STATE	FEDERAL AID PROJECT NO.	SHEET NO.
6 TEXAS	NH 76(139)M	1

DISTRICT	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
12	WALLER	0114	11	058	US 290

FINAL PLANS

Contractor: Williams Brothers Construction Co., Inc.
Contract Date: October 20, 1992
Work Began: October 21, 1992
Work Completed: January 15, 1994

SEE SHEET NO. 2 FOR DETAILED INDEX

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED AT THE DETAILED INDEX SHEETS HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

J.C. Liu, P.E. — J.C. LIU
April 1, 1992 — DATE

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

FINAL PLANS OF ~~PROPOSED~~
STATE HIGHWAY IMPROVEMENT

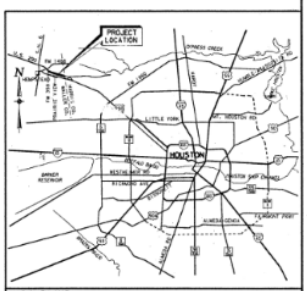
FEDERAL AID PROJECT NH 76(139)M

NET LENGTH OF PROJECT — ROWY = 38,196.30 FT = 7.234 MI; BRIDGE = 1514.74 FT = 0.286 MI*; TOTAL = 39,711.04 FT = 7.520 MI

* BRIDGE LENGTH BASED ON EASTBOUND LANES

WALLER COUNTY
U.S. 290

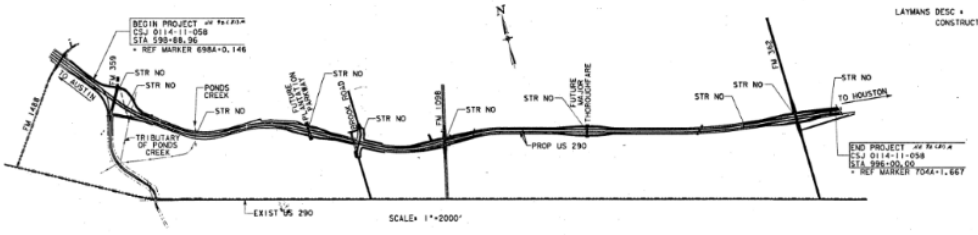
LIMITS OF US 290= 0.26 MI. W OF FM 359 TO HARRIS COUNTY LINE
CONSTRUCTION OF A NEW LOCATION OF FREEWAY FACILITY
CONSISTING OF GRADING, CEMENT STABILIZED BASE, CONCRETE PAVEMENT, RETAINING WALLS, BRIDGES, SIGNING, PAVEMENT MARKINGS, LIGHTING AND TRAFFIC SIGNALS.



VICINITY MAP

DESIGN SPEED = 70 MPH MAINLANES

LAYMANS DESC =
CONSTRUCT 4 - LANE FREEWAY ON A NEW LOCATION



CO	DESCRIPTION
1	Temporary erosion control
2	Relocate gas line
3	Replace BRI
4	Mod cap Alter No. 4 of Pond's Creek Bridge
5	Lift sprung for block out
6	Install TV D Retention Blockers
7	Temp erosion control
8	Electrical force account
9	Install 300' gas line
10	Mod pump station
11	Install concrete flumes
12	Relocate electrical service
13	Install Retrofitting for Proto Buffalo
14	Install fence
15	Install concrete buffer
16	Remove non-damaged areas
17	Install shoulder drains
18	Relocate & backfill existing channel
19	Revise PCL
20	Construct temporary ramp
21	Change in specifications
22	provide for turning
23	Install day construction ramps
24	Install concrete noise barrier
25	Install concrete ramp
26	Install concrete ramps
27	Install wing holes
28	Install 3.0' RCP cross drain
29	Remove & replace shoulder drains
30	Install concrete ramps
31	Substitute certain traffic markings
32	Open freeway to local traffic
33	Additional signs and barricades
34	Remove & replace SETs
35	Adjust zones

Revised 7/8/92

ALL CURVE DATA BASED UPON ARC DEFINITION.
HORIZONTAL CONTROL IS BASED ON NAD 1927, HOLDING FIRST-ORDER TRI-STATION KULHANEK, 1966 ADJUSTMENT.

VERTICAL CONTROL IS BASED ON NAD 1929, HOLDING MONUMENT JACKSON #2 ASMITH MARK, 1973 ADJUSTED, EL. 138.330

ALL BEARINGS AND COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE. ALL DISTANCES AND COORDINATES SHOWN ARE SURFACE AND MAY BE CONVERTED TO A GRID BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999870

SPECIFICATIONS ADOPTED BY THE STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION OF TEXAS, SEPTEMBER 1, 1982, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT:
REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL- AID CONSTRUCTION CONTRACTS, (FORM FHWA 1273, AUGUST, 1989) AND ADDENDUM TO FHWA FORM FHWA 1273, REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS (AUGUST, 1988)

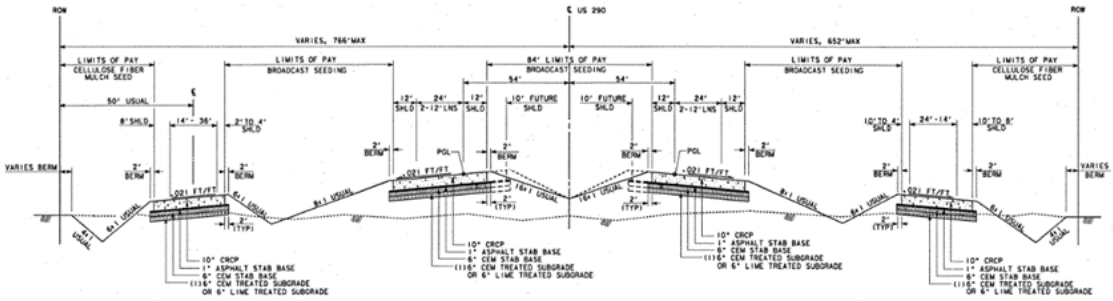
RR CROSSING = NONE
EQUATION = NONE
EXCEPTIONS = NONE

8422
02

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED:
DIVISION ADMINISTRATOR — DATE

"TEXAS DEPARTMENT OF TRANSPORTATION"
RECOMMENDED FOR LETTING: April 1, 1992 — J.C. Liu, P.E. — SUPERVISING DESIGN ENGINEER
APPROVED FOR LETTING: 5-26-92 — DIRECTOR OF TRANSPORTATION PLANNING AND DESIGN
RECOMMENDED FOR LETTING: 4-7, 1992 — DISTRICT ENGINEER
APPROVED FOR LETTING: 8-31-92 — FOR DIRECTOR OF MAINTENANCE AND OPERATIONS — FOR STATE ENGINEER-DIRECTOR, DIVISION DIRECTORS

WALLER
COUNTY — 0114-11-058
WORK — PROJ. NO. NH 76(139)M
DATE LETTING — DATE WORK
DATE ACCEPTED



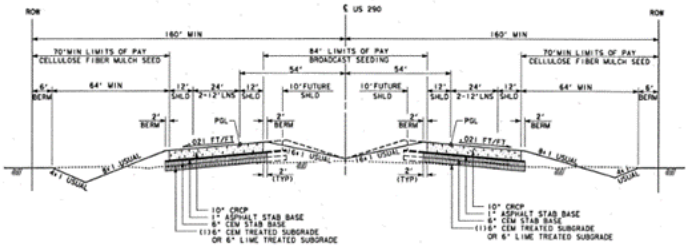
LT CONNECTOR (SEE NOTE= 2)

① AT-GRADE SECTION @ FM 359

STA 612+00.00 TO STA 621+50.00 (PONDS CREEK TRIBUTARY BRIDGE)
STA 622+50.00 (PONDS CREEK TRIBUTARY BRIDGE) TO STA 632+60.00

RT CONNECTOR (SEE NOTE= 3)

NOTES:
1. THE ACTUAL LOCATIONS OF 6" CEM TREATED SUBGRADE AND 6" LIME TREATED SUBGRADE WILL BE DETERMINED BY THE RESIDENT ENGINEER BASED ON THE LABORATORY TESTS.
2. SEE PLAN & PROFILE SHEETS FOR LIMITS OF LT CONNECTOR.
3. SEE PLAN & PROFILE SHEETS FOR LIMITS OF RT CONNECTOR AND RT ACCESS ROAD AT THIS LOCATION.
4. SEE PLAN & PROFILE SHEETS FOR ACCESS ROAD AT THIS LOCATION.



② AT-GRADE SECTION

STA 632+60.00 TO STA 658+71.10 (PONDS CREEK BRIDGE)
STA 662+05.80 TO STA 703+00.00 (PONDS CREEK BRIDGE)
STA 734+50.00 TO STA 774+28.00 (SEE NOTES= 4)
STA 806+88.00 TO STA 848+78.00
STA 881+92.00 TO STA 958+55.00

The seal appearing on this document was authorized by J. C. Liu, P.E. 60950, on 3-17-92

J.C. Liu, P.E.

PROPOSED TYPICAL SECTIONS

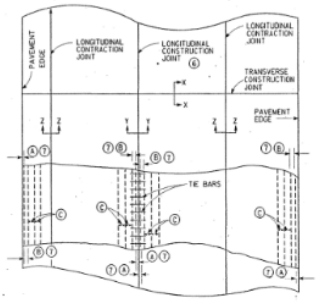
SHEET 1 OF 6 SHEETS

STATE	FEDERAL AID PROJECT NO.	SHEET NO.
6	F 535 (28)	3

STATE	DISTRICT	COUNTY
TEXAS	12	WALLER

CONT.	SECT.	JOB	HIGHWAY NO.
0114	11	058	US 290

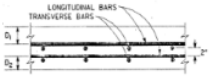
NOT TO SCALE



TWO LANE PAVEMENT PLAN ⑥
(38' PLACEMENT OR 16' & 22' PLACEMENT)

OPTIONAL STEEL PLACEMENT

LONGITUDINAL REINFORCING							
SPACING C (IN.)	NUMBER OF BARS REQUIRED FOR VARIOUS TYPICAL PLACEMENT WIDTHS (FT.) ⑦						
	12'	16'	22'	24'	27'	34'	38'
6"	24	32	44	48	54	68	76
6.5"	23	30	41	45	50	63	70
7"	21	27	37	41	46	58	65
8"	18	24	33	36	41	51	57
8.5"	17	23	31	34	38	48	54
9"	16	22	30	32	36	46	51
9.5"	16	21	29	31	34	43	48



SLAB THK. "T" (IN.) ①	LONG. REINFORCING		TRANSVERSE REINFORCING				
	BAR SIZE	SPACING C (IN.)	BAR SIZE	MAXIMUM ALLOWABLE ② PAVEMENT WIDTH (W) (FT.) FOR GIVEN TRANSVERSE STEEL SPACING (B_S)' (FT.)			B_S' ③ (FT.)
				12"	24"	36"	
SINGLE MAT REINFORCING							
8"	#5	9"	#5	186'	93'	62'	186.0
			#6	264'	132'	88'	264.0
9"	#6	9.5"	#5	165'	82'	55'	165.3
			#6	234'	117'	78'	234.7
10"	#6	8.5"	#5	148'	74'	49'	148.8
			#6	211'	105'	70'	211.2
11"	#6	7"	#5	135'	67'	45'	135.3
			#6	192'	96'	64'	192.0
12"	#6	6"	#5	124'	62'	41'	124.0
			#6	176'	88'	58'	176.0
DOUBLE MAT REINFORCING							
11"	#4	7"	#5	270'	135'	90'	270.6
			#6	384'	192'	128'	384.0
12"	#5	9"	#5	248'	124'	82'	248.0
			#6	352'	176'	117'	352.0
13"	#5	8"	#5	229'	114'	76'	229.0
			#6	324'	162'	108'	325.0
14"	#5	7"	#5	212'	106'	70'	212.4
			#6	300	150'	100'	300.8
15"	#5	6.5"	#5	198'	99'	66'	198.4
			#6	280'	140'	93'	281.6

LONGITUDINAL BAR PLACEMENT (DOUBLE MAT)		
LENGTH	D_1	D_2
8"	4 3/4"	3"
12"	5"	4"
13"	5 1/2"	4"
14"	6"	4"
15"	6"	5"

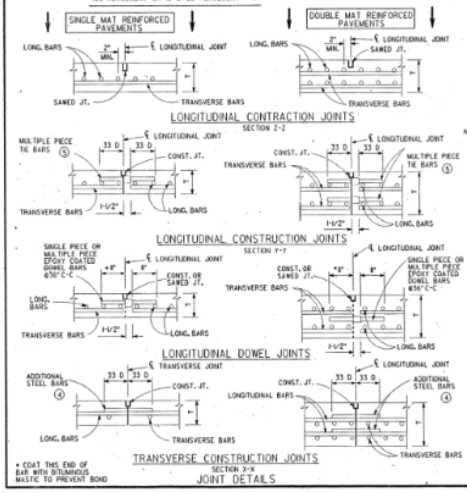
MULTIPLE PIECE TIEBAR PULL TEST LOAD	
#5	11,610 LBS.
#6	15,840 LBS.

GENERAL NOTES

1. NO EXPANSION JOINTS WILL BE USED EXCEPT AT STRUCTURE ENDS OR FIXED OBJECTS AS SHOWN ELSEWHERE IN THE PLANS.
2. DETAILS AS TO PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS SLOPE SHALL BE AS SHOWN ELSEWHERE IN THE PLANS. GENERALLY, PAVEMENT THICKNESS FOR CONNECTIONS AND RAMPS SHALL BE THE SAME AS THE FREEWAY, EXCEPT THAT A TRANSITION IN THICKNESS SHALL BE MADE TO MEET THE FRONTAGE STREET AS DIRECTED BY THE ENGINEER. REINFORCING STEEL THRU THE TRANSITION IN THICKNESS SHALL BE THE SAME AS IN THE THICKER SLAB.
3. WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY PLACE THE LONGITUDINAL CONSTRUCTION JOINT AT ANY OF THE LANE LINES TO GIVE A WIDER (MAXIMUM 3 LANES) OR DIFFERENT PLACEMENT. SAWED JOINTS SHALL BE USED AT ALL INTERMEDIATE LANE LINES. IN WIDENED AREAS SAWED JOINTS SHALL BE PLACED AS DIRECTED BY THE ENGINEER. LONGITUDINAL CONSTRUCTION AND/OR SAWED JOINTS SHALL NOT BE MORE THAN 17 FEET APART ON FREEWAY PAVEMENT AND FRONTAGE STREET PAVEMENT AS MEASURED TRANSVERSELY UNLESS DIRECTED BY THE ENGINEER.
4. LONGITUDINAL JOINTS SHALL BE SAWED AS SOON AS SAWING CAN BE ACCOMPLISHED WITHOUT DAMAGE TO THE PAVEMENT AND BEFORE 24 HOURS AFTER THE CONCRETE HAS BEEN PLACED. THE EXACT TIME TO BE APPROVED BY THE ENGINEER.
5. WITHIN ANY AREA BOUNDED BY TWO FEET OF PAVEMENT LENGTH MEASURED PARALLEL TO THE CENTERLINE AND TWELVE FEET OF PAVEMENT WIDTH MEASURED PERPENDICULAR TO THE PAVEMENT CENTERLINE, NOT OVER 33% OF THE REGULAR LONGITUDINAL STEEL SHALL BE SPLICED.
6. THE LONGITUDINAL BARS IN SINGLE MAT PLACEMENT SHALL BE PLACED AT THE VERTICAL SLAB CENTER WITH A TOLERANCE OF 1/2 INCH. TRANSVERSE STEEL SHALL BE PLACED DIRECTLY ABOVE OR BELOW THE LONGITUDINAL STEEL. LONGITUDINAL AND TRANSVERSE STEEL SPACING SHALL NOT VARY MORE THAN ONE TWELFTH OF THE SPACING SHOWN HEREON.

6A. THE LONGITUDINAL BARS IN DOUBLE MAT PLACEMENT SHALL BE PLACED WITH A TOLERANCE OF 1/2 INCH.

7. SPLICES SHALL BE A MINIMUM OF 33 TIMES THE NOMINAL STEEL DIAMETER ("D").
8. THE CHAIRS USED TO SUPPORT THE BAR MAT SHALL BE OF SUFFICIENT STRUCTURAL QUALITY AND NUMBER TO HOLD THE MAT WITHIN THE PLACEMENT HEIGHT TOLERANCES, AND SHALL BE OF A TYPE APPROVED BY THE ENGINEER. GALVANIZING OF CHAIRS WILL NOT BE REQUIRED. CHAIR SPACING SHALL NOT EXCEED 30" IN THE TRANSVERSE AND 48" IN THE LONGITUDINAL DIRECTION. PLACEMENT MAY BE STAGGERED SO THAT CHAIRS IN ALTERNATE ROWS ARE CENTERED BETWEEN THE CHAIRS IN ADJACENT ROWS. WHEN WIRE-TIE PLACING OF STEEL REINFORCEMENT IS USED, BAR CHAIRS WILL NOT BE REQUIRED, AND THE TRANSVERSE STEEL MAY BE PLACED EITHER ABOVE OR BELOW THE LONGITUDINAL STEEL. VIBRATION OF THE STEEL INTO POSITION SHALL NOT BE PERMITTED. WHEN THE "DOUBLE STRING-OFF" PROCEDURE IS USED FOR DOUBLE MAT REINFORCING, CHAIRS WILL NOT BE REQUIRED.
9. AT TRANSVERSE CONSTRUCTION JOINTS THE REGULAR LONGITUDINAL STEEL SHALL EXTEND A MINIMUM OF FOUR FEET ON EITHER SIDE OF THE JOINT, EXCEPT AS SHOWN ON SHEET 1 OF 2.
10. VIBRATION OF CONCRETE WITH HAND-MANIPULATED MECHANICAL VIBRATORS WILL BE REQUIRED ADJACENT TO ALL TRANSVERSE CONSTRUCTION JOINTS.
11. IF WIDTHS OCCUR, OTHER THAN THE TYPICAL WIDTHS SHOWN, INDIVIDUAL BARS OF THE SIZE SPECIFIED HEREON MAY BE ADDED OR REMOVED TO OBTAIN THE APPROPRIATE WIDTH. SPACING REQUIREMENTS SHALL NOT BE EXCEEDED HOWEVER.
12. MULTIPLE PIECE TIE BARS, OR MULTIPLE PIECE DOWEL BARS SHALL BE REQUIRED AT THE LONGITUDINAL CONSTRUCTION JOINTS. THE MULTIPLE PIECE TIE BAR/DOWEL BAR ASSEMBLIES SHALL HAVE STOP TYPE COUPLERS AND SHALL HAVE THREADS ON THE BARS. THE MULTIPLE PIECE TIE BAR ASSEMBLIES SHALL DEVELOP A MINIMUM ULTIMATE TENSILE STRENGTH EQUAL TO 1-1/4 TIMES THE MINIMUM YIELD STRENGTH OF THE TRANSVERSE BARS BEING JOINED. THE MULTIPLE PIECE DOWEL BAR ASSEMBLIES SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 50,0 KIPS. TIE BARS SHALL BE DEFORMED REINFORCING BARS OF THE SIZE SPECIFIED HEREON. SMOOTH DOWELS OR TIE BAR ASSEMBLIES MADE FROM STEEL OTHER THAN ASTM A615 GRADE 60 WITH DEFORMATIONS OTHER THAN ASTM STD. MAY BE USED PROVIDED IT CAN BE PROVEN TO THE SATISFACTION OF THE ENGINEER THAT THEY ARE IN EVERY RESPECT THE EQUAL OF THE ASSEMBLIES SPECIFIED. LABORATORY TESTING OF THESE PROPOSED ASSEMBLIES, AT THE CONTRACTOR'S EXPENSE, MAY BE REQUIRED. SHOULD THE CONTRACTOR ELECT TO USE THE SAW CUT METHOD TO FORM LONGITUDINAL DOWEL JOINTS THEN HE SHALL USE SINGLE PIECE OR MULTIPIECE DOWELS.
13. TIE BARS AND DOWEL BARS OMITTED, LOST OR DAMAGED SHALL BE REPLACED BY DRILLING AND EPOXY GROUTING AT THE CONTRACTOR'S EXPENSE.
14. MULTIPLE PIECE TIE BARS MAY BE PLACED BY ATTACHING TO THE REINFORCING STEEL MAT PRIOR TO PLACING CONCRETE, OR THEY MAY BE INSERTED INTO THE FRESH PAVING BY VIBRATING THEM INTO PLACE. IF THIS METHOD OF PLACING IS APPROVED BY THE ENGINEER, IF THE BARS ARE VIBRATED INTO PLACE, THEY SHALL BE TESTED TO PROVE THEY HAVE ACHIEVED THE REQUIRED ULTIMATE TENSILE LOADING EQUAL TO 1-1/4 TIMES THE DESIGN STRESS FOR NO YIELD (ONE MINUTE, 20,000 PSI STRESS = 24,000 PSI FOR GRADE 60 STEEL). SEE "MULTIPLE PIECE TIE BAR PULL TEST LOAD" CHART FOR REQUIREMENTS. PULL TESTS SHALL CONSIST OF NOT LESS THAN TWO TESTS OF FIVE BARS EACH FOR EACH DAY'S POUR.



JOINT DETAILS

NOTES:

① LONGITUDINAL AND TRANSVERSE BARS SHALL BE DEFORMED STEEL CONFORMING TO ASTM A 615 OR ASTM A 616 (GRADE 60) AS NOTED IN THE STANDARD SPECIFICATIONS.

② PAVEMENT WIDTH SHALL BE MEASURED AT RIGHT ANGLES TO THE CENTERLINE AND SHALL INCLUDE ALL MAINLANES, CONNECTORS, RAMPS AND CONCRETE SHOULDERS THAT ARE TIED TOGETHER. TRANSVERSE STEEL REQUIREMENTS AND THE MAXIMUM ALLOWABLE PAVEMENT WIDTH WERE DETERMINED USING SUBGRADE DRAG THEORY (SEE APPENDIX F, SECTION 100 OF THE HIGHWAY DESIGN DIVISION OPERATIONS AND PROCEDURES MANUAL) WITH A COEFFICIENT OF SLIDING RESISTANCE (f) OF 1.5, AND AN ALLOWABLE STEEL STRESS σ_s) OF 45.0 KSI.

③ TO DETERMINE THE MAXIMUM ALLOWABLE PAVEMENT WIDTH (W) FOR SPACING OTHER THAN THOSE GIVEN, DIVIDE "B_SW" (FOR THE GIVEN BAR SIZE) BY THE DESIRED TRANSVERSE BAR SPACING (B_S). TRANSVERSE BAR SPACING SHALL NOT BE LESS THAN 12" NOR GREATER THAN 36".

④ ADDITIONAL STEEL AT THE TRANSVERSE CONSTRUCTION JOINTS SHALL BE BARS OF EQUAL DIAMETER, AND A SPACING OF DOUBLE THAT SPECIFIED FOR THE LONGITUDINAL STEEL OF THE GIVEN THICKNESS. THE LENGTH OF THE BARS SHALL BE 66 TIMES THE BAR DIAMETER ("D").

⑤ MULTIPLE PIECE TIE BARS SPACING SHALL BE EQUAL TO OR LESS THAN THAT OF THE TRANSVERSE BARS.

⑥ THE LONGITUDINAL CONSTRUCTION JOINT CAN BE RELOCATED OR MAY BE REPLACED BY A LONGITUDINAL CONTRACTION JOINT DEPENDING ON THE PLACEMENT WIDTH AND PLACED 4' MIN. FROM THE LANE LINE OR AS DIRECTED BY THE ENGINEER.

⑦ THE NUMBER OF BARS REQUIRED FOR THE VARIOUS PLACEMENT WIDTHS INDICATED IN THE TABLE INCLUDES 2 BARS AT "B" SPACING ON BOTH SIDES WITH AN OVERHANG "X". "A" SPACING SHALL BE BETWEEN 3' AND 4'. "B" SPACING SHALL BE BETWEEN 3' AND 5'. THE "A" SPACINGS COMBINED ("A" AND "B") LOCATED AT BOTH LONGITUDINAL EDGES OF THE POUR SHALL PROVIDE FOR THE REMAINING SPACE AND STEEL LOCATION TO ROUND OUT THE PLACEMENT WIDTH.

GENERAL NOTES

WHEN THE ENGINEER HAD DETERMINED THAT THIS METHOD IS SATISFACTORY, THE TESTING MAY BE DISCONTINUED. WHEN TIE BARS ARE VIBRATED INTO PLACE, MEASURES SHALL BE TAKEN TO PREVENT THE PAVEMENT EDGE FROM SAGGING OR SLUMPING. THE TIE BARS SHALL BE ACCURATELY POSITIONED PARALLEL TO THE SURFACE AND PERPENDICULAR TO THE PAVEMENT ENGI.

15. "LEAVE-OUTS" IN CONTINUOUSLY REINFORCED PAVEMENT WILL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER IN WRITING.
16. DOWEL BAR JOINT SHALL BE INSTALLED ONLY WHERE CALLED FOR IN THE PLANS. DOWEL BAR EPOXY COATING SHALL CONFORM TO THE COATING FOR REINFORCING STEEL AS SPECIFIED IN ITEM " - "EPOXY COATING OF REINFORCING STEEL."
17. CONCRETE SHALL BE 6 SACKS OF CEMENT PER CU.YD.
18. ANY LONG. REINF. WHICH IS OR HAS BEEN BENT SHALL BE REPLACED. IF THERE IS NOT SUFFICIENT EXPOSED REINFORCING TO PROVIDE A MINIMUM OF A 33 BAR DIAMETER LAP THEN THE EXISTING PAVEMENT SHALL BE REMOVED AND THE EXISTING REINFORCING SUFFICIENTLY EXPOSED TO PROVIDE A 33 BAR DIAMETER LAP. ANY SHEAR BARS THAT ARE DISTURBED SHALL BE REPLACED BY DRILLING AND GROUTING AS REQUIRED BY NOTE 2 ON SHEET 1 OF 2. THE CONTRACTOR SHALL BEAR THE ENTIRE EXPENSE FOR THIS CORRECTIVE ACTION.

19. SHEAR DOWELS OF DOWEL BARS IN PROHIBITED.

* Rev 6/27/01 Rem no. STAND SHEET 1 OF 2

SHEET 2 OF 2

REF. GEN. NOTES 12 & 14 (10-31-89)
REV. GEN. NOTES 6A & 15 AND LONGITUDINAL BARS (01-13-90)
REV. GEN. NOTES 16 AND TRANS. REINF. CHART REINF. (06-26-90)

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DISTRICT 12

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT DETAILS

CRCP - 89 DIST. 12 (2)

DRAWN	DRAWING	DATE	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
CHECKED	ORIGINAL	MAY, 1989	6	TEXAS	F 535 (28)	5029
DRAWN	REVISED	FEB., 1991	DIST.	COUNTY		
CHECKED			12	WILLIAMSON		