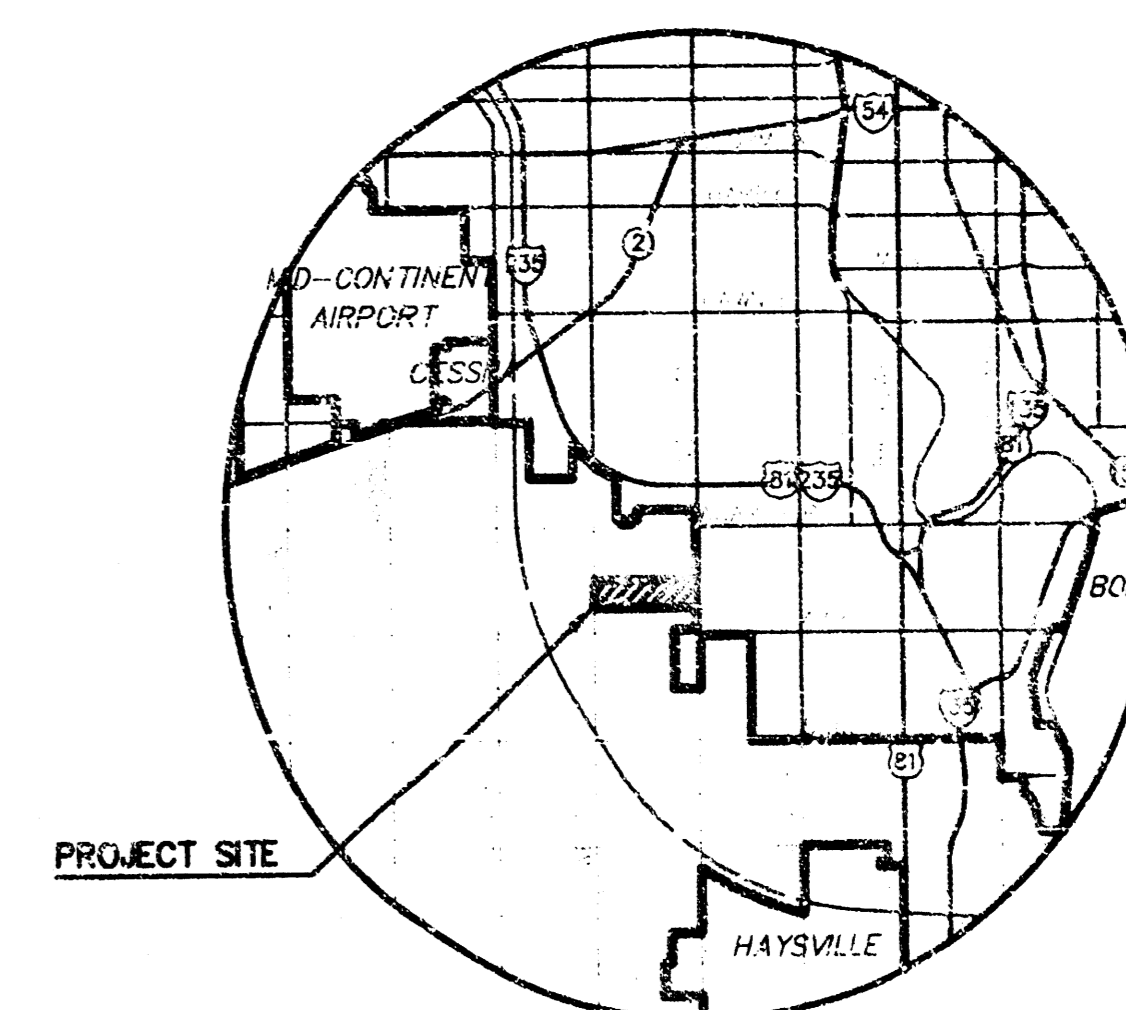


# STORM WATER SEWER PHASE 2 PLANS FOR THE LEGACY ADDITION

SWD # 182  
PROJECT NO. 468-83351  
CITY OF WICHITA, KANSAS  
MICHAEL E. LINDEBAK, CITY ENGINEER  
O.C.A. 751306  
FEBRUARY, 2002



LOCATION MAP

## GENERAL NOTES

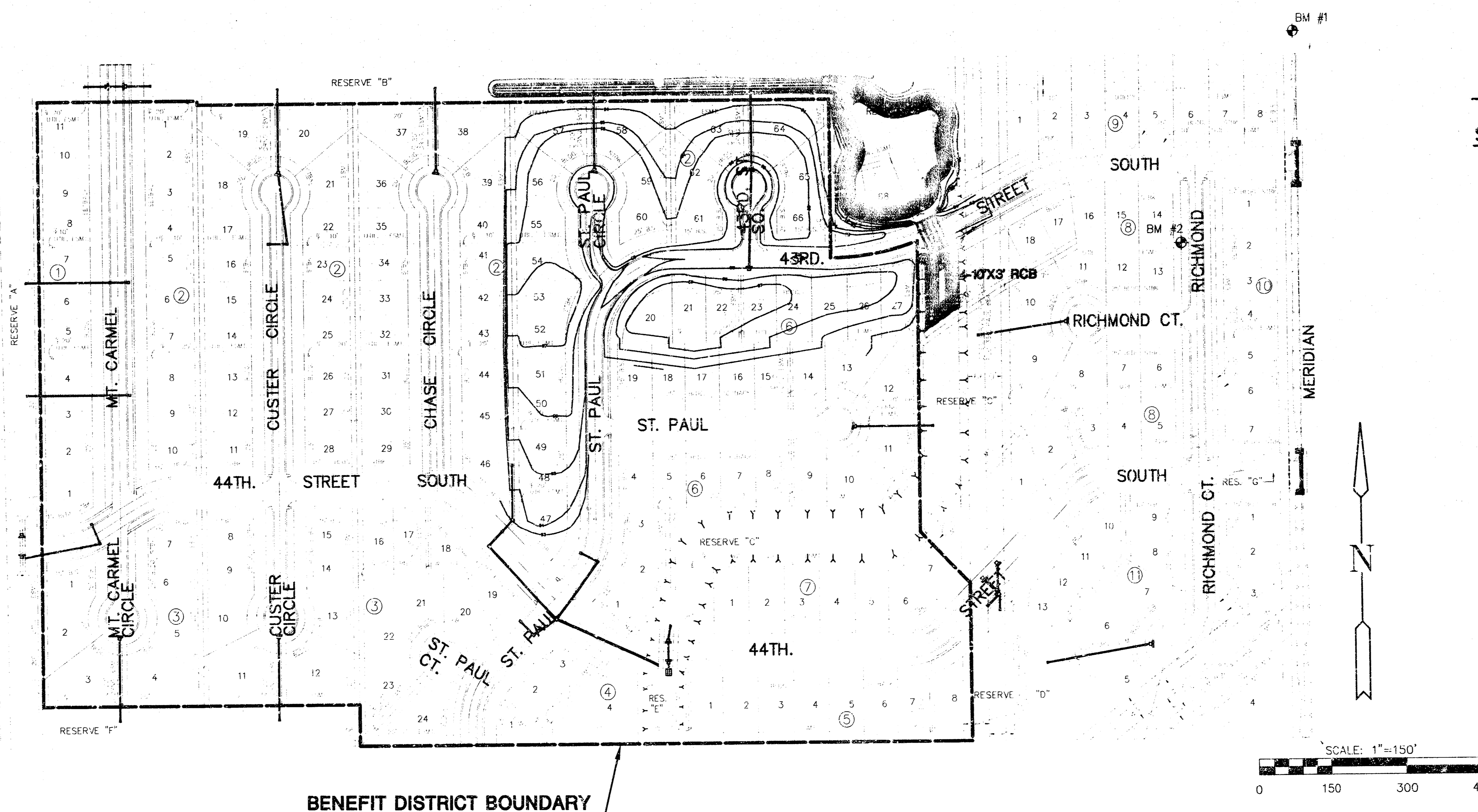
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PRESERVING PROPERTY IRONS. THE CONTRACTOR WILL BE REQUIRED TO RE-ESTABLISH ANY PROPERTY IRONS WHICH ARE DAMAGED OR DESTROYED BY HIS CONSTRUCTION OPERATIONS. SUCH IRONS SHALL BE RE-ESTABLISHED BY A LICENSED LAND SURVEYOR IN ACCORDANCE WITH STATE LAWS.
- EXISTING UTILITIES AND THEIR LOCATIONS, AS SHOWN ON THE PLANS REPRESENT THE BEST INFORMATION OBTAINABLE FOR DESIGN. LOCATION INFORMATION HAS BEEN OBTAINED FROM THE VARIOUS UTILITY COMPANIES AND IS EITHER FROM COMPANY RECORD DRAWINGS OR COMPANY PROVIDED FIELD LOCATIONS. THE PLAN LOCATIONS SHOWN ARE NOT GUARANTEED. ADDITIONAL EXISTING UTILITIES MAY ALSO BE ENCOUNTERED.
- CONTRACTOR WILL BE REQUIRED TO PROVIDE A MINIMUM ADVANCE NOTICE OF FORTY-EIGHT (48) HOURS TO UTILITY COMPANIES PRIOR TO STARTING ANY EXCAVATION AS FOLLOWS:

KANSAS ONE-CALL 1-800-344-7233  
or 687-2470 (LOCAL WICHITA)

THE CONTRACTOR MUST NOTIFY THE FOLLOWING IN CASE OF AN EMERGENCY:

SOUTHWESTERN BELL TELEPHONE COMPANY 1-800-734-7590  
CABLEVISION 262-0661  
KANSAS GAS & ELECTRIC (ELECTRIC) 264-1141  
KANSAS GAS & ELECTRIC (GAS) 832-3180 OR 832-3169  
CITY OF WICHITA SEWER MAINTENANCE 268-4908  
CITY OF WICHITA WATER DEPARTMENT 268-4908

- RUBBLE FROM THE REMOVAL OF MISCELLANEOUS STRUCTURES AND EXCESS EXCAVATION WHICH IS TO BE WASTED SHALL BE DISPOSED OF ON SITES TO BE PROVIDED BY THE CONTRACTOR. THESE SITES SHALL BE APPROVED BY THE ENGINEER AS TO SUITABILITY, APPEARANCE AND SITE LOCATION. LOCATIONS THAT, IN THE OPINION OF THE ENGINEER, WILL LEAVE AN UNSIGHTLY APPEARANCE WILL NOT BE APPROVED. ALL DISPOSAL SITES MUST BE APPROVED BY THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT. MATERIAL EITHER STOCKPILED OR DISPOSED OF IN A FLOOD PLAIN WOULD REQUIRE A KANSAS STATE BOARD OF AGRICULTURE PERMIT. ANY MATERIAL DUMPED IN WATERS OF THE UNITED STATES OR WETLANDS IS SUBJECT TO U.S. CORPS OF ENGINEERS PERMITTING REGULATIONS. ANY MATERIAL BURIED OR STOCKPILED BEYOND APPROVED CONSTRUCTION LIMITS WOULD REQUIRE ADDITIONAL ARCHAEOLOGICAL INVESTIGATIONS UNLESS BURIED IN A PREVIOUSLY APPROVED BORROW LOCATION.
- COST OF EXCAVATION, HAULING, AND DUMPING OF EXCESS EXCAVATION SHALL BE SUBSIDIARY TO THE PROJECT.
- TREES AND SHRUBS IN PUBLIC RIGHT-OF-WAY WHICH ARE IN DIRECT CONFLICT WITH PROPOSED NEW CONSTRUCTION SHALL BE REMOVED BY THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. TREES AND SHRUBS WHICH ARE NOT IN DIRECT CONFLICT WITH PROPOSED NEW CONSTRUCTION SHALL BE SAVED AND PROTECTED FROM DAMAGE.
- ALL DISTURBED AREAS TO BE SEEDDED WITH RYE GRASS AT A RATE OF 200 LBS./ ACRE WITHIN 10 DAYS OF CONSTRUCTION. COST SHALL BE SUBSIDIARY TO PROJECT.
- REVERSE CURB INLET TOPS. PAVEMENT IN THIS AREA WILL BE BUILT AT FUTURE DATE. COST OF REVERSING INLET TOPS SHALL BE SUBSIDIARY TO THE INLET CONSTRUCTION.
- CONTRACTOR SHALL LEAVE EXCESS MATERIAL ON SITE IN A LOCATION DESIGNATED BY THE OWNER. LOCATION WILL BE WITHIN THE BENEFIT DISTRICT BOUNDARY. MATERIAL SHALL BE PLACED ADJACENT TO ROAD RIGHT-OF-WAYS WITHIN LOTS. MATERIAL SHALL BE PLACED IN LIFTS NO GREATER THAN 8" AND SHALL BE SMOOTH SO GRASS MAY BE PLANTED.



## INDEX TO DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SITE GRADING
3	GRADING DETAILS
4	RCB PLAN & PROFILE
5-6	DITCH REGRADING PLAN & PROFILE
7-11	RCB DETAILS
12	CURB INLET DETAILS
13-17	EROSION CONTROL DETAILS
18	FINAL PLAN

*BOOKED  
4-19-03  
MCG  
C-247*



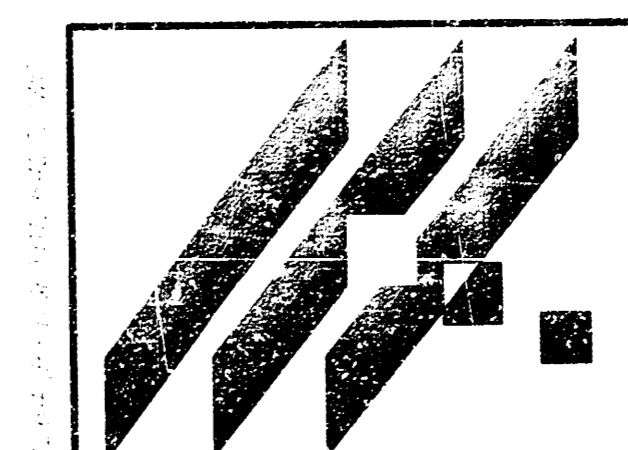
EARTHWORK SUMMARY	
EXCAVATION (PONDS)	25,900 C.Y.
EXCAVATION (DITCH GRADING)	1,716 C.Y.
COMPACTED FILL	24,590 C.Y.

NOTE:  
- NO SHRINKAGE/EXPANSION FACTORS WERE FIGURED INTO EARTHWORK QUANTITIES MEASURED.

## BENCHMARK

BM #1 MERIDIAN AND 43RD. ST. SOUTH  
C.O.W. BENCHMARK, 44' N. &  
30' E. OF 1/4 SEC. COR.  
ELEV.= 93.396

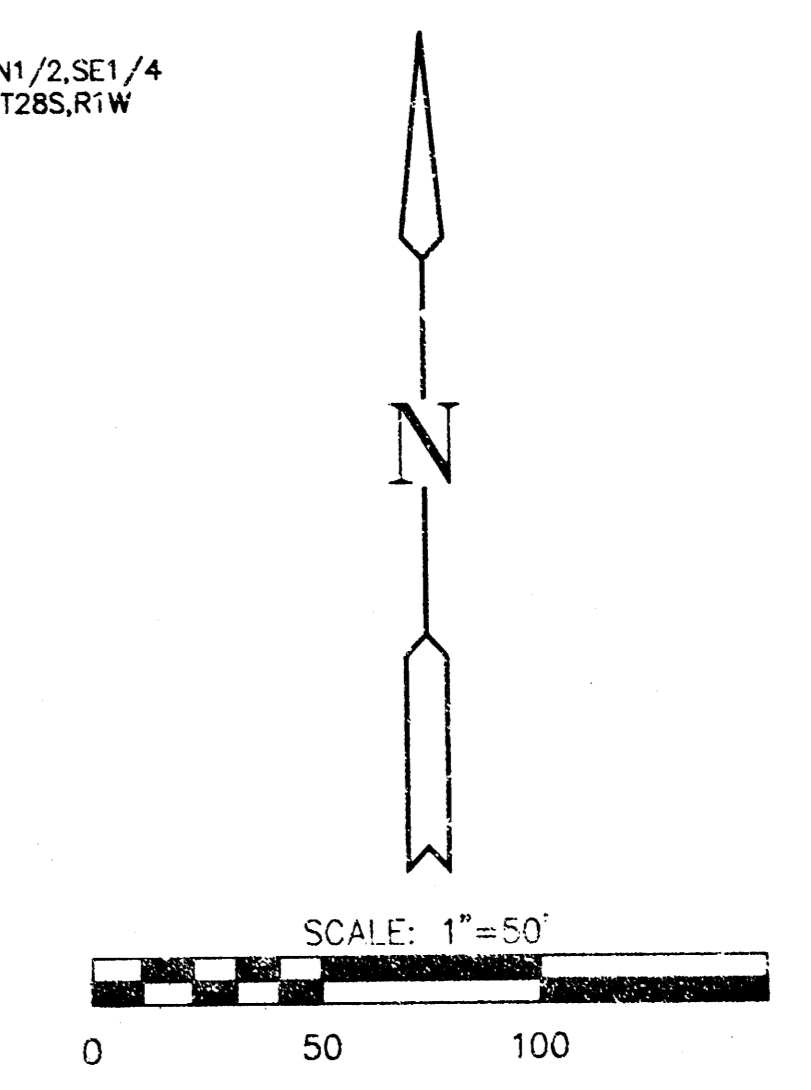
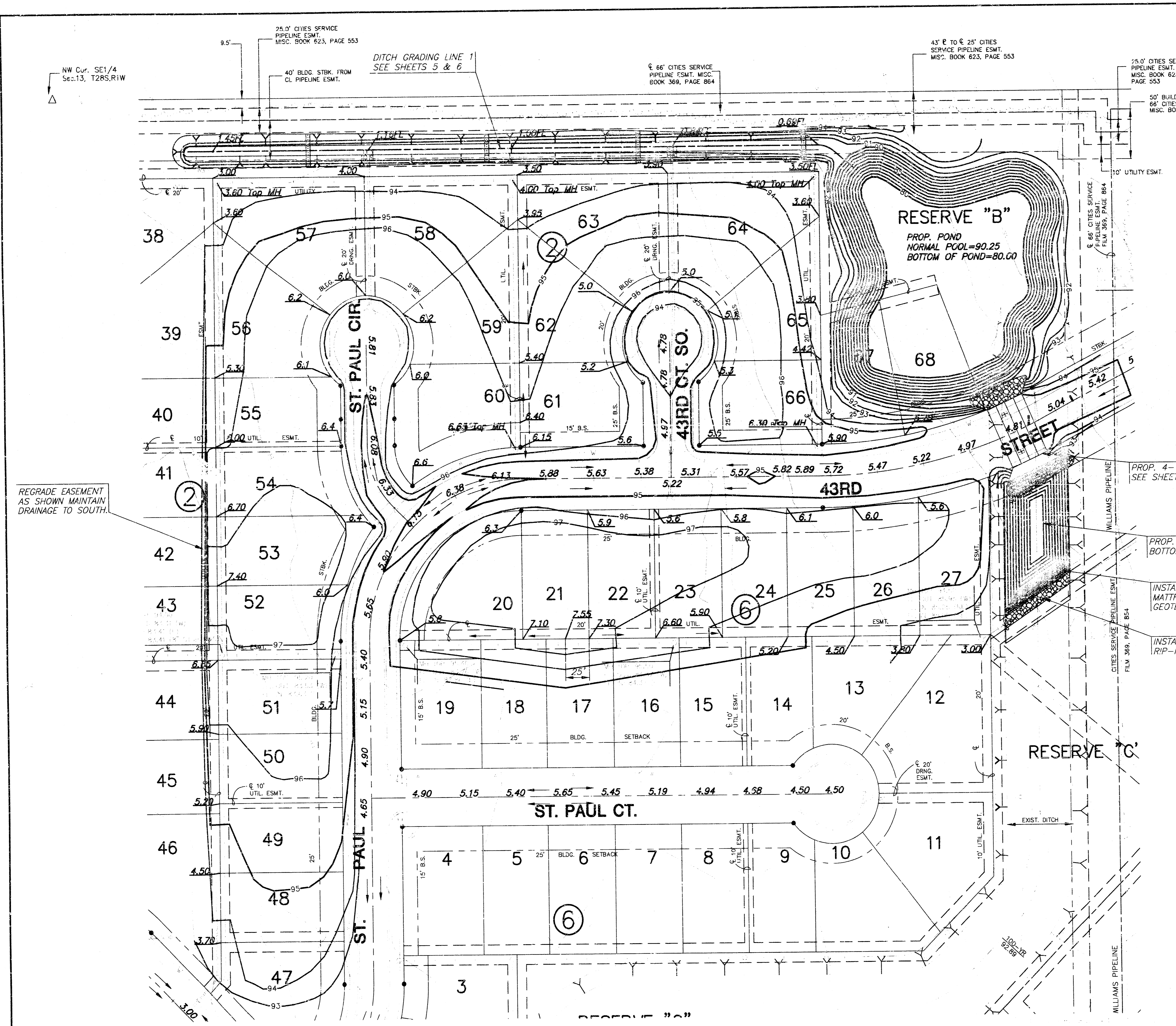
BM#2 TOP OF IRON AT NORTHEAST CORNER OF  
LOT 13, BLOCK 8  
ELEV.=95.42



MID-KANSAS ENGINEERING  
CONSULTANTS, INC.  
411 N. WEBB ROAD  
WICHITA, K.S. 67206  
316-684-9600

**THE LEGACY**  
PROJECT NAME  
**STORM WATER SEWER PLANS**  
**PHASE 2**  
SHEET TITLE

DK DESIGN BY.	DM/ DRAWN BY.	GJA CHECKED BY.
JANUARY 2002 DATE	01264DT JOB NO.	1 / 18 SHEET / OF



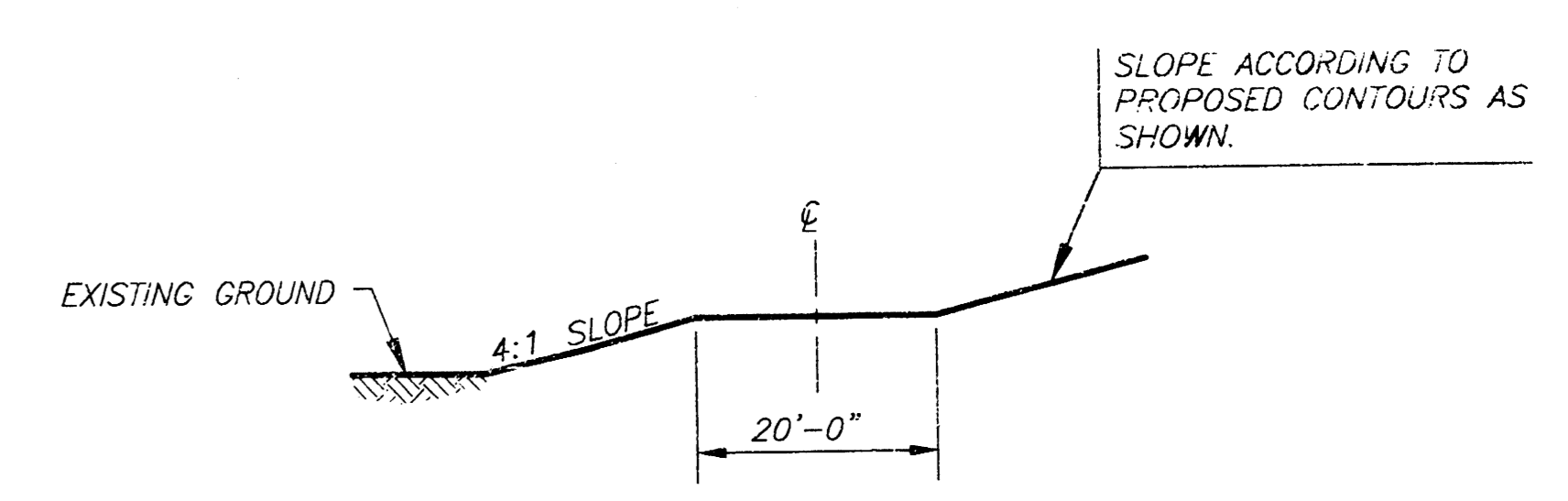
- NOTES:**
1. CONTRACTOR TO PLACE EXCAVATION FROM POND AS SHOWN BY PROPOSED CONTOURS.
  2. FILL SHALL BE PLACED IN LIFTS NO GREATER THAN 8" AND SHALL BE COMPACTED TO 95% STD. DENSITY. SEE SHEET 3 FOR GRADING DETAILS.
  3. GRADING SHALL BE COMPLETED WITHIN 0.3 FEET OF PROPOSED GRADES AS SHOWN. SPOT GRADES SHOWN ON CENTERLINE OF STREETS ARE TOP OF PROPOSED PAVEMENT. TOP OF SUBGRADE SHALL BE 10" BELOW SPOT GRADES SHOWN.
  4. IF ADDITIONAL MATERIAL IS AVAILABLE UPON COMPLETION OF GRADING AS SHOWN, THE MATERIAL SHALL BE SPREAD ON THE ST. PAUL/43RD STREET RIGHT-OF-WAY, AND THEN ACROSS LOTS 4-19, BLOCK 6. IF REQUIRED MATERIAL IS NOT AVAILABLE TO COMPLETE THE GRADING AS SHOWN, REQUIRED FILL ON LOTS 47-51, BLOCK 2 SHALL BE ELIMINATED.
  5. GEOTEXTILE FABRIC SHALL BE TREVIRA SPUNBOUND 1125 OR EQUAL.

**EARTHWORK QUANTITIES:**  
 EXCAVATION (PONDS) = 25,900 C.Y.  
 EXCAVATION (DITCH GRADING) = 1,716 C.Y.  
 COMPACTED FILL = 24,590 C.Y.

PROP. POND AREA  
 BOTTOM=81.00

INSTALL 110 S.Y. GABION  
 MATTRESS 12" THICK ON  
 GEOTEXTILE FILTER FABRIC

INSTALL 93 S.Y. LIGHT-STONE  
 RIP-RAP



**THE LEGACY - PHASE 2**  
PROJECT NAME

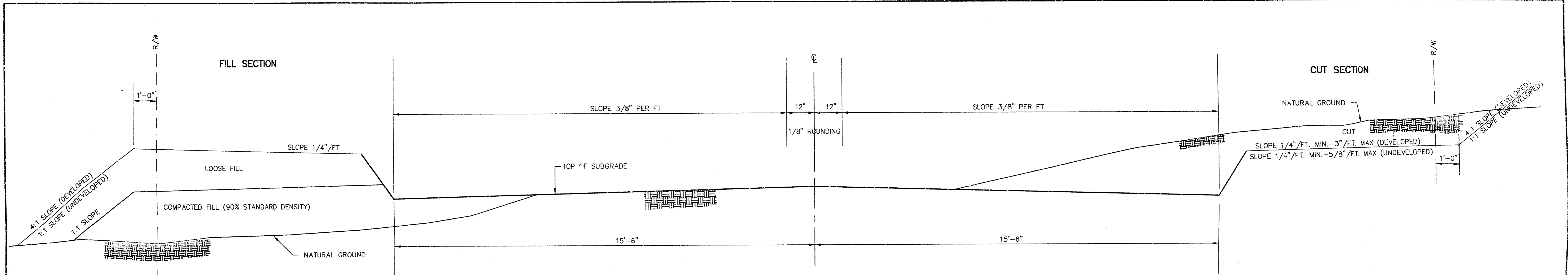
**SITE GRADING**  
SHEET TITLE

DK DESIGN BY. GJR DRAWN BY. DK CHECKED BY.

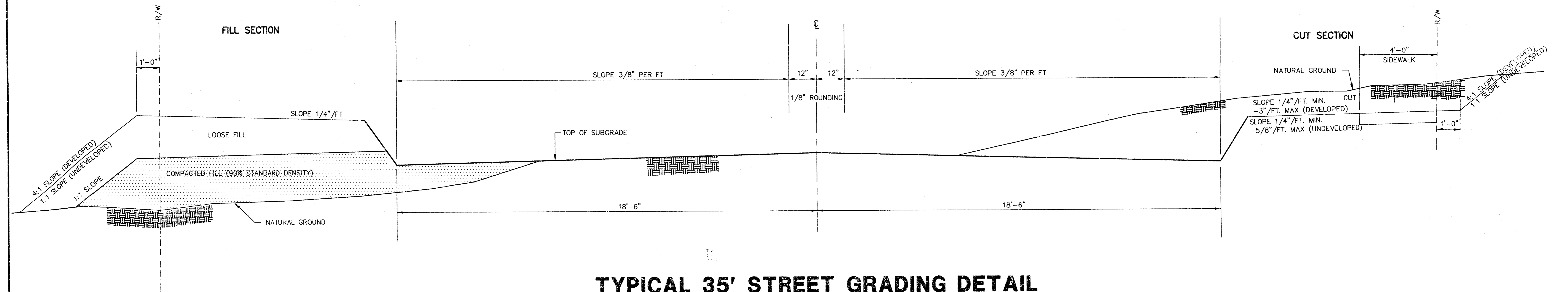
JANUARY 2002 DATE. POND=GR JOB NO. 2 / 18 ISHEET/OF

411 N. WEBB ROAD  
WICHITA, KS. 67206  
316-634-9600

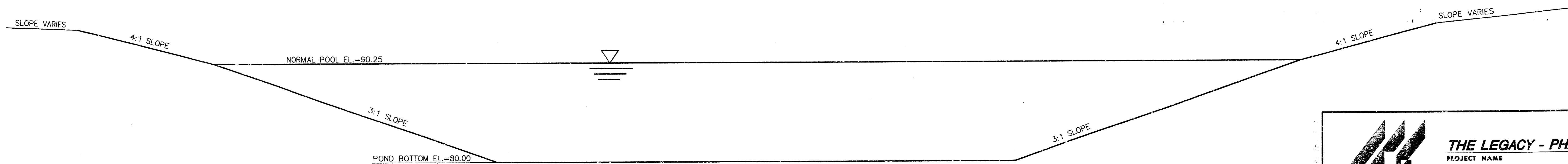
G:\CIVIL\19513810\2564\GRAD\POND-GR.DWG. Wed Feb 06 09:08:22 2002



**TYPICAL 29' B-B STREET GRADING DETAIL**  
(43RD ST. CT. SOUTH & ST. PAUL CIR.)



**TYPICAL 35' STREET GRADING DETAIL**  
(43RD ST. / ST. PAUL ST.)



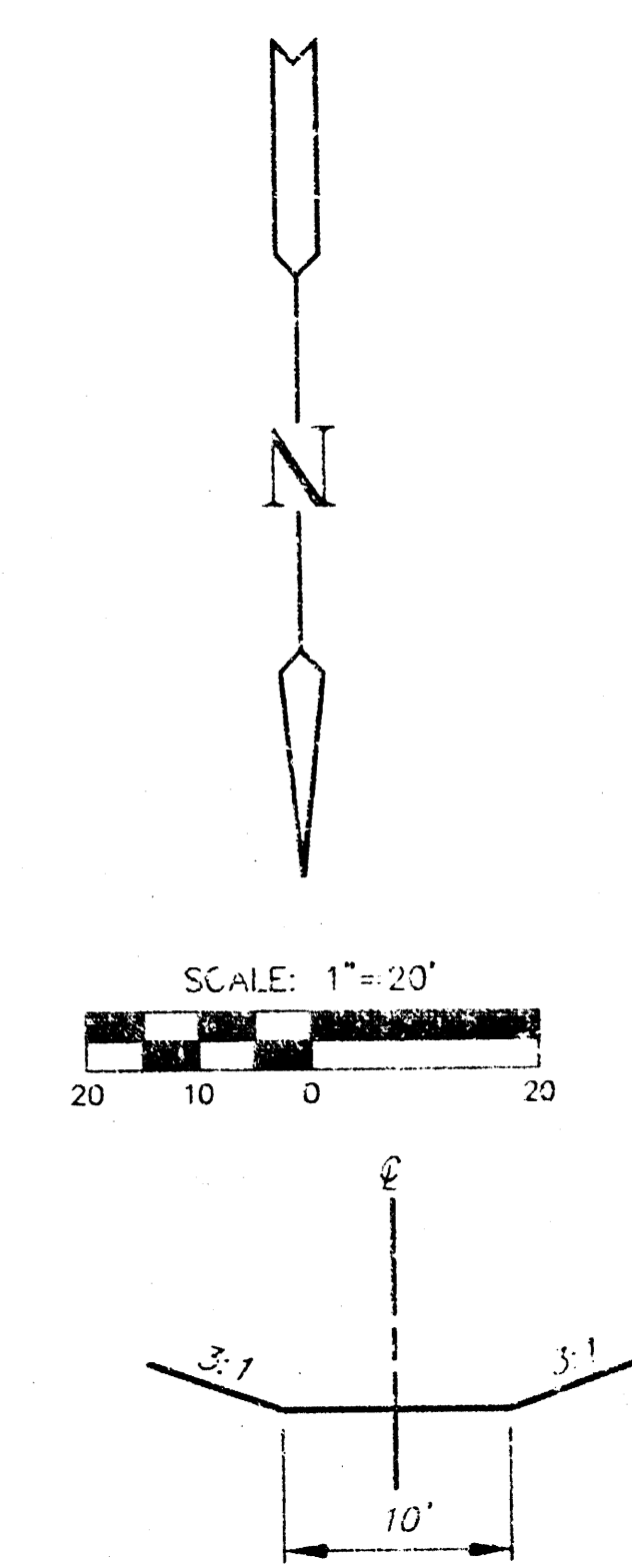
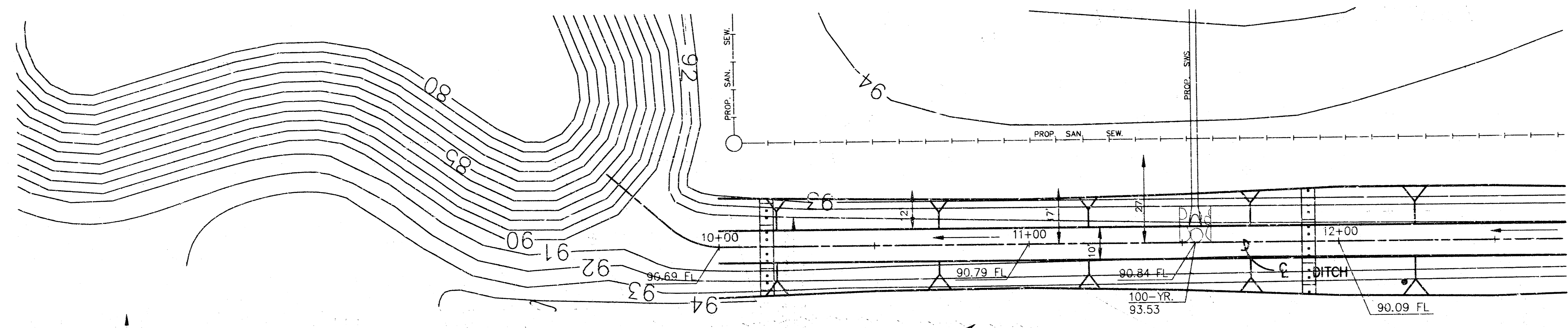
**TYPICAL POND DETAIL**

<p><b>MKEC</b> ENGINEERING CONSULTANTS 411 N. WEBB ROAD WICHITA, KS. 67206 316 - 884 - 9400</p>	<b>THE LEGACY - PHASE 2</b>	
	PROJECT NAME	
	<b>GRADING DETAILS</b>	
	SHEET TITLE	
DK	DM	DK
DESIGN BY:	DRAWN BY:	CHECKED BY:
JANUARY 2002	01264DD6	3 / 18
DATE	JOB NO.	SHEET/OF

G:\CIVIL\195138\10264\MP\DD6\01264DD6.dwg Wed Feb 06 09:08:17 2002



**THE LEGACY ADDITION  
STORM WATER SEWER PLANS  
PHASE 2**



PIPELINE CONTACT INFORMATION:  
SEMINOLE TRANSPORTATION AND GATHERING INC.  
GLEN COLLUM - R/W MANAGER  
11501 S. I-44 SERVICE ROAD  
OKLAHOMA CITY, OK. 73173  
PH. (405)-692-5120

EARTHWORK QUANTITIES:  
EXCAVATION = 1,716 C.Y.  
FILL = 0 C.Y.

**PLAN DITCH GRADING-LINE 1**

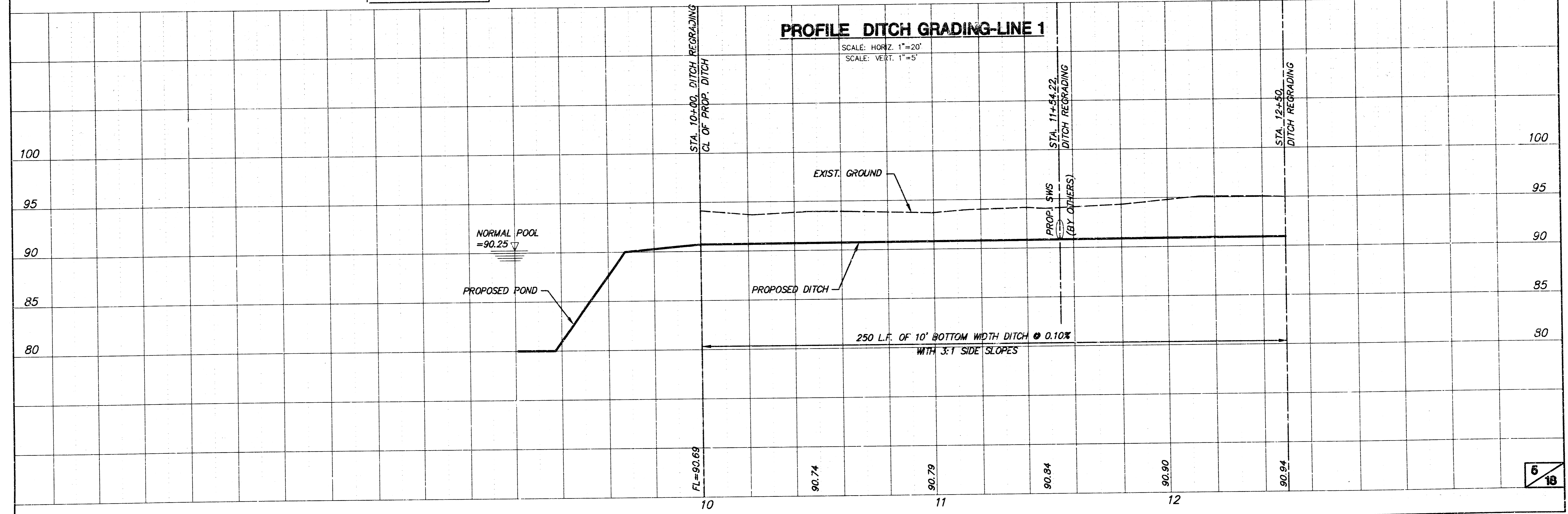
SCALE: 1"=20'

LEGEND  
[Symbol] - HAY BALE SEDIMENT BARRIER

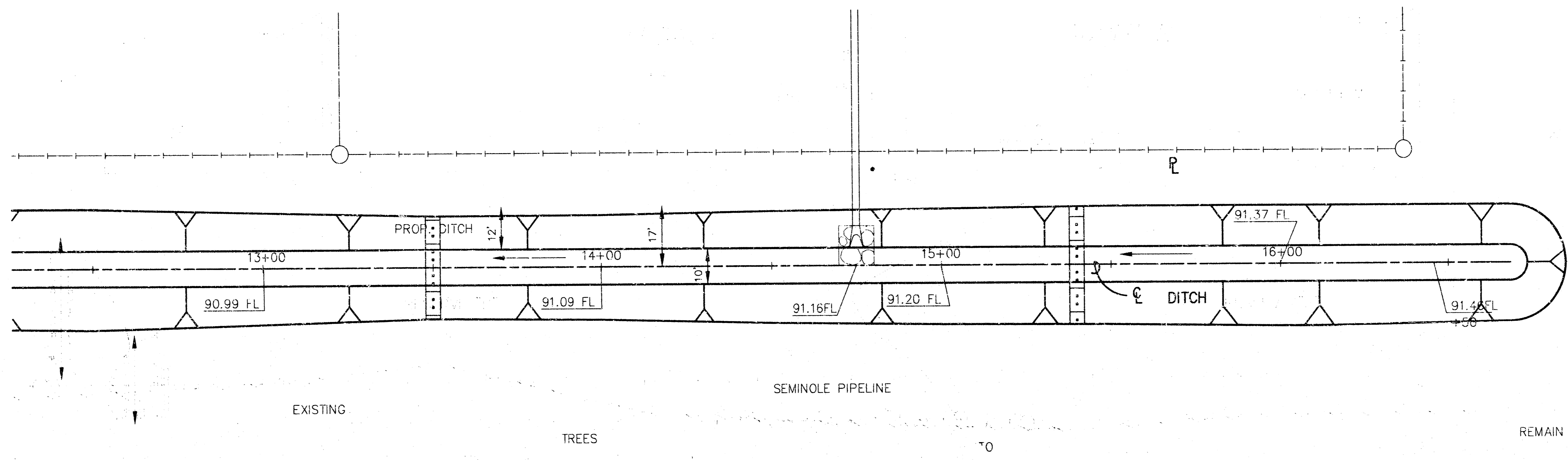
**TYPICAL DITCH CROSS SECTION**  
NTS

**PROFILE DITCH GRADING-LINE 1**

SCALE: HORIZ. 1"=20'  
SCALE: VERT. 1"=5'



THE LEGACY ADDITION  
STORM WATER SEWER PLANS  
PHASE 2



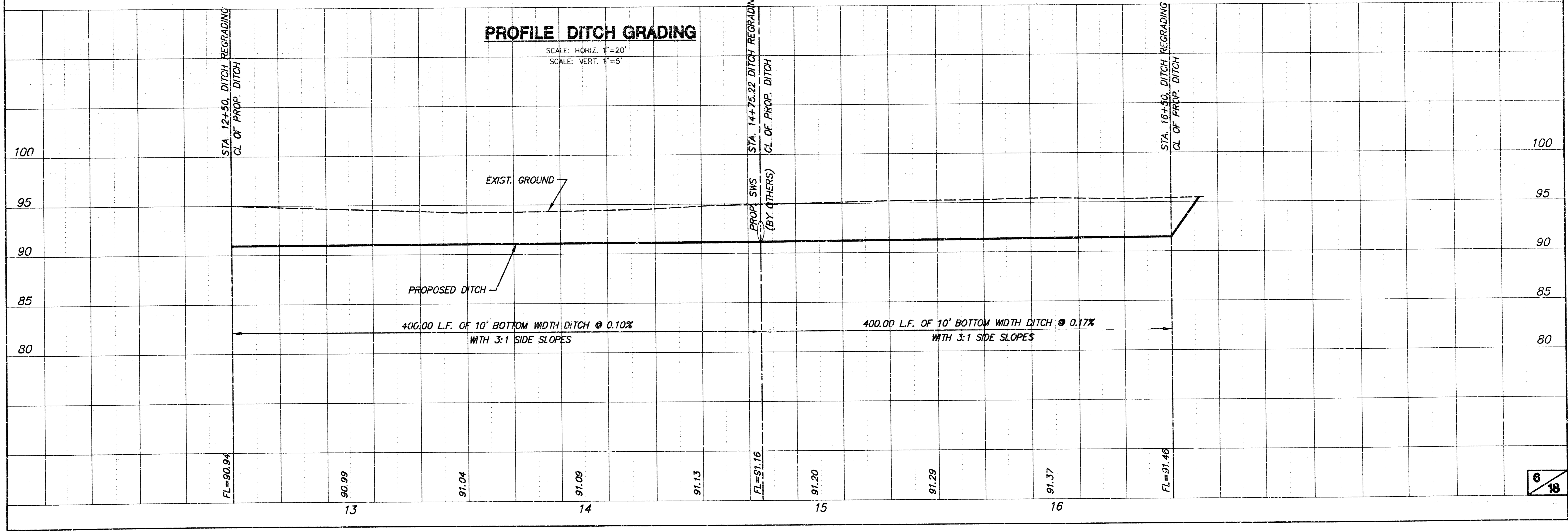
**PLAN DITCH GRADING**

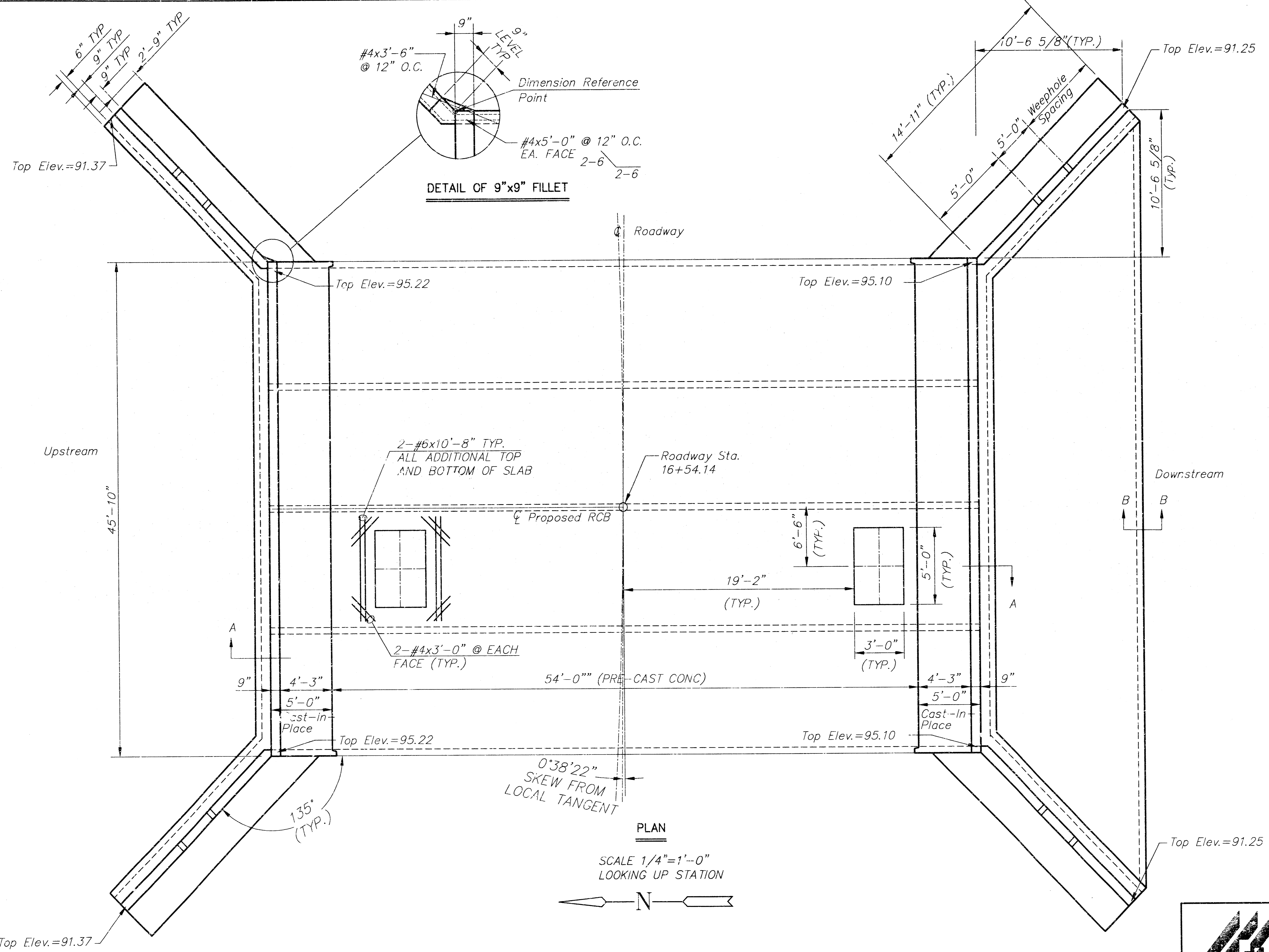
SCALE: 1" = 20'

LEGEND  
 - HAY BALE SEDIMENT BARRIER

**PROFILE DITCH GRADING**

SCALE: HORIZ. 1" = 20'  
SCALE: VERT. 1" = 5'





**PLAN**  
SCALE 1/4"=1'-0"  
LOOKING UP STATION  
N

**MKEC**  
ENGINEERING CONSULTANTS  
411 N. WEND ROAD  
WICHITA, KS. 67206  
316-684-9000

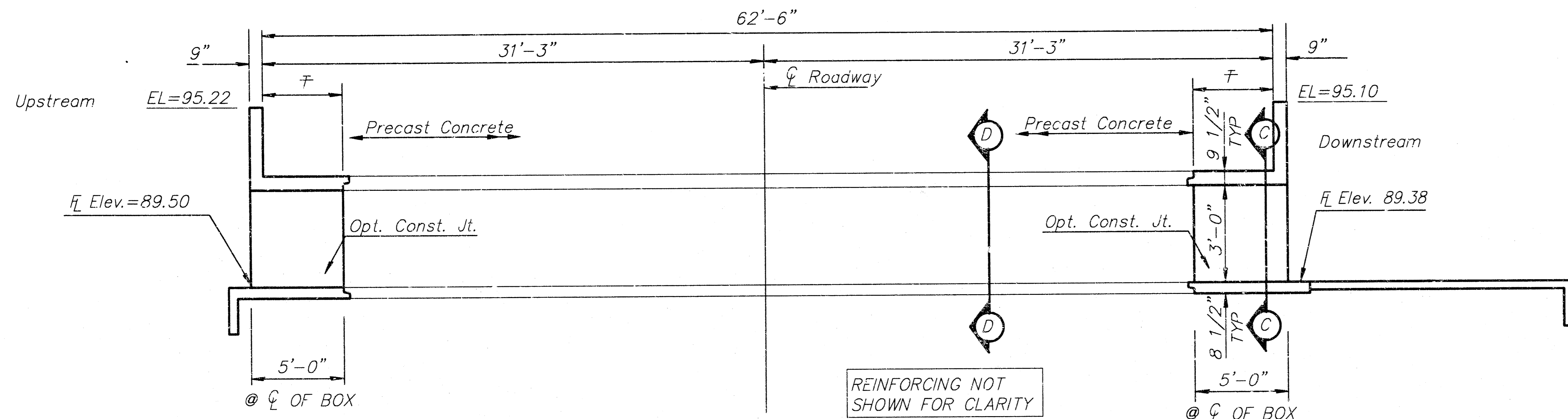
**THE LEGACY - PHASE 2**  
PROJECT NAME

**4-10'x3' RCB's**  
SHEET TITLE

DK DESIGN BY. HAW DRAWN BY. DK CHECKED BY.

JANUARY 2002 DATE 01264DD1 JOB NO. 7 / 18 SHEET/OF

C:\VT\1\0513\10\264\06105E\01264DD1.DWG MKD FEB 06 09:14:12 2002



**SECTION AND ELEVATION**  
 (Normal to  $\phi$  Roadway @ STA 16+54.14)  
 SCALE 1/4"=1'-0"

$\nabla$  Hand Compaction Equip.  
 Only in this area

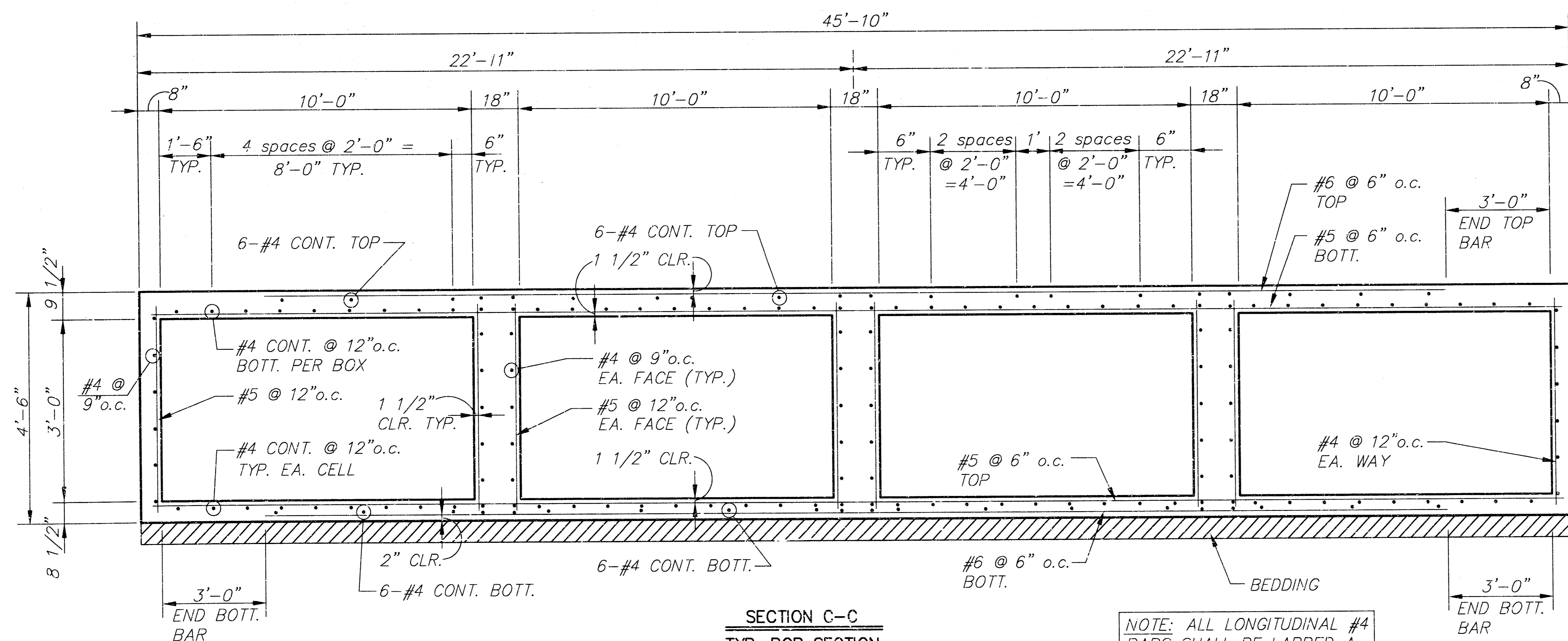
**GENERAL NOTES**

**LOADING:** HS20-44 AASHTO Specifications, 1996 Edition.

**UNIT STRESSES:** Concrete;  $X: f'_c = 4,000$  p.s.i.  
 Reinforcing Steel;  $f_y = 60,000$  p.s.i.

**CONCRETE:** City of Wichita Paving Mix with 6.6 sacks Type 1 Portland Cement per cubic Yard shall be used throughout. ( $f'_c=4,000$  PSI Bevel all exposed edges with a 3/4" triangular moulding.

**REINFORCING:** All reinforcing shall conform to ASTM A615, Grade 60. All dimensions relative to reinforcing steel shall be to centerline of bar unless otherwise noted.

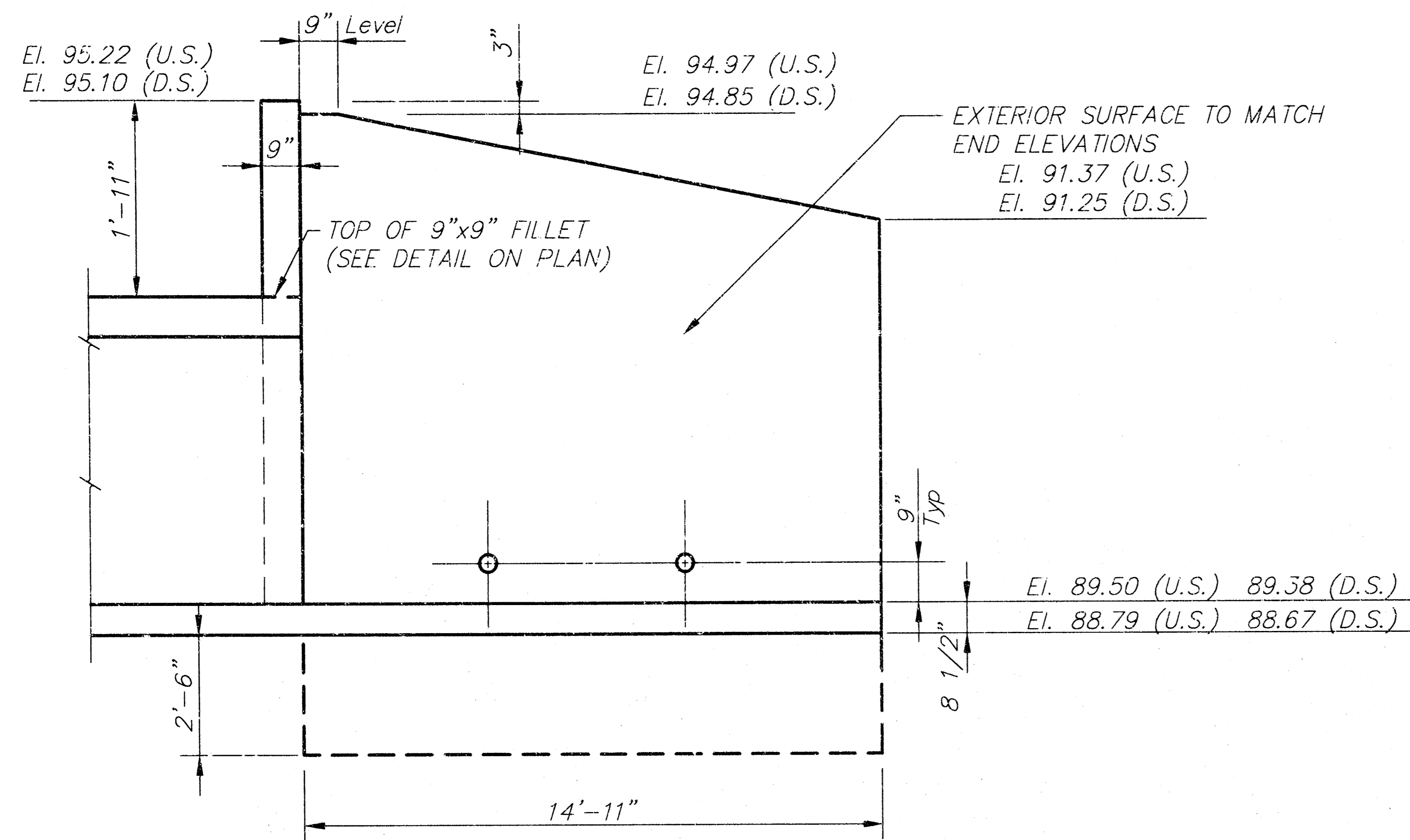


**SECTION C-C**  
 TYP. RCB SECTION  
 SCALE 1/2"=1'-0"

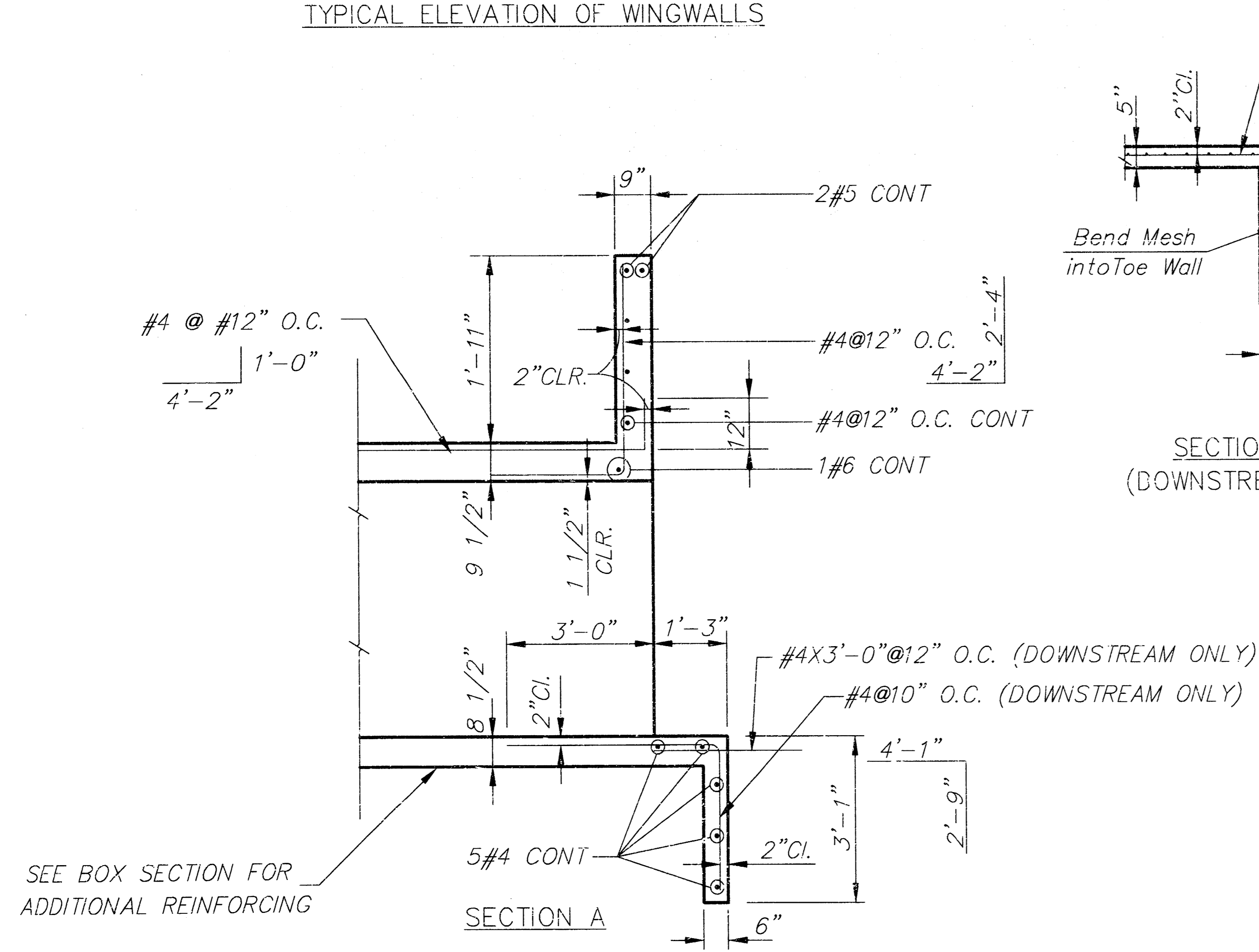
NOTE: ALL LONGITUDINAL #4 BARS SHALL BE LAPPED A MINIMUM OF 12"

<p><b>MKEC</b>          ENGINEERING          CONSULTANTS          411 N. WEST ROAD          WICHITA, KS. 67206          316-844-9400</p>	<b>THE LEGACY - PHASE 2</b>		
	PROJECT NAME		
	<b>4-10'x3' RCb's DETAILS</b>		
	SHEET TITLE		
DK	HAW	DK	
DESIGN BY:	DRAWN BY:	CHECKED BY:	
JANUARY 2002	01264DD2	8 / 18	
DATE	JOB NO.	SHEET/OF	

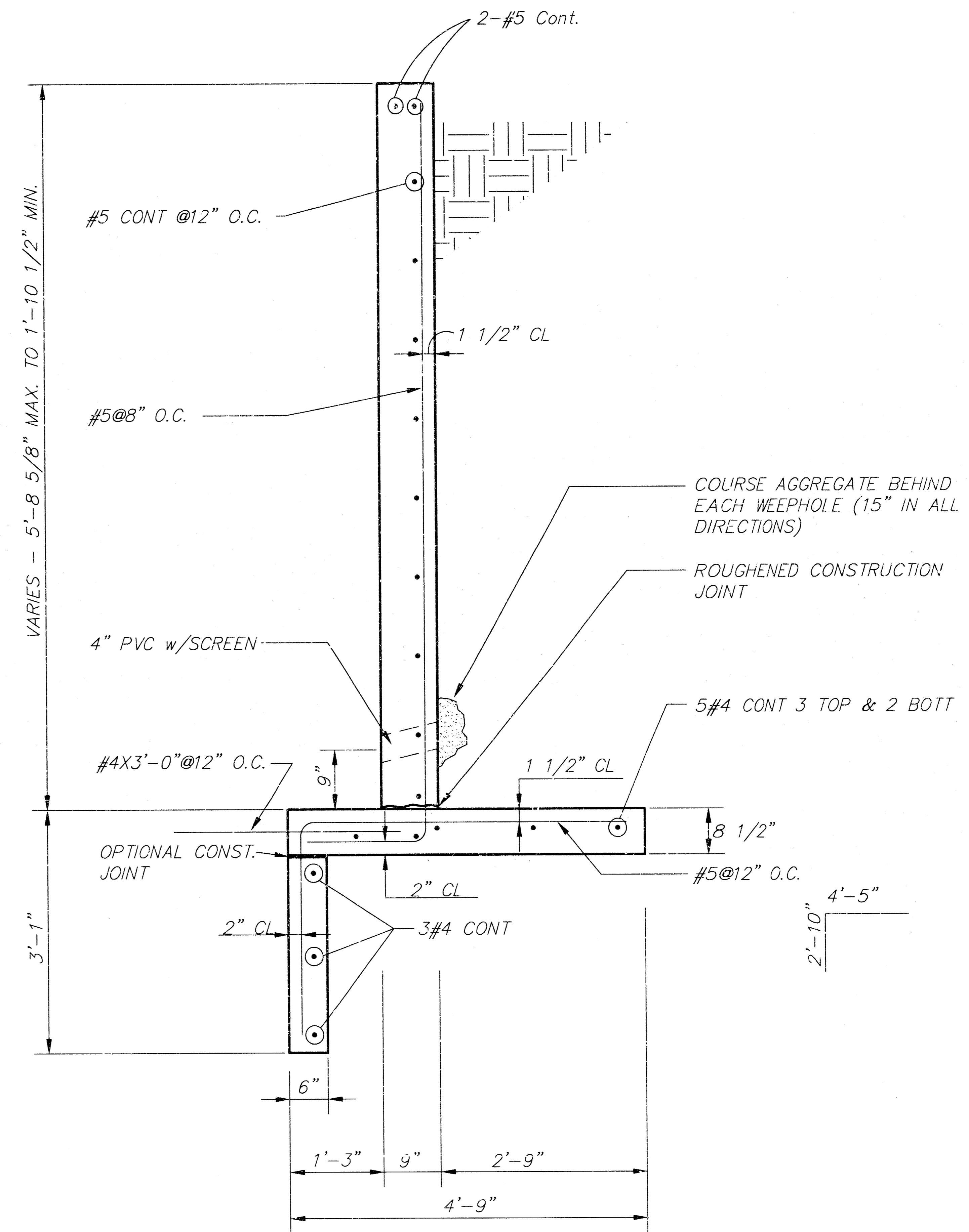
6:\2\11\195138\01264DD2\01264DD2.dwg Wed Feb 06 09:14:55 2002



TYPICAL ELEVATION OF WINGWALLS

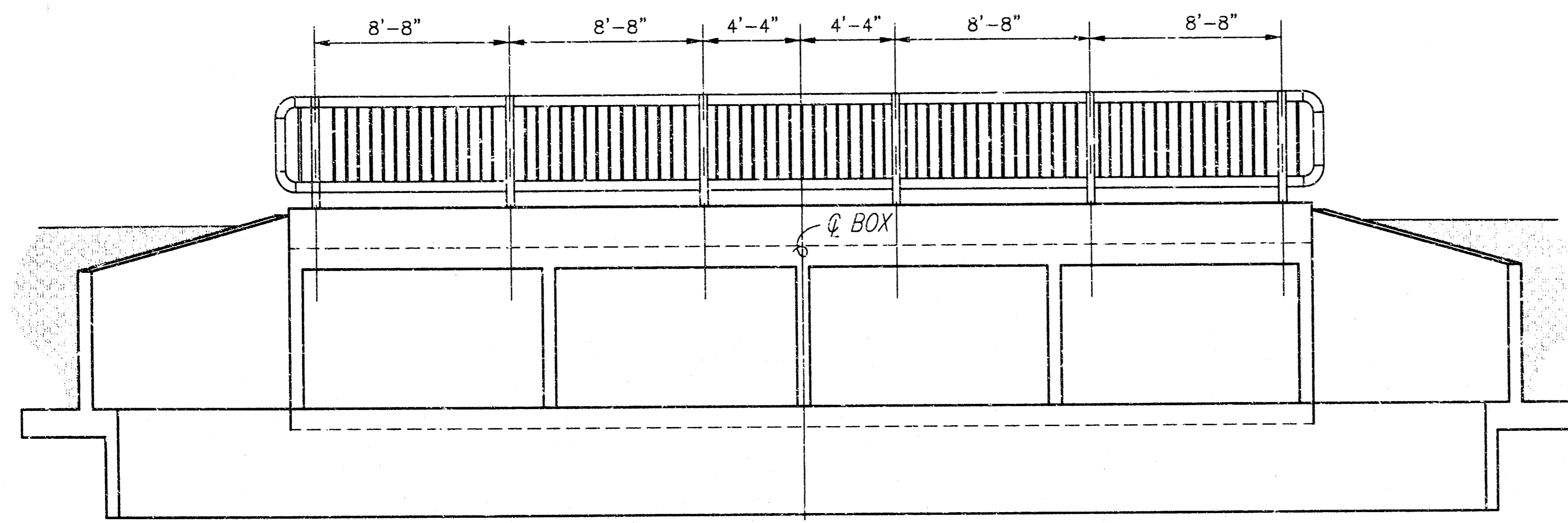


SEE BOX SECTION FOR ADDITIONAL REINFORCING

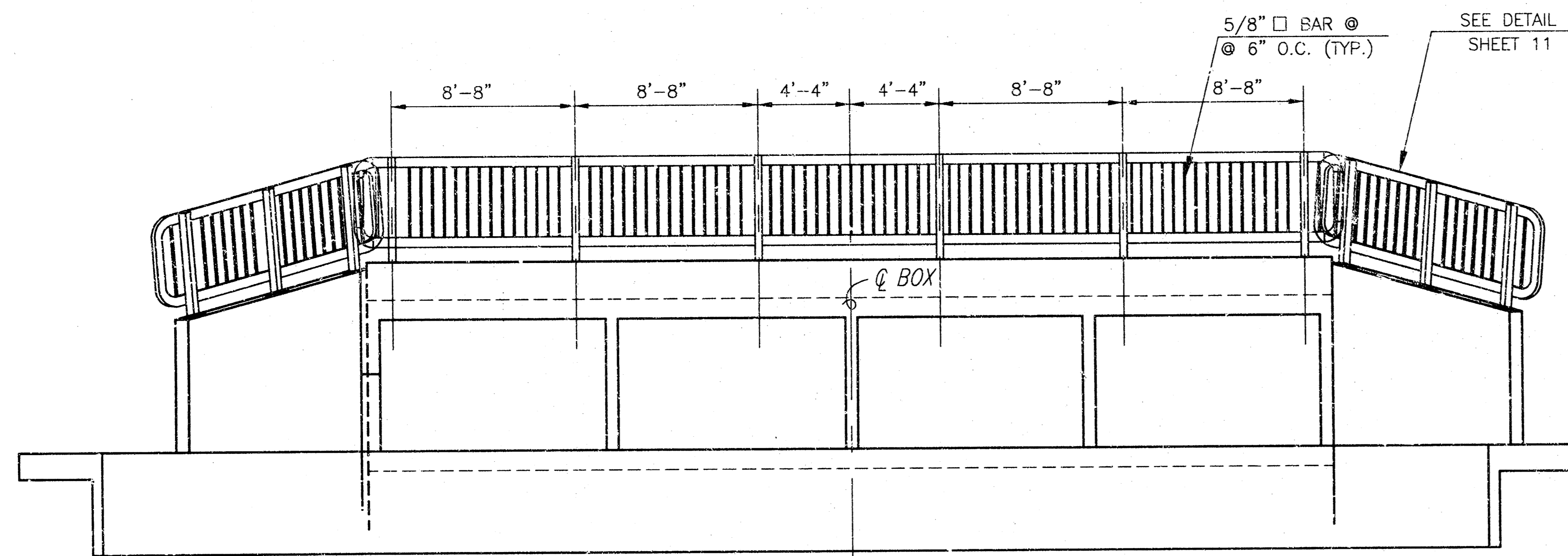


TYPICAL WINGWALL

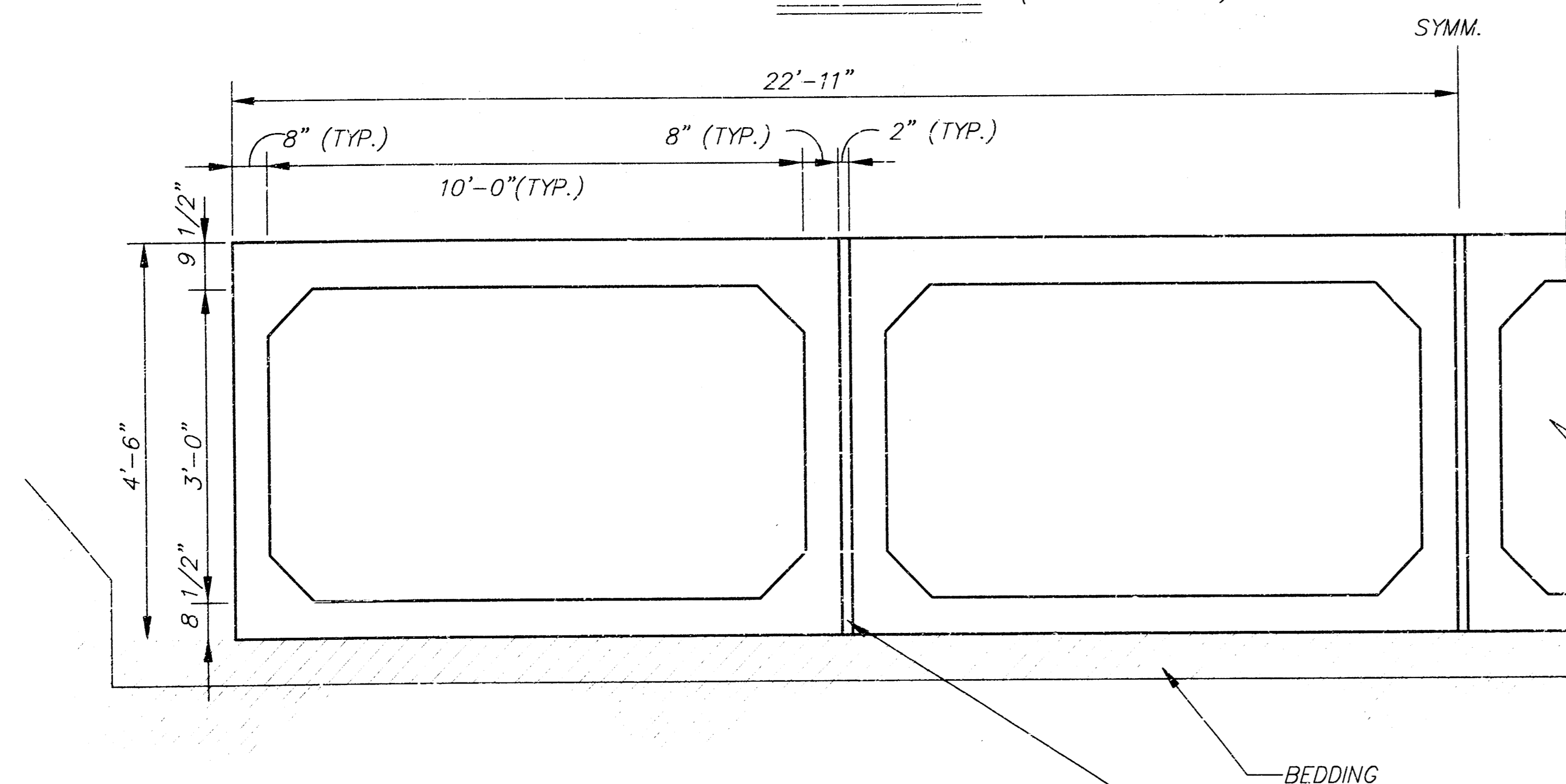
<p><b>MKEC</b> ENGINEERING CONSULTANTS 411 N. WEBB ROAD WICHITA, KS. 67206 316 - 684 - 9600</p>	<b>THE LEGACY - PHASE 2</b> PROJECT NAME		
	<b>4-10'x3' RCB's DETAILS</b> SHEET TITLE		
	DK DESIGN BY:	HAW DRAWN BY:	DK CHECKED BY:
	JANUARY 2002 DATE	01264DD3 JOB NO.	9 / 18 SHEET OF



END ELEVATION (Upstream End)

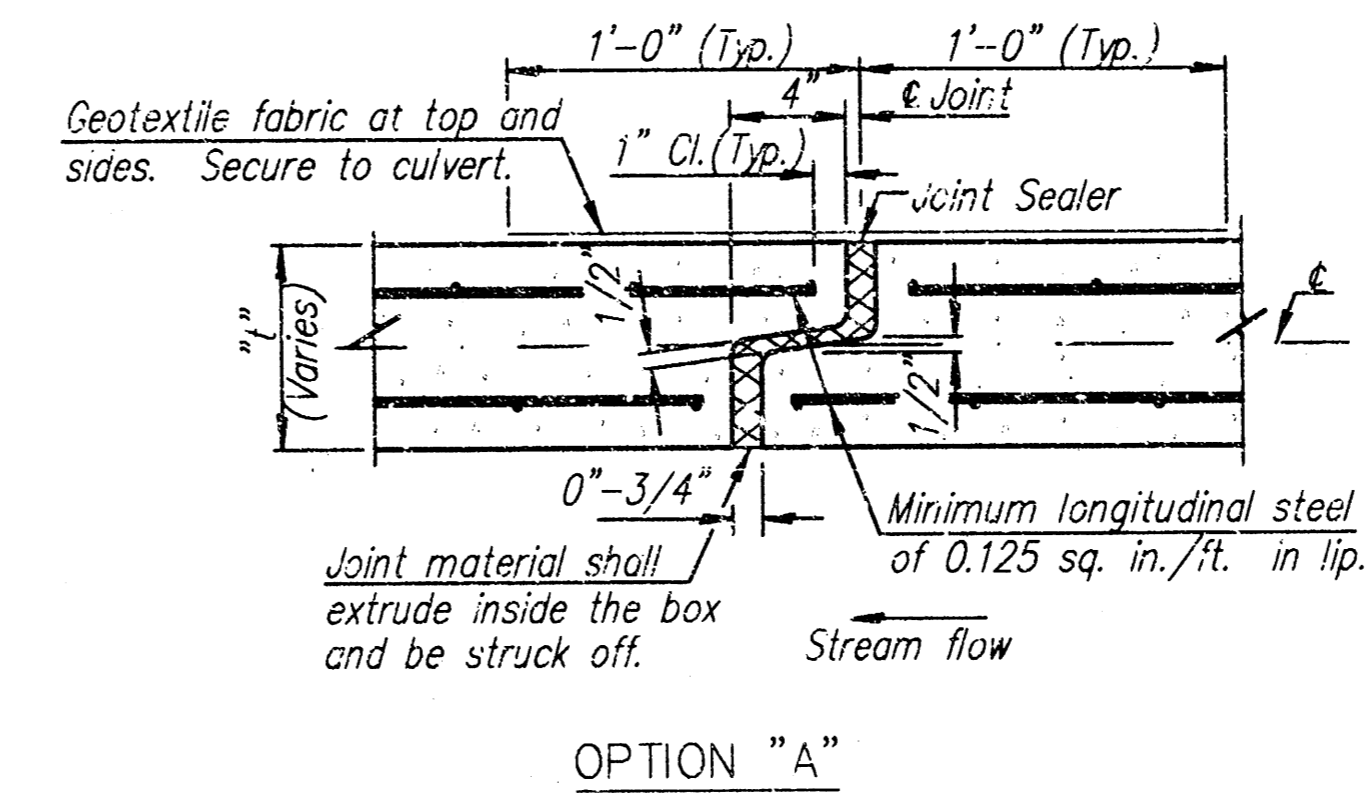


END ELEVATION (Downstream End)

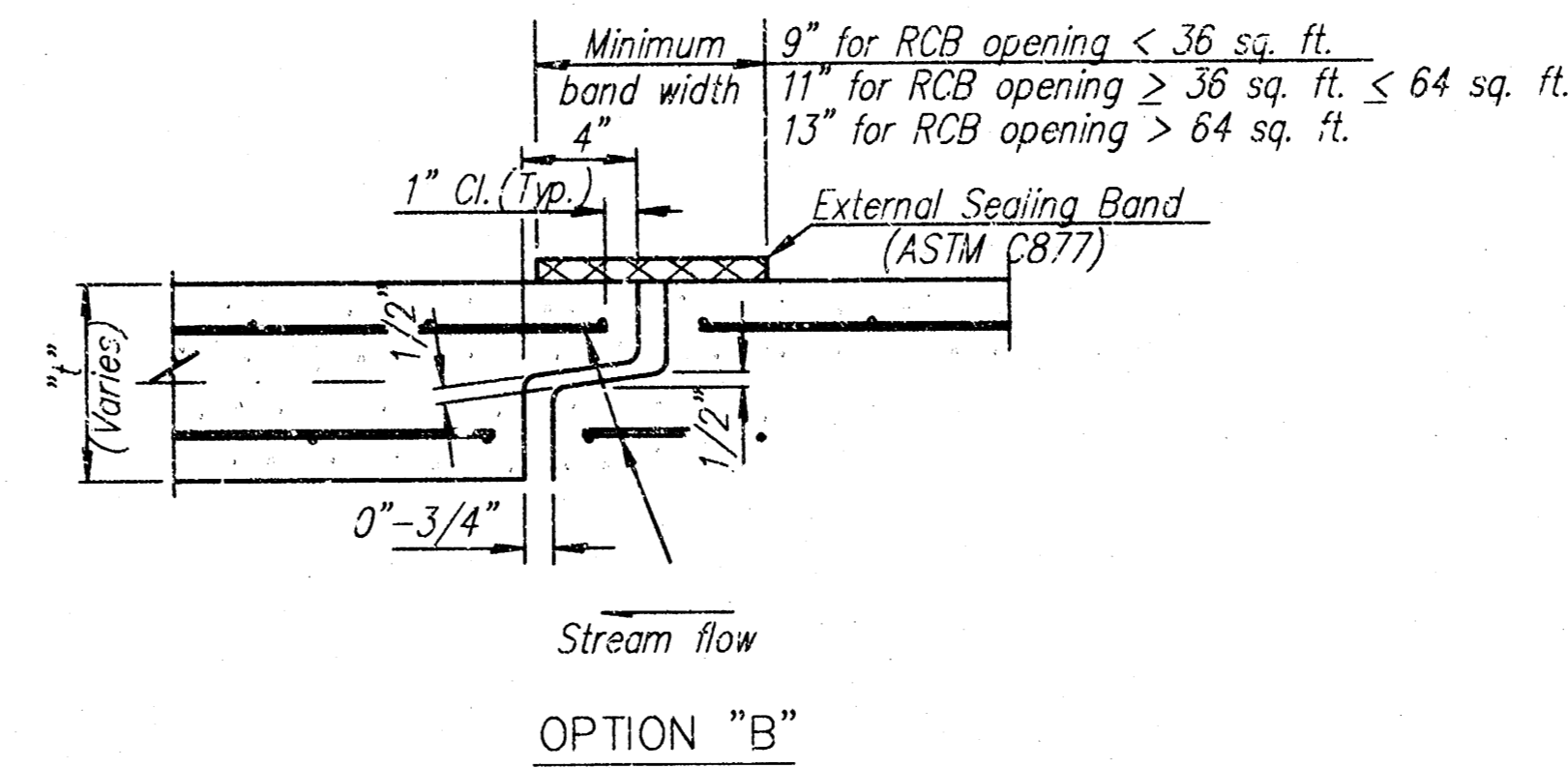


SECTION D-D  
TYP. PRECAST RCB SECTION  
SCALE 1/2"=1'-0"

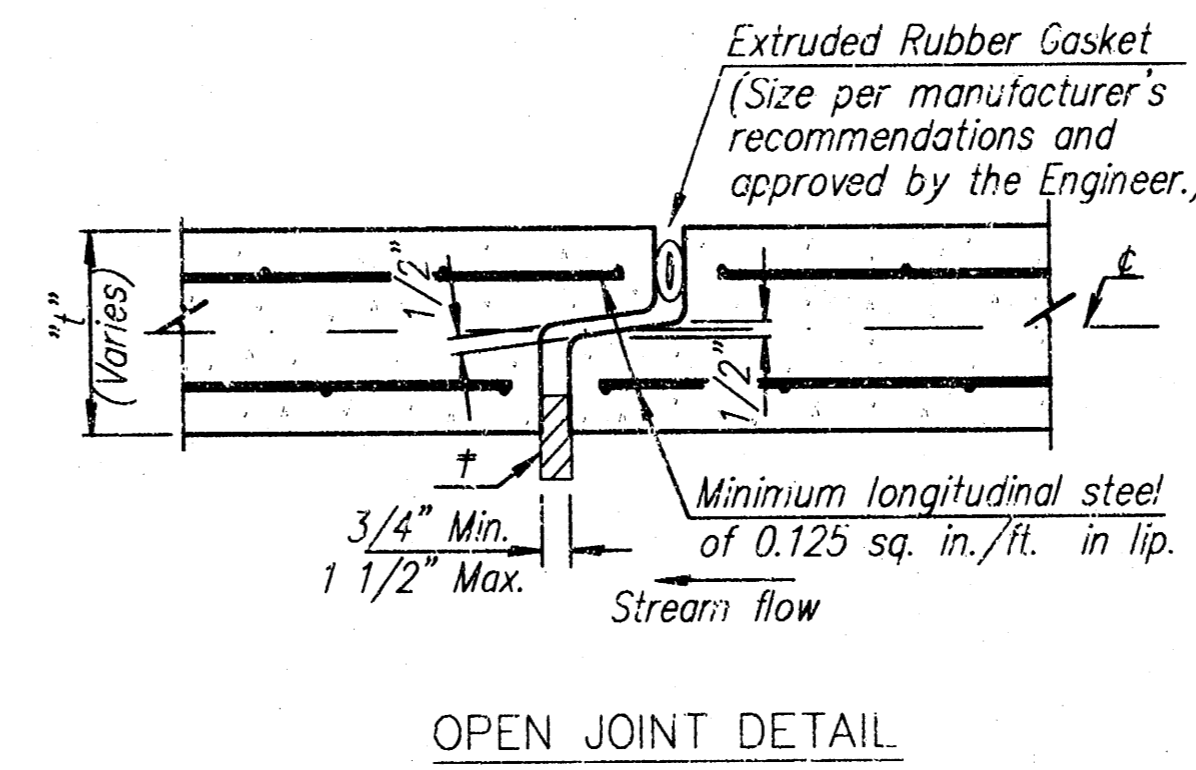
FILL SPACE BETWEEN BOXES WITH GROUT.  
(TO MAINTAIN PROPER JOINT GAP, PARTIALLY  
BACKFILL BOXES PRIOR TO GROUTING OR  
PROVIDE A MECHANICAL CONNECTION BETWEEN  
BOXES.)



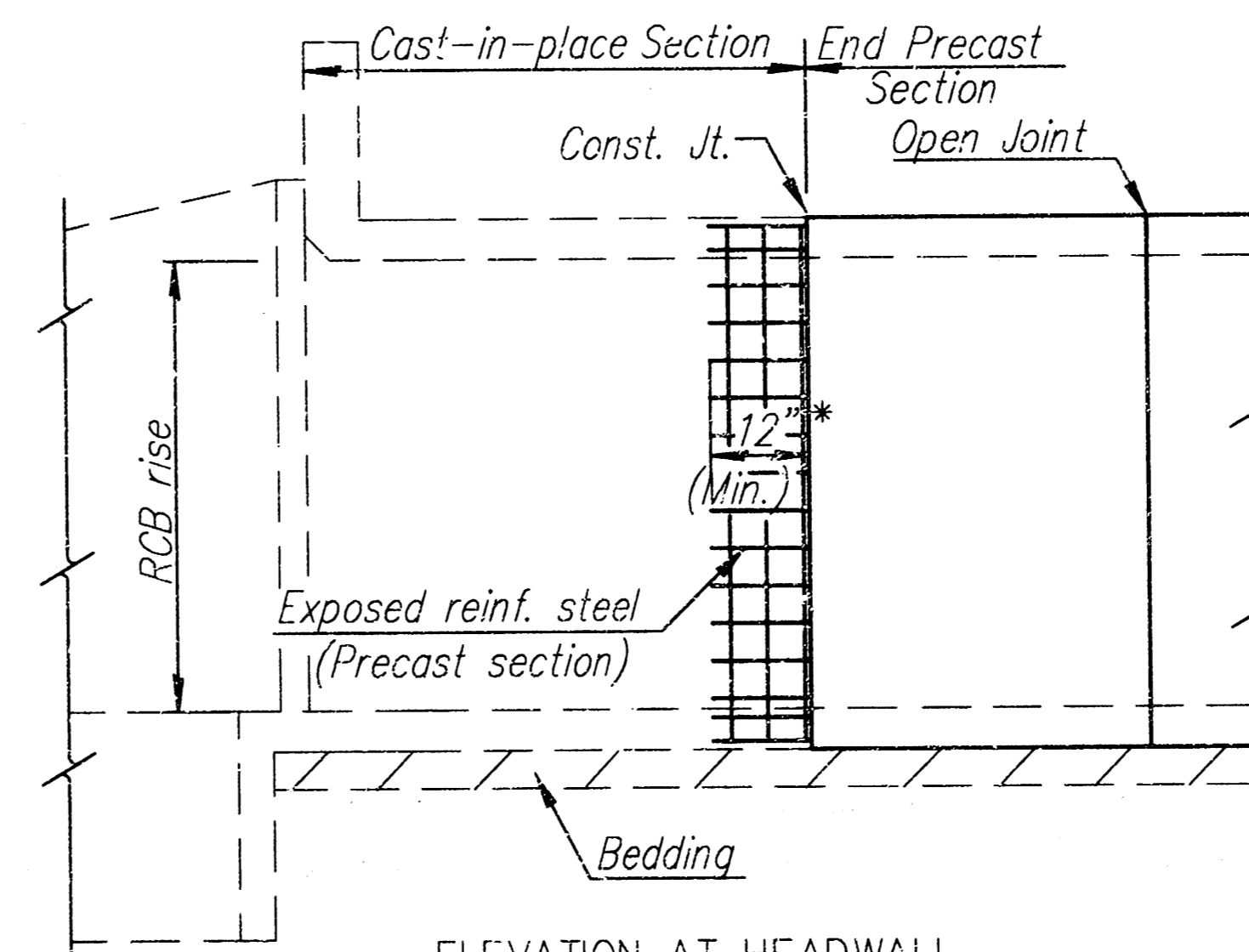
OPTION "A"



OPTION "B"



OPEN JOINT DETAIL



ELEVATION AT HEADWALL  
(End unit using combination of cast-in-place and precast sections.)

\* EXPOSED REINFORCING STEEL IN  
THE WALL AND THE TOP &  
BOTT. SLABS

GENERAL NOTES

**PRECAST BOX CULVERTS:** If precast box culverts are specified, they shall be constructed at the locations shown in the plans and according to the requirements shown on this sheet. When approved by the Engineer, precast box culverts may be constructed in lieu of cast-in-place box culverts. When the precast option is chosen by the Contractor, the cast-in-place quantities shall be used as the basis of payment which shall include all labor, equipment, materials, and incidentals necessary to complete the installation.

Unless otherwise approved by the Engineer, cast-in-place collars shall be required at horizontal and vertical changes in RCB alignment. Cast-in-place end sections and wingwalls are required except as noted on this sheet. Cast-in-place sections may be required at the direction of the Engineer at junctions of drainage structures.

Cast-in-place concrete work shall be done in accordance with the KDOT Specifications and KDOT's "Guidelines for Structural Design and Detail of Reinforced Concrete Box Culverts". Class AAA (AE) Concrete and Grade 60 Reinforcing Steel shall be used for the cast-in-place construction.

**SPECIFICATIONS:** Single-cell Precast Concrete Box Culverts shall conform to the requirements of the following specifications except as noted in the KDOT Specifications. Multiple-cell Precast Boxes shall be designed in accordance with the criteria used to develop the single-cell precast boxes. (See the latest AASHTO Specifications.)

Condition	Min. Fill	AASHTO	Equiv. ASTM
2 Ft. or more fill	2 Ft.	M259, Table 2	C739, Table 2
Less than 2 Ft. fill	0 Ft.	M273, Table 2	C850, Table 2

**FABRICATION:** Prior to fabrication, the Contractor shall furnish shop drawings to the Engineer for review. Shop drawings shall detail all phases of construction including layout, joint details, lifting devices, casting methods, construction placement and details of any cast-in-place segments or transitions that may be required. Copies of overweight and overload permits, when required, shall be submitted with the shop drawings.

The following information shall be legibly marked on an inside face of each box section by waterproof paint or other approved means:

- Date of manufacture
- Name or trademark and location of the manufacturer
- Weight of box section in tons
- Piece mark
- The top of the box

**CONSTRUCTION REQUIREMENTS:** Foundation preparation shall be in accordance with KDOT Specifications except that a minimum 6 inch thickness of crushed stone for backfill or 3 inch seal course shall be provided. Choice of bedding shall be at the Contractor's option and approved by the Engineer.

Precast concrete box culvert shall be laid with the groove end of each section upstream, and the sections shall be tightly joined. Joint shall be sealed with an approved bituminous mastic material and geotextile or sealing band or an extruded rubber gasket, installed in accordance with the recommendations of the manufacturer. Lifting holes shall be plugged with a precast plug, sealed and covered with mastic or mortar.

**THE LEGACY - PHASE 2**  
PROJECT NAME

---

**4-10'x3' RCB's DETAILS**  
SHEET TITLE

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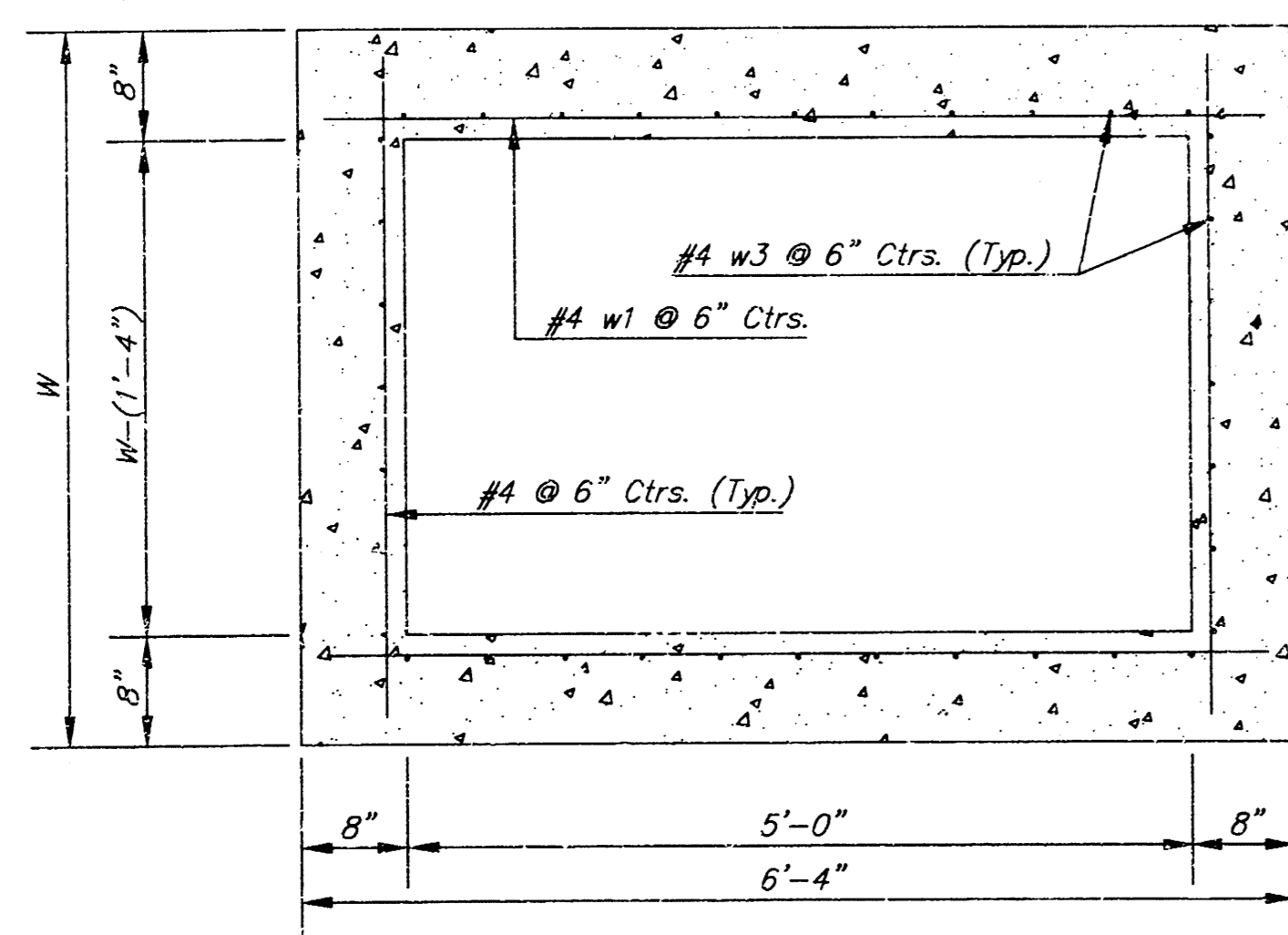
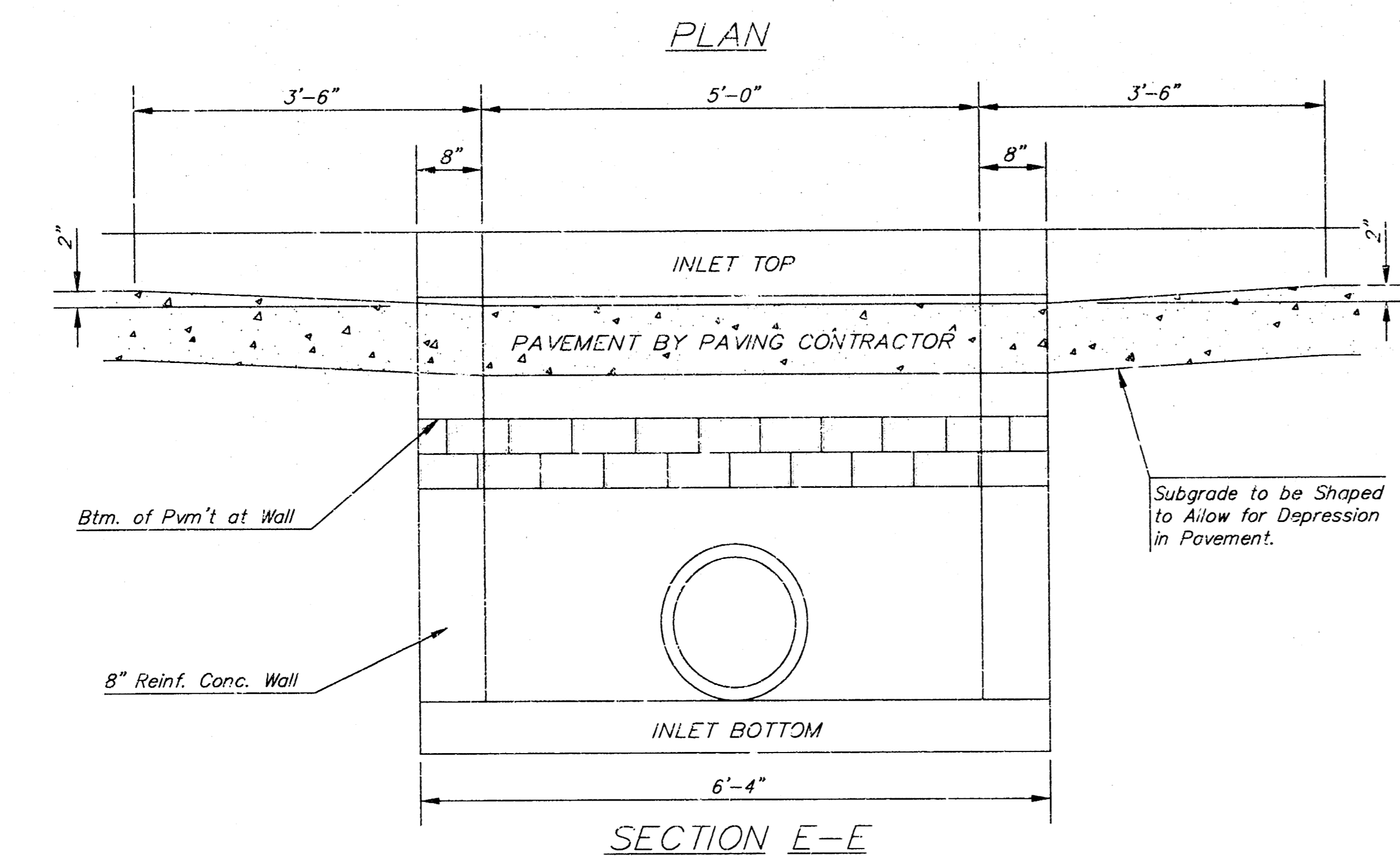
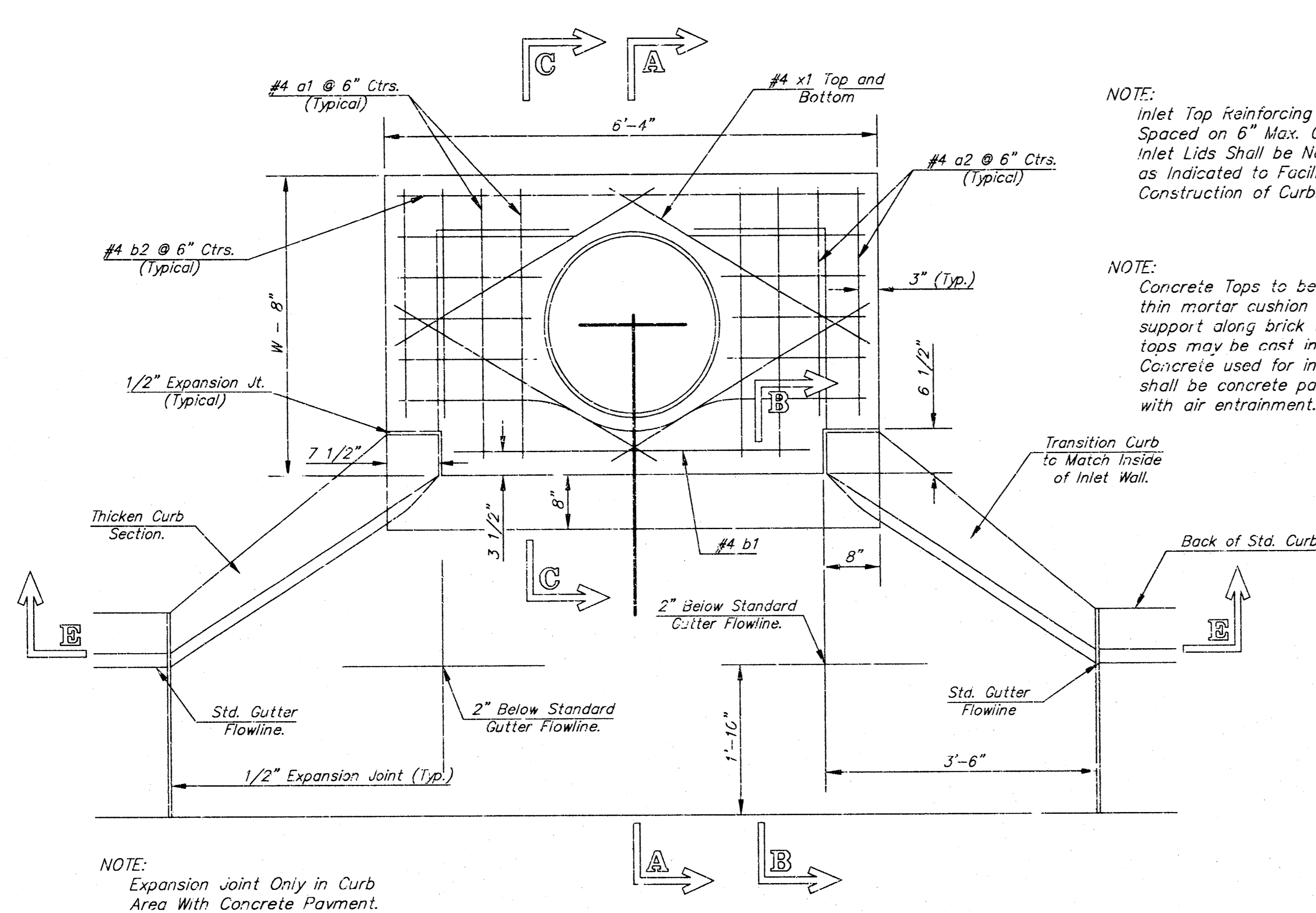
DK DESIGN BY: HAW DRAWN BY: DK CHECKED BY:

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JANUARY 2002 DATE: 01264DD4 JOB NO.: 10 / 18 SHEET OF

411 N. WEBB ROAD  
WICHITA, KS. 67206  
316-684-9000



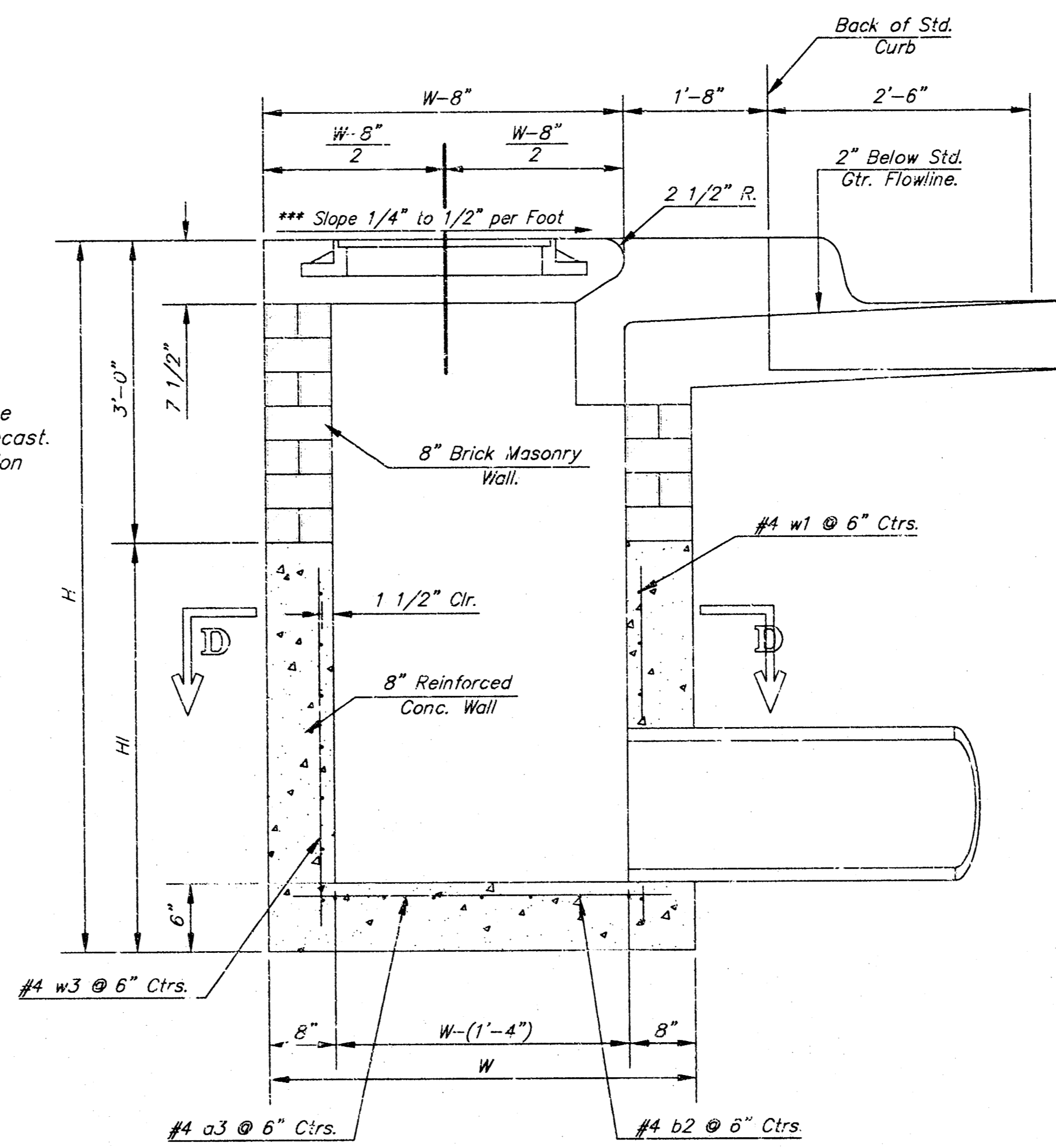


**NOTE:** Contractor shall have the option of constructing 8" brick masonry walls between the concrete inlet base and top on this inlet when W=6'-4" and H=7'-0" or less.

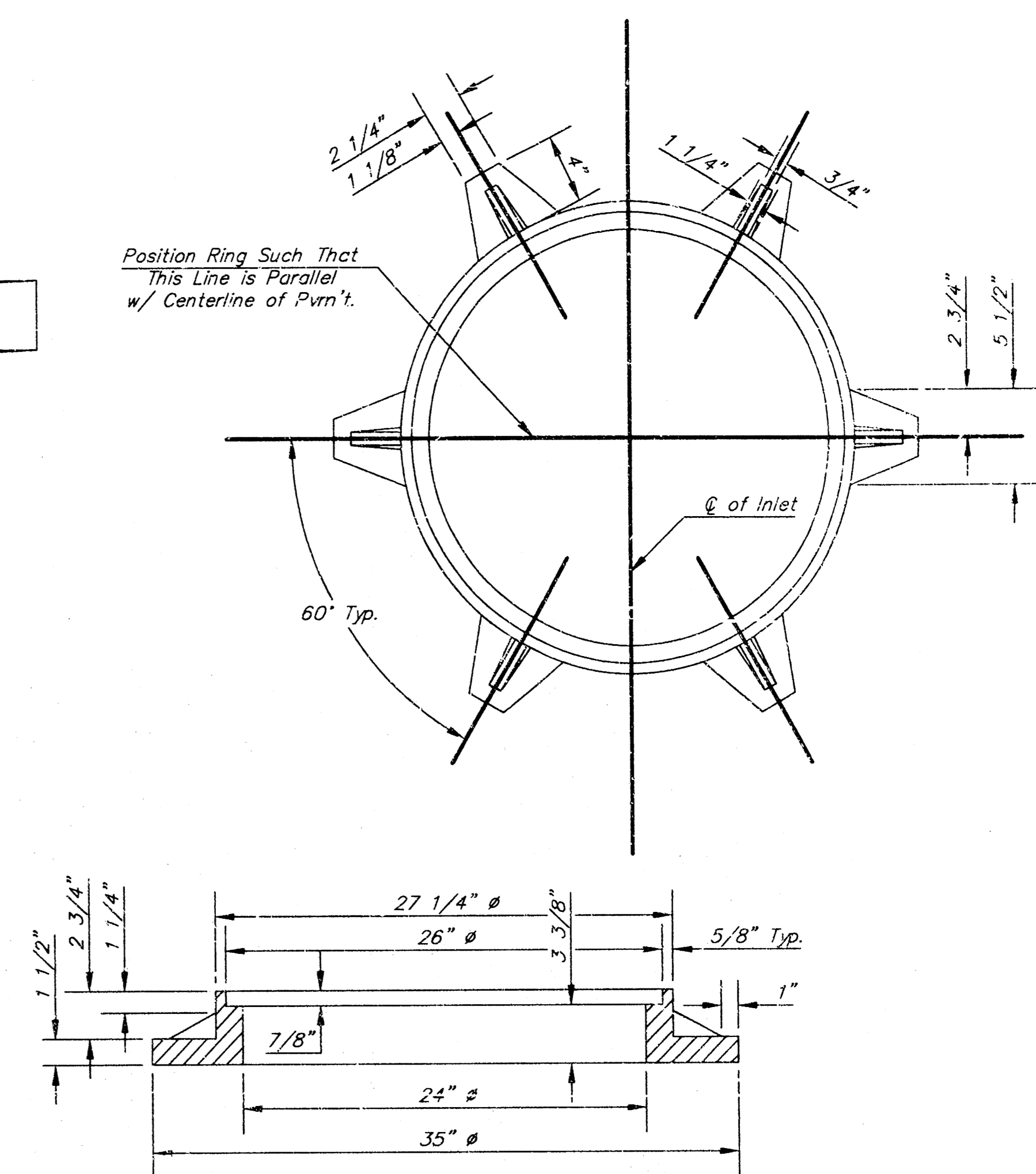
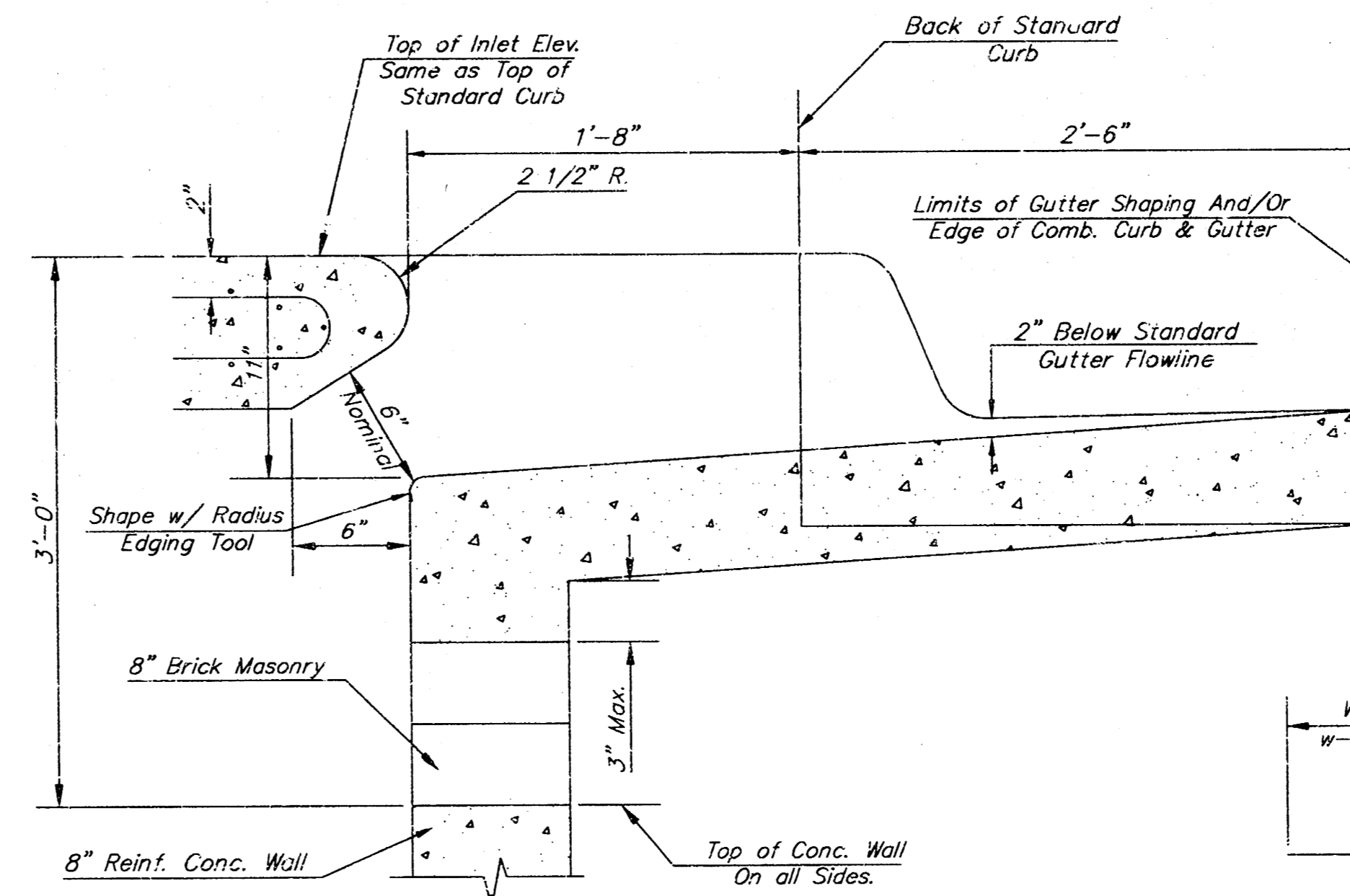
Additional curb and gutter construction necessary to connect set-back inlet to pavement will be paid for at the unit price bid for each inlet hookup.

Inlet invert shall be shaped with 8 sack sand mix concrete to create flow channels and to increase hydraulic efficiency such that the inlet will be self-cleaning between all inlet and/or outlet pipes.

The ends of all pipes installed in inlets shall be cut off flush with the inside face of the inlet wall

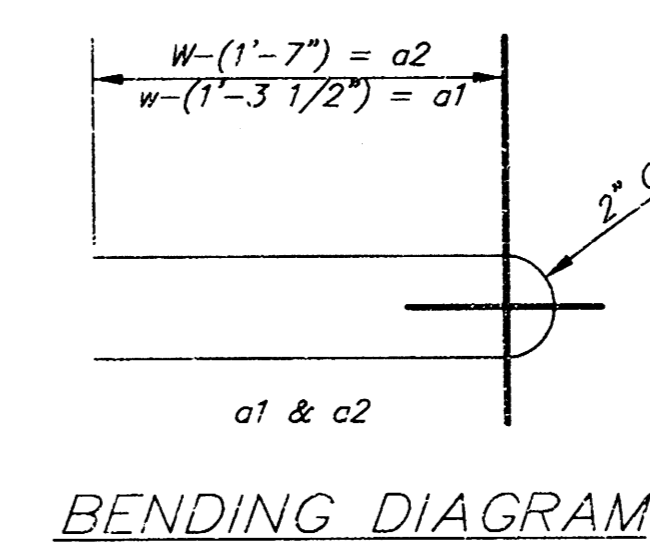
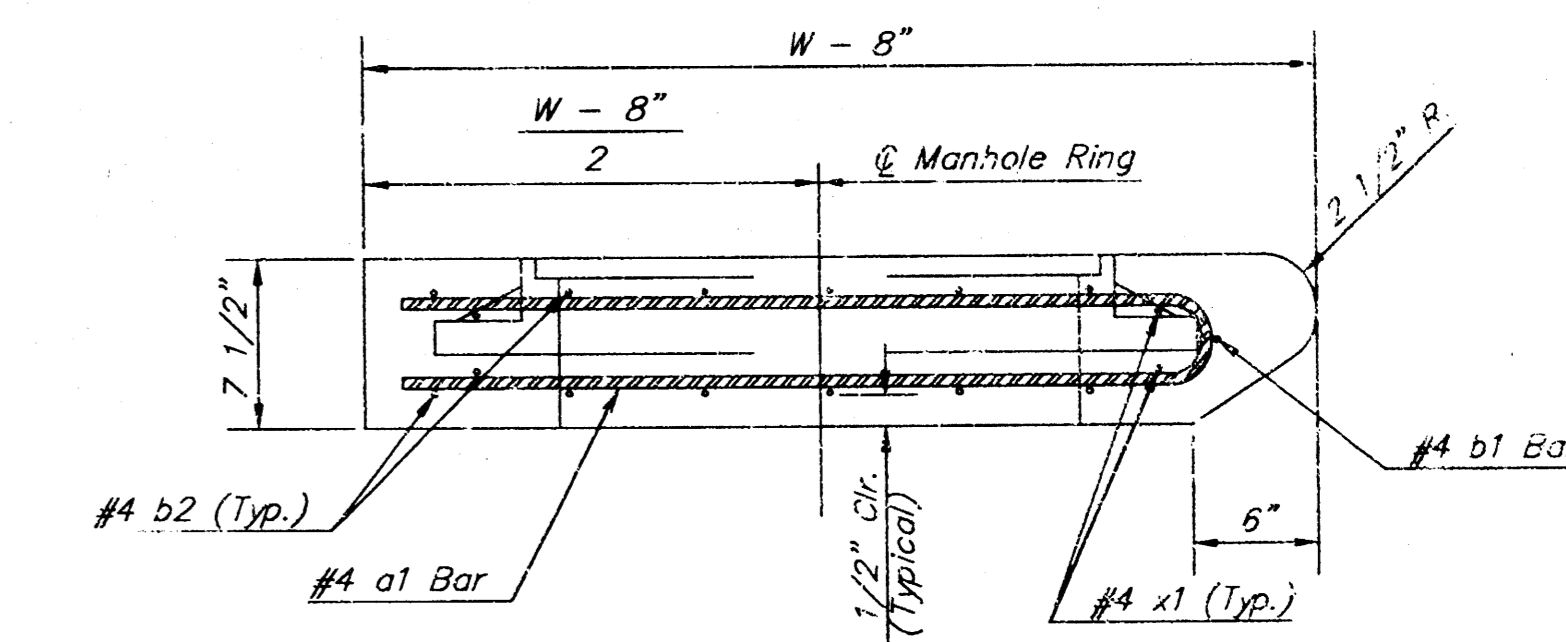


**SECTION A-A**  
\*\*\*NOTE: Slope of Inlet tops to Match Sidewalk or Parking Slopes within Limits Indicated.



**SECTION A-A**

**SECTION A-A**



PRECAST SLAB AND FLOOR REINFORCING											
		W = 4'-4"		W = 5'-4"		W = 6'-4"		W = 7'-4"		W = 8'-4"	
MARK	SIZE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
a1	#4	6	6'-7"	6	8'-7"	6	10'-7"	6	12'-7"	6	14'-7"
a2	#4	4	6'-0"	4	8'-0"	4	10'-0"	4	12'-0"	4	14'-0"
a3	#4	13	4'-1"	13	5'-1"	13	6'-1"	13	7'-1"	13	8'-1"
b1	#4	1	4'-9"	1	4'-9"	1	4'-9"	1	4'-9"	1	4'-9"
b2	#4	23	6'-1"	29	6'-1"	35	6'-1"	41	6'-1"	47	6'-1"
x1	#4	8	3'-10"	8	4'-2"	8	4'-6"	8	4'-10"	8	5'-2"

WALL REINFORCING											
		W = 4'-4"		W = 5'-4"		W = 6'-4"		W = 7'-4"		W = 8'-4"	
MARK	SIZE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
w1	#4	①	6'-1"	①	6'-1"	①	6'-1"	①	6'-1"	①	6'-1"
w2	#4	①	4'-1"	①	5'-1"	①	6'-1"	①	7'-1"	①	8'-1"
w3	#4	32	②	36	②	40	②	44	②	48	②

\* Field Bend or Cut Reinforcing as Required for Clearance.  
① 4 (H = 12") (H = 21") Rounded down to nearest 0.5"  
② H = 3"

**THE CITY OF WICHITA**

CITY ENGINEER'S OFFICE  
425 NORTH MAIN STREET  
WICHITA, KANSAS 67202  
(316) 268-4400  
(316) 268-4114 FAX

**STANDARD TYPE 1-A**  
**CURB INLET**  
**OPENING = 6" x 5'-0"**

M. E. LINDEBAK P.E. - CITY ENGINEER

PROJECT NUMBER 472-83301	INSEA CODE 765662
DATE OCT. 01	SHEET 12 OF 18

NW Cor. SE1/4  
Sec.13, T28S,R1W

25.0' CITIES SERVICE  
PIPELINE ESMT.  
MISC. BOOK 623, PAGE 553

40' BLDG. STBK. FROM  
CL. PIPELINE ESMT.

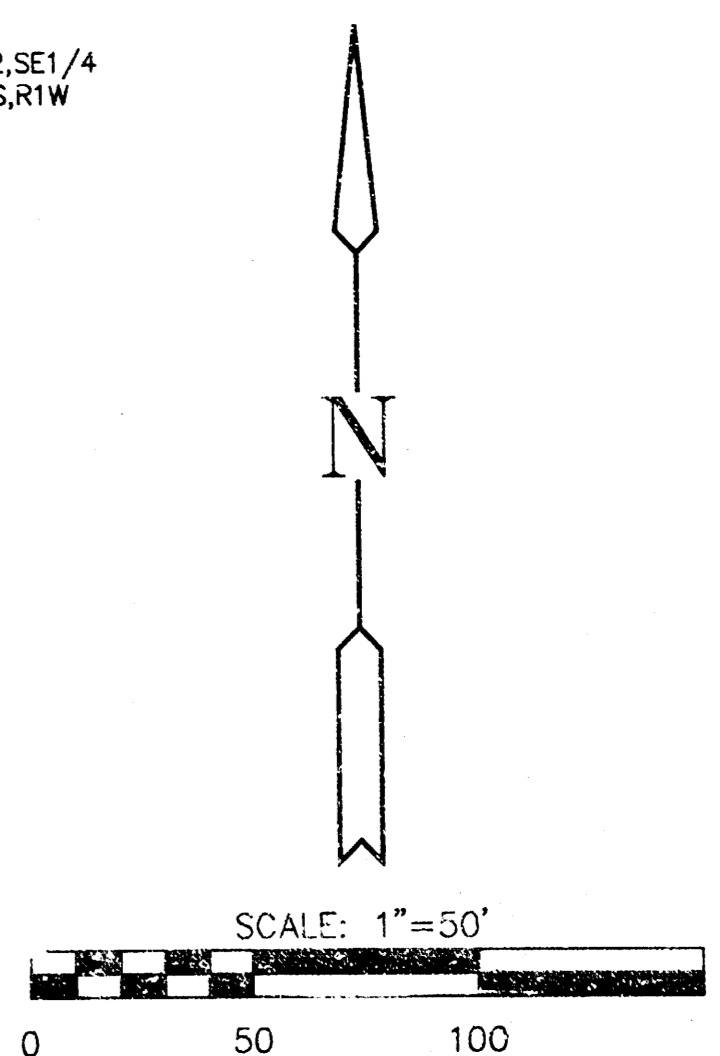
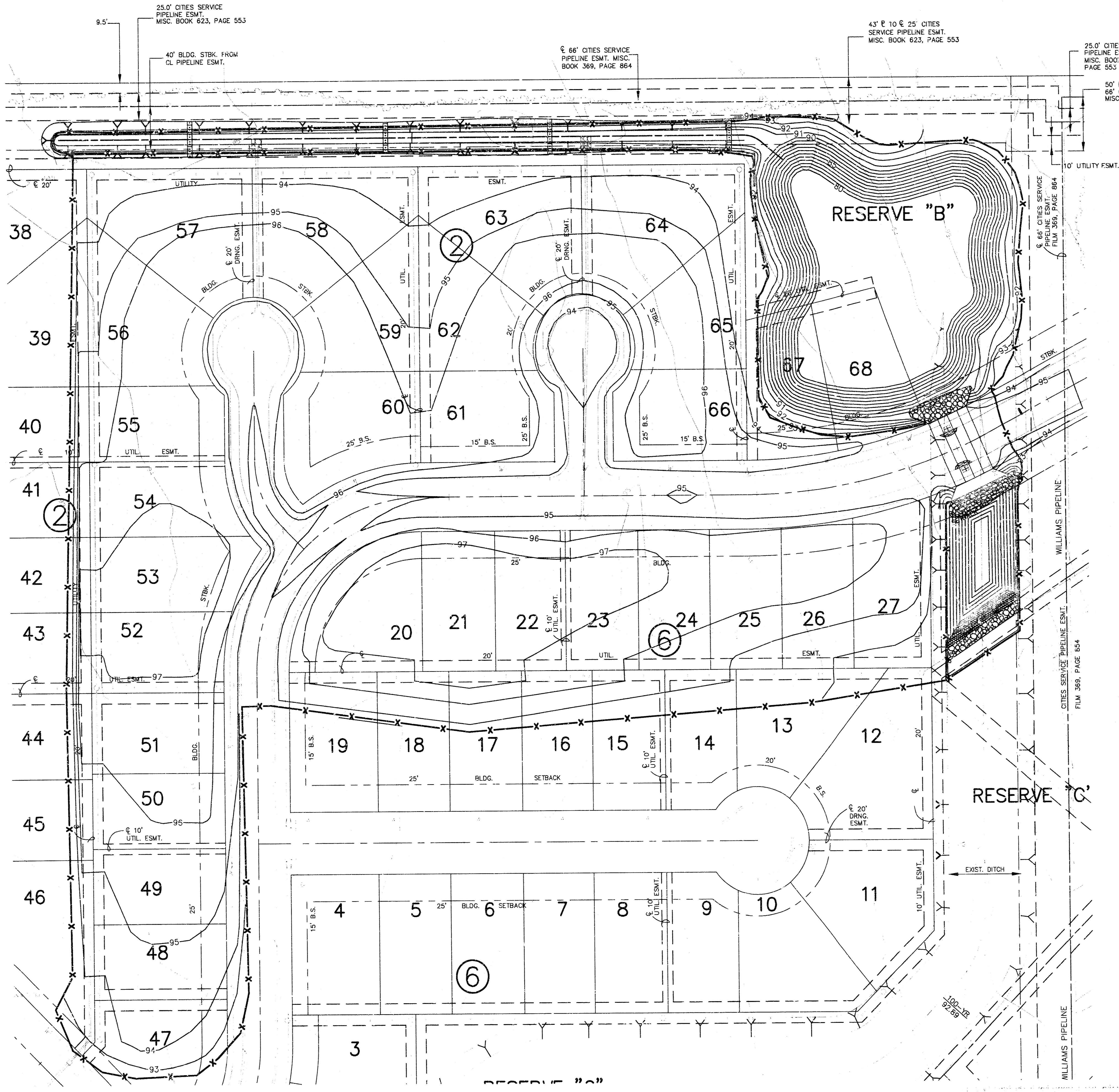
66' CITIES SERVICE  
PIPELINE ESMT. MISC.  
BOOK 369, PAGE 864

43' E 10' C 25' CITIES  
SERVICE PIPELINE ESMT.  
MISC. BOOK 623, PAGE 553

25.0' CITIES SERVICE  
PIPELINE ESMT.  
MISC. BOOK 523,  
PAGE 553

NE Cor. N1/2, SE1/4  
Sec.13, T28S,R1W

50' BUILDING SETBACK FROM  
66' CITIES SERVICE PIPELINE ESMT.  
MISC. BOOK 369, FILM 864



**NOTES:**

1. EROSION CONTROL IS TO MEET ALL FEDERAL, STATE, COUNTY & LOCAL CODE STANDARDS.
2. CONTRACTOR SHALL PROVIDE EROSION PROTECTION THROUGHOUT PROJECT CONSTRUCTION. THE PLAN PROVIDED HERE IS FOR FINAL PROTECTION. VARIOUS PHASES OF THIS PLAN SHALL BE IMPLEMENTED OR MODIFIED TO CONTROL EROSION. MODIFICATIONS OF THE PLAN SHALL BE APPROVED BY THE OWNERS REPRESENTATIVE.
3. ALL DISTURBED AREAS SHALL BE SEEDDED WITH RYE GRASS AT A RATE OF 200 LBS./ACRE WITHIN 10 DAYS OF CONSTRUCTION. APPROX. AREA TO BE SEEDDED = 12.4 AC. (FOR INFORMATION ONLY)

**LEGEND**

- SILT FENCE ——— X ———
- HAY BALE SEDIMENT BARRIER ——— [Symbol] ———
- CURB INLET SEDIMENT BARRIER ——— [Symbol] ———



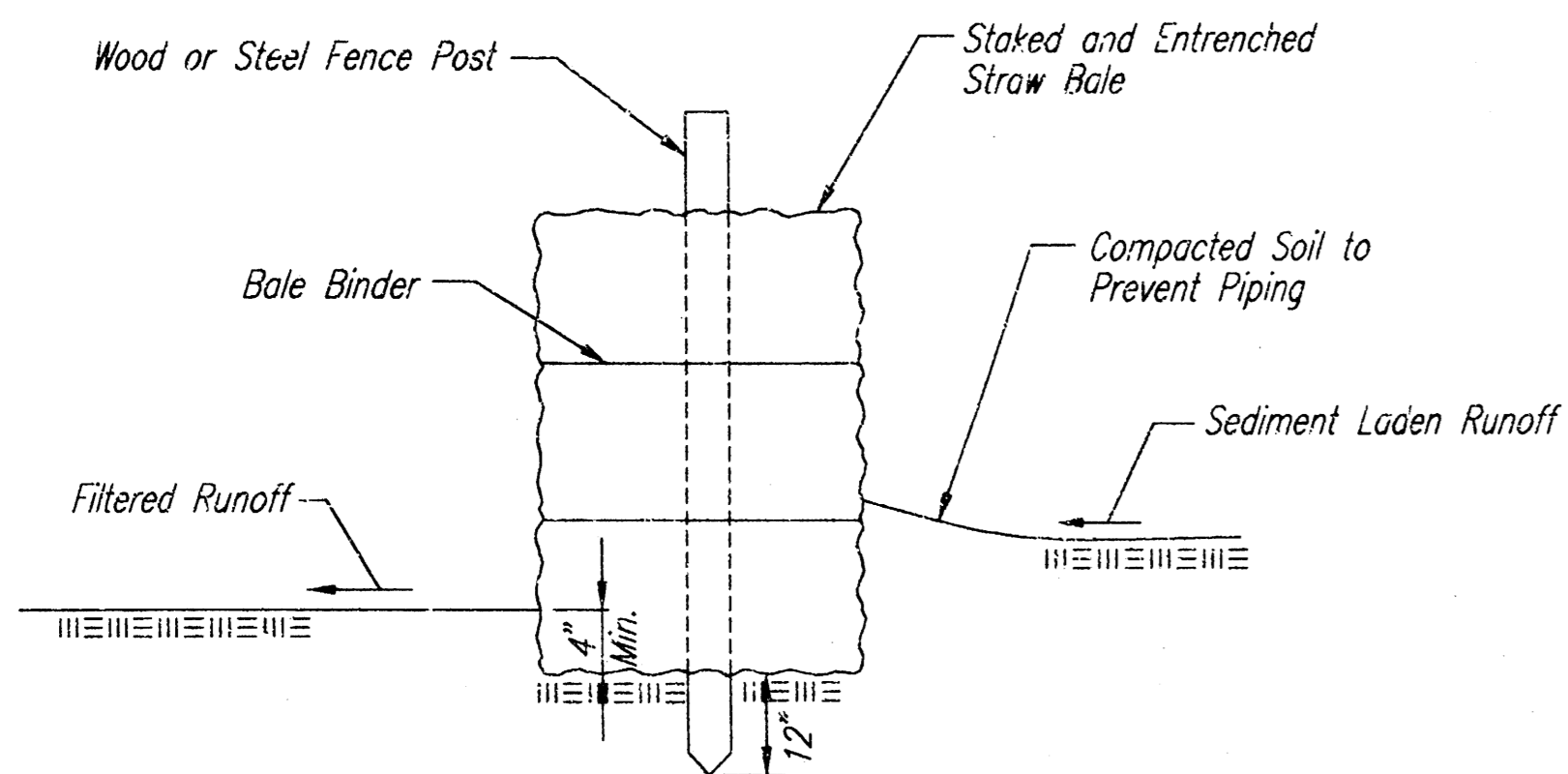
**THE LEGACY - PHASE 2**  
PROJECT NAME

**EROSION CONTROL**  
SHEET TITLE

DK DESIGN BY. DK DRAWN BY. DK CHECKED BY.

JANUARY 2002 DATE 01264ERS JOB NO. 13 / 18 SHEET/OF

G:\ACTUAL\381\01264ERS\01264ERS.DWG WED FEB 06 09:20:44 2002



STRAW BALE BARRIERS

**Material Specification:**

Bale slope barriers may be constructed of wheat straw, oat straw, prairie hay, or bromegrass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long.

**Placement:**

A slope barrier should be used at the toe of a slope when a ditch does not exist. The slope barrier should be placed on nearly level ground 5' to 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out sediment. When practicable, bale slope barriers should be placed along contours to avoid a concentration of flow. Bale slope barriers can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the slope barrier will not likely follow contours.

**Proper installation method:**

Excavate a trench the length of the planned slope barrier that is 4" deep and a bale's width wide. Make sure that the trench is excavated along a single contour. When practicable, slope barriers should be placed along contours to avoid a concentration of flow. Place the soil on the upslope side of the trench for later use. Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale along the centerline of the ditch check, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the upslope side of the check and compact it. The compacted soil should be no more than 3" to 4" deep.

**List of common placement/installation mistakes to avoid:**

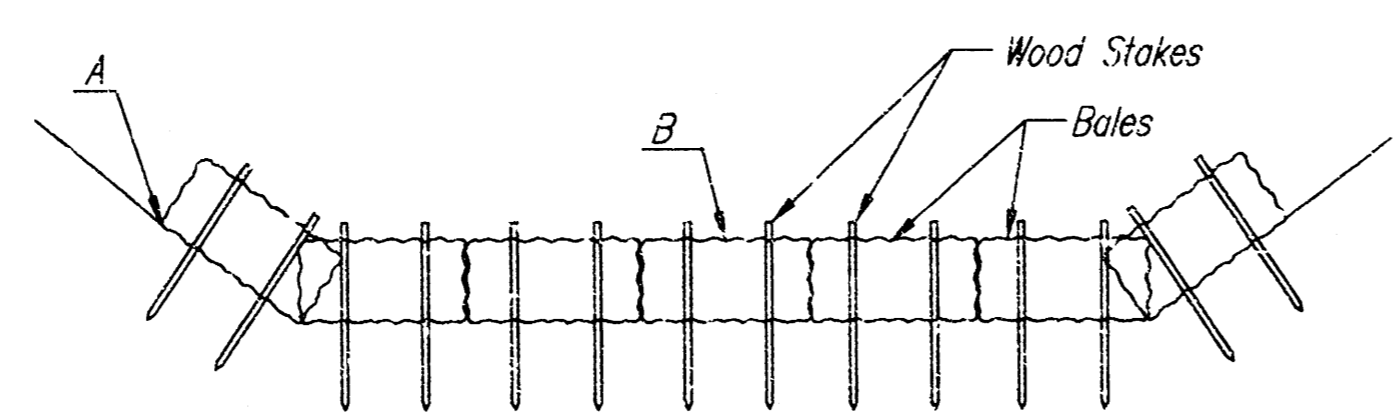
When practicable, do not place bale slope barriers across contours. Slope barriers should be placed along contours to avoid a concentration of flow. Concentrated flow over a slope barrier creates a scour hole on the downslope side of the barrier. The scour hole eventually undermines the bales and the barrier fails. Do not place bale slope barriers in areas with shallow soils underlain by rock. If the barrier is not anchored sufficiently, it will wash out. Bale slope barriers must be dug into the ground. Bales at ground level do not work because they allow water to flow under the barrier.

**Inspection and Maintenance:**

Bale slope barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Are there any points along the slope barrier where water is concentrating?
- Does water flow under the slope barrier?
- Does water flow through spaces between abutting bales?
- Are any bales dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the slope barrier?

NOTE: Point A must be higher than Point B so that water flows over the bales and not around them.



**STRAW BALE DITCH CHECKS**

**Material Specification:**

Bale ditch checks may be constructed of wheat straw, oat straw, prairie hay, or bromegrass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Optional: The downstream scour apron should be constructed of a double-netted straw erosion-control blanket at least 6' wide. Optional: The metal landscape staples used to anchor the erosion-control blanket should be at least 8" long.

**Placement:**

Bale ditch checks should be placed perpendicular to the flowline of the ditch. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the top of the lowest center bale. This prevents water from flowing around the check. Checks should not be placed in ditches where high flows are expected. Rock checks should be used instead. Bales should be placed in ditches with slopes of 6% or less. For slopes steeper than 6%, rock checks should be used. The following table provides check spacing for a given ditch grade:

Ditch grade (%)	Check Spacing (feet)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

**Proper installation method:**

Excavate a trench perpendicular to the ditch flowline that is 4" deep and a bale's width wide. Extend the trench in a straight line along the entire length of the proposed ditch check. Place the soil on the upstream side of the trench—it will be used later. Optional: On the downstream side of the trench, roll out a length of erosion-control blanket (scour apron) equal to the length of the trench. Place the upstream edge of the erosion-control blanket along the bottom upstream edge of the trench. The erosion control blanket should be anchored in the trench with one row of 8" landscape staples placed on 18" centers. The remainder of the erosion-control blanket (the portion that is not lying in the trench) will serve as the downstream scour apron. This section of the blanket should be anchored to the ground with 8" landscape staples placed around the perimeter of the blanket on 18" centers. The remainder of the blanket should be anchored using two evenly spaced rows of 8" landscape staples on 18" centers placed perpendicular to the flowline of the ditch. Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale along the centerline of the ditch check, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the upstream side of the check and compact it. The compacted soil should be no more than 3" to 4" deep and extend upstream no more than 24".

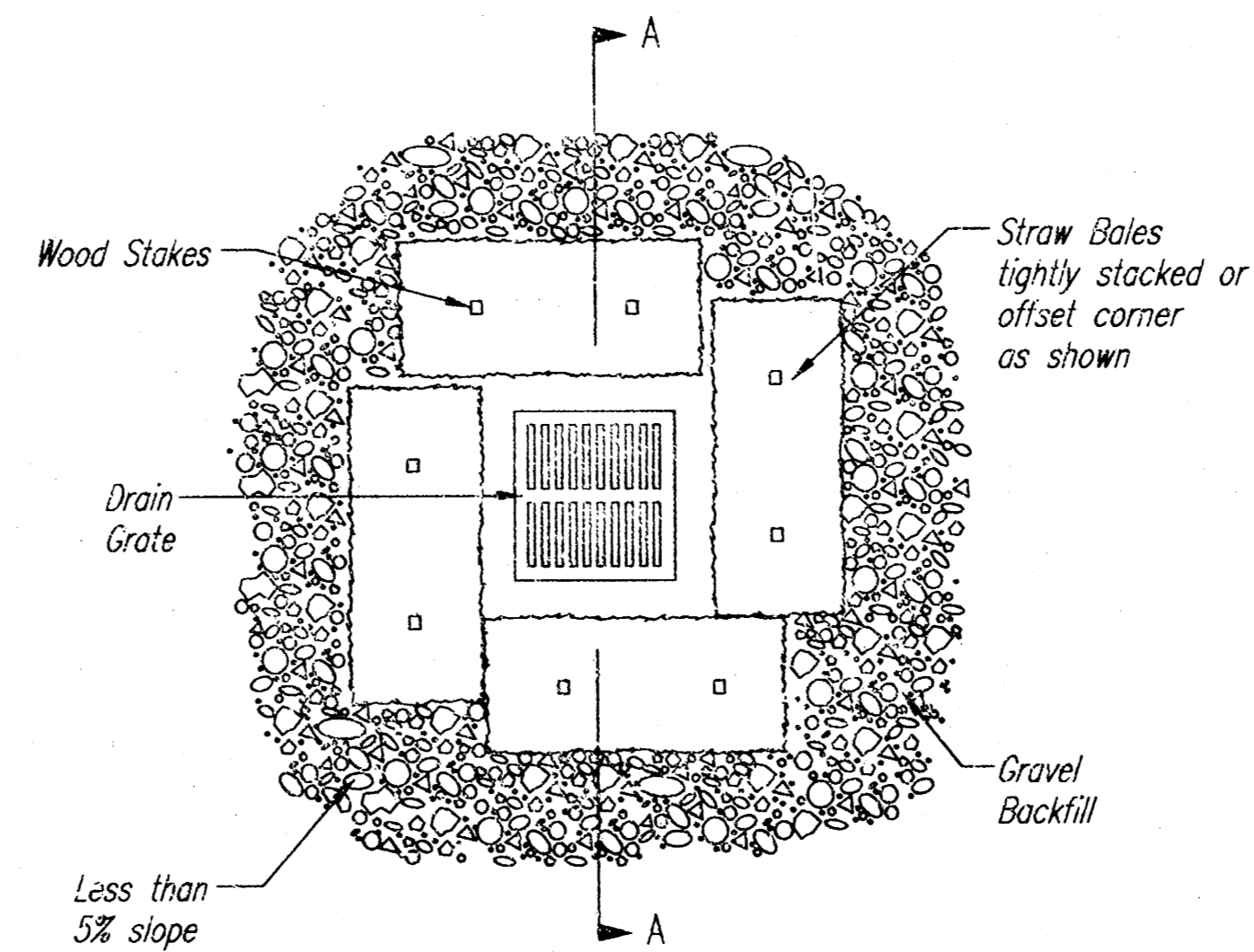
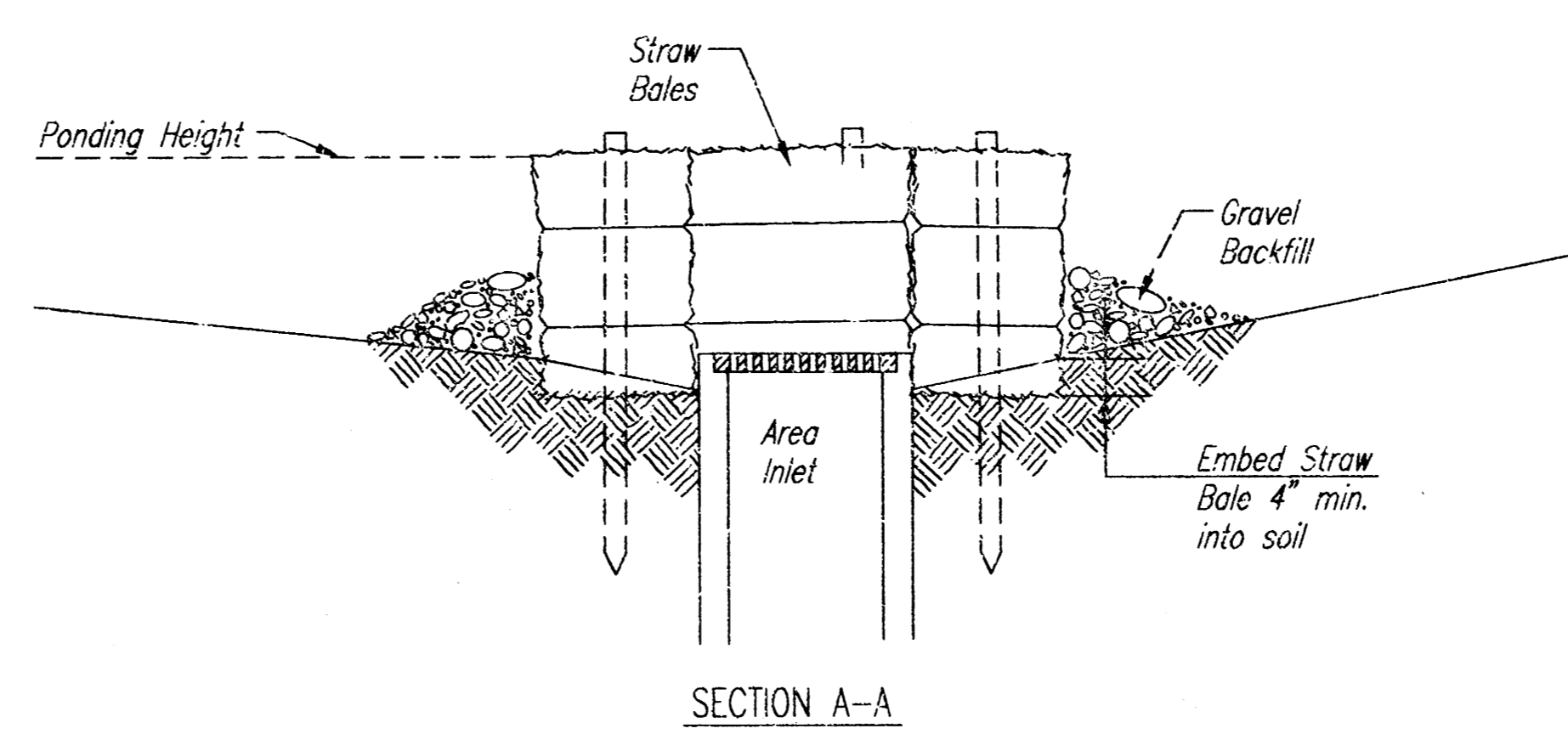
**List of common placement/installation mistakes to avoid:**

Do not place a bale ditch check directly in front of a culvert outlet. It will not stand up to the concentrated flow. Do not place bale ditch checks in ditches that will likely experience high flows. They will not stand up to concentrated flow. Follow prescribed ditch-check spacing guidelines. If spacing guidelines are exceeded, erosion will occur between the ditch checks. Do not allow water to flow around the ditch check. Make sure that the ditch check is long enough so that the ground level at the ends of the check is higher than the top of the lowest center bale. Do not place bale ditch checks in channels with shallow soils underlain by rock. If the check is not anchored sufficiently, it will wash out. Bale ditch checks must be dug into the ground. Bales at ground level do not work because they allow water to flow under the check.

**Inspection and Maintenance:**

Bale ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow around the ditch check?
- Does water flow under the ditch check?
- Does water flow through spaces between abutting bales?
- Are any bales and/or scour aprons (optional) dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the ditch check?



STRAW BALE BARRIERS FOR AREA INLETS (INLET PROTECTION)

**Material Specification:**

Bale area inlet barriers should be constructed of wheat straw, oat straw, prairie hay, or bromegrass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long.

**Placement:**

Bale area inlet barriers should be placed directly around the perimeter of a drop inlet. When a bale area inlet barrier is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

**Proper Installation Method:**

Excavate a trench around the perimeter of the area inlet that is at least 4" deep by a bale's width wide. Place the bales in the trench, making sure that they are butted tightly. Some bales may need to be shortened to fit into the trench around the area inlet. Two stakes should be driven through each bale, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the receiving side of the barrier and compact it. The compacted soil should be no more than 3" to 4" deep. Note: When a bale area inlet barrier is placed in a shallow median ditch, make sure that the top of the barrier is not higher than the paved road. In this configuration, water may spread onto the roadway causing a hazardous condition.

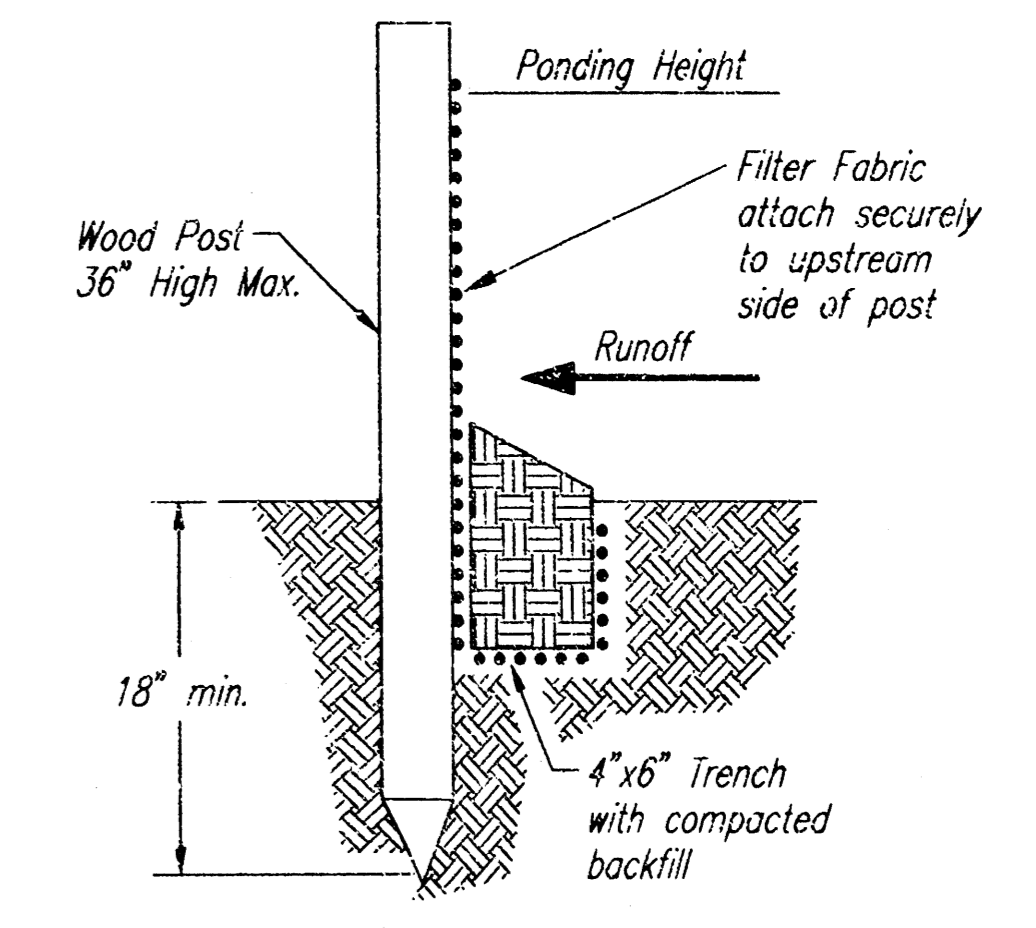
**List of common placement installation mistakes to avoid:**

Bales should be placed directly against the perimeter of the area inlet. This allows overtopping water to flow directly into the inlet instead of onto nearby soil causing scour. Bale area inlet barriers must be dug into the ground. Bales at ground level do not work because they allow water to flow under the barrier.

**Inspection and Maintenance:**

Bale area inlet barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow under the area inlet barrier?
- Does water flow through spaces between abutting bales?
- Are any bales dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the area inlet barrier?



SILT FENCE BARRIERS

**SILT FENCE BARRIERS**

**Material Specification:**

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Silt fence fabric should be attached to the wooden posts with staples, wire, zip ties, or nails.

**Placement:**

A slope barrier should be used at the toe of a slope when a ditch does not exist. The slope barrier should be placed on nearly level ground 5' to 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out sediment. When practicable, silt fence slope barriers should be placed along contours to avoid a concentration of flow. Silt fence slope barriers can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the slope barrier will not likely follow contours.

**Proper installation method:**

Excavate a trench the length of the planned slope barrier that is 6" deep by 4" wide. Make sure that the trench is excavated along a single contour. When practicable, slope barriers should be placed along contours to avoid a concentration of flow. Place the soil on the upslope side of the trench for later use. Roll out a continuous length of silt fence fabric on the downslope side of the trench. Place the edge of the fabric in the trench starting at the top upslope edge. Line all three sides of the trench with the fabric. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt-fence fabric should remain exposed. Lay the exposed silt fence upslope of the trench to clear an area for driving in the posts. Just downslope of the trench, drive posts into the ground to a depth of at least 18". Place posts no more than 4' apart. Attach the silt fence to the anchored post with staples, wire, zip ties, or nails.

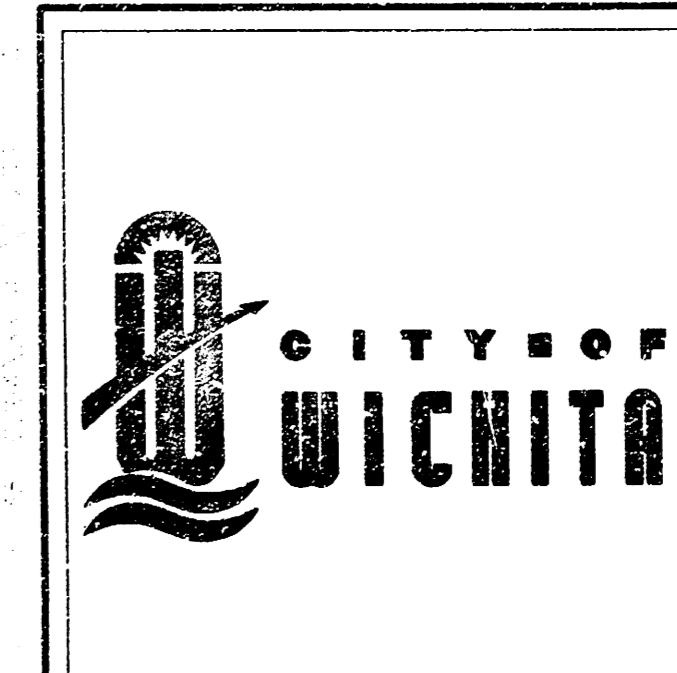
**List of common placement/installation mistakes to avoid:**

When practicable, do not place silt fence slope barriers across contours. Slope barriers should be placed along contours to avoid a concentration of flow. When the flow concentrates, it overtops the barrier and the silt fence slope barrier quickly deteriorates. Do not place silt-fence posts on the upslope side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail. Do not place silt fence slope barriers in areas with shallow soils underlain by rock. If the barrier is not sufficiently anchored, it will wash out. Silt fence slope barriers must be dug into the ground—silt fence at ground level does not work because water will flow underneath.

**Inspection and Maintenance:**

Silt fence slope barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Are there any points along the slope barrier where water is concentrating?
- Does water flow under the slope barrier?
- Do the silt fences sag excessively?
- Has the silt fence torn or become detached from the posts?
- Does sediment need to be removed from behind the slope barrier?



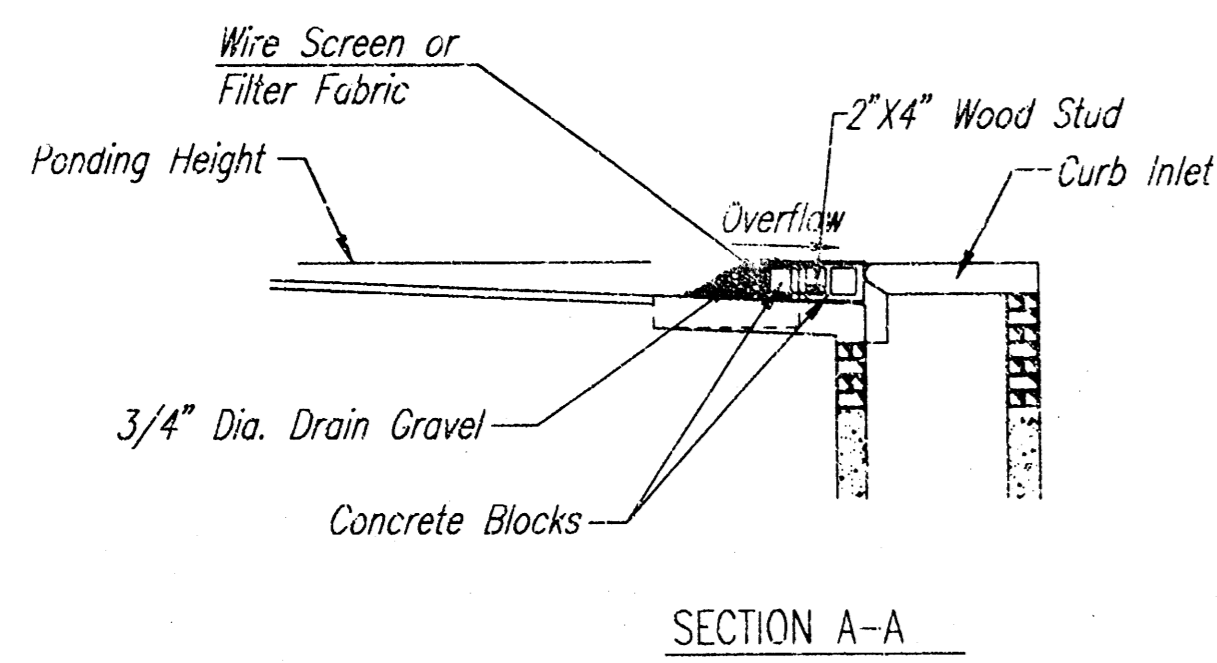
**SOIL EROSION BMP DETAILS**

CHRISTOPHER M. CARRIER, P.E.  
STORM WATER ENGINEER

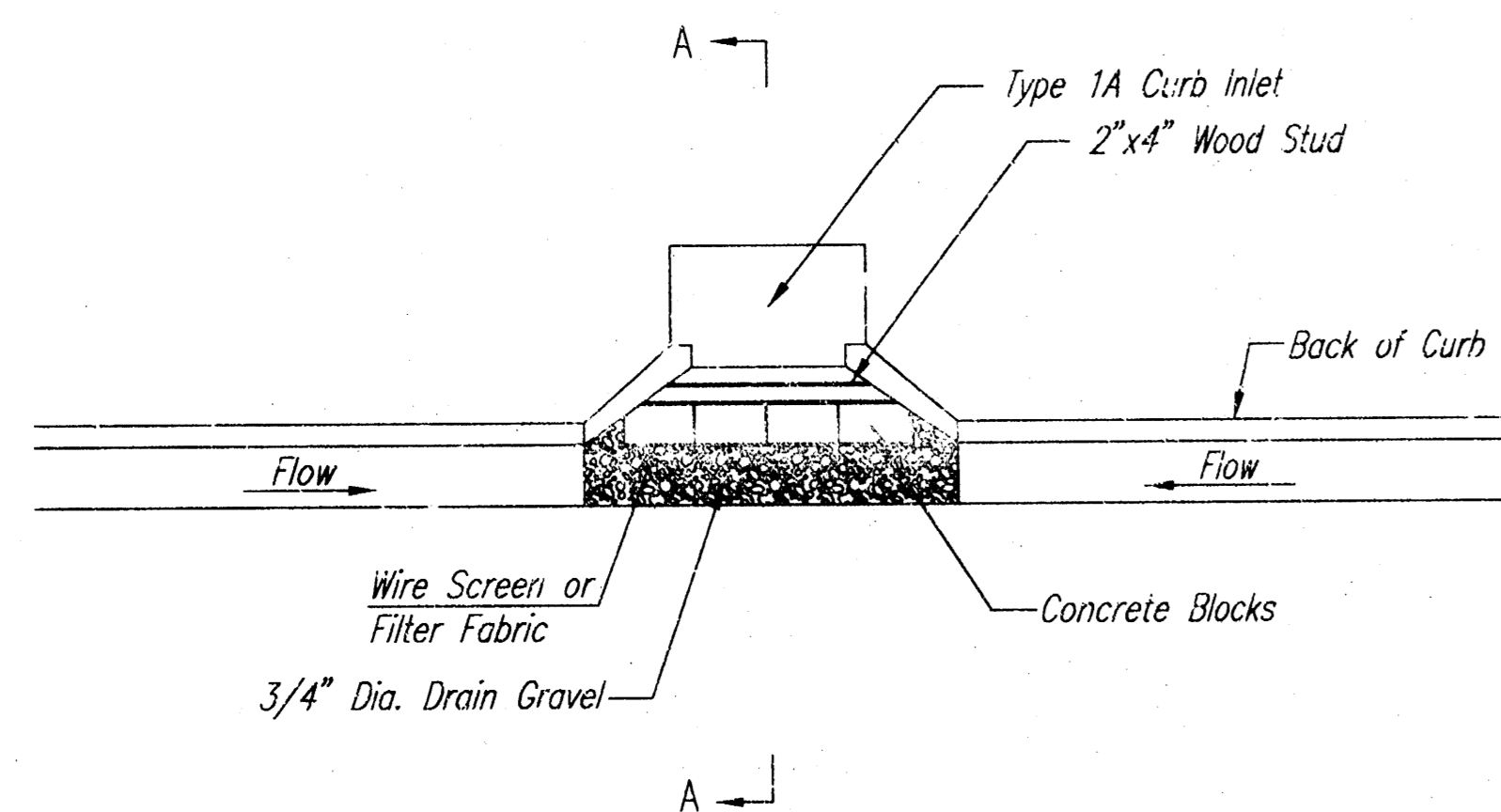
PROJECT NUMBER: \_\_\_\_\_ DCA NO.: \_\_\_\_\_

DATE: MAY 2001 SHEET 14 OF 18





SECTION A-A



CURB INLET GRAVEL FILTERS  
(INLET PROTECTION-RESIDENTIAL STREETS ONLY)

NOTE: Other types of curb inlet protection may be approved by the city so long as equal protection is provided.

A gravel inlet filter shall be installed at sump locations on residential streets. This type of protection is not to be used on arterial or collector streets at any time that it would pose an undue traffic hazard.

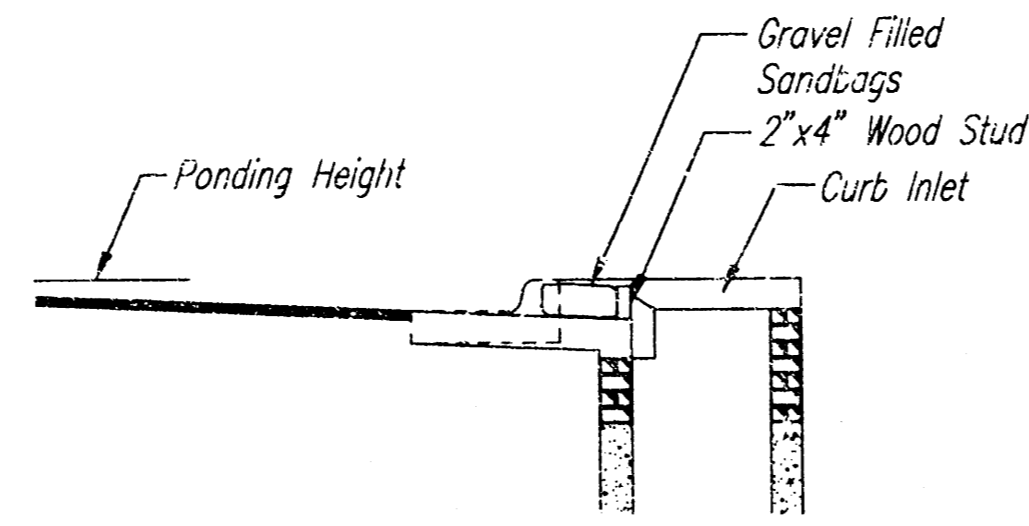
**Instructions for Installing:**

- STEP 1: Place concrete blocks around the inlet as shown on drawing. Insert 2x4 board as shown.
- STEP 2: Wrap 1/2" mesh wire screen around the concrete blocks.
- STEP 3: Place 1" to 1-1/2" diameter rock around the blocks and wire screen. Be sure the rock extends down from the top of the concrete block.
- STEP 4: To prevent damage to vehicles, signs warning drivers about the structures may be necessary. An alternative installation is the use of gravel bags supported by a 2"x4" board to prevent collapsing.

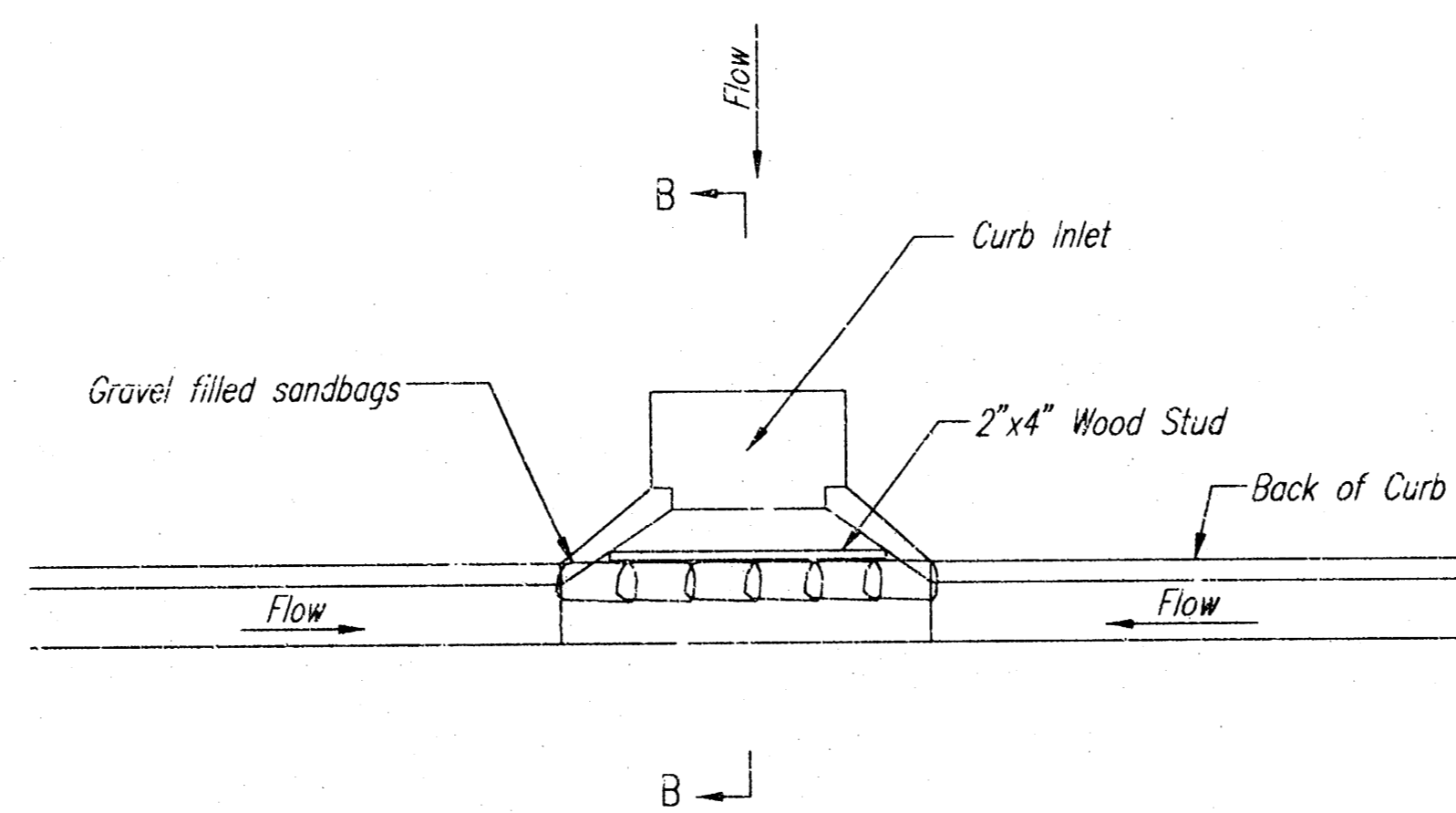
Use of rock with diameters smaller than 1" in the bag may result in clogging of pores and reduce the amount of water flowing into an inlet.

**Maintenance:**

All curb inlet gravel filters shall be inspected and repaired after each runoff event. Sediment deposits are to be removed once material is within 8 cm (3 inches) of the top of any block. Periodically, the gravel shall be raked to increase infiltration and filtering of runoff waters. Accumulated sediment is to be removed immediately from roads and streets.

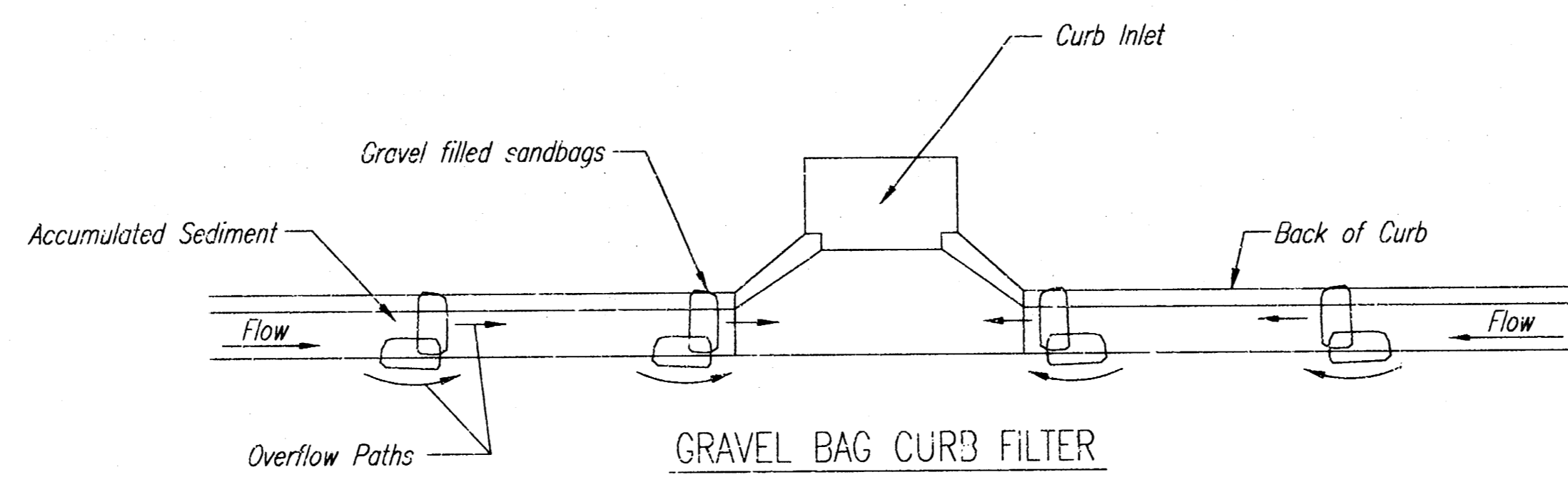


SECTION B-B



CURB INLET SANDBAG FILTERS  
(INLET PROTECTION)

NOTE: Other types of curb inlet protection may be approved by the City so long as equal protection is provided.



GRAVEL BAG CURB FILTER  
(INLET PROTECTION)

NOTE: Place two or more sets of bags in a manner that results in maximum support. The flow line bag must be lower than top of curb.

**CURB SEDIMENT TRAPS**

When inlets are located on streets having a grade (i.e., sump conditions do not exist), installing gravel (or sand) bags in the gutter flow line to create small sediment traps can be considered. Gravel bags are recommended over sand bags to allow for drainage.

If the spacing between bags becomes too large, little sediment may be trapped. Spacing of bags should be completed using the table or graph that illustrates placement distances based upon street slope. When installed in the gutter, bag tops must be lower than the sidewalk.

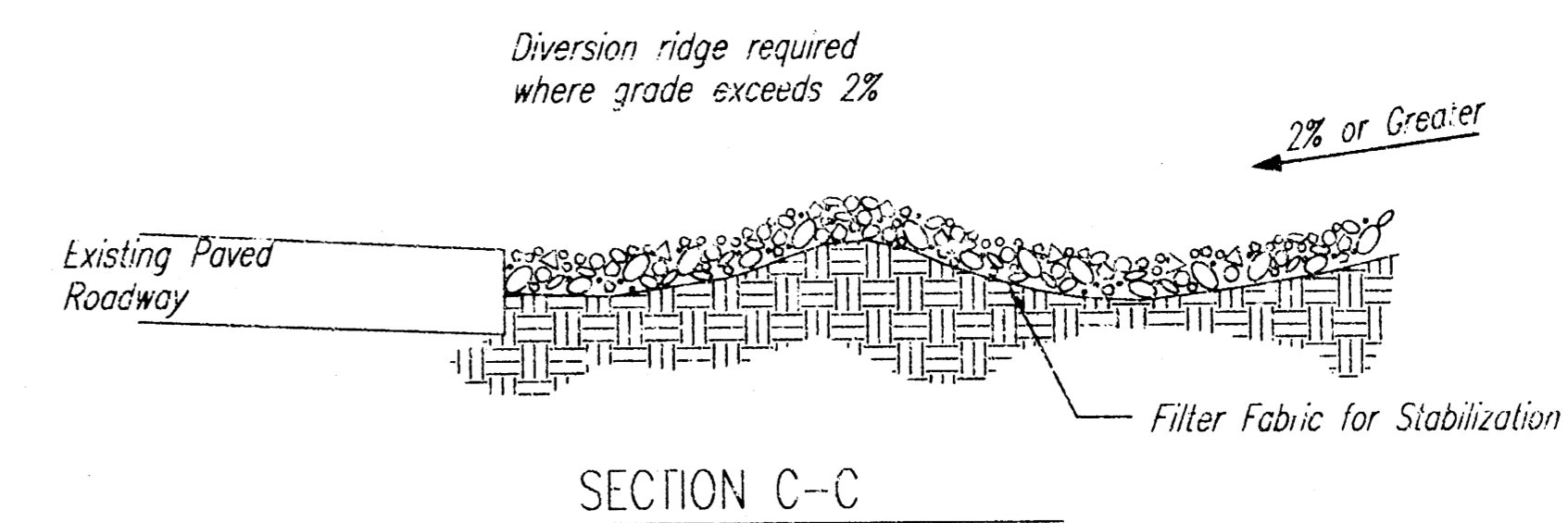
**Spacing:**

Gravel bags are to be placed according to street grades using the following table or graph that appears below.

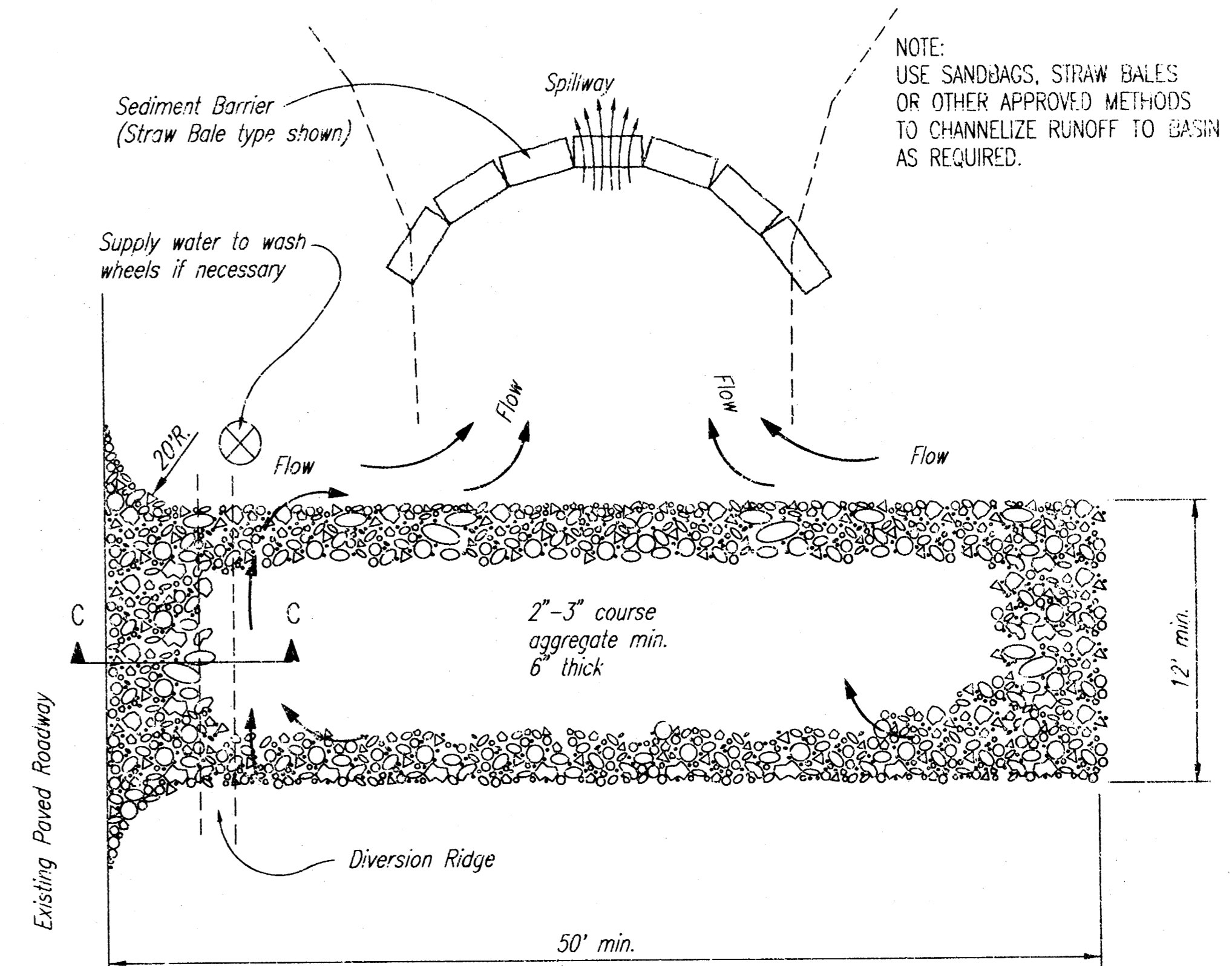
GRADE (%)	SPACING (FEET)
0.5	75
1.0	45
2.0	18
3.0	12
4.0	9
5.0	6

**Maintenance:**

Collected sediment shall be removed after every runoff event. Bags that are destroyed by vehicular traffic or through natural deterioration are to be immediately replaced.



SECTION C-C



STABILIZED CONSTRUCTION ENTRANCE

**NOTES:**

- 1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- 2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
- 3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN, AS SHOWN ABOVE.
- 4. DRIVE ENTRANCES ONTO RESIDENTIAL LOTS WILL NOT BE REQUIRED TO HAVE THE SEDIMENT BARRIER SHOWN, BUT WHEEL WASHING MAY BE REQUIRED IF STABILIZED ENTRANCE IS NOT SUFFICIENT TO KEEP MUD FROM BEING TRACKED ONTO ADJACENT STREET. ENTRANCE SHALL EXTEND FROM BACK OF CURB TO DWELLING.



**SOIL EROSION  
BMP DETAILS**

CHRISTOPHER M. CARRIER, P.E.  
STORM WATER ENGINEER

PROJECT NUMBER: 468-83199  
O&A NO.:

DATE: MAY 2001  
SHEET 16 OF 18



