B-5

U.S. Department
of Transportation

**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

MAR 14 1989

REFER TO:
HNG-14

Mr. Ellsworth F. Vines
General Manager
Construction Products
L.B. Foster Company
P.O. Box 2806
Pittsburgh, Pennsylvania 15230

Dear Mr. Vines:

Your February 13 letter requested Federal Highway Administration (FHWA) approval of a precast concrete traffic barrier/anchoring system that has been patented by your company. In support of this request, you provided copies of a report on a full-scale crash test conducted on November 15, 1988, by the Texas Transportation Institute. This report, entitled "Evaluation of L.B. Foster Precast Concrete Bolt-Down Barrier System," documents the results of a crash test of an 18,000-pound single-unit van at approximately 50 m.p.h. and a 15 degree impact angle. This is the maximum impact condition for a Performance Level 2 bridge railing under the new AASHTO Guide Specification for Bridge Railings.

The bridge rail that was impacted consisted of precast concrete safety shapes in 15 and 20-foot lengths. The test installation was 125 feet long; individual sections were 34 inches high, consisting of a 3-inch vertical face, a 10-inch high middle inclined surface (55 degrees), and a 21-inch high upper surface (84 degrees). Base width was 19 inches and the top width was 9 3/4 inches. These and other design details are shown on Drawings LB-T1 and D-1 (Enclosure A). We have noted also that the barrier segments can be made in lengths ranging from 12 feet to 20 feet in 1/8-inch increments. The railing was installed on a simulated bridge deck that was 10 inches thick and reinforced as shown in Enclosure B. It was bolted to the deck using 1-inch diameter by 15 1/2-inch HS Hot Dipped Galvanized Kelibond Anchors set in Keligrout to a depth of 6 1/2 inches. After 24 hours, the nuts were torqued to 700 foot-pounds, producing approximately 36,000 pounds of pre-tensioning in each bolt. The actual strength of each bolt, based on pull-out tests, was approximately 40,000 pounds.

Our review of the test report indicated that the system described above successfully contained and redirected the impacting truck. Neither the barrier, the anchor bolts or the bridge deck were damaged in the crash. Therefore, we have concluded that this system, when installed as described above, is acceptable for use on Federal-aid highways if requested by a State highway agency.

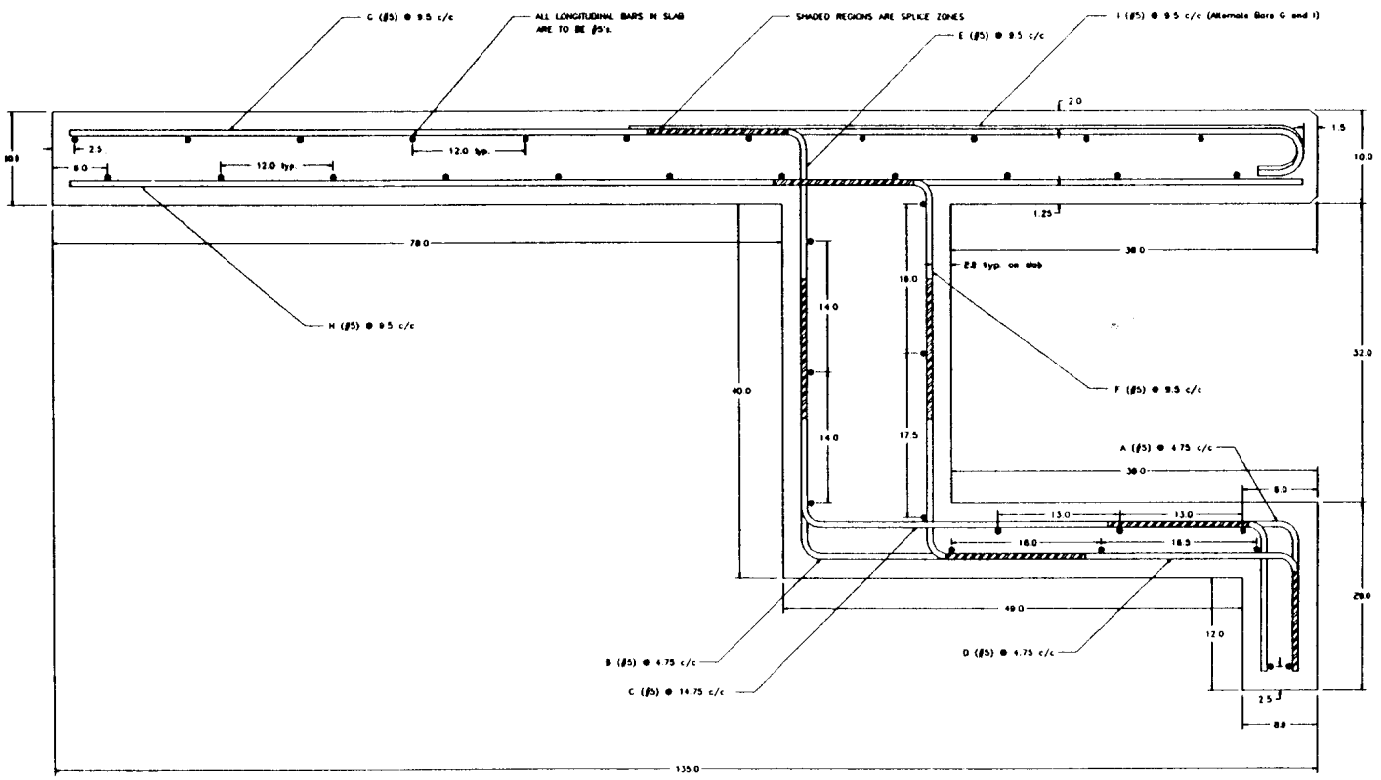
Since your product is a proprietary item, there must be a finding that it satisfies one of the following conditions before it can be used on a Federal-aid highway project: (a) its use is in the public interest because it is the only suitable product for a particular application, (b) it is competitively bid against a similar product, or (c) it is installed as an experimental feature.

Sincerely yours,

L. A. Staron

L. A. Staron
Chief, Federal-Aid and Design Division

Enclosures



Notes:

1. Minimum 28-day compressive strength of concrete shall be 3600 psi.
2. Reinforcing steel shall be grade 60 conforming to ASTM A305
3. The foundation shall be 140 feet long
4. Construction shall be generally in accordance with Texas SDHPT specifications and practices.

Figure 3A

The Texas A&M University System			
Revisions			TEXAS TRANSPORTATION INSTITUTE COLLEGE STATION, TEXAS 77843
No.	Date	By	
1	6/5/88	D K	
2			
3			
4			
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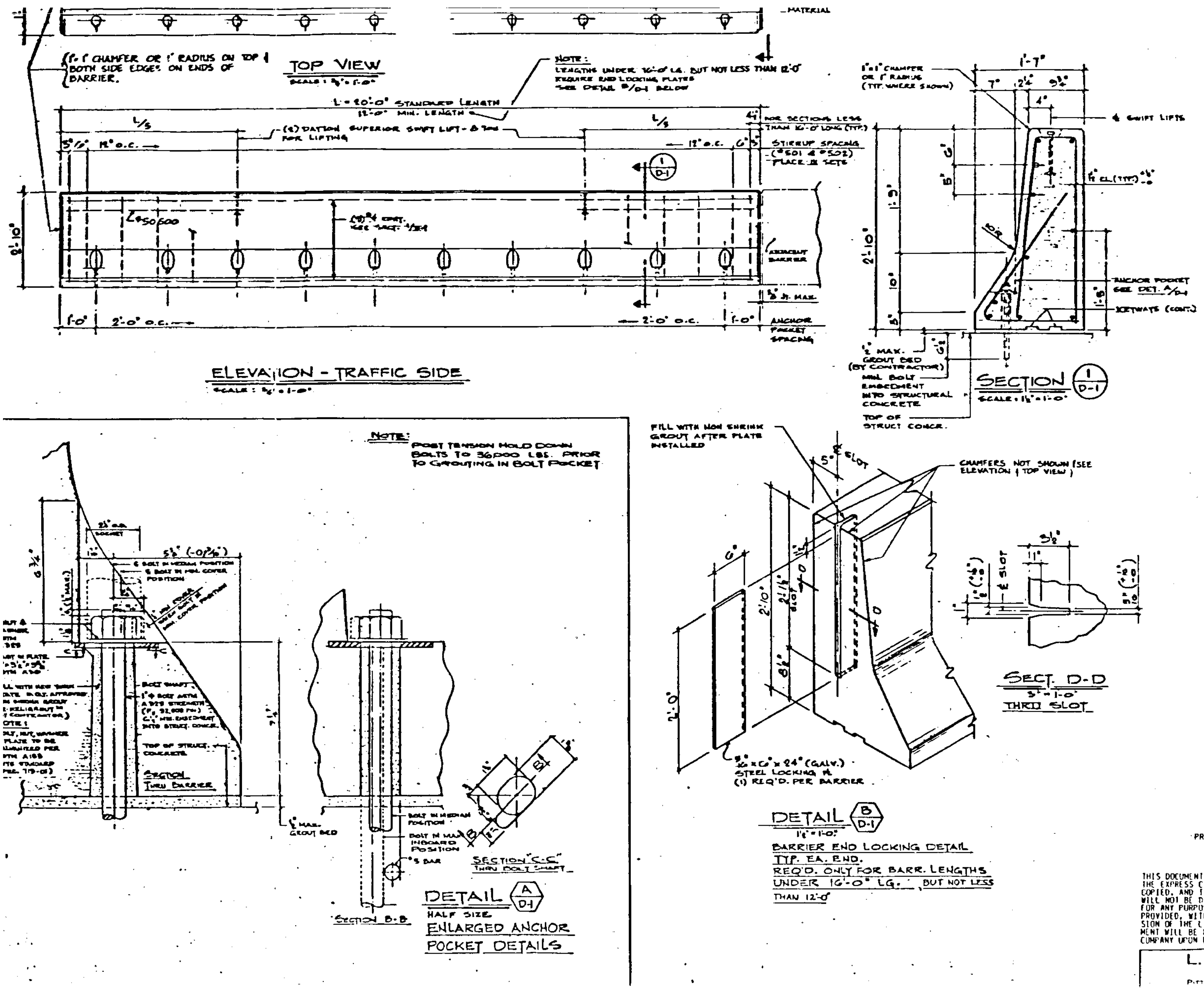
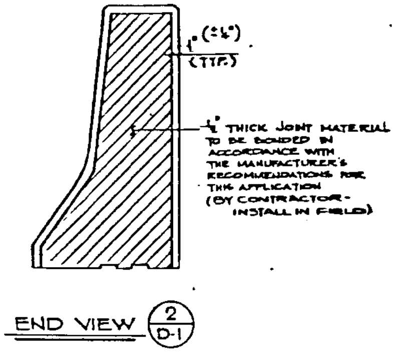
Project No	Date	Drawn By	Scale
RF 7048	4/21/88	Perry R	NTS

Title: PROPOSED FOUNDATION AND SLAB

Sheet No: 1 of 2

CONT.





NOTES :

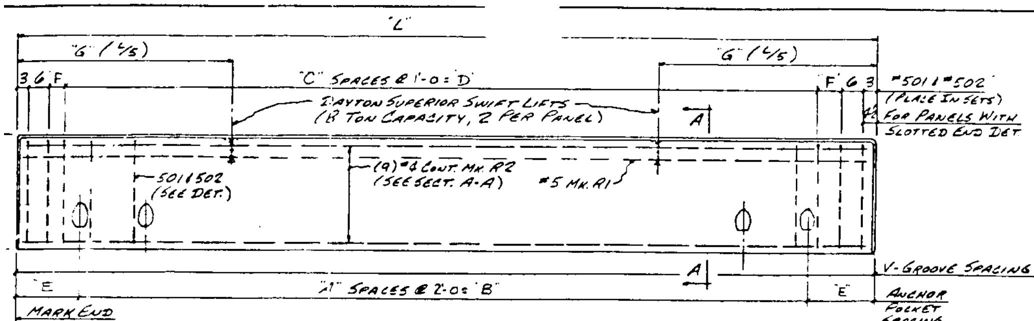
1. BARRIER TO BE BUILT AND INSTALLED IN ACCORDANCE WITH THE BARRIER SPECIFICATION IN CONTRACT DOCUMENTS.
2. ANCHORS TO BE KELIGROUTIN™ ANCHORS, ANCHORED WITH KELIBOND™ RESIN.
3. ANCHOR BOLTS, WASHERS, BEARING PLATES AND NUTS TO BE GALVANIZED IN ACCORDANCE WITH N.Y.S. STANDARD SPECIFICATIONS 719-01.
4. ALL REINFORCING BARS SHALL BE EPOXY COATED.
5. HOLE IN BARRIER POCKET SHALL BE FILLED WITH THE SAME MATERIAL USED TO GROUT THE BOLT IN THE BARRIER.
6. CONCRETE SHALL HAVE A MIN. STRENGTH OF 5000 psi. WITH BETWEEN $5\frac{1}{2}$ TO 9 % AIR.

L. B. FOSTER CO.
GENERAL OFFICES
PITTSBURGH PENNSYLVANIA 15220

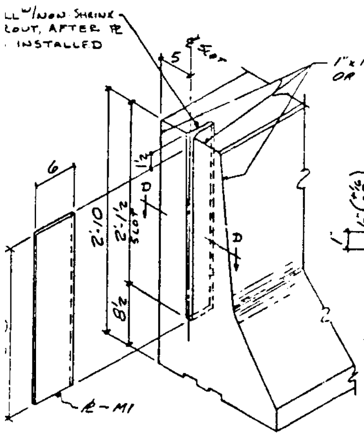
7	MARKETING REVISION
6	REVISED NOTES
5	REVD DET A/D-1 & SECT
4	REVD DET A/D & SECT. 1/D
3	REVD DET A/D-1 & SECT. 1/D
2	REVISED DETAIL A/D-1
1	REV. PER N.Y. DOT 10/3/

PARAPET BARR
NEW YORK STATE

CONTR.
APPR.
ENGR.
DATE 2-22-87 | DRAWN A.L. | CHK.

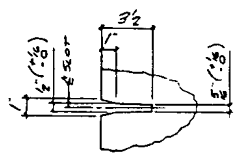


ELEVATION ~ TRAFFIC SIDE

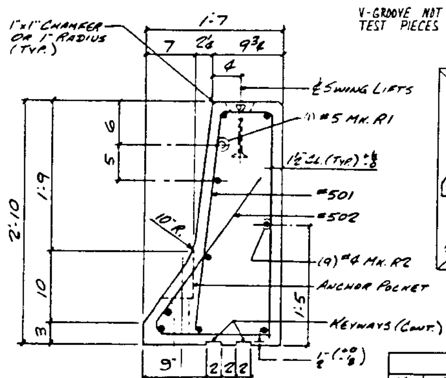


END DETAIL

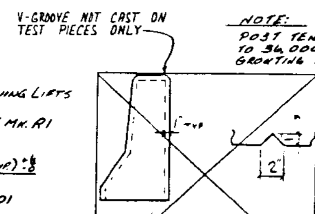
PANEL TYPE I ~ NOT REQUIRED
PANEL TYPE II ~ LEFT END ONLY
PANEL TYPE III ~ RIGHT END ONLY
PANEL TYPE IV ~ BOTH ENDS



SECT. D-D



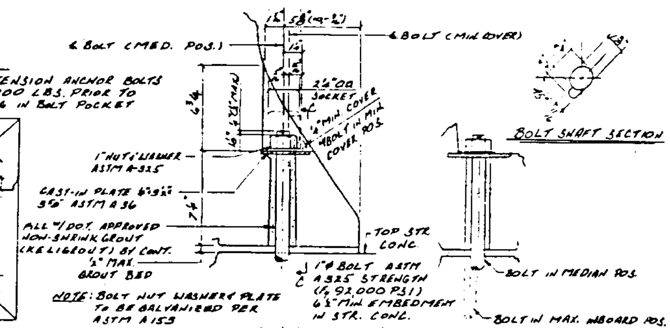
SECTION A-A



V-GROOVE DETAIL

NOTE: V-GROOVE TO BE CUT ... SPACED 5'-0" ...

NOTE: POST TENSION ANCHOR BOLTS TO 36,000 LBS. PRIOR TO GROUTING IN BOLT POCKET



NOTE: BOLT NUT WASHERS PLATE TO BE GALVANIZED PER ASTM A153

ANCHOR POCKET DETAIL

SECTION C-C

PARAPET BARRIER SCHEDULE

PANEL No.	PANEL TYPE	No. REQ'D	DIMENSIONS: L	A	B	C	D	E	F	G	REINFORCING BAR PER PANEL: 501	502	MK. R1	QUAN	MK. R2	QUAN	AB1 PER PANEL
TP-1	IV	4	20'-0"	9	18'-0"	19	19'-0"	1'-0"	—	4'-0"	22	22	19'-8"	1	19'-8"	9	10
TP-2	IV	4	15'-0"	6	12'-0"	13	13'-0"	1'-6"	1½"	3'-0"	18	18	14'-8"	1	14'-8"	9	7

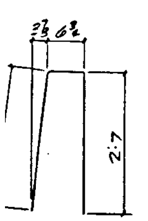
IN ORDER TO MEET DELIVERY SCHEDULES, THIS DIMENSION HAS BEEN IGNORED ON TEST PIECES ONLY.

GENERAL NOTES

- BARRIER TO BE BUILT AND INSTALLED IN ACCORDANCE WITH THE BARRIER SPECIFICATION IN CONTRACT DOCUMENTS.
- ANCHORS TO BE KELIGROUTIN™ ANCHORS, ANCHORED WITH KELIGROUTIN™ RESIN.
- ANCHOR BOLTS, WASHERS, BEARING PLATES AND NUTS TO GALVANIZED IN ACCORDANCE WITH N.Y.S. STANDARD SPECIFICATION 719-01.
- HOLE IN BARRIER SHALL BE FILLED WITH SAME MATERIAL USED TO GROUT ANCHOR BOLT IN THE BARRIER.
- REINFORCING BAR SHALL BE GRADE 60 & SHALL BE EPOXY COATED.
- ½" EXPANSION JT. MATERIAL BETWEEN EACH BARRIER TO BE SUPPLIED BY INSTALLING CONTRACTOR IN FIELD
- FOR ERECTION DWG SEE SHEET LE-

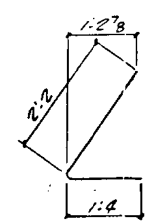
MISC. BILL OF MATERIAL

MK. No	No. REQ'D	DESCRIPTION	LENGTH FT	LENGTH IN	REMARKS
M1	7	PL 5/16 x 6 (PLAIN)	2	0	A36, GALV.
M2	68	PL ¼ x 3½	0	3⅝	A36 GALV.
AB1	68	1"φ	1	4	A325, GALV.
	16	DAYTON SWIFT LIFTS			



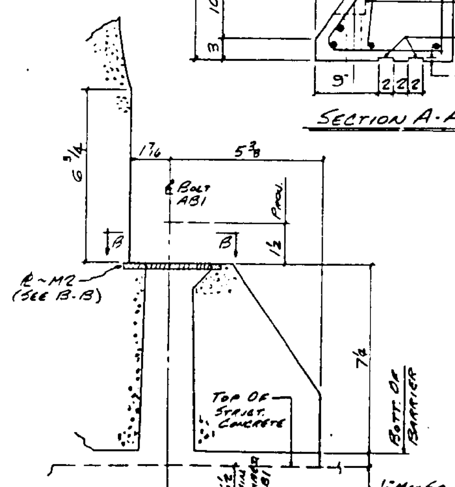
BARS - #501

BAR x 5-9

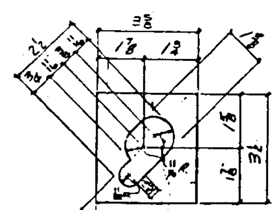


160 - BARS - #502

#5 BAR x 3'-6



ENLARGED POCKET DETAIL & SETTING ELEV.



SECT. B-B

68 - PLATES - M2

ITEM No.

PROPRIETARY INFORMATION OF L. B. FOSTER COMPANY

PROJ JOB

APPROVED:

L. B. FOSTER CO.
GENERAL OFFICES
PITTSBURGH, PENNSYLVANIA 15220

FOR: TEXAS A&M RESEARCH FOUNDATION AND THE TEXAS TRANSPORTATION INSTITUTE

DRAWING LB-T1

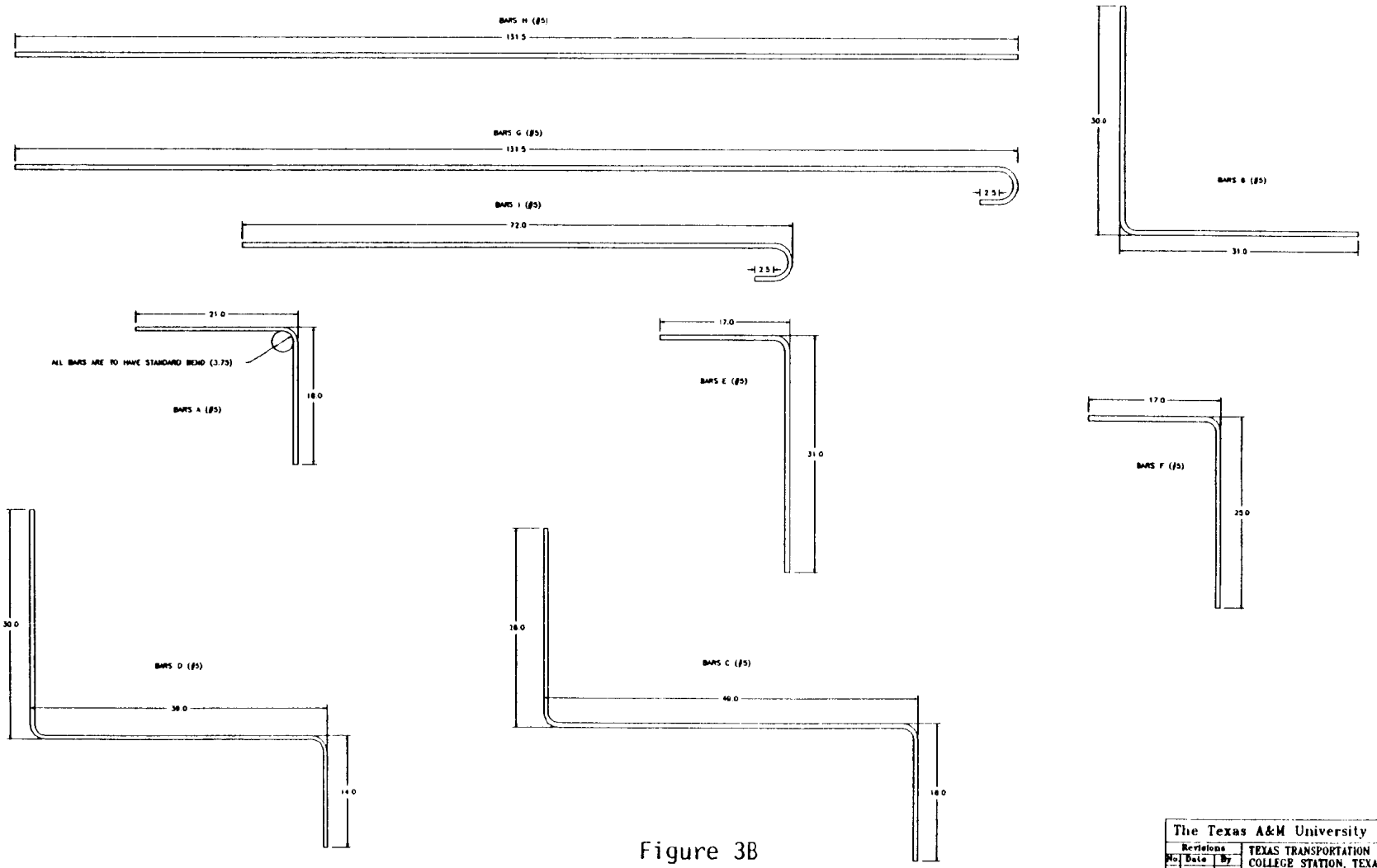


Figure 3B

The Texas A&M University System					
Revisions			TEXAS TRANSPORTATION INSTITUTE COLLEGE STATION, TEXAS 77843		
No.	Date	By			
1	8/3/88	D K	Project No.	Date	Drawn By	Scale
2			RF 7068	4/21/88	Perry R	NTS
3			Title			Sheet No.
4			PROPOSED FOUNDATION AND SLAB			2 of 2
5						

CONT