

MINNESOTA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLAN FOR GRADING, BASE & BITUMINOUS SURFACING & BOX CULVERT CONST.

C.R. 140
 LOCATED ON 80th AVE. N.E. FROM C.S.A.H. 21 TO EAST CO. LINE
FROM THE NE COR SEC 12 TO THE NW COR SEC 12, T31N R22W

STATE PROJ. NO. _____
 MINN. PROJ. NO. _____
 GROSS LENGTH 5,310.000 FEET 1.006 MILES
 BRIDGES-LENGTH 276.000 FEET .052 MILES
 EXCEPTIONS-LENGTH _____ FEET _____ MILES
 NET LENGTH 5,034.000 FEET 0.953 MILES
 MILE POINT NA TO MILE POINT NA

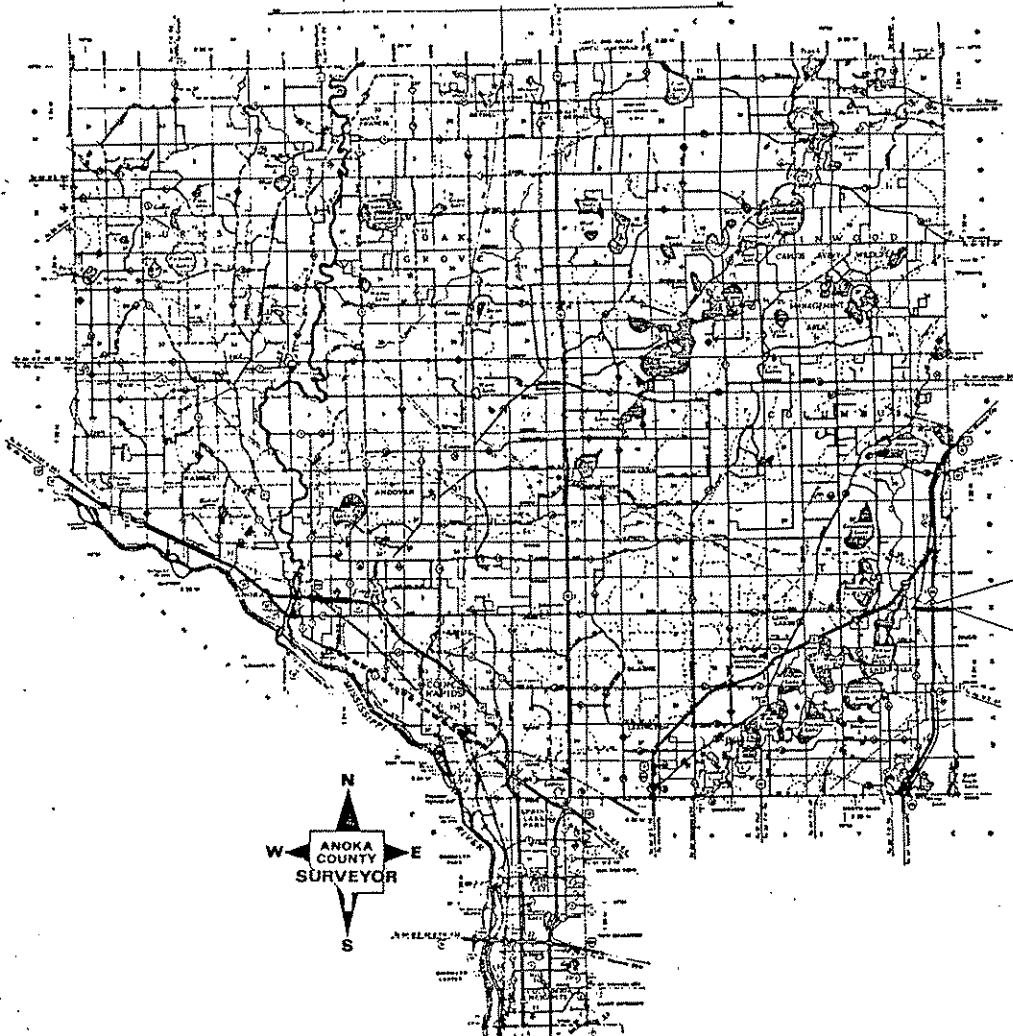
STATE PROJ. NO. _____
 MINN. PROJ. NO. _____
 GROSS LENGTH _____ FEET _____ MILES
 BRIDGES-LENGTH _____ FEET _____ MILES
 EXCEPTIONS-LENGTH _____ FEET _____ MILES
 NET LENGTH _____ FEET _____ MILES
 MILE POINT _____ TO MILE POINT _____

FED. PROJ. NO. _____ .033 .21 120
 .001 .00

GOVERNING SPECIFICATIONS
 THE 1983 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATION FOR CONSTRUCTION" AND SUPPLEMENTAL SPECIFICATIONS, DATED JUNE 10, 1986, SHALL GOVERN.

INDEX

- SHEET NO. 1 TITLE SHEET
- * * 2 ESTIMATED QUANTITIES
 - * * 3 TYPICAL SECTION & EROSION CONTROL
 - * * 4-5 PLAN & PROFILE
 - * * 6-7 SPECIAL DRAINAGE DITCH CONSTRUCTION
 - * * 8-14 CROSS SECTIONS
 - * * 15-20 BRIDGE CONST.
 - * * 21-22 TRAFFIC CONTROL & DETOUR



SCALE

INDEX MAP 2.66mi.

PLAN & PROFILE } HORIZ. 100'
 } VERT. 10'

CROSS SECTIONS 10'

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE MARCH 16, 1987 REG. NO. 6549 ENGR. Lawrence K. Rind
COUNTY ENGINEER

DESIGN SQUAD _____

Right of Way Approval _____ 19_____
DIRECTOR, RIGHT OF WAY OPERATIONS

Approved Ronald Stahlberg 7-1-1987
CITY ENGINEER

Recommended for Approval _____ 19_____
DISTRICT ENGINEER, S. A.

Recommended for Approval C. W. Weichselbaum 7/1/1987
DISTRICT ENGINEER, S. A.

Recommended for Approval _____ 19_____
TRANSPORTATION PLANS ENGINEER

Recommended for Approval Julie Skallman 11/16/1987
STATE AID PLANS ENGINEER

Approved 5-2-1988 Ray A. Dawson
STATE AID ENGINEER

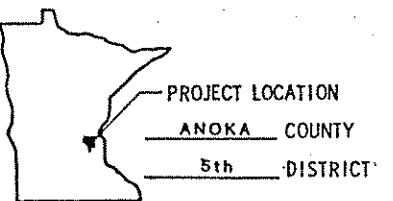
DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION

APPROVED _____
DIVISION ADMINISTRATOR DATE

PLAN REVISIONS		
DATE	SHEET NO.	APPROVED BY

DESIGN DATA

ADT (Current Year) = 280 (86) Design Speed 55 MPH 9 TON
 ADT (Future Year) = 364 (06) Based on STOPPING Sight Distance
 DHV (Design Hr. Vol.) = _____ Height of eye 35' Height of object 0.5'
 D (Directional Distr.) = _____ Design Speed not achieved at:
 T (Heavy Commercial) = LESS THAN 150 STA. 35+47 TO STA. 40+47 MPH 40
 Soil Factor = A-4, 100% STA. _____ TO STA. _____ MPH _____



FOR PLANS AND UTILITIES SYMBOLS SEE TECHNICAL MANUAL

STATE PROJ. NO.	AREA	JOB

STATE AID PROJ. NO. 210-110-01 COUNTY PROJ. NO. 86-03-140
 STATE PROJ. NO. _____ SHEET NO. 1 OF 22 SHEETS

I HEREBY CERTIFY THAT THE FINAL FIELD REVISIONS, IF ANY, OF THIS PLAN WERE MADE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

STATEMENT OF ESTIMATED QUANTITIES

ITEM NO.	ITEM	UNIT	TOTAL COUNTY PROJECT
2021.501	MOBILIZATION	LUMP SUM	1
2031.501	FIELD OFFICE, TYPE D	EACH	1
2101.501	CLEARING	ACRE	0.3
2101.502	CLEARING	TREE	23
2101.506	GRUBBING	ACRE	0.65
2101.507	GRUBBING	TREE	22
2104.513	SAWING BITUMINOUS PAVEMENT	LIN. FT.	248
2104.521	SALVAGE CULVERT PIPE	LIN. FT.	212
2104.521	SALVAGE FENCE	LIN. FT.	526
0557.603	INSTALL FENCE	LIN. FT.	447
2104.523	SALVAGE 24" RCP APRONS	EACH	2
2104.523	SALVAGE 44" SPAN RCP-A APRONS	EACH	2
2105.501	COMMON EXCAVATION (P)	CU. YD.	25,329
0563.601	TRAFFIC CONTROL	LUMP SUM	1
2105.525	TOPSOIL BORROW (LV)	CU. YD.	185
2130.501	WATER	M-GAL.	100
2211.503	AGGREGATE BASE PLACED, CL-4A (P)	CU. YD.	2894
2211.503	AGGREGATE BASE PLACED, CL-5A (P)	CU. YD.	3584
2331.504	BITUMINOUS MATERIAL FOR MIXTURE	TON	149
2331.510	BINDER COURSE MIXTURE	TON	1185
2331.514	BASE COURSE MIXTURE	TON	1625
2331.531	TEMPORARY LANE MARKING	RD. STA.	151
0331.601	2" WEAR COURSE PLACED	SQ. YD.	320
2341.504	BITUMINOUS MATERIAL FOR MIXTURE	TON	76
2341.508	WEARING COURSE MIXTURE	TON	1175
2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GAL.	1450
2501.511	15" C.M. PIPE CULVERT	LIN. FT.	104
2501.515	15" C.M. PIPE APRONS	EACH	6
2501.515	24" R.C. PIPE APRONS	EACH	2
2501.521	22" SPAN R.C. PIPE-ARCH CULVERT	LIN. FT.	52
2501.521	44" SPAN R.C. PIPE-ARCH CULVERT	LIN. FT.	18
2501.525	22" SPAN R.C. PIPE-ARCH APRONS	EACH	2
2501.561	24" R.C. PIPE CULVERT, DES. 3006F	LIN. FT.	72
2501.573	INSTALL 24" R.C.P APRONS	EACH	2
2501.573	INSTALL 44" SPAN RCP-A APRONS	EACH	2
2535.501	BITUMINOUS CURB	LIN. FT.	450
2573.501	BALE CHECK	EACH	30
2573.502	SILT FENCE, HEAVY DUTY	LIN. FT.	190
2573.508	BITUMINOUS LINED FLUME	SQ. YD.	14
2575.501	ROADSIDE SEEDING (P)	ACRE	8.0
2575.502	SEED, MIXTURE NO. 3	POUND	363
2575.505	SODDING	SQ. YD.	2133
2575.511	MULCH MATERIAL TYPE #1	TON	16
2575.519	DISC ANCHORING (P)	ACRE	8.0
2557.531	COMMERCIAL FERTILIZER, ANALYSIS 10-10-10	TON	2.0

PART 1 QUANTITIES ONLY, SEE SHEET NO. 15 FOR PART 2 QUANTITIES

- ① FOR USE IN FRONT YARD AREAS TO BE SODDED.
- ② FOR DUST CONTROL AS DIRECTED BY THE ENGINEER.
- ③ INCLUDES QUANTITY FOR WEARING COURSE.
- ④ PROVIDED FOR RESTORATION OF RESIDENTIAL DRIVEWAYS (TO END OF RADIUS) PAYMENT BY S.Y.. INCLUDES BITUMINOUS MATERIAL AND 4" CL-5A AGG. BASE. FIELD ENTRANCES TO BE PAVED WITH 2' WIDE APRON INCIDENTAL TO THE WEARING COURSE.
- ⑤ INCLUDES 7039 C.Y. OF SUBCUT MATERIAL FOR COMPACTION AND UNIFORMITY OF SOILS.
- ⑥ INCLUDES 40 TON FOR PAVING SHOULDERS IN BERM CONST. AREAS.

SPECIAL DETAILS

THE CONTRACTOR SHALL REMOVE SUFFICIENT TOPSOIL MATERIAL WITHIN THE EXCAVATION AREAS AND AREAS ON WHICH EMBANKMENTS WILL BE PLACED, STOCKPILE IF NECESSARY, AND USE IT FOR TOPSOIL COVERING ON THE NEW SLOPES AND DITCH BOTTOMS. THIS WILL REQUIRE APPROXIMATELY 2,936 CU. YDS. TO PROVIDE A MINIMUM COVER OF 3". SALVAGING AND REPLACING TOPSOIL SHALL BE CONSIDERED AS INCIDENTAL TO THE EXCAVATION ITEMS, AND NO ADDITIONAL COMPENSATION SHALL BE MADE. MATERIAL FOUND IN SUBCUTS THAT IS UNSUITABLE FOR FILL IN THE ROADBED MAY BE USED AS FILL FOR INSLOPES OR DISPOSED OF IN OTHER AREAS AS APPROVED BY THE ENGINEER.

DRAINAGE CHART

STATION	LOC.	INPLACE	REMARKS	SODDING CULV. END SQ. YD.	SALVAGE CULV. PIPE LIN. FT.	INSTALL CULVERT				FURNISH & INSTALL PIPE CULVERTS											
						24" RCP LIN. FT.	44" RCP-A LIN. FT.	15" CMP LIN. FT.	22" RCP-A LIN. FT.	44" RCP-A LIN. FT.	24" RCP LIN. FT.										
10+29	C	44x70RCP-A	EXTEND 6' RT. 10' LT.	50	2																
11+52	LT.	15x30 CMP		17	30																
15+82	RT.	15x18 RCP	FIELD ENT.	17	18																
23+30	C			29																	
25+09	C	15x44 CMP			44																
32+19	RT.		NO CULVERT REQ'D																		
32+76	C	18x88 RCP	REMAIN INPLACE	21																	
42+38	C	24x138 RCP	EXTEND 12' LT. 6' RT.	29	2																
42+78	RT.	15x64 CMP	REMAIN INPLACE	17																	
48+71	LT.	12x24 CMP			24																
49+78	LT.		NO CULVERT REQ'D																		
49+83	RT.		NO CULVERT REQ'D																		
53+50	C	BRIDGE																			
58+98	LT.	12x22 CMP	NO CULVERT REQ'D		22																
60+83	LT.	12x24 CMP	NO CULVERT REQ'D		24																
62+00	C			21																	
63+02	C	15x50 CMP	NO CULVERT REQ'D		50																
① CONTRACTOR SHALL VERIFY DURING CONSTRUCTION IF INPLACE CULVERT IS A GASKET OR A NON GASKET DESIGN AND FURNISH LIKE KIND.																					
TOTALS				201	212	4		2	2			104	6		52	2	18			72	2

PLATE NO.	DESCRIPTION
0004A	SPECIFICATION REFERENCE TO STANDARD PLATES
3000K	REINFORCED CONCRETE PIPE
3006F	GASKET JOINT FOR R.C. PIPE
3014J	REINFORCED CONCRETE PIPE ARCH DETAIL
3040F	CORRUGATED METAL PIPE CULVERT
3100G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE
3110G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE-ARCH
3123I	METAL APRON FOR C.S. PIPE
3145E	CONCRETE PIPE TIES
3221C	CORRUGATED STEEL PIPE COUPLING BAND
7065C	BITUMINOUS CURB
8000I	STANDARD BARRICADES
9000B	APPROACHES AND ENTRANCES
9102C	SODDING AT PIPE CULVERT ENDS

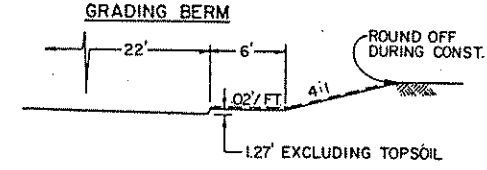
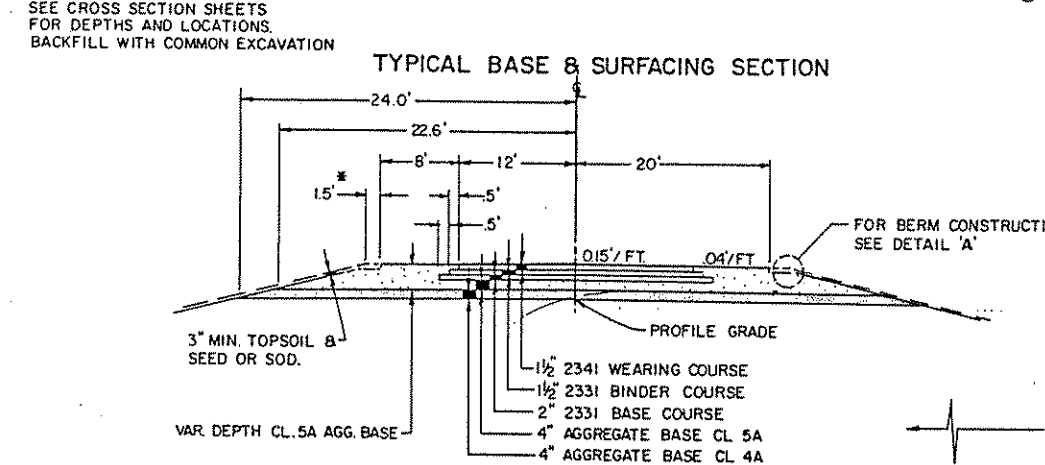
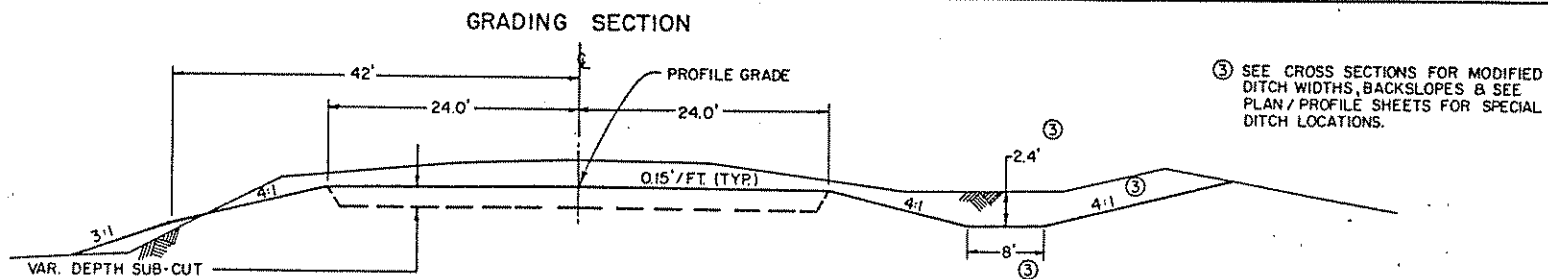
BASIS OF PLANNED QUANTITIES

- 2331 PLANT MIXED BASE AND BINDER COURSE: BITUMINOUS MIXTURE 110 LBS. / S.Y. PER 1" THICKNESS. BITUMINOUS MATERIAL FOR MIXTURE 5.3% BY WEIGHT.
- 2341 PLANT MIXED WEARING COURSE: BITUMINOUS MIXTURE 110 LBS. / S.Y. PER 1" THICKNESS. BITUMINOUS MATERIAL FOR MIXTURE 6.5% BY WEIGHT
- 2357 BITUMINOUS MATERIAL FOR TACK COAT: 0.05 GAL. PER S.Y.
- 2575 MULCH MATERIAL TYPE -1, 2 TONS PER ACRE.
- 2575 COMMERCIAL FERTILIZER, ANALYSIS 10-10-10 500 LBS. / ACRE ON ALL SOD AND SEED AREAS
- 2575 ROADSIDE SEEDING BASED ON HORIZONTAL MEASUREMENT PLUS 10% SEED MIXTURE NO. 3, 45 LBS. / ACRE.

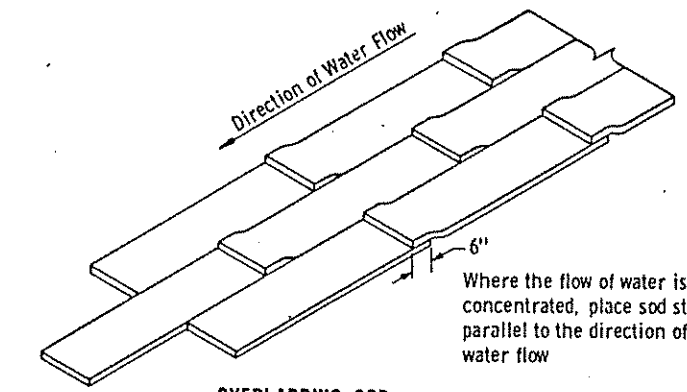
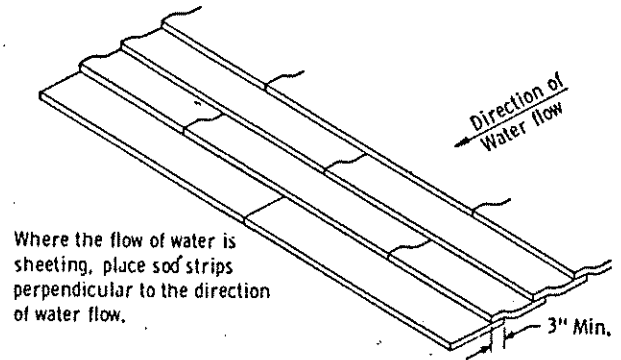
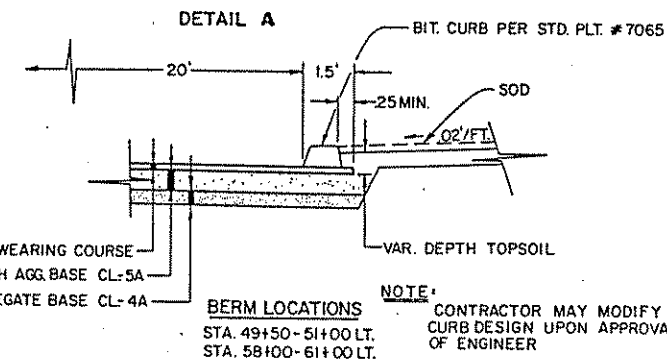
EARTHWORK SUMMARY	
EXCAVATION:	① 25,329 CU. YD.
EMBANKMENT	① 16,172 CU. YD.
TOPSOIL EMBANKMENT	2,936 CU. YD.
① EXCAVATION AND FILL QUANTITIES INCLUDE 6,885 C.Y. FOR SURCUT.	

CLEARING AND GRUBBING			
STATION (TO STATION)	LOC.	CLEARING TREE/ACRE	GRUBBING TREE/ACRE
10+30	43' LT.	1	1
32+72	47' LT.	2	1
32+74	41' RT.		1
33+44	57' LT.	1	1
33+50	57' LT.	1	1
33+62	57' LT.	1	1
33+65	57' LT.	1	1
33+72	23' RT.		1
35+16	60' LT.	1	1
35+17	23' RT.		1
35+19	60' LT.	1	1
35+34	23' RT.		1
40+92	31' LT.	1	1
41+87	30' RT.		1
42+96	23' LT.	2	1
50+12 - 54+50	RT.		0.4
53+20 - 53+89	RT.	0.05	
51+83 - 54+67	LT.	0.25	0.25
55+18	33' LT.	1	1
55+60	29' LT.	2	1
55+69	29' LT.	2	1
56+25	23' RT.	1	1
51+53	53' LT.	1	1
TOTALS		21	0.30 22 0.65

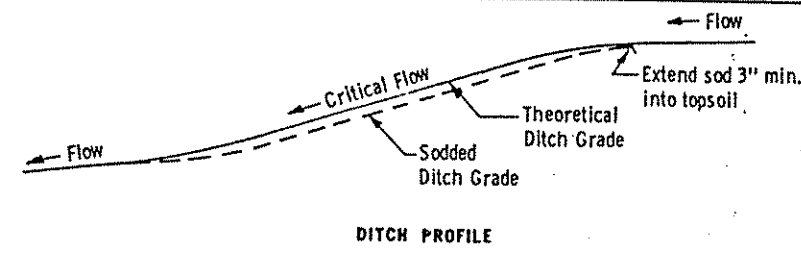
SALVAGE & INSTALL FENCE				
STATION	LOC.	SALVAGE	INSTALL	REMARKS
52+75 - 53+10	RT.	65'	35'	
53+64 - 57+71	LT.	437'	407'	
TOTAL		502'	442'	



* EXCEPTION IN BERM AREAS. SEE BERM DETAIL.



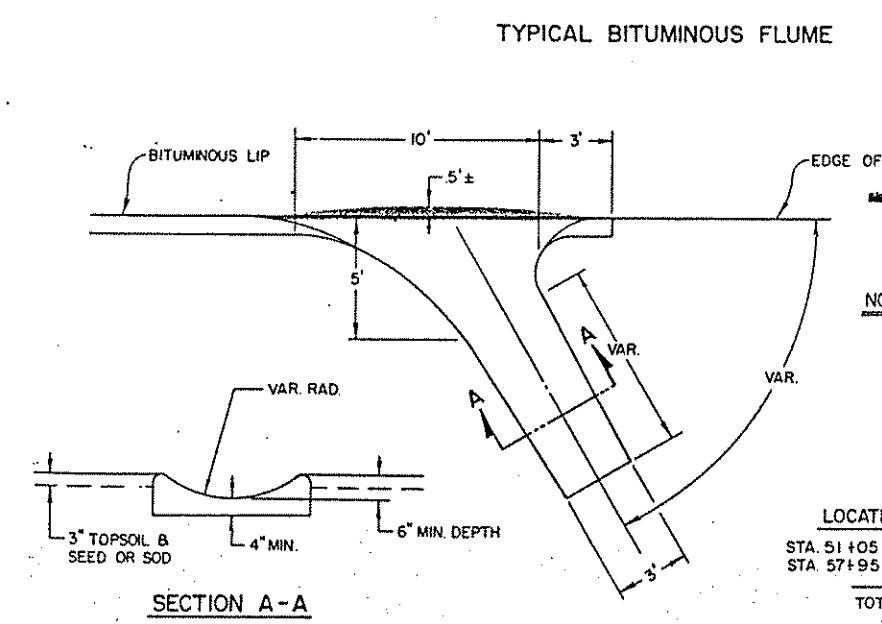
SPECIAL SOD PLACEMENT TECHNIQUES



NOTE: APPLIES TO DITCH GRADES 2.0% OR GREATER.

SODDED DITCH DETAILS

SODDING		
STATION	LOC.	S. Y.
10+08 - 10+50	LT.	600
48+00 - 51+00	LT.	616
57+50 - 60+00	LT.	525
CULV. ENDS (INCL. BOX CULV.)		392
TOTAL		2133



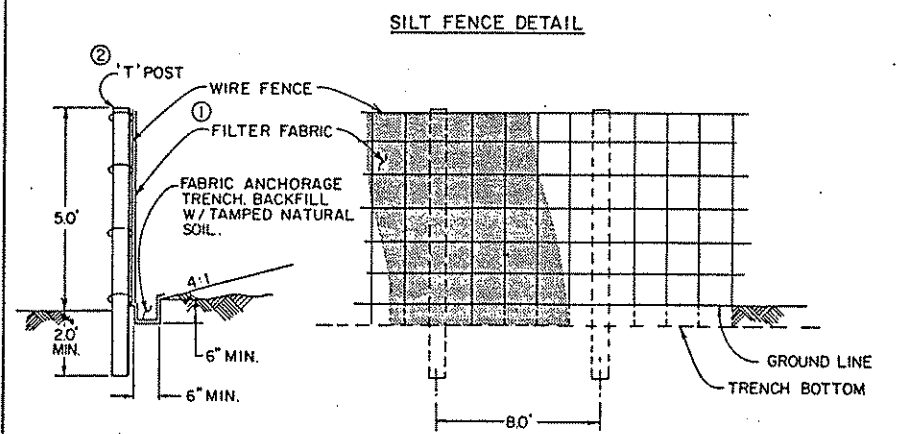
NOTE: DENOTES AREA OF INCREASED SLOPE TO DIVERT WATER FLOW INTO FLUME. THIS MUST BE ACCOMPLISHED DURING SHOULDER PAVING OPERATIONS.

NOTE: BITUMINOUS FLUME CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO ADDITIONAL COMPENSATION WILL BE MADE.

FLUME DESIGN MAY BE MODIFIED TO MATCH EXISTING CONDITIONS UPON APPROVAL OF THE ENGINEER.

LOCATION #

STA. 51+05 LT. 7 SY.	* LOCATIONS ARE APPROX. EXACT LOCATIONS ARE TO BE DETERMINED IN THE FIELD DURING CONST.
STA. 57+95 LT. 7 SY.	
TOTAL 14 SY.	



① FABRIC SHALL BE MIRAFI 100X TREVIRA 1115, SUPAC SNP (UV) OR APPROVED EQUAL AS DESIGNATED BY THE ENGINEER. WIRE MESH REINFORCEMENT SHALL HAVE MIN. 12-1/2 GA. WIRE WITH A MAX. MESH SPACING OF 6". ATTACH WIRE MESH TO STEEL POST W/ TIE WIRES. ATTACH FILTER FABRIC TO WIRE MESH W/ HOG RINGS.

② FENCE POST TO BE SET AT TOE OF SLOPE.

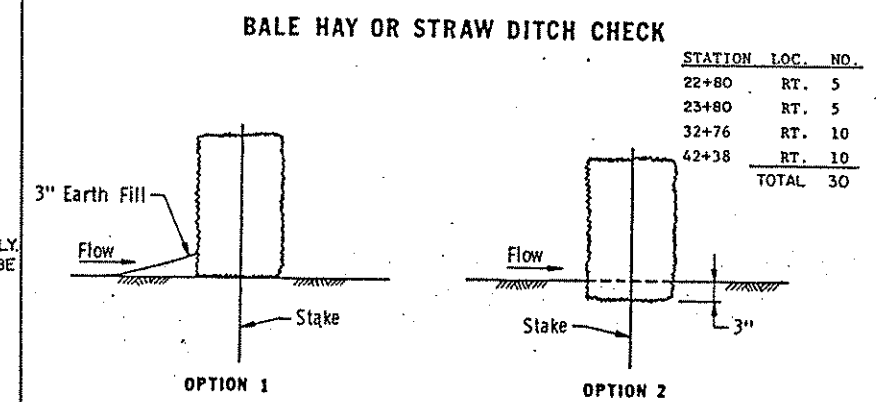
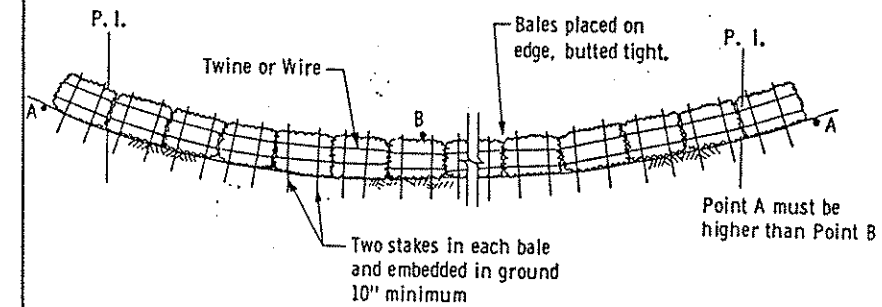
LOCATIONS

STA. 53+42 - STA. 53+72 LT. - 60'

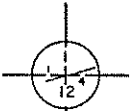
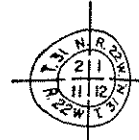
STA. 53+42 - STA. 54+15 RT. - 30'

TOTAL = 190'

NOTE: LOCATIONS ARE APPROX. ONLY. EXACT LOCATIONS ARE TO BE DETERMINED IN THE FIELD DURING CONST.



STATION	LOC.	NO.
22+80	RT.	5
23+80	RT.	5
32+76	RT.	10
42+38	RT.	10
TOTAL		30



40' DRAINAGE EASEMENT

STA. 23+30 LT. CONST. DRAINAGE DITCH.
SEE SHEET NO. 7 FOR CONST. DETAILS.

DITCH CLEANOUT CONST.
SEE SHEET NO. 6 FOR
CONST. DETAILS.

CAUTION: BURIED POWER

BEGIN PROJECT 86-03-140
P.O.T. STA. 10+04

CAUTION:
BURIED TELEPHONE CABLE.

NOTE:
UTILITY LOCATIONS
ARE ONLY APPROXIMATE.

NOTE: GUARD RAILS TO
REMAIN INPLACE
DURING CONST.

36+59 BEG. APPROACH
PANEL FOR BRIDGE.

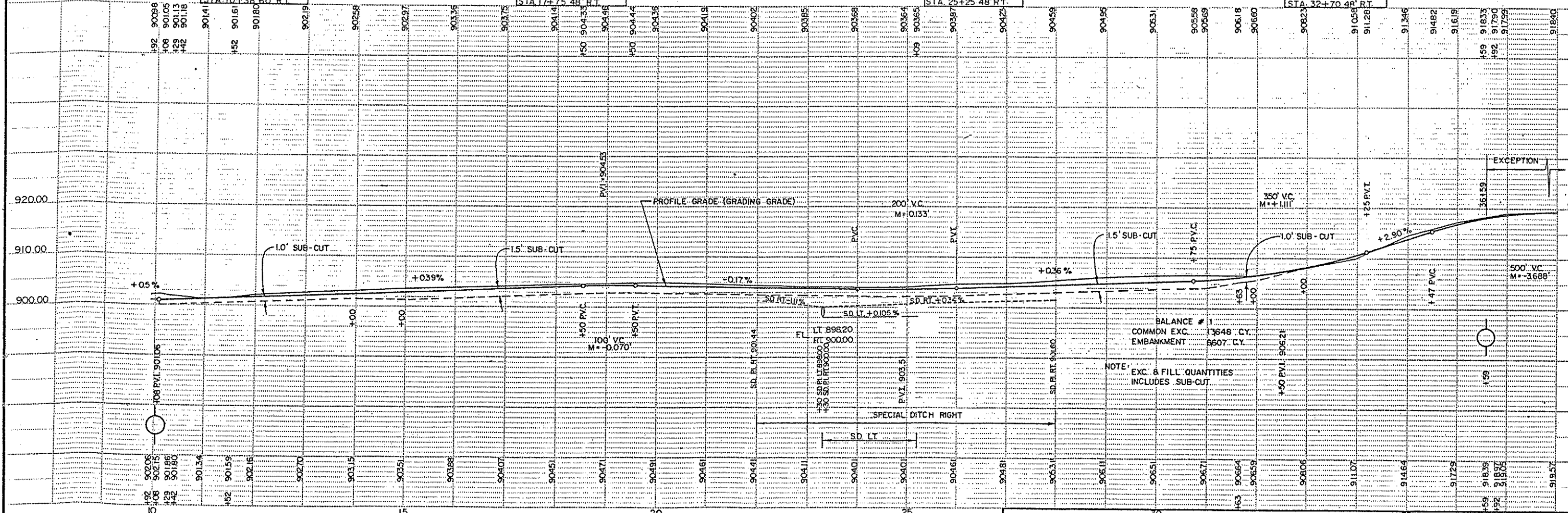
PT. 36+52.32
Δ = 00°03'24" LT

BM.11 ELEV. 901.52
DBL SPIKE IN PP #2203
STA. 10+38.60 RT.

BM.12 ELEV. 904.87
DBL SPIKE IN PP #494
STA. 17+75.48 RT.

BM.13 ELEV. 905.58
DBL SPIKE IN PP #492
STA. 25+25.48 RT.

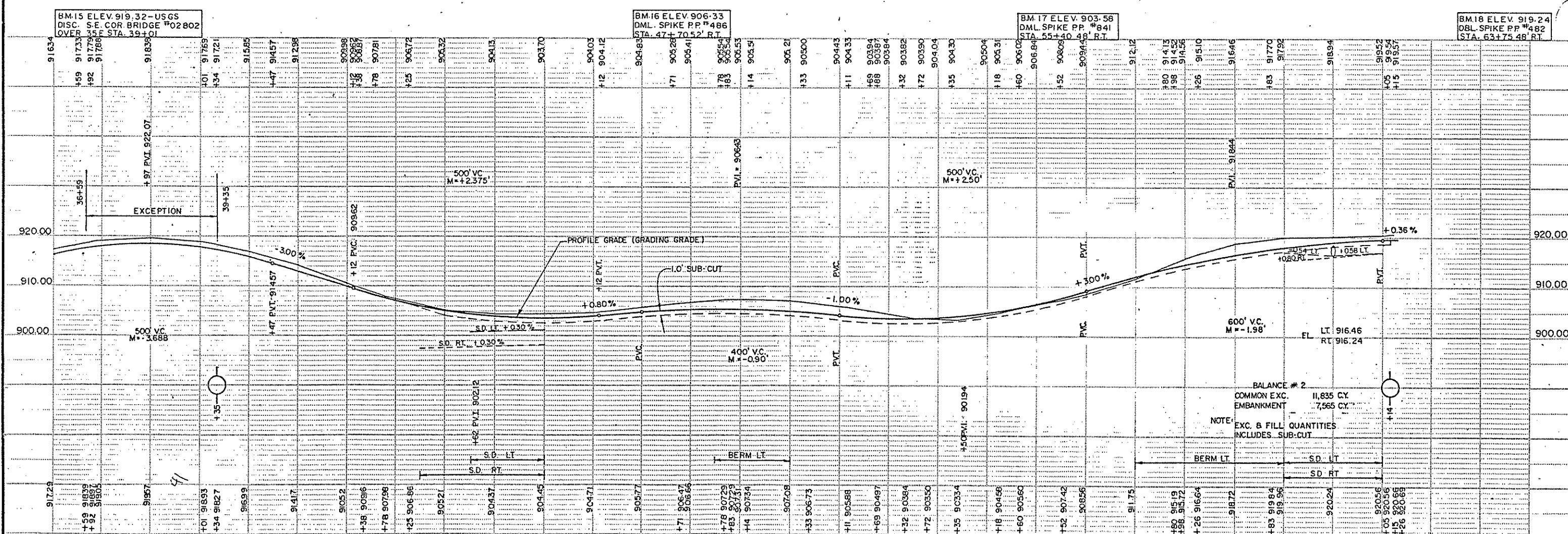
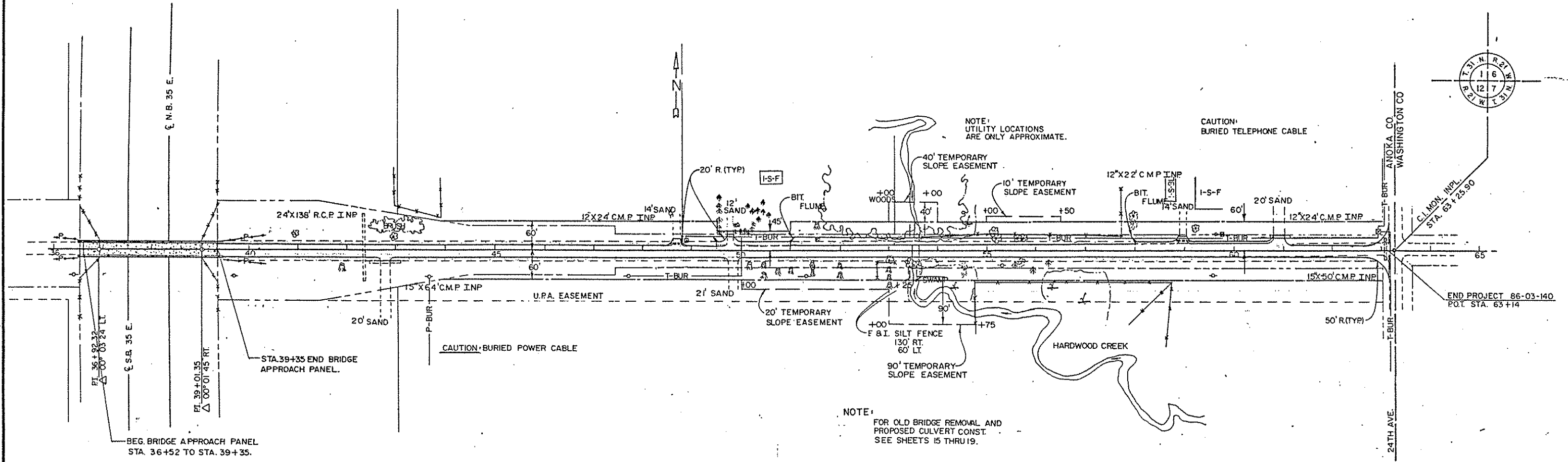
BM.14 ELEV. 903.09
DBL SPIKE IN PP #490
STA. 32+70.48 RT.



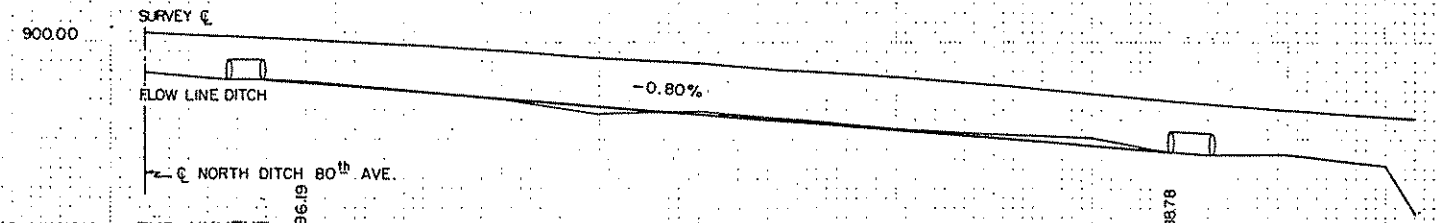
BALANCE # 1
COMMON EXC. 13648 C.Y.
EMBANKMENT 3607 C.Y.

NOTE: EXC. & FILL QUANTITIES
INCLUDES SUB-CUT.

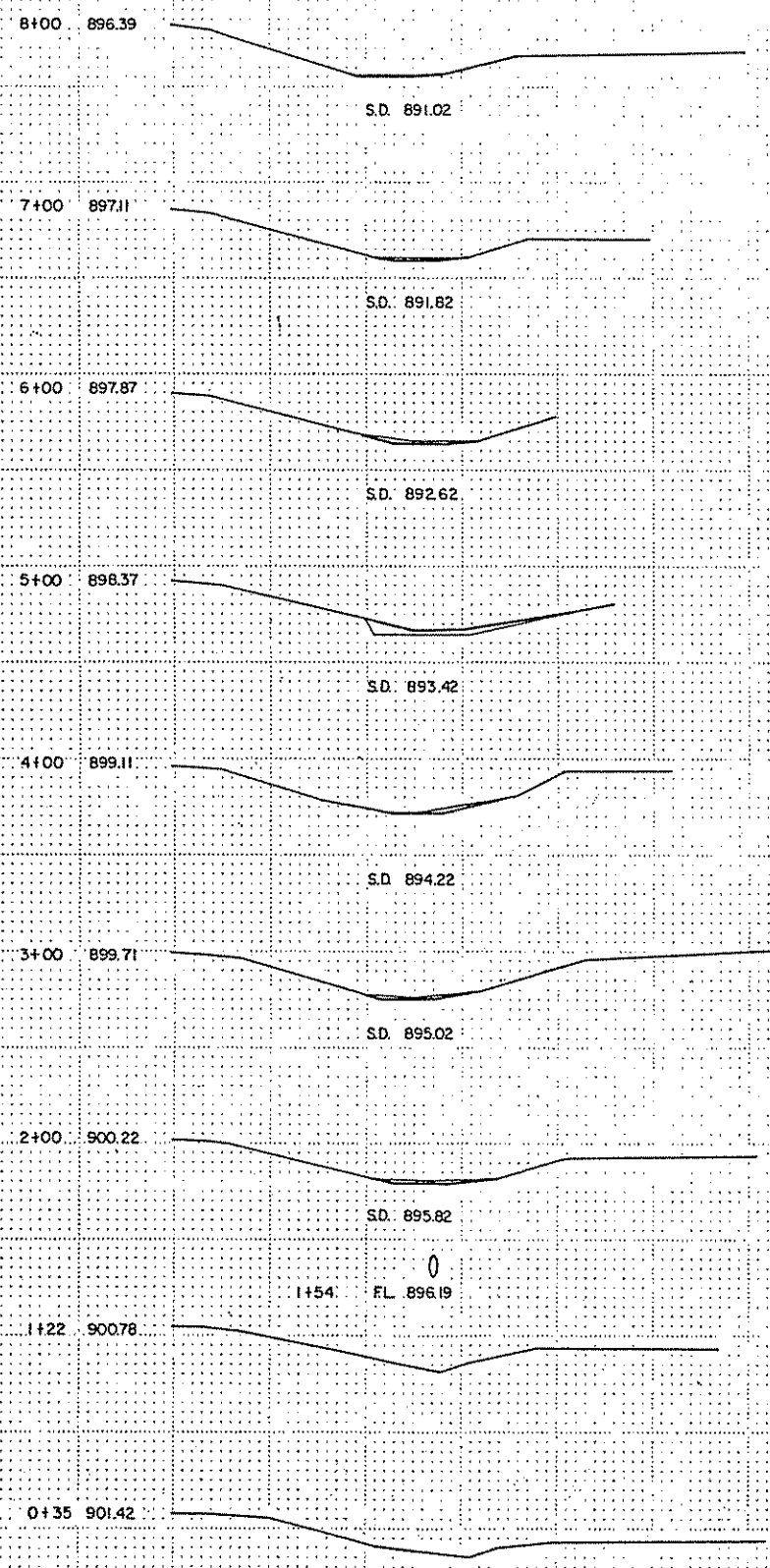
EXCEPTION



0+35 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00

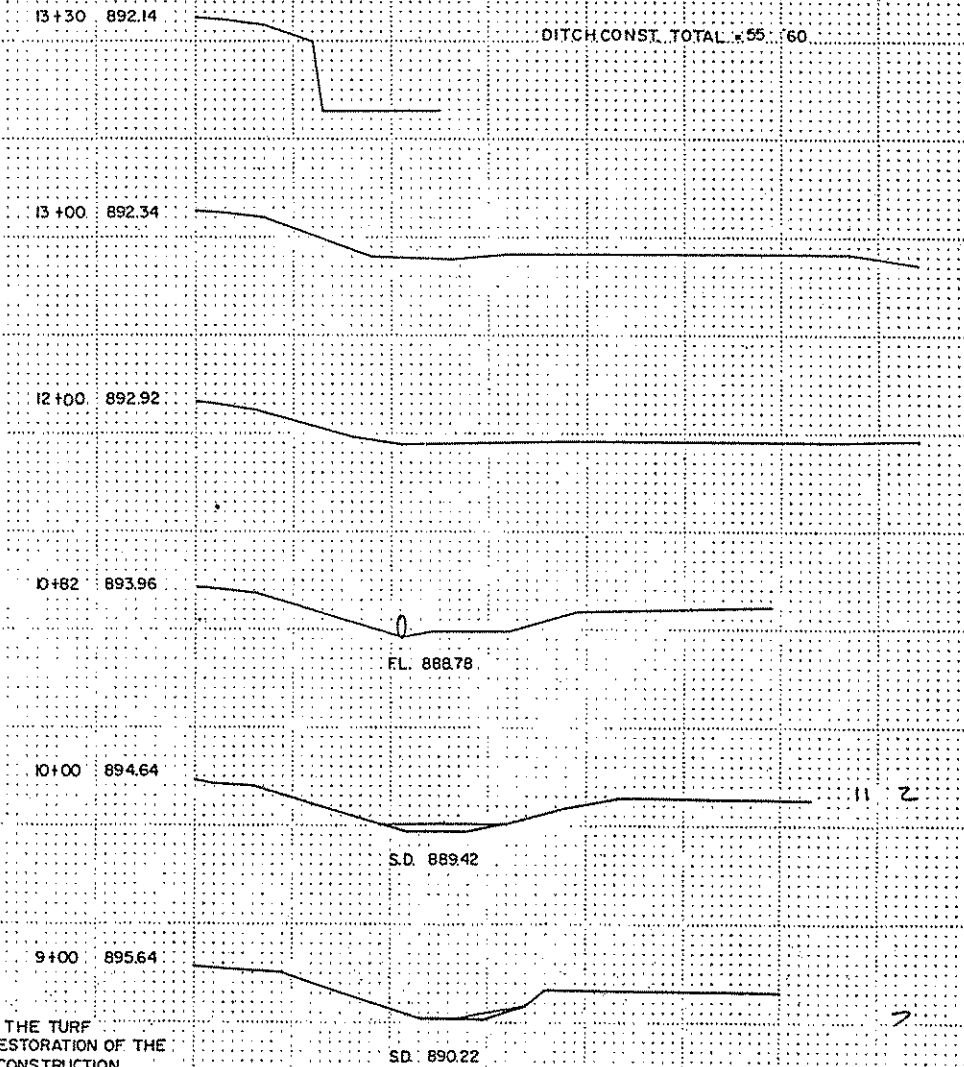


EXCAVATION		EMBANKMENT	
SUB-TOTALS	CU YDS.	CU YDS.	SUB-TOTALS
4	6	54	6



9
17
22
6
11
11
3

EXCAVATION		EMBANKMENT	
Sub-Totals	CU Yds.	CU Yds.	Sub-Totals
13+30	892.14		
13+00	892.34		
12+00	892.92		
10+82	893.96		
10+00	894.64		
9+00	895.64		



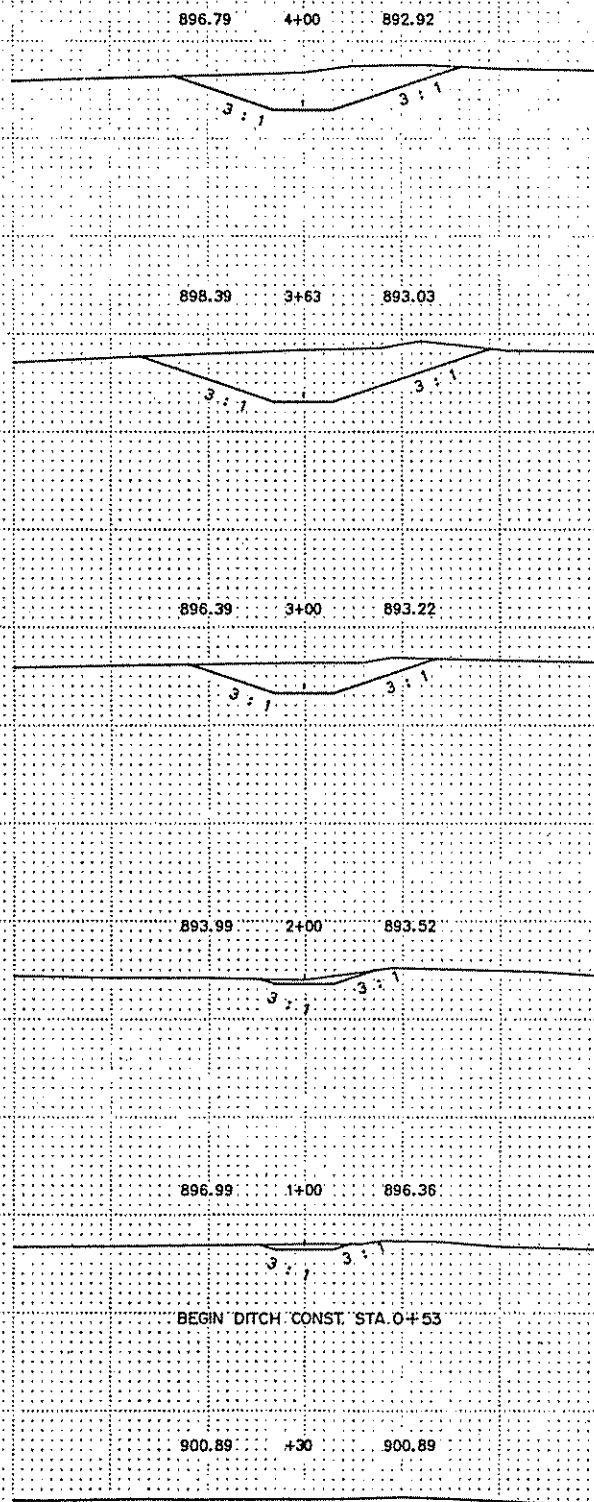
QUANTITIES ARE INCLUDED WITH THE TURF ESTABLISHMENT ITEMS FOR THE RESTORATION OF THE AREAS DISTURBED BY THE DITCH CONSTRUCTION.

EXCAVATION QUANTITIES INCLUDED WITH COMMON EXCAVATION FOR PAYMENT.

DITCH REGRADING EAST SIDE C.S.A.H. # 21 NORTH OF CTY. RD. # 140

EXCAVATION EMBANKMENT

Sub-Totals Cu. Yds. Cu. Yds. Sub-Totals



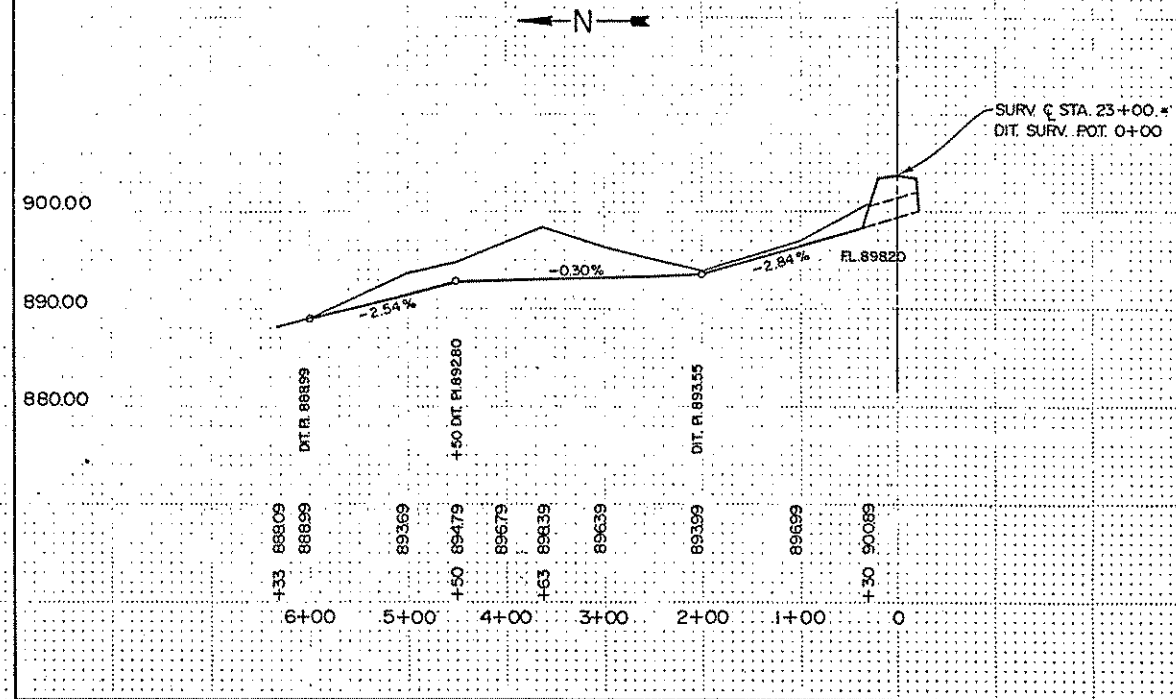
132 0

197 0

104 0

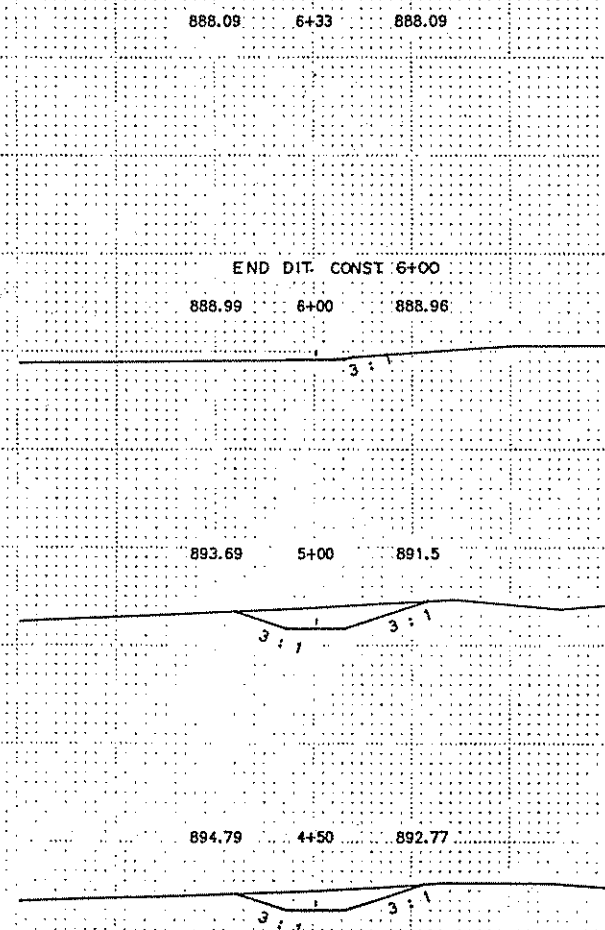
19 0

0 0



EXCAVATION EMBANKMENT

Sub-Totals Cu. Yds. Cu. Yds. Sub-Totals



* DIT. CONST. TOTAL = 649 0

END DIT. CONST. 6+00

54 0

50 0

93 0

QUANTITIES ARE INCLUDED WITH THE TURF ESTABLISHMENT ITEMS FOR THE RESTORATION OF THE AREA DISTURBED BY THE DITCH CONSTRUCTION.

DRAINAGE DITCH CONST. - STA. 23+30 LT.

EXCAVATION QUANTITIES INCLUDED WITH COMMON EXCAVATION FOR PAYMENT.

EXCAVATION EMBANKMENT

EXCAVATION EMBANKMENT

Sub-Totals	Cu. Yds.	Cu. Yds.	Sub-Totals
	81	103	
	103	181	
	31	39	
	124	55	

Sub-Totals	Cu. Yds.	Cu. Yds.	Sub-Totals
	488	272	
	520	270	
	451	237	
	283	221	
	207	230	
	99	73	

901.59 11+52 901.61
E 14' SAND ENT LT

901.34 11+00 901.41

901.80 10+42 901.18

901.86 10+29 901.13
INP 44' SPAN X 5' R.C.P. A. CULV. B. 2' APRONS.

902.15 10+08
EAST SHOULDER CSAH # 21

BEGIN CONSTRUCTION STA. 10+04

902.05 9+32
E CSAH # 21

904.07 17+00 903.75

903.88 16+00 903.36

903.51 15+00 902.97

903.15 14+00 902.58

902.7 13+00 902.19

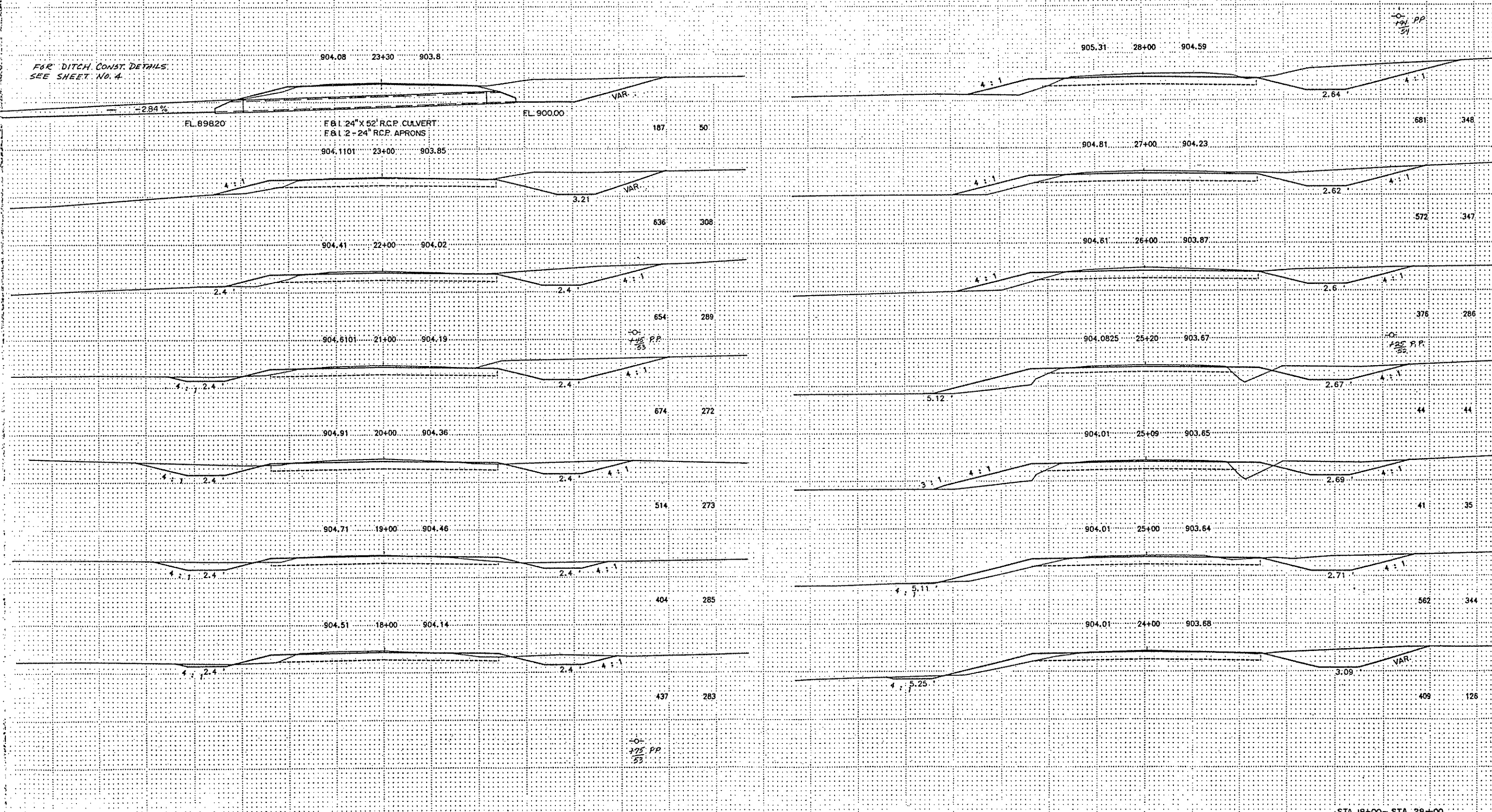
902.16 12+00 901.8

FL. 896.76
SALVAGE INPLACE 44' SPAN R.C.P. - A APRON
F.B.I. 44' SPAN X 10' R.C.P. - A CULV. EXTENSION
INSTALL SALVAGED 44' SPAN R.C.P. - A APRON

FL. 896.76
SALVAGE INPLACE 44' SPAN R.C.P. - A APRON
F.B.I. 44' SPAN X 8' R.C.P. - A CULV. EXTENSION
INSTALL SALVAGED 44' SPAN R.C.P. - A APRON

STA. 9+92 - STA. 17+00

F&R DITCH CONST. DETAILS
SEE SHEET NO. 4



904.08 23+30 903.8

FL 898.20

F&R 24" X 52" RCP CULVERT
F&R 2-24" RCP APRONS

FL 900.00

VAR

187 50

904.1101 23+00 903.85

3.21

VAR

636 308

904.41 22+00 904.02

2.4

2.4

4:1

654 289

904.6101 21+00 904.19

2.4

2.4

4:1

674 272

904.91 20+00 904.36

4:1

2.4

2.4

4:1

514 273

904.71 19+00 904.46

4:1

2.4

2.4

4:1

404 285

904.51 18+00 904.14

4:1

2.4

2.4

4:1

437 283

-O-
375 PP
53

905.31 28+00 904.59

4:1

2.64

4:1

681 348

904.81 27+00 904.23

4:1

2.62

4:1

572 347

904.61 26+00 903.87

4:1

2.6

4:1

376 286

904.0825 25+20 903.67

5.12

2.67

4:1

44 44

904.01 25+09 903.65

3:1

4:1

2.69

4:1

41 35

904.01 25+00 903.64

5.11

2.71

4:1

562 344

904.01 24+00 903.68

5.25

3.09

VAR

409 126

STA 18+00 - STA 28+00

EXCAVATION EMBANKMENT

EXCAVATION EMBANKMENT

Sub-Totals Cu. Yds. Cu. Yds. Sub-Totals

Sub-Totals Cu. Yds. Cu. Yds. Sub-Totals

908.06 33+00 908.23

918.05 37+00 917.88

906.59 32+00 906.6

916.97 36+92 917.79

906.64 31+63 906.18

916.39 36+59 917.33

906.71 31+00 905.69

917.29 36+00 916.19

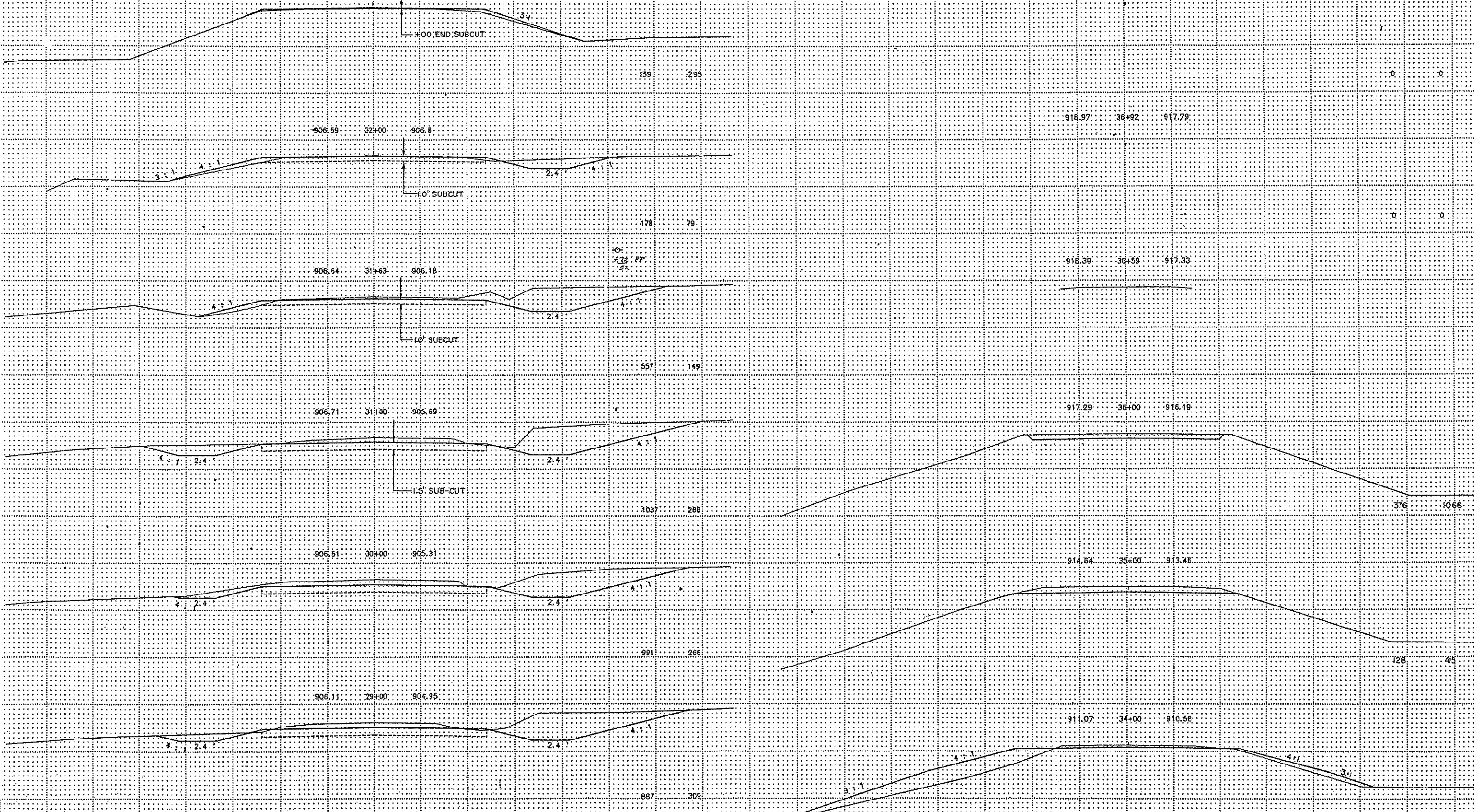
906.51 30+00 905.31

914.54 35+00 913.45

906.11 29+00 904.95

911.07 34+00 910.56

STA. 29+00 - STA. 37+00



139 295

178 79

557 149

1037 266

991 266

887 309

0 0

0 0

375 1066

128 415

31 461

EXCAVATION EMBANKMENT

EXCAVATION EMBANKMENT

Sub-Totals	Cu. Yds.	Cu. Yds.	Sub-Totals
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Sub-Totals	Cu. Yds.	Cu. Yds.	Sub-Totals
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907.29 49+83 905.54
2' SAND ENT. RT.

904.97 52+69 903.93
1/2' BUT SWAMP

1 1/2' SC FENCE

FINISH GRADE
GRADING GRADE

907.29 49+78 905.54
12' SAND ENT. LT.

905.88 52+11 904.33

49+50 BEGIN BERM LT.

317 105

906.73 51+33 905

52+00/21-47 STUMPS
B 22/50 S.B.
A 22/27-47 STUMPS
40/38 STUMPS
FO- 1660
135 RP
53

906.66 49+00 905.4

906.73 51+33 905

906.47 48+71 905.28
14' SAND ENT. LT.

907.08 51+00 905.2
51+00 END BERM LT.

905.77 48+00 904.83

907.34 50+14 905.51

904.71 47+00 904.03

907.31 50+00 905.63

340 238

STA. 47+00 - STA. 52+69

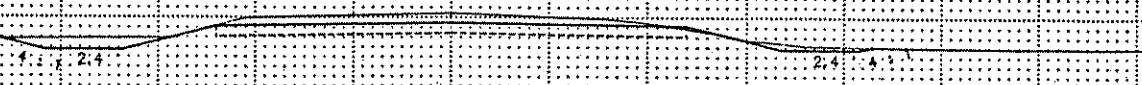
EXCAVATION EMBANKMENT

Sub-Totals	Cu. Yds.	Cu. Yds.	Sub-Totals
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EXCAVATION EMBANKMENT

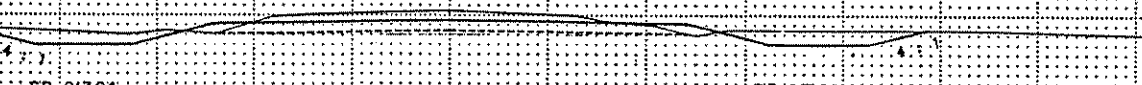
Sub-Totals	Cu. Yds.	Cu. Yds.	Sub-Totals
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920.56 63+05 919.54



21 8

920.56 63+00 919.52

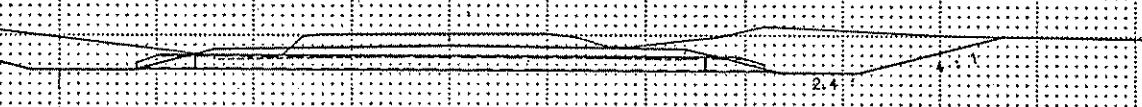


722 184

S.D. 917.04
0.58%

S.D. 917.04
0.80%

920.24 62+00 918.94



395 170

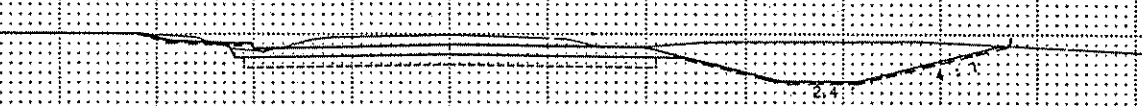
FL. 916.46
0.54%

FL. 916.24
0.80%

CROSS CULVERT
E.B.T. 22' SPAN X 52" R.C.P.-A. CULVERT
F.B.T. 2'-22" R.C.P.-A. APRONS

61+00 END BERM LT.

919.96 61+00 917.92



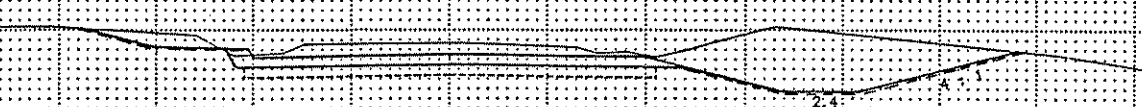
95 20

919.84 60+83 917.7
E 20' SAND ENT. LT.



578 101

918.72 60+00 916.46



660 120

920.69 63+26 920.69 24th Ave.

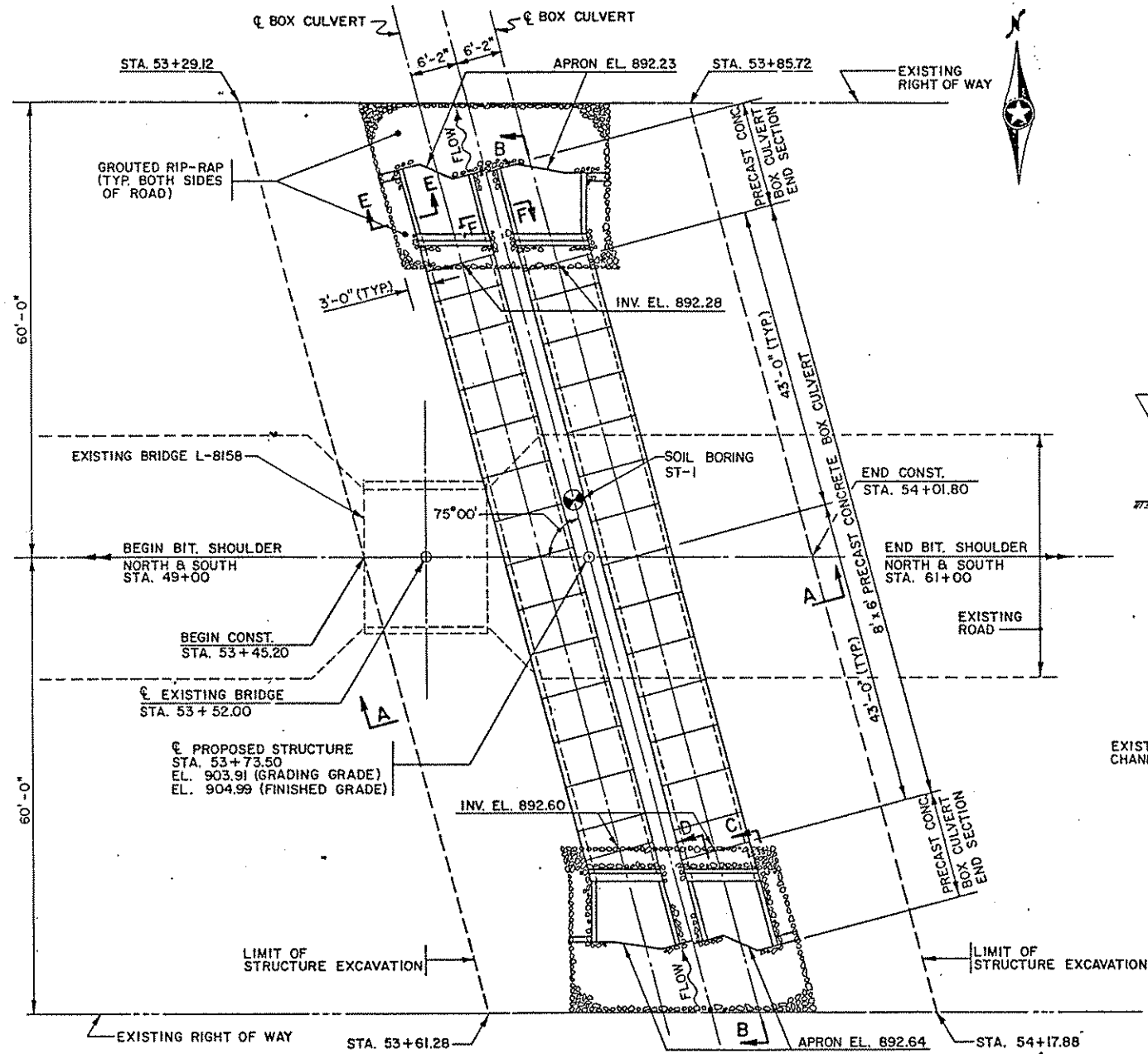
END PROJECT CP 86-03-140 STA. 63+14

920.66 63+15 919.57 Shoulder 24th Ave.

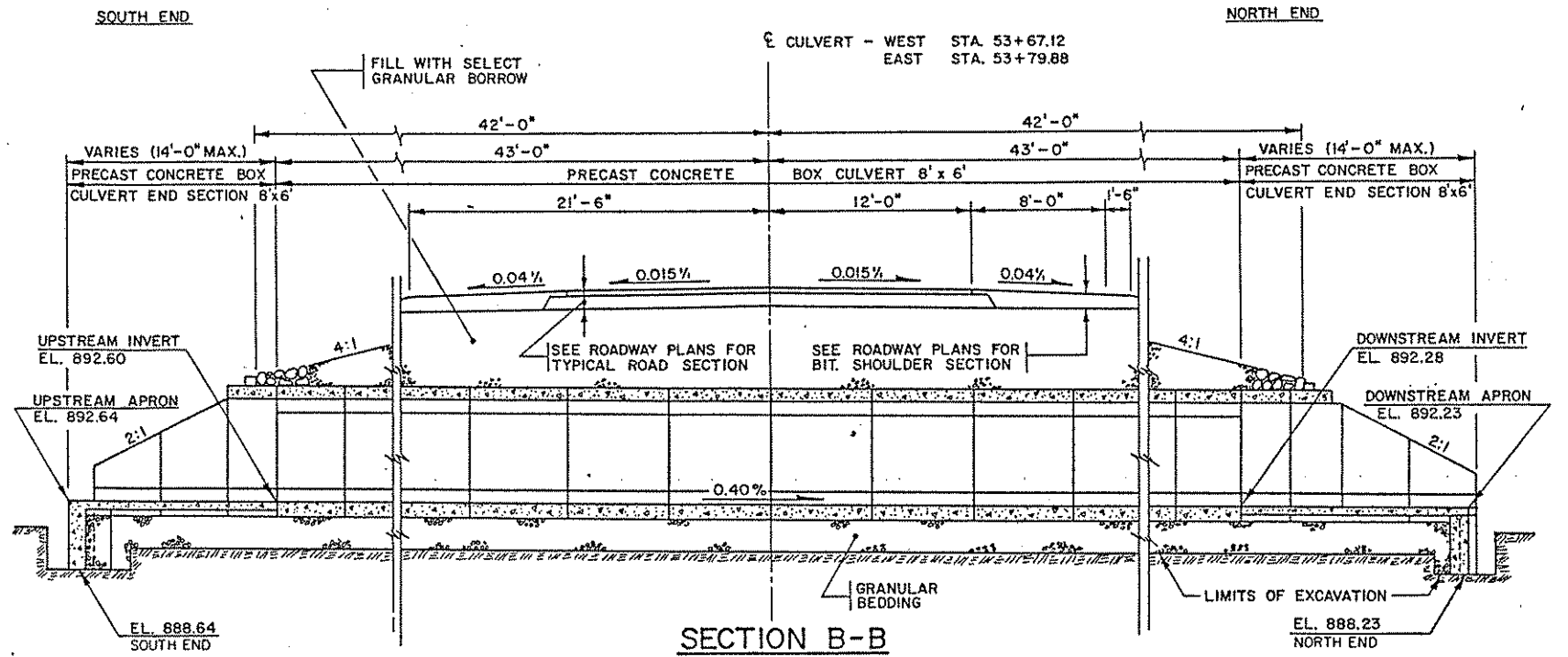


64 17

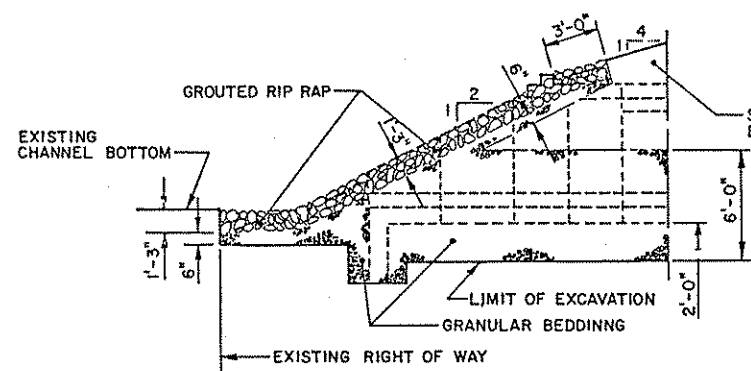
STA. 60+00 - STA. 63+26



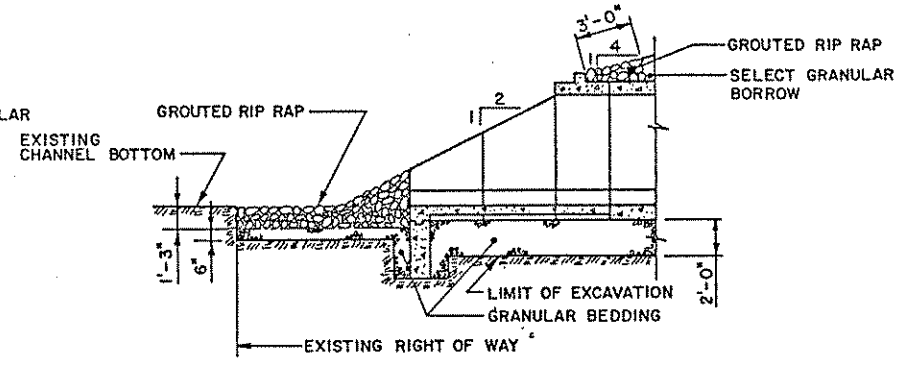
PLAN



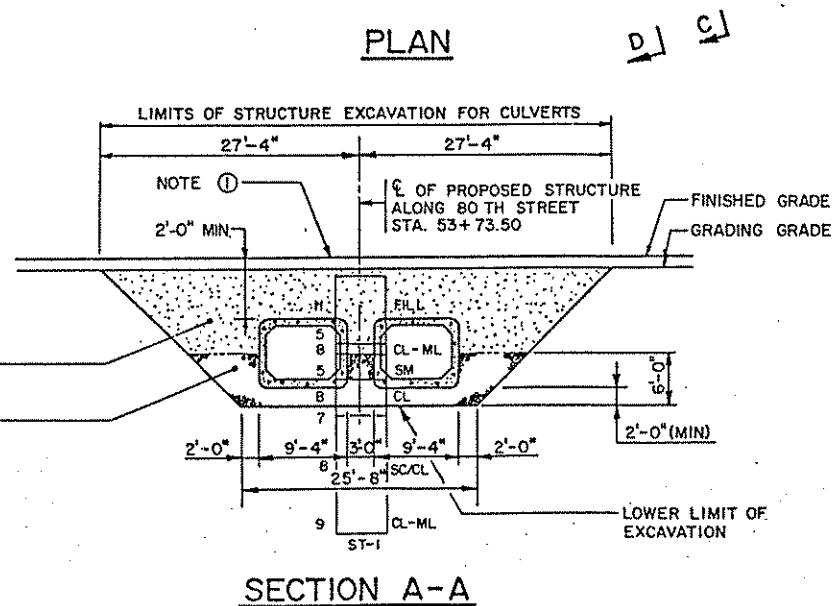
SECTION B-B



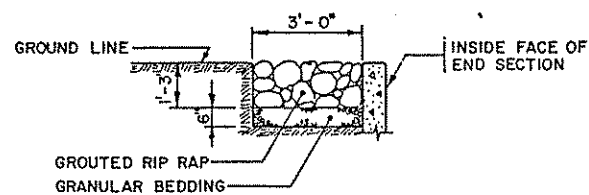
SECTION C-C



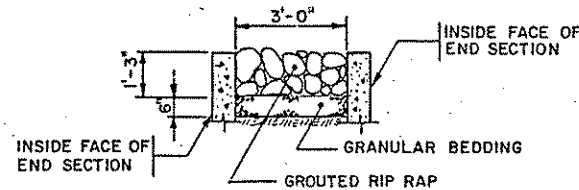
SECTION D-D



SECTION A-A



SECTION E-E

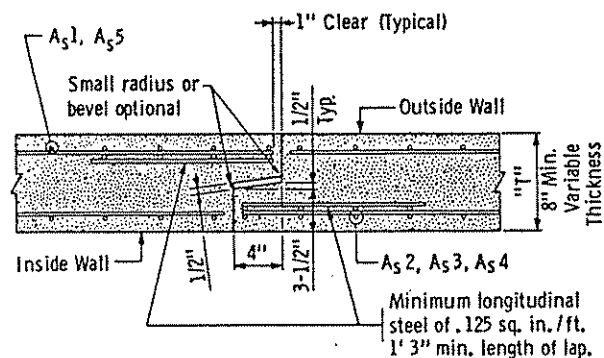


SECTION F-F

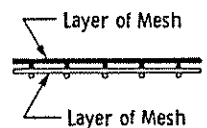
NOTES:

- ① SEE ROADWAY PLANS FOR TYPICAL ROADWAY SECTIONS AND TYPICAL BITUMINOUS SHOULDER SECTION.
- ② ADDITIONAL APRON DETAILS ON SHEET (16)
- ③ RIP RAP WORK SHALL COMPLY WITH SPECS. 2511 AND 3601. ALL RIP RAP SHALL BE GROUTED.
- ④ CAUTION SHALL BE TAKEN NOT TO DISTURB AREAS OUTSIDE THE CONSTRUCTION LIMITS.

TITLE:	DETAILS		DES: J.J.B.	DR: H.A.G.	APPROVED:	Bridge No. 96424
	S.A.P. 210-110-01		CHK: R.O.C.	CHK: R.O.C.		
Sheet No. 16 of 22 Sheets						

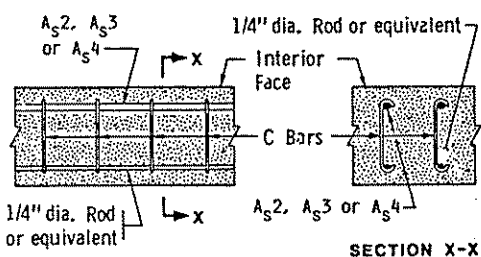


TONGUE AND GROOVE JOINT DETAIL



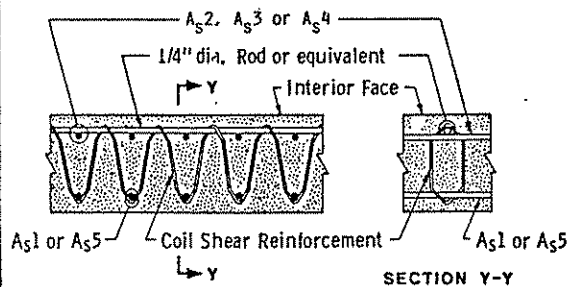
FABRIC LAYER DETAIL

When more than one layer of steel fabric is used to obtain the required reinforcement areas, the wires of the steel fabric shall be placed as shown in the Fabric Layer Detail.

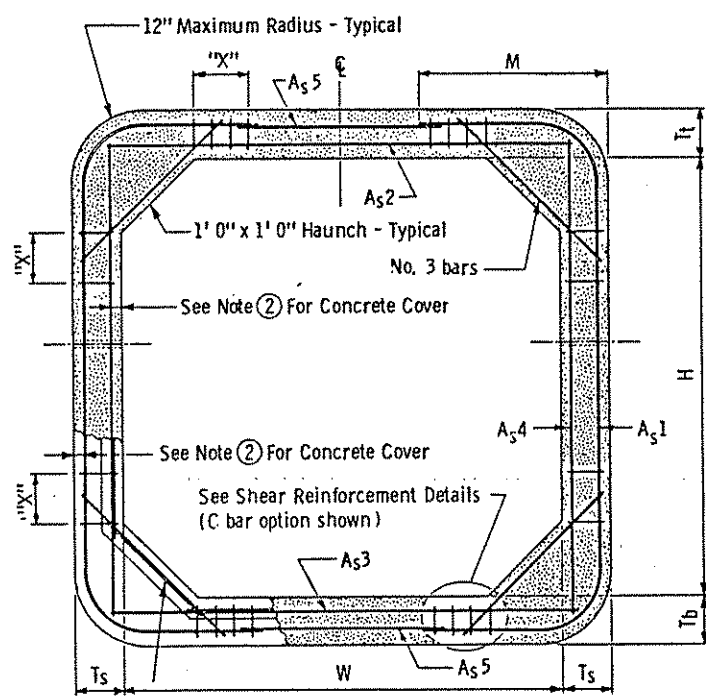


SHEAR REINFORCEMENT DETAIL C BAR OPTION

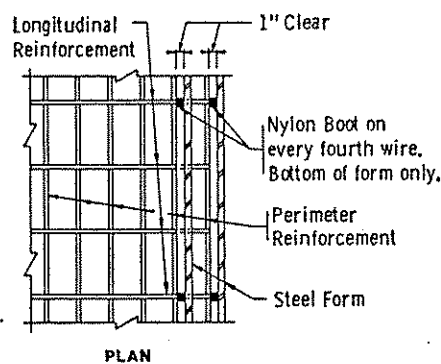
C Bars shall have 135° Min. and 180° Max. hooks



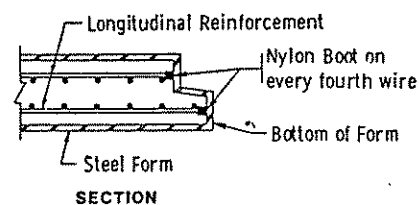
SHEAR REINFORCEMENT DETAIL COIL OPTION



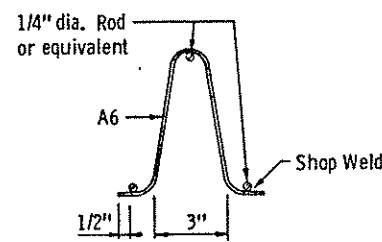
TRANSVERSE BARREL SECTION (Bar Reinforcement Option Shown)



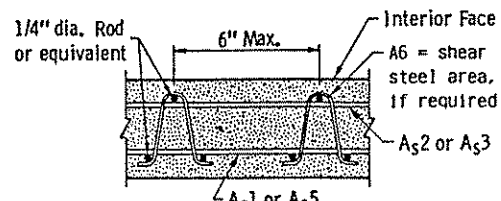
PLAN



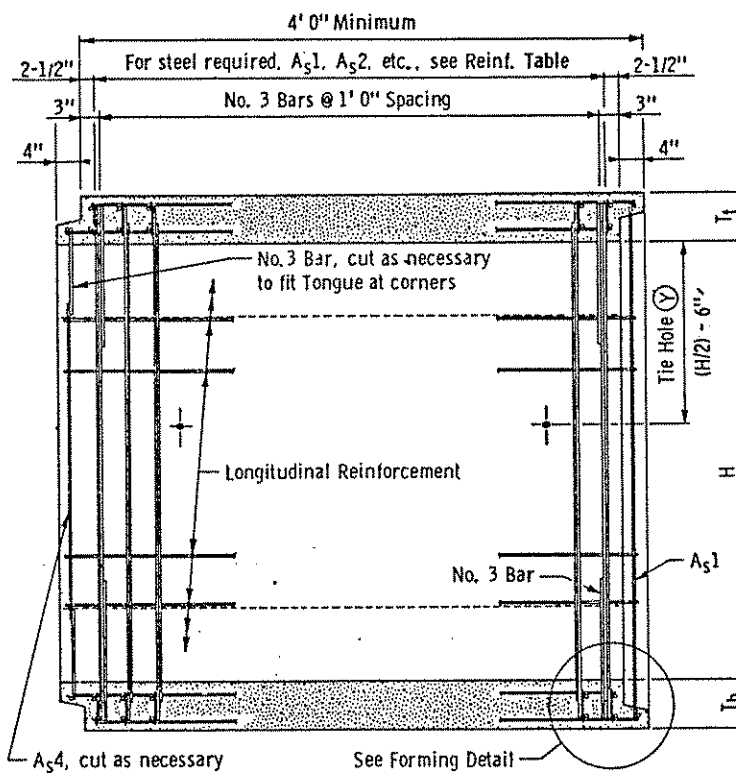
SECTION FORMING DETAIL



V BAR DETAIL

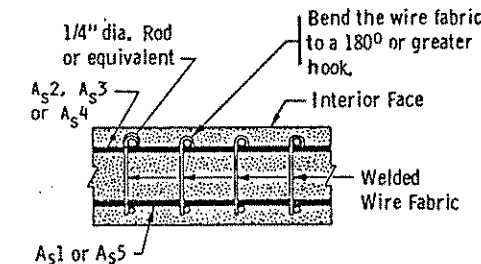


SHEAR REINFORCEMENT DETAIL V BAR OPTION



LONGITUDINAL BARREL SECTION (Bar Reinforcement Option Shown)

⊙ Culvert ties are to be 1" diameter rods. See Standard-Plate No. 3145 for connection details. All holes in the barrels are to be approved by the engineer.



SHEAR REINFORCEMENT DETAIL J BAR OPTION

SHEAR REINFORCEMENT TABLE

ⓕ Height of Overfill	NONE REQ'D. Shear Reinforcement Requirements ☆							
	Top of Culvert		Bottom of Culvert		Side of Culvert			
	**Area	Maximum Spacing	"X" (in inches)	**Area	Maximum Spacing	"X" (in inches)	**Area	Maximum Spacing

☆ when shear reinforcement is needed, a minimum shear steel of 0.06 sq. in. per sq. ft. shall be used.
 ** Square inches per linear foot of barrel.
 "X" = Distance from end of haunch.

Fy = 65,000 psi
 Mesh Reinf.

BARREL DETAILS

State Proj. No.

NOTES:

- The steel fabric, shear reinforcement and reinforcement bars used shall conform to applicable requirements of AASHTO M 259.
- 1-1/2" min. and 2" max. concrete cover on all reinforcement, including the shear reinforcement, except for tongue and groove detail.
- One of the following combinations of steel reinforcement may be used:
 - 1 or 2 layers of mesh or
 - 1 layer of mesh and 1 layer of reinforcement bars or
 - 1 layer of reinforcement bars.
 The reinforcement shall be developed in accordance with applicable parts of sections 8.21 thru 8.33 of the AASHTO "Standard Specifications for Highway Bridges".
- Longitudinal reinforcement parallel to the axis of the culvert shall have a min. of 0.06 square inches per peripheral foot on all faces of the barrel, except in tongue and groove.
- The max. shear reinforcement spacing in the longitudinal direction shall be 6 inches.
- The transverse steel areas in each face shall be a minimum of 0.192 sq. in. per linear feet of barrel.
- The maximum size of reinforcement bars shall be No. 6. The maximum mesh size shall be 1/2" dia. per layer (maximum of 2 layers).
- The spacing center to center of the circumferential wires shall not be less than 2 inches nor more than 4 inches. The spacing center to center of the longitudinal wires shall not be more than 8 inches.
- Welding will not be allowed on reinforcement bars or steel fabric, except that the original welding required to manufacture wire fabric is acceptable.
- When reinforcement bars are cut, additional reinforcement shall be added on both sides of the cut member to replace or exceed the steel area removed.
- Barrel sections which are cast with a draft in the forms shall be laid with the narrowest part of the section downstream.

BASIS OF DESIGN

- The design shall be in accordance with 1983 and Interim AASHTO Design Specifications.
- Live loads are based on HS20 or Military Loading as designated in FHWA PPM 20-4 Section 4C.
- Maximum allowable Design Stresses
 - F'c = 5000 P.S.I., N = 6
 - Fy = 60,000 P.S.I. reinforcement bars
 - Fy = 65,000 P.S.I. steel fabric
- Load factor design according to AASHTO standard specification Group X = 1.3 [B₀D + B_L(L+1) + B_EE_V + B_EE_L] shall be used where B_D = 1.00, B_E = 1.00, B_L = 1.67 E_V = Vertical earth pressure and E_L = Lateral earth pressure. The following values have been used for this structure:
 - Unit Soil Weight 120 lbs. per cu. ft.
 - Maximum lateral Pressure Coefficient 75% of soil weight
 - Minimum lateral Pressure Coefficient 16% of soil weight
- Concrete shall be Mix No. 3W36 with no calcium chloride allowed.
- Minimum overfill shall be two (2) feet.

DIMENSION TABLE

Dimensions	Height of Overfill ⓕ	
	6'	
"W" (in Ft.)	8	
"H" (in Ft.)	6	
T ₁ (in inches)	9	
T _b (in inches)	10	
T _s (in inches)	8	
"M" (in inches)	29	
Weight (lbs./ft.)	3590	

REINFORCEMENT TABLE

Reinforcement	Height of Overfill ⓕ							
	*Area	Length	*Area	Length	*Area	Length	*Area	Length
A ₅₁	.240	11'-4"						
A ₅₂	.292	8'-3"						
A ₅₃	.330	8'-3"						
A ₅₄	.192	6'-3"						
A ₅₅	.192	6'-0"						

* Square inches per linear foot of barrel

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNED: _____
 DATE: _____ REG. NO. _____

MINNESOTA
 DEPARTMENT OF TRANSPORTATION

Bridge No.

IDENTIFICATION NO. 113
 PRECAST CONCRETE BOX CULVERT

SEC. _____ TOWNSHIP _____ COUNTY _____

APPROVED: _____
 BRIDGE ENGINEER ASSOCIATE ENGINEER

DES. _____ DR. _____
 CHK. _____ CHK. _____

FIG. 5-397.701
 Approved: September 18, 1985

A _w REINFORCEMENT TABLE ②														
HEIGHT OF EACH END SECT.	MAXIMUM APRON WIDTH OF EACH SECTION AT THE RESPECTIVE HEIGHT													
	8' 0" - 11' 0"	12' 0"	13' 0"	14' 0"	15' 0"	16' 0"	17' 0"	18' 0"	19' 0"	20' 0"	21' 0"	22' 0"	23' 0"	24' 0"
4' 0"	No. 4 @ 1' 0"				No. 4 @ 10"	No. 4 @ 8-1/2"	No. 5 @ 11-1/2"	No. 5 @ 10"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10"	No. 6 @ 9-1/2"	No. 6 @ 8-1/2"	
5' 0"	No. 4 @ 1' 0"			No. 4 @ 11"	No. 4 @ 9-1/2"	No. 4 @ 8"	No. 5 @ 11"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 10-1/2"	No. 6 @ 9-1/2"	No. 6 @ 8"	No. 6 @ 7-1/2"	
6' 0"	No. 4 @ 1' 0"			No. 4 @ 10-1/2"	No. 4 @ 9"	No. 5 @ 1' 0"	No. 5 @ 10"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10"	No. 6 @ 9"	No. 6 @ 8"		
7' 0"	No. 4 @ 1' 0"		No. 4 @ 11-1/2"	No. 4 @ 9-1/2"	No. 4 @ 8"	No. 5 @ 10-1/2"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 11"	No. 6 @ 10"	No. 6 @ 9"			
8' 0"	No. 4 @ 1' 0"		No. 4 @ 11"	No. 4 @ 9"	No. 5 @ 1' 0"	No. 5 @ 10-1/2"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10-1/2"	No. 6 @ 9-1/2"				
10' 0"	No. 4 @ 1' 0"		No. 4 @ 10"	No. 4 @ 8"	No. 5 @ 11"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 10-1/2"						
12' 0"	No. 4 @ 1' 0"	No. 4 @ 11"	No. 4 @ 9"	No. 5 @ 11-1/2"	No. 5 @ 10"	No. 5 @ 8-1/2"								

NOTES:

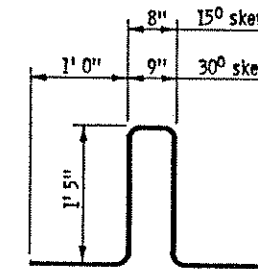
Curb is required and may be cast monolithically or cast separately.

- 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the level wall section. 3" dia. hole in the lintel beam. Fill the hole to the top of the lintel beam with an approved grout.
- Use the largest steel area from the table across each individual section.
- 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the lintel beam. 3" dia. hole in the curb. Fill the hole to the top of the curb with an approved grout.
- Cast an additional 3" hole at midpoint of beam when side of lintel beam is over 6 ft.
- Check the location to determine whether a tongue or a groove is used.
- For spans of 10' to 14', use No. 9 bar. For spans under 10', use No. 8 bar.

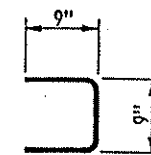
A_h REINFORCEMENT TABLE

HEIGHT "H"	"A _h "
8 ft. or less	No. 4 @ 1' 0"
10 ft.	No. 5 @ 8"
12 ft.	No. 6 @ 6"

NOTE: H is the highest vertical dimension of each section shown.



B401

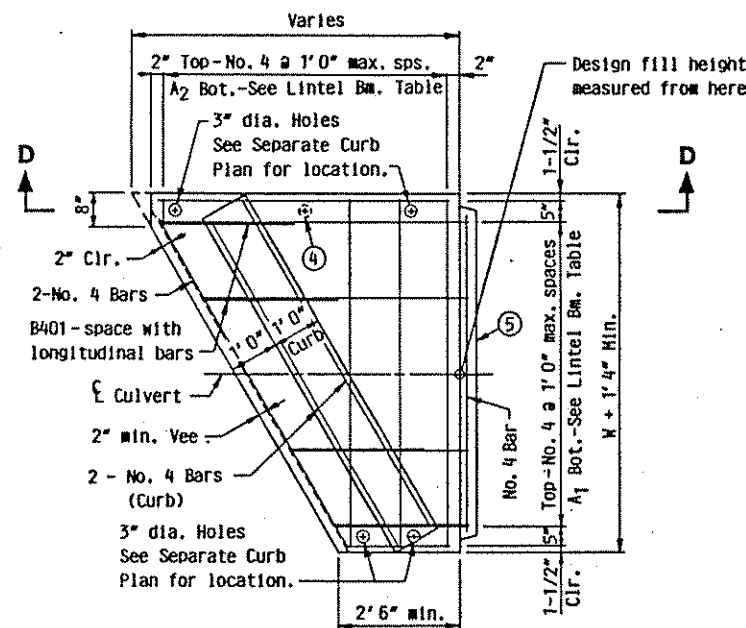


B402

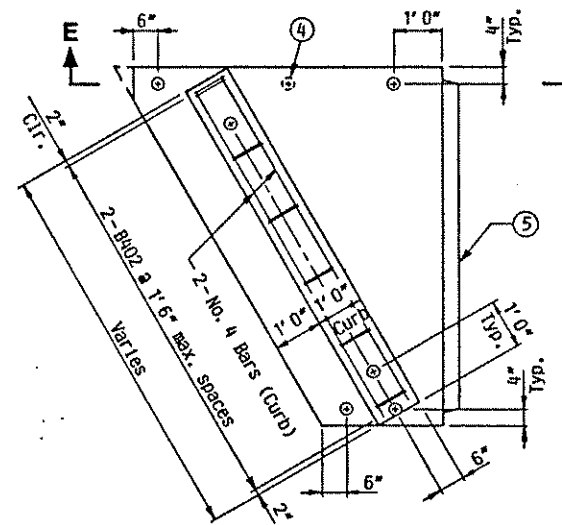
LINTEL BEAM REINFORCEMENT TABLE

W CULVERT WIDTH	4 FT. DESIGN FILL HEIGHT				2 FT. DESIGN FILL HEIGHT	
	SLAB THICK.	BOTTOM REINFORCEMENT		SLAB THICK.	BOTTOM REINFORCEMENT	
		A ₁	A ₂		A ₁	A ₂
Under 6'	9"	No. 4 @ 1' 2"	No. 4 @ 9-1/2"	9"	No. 4 @ 1' 6"	No. 4 @ 1' 4"
6' + to 8'	9"	No. 4 @ 8"	No. 5 @ 8"	9"	No. 4 @ 1' 1"	No. 4 @ 9"
8' + to 10'	9"	No. 5 @ 8"	No. 6 @ 7-1/2"	9"	No. 4 @ 9"	No. 4 @ 6"
10' + to 12'	9"	No. 5 @ 6"	No. 6 @ 6"	9"	No. 5 @ 9"	No. 5 @ 6"

NOTE: Maximum bar spacing given, reduce as necessary.

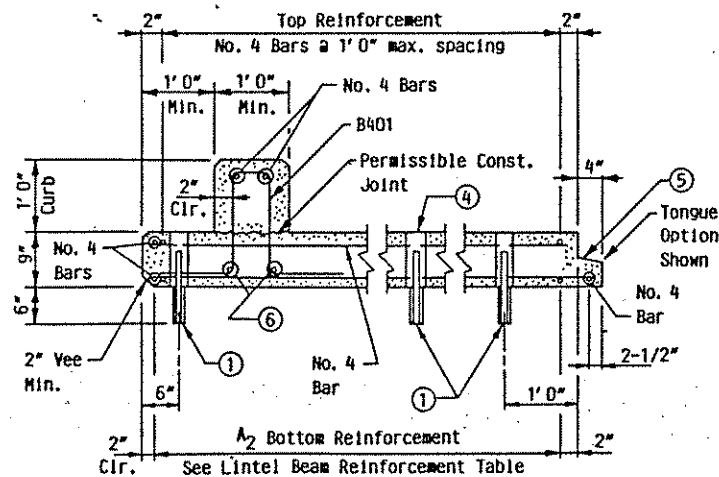


PLAN OF LINTEL BEAM

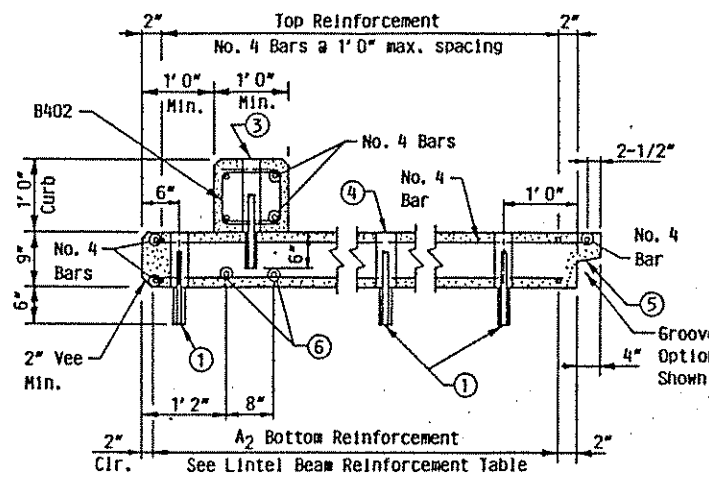


PLAN OF LINTEL BEAM

See Integral Curb Plan for lintel beam reinforcement



SECTION D-D
(With Integral Curb)

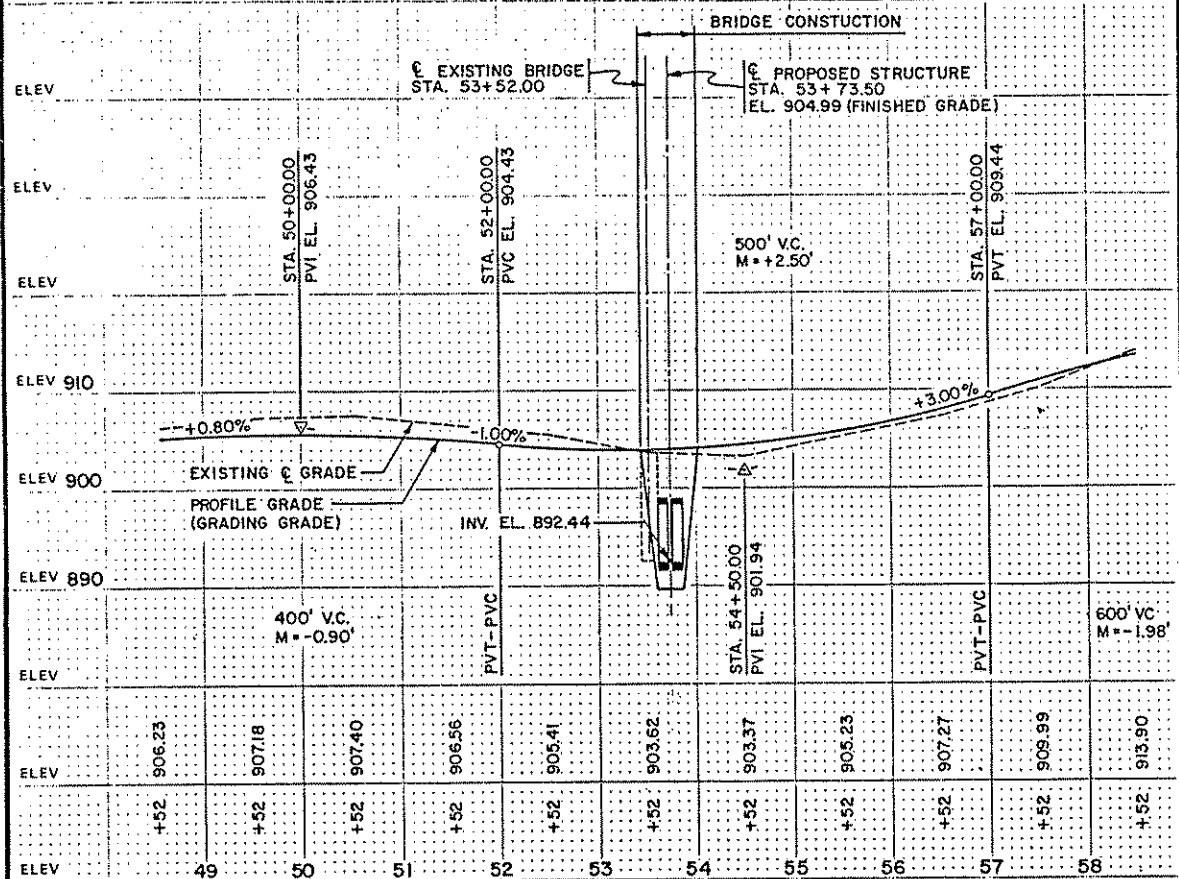


SECTION E-E
(With Separate Curb)

SAP 210-110-01

CONTRACTED PROFILE

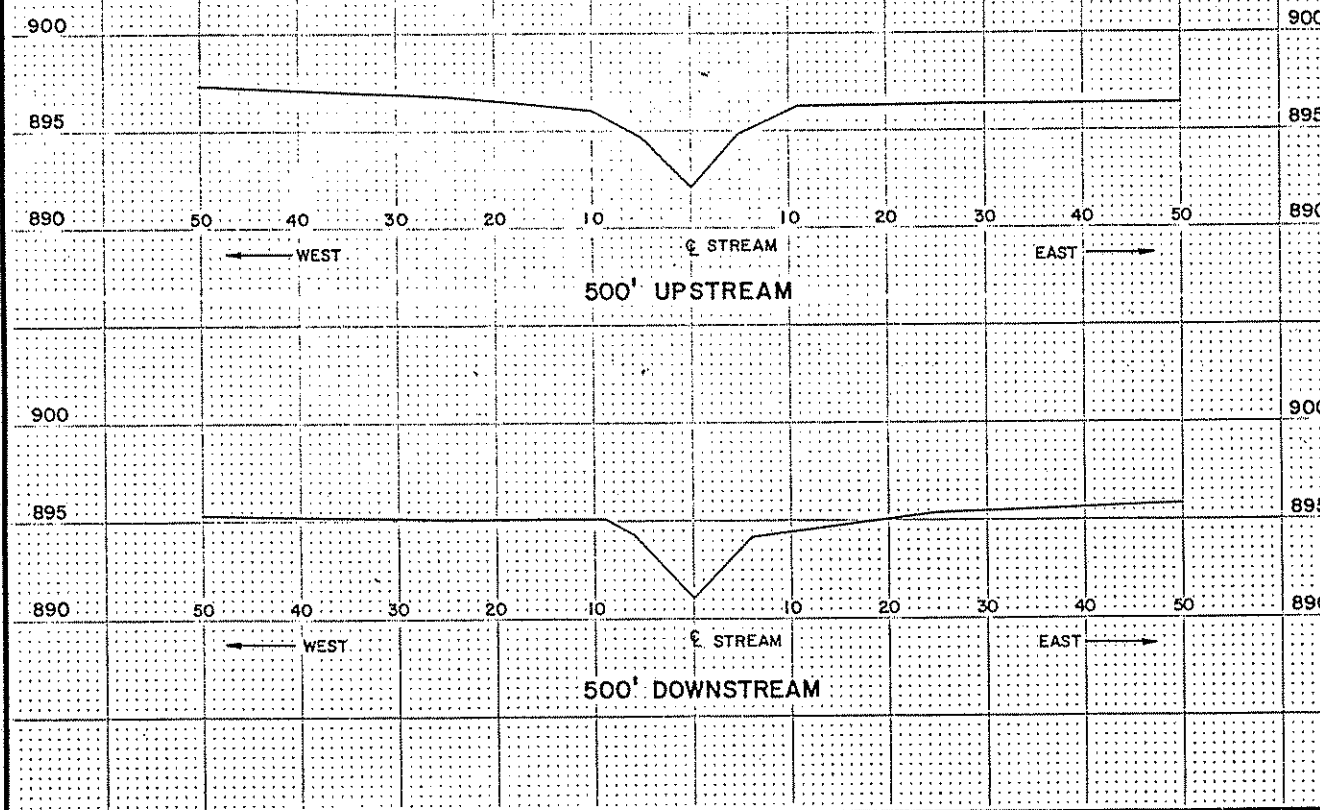
SCALE: HOR. 1" = 50' VER. 1" = 10'



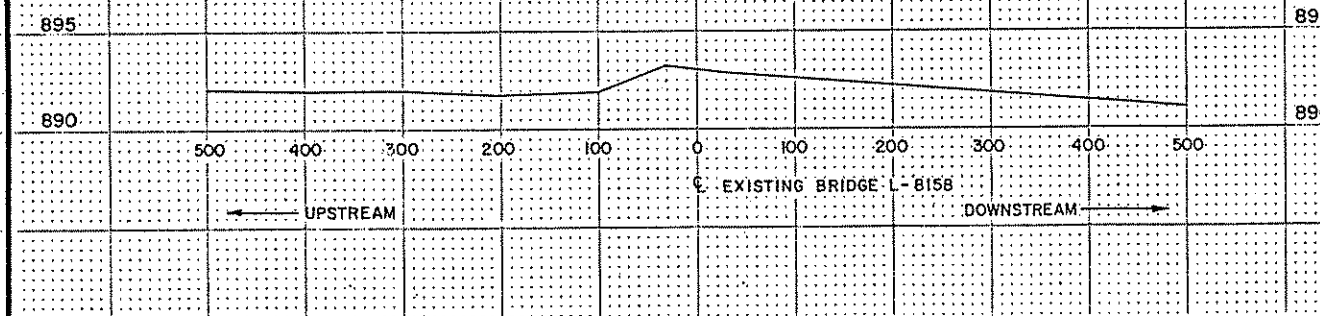
TYPICAL SECTIONS & PERTINENT DATA

SCALES AS SHOWN

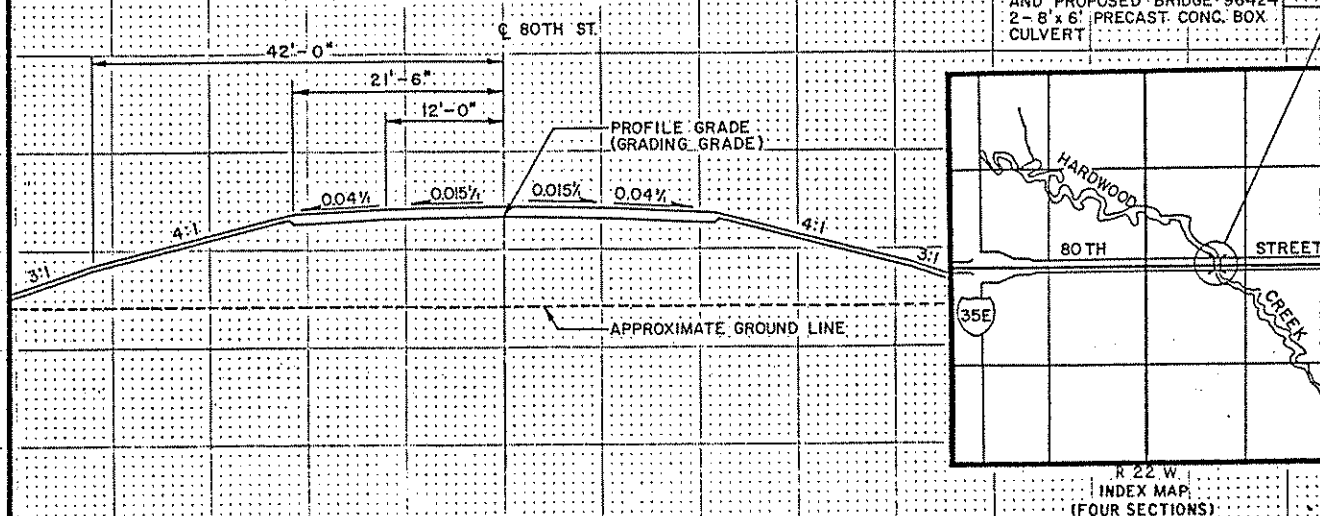
TYPICAL CHANNEL SECTIONS



STREAM PROFILE



PROPOSED ROADWAY SECTION



Fed. Proj. No.

LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

- Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating. **NONE**
- Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway): Given location, type, length, height above high water, cross-sectional area etc.
- Apparent highwater elevation: Obtained from
- Other data: Approx. velocity of water at time of survey

HYDRAULIC ENGINEERS RECOMMENDATION

DATE JULY 3, 1986

Stream or ditch designation **HARDWOOD CREEK**
 Drainage area **17.1 SQ. MI.**
 Max. flood on record **UNKNOWN** Design flood (.100 yr. freq.) **600** C.F.S.
 Max. observed highwater elevation **UNKNOWN** Design highwater elevation
 Design mean velocity through structure **6.25** F.P.S.
 Low superstructure at or above elevation **898.44**
 Flowline elevation **892.3** Skew angle
 Waterway area req'd. below elevation **899.65** 96 Sq. Ft. at Rt. angles to channel

In the interest of flood plain zoning the regional flood (100 yr. freq.) is **600** C.F.S. at stage **898.25** and mean velocity of **6.25** F.P.S. with **1.0** Ft. swellhead. The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Dept. of Natural Resources.

FOUNDATION ENGINEERS RECOMMENDATION

DATE

Bridge survey sheets made from: **TKDA SURVEY - MARCH 1986**

Bench mark elevation **919.32** (M.S.L. 1929 Adj.)
 Location: **USGS DISC. SE CORNER BRIDGE AT INT. 35E & 80TH ST.**

MINNESOTA
 DEPARTMENT OF TRANSPORTATION

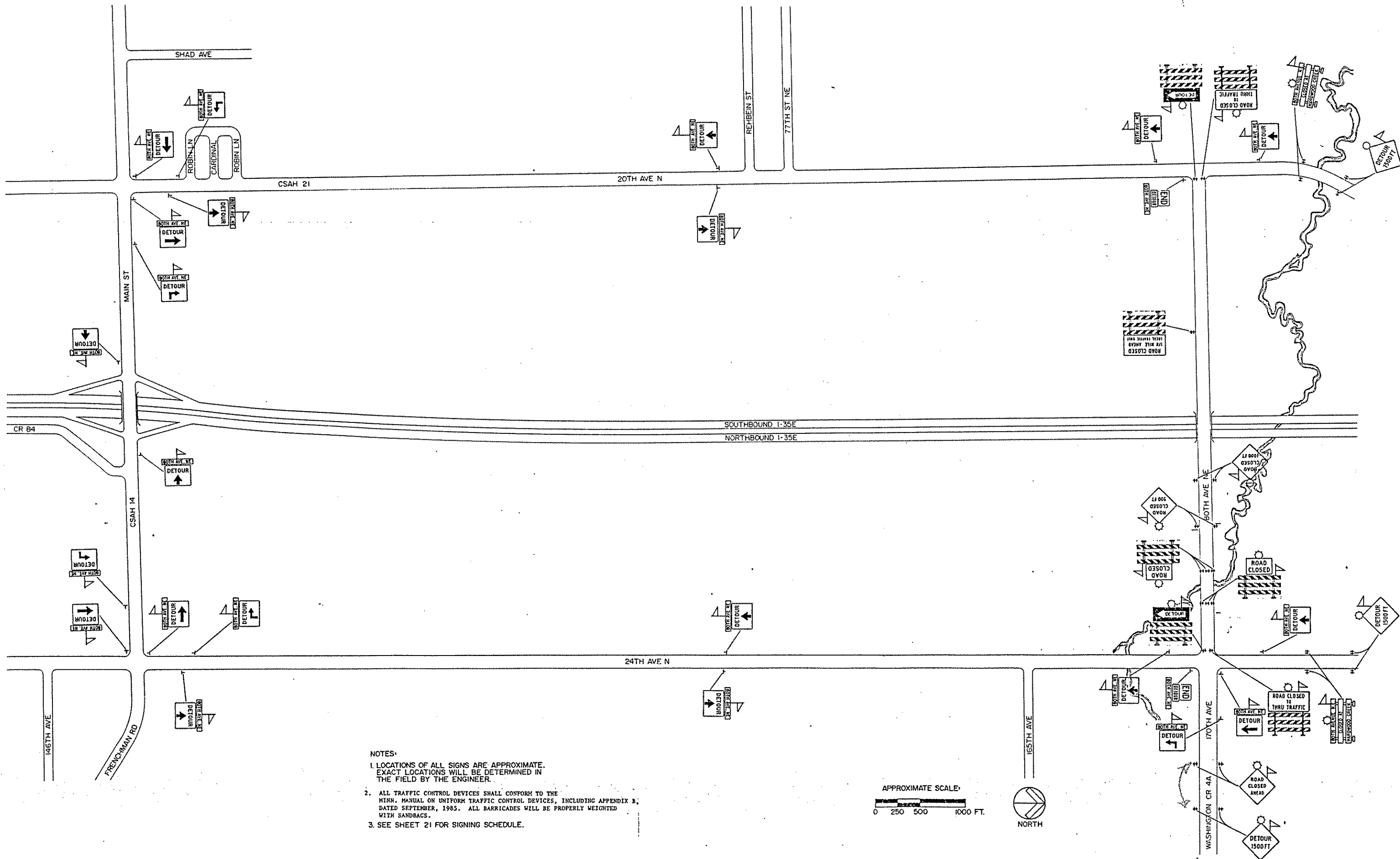
BRIDGE SURVEY

AT MILE POINT **N/A** ON **80TH STREET**
 (T.H., CSAH, C.R. etc.)
 PROPOSED BRIDGE LOCATED **1** MILES EAST OF
 JCT. CSAH 21
 SEC. **12** TWP. **31 N** R. **22 W**
 CITY OF LINO LAKES COUNTY **ANOKA**
 BRIDGE NO. **96424**

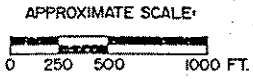
Area No. Job No.

S.A.P. 210-110-01

Sheet No. 20 of 22 Sheets



- NOTES:
1. LOCATIONS OF ALL SIGNS ARE APPROXIMATE. EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.
 2. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MINN. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING APPENDIX B, DATED SEPTEMBER, 1985. ALL BARRICADES WILL BE PROPERLY WEIGHTED WITH SANDBAGS.
 3. SEE SHEET 21 FOR SIGNING SCHEDULE.



M.U.T.C.D. CODE	SIZE	SIGN PANEL LEGEND	QUANTITY
YELLOW FLASHER R11-2	48" X 30"		6
TYPE III	8 FT.		
YELLOW FLASHER R11-3	60" X 30"		
TYPE III	8 FT.		1
YELLOW FLASHER R11-4	60" X 30"		2
TYPE III	8 FT.		
M4-6	24" X 12"		2
M4-8	24" X 12"		
	*	* MINIMUM 4" HIGH LETTERS	
	*		
M4-9	30" X 24"		12
			2
			2
			3
			3
YELLOW FLASHER W20-2	48" X 48"		6
YELLOW FLASHER W20-3	48" X 48"		2
YELLOW FLASHER W20-3	48" X 48"		2
YELLOW FLASHER W20-3	48" X 48"		2
YELLOW FLASHER M4-10(R)	48" X 18"		1
TYPE III	8 FT.		
YELLOW FLASHER M4-10(L)	48" X 18"		1
TYPE III	8 FT.		
YELLOW FLASHER	8 FT.		4

