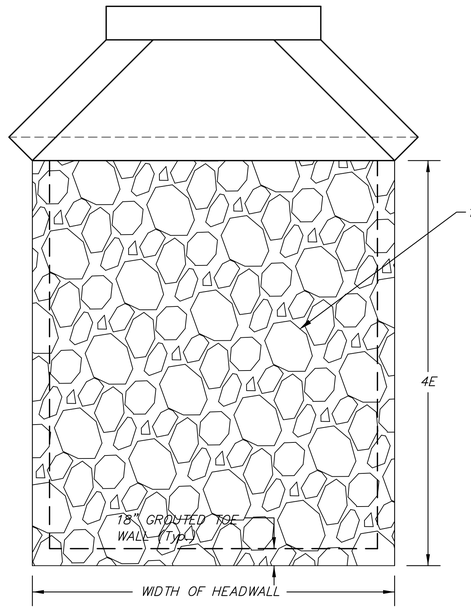
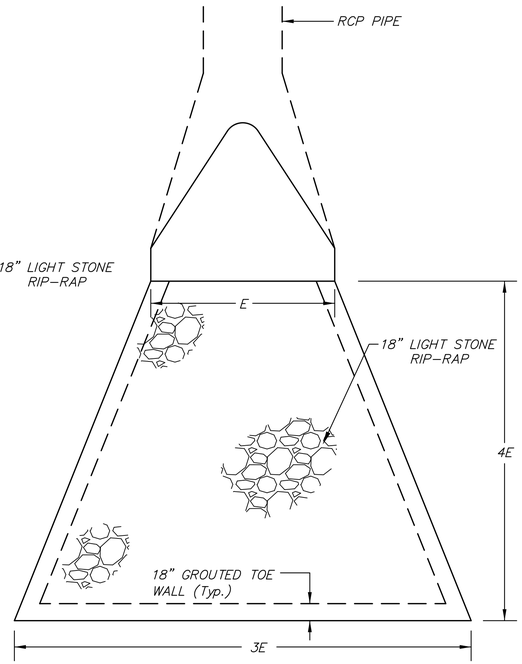
STATE	PROJECT NO.	YEAR	SHEET NO.	SHEETS
KANSAS	87 N–0351–01	2012	71	220

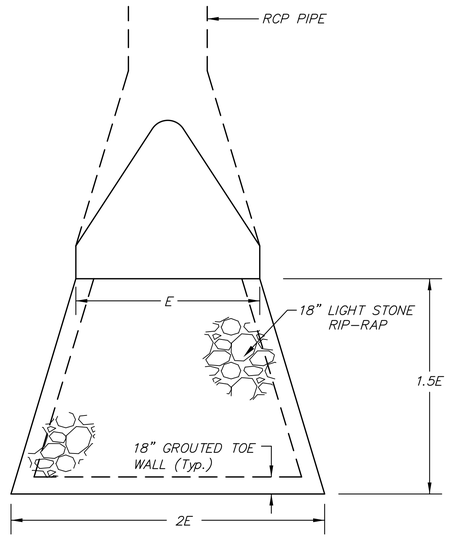
MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600



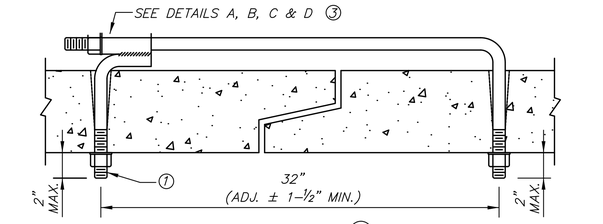
RIP–RAP PLAN AT HEADWALL



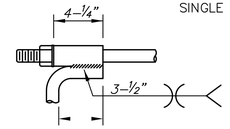
RIP–RAP PLAN PIPE OUTLET



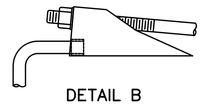
RIP–RAP PLAN PIPE INLET



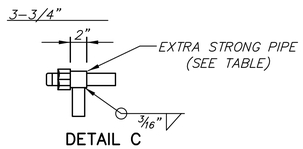
SINGLE CONNECTION TIE ③



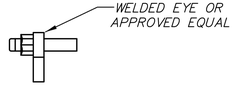
DETAIL A



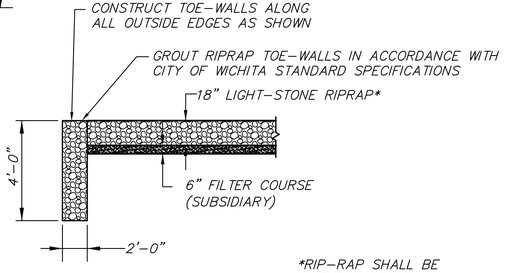
DETAIL B



DETAIL C

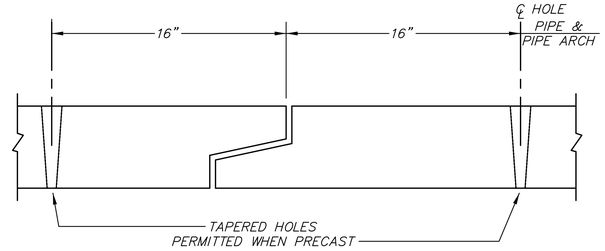


DETAIL D

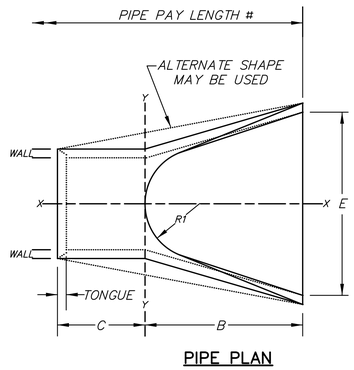


RIPRAP DETAIL

*RIP–RAP SHALL BE NATURAL STONE.

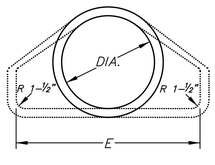


HOLES SHALL BE CAST OR DRILLED 16" FROM CENTERLINE OF JOINTS FOR BOX CULVERTS, AS SHOWN ABOVE, UNLESS FORMS ARE SET UP FOR 16" SPACING FROM OUTSIDE OF JOINT.

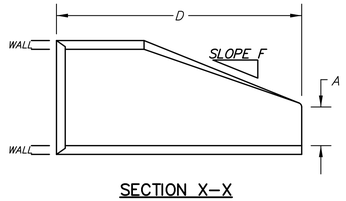


PIPE PLAN

END SECTIONS ARE NOT PAID FOR SEPARATELY BUT ARE INCLUDED IN THE OVERALL PIPE LENGTH.



SECTION Y–Y



SECTION X–X

NOTES:

FILTER COURSE AND GROUTED TOE WALL SUBSIDIARY TO "RIP RAP, LIGHT STONE".

TIES ARE SUBSIDIARY TO STORM SEWER PIPE.

TIE RODS SHALL BE GALVANIZED OR POWER WASHED AND DIPPED IN AN APPROVED ZINC RICH EPOXY PRIME PAINT AFTER FABRICATION.

RIP–RAP DIMENSIONS AT PIPE INLETS AND OUTLETS MAY BE ADJUSTED TO FIT ACTUAL FIELD CONDITIONS IF APPROVED BY THE ENGINEER.

TIES TO BE USED ONLY TO HOLD PIPE SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

CONNECT END SECTION AND PIPE SECTIONS WITH PIPE TIES A MINIMUM DISTANCE OF 20' FROM THE END OF THE END SECTION.

① TIE ROD THREADS SHALL PROJECT TO THE INSIDE OF PIPE EXCEPT AS NOTED IN PLANS.

② TIE ROD THREADS SHALL BE RECESSED WHEN PIPE IS USED AS CATTLE PASS OR PEDESTRIAN TRAIL.

③ TIES MAY BE COMPLETED WITH U–BOLT TIES, SINGLE CONNECTION TIES (AS SHOWN) OR DOUBLE CONNECTION TIES.

NOTE: SEE ROADSIDE IMPROVEMENT PLANS FOR QUANTITY AND DIMENSIONS OF RIP–RAP AT EACH LOCATION.

DIAM.	A	B	C	D	E	F	R1	TONGUE	WALL
12"	4"	2' 0"	4' 0–7/8"	6' 0–7/8"	2' 0"	3:1	9"	1–1/2"	2"
15"	6"	2' 3"	3' 10"	6' 1"	2' 6"	3:1	11"	2"	2 1/4"
18"	9"	2' 3"	3' 10"	6' 1"	3' 0"	3:1	12"	2–1/2"	2 1/2"
24"	9–1/2"	3' 7–1/2"	2' 6"	6' 1–1/2"	4' 0"	3:1	14"	2–1/2"	3"
30"	1' 0"	4' 6"	1' 7–3/4"	6' 1–3/4"	5' 0"	3:1	15"	3"	3–1/2"
36"	1' 3"	5' 3"	1' 10–3/4"	8' 1–3/4"	6' 0"	3:1	20"	3–1/2"	4"
42"	1' 9"	5' 3"	2'–11"	8' 2"	6' 6"	3:1	22"	3–3/4"	4–1/2"
48"	2' 0"	6' 0"	2' 2"	8' 2"	7' 0"	3:1	22"	4–1/4"	5"
54"	2' 3"	5' 5"	2' 11"	8' 4"	7' 6"	3:1	24"	4–3/4"	5–1/2"
60"	2' 6"	5' 0"	3' 3"	8' 3"	8' 0"	2.4:1	24"	5"	6"
66"	2' 0"	6' 6"	1' 9"	8' 3"	8' 6"	2:1	24"	5–1/2"	7"
72"	2' 0"	6' 6"	1' 9"	8' 3"	9' 0"	2:1	24"	6"	7–1/2"

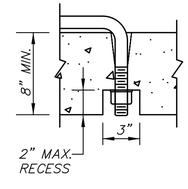
END AREA SQ.FT.	ROUND EQUIV.	SPAN	RISE	WALL	A	B	C	D	E	R1	R2	R3	R4
3.3	24"	30"	19"	3 1/4"	8–1/2"	3' 3"	2' 9"	6' 0"	4' 0"	8–1/4"	26–1/4"	3"	7"
4.1	27"	34"	22"	3 1/2"	9"	3' 10"	2' 2"	6' 0"	4' 6"	9–1/4"	29–17/32"	3"	8"
5.1	30"	38"	24"	3 3/4"	9–1/2"	4' 6"	1' 6"	6' 0"	5' 0"	10–1/4"	32–3/4"	3"	9"
6.3	33"	42"	27"	3 3/4"	10–3/8"	4' 9"	1' 3"	6' 0"	5' 6"	11–7/16"	36–3/16"	3"	10–1/2"
7.4	36"	45"	29"	4 1/2"	11 1/4"	5' 0"	3' 0"	8' 0"	6' 0"	12–1/4"	39–1/4"	3"	12"

TONGUE LENGTHS BASED ON QUINN STANDARD

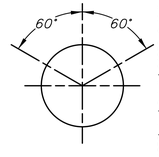
PIPE SIZE (INCHES)	ROD THREAD DIA.
12 – 27	⅝"
30 – 66	¾"
72 – 108	1"

ROD THREAD DIA.	EXTRA STRONG PIPE INSIDE DIA.
⅝"	¾"
¾"	1"
1"	1–¼"

PIPE SIZE LISTED IS INSIDE DIA. OF ROUND PIPE OR EQUIVALENT DIA. OF PIPE ARCH.



OPTIONAL RECESS DETAIL ②



ROUND PIPE

CENTRAL AVENUE IMPROVEMENTS FROM 135TH ST. W. TO 119TH ST. W.

RCP OUTFALL DETAIL
SHEET TITLE
472–84017
PROJECT NUMBER

JRA
DESIGN BY
TBK
DRAWN BY
JRA
CHECKED BY

ISSUED
November 9, 2012
REVISED

SHEET NO.
71 of 220

PLOTTED: Wednesday, November 14, 2012 @ 02:38PM
J:\Civil\04238\dwg\Details\04238 Outfall.dwg