TEXAS DEPARTMENT OF TRANSPORTATION

DALLAS DISTRICT
WILLIAM L. HALE, P.E., DISTRICT ENGINEER

DESIGN SCHEMATIC
SH 114 AT FM 156
DENTON COUNTY
PROJECT LENGTH: 0.21 MI.

CONTROL : 0353-02-063
PROJECT LIMIT: AT FM 156
FUNCTIONAL CLASS: RURAL PRINCIPAL ARTERIAL
DESIGN SPEED: 55 mph FM 156
DESIGN SPEED: 25 mph JUG HANDLES
ROLL 2 OF 2

SCALE: 1" = 100' H, 1" = 10' V

AUGUST, 2006

Halff Associates
ENGINEERS . ARCHITECTS . SCIENTISTS . PLANNERS . SURVEYORS

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LEGEND

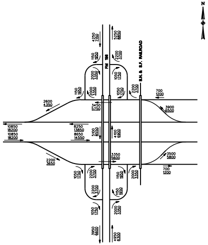
— - - —	EXISTING R.O.W.
— - - —	PROPOSED R.O.W.
→	DIRECTION OF TRAFFIC
— · —	EXISTING PROPERTY LINE
——	EXISTING LOT LINE
— —	FUTURE LOT LINE
▨	ROW AQUISITION
— - —	GRADING LIMITS
— · —	SURVEY LINE
— - - —	CITY LIMITS
— - —	100 FLOODPLAIN LIMITS
548	100 YR FLOOD ELEVATION
12" W	EXISTING WATER LINE
GAS	EXISTING GAS LINE
8" SS	EXISTING SANITARY SEWER
═	EXISTING STORM SEWER
FIBER OPTIC	EXISTING FIBER OPTICS
•	EXISTING POWER POLE
○MH	EXISTING SANITARY SEWER MANHOLE
- - -	EXISTING CONTOURS
	EXISTING PAVEMENT EDGES
— —	EXISTING UTILITY EASEMENTS
— - - —	PROPOSED SH 114 CENTERLINE
— —	PROPOSED DRAINAGE EASEMENT
▒	PROPOSED PAVEMENT
—‖—‖—	PROPOSED CONTROL OF ACCESS
━	PROPOSED RETAINING WALL
═	PROPOSED STORM SEWER

NOTES

1.) THE FLOODPLAIN BOUNDARY LIMITS WERE OBTAINED FROM FIRM COMMUNITY-PANEL NUMBERS:

48121C0475 F, MARCH 30, 1998
48121C0490 F, MARCH 30, 1998
48121C0495 F, MARCH 30, 1998

2.) EXACT LENGTHS OF LEFT TURN STORAGE LANES AND ADDITIONAL MEDIAN OPENING LOCATIONS TO BE DETERMINED DURING PS&E IN COORDINATION WITH DENTON COUNTY, CITY OF FORT WORTH TXDOT.


N
FM 156
B.N. & S.F. RAILROAD
4250
7150
5250
8850
1150
1950
2200
3700
2000
3350
1050
1750
2000
3350
1050
1750
2200
3700
700
1200
2600
4350
3450
5750
3900
6500
10850
18200
8250
13850
10850
18200
8650
14550
5100
8550
4100
6900
3350
5600
2200
3650
3500
5800
700
1200
1050
1750
2200
3700
1150
1950
2000
3350
2200
3700
1150
1950
1050
1750
2000
3350
3950
6600
4950
8300

LEGEND
1,000 - 2005 ADT
1,000 - 2025 ADT

TRAFFIC VOLUME DIAGR
OF FM 156
BASED ON DATA OBTAINED FROM
TRANSPORTATION PLANNING AND PROGRAM
TXDOT, AUSTIN, TEXAS

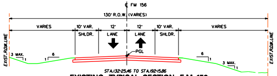
TRAFFIC DIAGRAM

N.T.S.

N AND

AM

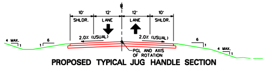
MING



℄ FM 156
130' R.O.W. (VARIES)
VARIES
10' VAR.
SHLDR.
12'
LANE
12'
LANE
10' VAR.
SHLDR.
VARIES
EXIST.ROW.LINE
3 MAX.
1
6
PGL
EXIST.ROW.LINE

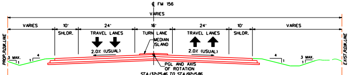
STA.132+25.46 TO STA.192+15.86

EXISTING TYPICAL SECTION F.M. 156



℄
10'
SHLDR.
12'
LANE
12'
LANE
10'
SHLDR.
2.0% (USUAL)
2.0% (USUAL)
4 MAX.
1
6
PGL AND AXIS
OF ROTATION

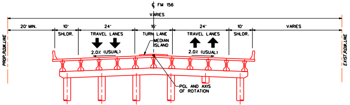
PROPOSED TYPICAL JUG HANDLE SECTION



℄ FM 156
VARIES
VARIES
10'
SHLDR.
24'
TRAVEL LANES
16'
TURN LANE
MEDIAN ISLAND
24'
TRAVEL LANES
10'
SHLDR.
VARIES
PROP.ROW.LINE
EXIST.ROW.LINE
2.0% (USUAL)
2.0% (USUAL)
3 MAX.
1
4
PGL AND AXIS
OF ROTATION

STA.132+25.46 TO STA.192+15.86
MEDIAN ISLAND (WHERE SHOWN IN PLAN)
STA.155+00.00 TO STA.169+00.00

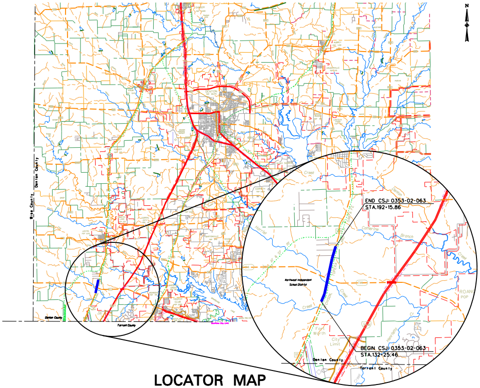
TYPICAL ROAD SECTION F.M. 156



℄ FM 156
VARIES
20' MIN.
10'
SHLDR.
24'
TRAVEL LANES
16'
TURN LANE
MEDIAN ISLAND
24'
TRAVEL LANES
10'
SHLDR.
VARIES
PROP.ROW.LINE
EXIST.ROW.LINE
2.0% (USUAL)
2.0% (USUAL)
PGL AND AXIS
OF ROTATION

STA.153+05.00 TO STA.155+85.44
STA.160+01.49 TO STA.162+74.37
MEDIAN ISLAND (WHERE SHOWN IN PLAN)
STA.155+00.00 TO STA.155+85.44
STA.160+01.49 TO STA.162+74.37

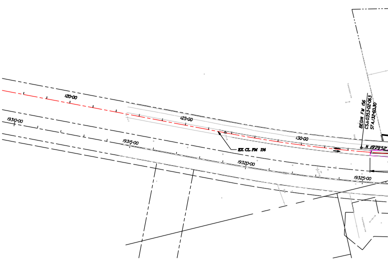
TYPICAL BRIDGE SECTION F.M. 156



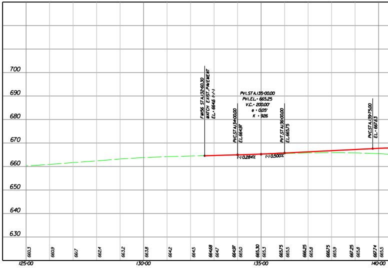
N
Denton County
Wise County
Tarrant County
END CSJ: 0353-02-063
STA.192+15.86
BEGIN CSJ: 0353-02-063
STA.132+25.46
Northwest Independent School District
Fort Worth City Limit
Denton County
Tarrant County

LOCATOR MAP

N.T.S.



120+00
125+00
130+00
19310+00
19315+00
19320+00
19325+00
EX. CL. FM 156
BEGIN FM 156
CSJ: 0353-02-063
STA.132+60.30
N 19°29'52"

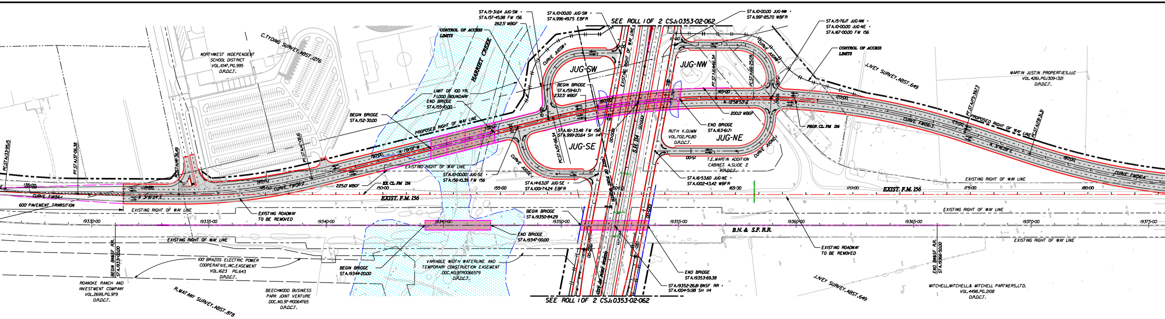


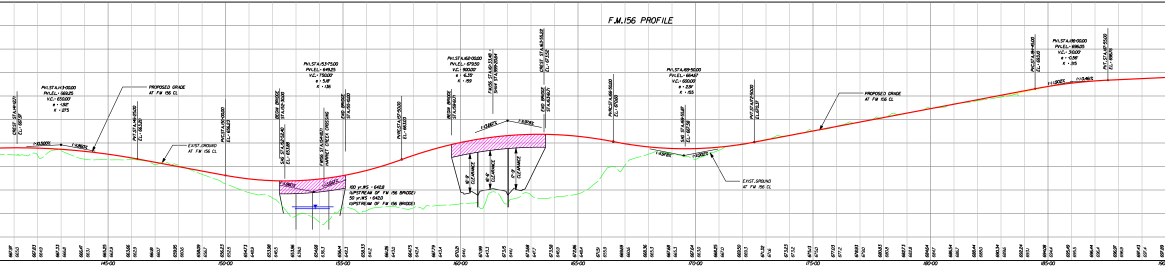
SUPERELEVATION TABLES

SOUTHBOUND	FM 156	NORTHBOUND	SOUTHBOUND	FM 156	NORTHBOUND
STATION	TEMPLATE	STATION	STATION	TEMPLATE	STATION
137+06.39	CL. * -2.00% -2.00% * AXIS OF ROTATION (TYP.)	137+06.39	159+03.34	CL. +4.00% -4.00%	158+12.34
140+22.49	CL. -2.00% -2.00%	138+40.49	174+56.28	CL. +4.00% -4.00%	174+56.28
141+93.49	CL. -4.50% +4.50%	142+84.49	180+02.29	CL. -4.00% +4.00%	180+02.28
146+51.17	CL. -4.50% +4.50%	145+60.17	184+89.97	CL. -4.00% +4.00%	183+98.97
148+22.17	CL. -2.00% -2.00%	150+04.17	186+27.97	CL. -2.00% -2.00%	188+09.97
154+92.34	CL. -2.00% -2.00%	156+74.34	192+15.62	CL. * -2.00% -2.00% *	192+15.62

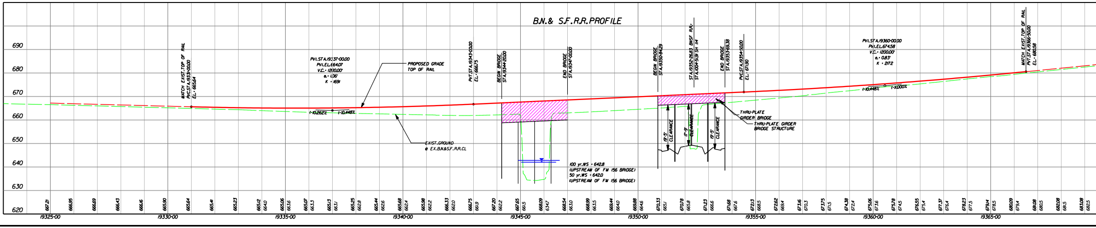
* MATCH EXISTING

CROSS SLOPE TRANSITIONS SHALL BE EFFECTED USING LINEAR INTERPOLATION OF THE CROSS SLOPE VALUES OVER THE LENGTH OF THE TRANSITION.

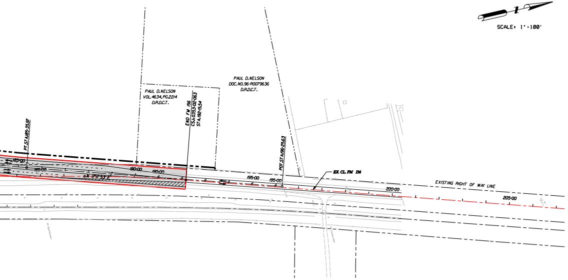

SEE ROLL 1 OF 2 CSJ:0353-02-062
JUG-SW
JUG-NW
JUG-SE
JUG-NE
HARRIET CREEK
S.H. 114
EXIST. F.M. 156
B.N.& S.F. R.R.
C.TYDING SURVEY, ABST. 1276
J. NEY SURVEY, ABST. 649
R. MATANY SURVEY, ABST. 878
NORTHWEST INDEPENDENT SCHOOL DISTRICT VOL.1047, PG.995 D.R.D.C.T.
MARTIN JUSTIN PROPERTIES, LLC VOL.4261, PG.1309-1321 D.R.D.C.T.
RUTH K. GUMM VOL.702, PG.80 D.R.D.C.T.
T.E. MARTIN ADDITION CABINET A, SLIDE 2 P.R.D.C.T.
ROANOKE RANCH AND INVESTMENT COMPANY VOL.2699, PG.979 D.R.D.C.T.
BEECHWOOD BUSINESS PARK JOINT VENTURE DOC. NO. 97-R0064765 D.R.D.C.T.
MITCHELL, MITCHELL & MITCHELL PARTNERS, LTD. VOL.4498, PG.2108 D.R.D.C.T.
100' BRAZOS ELECTRIC POWER COOPERATIVE, INC. EASEMENT VOL.1623 PG.643 D.R.D.C.T.
VARIABLE WIDTH WATERLINE AND TEMPORARY CONSTRUCTION EASEMENT DOC. NO. 97R0066579 D.R.D.C.T.
CONTROL OF ACCESS LIMITS
LIMIT OF 100 YR. FLOOD BOUNDARY
PROPOSED RIGHT OF WAY LINE
EXISTING RIGHT OF WAY LINE
EXISTING ROADWAY TO BE REMOVED
600' PAVEMENT TRANSITION
BEGIN BRIDGE STA.152+30.00
END BRIDGE STA.155+00.00
BEGIN BRIDGE STA.159+61.71
END BRIDGE STA.163+61.71
BEGIN BRIDGE STA.19344+20.00
END BRIDGE STA.19347+00.00
BEGIN BRIDGE STA.19350+84.29
END BRIDGE STA.19353+69.38
BEGIN BNSF RR STA.19331+00.00
END BNSF RR STA.19366+50.00
STA.15+31.64 JUG-SW = STA.157+45.98 FM 156
STA.10+00.00 JUG-SW = STA.996+49.75 EBFR
STA.10+00.00 JUG-NW = STA.997+85.70 WBFR
STA.15+76.17 JUG-NW = STA.10+00.00 JUG-NE = STA.167+00.00 FM 156
STA.10+00.00 JUG-SE = STA.156+10.39 FM 156
STA.14+63.07 JUG-SE = STA.1001+74.24 EBFR
STA.16+53.60 JUG-NE = STA.1002+43.42 WBFR
STA.161+33.48 FM 156 = STA.999+20.64 SH 114
STA.19352+26.81 BNSF RR = STA.1004+51.98 SH 114
262.5' MBGF
232.5' MBGF
225.0' MBGF
200.0' MBGF
EX. CL. FM 156
PROP. CL. FM 156
CURVE FM156-1
CURVE FM156-2
CURVE FM156-3
CURVE FM156-4
CURVE JUGSW-1
CURVE JUGSE-1
CURVE JUGNW-1
CURVE JUGNE-1
N. 78°01'07" W.
N. 12°58'53" E.
N. 31°16'28" E.
N. 31°16'24" E.
145+00
150+00
155+00
160+00
165+00
170+00
175+00
180+00
19330+00
19335+00
19340+00
19345+00
19350+00
19355+00
19360+00
19365+00
19370+00
19375+00

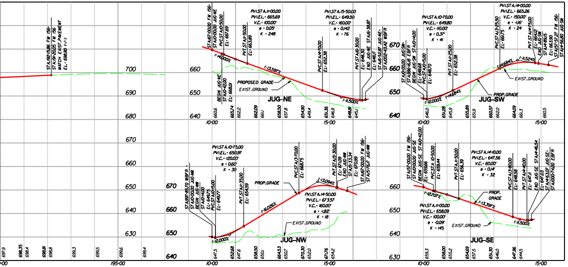

F.M.156 PROFILE

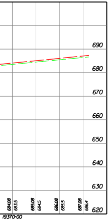
PVI. STA.143+00.00 PVI. EL. = 669.25 V.C. = 650.00' e = -1.92' K = 275
PROPOSED GRADE AT FM 156 CL
CREST STA.141+12.71 EL. = 665.91
(-)0.500%
(-)11.860%
PVT. STA.146+25.00 EL. = 663.20
EXIST. GROUND AT FM 156 CL
PVC. STA.150+00.00 EL. = 656.23
BEGIN BRIDGE STA.152+30.00
SAG STA.152+52.40 EL. = 653.88
PVI. STA.153+75.00 PVI. EL. = 649.25 V.C. = 750.00' e = 5.18' K = 136
FM156 STA.154+18.71 HARRIET CREEK CROSSING
END BRIDGE STA.155+00.00
(-)11.860%
(+)13.667%
100 yr. WS = 642.8 (UPSTREAM OF FM 156 BRIDGE)
50 yr. WS = 642.0 (UPSTREAM OF FM 156 BRIDGE)
PVT. STA.157+50.00 EL. = 663.00
BEGIN BRIDGE STA.159+61.71
PVI. STA.162+00.00 PVI. EL. = 679.50 V.C. = 900.00' e = -6.35' K = 159
FM156 STA.161+33.48 = SH114 STA.999+20.64
CREST STA.163+55.22 EL. = 673.52
END BRIDGE STA.163+61.71
(+)13.667%
(-)11.978%
16'-9" CLEARANCE
16'-6" CLEARANCE
17'-9" CLEARANCE
PVC. STA.166+50.00 EL. = 670.60
PVI. STA.169+50.00 PVI. EL. = 664.67 V.C. = 600.00' e = 2.91' K = 155
SAG STA.169+55.87 EL. = 667.58
(-)11.978%
(+)11.902%
EXIST. GROUND AT FM 156 CL
PVT. STA.172+50.00 EL. = 670.37
PROPOSED GRADE AT FM 156 CL
PVC. STA.184+45.00 EL. = 693.0
PVI. STA.186+00.00 PVI. EL. = 696.05 V.C. = 310.00' e = -0.56' K = 215
PVT. STA.187+55.00 EL. = 696.76
(+)1.902%
(+)0.461%
145+00
150+00
155+00
160+00
165+00
170+00
175+00
180+00
185+00
190+00


B.N.& S.F.R.R. PROFILE

690
680
670
660
650
640
630
620
MATCH EXIST. TOP OF RAIL PVC. STA.19331+00.00 EL. = 665.64
PVI. STA.19337+00.00 PVI. EL. 664.07 V.C. = 1200.00' e = 1.06' K = 1691
PROPOSED GRADE TOP OF RAIL
(-)0.262%
(+)0.448%
EXIST. GROUND @ EX. BN&SF RR CL
PVT. STA.19343+00.00 EL. = 666.75
BEGIN BRIDGE STA.19344+20.00
END BRIDGE STA.19347+00.00
100 yr. WS = 642.8 (UPSTREAM OF FM 156 BRIDGE)
50 yr. WS = 642.0 (UPSTREAM OF FM 156 BRIDGE)
BEGIN BRIDGE STA.19350+84.29
STA.19352+26.83 BNSF R.R. = STA.1004+51.9 SH 114
END BRIDGE STA.19353+69.38
PVC. STA.19354+50.00 EL. = 671.90
19'-5" CLEARANCE
17'-9" CLEARANCE
19'-5" CLEARANCE
THRU-PLATE GIRDER BRIDGE
THRU-PLATE GIRDER BRIDGE STRUCTURE
PVI. STA.19360+00.00 PVI. EL. 674.58 V.C. = 1200.00' e. = 0.83' K = 2172
(+)0.448%
(+)1.000%
MATCH EXIST. TOP OF RAIL PVT. STA.19366+50.00 EL. = 680.58
19325+00
19330+00
19335+00
19340+00
19345+00
19350+00
19355+00
19360+00
19365+00


SCALE: 1"=100'
PAUL D.NELSON
VOL.4634,PG.2214
D.R.D.C.T.
PAUL D.NELSON
DOC.NO.96-R0079636
D.R.D.C.T.
PT.STA.185+35.97
END FM 156
CSJ:0353-02-063
STA.192+15.54
POT.STA.196+25.63
EX. CL. FM 156
EXISTING RIGHT OF WAY LINE
N 17°11'53" E
185+00
190+00
195+00
200+00
205+00


STA.192+15.06 FM 156
STA.19+20.05 FM 156
MATCH EXIST. PAVEMENT
EL. 698.50 (+/-)
700
690
680
670
660
650
640
630
195+00
JUG-NE
STA.167+00.00 FM 156
STA.10+00.00 JUG-NE
PVC.STA.10+50.00
EL. 667.69
PVI.STA.11+00.00
PVI.EL. 665.69
V.C. 100.00'
e 0.05'
K 248
PVT.STA.11+50.00
EL. 663.89
(-)4.000%
(-)13.597%
PROPOSED GRADE
EXIST.GROUND
BEGIN JUG-NE
STA.10+42.00
EL. 668.01
PVC.STA.14+70.00
EL. 652.38
PVI.STA.15+50.00
PVI.EL. 649.50
V.C. 160.00'
e 0.142
K 76
PVT.STA.16+30.00
EL. 648.30
END JUG-NE
EL. 648.17
STA.16+38.87
STA.16+52.87 JUG-NE
STA.1002+43.42 WBFR
(-)1.500%
JUG-SW
STA.10+00.00 JUG-SW
STA.996+16.18 EBFR
BEGIN JUG-SW STA.10+14.00
EL. 648.68
PVC.STA.10+15.00
EL. 648.70
PVI.STA.10+70.00
PVI.EL. 649.80
V.C. 110.00'
e 0.37'
K 41
PVT.STA.11+25.00
EL. 652.38
(-)2.000%
(+)14.684%
PROP.GRADE
EXIST.GROUND
PVC.STA.13+25.50
EL. 661.75
PVI.STA.14+00.00
PVI.EL. 665.26
V.C. 150.00'
e -1.16'
K 24
PVT.STA.14+75.00
EL. 664.12
END JUG-SW
STA.14+89.15
EL. 663.90
STA.157+57.27 FM 156
STA.14+56.80 JUG-SW
(-)1.524%
JUG-NW
STA.997+85.70 WBFR
STA.10+00.00 JUG-NW
BEGIN JUG-NW
STA.10+14.00
EL. 649.75
PVC.STA.10+15.00
EL. 649.77
PVI.STA.10+75.00
PVI.EL. 650.97
V.C. 120.00'
e 0.60'
K 30
PVT.STA.11+35.00
EL. 654.59
(+)16.026%
(-)2.000%
PROP.GRADE
EXIST.GROUND
PVC.STA.13+70.00
EL. 668.75
PVI.STA.14+50.00
PVI.EL. 673.57
V.C. 160.00'
e -1.82'
K 18
PVT.STA.15+30.00
EL. 671.09
END JUG-NW
STA.15+33.34
EL. 670.99
STA.167+00.00 FM 156
STA.15+76.17 JUG-NW
(-)3.094%
JUG-SE
STA.157+00.00 FM 156
STA.10+00.00 JUG-SE
BEGIN JUG-SE STA.10+42.00
EL. 659.66
PVC.STA.10+50.00
EL. 659.44
PVI.STA.11+00.00
PVI.EL. 658.09
V.C. 100.00'
e -0.09'
K 145
PVT.STA.11+50.00
EL. 656.39
(-)2.707%
(-)13.397%
PROP. GRADE
EXIST.GROUND
PVC.STA.13+80.00
EL. 648.58
PVI.STA.14+10.00
PVI.EL. 647.56
V.C. 60.00'
e 0.14'
K 32
PVT.STA.14+40.00
EL. 647.11
END JUG-SE STA.14+46.54
EL. 647.03
STA.14+63.07 JUG-SE
STA.1000+74.00 EBFR
(-)1.500%
10+00
15+00


690
680
670
660
650
640
630
620
19370+00

B.N. & S.F. R.R. CENTERLINE DATA

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Beginning chain BNSFRR description
===============================================================================

Point 115       N      7,055,573.2530  E      2,332,285.4120  Sta 19301+01.6400

Course from 115 to TS BNSFRR-1B  N 23^ 39' 53.7542" E      Dist 1,532.0313

PISCS  BNSFRR-1  N     7,057,728.0608  E     2,333,229.7339  STA 19324+54.2855
Total Tangent  =              820.6142
Total Length   =            1,637.7331
Total Delta    =      10^ 40' 37.9041" (LT)
Back Tangent   = N  23^ 39' 53.7542" E
Ahead Tangent  = N  12^ 59' 15.8500" E

Beginning SCS BNSFRR-1 description
-------------------------------------------------------------------------------

Spiral Back
Spiral BNSFRR-1B           Type 1    Spiral Element

Angle   2^ 50' 59.8698" (LT)   P            2.3625   BK N  23^ 39' 53.7542" E
LS             570.0000        K          284.9765   AH N  20^ 48' 53.8844" E
R            5,729.6507        LT         380.0493   Defl     0^ 56' 59.885
YS               9.4492        ST         190.0448   Deg      0^ 59' 59.954
XS             569.8590        LC         569.9373

                          Spiral Coordinates
                         *------------------*
Point          North                 East                  Station
-----    -------------------   -------------------   -------------------
TS          7,056,976.4534        2,332,900.3499          19316+33.6713
PI          7,057,324.5437        2,333,052.8968          19320+13.7206
SC          7,057,502.1848        2,333,120.4294          19322+03.6713
CC          7,059,538.2229        2,327,764.7366


Circular Section
                                 Curve Data
                                *----------*
Curve BNSFRR-1
P.I.  Station       19324+52.6945  N      7,057,734.9550  E      2,333,208.9201
Delta         =     4^ 58' 38.1646" (LT)
Degree        =     0^ 59' 59.9543"
Tangent       =            249.0232
Length        =            497.7331
Radius        =          5,729.6507
External      =              5.4090
Long Chord    =            497.5766
Mid. Ord.     =              5.4039
P.C.  Station       19322+03.6713  N      7,057,502.1848  E      2,333,120.4294
P.T.  Station       19327+01.4044  N      7,057,974.5249  E      2,333,276.8818
C.C.                               N      7,059,538.2229  E      2,327,764.7366
Back          = N  20^ 48' 53.8844" E
Ahead         = N  15^ 50' 15.7198" E
Chord Bear    = N  18^ 19' 34.8021" E

Spiral Ahead
Spiral BNSFRR-1A           Type 2    Spiral Element

Angle   2^ 50' 59.8698" (LT)   P            2.3625   BK N  15^ 50' 15.7198" E
LS             570.0000        K          284.9765   AH N  12^ 59' 15.8500" E
R            5,729.6507        LT         380.0493   Defl     0^ 56' 59.885
YS               9.4492        ST         190.0448   Deg      0^ 59' 59.954
XS             569.8590        LC         569.9373

                          Spiral Coordinates
                         *------------------*
Point          North                 East                  Station
-----    -------------------   -------------------   -------------------
CS          7,057,974.5249        2,333,276.8818          19327+01.4044
PI          7,058,157.3553        2,333,328.7476          19328+91.4492
ST          7,058,527.6822        2,333,414.1608          19332+71.4044
CC          7,059,538.2229        2,327,764.7366

-------------------------------------------------------------------------------
Ending SCS BNSFRR-1 description

Course from ST BNSFRR-1A to TS BNSFRR-2B  N 12^ 59' 15.8499" E      Dist 4,462.5009

PISCS  BNSFRR-2  N     7,063,407.2734  E     2,334,539.6031  STA 19382+79.1015
Total Tangent  =              545.1962
Total Length   =            1,090.0004
Total Delta    =      4^ 11' 59.9599" (RT)
Back Tangent   = N  12^ 59' 15.8500" E
Ahead Tangent  = N  17^ 11' 15.8099" E

Beginning SCS BNSFRR-2 description
-------------------------------------------------------------------------------

Spiral Back
Spiral BNSFRR-2B           Type 1    Spiral Element

Angle   0^ 37' 29.9929" (RT)   P            0.2273   BK N  12^ 59' 15.8500" E
LS             250.0000        K          124.9995   AH N  13^ 36' 45.8429" E
R           11,459.1923        LT         166.6677   Defl     0^ 12' 29.996
YS               0.9090        ST          83.3343   Deg      0^ 29' 59.994
XS             249.9970        LC         249.9987

                          Spiral Coordinates
                         *------------------*
Point          North                 East                  Station
-----    -------------------   -------------------   -------------------
TS          7,062,876.0243        2,334,417.0744          19377+33.9053
PI          7,063,038.4283        2,334,454.5317          19379+00.5730
SC          7,063,119.4216        2,334,474.1451          19379+83.9053
CC          7,060,422.4076        2,345,611.4339


Circular Section
                                 Curve Data
                                *----------*
Curve BNSFRR-2
P.I.  Station       19382+78.9707  N      7,063,406.1983  E      2,334,543.5911
Delta         =     2^ 56' 59.9742" (RT)
Degree        =     0^ 29' 59.9943"
Tangent       =            295.0654
Length        =            590.0004
Radius        =         11,459.1923
External      =              3.7982
Long Chord    =            589.9353
Mid. Ord.     =              3.7970
P.C.  Station       19379+83.9053  N      7,063,119.4216  E      2,334,474.1451
P.T.  Station       19385+73.9057  N      7,063,689.0209  E      2,334,627.7039
C.C.                               N      7,060,422.4076  E      2,345,611.4339
Back          = N  13^ 36' 45.8429" E
Ahead         = N  16^ 33' 45.8171" E
Chord Bear    = N  15^ 05' 15.8300" E

Spiral Ahead
Spiral BNSFRR-2A           Type 2    Spiral Element

Angle   0^ 37' 29.9929" (RT)   P            0.2273   BK N  16^ 33' 45.8171" E
LS             250.0000        K          124.9995   AH N  17^ 11' 15.8099" E
R           11,459.1923        LT         166.6677   Defl     0^ 12' 29.996
YS               0.9090        ST          83.3343   Deg      0^ 29' 59.994
XS             249.9970        LC         249.9987

                          Spiral Coordinates
                         *------------------*
Point          North                 East                  Station
-----    -------------------   -------------------   -------------------
CS          7,063,689.0209        2,334,627.7039          19385+73.9057
PI          7,063,768.8975        2,334,651.4596          19386+57.2400
ST          7,063,928.1221        2,334,700.7105          19388+23.9057
CC          7,060,422.4076        2,345,611.4339

-------------------------------------------------------------------------------
Ending SCS BNSFRR-2 description

Course from ST BNSFRR-2A to 116  N 17^ 11' 15.8099" E      Dist 1,260.5018

Point 116       N      7,065,132.3320  E      2,335,073.1930  Sta 19400+84.4075

===============================================================================
Ending chain BNSFRR description
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F.M. 156 CENTERLINE DATA

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Beginning chain FM156 description
===============================================================================

Point 23        N      7,057,809.9160  E      2,333,076.5900  Sta   132+60.3000

Course from 23 to PC FM156-1  N 19^ 29' 52.27" E        Dist 134.8534

                                 Curve Data
                                *----------*
Curve FM156-1
P.I.  Station         135+50.9209  N      7,058,083.8710  E      2,333,173.5910
Delta         =       6^ 13' 28.45" (LT)
Degree        =       2^ 00' 00.00"
Tangent       =            155.7675
Length        =            311.2285
Radius        =          2,864.7890
External      =              4.2317
Long Chord    =            311.0755
Mid. Ord.     =              4.2254
P.C.  Station         133+95.1534  N      7,057,937.0361  E      2,333,121.6002
P.T.  Station         137+06.3820  N      7,058,235.4773  E      2,333,209.3546
C.C.                               N      7,058,893.2212  E      2,330,421.0955
Back          = N  19^ 29' 52.27" E
Ahead         = N  13^ 16' 23.82" E
Chord Bear    = N  16^ 23' 08.04" E

Course from PT FM156-1 to PC FM156-2  N 13^ 16' 23.82" E        Dist 430.1078

                                 Curve Data
                                *----------*
Curve FM156-2
P.I.  Station         144+23.8181  N      7,058,933.7479  E      2,333,374.0750
Delta         =      14^ 17' 30.64" (LT)
Degree        =       2^ 30' 00.00"
Tangent       =            287.3283
Length        =            571.6738
Radius        =          2,291.8312
External      =             17.9410
Long Chord    =            570.1929
Mid. Ord.     =             17.8017
P.C.  Station         141+36.4898  N      7,058,654.0953  E      2,333,308.1056
P.T.  Station         147+08.1636  N      7,059,221.0307  E      2,333,368.9673
C.C.                               N      7,059,180.2903  E      2,331,077.4983
Back          = N  13^ 16' 23.82" E
Ahead         = N   1^ 01' 06.83" W
Chord Bear    = N   6^ 07' 38.49" E

Course from PT FM156-2 to PC FM156-3  N 1^ 01' 06.83" W        Dist 1,058.1775

                                 Curve Data
                                *----------*
Curve FM156-3
P.I.  Station         161+18.0910  N      7,060,630.7353  E      2,333,343.9040
Delta         =      13^ 59' 59.72" (RT)
Degree        =       2^ 00' 00.00"
Tangent       =            351.7499
Length        =            699.9961
Radius        =          2,864.7890
External      =             21.5138
Long Chord    =            698.2561
Mid. Ord.     =             21.3535
P.C.  Station         157+66.3411  N      7,060,279.0410  E      2,333,350.1568
P.T.  Station         164+66.3372  N      7,060,973.4956  E      2,333,422.9190
C.C.                               N      7,060,329.9664  E      2,336,214.4931
Back          = N   1^ 01' 06.83" W
Ahead         = N  12^ 58' 52.89" E
Chord Bear    = N   5^ 58' 53.03" E

Course from PT FM156-3 to PC FM156-4  N 12^ 58' 52.89" E        Dist 158.7454

                                 Curve Data
                                *----------*
Curve FM156-4
P.I.  Station         170+86.3335  N      7,061,577.6468  E      2,333,562.1912
Delta         =      18^ 17' 34.95" (RT)
Degree        =       2^ 00' 00.00"
Tangent       =            461.2509
Length        =            914.6521
Radius        =          2,864.7890
External      =             36.8947
Long Chord    =            910.7723
Mid. Ord.     =             36.4256
P.C.  Station         166+25.0826  N      7,061,128.1840  E      2,333,458.5786
P.T.  Station         175+39.7348  N      7,061,971.8737  E      2,333,801.6438
C.C.                               N      7,060,484.6548  E      2,336,250.1527
Back          = N  12^ 58' 52.89" E
Ahead         = N  31^ 16' 27.85" E
Chord Bear    = N  22^ 07' 40.37" E

Course from PT FM156-4 to PC FM156-5  N 31^ 16' 27.85" E        Dist 291.5793

                                 Curve Data
                                *----------*
Curve FM156-5
P.I.  Station         181+85.4294  N      7,062,523.7430  E      2,334,136.8480
Delta         =      14^ 05' 35.26" (LT)
Degree        =       2^ 00' 00.00"
Tangent       =            354.1154
Length        =            704.6563
Radius        =          2,864.7890
External      =             21.8031
Long Chord    =            702.8813
Mid. Ord.     =             21.6384
P.C.  Station         178+31.3141  N      7,062,221.0838  E      2,333,953.0135
P.T.  Station         185+35.9704  N      7,062,862.0559  E      2,334,241.4522
C.C.                               N      7,063,708.3027  E      2,331,504.5046
Back          = N  31^ 16' 27.85" E
Ahead         = N  17^ 10' 52.59" E
Chord Bear    = N  24^ 13' 40.22" E

Course from PT FM156-5 to 24  N 17^ 10' 52.59" E        Dist 1,089.6592

Point 24        N      7,063,903.0890  E      2,334,563.3330  Sta   196+25.6295

===============================================================================
Ending chain FM156 description
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JUG–NE CENTERLINE DATA

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Beginning chain JUGNE description
===============================================================================

Point 706      N      7,061,200.9583  E      2,333,476.3602  Sta     10+00.000

Course from 706 to PC JUGNE-1  S 75^ 31' 13.32" E        Dist 82.7887

                                     Curve Data
                                    *----------*
Curve JUGNE-1
P.I.  Station          12+24.097  N      7,061,144.9260  E      2,333,693.3390
Delta         =      88^ 30' 06.15" (RT)
Degree        =      39^ 30' 00.00"
Tangent       =           141.3082
Length        =           224.0550
Radius        =           145.0526
External      =            57.4524
Long Chord    =           202.4357
Mid. Ord.     =            41.1527
P.C.  Station          10+82.789  N      7,061,180.2581  E      2,333,556.5192
P.T.  Station          13+06.844  N      7,061,007.2292  E      2,333,661.5964
C.C.                              N      7,061,039.8129  E      2,333,520.2509
Back          = S  75^ 31' 13.32" E
Ahead         = S  12^ 58' 52.83" W
Chord Bear    = S  31^ 16' 10.24" E

Course from PT JUGNE-1 to 707  S 12^ 58' 52.83" W        Dist 346.0229

Point 707      N      7,060,670.0495  E      2,333,583.8680  Sta     16+52.867

===============================================================================
Ending chain JUGNE description
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JUG–NW CENTERLINE DATA

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Beginning chain JUGNW description
===============================================================================

Point 704      N      7,060,852.6639  E      2,333,164.1631  Sta     10+00.000

Course from 704 to PC JUGNW-1  N 12^ 58' 53.01" E        Dist 266.5379

                                     Curve Data
                                    *----------*
Curve JUGNW-1
P.I.  Station          14+15.434  N      7,061,257.4810  E      2,333,257.4840
Delta         =      91^ 29' 54.12" (RT)
Degree        =      39^ 30' 00.00"
Tangent       =           148.8964
Length        =           231.6414
Radius        =           145.0526
External      =            62.8185
Long Chord    =           207.8000
Mid. Ord.     =            43.8348
P.C.  Station          12+66.538  N      7,061,112.3899  E      2,333,224.0367
P.T.  Station          14+98.179  N      7,061,220.2512  E      2,333,401.6509
C.C.                              N      7,061,079.8061  E      2,333,365.3822
Back          = N  12^ 58' 53.01" E
Ahead         = S  75^ 31' 12.87" E
Chord Bear    = N  58^ 43' 50.07" E

Course from PT JUGNW-1 to 705  S 75^ 31' 12.87" E        Dist 77.1602

Point 705      N      7,061,200.9583  E      2,333,476.3602  Sta     15+75.340

===============================================================================
Ending chain JUGNW description
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JUG–SE CENTERLINE DATA

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Beginning chain JUGSE description
===============================================================================

Point 708      N      7,060,123.1180  E      2,333,352.9290  Sta    10+00.0000

Course from 708 to PC JUGSE-01  N 88^ 58' 52.76" E        Dist 89.3038

                                     Curve Data
                                    *----------*
Curve JUGSE-01
P.I.  Station         12+06.3186  N      7,060,126.7860  E      2,333,559.2150
Delta         =      75^ 54' 55.81" (LT)
Degree        =      38^ 11' 49.87"
Tangent       =           117.0148
Length        =           198.7463
Radius        =           150.0000
External      =            40.2432
Long Chord    =           184.5241
Mid. Ord.     =            31.7303
P.C.  Station         10+89.3038  N      7,060,124.7057  E      2,333,442.2187
P.T.  Station         12+88.0501  N      7,060,240.7714  E      2,333,585.6686
C.C.                              N      7,060,274.6820  E      2,333,439.5519
Back          = N  88^ 58' 52.76" E
Ahead         = N  13^ 03' 56.95" E
Chord Bear    = N  51^ 01' 24.86" E

Course from PT JUGSE-01 to 709  N 13^ 03' 56.95" E        Dist 175.0227

Point 709      N      7,060,411.2630  E      2,333,625.2360  Sta    14+63.0728

===============================================================================
Ending chain JUGSE description
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JUG–SW CENTERLINE DATA

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Beginning chain JUGSW description
===============================================================================

Point 710      N      7,060,621.7760  E      2,333,144.8570  Sta    10+00.0000

Course from 710 to PC JUGSW-01  S 13^ 03' 57.45" W        Dist 163.4492

                                     Curve Data
                                    *----------*
Curve JUGSW-01
P.I.  Station         13+20.9102  N      7,060,309.1740  E      2,333,072.3080
Delta         =      92^ 46' 48.77" (LT)
Degree        =      38^ 11' 49.87"
Tangent       =           157.4611
Length        =           242.8980
Radius        =           150.0000
External      =            67.4718
Long Chord    =           217.2158
Mid. Ord.     =            46.5383
P.C.  Station         11+63.4492  N      7,060,462.5585  E      2,333,107.9056
P.T.  Station         14+06.3472  N      7,060,281.0582  E      2,333,227.2386
C.C.                              N      7,060,428.6476  E      2,333,254.0222
Back          = S  13^ 03' 57.45" W
Ahead         = S  79^ 42' 51.32" E
Chord Bear    = S  33^ 19' 26.94" E

Course from PT JUGSW-01 to 711  S 79^ 42' 51.32" E        Dist 125.2939

Point 711      N      7,060,258.6860  E      2,333,350.5190  Sta    15+31.6411

===============================================================================
Ending chain JUGSW description
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TEXAS DEPARTMENT OF TRANSPORTATION

DALLAS DISTRICT
WILLIAM L. HALE, P.E., DISTRICT ENGINEER

DESIGN SCHEMATIC
SH 114 AT FM 156
DENTON COUNTY
PROJECT LENGTH: 0.21 MI.

CONTROL : 0353–02–063
PROJECT LIMIT: AT FM 156
FUNCTIONAL CLASS: RURAL PRINCIPAL ARTERIAL
DESIGN SPEED: 55 mph FM 156
DESIGN SPEED: 25 mph JUG HANDLES
ROLL 2 OF 2

SCALE: 1″=100′ H, 1″=10′ V

AUGUST, 2006

Halff Associates
ENGINEERS . ARCHITECTS . SCIENTISTS . PLANNERS . SURVEYORS

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