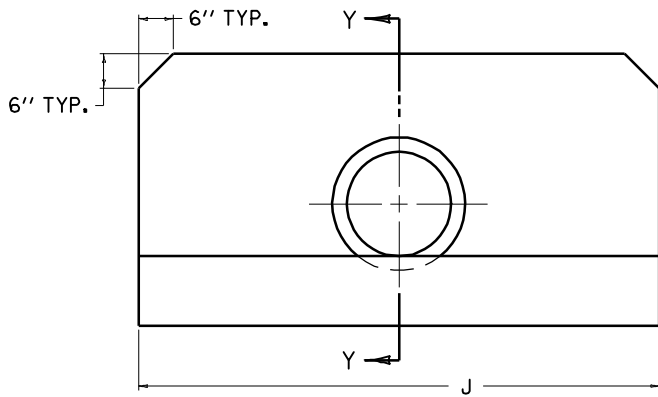
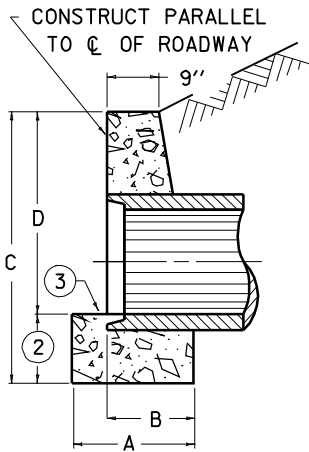


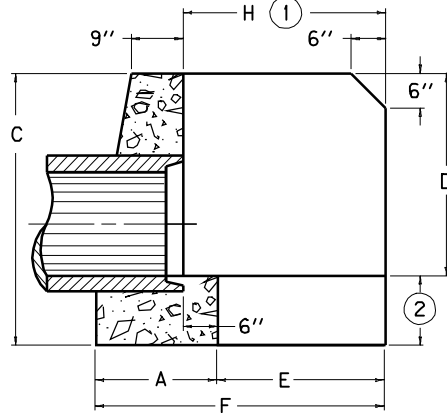
## DIMENSIONS AND QUANTITIES



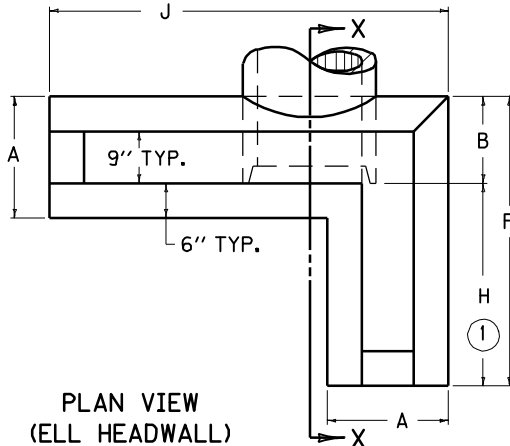
ELEVATION VIEW



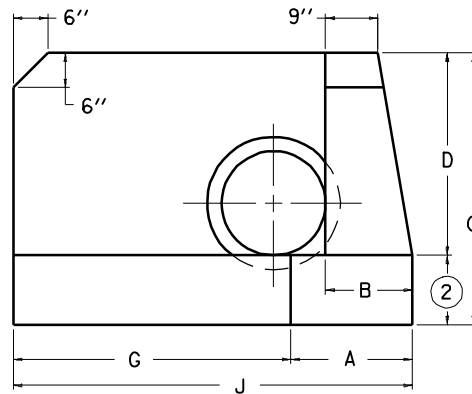
SECTION Y-Y



SECTION X-X



PLAN VIEW  
(ELL HEADWALL)



ELEVATION VIEW (ELL HEADWALL)

HEADWALL TYPE	PIPE DIAMETER	HEADWALL DIMENSIONS									CUBIC YARDS CONCRETE FOR ONE HEADWALL	
		A	B	C	D	E	F	G	H ①	J	(EARTH)	(ROCK)
		STANDARD	12"	1'-8"	1'-2"	4'-0"	2'-6"	—	—	—	—	6'-0"
15"	1'-8½"		1'-2½"	4'-3"	2'-9"	—	—	—	—	6'-9"	1.25	1.03
18"	1'-9"		1'-3"	4'-6"	3'-0"	—	—	—	—	7'-6"	1.48	1.23
21"	1'-9½"		1'-3½"	4'-9"	3'-3"	—	—	—	—	8'-3"	1.73	1.46
24"	1'-10"		1'-4"	5'-0"	3'-6"	—	—	—	—	9'-0"	1.99	1.69
27"	1'-10½"		1'-4½"	5'-3"	3'-9"	—	—	—	—	9'-9"	2.27	1.93
RAISED	12"	1'-8"	1'-2"	4'-6"	3'-0"	—	—	—	—	7'-6"	1.45	1.23
	15"	1'-8½"	1'-2½"	4'-9"	3'-3"	—	—	—	—	8'-3"	1.69	1.43
	18"	1'-9"	1'-3"	5'-0"	3'-6"	—	—	—	—	9'-0"	1.96	1.67
	21"	1'-9½"	1'-3½"	5'-3"	3'-9"	—	—	—	—	9'-9"	2.25	1.93
	24"	1'-10"	1'-4"	5'-6"	4'-0"	—	—	—	—	10'-6"	2.54	2.19
	27"	1'-10½"	1'-4½"	5'-9"	4'-3"	—	—	—	—	11'-3"	2.88	2.49
STANDARD ELL	12"	1'-8"	1'-2"	4'-0"	2'-6"	2'-0"	3'-8"	3'-0"	2'-6"	4'-8"	1.19	0.99
	15"	1'-8½"	1'-2½"	4'-3"	2'-9"	2'-3"	3'-11½"	3'-6"	2'-9"	5'-2½"	1.42	1.19
	18"	1'-9"	1'-3"	4'-6"	3'-0"	2'-6"	4'-3"	4'-0"	3'-0"	5'-9"	1.67	1.41
	21"	1'-9½"	1'-3½"	4'-9"	3'-3"	2'-9"	4'-6½"	4'-6"	3'-3"	6'-3½"	1.93	1.63
	24"	1'-10"	1'-4"	5'-0"	3'-6"	3'-0"	4'-10"	5'-0"	3'-6"	6'-10"	2.22	1.89
	27"	1'-10½"	1'-4½"	5'-3"	3'-9"	3'-3"	5'-1½"	5'-6"	3'-9"	7'-4½"	2.52	2.15
RAISED ELL	12"	1'-8"	1'-2"	4'-6"	3'-0"	2'-9"	4'-5"	3'-9"	3'-3"	5'-5"	1.62	1.37
	15"	1'-8½"	1'-2½"	4'-9"	3'-3"	3'-0"	4'-8½"	4'-3"	3'-6"	5'-11½"	1.88	1.59
	18"	1'-9"	1'-3"	5'-0"	3'-6"	3'-3"	5'-0"	4'-9"	3'-9"	6'-6"	2.16	1.85
	21"	1'-9½"	1'-3½"	5'-3"	3'-9"	3'-6"	5'-3½"	5'-3"	4'-0"	7'-0½"	2.47	2.12
	24"	1'-10"	1'-4"	5'-6"	4'-0"	3'-9"	5'-7"	5'-9"	4'-3"	7'-7"	2.79	2.41
	27"	1'-10½"	1'-4½"	5'-9"	4'-3"	4'-0"	5'-10½"	6'-3"	4'-6"	8'-1½"	3.14	2.72

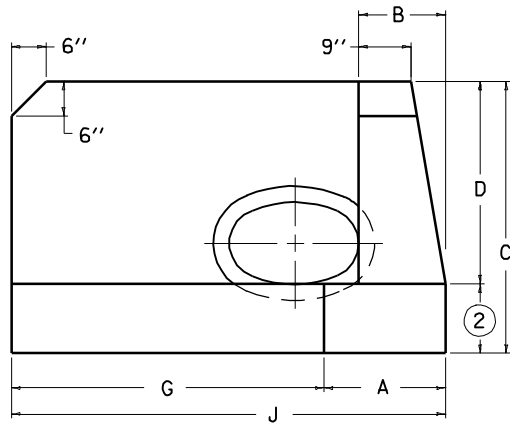
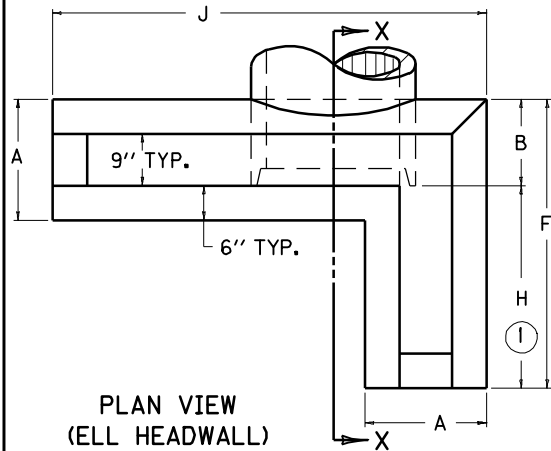
### NOTES

- ① THE DIMENSION AND/OR ANGLE OF INTERSECTION BETWEEN THE WALLS MAY BE VARIED ON CONSTRUCTION.
- ② VOLUME BASED ON VALUES OF 18" ON EARTH, 12" ON ROCK.
- ③ FINISH BY FLOATING
4. CIRCULAR PIPE INCLUDES SLIGHTLY ELLIPTICAL CONCRETE PIPE WITH CIRCULAR REINFORCEMENT.

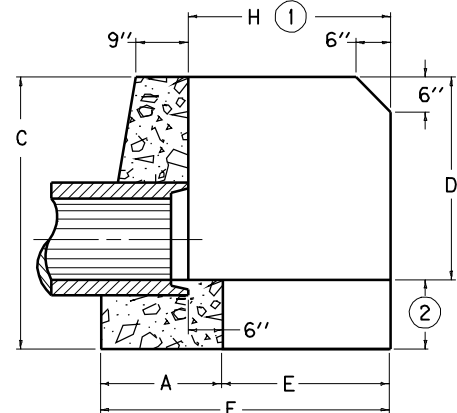
**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**CONCRETE HEADWALLS**  
**FOR**  
**12"-27"**  
**CIRCULAR PIPE CULVERTS**  
**STANDARD DRAWING NO. RDH-005-02**

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE

# DIMENSIONS AND QUANTITIES

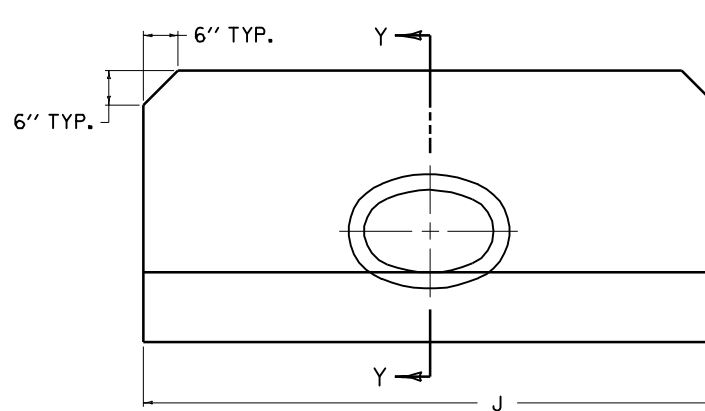


**ELEVATION VIEW (ELL HEADWALL)**

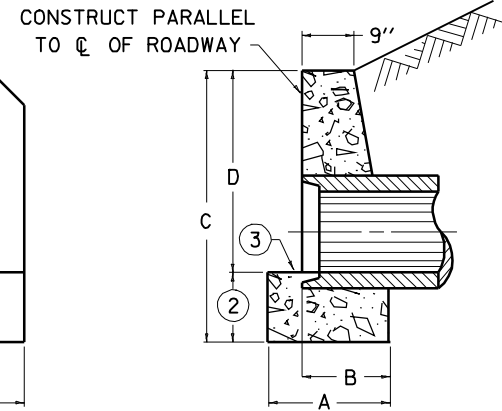


**SECTION X-X**

HEADWALL TYPE	ROUND EQUIVALENT	REINFORCED CONCRETE ELLIPTICAL PIPE	CORRUGATED METAL PIPE ARCH	HEADWALL DIMENSIONS									VOLUME CU. YDS FOR 1 HEADWALL (EARTH)	VOLUME CU. YDS FOR 1 HEADWALL (ROCK)
		SIZE OF PIPE		A	B	C	D	E	F	G	H ①	J		
STANDARD	15"	—	17" X 13"	1'-9"	1'-3"	4'-0"	2'-6"	—	—	—	—	7'-10"	1.43	1.18
	18"	23" X 14"	21" X 15"	1'-9"	1'-3"	4'-5"	2'-11"	—	—	—	—	8'-3"	1.64	1.33
	24"	30" X 19"	28" X 20"	1'-9"	1'-3"	4'-10"	3'-4"	—	—	—	—	9'-6"	2.10	1.79
	27"	34" X 22"	—	1'-10"	1'-4"	5'-2"	3'-8"	—	—	—	—	10'-6"	2.53	2.18
RAISED	15"	—	17" X 13"	1'-9"	1'-3"	4'-6"	3'-0"	—	—	—	—	9'-4"	1.89	1.59
	18"	23" X 14"	21" X 15"	1'-9"	1'-3"	4'-11"	3'-5"	—	—	—	—	9'-9"	2.11	1.62
	24"	30" X 19"	28" X 20"	1'-9"	1'-3"	5'-4"	3'-10"	—	—	—	—	11'-0"	2.68	2.18
	27"	34" X 22"	—	1'-10"	1'-4"	5'-8"	4'-2"	—	—	—	—	12'-0"	3.09	2.40
STANDARD ELL	15"	—	17" X 13"	1'-9"	1'-3"	4'-0"	2'-6"	1'-10"	3'-7"	4'-0"	2'-4"	5'-9"	1.41	1.16
	18"	23" X 14"	21" X 15"	1'-9"	1'-3"	4'-5"	2'-11"	2'-3"	4'-2"	4'-6"	2'-11"	6'-3"	1.86	1.76
	24"	30" X 19"	28" X 20"	1'-9"	1'-3"	4'-10"	3'-4"	2'-10"	4'-7"	5'-8"	3'-4"	7'-5"	2.48	2.30
	27"	34" X 22"	—	1'-10"	1'-4"	5'-2"	3'-8"	3'-2"	5'-0"	6'-5"	3'-8"	8'-3"	2.74	2.67
RAISED ELL	15"	—	17" X 13"	1'-9"	1'-3"	4'-6"	3'-0"	2'-4"	4'-1"	4'-9"	2'-10"	6'-6"	1.81	1.52
	18"	23" X 14"	21" X 15"	1'-9"	1'-3"	4'-11"	3'-5"	2'-11"	4'-8"	5'-3"	3'-5"	7'-0"	2.33	2.05
	24"	30" X 19"	28" X 20"	1'-9"	1'-3"	5'-4"	3'-10"	3'-4"	5'-1"	6'-5"	3'-10"	8'-2"	3.02	2.64
	27"	34" X 22"	—	1'-10"	1'-4"	5'-8"	4'-2"	3'-8"	5'-6"	7'-2"	4'-2"	9'-0"	3.26	2.83



**ELEVATION VIEW**



**SECTION Y-Y**

**NOTES**

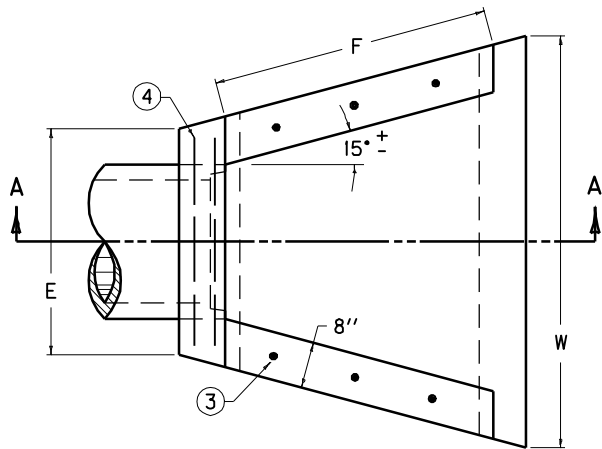
- ① THE DIMENSION AND/OR ANGLE OF INTERSECTION BETWEEN THE WALLS MAY BE VARIED ON CONSTRUCTION.
- ② VOLUME BASED ON VALUES OF 18" ON EARTH, 12" ON ROCK.
- ③ FINISH BY FLOATING

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**CONCRETE HEADWALLS**  
**FOR**  
**15"-27"**  
**NON-CIR. PIPE CULVERTS**

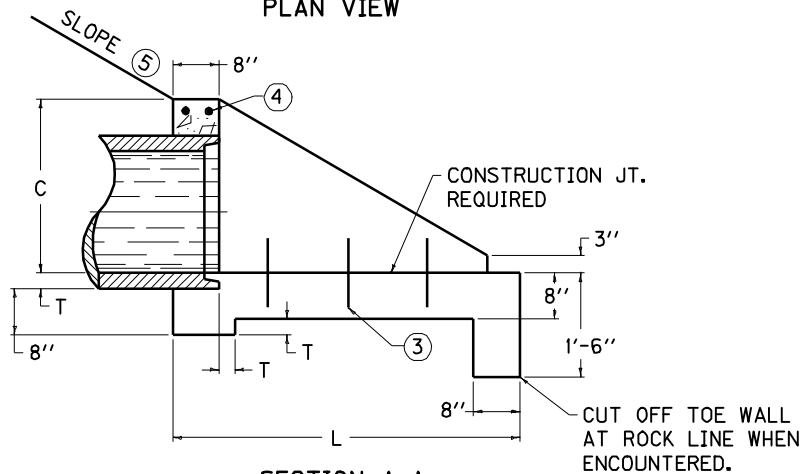
STANDARD DRAWING NO. RDH-010-02

SUBMITTED: *Joh B. Sackleton* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

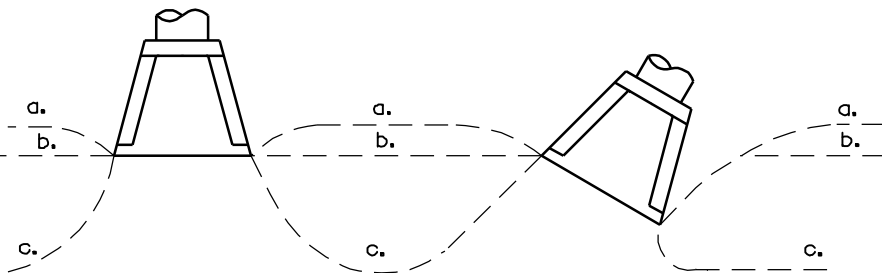
APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE



PLAN VIEW



SECTION A-A



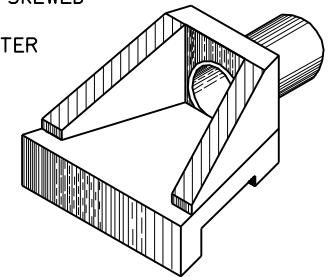
TOE OF SLOPES:

- a. STEEPER THAN 2:1
- b. 2:1
- c. FLATTER THAN 2:1

PIPE		DIMENSIONS						CLASS A CONC	REINF STEEL	
DIA. OR EQUIV. DIA.	SHAPE ⑨	C	E	F	L	W	T	C. Y.	LBS.	
12"	○	1'-9"	2'-6"	2'-3"	3'-6"	4'-0"	2"	0.58	7	
15"	○	2'-0"	2'-9"	2'-9"	4'-0"	4'-9"	2 1/4"	0.75		
	○	1'-9"	3'-0"	2'-6"	3'-6"	4'-9"		0.68		
18"	○	2'-3"	3'-0"	3'-6"	4'-6"	5'-3"	2 1/2"	0.93	8	
	○	2'-0"	3'-6"	3'-0"	4'-0"	5'-6"				2 3/4"
	○									
21"	○	2'-6"	3'-3"	4'-0"	5'-0"	6'-0"	2 3/4"	1.14	9	
	○	2'-3"	3'-0"	3'-6"	4'-6"	6'-0"		1.07		
24"	○	2'-9"	3'-6"	4'-6"	5'-6"	6'-6"	3"	1.35	8	
	○	2'-6"	4'-0"	4'-0"	5'-0"	6'-9"				3 1/4"
	○									
27"	○	3'-0"	3'-9"	5'-0"	6'-0"	7'-0"	3 1/4"	1.30	9	
	○	2'-9"	4'-6"	4'-3"	5'-3"	7'-3"		3 1/2"		1.57

NOTES

1. DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY INSIGNIFICANTLY FOR CORRUGATED METAL PIPE.
2. REINFORCING STEEL : MINIMUM GRADE 40, BARS EVENLY SPACED.
- ③ 6 - NO. 4 x 1'-0" DOWEL BARS.
- ④ 2 - NO. 4 x (E DIMENSION MINUS 4").
- ⑤ SLOPES SHALL BE WARPED TO FIT HEADWALL WHEN PIPE IS SKEWED AND/OR NORMAL SLOPE VARIES FROM 2:1.
6. VOLUME DISPLACED BY PIPE COMPUTED USING INSIDE DIAMETER OF PIPE.
7. WING ANGLES AND/OR DIMENSIONS MAY BE ALTERED DURING CONSTRUCTION TO ACCOMMODATE FLOW OF WATER.
8. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL SHALL REMAIN VERTICAL.
- ⑨ HEADWALLS ARE FOR CIRCULAR, ARCH, AND HORIZONTAL ELLIPTICAL 12"- 27" EQUIVALENT PIPE SIZES. SEE CURRENT STD. DWG. RDI-016, FOR NON-CIRCULAR PIPE EQUIVALENT SIZES.



ISOMETRIC VIEW

KENTUCKY  
DEPARTMENT OF HIGHWAYS

SLOPED & FLARED  
HEADWALLS FOR  
12" TO 27" PIPE

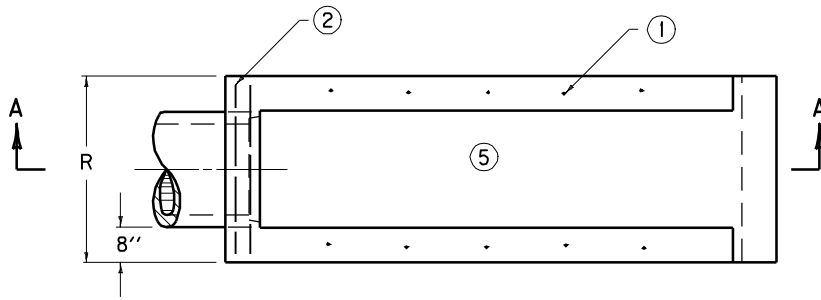
STANDARD DRAWING NO. RDH-020-03

SUBMITTED: *John B. Suckman* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

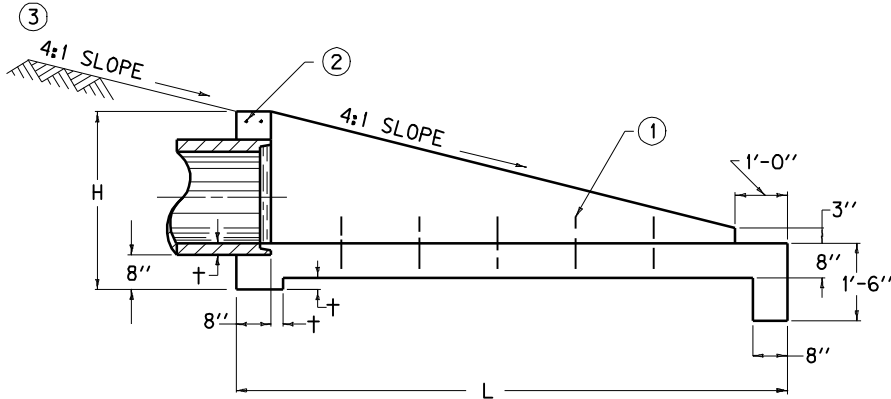
- NOTES -

REINFORCING STEEL : MINIMUM GRADE 40, EVENLY SPACED .

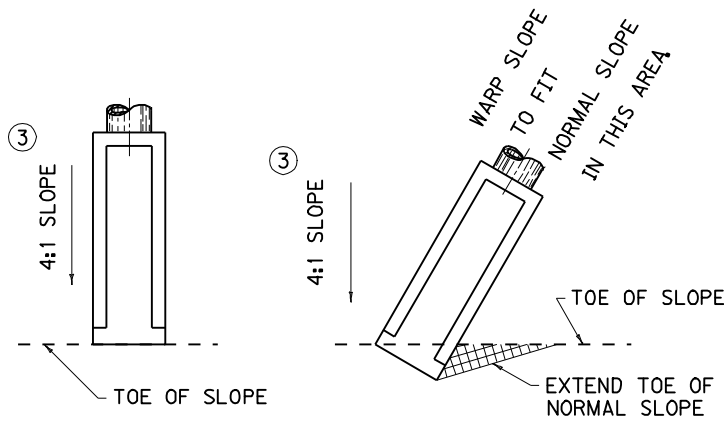
- ① 12 - NO. 4 X 1'-0" DOWEL BARS .
- ② 2 - NO. 4 X ( R DIMENSION MINUS 4" ) .
- ③ SLOPES SHALL BE WARPED TO FIT HEADWALL WHEN PIPE IS SKEWED AND/OR NORMAL SLOPE VARIES FROM 4 : 1 .
- ④ SEE CURRENT STD. DWG. RDI-016 FOR NON-CIRCULAR PIPE EQUIVALENT SIZES .
- ⑤ APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE . FRONT FACE OF HEADWALL SHALL REMAIN VERTICAL .
- ⑥ DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR METAL PIPE .



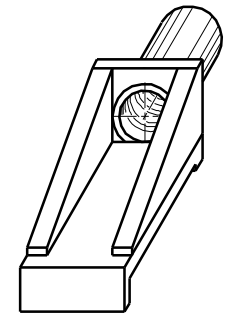
PLAN VIEW



SECTION A-A



PLAN VIEW OF STRUCTURE LOCATIONS



OBLIQUE VIEW

PIPE DIA. OR EQUIV. DIA.	SHAPE ④	DIMENSIONS ⑥				CLASS "A" CONC.	REINF. STEEL
		H	R	L	†		
12"	○	2'-6"	2'-8"	7'-4"	2"	0.93	11
15"	○	2'-10"	3'-0"	8'-5"	2 1/4"	1.20	12
	○	2'-6"	3'-3"	7'-1"		1.02	
18"	○	3'-1"	3'-3"	9'-6"	2 1/2"	1.50	13
	○	2'-9"	3'-7"	8'-0"		1.29	
	○	2'-10"	3'-9"	8'-3"		1.38	
21"	○	3'-5"	3'-7"	10'-7"	2 3/4"	1.84	12

KENTUCKY  
DEPARTMENT OF HIGHWAYS

**SLOPED & PARALLEL  
HEADWALLS  
12" TO 21" PIPE**

STANDARD DRAWING NO. RDH-030-03

SUBMITTED: *John B. Slaughter* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *John B. Slaughter* 12-1-99  
STATE HIGHWAY ENGINEER DATE

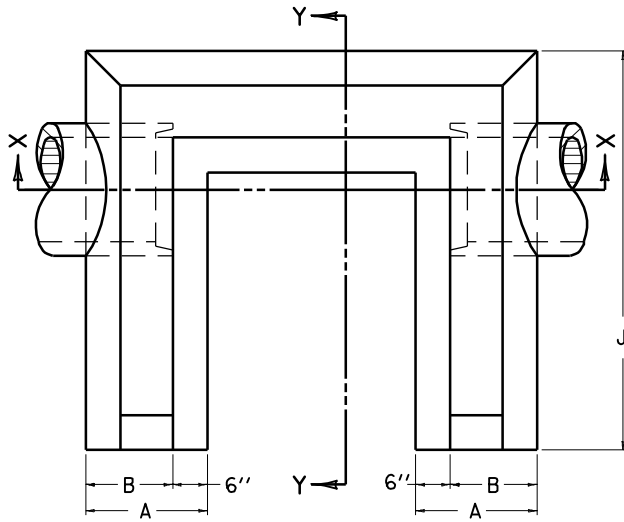


# DIMENSIONS AND QUANTITIES

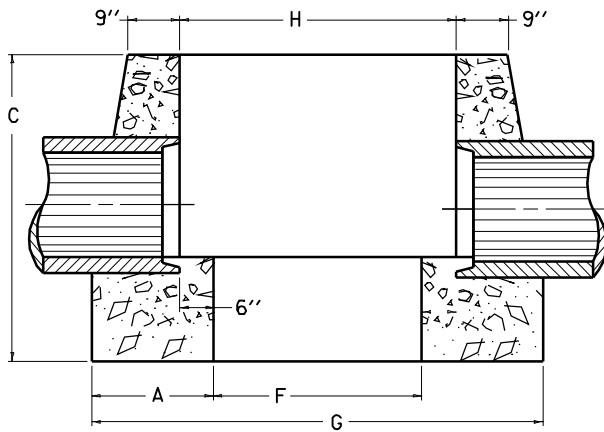
PIPE DIAMETER	HEADWALL DIMENSIONS									CU. YD. CONC. FOR 1 HEADWALL
	A	B	C	D	E	F	G	H	J	
12"	1'-8"	1'-2"	4'-0"	1'-6"	2'-6"	2'-6"	5'-10"	3'-6"	4'-8"	2.07
15"	1'-8"	1'-2"	4'-3"	1'-6"	2'-9"	2'-9"	6'-2"	3'-9"	5'-2"	2.42
18"	1'-9"	1'-3"	4'-6"	1'-6"	3'-0"	3'-0"	6'-6"	4'-0"	5'-9"	2.86
24"	1'-10"	1'-4"	5'-0"	1'-6"	3'-6"	3'-6"	7'-2"	4'-6"	6'-10"	3.75
30"	1'-11"	1'-5"	5'-6"	1'-6"	4'-0"	3'-9"	7'-7"	4'-9"	7'-11"	4.78
36"	2'-0"	1'-6"	6'-6"	2'-0"	4'-6"	4'-0"	8'-0"	5'-0"	9'-0"	6.72

### NOTES

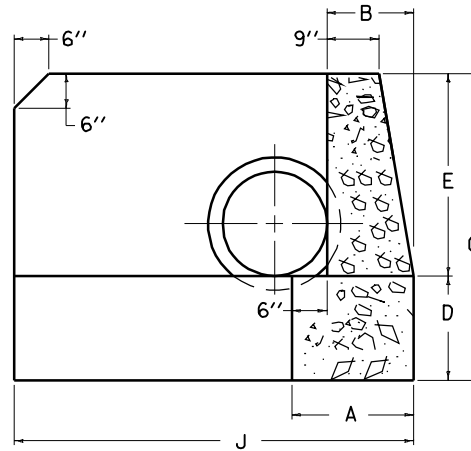
- VOLUME DISPLACED BY BARREL OF PIPE HAS BEEN COMPUTED USING INSIDE DIAMETER OF PIPE.



PLAN VIEW



SECTION X-X



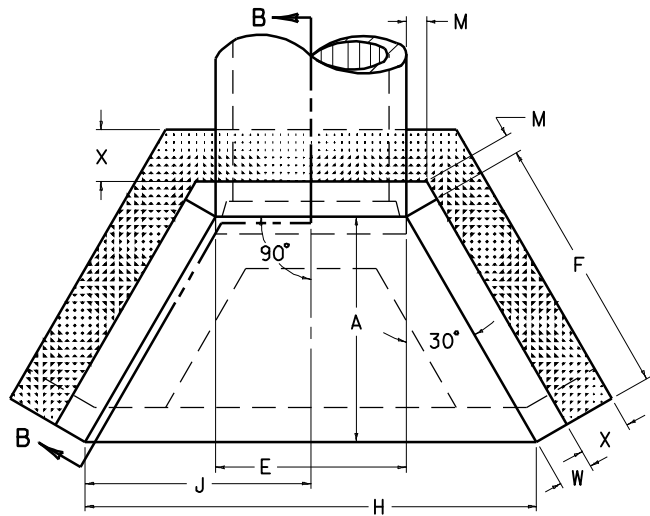
SECTION Y-Y

KENTUCKY  
DEPARTMENT OF HIGHWAYS

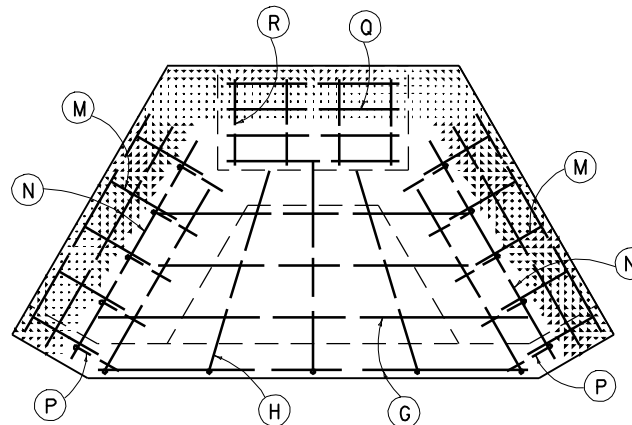
U-TYPE  
HEADWALLS

STANDARD DRAWING NO. RDH-050-02

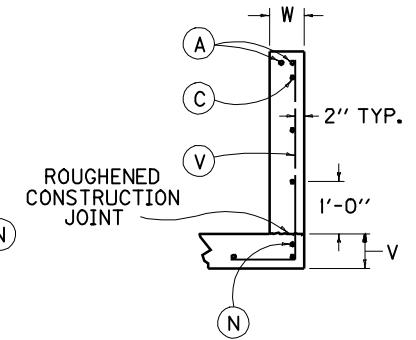
SUBMITTED: <i>John B. Sackleton</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>J. M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE



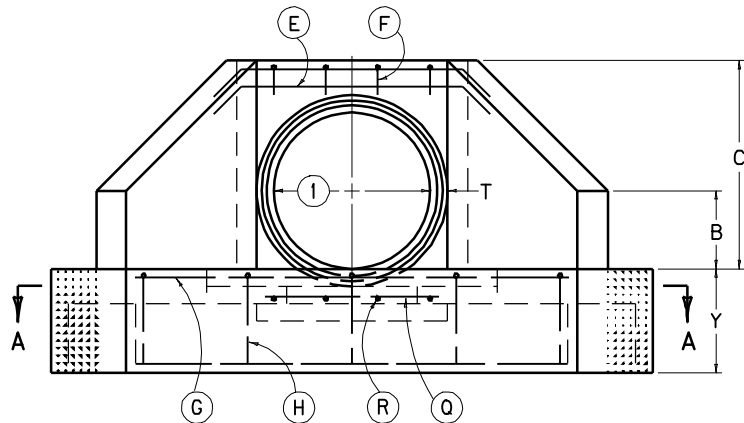
PLAN VIEW



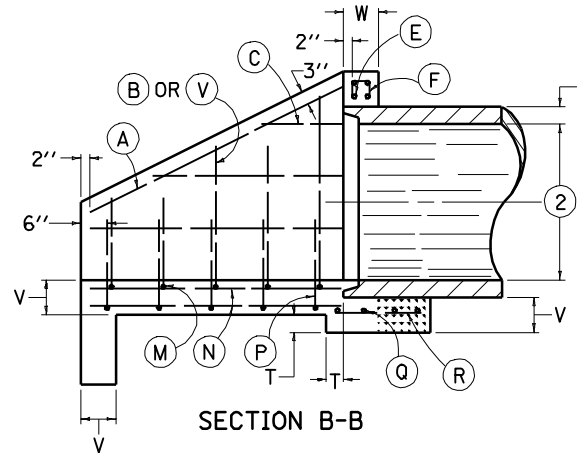
SECTION A-A



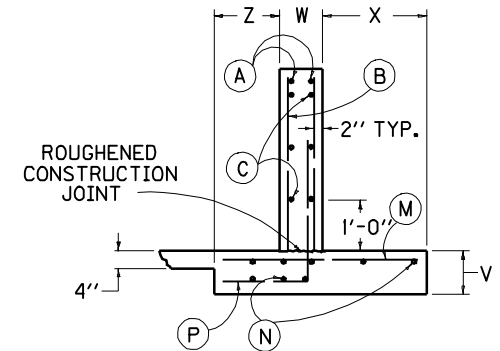
WING SECTION  
30'' TO 60'' CIRCULAR PIPE  
30'' TO 72'' NON-CIRCULAR PIPE



FRONT ELEVATION



SECTION B-B



WING SECTION  
66'' TO 108'' CIRCULAR PIPE

- ① DIAMETER OF CIRCULAR PIPE OR SPAN OF NON-CIRCULAR PIPE
- ② DIAMETER OF CIRCULAR PIPE OR RISE OF NON-CIRCULAR PIPE
3. [Hatched pattern] APPLIES TO 66" DIAMETER AND GREATER. (CIRCULAR PIPE)
4. SEE CURRENT STANDARD DRAWINGS RDH-200 AND 300 SERIES FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT.
5. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
6. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS
7. BARS (B), (C), (G), (P), (M), (V) ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
8. BARS (B) AND (V) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
9. BARS (C) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
10. HEADWALLS LOCATED AT EDGE OF SHOULDER SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
11. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

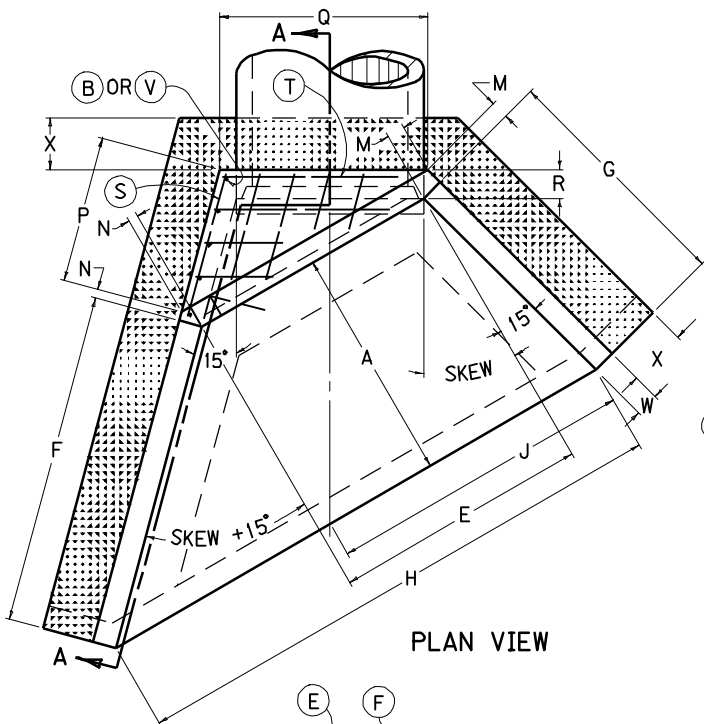
(LAYOUT AND STEEL PATTERN)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

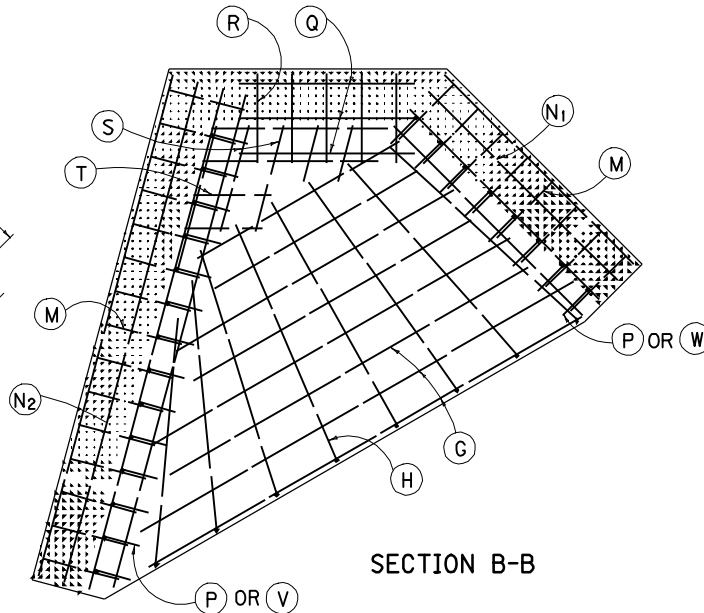
PIPE CULVERT  
HEADWALLS  
0° SKEW

STANDARD DRAWING NO. RDH-110-02

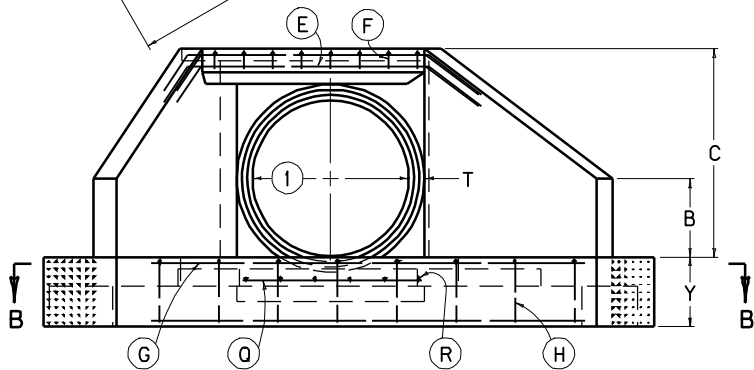
SUBMITTED: *John B. Sisk* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE



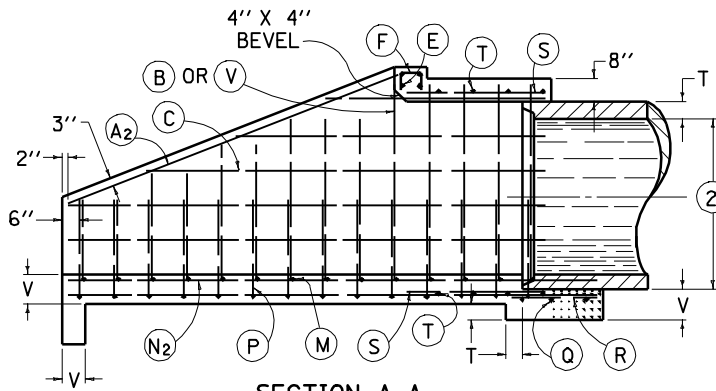
PLAN VIEW



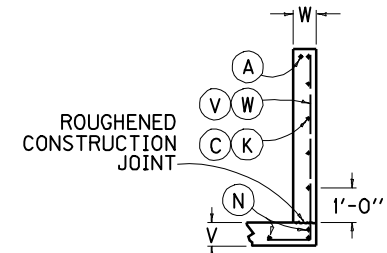
SECTION B-B



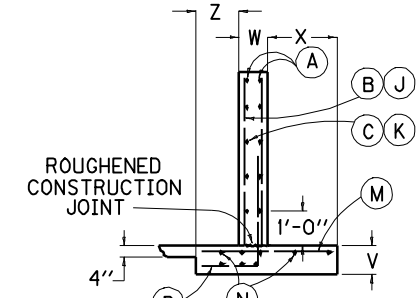
FRONT ELEVATION



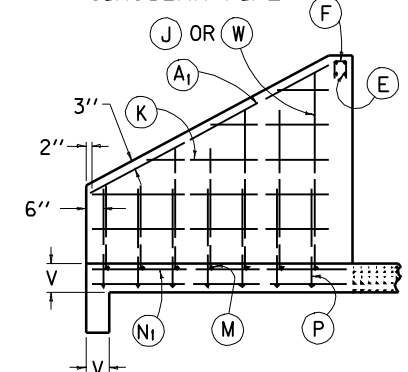
SECTION A-A



WING SECTION  
30'' TO 60'' CIRCULAR PIPE  
30'' TO 72'' NON-CIRCULAR PIPE



WING SECTION  
66'' TO 108''  
CIRCULAR PIPE



SHORT WING SECTION  
(LAYOUT AND STEEL PATTERN)

- ① DIAMETER OF CIRCULAR PIPE OR SPAN OF NON-CIRCULAR PIPE
- ② DIAMETER OF CIRCULAR PIPE OR RISE OF NON-CIRCULAR PIPE
3. [Hatched pattern] APPLIES TO 66" DIAMETER AND GREATER. (CIRCULAR PIPE)
4. SEE CURRENT STANDARD DRAWINGS RDH-200 AND 300 SERIES FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT.
5. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
6. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS
7. BARS (B), (C), (G), (P), (M), (V) ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
8. BARS (B) AND (V) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
9. BARS (C) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
10. HEADWALLS LOCATED AT EDGE OF SHOULDER SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
11. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

KENTUCKY  
DEPARTMENT OF HIGHWAYS

**PIPE CULVERT  
HEADWALLS**  
15° - 30° & 45° SKEW

STANDARD DRAWING NO. RDH-120-02

SUBMITTED: <i>John B. Sisk</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>[Signature]</i> STATE HIGHWAY ENGINEER	12-1-99 DATE

DIMENSION	DIAMETER OF PIPE														DIMENSION	
	30''	36''	42''	48''	54''	60''	66''	72''	78''	84''	90''	96''	102''	108''		
A	3'-9''	4'-4''	4'-11''	5'-6''	6'-1''	6'-8''	7'-5''	8'-0''	8'-7''	9'-2''	9'-9''	10'-4''	10'-11''	11'-6''	A	
B	1'-3''	1'-6''	1'-9''	2'-0''	2'-3''	2'-6''	2'-9''	3'-0''	3'-3''	3'-6''	3'-9''	4'-0''	4'-3''	4'-6''	B	
C	3'-6''	4'-0''	4'-7''	5'-1''	5'-8''	6'-2''	7'-0''	7'-5''	8'-0''	8'-6''	9'-1''	9'-7''	10'-2''	10'-8''	C	
E	3'-1''	3'-8''	4'-3''	4'-10''	5'-5''	6'-0''	6'-7''	7'-2''	7'-9''	8'-4''	8'-11''	9'-6''	10'-1''	10'-8''	E	
F	4'-4''	5'-0''	5'-8''	6'-4''	7'-0''	7'-8''	8'-7''	9'-3''	9'-11''	10'-7''	11'-3''	11'-11''	12'-7''	13'-3''	F	
H	7'-6''	8'-8''	10'-0''	11'-2''	12'-6''	13'-8''	15'-2''	16'-6''	17'-8''	19'-0''	20'-2''	21'-6''	22'-8''	24'-0''	H	
J	3'-9''	4'-4''	5'-0''	5'-7''	6'-3''	6'-10''	7'-7''	8'-3''	8'-10''	9'-6''	10'-1''	10'-9''	11'-4''	12'-0''	J	
M	0'-5''							0'-6''							M	
T	0'-3.5''	0'-4.0''	0'-4.5''	0'-5.0''	0'-5.5''	0'-6.0''	0'-6.5''	0'-7.0''	0'-7.5''	0'-8.0''	0'-8.5''	0'-9.0''	0'-9.5''	0'-10.0''	T	
V	0'-8''							1'-0''							V	
W	0'-8''							0'-10''							W	
X	----							2'-0''				2'-6''				X
Y	2'-0''							2'-6''				3'-0''				Y
Z	----							1'-3''				1'-9''				Z

CU. YDS. CONC. 2 HEADWALLS	3.36	4.30	5.35	6.53	7.82	9.22	18.76	20.95	23.25	25.67	31.48	34.31	37.25	40.32	CU. YDS. CONC. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	281	363	430	496	583	687	1320	1571	1815	2043	2451	2753	3050	3379	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CUR. STD. DWG. RDH-110

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS & QUANTITIES**  
**30'' - 108'' HEADWALLS**  
**CIRCULAR PIPE**  
**0° SKEW**

STANDARD DRAWING NO. RDH-210-03

SUBMITTED *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	DIAMETER OF PIPE														DIMENSION
	30''	36''	42''	48''	54''	60''	66''	72''	78''	84''	90''	96''	102''	108''	
A	4'-5''	5'-0''	5'-7''	6'-2''	6'-9''	7'-4''	7'-9''	8'-4''	8'-11''	9'-6''	10'-1''	10'-8''	11'-3''	11'-10''	A
B	1'-3''	1'-6''	1'-9''	2'-0''	2'-3''	2'-6''	2'-9''	3'-0''	3'-3''	3'-6''	3'-9''	4'-0''	4'-3''	4'-6''	B
C	3'-10''	4'-4''	4'-11''	5'-5''	6'-0''	6'-6''	7'-1''	7'-7''	8'-2''	8'-8''	9'-3''	9'-9''	10'-4''	10'-10''	C
E	3'-5''	4'-1''	4'-9''	5'-5''	6'-0''	6'-8''	7'-4''	8'-0''	8'-8''	9'-4''	9'-11''	10'-7''	11'-3''	11'-11''	E
F	5'-1''	5'-9''	6'-5''	7'-1''	7'-10''	8'-6''	8'-11''	9'-7''	10'-4''	11'-0''	11'-8''	12'-4''	13'-0''	13'-8''	F
G	4'-7''	5'-2''	5'-9''	6'-5''	7'-0''	7'-7''	8'-0''	8'-8''	9'-3''	9'-10''	10'-5''	11'-1''	11'-8''	12'-3''	G
H	7'-2''	8'-4''	9'-6''	10'-7''	11'-9''	12'-11''	13'-11''	15'-0''	16'-2''	17'-4''	18'-6''	19'-7''	20'-9''	21'-11''	H
J	4'-0''	4'-7''	5'-2''	5'-10''	6'-5''	7'-0''	7'-7''	8'-2''	8'-9''	9'-5''	10'-0''	10'-8''	11'-3''	11'-10''	J
M	0'-6''						0'-8''								M
N	0'-5''						0'-6''								N
P	1'-2''	1'-4''	1'-6''	1'-8''	1'-10''	2'-0''	2'-3''	2'-5''	2'-7''	2'-9''	3'-0''	3'-2''	3'-4''	3'-6''	P
Q	3'-11''	4'-6''	5'-1''	5'-8''	6'-3''	6'-10''	7'-7''	8'-2''	8'-9''	9'-4''	9'-11''	10'-6''	11'-1''	11'-8''	Q
R	0'-9''						1'-0''								R
T	0'-3.5''	0'-4.0''	0'-4.5''	0'-5.0''	0'-5.5''	0'-6.0''	0'-6.5''	0'-7.0''	0'-7.5''	0'-8.0''	0'-8.5''	0'-9.0''	0'-9.5''	0'-10.0''	T
V	0'-8''						1'-0''								V
W	0'-8''						0'-10''								W
X	----						2'-0''				2'-6''				X
Y	2'-0''						2'-6''				3'-0''				Y
Z	----						1'-3''				1'-9''				Z
CU. YDS. CONC. 2 HEADWALLS	3.76	4.89	6.15	7.55	9.07	10.73	21.24	23.75	26.39	29.16	35.43	38.66	42.03	45.54	CU. YDS. CONC. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	399	470	555	644	753	862	1689	1912	2148	2390	2937	3238	3582	3852	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CUR. STD. DWG. RDH-120

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS & QUANTITIES**  
**30''-108'' HEADWALLS**  
**CIRCULAR PIPE**  
**15° SKEW**

STANDARD DRAWING NO. RDH-212-02  
 SUBMITTED: *John B. [Signature]* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	DIAMETER OF PIPE														DIMENSION
	30''	36''	42''	48''	54''	60''	66''	72''	78''	84''	90''	96''	102''	108''	
A	4'-5''	5'-0''	5'-7''	6'-2''	6'-9''	7'-4''	7'-9''	8'-4''	8'-11''	9'-6''	10'-1''	10'-8''	11'-3''	11'-10''	A
B	1'-3''	1'-6''	1'-9''	2'-0''	2'-3''	2'-6''	2'-9''	3'-0''	3'-3''	3'-6''	3'-9''	4'-0''	4'-3''	4'-6''	B
C	3'-10''	4'-4''	4'-11''	5'-5''	6'-0''	6'-6''	7'-1''	7'-7''	8'-2''	8'-8''	9'-3''	9'-9''	10'-4''	10'-10''	C
E	4'-3''	5'-0''	5'-10''	6'-7''	7'-5''	8'-2''	9'-0''	9'-9''	10'-7''	11'-5''	12'-2''	13'-0''	13'-9''	14'-7''	E
F	6'-3''	7'-1''	7'-11''	8'-9''	9'-7''	10'-4''	11'-0''	11'-9''	12'-7''	13'-5''	14'-3''	15'-1''	15'-11''	16'-9''	F
G	4'-7''	5'-2''	5'-9''	6'-5''	7'-0''	7'-7''	8'-0''	8'-8''	9'-3''	9'-10''	10'-5''	11'-1''	11'-8''	12'-3''	G
H	9'-10''	11'-4''	12'-11''	14'-5''	15'-11''	17'-6''	18'-10''	20'-4''	21'-11''	23'-5''	25'-0''	26'-6''	28'-0''	29'-7''	H
J	5'-6''	6'-4''	7'-2''	8'-0''	8'-10''	9'-8''	10'-4''	11'-2''	12'-0''	12'-10''	13'-8''	14'-6''	15'-4''	16'-2''	J
M	0'-6''						0'-8''								M
N	0'-3''						0'-4''								N
P	2'-7''	3'-0''	3'-5''	3'-10''	4'-3''	4'-8''	5'-2''	5'-7''	6'-0''	6'-5''	6'-10''	7'-3''	7'-8''	8'-1''	P
Q	3'-8''	4'-3''	4'-10''	5'-5''	6'-0''	6'-7''	7'-4''	7'-11''	8'-6''	9'-1''	9'-8''	10'-3''	10'-10''	11'-5''	Q
R	0'-10''						1'-0''								R
T	0'-3.5''	0'-4.0''	0'-4.5''	0'-5.0''	0'-5.5''	0'-6.0''	0'-6.5''	0'-7.0''	0'-7.5''	0'-8.0''	0'-8.5''	0'-9.0''	0'-9.5''	0'-10.0''	T
V	0'-8''						1'-0''								V
W	0'-8''						0'-10''								W
X	----						2'-0''				2'-6''				X
Y	2'-0''						2'-6''				3'-0''				Y
Z	----						1'-3''				1'-9''				Z

CU. YDS. CONC. 2 HEADWALLS	4.96	6.45	8.12	9.97	12.01	14.22	26.64	29.92	33.37	37.01	44.75	48.98	53.39	58.00	CU. YDS. CONC. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	474	579	683	795	947	1112	2134	2440	2761	3113	3697	4170	4568	4948	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CUR. STD. DWG. RDH-120

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS & QUANTITIES**  
**30'' - 108'' HEADWALLS**  
**CIRCULAR PIPE**  
**30° SKEW**

STANDARD DRAWING NO. RDH-214-03  
 SUBMITTED: *John B. Ingleton* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	DIAMETER OF PIPE														DIMENSION
	30''	36''	42''	48''	54''	60''	66''	72''	78''	84''	90''	96''	102''	108''	
A	4'-5''	5'-0''	5'-7''	6'-2''	6'-9''	7'-4''	7'-9''	8'-4''	8'-11''	9'-6''	10'-1''	10'-8''	11'-3''	11'-10''	A
B	1'-3''	1'-6''	1'-9''	2'-0''	2'-3''	2'-6''	2'-9''	3'-0''	3'-3''	3'-6''	3'-9''	4'-0''	4'-3''	4'-6''	B
C	3'-10''	4'-4''	4'-11''	5'-5''	6'-0''	6'-6''	7'-1''	7'-7''	8'-2''	8'-8''	9'-3''	9'-9''	10'-4''	10'-10''	C
E	5'-11''	7'-1''	8'-3''	9'-4''	10'-6''	11'-7''	12'-9''	13'-10''	15'-0''	16'-1''	17'-3''	18'-4''	19'-6''	20'-7''	E
F	8'-10''	10'-0''	11'-2''	12'-4''	13'-6''	14'-8''	15'-6''	16'-8''	17'-10''	19'-0''	20'-2''	21'-4''	22'-6''	23'-8''	F
G	4'-7''	5'-2''	5'-9''	6'-5''	7'-0''	7'-7''	8'-0''	8'-8''	9'-3''	9'-10''	10'-5''	11'-1''	11'-8''	12'-3''	G
H	14'-9''	17'-1''	19'-5''	21'-8''	24'-0''	26'-3''	28'-3''	30'-6''	32'-10''	35'-1''	37'-5''	39'-8''	42'-0''	44'-3''	H
J	7'-9''	8'-11''	10'-1''	11'-3''	12'-5''	13'-6''	14'-6''	15'-8''	16'-9''	17'-11''	19'-1''	20'-3''	21'-5''	22'-7''	J
M	0'-6''						0'-8''								M
N	0'-2''						0'-3''								N
P	4'-10''	5'-8''	6'-6''	7'-4''	8'-2''	9'-0''	9'-11''	10'-9''	11'-7''	12'-5''	13'-3''	14'-1''	14'-11''	15'-9''	P
Q	3'-5''	4'-0''	4'-7''	5'-2''	5'-9''	6'-4''	7'-0''	7'-7''	8'-2''	8'-9''	9'-4''	9'-11''	10'-6''	11'-1''	Q
R	0'-10''						1'-0''								R
T	0'-3.5''	0'-4.0''	0'-4.5''	0'-5.0''	0'-5.5''	0'-6.0''	0'-6.5''	0'-7.0''	0'-7.5''	0'-8.0''	0'-8.5''	0'-9.0''	0'-9.5''	0'-10.0''	T
V	0'-8''						1'-0''								V
W	0'-8''						0'-10''								W
X	----						2'-0''				2'-6''				X
Y	2'-0''						2'-6''				3'-0''				Y
Z	----						1'-3''				1'-9''				Z
CU. YDS. CONC. 2 HEADWALLS	7.19	9.36	11.80	14.52	17.50	20.75	36.82	41.52	46.50	51.74	62.30	68.38	74.74	81.38	CU. YDS. CONC. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	639	768	965	1132	1353	1525	3046	3545	3963	4447	5261	5910	6537	7150	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CUR. STD. DWG. RDH-120

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS & QUANTITIES**  
**30''-108'' H-WALLS**  
**CIRCULAR PIPE**  
**45° SKEW**

STANDARD DRAWING NO. RDH-216-02  
 SUBMITTED: *John B. ...* 12-1-99  
DIRECTOR DIVISION OF DESIGN  
 DATE  
 APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER  
 DATE





DIMENSION	NON-CIRCULAR PIPE : EQUIVALENT ROUND SIZES								DIMENSION
	30''	36''	42''	48''	54''	60''	66''	72''	
A	4'-0''	4'-6''	5'-0''	5'-5''	5'-11''	6'-5''	6'-11''	7'-5''	A
B	1'-0''	1'-3''	1'-5''	1'-7''	1'-10''	2'-0''	2'-3''	2'-5''	B
C	3'-4''	3'-10''	4'-3''	4'-8''	5'-1''	5'-7''	6'-0''	6'-6''	C
E	4'-3''	5'-0''	5'-10''	6'-7''	7'-5''	8'-3''	9'-0''	9'-10''	E
F	4'-7''	5'-2''	5'-9''	6'-3''	6'-10''	7'-5''	8'-0''	8'-7''	F
G	4'-1''	4'-8''	5'-2''	5'-7''	6'-2''	6'-8''	7'-2''	7'-8''	G
H	7'-7''	8'-10''	10'-1''	11'-2''	12'-5''	13'-8''	14'-10''	16'-1''	H
J	4'-1''	4'-9''	5'-5''	6'-0''	6'-7''	7'-3''	7'-11''	8'-7''	J
M	0'-6''								M
N	0'-5''								N
P	1'-4''	1'-7''	1'-10''	2'-0''	2'-3''	2'-5''	2'-8''	2'-11''	P
Q	4'-7''	5'-4''	6'-1''	6'-9''	7'-6''	8'-3''	8'-11''	9'-8''	Q
R	0'-9''								R
T	0'-3.75''	0'-4.5''	0'-5.0''	0'-5.5''	0'-6.0''	0'-6.5''	0'-7.0''	0'-7.5''	T
V	0'-8''								V
W	0'-8''								W
Y	2'-0''								Y
CU. YDS. CONC. 2 HEADWALLS	4.10	5.22	6.42	7.60	9.08	10.68	12.35	14.20	CU. YDS. CONC. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	372	463	536	642	735	847	964	1113	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CUR. STD. DWG. RDH-120

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS & QUANTITIES**  
**30'' - 72'' HEADWALLS**  
**NON-CIRCULAR PIPE**  
**15° SKEW**

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STANDARD DRAWING NO. RDH-222-02

SUBMITTED *John B. ...* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	NON-CIRCULAR PIPE : EQUIVALENT ROUND SIZES								DIMENSION
	30''	36''	42''	48''	54''	60''	66''	72''	
A	4'-0''	4'-6''	5'-0''	5'-5''	5'-11''	6'-5''	6'-11''	7'-5''	A
B	1'-0''	1'-3''	1'-5''	1'-7''	1'-10''	2'-0''	2'-3''	2'-5''	B
C	3'-4''	3'-10''	4'-3''	4'-8''	5'-1''	5'-7''	6'-0''	6'-6''	C
E	5'-2''	6'-2''	7'-2''	8'-1''	9'-1''	10'-2''	11'-1''	12'-1''	E
F	5'-7''	6'-4''	7'-1''	7'-8''	8'-4''	9'-1''	9'-9''	10'-6''	F
G	4'-1''	4'-8''	5'-2''	5'-7''	6'-2''	6'-8''	7'-2''	7'-8''	G
H	10'-2''	11'-10''	13'-6''	14'-11''	16'-7''	18'-3''	19'-10''	21'-6''	H
J	5'-6''	6'-5''	7'-3''	8'-0''	8'-10''	9'-8''	10'-6''	11'-4''	J
M	0'-6''								M
N	0'-3''								N
P	3'-1''	3'-7''	4'-1''	4'-7''	5'-1''	5'-8''	6'-1''	6'-8''	P
Q	4'-4''	5'-1''	5'-10''	6'-6''	7'-3''	8'-0''	8'-8''	9'-5''	Q
R	0'-10''								R
T	0'-3.75''	0'-4.5''	0'-5.0''	0'-5.5''	0'-6.0''	0'-6.5''	0'-7.0''	0'-7.5''	T
V	0'-8''								V
W	0'-8''								W
Y	2'-0''								Y
CU. YDS. CONC. 2 HEADWALLS	5.27	6.81	8.46	10.04	12.07	14.28	16.58	19.08	CU. YDS. CONC. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	482	597	712	846	966	1146	1282	1467	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CUR. STD. DWG. RDH-120

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS & QUANTITIES**  
**30'' - 72'' HEADWALLS**  
**NON-CIRCULAR PIPE**  
**30° SKEW**

---

STANDARD DRAWING NO. RDH-224-02

SUBMITTED: *John B. Ingleton* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



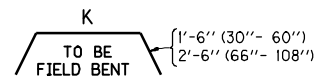


MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K		
		①	FT	IN	FT				IN	①	FT	IN		FT	IN
96"						102" (CONTINUED)									
A	5	4	13	0		G3	4	3	19	2					
B1	5	8	4	1		G4	4	3	21	7					
B2	5	8	5	0		H	4	11	13	3	10	7			
B3	5	8	5	11		M	4	26	4	9					
B4	5	8	6	10		N	4	16	12	5					
B5	5	8	7	10		P	7	26	7	0	4	9			
B6	5	8	8	9		Q	5	4	9	9					
C1	4	4	3	0		R	5	10	3	4					
C2	4	4	5	2											
C3	4	4	7	3											
C4	4	4	9	5		108"									
C5	4	4	11	7		A	5	4	14	6					
C6	4	12	11	9		B1	5	8	4	7					
E1	5	2	14	9	9	9	B2	5	8	5	6				
E2	5	2	15	3	10	3	B3	5	8	6	5				
F	4	10	1	9	0	6	B4	5	8	7	4				
G1	4	3	10	9			B5	5	8	8	3				
G2	4	3	14	3			B6	5	8	9	3				
G3	4	3	17	9			B7	5	8	10	2				
G4	4	3	20	0			C1	4	4	3	3				
H	4	10	12	8	10	0	C2	4	4	5	5				
M	4	24	4	9			C3	4	4	7	7				
N	4	16	11	9			C4	4	4	9	8				
P	6	24	6	9	4	6	C5	4	4	11	10				
Q	5	4	9	2			C6	4	16	13	1				
R	5	10	3	3			E1	5	2	15	10	10	10		
							E2	5	2	16	5	11	5		
							F	4	11	1	9	0	6		
							G1	4	1	9	10				
							G2	4	3	13	4				
102"						G3	4	3	16	10					
A	5	4	13	9			G4	4	3	20	3				
B1	5	8	4	4			G5	4	3	22	7				
B2	5	8	5	3			H	4	11	13	10	11	2		
B3	5	8	6	2			M	4	28	4	9				
B4	5	8	7	2			N	4	16	13	1				
B5	5	8	8	1			P	7	28	7	3	5	0		
B6	5	8	9	0			Q	5	4	10	4				
B7	5	4	9	11			R	5	11	3	4				
C1	4	4	2	0											
C2	4	4	4	2											
C3	4	4	6	4											
C4	4	4	8	6											
C5	4	4	10	7											
C6	4	16	12	5											
E1	5	2	15	4	10	4									
E2	5	2	15	10	10	10									
F	4	10	1	9	0	6									
G1	4	3	12	1											
G2	4	3	15	8											

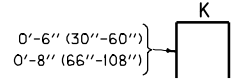
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

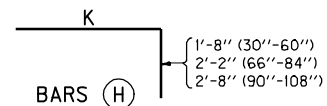
**BENT BAR SHAPES**



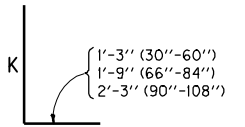
BARS (E)



BARS (F)



BARS (H)



BARS (P) AND (V)

(USE WITH CURRENT RDH-110)

**KENTUCKY  
DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT  
96" TO 108" DIAMETER  
CIRCULAR PIPE HEADWALLS  
0° SKEW**

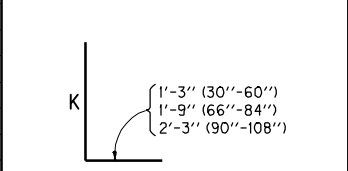
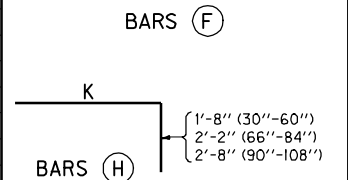
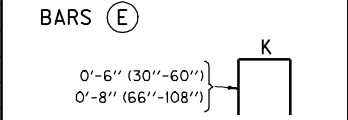
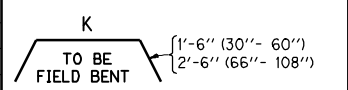
**STANDARD DRAWING NO. RDH-312-04**

SUBMITTED <i>John B. Enckstein</i>	12-1-99
<small>DIRECTOR DIVISION OF DESIGN</small>	<small>DATE</small>
APPROVED <i>J. M. Howell</i>	12-1-99
<small>STATE HIGHWAY ENGINEER</small>	<small>DATE</small>

MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K												
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN	FT	IN	①	FT	IN	FT	IN			
30"						36" (CONTINUED)						48"						54" (CONTINUED)						60" (CONTINUED)						72"									
A1	5	2	5	0		S	5	6	1	0		A1	5	2	7	0		K2	4	1	3	4		V3	5	2	6	3	5	0	A1	5	2	9	7				
A2	5	2	5	6		T	5	4	2	10		A2	5	2	7	9		K3	4	1	5	2		V4	5	2	7	2	5	11	A2	5	2	10	5				
C1	4	1	2	7		V1	5	2	3	4	2	1	C1	4	1	4	5		N1	4	3	6	10		W1	5	2	4	4	3	1	B1	5	4	3	1			
C2	4	1	4	8		V2	5	2	4	3	3	0	C2	4	1	6	6		N2	4	3	7	7		W2	5	2	5	5	4	2	B2	5	4	4	0			
C3	4	1	6	3		V3	5	2	5	3	4	0	C3	4	1	8	8		Q	4	2	5	1		W3	5	2	6	5	5	2	B3	5	4	5	0			
E1	5	2	6	9	3	9	V4	5	3	5	7	4	4	C4	4	1	8	10		R	4	6	0	11		W4	5	2	7	6	6	3	B4	5	4	5	11		
E2	5	2	7	0	4	0	W1	5	2	3	4	2	1	E1	5	2	8	9	5	9	S1	5	4	1	4									B5	5	4	6	11	
F	4	4	1	3	0	4	W2	5	2	4	5	3	2	E2	5	2	9	0	6	0	S2	5	4	1	9									B6	5	4	7	1	
G1	4	1	3	7		W3	5	1	5	6	4	3	F	4	6	1	3	0	4	T	5	4	4	0									C1	4	2	3	7		
G2	4	3	4	5								G1	4	2	5	5		V1	5	2	4	0	2	9	66"						C2	4	2	5	9				
G3	4	3	6	2								G2	4	3	7	11		G2	5	2	5	0	3	9								C3	4	2	7	11			
H	4	4	6	7	4	11						G3	4	3	9	8		V3	5	2	6	0	4	9	A1	5	2	8	11		C4	4	2	9	11				
K1	4	1	1	1		42"						H	4	6	8	4	6	8	V4	5	2	6	11	5	8	A2	5	2	9	9		C5	4	2	12	0			
K2	4	1	2	11		A1	5	2	6	4		K1	4	1	2	4		W1	5	2	7	2	5	11	B1	5	4	2	10		C6	4	4	12	3				
K3	4	1	4	5		A2	5	2	7	0		K2	4	1	4	1		W2	5	2	4	0	2	9	B2	5	4	3	9		E1	5	2	13	4	8	4		
N1	4	3	4	4		C1	4	1	3	2		K3	4	1	6	0		W3	5	2	5	1	3	10	B3	5	4	4	9		E2	5	2	13	10	8	10		
N2	4	3	4	11		C2	4	1	5	2		K4	4	1	6	2		W4	5	2	6	2	4	11	B4	5	4	5	8		F	4	9	1	9	0	6		
Q	4	2	2	9		C3	4	1	7	3		N1	4	3	6	3									B5	5	6	6	7		G1	4	1	7	5				
R	4	3	0	9		C4	4	1	8	0		N2	4	3	7	0		Q	4	2	4	6		C1	4	2	4	5		G2	4	3	9	9					
S	5	6	1	0		E1	5	2	8	1	5	1	Q	4	2	4	6		R	4	5	0	10		C2	4	2	6	5		G3	4	3	12	4				
T	5	4	2	9		E2	5	2	8	4	5	4	R	4	5	0	10		S1	5	4	1	2		C3	4	2	8	6		G4	4	3	14	0				
V1	5	2	3	1	1	10	F	4	5	1	3	0	4	S2	5	4	1	9		T	5	4	3	1		C4	4	2	10	7		H	4	7	11	2	9	0	
V2	5	2	4	0	2	9	G1	4	2	5	0		T	5	4	3	1		A1	5	2	8	4		E1	5	2	12	8	7	8	J2	5	4	4	1			
V3	5	3	5	1	3	10	G2	4	2	6	9		V1	5	2	3	10	2	7	A2	5	2	9	2		E2	5	2	13	1	8	1	J3	5	4	5	2		
W1	5	2	3	1	1	10	G3	4	3	8	5		V2	5	2	4	9	3	6	C1	4	1	5	1		F	4	8	1	9	0	6	J4	5	4	6	3		
W2	5	2	4	2	2	11	H	4	5	7	9	6	1	V3	5	2	5	9	4	6	C2	4	1	7	2		G1	4	1	6	3		J5	5	2	7	4		
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						K2	4	1	3	1		W1	5	2	3	10	2	7	C4	4	2	10	6		G3	4	3	11	2		K2	4	2	4	7				
						K3	4	1	4	11		W2	5	2	4	11	3	8	E1	5	2	10	0	7	0	G4	4	3	12	10		K3	4	2	6	5			
						K4	4	1	5	7		W3	5	2	5	11	4	8	E2	5	2	10	3	7	3	H	4	7	10	7	8	5	K4	4	2	8	4		
						N1	4	3	5	8								F	4	7	1	3	0	4	J1	5	4	2	10		K5	4	4	8	6				
						N2	4	3	6	2								G1	4	3	7	7		J2	5	4	3	11		M	4	2	1	6					
						Q	4	2	3	11								G2	4	3	10	2		J3	5	4	5	0		N1	4	7	8	5					
						R	4	4	0	10		54"						G3	4	3	11	10		J4	5	4	6	1		N2	4	7	12	2					
						S	5	6	1	1		A1	5	2	7	9		H	4	6	9	6	7	10	K1	4	1	2	6		P	5	19	5	0	3	3		
						T	5	4	3	0		A2	5	2	8	5									K2	4	1	4	5		Q	5	3	6	3				
						V1	5	2	3	7	2	4	C1	4	1	3	9									K3	4	1	6	3		R	5	7	2	9			
						V2	5	2	4	6	3	3	C2	4	1	5	10									K4	4	2	7	4		S1	5	8	1	3			
						V3	5	2	5	6	4	3	C3	4	1	7	11									K5	4	4	7	10		S2	5	4	2	3			
						V4	5	3	6	1	4	10	C4	4	2	9	8									M	4	19	7	9		T1	5	2	1	6			
						W1	5	2	3	7	2	4	E1	5	2	9	4	6	4	N1	4	3	8	3		N1	4	7	7	10		T2	5	4	6	3			
						W2	5	2	4	8	3	5	E2	5	2	9	7	6	7	Q	4	2	5	8		N2	4	7	11	4									
						W3	5	2	5	9	4	6	F	4	7	1	3	0	4	R	4	6	0	11		P	5	19	5	0	3	3							
												G1	4	3	6	5		G1	4	3	6	5		S1	5	6	1	3		Q	5	3	6	3					
											G2	4	3	8	0		G2	4	3	8	0		S2	5	4	2	3		R	5	7	2	7						
											G3	4	3	10	9		G3	4	3	10	9		T1	5	2	1	6		S1	5	8	1	3						
											H	4	6	8	11	7	3	H	4	6	8	11	7	3	T2	5	4	4	3		S2	5	4	2	3				
											K1	4	1	1	5		K1	4	1	1	5		V1	5	2	4	3	3	0	T1	5	2	1	6					
																							V2	5	2	5	3	4	0	T2	5	4	5	9					

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

**BENT BAR SHAPES**



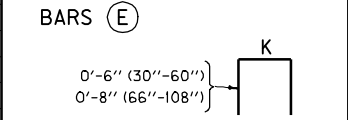
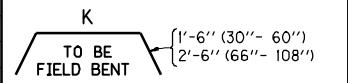
(USE WITH CURRENT RDH-120)

**KENTUCKY  
DEPARTMENT OF HIGHWAYS  
BILL OF REINFORCEMENT  
30" TO 72" DIAMETER  
CIRCULAR PIPE HEADWALLS  
15° SKEW**

MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K							
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①				FT	IN	FT	IN		①	FT	IN	FT	IN	①	FT
78"						84"						90"						96"						102"						108"											
A1	5	2	10	3		A1	5	2	10	11		A1	5	2	11	7		A1	5	2	12	4		A1	5	2	12	10		A1	5	2	13	7							
A2	5	2	11	3		A2	5	2	12	0		A2	5	2	12	9		A2	5	2	13	5		A2	5	2	14	0		A2	5	2	14	11							
B1	5	4	3	4		B1	5	4	3	7		B1	5	4	3	10		B1	5	4	4	1		B1	5	4	4	3		B1	5	4	4	7							
B2	5	4	4	3		B2	5	4	4	6		B2	5	4	4	9		B2	5	4	5	0		B2	5	4	5	3		B2	5	4	5	6							
B3	5	4	5	3		B3	5	4	5	6		B3	5	4	5	8		B3	5	4	5	11		B3	5	4	6	2		B3	5	4	6	5							
B4	5	4	6	2		B4	5	4	6	5		B4	5	4	6	7		B4	5	4	6	10		B4	5	4	7	1		B4	5	4	7	4							
B5	5	4	7	1		B5	5	4	7	4		B5	5	4	7	7		B5	5	4	7	9		B5	5	4	8	0		B5	5	4	8	4							
B6	5	6	7	7		B6	5	8	8	2		B6	5	10	8	6		B6	5	4	8	9		B6	5	4	8	11		B6	5	4	9	3							
C1	4	2	4	11		C1	4	2	4	1		C1	4	2	5	6		B7	5	8	9	3		B7	5	10	9	10		B7	5	12	10	2							
C2	4	2	7	0		C2	4	2	6	3		C2	4	2	7	7		C1	4	2	4	7		C1	4	2	6	1		C1	4	2	5	4							
C3	4	2	9	1		C3	4	2	8	4		C3	4	2	9	9		C2	4	2	6	10		C2	4	2	8	3		C2	4	2	7	6							
C4	4	2	11	3		C4	4	2	10	6		C4	4	2	11	11		C3	4	2	8	11		C3	4	2	10	4		C3	4	2	9	7							
C5	4	6	13	1		C5	4	2	12	6		C5	4	2	14	0		C4	4	2	11	2		C4	4	2	12	6		C4	4	2	11	9							
E1	5	2	14	0	9	0	C6	4	6	13	11		C6	4	6	14	9		C5	4	2	13	2		C5	4	2	14	8		C5	4	2	13	10						
E2	5	2	14	6	9	6	E1	5	2	14	8	9	8	E1	5	2	15	3	10	3	C6	4	2	15	5		C6	4	8	16	6		C6	4	2	16	0				
F	4	9	1	9	0	6	E2	5	2	15	1	10	1	E2	5	2	15	9	10	9	C7	4	6	15	7		E1	5	2	16	7	11	7	C7	4	8	17	4			
G1	4	2	8	5			F	4	10	1	9	0	6	F	4	11	1	9	0	6	E1	5	2	15	11	10	11	E2	5	2	17	0	12	0	E1	5	2	17	3	12	3
G2	4	3	10	11			G1	4	2	9	8			G1	4	3	10	9			E2	5	2	16	4	11	4	F	4	12	1	9	0	6	E2	5	2	17	8	12	8
G3	4	3	13	5			G2	4	3	12	1			G2	4	3	13	3			F	4	11	1	9	0	6	G1	4	1	10	6			F	4	13	1	9	0	6
G4	4	3	15	2			G3	4	3	14	9			G3	4	3	15	9			G1	4	3	11	9			G2	4	3	13	1			G1	4	1	11	8		
H	4	8	11	9	9	7	G4	4	3	16	7			G4	4	3	17	6			G2	4	3	14	4			G3	4	3	15	7			G2	4	3	14	2		
J1	5	4	3	4			H	4	8	12	4	10	2	H	4	9	13	6	10	10	G3	4	3	16	10			G4	4	3	18	2			G3	4	3	16	8		
J2	5	4	4	4			J1	5	4	3	7			J1	5	4	3	10			G4	4	3	18	6			G5	4	3	19	10			G4	4	3	19	2		
J3	5	4	5	5			J2	5	4	4	7			J2	5	4	4	11			H	4	10	14	0	11	4	H	4	10	14	8	12	0	G5	4	3	20	11		
J4	5	4	6	5			J3	5	4	5	8			J3	5	4	5	11			J1	5	4	4	1			J1	5	4	4	4			H	4	11	15	2	12	6
J5	5	2	7	7			J4	5	4	6	9			J4	5	4	7	0			J2	5	4	5	2			J2	5	4	5	4			J1	5	4	4	7		
K1	4	2	1	9			J5	5	4	7	9			J5	5	4	8	0			J3	5	4	6	2			J3	5	4	6	4			J2	5	4	5	7		
K2	4	2	3	8			K1	4	2	2	9			K1	4	2	2	0			J4	5	4	7	3			J4	5	4	7	5			J3	5	4	6	8		
K3	4	2	5	7			K2	4	2	4	8			K2	4	2	3	11			J5	5	4	8	3			J5	5	4	8	5			J4	5	4	7	9		
K4	4	2	7	5			K3	4	2	6	7			K3	4	2	5	10			J6	5	2	9	3			J6	5	4	9	6			J5	5	4	8	9		
K5	4	6	9	1			K4	4	2	8	6			K4	4	2	7	9			K1	4	2	3	1			K1	4	2	2	1			J6	5	4	9	10		
M	4	22	3	9			K5	4	6	9	8			K5	4	2	9	8			K2	4	2	5	0			K2	4	2	4	0			K1	4	2	3	3		
N1	4	7	9	0			M	4	24	3	9			K6	4	6	10	3			K3	4	2	6	11			K3	4	2	6	0			K2	4	2	5	2		
N2	4	7	13	0			N1	4	7	9	9			M	4	26	4	9			K4	4	2	8	9			K4	4	2	7	11			K3	4	2	7	1		
P	5	22	5	6	3	9	N2	4	7	14	0			N1	4	8	10	3			K5	4	2	10	8			K5	4	2	9	10			K4	4	2	9	0		
Q	5	3	7	5			P	5	24	5	9	4	0	N2	4	8	14	10			K6	4	6	10	10			K6	4	8	11	6			K5	4	2	10	11		
R	5	8	2	8			Q	5	3	8	0			Q	5	4	8	7			M	4	27	4	9			M	4	29	4	9			K6	4	8	12	1		
S1	5	8	1	3			R	5	8	2	10			R	5	4	8	7			N1	4	8	10	11			N1	4	8	12	1			M	4	30	4	9		
S2	5	6	2	3			S1	5	10	1	3			R	5	9	3	3			N2	4	8	15	8			N2	4	8	16	7			N1	4	8	12	2		
T1	5	2	2	3			S2	5	6	2	3			S1	5	8	1	3			P	6	27	6	9	4	6	P	7	29	7	0	4	9	N2	4	8	17	4		
T2	5	4	7	0			T1	5	2	2	3			S2	5	8	2	6			Q	5	4	9	2			Q	5	4	9	9			P	7	30	7	3	5	0
							T2	5	4	7	6			T1	5	2	3	3			R	5	9	3	5			R	5	10	3	5			Q	5	4	10	4		
													T2	5	4	8	3			S1	5	10	1	3			S1	5	10	1	6			R	5	10	3	5			
																			S2	5	8	2	9			S2	5	8	2	9			R	5	10	3	5				
																			T1	5	2	3	3			T1	5	2	4	0			S1	5	10	1	6				
																			T2	5	4	8	9			T2	5	4	9	3			S2	5	8	2	9				
																																	S2	5	8	2	9				
																																	T1	5	2	4	0				
																																	T2	5	4	10	0				

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

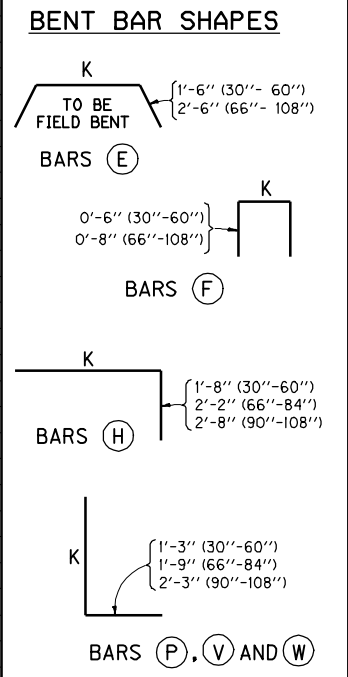
**BENT BAR SHAPES**





MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K										
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①				FT	IN	FT	IN		①	FT	IN	FT	IN	①	FT	IN	FT	IN
30"						36" (CONTINUED)						42" (CONTINUED)						48"						54" (CONTINUED)						60" (CONTINUED)						66" (CONTINUED)								
A1	5	2	5	0		N1	4	3	5	0		W2	5	2	4	7	3	4							E1	5	2	10	9	7	9	N1	4	3	7	5		K4	4	2	7	1		
A2	5	2	6	9		N2	4	3	6	10		W3	5	2	5	9	4	6							E2	5	2	10	11	7	11	N2	4	3	10	2		K5	4	4	7	10		
C1	4	1	4	1		R	4	2	0	10														G1	4	3	7	11		4	R	4	6	0	11		N1	4	7	7	10			
C2	4	1	6	7		S1	5	4	1	3														G2	4	3	11	7			S1	5	6	1	5			N2	4	7	16	1		
C3	4	1	8	9		S2	5	4	2	3		48"						G3	4	3	14	5			S2	5	6	3	8			P	5	24	5	0	3	3						
E1	5	2	7	7	4	7	T1	5	2	1	6								H	4	8	8	11	7	3	T1	5	4	2	10			Q	5	3	6	3							
E2	5	2	7	9	4	9	T2	5	4	3	3		A1	5	2	7	0			K1	4	1	1	6			T2	5	4	5	9			R	5	7	2	7						
F	4	5	1	3	0	4	V1	5	2	3	3	2	0	A2	5	2	9	2			K2	4	1	3	5			V1	5	2	4	3	3	0	S1	5	4	1	3					
G1	4	1	3	6			V2	5	2	4	1	2	10	C1	4	1	7	0			K3	4	1	3	5			V2	5	2	5	0	3	9	S2	5	4	2	8					
G2	4	2	5	9			V3	5	2	4	10	3	7	C2	4	1	9	7			K4	4	2	6	10			V3	5	2	5	10	4	7	S3	5	4	4	2					
G3	4	3	8	4			V4	5	5	5	7	4	4	C3	4	1	12	1			N1	4	3	6	10			V4	5	2	6	7	5	4	T1	5	4	3	3					
H	4	5	6	4	4	8	W1	5	2	3	4	2	1	C4	4	1	12	5			N2	4	3	9	4			V5	5	2	7	4	6	1	T2	5	4	5	3					
K1	4	1	1	1			W2	5	2	4	5	3	2	E1	5	2	9	11	6	11	Q	4	2	5	1			V6	5	5	7	9	6	6										
K2	4	1	2	11			W3	5	1	5	6	4	3	E2	5	2	10	1	7	1	R	4	6	0	11			W1	5	2	4	4	3	1										
K3	4	1	4	4									F	4	7	1	3	0	4	S1	5	6	1	6			W2	5	2	5	4	4	1											
N1	4	3	4	5									G1	4	2	6	7			S2	5	4	3	2			W3	5	2	6	5	5	1											
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Q	4	2	2	9			42"						G3	4	3	12	11			T2	5	4	4	6																				
R	4	3	0	9			A1	5	2	6	4			H	4	7	8	4	6	8	V1	5	2	4	0	2	9																	
S1	5	2	1	3			A2	5	2	8	3			K1	4	1	2	4			V2	5	2	4	9	3	6	66"																
S2	5	4	2	3			C1	4	1	5	3			K2	4	1	4	2			V3	5	2	5	7	4	4	A1	5	2	8	11												
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T2	5	4	2	3			C3	4	1	10	4			K4	4	1	6	3			V5	5	2	7	1	5	10	B1	5	4	2	9												
V1	5	2	3	0	1	9	C4	4	1	11	2			N1	4	3	6	2			V6	5	4	7	2	5	11	B2	5	4	3	6												
V2	5	2	3	10	2	7	E1	5	2	9	2	6	2	Q	4	2	4	6			W1	5	2	3	1	2	10	B3	5	4	4	4												
V3	5	2	4	8	3	5	E2	5	2	9	4	6	4	R	4	5	0	10			W2	5	2	4	2	3	11	B4	5	4	4	4												
V4	5	3	4	10	3	10	F	4	6	1	3	0	4	S1	5	4	1	6			W3	5	2	6	3	5	0	B5	5	4	5	1												
W1	5	2	3	1	1	10	G1	4	1	5	11			S2	5	4	2	9			W4	5	1	7	4	6	1	B6	5	4	5	11												
W2	5	2	4	3	3	0	G2	4	3	8	8			T1	5	2	2	0										C1	4	2	7	7												
W3	5	1	5	4	4	1	G3	4	3	11	4			T2	5	4	3	9			60"						C2	4	2	10	1													
							H	4	7	7	9	6	1	V1	5	2	3	9	2	6	A1	5	2	8	5			C3	4	2	12	8												
							K1	4	1	1	3			V2	5	2	4	6	3	3	A2	5	2	10	11			C4	4	2	15	1												
36"						K2	4	1	3	1			V3	5	2	5	4	4	1	C1	4	1	8	2			C5	4	4	16	1													
A1	5	2	5	8			K3	4	1	4	11			V4	5	2	6	1	4	10	C2	4	1	10	9			E1	5	2	14	4	9	4										
A2	5	2	7	5			K4	4	1	5	7			V5	5	5	6	8	5	5	C3	4	1	13	5			E2	5	2	14	8	9	8										
C1	4	1	6	2			N1	4	3	6	0			W1	5	2	3	10	2	7	C4	4	2	14	11			F	4	10	1	9	0	6										
C2	4	1	8	9			N2	4	3	7	9			W2	5	2	4	11	3	8	G1	4	2	14	11			G1	4	1	9	0												
C3	4	1	10	0			Q	4	2	3	11			W3	5	2	6	0	4	9	E1	5	2	11	6	8	6	G2	4	3	11	0												
E1	5	2	8	4	5	4	R	4	4	0	10									E2	5	2	11	8	8	8	G3	4	3	14	10													
E2	5	2	8	6	5	6	S1	5	2	1	3			54"						F	4	9	1	3	0	4	G4	4	3	17	3													
F	4	6	1	3	0	4	S2	5	2	2	4			A1	5	2	7	8			G1	4	3	9	4			H	4	9	10	6	8	4										
G1	4	1	4	8			T1	5	2	2	0			A2	5	2	10	0			G2	4	3	13	3			J1	5	4	2	9												
G2	4	2	7	3			T2	5	4	3	6			C1	4	1	6	4			G3	4	3	16	0			J2	5	4	3	10												
G3	4	3	9	10			V1	5	2	3	6	2	3	C2	4	1	8	11			H	4	9	9	8	8	0	J3	5	4	4	11												
H	4	6	7	2	5	6	V2	5	2	4	4	3	10	C3	4	1	11	6			K1	4	1	2	6			J4	5	4	6	0												
K1	4	1	2	2			V3	5	2	5	1	3	10	C4	4	1	8	11			K2	4	1	4	5			K1	4	2	1	7												
K2	4	1	4	0			V4	5	2	5	10	4	7	C1	4	1	11	6			K3	4	1	6	3			K2	4	2	3	5												
K3	4	1	5	0			V5	5	4	6	0	4	9	C2	4	1	13	9			K4	4	2	7	5			K3	4	2	5	4												
							W1	5	2	3	7	2	4	C3	4	1	13	9																										

- NOTES**
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  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.



(USE WITH CURRENT RDH-120)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**30" TO 66" DIAMETER**  
**CIRCULAR PIPE HEADWALLS**  
**30° SKEW**

**STANDARD DRAWING NO. RDH-330-04**

SUBMITTED *John B. Ingham* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

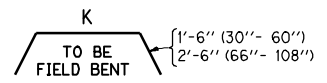


MARK	SIZE	NO LGTH					K	MARK	SIZE	NO LGTH					K	MARK	SIZE	NO LGTH					K	MARK	SIZE	NO LGTH					K			
		①	FT	IN	FT	IN				①	FT	IN	FT	IN				①	FT	IN	FT	IN				①	FT	IN	FT	IN		①	FT	IN
72"							78"							84"							90"							96"						
A1	5	2	9	6			A1	5	2	10	3			A1	5	2	10	10			A1	5	2	11	7			A1	5	2	12	3		
A2	5	2	12	6			A2	5	2	13	4			A2	5	2	14	2			A2	5	2	15	1			A2	5	2	15	11		
B1	5	4	3	1			B1	5	4	3	3			B1	5	4	3	6			B1	5	4	3	8			B1	5	4	4	0		
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B3	5	4	4	7			B3	5	4	4	9			B3	5	4	5	1			B3	5	4	5	4			B3	5	4	5	6		
B4	5	4	5	4			B4	5	4	5	7			B4	5	4	5	10			B4	5	4	6	1			B4	5	4	6	3		
B5	5	4	6	2			B5	5	4	6	4			B5	5	4	6	7			B5	5	4	6	9			B5	5	4	7	1		
B6	5	14	7	1			B6	5	4	7	1			B6	5	4	7	4			B6	5	4	7	7			B6	5	4	7	10		
C1	4	2	6	11			B7	5	14	7	7			B7	5	16	8	1			B7	5	4	8	4			B7	5	4	8	7		
C2	4	2	9	5			C1	4	2	8	7			C1	4	2	7	10			B8	5	14	8	8			B8	5	18	9	3		
C3	4	2	11	10			C2	4	2	11	1			C2	4	2	10	6			C1	4	2	9	8			C1	4	2	8	11		
C4	4	2	14	7			C3	4	2	13	9			C3	4	2	13	1			C2	4	2	12	2			C2	4	2	11	6		
C5	4	2	17	1			C4	4	2	16	3			C4	4	2	15	7			C3	4	2	14	10			C3	4	2	14	2		
C6	4	4	17	4			C5	4	6	18	7			C5	4	2	18	3			C4	4	2	17	6			C4	4	2	16	9		
E1	5	2	15	2	10	2	E1	5	2	15	11	10	11	E1	5	2	15	10			C5	4	2	20	1			C5	4	2	19	5		
E2	5	2	15	6	10	6	E2	5	2	16	3	11	3	E1	5	2	16	9	11	9	C6	4	6	21	1			C6	4	2	21	11		
F	4	10	1	9	0	6	F	4	11	1	9	0	6	E2	5	2	17	1	12	1	E1	5	2	17	6	12	6	C7	4	6	22	3		
G1	4	1	8	8			G1	4	2	10	3			F	4	12	1	9	0	6	E2	5	2	17	10	12	10	E1	5	2	18	4	13	4
G2	4	3	12	5			G2	4	3	14	0			G1	4	2	11	9			F	4	13	1	9	0	6	E2	5	2	18	8	13	8
G3	4	3	16	4			G3	4	3	17	9			G2	4	3	15	6			G1	4	3	13	3			F	4	14	1	9	0	6
G4	4	3	18	9			G4	4	3	20	5			G3	4	3	19	5			G2	4	3	17	0			G1	4	3	14	9		
H	4	10	11	5	9	3	H	4	11	11	8	9	6	G4	4	3	22	0			G3	4	3	20	10			G2	4	3	18	7		
J1	5	4	3	1			J1	5	4	3	4			H	4	12	12	8	10	6	G4	4	3	23	5			G3	4	3	22	4		
J2	5	4	4	1			J2	5	4	4	5			J1	5	4	3	7			H	4	12	13	8	11	0	G4	4	3	25	0		
J3	5	4	5	2			J3	5	4	5	5			J2	5	4	4	7			J1	5	4	3	10			J1	5	4	4	1		
J4	5	4	6	3			J4	5	4	6	6			J3	5	4	5	8			J2	5	4	4	10			J2	5	4	5	1		
J5	5	2	7	4			J5	5	2	7	7			J4	5	4	6	9			J3	5	4	5	11			J3	5	4	6	2		
K1	4	2	2	7			K1	4	2	1	10			J5	5	4	7	9			J4	5	4	6	11			J4	5	4	7	2		
K2	4	2	4	4			K2	4	2	3	9			K1	4	2	1	0			J5	5	4	7	0			J5	5	4	8	2		
K3	4	2	6	5			K3	4	2	5	7			K2	4	2	2	9			K1	4	2	2	10			J6	5	2	9	3		
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M	4	26	3	9			M	4	28	3	9			K5	4	2	8	6			K4	4	2	7	8			K4	4	2	4	11		
N1	4	7	8	5			N1	4	7	9	0			K6	4	6	9	7			K5	4	2	9	7			K5	4	2	6	10		
N2	4	7	17	3			N2	4	7	18	9			M	4	30	3	9			K6	4	6	10	3			K6	4	2	8	9		
P	5	26	5	3	3	6	P	5	28	5	6	3	9	N1	4	7	9	8			M	4	31	4	9			K5	4	2	10	7		
Q	5	3	6	10			Q	5	3	7	5			N2	4	7	19	10			N1	4	8	10	3			K6	4	6	10	10		
R	5	7	2	9			R	5	8	2	8			P	5	30	5	9	4	0	N2	4	8	10	3			M	4	34	4	9		
S1	5	4	1	9			S1	5	2	1	3			Q	5	3	8	0			P	6	31	6	6	4	3	N1	4	8	10	10		
S2	5	4	3	3			S2	5	4	2	3			R	5	8	2	10			Q	5	4	8	7			N2	4	8	22	3		
S3	5	4	4	6			S3	5	4	3	6			S1	5	4	1	3			R	5	9	3	3			P	6	34	6	9	4	6
T1	5	2	1	6			S4	5	4	5	0			S2	5	4	3	3			S1	5	4	1	6			Q	5	4	9	2		
T2	5	4	3	3			T1	5	4	2	3			S3	5	4	4	3			S2	5	4	3	3			R	5	9	3	5		
T3	5	4	6	3			T2	5	4	4	3			S4	5	4	5	6			S3	5	4	4	3			S1	5	4	2	3		
							T3	5	4	6	6			T1	5	4	2	3			S4	5	4	5	9			S2	5	4	3	3		
														T2	5	4	5	3			T1	5	4	2	3			S3	5	4	5	3		
														T3	5	4	7	3			T2	5	4	5	3			S4	5	4	6	3		
																					T3	5	4	7	9			T1	5	4	3	3		
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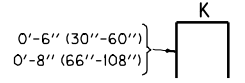
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

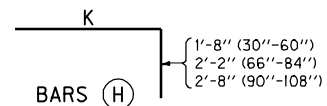
**BENT BAR SHAPES**



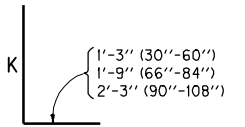
BARS (E)



BARS (F)



BARS (H)



BARS (P) AND (V)

(USE WITH CURRENT RDH-120)

**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
72" TO 96" DIAMETER  
CIRCULAR PIPE HEADWALLS  
30° SKEW

**STANDARD DRAWING NO. RDH-332-03**

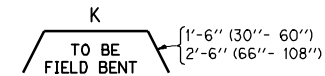
SUBMITTED <i>John B. Enclator</i>	12-1-99
<small>DIRECTOR DIVISION OF DESIGN</small>	<small>DATE</small>
APPROVED <i>J. M. Howell</i>	12-1-99
<small>STATE HIGHWAY ENGINEER</small>	<small>DATE</small>

MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT	
102''						102'' (CONTINUED)						108'' (CONTINUED)								
A1	5	2	12	11		T3	5	4	8	9		S1	5	4	2	0				
A2	5	2	16	10								S2	5	4	3	9				
B1	5	4	4	3								S3	5	4	5	0				
B2	5	4	5	0		108''						S4	5	4	6	3				
B3	5	4	5	9		A1	5	2	13	6		S5	5	2	7	0				
B4	5	4	6	6		A2	5	2	17	8		T1	5	2	2	3				
B5	5	4	7	4		B1	5	4	4	6		T2	5	4	4	6				
B6	5	4	8	1		B2	5	4	5	3		T3	5	4	6	9				
B7	5	4	8	10		B3	5	4	6	0		T4	5	4	9	9				
B8	5	4	9	7		B4	5	4	6	9										
B9	5	16	9	9		B5	5	4	7	6										
C1	4	2	10	10		B6	5	4	8	3										
C2	4	2	13	5		B7	5	4	9	0										
C3	4	2	15	11		B8	5	4	9	9										
C4	4	2	18	7		B9	5	18	10	4										
C5	4	2	21	3		C1	4	2	9	10										
C6	4	8	23	5		C2	4	2	12	6										
E1	5	2	19	1	14	1	C3	4	2	15	2									
E2	5	2	19	5	14	5	C4	4	2	17	9									
F	4	15	1	9	0	6	C5	4	2	20	6									
G1	4	1	12	8			C6	4	2	23	1									
G2	4	3	16	5			C7	4	8	24	9									
G3	4	3	20	3			E1	5	2	19	11	14	11							
G4	4	3	24	0			E2	5	2	20	3	15	3							
G5	4	3	26	7			F	4	15	1	9	0	6							
H	4	14	14	6	11	10	G1	4	1	15	5									
J1	5	4	4	4			G2	4	3	18	0									
J2	5	4	5	4			G3	4	3	21	10									
J3	5	4	6	5			G4	4	3	25	7									
J4	5	4	7	5			G5	4	3	28	3									
J5	5	4	8	6			H	4	15	15	2	12	6							
J6	5	4	9	6			J1	5	4	4	6									
K1	4	2	2	2			J2	5	4	5	7									
K2	4	2	4	1			J3	5	4	6	7									
K3	4	2	6	0			J4	5	4	7	7									
K4	4	2	8	0			J5	5	4	8	8									
K5	4	2	9	11			J6	5	4	9	9									
K6	4	8	11	5			K1	4	2	3	2									
M	4	36	4	9			K2	4	2	5	1									
N1	4	8	11	5			K3	4	2	7	0									
N2	4	8	23	7			K4	4	2	8	11									
P	7	36	7	0	4	9	K5	4	2	10	9									
Q	5	4	9	9			K6	4	8	12	0									
R	5	10	3	5			M	4	37	4	9									
S1	5	4	2	3			N1	4	8	11	11									
S2	5	4	3	6			N2	4	8	24	9									
S3	5	4	5	3			P	7	37	7	3	5	0							
S4	5	4	6	6			Q	5	4	10	4									
T1	5	4	3	3			R	5	10	3	5									
T2	5	4	6	3																

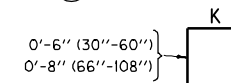
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

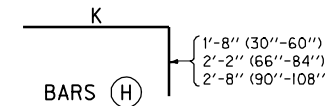
**BENT BAR SHAPES**



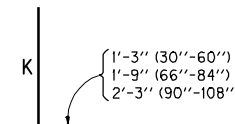
BARS (E)



BARS (F)



BARS (H)



BARS (P) AND (V)

(USE WITH CURRENT RDH-120)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

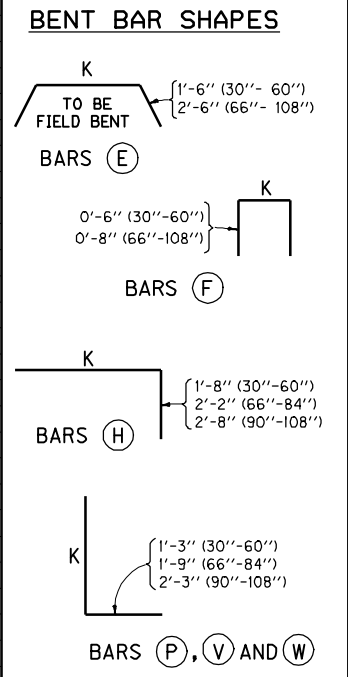
**BILL OF REINFORCEMENT**  
**102'' TO 108'' DIAMETER**  
**CIRCULAR PIPE HEADWALLS**  
**30° SKEW**

**STANDARD DRAWING NO. RDH-334-04**

SUBMITTED *John B. Enclator* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K											
		①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN	①	FT	IN	FT	IN		
30"						36" (CONTINUED)						42" (CONTINUED)						54"						60" (CONTINUED)						66" (CONTINUED)											
A1	5	2	5	0		N1	4	3	5	0		V2	5	2	4	0	2	9	A1	5	2	7	9		E1	5	2	14	10	11	10	C3	4	2	20	6					
A2	5	2	8	11		N2	4	3	9	10		V3	5	2	4	7	3	4	A2	5	2	13	10		E2	5	2	15	1	12	1	C4	4	2	24	1					
C1	4	1	7	1		Q	4	2	3	4		V4	5	2	5	2	3	11	C1	4	1	11	0		G1	4	3	13	0		C5	4	4	25	3						
C2	4	1	10	6		R	4	4	0	10		V5	5	8	6	3	5	0	C2	4	1	14	8		G2	4	3	19	0		E1	5	2	18	0	13	0				
C3	4	1	13	7		S1	5	2	2	3		W1	5	2	3	6	2	3	C3	4	1	18	3		G3	4	3	23	10		E2	5	2	18	5	13	5				
E1	5	2	9	4	6	4	S2	5	4	4	3		W2	5	2	4	8	3	5	C4	4	2	21	5		H	4	13	9	5	7	9	G1	4	1	11	8				
E2	5	2	9	6	6	6	T1	5	4	1	6		W3	5	2	5	9	4	6	E1	5	2	13	9	10	9	K1	4	1	2	7		G2	4	3	15	6				
F	4	7	1	3	0	4	T2	5	4	3	0								E2	5	2	14	0	11	0	K2	4	1	4	5		G3	4	3	21	5					
G1	4	1	6	5			V1	5	2	3	3	2	0	48"						F	4	11	1	3	0	4	K3	4	1	6	4		G4	4	3	25	9				
G2	4	2	8	5			V2	5	2	3	9	2	6	48"						G1	4	3	11	7		K4	4	2	7	5		H	4	14	10	7	8	5			
G3	4	3	12	5			V3	5	2	4	4	3	1	48"						G2	4	3	16	11		N1	4	3	7	5		J1	5	2	2	10					
H	4	7	6	7	4	11	V4	5	2	4	11	3	8	48"						G3	4	3	21	7		N2	4	3	14	6		J2	5	2	3	11					
K1	4	1	1	0			V5	5	2	5	6	4	3	A1	5	2	7	1			H	4	11	8	11	7	3	Q	4	2	5	8		J3	5	2	5	0			
K2	4	1	2	10			V6	5	6	5	7	4	4	A2	5	2	12	6			K1	4	1	1	5			R	4	6	0	11		J4	5	2	6	1			
K3	4	1	4	5			W1	5	2	3	3	2	0	C1	4	1	11	10			K2	4	1	3	3			S1	5	4	1	9			K1	4	2	1	8		
N1	4	3	4	5			W2	5	2	4	5	3	2	C2	4	1	15	4			K3	4	1	5	2			S2	5	4	4	6			K2	4	2	3	6		
N2	4	3	8	8			W3	5	1	5	7	4	4	C3	4	1	18	11			K4	4	2	6	10			S3	5	4	7	9			K3	4	2	5	5		
Q	4	2	2	9									C4	4	1	19	6			N1	4	3	6	10			T1	5	4	1	6			K4	4	2	7	3			
R	4	3	0	9									E1	5	2	12	7	9	7	N2	4	3	13	4			T2	5	4	2	6			K5	4	4	7	10			
S1	5	2	1	6			42"						E2	5	2	12	10	9	10	Q	4	2	5	1			T3	5	4	4	0			M	4	34	3	9			
S2	5	4	3	6			42"						F	4	10	1	3	0	4	R	4	6	0	11			T4	5	4	5	6			N1	4	7	7	10			
T1	5	2	1	6			42"						G1	4	2	10	0			S1	5	2	1	9			V1	5	2	4	3	3	0	N2	4	7	25	4			
T2	5	4	2	9			A1	5	2	6	5			G2	4	3	14	6			S2	5	4	3	6			V2	5	2	4	9	3	6	P	5	34	5	0	3	3
V1	5	2	3	0	1	9	A2	5	2	11	5			G3	4	3	19	4			S3	5	4	6	6			V3	5	2	5	4	4	1	Q	5	3	6	3		
V2	5	2	3	7	2	4	C1	4	1	9	2			H	4	11	8	3	6	7	T1	5	2	1	3			V4	5	2	5	10	4	7	R	5	7	2	7		
V3	5	2	4	1	2	10	C2	4	1	12	8			K1	4	1	2	4			T2	5	4	2	6			V5	5	2	6	5	5	2	S1	5	4	3	3		
V4	5	2	4	9	3	6	C3	4	1	16	3			K2	4	1	4	2			T3	5	4	3	3			V6	5	2	6	11	5	8	S2	5	4	6	3		
V5	5	6	5	0	3	9	C4	4	1	17	6			K3	4	1	6	1			T4	5	4	4	9			V7	5	2	7	6	6	3	S3	5	4	8	0		
W1	5	2	3	1	1	10	E1	5	2	11	6	8	6	K4	4	1	6	3			V1	5	2	3	11	2	8	V8	5	10	7	9	6	6	T1	5	4	2	3		
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W3	5	1	5	3	4	0	F	4	9	1	3	0	4	N2	4	3	12	2			V3	5	2	5	1	3	10	W2	5	2	5	5	4	2	T3	5	4	5	3		
							G1	4	1	8	3			Q	4	2	4	6			V4	5	2	5	7	4	4	W3	5	2	6	6	5	3	T4	5	4	6	3		
							G2	4	3	12	5			R	4	5	0	10			V5	5	2	6	1	4	10	W4	5	1	7	7	6	4							
							G3	4	3	16	11			S1	5	4	2	9			V6	5	2	6	8	5	5														
							H	4	9	7	8	6	0	S2	5	4	5	6			V7	5	10	7	3	6	0														
36"						K1	4	1	1	3			T1	5	4	1	6			W1	5	2	4	0	2	9	66"														
A1	5	2	5	8			K2	4	1	3	1			T2	5	4	2	9			W2	5	2	5	1	3	10	A1	5	2	8	11									
A2	5	2	10	2			K3	4	1	5	0			T3	5	4	4	3			W3	5	2	6	2	4	11	A2	5	2	15	11									
C1	4	1	9	8			K4	4	1	5	7			V1	5	2	3	8	2	5	W4	5	1	8	2	6	11	B1	5	4	2	9									
C2	4	1	13	2			N1	4	3	5	7			V2	5	2	4	3	3	0								B2	5	4	3	4									
C3	4	1	15	6			N2	4	3	11	0			V3	5	2	4	10	3	7								B3	5	4	3	10									
E1	5	2	10	4	7	4	Q	4	2	3	11			V4	5	2	5	5	4	2								B4	5	4	4	5									
E2	5	2	10	7	7	7	R	4	4	0	10			V5	5	2	5	11	4	8								B5	5	4	5	0									
F	4	8	1	3	0	4	S1	5	2	1	9			V6	5	2	6	6	5	3								B6	5	4	5	6									
G1	4	1	8	8			S2	5	2	3	3			V7	5	8	6	8	5	5								B7	5	4	6	1									
G2	4	2	10	8			S3	5	4	5	3			W1	5	2	3	10	2	7	60"						B8	5	24	6	8										
G3	4	3	14	9			T1	5	4	1	3			W2	5	2	4	11	3	8	A1	5	2	8	4			C1	4	1	13	11									
H	4	8	7	2	5	6	T2	5	4	2	3			W3	5	2	6	0	4	9	A2	5	2	15	0			C2	4	1	17	6									
K1	4	1	2	0			T3	5	4	3	6									C1	4	1	21	2			C3	4	1	23	8										
K2	4	1	3	10			V1	5	2	3	6	2	3							C2	4	1	23	8			C4	4	1	23	8										

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE O. TO O. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.



(USE WITH CURRENT RDH-120)

**KENTUCKY DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**30" TO 66" DIAMETER**  
**CIRCULAR PIPE HEADWALLS**  
**45° SKEW**

**STANDARD DRAWING NO. RDH-340-05**

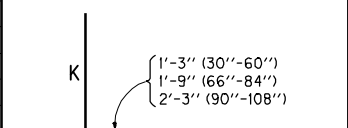
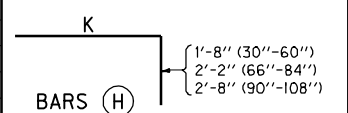
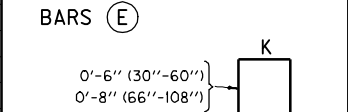
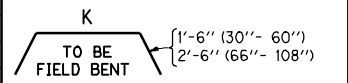
SUBMITTED *John B. Encheta* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN

APPROVED *J. M. Howell* 12

MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①				FT	IN	FT	IN		①	FT	IN	FT	IN	①	FT	IN	FT	IN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
72"						78"						84"						84" (CONTINUED)						90" (CONTINUED)						96" (CONTINUED)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
A1	5	2	9	7		A1	5	2	10	2		A1	5	2	10	10		T5	5	4	7	9		S3	5	4	8	4		K6	4	6	10	10		A2	5	2	17	1		A2	5	2	18	3		A2	5	2	19	6								S4	5	4	11	3		M	4	4	7	4	9	B1	5	4	3	0		B1	5	4	3	2		B1	5	4	3	6								T1	5	4	2	6		N1	4	8	10	11		B2	5	4	3	6		B2	5	4	3	9		B2	5	4	4	0								T2	5	4	4	0		N2	4	8	35	4		B3	5	4	4	1		B3	5	4	4	4		B3	5	4	4	6								T3	5	4	5	5		P	6	44	6	9	4 6	B4	5	4	4	8		B4	5	4	4	11		B4	5	4	5	1		A1	5	2	11	7								T4	5	4	6	9		Q	5	4	9	2		B5	5	4	5	3		B5	5	4	5	5		B5	5	4	5	8		A2	5	2	20	8								T5	5	4	8	3		S1	5	4	4	4		B6	5	4	5	9		B6	5	4	6	0		B6	5	4	6	2		B1	5	4	3	8														S2	5	4	7	5		B7	5	4	6	4		B7	5	4	6	6		B7	5	4	6	9		B2	5	4	4	3								S3	5	4	9	5		B8	5	4	6	10		B8	5	4	7	1		B8	5	4	7	3		B3	5	4	4	10								S4	5	4	12	2		B9	5	24	7	1		B9	5	28	7	8		B9	5	4	7	10		B4	5	4	5	4								T1	5	4	1	6		C1	4	2	12	0		C1	4	2	15	4		B10	5	28	8	3		B5	5	4	5	11		A1	5	2	12	3		T2	5	4	3	6		C2	4	2	16	0		C2	4	2	19	0		C1	4	2	14	2		B6	5	4	6	5		A2	5	2	21	11		T3	5	4	5	9		C3	4	2	19	8		C3	4	2	22	8		C2	4	2	18	10		B7	5	4	7	0		B1	5	4	4	0		T4	5	4	6	6		C4	4	2	23	3		C4	4	2	26	2		C3	4	2	21	7		B8	5	4	7	6		B2	5	4	4	6		T5	5	4	7	6		C5	4	2	26	9		C5	4	6	29	3		C4	4	2	25	1		B9	5	4	8	1		B3	5	4	4	1		T6	5	4	9	0		C6	4	4	27	3		E1	5	2	20	3	15 3	C5	4	2	28	9		B10	5	30	8	8		A1	5	2	12	3		B4	5	4	5	7		E1	5	2	19	1	14 1	E2	5	2	20	8	15 8	C6	4	6	31	3		C1	4	2	17	1		B5	5	4	6	1		E2	5	2	19	6	14 6	F	4	15	1	9	0 6	E1	5	2	21	4	15 4	C2	4	2	20	10		B6	5	4	6	8		F1	4	15	1	9	0 6	G1	4	1	16	5		E2	5	2	21	9	15 9	C3	4	2	24	5		B7	5	4	7	2		G1	4	1	14	2		G2	4	3	20	5		F	4	17	1	9	0 6	C4	4	2	28	2		B8	5	4	7	9		G2	4	3	18	2		G3	4	3	26	5		G1	4	2	16	8		C5	4	2	31	10		B9	5	4	8	4		G3	4	3	18	2		G4	4	3	26	5		G2	4	3	22	8		C6	4	6	33	6		B10	5	4	8	10		G4	4	3	24	2		E1	5	2	22	6	17 6	B11	5	30	9	3		G5	4	3	24	2		G4	4	3	30	6		E2	5	2	22	11	17 11	C1	4	2	16	4		H	4	16	11	4	9 2	J1	5	4	3	4		G4	4	3	32	8		H	4	17	12	4	10 2	F	4	18	1	9	0 6	C2	4	2	20	0		J1	5	4	3	0		J2	5	4	4	5		G1	4	3	18	6		C3	4	2	23	9		J2	5	4	4	1		J3	5	4	5	5		G2	4	3	24	6		C4	4	2	27	5		J3	5	4	4	7		J4	5	4	6	6		G3	4	3	30	6		C5	4	2	31	1		J4	5	4	6	8		J5	5	4	7	9		G4	4	3	35	0		C6	4	2	34	1		J5	5	4	7	9		H	4	14	13	5	10 9	C7	4	6	35	2		K1	4	2	2	9		K2	4	2	3	9		K1	4	2	2	9		J1	5	4	4	0		E1	5	2	23	7	18 7	K2	4	2	5	6		K3	4	2	6	3		K4	4	2	7	5		K5	4	6	9	0		K4	4	2	4	8		J2	5	4	5	0		E2	5	2	24	0	19 0	K5	4	6	9	0		M	4	39	3	9		N1	4	7	9	0		M	4	42	3	9		K1	4	2	2	0		F	4	19	1	9	0 6	N1	4	7	8	6		N2	4	7	29	1		M	4	42	3	9		K2	4	2	3	10		G1	4	3	21	0		N2	4	7	27	3		P	5	39	5	6	3 9	Q	5	3	7	5		N2	4	7	32	4		P	5	42	5	9	4 0	K4	4	2	7	8		Q	5	3	7	5		Q	5	3	7	5		K5	4	2	9	8		R	5	8	2	8		S1	5	4	2	6		R	5	8	2	10		S1	5	4	2	6		S2	5	4	5	3		S2	5	4	5	3		S3	5	4	7	6		S3	5	4	7	6		S4	5	4	9	9		S4	5	4	9	9		T1	5	4	2	3		T1	5	4	1	9		T1	5	4	1	9		T2	5	4	4	0		T2	5	4	3	3		T3	5	4	5	3		T3	5	4	5	3		T4	5	4	6	6		T4	5	4	6	6		T5	5	4	7	3		T5	5	4	7	3	

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

**BENT BAR SHAPES**



(USE WITH CURRENT RDH-120)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**72" TO 96" DIAMETER**  
**CIRCULAR PIPE HEADWALLS**  
**45° SKEW**

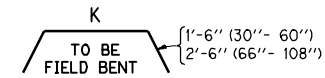
**STANDARD DRAWING NO. RDH-342-04**  
 SUBMITTED *John B. Eckstein* 12-1-99  
 DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED *J. M. Powell* 12-1-99  
 STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K					
		①	FT	IN	FT			IN	①	FT	IN			FT	IN	①	FT	IN	FT
102''						102'' (CONTINUED)						108'' (CONTINUED)							
A1	5	2	12	9		T1	5	4	2	9		K4	4	2	8	11			
A2	5	2	23	4		T2	5	4	4	3		K6	4	8	12	0			
B1	5	4	4	3		T3	5	4	5	3		M	4	5	1	4	9		
B2	5	4	4	9		T4	5	4	6	6		N1	4	8	16	0			
B3	5	4	5	4		T5	5	4	8	6		N2	4	8	44	0			
B4	5	4	5	10		T6	5	4	9	6		P	7	5	1	7	3	5	0
B5	5	4	6	4								Q	5	4	10	4			
B6	5	4	6	11								R	5	10	3	5			
B7	5	4	7	5								S1	5	4	3	5			
B8	5	4	8	0		108''						S2	5	4	6	0			
B9	5	4	8	6								S3	5	4	8	6			
B10	5	4	9	0		A1	5	2	13	7		S4	5	4	11	6			
B11	5	34	9	7		A2	5	2	24	3		S5	5	4	13	6			
C1	4	2	19	0		B1	5	4	4	5		T1	5	4	2	3			
C2	4	2	22	9		B2	5	4	5	0		T2	5	4	3	6			
C3	4	2	26	5		B3	5	4	5	5		T3	5	4	5	0			
C4	4	2	30	0		B4	5	4	6	0		T4	5	4	6	3			
C5	4	2	34	0		B5	5	4	6	6		T5	5	4	7	9			
C6	4	8	37	3		B6	5	4	7	1		T6	5	4	9	3			
E1	5	2	24	9	19	9	B7	5	4	7	7		T7	5	4	10	3		
E2	5	2	25	2	20	2	B8	5	4	8	2								
F	4	20	1	9	0	6	B9	5	4	8	8								
G1	4	1	20	6		B10	5	4	9	3									
G2	4	3	24	0		B11	5	4	9	9									
G3	4	3	29	0		B12	5	34	10	3									
G4	4	3	35	0		C1	4	2	18	2									
G5	4	3	39	6		C2	4	2	22	1									
H	4	21	14	5	11	9	C3	4	2	25	5								
J1	5	4	4	3		C4	4	2	29	3									
J2	5	4	5	4		C5	4	2	33	0									
J3	5	4	6	4		C6	4	2	36	7									
J4	5	4	7	5		C7	4	8	39	2									
J5	5	4	8	5		E1	5	2	25	7	20	7							
J6	5	4	9	5		E2	5	2	26	2	21	2							
K1	4	2	2	0		F	4	21	1	9	0	6							
K2	4	2	4	0		G1	4	1	19	9									
K3	4	2	6	0		G2	4	3	25	8									
K4	4	2	8	0		G3	4	3	31	10									
K5	4	2	10	0		G4	4	3	37	9									
K6	4	8	11	6		G5	4	3	41	9									
M	4	49	4	9		H	4	21	15	1	12	5							
N1	4	8	11	6		J1	5	4	4	6									
N2	4	8	37	3		J2	5	4	5	7									
P	7	49	7	0	4	9	J3	5	4	6	7								
Q	5	4	9	9		J4	5	4	7	6									
R	5	10	3	5		J5	5	4	8	7									
S1	5	4	2	6		J6	5	4	9	7									
S2	5	4	5	3		K1	4	2	2	11									
S3	5	4	8	6		K2	4	2	4	11									
S4	5	4	10	6		K3	4	2	6	10									

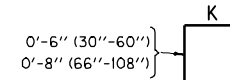
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

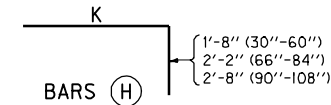
**BENT BAR SHAPES**



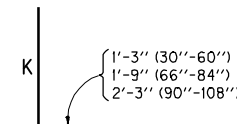
BARS (E)



BARS (F)



BARS (H)



BARS (P) AND (V)

(USE WITH CURRENT RDH-I20)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**102'' TO 108'' DIAMETER**  
**CIRCULAR PIPE HEADWALLS**  
**45° SKEW**

**STANDARD DRAWING NO. RDH-344-04**  
 SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE





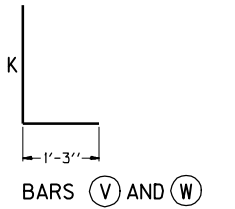
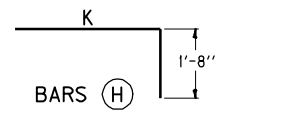
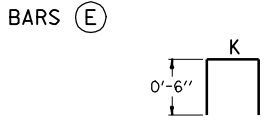
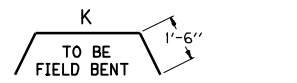


MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K									
		①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN	①	FT	IN	FT	IN
		30"					36" (CONTINUED)					48"					54" (CONTINUED)					60" (CONTINUED)										
A1	5	2	4	6		S1	5	4	1	9		A1	5	2	6	2		G3	4	3	15	2		Q	4	2	7	1				
A2	5	2	5	10		T1	5	4	1	4		A2	5	2	8	1		K1	4	1	1	8		S1	5	4	1	2				
C1	4	1	5	11		T2	5	4	4	2		C1	4	1	5	11		K2	4	1	3	7		S2	5	4	2	6				
C2	4	1	8	4		V1	5	2	3	0	1	9	C2	4	1	8	4		K3	4	1	5	6		S3	5	4	3	11			
E1	5	2	8	4	5	4	V2	5	2	3	10	2	7	C3	4	1	10	10		K4	4	1	6	0		S4	5	4	5	5		
E2	5	2	8	9	5	9	V3	5	2	4	7	3	4	C4	4	1	12	2		N1	4	3	6	0		T1	5	4	1	6		
F	4	6	1	3	0	4	V4	5	4	5	0	3	9	E1	5	2	11	4	8	4	N2	4	3	13	3		T2	5	4	4	3	
G1	4	2	6	2		W1	5	2	3	1	1	10	E2	5	2	11	9	8	9	Q	4	2	6	4		T3	5	4	7	2		
G2	4	3	8	8		W2	5	2	4	3	3	0	F	4	9	1	3	0	4	R	4	7	1	0		V1	5	2	3	10	2	7
H	4	5	6	2	4	6	W3	5	1	5	4	4	1	G1	4	2	8	4		G1	5	2	1	1		V2	5	2	4	7	3	4
K1	4	1	2	0									G2	4	2	10	11		S2	5	4	1	9		V3	5	2	5	5	4	2	
K2	4	1	3	9									G3	4	3	13	6		S3	5	4	3	3		V4	5	2	6	2	4	11	
N1	4	3	3	11									H	4	8	7	7	5	11	S4	5	4	4	9		V5	5	7	6	11	5	8
N2	4	3	8	7		42"					K1	4	1	2	7		T1	5	2	1	10		W1	5	2	3	10	2	7			
Q	4	2	3	5		A1	5	2	5	8		K2	4	1	4	5		T2	5	4	3	3		W2	5	2	4	11	3	8		
R	4	4	0	10		A2	5	2	7	5		K3	4	1	5	5		T3	5	4	6	3		W3	5	2	6	0	4	9		
S1	5	4	1	5		C1	4	1	6	10		N1	4	3	5	5		V1	5	2	3	8	2	5								
S2	5	4	2	9		C2	4	1	9	4		N2	4	3	12	2		V2	5	2	4	4	3	1								
T1	5	2	1	2		C3	4	1	11	1		Q	4	2	5	7		V3	5	2	5	1	3	10								
T2	5	4	3	9		C4	4	1	11	1		R	4	6	1	0		V4	5	2	5	11	4	8								
V1	5	2	2	10	1	7	E1	5	2	10	4	7	4	S1	5	4	1	5		V5	5	6	6	3	5	0						
V2	5	2	3	8	2	5	E2	5	2	10	9	7	9	S2	5	4	2	10		W1	5	2	3	8	2	5						
V3	5	2	4	6	3	3	F	4	8	1	3	0	4	S3	5	4	4	3		W2	5	2	4	9	3	6						
V4	5	3	4	8	3	5	G1	4	1	7	2		T1	5	2	1	4		W3	5	2	5	9	4	6							
W1	5	2	2	11	1	8	G2	4	2	9	6		T2	5	4	2	9															
W2	5	2	4	0	2	9	G3	4	3	12	0		T3	5	4	5	10															
						H	4	7	7	2	5	6	V1	5	2	3	5	2	2													
						K1	4	1	1	11		V2	5	2	4	2	2	11														
						K2	4	1	3	9		V3	5	2	5	0	3	9	60"													
						K3	4	1	5	0		V4	5	2	5	9	4	6	A1	5	2	7	4									
						N1	4	3	5	0		V5	5	4	5	11	4	8	A2	5	2	9	7									
						N2	4	3	11	1		W1	5	2	3	6	2	3	C1	4	1	6	10									
						Q	4	2	4	11		W2	5	2	4	7	3	4	C2	4	1	9	4									
						R	4	5	0	11		W3	5	2	5	8	4	5	C3	4	1	11	10									
						S1	5	4	1	0									C4	4	1	14	4									
						S2	5	4	2	5									C5	4	1	14	6									
						S3	5	4	3	9									E1	5	2	13	4	10	4							
						T1	5	4	2	2		54"					E2	5	2	13	9	10	9									
						T2	5	4	5	0		A1	5	2	6	9		F	4	11	1	3	0	4								
						V1	5	2	3	3	2	0	A2	5	2	8	10		G1	4	1	9	3									
						V2	5	2	4	0	2	9	C1	4	1	7	6		G2	4	2	11	9									
						V3	5	2	4	10	3	7	C2	4	1	10	0		G3	4	2	14	3									
						V4	5	5	5	7	4	4	C3	4	1	12	7		G4	4	3	16	10									
						W1	5	2	3	3	2	0	C4	4	1	13	3		H	4	9	8	7	6	11							
						W2	5	2	4	4	3	1	C5	4	1	14	6		K1	4	1	2	7									
						W3	5	1	5	6	4	3	E1	5	2	12	3	9	3	K2	4	1	4	5								
													E2	5	2	12	7	9	7	K3	4	1	6	4								
													F	4	10	1	3	0	4	K4	4	1	6	6								
													G1	4	2	10	0		N1	4	3	6	6									
													G2	4	2	12	7		N2	4	3	14	6									

**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

**BENT BAR SHAPES**



(USE WITH CURRENT RDH-120)

**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
30" TO 60" DIAMETER  
NON-CIRCULAR PIPE HEADWALLS  
30° SKEW

STANDARD DRAWING NO. RDH-370-05

SUBMITTED *John B. Enckstein* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN

APPROVED *J. W. Howell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER



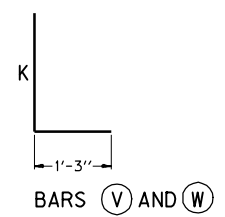
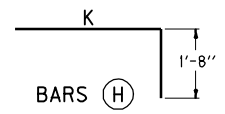
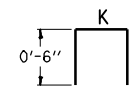
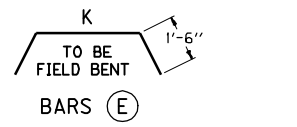
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66"						72" (CONTINUED)							
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A2	5	2	10	3		E2	5	2	15	7	12	7	
C1	4	1	8	3		F	4	13	1	3	0	4	
C2	4	1	10	10		G1	4	2	12	4			
C3	4	1	13	6		G2	4	2	14	10			
C4	4	2	15	8		G3	4	2	17	5			
E1	5	2	14	3	11	3	G4	4	3	20	0		
E2	5	2	14	8	11	8	H	4	11	9	6	7	10
F	4	12	1	3	0	4	K1	4	1	2	5		
G1	4	1	10	9			K2	4	1	4	3		
G2	4	2	13	3			K3	4	1	6	2		
G3	4	2	15	9			K4	4	2	7	6		
G4	4	3	18	3			N1	4	3	7	6		
H	4	10	9	1	7	5	N2	4	3	17	0		
K1	4	1	1	7			Q	4	3	8	6		
K2	4	1	3	5			R	4	9	1	2		
K3	4	1	5	4			S1	5	4	1	0		
K4	4	2	7	0			S2	5	4	3	5		
N1	4	3	7	0			S3	5	4	4	10		
N2	4	3	15	8			S4	5	4	6	3		
Q	4	3	7	9			T1	5	4	2	10		
R	4	8	1	1			T2	5	4	5	6		
S1	5	4	1	6			T3	5	4	8	5		
S2	5	4	2	11			V1	5	2	4	2	2	11
S3	5	4	4	4			V2	5	2	4	11	3	8
S4	5	4	5	9			V3	5	2	5	9	4	6
T1	5	4	2	1			V4	5	2	6	6	5	3
T2	5	4	4	10			V5	5	2	7	4	6	1
T3	5	4	7	8			V6	5	7	7	9	6	6
V1	5	2	4	1	2	10	W1	5	2	4	2	2	11
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V5	5	2	7	1	5	10							
V6	5	6	7	3	6	0							
W1	5	2	4	1	2	10							
W2	5	2	5	2	3	11							
W3	5	2	6	2	4	11							
W4	5	1	7	3	6	0							

72"												
A1	5	2	8	6								
A2	5	2	11	2								
C1	4	1	7	7								
C2	4	1	10	0								
C3	4	1	12	7								
C4	4	1	15	1								

**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

**BENT BAR SHAPES**



(USE WITH CURRENT RDH-120)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**66" TO 72" DIAMETER**  
**NON-CIRCULAR PIPE HEADWALLS**  
**30° SKEW**

**STANDARD DRAWING NO. RDH-372-04**

SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

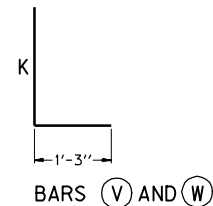
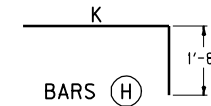
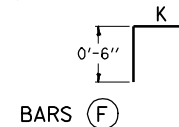
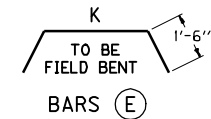


MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K
		①	FT	IN	FT				IN	①	FT	IN	
66"						72"							
A1	5	2	7	8		A1	5	2	8	6			
A2	5	2	14	1		A2	5	2	15	2			
C1	4	1	14	10		C1	4	1	14	1			
C2	4	1	18	6		C2	4	1	17	8			
C3	4	1	22	2		C3	4	1	21	6			
C4	4	2	25	6		C4	4	1	25	0			
E1	5	2	18	8	15	8	C5	4	2	27	7		
E2	5	2	19	0	16	0	E1	5	2	20	2	17	2
F	4	16	1	3	0	4	E2	5	2	20	7	17	7
G1	4	1	15	0			F	4	18	1	3	0	4
G2	4	2	19	0			G1	4	2	17	7		
G3	4	2	22	0			G2	4	2	21	7		
G4	4	3	27	0			G3	4	2	25	7		
H	4	15	9	0	7	4	G4	4	3	29	7		
K1	4	1	1	7			H	4	15	9	7	7	11
K2	4	1	3	5			K1	4	1	2	5		
K3	4	1	5	4			K2	4	1	4	3		
K4	4	2	7	0			K3	4	1	6	2		
N1	4	3	7	0			K4	4	2	7	6		
N2	4	3	25	6			N1	4	3	7	6		
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S1	5	4	2	2			R	4	9	1	2		
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S3	5	4	8	0			S2	5	4	3	6		
S4	5	4	11	0			S3	5	4	6	6		
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T2	5	4	3	8			S5	5	4	12	2		
T3	5	4	5	1			T1	5	4	1	9		
T4	5	4	6	7			T2	5	4	3	2		
T5	5	4	8	1			T3	5	4	4	7		
V1	5	2	3	11	2	8	T4	5	4	6	0		
V2	5	2	4	6	3	3	T5	5	4	7	5		
V3	5	2	5	0	3	9	T6	5	4	8	10		
V4	5	2	5	7	4	4	V1	5	2	4	2	2	11
V5	5	2	6	2	4	11	V2	5	2	4	8	3	5
V6	5	2	6	8	5	5	V3	5	2	5	3	4	0
V7	5	14	7	3	6	0	V4	5	2	5	9	4	6
W1	5	2	4	1	2	10	V5	5	2	6	4	5	1
W2	5	2	5	2	3	11	V6	5	2	6	11	5	8
W3	5	2	6	2	4	11	V7	5	2	7	5	6	2
W4	5	1	7	3	6	0	V8	5	14	7	9	6	6
							W1	5	2	4	2	2	11
							W2	5	2	5	4	4	1
							W3	5	2	6	5	5	2
							W4	5	2	7	6	6	3

**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

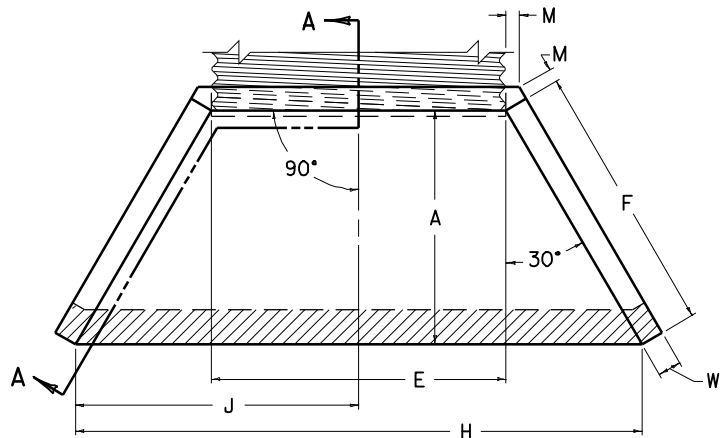
**BENT BAR SHAPES**



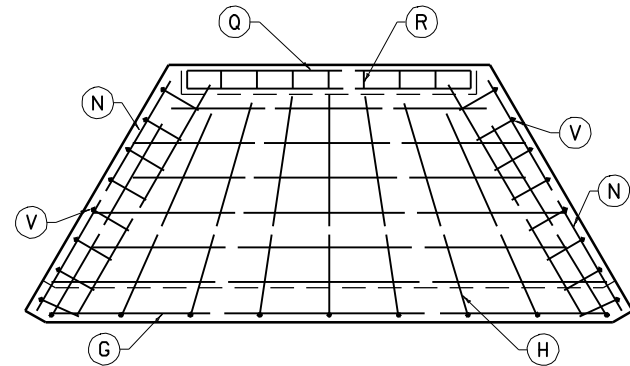
(USE WITH CURRENT RDH-120)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**66" TO 72" DIAMETER**  
**NON-CIRCULAR PIPE HEADWALLS**  
**45° SKEW**

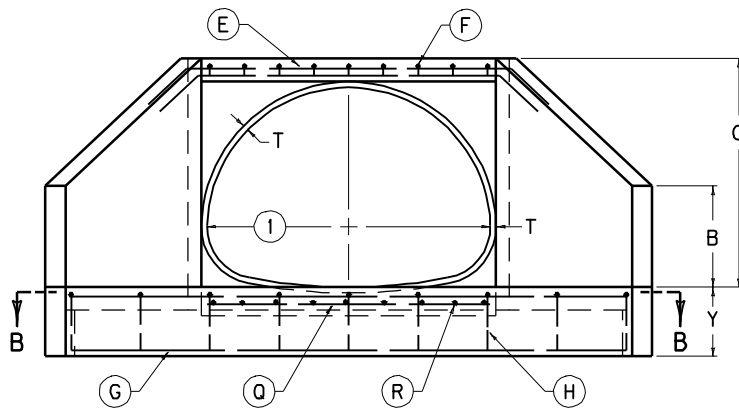
**STANDARD DRAWING NO. RDH-382-04**  
 SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



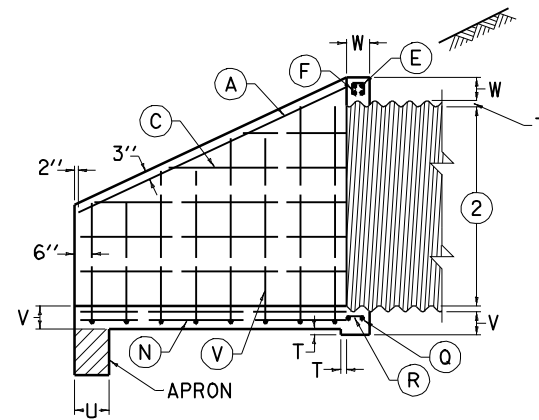
PLAN VIEW



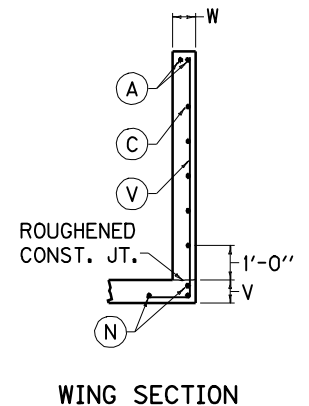
SECTION B-B



FRONT ELEVATION



SECTION A-A



WING SECTION

NOTES

- ① SPAN OF STRUCTURAL PLATE STEEL PIPE ARCH
- ② RISE OF STRUCTURAL PLATE STEEL PIPE ARCH
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CUR. STD. DWGS. RDH-420 THRU RDH-465.
4. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
6. BARS (C), (G), AND (V) ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS (V) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
8. BARS (C) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
9. HEADWALLS LOCATED AT SHOULDER EDGE SHALL BE PARALLEL TO CENTERLINE OF ROAD.
10. LIMITS OF APRON.
11. PAVING SHALL BE REQUIRED AND SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

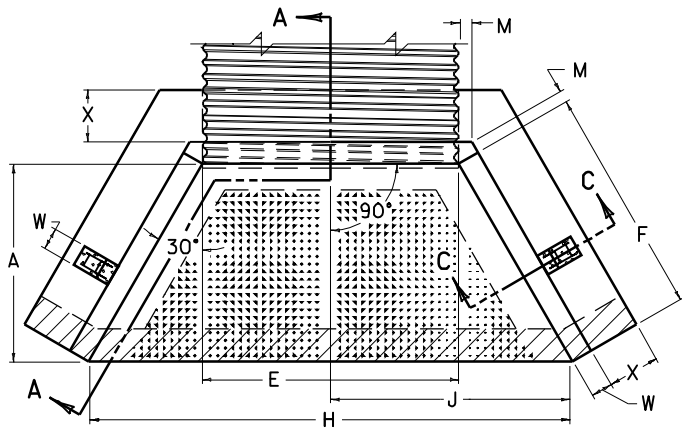
(LAYOUT AND STEEL PATTERN)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

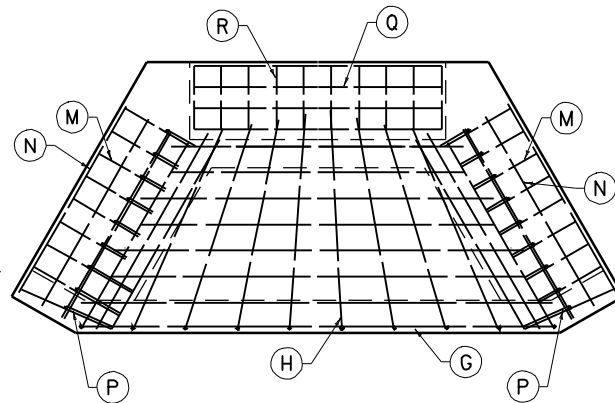
STEEL PIPE ARCH  
HEADWALLS - 0° SKEW  
(PIPE RISE LESS THAN 6'-0")

STANDARD DRAWING NO. RDH-400-02

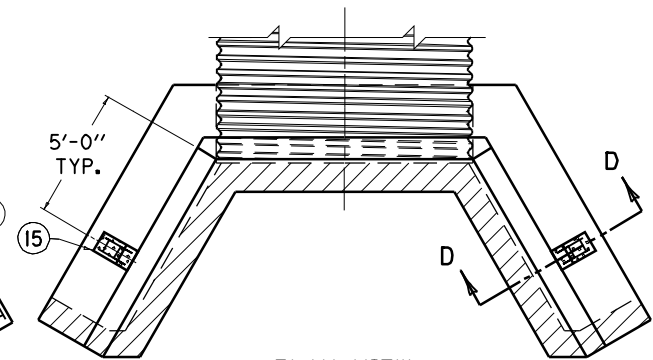
SUBMITTED: <i>John B. Sisk</i>	12-1-99
DIRECTOR DIVISION OF DESIGN	DATE
APPROVED: <i>J. M. Howell</i>	12-1-99
STATE HIGHWAY ENGINEER	DATE



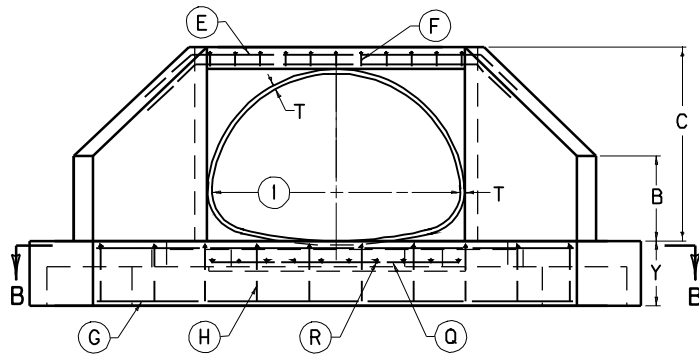
PLAN VIEW



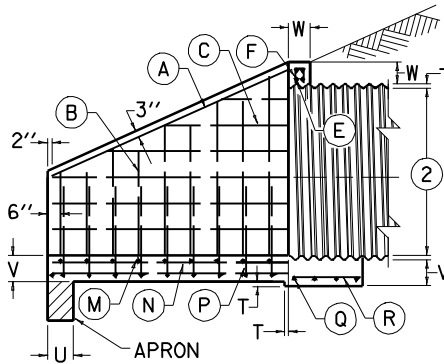
SECTION B-B



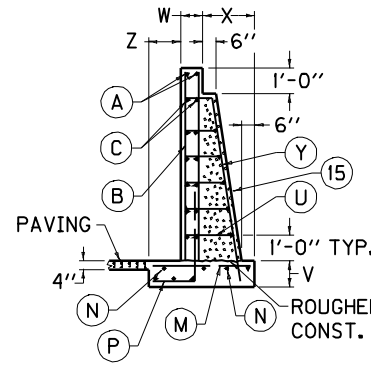
PLAN VIEW  
WITHOUT PAVING



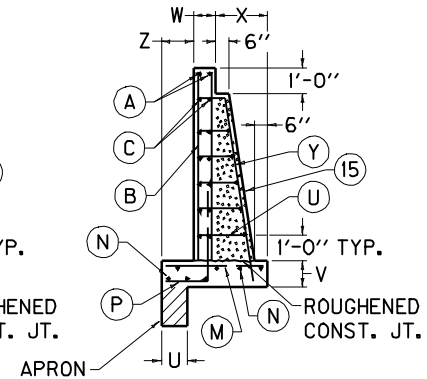
FRONT ELEVATION



SECTION A-A



SECTION C-C



SECTION D-D

NOTES

- ① SPAN OF STRUCTURAL PLATE STEEL PIPE ARCH.
- ② RISE OF STRUCTURAL PLATE STEEL PIPE ARCH.
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CUR. STD. DWGS. RDH-420 THRU RDH-465.
4. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
6. BARS (B), (C), (G), (M), (P) AND (U) ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS (B), (C) AND (U) ARE PLACED IN ORDER OF INCREASING LENGTH, BEGINNING AT THE END OF WING, TOP OF WING AND TOP OF COUNTERFORT RESPECTIVELY.
8. HEADWALLS LOCATED AT SHOULDER EDGE SHALL BE PARALLEL TO CENTERLINE OF ROAD.
9. LIMITS OF APRON.
10. LIMITS OF PAVING.
11. LIMITS OF COUNTERFORTS.
12. THESE HEADWALLS ARE DESIGNED BOTH WITH AND WITHOUT PAVING BETWEEN THE WINGS. (SEE PLANS)
13. WHEN PAVING IS REQUIRED; PAVING SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.
14. WHEN PAVING IS NOT REQUIRED BARS (H) AND (G) SHALL BE ELIMINATED.
- ⑮ A COUNTERFORT SHALL BE REQUIRED ON A WING WALL WHEN THE PIPE RISE IS 8'-0" OR GREATER AND THE WING WALL IS 15'-0" OR LONGER.

(LAYOUT AND STEEL PATTERN)

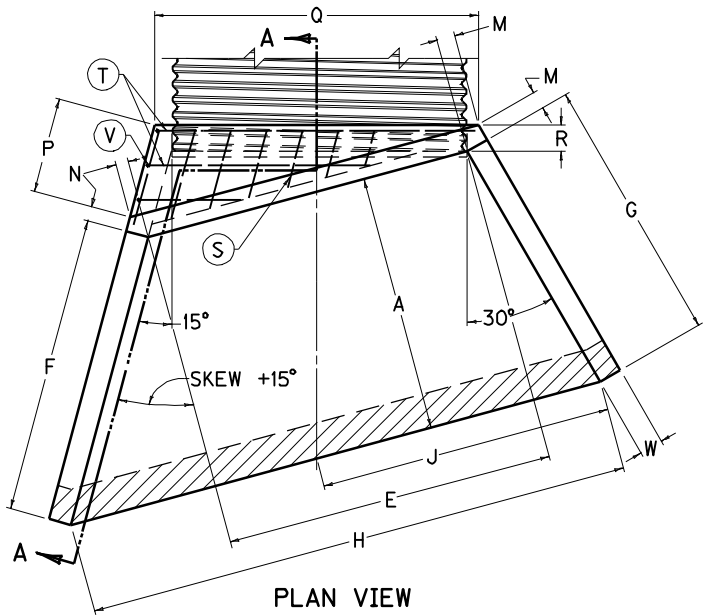
KENTUCKY  
DEPARTMENT OF HIGHWAYS

STEEL PIPE ARCH  
HEADWALLS - 0° SKEW  
(PIPE RISE 6'-0" OR GREATER)

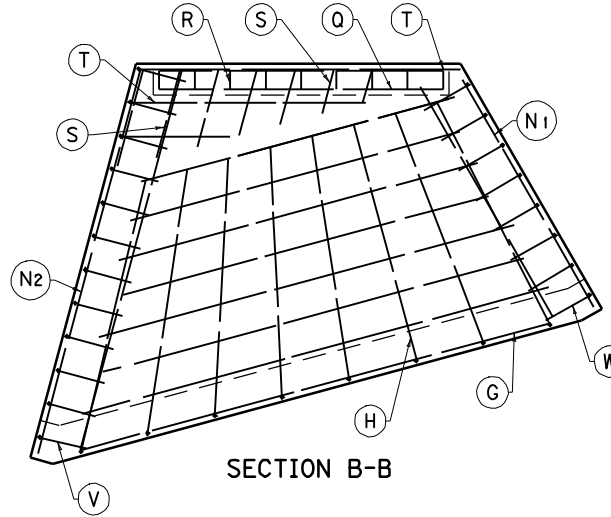
STANDARD DRAWING NO. RDH-405-02

SUBMITTED: *John B. Suckman* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

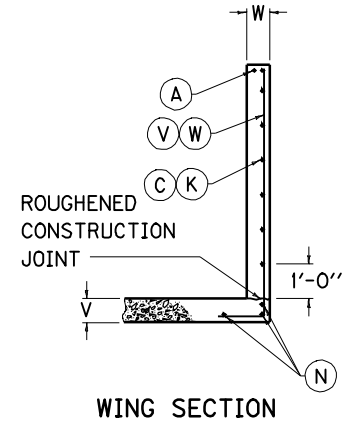
APPROVED: *J. H. Howell* 12-1-99  
DATE



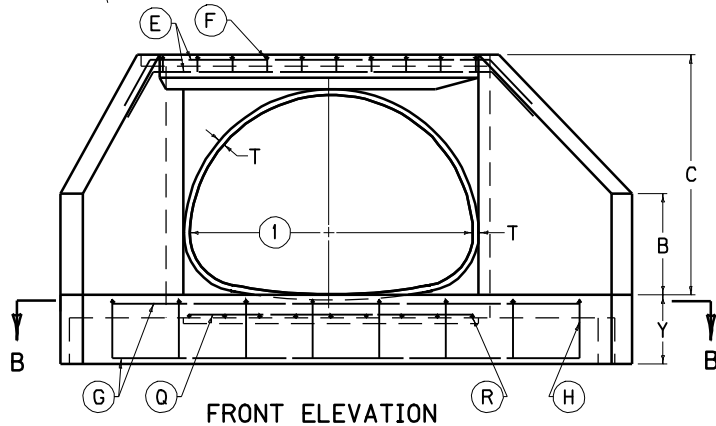
PLAN VIEW



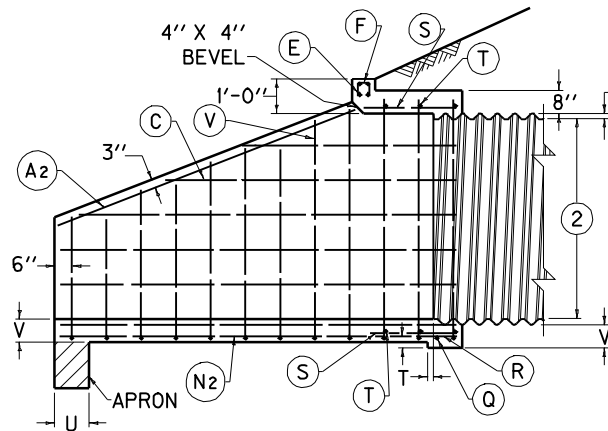
SECTION B-B



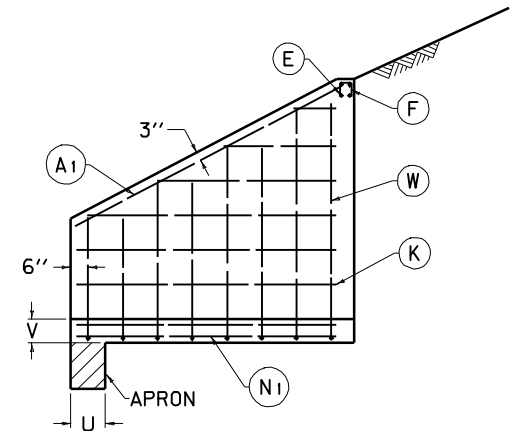
WING SECTION



FRONT ELEVATION



SECTION A-A



SHORT WING SECTION

~ NOTES ~

- ① SPAN OF STRUCTURAL PLATE STEEL PIPE ARCH.
- ② RISE OF STRUCTURAL PLATE STEEL PIPE ARCH.
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CURRENT STANDARD DRAWINGS RDH-420 THRU RDH-465.
4. DIMENSIONS FROM CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
6. BARS ○, ○, ○, ○, ○ ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS ○ AND ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
8. BARS ○ AND ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
9. HEADWALLS LOCATED AT EDGE OF SHOULDERS SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
10. ▨ LIMITS OF APRON.
11. PAVING SHALL BE REQUIRED AND SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

(LAYOUT AND STEEL PATTERN)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

STEEL PIPE ARCH  
H-WALLS-15°-30° & 45° SK  
(PIPE RISE LESS THAN 6'-0")

STANDARD DRAWING NO. RDH-410-02

SUBMITTED: *John B. Suckman* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *John B. Suckman* 12-1-99  
STATE HIGHWAY ENGINEER DATE





DIMENSION	0° SKEW						15° SKEW						DIMENSION
	7'-0" x 5'-1"	8'-2" x 5'-9"	9'-6" x 6'-5"	11'-5" x 7'-3"	12'-10" x 8'-4"	15'-4" x 9'-3"	7'-0" x 5'-1"	8'-2" x 5'-9"	9'-6" x 6'-5"	11'-5" x 7'-3"	12'-10" x 8'-4"	15'-4" x 9'-3"	
A	6'-1"	6'-9"	7'-7"	8'-5"	9'-6"	10'-5"	6'-9"	7'-5"	7'-11"	8'-9"	9'-10"	10'-9"	A
B	2'-7"	2'-11"	3'-3"	3'-8"	4'-2"	4'-8"	2'-7"	2'-11"	3'-3"	3'-8"	4'-2"	4'-8"	B
C	5'-11"	6'-7"	7'-5"	8'-3"	9'-4"	10'-3"	6'-3"	6'-11"	7'-7"	8'-5"	9'-6"	10'-5"	C
E	7'-4"	8'-6"	9'-10"	11'-9"	13'-2"	15'-8"	8'-2"	9'-6"	11'-0"	13'-1"	14'-8"	17'-6"	E
F	7'-0"	7'-10"	8'-9"	9'-9"	11'-0"	12'-0"	7'-10"	8'-7"	9'-2"	10'-1"	11'-4"	12'-5"	F
G	-----						7'-0"	7'-8"	8'-2"	9'-1"	10'-2"	11'-2"	G
H	14'-4"	16'-4"	18'-7"	21'-6"	24'-2"	27'-8"	13'-11"	15'-9"	17'-8"	20'-6"	23'-0"	26'-7"	H
J	7'-2"	8'-2"	9'-4"	10'-9"	12'-1"	13'-10"	7'-5"	8'-4"	9'-4"	10'-9"	12'-1"	13'-10"	J
M	0'-5"		0'-6"				0'-6"		0'-8"				M
N	-----						0'-5"		0'-6"				N
P	-----						2'-5"	2'-9"	3'-3"	3'-10"	4'-3"	5'-0"	P
Q	-----						8'-2"	9'-4"	10'-10"	12'-9"	14'-2"	16'-8"	Q
R	-----						0'-9"		1'-0"				R
T	0'-2"						0'-2"						T
U	1'-0"						1'-0"						U
V	0'-8"		1'-0"				0'-8"		1'-0"				V
W	0'-8"		0'-10"				0'-8"		0'-10"				W
X	----		2'-0"		2'-6"		----		2'-0"		2'-6"		X
Y	2'-0"		2'-6"		3'-0"		2'-0"		2'-6"		3'-0"		Y
Z	----		1'-3"		1'-9"		----		1'-3"		1'-9"		Z

**KENTUCKY  
DEPARTMENT OF HIGHWAYS**

**DIMENSIONS  
STEEL PIPE ARCHES  
0° SKEW & 15° SKEW**

STANDARD DRAWING NO. RDH-420-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



DIMENSION	30° SKEW						45° SKEW						DIMENSION
	7'-0" x 5'-1"	8'-2" x 5'-9"	9'-6" x 6'-5"	11'-5" x 7'-3"	12'-10" x 8'-4"	15'-4" x 9'-3"	7'-0" x 5'-1"	8'-2" x 5'-9"	9'-6" x 6'-5"	11'-5" x 7'-3"	12'-10" x 8'-4"	15'-4" x 9'-3"	
A	6'-9"	7'-5"	7'-11"	8'-9"	9'-10"	10'-9"	6'-9"	7'-5"	7'-11"	8'-9"	9'-10"	10'-9"	A
B	2'-7"	2'-11"	3'-3"	3'-8"	4'-2"	4'-8"	2'-7"	2'-11"	3'-3"	3'-8"	4'-2"	4'-8"	B
C	6'-3"	6'-11"	7'-7"	8'-5"	9'-6"	10'-5"	6'-3"	6'-11"	7'-7"	8'-5"	9'-6"	10'-5"	C
E	10'-0"	11'-7"	13'-5"	16'-1"	18'-0"	21'-5"	14'-2"	16'-5"	19'-0"	22'-8"	25'-5"	30'-3"	E
F	9'-7"	10'-6"	11'-2"	12'-4"	13'-11"	15'-2"	13'-6"	14'-10"	15'-10"	17'-6"	19'-8"	21'-6"	F
G	6'-9"	7'-5"	7'-11"	8'-9"	9'-10"	10'-9"	7'-0"	7'-8"	8'-2"	9'-1"	10'-2"	11'-2"	G
H	16'-9"	19'-0"	21'-4"	24'-10"	27'-10"	32'-2"	24'-1"	27'-3"	30'-7"	35'-6"	39'-10"	46'-0"	H
J	8'-2"	9'-2"	10'-3"	11'-10"	13'-3"	15'-3"	10'-2"	11'-5"	12'-9"	14'-9"	16'-6"	18'-11"	J
M	0'-8"		0'-10"				0'-10"		1'-1"				M
N	0'-3"		0'-4"				0'-2"		0'-3"				N
P	5'-8"	6'-6"	7'-7"	8'-11"	9'-11"	11'-8"	11'-2"	12'-9"	14'-10"	17'-7"	19'-7"	23'-1"	P
Q	8'-0"	9'-2"	10'-8"	12'-7"	14'-0"	16'-6"	7'-11"	9'-1"	10'-6"	12'-5"	13'-10"	16'-4"	Q
R	0'-11"		1'-2"				1'-1"		1'-4"				R
T	0'-2"						0'-2"						T
U	1'-0"						1'-0"						U
V	0'-8"		1'-0"				0'-8"		1'-0"				V
W	0'-8"		0'-10"				0'-8"		0'-10"				W
X	----		2'-0"		2'-6"		----		2'-0"		2'-6"		X
Y	2'-0"		2'-6"		3'-0"		2'-0"		2'-6"		3'-0"		Y
Z	----		1'-3"		1'-9"		----		1'-3"		1'-9"		Z

**KENTUCKY  
DEPARTMENT OF HIGHWAYS**

**DIMENSIONS  
STEEL PIPE ARCHES  
30° SKEW & 45° SKEW**

STANDARD DRAWING NO. RDH-425-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
<b>0° SKEW</b>							
7'-0" x 5'-1"	9.48	1.50	—	—	—	581	—
8'-2" x 5'-9"	11.50	1.69	—	—	—	693	—
9'-6" x 6'-5"	21.81	2.64	2.63	3.45	19.99	1709	306
11'-5" x 7'-3"	26.11	2.96	3.45	3.88	23.59	2155	372
12'-10" x 8'-4"	34.41	4.48	3.95	5.81	31.78	2903	496
15'-4" x 9'-3"	40.69	5.01	5.13	6.49	37.04	3389	583
<b>15° SKEW</b>							
7'-0" x 5'-1"	12.02	1.46	—	—	—	892	—
8'-2" x 5'-9"	14.63	1.65	—	—	—	1076	—
9'-6" x 6'-5"	26.27	2.55	2.71	3.54	24.55	2147	295
11'-5" x 7'-3"	32.00	2.86	3.56	3.98	29.56	2747	399
12'-10" x 8'-4"	41.67	4.34	4.07	5.95	39.21	3678	488
15'-4" x 9'-3"	50.31	4.86	5.31	6.66	46.80	4452	621

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
<b>30° SKEW</b>							
7'-0" x 5'-1"	15.78	1.75	—	—	—	1197	—
8'-2" x 5'-9"	19.36	1.97	—	—	—	1440	—
9'-6" x 6'-5"	34.24	2.96	3.35	4.00	31.94	2875	366
11'-5" x 7'-3"	42.39	3.34	4.39	4.52	39.18	3758	478
12'-10" x 8'-4"	54.95	5.05	5.04	6.74	51.60	4962	575
15'-4" x 9'-3"	68.08	5.69	6.56	7.58	63.40	6145	762
<b>45° SKEW</b>							
7'-0" x 5'-1"	23.33	2.46	—	—	—	1782	—
8'-2" x 5'-9"	28.88	2.78	—	—	—	2208	—
9'-6" x 6'-5"	49.84	3.98	4.89	5.14	46.11	4287	540
11'-5" x 7'-3"	62.51	4.53	6.39	5.84	57.43	5551	668
12'-10" x 8'-4"	81.38	6.82	7.38	8.63	75.81	7467	831
15'-4" x 9'-3"	101.25	7.74	9.55	9.76	93.71	9276	1040

- ① STRUCTURAL PLATE STEEL PIPE ARCHES EQUALS THE INTERIOR SPAN (S) BY THE INTERIOR RISE (R) IN FEET AND INCHES.
- ② CU. YDS. OF CONCRETE IN TWO HEADWALLS WITH PAVING.
- ③ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITH PAVING).
- ④ CU. YDS. OF CONCRETE IN TWO PAVED AREAS OF THE HEADWALLS.
- ⑤ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITHOUT PAVING).
- ⑥ CU. YDS. OF CONCRETE IN TWO HEADWALLS WITHOUT PAVING.
- ⑦ POUNDS OF REINFORCING STEEL IN TWO HEADWALLS WITH PAVING.
- ⑧ POUNDS OF REINFORCING STEEL TO DEDUCT WHEN PAVING FOR TWO HEADWALLS IS ELIMINATED.

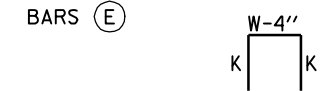
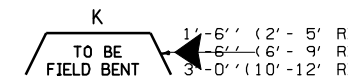
KENTUCKY DEPARTMENT OF HIGHWAYS	
QUANTITIES FOR STEEL PIPE ARCHES 0°-15°-30° & 45° SKEW	
STANDARD DRAWING NO. RDH-430-02	
SUBMITTED: <i>John B. Suckley</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>J. M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE

MARK	SIZE	NO				K				MARK	SIZE	NO				K				MARK	SIZE	NO				K																				
		①	FT	IN	FT	IN	①	FT	IN			FT	IN	①	FT	IN	FT	IN	①			FT	IN	FT	IN	①	FT	IN	FT	IN																
7'-0" x 5'-1"										9'-6" x 6'-5"										11'-5" x 7'-3" (CONT'D)										15'-4" x 9'-3" (CONT'D)																
A	5	4	7	8						A	5	4	9	7						P	6	20	5	10	4	1											Q	5	4	11	5					
C1	4	2	1	6						B1	5	8	3	3						R	5	12	2	8						E1	5	2	20	11	15	11										
C2	4	2	3	7						B2	5	8	4	3																E2	5	2	21	5	16	5										
C3	4	2	5	8						B3	5	8	5	2																F	4	17	1	5	0	6										
C4	4	4	6	10						B4	5	8	6	2																G1	4	1	15	2												
E1	5	2	10	7	7	7				B5	5	4	7	1						12'-10" x 8'-4"										G2	4	2	17	4												
E2	5	2	10	11	7	11				C1	4	4	2	6						A	5	4	11	11						G3	4	2	19	6												
F	4	8	0	11	0	4				C2	4	4	4	7						B1	5	8	4	3						G4	4	2	21	8												
G1	4	2	9	5						C3	4	4	6	8						B2	5	8	5	2						G5	4	2	23	10												
G2	4	2	11	8						C4	4	12	8	7						H	4	14	12	9	10	1				G6	4	3	26	0												
G3	4	3	14	0						E1	5	2	15	1	10	1				M	4	24	4	9																						
H	4	8	7	5	5	9				E2	5	2	15	8	10	8				B4	5	8	7	0						N	4	16	11	10												
N	4	6	6	10						F	4	11	1	5	0	6				B5	5	8	8	0						P	7	24	7	4	5	1										
Q	4	2	7	0						G1	4	2	11	3						B6	5	4	8	11						Q	5	4	15	4												
R	4	8	0	6						G2	4	2	13	6						C1	4	4	2	5						R	5	16	3	2												
V1	5	4	4	4	3	1				G3	4	2	15	9						C2	4	4	4	6																						
V2	5	4	5	4	4	1				G4	4	3	18	0						C3	4	4	6	8																						
V3	5	4	6	3	5	0				H	4	10	9	5	7	3				C4	4	4	8	10																						
V4	5	2	7	3	6	0				M	4	18	3	9						C5	4	16	10	9																						
										N	4	14	8	7						E1	5	2	18	4	13	4																				
										P	5	18	5	5	3	8				E2	5	2	18	11	13	11																				
										Q	5	4	9	6						F	4	14	1	5	0	6																				
										R	5	10	2	8						G1	4	2	14	8																						
8'-2" x 5'-9"										11'-5" x 7'-3"										15'-4" x 9'-3"																										
A	5	4	8	6						A	5	4	10	7						A	5	4	13	1																						
C1	4	2	2	11						B1	5	8	3	8						B1	5	8	4	8																						
C2	4	2	5	0						B2	5	8	4	8						B2	5	8	5	7																						
C3	4	2	7	2						B3	5	8	5	7						B3	5	8	6	7																						
C4	4	4	7	8						B4	5	8	6	6						B4	5	8	7	6																						
E1	5	2	11	8	8	8				B5	5	8	7	6						B5	5	8	8	5																						
E2	5	2	12	1	9	1				C1	4	4	2	3						B6	5	8	9	4																						
F	4	9	0	11	0	4				C2	4	4	4	4						C1	4	4	2	3																						
G1	4	1	9	1						C3	4	4	6	5						C2	4	4	4	5																						
G2	4	2	11	4						C4	4	4	8	6						C3	4	4	6	6																						
G3	4	2	13	8						C5	4	12	9	7						C4	4	4	8	8																						
G4	4	3	16	0						E1	5	2	17	0	12	0				C5	4	4	4	5																						
H	4	9	8	1	6	5				E2	5	2	17	6	12	6				A	5	4	10	10																						
N	4	6	7	8						F	4	13	1	5	0	6				B1	5	8	5	7																						
Q	4	2	8	2						G1	4	1	11	4						B2	5	8	6	7																						
R	4	9	0	6						G2	4	2	13	6						B3	5	8	7	6																						
V1	5	4	4	8	3	5				G3	4	2	15	8						B4	5	8	8	5																						
V2	5	4	5	7	4	4				G4	4	2	17	10						B5	5	8	9	4																						
V3	5	4	6	7	5	4				G5	4	3	20	0						C1	4	4	2	3																						
V4	5	4	7	6	6	3				H	4	11	10	3	8	1				C2	4	4	4	5																						
										M	4	20	3	9						C3	4	4	6	6																						
										N	4	14	9	7						C4	4	4	8	8																						
																				C5	4	4	10	10																						

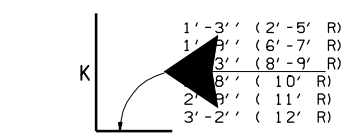
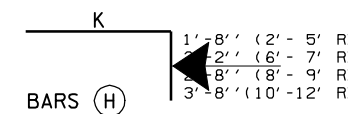
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

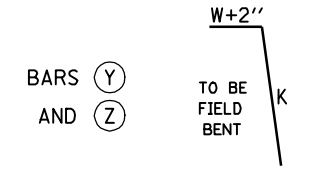
**BENT BAR SHAPES**



BARS (F), (U) AND (X)



BARS (P), (V) AND (W)



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

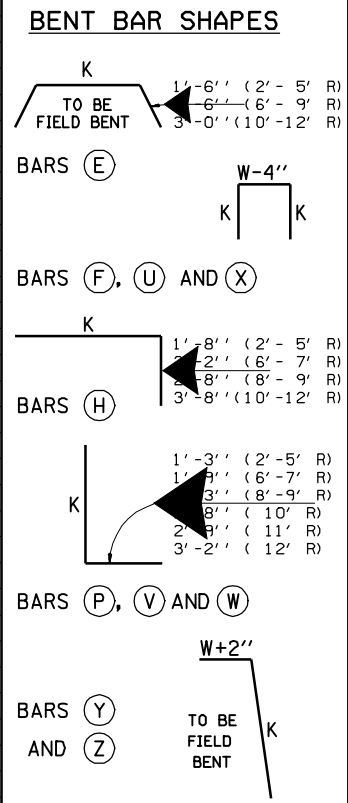
**BILL OF REINFORCEMENT**  
**7'-0" x 5'-1" - 15'-4" x 9'-3"**  
**STEEL PIPE ARCHES**  
**0° SKEW**

**STANDARD DRAWING NO. RDH-435-04**

SUBMITTED BY *John B. Enckstein* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN  
APPROVED BY *J. M. Powell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER

MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K								
		①	FT	IN	FT			IN	①	FT	IN			FT	IN	①	FT			IN	FT	IN	①			FT	IN	FT	IN	①	FT	IN	FT	IN
7'-0" X 5'-1"					8'-2" X 5'-9"					9'-6" X 6'-5"					11'-5" X 7'-3"					11'-5" X 7'-3" (CONT'D)					12'-10" X 8'-4" (CONT'D)									
A1	5	2	7	9		A1	5	2	8	6		A1	5	2	9	1		A1	5	2	10	1		S11	5	2	4	0		R	5	14	3	4
A2	5	2	8	6		A2	5	2	9	4		A2	5	2	9	11		A2	5	2	11	0		T1	5	2	3	11		S1	5	2	1	0
C1	4	1	5	0		C1	4	1	4	9		B1	5	4	3	3		B1	5	4	3	8		T2	5	2	7	3		S2	5	2	1	3
C2	4	1	7	1		C2	4	1	6	10		B2	5	4	4	3		B2	5	4	4	8		T3	5	2	10	7		S3	5	2	1	7
C3	4	1	9	2		C3	4	1	9	0		B3	5	4	5	2		B3	5	4	5	7		T4	5	2	12	6		S4	5	2	1	10
C4	4	2	10	6		C4	4	1	11	1		B4	5	4	6	2		B4	5	4	6	6							S5	5	2	2	2	
E1	5	2	11	6	8	6	C5	4	2	11	7		B5	5	10	7	1		B5	5	4	7	6						S6	5	2	2	6	
E2	5	2	11	10	8	10	E1	5	2	12	9	9	9	C1	4	2	4	4		B6	5	8	7	11					S7	5	2	2	9	
F	4	9	1	3	0	6	E2	5	2	13	2	10	2	C2	4	2	6	6		C1	4	2	6	8					S8	5	2	3	1	
G1	4	1	7	7		F	4	10	1	3	0	6	C3	4	2	8	6		C2	4	2	8	10					S9	5	2	3	4		
G2	4	2	9	1		G1	4	2	9	5			C4	4	2	10	8		C3	4	2	10	11					S10	5	2	3	8		
G3	4	2	10	6		G2	4	2	11	0			C5	4	6	12	6		C4	4	2	13	0					S11	5	2	3	11		
G4	4	3	12	0		G3	4	2	12	6			E1	5	2	16	2	11	2	C5	4	6	14	0				T1	5	2	1	10		
H	4	7	8	9	7	1	G4	4	3	14	0		E2	5	2	16	10	11	10	E1	5	2	18	4	13	4		T2	5	2	5	3		
K1	4	1	2	0		H	4	8	9	5	7	9	F	4	12	1	5	0	6	E2	5	2	19	0	14	0		T3	5	2	8	8		
K2	4	1	3	11		K1	4	1	1	4			G1	4	2	11	5		F	4	14	1	5	0	6		T4	5	2	12	0			
K3	4	1	5	9		K2	4	1	3	3			G2	4	2	12	11		G1	4	1	13	4				T5	5	2	13	11			
K4	4	2	6	10		K3	4	1	5	2			G3	4	2	14	6		G2	4	2	15	0											
N1	4	3	6	10		K4	4	1	7	1			G4	4	3	16	0		G3	4	2	16	8											
N2	4	3	10	3		K5	4	2	7	6			H	4	9	10	7	8	5	G4	4	2	18	4										
Q	4	2	7	0		N1	4	3	7	6			J1	5	4	3	3		G5	4	3	20	0											
R	4	8	0	7		N2	4	3	11	5			J2	5	4	4	4		H	4	11	11	5	9	3									
S1	5	2	1	1		Q	4	2	8	2			J3	5	4	5	5		J1	5	4	3	8											
S2	5	2	1	4		R	4	9	0	7			J4	5	4	6	6		J2	5	4	4	9											
S3	5	2	1	8		S1	5	2	1	1			K1	4	2	2	7		J3	5	4	5	10											
S4	5	2	2	0		S2	5	2	1	5			K2	4	2	4	6		J4	5	4	6	10											
S5	5	2	2	4		S3	5	2	1	9			K3	4	2	6	4		J5	5	2	7	11											
S6	5	2	2	8		S4	5	2	2	0			K4	4	6	8	0		K1	4	2	2	4											
T1	5	2	2	1		S5	5	2	2	4			M1	4	1	2	4		K2	4	2	4	3											
T2	5	2	5	3		S6	5	2	2	8			M2	4	20	3	9		K3	4	2	6	1											
T3	5	2	7	11		S7	5	2	3	0			N1	4	7	8	0		K4	4	2	8	0											
V1	5	2	4	4	3	1	T1	5	2	3	3		N2	4	5	11	9		K5	4	6	8	11											
V2	5	2	5	3	4	0	T2	5	2	6	6		N3	4	2	12	8		M1	4	1	2	6											
V3	5	2	6	3	5	0	T3	5	2	9	1		P	5	21	5	5	3	8	M2	4	22	3	9										
V4	5	2	7	2	5	11	V1	5	2	4	8	3	5	Q	5	4	9	6		N1	4	7	8	11										
V5	5	3	7	6	6	3	V2	5	2	5	7	4	4	R	5	10	2	10		N2	4	5	12	10										
W1	5	2	4	4	3	1	V3	5	2	6	7	5	4	S1	5	2	1	2		N3	4	2	14	3										
W2	5	2	5	5	4	2	V4	5	2	7	6	6	3	S2	5	2	1	5		P	6	23	5	11	4	2								
W3	5	2	6	6	5	3	V5	5	4	8	2	6	11	S3	5	2	1	9		Q	5	4	11	5										
W4	5	1	7	6	6	3	W1	5	2	4	8	3	5	S4	5	2	2	1		R	5	12	2	10										
							W2	5	2	5	9	4	6	S5	5	2	2	4		S1	5	2	1	2										
							W3	5	2	6	9	5	6	S6	5	2	2	8		S2	5	2	1	5										
							W4	5	2	7	10	6	7	S7	5	2	3	0		S3	5	2	1	9										
													S8	5	2	3	3		S4	5	2	2	1											
													S9	5	2	3	5		S5	5	2	2	4											
													T1	5	2	1	11		S6	5	2	2	8											
													T2	5	2	5	2		S7	5	2	2	11											
													T3	5	2	8	9		S8	5	2	3	3											
													T4	5	2	10	7		S9	5	2	3	7											
														S10	5	2	3	10		P	7	26	6	11	4	8								
																			Q	5	4	12	10											

- ### NOTES
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - R = BOX OR PIPE RISE
  - W = WING WALL WIDTH



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**7'-0" x 5'-1" - 12'-10" x 8'-4"**  
**STEEL PIPE ARCHES**  
**15° SKEW**

**STANDARD DRAWING NO. RDH-440-03**

SUBMITTED *John B. Ingham* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

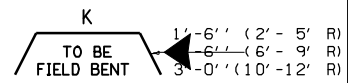
APPROVED *J. W. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K			
		①	FT	IN	FT			IN	①	FT	IN
15'-4" X 9'-3"						15'-4" X 9'-3" (CONT'D)					
A1	5	2	12	4		S7	5	2	2	7	
A2	5	2	13	6		S8	5	2	3	3	
B1	5	4	4	8		S9	5	2	3	6	
B2	5	4	5	7		S10	5	2	3	10	
B3	5	4	6	7		S11	5	2	4	1	
B4	5	4	7	6		S12	5	2	4	5	
B5	5	4	8	5		S13	5	2	4	8	
B6	5	4	9	4		S14	5	2	5	0	
B7	5	12	9	11		S15	5	2	5	2	
C1	4	2	8	0		T1	5	2	4	4	
C2	4	2	10	1		T2	5	2	7	8	
C3	4	2	12	3		T3	5	2	11	0	
C4	4	2	14	4		T4	5	2	14	5	
C5	4	2	16	6		T5	5	2	16	5	
C6	4	8	17	6							
E1	5	2	22	9	17	9					
E2	5	2	23	4	18	4					
F	4	19	1	5	0	6					
G1	4	1	17	8							
G2	4	2	19	4							
G3	4	2	21	0							
G4	4	2	22	8							
G5	4	2	24	4							
G6	4	3	26	0							
H	4	14	13	11	11	3					
J1	5	4	4	8							
J2	5	4	5	9							
J3	5	4	6	9							
J4	5	4	7	10							
J5	5	4	8	10							
J6	5	2	9	11							
K1	4	2	2	5							
K2	4	2	4	4							
K3	4	2	6	3							
K4	4	2	8	2							
K5	4	2	10	1							
K6	4	8	10	11							
M1	4	1	2	11							
M2	4	28	4	9							
N1	4	8	11	0							
N2	4	5	16	1							
N3	4	3	17	9							
P	7	29	7	5	5	2					
Q	5	4	15	4							
R	5	16	3	4							
S1	5	2	1	1							
S2	5	2	1	5							
S3	5	2	1	9							
S4	5	2	2	0							
S5	5	2	2	4							

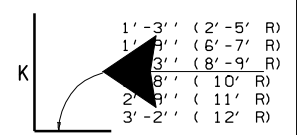
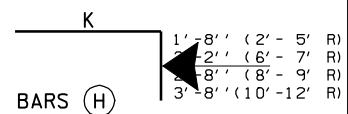
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

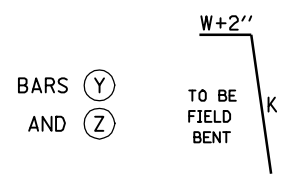
**BENT BAR SHAPES**



BARS (F), (U) AND (X)



BARS (Y) AND (Z)



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**15'-4" x 9'-3"**  
**STEEL PIPE ARCHES**  
**15° SKEW**

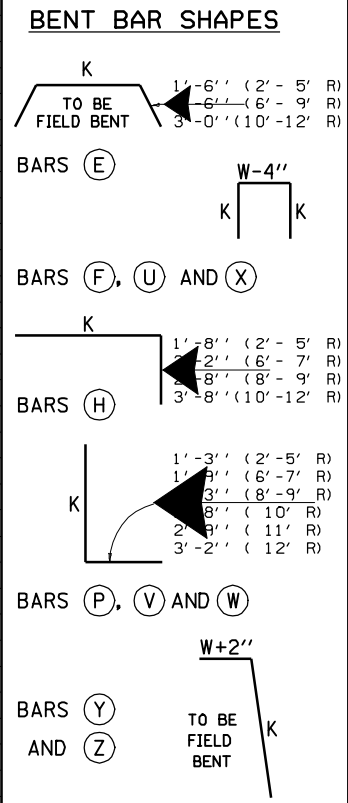
**STANDARD DRAWING NO. RDH-445-03**

SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K																
		①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN	①	FT	IN	FT	IN							
7'-0" X 5'-1"						8'-2" X 5'-9"						9'-6" X 6'-5"						9'-6" X 6'-5" (CONT'D)						11'-5" X 7'-3" (CONT'D)						12'-10" X 8'-4" (CONT'D)									
A1	5	2	7	6		A1	5	2	8	3		A1	5	2	8	10		T4	5	2	5	7		S1	5	2	1	7		J1	5	4	4	3					
A2	5	2	10	1		A2	5	2	11	1		A2	5	2	11	10		T5	5	2	7	0		S2	5	2	2	3		J2	5	4	5	4					
C1	4	1	8	6		C1	4	1	8	6		B1	5	4	3	3		T6	5	2	8	5		S3	5	2	3	0		J3	5	4	6	5					
C2	4	1	11	2		C2	4	1	11	1		B2	5	4	4	0		T7	5	2	9	11		S4	5	2	3	8		J4	5	4	7	6					
C3	4	1	13	8		C3	4	1	13	9		B3	5	4	4	9		T8	5	2	10	6		S5	5	2	4	5		J5	5	4	8	7					
C4	4	2	15	2		C4	4	1	16	3		B4	5	4	5	7								S6	5	2	5	1		K1	4	2	2	5					
E1	5	2	13	3	10	3	C5	4	2	16	11		B5	5	4	6	4								S7	5	2	5	10		K2	4	2	4	4				
E2	5	2	13	9	10	9	E1	5	2	14	11	11	11	B6	5	18	7	1		11'-5" X 7'-3"						S8	5	2	6	6		K3	4	2	6	1			
F	4	11	1	3	0	6	E2	5	2	15	3	12	3	C1	4	2	8	9		S9	5	2	7	3		K4	4	2	7	11									
G1	4	1	10	3		F	4	13	1	3	0	6	C2	4	2	11	4		A1	5	2	9	9		S10	5	2	7	11		K5	4	8	9	8				
G2	4	2	12	2		G1	4	2	12	3		C3	4	2	13	11		A2	5	2	13	1		S11	5	2	8	8		M1	4	1	2	11					
G3	4	2	14	1		G2	4	2	14	2		C4	4	2	16	5		B1	5	4	3	8		T1	5	2	1	11		N1	4	8	9	8					
G4	4	3	16	0		G3	4	2	16	1		C5	4	6	18	9		B2	5	4	4	5		T2	5	2	3	4		N2	4	5	2	1	7				
H	4	9	8	9	7	1	G4	4	3	18	0		E1	5	2	18	8	13	8	B3	5	4	5	2		T3	5	2	4	8		N3	4	3	2	4	0		
K1	4	1	1	11		H	4	10	9	5	7	9	E2	5	2	19	4	14	4	B4	5	4	5	11		T4	5	2	6	2		P	7	3	4	6	11	4	8
K2	4	1	3	9		K1	4	1	1	4		F	4	14	1	5	0	6	B5	5	4	6	9		T5	5	2	7	7		Q	5	4	1	2	10			
K3	4	1	5	7		K2	4	1	3	2		G1	4	2	14	4		B6	5	4	7	6		T6	5	2	9	0		R	5	1	4	3	6				
K4	4	2	6	7		K3	4	1	5	1		G2	4	2	16	2		B7	5	20	7	11		T7	5	2	10	4		S1	5	2	1	1					
N1	4	3	6	7		K4	4	1	6	10		G3	4	2	18	1		C1	4	2	12	3		T8	5	2	11	9		S2	5	2	1	10					
N2	4	3	15	2		K5	4	1	7	3		G4	4	3	20	0		C2	4	2	13	11		T9	5	2	12	5		S3	5	2	2	6					
Q	4	2	7	0		N1	4	3	7	3		H	4	11	10	7	8	5	C3	4	2	17	6		S4	5	2	3	2										
R	4	8	0	9		N2	4	3	16	11		J1	5	4	3	4		C4	4	2	20	1		S5	5	2	3	11											
S1	5	2	1	7		Q	4	2	8	2		J2	5	4	4	5		C5	4	6	21	4		S6	5	2	4	8											
S2	5	2	2	3		R	4	9	0	9		J3	5	4	5	6		E1	5	2	21	4	16	4	S7	5	2	5	4										
S3	5	2	3	0		S1	5	2	1	0		J4	5	4	6	7		E2	5	2	22	0	17	0	S8	5	2	6	1										
S4	5	2	3	8		S2	5	2	1	8		K1	4	2	2	6		F	4	17	1	5	0	6	S9	5	2	6	9										
S5	5	2	4	5		S3	5	2	2	5		K2	4	2	4	4		G1	4	1	16	3		A1	5	2	11	0											
S6	5	2	5	1		S4	5	2	3	2		K3	4	2	6	2		G2	4	2	18	3		A2	5	2	14	8											
S7	5	2	5	8		S5	5	2	3	10		K4	4	6	7	9		G3	4	2	20	2		B1	5	4	4	1											
T1	5	2	1	2		S6	5	2	4	6		M1	4	1	2	5		G4	4	2	22	1		B2	5	4	4	11											
T2	5	2	2	7		S7	5	2	5	3		M2	4	2	6	3	9	G5	4	3	24	0		B3	5	4	5	8											
T3	5	2	4	0		S8	5	2	6	0		N1	4	7	7	9		H	4	13	11	5	9	3	B4	5	4	6	6										
T4	5	2	5	5		S9	5	2	6	5		N2	4	5	16	11		J1	5	4	3	9		B5	5	4	7	3											
T5	5	2	6	10		T1	5	2	1	0		N3	4	2	18	11		J2	5	4	4	10		B6	5	4	8	0											
T6	5	2	7	10		T2	5	2	2	4		P	5	27	5	6	3	9	J3	5	4	5	11		B7	5	4	8	9										
V1	5	2	4	4	3	1	T3	5	2	3	9		Q	5	4	9	6		J4	5	4	7	0		B8	5	20	9	0										
V2	5	2	5	1	3	10	T4	5	2	5	2		R	5	10	3	0		J5	5	2	8	1		C1	4	2	10	10										
V3	5	2	5	10	4	7	T5	5	2	6	7		S1	5	2	1	7		K1	4	2	2	3		C2	4	2	13	6										
V4	5	2	6	7	5	4	T6	5	2	8	0		S2	5	2	2	4		K2	4	2	4	1		C3	4	2	16	1										
V5	5	2	7	5	6	2	T7	5	2	8	11		S3	5	2	3	0		K3	4	2	5	11		C4	4	2	18	8										
V6	5	5	7	6	6	3	V1	5	2	4	8	3	5	S4	5	2	3	9		K4	4	2	7	9		C5	4	2	21	3									
W1	5	2	4	4	3	1	V2	5	2	5	5	4	2	S5	5	2	4	5		K5	4	6	8	7		C6	4	8	23	10									
W2	5	2	5	6	4	3	V3	5	2	6	2	4	11	S6	5	2	5	1		M1	4	1	2	3		E1	5	2	23	3	18	3							
W3	5	2	6	7	5	4	V4	5	2	6	11	5	8	S7	5	2	5	10		M2	4	30	3	9		E2	5	2	23	11	18	11							
W4	5	1	7	8	6	5	V5	5	2	7	9	6	6	S8	5	2	6	6		N1	4	7	8	7		F	4	19	1	5	0	6							
							V6	5	7	8	2	6	11	S9	5	2	7	3		N2	4	7	8	7		G1	4	2	18	6									
							W1	5	2	4	9	3	6	S10	5	2	7	6		N3	4	5	19	5		G2	4	2	20	4									
							W2	5	2	5	10	4	7	T1	5	2	1	4		P	6	31	5	10	4	1	G3	4	2	22	3								
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							W4	5	1	8	0	6	9	T3	5	2	4	2		R	5	12	3	0		G5	4	3	26	0									
																			H	4	14	13	0	10	4	T10	5	2	13	9									

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - R = BOX OR PIPE RISE
  - W = WING WALL WIDTH



KENTUCKY  
DEPARTMENT OF HIGHWAYS

BILL OF REINFORCEMENT  
7'-0" X 5'-1" - 12'-10" X 8'-4"  
STEEL PIPE ARCHES  
30° SKEW

STANDARD DRAWING NO. RDH-450-03

SUBMITTED *John B. Ingleton* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

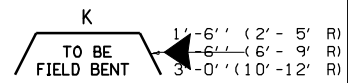
APPROVED *J. W. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K
		①	FT	IN	FT				IN	①	FT	IN	
15'-4" X 9'-3"						15'-4" X 9'-3" (CONT'D)							
A1	5	2	12	0		S5	5	2	4	3			
A2	5	2	16	1		S6	5	2	5	0			
B1	5	4	4	7		S7	5	2	6	5			
B2	5	4	5	5		S8	5	2	7	2			
B3	5	4	6	2		S9	5	2	7	10			
B4	5	4	6	11		S10	5	2	8	7			
B5	5	4	7	8		S11	5	2	9	3			
B6	5	4	8	5		S12	5	2	10	0			
B7	5	4	9	2		S13	5	2	10	8			
B8	5	26	9	11		S14	5	2	11	4			
C1	4	2	15	1		S15	5	2	11	9			
C2	4	2	17	8		S16	5	2	11	9			
C3	4	2	19	4		T1	5	2	1	7			
C4	4	2	23	0		T2	5	2	3	0			
C5	4	2	25	7		T3	5	2	4	4			
C6	4	8	26	11		T4	5	2	5	10			
E1	5	2	26	8	21	8	T5	5	2	7	2		
E2	5	2	27	3	22	3	T6	5	2	8	6		
F	4	22	1	5	0	6	T7	5	2	10	0		
G1	4	1	22	0			T8	5	2	11	5		
G2	4	2	24	0			T9	5	2	12	10		
G3	4	2	26	0			T10	5	2	14	3		
G4	4	2	28	0			T11	5	2	15	7		
G5	4	2	30	0			T12	5	2	16	3		
G6	4	3	32	0			X1	4	1	2	7	1	1
H	4	17	13	11	11	3	X2	4	1	2	11	1	3
J1	5	4	4	8			X3	4	1	3	5	1	6
J2	5	4	5	9			X4	4	1	3	9	1	8
J3	5	4	6	10			X5	4	1	4	1	1	10
J4	5	4	7	11			X6	4	1	4	7	2	1
J5	5	4	9	0			X7	4	1	4	11	2	3
J6	5	2	10	1			Z	4	2	9	4	8	4
K1	4	2	2	3									
K2	4	2	4	2									
K3	4	2	6	0									
K4	4	2	7	10									
K5	4	2	9	8									
K6	4	8	10	7									
M1	4	1	2	11									
M2	4	37	4	9									
N1	4	8	10	7									
N2	4	5	24	8									
N3	4	3	27	0									
P	7	38	7	4	5	1							
Q	5	4	15	4									
R	5	16	3	6									
S1	5	2	1	5									
S2	5	2	2	2									
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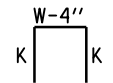
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

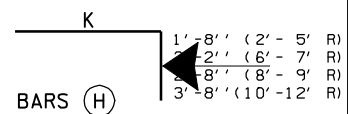
**BENT BAR SHAPES**



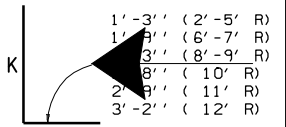
BARS (E)



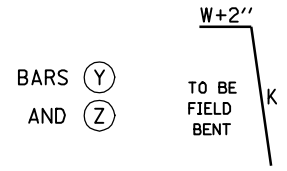
BARS (F), (U) AND (X)



BARS (H)



BARS (P), (V) AND (W)



BARS (Y) AND (Z)

**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
15'-4" x 9'-3"  
STEEL PIPE ARCHES  
30° SKEW

STANDARD DRAWING NO. RDH-455-03

SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



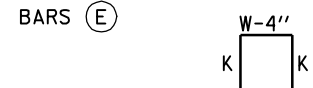
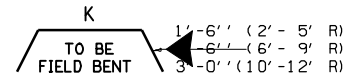


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12'-10" X 8'-4"						12'-10" X 8'-4" (CONT'D)						15'-4" X 9'-3" (CONT'D)						15'-4" X 9'-3" (CONT'D)															
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G4	4	2	35	2		T16	5	2	12	1		K1	4	2	2	4		X2	4	1	2	7	1	4	X2	4	1	2	7	1	4		
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K3	4	2	6	4		Z	4	2	9	0	8	0	N3	4	3	44	8																
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K5	4	8	10	0									Q	5	4	15	4																
M1	4	1	2	11									R	5	16	3	8																
M2	4	48	4	9		15'-4" X 9'-3"						S1	5	2	2	4																	
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P	7	49	6	11	4	8	B1	5	4	4	7	S5	5	2	8	1																	
Q	5	4	12	10		B2	5	4	5	1		S6	5	2	9	6																	
R	5	14	3	8		B3	5	4	5	8		S7	5	2	10	11																	
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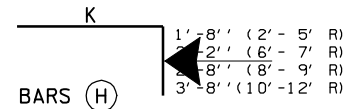
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

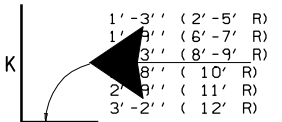
**BENT BAR SHAPES**



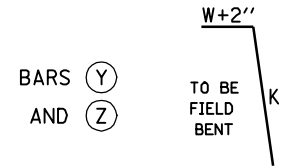
BARS (F), (U) AND (X)



BARS (H)



BARS (P), (V) AND (W)



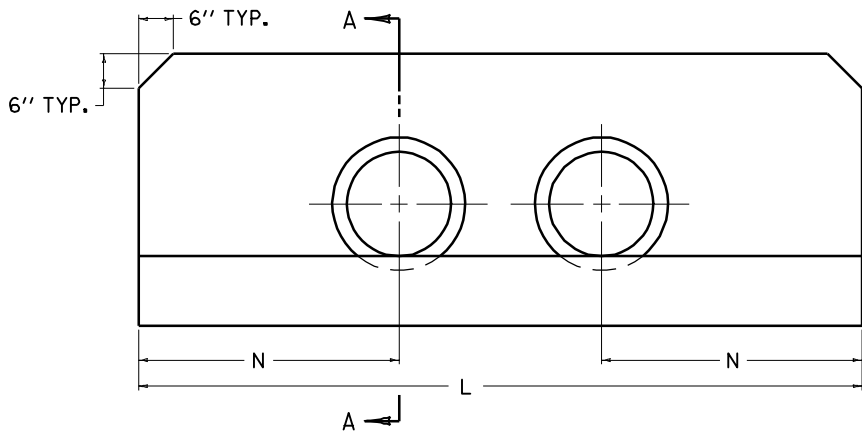
**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
12'-10" X 8'-4" - 15'-4" X 9'-3"  
STEEL PIPE ARCHES  
45° SKEW

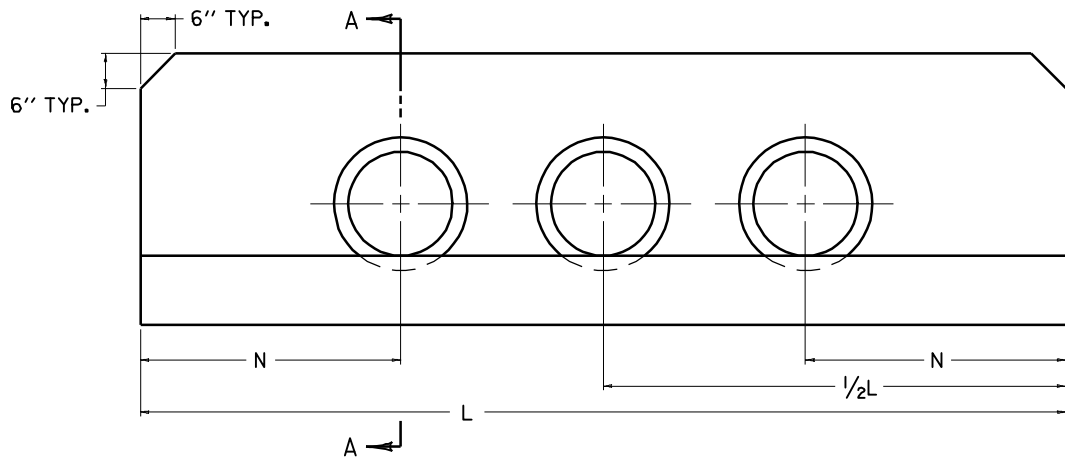
STANDARD DRAWING NO. RDH-465-03

SUBMITTED *John B. Enckstein* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN

APPROVED *J. W. Howell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER



DOUBLE PIPE ELEVATION VIEW



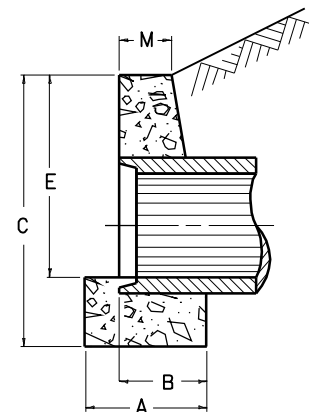
TRIPLE PIPE ELEVATION VIEW

**DIMENSIONS AND QUANTITIES**

HEADWALL TYPE	PIPE DIAMETER	HEADWALL DIMENSIONS							VOLUME CU. YD. FOR 2 HEADWALL
		A	B	C	E	L	M	N	
STANDARD DOUBLE	18"	1'-9"	1'-3"	4'-6"	3'-0"	10'-5"	10 <sup>3</sup> / <sub>4</sub> "	3'-9"	4.18
	24"	1'-10"	1'-4"	5'-0"	3'-6"	12'-6"	10 <sup>3</sup> / <sub>4</sub> "	4'-6"	5.65
STANDARD TRIPLE	18"	1'-9"	1'-3"	4'-6"	3'-0"	13'-4"	10 <sup>3</sup> / <sub>4</sub> "	3'-9"	4.87
	24"	1'-10"	1'-4"	5'-0"	3'-6"	16'-0"	10 <sup>3</sup> / <sub>4</sub> "	4'-6"	6.68
RAISED DOUBLE	18"	1'-9"	1'-3"	5'-0"	3'-6"	11'-11"	10 <sup>3</sup> / <sub>4</sub> "	4'-6"	5.25
	24"	1'-10"	1'-4"	5'-6"	4'-0"	14'-2"	10 <sup>3</sup> / <sub>4</sub> "	5'-3"	7.43
RAISED TRIPLE	18"	1'-9"	1'-3"	5'-0"	4'-0"	14'-10"	10 <sup>3</sup> / <sub>4</sub> "	4'-6"	6.76
	24"	1'-10"	1'-4"	5'-6"	4'-6"	17'-6"	10 <sup>3</sup> / <sub>4</sub> "	5'-3"	8.83

**NOTES**

1. VOLUME DISPLACED BY BARREL OF PIPE HAS BEEN COMPUTED USING INSIDE DIAMETER OF PIPE. NO DEDUCTION HAS BEEN MADE FOR BEVELED EDGES.
2. WHEN HEADWALLS ARE LOCATED AT THE EDGE OF THE SHOULDER, THE TOP OF THE HEADWALLS SHALL BE PARALLEL TO THE EDGE OF SHOULDER.
3. WHEN A RAISED HEADWALL IS USED ON THE OUTLET END OF THE PIPE, THE TOPS OF BOTH WALLS SHALL BE AT THE SAME ELEVATION.



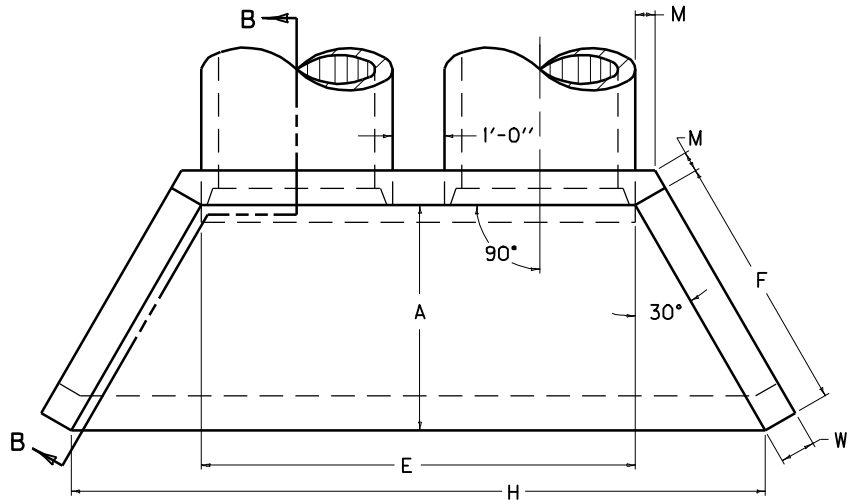
SECTION A-A

KENTUCKY  
DEPARTMENT OF HIGHWAYS

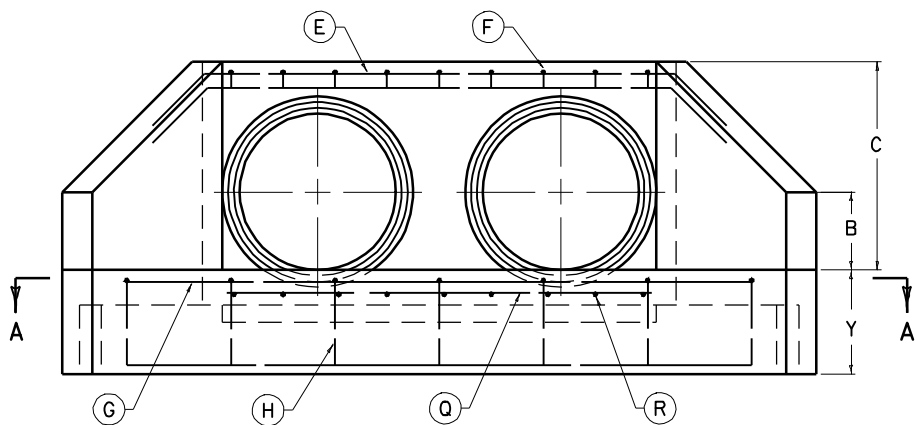
18"-24" DOUBLE AND  
TRIPLE PIPE CULVERT  
HEADWALLS AT 0° SKEW

STANDARD DRAWING NO. RDH-500-03

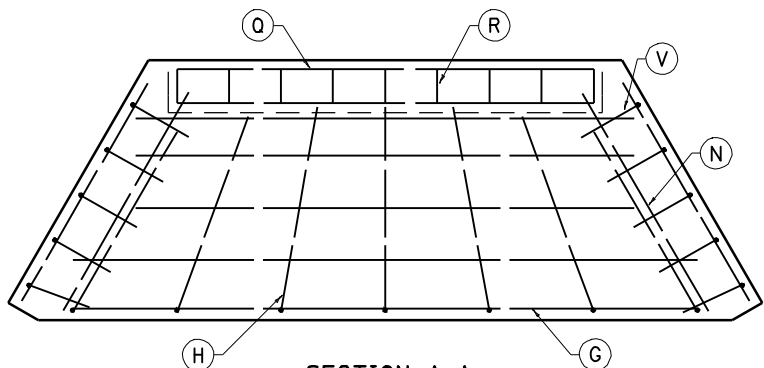
SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



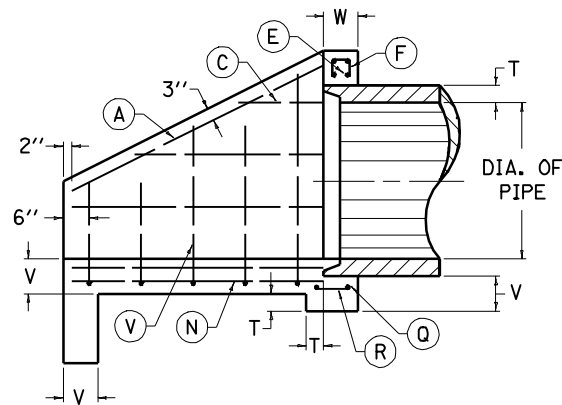
PLAN VIEW



FRONT ELEVATION

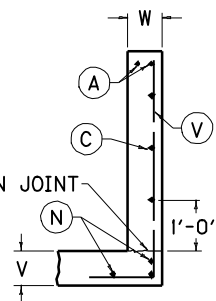


SECTION A-A



SECTION B-B

ROUGHENED  
CONSTRUCTION



WING SECTION

~ NOTES ~

1. SEE CURRENT STANDARD DRAWING RDH-522 AND 524 FOR DIMENSIONS, QUANTITIES AND BILL OF REINFORCEMENT.
2. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
3. BARS ○, ○, ○, ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
4. BARS ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
5. BARS ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
6. HEADWALLS LOCATED AT EDGE OF SHOULDER SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
7. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.
8. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.

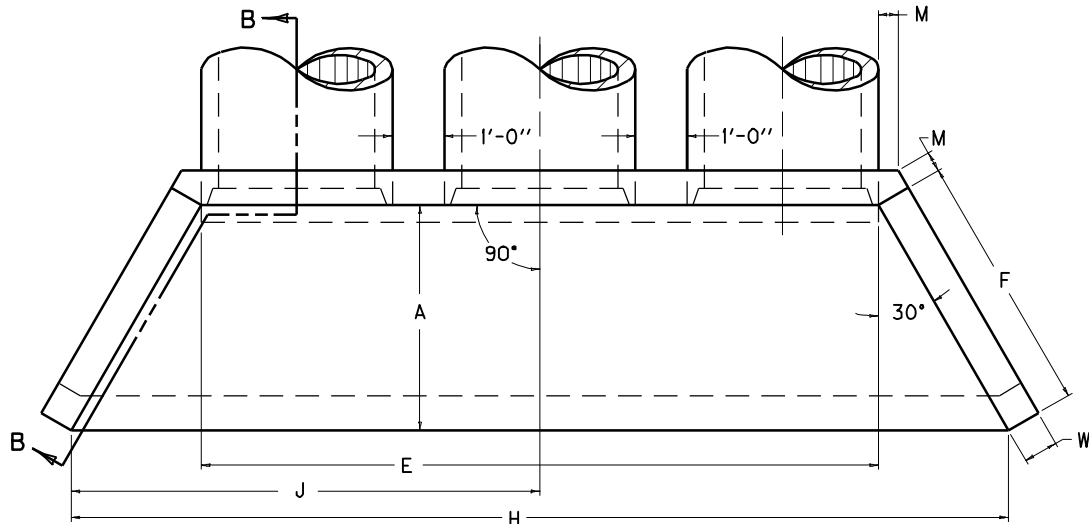
KENTUCKY  
DEPARTMENT OF HIGHWAYS

DOUBLE PIPE CULVERT  
HEADWALLS  
0° SKEW

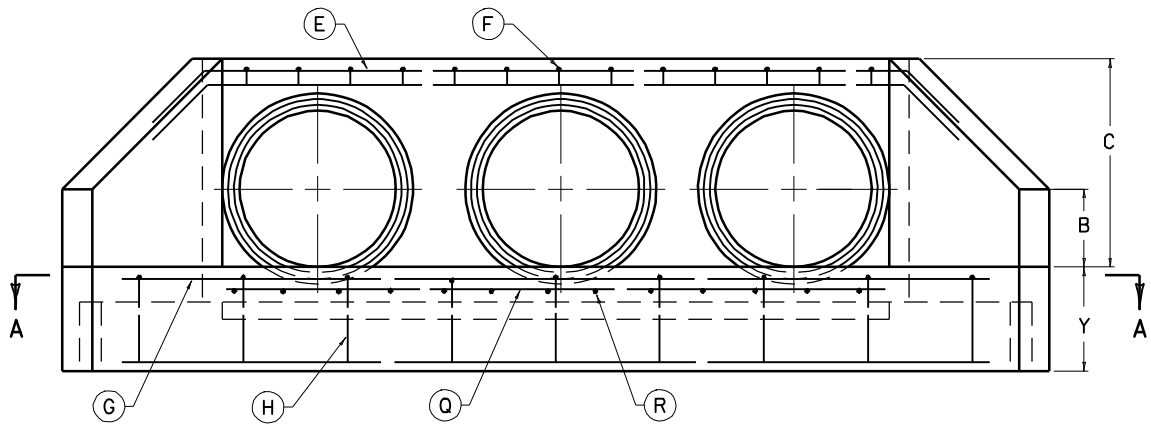
STANDARD DRAWING NO. RDH-510-04

SUBMITTED: *John B. Sisk* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

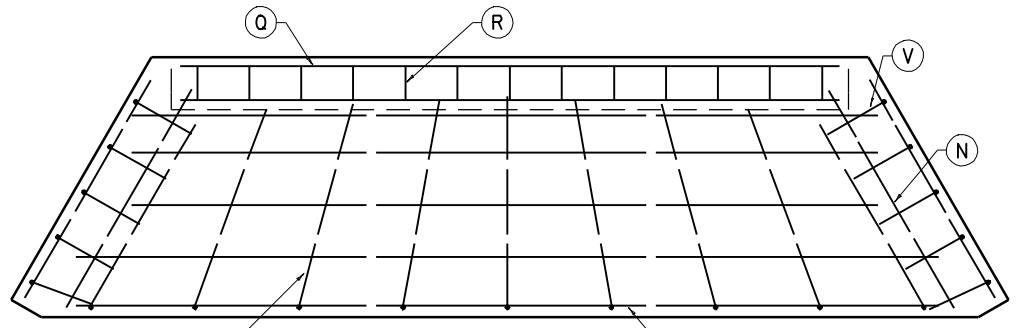
APPROVED: *John B. Sisk* 12-1-99  
STATE HIGHWAY ENGINEER DATE



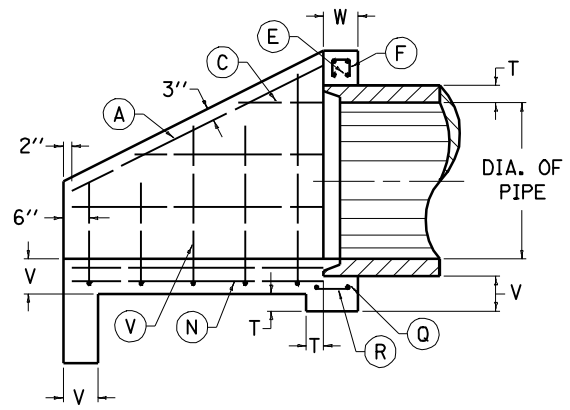
PLAN VIEW



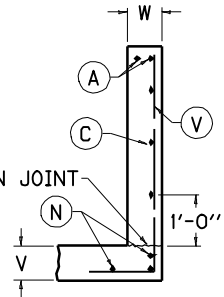
FRONT ELEVATION



SECTION A-A



SECTION B-B



WING SECTION

~ NOTES ~

1. SEE CURRENT STANDARD DRAWING RDH-522 AND 524 FOR DIMENSIONS, QUANTITIES AND BILL OF REINFORCEMENT.
2. ENCIRCLED LETTERS, ( ), INDICATE STEEL BAR LOCATIONS.
3. BARS (C), (G), (V) ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
4. BARS (V) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
5. BARS (C) ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
6. HEADWALLS LOCATED AT EDGE OF SHOULDER SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
7. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.
8. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.

KENTUCKY  
DEPARTMENT OF HIGHWAYS

TRIPLE PIPE CULVERT  
HEADWALLS  
0° SKEW

STANDARD DRAWING NO. RDH-520-05

SUBMITTED: *John B. Slaughter* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *John B. Slaughter* 12-1-99  
STATE HIGHWAY ENGINEER DATE

# DIMENSIONS FOR MULTIPLE PIPE HEADWALLS - 0° SKEW

DIMENSION	DOUBLE				TRIPLE				DIMENSION
	30''	36''	42''	48''	30''	36''	42''	48''	
A	3'-9''	4'-4''	4'-11''	5'-6''	3'-9''	4'-4''	4'-11''	5'-6''	A
B	1'-3''	1'-6''	1'-9''	2'-0''	1'-3''	1'-6''	1'-9''	2'-0''	B
C	3'-6''	4'-0''	4'-7''	5'-1''	3'-6''	4'-0''	4'-7''	5'-1''	C
E	7'-2''	8'-4''	9'-6''	10'-8''	11'-3''	13'-0''	14'-9''	16'-6''	E
F	4'-4''	5'-0''	5'-8''	6'-4''	4'-4''	5'-0''	5'-8''	6'-4''	F
H	11'-6''	13'-4''	15'-2''	17'-0''	15'-6''	18'-0''	20'-6''	22'-10''	H
J	--	--	--	--	7'-9''	9'-0''	10'-3''	11'-5''	J
M	0'-5''				0'-5''				M
T	0'-3.5''	0'-4''	0'-4.5''	0'-5''	0'-3.5''	0'-4''	0'-4.5''	0'-5''	T
V	0'-8''				0'-8''				V
W	0'-8''				0'-8''				W
Y	2'-0''				2'-0''				Y
CLASS "A" CONC. CU. YDS. 2 HEADWALLS	4.91	6.22	7.75	9.38	6.49	8.20	10.19	12.30	CLASS "A" CONC. CU. YDS. 2 HEADWALLS
LBS. STEEL 2 HEADWALLS	379	480	561	660	475	594	702	797	LBS. STEEL 2 HEADWALLS

DIMENSIONS AND QUANTITIES ARE BASED ON CONCRETE PIPE AND WILL VARY SLIGHTLY FOR CORRUGATED METAL PIPE.

USE WITH CURRENT STD. DWG.  
RDH-510 OR RDH-520

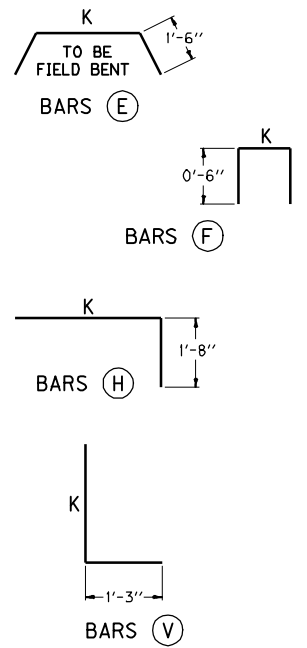
<b>KENTUCKY</b>	
<b>DEPARTMENT OF HIGHWAYS</b>	
<b>DIMENSIONS &amp; QUANTITIES</b>	
<b>30''-48'' DOUBLE &amp;</b>	
<b>TRIPLE-HEADWALLS</b>	
<b>CIRCULAR PIPE 0° SKEW</b>	
<b>STANDARD DRAWING NO. RDH-522-02</b>	
SUBMITTED: <i>John B. Suckley</i>	12-1-99
<small>DIRECTOR DIVISION OF DESIGN</small>	<small>DATE</small>
APPROVED: <i>J. M. Howell</i>	12-1-99
<small>STATE HIGHWAY ENGINEER</small>	<small>DATE</small>

MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K				
		①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN
DOUBLE 30''						42''						TRIPLE 30''						42''									
A	5	4	4	8		A	5	4	6	2		A	5	4	4	8		A	5	4	6	2					
C1	4	2	2	4		C1	4	2	2	9		C1	4	2	2	4		C1	4	2	2	9					
C2	4	2	4	2		C2	4	2	4	9		C2	4	2	4	2		C2	4	2	4	9					
E1	5	2	10	6	7	6	E1	5	2	12	10	9	10	E1	5	2	14	7	11	7	E1	5	2	18	1	15	1
E2	5	2	10	8	7	8	E2	5	2	13	0	10	0	E2	5	2	14	9	11	9	E2	5	2	18	3	15	3
F	4	8	1	3	0	4	F	4	10	1	3	0	4	F	4	12	1	3	0	4	F	4	15	1	3	0	4
G1	4	2	7	8			G1	4	3	11	5			G1	4	2	11	10			G1	4	3	16	8		
G2	4	3	10	0			G2	4	3	13	9			G2	4	3	14	1			G2	4	3	19	1		
H	4	6	5	1	3	5	H	4	7	6	3	4	7	H	4	8	5	1	3	5	H	4	10	6	3	4	7
N	4	6	4	2			N	4	6	5	6			N	4	6	4	2			N	4	6	5	6		
Q	4	2	7	1			Q	4	2	9	2			Q	4	2	11	1			Q	4	2	14	5		
R	4	8	0	8			R	4	10	0	9			R	4	12	0	8			R	4	15	0	9		
V1	5	4	3	1	1	10	V1	5	4	3	6	2	3	V1	5	4	3	1	1	10	V1	5	4	3	6	2	3
V2	5	4	4	1	2	10	V2	5	4	4	6	3	3	V2	5	4	3	1	2	10	V2	5	4	4	6	3	3
V3	5	4	4	1	2	10	V3	5	4	5	6	4	3	V3	5	4	4	1	2	10	V3	5	4	5	6	4	3
36''						48''						36''						48''									
A	5	4	5	5			A	5	4	6	11			A	5	4	5	5			A	5	4	6	11		
C1	4	2	1	7			C1	4	2	1	10			C1	4	2	1	7			C1	4	2	1	10		
C2	4	2	3	8			C2	4	2	3	10			C2	4	2	3	8			C2	4	2	3	10		
C3	4	2	4	10			C3	4	2	5	10			C3	4	2	4	10			C3	4	2	5	10		
E1	5	2	11	8	8	8	E1	5	2	6	2			E1	5	2	16	4	13	4	E1	5	2	16	4	13	4
E2	5	2	11	10	8	10	E2	5	2	14	0	11	0	E2	5	2	16	6	13	6	E2	5	2	19	10	16	10
F	4	9	1	3	0	4	F	4	11	1	3	0	4	F	4	13	1	3	0	4	F	4	17	1	3	0	4
G1	4	3	9	7			G1	4	1	11	0			G1	4	3	14	4			G1	4	1	16	9		
G2	4	3	12	0			G2	4	3	13	3			G2	4	3	16	8			G2	4	3	19	0		
H	4	7	5	8	4	0	G3	4	3	15	7			H	4	9	5	8	4	0	H	4	9	5	8	4	0
N	4	6	4	10			H	4	9	16	10	5	2	N	4	6	4	10			N	4	6	4	10		
Q	4	2	8	2			N	4	6	6	2			Q	4	2	12	8			Q	4	12	6	11	5	3
R	4	9	0	8			Q	4	2	10	4			R	4	13	0	8			R	4	6	6	2		
V1	5	4	3	4	2	1	R	4	2	10	9			V1	5	4	3	4	2	1	Q	4	6	16	2		
V2	5	4	4	4	3	1	V1	5	4	3	9	2	6	V2	5	4	4	4	3	1	R	4	17	0	9		
V3	5	2	5	4	4	1	V2	5	4	4	9	3	6	V3	5	2	5	4	4	1	V1	5	4	3	9	2	6
							V3	5	4	5	9	4	6								V2	5	4	4	9	3	6
																					V3	5	4	5	9	4	6

**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.

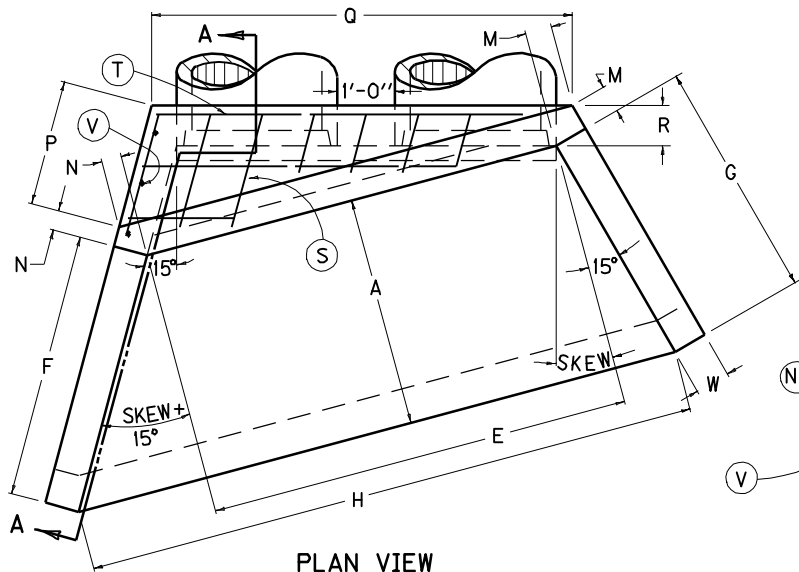
**BENT BAR SHAPES**



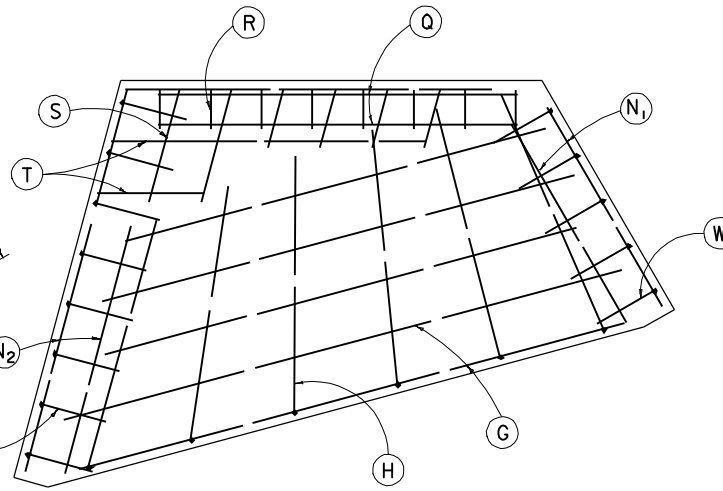
(USE WITH CURRENT STD. DWG. NO. RDH-510 OR RDH-520 )

**KENTUCKY DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**30" TO 48" DOUBLE & TRIPLE**  
**CIRCULAR PIPE HEADWALLS**  
**0° SKEW**

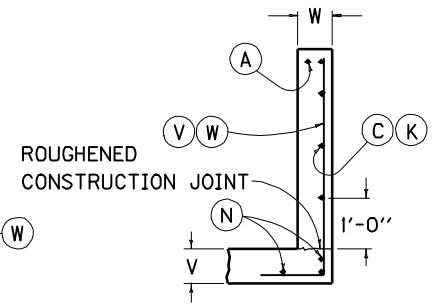
**STANDARD DRAWING NO. RDH-524-03**  
 SUBMITTED *John B. Eckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED *J. W. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



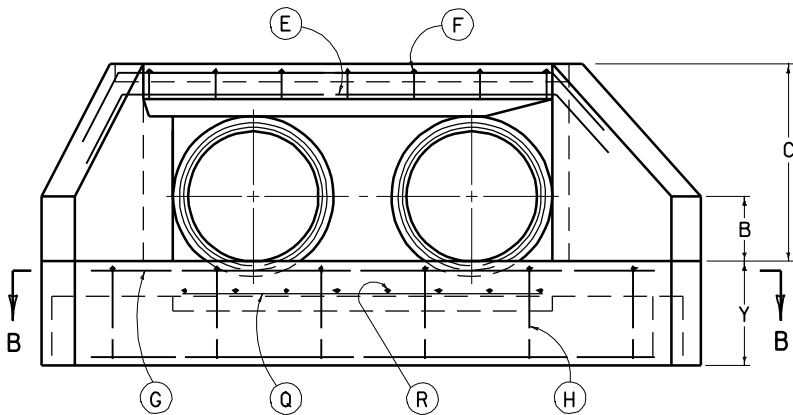
PLAN VIEW



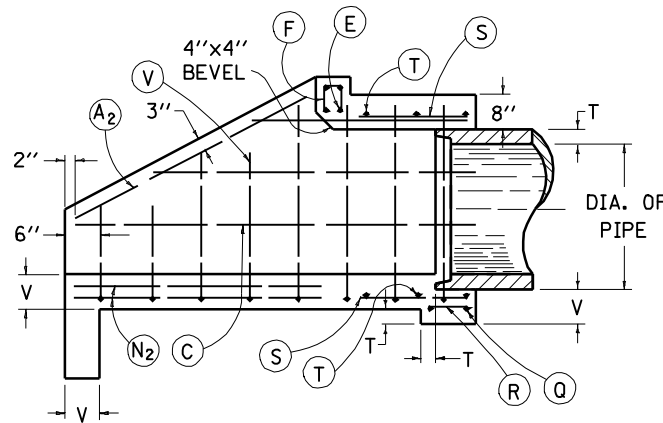
SECTION B-B



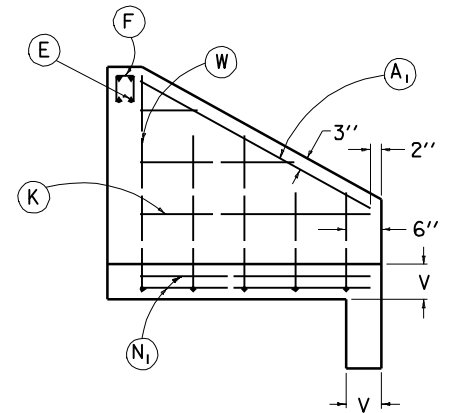
WING SECTION



FRONT ELEVATION



SECTION A-A



SHORT WING SECTION

~ NOTES ~

1. SEE CURRENT STANDARD DRAWINGS RDH-532, 534 AND 536 FOR DIMENSIONS, QUANTITIES AND BILL OF REINFORCEMENT.
2. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
3. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
4. BARS ○, ○, ○, ○ ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
5. BARS ○ AND ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
6. BARS ○ AND ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
7. HEADWALLS LOCATED AT EDGE OF SHOULDER SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
8. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

(LAYOUT AND STEEL PATTERN)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

DOUBLE PIPE  
CULVERT HEADWALLS  
15° - 30° & 45° SKEW

STANDARD DRAWING NO. RDH-530-04

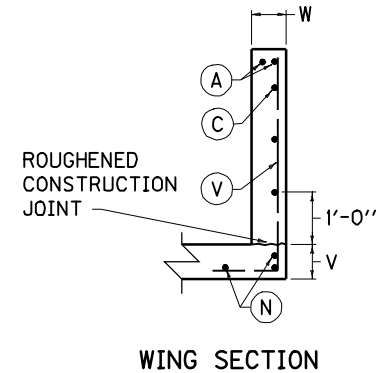
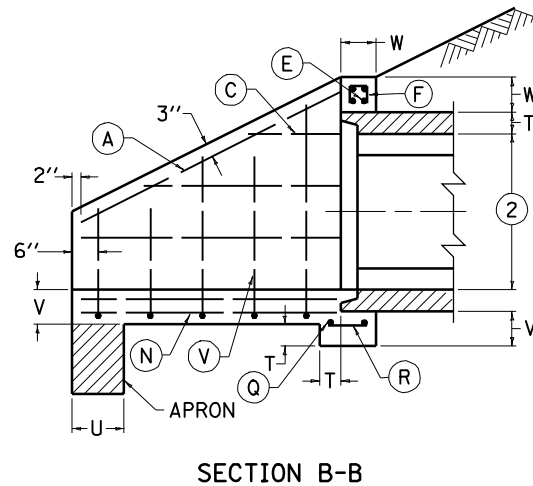
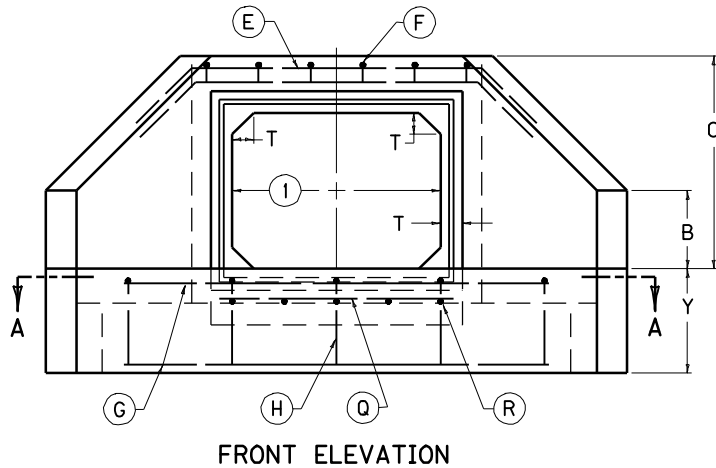
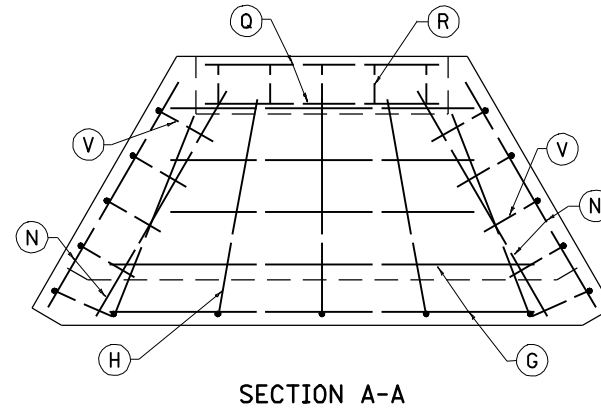
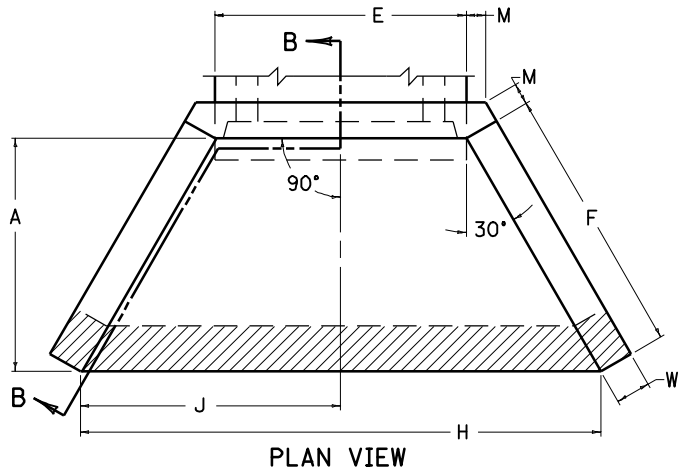
SUBMITTED: *John B. Sisk* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
APPROVED: *John M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE











NOTES

- ① SPAN OF BOX CULVERT
- ② RISE OF BOX CULVERT
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CUR. STD. DWGS. RDH-1100, RDH-1200 AND RDH-1300 SERIES.
4. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
6. BARS ○, ○, AND ○ ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
8. BARS ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
9. HEADWALLS LOCATED AT SHOULDER EDGE SHALL BE PARALLEL TO CENTERLINE OF ROAD.
10. LIMITS OF APRON.
11. PAVING SHALL BE REQUIRED AND SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF BOX. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

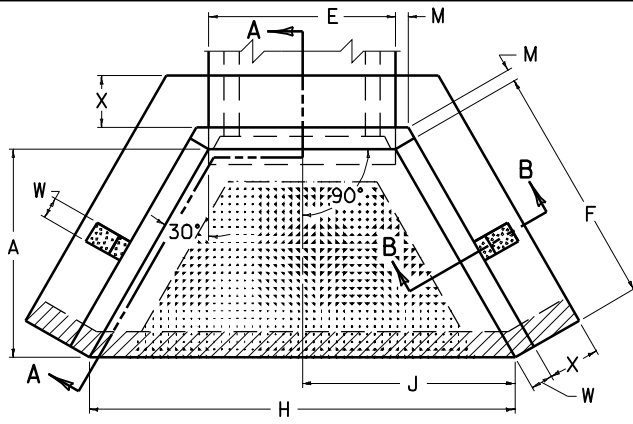
(LAYOUT AND STEEL PATTERN)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

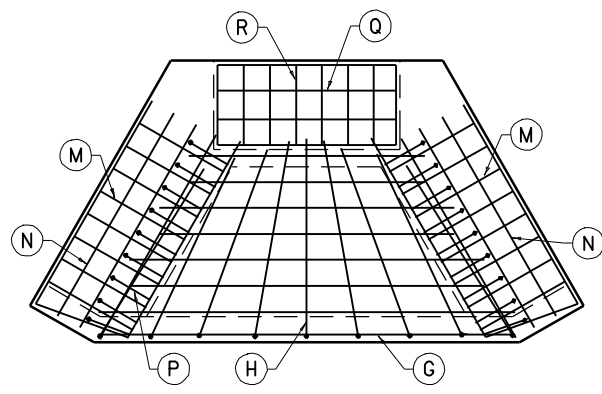
PRECAST BOX CULVERT  
HEADWALLS - 0° SKEW  
(BOX RISE LESS THAN 6'-0")

STANDARD DRAWING NO. RDH-1000-02

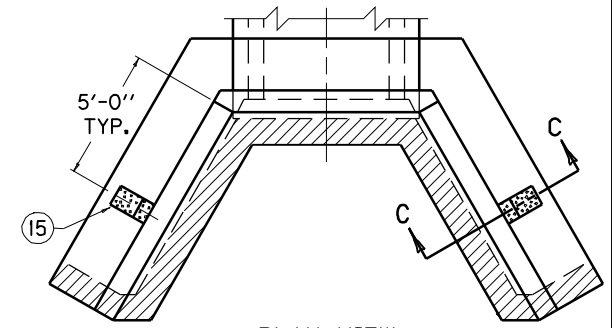
SUBMITTED BY <i>John B. Sisk</i>	12-1-99
DIRECTOR DIVISION OF DESIGN	DATE
APPROVED <i>John B. Sisk</i>	12-1-99
STATE HIGHWAY ENGINEER	DATE



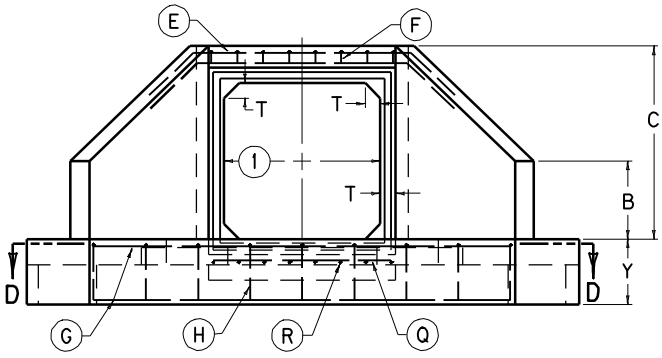
PLAN VIEW



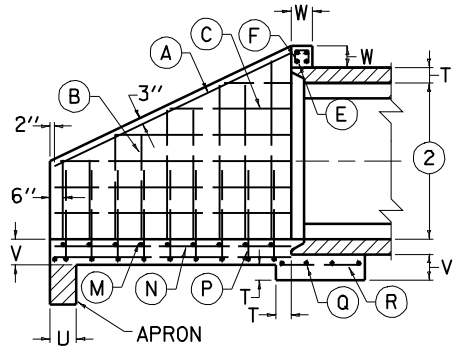
SECTION D-D



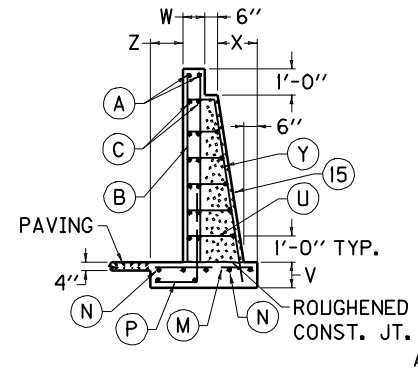
PLAN VIEW  
WITHOUT PAVING



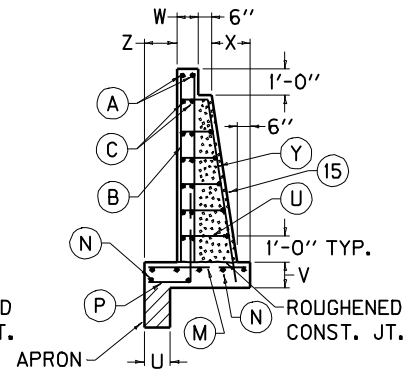
FRONT ELEVATION



SECTION A-A



SECTION B-B



SECTION C-C

NOTES

- ① SPAN OF BOX CULVERT
- ② RISE OF BOX CULVERT
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CUR. STD. DWGS. RDH-1100, RDH-1200 AND RDH-1300 SERIES.
4. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
6. BARS (B), (C), (G), (M), (P) AND (U) ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS (B), (C) AND (U) ARE PLACED IN ORDER OF INCREASING LENGTH, BEGINNING AT THE END OF WING, TOP OF WING AND TOP OF COUNTERFORT RESPECTIVELY.
8. HEADWALLS LOCATED AT SHOULDER EDGE SHALL BE PARALLEL TO CENTERLINE OF ROAD.
9. LIMITS OF APRON.
10. LIMITS OF PAVING.
11. LIMITS OF COUNTERFORTS.
12. THESE HEADWALLS ARE DESIGNED BOTH WITH AND WITHOUT PAVING BETWEEN THE WINGS. (SEE PLANS)
13. WHEN PAVING IS REQUIRED; PAVING SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF BOX. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.
14. WHEN PAVING IS NOT REQUIRED BARS (H) AND (G) SHALL BE ELIMINATED.
- ⑮ A COUNTERFORT SHALL BE REQUIRED ON A WING WALL WHEN THE BOX RISE IS 8'-0" OR GREATER AND THE WING WALL IS 15'-0" OR LONGER.

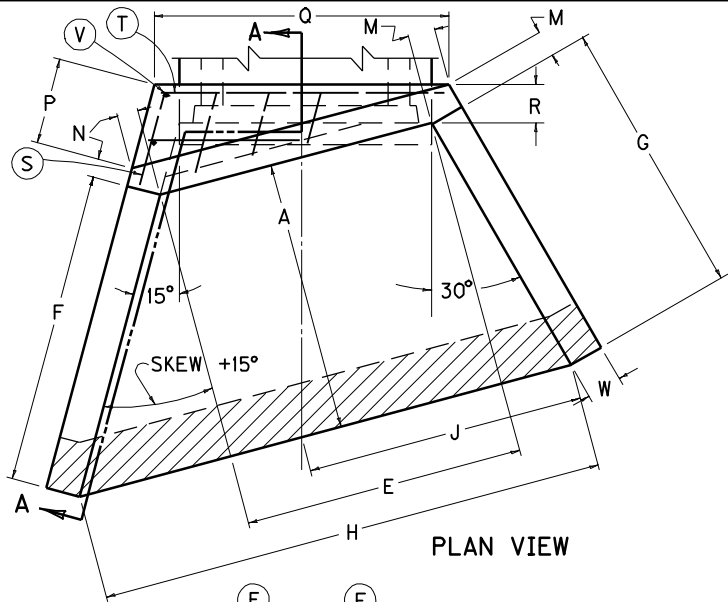
(LAYOUT AND STEEL PATTERN)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

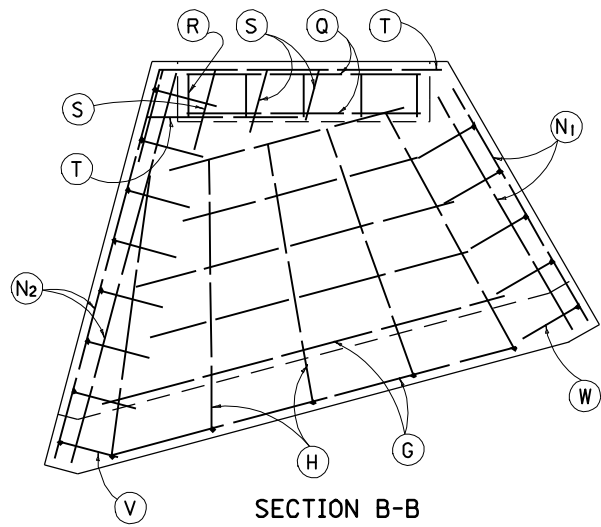
PRECAST BOX CULVERT  
HEADWALLS - 0° SKEW  
(BOX RISE 6'-0" OR GREATER)

STANDARD DRAWING NO. RDH-1005-02

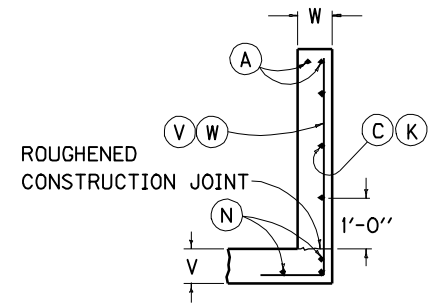
SUBMITTED: *John B. Sisk* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
APPROVED: *J. M. Howell* 12-1-99  
DATE



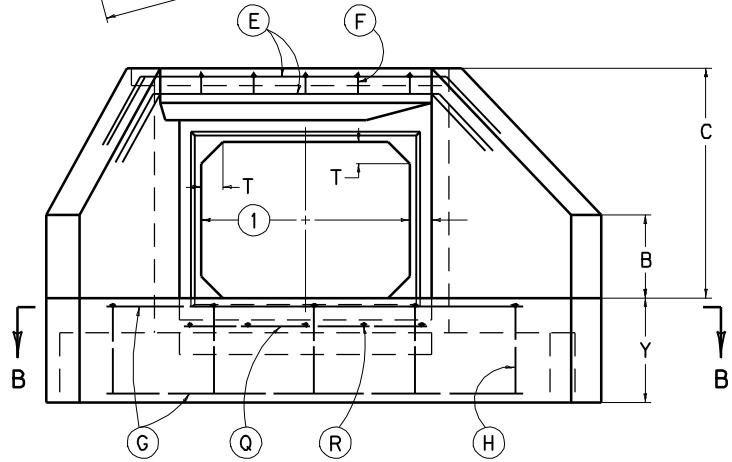
PLAN VIEW



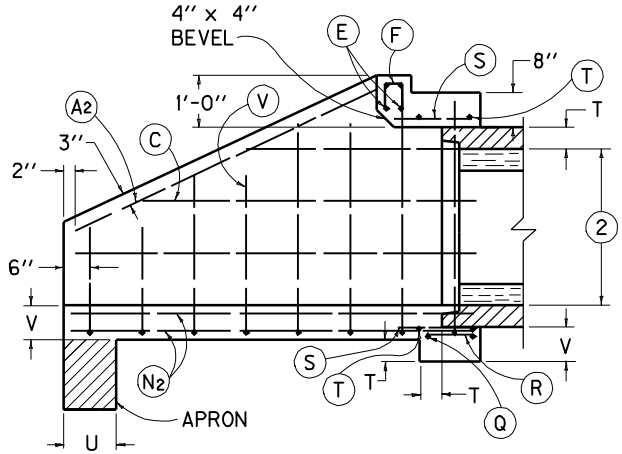
SECTION B-B



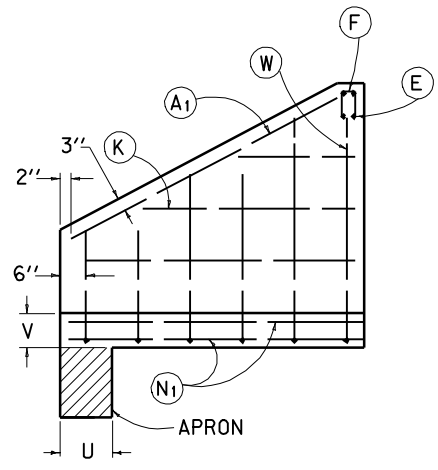
WING SECTION



FRONT ELEVATION



SECTION A-A



SHORT WING SECTION

~ NOTES ~

- ① SPAN OF BOX CULVERT.
- ② RISE OF BOX CULVERT.
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CURRENT STANDARD DRAWINGS RDH-1100, RDH-1200 AND RDH-1300 SERIES.
4. DIMENSIONS FROM CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ○, INDICATE STEEL BAR LOCATIONS.
6. BARS ○, ○, ○, ○, ○ ARE SPACED 1'-0" O.C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS ○ AND ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE END OF EACH WING.
8. BARS ○ AND ○ ARE PLACED IN ORDER OF INCREASING LENGTHS, BEGINNING AT THE TOP OF EACH WING.
9. HEADWALLS LOCATED AT EDGE OF SHOULDERS SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
10. ▨ LIMITS OF APRON.
11. PAVING SHALL BE REQUIRED AND SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF BOX. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.

(LAYOUT AND STEEL PATTERN)

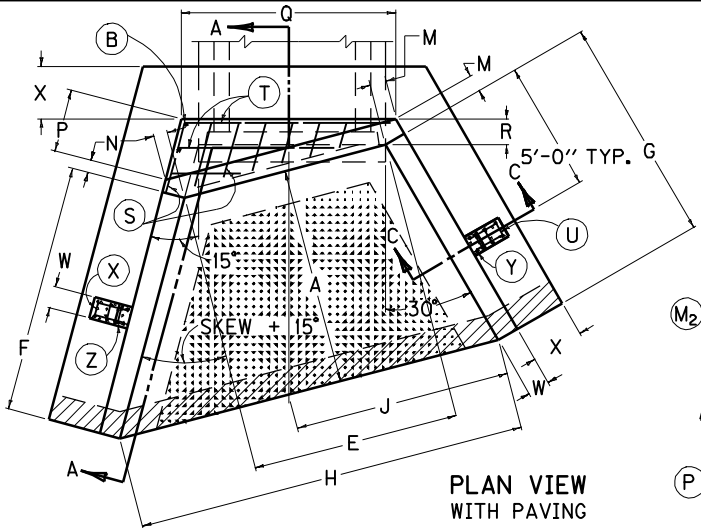
KENTUCKY  
DEPARTMENT OF HIGHWAYS

PRECAST BOX CULVERT  
H-WALLS-15°-30° & 45° SK  
(BOX RISE LESS THAN 6'-0")

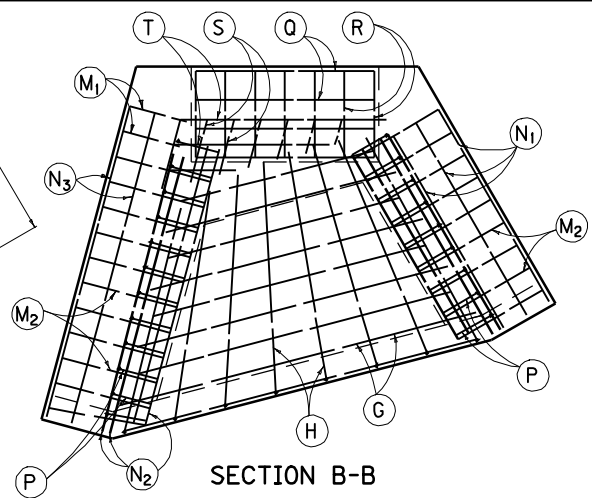
STANDARD DRAWING NO. RDH-1010-02

SUBMITTED: *John B. Suckstun* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

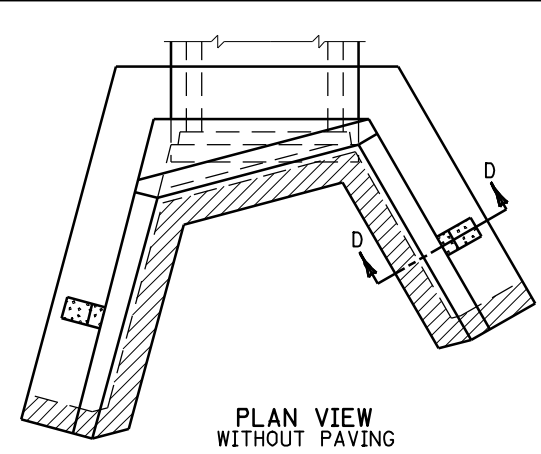
APPROVED: *John M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



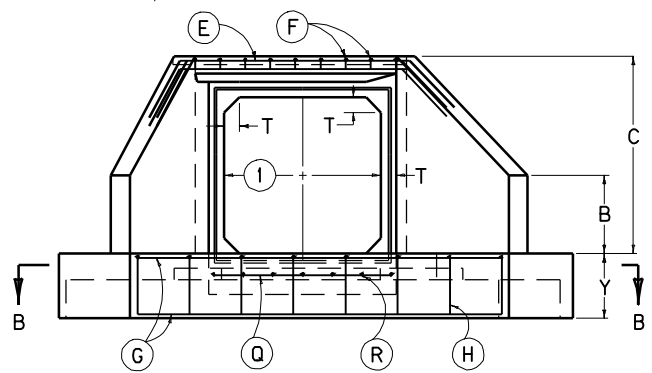
PLAN VIEW WITH PAVING



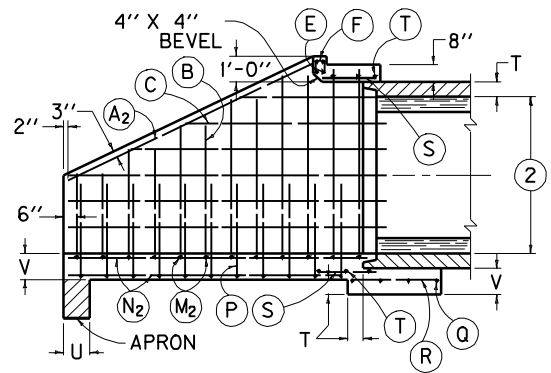
SECTION B-B



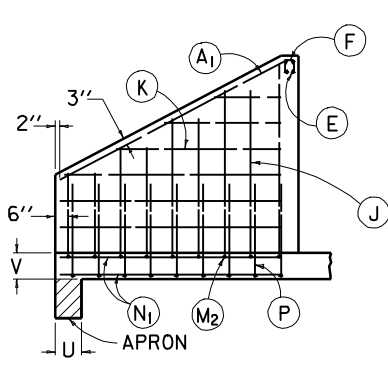
PLAN VIEW WITHOUT PAVING



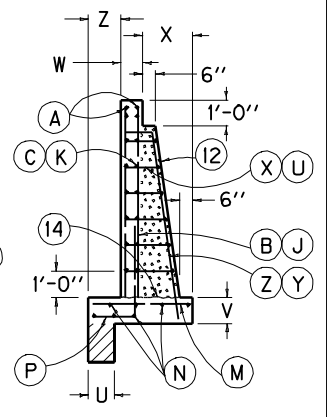
FRONT ELEVATION



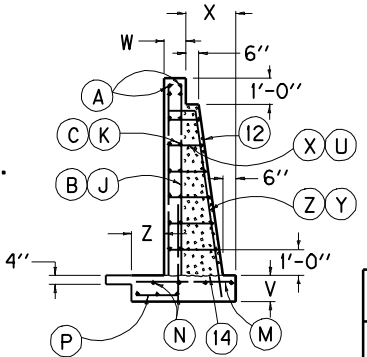
SECTION A-A



SHORT WING SECTION



SECTION D-D



SECTION C-C

- ① SPAN OF BOX CULVERT.
- ② RISE OF BOX CULVERT.
3. FOR DIMENSIONS, QUANTITIES, AND BILL OF REINFORCEMENT SEE CURRENT STANDARD DRAWINGS RDH-1100, RDH-1200 AND RDH-1300 SERIES.
4. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR DISTANCE.
5. ENCIRCLED LETTERS, ( ), INDICATE STEEL BAR LOCATIONS.
6. BARS (B), (C), (G), (J), (K), (M), (P), (X), (U) ARE SPACED 1'-0" O. C. ALL OTHER BARS SHALL BE EVENLY SPACED.
7. BARS (B) AND (J), (C) AND (K), (U) AND (X) ARE PLACED IN ORDER OF INCREASING LENGTH BEGINNING AT THE END OF WING, TOP OF WING AND TOP OF COUNTERFORT RESPECTIVELY.
8. HEADWALLS LOCATED AT EDGE OF SHOULDER SHALL BE PARALLEL TO CENTERLINE OF THE ROAD.
9. [Hatched Area] LIMITS OF APRON, [Dotted Area] LIMITS OF PAVING, [Cross-hatched Area] LIMITS OF COUNTERFORTS
10. THESE HEADWALLS ARE DESIGNED BOTH WITH AND WITHOUT PAVING BETWEEN THE WINGS. (SEE PLANS)
11. WHEN PAVING IS REQUIRED IT SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF BOX. FRONT FACE OF HEADWALL AND ENDS OF WINGS SHALL REMAIN VERTICAL.
- ⑫ A COUNTERFORT SHALL BE REQUIRED ON A WING WALL WHEN THE BOX RISE IS 8'-0" OR GREATER AND THE WING WALL IS 15'-0" OR LONGER.
13. WHEN PAVING IS NOT REQUIRED (H) AND (G) BARS SHALL BE ELIMINATED.
14. ROUGHENED CONSTRUCTION JOINT

KENTUCKY DEPARTMENT OF HIGHWAYS	
<b>PRECAST BOX CULVERT</b> H-WALLS-15°-30° & 45° SK (BOX RISE 6'-0" OR GREATER)	
STANDARD DRAWING NO. RDH-1015-02	
SUBMITTED: <i>John B. Suckman</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>John M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE

DIMENSION	PRECAST BOX CULVERT												DIMENSION
	3'x2'	3'x3'	4'x2'	4'x3'	4'x4'	5'x3'	5'x4'	5'x5'	6'x3'	6'x4'	6'x5'	6'x6'	
A	3'-4"	4'-4"	3'-6"	4'-6"	5'-6"	4'-8"	5'-8"	6'-8"	4'-10"	5'-10"	6'-10"	8'-0"	A
B	1'-0"	1'-6"	1'-0"	1'-6"	2'-0"	1'-6"	2'-0"	2'-6"	1'-6"	2'-0"	2'-6"	3'-0"	B
C	3'-0"	4'-0"	3'-1"	4'-1"	5'-1"	4'-2"	5'-2"	6'-2"	4'-3"	5'-3"	6'-3"	7'-5"	C
E	3'-8"		4'-10"			6'-0"			7'-2"				E
F	3'-10"	5'-0"	4'-0"	5'-2"	6'-4"	5'-5"	6'-7"	7'-8"	5'-7"	6'-9"	7'-11"	9'-3"	F
H	7'-6"	8'-8"	8'-10"	10'-0"	11'-2"	11'-5"	12'-7"	13'-8"	12'-9"	13'-11"	15'-1"	16'-5"	H
J	3'-9"	4'-4"	4'-5"	5'-0"	5'-7"	5'-8"	6'-3"	6'-10"	6'-4"	6'-11"	7'-6"	8'-2"	J
M	0'-5"											0'-6"	M
T	0'-4"		0'-5"			0'-6"			0'-7"				T
U	1'-0"												U
V	0'-8"											1'-0"	V
W	0'-8"											0'-10"	W
X	----											2'-0"	X
Y	2'-0"											2'-6"	Y
Z	----											1'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**3'x2' - 6'x6' HEADWALLS**  
**PRECAST BOX CULVERT**  
**0° SKEW**

STANDARD DRAWING NO. RDH-1100-02

SUBMITTED: *John B. Slaughter* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



DIMENSION	PRECAST BOX CULVERT														DIMENSION		
	7'x4'	7'x5'	7'x6'	7'x7'	8'x4'	8'x5'	8'x6'	8'x7'	8'x8'	9'x5'	9'x6'	9'x7'	9'x8'	9'x9'			
A	6'-0"	7'-0"	8'-2"	9'-2"	6'-0"	7'-0"	8'-2"	9'-2"	10'-2"	7'-2"	8'-4"	9'-4"	10'-4"	11'-4"	A		
B	2'-0"	2'-6"	3'-0"	3'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	B		
C	5'-4"	6'-4"	7'-6"	8'-6"	5'-4"	6'-4"	7'-6"	8'-6"	9'-6"	6'-5"	7'-7"	8'-7"	9'-7"	10'-7"	C		
E	8'-4"				9'-4"				10'-6"						E		
F	6'-11"	8'-1"	9'-5"	10'-7"	6'-11"	8'-1"	9'-5"	10'-7"	11'-9"	8'-3"	9'-7"	10'-9"	11'-11"	13'-1"	F		
H	15'-3"	16'-5"	17'-9"	18'-11"	16'-3"	17'-5"	18'-9"	19'-11"	21'-1"	18'-9"	20'-1"	21'-3"	22'-5"	23'-7"	H		
J	7'-8"	8'-2"	8'-11"	9'-6"	8'-2"	8'-8"	9'-5"	10'-0"	10'-6"	9'-5"	10'-1"	10'-8"	11'-3"	11'-10"	J		
M	0'-5"		0'-6"		0'-5"		0'-6"			0'-5"	0'-6"				M		
T	0'-8"								0'-9"						T		
U	1'-0"														U		
V	0'-8"		1'-0"		0'-8"			1'-0"			0'-8"	1'-0"				V	
W	0'-8"		0'-10"		0'-8"			0'-10"			0'-8"	0'-10"				W	
X	----		2'-0"		----			2'-0"		2'-6"	----	2'-0"		2'-6"		X	
Y	2'-0"		2'-6"		2'-0"			2'-6"		3'-0"	2'-0"		2'-6"		3'-0"		Y
Z	----		1'-3"		----			1'-3"		1'-9"	----	1'-3"		1'-9"		Z	

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**7'x4' - 9'x9' HEADWALLS**  
**PRECAST BOX CULVERT**  
**0° SKEW**

STANDARD DRAWING NO. RDH-1105-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE



DIMENSION	PRECAST BOX CULVERT											DIMENSION
	10'x5'	10'x6'	10'x7'	10'x8'	10'x9'	10'x10'	11'x4'	11'x6'	11'x8'	11'x10'	11'x11'	
A	7'-4"	8'-6"	9'-6"	10'-6"	11'-6"	12'-8"	6'-6"	8'-8"	10'-8"	12'-10"	13'-11"	A
B	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	2'-0"	3'-0"	4'-0"	5'-0"	5'-6"	B
C	6'-6"	7'-8"	8'-8"	9'-8"	10'-8"	11'-10"	5'-7"	7'-9"	9'-9"	11'-11"	13'-0"	C
E	11'-8"						12'-10"					E
F	8'-6"	9'-10"	11'-0"	12'-1"	13'-3"	14'-8"	7'-6"	10'-0"	12'-4"	14'-10"	16'-1"	F
H	20'-2"	21'-6"	22'-8"	23'-9"	24'-11"	26'-4"	20'-4"	22'-10"	25'-2"	27'-8"	28'-11"	H
J	10'-1"	10'-9"	11'-4"	11'-11"	12'-6"	13'-2"	10'-2"	11'-5"	12'-7"	13'-10"	14'-5"	J
M	0'-5"	0'-6"				0'-7"	0'-5"	0'-6"		0'-7"	0'-8"	M
T	0'-10"						0'-11"					T
U	1'-0"											U
V	0'-8"	1'-0"				1'-1"	0'-8"	1'-0"		1'-1"	1'-2"	V
W	0'-8"	0'-10"				1'-0"	0'-8"	0'-10"		1'-0"	1'-1"	W
X	----	2'-0"		2'-6"		3'-0"	----	2'-0"	2'-6"	3'-0"	3'-3"	X
Y	2'-0"	2'-6"		3'-0"		4'-0"	2'-0"	2'-6"	3'-0"	4'-0"		Y
Z	----	1'-3"		1'-9"		2'-0"	----	1'-3"	1'-9"	2'-0"		Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**10'x5' - 11'x11' HEADWALLS**  
**PRECAST BOX CULVERT**  
**0° SKEW**

STANDARD DRAWING NO. RDH-1110-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT					DIMENSION
	12'x4'	12'x6'	12'x8'	12'x10'	12'x12'	
A	6'-8"	8'-10"	10'-10"	13'-0"	15'-3"	A
B	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	B
C	5'-8"	7'-10"	9'-10"	12'-0"	14'-3"	C
E	14'-0"					E
F	7'-8"	10'-2"	12'-6"	15'-0"	17'-7"	F
H	21'-8"	24'-2"	26'-6"	29'-0"	31'-7"	H
J	10'-10"	12'-1"	13'-3"	14'-6"	15'-10"	J
M	0'-5"	0'-6"		0'-7"	0'-9"	M
T	1'-0"					T
U	1'-0"					U
V	0'-8"	1'-0"		1'-1"	1'-4"	V
W	0'-8"	0'-10"		1'-0"	1'-3"	W
X	----	2'-0"	2'-6"	3'-0"	3'-6"	X
Y	2'-0"	2'-6"	3'-0"	4'-0"		Y
Z	----	1'-3"	1'-9"	2'-0"	2'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**12'x4' - 12'x12' HEADWALLS**  
**PRECAST BOX CULVERT**  
**0° SKEW**

STANDARD DRAWING NO. RDH-1115-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT												DIMENSION
	3'x2'	3'x3'	4'x2'	4'x3'	4'x4'	5'x3'	5'x4'	5'x5'	6'x3'	6'x4'	6'x5'	6'x6'	
A	4'-0"	5'-0"	4'-2"	5'-2"	6'-2"	5'-4"	6'-4"	7'-4"	5'-6"	6'-6"	7'-6"	8'-4"	A
B	1'-0"	1'-6"	1'-0"	1'-6"	2'-0"	1'-6"	2'-0"	2'-6"	1'-6"	2'-0"	2'-6"	3'-0"	B
C	3'-4"	4'-4"	3'-5"	4'-5"	5'-5"	4'-6"	5'-6"	6'-6"	4'-7"	5'-7"	6'-7"	7'-7"	C
E	4'-1"		5'-5"			6'-8"			8'-0"				E
F	4'-7"	5'-9"	4'-10"	6'-0"	7'-1"	6'-2"	7'-4"	8'-6"	6'-4"	7'-6"	8'-8"	9'-7"	F
G	4'-2"	5'-2"	4'-4"	5'-4"	6'-5"	5'-6"	6'-7"	7'-7"	5'-8"	6'-9"	7'-9"	8'-8"	G
H	7'-6"	8'-4"	8'-11"	9'-9"	10'-7"	11'-2"	12'-1"	12'-11"	12'-8"	13'-6"	14'-4"	15'-0"	H
J	4'-0"	4'-7"	4'-9"	5'-3"	5'-10"	6'-0"	6'-6"	7'-0"	6'-8"	7'-2"	7'-9"	8'-2"	J
M	0'-6"											0'-8"	M
N	0'-5"											0'-6"	N
P	1'-4"		1'-8"			2'-0"			2'-5"				P
Q	4'-6"		5'-8"			6'-10"			8'-0"		8'-2"		Q
R	0'-9"											1'-0"	R
T	0'-4"		0'-5"			0'-6"			0'-7"				T
U	1'-0"												U
V	0'-8"											1'-0"	V
W	0'-8"											0'-10"	W
X	----											2'-0"	X
Y	2'-0"											2'-6"	Y
Z	----											1'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS**  
**3'x2' - 6'x6' HEADWALLS**  
**PRECAST BOX CULVERT**  
**15° SKEW**

STANDARD DRAWING NO. RDH-1120-02  
 SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT														DIMENSION	
	7'x4'	7'x5'	7'x6'	7'x7'	8'x4'	8'x5'	8'x6'	8'x7'	8'x8'	9'x5'	9'x6'	9'x7'	9'x8'	9'x9'		
A	6'-8"	7'-8"	8'-6"	9'-6"	6'-8"	7'-8"	8'-6"	9'-6"	10'-6"	7'-10"	8'-8"	9'-8"	10'-8"	11'-8"	A	
B	2'-0"	2'-6"	3'-0"	3'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	B	
C	5'-8"	6'-8"	7'-8"	8'-8"	5'-8"	6'-8"	7'-8"	8'-8"	9'-8"	6'-9"	7'-9"	8'-9"	9'-9"	10'-9"	C	
E	9'-4"				10'-5"					11'-9"					E	
F	7'-8"	8'-10"	9'-10"	11'-0"	7'-8"	8'-10"	9'-10"	11'-0"	12'-1"	9'-1"	10'-0"	11'-2"	12'-4"	13'-6"	F	
G	6'-11"	7'-11"	8'-10"	9'-10"	6'-11"	7'-11"	8'-10"	9'-10"	10'-10"	8'-1"	9'-0"	10'-0"	11'-1"	12'-1"	G	
H	14'-11"	15'-9"	16'-6"	17'-4"	16'-1"	16'-11"	17'-7"	18'-5"	19'-3"	18'-4"	19'-0"	19'-11"	20'-9"	21'-7"	H	
J	7'-11"	8'-5"	8'-10"	9'-5"	8'-5"	8'-11"	9'-5"	9'-11"	10'-5"	9'-8"	10'-1"	10'-7"	11'-2"	11'-8"	J	
M	0'-6"		0'-8"		0'-6"		0'-8"			0'-6"	0'-8"				M	
N	0'-5"		0'-6"		0'-5"		0'-6"			0'-5"	0'-6"				N	
P	2'-9"				3'-0"			3'-1"			3'-5"					P
Q	9'-2"		9'-4"		10'-2"			10'-4"			11'-4"	11'-6"				Q
R	0'-9"		1'-0"		0'-9"			1'-0"			0'-9"	1'-0"				R
T	0'-8"								0'-9"							T
U	1'-0"														U	
V	0'-8"		1'-0"		0'-8"			1'-0"			0'-8"	1'-0"				V
W	0'-8"		0'-10"		0'-8"			0'-10"			0'-8"	0'-10"				W
X	----		2'-0"		----			2'-0"		2'-6"	----		2'-0"		2'-6"	X
Y	2'-0"		2'-6"		2'-0"			2'-6"		3'-0"	2'-0"	2'-6"		3'-0"		Y
Z	----		1'-3"		----			1'-3"		1'-9"	----		1'-3"		1'-9"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**7'x4' - 9'x9' HEADWALLS**  
**PRECAST BOX CULVERT**  
**15° SKEW**

STANDARD DRAWING NO. RDH-1125-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT											DIMENSION
	10'x5'	10'x6'	10'x7'	10'x8'	10'x9'	10'x10'	11'x4'	11'x6'	11'x8'	11'x10'	11'x11'	
A	8'-0"	8'-10"	9'-10"	10'-10"	11'-10"	12'-8"	7'-2"	9'-0"	11'-0"	12'-10"	13'-9"	A
B	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	2'-0"	3'-0"	4'-0"	5'-0"	5'-6"	B
C	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	5'-11"	7'-11"	9'-11"	11'-11"	12'-11"	C
E	13'-0"						14'-4"					E
F	9'-3"	10'-2"	11'-4"	12'-6"	13'-8"	14'-8"	8'-3"	10'-5"	12'-8"	14'-10"	15'-11"	F
G	8'-3"	9'-2"	10'-2"	11'-3"	12'-3"	13'-1"	7'-5"	9'-4"	11'-5"	13'-3"	14'-3"	G
H	19'-9"	20'-6"	21'-4"	22'-2"	23'-0"	23'-9"	20'-4"	21'-11"	23'-7"	25'-2"	25'-11"	H
J	10'-4"	10'-9"	11'-4"	11'-10"	12'-5"	12'-10"	10'-6"	11'-6"	12'-6"	13'-6"	14'-0"	J
M	0'-6"	0'-8"				0'-9"	0'-6"	0'-8"		0'-9"	0'-10"	M
N	0'-5"	0'-6"				0'-7"	0'-5"	0'-6"		0'-7"	0'-8"	N
P	3'-9"					3'-10"	4'-1"	4'-2"			4'-3"	P
Q	12'-6"	12'-8"				12'-10"	13'-8"	13'-10"		14'-0"	14'-2"	Q
R	0'-9"	1'-0"				1'-2"	0'-9"	1'-0"		1'-2"	1'-3"	R
T	0'-10"						0'-11"					T
U	1'-0"											U
V	0'-8"	1'-0"				1'-1"	0'-8"	1'-0"		1'-1"	1'-2"	V
W	0'-8"	0'-10"				1'-0"	0'-8"	0'-10"		1'-0"	1'-1"	W
X	----	2'-0"	2'-6"		3'-0"	----	2'-0"	2'-6"	3'-0"	3'-3"	X	
Y	2'-0"	2'-6"	3'-0"		4'-0"	2'-0"	2'-6"	3'-0"	4'-0"			Y
Z	----	1'-3"	1'-9"		2'-0"	----	1'-3"	1'-9"	2'-0"			Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS**  
**10'x5' - 11'x11' HEADWALLS**  
**PRECAST BOX CULVERT**  
**15° SKEW**

STANDARD DRAWING NO. RDH-1130-02  
 SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT					DIMENSION
	12'x4'	12'x6'	12'x8'	12'x10'	12'x12'	
A	7'-4"	9'-2"	11'-2"	13'-0"	14'-9"	A
B	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	B
C	6'-0"	8'-0"	10'-0"	12'-0"	14'-0"	C
E	15'-7"					E
F	8'-6"	10'-7"	12'-11"	15'-0"	17'-0"	F
G	7'-7"	9'-6"	11'-7"	13'-6"	15'-3"	G
H	21'-10"	23'-4"	25'-1"	26'-7"	28'-1"	H
J	11'-2"	12'-2"	13'-3"	14'-3"	15'-2"	J
M	0'-6"	0'-8"		0'-9"	1'-0"	M
N	0'-5"	0'-6"		0'-7"	0'-9"	N
P	4'-5"	4'-6"		4'-7"	4'-8"	P
Q	14'-10"	15'-0"		15'-2"	15'-6"	Q
R	0'-9"	1'-0"		1'-2"	1'-5"	R
T	1'-0"					T
U	1'-0"					U
V	0'-8"	1'-0"		1'-1"	1'-4"	V
W	0'-8"	0'-10"		1'-0"	1'-3"	W
X	----	2'-0"	2'-6"	3'-0"	3'-6"	X
Y	2'-0"	2'-6"	3'-0"	4'-0"		Y
Z	----	1'-3"	1'-9"	2'-0"	2'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**12'x4' - 12'x12' HEADWALLS**  
**PRECAST BOX CULVERT**  
**15° SKEW**

STANDARD DRAWING NO. RDH-1135-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT												DIMENSION
	3'x2'	3'x3'	4'x2'	4'x3'	4'x4'	5'x3'	5'x4'	5'x5'	6'x3'	6'x4'	6'x5'	6'x6'	
A	4'-0"	5'-0"	4'-2"	5'-2"	6'-2"	5'-4"	6'-4"	7'-4"	5'-6"	6'-6"	7'-6"	8'-4"	A
B	1'-0"	1'-6"	1'-0"	1'-6"	2'-0"	1'-6"	2'-0"	2'-6"	1'-6"	2'-0"	2'-6"	3'-0"	B
C	3'-4"	4'-4"	3'-5"	4'-5"	5'-5"	4'-6"	5'-6"	6'-6"	4'-7"	5'-7"	6'-7"	7'-7"	C
E	5'-0"		6'-7"			8'-2"			9'-9"				E
F	5'-8"	7'-1"	5'-11"	7'-4"	8'-9"	7'-7"	8'-11"	10'-4"	7'-9"	9'-2"	10'-7"	11'-9"	F
G	4'-0"	5'-0"	4'-2"	5'-2"	6'-2"	5'-4"	6'-4"	7'-4"	5'-6"	6'-6"	7'-6"	8'-4"	G
H	9'-0"	10'-0"	10'-9"	11'-9"	12'-9"	13'-6"	14'-6"	15'-6"	15'-3"	16'-3"	17'-3"	18'-1"	H
J	4'-5"	5'-0"	5'-2"	5'-9"	6'-4"	6'-7"	7'-1"	7'-8"	7'-4"	7'-11"	8'-6"	8'-11"	J
M	0'-8"											0'-10"	M
N	0'-3"											0'-4"	N
P	3'-1"		3'-11"			4'-9"			5'-7"		5'-8"		P
Q	4'-4"		5'-6"			6'-8"			7'-10"		8'-0"		Q
R	0'-11"											1'-2"	R
T	0'-4"		0'-5"			0'-6"			0'-7"				T
U	1'-0"												U
V	0'-8"											1'-0"	V
W	0'-8"											0'-10"	W
X	----											2'-0"	X
Y	2'-0"											2'-6"	Y
Z	----											1'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**3'x2' - 6'x6' HEADWALLS**  
**PRECAST BOX CULVERT**  
**30° SKEW**

STANDARD DRAWING NO. RDH-1140-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT														DIMENSION
	7'x4'	7'x5'	7'x6'	7'x7'	8'x4'	8'x5'	8'x6'	8'x7'	8'x8'	9'x5'	9'x6'	9'x7'	9'x8'	9'x9'	
A	6'-8"	7'-8"	8'-6"	9'-6"	6'-8"	7'-8"	8'-6"	9'-6"	10'-6"	7'-10"	8'-8"	9'-8"	10'-8"	11'-8"	A
B	2'-0"	2'-6"	3'-0"	3'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	B
C	5'-8"	6'-8"	7'-8"	8'-8"	5'-8"	6'-8"	7'-8"	8'-8"	9'-8"	6'-9"	7'-9"	8'-9"	9'-9"	10'-9"	C
E	11'-5"				12'-9"				14'-4"						E
F	9'-5"	10'-10"	12'-0"	13'-5"	9'-5"	10'-10"	12'-0"	13'-5"	14'-10"	11'-1"	12'-3"	13'-8"	15'-1"	16'-6"	F
G	6'-8"	7'-8"	8'-6"	9'-6"	6'-8"	7'-8"	8'-6"	9'-6"	10'-6"	7'-10"	8'-8"	9'-8"	10'-8"	11'-8"	G
H	18'-1"	19'-1"	19'-11"	20'-11"	19'-5"	20'-5"	21'-3"	22'-3"	23'-3"	22'-2"	23'-0"	24'-0"	25'-0"	26'-0"	H
J	8'-8"	9'-3"	9'-9"	10'-4"	9'-3"	9'-10"	10'-4"	10'-10"	11'-5"	10'-7"	11'-1"	11'-8"	12'-3"	12'-10"	J
M	0'-8"		0'-10"		0'-8"		0'-10"			0'-8"	0'-10"				M
N	0'-3"		0'-4"		0'-3"		0'-4"			0'-3"	0'-4"				N
P	6'-5"		6'-6"		7'-1"		7'-3"			7'-11"	8'-0"				P
Q	9'-0"		9'-2"		10'-0"		10'-2"			11'-2"	11'-4"				Q
R	0'-11"		1'-2"		0'-11"		1'-2"			0'-11"	1'-2"				R
T	0'-8"								0'-9"						T
U	1'-0"														U
V	0'-8"		1'-0"		0'-8"		1'-0"			0'-8"	1'-0"				V
W	0'-8"		0'-10"		0'-8"		0'-10"			0'-8"	0'-10"				W
X	----		2'-0"		----		2'-0"		2'-6"	----	2'-0"		2'-6"		X
Y	2'-0"		2'-6"		2'-0"		2'-6"		3'-0"	2'-0"	2'-6"		3'-0"		Y
Z	----		1'-3"		----		1'-3"		1'-9"	----	1'-3"		1'-9"		Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**7'x4' - 9'x9' HEADWALLS**  
**PRECAST BOX CULVERT**  
**30° SKEW**

STANDARD DRAWING NO. RDH-1145-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



DIMENSION	PRECAST BOX CULVERT											DIMENSION
	10'x5'	10'x6'	10'x7'	10'x8'	10'x9'	10'x10'	11'x4'	11'x6'	11'x8'	11'x10'	11'x11'	
A	8'-0"	8'-10"	9'-10"	10'-10"	11'-10"	12'-8"	7'-2"	9'-0"	11'-0"	12'-10"	13'-9"	A
B	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	2'-0"	3'-0"	4'-0"	5'-0"	5'-6"	B
C	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	5'-11"	7'-11"	9'-11"	11'-11"	12'-11"	C
E	15'-11"						17'-6"					E
F	11'-4"	12'-6"	13'-11"	15'-4"	16'-9"	17'-11"	10'-2"	12'-9"	15'-7"	18'-2"	19'-5"	F
G	8'-0"	8'-10"	9'-10"	10'-10"	11'-10"	12'-8"	7'-2"	9'-0"	11'-0"	12'-10"	13'-9"	G
H	23'-11"	24'-9"	25'-9"	26'-9"	27'-9"	28'-7"	24'-8"	26'-6"	28'-6"	30'-4"	31'-3"	H
J	11'-4"	11'-10"	12'-5"	13'-0"	13'-7"	14'-1"	11'-7"	12'-7"	13'-9"	14'-10"	15'-4"	J
M	0'-8"	0'-10"				1'-0"	0'-8"	0'-10"		1'-0"	1'-1"	M
N	0'-3"	0'-4"				0'-5"	0'-3"	0'-4"		0'-5"		N
P	8'-9"	8'-10"				9'-0"	9'-7"	9'-8"		9'-10"		P
Q	12'-4"	12'-6"				12'-8"	13'-6"	13'-8"		13'-10"	13'-11"	Q
R	0'-11"	1'-2"				1'-4"	0'-11"	1'-2"		1'-4"	1'-6"	R
T	0'-10"						0'-11"					T
U	1'-0"											U
V	0'-8"	1'-0"				1'-1"	0'-8"	1'-0"		1'-1"	1'-2"	V
W	0'-8"	0'-10"				1'-0"	0'-8"	0'-10"		1'-0"	1'-1"	W
X	----	2'-0"	2'-6"			3'-0"	----	2'-0"	2'-6"	3'-0"	3'-3"	X
Y	2'-0"	2'-6"	3'-0"			4'-0"	2'-0"	2'-6"	3'-0"	4'-0"		Y
Z	----	1'-3"	1'-9"			2'-0"	----	1'-3"	1'-9"	2'-0"		Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**DIMENSIONS**  
**10'x5' - 11'x11' HEADWALLS**  
**PRECAST BOX CULVERT**  
**30° SKEW**

STANDARD DRAWING NO. RDH-1150-02  
 SUBMITTED: *John B. Sisk* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE  
 APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT					DIMENSION
	12'x4'	12'x6'	12'x8'	12'x10'	12'x12'	
A	7'-4"	9'-2"	11'-2"	13'-0"	14'-9"	A
B	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	B
C	6'-0"	8'-0"	10'-0"	12'-0"	14'-0"	C
E	19'-1"					E
F	10'-4"	13'-0"	15'-10"	18'-5"	20'-10"	F
G	7'-4"	9'-2"	11'-2"	13'-0"	14'-9"	G
H	26'-5"	28'-3"	30'-3"	32'-1"	33'-10"	H
J	12'-4"	13'-5"	14'-6"	15'-7"	16'-7"	J
M	0'-8"	0'-10"		1'-0"	1'-3"	M
N	0'-3"	0'-4"		0'-5"	0'-6"	N
P	10'-5"	10'-6"		10'-8"	10'-10"	P
Q	14'-8"	14'-10"		15'-0"	15'-4"	Q
R	0'-11"	1'-2"		1'-4"	1'-8"	R
T	1'-0"					T
U	1'-0"					U
V	0'-8"	1'-0"		1'-1"	1'-4"	V
W	0'-8"	0'-10"		1'-0"	1'-3"	W
X	----	2'-0"	2'-6"	3'-0"	3'-6"	X
Y	2'-0"	2'-6"	3'-0"	4'-0"		Y
Z	----	1'-3"	1'-9"	2'-0"	2'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**12'x4' - 12'x12' HEADWALLS**  
**PRECAST BOX CULVERT**  
**30° SKEW**

STANDARD DRAWING NO. RDH-1155-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT												DIMENSION
	3'x2'	3'x3'	4'x2'	4'x3'	4'x4'	5'x3'	5'x4'	5'x5'	6'x3'	6'x4'	6'x5'	6'x6'	
A	4'-0"	5'-0"	4'-2"	5'-2"	6'-2"	5'-4"	6'-4"	7'-4"	5'-6"	6'-6"	7'-6"	8'-4"	A
B	1'-0"	1'-6"	1'-0"	1'-6"	2'-0"	1'-6"	2'-0"	2'-6"	1'-6"	2'-0"	2'-6"	3'-0"	B
C	3'-4"	4'-4"	3'-5"	4'-5"	5'-5"	4'-6"	5'-6"	6'-6"	4'-7"	5'-7"	6'-7"	7'-7"	C
E	7'-1"		9'-4"			11'-7"			13'-10"				E
F	8'-0"	10'-0"	8'-4"	10'-4"	12'-4"	10'-8"	12'-8"	14'-8"	11'-0"	13'-0"	15'-0"	16'-8"	F
G	4'-2"	5'-2"	4'-4"	5'-4"	6'-5"	5'-6"	6'-7"	7'-7"	5'-8"	6'-9"	7'-9"	8'-8"	G
H	12'-11"	14'-5"	15'-5"	16'-11"	18'-4"	19'-5"	20'-10"	22'-4"	21'-11"	23'-4"	24'-10"	26'-1"	H
J	5'-6"	6'-3"	6'-6"	7'-2"	7'-11"	8'-2"	8'-11"	9'-7"	9'-1"	9'-10"	10'-7"	11'-2"	J
M	0'-10"											1'-1"	M
N	0'-2"											0'-3"	N
P	5'-11"		7'-7"			9'-3"			10'-11"		11'-1"		P
Q	4'-3"		5'-5"			6'-7"			7'-9"		7'-10"		Q
R	1'-1"											1'-4"	R
T	0'-4"		0'-5"			0'-6"			0'-7"				T
U	1'-0"												U
V	0'-8"											1'-0"	V
W	0'-8"											0'-10"	W
X	----											2'-0"	X
Y	2'-0"											2'-6"	Y
Z	----											1'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**3'x2' - 6'x6' HEADWALLS**  
**PRECAST BOX CULVERT**  
**45° SKEW**

STANDARD DRAWING NO. RDH-1160-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT														DIMENSION
	7'x4'	7'x5'	7'x6'	7'x7'	8'x4'	8'x5'	8'x6'	8'x7'	8'x8'	9'x5'	9'x6'	9'x7'	9'x8'	9'x9'	
A	6'-8"	7'-8"	8'-6"	9'-6"	6'-8"	7'-8"	8'-6"	9'-6"	10'-6"	7'-10"	8'-8"	9'-8"	10'-8"	11'-8"	A
B	2'-0"	2'-6"	3'-0"	3'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	B
C	5'-8"	6'-8"	7'-8"	8'-8"	5'-8"	6'-8"	7'-8"	8'-8"	9'-8"	6'-9"	7'-9"	8'-9"	9'-9"	10'-9"	C
E	16'-1"				18'-0"				20'-3"						E
F	13'-4"	15'-4"	17'-0"	19'-0"	13'-4"	15'-4"	17'-0"	19'-0"	21'-0"	15'-8"	17'-4"	19'-4"	21'-4"	23'-4"	F
G	6'-11"	7'-11"	8'-10"	9'-10"	6'-11"	7'-11"	8'-10"	9'-10"	10'-10"	8'-1"	9'-0"	10'-0"	11'-1"	12'-1"	G
H	25'-10"	27'-4"	28'-7"	30'-0"	27'-9"	29'-3"	30'-6"	31'-11"	33'-5"	31'-9"	33'-0"	34'-5"	35'-11"	37'-4"	H
J	10'-9"	11'-6"	12'-1"	12'-10"	11'-6"	12'-3"	12'-10"	13'-7"	14'-3"	13'-2"	13'-9"	14'-6"	15'-3"	16'-0"	J
M	0'-10"		1'-1"		0'-10"		1'-1"		0'-10"	1'-1"				M	
N	0'-2"		0'-3"		0'-2"		0'-3"		0'-2"	0'-3"				N	
P	12'-7"		12'-9"		14'-0"		14'-2"		15'-7"	15'-10"				P	
Q	8'-11"		9'-0"		9'-11"		10'-0"		11'-1"	11'-2"				Q	
R	1'-1"		1'-4"		1'-1"		1'-4"		1'-1"	1'-4"				R	
T	0'-8"								0'-9"						T
U	1'-0"														U
V	0'-8"		1'-0"		0'-8"		1'-0"		0'-8"	1'-0"				V	
W	0'-8"		0'-10"		0'-8"		0'-10"		0'-8"	0'-10"				W	
X	----		2'-0"		----		2'-0"		2'-6"	----		2'-0"		2'-6"	X
Y	2'-0"		2'-6"		2'-0"		2'-6"		3'-0"	2'-0"		2'-6"		3'-0"	Y
Z	----		1'-3"		----		1'-3"		1'-9"	----		1'-3"		1'-9"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**7'x4' - 9'x9' HEADWALLS**  
**PRECAST BOX CULVERT**  
**45° SKEW**

STANDARD DRAWING NO. RDH-1165-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *[Signature]* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT											DIMENSION	
	10'x5'	10'x6'	10'x7'	10'x8'	10'x9'	10'x10'	11'x4'	11'x6'	11'x8'	11'x10'	11'x11'		
A	8'-0"	8'-10"	9'-10"	10'-10"	11'-10"	12'-8"	7'-2"	9'-0"	11'-0"	12'-10"	13'-9"	A	
B	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	2'-0"	3'-0"	4'-0"	5'-0"	5'-6"	B	
C	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	5'-11"	7'-11"	9'-11"	11'-11"	12'-11"	C	
E	22'-6"						24'-10"					E	
F	16'-0"	17'-8"	19'-8"	21'-8"	23'-8"	25'-4"	14'-4"	18'-0"	22'-0"	25'-8"	27'-6"	F	
G	8'-3"	9'-2"	10'-2"	11'-3"	12'-3"	13'-1"	7'-5"	9'-4"	11'-5"	13'-3"	14'-3"	G	
H	34'-3"	35'-6"	36'-11"	38'-5"	39'-10"	41'-1"	35'-3"	38'-0"	40'-11"	43'-7"	44'-11"	H	
J	14'-1"	14'-9"	15'-5"	16'-2"	16'-11"	17'-6"	14'-4"	15'-8"	17'-2"	18'-6"	19'-2"	J	
M	0'-10"	1'-1"				1'-4"	0'-10"	1'-1"		1'-4"	1'-5"	M	
N	0'-2"	0'-3"					0'-2"	0'-3"				N	
P	17'-3"	17'-5"				17'-8"	18'-11"	19'-1"		19'-4"	19'-5"	P	
Q	12'-3"	12'-4"				12'-6"	13'-5"	13'-6"		13'-8"	13'-9"	Q	
R	1'-1"	1'-4"				1'-8"	1'-1"	1'-4"		1'-8"	1'-9"	R	
T	0'-10"						0'-11"					T	
U	1'-0"											U	
V	0'-8"	1'-0"				1'-1"	0'-8"	1'-0"		1'-1"	1'-2"	V	
W	0'-8"	0'-10"					1'-0"	0'-8"	0'-10"		1'-0"	1'-1"	W
X	----	2'-0"	2'-6"			3'-0"	----	2'-0"	2'-6"	3'-0"	3'-3"	X	
Y	2'-0"	2'-6"	3'-0"			4'-0"	2'-0"	2'-6"	3'-0"	4'-0"		Y	
Z	----	1'-3"	1'-9"			2'-0"	----	1'-3"	1'-9"	2'-0"		Z	

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**10'x5' - 11'x11' HEADWALLS**  
**PRECAST BOX CULVERT**  
**45° SKEW**

STANDARD DRAWING NO. RDH-1170-02

SUBMITTED: *John B. Suckley* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

DIMENSION	PRECAST BOX CULVERT					DIMENSION
	12'x4'	12'x6'	12'x8'	12'x10'	12'x12'	
A	7'-4"	9'-2"	11'-2"	13'-0"	14'-9"	A
B	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	B
C	6'-0"	8'-0"	10'-0"	12'-0"	14'-0"	C
E	27'-1"					E
F	14'-8"	18'-4"	22'-4"	26'-0"	29'-6"	F
G	7'-7"	9'-6"	11'-7"	13'-6"	15'-3"	G
H	37'-9"	40'-6"	43'-5"	46'-1"	48'-8"	H
J	15'-3"	16'-7"	18'-1"	19'-5"	20'-8"	J
M	0'-10"	1'-1"		1'-4"	1'-8"	M
N	0'-2"	0'-3"			0'-4"	N
P	20'-7"	20'-9"		20'-11"	21'-3"	P
Q	14'-7"	14'-8"		14'-10"	15'-0"	Q
R	1'-1"	1'-4"		1'-8"	2'-0"	R
T	1'-0"					T
U	1'-0"					U
V	0'-8"	1'-0"		1'-1"	1'-4"	V
W	0'-8"	0'-10"		1'-0"	1'-3"	W
X	----	2'-0"	2'-6"	3'-0"	3'-6"	X
Y	2'-0"	2'-6"	3'-0"	4'-0"		Y
Z	----	1'-3"	1'-9"	2'-0"	2'-3"	Z

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**DIMENSIONS**  
**12'x4' - 12'x12' HEADWALLS**  
**PRECAST BOX CULVERT**  
**45° SKEW**

STANDARD DRAWING NO. RDH-1175-02

SUBMITTED: *John B. Suckett* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
3 X 2	3.17	0.82	—	—	—	271	—
3 X 3	4.39	0.94	—	—	—	365	—
4 X 2	3.74	0.96	—	—	—	311	—
4 X 3	5.06	1.07	—	—	—	389	—
4 X 4	6.60	1.18	—	—	—	497	—
5 X 3	5.76	1.20	—	—	—	430	—
5 X 4	7.39	1.32	—	—	—	576	—
5 X 5	9.24	1.43	—	—	—	681	—
6 X 3	6.51	1.34	—	—	—	483	—
6 X 4	8.22	1.45	—	—	—	603	—
6 X 5	10.16	1.57	—	—	—	738	—
6 X 6	19.81	2.39	2.24	3.26	18.43	1619	273
7 X 4	9.10	1.59	—	—	—	652	—
7 X 5	11.13	1.70	—	—	—	796	—
7 X 6	21.08	2.54	2.56	3.43	19.40	1678	292
7 X 7	24.13	2.67	3.00	3.69	22.15	2092	353
8 X 4	9.59	1.68	—	—	—	693	—
8 X 5	11.67	1.80	—	—	—	805	—
8 X 6	21.80	2.65	2.78	3.54	19.90	1736	325
8 X 7	24.88	2.78	3.25	3.80	22.64	2117	350
8 X 8	31.42	4.03	3.34	5.47	29.52	2749	427

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
9 X 5	12.70	1.93	—	—	—	877	—
9 X 6	23.13	2.81	3.12	3.71	20.91	1791	327
9 X 7	26.26	2.93	3.62	3.97	23.68	2204	397
9 X 8	33.01	4.23	3.73	5.70	30.75	2846	479
9 X 9	36.81	4.40	4.25	6.04	34.20	3431	509
10 X 5	13.79	2.07	—	—	—	971	—
10 X 6	24.50	2.96	3.47	3.89	21.96	1972	376
10 X 7	27.69	3.09	4.00	4.14	24.75	2419	444
10 X 8	34.64	4.43	4.12	5.93	32.01	3081	482
10 X 9	38.50	4.60	4.68	6.27	35.49	3539	565
10 X 10	53.89	7.29	5.40	9.95	51.16	4748	674
11 X 4	12.60	2.09	—	—	—	870	—
11 X 6	25.92	3.11	3.83	4.06	23.04	2049	413
11 X 8	36.32	4.63	4.53	6.16	33.32	3180	534
11 X 10	56.04	7.59	5.89	10.29	52.85	4801	677
11 X 11	69.84	7.77	6.93	10.66	65.81	5688	778
12 X 4	13.72	2.22	—	—	—	903	—
12 X 6	27.39	3.26	4.19	4.23	24.17	2134	457
12 X 8	38.05	4.84	4.94	6.39	34.66	3424	587
12 X 10	60.16	7.88	6.38	10.62	56.52	5075	740
12 X 12	92.85	8.01	8.83	10.98	86.98	6916	929

① PRECAST CONCRETE BOX CULVERT SECTIONS EQUALS THE INTERIOR SPAN (S) BY THE INTERIOR RISE (R) IN FEET.

② CU. YDS. OF CONCRETE IN TWO HEADWALLS WITH PAVING.

③ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITH PAVING).

④ CU. YDS. OF CONCRETE IN TWO PAVED AREAS OF THE HEADWALLS.

⑤ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITHOUT PAVING).

⑥ CU. YDS. OF CONCRETE IN TWO HEADWALLS WITHOUT PAVING.

⑦ POUNDS OF REINFORCING STEEL IN TWO HEADWALLS WITH PAVING.

⑧ POUNDS OF REINFORCING STEEL TO DEDUCT WHEN PAVING FOR TWO HEADWALLS IS ELIMINATED.

KENTUCKY DEPARTMENT OF HIGHWAYS	
QUANTITIES 3' x 2' - 12' x 12' H-WALLS PRECAST BOX CULVERTS 0° SKEW	
STANDARD DRAWING NO. RDH-1200-02	
SUBMITTED: <i>John B. Slaughter</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>J. M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
3 x 2	4.15	0.83	—	—	—	371	—
3 x 3	5.44	0.91	—	—	—	475	—
4 x 2	5.05	0.97	—	—	—	448	—
4 x 3	6.44	1.06	—	—	—	534	—
4 x 4	8.04	1.14	—	—	—	661	—
5 x 3	7.53	1.20	—	—	—	637	—
5 x 4	9.23	1.28	—	—	—	769	—
5 x 5	11.15	1.37	—	—	—	887	—
6 x 3	8.70	1.34	—	—	—	719	—
6 x 4	10.51	1.42	—	—	—	830	—
6 x 5	12.53	1.51	—	—	—	982	—
6 x 6	22.48	2.26	2.21	3.31	21.33	1967	270
7 x 4	11.88	1.57	—	—	—	933	—
7 x 5	14.00	1.65	—	—	—	1057	—
7 x 6	24.40	2.42	2.57	3.50	22.91	2129	310
7 x 7	27.46	2.51	2.96	3.74	25.73	2433	336
8 x 4	12.82	1.68	—	—	—	1053	—
8 x 5	15.01	1.76	—	—	—	1139	—
8 x 6	25.71	2.54	2.82	3.62	23.97	2201	315
8 x 7	28.82	2.63	3.24	3.87	26.81	2549	382
8 x 8	35.47	3.79	3.28	5.53	33.93	3239	418

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
9 X 5	16.63	1.90	—	—	—	1266	—
9 X 6	27.77	2.70	3.19	3.81	25.68	2381	357
9 X 7	30.96	2.79	3.65	4.05	28.57	2694	385
9 X 8	37.85	4.00	3.70	5.78	35.93	3394	469
9 X 9	41.66	4.12	4.17	6.10	39.46	4022	498
10 X 5	18.35	2.05	—	—	—	1328	—
10 X 6	29.93	2.86	3.58	3.99	27.49	2541	401
10 X 7	33.20	2.95	4.07	4.24	30.42	2996	434
10 X 8	40.34	4.21	4.14	6.02	38.01	3818	520
10 X 9	44.22	4.34	4.64	6.35	41.59	4257	554
10 X 10	59.12	6.77	4.96	9.87	57.26	5286	602
11 X 4	17.65	2.10	—	—	—	1308	—
11 X 6	32.19	3.02	3.97	4.18	29.38	2692	403
11 X 8	42.92	4.43	4.58	6.27	40.18	3926	526
11 X 10	62.30	7.08	5.47	10.23	59.98	5480	670
11 X 11	74.61	7.18	6.12	10.49	71.81	6336	702
12 X 4	19.47	2.25	—	—	—	1468	—
12 X 6	34.56	3.18	4.38	4.36	31.36	2921	468
12 X 8	45.61	4.64	5.04	6.52	42.45	4246	598
12 X 10	66.55	7.39	5.98	10.59	63.76	5915	730
12 X 12	99.18	7.34	7.20	10.67	95.30	7588	876

- ① PRECAST CONCRETE BOX CULVERT SECTIONS EQUALS THE INTERIOR SPAN (S) BY THE INTERIOR RISE (R) IN FEET.
- ② CU. YDS. OF CONCRETE IN TWO HEADWALLS WITH PAVING.
- ③ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITH PAVING).
- ④ CU. YDS. OF CONCRETE IN TWO PAVED AREAS OF THE HEADWALLS.
- ⑤ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITHOUT PAVING).
- ⑥ CU. YDS. OF CONCRETE IN TWO HEADWALLS WITHOUT PAVING.
- ⑦ POUNDS OF REINFORCING STEEL IN TWO HEADWALLS WITH PAVING.
- ⑧ POUNDS OF REINFORCING STEEL TO DEDUCT WHEN PAVING FOR TWO HEADWALLS IS ELIMINATED.

KENTUCKY DEPARTMENT OF HIGHWAYS	
QUANTITIES 3' x 2' - 12' x 12' H-WALLS PRECAST BOX CULVERTS 15° SKEW	
STANDARD DRAWING NO. RDH-1205-02	
SUBMITTED: <i>John B. Suckley</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>J. M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE



BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
3 x 2	5.29	0.98	—	—	—	467	—
3 x 3	6.83	1.08	—	—	—	595	—
4 x 2	6.60	1.15	—	—	—	581	—
4 x 3	8.29	1.25	—	—	—	682	—
4 x 4	10.21	1.35	—	—	—	835	—
5 x 3	9.90	1.43	—	—	—	821	—
5 x 4	11.96	1.53	—	—	—	982	—
5 x 5	14.25	1.62	—	—	—	1116	—
6 x 3	11.65	1.60	—	—	—	955	—
6 x 4	13.86	1.70	—	—	—	1123	—
6 x 5	16.30	1.80	—	—	—	1279	—
6 x 6	28.16	2.60	2.74	3.71	26.53	2526	344
7 x 4	15.92	1.87	—	—	—	1253	—
7 x 5	18.50	1.97	—	—	—	1436	—
7 x 6	31.04	2.79	3.18	3.93	29.01	2765	351
7 x 7	34.68	2.90	3.66	4.20	32.32	3163	421
8 x 4	17.44	2.01	—	—	—	1388	—
8 x 5	20.13	2.11	—	—	—	1574	—
8 x 6	33.19	2.94	3.49	4.08	30.84	2933	391
8 x 7	36.90	3.06	4.00	4.35	34.20	3378	464
8 x 8	44.65	4.37	4.08	6.20	42.41	4170	508

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
9 X 5	22.59	2.28	—	—	—	1754	—
9 X 6	36.36	3.14	3.94	4.31	33.58	3214	435
9 X 7	40.19	3.25	4.50	4.57	37.01	3594	472
9 X 8	48.79	4.63	4.60	6.50	46.06	4453	549
9 X 9	53.38	4.78	5.17	6.86	50.28	5254	601
10 X 5	25.21	2.45	—	—	—	1904	—
10 X 6	39.70	3.34	4.41	4.53	36.48	3470	479
10 X 7	43.64	3.45	5.01	4.80	39.98	4035	520
10 X 8	52.57	4.89	5.13	6.80	49.35	5002	613
10 X 9	57.28	5.04	5.74	7.15	53.65	5595	657
10 X 10	75.63	7.82	6.15	11.08	72.74	7001	770
11 X 4	24.86	2.53	—	—	—	1911	—
11 X 6	43.21	3.53	4.89	4.75	39.53	3741	523
11 X 8	56.54	5.15	5.67	7.09	52.80	5316	666
11 X 10	80.45	8.20	6.77	11.51	76.99	7270	832
11 X 11	94.18	8.30	7.57	11.78	90.10	8203	881
12 X 4	27.66	2.70	—	—	—	2133	—
12 X 6	46.90	3.73	5.39	4.97	42.76	4020	568
12 X 8	60.68	5.41	6.23	7.39	56.42	5712	720
12 X 10	85.47	8.58	7.41	11.94	81.42	7651	895
12 X 12	123.25	8.49	8.92	11.98	117.82	9593	998

- ① PRECAST CONCRETE BOX CULVERT SECTIONS EQUALS THE INTERIOR SPAN (S) BY THE INTERIOR RISE (R) IN FEET.
- ② CU. YDS. OF CONCRETE IN TWO HEADWALLS WITH PAVING.
- ③ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITH PAVING).
- ④ CU. YDS. OF CONCRETE IN TWO PAVED AREAS OF THE HEADWALLS.
- ⑤ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITHOUT PAVING).
- ⑥ CU. YDS. OF CONCRETE IN TWO HEADWALLS WITHOUT PAVING.
- ⑦ POUNDS OF REINFORCING STEEL IN TWO HEADWALLS WITH PAVING.
- ⑧ POUNDS OF REINFORCING STEEL TO DEDUCT WHEN PAVING FOR TWO HEADWALLS IS ELIMINATED.

<b>KENTUCKY DEPARTMENT OF HIGHWAYS</b>	
<b>QUANTITIES 3' x 2' - 12' x 12' H-WALLS PRECAST BOX CULVERTS 30° SKEW</b>	
STANDARD DRAWING NO. RDH-1210-02	
SUBMITTED: <i>John B. Slaughter</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>J. M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
3 x 2	7.66	1.37	—	—	—	682	—
3 x 3	9.79	1.51	—	—	—	836	—
4 x 2	9.76	1.61	—	—	—	855	—
4 x 3	12.12	1.76	—	—	—	1023	—
4 x 4	14.78	1.90	—	—	—	1213	—
5 x 3	14.71	2.00	—	—	—	1244	—
5 x 4	17.59	2.15	—	—	—	1443	—
5 x 5	20.78	2.29	—	—	—	1672	—
6 x 3	17.55	2.25	—	—	—	1458	—
6 x 4	20.67	2.39	—	—	—	1672	—
6 x 5	24.08	2.54	—	—	—	1903	—
6 x 6	39.83	3.47	4.05	4.71	37.03	3606	453
7 x 4	24.01	2.64	—	—	—	1808	—
7 x 5	27.65	2.79	—	—	—	2153	—
7 x 6	44.50	3.75	4.67	5.02	41.10	4010	536
7 x 7	49.45	3.91	5.37	5.36	45.52	4518	580
8 x 4	26.61	2.83	—	—	—	2122	—
8 x 5	30.41	2.98	—	—	—	2373	—
8 x 6	48.14	3.97	5.11	5.23	44.30	4305	577
8 x 7	53.23	4.13	5.86	5.57	48.81	4833	627
8 x 8	64.11	5.87	6.04	7.83	60.03	5959	729

BOX SIZE ①	CONCRETE 2 HEADWALLS					REINFORCEMENT 2 HEADWALLS	
	②	③	④	⑤	⑥	⑦	⑧
9 X 5	34.44	3.22	—	—	—	2652	—
9 X 6	53.33	4.24	5.75	5.54	48.87	4710	623
9 X 7	58.61	4.41	6.56	5.88	53.51	5291	717
9 X 8	69.97	6.24	6.77	8.24	65.20	6440	784
9 X 9	76.20	6.46	7.62	8.69	70.82	7566	887
10 X 5	38.73	3.47	—	—	—	2996	—
10 X 6	58.82	4.52	6.42	5.85	53.72	5143	670
10 X 7	64.29	4.68	7.29	6.18	58.49	5991	769
10 X 8	76.14	6.61	7.53	8.65	70.65	7345	885
10 X 9	82.56	6.83	8.43	9.10	76.40	8098	948
10 X 10	107.47	10.51	9.07	13.96	101.86	9907	1087
11 X 4	38.80	3.57	—	—	—	2550	—
11 X 6	64.61	4.80	7.11	6.15	58.85	5587	716
11 X 8	82.61	6.98	8.30	9.06	76.38	7869	942
11 X 10	115.31	11.05	9.96	14.56	108.87	10514	1153
11 X 11	134.04	11.15	11.13	14.87	126.62	11723	1277
12 X 4	43.41	3.82	—	—	—	3397	—
12 X 6	70.70	5.08	7.81	6.46	64.28	6159	840
12 X 8	89.38	7.35	9.10	9.47	82.40	8518	1036
12 X 10	123.48	11.59	10.86	15.16	116.18	11234	1220
12 X 12	177.08	11.40	13.12	15.07	167.63	13937	1478

- ① PRECAST CONCRETE BOX CULVERT SECTIONS EQUALS THE INTERIOR SPAN (S) BY THE INTERIOR RISE (R) IN FEET.
- ② CU. YDS. OF CONCRETE IN TWO HEADWALLS WITH PAVING.
- ③ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITH PAVING).
- ④ CU. YDS. OF CONCRETE IN TWO PAVED AREAS OF THE HEADWALLS.
- ⑤ CU. YDS. OF CONCRETE IN TWO APRONS (HEADWALLS WITHOUT PAVING).
- ⑥ CU. YDS. OF CONCRETE IN TWO HEADWALLS WITHOUT PAVING.
- ⑦ POUNDS OF REINFORCING STEEL IN TWO HEADWALLS WITH PAVING.
- ⑧ POUNDS OF REINFORCING STEEL TO DEDUCT WHEN PAVING FOR TWO HEADWALLS IS ELIMINATED.

<b>KENTUCKY DEPARTMENT OF HIGHWAYS</b>	
<b>QUANTITIES 3' x 2' - 12' x 12' H-WALLS PRECAST BOX CULVERTS 45° SKEW</b>	
STANDARD DRAWING NO. RDH-1215-02	
SUBMITTED: <i>John B. Ingleton</i> DIRECTOR DIVISION OF DESIGN	12-1-99 DATE
APPROVED: <i>J. M. Howell</i> STATE HIGHWAY ENGINEER	12-1-99 DATE







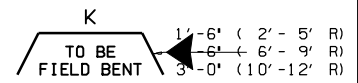


MARK	SIZE	NO	LGTH		K	
			① FT	IN	FT	IN
12' X 12'						
A	5	4	19	3		
B1	5	8	6	0		
B2	5	8	7	0		
B3	5	8	7	10		
B4	5	8	8	9		
B5	5	8	9	9		
B6	5	8	10	9		
B7	5	8	11	8		
B8	5	8	12	7		
B9	5	8	13	7		
C1	4	4	2	3		
C2	4	4	4	5		
C3	4	4	6	6		
C4	4	4	8	7		
C5	4	4	10	9		
C6	4	4	12	11		
C7	4	4	15	1		
C8	4	4	17	1		
C9	4	20	17	5		
E1	5	2	20	3	14	3
E2	5	2	21	3	15	3
F	4	14	2	8	0	11
G1	4	4	16	10		
G2	4	3	20	1		
G3	4	3	23	5		
G4	4	3	26	9		
G5	4	4	30	0		
H	4	16	18	7	14	11
M	4	36	6	8		
N	4	22	17	5		
P	8	36	9	8	6	6
Q	5	6	13	8		
R	5	14	5	5		
U1	4	2	4	0	1	7
U2	4	2	4	6	1	10
U3	4	2	5	0	2	1
U4	4	2	5	4	2	3
U5	4	2	5	10	2	6
U6	4	2	6	4	2	9
U7	4	2	6	10	3	0
U8	4	2	7	2	3	2
U9	4	2	7	8	3	5
U10	4	2	8	2	3	8
Y	4	4	13	8	12	3

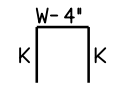
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

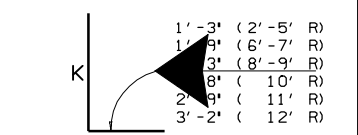
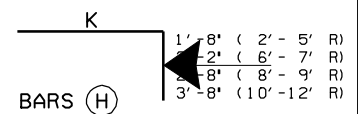
**BENT BAR SHAPES**



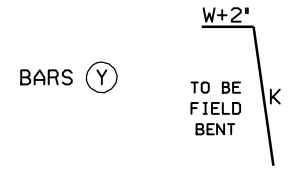
BARS (E)



BARS (F) AND (U)



BARS (P) AND (V)



**KENTUCKY  
DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT  
12' X 12' HEADWALLS  
PRECAST BOX CULVERTS  
0° SKEW**

**STANDARD DRAWING NO. RDH-1308-03**

SUBMITTED <i>John B. Enckstein</i>	12-1-99
<small>DIRECTOR DIVISION OF DESIGN</small>	<small>DATE</small>
APPROVED <i>J. W. Howell</i>	12-1-99
<small>STATE HIGHWAY ENGINEER</small>	<small>DATE</small>

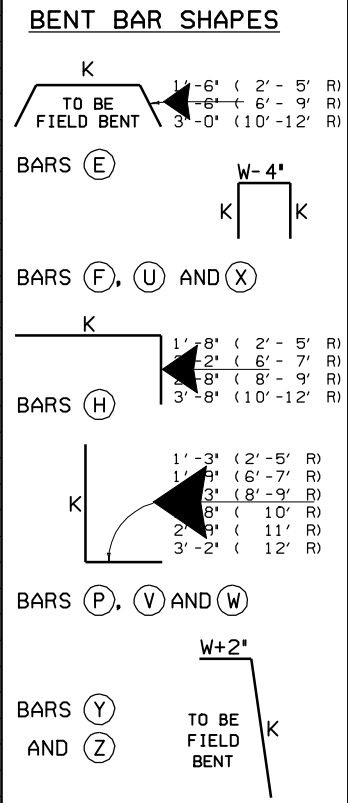






MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K										
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①				FT	IN	FT	IN		①	FT	IN	FT	IN	①	FT	IN	FT	IN
7' X 6'						7' X 6' (CONTINUED)						7' X 7'						8' X 4'						8' X 5'						8' X 6'														
A1	5	2	9	9		T2	5	2	7	1		S4	5	2	1	11		V5	5	6	6	11	5	8	W3	5	2	6	5	5	2	S4	5	2	1	11								
A2	5	2	10	8		T3	5	2	9	1		S5	5	2	2	2		W1	5	2	3	9	2	6	W4	5	2	7	5	6	2	S5	5	2	2	3								
B1	5	4	3	1								S6	5	2	2	6		W2	5	2	4	10	3	7								S6	5	2	2	6								
B2	5	4	4	0								S7	5	2	2	10		W3	5	2	5	11	4	8								S7	5	2	2	10								
B3	5	4	4	11		7' X 7'						T1	5	2	3	6									W4	5	1	6	11	5	8								S8	5	2	3	1	
B4	5	4	5	11								T2	5	2	7	1		8' X 6'						S9	5	2	3	5																
B5	5	4	6	10		A1	5	2	10	11		T3	5	2	9	1		A1	5	2	9	9		T2	5	2	4	9																
B6	5	6	7	2		A2	5	2	12	0		8' X 5'						A2	5	2	10	8		T3	5	2	8	1																
C1	4	2	4	1		B1	5	4	3	6								B1	5	4	3	0		T4	5	2	10	1																
C2	4	2	6	2		B2	5	4	4	6		A1	5	2	8	9		B2	5	4	4	0																						
C3	4	2	8	4		B3	5	4	5	5		A2	5	2	9	7		B3	5	4	4	11																						
C4	4	2	10	5		B4	5	4	6	5		C1	4	1	4	3		B4	5	4	5	11																						
C5	4	2	12	6		B5	5	4	7	4		C2	4	1	6	4		B5	5	4	6	10																						
C6	4	4	12	9		B6	5	8	8	2		C3	4	1	8	6		B6	5	6	7	2																						
E1	5	2	14	6	9	6	C1	4	2	4	1		C4	4	1	10	7		C1	4	2	4	4																					
E2	5	2	15	2	10	2	C2	4	2	6	2		C5	4	2	11	11		C2	4	2	6	5																					
F	4	10	1	5	0	6	C3	4	2	8	4		C3	4	1	8	5		E1	5	2	13	8	10	8	C3	4	2	8	6														
G1	4	1	9	0		C4	4	2	10	5		C4	4	1	10	7		E2	5	2	14	1	11	1	C4	4	2	10	8															
G2	4	2	10	9		C5	4	2	12	7		C5	4	1	10	9		F	4	11	1	3	0	6	C5	4	2	12	8															
G3	4	2	12	6		C6	4	6	13	11		E1	5	2	13	8	10	8	G1	4	2	10	11		C6	4	4	13	0															
G4	4	2	14	2		E1	5	2	14	6	9	6	E2	5	2	14	1	11	1	G2	4	2	12	8		E1	5	2	15	8	10	8												
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H	4	9	11	2	9	0	F	4	10	1	5	0	6	G1	4	1	10	9		G4	4	3	16	0		F	4	11	1	5	0	6												
J1	5	4	3	1		G1	4	2	9	3		G2	4	2	12	6		H	4	9	9	8	8	0	G1	4	1	9	10															
J2	5	4	4	2		G2	4	2	10	11		G3	4	2	14	2		K1	4	1	2	9		G2	4	2	11	4																
J3	5	4	5	2		G3	4	2	12	8		G4	4	3	16	0		K2	4	1	4	8		G3	4	2	12	11																
J4	5	4	6	3		G4	4	2	14	4		H	4	9	8	8	7	0	K3	4	1	6	7		G4	4	2	14	6															
J5	5	2	7	4		G5	4	3	16	0		K1	4	1	2	9		K4	4	2	7	9		G5	4	3	16	0																
K1	4	2	2	10		H	4	9	12	2	10	0	K2	4	1	4	8		N1	4	3	7	9		H	4	9	11	2	9	0													
K2	4	2	4	9		J1	5	4	3	7		K3	4	1	6	6		N2	4	3	11	11		J1	5	4	3	1																
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M1	4	1	2	5		J5	5	4	7	9		Q	4	2	9	0		S2	5	2	1	4		J5	5	2	7	3																
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N1	4	7	8	8		K2	4	2	4	8		S1	5	2	1	1		S4	5	2	2	0		K2	4	2	4	7																
N2	4	5	11	7		K3	4	2	6	7		S2	5	2	1	4		S5	5	2	2	3		K3	4	2	6	6																
N3	4	2	12	11		K4	4	2	8	6		S3	5	2	1	8		S6	5	2	2	7		K4	4	2	8	5																
P	5	22	5	3	3	6	K5	4	6	9	8		S4	5	2	2	0		S7	5	2	2	10		K5	4	4	8	8															
Q	5	4	8	0		M1	4	1	2	6		S5	5	2	2	3		S8	5	2	3	2		M1	4	2	2	3																
R	5	9	3	4		M2	4	23	3	9		S6	5	2	2	7		T1	5	2	4	0		M2	4	21	3	9																
S1	5	2	1	0		N1	4	7	9	8		S7	5	2	2	10		T2	5	2	7	4		N1	4	7	8	8																
S2	5	2	1	4		N2	4	5	12	9		S8	5	2	3	2		T3	5	2	9	11		N2	4	5	11	11																
S3	5	2	1	7		N3	4	2	14	1		T1	5	2	4	0		V1	5	2	4	3	3	0	N3	4	2	13	3															
S4	5	2	1	11		P	5	24	5	9	4	0	T2	5	2	7	4		V2	5	2	5	3	4	0	P	5	22	5	3	3	6												
S5	5	2	2	2		Q	5	4	8	0		T3	5	2	9	11		V3	5	2	6	2	4	11	Q	5	4	9	0															
S6	5	2	2	6		R	5	9	3	4		V1	5	2	3	10	2	7	V4	5	2	7	1	5	10	R	5	10	3	4														
S7	5	2	2	10		S1	5	2	1	0		V2	5	2	4	9	3	6	V5	5	4	7	11	6	8	S1	5	2	1	1														
S8	5	2	3	1		S2	5	2	1	4		V3	5	2	5	8	4	5	W1	5	2	4	4	3	1	S2	5	2	1	4														
T1	5	2	3	6		S3	5	2	1	7		V4	5	2	6	8	5	5	W2	5	2	5	4	4	1	S3	5	2	1	7														

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - R = BOX OR PIPE RISE
  - W = WING WALL WIDTH



**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
7' X 6' - 8' X 6' HEADWALLS  
PRECAST BOX CULVERTS  
15° SKEW

**STANDARD DRAWING NO. RDH-1314-03**

SUBMITTED *John B. Ingleton* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN

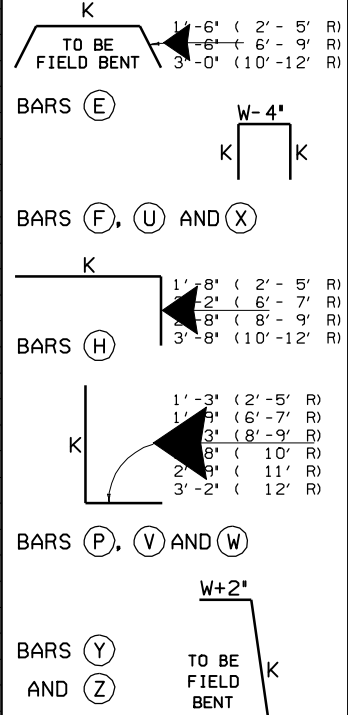
APPROVED *J. W. Powell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER



MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K																																																																																																																																																																																																																																																																																																																																																																												
		①	FT	IN	FT IN				①	FT	IN	FT IN				①	FT	IN	FT IN				①	FT	IN	FT IN		①	FT	IN	FT IN	①	FT	IN	FT IN																																																																																																																																																																																																																																																																																																																																																																				
9' X 8' (CONTINUED)																												9' X 9'																												9' X 9' (CONTINUED)																												9' X 9' (CONTINUED)																												10' X 5' (CONTINUED)																												10' X 5' (CONTINUED)																												10' X 6' (CONTINUED)																												10' X 6' (CONTINUED)																												10' X 7' (CONTINUED)																												10' X 7' (CONTINUED)																												10' X 7' (CONTINUED)																												10' X 7' (CONTINUED)																												10' X 7' (CONTINUED)																												10' X 7' (CONTINUED)																											

- ### NOTES
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - R = BOX OR PIPE RISE
  - W = WING WALL WIDTH

#### BENT BAR SHAPES



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**9' X 8' - 10' X 7' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**15° SKEW**

STANDARD DRAWING NO. RDH-1318-03

SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

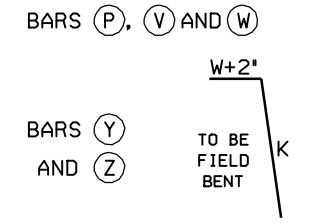
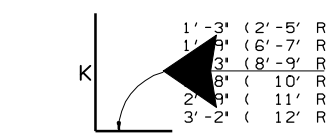
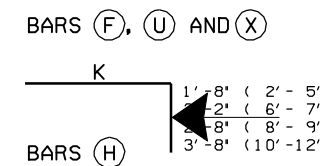
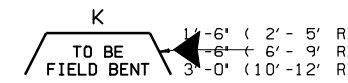
APPROVED *J. W. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K				
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN	FT	IN
		10' X 8'					10' X 8' (CONTINUED)					10' X 9' (CONTINUED)					10' X 10' (CONTINUED)					11' X 4'									
A1	5	2	12	5		S4	5	2	2	0		K2	4	2	5	2		E1	5	2	19	3	13	3	A1	5	2	8	3		
A2	5	2	13	8		S5	5	2	2	3		K3	4	2	7	0		F	4	14	1	7	0	6	A2	5	2	8	11		
B1	5	4	4	0		S6	5	2	2	11		K4	4	2	9	0		G1	4	1	11	10		C1	4	1	5	9			
B2	5	4	5	0		S7	5	2	3	2		K5	4	2	10	11		G2	4	2	13	6		C2	4	1	7	11			
B3	5	4	5	11		S8	5	2	3	6		K6	4	1	2	10		G3	4	2	15	3		C3	4	1	10	1			
B4	5	4	6	10		S9	5	2	3	9		M1	4	29	4	9		G4	4	2	16	11		C4	4	2	12	2			
B5	5	4	7	9		S10	5	2	4	0		M2	4	8	12	1		G5	4	2	18	7		E1	5	2	17	7	14	7	
B6	5	4	8	9		T1	5	2	3	9		N1	4	5	16	3		G6	4	2	20	3		E2	5	2	17	11	14	11	
B7	5	10	9	4		T2	5	2	7	0		N2	4	3	17	9		G7	4	3	22	0		F	4	15	1	3	0	6	
C1	4	2	5	6		T3	5	2	10	6		N3	4	7	30	7	3	5	0	H	4	12	17	0	13	4					
C2	4	2	7	7		T4	5	2	12	5		Q	5	5	11	4		J1	5	4	5	0		G1	4	1	14	11			
C3	4	2	9	9							R	5	12	4	0		J2	5	4	6	1		G2	4	2	16	7				
C4	4	2	11	11							S1	5	2	1	2		J3	5	4	7	1		G3	4	2	18	3				
C5	4	2	14	0							S2	5	2	1	5		J4	5	4	8	2		G4	4	3	20	0				
C6	4	2	16	1		10' X 9'					S3	5	2	1	9		J5	5	4	9	2		H	4	11	9	2	7	6		
C7	4	6	16	5							S4	5	2	2	0		J6	5	4	10	3		K1	4	1	1	4				
E1	5	2	18	3	13	3	A1	5	2	13	7		S5	5	2	2	3		J7	5	2	11	3		K2	4	1	5	1		
E2	5	2	18	11	13	11	A2	5	2	14	10		S6	5	2	2	7		K1	4	2	1	3		K3	4	1	7	1		
F	4	14	1	5	0	6	B1	5	4	4	6		S7	5	2	2	11		K2	4	2	3	2		K4	4	1	7	3		
G1	4	1	13	6		B2	5	4	5	6		S8	5	2	3	2		K3	4	2	5	0		N1	4	3	7	3			
G2	4	2	15	2		B3	5	4	6	5		S9	5	2	3	6		K4	4	2	7	0		N2	4	3	12	5			
G3	4	2	16	11		B4	5	4	7	4		S10	5	2	3	9		K5	4	2	8	11		Q	4	2	12	6			
G4	4	2	18	7		B5	5	4	8	3		S11	5	2	4	0		K6	4	2	10	10		R	4	13	1	4			
G5	4	2	20	3		B6	5	4	9	2		T1	5	2	3	9		K7	4	2	12	8		S1	5	2	1	0			
G6	4	3	22	0		B7	5	4	10	1		T2	5	2	7	0		K8	4	8	12	11		S2	5	2	1	3			
H	4	12	14	0	11	4	B8	5	8	10	4		T3	5	2	10	6		M1	4	1	3	6		S3	5	2	1	6		
J1	5	4	4	0		C1	4	2	5	6		T4	5	2	12	5		M2	4	31	5	8		S4	5	2	1	10			
J2	5	4	5	1		C2	4	2	7	8		10' X 10'					N1	4	9	12	11		S5	5	2	2	1				
J3	5	4	6	1		C3	4	2	9	9		A1	5	2	14	8		N2	4	6	17	2		S6	5	2	2	5			
J4	5	4	7	2		C4	4	2	12	0		A2	5	2	15	11		N3	4	3	18	11		S7	5	2	2	8			
J5	5	4	8	2		C5	4	2	14	1		E1	5	2	18	3	13	3	P	8	32	8	2	5	6	S8	5	2	3	0	
J6	5	2	9	3		C6	4	2	16	3		E2	5	2	18	11	13	11	Q	5	6	11	4		S9	5	2	3	4		
K1	4	2	1	2		C7	4	8	17	7		F	4	14	1	5	0	6	R	5	12	4	8		S10	5	2	3	7		
K2	4	2	3	1		E1	5	2	18	3	13	3	G1	4	2	13	6		S1	5	2	1	1		S11	5	2	3	11		
K3	4	2	5	0		E2	5	2	18	11	13	11	G2	4	2	15	2		S2	5	2	1	4		S12	5	2	4	2		
K4	4	2	7	0		F	4	14	1	5	0	6	G3	4	2	16	11		S3	5	2	1	8		T1	5	2	4	0		
K5	4	2	8	11		G1	4	2	13	6		G4	4	2	17	10		S4	5	2	2	0		T2	5	2	7	6			
K6	4	2	10	10		G2	4	2	15	2		G5	4	2	18	7		S5	5	2	2	3		T3	5	2	10	11			
K7	4	6	11	1		G3	4	2	16	11		G6	4	2	20	4		S6	5	2	2	7		T4	5	2	13	4			
M1	4	1	2	10		G4	4	2	18	7		G7	4	2	20	3		S7	5	2	2	10		V1	5	2	3	10	2	7	
M2	4	27	4	9		G5	4	2	20	4		G8	4	2	22	0		S8	5	2	3	2		V2	5	2	4	9	3	6	
N1	4	8	11	1		G6	4	3	22	0		B8	5	10	11	4		S9	5	2	3	5		V3	5	2	4	5	5	8	
N2	4	5	15	1		H	4	12	15	0	12	4	C1	4	2	5	7		S10	5	2	3	9		V4	5	2	5	4	6	7
N3	4	3	16	7		J1	5	4	4	6		C2	4	2	7	9		S11	5	2	4	0		V5	5	5	7	2	5	11	
P	7	28	6	9	4	6	J2	5	4	5	7		C3	4	2	9	11		S12	5	2	4	2		W1	5	2	3	10	2	7
Q	5	5	11	4		J3	5	4	6	7		C4	4	2	12	1		T1	5	2	4	2		W2	5	2	4	10	3	7	
R	5	12	4	0		J4	5	4	7	8		C5	4	2	14	2		T2	5	2	7	8		W3	5	2	5	11	4	8	
S1	5	2	1	2		J5	5	4	8	8		C6	4	2	16	4		T3	5	2	11	3		W4	5	1	6	9	5	9	
S2	5	2	1	5		J6	5	4	9	9		C7	4	2	18	5		T4	5	2	12	6									
S3	5	2	1	9		K1	4	2	3	2		C8	4	8	18	9															

**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

**BENT BAR SHAPES**



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**10' X 8' - 11' X 4' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**15° SKEW**

**STANDARD DRAWING NO. RDH-1320-03**

SUBMITTED *John B. Ingham* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN

APPROVED *J. W. Howell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER



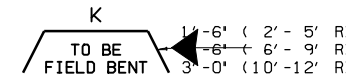


MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K			
		①	FT	IN	FT			IN	①	FT	IN
12' X 12'						12' X 12' (CONTINUED)					
A1	5	2	17	0		N1	4	11	15	1	
A2	5	2	18	8		N2	4	7	20	2	
B1	5	4	6	0		N3	4	4	22	3	
B2	5	4	7	0		P	8	37	9	8	6 6
B3	5	4	7	11		Q	5	7	13	8	
B4	5	4	8	10		R	5	14	5	7	
B5	5	4	9	9		S1	5	2	1	0	
B6	5	4	10	8		S2	5	2	1	4	
B7	5	4	11	7		S3	5	2	1	7	
B8	5	4	12	7		S4	5	2	1	11	
B9	5	12	13	6		S5	5	2	2	2	
C1	4	2	6	10		S6	5	2	2	6	
C2	4	2	9	0		S7	5	2	2	9	
C3	4	2	11	1		S8	5	2	3	1	
C4	4	2	13	3		S9	5	2	3	5	
C5	4	2	15	5		S10	5	2	3	8	
C6	4	2	17	6		S11	5	2	4	0	
C7	4	2	19	9		S12	5	2	4	3	
C8	4	2	21	9		S13	5	2	4	7	
C9	4	10	22	1		S14	5	2	4	10	
E1	5	2	21	10	15	10	S15	5	2	5	2
E2	5	2	23	1	17	1	S16	5	2	5	6
F	4	17	1	10	0	6	T1	5	2	4	5
G1	4	1	16	2		T2	5	2	8	0	
G2	4	2	17	10		T3	5	2	11	5	
G3	4	2	19	7		T4	5	2	14	10	
G4	4	2	21	3		T5	5	2	15	3	
G5	4	2	23	0		U1	4	1	3	8	1 5
G6	4	2	24	8		U2	4	1	4	2	1 8
G7	4	2	26	5		U3	4	1	4	8	1 11
G8	4	3	28	0		U4	4	1	5	2	2 2
H	4	15	19	4	15	8	U5	4	1	5	8 2 5
J1	5	4	6	1		U6	4	1	6	2	2 8
J2	5	4	7	1		U7	4	1	6	8	2 11
J3	5	4	8	2		U8	4	1	7	2	3 2
J4	5	4	9	3		U9	4	1	7	8	3 5
J5	5	4	10	3		U10	4	1	8	2	3 8
J6	5	4	11	4		X1	4	1	4	0	1 7
J7	5	4	12	4		X2	4	1	4	4	1 9
J8	5	2	13	5		X3	4	1	4	10	2 0
K1	4	2	1	6		X4	4	1	5	4	2 3
K2	4	2	3	5		X5	4	1	5	10	2 6
K3	4	2	5	4		X6	4	1	6	2	2 8
K4	4	2	7	3		X7	4	1	6	8	2 11
K5	4	2	9	2		X8	4	1	7	2	3 2
K6	4	2	11	1		X9	4	1	7	8	3 5
K7	4	2	13	0		X10	4	1	8	2	3 8
K8	4	2	14	11		Y	4	2	13	1	11 8
K9	4	10	15	1		Z	4	2	13	4	11 11
M1	4	2	4	0							

**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

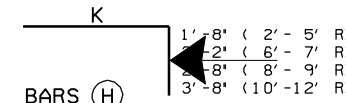
**BENT BAR SHAPES**



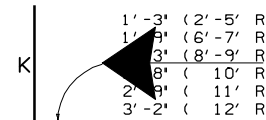
BARS (E)



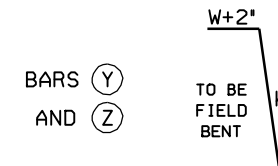
BARS (F), (U) AND (X)



BARS (H)



BARS (P), (V) AND (W)



BARS (Y) AND (Z)

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**12' X 12' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**15° SKEW**

**STANDARD DRAWING NO. RDH-1326-03**

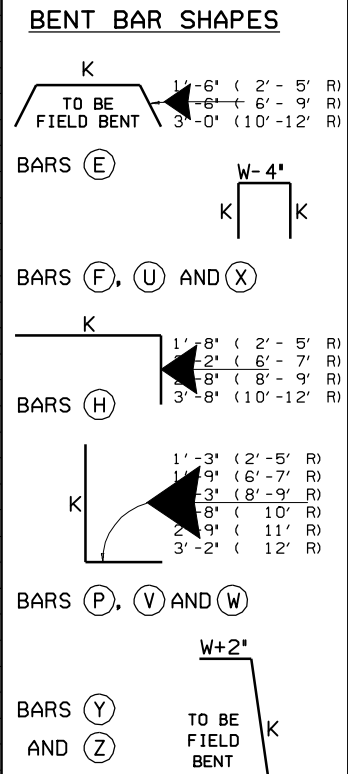
SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①				FT	IN	FT	IN		①	FT	IN	FT	IN	①	FT	IN	FT	IN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
3' X 2'						3' X 3' (CONTINUED)						4' X 2' (CONTINUED)						4' X 4'						5' X 3' (CONTINUED)						5' X 4' (CONTINUED)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
A1	5	2	4	5		Q	4	2	3	4		W1	5	2	2	10	1	7	A1	5	2	6	10		F	4	9	1	3	0	6	K1	4	1	2	4		E2	5	2	11	11	8	11	H	4	8	8	4	6	8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
A2	5	2	5	11		R	4	4	0	11								A2	5	2	9	2		G1	4	2	8	6		K2	4	1	4	2		E1	5	2	8	3	5	3	K3	4	1	6	0		G2	4	2	10	2		K4	4	1	6	2		F	4	6	1	3	0	6	N2	4	3	13	7		G3	4	3	12	0		Q	4	2	5	8		G1	4	2	6	3		T1	5	2	1	9		A1	5	2	5	9		F	4	7	1	3	0	6	N1	4	3	5	2		G2	4	2	10	4	7	4	R	4	6	1	1		G4	4	1	12	7		A2	5	2	7	9		G1	4	2	8	3	0	6	K2	4	1	4	1		E2	5	2	10	4	7	4	K3	4	1	5	2		E1	5	2	8	8	5	8	S4	5	2	3	0		E2	5	2	10	4	7	4	N2	4	3	12	3		G3	4	3	12	0		K3	4	1	5	2		E2	5	2	10	4	7	4	R	4	6	1	1		E1	5	2	9	10	6	10	S5	5	2	4	2		F	4	7	1	3	0	6	S6	5	2	4	8		G1	4	1	6	7		T1	5	2	1	3		G2	4	2	8	4		K1	4	1	2	3		T2	5	2	2	1		G3	4	3	10	0		T3	5	2	2	8		H	4	6	7	2	5	6	T4	5	2	1	3		K1	4	1	2	2		T5	5	2	6	5		K2	4	1	4	0		V1	5	2	3	3	2	0	K3	4	1	5	0		Q	4	2	4	6		V2	5	2	4	10	2	9	N1	4	3	6	0		N2	4	3	12	7		N2	4	3	11	2		S1	5	2	1	2		S2	5	2	3	10		Q	4	2	4	6		S3	5	2	2	8		S4	5	2	3	4		R	4	5	1	0		S5	5	2	3	10		S1	5	2	1	2		S2	5	2	1	11		S2	5	2	1	11		S3	5	2	2	8		T1	5	2	1	6		S4	5	2	3	4		T2	5	2	2	11		S5	5	2	3	10		S5	5	2	3	3	2	0	T3	5	2	4	4		S6	5	2	4	8		T4	5	2	5	3		T1	5	2	1	2		T2	5	2	2	8		T3	5	2	4	1		T4	5	2	5	6		T5	5	2	6	5		V1	5	2	3	3	2	0	V2	5	2	4	10	2	9	V3	5	2	4	10	3	7	V4	5	2	5	7	4	4	V5	5	4	5	9	4	6	W1	5	2	3	4	2	1	W2	5	2	4	5	3	2	W3	5	1	5	6	4	3
3' X 3'						4' X 2'						4' X 3'						5' X 3'						5' X 4'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
A1	5	2	5	7		N2	4	3	9	9	N1	4	3	5	0	N2	4	3	11	2	A1	5	2	7	1	A2	5	2	9	5	C1	4	1	6	1	S1	5	2	1	2	S2	5	2	1	11	E1	5	2	8	3	5	3	S3	5	2	2	8	C2	4	1	8	10	S4	5	2	1	11	E2	5	2	10	4	7	4	S5	5	2	3	4	C3	4	1	10	1	S6	5	2	3	10	F	4	7	1	3	0	6	S7	5	2	4	8	E1	5	2	8	3	5	3	S8	5	2	3	4	E2	5	2	8	8	5	8	S9	5	2	3	4	F	4	6	1	3	0	6	T1	5	2	1	6	G1	4	1	5	10	T2	5	2	2	11	G2	4	2	7	10	T3	5	2	4	4	G3	4	3	9	10	T4	5	2	5	3	H	4	6	7	0	5	4	T5	5	2	5	3	K1	4	1	2	0	V1	5	2	2	9	1	6	K2	4	1	3	9	V2	5	2	3	7	2	4	K3	4	1	4	10	V3	5	2	4	5	3	2	N1	4	3	4	10	V4	5	4	4	8	3	5	N2	4	3	4	10	V5	5	2	4	8	3	5																																																																																																																																																																																																																																																																																																																																			

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  - W = WING WALL WIDTH



**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
3' X 2' - 5' X 4' HEADWALLS  
PRECAST BOX CULVERTS  
30° SKEW

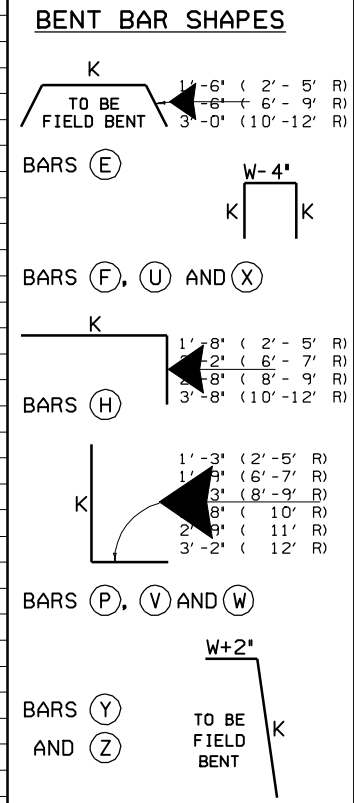
STANDARD DRAWING NO. RDH-1328-03

SUBMITTED *John B. Eckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO	LGTH		K	MARK	SIZE	NO	LGTH		K	MARK	SIZE	NO	LGTH		K	MARK	SIZE	NO	LGTH		K																	
			①	②					①	②					①	②					①	②		①	②															
5' X 5'						6' X 3'						6' X 4' (CONTINUED)						6' X 5' (CONTINUED)						6' X 6' (CONTINUED)						7' X 4'										
A1	5	2	8	1		A1	5	2	6	1		E1	5	2	13	1	10	1	F	4	11	1	3	0	6	B7	5	12	7	1		A1	5	2	7	5				
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C1	4	1	5	8		C1	4	1	6	8		F	4	11	1	3	0	6	G2	4	2	12	3		C2	4	2	9	4		C1	4	1	7	8					
C2	4	1	8	2		C2	4	1	9	2		G1	4	1	10	0			G3	4	2	14	1		C3	4	2	11	11		C2	4	1	10	3					
C3	4	1	10	10		C3	4	1	11	9		G2	4	2	12	0			G4	4	3	16	0		C4	4	2	17	1		C3	4	1	12	10					
C4	4	1	13	5		C4	4	1	13	3		G3	4	2	14	0			H	4	9	9	6	7	10	C5	4	4	17	5		C4	4	1	15	4				
C5	4	2	15	0		E1	5	2	13	1	10	1	G4	4	3	16	0		K1	4	1	2	6		E1	5	2	15	1	10	1	C5	4	1	15	9				
E1	5	2	11	6	8	6	E2	5	2	13	6	10	6	H	4	9	8	6	6	10	K2	4	1	4	4	E2	5	2	15	9	10	9	E1	5	2	14	8	11	8	
E2	5	2	11	11	8	11	F	4	11	1	3	0	6	K1	4	1	2	6		K3	4	1	6	2	F	4	11	1	5	0	6	E2	5	2	15	0	12	0		
F	4	9	1	3	0	6	G1	4	2	10	4		K2	4	1	4	4		K4	4	2	7	4	G1	4	1	9	11		F	4	12	1	3	0	6				
G1	4	2	8	6		G2	4	2	12	2		K3	4	1	6	2		N1	4	3	7	4	G2	4	2	11	11		G1	4	1	10	7							
G2	4	2	10	4		G3	4	3	14	0		K4	4	1	6	4		N2	4	3	16	1	G3	4	2	13	11		G2	4	2	12	5							
G3	4	2	12	1		H	4	8	7	6	5	10	N1	4	3	6	4		Q	4	2	6	10	G4	4	2	15	11		G3	4	2	14	2						
G4	4	3	14	0		K1	4	1	2	6		N2	4	3	14	8		R	4	8	1	2	G5	4	3	18	0		G4	4	3	16	0							
H	4	8	9	4	7	8	K2	4	1	4	3		Q	4	2	6	10		S1	5	2	1	5	H	4	10	11	0	8	10	H	4	9	8	8	7	0			
K1	4	1	2	5		K3	4	1	5	4		R	4	8	1	2		S2	5	2	2	2	J1	5	4	3	1		K1	4	1	2	8							
K2	4	1	4	2		N1	4	3	5	4		S1	5	2	1	5		S3	5	2	2	10	J2	5	4	4	2		K2	4	1	4	6							
K3	4	1	6	1		N2	4	3	13	3		S2	5	2	2	2		S4	5	2	3	7	J3	5	4	5	3		K3	4	1	6	3							
K4	4	2	7	2		Q	4	2	6	10		S3	5	2	2	10		S5	5	2	4	3	J4	5	4	6	4		K4	4	1	6	6							
N1	4	3	7	2		R	4	8	1	2		S4	5	2	3	7		S6	5	2	5	0	K1	4	2	2	6		N1	4	3	6	6							
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R	4	6	1	1		S3	5	2	2	10		S7	5	2	5	6		T2	5	2	2	5	K4	4	2	7	11		R	4	9	1	3							
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T1	5	2	1	3		T3	5	2	3	10		V1	5	2	3	9	2	6	V3	5	2	5	9	4	6	P	5	26	5	3	3	6	S7	5	2	5	10			
T2	5	2	2	8		T4	5	2	5	3		V2	5	2	4	6	3	3	V4	5	2	6	6	5	3	Q	5	5	6	10		S8	5	2	6	4				
T3	5	2	4	1		T5	5	2	6	8		V3	5	2	5	3	4	0	V5	5	2	7	4	6	1	R	5	8	3	5		T1	5	2	2	2				
T4	5	2	5	6		T6	5	2	7	7		V4	5	2	6	1	4	10	V6	5	6	7	10	6	7	S1	5	2	1	1		T2	5	2	3	7				
T5	5	2	6	5		V1	5	2	3	3	2	0	V5	5	7	6	10	5	7	W1	5	2	4	3	3	0	S2	5	2	1	10		T3	5	2	5	1			
V1	5	2	4	3	3	0	V2	5	2	4	0	2	9	W1	5	2	3	9	2	6	W2	5	2	5	4	4	1	S3	5	2	2	6		T4	5	2	6	6		
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V5	5	2	7	4	6	1	W1	5	2	3	4	2	1													S7	5	2	5	4		V2	5	2	4	6	3	3		
V6	5	5	7	9	6	6	W2	5	2	4	5	3	2													S8	5	2	5	8		V3	5	2	5	3	4	0		
W1	5	2	4	3	1		W3	5	1	5	7	4	4														T1	5	2	1	6		V4	5	2	6	1	4	10	
W2	5	2	5	5	4	2																					T2	5	2	3	0		V5	5	2	6	10	5	7	
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																												T5	5	2	7	2		W2	5	2	4	11	3	8
																												T6	5	2	7	9		W3	5	2	6	0	4	9
																																	W4	5	1	7	1	5	10	

- NOTES**
- 1 NUMBER OF BARS IN ONE HEADWALL.
  - 2 DIMENSIONS ARE 0. TO 0. OF BARS.
  - 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - 4 R = BOX OR PIPE RISE
  - 5 W = WING WALL WIDTH



**KENTUCKY DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**

**5' X 5' - 7' X 4' HEADWALLS**

**PRECAST BOX CULVERTS**

**30° SKEW**

**STANDARD DRAWING NO. RDH-1330-03**

SUBMITTED: *John B. Ingleton* 12-1-99 DATE

APPROVED: *J. N. Howell* 12-1-99 DATE

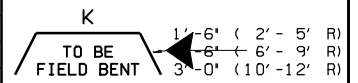
STATE HIGHWAY ENGINEER

Table with columns for MARK, SIZE, NO, LGTH, K, repeated for 7' X 5', 7' X 6', 7' X 7', 8' X 4', and 8' X 5' sections.

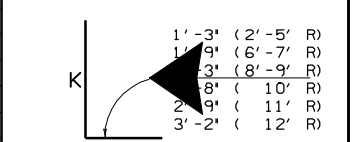
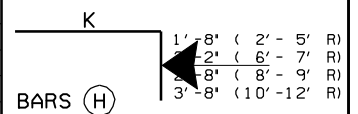
NOTES

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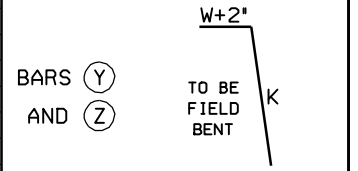
BENT BAR SHAPES



BARS (F), (U) AND (X)



BARS (P), (V) AND (W)



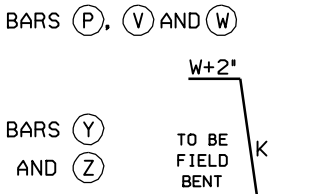
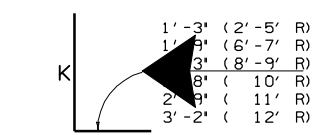
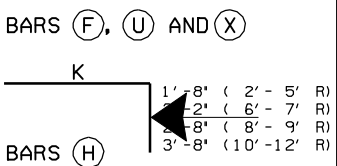
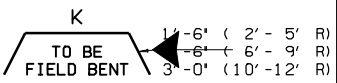
KENTUCKY DEPARTMENT OF HIGHWAYS
BILL OF REINFORCEMENT
7' X 5' - 8' X 5' HEADWALLS
PRECAST BOX CULVERTS
30° SKEW
STANDARD DRAWING NO. RDH-1332-03
SUBMITTED BY: John B. Ingham
APPROVED: J. W. Powell



MARK	SIZE	NO					K	MARK	SIZE	NO					K	MARK	SIZE	NO					K	MARK	SIZE	NO					K	MARK	SIZE	NO					K																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		①	FT	IN	FT	IN				①	FT	IN	FT	IN				①	FT	IN	FT	IN				①	FT	IN	FT	IN				①	FT	IN	FT	IN		①	FT	IN	FT	IN	①	FT	IN	FT	IN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
																																																		9' X 6' (CONTINUED)					9' X 7' (CONTINUED)					9' X 8' (CONTINUED)					9' X 8' (CONTINUED)					9' X 9' (CONTINUED)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
9' X 6'								S8	5	2	6	4		9' X 7'								K5	4	6	9	6	9' X 8'								E2	5	2	20	2	15	2	9' X 8'								X3	4	1	3	7	1	7	9' X 9'								M2	4	35	4	9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
A1	5	2	9	8			S9	5	2	7	0		M1	4	1	2	5		F	4	15	1	5	0	6	X4	4	1	4	1	1	10	N1	4	8	11	6			S10	5	2	7	8		M2	4	31	3	9		G1	4	1	14	5			X5	4	1	4	5	2	0	N2	4	5	22	2			S11	5	2	8	0		N1	4	7	9	6		G2	4	2	16	4			X6	4	1	4	11	2	3	N3	4	3	24	8			T1	5	2	2	0			N2	4	5	19	10		G3	4	2	18	2			Z	4	2	8	8	7	8	P	7	37	7	3	5	0	T2	5	2	3	5			N3	4	2	21	10		G4	4	2	20	2			Q	5	5	10	2			T3	5	2	4	10		P	5	32	5	9	4	0	G5	4	2	22	1			T4	5	2	6	3			Q	5	5	10	2			T5	5	2	7	8			R	5	11	3	7			H	4	13	13	2	11	2	T6	5	2	9	1			S1	5	2	1	5			J1	5	4	4	0			T7	5	2	10	6			S2	5	2	2	1			J2	5	4	5	1			T8	5	2	11	2			S3	5	2	2	9			J3	5	4	6	2			S4	5	2	3	6			J4	5	4	7	3			S5	5	2	4	2			J5	5	4	8	4			S6	5	2	4	11			J6	5	2	9	5			S7	5	2	5	7			K1	4	2	1	1			S8	5	2	6	4			K2	4	2	2	11			S9	5	2	7	0			K3	4	2	4	9			S10	5	2	7	8			K4	5	2	6	8			S11	5	2	8	0			K5	4	2	8	6			T1	5	2	2	0			B1	5	4	3	6			T2	5	2	3	5			B2	5	4	4	3			T3	5	2	4	10			B3	5	4	5	0			T4	5	2	6	3			B4	5	4	5	9			T5	5	2	7	8			B5	5	4	6	7			T6	5	2	9	1			B6	5	4	7	4			T7	5	2	10	6			B7	5	4	8	1			T8	5	2	11	2			B8	5	16	8	3			P	6	34	6	9	4	6	M1	4	1	3	0			M2	4	33	4	9			N1	4	8	10	6			N2	4	5	20	10			N3	4	3	23	3			P	6	34	6	9	4	6	Q	5	5	10	2			R	5	11	4	1			S1	5	2	1	5			S2	5	2	2	1			S3	5	2	2	9			S4	5	2	3	6			S5	5	2	4	2			S6	5	2	4	11			S7	5	2	5	7			S8	5	2	6	4			S9	5	2	7	0			S10	5	2	7	8			S11	5	2	8	0			T1	5	2	2	0			T2	5	2	3	5			T3	5	2	4	10			T4	5	2	6	3			T5	5	2	7	8			T6	5	2	9	1			T7	5	2	10	6			T8	5	2	11	2			X1	4	1	2	9	1	2	X2	4	1	3	1	1	4	X3	4	1	3	5	1	6	X4	4	1	3	11	1	9	X5	4	1	4	3	1	11	X6	4	1	4	7	2	1	X7	4	1	4	11	2	3	Z	4	2	9	8	8	8

- ### NOTES
- 1 NUMBER OF BARS IN ONE HEADWALL.
  - 2 DIMENSIONS ARE 0. TO 0. OF BARS.
  - 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - 4 R = BOX OR PIPE RISE
  - 5 W = WING WALL WIDTH

### BENT BAR SHAPES



**KENTUCKY  
DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT  
9' X 6' - 9' X 9' HEADWALLS  
PRECAST BOX CULVERTS  
30° SKEW**

**STANDARD DRAWING NO. RDH-1336-03**

SUBMITTED BY *John B. Imholster*

APPROVED *John M. Powell*

DIRECTOR DIVISION OF DESIGN

STATE HIGHWAY ENGINEER

DATE 12-1-99

DATE 12-1-99







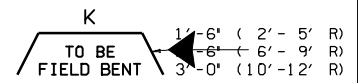


MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K				
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN	FT	IN
		12' X 4'					12' X 4' (CONTINUED)					12' X 6' (CONTINUED)					12' X 8' (CONTINUED)					12' X 8' (CONTINUED)									
A1	5	2	8	2		V3	5	2	5	3	4	0	N2	4	5	21	7	C5	4	2	23	3	T3	5	2	4	1				
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C3	4	1	17	9		W1	5	2	3	10	2	7	R	5	14	3	10	E2	5	2	25	0	20	0	T7	5	2	9	9		
C4	4	1	20	5		W2	5	2	4	11	3	8	S1	5	2	1	0	F	4	20	1	5	0	6	T8	5	2	11	1		
C5	4	1	20	8		W3	5	2	6	0	4	9	S2	5	2	1	8	G1	4	1	20	0	T9	5	2	12	7				
E1	5	2	22	5	19	5							S3	5	2	2	5	G2	4	2	21	11	T10	5	2	14	0				
E2	5	2	22	9	19	9							S4	5	2	3	1	G3	4	2	23	11	T11	5	2	14	7				
F	4	20	1	3	0	6							S5	5	2	3	10	G4	4	2	25	11	X1	4	1	2	9	1	2		
G1	4	2	20	0			12' X 6'					S7	5	2	5	3	G5	4	2	27	11	X2	4	1	3	3	1	5			
G2	4	2	22	0									S8	5	2	5	11	G6	4	3	30	0	X3	4	1	3	7	1	7		
G3	4	2	24	0		A1	5	2	10	3			S9	5	2	6	8	H	4	16	14	4	11	8	X4	4	1	4	1	1	10
G4	4	3	26	0		A2	5	2	13	8			S10	5	2	7	4	J1	5	4	4	1	X5	4	1	4	5	2	0		
H	4	14	9	4	7	8	B1	5	4	3	0		S11	5	2	8	0	J2	5	4	5	2	X6	4	1	4	11	2	3		
K1	4	1	1	5			B2	5	4	3	9		S12	5	2	8	9	J3	5	4	6	2	Z	4	2	8	11	7	11		
K2	4	1	3	3			B3	5	4	4	6		S13	5	2	9	5	J4	5	4	7	3									
K3	4	1	5	2			B4	5	4	5	4		S14	5	2	10	2	J5	5	4	8	4									
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K5	4	1	7	2			B6	5	4	6	10		T1	5	2	1	3	K2	4	2	3	3									
N1	4	3	7	2			B7	5	24	7	6		T2	5	2	2	8	K3	4	2	5	3									
N2	4	3	20	9			C1	4	2	12	10		T3	5	2	4	1	K4	4	2	7	2									
Q	4	2	13	8			C2	4	2	15	4		T4	5	2	5	6	K5	4	2	8	11									
R	4	14	1	7			C3	4	2	17	11		T5	5	2	6	11	K6	4	2	10	9									
S1	5	2	1	4			C4	4	2	20	6		T6	5	2	8	4	K7	4	6	11	0									
S2	5	2	2	1			C5	4	2	23	0		T7	5	2	9	9	M1	4	2	2	9									
S3	5	2	2	9			C6	4	4	23	6		T8	5	2	11	1	M2	4	36	4	9									
S4	5	2	3	6			E1	5	2	24	5	19	5	T9	5	2	12	7	N1	4	8	11	0								
S5	5	2	4	2			E2	5	2	25	0	20	0	T10	5	2	14	0	N2	4	5	24	0								
S6	5	2	4	10			F	4	20	1	5	0	6	T11	5	2	14	7	N3	4	3	26	7								
S7	5	2	5	7			G1	4	1	20	0			P	7	38	6	9	4	6											
S8	5	2	6	3			G2	4	2	22	0			Q	5	5	13	8													
S9	5	2	7	0			G3	4	2	23	11			R	5	14	4	4													
S10	5	2	7	8			G4	4	2	26	0		12' X 8'					S1	5	2	1	0									
S11	5	2	8	4			G5	4	3	28	0		A1	5	2	12	6	S2	5	2	1	8									
S12	5	2	9	0			H	4	15	11	10	9	8	A2	5	2	16	9	S3	5	2	2	5								
S13	5	2	9	8			J1	5	4	3	1			B1	5	4	4	0	S4	5	2	3	1								
S14	5	2	10	4			J2	5	4	4	2			B2	5	4	4	9	S5	5	2	3	10								
T1	5	2	2	2			J3	5	4	5	3			B3	5	4	5	6	S6	5	2	4	6								
T2	5	2	3	7			J4	5	4	6	4			B4	5	4	6	3	S7	5	2	5	3								
T3	5	2	5	0			J5	5	2	7	5			B5	5	4	7	1	S8	5	2	5	11								
T4	5	2	6	5			K1	4	2	1	6			B6	5	4	7	10	S9	5	2	6	8								
T5	5	2	7	10			K2	4	2	3	4			B7	5	4	8	7	S10	5	2	7	4								
T6	5	2	9	3			K3	4	2	5	2			B8	5	4	9	4	S11	5	2	8	0								
T7	5	2	10	8			K4	4	2	6	11			B9	5	22	9	6	S12	5	2	8	9								
T8	5	2	12	0			K5	4	2	8	10			C1	4	2	12	10	S13	5	2	9	5								
T9	5	2	13	6			K6	4	4	9	0			C2	4	2	15	4	S14	5	2	10	2								
T10	5	2	14	5			M1	4	2	2	3			C3	4	2	18	1	S15	5	2	10	5								
V1	5	2	3	9	2	6	M2	4	31	3	9			C4	4	2	20	9	T1	5	2	1	3								
V2	5	2	4	6	3	3	N1	4	7	9	0			T2	5	2	2	8													

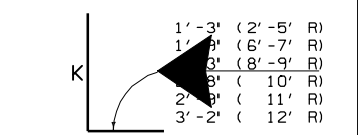
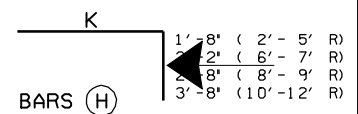
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

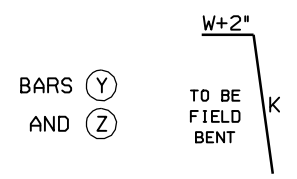
**BENT BAR SHAPES**



BARS (F), (U) AND (X)



BARS (Y) AND (Z)



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**12' X 4' - 12' X 8' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**30° SKEW**

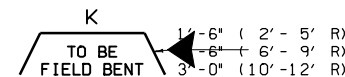
STANDARD DRAWING NO. RDH-1344-03  
 SUBMITTED BY *John B. Ingleton* 12-1-99 DATE  
 DIRECTOR DIVISION OF DESIGN  
 APPROVED BY *J. M. Powell* 12-1-99 DATE  
 STATE HIGHWAY ENGINEER

MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K				MARK	SIZE	NO LGTH K													
		①	FT	IN	FT			IN	①	FT	IN			FT	IN	①	FT	IN	FT	IN							
12' X 10'																											
12' X 10' (CONTINUED)																											
A1	5	2	14	7		P	8	42	8	2	5	6	B7	5	4	10	7			R	5	14	5	10			
A2	5	2	19	6		Q	5	6	13	8			B8	5	4	11	4			S1	5	2	1	2			
B1	5	4	5	0		R	5	14	5	0			B9	5	4	12	1			S2	5	2	1	10			
B2	5	4	5	9		S1	5	2	1	4			B10	5	4	12	11			S3	5	2	2	6			
B3	5	4	6	6		S2	5	2	2	0			B11	5	24	13	6			S4	5	2	3	3			
B4	5	4	7	3		S3	5	2	2	9			C1	4	2	13	2			S5	5	2	4	0			
B5	5	4	8	0		S4	5	2	3	5			C2	4	2	15	10			S6	5	2	4	8			
B6	5	4	8	9		S5	5	2	4	2			C3	4	2	18	5			S7	5	2	5	4			
B7	5	4	9	7		S6	5	2	4	10			C4	4	2	21	0			S8	5	2	6	0			
B8	5	4	10	4		S7	5	2	5	7			C5	4	2	23	8			S9	5	2	6	9			
B9	5	4	11	1		S8	5	2	6	4			C6	4	2	26	3			S10	5	2	7	6			
B10	5	22	11	6		S9	5	2	7	0			C7	4	2	28	11			S11	5	2	8	2			
C1	4	2	12	10		S10	5	2	7	8			C8	4	2	31	6			S12	5	2	8	11			
C2	4	2	15	6		S11	5	2	8	5			C9	4	10	31	10			S13	5	2	9	7			
C3	4	2	18	2		S12	5	2	9	2			E1	5	2	25	5	19	5	S14	5	2	10	4			
C4	4	2	20	10		S13	5	2	9	10			E2	5	2	26	7	20	7	S15	5	4	11	0			
C5	4	2	23	5		S14	5	2	10	6			F	4	20	1	10	0	6	T1	5	2	1	0			
C6	4	2	26	1		S15	5	2	10	8			G1	4	1	18	7			T2	5	2	2	6			
C7	4	2	28	8		T1	5	2	1	10			G2	4	2	20	6			T3	5	2	3	10			
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F	4	20	1	7	0	6	T5	5	2	7	5		G6	4	2	28	2			T7	5	2	9	7			
G1	4	1	19	11			T6	5	2	8	11		G7	4	2	30	1			T8	5	2	10	11			
G2	4	2	21	11			T7	5	2	10	3		G8	4	3	32	0			T9	5	2	12	4			
G3	4	2	23	11			T8	5	2	11	9		H	4	17	19	4	15	8	T10	5	2	13	9			
G4	4	2	25	11			T9	5	2	13	1		J1	5	4	6	0			X1	4	1	4	0	1	7	
G5	4	2	28	0			T10	5	2	14	6		J2	5	4	7	2			X2	4	1	4	6	1	10	
G6	4	2	30	0			T11	5	2	14	10		J3	5	4	8	2			X3	4	1	5	0	2	1	
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J1	5	4	5	0			X3	4	1	4	3	1	10	J6	5	4	11	5			X6	4	1	6	4	2	9
J2	5	4	6	1			X4	4	1	4	7	2	0	J7	5	4	12	6			X7	4	1	6	10	3	0
J3	5	4	7	3			X5	4	1	5	1	2	3	J8	5	2	13	7			X8	4	1	7	4	3	3
J4	5	4	8	3			X6	4	1	5	7	2	6	K1	4	2	1	4			X9	4	1	7	10	3	6
J5	5	4	9	4			X7	4	1	6	1	2	9	K2	4	2	3	3			X10	4	1	8	2	3	8
J6	5	4	10	5			X8	4	1	6	5	2	11	K3	4	2	5	2			Z	4	2	13	9	12	4
J7	5	2	11	6			Z	4	2	11	2	10	0	K4	4	2	7	0									
K1	4	2	1	5										K5	4	2	8	10									
K2	4	2	3	3										K6	4	2	10	8									
K3	4	2	5	2										K7	4	2	12	7									
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K6	4	2	10	9										M1	4	2	4	2									
K7	4	2	12	7										M2	4	45	6	8									
K8	4	8	12	10										N1	4	11	14	7									
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M2	4	41	5	8										N3	4	4	32	0									
N1	4	9	12	10										P	8	47	9	8	6	6							
N2	4	6	26	5										Q	5	7	13	8									
12' X 12'																											
A1	5	2	16	7																							
A2	5	2	22	2																							
B1	5	4	6	0																							
B2	5	4	6	9																							
B3	5	4	7	6																							
B4	5	4	8	3																							
B5	5	4	9	1																							

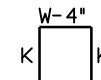
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE O. TO O. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

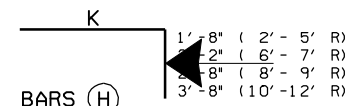
**BENT BAR SHAPES**



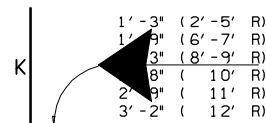
BARS (E)



BARS (F), (U) AND (X)



BARS (H)



BARS (P), (V) AND (W)

W+2"

BARS (Y) AND (Z)



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**12' X 10' - 12' X 12' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**30° SKEW**

**STANDARD DRAWING NO. RDH-1346-03**

SUBMITTED *John B. Eckstein* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN  
 APPROVED *J. W. Howell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER

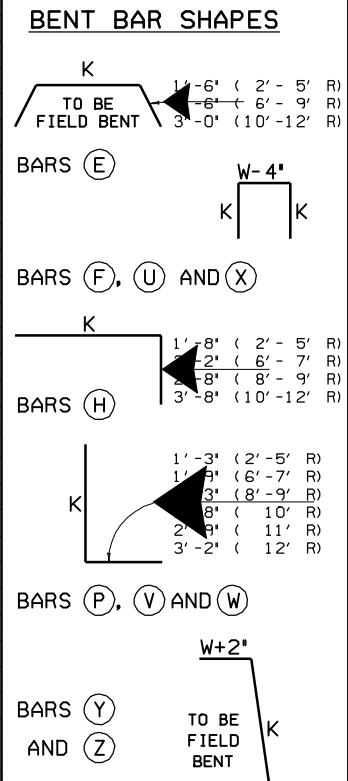






MARK K	SIZE E	NO LGTH					MARK K	SIZE E	NO LGTH					MARK K	SIZE E	NO LGTH					MARK K	SIZE E	NO LGTH					MARK K	SIZE E	NO LGTH														
		①	FT		IN				①	FT		IN				①	FT		IN				①	FT		IN				①	FT		IN		①	FT		IN		①	FT		IN	
			FT	IN	FT	IN				FT	IN	FT	IN				FT	IN	FT	IN				FT	IN	FT	IN				FT	IN	FT	IN		FT	IN	FT	IN		FT	IN	FT	IN
7' X 7'					7' X 7' (CONTINUED)					8' X 4' (CONTINUED)					8' X 5' (CONTINUED)					8' X 6' (CONTINUED)					8' X 6' (CONTINUED)																			
A1	5	2	10	11		S6	5	2	9	0	S8	5	2	11	5	N1	4	3	7	9	B6	5	4	5	9	T5	5	2	4	0														
A2	5	2	19	6		S7	5	2	10	5	S9	5	2	12	10	N2	4	3	29	2	B7	5	4	6	3	T6	5	2	4	8														
B1	5	4	3	5		S8	5	2	11	10	S10	5	2	13	10	Q	4	2	9	0	B8	5	4	6	10	T7	5	2	5	5														
B2	5	4	4	0		S9	5	2	12	8	T1	5	2	1	6	R	4	10	1	5	B9	5	30	7	2	T8	5	2	6	1														
B3	5	4	4	6		T1	5	2	1	6	T2	5	2	2	3	S1	5	2	1	6	C1	4	2	16	1	T9	5	2	6	10														
B4	5	4	5	1		T2	5	2	2	4	T3	5	2	3	0	S2	5	2	2	10	C2	4	2	19	9	T10	5	2	7	7														
B5	5	4	5	7		T3	5	2	3	0	T4	5	2	3	8	S3	5	2	4	4	C3	4	2	23	5	T11	5	2	8	3														
B6	5	4	6	2		T4	5	2	3	9	T5	5	2	4	5	S4	5	2	5	9	C4	4	2	27	0	T12	5	2	9	0														
B7	5	4	6	8		T5	5	2	4	5	T6	5	2	5	1	S5	5	2	7	2	C5	4	2	30	7	T13	5	2	9	8														
B8	5	4	7	3		T6	5	2	5	1	T7	5	2	5	10	S6	5	2	8	7	C6	4	4	31	1	T14	5	2	9	10														
B9	5	4	7	9		T7	5	2	5	10	T8	5	2	6	6	S7	5	2	10	0	E1	5	2	23	3 18 3																			
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C1	4	2	14	7		T9	5	2	7	3	T10	5	2	7	11	S9	5	2	12	10	F	4	19	1	5 0 6																			
C2	4	2	18	1		T10	5	2	8	0	T11	5	2	8	8	S10	5	2	13	10	G1	4	1	18	4																			
C3	4	2	21	11		T11	5	2	8	8	T12	5	2	9	4	T1	5	2	1	6	G2	4	2	21	3																			
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C5	4	2	29	4							V1	5	2	3	9 2 6	T3	5	2	3	0	G4	4	2	27	1																			
C6	4	6	31	6							V2	5	2	4	3 3 0	T4	5	2	3	8	G5	4	3	30	0																			
E1	5	2	21	4 16 4	8' X 4'					V3	5	2	4	10 3 7	T5	5	2	4	5	H	4	16	11 2 9 0																					
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F	4	17	1	5 0 6	A1	5	2	7	7	V5	5	2	5	11 4 8	T7	5	2	5	10	J2	5	4	4	1																				
G1	4	2	16	8	A2	5	2	13	8	V6	5	2	6	5 5 2	T8	5	2	6	6	J3	5	4	5	2																				
G2	4	2	19	6	C1	4	1	15	10	V7	5	15	6	11 5 8	T9	5	2	7	3	J4	5	4	6	3																				
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H	4	15	12	2 10 0	C5	4	1	27	2	W4	5	1	7	0 5 9	T13	5	2	9	9	K3	4	2	6	7																				
J1	5	4	3	6	E1	5	2	21	3 18 3						V1	5	2	4	3 3 0	K4	4	2	8	5																				
J2	5	4	4	7	E2	5	2	21	9 18 9						V2	5	2	4	9 3 6	K5	4	4	8	7																				
J3	5	4	5	8	F	4	19	1	3 0 6	8' X 5'					V3	5	2	5	3 4 0	M1	4	1	2	4																				
J4	5	4	6	8	G1	4	1	17	9	A1	5	2	8	9	V4	5	2	5	10 4 7	M2	4	39	3	9																				
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K3	4	2	6	7	H	4	14	8	8 7 0	C3	4	1	23	1	V8	5	15	7	10 6 7	P	5	40	5	3 3 6																				
K4	4	2	8	6	K1	4	1	2	9	C4	4	1	23	1	W1	5	2	4	3 3 0	Q	5	5	9	0																				
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M2	4	40	3	9	K4	4	1	6	9	E1	5	2	21	3 18 3	W4	5	2	7	6 6 3	S2	5	2	3	4																				
N1	4	7	9	8	N1	4	3	6	9	E2	5	2	21	9 18 9						S3	5	2	4	9																				
N2	4	5	28	7	N2	4	3	27	2	F	4	19	1	3 0 6						S4	5	2	6	2																				
N3	4	2	31	10	Q	4	2	9	0	G1	4	2	19	7	8' X 6'					S5	5	2	7	7																				
P	5	42	5	9 4 0	R	4	10	1	5	G2	4	2	22	5	A1	5	2	9	9	S6	5	2	9	0																				
Q	5	5	8	0	S1	5	2	1	6	G3	4	2	25	2	A2	5	2	17	5	S7	5	2	10	5																				
R	5	9	3	8	S2	5	2	2	10	G4	4	3	28	0	B1	5	4	2	11	S8	5	2	11	10																				
S1	5	2	1	11	S3	5	2	4	4	H	4	15	9	8 8 0	B2	5	4	3	6	S9	5	2	13	3																				
S2	5	2	3	4	S4	5	2	5	9	K1	4	1	2	10	B3	5	4	4	1	S10	5	2	14	1																				
S3	5	2	4	9	S5	5	2	7	2	K2	4	1	4	9	B4	5	4	4	7	T1	5	2	1	2																				
S4	5	2	6	2	S6	5	2	8	7	K3	4	1	6	7	B5	5	4	4	7	T2	5	2	1	11																				
S5	5	2	7	7	S7	5	2	10	0	K4	4	2	7	9	B6	5	4	5	2	T3	5	2	2	7																				
																				T4	5	2	3	4																				

- NOTES**
- NUMBER OF BARS IN ONE HEADWALL.
  - DIMENSIONS ARE 0. TO 0. OF BARS.
  - ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
  - R = BOX OR PIPE RISE
  - W = WING WALL WIDTH



**KENTUCKY  
DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT  
7' X 7' - 8' X 6' HEADWALLS  
PRECAST BOX CULVERTS  
45° SKEW**

STANDARD DRAWING NO. RDH-1354-03

SUBMITTED: *John B. Ingleton* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED: *J. W. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

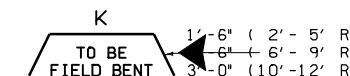


MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K						
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN	FT	IN		
																																9' X 7'	
9' X 7'						9' X 7' (CONTINUED)						9' X 8' (CONTINUED)						9' X 8' (CONTINUED)						9' X 9' (CONTINUED)									
A1	5	2	11	2		S6	5	2	9	3		G3	4	2	25	7		T15	5	2	11	0		K1	4	2	3	0					
A2	5	2	19	10		S7	5	2	10	8		G4	4	2	28	4		X1	4	1	2	5	1	0	K2	4	2	5	0				
B1	5	4	3	5		S8	5	2	12	1		G5	4	2	31	3		X2	4	1	2	11	1	3	K3	4	2	6	11				
B2	5	4	4	0		S9	5	2	13	6		G6	4	3	34	0		X3	4	1	3	3	1	5	K4	4	2	8	10				
B3	5	4	4	7		S10	5	2	14	11		H	4	18	13	10	11	2	X4	4	1	3	9	1	8	K5	4	2	10	9			
B4	5	4	5	1		S11	5	2	15	9		J1	5	4	4	0		X5	4	1	4	1	1	10	K6	4	8	11	0				
B5	5	4	5	7		T1	5	2	1	8		J2	5	4	5	1		X6	4	1	4	5	2	0	M1	4	1	2	11				
B6	5	4	6	2		T2	5	2	2	4		J3	5	4	6	2		X7	4	1	4	11	2	3	M2	4	5	0	4	9			
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B8	5	4	7	3		T4	5	2	3	9		J5	5	4	8	3									N2	4	5	35	4				
B9	5	4	7	9		T5	5	2	4	6		J6	5	2	9	3									N3	4	3	39	3				
B10	5	3	4	8	3	T6	5	2	5	2		K1	4	2	1	1								P	7	5	1	7	3	5	0		
C1	4	2	17	11		T7	5	2	5	11		K2	4	2	3	0		9' X 9'						Q	5	5	10	2					
C2	4	2	21	7		T8	5	2	6	7		K3	4	2	5	0		A1	5	2	13	5			R	5	11	4	3				
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E1	5	2	25	6	20	6	T13	5	2	10	2		M1	4	1	2	10		B4	5	4	6	0			S5	5	2	7	10			
E2	5	2	26	3	21	3	T14	5	2	10	10		M2	4	4	7	9		B5	5	4	6	7			S6	5	2	9	3			
F	4	21	1	5	0	6	T15	5	2	11	0		N1	4	8	10	11		B6	5	4	7	1			S7	5	2	10	8			
G1	4	2	22	3									N2	4	5	33	4		B7	5	4	7	8			S8	5	2	12	1			
G2	4	2	25	2									N3	4	3	37	3		B8	5	4	7	8			S9	5	2	13	6			
G3	4	2	28	1		9' X 8'						P	6	48	6	9	4	6		B9	5	4	8	2			S10	5	2	14	11		
G4	4	2	31	0		Q	5	5	10	2			R	5	11	4	3		B10	5	4	8	9			S11	5	2	15	9			
G5	4	3	34	0		A1	5	2	12	3			S1	5	2	2	2		B11	5	4	9	10			T1	5	2	1	8			
H	4	18	12	4	10	2	A2	5	2	21	11		S2	5	2	3	7		B12	5	3	4	10	3		T2	5	2	2	4			
J1	5	4	3	6		B1	5	4	4	0			S3	5	2	5	0		C1	4	2	17	11			T3	5	2	3	0			
J2	5	4	4	7		B2	5	4	4	6			S4	5	2	6	5		C2	4	2	21	9			T4	5	2	3	9			
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K1	4	2	3	0		B6	5	4	6	8			S8	5	2	12	1		C6	4	2	36	9			T8	5	2	6	7			
K2	4	2	4	11		B7	5	4	7	2			S9	5	2	13	6		C7	4	8	39	0			T9	5	2	7	4			
K3	4	2	6	10		B8	5	4	7	9			S10	5	2	14	11		C8	4	2	25	4			T10	5	2	8	0			
K4	4	2	8	8		B9	5	4	8	3			S11	5	2	15	9		E1	5	2	25	6	20	6	T11	5	2	8	9			
K5	4	6	9	10		B10	5	4	8	9			T1	5	2	1	8		E2	5	2	26	3	21	3	T12	5	2	9	5			
M1	4	2	2	4		B11	5	3	4	9	3		T2	5	2	2	4		F	4	21	1	5	0	6	T13	5	2	10	2			
M2	4	4	3	9		C1	4	2	18	0			T3	5	2	3	0		G1	4	2	21	9			T14	5	2	10	10			
N1	4	7	9	10		C2	4	2	21	9			T4	5	2	3	9		G2	4	2	24	7			T15	5	2	11	0			
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N3	4	2	35	3		C4	4	2	29	2			T6	5	2	5	2		G4	4	2	30	3			X2	4	1	2	9	1	2	
P	5	45	5	9	4	0	C5	4	2	32	10			T7	5	2	5	11		G5	4	2	33	1			X3	4	1	3	3	1	5
Q	5	5	10	2		C6	4	2	36	6			T8	5	2	6	7		G6	4	3	36	0			X4	4	1	3	7	1	7	
R	5	11	3	9		C7	4	6	37	1			T9	5	2	7	4		H	4	19	14	10	12	2		X5	4	1	3	11	1	9
S1	5	2	2	2		E1	5	2	25	6	20	6	T10	5	2	8	0		J1	5	4	4	6			X6	4	1	4	3	1	11	
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S5	5	2	7	10		G2	4	2	22	9			T14	5	2	10	10		J5	5	4	8	8										
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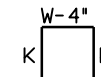
**NOTES**

- NUMBER OF BARS IN ONE HEADWALL.
- DIMENSIONS ARE O. TO O. OF BARS.
- ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- R = BOX OR PIPE RISE
- W = WING WALL WIDTH

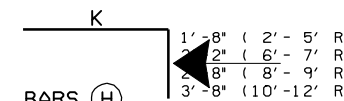
**BENT BAR SHAPES**



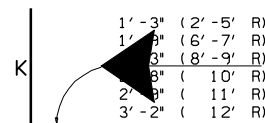
BARS (E)



BARS (F), (U) AND (X)



BARS (H)



BARS (P), (V) AND (W)



BARS (Y) AND (Z)

KENTUCKY  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
9' X 7' - 9' X 9' HEADWALLS  
PRECAST BOX CULVERTS  
45° SKEW

**STANDARD DRAWING NO. RDH-1358-03**

SUBMITTED *John B. Suckstein* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN  
APPROVED *J. M. Powell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER

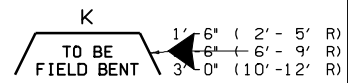


MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K				
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN	FT	IN
10' X 5'						10' X 5' (CONTINUED)						10' X 6' (CONTINUED)						10' X 7'						10' X 7' (CONTINUED)							
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C5	4	2	33	1		V6	5	2	6	11	5	8	M1	4	2	2	4		B5	5	4	5	7		S13	5	2	17	4		
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G1	4	2	25	1		W1	5	2	4	4	3	1	N3	4	2	35	2		B9	5	4	7	9		T4	5	2	3	6		
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G3	4	2	31	0		W3	5	2	6	5	5	2	R	5	12	3	10		C1	4	2	19	9		T6	5	2	4	11		
G4	4	3	34	0		W4	5	2	7	5	6	2	S1	5	2	1	1		C2	4	2	23	6		T7	5	2	5	8		
H	4	18	10	0	8	4							S2	5	2	2	6		C3	4	2	27	1		T8	5	2	6	4		
K1	4	1	3	1									S3	5	2	3	10		C4	4	2	30	10		T9	5	2	7	1		
K2	4	1	5	1									S4	5	2	5	3		C5	4	2	34	6		T10	5	2	7	9		
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T7	5	2	5	4		G3	4	2	28	5		T16	5	2	12	0		N3	4	2	37	2									
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T9	5	2	6	9		G5	4	3	34	0								Q	5	5	11	4									
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T11	5	2	8	2		J1	5	4	3	0							S1	5	2	1	1										
T12	5	2	8	10		J2	5	4	4	1							S2	5	2	2	6										
T13	5	2	9	7		J3	5	4	5	2							S3	5	2	3	10										
T14	5	2	10	3		J4	5	4	6	3							S4	5	2	5	3										
T15	5	2	10	11		J5	5	2	7	3							S5	5	2	6	8										

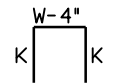
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

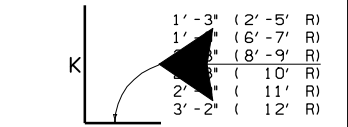
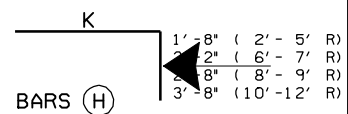
**BENT BAR SHAPES**



BARS (E)



BARS (F), (U) AND (X)



BARS (Y) AND (Z)



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**10' X 5' - 10' X 7' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**45° SKEW**

**STANDARD DRAWING NO. RDH-1360-03**

SUBMITTED *John B. Enckstein* 12-1-99 DATE  
DIRECTOR DIVISION OF DESIGN

APPROVED *J. M. Powell* 12-1-99 DATE  
STATE HIGHWAY ENGINEER

MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K	MARK	SIZE	NO LGTH				K																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN	FT	IN	①	FT	IN	FT	IN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
10' X 8'						10' X 8' (CONTINUED)						10' X 9' (CONTINUED)						10' X 9' (CONTINUED)						10' X 10' (CONTINUED)						10' X 10' (CONTINUED)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
A1	5	2	12	5		S1	5	2	1	1		B7	5	4	7	1		S8	5	2	10	11		B13	5	38	11	5		S9	5	2	12	11		C1	4	2	19	11		S10	5	2	13	9		B8	5	4	8	2		S9	5	2	12	4		C2	4	2	23	9		S11	5	2	15	9		B9	5	4	8	9		S12	5	2	15	2		C3	4	2	27	5		S12	5	2	16	7		B10	5	4	9	3		S13	5	2	17	4		C4	4	2	31	2		S13	5	2	17	7		B11	5	4	9	9		T1	5	2	1	5		C5	4	2	35	0		T2	5	2	2	1		B12	5	38	10	4		T2	5	2	1	5		C6	4	2	38	7		T3	5	2	2	10		C1	4	2	19	10		T3	5	2	2	10		C2	4	2	23	8		T4	5	2	3	6		C3	4	2	27	5		T4	5	2	3	6		C4	4	2	31	2		T5	5	2	4	3		C5	4	2	34	9		T5	5	2	4	3		C6	4	2	38	7		T6	5	2	4	11		C7	4	2	42	3		T6	5	2	4	11		C8	4	2	46	0		T7	5	2	5	8		C9	4	2	50	0		T7	5	2	5	8		E1	5	2	28	9	22	9	T8	5	2	6	4		E2	5	2	29	10	23	10	T9	5	2	7	1		F	4	23	1	7	0	6	T9	5	2	7	1		G1	4	1	22	9		T10	5	2	7	9		G2	4	2	25	7		T10	5	2	7	9		G3	4	2	28	5		T11	5	2	8	6		G4	4	2	31	4		T11	5	2	8	6		G5	4	2	34	3		T12	5	2	8	6		G6	4	2	37	3		T12	5	2	9	2		G7	4	3	40	0		T13	5	2	9	10		H	4	21	17	0	13	4	T13	5	2	9	10		J1	5	4	5	0		T14	5	2	10	7		J2	5	4	6	1		T15	5	2	11	4		J3	5	4	7	2		T16	5	2	12	0		J4	5	4	8	1		T17	5	2	12	1		J5	5	4	9	2		X1	4	1	2	7	1	1	X1	4	1	2	7	1	1	X2	4	1	2	11	1	3	X2	4	1	2	11	1	3	X3	4	1	3	3	1	5	X3	4	1	3	3	1	5	X4	4	1	3	7	1	7	X4	4	1	3	7	1	7	X5	4	1	3	11	1	9	X5	4	1	3	11	1	9	X6	4	1	4	3	1	11	X6	4	1	4	3	1	11	X7	4	1	4	7	2	1	X7	4	1	4	7	2	1	X8	4	1	4	11	2	3	X8	4	1	4	11	2	3	X9	4	2	7	0		X9	4	2	7	0		X10	4	2	10	9		X10	4	2	10	9		X11	4	2	12	7		X11	4	2	12	7		X12	4	2	13	5		X12	4	2	13	5		X13	4	1	3	11	1	8	X13	4	1	3	11	1	8	X14	4	1	4	3	1	10	X14	4	1	4	3	1	10	X15	4	1	4	9	2	1	X15	4	1	4	9	2	1	X16	4	1	5	3	2	4	X16	4	1	5	3	2	4	X17	4	1	5	7	2	6	X17	4	1	5	7	2	6	X18	4	1	6	1	2	9	X18	4	1	6	1	2	9	X19	4	1	6	5	2	11	X19	4	1	6	5	2	11	X20	4	2	11	7	10	5	X20	4	2	11	7	10	5

**NOTES**

- NUMBER OF BARS IN ONE HEADWALL.
- DIMENSIONS ARE 0. TO 0. OF BARS.
- ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- R = BOX OR PIPE RISE
- W = WING WALL WIDTH

**BENT BAR SHAPES**

**BARS (E)**

**BARS (F), (U) AND (X)**

**BARS (H)**

**BARS (P), (V) AND (W)**

**BARS (Y) AND (Z)**

TO BE FIELD BENT

**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**  
**BILL OF REINFORCEMENT**  
**10' X 8' - 10' X 10' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**45° SKEW**  
**STANDARD DRAWING NO. RDH-1362-03**

SUBMITTED *John B. Enck* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

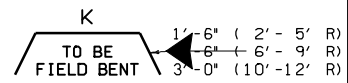
APPROVED *J. H. Howell* 12-1-99  
STATE HIGHWAY ENGINEER DATE

MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K	MARK	SIZE	NO				K		
		①	FT	IN	FT				IN	①	FT	IN				FT	IN	①	FT				IN	FT	IN	①		FT	IN
11' X 4'						11' X 6' (CONTINUED)						11' X 8' (CONTINUED)						11' X 8' (CONTINUED)											
A1	5	2	8	2		T14	5	2	10	9		N2	4	5	34	1		B8	5	4	7	9		S10	5	2	14	0	
A2	5	2	14	8		T15	5	2	11	5		N3	4	2	37	2		B9	5	4	8	3		S11	5	2	15	5	
C1	4	1	21	8		T16	5	2	12	1		P	5	46	5	3	3	B10	5	4	8	9		S12	5	2	16	9	
C2	4	1	25	5		T17	5	2	12	10		Q	5	5	12	6		B11	5	42	9	4		S13	5	2	18	2	
C3	4	1	29	1		T18	5	2	13	2		R	5	13	3	11		C1	4	2	21	10		S14	5	2	19	0	
C4	4	1	32	9								S1	5	2	1	3		C2	4	2	25	8		T1	5	2	1	2	
C5	4	1	33	1								S2	5	2	2	7		C3	4	2	29	4		T2	5	2	1	11	
E1	5	2	28	0	25	11' X 6'						S3	5	2	4	0		C4	4	2	33	1		T3	5	2	2	8	
E2	5	2	28	6	25							S4	5	2	5	5		C5	4	2	36	10		T4	5	2	3	3	
F	4	26	1	3	0	A1	5	2	10	4		S5	5	2	6	10		C6	4	2	40	6		T5	5	2	4	0	
G1	4	2	25	6		A2	5	2	18	5		S6	5	2	8	3		C7	4	6	41	6		T6	5	2	4	9	
G2	4	2	28	5		B1	5	4	3	0		S7	5	2	9	8		E1	5	2	30	0	T7	5	2	5	5		
G3	4	2	31	3		B2	5	4	3	6		S8	5	2	11	1		E2	5	2	30	8	T8	5	2	6	1		
G4	4	3	34	0		B3	5	4	4	1		S9	5	2	12	6		F	4	26	1	5	0	T9	5	2	6	10	
H	4	18	9	2	7	B4	5	4	4	7		S10	5	2	14	0		G1	4	1	25	7		T10	5	2	7	7	
K1	4	1	1	5		B5	5	4	5	2		S11	5	2	15	5		G2	4	2	28	5		T11	5	2	8	3	
K2	4	1	3	4		B6	5	4	5	8		S12	5	2	16	9		G3	4	2	31	3		T12	5	2	9	0	
K3	4	1	5	2		B7	5	4	6	3		S13	5	2	18	2		G4	4	2	34	2		T13	5	2	9	8	
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K5	4	1	7	3		B9	5	4	7	4		T1	5	2	1	2		G6	4	3	40	0		T15	5	2	11	1	
N1	4	3	7	3		B10	5	38	7	5		T2	5	2	1	11		H	4	21	14	2	T16	5	2	11	10		
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Q	4	2	12	6		C2	4	2	25	7		T4	5	2	3	3		J2	5	4	5	1		T18	5	4	13	3	
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S6	5	2	9	4		F	4	26	1	5	0	T11	5	2	8	3		K3	4	2	5	4		X7	4	1	5	1	2
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S8	5	2	12	2		G2	4	2	27	6		T13	5	2	9	8		K5	4	2	9	2							
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S10	5	2	15	0		G4	4	2	33	1		T15	5	2	11	1		K7	4	6	11	3							
S11	5	2	16	5		G5	4	3	36	0		T16	5	2	11	10		M1	4	1	2	10							
S12	5	2	17	10		H	4	19	11	8	9	T17	5	2	12	6		M2	4	5	1	4	9						
S13	5	2	18	9		J1	5	4	3	1		T18	5	4	13	3		N1	4	8	11	3							
T1	5	2	1	6		J2	5	4	4	1								N2	4	5	37	4							
T2	5	2	2	3		J3	5	4	5	2								N3	4	3	41	2							
T3	5	2	2	11		J4	5	4	6	3								P	7	52	6	9	4						
T4	5	2	3	7		J5	5	4	7	3		11' X 8'						Q	5	5	12	6							
T5	5	2	4	5		K1	4	2	1	5		A1	5	2	12	7		R	5	13	4	5							
T6	5	2	5	1		K2	4	2	3	4		A2	5	2	22	7		S1	5	2	1	3							
T7	5	2	5	9		K3	4	2	5	2		B1	5	4	4	0		S2	5	2	2	7							
T8	5	2	6	6		K4	4	2	7	1		B2	5	4	4	6		S3	5	2	4	0							
T9	5	2	7	2		K5	4	2	9	0		B3	5	4	5	0		S4	5	2	5	5							
T10	5	2	7	11		K6	4	4	9	2		B4	5	4	5	7		S5	5	2	6	10							
T11	5	2	8	7		M1	4	1	2	4		B5	5	4	5	7		S6	5	2	8	3							
T12	5	2	9	4		M2	4	45	3	9		B6	5	4	6	1		S7	5	2	9	8							
T13	5	2	10	1		N1	4	7	9	2		B7	5	4	6	8		S8	5	2	11	1							
																		S9	5	2	12	6							

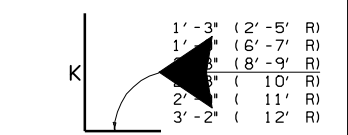
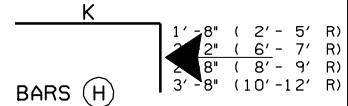
**NOTES**

- ① NUMBER OF BARS IN ONE HEADWALL.
- 2 DIMENSIONS ARE 0. TO 0. OF BARS.
- 3 ALL BARS ARE STRAIGHT EXCEPT THOSE SHOWN BELOW.
- 4 R = BOX OR PIPE RISE
- 5 W = WING WALL WIDTH

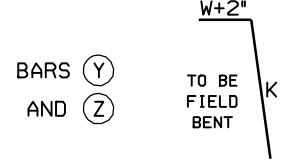
**BENT BAR SHAPES**



BARS (F), (U) AND (X)



BARS (Y) AND (Z)



**KENTUCKY**  
**DEPARTMENT OF HIGHWAYS**

**BILL OF REINFORCEMENT**  
**11' X 4' - 11' X 8' HEADWALLS**  
**PRECAST BOX CULVERTS**  
**45° SKEW**

**STANDARD DRAWING NO. RDH-1364-03**

SUBMITTED *John B. Eckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. W. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE



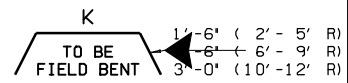


MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K					MARK	SIZE	NO LGTH K									
		①	FT	IN	FT	IN			①	FT	IN	FT	IN			①	FT	IN	FT	IN					
12' X 12'																12' X 12' (CONTINUED)					12' X 12' (CONTINUED)				
A1	5	2	17	0		K5	4	2	9	2		U4	4	1	5	2	2	2							
A2	5	2	30	5		K6	4	2	11	1		U5	4	1	5	8	2	5							
B1	5	4	5	11		K8	4	2	15	0		U7	4	1	6	8	2	11							
B2	5	4	6	6		K9	4	10	15	1		U8	4	1	7	2	3	2							
B3	5	4	7	0		M1	4	3	4	0		U9	4	1	7	8	3	5							
B4	5	4	7	6		M2	4	63	6	8		U10	4	1	8	2	3	8							
B5	5	4	8	1		N1	4	11	15	1		X1	4	1	3	10	1	6							
B6	5	4	8	7		N2	4	7	45	5		X2	4	1	4	2	1	8							
B7	5	4	9	2		N3	4	4	50	9		X3	4	1	4	8	1	11							
B8	5	4	9	8		P	8	66	9	8	6	6	X4	4	1	5	2	2	2						
B9	5	4	10	3		Q	5	7	13	8		X5	4	1	5	6	2	4							
B10	5	4	10	9		R	5	14	6	2		X6	4	1	6	0	2	7							
B11	5	4	11	4		S1	5	2	2	9		X7	4	1	6	6	2	10							
B12	5	4	11	10		S2	5	2	4	3		X8	4	1	6	10	3	0							
B13	5	4	12	5		S3	5	2	5	7		X9	4	1	7	4	3	3							
B14	5	4	12	11		S4	5	2	7	0		X10	4	1	7	8	3	5							
B15	5	46	13	5		S5	5	2	8	5		X11	4	1	8	2	3	8							
C1	4	2	24	2		S6	5	2	9	10		Y	4	2	13	1	11	8							
C2	4	2	27	10		S7	5	2	11	3		Z	4	2	14	3	12	10							
C3	4	2	31	8		S8	5	2	12	7															
C4	4	2	35	4		S9	5	2	14	1															
C5	4	2	38	10		S10	5	2	15	5															
C6	4	2	42	9		S11	5	2	16	11															
C7	4	2	46	5		S12	5	2	18	5															
C8	4	2	50	0		S13	5	2	19	9															
C9	4	10	50	8		S14	5	4	21	2															
E1	5	2	33	3	27	3	T1	5	2	1	1														
E2	5	2	34	8	28	8	T2	5	2	1	10														
F	4	28	1	10	0	6	T3	5	2	2	7														
G1	4	1	27	6			T4	5	2	3	3														
G2	4	2	30	4			T5	5	2	4	0														
G3	4	2	33	2			T6	5	2	4	8														
G4	4	2	36	3			T7	5	2	5	3														
G5	4	2	39	1			T8	5	2	6	0														
G6	4	2	42	0			T9	5	2	6	9														
G7	4	2	44	10			T10	5	2	7	5														
G8	4	3	48	0			T11	5	2	8	1														
H	4	25	19	4	15	8	T12	5	2	8	11														
J1	5	4	6	0			T13	5	2	9	7														
J2	5	4	7	1			T14	5	2	10	3														
J3	5	4	8	1			T15	5	2	11	0														
J4	5	4	9	2			T16	5	2	11	8														
J5	5	4	10	2			T17	5	2	12	5														
J6	5	4	11	3			T18	5	2	13	1														
J7	5	4	12	4			T19	5	2	13	10														
J8	5	2	13	4			T20	5	2	14	6														
K1	4	2	1	5			T21	5	4	14	10														
K2	4	2	3	4			U1	4	1	3	10	1	6												
K3	4	2	5	4			U2	4	1	4	2	1	8												
K4	4	2	7	3			U3	4	1	4	8	1	11												

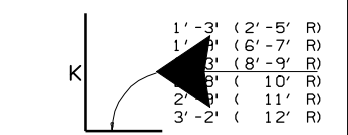
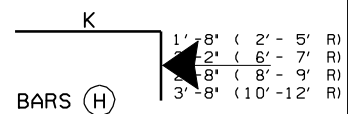
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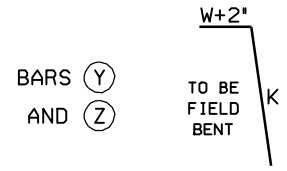
**BENT BAR SHAPES**



BARS (F), (U) AND (X)



BARS (Y) AND (Z)



**KENTUCKY**  
DEPARTMENT OF HIGHWAYS

**BILL OF REINFORCEMENT**  
12' X 12' HEADWALLS  
PRECAST BOX CULVERTS  
45° SKEW

STANDARD DRAWING NO. RDH-1370-03

SUBMITTED *John B. Enckstein* 12-1-99  
DIRECTOR DIVISION OF DESIGN DATE

APPROVED *J. M. Powell* 12-1-99  
STATE HIGHWAY ENGINEER DATE