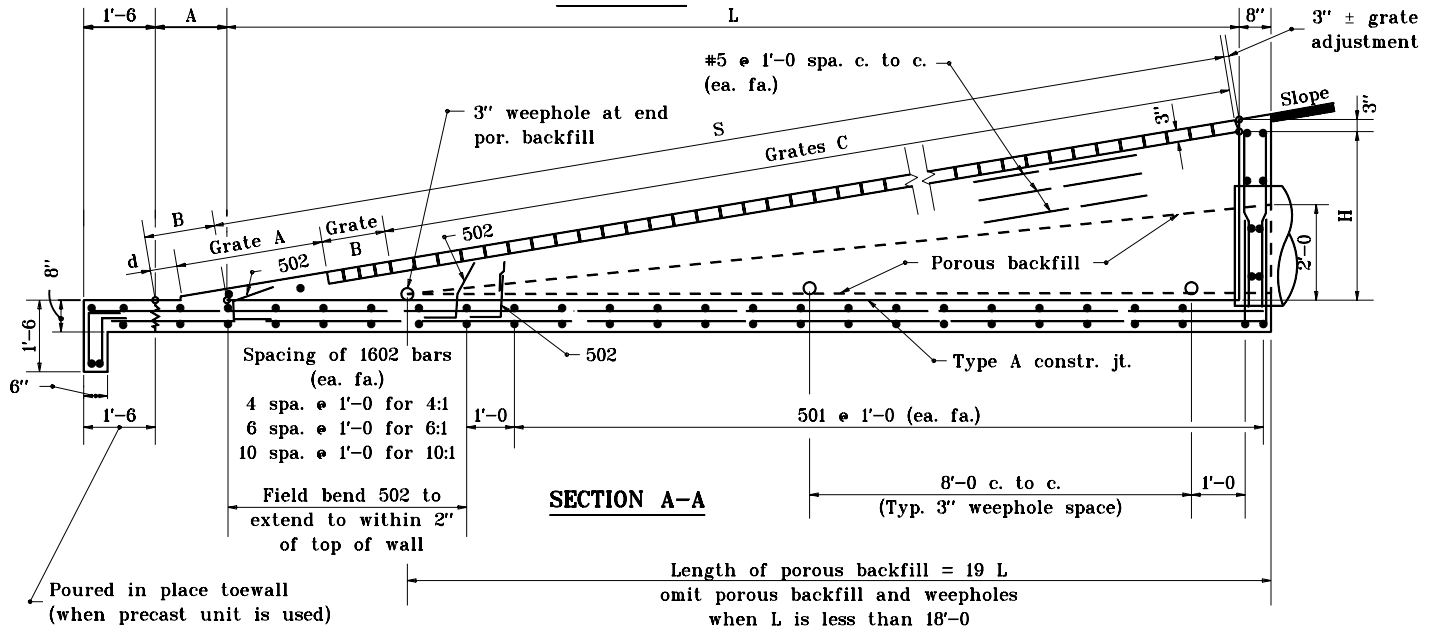
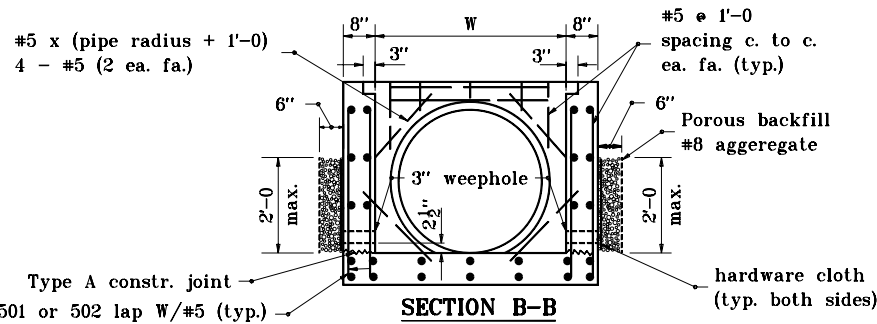


**PLAN VIEW**



**SECTION A-A**

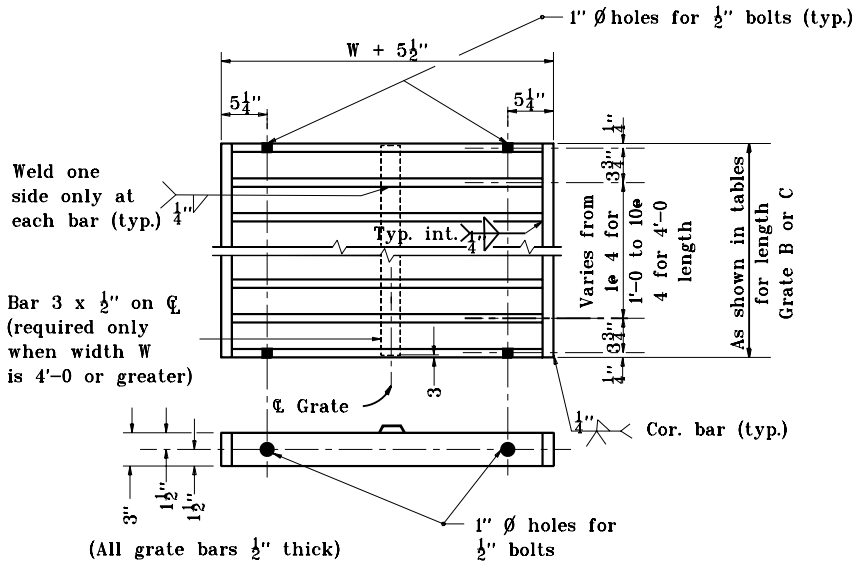


**SECTION B-B**

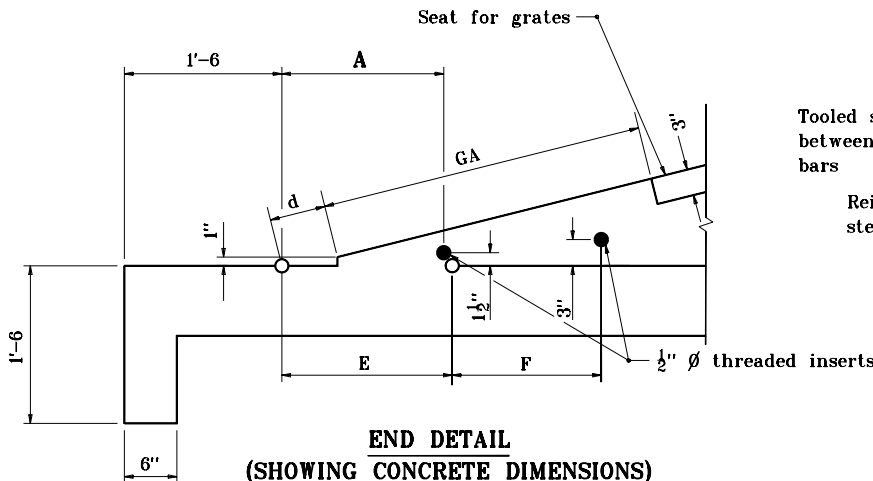
**GENERAL NOTES**

1. The invert grade of the grated box end section shall be the same as that of the pipe.
2. See Standard Drawings E 715-GBTT-05 and -06 for dimensions tables.
3. Type II grated box end sections shall be used for culverts parallel to the mainline within the clear zone.
4. See Standard Drawing E 715-GBTT-02 for bending diagrams.

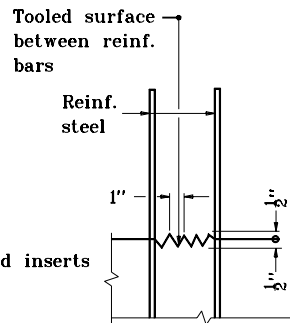
INDIANA DEPARTMENT OF TRANSPORTATION	
<b>GRATED BOX END SECTION TYPE II</b>	
JANUARY 1999	
<b>STANDARD DRAWING NO. E 715-GBTT-01</b>	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY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



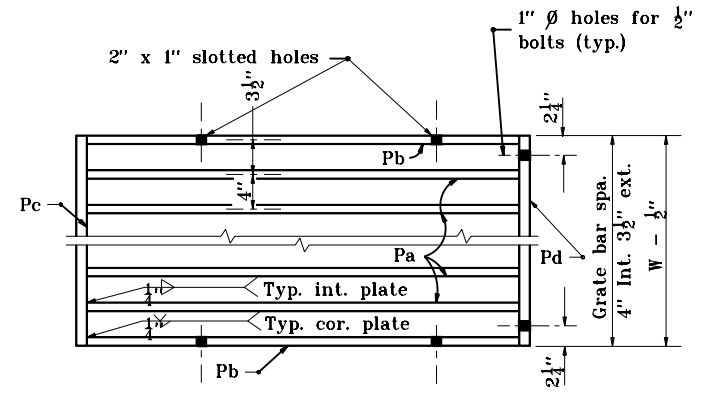
**GRATE B & C**



**END DETAIL  
(SHOWING CONCRETE DIMENSIONS)**

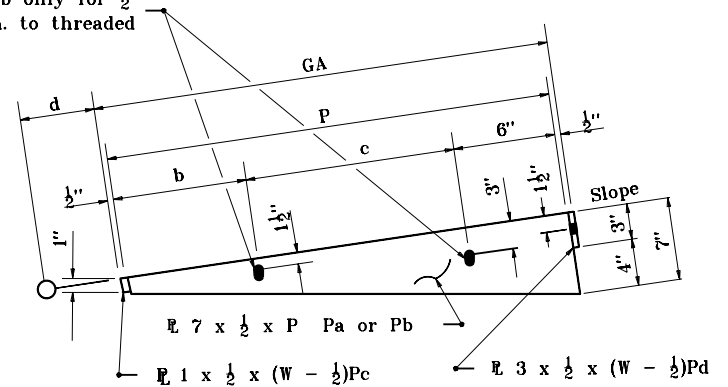


**TYPE A CONSTR. JOINT**

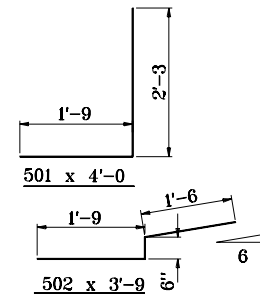


**PLAN VIEW**

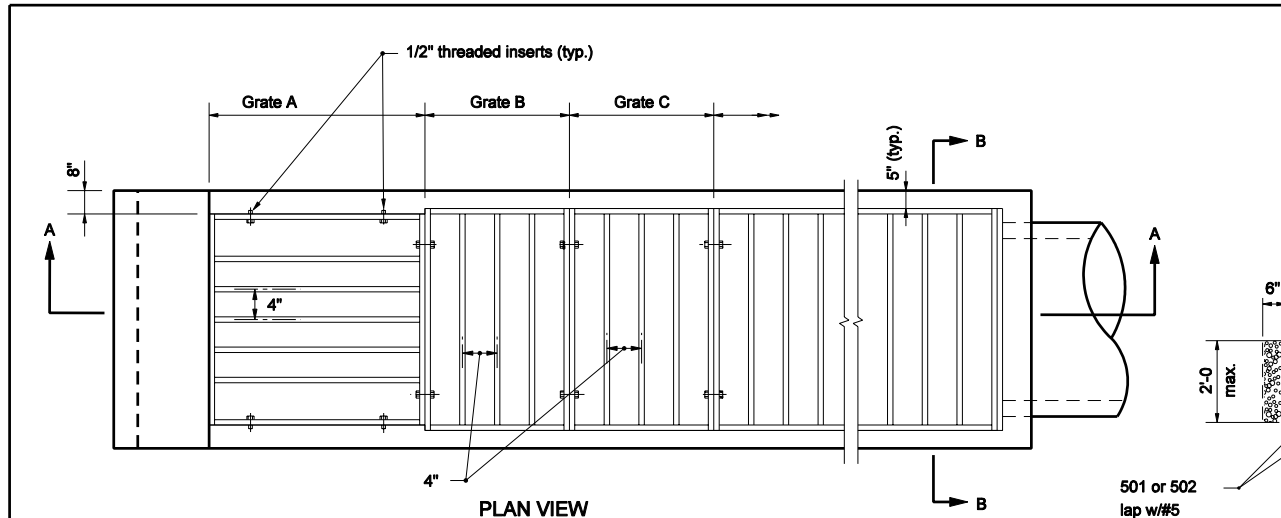
1" x 2" slotted hole in R. Pb only for  $\frac{1}{2}$ " bolt conn. to threaded inserts.



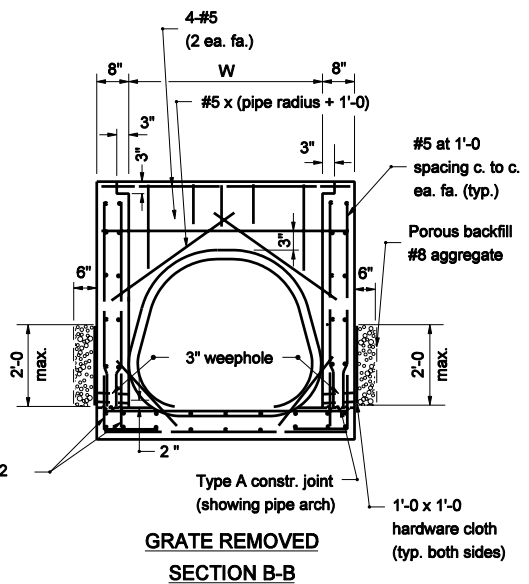
**ELEVATION  
GRATE A**



INDIANA DEPARTMENT OF TRANSPORTATION	
GRATED BOX END SECTION TYPE II	
JANUARY 1999	
STANDARD DRAWING NO. E 715-GBTT-02	
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



**PLAN VIEW**

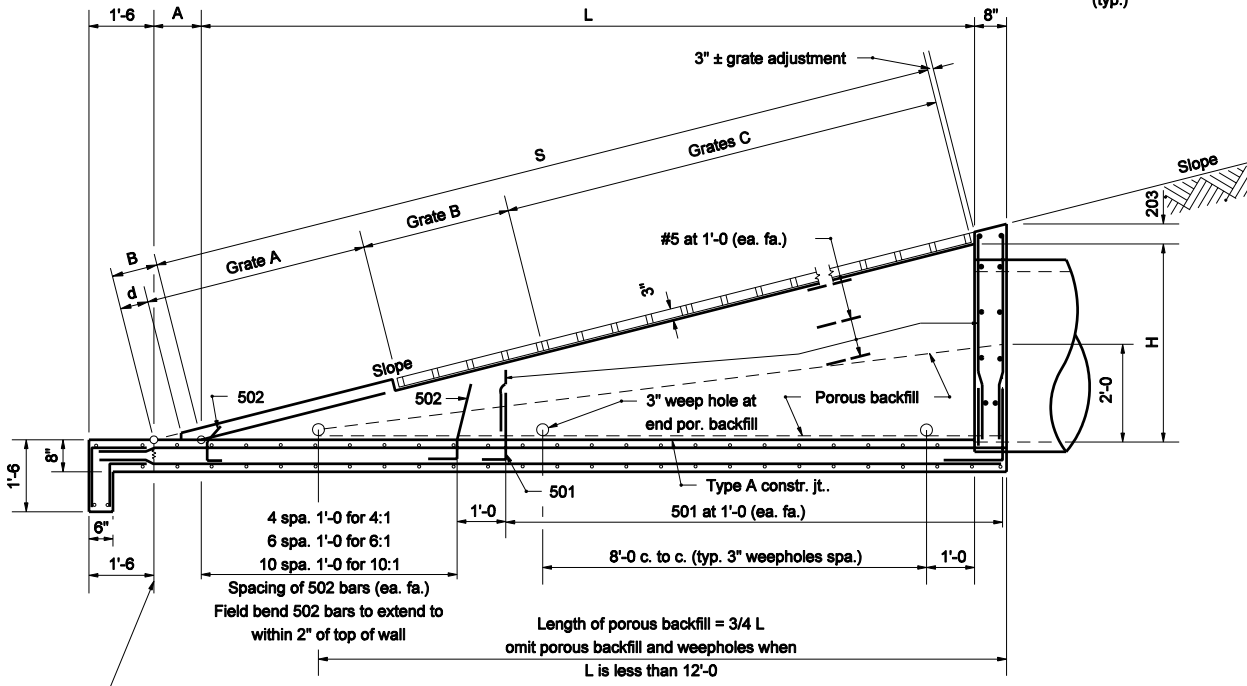


**GRATE REMOVED SECTION B-B**

501 or 502 lap w/#5 (typ.)

**GENERAL NOTES**

1. The invert grade of the grated box end section shall be the same as that of the pipe.
2. See Standard Drawings E 715-GBTT-05 and -06 for dimensions tables.
3. See Standard Drawing E 715-GBTT-02 for bending diagrams.
4. Type II grated box end sections shall be used for culverts parallel to the mainline within the clear zone.



**SECTION A-A**

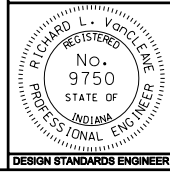
Poured in place toewall (when precast unit is used)

INDIANA DEPARTMENT OF TRANSPORTATION

**GRATED BOX END SECTION TYPE II**

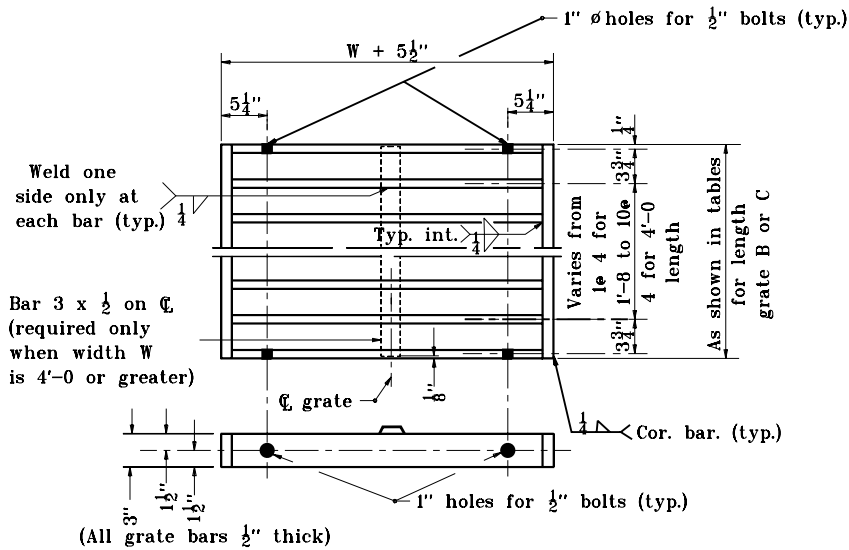
MARCH 2006

STANDARD DRAWING NO. E 715-GBTT-03

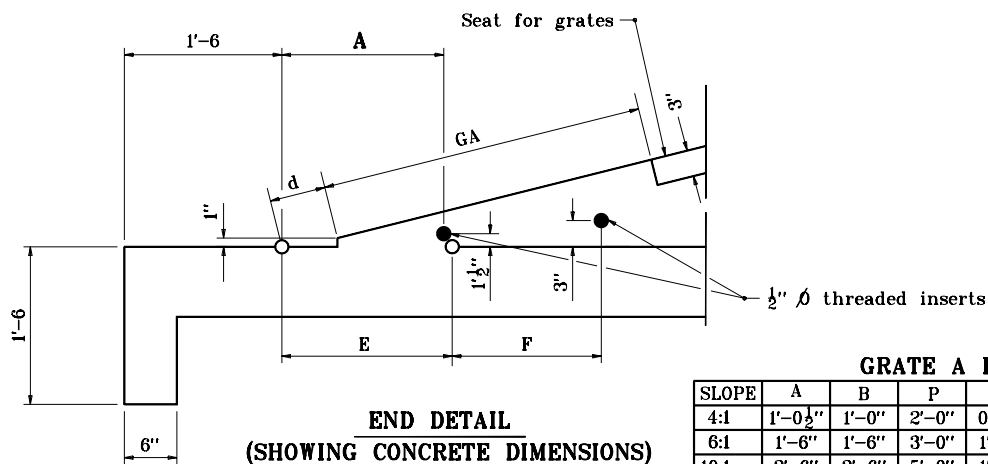


/s/ Richard L. VanCleave 3-01-06  
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-06  
CHIEF HIGHWAY ENGINEER DATE



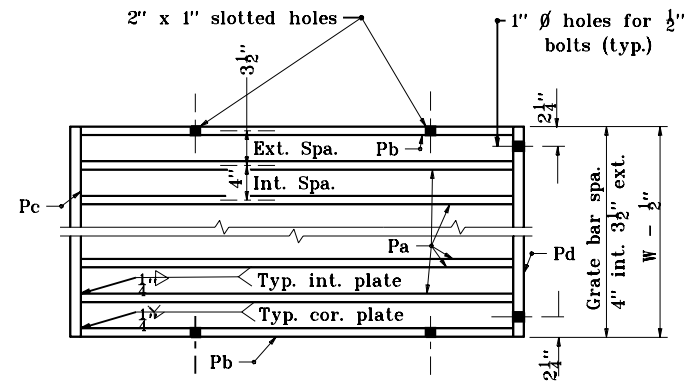
**GRATE B & C**



**END DETAIL  
(SHOWING CONCRETE DIMENSIONS)**

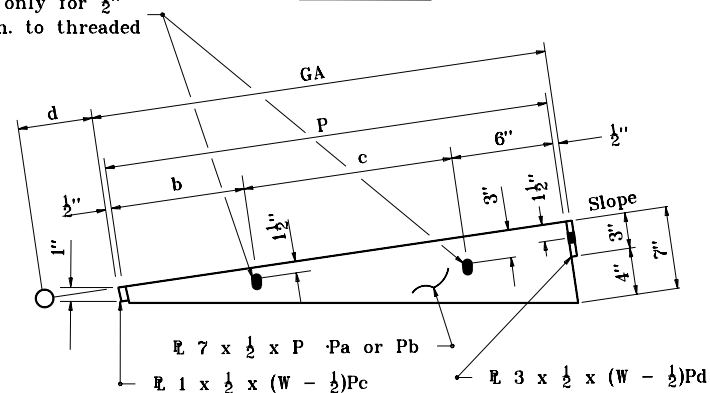
**GRATE A DIMENSIONS TABLE**

SLOPE	A	B	P	b	c	d	E	F	G
4:1	1'-0 $\frac{1}{2}$ "	1'-0"	2'-0"	0'-8"	0'-10"	4"	1'-0 $\frac{1}{2}$ "	0'-10"	2'-1"
6:1	1'-6"	1'-6"	3'-0"	1'-0"	1'-6"	6"	1'-6 $\frac{1}{2}$ "	1'-6"	3'-1"
10:1	2'-6"	2'-6"	5'-0"	1'-8"	2'-10"	10"	2'-6 $\frac{1}{2}$ "	2'-10"	5'-1"



**PLAN VIEW**

1" x 2" slotted hole in R, Pb only for  $\frac{1}{2}$ " bolt conn. to threaded inserts.



**ELEVATION  
GRATE A**

INDIANA DEPARTMENT OF TRANSPORTATION  
**GRATED BOX END SECTION  
TYPE II**  
JANUARY 1999

STANDARD DRAWING NO. E 715-GBTT-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


4:1 Slope							
Pipe Diameter	H	L	W	S	Grate C		Grate B
					No.	Length	Length
12	1'-5	5'-8	2'-0	5'-9	1	3'-4	1'-0
15 & 18	2'-0	8'-0	2'-0	8'-1	1	4'-0	2'-8
21 & 24	2'-6	10'-0	3'-0	10'-1	2	3'-0	2'-8
27 & 30	3'-1	12'-4	3'-0	12'-5	3	3'-0	2'-0
33 & 36	3'-7	14'-4	4'-0	14'-5	5	2'-4	1'-4
42	4'-2	16'-5	4'-0	17'-1	6	2'-4	1'-8
48	4'-8	18'-8	5'-0	19'-1	8	2'-0	1'-8
54	5'-3	21'-0	6'-0	21'-5	12	1'-8	-
60	5'-9	23'-0	6'-0	23'-5	12	1'-8	2'-0

10:1 Slope							
Pipe Diameter	H	L	W	S	Grate C		Grate B
					No.	Length	Length
12	1'-5	14'-2	2'-0	14'-1	2	4'-0	2'-8
15 & 18	2'-0	20'-0	2'-0	19'-9	4	3-8	1'-8
21 & 24	2'-6	25'-0	3'-0	24'-9	8	2'-8	-
27 & 30	3'-1	30'-10	3'-0	30'-5	9	3'-0	-
33 & 36	3'-7	35'-10	4'-0	35'-9	13	2'-4	2'-0
42	4'-2	41'-8	4'-0	41'-9	16	2'-4	1'-0
48	4'-8	46'-8	5'-0	46'-9	21	2'-0	1'-4
54	5'-3	52'-6	6'-0	52'-5	36	1'-4	1'-0
60	5'-9	57'-6	6'-0	57'-9	40	1'-4	1'-0

6:1 Slope							
Pipe Diameter	H	L	W	S	Grate C		Grate B
					No.	Length	Length
12	1'-5	8'-6	2'-0	8'-5	1	4'-0	2'-4
15 & 18	2'-0	12'-0	2'-0	11'-9	2	4'-0	1'-8
21 & 24	2'-6	15'-0	3'-0	15'-1	4	3'-0	1'-0
27 & 30	3'-1	18'-6	3'-0	18'-5	5	3'-0	1'-4
33 & 36	3'-7	21'-6	4'-0	21'-5	9	2'-0	1'-4
42	4'-2	25'-0	4'-0	25'-1	9	2'-4	2'-0
48	4'-8	28'-0	5'-0	28'-1	13	2'-0	-
54	5'-3	31'-6	6'-0	31'-9	17	1'-8	1'-4
60	5'-9	34'-6	6'-0	34'-9	19	1'-8	1'-0

GRATE A DIMENSIONS TABLE									
Slope	A	B	P	b	c	d	E	F	GA
4:1	1'-0½	1'-0	2'-0	0'-8	0'-10	4"	1'-0½	0'-10	2'-1
6:1	1'-6	1'-6	3'-0	1'-0	1'-6	6"	1'-6½	1'-6	3'-1
10:1	2'-6	2'-6	5'-0	1'-8	2'-10	10"	2'-6½	2'-10	5'-1

APPROXIMATE QUANTITIES												
Pipe Diameter	4:1 Slope				6:1 Slope				10:1 Slope			
	Conc., cys		Reinf. Steel, lb.	Str. Steel, lb.	Conc., cys		Reinf. Steel, lb.	Str. Steel, lb.	Conc., cys		Reinf. Steel, lb.	Str. Steel, lb.
	Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe			Conc. Pipe	C.M. Pipe		
12	1.1	1.1	295	335	1.5	1.5	400	480	2.3	2.4	605	790
15 & 18	1.6	1.6	395	445	2.2	2.2	550	645	3.4	3.4	865	1080
21 & 24	2.4	2.4	565	750	3.3	3.3	790	1130	5.2	5.2	1245	1830
27 & 30	2.9	3.0	695	910	4.2	4.3	980	1345	6.6	6.7	1580	2195
33 & 36	4.0	4.1	910	1415	5.7	5.8	1290	2115	9.1	9.2	2075	3455
42	4.8	4.9	1085	1655	6.9	7.0	1545	2415	11.0	11.2	2490	4015
48	6.2	6.3	1350	2230	8.8	9.0	1925	3265	14.2	14.4	3100	5425
54	7.8	8.0	1665	2955	11.3	11.4	2400	4375	18.1	18.3	3855	7440
60	8.7	8.9	1850	3215	12.6	12.8	2675	4780	20.4	20.4	4310	8175

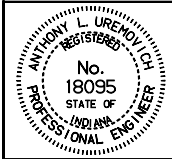
INDIANA DEPARTMENT OF TRANSPORTATION	
<b>GRATED BOX END SECTION</b>	
<b>DIMENSIONS &amp; QUANTITIES TYPE II</b>	
JANUARY 1999	
<b>STANDARD DRAWING NO. E 715-GBTT-05</b>	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE ORIGINALLY APPROVED 1-04-99
DESIGN STANDARDS ENGINEER	

4:1 SLOPE							
PIPE SIZE	H	L	W	S	GRATE C		GRATE B
					No.	LENGTH	LENGTH
17 x 13	1'-6	6'-0	2'-0	6'-1	1	3'-8	1'-0
21 x 15	1'-8	6'-8	2'-0	6'-9	1	4'-0	1'-4
24 x 18	1'-11	7'-8	3'-0	7'-9	2	2'-8	1'-0
28 x 20	2'-1	8'-4	3'-0	8'-5	2	3'-0	1'-0
35 x 24	2'-5	9'-8	4'-0	9'-9	3	2'-4	1'-4
42 x 29	2'-10	11'-4	4'-0	11'-5	5	2'-0	-
49 x 33	3'-2	12'-8	5'-0	12'-9	5	2'-0	1'-4
57 x 38	3'-7	14'-4	5'-0	14'-5	6	2'-0	1'-0
64 x 43	4'-0	16'-0	6'-0	16'-5	9	1'-8	-
71 x 47	4'-4	17'-4	6'-0	17'-9	9	1'-8	1'-4

10:1 SLOPE							
PIPE SIZE	H	L	W	S	GRATE C		GRATE B
					No.	LENGTH	LENGTH
17 x 13	1'-6	15'-0	2'-0	14'-9	2	4'-0	3'-4
21 x 15	1'-8	16'-8	2'-0	16'-5	3	4'-0	1'-0
24 x 18	1'-11	19'-2	3'-0	19'-1	5	2'-6	2'-4
28 x 20	2'-1	20'-10	3'-0	20'-9	5	3'-0	2'-4
35 x 24	2'-5	24'-2	4'-0	24'-1	8	2'-4	2'-0
42 x 29	2'-10	28'-4	4'-0	28'-1	10	2'-4	1'-4
49 x 33	3'-2	31'-8	5'-0	31'-9	17	1'-8	-
57 x 38	3'-7	35'-10	5'-0	35'-9	23	1'-4	1'-8
64 x 43	4'-0	40'-0	6'-0	40'-1	22	1'-8	-
71 x 47	4'-4	43'-4	6'-0	43'-5	24	1'-8	-

6:1 SLOPE							
PIPE SIZE	H	L	W	S	GRATE C		GRATE B
					No.	LENGTH	LENGTH
17 x 13	1'-6	9'-0	2'-0	8'-9	1	4'-0	2'-8
21 x 15	1'-8	10'-0	2'-0	9'-9	1	4'-0	3'-8
24 x 18	1'-11	11'-6	3'-0	11'-5	3	2'-8	1'-4
28 x 20	2'-1	12'-6	3'-0	12'-5	3	3'-0	1'-4
35 x 24	2'-5	14'-6	4'-0	14'-5	5	2'-0	2'-4
42 x 29	2'-10	17'-0	4'-0	17'-1	7	2'-0	1'-0
49 x 33	3'-2	19'-0	5'-0	19'-1	8	2'-0	1'-0
57 x 38	3'-7	21'-6	5'-0	21'-5	9	2'-0	1'-4
64 x 43	4'-0	24'-0	6'-0	24'-1	12	1'-8	2'-0
71 x 47	4'-4	26'-0	6'-0	26'-1	18	1'-4	-

APPROXIMATE QUANTITIES									
PIPE Size	4:1 SLOPE			6:1 SLOPE			10:1 SLOPE		
	Str. Steel, lb.	Conc., cys	Reinf. Steel, lb.	Str. Steel, lb.	Conc., cys	Reinf. Steel, lb.	Str. Steel, lb.	Conc., cys	Reinf. Steel, lb.
17 x 13	355	1.2	305	495	1.6	415	820	2.5	640
21 x 15	385	1.3	335	540	1.8	460	910	2.8	715
24 x 18	605	1.8	440	875	2.5	610	1445	3.9	935
28 x 20	645	2.0	465	940	2.7	645	1545	4.2	1020
35 x 24	975	2.7	615	1435	3.7	855	2375	5.8	1325
42 x 29	1145	3.1	700	1710	4.4	995	2750	6.9	1570
49 x 33	1520	4.0	880	2270	5.6	1230	3825	8.9	1960
57 x 38	1715	4.5	985	2525	6.4	1400	4400	10.2	2245
64 x 43	2295	5.7	1210	3335	8.1	1725	5560	12.9	2755
71 x 47	2470	6.2	1310	3735	8.9	1880	6005	14.2	3015

INDIANA DEPARTMENT OF TRANSPORTATION	
GRATED BOX END SECTION TYPE II	
DIMENSIONS AND QUANTITIES	
JANUARY 1999	
STANDARD DRAWING NO. E 715-GBTT-06	
	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