

B437-32N

LETTING DATE
5/28/02

STREAM CHANNEL STABILIZATION STRUCTURE
LHC47-32N
CRAWFORD COUNTY

TRAFFIC CONTROL PLAN
THIS ROAD WILL BE OPEN TO THROUGH TRAFFIC DURING CONSTRUCTION. LOCAL TRAFFIC TO ADJACENT PROPERTIES WILL BE MAINTAINED AS PROVIDED FOR IN ARTICLE 1107.08 OF THE CURRENT STANDARD SPECIFICATIONS. TRAFFIC CONTROL DEVICES, PROCEDURES AND LAYOUTS SHALL BE AS PER PART VI OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) REVISION 3, DATED SEPTEMBER 3, 1993.

DRAWING APPROVAL
ALL SHOP DRAWINGS THAT REQUIRE APPROVAL SHALL BE APPROVED BY SUNDQUIST ENGINEERING, P.C.
ADDRESS: 120 SOUTH MAIN, P.O. BOX 220 DENISON, IOWA 51442-0220
TELEPHONE: (712)263-8118
THESE SHOP DRAWINGS SHALL NOT BE SENT TO IOWA D.O.T. OFFICE OF BRIDGE DESIGN.

Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

FARM TO MARKET ROAD SYSTEM CRAWFORD COUNTY

PROJECT NO. LHC47-32N
STREAM CHANNEL STABILIZATION STRUCTURE
ON E35 (L AVENUE) OVER
MILLER CREEK

IN COOPERATION WITH LOESS HILLS DEVELOPMENT AND
CONSERVATION AUTHORITY - HUNGRY CANYONS ALLIANCE
SITE HC 01-20

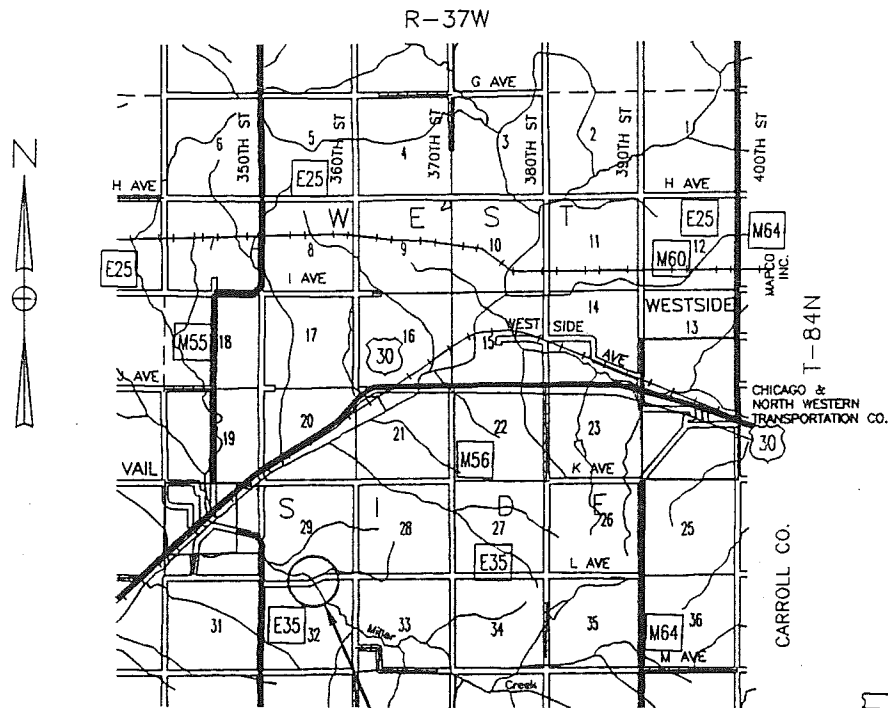
SCALES: AS NOTED

The Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, plus current Supplemental Specifications and Special Provisions shall apply to construction work on this project.

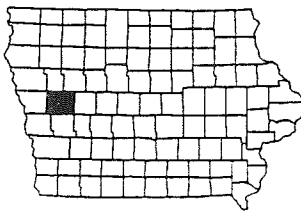
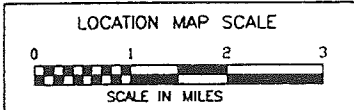
TOTAL SHEETS
8
PROJECT NUMBER
LHC47-32N
R.O.W. PROJECT NUMBER
PROJECT IDENTIFICATION NUMBER

INDEX OF SHEETS	
NO.	DESCRIPTION
A1	TITLE SHEET
B1	ESTIMATED PROJECT QUANTITIES AND GENERAL INFORMATION
U1-U2	DETAIL SHEETS
V1	WEIR SITUATION PLAN
Z1-Z3	CROSS SECTIONS - CHANNEL

STANDARD ROAD PLANS					
The following Standard Plans shall be considered applicable to construction work on this project.					
Identification	Date	Identification	Date	Identification	Date
RS-12	04-30-96				



SUNDQUIST ENGINEERING, P.C.
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120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442-0220
PHONE: (712)263-8118 FAX: (712)263-2181



DESIGN DATA RURAL			
2000 AADT	100	V.P.D.	
2020 AADT		V.P.D.	
201X DHV	X	V.P.H.	
TRUCKS	X	%	
ESALs per day	X		
DESIGN SPEED	40	M.P.H.	

Approved
Robert D. Lohman
Mark Sigbert
BOARD OF SUPERVISORS

Approved
John P. Hawker
Crawford County Engineer
4/30/02
Date

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.
Troy J. Groth
TROY J. GROTH, P.E. #14450
4/12/02
DATE
MY LICENSE RENEWAL DATE IS DECEMBER 31, 2003.
PAGES OR SHEETS COVERED BY THIS SEAL:
ALL SHEETS

ESTIMATED PROJECT QUANTITIES

100-1A
07-15-97

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2101-0850002	CLEARING AND GRUBBING	UNIT	414.8	
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	1126	
3	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	1399	
4		PILES, FURNISH & INSTALL STEEL, HP 10x42	LF	115	
5	2501-5775000	PILES, STEEL SHEET	SF	2200	
6	2507-3250005	ENGINEERING FABRIC	SY	873	
7	2507-4011100	CONCRETE GROUT FOR REVETMENT OR GABION	CY	54	
8	2507-6850053	REVETMENT, SPECIAL	TON	941	
9	2528-8445110	TRAFFIC CONTROL	LS	1	
10	2533-4980005	MOBILIZATION	LS	1	
11	2599-9999010	REMOVAL OF WATER	LS	1	
12	2601-2634100	MULCHING	ACRE	0.5	
13	2601-2636043	SEEDING AND FERTILIZING (RURAL)	ACRE	0.5	

GENERAL NOTES

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL NECESSARY ARRANGEMENTS WITH ADJACENT PROPERTY OCCUPANTS FOR RESTRAINING LIVESTOCK FROM ENTERING THE RIGHT-OF-WAY.

CONTRACTOR IS TO USE DUE CAUTION IN WORKING OVER AND AROUND ALL TILE LINES. BREAKS IN THE TILE LINE DUE TO THE CONTRACTOR'S CARELESSNESS ARE TO BE REPLACED AT HIS EXPENSE WITHOUT COST TO THE COUNTY. ANY TILE LINES BROKEN OR DISTURBED BY CUT LINES WILL BE REPLACED AS DIRECTED BY THE ENGINEER IN CHARGE OF CONSTRUCTION AND AT THE COUNTY'S EXPENSE.

ALL BORROW AREAS, STOCKPILE AREAS, HAUL ROADS AND AREAS FOR MANEUVERING EQUIPMENT ON THIS PROJECT WILL REQUIRE SUBSOIL TILLAGE TO AN AVERAGE DEPTH OF 18 TO 24 INCHES. SUCH TILLAGE SHALL BE ACCOMPLISHED ON MAXIMUM OF THREE FOOT CENTERS. SUCH AREAS SHALL BE DESIGNATED BY THE COUNTY ENGINEER.

WHERE PUBLIC UTILITY FIXTURES ARE SHOWN AS EXISTING ON THE PLANS OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNERS OF THOSE UTILITIES PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. THE CONTRACTOR SHALL AFFORD ACCESS TO THESE FACILITIES FOR NECESSARY MODIFICATION OF SERVICES. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS, AND THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION AND TO AVOID DAMAGE THERETO. NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR ANY INTERFERENCE OR DELAY CAUSED BY SUCH WORK.

CONTRACTOR SHALL NOTIFY ONE-CALL (1-800-292-8989) FOR UTILITY LOCATES PRIOR TO COMMENCING WORK.

213-1
IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE WASTE AREAS OR DISPOSAL SITES FOR EXCESS MATERIAL (EXCAVATED MATERIAL OR BROKEN CONCRETE) WHICH IS NOT DESIRABLE TO BE INCORPORATED INTO THE WORK INVOLVED ON THIS PROJECT. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES. NO MATERIAL SHALL BE PLACED WITHIN THE RIGHT-OF-WAY, UNLESS SPECIFICALLY STATED IN THE PLANS OR APPROVED BY THE ENGINEER.

251-1
THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN ACCESS TO INDIVIDUAL PROPERTIES DURING CONSTRUCTION.

RELOCATED ACCESS SHALL BE COMPLETED TO INDIVIDUAL PROPERTIES PRIOR TO REMOVAL OF EXISTING ACCESS.

IF THE PERMANENT ACCESS CANNOT BE COMPLETED PRIOR TO REMOVAL OF THE EXISTING ACCESS, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN AN ALTERNATE ACCESS. TEMPORARY GRANULAR SURFACING WILL BE PAID FOR AS A CONTRACT ITEM OR BY EXTRA WORK.

ESTIMATE REFERENCE INFORMATION

DATA LISTED BELOW ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT CONSTITUTE A BASIS FOR ANY EXTRA WORK ORDERS.

2. EMBANKMENT-IN-PLACE

PLAN QUANTITY FOR EMBANKMENT-IN-PLACE INCLUDES FILL + 35% SHRINK.

TYPE "A" COMPACTION WILL BE REQUIRED. BORROW FROM SUITABLE CLASS 10 CHANNEL EXCAVATION ALLOWED. ADDITIONAL NECESSARY BORROW SHALL BE PROVIDED BY THE CONTRACTOR. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED. ALL AREAS TO RECEIVE NEW EMBANKMENT SHALL BE THOROUGHLY CLEANED OF ALL VEGETATION AND OTHER DEBRIS. EXISTING SURFACES SHALL BE PLOWED, STEPPED OR BENCHED PRIOR TO PLACEMENT OF NEW EMBANKMENT FILLS. SUCH WORK SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM.

FILL MATERIALS SHALL CONTAIN NO SOD, BRUSH, ROOTS OR OTHER PERISHABLE MATERIALS. FILL SHALL NOT BE PLACED UPON A FROZEN SURFACE, NOR SHALL SNOW, ICE OR FROZEN MATERIAL BE INCORPORATED IN THE FILL.

PAYMENT FOR THIS ITEM SHALL BE BASED ON PLAN QUANTITY.

3. EXCAVATION, CLASS 10, CHANNEL

SUITABLE CLASS 10 CHANNEL EXCAVATION MAY BE USED FOR EMBANKMENT-IN-PLACE. EXCESS MATERIALS AND UNSUITABLE MATERIAL SHALL BE HAULED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR. THE COST OF HAULING AND DISPOSING OF THIS MATERIAL SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR CLASS 10 CHANNEL EXCAVATION.

SHAPING CHANNEL BOTTOM BETWEEN WEIR AND BRIDGE AS SHOWN ON PLAN SHEET V1 SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR CLASS 10 CHANNEL EXCAVATION.

NO EXTRA PAYMENT SHALL BE ALLOWED FOR HANDLING OR DISPOSAL OF BROKEN CONCRETE REVETMENT ENCOUNTERED DURING WORK ON THIS PROJECT.

PAYMENT FOR THIS ITEM SHALL BE BASED ON PLAN QUANTITY.

4. PILES, FURNISH AND INSTALL STEEL HP 10X42

INCLUDES FURNISHING AND INSTALLING THE HP 10X42 WALER AS DETAILED ON DRAWING SHEET U2. BOLTS, NUTS AND WASHERS REQUIRED TO INSTALL WALER SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM.

5. PILES, STEEL SHEET

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING THE SHEET PILES AS SHOWN ON THE DRAWINGS. THIS ITEM SHALL INCLUDE FIELD CUTTING THE SHEET PILES TO THE SPECIFIED 2:1 GRADE AS SHOWN ON THE DRAWINGS.

THE SHEET PILES AND APPURTENANT METAL WORK SHALL MEET THE REQUIREMENTS OF ASTM A328, A572 OR A690. THE SHEET PILES SHALL BE INSTALLED STARTING FROM THE CENTERLINE OF THE WEIR SECTION AND PROGRESSING AWAY FROM THE CENTERLINE.

SHEET PILES SHALL MEET THE FOLLOWING REQUIREMENTS:

- (a) MINIMUM SECTION MODULUS OF 19.25 CU. IN. PER FOOT OF LENGTH.
(b) MINIMUM WALL THICKNESS OF 3/8 INCH.

6. ENGINEERING FABRIC

SEE DRAWING SHEET U2 - DETAILS OF PLACEMENT OF ENGINEERING FABRIC FOR INSTALLATION DETAILS. MATERIAL TO CONFORM TO IOWA DOT MATERIALS IM 496.01 APPENDIX A, EMBANKMENT EROSION CONTROL (SPECIFICATION 4196.01C).

MATERIAL SHALL BE JOINED BY OVERLAPPING A MINIMUM OF 18 INCHES.

7. CONCRETE GROUT FOR REVETMENT OR GABION

GROUTING OPERATION SHALL NOT BE PERFORMED EXCEPT IN THE PRESENCE OF THE ENGINEER.

THE AVERAGE RATE OF GROUT APPLICATION SHALL BE 5.4 CUBIC FEET OF GROUT PER SQUARE YARD OF SURFACE AREA.

THE GROUT SHALL BE CONSOLIDATED INTO THE VOIDS WITH THE USE OF A CONCRETE VIBRATOR.

METHOD OF MEASUREMENT: THE ENGINEER WILL COMPUTE TO THE NEAREST 0.1 CUBIC YARD THE VOLUME OF CONCRETE GROUT FOR REVETMENT OR GABION FURNISHED AND ACCEPTABLY PLACED WITHIN THE SPECIFIED LIMITS, FROM THE NOMINAL VOLUME OF EACH BATCH AND A COUNT OF BATCHES. GROUT UNUSED OR WASTED, INCLUDING ANY PARTIAL BATCH REMAINING AT THE COMPLETION OF THE OPERATION, WILL BE ESTIMATED AND DEDUCTED BY THE ENGINEER. METHOD OF MEASUREMENT IN THE CURRENT STANDARD SPECIFICATIONS SHALL NOT APPLY.

8. REVETMENT, SPECIAL

SPECIAL REVETMENT SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATIONS SECTION 2507.03, CLASS B REVETMENT.

MATERIAL SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATIONS SECTION 4130 FOR CLASS B REVETMENT ON PRIMARY PROJECTS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVAL OF ALL REMNANTS OF RIPRAP STOCKPILES FROM FARM FIELDS UTILIZED BY CONTRACTOR IN THE PROJECT AREA. THIS WORK WILL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THE PRICE BID FOR THIS ITEM.

MATERIAL FOR SPECIAL REVETMENT SHALL BE MEASURED IN TONS TO THE NEAREST 0.1 TONS. ONLY MATERIAL PLACED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS WILL BE MEASURED.

FOR THE QUANTITY OF REVETMENT FURNISHED AND PLACED, THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER TON.

11. REMOVAL OF WATER

THIS ITEM CONSISTS OF DIVERTING SURFACE WATER AND DEWATERING THE SITE AS NEEDED FOR CONSTRUCTION. POLLUTION CONTROL SHALL BE INCLUDED IN AND CONSIDERED INCIDENTAL TO THIS ITEM. DEWATERING OF SITE SHALL INCLUDE REMOVAL OF WATER FROM THE PROPOSED STILLING BASIN TO FACILITATE PLACEMENT OF ENGINEERING FABRIC, RIPRAP AND GROUT. PLACEMENT OF GROUT IN STANDING WATER SHALL NOT BE ALLOWED.

12. MULCHING

13. SEEDING AND FERTILIZING (RURAL)

INCLUDES RESTORING ALL DISTURBED AREAS IN ACCORDANCE WITH SECTION 2601 OF THE REFERENCE SPECIFICATIONS EXCEPT THAT THE FOLLOWING SPECIFIED SPECIES AND RATE OF SEED SHALL BE SOWN PER ACRE:

SWITCHGRASS (CAVE-IN-ROCK)	3 POUNDS (PLS)
SMOOTH BROMEGRASS (SOUTHERN TYPE)	15 POUNDS
TALL FESCUE (ENDOPHYTE FREE)	12 POUNDS
RED CLOVER (MEDIUM)	5 POUNDS
BIRDSFOOT TREFOIL (EMPIRE)	5 POUNDS
PERENNIAL RYEGRASS	10 POUNDS

AT THE OPTION OF THE ENGINEER, 1½ BUSHELS PER ACRE OF OATS MAY BE SEEDED AS A NURSE CORP. THIS DECISION WILL BE BASED ON THE STEEPNESS OF THE SLOPES AND THE NEED FOR IMMEDIATE COVER. SECTION 1109.16 PARAGRAPH C OF THE REFERENCE SPECIFICATIONS DOES NOT APPLY.

REV.

SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS

HIGHWAYS • MUNICIPAL • MAPPING • SURVEYING
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442
PHONE: (712)263-8118 FAX: (712)263-2181

SE PROJECT NO. 05901

DATE: 01/02

DRAWN BY: LMD

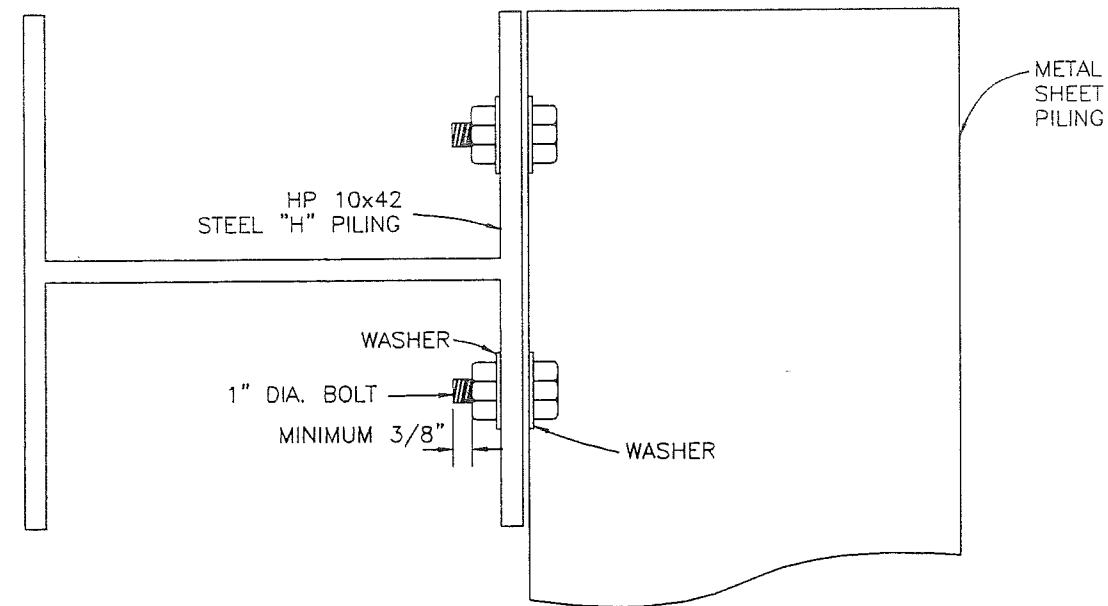
REVIEWED BY: SAS

APPROVED BY: T.JG

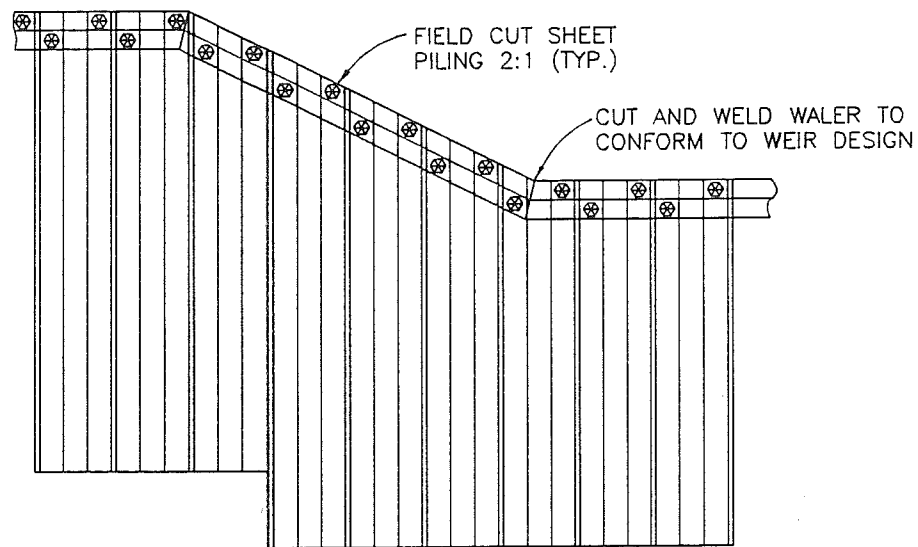
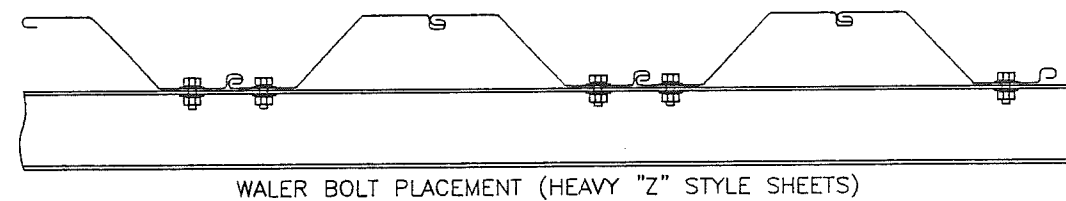
CLIENT: CRAWFORD COUNTY

DESCRIPTION: GENERAL NOTES, ESTIMATED PROJECT QUANTITIES
AND ESTIMATE REFERENCE INFORMATION

SHEET 81



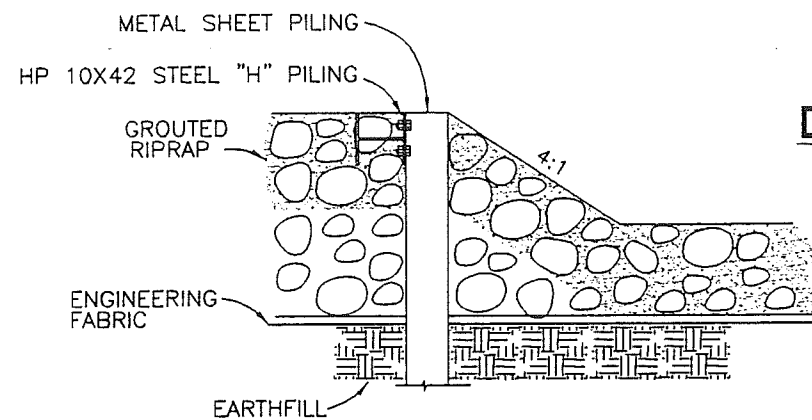
BOLT DETAIL



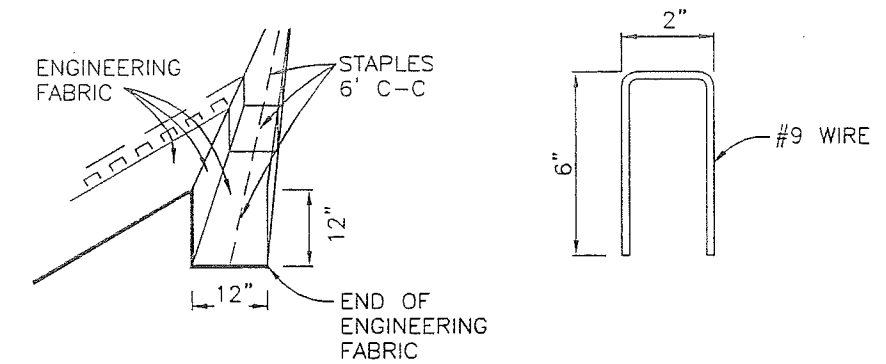
- NOTES:
1. ALL BOLTS SHALL BE 1" DIA. W/2 WASHERS. BOLTS SHALL EXTEND AT MINIMUM 3/8" BEYOND NUT.
 2. ALL HOLES SHALL BE FIELD CUT 1/16" DIA. LARGER THAN THE BOLTS.

DETAILS OF WALER

NO SCALE

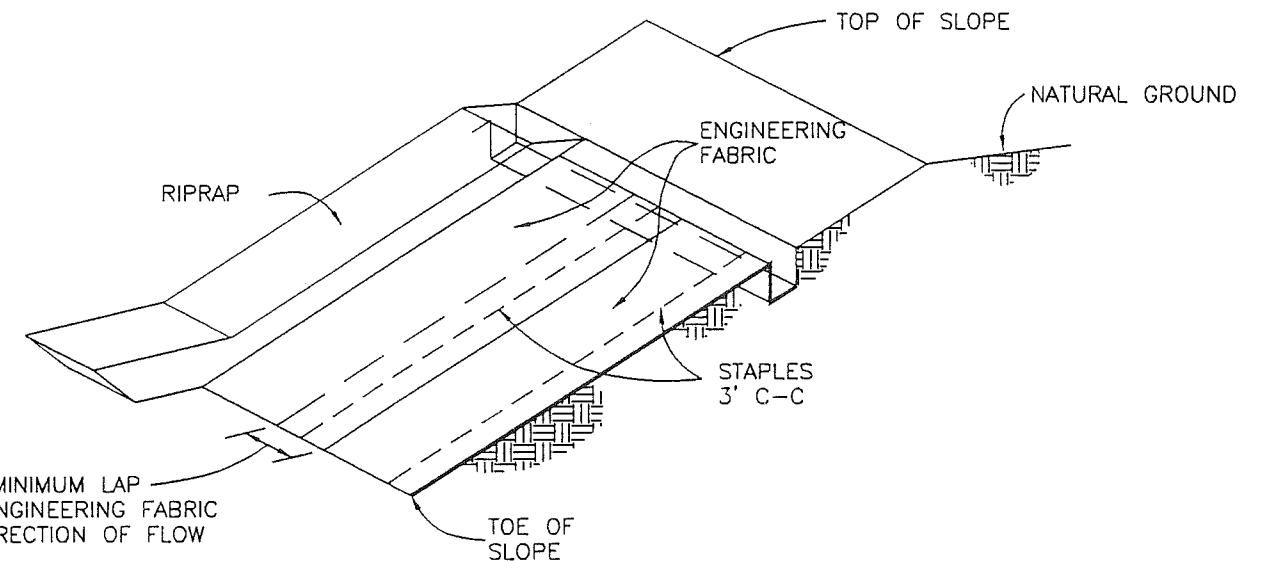


GROUTED RIPRAP DETAIL



DETAIL OF TRENCH

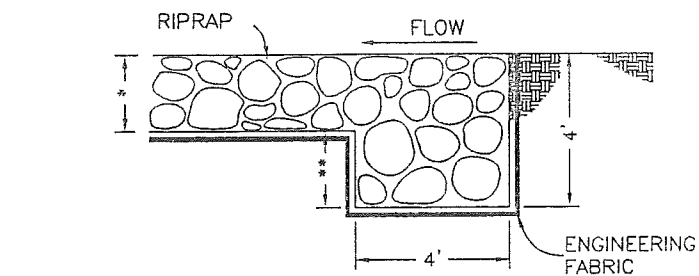
STAPLE



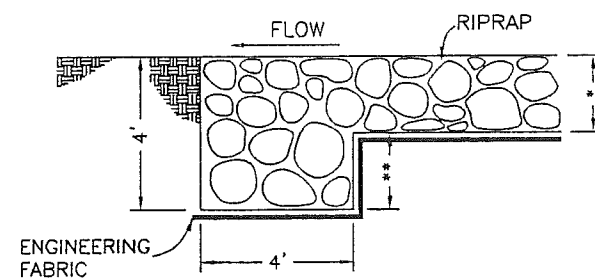
EXCAVATE 12"x12" TRENCH ALONG TOP OF RIPRAP. PLACE END OF ENGINEERING FABRIC STRIPS INTO TRENCH WITH STAPLES AS SHOWN. BACKFILL WITH THE EXCAVATED MATERIAL AND COMPACT. THE ENGINEER MAY PERMIT THE USE OF THE WHEELS OF PNEUMATIC-TIRED EQUIPMENT FOR CONSOLIDATING THE TRENCH BACKFILL MATERIAL.

DETAILS OF PLACEMENT OF ENGINEERING FABRIC

NO SCALE



TYPICAL UPSTREAM



TYPICAL DOWNSTREAM

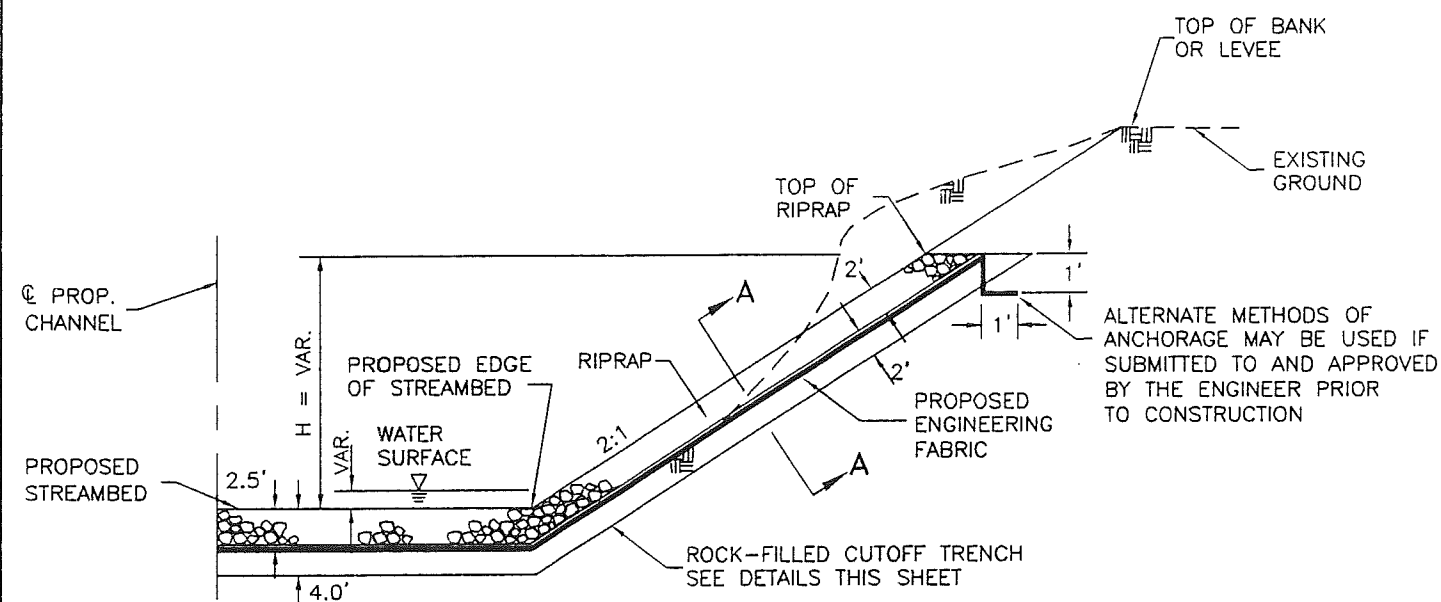
* 2.5' ACROSS CHANNEL BOTTOM
2.0' ON SIDE SLOPES

** 1.5' ACROSS CHANNEL BOTTOM
2.0' ON SIDE SLOPES

SECTION A-A

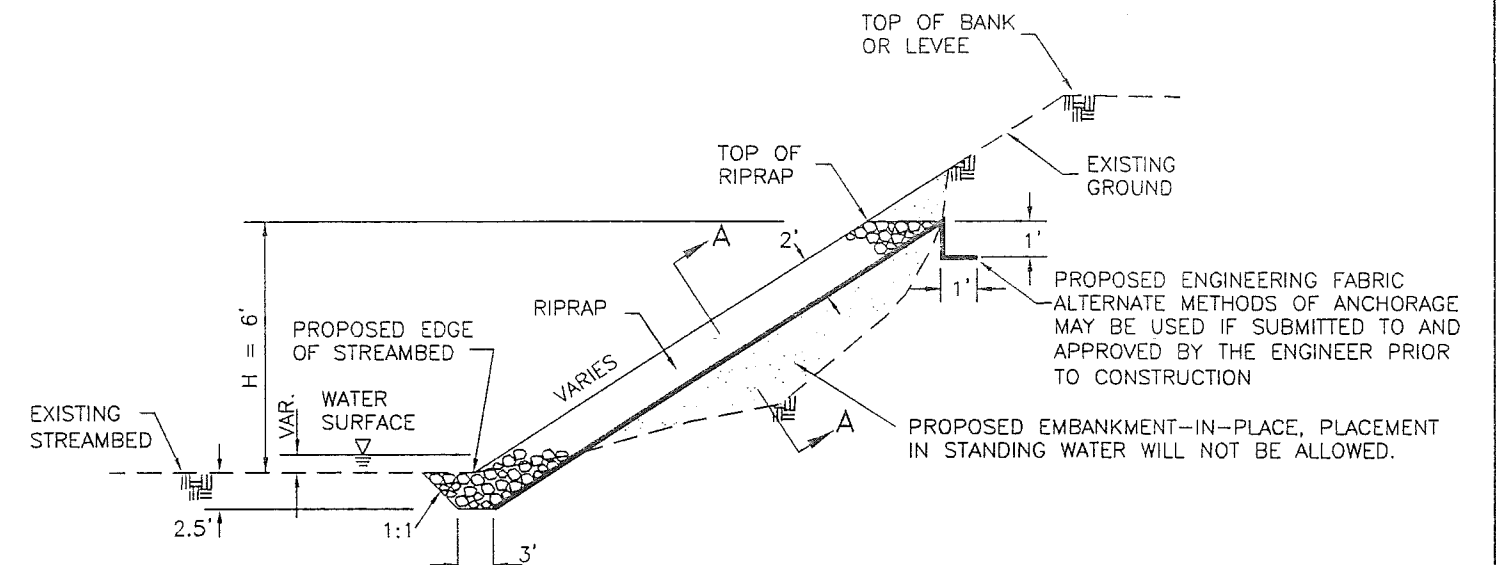
ROCK-FILLED CUTOFF TRENCH DETAILS

CONTINUOUS ACROSS BOTTOM WIDTH AND SIDE SLOPES
NO SCALE



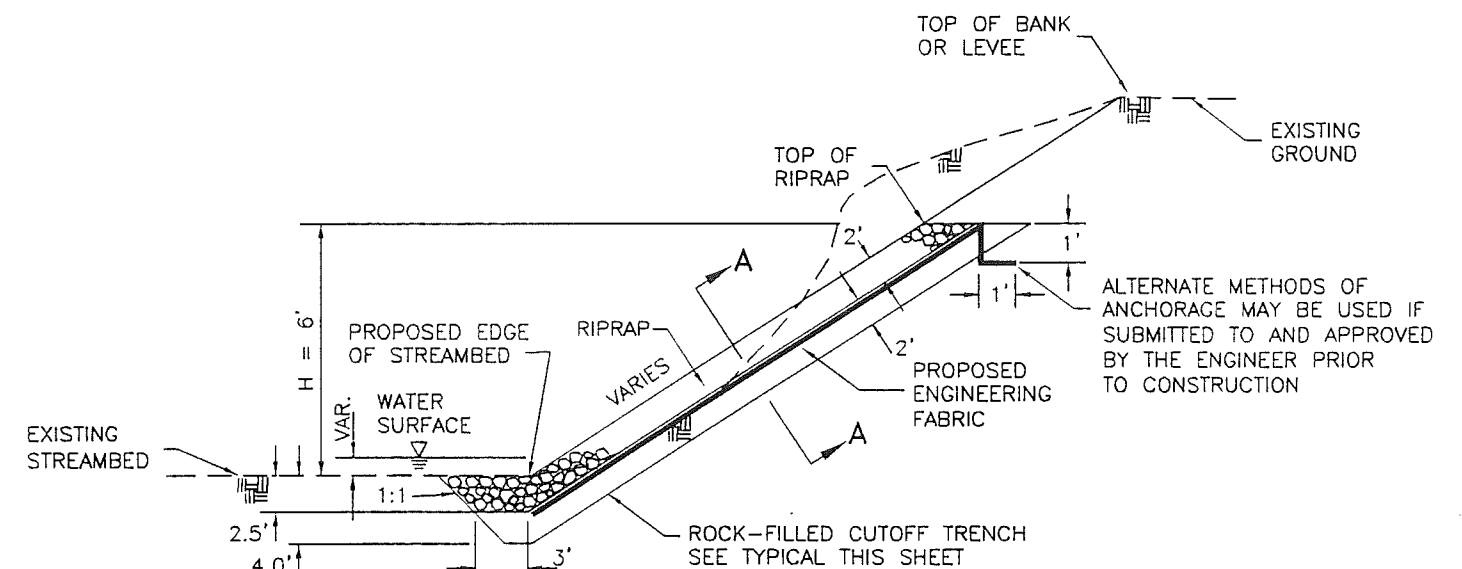
TYPICAL FULL-CHANNEL BANK STABILIZATION SECTION

FOR H DIMENSION AND CHANNEL SLOPE SEE CROSS SECTIONS
NO SCALE



CHANNEL FILL

NO SCALE

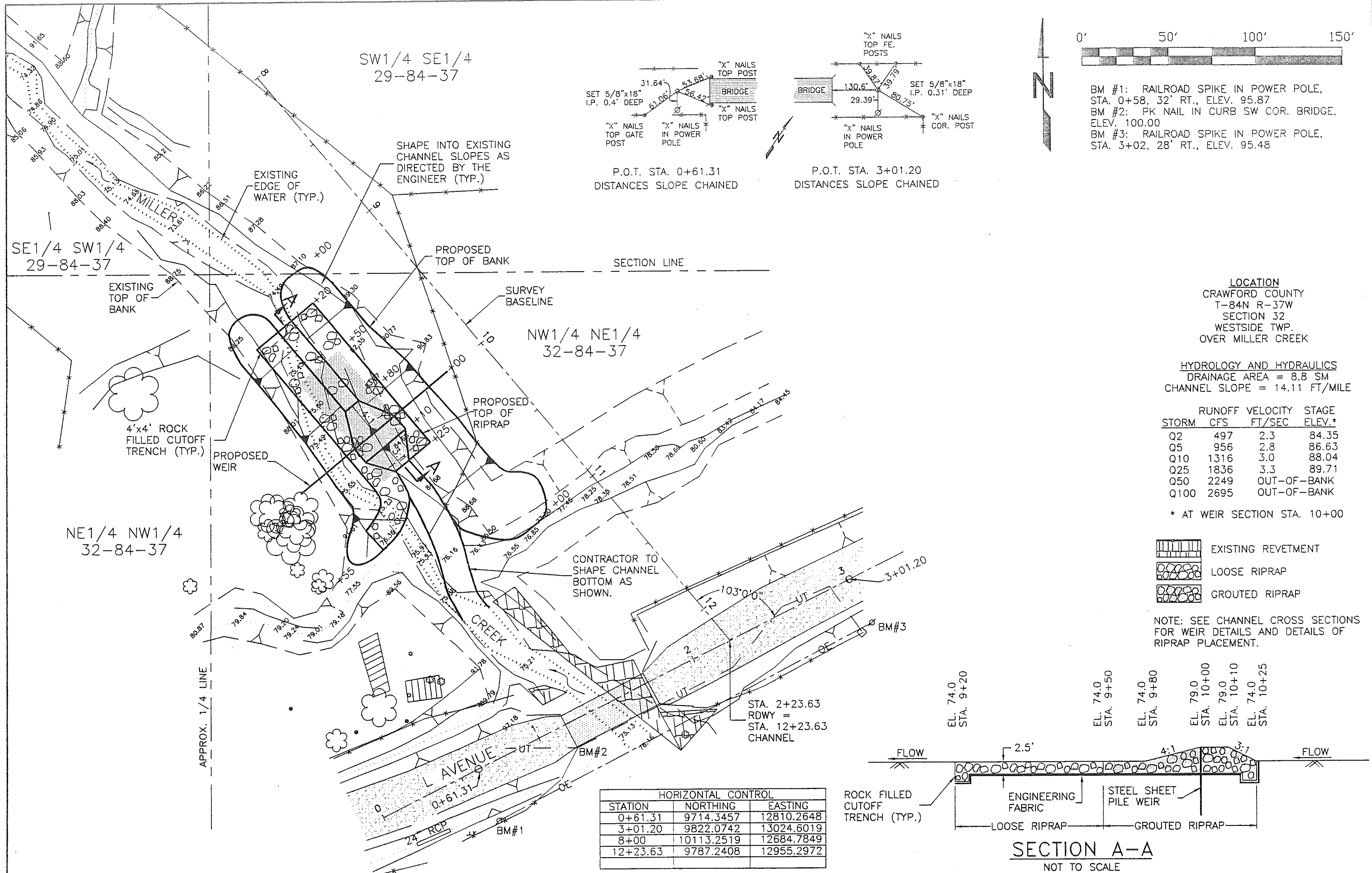


CHANNEL CUT

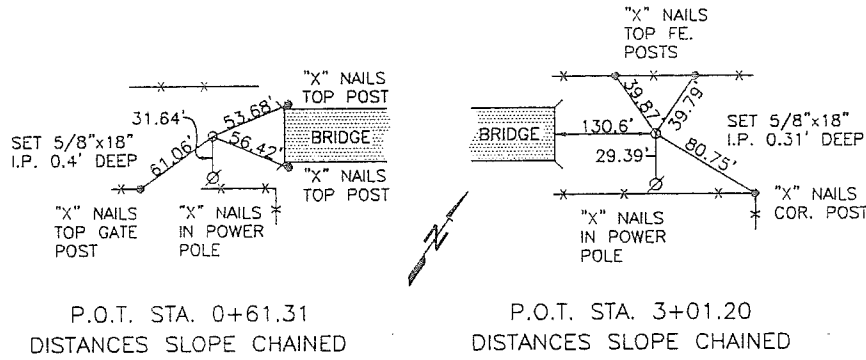
NO SCALE

TYPICAL HALF-CHANNEL BANK STABILIZATION SECTION

FOR CHANNEL SLOPE SEE CROSS SECTIONS



HORIZONTAL CONTROL		
STATION	NORTHING	EASTING
0+61.31	9714.3457	12810.2648
3+01.20	9822.0742	13024.6019
8+00	10113.2519	12684.7849
12+23.63	9787.2408	12955.2972



BM #1: RAILROAD SPIKE IN POWER POLE, STA. 0+58, 32' RT., ELEV. 95.87
 BM #2: PK NAIL IN CURB SW COR. BRIDGE, ELEV. 100.00
 BM #3: RAILROAD SPIKE IN POWER POLE, STA. 3+02, 28' RT., ELEV. 95.48

LOCATION
 CRAWFORD COUNTY
 T-84N R-37W
 SECTION 32
 WESTSIDE TWP.
 OVER MILLER CREEK

HYDROLOGY AND HYDRAULICS
 DRAINAGE AREA = 8.8 SM
 CHANNEL SLOPE = 14.11 FT/MILE

STORM	RUNOFF VELOCITY		STAGE ELEV.*
	CFS	FT/SEC	
Q2	497	2.3	84.35
Q5	956	2.8	86.63
Q10	1316	3.0	88.04
Q25	1836	3.3	89.71
Q50	2249	OUT-OF-BANK	
Q100	2695	OUT-OF-BANK	

* AT WEIR SECTION STA. 10+00

- EXISTING REVETMENT
- LOOSE RIPRAP
- GROUTED RIPRAP

NOTE: SEE CHANNEL CROSS SECTIONS FOR WEIR DETAILS AND DETAILS OF RIPRAP PLACEMENT.

