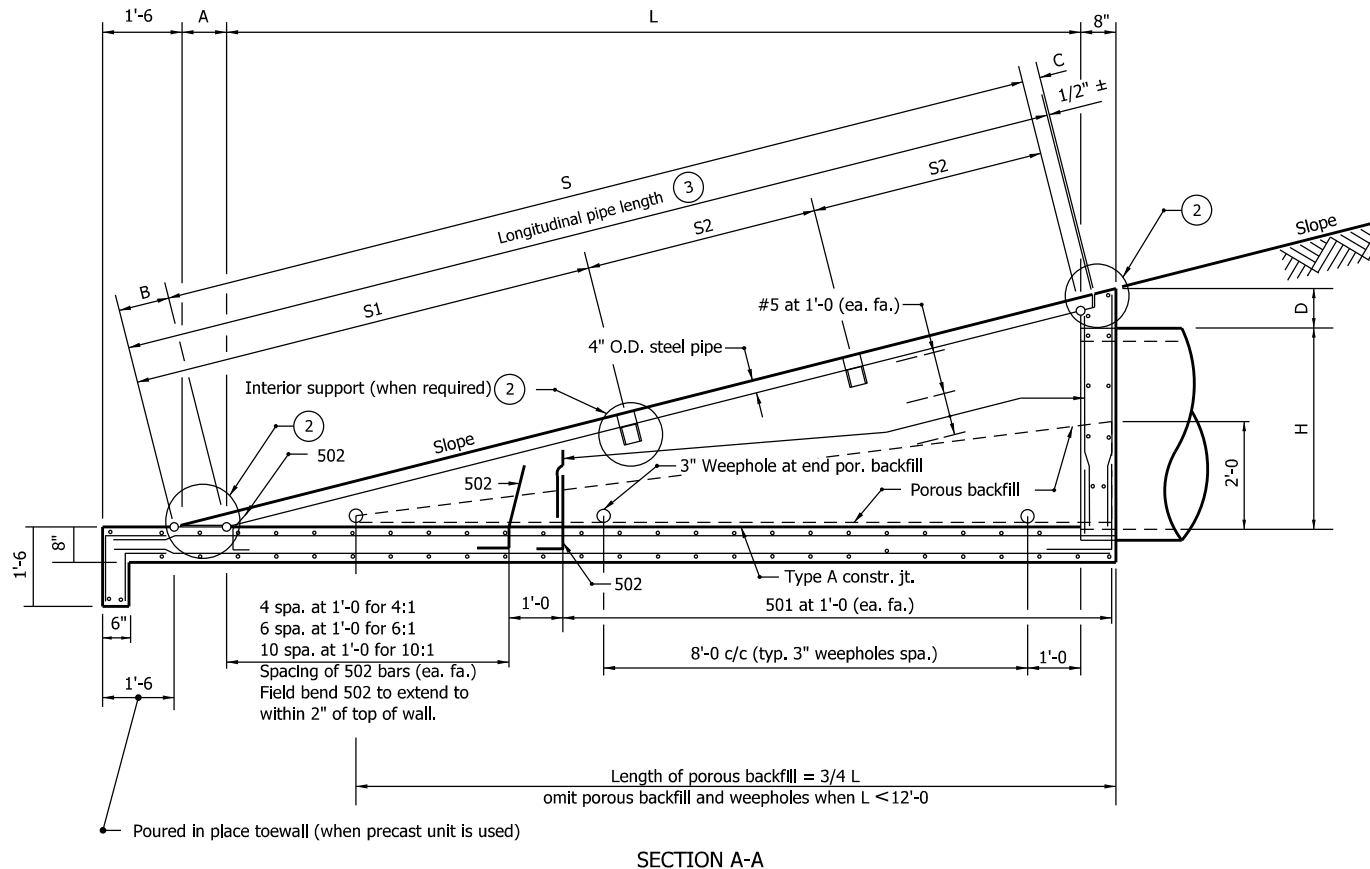


**GRATE REMOVED  
SECTION B-B**

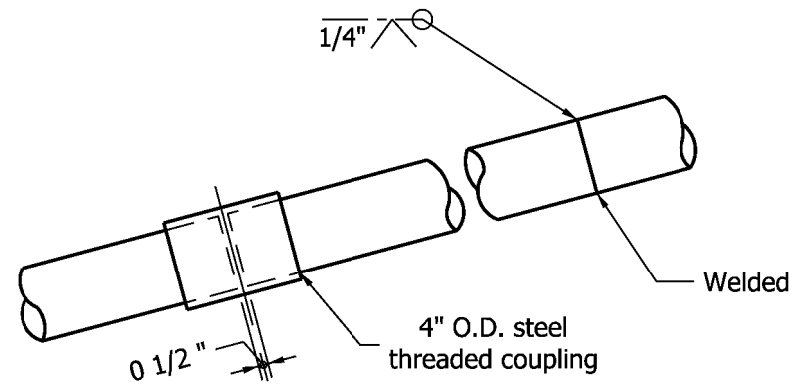
**GENERAL NOTES**

1. The invert grade of the grated box end section shall be the same as that of the pipe.
2. See Standard Drawing E 715-GBTO-04 for Details A, B, C, and D.
3. See Standard Drawings E 715-GBTO-05 through -08 for tables.
4. Type I grated box end section shall be used for mainline cross-culverts, outlet pipes within the clear zone.
5. See Standard Drawing E 715-GBTO-02 for bending diagrams.

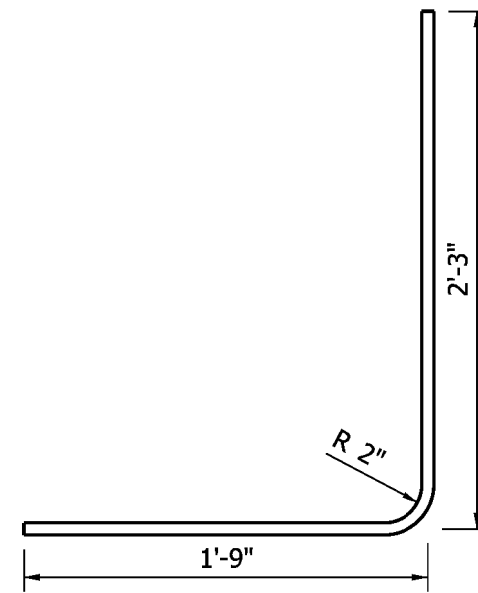


**SECTION A-A**

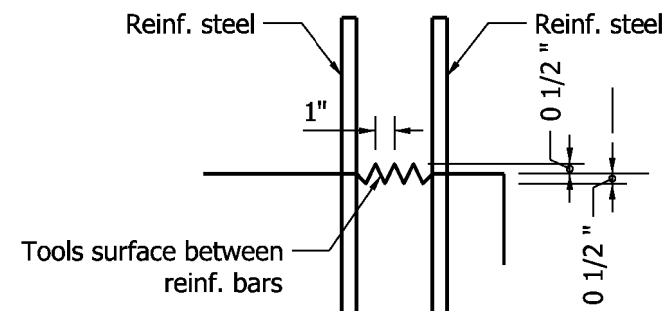
INDIANA DEPARTMENT OF TRANSPORTATION	
GRATED BOX END SECTION TYPE I	
JANUARY 1999	
STANDARD DRAWING NO. E 715-GBTO-01	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE /s/ Flooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 1-04-89



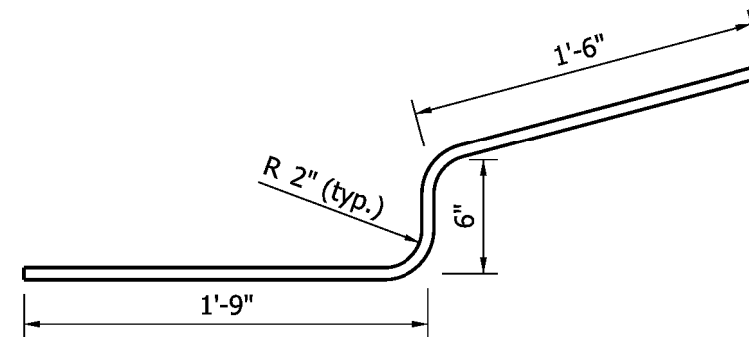
OPTIONAL COUPLING



501 x 4'-0"



TYPE A CONSTRUCTION JOINT



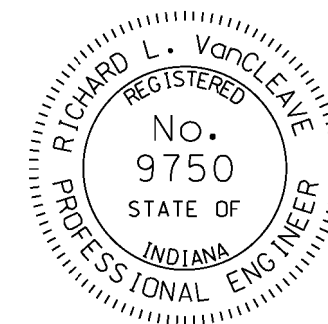
502 x 3'-9"

INDIANA DEPARTMENT OF TRANSPORTATION

GRATED BOX END SECTION  
TYPE 1

SEPTEMBER 2009

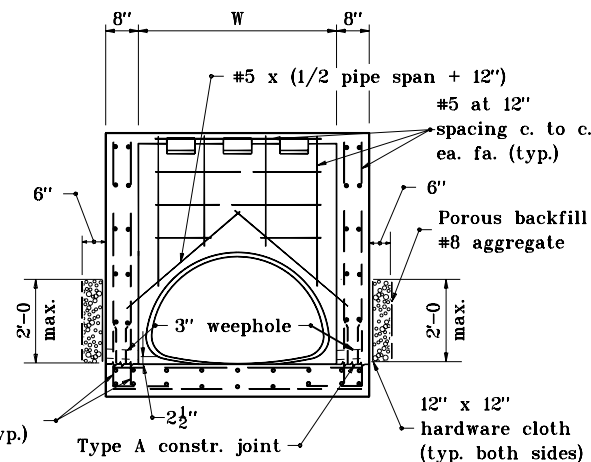
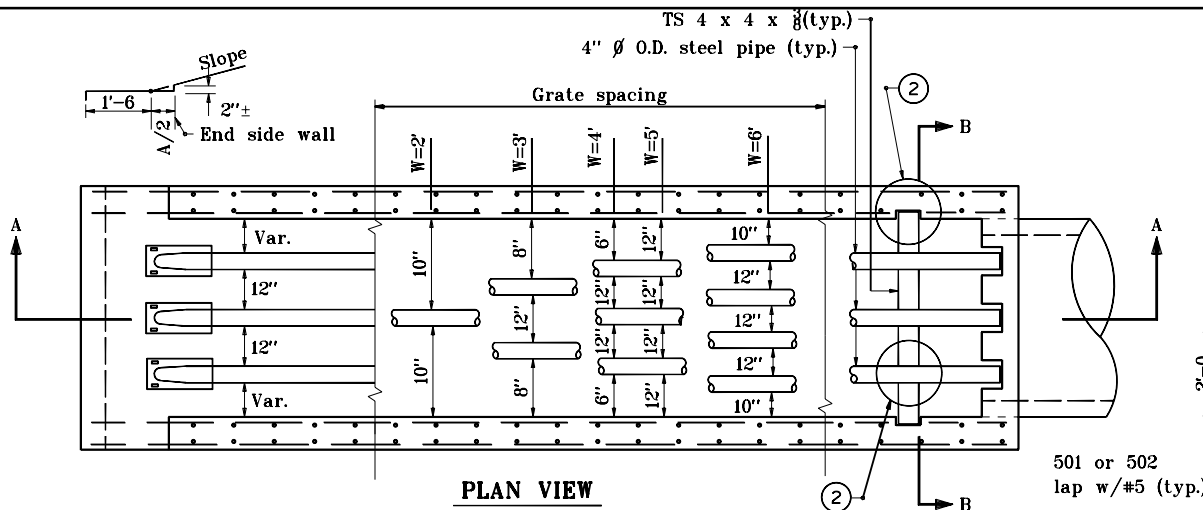
STANDARD DRAWING NO. E 715-GBTO-02



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/01/09  
DESIGN STANDARDS ENGINEER DATE

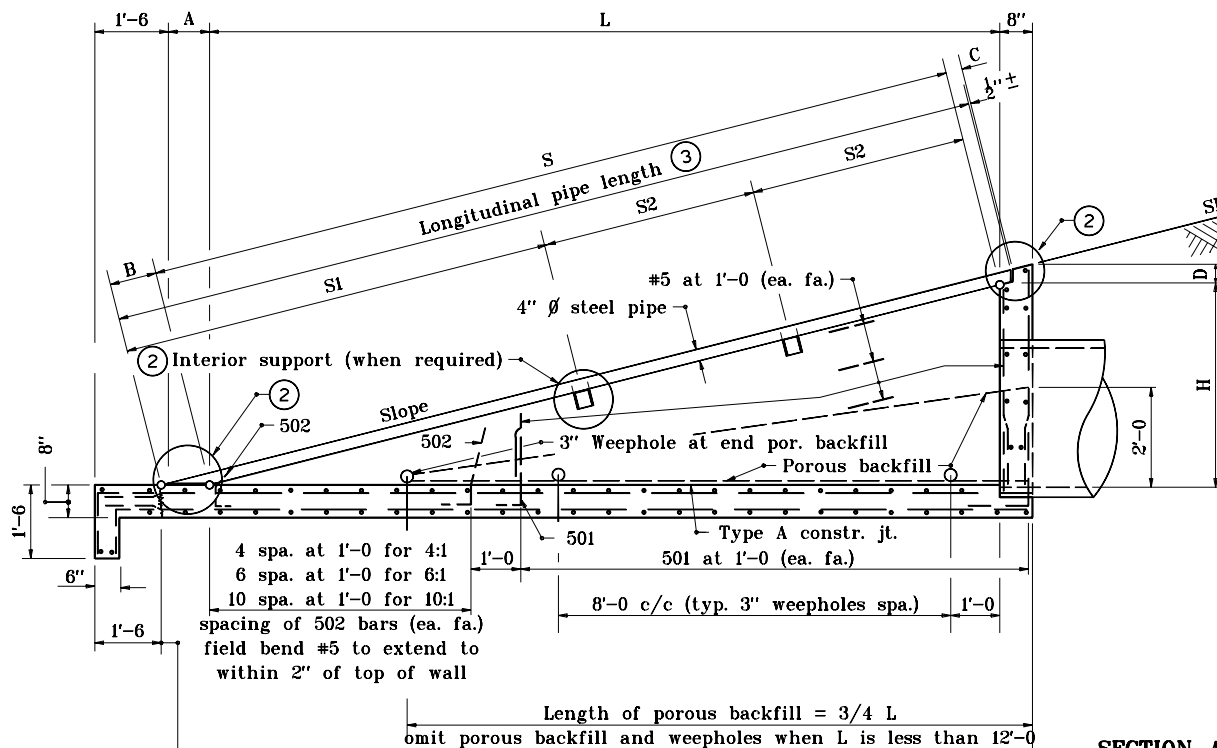
/s/ Mark A. Miller 09/01/09  
CHIEF HIGHWAY ENGINEER DATE



### GRATE REMOVED SECTION B-B

#### GENERAL NOTES

1. The invert grade of the grated box end section shall be the same as that of the pipe.
2. See Standard Drawing E 715-GBT0-04 for Details A, B, C, and D.
3. See Standard Drawings E 715-GBT0-05 through -08 for tables.
4. Type I grated box end sections shall be used for mainline cross-culverts' outlet pipes within the clear zone.
5. See Standard Drawing E 715-GBT0-02 for bending diagrams.

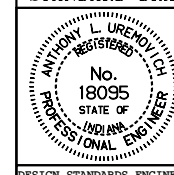


INDIANA DEPARTMENT OF TRANSPORTATION

### GRATED BOX END SECTION TYPE I

JANUARY 1999

STANDARD DRAWING NO. E 715-GBT0-03

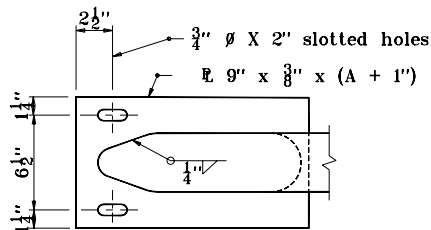


DETAILS PLACED IN THIS FORMAT 11-15-99

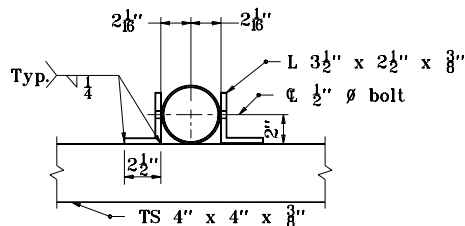
/s/ Anthony L. Uremovich 11-15-99  
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99  
CHIEF HIGHWAY ENGINEER DATE

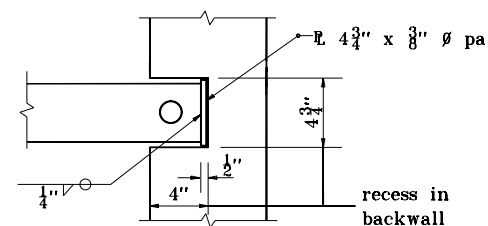
ORIGINALLY APPROVED 1-04-99



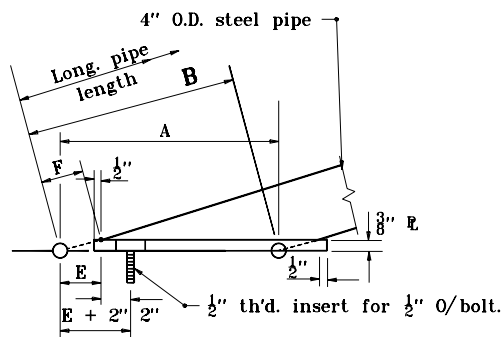
**PLAN**



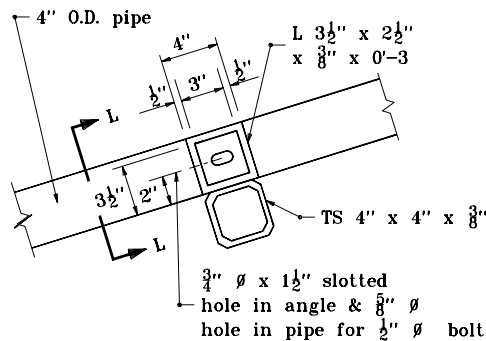
**SECTION L-L**



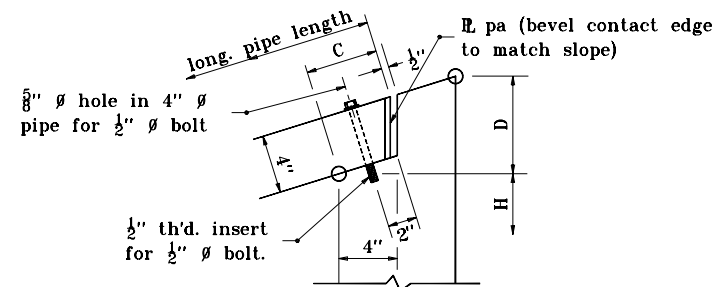
**PLAN**



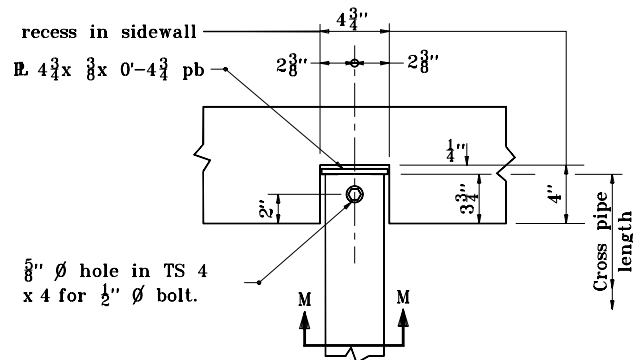
**DETAIL A**



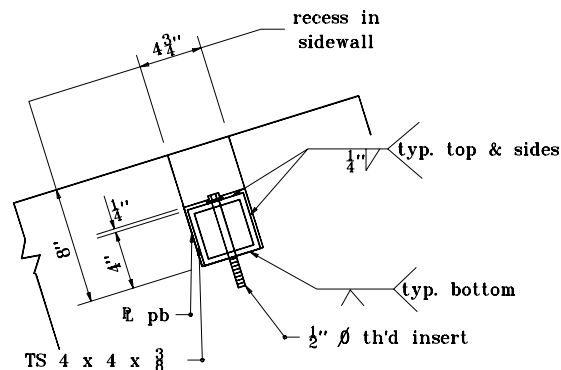
**DETAIL B**



**DETAIL C**



**DETAIL D**



**SECTION M-M**

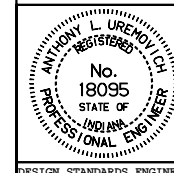
INDIANA DEPARTMENT OF TRANSPORTATION

**GRATED BOX END SECTION**

**TYPE I**

JANUARY 1999

**STANDARD DRAWING NO.E 715-GBT0-04**



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99  
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99  
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 1-04-99

2 : 1 SLOPE										
CULVERT SIZE	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	SI	S2
12	2'-0"	4'-0"	2'-0"	4'-5 $\frac{1}{2}$ "	1	5'-7 $\frac{1}{2}$ "	-	-	5'-1 $\frac{1}{2}$ "	-
15 & 18	2'-6"	5'-0"	2'-0"	5'-7"	1	6'-9"	1	2'-7 $\frac{1}{2}$ "	4'-9 $\frac{1}{2}$ "	1'-6"
21 & 24	3'-0"	6'-0"	3'-0"	6'-8 $\frac{1}{2}$ "	2	7'-10 $\frac{1}{2}$ "	-	-	7'-4 $\frac{1}{2}$ "	-
27 & 30	3'-6"	7'-0"	3'-0"	7'-9 $\frac{1}{2}$ "	2	10'-1 $\frac{1}{2}$ "	-	-	8'-5 $\frac{1}{2}$ "	-
33 & 36	4'-0"	8'-0"	4'-0"	8'-11 $\frac{1}{2}$ "	3	10'-11 $\frac{1}{2}$ "	-	-	9'-7 $\frac{1}{2}$ "	-
42	4'-6"	9'-0"	4'-0"	10'-0 $\frac{1}{2}$ "	3	11'-1 $\frac{1}{2}$ "	-	-	10'-8 $\frac{1}{2}$ "	-
48	5'-0"	10'-0"	5'-0"	11'-2 $\frac{1}{2}$ "	3	12'-4 $\frac{1}{2}$ "	-	-	11'-10 $\frac{1}{2}$ "	-
54	5'-6"	11'-0"	6'-0"	12'-3 $\frac{1}{2}$ "	4	13'-5 $\frac{1}{2}$ "	1	6'-7 $\frac{1}{2}$ "	9'-11 $\frac{1}{2}$ "	3'-0"
60	6'-0"	12'-0"	6'-0"	13'-5"	4	14'-7"	1	6'-7 $\frac{1}{2}$ "	11'-1"	3'-0"

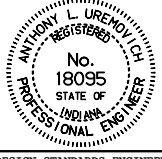
3 : 1 SLOPE										
CULVERT SIZE	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	SI	S2
12	2'-0"	6'-0"	2'-0"	6'-3 $\frac{1}{2}$ "	1	7'-9"	1	2'-7 $\frac{1}{2}$ "	5'-3 $\frac{1}{2}$ "	2'-0"
15 & 18	2'-6"	7'-6"	2'-0"	7'-10 $\frac{1}{2}$ "	1	9'-3 $\frac{1}{2}$ "	1	2'-7 $\frac{1}{2}$ "	5'-4 $\frac{1}{2}$ "	3'-6"
21 & 24	3'-0"	9'-0"	3'-0"	9'-5 $\frac{1}{2}$ "	2	10'-10 $\frac{1}{2}$ "	1	3'-7 $\frac{1}{2}$ "	6'-11 $\frac{1}{2}$ "	3'-6"
27 & 30	3'-6"	10'-6"	3'-0"	11'-0 $\frac{1}{2}$ "	2	12'-5 $\frac{1}{2}$ "	1	3'-7 $\frac{1}{2}$ "	8'-6 $\frac{1}{2}$ "	3'-6"
33 & 36	4'-0"	12'-0"	4'-0"	12'-7 $\frac{1}{2}$ "	3	14'-0 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	10'-1 $\frac{1}{2}$ "	3'-6"
42	4'-6"	13'-6"	4'-0"	14'-2 $\frac{1}{2}$ "	3	15'-7 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	10'-8 $\frac{1}{2}$ "	4'-6"
48	5'-0"	15'-0"	5'-0"	15'-9 $\frac{1}{2}$ "	3	17'-2 $\frac{1}{2}$ "	1	5'-7 $\frac{1}{2}$ "	12'-3 $\frac{1}{2}$ "	4'-6"
54	5'-6"	16'-6"	6'-0"	17'-4 $\frac{1}{2}$ "	4	18'-9 $\frac{1}{2}$ "	1	6'-7 $\frac{1}{2}$ "	10'-4 $\frac{1}{2}$ "	8'-0"
60	6'-0"	18'-0"	6'-0"	18'-11 $\frac{1}{2}$ "	4	20'-4 $\frac{1}{2}$ "	1	6'-7 $\frac{1}{2}$ "	11'-11 $\frac{1}{2}$ "	8'-0"

4 : 1 SLOPE										
CULVERT SIZE	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	SI	S2
12	2'-0"	8'-0"	2'-0"	8'-3"	1	9'-11 $\frac{1}{2}$ "	1	2'-7 $\frac{1}{2}$ "	5'-7"	4'-0"
15 & 18	2'-6"	10'-0"	2'-0"	10'-3 $\frac{1}{2}$ "	1	12'-0 $\frac{1}{2}$ "	2	2'-7 $\frac{1}{2}$ "	5'-7 $\frac{1}{2}$ "	3'-0"
21 & 24	3'-0"	12'-0"	3'-0"	12'-4 $\frac{1}{2}$ "	2	14'-1"	1	3'-7 $\frac{1}{2}$ "	9'-2 $\frac{1}{2}$ "	4'-6"
27 & 30	3'-6"	14'-0"	3'-0"	14'-5 $\frac{1}{2}$ "	2	16'-1 $\frac{1}{2}$ "	1	3'-7 $\frac{1}{2}$ "	9'-3 $\frac{1}{2}$ "	6'-6"
33 & 36	4'-0"	16'-0"	4'-0"	16'-5 $\frac{1}{2}$ "	3	18'-2 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	11'-3 $\frac{1}{2}$ "	6'-6"
42	4'-6"	18'-0"	4'-0"	18'-6 $\frac{1}{2}$ "	3	20'-3 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	12'-4 $\frac{1}{2}$ "	7'-6"
48	5'-0"	20'-0"	5'-0"	20'-7 $\frac{1}{2}$ "	3	22'-4 $\frac{1}{2}$ "	1	5'-7 $\frac{1}{2}$ "	11'-5 $\frac{1}{2}$ "	10'-6"
54	5'-6"	22'-0"	6'-0"	22'-8 $\frac{1}{2}$ "	4	24'-4 $\frac{1}{2}$ "	1	6'-7 $\frac{1}{2}$ "	12'-6 $\frac{1}{2}$ "	11'-6"
60	6'-0"	24'-0"	6'-0"	24'-8 $\frac{1}{2}$ "	4	26'-5 $\frac{1}{2}$ "	2	6'-7 $\frac{1}{2}$ "	12'-6 $\frac{1}{2}$ "	6'-9"

5 : 1 SLOPE										
CULVERT SIZE	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	SI	S2
12	2'-0"	10'-0"	2'-0"	10'-2 $\frac{1}{2}$ "	1	12'-2 $\frac{1}{2}$ "	2	2'-7 $\frac{1}{2}$ "	6'-2 $\frac{1}{2}$ "	2'-10"
15 & 18	2'-6"	12'-6"	2'-0"	12'-9"	1	14'-9 $\frac{1}{2}$ "	2	2'-7 $\frac{1}{2}$ "	5'-11"	4'-3"
21 & 24	3'-0"	15'-0"	3'-0"	15'-3 $\frac{1}{2}$ "	2	17'-4"	1	3'-7 $\frac{1}{2}$ "	9'-2 $\frac{1}{2}$ "	7'-9"
27 & 30	3'-6"	17'-6"	3'-0"	17'-10 $\frac{1}{2}$ "	2	19'-10 $\frac{1}{2}$ "	2	3'-7 $\frac{1}{2}$ "	9'-6 $\frac{1}{2}$ "	5'-0"
33 & 36	4'-0"	20'-0"	4'-0"	20'-4 $\frac{1}{2}$ "	3	22'-5 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	13'-0 $\frac{1}{2}$ "	9'-0"
42	4'-6"	22'-6"	4'-0"	22'-11 $\frac{1}{2}$ "	3	24'-11 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	13'-1 $\frac{1}{2}$ "	11'-6"
48	5'-0"	25'-0"	5'-0"	25'-6"	3	27'-6 $\frac{1}{2}$ "	2	5'-7 $\frac{1}{2}$ "	13'-2"	7'-0"
54	5'-6"	27'-6"	6'-0"	28'-0 $\frac{1}{2}$ "	4	30'-0 $\frac{1}{2}$ "	2	6'-7 $\frac{1}{2}$ "	13'-2 $\frac{1}{2}$ "	8'-3"
60	6'-0"	30'-0"	6'-0"	30'-7 $\frac{1}{2}$ "	4	32'-7 $\frac{1}{2}$ "	2	6'-7 $\frac{1}{2}$ "	11'-9 $\frac{1}{2}$ "	10'-3"

6 : 1 SLOPE										
CULVERT SIZE	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	SI	S2
12	2'-0"	12'-0"	2'-0"	12'-2"	1	14'-6 $\frac{1}{2}$ "	2	2'-7 $\frac{1}{2}$ "	6'-2"	4'-0"
15 & 18	2'-6"	15'-0"	2'-0"	15'-2 $\frac{1}{2}$ "	1	17'-6 $\frac{1}{2}$ "	2	2'-7 $\frac{1}{2}$ "	6'-8 $\frac{1}{2}$ "	5'-3"
21 & 24	3'-0"	18'-0"	3'-0"	18'-3"	2	20'-7 $\frac{1}{2}$ "	2	3'-7 $\frac{1}{2}$ "	9'-9"	5'-3"
27 & 30	3'-6"	21'-0"	3'-0"	21'-3 $\frac{1}{2}$ "	2	23'-7 $\frac{1}{2}$ "	2	3'-7 $\frac{1}{2}$ "	9'-9 $\frac{1}{2}$ "	6'-9"
33 & 36	4'-0"	24'-0"	4'-0"	24'-4"	3	26'-8 $\frac{1}{2}$ "	2	4'-7 $\frac{1}{2}$ "	13'-4"	6'-6"
42	4'-6"	27'-0"	4'-0"	27'-4 $\frac{1}{2}$ "	3	29'-8 $\frac{1}{2}$ "	2	4'-7 $\frac{1}{2}$ "	13'-4 $\frac{1}{2}$ "	8'-0"
48	5'-0"	30'-0"	5'-0"	30'-5"	3	32'-9 $\frac{1}{2}$ "	2	5'-7 $\frac{1}{2}$ "	13'-5"	9'-6"
54	5'-6"	33'-0"	6'-0"	33'-5 $\frac{1}{2}$ "	4	35'-9 $\frac{1}{2}$ "	2	6'-7 $\frac{1}{2}$ "	12'-11 $\frac{1}{2}$ "	11'-3"
60	6'-0"	36'-0"	6'-0"	36'-6"	4	38'-10 $\frac{1}{2}$ "	3	6'-7 $\frac{1}{2}$ "	13'-0"	8'-6"

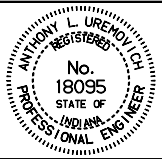
APPROXIMATE QUANTITIES																				
PIPE DIAMETER	2 : 1 SLOPE				3 : 1 SLOPE				4 : 1 SLOPE				5 : 1 SLOPE				6 : 1 SLOPE			
	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.
	Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe		
12	1.1	1.1	290	80	1.4	1.4	375	160	1.7	1.7	465	195	2.1	2.1	555	275	2.4	2.4	645	305
15 & 18	1.3	1.3	345	145	1.8	1.8	460	180	2.2	2.2	575	270	2.8	2.8	690	305	3.0	3.0	805	345
21 & 24	1.9	1.9	460	215	2.5	2.5	620	370	3.1	3.1	775	460	3.7	3.8	935	545	4.3	4.4	1090	705
27 & 30	2.1	2.2	525	245	2.9	3.0	715	410	3.6	3.7	905	510	4.4	4.5	1095	680	5.2	5.3	1285	780
33 & 36	2.8	2.9	670	410	3.8	3.9	910	660	4.8	4.9	1150	825	5.9	6.0	1395	995	6.9	7.0	1640	1255
42	3.2	3.3	745	450	4.4	4.5	1025	720	5.6	5.7	1305	905	6.8	6.9	1585	1090	8.0	8.1	1870	1370
48	4.0	4.1	1.1	910	5.5	5.6	1250	80	8.5	8.7	1940	1310	10.1	10.2	1940	1310	10.1	10.2	2285	1515
54	4.9	5.1	1090	845	6.8	6.9	1500	1125	8.6	8.8	1915	1415	10.5	10.7	2330	1845	12.4	12.6	2745	2145
60	5.4	5.8	1180	900	7.8	7.7	1640	1205	9.8	9.8	2105	1850	11.7	11.9	2570	1970	13.8	14.0	3035	2425

INDIANA DEPARTMENT OF TRANSPORTATION	
GRADED BOX END SECTION TYPE I	
DIMENSIONS AND QUANTITIES	
JANUARY 1999	
STANDARD DRAWING NO.E 715-GBT0-05	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE  /s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 1-04-99

2:1 SLOPE										
Pipe Size	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	S 1	S 2
17 x 13	1'-9"	3'-6"	2'-0"	3'-11"	1	5'-0 $\frac{7}{8}$ "	-	-	4'-7"	-
21 x 15	1'-11"	3'-10"	2'-0"	4'-3 $\frac{1}{2}$ "	1	5'-5 $\frac{3}{8}$ "	-	-	4'-11 $\frac{3}{8}$ "	-
24 x 18	2'-2"	4'-4"	3'-0"	4'-10 $\frac{1}{8}$ "	2	6'-0 $\frac{1}{8}$ "	-	-	5'-6 $\frac{1}{8}$ "	-
28 x 20	2'-4"	4'-8"	3'-0"	5'-2 $\frac{1}{2}$ "	2	6'-4 $\frac{3}{8}$ "	-	-	5'-10 $\frac{3}{8}$ "	-
35 x 24	2'-8"	5'-4"	4'-0"	5'-11 $\frac{1}{2}$ "	3	7'-1 $\frac{1}{2}$ "	-	-	6'-7 $\frac{1}{2}$ "	-
42 x 29	3'-1"	6'-2"	4'-0"	6'-10 $\frac{3}{4}$ "	3	8'-0 $\frac{3}{4}$ "	-	-	7'-6 $\frac{3}{4}$ "	-
49 x 33	3'-5"	6'-10"	5'-0"	7'-7 $\frac{3}{8}$ "	3	8'-9 $\frac{3}{8}$ "	-	-	8'-3 $\frac{3}{8}$ "	-
57 x 38	3'-10"	7'-8"	5'-0"	8'-6 $\frac{1}{8}$ "	3	9'-8 $\frac{1}{8}$ "	-	-	9'-2 $\frac{1}{8}$ "	-
64 x 43	4'-3"	8'-6"	6'-0"	9'-6"	4	10'-8"	-	-	10'-2"	-
71 x 47	4'-7"	9'-2"	6'-0"	10'-3"	4	11'-5"	-	-	10'-11"	-

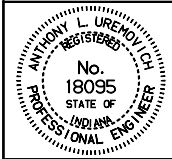
3:1 SLOPE										
Pipe Size	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	S 1	S 2
17 x 13	1'-9"	5'-3"	2'-0"	5'-6 $\frac{3}{8}$ "	1	6'-11 $\frac{1}{8}$ "	1	2'-7 $\frac{1}{2}$ "	5'-0 $\frac{3}{8}$ "	1'-6"
21 x 15	1'-11"	5'-9"	2'-0"	6'-0 $\frac{3}{8}$ "	1	7'-5 $\frac{3}{8}$ "	1	2'-7 $\frac{1}{2}$ "	5'-0 $\frac{3}{8}$ "	2'-0"
24 x 18	2'-2"	6'-6"	3'-0"	6'-10 $\frac{1}{4}$ "	2	8'-3 $\frac{1}{4}$ "	-	-	7'-10 $\frac{1}{4}$ "	-
28 x 20	2'-4"	7'-0"	3'-0"	7'-4 $\frac{1}{2}$ "	2	8'-9 $\frac{3}{8}$ "	-	-	8'-4 $\frac{1}{2}$ "	-
35 x 24	2'-8"	8'-0"	4'-0"	8'-5 $\frac{1}{4}$ "	3	9'-10 $\frac{1}{4}$ "	-	-	9'-5 $\frac{1}{4}$ "	-
42 x 29	3'-1"	9'-3"	4'-0"	9'-9"	3	11'-2"	-	-	10'-9"	-
49 x 33	3'-5"	10'-3"	5'-0"	10'-9 $\frac{5}{8}$ "	3	12'-2 $\frac{3}{8}$ "	-	-	11'-9 $\frac{5}{8}$ "	-
57 x 38	3'-10"	11'-6"	5'-0"	12'-1 $\frac{1}{2}$ "	3	13'-6 $\frac{1}{2}$ "	1	5'-7 $\frac{1}{2}$ "	10'-1 $\frac{1}{2}$ "	3'-0"
64 x 43	4'-3"	12'-9"	6'-0"	13'-5 $\frac{1}{4}$ "	4	14'-10 $\frac{3}{8}$ "	1	6'-7 $\frac{1}{2}$ "	11'-5 $\frac{1}{4}$ "	3'-0"
71 x 47	4'-7"	13'-9"	6'-0"	14'-5 $\frac{6}{8}$ "	4	15'-11"	1	6'-7 $\frac{1}{2}$ "	12'-5 $\frac{6}{8}$ "	3'-0"

4:1 SLOPE										
Pipe Size	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	S 1	S 2
17 x 13	1'-9"	7'-0"	2'-0"	7'-2 $\frac{5}{8}$ "	1	8'-11 $\frac{1}{4}$ "	1	2'-7 $\frac{1}{2}$ "	5'-9 $\frac{5}{8}$ "	2'-9"
21 x 15	1'-11"	7'-8"	2'-0"	7'-10 $\frac{1}{4}$ "	1	9'-7 $\frac{1}{2}$ "	1	2'-7 $\frac{1}{2}$ "	5'-8 $\frac{1}{4}$ "	3'-6"
24 x 18	2'-2"	8'-8"	3'-0"	8'-11 $\frac{1}{4}$ "	2	10'-7 $\frac{3}{8}$ "	1	3'-7 $\frac{1}{2}$ "	8'-3 $\frac{1}{4}$ "	2'-0"
28 x 20	2'-4"	9'-4"	3'-0"	9'-7 $\frac{1}{2}$ "	2	11'-4"	1	3'-7 $\frac{1}{2}$ "	8'-11 $\frac{1}{2}$ "	2'-0"
35 x 24	2'-8"	10'-8"	4'-0"	11'-0"	3	12'-8 $\frac{1}{2}$ "	-	-	12'-4"	-
42 x 29	3'-1"	12'-4"	4'-0"	12'-8 $\frac{1}{2}$ "	3	14'-5 $\frac{1}{8}$ "	1	4'-7 $\frac{1}{2}$ "	11'-0 $\frac{1}{2}$ "	3'-0"
49 x 33	3'-5"	13'-8"	5'-0"	14'-1"	3	15'-9 $\frac{3}{8}$ "	1	5'-7 $\frac{1}{2}$ "	12'-5"	3'-0"
57 x 38	3'-10"	15'-4"	5'-0"	15'-9 $\frac{3}{8}$ "	3	17'-6 $\frac{1}{4}$ "	1	5'-7 $\frac{1}{2}$ "	12'-7 $\frac{3}{8}$ "	4'-6"
64 x 43	4'-3"	17'-0"	6'-0"	17'-6 $\frac{1}{4}$ "	4	19'-2 $\frac{6}{8}$ "	1	6'-7 $\frac{1}{2}$ "	12'-4 $\frac{1}{4}$ "	6'-6"
71 x 47	4'-7"	18'-4"	6'-0"	18'-10 $\frac{1}{4}$ "	4	20'-7 $\frac{3}{8}$ "	1	6'-7 $\frac{1}{2}$ "	12'-8 $\frac{3}{4}$ "	7'-6"

INDIANA DEPARTMENT OF TRANSPORTATION	
<b>GRATED BOX END SECTION</b> <b>TYPE I DIMENSIONS</b> JANUARY 1999	
STANDARD DRAWING NO. <b>E 715-GBT0-06</b>	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE  /s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 1-04-99

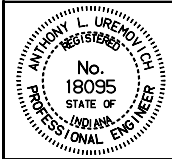
5:1 SLOPE										
Pipe Size	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	S 1	S 2
17 x 13	1'-9"	8'-9"	2'-0"	8'-11 $\frac{1}{2}$ "	1	10'-11 $\frac{1}{2}$ "	1	2'-7 $\frac{1}{2}$ "	6'-1 $\frac{1}{2}$ "	4'-6"
21 x 15	1'-11"	9'-7"	2'-0"	9'-9 $\frac{1}{4}$ "	1	11'-9 $\frac{3}{8}$ "	1	2'-7 $\frac{1}{2}$ "	6'-8 $\frac{1}{4}$ "	4'-9"
24 x 18	2'-2"	10'-10"	3'-0"	11'-0 $\frac{3}{8}$ "	2	13'-1"	1	3'-7 $\frac{1}{2}$ "	8'-8 $\frac{3}{8}$ "	4'-0"
28 x 20	2'-4"	11'-6"	3'-0"	11'-0 $\frac{3}{4}$ "	2	13'-11 $\frac{1}{8}$ "	1	3'-7 $\frac{1}{2}$ "	9'-6 $\frac{3}{4}$ "	4'-0"
35 x 24	2'-8"	13'-4"	4'-0"	13'-7 $\frac{1}{8}$ "	3	15'-7 $\frac{1}{2}$ "	1	4'-7 $\frac{1}{2}$ "	12'-3 $\frac{1}{8}$ "	3'-0"
42 x 29	3'-1"	15'-5"	4'-0"	15'-8 $\frac{3}{8}$ "	3	17'-9"	1	4'-7 $\frac{1}{2}$ "	12'-10 $\frac{3}{8}$ "	4'-6"
49 x 33	3'-5"	17'-1"	5'-0"	17'-5"	3	19'-5 $\frac{1}{2}$ "	1	5'-7 $\frac{1}{2}$ "	13'-1"	6'-0"
57 x 38	3'-10"	19'-2"	5'-0"	19'-6 $\frac{1}{2}$ "	3	21'-6 $\frac{1}{2}$ "	1	5'-7 $\frac{1}{2}$ "	13'-2 $\frac{1}{2}$ "	8'-0"
64 x 43	4'-3"	21'-3"	6'-0"	21'-8"	4	23'-8 $\frac{3}{8}$ "	1	6'-7 $\frac{1}{2}$ "	12'-10"	10'-6"
71 x 47	4'-7"	22'-11"	6'-0"	23'-4 $\frac{3}{8}$ "	4	25'-4 $\frac{3}{4}$ "	1	6'-7 $\frac{1}{2}$ "	13'-6 $\frac{3}{8}$ "	11'-6"

6:1 SLOPE										
Pipe Size	H	L	W	Longitudinal Pipe			Cross Tube			
				S	No.	Length	No.	Length	S 1	S 2
17 x 13	1'-9"	10'-6"	2'-0"	10'-7 $\frac{3}{4}$ "	1	13'-0"	2	2'-7 $\frac{1}{2}$ "	6'-7 $\frac{3}{4}$ "	3'-0"
21 x 15	1'-11"	11'-6"	2'-0"	11'-7 $\frac{1}{8}$ "	1	14'-0 $\frac{1}{8}$ "	2	2'-7 $\frac{1}{2}$ "	6'-1 $\frac{1}{8}$ "	3'-9"
24 x 18	2'-2"	13'-0"	3'-0"	13'-2 $\frac{1}{4}$ "	2	15'-6 $\frac{1}{8}$ "	1	3'-7 $\frac{1}{2}$ "	9'-8 $\frac{1}{4}$ "	5'-6"
28 x 20	2'-4"	14'-0"	3'-0"	14'-2 $\frac{1}{4}$ "	2	16'-6 $\frac{1}{2}$ "	1	3'-7 $\frac{1}{2}$ "	9'-8 $\frac{1}{4}$ "	6'-6"
35 x 24	2'-5"	16'-0"	4'-0"	16'-2 $\frac{3}{8}$ "	3	18'-6 $\frac{1}{8}$ "	1	4'-7 $\frac{1}{2}$ "	13'-2 $\frac{3}{8}$ "	5'-0"
42 x 29	3'-1"	18'-6"	4'-0"	18'-9"	3	21'-1 $\frac{1}{4}$ "	1	4'-7 $\frac{1}{2}$ "	13'-6"	7'-3"
49 x 33	3'-5"	20'-6"	5'-0"	20'-9 $\frac{3}{8}$ "	3	23'-1 $\frac{3}{8}$ "	1	5'-7 $\frac{1}{2}$ "	13'-3 $\frac{3}{8}$ "	9'-6"
57 x 38	3'-10"	23'-0"	5'-0"	23'-3 $\frac{3}{4}$ "	3	25'-8"	1	5'-7 $\frac{1}{2}$ "	13'-9 $\frac{3}{4}$ "	11'-6"
64 x 43	4'-3"	25'-6"	6'-0"	25'-10 $\frac{1}{4}$ "	4	28'-2 $\frac{1}{2}$ "	2	6'-7 $\frac{1}{2}$ "	13'-4 $\frac{1}{4}$ "	7'-3"
71 x 47	4'-7"	27'-6"	6'-0"	27'-10 $\frac{1}{2}$ "	4	30'-2 $\frac{3}{4}$ "	2	6'-7 $\frac{1}{2}$ "	13'-4 $\frac{1}{2}$ "	8'-3"

INDIANA DEPARTMENT OF TRANSPORTATION	
<b>GRADED BOX END SECTION</b> <b>TYPE I DIMENSIONS</b> JANUARY 1999	
STANDARD DRAWING NO.E 715-GBT0-07	
	DETAILS PLACED IN THIS FORMAT 11-15-99  /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE  /s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 1-04-99

APPROXIMATE QUANTITIES																				
PIPE SIZE	2:1 SLOPE				3:1 SLOPE				4:1 SLOPE				5:1 SLOPE				6:1 SLOPE			
	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.	Concrete, Cu. Yds.		Reinf. Steel, lb.	Str. Steel, lb.
	Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe		
17 x 13	—	1.0	260	75	—	1.2	335	150	—	1.5	415	180	—	1.8	490	210	—	2.1	565	290
21 x 15	—	1.1	280	80	—	1.3	360	160	—	1.6	445	190	—	1.9	530	220	—	2.3	615	300
24 x 18	—	1.4	360	170	—	1.8	465	235	—	2.2	570	370	—	2.6	680	440	—	3.1	790	505
28 x 20	—	1.5	375	180	—	1.9	495	245	—	2.4	610	390	—	2.8	730	460	—	3.3	845	530
35 x 24	—	2.0	475	300	—	2.6	625	410	—	3.2	775	525	—	3.8	925	740	—	4.4	1075	860
42 x 29	—	2.2	535	335	—	2.9	710	460	—	3.6	885	685	—	4.4	1060	820	—	5.1	1240	955
49 x 33	—	2.8	645	360	—	3.7	860	500	—	4.6	1075	750	—	5.5	1290	900	—	6.4	1505	1045
57 x 38	—	3.0	710	395	—	4.1	955	655	—	5.2	1205	815	—	6.2	1450	980	—	7.3	1700	1140
64 x 43	—	3.8	855	575	—	5.1	1155	925	—	6.4	1450	1160	—	7.8	1755	1400	—	9.1	2055	1760
71 x 47	—	4.0	910	610	—	5.5	1235	980	—	7.0	1565	1225	—	8.4	1895	1480	—	9.9	2225	1865

DIMENSIONS						
Slope	A	B	C	D	E	F
2:1	0'-9"	0'-8"	0'-6 $\frac{1}{2}$ "	0'-8 $\frac{1}{2}$ "	0'-0 $\frac{3}{4}$ "	0'-0 $\frac{7}{8}$ "
3:1	1'-0 $\frac{3}{8}$ "	1'-0"	0'-5 $\frac{1}{2}$ "	0'-6 $\frac{1}{8}$ "	0'-1 $\frac{1}{8}$ "	0'-1 $\frac{1}{8}$ "
4:1	1'-4 $\frac{1}{2}$ "	1'-4"	0'-5 $\frac{1}{8}$ "	0'-6 $\frac{1}{8}$ "	0'-1 $\frac{1}{2}$ "	0'-1 $\frac{1}{2}$ "
5:1	1'-8 $\frac{3}{8}$ "	1'-8"	0'-4 $\frac{7}{8}$ "	0'-5 $\frac{3}{8}$ "	0'-1 $\frac{1}{8}$ "	0'-1 $\frac{1}{8}$ "
6:1	2'-0 $\frac{3}{8}$ "	2'-0"	0'-4 $\frac{3}{4}$ "	0'-5 $\frac{3}{8}$ "	0'-2 $\frac{1}{4}$ "	0'-2 $\frac{1}{4}$ "

INDIANA DEPARTMENT OF TRANSPORTATION	
GRADED BOX END SECTION TYPE I	
DIMENSIONS AND QUANTITIES	
JANUARY 1999	
STANDARD DRAWING NO. <b>E 715-GBT0-08</b>	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 1-04-99