

CONSTRUCTION PLANS

FOR

TRINITY STREET

DRAINAGE IMPROVEMENTS

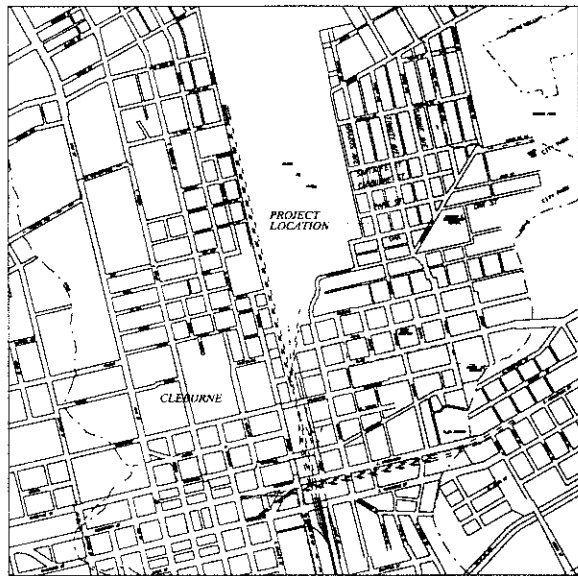
CLEBURNE, TEXAS

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- RICK GOON**
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ASSISTANT DIRECTOR OF PUBLIC WORKS
- GERALD LINCYCOMB**
WATER UTILITIES SUPERINTENDENT

APPROVED BY THE CITY OF CLEBURNE

DIRECTOR OF PUBLIC WORKS DATE



PROJECT LOCATION MAP
SCALE: 1" = 300'

SHEET INDEX	
NO.	DESCRIPTION
1	DRAINAGE PLAN
2	CHANNEL TRINITY STREET PLAN / PROFILE
3	BOX CULVERT DETAILS
4	WING WALL DETAILS
5	MISCELLANEOUS DETAILS



City of Cleburne

2002

JOHNSON COUNTY, TEXAS



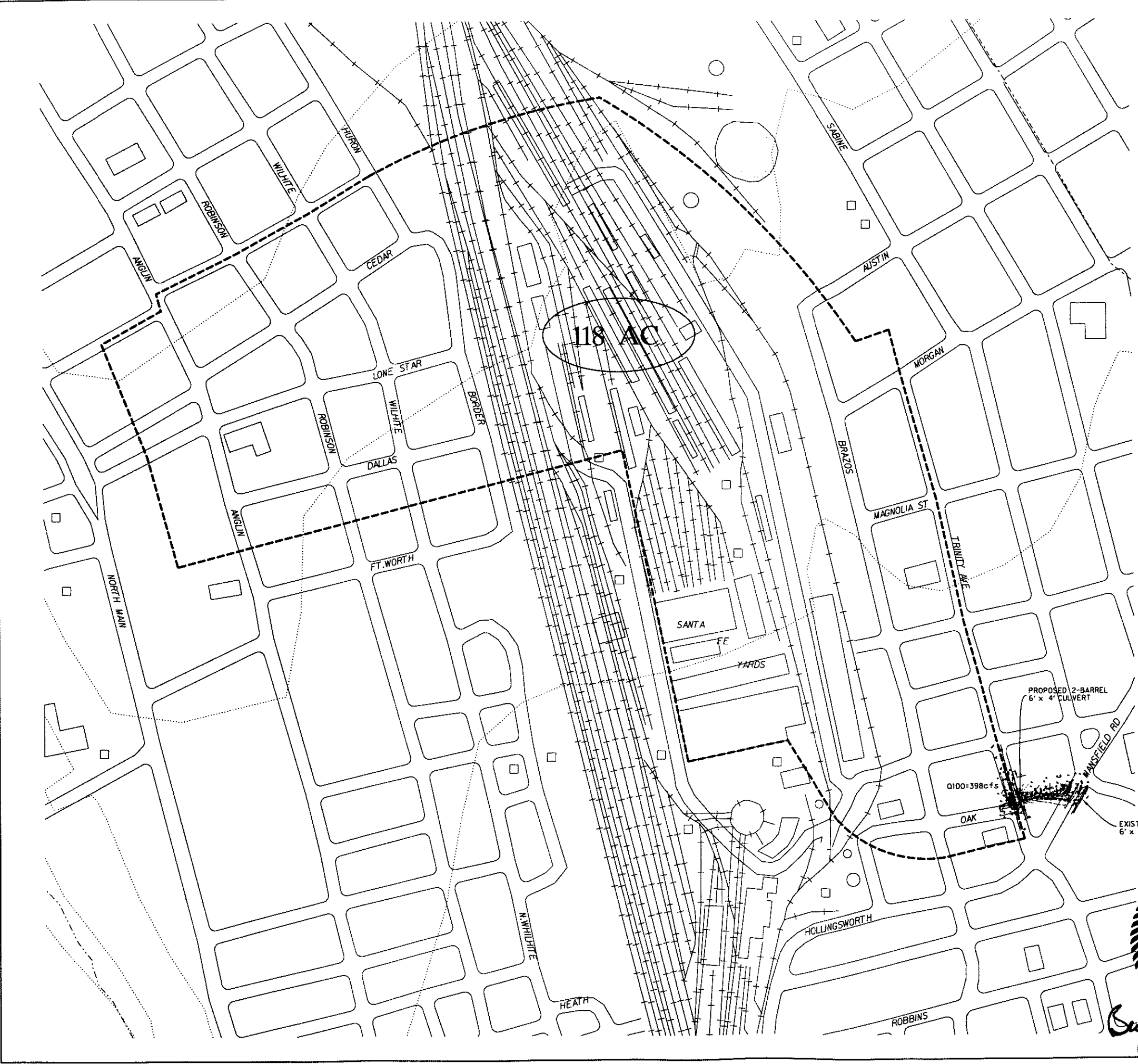
PREPARED BY:

CHILDRESS ENGINEERS
CONSULTANTS AND PLANNERS
ONE NORTH WALNUT
CLEBURNE, TEXAS 76031

Benjamin S. Shanklin
BENJAMIN S. SHANKLIN, P.E.

7-22-02
DATE

RECEIVED JUL 25 2002
NOT FINAL SET



DRAINAGE CALCULATIONS										
DRAINAGE AREA NO.	TOTAL AREA ACRES	Tc MIN.	C	I _a IN./HR.	Q _a CFS	I _w IN./HR.	Q _w CFS	I _p IN./HR.	Q _p CFS	COMMENTS
1	118	40	0.63	2.5	267	4.3	320	5.56	398	2-BARREL 6' x 4' BOX

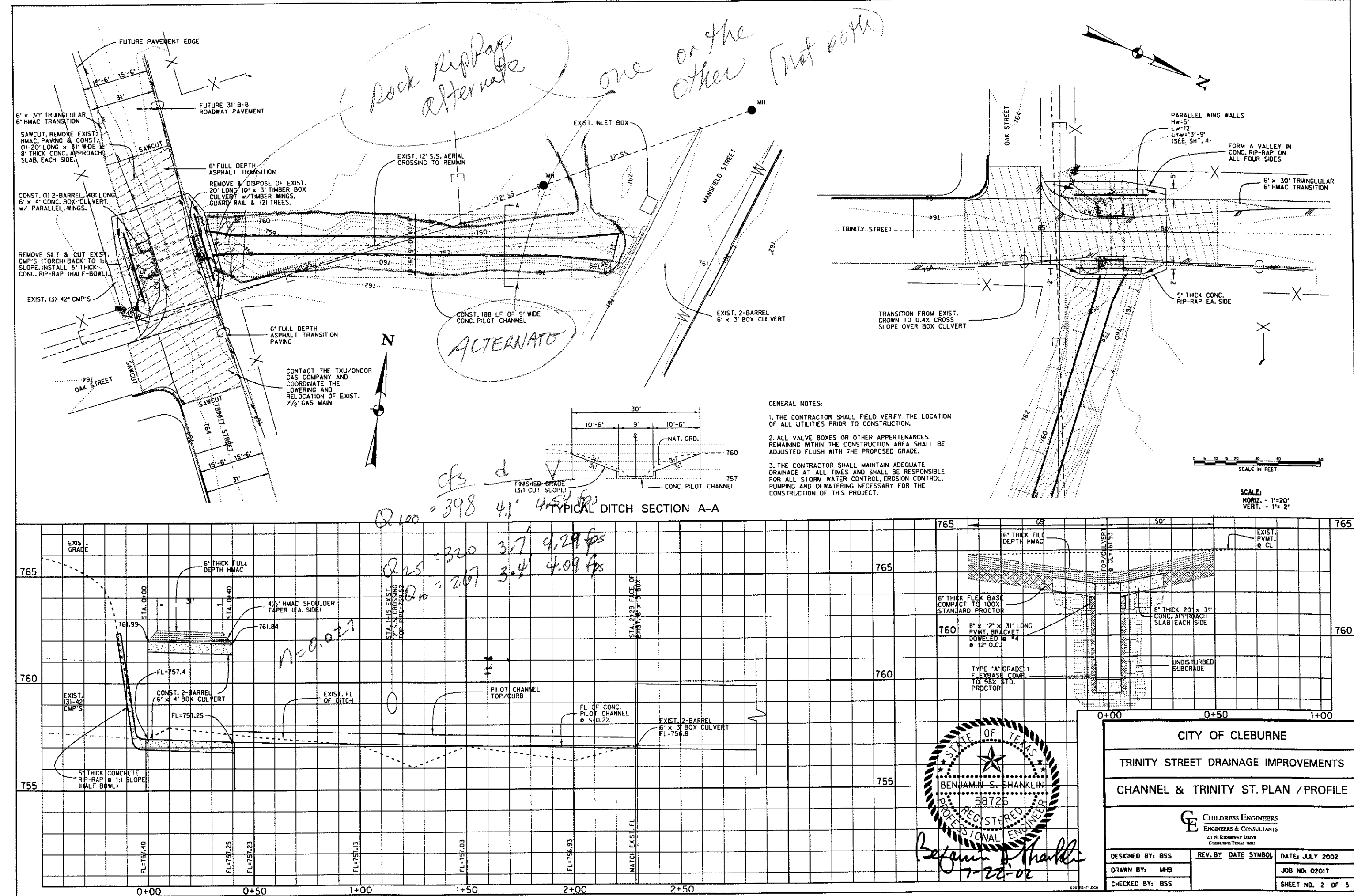
$Q_{100} = 398 \text{ cfs}$
 $Q_{25} = 320 \text{ cfs}$
 $Q_{10} = 267 \text{ cfs}$

0 100 200 300 400 500
SCALE IN FEET



Benjamin S. Shanklin
7-22-02

CITY OF CLEBURNE			
TRINITY STREET DRAINAGE IMPROVEMENTS			
DRAINAGE AREA MAP			
 CHILDRESS ENGINEERS ENGINEERS & CONSULTANTS 201 N. RIVERWAY DRIVE CLEBURNE, TEXAS 76033			
DESIGNED BY: BSS	REV. BY: DATE SYMBOL	DATE: JULY 2002	
DRAWN BY: MMB		JOB NO: 02017	
CHECKED BY: BSS		SHEET NO. 1 OF 5	



Bar Dimensions

H	X*	Y*
3'-0"	3'-5"	2'-2"
4'-0"	4'-5"	2'-2"
5'-0"	5'-5"	2'-2"
6'-0"	6'-5"	2'-2"

BARS K ~ #4
(Spa = 1'-0" Max)
(Length = 4'-3")

BARS C

BARS D

BARS Z

BARS Y

② Extend into slab.

SECTION THRU CURB

Finished Grade (Roadway Slope)

3" Chamfer (See GENERAL NOTES)

TYPICAL SECTION ③

③ Reinforcing shown for orientation purposes only. See table for number and spacing of bars.

Length of Box

BARS F₂ (Top & Bottom)

BARS D

BARS B (Top)

BARS E (Bottom)

BARS F₂

BARS M

BARS F₁ (Bottom)

BARS C

BARS H

BARS Z

BARS F₂

BARS F₂

BARS E (Top)

BARS B (Bottom)

BARS C

PART PLANS ③

TOP SLAB

GENERAL NOTES:

Designed according to current AASHTO Standard and Interim Specifications.

Designed for HS20 Loading and to the maximum fill height shown.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" concrete with a minimum 28 day compressive strength of 3600 psi, except for the top slab of direct traffic culverts, which shall be Class "S" concrete with a minimum 28 day compressive strength of 4000 psi.

The bottom edge of the top slab shall be chamfered 3' at the entrance.

Reinforcing bars shall be adjusted to provide a minimum of 1 1/4" clear cover.

Construction joints shown at the flow line may be raised a maximum of 6' at the Contractor's option. If this option is used, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed. See standard MC-M0 for skewed ends, section details and lengthening details.

For Direct Traffic, construct top slab to conform to crown of roadway while maintaining constant thickness of slab. Bar Dimensions "X" and "Y" shall be adjusted as necessary. The maximum permissible variation in dimension H is 6 inches.

HS20 LOADING

Texas Department of Transportation
Bridge Division

CITY OF CLEBURNE

TRINITY STREET DRAINAGE IMPROVEMENTS

BOX CULVERT DETAILS

CHILDRESS ENGINEERS
ENGINEERS & CONSULTANTS
20 N. ROCKWAY DRIVE
CLEBURNE, TEXAS 76033

DESIGNED BY: BSS

DRAWN BY: MMB

CHECKED BY: BSS

REV. BY DATE SYMBOL

DATE: JULY 2002

JOB NO: 02017

SHEET NO. 3 OF 4

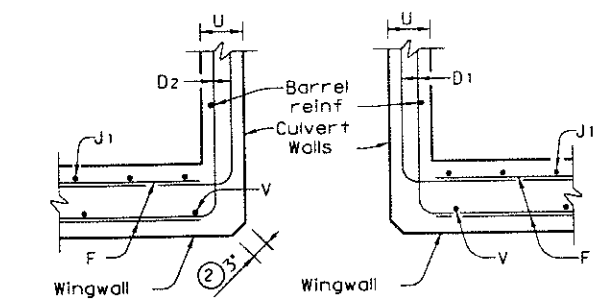
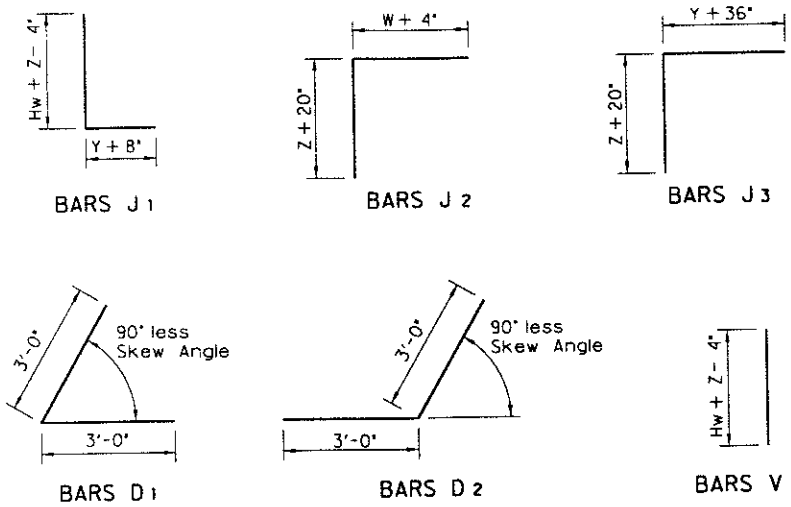
REGISTERED PROFESSIONAL ENGINEER
BENJAMIN S. SHANKLIN
58726

Benjamin S. Shanklin
7-22-02

TABLE OF DIMENSIONS & REINFORCING STEEL (Wings for One Structure End)									
Dimensions				Variable Reinforcing		④ Estimated Quantities per ft of wing (2-Wings)		Estimated Quantities per ft of (1-Toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1 Bars J2	Reinf Lb/Ft	Conc CY/Ft	Reinf Lb/Ft	Conc CY/Ft
2'-6"	2'-10"	10"	1'-0"	7"	#4 1'-0" #4 1'-0"	43.13	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4 1'-0" #4 1'-0"	43.80	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4 1'-0" #4 1'-0"	44.47	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4 1'-0" #4 1'-0"	47.81	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4 1'-0" #4 1'-0"	48.48	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4 1'-0" #4 1'-0"	50.26	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4 1'-0" #4 1'-0"	54.27	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4 1'-0" #4 1'-0"	57.94	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4 1'-0" #4 1'-0"	61.95	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5 1'-0" #5 1'-0"	75.16	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5 1'-0" #5 1'-0"	79.54	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5 1'-0" #5 1'-0"	86.65	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5 1'-0" #5 1'-0"	91.03	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5 6" #5 6"	133.54	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5 6" #5 6"	138.96	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5 6" #5 6"	151.43	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6 6" #5 6"	190.76	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6 6" #6 6"	224.62	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7 6" #6 6"	277.90	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8 6" #6 6"	343.21	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9 6" #6 6"	427.43	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9 6" #7 6"	484.01	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9 6" #7 6"	500.21	2.448	11.47	0.279

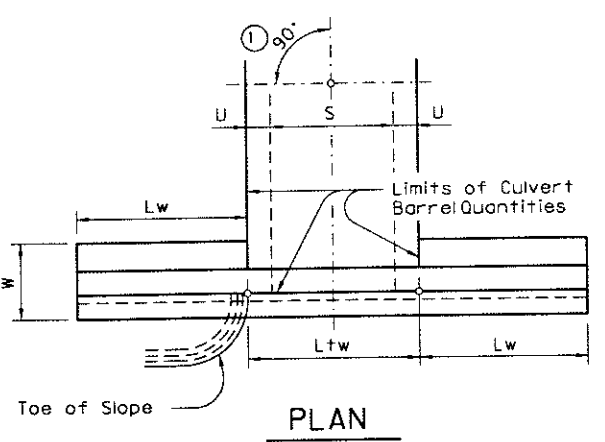
TABLE OF WINGWALL REINFORCING (2-Wings)			
Bar	Size	No.	Spa
D1	#5	~	1'-0"
D2	#5	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#5	~	1'-0"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING			
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"

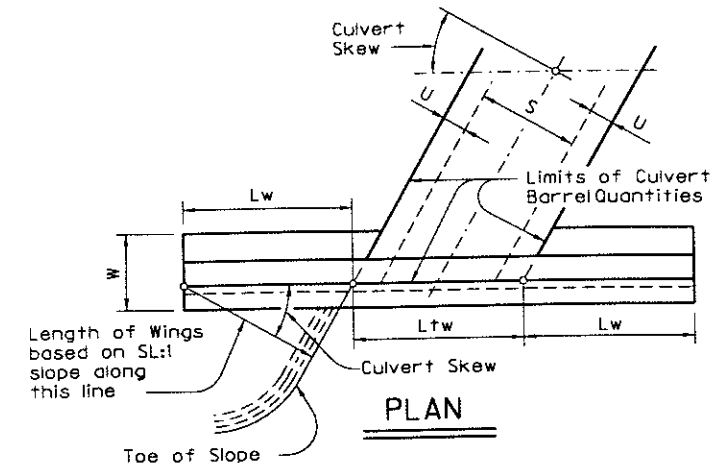


SECTION C-C

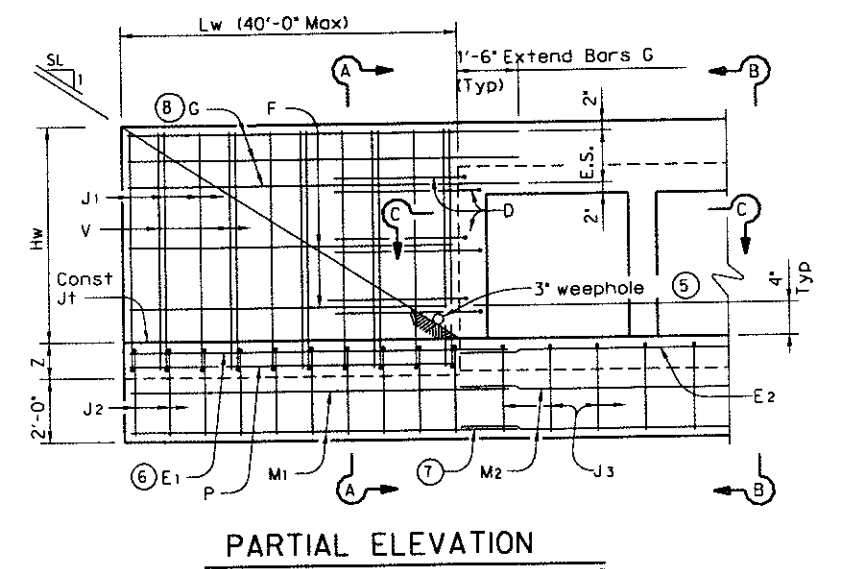
SECTION C-C



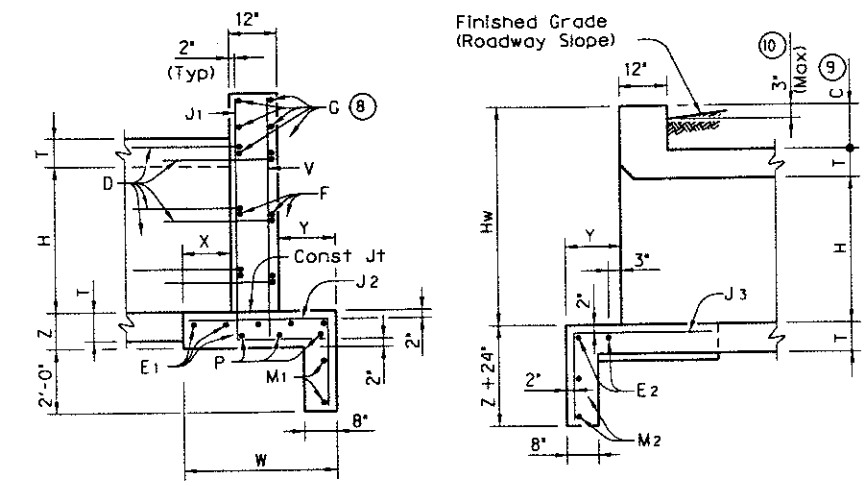
DETAILS FOR NON-SKEWED BOX CULVERTS



DETAILS FOR SKEWED BOX CULVERTS (Showing 30° Skew)



PARTIAL ELEVATION



SECTION A-A (Showing Wing Reinf)

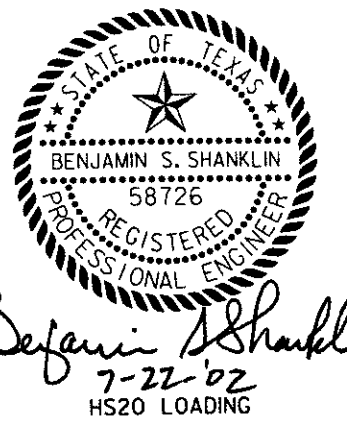
SECTION B-B (Showing Toewall Reinf)

- Skew Angle = 0°
- At discharge end, chamfer may be 3/4".
- For 15° Skew ~ 1' For 30° Skew ~ 2' For 45° Skew ~ 3'
- Quantities shown are for two wings. To determine total quantities for two wings, multiply the tabulated values by Lw.
- Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
- Extend Bars E1 1'-6" minimum into the bottom slab of the culvert.
- Lap Bars M1 1'-6" minimum with Bars M2.
- Bars G shall be equally spaced at 1'-0" maximum, placed as shown. There shall be at least 4 Bars G per wing.
- 0' min to 5'-0" max.
- For vehicle safety, curb heights and wall heights shall be reduced, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

WING DIMENSION CALCULATIONS:
Formulas: (All values are in Feet)
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine (φ)
For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ (Cosine φ)
For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5' U)] ÷ (Cosine φ)
Total Wingwall Area (Two Wings ~ S.F.) = (2) (Hw) (Lw)

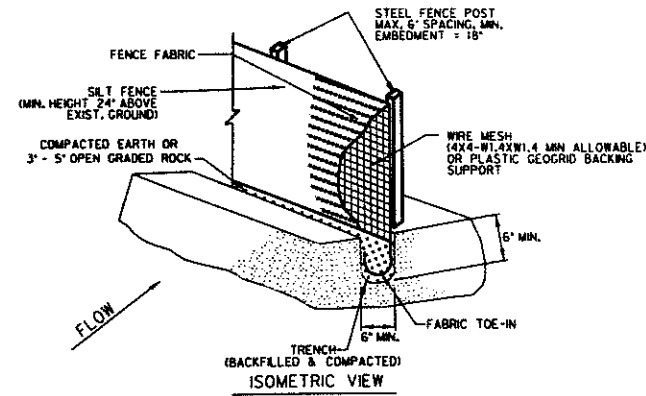
Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL = Channel Slope ratio, (Horizontal:1 Vertical, Usual value is 2:1)
φ = Culvert Skew
See applicable box culvert standard for S, H, T and U values.

GENERAL NOTES:
Designed according to current AASHTO Standard and Interim Specifications.
All reinforcing steel shall be Grade 60.
All concrete shall be Class 'C' and shall have a minimum 28 day compressive strength of 3600 psi.
All reinforcing bars shall be adjusted to provide a minimum of 1 1/2" clear cover.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

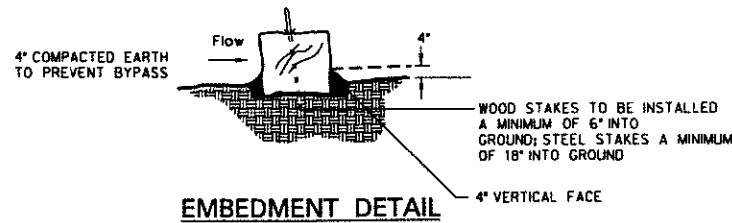
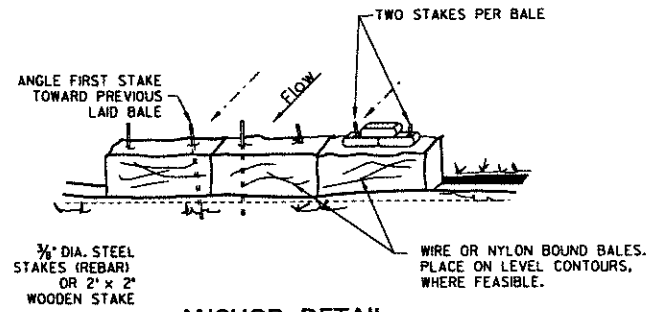


Defamin S. Shanklin
7-22-02
HS20 LOADING

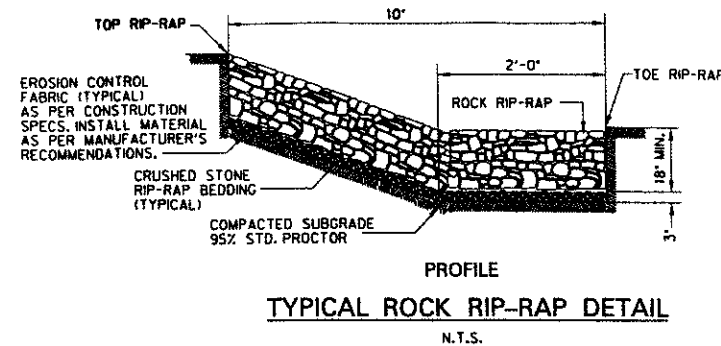
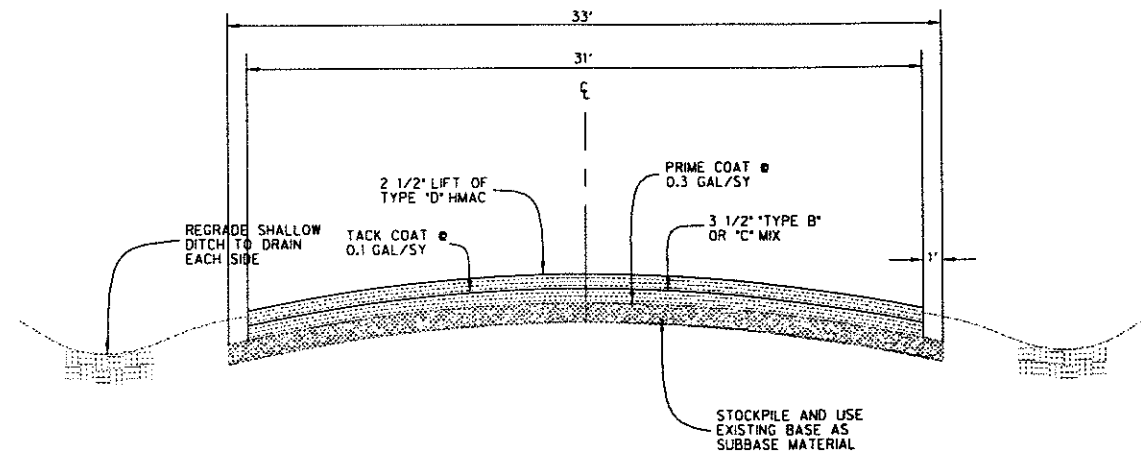
Texas Department of Transportation Bridge Division		
CITY OF CLEBURNE		
TRINITY STREET DRAINAGE IMPROVEMENTS		
BOX CULVERT WING WALL DETAILS		
CHILDRESS ENGINEERS ENGINEERS & CONSULTANTS 201 N. RIVERWAY DRIVE CLEBURNE, TEXAS 76031		
DESIGNED BY: BSS	REV. BY: DATE SYMBOL	DATE: JULY 2002
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CHECKED BY: BSS		SHEET NO. 4 OF 5



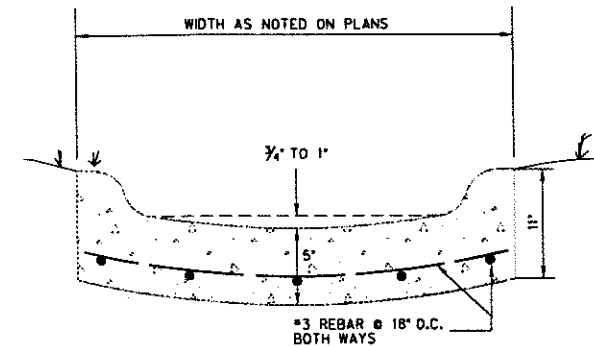
- GENERAL NOTES:
1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED WITH A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 18".
 2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE, AS NECESSARY, TO PREVENT FLOW UNDER FENCE.
 3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED.
 4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO BACKING SUPPORT, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. FABRIC SHALL OVERLAP AT ABUTTING ENDS A MINIMUM OF 3 FEET AND SHALL BE JOINED SUCH THAT NO BYPASS OR LEAKAGE OCCURS.
 5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
 6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
 7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.



HAY BALE DIKE



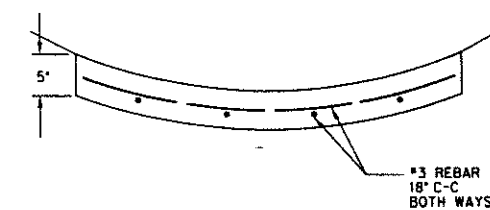
- NOTES:
1. CONTRACTION JOINTS SHALL BE SAWS.
 2. JOINT SEALING MATERIAL SHALL CONFORM TO CLASS 1, CLASS 2 OR CLASS 3 TxDOT STANDARD SPECIFICATION ITEM 433 OR APPROVED EQUAL.
 3. LONGITUDINAL CONTRACTION JOINTS OR OPTIONAL CONSTRUCTION JOINTS WITH TIEBARS AT THE CONTRACTOR'S OPTION.
 4. TRANSVERSE CONTRACTION JOINTS SHALL BE CONSTRUCTED AT 20' INTERVALS.
 5. EXPANSION JOINTS SHALL BE CONSTRUCTED AT INTERSECTIONS AS SHOWN. SPACING SHALL NOT EXCEED 600'.



TYPICAL CONCRETE PILOT CHANNEL DETAIL

N.T.S.

NOTE: CONCRETE SHALL BE A MINIMUM OF 5-SACK (3,000 PSI) COMPRESSIVE STRENGTH AT 28 DAYS.



TYPICAL CONC. RIP-RAP DETAIL

N.T.S.



Benjamin S. Shanklin
7-22-07

CITY OF CLEBURNE			
TRINITY STREET DRAINAGE IMPROVEMENTS			
MISCELLANEOUS DETAILS			
CHILDRESS ENGINEERS			
CONSULTANTS AND PLANNERS ONE NORTH WALNUT CLEBURNE, TEXAS 76031			
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