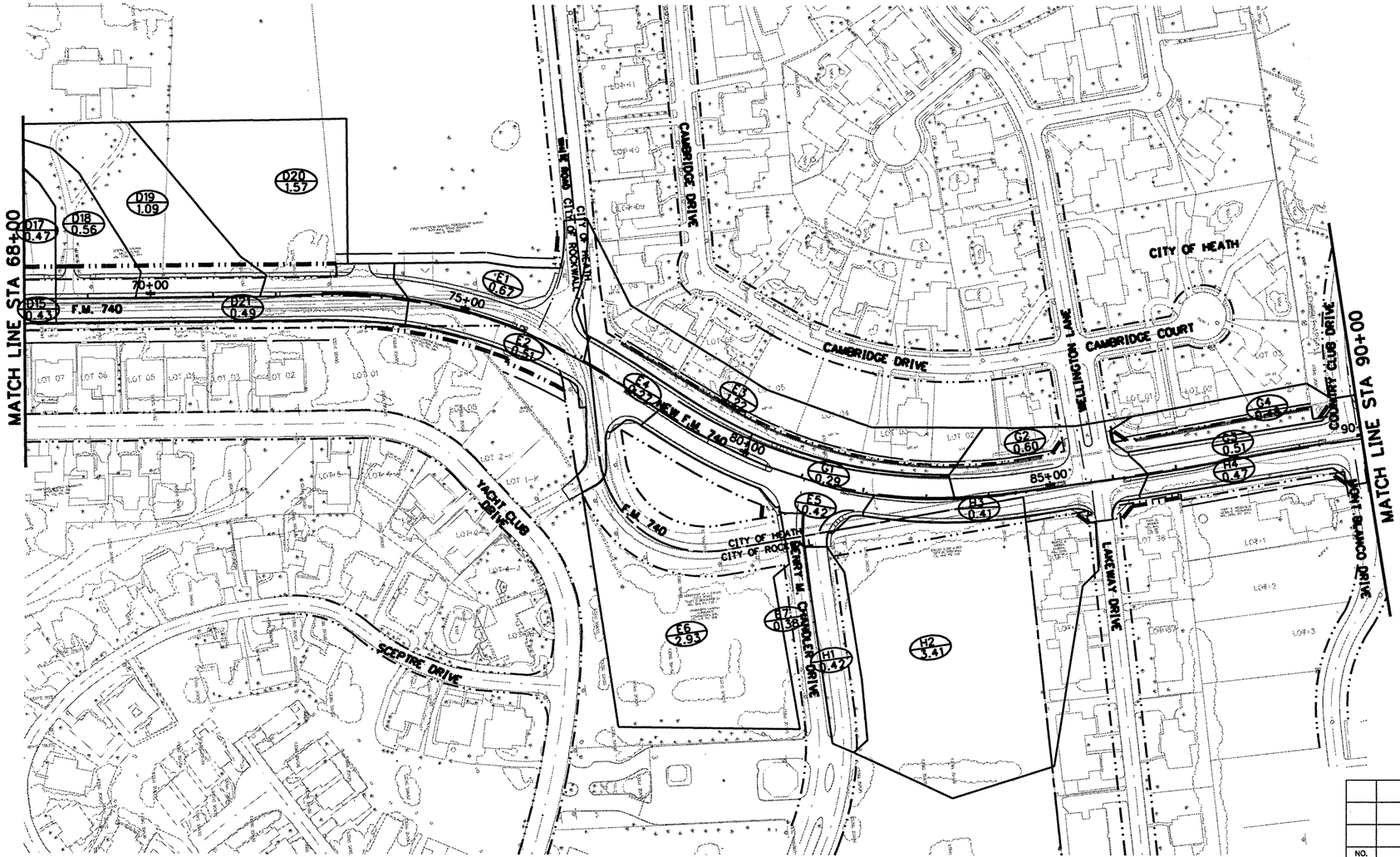

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SCALE FEET

AREA ID
AREA (ACRES)

STATE OF TEXAS
ROBIN R. HANDEL
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4/15/09

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Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE AREA MAP

SHEET 3 OF 6

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					225
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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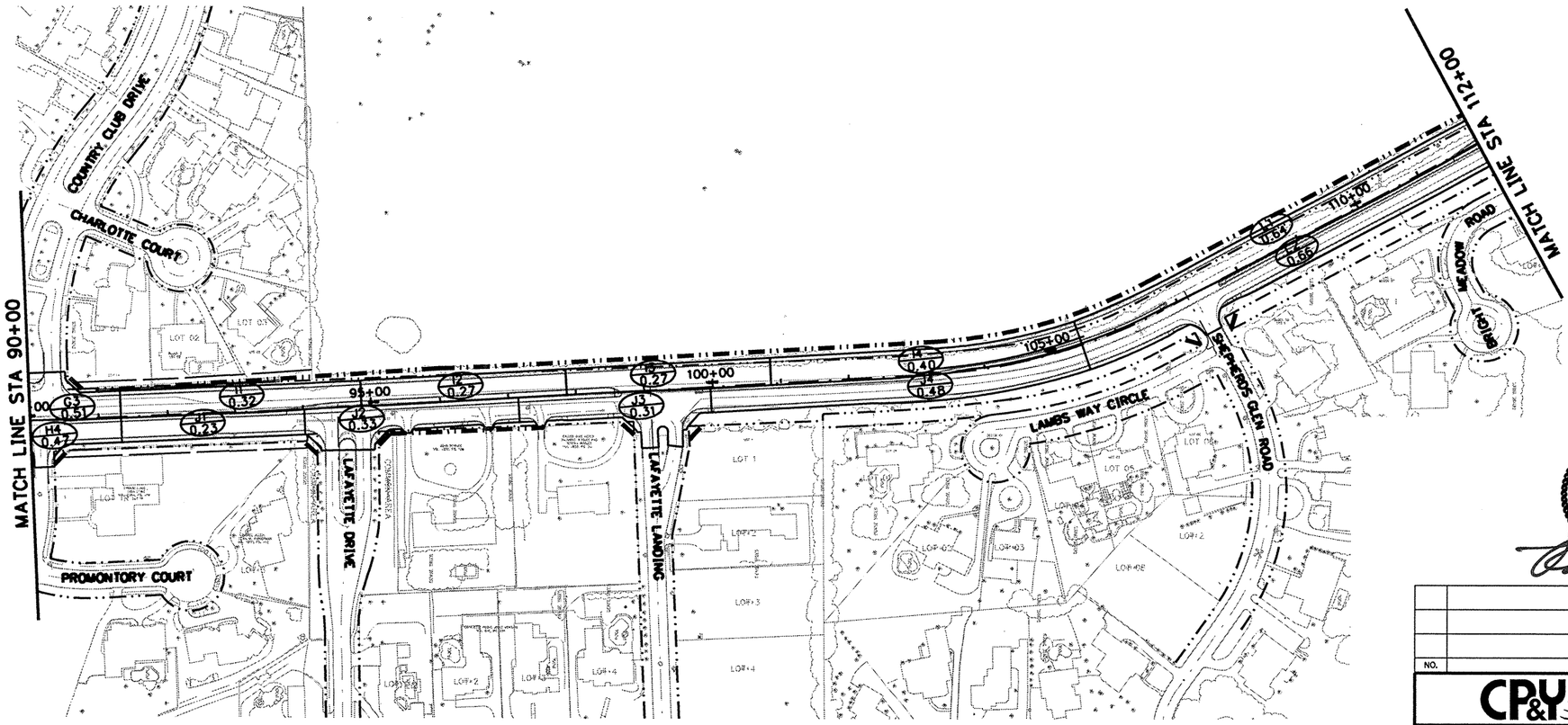

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DALLAS DIST.-FM740

DRAINAGE AREA MAP

SHEET 4 OF 6

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				226
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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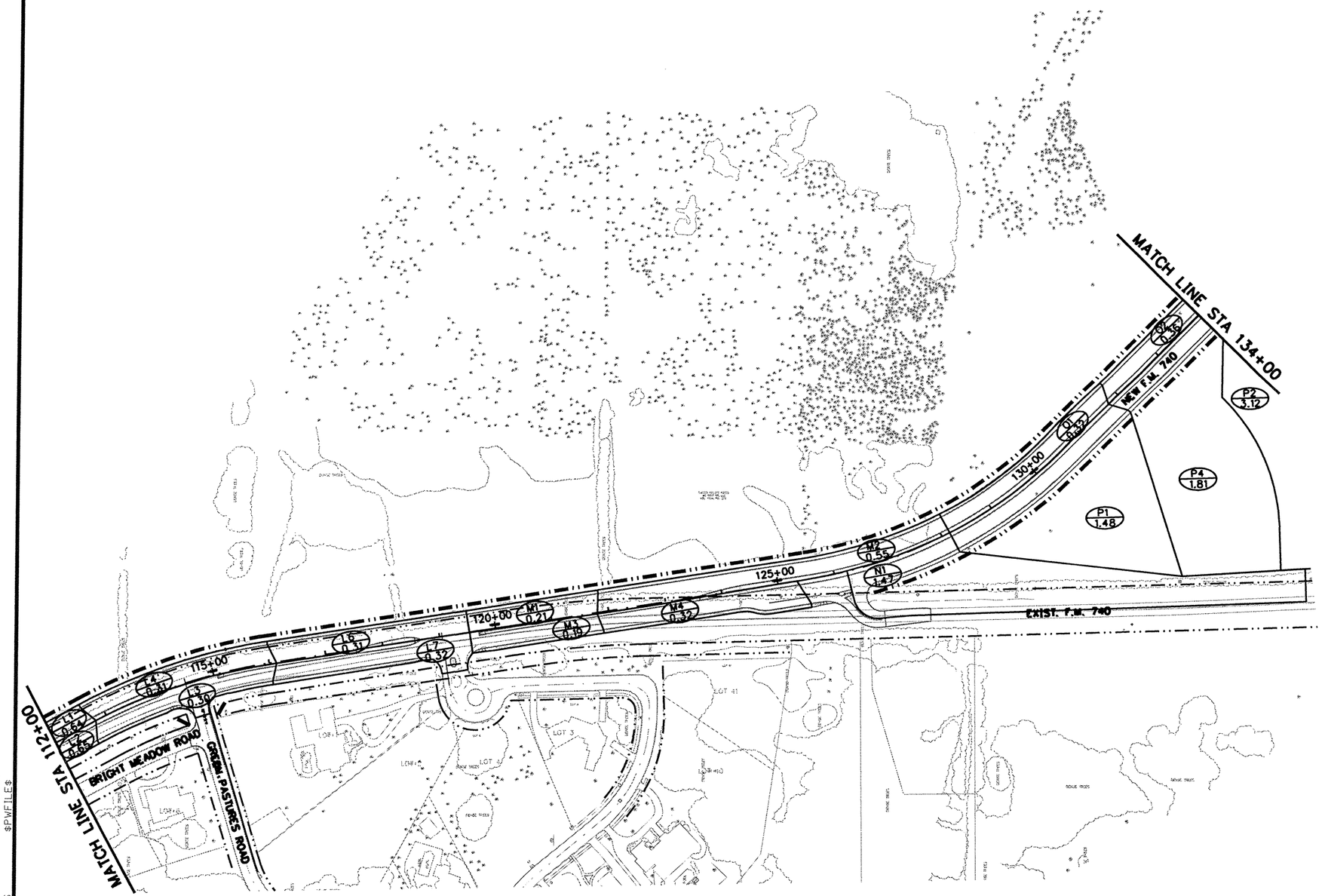

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SCALE FEET

AREA ID
AREA (ACRES)

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5/21/09

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DALLAS DIST.-FM740

DRAINAGE AREA MAP

SHEET 5 OF 6

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				227
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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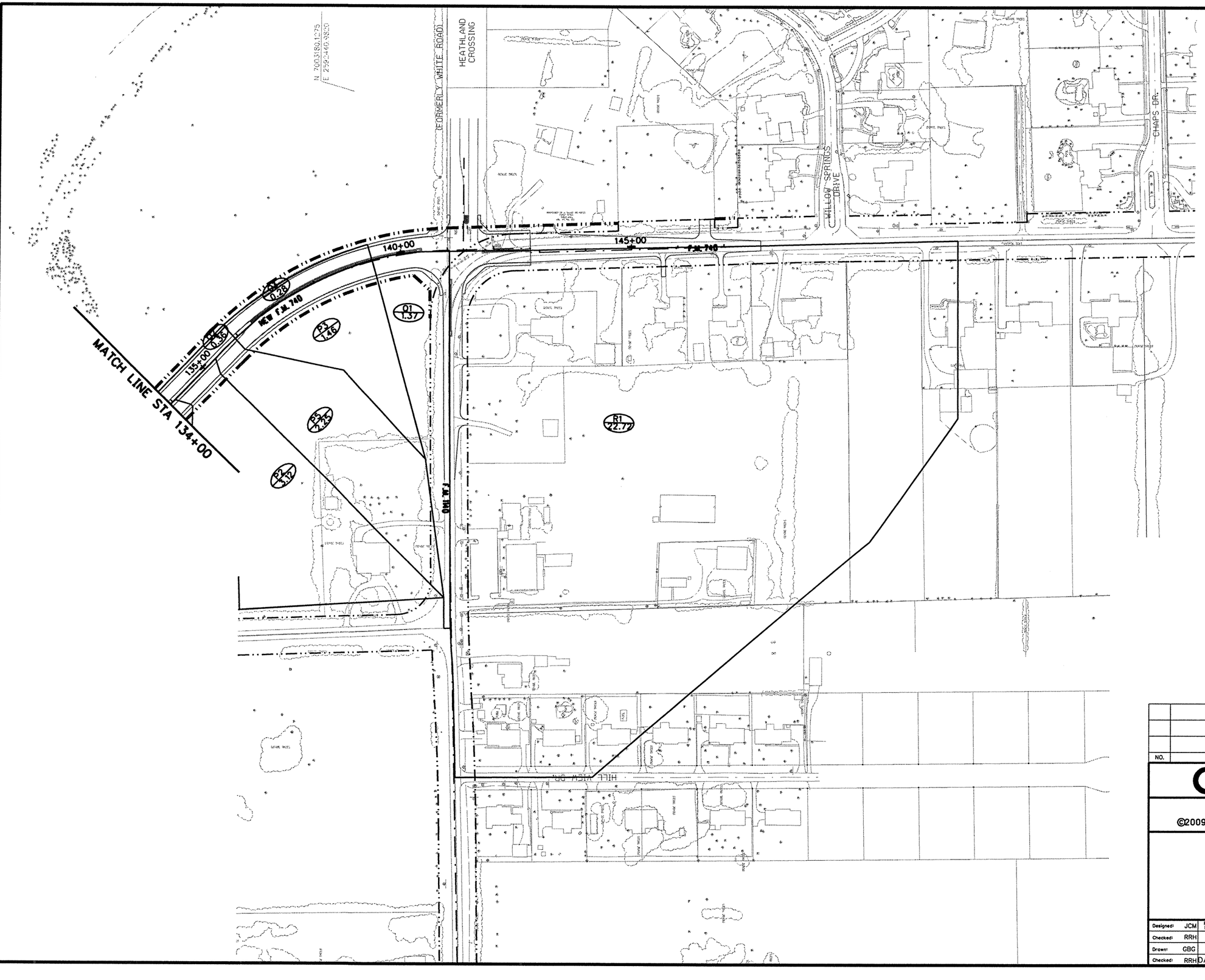

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DALLAS DIST.-FM740

DRAINAGE AREA MAP

SHEET 6 OF 6

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					228
Drawn:	GBC	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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4/15/2009 8:47:08 AM GBRANICK
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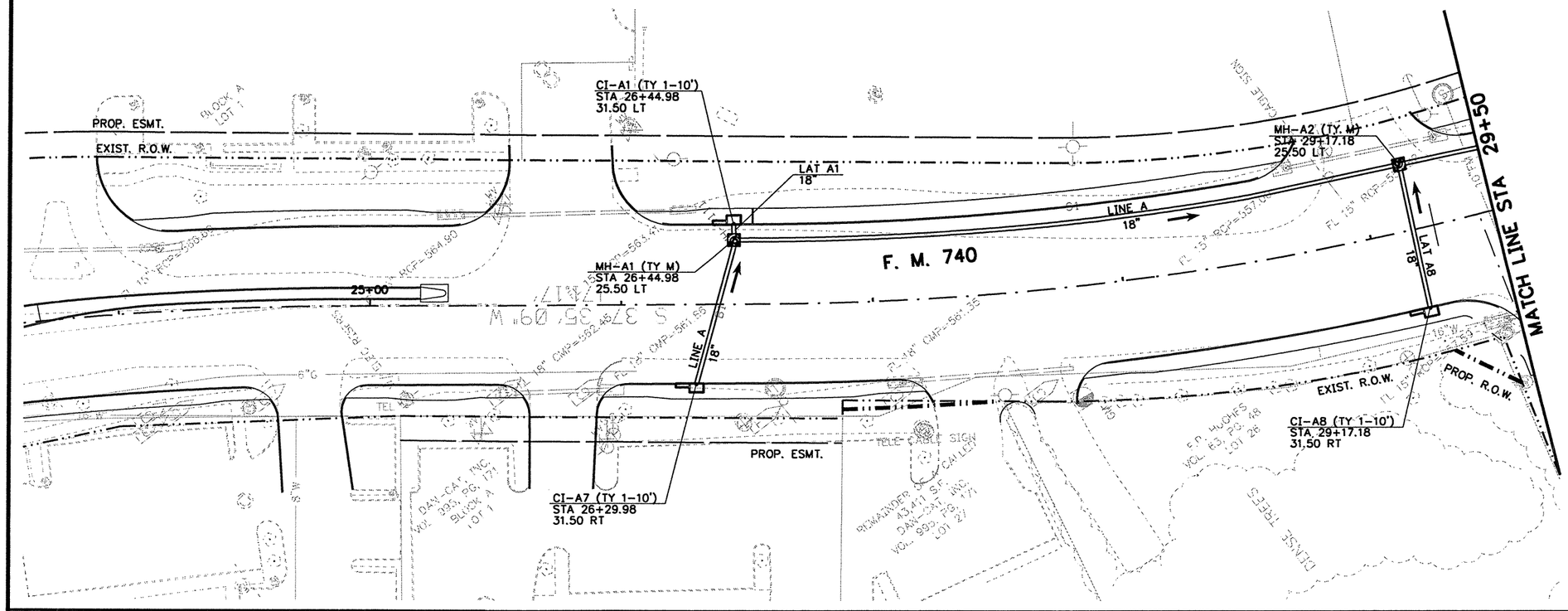
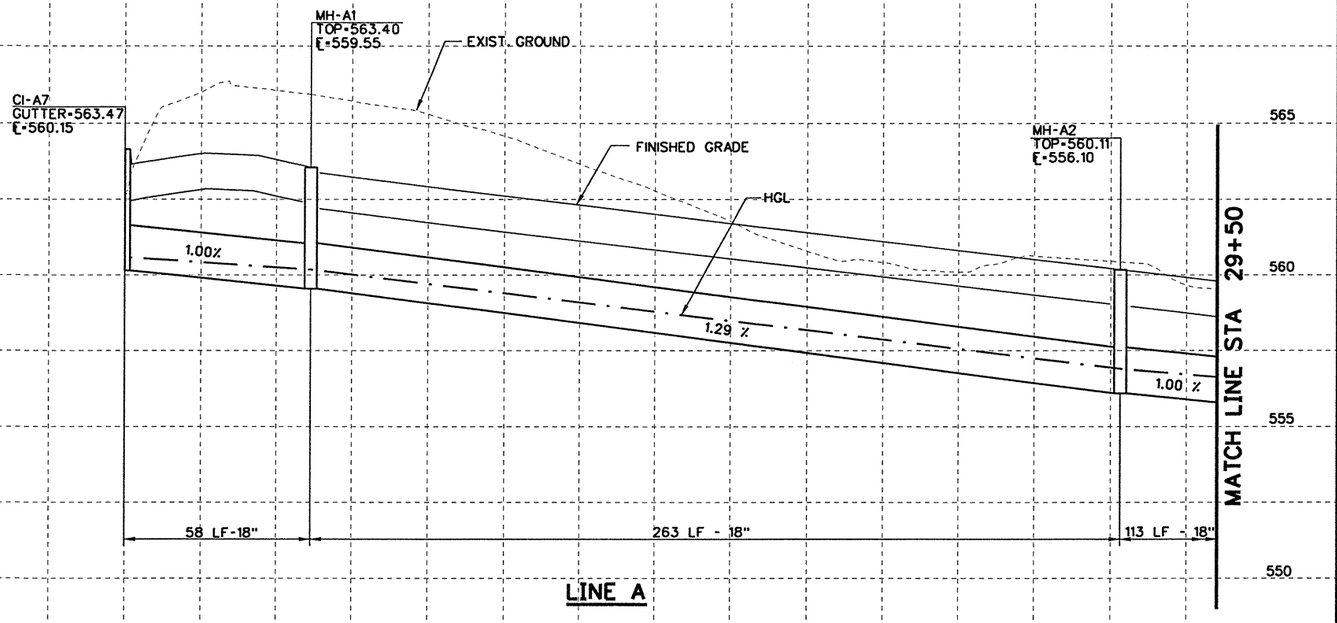
cpy6&w_ANSIB.tbl





LINE A

0 25 50
SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

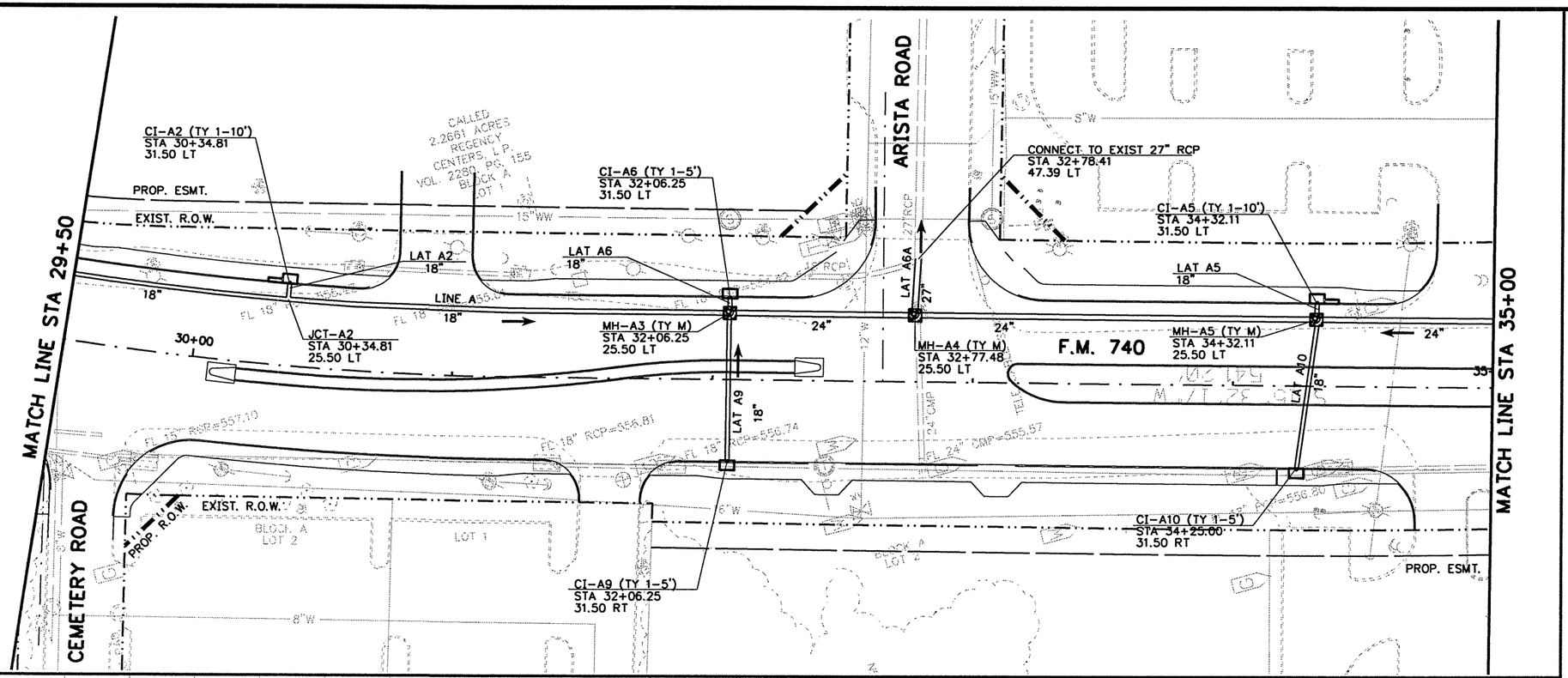
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

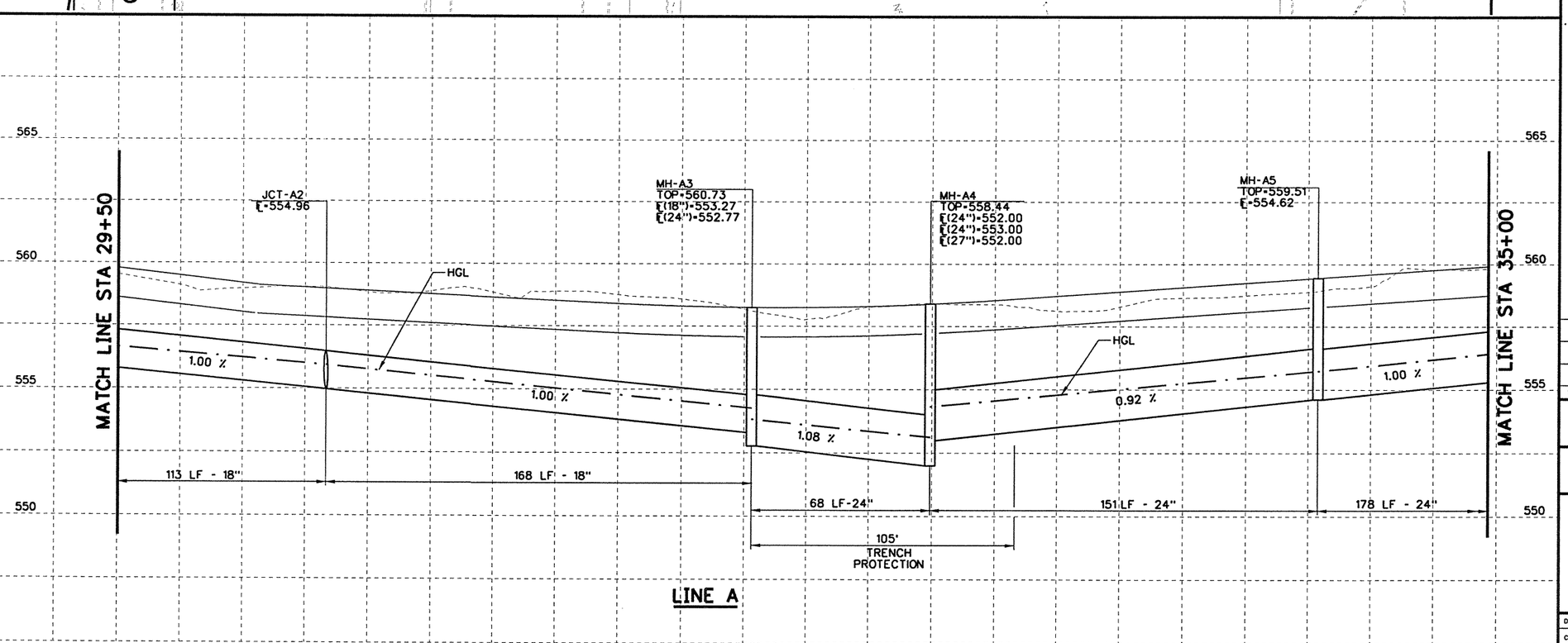
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 1 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				229
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

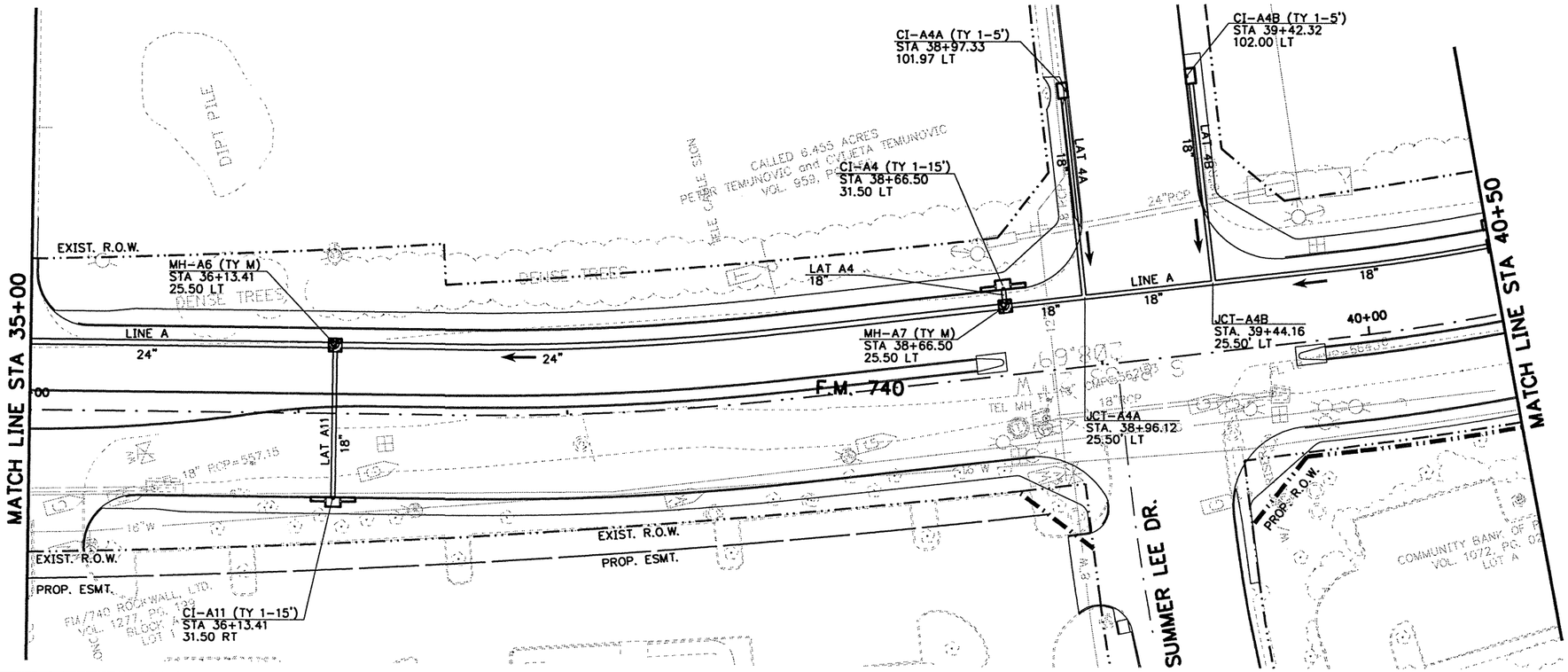
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

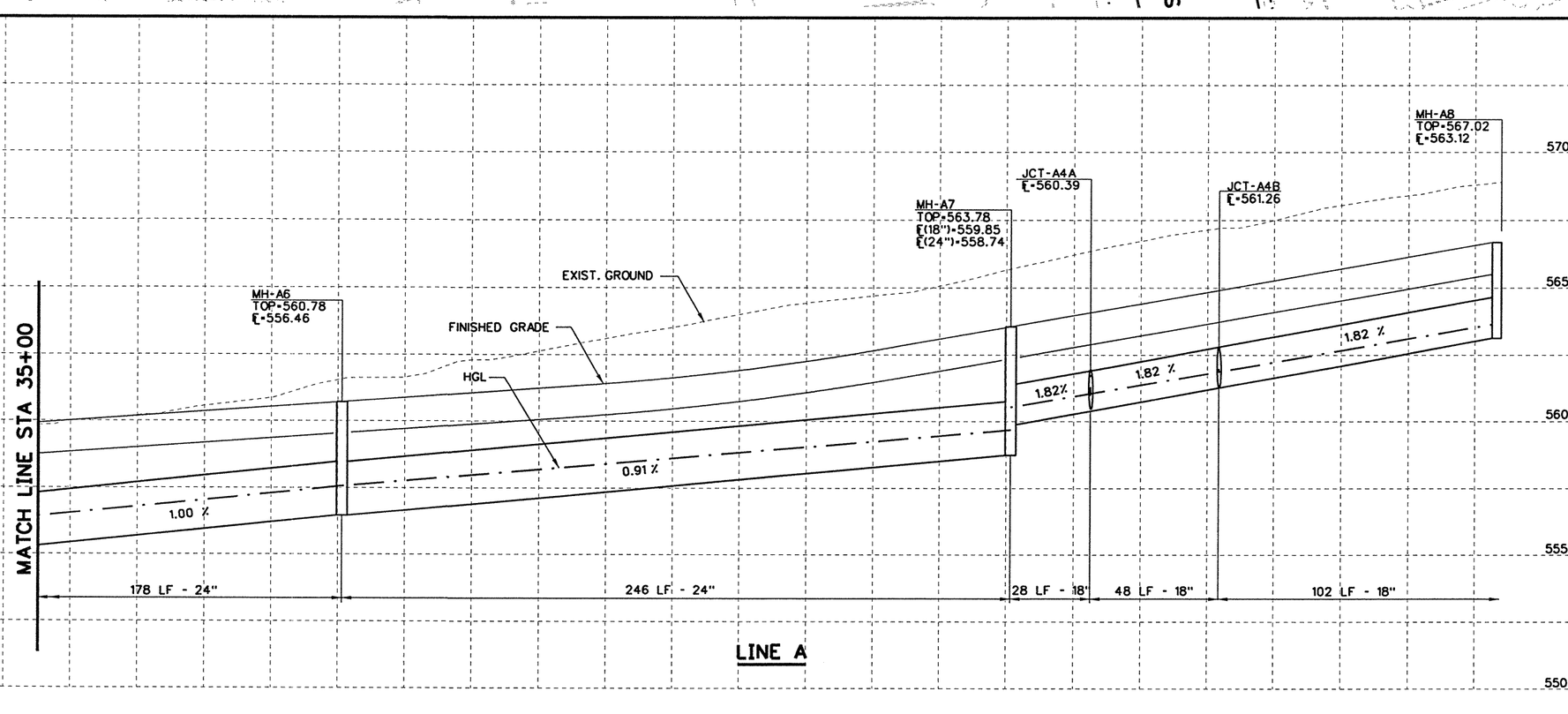
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 2 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					230
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

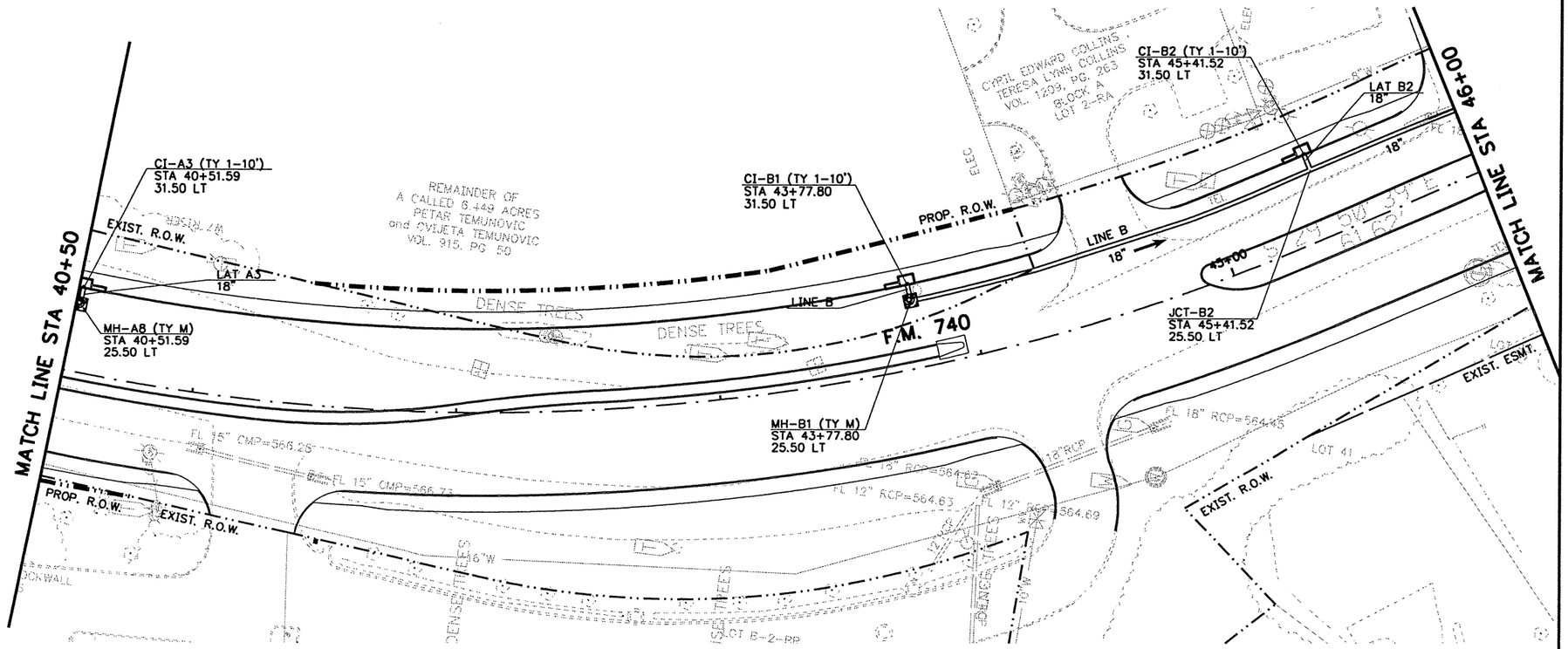
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

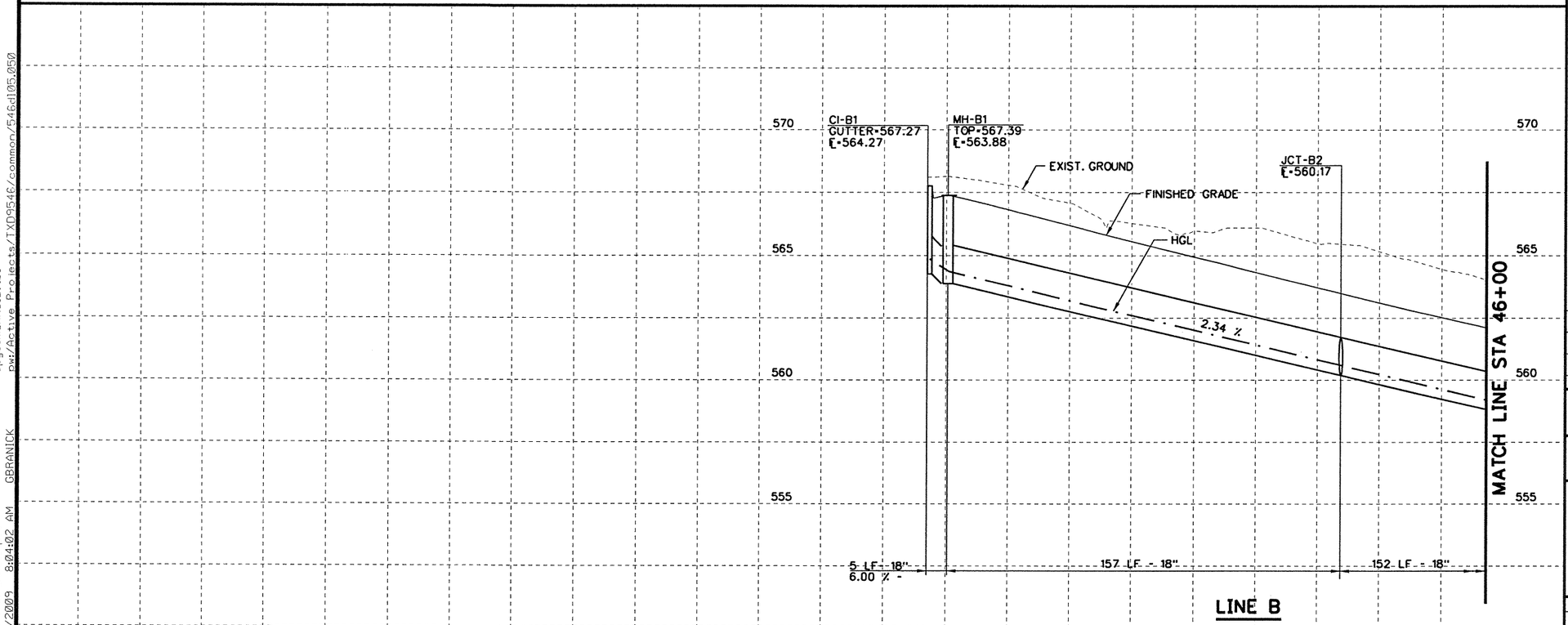
DALLAS DIST.-FM740

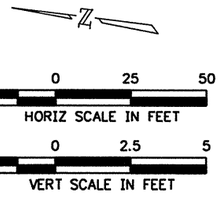
DRAINAGE LAYOUT SHEET

SHEET 3 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				231
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740







NO.	REVISION	BY	DATE

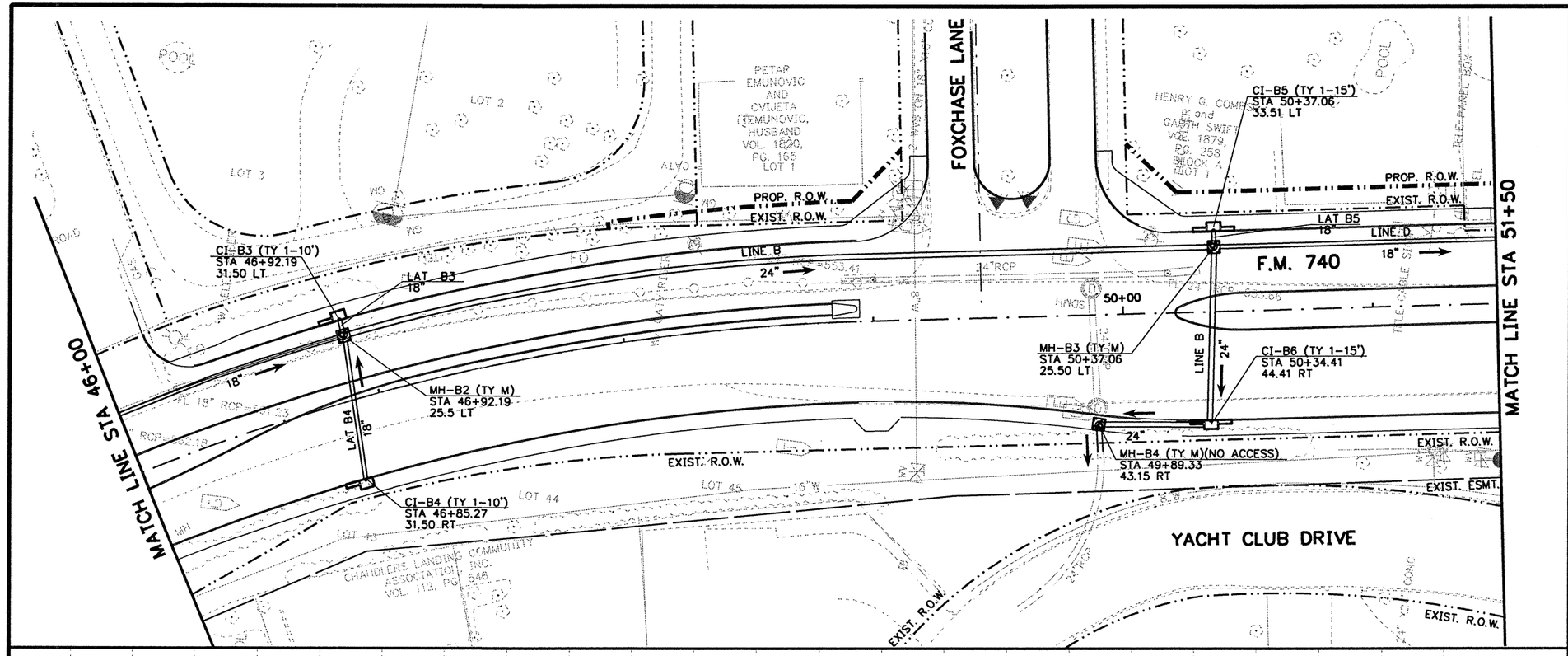
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

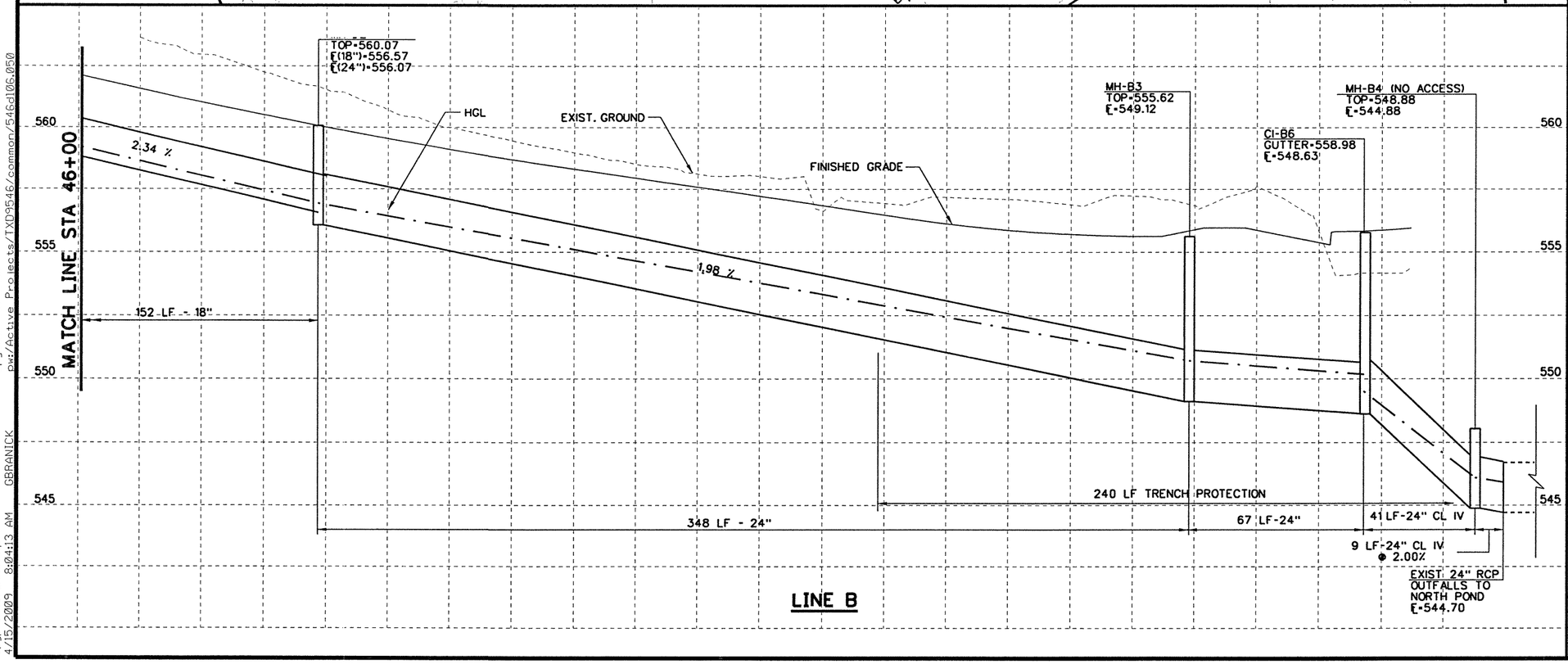
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 4 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					232
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740





NOTE: MH-B4 TO CONNECT TO EXISTING RCP AND OUTFALLS TO NORTH POND. DESIGN OUTFALLS 5 YR STORM TO NORTH POND (Q-22 CFS). EXCESS FLOW SPLIT TO LINE D AT MH-B3.

25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

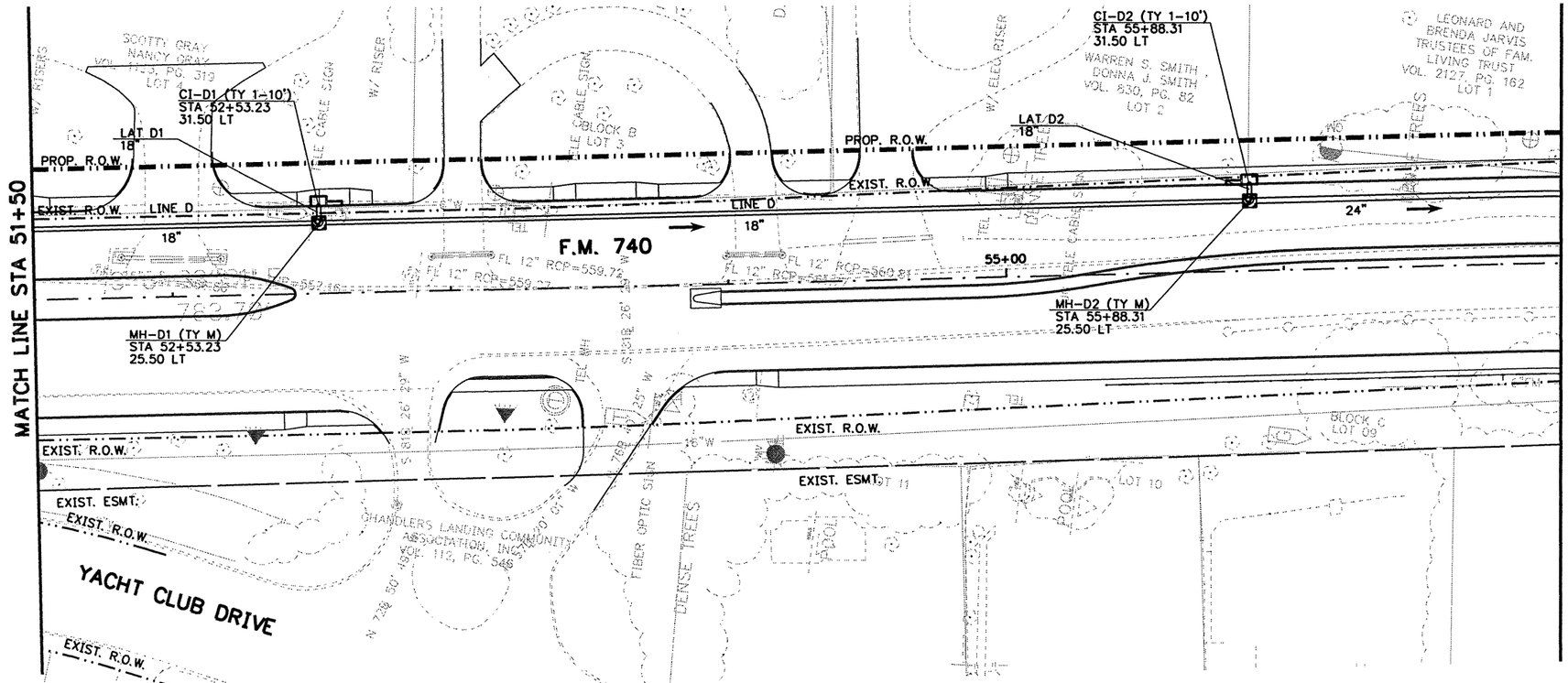
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

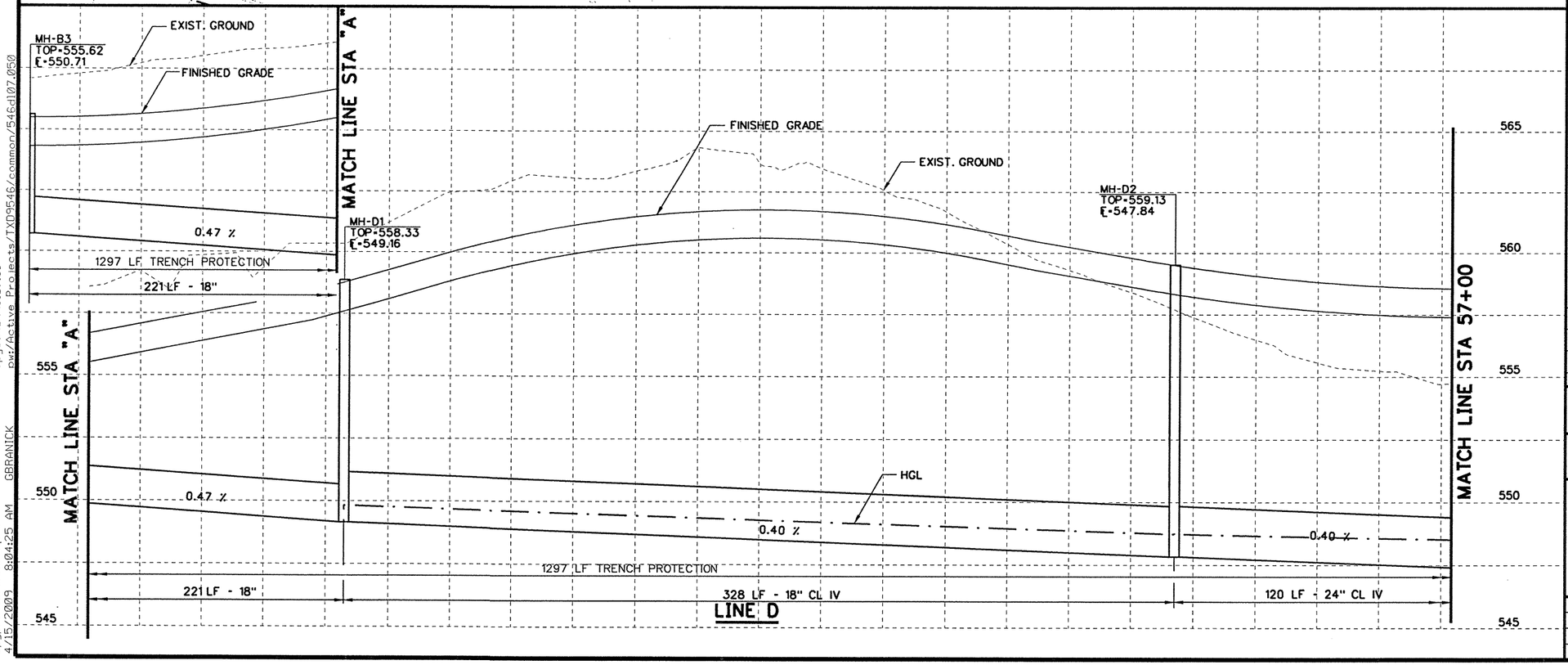
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 5 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				233
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

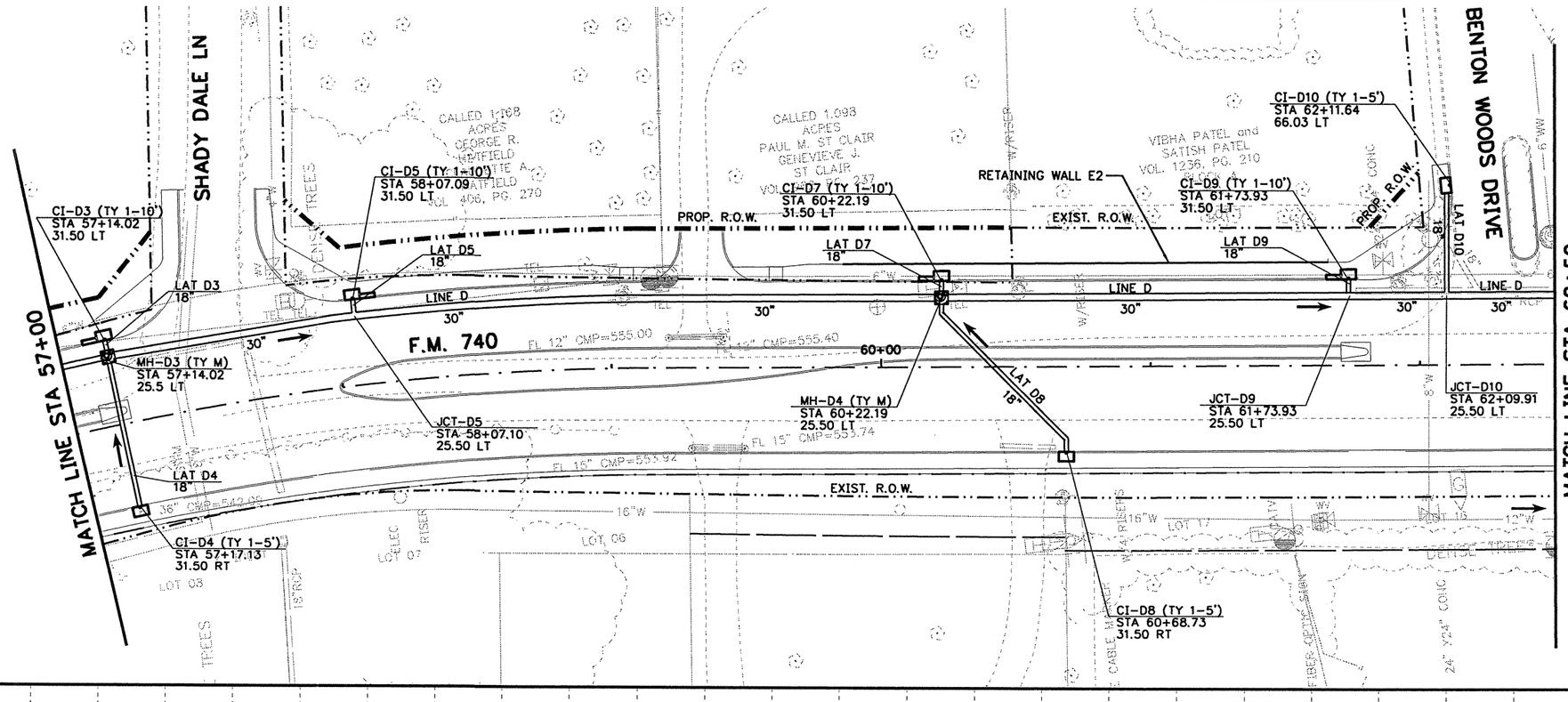
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

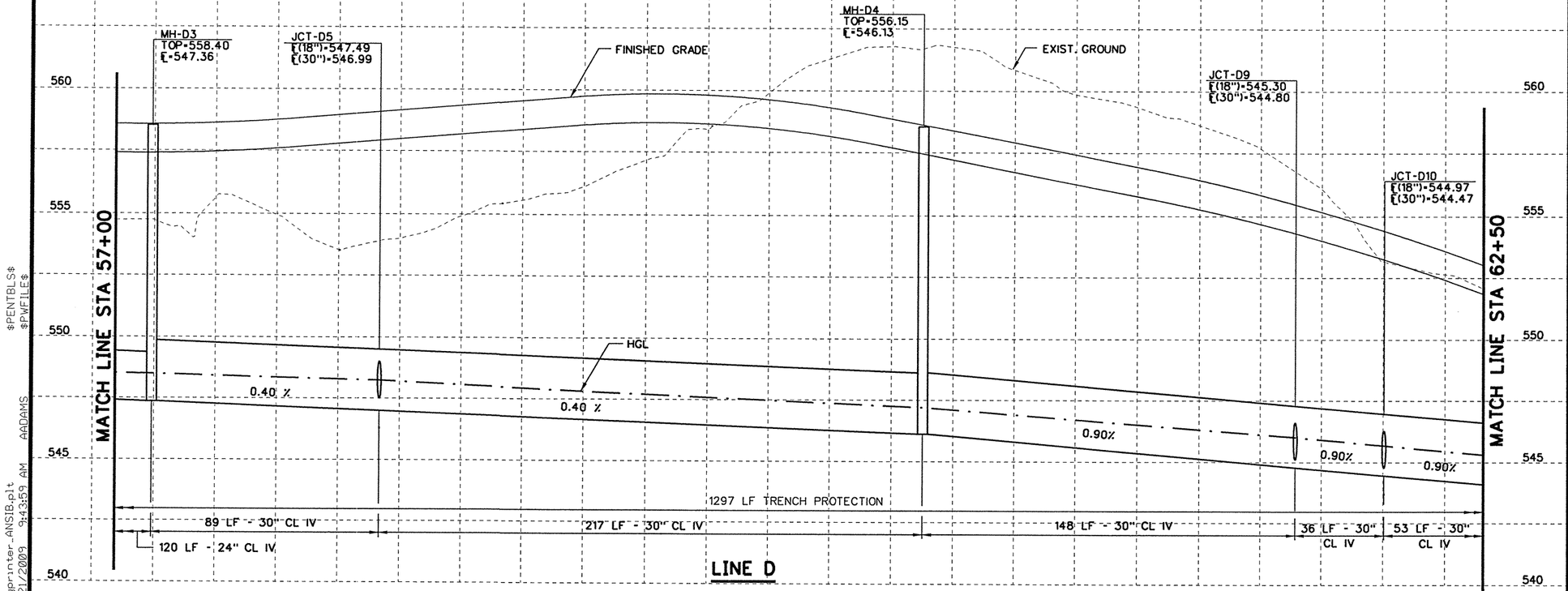
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 6 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				234
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

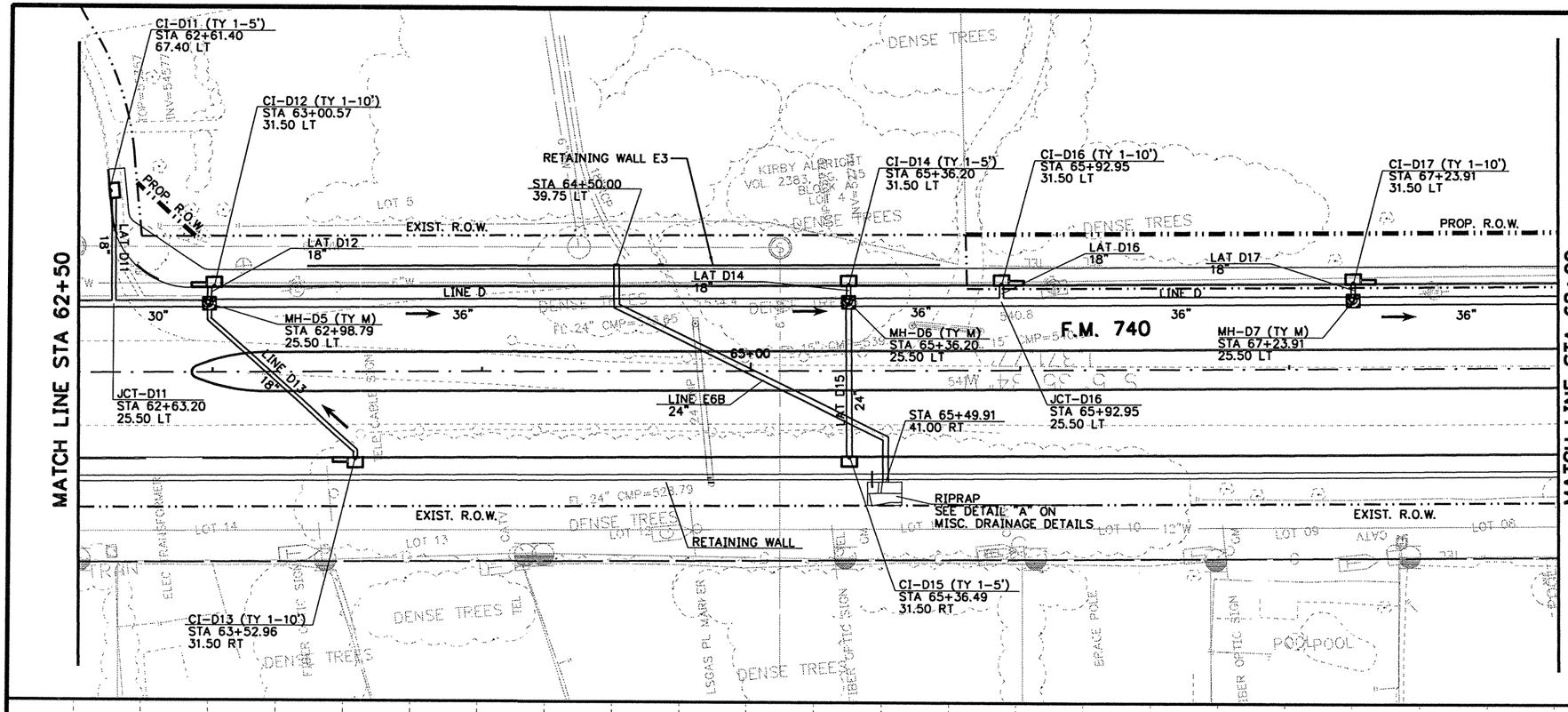
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

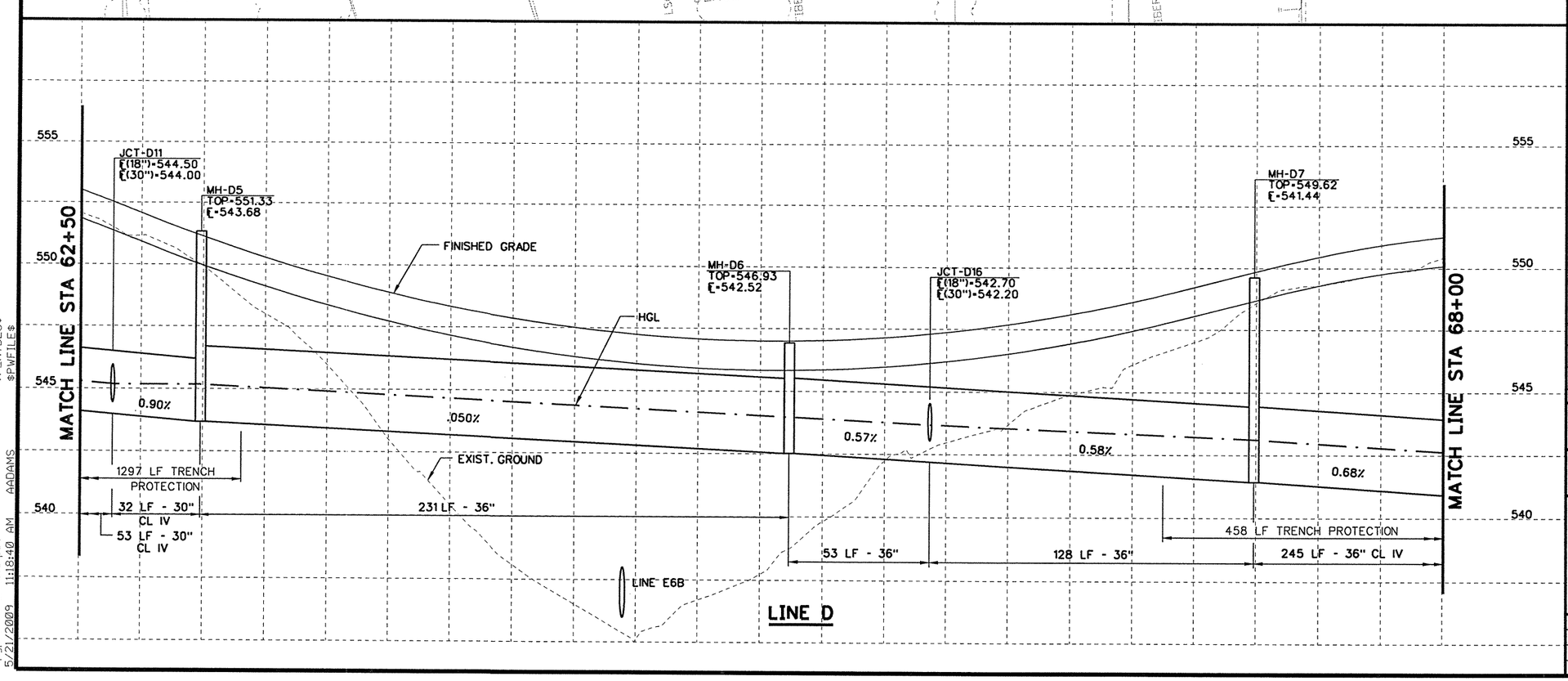
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 7 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				235
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 8 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				236
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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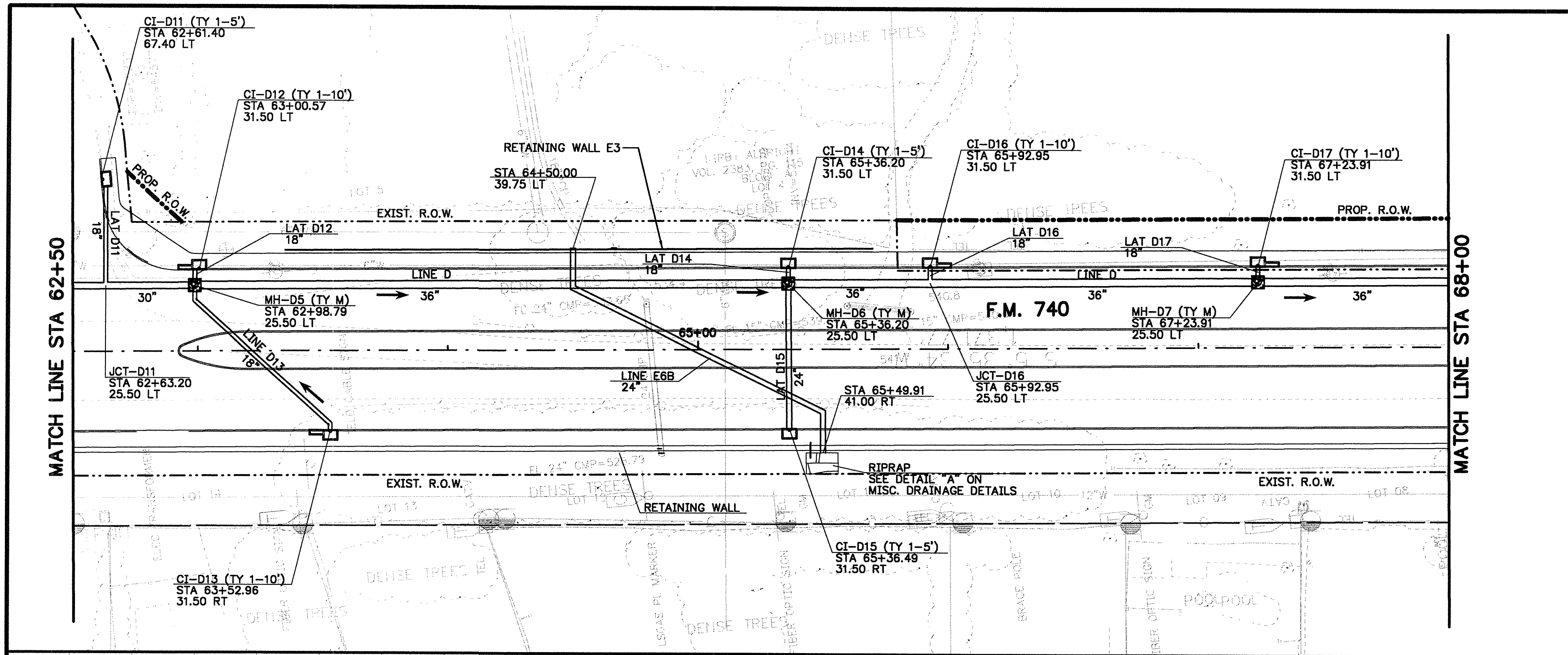

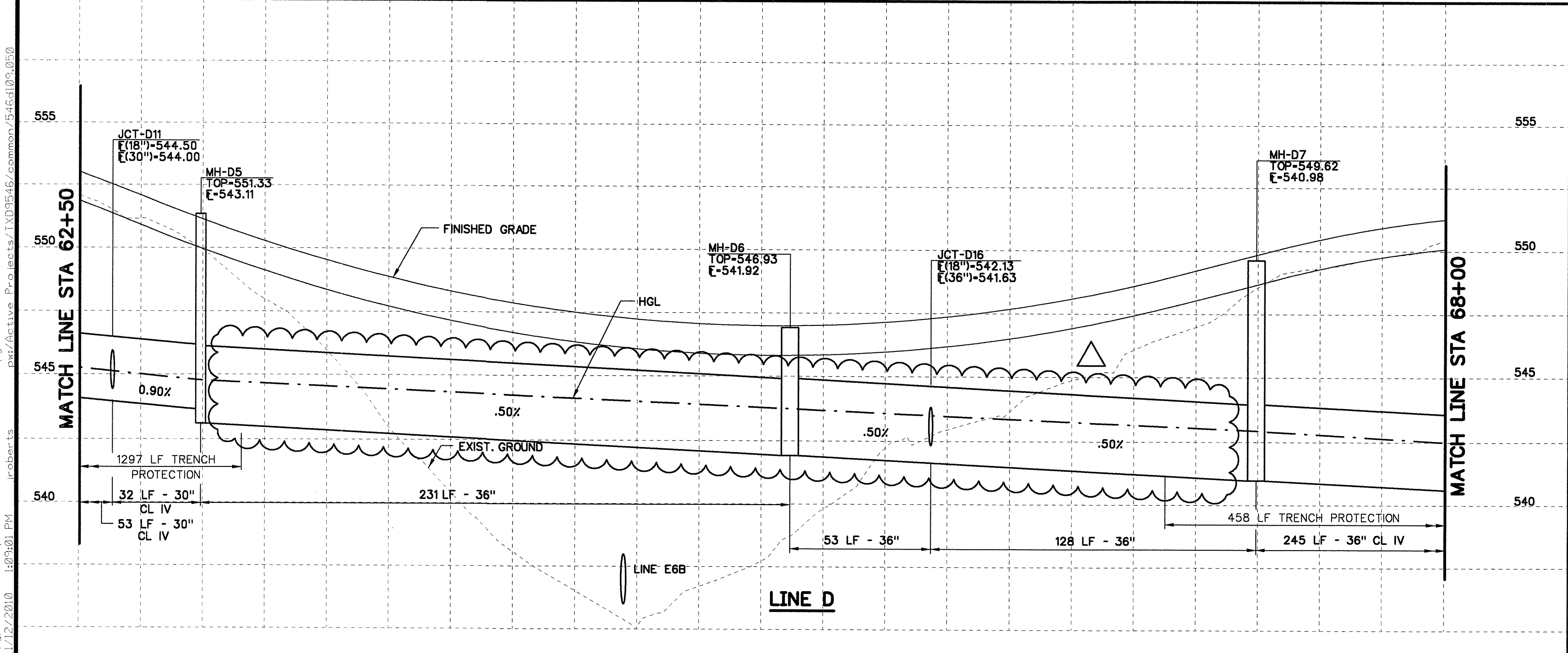

LINE D

11/15/2010

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER

HORIZ SCALE IN FEET (25 0 25 50)

VERT SCALE IN FEET (2.5 0 2.5 5)

NO.	REVISION	BY	DATE
△	LOWER 36" RCP	AJA	11/8/10

 Texas Department of Transportation

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 8 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				236A
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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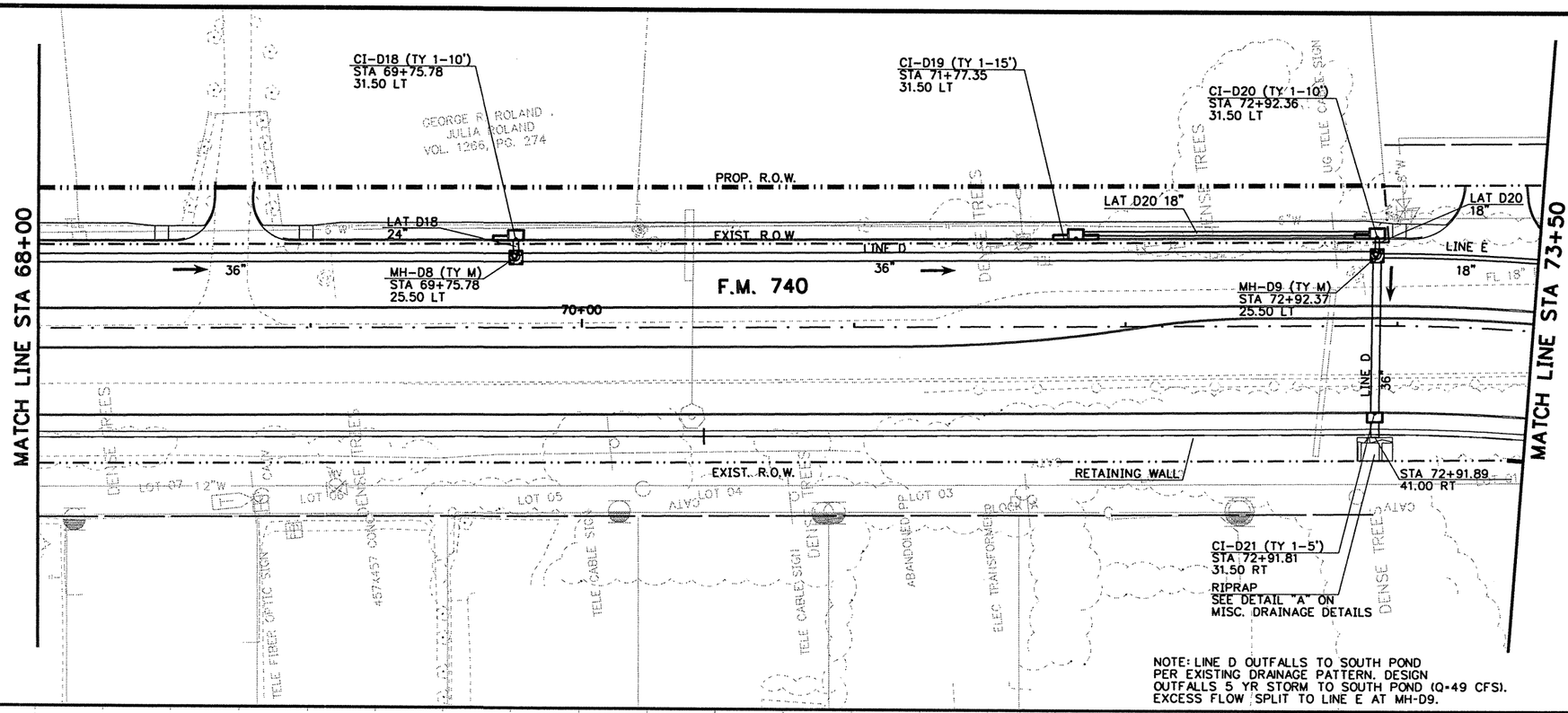
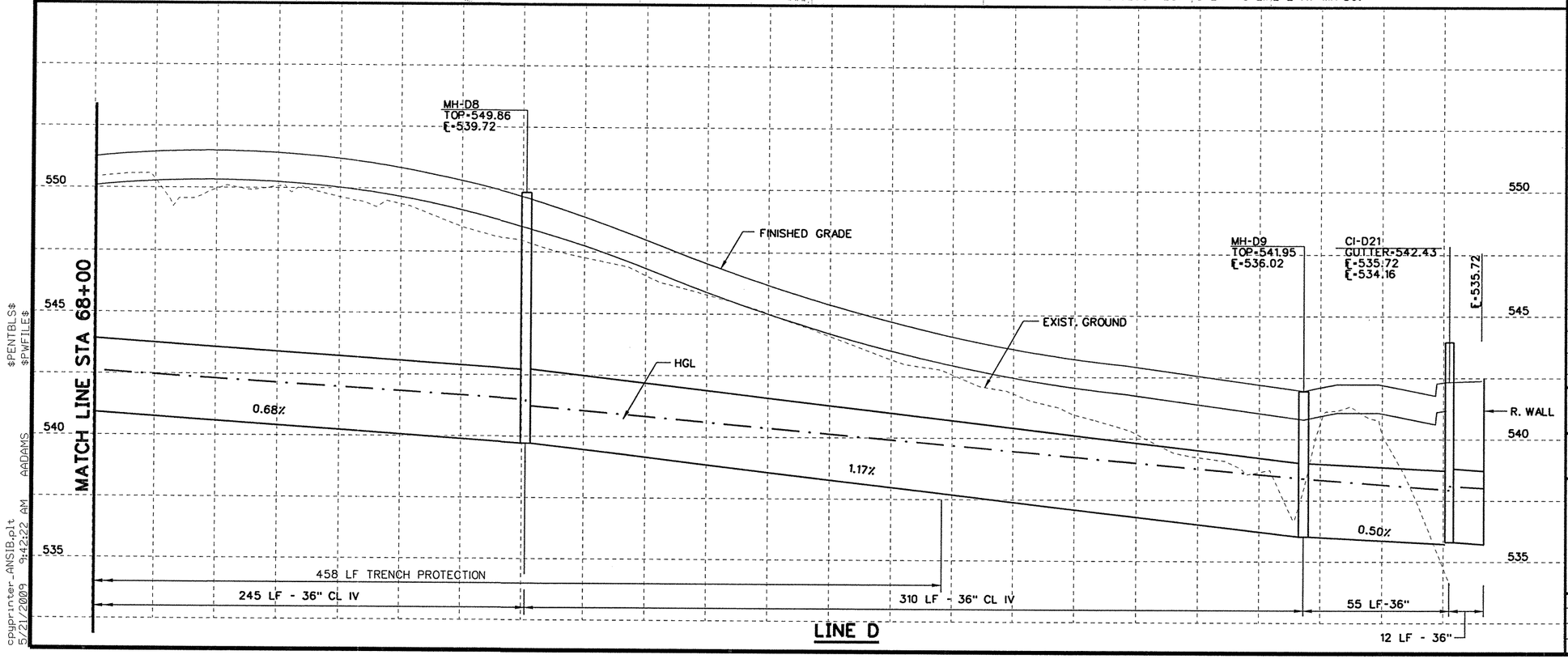




25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

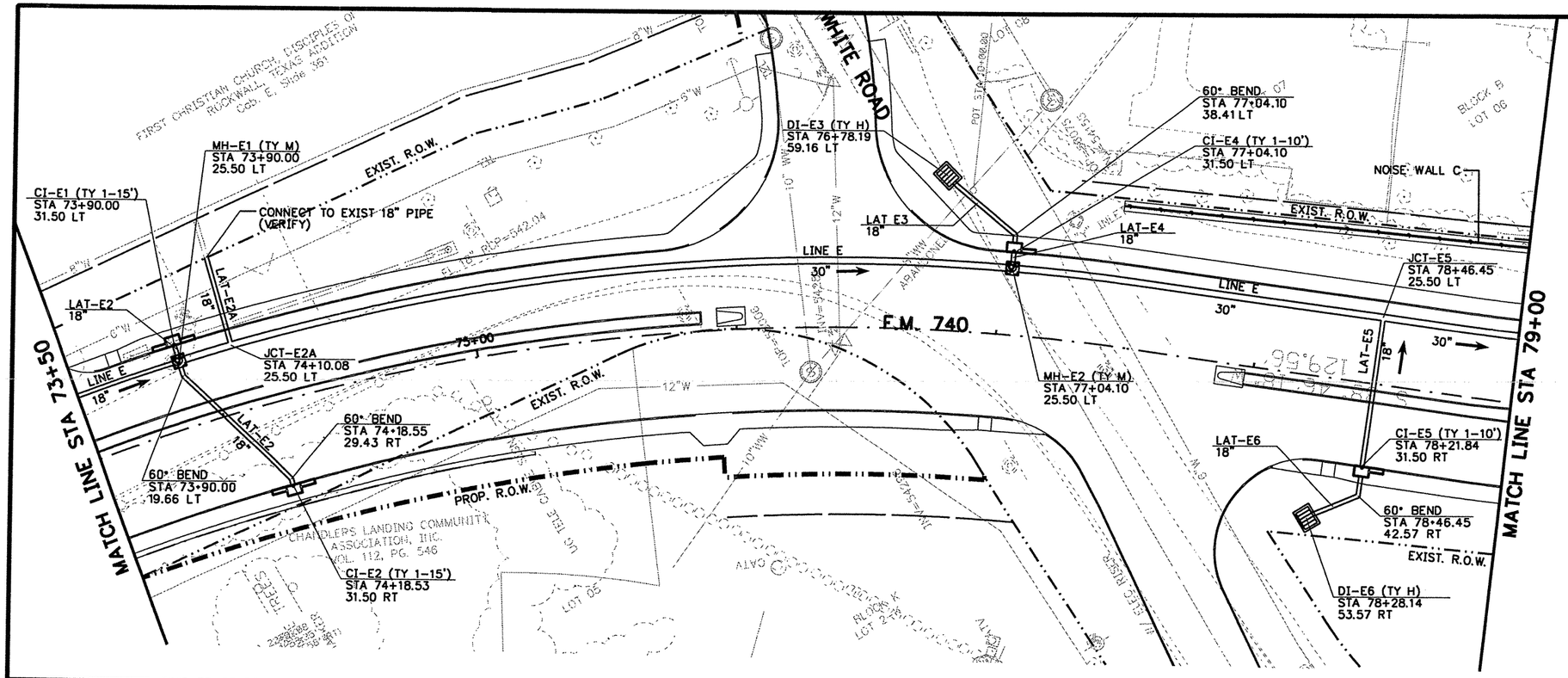
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 9 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				237
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

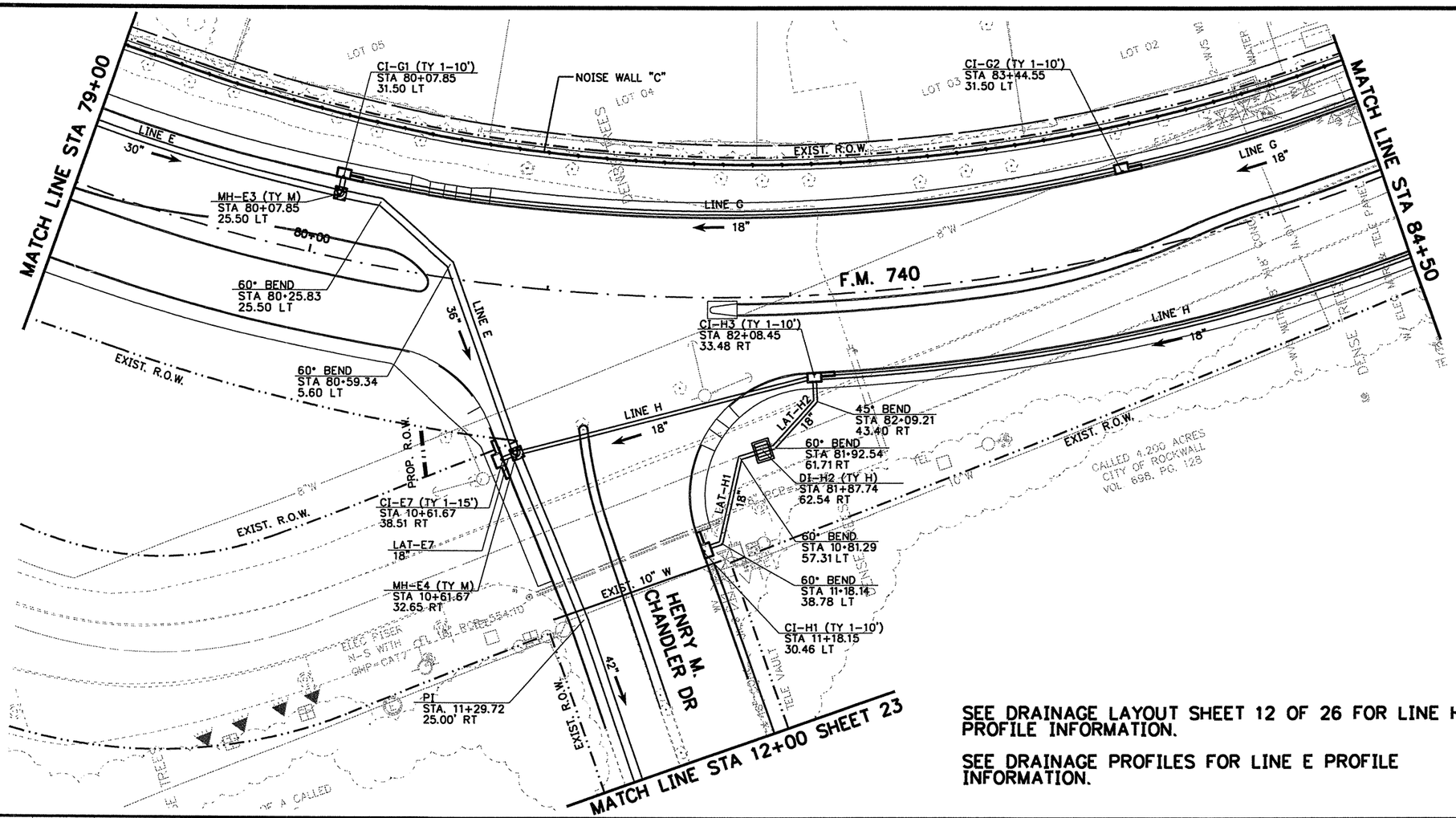
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

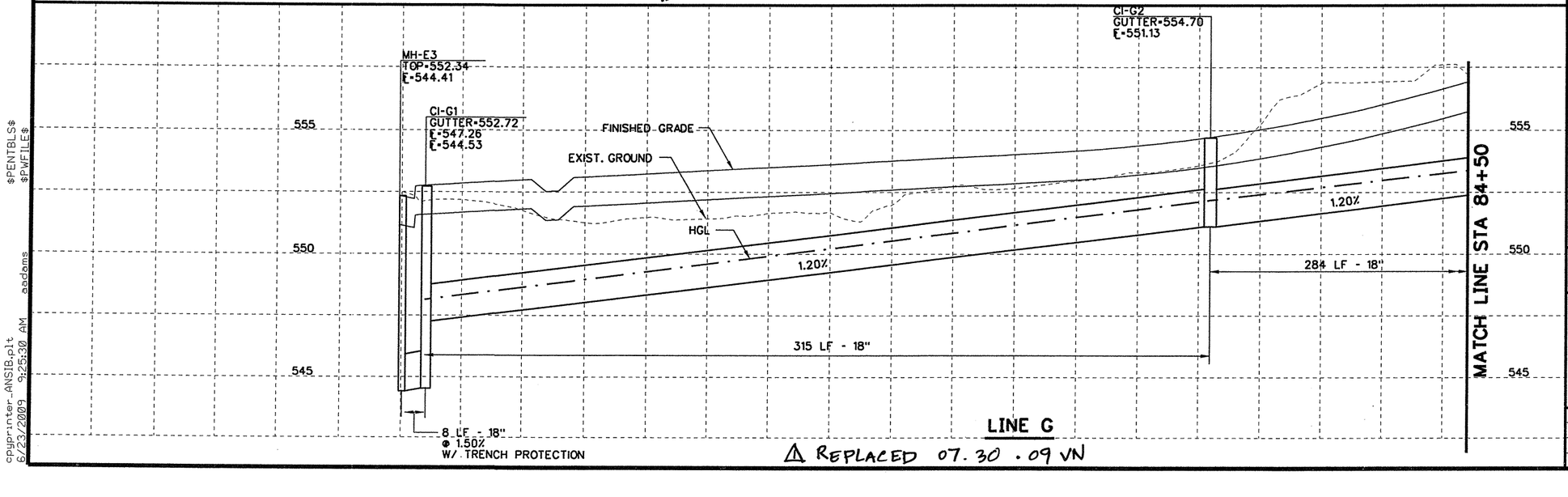
SHEET 10 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				238
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



SEE DRAINAGE LAYOUT SHEET 12 OF 26 FOR LINE H PROFILE INFORMATION.

SEE DRAINAGE PROFILES FOR LINE E PROFILE INFORMATION.



LINE G

⚠ REPLACED 07.30.09 VN

25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 11 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					239
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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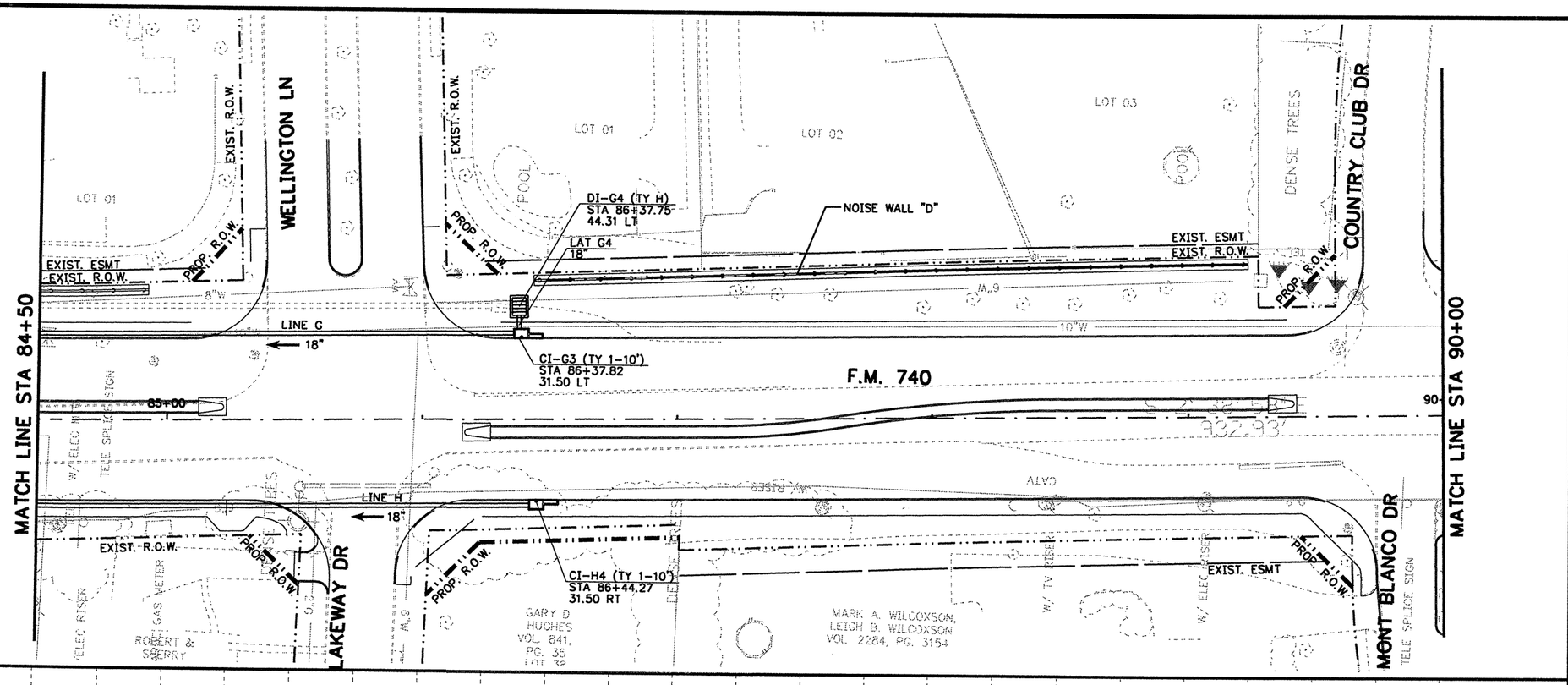
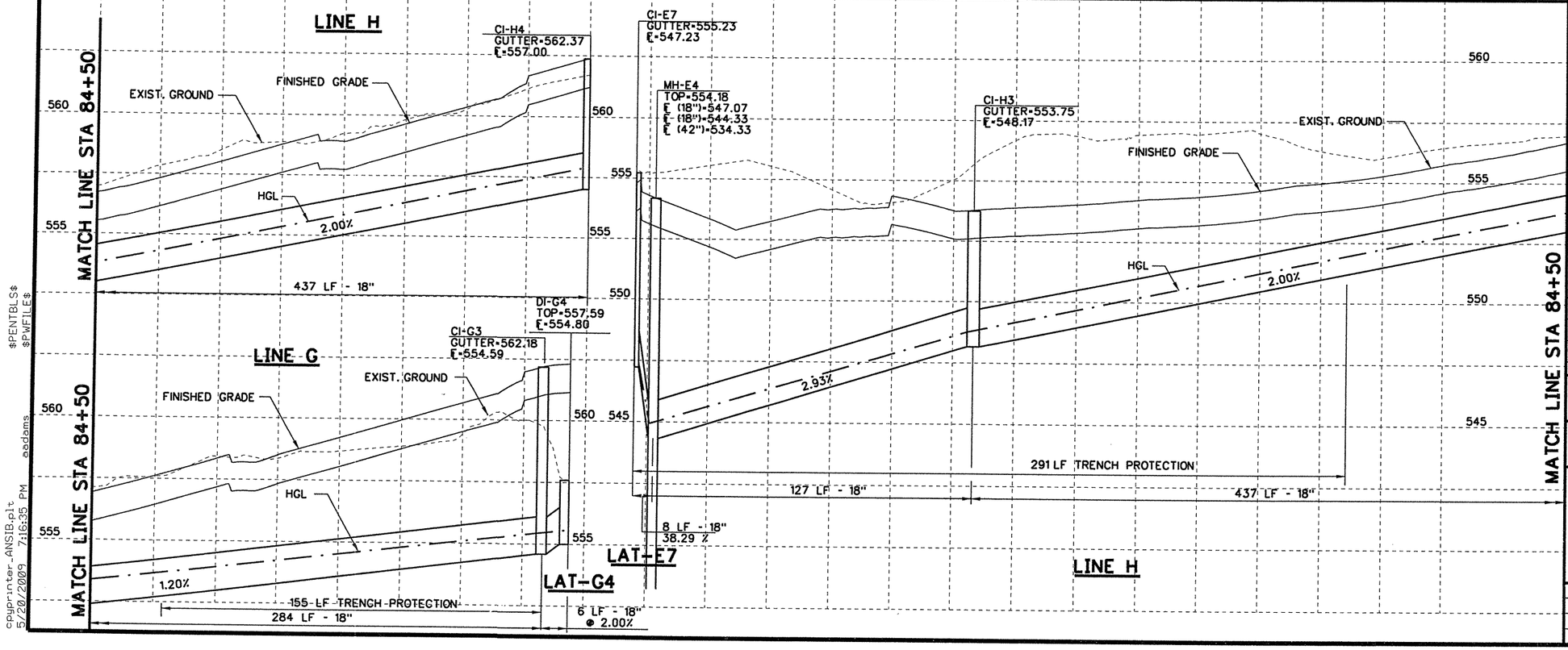




25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

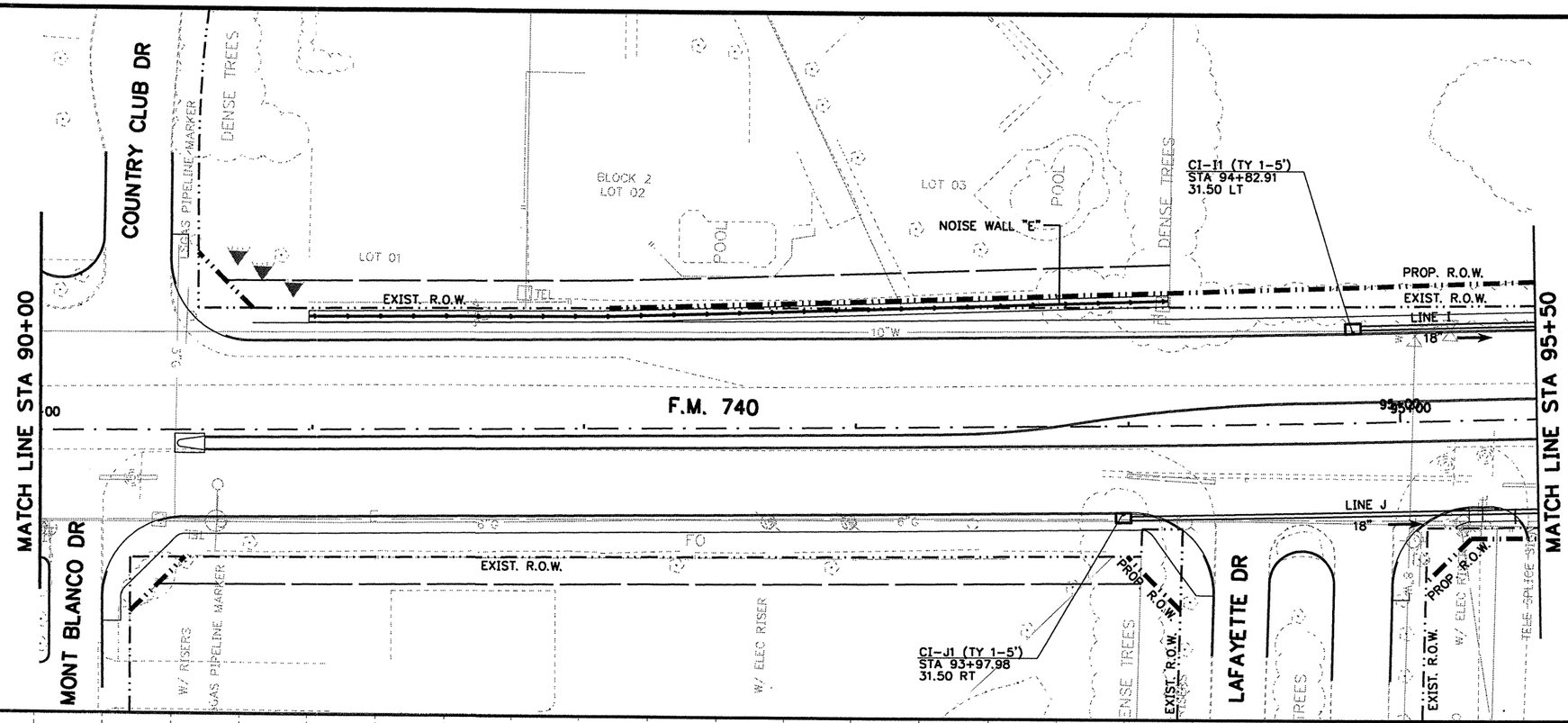
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

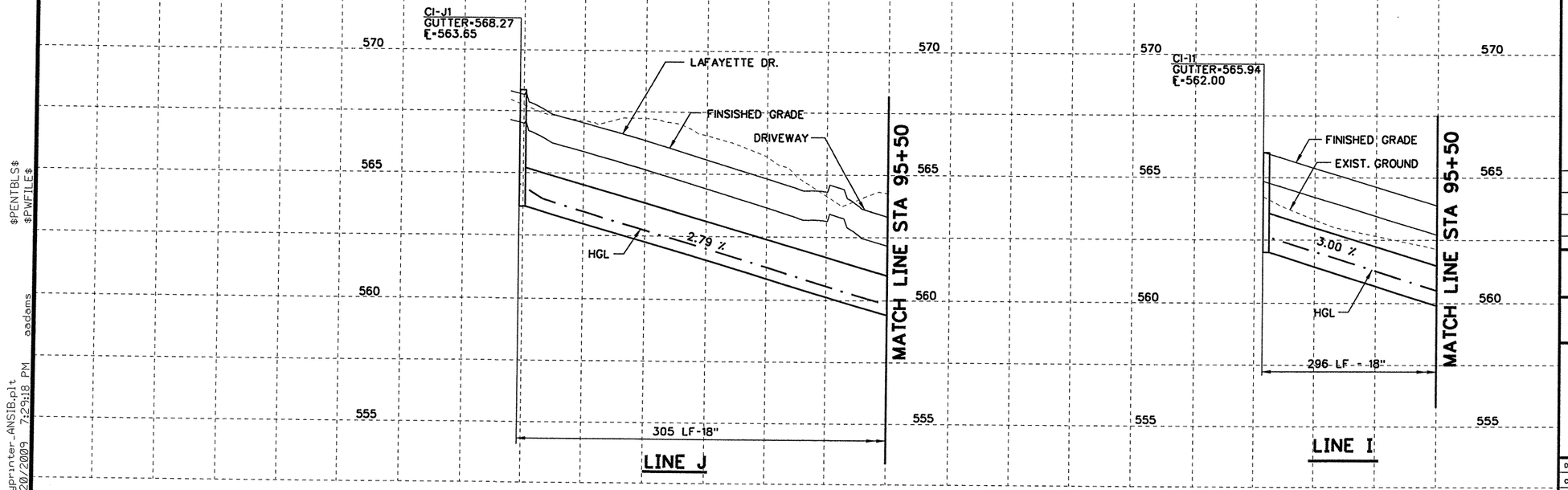
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 12 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				Z40
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/21/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 13 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.	
Checked:	RRH	6	TEXAS				241	
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.	
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740	

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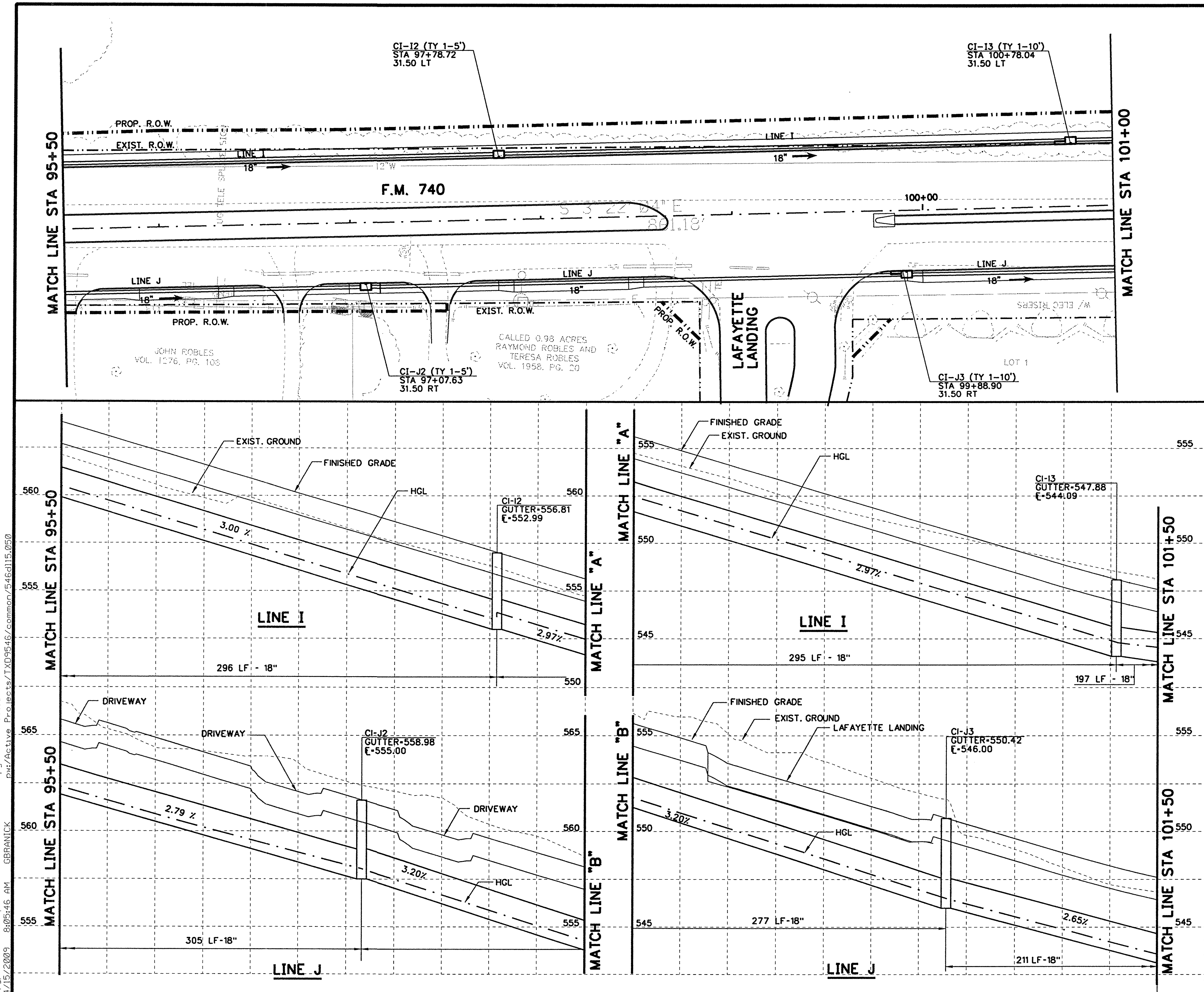

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HORIZ SCALE IN FEET (25 0 25 50)

VERT SCALE IN FEET (2.5 0 2.5 5)

STATE OF TEXAS
ROBIN R. HANDEL
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PROFESSIONAL ENGINEER

4/15/09

NO.	REVISION	BY	DATE

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Firm Registration Number: 1741

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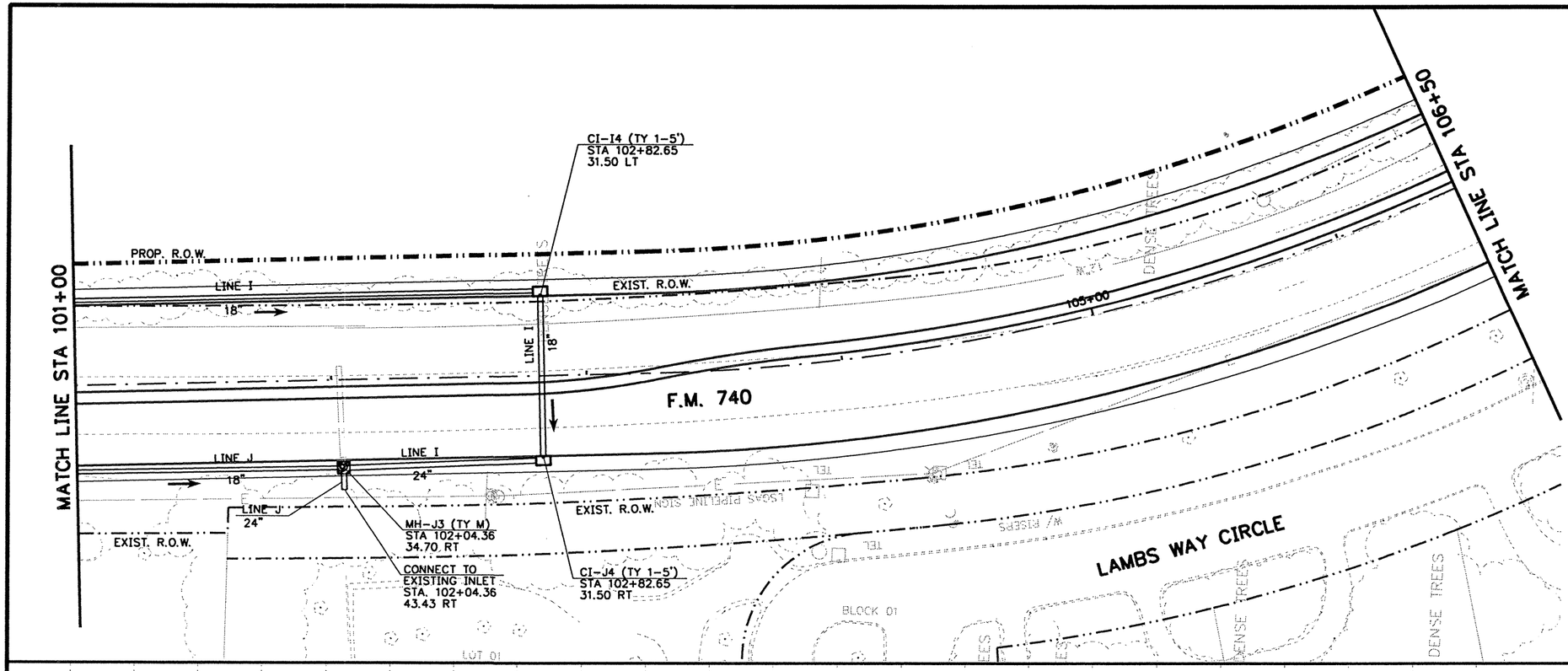
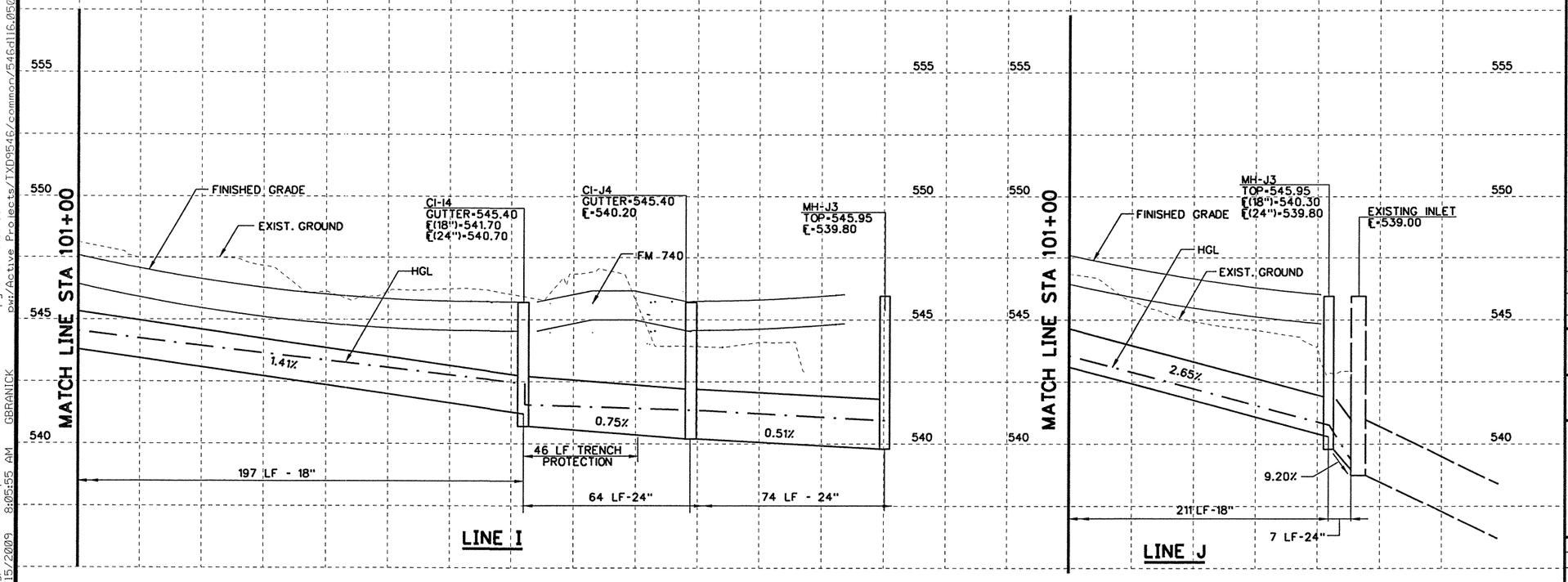
DALLAS DIST.-FM740

DRAINAGE
LAYOUT SHEET

SHEET 14 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked: RRH	6	TEXAS					242
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039		FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 15 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				243
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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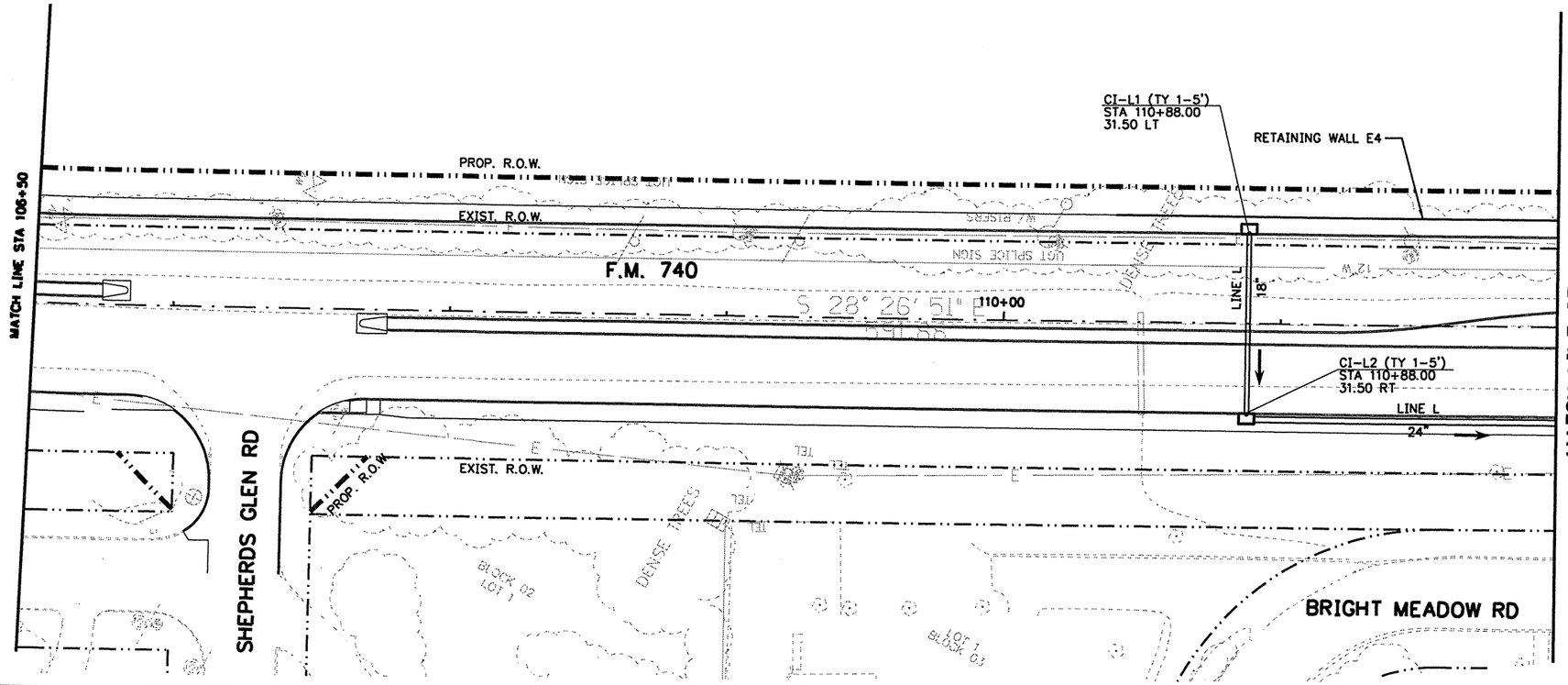
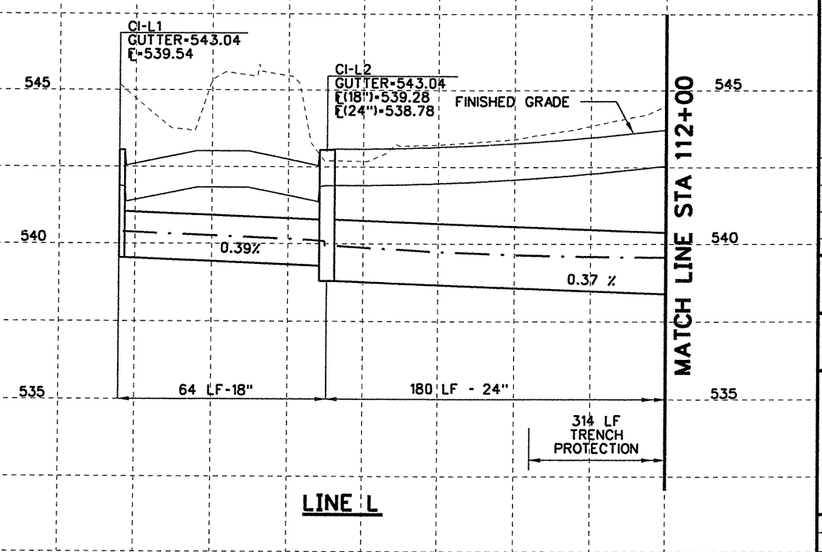




25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

5/21/09

NO.	REVISION	BY	DATE

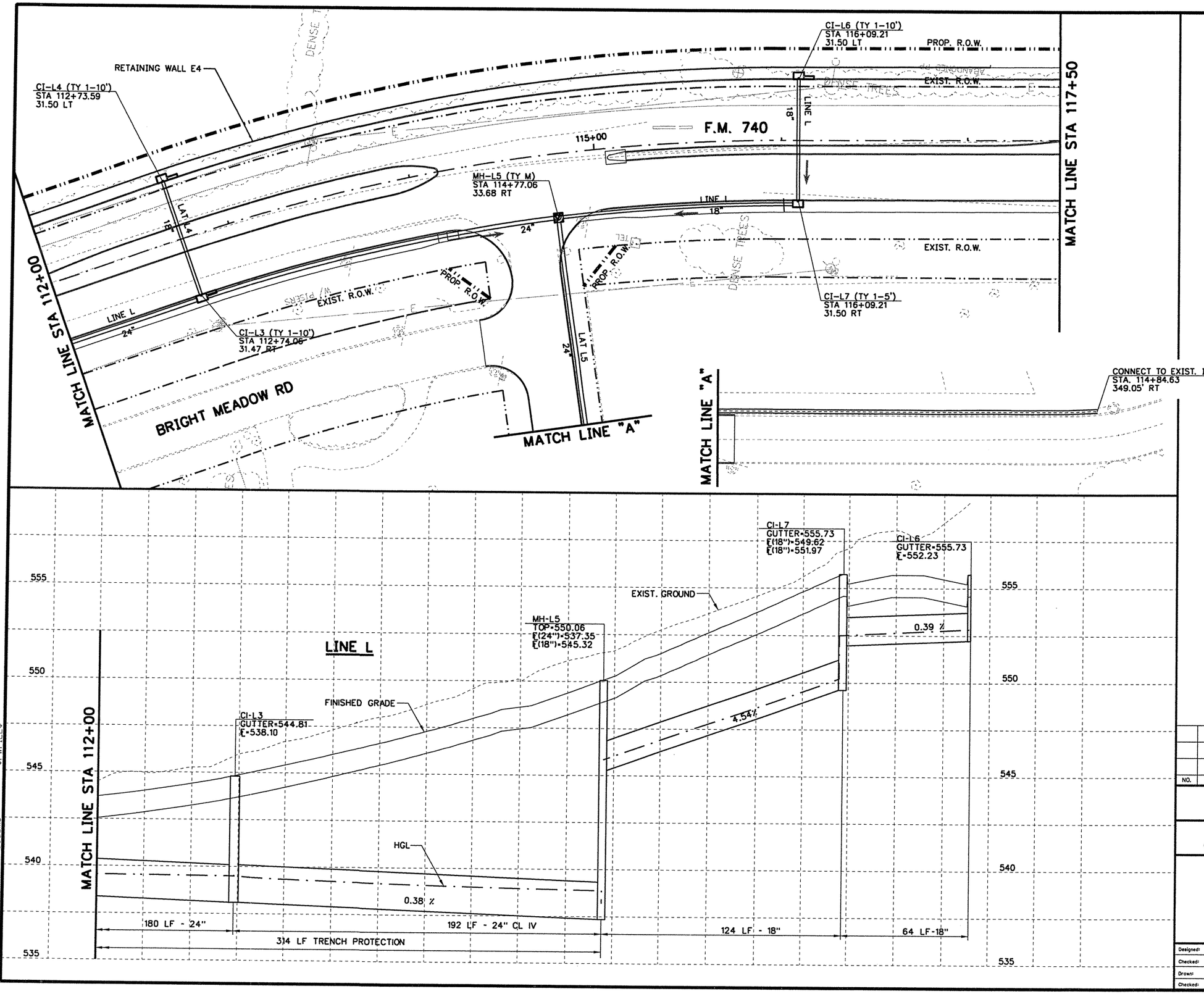
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 16 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				244
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
6/21/09

NO.	REVISION	BY	DATE

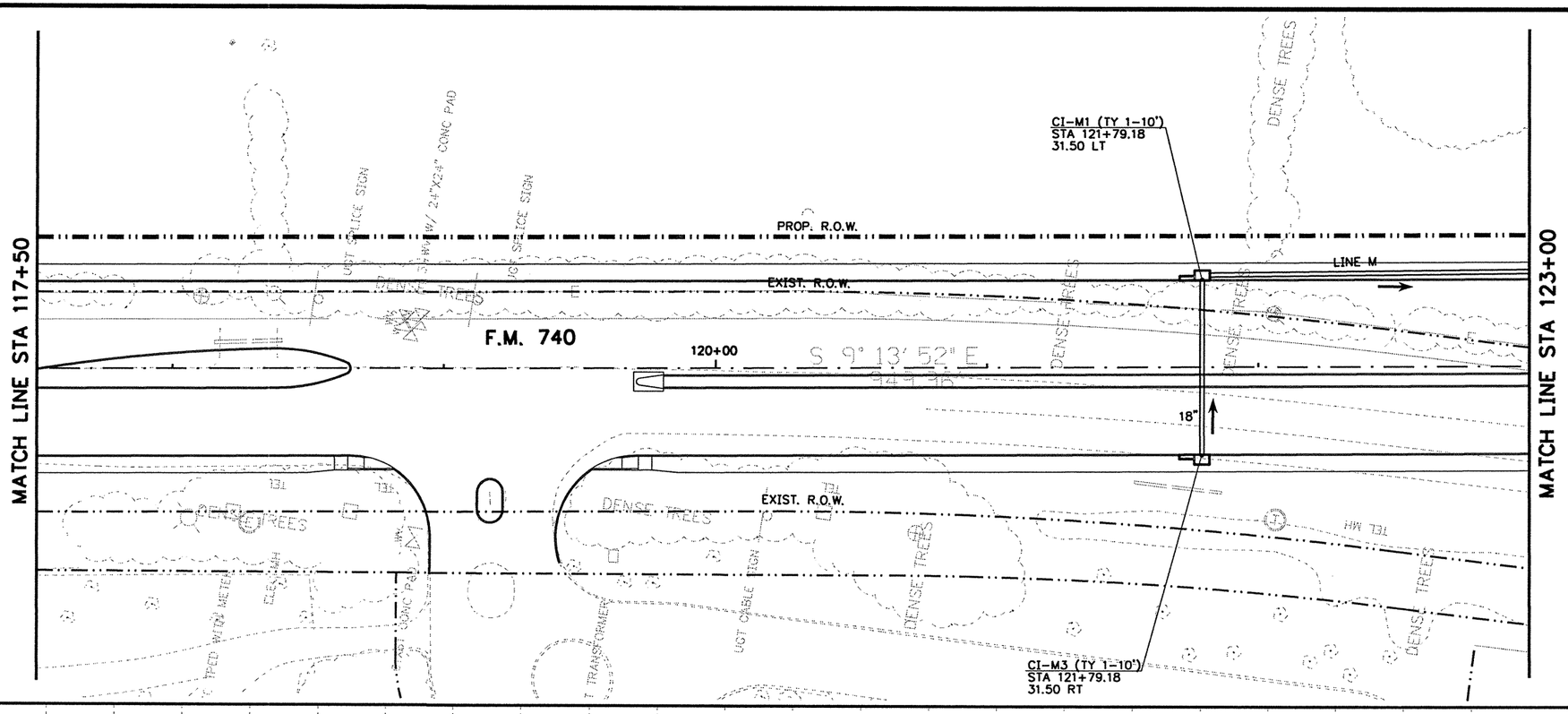
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

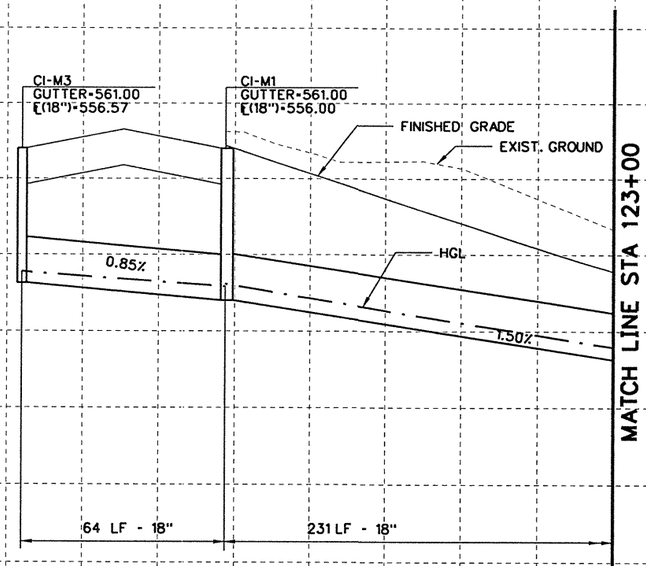
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 17 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				245
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
5/21/09

NO.	REVISION	BY	DATE

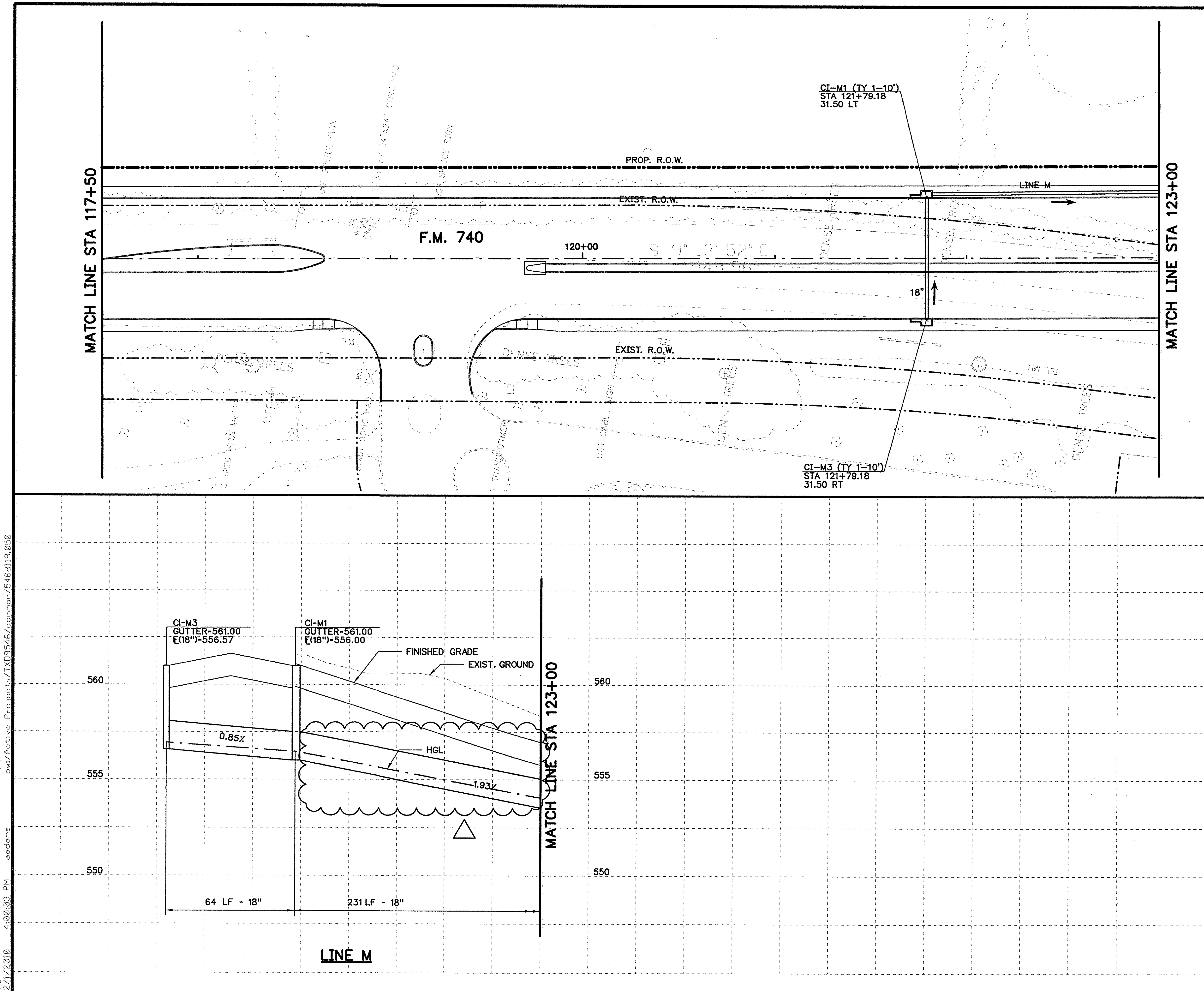
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 18 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				246
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



25 0 25 50
HORIZ SCALE IN FEET
2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
12/1/10

NO.	REVISION	BY	DATE
△	LOWER MH-M1 AND CONNECTION TO CI-M2	AJA	12/1/10

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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DALLAS DIST.-FM740

DRAINAGE
LAYOUT SHEET

SHEET 18 OF 26

		FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Designed:	JCM	6	TEXAS				246A
Checked:	RRH	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Drawn:	GBG	DALLAS	ROCKWALL	1014	03	039	FM 740
Checked:	RRH						

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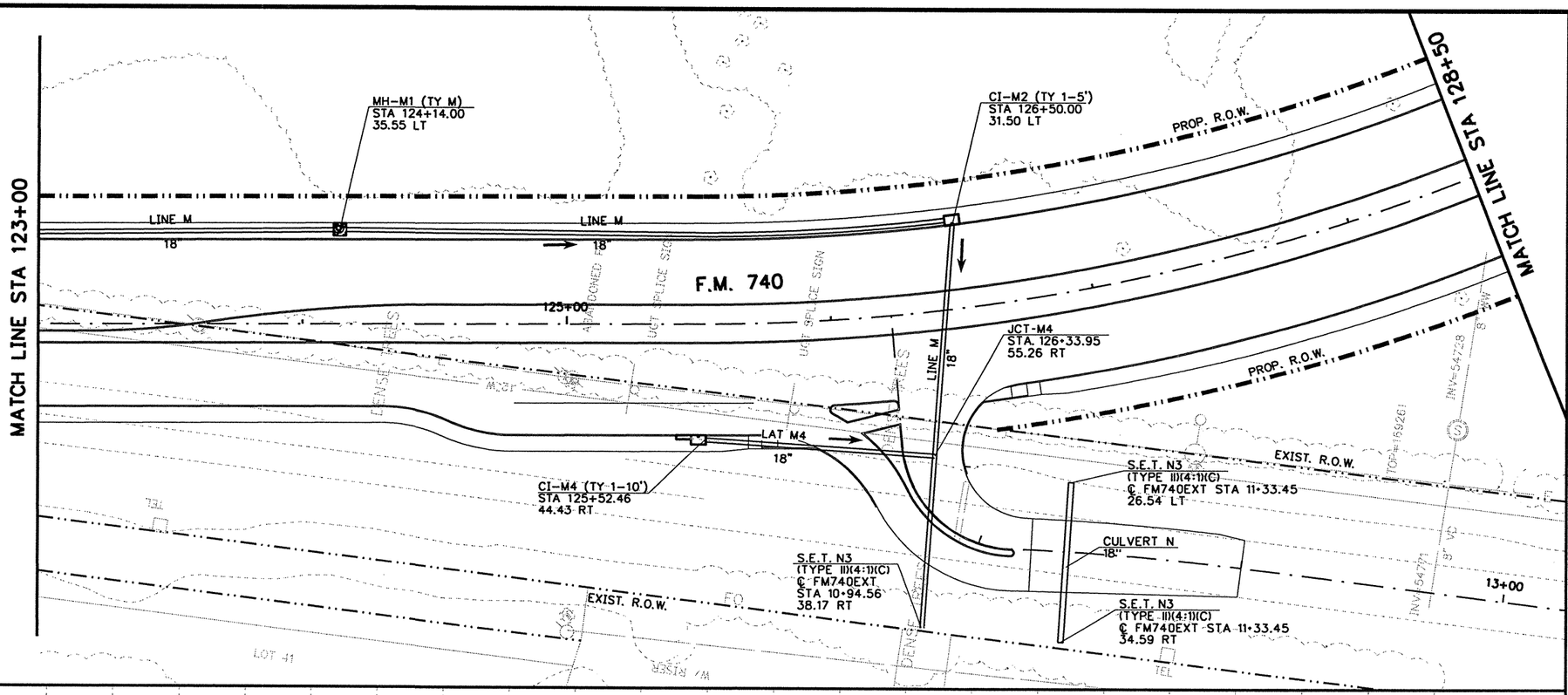

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STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

5/21/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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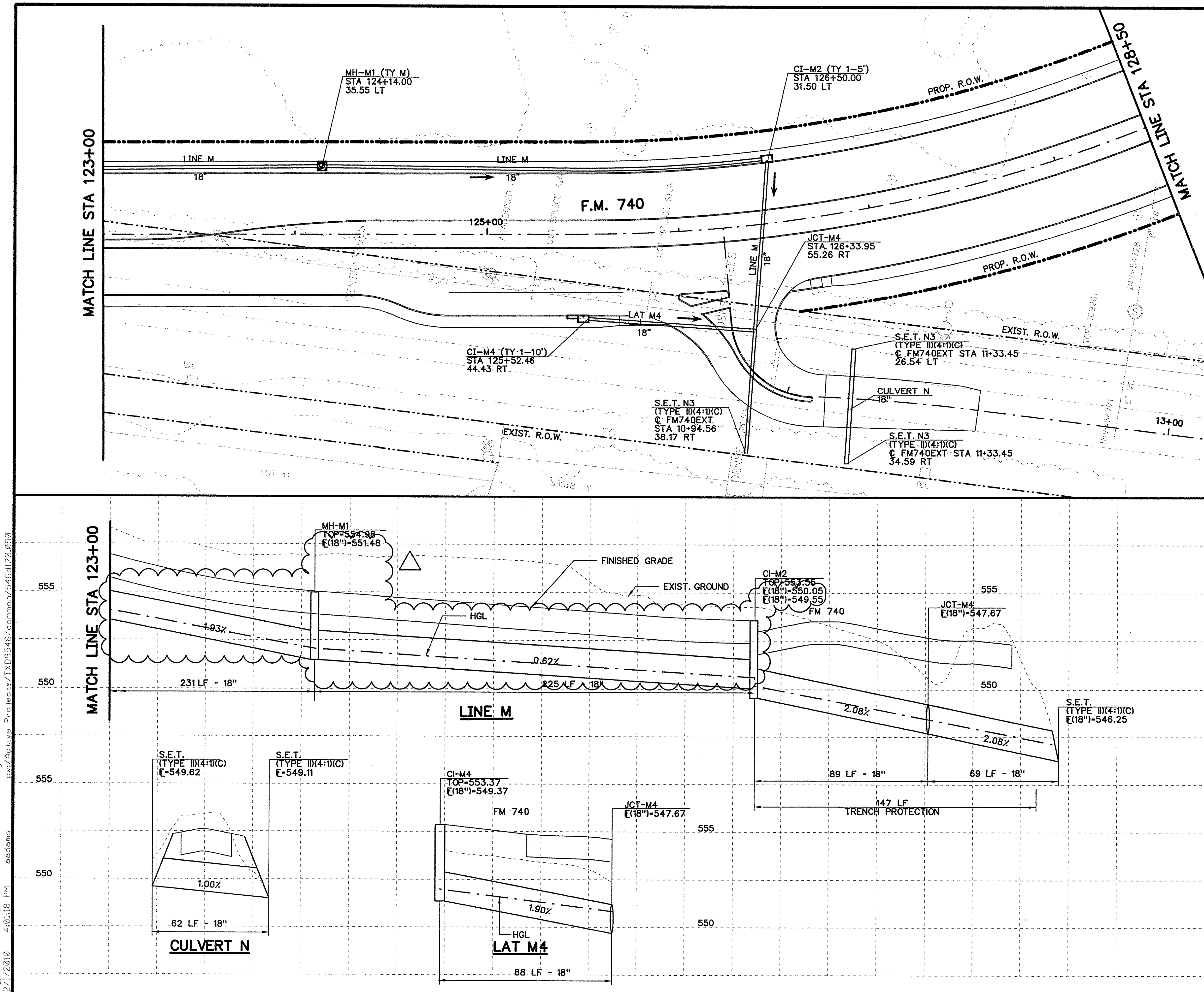
DALLAS DIST.-FM740

DRAINAGE
LAYOUT SHEET

SHEET 19 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				247
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



25 0 25 50
HORIZ SCALE IN FEET
2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
12/1/10

NO.	REVISION	BY	DATE
△	LOWER MH-M1 AND CONNECTION TO CI-M2	AJA	12/1/10

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Firm Registration Number: 1741

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DALLAS DIST.-FM740

DRAINAGE
LAYOUT SHEET

SHEET 19 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked: RRH	6	TEXAS					247A
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

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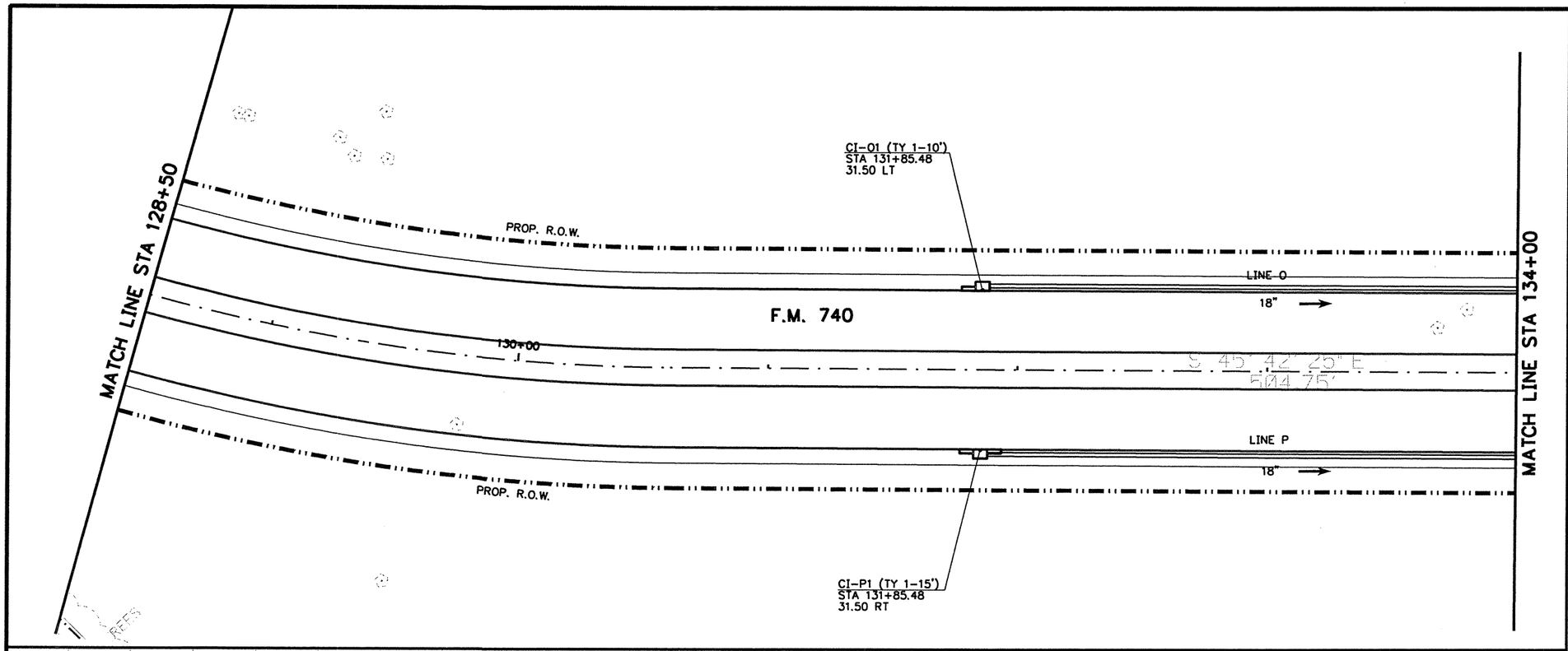
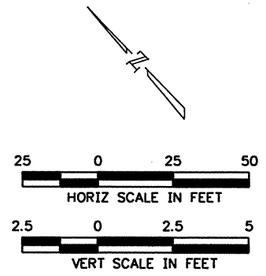
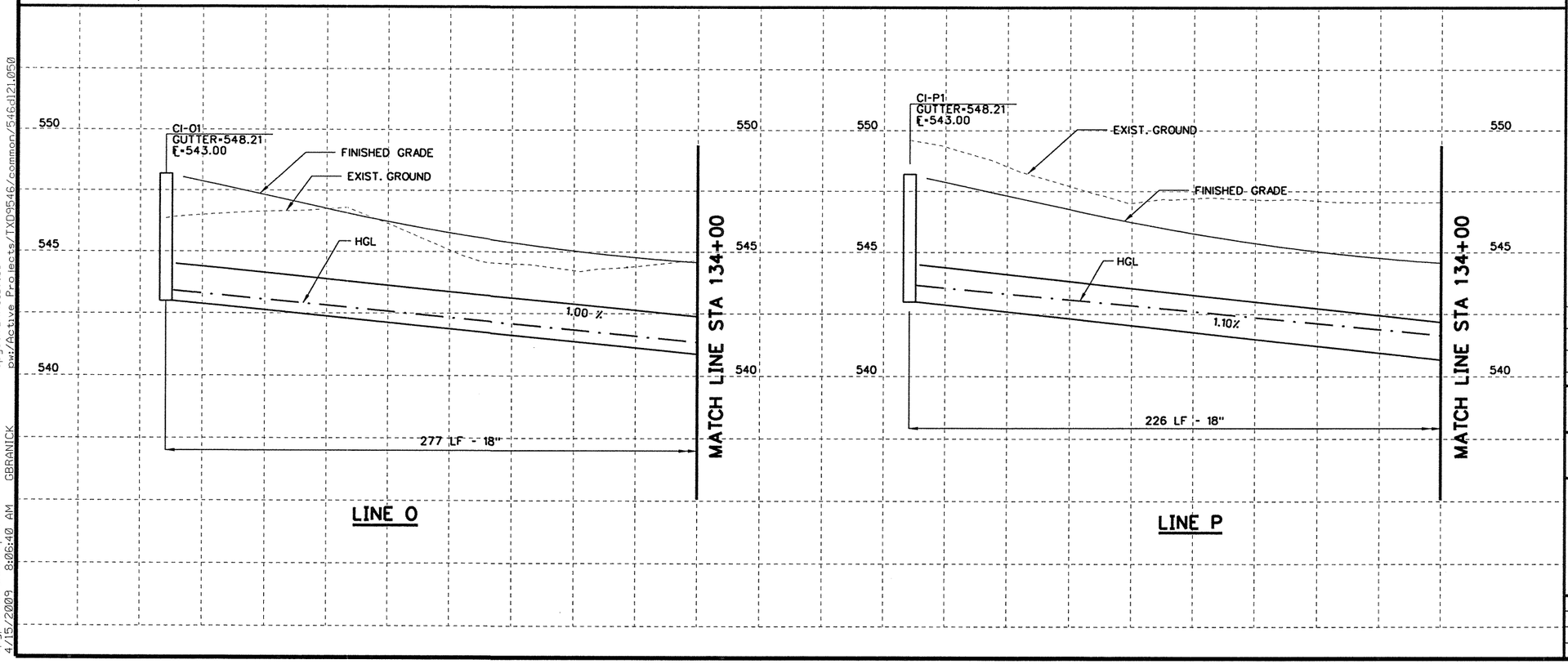






STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED PROFESSIONAL ENGINEER

4/15/09

NO.	REVISION	BY	DATE

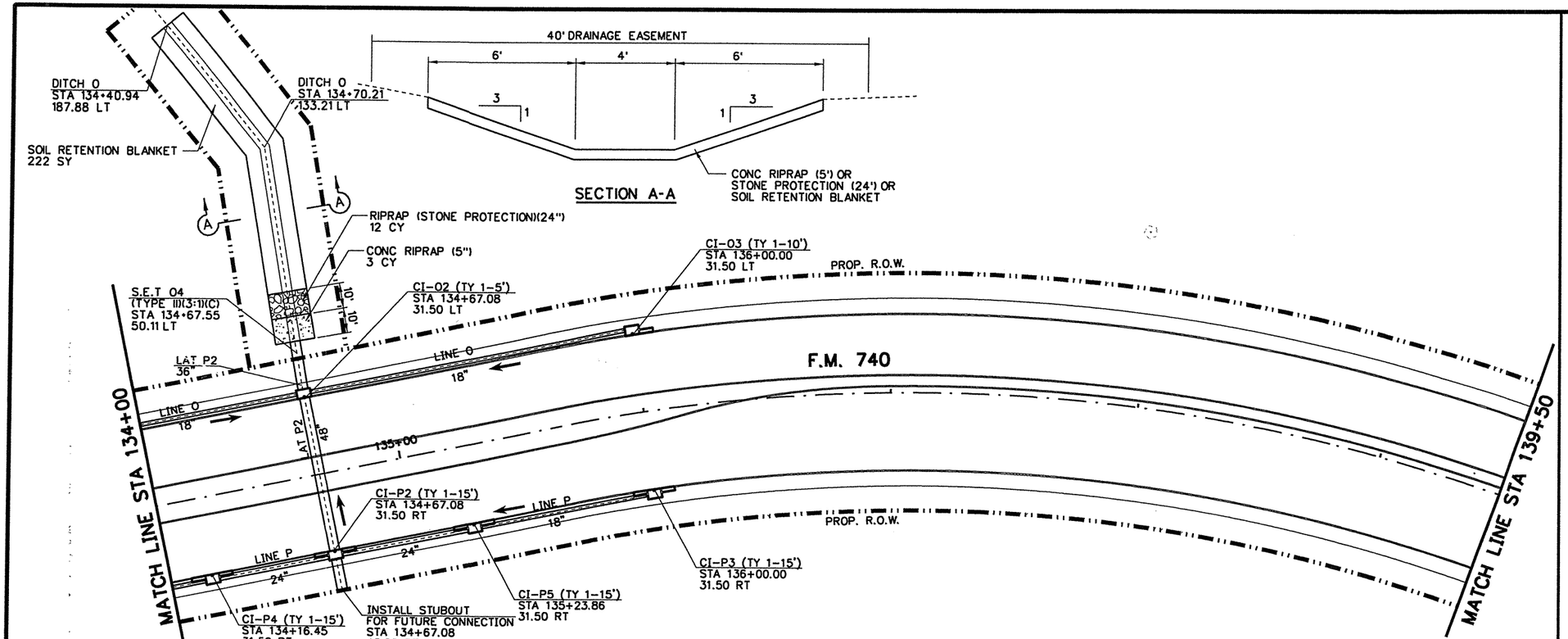
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

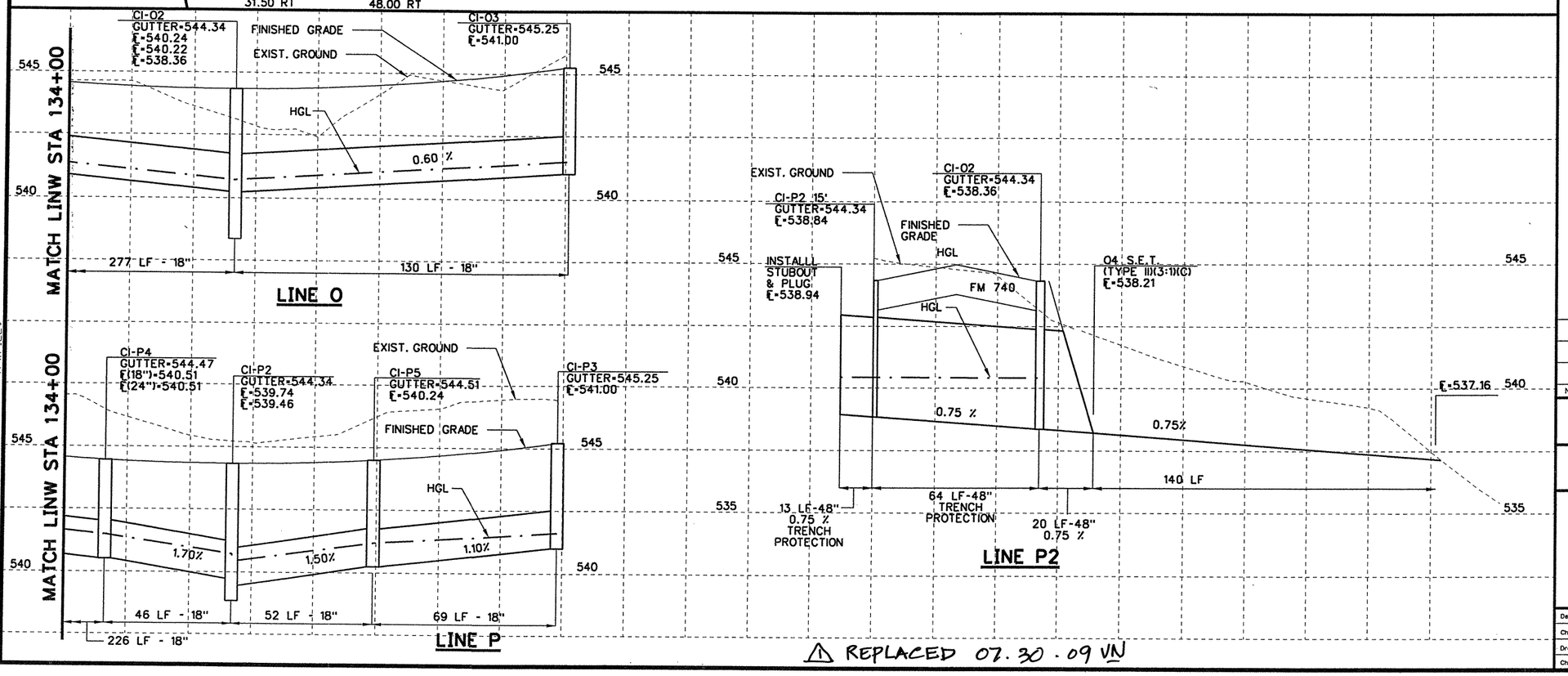
DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 20 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				248
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740





25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

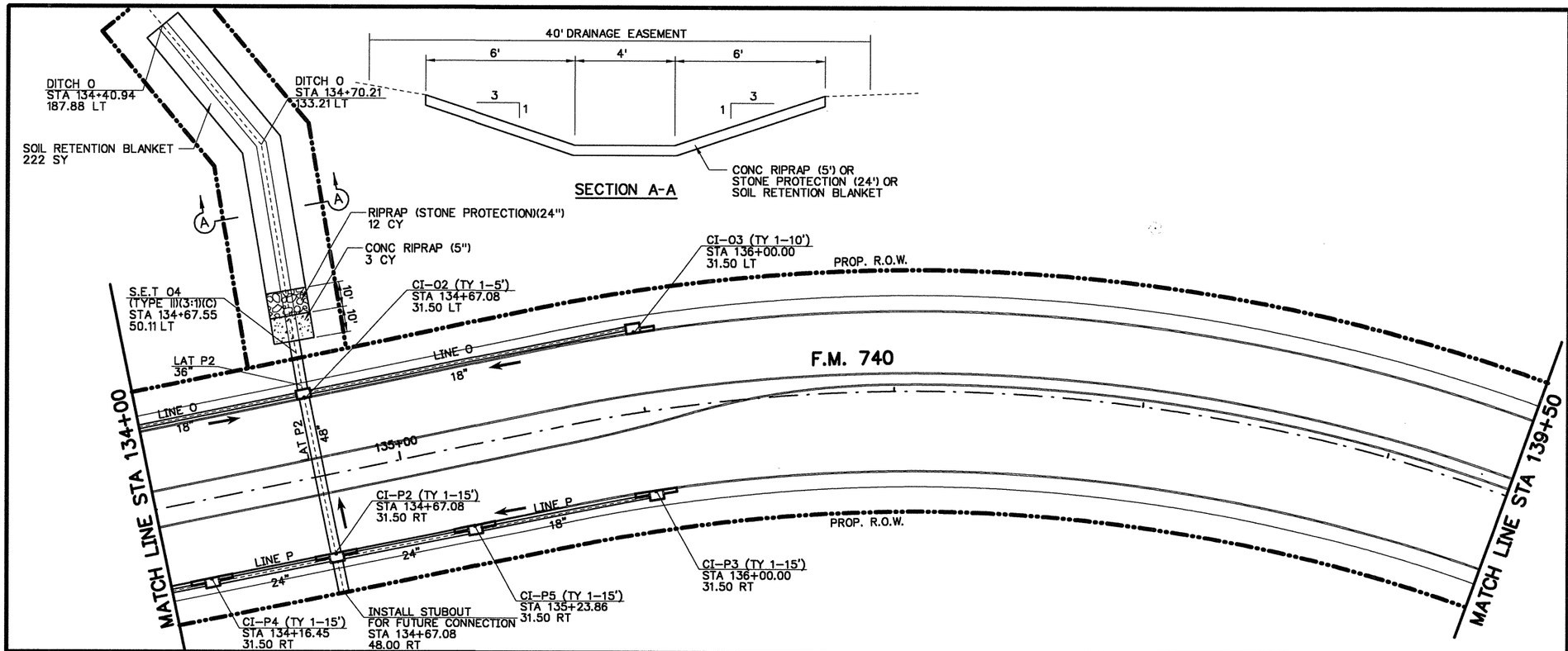
DALLAS DIST.-FM740

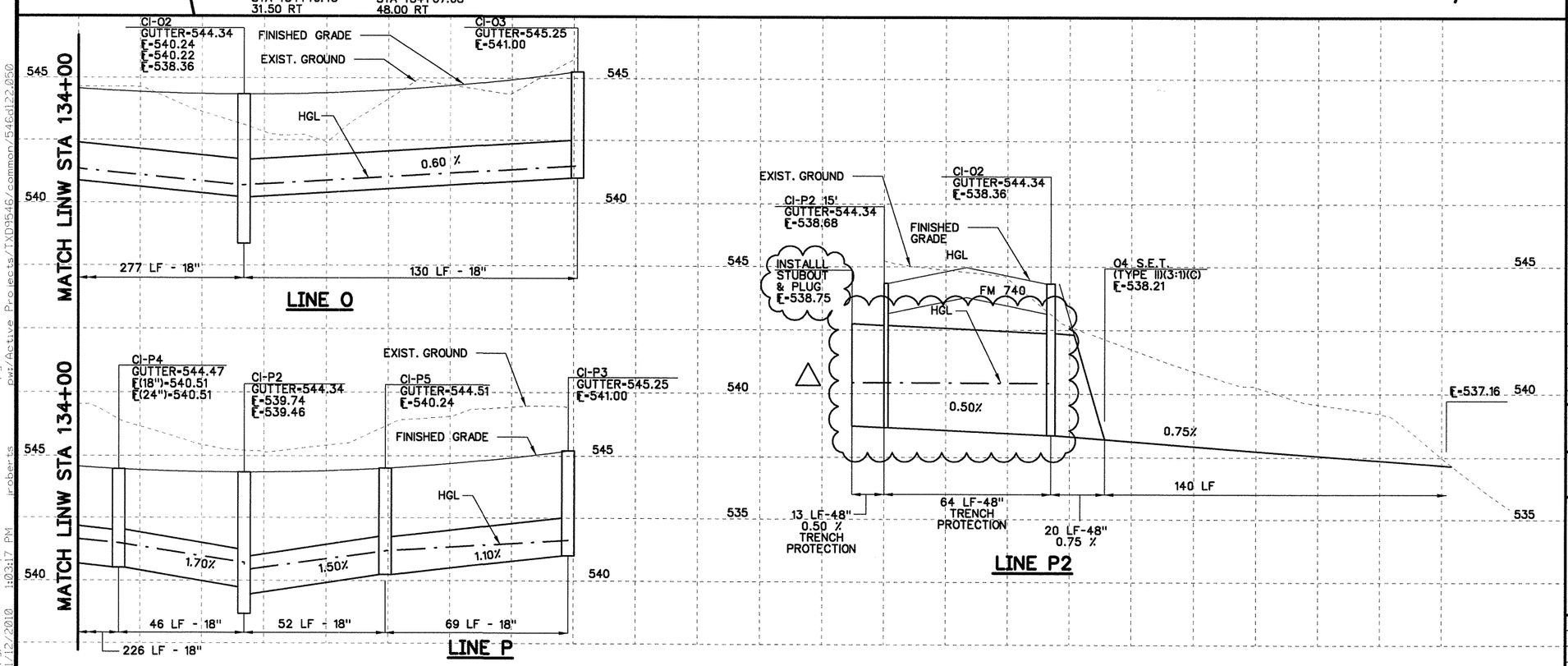
DRAINAGE LAYOUT SHEET

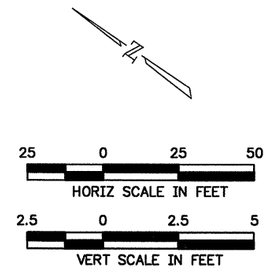
SHEET 21 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				249
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

⚠ REPLACED 07.30.09 VN







11/15/10

NO.	REVISION	BY	DATE
△	LOWER 48" RCP	AJA	11/8/10

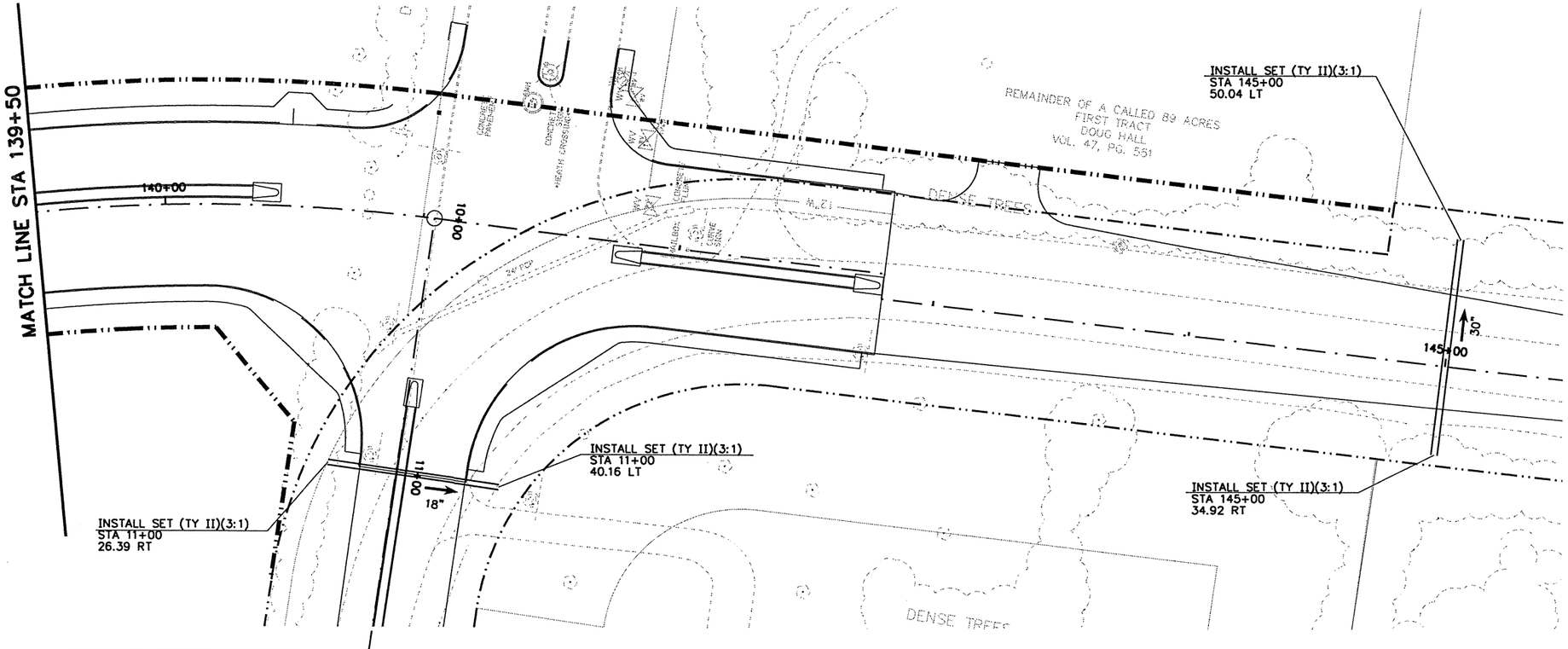
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 21 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				249A
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



△ REPLACED 07.30.09 VN

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STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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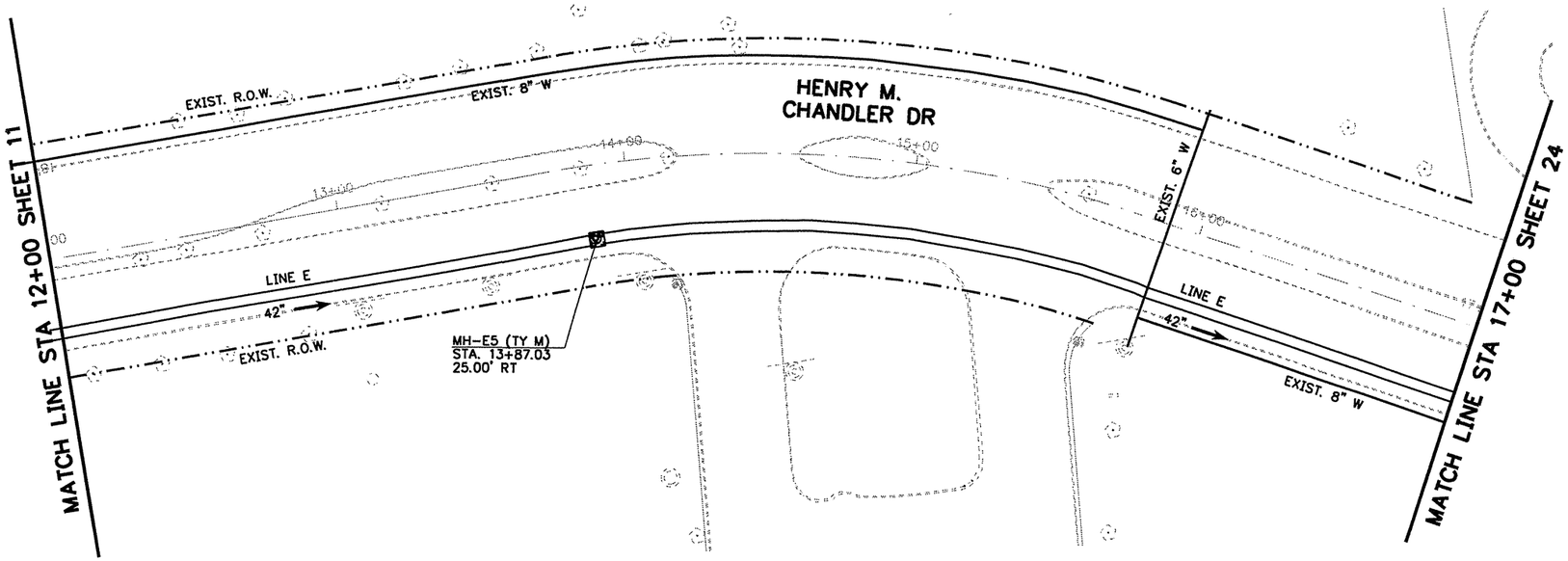
DALLAS DIST.-FM740

DRAINAGE
LAYOUT SHEET

SHEET 22 OF 26

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	6	TEXAS				250
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	DALLAS	ROCKWALL	1014	03	039	FM 740



SEE DRAINAGE PROFILES FOR LINE E PROFILE INFORMATION.

25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 23 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				251
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

⚠ REPLACED 07.30.09 VN

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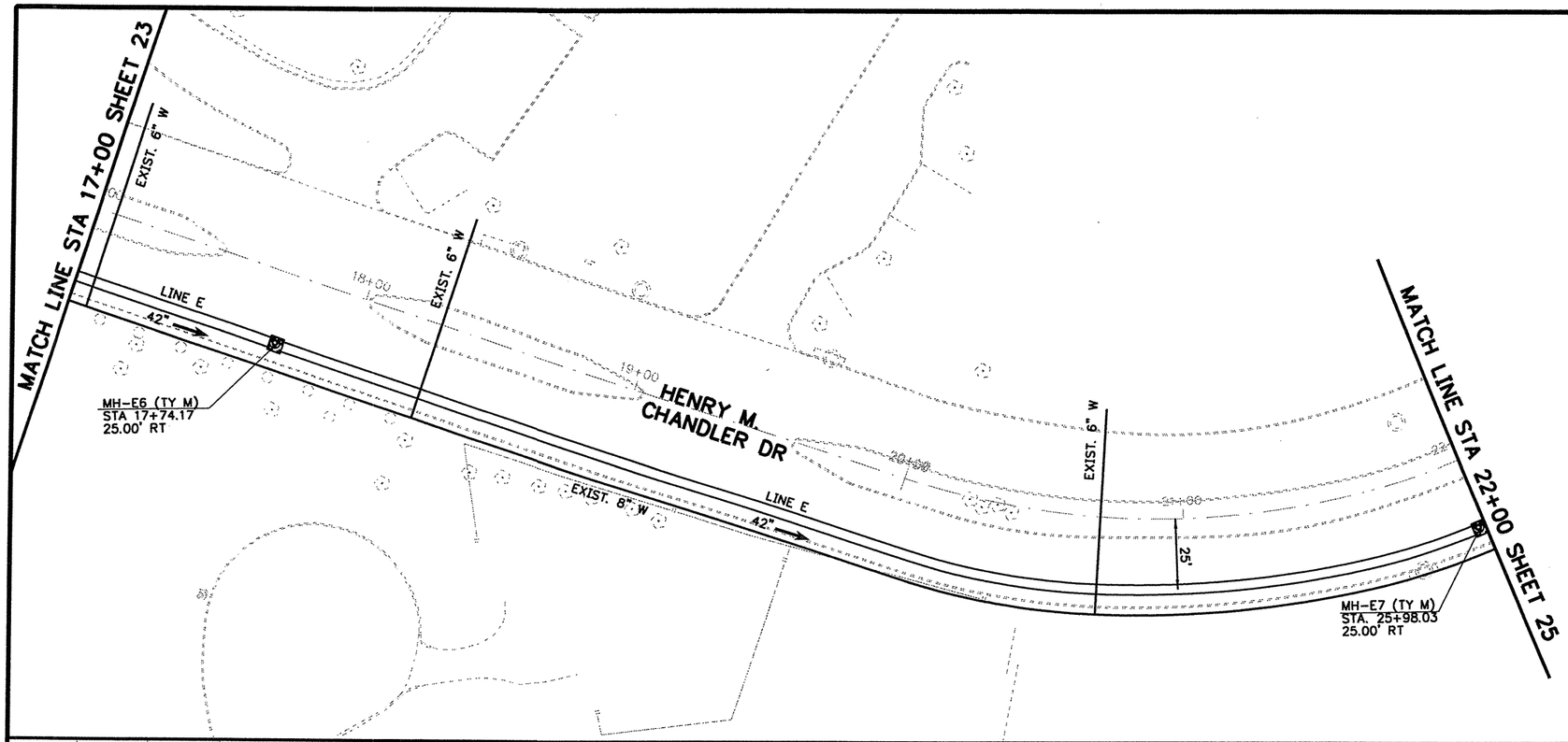


SEE DRAINAGE PROFILES FOR LINE E PROFILE INFORMATION.

⚠ REPLACED 07.30.09 VN

25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

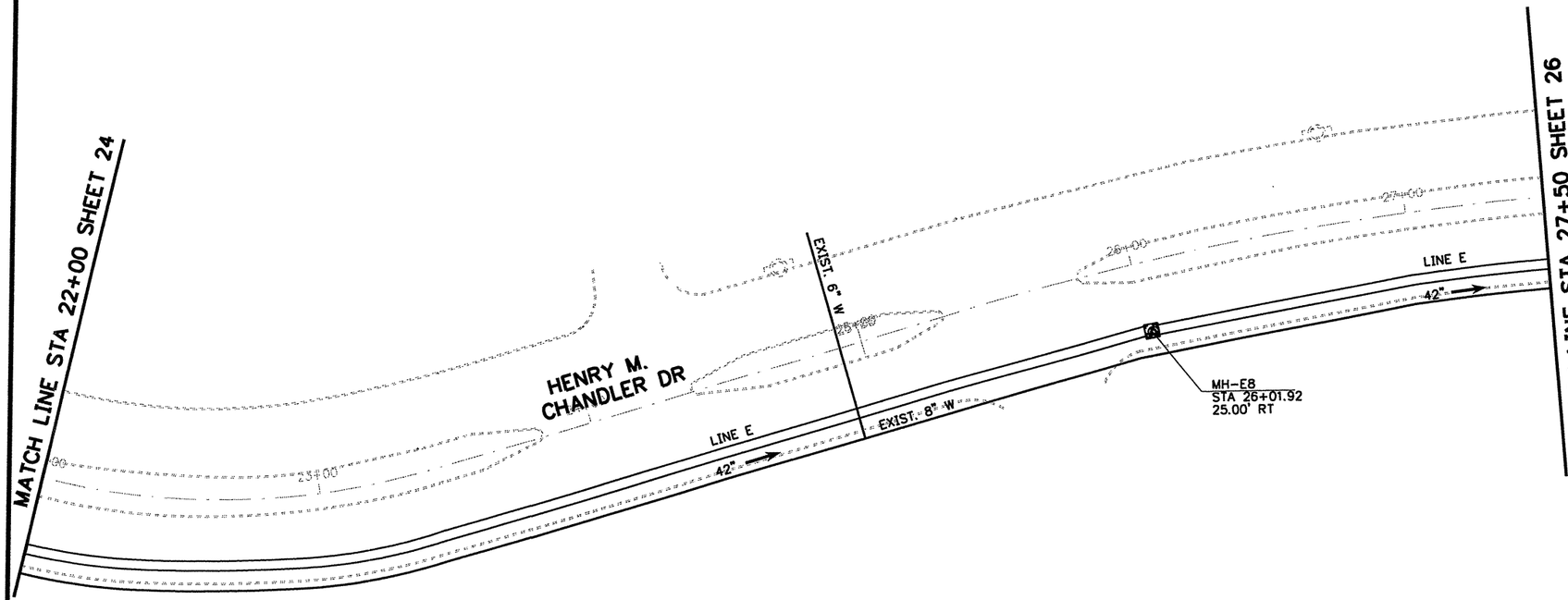
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 24 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					252
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740



SEE DRAINAGE PROFILES FOR LINE E PROFILE INFORMATION.

25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 25 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				253
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

⚠ REPLACED 07.30.09 VN

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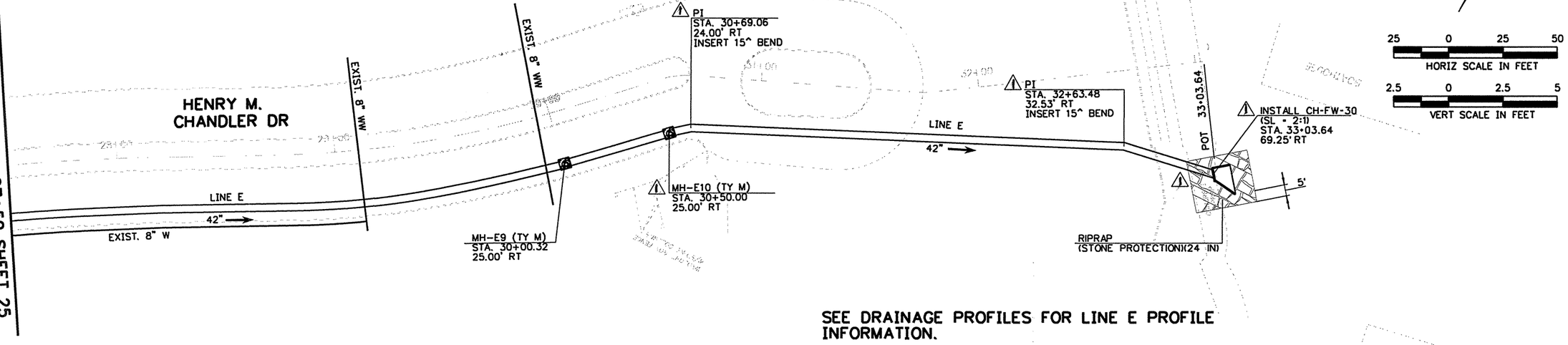
NOTE:

SEE MISC. DRAINAGE DETAILS FOR FURTHER INFORMATION.



SEE DRAINAGE PROFILES FOR LINE E PROFILE INFORMATION.

7/15/09

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 26 OF 26

Designed: JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked: RRH	6	TEXAS				254
Drawn: GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked: RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

⚠ REVISED 07.30.09 VN

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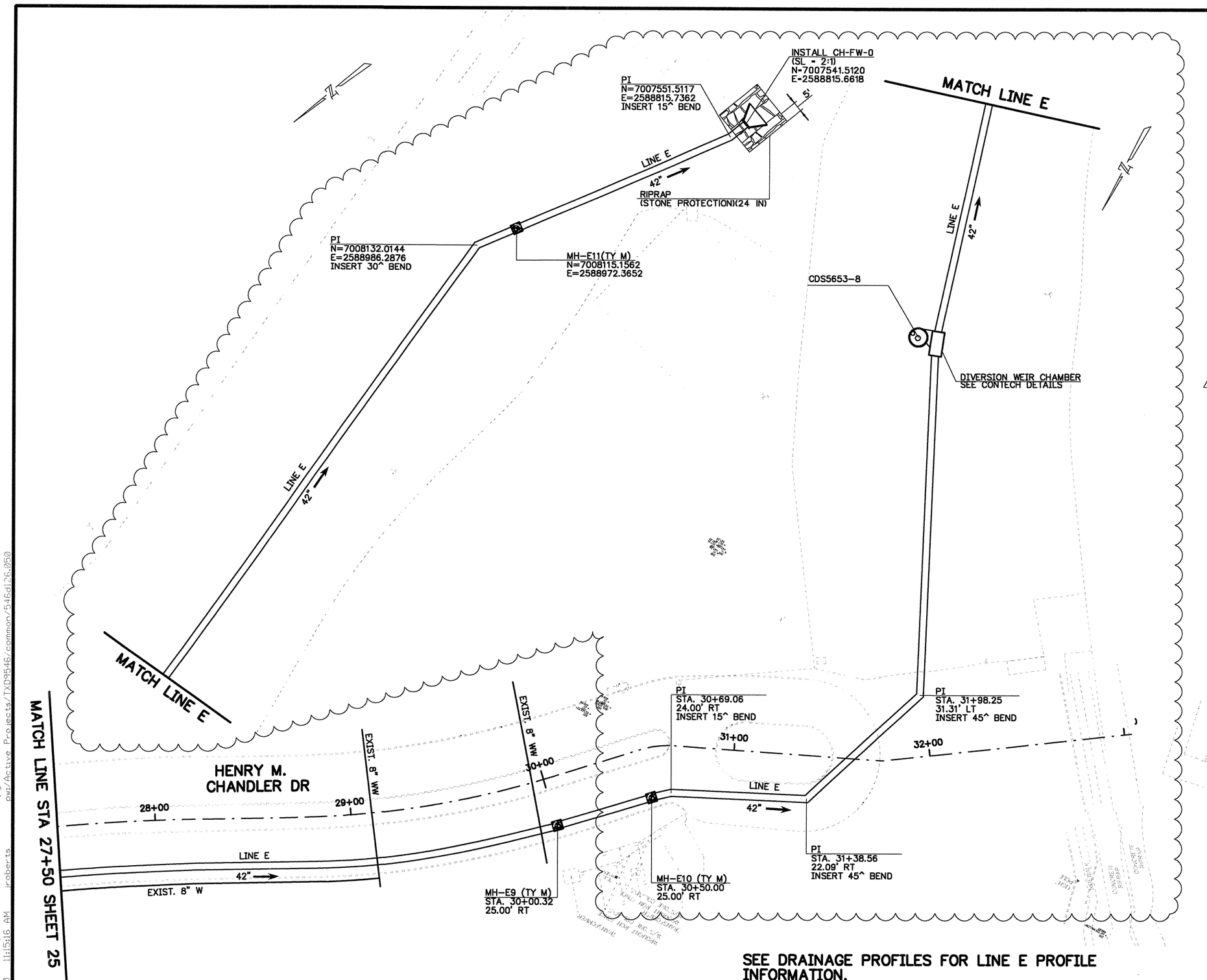


25 0 25 50
HORIZ SCALE IN FEET

2.5 0 2.5 5
VERT SCALE IN FEET

NOTE:

SEE MISC. DRAINAGE DETAILS FOR FURTHER INFORMATION.

SEE DRAINAGE PROFILES FOR LINE E PROFILE INFORMATION.

No.	DATE	REVISION	APPROVE
△	11-02-10	MANHOLE & CDS, LAKE OUTFALL & WINGWALL CHANGE	

11/15/2010

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

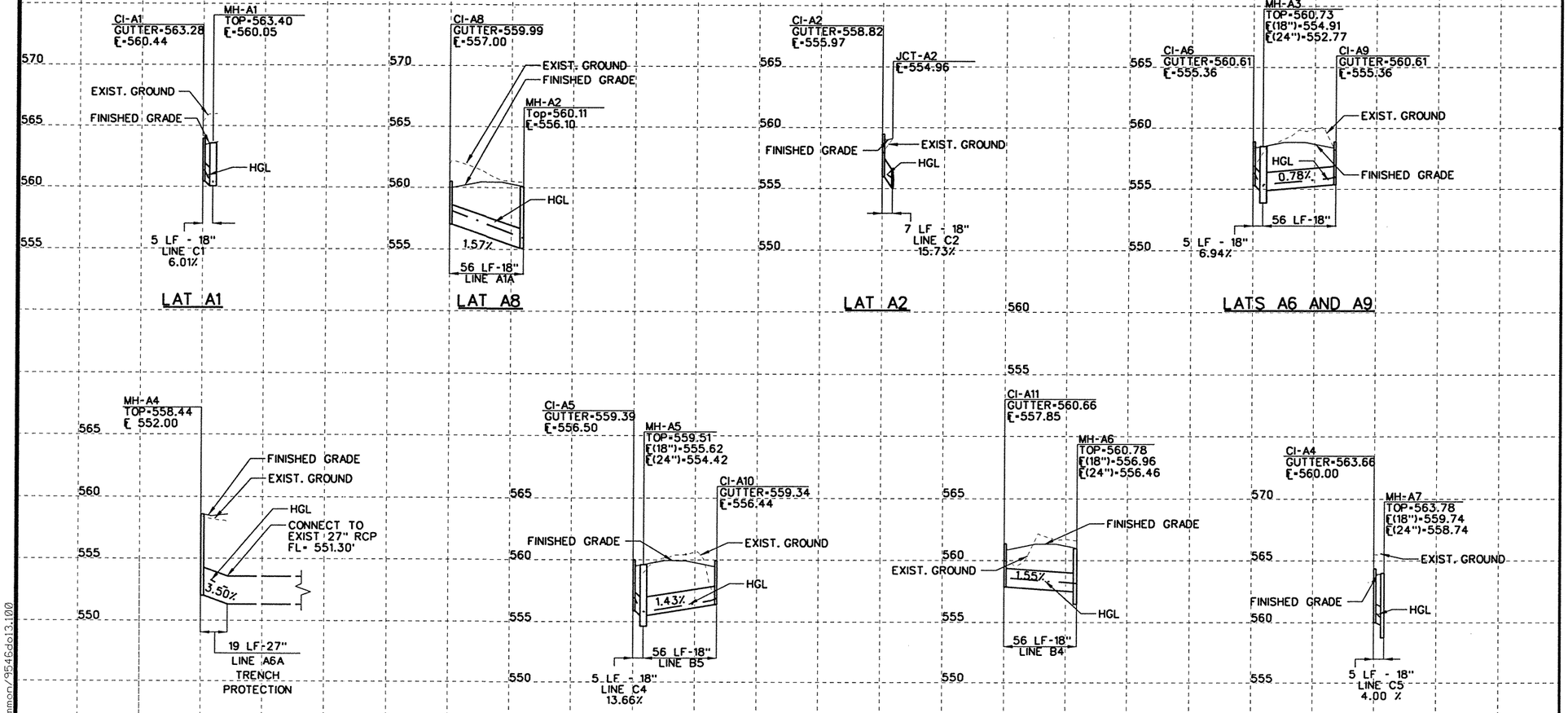
Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE LAYOUT SHEET

SHEET 26 OF 26

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				254A
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

4/15/09

NO.	REVISION	BY	DATE

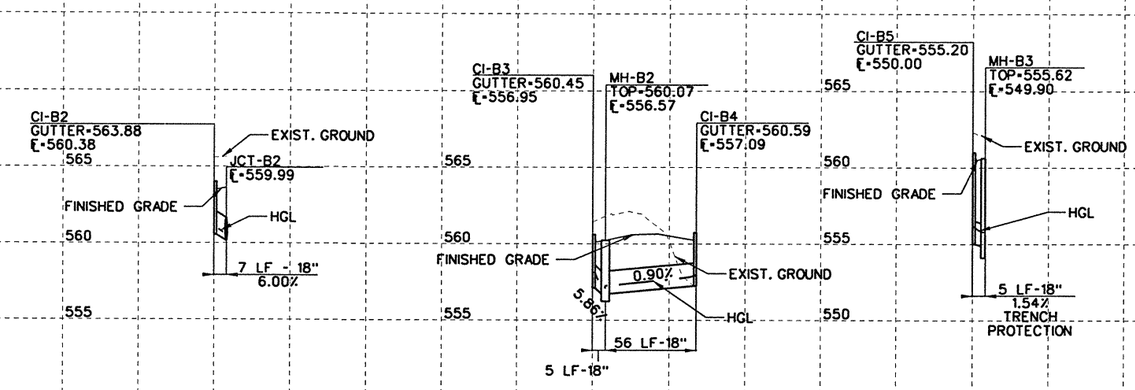
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE A LATERALS

SHEET 1 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					235
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740



LAT B2

LATS B3 AND B4

LAT B5

5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

4/15/09

NO.	REVISION	BY	DATE

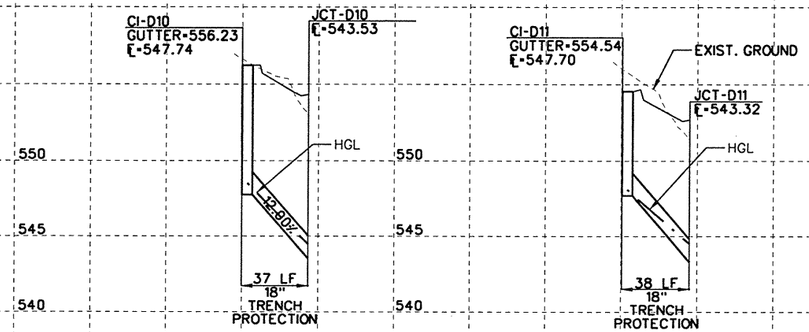
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

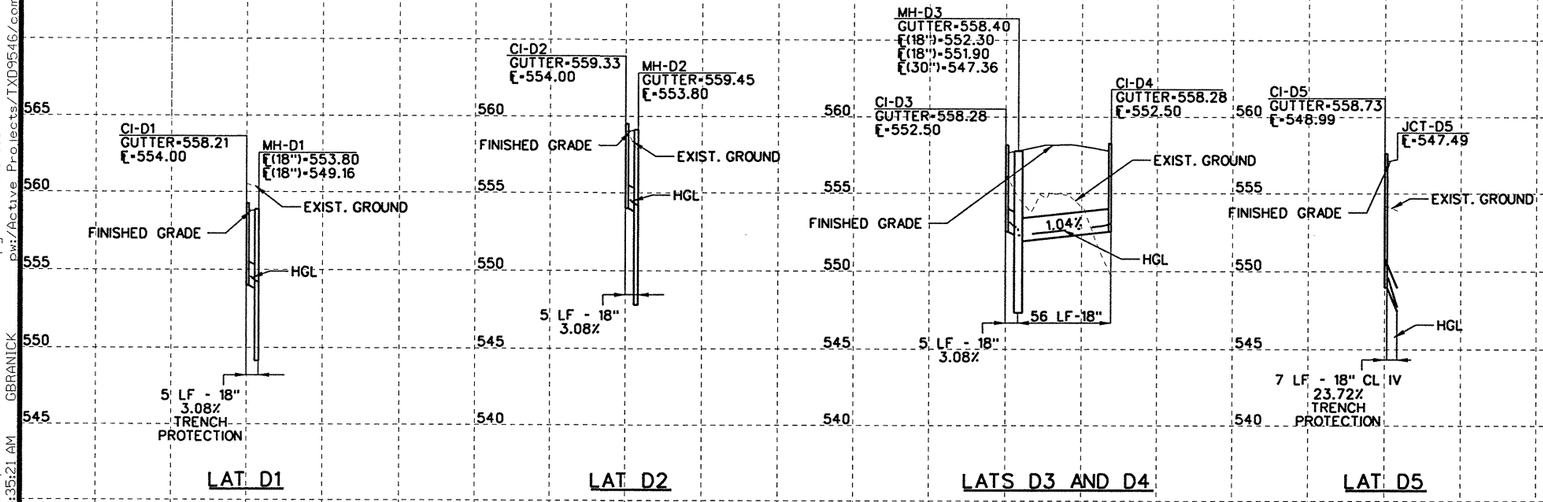
DRAINAGE PROFILES
LINE B
LINE B LATERALS

SHEET 2 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				256
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



LAT D10 LAT D11



LAT D1 LAT D2 LATS D3 AND D4 LAT D5

5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

4/15/09

NO.	REVISION	BY	DATE

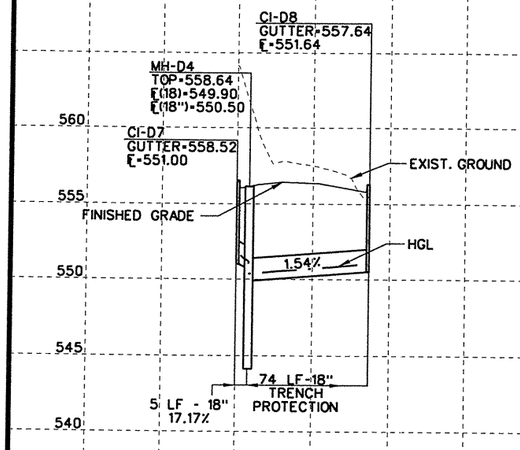
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

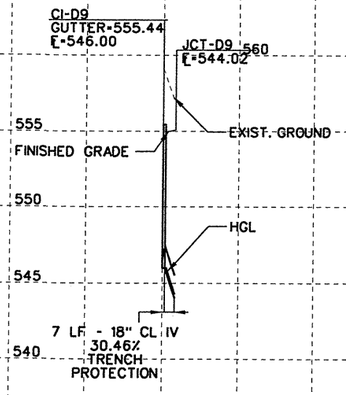
DRAINAGE PROFILES
LINE D AND LINE D LATERALS

SHEET 3 OF 8

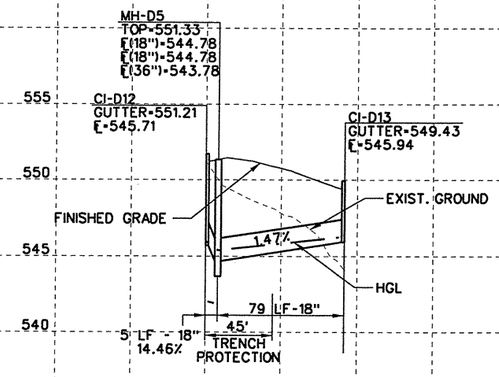
Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				257
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



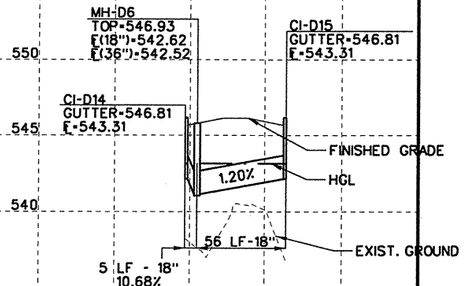
LAT D7 AND D8



LAT D9



LAT D12 AND D13



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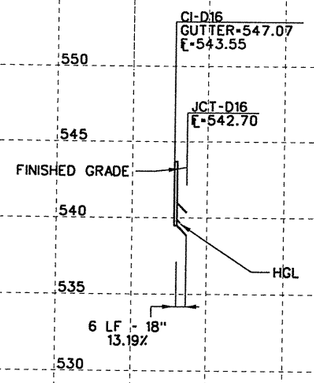
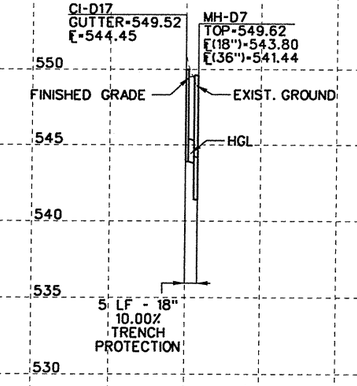
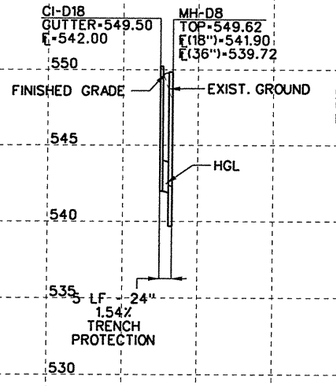


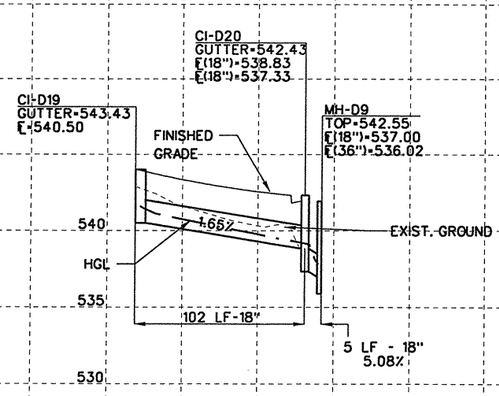
LAT D16



LAT D17



LAT D18



LAT D20

⚠ REPLACED 07.30.09 VN

5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE D LATERALS

SHEET 4 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				258
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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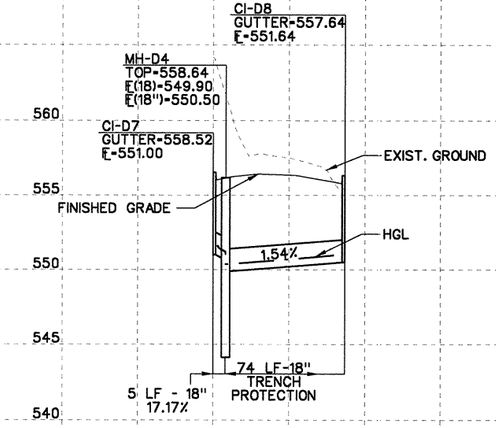
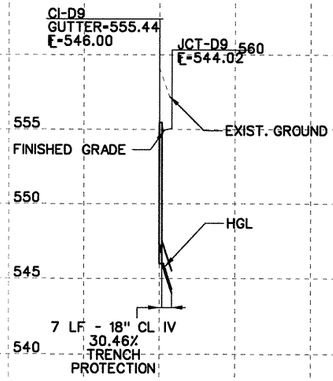
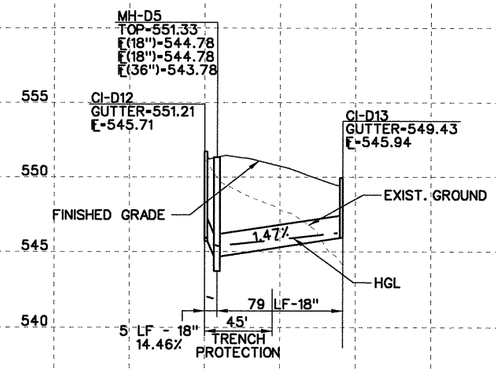


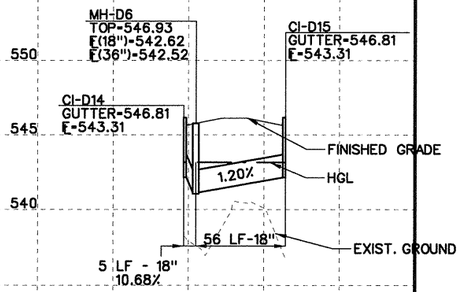
LAT D7 AND D8



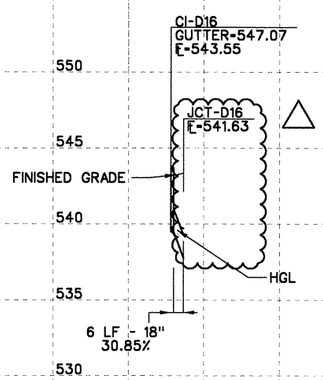
LAT D9



LAT D12 AND D13



LAT D14 AND D15



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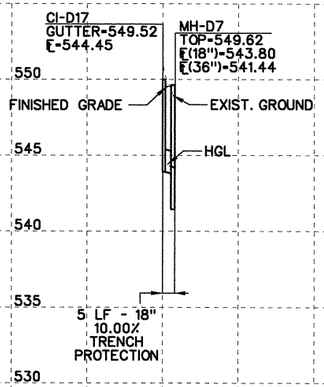

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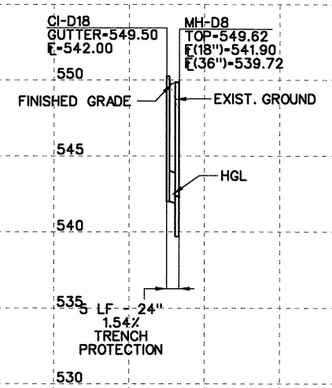

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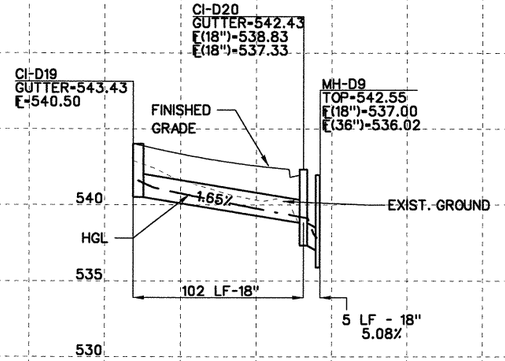


LAT D20

5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

11/15/10

NO.	REVISION	BY	DATE
△	LOWER 18" RCP LAT	AJA	11/8/10

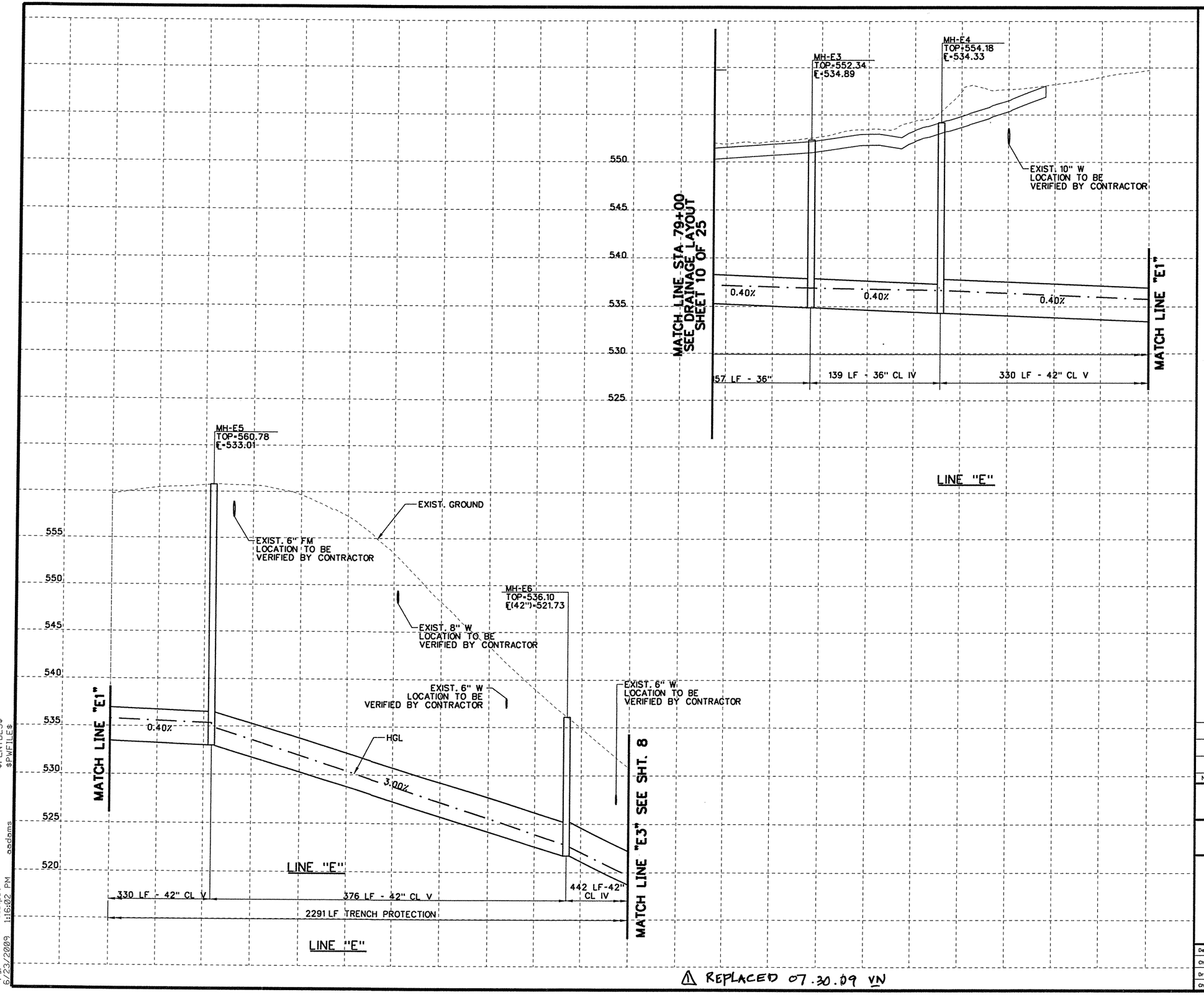
CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE D LATERALS

SHEET 4 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				25A
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

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DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE E

SHEET 5 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				259
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

⚠ REPLACED 07.30.09 VN

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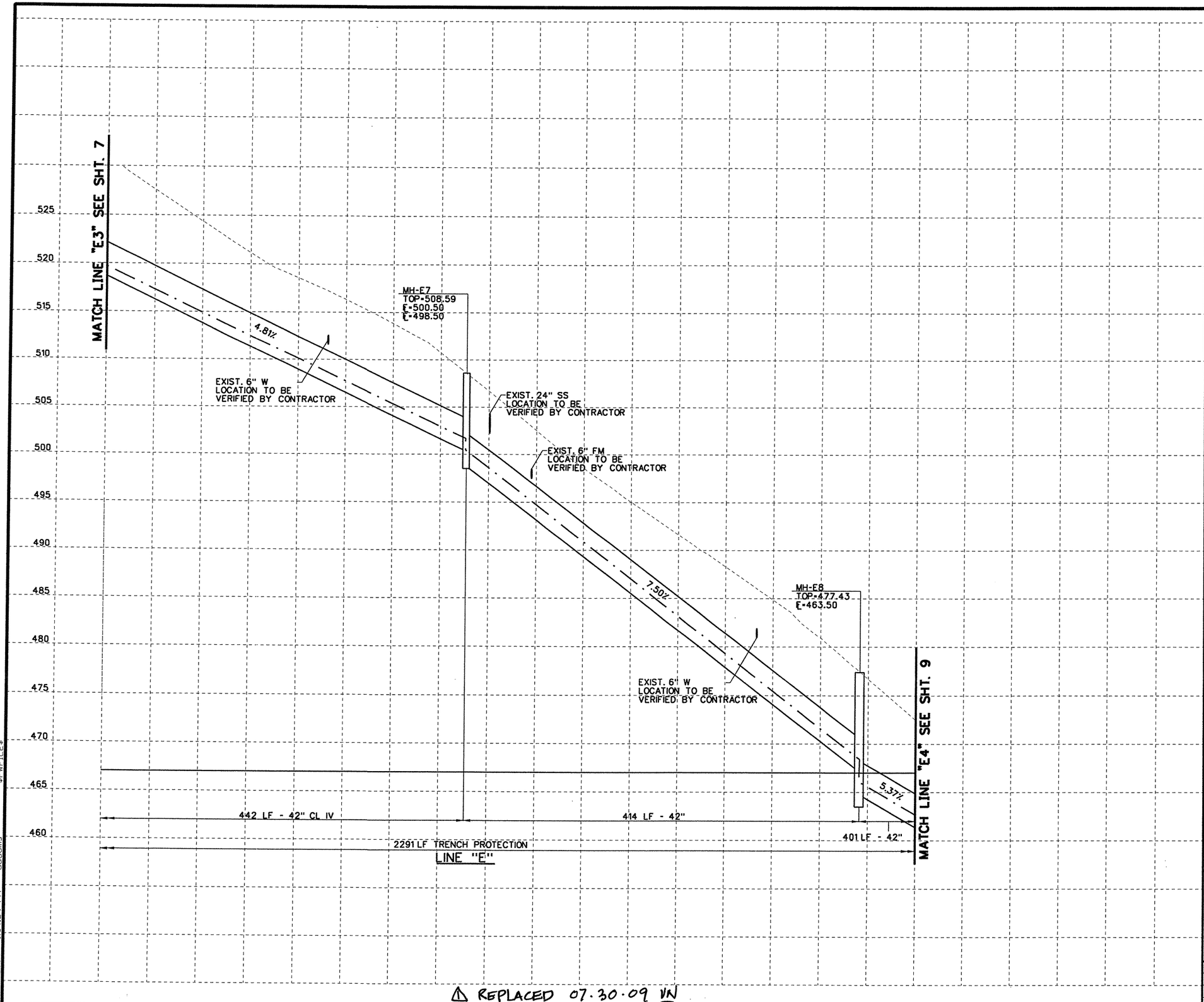

5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER

6/25/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE E

SHEET 6 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
Checked:	RRH	6	TEXAS					260
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039		FM 740

⚠ REPLACED 07.30.09 VN

MATCH LINE "E4" SEE SHT. 8

EXIST. 6" W
LOCATION TO BE
VERIFIED BY CONTRACTOR

EXIST. GROUND

HGL

EXIST. 8" W
LOCATION TO BE
VERIFIED BY CONTRACTOR

5.37%

MH-E9
TOP=451.29
℄=442.00

MH-E10
TOP=449.61
℄=441.33
℄=435.58

⚠ INSTALL CH-FW-30
(SL=2:1)
℄=432.00

1.35%

EXIST. 8" WW
LOCATION TO BE
VERIFIED BY CONTRACTOR

RIPRAP (STONE PROTECTION)(24 IN)

LAKE RAY HUBBARD
ELEV. 435.5

401 LF - 42"

50 LF
42"

⚠ 265 LF - 42"

2309 LF TRENCH PROTECTION

LINE "E"

10.50'

CI-E1
GUTTER=542.32
℄=538.32

MH-E1
TOP=541.94
℄=537.39

CI-E2
GUTTER=542.62
℄=538.59

FINISHED GRADE

EXIST. GROUND

1.80%

63 LF-18"

HGL

5 LF - 18"
11.42%

LAT E2

CI-E4
GUTTER=549.92
℄=544.00

MH-E2
TOP=549.53
℄=543.80

DI-E3
TOP=548.00
℄=545.50

EXIST. GROUND

4.42%

HGL

48 LF
TRENCH
PROTECTION

34 LF
18"

5 LF - 18"
5.15%

LAT E4

DI-E6
TOP=550.25
℄=540.00

CI-E5
TOP=552.02
℄(18")=538.75
℄(24")=538.25

JCT-E5
TOP=551.53
℄=536.02

EXIST. GROUND

FINISHED GRADE

3.11%

3.77%

HGL

36 LF
18"

58 LF-24"

91 LF
TRENCH
PROTECTION

LAT E5

℄=537.00
RETAINING WALL E3

FM 740

0.87%

143 LF-24"

℄=535.75
RETAINING WALL W1

CULVERT E6B

⚠ REVISED 07.30.09 VN

SCALE VERT. 5 0 5 10 FEET

SCALE HORZ. 50 25 0 50 100 FEET

7/15/09

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE E & E LATERALS

SHEET 7 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				261
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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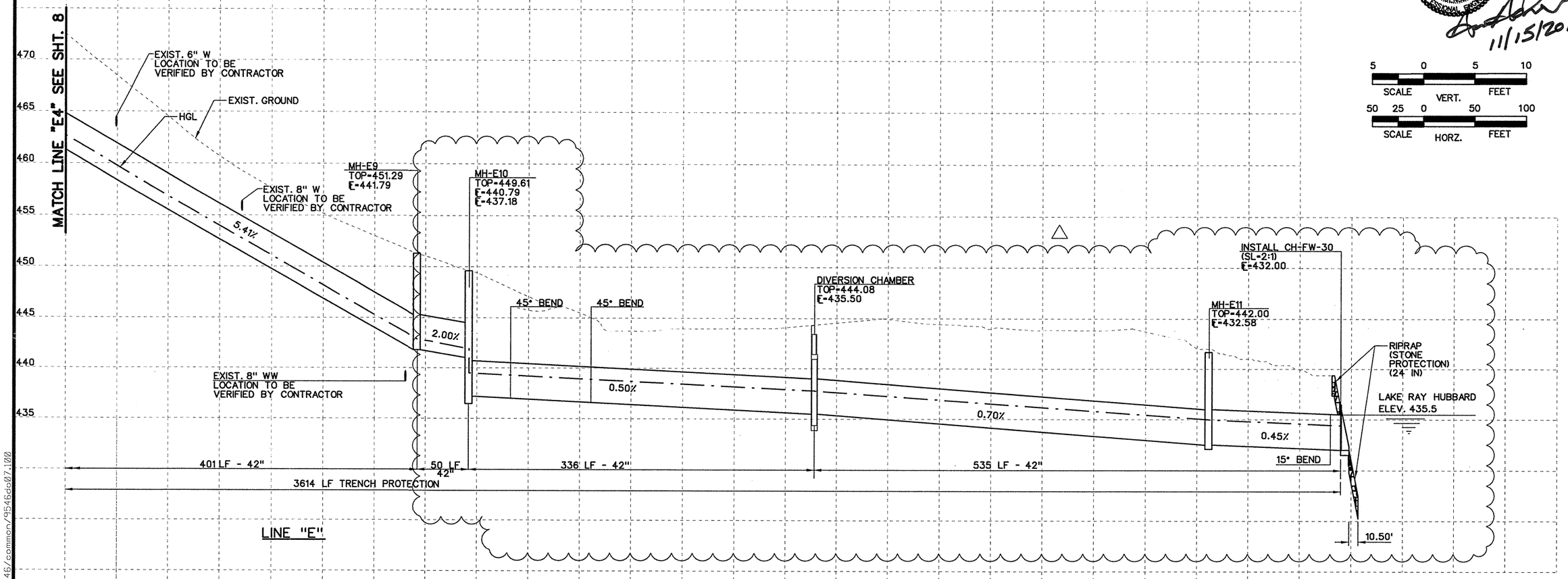
1:52:07 PM
$PLTDRVS$
7/15/2009

No.	DATE	REVISION	APPROVE.
△	11-02-10	ADD MH & CDS, LAKE OUTFALL & WINGWALL CHANGE	

STATE OF TEXAS
ANDREW J. ADAMS
99322
LICENSED
PROFESSIONAL ENGINEER
11/15/2010

SCALE VERT. 5 0 5 10 FEET

SCALE HORZ. 50 25 0 50 100 FEET



LINE "E"

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE PROFILES
LINE E

SHEET 7 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				26
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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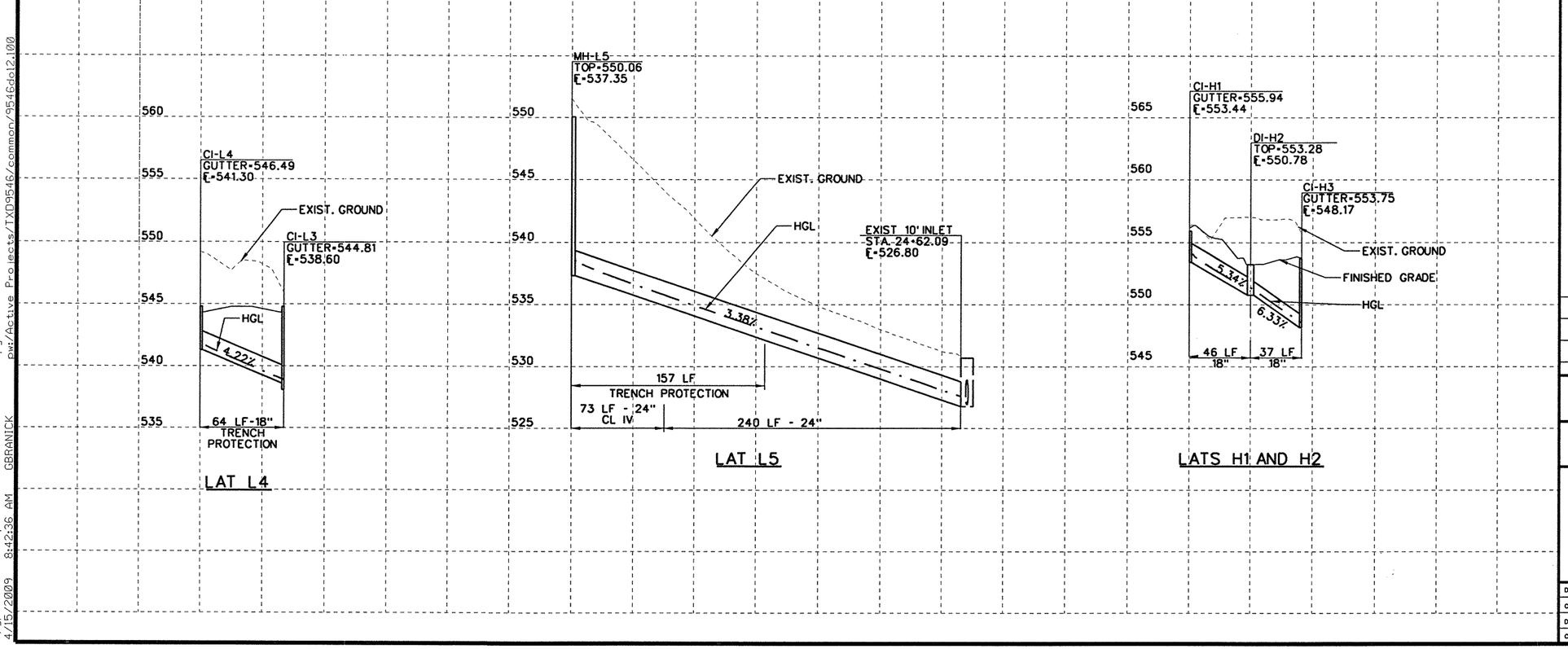

5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
4/15/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

DRAINAGE PROFILES
MISCELLANEOUS LATERALS

SHEET 8 OF 8

Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				2102
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740

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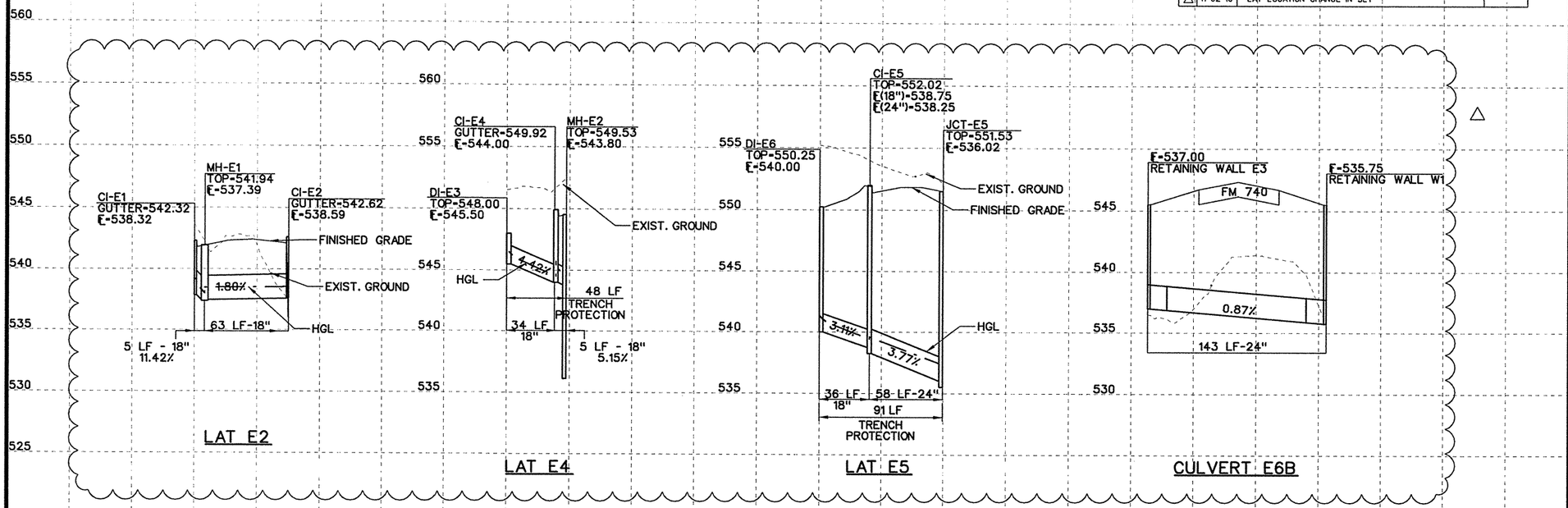
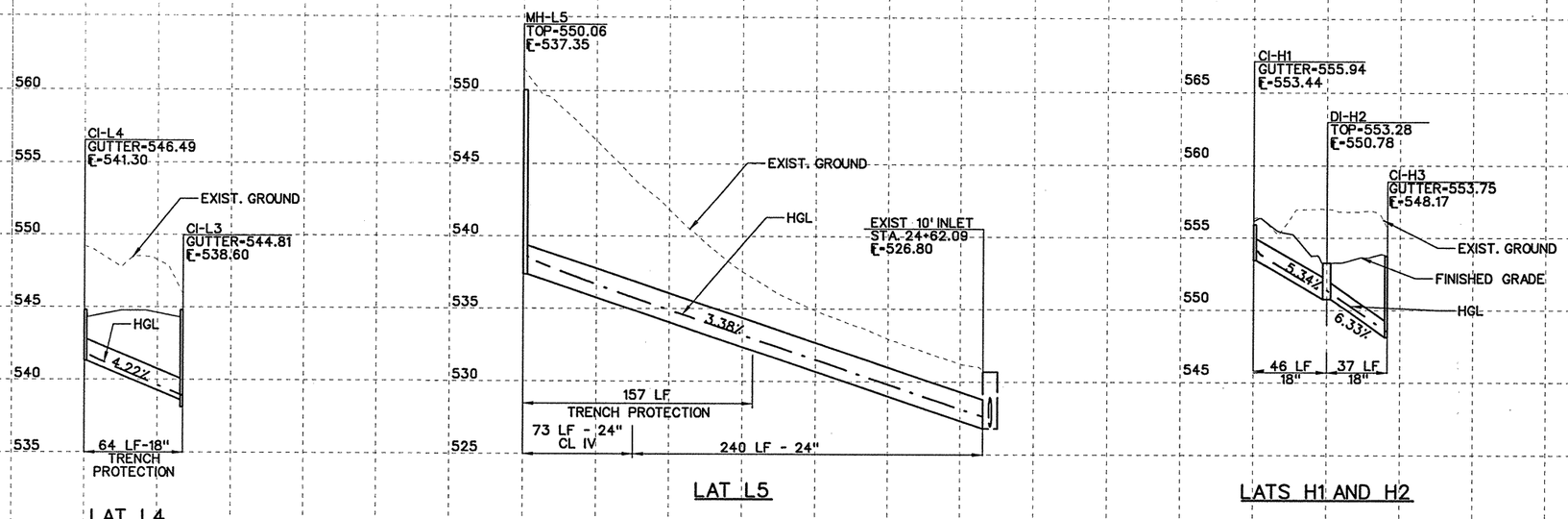
No.	DATE	REVISION	APPROVE.
△	11-02-10	LAT LOCATION CHANGE IN SET	





5 0 5 10
SCALE VERT. FEET

50 25 0 50 100
SCALE HORZ. FEET

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED
PROFESSIONAL ENGINEER
11/15/10

NO.	REVISION	BY	DATE

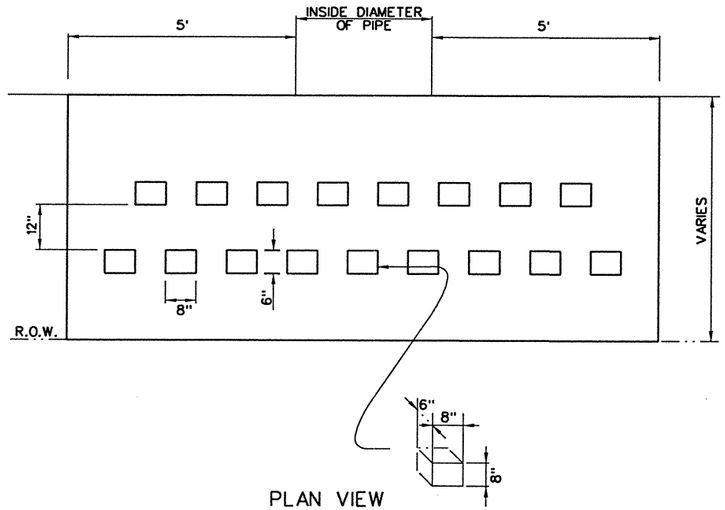
Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

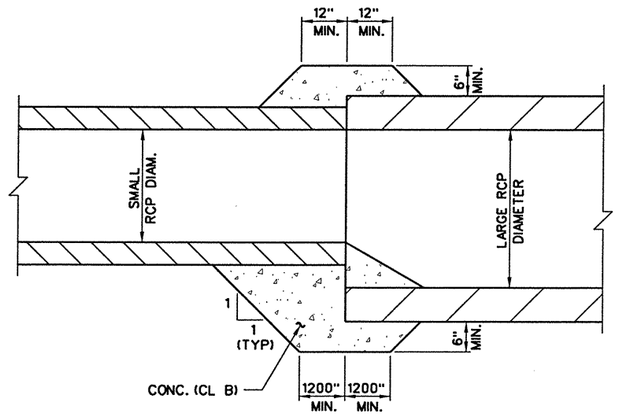
DRAINAGE PROFILES
MISCELLANEOUS & LINE E LATERALS

SHEET 8 OF 8

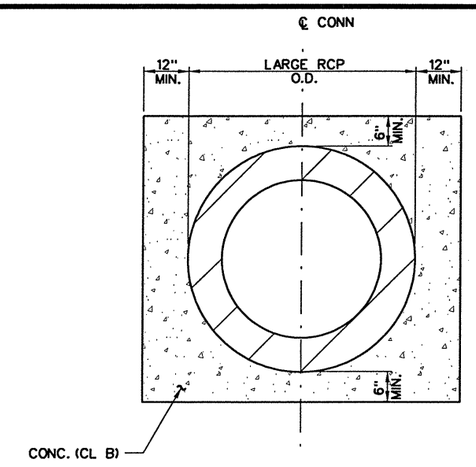
Designed:	JCM	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	RRH	6	TEXAS				262A
Drawn:	GBG	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	RRH	DALLAS	ROCKWALL	1014	03	039	FM 740



PLAN VIEW

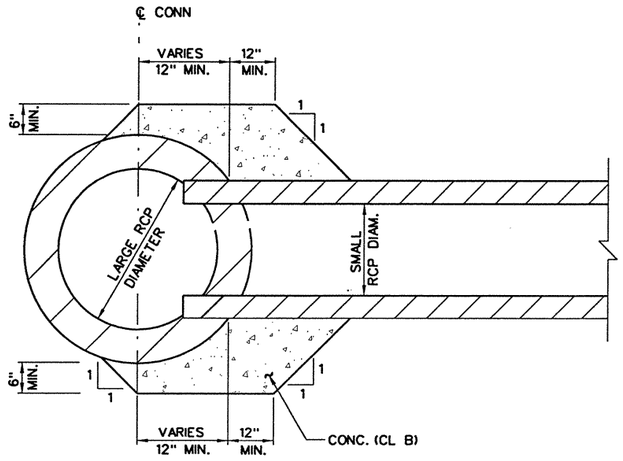


SIDE SECTION

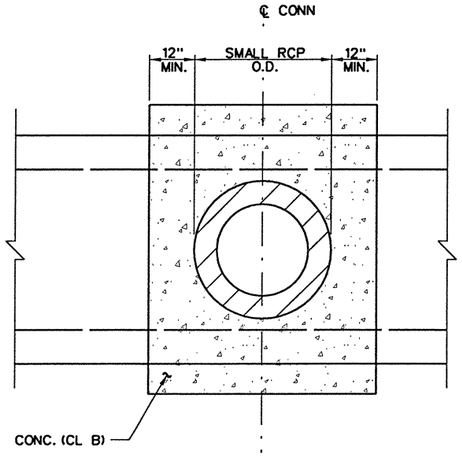


END SECTION

END - END CONNECTION

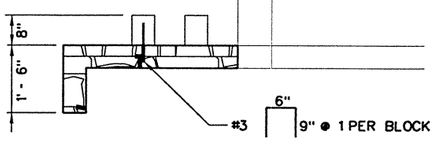


SIDE SECTION



END SECTION

END - SIDE CONNECTION



PROFILE VIEW

NOTE:

8" ENERGY DISSIPATORS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 432, CONCRETE RIPRAP.

A **RIPRAP OUTLET DETAIL**

SCALE: NTS

B **CONCRETE COLLAR DETAIL**

SCALE: NTS

NOTE: DETAIL TO BE USED WHEREVER PRECAST FITTINGS ARE NOT UTILIZED.

ROBIN R. HANDEL 86931 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

4/15/09

NO.	REVISION	BY	DATE

CP&Y Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

Texas Department of Transportation

DALLAS DIST.-FM740

MISCELLANEOUS DRAINAGE DETAILS

SHEET 1 OF 2

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	6	TEXAS				263
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	DALLAS	ROCKWALL	1014	03	039	FM 740

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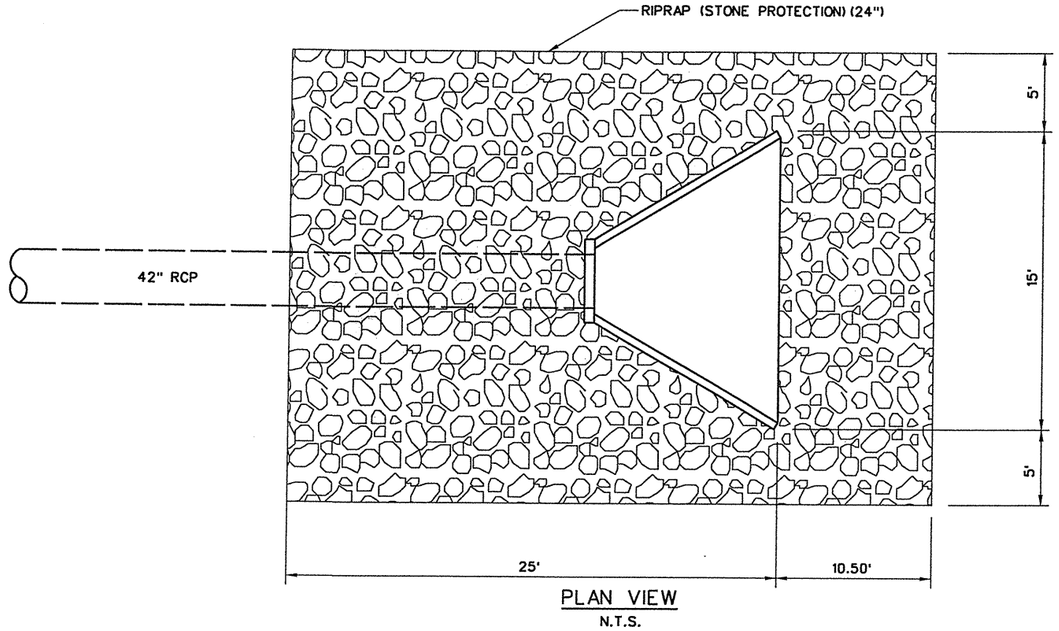
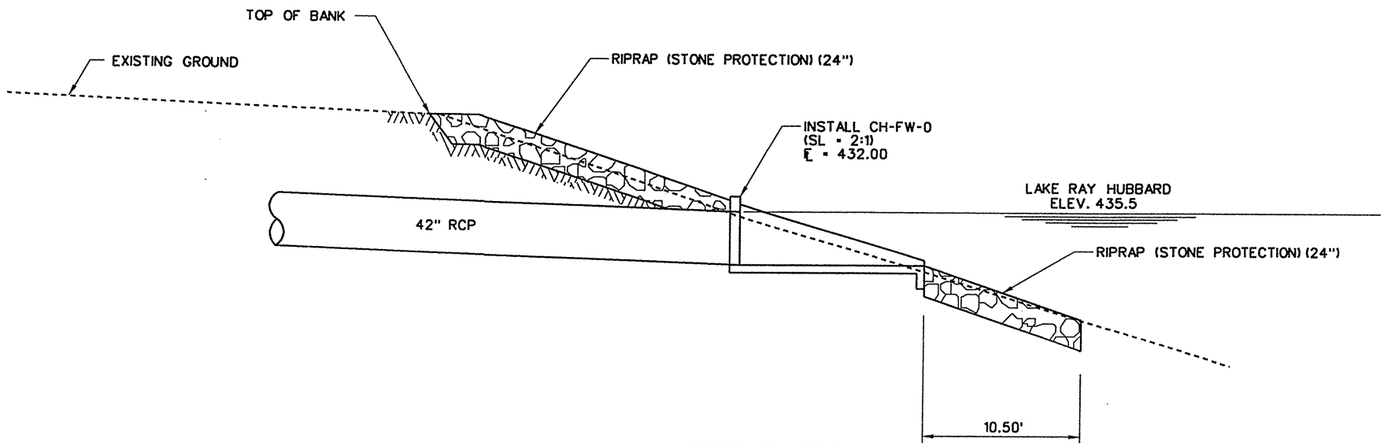


PLAN VIEW
N.T.S.



PROFILE VIEW
N.T.S.

LAKE RAY HUBBARD STONE PROTECTION DETAILS

⚠ REPLACED 07.30.09 VN

STATE OF TEXAS
ROBIN R. HANDEL
86931
LICENSED PROFESSIONAL ENGINEER
6/25/09

NO.	REVISION	BY	DATE

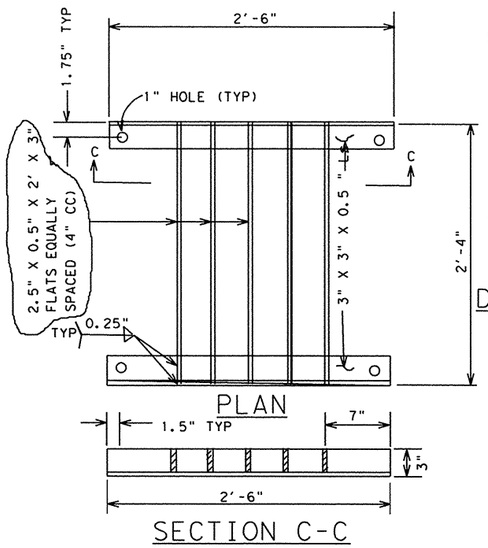
Chiang, Patel & Yerby, Inc.
Firm Registration Number: 1741

DALLAS DIST.-FM740

MISCELLANEOUS DRAINAGE DETAILS

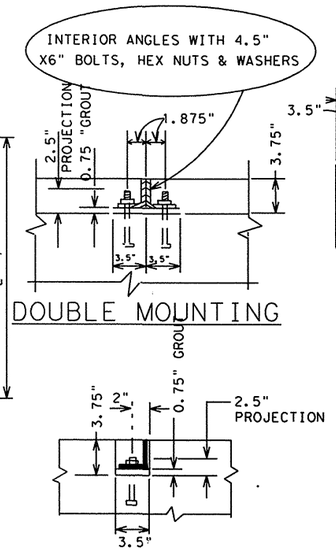
SHEET 2 OF 2

Designed:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Checked:	6	TEXAS				264
Drawn:	DIST.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Checked:	DALLAS	ROCKWALL	1014	03	039	FM 740



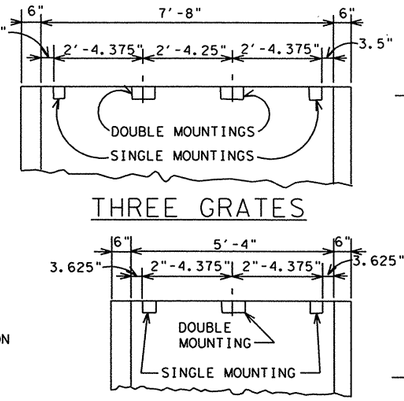
GRATE DETAILS TYPE C

SC: 1.5" = 1'-0"



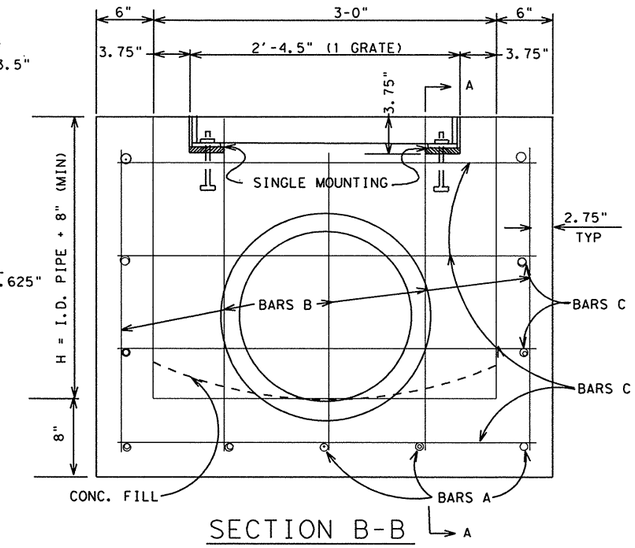
GRATE MOUNTING DETAILS

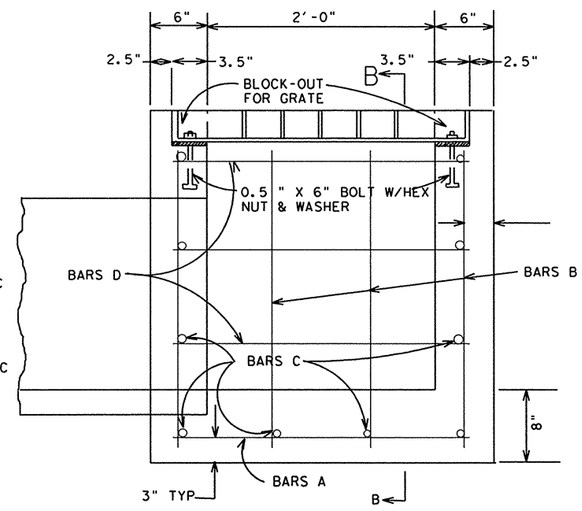
SCALE: 1.5" = 1-0"



MULTIPLE GRATE INLET DETAILS

SCALE: ½" = 1'-0"



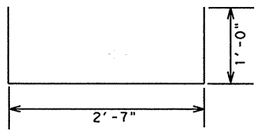


INLET DETAILS TYPE "C"

SCALE : 1.5" = 1'-0"

PIPE SIZE	CONC. C.Y.
15"	0.04
18"	0.05
21"	0.07
24"	0.09
27"	0.11
30"	0.14
33"	0.17
36"	0.20
39"	0.23
42"	0.26
48"	0.34

CONCRETE TO BE DEDUCTED FOR PIPES

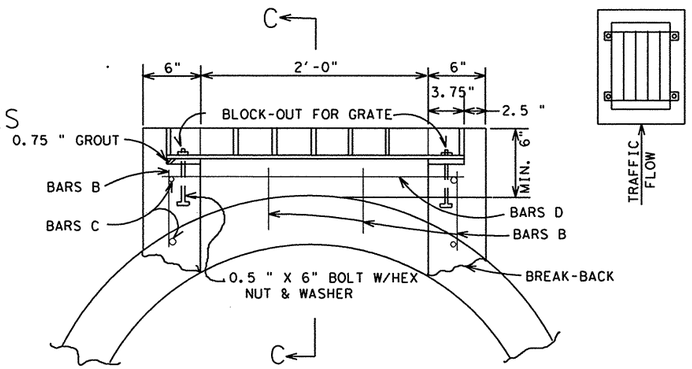


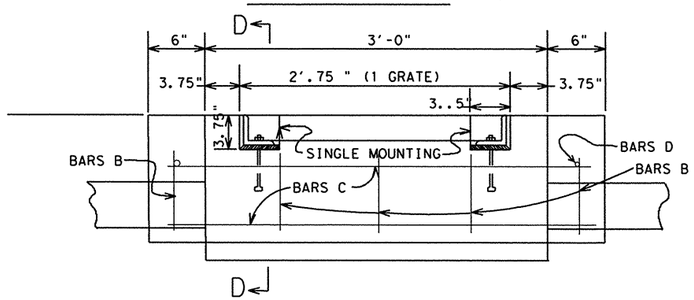
BAR "A"

BILL OF REINFORCING STEEL FOR TYPE "C" INLETS

	H	BARS A 12" C.C. NO.	LENGTH	SIZE	WT.	BARS B 12" C.C. NO.	LENGTH	SIZE	WT.	BARS C 12" C.C. NO.	LENGTH	SIZE	WT.	BARS D 12" C.C. NO.	LENGTH	SIZE	WT.	REINF. STEEL LB.	CL "A" CONC. C.Y.	GRATE
1 GRATE	2'-6"	5	4'-7"	4	15	14	2'-8"	4	25	10	3'-8"	4	24	6	2"-8"	4	11	75	0.85	95#
	3'-0"	5	↑	↑	15	14	3'-2"	↑	30	10	3'-8"	↑	24	6	↑	↑	11	80	0.96	
	3'-6"	5			15	14	3'-8"		34	12	3'-8"		29	8			14	92	1.07	
	4'-0"	5			15	14	4'-2"		39	12	3'-8"		29	8			14	97	1.18	
	4'-6"	5			15	14	4'-8"		44	14	3'-8"		34	10			18	111	1.29	
	5'-0"	5			15	14	5'-2"		48	14	3'-8"		34	10			18	115	1.40	
2-GRATE	3'-0"	7			21	18	3"-2"		38	10	6'-0"		40	6			11	110	1.38	190#
	3'-6"	7			21	18	3'-8"		44	12	6'-0"		48	8			14	127	1.53	
	4'-0"	7			21	18	4'-2"		50	12	6'-0"		48	8			14	133	1.68	
	4'-6"	7			21	18	4'-8"		56	14	6'-0"		56	10			18	151	1.83	
	5'-0"	7			21	18	5'-2"		62	14	6'-0"		56	10			18	157	1.98	
	5'-6"	7			21	18	5'-8"		68	16	6'-0"		64	12			21	174	2.13	
3-GRATE	4'-0"	10			31	24	4'-2"		67	12	8'-4"		67	8			14	178	2.22	285#
	4'-6"	10			31	24	4'-8"		75	14	8'-4"		78	10			18	202	2.41	
	5'-0"	10			31	24	5'-2"		83	14	8'-4"		78	10			18	210	2.60	
	5'-6"	10			31	24	5'-8"		91	16	8'-4"		89	12			21	232	2.79	
	6'-0"	10	↓	↓	31	24	6'-2"	↓	99	16	8'-4"	↓	89	12	↓	↓	21	240	2.98	
	6'-6"	10	4'-7"	4	31	24	6'-8"	4	107	16	8'-4"	4	100	14	2"-8"	4	25	263	3.17	

* DOES NOT INCLUDE QUANTITY FOR SHAPING OR DEDUCTION FOR PIPES





INLET DETAILS TYPE "G"

FOR USE WITH PIPES GREATER THAN 30" DIAMETER

GENERAL NOTES

1. EXPOSED EDGES SHALL BE CHAMFERED 0.75".
2. ALL CONCRETE SHALL BE CLASS "A".
3. ALL DIMENSIONS TO BE REINFORCING STEEL ARE TO CENTERS OF BARS.
4. IN AREAS OF CONFLICT BETWEEN REINFORCING STEEL, BLOCKOUTS, PIPES, ANCHOR BOLTS OR OTHER REINFORCING STEEL, THE REINFORCEMENT SHALL BE BENT OR ADJUSTED TO CLEAR AS DIRECTED BY THE ENGINEER.
5. IF POSSIBLE HORIZONTAL GRATE INLET SHOULD BE ORIENTED SUCH THAT BOTH TRAFFIC AND DITCH WATER APPROACH PARRALLEL TO BARS ON GRATE. IF THIS IS NOT POSSIBLE ORIENTATION SHOULD FAVOR TRAFFIC FLOW WHERE PIPE SIZES PERMIT.
6. STRUCTURAL STEEL FOR GRATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION A-36 OR AISI DESIGNATION m1010-m1020. PAYMENT FOR GRATES SHALL BE MADE UNDER THE BID ITEM "GRATE (TY C)." QUANTITIES FOR CONCRETE & STEEL ARE FOR CONTRACTOR'S INFORMATION ONLY.
7. PAYMENT FOR INLETS SHALL BE MADE UNDER THE BID ITEM "INLETS (COMP) (TY C-1 GRATE), (TY C-2 GRATE), (TY C=3 GRATE) OR (TY G-1 GRATE)."
8. EXISTING BARS EXPOSED BY BREAK -BACK SHALL BE CLEANED AND BENT INTO POSITION TO PROVIDE A TIE TO THE NEW CONCRETE EXTENSION FOR TYPE "G" INLET.

STD 7

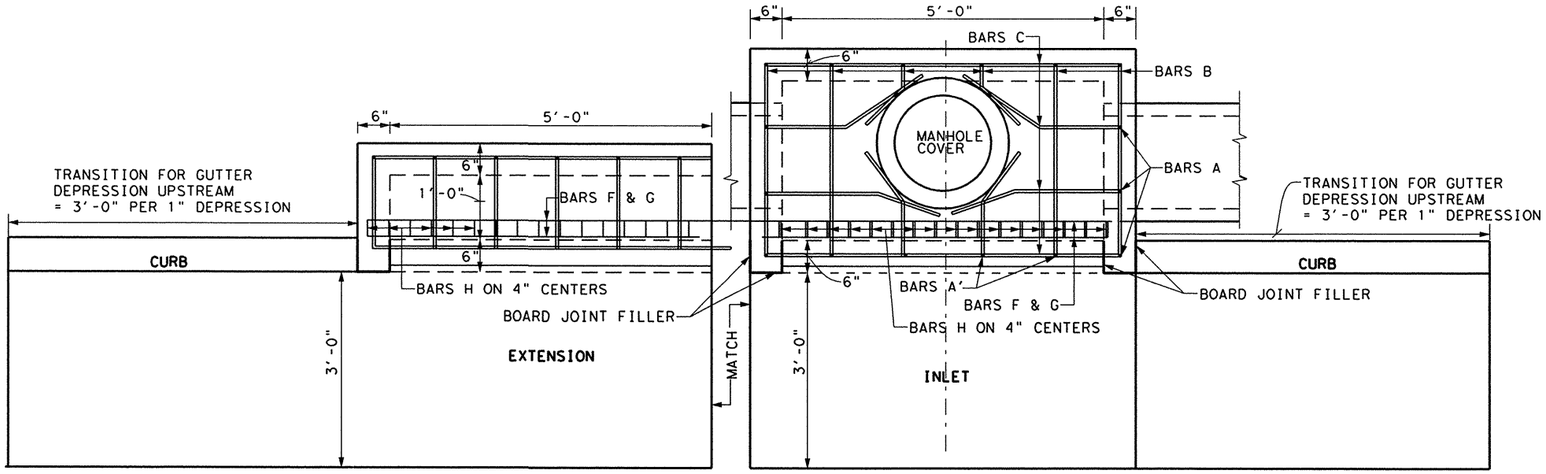
DROP INLET TYPE C & G DETAILS

TXDOT

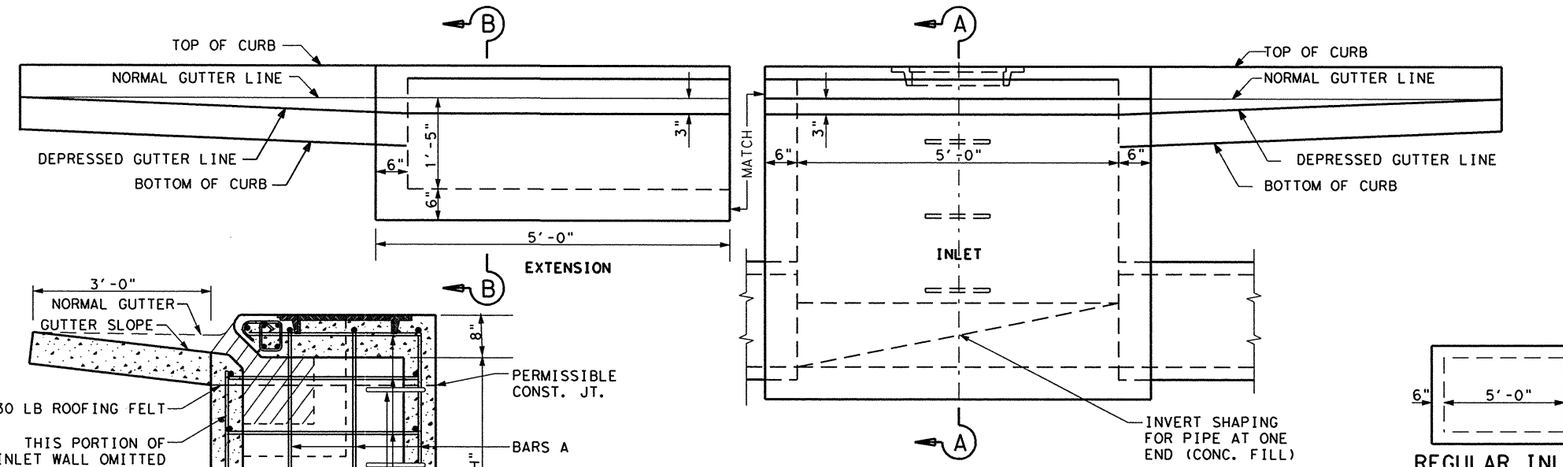
DALLAS DISTRICT STANDARD

REVISED ON 9/10/08

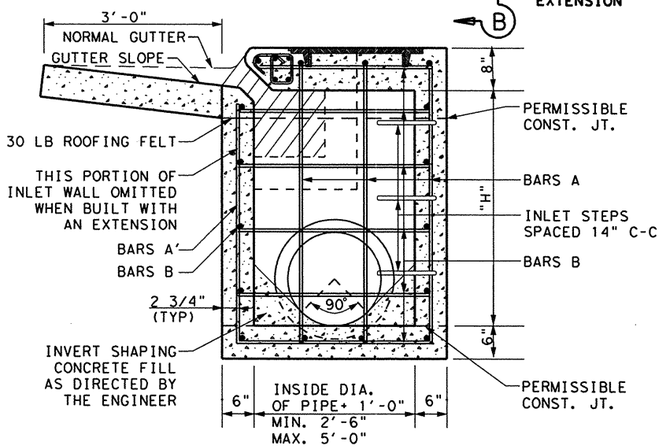
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	(SEE TITLE SHEET)		265
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	039	FM 740



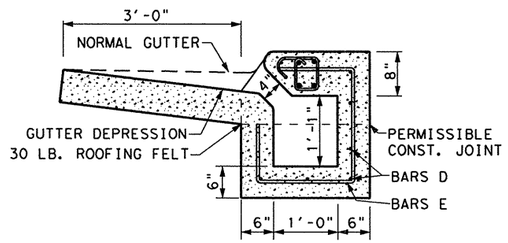
PLAN VIEW



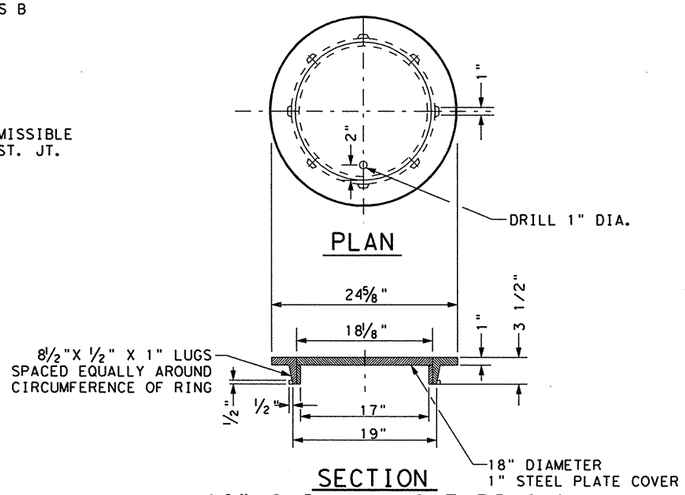
ELEVATION VIEW



SECTION A-A



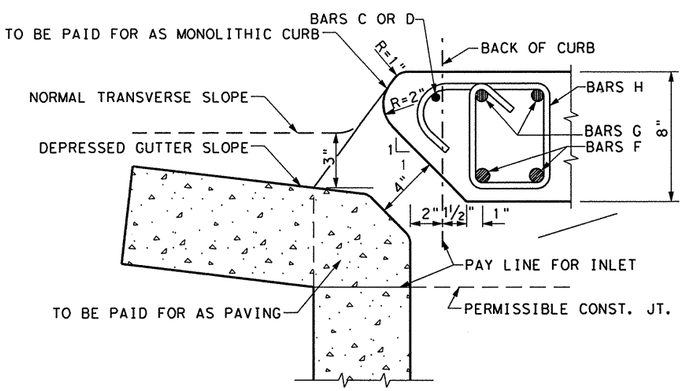
SECTION B-B



SECTION

18" C.I. MANHOLE RING & STEEL PLATE COVER TY. A

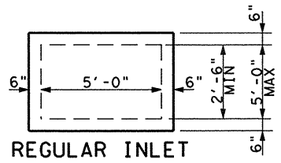
NOTE: DIMENSIONS FOR CURB SECTIONS VARY ACCORDING TO LIMITS OF PROPOSED CURB TYPES.



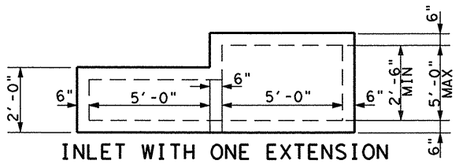
THROAT DETAIL

GENERAL NOTES:

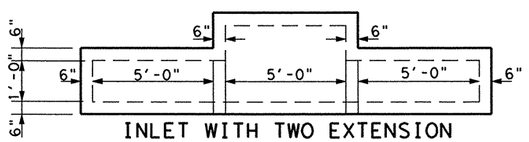
1. ALL CONCRETE SHALL BE CLASS A. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
2. CAST IRON STEPS, SPACED 14" AND LOCATED AS DIRECTED BY THE ENGINEER, SHALL BE PROVIDED AND INSTALLED IN ALL INLETS WHERE THE DEPTH "H" EXCEEDS 4'-0".
3. PAYMENT OF CURB INLETS AND EXTENSIONS THERETO AS SHOWN ON PLANS WILL BE MADE AT THE UNIT PRICE BID FOR "INLET (COMPLETE) (TYPE I)", "INLET EXTENSION".
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. SEE SHEET NO. 2 OF 2 FOR INLET SUMMARY OF CONCRETE AND REINFORCING STEEL.



REGULAR INLET



INLET WITH ONE EXTENSION



INLET WITH TWO EXTENSION

PLAN OF INLET AND EXTENSIONS

SHEET 1 OF 2

Texas Department of Transportation
Dallas District

CURB INLET TYPE I

CI(TY I)-08

FILE: CI(TY I)-08	DN: TxDOT	CK: TxDOT	DW:	CK:
© TxDOT	DISTRICT	FEDERAL AID PROJECT		SHEET
	DAL	(SEE TITLE SHEET)		266
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

REVISED ON 9/10/08

NOT TO SCALE

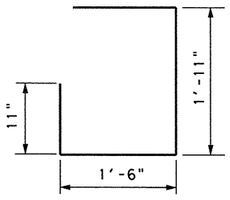
LEVELS DISPLAYED

REINFORCING STEEL AND CONCRETE IN TYPE I - 5FT. INLETS

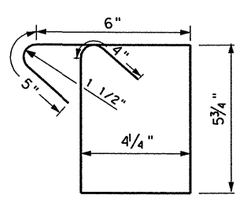
INLET SIZE		STEEL																										TOTALS	
		BARS A				BARS A'				BARS B				BARS C				BARS F				BARS G				BARS H				Reinf. Steel	CL A Conc
H	W	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	LBS	*C.Y.
3.0	2.5	12	4	3'-10"	31	4	4	2'-6"	7	18	4	3'-2"	38	13	4	5'-8"	49	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	194	1.64
3.5	2.5	12	4	4'-4"	35	4	4	3'-0"	8	18	4	3'-2"	38	13	4	5'-8"	49	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	199	1.80
4.0	2.5	12	4	4'-10"	39	4	4	3'-6"	9	20	4	3'-2"	42	15	4	5'-8"	57	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	216	1.96
4.5	2.5	12	4	5'-4"	43	4	4	4'-0"	11	20	4	3'-2"	42	15	4	5'-8"	57	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	222	2.11
5.0	2.5	12	4	5'-10"	47	4	4	4'-6"	12	22	4	3'-2"	47	17	4	5'-8"	64	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	239	2.27
5.5	2.5	12	4	6'-4"	51	4	4	5'-0"	13	22	4	3'-2"	47	17	4	5'-8"	64	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	244	2.42
6.0	2.5	12	4	6'-10"	55	4	4	5'-6"	15	24	4	3'-2"	51	19	4	5'-8"	72	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	262	2.59
6.5	2.5	12	4	7'-4"	59	4	4	6'-0"	16	24	4	3'-2"	51	19	4	5'-8"	72	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	267	2.74
8.0	2.5	12	4	8'-10"	71	4	4	7'-6"	20	28	4	3'-2"	59	23	4	5'-8"	87	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	306	3.22
8.5	2.5	12	4	9'-4"	75	4	4	8'-0"	21	28	4	3'-2"	59	23	4	5'-8"	87	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	311	3.37
10.0	2.5	12	4	10'-10"	87	4	4	9'-6"	25	32	4	3'-2"	68	27	4	5'-8"	102	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	351	3.84
10.5	2.5	12	4	11'-4"	91	4	4	10'-0"	27	32	4	3'-2"	68	27	4	5'-8"	102	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	357	4.00
4.0	3.0	12	4	4'-10"	39	4	4	3'-6"	9	20	4	3'-8"	49	15	4	5'-8"	57	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	223	2.16
4.5	3.5	14	4	5'-4"	50	4	4	4'-0"	11	20	4	4'-2"	56	17	4	5'-8"	64	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	250	2.54
5.5	3.5	14	4	6'-4"	59	4	4	5'-0"	13	22	4	4'-2"	61	19	4	5'-8"	72	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	274	2.89
7.5	4.0	16	4	8'-4"	89	4	4	7'-0"	19	26	4	4'-8"	81	25	4	5'-8"	95	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	353	3.87
10.0	5.0	18	4	10'-10"	130	4	4	9'-6"	25	32	4	5'-8"	121	33	4	5'-8"	125	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	470	5.42
7.5	5.0	18	4	8'-4"	100	4	4	7'-0"	19	26	4	5'-8"	96	29	4	5'-8"	110	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	394	4.09

*Does not include invert shaping

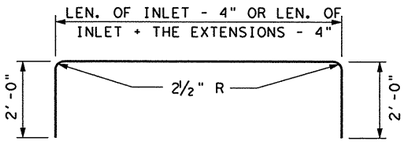
NOTE: On inlets with entensions, Bars F & G shall run continuous the inlet and extensions. Where two or more extensions are together, Bars D shall run continuous the the



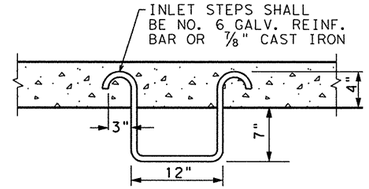
BARS E



BARS H



BARS G



DETAIL OF INLET STEPS

CONCRETE TO BE DEDUCTED FOR PIPES	
Pipe Size	Conc. C.Y.
15"	0.04
18"	0.05
21"	0.07
24"	0.09
27"	0.11
30"	0.14
33"	0.17
36"	0.19
42"	0.26
48"	0.34
54"	0.43

NOTE:

WHERE TWO OR MORE EXTENSIONS ARE TOGETHER, BARS "D" SHALL RUN CONTINUOUS THRU THE EXTENSIONS.
* DOES NOT INCLUDE QUANTITY FOR INVERT SHAPING.

REINFORCING STEEL AND CONCRETE IN EXTENSIONS

5'-0" EXTN. NO.	BARS D				BARS E				BARS F				BARS G				BARS H				Reinf. Steel	CL A Conc.
	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	*LENGT	WEIGHT	NO.	SIZE	*LENGT	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	LBS	C.Y.
1	8	4	5'-8"	30	6	4	5'-4"	21	2	7	5'-6"	23	2	6	5'-6"	17	16	3	2'-7"	6	97	1.64
2	8	4	11'-2"	60	12	4	5'-4"	43	2	7	11'-0"	45	2	6	11'-0"	33	33	3	2'-7"	32	213	1.80
3	Reinf. Steel is as shown for 1 Extension and as shown for 2 Extensions																					

** Length is to be added to the length as shown in the above table for Typ. I - 5'-0" Inlets*

GENERAL NOTES:

REINFORCING STEEL AND CONCRETE TABLRS SHOWN ABOVE ARE FOR INFORMATION ONLY

THESE TABLES ARE TO BE USED WITH INLET TYPE I, WITH 3" & 5" NORMAL CURB HEIGHT AND 8" CONCRETE PAVEMENT.

REVISED ON 9/10/08

NOT TO SCALE

LEVELS DISPLAYED

SHEET 2 OF 2

Texas Department of Transportation
Dallas District

CURB INLET TYPE I

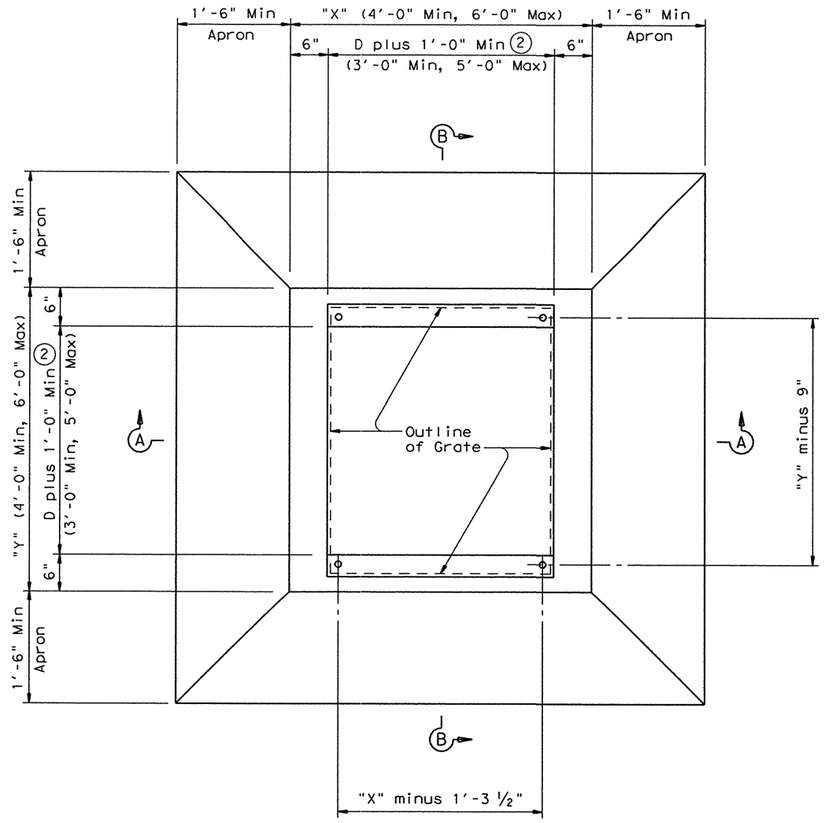
CI(TY I)-08

FILE: CI(TY I)-08	DN: TxDOT	CK: TxDOT	DW:	CK:
© TxDOT	DISTRICT	FEDERAL AID PROJECT		SHEET
	DAL	(SEE TITLE SHEET)		267
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

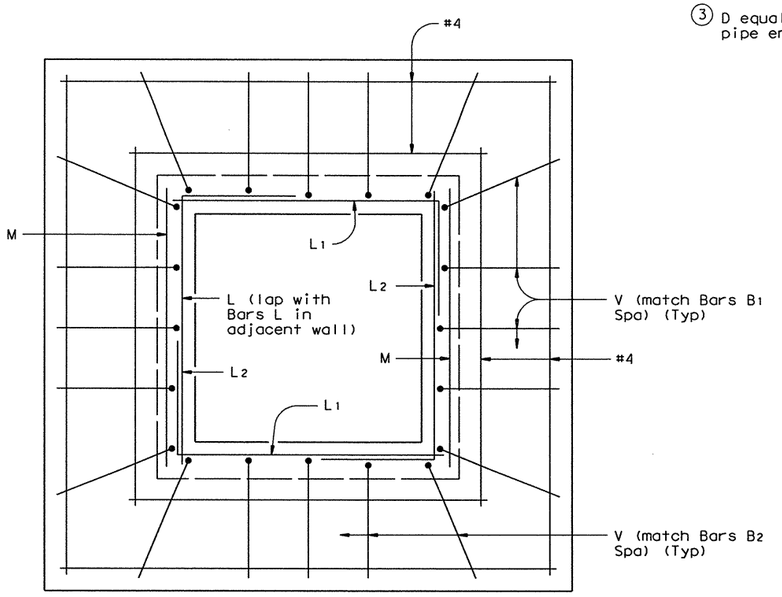
PATH:

LEVELS DISPLAYED

1

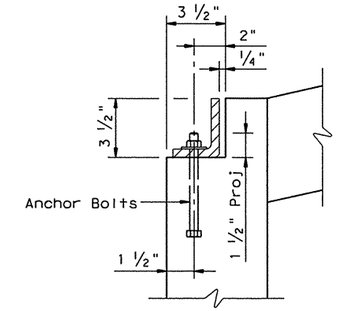


PLAN

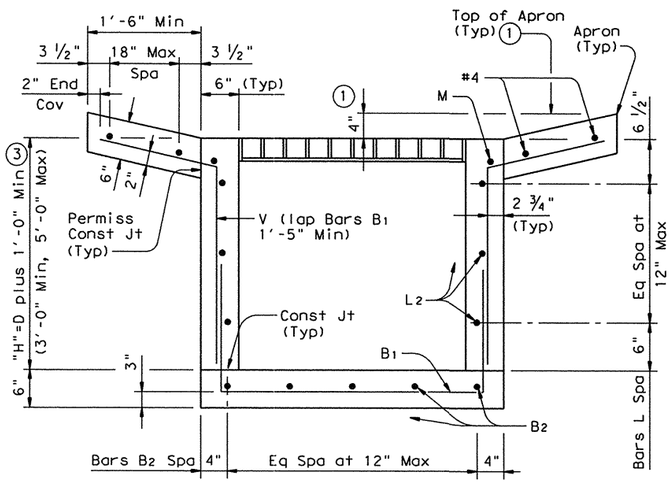


TYPICAL APRON PLAN
(Showing reinforcing in walls and in apron)

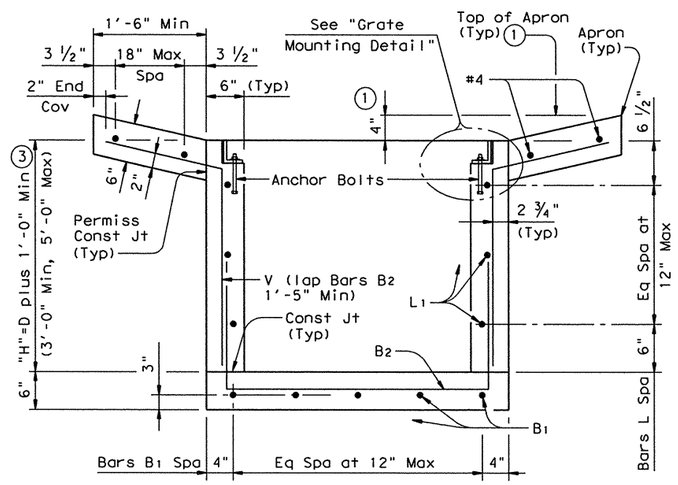
1. May be changed as directed by the Engineer.
2. D equals the maximum inside diameter of any pipe entering the wall shown or the opposite wall.
3. D equals the maximum inside diameter of any pipe entering the inlet.



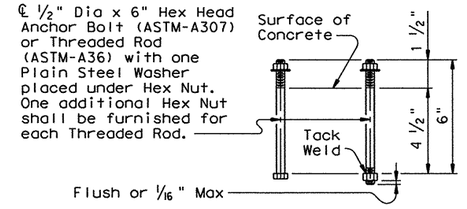
GRATE MOUNTING DETAIL



SECTION A-A



SECTION B-B



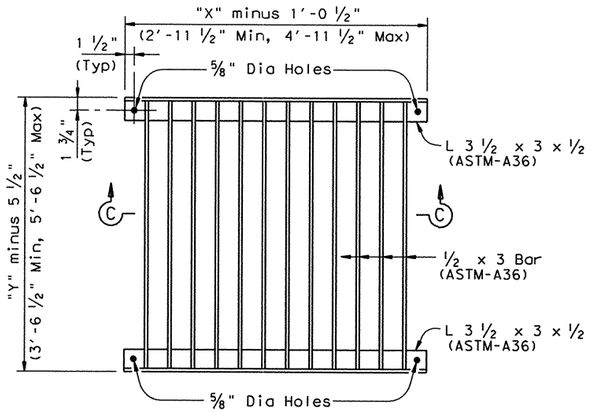
ANCHOR BOLT OPTIONS

Texas Department of Transportation
Bridge Division

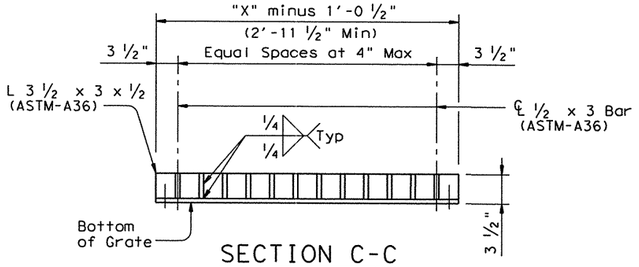
HORIZONTAL INLET TYPE H WITH GRATE (MAX 48" DIA PIPES)

IL-H-G

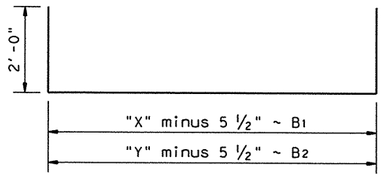
FILE: ilhste01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	DALLAS			68
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740



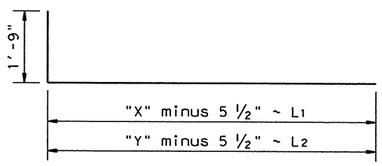
TYPICAL GRATE PLAN



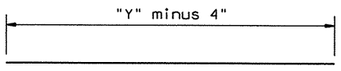
SECTION C-C



BARS B (#4)



BARS L (#4)



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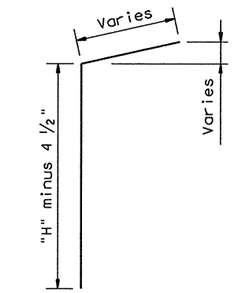

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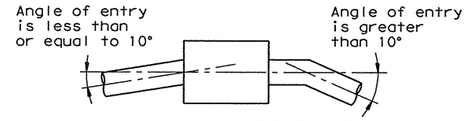
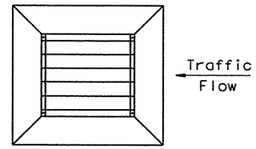


PIPE CONNECTION DETAIL

Connecting pipes should enter within 10° of normal to inlet wall. If necessary, pipe elbow or curved approach alignment should be used to stay within this limit.



GRATE ORIENTATION DETAIL

If possible, horizontal grate inlet should be oriented such that both traffic and ditch water approach parallel to bars on grate. If this is not possible, orientation must favor traffic flow. Grate is not to be used under direct traffic, rather it is to be used in ditches and medians away from the roadway.

GENERAL NOTES:

When approved, precast inlets with equivalent structural capacity may be furnished. Sealed engineering calculations and drawings shall be submitted for approval prior to construction.

Shop drawings will not be required.

Apron shall be cast-in-place.

In areas of conflict between reinforcing steel, blockouts, pipes, anchor bolts or other reinforcing steel, the reinforcement shall be bent or adjusted to clear as directed by the Engineer.

Anchor Bolts are ½" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex head nut each) with one hex head nut and one plain steel washer.

Structural Steel for grates shall conform to the requirements of ASTM Designation A-36 or AISI Designation M1010-M1020.

All reinforcing steel shall be Grade 60 unless otherwise noted.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

All concrete shall be Class "A" (f'c = 3,000 psi).

Texas Department of Transportation
Bridge Division

HORIZONTAL INLET TYPE H WITH GRATE (MAX 48" DIA PIPES)

IL-H-G

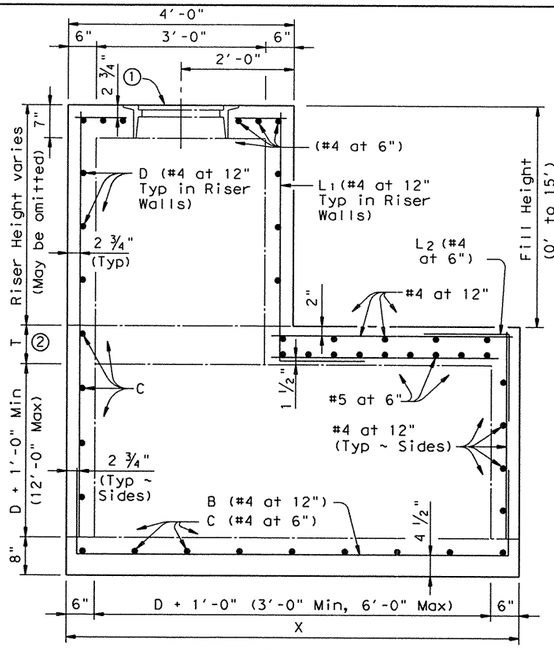
FILE: ilhste01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT			
©TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT				SHEET	
REVISIONS	DALLAS					ZGR	
	COUNTY			CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL			1014	03	039	FM 740

PATH:
LEVELS DISPLAYED

ACC:

LEVELS DISPLAYED

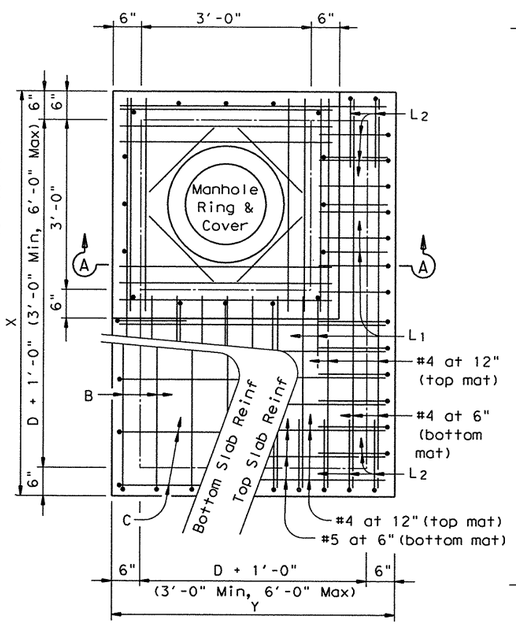
1



ELEVATION

D = Maximum inside diameter of any Pipe entering the side shown or the opposite side

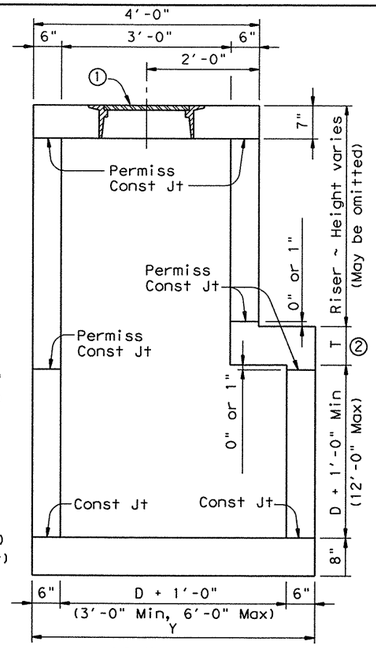
① See Ring and Cover Details



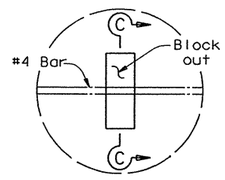
PLAN

MANHOLE WITH CAST-IN-PLACE RISER

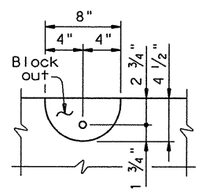
② For Fill Height less than or equal to 10', T=8".
For Fill Height between 10' and 15', T=10".



SECTION A-A

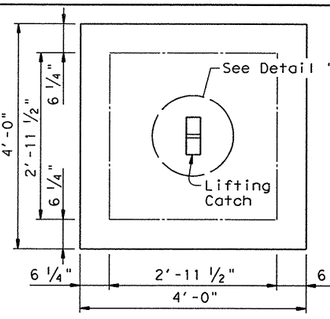


DETAIL "A"

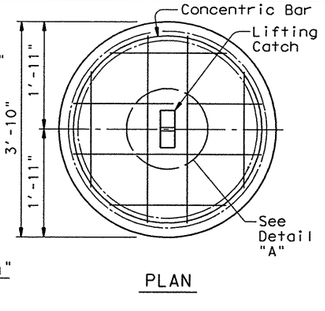


SECTION C-C

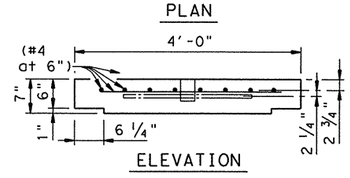
LIFTING CATCH



PLAN

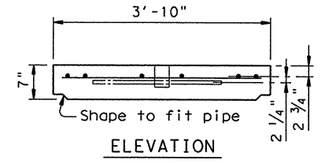


PLAN



ELEVATION

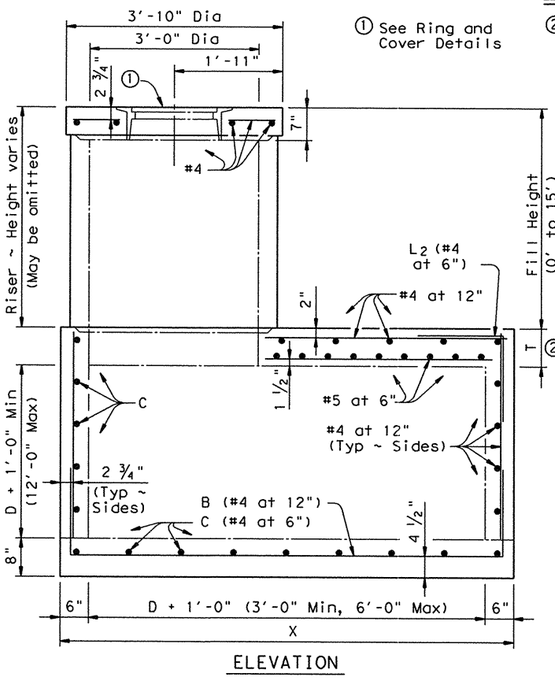
CAST-IN-PLACE RISER COVER



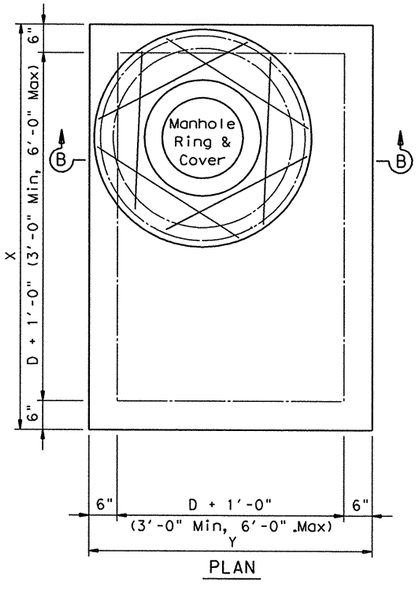
ELEVATION

CONCRETE PIPE RISER COVER

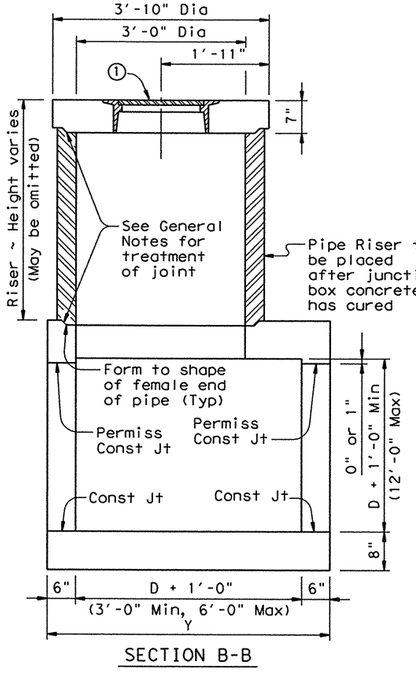
OPTIONAL PRECAST CONCRETE LIFT-OFF COVERS



ELEVATION

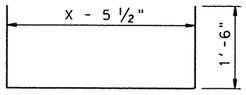


PLAN

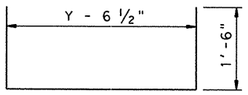


SECTION B-B

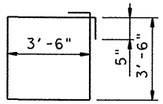
OPTIONAL MANHOLE WITH CONCRETE PIPE RISER



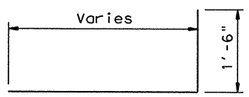
BARS B



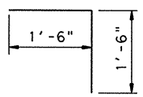
BARS C



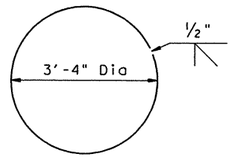
BARS D



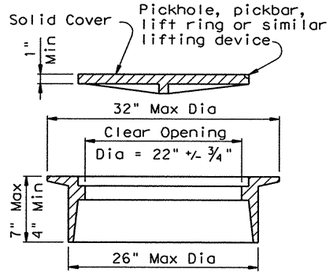
BARS L_1



BARS L_2

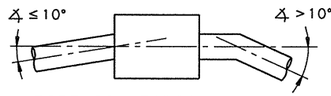


CONCENTRIC BAR



RING AND COVER DETAILS

Approximate Weight = 245 lb



PIPE CONNECTION DETAIL

Connecting pipes should enter within 10° of normal to inlet wall. If necessary, pipe elbow or curved approach alignment should be used to stay within this limit.

GENERAL NOTES:

Unless otherwise shown in the plans, payment will be made for each manhole of the Type M.

When approved, precast inlets with equivalent structural capacity may be furnished. Sealed engineering calculations and drawings shall be submitted for approval prior to construction.

Shop drawings will not be required.

In areas of conflict between reinforcing steel, blockouts, pipes, anchor bolts or other reinforcing steel, the reinforcement shall be bent or adjusted to clear as directed by the Engineer.

The riser may be constructed of reinforced concrete as shown or of Reinforced Concrete Pipe, Class III, in accordance with ASTM Designation C-76. If pipe is used, joints shall conform to the Item "Reinforced Concrete Pipe Culverts". Precast Concrete Lift-Off Cover may be substituted for Ring and Cover.

The riser, either cast-in-place or concrete pipe, may be located in any corner.

All reinforcing steel shall be #4 unless otherwise noted.

Pipes may enter any or all walls. The maximum size of pipe that can be accommodated is 60". More than one pipe may enter a side, subject to the maximum box dimension shown. The clear distance between adjacent pipes should be 9" minimum.

Ring and cover shall conform to the requirements of AASHTO M306, "Standard Specification for Drainage Structure Castings". Materials shall conform to ASTM A48, Class 35B for gray iron castings or ASTM A536, Grade 65-45-12 for ductile iron castings. Aluminum alloy castings shall not be permitted.

All concrete shall be Class "A" (f'c = 3000 psi).

Texas Department of Transportation
Bridge Division

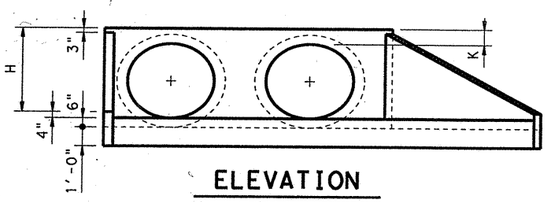
MANHOLE TYPE M
(JUNCTION BOX WITH ACCESS)
15' MAX FILL

MH-M

FILE: mh-mstde.dgn	DN: TxDOT	CK: TER	DW: MCB		CK: TER/GAF	
©TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT			SHEET	
REVISIONS	DALLAS				270	
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

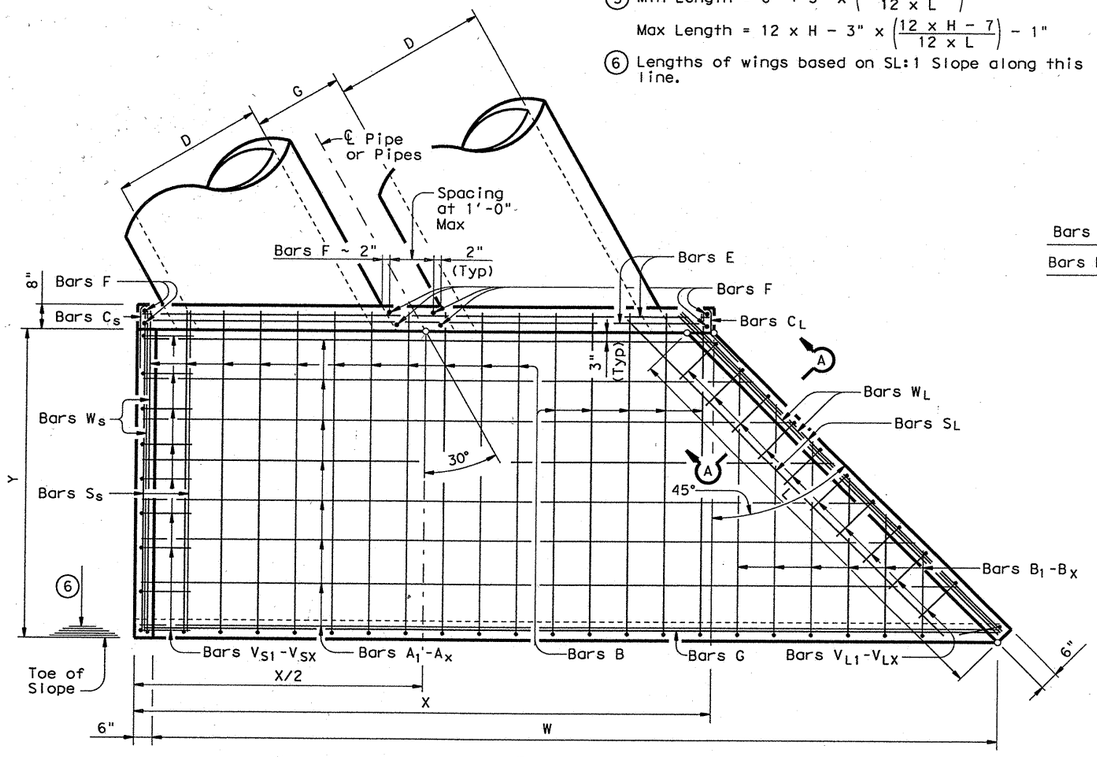
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	Values for one Pipe W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be added for each addt'l Pipe X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4'- 9"	3'- 1 1/2"	2'-10"	4'- 0"	90	0.6	2'- 0 1/4"	22	0.2
	15"	5'- 6 3/4"	3'- 5 1/4"	3'- 4"	4'- 8 1/2"	102	0.8	2'- 6"	28	0.3
	18"	6'- 4 3/4"	3'- 9 1/4"	3'-10"	5'- 5"	129	0.9	3'- 1"	41	0.4
	21"	7'- 2 3/4"	4'- 1 1/4"	4'- 4"	6'- 1 1/2"	144	1.1	3'- 6 3/4"	47	0.5
	24"	8'- 2 1/2"	4'- 7"	4'-10"	6'-10"	164	1.4	4'- 1 3/4"	57	0.6
	27"	9'- 0 1/2"	4'-11"	5'- 4"	7'- 6 1/2"	178	1.6	4'- 6 1/4"	62	0.7
	30"	9'-10 1/2"	5'- 3"	5'-10"	8'- 3"	212	1.8	5'- 0"	72	0.9
	33"	10'- 8 3/4"	5'- 7"	6'- 4"	8'-11 1/2"	225	2.1	5'- 4 3/4"	79	1.0
	36"	11'- 6 3/4"	5'-11 1/4"	6'-10"	9'- 8"	250	2.4	5'-10 1/2"	90	1.2
	42"	13'- 2 3/4"	6'- 7 1/4"	7'-10"	11'- 1"	304	3.0	6'- 8 3/4"	109	1.5
	48"	15'- 4 3/4"	7'- 3 1/4"	9'- 4"	13'- 2 1/2"	369	4.0	7'- 7 1/4"	142	2.0
	54"	17'- 1"	7'-11 1/2"	10'- 4"	14'- 7 1/4"	429	4.7	8'- 8"	170	2.5
	60"	18'- 9"	8'- 7 1/2"	11'- 4"	16'- 0 1/4"	484	5.6	9'- 6 1/4"	194	2.9
	66"	20'- 5"	9'- 3 1/2"	12'- 4"	17'- 5 1/4"	550	6.5	10'- 1 1/4"	217	3.3
	72"	22'- 1 1/4"	9'-11 3/4"	13'- 4"	18'-10 1/4"	614	7.5	10'- 9 1/4"	239	3.7
3:1	12"	6'- 2"	3'- 1 1/2"	4'- 3"	6'- 0"	118	0.9	2'- 0 1/4"	24	0.3
	15"	7'- 2 3/4"	3'- 5 1/4"	5'- 0"	7'- 0 3/4"	142	1.1	2'- 6"	31	0.4
	18"	8'- 3 3/4"	3'- 9 1/4"	5'- 9"	8'- 1 1/2"	179	1.4	3'- 1"	46	0.5
	21"	9'- 4 3/4"	4'- 1 1/4"	6'- 6"	9'- 2 1/4"	197	1.7	3'- 6 3/4"	53	0.7
	24"	10'- 7 1/2"	4'- 7"	7'- 3"	10'- 3"	227	2.1	4'- 1 3/4"	65	0.8
	27"	11'- 8 1/2"	4'-11"	8'- 0"	11'- 3 3/4"	255	2.4	4'- 6 1/4"	75	1.0
	30"	12'- 9 1/2"	5'- 3"	8'- 9"	12'- 4 1/2"	298	2.8	5'- 0"	86	1.2
	33"	13'-10 3/4"	5'- 7"	9'- 6"	13'- 5 1/4"	322	3.2	5'- 4 3/4"	94	1.3
	36"	14'-11 3/4"	5'-11 1/4"	10'- 3"	14'- 6"	355	3.7	5'-10 1/2"	108	1.5
	42"	17'- 1 3/4"	6'- 7 1/4"	11'- 9"	16'- 7 1/2"	441	4.6	6'- 8 3/4"	133	2.0
	48"	20'- 0 3/4"	7'- 3 1/4"	14'- 0"	19'- 9 1/2"	542	6.2	7'- 7 1/4"	176	2.7
	54"	22'- 3"	7'-11 1/2"	15'- 6"	21'-11"	626	7.5	8'- 8"	211	3.3
	60"	24'- 5"	8'- 7 1/2"	17'- 0"	24'- 0 1/2"	725	8.9	9'- 6 1/4"	246	3.9
	66"	26'- 7"	9'- 3 1/2"	18'- 6"	26'- 2"	821	10.4	10'- 1 1/4"	274	4.5
	72"	28'- 9 1/4"	9'-11 3/4"	20'- 0"	28'- 3 1/2"	930	12.0	10'- 9 1/4"	309	5.1
4:1	12"	7'- 7"	3'- 1 1/2"	5'- 8"	8'- 0 1/4"	156	1.2	2'- 0 1/4"	28	0.3
	15"	8'-10 3/4"	3'- 5 1/4"	6'- 8"	9'- 5 1/4"	183	1.5	2'- 6"	36	0.5
	18"	10'- 2 3/4"	3'- 9 1/4"	7'- 8"	10'-10"	228	1.9	3'- 1"	52	0.6
	21"	11'- 6 3/4"	4'- 1 1/4"	8'- 8"	12'- 3"	264	2.3	3'- 6 3/4"	63	0.8
	24"	13'- 0 1/2"	4'- 7"	9'- 8"	13'- 8"	301	2.8	4'- 1 3/4"	75	1.0
	27"	14'- 4 1/2"	4'-11"	10'- 8"	15'- 1"	339	3.4	4'- 6 1/4"	87	1.2
	30"	15'- 8 1/2"	5'- 3"	11'- 8"	16'- 6"	394	3.9	5'- 0"	99	1.4
	33"	17'- 0 3/4"	5'- 7"	12'- 8"	17'-11"	432	4.5	5'- 4 3/4"	112	1.7
	36"	18'- 4 3/4"	5'-11 1/4"	13'- 8"	19'- 4"	479	5.2	5'-10 1/2"	128	1.9
	42"	21'- 0 3/4"	6'- 7 1/4"	15'- 8"	22'- 1 3/4"	587	6.6	6'- 8 3/4"	158	2.5
	48"	24'- 8 3/4"	7'- 3 1/4"	18'- 8"	26'- 4 3/4"	738	8.9	7'- 7 1/4"	211	3.3
	54"	27'- 5"	7'-11 1/2"	20'- 8"	29'- 2 3/4"	871	10.8	8'- 8"	257	4.1
	60"	30'- 1"	8'- 7 1/2"	22'- 8"	32'- 0 3/4"	999	12.8	9'- 6 1/4"	297	4.9
	66"	32'- 9"	9'- 3 1/2"	24'- 8"	34'-10 1/2"	1139	14.9	10'- 1 1/4"	340	5.6
	72"	35'- 5 1/4"	9'-11 3/4"	26'- 8"	37'- 8 1/2"	1290	17.3	10'- 9 1/4"	378	6.4
6:1	12"	10'- 5"	3'- 1 1/2"	8'- 6"	12'- 0 1/4"	223	1.9	2'- 0 1/4"	32	0.4
	15"	12'- 2 3/4"	3'- 5 1/4"	10'- 0"	14'- 1 3/4"	273	2.5	2'- 6"	43	0.6
	18"	14'- 0 3/4"	3'- 9 1/4"	11'- 6"	16'- 3 1/4"	336	3.2	3'- 1"	61	0.8
	21"	15'-10 3/4"	4'- 1 1/4"	13'- 0"	18'- 4 1/2"	396	3.9	3'- 6 3/4"	76	1.1
	24"	17'-10 1/2"	4'- 7"	14'- 6"	20'- 6"	450	4.8	4'- 1 3/4"	91	1.4
	27"	19'- 8 1/2"	4'-11"	16'- 0"	22'- 7 1/2"	519	5.7	4'- 6 1/4"	108	1.6
	30"	21'- 6 1/2"	5'- 3"	17'- 6"	24'- 9"	595	6.6	5'- 0"	124	2.0
	33"	23'- 4 3/4"	5'- 7"	19'- 0"	26'-10 1/2"	674	7.7	5'- 4 3/4"	143	2.3
	36"	25'- 2 3/4"	5'-11 1/4"	20'- 6"	29'- 0"	737	8.8	5'-10 1/2"	162	2.7
	42"	28'-10 3/4"	6'- 7 1/4"	23'- 6"	33'- 2 3/4"	920	11.3	6'- 8 3/4"	202	3.5
	48"	34'- 0 3/4"	7'- 3 1/4"	28'- 0"	39'- 7 1/4"	1189	15.5	7'- 7 1/4"	274	4.6

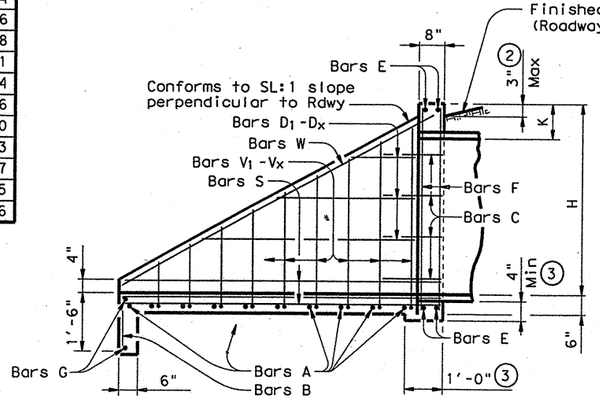


ELEVATION

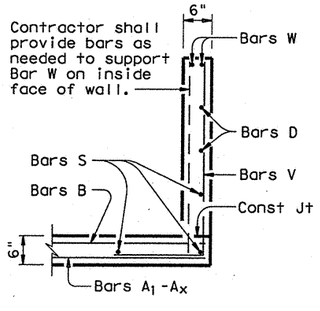
Showing dimensions



PLAN



TYPICAL WING ELEVATION



SECTION A-A

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) 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.

(3) Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.

(4) Quantities shown are for one structure end only (one headwall).

(5) Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$

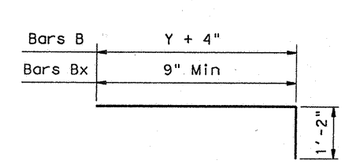
(6) Lengths of wings based on SL:1 Slope along this line.

TABLE OF REINFORCING STEEL (4)

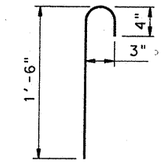
Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
CL	# 4	1'-0"	~
CS	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
SL	# 4	~	3
SS	# 4	~	3
V	# 4	1'-0"	~
WL	# 5	~	2
WS	# 5	~	2

TABLE OF CONSTANT DIMENSIONS

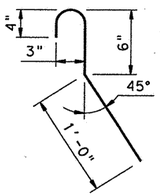
DIA OF PIPE, D	G	K	H
12"	9"	1'- 0"	2'- 0"
15"	11"	1'- 0"	2'- 3"
18"	1'- 2"	1'- 0"	2'- 6"
21"	1'- 4"	1'- 0"	2'- 9"
24"	1'- 7"	1'- 0"	3'- 0"
27"	1'- 8"	1'- 0"	3'- 3"
30"	1'-10"	1'- 0"	3'- 6"
33"	1'-11"	1'- 0"	3'- 9"
36"	2'- 1"	1'- 0"	4'- 0"
42"	2'- 4"	1'- 0"	4'- 6"
48"	2'- 7"	1'- 3"	5'- 3"
54"	3'- 0"	1'- 3"	5'- 9"
60"	3'- 3"	1'- 3"	6'- 3"
66"	3'- 3"	1'- 3"	6'- 9"
72"	3'- 4"	1'- 3"	7'- 3"



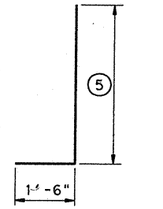
BARS B & B_1-B_X



BARS C_S
(2'-0" long)



BARS C_L
(2'-0" long)



BARS V_S & V_L

GENERAL NOTES:

Designed according to current AASHTO Standard and Interim Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

Texas Department of Transportation
Bridge Division

CONCRETE HEADWALLS WITH FLARED WINGS FOR 30° SKEW PIPE CULVERTS

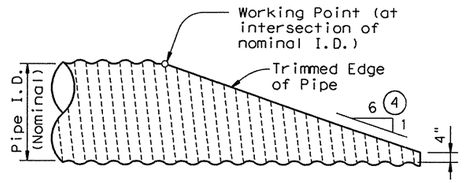
CH-FW-30

FILE: chfw30se.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
© TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	18			271
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM740

⚠ REPLACED 07.30.09 VN

ACC:

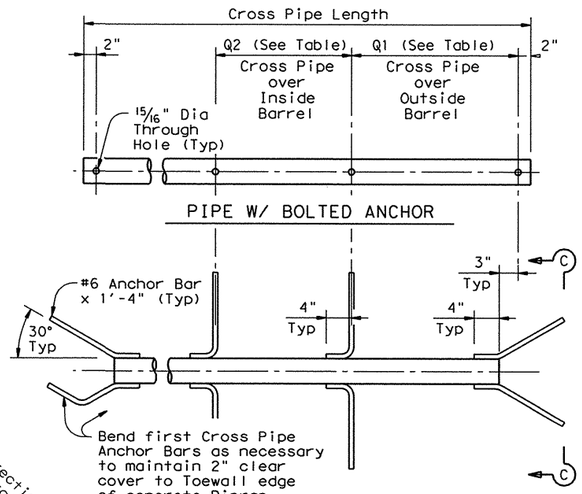
LEVELS

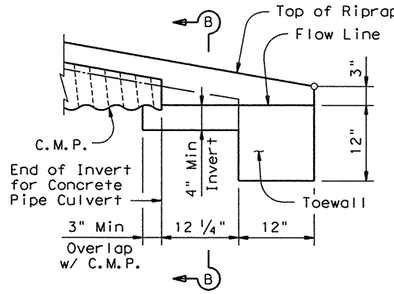


NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

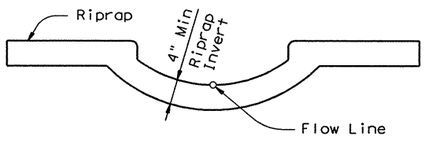
(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)





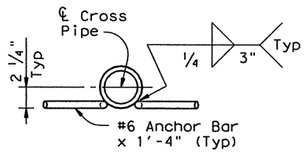
DETAIL "A"

(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.)



SECTION C-C

CROSS PIPE DETAILS

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"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
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.

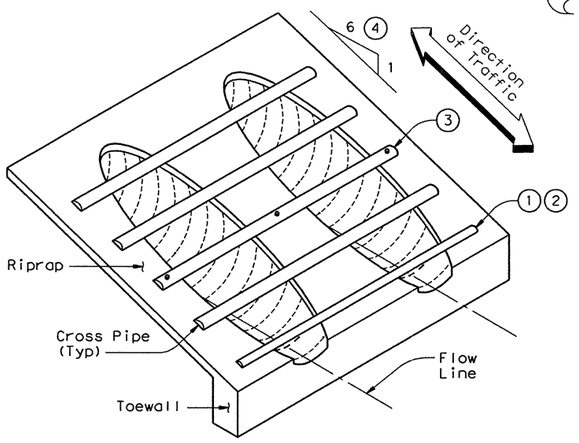
(2) Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).

(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.

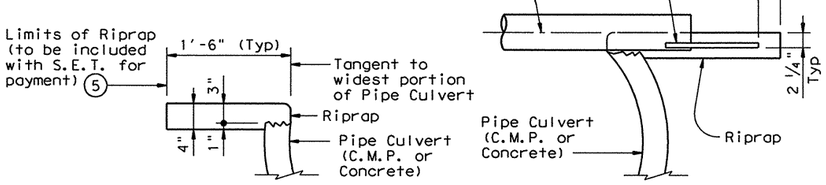
(4) Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.

(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.

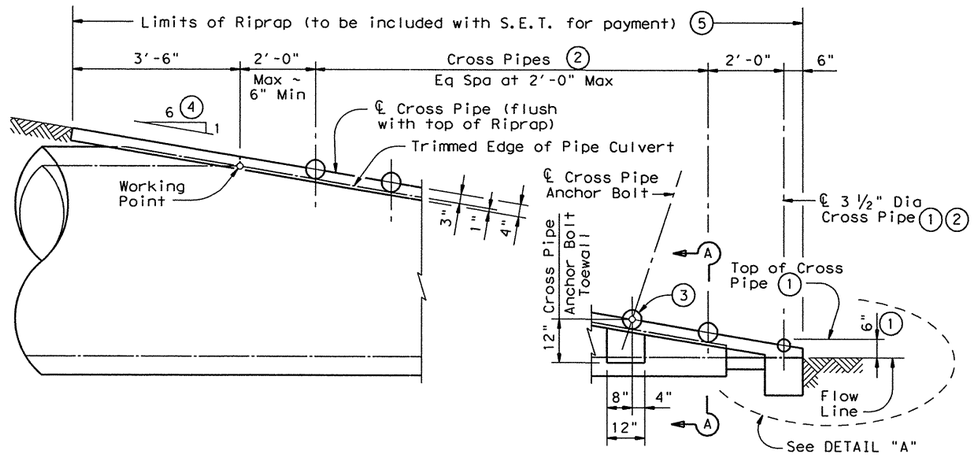


ISOMETRIC VIEW OF TYPICAL INSTALLATION



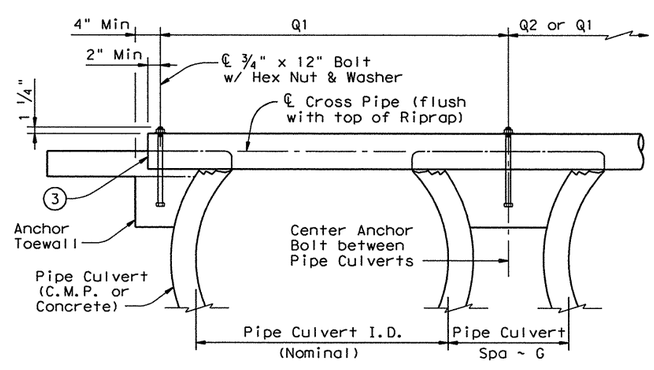
SHOWING TYPICAL PIPE CULVERT & RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

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 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".

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

SAFETY END TREATMENT
FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

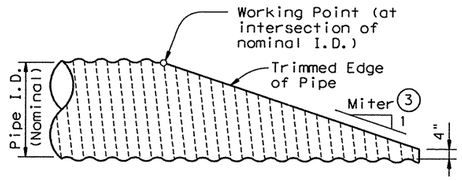
SETP-PD

FILE: setppdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
© TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)		272
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

ACC:

LEVELS DISPLAYED

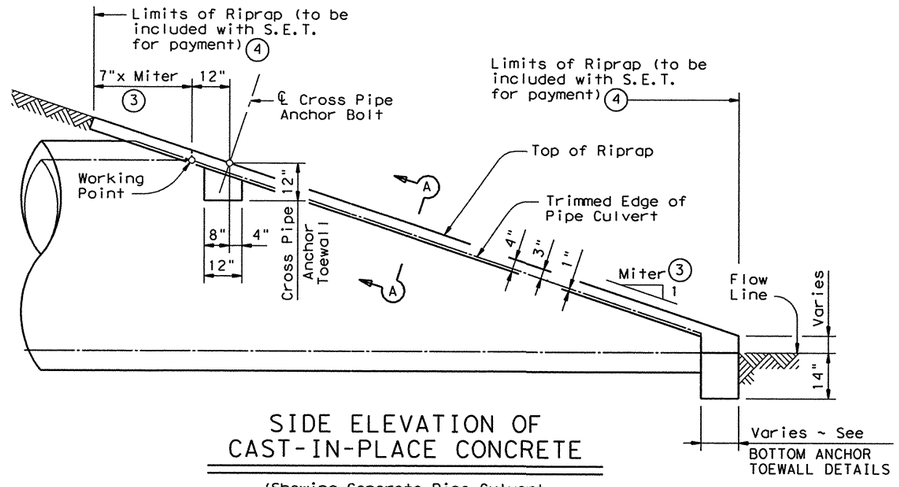
1



NOTE: All Pipe Runners, 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.

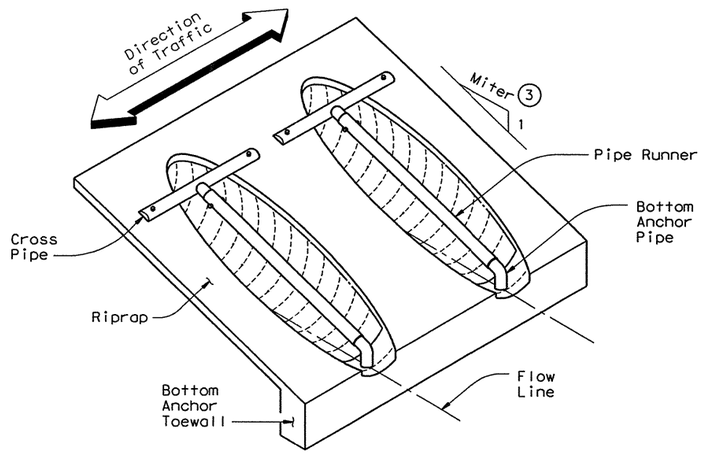
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert.
Details of Concrete Pipe Culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.
Details of Corrugated Metal Pipe Culvert are similar.
Pipe Runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS & PIPE RUNNER LENGTHS (1)(2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1'- 7"	3'- 5"	N/A	N/A	N/A	5'-10"	N/A	N/A	N/A	8'- 1"	N/A	N/A	N/A	12'- 9"
27"	1'- 8"	3'- 8"	N/A	N/A	5'- 5"	6'-11"	N/A	N/A	7'- 7"	9'- 7"	N/A	N/A	11'-11"	14'-11"
30"	1'-10"	3'-11"	N/A	N/A	6'- 4"	8'- 0"	N/A	N/A	8'- 9"	11'- 0"	N/A	N/A	13'- 8"	17'- 0"
33"	1'-11"	4'- 2"	6'- 2"	6'- 5"	7'- 3"	9'- 1"	8'- 6"	8'-10"	10'- 0"	12'- 5"	13'- 3"	13'- 9"	15'- 5"	19'- 2"
36"	2'- 1"	4'- 5"	6'-11"	7'- 3"	8'- 2"	10'- 2"	9'- 6"	9'-11"	11'- 2"	13'-10"	14'- 9"	15'- 3"	17'- 2"	21'- 3"
42"	2'- 4"	4'-11"	8'- 6"	8'-10"	9'-11"	12'- 4"	11'- 7"	12'- 0"	13'- 6"	16'- 8"	17'- 9"	18'- 5"	20'- 8"	25'- 7"
48"	2'- 7"	5'- 5"	10'- 1"	10'- 5"	11'- 9"	N/A	13'- 7"	14'- 2"	15'-10"	N/A	20'- 9"	21'- 6"	24'- 2"	N/A
54"	3'- 0"	5'-11"	11'- 8"	12'- 1"	N/A	N/A	15'- 8"	16'- 3"	N/A	N/A	23'-10"	24'- 8"	N/A	N/A
60"	3'- 3"	6'- 5"	13'- 3"	N/A	N/A	N/A	17'- 9"	N/A	N/A	N/A	26'-10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (No Skew)	Always required
42" to 60"	Always required	Always required

STANDARD PIPE SIZES & MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10'- 0"
4" STD	4.500"	4.026"	19'- 8"
5" STD	5.563"	5.047"	34'- 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Size of Pipe Runner shall be as shown in the tables. Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out and Bottom Anchor Pipe shall be the next smaller size pipe as shown in the STANDARD PIPE SIZES table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT "Roadway Design Manual".

(3) Miter = Slope of Mitered Pipe Culvert End

(4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

(5) 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.

ACC:
LEVELS DISPLAYED

SHEET 1 OF 2

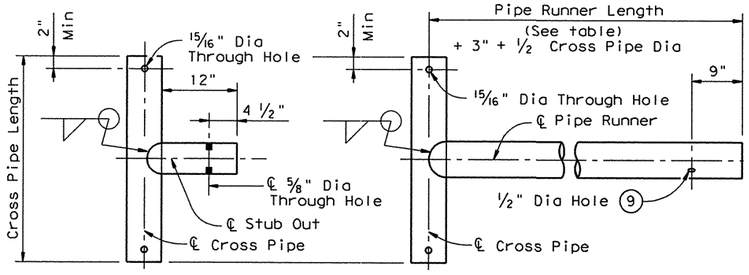
Texas Department of Transportation
Bridge Division

SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

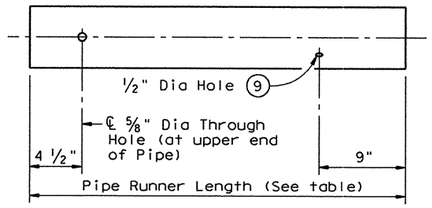
FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)		

COUNTY	CONTROL	SECT	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740



OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS

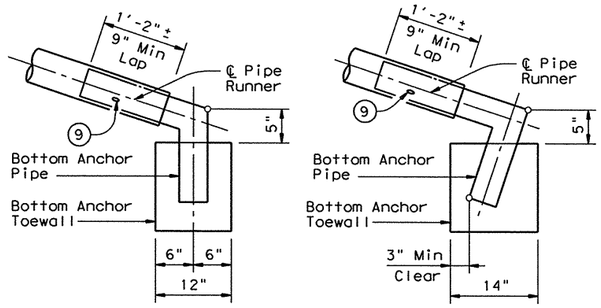


NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

OPTION B1 OPTION B2

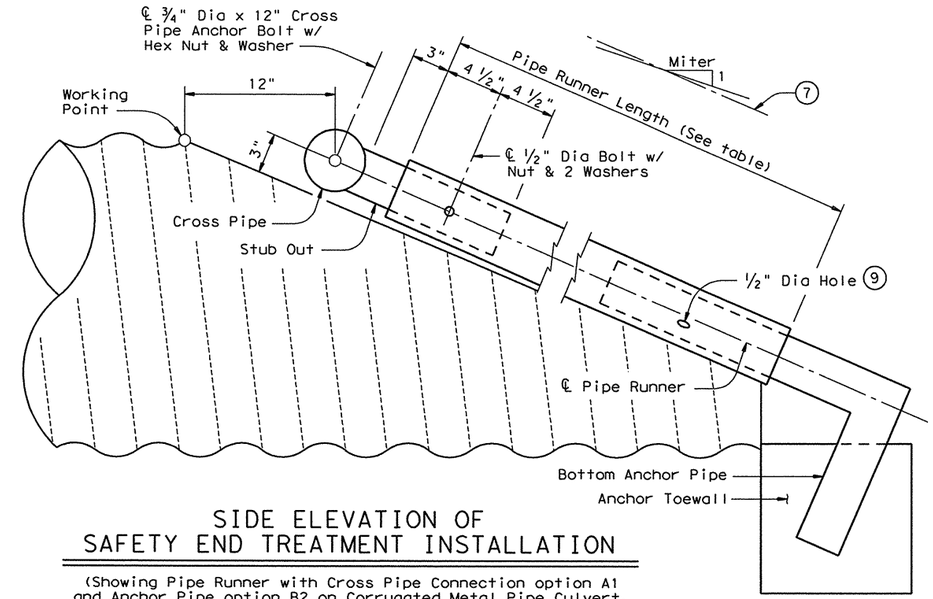
BOTTOM ANCHOR PIPE DETAILS (10)



OPTION B1 OPTION B2

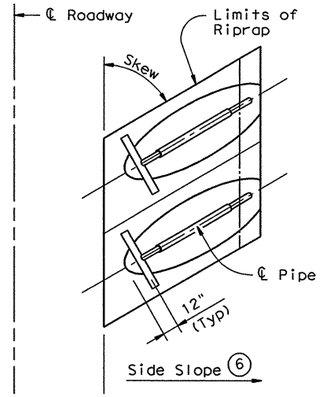
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert & Riprap not shown for clarity)

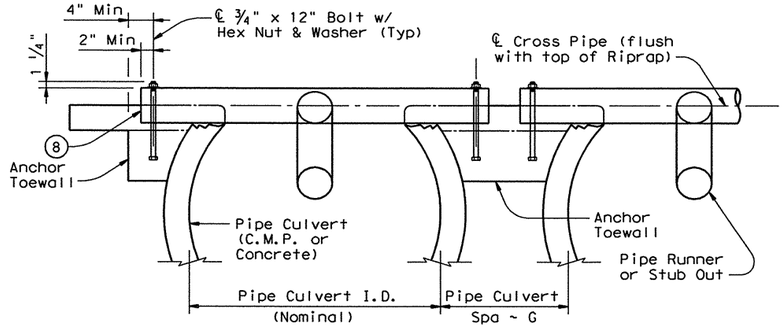


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

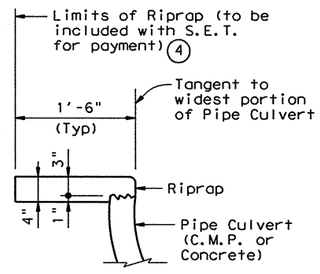
(Showing Pipe Runner with Cross Pipe Connection option A1 and Anchor Pipe option B2 on Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Riprap not shown for clarity)



PLAN OF SKEWED INSTALLATION



SHOWING CROSS PIPE & ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT & RIPRAP

SECTION A-A

(6) Recommended values of side slope are 3:1, 4:1, & 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of Pipe Runner may vary slightly from Side Slope of Riprap and trimmed Culvert Pipe edge.

(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" hole shall be inspected to ensure that the lap of the Pipe Runner with the Bottom Anchor Pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" 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.

GENERAL NOTES:

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.

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.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

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 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

SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

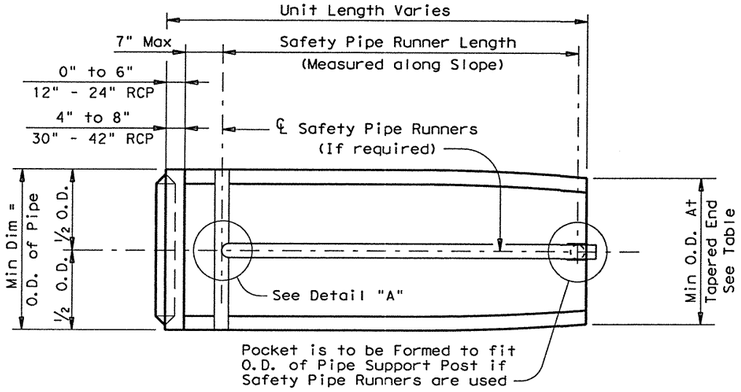
FILE: setpcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF			
©TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT			SHEET		
REVISIONS	DALLAS	(SEE TITLE SHEET)			274		
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	ROCKWALL		1014	03	039	FM 740	

ACC:
LEVELS DISPLAYED
1

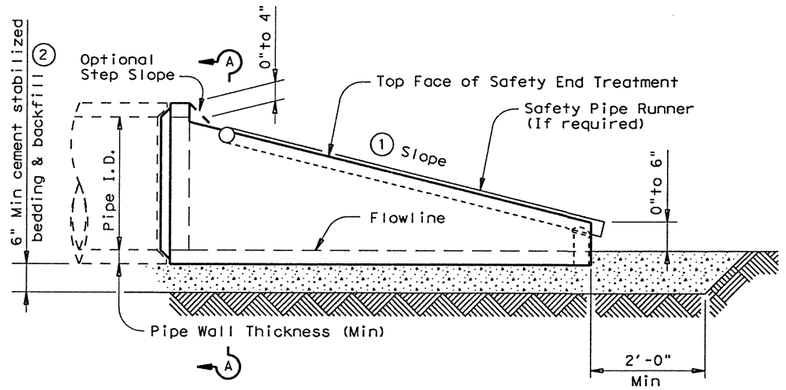
ACC:

LEVELS DISPLAY

1



PLAN VIEW



LONGITUDINAL ELEVATION

Maximum Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11'- 2"	3" STD	3.500"	3.068"
15'- 6"	3 ½" STD	4.000"	3.548"
20'-10"	4" STD	4.500"	4.026"
35'- 4"	5" STD	5.563"	5.047"

Maximum Safety Pipe Runner Lengths & Required Safety Pipe Runner Sizes

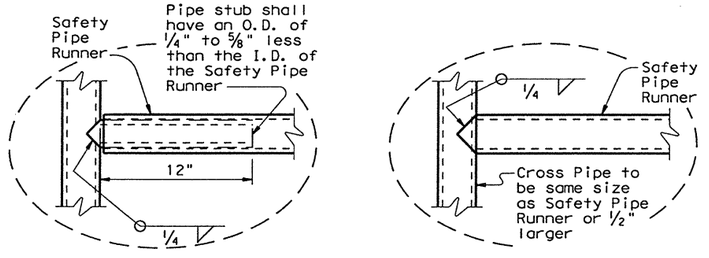
(1) Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.

(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)	SLOPE	MINIMUM LENGTH OF UNIT	SINGLE PIPE		MULTIPLE PIPE	
							SKEW	PIPE RUNNERS REQUIRED	SKEW	PIPE RUNNERS REQUIRED
12"	2"	16"	16"	0.07 CIRC.	3:1	2'-0"	<=45 deg	No	<=45 deg	No
					4:1	2'-8"				
					6:1	4'-0"				
15"	2 ¼"	19 ½"	19"	0.07 CIRC.	3:1	2'-10"	<=45 deg	No	<=45 deg	No
					4:1	3'-9"				
					6:1	5'-8"				
18"	2 ½"	23"	21 ½"	0.07 CIRC.	3:1	3'-8"	<=45 deg	No	<=45 deg	No
					4:1	4'-10"				
					6:1	7'-3"				
24"	3"	30"	27"	0.07 CIRC.	3:1	5'-3"	<=45 deg	No	<=30 deg	No
					4:1	7'-0"			>30 deg	Yes
					6:1	10'-6"				
30"	3 ½"	37"	31"	0.18 CIRC.	3:1	6'-3"	<=15 deg	No	<=15 deg	No
					4:1	8'-2"	>15 deg	Yes	>15 deg	Yes
					6:1	12'-1"				
36"	4"	44"	36"	0.19 ELIP.	3:1	7'-10"	=0 deg	No	=>0 deg	Yes
					4:1	10'-4"	>0 deg	Yes		
					6:1	15'-4"				
42"	4 ½"	51"	41 ½"	0.23 ELIP.	3:1	9'-6"	=>0 deg	Yes	=>0 deg	Yes
					4:1	12'-6"				
					6:1	18'-7"				



OPTION A OPTION B

DETAIL A

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.

All precast concrete end sections shall be manufactured in accordance with Item "Reinforced Concrete Pipe Culverts" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

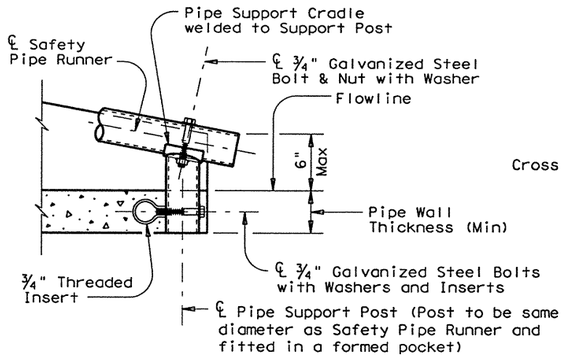
Precast concrete end sections shall be provided with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

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 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

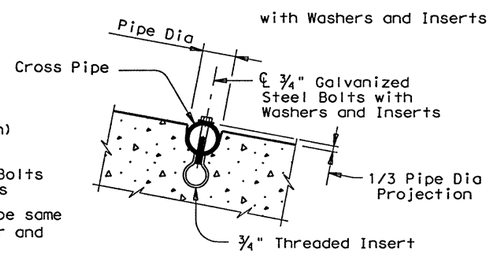
Safety Pipe Runners, Cross Pipes, Pipe Support Posts, and Pipe Stubs shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



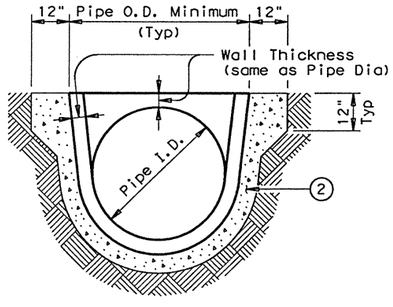
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

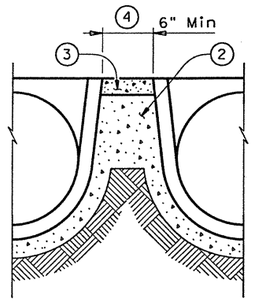


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



SECTION A-A



MULTIPLE PIPE INSTALLATION

Texas Department of Transportation
Bridge Division

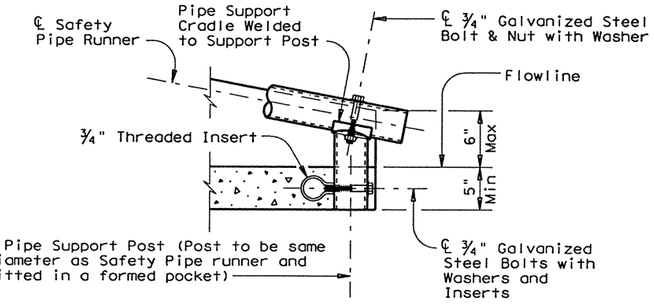
PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-RC

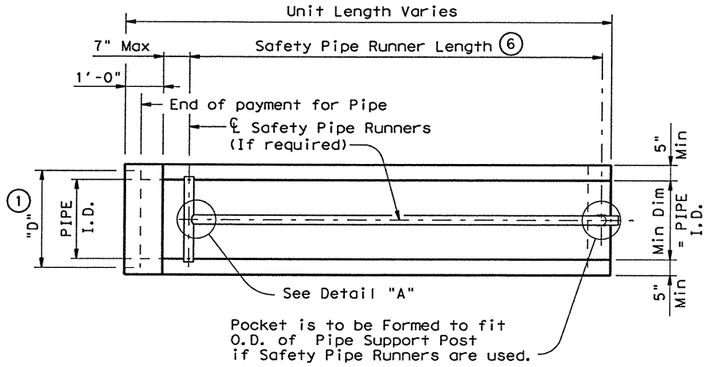
FILE: psetrcse.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF	
©TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS					275
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	Rockwall	1014	03	039	

PIPE I.D.	PIPE WALL "B" THICKNESS	(1) "D"	SLOPE	MINIMUM LENGTH OF UNIT	SINGLE PIPE		MULTIPLE PIPE	
					SKEW	PIPE RUNNERS REQUIRED	SKEW	PIPE RUNNERS REQUIRED
12"	2"	17"	3:1	2'-11"	<=45 deg	No	<=45 deg	No
			4:1	3'-6"				
			6:1	4'-9"				
15"	2 1/4"	20 1/2"	3:1	3'-8"	<=45 deg	No	<=45 deg	No
			4:1	4'-7"				
			6:1	6'-5"				
18"	2 1/2"	24"	3:1	4'-6"	<=45 deg	No	<=45 deg	No
			4:1	5'-8"				
			6:1	8'-0"				
24"	3"	31"	3:1	6'-2"	<=45 deg	No	<=30 deg	No
			4:1	7'-10"			>30 deg	Yes
			6:1	11'-3"				
30"	3 1/2"	38 1/2"	3:1	7'-10"	<=15 deg	No	<=15 deg	No
			4:1	10'-1"	>15 deg	Yes	>15 deg	Yes
			6:1	14'-8"				
36"	4"	45 1/2"	3:1	9'-5"	=0 deg	No	=>0 deg	Yes
			4:1	12'-3"	>0 deg	Yes		
			6:1	17'-11"				
42"	4 1/2"	52 1/2"	3:1	11'-1"	=>0 deg	Yes	=>0 deg	Yes
			4:1	14'-5"				
			6:1	21'-2"				

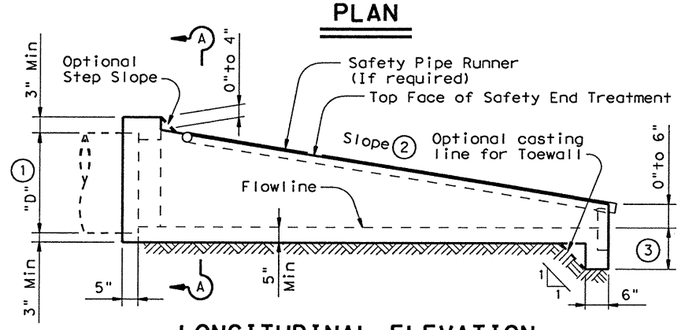


END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

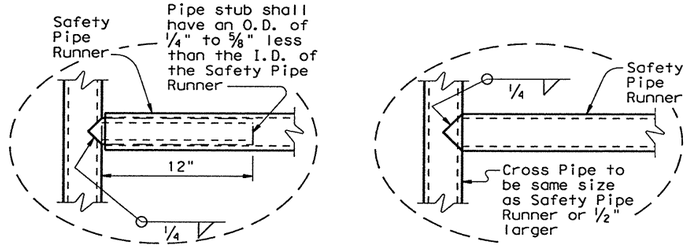
(If required)

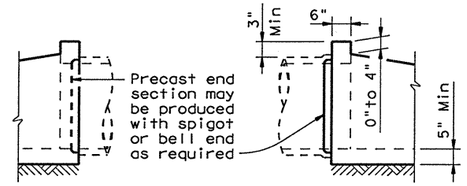


PLAN



LONGITUDINAL ELEVATION





OPTIONAL JOINT

(Showing joint between RCP and Precast Safety End Treatment)

Maximum Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11'- 2"	3" STD	3.500"	3.068"
15'- 6"	3 1/2" STD	4.000"	3.548"
20'-10"	4" STD	4.500"	4.026"
35'- 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on ASTM C-76, Class III, Wall thickness "B". If any other wall thickness is used, dimension "D" must be adjusted accordingly.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) The top 4" of void between precast end treatments shall be filled with concrete riprap and shall be considered subsidiary to Safety End Treatment.

(5) Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

(6) Measured along Slope.

(7) 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.

Manufacture of this product shall conform to requirements of Item "Safety End Treatment" except as noted below :

A. 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 fabric.

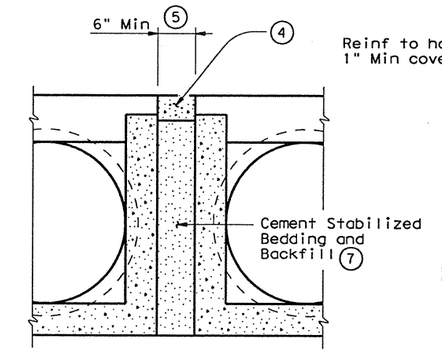
B. Concrete for precast (steel formed) sections shall be Class "C" with a minimum compressive strength of 3600 psi.

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.

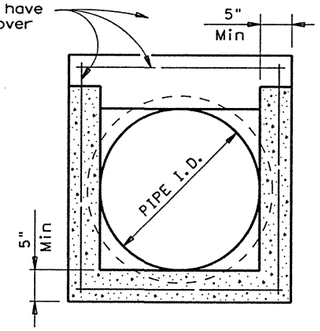
Pipe Runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety Pipe Runners, Cross Pipes, Pipe Support Posts, and Pipe Stubs shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

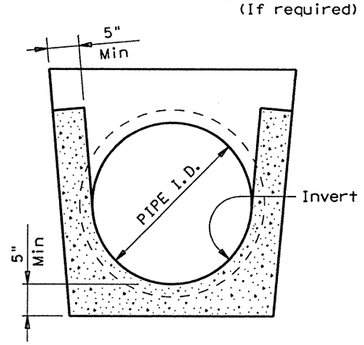
All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



MULTIPLE PIPE INSTALLATION

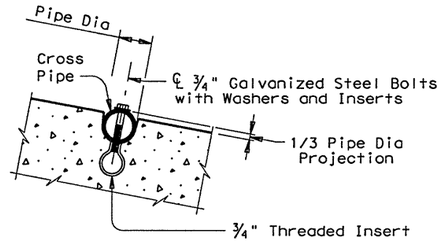


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

Texas Department of Transportation
Bridge Division

PRECAST SAFETY END TREATMENT

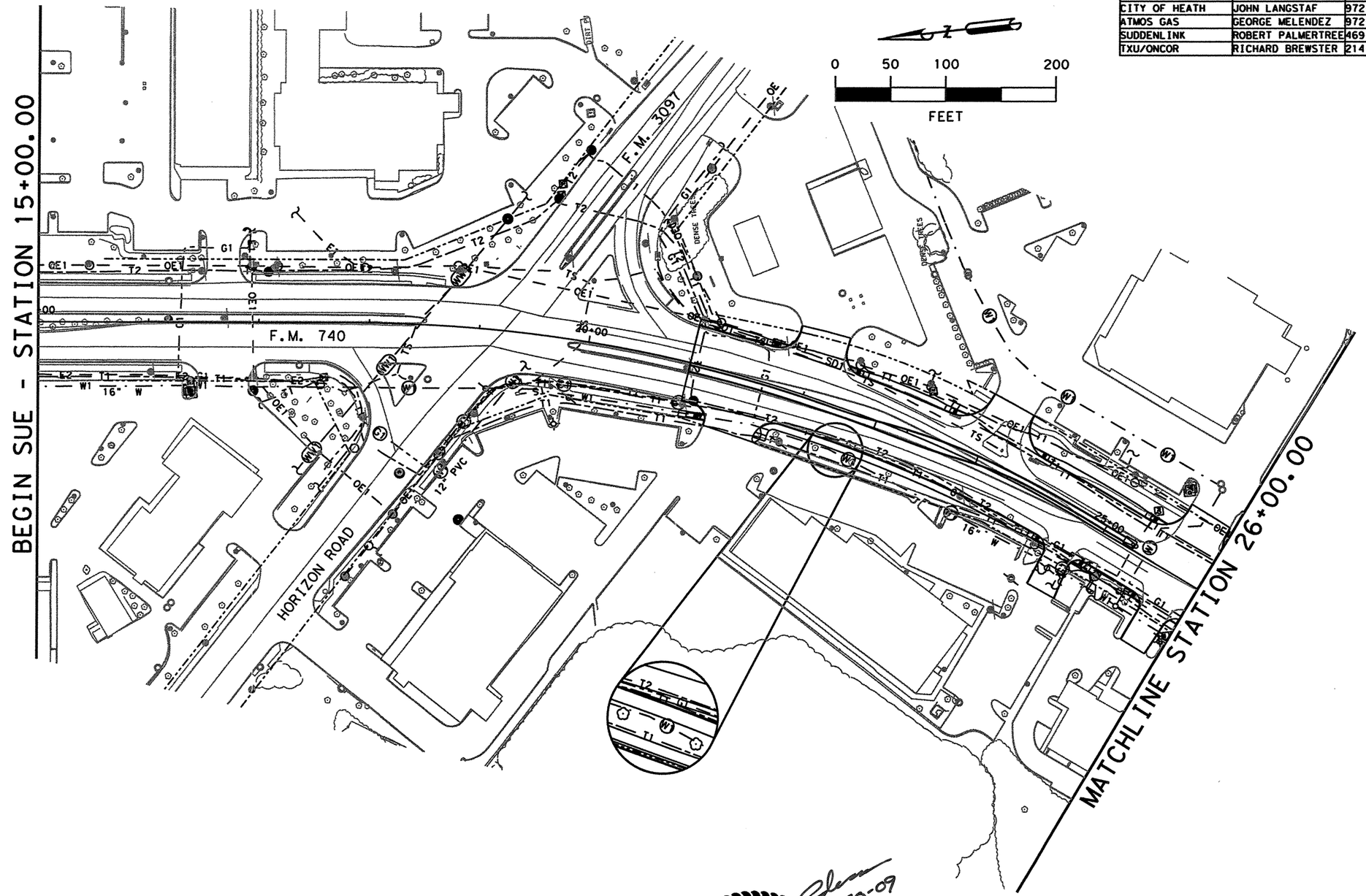
TYPE II ~ CROSS DRAINAGE

PSET-SC

FILE: psetscse.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
© TxDOT May 2005	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS				276
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	Rockwall	1014	03	039	

ACC:

LEVELS DISPLAY



UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
8707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET

STA. 15+00 TO STA. 26+00

SHEET 01 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JRV	DATE:	04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	277

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

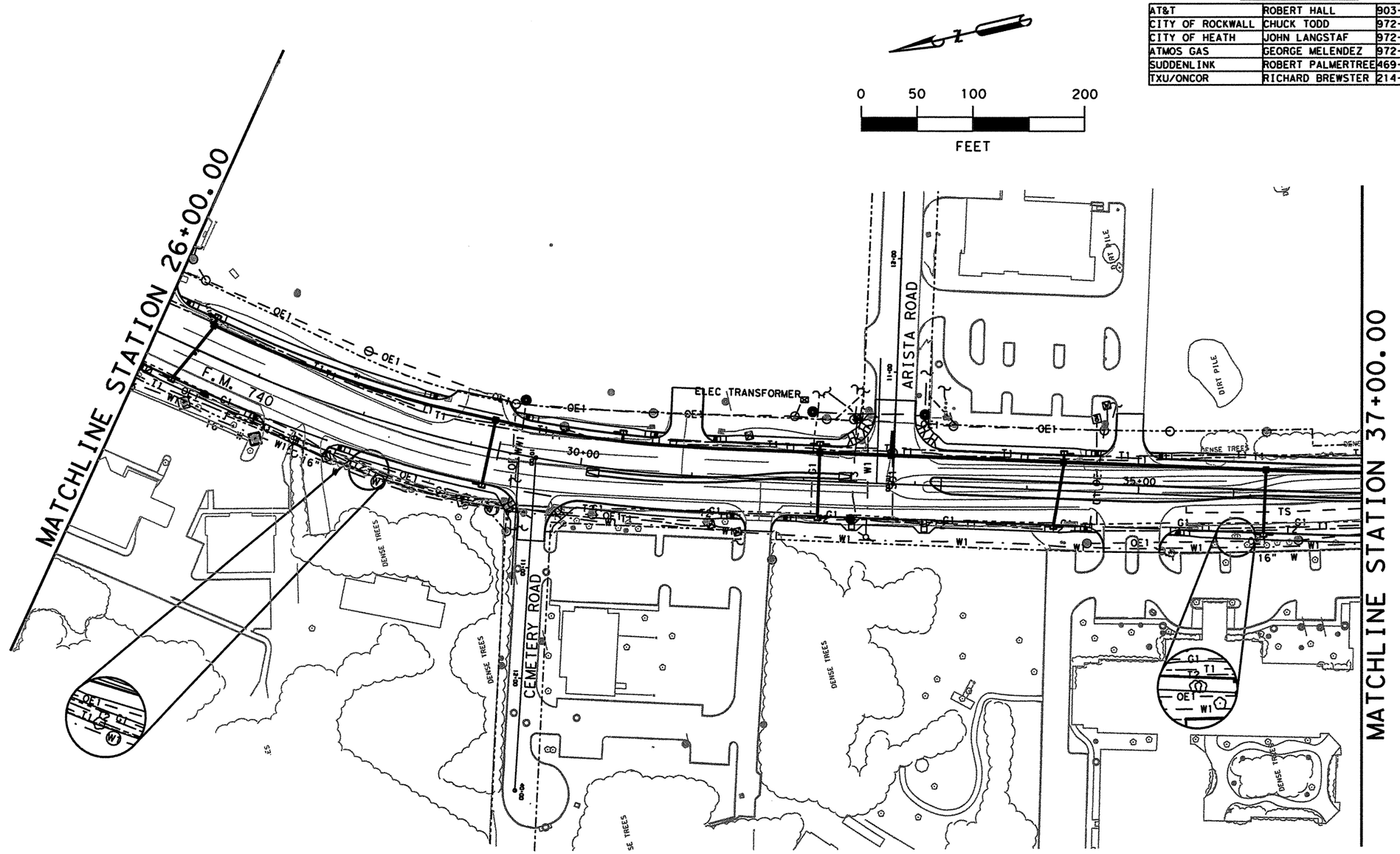
QUALITY LEVEL "B" SUE - 7,118 FEET
QUALITY LEVEL "C" SUE - 1,786 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.



UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES

A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.

AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 26+00 TO STA. 37+00

SHEET 02 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09
G&A PROJECT NUMBER	SHEET NAME	DATE	
0901-3495Q	SUE	04/24/09	
CSJ NUMBER	SHEET NO		
1014-03-039	278		
STATE	DISTRICT	COUNTY	
TX	DAL	ROCKWALL	

NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 7,377 FEET
QUALITY LEVEL "C" SUE - 213 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5.20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

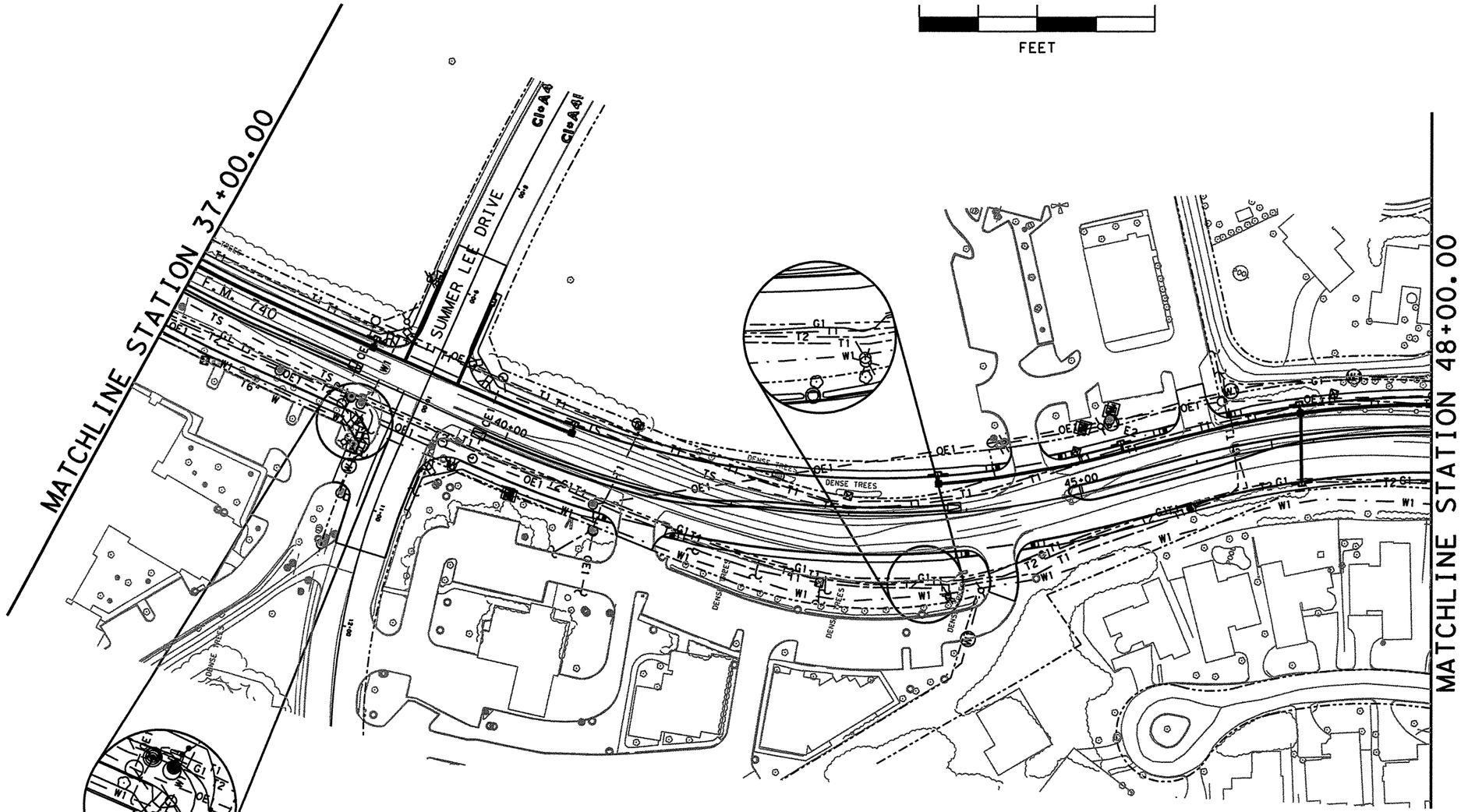
SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

UTILITY CONTACTS		
AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

0 50 100 200

FEET



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 7,960 FEET
QUALITY LEVEL "C" SUE - 352 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE (F)
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER (WM)
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER (GM)

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL (C)
CABLE CABINET (C)
CABLE HANDHOLE (C)
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET) (E)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE (E)
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP (E)
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET

STA. 37+00 TO STA. 48+00

SHEET 03 OF 14

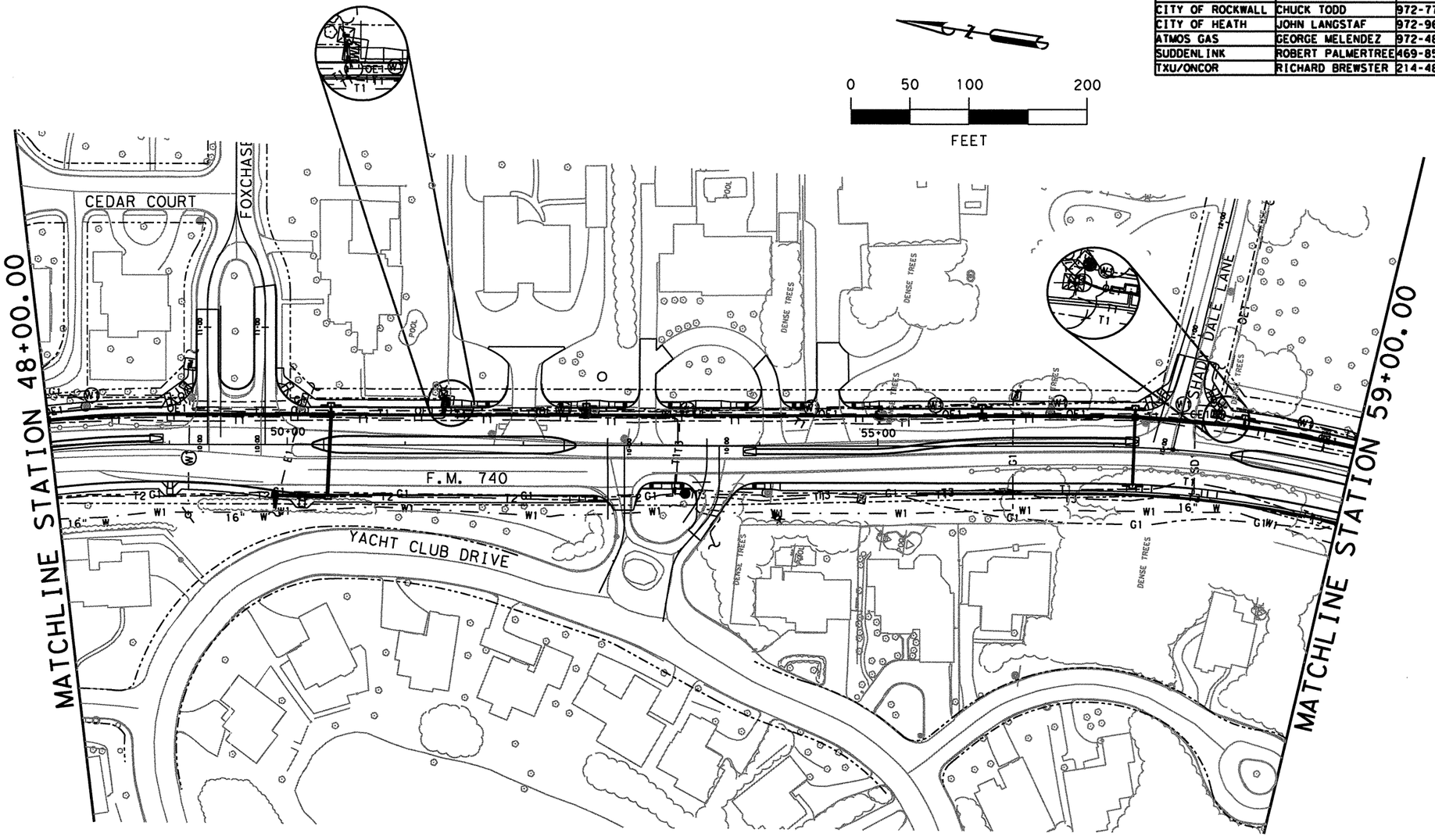
DESIGNED BY: JSA	CHECKED BY: PB	DATE: 04/24/09
APPROVED BY: JSA	CHECKED BY: JRV	DATE: 04/27/09

GBA PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	279

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

UTILITY CONTACTS		
AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245



REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS
AT&T
AT&T (DUCT)
AT&T (FOC)
COMM OWNER 4
COMM OWNER 5
COMM OWNER 6
COMM OWNER 7
COMM OWNER 8

WATER
CITY OF ROCKWALL
CITY OF HEATH
WATER OWNER 3
WATER OWNER 4
WATER OWNER 5
WATER OWNER 6

PETROLEUM AND GAS
ATMOS GAS
GAS OWNER 2
GAS OWNER 3

WASTE WATER
CITY OF ROCKWALL
CITY OF HEATH
WW OWNER 3
WW OWNER 4

STORM DRAIN
CITY OF ROCKWALL
STORM DRAIN OWNER 2

TV CABLE
SUDDENLINK
CATV OWNER 2

ELECTRIC
TXU/ONCOR
CITY OF ROCKWALL
ELECTRIC OWNER 3
ELECTRIC OWNER 4
ELECTRIC OWNER 5
ELECTRIC OWNER 6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS
TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER
WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS
GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER
WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE
CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC
LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS
TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET

STA. 48+00 TO STA. 59+00

SHEET 04 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE: 04/24/09
APPROVED BY: JSA	CHECKED BY: JRV	DATE: 04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	280

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 7,467 FEET
QUALITY LEVEL "C" SUE - 0 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

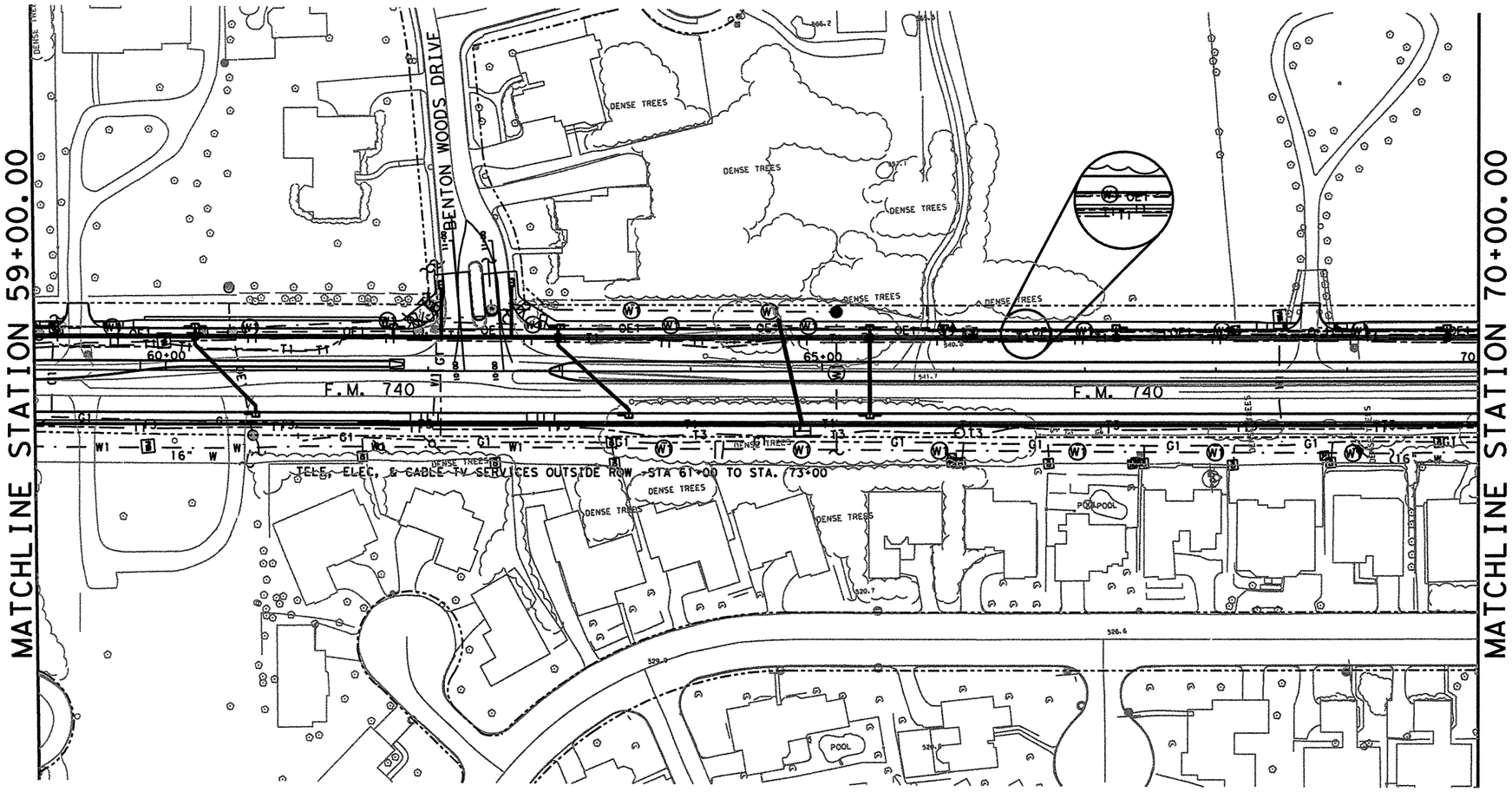
THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

0 50 100 200

FEET



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 8,080 FEET
QUALITY LEVEL "C" SUE - 690 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 59+00 TO STA. 70+00

SHEET 05 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09

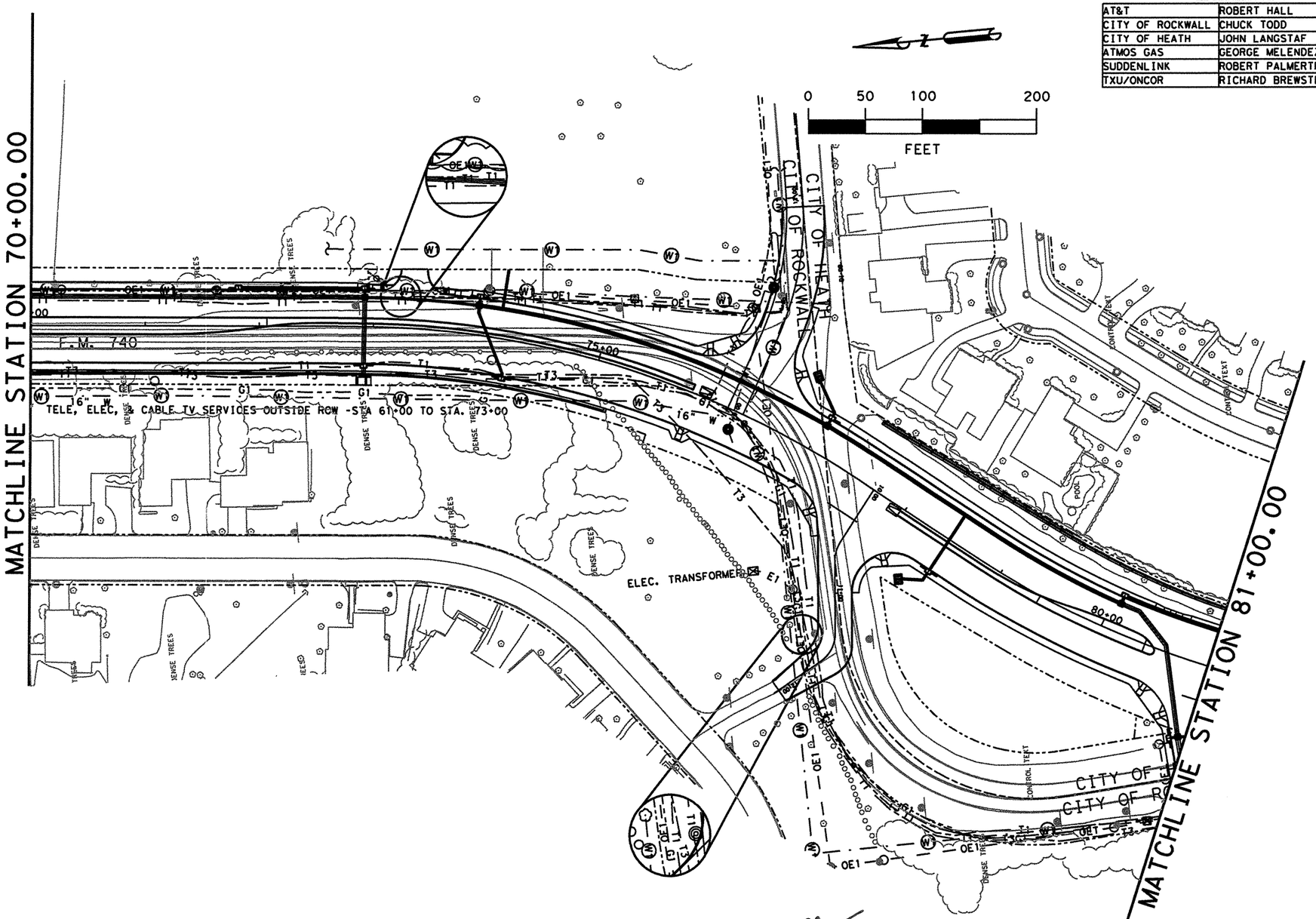
GBA PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	281

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 6,715 FEET
QUALITY LEVEL "C" SUE - 1,950 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T T1
AT&T (DUCT) T2
AT&T (FOC) T3
COMM OWNER 4 T4
COMM OWNER 5 T5
COMM OWNER 6 T6
COMM OWNER 7 T7
COMM OWNER 8 T8

WATER

CITY OF ROCKWALL W1
CITY OF HEATH W2
WATER OWNER 3 W3
WATER OWNER 4 W4
WATER OWNER 5 W5
WATER OWNER 6 W6

PETROLEUM AND GAS

ATMOS GAS G1
GAS OWNER 2 G2
GAS OWNER 3 G3

WASTE WATER

CITY OF ROCKWALL WW1
CITY OF HEATH WW2
WW OWNER 3 WW3
WW OWNER 4 WW4

STORM DRAIN

CITY OF ROCKWALL SD1
STORM DRAIN OWNER 2 SD2

TV CABLE

SUDDENLINK C1
CATV OWNER 2 C2

ELECTRIC

TXU/ONCOR E1
CITY OF ROCKWALL E2
ELECTRIC OWNER 3 E3
ELECTRIC OWNER 4 E4
ELECTRIC OWNER 5 E5
ELECTRIC OWNER 6 E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 70+00 TO STA. 81+00

SHEET 06 OF 14

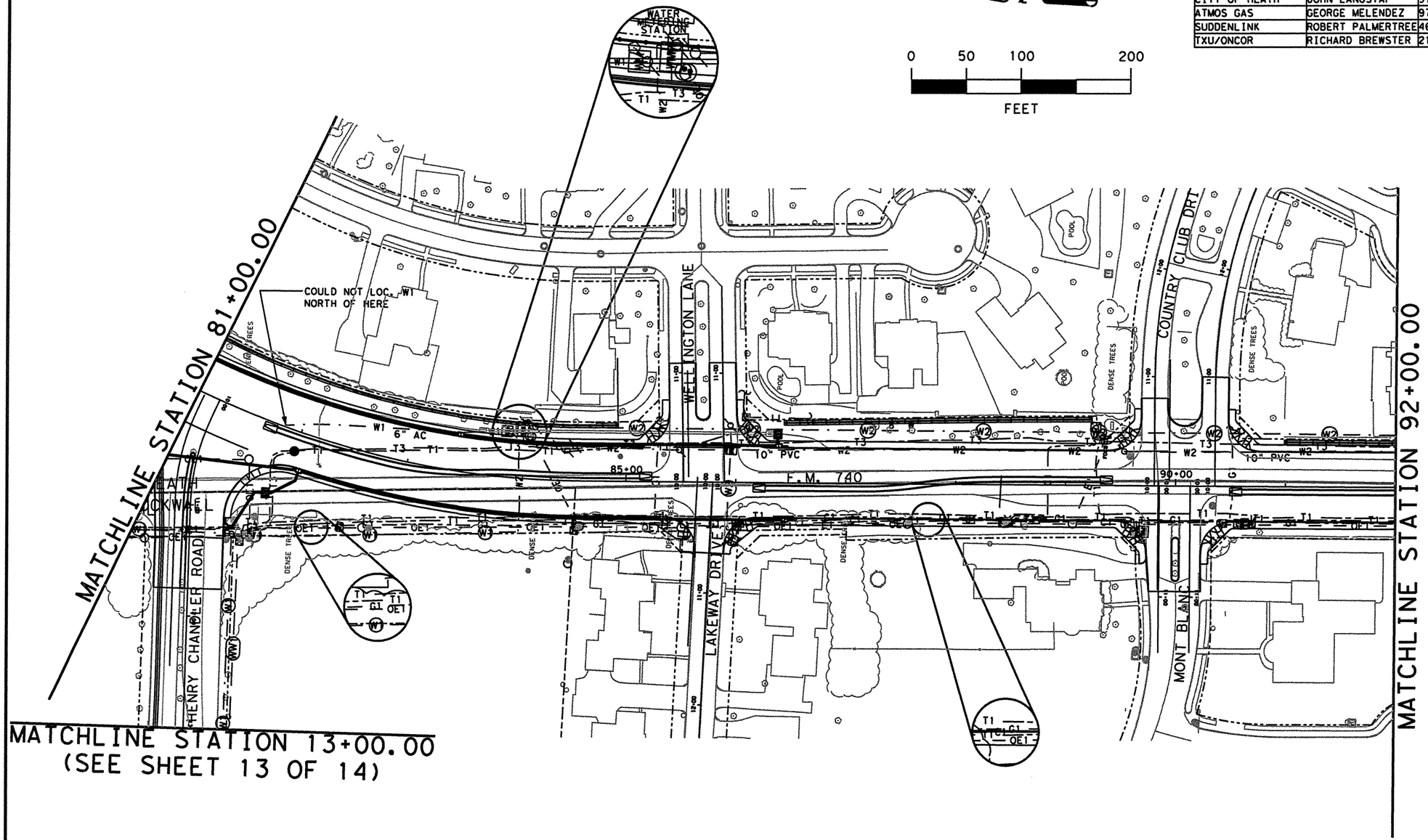
DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JRV	DATE:	04/27/09
G&A PROJECT NUMBER	SHEET NAME	DATE	
0901-3495Q	SUE	04/24/09	
CSJ NUMBER	SHEET NO		
1014-03-039	282		
STATE	DISTRICT	COUNTY	
TX	DAL	ROCKWALL	

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

0 50 100 200

FEET



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 7,974 FEET
QUALITY LEVEL "C" SUE - 599 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5.20.09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 81+00 TO STA. 92+00

SHEET 07 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	283

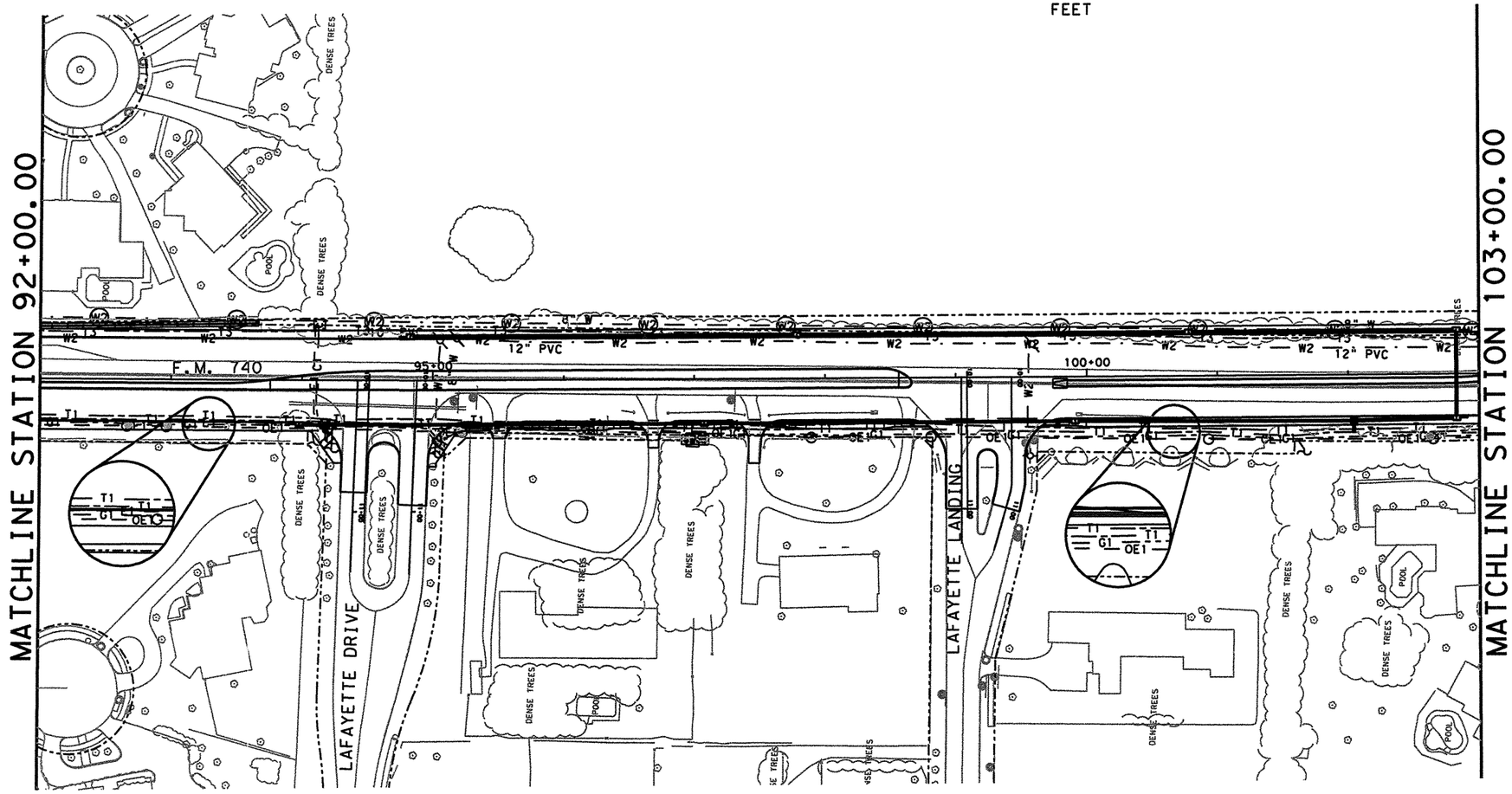
STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

0 50 100 200

FEET



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 6,300 FEET
QUALITY LEVEL "C" SUE - 0 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET

STA. 92+00 TO STA. 103+00

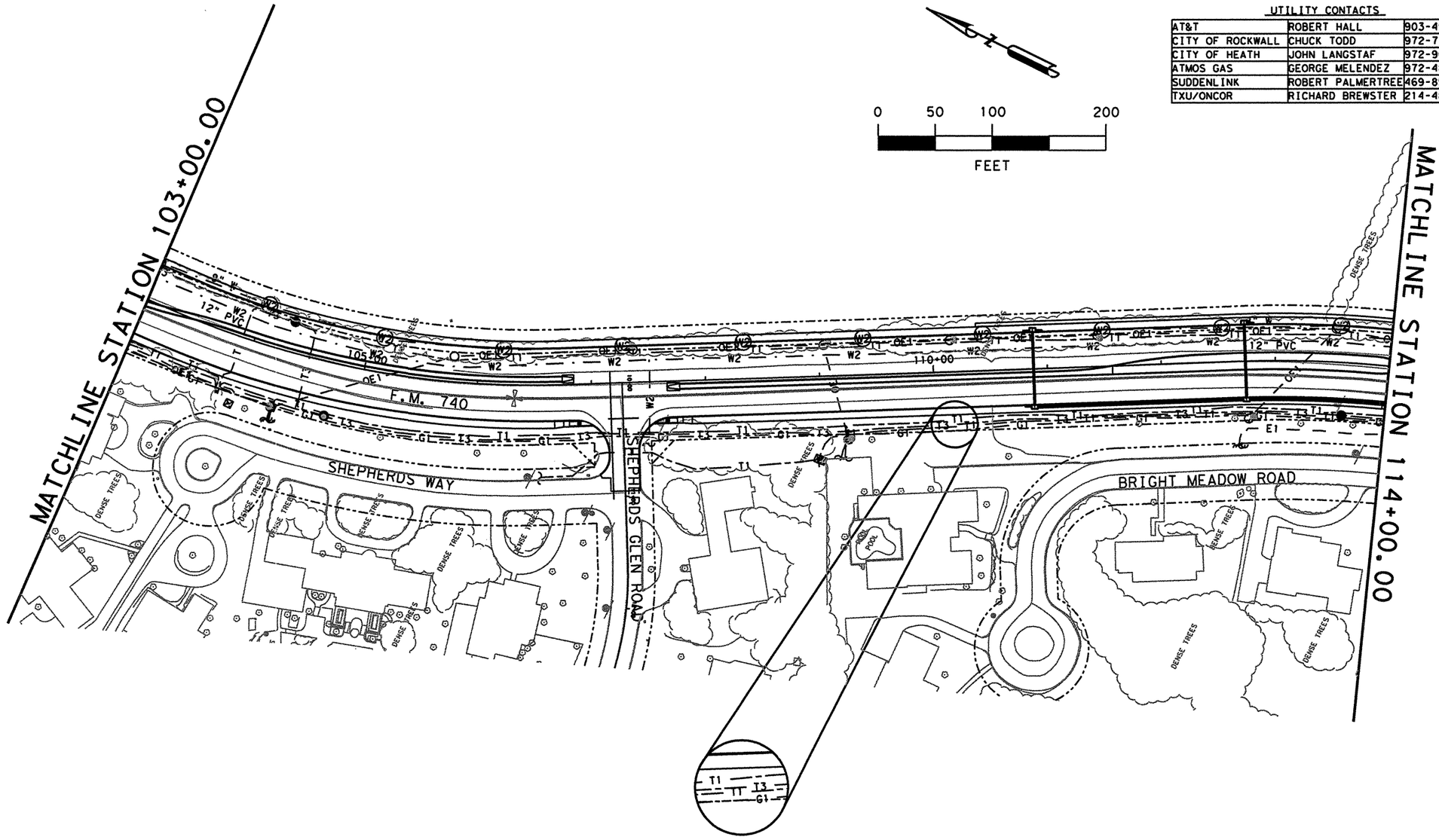
SHEET 08 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	284

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL



UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

- AT&T — T1
- AT&T (DUCT) — T2
- AT&T (FOC) — T3
- COMM OWNER 4 — T4
- COMM OWNER 5 — T5
- COMM OWNER 6 — T6
- COMM OWNER 7 — T7
- COMM OWNER 8 — T8

WATER

- CITY OF ROCKWALL — W1
- CITY OF HEATH — W2
- WATER OWNER 3 — W3
- WATER OWNER 4 — W4
- WATER OWNER 5 — W5
- WATER OWNER 6 — W6

PETROLEUM AND GAS

- ATMOS GAS — G1
- GAS OWNER 2 — G2
- GAS OWNER 3 — G3

WASTE WATER

- CITY OF ROCKWALL — WW1
- CITY OF HEATH — WW2
- WW OWNER 3 — WW3
- WW OWNER 4 — WW4

STORM DRAIN

- CITY OF ROCKWALL — SD1
- STORM DRAIN OWNER 2 — SD2

TV CABLE

- SUDDENLINK — C1
- CATV OWNER 2 — C2

ELECTRIC

- TXU/ONCOR — E1
- CITY OF ROCKWALL — E2
- ELECTRIC OWNER 3 — E3
- ELECTRIC OWNER 4 — E4
- ELECTRIC OWNER 5 — E5
- ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES

ABANDONED UTILITIES

A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.

AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

- TELEPHONE CABINET
- TELEPHONE PEDESTAL
- TELEPHONE HANDHOLE (VAULT)
- TELEPHONE ENCLOSURE
- TELEPHONE MANHOLE
- FIBER HANDHOLE
- TELEPHONE POLE
- TELEPHONE POLE W/ RISER

WATER

- WATER VALVE
- WATER METER
- WATER MANHOLE
- FIRE HYDRANT
- WATER REDUCER

PETROLEUM AND GAS

- GAS VENT PIPE (GAS RISER)
- GAS VALVE
- GAS METER

WASTE WATER

- WASTE WATER MANHOLE
- WASTE WATER CLEANOUT
- FORCE MAIN MANHOLE

TV CABLE

- CABLE PEDESTAL
- CABLE CABINET
- CABLE HANDHOLE
- CABLE POLE
- CABLE POLE W/ RISER

ELECTRIC

- LIGHT POLE
- ELECTRIC JUNCTION BOX (CABINET)
- ELECTRIC POLE
- ELECTRIC POLE W/ RISER
- TRANSMISSION POLE
- ELECTRIC HANDHOLE
- ELECTRIC MANHOLE

MISCELLANEOUS

- TEST HOLE
- END CAP
- CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 103+00 TO STA. 114+00

SHEET 09 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09
G&A PROJECT NUMBER	SHEET NAME		DATE
0901-3495Q	SUE		04/24/09
CSJ NUMBER	SHEET NO		
1014-03-039	285		
STATE	DISTRICT	COUNTY	
TX	DAL	ROCKWALL	

NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 6,975 FEET
QUALITY LEVEL "C" SUE - 0 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5.20.09

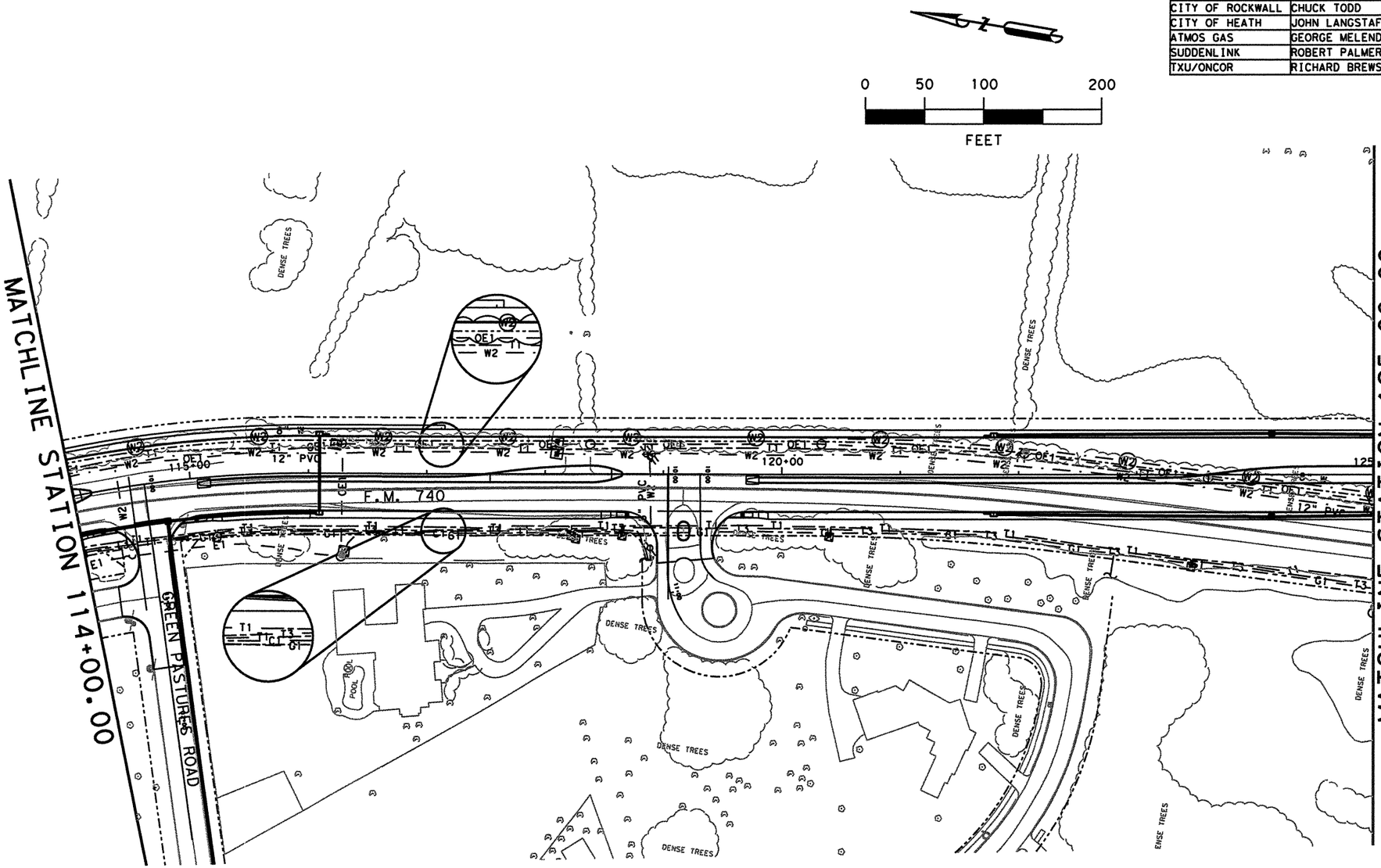
Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 6,737 FEET
QUALITY LEVEL "C" SUE - 0 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 114+00 TO STA. 125+00

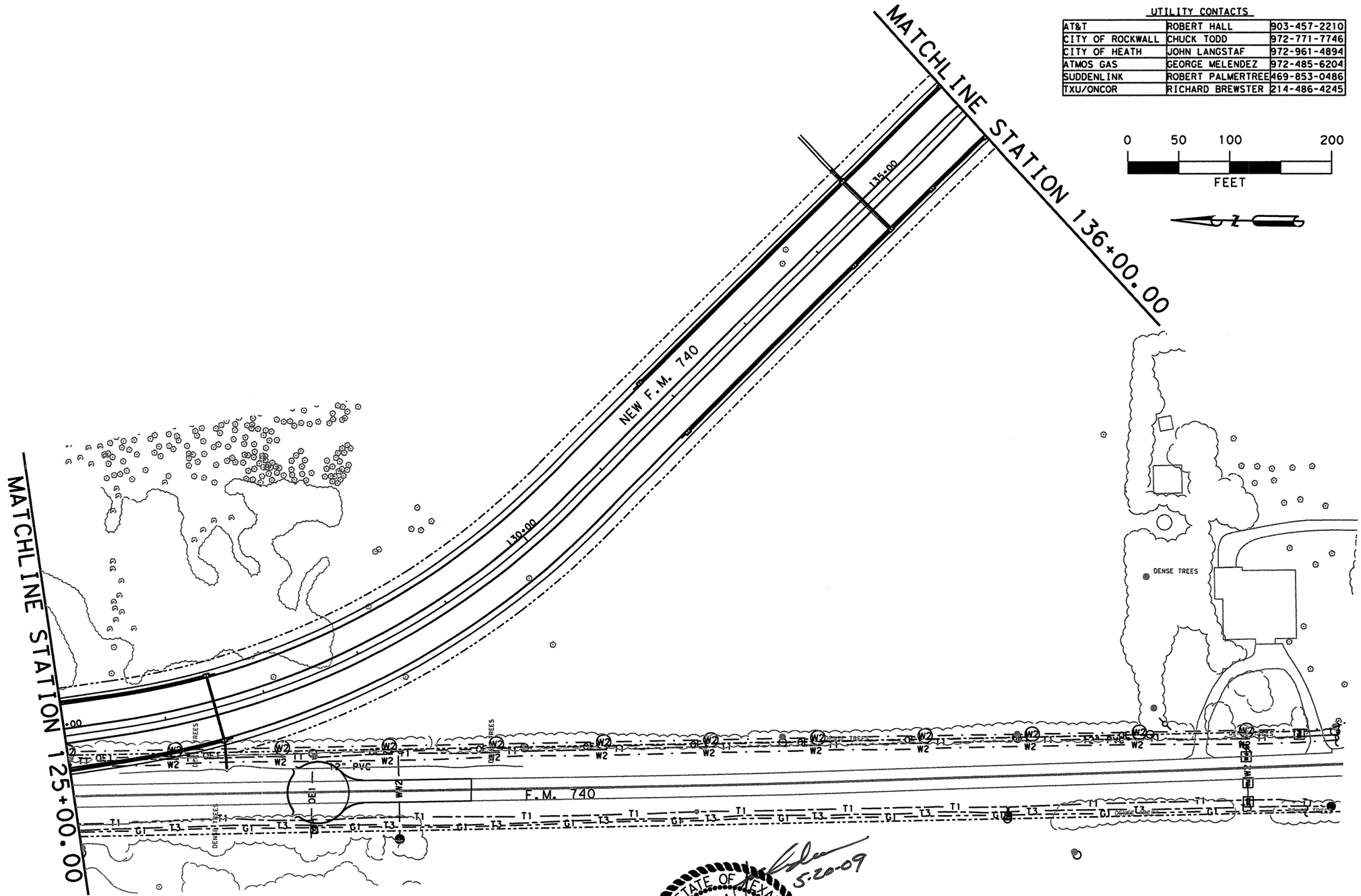
SHEET 10 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JSV	DATE:	04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	286

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL



UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS

AT&T T1
AT&T (DUCT) T2
AT&T (FOC) T3
COMM OWNER 4 T4
COMM OWNER 5 T5
COMM OWNER 6 T6
COMM OWNER 7 T7
COMM OWNER 8 T8

WATER

CITY OF ROCKWALL W1
CITY OF HEATH W2
WATER OWNER 3 W3
WATER OWNER 4 W4
WATER OWNER 5 W5
WATER OWNER 6 W6

PETROLEUM AND GAS

ATMOS GAS G1
GAS OWNER 2 G2
GAS OWNER 3 G3

WASTE WATER

CITY OF ROCKWALL WW1
CITY OF HEATH WW2
WW OWNER 3 WW3
WW OWNER 4 WW4

STORM DRAIN

CITY OF ROCKWALL SD1
STORM DRAIN OWNER 2 SD2

TV CABLE

SUDDENLINK C1
CATV OWNER 2 C2

ELECTRIC

TXU/ONCOR E1
CITY OF ROCKWALL E2
ELECTRIC OWNER 3 E3
ELECTRIC OWNER 4 E4
ELECTRIC OWNER 5 E5
ELECTRIC OWNER 6 E6

PROPOSED UTILITIES
ABANDONED UTILITIES

A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.

AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET

STA. 125+00 TO STA. 136+00

SHEET 11 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09
G&A PROJECT NUMBER	SHEET NAME		DATE
0901-3495Q	SUE		04/24/09
CSJ NUMBER	SHEET NO		
1014-03-039	287		
STATE	DISTRICT	COUNTY	
TX	DAL	ROCKWALL	

NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 6,307 FEET
QUALITY LEVEL "C" SUE - 0 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

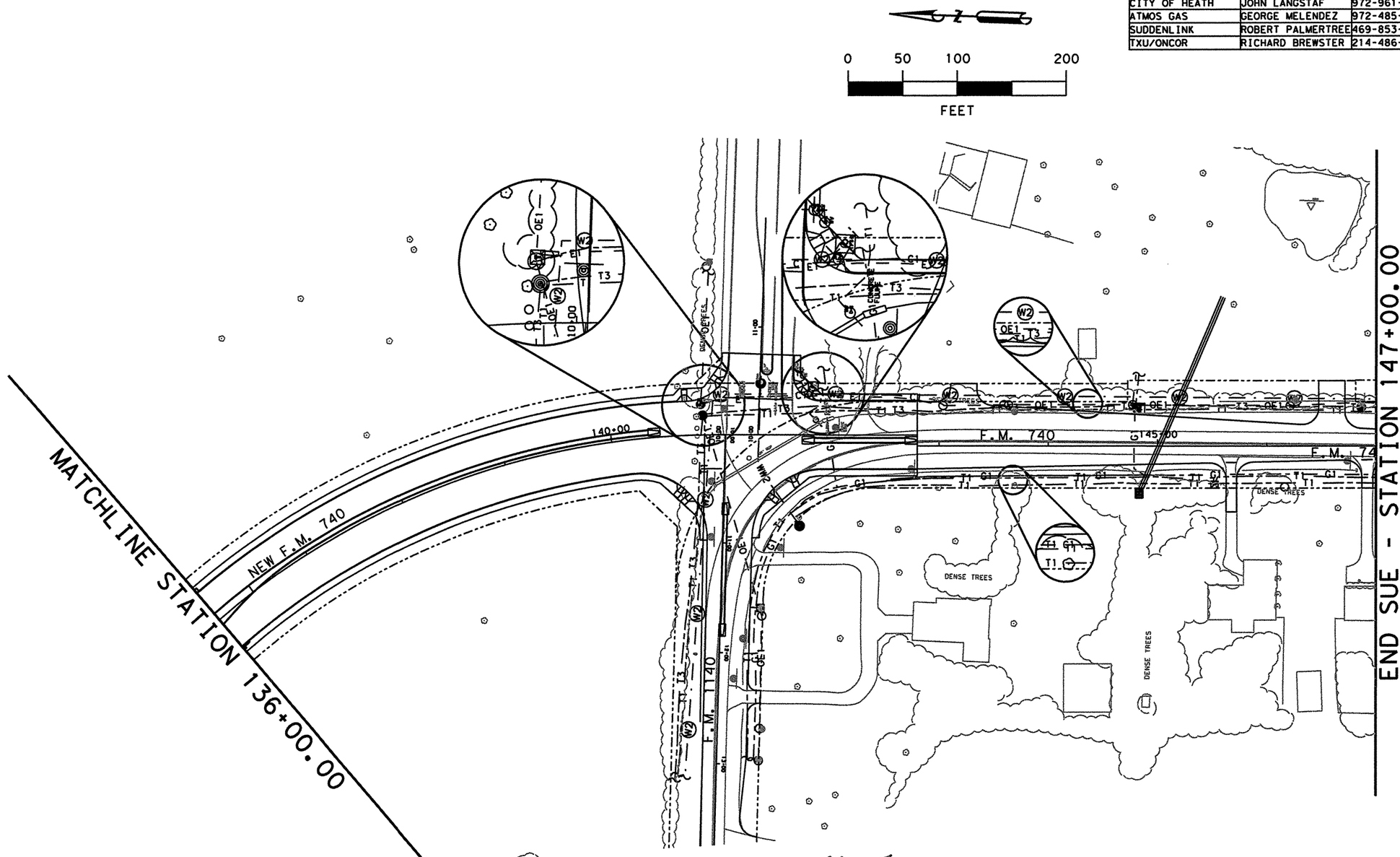
Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 5,390 FEET
QUALITY LEVEL "C" SUE - 1,080 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-20-09

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND
COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND
COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
500 FT NORTH OF FM 3097 TO WILLOW SPRINGS ROAD

S.U.E. PLAN SHEET
STA. 136+00 TO STA. 147+00

SHEET 12 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE: 04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE: 04/27/09

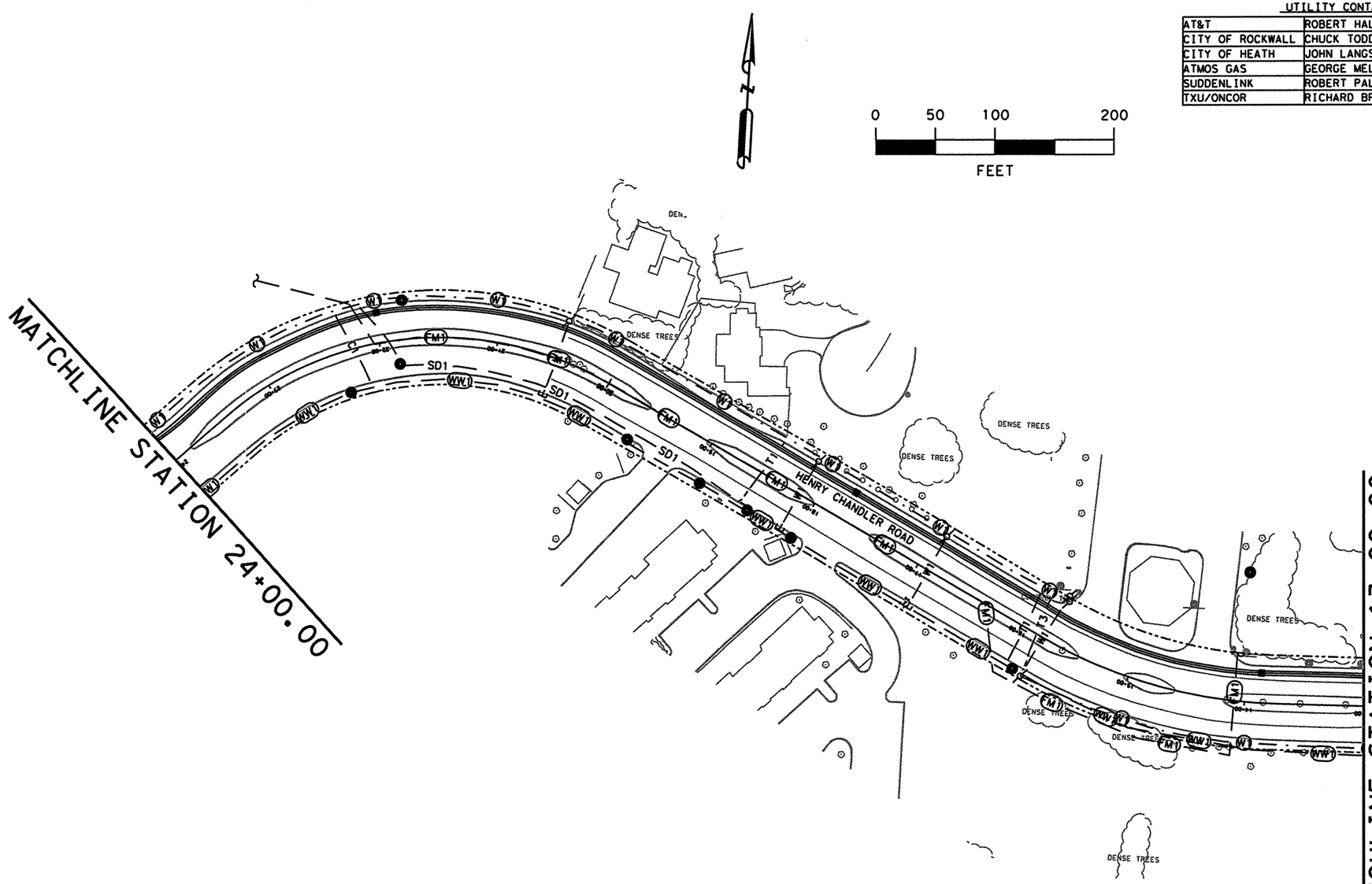
G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	280

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 895 FEET
QUALITY LEVEL "C" SUE - 1,930 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-2009

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND

COMMUNICATIONS
AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER
CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS
ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER
CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN
CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE
SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC
TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND

COMMUNICATIONS
TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER
WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS
GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER
WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE
CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC
LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS
TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
HENRY CHANDLER ROAD

S.U.E. PLAN SHEET
STA. 13+00 TO STA. 24+00

SHEET 13 OF 14

DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JKV	DATE:	04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	289

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL

UTILITY CONTACTS

AT&T	ROBERT HALL	903-457-2210
CITY OF ROCKWALL	CHUCK TODD	972-771-7746
CITY OF HEATH	JOHN LANGSTAF	972-961-4894
ATMOS GAS	GEORGE MELENDEZ	972-485-6204
SUDDENLINK	ROBERT PALMERTREE	469-853-0486
TXU/ONCOR	RICHARD BREWSTER	214-486-4245

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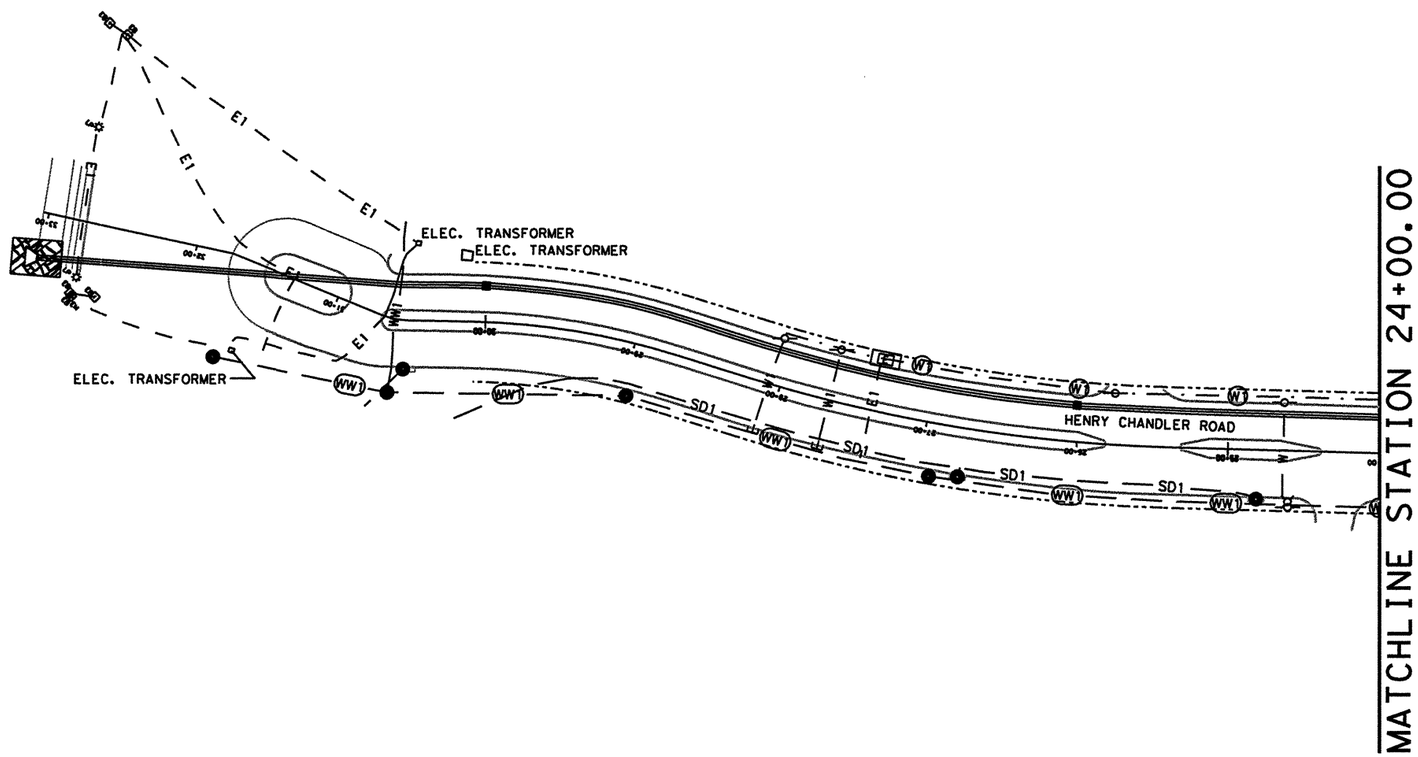
FEET



NOTES:

1. WHERE INDICATED, UTILITY SIZES WERE OBTAINED FROM RECORDS.

SUE QUANTITY SUMMARY

QUALITY LEVEL "B" SUE - 1,721 FEET
QUALITY LEVEL "C" SUE - 1,176 FEET

STATE OF TEXAS
J. S. ANDERSON
69493
REGISTERED PROFESSIONAL ENGINEER
5-2009

Gorrondona & Associates, Inc.
Texas Registered Engineering Firm F-7933

SUBSURFACE UTILITY ENGINEERING (SUE) CERTIFICATION:

THE ENGINEER'S SEAL HEREON IS TO CERTIFY THAT THE UTILITIES SHOWN HAVE BEEN INVESTIGATED IN ACCORDANCE WITH STANDARD SUE INDUSTRY PRACTICES. ALL OTHER INFORMATION HEREON HAS BEEN PROVIDED BY OTHERS AND IS NOT A PART OF THIS CERTIFICATION.

REV	DATE	BY	DESCRIPTION

UTILITIES LEGEND
COMMUNICATIONS

AT&T — T1
AT&T (DUCT) — T2
AT&T (FOC) — T3
COMM OWNER 4 — T4
COMM OWNER 5 — T5
COMM OWNER 6 — T6
COMM OWNER 7 — T7
COMM OWNER 8 — T8

WATER

CITY OF ROCKWALL — W1
CITY OF HEATH — W2
WATER OWNER 3 — W3
WATER OWNER 4 — W4
WATER OWNER 5 — W5
WATER OWNER 6 — W6

PETROLEUM AND GAS

ATMOS GAS — G1
GAS OWNER 2 — G2
GAS OWNER 3 — G3

WASTE WATER

CITY OF ROCKWALL — WW1
CITY OF HEATH — WW2
WW OWNER 3 — WW3
WW OWNER 4 — WW4

STORM DRAIN

CITY OF ROCKWALL — SD1
STORM DRAIN OWNER 2 — SD2

TV CABLE

SUDDENLINK — C1
CATV OWNER 2 — C2

ELECTRIC

TXU/ONCOR — E1
CITY OF ROCKWALL — E2
ELECTRIC OWNER 3 — E3
ELECTRIC OWNER 4 — E4
ELECTRIC OWNER 5 — E5
ELECTRIC OWNER 6 — E6

PROPOSED UTILITIES
ABANDONED UTILITIES
A CIRCLE AROUND THE SYMBOL DESIGNATES LEVEL C & D.
AN "O" IN FRONT OF THE SYMBOL DESIGNATES AN OVERHEAD UTILITY.

SYMBOL LEGEND
COMMUNICATIONS

TELEPHONE CABINET
TELEPHONE PEDESTAL
TELEPHONE HANDHOLE (VAULT)
TELEPHONE ENCLOSURE
TELEPHONE MANHOLE
FIBER HANDHOLE
TELEPHONE POLE
TELEPHONE POLE W/ RISER

WATER

WATER VALVE
WATER METER
WATER MANHOLE
FIRE HYDRANT
WATER REDUCER

PETROLEUM AND GAS

GAS VENT PIPE (GAS RISER)
GAS VALVE
GAS METER

WASTE WATER

WASTE WATER MANHOLE
WASTE WATER CLEANOUT
FORCE MAIN MANHOLE

TV CABLE

CABLE PEDESTAL
CABLE CABINET
CABLE HANDHOLE
CABLE POLE
CABLE POLE W/ RISER

ELECTRIC

LIGHT POLE
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC POLE
ELECTRIC POLE W/ RISER
TRANSMISSION POLE
ELECTRIC HANDHOLE
ELECTRIC MANHOLE

MISCELLANEOUS

TEST HOLE
END CAP
CONTINUATION

Gorrondona & Associates, Inc.
6707 BRENTWOOD STAIR RD, SUITE 50
FORT WORTH, TEXAS 76112

FM 740
HENRY CHANDLER ROAD

S.U.E. PLAN SHEET
STA. 24+00 TO END

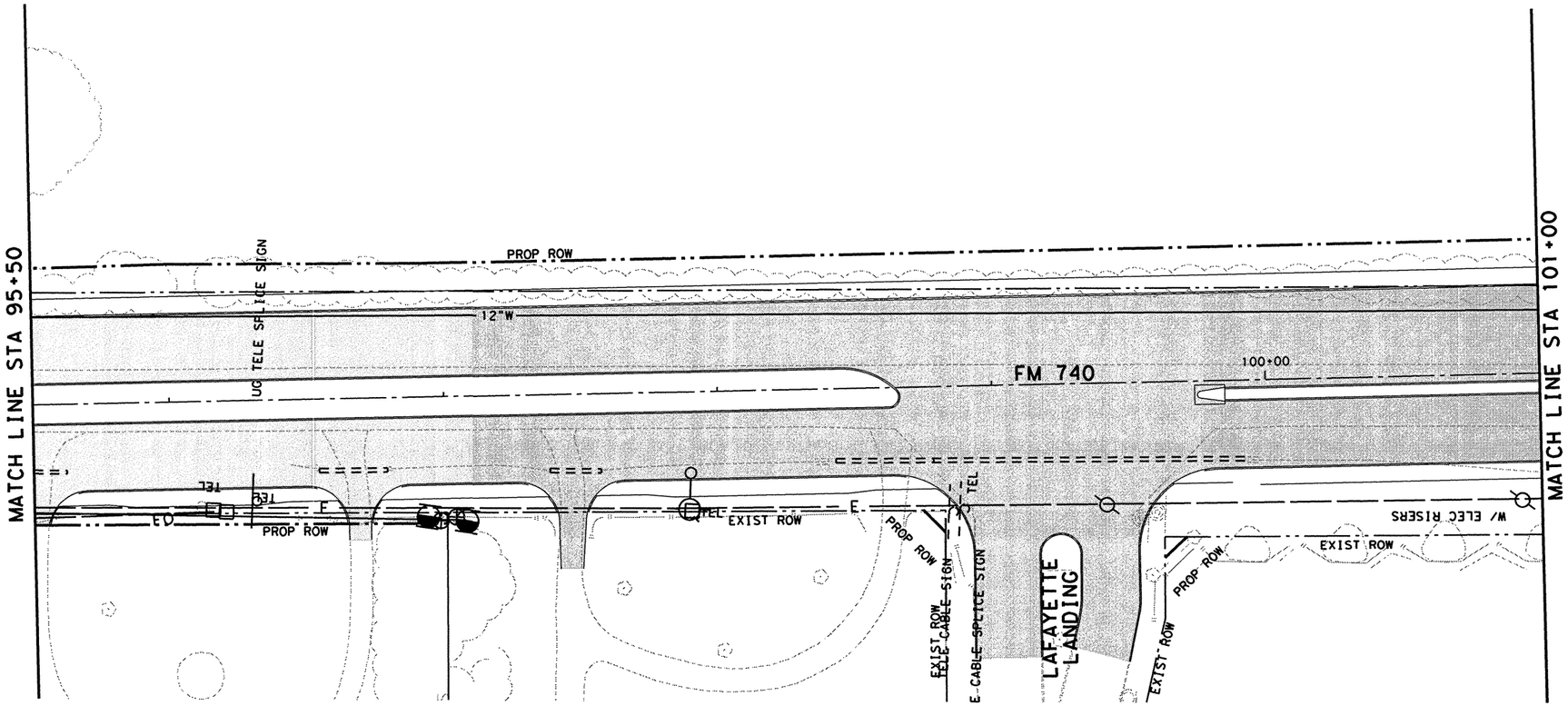
SHEET 14 OF 14

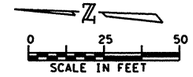
DESIGNED BY: JSA	CHECKED BY: PB	DATE:	04/24/09
APPROVED BY: JSA	CHECKED BY: JRV	DATE:	04/27/09

G&A PROJECT NUMBER	SHEET NAME	DATE
0901-3495Q	SUE	04/24/09

CSJ NUMBER	SHEET NO
1014-03-039	290

STATE	DISTRICT	COUNTY
TX	DAL	ROCKWALL





UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—— W ——	WATER	CITY OF ROCKWALL/HEATH
—— WW ——	WASTEWATER	CITY OF ROCKWALL/HEATH
—— G ——	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—— UT ——	TELEPHONE	SBC
—— FO ——	FIBER OPTIC	AT&T
—— UE ——	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— E ——	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— OT ——	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- TELEPHONE VAULT
- TELEPHONE POLE
- TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
- MONUMENT FOUND
- GAS METER
- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
- FLOODLIGHT
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- WATER VAULT
- SPRINKLER CTRL. VALVE
- SANITARY SEWER M.H.
- CLEAN OUT
- STORM DRAIN MANHOLE
- SIGN AND POLE
- UNDERG. FIBER-OPTIC MK.
- ELECTRIC RISER
- ELECTRIC METER
- POWER POLE
- ELECTRIC MANHOLE
- PULL BOX
- ELECTRIC VAULT
- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
- UNDERG. ELECTRIC MKR.

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
EXISTING UTILITY COMPOSITE
STA 95+50 TO STA 101+00

SCALE: 1"=50' SHEET 15 OF 24

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	291
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

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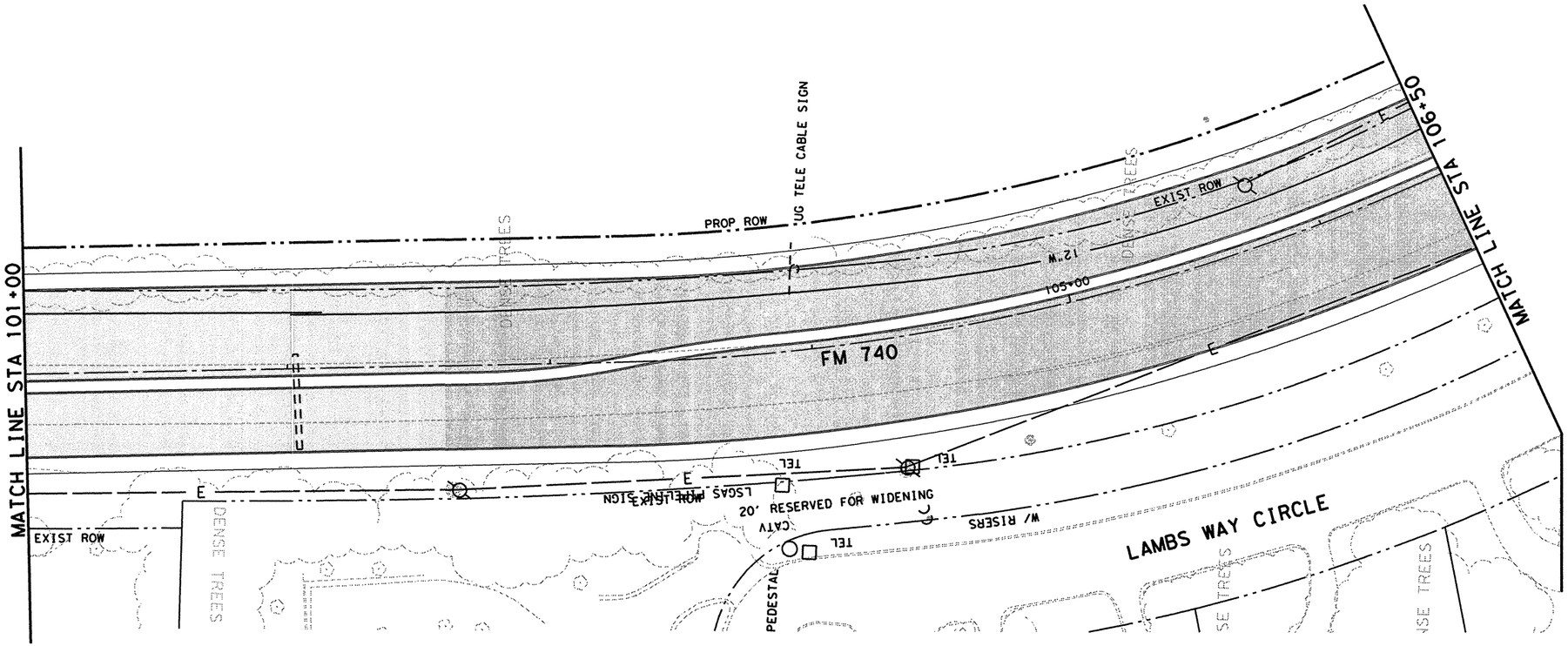

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0 25 50

SCALE IN FEET

UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—W—	WATER	CITY OF ROCKWALL/HEATH
—WW—	WASTEWATER	CITY OF ROCKWALL/HEATH
—G—	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—UT—	TELEPHONE	SBC
—FO—	FIBER OPTIC	AT&T
—UE—	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—E—	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—OT—	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

TELEPHONE VAULT		FIRE HYDRANT		ELECTRIC RISER	
TELEPHONE POLE		WATER METER		ELECTRIC METER	
TELEPHONE MANHOLE		WATER VALVE		POWER POLE	
UNDERGR. PHONE MARKER	W	WATER VAULT		ELECTRIC MANHOLE	
MONUMENT FOUND		SPRINKLER CTRL. VALVE		PULL BOX	
GAS METER		SANITARY SEWER M.H.		ELECTRIC VAULT	
GAS VALVE		CLEAN OUT		POWERPOLE W/LIGHT	
GAS MANHOLE		STORM DRAIN MANHOLE		LIGHT POST	
UNDERGR. GAS MARKER		SIGN AND POLE		TRAFFIC SIGNAL POLE	
FLOODLIGHT		UNDERG. FIBER-OPTIC MK.		UNDERG. ELECTRIC MKR.	

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED
PROFESSIONAL ENGINEER
4-15-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

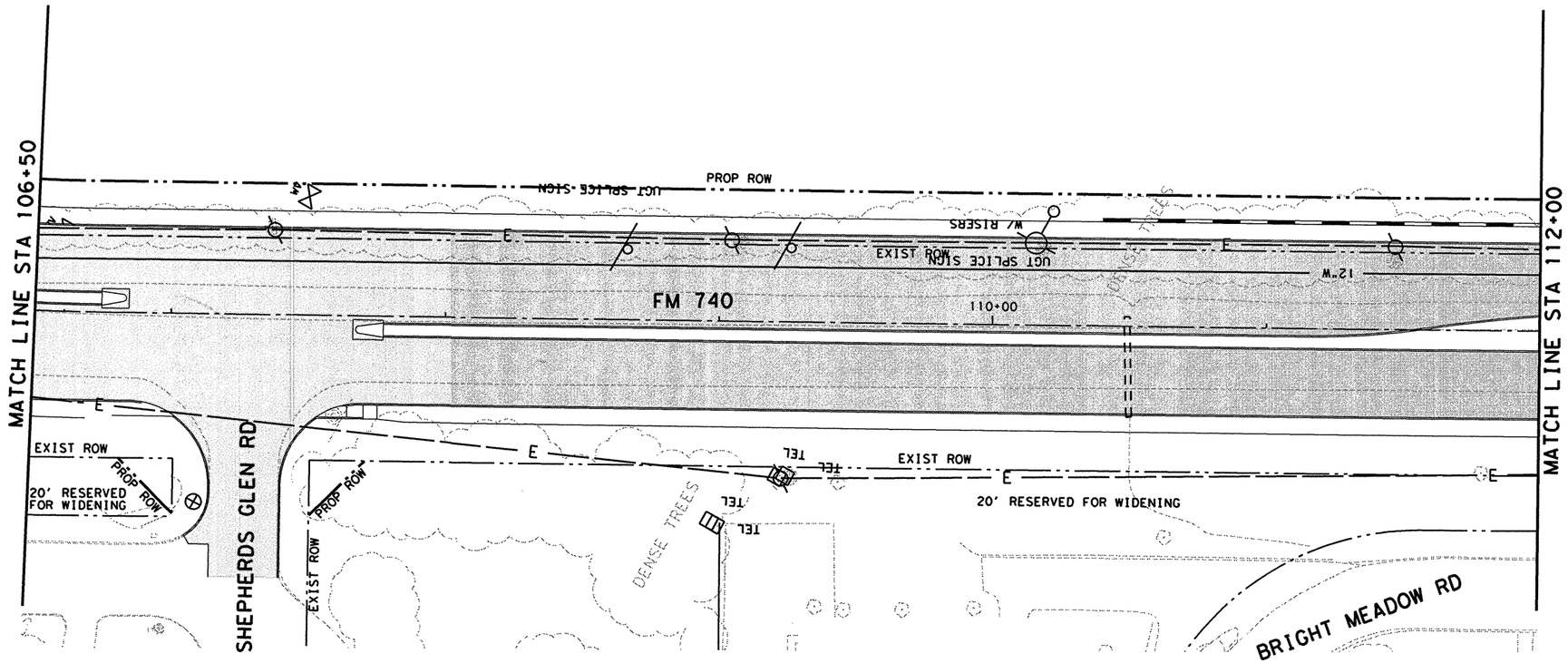
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
EXISTING UTILITY COMPOSITE
STA 101+00 TO STA 106+50

SCALE: 1"=50' SHEET 16 OF 24

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	292
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	



0 25 50
SCALE IN FEET

UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—— W ——	WATER	CITY OF ROCKWALL/HEATH
—— WW ——	WASTEWATER	CITY OF ROCKWALL/HEATH
—— G ——	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—— UT ——	TELEPHONE	SBC
—— FO ——	FIBER OPTIC	AT&T
—— UE ——	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— E ——	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— OT ——	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- TELEPHONE VAULT
- TELEPHONE POLE
- TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
- MONUMENT FOUND
- GAS METER
- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
- FLOODLIGHT
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- WATER VAULT
- SPRINKLER CTRL. VALVE
- SANITARY SEWER M.H.
- CLEAN OUT
- STORM DRAIN MANHOLE
- SIGN AND POLE
- UNDERG. FIBER-OPTIC MK.
- ELECTRIC RISER
- ELECTRIC METER
- POWER POLE
- ELECTRIC MANHOLE
- PULL BOX
- ELECTRIC VAULT
- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
- UNDERG. ELECTRIC MKR.

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
4-15-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
EXISTING UTILITY COMPOSITE
STA 106+50 TO STA 112+00

SCALE: 1"=50' SHEET 17 OF 24

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	293
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

jparas
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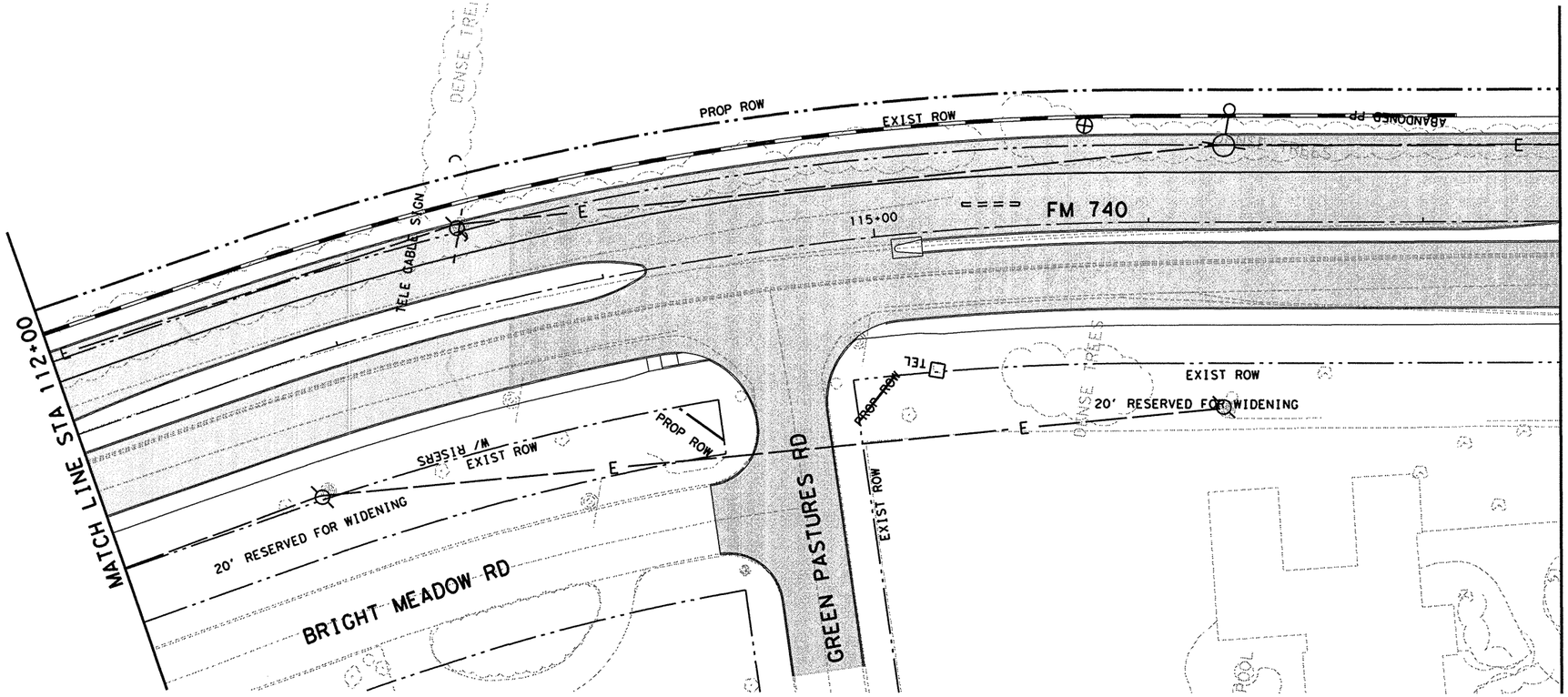


0 25 50
SCALE IN FEET

UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—W—	WATER	CITY OF ROCKWALL/HEATH
—WW—	WASTEWATER	CITY OF ROCKWALL/HEATH
—G—	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—UT—	TELEPHONE	SBC
—FO—	FIBER OPTIC	AT&T
—UE—	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—E—	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—OT—	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- T — TELEPHONE VAULT
- TELEPHONE POLE
- T — TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
- MONUMENT FOUND
- GAS METER
- GV — GAS VALVE
- G — GAS MANHOLE
- UNDERGR. GAS MARKER
- FLOODLIGHT
- FIRE HYDRANT
- WV — WATER METER
- WATER VALVE
- W — WATER VAULT
- SPRINKLER CTRL. VALVE
- S — SANITARY SEWER M.H.
- CO — CLEAN OUT
- D — STORM DRAIN MANHOLE
- SIGN AND POLE
- UNDERG. FIBER-OPTIC MK.
- D — ELECTRIC RISER
- ELECTRIC METER
- POWER POLE
- E — ELECTRIC MANHOLE
- PULL BOX
- E — ELECTRIC VAULT
- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
- UNDERG. ELECTRIC MKR.

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
4-6-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

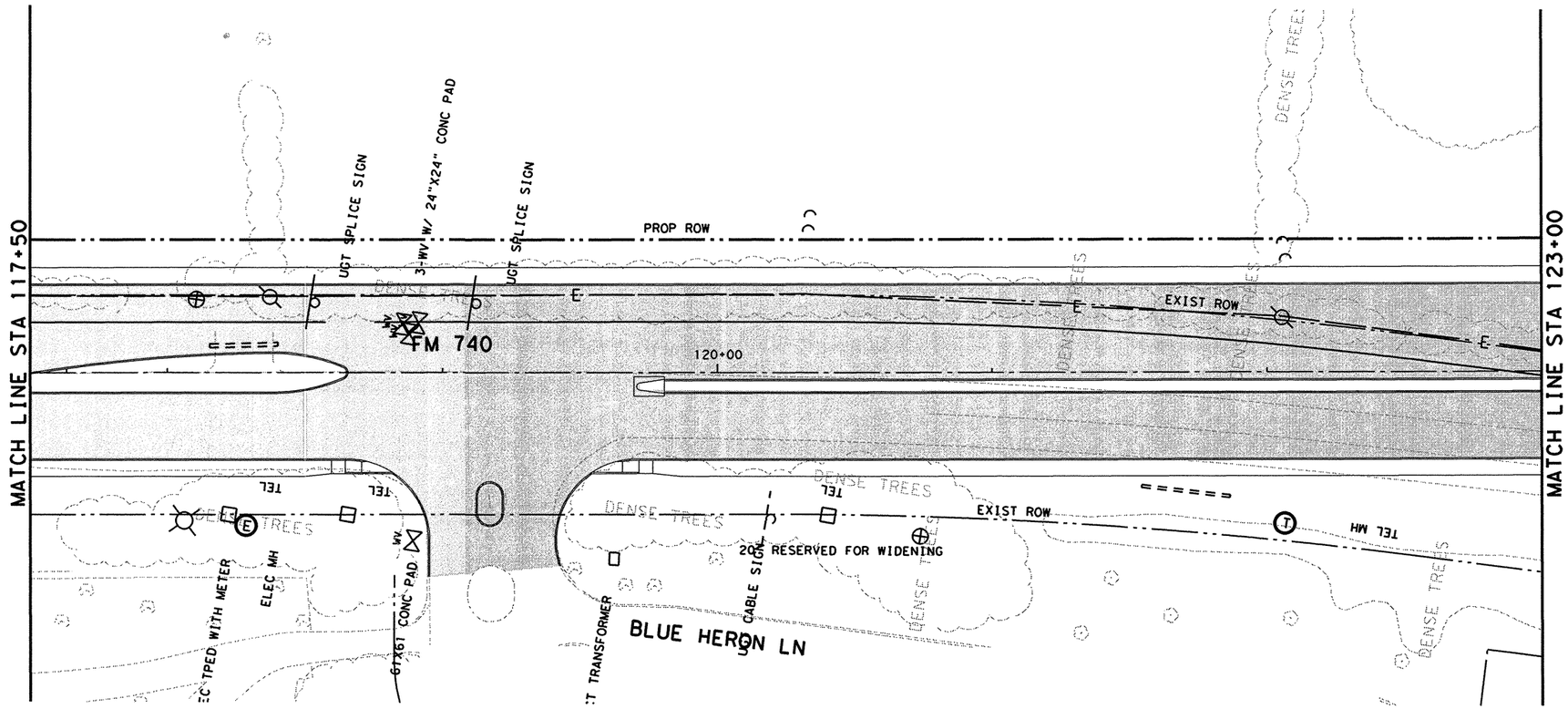
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

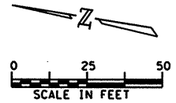
Texas Department of Transportation

FM 740
EXISTING UTILITY COMPOSITE
STA 112+00 TO STA 117+50

SCALE: 1"=50' SHEET 18 OF 24

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	294
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	





UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—— W ——	WATER	CITY OF ROCKWALL/HEATH
—— WW ——	WASTEWATER	CITY OF ROCKWALL/HEATH
—— G ——	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—— UT ——	TELEPHONE	SBC
—— FO ——	FIBER OPTIC	AT&T
—— UE ——	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— E ——	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— OT ——	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

TELEPHONE VAULT	FIRE HYDRANT	ELECTRIC RISER
TELEPHONE POLE	WATER METER	ELECTRIC METER
TELEPHONE MANHOLE	WATER VALVE	POWER POLE
UNDERGR. PHONE MARKER	WATER VAULT	ELECTRIC MANHOLE
MONUMENT FOUND	SPRINKLER CTRL. VALVE	PULL BOX
GAS METER	SANITARY SEWER M.H.	ELECTRIC VAULT
GAS VALVE	CLEAN OUT	POWERPOLE W/LIGHT
GAS MANHOLE	STORM DRAIN MANHOLE	LIGHT POST
UNDERGR. GAS MARKER	SIGN AND POLE	TRAFFIC SIGNAL POLE
FLOODLIGHT	UNDERG. FIBER-OPTIC MK.	UNDERG. ELECTRIC MKR.

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
4-15-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

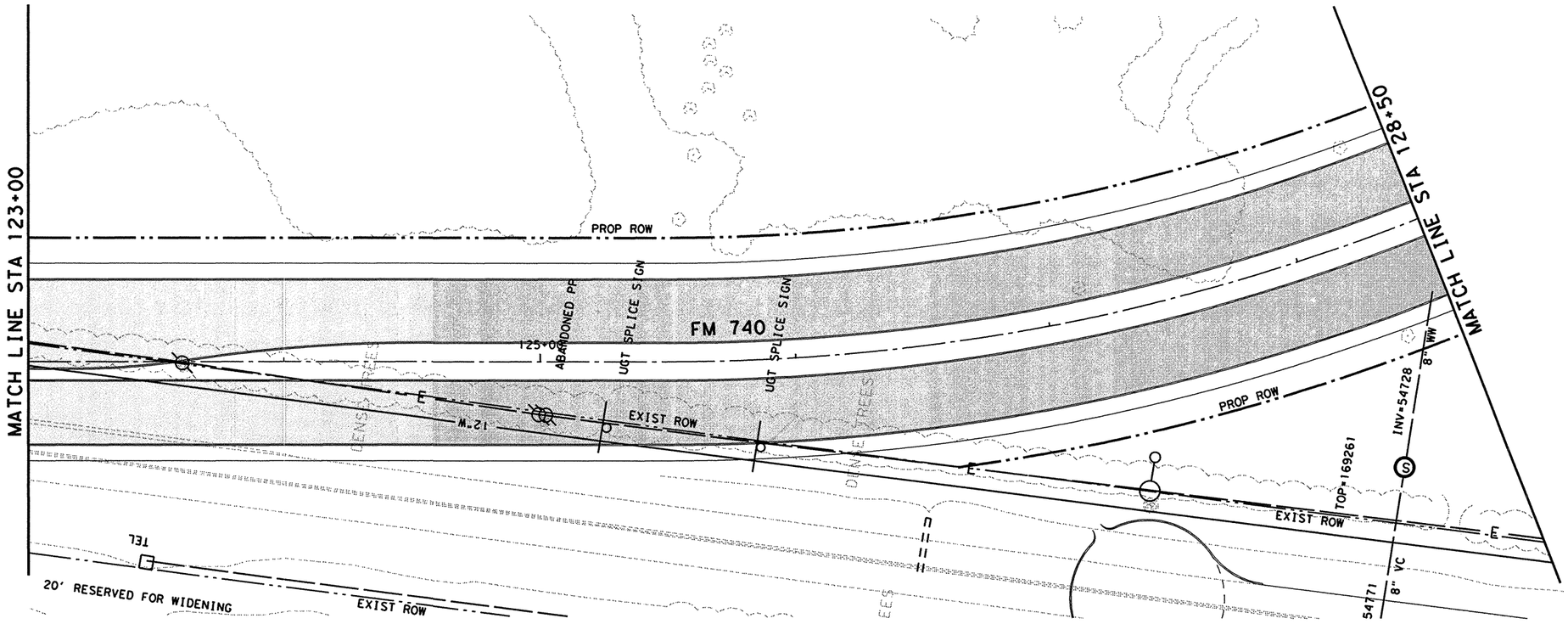
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
EXISTING UTILITY COMPOSITE
STA 117+50 TO STA 123+00

SCALE: 1"=50' SHEET 19 OF 24

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	295
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	



UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—— W ——	WATER	CITY OF ROCKWALL/HEATH
—— WW ——	WASTEWATER	CITY OF ROCKWALL/HEATH
—— G ——	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—— UT ——	TELEPHONE	SBC
—— FO ——	FIBER OPTIC	AT&T
—— UE ——	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— E ——	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— OT ——	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- TELEPHONE VAULT
- TELEPHONE POLE
- TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
- MONUMENT FOUND
- GAS METER
- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
- FLOODLIGHT
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- WATER VAULT
- SPRINKLER CTRL. VALVE
- SANITARY SEWER M.H.
- CLEAN OUT
- STORM DRAIN MANHOLE
- SIGN AND POLE
- UNDERG. FIBER-OPTIC MK.
- ELECTRIC RISER
- ELECTRIC METER
- POWER POLE
- ELECTRIC MANHOLE
- PULL BOX
- ELECTRIC VAULT
- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
- UNDERG. ELECTRIC MKR.

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
4-15-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

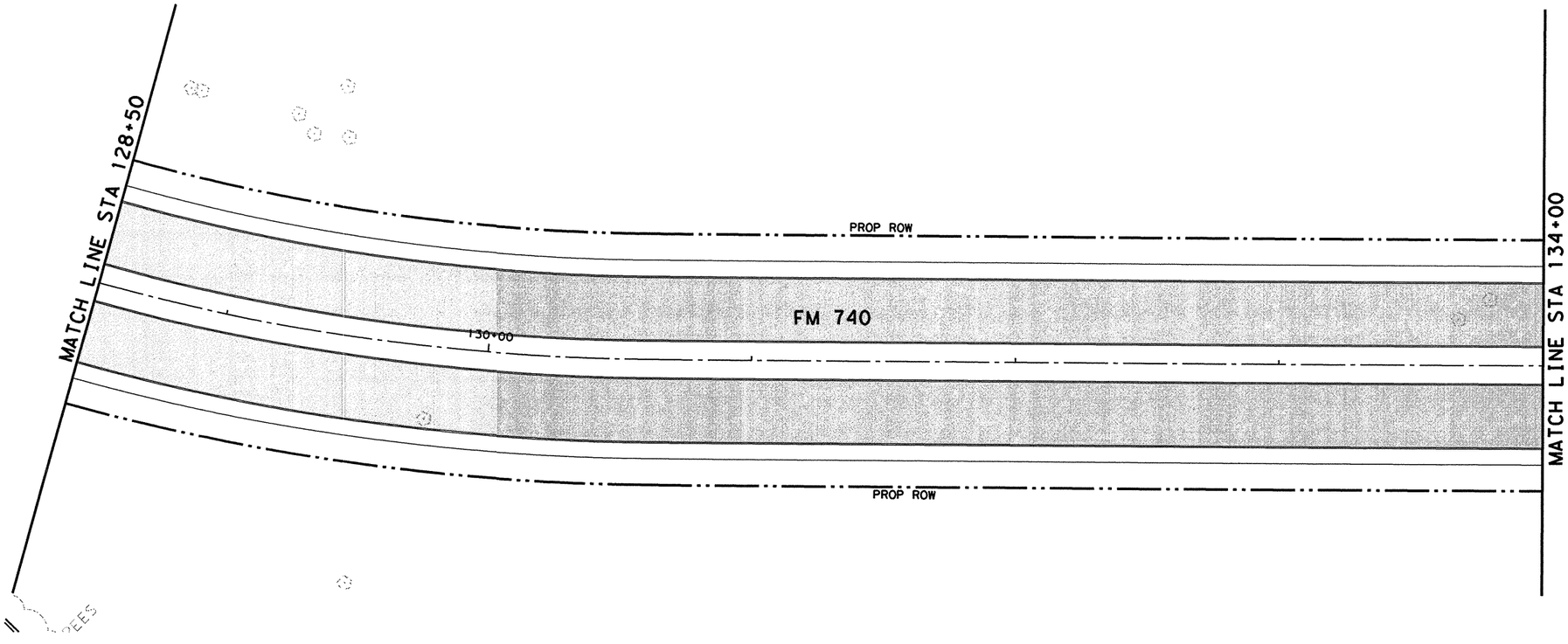
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
EXISTING UTILITY COMPOSITE
STA 123+00 TO STA 128+50

SCALE: 1"=50' SHEET 20 OF 24

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	296
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	



UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—— W ——	WATER	CITY OF ROCKWALL/HEATH
—— WW ——	WASTEWATER	CITY OF ROCKWALL/HEATH
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—— UT ——	TELEPHONE	SBC
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—— UE ——	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— E ——	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— OT ——	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- TELEPHONE VAULT
- TELEPHONE POLE
- TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
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- GAS METER
- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
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- SPRINKLER CTRL. VALVE
- SANITARY SEWER M.H.
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- POWER POLE
- ELECTRIC MANHOLE
- PULL BOX
- ELECTRIC VAULT
- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
- UNDERG. ELECTRIC MKR.

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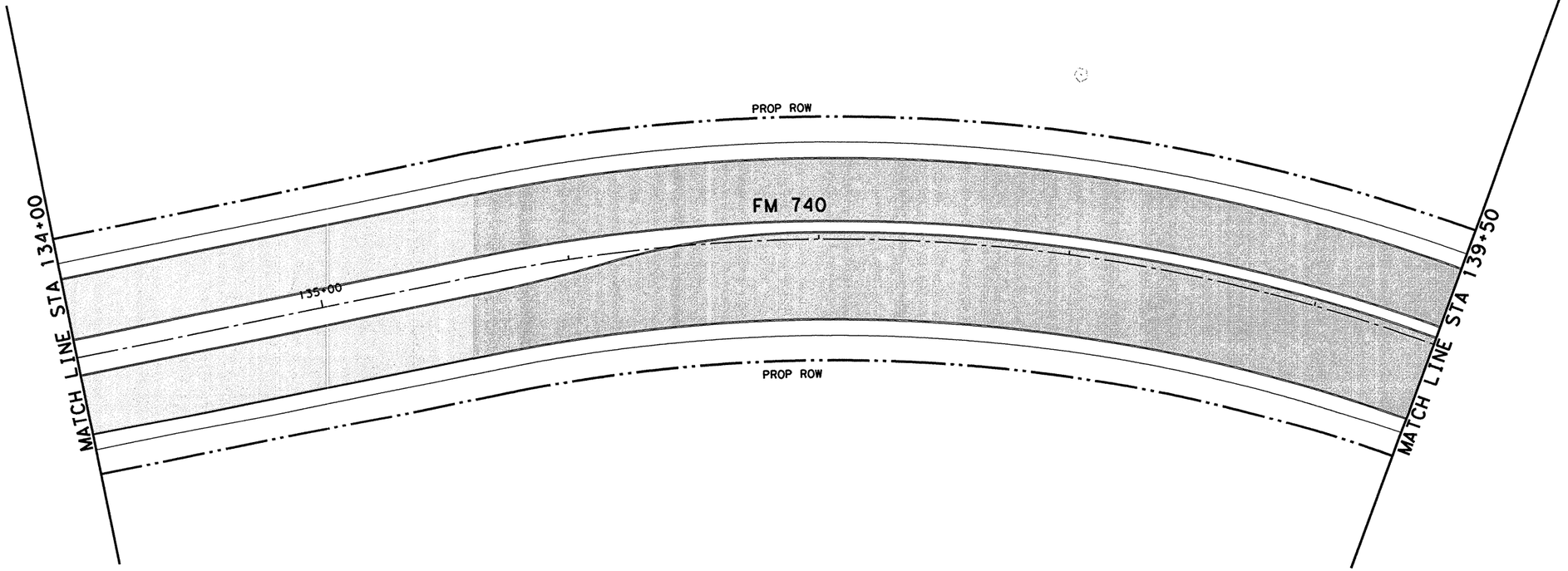
FM 740
EXISTING UTILITY COMPOSITE
STA 128+50 TO STA 134+00

SCALE: 1"=50' SHEET 21 OF 24

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	297
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	



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SCALE IN FEET

UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—— W ——	WATER	CITY OF ROCKWALL/HEATH
—— WW ——	WASTEWATER	CITY OF ROCKWALL/HEATH
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—— UT ——	TELEPHONE	SBC
—— FO ——	FIBER OPTIC	AT&T
—— UE ——	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— E ——	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—— OT ——	OVERHEAD TELEPHONE	SBC
—— SD ——	STORM DRAIN	

- TELEPHONE VAULT
- TELEPHONE POLE
- TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
- MONUMENT FOUND
- GAS METER
- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
- FLOODLIGHT
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- WATER VAULT
- SPRINKLER CTRL. VALVE
- SANITARY SEWER M.H.
- CLEAN OUT
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- ELECTRIC RISER
- ELECTRIC METER
- POWER POLE
- ELECTRIC MANHOLE
- PULL BOX
- ELECTRIC VAULT
- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
- UNDERG. ELECTRIC MKR.

STATE OF TEXAS
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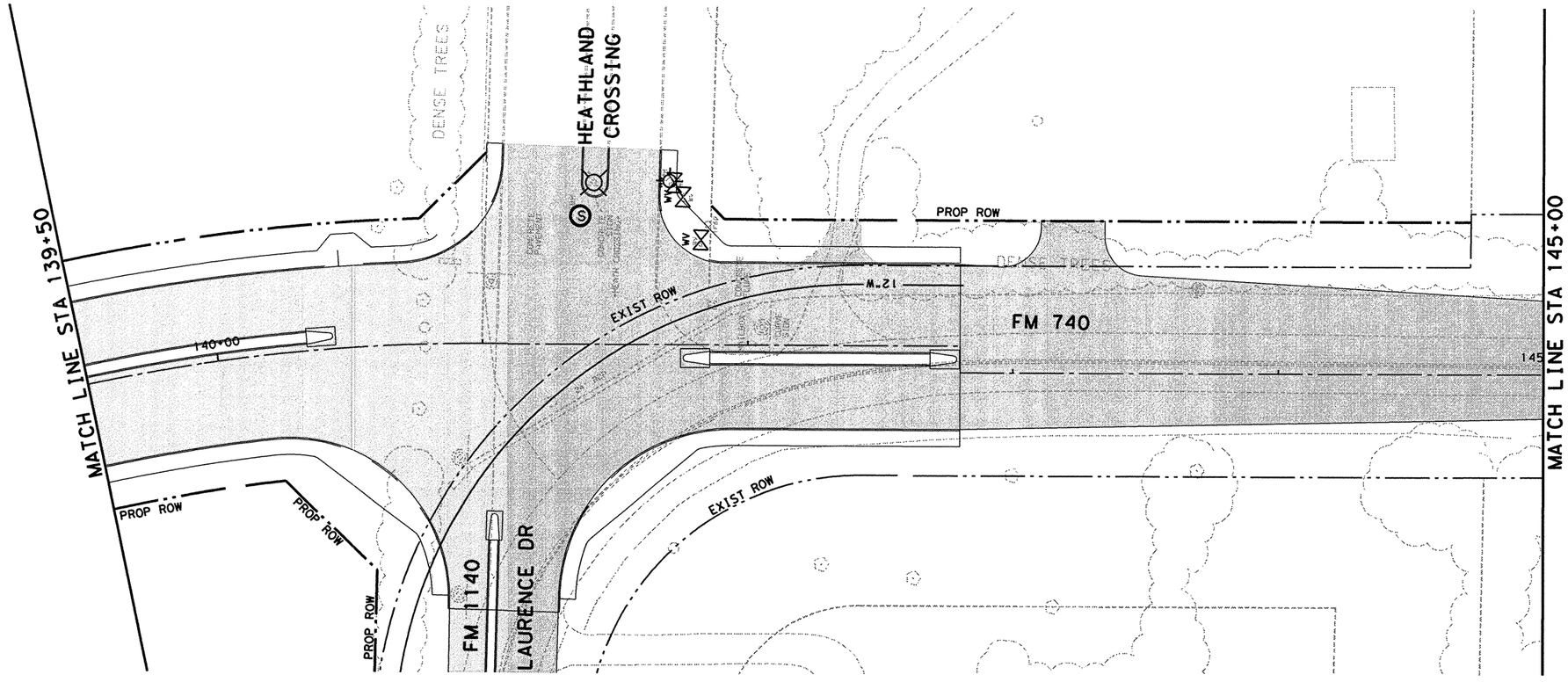
FM 740
EXISTING UTILITY COMPOSITE
STA 134+00 TO STA 139+50

SCALE: 1"=50' SHEET 22 OF 24

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	298
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	



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0 25 50
SCALE IN FEET

UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—W—	WATER	CITY OF ROCKWALL/HEATH
—WW—	WASTEWATER	CITY OF ROCKWALL/HEATH
—G—	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—UT—	TELEPHONE	SBC
—FO—	FIBER OPTIC	AT&T
—UE—	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—E—	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—OT—	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- TELEPHONE VAULT
- TELEPHONE POLE
- TELEPHONE MANHOLE
- UNDERGR. PHONE MARKER
- MONUMENT FOUND
- GAS METER
- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
- FLOODLIGHT
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- LIGHT POST
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Dallas, Texas 75204-2489

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FM 740
EXISTING UTILITY COMPOSITE
STA 139+50 TO STA 145+00

SCALE: 1"=50' SHEET 23 OF 24

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	299
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

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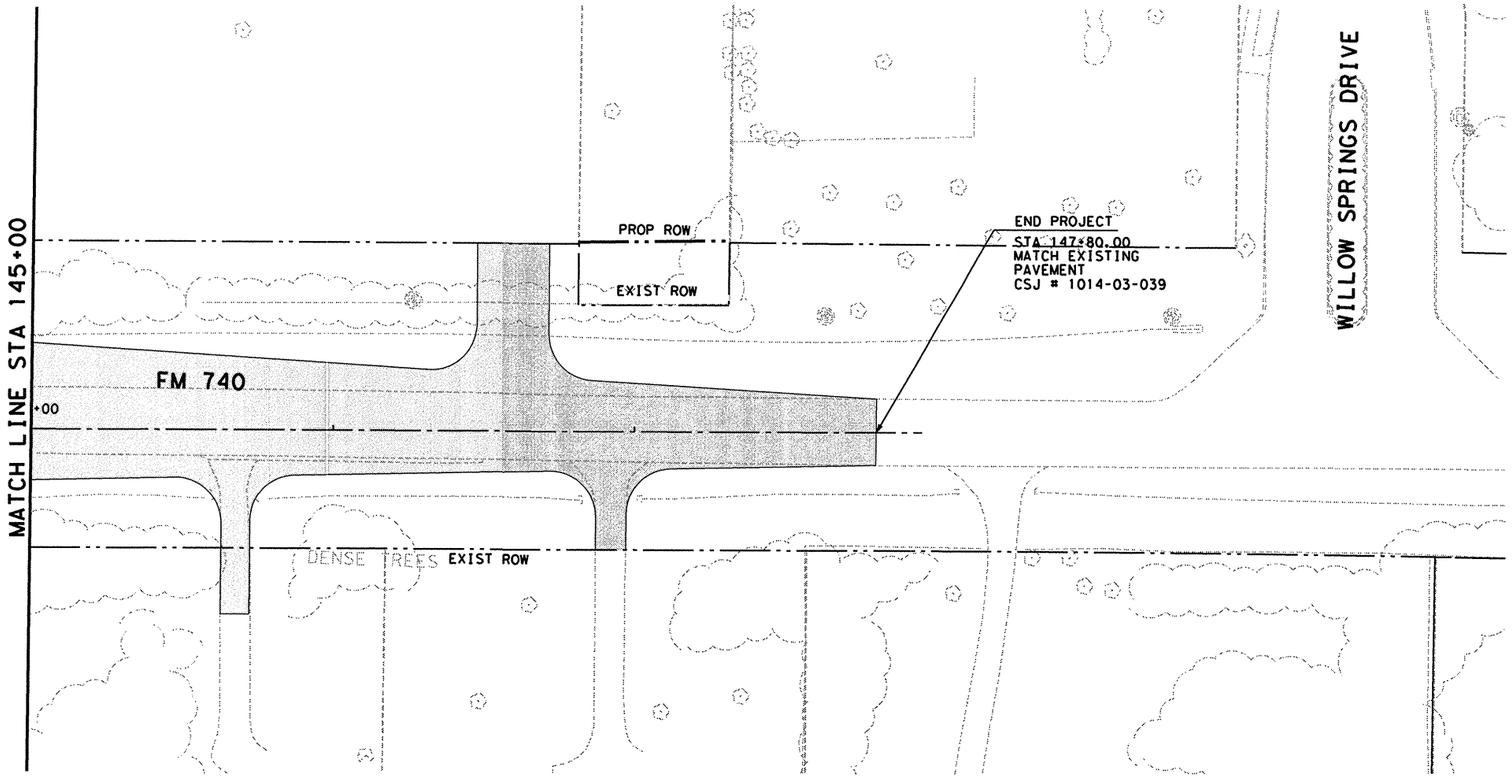

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SCALE IN FEET

UTILITIES LEGEND

SYMBOL	UTILITY TYPE	UTILITY COMPANY
—W—	WATER	CITY OF ROCKWALL/HEATH
—WW—	WASTEWATER	CITY OF ROCKWALL/HEATH
—G—	GAS/PETROLEUM	TXU ELECTRIC & GAS (LONE STAR PIPELINE)
—UT—	TELEPHONE	SBC
—FO—	FIBER OPTIC	AT&T
—UE—	ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
— E —	OVERHEAD ELECTRICAL	TXU ELECTRIC & GAS (TU ELECTRIC)
—OT—	OVERHEAD TELEPHONE	SBC
SD	STORM DRAIN	

- TELEPHONE VAULT
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- GAS VALVE
- GAS MANHOLE
- UNDERGR. GAS MARKER
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- FIRE HYDRANT
- WATER METER
- WATER VALVE
- WATER VAULT
- SPRINKLER CTRL. VALVE
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- ELECTRIC MANHOLE
- PULL BOX
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- POWERPOLE W/LIGHT
- LIGHT POST
- TRAFFIC SIGNAL POLE
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4-15-09

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Texas Department of Transportation

FM 740
EXISTING UTILITY COMPOSITE
STA 145+00 TO END OF PROJECT

SCALE: 1"=50' SHEET 24 OF 24

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	300
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

SUMMARY OF TRAFFIC SIGNAL FOUNDATION

LOCATION	416 DRILL SHAFT (TRF SIG POLE) (24 IN) *	416 DRILL SHAFT (30 IN)	416 DRILL SHAFT (TRF SIG POLE) (36 IN)	TRAFFIC SIGNAL CONTROLLER FOUNDATION **
	LF	LF	LF	CY
HENRY CHANDLER DR	12	10	39	1
SUMMER LEE DR			52	1
TOTAL	12	10	91	2

* SUBSIDIARY TO ITEM 687
** SUBSIDIARY TO ITEM 680

SUMMARY OF ILLUMINATION

LOCATION	610 INS RD IL AM (TY ST) 50S-8 (.4 KW)S *
	EA
HENRY CHANDLER DR	1
SUMMER LEE DR	
TOTAL	1

* REMOVE ARM AND DELIVER TO DALLAS DISTRICT SIGNAL SHOP

SUMMARY OF CONDUIT

LOCATION	618 CONDT (PVC) (SCHD 40) (3")	618 CONDT (PVC) (SCHD 40) (4")	618 CONDT (PVC) (SCHD 40) (4") BORE
	LF	LF	LF
HENRY CHANDLER DR	48	241	234
SUMMER LEE DR	43	83	207
TOTAL	91	324	441

SUMMARY OF ELECTRICAL CONDUCTORS

LOCATION	620 ELEC CONDR (NO. 6) BARE	620 ELEC CONDR (NO. 6) INSULATED	620 ELEC CONDR (NO. 8) INSULATED
	LF	LF	LF
HENRY CHANDLER DR	446	90	678
SUMMER LEE DR	310	46	650
TOTAL	756	136	1328

SUMMARY OF GROUND BOX

LOCATION	624 GROUND BOX TY C (162911) W/ APRON
	EA
HENRY CHANDLER DR	5
SUMMER LEE DR	4
TOTAL	9

SUMMARY OF ELECTRICAL SERVICES

LOCATION	628 ELEC SRV TY D 120/ 240 070 (NS) SS (E) GC (O)
	EA
HENRY CHANDLER DR	1
SUMMER LEE DR	1
TOTAL	2

SUMMARY OF INSTL HWY TRAFFIC SIGNAL

LOCATION	680 INSTALL HWY TRF SIG (ISOLATED)
	EA
HENRY CHANDLER DR	1
SUMMER LEE DR	1
TOTAL	2

SUMMARY OF TEMP TRAFFIC SIGNAL FOR CONSTRUCTION

LOCATION	681 TEMP TRAF SIGNALS
	EA
HENRY CHANDLER DR	1
SUMMER LEE DR	1
TOTAL	2

SUMMARY OF VEH SIG SEC

LOCATION	682 VEH SIG SEC (12 IN) LED (GRN ARW)	682 VEH SIG SEC (12 IN) LED (GRN)	682 VEH SIG SEC (12 IN) LED (YEL ARW)	682 VEH SIG SEC (12 IN) LED (YEL)	682 VEH SIG SEC (12 IN) LED (RED)	682 PED SIG SEC (12 IN) LED (2 INDICATIONS)	682 BACK PLATE (12 IN) (3 SEC)	682 BACK PLATE (12 IN) (5 SEC)
	EA	EA	EA	EA	EA	EA	EA	EA
HENRY CHANDLER DR	1	9	1	9	9	4	8	1
SUMMER LEE DR	3	10	3	10	10	8	7	3
TOTAL	4	19	4	19	19	12	15	4

SUMMARY OF TRAFFIC SIGNAL CABLE

LOCATION	684 TRF SIG CBL (TY A) (14 AWG) (5 CONDR)	684 TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	684 TRF SIG CABL (TY A) (14 AWG) (16 CONDR)	OPTICOM CABLE *
	LF	LF	LF	LF
HENRY CHANDLER DR	206	206	644	814
SUMMER LEE DR	232	232	599	831
TOTAL	438	438	1243	1645

* FOR CONTRACTOR INFORMATION ONLY

SUMMARY OF TRAFFIC POLE ASSEMBLY

LOCATION	686 INS TRF SIG PL AM (S) 1 ARM (36')	686 INS TRF SIG PL AM (S) 1 ARM (36') LUM	686 INS TRF SIG PL AM (S) 1 ARM (44') LUM
	EA	EA	EA
HENRY CHANDLER DR	1	1	1
SUMMER LEE DR	2		2
TOTAL	3	1	3

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER
Kelvin Kroeker, PE

HUITT-ZOLLARS
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Texas Department of Transportation

FM 740
TRAFFIC SIGNAL SUMMARY

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	301
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

SUMMARY OF PEDESTAL POLE ASSEMBLY

LOCATION	687 PED POLE ASSEMBLY
	EA
HENRY CHANDLER DR	2
SUMMER LEE DR	
TOTAL	2

SUMMARY OF TRAFFIC SIGNAL DETECTORS

LOCATION	688 PED DETECT (2 INCH PUSH BTN)
	EA
HENRY CHANDLER DR	4
SUMMER LEE DR	8
TOTAL	12

SUMMARY OF SPREAD SPECTRUM RADIO EQUIPMENT

LOCATION	6006 SPREAD SPECTRUM RADIO	6006 COAXIAL CABLE	6006 ANTENNA (UNI-DIRECTIONAL)
	EA	LF	EA
HENRY CHANDLER DR	1	94	1
SUMMER LEE DR	1	63	1
TOTAL	2	157	2

SUMMARY OF REMOVING TRAF SIGNALS

LOCATION	6007 REMOVING TRAFFIC SIGNALS
	EA
HENRY CHANDLER DR	1
SUMMER LEE DR	1
TOTAL	2

SUMMARY OF VIVDS

LOCATION	6266 VIVDS PROCESSOR SYSTEM	6266 VIVDS CAMERA ASSEMBLY	6266 VIVDS SET-UP SYSTEM	6266 VIVDS COMMUNICATION CABLE (COAXIAL)	6266 VIVDS TEMPORARY	6266 VIVDS CENTRAL CONTROL
	EA	EA	EA	LF	EA	EA
HENRY CHANDLER DR	1	5	1	1270	1	1
SUMMER LEE DR	1	6	1	1336	1	1
TOTAL	2	11	2	2606	2	2

5/26/09

STATE OF TEXAS
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Kelvin Kroeker, PE

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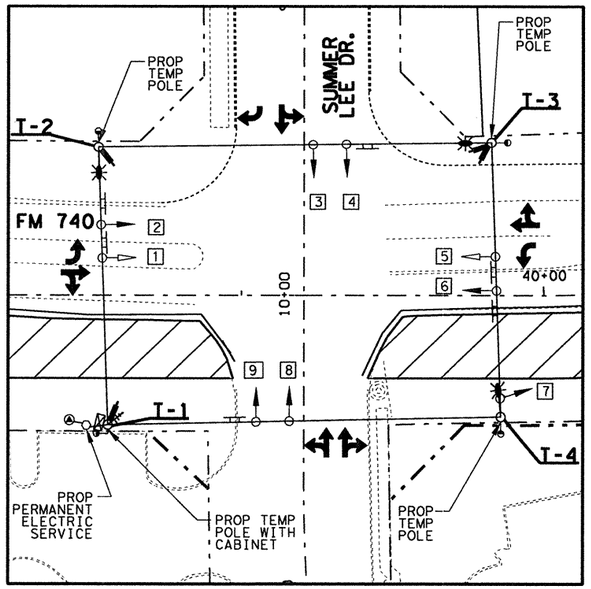
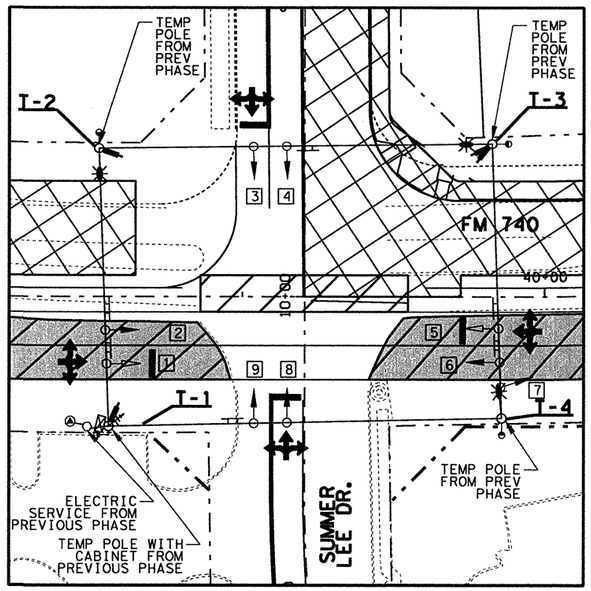
FM 740
TRAFFIC SIGNAL SUMMARY

SHEET 2 OF 2

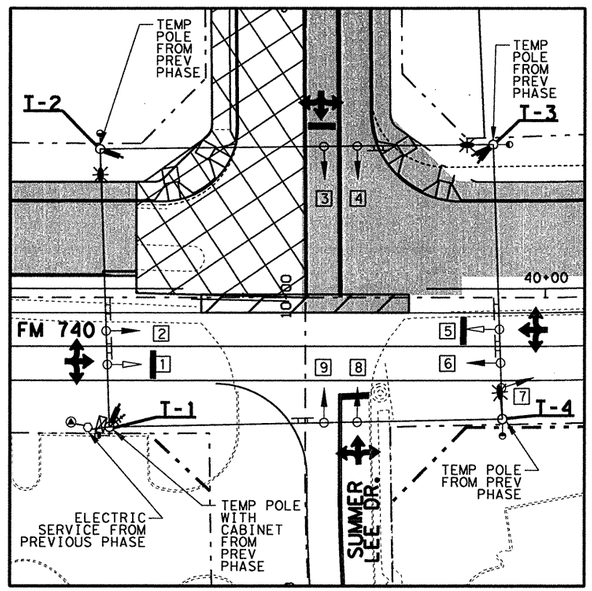
DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	302
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



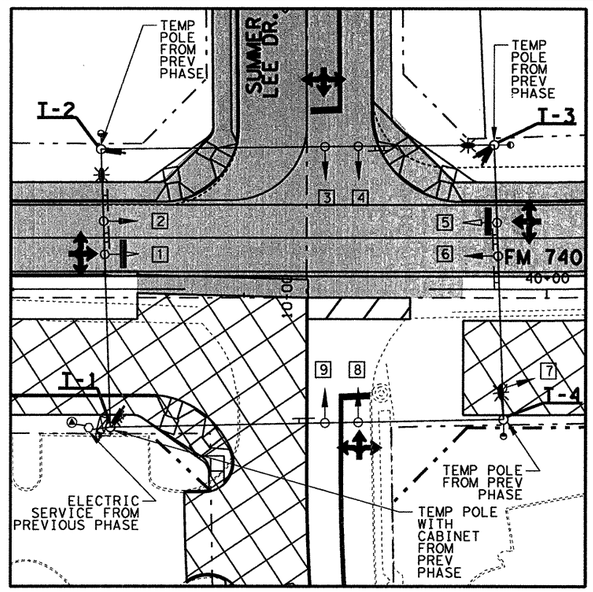
PHASE 1



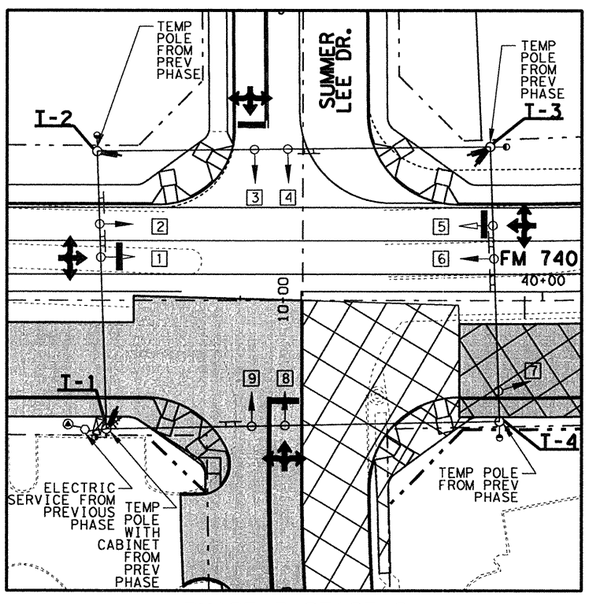
PHASE 2 STAGE 1



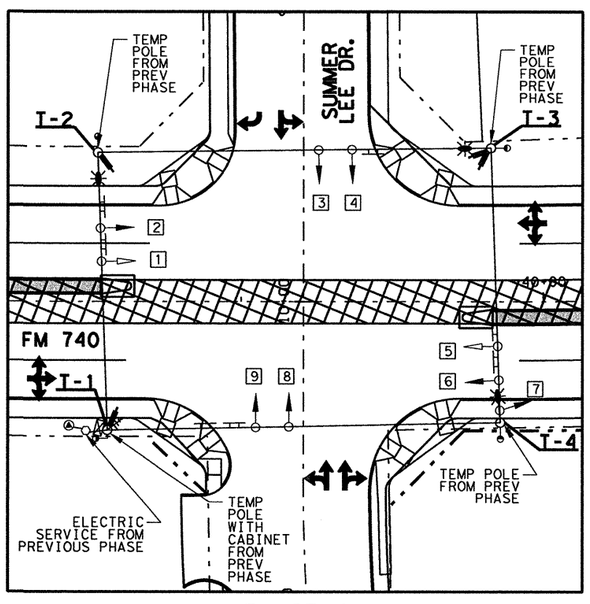
PHASE 2 STAGE 2



PHASE 3 STAGE 1



PHASE 3 STAGE 2



PHASE 4

LEGEND	
	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

0 25 50
SCALE IN FEET

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER
Kelvin J. Kroeker, P.E.

NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON THE TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. REFER TO TEMPORARY SIGNAL LAYOUT SHEETS FOR LUMINAIRES AND FURTHER DETAILS ON THE TEMPORARY SIGNS AND SIGNALS.

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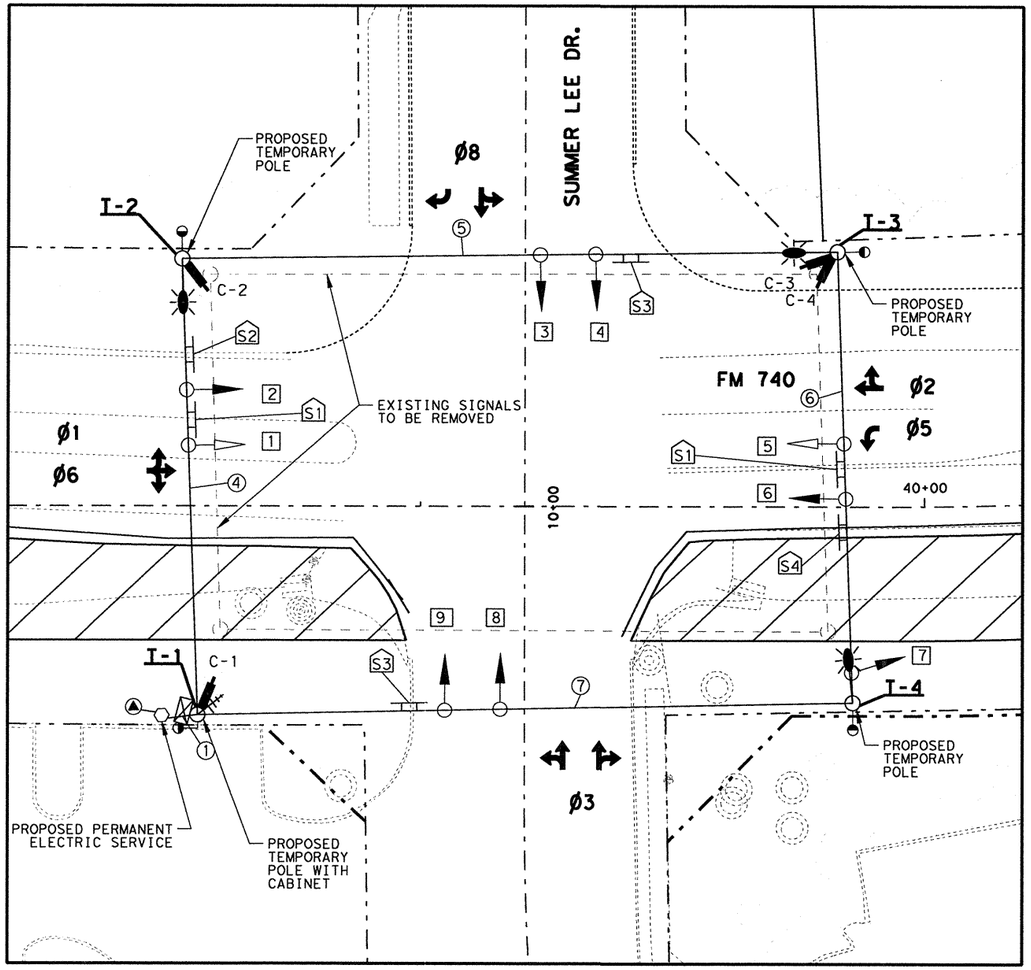
Texas Department of Transportation

FM 740
TEMPORARY SIGNAL LAYOUT OVERVIEW AT SUMMER LEE DRIVE

SCALE: 1"=50'

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	303
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



0 15 30
SCALE IN FEET

LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

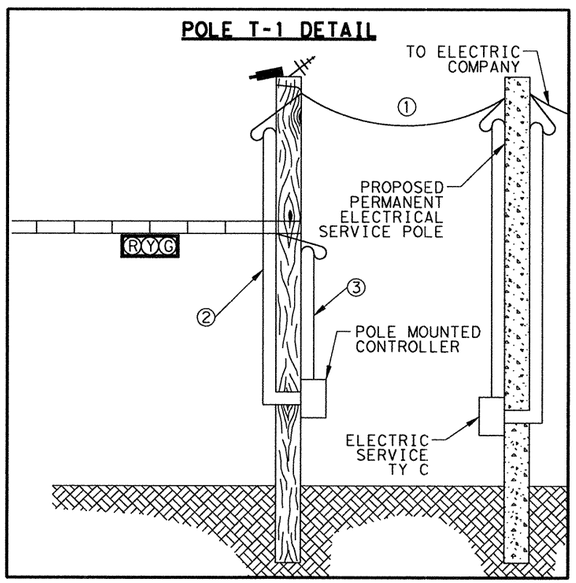
S1 — LEFT TURN YIELD ON GREEN — R10-12, 24" X 30"

S2 — 1400 SUMMER LEE DR 1300 — D3-1 — SEE NOTE 12

S3 — 3000 RIDGE RD 3000 — D3-1 — SEE NOTE 12

S4 — 1300 SUMMER LEE DR 1400 — D3-1 — SEE NOTE 12

POLE T-1 DETAIL



SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	54′		
2	T-1 & T-2	65′		
3	T-2 & T-3		71′	
4	T-2 & T-3		82′	
5	T-3 & T-4			38′
6	T-3 & T-4			49′
7	T-3 & T-4			84′
8	T-1 & T-4	60′		
9	T-1 & T-4	49′		

SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE 3 SEC	BACKPLATE 5 SEC	12" VEH SEC
1	H5LT	2 & 5		1	5
2	H3	2	1		3
3	H3	3	1		3
4	H3	3	1		3
5	H5LT	1 & 6		1	5
6	H3	6	1		3
7	H3	2	1		3
8	H3	8	1		3
9	H3	8		1	3
TOTAL			6	3	31

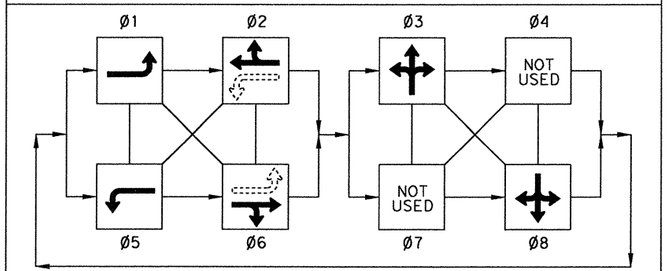
CABLE RUNS

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE #6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	LENGTH OF RUN
1	OH	2	1						3	6
2	RMC	2	1		1	1	1	1		20
3	RMC	1	1	4	3	3		3		20
4	OH		1	2	3	3		2	2	91
5	OH		1	1	2	2		1	1	130
6	OH		1	1						90
7	OH		1	2				1	1	130
ITEM TOTAL		72	487	742	613	613	20	522	460	

APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
T-1	2590747.0287	7012657.4258
T-2	2590837.4339	7012647.0385
T-3	2590819.6310	7012518.2633
T-4	2590730.2170	7012528.5174

PHASING DIAGRAM



5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED PROFESSIONAL ENGINEER
Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
TEMPORARY SIGNAL LAYOUT AT SUMMER LEE DRIVE PHASE 1

SCALE: 1"=30′ SHEET 1 OF 6

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	304
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

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SCALE=1:30
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5/27/2009
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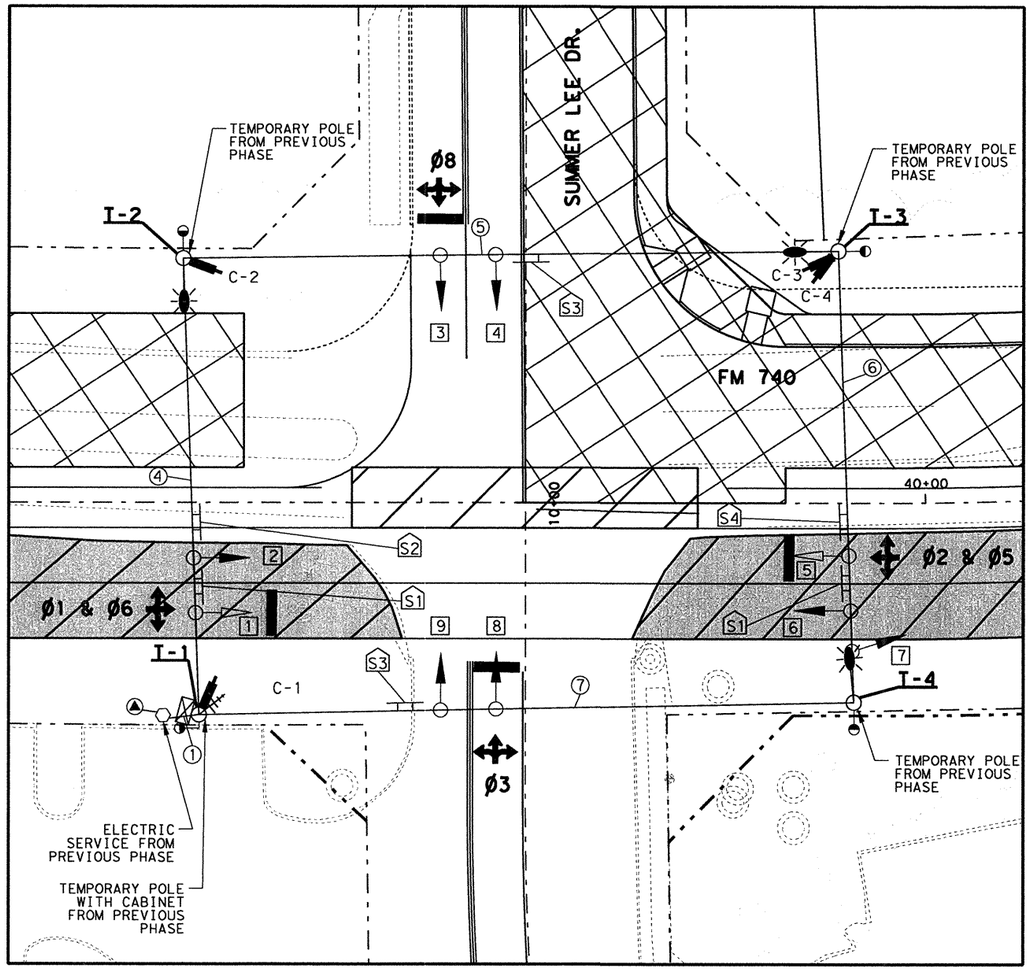

0 15 30
SCALE IN FEET

LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
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12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

S1 — LEFT TURN YIELD ON GREEN — R10-12 24" X 30"

S2 — 1400 SUMMER LEE DR 1300 — D3-1 SEE NOTE 12

S3 — 3000 RIDGE RD 3000 — D3-1 SEE NOTE 12

S4 — 1300 SUMMER LEE DR 1400 — D3-1 SEE NOTE 12

CABLE RUNS

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE								LENGTH OF RUN
		#6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	
1	OH	2	1						3	6
2	RMC	2	1		1	1	1	1		20
3	RMC	1	1	4	3	3		3		20
4	OH		1	2	3	3		2	2	91
5	OH		1	1	2	2		1	1	130
6	OH		1	1						90
7	OH		1	2				1	1	130
ITEM TOTAL		72	487	742	613	613	20	522	460	

APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
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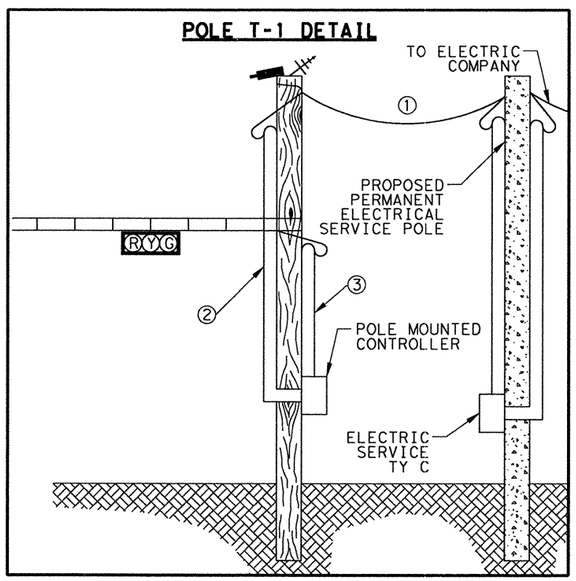
T-2	2590837.4339	7012647.0385
T-3	2590819.6310	7012518.2633
T-4	2590730.2170	7012528.5174

POLE T-1 DETAIL



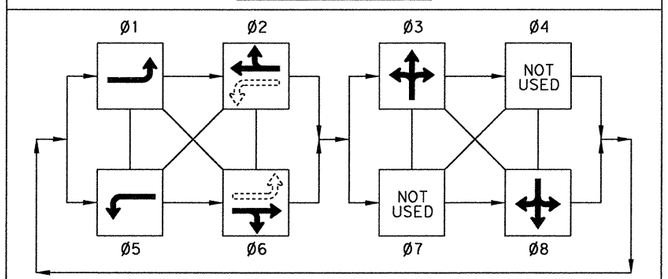
SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	20'		
2	T-1 & T-2	31'		
3	T-2 & T-3		51'	
4	T-2 & T-3		62'	
5	T-3 & T-4			61'
6	T-3 & T-4			72'
7	T-3 & T-4			80'
8	T-1 & T-4	59'		
9	T-1 & T-4	48'		

SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE		12" VEH SEC
			3 SEC	5 SEC	
1	H5LT	2 & 5		1	5
2	H3	2	1		3
3	H3	3	1		3
4	H3	3	1		3
5	H5LT	1 & 6		1	5
6	H3	6	1		3
7	H3	2	1		3
8	H3	8	1		3
9	H3	8		1	3
TOTAL			6	3	31

PHASING DIAGRAM



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STATE OF TEXAS
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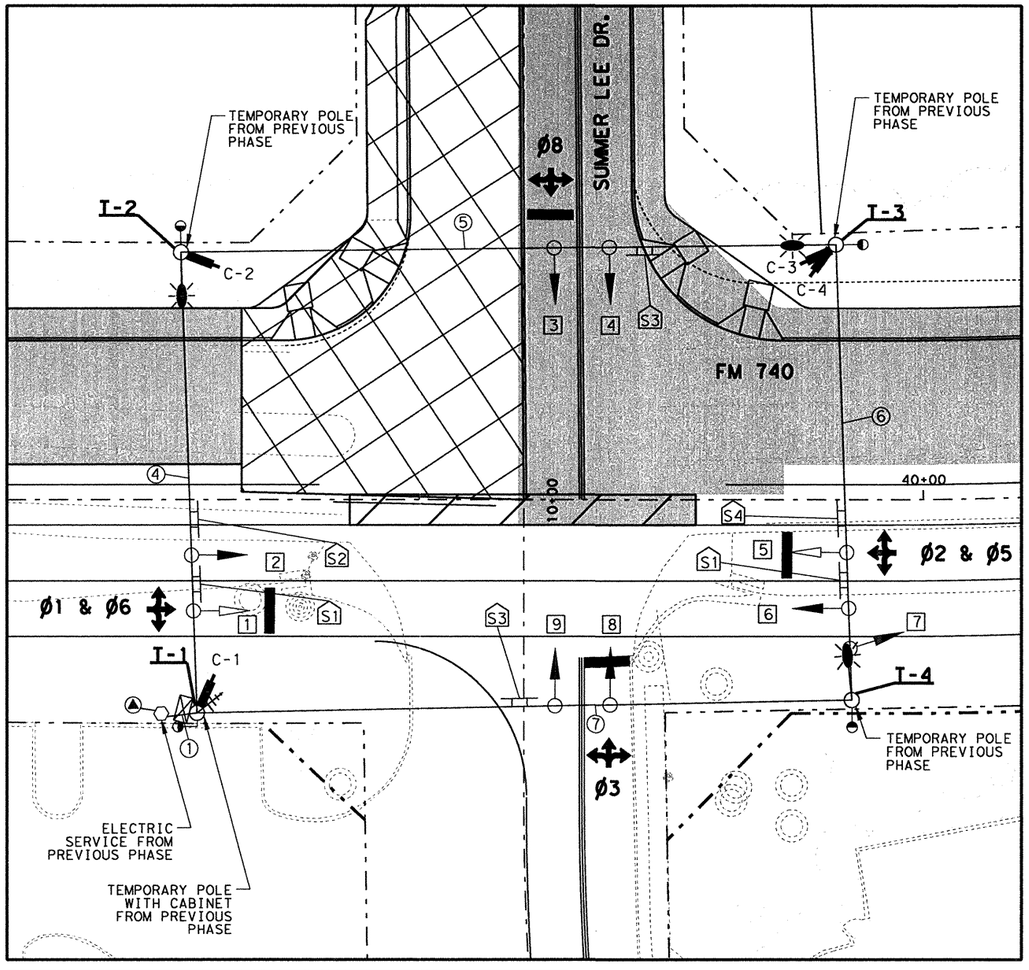
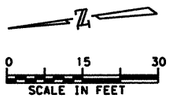
Texas Department of Transportation

FM 740
TEMPORARY SIGNAL LAYOUT AT SUMMER LEE DRIVE PHASE 2 STAGE 1

SCALE: 1"=30' SHEET 2 OF 6

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	305
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	





LEGEND	
	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
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	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

NOTES:

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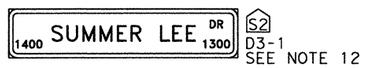
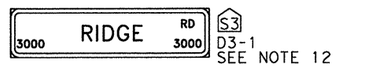
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

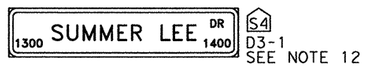
S1 R10-12 24" X 30"



S2 D3-1 SEE NOTE 12



S3 D3-1 SEE NOTE 12



S4 D3-1 SEE NOTE 12

CABLE RUNS										
RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE								LENGTH OF RUN
		#6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	
1	OH	2	1						3	6
2	RMC	2	1		1	1	1	1		20
3	RMC	1	1	4	3	3		3		20
4	OH		1	2	3	3		2	2	91
5	OH		1	1	2	2		1	1	130
6	OH		1	1						90
7	OH		1	2				1	1	130
ITEM TOTAL		72	487	742	613	613	20	522	460	

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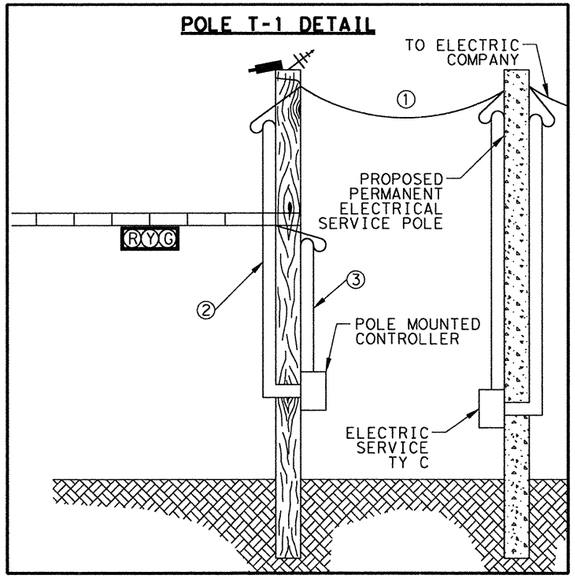
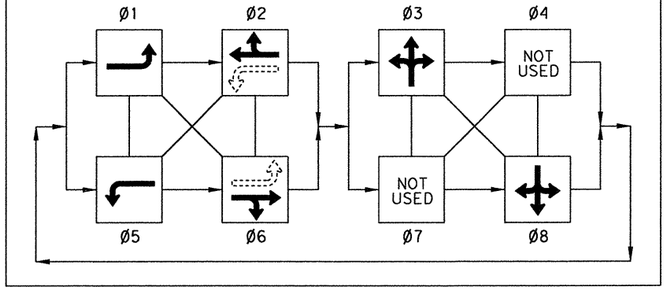


SIGNAL HEAD LOCATION				
NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	20′		
2	T-1 & T-2	31′		
3	T-2 & T-3		74′	
4	T-2 & T-3		85′	
5	T-3 & T-4			61′
6	T-3 & T-4			72′
7	T-3 & T-4			84′
8	T-1 & T-4	82′		
9	T-1 & T-4	71′		

SIGNAL HEADS					
NO.	TYPE	PHASE	BACKPLATE		12" VEH SEC
			3 SEC	5 SEC	
1	H5LT	2 & 5		1	5
2	H3	2	1		3
3	H3	3	1		3
4	H3	3	1		3
5	H5LT	1 & 6		1	5
6	H3	6	1		3
7	H3	2	1		3
8	H3	8	1		3
9	H3	8		1	3
TOTAL			6	3	31

PHASING DIAGRAM



5/26/09

Kelvin J. Kroeker, PE

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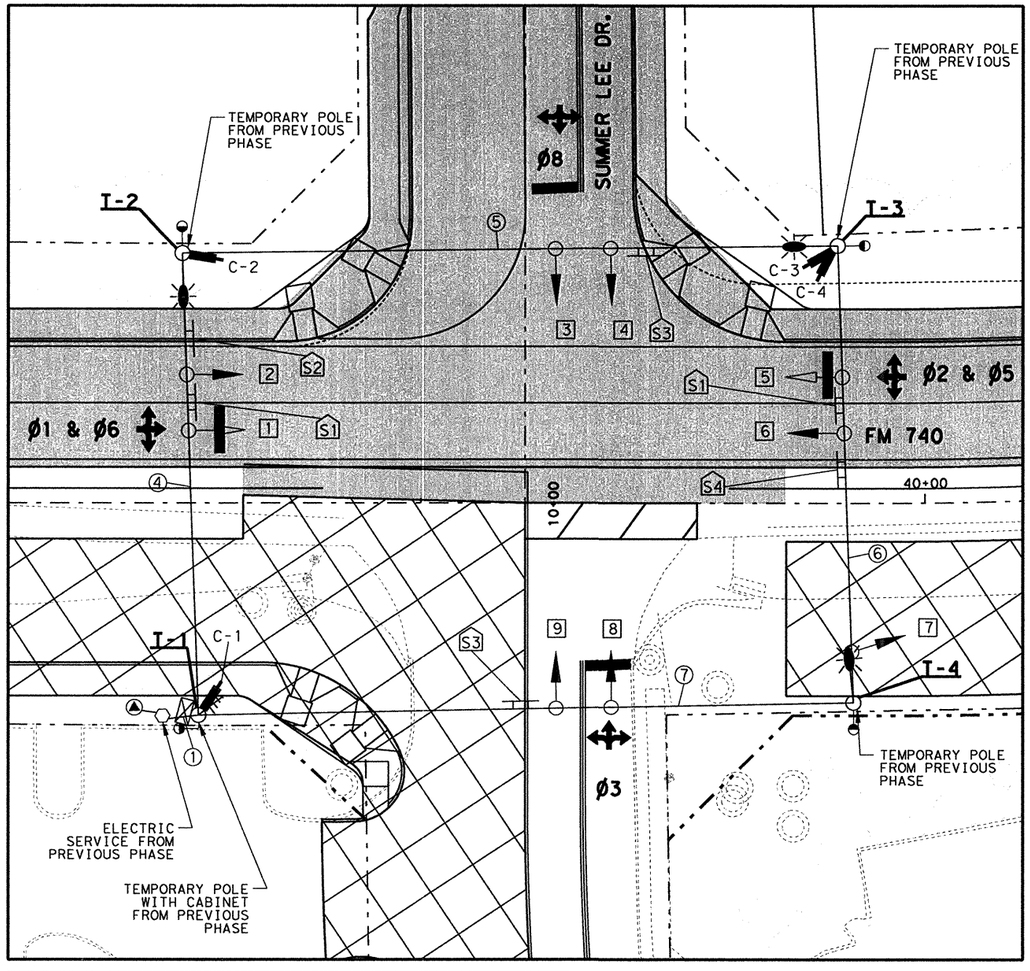
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
TEMPORARY SIGNAL LAYOUT AT SUMMER LEE DRIVE PHASE 2 STAGE 2

SCALE: 1"=30′ SHEET 3 OF 6

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	306
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



0 15 30
SCALE IN FEET

LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
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	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
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	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
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	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
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12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

S1 — LEFT TURN YIELD ON GREEN — R10-12 24" X 30"

S2 — 1400 SUMMER LEE DR 1300 — D3-1 SEE NOTE 12

S3 — 3000 RIDGE RD 3000 — D3-1 SEE NOTE 12

S4 — 1300 SUMMER LEE DR 1400 — D3-1 SEE NOTE 12

CABLE RUNS

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE								LENGTH OF RUN
		#6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	
1	OH	2	1						3	6
2	RMC	2	1		1	1	1	1		20
3	RMC	1	1	4	3	3		3		20
4	OH		1	2	3	3		2	2	91
5	OH		1	1	2	2		1	1	130
6	OH		1	1						90
7	OH		1	2				1	1	130
ITEM TOTAL		72	487	742	613	613	20	522	460	

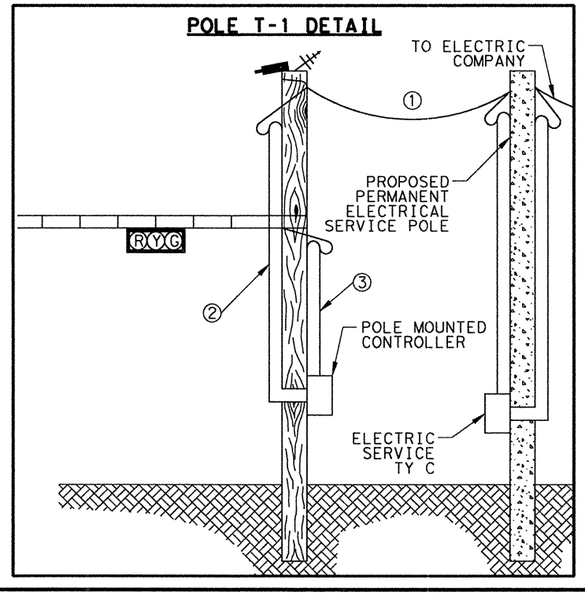
5/26/09
Kelvin J. Kroeker, PE

STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER

APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
T-1	2590747.0287	7012657.4258
T-2	2590837.4339	7012647.0385
T-3	2590819.6310	7012518.2633
T-4	2590730.2170	7012528.5174

POLE T-1 DETAIL



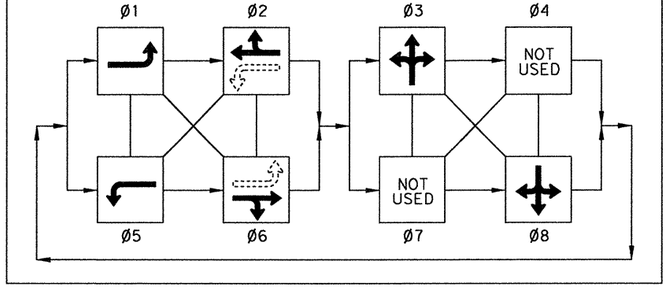
SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	56′		
2	T-1 & T-2	67′		
3	T-2 & T-3		74′	
4	T-2 & T-3		85′	
5	T-3 & T-4			26′
6	T-3 & T-4			37′
7	T-3 & T-4			80′
8	T-1 & T-4	82′		
9	T-1 & T-4	71′		

SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE 3 SEC	BACKPLATE 5 SEC	12" VEH SEC
1	H5LT	2 & 5		1	5
2	H3	2	1		3
3	H3	3	1		3
4	H3	3	1		3
5	H5LT	1 & 6		1	5
6	H3	6	1		3
7	H3	2	1		3
8	H3	8	1		3
9	H3	8		1	3
TOTAL			6	3	31

PHASING DIAGRAM



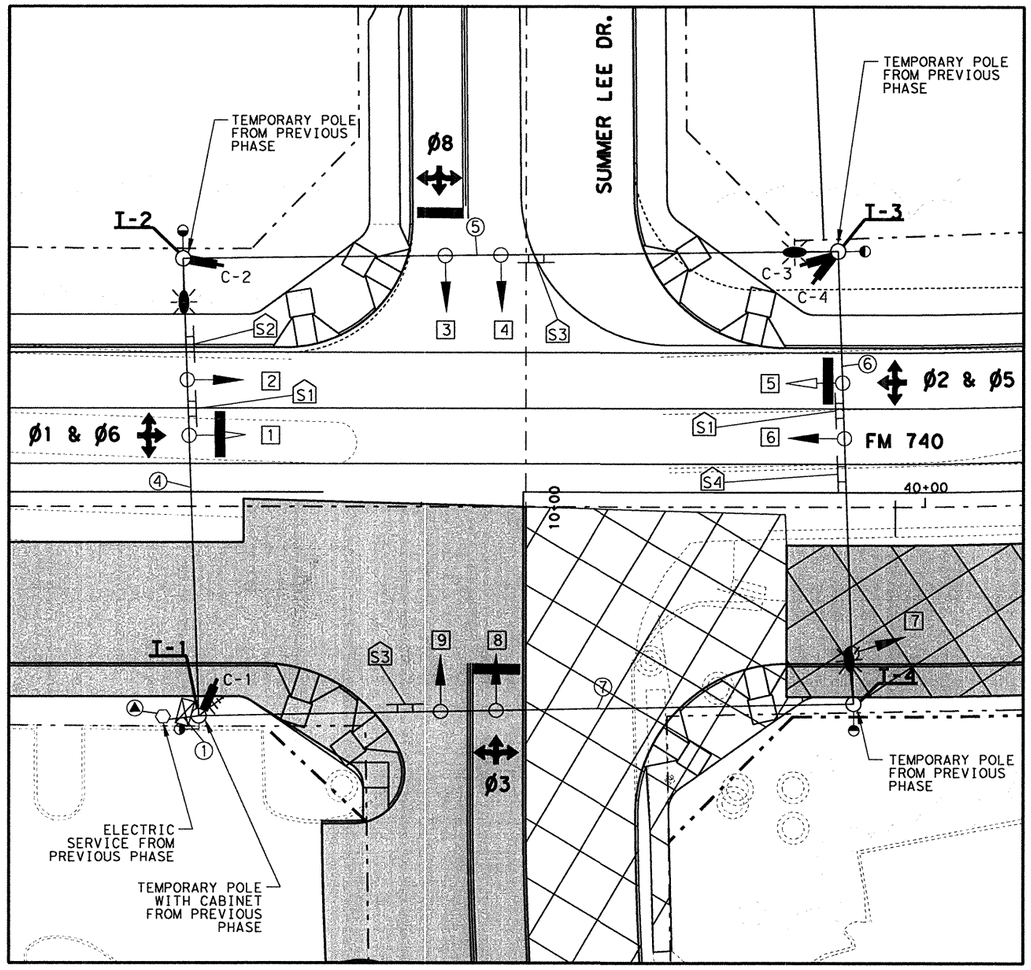
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
TEMPORARY SIGNAL LAYOUT AT SUMMER LEE DRIVE PHASE 3 STAGE 1

SCALE: 1"=30′ SHEET 4 OF 6

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	DALLAS	ROCKWALL	307
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



0 15 30
SCALE IN FEET

LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

S1 — LEFT TURN YIELD ON GREEN — R10-12 24" X 30"

S2 — 1400 SUMMER LEE DR 1300 — D3-1 — SEE NOTE 12

S3 — 3000 RIDGE RD 3000 — D3-1 — SEE NOTE 12

S4 — 1300 SUMMER LEE DR 1400 — D3-1 — SEE NOTE 12

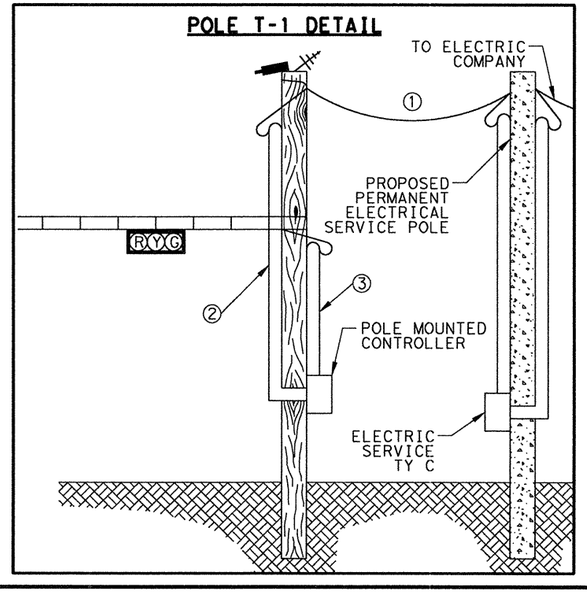
CABLE RUNS

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE								LENGTH OF RUN
		#6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	
1	OH	2	1						3	6
2	RMC	2	1		1	1	1	1		20
3	RMC	1	1	4	3	3		3		20
4	OH		1	2	3	3		2	2	91
5	OH		1	1	2	2		1	1	130
6	OH		1	1						90
7	OH		1	2				1	1	130
ITEM TOTAL		72	487	742	613	613	20	522	460	

APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
T-1	2590747.0287	7012657.4258
T-2	2590837.4339	7012647.0385
T-3	2590819.6310	7012518.2633
T-4	2590730.2170	7012528.5174

POLE T-1 DETAIL



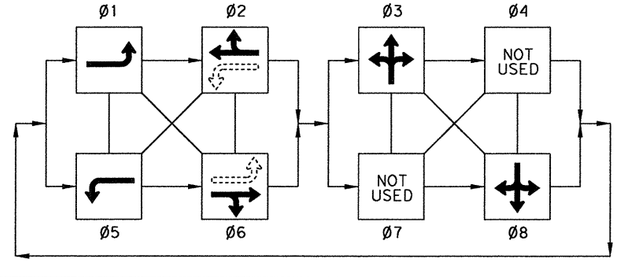
SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	56'		
2	T-1 & T-2	67'		
3	T-2 & T-3		52'	
4	T-2 & T-3		63'	
5	T-3 & T-4			26'
6	T-3 & T-4			37'
7	T-3 & T-4			80'
8	T-1 & T-4	59'		
9	T-1 & T-4	48'		

SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE 3 SEC	BACKPLATE 5 SEC	12" VEH SEC
1	H5LT	2 & 5		1	5
2	H3	2	1		3
3	H3	3	1		3
4	H3	3	1		3
5	H5LT	1 & 6		1	5
6	H3	6	1		3
7	H3	2	1		3
8	H3	8	1		3
9	H3	8		1	3
TOTAL			6	3	31

PHASING DIAGRAM



5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER

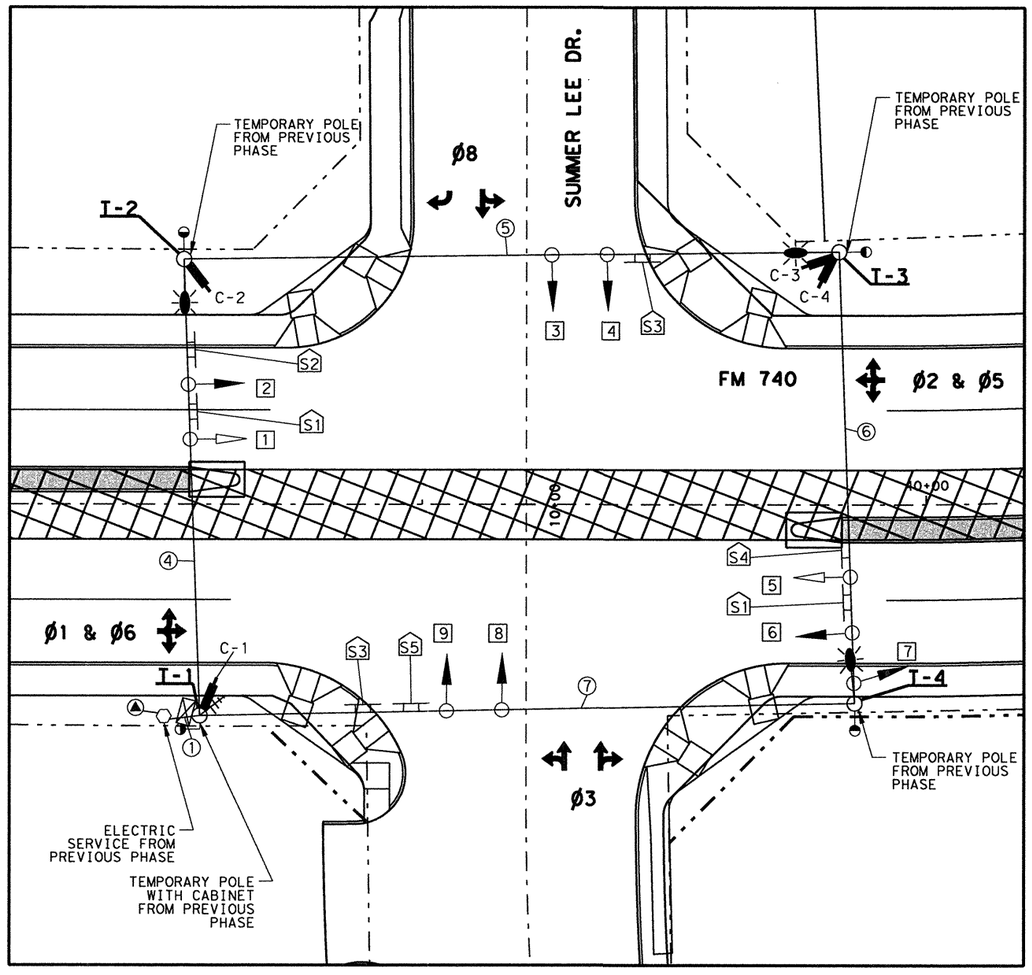
Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
TEMPORARY SIGNAL LAYOUT AT SUMMER LEE DRIVE PHASE 3 STAGE 2

SCALE: 1"=30' SHEET 5 OF 6

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	308
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



0 15 30
SCALE IN FEET

LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

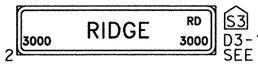
NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

S5
R3-5R
30" X 36"

S1
R10-12
24" X 30"

S2
D3-1
SEE NOTE 12



S3
D3-1
SEE NOTE 12

S4
D3-1
SEE NOTE 12

CABLE RUNS

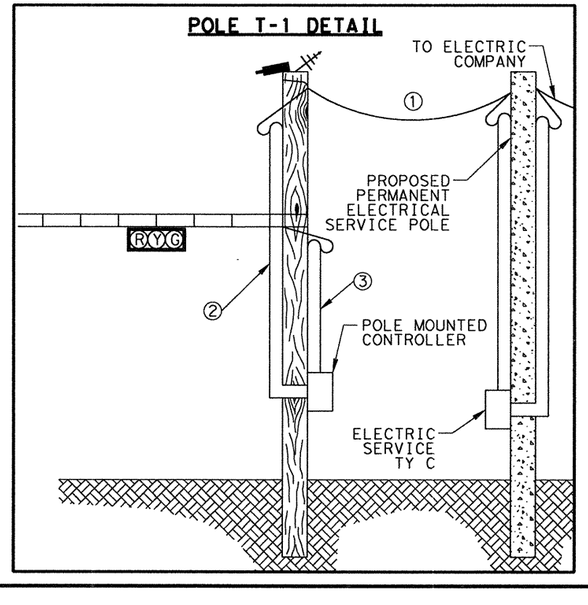
RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE								LENGTH OF RUN
		#6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	
1	OH	2	1						3	6
2	RMC	2	1		1	1	1	1		20
3	RMC	1	1	4	3	3		3		20
4	OH		1	2	3	3		2	2	91
5	OH		1	1	2	2		1	1	130
6	OH		1	1						90
7	OH		1	2				1	1	130
ITEM TOTAL		72	487	742	613	613	20	522	460	

5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER

Kelvin J. Kroeker, P.E.

POLE T-1 DETAIL



SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	55'		
2	T-1 & T-2	66'		
3	T-2 & T-3		73'	
4	T-2 & T-3		84'	
5	T-3 & T-4			65'
6	T-3 & T-4			76'
7	T-3 & T-4			86'
8	T-1 & T-4	60'		
9	T-1 & T-4	49'		

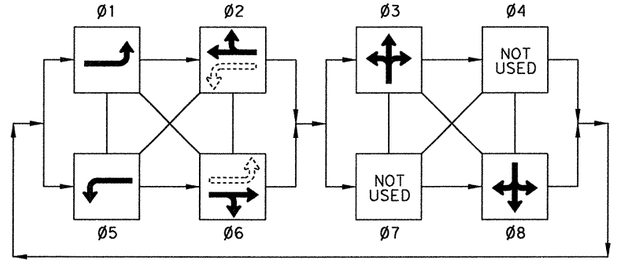
SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE 3 SEC	BACKPLATE 5 SEC	12" VEH SEC
1	H5LT	2 & 5		1	5
2	H3	2	1		3
3	H3	3	1		3
4	H3	3	1		3
5	H5LT	1 & 6		1	5
6	H3	6	1		3
7	H3	2	1		3
8	H3	8	1		3
9	H3	8		1	3
TOTAL			6	3	31

APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
T-1	2590747.0287	7012657.4258
T-2	2590837.4339	7012647.0385
T-3	2590819.6310	7012518.2633
T-4	2590730.2170	7012528.5174

PHASING DIAGRAM

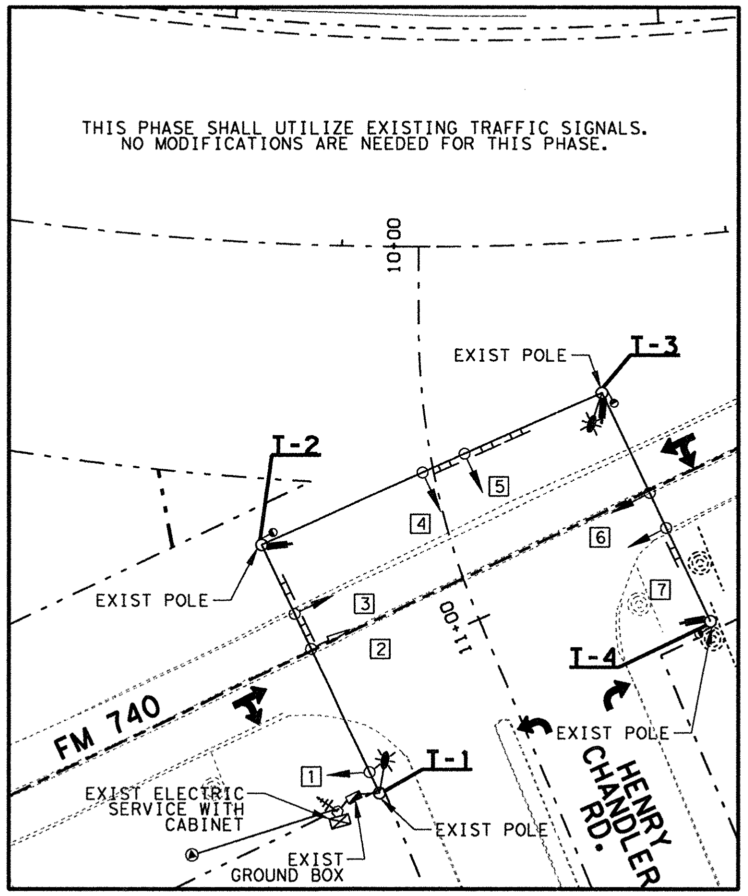


HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

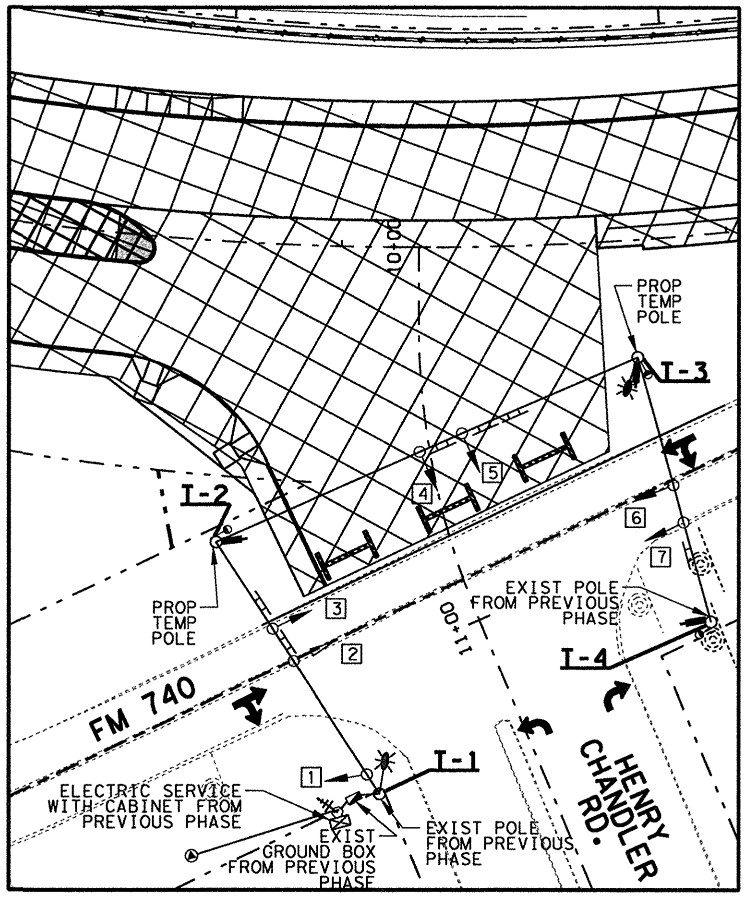
FM 740
TEMPORARY SIGNAL LAYOUT AT SUMMER LEE DRIVE PHASE 4

SCALE: 1"=30' SHEET 6 OF 6

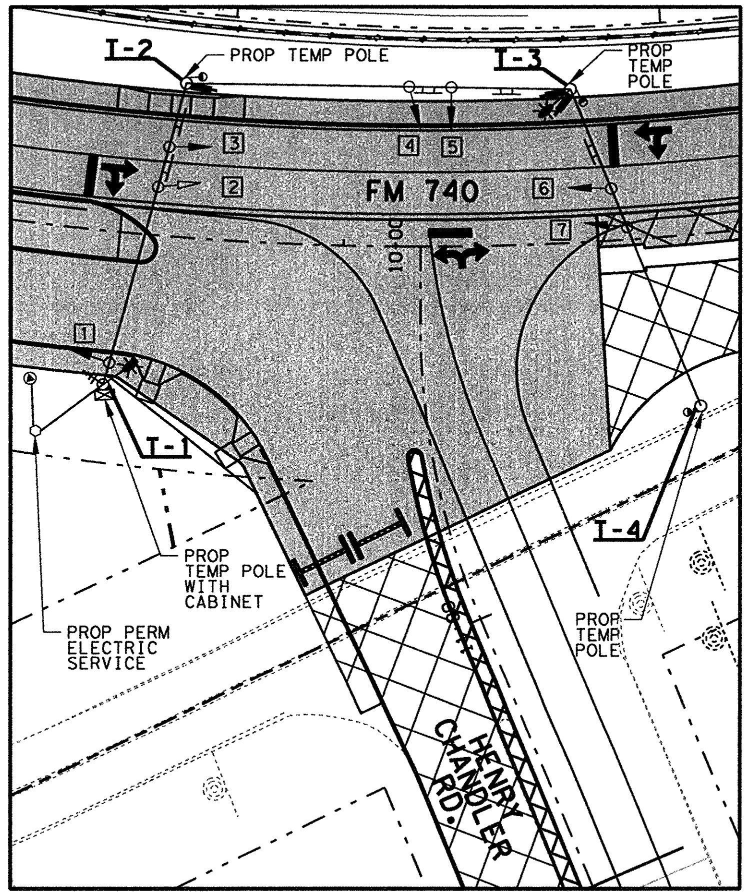
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	309
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



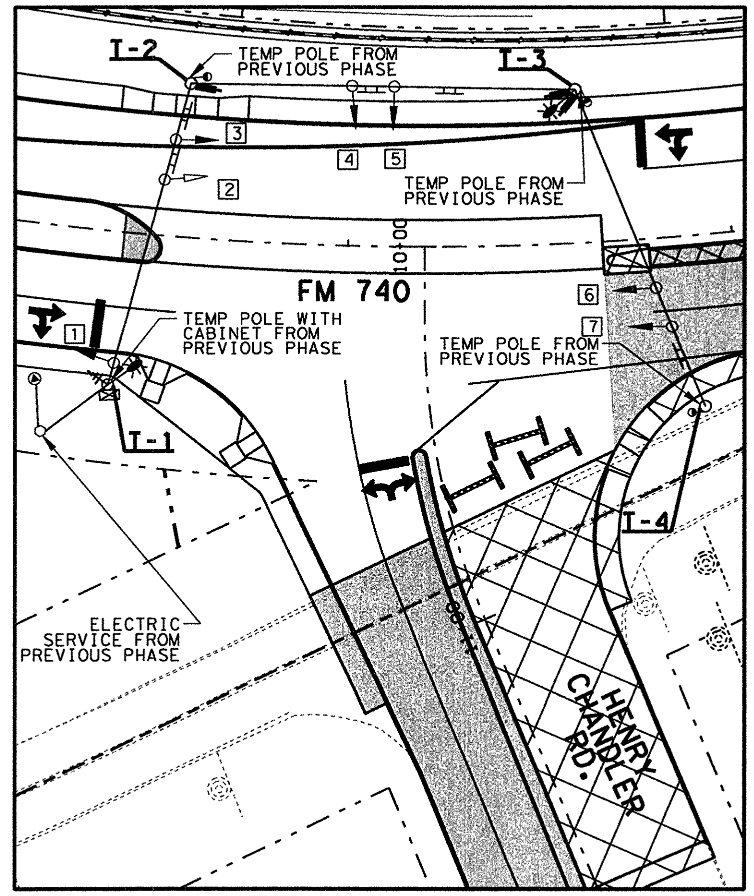
PHASE 1



PHASE 2



PHASE 3



PHASE 4

NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON THE TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. REFER TO TEMPORARY SIGNAL LAYOUT SHEETS FOR LUMINAIRES AND FURTHER DETAILS ON THE TEMPORARY SIGNS AND SIGNALS.
13. PHASE 1 SHALL UTILIZE EXISTING TRAFFIC SIGNALS. NO MODIFICATIONS ARE NEEDED FOR THIS PHASE.
14. PROVIDE NEW TEMPORARY SIGNALS FOR PHASE 3, TO BE INSTALLED IN PHASE 2, PRIOR TO REMOVING THE EXISTING TEMPORARY SIGNALS.

LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	GROUND BOX
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

0 25 50
SCALE IN FEET

5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED PROFESSIONAL ENGINEER

Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
TEMPORARY SIGNAL LAYOUT OVERVIEW AT HENRY CHANDLER ROAD

SCALE: 1"=50'

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	310
	CONTROL	SECTION	JOB	
CHECK	1014	03	039	

foropeza
SCALE=1:50
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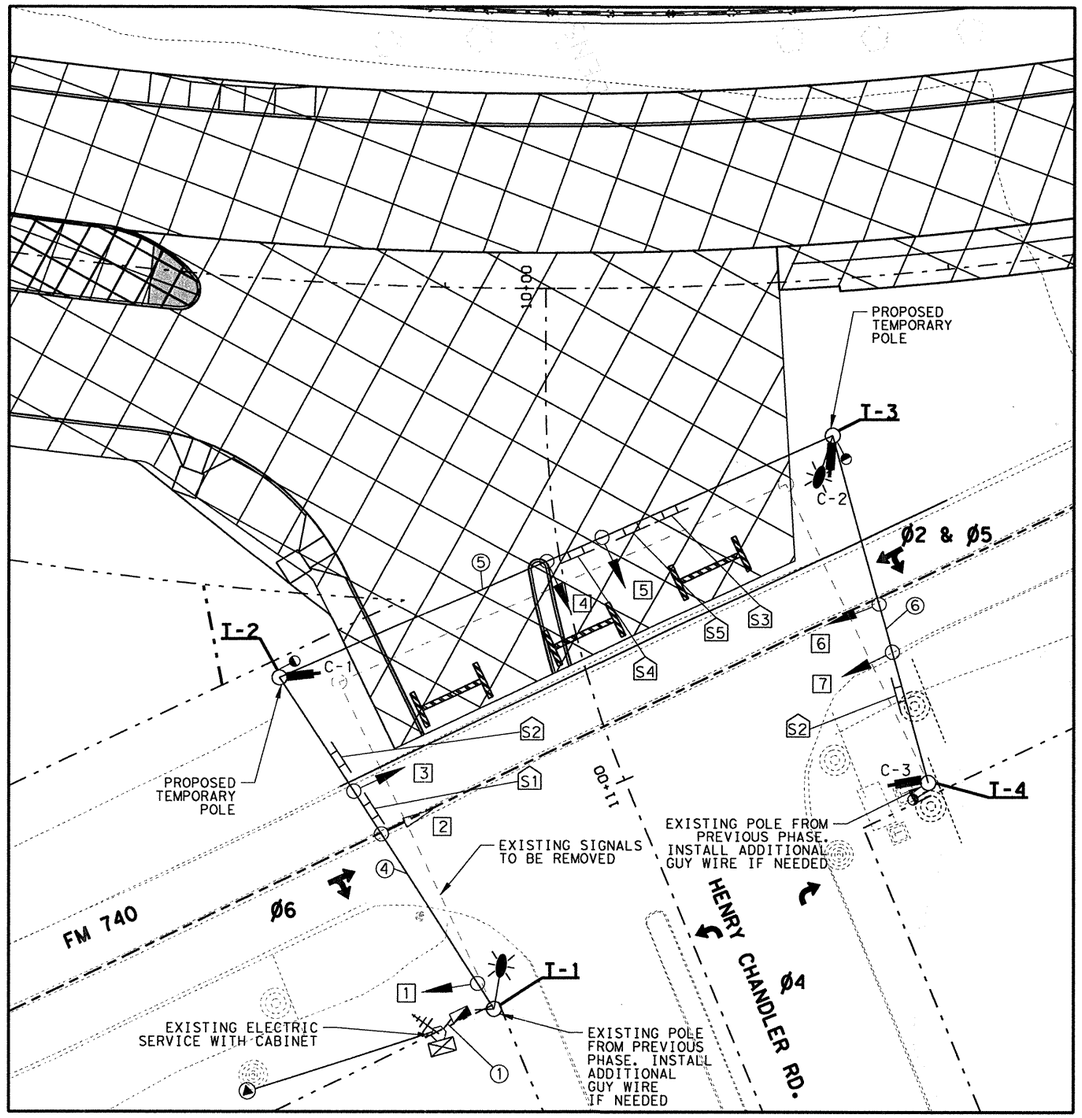
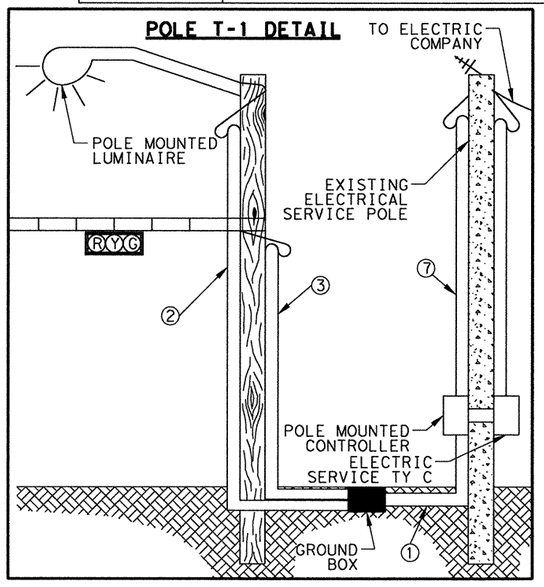
5/27/2009
8:33:58 AM



LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	GROUND BOX
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

POLE T-1 DETAIL



NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON THE TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.
13. PHASE 1 SHALL UTILIZE EXISTING TRAFFIC SIGNALS. NO MODIFICATIONS ARE NEEDED FOR THIS PHASE.
14. PROVIDE NEW TEMPORARY SIGNALS FOR PHASE 3, TO BE INSTALLED IN PHASE 2, PRIOR TO REMOVING THE EXISTING TEMPORARY SIGNALS.

SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	6'		
2	T-1 & T-2	41'		
3	T-1 & T-2	51'		
4	T-2 & T-3		58'	
5	T-2 & T-3		70'	
6	T-3 & T-4			35'
7	T-3 & T-4			45'

SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE 3 SEC	BACKPLATE 5 SEC	12" VEH SEC
1	H3	6	1		3
2	H5LT	2 & 5		1	5
3	H3	2	1		3
4	H3	4	1		3
5	H3	4	1		3
6	H3	6	1		3
7	H3	6	1		3
TOTAL			6	1	23

0 15 30
SCALE IN FEET

5/26/09

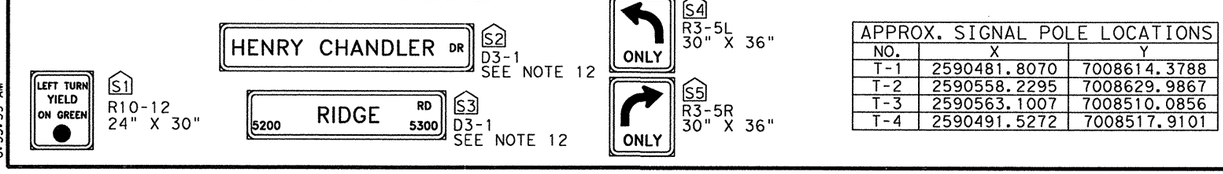
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER

Kelvin J. Kroeker, PE

CABLE RUNS

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE #6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	LENGTH OF RUN
1	RMC	2	1	3	3	3		3	2	*3
2	RMC	2	1						1	*20
3	RMC	1	1	3	3	3		3	1	*20
4	OH		1	3	3	3		3	1	78
5	OH		1	2	2	2		2	1	120
6	OH		1	1	1	1		1		72
7	RMC						1			*20
ITEM TOTAL		86	313	615	615	615	20	615	244	

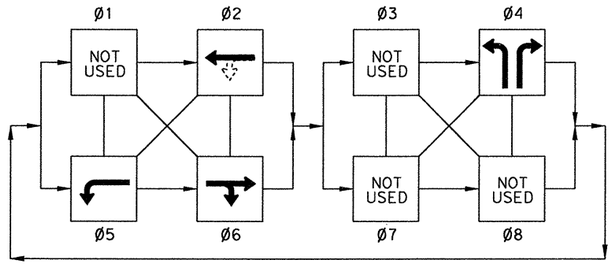
*LENGTH OF RUN FROM EXISTING TRAFFIC SIGNALS



APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
T-1	2590481.8070	7008614.3788
T-2	2590558.2295	7008629.9867
T-3	2590563.1007	7008510.0856
T-4	2590491.5272	7008517.9101

PHASING DIAGRAM



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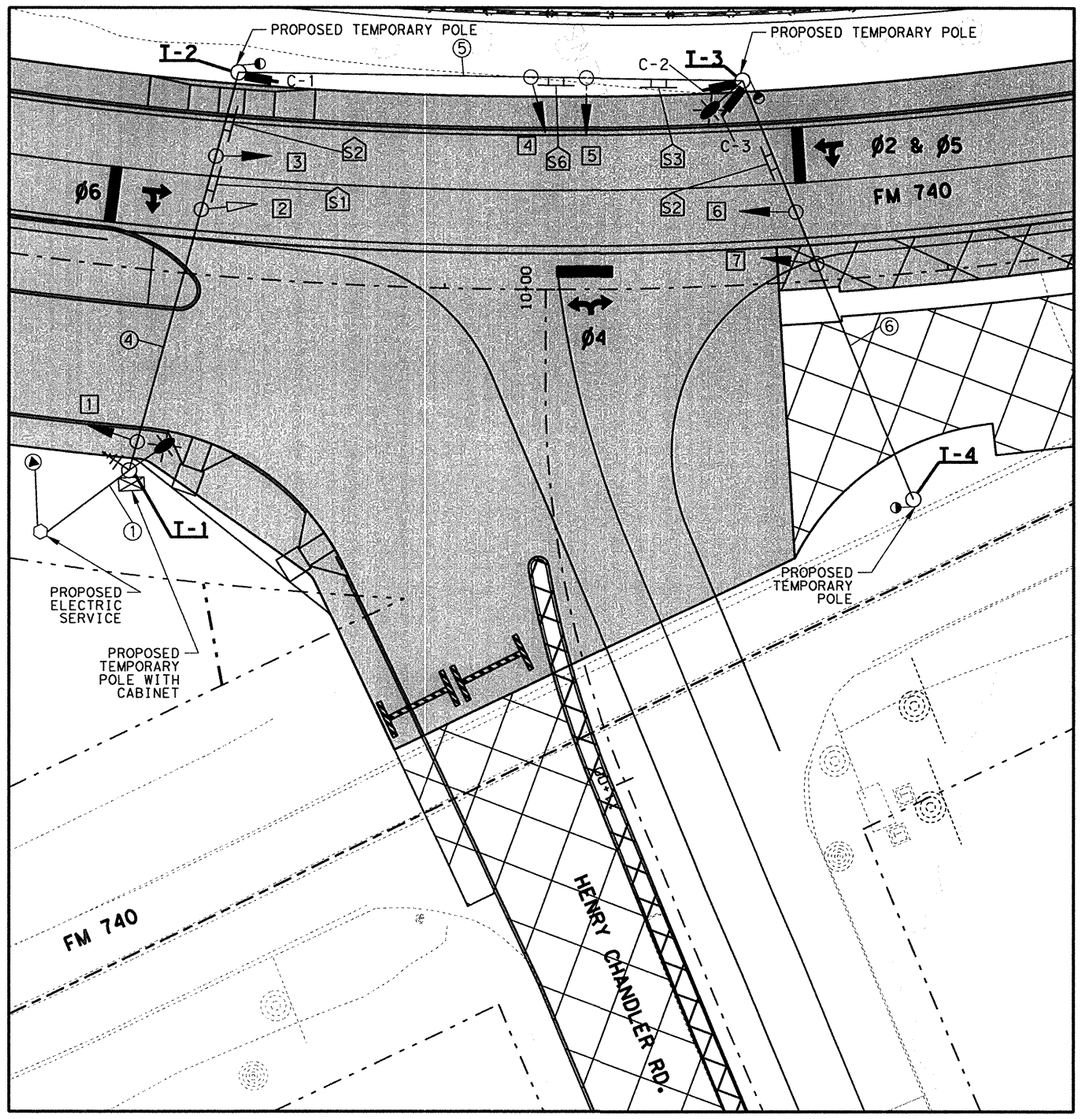
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
TEMPORARY SIGNAL LAYOUT AT HENRY CHANDLER ROAD PHASE 2

SCALE: 1"=30' SHEET 1 OF 3

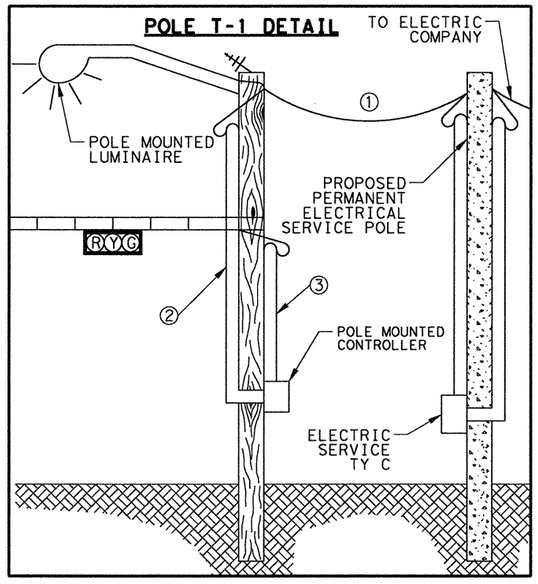
DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	311
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



LEGEND

	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

POLE T-1 DETAIL



NOTES:

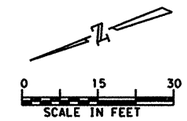
1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

SIGNAL HEAD LOCATION

NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	6′		
2	T-1 & T-2	54′		
3	T-1 & T-2	65′		
4	T-2 & T-3		58′	
5	T-2 & T-3		69′	
6	T-3 & T-4			28′
7	T-3 & T-4			39′

SIGNAL HEADS

NO.	TYPE	PHASE	BACKPLATE 3 SEC	BACKPLATE 5 SEC	12" VEH SEC
1	H3	6	1		3
2	H5LT	2 & 5		1	5
3	H3	2	1		3
4	H3	4	1		3
5	H3	4	1		3
6	H3	6	1		3
7	H3	6	1		3
TOTAL			6	1	23

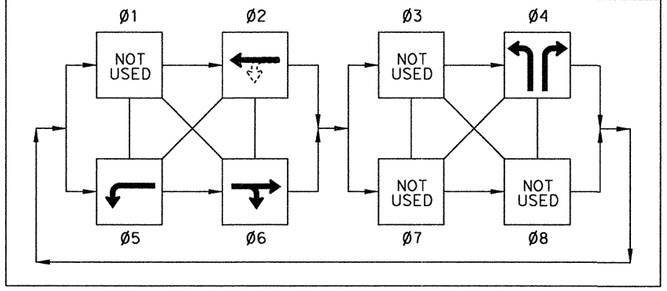


5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER

Kelvin J. Kroeker, P.E.

PHASING DIAGRAM



CABLE RUNS

RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE #6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	LENGTH OF RUN
1	OH	2	1						2	21
2	RMC	2	1				1		1	20
3	RMC	1	1		3	3			1	20
4	OH		1	3	3	3		3	1	82
5	OH		1	2	2	2		2	1	100
6	OH		1	1				1		90
ITEM TOTAL		102	333	536	506	506	20	536	264	

APPROX. SIGNAL POLE LOCATIONS

NO.	X	Y
T-1	2590607.4651	7008642.6174
T-2	2590673.0391	7008593.3827
T-3	2590634.8749	7008500.9517
T-4	2590544.8802	7008499.9799

LEFT TURN YIELD ON GREEN — S1 R10-12 24" X 30"

HENRY CHANDLER DR — S2 D3-1 SEE NOTE 12

5200 RIDGE RD 5300 — S3 D3-1 SEE NOTE 12

S6 R3-8c 30" X 30"

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
TEMPORARY SIGNAL LAYOUT AT HENRY CHANDLER ROAD PHASE 3

SCALE: 1"=30′ SHEET 2 OF 3

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	312
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

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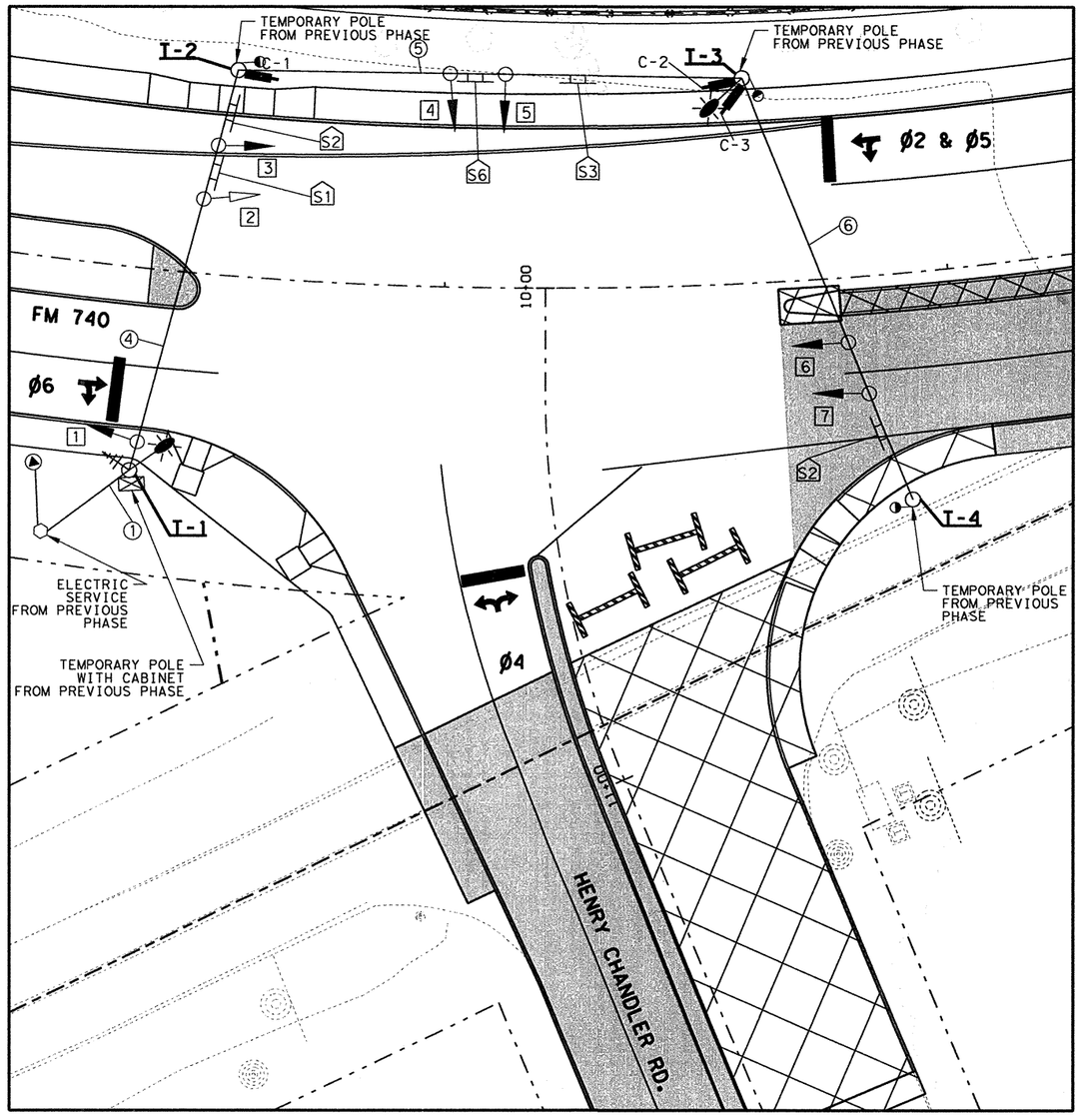
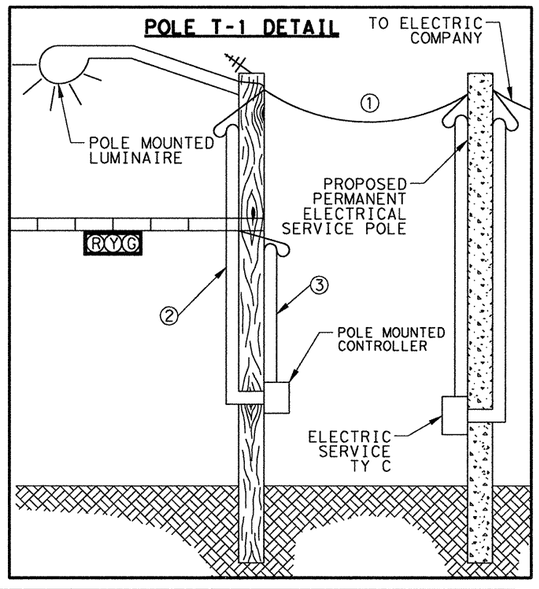


LEGEND	
	TEMP. 3-SECTION SIGNAL HEAD
	TEMP. 5-SECTION SIGNAL HEAD
	TEMP. VEHICLE DETECTION CAMERA
	PROP. SPAN WIRE SEE AERIAL RUN LENGTHS TABLE
	TEMP. ELECTRICAL SERVICE
	TEMP. POWER SOURCE
	TEMP. CONTROLLER MOUNTED ON POLE
	TEMP. SIGN
	TEMP. OPTICOM
	TEMP. SSR ANTENNA
	TEMP. LUMINAIRE
	TRAFFIC FLOW
	PERMANENT PAVEMENT CONSTRUCTION THIS PHASE
	PERMANENT PAVEMENT CONSTRUCTION PREVIOUS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION THIS PHASE
	TEMPORARY PAVEMENT CONSTRUCTION PREVIOUS PHASE
	MEDIAN CONSTRUCTION THIS PHASE

POLE T-1 DETAIL



NOTES:

1. ALL CABLE SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES.
2. EXACT LOCATION OF TEMPORARY POLE, CONTROLLER, SIGNAL HEADS, SIGNS, VIVDS CAMERAS & PULL BOXES SHALL BE DETERMINED IN THE FIELD.
3. TEMPORARY DETECTION SHALL BE PROVIDED IN ACCORDANCE WITH TXDOT SPECIAL SPECIFICATION 6266.
4. THE SIGNAL HEADS SHALL BE SHIFTED TO MATCH THE SUBMITTED TRAFFIC CONTROL PLAN AS PRESENTED BY THE CONTRACTOR & APPROVED BY THE ENGINEER.
5. CONTRACTOR TO PROVIDE EXTRA CABLE COILED ON SPAN WIRE TO ACCOMODATE SIGNAL HEAD ADJUSTMENTS.
6. CONTRACTOR TO REMOVE TEMPORARY SIGNAL SPAN RELATED EQUIPMENT/MATERIALS WHEN THE PERMANENT SIGNALS ARE IN OPERATION. ALL MATERIALS TO BECOME THE PROPERTY OF TXDOT, EXCEPT FOR POLES, WIRES, AND STRANDS.
7. THE RECONFIGURATION OF THE VIVDS CAMERA ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
8. LUMINAIRE ASSEMBLY IS SUBSIDIARY TO ITEM 681-TEMPORARY TRAFFIC SIGNAL CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS.
10. REFER TO TCP SHEETS FOR FURTHER DETAILS ON TRAFFIC CONTROL.
11. REFER TO TXDOT STANDARD "LUM-A" SHEET FOR LUMINAIRE DETAILS.
12. THE EXISTING STREET NAME SIGNS SHALL BE UTILIZED.

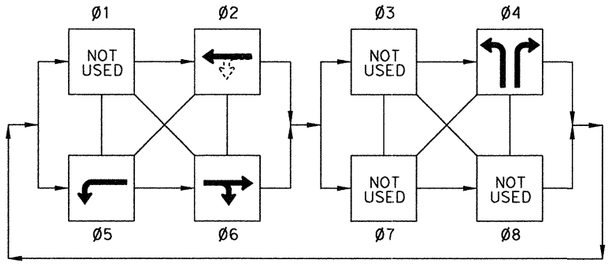
SIGNAL HEAD LOCATION				
NO.	MOUNT ON SPAN BETWEEN	DISTANCE FROM T-1	DISTANCE FROM T-2	DISTANCE FROM T-3
1	T-1 & T-2	6′		
2	T-1 & T-2	56′		
3	T-1 & T-2	67′		
4	T-2 & T-3		42′	
5	T-2 & T-3		53′	
6	T-3 & T-4			56′
7	T-3 & T-4			67′

SIGNAL HEADS					
NO.	TYPE	PHASE	BACKPLATE		12" VEH SEC
			3 SEC	5 SEC	
1	H3	6	1		3
2	H5LT	2 & 5		1	5
3	H3	2	1		3
4	H3	4	1		3
5	H3	4	1		3
6	H3	6	1		3
7	H3	6	1		3
TOTAL			6	1	23

0 15 30
SCALE IN FEET

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER
Kelvin J. Kroeker, PE

PHASING DIAGRAM



CABLE RUNS										
RUN NO.	SIZE/TYPE CONDUIT	CABLE TYPE								LENGTH OF RUN
		#6 XHHW WIRE POWER	#8 BARE GROUND WIRE	20 CNDR. #12 CABLE	VIVDS POWER CABLE	VIVDS COMM CABLE	SSR CABLE	OPTICOM CABLE	LUMIN. #8 XHHW POWER	
1	OH	2	1						2	21
2	RMC	2	1				1		1	20
3	RMC	1	1		3	3			1	20
4	OH		1	3	3	3		3	1	82
5	OH		1	2	2	2		2	1	100
6	OH		1	1				1		90
ITEM TOTAL		102	333	536	506	506	20	536	264	

APPROX. SIGNAL POLE LOCATIONS		
NO.	X	Y
T-1	2590607.4651	7008642.6174
T-2	2590673.0391	7008593.3827
T-3	2590634.8749	7008500.9517
T-4	2590544.8802	7008499.9799

LEFT TURN YIELD ON GREEN — S1 R10-12 24" X 30"

HENRY CHANDLER DR — S2 D3-1 SEE NOTE 12

5200 RIDGE RD 5300 — S3 D3-1 SEE NOTE 12

S6 R3-8c 30" X 30"

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
TEMPORARY SIGNAL LAYOUT AT HENRY CHANDLER ROAD PHASE 4

SCALE: 1"=30′ SHEET 3 OF 3

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	313
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

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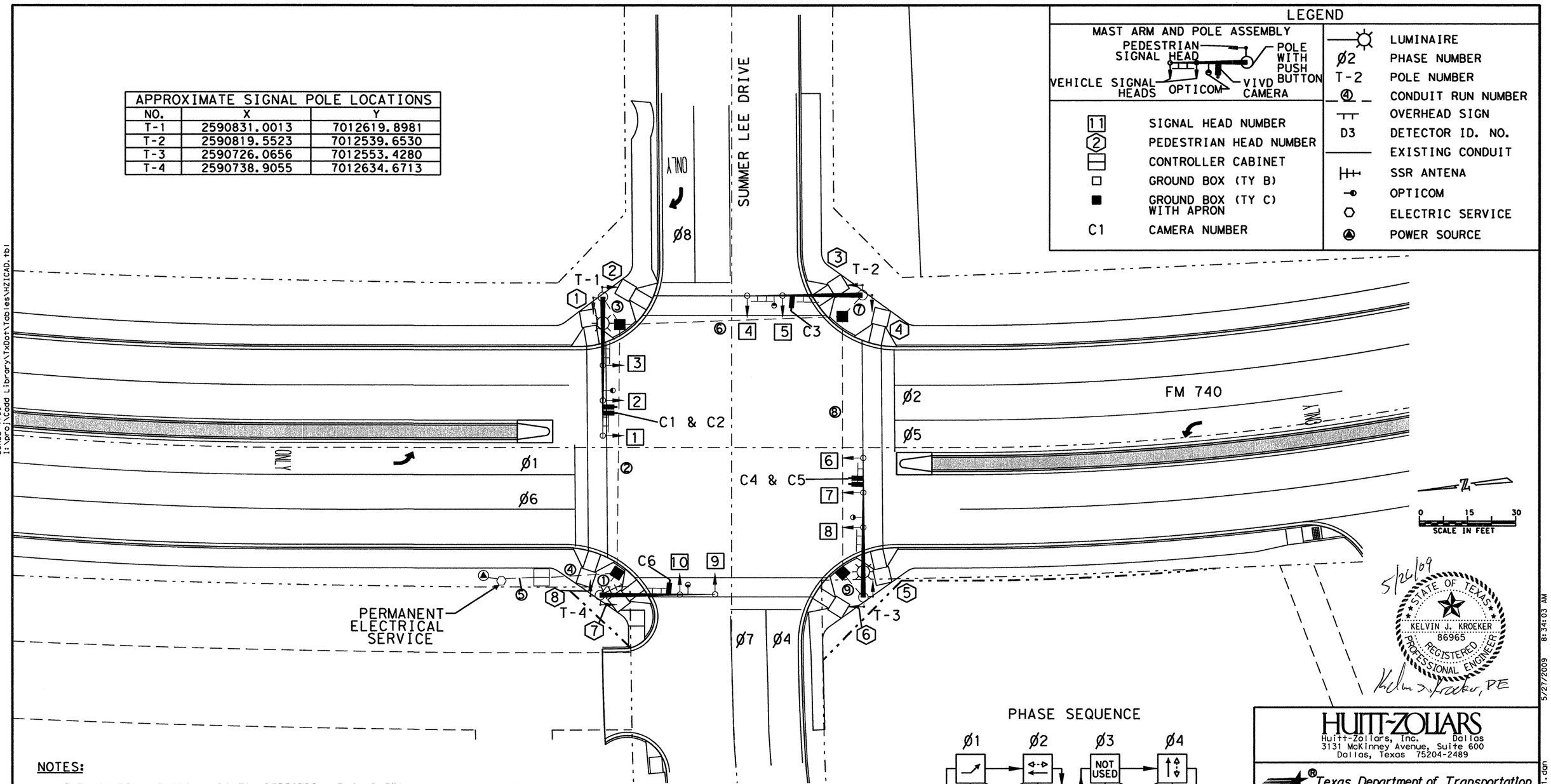
APPROXIMATE SIGNAL POLE LOCATIONS		
NO.	X	Y
T-1	2590831.0013	7012619.8981
T-2	2590819.5523	7012539.6530
T-3	2590726.0656	7012553.4280
T-4	2590738.9055	7012634.6713



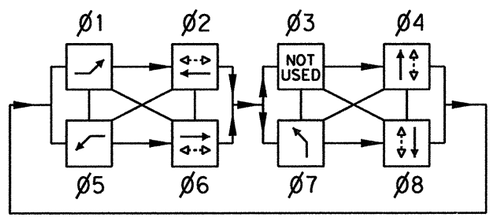
LEGEND

MAST ARM AND POLE ASSEMBLY

PEDESTRIAN SIGNAL HEAD — POLE WITH PUSH BUTTON — VEHICLE SIGNAL HEADS — OPTICOM — VIVD CAMERA

11	SIGNAL HEAD NUMBER
2	PEDESTRIAN HEAD NUMBER
	CONTROLLER CABINET
	GROUND BOX (TY B)
	GROUND BOX (TY C) WITH APRON
C1	CAMERA NUMBER
	LUMINAIRE
Ø2	PHASE NUMBER
T-2	POLE NUMBER
④	CONDUIT RUN NUMBER
	OVERHEAD SIGN
D3	DETECTOR ID. NO.
	EXISTING CONDUIT
	SSR ANTENA
	OPTICOM
	ELECTRIC SERVICE
	POWER SOURCE

PHASE SEQUENCE



NOTES:

1. THE LOCATION OF SIGNAL POLES, PEDESTRIAN PUSH BUTTONS, AND FIXTURES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE LOCAL CONDITIONS. EXACT LOCATION OF SIGNAL POLES, CONTROLLER, ETC. TO BE APPROVED BY THE ENGINEER IN THE FIELD.
2. FOR PUSH BUTTON LOCATIONS AND GROUND BOX TYPES, SEE "SIGNAL DESIGN TABLES" SHEET.
3. FOR PROPOSED CONCRETE PAD, SEE TXDOT STANDARD TS-CF.
4. FOR FOUNDATION SUMMARY TABLE, SEE TXDOT STANDARD TS-FD-99.
5. FOR PROPOSED SIGNS MOUNTED ON SIGNAL MAST ARM/POLE, SEE "TRAFFIC SIGNING LAYOUT" SHEET FOR FURTHER SIGN DETAILS.
6. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO ANY CONTRUCTION ACTIVITIES AND NOTIFY THE ENGINEER OF ANY DISCREPENCIES WITH DESIGN PLANS.
7. PROPOSED SIGNS MOUNTED ON SIGNAL MAST ARM/POLE SHALL BE BANDED. DRILLING THROUGH MAST ARM OR POLE WILL NOT BE ACCEPTED.
8. CONTRACTOR SHALL INSTALL SPREAD SPECTRUM RADIO THAT IS COMPATIBLE WITH THE EXISTING SSR SYSTEM. YAGI ANTENNA SHOULD BE ORIENTED TOWARD THE MASTER LOCATION AT FM 740 AT IH 30, OR AS DIRECTED BY THE ENGINEER.
9. DETECTION ZONES TO BE DETERMINED IN THE FIELD.
10. INSTALL NEMA TS-2 MASTER CONTROLLER SUBSIDIARY TO ITEM 680.
11. CONTRACTOR SHALL LABEL ALL CONDUCTORS AT ALL ACCESSIBLE POINTS.
12. INTERVAL TIMING TO BE PROVIDED BY TXDOT.
13. PROPOSED SIGNS MOUNTED ON SIGNAL MAST ARM/POLE WILL BE PAID UNDER ITEM 686, "TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)."
14. BACK OF CABINET SHOULD FACE THE ROADWAY.
15. INSTALL OPTICOM EQUIPMENT SUPPLIED BY THE CITY.

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED PROFESSIONAL ENGINEER
Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
AT SUMMER LEE DRIVE
SIGNAL LAYOUT

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
KJK	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	314
CHECK KJK	CONTROL 1014	SECTION 03	JOB 039	

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A

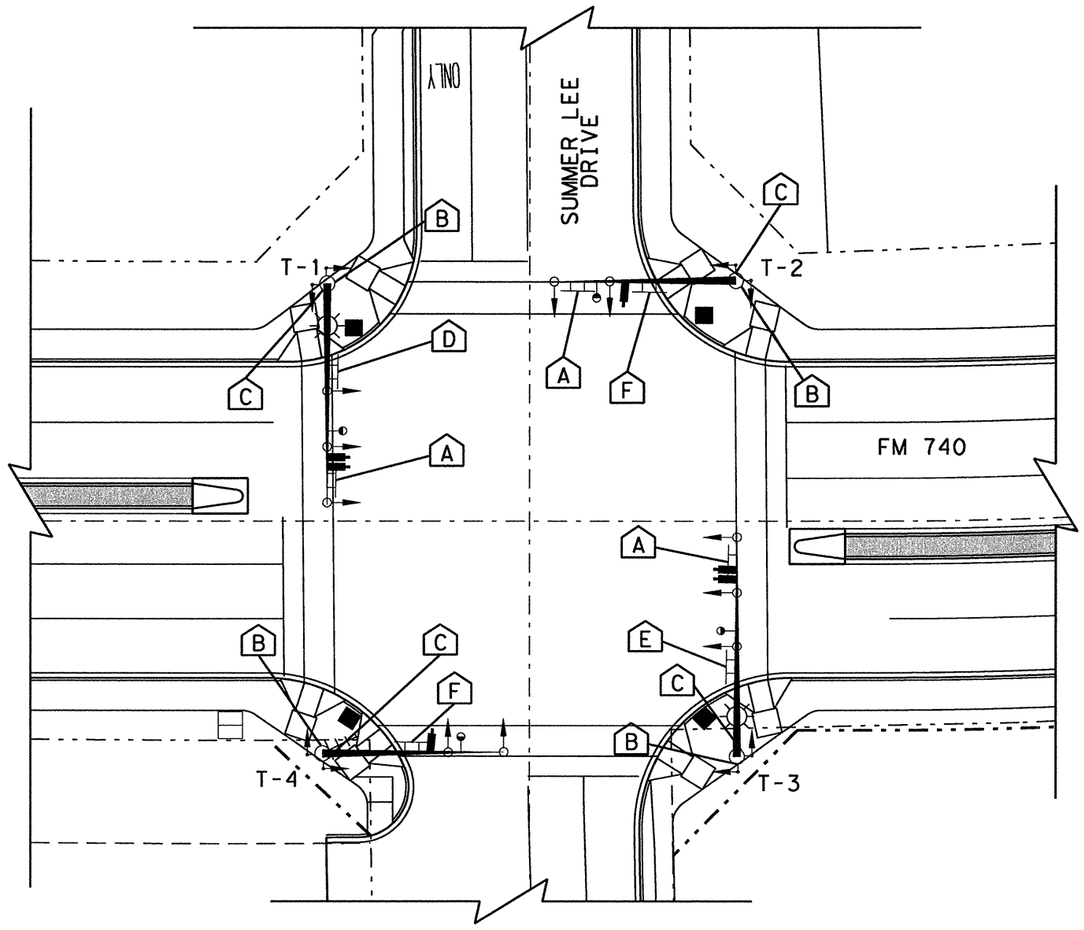
R10-12 (24"X30")
MOUNTED ON
MAST ARM
T-1, T-2, & T-3

B

R10-4bR (9"X12")
MOUNTED ON
SIGNAL POLE
T-1, T-2, T-3, & T-4

C

R10-4bL (9"X12")
MOUNTED ON
SIGNAL POLE
T-1, T-2, T-3, & T-4



LEGEND

MAST ARM AND POLE ASSEMBLY

A	SIGN NUMBER
T-2	POLE NUMBER
	CONTROLLER CABINET
	GROUND BOX (TY B)
	GROUND BOX (TY C) WITH APRON
	SMALL SIGN
	SSR ANTENA
	LUMINAIRE
	OPTICOM

N

0 15 30
SCALE IN FEET

D

D3-1
MOUNTED ON
MAST ARM
T-1

E

D3-1
MOUNTED ON
MAST ARM
T-3

F

D3-1
MOUNTED ON
MAST ARM
T-2 & T-4

NOTES:

1. SIGN LOCATIONS SHOWN ON PLANS ARE DIAGRAMATIC. CONTRACTOR SHALL PLACE SIGNS IN CONFORMANCE WITH THE 2006 "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS."
2. FOR SIGN DIMENSIONS AND DETAILS, SEE "STREET NAME SIGN DETAILS" FOR FURTHER INFORMATION.

5/26/09

Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
AT SUMMER LEE DRIVE
TRAFFIC SIGNING LAYOUT

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
KJK	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	315
CHECK KJK	CONTROL	SECTION	JOB	
	1014	03	039	

CONDUIT RUNS

RUN NO.	ITEM 618 SIZE/TYPE CONDUIT (FEET)					ITEM 620 ELECTRICAL CONDUCTORS				ITEM 684 SIG CAB TY-A			LENGTH OF RUN (FEET)
	1.25 IN. RMC	3 IN. PVC TRENCHED	3 IN. PVC BORE	4 IN. PVC TRENCH	4 IN. PVC BORED	NO. 6 XHHW WIRE	NO. 6 BARE WIRE	NO. 8 XHHW WIRE	* OPTICOM CABLE	14 AWG 16 CNDR CBL	VIVD COMMUN. CABLE	SSR CABLE	
	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	
1		10					1		1	1	1	1	10
2				8	72		1	2	3	3	5		80
3		11					1	2	1	1	2		11
4				2-23		2	1	2	4	4	6	1	23
5				11			1	2					11
6				10	61		1	2	2	2	3		71
7		11					1		1	1	1		11
8				8	74		1	2	1	1	2		82
9		11					1	2	1	1	2		11
TOTAL		43		83	207	46	310	578	599	599	980	33	310

* SHOWN FOR CONTRACTOR INFORMATION ONLY.

CABLE RUNS

CNDR COLOR	CABLE NO. 1 FROM T-1 TO CNTRL 16 CNDR	CABLE NO. 2 FROM T-2 TO CONTRL 16 CNDR	CABLE NO. 3 FROM T-3 TO CNTRL 16 CNDR	CABLE NO. 4 FROM T-4 TO CNTRL 16 CNDR
BLACK	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON
WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON
RED	SH 1,2,3 Ø2 RED	SH 4,5 Ø4 RED	SH 6,7,8 Ø6 RED	SH 9,10 Ø8 RED
GREEN	SH 1,2,3 Ø2 GR	SH 4,5 Ø4 GR	SH 6,7,8 Ø6 GR	SH 9,10 Ø8 GR
ORANGE	SH 1,2,3 Ø2 Y	SH 4,5 Ø4 Y	SH 6,7,8 Ø6 Y	SH 9,10 Ø8 Y
BLUE	SH 1 Ø5 GR ARROW	SH 4 Ø7 GR ARROW	SH 6 Ø1 GR ARROW	SPARE
WHITE/ BLACK	SH 1 Ø5 Y ARROW	SH 4 Ø7 Y ARROW	SH 6 Ø1 Y ARROW	SPARE
RED/ BLACK	Ø8 PED CALL	Ø2 PED CALL	Ø4 PED CALL	Ø6 PED CALL
GREEN/ BLACK	PH 1 Ø8-W	PH3 Ø2-W	PH 5 Ø4-W	PH 7 Ø6-W
ORANGE/ BLACK	PH 1 Ø8-DW	PH3 Ø2-DW	PH 5 Ø4-DW	PH 7 Ø6-DW
BLUE/ BLACK	PH 2 Ø2-W	PH4 Ø8-W	PH 6 Ø6-W	PH 8 Ø8-W
BLACK/ WHITE	PH 2 Ø2-DW	PH4 Ø8-DW	PH 6 Ø6-DW	PH 8 Ø8-DW
RED/ WHITE	Ø2 PED CALL	Ø8 PED CALL	Ø6 PED CALL	Ø8 PED CALL
GREEN/ WHITE	SPARE	SPARE	SPARE	SPARE
BLUE/ WHITE	SPARE	SPARE	SPARE	SPARE
BLACK/ RED	SPARE	SPARE	SPARE	SPARE

SIGNAL HEAD SUMMARY

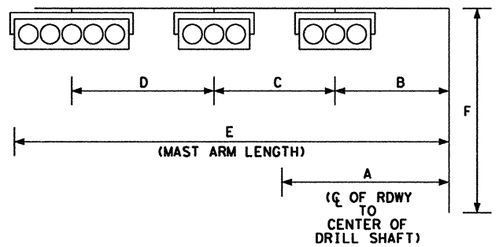
SIGNAL HEAD NO.	SIGNAL HEAD TYPE	12 INCH SIGNAL INDICATION *				TRAFFIC SIGNAL LAMPS 12' LED					PEDESTRIAN SIGNAL LAMPS (LED)	
		BLACK PLATE		VEH SIG SECTIONS	PED SIG SECTIONS	RED	YELLOW	GREEN	GREEN ARROW	YELLOW ARROW	WALK	DON'T WALK
		3 SEC	5 SEC									
		EA	EA	*EA	*EA	EA	EA	EA	EA	EA	EA	EA
1	H5LT		1	5		1	1	1	1	1		
2	H3	1		3		1	1	1				
3	H3	1		3		1	1	1				
4	H5LT		1	5		1	1	1	1	1		
5	H3	1		3		1	1	1				
6	H5LT		1	5		1	1	1	1	1		
7	H3	1		3		1	1	1				
8	H3	1		3		1	1	1				
9	H3	1		3		1	1	1				
10	H3	1		3		1	1	1				
1	152A				1						1	1
2	152A				1						1	1
3	152A				1						1	1
4	152A				1						1	1
5	152A				1						1	1
6	152A				1						1	1
7	152A				1						1	1
8	152A				1						1	1
TOTAL		7	3	36	8	10	10	10	3	3	8	8

* SHOWN FOR CONTRACTOR INFORMATION ONLY.

TRAFFIC SIGNAL ARMS

POLE NUMBER	MAST ARM LENGTH E	A	B	C	D	F	NUMBER OF SIGNAL HEADS	SIGNAL POLE FOUNDATION FDN TYPE	SIGNAL POLE FOUNDATION DS LNGTH	CNDRS & CABLES INSIDE POLE (LF) *LUM-A	5 CNDR	7 CNDR	OPTICOM *	#8 XHHW LUM	CABLE ILSL	VIVD COAXIAL	SPREAD SPECTRUM CABLE
	LF	LF	LF	LF	LF	LF	EA		LF	EA	LF	LF	LF	LF	LF	LF	LF
T-1	44	46.70	21	11	11	18	3	36-A	13	1	62	62	62	36		124	
T-2	36	47.32	25		11	18	2	36-A	13		54	54	54			54	
T-3	44	47.18	22	11	11	18	3	36-A	13	1	62	62	62	36		124	
T-4	36	46.57	25		11	18	2	36-A	13		54	54	54			54	30
				TOTAL			10		52	2	232	232	232	72		356	30

* SHOWN FOR CONTRACTOR INFORMATION ONLY.



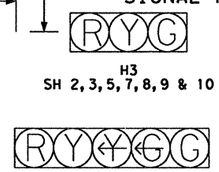
GROUND BOX SUMMARY

PULL BOX TYPE	QUANTITY (EA)
TYPE C W/ APRON	4

PED PUSH BUTTON

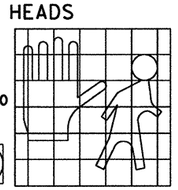
T-1	2
T-2	2
T-3	2
T-4	2
TOTAL	8

SIGNAL HEADS



H3
SH 2, 3, 5, 7, 8, 9 & 10

H5LT
SH 1, 4 & 6



SH 152A
PH 1-8

ELECTRICAL SERVICE CONNECTION

SERVICE POLE NO.	LOCATION	SERVICE POLE DESCRIPTION (SEE ED (4) (5)-3)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE (XHHW)	SAFETY SWITCH AMPS.	MAIN DISCONNECT CKT. BRK. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANEL BD./ LOADCENTER AMP RATING (MIN.)	CIRCUIT DESCRIPTION	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
1	NORTHEAST CORNER FM 740 & SUMMER LEE	TY D (120/240) 70 (NS) SS (E) GC (O)	1¼"	3/#6	N/A	2P/70	30	100	LIGHTING	2P/15	<7.1
									TEMPORARY SIGNAL	1P/50	
									PERMANENT SIGNAL	1P/50	

* SHOWN FOR CONTRACTOR INFORMATION ONLY.
ALL OPTICOM EQUIPMENT SHALL BE SUPPLIED BY THE CITY.

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER
Kelvin J. Kroeker, PE

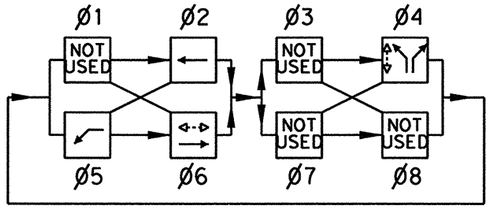
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
AT SUMMER LEE DRIVE
SIGNAL DESIGN TABLES

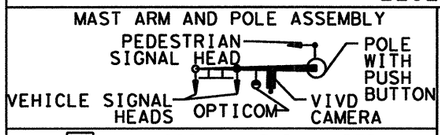
DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	316
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

APPROXIMATE SIGNAL POLE LOCATIONS		
NO.	X	Y
T-1	2590672.0791	7008594.9629
T-2	2590639.7437	7008513.6757
T-3	2590538.9155	7008517.7765
T-4	2590597.9860	7008636.0258
T-5	2590578.6614	7008624.6705

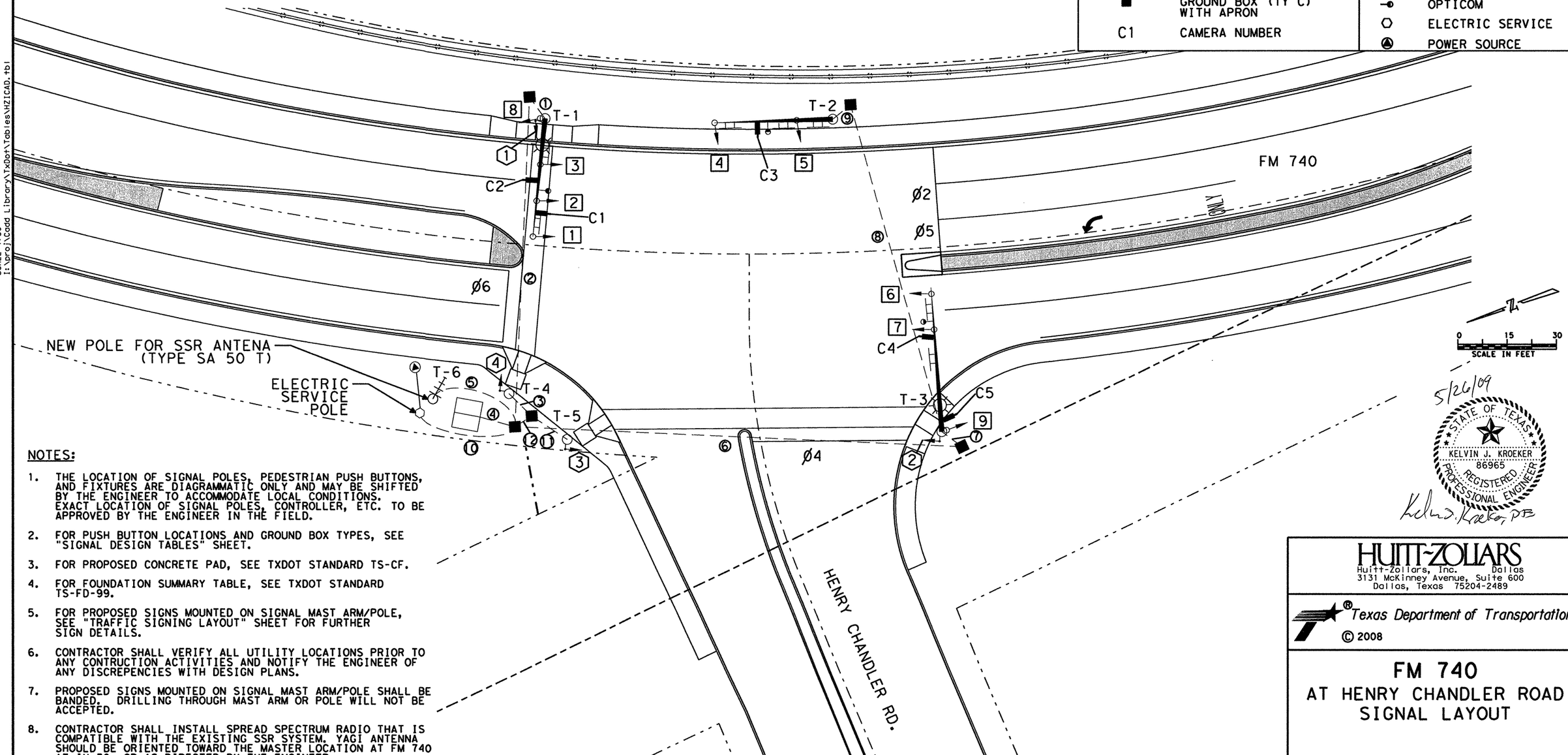
PHASE SEQUENCE



LEGEND



11	SIGNAL HEAD NUMBER
2	PEDESTRIAN HEAD NUMBER
	CONTROLLER CABINET
	GROUND BOX (TY B)
	GROUND BOX (TY C) WITH APRON
C1	CAMERA NUMBER
	LUMINAIRE
ø2	PHASE NUMBER
T-2	POLE NUMBER
④	CONDUIT RUN NUMBER
	OVERHEAD SIGN
D3	DETECTOR ID. NO.
	EXISTING CONDUIT
	SSR ANTENA
	OPTICOM
	ELECTRIC SERVICE
	POWER SOURCE



NOTES:

1. THE LOCATION OF SIGNAL POLES, PEDESTRIAN PUSH BUTTONS, AND FIXTURES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE LOCAL CONDITIONS. EXACT LOCATION OF SIGNAL POLES, CONTROLLER, ETC. TO BE APPROVED BY THE ENGINEER IN THE FIELD.
2. FOR PUSH BUTTON LOCATIONS AND GROUND BOX TYPES, SEE "SIGNAL DESIGN TABLES" SHEET.
3. FOR PROPOSED CONCRETE PAD, SEE TXDOT STANDARD TS-CF.
4. FOR FOUNDATION SUMMARY TABLE, SEE TXDOT STANDARD TS-FD-99.
5. FOR PROPOSED SIGNS MOUNTED ON SIGNAL MAST ARM/POLE, SEE "TRAFFIC SIGNING LAYOUT" SHEET FOR FURTHER SIGN DETAILS.
6. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO ANY CONTRUCTION ACTIVITIES AND NOTIFY THE ENGINEER OF ANY DISCREPENCIES WITH DESIGN PLANS.
7. PROPOSED SIGNS MOUNTED ON SIGNAL MAST ARM/POLE SHALL BE BANDED. DRILLING THROUGH MAST ARM OR POLE WILL NOT BE ACCEPTED.
8. CONTRACTOR SHALL INSTALL SPREAD SPECTRUM RADIO THAT IS COMPATIBLE WITH THE EXISTING SSR SYSTEM. YAGI ANTENNA SHOULD BE ORIENTED TOWARD THE MASTER LOCATION AT FM 740 AT IH 30, OR AS DIRECTED BY THE ENGINEER.
9. DETECTION ZONES TO BE DETERMINED IN THE FIELD.
10. INSTALL NEMA TS-2 MASTER CONTROLLER SUBSIDIARY TO ITEM 680.
11. CONTRACTOR SHALL LABEL ALL CONDUCTORS AT ALL ACCESSIBLE POINTS.
12. INTERVAL TIMING TO BE PROVIDED BY TXDOT.
13. PROPOSED SIGNS MOUNTED ON SIGNAL MAST ARM/POLE WILL BE PAID UNDER ITEM 686, "TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)."
14. BACK OF CABINET SHOULD FACE THE ROADWAY.
15. INSTALL OPTICOM EQUIPMENT SUPPLIED BY THE CITY.
16. SIGNAL HEADS 8 AND 9 SHALL BE MOUNTED ON TRAFFIC SIGNAL POLE AND NOT ON MAST ARM.

5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED PROFESSIONAL ENGINEER

Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
AT HENRY CHANDLER ROAD
SIGNAL LAYOUT

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
KJK	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	317
CHECK KJK	CONTROL	SECTION	JOB	
	1014	03	039	

A

R10-12 (24"X30")
MOUNTED ON
MAST ARM
T-1 & T-3

B

R9-3a (18"X18")
MOUNTED ON
SIGNAL POLE
T-2 & T-3

C

R10-4bR (9"X12")
MOUNTED ON
SIGNAL POLE
T-3 & T-5

D

R10-4bL (9"X12")
MOUNTED ON
SIGNAL POLE
T-1 & T-4

E

R3-5L (30"X36")
MOUNTED ON
SIGNAL POLE
T-2

F

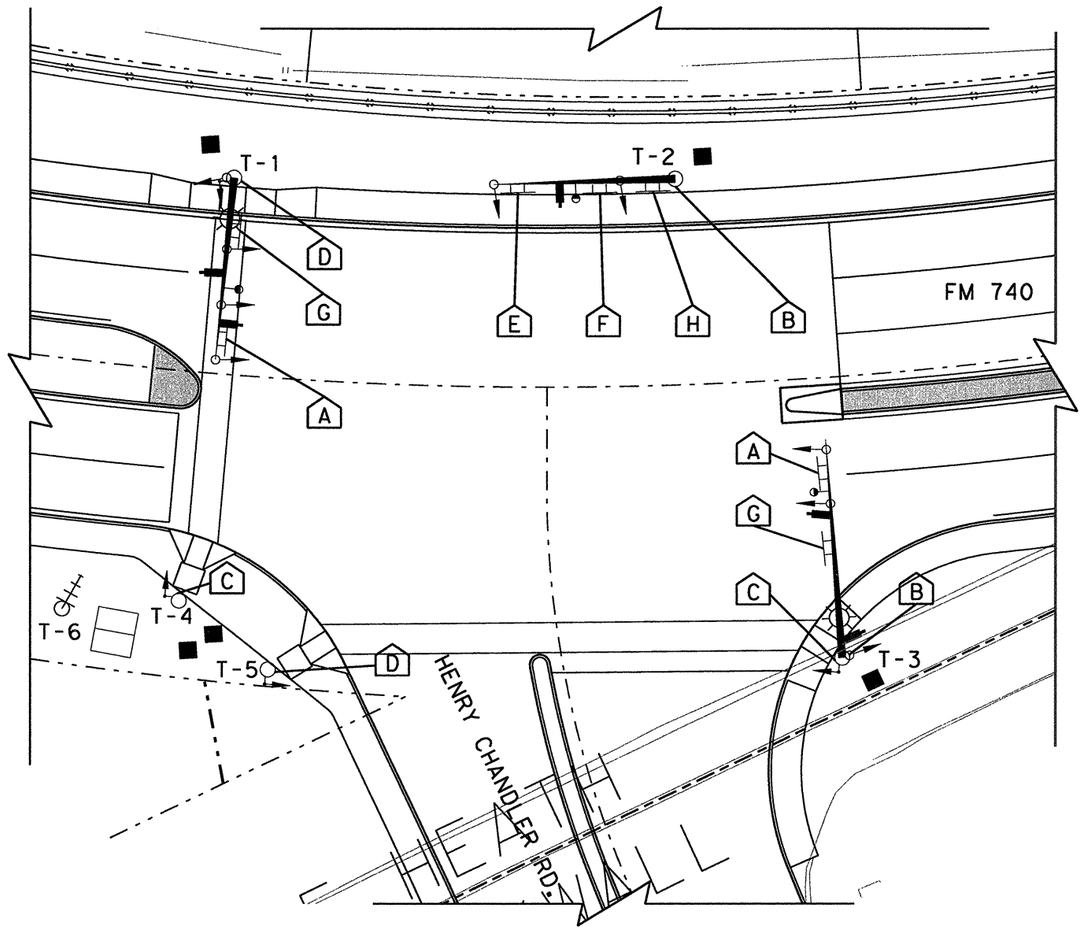
R3-5R (30"X36")
MOUNTED ON
SIGNAL POLE
T-2

G

D3-1
MOUNTED ON
MAST ARM
T-1 & T-3

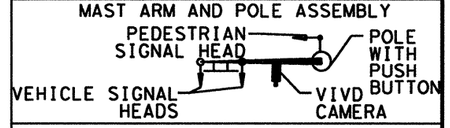
H

D3-1
MOUNTED ON
MAST ARM
T-2

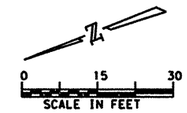


LEGEND

MAST ARM AND POLE ASSEMBLY



A	POLE NUMBER
T-2	POLE NUMBER
	CONTROLLER CABINET
	GROUND BOX (TY B)
	GROUND BOX (TY C) WITH APRON
	SMALL SIGN
	SSR ANTENA
	LUMINAIRE
	OPTICOM



NOTES:

1. SIGN LOCATIONS SHOWN ON PLANS ARE DIAGRAMATIC. CONTRACTOR SHALL PLACE SIGNS IN CONFORMANCE WITH THE 2006 "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS."
2. FOR SIGN DIMENSIONS AND DETAILS, SEE "STREET NAME SIGN DETAILS" FOR FURTHER INFORMATION.

5/26/09

Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
AT HENRY CHANDLER ROAD
TRAFFIC SIGNING
LAYOUT

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	318
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

foropezo
SCALE=1:30
I:\proj\Cadd Library\TxDot\Tables\HZICAD.tbl
i:\proj\01196321 - fm 740 signals\dgn\196321TSSL2.dgn
5/27/2009
8:34:07 AM

LEGEND

- PROPOSED SSR ANTENNA
- C2 — PROPOSED VIVDS CAMERA AND NUMBER
- PROPOSED VIVDS DETECTION ZONE
- PROPOSED MAST ARM SIGNAL WITH HEAD NUMBERS, 250 WATT H.P.S. LUMINAIRE, PED HEAD AND ST. SIGN (④ ⑤ ⑥)
- RIGHT OF WAY
- TYPE A GROUND BOX
- TYPE C GROUND BOX
- ④ — PROPOSED CONDUIT WITH RUN NUMBER
- OPTICOM

N

0 10 20
SCALE IN FEET

EXISTING POWER SOURCE
CONTACT ONCOR ELECTRIC CO.
RICHARD BREWSTER AT (214)486-4245
POLE #:
4080906
3640318

INSTALL SERVICE POLE
TY D (120/240)070(NS)SS(E)GC(O)
3187A RIDGE RD.

INSTALL CONTROLLER, CABINET, AND FOUNDATION (SEE NOTE A)

Ø8

Ø8-A

P1 P2 P3 P4

C1 C2 C3 C4 C5 C6

FM 740

Ø2-A
Ø2-B
Ø2
Ø5-A
Ø5
Ø2-C
Ø2-D
Ø2-E
Ø2-F

Ø6-G
Ø6-F
Ø6-E
Ø6-D
Ø6-C
Ø6-B
Ø6-A
Ø6
ONLY

210′ FROM STOP BAR
350′ FROM STOP BAR

YACHT CLUB DR.

Ø4-A
Ø4

ADDED SHEET
CHANGE ORDER

NOTE A:
FLASHER CABINET WITH OPTICOM EQUIPMENT TO BE PROVIDED BY THE CITY OF ROCKWALL AND INSTALLED BY CONTRACTOR ON THE SIDE OF CONTROLLER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Signature , P.E. 12/21/10 Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT
FM 740 AT YACHT CLUB DR

SCALE: 1"=30′ SHEET 1 OF 3

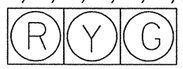
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS MHA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LDL	TEXAS	DAL	ROCKWALL	318 A-A
CHECK MBY	CONTROL	SECTION	JOB	
	1014	03	039	

FILE: U:\FM 740 at Yacht Club\FM 740 Signal Layout+New.dgn

RUN #	CONDUIT TYPE (LF)			WIRE SIZE AND TYPE (EA)							TOTAL LENGTH OF RUNS (LF)	RUN #
				CONDUCTORS				SIGNAL CABLE TY-A				
	2"	3" TRENCH	4" BORE	NO. 6 XHHW	NO. 6 BARE	NO. 8 XHHW	16 CNDR TY-A 14 AWG	SSR COAX	VIVDS CABLE	OPTICOM* CABLE		
	PVC	PVC	PVC									
1		2@17		2	2		4	1	6	3	17	1
2		8			1	4	1	1	1	2	8	2
3			43	2	1	2	1		2		43	3
4	6			2	1	2					6	4
5		16			1		1		2		16	5
6			88		1	2	2		3	1	88	6
7		7			1	2	1		3	1	7	7
8			55		1		1				55	8
9	13				1		1				13	9
	19	65	186	132	270	320	386	25	513	162	TOTAL	

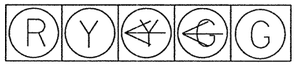
*SUPPLIED BY CITY OF ROCKWALL

SH 2, 3, 4, 5, 6, 7, 8, 9



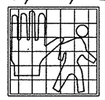
H3

SH 1



H5LT

SH 10, 11, 12, 13



143C/152A

SIGNAL HEAD #	SIGNAL HEAD DETAILS								PED SIG SECT LED LAMP EA
	12" SIG IND			LED SIGNAL LAMPS					
	SIG HEAD TYPE	BACKPLATE 3 SEC EA	BACKPLATE 5 SEC EA	RED EA	YEL EA	GRN EA	YEL ARW EA	GRN ARW EA	
2, 3, 4, 5, 6, 7, 8, 9	H3	8		8	8	8			
1	H5LT		1	1	1	1	1	1	
10, 13	152A								2
11, 12	143C								2
TOTAL		8	1	9	9	9	1	1	4

CABLE TERMINATION CHART				
CNDR. COLOR	CABLE 1 FROM P1 TO CNTRL. 16 CNDR.	CABLE 2 FROM P2 TO CNTRL. 16 CNDR.	CABLE 3 FROM P3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P4 TO CNTRL. 16 CNDR.
BLACK	P.B. COMMON	SPARE	P.B. COMMON	P.B. COMMON
WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON
RED	SH 1, 2, 3 R	SH 4, 5 R	SH 6, 7 R	SPARE
GREEN	SH 1, 2, 3 G	SH 4, 5 G	SH 6, 7 G	SPARE
ORANGE	SH 1, 2, 3 Y	SH 4, 5 Y	SH 6, 7 Y	SPARE
BLUE	SH 1 ~~6~~	SPARE	SPARE	SPARE
WHITE/ BLACK	SH 1 ~~Y~~	SPARE	SPARE	SPARE
RED/ BLACK	SPARE	SPARE	SH 8, 9 R	Ø8 PED CALL
GRN/ BLACK	SPARE	SPARE	SH 8, 9 G	SH 12 W
ORANGE/ BLACK	Ø8 PED CALL	SPARE	SH 8, 9 Y	SH 12 DW
BLUE/ BLACK	SPARE	SPARE	Ø6 PED CALL	Ø6 PED CALL
BLACK/ WHITE	SPARE	SPARE	SPARE	SPARE
RED/ WHITE	SH 13 DW	SPARE	SH 10 DW	SH 11 DW
GRN/ WHITE	SH 13 W	SPARE	SH 10 W	SH 11 W
BLUE/ WHITE	SPARE	SPARE	SPARE	SPARE
BLACK/ RED	SPARE	SPARE	SPARE	SPARE

ELECTRICAL SERVICE DATA									
ELECTRICAL SERVICE DESCRIPTION (SEE ED(4))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
TY D (120/240) 070 (NS) SS (E) GC (O)	1 1/4	3/#4	N/A	2P/70	30	100	T.S. LIGHTING	1P/50 2P/15	<7.1

GROUND BOX SUMMARY			
TYPE	DESCRIPTION	UNIT	QTY.
A	122311 W/ APRON	EA	1
C	162911 W/ APRON	EA	3

7 ADDED SHEET CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Lisa D Lawson, P.E. 11/22/10
Signature Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT FM 740 AT YACHT CLUB DR

SHEET 2 OF 3

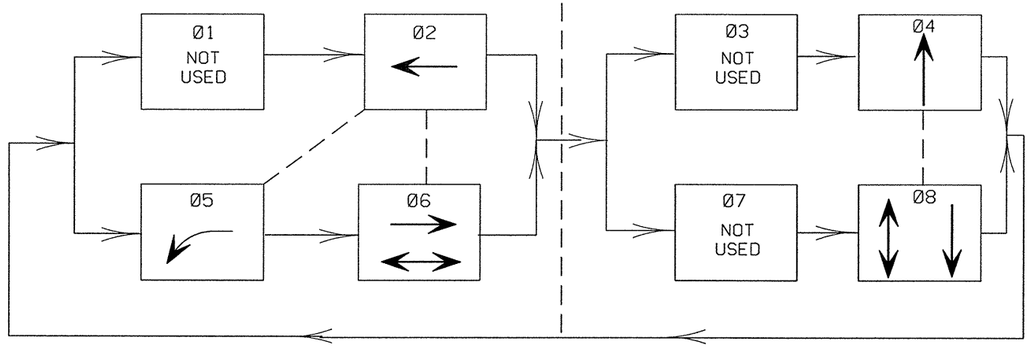
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MHA	TEXAS	DAL	ROCKWALL	3 of 8 8-B
CHECK	CONTROL	SECTION	JOB	
LDL	1014	03	039	
CHECK				
MBY				

FILE: u:\fm 740 at yacht club\FM 740 Charts.dgn

VIVDS DETECTION ZONE DETAILS

CAMERA	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE LOCATION	ZONE	SETBACK DISTANCE	DETECT UNIT	DELAY INHIBIT
C1	MAST ARM POLE P1	24'	STOPBAR	Ø2-A	N/A	Ø2-1	Ø2R
				Ø2-B			
				Ø5-A		Ø5-1	Ø5G
C2	MAST ARM POLE P1	24'	SETBACK	Ø6-D	210'	Ø6-2	Ø6G
				Ø6-E			
				Ø6-F	350'	Ø6-3	Ø6G
				Ø6-G			
C3	MAST ARM POLE P2	24'	STOPBAR	Ø4-A	N/A	Ø4-1	Ø4G
C4	MAST ARM POLE P3	24'	SETBACK	Ø2-C	210'	Ø2-2	Ø2G
				Ø2-D			
				Ø2-E	350'	Ø2-3	Ø2G
				Ø2-F			
C5	MAST ARM POLE P3	24'	STOPBAR	Ø6-A	N/A	Ø6-1	Ø6R
				Ø6-B			
				Ø6-C			
C6	MAST ARM POLE P3	24'	STOPBAR	Ø8-A	N/A	Ø8-1	Ø8G

NOTE: SETBACK DISTANCE MEASURED FROM THE STOP LINE TO THE DETECTION ZONE



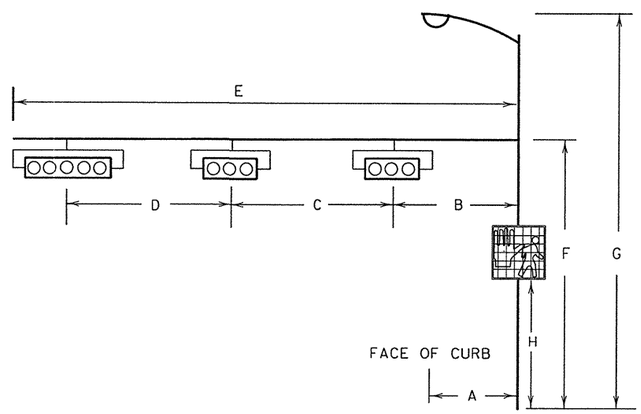
PHASE SEQUENCE
Ø5 IS A PROTECTED/PERMITTED LEFT TURN PHASE

NOTE:
DURING MAINTENANCE FLASH, SIGNAL HEADS 1,2,3,6 AND 7 SHALL FLASH YELLOW
ALL OTHER SIGNAL HEADS SHALL FLASH RED
DURING EMERGENCY FLASH, ALL SIGNAL HEADS FLASH RED

SIGNAL HEAD & POLE PLACEMENT (LF)

POLE NUMBER	FND. TYPE WIND ZONE 80 MPH	DRILLED SHAFT LENGTH 24" DIA TYPE A ITEM 416 (LF)	DRILLED SHAFT LENGTH 30" DIA TYPE A ITEM 416 (LF)	DRILLED SHAFT LENGTH 36" DIA TYPE A ITEM 416 (LF)	DRILLED SHAFT LENGTH 48" DIA TYPE A ITEM 416 (LF)	WIRE INSIDE POLE (LF) (ITEM 684) SIG. CABLE TY-A SIGNAL HEADS 5 CNDR CABLE 14 AWG	WIRE INSIDE POLE (LF) (ITEM 684) SIG. CABLE TY-A SIGNAL HEADS 7 CNDR CABLE 14 AWG	WIRE INSIDE POLE (LF) (ITEM 684) SIG. CABLE TY-A PED. HEADS 5 CNDR CABLE 14 AWG	WIRE INSIDE POLE (LF) (ITEM 620) LUMINAIRE NO.12 XHHW	WIRE INSIDE POLE (LF) CITY SUPPLIED OPTICOM CABLE	WIRE INSIDE POLE (LF) (ITEM 6006) SSR COAX CABLE	WIRE INSIDE POLE (LF) (ITEM 6266) VIVDS COAX CABLE	** NO. OF HEADS	LUM-A	DIMENSION (LF) A	B	C	D	E	F	G	H
P1	36-A			13.0		80.0	56.0	10.0	-	-	-	92.0	3		10	15	12	10	40	19	-	10
P2	30-A		11.0			64.0	-	-	80.0	70.0	35.0	32.0	2	1	12	8	10	-	24	19	30	-
P3	30-A		11.0			156.0	-	10.0	80.0	46.0	-	116.0	4	1	6	15	10	-	28	19	30	10
															11	15	10	-	28	19	-	
P4	24-A	6.0				-	-	20.0	-	-	-	-			8	-	-	-	-	-	-	10
TOTAL		6.0	22.0	13.0		300.0	56.0	40.0	160.0	116.0	35.0	240.0										

** DOES NOT INCLUDE PED HEADS OR VERTICAL HEADS



ADDED SHEET
CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Lisa D Lawson , P.E. 11/24/10
Signature Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT FM 740 AT YACHT CLUB DR

SHEET 3 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS MHA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LDL	TEXAS	DAL	ROCKWALL	3/8
CHECK MBY	CONTROL	SECTION	JOB	C-C
	1014	03	039	

FILE: u:\fm 740 at yacht club\FM 740 Charts.dgn

LEGEND

- PROPOSED SSR ANTENNA
- C2 — PROPOSED VIVDS CAMERA AND NUMBER
- PROPOSED VIVDS DETECTION ZONE
- (4) (5) (6) — PROPOSED MAST ARM SIGNAL WITH HEAD NUMBERS, 250 WATT H.P.S. LUMINAIRE, PED HEAD AND ST. SIGN
- RIGHT OF WAY
- TYPE A GROUND BOX
- TYPE C GROUND BOX
- (4) — PROPOSED CONDUIT WITH RUN NUMBER

N

0 10 20
SCALE IN FEET

GENERAL NOTE:
OPTICOM WIRE TO BE PROVIDED BY THE CITY OF HEATH AND INSTALLED BY THE CONTRACTOR FOR FUTURE USE.

HEATHLAND CROSSING

Ø8

Ø8-A

Ø8-B

C4

P4

P5

P3

P2

P1

P6

PROP ROW

FM 740

Ø1

Ø1-A

Ø6

Ø6-B

Ø6-A

Ø6-D

Ø6-C

Ø6-F

Ø6-E

C3

C2

Ø2-A

Ø2-B

Ø2

Ø5-A

Ø5 ONLY

C5

C6

190′ FROM STOP BAR

350′ FROM STOP BAR

Ø2-C

Ø2-D

C1

Ø4-B

Ø4-A

Ø4

FM 1140

EXIST ROW

INSTALL CONTROLLER, CABINET, AND FOUNDATION

INSTALL SERVICE POLE
TY D (120/240)070(NS)SS(E)GC(O)
1575 LAURENCE DRIVE SGNL

EXISTING POWER SOURCE
CONTACT ONCOR ELECTRIC CO.
RICHARD BREWSTER AT (214)486-4245
POLE #: 2316-435-1270

7 ADDED SHEET CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Signature , P.E. 12/21/10 Date

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT
FM 740 AT FM 1140

SCALE: 1"=30′ SHEET 1 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS MHA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LDL	TEXAS	DAL	ROCKWALL	3/8
CHECK MBY	CONTROL	SECTION	JOB	D-D
	1014	03	039	

FILE: U:\FM 740 at FM 1140\FM 740 at FM 1140 Signal Layout.dgn

RUN #	CONDUIT TYPE (LF)				WIRE SIZE AND TYPE (EA)							TOTAL LENGTH OF RUNS (LF)	RUN #
					CONDUCTORS				SIGNAL CABLE TY-A				
	2" TRENCH PVC	3" PVC	2" BORE PVC	3" PVC	NO. 6 XHHW	NO. 6 BARE	NO. 8 XHHW	16 CNDR TY-A 14 AWG	SSR COAX	VIVDS CABLE	OPTICOM* CABLE		
1	58				2	1	2					58	1
2		2@19			2	2		6	1	6	4	19	2
3		12				1	4	1	1	1	1	12	3
4		43				1		2		2	1	43	4
5	11					1		1		2	1	11	5
6				81		1	2	3		3	2	81	6
7	17					1		1				17	7
8				112		1	2	2		3	2	112	8
9		17				1	2	1		2	1	17	9
10	26					1		1		1	1	26	10
11	6					1		1				6	11
12			101			1		1				101	12
	118	110	101	193	154	522	584	857	31	873	571	TOTAL	

*SUPPLIED BY CITY OF HEATH FOR FUTURE USE.

GROUND BOX SUMMARY			
TYPE	DESCRIPTION	UNIT	QTY.
A	122311 W/ APRON	EA	1
C	162911 W/ APRON	EA	4

ELECTRICAL SERVICE DATA

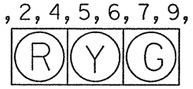
ELECTRICAL SERVICE DESCRIPTION(SEE ED(4))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
TY D (120/240)070(NS)SS(E)GC(O)	1¼	3/#4	N/A	2P/70	30	100	T.S. LIGHTING	1P/50 2P/15	<7.1

CABLE TERMINATION CHART

CNDR. COLOR	CABLE 1 FROM P1 TO CNTRL. 16 CNDR.	CABLE 2 FROM P2 TO CNTRL. 16 CNDR.	CABLE 3 FROM P3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P4 TO CNTRL. 16 CNDR.	CABLE 5 FROM P5 TO CNTRL. 16 CNDR.	CABLE 6 FROM P6 TO CNTRL. 16 CNDR.
BLACK	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	SPARE
WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON
RED	SH 1,2 R	SPARE	SH 3,4,5 R	SH 6,7 R	SPARE	SH 8,9,10 R
GREEN	SH 1,2 G	SPARE	SH 3,4,5 G	SH 6,7 G	SPARE	SH 8,9,10 G
ORANGE	SH 1,2 Y	SPARE	SH 3,4,5 Y	SH 6,7 Y	SPARE	SH 8,9,10 Y
BLUE	SPARE	SPARE	SH 3 ~~G~~	SPARE	SPARE	SH 8 ~~G~~
WHITE/ BLACK	SPARE	SPARE	SH 3 ~~Y~~	SPARE	SPARE	SH 8 ~~Y~~
RED/ BLACK	Ø6 PED CALL	Ø6 PED CALL	08 PED CALL	Ø2 PED CALL	Ø2 PED CALL	SPARE
GRN/ BLACK	SH 11 W	SH 12 W	SH 14 W	SH 15 W	SH 16 W	SPARE
ORANGE/ BLACK	SH 11 DW	SH 12 DW	SH 14 DW	SH 15 DW	SH 16 DW	SPARE
BLUE/ BLACK	SPARE	08 PED CALL	SPARE	SPARE	SPARE	SPARE
BLACK/ WHITE	SPARE	SH 13 W	SPARE	SPARE	SPARE	SPARE
RED/ WHITE	SPARE	SH 13 DW	SPARE	SPARE	SPARE	SPARE
GRN/ WHITE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
BLUE/ WHITE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
BLACK/ RED	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

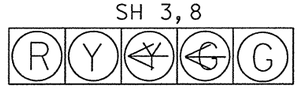
SIGNAL HEAD #	12" SIG IND			LED SIGNAL LAMPS					PED SIG SECT LED LAMP EA
	SIG HEAD TYPE	BACKPLATE 3 SEC EA	BACKPLATE 5 SEC EA	RED EA	YEL EA	GRN EA	YEL ARW EA	GRN ARW EA	
1,2,4,5,6,7, 9,10	H3	8		8	8	8			
3,8	H5LT		2	2	2	2	2	2	
11,14,15,16	152A								4
12,13	143C								2
TOTAL		8	2	10	10	10	2	2	6

SH 1,2,4,5,6,7,9,10



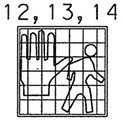
H3

SH 3,8



H5LT

SH 11,12,13,14,15,16



143C/152A

ADDED SHEET
CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Signature , P.E. 12/2/10 Date

Texas Department of Transportation
©2010

TRAFFIC SIGNAL LAYOUT FM 740 AT FM 1140

SHEET 2 OF 3

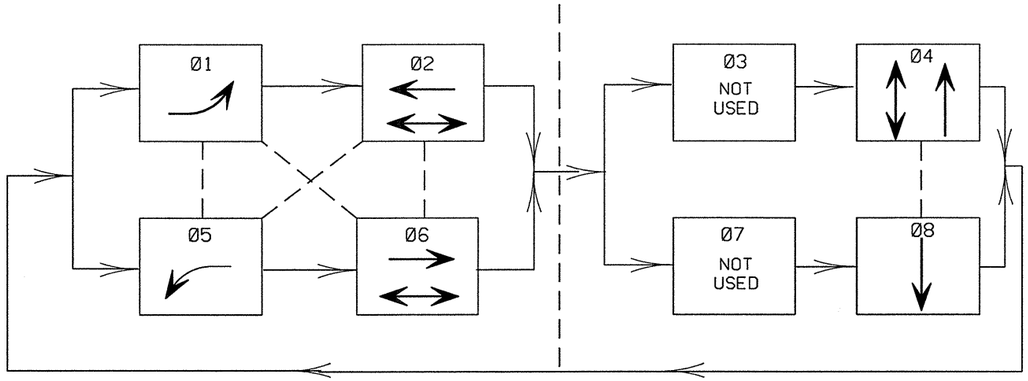
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS MHA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LDL	TEXAS	DAL	ROCKWALL	3/8
CHECK MBY	CONTROL	SECTION	JOB	E-E
	1014	03	039	

FILE: U:\FM 740 at FM 1140\FM 740 at FM 1140 Charts.dgn

VIVDS DETECTION ZONE DETAILS

CAMERA	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE LOCATION	ZONE	SETBACK DISTANCE	DETECT UNIT	DELAY INHIBIT
C1	MAST ARM POLE P1	24'	STOPBAR	08-A	N/A	08-1	08G
				08-B			
C2	MAST ARM POLE P3	24'	STOPBAR	02-A	N/A	02-1	02R
				02-B			
				05-A		05-1	05G
C3	MAST ARM POLE P3	24'	SETBACK	06-C	190'	06-2	06G
				06-D			
				06-E	350'	06-3	06G
				06-F			
C4	MAST ARM POLE P4	24'	STOPBAR	04-A	N/A	04-1	04G
				04-B			
C5	MAST ARM POLE P6	24'	STOPBAR	06-A	N/A	06-1	06R
				06-B			
				01-A		01-1	01G
C6	MAST ARM POLE P6	24'	SETBACK	02-C	190'	02-2	02G
				02-D	350'	02-3	02G

NOTE: SETBACK DISTANCE MEASURED FROM THE STOP LINE TO THE DETECTION ZONE



PHASE SEQUENCE
Ø1 & Ø5 ARE PROTECTED/PERMITTED LEFT TURN PHASES

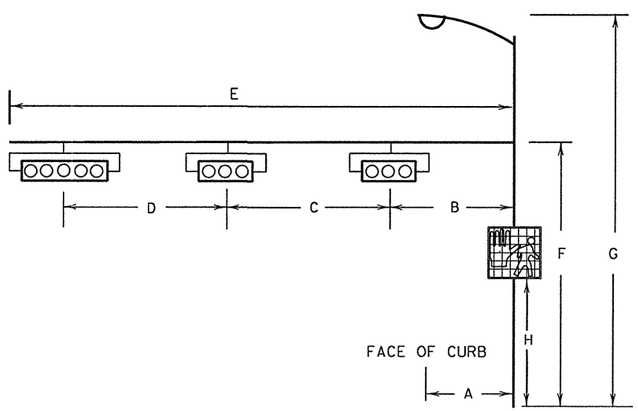
NOTE:
DURING MAINTENANCE FLASH, SIGNAL HEADS 3, 4, 5, 8, 9 AND 10 SHALL FLASH YELLOW
ALL OTHER SIGNAL HEADS SHALL FLASH RED
DURING EMERGENCY FLASH, ALL SIGNAL HEADS FLASH RED

SIGNAL HEAD & POLE PLACEMENT

POLE NUMBER	FND. TYPE WIND ZONE 80 MPH	DRILLED SHAFT LENGTH 24" DIA TYPE A ITEM 416 (LF)	30" DIA TYPE A ITEM 416 (LF)	36" DIA TYPE A ITEM 416 (LF)	48" DIA TYPE A ITEM 416 (LF)	WIRE INSIDE POLE (LF) (ITEM 684) SIG. CABLE TY-A SIGNAL HEADS 5 CNDR CABLE 14 AWG	SIGNAL HEADS 7 CNDR CABLE 14 AWG	PED. HEADS 5 CNDR CABLE 14 AWG	(ITEM 620) LUMINAIRE NO. 12 XHHW	CITY SUPPLIED OPTICOM* CABLE	(ITEM 6006) SSR COAX CABLE	(ITEM 6266) VIVDS COAX CABLE	** NO. OF HEADS	LUM-A	DIMENSION (LF) A	B	C	D	E	F	G	H
P1	36-A			13.0		98.0	-	10.0	80.0	50.0	35.0	51.0	2	1	13	24	12	-	40	19	-	10
P2	24-A	6.0				-	-	20.0	-	-	-	-			8	-	-	-	-	-	30	10
P3	36-A			13.0		77.0	56.0	10.0	80.0	44.0	-	98.0	3	1	11	14	11	12	40	19	30	10
P4	36-A			13.0		93.0	-	10.0	-	47.0	-	48.0	2		12	22	11	-	36	19	-	10
P5	24-A	6.0				-	-	10.0	-	-	-	-			10	-	-	-	-	-	-	10
P6	36-A			13.0		74.0	52.0	-	-	42.0	-	93.0	3		8	13	10	10	36	19	-	-
TOTAL		12.0		52.0		342.0	108.0	60.0	160.0	183.0	35.0	290.0										

** DOES NOT INCLUDE PED HEADS OR VERTICAL HEADS

*COIL IN POLE BASE FOR FUTURE USE



ADDED SHEET
CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Lisa D Lawson, P.E. 12/2/10
Signature Date

Texas Department of Transportation
©2010

TRAFFIC SIGNAL LAYOUT FM 740 AT FM 1140

SHEET 3 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS MHA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LDL	TEXAS	DAL	ROCKWALL	3B
	CONTROL	SECTION	JOB	
CHECK MBY	1014	03	039	F-F

FILE: U:\FM 740 at FM 1140\FM 740 at FM 1140 Charts.dgn

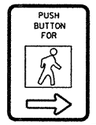
A

R10-12
(24"X30")
1 EA.

B

R10-4bL
(9"X12")
1 EA.

C



R10-4bR
(9"X12")
3 EA.

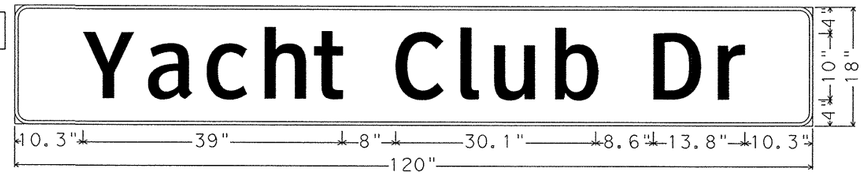
D

R3-5R
(30"X36")
1 EA.

G

R9-3A
(24"X24")
2 EA.

E



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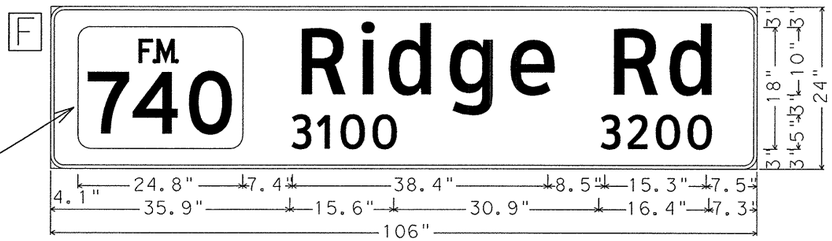
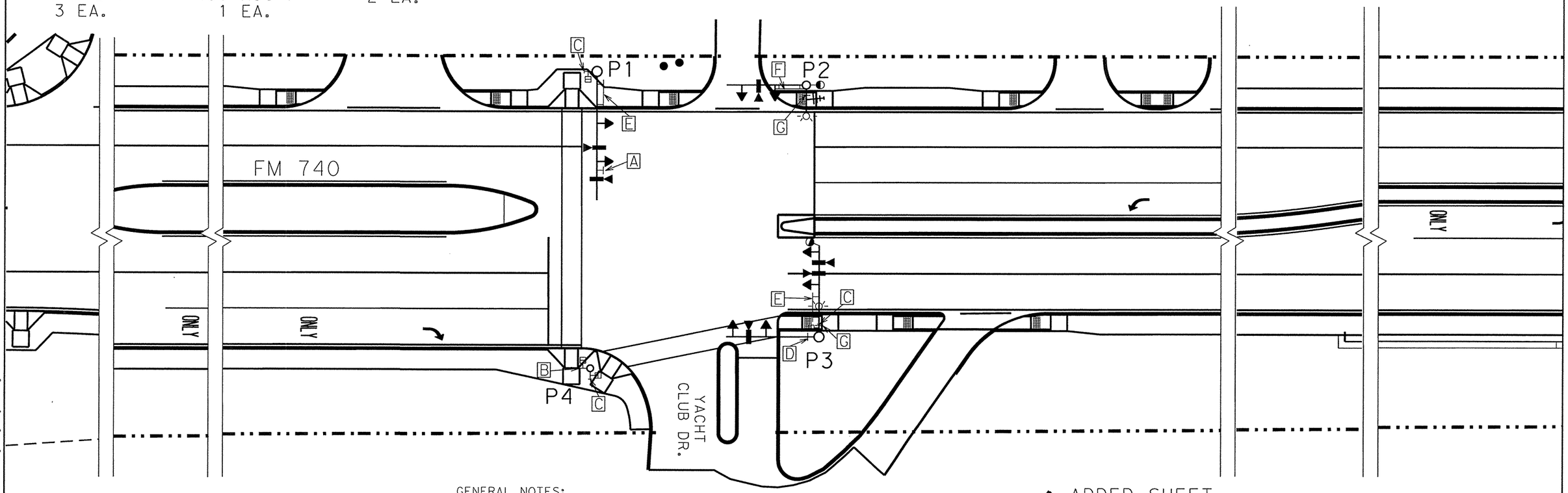


**M1-6F(3)



LEGEND

PROPOSED MAST ARM SIGNAL WITH HEAD NUMBERS, 250 WATT H.P.S. LUMINAIRE, PED HEAD AND ST. SIGN

RIGHT OF WAY

[A] PROPOSED SIGN DESIGNATION

GENERAL NOTES:

ALL LETTERING SHALL BE SERIES CV-3W.
ALL BORDERS SHALL BE 0.5".
EACH BORDER RADIUS SHALL BE 2.0".
ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" LATEST ADDITION AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE.
SIGN BACKGROUNDS SHALL BE OF FLAT SURFACE REFLECTIVE SHEETING CONFORMING WITH THE SPECIFICATIONS (TYPE C).
THE SIGN BLANKS SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 0.080 INCHES THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)".
ALL SHIELDS SHALL BE DIRECT-APPLY SHEETING.
SEE ARROW DETAIL ON TSR(6)-03

** USE 24" SHIELD DESIGN AND REDUCE DIMENSIONS BY 25%

7 ADDED SHEET CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Lisa D Lawson ,P.E. 11/29/10
Signature Date

Texas Department of Transportation ©2010

TRAFFIC SIGNING LAYOUT FM 740 AT YACHT CLUB DR

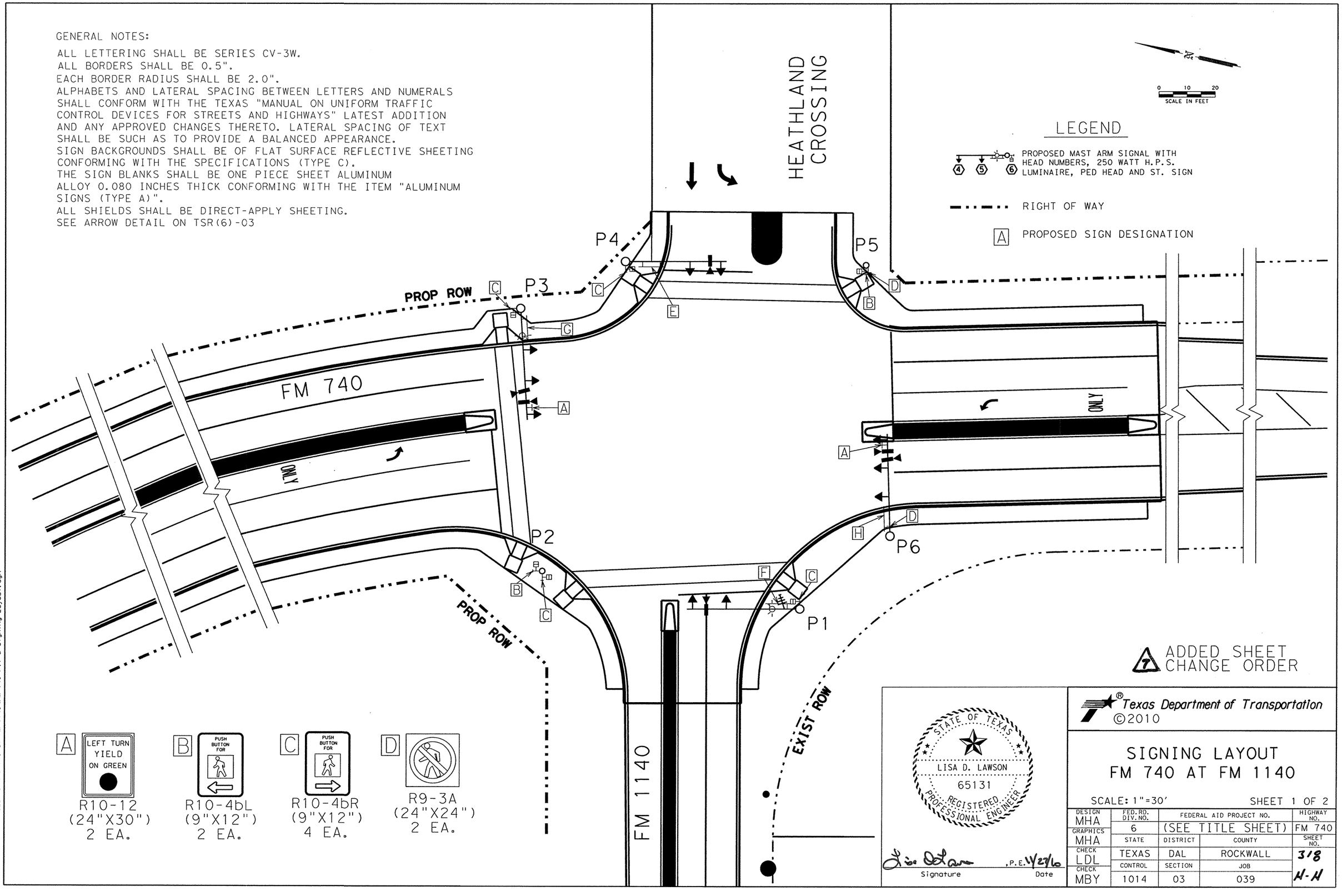
SCALE: 1"=30' SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MHA				
CHECK	TEXAS	DAL	ROCKWALL	318
LDL	CONTROL	SECTION	JOB	
CHECK	1014	03	039	G-G
MBY				

FILE: u:\fm 740 at yacht club\FM 740 Pvt & Signing Layout.dgn

GENERAL NOTES:

ALL LETTERING SHALL BE SERIES CV-3W.
ALL BORDERS SHALL BE 0.5".
EACH BORDER RADIUS SHALL BE 2.0".
ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" LATEST ADDITION AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE.
SIGN BACKGROUNDS SHALL BE OF FLAT SURFACE REFLECTIVE SHEETING CONFORMING WITH THE SPECIFICATIONS (TYPE C).
THE SIGN BLANKS SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 0.080 INCHES THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)".
ALL SHIELDS SHALL BE DIRECT-APPLY SHEETING.
SEE ARROW DETAIL ON TSR(6)-03



SCALE IN FEET: 0 10 20

LEGEND

- PROPOSED MAST ARM SIGNAL WITH HEAD NUMBERS, 250 WATT H.P.S. LUMINAIRE, PED HEAD AND ST. SIGN
- RIGHT OF WAY
- [A] PROPOSED SIGN DESIGNATION

A — LEFT TURN YIELD ON GREEN
R10-12 (24"X30") 2 EA.

B — PUSH BUTTON FOR
R10-4bL (9"X12") 2 EA.

C — PUSH BUTTON FOR
R10-4bR (9"X12") 4 EA.

D
R9-3A (24"X24") 2 EA.

ADDED SHEET CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED PROFESSIONAL ENGINEER

Lisa DLawson ,P.E. 4/27/10
Signature Date

Texas Department of Transportation

SIGNING LAYOUT FM 740 AT FM 1140

SCALE: 1"=30' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MHA				
CHECK	TEXAS	DAL	ROCKWALL	318
LDL	CONTROL	SECTION	JOB	
CHECK				H-H
MBY	1014	03	039	

FILE: U:\FM 740 at FM 1140\FM 740 Pvt & Signing Layout.dgn

LEVELS DISPLAYED

1	2	3	4				9	10	11	12	13	14	15	16		
17	18	19	20	21			25	26	27	28	29	30	31	32		
33	34	35	36	37			41	42	43	44	45	46	47	48		
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

ACC:

SUMMARY OF SMALL SIGNS

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

Post Type: FRP = Fiberglass; TWT = Thin-Wall; 10BWG = 10 BWG; S80 = Sch 80

Posts (1 or 2)

Anchor Type: UA=Univer-Conc; UB=Univer-Bolt; SA=Slip-Conc; SB=Slip-Bolt; WA=Wedge-Steel; WS=Wedge-Plastic

Mounting Designation: P = Prefab. "Plain"; T = Prefab. "T"; U = Prefab. "U"

1EXT or 2EXT = # of Ext.; BM = Extruded Wind Beam; WC = 1.12 #/ft Wing Chan.; EXAL = Extruded Alum. signs

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN TEXT	DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	MOUNTING
			FM 740 AT YACHT CLUB DR				
	A	R10-12* (1 EA.)	LEFT TURN YIELD ON GREEN	24"X30"	X		MOUNT ON POLE P1 MAST ARM
	B	R10-4bL** (1 EA.)	PUSH BUTTON FOR	9"X12"	X		MOUNT ON POLE P4
	C	R10-4bR** (3 EA.)	PUSH BUTTON FOR	9"X12"	X		MOUNT ON POLES P1, P3 & P4
	D	R3-5R* (1 EA.)	ONLY	30"X36"	X		MOUNT ON POLE P3
	E	(2 EA.)	Yacht Club Dr	120"X18"	X		MOUNT ON POLES P1 & P3 MAST ARM
	F	(1 EA.)	FM 740 Ridge Rd 3100 3200	106"X24"	X		MOUNT ON POLE P2 MAST ARM
	G	R9-3A* (1 EA.)		24"X24"	X		MOUNT ON POLES P2 & P3
			FM 740 AT FM 1140				
	A	R10-12* (2 EA.)	LEFT TURN YIELD ON GREEN	24"X30"	X		MOUNT ON POLES P1 & P3 MAST ARM
	B	R10-4bL** (2 EA.)	PUSH BUTTON FOR	9"X12"	X		MOUNT ON POLES P2 & P5
	C	R10-4bR** (4 EA.)	PUSH BUTTON FOR	9"X12"	X		MOUNT ON POLES P1 - P4
	D	R9-3A* (2 EA.)		24"X24"	X		MOUNT ON POLES P5 & P6
	E	(1 EA.)	FM 740 ← Ridge Rd Laurence Dr 1400 →	112"X24"	X		MOUNT ON POLE P4 MAST ARM
	F	(1 EA.)	FM 740 ← 1400 Laurence Dr Ridge Rd →	120"X24"	X		MOUNT ON POLE P1 MAST ARM
	G	(1 EA.)	← 1500 Laurence Dr Heathland Crossing →	132"X24"	X		MOUNT ON POLE P3 MAST ARM
	H	(1 EA.)	← Heathland Crossing Laurence Dr 1500 →	134"X24"	X		MOUNT ON POLE P6 MAST ARM

ALUMINUM SIGN BLANKS (TYPE A)

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

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

Reflective sheeting will be designated as:

Type C - High Intensity - C
Type D - Prismatic - D
Type E - Flourescent Prismatic - E

* SUBSIDIARY TO ITEM 680

** SUBSIDIARY TO ITEM 688

ADDED SHEET CHANGE ORDER

SUMMARY OF SMALL SIGNS

SHEET 1 OF 1

DN: MT
CK: BAS
DW: CAT 10-08
CK: LDL 11-08

DISTRICT	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
18	ROCKWALL	1014	03	039	FM 740

FEDERAL AID PROJECT (SEE TITLE SHEET)

SHEET 31

CONDUIT RUNS

RUN NO.	ITEM 618 SIZE/TYPE CONDUIT (FEET)					ITEM 620 ELECTRICAL CONDUCTORS				ITEM 684 SIG CAB TY-A			LENGTH OF RUN (FEET)
	1.25 IN .RMC	3 IN. PVC TRENCHED	3 IN. PVC BORE	4 IN. PVC TRENCH	4 IN. PVC BORED	NO. 6 XHHW WIRE	NO. 6 BARE WIRE	NO. 8 XHHW WIRE	*OPTICOM CABLE	14 AWG 16 CNDR. CABLE	VIVD COMMUN. CABLE	SSR CABLE	
	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	
1		9					1	2	1	1	2		9
2				38	65		1	2	1	1	2		103
3		10					1						10
4				2-12		2	1	2	3	3	5	1	12
5				32								1	32
6				49	89		1	2	2	2	3		138
7		8					1	2	1	1	2		8
8				25	80		1		1	1	1		105
9		8					1		1	1	1		8
10				2-33		2	1	2	3	3	5		33
11		13					1						13
12				7			1						7
TOTAL		48		241	234	90	446	606	644	644	992	44	478

* SHOWN FOR CONTRACTOR INFORMATION ONLY.

CABLE RUNS

CNDR COLOR	CABLE NO. 1 FROM T-1 TO CNTRL 16 CNDR	CABLE NO. 2 FROM T-2 TO CONTRL 16 CNDR	CABLE NO. 3 FROM T-3 TO CNTRL 16 CNDR	CABLE NO. 4 FROM T-4 TO CNTRL 12 CNDR	CABLE NO. 5 FROM T-5 TO CNTRL 12 CNDR
BLACK	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON
WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON
RED	SH 1,2,3 Ø2 RED	SH 4,5 Ø4 RED	SH 6,7 Ø6 RED	Ø4 PED CALL	Ø6 PED CALL
GREEN	SH 1,2,3 Ø2 GR	SH 4,5 Ø4 GR	SH 6,7 Ø6 GR	PH 4 Ø4-W	PH 3 Ø6-W
ORANGE	SH 1,2,3 Ø2 Y	SH 4,5 Ø4 Y	SH 6,7 Ø6 Y	PH 4 Ø4-DW	PH 3 Ø6-DW
BLUE	SH 1 Ø5 GR ARROW	SPARE	SPARE	SPARE	SPARE
WHITE/ BLACK	SH 1 Ø5 Y ARROW	SPARE	SPARE	SPARE	SPARE
RED/ BLACK	Ø4 PED CALL	SPARE	Ø6 PED CALL	SPARE	SPARE
GREEN/ BLACK	PH 1 Ø4-W	SPARE	PH 2 Ø6-W	SPARE	SPARE
ORANGE/ BLACK	PH 1 Ø4-DW	SPARE	PH 2 Ø6-DW	SPARE	SPARE
BLUE/ BLACK	SH 8 Ø6 RED	SPARE	SH 9 Ø2 RED	SPARE	SPARE
BLACK/ WHITE	SH 8 Ø6 GR	SPARE	SH 9 Ø2 RED	SPARE	SPARE
RED/ WHITE	SH 8 Ø6 Y	SPARE	SH 9 Ø2 RED		
GREEN/ WHITE	SPARE	SPARE	SPARE		
BLUE/ WHITE	SPARE	SPARE	SPARE		
BLACK/ RED	SPARE	SPARE	SPARE		

* SHOWN FOR CONTRACTOR INFORMATION ONLY.
ALL OPTICOM EQUIPMENT SHALL BE SUPPLIED BY THE CITY.

SIGNAL HEAD SUMMARY

SIGNAL HEAD NO.	SIGNAL HEAD TYPE	12 INCH SIGNAL INDICATION * BLACK PLATE 3 SEC	BLACK PLATE 5 SEC	VEH SIG SECTIONS	PED SIG SECTIONS	TRAFFIC SIGNAL LAMPS 12' LED RED	YELLOW	GREEN	GREEN ARROW	YELLOW ARROW	PEDESTRIAN SIGNAL LAMPS (LED) WALK	DON'T WALK
		EA	EA	*EA	*EA	EA	EA	EA	EA	EA	EA	EA
1	H5LT		1	5		1	1	1	1	1		
2	H3	1		3		1	1	1				
3	H3	1		3		1	1	1				
4	H3	1		3		1	1	1				
5	H3	1		3		1	1	1				
6	H3	1		3		1	1	1				
7	H3	1		3		1	1	1				
8	V3	1		3		1	1	1				
9	V3	1		3		1	1	1				
1	152A				1						1	1
2	152A				1						1	1
3	152A				1						1	1
4	152A				1						1	1
TOTAL		8	1	29	4	9	9	9	1	1	4	4

* SHOWN FOR CONTRACTOR INFORMATION ONLY.

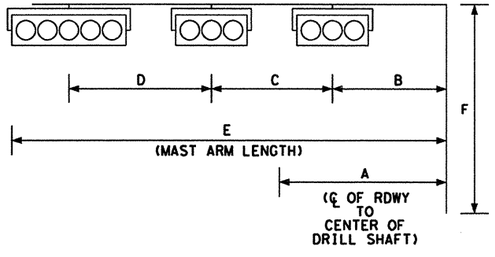
ELECTRICAL SERVICE CONNECTION

SERVICE POLE NO.	LOCATION	SERVICE POLE DESCRIPTION (SEE ED (4) (5)-3)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE (XHHW)	SAFETY SWITCH AMPS.	MAIN DISCONNECT CKT. BRK. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANEL BD./ LOADCENTER AMP RATING (MIN.)	CIRCUIT DESCRIPTION	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
1	NORTHWEST CORNER FM 740 & HENRY CHANDLER	TY D (120/240) 70 (NS) SS (E) GC (0)	1¼"	3/#6	N/A	2P/70	30	100	LIGHTING	2P/15	<7.1
									TEMPORARY SIGNAL	1P/50	
									PERMANENT SIGNAL	1P/50	

TRAFFIC SIGNAL ARMS

POLE NUMBER	SIGNAL HEAD & POLE PLACEMENT MAST ARM LENGTH E	A	B	C	D	F	NUMBER OF SIGNAL HEADS	SIGNAL POLE FOUNDATION FDN TYPE	DS LNGTH	CNDRS & CABLES INSIDE POLE (LF) LUM-A	5 CNDR	7 CNDR	OPTICOM *	#8 XHHW LUM	CABLE ILSL	VIVD COAXIAL	SPREAD SPECTRUM CABLE
	LF	LF	LF	LF	LF	LF	EA		LF	EA	LF	LF	LF	LF	LF	LF	LF
T-1	36	38.68	14	11	11	18	4	36-A	13	1	54	54	54	36		108	
T-2	36	40.62	11		25	18	2	36-A	13		54	54	54			54	
T-3	44	56.24	31		11	18	3	36-A	13	1	62	62	62	36		116	
T-4		45.95				18	0	24-A	6		18	18					
T-5		58.37				18	0	24-A	6		18	18					
T-6		49.84				50	0	S	10								50
				TOTAL			9		61	2	206	206	170	72		278	50

* SHOWN FOR CONTRACTOR INFORMATION ONLY.



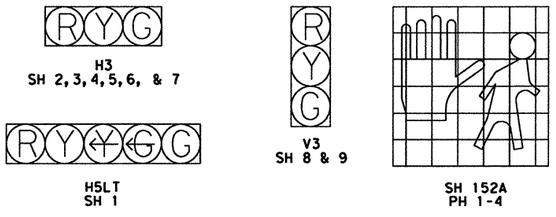
GROUND BOX SUMMARY

PULL BOX TYPE	QUANTITY (EA)
TYPE C W/ APRON	5

PED PUSH BUTTON

T-1	1
T-2	0
T-3	1
T-4	1
T-5	1
TOTAL	4

SIGNAL HEADS



5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER
Kelvin J. Kroeker PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
AT HENRY CHANDLER ROAD
SIGNAL DESIGN TABLES

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	319
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

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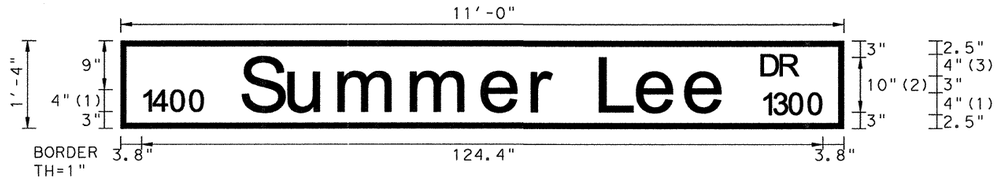

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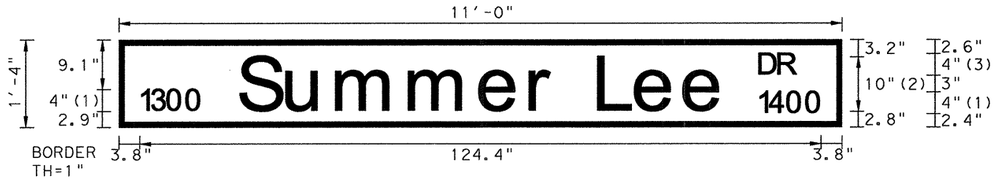
(2) ClearviewHwy-3-W
(3) ClearviewHwy-2-B



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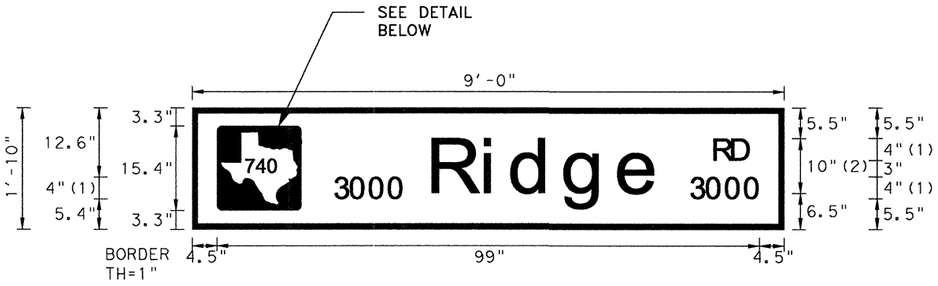

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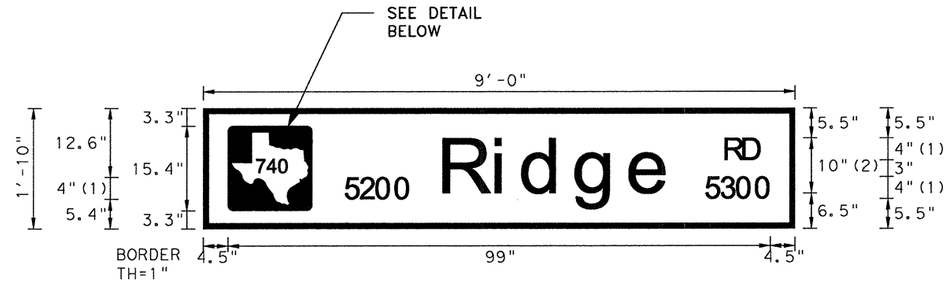

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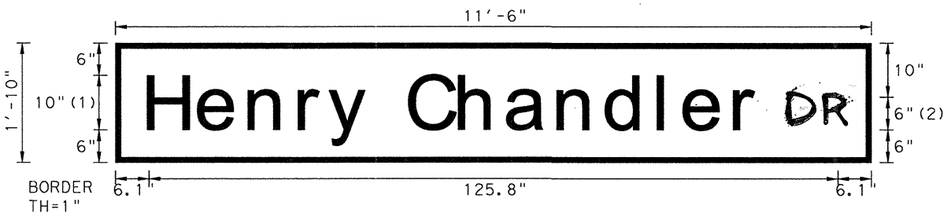

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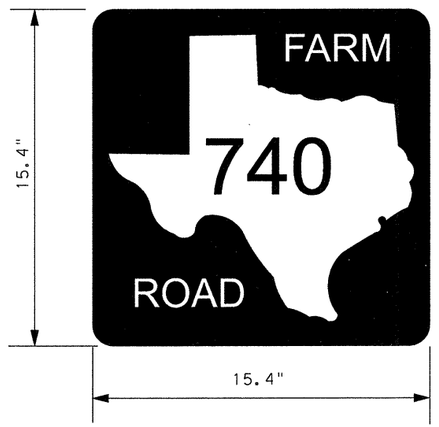
(2) ClearviewHwy-2-W

NOTE:

1. SIGN LOCATIONS SHOWN ON PLANS ARE DIAGRAMATIC. CONTRACTOR SHALL PLACE SIGNS IN CONFORMANCE WITH THE 2006 "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.

MOUNT: BRACKET/OVERHEAD
ALUMINUM SIGN BLANK MATERIALS: DMS-7110
SIGN FACE MATERIALS: DMS-8300
SIGN BACKGROUND: GREEN (TYPE C SHEETING) RETROREFLECTIVE
LEGEND AND BORDERS: WHITE (TYPE D SHEETING) RETROREFLECTIVE



NOTE:

1. BLACK LEGEND AND BORDERS SHALL BE APPLIED BY SCREENING PROCESS OR CUT-OUT ACRYLIC NON-REFLECTIVE BLACK FILM TO WHITE BACKGROUND SHEETING, OR COMBINATION THEROF.

BACKGROUND AND NUMBER:
BLACK ACRYLIC
NONREFLECTIVE FILM

TEXT AND TEXAS
WHITE – RETROREFLECTIVE

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER
Kelvin J. Kroeker, P.E.

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

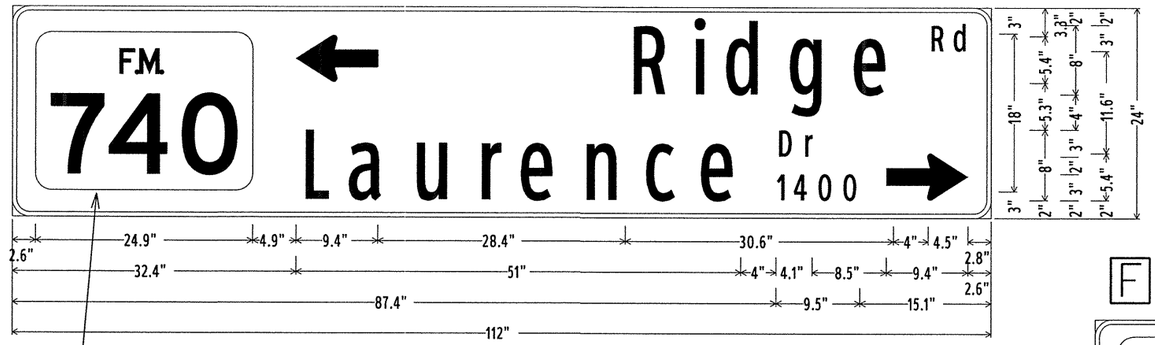
Texas Department of Transportation

FM 740
STREET NAME SIGN DETAILS

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	319k
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	

** USE 24" SHIELD DESIGN AND REDUCE DIMENSIONS BY 25%

E



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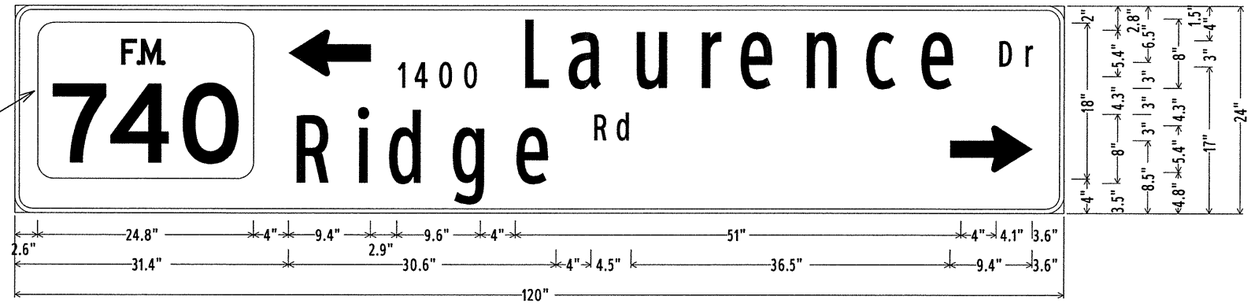
F



**M1-6F(3)

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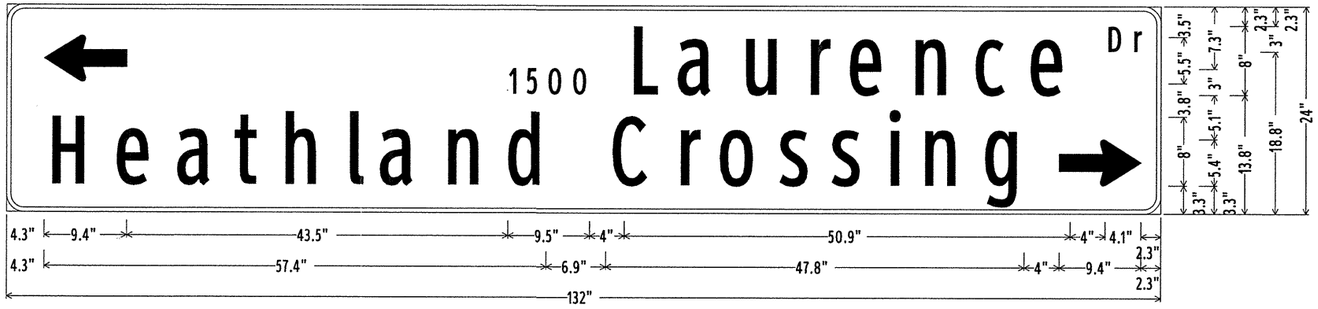

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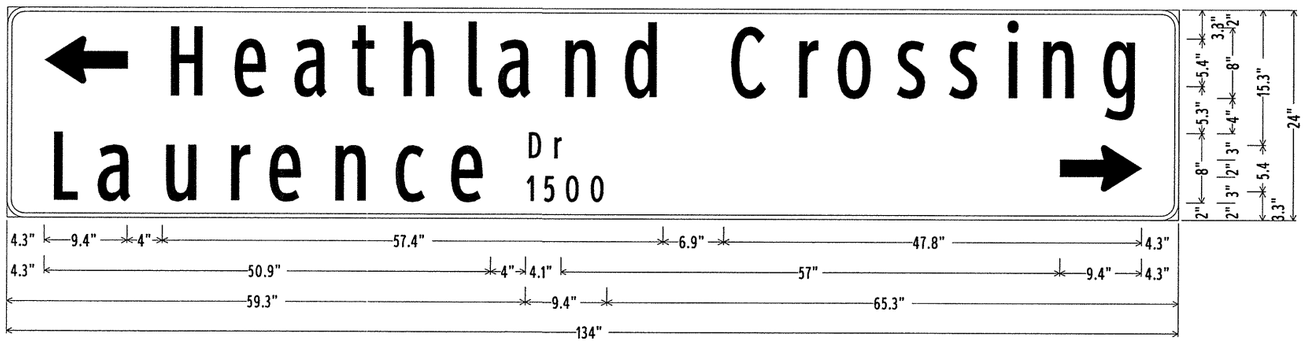

ADDED SHEET
CHANGE ORDER

STATE OF TEXAS
LISA D. LAWSON
65131
REGISTERED
PROFESSIONAL ENGINEER

Lisa D Lawson ,P.E. 11/23/10
Signature Date

Texas Department of Transportation
©2010

SIGNING LAYOUT
FM 740 AT FM 1140

SCALE: 1"=40' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MHA	6	(SEE TITLE SHEET)		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MHA	TEXAS	DAL	ROCKWALL	319
CHECK	CONTROL	SECTION	JOB	B-B
LDL	1014	03	039	
CHECK				
MBY				

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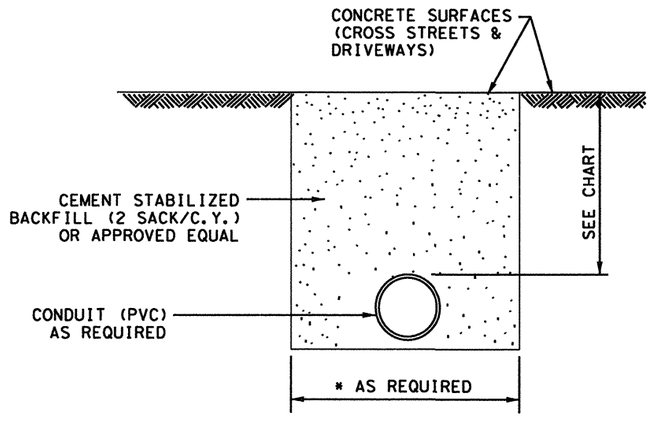


TRENCH DETAIL

NTS

TRENCH DEPTH CHART	
SYSTEM	DEPTH
ILLUMINATION	18 INCHES
TRAFFIC SIGNALS	18 INCHES
TRAFFIC MANAGEMENT	42 INCHES
TRAFFIC MANAGEMENT (BORE)	60 INCHES

NOTES:

1. FOR ALL LOCATIONS WITH ASPHALT/CONCRETE SURFACES TRENCH WILL BE BACKFILLED WITH CEMENT STABLIZIED BACKFILL MATERIAL
2. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OF PAVEMENT REMOVED FOR CONDUIT INSTALLATION.
3. EXCAVATION WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO (ITEM 618 "CONDUIT").

* 4. SEE CONDUIT RUN TABLES ON PLAN LAYOUT SHEETS.

5/26/09

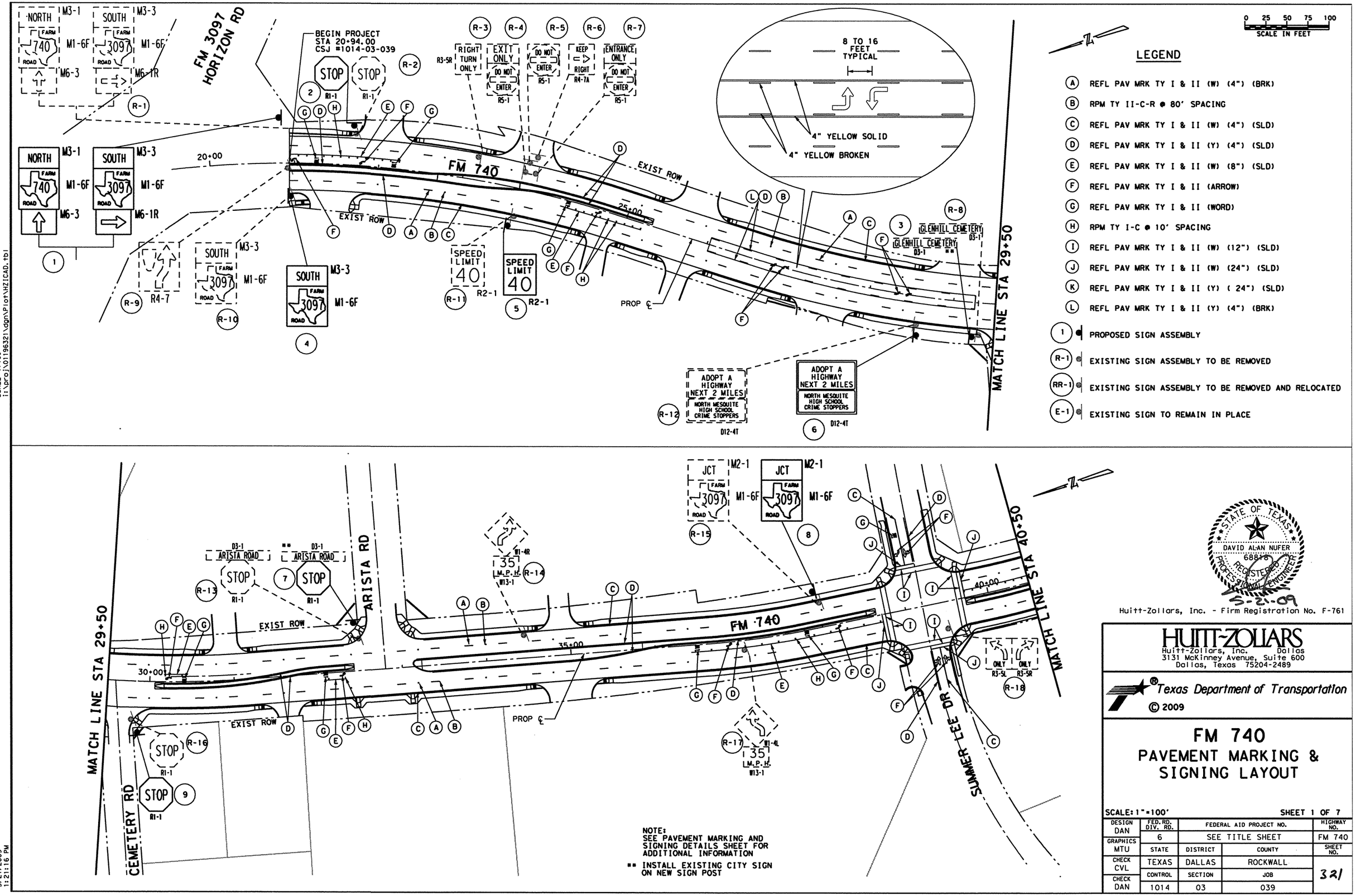
STATE OF TEXAS
KELVIN J. KROEKER
86965
REGISTERED
PROFESSIONAL ENGINEER

Kelvin J. Kroeker, PE

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

FM 740
TRENCH DETAIL

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	320
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
5-21-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

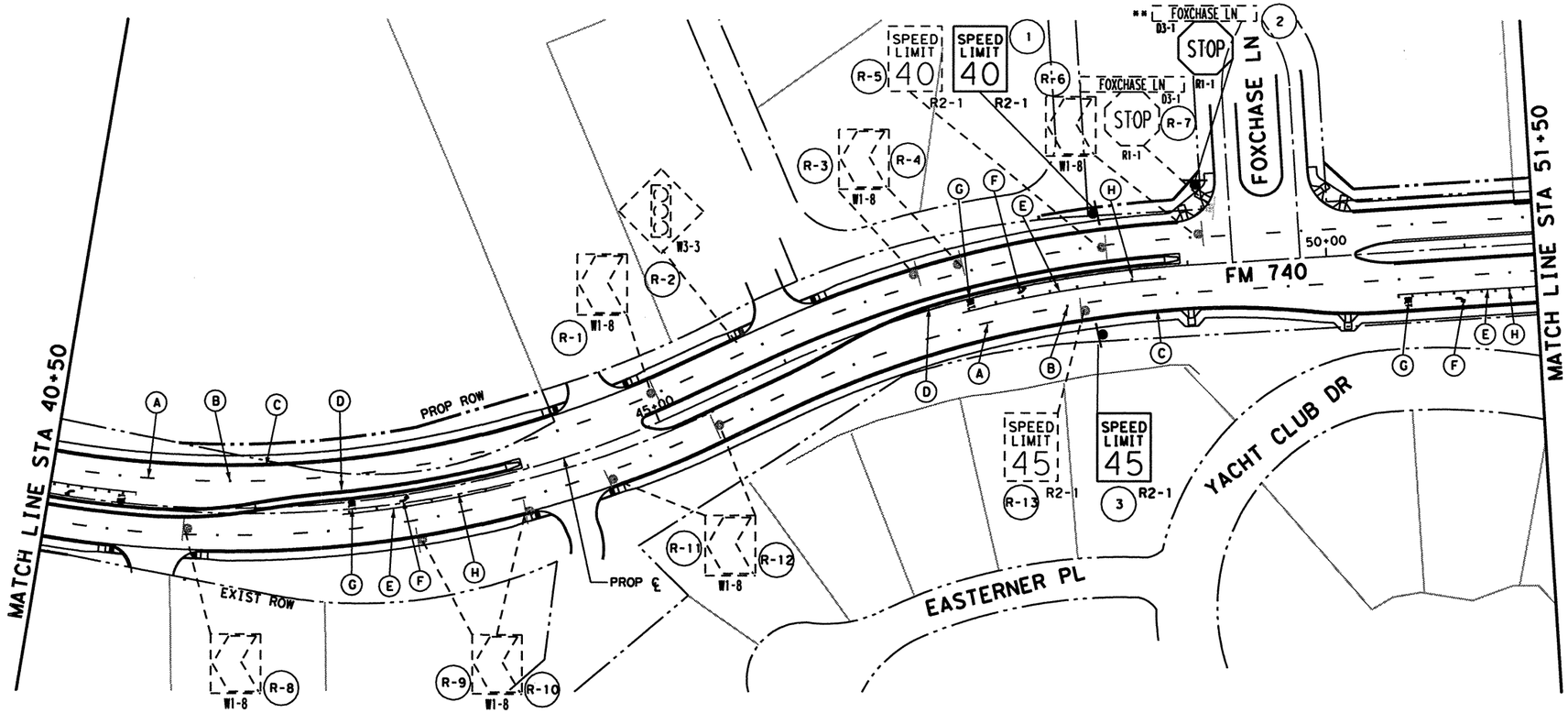
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 1 OF 7

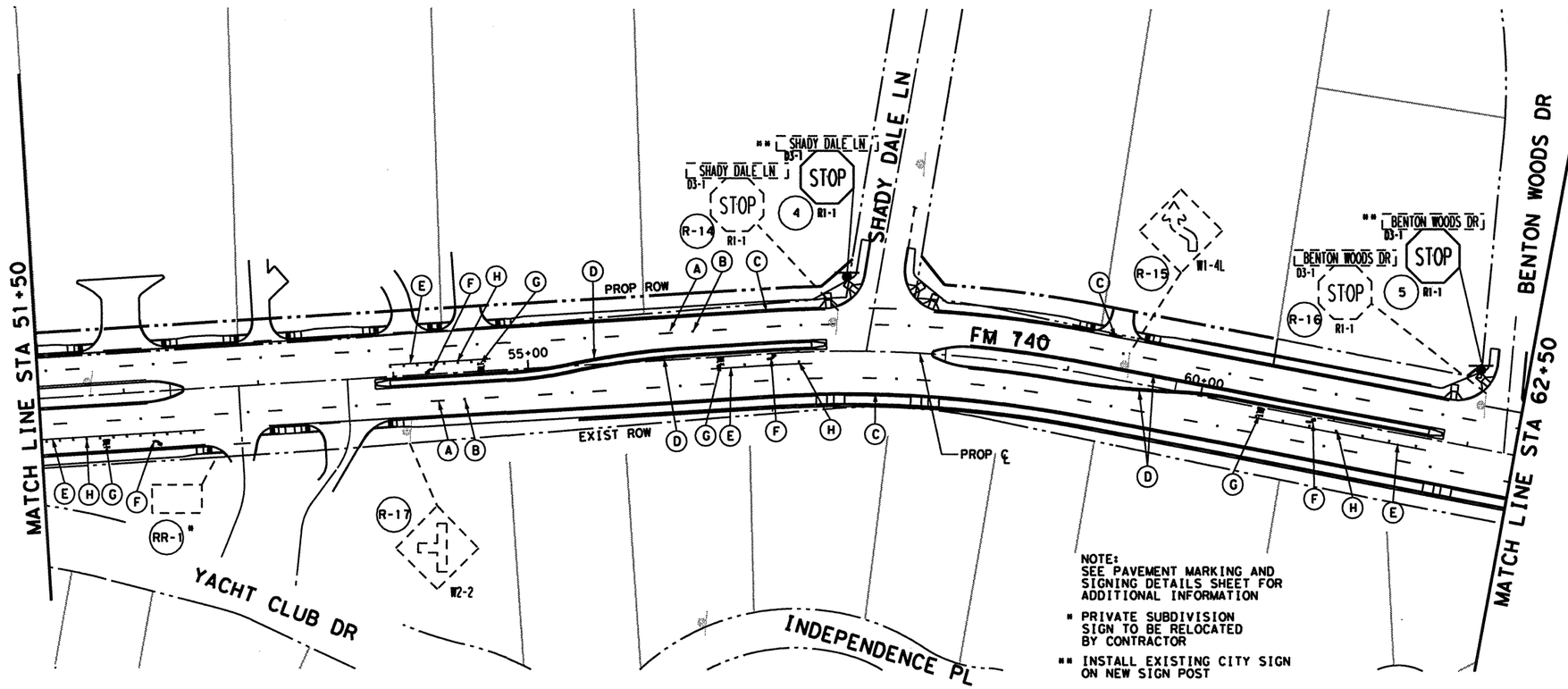
DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	321
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	



LEGEND

- (A) REFL PAV MRK TY I & II (W) (4") (BRK)
- (B) RPM TY II-C-R @ 80' SPACING
- (C) REFL PAV MRK TY I & II (W) (4") (SLD)
- (D) REFL PAV MRK TY I & II (Y) (4") (SLD)
- (E) REFL PAV MRK TY I & II (W) (8") (SLD)
- (F) REFL PAV MRK TY I & II (ARROW)
- (G) REFL PAV MRK TY I & II (WORD)
- (H) RPM TY I-C @ 10' SPACING
- (I) REFL PAV MRK TY I & II (W) (12") (SLD)
- (J) REFL PAV MRK TY I & II (W) (24") (SLD)
- (K) REFL PAV MRK TY I & II (Y) (24") (SLD)
- (L) REFL PAV MRK TY I & II (Y) (4") (BRK)
- (1) PROPOSED SIGN ASSEMBLY
- (R-1) EXISTING SIGN ASSEMBLY TO BE REMOVED
- (RR-1) EXISTING SIGN ASSEMBLY TO BE REMOVED AND RELOCATED
- (E-1) EXISTING SIGN TO REMAIN IN PLACE

0 25 50 75 100
SCALE IN FEET



NOTE:
SEE PAVEMENT MARKING AND SIGNING DETAILS SHEET FOR ADDITIONAL INFORMATION

* PRIVATE SUBDIVISION SIGN TO BE RELOCATED BY CONTRACTOR

** INSTALL EXISTING CITY SIGN ON NEW SIGN POST

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
5-21-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 2 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MTU	TEXAS	DALLAS	ROCKWALL	322
CHECK CVL	CONTROL	SECTION	JOB	
CHECK DAN	1014	03	039	

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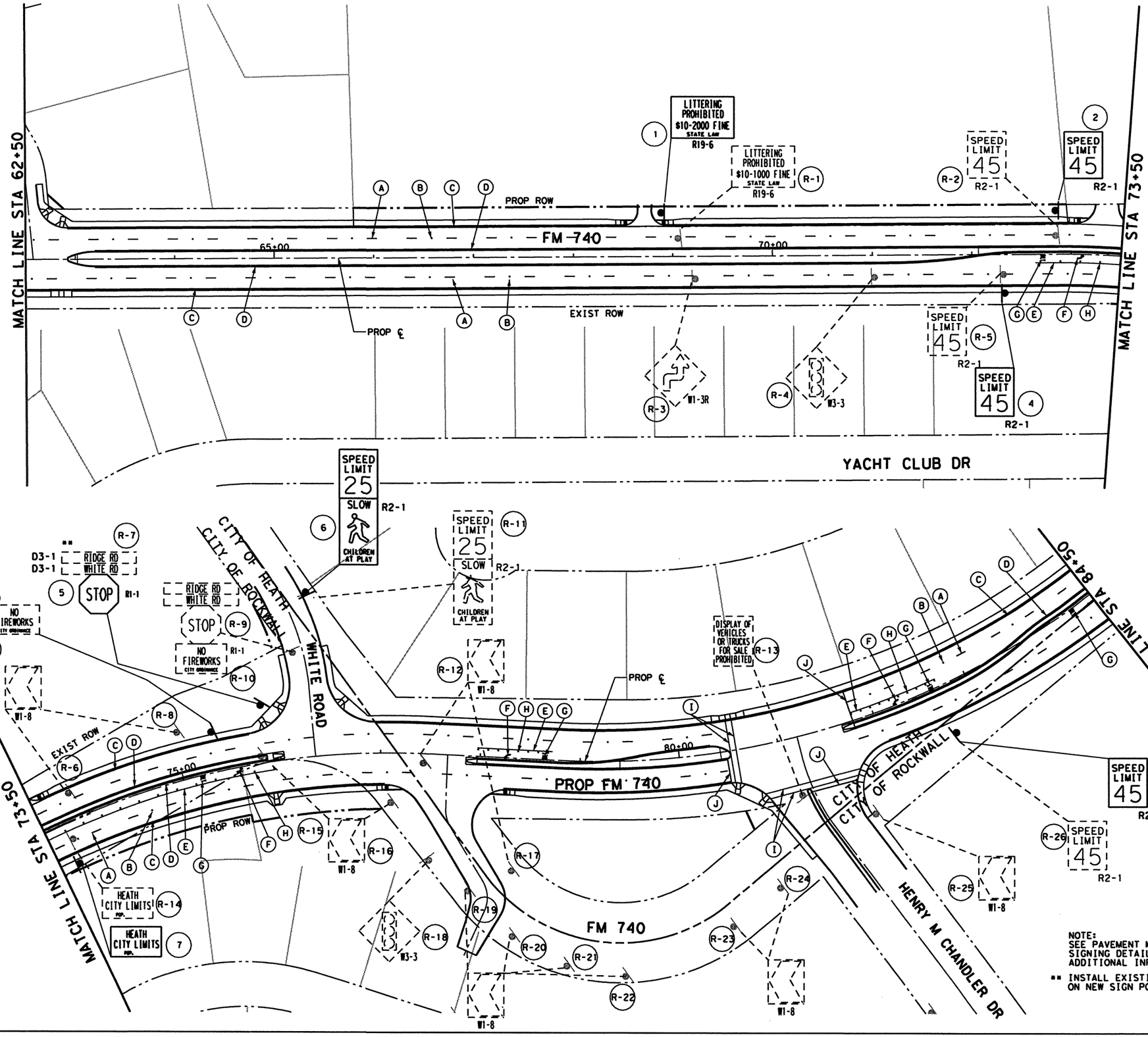

0 25 50 75 100
SCALE IN FEET

LEGEND

- (A) REFL PAV MRK TY I & II (W) (4") (BRK)
- (B) RPM TY II-C-R @ 80' SPACING
- (C) REFL PAV MRK TY I & II (W) (4") (SLD)
- (D) REFL PAV MRK TY I & II (Y) (4") (SLD)
- (E) REFL PAV MRK TY I & II (W) (8") (SLD)
- (F) REFL PAV MRK TY I & II (ARROW)
- (G) REFL PAV MRK TY I & II (WORD)
- (H) RPM TY I-C @ 10' SPACING
- (I) REFL PAV MRK TY I & II (W) (12") (SLD)
- (J) REFL PAV MRK TY I & II (W) (24") (SLD)
- (K) REFL PAV MRK TY I & II (Y) (24") (SLD)
- (L) REFL PAV MRK TY I & II (Y) (4") (BRK)
- (1) PROPOSED SIGN ASSEMBLY
- (R-1) EXISTING SIGN ASSEMBLY TO BE REMOVED
- (RR-1) EXISTING SIGN ASSEMBLY TO BE REMOVED AND RELOCATED
- (E-1) EXISTING SIGN TO REMAIN IN PLACE

NOTE:
SEE PAVEMENT MARKING AND SIGNING DETAILS SHEET FOR ADDITIONAL INFORMATION

** INSTALL EXISTING CITY SIGN ON NEW SIGN POST

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
5-21-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

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FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 3 OF 7

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	323
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

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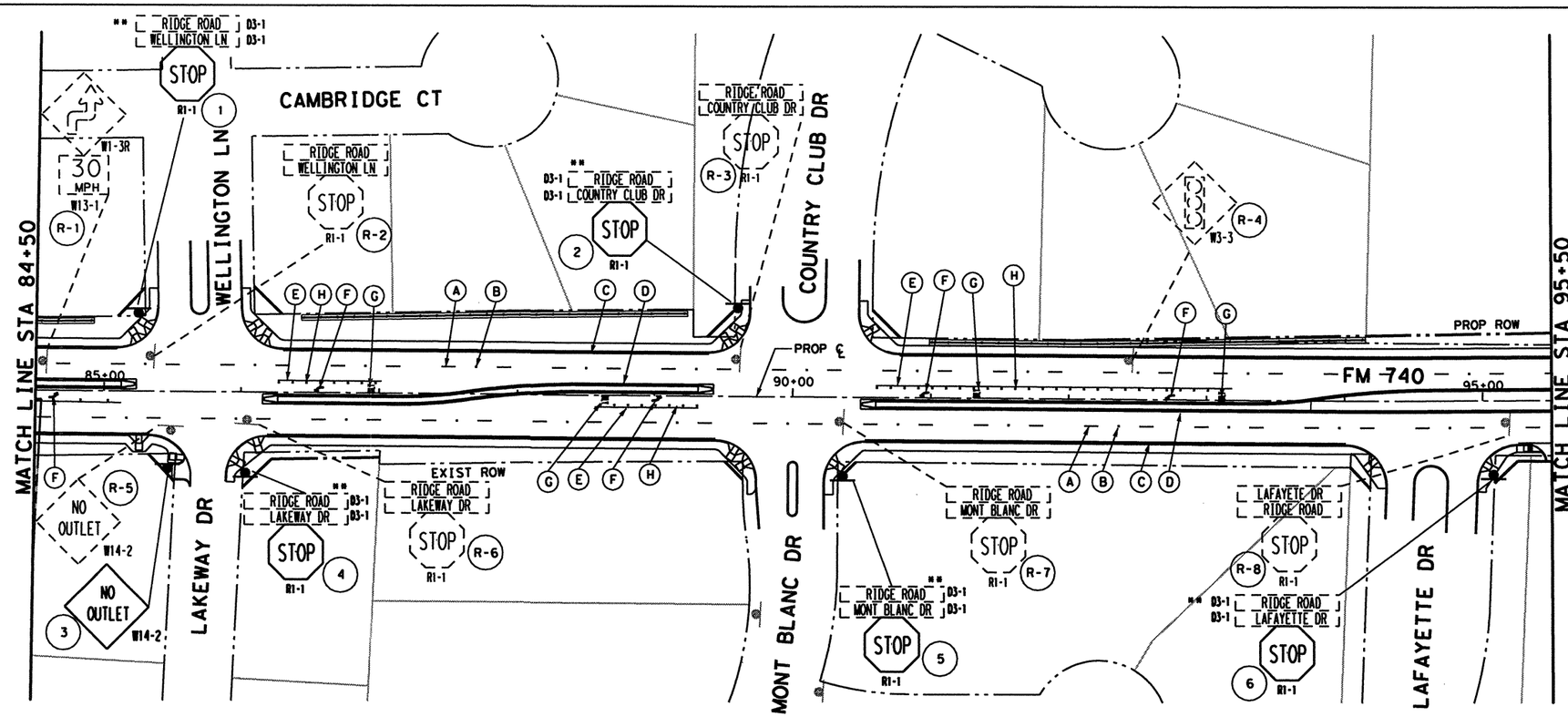

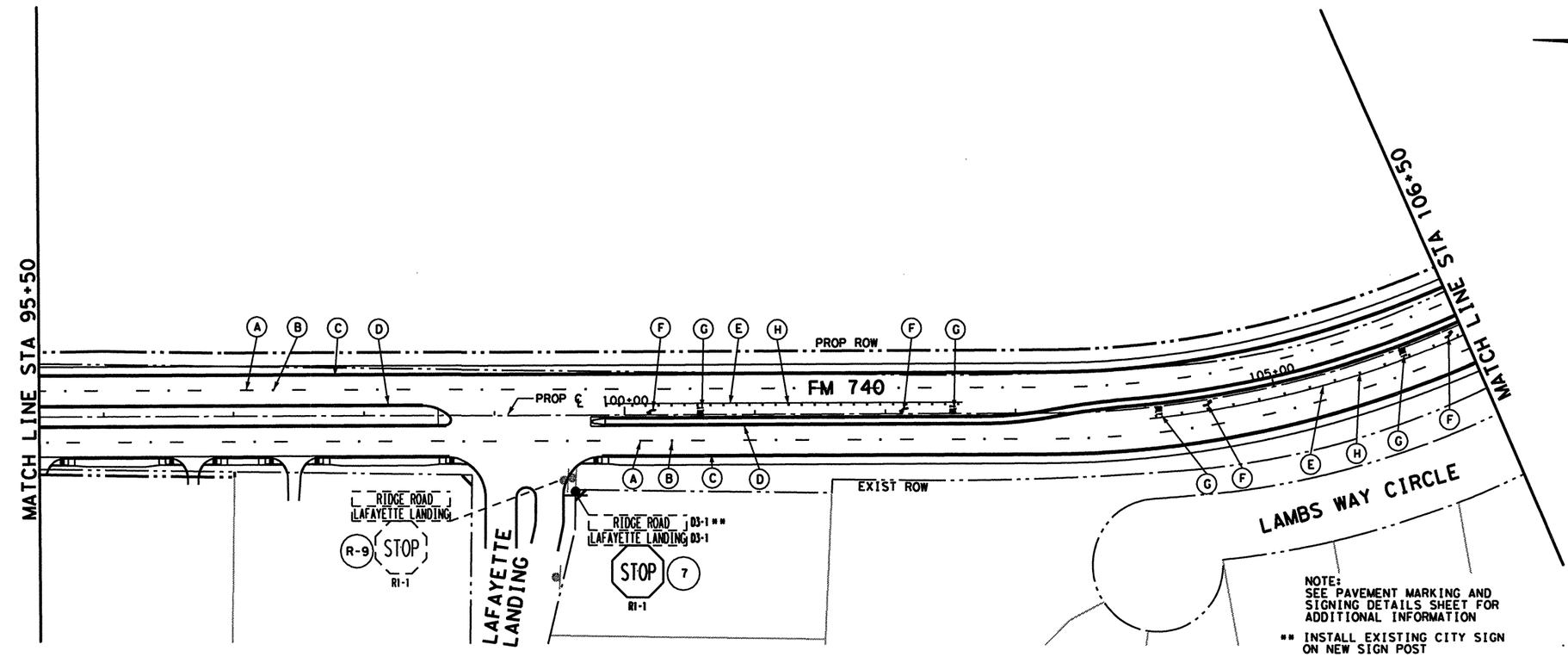

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LEGEND

- (A) REFL PAV MRK TY I & II (W) (4") (BRK)
- (B) RPM TY II-C-R @ 80' SPACING
- (C) REFL PAV MRK TY I & II (W) (4") (SLD)
- (D) REFL PAV MRK TY I & II (Y) (4") (SLD)
- (E) REFL PAV MRK TY I & II (W) (8") (SLD)
- (F) REFL PAV MRK TY I & II (ARROW)
- (G) REFL PAV MRK TY I & II (WORD)
- (H) RPM TY I-C @ 10' SPACING
- (I) REFL PAV MRK TY I & II (W) (12") (SLD)
- (J) REFL PAV MRK TY I & II (W) (24") (SLD)
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Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

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FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 4 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	324
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

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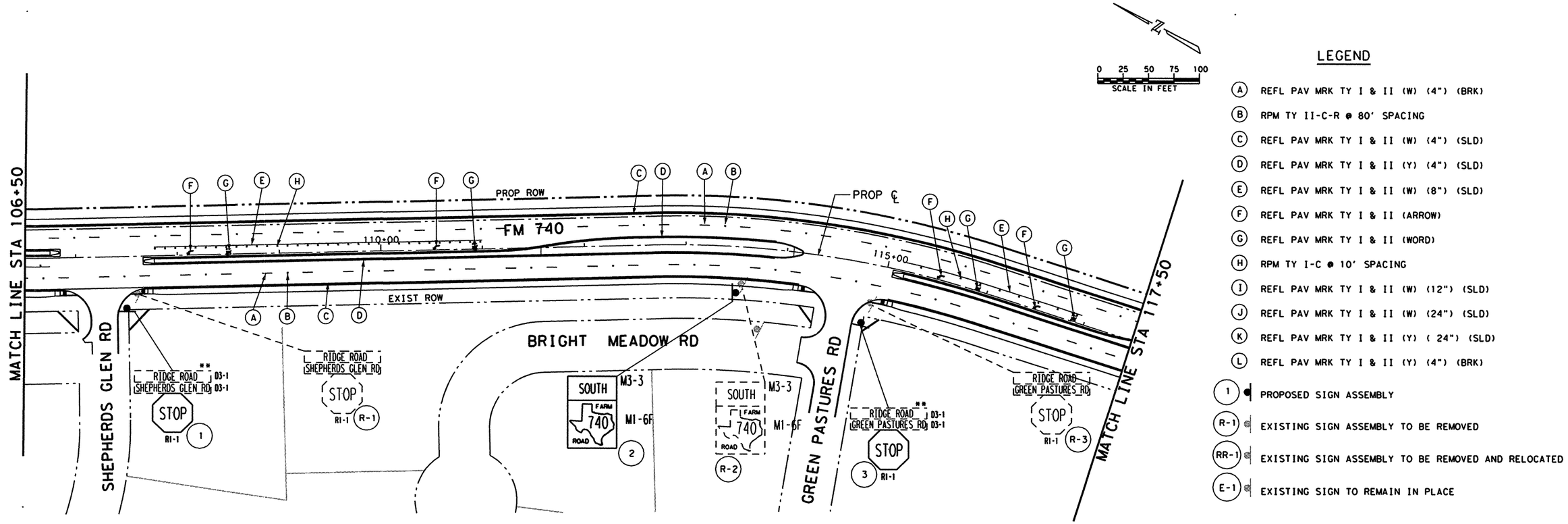

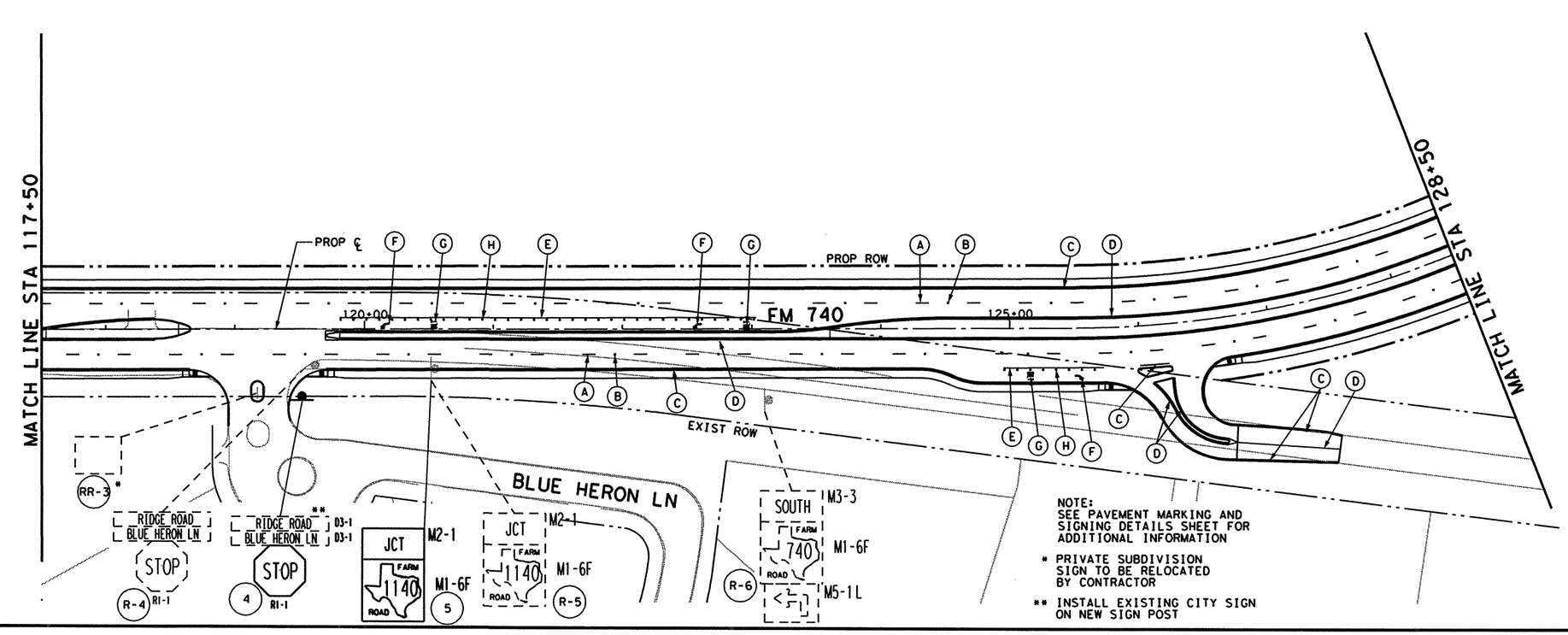

LEGEND

- (A) REFL PAV MRK TY I & II (W) (4") (BRK)
- (B) RPM TY II-C-R @ 80' SPACING
- (C) REFL PAV MRK TY I & II (W) (4") (SLD)
- (D) REFL PAV MRK TY I & II (Y) (4") (SLD)
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0 25 50 75 100
SCALE IN FEET

NOTE:
SEE PAVEMENT MARKING AND SIGNING DETAILS SHEET FOR ADDITIONAL INFORMATION

* PRIVATE SUBDIVISION SIGN TO BE RELOCATED BY CONTRACTOR

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Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

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FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 5 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MTU	TEXAS	DALLAS	ROCKWALL	325
CHECK	CONTROL	SECTION	JOB	
CVL / DAN	1014	03	039	

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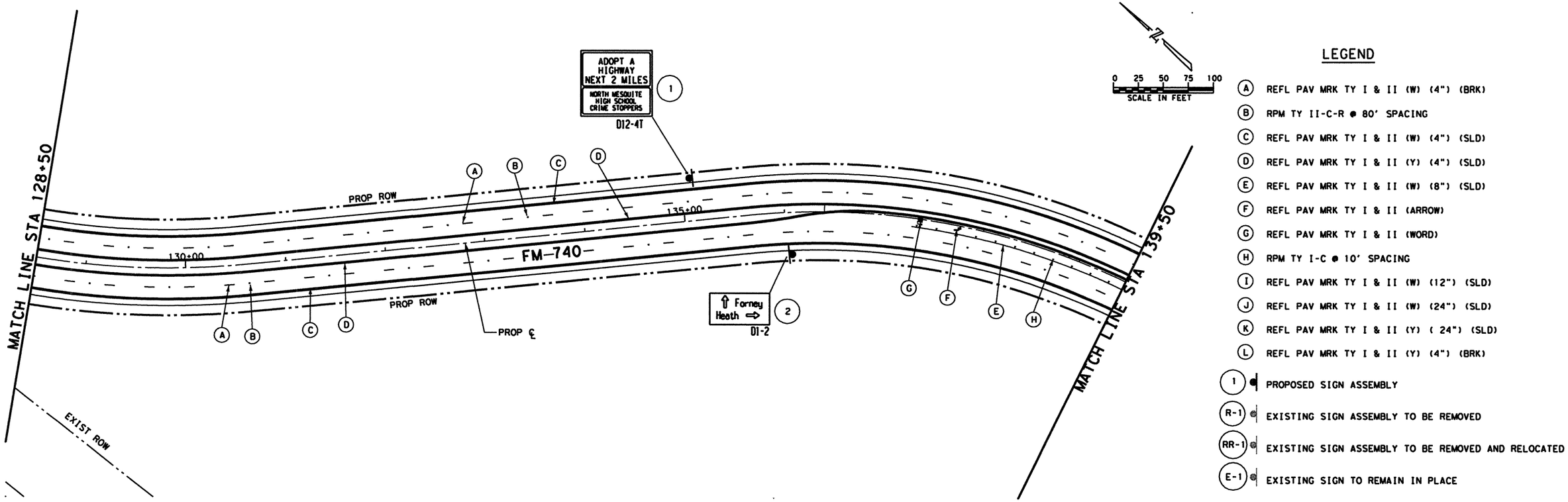

LEGEND

- (A) REFL PAV MRK TY I & II (W) (4") (BRK)
- (B) RPM TY II-C-R @ 80' SPACING
- (C) REFL PAV MRK TY I & II (W) (4") (SLD)
- (D) REFL PAV MRK TY I & II (Y) (4") (SLD)
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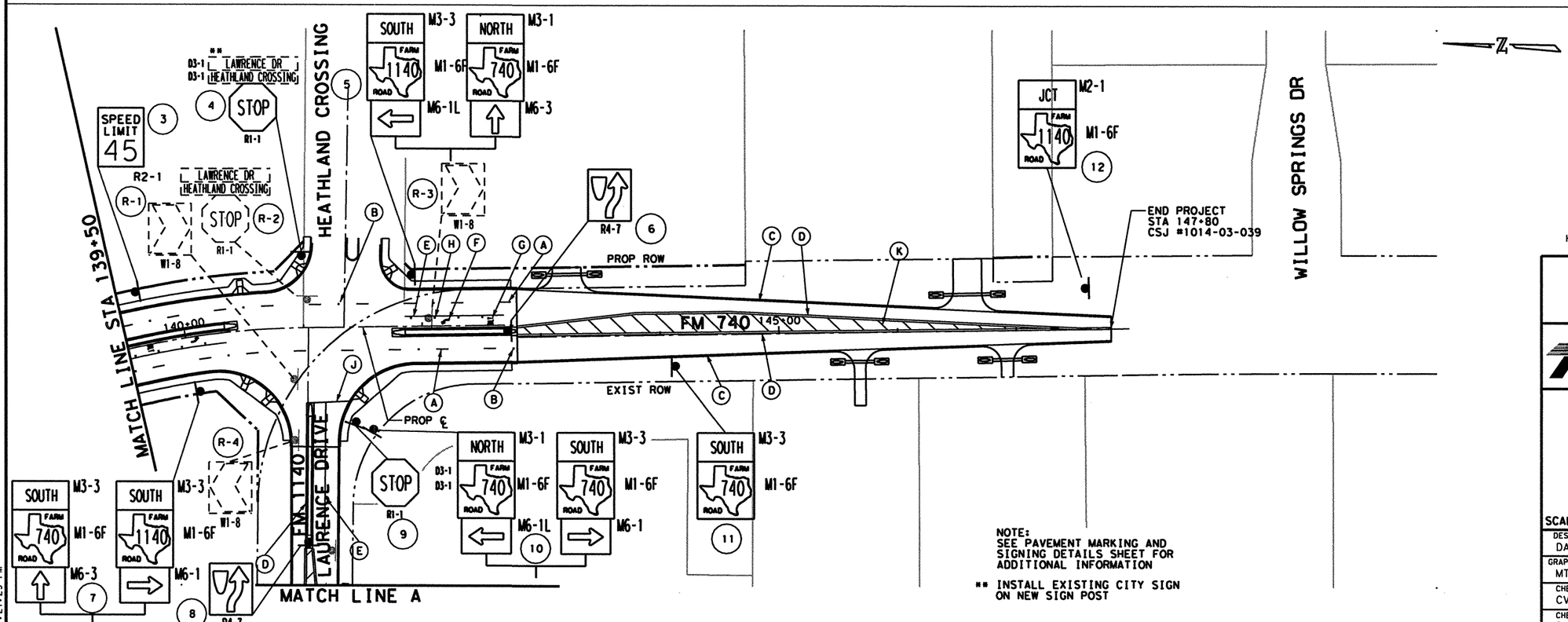

NOTE:
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Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

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FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 6 OF 7

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	326
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

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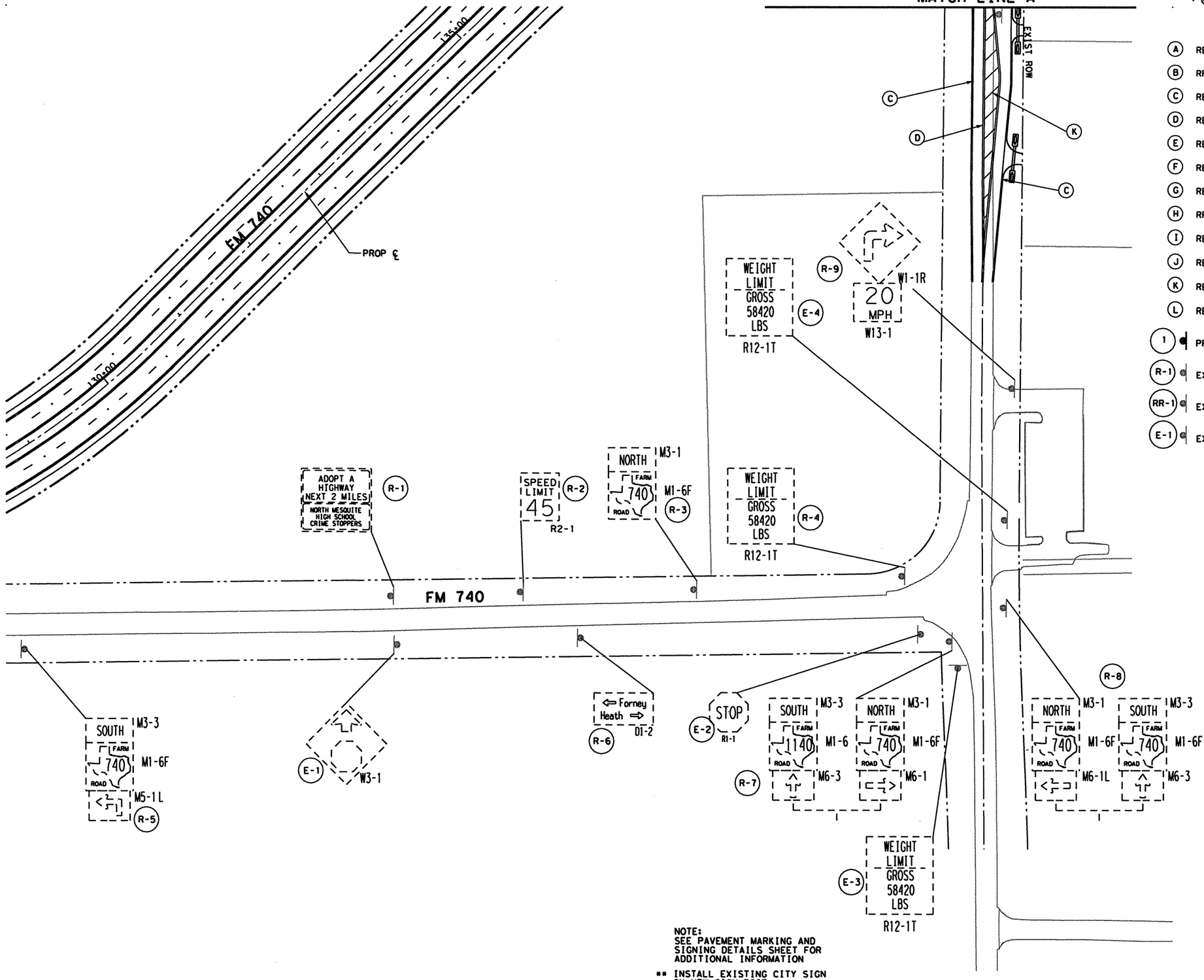

0 25 50 75 100
SCALE IN FEET

LEGEND

- (A) REFL PAV MRK TY I & II (W) (4") (BRK)
- (B) RPM TY II-C-R @ 80' SPACING
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Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
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FM 740
PAVEMENT MARKING & SIGNING LAYOUT

SCALE: 1"=100' SHEET 7 OF 7

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	327
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

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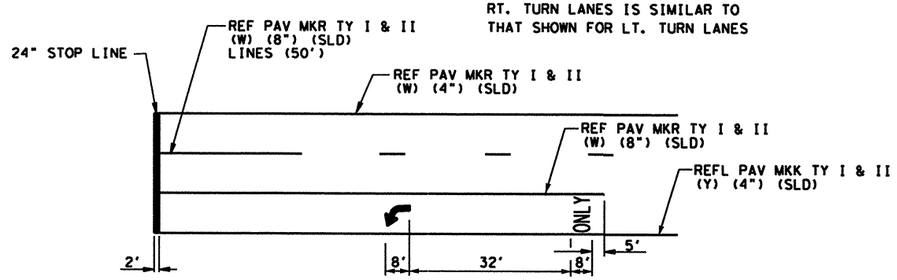
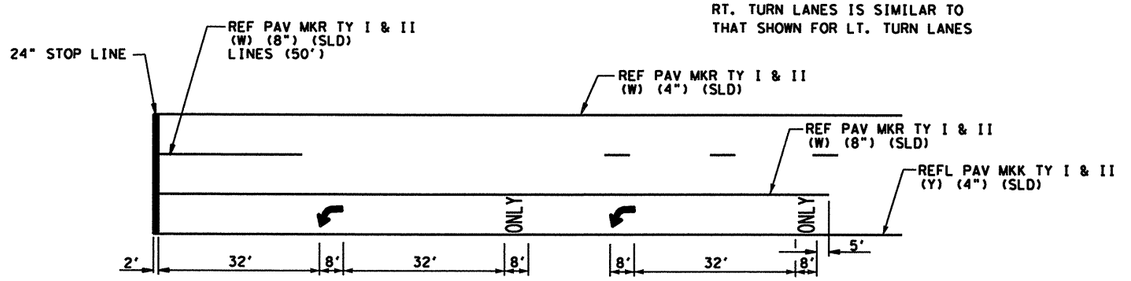
NOTES:
1. THE NUMBER OF LANES MAY VARY
2. THE TREATMENT FOR EXCLUSIVE RT. TURN LANES IS SIMILAR TO THAT SHOWN FOR LT. TURN LANES



TYPICAL ARROW PLACEMENT FOR TURN LANES <150' STORAGE LENGTH

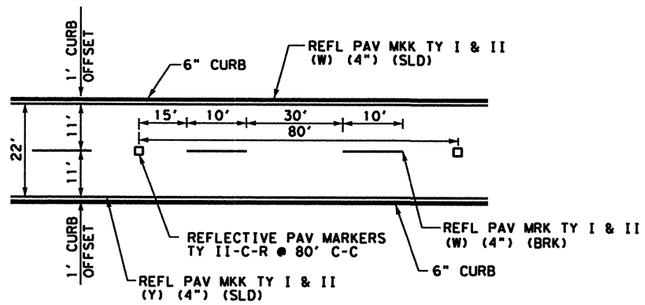
DETAIL "A"

NOTES:
1. THE NUMBER OF LANES MAY VARY
2. THE TREATMENT FOR EXCLUSIVE RT. TURN LANES IS SIMILAR TO THAT SHOWN FOR LT. TURN LANES



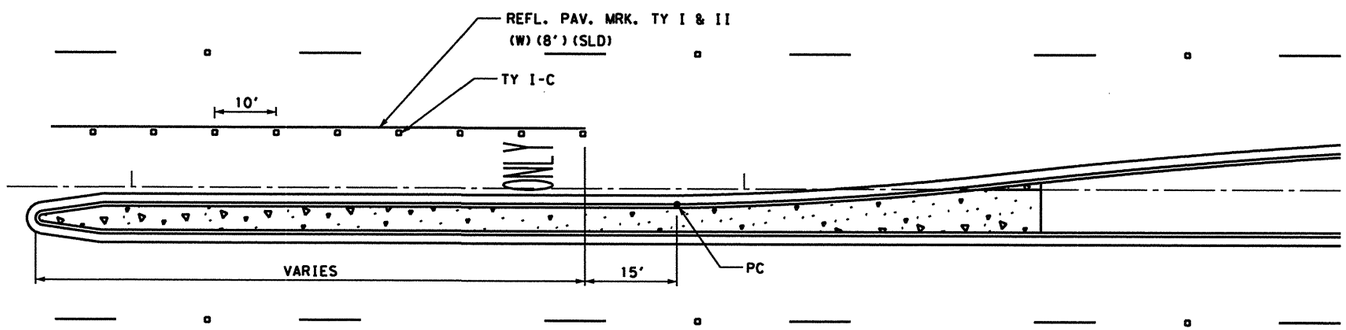
TYPICAL ARROW PLACEMENT FOR TURN LANES >150' STORAGE LENGTH

DETAIL "A"



TYPICAL PAVEMENT MARKINGS FOR FM 740

DETAIL "B"



TYPICAL PAVEMENT MARKINGS FOR LEFT TURN BAYS

DETAIL "C"

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Dallas, Texas 75204-2489

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FM 740
PAVEMENT MARKINGS & SIGNING DETAILS

SCALE: NONE SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	328
CHECK DAN	CONTROL 1014	SECTION 03	JOB 039	

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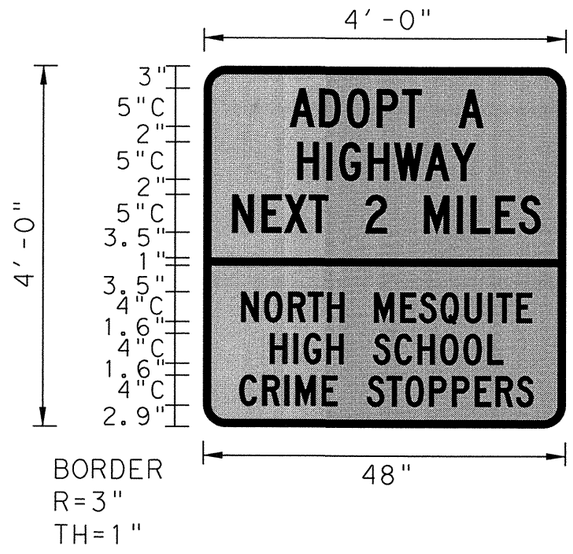

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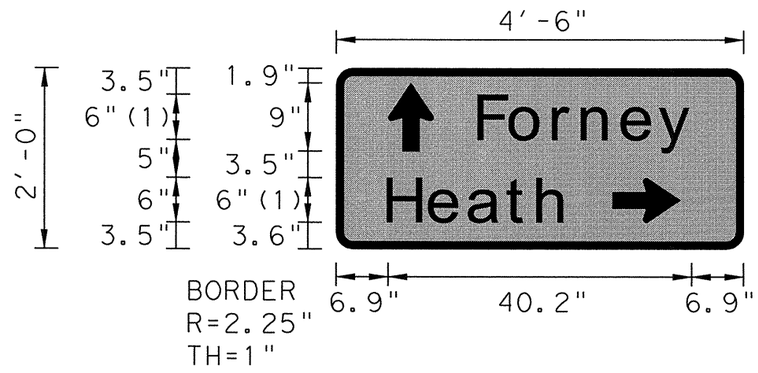
SHEET 6 SIGN 1



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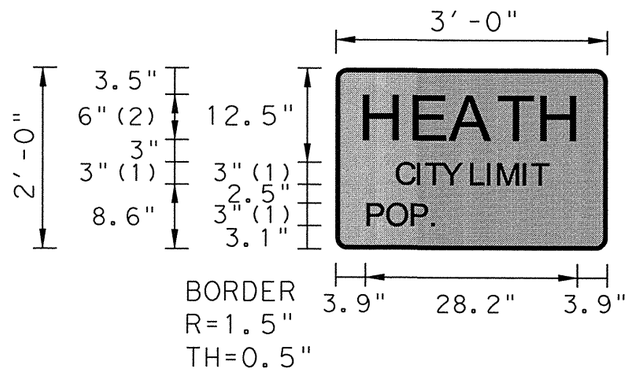

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SHEET 3 SIGN 7

STATE OF TEXAS
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PROFESSIONAL ENGINEER
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FM 740
SIGN DETAILS

SCALE: 1"=NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	329
CHECK CVL	CONTROL	SECTION	JOB	
	1014	03	039	

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I. GENERAL REQUIREMENTS FOR ALL ELECTRICAL WORK

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

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

With the exception of high strength bolts, miscellaneous nuts, bolts and hardware may be stainless steel when plans specify galvanized, provided that bolts are 1/2 inch or less in diameter. The Contractor shall provide the following electrical test instruments as required by the Engineer to confirm compliance with the contract and the NEC. Those test instruments are voltmeter, amp probe, megger (1000 volt DC) and torque wrenches. All meters shall have been properly calibrated within one year. Calibration certification shall be provided to the Engineer upon request. Calibration certification tag shall also be applied to the meter. The Contractor shall operate meters during inspection as requested by the Engineer. Grounding shall be as shown on the plans and in accordance with the NEC. Metallic conduit, light poles, luminaires on bridge structures, and all metal enclosures shall be bonded to the system-grounding conductor. The ground rod in each ground box or junction box at the bridge ends, and in each ground box installed for underpass lighting will also be bonded to the system grounding conductor. The grounding conductor shall be bare or, if insulated, shall be green. Ground rods, connectors, and bonding jumpers will not be paid for separately, but will be subsidiary to the various bid items.

SUBMITTALS:

The contractor shall submit for approval six (6) copies of catalog cut sheets for each of the following three (3) categories.
Category 1. Electrical services including photocell.
Catagory 2. Breakaway disconnects, heat shrink tubing, heat shrink filler tape, GelCaps and ground boxes which will include loading capacity certification.
Category 3. Highmast assembly kits, when applicable. See Item 614 "Highmast Illumination Assemblies". Submittals shall be legible and shall be marked to indicate which product on a cut sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, the Contractor shall furnish to the State such warranties and guarantees.
Any deviation from plans or specifications, including deviations due to plan error should be prominently displayed on the submittal. Any changes not prominently noted in submittal and incorporated into the work without proper authorization will constitute grounds for rejection of that portion of the work.

II. CONDUIT

A. MATERIALS

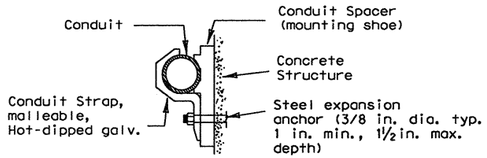
1. Conduit and fittings shall be UL Listed for the intended use shown on plan sheets.
2. Conduit shall be the type shown by descriptive code or shown elsewhere on the plans. Substitution of the various types of conduits will not be permitted. All flexible conduit in rigid metallic conduit (RMC) systems shall be Liquidtight Flexible Metal (LFMC) conduit. All flexible conduit in PVC systems shall be Liquidtight Flexible Non-metallic conduit (LFNC).
3. All exposed conduits shall be RMC, unless otherwise specifically shown on the plans. All metal conduit shall be properly grounded.
4. Couplings, connectors, conduit bodies, grounding bushings, and offset nipples for RMC shall be electro-zinc plated steel or hot dipped galvanized malleable iron, threaded or threadless compression type, rain-tight and shall be UL listed for the intended use.
5. Expansion joints for metal conduit shall be provided with an internal or external bonding jumper and shall be UL listed.
6. Unless otherwise shown on the plans, junction box minimum sizes shall be in accordance with the following table which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes are present, the conductors shall be counted as if all are of the larger size. Situations not applicable to the table shall be sized in accordance with NEC 370-28.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

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

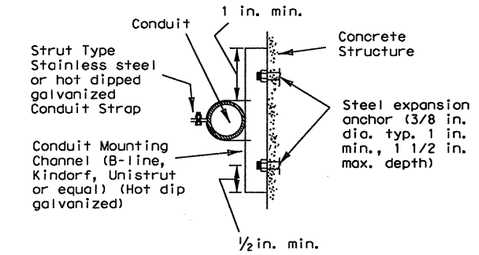
B. CONSTRUCTION METHODS

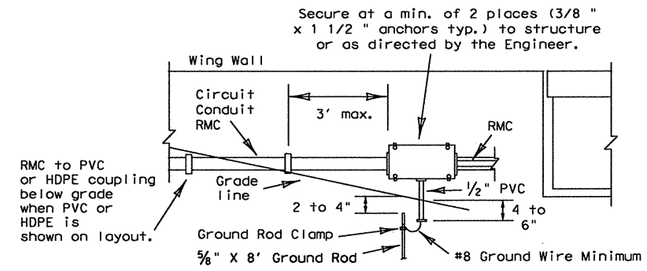
1. Conduit in structures shall have expansion fittings at structure expansion joints. All straight runs of RMC conduit exposed on structures such as bridges shall have expansion joints installed at maximum intervals of 150 feet. Expansion joints shall be installed so they allow for movement of the conduit. Installation of the joint in such a manner that will not allow for movement shall be repaired at no expense to the state. The method of determining the final setting length of the expansion joint shall be provided to the Engineer upon request.
2. Conduit supports shall be spaced at maximum intervals of 5 feet. Conduit spacers shall be used with metal conduit placed on surfaces of concrete structures (See conduit mounting options).
3. Conduit supports shall not be attached directly to prestressed concrete beams except as shown specifically in the plans and approved by the Engineer.
4. Unless otherwise shown on the plans, conduit placed beneath existing roadways, driveways, or sidewalks, or after the base or surfacing operation has begun, shall be accomplished by jacking or boring. The Contractor shall back fill and compact the bore pits to the bottom of the conduit prior to installing connecting conduit or duct cable to prevent bending of the connection.
5. Conduit trenched in the subgrade of new roadways shall be backfilled with excavated material, unless otherwise noted on the plans. Conduit trenched in the sub-base of new roadways shall be backfilled with cement-stabilized base.
6. Open ends of all conduit and raceways shall be fitted with temporary caps or plugs to prevent entry of dirt, debris and rodents during construction. The temporary cap may be constructed of duct tape, but in all cases shall be tightly fixed to the conduit and shall be durable. The contractor shall clean out the conduit and prove it clear in accordance with Standard Specifications Item 618.3 prior to installing any conductors.
7. Conduit entry into the top of enclosures such as safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes shall be made weatherproof using conduit sealing hubs, or threaded bosses.
8. A bonding jumper shall be installed from each grounding bushing to the nearest grounding rod, grounding lug, and/or equipment grounding conductor. All jumpers shall be the same size as equipment grounding conductor. Conduit used as casing under roadways for duct cable need not be grounded if duct extends full length through the casing. At electrical services, grounding electrode conductor shall be a solid Copper #6 AWG.
9. Metal junction boxes shall be bonded to the grounding conductor in accordance with the NEC.
10. Conduits entering ground boxes shall be placed so that the conduit ends shall be not less than 3 inches nor more than 6 inches from bottom of box (See ground box detail on sheet ED(3).
11. Conduit ends shall be sealed with heat shrink boots with waterproof sealant, urethane foam, or by other methods approved by the Engineer. Sealing shall be done after completion of any required pull tests. Duct tape shall not be used as a permanent conduit sealant. Silicone caulking shall not be used as a sealant.
12. All strut mounting material and hardware shall be hot-dip galvanized or shall be stainless steel. The cut ends of strut and non-galvanized rigid metal conduit threads shall be coated with a zinc rich paint (90% or more zinc content). Zinc rich paint may only be used to touch up galvanized material as allowed under item 445.6 galvanizing. The painting of non-galvanized material with a zinc rich paint shall not be considered as an approved alternative for galvanized materials.
13. All PVC conduit terminations shall be fitted with bushings or bell ends. All metal conduit terminations shall be fitted with a grounding type bushing.



CONDUIT MOUNTING OPTIONS

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

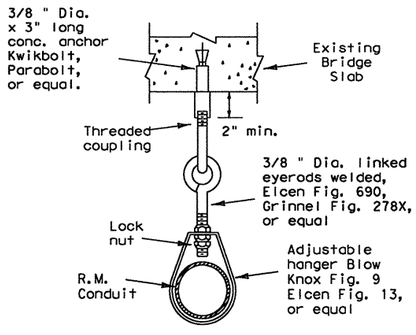




TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

NOTES

1.) Ground rod clamp to be UL listed for direct burial.
2.) For conduit placed in structure, use flush-mounted box.
3.) Bond junction box and metal conduits to equipment grounding conductor and grounding electrode conductor using listed connector.
4.) Seal all conduits entering the junction box from underground.
5.) Install bell end or bushing on 1/2 " PVC conduit both ends.
6.) Ground rod to be driven within 8 inches of 1/2 inch PVC conduit end.



CONDUIT HANGER DETAIL

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

5/03 Revision

⚠1 Revised notes.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS-CONDUIT

ED(1)-03

©TxDOT January 1992	DN: KB	CK: JW	DW: DN	CK: GC	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
4-98 12-00 3-03 5-03	DAL	6	SEE TITLE SHEET				330
	COUNTY		CONTROL	SECTION	JOB		HIGHWAY
	ROCKWALL		1014	03	039		FM 740

71A

LEVELS DISPL
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1 7 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

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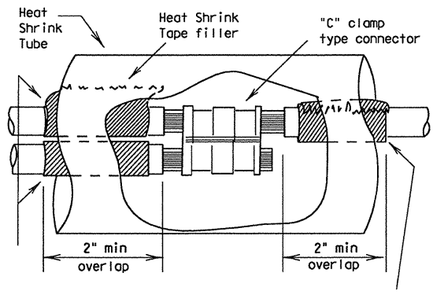
I. ELECTRICAL CONDUCTORS

A. MATERIALS

1. Insulated conductors shall be NEC Type XHHW. Insulated conductors shall be color coded in accordance with the NEC, articles 200, 250, and 310; i.e. Insulation of grounded conductors (neutrals) shall be white. Grounding conductors (ground wires) shall be bare or insulation shall be green. Insulation of ungrounded conductors (hots) shall be any color except green, white, or gray. Identification of conductors #6 American Wire Guage (AWG) and smaller shall be by continuous jacket color. Color coding of electrical conductors #4 AWG and larger shall be either by continuous color jacket or by colored tape. Colored tape marker shall consist of a half-lap of tape covering a 6-inch length of conductor.
2. Where two or more circuits are present in one conduit or enclosure, the conductors of each circuit shall be identified by a permanent non-metallic tag at each accessible location. The tag shall be fastened to the conductors by two plastic straps. Each tag shall indicate circuit number, letter, or other identification shown in the plans.
3. Grounding electrode conductor #6 AWG for bonding to ground rod at electrical service, shall be solid. Connection of conductor to ground rod shall be made using UL Listed connectors designed for such purposes.
4. Heat Shrink Tape filler shall be used to seal the ends of heat shrink tubing around two or more conductors that are insulated with heat shrink tubing. Tape material shall have a minimum dielectric strength of 225 volts per mil and shall be cross-linked butyl rubber. Tape shall be supplied in rolls and shall have a backing (release paper) to prevent the tape from sticking to itself.
5. Heat shrink tubing shall be heavy wall, UL listed for 600 volts or greater and shall have factory applied internal sealant.
6. GelCaps shall be UL listed for 600-volt applications. GelCap shall have see-through elastomer molded cover. Cover shall be filled with high dielectric insulating gel silicone sealant to provide waterseal. Cover shall be held in place by snap-lock, molded clamp made of UV stable polypropylene.
7. Splicing materials, insulating materials, breakaway disconnects, GelCaps and fuse holders will not be paid for directly but shall be subsidiary to various bid items.

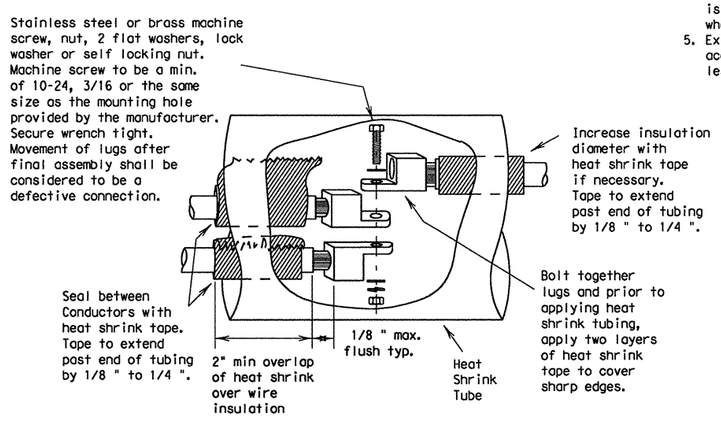
B. CONSTRUCTION METHODS

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



SPLICE OPTION 1

C-CLAMP

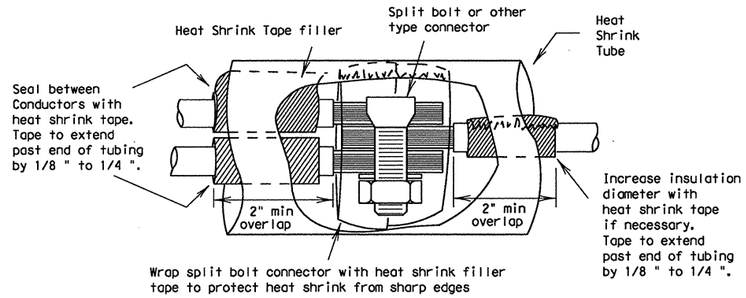


SPLICE OPTION 2

BOLTED WIRE LUGS

SPLICE OPTION 3

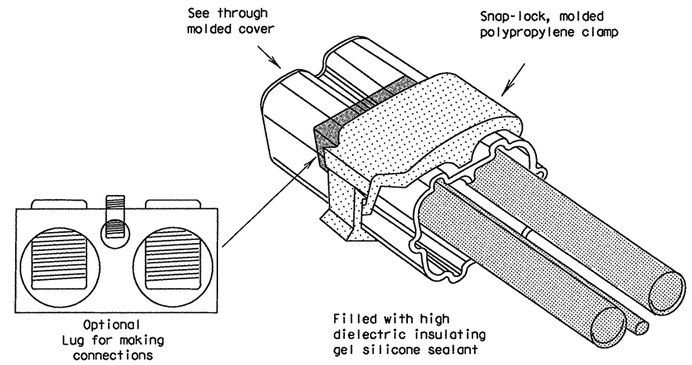
SPLIT BOLT



SPLICE OPTION 4

GELCAP

GelCap shall be sized and installed according to manufacturers specifications



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

C. TEMPORARY WIRING

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

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LEVELS DISP
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS-CONDUCTORS

ED(2)-03

© TxDOT January 1992	DN: KB	CK: JW	DW: DN	CK: GC	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
10-93 4-98 12-00 3-03	DAL	6	SEE TITLE SHEET				331
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY	
	ROCKWALL		1014	03	039	FM 740	

II. GROUND RODS

A. MATERIALS

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

B. CONSTRUCTION METHODS

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

III. GROUND BOX

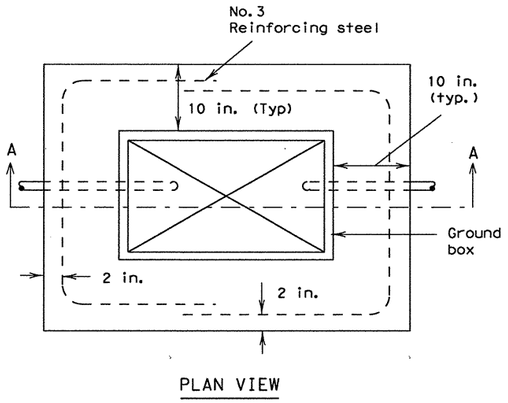
A. MATERIALS

1. Ground boxes 16x30x24 inches (WxLxD) or smaller shall be polymer concrete of the type required by the descriptive code shown elsewhere. Larger ground boxes shall be as shown elsewhere in the plans.
2. All ground boxes and covers shall be permanently marked either by impress or by permanent ink, with manufacturer's model number and manufacturer's name or logo.
3. Covers shall be bolted down, and bolt holes in the box shall be arranged to drain dirt.
4. Ground box Types A, B, C, D & E shall meet the following requirements:
   a. Ground boxes and covers be manufactured from polymer concrete reinforced with continuous strands of woven or stitched borosilicate fiberglass cloth. The polymer concrete shall be made from catalyzed polyester resin, sand and aggregate, and shall have a minimum compressive strength of 11,000 psi. Polymer concrete containing chopped fiberglass or fiberglass reinforced plastic is not acceptable.
   b. Minimum inside dimensions shall be as follows (width x length x depth):
      Type A shall be 11.5 inches x 21 inches x 10 inches, (122311)
      Type B shall be 11.5 inches x 21 inches x 20 inches, (122322)
      Type C shall be 15.25 inches x 28.25 inches x 10 inches, (162911)
      Type D shall be 15.25 inches x 28.25 inches x 20 inches, (162922)
      Type E shall be 11.5 inches x 21 inches x 16 inches, (122317)
   c. Bottom edge of box or extension shall be footed with a minimum 1 1/4 inch flange.
   d. Ground boxes shall withstand 600 lbs. per sq. ft. applied over the entire sidewall with less than 1/4 inch deflection per foot length of box. Ground boxes and covers shall withstand a test loading of 20,000 lbs. over a 10 inch by 10 inch area centered on the cover with less than 1/2 inch deflection. Ground boxes and covers shall meet Western Underground Standards 3.6. Manufacturer shall supply certification by an independent laboratory or sealed by a Texas-Licensed Professional Engineer.
   e. Covers shall be 2 inch (nominal) thick polymer concrete. All hardware shall be stainless steel. Cover shall be secured with two 1/2 inch stainless steel bolts. Bolts shall be self-retaining and shall withstand a minimum of 70 ft-lbs. torque and shall have a minimum 750 lbs. straight pull out strength. Nuts shall be floating and shall provide a minimum of 1/2 inch movement from the center of the nut. Covers shall be skid resistant, minimum 0.5 coefficient of friction. Covers shall be interchangeable between manufacturers and shall conform to the dimensions shown herein. Unless otherwise approved by the Engineer, cover shall be legibly imprinted with the following words in minimum 1 inch letters:
      Ground Boxes containing wiring for traffic signals shall be labeled, Danger High Voltage Traffic Signal.
      Ground boxes containing wiring for illumination systems shall be labeled, Danger High Voltage Illumination.
      Ground boxes containing wiring for traffic management systems shall be labeled, Danger High Voltage Traffic Management.
      Ground boxes containing wiring for sign illumination systems shall be labeled, Danger High Voltage Sign Illumination.
      Ground boxes containing wiring for traffic signals that also contain illumination, powered by the signal electrical service, shall be labeled, Danger High Voltage Traffic Signal.

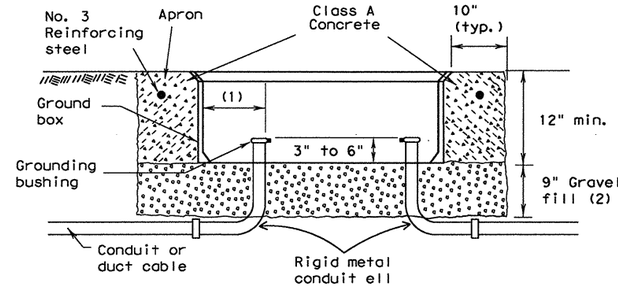
B. CONSTRUCTION METHODS

⚠

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



PLAN VIEW



SECTION A - A

APRON FOR GROUND BOXES

(Where required)

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

PLAN VIEW

END

SIDE

GROUND BOX COVER

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

5/03 Revision

⚠ Revised notes.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS-GROUND BOXES

ED(3)-03

DN: KB	CK: JW	DW: DN	CK: GC	MSG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
4-98 12-00 3-03 5-03	DAL	6	SEE TITLE SHEET	332

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

71C

LEVELS DISP 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

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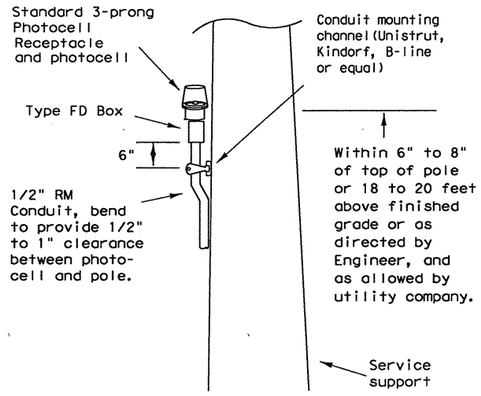

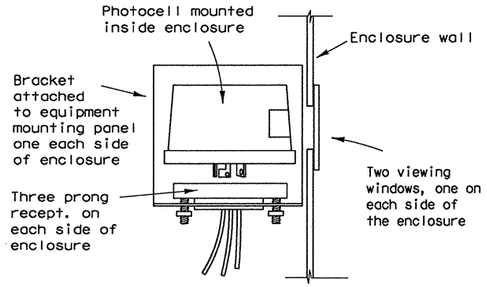

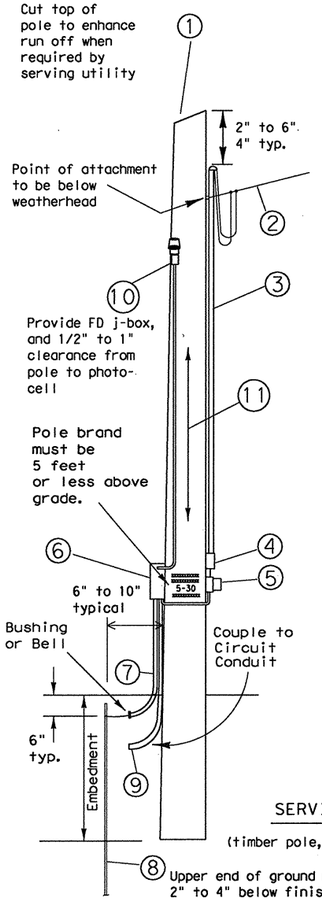

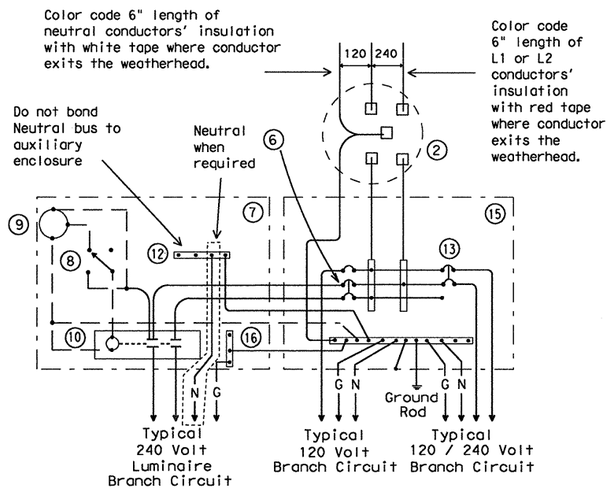

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ELECTRICAL SERVICES NOTES

All work, materials, services, and incidentals, whether or not specifically shown on the plans, which may be necessary for a complete and proper electrical service installation as specified in the plans to obtain electrical power shall be paid for, performed, furnished and installed by the Contractor. The Contractor shall contact the Utility for metering and shall comply with all Utility requirements.

Primary line extensions, connection charges, meter charges, and other charges by the Utility company to provide power to the location shown, when required, shall be paid for under force account work. The costs associated with these charges shall be approved by the Engineer prior to engaging the Utility company to do the work. The Contractor shall consult with the appropriate Utility to determine costs and requirements, and shall coordinate the Utility's work as approved by the Engineer. The Contractor shall be reimbursed only the amount billed by the Utility. No additional amount for supervision of the Utility's work will be paid.

Materials shall be new and unused, materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards and shall be Underwriters Laboratories (UL) Listed. Electrical Service conduits, conductors, disconnects, contactors, circuit breaker panel sizes, and branch circuit breakers, shall be as shown in the Electrical Service Data elsewhere in the plans. Faulty fabrication or poor workmanship in any material, equipment, or installation shall be justification for rejection.

The Contractor shall submit for approval no less than six (6) copies of catalog cut sheets on electrical service materials. Submittals shall be legible and shall be marked to indicate which product on a cut-sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

The Contractor shall provide locks keyed with Master #2195 for all lockable electrical enclosures. Keys and locks become property of the State. Unless otherwise approved by the Engineer, enclosures shall not be energized until locks are provided and all bolts are installed.

Circuit directories, where provided, shall be filled out. All breakers and components in shop built panels and enclosures shall be labeled with duo-colored plastic labels. Letters shall be a minimum 3/8 " in height.

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

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

I. Safety Switch. A safety switch, placed ahead of the meter, shall only be used when specified by the Utility and when shown on the Electrical Service Data. The switch shall be UL Listed, heavy duty type, 600 volt, unfused, with a UL type 3R enclosure and equipped with a solid neutral (s/n) assembly. The switch shall be padlockable in the "on" position.

II. Service Type. Electrical service types A, C, D, and T shall be as schematically detailed on ED(4) or ED(5). Other service types shall be as detailed elsewhere on the plans.

III. Branch Circuit Breakers. Circuit breakers shall be thermal magnetic and have a minimum interrupting capacity of 10,000 amps and a voltage rating compatible with their use. Circuit breakers shall be sized as shown in the electrical service data. Circuit breakers in panelboards and load centers shall be full size and designed exclusively for the panelboard or load center in use. Tandem and half-width breakers shall not be used. All circuit breakers shall be permanently and clearly marked identifying the circuit or device supplied. Circuit breakers shall be UL Listed to UL489.

IV. Circuit Breaker Panelboard. Panelboards shall be UL Listed. Panelboards shall have copper busses, a minimum of 6 one-pole spaces or as required in the electrical service data, and when required will be rated for service equipment. Enclosure shall meet or exceed UL type 3R classification. Panelboards shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Circuit breakers shall be bolt-in type only.

V. Circuit Breaker Load Center. Load centers shall be UL Listed.
Load centers for type T services may have copper or aluminum busses, all other load centers will be copper bus only. Load center will have a minimum of 4 one-pole spaces, and shall be rated for service equipment. Enclosure shall meet UL type 3R classification. Load centers shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Circuit breakers shall be plug-in type only. Load centers for type T services shall accomodate a maximum of 6 one-pole breakers.

VI. Separate or Auxiliary Enclosure. Separate enclosures for HOA, photocell and lighting contactors for types D & T Services shall be a UL Listed assembly with outer door. Interior shall have dead front trim. HOA switch operator shall extend through the dead front trim. Photocell shall be mounted inside the enclosure as described in paragraph XIII when required by descriptive code. Separate enclosures shall meet the construction requirements of paragraph VIII. E, except that separate enclosure shall not have external operating handle, need not have a data pocket and door may latch at only one point. All equipment may be located in one enclosure instead of two, when approved by the Engineer.

VII. Where a Type D or T service is provided, laminated "as built" drawings are required as shown on ED(5) VIII E; shall be delivered before completion of the work, to the Engineer in lieu of placement within these smaller enclosures. Conduit may not enter the back wall of a service enclosure penetrating the equipment mounting panel. Provide grounding bushings on all metal conduits, terminate bonding jumper to grounding bus. Grounding bushing is not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss such as a meter base.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

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

Example: ELEC SERV TY A(240/480)100(NS)SS(E)GC(O)

Schematic Type

Service Voltage (V / V)

Disconnect Amp Rating
(000 indicates main lug only)

SS= Safety switch ahead of meter
NS= No switch ahead of meter
and/or no meter required

Enclosure Type
GS= Galvanized steel (see ED(5)VIII,D)
SS= Stainless steel
AL= Aluminum

Photocell Mounting Location
T= Top of pole
E= Inside service/separate enclosure
L= Luminaire mounted
N= None

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Switch gear to be placed on traffic signal pole
RT= Rectangular structural tubing
PS= Pedestal Service (see ED(5)VIII,G)

O= Overhead service
U= Underground service

SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

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

TOP MOUNTED PHOTOCELL

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

ENCLOSURE MOUNTED PHOTOCELL

For photocell specifications see ED(5),XIII.

SCHEMATIC LEGEND

1 - omitted
2 - Meter (when required)
3 - Service Assembly Enclosure
4 - Main Disconnect Breaker (Not Used)
5 - Omit
6 - Circuit Breaker, 15 Amp typical for control circuit wiring
7 - Auxiliary Enclosure
8 - Control Station ("H-O-A" Switch)
9 - Photo Electric Control (enclosure-mounted shown)
10 - Lighting Contactor
11 - Power Distribution Terminal Blocks (Not Used)
12 - Neutral Bus required when 120 v. lights are controlled by lighting contactor
13 - Branch Circuit Breaker (See Electrical Service Data)
14 - Circuit Breaker Panelboard (Not Used)
15 - Load Center
16 - Ground Bus

────	Power Wiring
– – – –	Control Wiring
──N──	Neutral Conductor (when required-to serve 120 v. loads only)
──G──	Equipment grounding conductor-always required

1 - Class 5 pole, height as required
2 - Service drop from utility company (attached below weatherhead)
3 - Service conduit and service entrance conductors(RMC) (See Electrical Service Data)
4 - Safety switch (when required)
5 - Meter (when required)
6 - Service enclosure
7 - No. 6 bare grounding electrode conductor in 1/2 " PVC to ground rod - extend 1/2 " PVC 6" underground.
8 - 5/8 " x 8' Copper clad ground rod - drive ground rod completely underground unless otherwise approved by the Engineer.
9 - RM conduit - same size as branch circuit conduit.
10 - Photocell and conduit - if top mounted. (See Electrical Service Data)
11 - When required by the serving utility provide bare #6 awg copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor to a height of 8 ft above finish grade.

LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

(If applicable)

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

SERVICE SUPPORT TYPE TP (O)

(timber pole, overhead service, typical arrangement)

TIMBER POLE NOTES

1. Conduit and electrical conductors attached to the electrical service pole and underground within 12 inches of service pole shall not be paid for directly but shall be subsidiary to the service pole.
2. Pole top mounted photocell, install on north side of pole or in service enclosure as required. See Electrical Service Data.
3. Attach meter and service equipment with stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Gain pole as required to provide flat surfaces for each strut. Paint ends of galvanized channel with zinc rich paint. Gain depth 5/8" max. Gain height 1 7/8" max. Strut to be 1" max. deep, and 1 5/8" wide max. Secure each strut section to timber pole with two galvanized or SS lag bolts, 1/4" diameter min. by 1 1/2" length min. Place flat cut galvanized or SS washer on each lag bolt. Gain pole in a neat and workmanlike manner.
4. Embedment depth shall be as required in Item 627 Treated Timber Poles.
5. Poles trimmed for excess length shall be trimmed from the top end only.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

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

ED(4)-03

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REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
12-00 3-03	DAL	6	SEE TITLE SHEET			333
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

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SERVICE ENCLOSURE NOTES

VIII. Service Assembly Enclosures. All service assemblies and enclosures shall be UL Listed for the intended purpose.

A. Shop built or shop assembled service assemblies (all types except Type T and Type D without lighting contactor or enclosure mounted photo cell) and all auxilliary equipment enclosures mounted with service equipment and paid for as part of Item 628, "Electrical Services", shall be built or assembled by a UL Listed Industrial Control Panel shop and shall have a unique serial numbered UL Label with the words "LISTED ENCLOSED INDUSTRIAL CONTROL PANEL". The same or an additional label shall have the name, location, and phone number of the shop, the UL file number of the shop, the shop order or drawing number, date of manufacture or assembly, and the line voltage. The service assembly enclosure shall also be labeled "SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT".

B. Conduit entries into the top of enclosures shall have threaded hub. Conduit entries through the equipment mounting back plate will not be allowed.

C. All service enclosure front doors shall be permanently labeled "DANGER HIGH VOLTAGE". Label shall be a self sticking type, intended for outdoor installation. Lettering style, layout and colors of red, black and white shall be as required by OSHA. Label letters shall be 1 to 1 1/2 inches high or as high as the enclosure door width will permit for smaller services. Separate or auxiliary lighting enclosures need not be OSHA labeled when mounted in the same viewing plane as the service enclosure front door. Where only one type of load is served by the service, the service door shall be marked using duo-colored plastic labels or self adhesive vinyl weather resistant labels, minimum of 1 inch high; applied in a neat and workmanlike manner. On the label will be the service number shown on the plans as well as identifying the load served specifically (i.e. lighting, landscaping, signals, traffic management or other wording as directed by the Engineer). Safety switches need not be OSHA labeled unless specifically required by the serving utility.

D. Type GS enclosures will only be allowed for service Types D and T without an enclosure mounted photocell and/or lighting contactor and the Type C panelboard. This spec will allow an "off the shelf" product meeting these specifications to be used. Type GS enclosures shall be made from pre-galvanized steel sheeting, hot dipped galvanized steel, or powder coat painted steel unless shown differently on the plans. Steel enclosures shall be painted inside and outside; galvanized enclosures may be painted. Unless otherwise approved by the Engineer, painted enclosures shall be gray, beige, white or light green. Panelboard/loadcenter enclosures shall meet UL type 3R requirements, shall have a dead front trim, and an outer padlockable door preventing unauthorized persons from operating contained equipment. Galvanized steel is no longer allowed for Types A,C,or custom-built D or T enclosures. If GS is shown in the descriptive code for any of these, an AL shall be provided.

E. Type AL enclosures for service Types A and C shall meet UL type 3R requirements and shall also meet additional requirements of this paragraph. The enclosure shall have both a main disconnect remote operator handle and a door latch handle. Die-cast handles are not acceptable. The main disconnect remote operator shall be flange-mounted, shall interlock the door when in the "on" position, and shall be padlockable in both the "on" or "off" positions. Door latch shall latch at two or more points, operate by a handle separate from disconnect switch and be capable of being locked. Door closure clamps will not be allowed. Lock must be keyed to Master #2195. All the enclosures shall have either a continuous stainless steel piano hinge with stainless steel pin or enclosures less than 30 inches may have two heavy duty hinges, those over 30 inches must have three. Heavy duty two and three point hinges shall have a 0.185 inch minimum diameter electro-zinc plated steel pin or a stainless steel pin. Two point hinged doors shall be rated for 56 lbs of loading. Three point hinged doors shall be rated for 70 lbs of loading. The door shall have an attached data pocket constructed of either thermoplastic or metal. Pocket shall be 12" x 12", unless that size will not fit in enclosure. The pocket shall then be as large as possible, as approved by the Engineer, and mechanically attached with stainless steel nuts and bolts, or stainless steel or aluminum rivets. Enclosure shall include an equipment mounting panel installed inside the enclosure on collar studs or tapped bosses, and constructed of a minimum 12 guage galvanized steel. Equipment mounting panels shall not be painted. Enclosure shall have factory installed external mounting feet. Enclosure door shall be capable of opening at least 130 degrees, with arm or other approved means to hold the door open. Only the enclosure exterior will be primed and painted. Paint color shall be beige or gray and shall be powder coat paint as shown below. Condensation drainage shall be provided in the bottom of the enclosure before leaving the factory. The Contractor shall prepare and submit a schematic drawing unique to an individual service. The approved drawing shall be laminated and placed in the document pocket of the service at the time of shipment to the job site. All applicable wiring diagrams and plan sheet layouts for all equipment and branch breaker circuits supplied by that service shall also be laminated and placed in the document pocket prior to shipping. Type AL enclosures for Type D and T services with enclosure mounted photocell and/or lighting contactor shall have the loadcenter interior mounted in an enclosure with properly adapted dead front trim. Types D and T shall not have a loadcenter exterior "can" mounted inside another enclosure meeting these specifications. (Do not put one enclosure inside another enclosure). Types D and T with enclosure mounted photocell and/or lighting contactor shall meet the additional requirements of this paragraph except that remote-operating handle will not be provided.

F. Type SS enclosures for Type A and C shall meet all the requirements above for their respective type AL. Type SS enclosures for D and T shall meet all the requirements above for their respective type AL. Stainless Steel shall not be painted.

G. PS enclosure shall be as detailed and specified on ED(8). Galvanized steel will not be allowed for any pedestal service. If GS is shown in the descriptive code on AL will be provided.

IX. Powder Coat Paint. Powder coating shall be either a polyester thermosetting resin, a zinc rich primer with a TGIC (triglycidyl isocyanurate) powder overcoating, or a zinc-rich epoxy powder, applied by either electrostatic spray or fluidized bed immersion, high temperature oven cured, high density, low gloss, 4 mil thick (minimum), coating. Adhesion shall meet the 5A or 5B classifications of ASTM D3359. Finish shall be uniform in appearance and free of scratches.

X. Main Disconnect. Main disconnect device shall be a circuit breaker, as specified in the Electrical Service Data, shall be two or three pole, and rated for the voltage and amperage specified. Circuit breaker shall be an UL Listed thermal-magnetic circuit breaker controlled by flange-mounted remote operator in the service assembly enclosure when required. Circuit breakers shall have a minimum interrupting rating of 10,000 Amps. When the utility company provides a transformer larger than 50 KVA, Contractor shall verify that the available fault current is less than the circuit breaker amps interrupting capacity (AIC) rating and shall provide documentation from the Utility to the Engineer. Documentation shall be submitted at the same time as other electrical submittals. Circuit breaker shall be UL Listed to UL489. No backfed breakers will be allowed for use as a main disconnect.

XI. Control Circuit. Control circuit protection shall be 15 amp circuit breaker.

XII. Control Station ("H-O-A" Switch). Control station shall be a maintained-contact, three position selector switch in an UL type enclosure. Switch shall be rated 600 volts and shall be fitted with "Hand-Off-Auto" legend.

XIII. Photo Electric Control. Photo electric control shall consist of a photocell, internal lightning arrester, and relay or bimetallic switch mounted inside a weatherproof enclosure with standard 3-prong twist lock photocell plug and receptacle. The enclosure shall be made of poly-acrylic with clear acrylic window. Enclosure chassis shall be molded thermosetting plastic. The photocell shall have a polyethylene gasket, and shall have a hermetically sealed cadmium sulfide cell. The arrester shall have an enclosed type expulsion arrester rated 2.0 kV sparkover with 5,000 amps follow-through. Relay or switch shall be time delay type with normally closed contacts. Photo electric control shall be rated a minimum of 1800 VA, voltage as required. Enclosure mounted photocells shall be the same as above except that the photocell shall be mounted inside the enclosure. The enclosure shall have two acrylic paned windows, or other material approved by the Engineer, one on each side of the enclosure. Each window shall be rectangular approximately one inch by two inches, round 2 inch diameter, or as otherwise approved by the Engineer. Bracket and photocell's receptacle will be mounted inside enclosure next to each window. Except for window side, 2" of clearance is required on all sides of photocell for ease of replacement. The photocell's receptacle is held in place by two mounting screws on bracket and located next to each window of the enclosure. The 3-prong twist lock photocell shall be mounted in a position to receive light from the window closest to the photocell. The photocell shall be mounted in a position to receive light from one window. Top of pole mounted photocells shall be mounted as shown on ED(4). The Contractor shall be responsible for proper operation of the photo-electric control. The Contractor shall move and/or adjust or shield the photocell from stray or ambient nighttime light or shall make any other adjustments required for proper operation. The photocell shall face North when practicable. Unless otherwise shown on the plans, the photocell shall turn on the illumination system at 1.0 +(-) 0.5 footcandle and turn off the illumination system at two footcandles higher than turn on.

XIV. Lighting Contactor. Lighting contactor shall be a UL Listed NEMA rated lighting contactor, two-pole or multipole as required, electrically held type designed to control high pressure sodium lighting loads, with silver alloy double break contacts rated at 240 volts, 480 volts or 600 volts as required. Lighting contactor shall not be the DIN rail mounted type.

XV. Power Distribution Terminal Blocks. Power distribution terminal blocks shall be rated for 600 volts and shall be used for line side connections to branch circuit breakers where more than one circuit breaker is required. Lugs on blocks shall be properly sized for conductors being used. Only one conductor shall be placed under each lug.

XVI. Neutral/Ground Bus. Neutral/ground bus shall be a factory made bus permanently bonded to the enclosure with properly sized lugs for grounding and neutral conductors.

SCHEMATIC LEGEND

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

———— Power Wiring
– – – – Control Wiring
——N—— Neutral Conductor (when required) serve 120 v. loads only)
——G—— Equipment grounding conductor-always required

LEVELS DISPL
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 1

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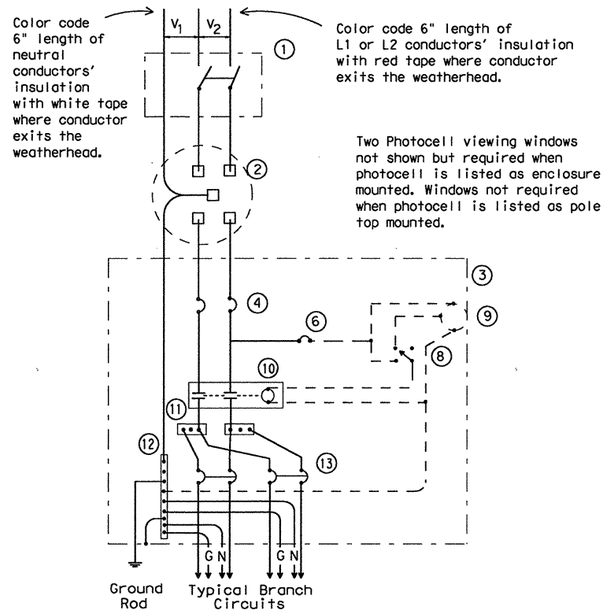
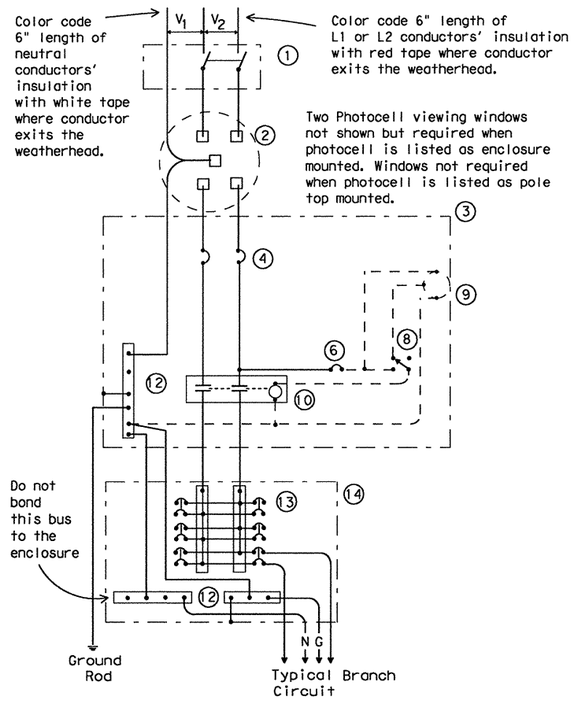


SCHEMATIC TYPE A

THREE WIRE

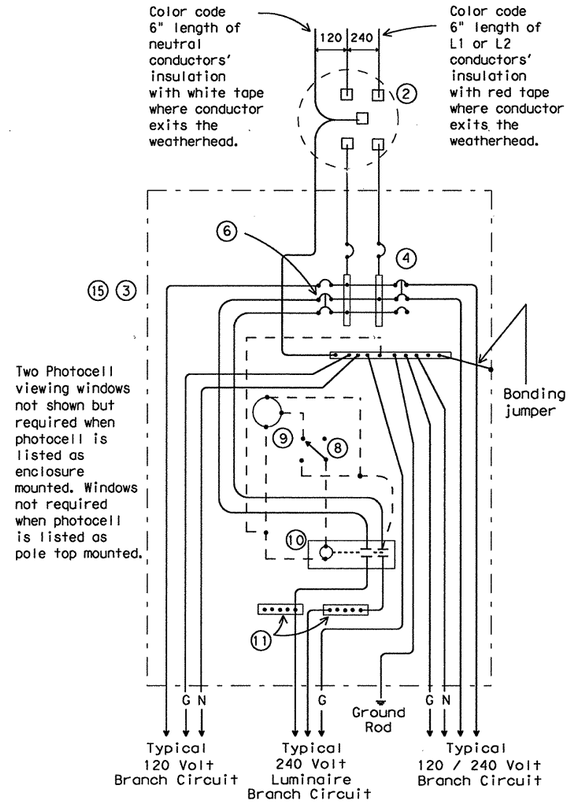
Maximum feeder circuit size (High Mast Poles): 100 amps for two pole 480V, 125 amps for one or two pole 120V or 240V. Maximum branch circuit size: 50 amps.



SCHEMATIC TYPE C

THREE WIRE

Maximum feeder circuit size (High Mast Poles): 100 amps for two pole 480V, 125 amps for one or two pole 120V or 240V. Maximum branch circuit size: 50 amps.



SCHEMATIC TYPE D

120/240 VOLTS - THREE WIRE

Install photocell and lighting contactor when shown on Electrical Service Data. See Type D service notes.

TYPE D SERVICE NOTES

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

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS- SERVICE ENCLOSURE & NOTES

ED(5)-03

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REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
12-00 3-03	DAL	6	SEE TITLE SHEET	334

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

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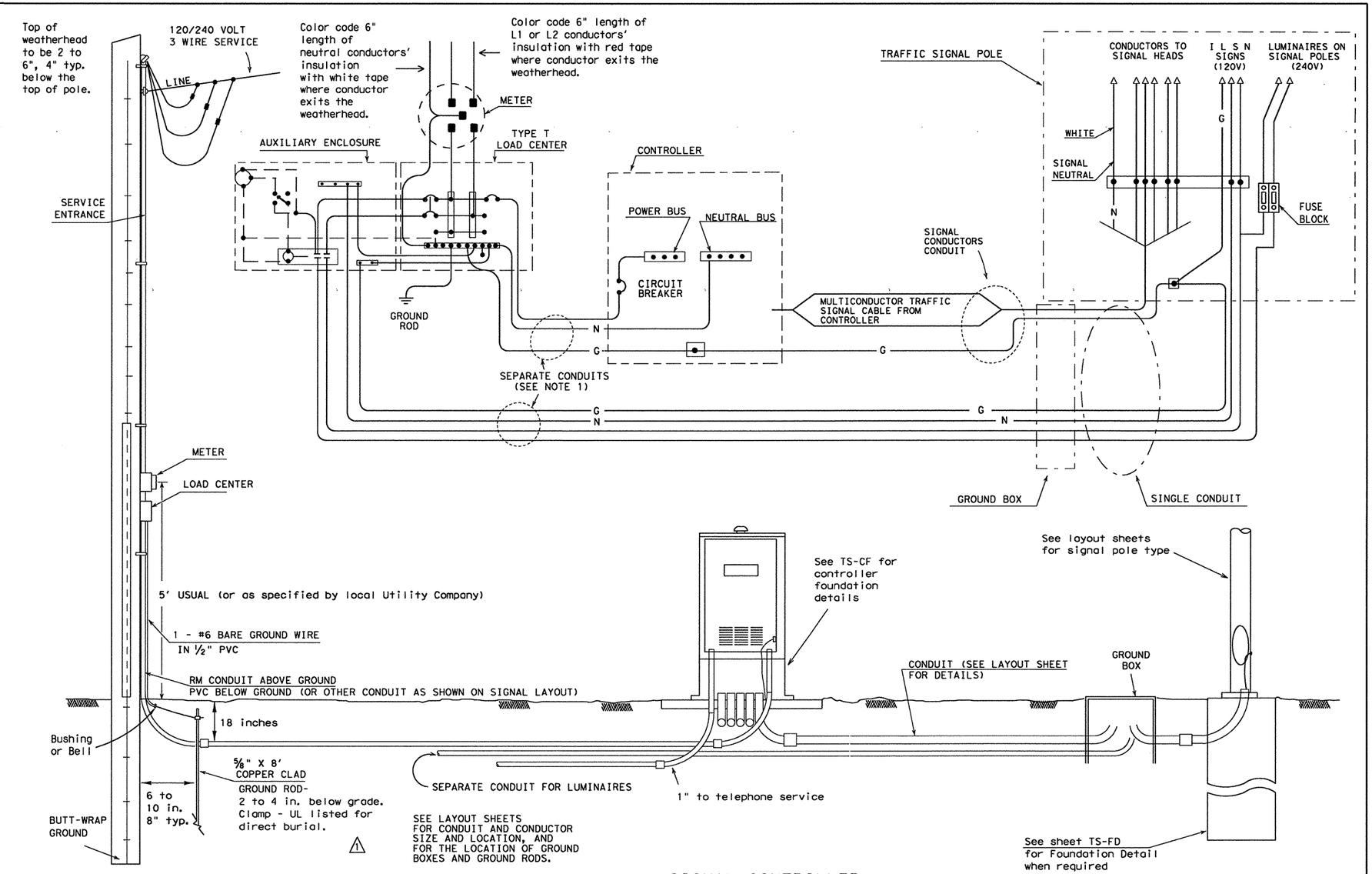
NOTES:

1. Luminaire conductors shall not be looped through controller cabinet.
2. Electrical system to include an equipment grounding conductor noted here as "G". All exposed metal parts are to be bonded to grounding conductor.
3. Photocell, when required, shall be mounted at top of pole or in enclosure as shown on ED(4) and ED(5) and as required by descriptive code.
4. Roadway lighting fixtures, when required, shall be in accordance with the material and construction methods of the Item, "Roadway Illumination Assemblies" except for the test period for proper operation of the luminaires. Installed roadway lighting luminaires and internally lighted street name signs shall be tested for proper operation as a part of the associated traffic signal system.
5. Internally lighted street name signs (ILSN), when required, shall be in accordance with the Item "Internally Lighted Street Name Signs". Because of the electrical isolation of ILSN hinges, a #12 green grounding conductor shall be run to the ILSN fixture.
6. Install ground rod at alternate location when directed by the Engineer. Maintain a minimum of 8 ft in contact with the earth.
7. Liquidtight flexible metal conduit (LFMC), may be used when meter and service enclosure are mounted 90 to 180 degrees to each other. LFMC shall be same size as service entrance conduit. LFMC shall not exceed 3 ft. and shall be securely supported within one foot of each end. No strap required for a LFMC shorter than 12". Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. A neutral conductor must be installed within the LFMC. Bend in liquidtight flexible metal conduit shall not exceed 180 degrees.
8. Minimum embedment depth as per Item 627 Treated Timber Poles.
9. Pole to be set plumb.
10. Back fill thoroughly tamped in 6 in. lifts. Place 6 inches additional backfill above grade around pole base to allow for settling, as per Item 627.
11. Excess pole length shall be trimmed from the top at a slope to aid water run off.
12. Gain pole two places for each meter, service, separate or auxiliary enclosure. See ED(4) for details.
13. All illumination and power conductors to be pull tested and megged. Do not meg traffic signal cable.
14. Enclosures are to be locked, and ground box covers are to be bolted before power is applied to the circuit.
15. Conduits entering top of enclosures to be fitted with conduit sealing hub or threaded boss, such as meter hub. Off-set nipple, when required, shall not be zinc-die-pressure cast. All metal conduits not connected to conduit sealing hub, or threaded boss must have a grounding bushing. Terminate bonding jumper to ground bus. All conduits entering enclosures shall be sealed. Silicone shall not be allowed.



ELECTRICAL SERVICE

(TYPE T TIMBER POLE SHOWN AS EXAMPLE, SEE ELECTRICAL DETAILS, LAYOUT SHEETS, AND ELECTRICAL SERVICE DATA SHEET FOR SERVICE REQUIRED AND FOR DETAILS.)

SIGNAL CONTROLLER

SIGNAL POLE

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

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION(SEE ED(4))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS ***	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
TY D (120/240)070(NS)AL(E)**(*)	1¼ ⚠1	3/#4	N/A	2P/70	30	100	T.S. Lighting	1P/50 2P/15	<7.1
TY T (120/240)000(NS)GS(E)**(*)	1¼ ⚠1	3/#4	N/A	None	30	70	T.S. Lighting	1P/50 2P/15	<7.1

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

5/03 Revision
⚠1 Revised notes.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS- TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(7)-03

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REVISIONS 4-98 12-00 3-03 5-03	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: SEE TITLE SHEET		SHEET: 365
	COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 039	HIGHWAY: FM 740

DN: LR CK: CW DW: DN CK: MT
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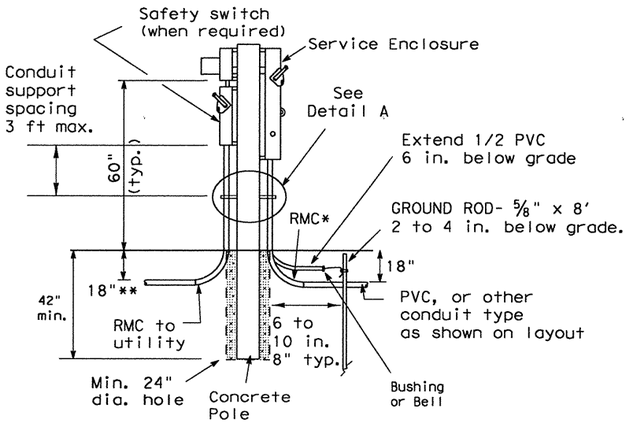
LEVELS DISPL

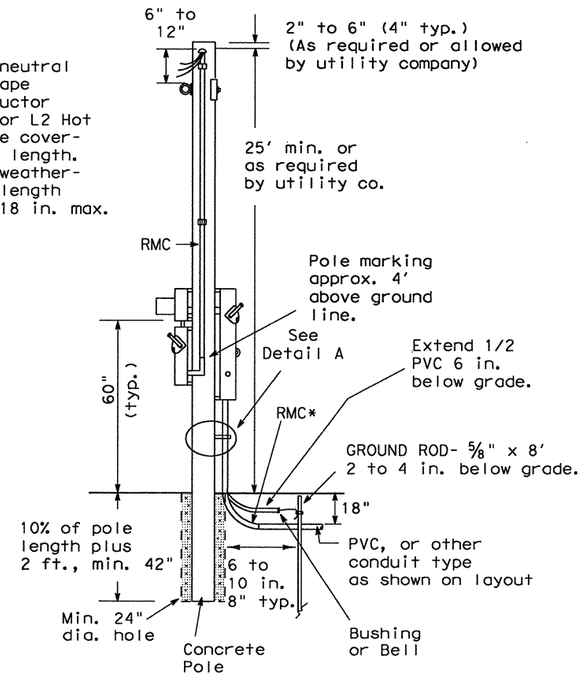
71G



CONCRETE SERVICE SUPPORT

(Underground)

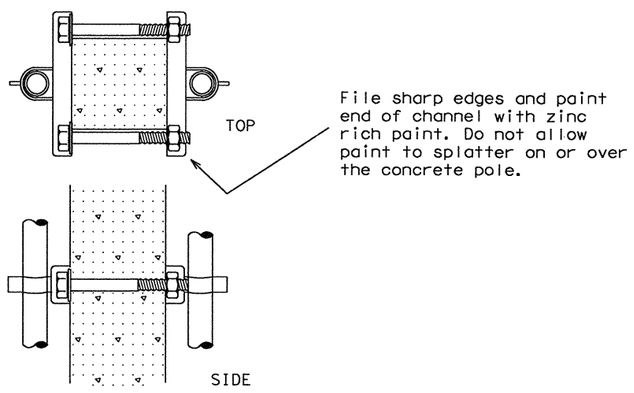
Color code grounded - neutral conductor with white tape covering 6 in. of conductor length. Color code L1 or L2 Hot conductor with red tape covering 6 in. of conductor length. Where conductors exit weatherhead, conductors free length shall be 12 in. min., 18 in. max.



CONCRETE SERVICE SUPPORT

(Overhead)

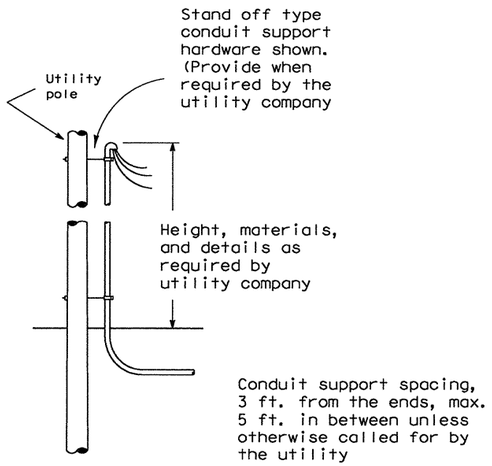
*same size as branch circuit conduit shown on layout sheets.
** or as required by utility company.



DETAIL A

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

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



UTILITY POLE CONNECTIONS

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

NOTES:

Electrical service support structures bid as type GC or OC shall be concrete poles and shall meet the following specifications.

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

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS- SERVICE SUPPORT TYPES GC AND OC

ED(9)-03

© TxDOT April 1998	DN: KB	CK: JW	DW: DN	CK: GC	REQ NO.:
REVISIONS 12-00 3-03	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: SEE TITLE SHEET		SHEET: 336
COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 039	HIGHWAY: FM 740	

71J

DN: CK: DW: CK:
DATE: ACC: FILE:
LEVELS DISPL

ROADWAY ILLUMINATION LIGHT FIXTURES

Fixture Housing:

A. Provide *UL listed fixture suitable for use in wet locations. Ensure optical compartment meets IEC Standard 60529-IP 65. Place a permanent label inside fixture indicating fixture meets *UL, IP 65 optical, and shows date of manufacture. Meet ANSI 136.15 wattage label requirements.
B. Construct fixture housing, lens frame, and door from 96% copper-free, die cast aluminum. Provide fixture mounting to a 2-in. pipe arm. Equip fixture with a 4-bolt clamp capable of adjustments plus or minus 5 degrees from level. Meet ANSI 136.31 3.0 G vibration requirements.
C. Attach a level bubble to the fixture housing. Ensure the level bubble is sensitive to 1 degree changes in position at any point within 5 degrees of the level position. Ensure the level bubble is clearly visible from the ground up to a 50 ft. mounting height. Ensure level bubble corresponds to level position of fixture.
D. Do not exceed 1.6 sq. ft. effective projected area. Do not exceed 60 lb. maximum weight.
E. Equip fixture with a 3-prong photocell receptacle with shorting cap installed.
F. Paint inside and outside of fixture light gray, when installing on galvanized poles. For all other fixtures, paint to match the color of the pole as directed by the Department.
G. Use a thermoset powder coat system. Ensure paint exceeds 1000-hr. salt-spray test in accordance with ASTM B117. Ensure a nominal thickness of 2.5 mil and no pigment loss upon 50 double-rubs using Methyl Ethyl Ketone (MEK) solvent in accordance with ASTM D5402, "Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs."
H. Fabricate brackets, nuts, bolts, washers, ballast tray, and parts from stainless-steel, or aluminum of adequate thickness as approved by the Department except that:
   1. The 4 bolts/studs, 4 flat washers, 4 lock washers, and clamp that attach the luminaire to the arm may be galvanized in accordance with ASTM A123, A153 or B633. Provide means to ensure clamp is in the open position when installing.
   2. Glass lens retainer spring clips may be fabricated from galvanized steel in accordance with ASTM A153.
   3. Provide nylon throat or other approved locking means for all stainless steel nuts.
I. Provide optical assemblies which meet the following:
   1. Polished aluminum reflectors with Alzak or equal coating.
   2. Do not paint reflectors, except that, when approved by the Engineer, some surfaces may be painted with 92% reflective white paint.
   3. Reflectors may be one piece or segmented as follows.
      a. One piece reflectors:
         1. Seal photometric compartment by the use of a seamless or vulcanized seam, closed-cell silicone gasket, or other method approved by the Department.
         2. Provide a non-adjustable lamp socket mounting method so the lamp center is consistent with the reflector.
      b. Segmented reflectors:
         1. Attach segments at both ends (or opposite sides if segments are square) of the segment to a rigid aluminum base plate and side wall support assembly. Seal glass lens to lens frame with a one piece seamless silicone gasket.
   4. Equip the optical assembly with a lamp support in addition to the lamp socket to ensure the outer envelope is positioned as intended.
J. Provide 5/32 in. thick (min.) clear heat tempered or borosilicate glass.

Electrical Components:

K. Meet the following ballast requirements and pass tests in accordance with Test Method Tex-1130-T, "Ballasts of Lighting Assemblies."
   1. Mount electrical components on a removable stainless steel or aluminum tray of adequate thickness.
   2. Provide a fixture wiring diagram on or near the ballast.
   3. Use a copper wound magnetic regulating three isolated coil ballast.
   4. Provide ballast factor between 0.95 and 1.0.
   5. When the circuit voltage indicated on the plans is applied, the ballast input wattage during fluctuations of the test voltage of plus 10 percent and minus 10 percent, do not exceed the following:
      a. 220 Watts for 150 watt nominal lamp rating
      b. 440 Watts for 250 watt nominal lamp rating
      c. 552 Watts for 400 watt nominal lamp rating
   6. During fluctuation of the test voltage of plus 10 percent and minus 10 percent, ensure the lamp wattage fluctuation does not exceed a total of 20 percent and ballast maintains lamp wattage within the following limits.
      a. 110 Watts minimum and 180 Watts maximum for 150 Watt nominal lamp rating
      b. 175 Watts minimum and 370 Watts maximum for 250 Watt nominal lamp rating
      c. 280 Watts minimum and 475 Watts maximum for 400 Watt nominal lamp rating
   7. Ensure the ballast power factor, when tested at circuit voltage indicated on the plans, is not less than 90%.
   8. Permanently and clearly mark ballast or fixture to indicate following:
      a. Lamp type
      b. Catalog number
      c. Voltage rating
      d. Connection diagram
      e. Manufacturer
      f. *UL listing
L. Meet the following electronic starting aid requirements and pass tests in accordance with Test Method Tex-1140-T, "Electronic Starting Aids of High Pressure Sodium Vapor Lighting Assemblies."
   1. Provide a starting pulse with an amplitude of 2500 volts minimum, 4000 volts maximum.
   2. Ensure the pulse width is a minimum of 0.8 microseconds at 2250 volts.
   3. Ensure the pulse occurs when the open circuit voltage is equal to or greater than 90 percent of peak open circuit voltage.
   4. Ensure pulse repetition rate is a minimum of one per cycle.
   5. Provide a pulse current of 0.18 amperes (min.).
   6. Discontinue to pulse when, either,
      a. the lamp starts, or
      b. after a minimum of 3 minutes and a maximum of 10 minutes if the lamp fails to start.
M. Do not place fuses inside pole mounted luminaires. For wall mount or underpass mounted luminaires, provide internal 10 amp time-delay fuses.
N. Provide a two position terminal block for connecting supply wires which meet the following requirements:
   1. Insulate using nylon, porcelain, or phenolic material. Ensure phenolic terminal block is of adequate construction as approved by the Department.
   2. Fabricate terminals from nickel, tin plated brass, or aluminum.
O. Equip fixture with MOV surge protection in accordance with IEEE recommendations.
   1. Connect MOV from line to neutral or from line to line.
   2. Install MOV on the terminal block.

Lamp & Socket:

P. Provide *UL listed mogul base lamp sockets rated for 600 V, 1500 W that can withstand a 5000 V pulse. Meet *UL 496 requirements. Use porcelain-insulated lamp sockets with nickel plated copper alloy screw shells. Equip socket shell with a spring tensioned contact. Use nickel-plated copper alloy or stainless steel for the spring and contact.
Q. Supply and secure lamps inside the fixture that meet the following:
   1. Use pre-qualified high pressure sodium (HPS) lamps from TxDOT's material producers list of the wattages shown on the plans. No alternatives allowed.
   2. Average rated lamp life 30,000 hours.
   3. Fully extinguish at end of usable lamp life and remain extinguished without cycling.
   4. Do not provide lamps that burn at reduced output at end of life.
   5. Meet the Federal Toxic Characteristic Leachate Procedure (TCLP) limits.

Performance:

R. Meet the following photometric requirements using published photometric data and photometric data obtained by testing sampled fixtures.
   1. 150 Watt mast arm (underpass) mounted luminaire. Meet IESNA Cutoff requirements. Provide a minimum intensity of 0.20 foot-candle in a rectangular area measuring 110.0 ft. by 30.0 ft., when mounted in a level position as indicated on the properly mounted fixture level bubble 20.0 ft. above the midpoint of either long side of the surface area. Do not exceed 50:1 maximum to minimum horizontal illuminance uniformity ratio within the rectangular area.
   2. 250-watt mast arm mounted luminaire. Meet IESNA Cutoff requirements. Provide a minimum intensity of 0.20 foot-candle in a rectangular area measuring 190.0 ft. by 45.0 ft., when mounted properly in a level position as indicated on the level bubble 40.0 ft. above the midpoint either long side of the surface area. Ensure light intensities along a line parallel to and 20.0 ft. in from the long side of this rectangular area do not decrease by more than 0.50 foot-candles in any 5.0 ft. interval along the line from 10.0 ft. to 90.0 ft. on both sides of the luminaire and provide a minimum intensity of 0.30 foot-candles at any point along the line. Do not exceed 20:1 maximum-to-minimum horizontal illuminance uniformity ratio within the rectangular area.
   3. 400-watt mast arm mounted luminaire. Meet IESNA Cutoff requirements. Provide a minimum intensity of 0.20 foot-candle in a rectanglular area measuring 220.0 ft. by 60.0 ft. when mounted properly in a level position as indicated on the level bubble 50.0 ft. above the midpoint of either long side of the surface area. Ensure light intensities along a line parallel to and 30.0 ft. in from the long side of this rectangular area do not decrease by more than 0.75 foot-candle in any 10.0 ft. interval along the line from 10.0 ft. to 90.0 ft. on both sides of the luminaire and provide a minimum intensity of 0.30 foot-candle at any point along the line. Do not exceed 20:1 maximum-to-minimum horizontal illuminance uniformity ratio within the rectangular area.
S. Ensure photometric data is consistent from fixture to fixture. Match published photometric data (or approved photometric reports submitted during the prequalification process as the typical photometric output instead of published data) as follows:
   1. Point of maximum candela within 5 degrees horizontally and vertically.
   2. Maximum candela within 20% of published maximum candela.
   3. Fixture efficiency within 10% of published efficiency.

* When reference is made to UL, it can be considered to mean a Nationally Recognized Independent Testing Lab (NRTL). Comperable standards of Canadian Standard Association, Electrical Testing Laboratories or Factory Mutual can be equal to the referenced UL standard.

ACC: 04 JAN 2007
LEVEL DISPLAYED: 1 2 62

Sheet 1 of 2

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM LIGHT FIXTURES)
RID(LUM1)-07

FILE: rid-07dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2007	DIST	FEDERAL AID PROJECT		SHEET
REVISIONS	DAL	SEE TITLE SHEET		357
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

72A

Prequalification:

T. Use only pre-qualified fixtures. No alternates will be considered.
   1. Only materials with approved product codes or designations from prequalified producers are accepted on bids. The Construction Division (CST) of the Texas Department of Transportation (TxDOT) maintains the material producers list of approved producer product codes or designations. Use the following website to view this list:
      http://www.dot.state.tx.us/business/producer_list.htm
      Use of prequalified material does not relieve the contractor of the responsibility to provide materials that meet the specifications. All materials, including those shown on the prequalified material list, may be inspected and tested at any time and may be rejected if not in compliance with the specifications.
   2. Notify the Department in writing as to which fixture from the prequalified list of approved fixtures will be supplied on each project.
   3. To have a fixture listed as pre-qualified:
      a. Submit a sample of each type of luminaire and all pertinent data, including published photometric data and recently tested photometric data (IES format, both "averaged" and both sides of "un-averaged" data) to:
         TXDOT- TRF 118 East Riverside Dr. Austin, TX 78704
      b. Demonstrate a commitment to quality.
      c. Submit the following documentation:
         1. QA/QC program documentation with the following minimum requirements;
            a. Written statement of the companies QA/QC policy.
            b. QA/QC person employed that has special QA/QC training and has QA/QC as their primary job responsibility.
            c. A written procedure specifically for handling orders for fixtures built to TxDOT specifications.
            d. A written procedure for keeping track of fixtures built, certified, and tested for TxDOT orders.
            e. A check list of features for TxDOT fixtures with QA/QC person signature.
         2. Fixture UL certification
         3. IP 65 certification
         4. 3G certification
         5. Aluminum casting and paint analysis
         6. Socket, MOV, and shutoff ignitor data
         7. Stainless steel and aluminum bracket data
         8. Ballast electrical data
         9. Photometric data
         10. Lamp data
      d. Prequalification samples, if approved, will not be returned to the manufacturer but will be retained by the the Department for comparison testing. Once a fixture has been approved, do not change any material or manufacturing method without prior approval of the Department. Unapproved changes will result in rejection of the fixture.
      e. In addition, luminaires will be tested for compliance with this specification. Luminaires that inconsistently pass testing or that are inconsistent with published photometric information will be removed from the pre-qualified list at the discretion of the Department.

Sampling:

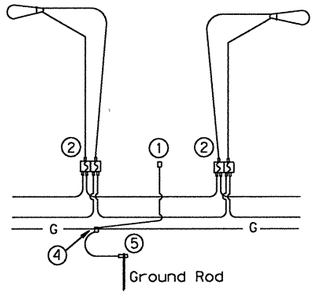
U. Sample in accordance with Test Method Tex-1110-T, "Sampling Lighting Assemblies."

Manufacturer Warranty:

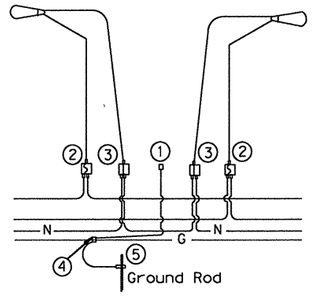
V. Replace failed fixtures, when non-operable due to defects in materials or workmanship within five years of installation with a fixture that passes all testing, delivered to the project location. Lamps and photocells are subject to the warranties of their respective manufacturers.

Testing:

W. Conduct electrical testing required in the Ballast section. Provide photometric testing of fixtures. Test fixtures at the following rates.
   1. Manufactuer Testing. Before fixtures are shipped from the manufacturer, test fixtures as follows. From each lot or manufacturing run, select one completed fixture of each 25, with a minimum of 2 and a maximum of 5. Test photometrics at an independent test lab inspected and approved by TxDOT. Electrical testing may be performed at manufacturer's facility.
      a. Provide IES photometric report in two formats:
         1. Standard averaged format for asymmetric fixtures.
         2. Un-averaged format showing both sides. Un-averaged data may be supplied in two files or as approved by the Department.
      b. Provide electrical and photometric test data directly to TRF-TE electronically for evaluation prior to shipping fixtures to the project. Do not ship fixtures until test data for each lot is approved by TRF-TE.
      c. Provide the following information on test reports:
         1. TxDOT's Control-Section-Job number, maintenance contract number, or purchase order number the fixtures are assigned to,
         2. a unique fixture test number per fixture,
         3. date of manufacture, and
         4. quantities supplied and lot number per fixture type.
      d. Write the unique lab report number on the top of the fixture housing with permanent marker. Ensure the test lab retains the results for 5 years. Provide the Department access to documentation.
      e. Retain records of manufacturing lots, test reports, lot quantities, and other pertinent details. Submit records to the Department upon request.
      f. Submit to TRF-TE a daily shipment report for shipments to each job.
      g. Make available to TxDOT inspectors upon request, all manufacturing facilities involved in the production of fixtures for use on Department projects, inventories of fixtures produced to Department specifications, and records of fixture testing and tracking.
   2. Departmental Test Reporting. Departmental test reports will be issued in accordance with Tex 1110-T.



FOR THREE-WIRE CIRCUIT-CENTER GROUNDED
LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR FOR 120/240 VOLT SERVICE.



FOUR-WIRE CIRCUIT-CENTER GROUNDED
LUMINAIRES SERVED AT 240V
(240/480 VOLT SERVICE)

NOTES:

① Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors.
②③ Use pre-qualified Breakaway Connectors for both T-Base and Shoe-Base installations.
④ Split Bolt or other connector.
⑤ Use Ground Rod Clamp listed for its intended purpose (i.e. concrete, direct burial...)

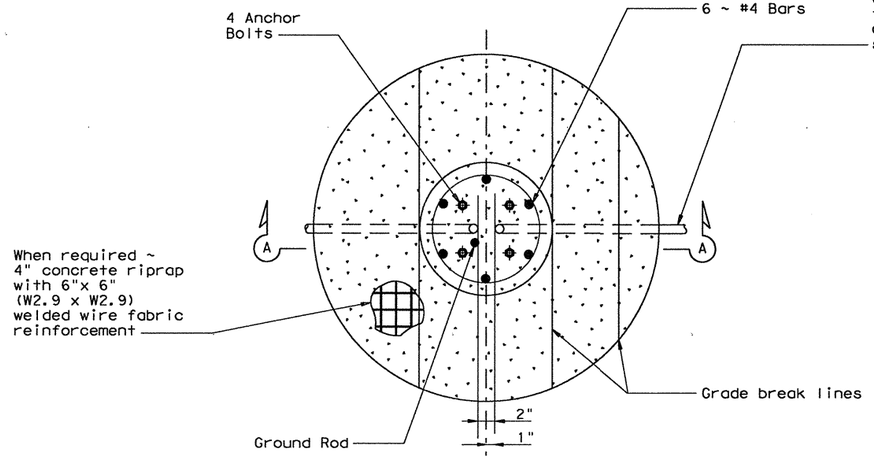
Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS

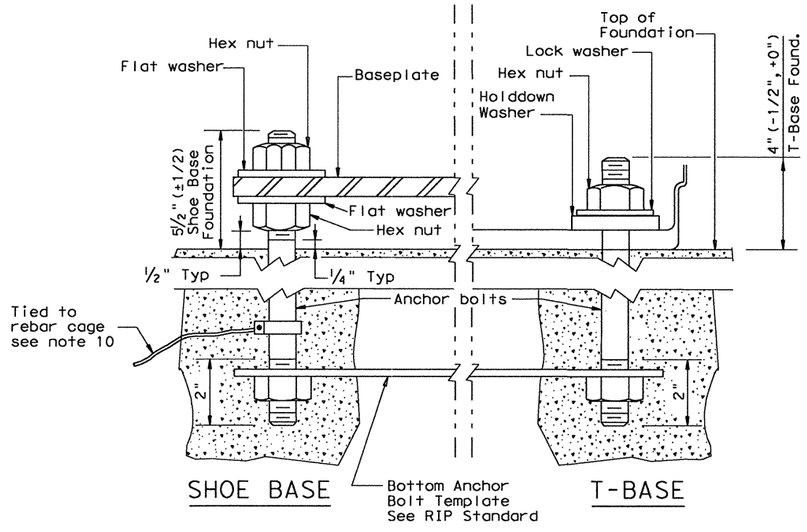
(RDWY ILLUM LIGHT FIXTURES)

RID(LUM2)-07

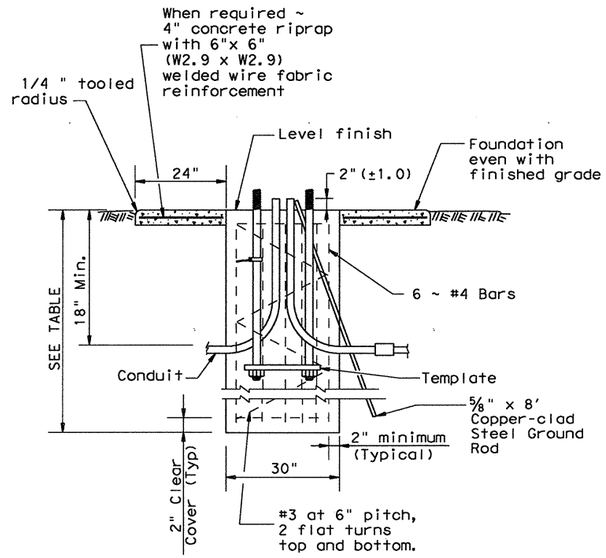
FILE: rid-07.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
©TxDOT January 2007	DIST	FEDERAL AID PROJECT				SHEET
REVISIONS	DAL	SEE TITLE SHEET				338
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740



FOUNDATION DETAIL

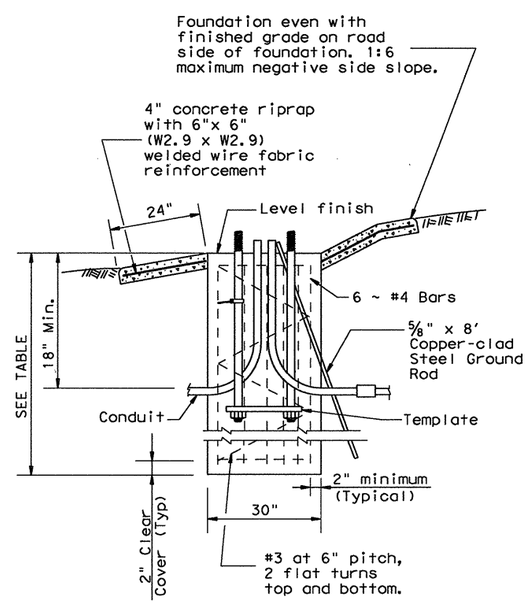


ANCHOR BOLT DETAIL



SECTION A-A

SHOWING CONSTANT GRADE



SECTION A-A

SHOWING SLOPED GRADE

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)		
Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

ANCHOR BOLTS			
POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

RECOMMENDED FOUNDATION LENGTHS (See note 1)			
MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

BREAKAWAY POLE PLACEMENT (See note 6)	
Roadway Functional Classification	** Pole offset (distance to transformer base, tolerance + 6in.-0in.)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less, see design guidelines for further information.
7. Use 8 hold down washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete.
11. Use rip rap on T-base foundations that are located on a sloped grades.

ACC: 04 JAN 2007
LEVELS SPLAYED 1:2 62

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)
RID(FND)-07

FILE: rid-07.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2007	DIST	FEDERAL AID PROJECT		SHEET
REVISIONS	DAL	SEE TITLE SHEET		339
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

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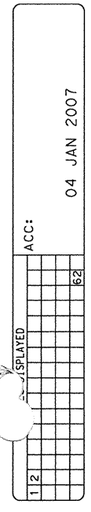
ACC: 04 JAN 2007



SHIPPING PARTS LIST ~ POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation				Quantity	T-Base Designation				Quantity	CSB/SSCB Mounted Designation				Quantity
	Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire	
20	(Type SA 20 S - 4)			(.15kW) S		(Type SA 20 T - 4)			(.15kW) S						
	(Type SA 20 S - 4 - 4)			(.15kW) S		(Type SA 20 T - 4 - 4)			(.15kW) S						
30	(Type SA 30 S - 4)			(.25kW) S		(Type SA 30 T - 4)			(.25kW) S		(Type SP 28 S - 4)			(.25kW) S	
	(Type SA 30 S - 4 - 4)			(.25kW) S		(Type SA 30 T - 4 - 4)			(.25kW) S		(Type SP 28 S - 4 - 4)			(.25kW) S	
	(Type SA 30 S - 8)			(.25kW) S		(Type SA 30 T - 8)			(.25kW) S		(Type SP 28 S - 8)			(.25kW) S	
	(Type SA 30 S - 8 - 8)			(.25kW) S		(Type SA 30 T - 8 - 8)			(.25kW) S		(Type SP 28 S - 8 - 8)			(.25kW) S	
40	(Type SA 40 S - 4)			(.25kW) S		(Type SA 40 T - 4)			(.25kW) S		(Type SP 38 S - 4)			(.25kW) S	
	(Type SA 40 S - 4 - 4)			(.25kW) S		(Type SA 40 T - 4 - 4)			(.25kW) S		(Type SP 38 S - 4 - 4)			(.25kW) S	
	(Type SA 40 S - 8)			(.25kW) S		(Type SA 40 T - 8)			(.25kW) S		(Type SP 38 S - 8)			(.25kW) S	
	(Type SA 40 S - 8 - 8)			(.25kW) S		(Type SA 40 T - 8 - 8)			(.25kW) S		(Type SP 38 S - 8 - 8)			(.25kW) S	
	(Type SA 40 S - 10)			(.25kW) S		(Type SA 40 T - 10)			(.25kW) S		(Type SP 38 S - 10)			(.25kW) S	
	(Type SA 40 S - 10 - 10)			(.25kW) S		(Type SA 40 T - 10 - 10)			(.25kW) S		(Type SP 38 S - 10 - 10)			(.25kW) S	
	(Type SA 40 S - 12)			(.25kW) S		(Type SA 40 T - 12)			(.25kW) S		(Type SP 38 S - 12)			(.25kW) S	
	(Type SA 40 S - 12 - 12)			(.25kW) S		(Type SA 40 T - 12 - 12)			(.25kW) S		(Type SP 38 S - 12 - 12)			(.25kW) S	
50	(Type SA 50 S - 4)			(.4kW) S		(Type SA 50 T - 4)			(.4kW) S		(Type SP 48 S - 4)			(.4kW) S	
	(Type SA 50 S - 4 - 4)			(.4kW) S		(Type SA 50 T - 4 - 4)			(.4kW) S		(Type SP 48 S - 4 - 4)			(.4kW) S	
	(Type ST 50 S - 8)			(.4kW) S	*1	(Type SA 50 T - 8)			(.4kW) S		(Type SP 48 S - 8)			(.4kW) S	
	(Type SA 50 S - 8 - 8)			(.4kW) S		(Type SA 50 T - 8 - 8)			(.4kW) S		(Type SP 48 S - 8 - 8)			(.4kW) S	
	(Type SA 50 S - 10)			(.4kW) S		(Type SA 50 T - 10)			(.4kW) S		(Type SP 48 S - 10)			(.4kW) S	
	(Type SA 50 S - 10 - 10)			(.4kW) S		(Type SA 50 T - 10 - 10)			(.4kW) S		(Type SP 48 S - 10 - 10)			(.4kW) S	
	(Type SA 50 S - 12)			(.4kW) S		(Type SA 50 T - 12)			(.4kW) S		(Type SP 48 S - 12)			(.4kW) S	
	(Type SA 50 S - 12 - 12)			(.4kW) S		(Type SA 50 T - 12 - 12)			(.4kW) S		(Type SP 48 S - 12 - 12)			(.4kW) S	

OTHER Designation				Quantity
Pole	A1	A2	Luminaire	

GENERAL NOTES:

All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, Contractor shall furnish to the Department such warranties or guarantees.

The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Erection and/or removal of poles and luminaires located near overhead electrical lines shall be accomplished using established industry and utility safety practices and in accordance with laws governing such work. The Contractor shall consult with the appropriate utility company prior to beginning such work.

A. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.

B. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.
1. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer registered in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
2. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the 2001 Edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." All poles shall be designed for 110 mph 3-second gust wind speeds. An additional 1.14 gust factor shall be applied to the wind loads. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
3. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
4. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.

C. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.
1. Meet all of the requirements stated above for optional steel pole designs and the following:
a. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
b. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
C. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
d. Pole components shall be constructed using the following material:
Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.

D. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.

* REMOVE ARM AND DELIVER TO DALLAS DISTRICT SIGNAL SHOP

EXPLANATION OF ROADWAY ILLUMINAION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (.4KW) S

SA: Pole and mast arm may be steel or aluminum.
ST: Pole and mast arm must be steel.
AL: Pole and mast arm must be aluminum.
SP: Squashed (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (5), or SSCB (4).

Two numerical digits denote mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Shoe Base Bridge Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Next three figures indicate luminaire rating (1 kW= 1000 watts, .4 kW= 400 watts, etc.) Fixtures for U/P (SPL-CO) (.15KW)S(TYPE 1) and (TYPE 2) as shown on RID(UP) shall be "cobra head" style fixtures that meet the specifications shown on RID(LUM) sheets 1 and 2. Fixtures bid under the descriptive code RDWY ILL ASSEM U/P TYPE IF shall meet the specifications shown on RID(IF). All other fixtures bid under Item 610 shall meet specifications shown elsewhere in the plans.

Last letter indicates the type of lamp (M- Metal Halide, S- High Pressure Sodium, L- Low Pressure Sodium).

5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
LICENSED PROFESSIONAL ENGINEER

Kelvin J. Kroeker, PE

SHEET 1 of 4

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION POLES

RIP(1)-07

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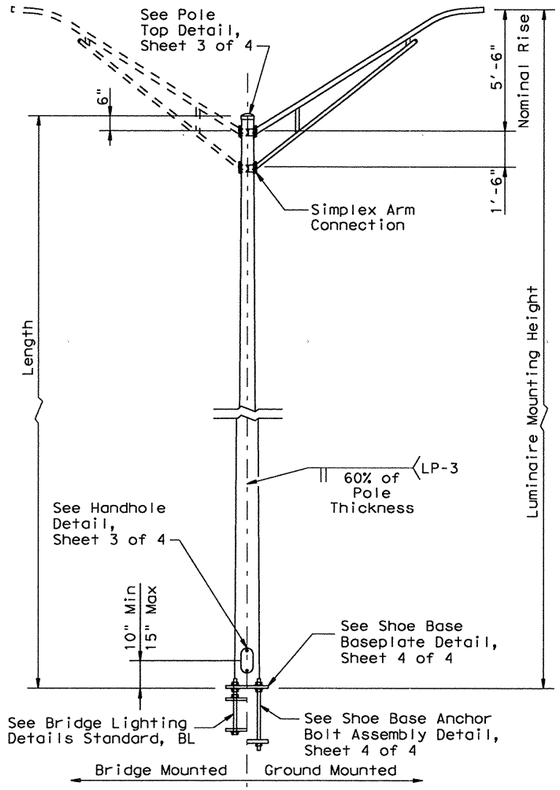
REVISIONS	STATE DISTRICT	FEDERAL AID PROJECT			SHEET
	DAL	SEE TITLE SHEET			340
	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740



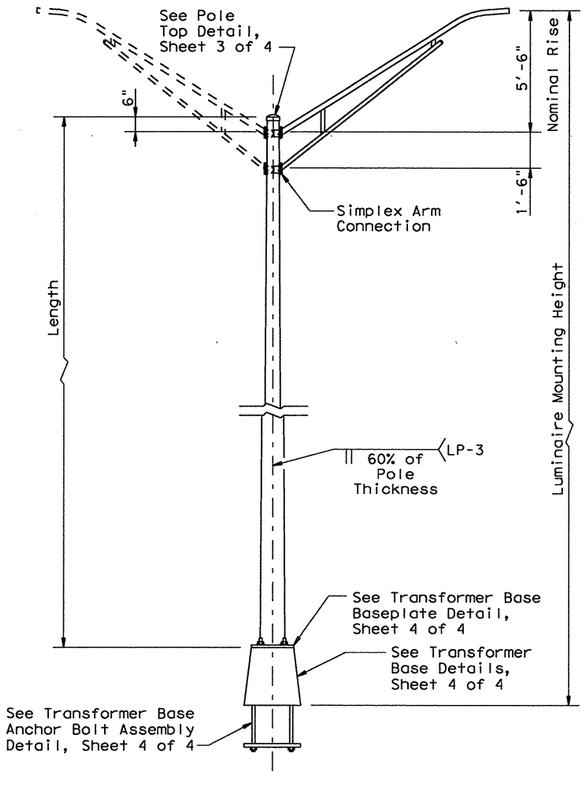
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3

Designs conform to 2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications. Design 3-Second Gust Wind Speed equal 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is less than 25' above natural ground level.

Design structures to support two 12' luminaire mast arms and luminaires. Design mast arms for a 60-pound luminaire having an effective projected area of 1.6 square feet.

Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance 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 these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.41	43.50	0.1196	30.3

For mounting heights between values shown in the tables, use base diameter and thickness values for the larger pole.

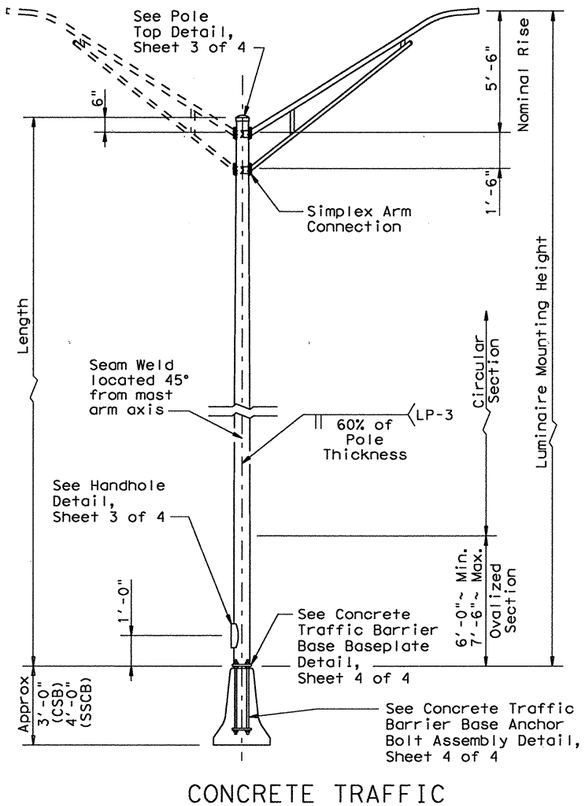
Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."

Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with the ANSI/AWS Structural Welding Code D1.1.

Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.

Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.

Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About ℄ of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. Except for poles mounted on a concrete traffic barrier, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier.

The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."

MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	A325 ①	92
Anchor Bolts(T-Base, Shoe)	F1554 Gr 55	55
Anchor Bolts (CSB/SSCB)	A325, A193-B7, or A321	105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

① Lubricate in the field if necessary in lieu of the requirements in ASTM A325.

② Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.

③ A1011 SS Gr 50 may be used in lieu of HSLAS, provided the material meets the elongation requirements for HSLAS

POLE ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION POLES

RIP(2)-07

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REVISIONS	STATE DISTRICT	FEDERAL AID PROJECT		SHEET
	DAL	SEE TITLE SHEET		341
	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

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ACC: 04 JAN 2007
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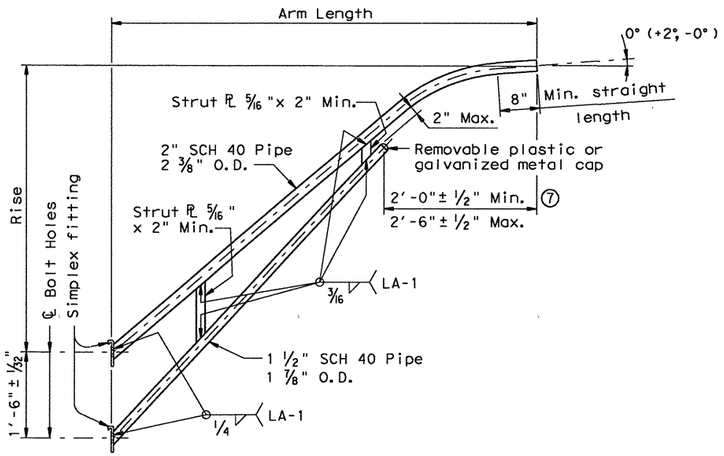


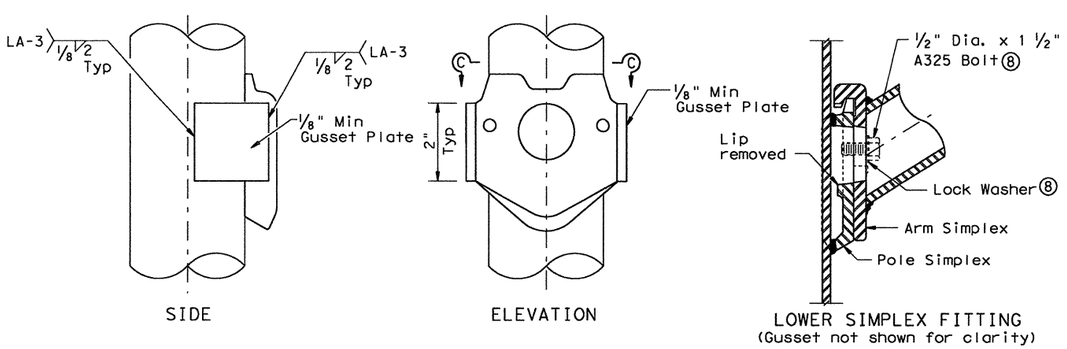
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6" (10)
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35, A148 Gr 80-50, A576 Gr 1021 (5), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 (6), or A1011 HSLAS-F Gr 50 (6)
Arm Struts and Gusset Plates (4)	ASTM A36, A572 Gr 50 (6), or A588
Misc.	ASTM designations as noted

SECTION C-C

UPPER SIMPLEX FITTING
(Gusset not shown for clarity)



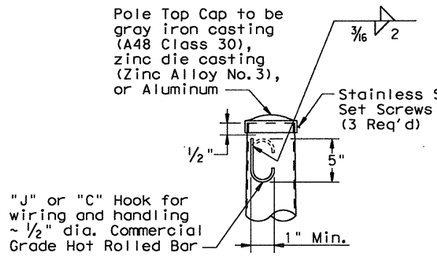
SIDE

ELEVATION

LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

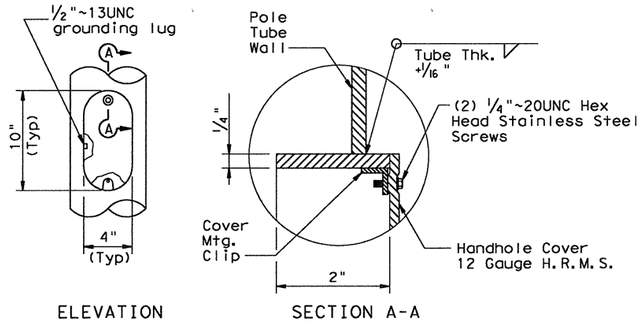
SIMPLEX ATTACHMENT DETAIL

SECTION B-B



POLE TOP

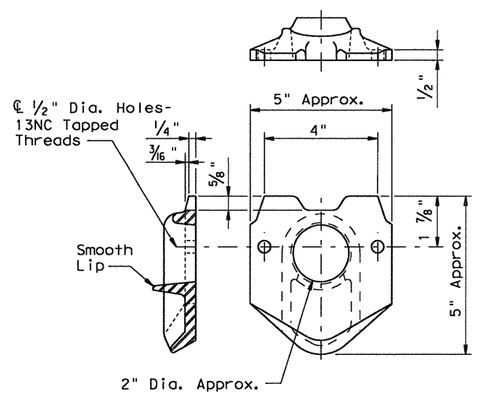
ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±3"
Arm Rise	+1 3/4" in 10 ft
Arm Diameter	+3/16"
Overall length or width	+1/4"
Thickness	+1/4", -1/16"
Deviation from flat	1/8" in 12"
Spacing between holes	+3/32"
Bolt hole size	±1/16"
Strut location in truss arms	±1 1/2"



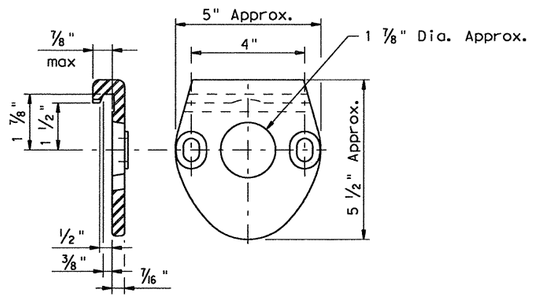
ELEVATION

SECTION A-A

HANDHOLE



POLE SIMPLEX DETAIL (9)



ARM SIMPLEX DETAIL (9)

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

(5) 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.

(6) A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.

(7) 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.

(8) Each pole simplex fitting shall be supplied with 2 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.

(9) Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

(10) Luminaire mounting heights are based on assumed 5'-6" luminaire arm rise.

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION POLES

RIP(3)-07

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REVISIONS	STATE DISTRICT	FEDERAL AID PROJECT	SHEET
	DAL	SEE TITLE SHEET	342

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

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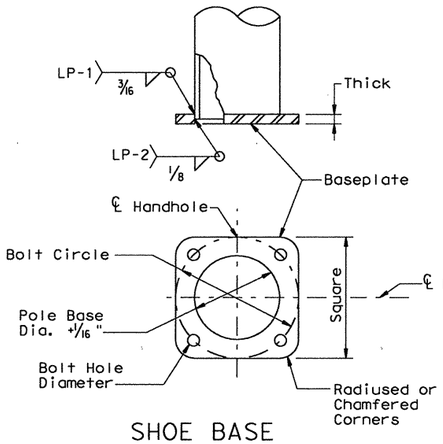
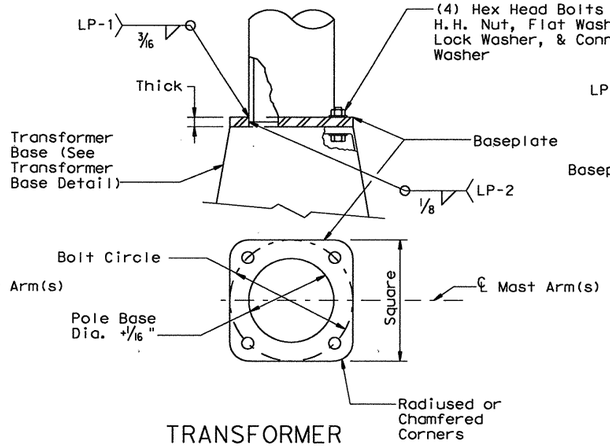


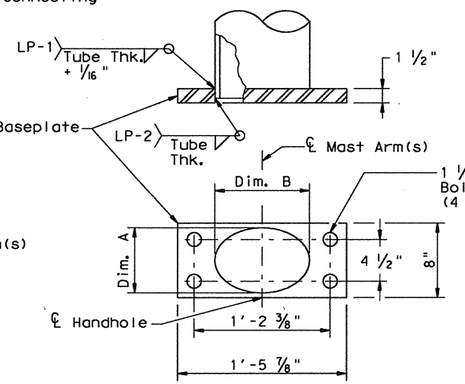
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20′ - 30′	13"	13"	1 ¼"	1 ¼"
40′	15"	15"	1 ¼"	1 ½"
50′	15"	15"	1 ½"	1 ½"



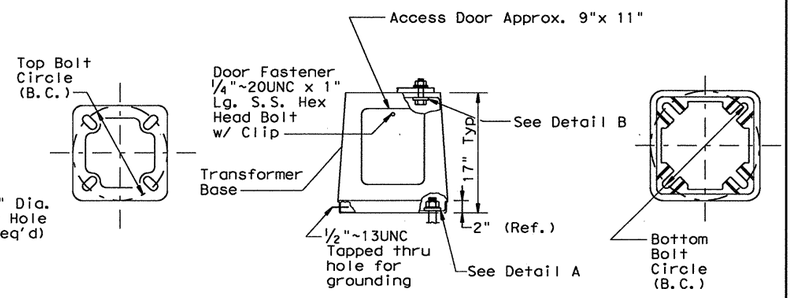
TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20′ - 30′	13"	13"	1 ¼"	1"	1 ¼"	A
40′	15"	15"	1 ¼"	1 ¼"	1 ½"	B
50′	15"	15"	1 ½"	1 ¼"	1 ½"	B



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS	POLE DIA.②	DIM. A	DIM. B
28′ - 38′	9"	7"± ¼"	10"± ¼"
48′	10 ½"	7"± ¼"	13"± ¼"



TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 ¼"

TRANSFORMER BASE DETAILS

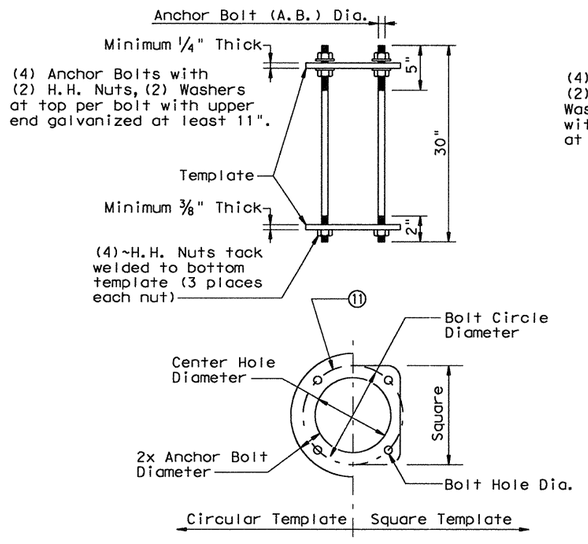
For mounting heights between those shown in the table, use the values in the table for the larger mounting height.

All breakaway bases shall meet the breakaway requirements of the Latest Edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.

Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four hex head bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.

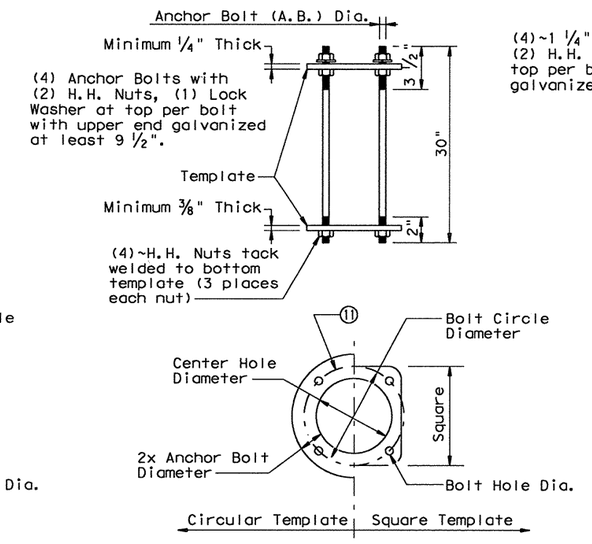
Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.

Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.



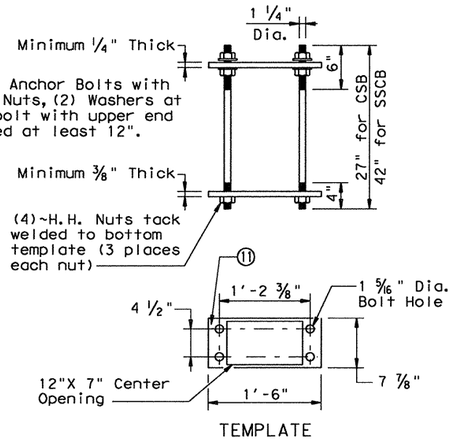
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE					
MOUNTING HEIGHTS	A.B. Dia.	BOLT CIRCLE DIAMETER	SQUARE	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′ - 30′	1"	13"	13"	11"	1 1/16"
40′ - 50′	1 ¼"	15"	14 ½"	12 ½"	1 5/16"



TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE					
MOUNTING HEIGHTS	A.B. Dia.	BOLT CIRCLE DIAMETER	SQUARE	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′ - 30′	1"	14"	14"	12"	1 1/16"
40′ - 50′	1 ¼"	17 ¼"	16 ¾"	14 ¾"	1 5/16"



CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

⑪ Anchor Bolt Templates need not be galvanized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± ½"
Threaded length	± ½"
Galvanized length (if required)	- ¼"

ACC: 04 JAN 2007
LEVELS SPLAYED 62
1 2

SHEET 4 of 4

Texas Department of Transportation
Traffic Operations Division

ROADWAY ILLUMINATION POLES

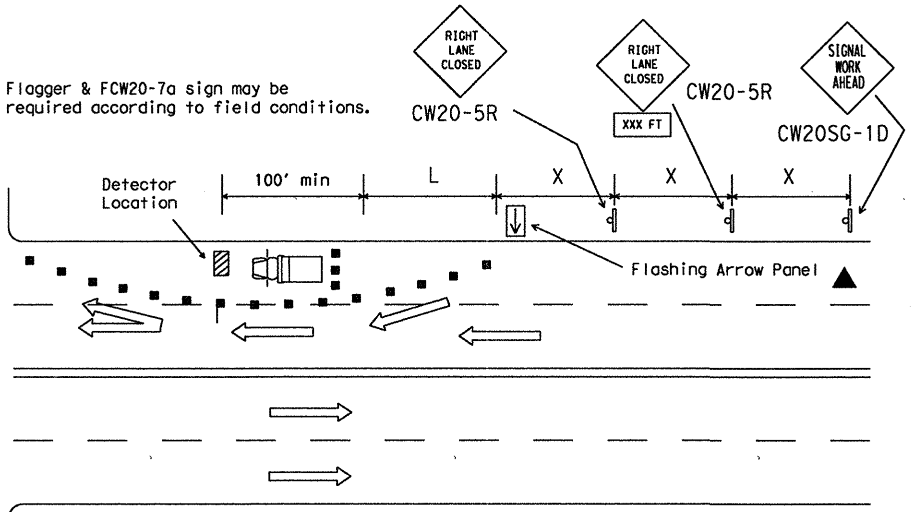
RIP(4)-07

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

REVISIONS

STATE DISTRICT	FEDERAL AID PROJECT			SHEET
DAL	SEE TITLE SHEET			343
COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

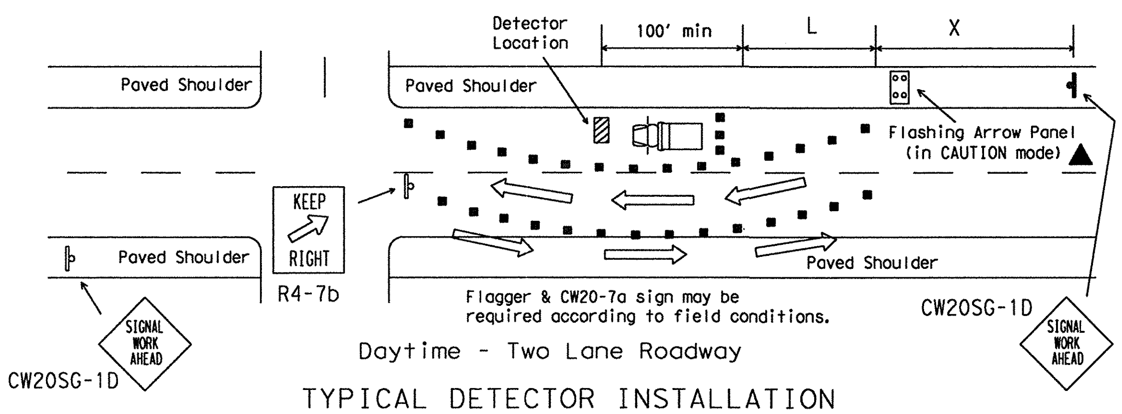
73D



Daytime - Four Lane Roadway

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing X Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	600'
65		650'	715'	780'	65'	130'-165'	700'
70		700'	770'	840'	70'	140'-175'	800'
75		750'	825'	900'	75'	150'-185'	900'

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

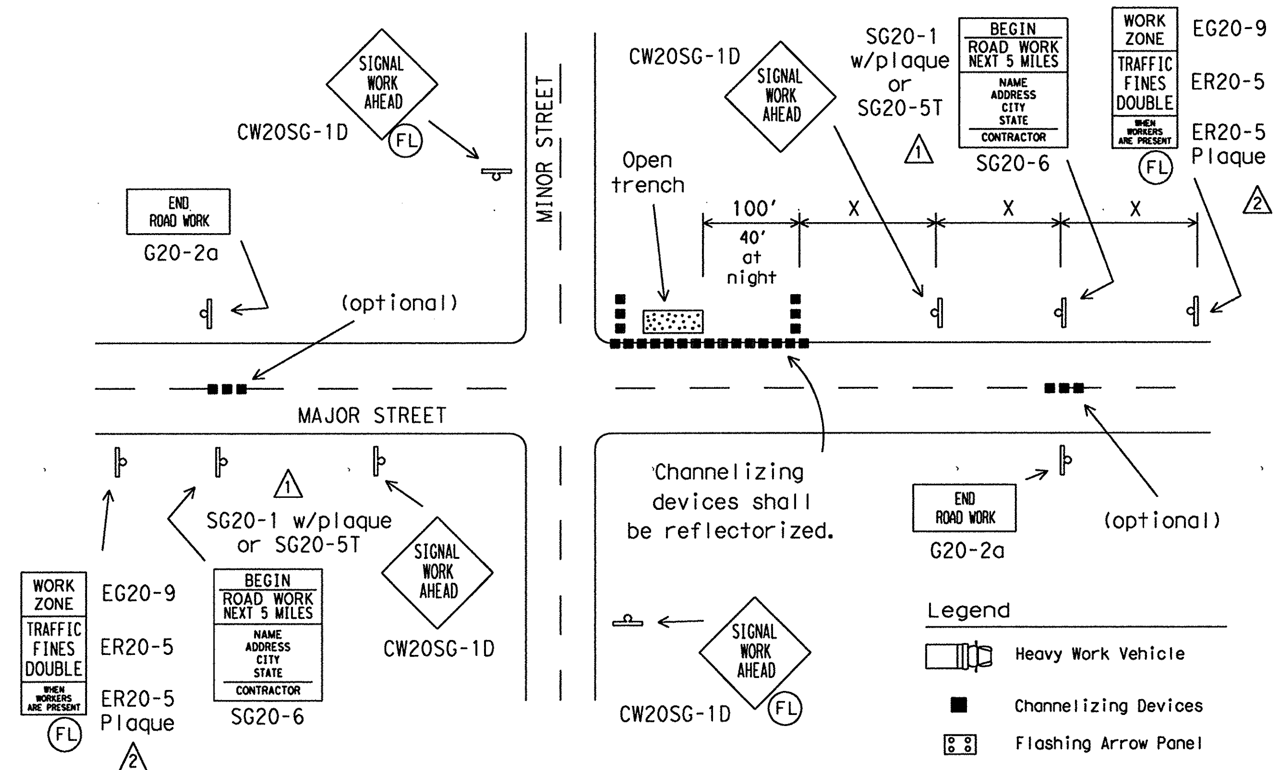


Daytime - Two Lane Roadway

TYPICAL DETECTOR INSTALLATION

OR OTHER WORK OPERATIONS THAT ARE SHORT TERM OR SHORT DURATION

Nighttime Channelizing Devices shall be reflectorized.



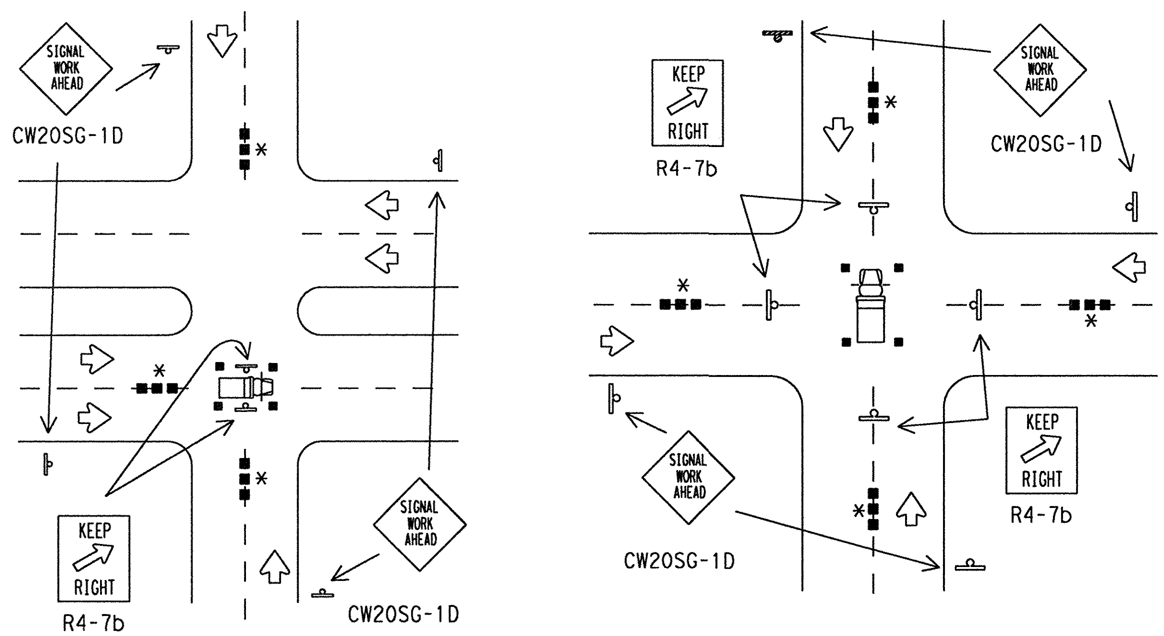
TYPICAL ADVANCE SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

Observe Warning Signs State Law (R20-3) shall be required.
See BC(2).
Location will be as directed by the Engineer.

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

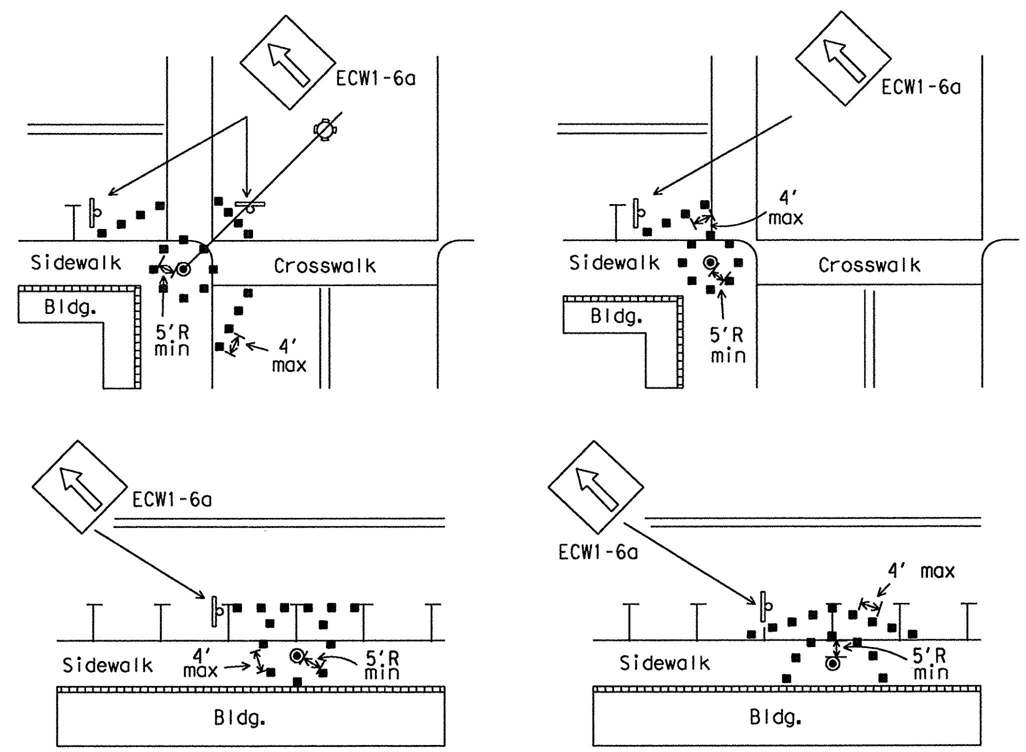
1. Typical channelizing device is the 28" cone.
2. Plastic drums or vertical panels may be used if approved by the Engineer.
3. For several closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits.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



TYPICAL HANGING SIGNAL INSTALLATIONS

OR OTHER WORK OPERATIONS THAT ARE SHORT TERM OR SHORT DURATION

* Advance warning channelizing devices are optional.



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

TYPICAL RESTRICTED PEDESTRIAN MOVEMENTS

FOR ALL WORK OPERATIONS REGARDLESS OF WORK DURATION

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL INSTALLATION TYPICAL DETAILS

SHEET 1 OF 2

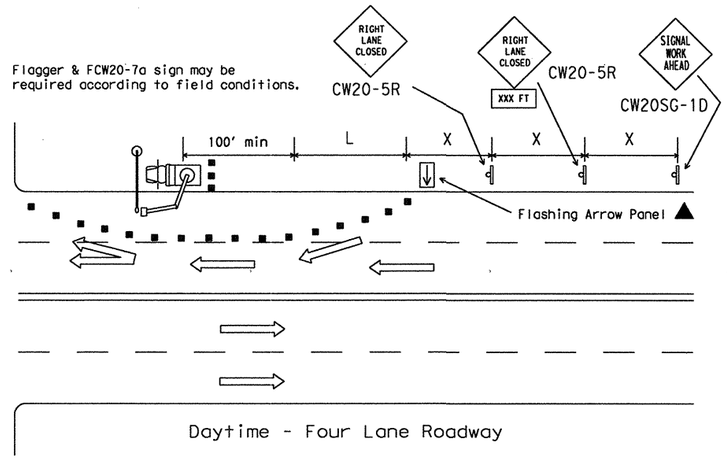
WZ(BTS-1)-03

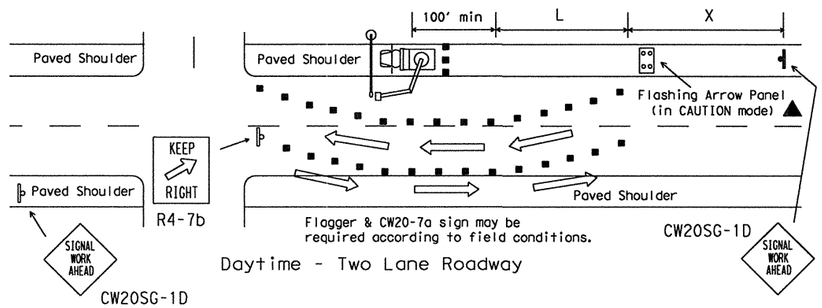
©TxDOT April 1992	DN: GRB	CK: GRB	DW: FDN	CK: CAL
REVISIONS 2-98 4-98 10-99 3-03	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: SEE TITLE SHEET	SHEET: 344
	COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03 JOB: 039	HIGHWAY: FM 740

116A

LEVELS DISPLAYED
ACC:

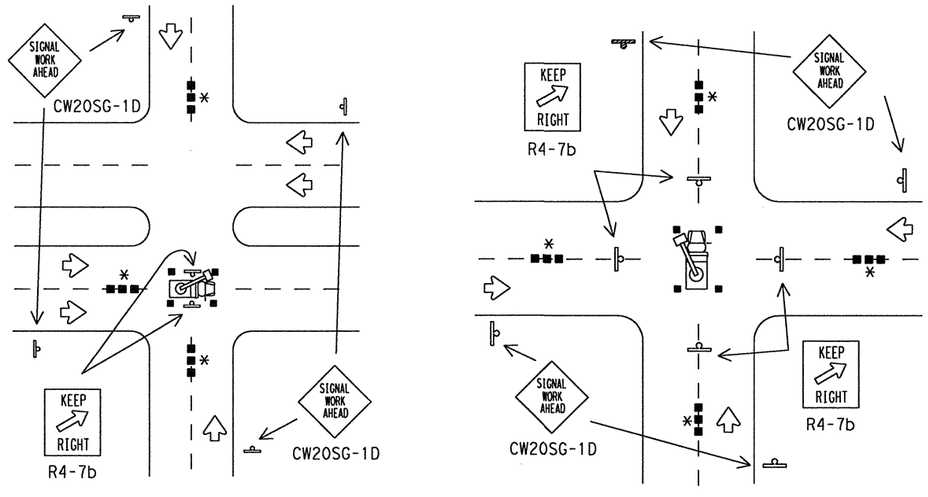
"ABOVE LANE" WORK PERFORMED BY BUCKET TRUCK





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

"ABOVE TRUCK" WORK PERFORMED BY BUCKET TRUCK



GENERAL NOTES FOR WORK ZONE SIGNS

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

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

The types of sign supports, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring that the sign support and substrate meets crashworthiness and length of work requirements.

a. Long-term stationary is work that occupies a location more than 3 days.
b. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
c. Short-term stationary is daytime work that occupies a location for more than 1 hour, but less than 12 hours.
d. Short duration is work that occupies a location up to 1 hour.
e. Mobile is work that moves intermittently or continuously.

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday.
5. 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.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This type of sign support meets the crashworthiness standards regardless of the direction of impact. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face. These materials can damage the retroreflectivity of sign sheeting.
7. Signs shall be removed upon completion of the work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended.
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.
6. Rubber (such as tire inner tubes) shall NOT be used for sandbags.
7. Rubber ballasts (such as those used with cones or edgeline channelizers) shall NOT be used as sign support weights.
8. 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.
9. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

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

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

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

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

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

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

LEVEL: DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TRAFFIC SIGNAL INSTALLATION BARRICADES AND SIGNS

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

DN: - GRB	CK: - GRB	DW: - FDN	CK: - CAL

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
2-98 4-98 10-99 3-03	DAL	6	SEE TITLE SHEET	345

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

116B

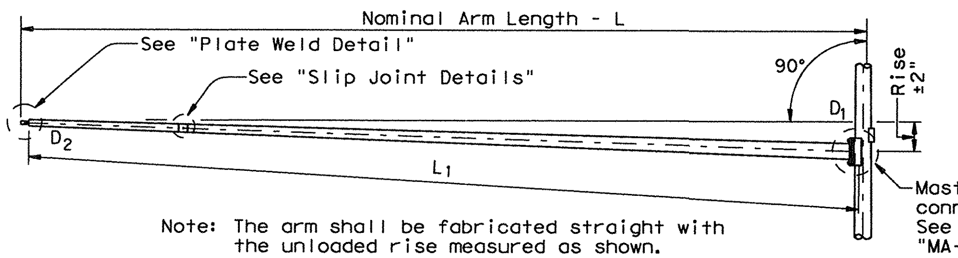
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	(1) thk	D_B	D_{19}	D_{24}	D_{30}	(1) thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	(1) thk	Rise	L_1	D_1	(2) D_2	(1) thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

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

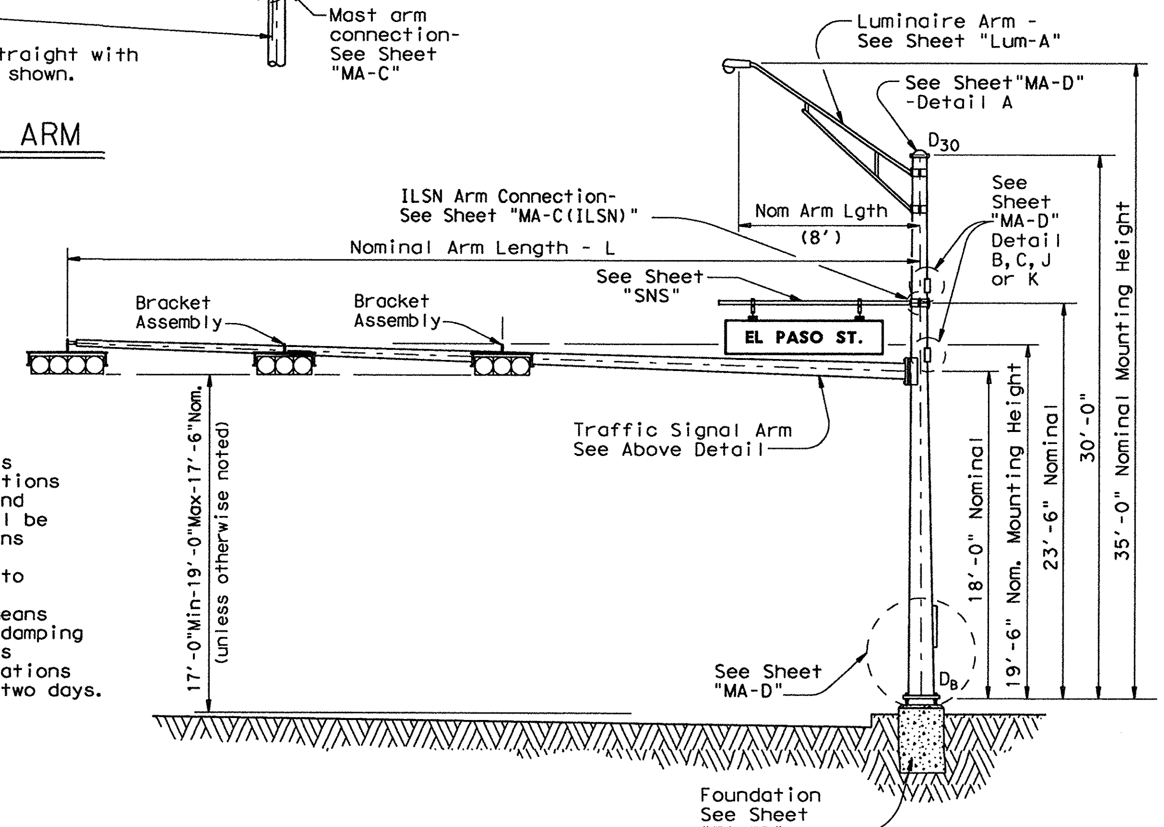
(1) Thickness shown are minimums, thicker materials may be used.

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



TRAFFIC SIGNAL ARM

(Fixed Mount)



STRUCTURE ASSEMBLY

VIBRATION WARNING

Mast Arms of approximately 40' or longer are subject to possible harmonic vertical vibrations in light wind conditions due to unusual combinations of signal numbers, weights or positions, arm-wind orientation, and arm-pole stiffness. Arms shall be visually inspected in 5 to 20 mph wind conditions after signal head installation and, if vertical movements with a total excursion (max positive to max negative) of more than approximately 8" are observed at arm tip, damping devices or other means shall be fitted to the arm(s). The necessary damping device(s) or other remedial measures shall be as recommended by the fabricator. Excessive vibrations shall not be allowed to continue for more than two days.

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	2
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	3
40	40L-80		40S-80		40-80	
44	44L-80	3	44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 Bracket Assembly		2 Bracket Assemblies		3 Bracket Assemblies	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80	3	36III-80	1
40			40II-80		40III-80	
44			44II-80		44III-80	3
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	4

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
¾"	1'-6"	2
1 ½"	3'-4"	
1 ¾"	3'-10"	7

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

Templates may be removed for shipment.

MODIFICATIONS

(A) REMOVED BRACKET ASSEMBLY OPTIONS A AND B

(B) REMOVED CGB CONNECTORS

(C) REMOVED TENON DETAIL

(D) REQUIRE MEASUREMENT OF POLE HEIGHT

(E) MIN. AND MAX. SIGNAL HEAD HEIGHT DISTANCE

11/99 Revision

Changed to Facilitate new terminal strip enclosure

5/26/09

STATE OF TEXAS
KELVIN J. KROEKER
86965
LICENSED PROFESSIONAL ENGINEER

Kelvin J. Kroeker, PE

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY
(80 MPH WIND ZONE)
SMA-80(1)-99 (DAL)

FILE: SMA-80.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
© TxDOT 2001	DIST	FED REG	FEDERAL AID PROJECT NO.	SHEET
REVISIONS 5-96 11-99	DAL	6	SEE TITLE SHEET	346
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

122A

ACC: d48hplq:/usr/d482517
LV=1,2 for English 1,3 for Metric

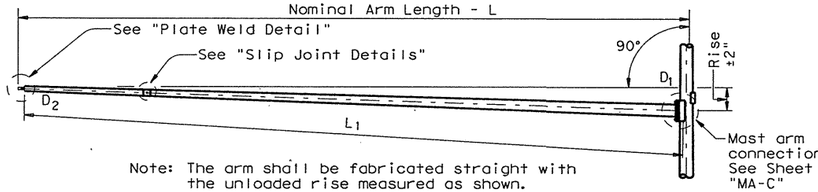
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

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

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

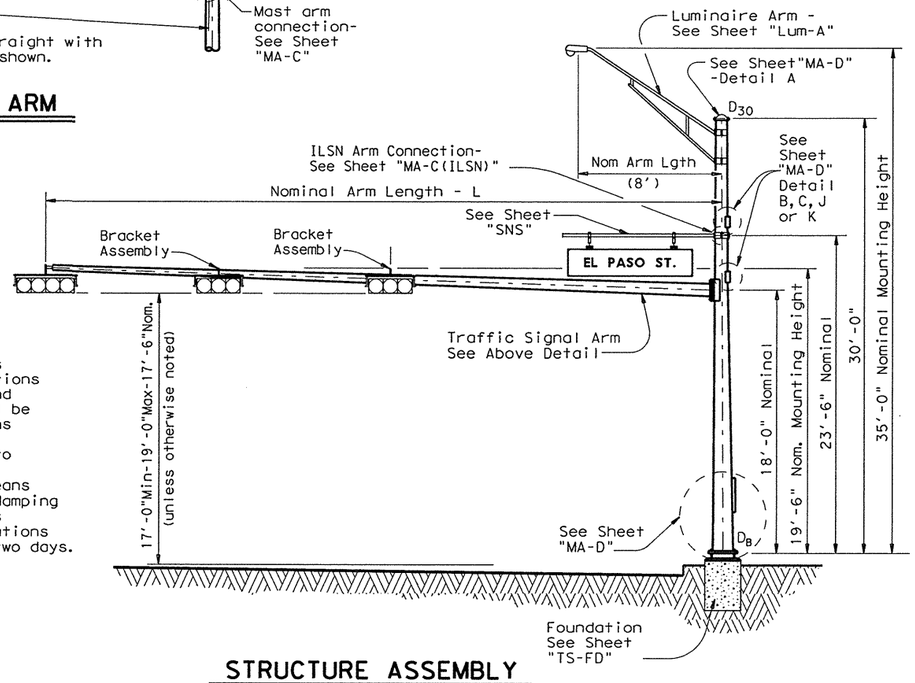
② D_2 may be increased by up to 1" for polygonal arms.



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

TRAFFIC SIGNAL ARM

(Fixed Mount)



STRUCTURE ASSEMBLY

VIBRATION WARNING

Mast Arms of approximately 40' or longer are subject to possible harmonic vertical vibrations in light wind conditions due to unusual combinations of signal numbers, weights or positions, arm-wind orientation, and arm-pole stiffness. Arms shall be visually inspected in 5 to 20 mph wind conditions after signal head installation and, if vertical movements with a total excursion (max positive to max negative) of more than approximately 8" are observed at arm tip, damping devices or other means shall be fitted to the arm(s). The necessary damping device(s) or other remedial measures shall be as recommended by the fabricator. Excessive vibrations shall not be allowed to continue for more than two days.

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	2
24	24L-80	(1) A	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	(5) A
40	40L-80	(2) A	40S-80		40-80	(1)
44	44L-80	3	44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 Bracket Assembly		2 Bracket Assemblies		3 Bracket Assemblies	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80	(1) A		
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80	(5)	36III-80	1
40			40II-80	(2) A	40III-80	(1) A
44			44II-80		44III-80	3
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	(7) A

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
¾"	1'-6"	(5)
1 ½"	3'-4"	(3) A
1 ¾"	3'-10"	(12)

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

Templates may be removed for shipment.

MODIFICATIONS

(A) REMOVED BRACKET ASSEMBLY OPTIONS A AND B

(B) REMOVED CGB CONNECTORS

(C) REMOVED TENON DETAIL

(D) REQUIRE MEASUREMENT OF POLE HEIGHT

(E) MIN. AND MAX. SIGNAL HEAD HEIGHT DISTANCE

(7) CHANGE ORDER

11/99 Revision

(A) Changed to Facilitate new terminal strip enclosure

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 21 31 41 51 61
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC: d48hplq:/usr/d482517

LV=1,2 for English 1,3 for Metric

SHEET 1 OF 2

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-99 (DAL)

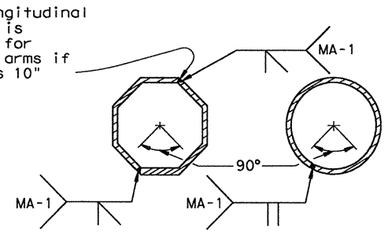
346A

FILE: SMA-80.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY	
© TxDOT 2001	DIST	FED REG	FEDERAL AID PROJECT NO. ⊕		SHEET
REVISIONS	18	6	(SEE TITLE SHEET)		346A
5-96	COUNTY		CONTROL	SECT	JOB	HIGHWAY
11-99	ROCKWALL		1014	03	039	FM 740

122A

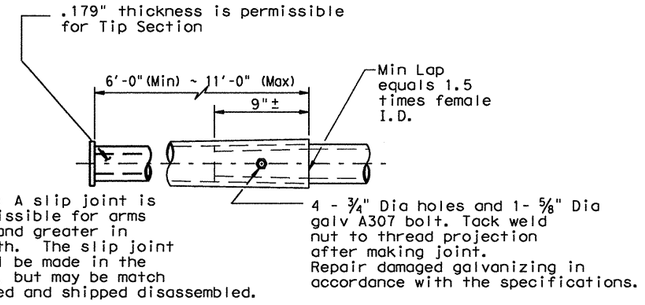
Stainless steel bands and cast bracket as in "Astro-Brac" with 1½" Dia Threaded Coupling.

BRACKET ASSEMBLY OPTION C



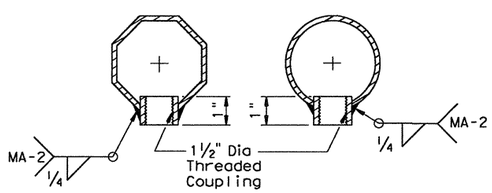
Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.

ARM WELD DETAIL



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

SLIP JOINT DETAIL



COUPLING DETAILS

NOTE:

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

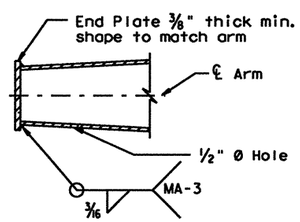


PLATE WELD DETAIL

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 75 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.5 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" 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 the Specifications 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. Miscellaneous welds which do not call for preapproved weld procedures are nevertheless subject to rejection for poor workmanship. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and the Specifications.

Unless otherwise noted, all parts shall be galvanized in accordance with the Specifications.

Special design require submission of shop drawings in accordance with the item "Steel Structures".

△ **The pole heights are for bidding purposes only. Prior to fabrication, the Contractor in cooperation with the Engineer shall make field measurements to determine the actual pole height necessary to ensure a verticle clearance of 17'-6" min., 19' max.**

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

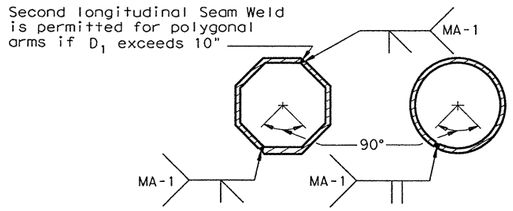
SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

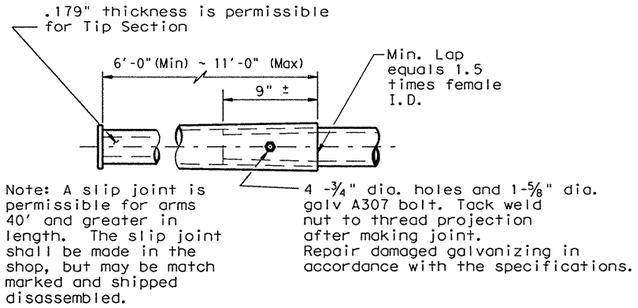
SMA-80(2)-96 (DAL)

FILE: SMA-80.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
© TxDOT 2001	DISTRICT	FED REG	FEDERAL AID PROJECT NO.	SHEET
REVISIONS	DALLAS	6	(SEE TITLE SHEET)	347
6-96	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

DALLAS DISTRICT STANDARD



ARM WELD DETAIL



SLIP JOINT DETAIL

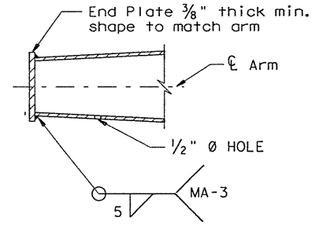
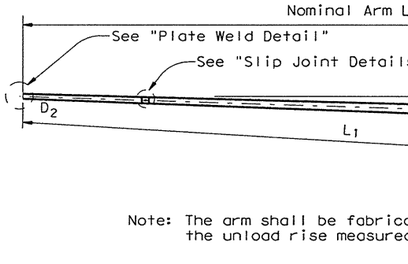
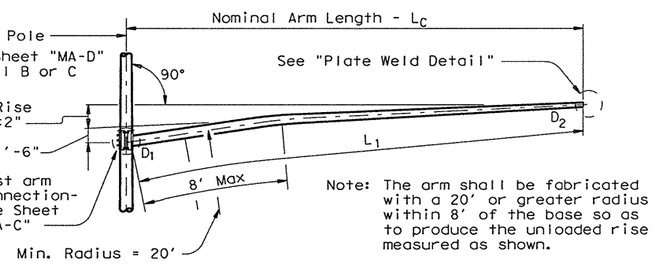


PLATE WELD DETAIL

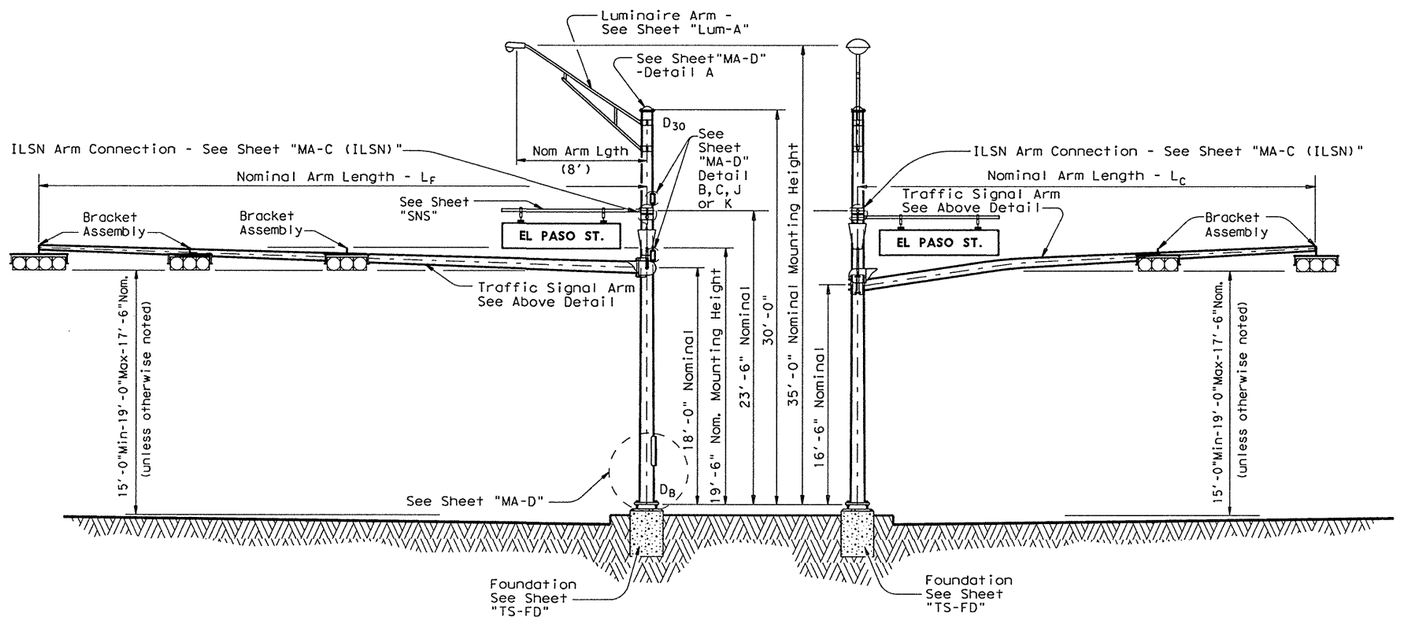
NOTE: Pole manufacturer shall drill ½" hole In bottom of mast arm at end plate.
(FOR HOT-DIP GALVANIZING)



FIXED MOUNT TRAFFIC SIGNAL ARM



CLAMP-ON TRAFFIC SIGNAL ARM



ELEVATION
(Showing fixed mount arm)

STRUCTURE ASSEMBLY

ELEVATION
(Showing clamp mount arm)

VIBRATION WARNING

Mast Arms of approximately 40'-0" or longer are subject to possible harmonic vertical vibrations in light wind conditions due to unusual combinations of signal numbers, weights or positions, arm-wind orientation, and arm-pole stiffness.

Arms shall be visually inspected in 5 to 20 mph wind conditions after signal head installation and, if vertical movements with a total excursion (max positive to max negative) of more than approximately 8" are observed at arm tip, damping devices or other means shall be fitted to the arm(s).

The necessary damping device(s) or other remedial measures shall be as recommended by the fabricator. 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. 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 signs and two traffic signal arms with length combinations as tabulated. The specified luminaire load applied at the end of luminaire arm equals 75 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.5 sq ft. The specified internally lighted street name sign applied 4'-6" from the centerline of the pole equals 85 lbs vertical dead load plus the 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" 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 the Specifications 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. Miscellaneous welds which do not call for preapproved weld procedures are nevertheless subject to rejection for poor workmanship. Material, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and the Specifications.

Unless otherwise noted, all parts shall be galvanized in accordance with the Specifications.

Special designs require submission of shop drawings in accordance with the item "Steel Structures".

7
ADDED SHEET
CHANGE ORDER

MODIFICATIONS

(A) REMOVED BRACKET ASSEMBLY OPTIONS
(B) REMOVED CGB CONNECTORS
(C) REMOVED TENON DETAIL

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

DUAL MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

DMA-80 (1)-96 (DAL)

FILE: DMA-80.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
ORIG DATE: 2001	DIST	FED REG	STATE PROJECT NO	SHEET
REVISIONS 5-96	18	6	(SEE TITLE SHEET)	347 A-1 A
	COUNTY		CONTROL SECT JOB	HIGHWAY
	ROCKWALL		1014 03 039	FM 740

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length		30' Poles With Luminaire		24' Poles With ILSN		19' Poles With no Luminaire and no ILSN	
		See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		See note above plus one small hand hole		See note above	
LF	Lc						
ft.	ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20	2020L-80		2020S-80		2020-80	
24	20	2420L-80		2420S-80		2420-80	
	24	2424L-80		2424S-80		2424-80	
28	20	2820L-80		2820S-80		2820-80	
	24	2824L-80		2824S-80		2824-80	
	28	2828L-80	1 (7)	2828S-80		2828-80	
32	20	3220L-80		3220S-80		3220-80	
	24	3224L-80		3224S-80		3224-80	
	28	3228L-80		3228S-80		3228-80	
	32	3232L-80		3232S-80		3232-80	
36	20	3620L-80		3620S-80		3620-80	
	24	3624L-80		3624S-80		3624-80	
	28	3628L-80		3628S-80		3628-80	
	32	3632L-80		3632S-80		3632-80	
	36	3636L-80		3636S-80		3636-80	
40	20	4020L-80		4020S-80		4020-80	
	24	4024L-80		4024S-80		4024-80	
	28	4028L-80		4028S-80		4028-80	
	32	4032L-80		4032S-80		4032-80	
	36	4036L-80		4036S-80		4036-80	
44	20	4420L-80		4420S-80		4420-80	
	24	4424L-80		4424S-80		4424-80	
	28	4428L-80		4428S-80		4428-80	
	32	4432L-80		4432S-80		4432-80	
	36	4436L-80		4436S-80		4436-80	

Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 1 Bracket Assembly		Type II Arm (2 Signals) 2 Bracket Assemblies		Type III Arm (3 Signals) 3 Bracket Assemblies	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1 (7)		
32			32II-80		32III-80	
36			36II-80		36III-80	
40			40II-80		40III-80	
44					44III-80	

Traffic Signal Arms (Clamp-On Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 1 Bracket Assembly and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 2 Bracket Assemblies and 2 clamps w/bolts and washers		Type III Arm (3 Signals) 3 Bracket Assemblies and 3 clamps w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80		20II-80			
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	1 (7)

ILSN Arm (1 or 2 per pole) ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	1 (7)
1 ¾"	3'-10"	
2"	4'-3"	

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

Templates may be removed for shipment.

ARMS		ROUND POLES					POLYGONAL POLES					Foundation Type
LF	Lc	D_B	D_{19}	D_{24}	D_{30}	(2) thk	D_B	D_{19}	D_{24}	D_{30}	(2) thk	
ft.	ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	20	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
24	20	12.0	9.3	8.6	7.8	.179	13.0	10.0	9.2	8.3	.179	30-A
	24	12.0	9.3	8.6	7.8	.179	13.0	10.0	9.2	8.3	.239	30-A
28	20	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
	24	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
	28	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
32	20	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
	24	13.0	10.3	9.6	8.8	.179	12.5	9.5	8.7	7.8	.239	30-A
	28	12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3	.239	30-A
	32	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
36	20	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
	24	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
	28	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
	32	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
	36	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
40	20	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
	24	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
	28	13.0	10.3	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A
	32	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A
	36	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
44	20	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	24	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	28	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	32	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B
	36	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B

Arm LF or Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	(2) thk	Rise	L_1	D_1	(3) D_2	(2) thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire

D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length
L_C = Clamp-on Arm Length (36' Max)

(2) Thickness shown are minimums, thicker materials may be used.

(3) D_2 may be increased by up to 1.0" for polygonal arms.

(7) ADDED SHEET CHANGE ORDER

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

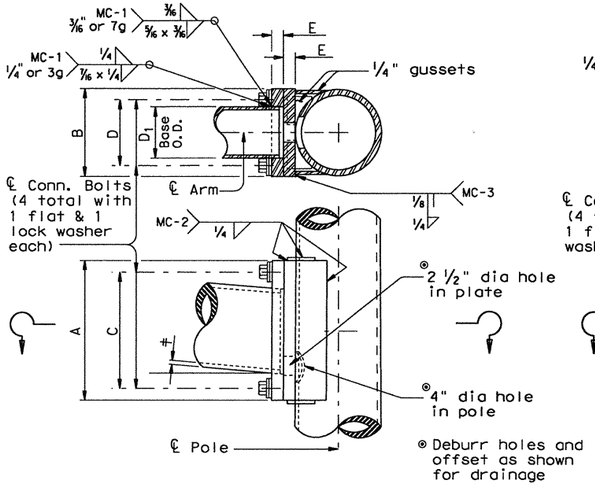
DUAL MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

DMA-80 (2)-96 (DAL)

FILE: DMA-80.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
ORIG DATE: 2001	DIST	FED REG	STATE PROJECT NO	SHEET
REVISIONS	18	6	(SEE TITLE SHEET)	3478-6
5-96	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

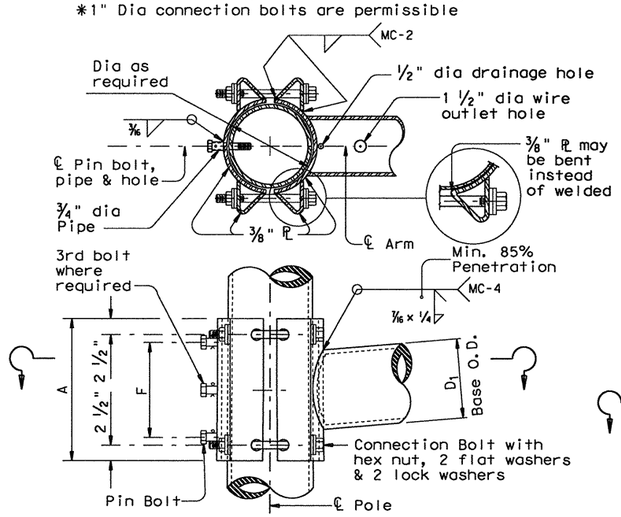
ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1	1
7.5	.179	13	9	10	6	1	1
8.0	.179	14	10	11	7	1 1/4	1 1/4
9.0	.179	16	11	13	8	1 1/4	1 1/4
9.5	.179	17	12	14	9	1 1/4	1 1/4
9.5	.239	18	12	15	9	1 1/4	1 1/4
10.0	.239	18	12	15	9	1 1/4	1 1/4
10.5	.239	18	13	15	10	1 1/2	1 1/2
11.0	.239	18	13	15	10	1 1/2	1 1/2



FIXED MOUNT DETAIL 1

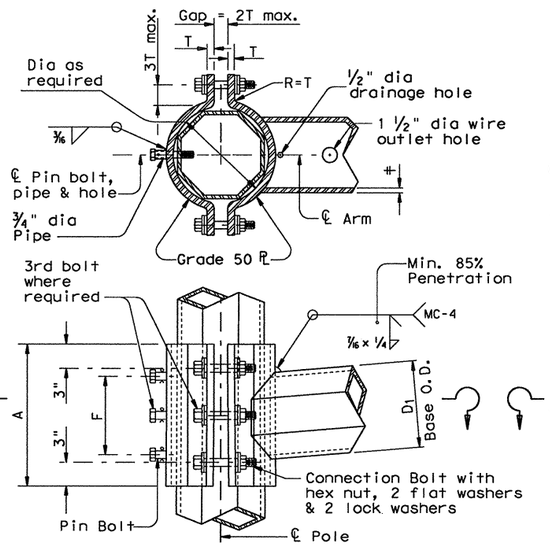
ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	8	4	* 7/8	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8

*1" Dia connection bolts are permissible



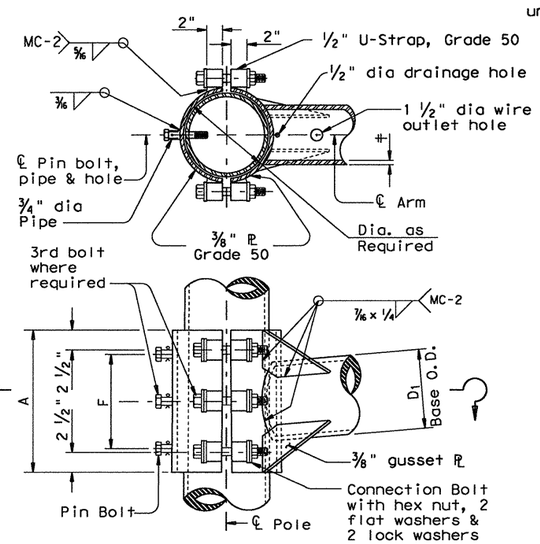
CLAMP-ON DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	8	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

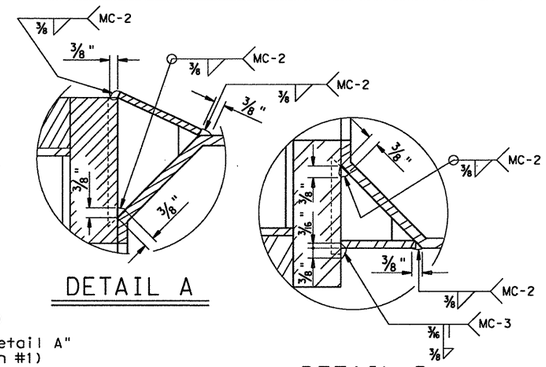


CLAMP-ON DETAIL 2

ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	8	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



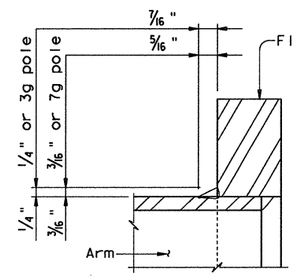
DETAIL A

DETAIL B

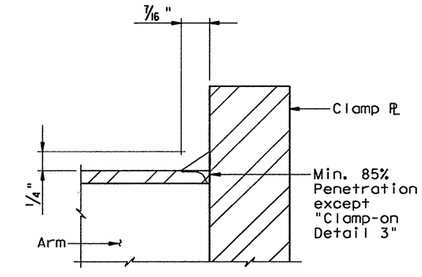
MATERIALS	
Round Shafts or Polygonal Shafts	ASTM A595 GR A, ASTM A570 GR 50, ASTM A607 GR 50, ASTM A572 GR 50 or A36M50
Plates (1)	ASTM A36 OR A572 GR 50 or A595(2) or A36M50
Connection Bolts	ASTM A325 except where noted
Pin Bolts	ASTM A325
Pipe	ASTM A53 GR A or B, or A501
Misc. Hardware	Galvanized steel or stainless steel or as noted

(1) Any of the materials listed for plates may be used where the drawings do not specify a particular Grade designation.

(2) If A595 material is used, it need not be cold worked to A595 requirments, but material must have 40 ksi minimum yield prior to fabrication.



FIXED MOUNT ARM



CLAMP-ON ARM

ARM BASE WELD DETAILS

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 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"

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 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC: d48hp1a:/usr/d482517
LV=1.2 for English 1.3 for Metric

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

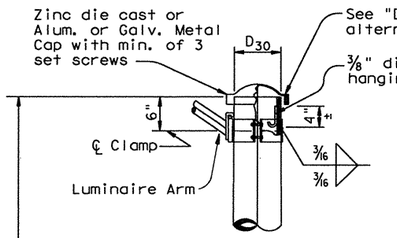
MAST ARM CONNECTIONS

MA-C-96

FILE: MA-C.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
©TxDOT August 1995	DIST	FED REG	FEDERAL AID PROJECT •	SHEET
REVISIONS	DAL	6	SEE TITLE SHEET	348
5-96	COUNTY		CONTROL SECT	JOB HIGHWAY
	ROCKWALL		1014 03	039 FM 740

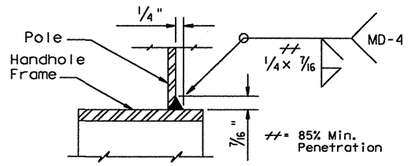
126A

LEVEL DISPLAYED 1 2 3 4 5 8

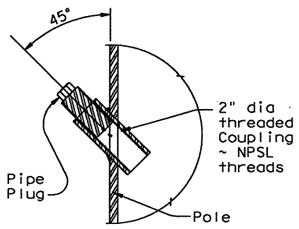


DETAIL A

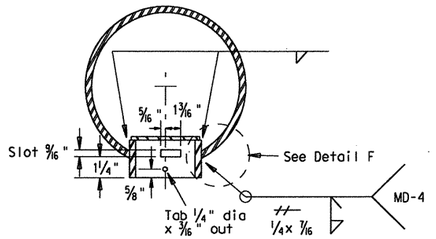
(for pole with luminaire)



DETAIL E

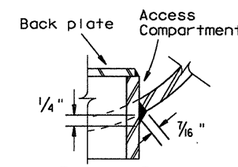


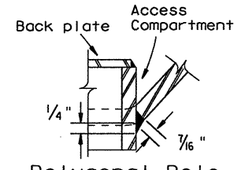
COUPLING DETAIL



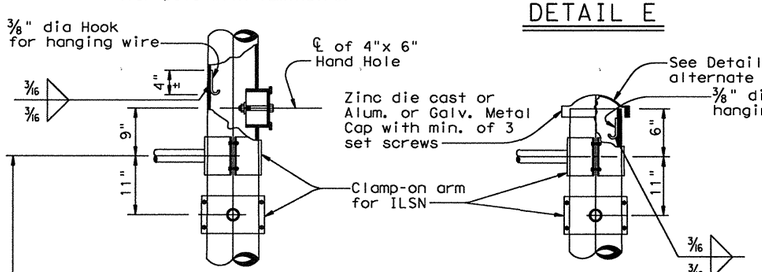
SECTION C-C

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



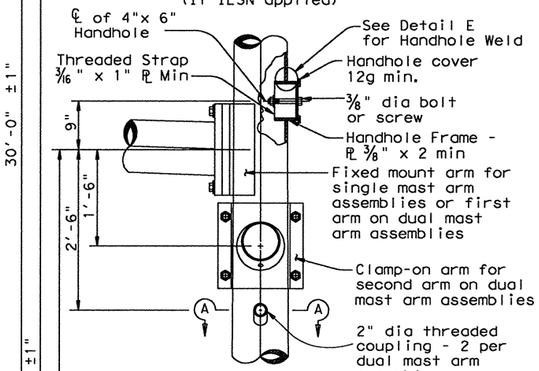


DETAIL F



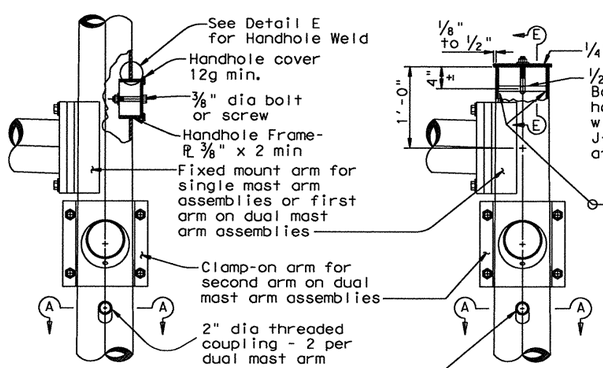
DETAIL J

(If ILSN applied)



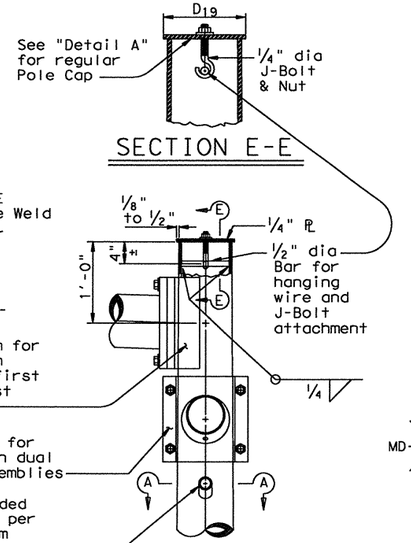
DETAIL B

(for 30' pole with luminaire and ILSN sign)



DETAIL K

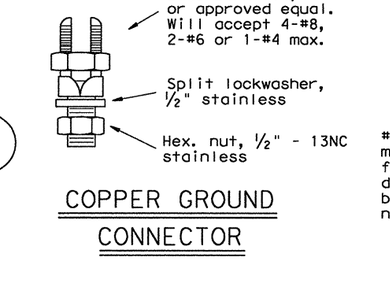
(for 24' pole with ILSN sign and no luminaire)



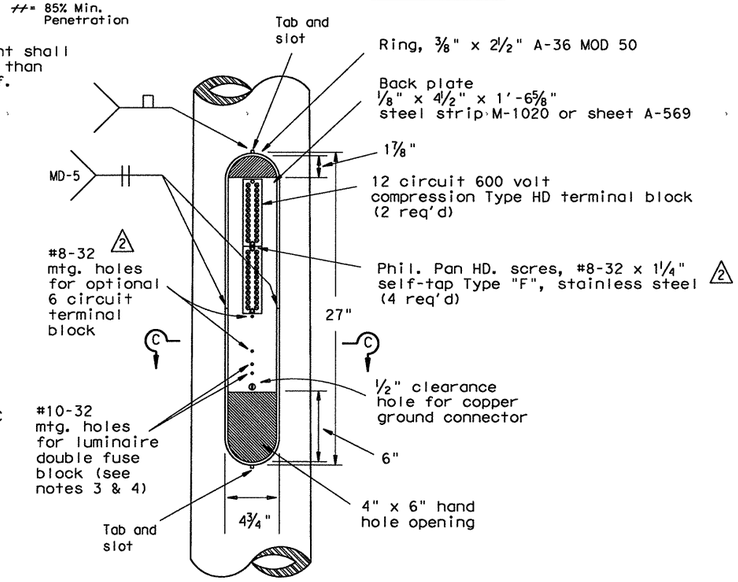
SECTION E-E

DETAIL C

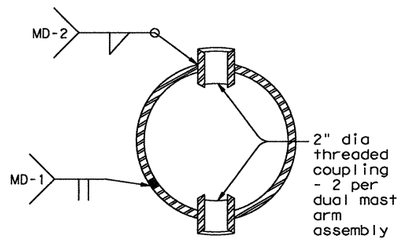
(for 19' pole with no ILSN sign and no luminaire)



COPPER GROUND CONNECTOR

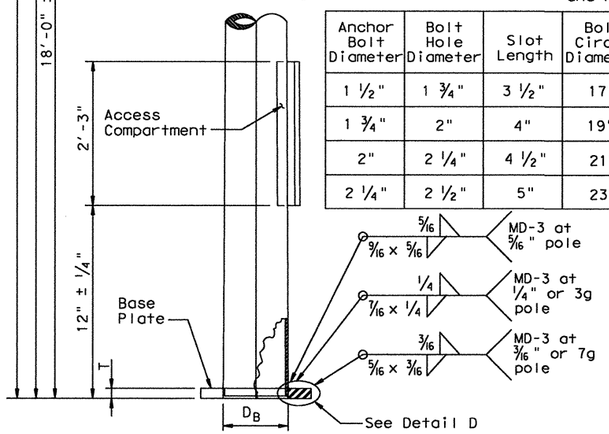


ACCESS COMPARTMENT



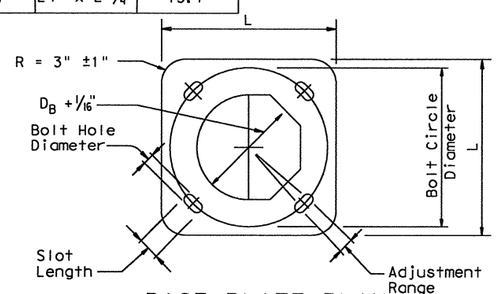
SECTION A-A

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1¼" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

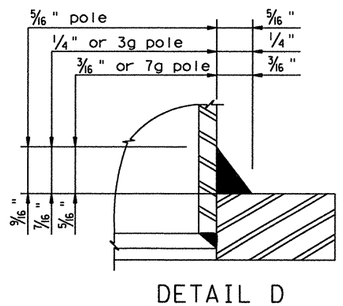


POLE ELEVATION

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



BASE PLATE PLAN



DETAIL D

1. 10/03 Revision — Revised notes, and remove detail.
2. 2/07 Revision — Revised dimension of terminal-block screw.

STANDARD PLANS

Texas Department of Transportation

Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-07

©TxDOT August 1995	DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
8-99	DAL	6	SEE TITLE SHEET	349
10-00				
10-03	COUNTY		CONTROL / SECTION / JOB	HIGHWAY
2-07	ROCKWALL		1014 / 03 / 039	FM 740

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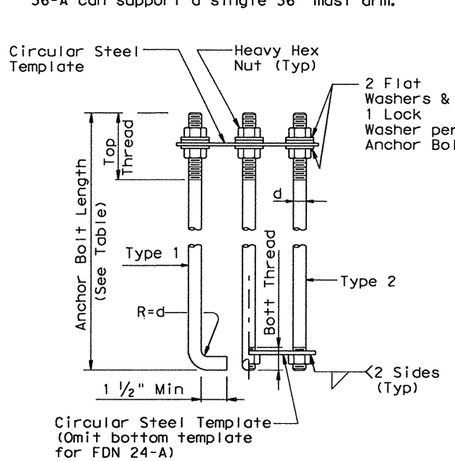
FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		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	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

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

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32' ⚠1	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	⚠1	36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

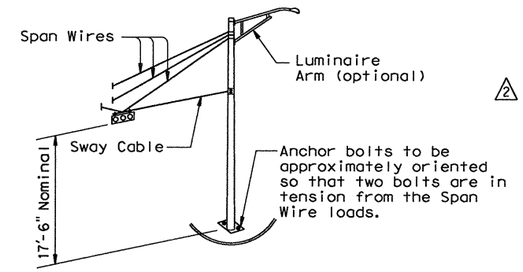
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



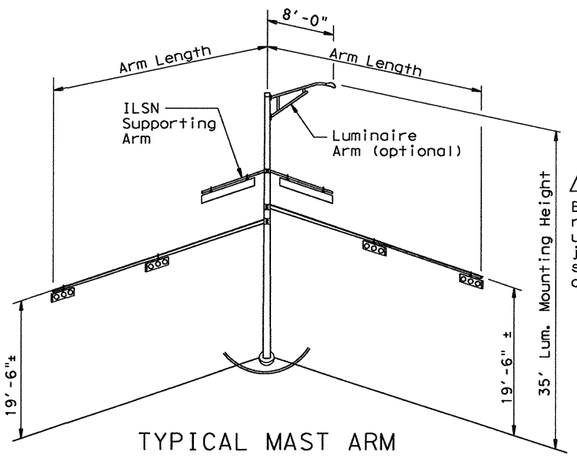
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

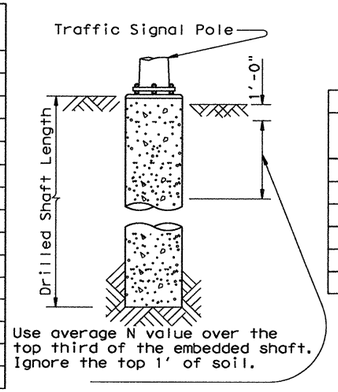
INSTALLATION PROCEDURE:
Threads of anchor bolts shall be coated with pipe joint compound prior to installed of upper nuts when erecting pole. After pole is plumbed and in permanent alignment, the exposed threads of painted bolts shall be cleaned and an additional coating of zinc-rich paint applied to seal the bolt thread-nut joint.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

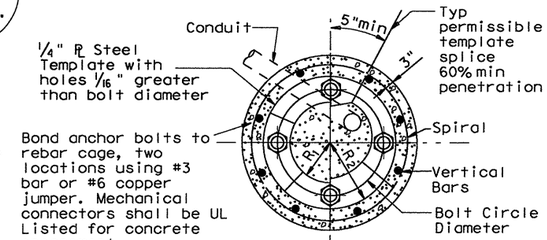


NOTES:
① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
② Foundation Design Loads are the allowable moments and shears at the base of the structure.
③ Foundations may be listed seperately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

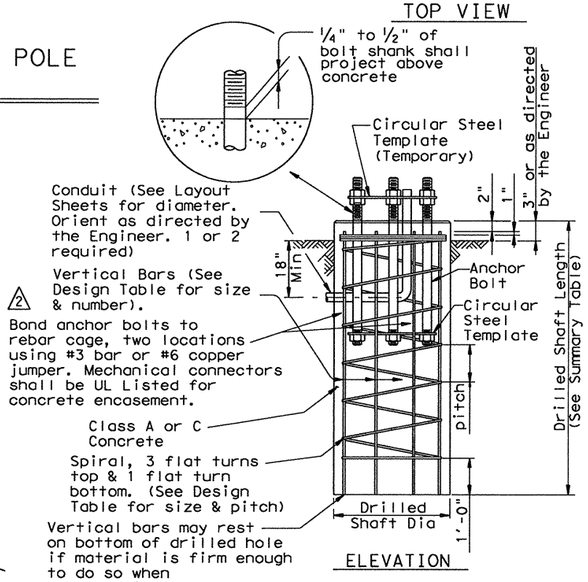
ANCHOR BOLT & TEMPLATE SIZES

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

⑦ Min dimensions given, longer bolts are acceptable.



TOP VIEW



ELEVATION

FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
SUMMER LEE DR.								
POLE 1	10	36A	1			13		
POLE 2	10	36A	1			13		
POLE 3	10	36A	1			13		
POLE 4	10	36A	1			13		
HENRY CHANDLER RD.								
POLE 1	10	36A	1			13		
POLE 2	10	36A	1			13		
POLE 3	10	36A	1			13		
POLE 4	10	24A	1	6				
POLE 5	10	24A	1	6				
POLE 6	10	30A	1		10			
TOTAL DRILLED SHAFT LENGTHS				12	10	91		

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.
Concrete shall be Class A or C.
Threads for anchor bolts and nuts shall be rolled or cut threads of unified national coarse thread series except for A193B7 bolts which shall have 8 pitch thread series. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.
Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Anchor bolts larger than 1" in diameter shall conform to A36M55 in accordance with the Item, "Anchor Bolts" or ASTM A193B7 or A687. Galvanize or coat with zinc-rich paint a minimum of the upper 14 inches of all anchor bolts unless otherwise noted. Exposed nuts shall be galvanized or coated with zinc-rich paint. Washers shall be galvanized. Templates and embeded nuts need not be galvanized.

5/26/09
STATE OF TEXAS
KELVIN J. KROEKER
86965
LICENSED
PROFESSIONAL ENGINEER
Kelvin J. Kroeker, P.E.

11/99 Revision
⚠1 Changed to Facilitate new terminal strip enclosure
⚠2 Changed from ground rod to UFER ground

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-99

LEVELS	ACC: d48hp1q:/usr/d482517
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63	LV=1,2 for English 1,3 for Metric

DN- MS	CK:- JSY	DW- MAO/MMF	CK- JSY/TEB

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
5-96	DAL	6	SEE TITLE SHEET	350
11-99	COUNTY		CONTROL / SECTION / JOB	HIGHWAY
	ROCKWALL		1014 / 03 / 039	FM 740

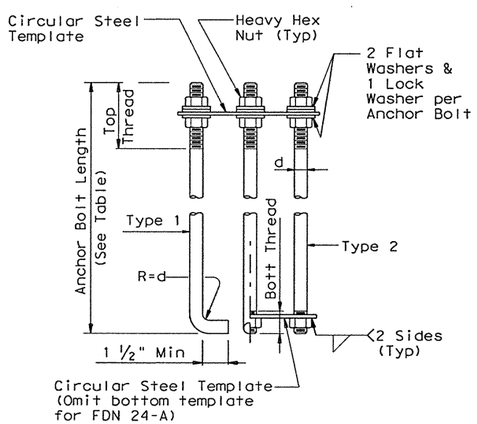
FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		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	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

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

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32' ⚠1	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	⚠1	36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

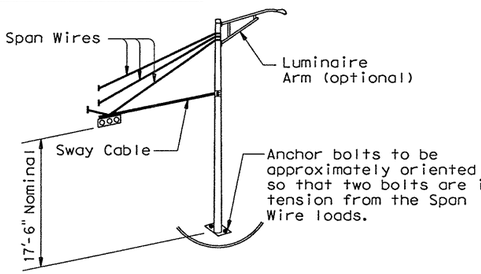
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



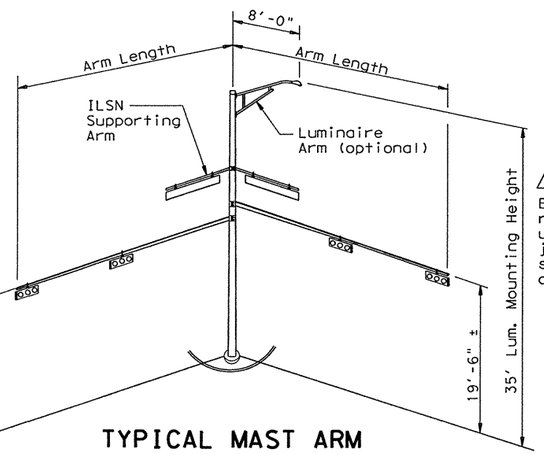
HOOKED ANCHOR (TYPE 1) | NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

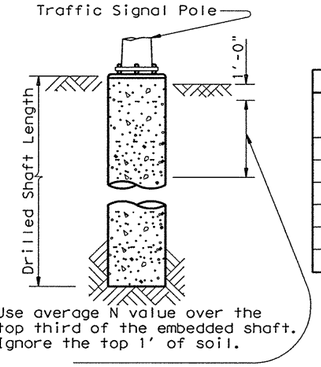
INSTALLATION PROCEDURE:
Threads of anchor bolts shall be coated with pipe joint compound prior to installation of upper nuts when erecting pole. After pole is plumbed and in permanent alignment, the exposed threads of painted bolts shall be cleaned and an additional coating of zinc-rich paint applied to seal the bolt thread-nut joint.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

NOTES:

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

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

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

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

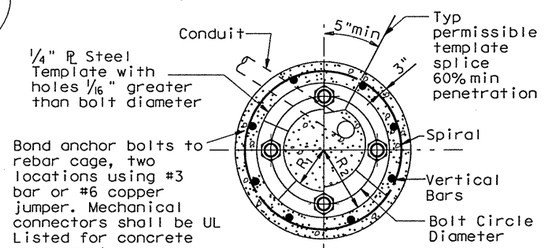
⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

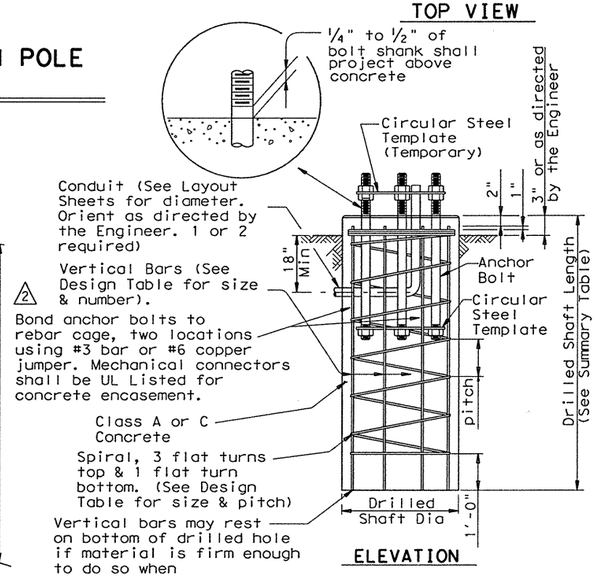
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

ANCHOR BOLT & TEMPLATE SIZES

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

⑦ Min dimensions given, longer bolts are acceptable.





FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET) 24-A	30-A	36-A	36-B	42-A
SUMMER LEE DR.								
POLE 1	10	36A	1			13		
POLE 2	10	36A	1			13		
POLE 3	10	36A	1			13		
POLE 4	10	36A	1			13		
HENRY CHANDLER RD.								
POLE 1	10	36A	1			13		
POLE 2	10	36A	1			13		
POLE 3	10	36A	1			13		
POLE 4	10	24A	1	6				
POLE 5	10	24A	1	6				
POLE 6	10	30A	1		10			
YACHT CLUB DR.								
POLE 1	10	36A	1			13		
POLE 2	10	30A	1		11			
POLE 3	10	30A	1		11			
POLE 4	10	24A	1	6				
FM 1140								
POLE 1	10	36A	1			13		
POLE 2	10	24A	1	6				
POLE 3	10	36A	1			13		
POLE 4	10	36A	1			13		
POLE 5	10	24A	1	6				
POLE 6	10	36A	1			13		
TOTAL DRILLED SHAFT LENGTHS				30	32	156		

⚠3

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. Concrete shall be Class A or C.

Threads for anchor bolts and nuts shall be rolled or cut threads of unified national coarse thread series except for A193B7 bolts which shall have 8 pitch thread series. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Anchor bolts larger than 1" in diameter shall conform to A36M55 in accordance with the Item, "Anchor Bolts" or ASTM A193B7 or A687. Galvanize or coat with zinc-rich paint a minimum of the upper 14 inches of all anchor bolts unless otherwise noted. Exposed nuts shall be galvanized or coated with zinc-rich paint. Washers shall be galvanized. Templates and embeded nuts need not be galvanized.

⚠7 CHANGE ORDER

11/99 Revision

⚠1 Changed to Facilitate new terminal strip enclosure

⚠2 Changed from ground rod to UFER ground

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-99

DN: - MS	CK: - JSY	DW: - MAO/MMF	CK: - JSY/TEB

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
5-96	18	6	(SEE TITLE SHEET)	350A
11-99	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

MATERIALS	
Pole or Arm Simplex	ASTM A27 GR 65-35 or A148 GR 80-50 or A576 GR 1021 (4) or A36 (Arm only)
Arm Pipes	ASTM A53 GR A or B or A500 GR B or A501 or A595 (2) or A715 GR 50
Arm Plates (3)	ASTM A36 or A572 GR50 (1) or A595 GR A or A588
Misc.	ASTM designations as noted

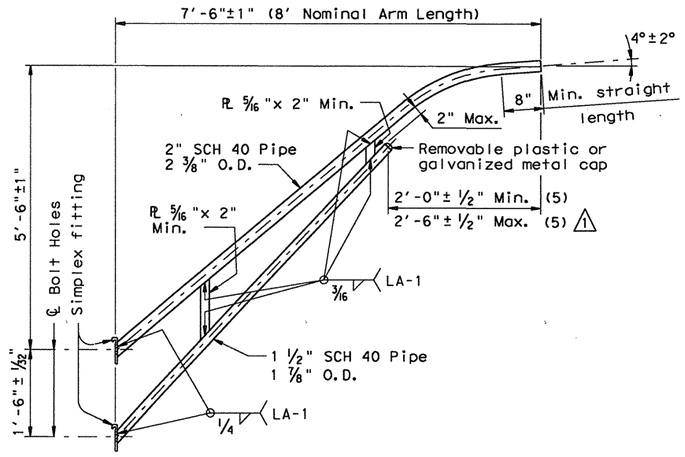
(1) ASTM A36M50 steel as described in Item 442 "Metal for Structures" may be used in lieu of A 572 GR 50.

(2) If A595 GR A material is used, arm need not be cold worked to A595 requiremants, but material must have 40 ksi minimum yield prior to fabrication.

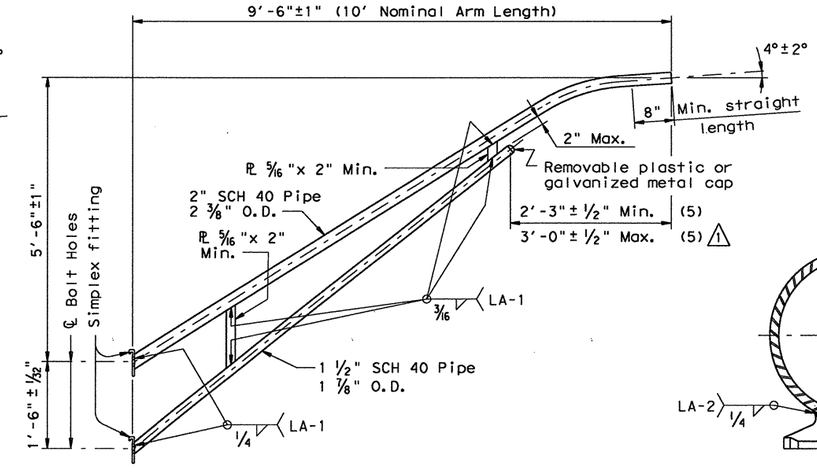
(3) Either of the materials listed for pates may be used where the drawings do not specify a particular ASTM designation.

(4) 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.

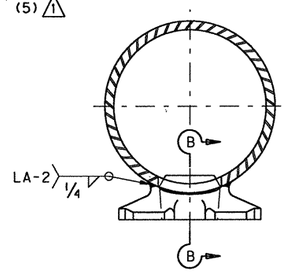
(5) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.



8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

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 75 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.5 sq. ft.

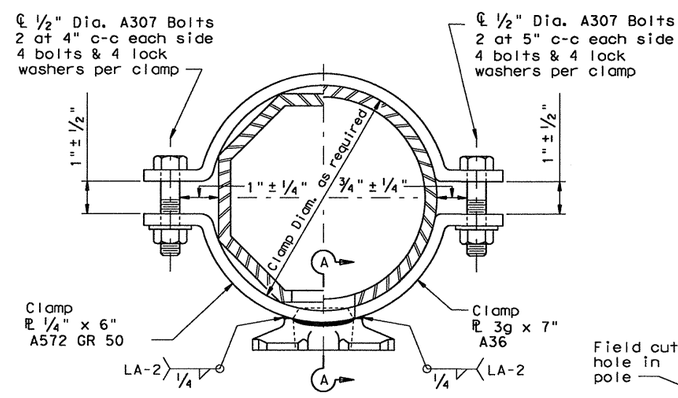
Materials and fabrication shall be in accordance with the Specificatons and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with the Specifications.

Special designs require submission of shop drawings in accordance with the item "Steel Structures".

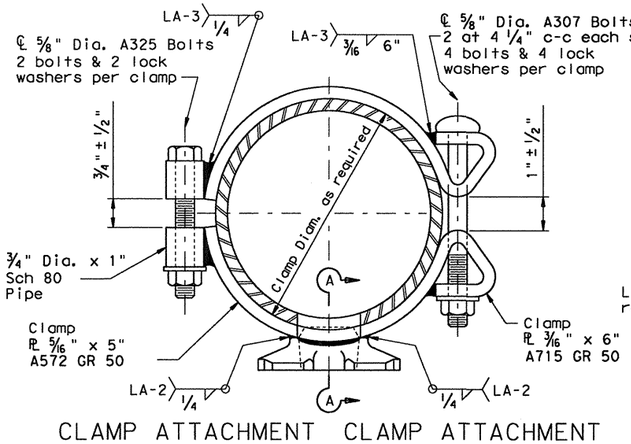
Each pole simplex fitting shall be supplied with 2 A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely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

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



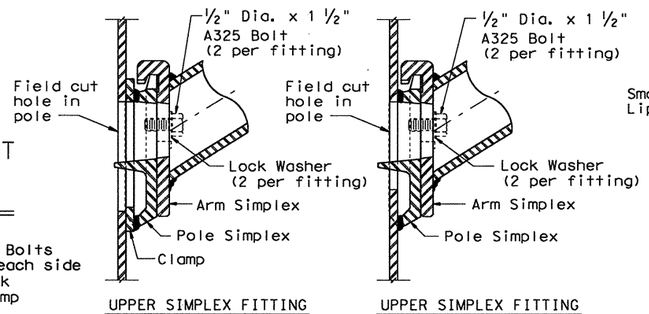
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)

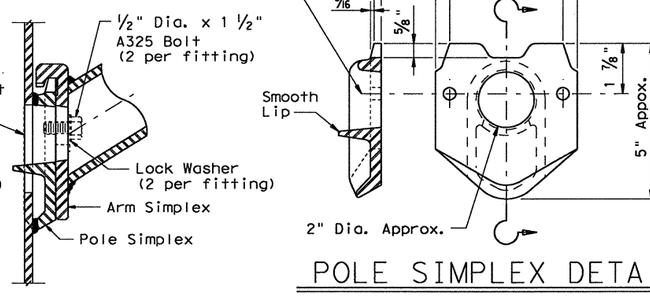


CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

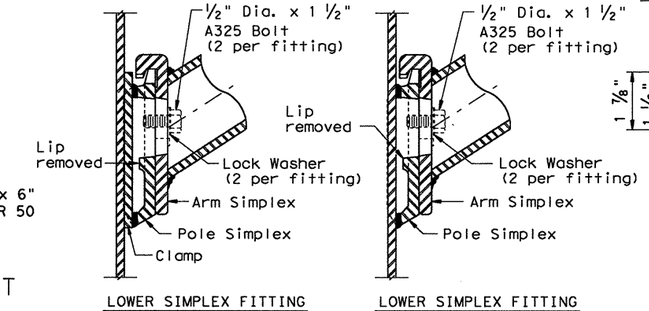
CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



UPPER SIMPLEX FITTING

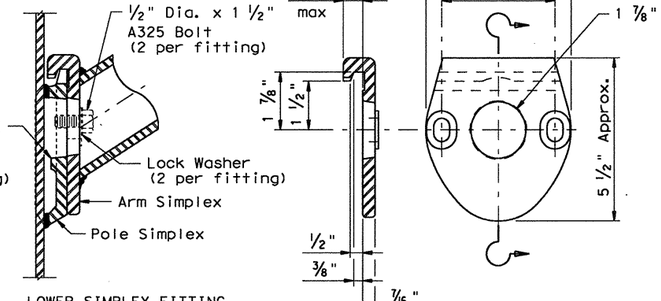


UPPER SIMPLEX FITTING



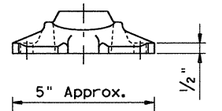
LOWER SIMPLEX FITTING

SECTON A-A



LOWER SIMPLEX FITTING

SECTON B-B



POLE SIMPLEX DETAIL

ARM SIMPLEX DETAIL

⚠1 1-99 - minor typo correction

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-99

FILE: lum-a.dgn	DN: LEH	CK: JSY	DW: LTT	CK: TEB	STD:	
©TxDOT August 1995	DIST	FED REG	FEDERAL AID PROJECT •			SHEET
REVISIONS 5-96 1-99	DAL	6	SEE TITLE SHEET			351
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

129

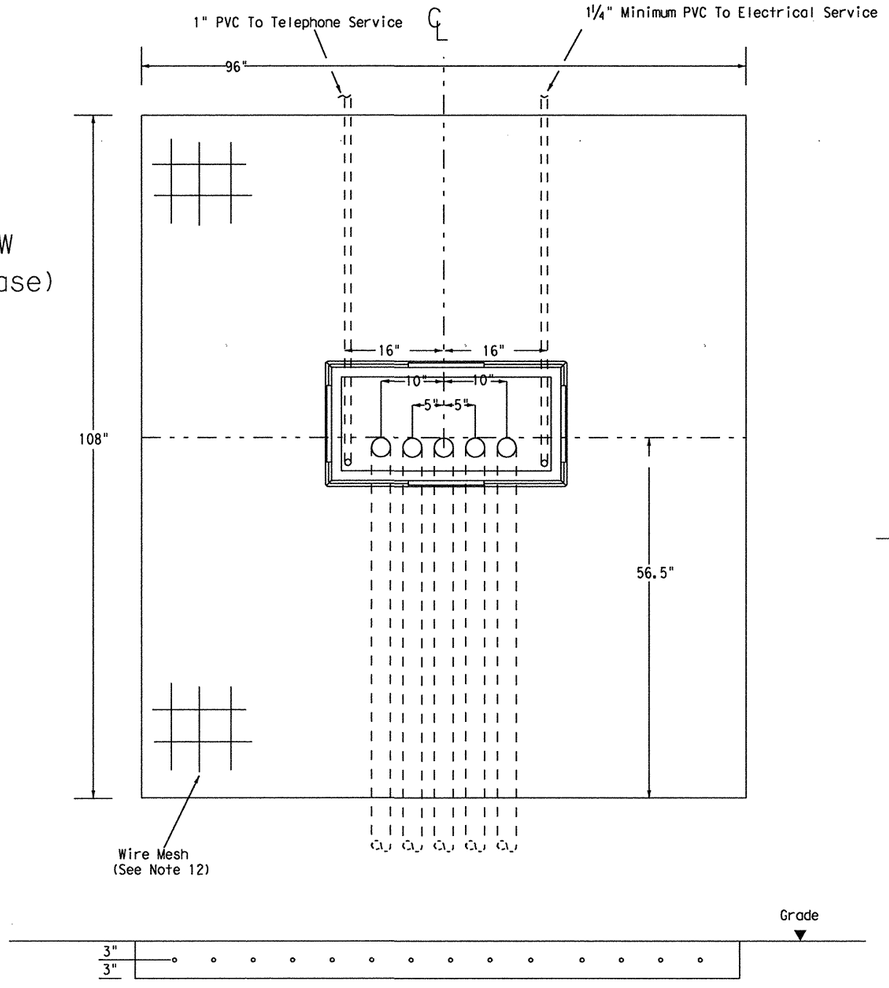
LEVELS DISPLAYED 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC: (LV=1,2 for English; 1,3 for Metric)

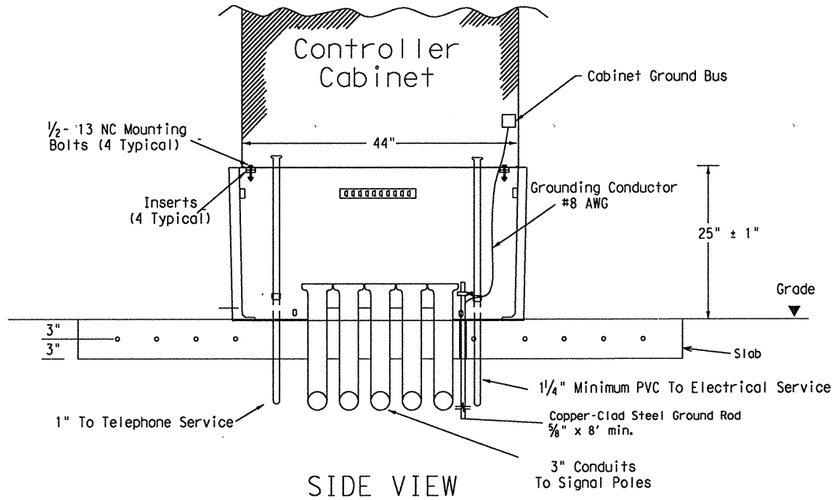
LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	13	15	16	ACC:		
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

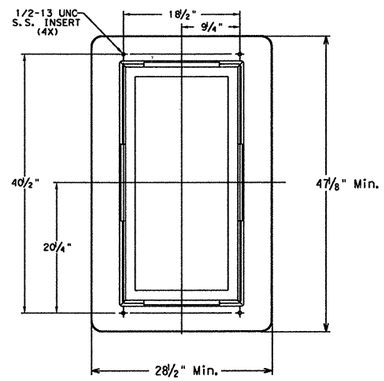
TOP VIEW (Slab & Base)



SIDE VIEW (Slab & Base)



CABINET BASE



TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Operation Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four ½"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 3/16 x 3/16 inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using ½"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

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

CONDUITS:

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

CONTROLLER CABINET:

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

PAYMENT:

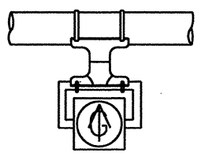
20. Bid TS-CF as subsidiary to Item 680.

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

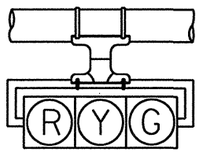
TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-04

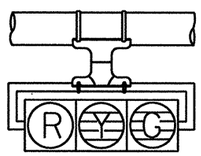
©TxDOT October 2000		DN: HW	CK:	DW: CJ	CK: CAL
REVISIONS 12-04	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DAL	6	SEE TITLE SHEET		352
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740



H1TA



H3



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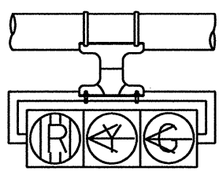

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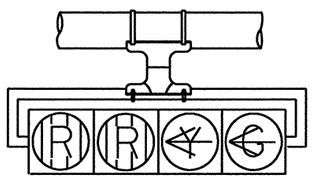

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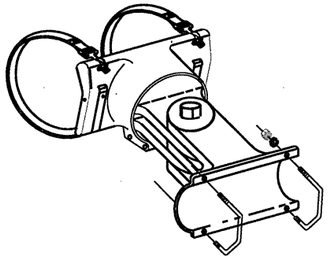
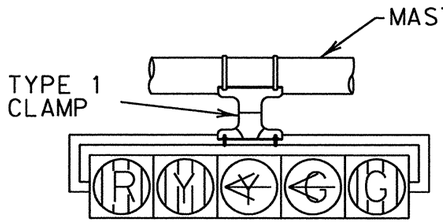
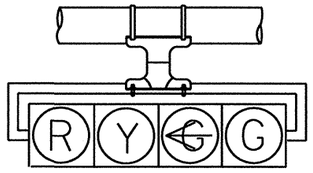


TYPE 2 CLAMP KIT

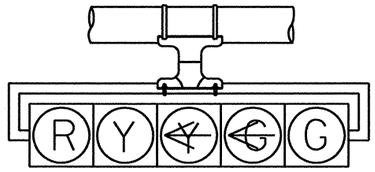
SHALL BE INSTALLED WHEN ROTATION ABOUT THE HORIZONTAL AND VERTICAL AXES ARE NEEDED.



H5LLT



H4LT



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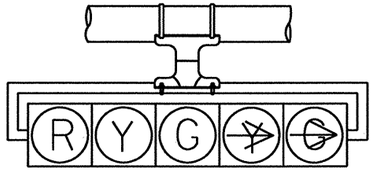
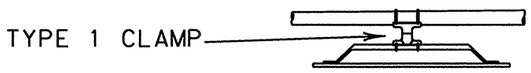
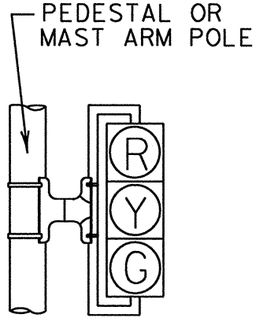


H5RT

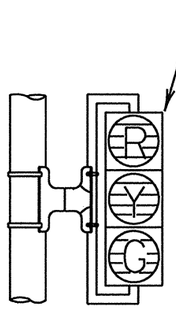


ONE (1) CLAMP SHALL BE USED ON SIGNS LESS THAN OR EQUAL TO 10'-0" IN LENGTH.

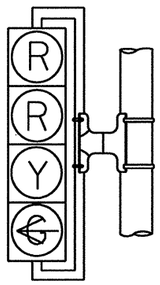
TWO (2) CLAMPS SHALL BE USED ON SIGNS GREATER THAN 10'-0" IN LENGTH.



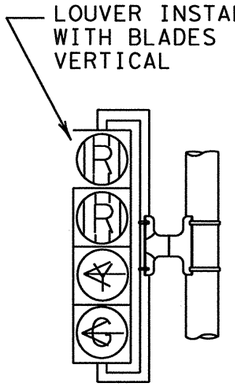
V3



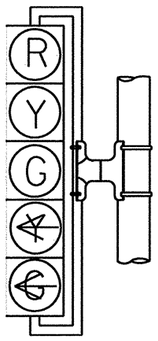
V3L



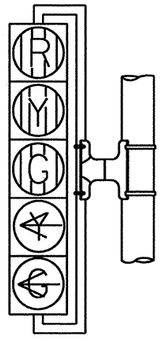
V4LT



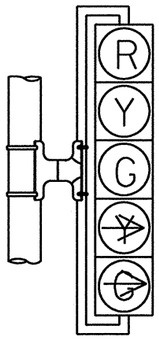
V4LLT



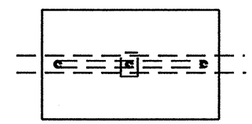
V5LT



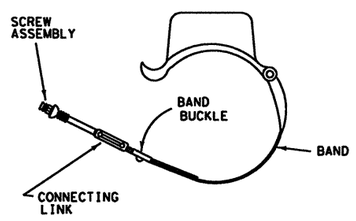
V5LLT



V5RT



SIGN OR DAMPENING DEVICE ATTACHMENT FOR MAST ARMS



TYPE 1 AND 2 CLAMPS

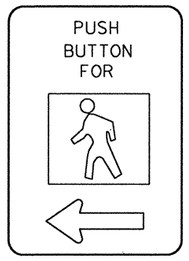
NOTES:

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

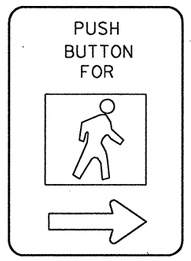
TRAFFIC SIGNAL HEAD IDENTIFICATION

DALLAS DISTRICT STANDARD

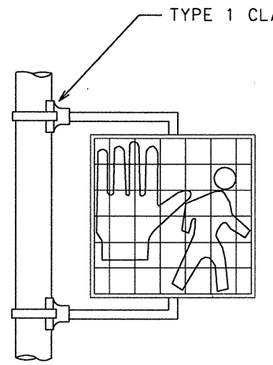
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	(SEE TITLE SHEET)		353
STATE	STATE DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	039	FM 740



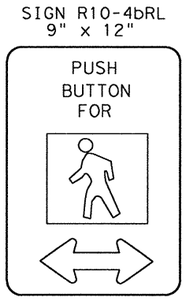
PEDESTRIAN PUSHBUTTON
SIGN DETAILS



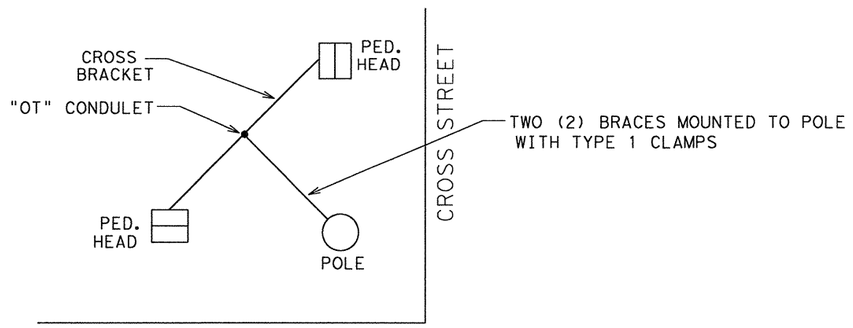
PEDESTRIAN PUSHBUTTON
SIGN DETAILS



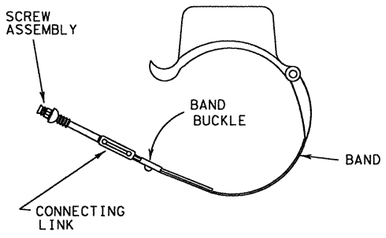
PEDESTRIAN SIGNAL HEAD MOUNTING
FOR ONE PEDESTRIAN SIGNAL HEAD
152A



PEDESTRIAN PUSHBUTTON
SIGN DETAILS



PEDESTRIAN SIGNAL HEAD MOUNTING
FOR TWO PEDESTRIAN SIGNAL HEADS
143C



TYPE 1 CLAMP

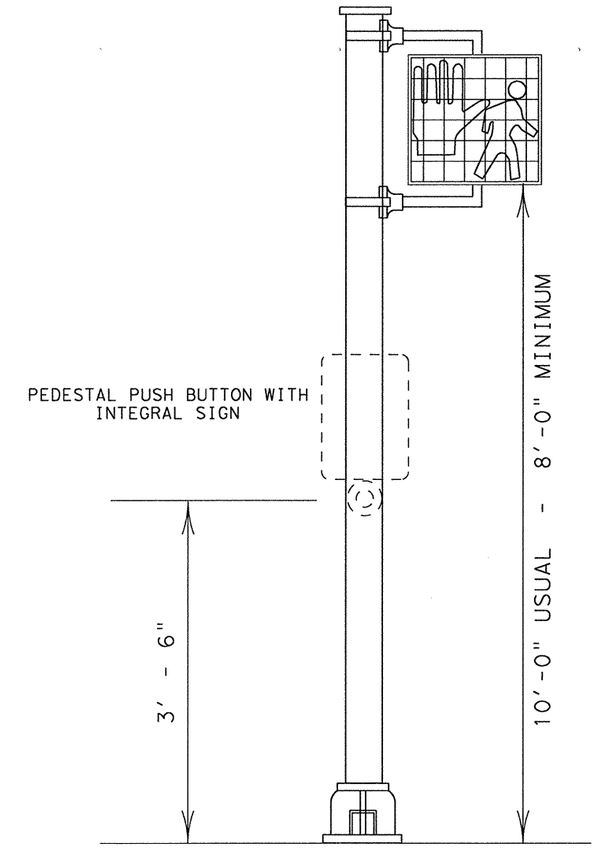
⚠1 NOTE: CLAM SHELL MOUNTING HARDWARE MAY BE USED INSTEAD OF MOUNTING HARDWARE SHOWN ABOVE, AS APPROVED BY THE ENGINEER. ICC P/N 4805 OR McCAIN QUICKMOUNT OR APPROVED EQUAL.

NOTES:

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

NOTE:

THE POLE ON THIS DRAWING IS SHOWN AS AN EXAMPLE ONLY. POLES OF SIMILAR DESIGN FOR ANY CROSS SECTION WHICH MEET THE SPECIFICATIONS AND REQUIREMENTS SHOWN ON THESE DRAWINGS AND ARE APPROVED BY THE ENGINEER WILL BE DEEMED ACCEPTABLE.



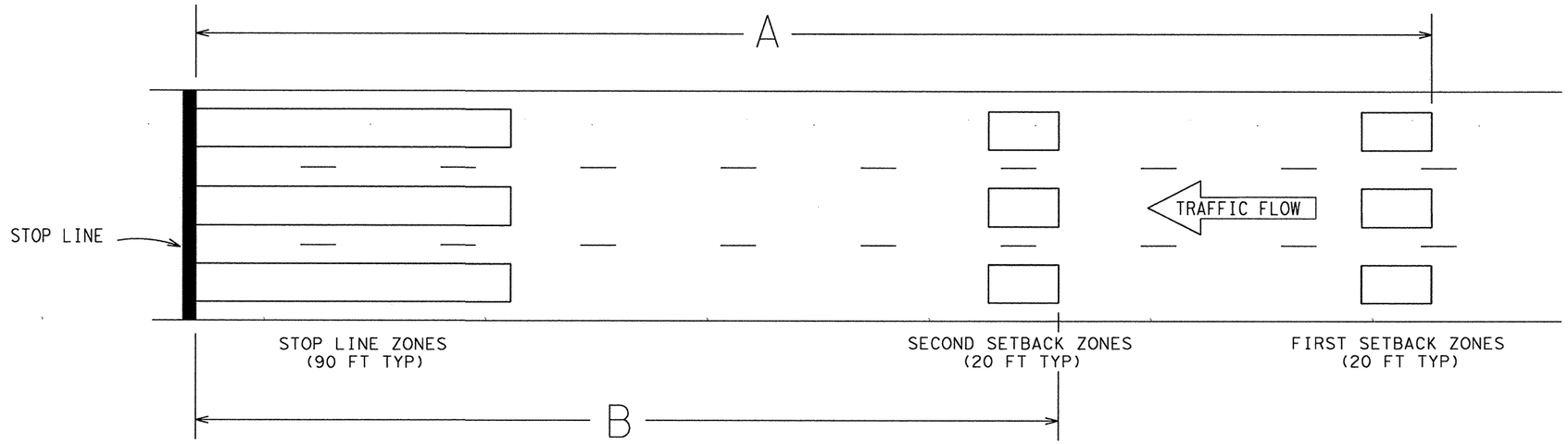
PEDESTAL POLE

⚠1 ALTERNATIVE MOUNTING METHOD revised 12-92

DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	(SEE TITLE SHEET)		354
STATE	STATE DIST.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	039	FM 740

PEDESTRIAN SIGNAL HEAD IDENTIFICATION



APPROACH SPEED LIMIT (MPH)	DISTANCE [2] BETWEEN CAMERA AND STOP LINE (FT)	DISTANCE [1] A (FT)	CAMERA HEIGHT (FT)									
			24	28	32	36	40	24	28	32	36	40
			DISTANCE B (FT)					EXTENSION ON 2ND DET. ZONE (SEC.)				
60	80	470	280	295	305	310	315	0.0	0.0	0.0	0.5	0.5
	150	470	270	285	295	300	310	0.0	0.0	0.0	0.0	0.5
55	80	430	255	265	275	280	285	0.0	0.0	0.0	0.5	0.5
	150	430	245	255	265	275	280	0.0	0.0	0.0	0.0	0.5
50	80	390	235	245	250	255	260	0.0	0.0	0.5	0.5	0.5
	150	390	220	230	240	245	250	0.0	0.0	0.0	0.0	0.5
45	80	350	210	215	220	225	230	0.0	0.0	0.5	0.5	0.5
	150	350	190	200	210	215	220	0.0	0.0	0.0	0.0	0.5

1. Distances shown are based on a 20' detection zone and a 1.0 second passage time setting.
2. Distance between the camera and the stop line, as measured parallel to the direction of travel.

DALLAS DISTRICT STANDARD

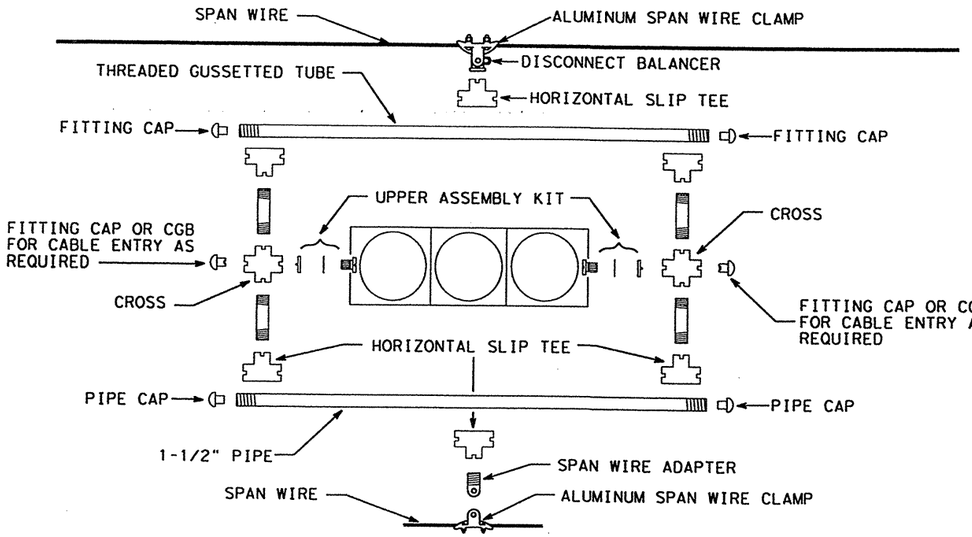
Texas Department of Transportation

Dallas District

VIDEO DETECTION ZONE PLACEMENT

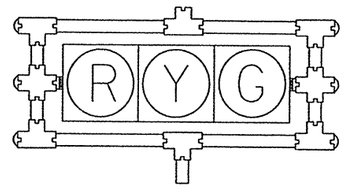
VDZ-04 (DAL)

©TxDOT September 2004	DN: THW	CK: CDB	DW: BES	CK: TRF-Aus.
REVISIONS	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	(SEE TITLE SHEET)		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	DALLAS	ROCKWALL	356
	CONTROL	SECTION	JOB	
	1014	03	039	



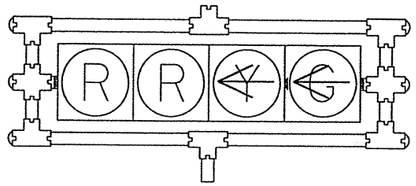
BOTTOM TETHERED, SPAN WIRE SIGNAL HARDWARE ASSEMBLY

(BACK PANEL NOT SHOWN)



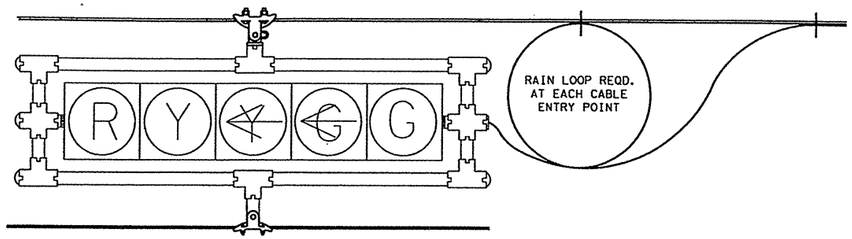
SH 3H

TYPICAL SPAN WIRE HORIZONTAL MOUNT INSTALLATION



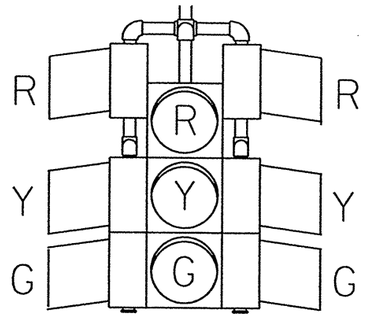
SH 4H

TYPICAL SPAN WIRE HORIZONTAL MOUNT INSTALLATION

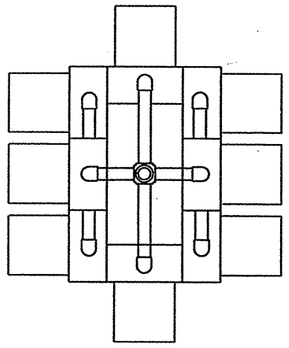


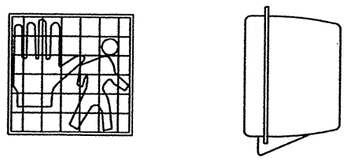
SH 5H

TYPICAL SPAN WIRE HORIZONTAL MOUNT INSTALLATION

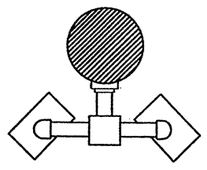


SIDES



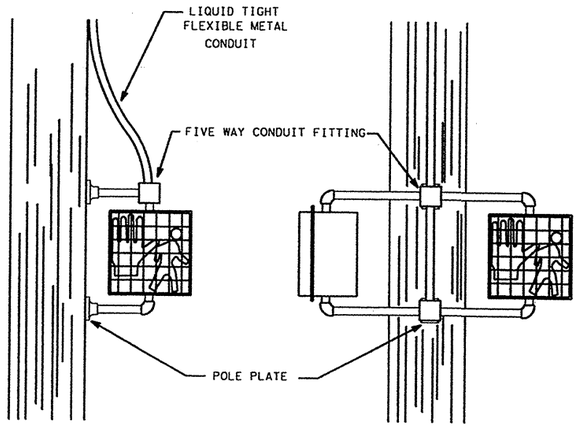


"EGGCRATE" VISOR PEDESTRIAN SIGNAL WITH ONE-PIECE REFLECTOR



SH 143C

PLAN VIEW

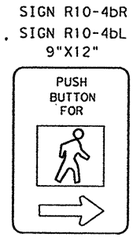


SH 152A

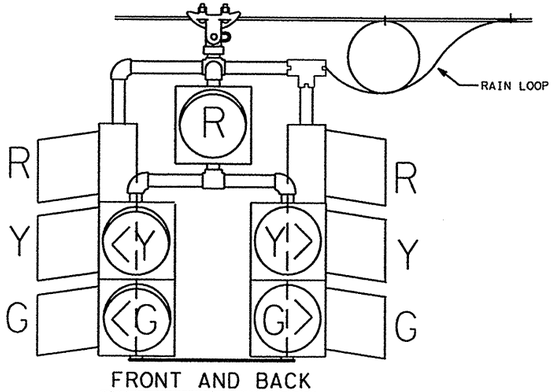
ONE-WAY ADJUSTABLE FACE SIGNAL FOR WOOD POLE MOUNTING

SH 143C

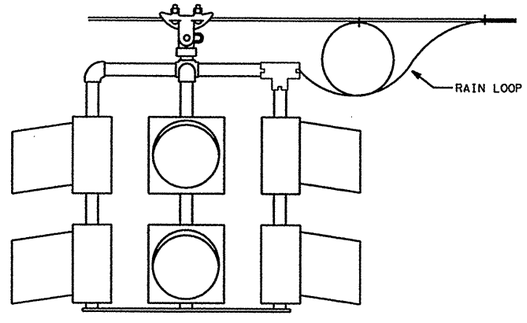
TWO-WAY ADJUSTABLE FACE SIGNAL FOR WOOD POLE MOUNTING



PEDESTRIAN PUSHBUTTON SIGN DETAILS



FRONT AND BACK

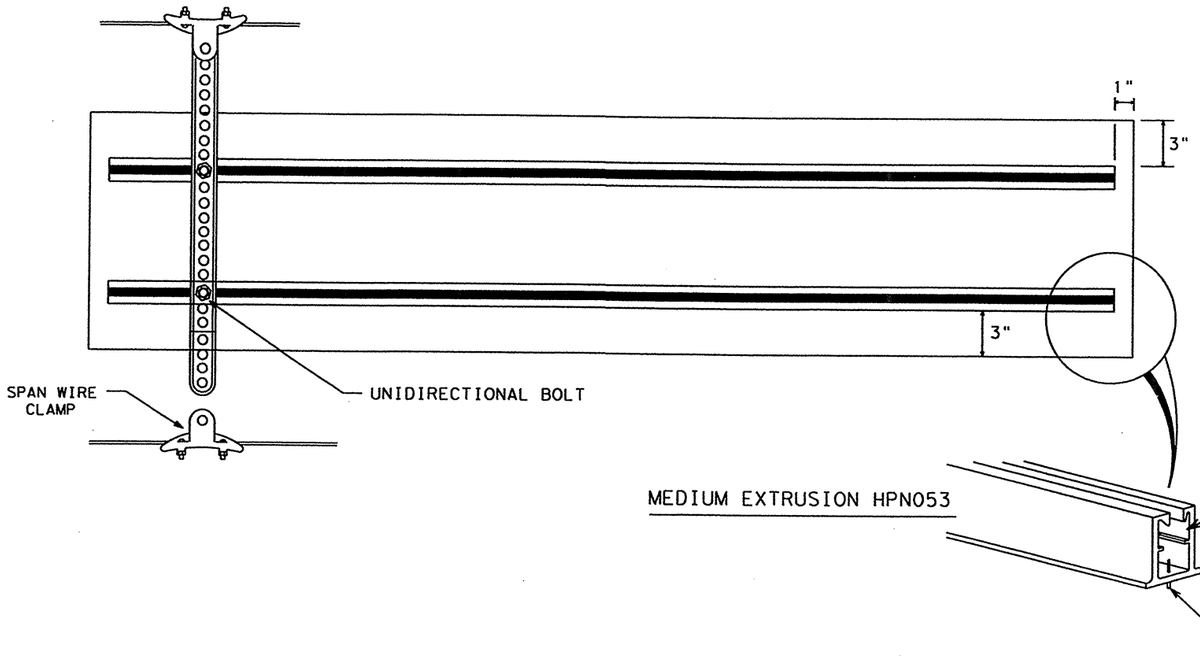


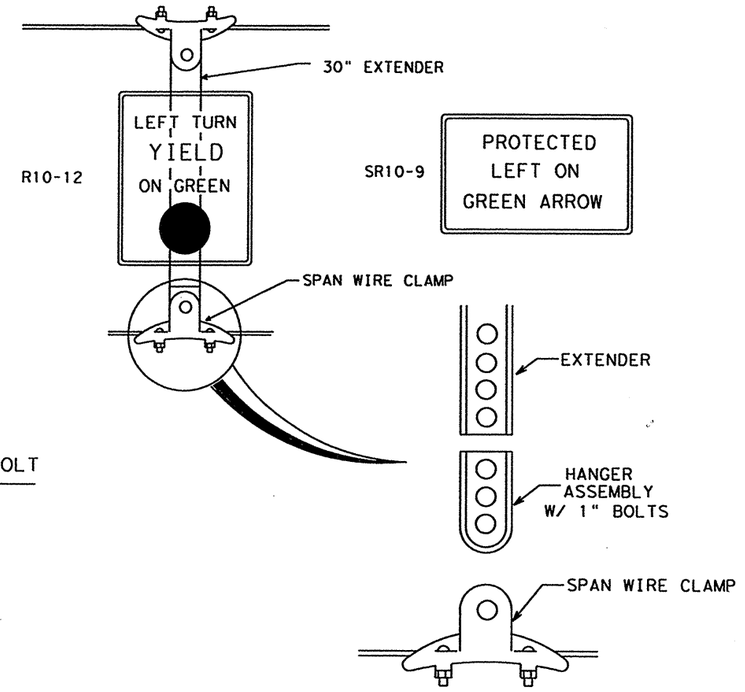
TYPICAL FLASHING BEACON INSTALLATION

SIGNAL HEADS FOR SPAN WIRE INSTALLATION

DALLAS DISTRICT STANDARD

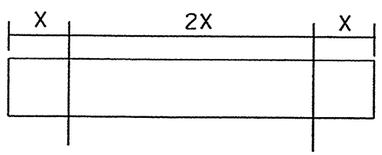
FED. NO. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			357
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	039	FM 740



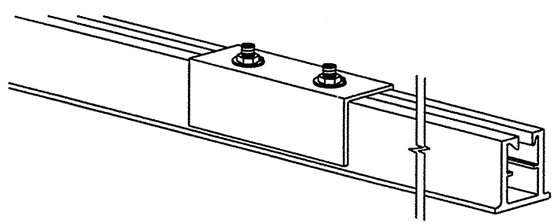


HANGER ASSEMBLY DETAILS

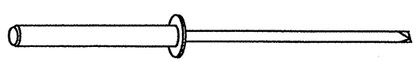
NOTES:
1. FOR SIGNS LESS THAN 5'-0" ONE VERTICAL SUPPORT IS REQUIRED PER SIGN. TWO VERTICAL SUPPORTS SHALL BE USED FOR SIGNS LONGER THAN 5'-0"
2. FOR STREET NAME SIGNS, EXTRUDED ALUMINUM SHALL BE MOUNTED FOR HORIZONTAL SUPPORT AS SHOWN.



SIGN LENGTH	X
5'-6"-6'-0"	1'-6"
6'-6"-7'-0"	1'-9"
7'-6"-8'-0"	2'-0"
8'-6"-9'-0"	2'-3"
9'-6"-10'-0"	2'-6"
10'-6"-11'-0"	2'-9"
11'-6"-12'-0"	3'-0"
12'-6"-13'-0"	3'-3"



5" ALUMINUM COUPLING
6061-T6



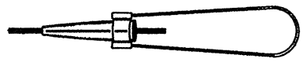
ALUMINUM RIVET

NOTE: ALUMINUM RIVETS SHALL BE USED TO ATTACH THE SIGN TO THE EXTRUDED ALUMINUM. SPACINGS OF RIVETS SHALL BE 6" O.C.

DALLAS DISTRICT STANDARD

SIGNS FOR SPAN WIRE INSTALLATION

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			358
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	Rockwall	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	039	FM 740



COMPRESSION FITTING

SOURCES:
RELIABLE ELECTRIC NO. 5264
FARGO NO. OR EQUAL

LUMINAIRE ARM

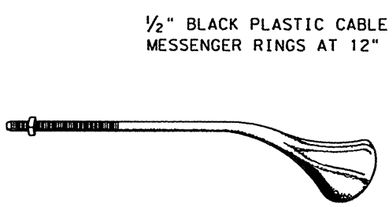
SOURCES:
CROUSE HINDS NO. 106-R82
JOSLYN NO. J75100B OR EQUAL

SQUARE WASHER
EYE NUT
COMPRESSION FITTING
8" MIN.
THIMBLEYE BOLT
LIFT PLATE
COMPRESSION FITTING
RM CONDUIT FOR SSR OR VIVDS CABLE (IF REQUIRED) (SEE LAYOUT SHEETS)
RM CONDUIT FOR LUMINAIRES (IF REQUIRED) (SEE LAYOUT SHEETS)
3/8" STRANDED STEEL CABLE
SQUARE WASHER
EYE NUT
SPLIT BOLT CONNECTOR
COMPRESSION FITTING
THIMBLEYE BOLT
LIFT PLATE
COMPRESSION FITTING
MULTI CONDUCTOR SIGNAL CABLE
NO. 6 BARE
SQUARE WASHER
EYE NUT
1/4" STRANDED STEEL CABLE
COMPRESSION FITTING
1/2" BLACK PLASTIC CABLE STRAPS OR MESSENGER RINGS AT 12" CTRS.
THIMBLEYE BOLT
CONDUIT (SEE LAYOUT SHEETS FOR SIZE (PAY ITEM)
SQUARE WASHER AND NUT
3/8" STRANDED STEEL CABLE
GROUND
PVC MOULDING
CLASS A OR C CONCRETE BACKFILL
GROUND BOX
PENTACHLOROPHENOL TREATED 40' SOUTHERN YELLOW PINE POLE (CLASS 2)
6' (40' POLE)
7' (50' POLE)
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.

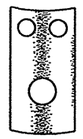
SAG= 5% OF LENGTH OF SPAN
RAIN LOOP 6" MIN.
CONDUIT (SEE LAYOUT SHEETS FOR SIZE (PAY ITEM)
GUY SPREADER
15" MIN.-48" MAX.
DONT WALK/WALK SIGNAL
1 1/2" LTFM (SUB 682)
ENCLOSED 10" X 10" X 6" NEMA 3R WITH TERMINAL STRIP KULKA
PED. PUSH BUTTON SIGN
PED. PUSH BUTTON
1/2" LIQUID TIGHT FLEXIBLE METAL CONDUIT (SUB 688)
7' MIN-10' MAX.
3.5'
GUY CLAMP OR COMPRESSION FITTING
3/8"X 8' DOUBLE EYE ANCHOR ROD
CLASS A OR C CONCRETE BACKFILL
CLASS A OR C CONCRETE BACKFILL
* 12" MAX.
8-WAY ANCHOR

* 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 ANCHOR TO THE POLE BUTT BE LESS THAN 1/3 OF THE DISTANCE FROM THE GROUND TO THE POINT OF GUY ATTACHMENT.



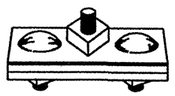
THIMBLEYE BOLT (Angle Type)

SOURCES:
JOSLYN NO. J80 SERIES
McGRAW EDISON DG4F OR EQUAL



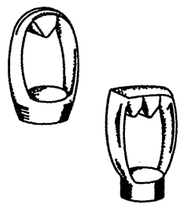
LIFT PLATE

SOURCES:
JOSLYN J7886
McGRAW EDISON DG4M-2 OR EQUAL



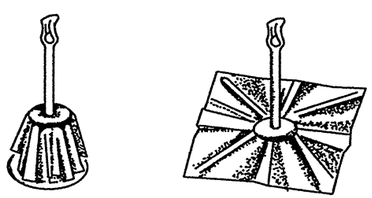
GUY CLAMP (3-Bolt)

6" HEAVY GUY CLAMP WITH 3-5/8" BOLTS OR RELIABLE ELECTRIC STRANDVISE WITH FLEXIBLE BAIL (NO. 5264) OR FARGO STRANDVISE OR EQUAL



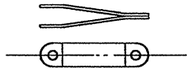
EYE NUTS (Twineye & tripleye)

SOURCES:
JOSLYN NO. J12593
McGRAW EDISON DGISE OR EQUAL



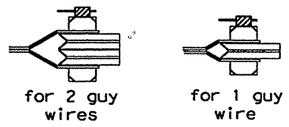
8-WAY ANCHOR

SOURCES:
8-WAY ANCHOR -JOSLYN NO. J8200-1(T) OR
6-WAY ANCHOR-McGRAW EDISON DA6E1 OR EQUAL

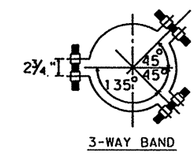


CONNECTING LINK

STEEL STRAIN POLE
CONNECTION LINK
GUY ATTACHMENT FOR 2 WIRES
RELIABLE ELECTRIC STRANDVISE (NO. 5202) OR FARGO OR EQUAL
GUY ATTACHMENT FOR 1 WIRE
CONNECTION LINK
3 WAY BAND



GUY ATTACHMENT



3-WAY BAND

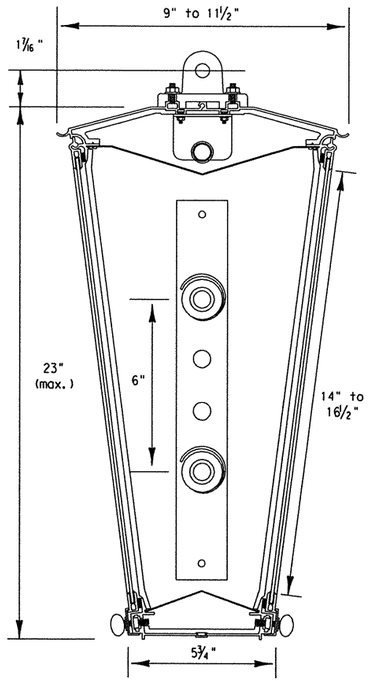
SPAN CABLE ATTACHMENT DETAILS FOR STEEL STRAIN POLES

DALLAS DISTRICT STANDARD

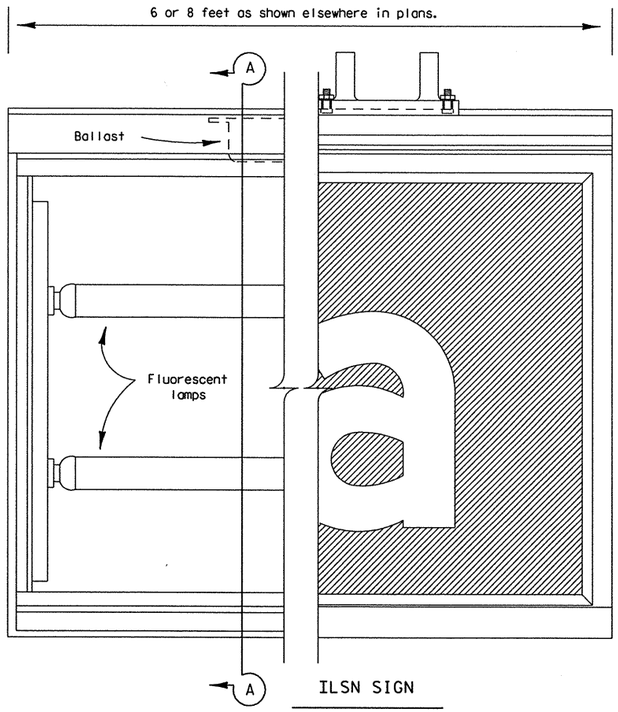
CONSTRUCTION DETAILS FOR SPAN WIRE MOUNTED SIGNALS

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			359
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	Rockwall	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	039	FM 740

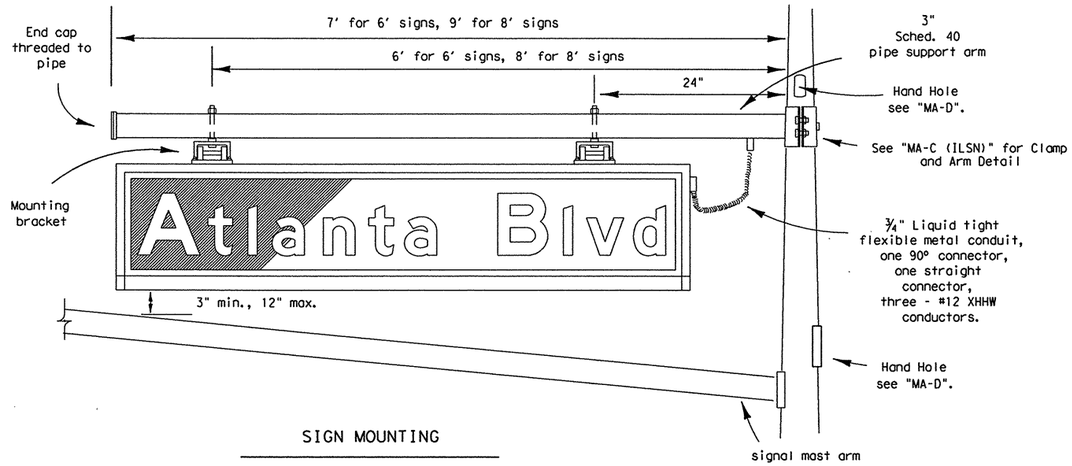
INTERNALLY LIGHTED STREET NAME SIGN DETAILS



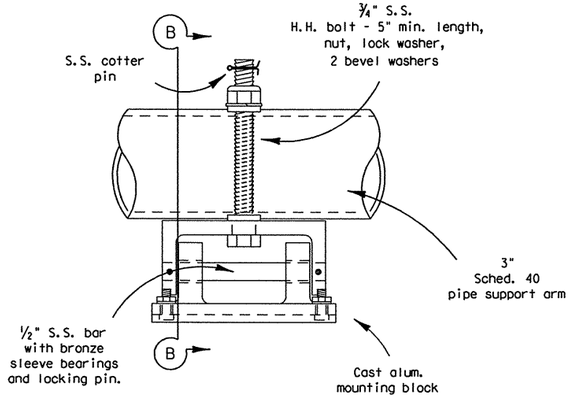
Section A-A



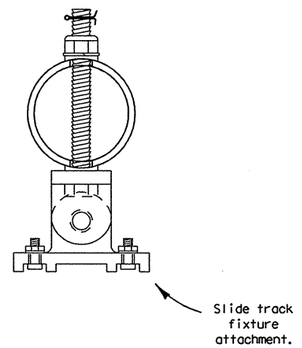
ILSN SIGN



SIGN MOUNTING



MOUNTING BRACKET



Section B-B

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

ILSN Sign 6 S

- ILSN Sign: Internally lighted street name sign
- 6: Sign length; 6 or 8 ft.
- S: Single or double face

LEVELS DISPLAY
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58nplc/usr/d580504
FILE:

DN: LR
CK: CW
DW: DN
CK: MT

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

STREET NAME SIGN DETAILS (ILLUMINATED)

SNS-95

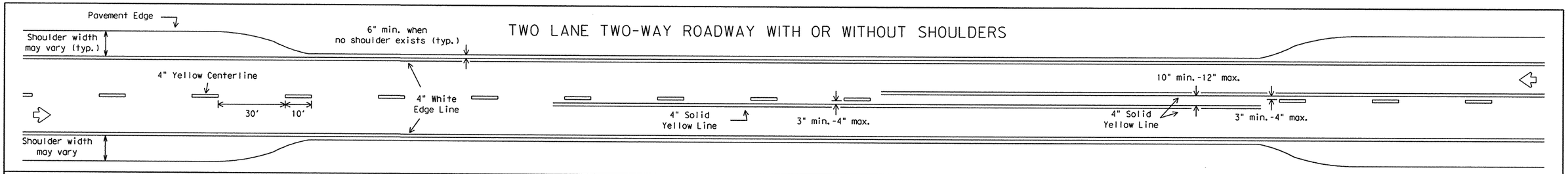
DN: CW	CK: CB	DW: DN	CK:	MSG NO.:

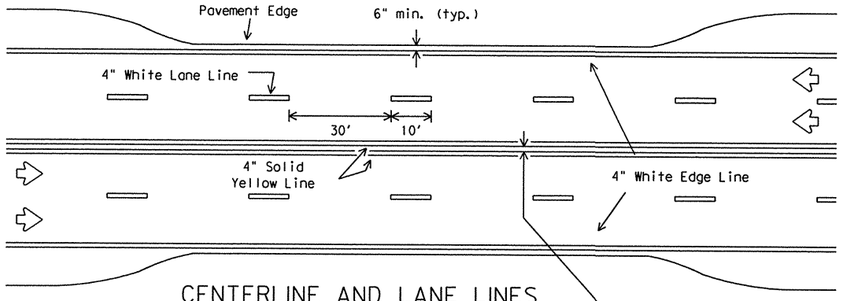
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	DALLAS	6	(SEE TITLE SHEET)	360

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	014	03	039	FM 740

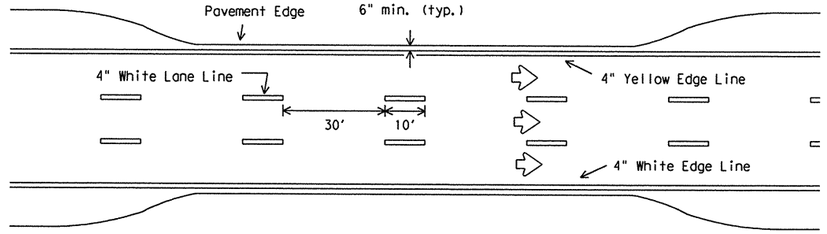
82

TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

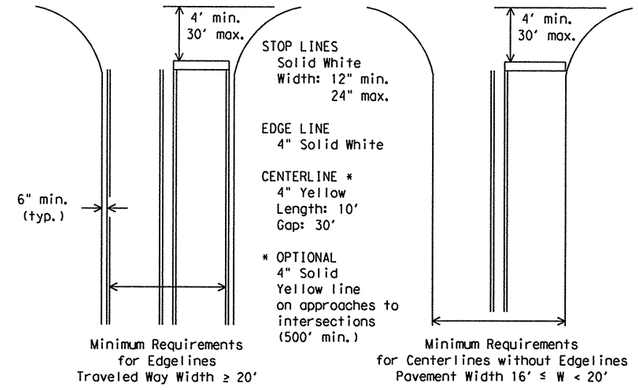




CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



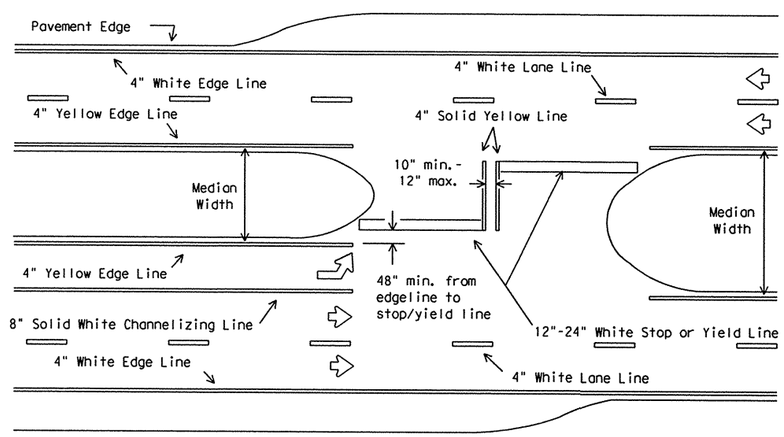
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

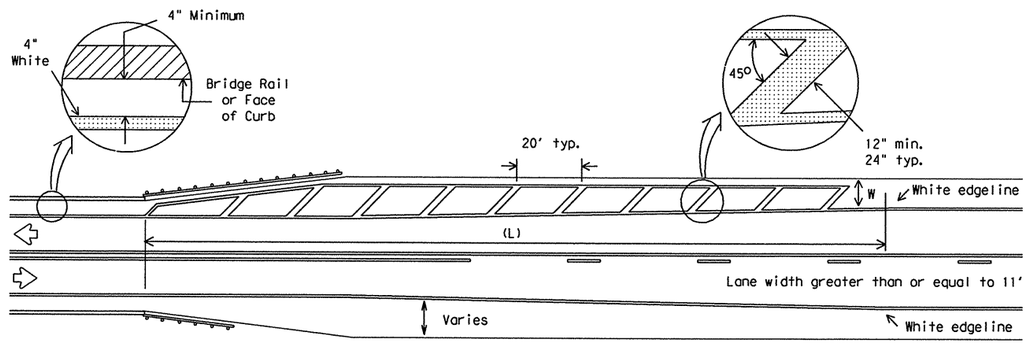
Based on Traveled Way and Pavement Widths for Undivided Highways

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



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.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching should be required if the shoulder width in advance of the bridge is 4 foot or wider and any reduction in shoulder width across the bridge occurs.
5. For guard fence details, refer elsewhere in the plans.

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed *	Formula
30, 35, 40	$L = \frac{WS^2}{60}$
45, 50, 55, 60, 65, 70	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 cross-hatching 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 cross-hatching 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.

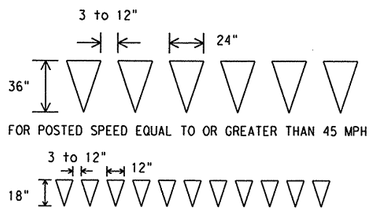
The traveled way includes only that portion of the roadway used for vehicular travel and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

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

SPECIFICATION REFERENCE TABLE

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECT.)	DMS-4200
EPOXY	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130

YIELD LINES



STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-03

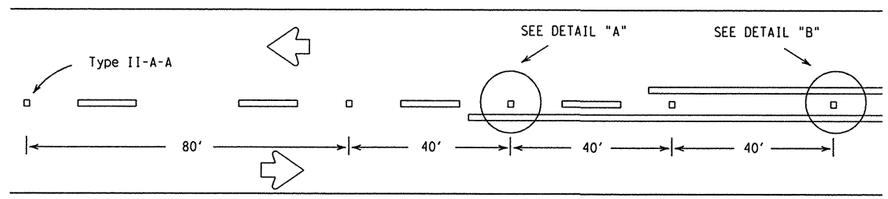
©TxDOT November 1978	DN: BAS	CK: GRB	DW: FDN	CK: CAL	MEG NO.:
REVISIONS 8-95, 5-00, 8-00, 3-03	STATE DISTRICT: DALLAS	FEDERAL REGION: 6	FEDERAL AID PROJECT: (SEE TITLE SHEET)		SHEET: 361
COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 039	HIGHWAY: FM 740	

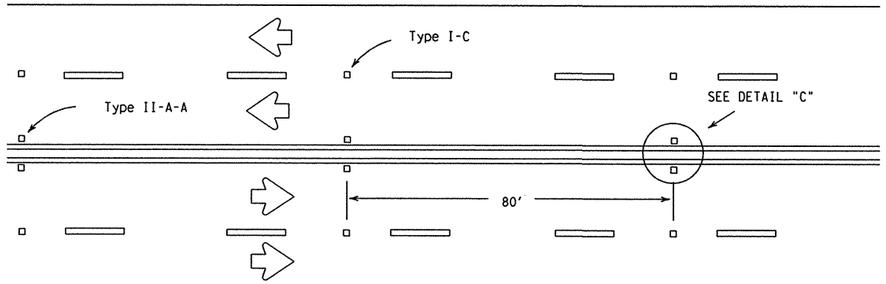
22A

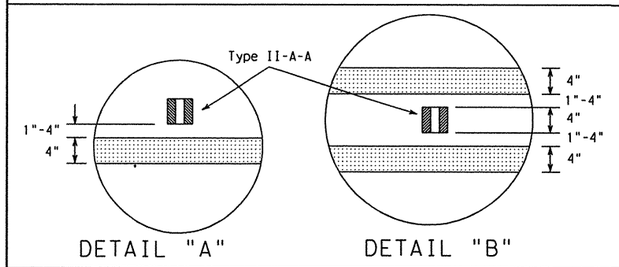
LEVELS DISPLAYED

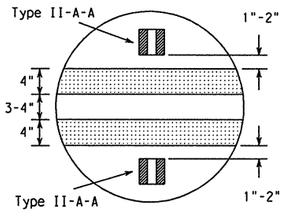
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

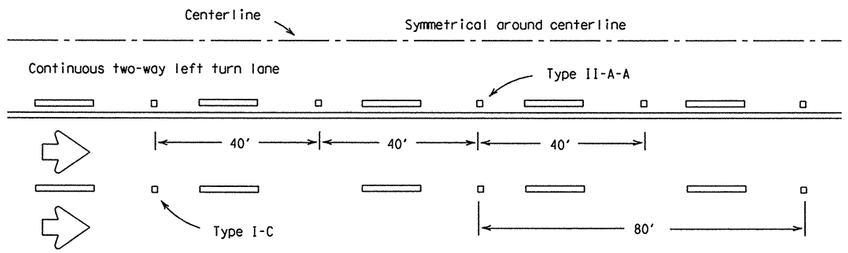
ACC:

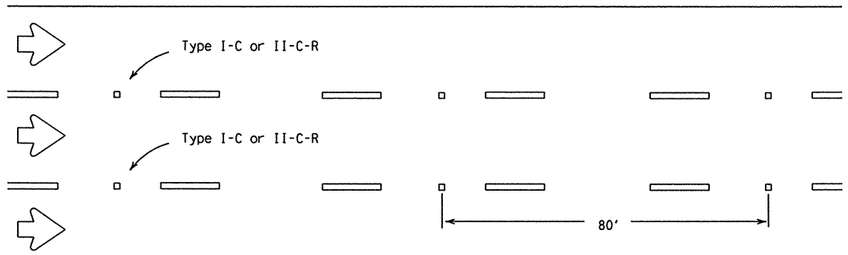


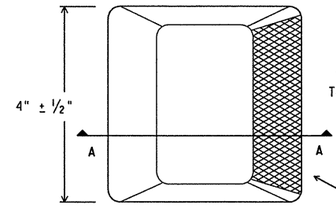


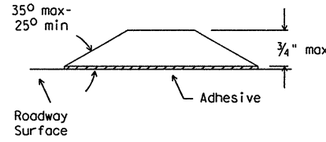


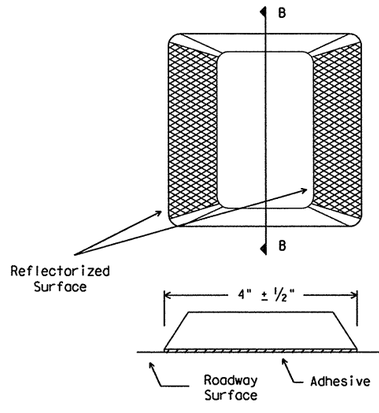


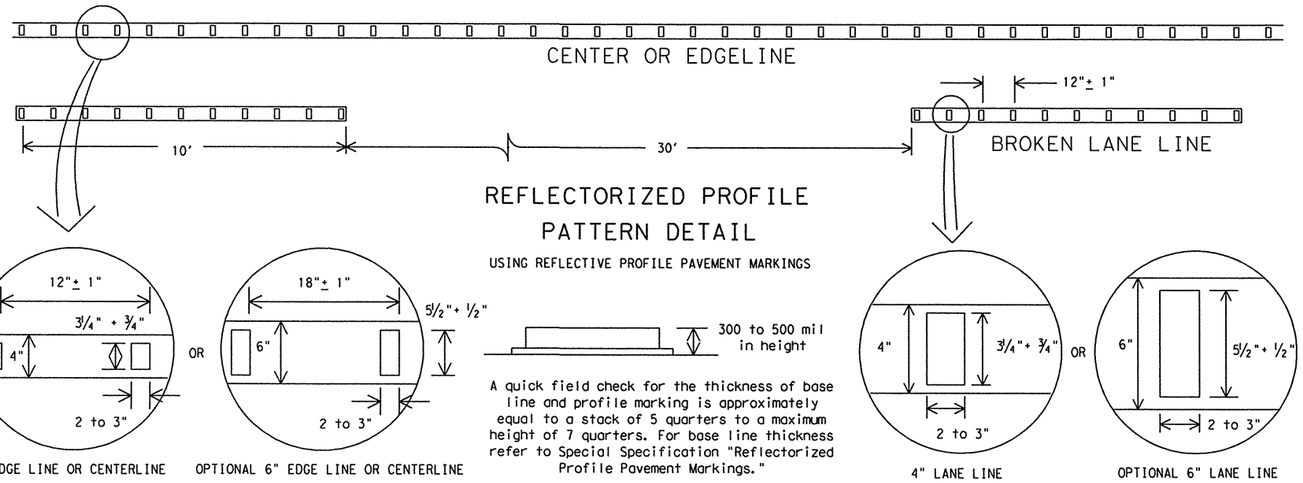












REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

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.

DETAIL "A"

DETAIL "B"

DETAIL "C"

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.

RAISED PAVEMENT MARKERS

(REFLECTORIZED)

SECTION A

SECTION B

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. For base line thickness refer to Special Specification "Reflectorized Profile Pavement Markings."

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.

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

SPECIFICATION REFERENCE TABLE

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECT.)	DMS-4200
EPOXY	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS

PM(2)-08

©TxDOT April 1977	DN:- BAS	CK:- GRB	DW:- FDN	CK:- CAL

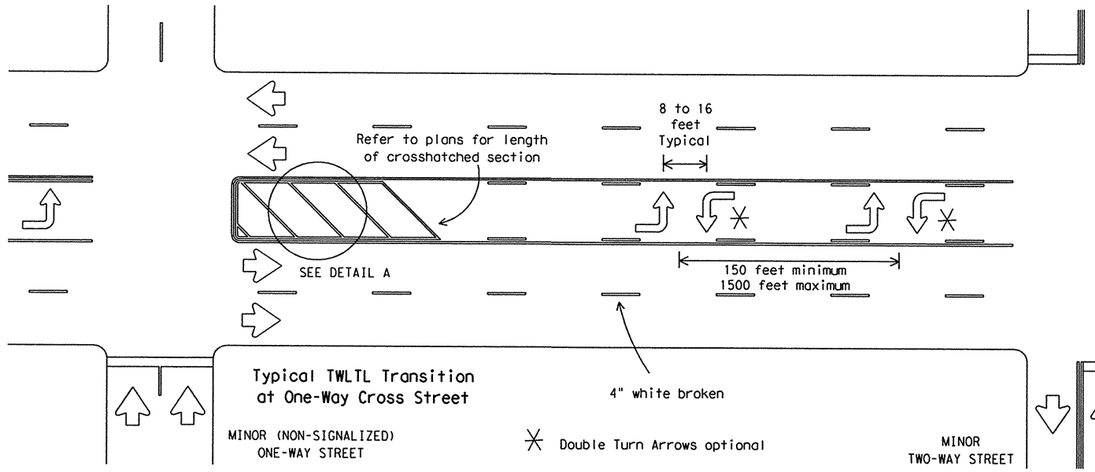
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
4-92 5-00 8-00 2-08	DALLAS	6	(SEE TITLE SHEET)			362
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

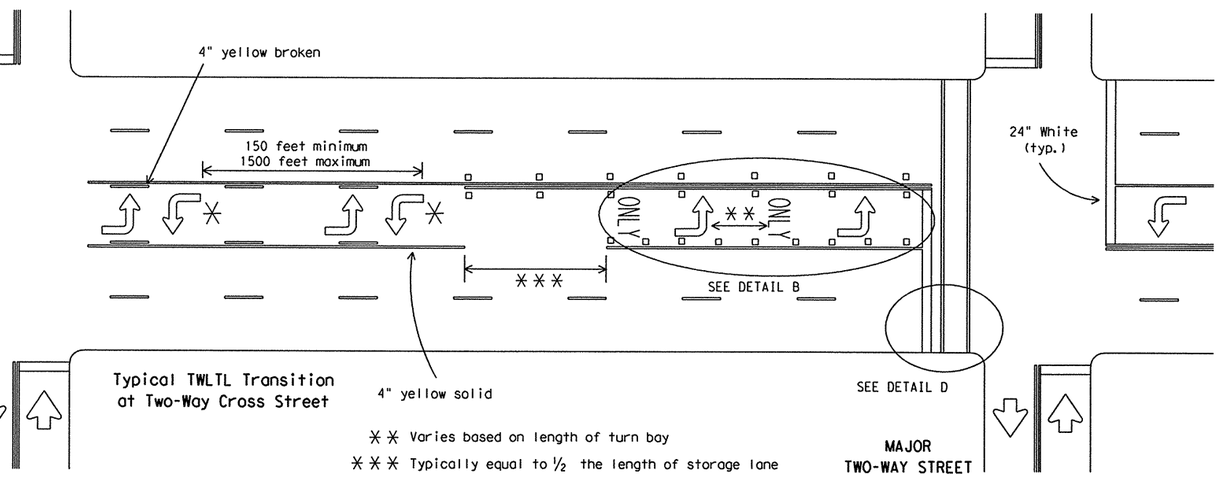
22B

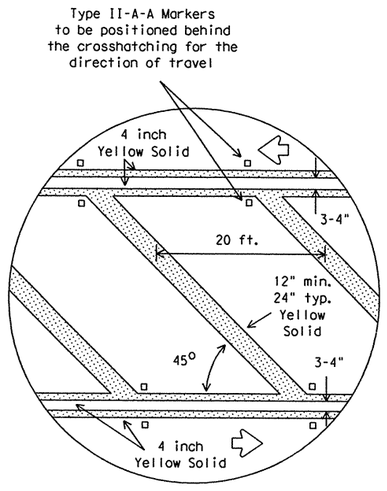
ACC:

LEVELS DISPLAYED

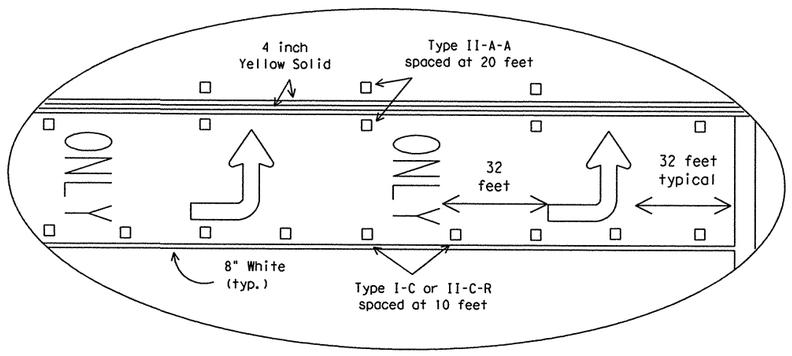
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	[illegible]	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	



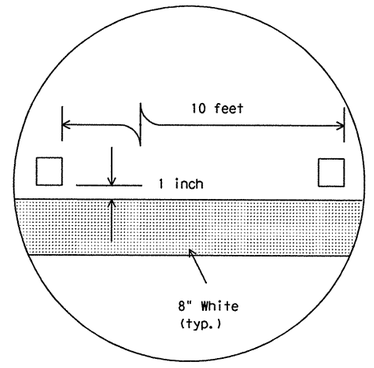




DETAIL A

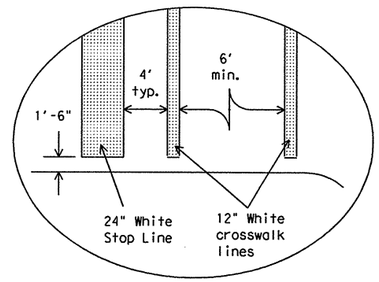


DETAIL B



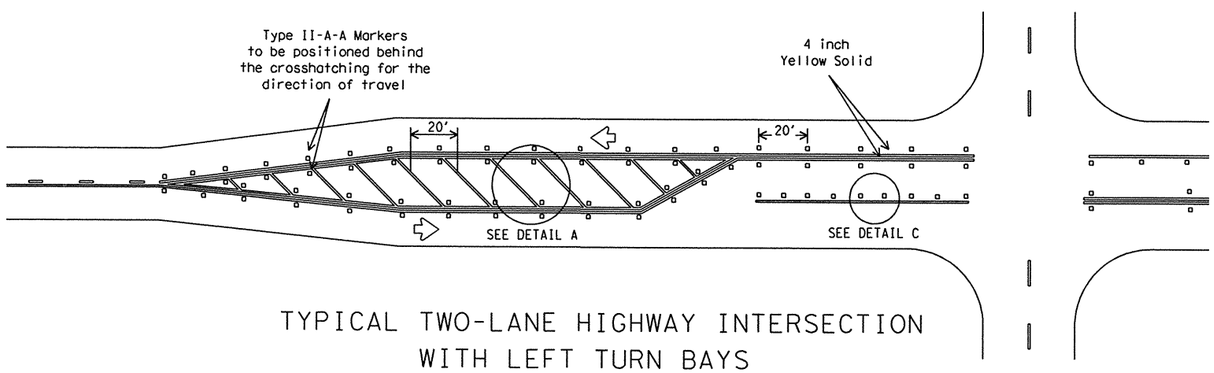
DETAIL C

Raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Raised pavement marker Type II-C-R with divided highways and raised medians.

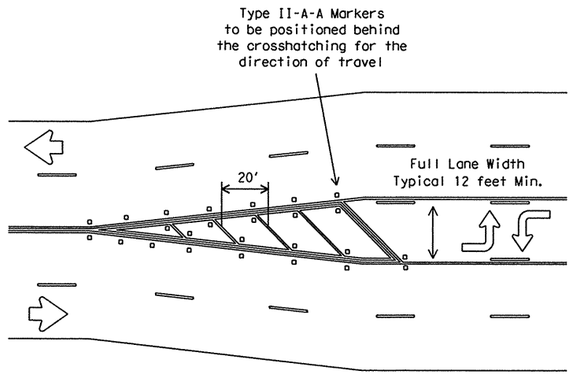


DETAIL D

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



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

Refer elsewhere in plans for additional RPM placement and details.

Details for words and arrows as shown on other sheets.

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

For a left turn bay, two sets of words and arrows shall be used if the length of the bay is equal to or greater than 180 feet. The bottom of the first ONLY shall be placed at the beginning of the turn bay lane line as shown above.

Other crosswalk paterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.

SPECIFICATION REFERENCE TABLE

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECT.)	DMS-4200
EPOXY	DMS-6100
BITUMINOUS ADHESIVE FOR PAVE. MKS.	DMS-6130

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

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

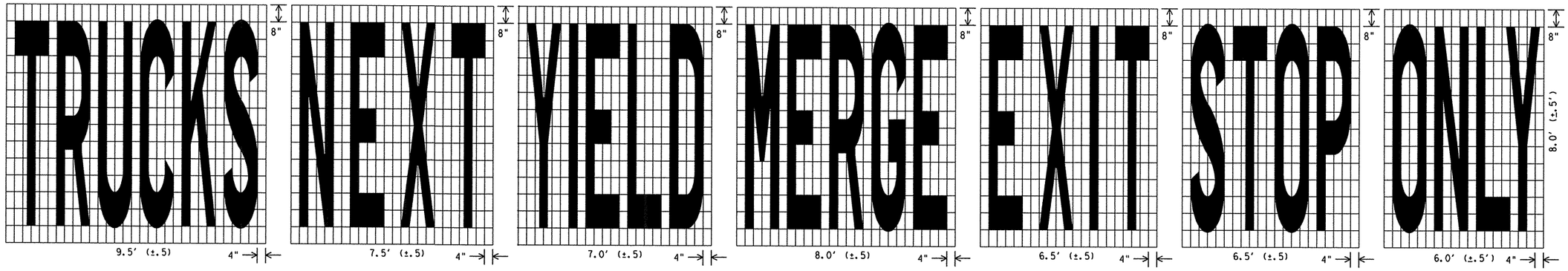
PM(4)-03

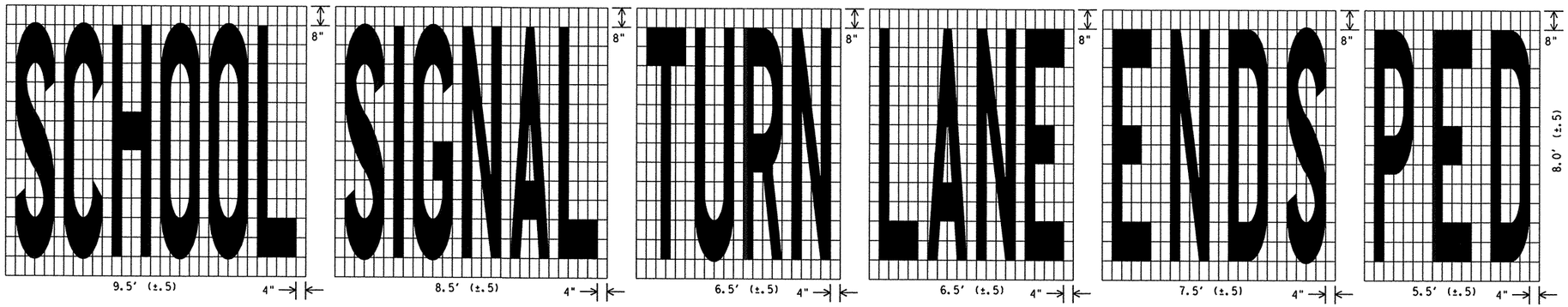
DN: BAS	CK: GRB	DW: FDN	CK: CAL	MEG NO.:

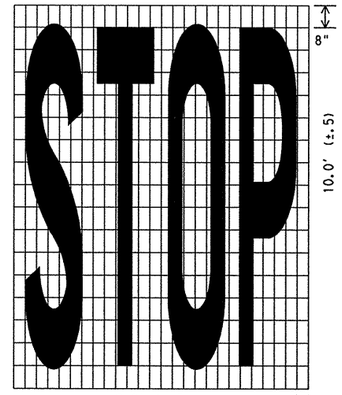
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
5-00	DALLAS	6	(SEE TITLE SHEET)	363
8-00	COUNTY		CONTROL / SECTION / JOB	HIGHWAY
3-03	ROCKWALL		1014 / 03 / 039	FM 740

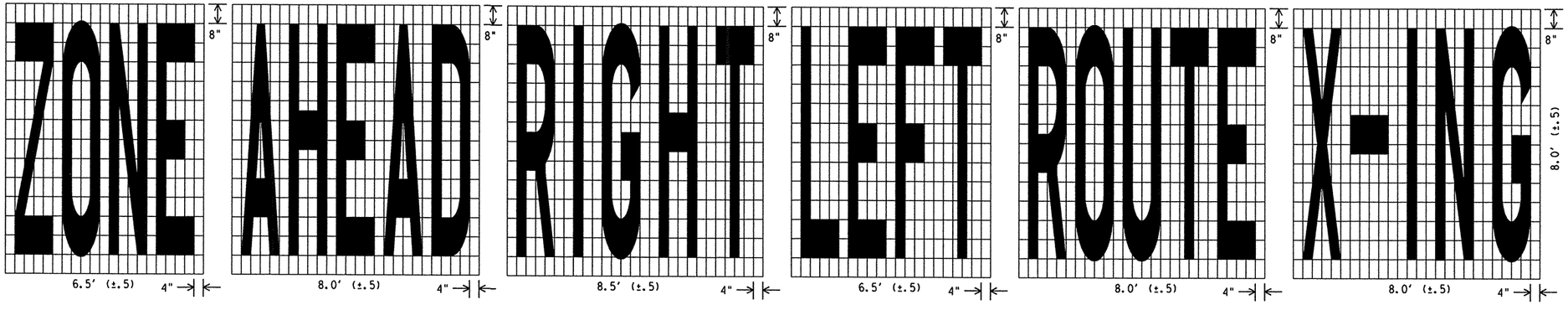
LEVELS DISPLAYED / ACC:

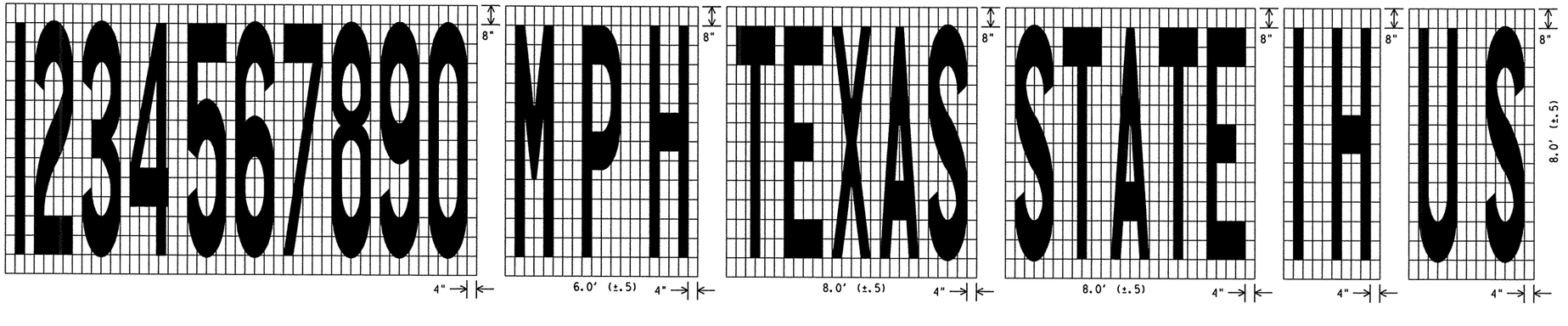
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		











LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	31	41	51	61
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	16	26	3	

ACC:

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

STANDARD PAVEMENT MARKINGS (WORDS)

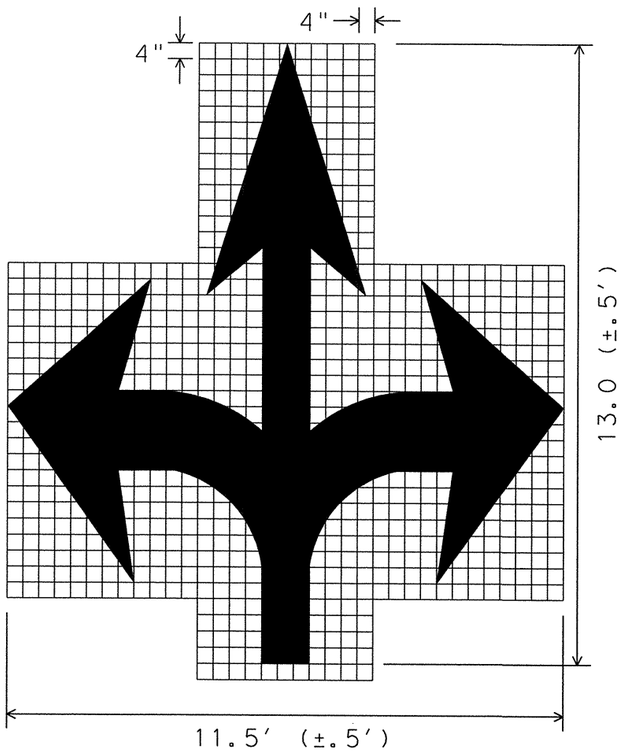
PM(5)-01

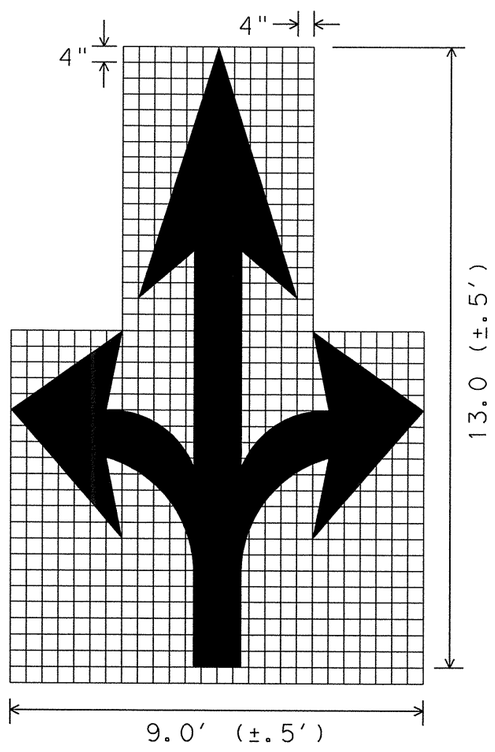
DN: -	CK: - GRB	DW: - FDN	CK: - CAL

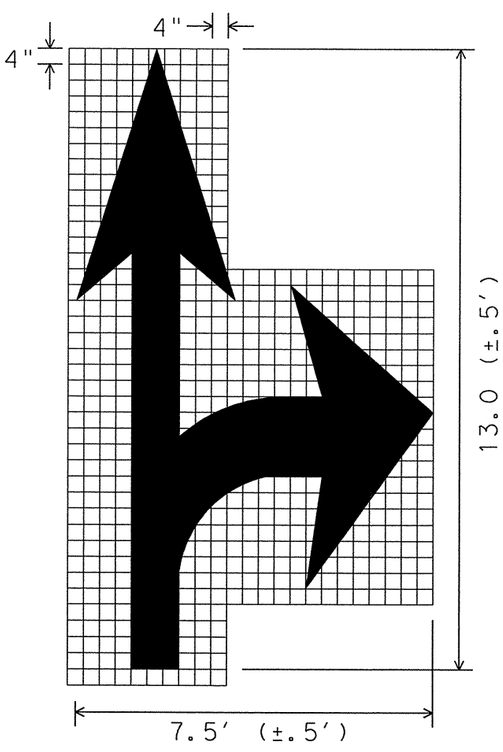
REVISIONS

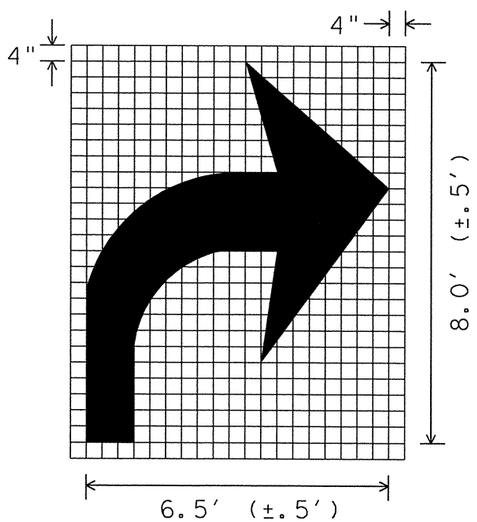
STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DALLAS	6	(SEE TITLE SHEET)	364

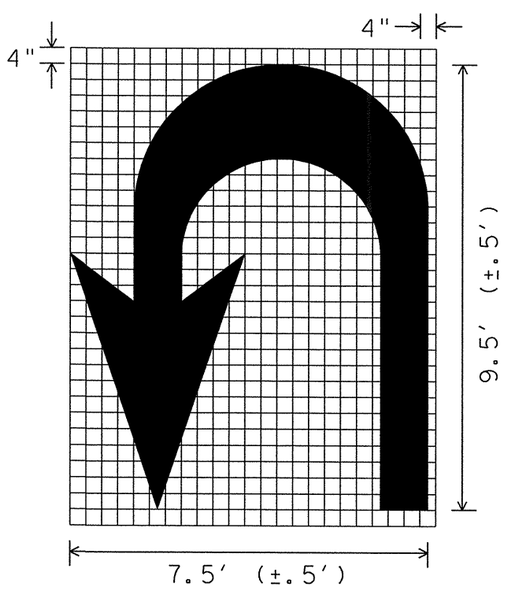
COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

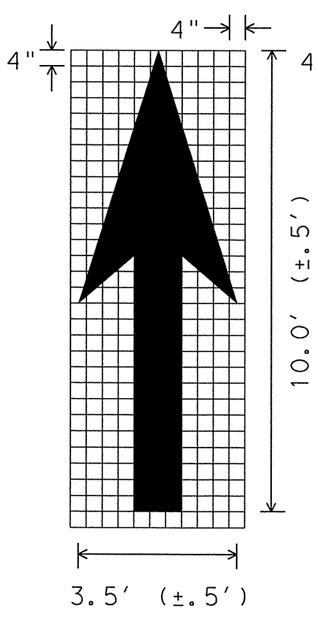


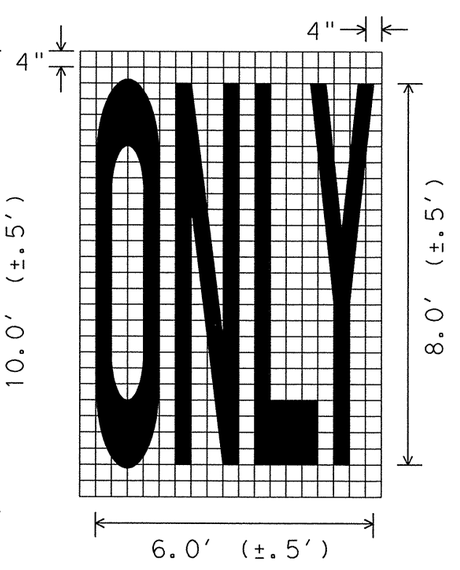












GENERAL NOTES;

1. Minimum 8 foot white markings should be used, unless otherwise noted. If message consists of more than one word, it should be placed with first word nearest the driver.
2. These details are standard size for normal installation; sizes may be reduced approximately one-third for low speed urban conditions; larger sizes may be needed for freeways, above average speed conditions or other critical locations.
3. The longitudinal space between markings should be at least four times the height of the markings, on low speed roads, but should not exceed ten times the height under any condition.
4. Markings considered appropriate for use when warranted include the following:
   A. Regulatory
      STOP
      RIGHT (LEFT) TURN ONLY
      25 MPH
      SYMBOL ARROWS
   B. Warning
      STOP AHEAD
      SIGNAL AHEAD
      SCHOOL
      SCHOOL X-ING
      PED X-ING
      R X R (see RCPM standard)
   C. Guide
      US XXX
      ROUTE XXX
      STATE XXX
      Other words or symbols may be necessary under certain conditions
5. Uncontrolled use of pavement markings can result in driver confusion. Word and symbol markings should be no more than three lines.
6. The word "STOP" shall not be used on the pavement unless accompanied by a Stop line and Stop sign. The word "STOP" shall not be placed on the pavement in advance to a stop line, unless every vehicle is required to stop at all times.
7. Pavement markings should generally be no more than one lane in width, with School messages being the exception. For details of School and School crossing pavement markings, refer to Part VII of the "Texas Manual on Uniform Traffic Control Devices".
8. Spacing between letters should be approximately 4 inches. The width of letters may vary depending on the width of the travel lanes.
9. Lane-Use arrow markings may be used to convey either guidance or mandatory messages. Arrows used to convey a mandatory movement must be accompanied by standard signs and the pavement marking word "ONLY".
10. Pavement markings are to be located as specified elsewhere in the plans.

SPACING BETWEEN LINES OF PAVEMENT MARKINGS	
MPH	SPACING
≤ 45	MINIMUM 4 TIMES THE LETTER HEIGHT
> 45	MINIMUM - 4 TIMES THE LETTER HEIGHT MAXIMUM - 10 TIMES THE LETTER HEIGHT

LEVELS DISPLAYED ACC:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

STANDARD PAVEMENT MARKINGS (ARROWS)

PM(6)-01

DN: -	CK: GRB	DW: FDN	CK: CAL

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	DALLAS	6	(SEE TITLE SHEET)	365

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

REQUIREMENTS FOR REGULATORY SIGNS

TYPICAL EXAMPLES

DEPARTMENTAL MATERIAL SPECIFICATIONS

ALUMINUM SIGN BLANKS DMS-7110

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

SIGN FACE MATERIALS DMS-8300

USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE C SHEETING
LEGEND & BORDERS	WHITE	TYPE C SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM

GENERAL NOTES:

1. 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).
2. Regulatory sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to white background sheeting, or combination thereof.
5. 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.
6. 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.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

DEPARTMENTAL MATERIAL SPECIFICATIONS

ALUMINUM SIGN BLANKS DMS-7110

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

SIGN FACE MATERIALS DMS-8300

USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE C SHEETING
BACKGROUND	FLOR. YEL. GRN.	TYPE E SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM

GENERAL NOTES:

1. 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).
2. School sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110.
6. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

REQUIREMENTS FOR WARNING SIGNS

TYPICAL EXAMPLES

DEPARTMENTAL MATERIAL SPECIFICATIONS

ALUMINUM SIGN BLANKS DMS-7110

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

SIGN FACE MATERIALS DMS-8300

USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	YELLOW	TYPE E SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE D SHEETING

GENERAL NOTES:

1. 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).
2. Warning sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod, or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to yellow background sheeting, or combination thereof.
5. Colored legend and symbols shall be applied by screening process with transparent colored ink, transparent colored overlay film, or colored sheeting to white sheeting, or combination thereof. The colored legend or symbol is then applied to the yellow background sheeting.
6. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110.
7. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/publications/traffic.htm

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TYPICAL SIGN REQUIREMENTS

TSR(4)-08

© TxDOT October 2003	DN: - TxDOT		CK: - TxDOT	DW: - TxDOT		CK: - TxDOT
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
12-03 9-08	DALLAS	6	(SEE TITLE SHEET)			366
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

4

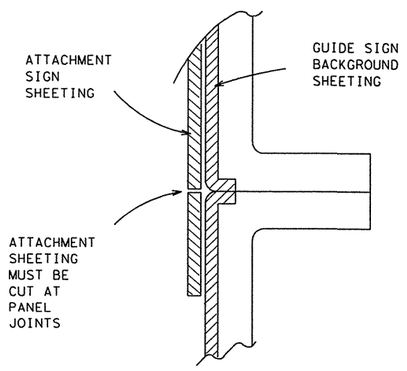
LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

ACC:

MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)

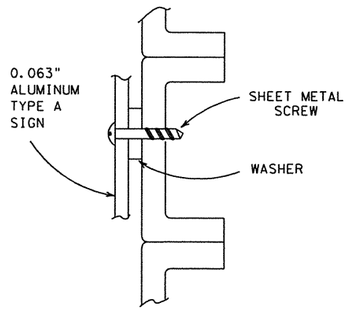
DIRECT APPLIED ATTACHMENT



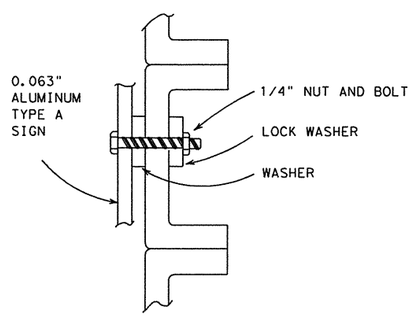
Sheeting for legend, symbols, and borders must be cut at panel joints.

Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

SCREW ATTACHMENT

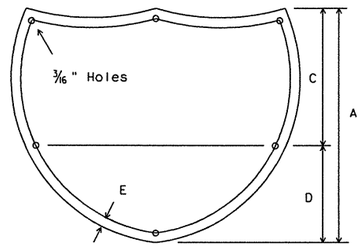


NUT/BOLT ATTACHMENT



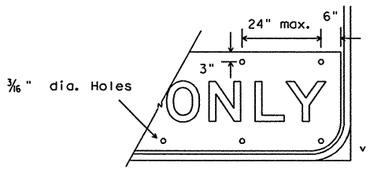
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

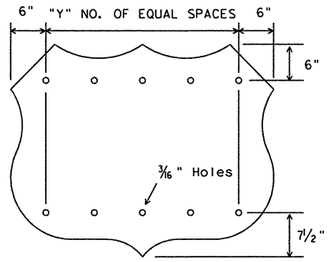


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

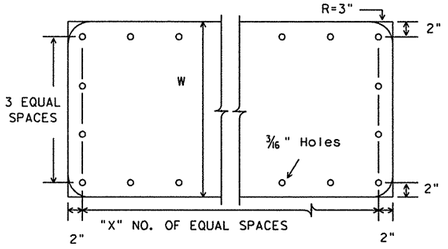


EXIT ONLY PANEL



U.S. ROUTE MARKERS

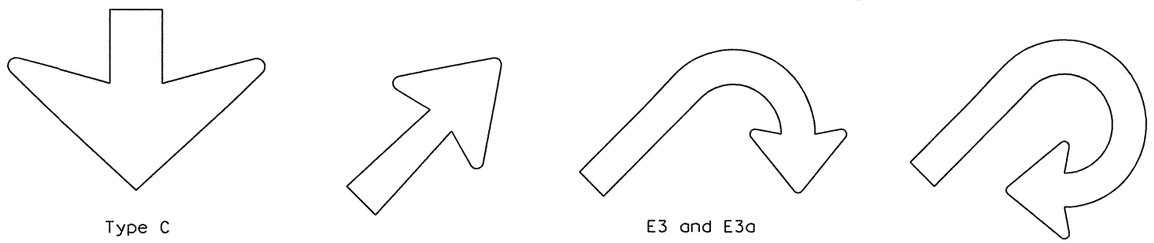
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

ARROW DETAILS for Large Ground-Mounted and Overhead Guide Signs



Type C "Down" arrow

E3 and E3a

E4 and E4a

TYPE	LETTER SIZE
A-1	10.67" U/L and 10" Caps
A-2	13.33" U/L and 12" Caps
A-3	16" U/L
B-1	10.67" U/L and 10" Caps
B-2	13.33" U/L and 12" Caps
B-3	16" U/L

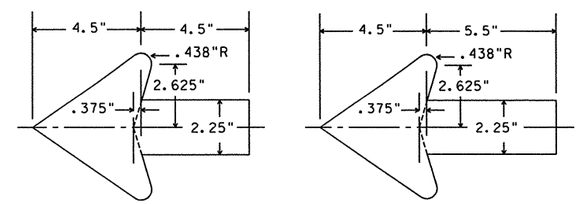
CODE	USED ON SIGN NO.
E-3 & E-4	E5-3 and E5-4
E-3a & E-4a	E5-3a and E5-4a

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/publications/traffic.htm

ARROW DETAILS for Destination Signs



Standard arrow to be used with 6 inch letters.

Standard arrow to be used with 8 inch letters.

LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

ACC:

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TYPICAL SIGN REQUIREMENTS

TSR(5)-08

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

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
12-03	DALLAS	6	(SEE TITLE SHEET)	367
9-08				

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

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LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

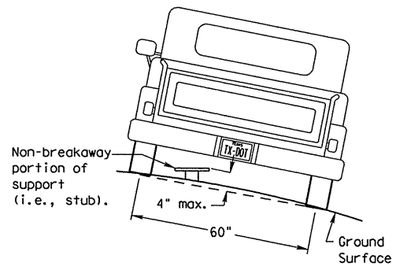
Anchor Type

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

Sign Mounting Designation

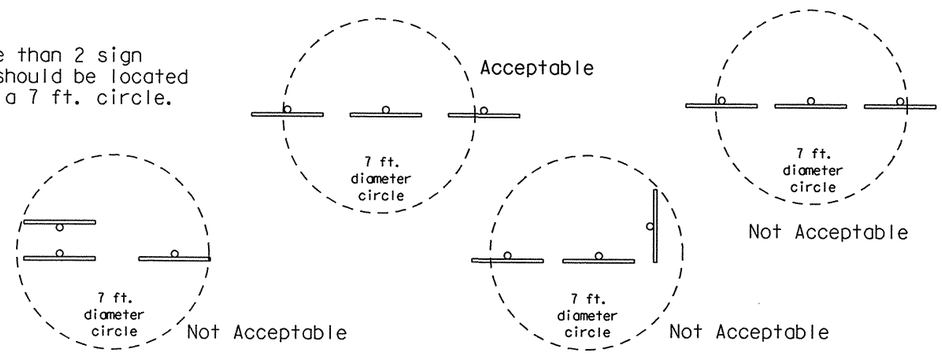
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))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

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



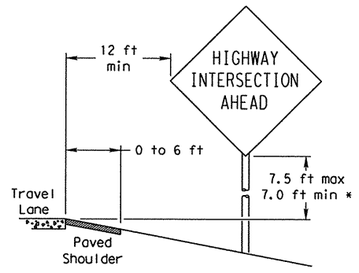
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

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



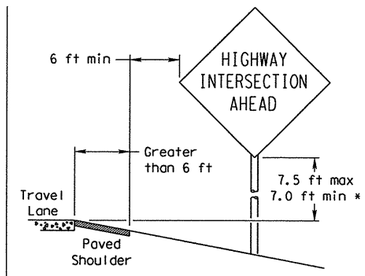
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

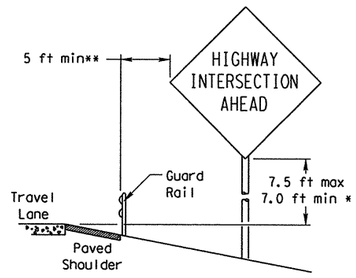
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



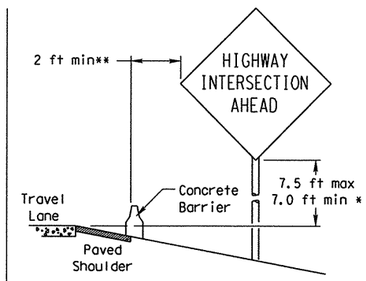
GREATER THAN 6 FT. WIDE

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

BEHIND BARRIER



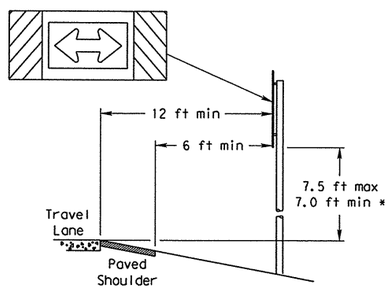
BEHIND GUARDRAIL



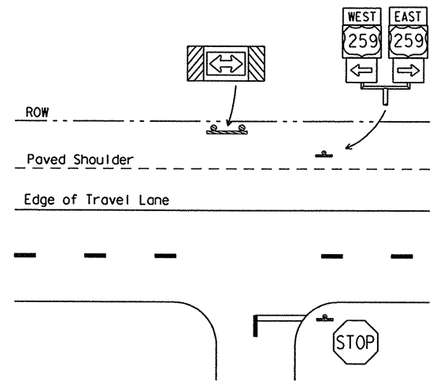
BEHIND CONCRETE BARRIER

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

T-INTERSECTION



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



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

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

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

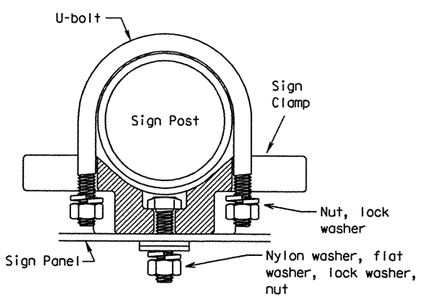
The maximum values may be increased when directed by the Engineer.

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

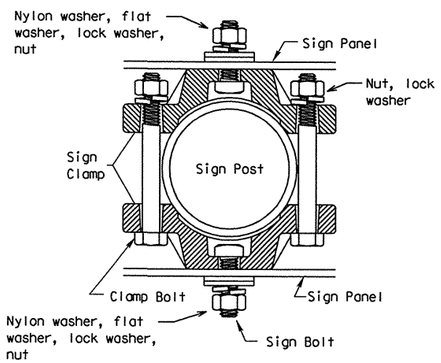
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



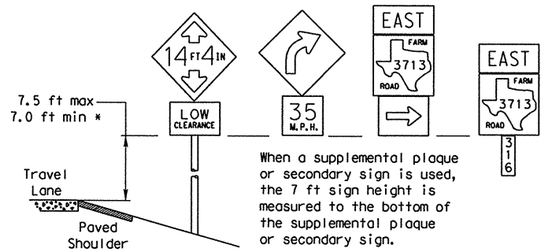
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

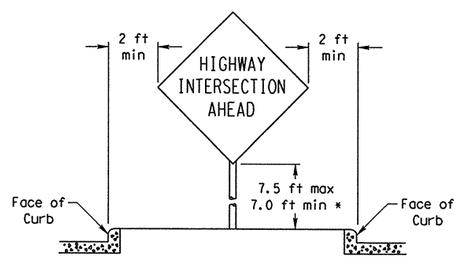
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



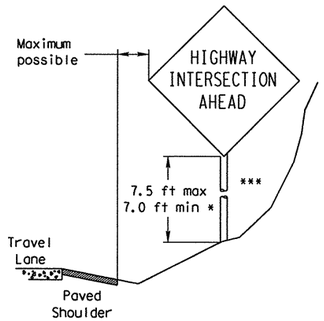
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



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

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

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

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

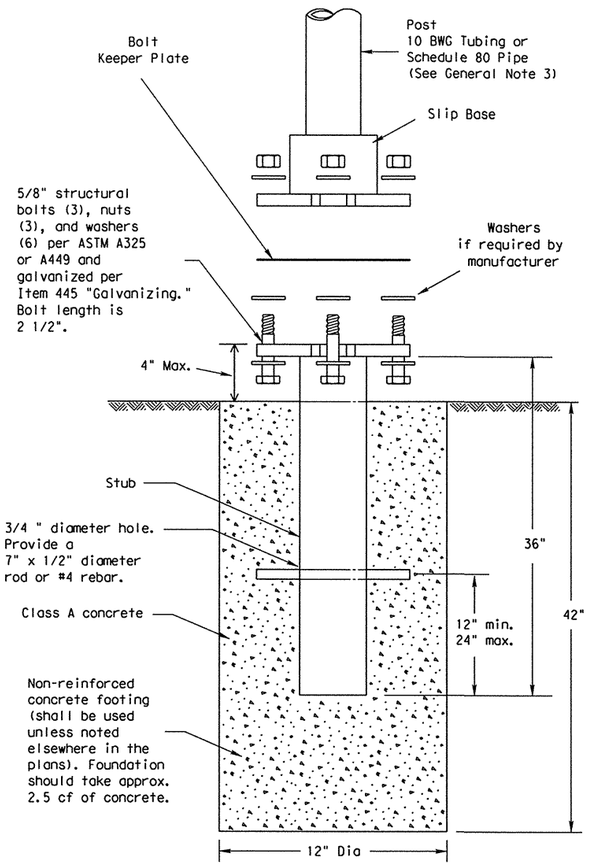
SMD(GEN)-08

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

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
9-08	DALLAS	6	(SEE TITLE SHEET)	368

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

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

GENERAL NOTES:

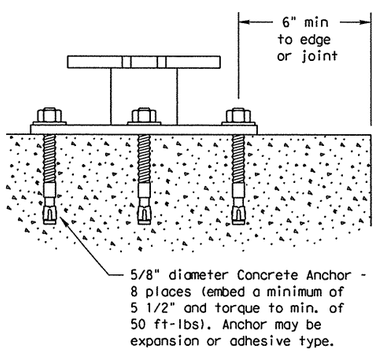
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)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

ASSEMBLY PROCEDURE

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

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

CONCRETE ANCHOR



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

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

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

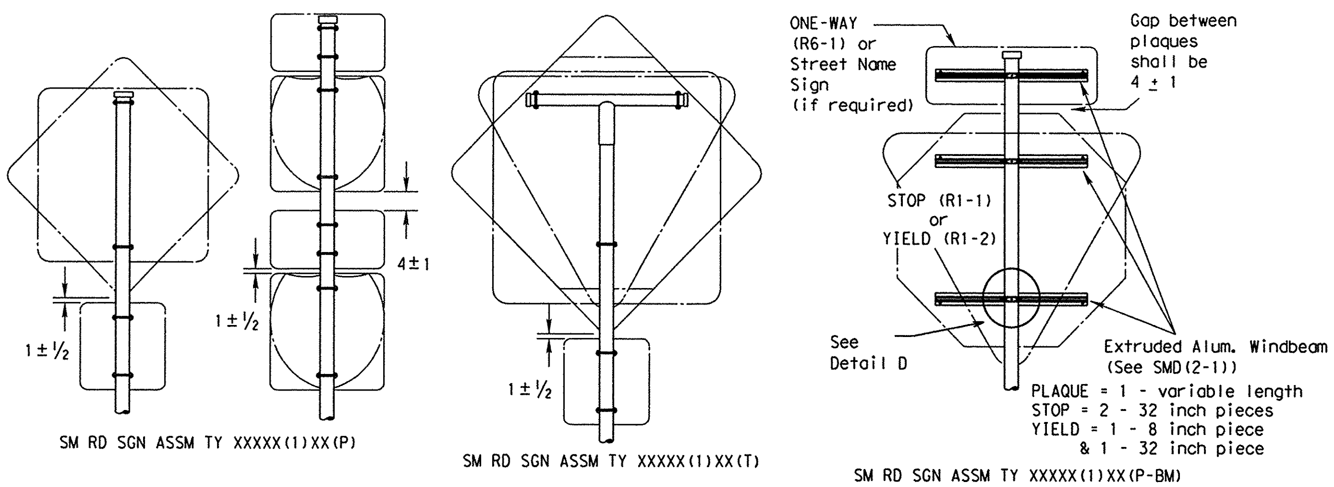
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

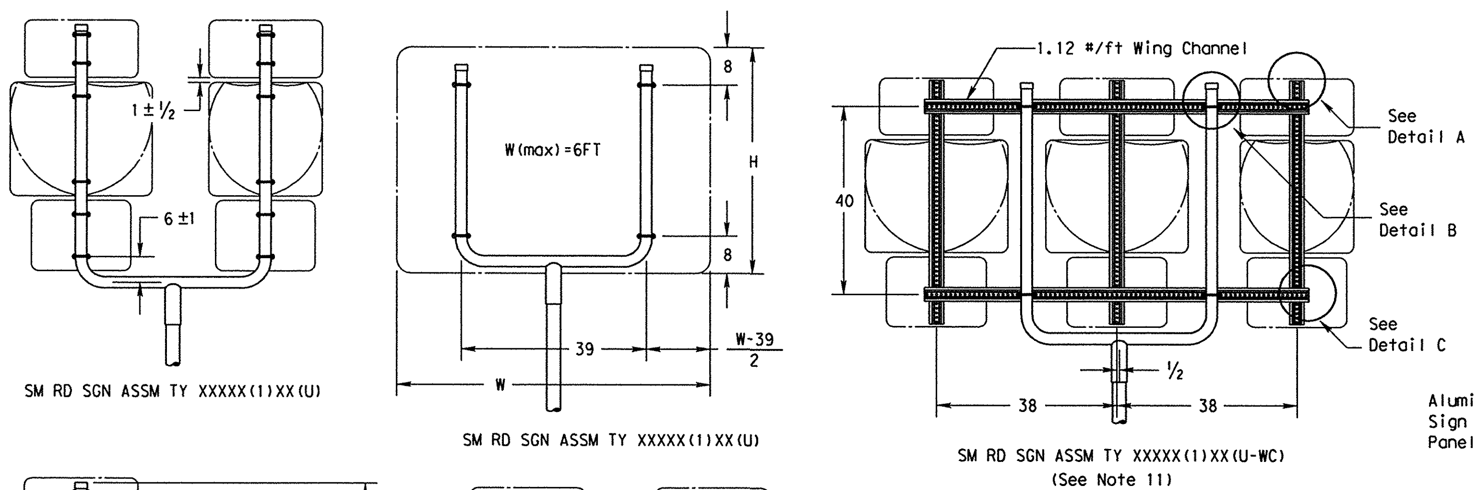
SMD(SLIP-1)-08

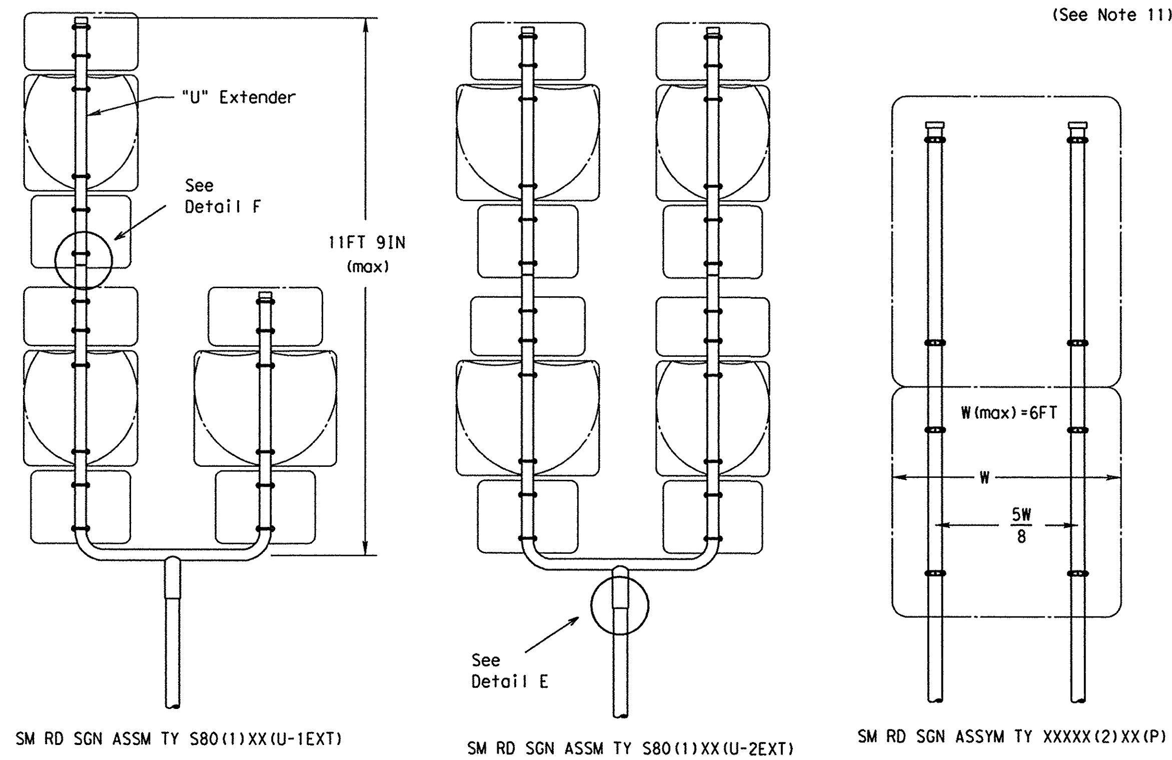
DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

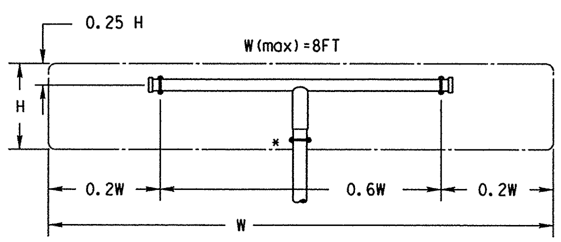
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
9-08	DALLAS	6	(SEE TITLE SHEET)	369

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740



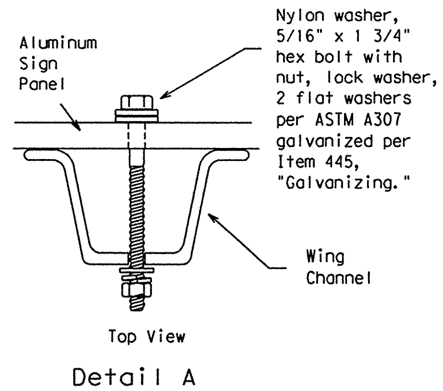


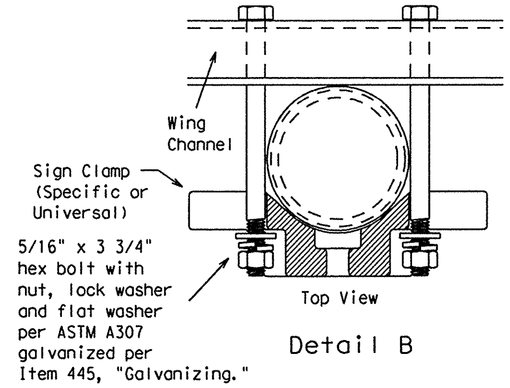


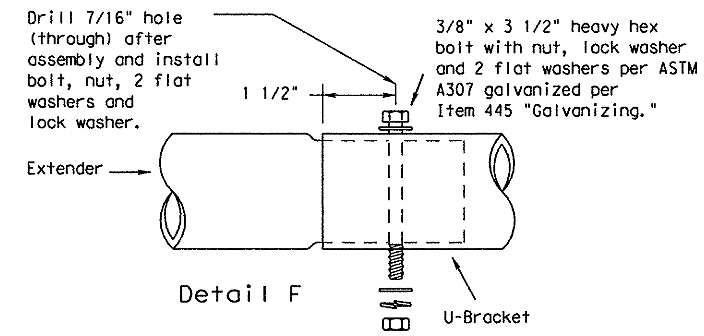


All dimensions are in english unless detailed otherwise.

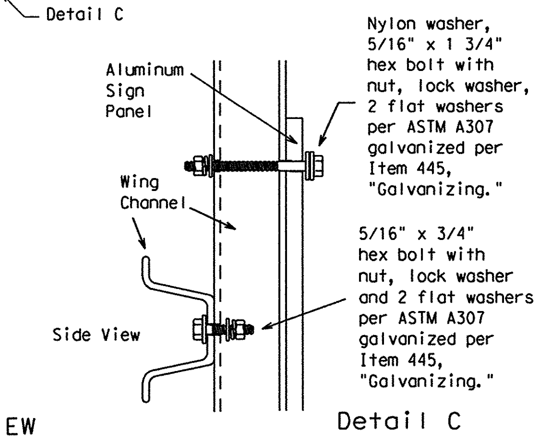
SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

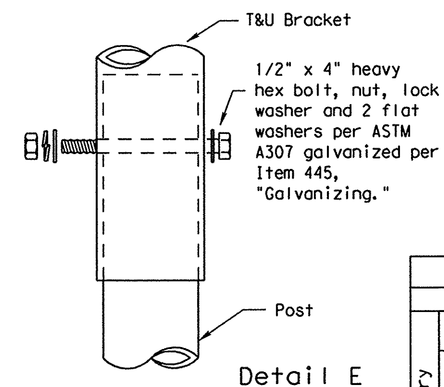


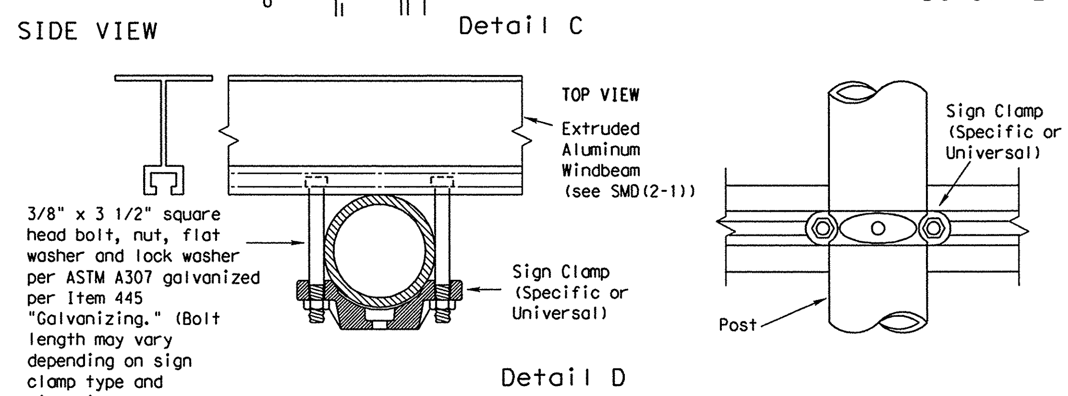




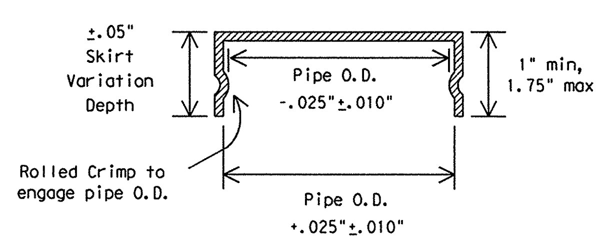
Splices shall only be allowed behind the sign substrate.







FRICTION CAP DETAIL



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

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

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

GENERAL NOTES:

1.

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

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

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
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)

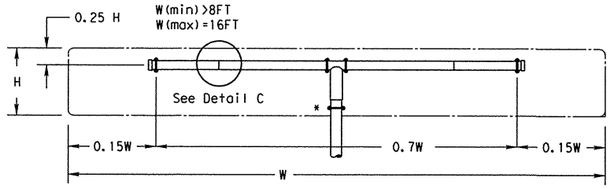
STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

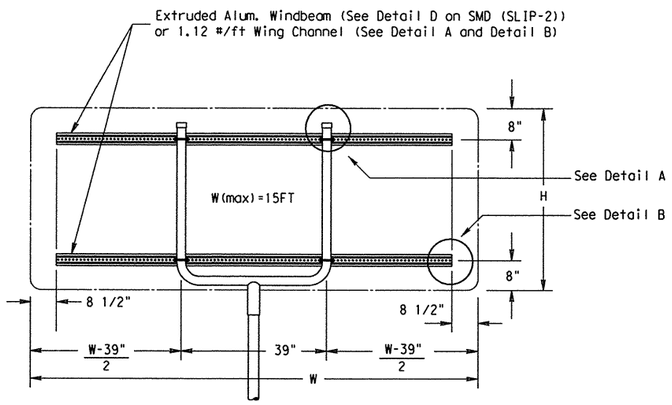
SMD(SLIP-2)-08

©TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS 9-08	STATE DISTRICT: DALLAS	FEDERAL REGION: 6	FEDERAL AID PROJECT: (SEE TITLE SHEET)	SHEET: 370
COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 039	HIGHWAY: FM 740

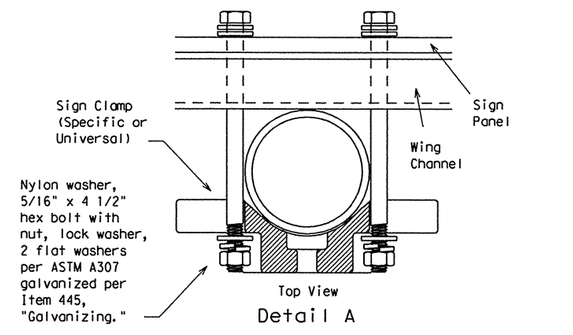
26C



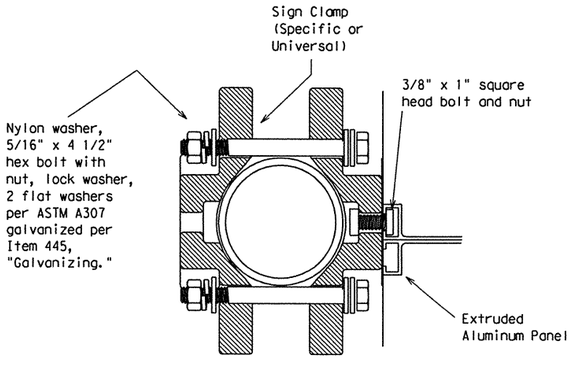
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



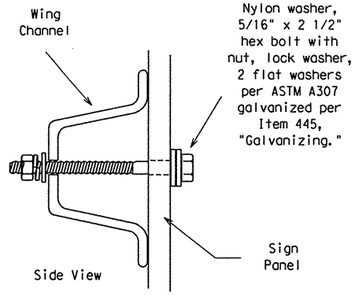
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



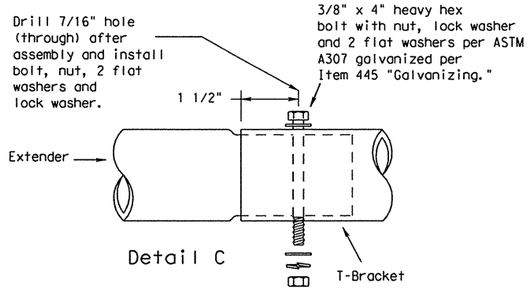
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

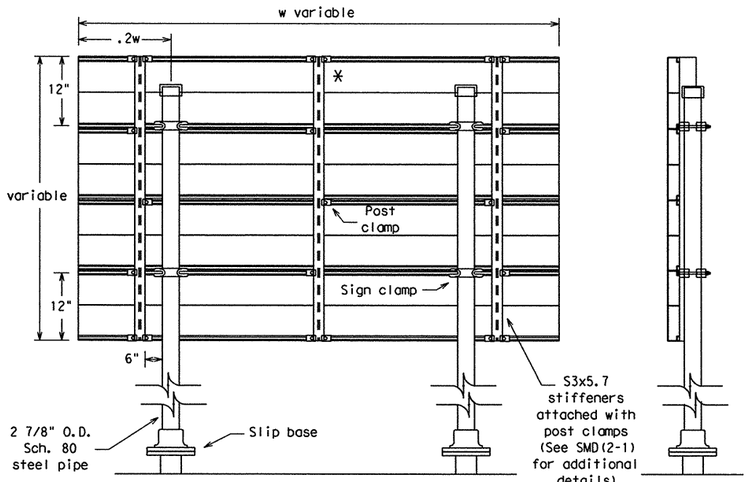


Detail B

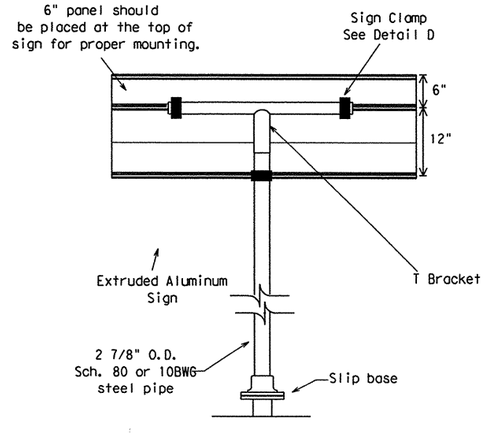


Detail C

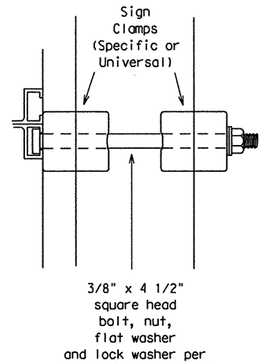
Splices shall only be allowed behind the sign substrate.



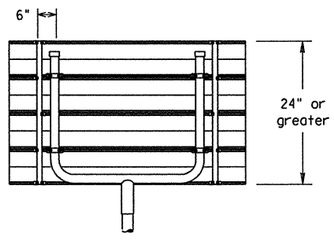
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



Extruded Aluminum Sign
With T Bracket



Detail E



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

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

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

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 31 41 51 61
71 81 91 92 02 12 22 32 42 52 62 72 82 93 03 13 23
33 43 53 63 73 83 94 04 14 24 34 44 54 64 74 84 94
95 05 15 25 35 45 55 65 75 85 96 06 16 26 36

ACC:

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

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

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
9-08	DALLAS	6	(SEE TITLE SHEET)	371

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	039	FM 740

During the planning phase of project development the following environmental permits, issues and commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities, as additional environmental clearances may be required.

I. Clean Water Act, Section 402 Texas Pollutant Discharge Elimination System

(Addresses MS4 requirements for project)

☐ No Action Required ☒ Required Action

Action No.	Waters of the US/Station • R/L of Centerline	Commitment
1. Project disturbs more than 5 acres surface area: TxDOT must file NOI and coordinate with TCEQ for CGP.		Comply with TPDES CGP. Contractor must implement and maintain a SW3P. See SW3P Plan Sheet, BMPs, and detail.
2. TxDOT must file NOT.		Contractor must stabilize project site as stated in SW3P.

II. Clean Water Act, Section 401 and 404 Compliance

Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet area is prohibited unless specified in the USACE permit and approved by the Engineer.

When temporary fill is implemented, only stated District standards will be used unless written authorization for an alternative is obtained from the Engineer. No equipment is allowed in any stream channel below the Ordinary High Water Mark except on temporary stream crossings or drill pads.

☐ No Permit Required ☒ 404 Permit and 401 Certification Required

Permit	Required Action	Waters of the US	Applicable Plan Sheet Number
NWP 12	Comply with conditions of the permit. (USACE coordination not required).	The NWP 12 is owing to the outfall from the stormwater drain that goes into Lake Ray Hubbard.	

Best Management Practices for applicable 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

- ☐ Temporary Vegetation
- ☐ Mulch
- ☐ Interceptor Swale
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Blankets, Matting
- ☒ Sod
- ☐ Diversion Dike
- ☒ Mulch Filter Berms and Socks
- ☐ Compost Blankets

Category II (Sedimentation Control)

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

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

- ☐ Retention/Irrigation
- ☐ Extended Detention Basin
- ☒ Vegetative Filter Strips
- ☒ Grassy Swales
- ☐ Erosion Control Compost
- ☐ Compost Filter Berms and Socks
- ☐ Constructed Wetlands
- ☐ Wet Basins
- ☒ Vegetation-Lined Ditches
- ☐ Sand Filter Systems
- ☐ Inlet Sediment Traps
- ☐ Sedimentation Chambers

III. Cultural Resources

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.	Station • R/L of Centerline	Commitment

IV. Vegetation Resources

☒ No Action Required ☐ Required Action

Action No.	Station • R/L of Centerline	Commitment

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds Treaty Act (MBTA)

☒ No Action Required ☐ Required Action

Species Potentially within Project Area w/ Description	Habitat Description

Special Notes

Action

VI. Hazardous Materials or Contamination Issues

Comply with the Hazardous Communication Act for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of the 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 labeling 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, canisters, barrels, etc.
- Undesirable smells/odors
- Underground storage tanks
- Evidence of leaching or seepage of substances
- Any other evidence indicating possible hazardous materials or contamination discovered on-site

.....

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

☐ Yes ☒ No

If "No", then no further action required.
If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.

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

☐ Yes ☐ No

If "Yes", then TxDOT must retain a Texas Department of State Health Services (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 abatement activities and/or 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.

VII. Other Environmental Issues

☒ No Action Required ☐ Required Action

Action No.	Station • R/L of Centerline	Commitment

List of Abbreviations

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

 Texas Department of Transportation
Dallas District (DAL)

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	STP ( ) MM		FM 740
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONTROL	SECTION	JOB	SHEET NO.
1014	03	039	372

Revised: February 16, 2009
Prepared by Nikki Loya of Civil Associates, Inc., on 4/08/09

Notes To Designer:
1. Do not alter Sheet Design or Font style, size, weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.
3. All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.

A. GENERAL SITE DATA

1. PROJECT LIMITS: *From FM 3097 to FM 1140.*

Project Coordiates: 32°53'28.84" N ; 96°28'17.44 E

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet*
- *Drainage Patterns: Drainage Area Maps (Sheets 223-228)*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections (Sheets 7-11)*
- *Location of Erosion and Sediment Controls: SW3P Site Maps (Sheets 374-380)*
- *Surface Waters and Discharge Locations: Drainage and Culvert Layouts (Sheets 229-254)*
- *Project Specific Locations: To be specified by the Project Field Office during construction and located in the Project SW3P File. Reference item #10 below.*

3. PROJECT DESCRIPTION:

For the construction of the widening of FM 740 to a 4 lane urban highway, grading, concrete paving, HMAC, embankment, drainage structures, retaining walls, noise walls, illumination, traffic signals signing, and pavement markings.

4. MAJOR SOIL DISTURBING ACTIVITIES:

Major soil disturbing activities may include but are not limited to: Right-of-way preparation, cut and/or fill to improve roadway profile, placement of road base, ditch grading, temporary detours, storm drainage installation, final grading and placement of topsoil.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

Existing soils on the project consist of brown, dark brown, tan and gray clay with some sand and trace of calcareous deposit.

6. TOTAL PROJECT AREA: *25.09* Acres

7. TOTAL AREA TO BE DISTURBED: *15.84* Acres (*63* %)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: *0.70*
AFTER CONSTRUCTION: *0.82*

9. NAME OF RECEIVING WATERS:

Discharge to storm sewer systems and ultimately to Lake Ray Hubbard

10. PROJECT SW3P FILE:

For projects disturbing one acre or more, TxDOT will maintain a SW3P file at the project field office which contains the following: Index Sheet, TCEQ N.O.I., TCEQ Signature Authority, TCEQ Fee Payment Form, TPDES Storm Water Program or Construction Site Notice, TPDES Permit Coverage Notice, SW3P Inspector Qualification Statements, Inspection and Maintenance Reports, Required Location Maps, Stored Materials List specifying associated control measures, and the Appendix, which contains the TPDES Construction General Permit Language and the Contractor's PSL Permits.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

T	TEMPORARY SEEDING	T/P	PRESERVATION OF NATURAL RESOURCES
___	MULCHING (Hay or Straw)	___	FLEXIBLE CHANNEL LINER
___	BUFFER ZONES	___	RIGID CHANNEL LINER
___	PLANTING	T/P	SOIL RETENTION BLANKET
___	SEEDING	P	COMPOST MANUFACTURED TOPSOIL
P	SODDING	___	OTHER:

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

T	SILT FENCES
T	EROSION CONTROL COMPOST LOGS
___	EROSION CONTROL COMPOST BERMS (Low Velocity)
T	ROCK FILTER DAMS
___	DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
___	DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
T	DIVERSION DIKE AND SWALE COMBINATIONS
___	PIPE SLOPE DRAINS
P	PAVED FLUMES
T	ROCK BEDDING AT CONSTRUCTION EXIT
___	TIMBER MATTING AT CONSTRUCTION EXIT
___	CHANNEL LINERS
___	SEDIMENT TRAPS
___	SEDIMENT BASINS
___	STORM INLET SEDIMENT TRAP
P	STONE OUTLET STRUCTURES
P	CURBS AND GUTTERS
P	STORM SEWERS
___	VELOCITY CONTROL DEVICES
	OTHER:

3. STORM WATER MANAGEMENT:

1. 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.

2. 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.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

1. Install controls down-slope of work area and initiate inspection and maintenance activities.

2. Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the engineer.

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 non-polluted ground water, spring water, foundation and/or footing drain water; and water used for dust control, pavement washing and vehicle washwater containing no detergents.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

Maintain all erosion and sediment controls in good working order. Perform any necessary repairs at the earliest date possible but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. Stabilize disturbed areas on which construction activities have ceased, temporarily or permanently, within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways have priority followed by devices protecting storm sewer inlets.

2. 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 and/or repair each BMP control device in accordance with the current Inspection and Maintenance Report and Item #1 above.

3. WASTE MATERIALS:

On a regular 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.

4. 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.

5. 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.

6. OFFSITE VEHICLE TRACKING:

On a regular basis, or as may be directed, dampen haul roads for dust control and stabilize construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be avilable on a weekly basis, or as may be directed, to remove sediment from paved roadways abutting or transversing the project site.

7. MANAGEMENT PRACTICES:

1. Construct disposal areas, stockpiles and haul roads 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.
2. Locate construction staging areas and vehicle maintenance areas in a manner to minimize the runoff of pollutants.
3. 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.
4. 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.

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
STORM WATER POLLUTION PREVENTION PLAN (SW3P)

STATE OF TEXAS
DAVID ALAN NUFER
68816
REGISTERED
PROFESSIONAL ENGINEER
4-15-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
ANU	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
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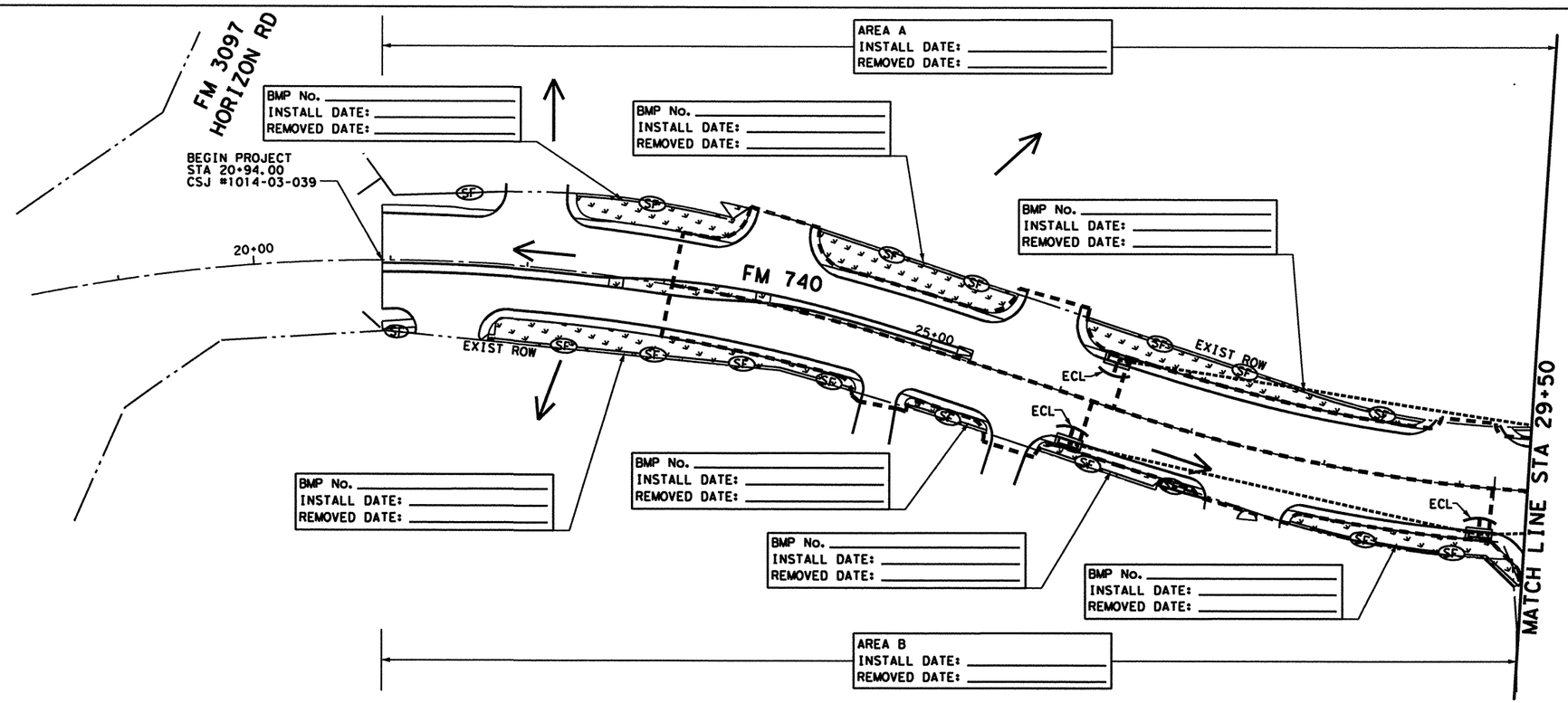
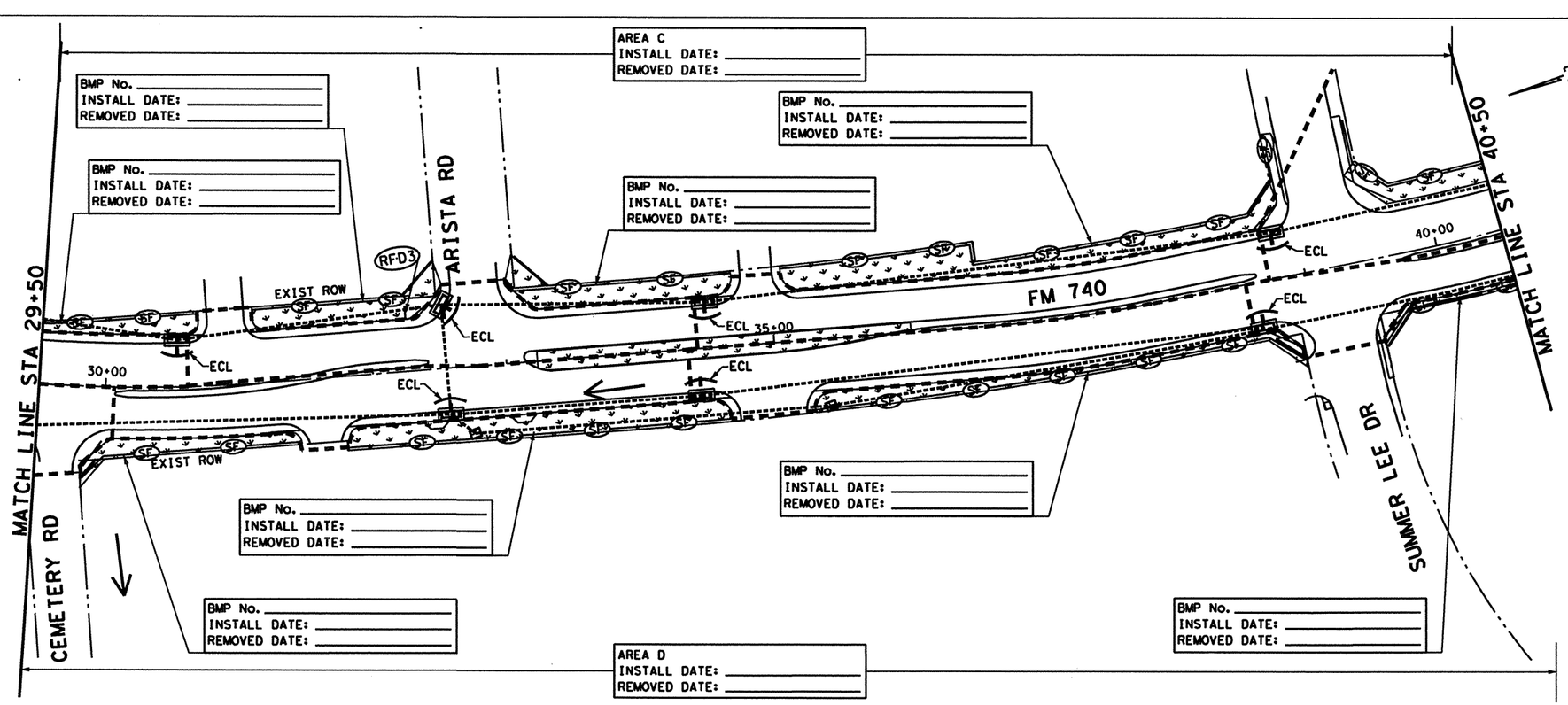
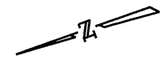
CHECK ANU	CONTROL	SECTION	JOB	
	1014	03	039	







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SCALE IN FEET

LEGEND

- SF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD3 — ROCK FILTER DAMS (INTALL) (TY 3)
- COMPOST MANUF TOPSOIL (PB) AND BLOCK SODDING
- 20' / 60' — CONSTRUCTION EXITS (TY1)
- DRAINAGE AREA BOUNDARY
- BIODGRD EROSION CONTROL LOGS (18" DIA)

NOTE:

1. SEDIMENT CONTROL FENCE SHOWN SHALL BE INSTALLED PRIOR TO BEGINNING OF CONSTRUCTION AT THESE LOCATIONS. IT SHALL REMAIN UNTIL THE CONSTRUCTION AND FINAL GRADING IS COMPLETE.

STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED PROFESSIONAL ENGINEER
S-21-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 1 OF 7

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK CVL	CONTROL 1014	SECTION 03	JOB 039	

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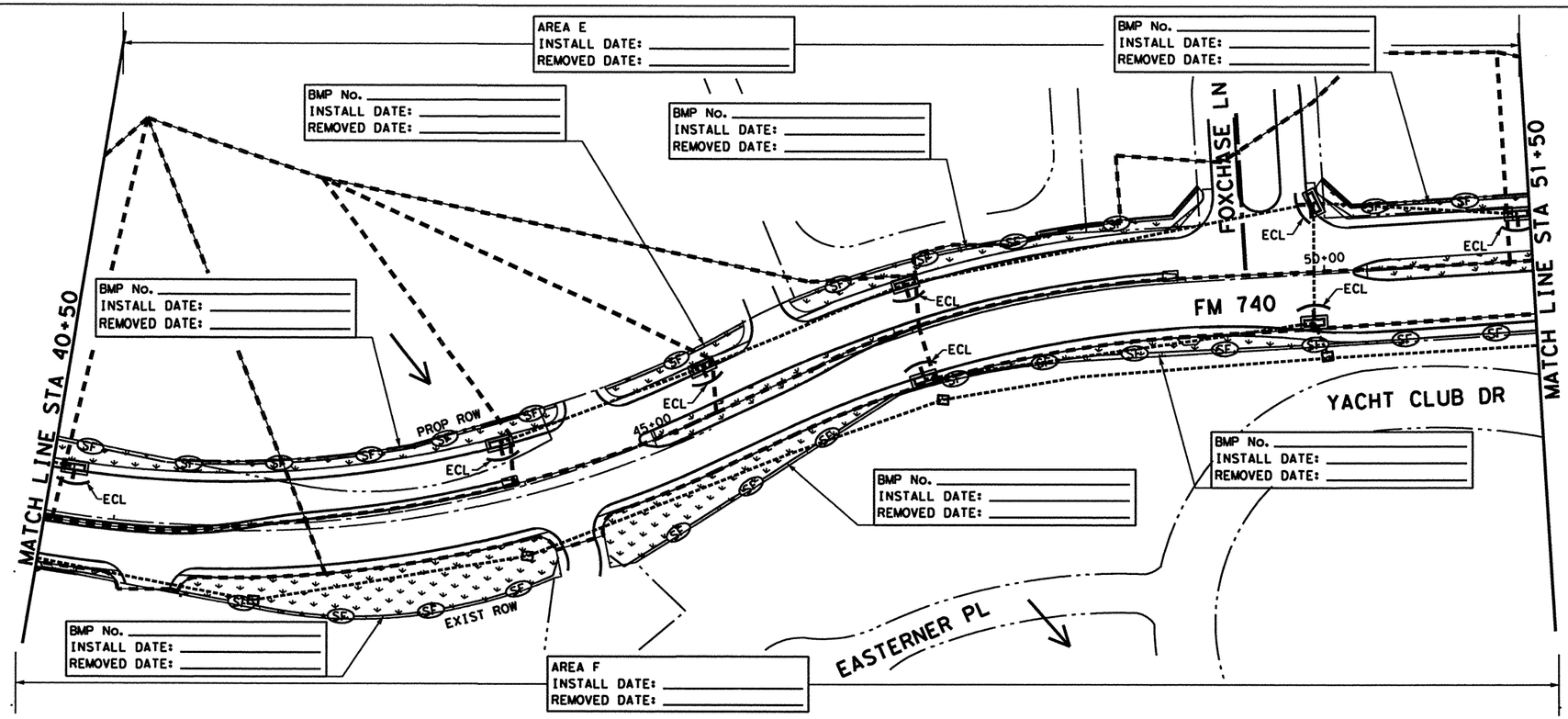

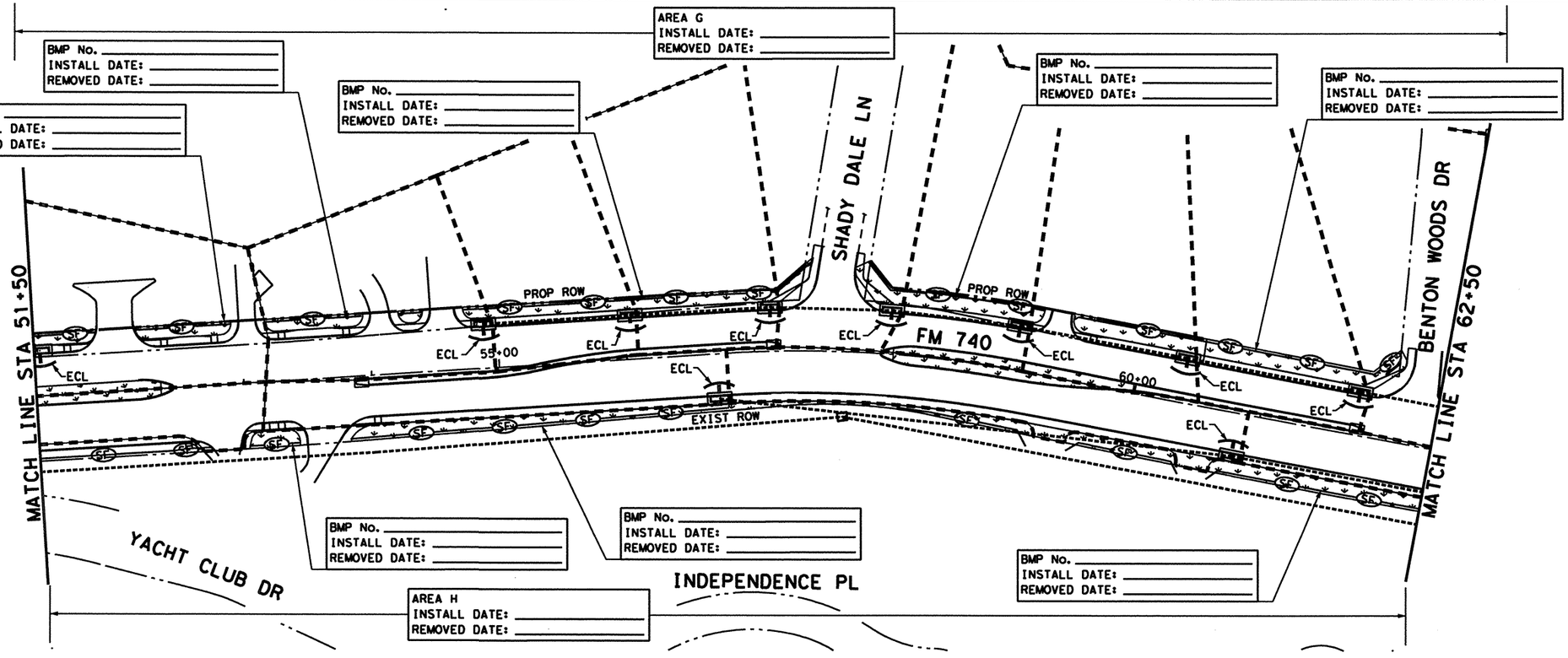

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SCALE IN FEET

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STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED
PROFESSIONAL ENGINEER
5-21-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 2 OF 7

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK CVL	CONTROL	SECTION	JOB	
	1014	03	039	

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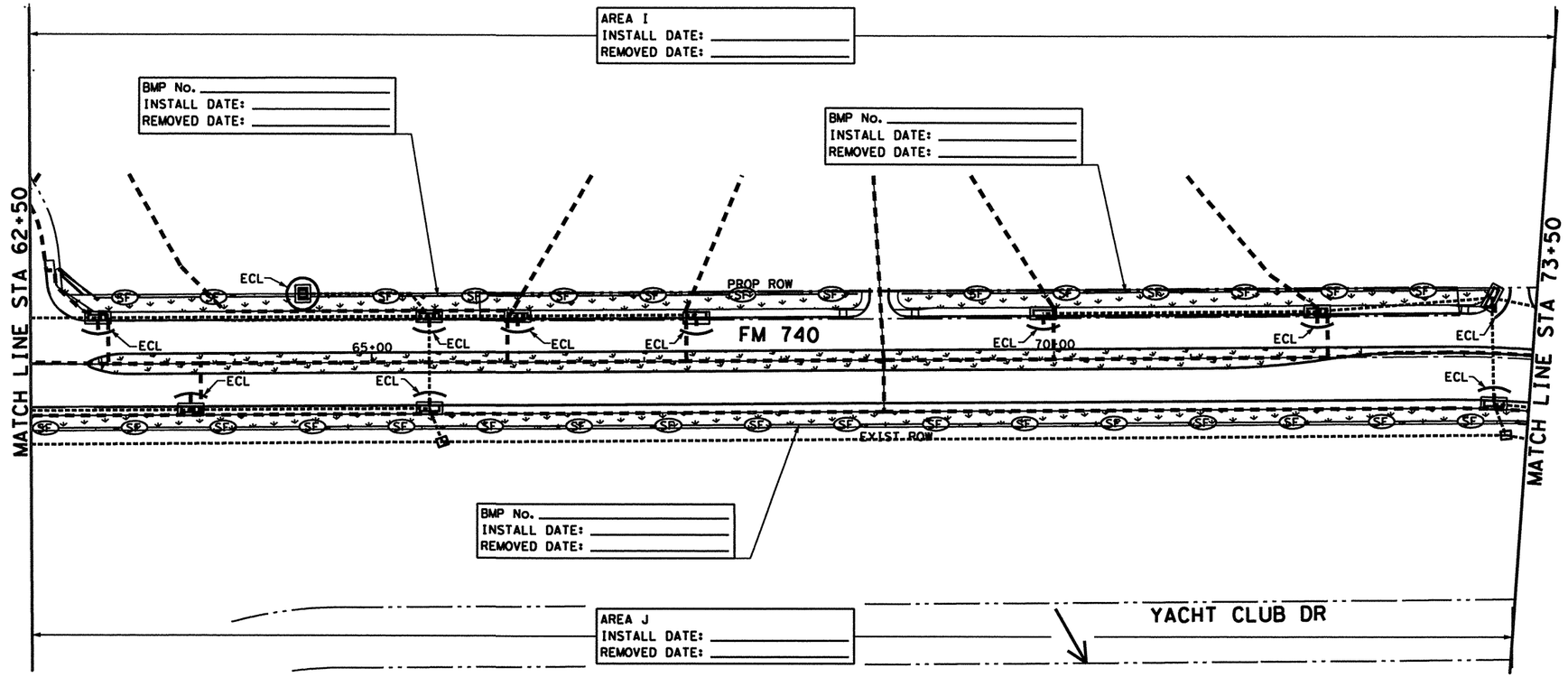

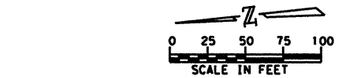

LEGEND

- SF — TEMPORARY SEDIMENT CONTROL FENCE
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- 20' / 60' — CONSTRUCTION EXITS (TY1)
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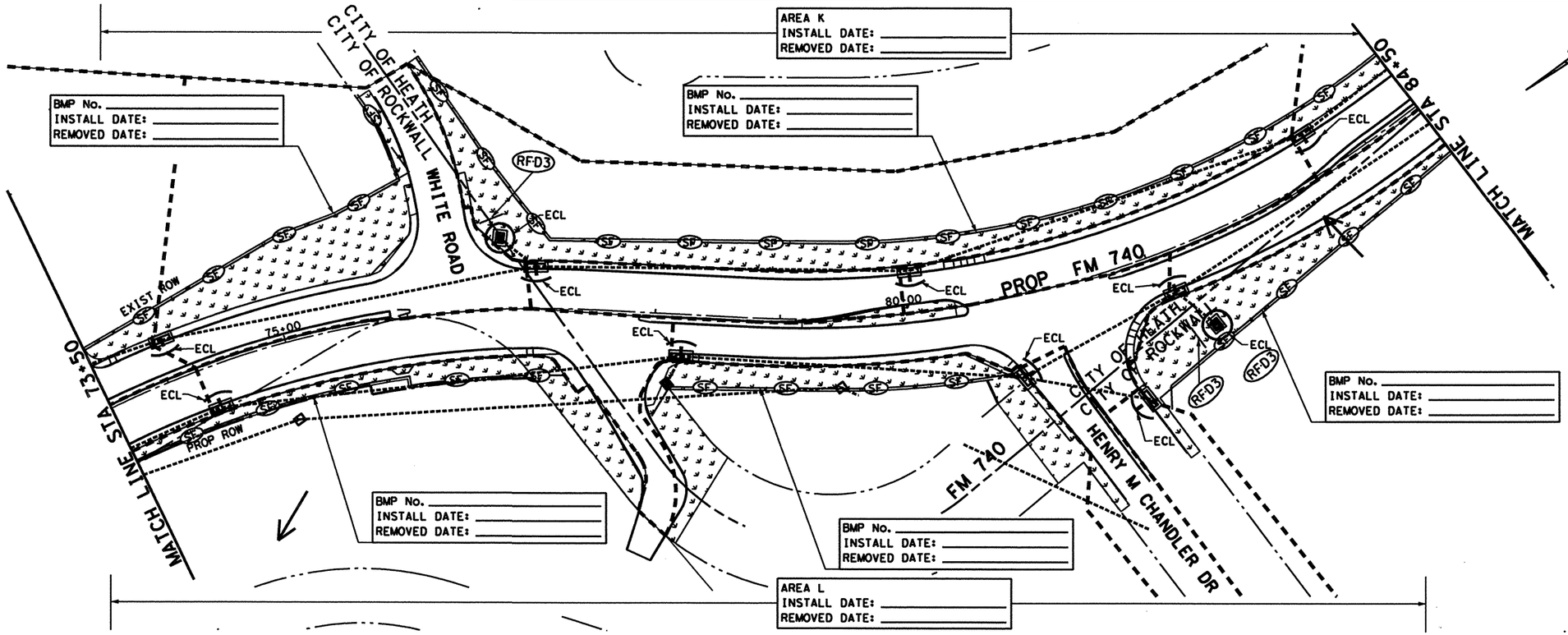
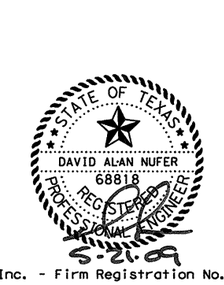
- BIODGRD EROSION CONTROL LOGS (18" DIA)

NOTE:

1. SEDIMENT CONTROL FENCE SHOWN SHALL BE INSTALLED PRIOR TO BEGINNING OF CONSTRUCTION AT THESE LOCATIONS. IT SHALL REMAIN UNTIL THE CONSTRUCTION AND FINAL GRADING IS COMPLETE.





Huitt-Zollars, Inc. - Firm Registration No. F-761

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Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 3 OF 7

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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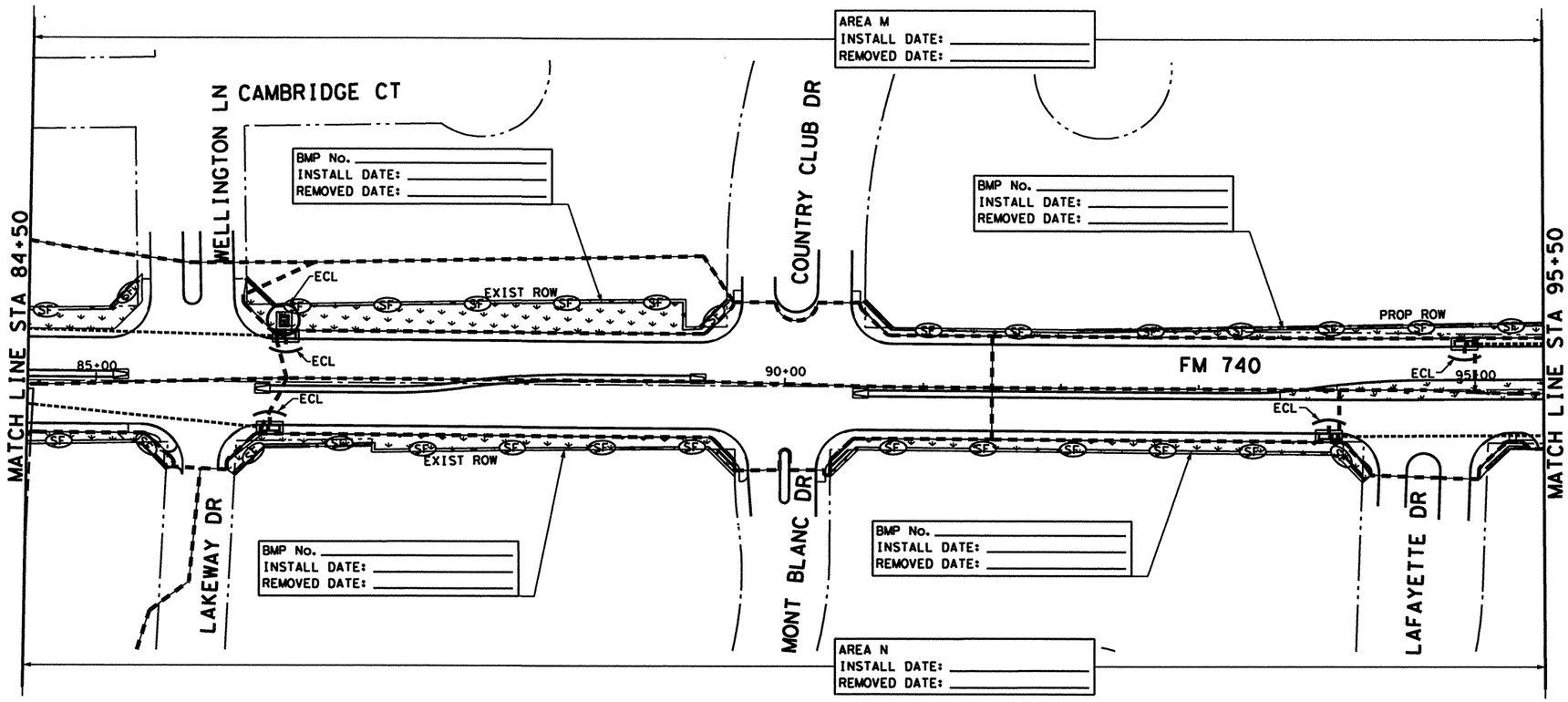
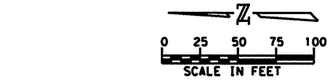
DAN	1014	03	039	
CHECK				
CVL				



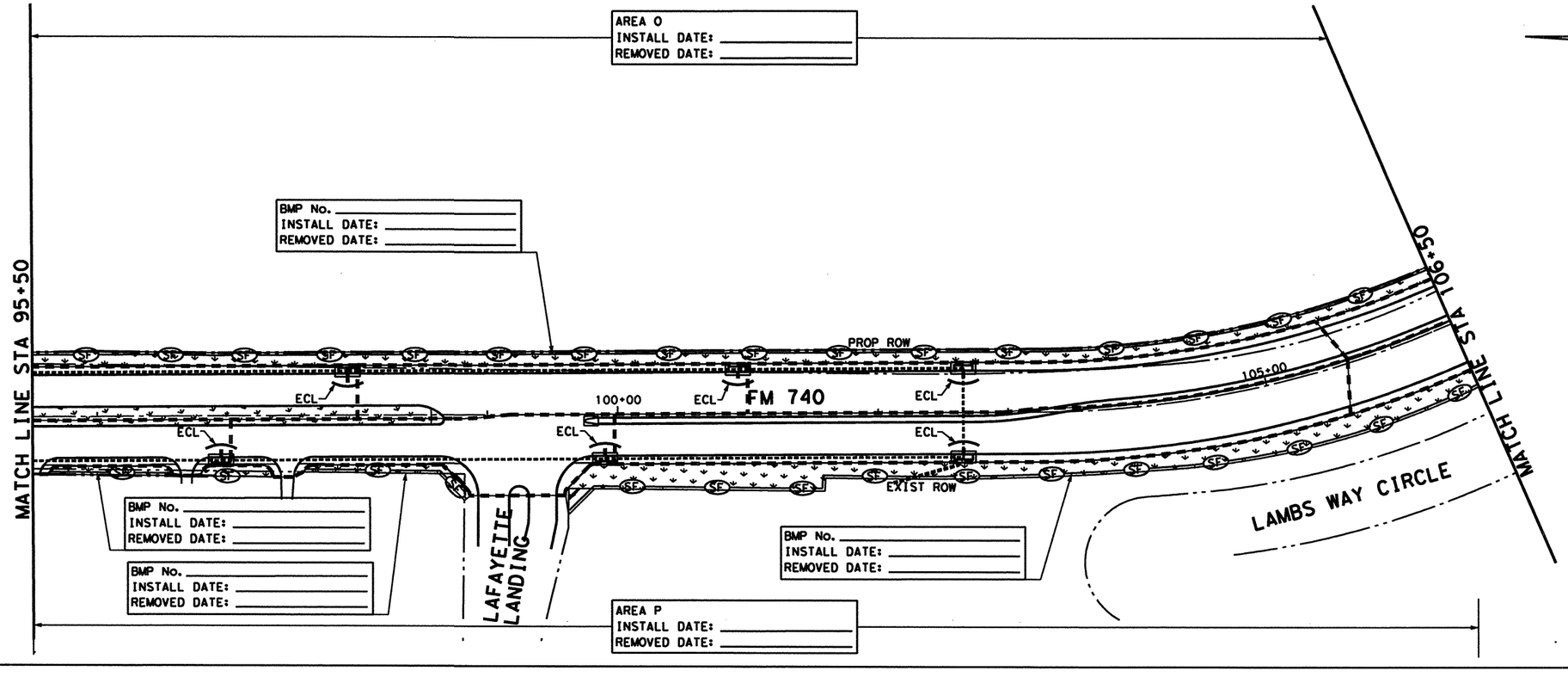


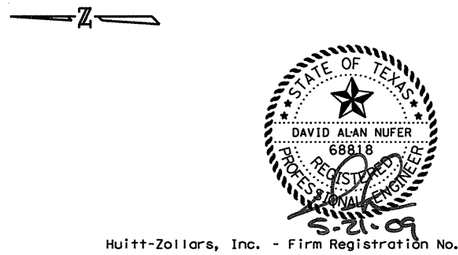
LEGEND

- SF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD3 — ROCK FILTER DAMS (INTALL) (TY 3)
- COMPOST MANUF TOPSOIL (PB) AND BLOCK SODDING
- 20' × 60' — CONSTRUCTION EXITS (TY1)
- DRAINAGE AREA BOUNDARY
- BIODGRD EROSION CONTROL LOGS (18" DIA)

NOTE:

1. SEDIMENT CONTROL FENCE SHOWN SHALL BE INSTALLED PRIOR TO BEGINNING OF CONSTRUCTION AT THESE LOCATIONS. IT SHALL REMAIN UNTIL THE CONSTRUCTION AND FINAL GRADING IS COMPLETE.





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Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 4 OF 7

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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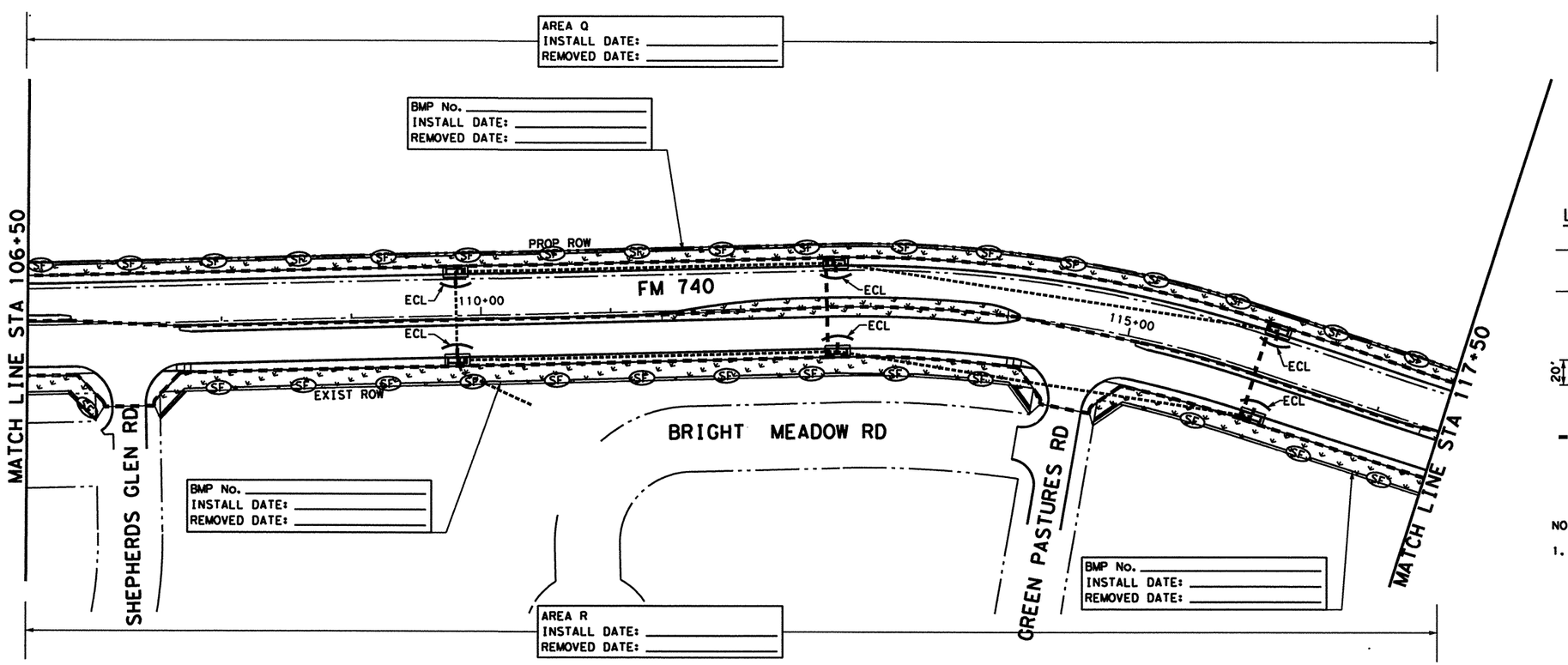
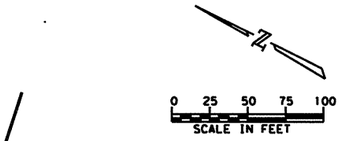
CHECK DAN	CONTROL	SECTION	JOB	
CHECK CVL	1014	03	039	





LEGEND

- SF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD3 — ROCK FILTER DAMS (INTALL) (TY 3)
- COMPOST MANUF TOPSOIL (PB) AND BLOCK SODDING
- 20' / 60' — CONSTRUCTION EXITS (TY1)
- DRAINAGE AREA BOUNDARY
- BIODGRD EROSION CONTROL LOGS (18" DIA)

NOTE:

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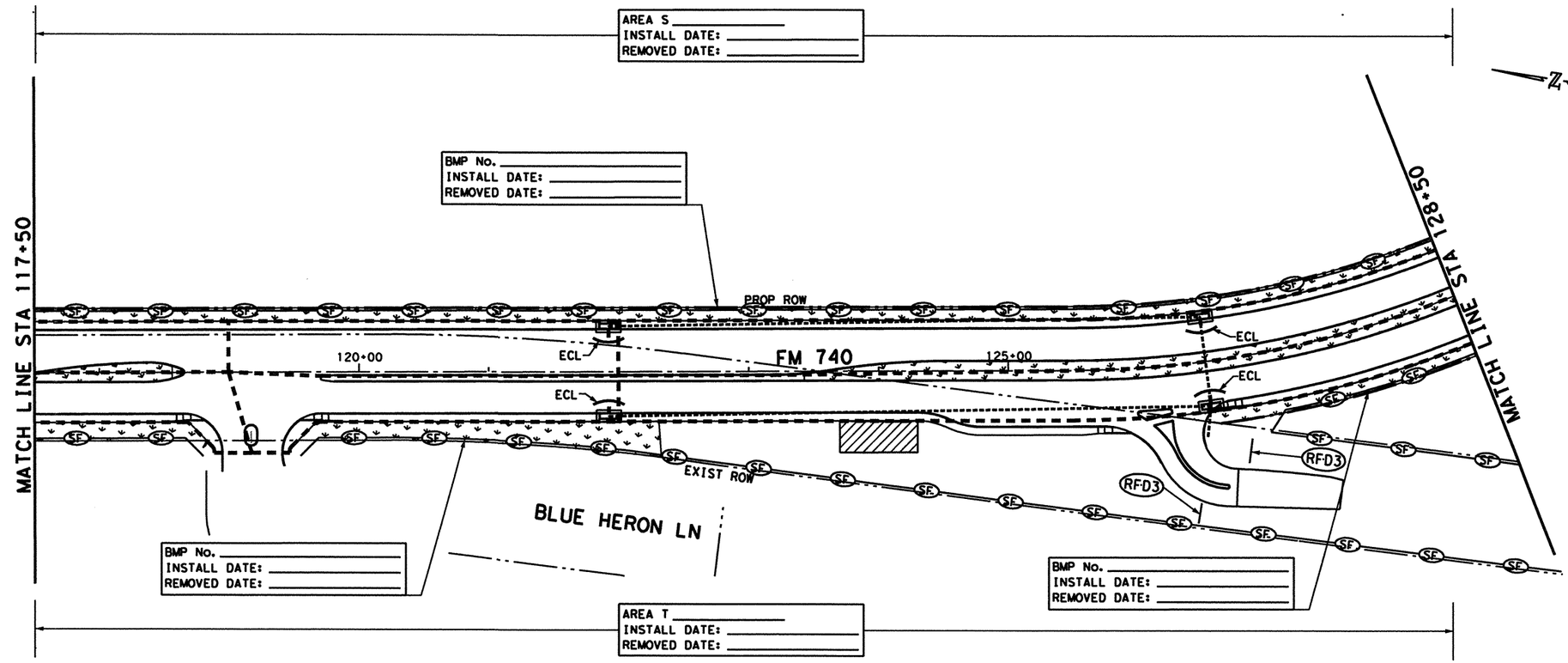

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Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 5 OF 7

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
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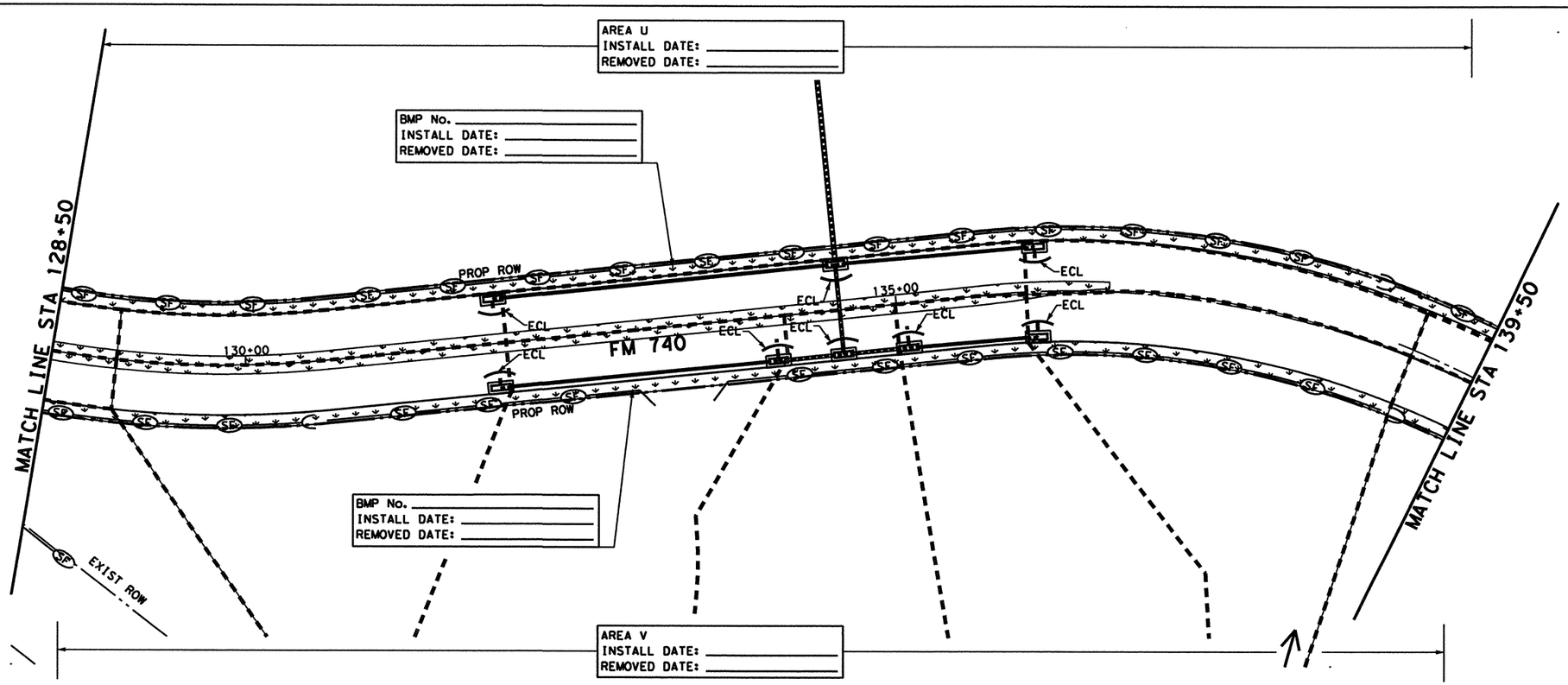
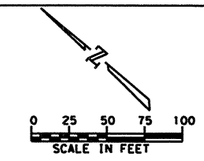
CHECK CVL	CONTROL 1014	SECTION 03	JOB 039	



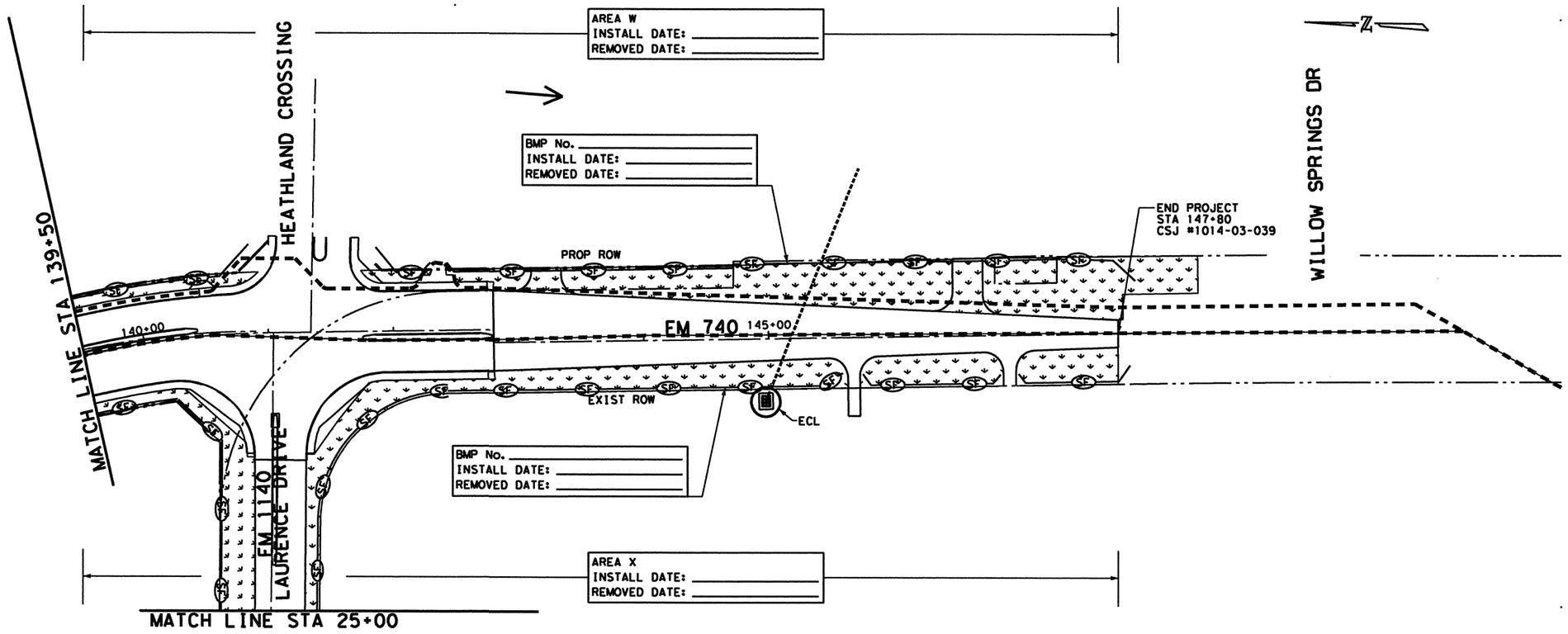


LEGEND

- SF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD3 — ROCK FILTER DAMS (INTALL) (TY 3)
- COMPOST MANUF TOPSOIL (PB) AND BLOCK SODDING
- 20' × 60' — CONSTRUCTION EXITS (TY1)
- DRAINAGE AREA BOUNDARY
- BIODGRD EROSION CONTROL LOGS (18" DIA)

NOTE:

1. SEDIMENT CONTROL FENCE SHOWN SHALL BE INSTALLED PRIOR TO BEGINNING OF CONSTRUCTION AT THESE LOCATIONS. IT SHALL REMAIN UNTIL THE CONSTRUCTION AND FINAL GRADING IS COMPLETE.



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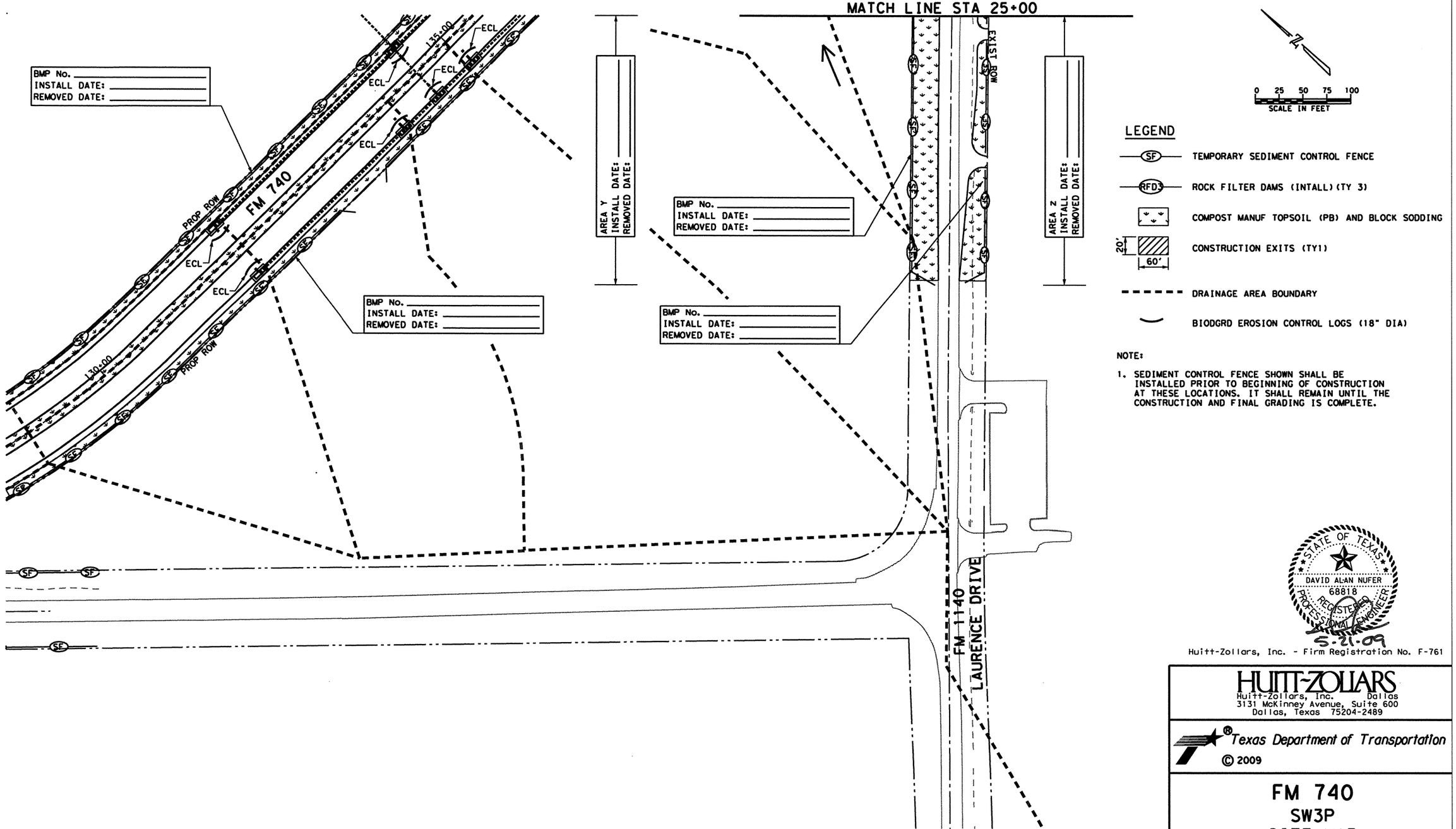
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 6 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	379
CHECK CVL	CONTROL	SECTION	JOB	
	1014	03	039	



NOTE:

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STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED
PROFESSIONAL ENGINEER
5.21.09

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Texas Department of Transportation

FM 740
SW3P
SITE MAP

SCALE: 1"=100' SHEET 7 OF 7

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	380
CHECK CVL	CONTROL	SECTION	JOB	
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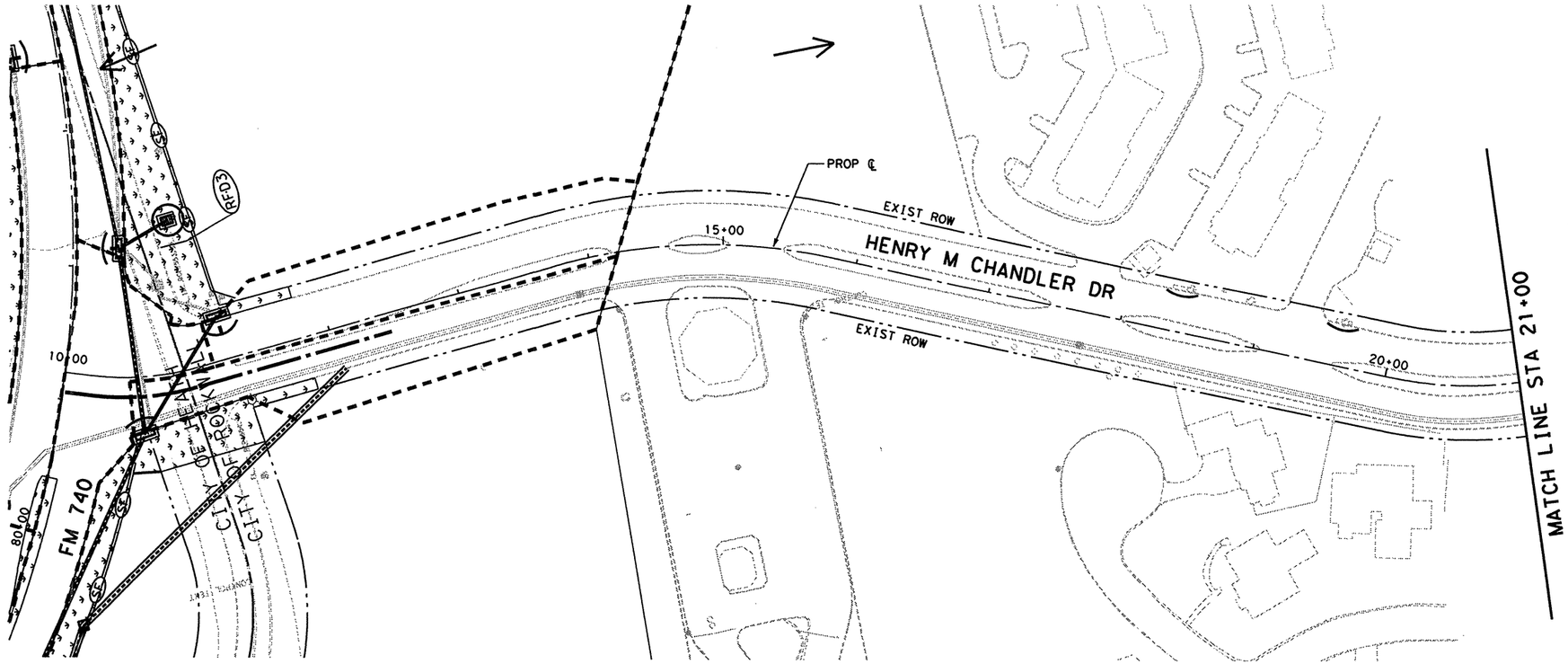

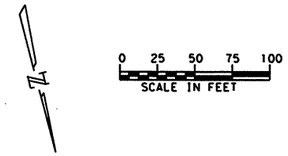

LEGEND

- SF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD3 — ROCK FILTER DAMS (INTALL) (TY 3)
- COMPOST MANUF TOPSOIL (PB) AND BLOCK SODDING
- 20' × 60' — CONSTRUCTION EXITS (TY1)
- DRAINAGE AREA BOUNDARY
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NOTE:

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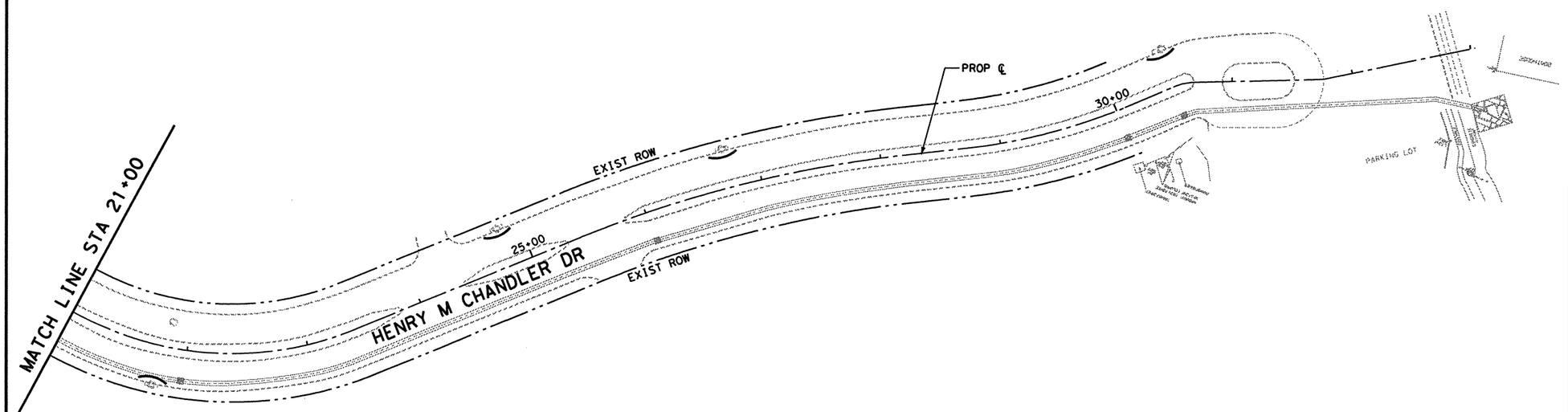

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FM 740
SW3P
SITE MAP
HENRY M CHANDLER DR

SCALE: 1"=100' SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS JP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	380A
CHECK CVL	CONTROL	SECTION	JOB	
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△ ADDED 07.30.09 VN

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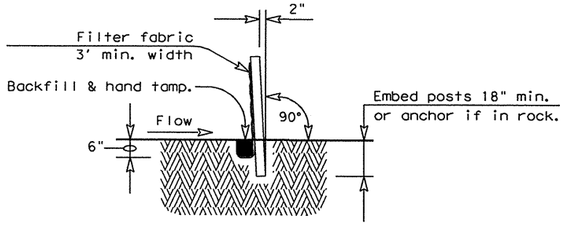


SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

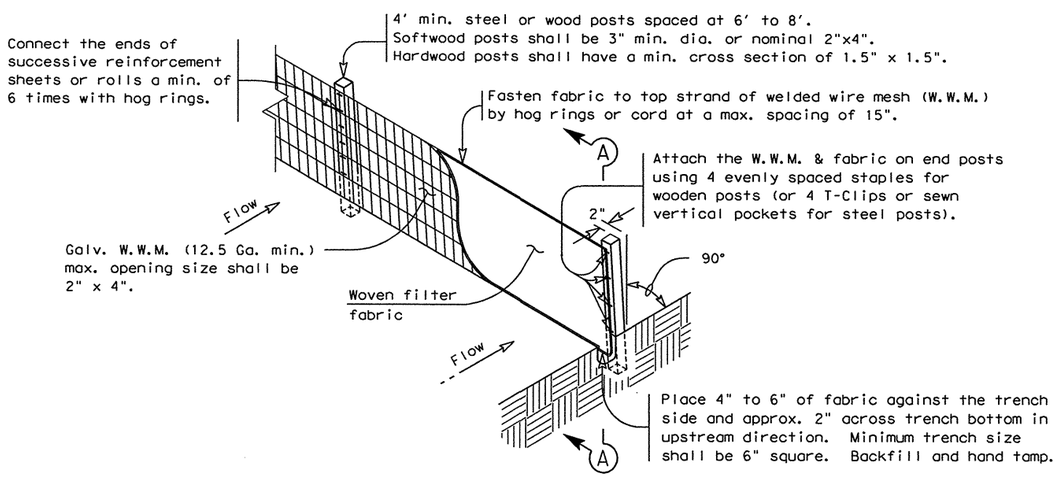
Sediment control fence should be sized to filter a max. flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

PLAN SHEET LEGEND

Sediment Control Fence —— (SCF) ——

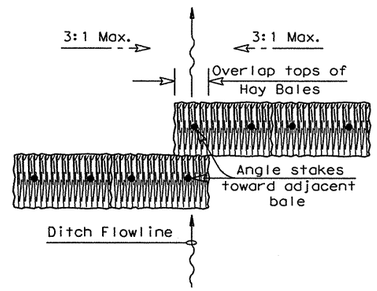
GENERAL NOTES

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

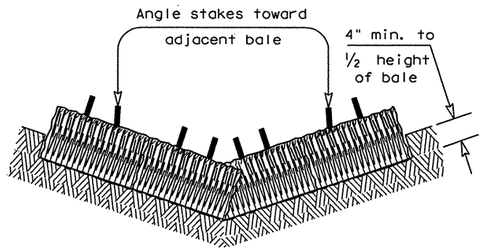


TEMPORARY SEDIMENT CONTROL FENCE

(SCF)



PLAN VIEW



PROFILE VIEW

PLANS SHEET LEGEND

Baled Hay —— (BH) ——

BALED HAY USAGE GUIDELINES

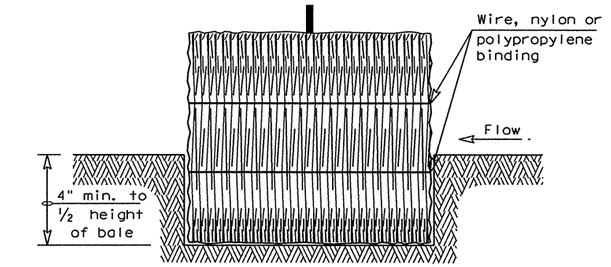
A Baled Hay installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT^2 of cross sectional area. Baled hay may be used at the following locations:

1. Where the runoff approaching the baled hay flows over disturbed soil for less than 100'. If the slope of the disturbed soil exceeds 10%, the length of slope upstream the baled hay should be less than 50'.
2. Where the installation will be required for less than 3 months.
3. Where the contributing drainage area is less than ½ acre.

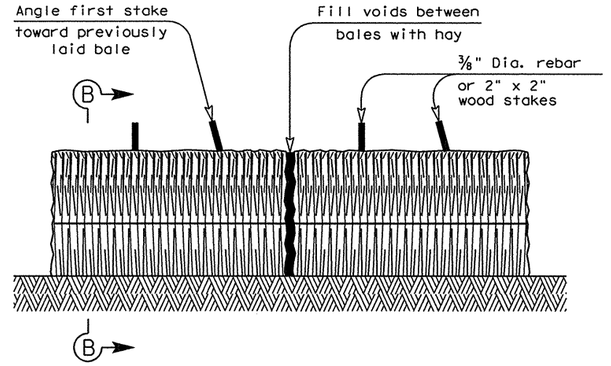
For Baled Hay installations in small ditches, the additional following considerations apply:

1. The ditch sideslopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
2. The ditch should be graded large enough to contain the overtopping drainage when sediment has filled to the top of the baled hay.

Bales should be replaced usually every 2 months or more often during wet weather when loss of structural integrity is accelerated.



SECTION B-B



BALED HAY FOR EROSION CONTROL

(BH)

GENERAL NOTES

1. Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 Lbs.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetative matter.
3. Hay bales shall be embedded in the soil a minimum of 4" and where possible ½ the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with ⅜" Dia. rebar or 2" x 2" wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

LEVELS DISPLAYED

1

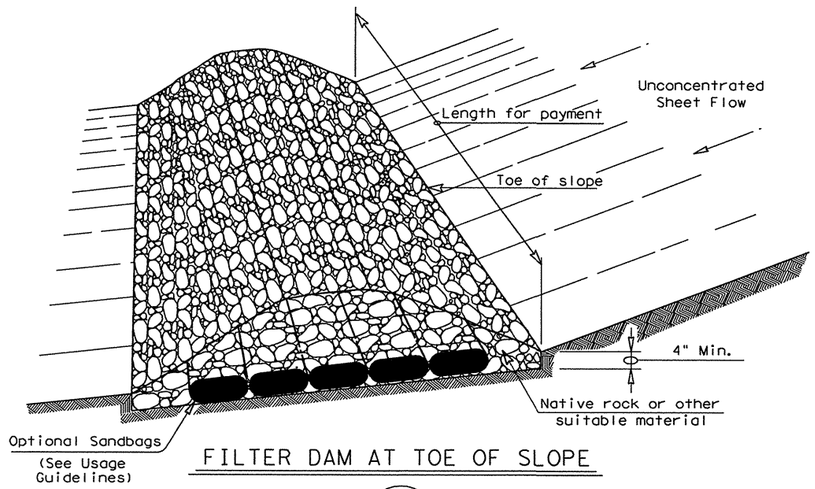
Texas Department of Transportation
Design Division (Roadway)

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCED & BALED HAY

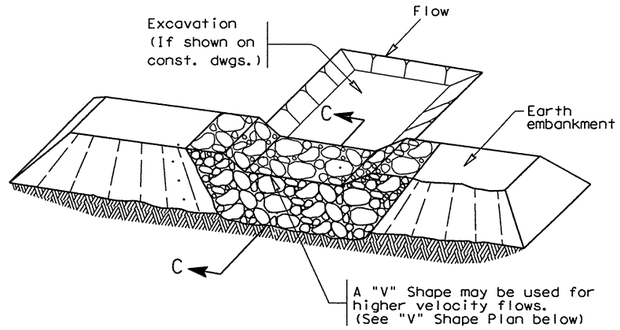
EC(1)-93

FILE: EC193.DGN	DN: HEJ	CK: HEJ	DW: BGD	CK:	
©TxDOT JUNE 1993	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)			38A
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740



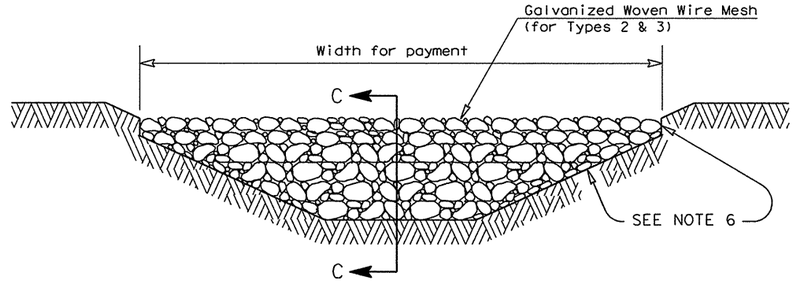
FILTER DAM AT TOE OF SLOPE

RFD1
TYPE 1



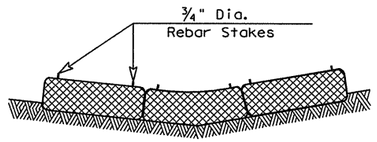
FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2
TYPE 1 OR TYPE 2

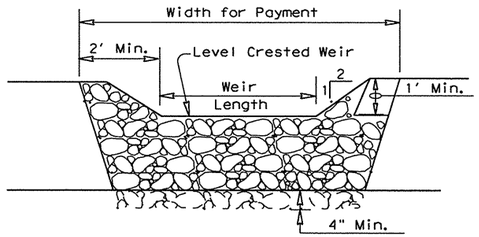


FILTER DAM AT CHANNEL SECTIONS

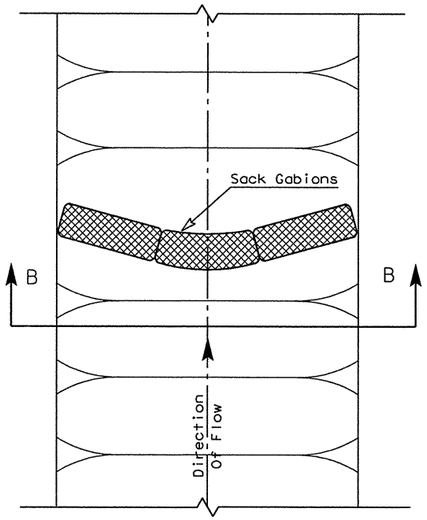
RFD1 OR RFD2 OR RFD3
TYPE 1 OR TYPE 2



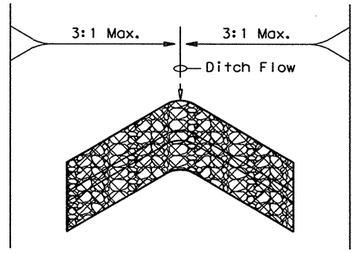
SECTION B-B



PROFILE

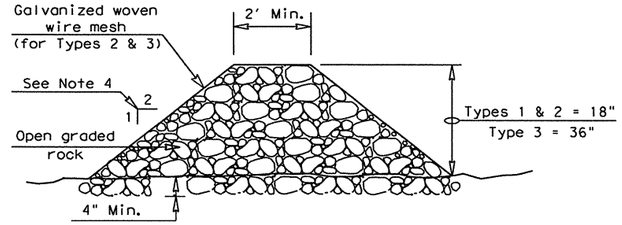


PLAN VIEW



"V" SHAPE

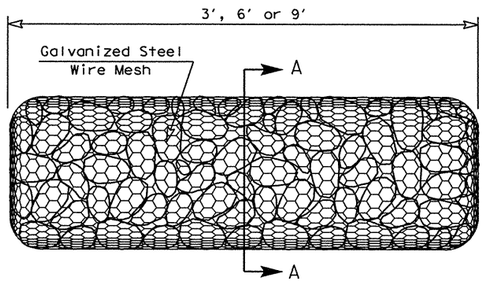
(Plan View)



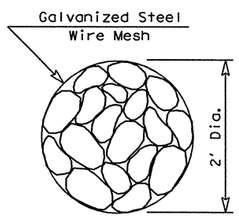
SECTION C-C

PLANS SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3



TYPE 4 (SACK GABIONS)



SECTION A-A

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/FT^2 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): 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 (approx. 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): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

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. 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 ¾" dia. rebar stakes.
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.

LEVELS DISPLAYED
1

Texas Department of Transportation
Design Division (Roadway)

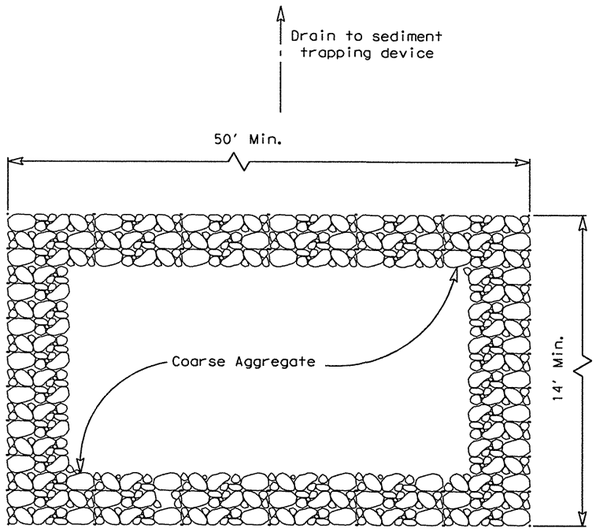
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

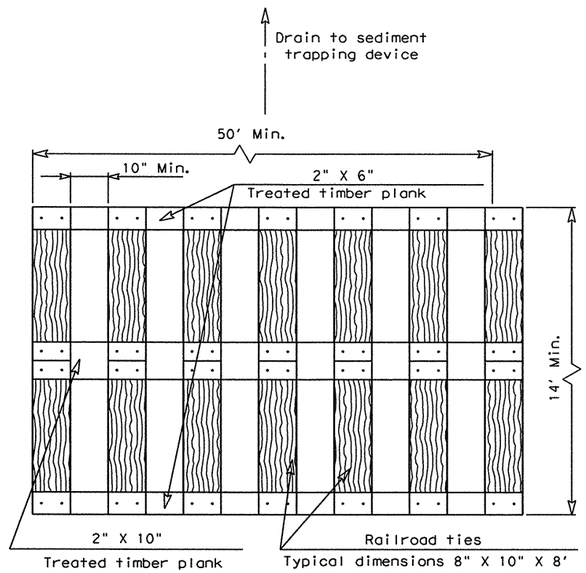
EC(2)-93

FILE: EC293.DGN	DN: HEJ	CK: HEJ	DW: BGD	CK:	
©TxDOT JUNE 1993	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)			382
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

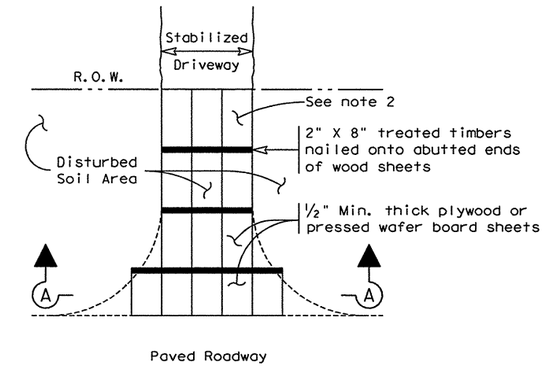
LEVELS DISPLAYED



PLAN

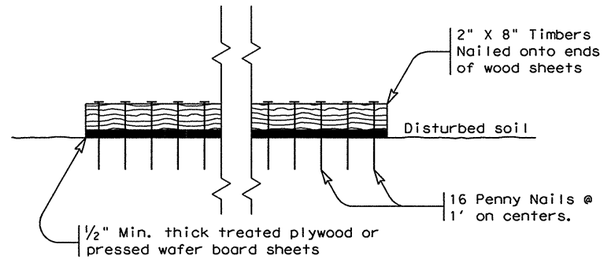


PLAN

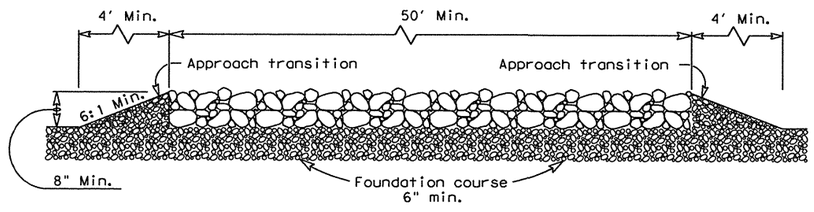


Paved Roadway

PLAN



SECTION A-A

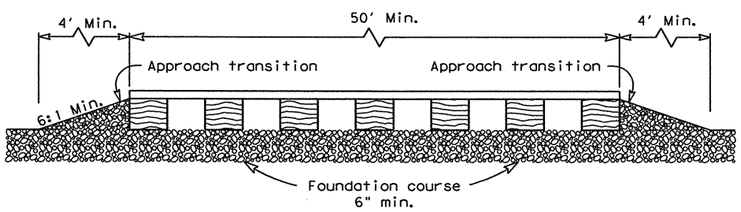


PROFILE

CONSTRUCTION EXIT (TYPE 1)

GENERAL NOTES

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.



PROFILE

CONSTRUCTION EXIT (TYPE 2)

GENERAL NOTES

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

GENERAL NOTES

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. 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.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

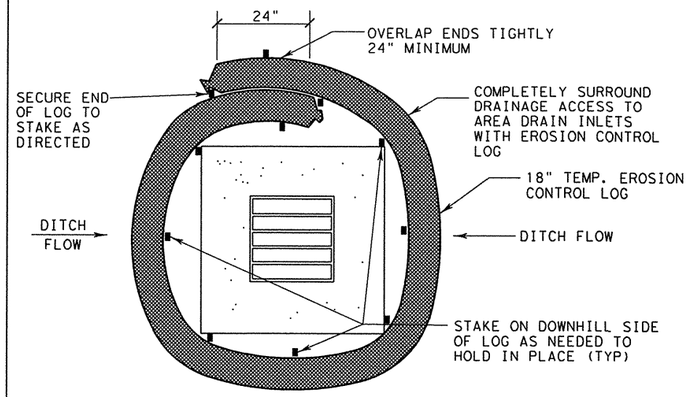
Texas Department of Transportation
Design Division (Roadway)

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

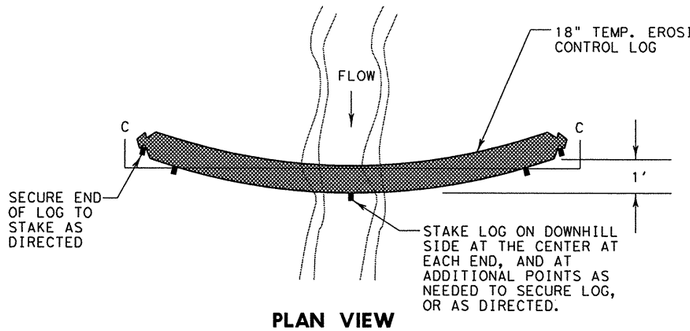
EC(3)-93

FILE: EC393.DGN	DN: HEJ	CK: HEJ	DW: BGD	CK:	
©TxDOT JUNE 1993	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS	DALLAS	(SEE TITLE SHEET)			383
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	039	FM 740

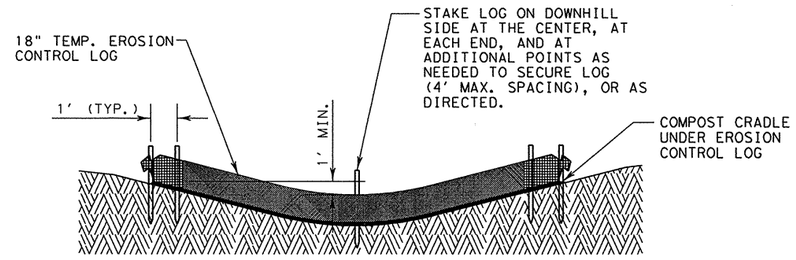


LOGS PLACED AT AREA DRAIN INLETS

NTS



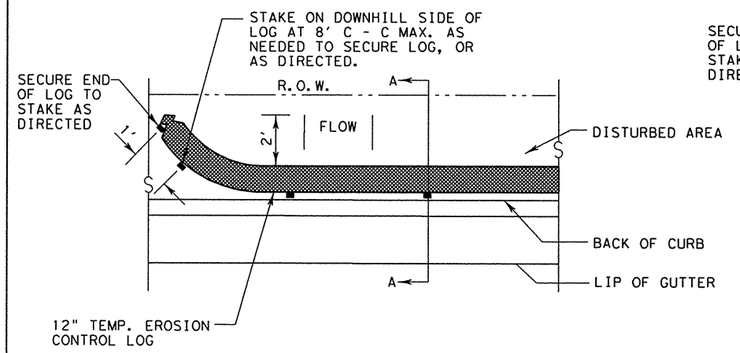
PLAN VIEW



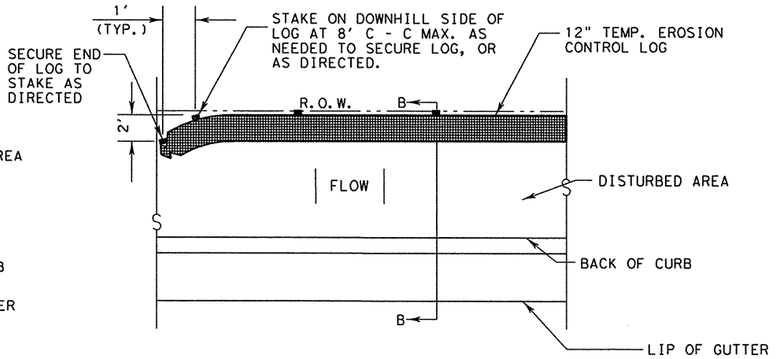
SECTION C-C

EROSION CONTROL LOG CHECK DAM

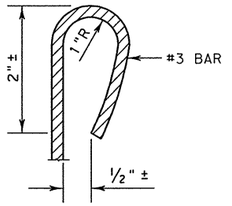
NTS



PLAN VIEW



PLAN VIEW

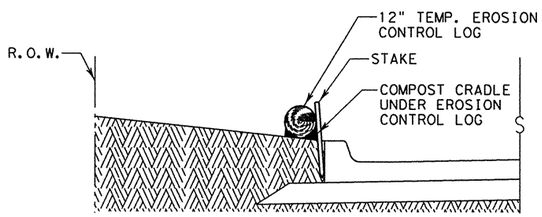


REBAR STAKE DETAIL

NTS

GENERAL NOTES:

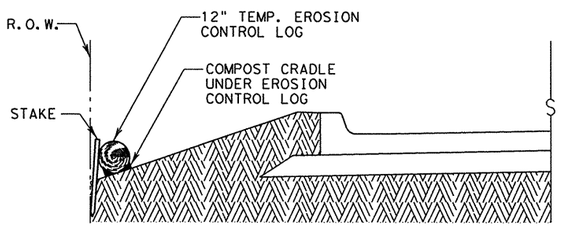
1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.



SECTION A-A

LOG PLACED AT BACK OF CURB

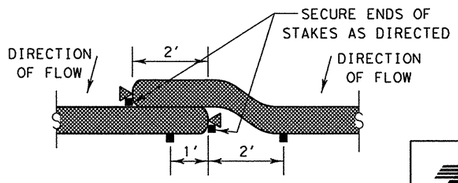
NTS



SECTION B-B

LOG PLACED AT EDGE OF RIGHT-OF-WAY

NTS



LAP DETAIL

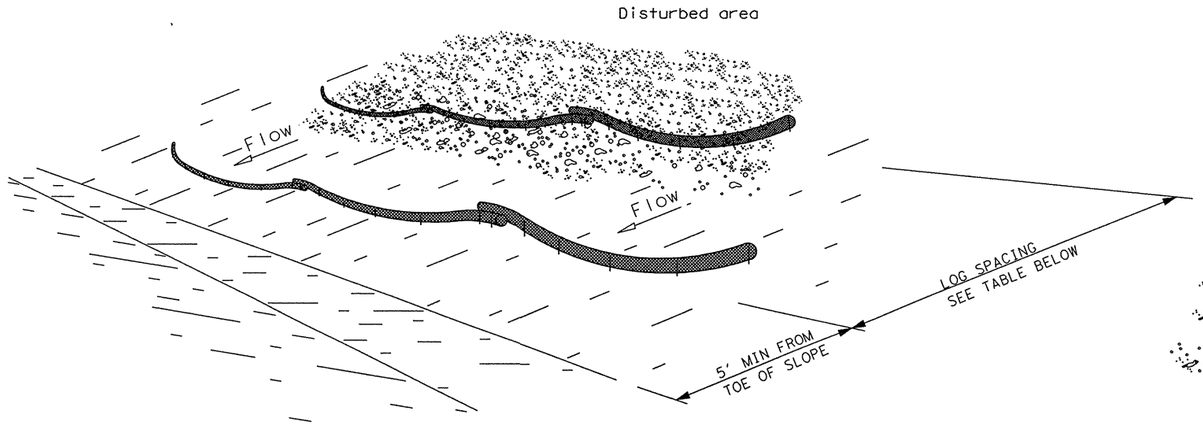
NTS

DALLAS DISTRICT

EROSION CONTROL LOGS

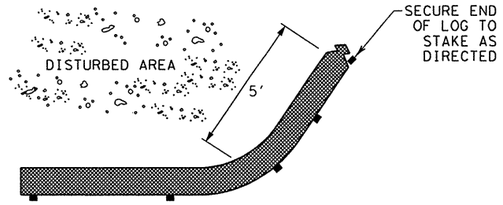
SCALE: NOT TO SCALE — SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	(See Title Sheet)		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	384
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



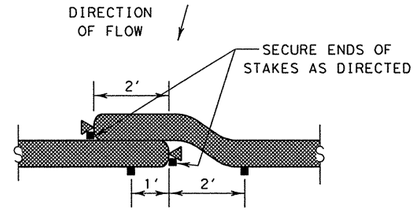
LOGS PLACED ON EXPOSED SLOPES

NTS



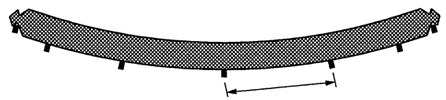
END SECTION RAP DETAIL

NTS



LAP DETAIL

NTS

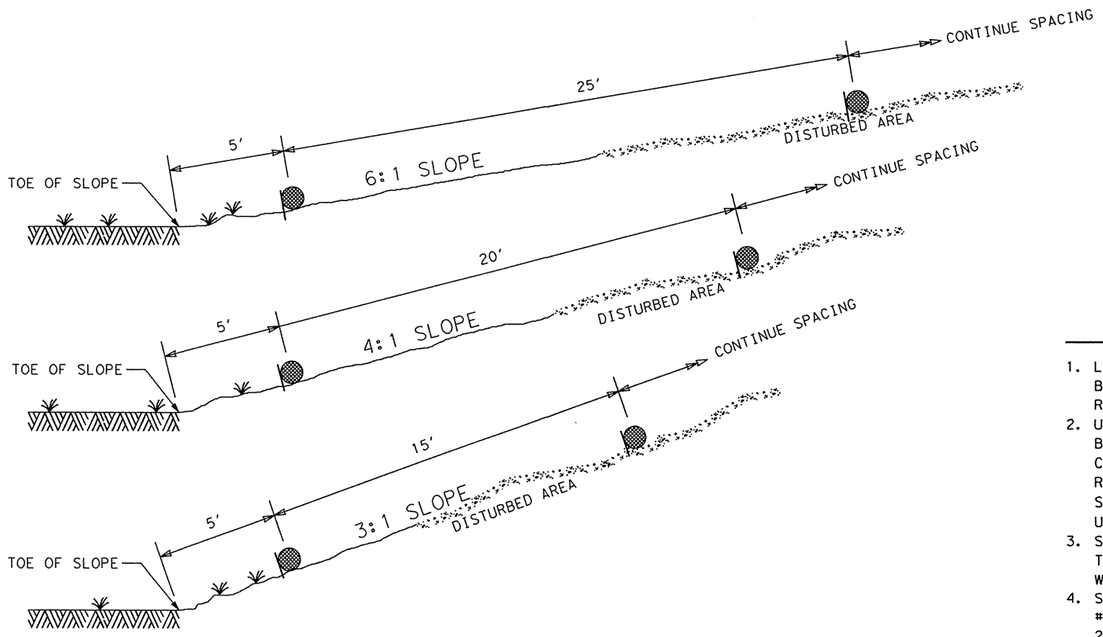


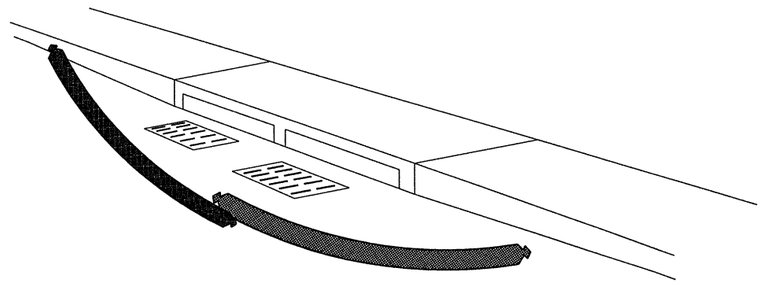
STAKE ON DOWNHILL SIDE OF LOG AT 8' C - C MAX. AS NEEDED TO SECURE LOG, OR AS DIRECTED.

STAKE DETAIL

NTS

SLOPE	LOG DIAMETER	SPACING BETWEEN LOGS
3:1	6"	15'
4:1	6"	20'
6:1	6"	25'





COMPLETED INLETS DETAIL

WITH NO TRAFFIC NTS

GENERAL NOTES:

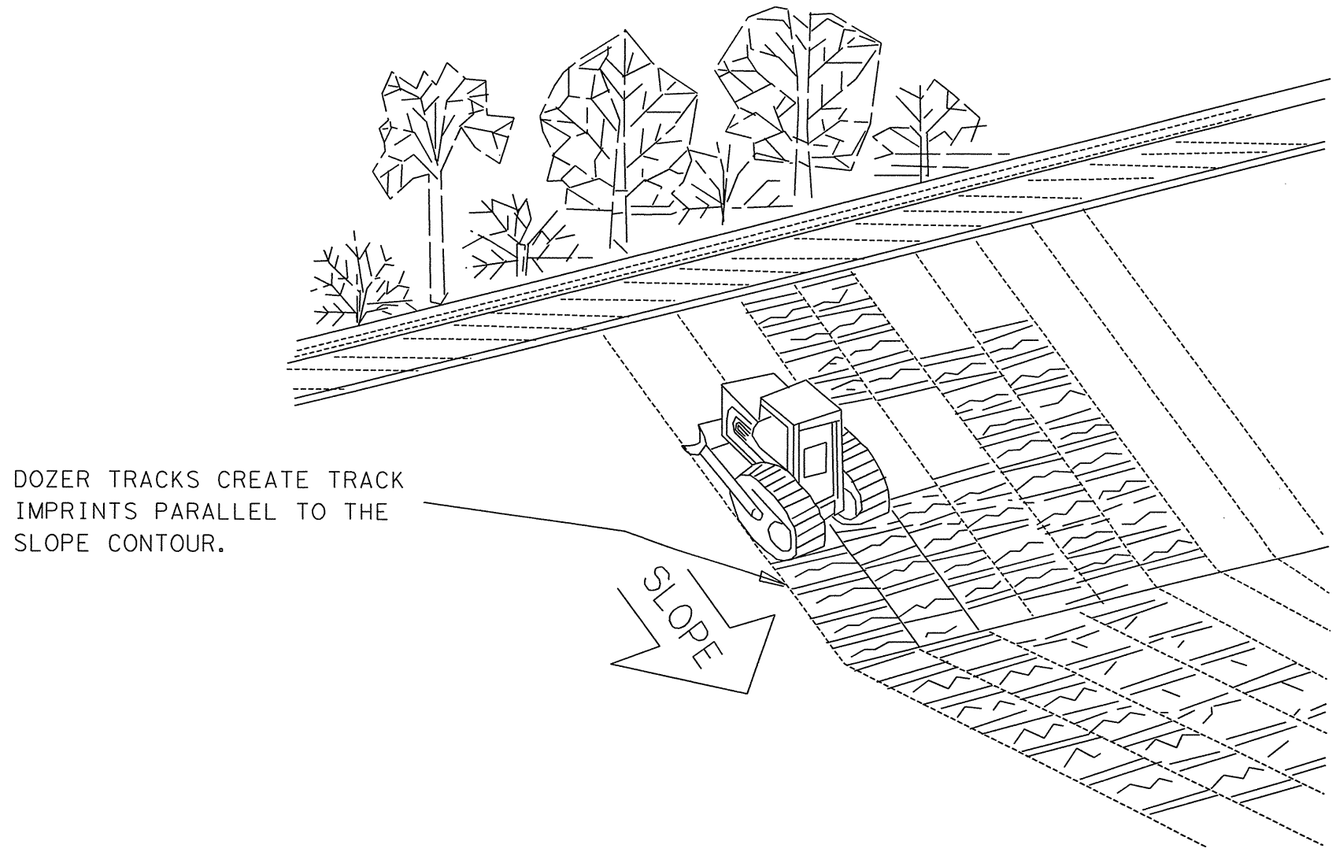
1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS DIRECTED BY THE ENGINEER.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.

DALLAS DISTRICT

EROSION CONTROL LOGS

SCALE: NOT TO SCALE SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	(See Title Sheet)		FM 740
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	ROCKWALL	385
CHECK	CONTROL	SECTION	JOB	
	1014	03	039	



NOTE:

PERFORM VERTICAL TRACKING ON SLOPES TO TEMPORARILY STABILIZE SOIL. PROVIDE EQUIPMENT WITH A TRACK UNDERCARRIAGE CAPABLE OF PRODUCING LINEAR SOIL IMPRESSIONS MEASURING AT LEAST 12" IN LENGTH BY 2" TO 4" IN WIDTH BY 1/2" TO 2" IN DEPTH. DO NOT EXCEED 12" BETWEEN TRACK CLEATS. INSTALL CONTINOUS LINEAR TRACK IMPRESSIONS WHERE THE MINIMUM 12" IN LENGTH IS PERPENDICULAR TO THE DIRECTION OF WATER FLOW.

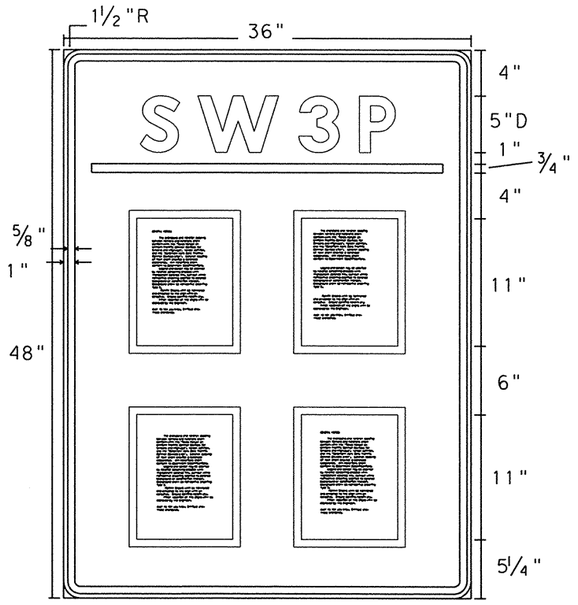
Dallas District Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

VERTICAL TRACKING FOR EROSION CONTROL

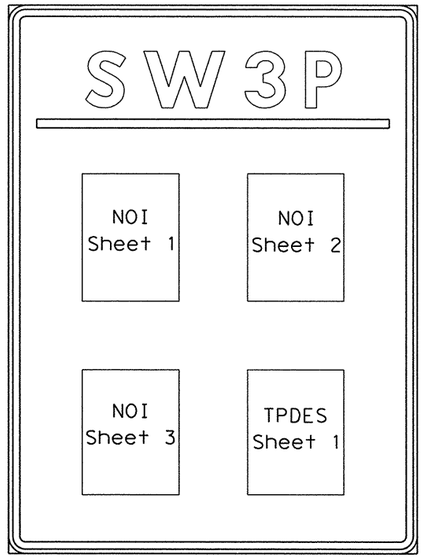
FED. RD. DIV. NO.	PROJECT NUMBER		SHEET NUMBER
6			386
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NUMBER
1014	03	039	FM 740

FILENAME: $FILE$

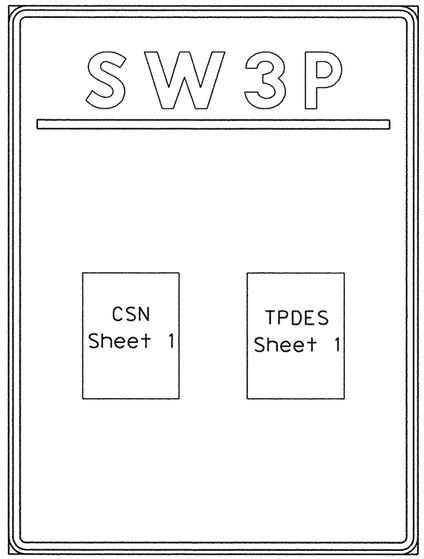


36" X 48"

Letters - White
Numbers - White
Border - White
Background - Blue



NOI Permit Sheet Arrangement



Construction Site Notice Sheet Arrangement

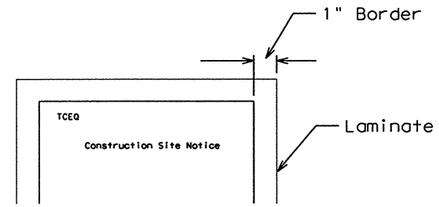
GENERAL NOTES:

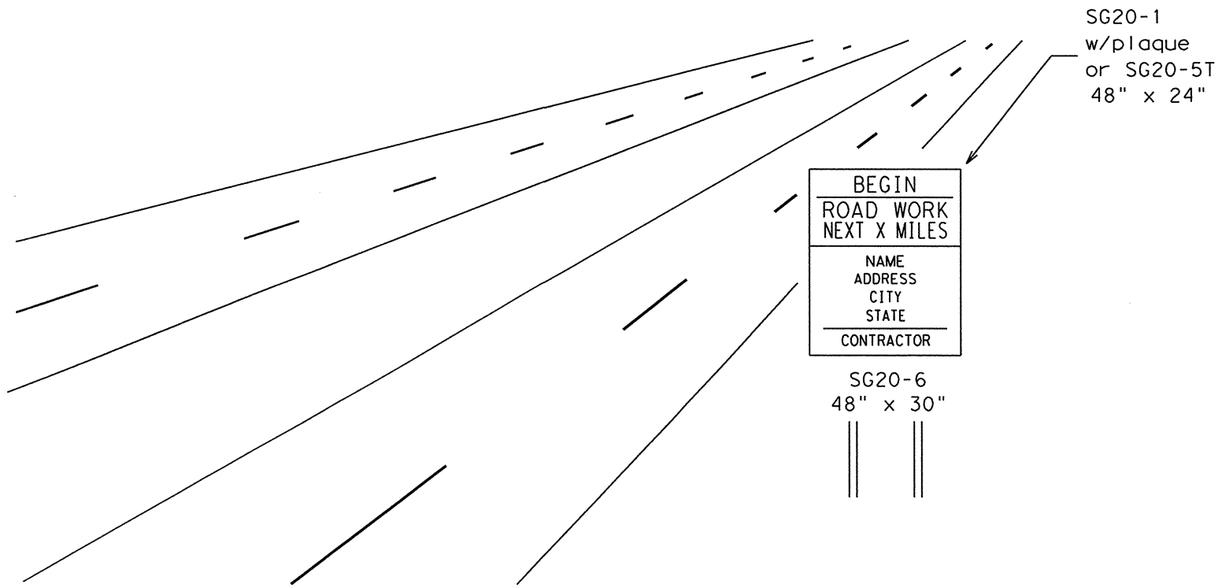
The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.

Permit Sheets will be laminated and attached to the sign with an adhesive. Ensure permits remain dry.

Final location of the signs will be approved by the Engineer.





DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

Texas Department of Transportation
DALLAS DISTRICT STANDARD

SW3P
PROJECT LIMITS SIGN

FILE:	DN: TxDOT	CK:	DW:	CK:	
©TxDOT	DISTRICT	FEDERAL AID PROJECT			SHEET
REVISIONS	18	(SEE TITLE SHEET)			386A
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL	1014	03	039	FM 740

PATH:

LEVELS DISPL

SEEDING FOR EROSION CONTROL

PLANTING SEASON	PERMANENT DRILL SEED MIX ITEM 164 DRILL SEED(PERM) (WARM OR COOL) SY	PERMANENT BROADCAST SEED MIX ITEM 164 BRDCST SEED(PERM) (WARM OR COOL) SY	TEMPORARY DRILL SEED MIX ITEM 164 DRILL SEED(TEMP) (WARM OR COOL) SY	TEMPORARY BROADCAST SEED MIX ITEM 164 BRDCST SEED(TEMP) (WARM OR COOL) SY
WARM SEASON Mar.15th, April, May, June, July, August, Sept. 15th	Pure Live Seed Rate Green Sprangletop (Leptochloa dubia) - 15 lbs/acre Hulled - Common Bermuda (Cynodon dactylon) - 50 lbs/acre Buffalograss (Buchloe dactyloides) - 25 lbs/acre total: 90 lbs/acre	Pure Live Seed Rate Green Sprangletop (Leptochloa dubia) - 15 lbs/acre Hulled - Common Bermuda (Cynodon dactylon) - 50 lbs/acre Buffalograss (Buchloe dactyloides) - 25 lbs/acre total: 90 lbs/acre	Pure Live Seed Rate Foxtail Millet (Setaria italica) - 75 lbs/acre	Pure Live Seed Rate Foxtail Millet (Setaria italica) - 75 lbs/acre
COOL SEASON Sept 16th, Oct, Nov, Dec, Jan, Feb, Mar 14th	Pure Live Seed Rate Red Winter Wheat (Triticum aestivum) - 30 lbs/acre Crimson Clover (Trifolium incarnatum) - 25 lbs/acre Hulled - Common Bermuda (Cynodon dactylon) - 50 lbs/acre Unhulled - Common Bermuda(Cynodon dactylon) - 50 lbs/acre total: 155 lbs/acre	Pure Live Seed Rate Red Winter Wheat (Triticum aestivum) - 30 lbs/acre Crimson Clover (Trifolium incarnatum) - 25 lbs/acre Hulled - Common Bermuda (Cynodon dactylon) - 50 lbs/acre Unhulled - Common Bermuda(Cynodon dactylon) - 50 lbs/acre total: 155 lbs/acre	Pure Live Seed Rate Red Winter Wheat (Triticum aestivum) - 30 lbs/acre	Pure Live Seed Rate Red Winter Wheat (Triticum aestivum) - 30 lbs/acre

SEEDING NOTES:

1. Refer to Item 164 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. Apply seed upon completion of each construction stage (dependent on planting date requirements) without compensation for additional move-ins.
3. All seed will meet labelling, delivery, analysis, and testing requirements as described in Item 164.2(A).
4. Hydromulch 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.
8. Seed will be drilled to a depth as described in Item164.3(D).
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 maybe 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 2004 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.

VEGETATIVE WATERING FOR SEED AND SOD ITEM 168 VEGETATIVE WATERING MG

WATERING SCHEDULE

MONTH	RATE	TIME SCHEDULE	TOTAL WATER
March, April, May, October	7000 gallons/acre per working day	Vegetative watering for seed and/or sod shall begin on the day after placement for 20 consecutive working days	140,000 gallons/acre (20 working days)
June, July, August, September	12,000 gallons/acre per working day	Vegetative watering for seed and/or sod shall begin on the day after placement for 20 consecutive working days	240,000 gallons/acre (20 working days)
November, December, January, 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. All watering equipment will have a metering device.
3. Water will be evenly distributed over entire area(s) designated for seeding and/or sodding.
4. 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).
5. **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.**

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 2004 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.

COMPOST APPLICATION ITEM 161 COMPOST MANF. TOPSOIL (BOS) (4") SY

APPLICATION RATE

A one inch uniform layer of compost will be placed on grade. The compost will then be incorporated into the existing soil (by till or disk) to a 3 to 4 inch 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 will be placed in locations where concentration of flow may cause erosion - reference current Special Specification for Compost/Mulch Filter Berm.

ROADSIDE MOWING ITEM 730 PROJECT MAINTENANCE AC

Mowing will be included during project construction. Provide six mowing cycles per year during the project.

Once seed is established, mowing will be used to promote the warm season grasses by mowing the cool season and/or temporary grasses.

REQUIRED ITEMS:

- 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 WHERE CANNOT DRILL SEED OR SOD.

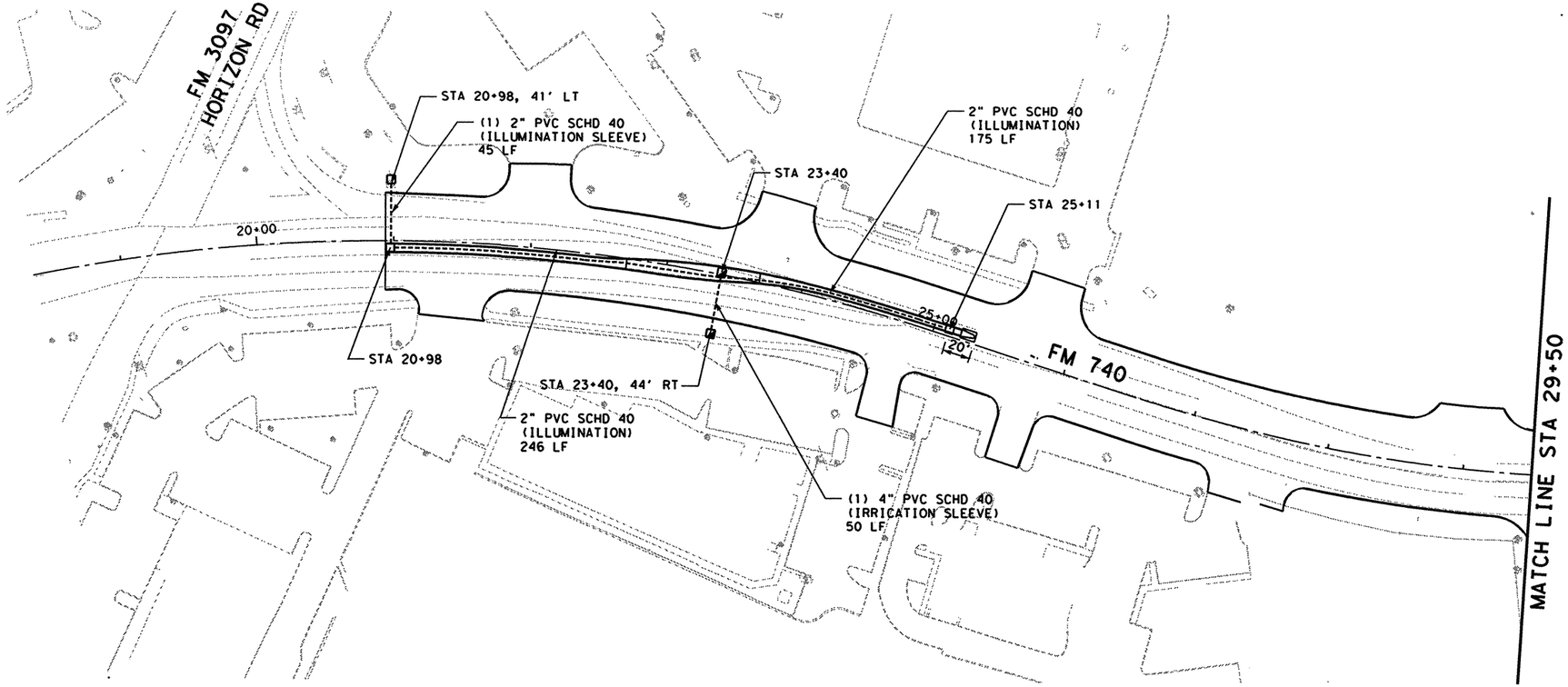
SEQUENCE OF WORK:

PREPARE SOIL WITH COMPOST
APPLY FERTILIZER
PLACE SEED AND/OR SOD
APPLY WATER FOR SEED AND SOD AREAS
MOW TO PROMOTE WARM SEASON GRASSES

REVISED ON 9/10/08

DALLAS DISTRICT STANDARD
VEGETATION ESTABLISHMENT SHEET

DESIGN	FED. RD./DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
	6	(SEE TITLE SHEET)		FM 740
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	DALLAS	Rockwall	387
	CONTROL	SECTION	JOB	
	1014	03	039	



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SCALE IN FEET

LEGEND

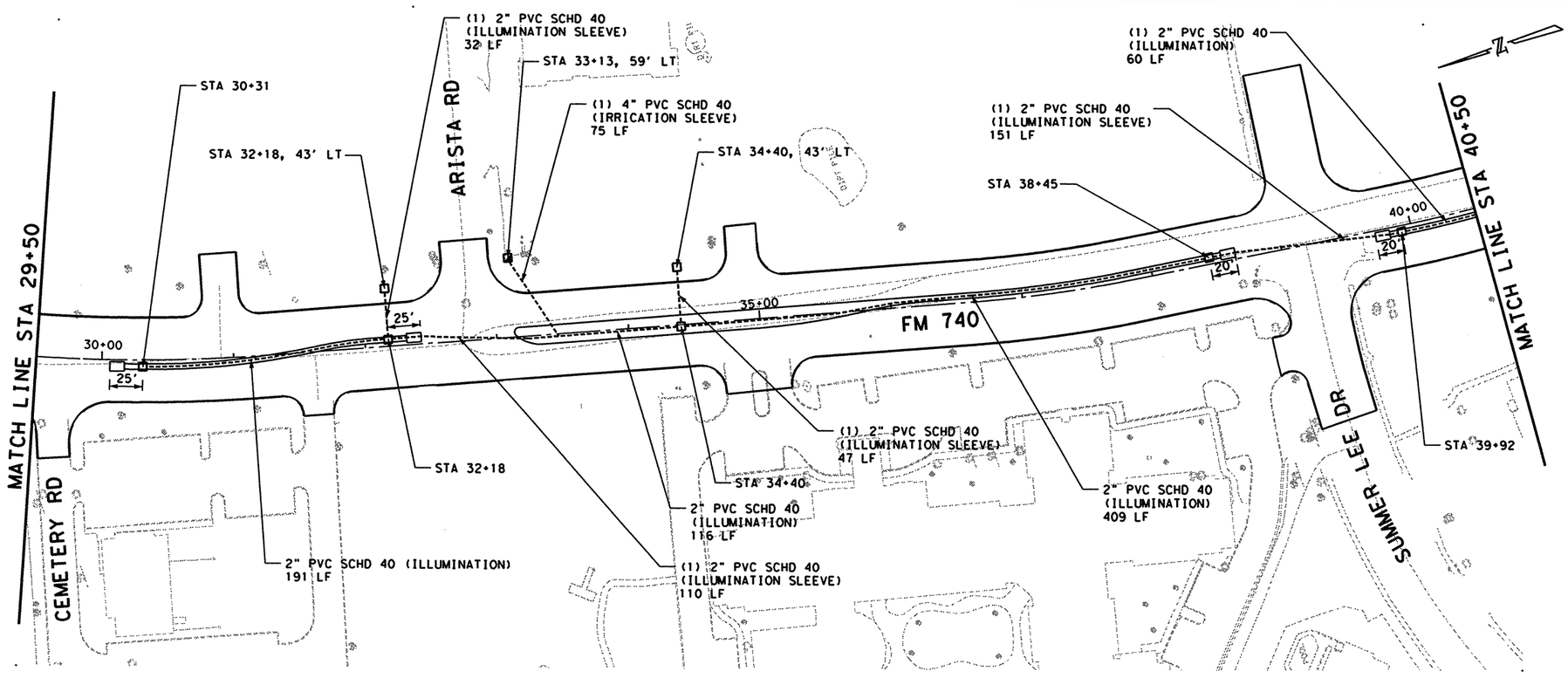
-------- PROPOSED CONDUIT

ILLUMINATION PULL BOX

IRRIGATION PULL BOX

NOTES:

1. LOCATION OF CONDUIT IS DIAGRAMATIC FOR CLARITY, LOCATE IN MEDIAN AND INSTALL GROUND BOX TYPE "A" AT ENDS OF MEDIANS AND CONNECTIONS TO FUTURE SERVICES.
2. CONTRACTOR SHALL LAY SLEEVES AND CONDUITS AT THIRTY-SIX (36") INCHES BELLOW FINISH GRADE OF THE TOP OF PAVEMENT.
3. CONTRACTOR SHALL EXTEND SLEEVES ONE (1') FOOT BEYOND EDGE OF ALL PAVEMENT.
4. CONTRACTOR SHALL CAP PIPE ENDS USING PVC CAPS.
5. ALL SLEEVES SHALL BE SCHEDULE 40 PVC PIPE.
6. ANY FUTURE INSTALLATION FOR ILLUMINATION SYSTEMS WILL BE DONE TO THE NATIONAL ELECTRICAL CODE AND TxDOT RESERVES THE RIGHT TO REVIEW AND INSPECT THESE INSTALLATIONS.



STATE OF TEXAS
DAVID ALAN NUFER
68818
REGISTERED
PROFESSIONAL ENGINEER
4-15-09

Huitt-Zollars, Inc. - Firm Registration No. F-761

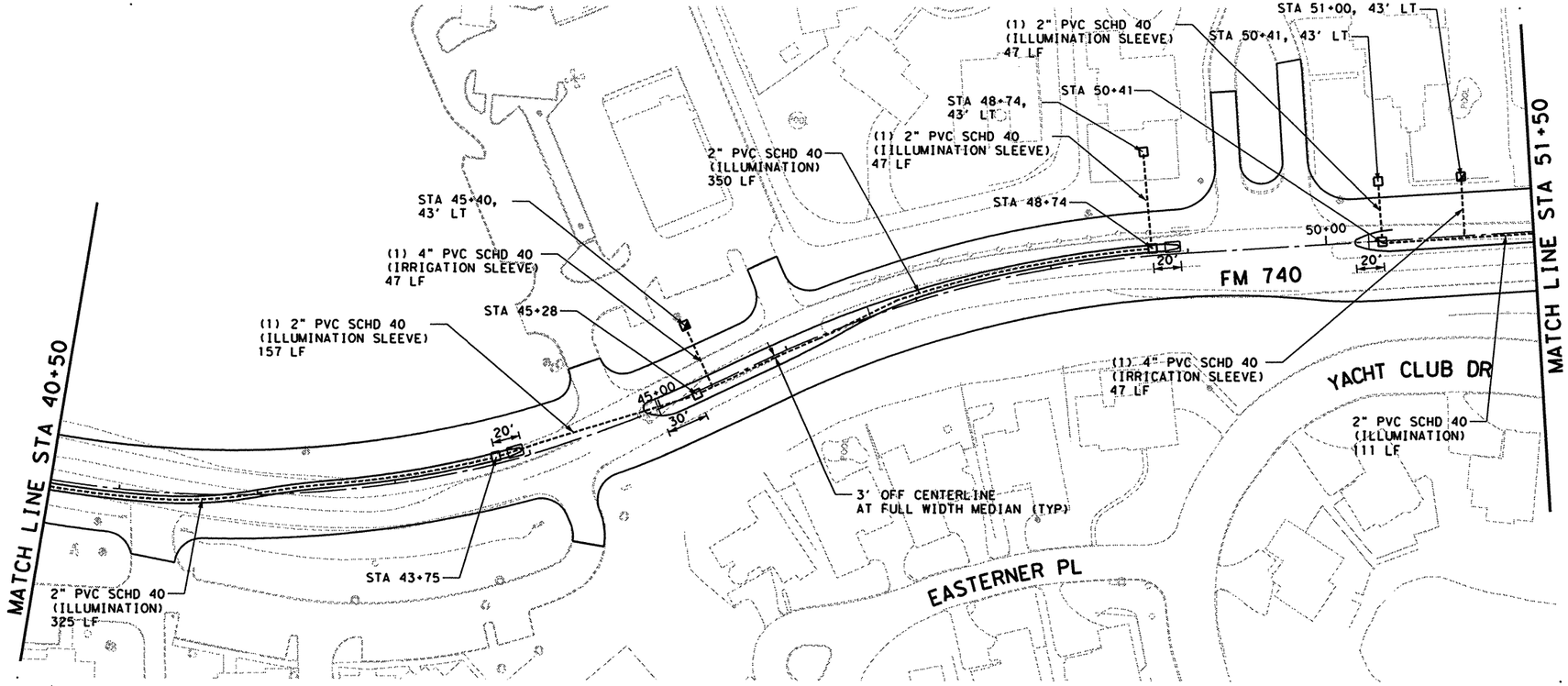
HUITT-ZOLLARS
Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

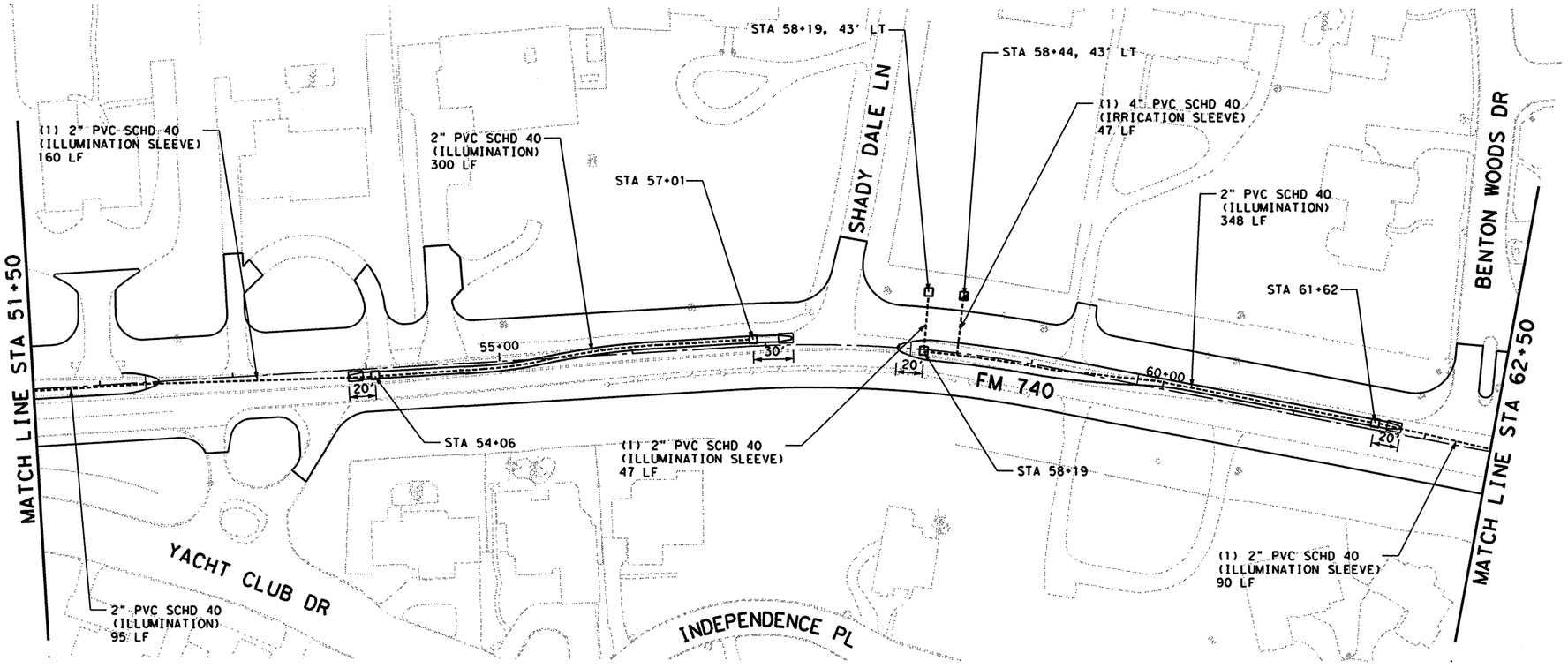
Texas Department of Transportation

FM 740
ILLUMINATION/IRRIGATION CONDUIT LAYOUT
BEGIN PROJECT TO STA 40+50

SCALE: 1"=100' SHEET 1 OF 3

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	388
CHECK CVL	CONTROL	SECTION	JOB	
	1014	03	039	





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0 25 50 75 100
SCALE IN FEET

LEGEND

-------- PROPOSED CONDUIT

□ ILLUMINATION PULL BOX

▨ IRRIGATION PULL BOX

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3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
ILLUMINATION/IRRIGATION CONDUIT LAYOUT
STA 40+50 TO STA 62+50

SCALE: 1"=100' SHEET 2 OF 3

DESIGN	FED.RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
DAN	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CVL	TEXAS	DALLAS	ROCKWALL	389
CHECK DAN	CONTROL	SECTION	JOB	
	1014	03	039	

jparras
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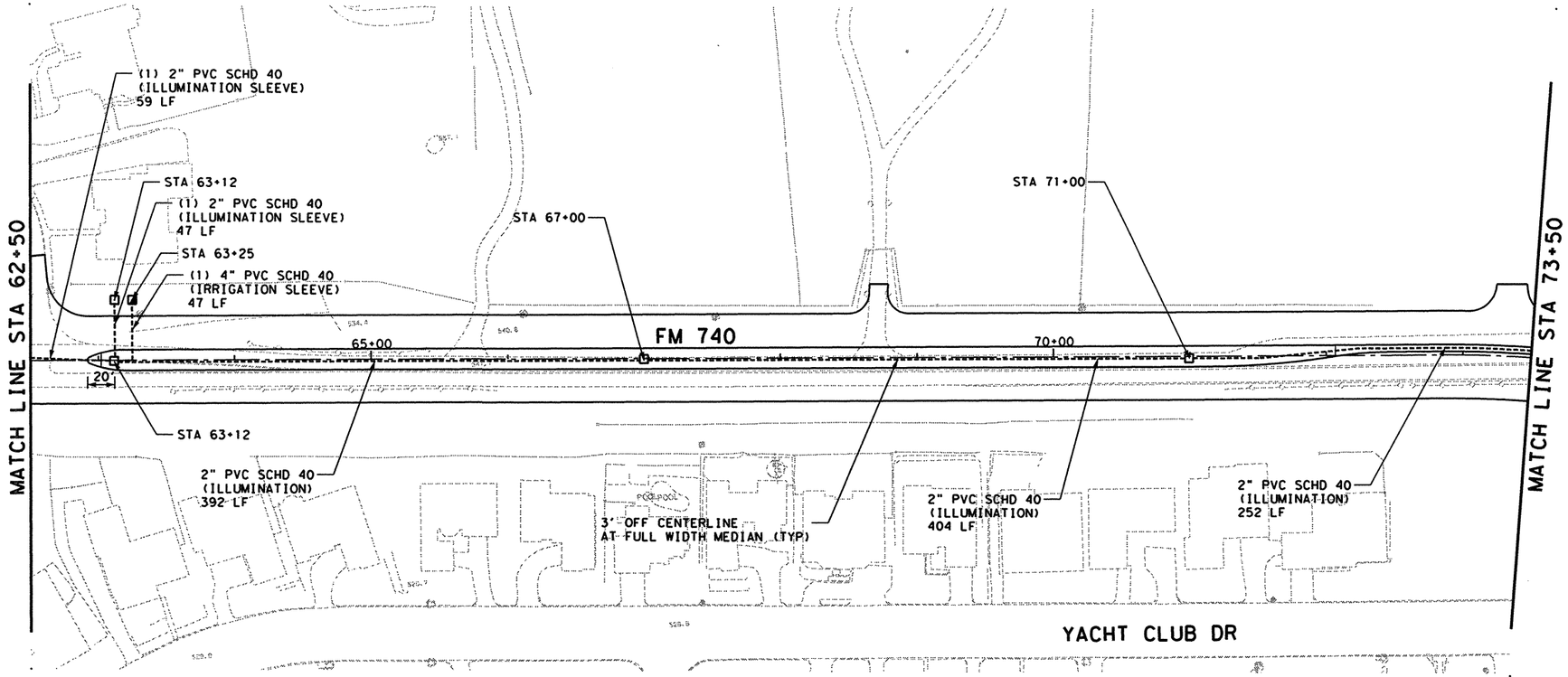

0 25 50 75 100
SCALE IN FEET

LEGEND

-------- PROPOSED CONDUIT

ILLUMINATION PULL BOX

IRRIGATION PULL BOX

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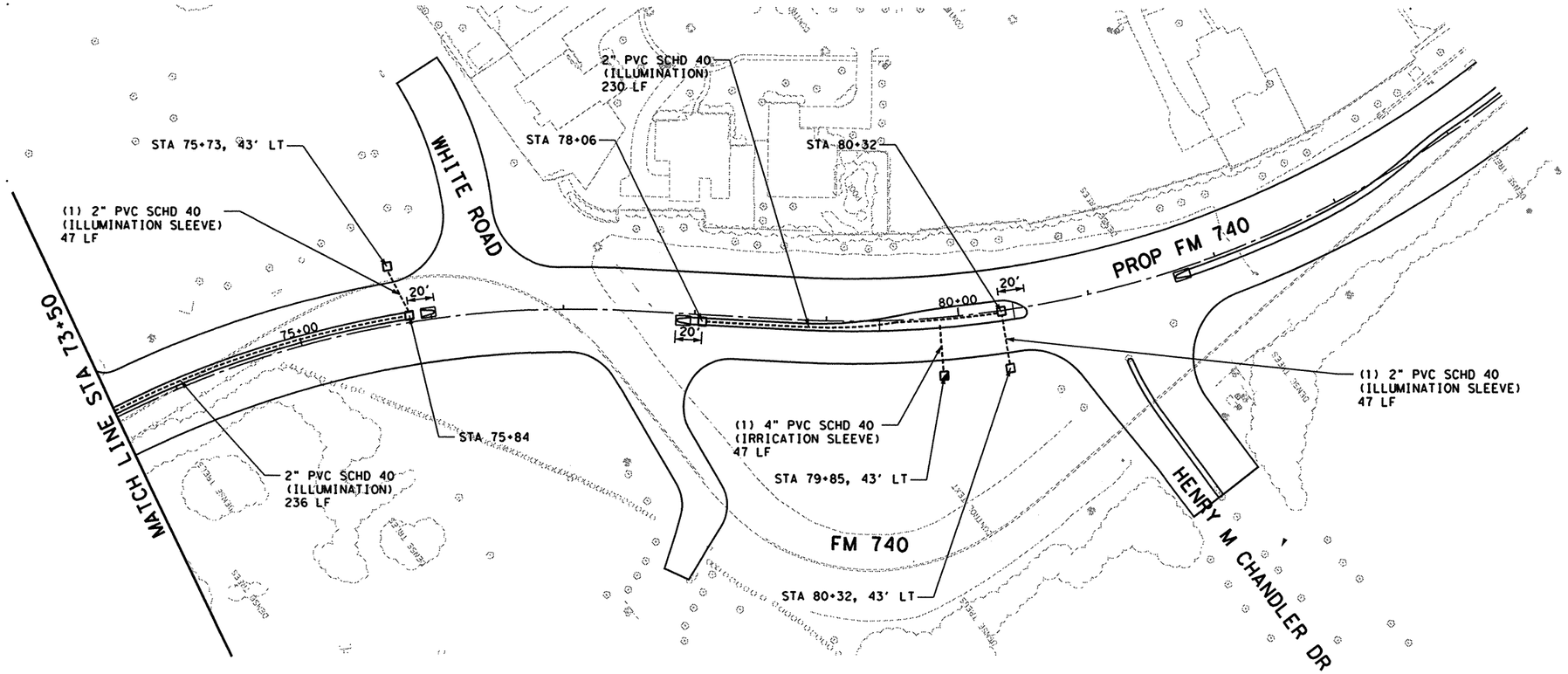

STATE OF TEXAS
DAVID ALAN NUFER
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PROFESSIONAL ENGINEER
4-15-09

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Huitt-Zollars, Inc. Dallas
3131 McKinney Avenue, Suite 600
Dallas, Texas 75204-2489

Texas Department of Transportation

FM 740
ILLUMINATION /IRRIGATION CONDUIT LAYOUT
STA 62+50 TO STA 84+50

SCALE: 1"=100' SHEET 3 OF 3

DESIGN	FED. RD. DIV. RD.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CVL	6	SEE TITLE SHEET		FM 740
GRAPHICS MTU	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK DAN	TEXAS	DALLAS	ROCKWALL	390
CHECK CVL	CONTROL	SECTION	JOB	
	1014	03	039	

jparas
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