LETTING DATE

STREAM CHANNEL STABILIZATION STRUCTURE

LHC58-12

CRAWFORD COUNTY

8538-12

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 6 OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 2000 MILLENNIUM EDITION, DECEMBER 2000, INCLUDING ERRATA NO. 1 DATED JUNE 14, 2001.

PERMITS

THIS PROJECT IS COVERED BY THE FOLLOWING CORPS OF ENGINEERS (COE) AND IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR) FLOOD PLAIN DEVELOPMENT PERMITS.
COE PERMIT NO. NWP #3
IDNR PERMIT NO. _____

Iowa Department of Transportation
Highway Division

PLANS OF PROPOSED IMPROVEMENTS ON THE

FARM TO MARKET ROAD SYSTEM
CRAWFORD COUNTY

PROJECT NO. LHC58-12
STREAM CHANNEL STABILIZATION STRUCTURE
ON E16 (C AVENUE) OVER
BOYER RIVER

IN COOPERATION WITH LOESS HILLS DEVELOPMENT AND CONSERVATION AUTHORITY - HUNGRY CANYONS ALLIANCE
SITE HC 69-6114-01-6

SCALES: As Noted

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

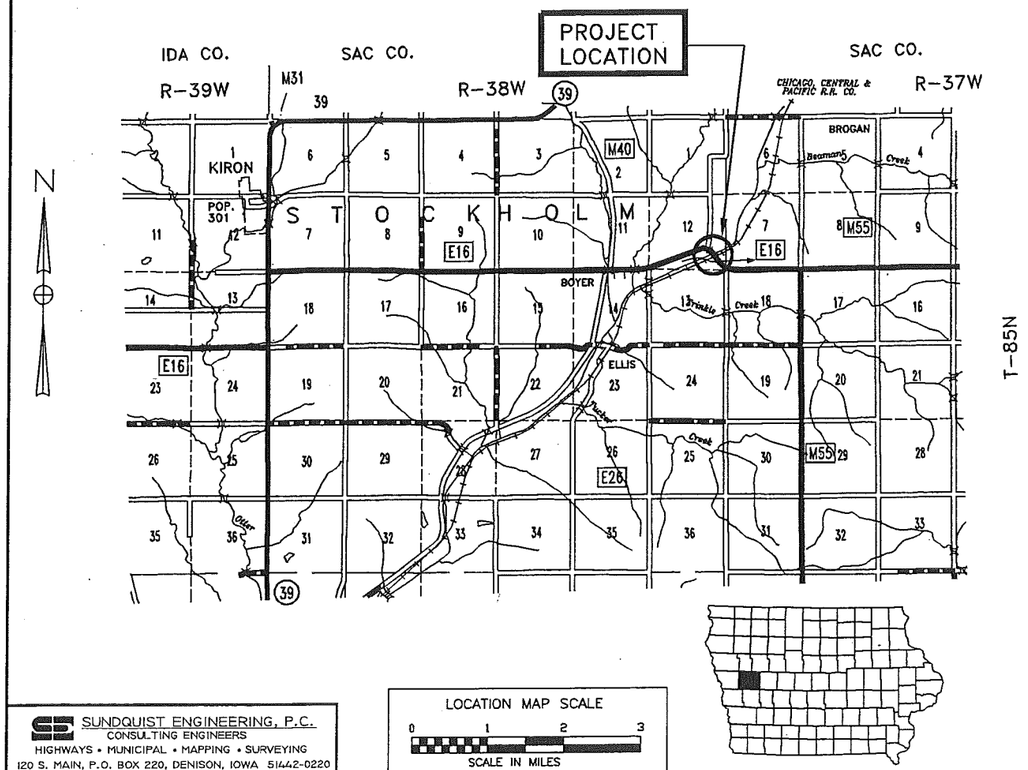
	TOTAL SHEETS
	10
PROJECT NUMBER	
LHC58-12	
R.O.W. PROJECT NUMBER	
PROJECT IDENTIFICATION NUMBER	

INDEX OF SHEETS

STANDARD ROAD PLANS

The following Standard Plans shall be considered applicable to construction work on this project.

Identification	Date	Identification	Date	Identification	Date
RS-2	10-27-98				
RS-13	04-30-96				



LOCATION MAP SCALE
0 1 2 3
SCALE IN MILES

SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS
HIGHWAYS • MUNICIPAL • MAPPING • SURVEYING
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442-0220
PHONE: (712)263-8118 FAX: (712)263-2181

DESIGN DATA RURAL

2000 AADT	410	V.P.D.
2020 AADT	-	V.P.D.
201X DHV	X	V.P.H.
TRUCKS	X	%
ESALs per day	X	
DESIGN SPEED	-	M.P.H.

Approved

BOARD OF SUPERVISORS

Approved

Crawford County Engineer — Date 12/24/01

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, P.E. #14450 — DATE 12/21/01

MY LICENSE RENEWAL DATE IS DECEMBER 31, 2001.

PAGES OR SHEETS COVERED BY THIS SEAL:
ALL SHEETS

LICENSED PROFESSIONAL ENGINEER TROY J. GROTH 14450 IOWA

DESIGN TEAM: TJG/SAS/LMD	ENGLISH	SE PROJECT NO. : 05101	FHWA NO. 130115	CRAWFORD COUNTY	PROJECT NUMBER LHC58-12	SHEET NUMBER A1

ESTIMATED PROJECT QUANTITIES

100-1A
07-15-97

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2101-0850001	CLEARING AND GRUBBING	ACRE	1.2	
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	90	
3	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	5919	
4	2507-3250005	ENGINEERING FABRIC	SY	2154	
5	2507-4011100	CONCRETE GROUT FOR REVETMENT OR GABION	CY	127	
6	2507-6850053	REVETMENT, SPECIAL	TON	2358	
7	2528-8445110	TRAFFIC CONTROL	LS	1	
8	2533-4980005	MOBILIZATION	LS	1	
9	2599-9999010	REMOVAL OF WATER	LS	1	
10	2601-2634100	MULCHING	ACRE	1.0	
11	2601-2636041	SEEDING AND FERTILIZING	ACRE	1.0	

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.

213-4
THE CONTRACTOR SHALL APPLY NECESSARY MOISTURE TO THE CONSTRUCTION AREA AND HAUL ROADS TO PREVENT THE SPREAD OF DUST. REFER TO ARTICLE 1107.07 OF THE CURRENT STANDARD SPECIFICATIONS FOR ADDITIONAL DETAILS.

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.

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. 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.

5. 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.

6. 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.

9. 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.

10. MULCHING
11. SEEDING AND FERTILIZING
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:

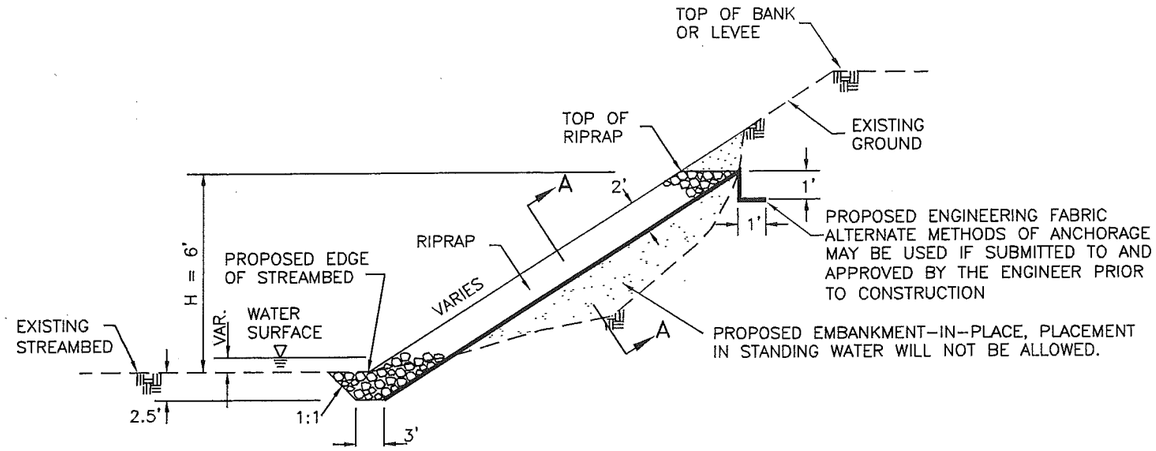
SWITCHGRASS (CAVE-IN-ROCK)	3 POUNDS (PLS)
SMOOTH BROMEGRASS (SOUTHERN TYPE)	15 POUNDS
TALL FESCUE (ENDOPHYTE FREE)	12 POUNDS
RED CLOVER (MEDIUM)	5 POUNDS
BIRDSFOOT TREFOIL (EMPIRE)	5 POUNDS
PERENNIAL RYEGRASS	10 POUNDS

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.:

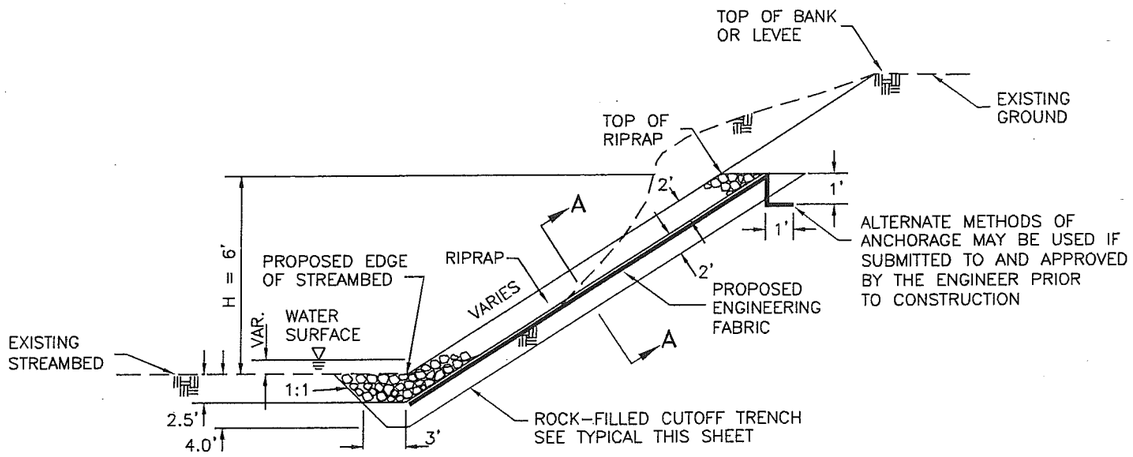
SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS
HIGHWAYS • MUNICIPAL • MAPPING • SURVEYING
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442
PHONE: (712)263-8118 FAX: (712)263-2181

SE PROJECT NO. 05101 | DATE: 09/01 | DRAWN BY: LMD | REVIEWED BY: SAS | APPROVED BY: TJG | CLIENT: CRAWFORD COUNTY | DESCRIPTION: GENERAL NOTES, ESTIMATED PROJECT QUANTITIES AND ESTIMATE REFERENCE INFORMATION | SHEET B1



CHANNEL FILL

NO SCALE

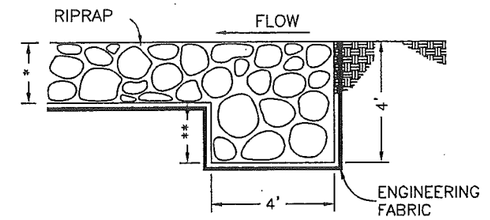


CHANNEL CUT

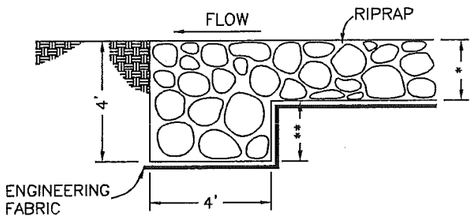
NO SCALE

TYPICAL HALF-CHANNEL BANK STABILIZATION SECTION

FOR CHANNEL SLOPE SEE CROSS SECTIONS



TYPICAL UPSTREAM



* 2.5' ACROSS CHANNEL BOTTOM
2.0' ON SIDE SLOPES

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

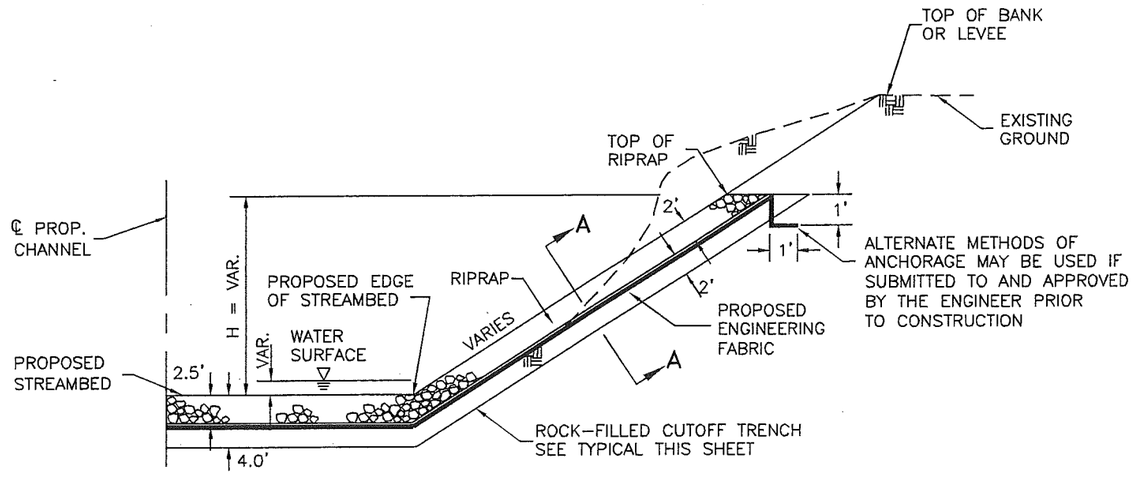
TYPICAL DOWNSTREAM

SECTION A-A

ROCK-FILLED CUTOFF TRENCH DETAILS

CONTINUOUS ACROSS BOTTOM WIDTH AND SIDE SLOPES

NO SCALE



TYPICAL FULL-CHANNEL BANK STABILIZATION SECTION

NO SCALE

FOR H DIMENSION AND CHANNEL SLOPE SEE CROSS SECTIONS

REV.:

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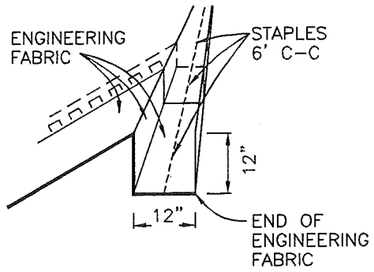
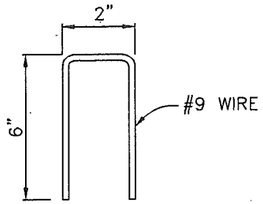
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442
PHONE: (712)263-8118 FAX: (712)263-2181

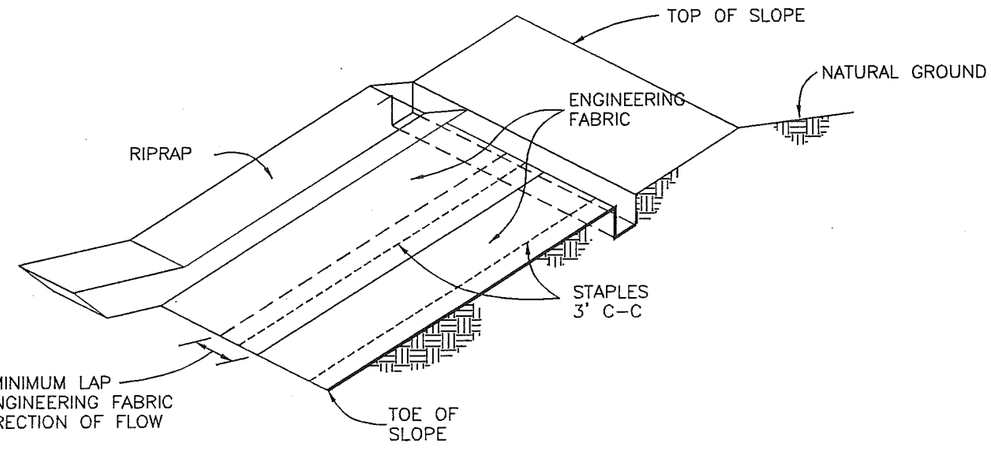
SE PROJECT NO. 05101 | DATE: 09/01 | DRAWN BY: LMD | REVIEWED BY: SAS | APPROVED BY: TJG | CLIENT: CRAWFORD COUNTY | DESCRIPTION: TYPICAL SECTIONS | SHEET UI



DETAIL OF TRENCH

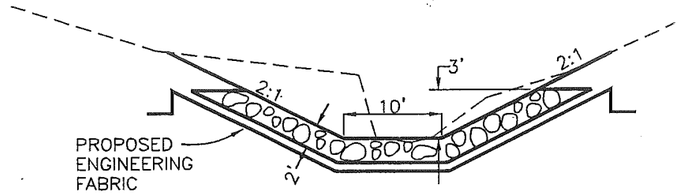


STAPLE



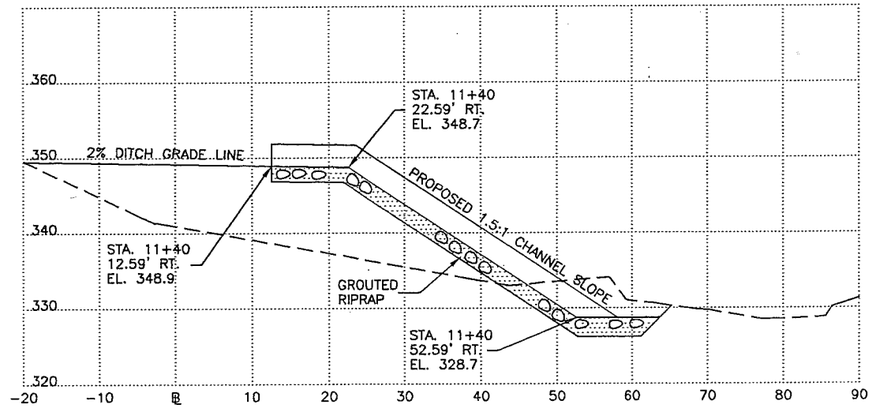
EXCAVATE 12"x12" TRENCH ALONG TOP OF RIPRAP. PLACE END OF ENGINEERING FABRIC STRIPS INTO TRENCH WITH STAPLES AS SHOWN. BACKFILL WITH THE EXCAVATED MATERIAL AND COMPACT. THE ENGINEER MAY PERMIT THE USE OF THE WHEELS OF PNEUMATIC-TIRED EQUIPMENT FOR CONSOLIDATING THE TRENCH BACKFILL MATERIAL.

DETAILS OF PLACEMENT OF ENGINEERING FABRIC



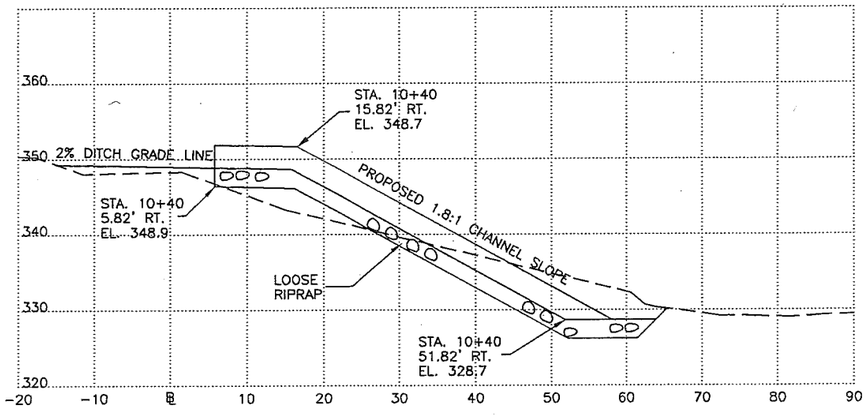
SECTION D-D

NOT TO SCALE



SECTION C-C

0' 10' 20' 30'



SECTION B-B

0' 10' 20' 30'

REV.:

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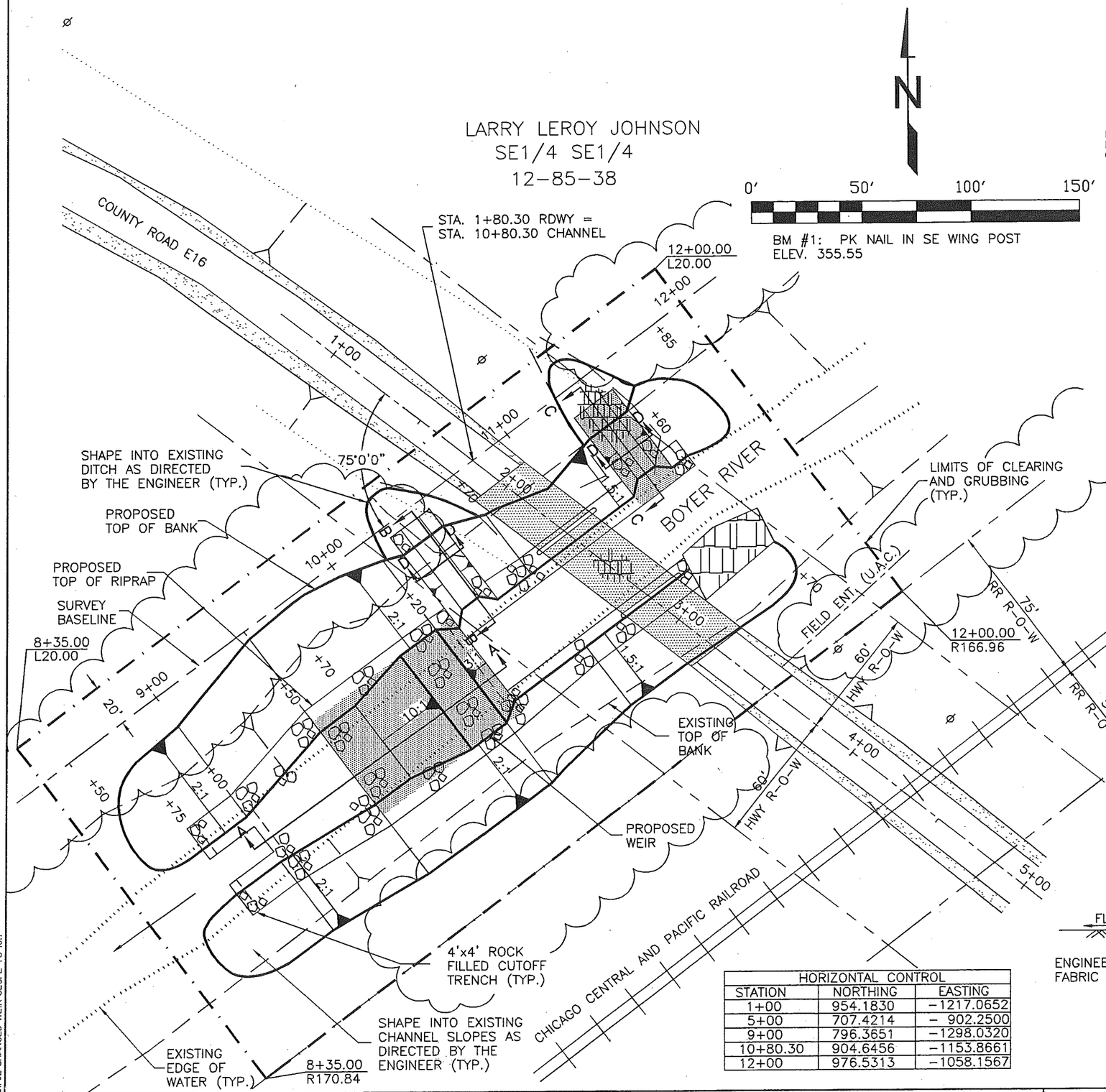
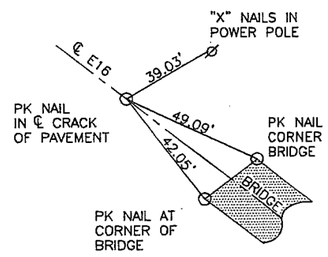
SE PROJECT NO. 05101 | DATE: 09/01 | DRAWN BY: LMD | REVIEWED BY: SAS | APPROVED BY: TJG

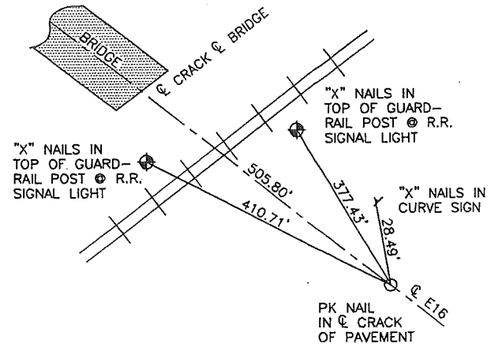
CLIENT: CRAWFORD COUNTY

DESCRIPTION: TYPICAL SECTIONS





P.O.T. STA. 1+52.27
DISTANCES SLOPE CHAINED



P.O.T STA. 7+27.56
DISTANCES PLUMB CHAINED

BANK REPAIR AREA NOTES:

SHAPE EMBANKMENT ADJACENT TO EXISTING CONCRETE BRIDGE ABUTMENTS AND WINGWALLS AS DIRECTED BY THE ENGINEER.

REFER TO SHEET U2 FOR SECTIONS B-B, C-C AND D-D.

SHAPE EXISTING BROKEN CONCRETE REVETMENT ON SOUTHERLY CHANNEL BANK UPSTREAM OF BRIDGE AS DIRECTED BY THE ENGINEER.

CONTRACTOR SHALL RESTRICT ALL OPERATIONS FROM EXISTING RAILROAD RIGHT-OF-WAY.

LOCATION
CRAWFORD COUNTY
T-85N R-38W
SECTION 12
STOCKHOLM TWP.
OVER BOYER RIVER

HYDROLOGY AND HYDRAULICS
DRAINAGE AREA = 222.0 SM
CHANNEL SLOPE = 2.41 FT/MILE

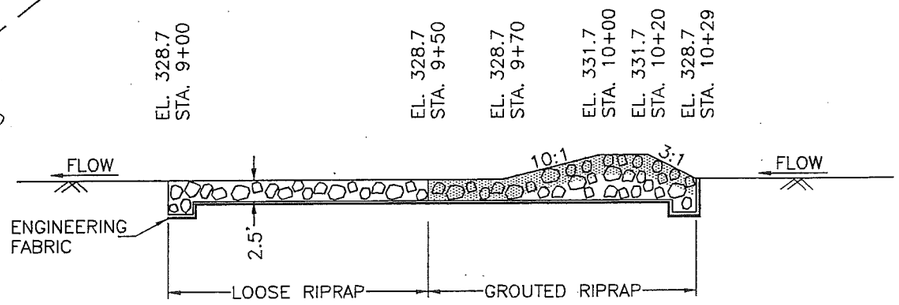
STORM	RUNOFF CFS	VELOCITY FT/SEC	STAGE ELEV.*
Q2	3676	3.40	345.08
Q5	6421	3.83	350.09
Q10	8286	4.24	351.90
Q25	10834	4.72	353.73
Q50	12853	4.93	354.94
Q100	14911	5.17	355.98

* 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.

HORIZONTAL CONTROL		
STATION	NORTHING	EASTING
1+00	954.1830	-1217.0652
5+00	707.4214	- 902.2500
9+00	796.3651	-1298.0320
10+80.30	904.6456	-1153.8661
12+00	976.5313	-1058.1567



SECTION A-A
NOT TO SCALE

REV.: 01/02 CHANGED WEIR SLOPE TO 10:1

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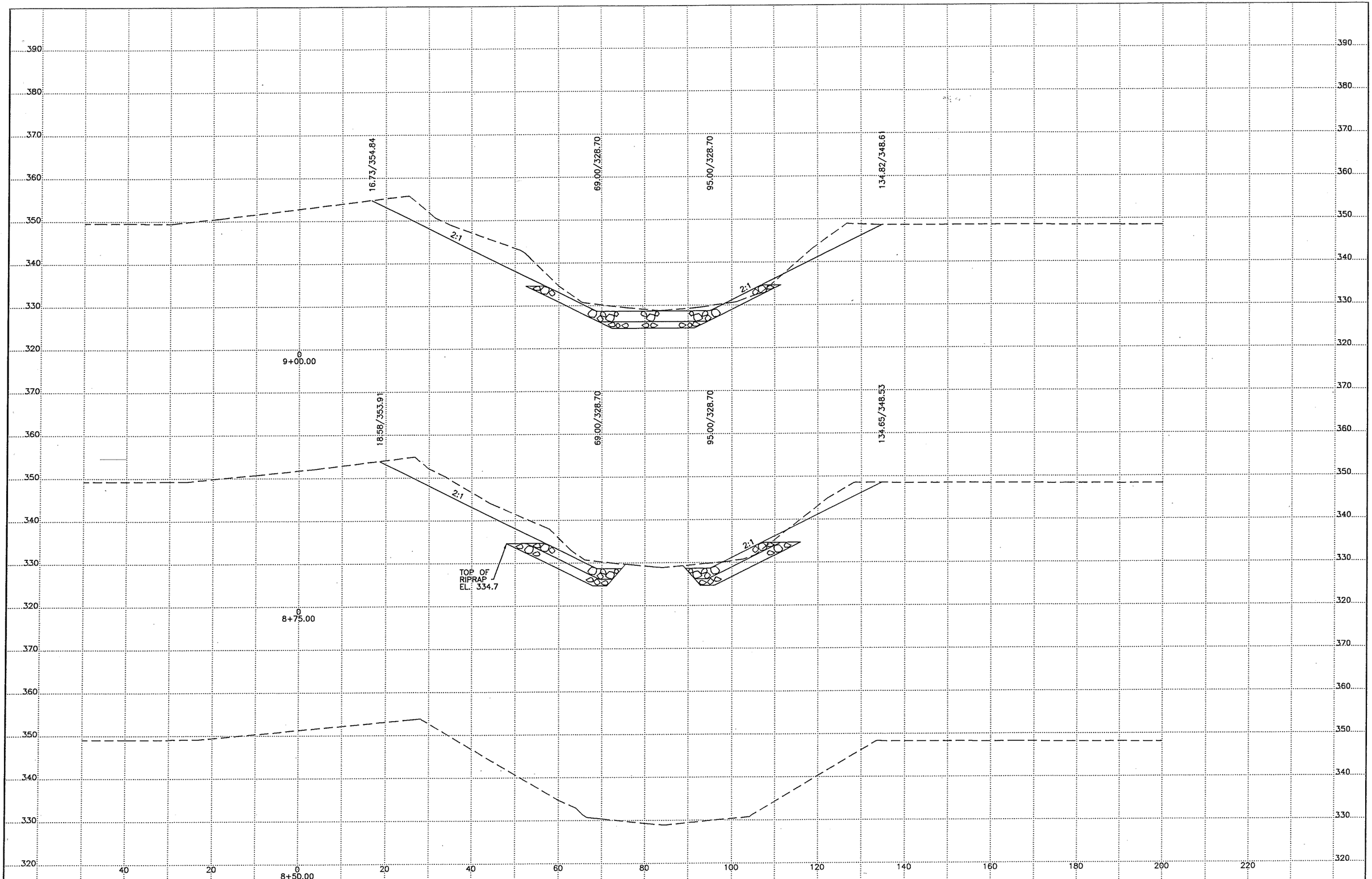
SE PROJECT NO. 05101 DATE: 09/01 DRAWN BY: LMD REVIEWED BY: SAS APPROVED BY: TJG

CLIENT: CRAWFORD COUNTY DESCRIPTION: PLAN VIEW



REV:

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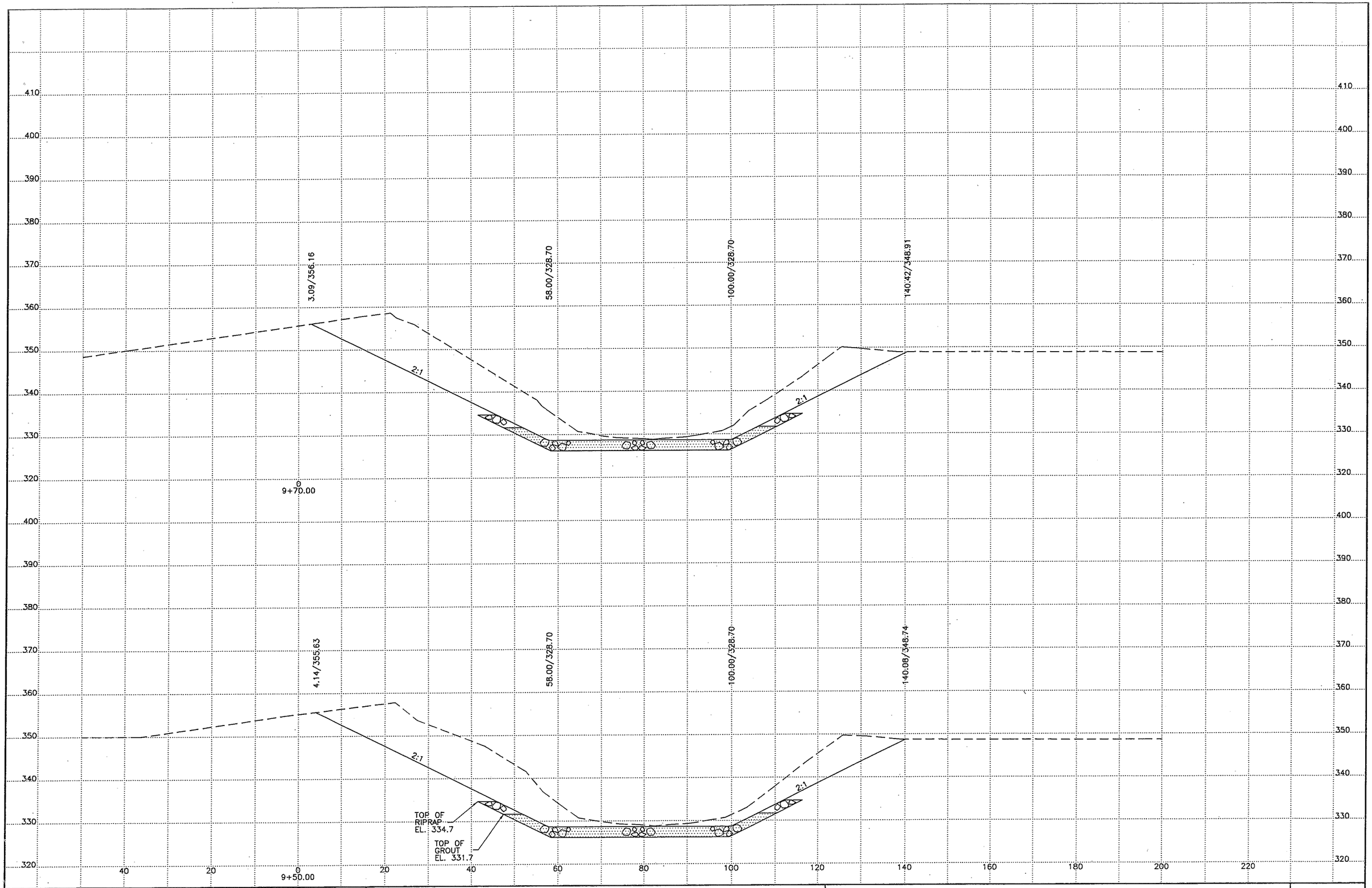
SE PROJECT NO. 05101 DATE: 09/01 DRAWN BY: LMD REVIEWED BY: SAS APPROVED BY: TJG

CLIENT: CRAWFORD COUNTY

DESCRIPTION: CHANNEL CROSS SECTIONS

SHEET ZI



REV:

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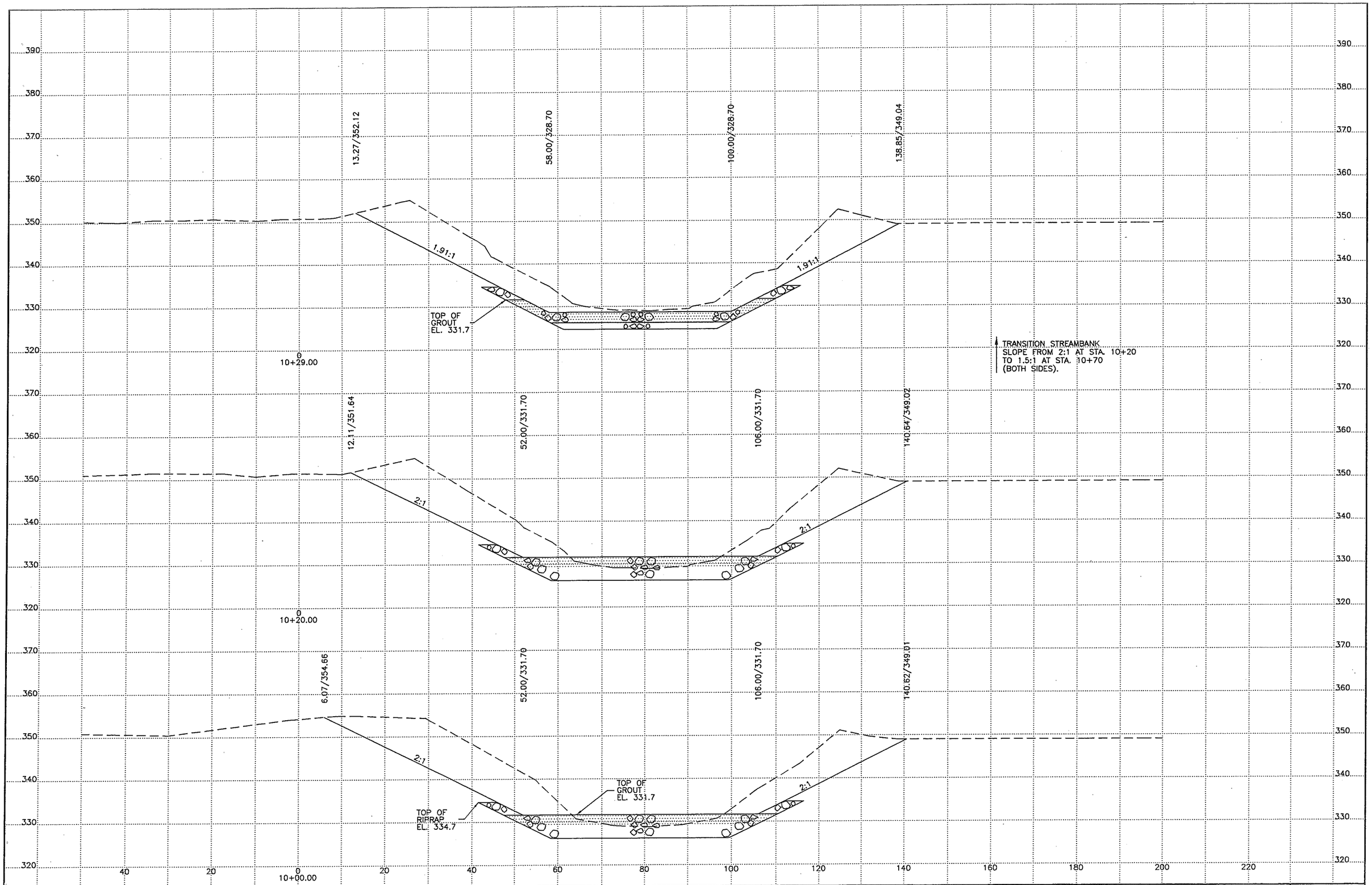
DESCRIPTION: CHANNEL CROSS SECTIONS

SHEET Z2



REV:

SUNDQUIST ENGINEERING, P.C.
CONSULTING ENGINEERS

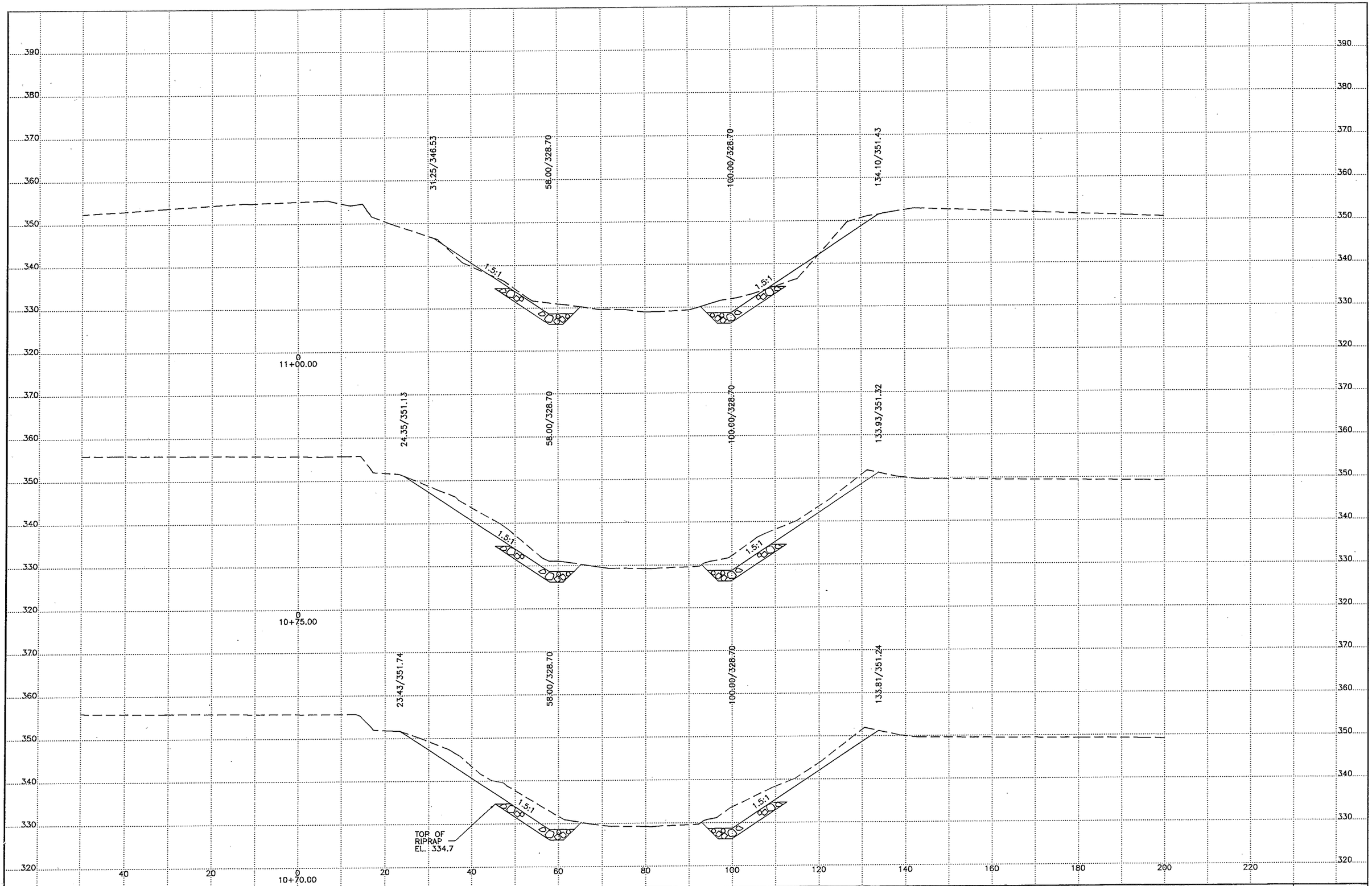
HIGHWAYS • MUNICIPAL • MAPPING • SURVEYING
120 S. MAIN, P.O. BOX 220, DENISON, IOWA 51442
PHONE: (712)263-8118 FAX: (712)263-2181

SE PROJECT NO. 05101 DATE: 09/01 DRAWN BY: LMD REVIEWED BY: SAS APPROVED BY: TJG

CLIENT: CRAWFORD COUNTY

DESCRIPTION: CHANNEL CROSS SECTIONS

SHEET Z3



REV:

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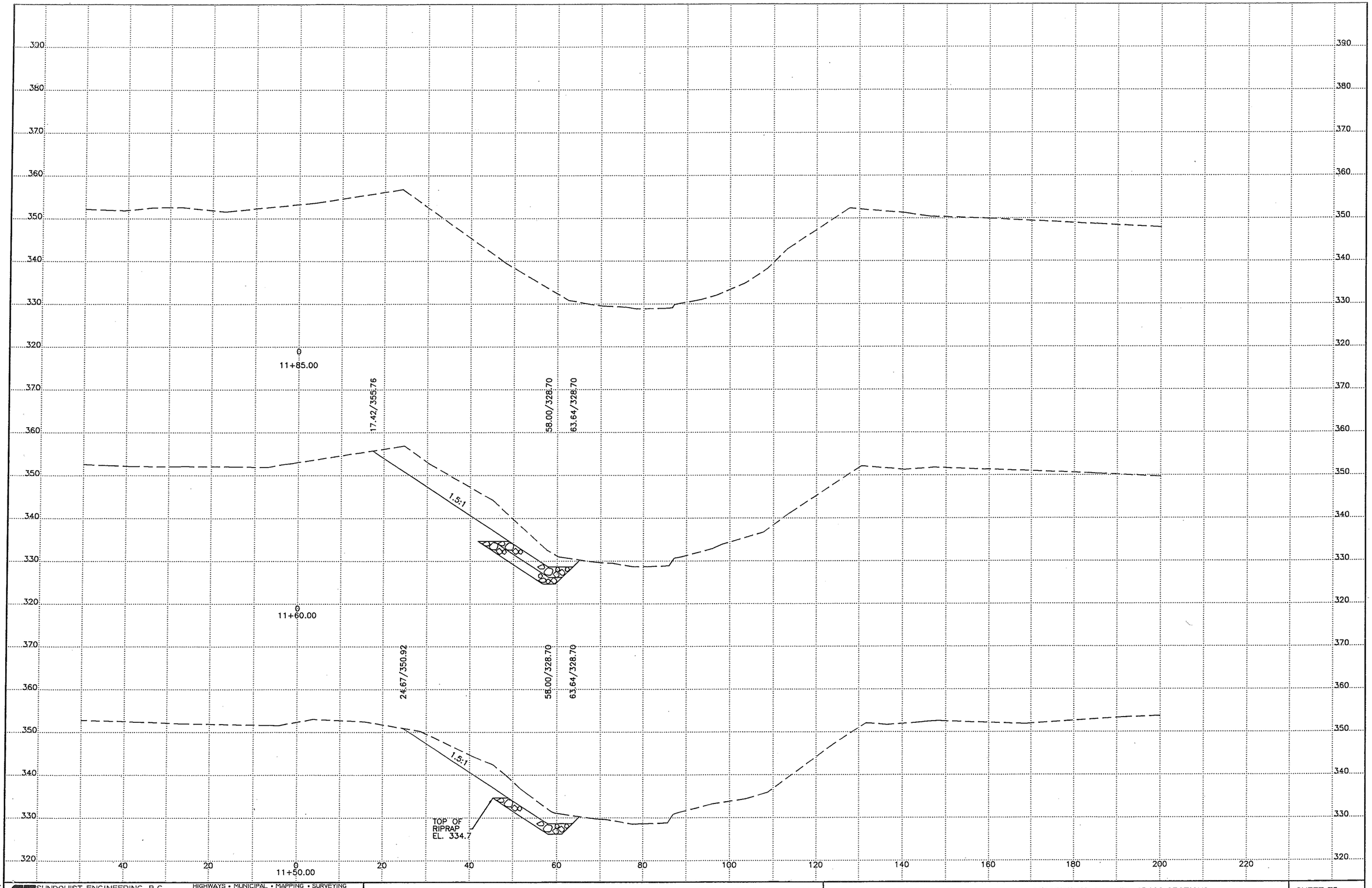
SE PROJECT NO. 05101 DATE: 09/01 DRAWN BY: LMD REVIEWED BY: SAS APPROVED BY: TJG

CLIENT: CRAWFORD COUNTY

DESCRIPTION: CHANNEL CROSS SECTIONS

SHEET Z4



REV:

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SE PROJECT NO. 05101 DATE: 09/01 DRAWN BY: LMD REVIEWED BY: SAS APPROVED BY: TJG

CLIENT: CRAWFORD COUNTY

DESCRIPTION: CHANNEL CROSS SECTIONS

SHEET Z5