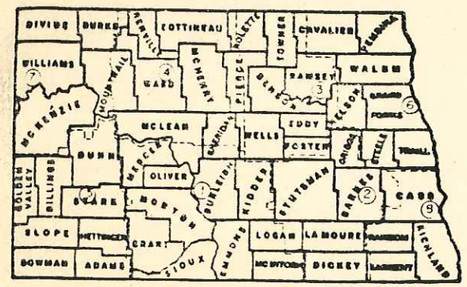
20 Mdn City Elec

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FI-194-4(35)000	1

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS
FOR THE PROPOSED IMPROVEMENT OF A
STATE HIGHWAY
IN MORTON COUNTY
FEDERAL AID PROJECT NO. FI-194-4(35)000



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

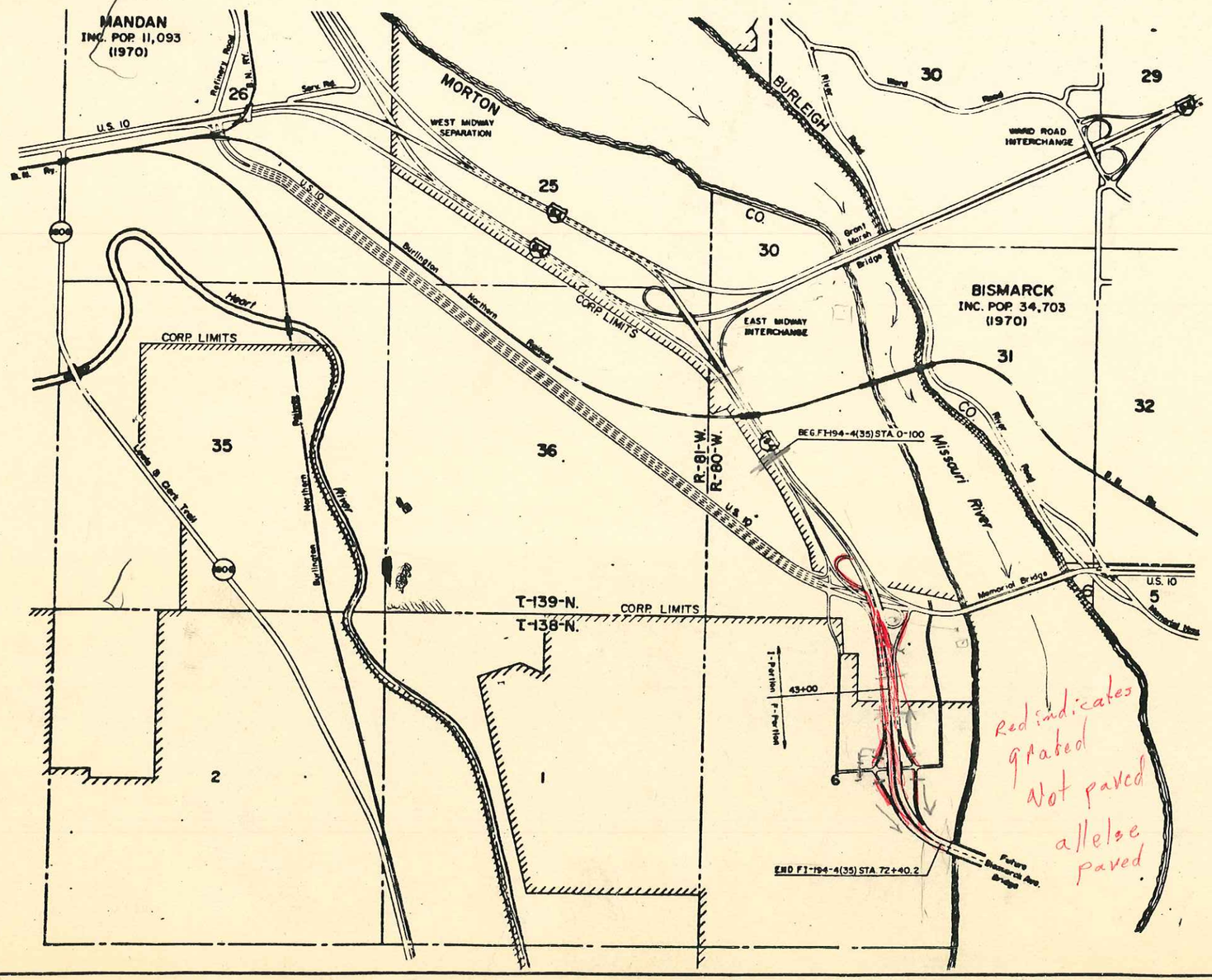
SCALES
- LAYOUT SHEET: 1 IN. =
- PLAN AND PROFILE DRAWINGS: HOR. 1 IN. = 100 FT. / VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
FI-194-4(35)		
TOTALS		

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota State Highway Department, Oct. 1976, and approved by the Federal Highway Administration on December 17, 1976, and other Contract Provisions submitted herewith.

DESIGN DATA

TRAFFIC	AVERAGE DAILY			EST. 30TH MAX. HR.
CURRENT TRAFFIC (19)	PASS.	TRUCKS	TOTAL	
TRAFFIC FORECAST (19)	PASS.	TRUCKS	TOTAL	
DESIGN SPEED		MPH		
TRAFFIC CLASSIFICATION				
MINIMUM SIGHT DISTANCE (STOPPING)				
MINIMUM SIGHT DISTANCE (SAFE PASSING)				
MINIMUM PASSING SIGHT DISTANCE FOR MARKING				
BRIDGES				



Red indicates graded
Not paved
all else paved

10

APPROVED	DATE
CHIEF ENGINEER NORTH DAKOTA STATE HIGHWAY DEPARTMENT	

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

Construction Schedule
1) all of 1979 & 1/2 of 1980
2) Service roads first

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NOTE SHEET

1. GENERAL NOTE: The Engineer will attend to the removal of existing fences to the new highway right-of-way line and to the relocation or adjustment of utility facilities as shown on the plans.

2. Removal of structures, obstructions and foundations within the right-of-way shall be in accordance with Section 202 of the Standard Specifications.

Pioneer Blacktop Contractor

3. The Engineer may require that a portion of the S.W. Interchange be constructed at an early stage to permit placement of the PCC Pavement that will be removed. (Approx. 936 C.Y. ± 5102 C.Y. for F-1-094(03) for use on a future project. (See Sheet No. for Typical Section of Existing P.C.C. Pavement.)

4. PRIVATE PROPERTY WITHIN RIGHT-OF-WAY: All privately owned light poles, guard posts, buildings, signs, etc., within the right-of-way limits will be removed by the owners.

5. TREE, STUMP & BRUSH REMOVAL: Remove within construction limits only, or as determined by the Engineer. To be paid for as "Clearing & Grubbing" by the acre. (Area determined from aerial photo.)

6. MANHOLE & WATER GATE VALVES ADJUSTMENT: The exact number, if any, of these adjustments will be determined by the Engineer. The Contractor shall not disturb any hydrants.

7. ADJUST WATER & SEWER LINES: The depth of the existing water and sewer lines under the roadway are not available. If it is determined in the field that adjustment or relocation of these lines is necessary, such work shall be done in accordance with Section 109-5 of the Standard Specifications, "Extra or Force Account Work".

8. POLE LINES: ⊟ ● Designation of poles to be moved.

9. UTILITY POLES: Equipment shall work around utility poles within the construction area that are not to be disturbed.

10. UTILITIES: Separate plans, if any, showing relocation or adjustment work to be performed by utility companies to accommodate highway construction will be made available to the Contractor upon request to the Engineer.

11. The Contractor shall notify the local utility companies in writing, that he intends to start work on the project and that the utility company is requested to locate exactly any underground facility that may be affected.

12. FIELD LABORATORY: If deemed unnecessary by the Engineer in the field, the item "Field Laboratory" shall be deleted.

13. SHRINKAGE: 35% additional volume in yardage computed by the end area method is allowed for shrinkage for earth embankment from excavation areas. 15% from Borrow areas.

14. SUBCUT: 2.0' below grade line, scarify an additional 1.0'.

15. COMPACTION AND DENSITY CONTROL: Compaction and Density Control shall be in accordance with Paragraph 203-2.3.3 of the Standard Specifications, except that, if the embankment is unstable (as evidenced by sponginess or rutting) when compacted to the required density, it may be necessary to dry the soils to obtain adequate stability. This may require drying below optimum moisture. The cost of such drying will be incidental to the price bid for Roadway Excavation and/or Borrow.

16. SEQUENCE OF CONSTRUCTION & TRAFFIC FLOW: See Construction Signing Sheet (No.).

17. APPROACHES: Place 1" Aggr. (Cl. 5) for interim use on approaches. Place immediately after approach construction. Access disruption shall be kept to a minimum.

18. Use special care on all culvert installations for correct inverts.

19. CSP CULVERTS WITHOUT END SECTIONS: Shall have the terminal sections cut (as shown on Sheet No.) and Hot Dipped Galvanized.

20. MAINTENANCE & PROTECTION OF TRAFFIC: The stock of signs shown on the plans need not be on the project, but should be available for use when needed. Those signs shown on the project layout sheet shall be installed before work is started.

21. SPECIFIED DENSITY: Compaction of the Hot Bit. Pavement shall be in accordance with Sec. 406-4.8.2 of the Standard Specifications. ~~The Hot Bit. Pavement shall be compacted to 97% of the Marshall Density determined in the field. The average of the sub-lot densities shall equal 97% or more, and no one sub-lot density shall be less than 95%.~~

22. PRIME, FOG OR TACK COAT: When directed by the Engineer, Emulsified Asphalt for Prime, Fog or Tack Coat shall be diluted with water prior to application in a 50:50 ratio or other approved proportions. Quantity shown does not include water. Cost of water shall be included in the price bid for "Emulsified Asphalt for Prime, Fog or Tack Coat".

23. GRADE OF BITUMEN: Grade of bitumen for Prime & Fog to be specified by the Engineer.

24. CLASS 25 AGGREGATE: Class 25 Aggregate shall have a maximum clay content of 3% and a maximum shale and soft rock content of 4%. Not less than 50% by weight of the particles retained on No. 4 Sieve shall have at least one fractured face.

25. BORROW: The Contractor will be required to obtain the material from one of the Borrow Areas specified. Upon completion of the Contractor's operations, the borrow site will be required to drain naturally. No depressions or areas that will collect and pond water will be acceptable. In addition to the above requirements, all provisions of Sections 203-1.5 and 203-1.6 of the Standard Specifications shall remain in force. If the Borrow Area "A" is selected, a temporary bridge and cartway shall be constructed by the Contractor at his own expense. No fill material will be placed between the banks of the Heart River. All plans shall be approved by the Engineer. All necessary permits shall be obtained by the Contractor.

26. EXISTING ASPHALT SURFACING: May be removed, salvaged and possessed by the Contractor. If done, the Contractor shall provide, at his own expense, an equivalent amount of suitable material for the roadbed embankment.

27. COOPERATION BETWEEN CONTRACTORS: The grading and structural Contractor shall conduct their individual operations to the mutual benefit of each other. (Sec. 105-7 of the Standard Specifications.)

28. STRUCTURAL EMBANKMENT: The Engineer may order the grading Contractor to construct the embankment at both ends of the M.L. Lt. Rdwy. and Eastbound Ramp structures soon after the traffic has been routed onto the new Eastbound Cross Road to permit the structural Contractor to begin his construction work.

29. The cost of Loose Rock Rip Rap (20 CY±) and Aggregate Cushion (8 C.Y.±) shall be included in the Lump Sum bid for Pumping Equipment.

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SUMMARY OF QUANTITIES

SPEC.	CODE	ITEM	UNIT
201	0360	Clearing & Grubbing	Acre
201	0370	Clearing & Grubbing	L. Sum
202	0114	Removal of Concrete Pavement	S.Y.
203	0101	Common Excavation, Type A	C.Y.
203	0108	Topsoil-Borrow Area	C.Y.
203	0140	Borrow	C.Y.
204		Average Haul (Not a Bid Item.)	C.Y. Sta.
216	0100	Water	M Gal.
302	0120	Aggregate Base Course, Cl. 5	Ton
401	0100	MC 70, 250 Liquid Asphalt	Gal.
401	0152	SS-1h or CSS-1h Emuls. Asphalt	Gal.
401	0160	Blotter Material, Cl. 44	Ton
406	0190	Hot Bit. Pavement, Cl. 25	Ton
406	0320	120-150 Asphalt Cement	Ton
630	0055	18" CSP .064"	L.F.
630	0085	24" CSP .064"	L.F.
630	0122	36" CSP .064"	L.F.
630	0143	42" CSP .064"	L.F.
630	0440	15" CSES .064"	Ea.
630	0455	18" CSES .064"	Ea.
630	0485	24" CSES .064"	Ea.
630	0525	36" CSES .079"	Ea.
630	0545	42" CSES .109"	Ea.
630	2290	18" RCP, Cl. II	L.F.
630	2295	18" RCP, Cl. III	L.F.
630	2375	24" RCP, Cl. II	L.F.
630	2380	24" RCP, Cl. III	L.F.
630	2461	30" RCP, Cl. II (Sewer)	L.F.
630	2640	48" RCP, Cl. II	L.F.
630	3265	18" RCES	Ea.
630	3275	24" RCES	Ea.
630	3285	30" RCES	Ea.
630	3300	48" RCES	Ea.
630	3330	22" x 13" RCP Arch End Section	Ea.
630	5665	22" x 13" RCP Arch, Cl. IV	L.F.

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
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SPEC.	CODE	ITEM	UNIT
705	0100	Mobilization	L. Sum
714	0122	72" Manhole Riser	Ea.
714	0185	Poured Manhole	L. Sum
714	0216	72" Manhole	Ea.
716	0110	Adjust Manholes	Ea.
716	0140	Adjust Utility Appurtenance	Ea.
720	0100	Monuments	Ea.
720	0110	Right-of-Way Markers	Ea.
726	0140	Seeding, Type A, Cl. I or IV	Acre
726	0190	Seeding, Type B, Cl. I or IV	Acre
726	0400	Temporary Cover Crop	Acre
728	0100	Sodding	S.Y.
732	4050	Pebble Mulch, 1"	Ton
732	4112	Polyethylene, 6 Mil. Black	S.Y.
738	0105	Barbed Wire Fenc, 4 Strand	L.F.
738	0110	Chain Link Fence	L.F.
738	0120	Install Vehicle Gates	Ea.
738	0142	Corner Assembly Chain Link	Ea.
738	0152	Dbl. Brace Assembly Chain Link	Ea.
740	0101	Reset Existing Fence-Barbed Wire	L.F.
746	0100	Flagging	M. Hr.
752	0100	Bridge Approach Drains	Ea.
756	0100	Field Laboratory, Type A	Ea.
762	3299	Maintenance & Protection of Traffic	L. Sum
776	0100	Temporary Striping	Mile
900	2080	Class AE-3 Concrete Ditch Liner	S.Y.
900	4010	Pumping Equipment	L. Sum
900	5059	6" PVC Water Main	L.F.
900	5160	30" Sluice Gate	Ea.
900	8505	Trainee	M. Hr.

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SUPPLEMENTAL SPECIFICATIONS & SPECIAL PROVISIONS

Description	No.
Trainee	SP
Legal Relations & Responsibility to Public	SP-107-5
Repair & Restoration of Haul Roads	SP-190
Aggregate Base Course	SP-302-1
Measurement & Payment	SP-109-3
Maintenance & Protection of Traffic	SP-762-2,3 & 5
Hot Bituminous Pavement	SP-406-7 & 8
Seeding	SP-726-23
Pumping Equipment	SP-188
Temporary Striping	SP-776-1
Borrow	SS-203-2

BASIS OF ESTIMATE

Water for Compaction: 10 Gal./C.Y. of Embankment Quantity (Includes amount of use as a dust palliative.)

Topsoil: No removal required, except 6" on M.L. Cross Sections (Sta. 0 to 19, 34 to 72+40)

Seeding: Entire right-of-way and construction area in easements except roadbed, undisturbed and sodded areas.

MAXIMUM SIZE OF AGGREGATE

Description	Type of Aggregate	Max. Size
Aggr. Base Crse., Cl. 5	Crushed	3/4"
Hot Bit. Pavement, Cl. 25	Crushed	3/4"
Blotter Material, Cl. 44	Screened	5/8"

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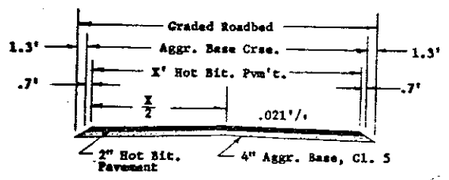
SURFACING BASIS OF ESTIMATE & TYPICAL SECTIONS

30' (2" H.B.P. 4" AGGR.) Q/S	W	32' (4" H.B.P. 2" AGGR.) Q/S	W	48' (4" H.B.P. 2" AGGR.) Q/S	W	44' (4" H.B.P. 2" AGGR.) Q/S	W	58' (4" H.B.P. 2" AGGR.) Q/S	W	78' (4" H.B.P. 2" AGGR.) Q/S	W	F-1-094(03) 76' (6" H.B.P. 6" AGGR.) Q/S	W	UNIT	DESCRIPTION
1.3		0.72		1.09		1.00		1.33		1.79		5.14		M GAL.	WATER FOR DUST PALLIATIVE + 20 GAL./TON OF AGGR. BASE COURSE
64.82	26'	36.23	30.6'	54.40	46'	50.12	42.6'	66.32	56.6'	89.47	76.6'	257.0	72'	TON	AGGR. BASE COURSE, CL. 5 @ 1.50 TON/C.Y. + 25%
101.11	26'	119.80	30.6'	178.89	46'	165.67	42.6'	220.11	56.6'	297.89	76.6'	280.0	72'	GAL.	MC-70, 250 LIQ. ADPHALT FOR PRIME COAT @ .35 GAL./SY (TOP OF BASE COURSE)
1.73	26'	2.04	30.6'	3.07	46'	2.84	42.6'	3.77	56.6'	5.11	76.6'	4.26	64'	TON	BLOTTER MATERIAL, CL. 44 @ 12 LBS./SY (TOP OF PRIME COAT)
14.44	26'	17.00	30.6'	25.56	46'	23.67	42.6'	31.44	56.6'	42.56	76.6'	40.0	70'	GAL.	SS-1h OR CSS-1h EMULS. ASPHALT FOR TACK COAT @ .05 GAL./SY
		16.28	29.3'	24.58	44.25'	22.94	41.3'	30.72	55.3'	41.83	75.3'	38.89	72'	GAL.	SS-1h OR CSS-1h EMULS. ASPH. FOR TACK COAT @ .05 GAL./SY (BET. 2" HOT BIT. PVMT. LIFTS)
30.86	24'	72.35	28'	109.26	42.5'	101.98	40'	136.54	54'	185.93	74'	259.24	68'	TON	HOT BIT. PVM'T. (SURF. CRSE.) @ 2.0 TON/CY
1.98		4.63		6.99		6.53		8.74		11.90		16.59		TON	120-150 ASPH. CEMENT FOR HOT BIT. PVM'T. @ 6.4% OF HOT BIT. PVM'T.
13.33	24'	15.56	28'	23.61	42.5'	22.22	40'	30.00	54'	41.11	74'	37.78	68'	GAL.	MC-70, 250 LIQ. ASPH. FOR FOG COAT @ .05 GAL./SY (TOP OF SURF. CRSE.)
0.80	24'	0.93	28'	1.42	42.5'	1.33	40'	1.80	54'	2.47	74'	2.26	68'	TON	BLOTTER MATERIAL, CL. 44 @ 6 LBS./ SY (FOG COAT MAINTENANCE)

Q = QUANTITY
S = STA.
W = WIDTH
H.B.P. = HOT BIT. PVM'T.

	AGGR. BASE CL. 5	MC 70-250 LIQ. ASPH. PRIME COAT	BLOTTER MATERIAL CL. 44	SS-1H OR CSS-1H EMULS. ASPHALT TACK	SS-1H OR CSS-1H EMULS. ASPHALT (BTWN. H.B.P.)	HOT BIT. PVM'T. CL. 25	120-150 ASPH. CEMENT	MC-70, 250 LIQ. ASPHALT FOG COAT	BLOTTER MATERIAL CL. 44
N.W.R.	506	1661	29	237	227	1011	65	218	14
N. BD. M.L. N.E.R.	1591	5228	90	747	717	3188	204	688	42
WEST END X-RD.	329	806	14	115	112	544	35	110	6
E. BD. X-RD.	744	2460	42	351	341	1514	97	330	20
W. BD. X-RD.	608	1997	34	285	274	1214	78	261	15
SERV. RD.	4918	7369	126	1053		2249	144	972	58
COLONIAL SERV. RD.	203	263	4.50	37.55		80	5	34	2.08
1 C.D.	15	26	.46	.10		9	0.58	4	.22
1 DBL. C.D.	19	33	.58	.13		12	0.77	5	.28
MED. X-OVER	38	60	1	8		18	1	8	1
TOTAL	8971	19903	342	2834	1671	9839	630	2630	159

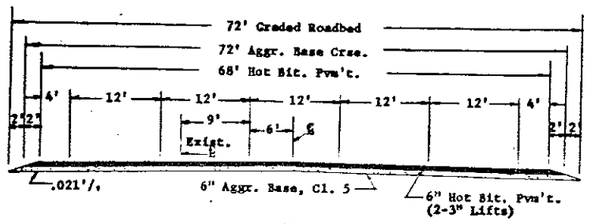


X

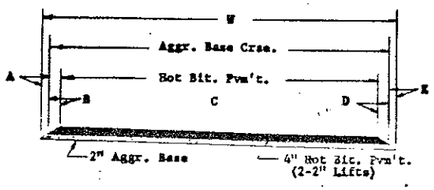
C.D. = 30' (34' GRADED)
C.D. = 40' (44' GRADED)

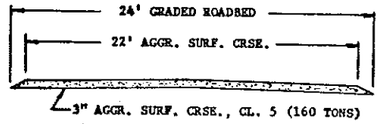
W	A	B	C	D	E
48'	1	1.5	42.5	*2	1
32'	.7	1.3	28	1.3	.7
44'	.7	1.3	40	1.3	.7
58'	.7	1.3	54	1.3	.7
78'	.7	1.3	74	1.3	.7

*INSIDE SHLDR.

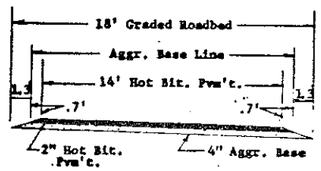


MAINLINE

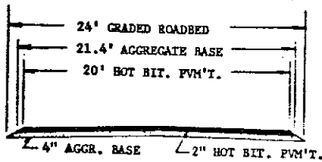




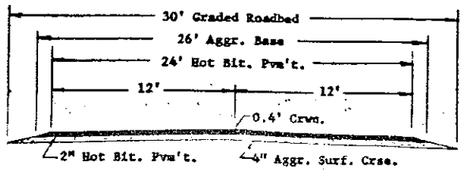
SERVICE ROAD
NT. OF N.E. RAMP



TEMP. X-OVER



SERVICE ROAD
(COLONIAL MOTEL)



SERVICE ROAD

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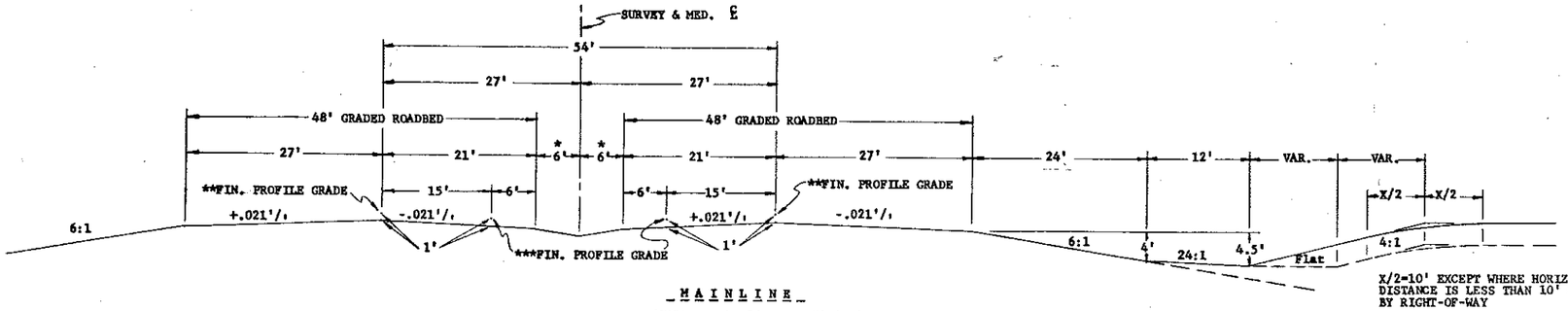
TYPICAL SECTIONS

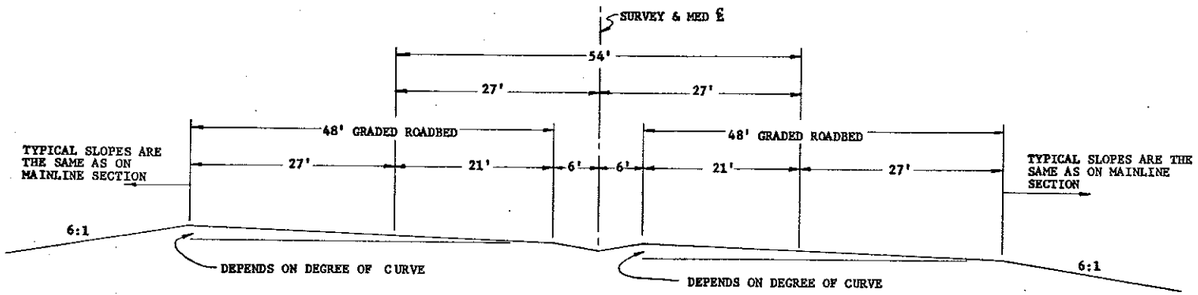


MAINLINE

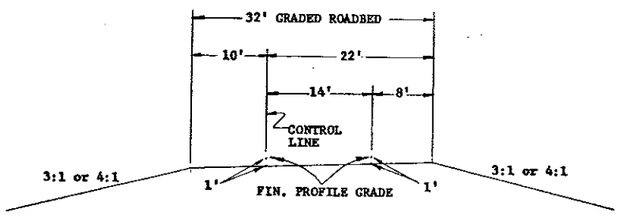
*VARIES-STA. 56+00 TO 72+40.2
**STA. 0+00 TO 43+00
***STA. 43+00 TO 72+40.2

X/2=10' EXCEPT WHERE HORIZONTAL BACKSLOPE DISTANCE IS LESS THAN 10' OR RESTRICTED BY RIGHT-OF-WAY

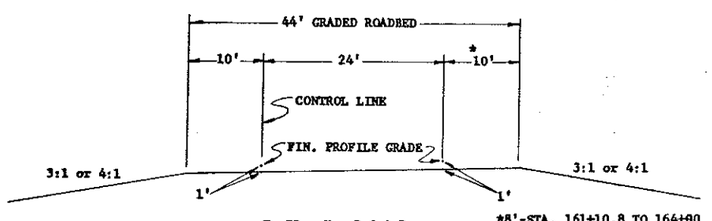
USE 4:1 BACKSLOPES ON CUT SECTIONS EXCEPT AS NOTED ON X-SECTIONS.



CURVE

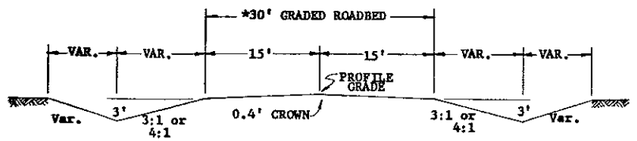


RAMPS & X-ROADS



E. BD. X-ROAD
STA. 161+10.8 TO 174+35.6

*8'-STA. 161+10.8 TO 164+00



SERVICE ROADS

*40'-STA. 35+76.2 TO 38+26.2 W. SERV. RD.
STA. 40+08.7 TO 42+58.7 E. SERV. RD.

SURFACING

AREAS TO BE SURFACED

MED-X-OVER
Δ = 18.572° LT. & RT.
R = 300'
T = 49.1'

Mainline
Δ = 11 65278°
D = 2°00'(2-200'Sp)
R = 2864.93
Ts = 392.39
L = 382.64
Sc = 2°
Xc = 2.33
Yc = 199.98
SE = .043⅛

E. Bd. Ramp
Δ = 4.99139°
D = 1°30'
R = 3819.83
T = 166.49
L = 332.76
SE = .030⅛

Mainline
Δ = 4199444°
D = 1°30'(2-200'Sp.)
R = 3819 83
Ts = 1566.24
L = 2599 63
Sc = 1°30'
Xc = 1.75
Yc = 199 99
SE = .035⅛

NE Ramp
Δ = 19.9419°
D = 4°00'
R = 1432.69
T = 251.87
L = 498.55
SE = .041⅞

NE Ramp
Δ = 19 87055°
D = 5°34'30"
R = 1013.14
T = 180.09
L = 356.42
SE = .034⅛

W Bd. X-Rd.
Δ = 6.25944°
D = 5°30'
R = 1042.14
T = 56.98
L = 113.81
SE = .021⅛

E. Service Rd.
Δ = 25 00°
D = 16°00'
R = 359.26
T = 79.65
L = 156.25

E. Service Rd.
Δ = 22.23333°
D = 6°00'
R = 955.37
T = 187.72
L = 370.52

SE Ramp
Δ = 13.00000°
D = 6°00'
R = 955.37
T = 108.85
L = 216.67
SE = .021⅛

SE Loop
Δ = 246 13479°
D = 36°(2-200'Sp)
R = 161.80
Lc = 200'
L = 488.77(Arc)
Xc = 40.74
Yc = 192 29
p = 9.84
q = 97.20
SE = .060⅛

SE Ramp
Δ = 31.69306°
D = 5°00'
R = 1146.28
T = 325.37
L = 633 86
SE = .056⅛

NW Loop
Δ = 198.02562°
D = 43°00'(2-200'Sp.)
R = 136.42
Lc = 200'
L = 266.73 (Arc)
Xc = 48.08
Yc = 189.08
p = 11.44
q = 96.07
SE = 060⅛

NW Loop
Δ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043⅞

NW Ramp
Δ = 26.27806°
D = 6°00'
R = 955.37
T = 223.01
L = 437 97
SE = .038⅛

Exist Rd
Δ = 22.51667°
D = 1°30'
R = 3819.83
T = 760.38
L = 1501.11

W Bd X-Rd
Δ = 17 86472°
D = 5°00'
R = 1146 28
T = 179 55
L = 356 09
SE = 034⅛

E. Bd Ramp
Δ = 51.41221°
D = 5°00'
R = 1146.28
T = 551.82
L = 1028 24
SE = .034⅛

W. Service Rd
Δ = 16 31111°
D = 6°00'
R = 955 37
T = 136 91
L = 271 85

W Bd. X-Rd.
Δ = 18.06416°
D = 6°00'
R = 955.37
T = 151.86
L = 301.07
SE = .038⅛

SW Ramp

Curve ①	Curve ②	Curve ③
Δ = 31.67236°	Δ = 24.79490°	Δ = 6.17553°
D = 12°00'	D = 6°00'	D = 3°00'
R = 478.34	R = 955.37	R = 1910 08
T = 135.68	T = 210 01	T = 103 04
L = 263 94	L = 413.25	L = 205 85
SE = .060⅛	SE = 060⅛	SE = .060⅛

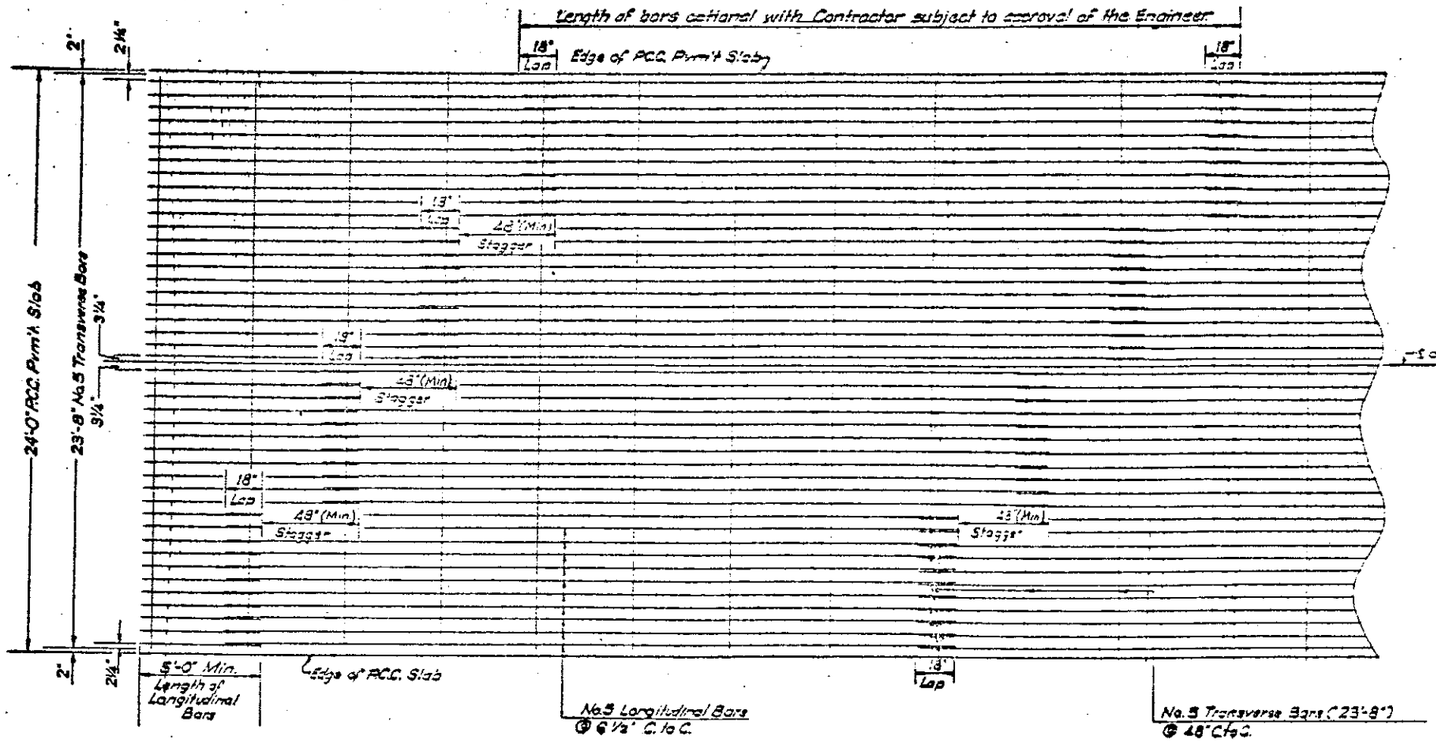
E. Bd X-Rd
Δ = 14 97242°
D = 2°30'
R = 2292.01
T = 301 19
L = 598 90
SE = .031⅛

SERV. RD. SECT. CON'T. THRU. SOUTH INTERCHANGE

3	N.D.			

EXISTING P.C.C. PAVEMENT
(To Be Removed)

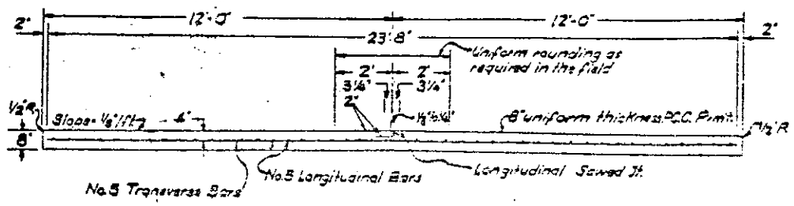
0.60% Continuously Reinforced P.C.C. Pavement
(Reinforcing Steel Bars)



No. 5 Bar = 1.043 lbs./ft.

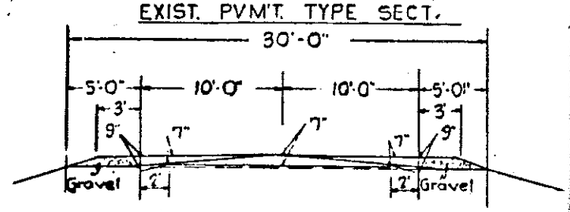
I-194

DETAIL OF BAR ARRANGEMENT & LAPPING

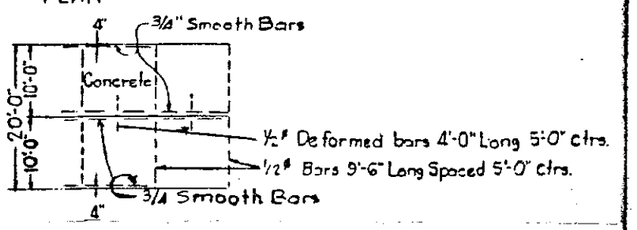


CROSS SECTION OF SLAB REINFORCEMENT

EXIST. PVM'T. TYPE SECT.

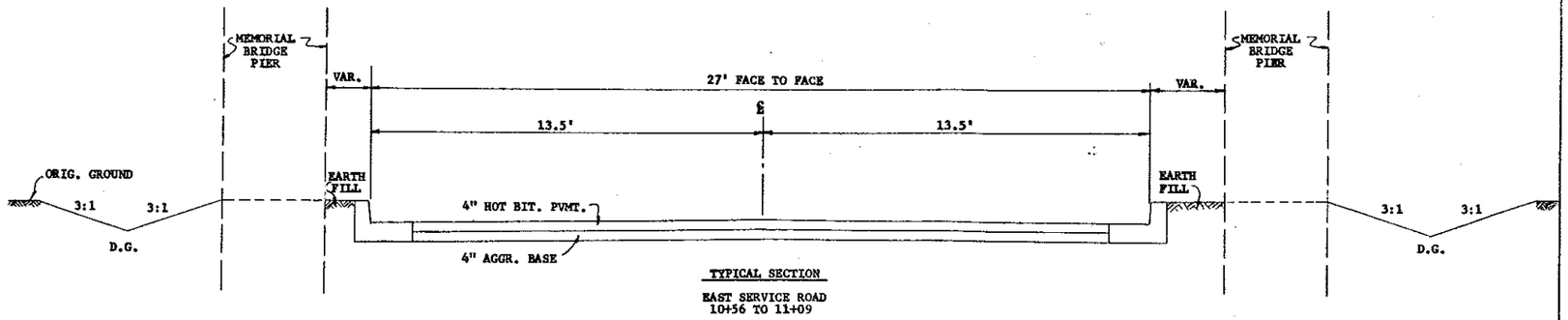


PLAN



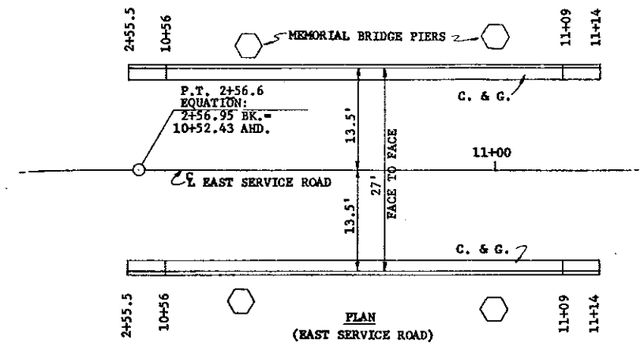
OLD HWY. U.S. 10
(CROSSROAD)

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

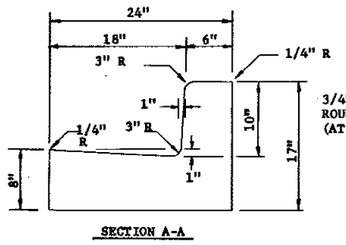


TYPICAL SECTION

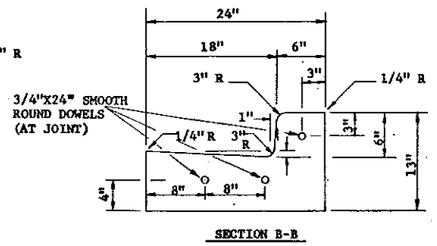
EAST SERVICE ROAD
10+56 TO 11+09



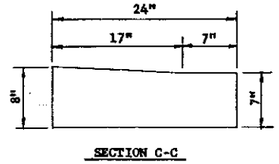
PLAN
(EAST SERVICE ROAD)



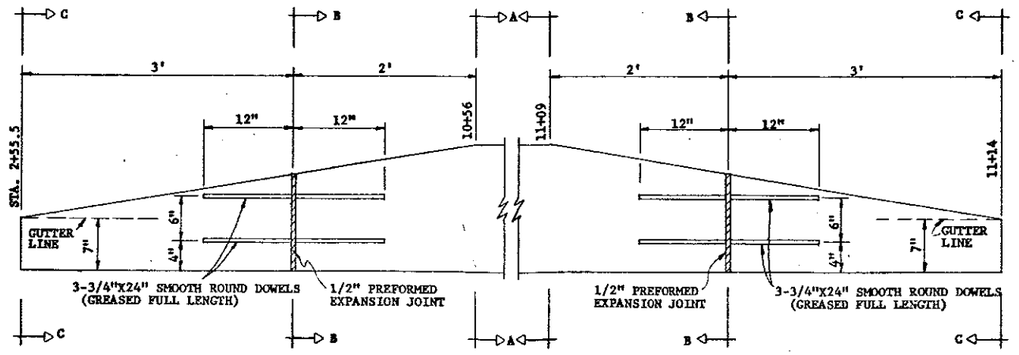
SECTION A-A



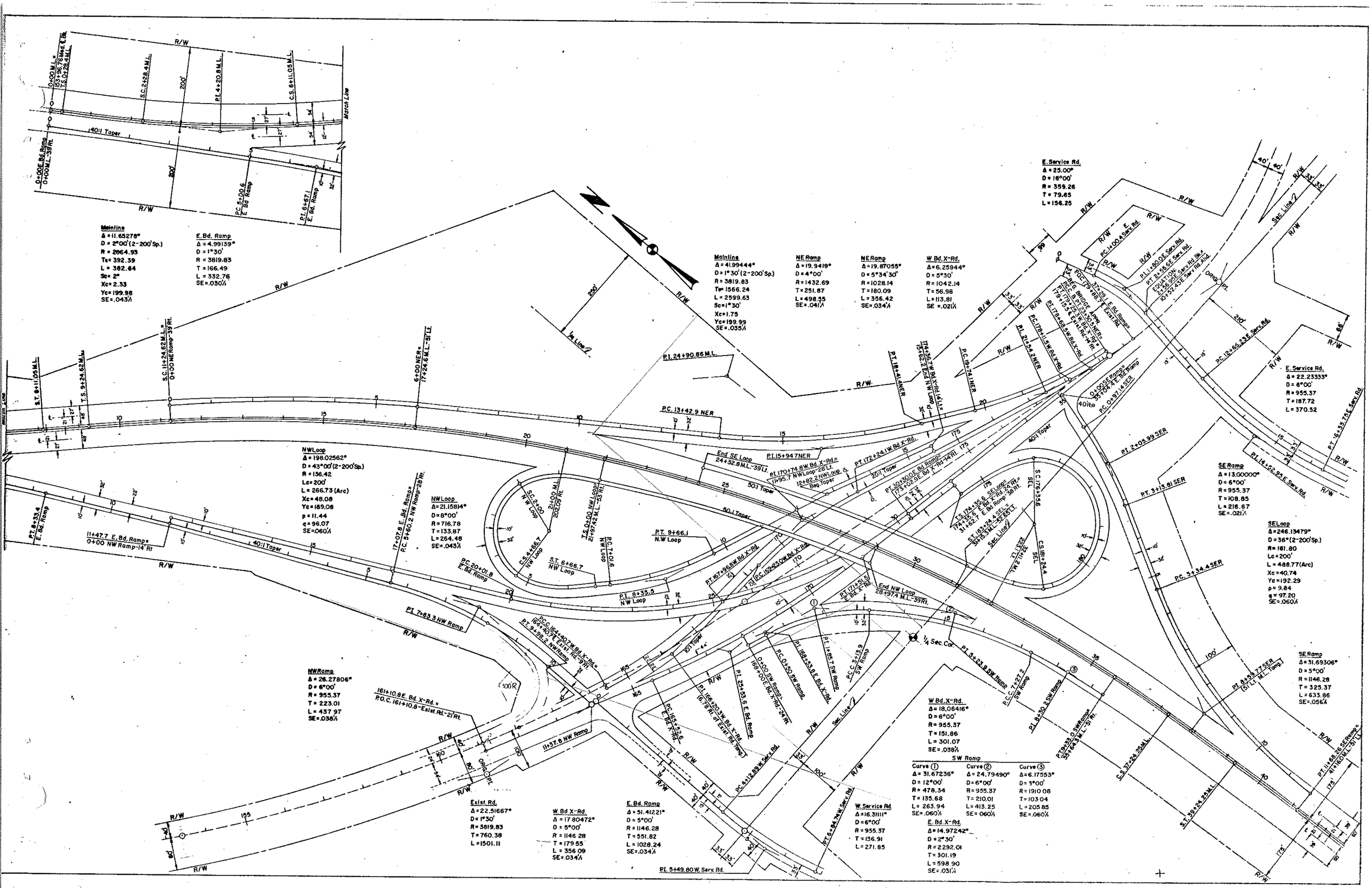
SECTION B-B



SECTION C-C



ELEVATION



Mainline
Δ = 11.65278°
D = 2°00' (2-200' Sp.)
R = 2864.93
Ts = 392.39
L = 382.64
Sc = 2°
Xc = 2.33
Yc = 199.98
SE = .043'/'

E. Bd. Ramp
Δ = 4.99139°
D = 1°30'
R = 3819.83
T = 166.49
L = 332.76
SE = .030'/'

Mainline
Δ = 41.99444°
D = 1°30' (2-200' Sp.)
R = 3819.83
Ts = 1566.24
L = 2599.63
Sc = 1°30'
Xc = 1.75
Yc = 199.99
SE = .035'/'

NE Ramp
Δ = 19.9419°
D = 4°00'
R = 1432.69
T = 251.87
L = 498.55
SE = .041'/'

NE Ramp
Δ = 19.87055°
D = 5°34'30"
R = 1028.14
T = 180.09
L = 356.42
SE = .034'/'

W Bd. X-Rd.
Δ = 6.25944°
D = 5°30'
R = 1042.14
T = 56.98
L = 113.81
SE = .021'/'

E. Service Rd.
Δ = 25.00°
D = 16°00'
R = 359.26
T = 79.65
L = 156.25

E. Service Rd.
Δ = 22.23333°
D = 6°00'
R = 955.37
T = 187.72
L = 370.52

NW Loop
Δ = 198.02562°
D = 43°00' (2-200' Sp.)
R = 136.42
Lc = 200'
L = 266.73 (Arc)
Xc = 48.08
Yc = 189.08
p = 11.44
q = 96.07
SE = .060'/'

NW Loop
Δ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043'/'

SE Ramp
Δ = 13.00000°
D = 6°00'
R = 955.37
T = 108.85
L = 216.67
SE = .021'/'

SE Loop
Δ = 246.13479°
D = 36° (2-200' Sp.)
R = 161.80
Lc = 200'
L = 488.77 (Arc)
Xc = 40.74
Yc = 192.29
p = 9.84
q = 97.20
SE = .060'/'

NW Ramp
Δ = 26.27806°
D = 6°00'
R = 955.37
T = 223.01
L = 437.97
SE = .038'/'

SE Ramp
Δ = 31.69306°
D = 5°00'
R = 1146.28
T = 325.37
L = 633.86
SE = .056'/'

W Bd. X-Rd.
Δ = 18.06416°
D = 6°00'
R = 955.37
T = 151.86
L = 301.07
SE = .038'/'

SW Ramp

Curve ①	Curve ②	Curve ③
Δ = 31.67236°	Δ = 24.79490°	Δ = 6.17553°
D = 12°00'	D = 6°00'	D = 3°00'
R = 478.34	R = 955.37	R = 1910.08
T = 135.68	T = 210.01	T = 103.04
L = 263.94	L = 413.25	L = 205.85
SE = .060'/'	SE = .060'/'	SE = .060'/'

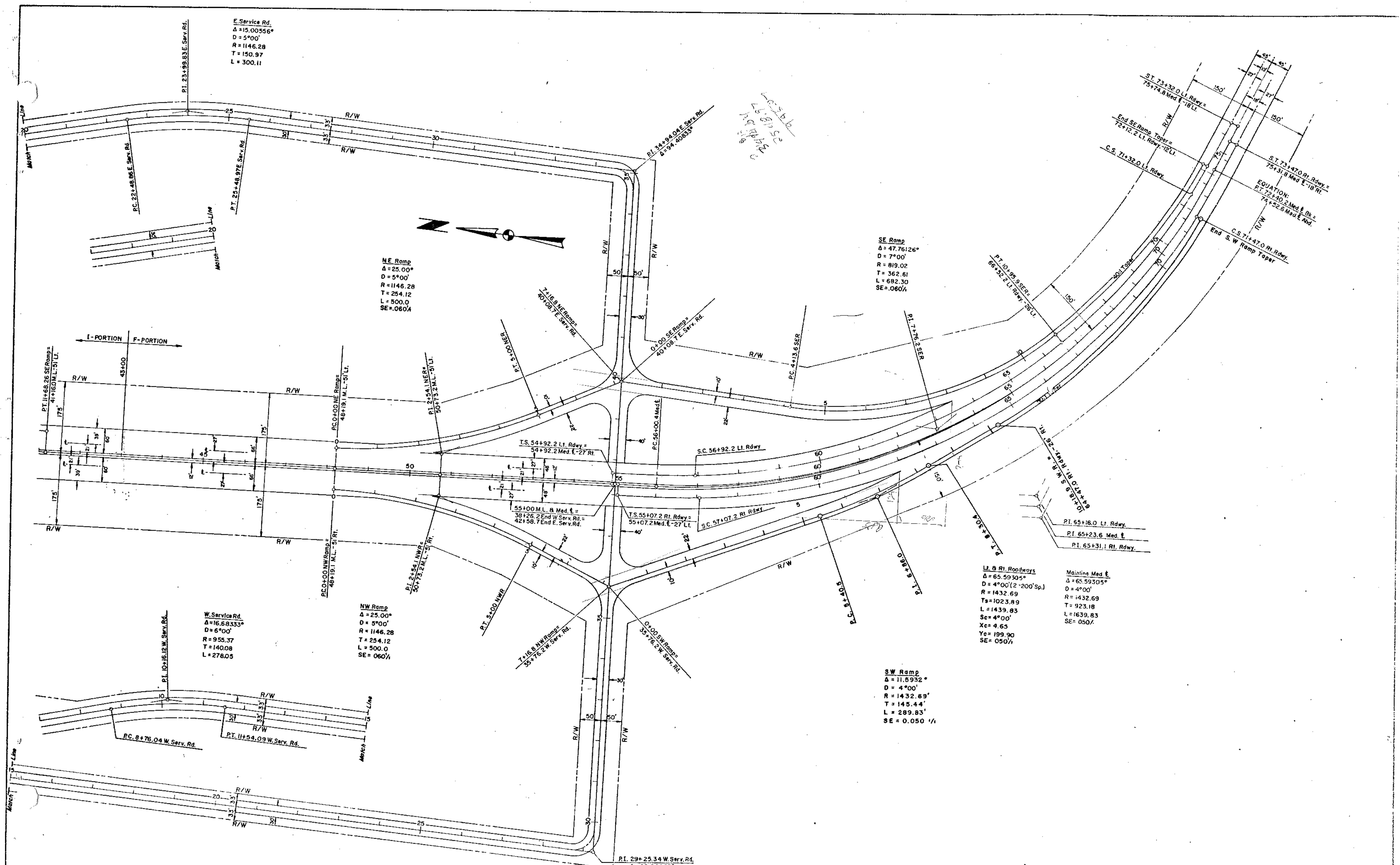
Exist. Rd.
Δ = 22.51667°
D = 1°30'
R = 3819.83
T = 760.38
L = 1501.11

W. Bd X-Rd.
Δ = 17.80472°
D = 5°00'
R = 1146.28
T = 179.55
L = 356.09
SE = .034'/'

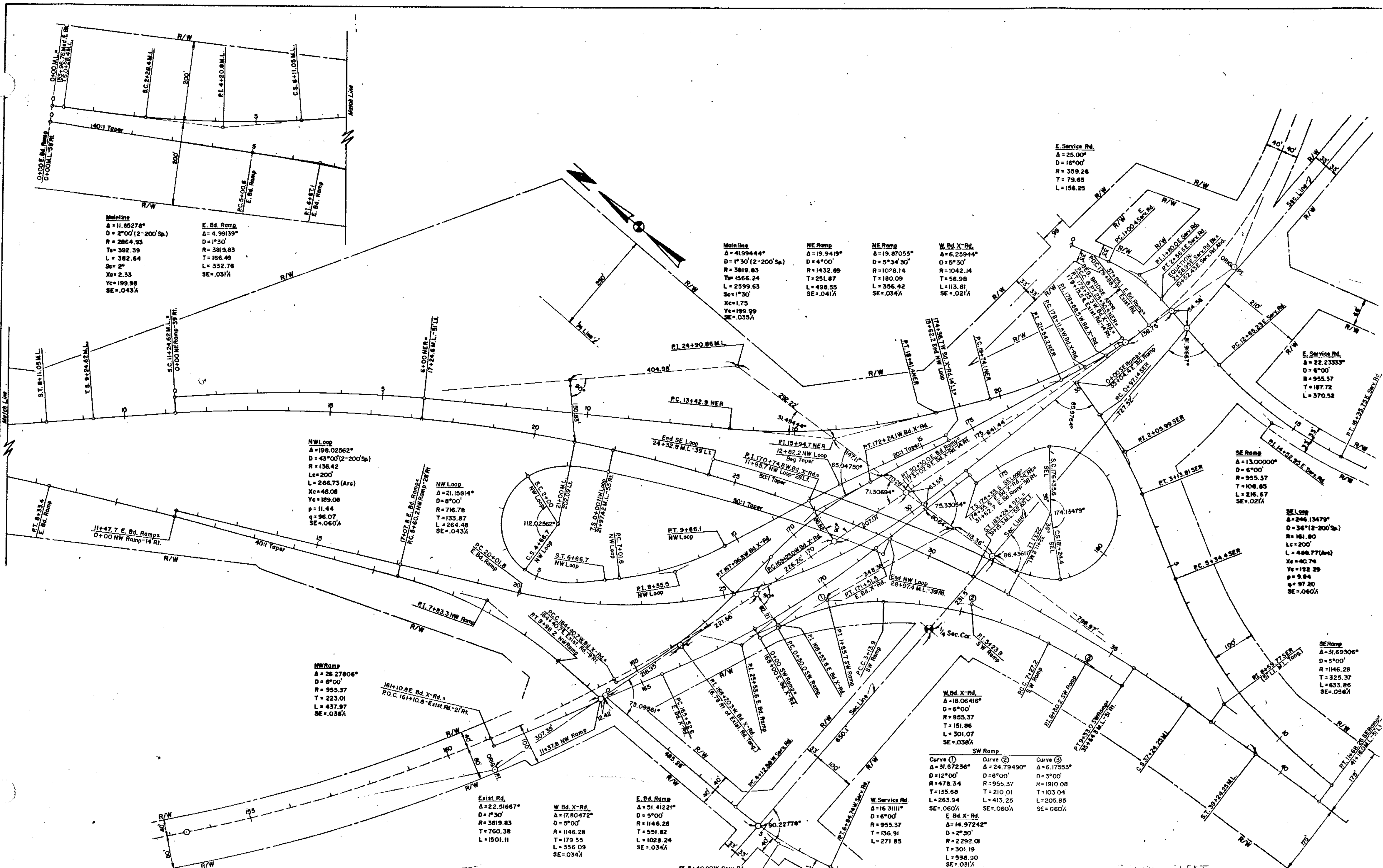
E. Bd. Ramp
Δ = 51.41221°
D = 5°00'
R = 1146.28
T = 551.82
L = 1028.24
SE = .034'/'

W. Service Rd.
Δ = 16.31111°
D = 6°00'
R = 955.37
T = 136.91
L = 271.85

E. Bd. X-Rd.
Δ = 14.97242°
D = 2°30'
R = 2292.01
T = 301.19
L = 598.90
SE = .031'/'



E. Service Rd.
Δ = 15.00556°
D = 5°00'
R = 1146.28
T = 150.97
L = 300.11
P.I. 23+99.83 E. Serv. Rd.
P.C. 22+48.86 E. Serv. Rd.
P.T. 25+48.97 E. Serv. Rd.
P.I. 34+94.04 E. Serv. Rd.
Δ = 94.90833°
NE Ramp
Δ = 25.00°
D = 5°00'
R = 1146.28
T = 254.12
L = 500.0
SE = .060'/'
SE Ramp
Δ = 47.76126°
D = 7°00'
R = 819.02
T = 362.61
L = 682.30
SE = .060'/'
I-PORTION
F-PORTION
R/W
Match Line
S.T. 73+32.0 Lt. Rdwy = 75+74.8 Med. ℄ - 18' Lt.
End SE Ramp Taper = 72+12.2 Lt. Rdwy. - 12' Lt.
C.S. 71+32.0 Lt. Rdwy.
S.T. 73+47.0 Rt. Rdwy. = 75+31.8 Med. ℄ - 18' Rt.
EQUATION: P.I. 72+30.2 Med. ℄ Bk. = 74+52.6 Med. ℄ Ahd.
C.S. 71+47.0 Rt. Rdwy.
End S.W. Ramp Taper
P.T. 10+95.9 SER = 66+52.2 Lt. Rdwy. - 26' Lt.
P.I. 7+76.2 SER
P.C. 4+13.6 SER
0+00 SE Ramp = 40+08.7 E. Serv. Rd.
7+16.8 NE Ramp = 40+08.7 E. Serv. Rd.
P.T. 5+00 NER
P.I. 2+54.1 NER = 50+73.2 M.L. - 51' Lt.
P.C. 0+00 NE Ramp = 48+19.1 M.L. - 51' Lt.
P.T. 11+68.26 SE Ramp = 41+16.0 M.L. - 51' Lt.
T.S. 54+92.2 Lt. Rdwy. = 54+92.2 Med. ℄ - 27' Rt.
P.C. 56+00.4 Med. ℄
S.C. 56+92.2 Lt. Rdwy.
55+00 M.L. & Med. ℄ = 38+26.2 End W. Serv. Rd. = 42+58.7 End E. Serv. Rd.
T.S. 55+07.2 Rt. Rdwy. = 55+07.2 Med. ℄ - 27' Lt.
S.C. 57+07.2 Rt. Rdwy.
P.C. 0+00 NW Ramp = 48+19.1 M.L. - 51' Rt.
P.I. 2+54.1 NWR = 50+73.2 M.L. - 51' Rt.
P.T. 5+00 NWR
7+16.8 NW Ramp = 35+76.2 W. Serv. Rd.
0+00 SW Ramp = 35+76.2 W. Serv. Rd.
P.C. 5+40.5
P.I. 6+86.0
P.T. 8+30.4
10+18.9 S.W.R. = 64+47.0 Rt. Rdwy. - 26' Rt.
P.I. 65+16.0 Lt. Rdwy.
P.I. 65+23.6 Med. ℄
P.I. 65+31.1 Rt. Rdwy.
Lt. & Rt. Roadways
Δ = 65.59305°
D = 4°00' (2-200' Sp.)
R = 1432.69
Ts = 1023.89
L = 1439.83
Sc = 4°00'
Xc = 4.65
Yc = 199.90
SE = .050'/'
Mainline Med. ℄
Δ = 65.59305°
D = 4°00'
R = 1432.69
T = 923.18
L = 1639.83
SE = .050'/'
W. Service Rd.
Δ = 16.68333°
D = 6°00'
R = 955.37
T = 140.08
L = 278.05
NW Ramp
Δ = 25.00°
D = 5°00'
R = 1146.28
T = 254.12
L = 500.0
SE = .060'/'
SW Ramp
Δ = 11.5932°
D = 4°00'
R = 1432.69'
T = 145.44'
L = 289.83'
SE = 0.050 '/'
P.I. 10+16.12 W. Serv. Rd.
P.C. 8+76.04 W. Serv. Rd.
P.T. 11+54.09 W. Serv. Rd.
P.I. 29+25.34 W. Serv. Rd.
Δ = 85.85833°


Mainline
Δ = 11.65278°
D = 2°00' (2-200' Sp.)
R = 2864.93
Ts = 392.39
L = 382.64
Ss = 2°
Xc = 2.33
Yc = 199.98
SE = .043'/'
E. Bd. Ramp
Δ = 4.99139°
D = 1°30'
R = 3819.83
T = 166.49
L = 332.76
SE = .031'/'
Mainline
Δ = 41.99444°
D = 1°30' (2-200' Sp.)
R = 3819.83
Ts = 1566.24
L = 2599.63
Sc = 1°30'
Xc = 1.75
Yc = 199.99
SE = .035'/'
NE Ramp
Δ = 19.9419°
D = 4°00'
R = 1432.69
T = 251.87
L = 498.55
SE = .041'/'
NE Ramp
Δ = 19.87055°
D = 5°34'30"
R = 1028.14
T = 180.09
L = 356.42
SE = .034'/'
W. Bd. X-Rd.
Δ = 6.25944°
D = 5°30'
R = 1042.14
T = 56.98
L = 113.81
SE = .021'/'
E. Service Rd.
Δ = 25.00°
D = 16°00'
R = 359.26
T = 79.65
L = 156.25
E. Service Rd.
Δ = 22.23333°
D = 6°00'
R = 955.37
T = 187.72
L = 370.52
NW Loop
Δ = 198.02562°
D = 43°00' (2-200' Sp.)
R = 136.42
Lc = 200'
L = 266.73 (Arc)
Xc = 48.06
Yc = 189.08
p = 11.44
q = 96.07
SE = .060'/'
NW Loop
Δ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043'/'
SE Ramp
Δ = 13.00000°
D = 6°00'
R = 955.37
T = 108.85
L = 216.67
SE = .021'/'
SE Loop
Δ = 246.13479°
D = 36° (2-200' Sp.)
R = 161.80
Lc = 200'
L = 488.77 (Arc)
Xc = 40.74
Yc = 192.29
p = 9.84
q = 97.20
SE = .060'/'
SE Ramp
Δ = 31.69306°
D = 5°00'
R = 1146.28
T = 325.37
L = 633.86
SE = .056'/'
NW Ramp
Δ = 26.27806°
D = 6°00'
R = 955.37
T = 223.01
L = 437.97
SE = .038'/'
W. Bd. X-Rd.
Δ = 18.06416°
D = 6°00'
R = 955.37
T = 151.86
L = 301.07
SE = .038'/'
SW Ramp
Curve ① Δ = 31.67236° D = 12°00' R = 478.34 T = 135.68 L = 263.94 SE = .060'/'
Curve ② Δ = 24.79490° D = 6°00' R = 955.37 T = 210.01 L = 413.25 SE = .060'/'
Curve ③ Δ = 6.17553° D = 3°00' R = 1910.08 T = 103.04 L = 205.85 SE = .060'/'
E. Bd. X-Rd.
Δ = 14.97242°
D = 2°30'
R = 2292.01
T = 301.19
L = 598.90
SE = .031'/'
Exist. Rd.
Δ = 22.51667°
D = 1°30'
R = 3819.83
T = 760.38
L = 1501.11
W. Bd. X-Rd.
Δ = 17.80472°
D = 5°00'
R = 1146.28
T = 179.55
L = 356.09
SE = .034'/'
E. Bd. Ramp
Δ = 51.41221°
D = 5°00'
R = 1146.28
T = 551.82
L = 1028.24
SE = .034'/'
W. Service Rd.
Δ = 16.31111°
D = 6°00'
R = 955.37
T = 136.91
L = 271.85
Match Line
R/W
(40:1 Taper)
50:1 Taper
40:1 Taper
Sec. Line
1/4 Sec. Cor.
P.I. 24+90.86 M.L.
P.C. 13+42.9 NER
P.I. 15+94.7 NER
End SE Loop 24+32.8 M.L.-39' Lt.
End NW Loop 28+97.4 M.L.-39' Rt.
P.I. 7+83.3 NW Ramp
11+47.7 E. Bd. Ramp = 0+00 NW Ramp-14' Rt.
P.I. 5+49.80 W. Serv. Rd.

E. Service Rd.
Δ = 15.00556°
D = 5°00'
R = 1146.28
T = 150.97
L = 300.11

P.I. 23+99.83 E. Serv. Rd.

P.C. 22+48.86 E. Serv. Rd.

P.T. 23+48.87 E. Serv. Rd.

P.I. 33+34.04 E. Serv. Rd.
Δ = 94.40833°

NE Ramp
Δ = 25.00°
D = 5°00'
R = 1146.28
T = 254.12
L = 500.0
SE = .060 ft

7+16.8 NE Ramp = 40+08.7 E. Serv. Rd.

0+00 SE Ramp = 40+08.7 E. Serv. Rd.

SE Ramp
Δ = 47.76126°
D = 7°00'
R = 819.02
T = 362.61
L = 682.30
SE = .060 ft

P.C. 4+13.6 SER

P.I. 7+79.2 SER

P.T. 10+95.9 SER = 66+32.2 Lt. Rdwy. -28 Lt.

S.T. 73+32.0 Lt. Rdwy. = 73+74.8 Med. ℄ -18 Lt.

End SE Ramp Taper = 72+12.2 Lt. Rdwy. -12 Lt.

C.S. 71+32.0 Lt. Rdwy.

S.T. 73+47.0 Rt. Rdwy. = 73+31.8 Med. ℄ -18 Rt.

EQUATION: P.T. 72+40.2 Med. ℄ Bk. = 74+52.6 Med. ℄ Ahd.

C.S. 71+47.0 Rt. Rdwy.

End S.W. Ramp Taper

I-PORTION F-PORTION

P.T. 11+68.26 SE Ramp = 41+16.0 M.L. -51' Lt.

P.C. 0+00 NE Ramp = 46+19.1 M.L. -51 Lt.

P.I. 2+54.1 NER = 50+73.2 M.L. -51 Lt.

P.T. 5+00 NER

P.C. 56+00.4 Med. ℄

T.S. 54+92.2 Lt. Rdwy. = 54+92.2 Med. ℄ -27 Rt.

S.C. 56+92.2 Lt. Rdwy.

536.13'

55+00 M.L. & Med. ℄ = 38+26.2 End W. Serv. Rd. = 42+58.7 End E. Serv. Rd.

T.S. 55+07.2 Rt. Rdwy. = 55+07.2 Med. ℄ -27' Lt.

S.C. 57+07.2 Rt. Rdwy.

P.C. 0+00 NW Ramp = 48+19.1 M.L. -51 Rt.

P.I. 2+54.1 NWR = 50+73.2 M.L. -51 Rt.

P.T. 5+00 NWR

7+16.8 NW Ramp = 35+76.2 W. Serv. Rd.

0+00 SW Ramp = 35+76.2 W. Serv. Rd.

P.C. 5+40.8

P.T. 8+40.8

P.I. 65+16.0 Lt. Rdwy.

P.I. 65+23.6 Med. ℄

P.I. 65+31.1 Rt. Rdwy.

W. Service Rd.
Δ = 16.68333°
D = 6°00'
R = 955.37
T = 140.08
L = 278.05

P.T. 10+15.12 W. Serv. Rd.

P.C. 8+76.04 W. Serv. Rd.

P.T. 11+54.09 W. Serv. Rd.

NW Ramp
Δ = 25.00°
D = 5°00'
R = 1146.28
T = 254.12
L = 500.0
SE = .060 ft

Lt. & Rt. Roadways
Δ = 65.59305°
D = 4°00' (2-200' Sp.)
R = 1432.69
Ts = 1023.89
L = 1439.83
Sc = 4°00'
Xc = 4.85
Yc = 199.90
SE = .050 ft

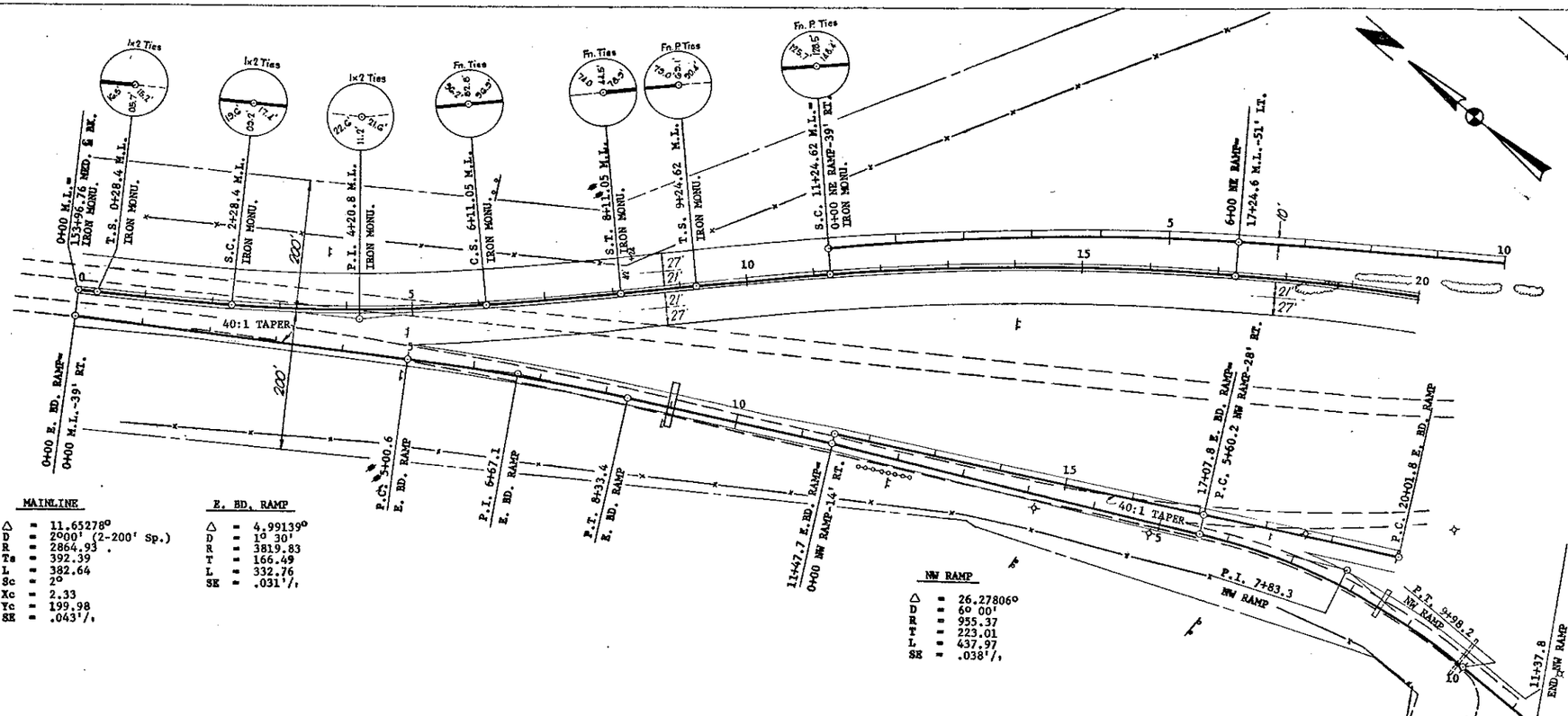
Mainline Med. ℄
Δ = 65.59305°
D = 4°00'
R = 1432.69
T = 923.18
L = 1639.83
SE = .050 ft

SW Ramp
Δ = 11.5932°
D = 4°00'
R = 1432.69'
T = 145.44'
L = 289.83'
SE = 0.050 ft

P.I. 29+25.34 W. Serv. Rd.
Δ = 85.85833°

Grading SHEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		



MAINLINE

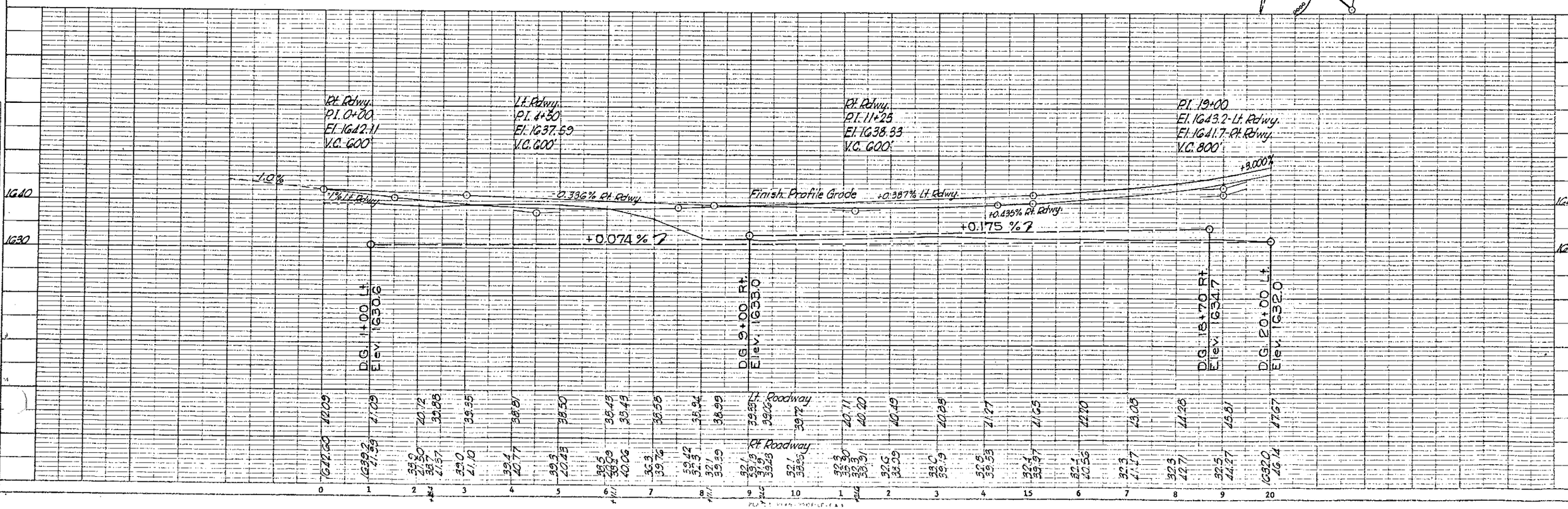
△	= 11.65278°
D	= 2°00' (2-200' Sp.)
R	= 2864.93
Te	= 392.39
L	= 382.64
Sc	= 2°
Xc	= 2.33
Yc	= 199.98
SE	= .043'/'

E. BD. RAMP

△	= 4.99139°
D	= 1° 30'
R	= 3819.83
T	= 166.49
L	= 332.76
SE	= .031'/'

NW RAMP

△	= 26.27806°
D	= 6° 00'
R	= 955.37
T	= 223.01
L	= 437.97
SE	= .038'/'



6	N.D.	I-194-4(35)	

NW LOOP
△ = 198.02562°
D = 43°00' (2-200' SP.)
M = 136.42
Lc = 200'
L = 266.73 (ARC)
Xc = 48.08
Yc = 189.08
P = 11.44
Rd = 96.07
SE = .060'/'

NW LOOP
△ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043'/'

EXIST. RD.
△ = 22.51667°
D = 1° 30'
R = 3819.83
T = 760.38
L = 1501.11

E. BD. RAMP
△ = 91.41221°
D = 50.00°
R = 1146.28
T = 551.82
L = 1028.24
SE = .034'/'

E. SERVICE ROAD
△ = 22.23333°
D = 6° 00'
R = 955.37
T = 187.72
L = 370.52

SE RAMP
△ = 13.00000°
D = 6° 00'
R = 955.37
T = 108.85
L = 216.67
SE = .021'/'

E. BD. X-RD.

Detail 18"CSP End Cut
Sta. 161+25-LT (E. Bd X-Rd)
(End Cut to 2:1 Slope)

PLATE 1 - PLAN - PROFILE - F.A.S.
BLUEPRINT PAPER CO., S. F. CAL.
NO. 120011

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.		

NW LOOP
△ = 198.02562°
D = 43°00' (2-200' SP.)
R = 136.42
Lc = 200'
L = 266.73 (ARC)
Xc = 48.08
Yc = 189.08
p = 11.44
q = 96.07
SE = .060'/'

NW LOOP
△ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043'/'

EXIST. RD.
△ = 22.51667°
D = 1° 30'
R = 3819.83
T = 760.38
L = 1501.11

E. BD. RAMP
△ = 31.41221°
D = 39°00'
R = 1146.28
T = 551.82
L = 1028.24
SE = .034'/'

W. BD. X-RD.
△ = 18.06416°
D = 6° 00'
R = 955.37
T = 151.86
L = 301.07
SE = .038'/'

SW RAMP

CURVE ①
△ = 31.67236°
D = 12° 00'
R = 478.34
T = 135.68
L = 263.94
SE = .060'/'

CURVE ②
△ = 24.79490°
D = 6° 00'
R = 955.37
T = 210.01
L = 413.25
SE = .060'/'

CURVE ③
△ = 6.17553°
D = 3° 00'
R = 1910.08
T = 103.04
L = 205.85
SE = .060'/'

E. BD. X-RD.
△ = 14.97242°
D = 2° 30'
R = 2292.01
T = 301.19
L = 598.90
SE = .031'/'

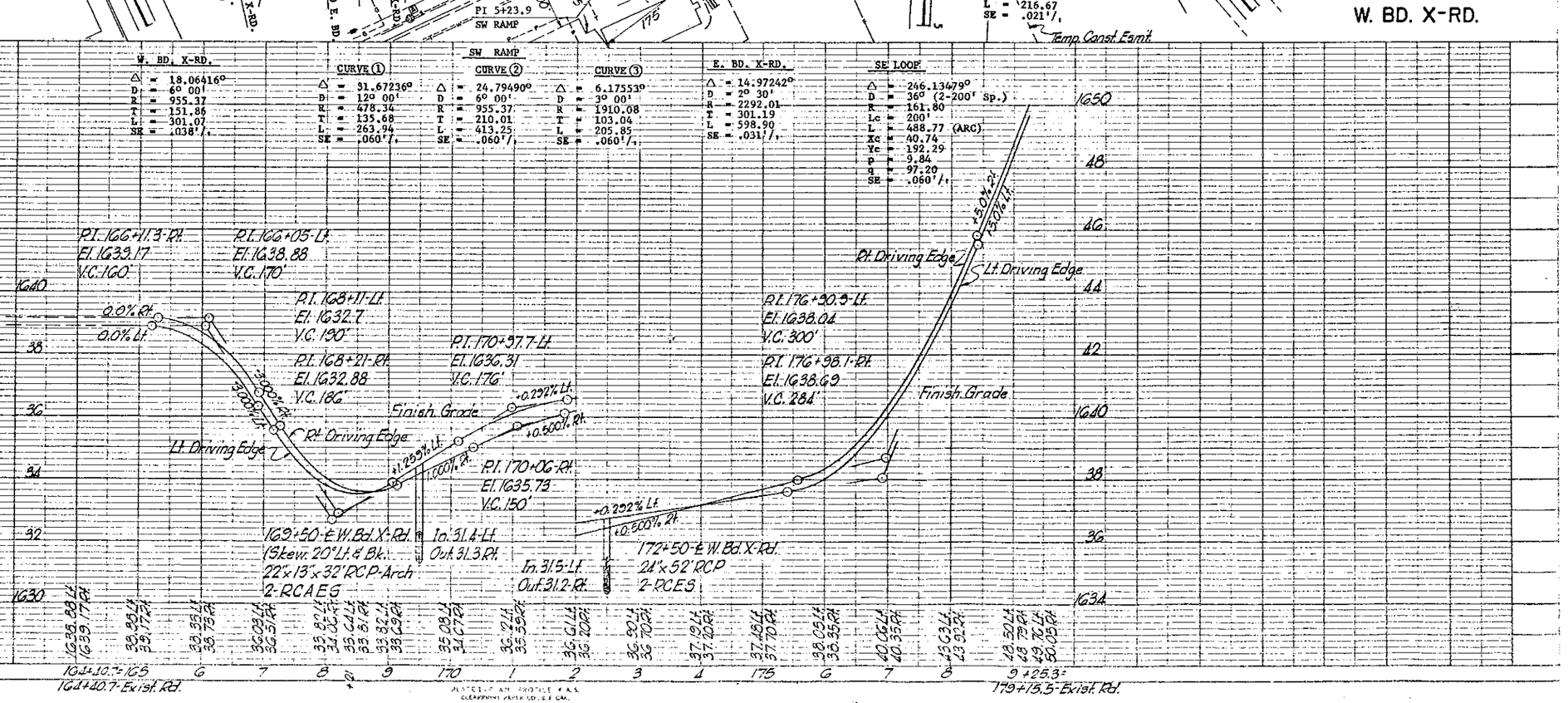
SE LOOP
△ = 246.13479°
D = 360° (2-200' Sp.)
R = 161.80
Lc = 200'
L = 488.77 (ARC)
Xc = 40.74
Yc = 192.29
p = 9.84
q = 97.20
SE = .060'/'

E. SERVICE ROAD
△ = 22.23333°
D = 6° 00'
R = 955.37
T = 187.72
L = 370.52

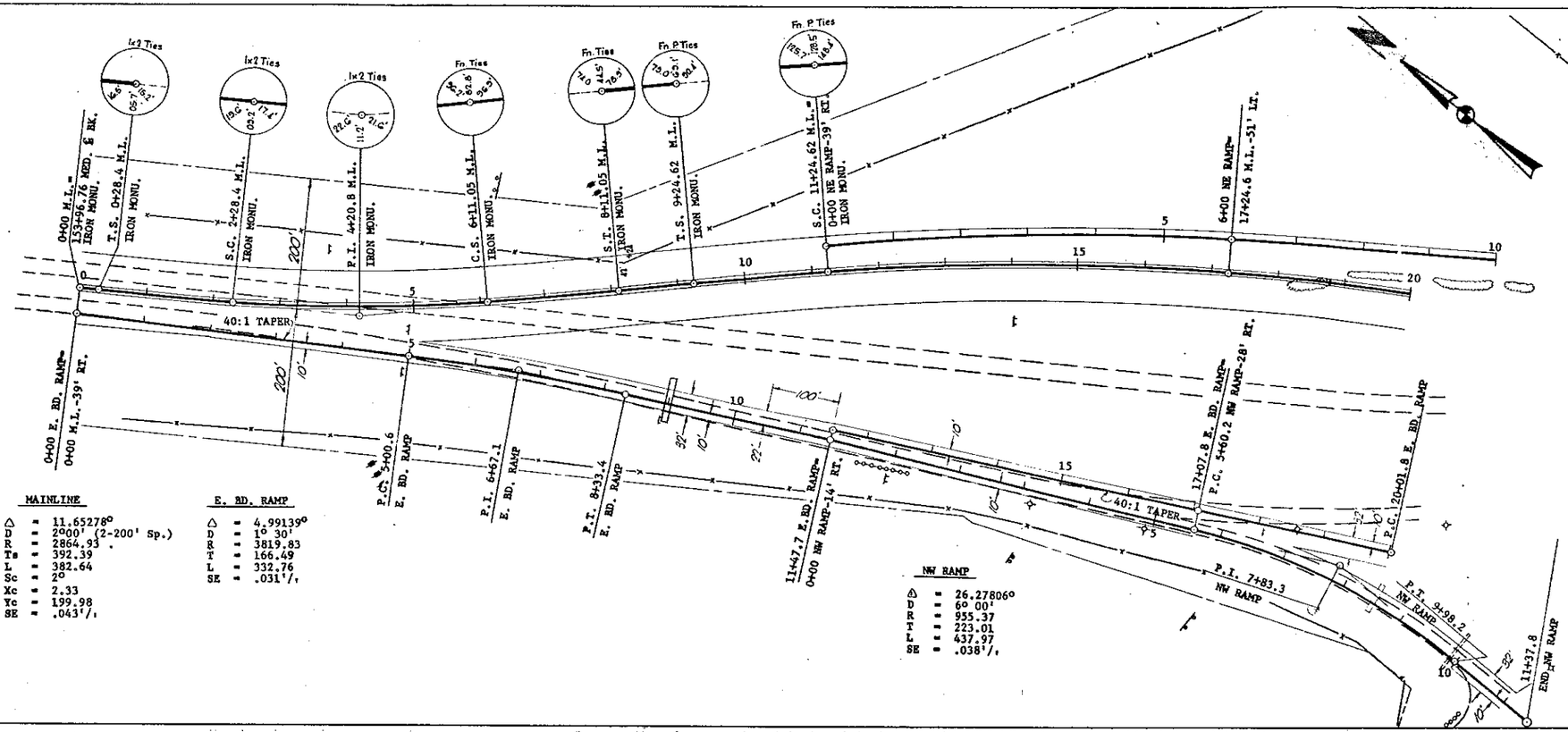
SE RAMP
△ = 13.00000°
D = 6° 00'
R = 955.37
T = 108.85
L = 216.67
SE = .021'/'

Existing Manhole Elevs.

	A	B	C	D
Top:	1634.77	34.27	31.94	35.15
Bottom:	1626.20	26.94	27.54	28.25



	STATE	FED. A.D. PROJ. NO.	SHEET NO.
8	N.D.		



MAINLINE

Δ	11.65278°
D	2°00' (2-200' Sp.)
R	2864.93
T	392.39
L	382.64
Sc	2°
Xc	2.33
Yc	199.98
SE	.043'/.

E. BD. RAMP

Δ	4.99139°
D	1° 30'
R	3819.83
T	166.49
L	332.76
SE	.031'/.

NW RAMP

Δ	26.27806°
D	6° 00'
R	955.37
T	223.01
L	437.97
SE	.038'/.

E. BD. RAMP

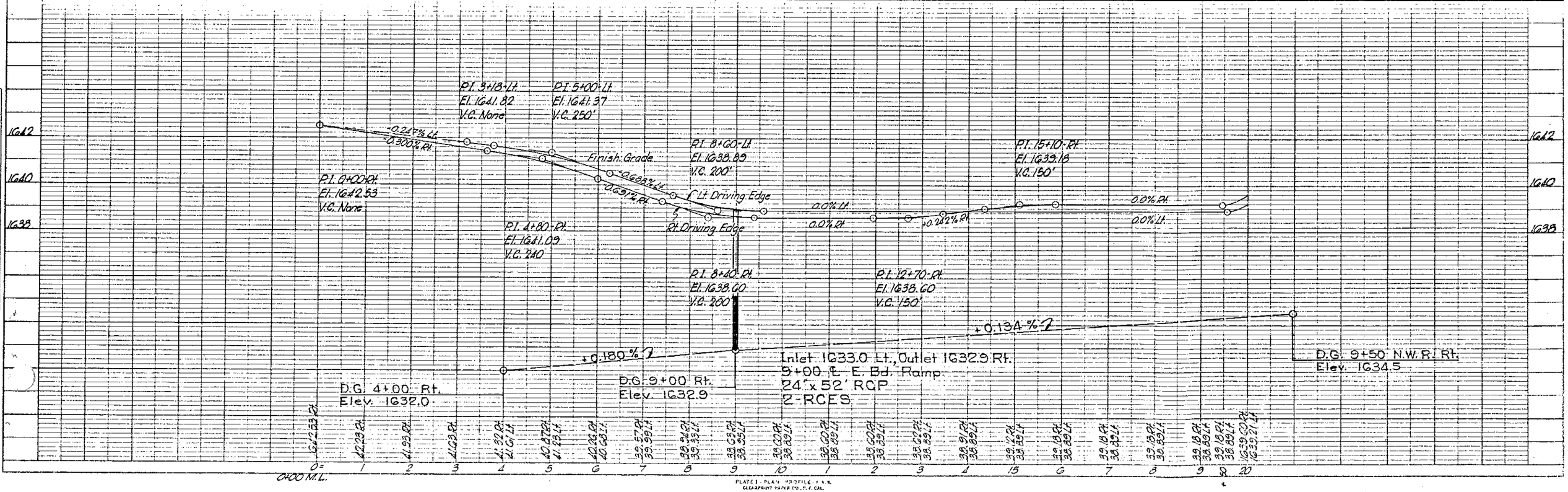


PLATE I - PLAN - PROFILE - Y & B
CLEARPRINT PAPER CO., S. F., CAL.
NO. 1000-1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

MAINLINE

MAINLINE
Δ = 41.99444°
D = 1° 30' (2-200' Sp.)
R = 3819.83
Ta = 1566.24
L = 2399.63
Sc = 1° 30'
Xa = 1.75
Ya = 199.99
SE = .035'/'.

P.I. 24+90.86 ML. IRON MONU.

NE RAMP
Δ = 19.96190°
D = 4° 00'
R = 1432.69
T = 251.87
L = 498.55
SE = .041'/'.

NW LOOP
Δ = 198.02562°
D = 43°00' (2-200' SP)
R = 136.42
L = 200'
Lc = 266.73 (ARC)
Xc = 48.08
Yc = 189.08
P = 11.44
q = 96.07
SE = .060'/'.

NW LOOP
Δ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043'/'.

E. BD. X-RD.
Δ = 14.97242°
D = 2° 30'
R = 2292.01
T = 301.19
L = 598.90
SE = .031'/'.

W. BD. X-RD.
Δ = 18.06416°
D = 6° 00'
R = 955.37
T = 151.86
L = 301.07
SE = .038'/'.

SE LOOP
Δ = 246.134790°
D = 36° (2-200' Sp.)
R = 161.80
Lc = 200'
L = 488.77 (Arc)
Xc = 40.74
Yc = 192.29
P = 9.84
q = 97.20
SE = .060'/'.

SE RAMP
Δ = 31.69306°
D = 5° 00'
R = 1146.28
T = 325.37
L = 633.86
SE = .056'/'.

EXIST. RD.
Δ = 22.51667°
D = 10 30'
R = 3819.83
T = 760.38
L = 1501.11

W. BD. X-RD.
Δ = 17.80472°
D = 5° 00'
R = 1146.28
T = 179.55
L = 356.09
SE = .034'/'.

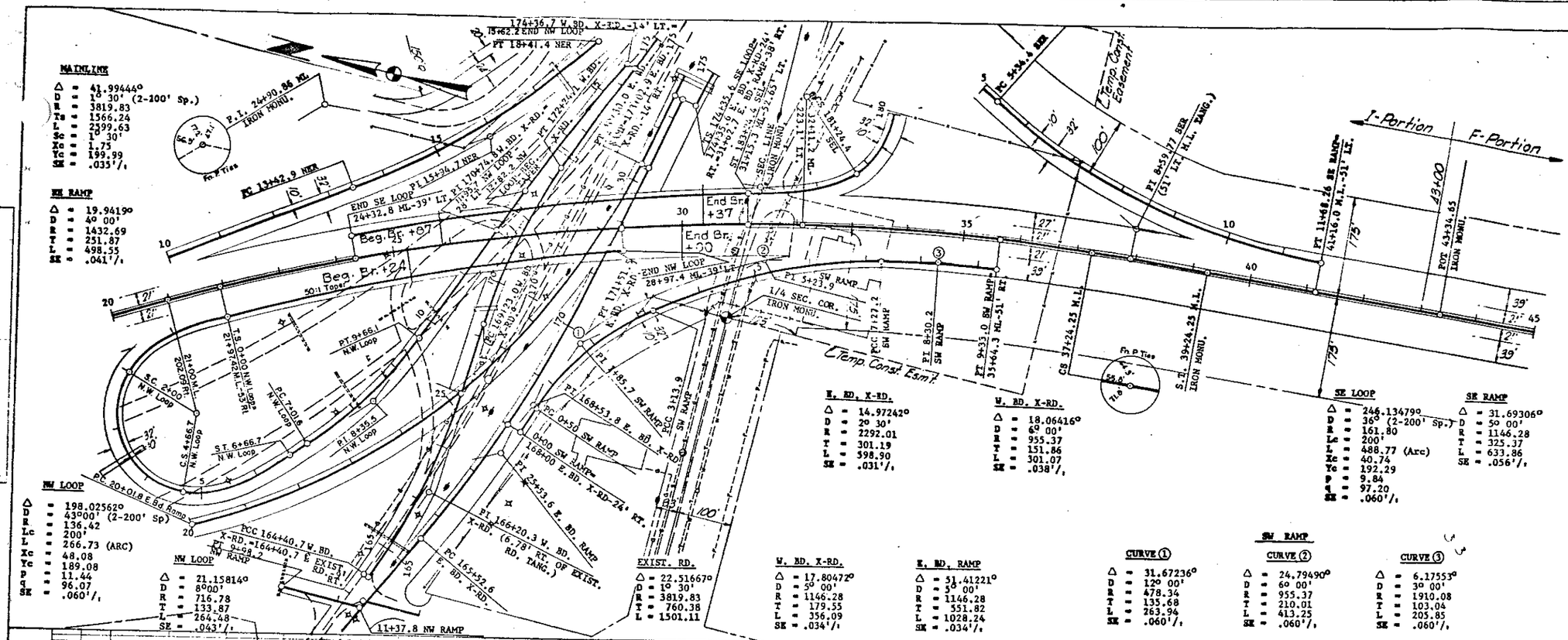
E. BD. RAMP
Δ = 51.41221°
D = 5° 00'
R = 1146.28
T = 551.82
L = 1028.24
SE = .034'/'.

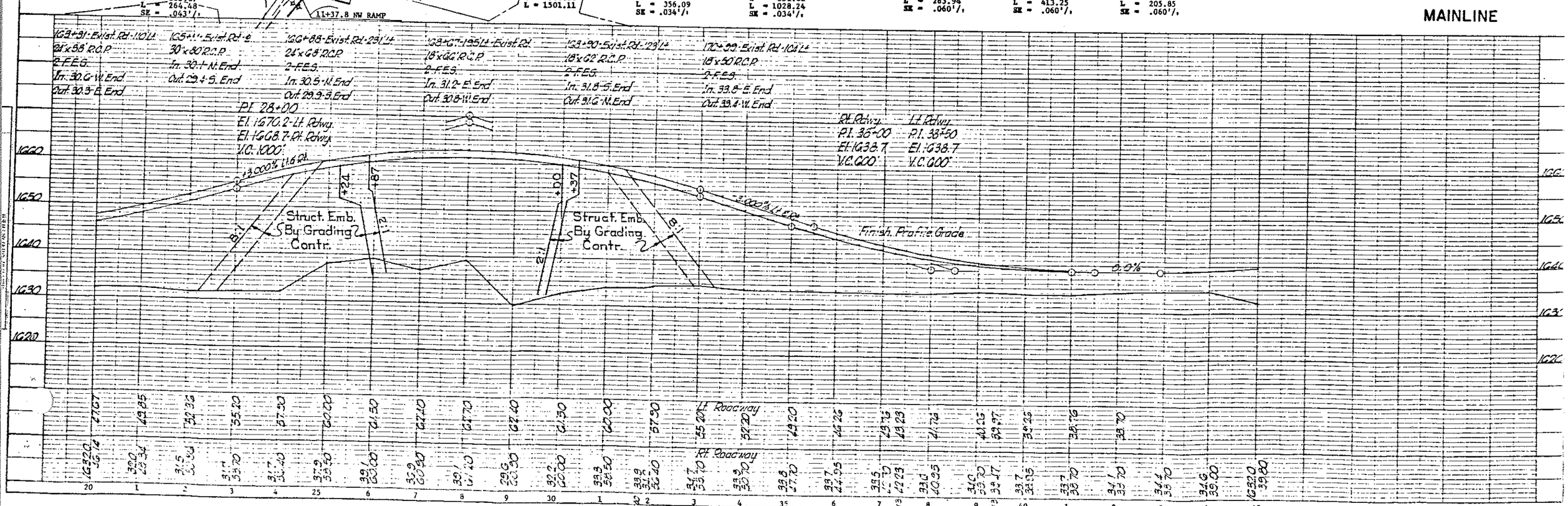
SW RAMP

CURVE ①
Δ = 31.67236°
D = 12° 00'
R = 478.34
T = 135.68
L = 263.94
SE = .060'/'.

CURVE ②
Δ = 24.79490°
D = 6° 00'
R = 955.37
T = 210.01
L = 413.25
SE = .060'/'.

CURVE ③
Δ = 6.17553°
D = 3° 00'
R = 1910.08
T = 103.04
L = 205.85
SE = .060'/'.





STATE	FED. AID PROJ. NO.	SHEET NO.
G	N.D.	

NW LOOP
△ = 198.02562°
D = 43°00' (2-200' SP.)
R = 136.42
Lc = 200'
L = 266.73 (ARC)
Xc = 48.08
Yc = 189.08
p = 11.44
q = 96.07
SE = .060'/.

NW LOOP
△ = 21.15814°
D = 8°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043'/.

EXIST. RD.
△ = 22.51667°
D = 1° 30'
R = 3819.83
T = 760.38
L = 1501.11

E. BD. RAMP
△ = 51.41221°
D = 50.00'
R = 1146.28
T = 551.82
L = 1028.24
SE = .034'/.

E. SERVICE ROAD
△ = 22.23333°
D = 6° 00'
R = 955.37
T = 187.72
L = 370.52

SE RAMP
△ = 13.00000°
D = 6° 00'
R = 955.37
T = 108.85
L = 216.67
SE = .021'/.

E. BD. RAMP

Temp. Const. Esmt.

Temp. Const. Esmt.

P.I. 24+30
El. 1662.15-Rt.
El. 1661.67-Lt.
V.C. 344'

Rt. Driving Edge
Lt. Driving Edge
Finish Grade

P.I. 20+47.2-Rt.
El. 39.18
V.C. 200'

P.I. 20+50.3-Lt.
El. 38.89
V.C. 190'

P.I. 28+95-Lt.
El. 1633.77
V.C. 180'

P.I. 28+97-Rt.
El. 1634.13
V.C. 186'

P.I. 32+13.3-Lt.
El. 1637.91
V.C. 220'

P.I. 34+09.1-Rt.
El. 1637.41
V.C. 230'

Finish Grade
Rt. Driving Edge
Lt. Driving Edge

In. 31.0-Lt.
Out 30.9-Rt.
52+00-℄
Obl. 24"x68' RCP
4-RCES

PLATE & PLAN PROFILE - C.A.S.
CLEARPRINT PAPER CO., S.F. CAL.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	I-194-4(35)	

MAINLINE

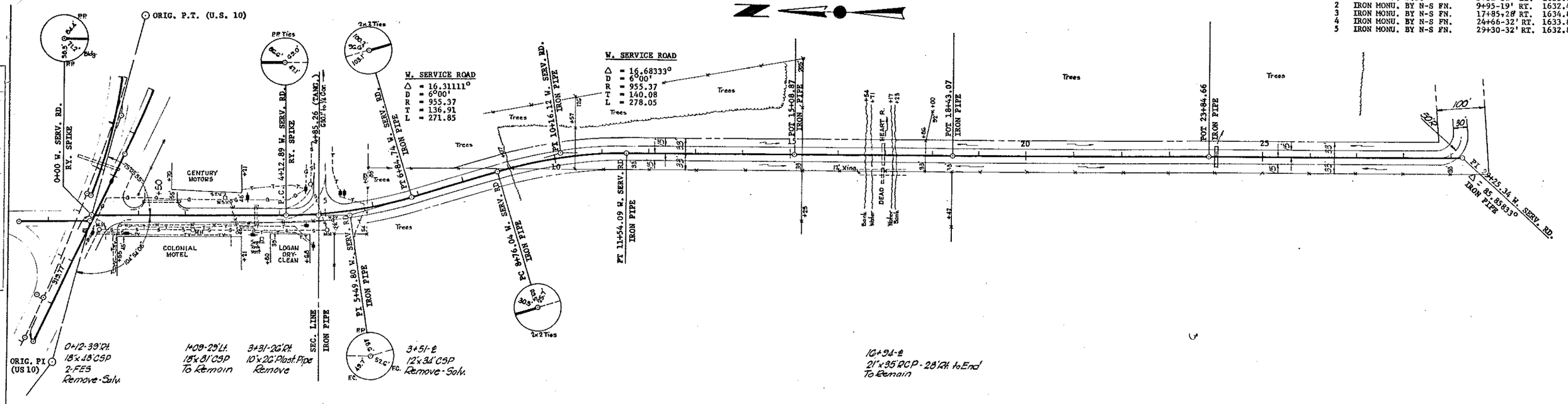
DRAINAGE DATA
Sta. 45+80 - 48" RCP
Drainage Area = 110 Acres
Design Discharge = 95 CFS (50 Yr.)
Design H.W. = 4.8 Ft.
Design Velocity = 11.0 FPS
Max. Stage Elev. 1633.1
Design Discharge = 118 CFS (100 Yr.)
Max. Stage Elev. = 1634.2

PLATE 1 PLAN PROFILE - F.A.S.
CLEARPRINT PAPER CO., S. F. CAL.
NO. 1300H-1

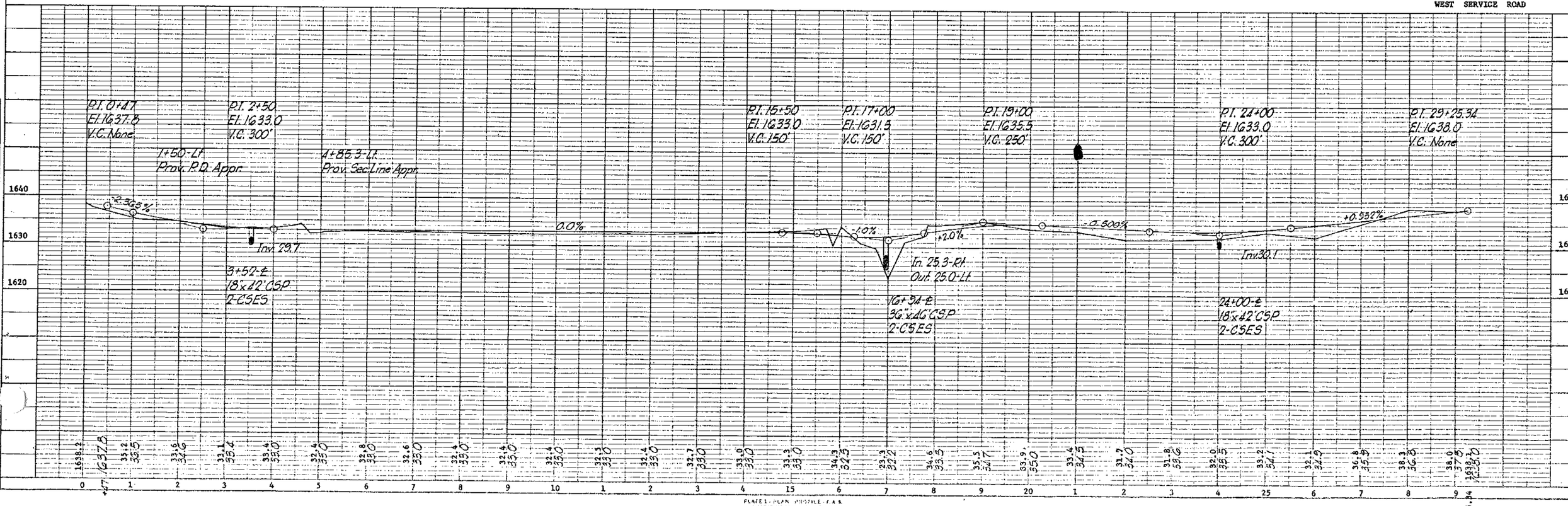
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
1	PAINT SPOT ON NW COR. SW	1+66-52' LT.	1633.80
A	NAIL IN N. P.P.	5+32-38' LT.	1633.60
2	IRON MONU. BY N-S FN.	9+95-19' RT.	1632.47
3	IRON MONU. BY N-S FN.	17+85+28' RT.	1634.85
4	IRON MONU. BY N-S FN.	24+66-32' RT.	1633.82
5	IRON MONU. BY N-S FN.	29+30-32' RT.	1632.81



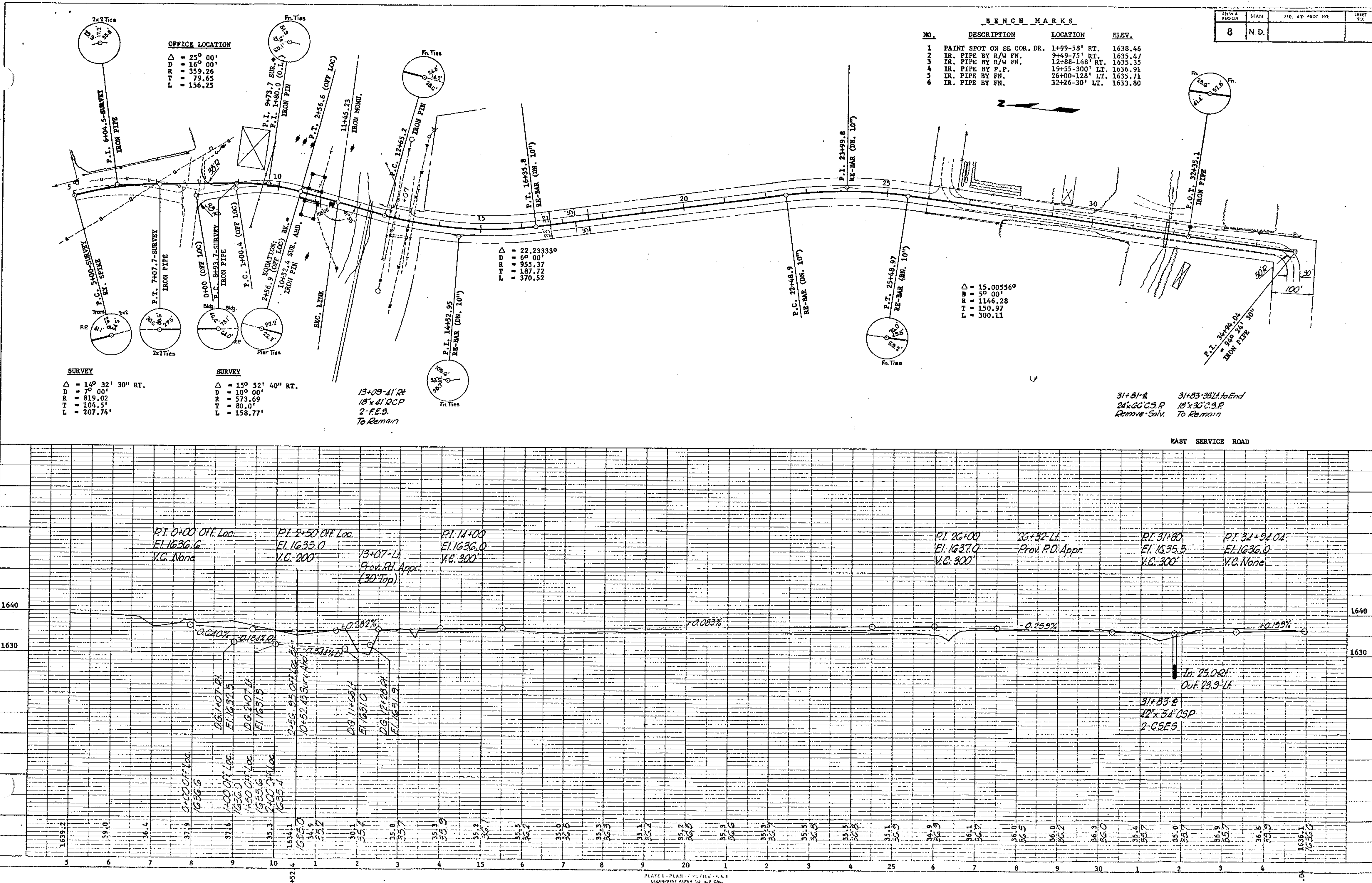
WEST SERVICE ROAD



FHWA REGION	STATE	FED. AID PROJ NO.	SHEET NO.
8	N.D.		

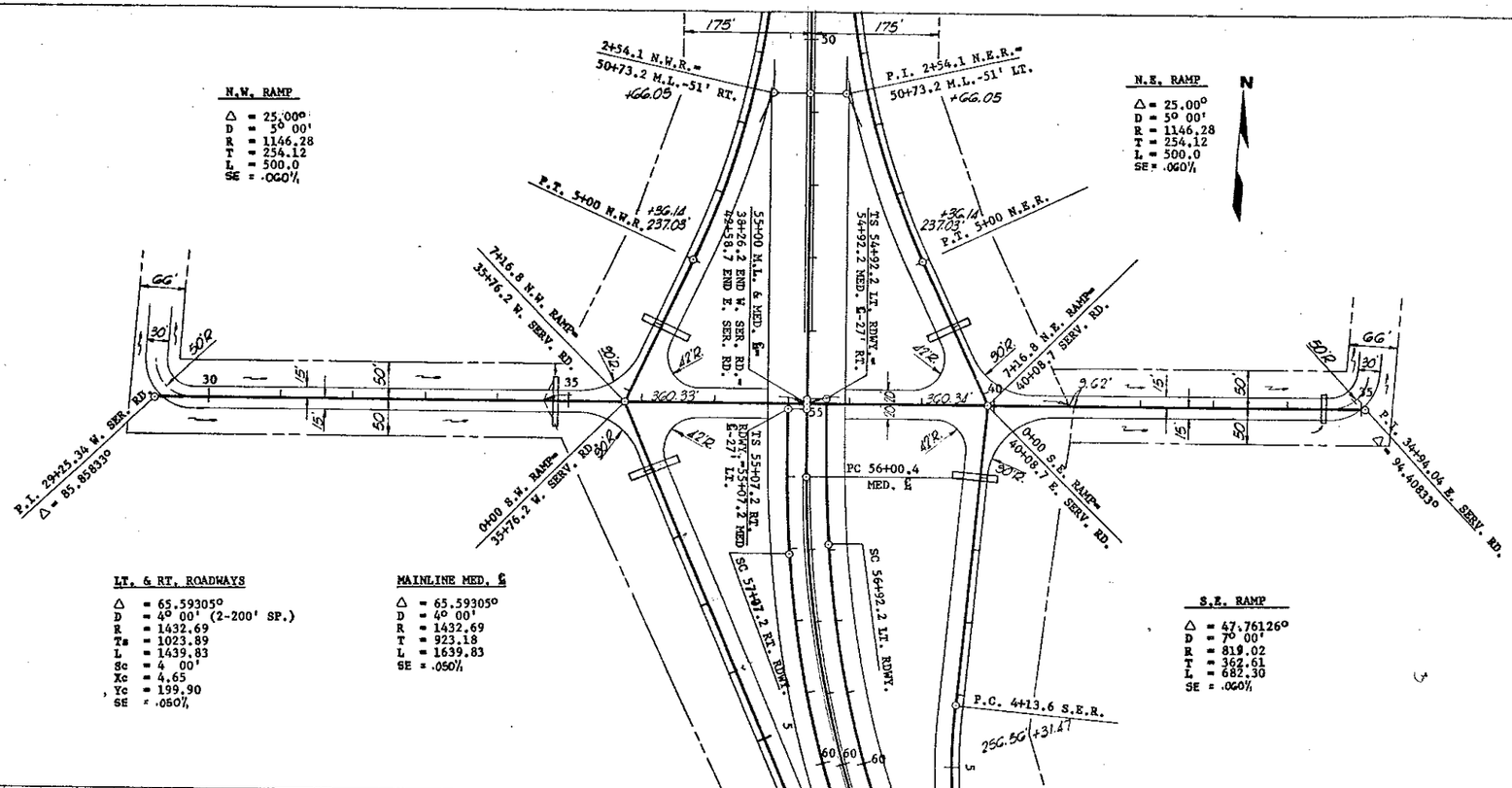
BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
1	PAINT SPOT ON SE COR. DR.	1+99-58' RT.	1638.46
2	IR. PIPE BY R/W FN.	9+49-75' RT.	1635.47
3	IR. PIPE BY R/W FN.	12+88-148' RT.	1635.35
4	IR. PIPE BY P.P.	19+55-300' LT.	1636.91
5	IR. PIPE BY FN.	26+00-128' LT.	1635.71
6	IR. PIPE BY FN.	32+26-30' LT.	1633.80



OFFICE LOCATION
Δ = 25° 00'
D = 16° 00'
R = 359.26
T = 79.65
L = 156.25
P.I. 6+04.5-SURVEY IRON PIPE
P.I. 9+73.7 SUR.
P.I. 1+80.0 (O.L.) IRON PIN
P.T. 2+56.6 (OFF LOC)
11+45.23 IRON MONU.
P.C. 12+65.2 IRON PIN
P.T. 16+35.8 RE-BAR (DN. 10")
P.I. 23+99.8 RE-BAR (DN. 10")
P.O.T. 32+35.1 IRON PIPE
P.C. 5+00-SURVEY RY. SPIKE
P.T. 7+07.7-SURVEY IRON PIPE
0+00 (OFF LOC)
P.C. 8+93.7-SURVEY IRON PIPE
P.C. 1+00.4 (OFF LOC)
EQUATION: 2+56.9 (OFF LOC) BK.= 10+52.4 SUR. AHD. IRON PIN
SEC. LINE
P.I. 14+52.95 RE-BAR (DN. 10")
P.C. 22+48.9 RE-BAR (DN. 10")
P.T. 25+48.97 RE-BAR (DN. 10")
P.I. 34+94.04 = 94° 24' 30" IRON PIPE
Δ = 22.23333°
D = 6° 00'
R = 955.37
T = 187.72
L = 370.52
Δ = 15.00556°
D = 5° 00'
R = 1146.28
T = 150.97
L = 300.11
SURVEY
Δ = 14° 32' 30" RT.
D = 7° 00'
R = 819.02
T = 104.5'
L = 207.74'
SURVEY
Δ = 15° 52' 40" RT.
D = 10° 00'
R = 573.69
T = 80.0'
L = 158.77'
13+08-41' Rt.
18"x 41' RCP
2-F.E.S.
To Remain
31+81-℄
24"x 66' C.S.P.
Remove-Salv.
31+83-38' Lt. to End
18"x 36' C.S.P.
To Remain
EAST SERVICE ROAD
P.I. 0+00 Off Loc.
El. 1636.6
V.C. None
P.I. 2+50 Off Loc.
El. 1635.0
V.C. 200'
13+07-Lt.
Prov. Rd. Appr.
(30' Top)
P.I. 14+00
El. 1636.0
V.C. 300'
P.I. 26+00
El. 1637.0
V.C. 300'
26+32-Lt.
Prov. P.D. Appr.
P.I. 31+80
El. 1635.5
V.C. 300'
P.I. 34+94.04
El. 1636.0
V.C. None
-0.640%
-0.184% Rt.
-0.544% Lt.
+0.282%
+0.083%
-0.259%
+0.159%
In 25.0-Rt.
Out 23.9-Lt.
31+83-℄
42"x 54' CSP
2-CSES
1640
1630
PLATE 1 - PLAN - PROFILE - F.A.S.
CLEARPRINT PAPER CO., S.F. CAL.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		



SERVICE ROAD CROSSROAD

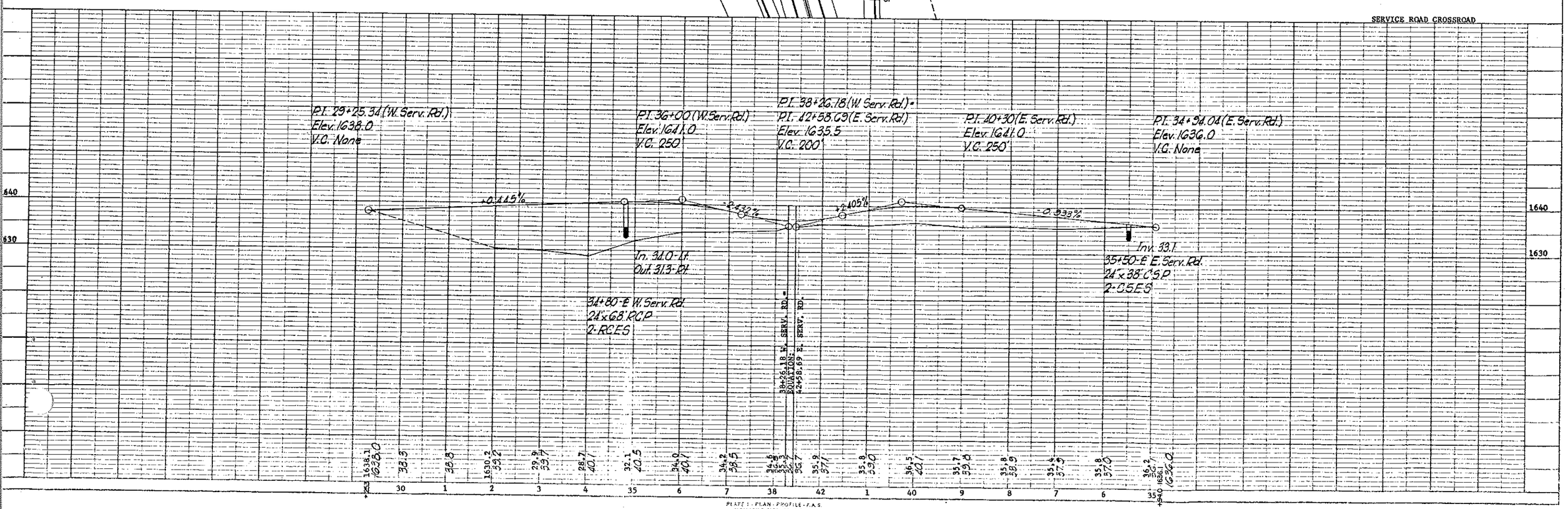
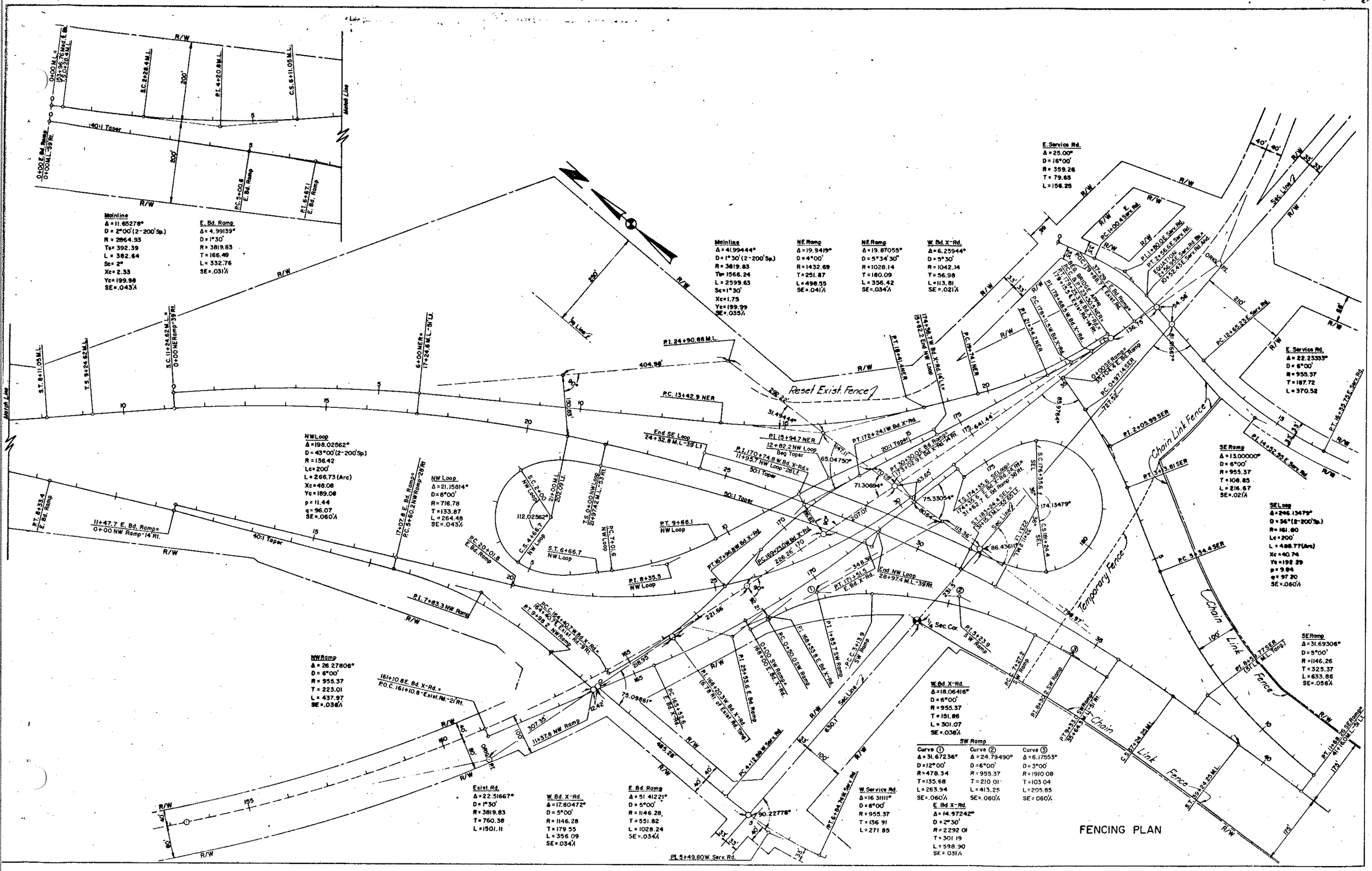
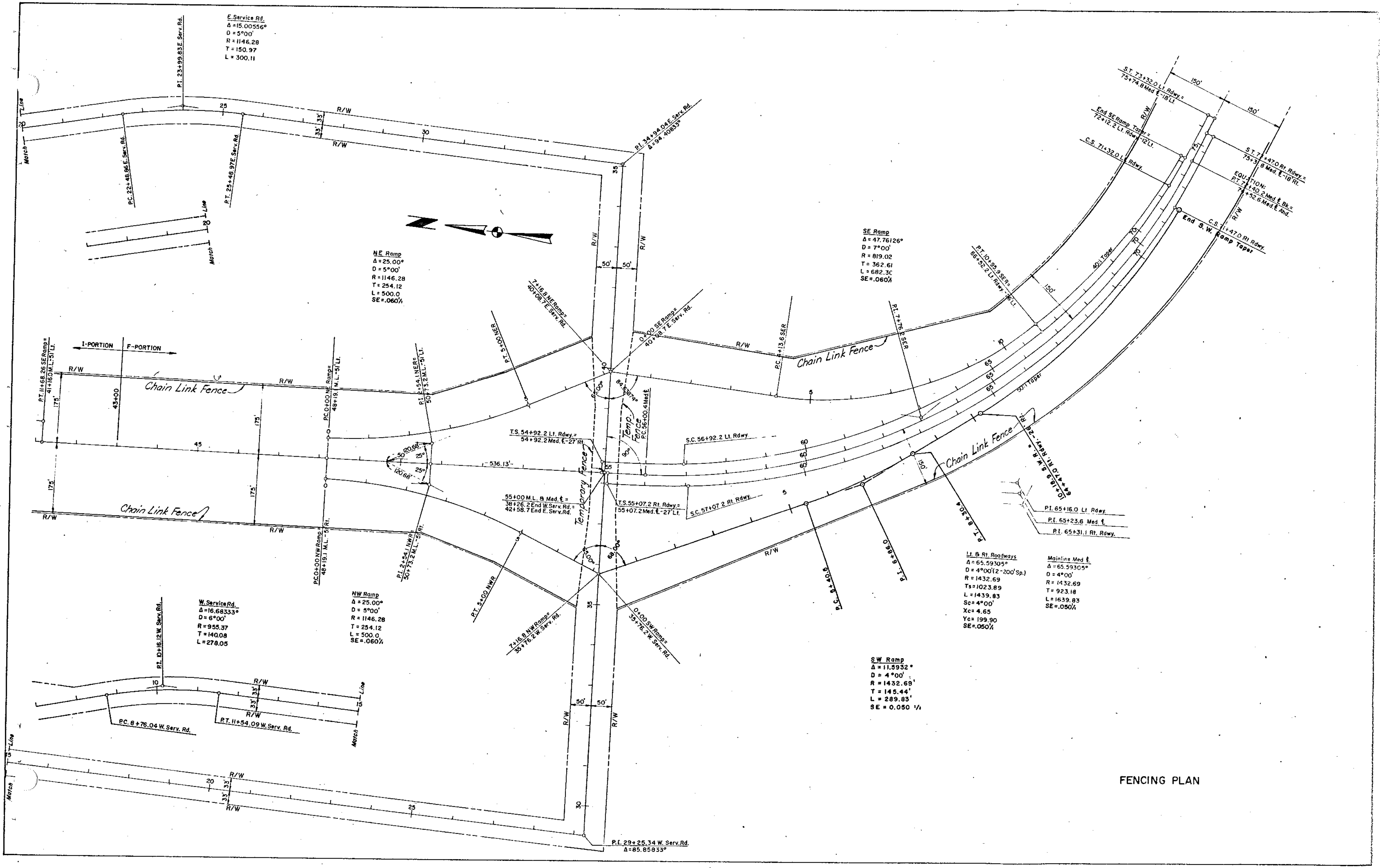


PLATE 1 - PLAN - PROFILE - F.A.S.
CLEARPRINT PAPER CO., S. F. CAL.
NO 1000-1

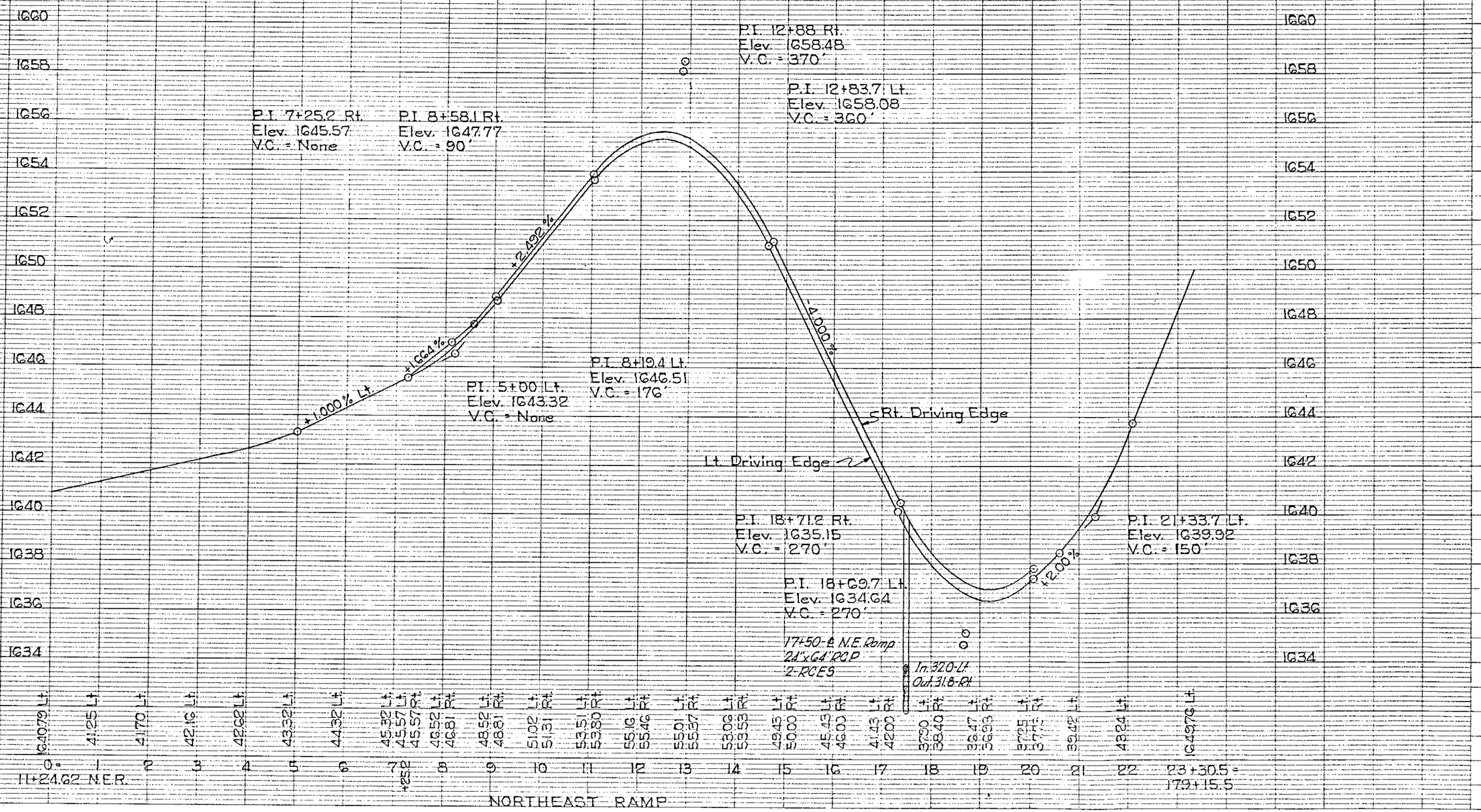

Mainline
Δ = 11.65278°
D = 2°00' (2-200' Sp.)
R = 2864.93
Ts = 392.39
L = 382.64
Sc = 2°
Xc = 2.33
Yc = 199.98
SE = .043/h
E. Bd. Ramp
Δ = 4.99139°
D = 1°30'
R = 3819.83
T = 166.49
L = 332.76
SE = .031/h
Mainline
Δ = 41.99444°
D = 1°30' (2-200' Sp.)
R = 3819.83
Ts = 1566.24
L = 2599.63
Sc = 1°30'
Xc = 1.75
Yc = 199.99
SE = .035/h
NE Ramp
Δ = 19.9419°
D = 4°00'
R = 1432.69
T = 251.87
L = 498.55
SE = .041/h
NE Ramp
Δ = 19.87055°
D = 5°34'30"
R = 1028.14
T = 180.09
L = 356.42
SE = .034/h
W. Bd. X-Rd.
Δ = 6.25944°
D = 5°30'
R = 1042.14
T = 56.98
L = 113.81
SE = .021/h
E. Service Rd.
Δ = 25.00°
D = 16°00'
R = 359.26
T = 79.65
L = 156.25
E. Service Rd.
Δ = 22.23333°
D = 6°00'
R = 955.37
T = 187.72
L = 370.52
SE Ramp
Δ = 13.00000°
D = 6°00'
R = 955.37
T = 108.85
L = 216.67
SE = .021/h
SE Loop
Δ = 246.13479°
D = 36°(2-200' Sp.)
R = 159.80
Lc = 200'
L = 686.77 (Arc)
Xc = 140.74
Yc = 192.29
p = 9.84
q = 97.20
SE = .060/h
SE Ramp
Δ = 31.69306°
D = 5°00'
R = 1146.26
T = 325.37
L = 633.86
SE = .056/h
NW Loop
Δ = 198.02562°
D = 43°00' (2-200' Sp.)
R = 136.42
Lc = 200'
L = 266.73 (Arc)
Xc = 48.08
Yc = 189.08
p = 11.44
q = 96.07
SE = .060/h
NW Loop
Δ = 21.15814°
D = 6°00'
R = 716.78
T = 133.87
L = 264.48
SE = .043/h
NW Ramp
Δ = 26.27806°
D = 6°00'
R = 955.37
T = 223.01
L = 437.97
SE = .036/h
Exist. Rd.
Δ = 22.51667°
D = 1°30'
R = 3819.83
T = 760.38
L = 1501.11
W. Bd. X-Rd.
Δ = 17.80472°
D = 5°00'
R = 1146.28
T = 179.55
L = 356.09
SE = .034/h
E. Bd. Ramp
Δ = 51.41221°
D = 5°00'
R = 1146.28
T = 551.82
L = 1028.24
SE = .034/h
W. Bd. X-Rd.
Δ = 18.06416°
D = 6°00'
R = 955.37
T = 151.86
L = 301.07
SE = .038/h
SW Ramp
Curve ① Δ = 31.67236° D = 12°00' R = 478.34 T = 135.68 L = 263.94 SE = .060/h
Curve ② Δ = 24.79490° D = 6°00' R = 955.37 T = 210.01 L = 413.25 SE = .060/h
Curve ③ Δ = 6.17553° D = 3°00' R = 1910.08 T = 103.04 L = 205.85 SE = .060/h
W. Service Rd.
Δ = 16.31111°
D = 6°00'
R = 955.37
T = 136.91
L = 271.85
E. Bd X-Rd.
Δ = 14.97242°
D = 2°30'
R = 2292.01
T = 301.19
L = 598.90
SE = .031/h
FENCING PLAN



E. Service Rd.
Δ = 15.00556°
D = 5°00'
R = 1146.28
T = 150.97
L = 300.11
NE Ramp
Δ = 25.00°
D = 5°00'
R = 1146.28
T = 254.12
L = 500.0
SE = .060'/'
SE Ramp
Δ = 47.76126°
D = 7°00'
R = 819.02
T = 362.61
L = 682.30
SE = .060'/'
NW Ramp
Δ = 25.00°
D = 5°00'
R = 1146.28
T = 254.12
L = 500.0
SE = .060'/'
W. Service Rd.
Δ = 16.68333°
D = 6°00'
R = 955.37
T = 140.08
L = 278.05
SW Ramp
Δ = 11.5932°
D = 4°00'
R = 1432.69'
T = 145.44'
L = 289.83'
SE = 0.050 '/'
Lt. & Rt. Roadways
Δ = 65.59305°
D = 4°00' (2-200' Sp.)
R = 1432.69
Ts = 1023.89
L = 1439.83
Sc = 4°00'
Xc = 4.65
Yc = 199.90
SE = .050'/'
Mainline Med. ℄
Δ = 65.59305°
D = 4°00'
R = 1432.69
T = 923.18
L = 1639.83
SE = .050'/'
I-PORTION
F-PORTION
Chain Link Fence
Temporary Fence
Temp. Fence
R/W
Match Line
P.I. 29+25.34 W. Serv. Rd.
Δ = 85.85833°
P.I. 34+94.04 E. Serv. Rd.
Δ = 94.40833°
P.I. 65+16.0 Lt. Rdwy.
P.I. 65+23.6 Med. ℄
P.I. 65+31.1 Rt. Rdwy.
T.S. 54+92.2 Lt. Rdwy. = 54+92.2 Med. ℄ -27' Rt.
S.C. 56+92.2 Lt. Rdwy.
T.S. 55+07.2 Rt. Rdwy. = 55+07.2 Med. ℄ -27' Lt.
S.C. 57+07.2 Rt. Rdwy.
55+00 M.L. & Med. ℄ = 38+26.2 End W. Serv. Rd. = 42+58.7 End E. Serv. Rd.
FENCING PLAN

FED ROAD DIST No	STATE	FEDERAL PROJ No	SHEET No.

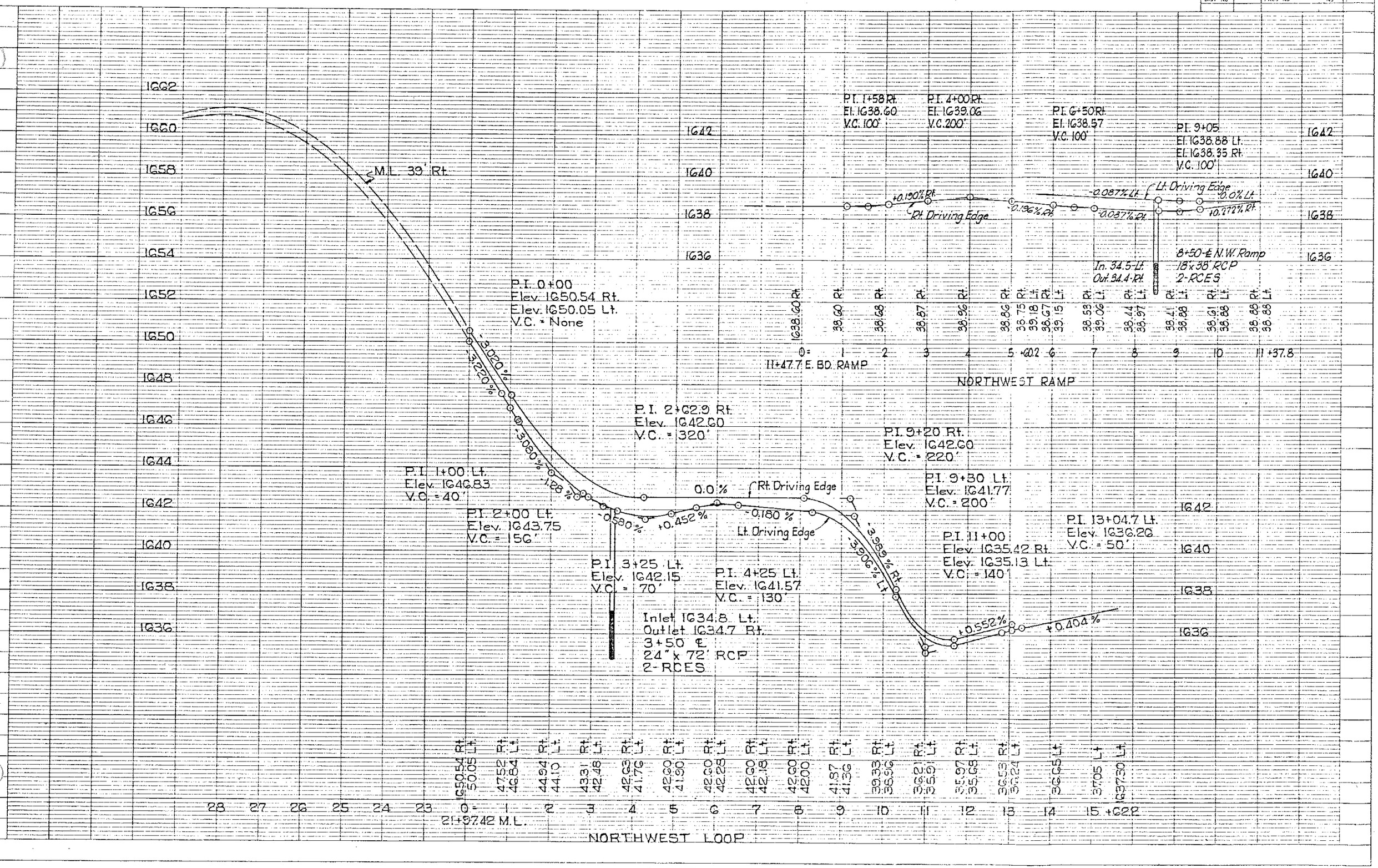
PROFILES: ALIGNMENT CHECKED — RT. OF WAY CHECKED —
NOTE BOOK NO.
GRADES CHECKED — B.M.'s NOTED — STRUCTURE NOTATIONS CHKD



FULL PROFILE DOTTED
CHARLES BRUNING COMPANY, INC.

State Proj. No. _____ Sheet No. ____ of ____ Sheets

FED ROAD DIST No	STATE	FEDERAL PROJ No	SHEET No.



FULL PROFILE DOTTED
CHARLES BRUNING COMPANY, INC.

State Proj. No. ________ Sheet No. ____ of ____ Sheets

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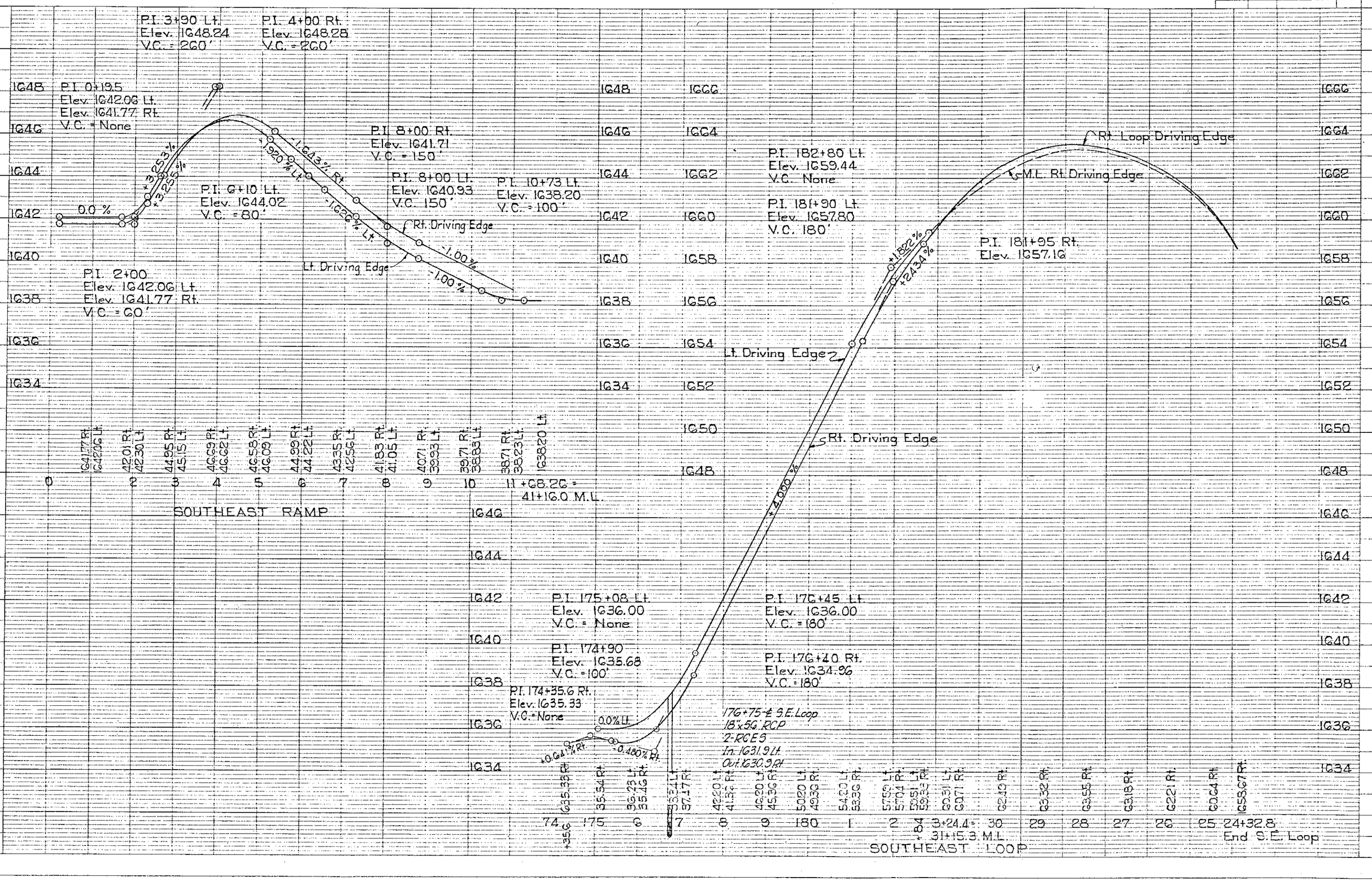


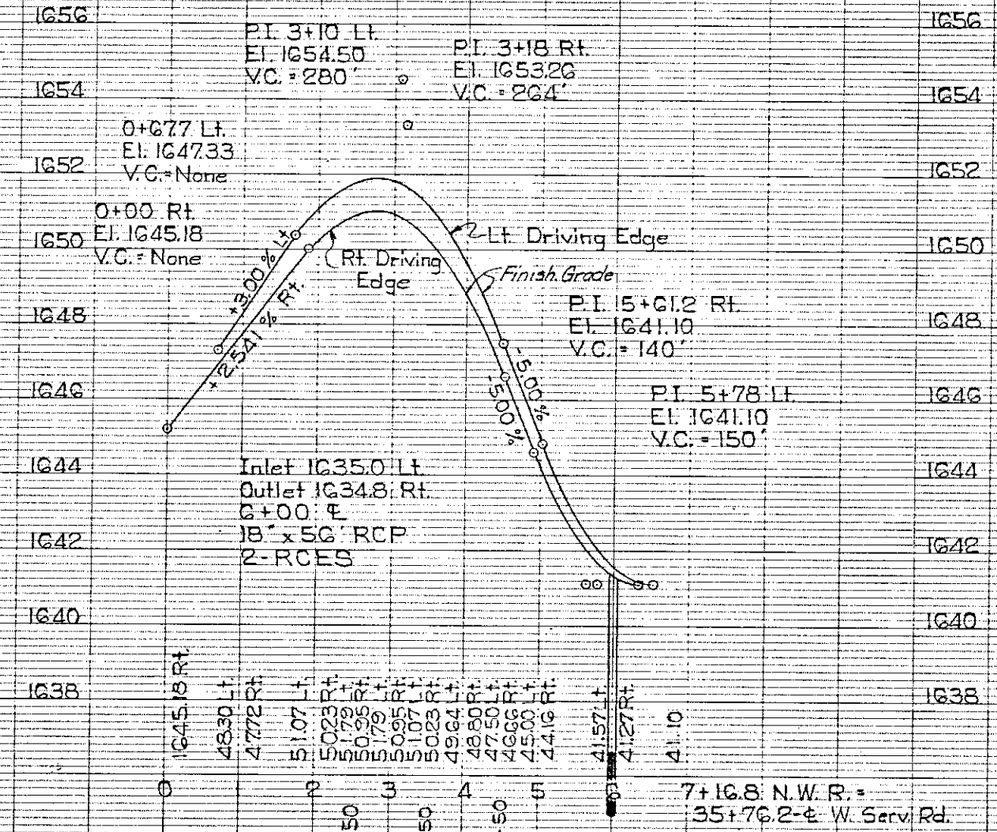
NOTE BOOK NO.
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED

NOTE BOOK NO.
GRADES CHECKED
B.M.s NOTED
STRUCTURE NOTAT'NS CH'KD

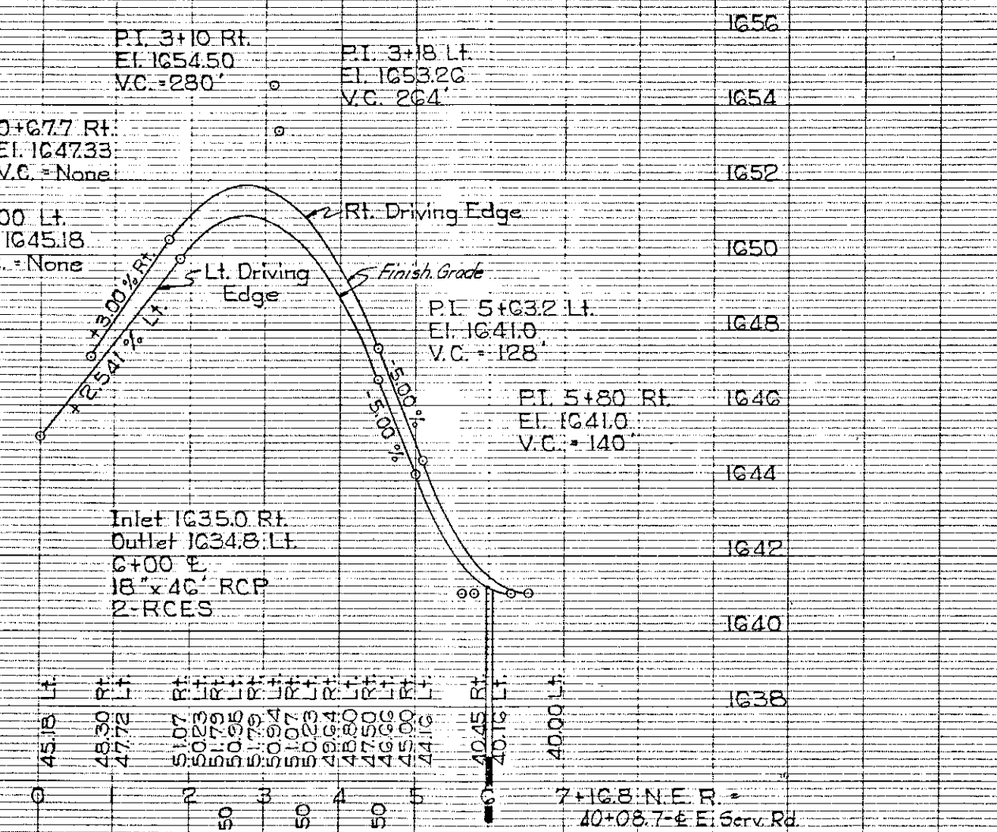
FULL PROFILE DOTTED
CHARLES BRUNING COMPANY, INC.

State Proj. No.________ Sheet No.____of____Sheets

FED ROAD DIST No	STATE	FEDERAL PROJ No	SHEET No
8	N.D.		



NORTHWEST RAMP GRADES

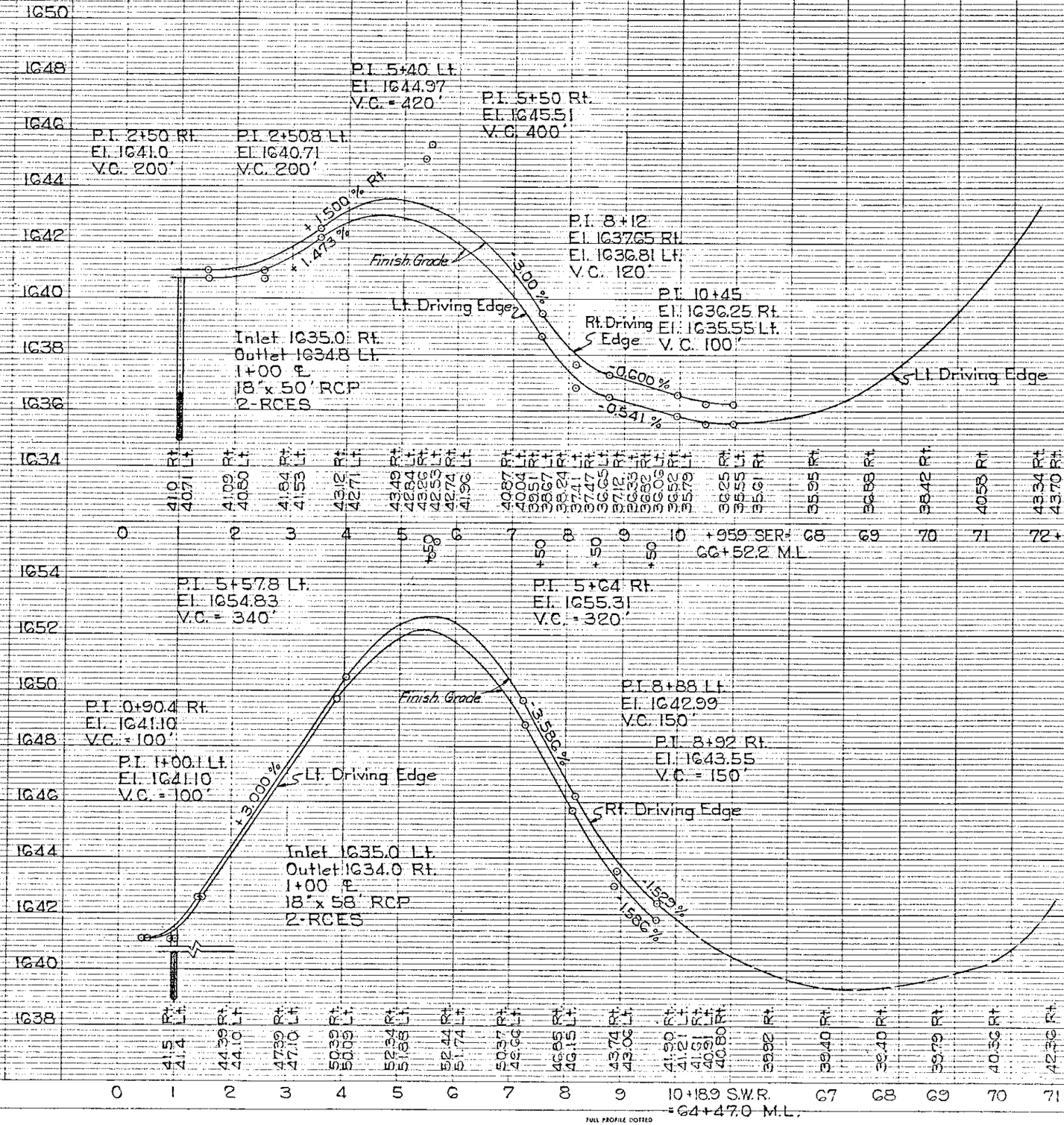


NORTHEAST RAMP GRADES

FULL PROFILE DOTTED
CHARLES SELMING COMPANY, INC.

State Proj. No. _____ Sheet No. ____ of ____ Sheets

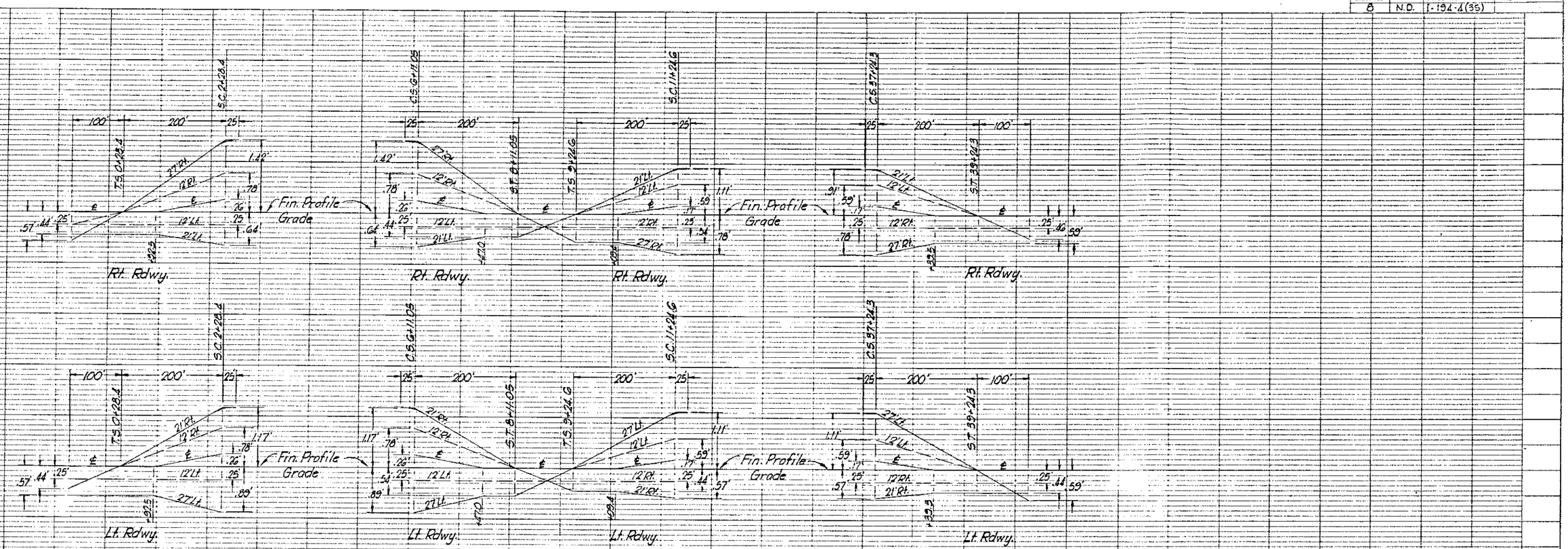
FED. ROAD DIST. No.	STATE	FEDERAL PROJ. No.	SHEET No.
8	N.D.		



FULL PROFILE DOTTED
CHARLES BRUNING COMPANY, INC.

State Proj. No. _____ Sheet No. ____ of ____ Sheets

FED. ROAD DIST. NO.	STATE	FEDERAL PROJ. NO.	SHEET NO.
8	N.D.	I-194-4(35)	



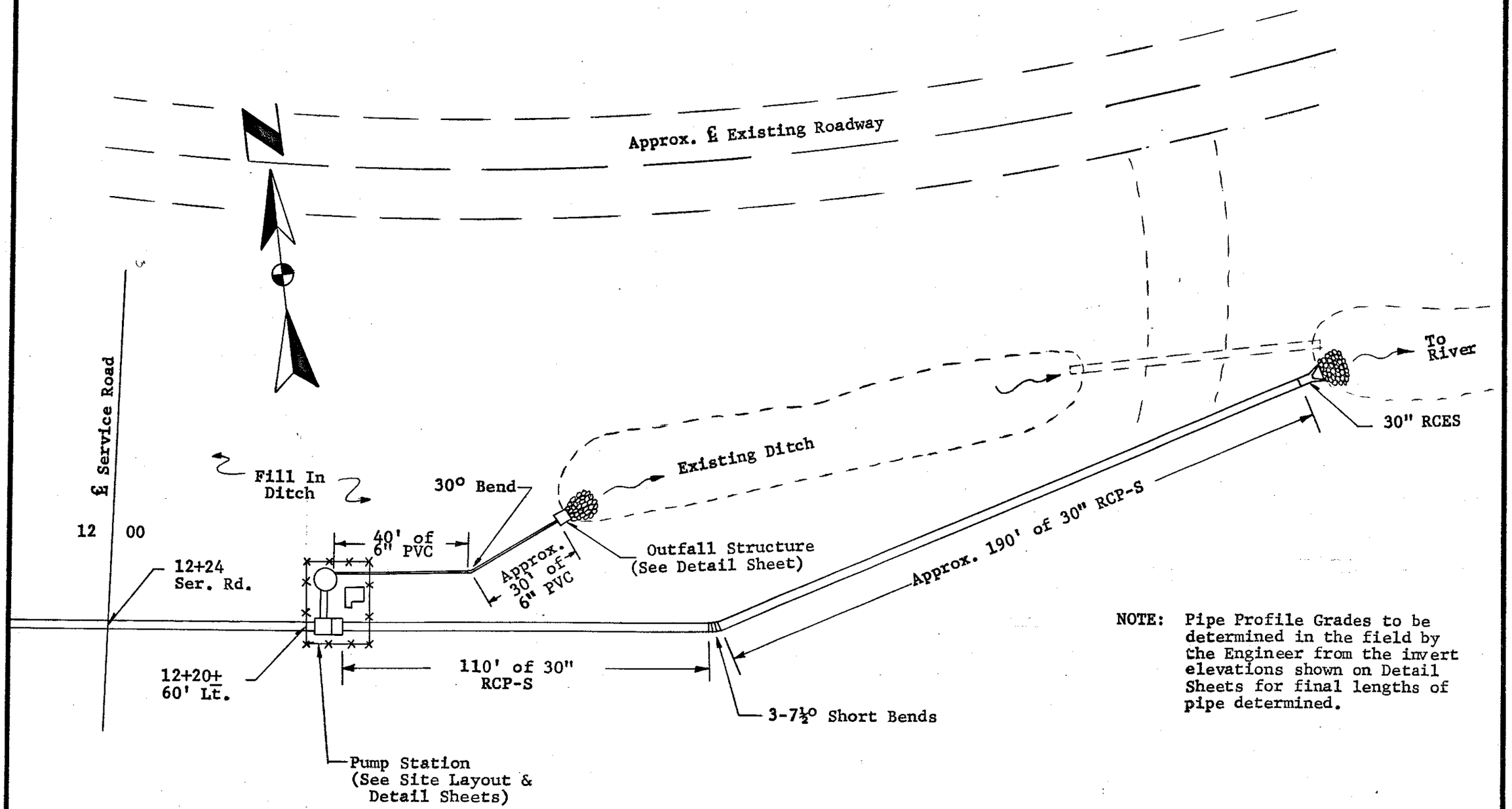
SUPERELEVATION TRANSITIONS - MAINLINE

FULL PROFILE DOTTED
CHARLES BROOKINS COMPANY, INC.

State Proj. No. _____ Sheet No. ____ of ____ Sheets

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	I-194-4(35)	

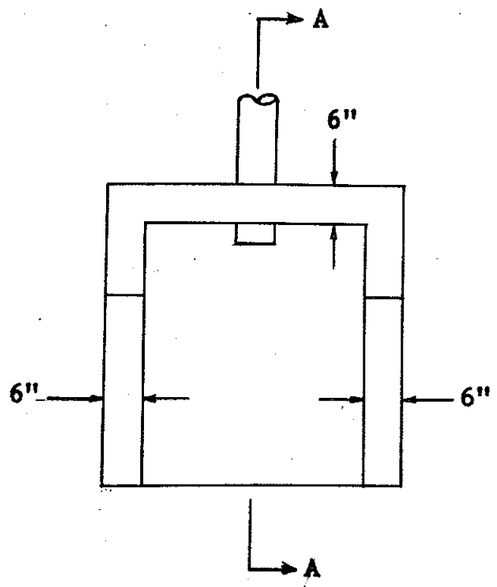
PUMP STATION & DISCHARGE PIPING PLAN LAYOUT



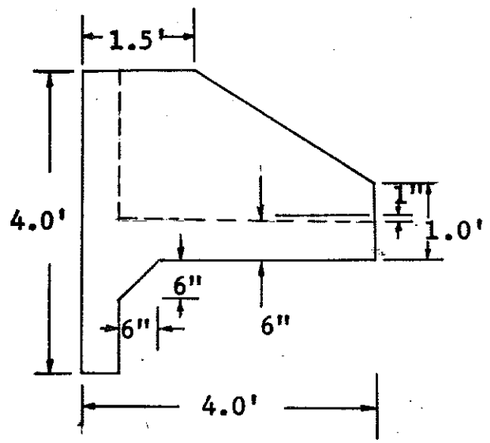
NOTE: Pipe Profile Grades to be determined in the field by the Engineer from the invert elevations shown on Detail Sheets for final lengths of pipe determined.

PUMP STATION OUTFALL PIPE STRUCTURE & RIPRAP DETAIL

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	I-194-4(35)	



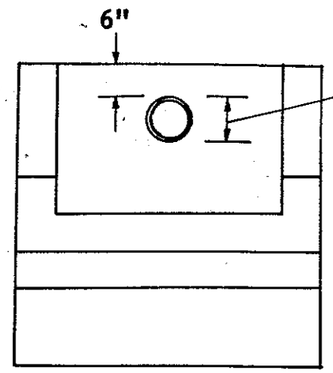
PLAN VIEW



SIDE VIEW

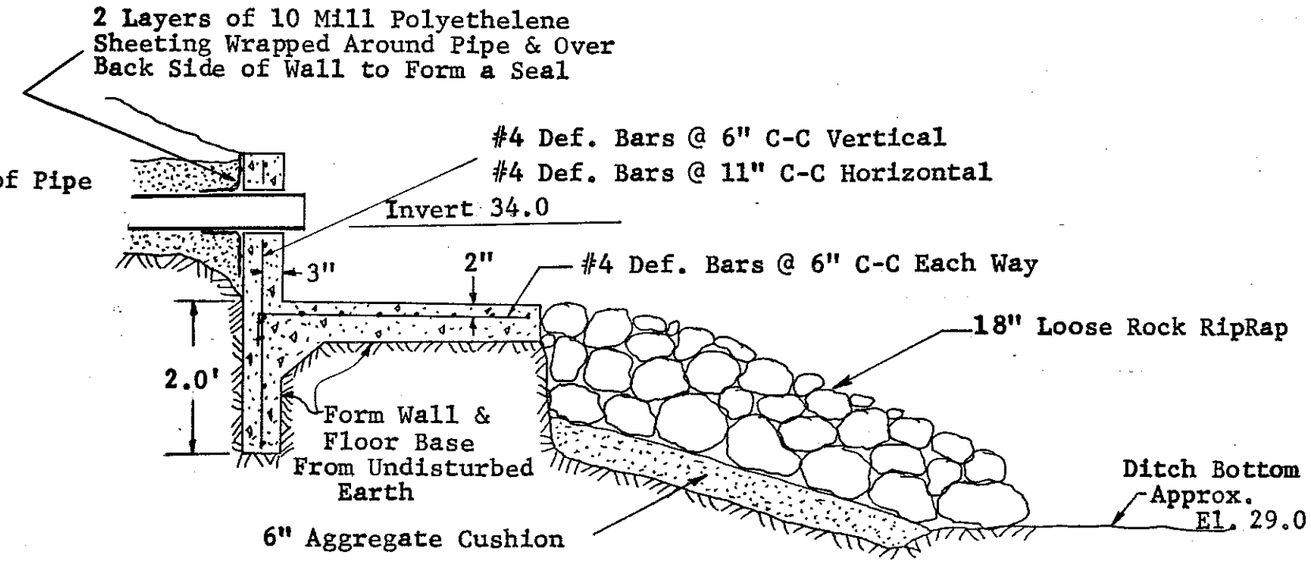
NOTES:

1. Limits of Riprap shall be determined by the Engineer in the field.
2. Outfall structure shall be constructed of Class AE Concrete. The cost of concrete, steel, labor and miscellaneous materials necessary to construct outfall structure shall be considered incidental to other items.



Hole ½" in Dia. Larger than O.D. of Pipe

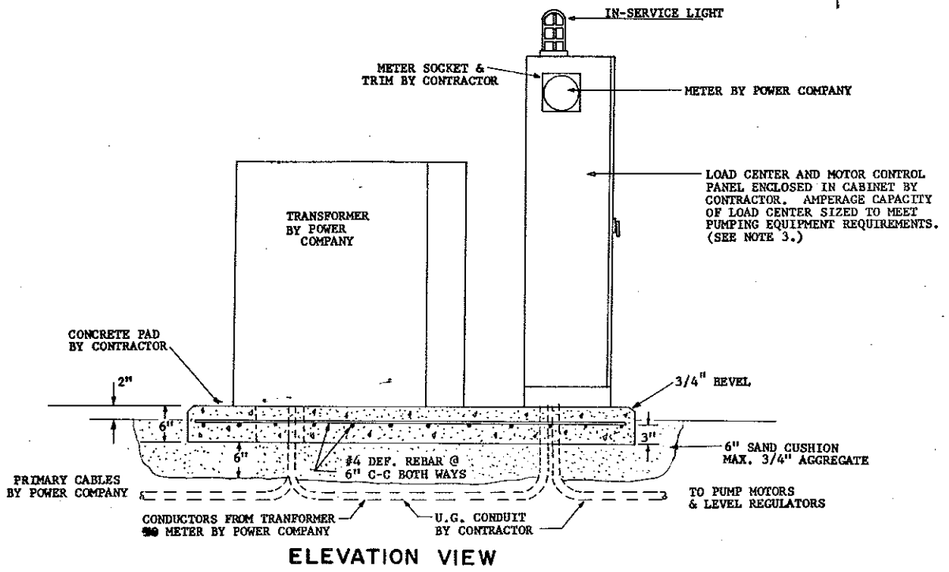
FRONT VIEW



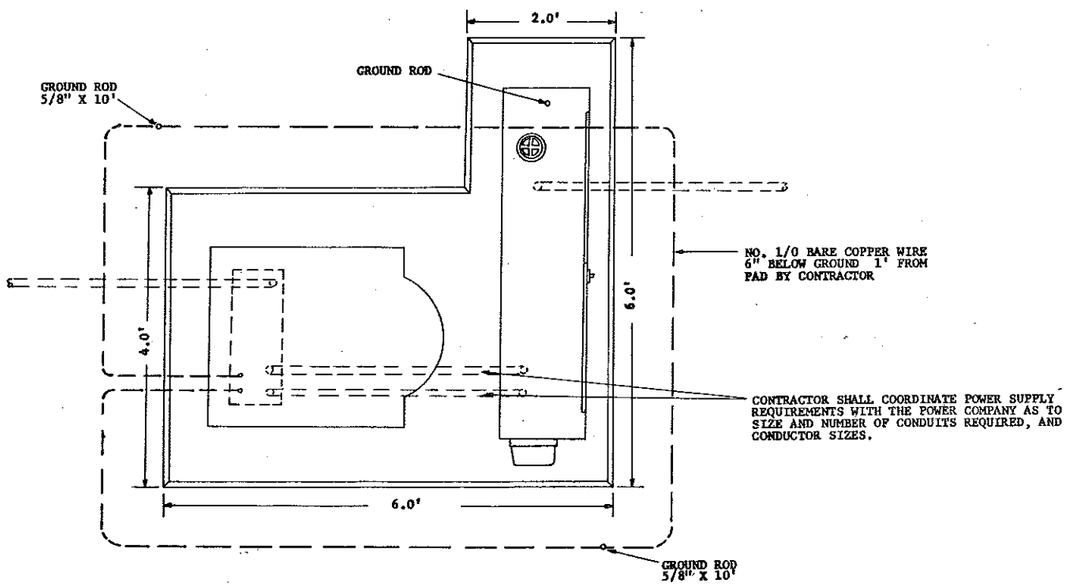
SEC. A-A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	I-194-4(35)	

TRANSFORMER PAD & CONTROL CABINET DETAILS



ELEVATION VIEW

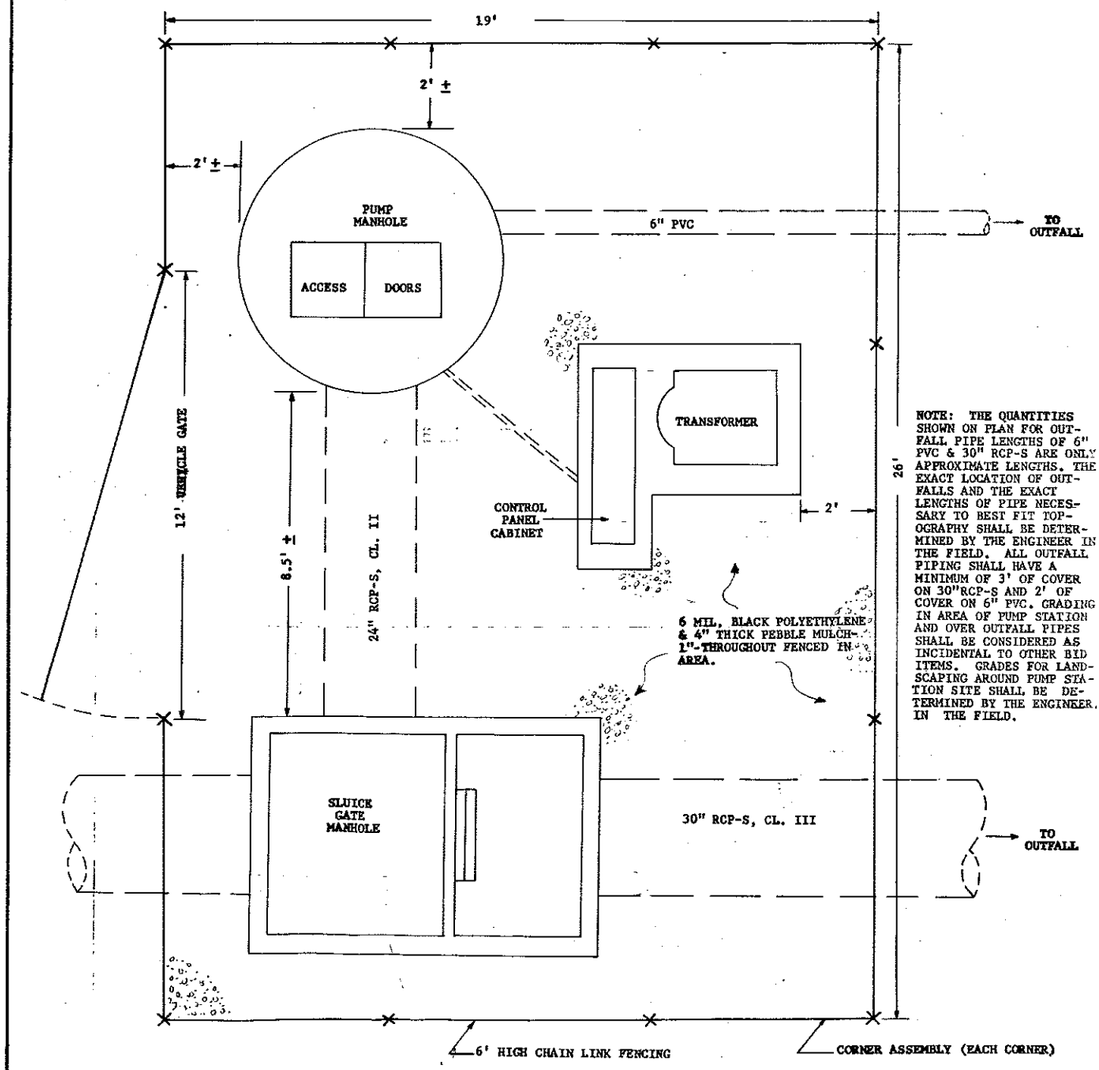


PLAN VIEW

NOTES:

1. CONTRACTOR SHALL CONSTRUCT TRANSFORMER PAD, WITH CONDUITS REQUIRED TO POWER COMPANY SPECIFICATIONS. POWER COMPANY WILL SUPPLY AND SET TRANSFORMER.
2. GROUNDING GRID: THE GROUNDING GRID SHALL HAVE A GROUND RESISTANCE NOT TO EXCEED 25 OHMS. THIS SHALL BE OBTAINED BY ONE OR MORE 5/8" X 10' COPPERWELD AROUND RODS IN PARALLEL OR SERIES AT TWO CORNERS. MINIMUM DISTANCE BETWEEN GROUND UNIT ASSEMBLIES SHALL BE 6'-0".
3. CABINET: CABINET SHALL BE 56" HIGH X 56" WIDE X 14" DEEP. MINIMUM 12 GA. STEEL WITH PROVISIONS FOR PADLOCK. CABINET SHALL BE WEATHERPROOF. CABINET SHALL HAVE ONE SHOP COAT OF RED LEAD AND TWO FIELD COATS OF EXTERIOR DARK GREEN ENAMEL.
4. THE EXACT LOCATION OF TRANSFORMER AND PANEL PAD SHALL BE DETERMINED BY ENGINEER IN THE FIELD, IN THE GENERAL LOCATION AS SHOWN ON PLANS.

PUMP STATION SITE LAYOUT & FENCE PLAN



NOTE: THE QUANTITIES SHOWN ON PLAN FOR OUTFALL PIPE LENGTHS OF 6" PVC & 30" RCP-S ARE ONLY APPROXIMATE LENGTHS. THE EXACT LOCATION OF OUTFALLS AND THE EXACT LENGTHS OF PIPE NECESSARY TO BEST FIT TOPOGRAPHY SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD. ALL OUTFALL PIPING SHALL HAVE A MINIMUM OF 3' OF COVER ON 30"RCP-S AND 2' OF COVER ON 6" PVC. GRADING IN AREA OF PUMP STATION AND OVER OUTFALL PIPES SHALL BE CONSIDERED AS INCIDENTIAL TO OTHER BID ITEMS. GRADES FOR LANDSCAPING AROUND PUMP STATION SITE SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.

NOTE: CHAIN LINK FENCE POSTS SHALL BE 8'-9" IN LENGTH. FENCING MATERIAL SHALL BE 6'-0" IN HEIGHT. SEE STANDARD DWG. D-738-2.

DRAINAGE WITHIN FENCED AREA SHALL BE DETERMINED BY ENGINEER IN THE FIELD.

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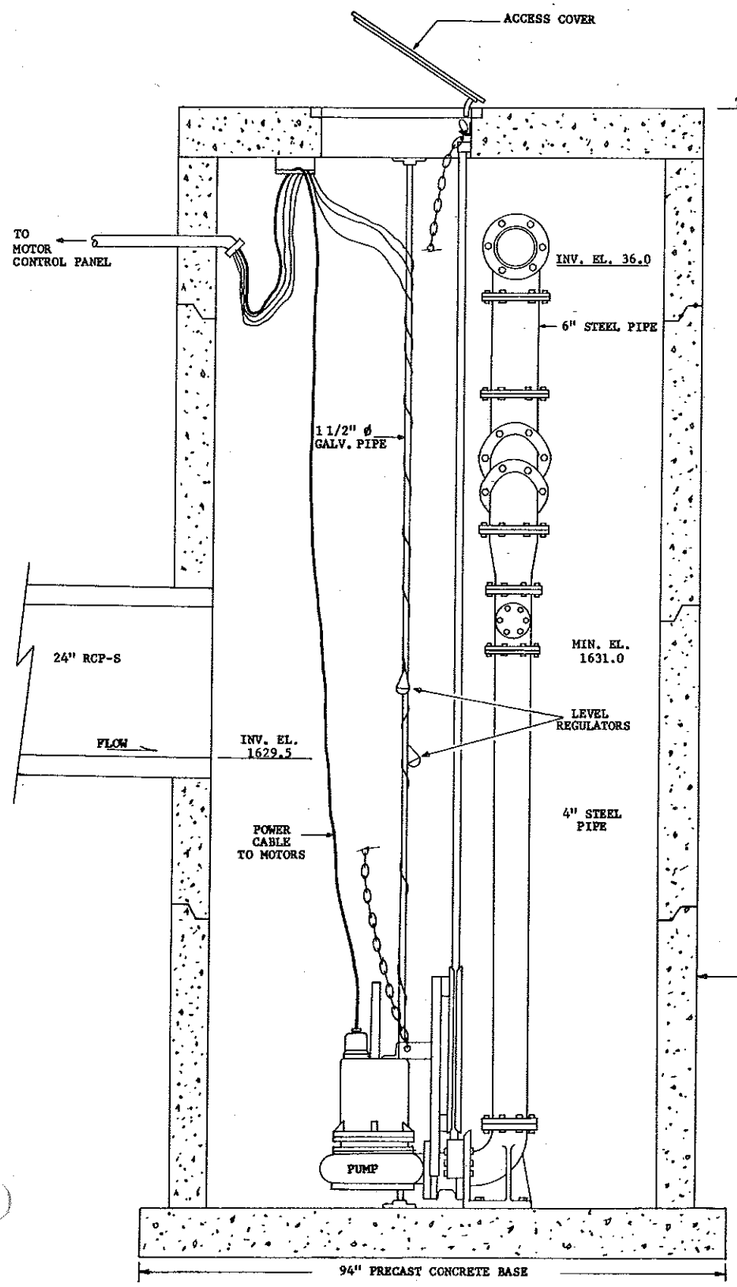
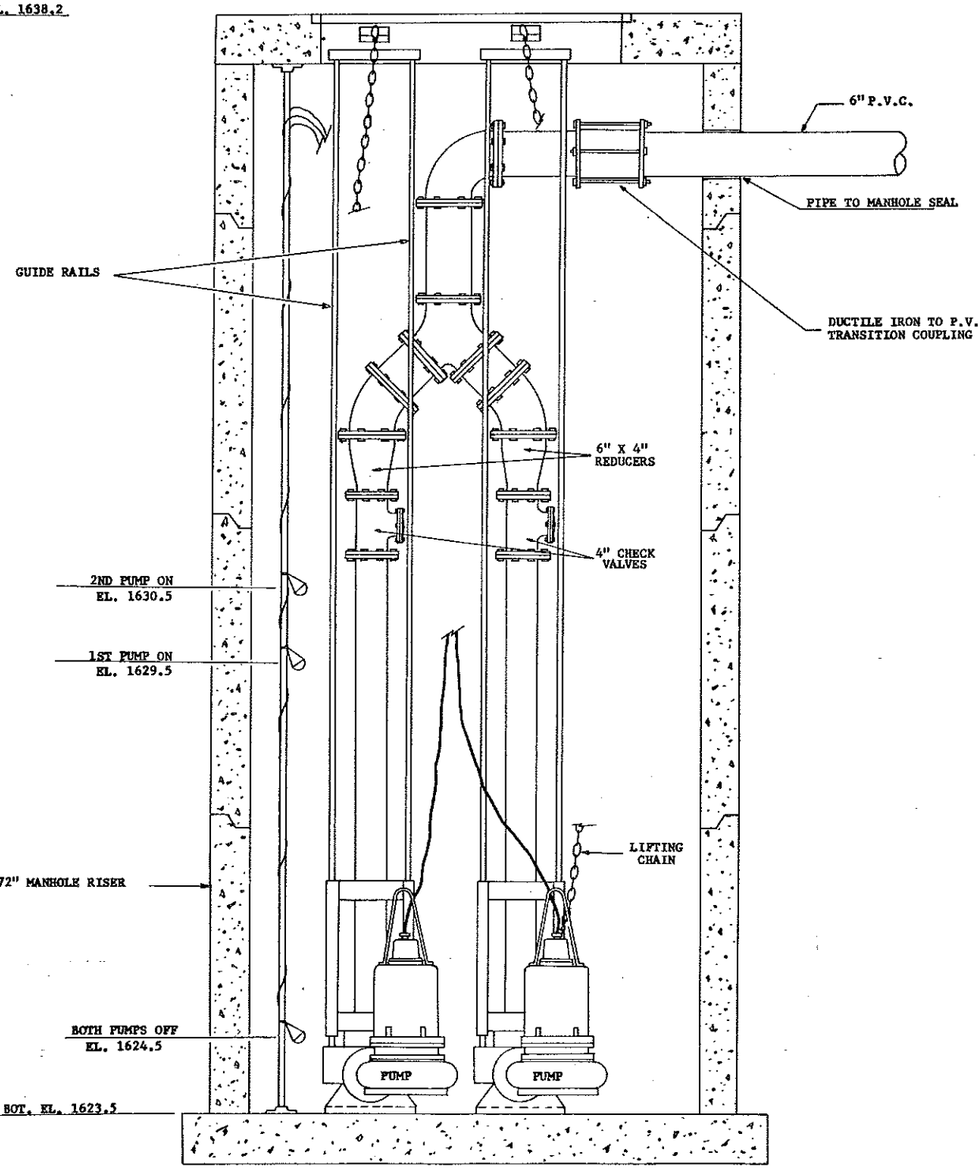
PUMPING EQUIPMENT & MANHOLE DETAILS

(SEE SPECIAL PROVISION FOR SPECIFICATIONS ON PUMPING EQUIPMENT & MATERIALS)



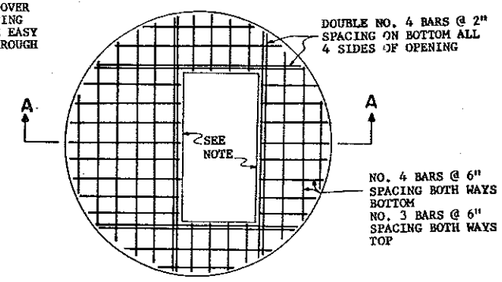
SECTION A-A



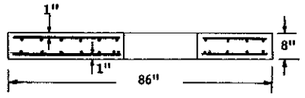
ELEVTION VIEW

PUMP STATION COVER REINFORCING DETAILS

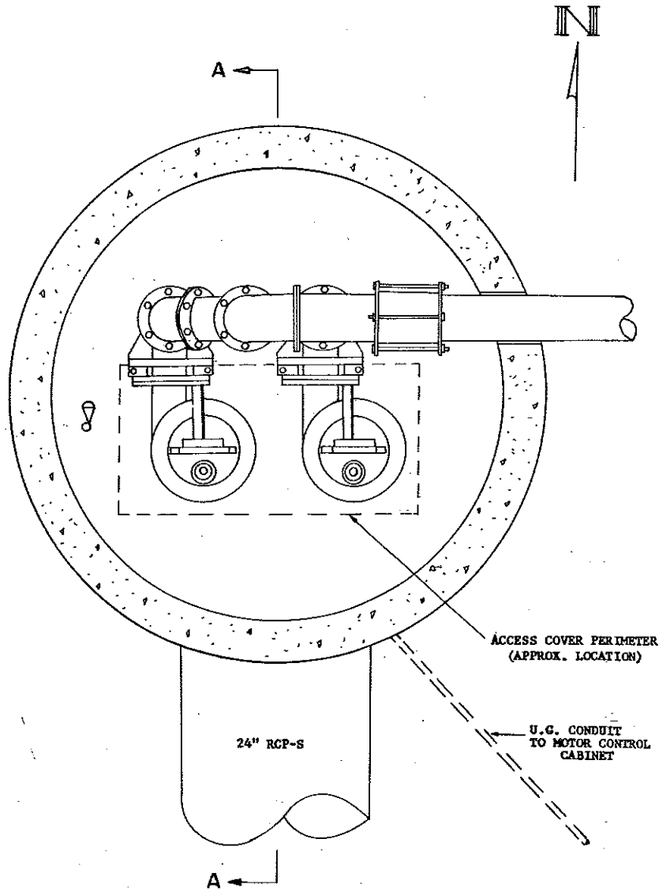
NOTE: THE DIMENSIONS AND LOCATION OF ACCESS COVER OPENING IN CONCRETE COVER WILL HAVE TO BE DETERMINED BY PUMPING EQUIPMENT SUPPLIER SO AS TO ASSURE EASY REMOVAL OF SLIDE OUT TYPE PUMPS THROUGH OPENING.



TOP VIEW



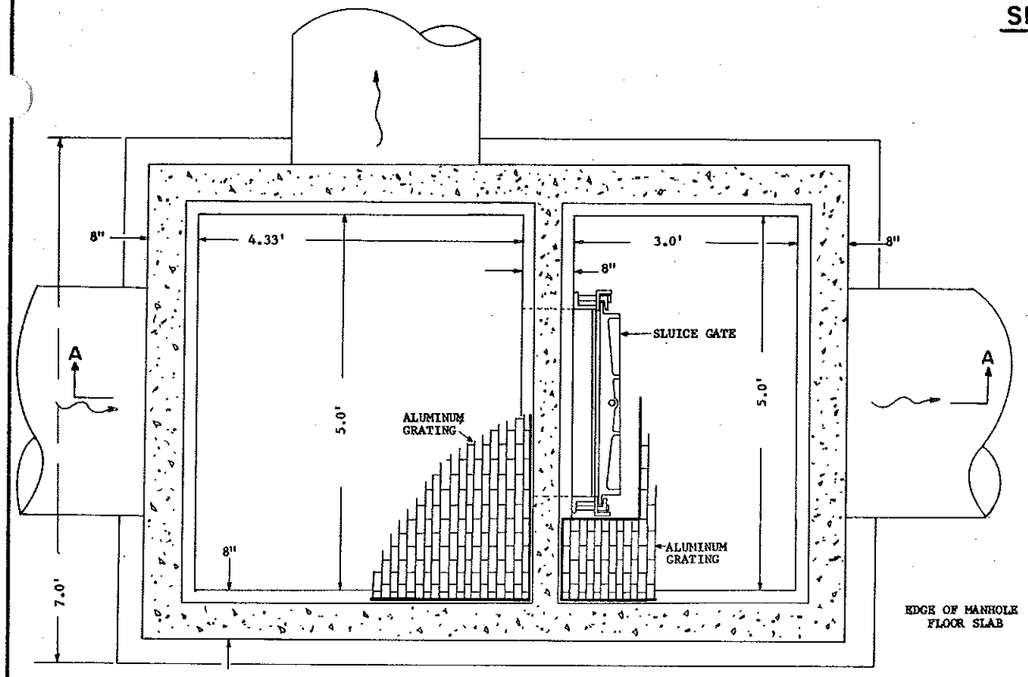
SECTION A-A



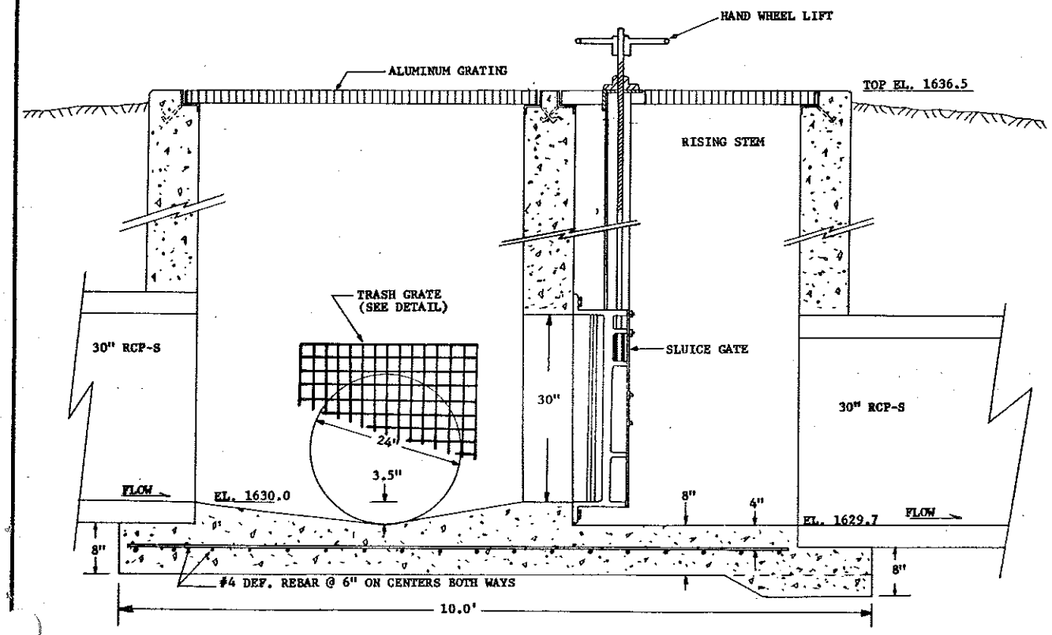
PLAN VIEW

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	I-194-4(35)	

SLUICE GATE MANHOLE DETAILS



TOP VIEW



SECTION A-A

NOTES:

1. ALUMINUM GRATING: THE GRATING SHALL BE CONSTRUCTED OF ALUMINUM ALLOY AND SHALL BE CAPABLE OF CARRYING A UNIFORM LOADING OF 100 POUNDS PER SQUARE FOOT WITH A MAXIMUM DEFLECTION OF 0.25 INCH FOR A 5 FOOT SPAN. THE BEARING BARS SHALL HAVE A MINIMUM DIMENSION OF 0.25 INCH BY 1.25 INCH.

   A FRAME OF ALUMINUM ALLOY SHALL BE INSTALLED AROUND PERIMETER OF EACH OPENING AS SHOWN. FRAMING SHALL BE ANCHORED TO CONCRETE WALLS IN A MANNER SIMILIAR TO DETAIL SHOWN AS RECOMMENDED BY MANUFACTURER.

   FRAMING AND GRATING SECTIONS SHALL BE DETERMINED BY MANUFACTURER TO MEET DESIGN CRITERIA. COST OF ALUMINUM GRATING & FRAME SHALL BE INCLUDED IN THE PRICE BID FOR "POURED MANHOLE".

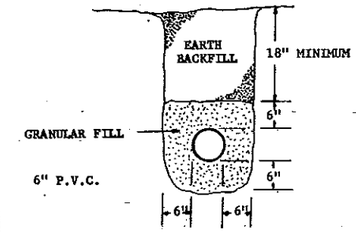
2. SLUICE GATE: THE GATE OPENING SHALL BE EITHER 30 INCHES IN DIAMETER, OR 30 INCHES BY 30 INCHES SQUARE OPENING. GATE SHALL BE DESIGNED WITH A POSITIVE NEOPRENE SEAL WITH A MINIMUM UNSEATING HEAD OF 5 FEET AND A MINIMUM SEATING HEAD OF 10 FEET. GATE AND SEAT SHALL BE OF CAST IRON WITH GALVANIZED STEEL STRUCTURAL GUIDES AND BOLTS. THE FRAME SHALL HAVE A FLANGE BACK DESIGN TO MOUNT ON CONCRETE WALL OPENING.

   THE GATE SHALL HAVE A RISING STEM TYPE OPERATOR, WITH STEM OF COLD FINISHED STEEL SECURED TO THE SLIDE WITH CAST IRON THRUST NUT AND OPERATED BY A CAST BRONZE LIFT NUT WITH SUITABLE HAND WHEEL OR GEARED CRANK LIFT. THRUST NUT SHALL BE THREADED TO FIT THE STEM ORDERED.

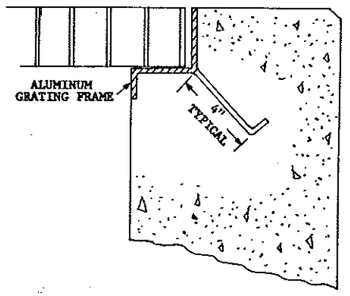
   ALL MATERIALS, LABOR, AND EQUIPMENT NECESSARY FOR A COMPLETE AND OPERABLE SLUICE GATE SHALL BE INCLUDED IN PRICE BID FOR "SLUICE GATE".

3. TRASH GRATE: TRASH GRATE SHALL BE CONSTRUCTED OF ALUMINUM ALLOY BARS. ALL BAR CONNECTIONS SHALL BE WELDED. THE TRASH GRATE SHALL BE FASTENED OVER 24" PIPE OPENING AS SHOWN WITH ANCHOR CLIPS. ANCHOR CLIPS SHALL BE FABRICATED FROM ALUMINUM ALLOY OR GALVANIZED STEEL TO DIMENSIONS SHOWN.

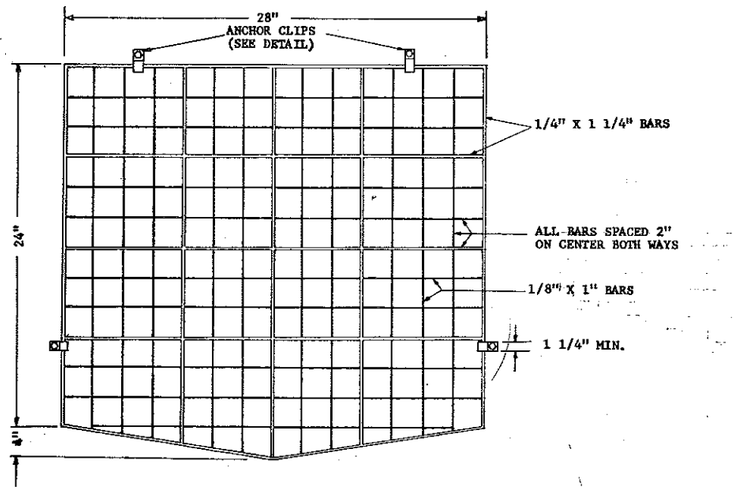
   COST OF TRASH GRATE SHALL BE INCLUDED IN PRICE BID FOR "POURED MANHOLE".



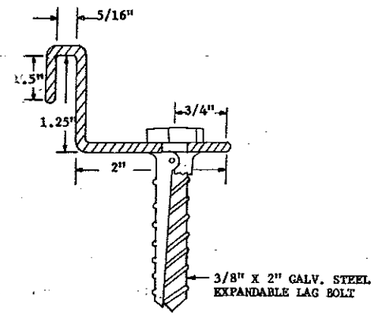
P.V.C. PIPE TRENCH BACKFILL DETAIL



GRATING FRAME DETAIL



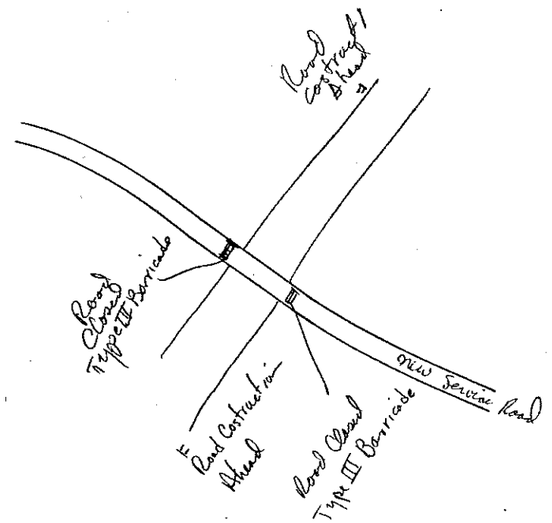
TRASH GRATE DETAIL

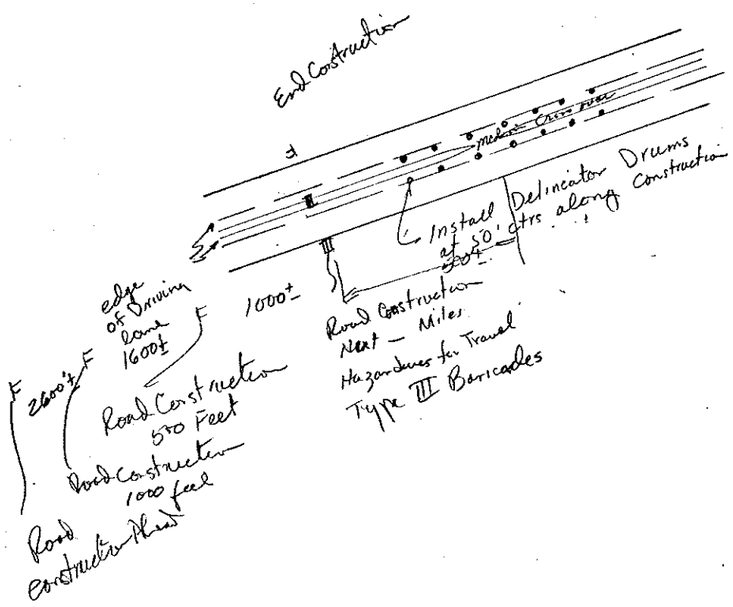


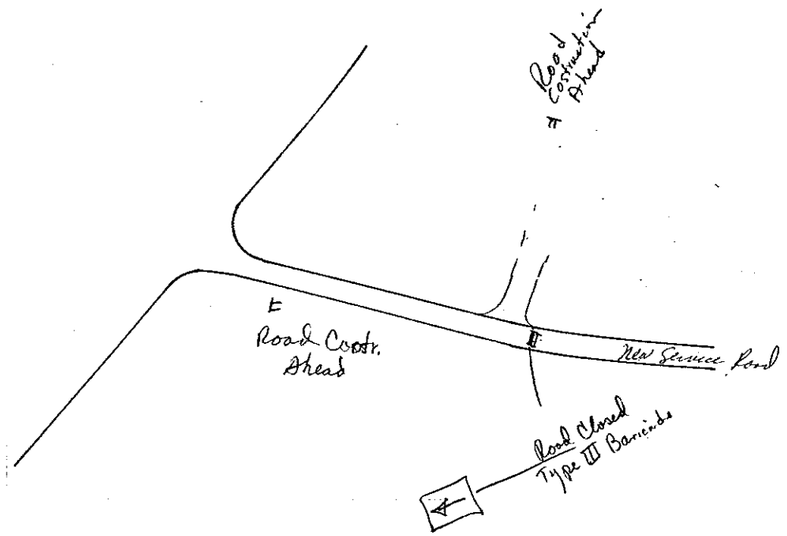
ANCHOR CLIP DETAIL

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.		

Provide Road Construction Signing Entering Missouri River Bridge



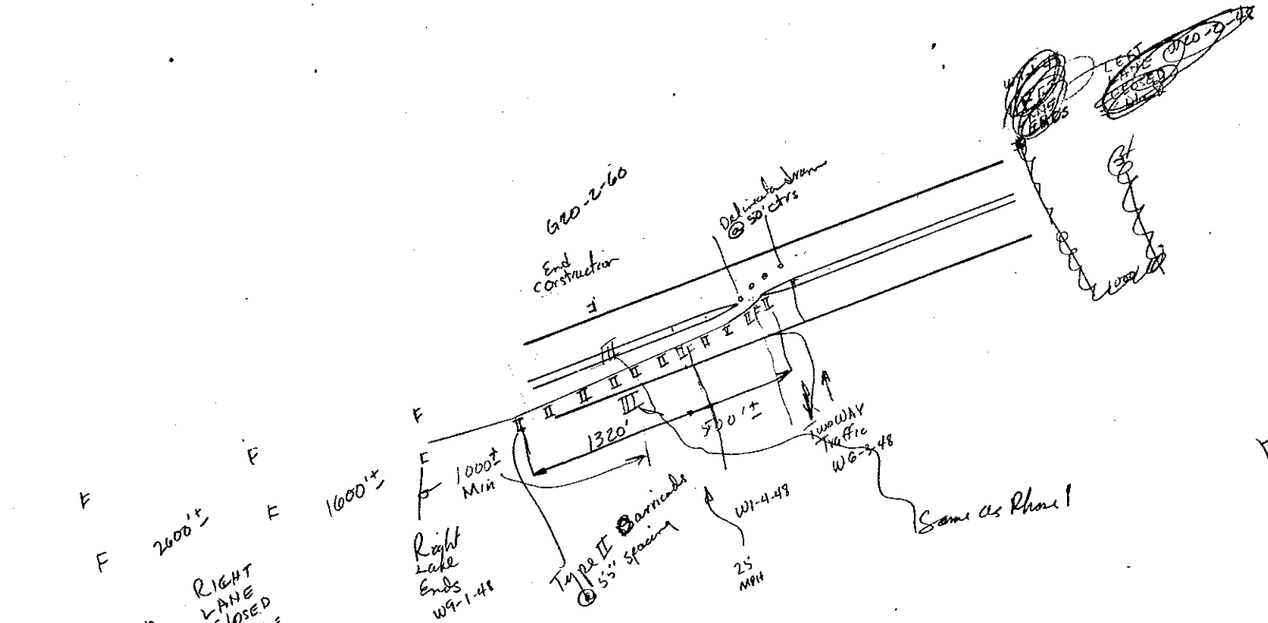


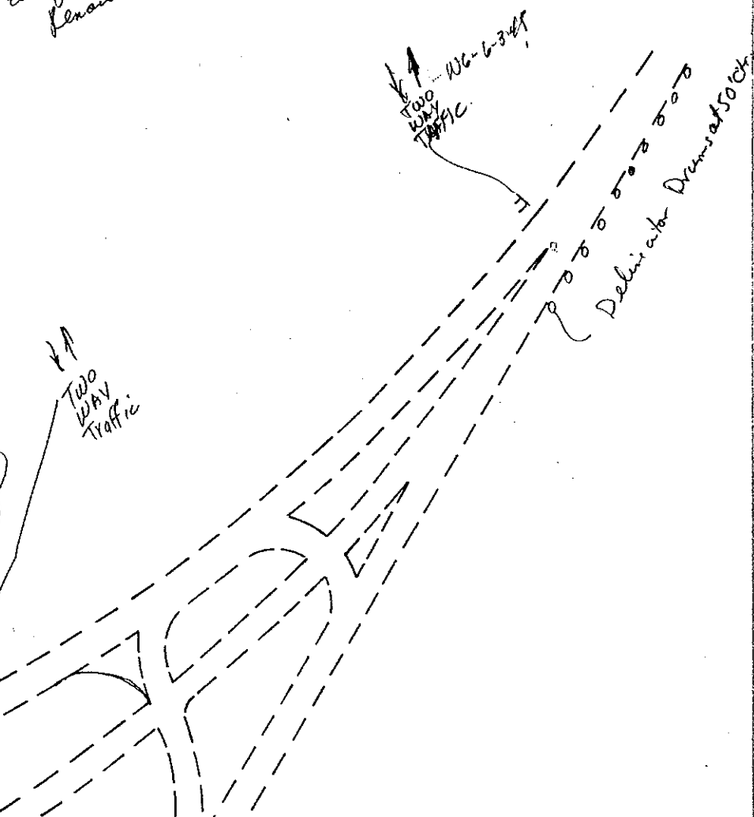


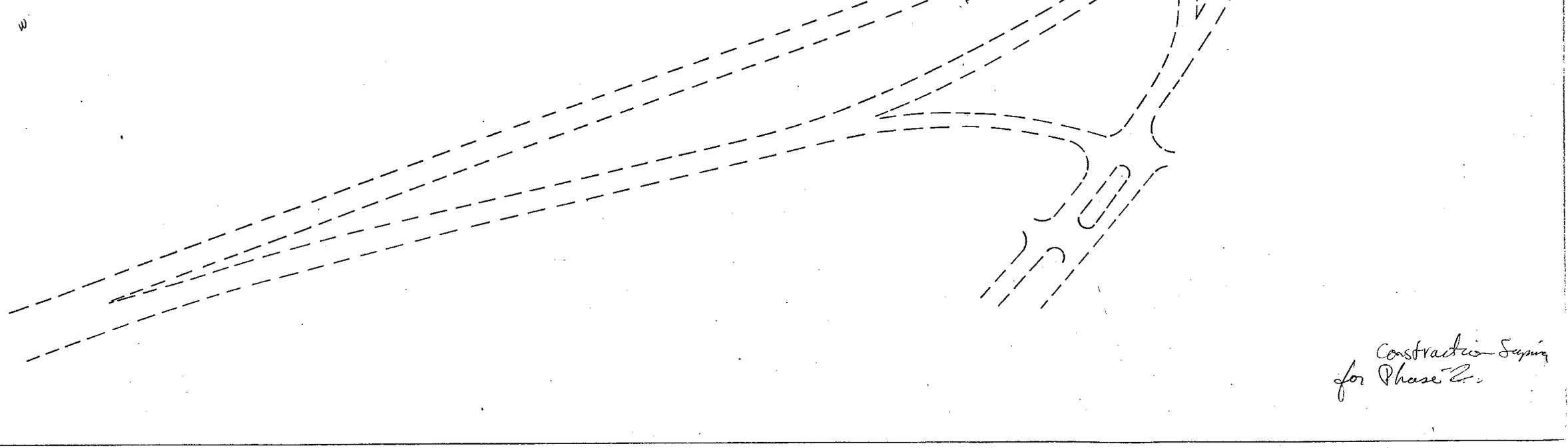
construction signing for Phase I

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

Construction
East of Bridge to
Remain

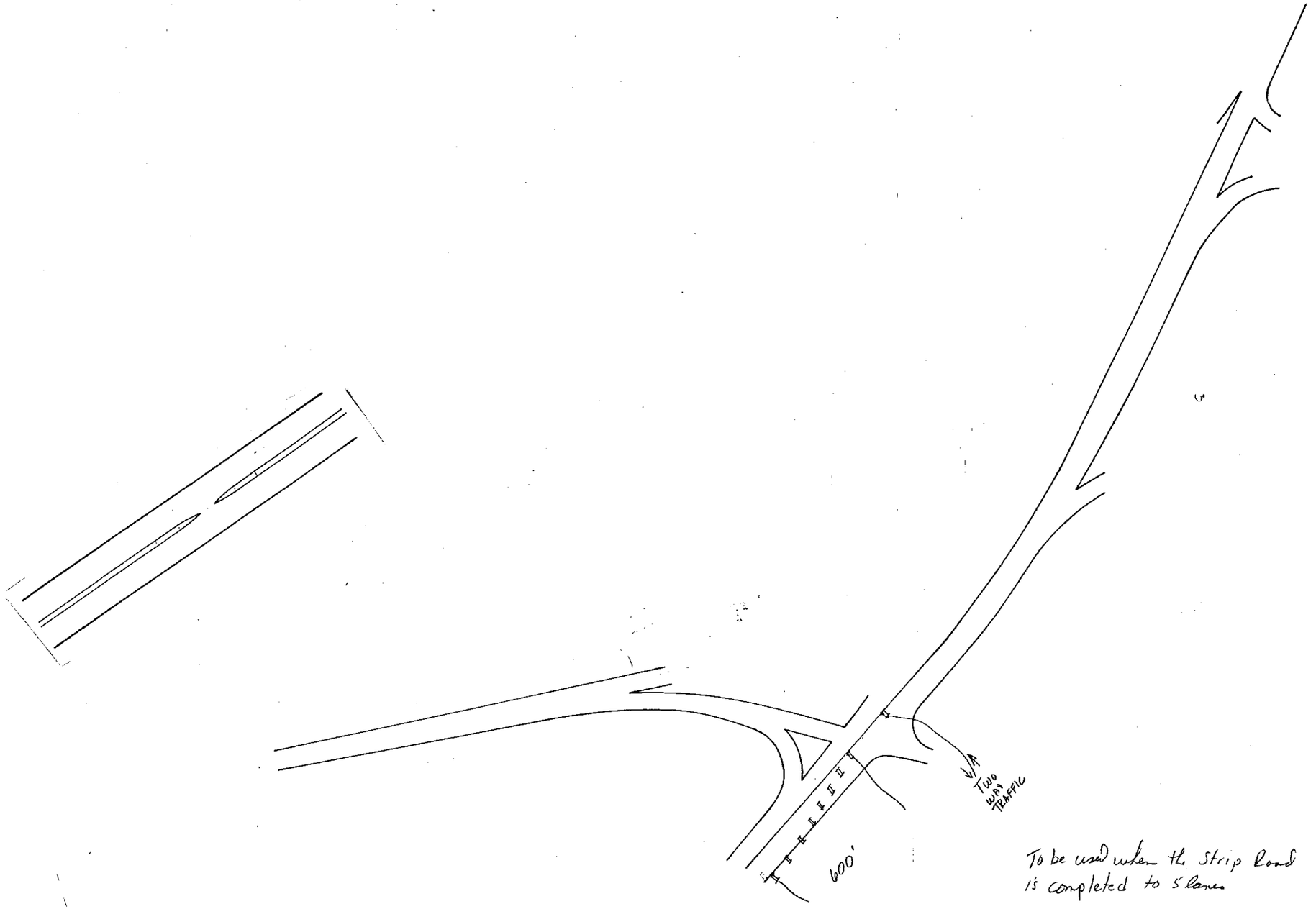






Construction Signing
for Phase 2.

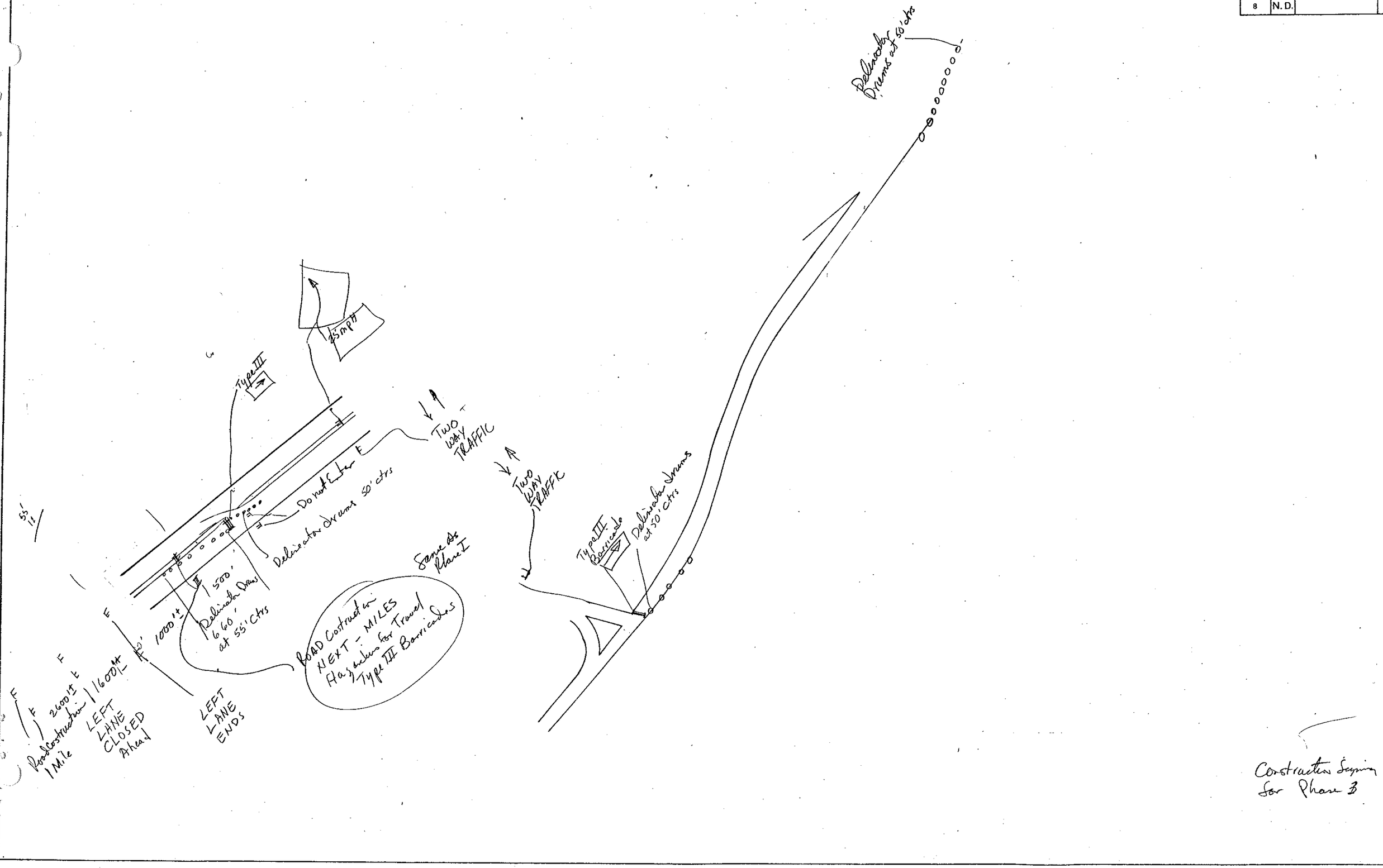
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.		



To be used when the Strip Road is completed to 5 lanes

Construction Signing for Phase 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		



Construction Signing for Phase 3