DRAINAGE REPORT

FOR

CORONA STORM DRAIN AND CHANNEL

CORONADO MOBILE HOME PARK

(WEST OF I-25)

DIANE HOELZER
NEW MEXICO
11967
REGISTERED PROFESSIONAL ENGINEER

9-13-99

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I. PROJECT DESCRIPTION

When the Buena Vista Estates Subdivision was constructed, the master planned Corona storm drain was constructed from Louisiana to San Pedro Avenue as part of the required infrastructure improvements (see Figure 1). At that time the downstream storm drain improvements were not in place, resulting in the construction of a large retention pond on the vacant commercial site located at the west end of the subdivision to retain the required developed flows. Presently the downstream storm drain improvements between San Pedro and I-25 are being designed and are going through the city approval process to be constructed through a city work order.

From I-25, runoff is conveyed under the Interstate through (8) 4' CMP and then into an earthen channel that passes through the Coronado Mobile Home Park (see Figure 2). Recently, through a DRB platting action this earthen channel now lies within a 60' drainage easement that has been granted to the City of Albuquerque.

The purpose of this report is twofold:

1. *to analyze and verify that the earthen channel in the Coronado Mobile Home Park has the capacity to convey an allowable peak discharge of 270 cfs which is approximately 78.5 percent of the "developed conditions" peak discharge of 344 cfs as determined in the approved Final North Albuquerque Acres Master Drainage Plan (RTI, Inc., October 1998), and*

2. *to determine the allowable peak discharge per acre from the upstream sub basin areas where the runoff discharge can be controlled through the use of onsite detention ponds.*

II. DRAINAGE ANALYSIS ASSUMPTIONS

The peak discharge value of 270 cfs used in this report's HEC-2 and storm drain analysis is approximately 78.5 percent of the peak "developed conditions" discharge of 344 cfs as determined previously in the approved N.A.A. Master Drainage Plan AHYMO hydrologic analysis. This is the flow rate for which the Prudent Line is confined to the drainage easement. The two upstream sub basins generating this discharge are shown in Figure 3 (RTI, October 1998). Cross sections used in the HEC-2 analysis were taken at 50' intervals (maximum) in the channel from a topographic survey provided by the City of Albuquerque, Public Works Department, Survey Section. The Manning's "n" value assumed in the analysis was 0.025, typical of earth channel with some natural vegetation growth. Before the runoff discharges into another earthen channel west of the Coronado mobile home park, it passes through a 414 feet reach of storm drain consisting of three different pipe size reach sections: 298' of (5.2' x 8.0') elliptical RCP, 75' of (4.0' x 6.3') elliptical RCP and 41' of (5.5' x 8.0') elliptical CMP. To analyze this reach of storm drain, CALC w/ [signature]

the elliptical shaped culverts were converted to an equivalent circular pipe and then the Storm Sewer program was used to determine the "initial conditions" downstream water surface elevation used in the HEC-2 analysis for the earthen channel capacity analysis.

III. EARTHEN CHANNEL CAPACITY ANALYSIS

The HEC-2 analysis shows that both the "developed conditions" discharge of 344 cfs and the allowable discharge of 270 cfs are contained within the banks throughout the mobile home park. The water surface elevation and prudent line for 270 cfs are plotted on the three sheets found in the back pockets of this report. The prudent line is defined as 4' per 100 cts which is 10.8' from the 100 year maximum water surface elevation. The Prudent Line is considered since we are proposing to renew discharges to the existing channel. In one area, the prudent line extends into three mobile home sites that are located less than 8 feet from the top of bank and are encroaching into the established 60' drainage easement.

IV. DETERMINATION OF ALLOWABLE DISCHARGE RATE AND DETENTION POND LOCATIONS

According to the NAA Master Drainage plan, the "developed conditions" peak discharge reaching the 8 culverts at I-25 is 344 cfs (RTI, October 1998). The two sub basins generating this discharge are identified as Sub Basin 942.1 (123.6 cfs at 35.93%) and Sub Basin 942.2 (220.4 cfs at 64.07%). Using the same proportionate percentages for the allowable discharge of 270 cfs, Sub Basin 942.1 can discharge 97.01 cfs and Sub Basin 942.2 can discharge 172.99 cfs.

In order to restrict the flows from 344 cfs to 270 cfs, detention ponds will be required on all areas not yet developed and on some developed areas where it is feasible. Some areas such as the existing mobile home park south of Corona Avenue, it is not possible to construct a detention pond to restrict their flows. These areas will be allowed to free discharge.

An allowable discharge rate for Sub Basin 942.1 and 942.2 was determined based on the acreages within each sub basin that could accommodate an onsite detention pond to choke the peak developed discharge value down to the allowable discharge value (Refer to Figure 4). The allowable discharge rate for Sub Basin 942.1 was determined to be 1.46 cfs per acre and Sub Basin 942.2 was determined to be 2.46 cfs per acre. A separate allowable discharge rate was determined for each sub basin in accordance with the sub basin boundaries defined in the approved NAA Master Drainage Plan. Part of the reason Sub Basin 942.1 has a smaller allowable discharge rate than Sub Basin 942.2 is that a larger portion of the area in Sub Basin 942.1 cannot accommodate a detention pond to choke the flow down. The allowable discharge calculations can be found in Appendix A - Hydrology and a summary table and exhibit is shown in Figure 4.

V. RECOMMENDATIONS

The results of the HEC-2 analysis establish that the existing earthen channel has the capacity to convey the "developed conditions" flows as well as the "allowable" flows through the mobile home park. However, there are three mobile homes that encroach into the established 60' drainage easement and the 100 year prudent line .

It is recommended that the allowable discharge of 270 cfs be allowed to be conveyed through the mobile home park and that for the interim condition, the city of Albuquerque take over the maintenance of the earthen channel through the park.

The upstream areas, where it is feasible to construct detention pond in accordance with the allowable discharge rates established in this report shall be allowed to replace their retention ponds and connect to the completed storm drain in Corona.

FIGURE 2
STORM DRAIN FACILITIES

FIGURE 3
SUB BASIN BOUNDARIES
MASTER DRAINAGE PLAN

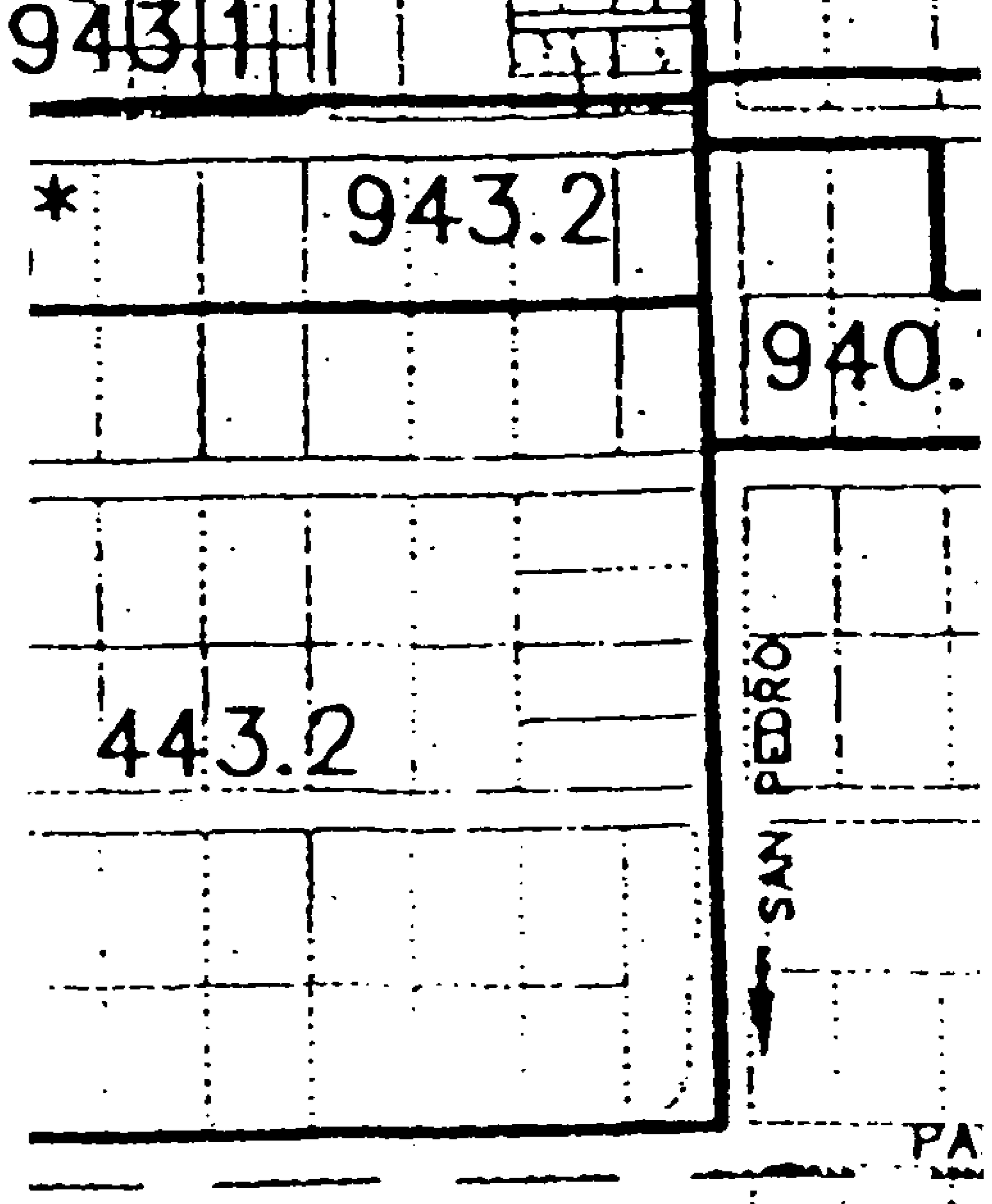

FIGURE 4
SUMMARY OF
ALLOWABLE DISCHARGES

SUMMARY TABLE

Total for sub basin 942.1 and 942.2:
Q (developed) = 344 cfs (source: approved NAA Master Drainage Plan, RTI Inc.,Oct. 1998)
Q (allowable) = 270 cfs

SUB BASIN 942.1

Q (developed) = 123.6 cfs
Q (allowable) = 97.01 cfs

DETENTION CONTROL AREA = 10 acres
FREE DISCHARGE AREA = 20 acres

Q (free discharge) = 82.40 cfs
Q (detention) = 14.61 cfs

97.01 cfs

Q (detention) = 1.46 cfs/acre

SUB BASIN 942.2

Q (developed) = 220.4 cfs
Q (allowable) = 172.99 cfs

DETENTION CONTROL AREA = 54 acres
FREE DISCHARGE AREA = 12 acres

Q (free dsicharge) = 40.08 cfs
Q (detention) = 132.91 cfs

\+ ***172.99 cfs = 270 cfs (allowable)***

Q (detention) = 2.46 cfs/acre

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PROJECT Corona Storm Drain
SUBJECT Allowable Discharge Calcs
BY DLH DATE 9-8-99
CHECKED ____ DATE ____
SHEET ____ OF ____

From NAA Master Drainage Plan, RTI, Inc. OCT. '98.

Q(developed) = 344 cfs (at I-25 crossing to Coronado earthen channel.)

SUB BASIN	Area (acres)	LAND TREATMENT A	B	C	D	Q (cfs)	Adjusted Q (cfs)	Allowable Q cfs
942.1	30	0	10	20	70	128.5	123.6	97.01
942.2	66	0	30	15	55	229.08	220.4	172.99
						357.58	344.0	270.0

SUB BASIN 942.1

$Q_D = \frac{123.6 \text{ cfs}}{30 \text{ acres}} = 4.12 \frac{\text{cfs}}{\text{acre}}$

DETENTION AREAS = 10 ac.
FREE DISCHARGE AREAS = 20 ac.

$Q_{FD} = 20(4.12) = 82.40 \text{ cfs}$

$Q_{DET} = Q_{ALLOW} - Q_{FD}$
$= 97.01 - 82.40$
$Q_{DET} = 14.61 \text{ cfs}$

$Q_{DET. ALLOW.} = \frac{14.61 \text{ cfs}}{10 \text{ acres}} = 1.46 \text{ cfs/ac.}$

SUB BASIN 942.2

$Q_D = \frac{220.4 \text{ cfs}}{66 \text{ acres}} = 3.34 \frac{\text{cfs}}{\text{acre}}$

DETENTION AREA = 54 ac.
FREE DISCHARGE AREA = 12 ac.

$Q_{FD} = 12(3.34) = 40.08 \text{ cfs}$

$Q_{DET} = Q_{ALLOW} - Q_{FD}$
$= 172.99 - 40.08$
$Q_{DET} = 132.91 \text{ cfs}$

$Q_{DET. Allow.} = \frac{132.91 \text{ cfs}}{54 \text{ acres}} = 2.46 \text{ cfs/ac.}$

TABLE A-1 (cont.) NORTH DOMINGO BACA SUB-BASIN CHARACTERISTICS							
Basin ID	**Hydrologic Condition**	**Basin Area (mi^2)**	**Land Treatment (%)**				**TP (hrs)**
			A	**B**	**C**	**D**	
940.2	Existing Future	.0156 .0156	0 0	34 34	16 16	50 50	.133 .133
939.16	Existing Future	.0128 .0128	0 0	34 34	16 16	50 50	.133 .133
939.14	Existing Future	.0112 .0112	0 0	10 10	30 30	60 60	.133 .133
940.0	Existing Future	.0141 .0141	0 0	34 34	16 16	50 50	.133 .133
940.1	Existing Future	.007 .007	0 0	20 20	10 10	70 70	.133 .133
942.1	Existing Future	.0469 .0469	20 0	5 10	30 20	45 70	.133 .133
942.2	Existing Future	.1031 .1031	15 0	15 30	25 15	45 55	.160 .160
943.1	Existing Future	.012 .012	0 0	15 15	20 20	65 65	.133 .133
943.2	Existing Future	.013 .0375	80 0	0 20	10 10	10 70	.133 .133
443.2	Existing Future	.0703 ,0703	30 0	10 10	10 20	50 70	.133 .133

SOURE: NAA Master Drainage Plan, RTI, Inc. Oct. '98

TABLE A-7 (cont.)

NORTH DOMINGO BACA FUTURE CONDITION

Sub-basin	Area (sq. mi.)	10-yr Vol (ac-ft)	10-yr Qp (cfs)	100-yr Vol (ac-ft)	100-yr Qp (cfs)
939.14	.0112	.714	18.32	1.203	29.58
939.16	.0128	.700	18.24	1.219	30.89
925.2	.0094	.556	14.20	.962	23.81
925.1	.0064	3.783	96.60	6.547	162.00
926.2	.0470	2.75	70.79	4.757	118.23
940.0	.0141	0.771	20.09	1.343	34.02
940.1	.0070	0.479	11.73	0.791	18.82
940.2	.0156	0.853	22.23	1.486	37.64
942.1	.0469	3.270	80.87	1.219	~~30.89~~ 128.5
942.2	.1031	5.996	136.08	10.288	229.08
943.1	.0120	0.793	19.85	1.322	31.97
943.2	.0375	2.567	62.80	4.239	100.77
960.0	.0075	0.418	11.02	0.727	18.46
443.2	.0703	4.901	121.03	8.081	192.62

SOURCE: NAA Master Drainage Plan, RTI, Inc. Oct '98

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	943.19	3&14	3	4.32386	288.50	376.928	1.63451	1.550	.104	
COMPUTE NM HYD	940.10	-	1	.00700	18.82	.791	2.11965	1.500	4.202	PER IMP= 70.00
ROUTE MCUNGE	940.80	1	6	.00700	18.75	.791	2.11970	1.600	4.185	CCODE = .2
COMPUTE NM HYD	943.20	-	1	.03750	100.77	4.239	2.11965	1.500	4.199	PER IMP= 70.00
*S OVERLAND FLOW AT I-25 (AP 943.29)										
ADD HYD	943.29	1& 6	5	.04450	112.79	5.031	2.11964	1.500	3.960	
*S TOTAL NDB Q AT I-25 BOX CULVERT (943.89)										
ADD HYD	943.98	5& 3	9	4.36836	394.04	381.959	1.63945	1.550	.141	
*S CORONA SD SYSTEM										
COMPUTE NM HYD	942.20	-	1	.10310	229.08	10.288	1.87097	1.550	3.472	PER IMP= 55.00
*S (ROUTE IN SD DIA=4 FT)										
ROUTE	942.29	1	5	.10310	231.01	10.288	1.87097	1.550	3.501	
COMPUTE NM HYD	942.10	-	2	.04690	128.50	5.391	2.15532	1.500	4.281	PER IMP= 70.00
*S CORONA SD AT I-25										
ADD HYD	942.59	2& 5	3	.15000	344.19	15.679	1.95987	1.550	3.585	
*S TOTAL Q AT CORONADO MH PARK (AP 943.99)										
ADD HYD	943.99	3& 9	3	4.51836	738.23	397.637	1.65009	1.550	.255	
COMPUTE NM HYD	443.20	-	2	.07030	192.62	8.081	2.15532	1.500	4.281	PER IMP= 70.00
FINISH										

-(s0p10h4099T-&16D

SOURCE: NAA Master Drainage Plan, RTI, Inc Oct '98.

EROSIVE

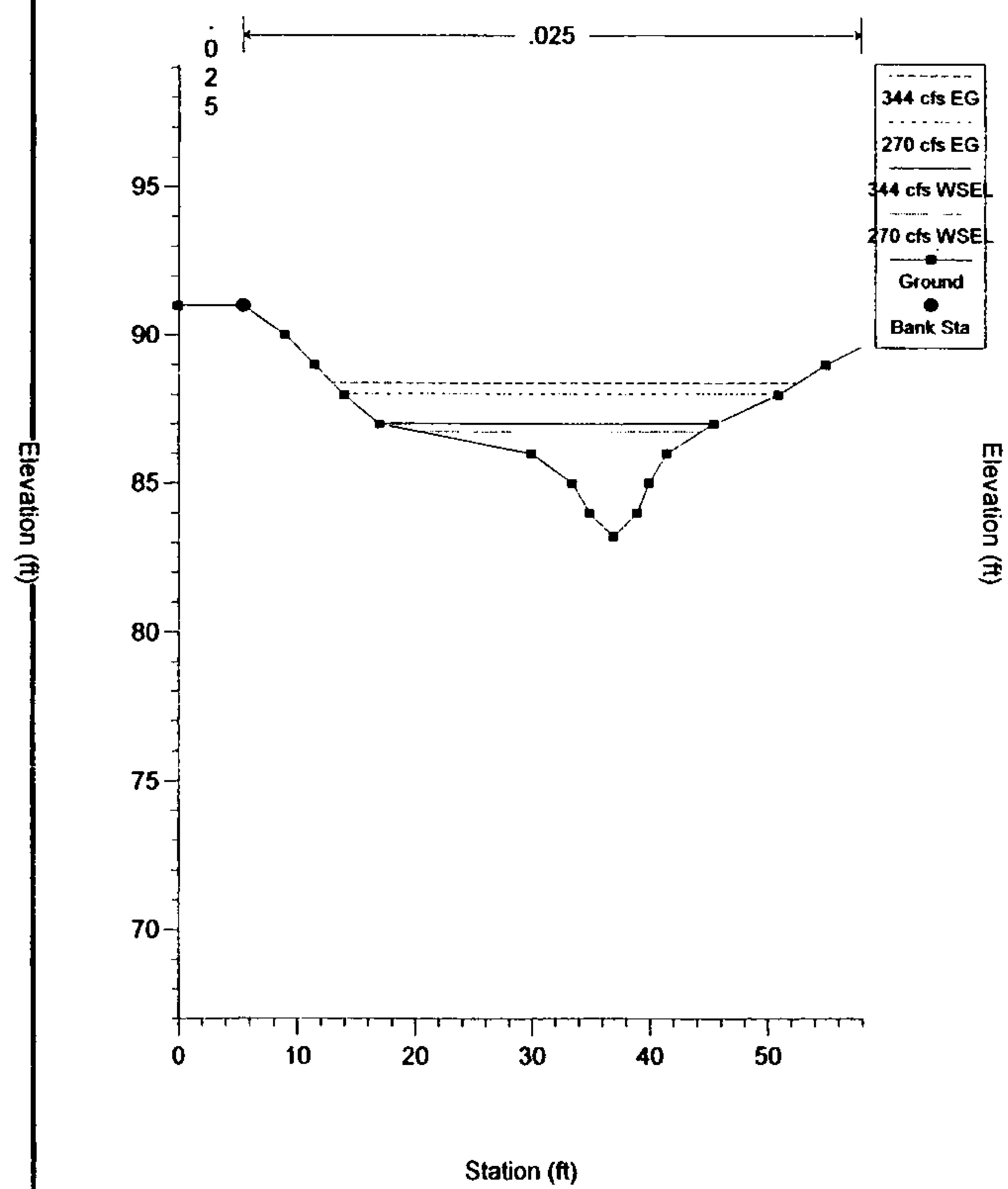
HEC-RAS Plan: Plan 01 Reach: CORONA CHAN (continued)

River Sta.	Q Total	Min Ch El	W.S. Elev.	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1812	270.00	75.50	79.07	79.26	80.30	0.011049	8.89	30.37	16.24	1.15
1787.*	344.00	75.00	78.52	79.08	80.43	0.017873	11.10	31.00	17.23	1.46
1787.*	270.00	75.00	78.21	78.69	79.90	0.018222	10.43	25.89	16.06	1.45
1762	344.00	74.50	77.89	78.51	79.93	0.021283	11.45	30.05	18.07	1.56
1762	270.00	74.50	77.62	78.15	79.40	0.021676	10.72	25.18	16.96	1.55
1737	344.00	74.50	77.26	77.91	79.39	0.020724	11.70	29.41	17.28	1.58
1737	270.00	74.50	76.98	77.55	78.85	0.021403	10.97	24.61	16.42	1.58
1712.*	344.00	73.80	76.35	77.12	78.79	0.024534	12.54	27.42	16.05	1.69
1712	270.00	73.80	76.05	76.73	78.24	0.026017	11.89	22.71	15.14	1.71
1702.*	344.00	73.56	76.13	76.90	78.56	0.024432	12.49	27.53	16.33	1.70
1702.*	270.00	73.56	75.86	76.52	77.96	0.024490	11.63	23.22	15.44	1.67
1692.*	344.00	73.32	75.90	76.67	78.33	0.024819	12.51	27.49	16.59	1.71
1692.*	270.00	73.32	75.64	76.28	77.72	0.024587	11.58	23.33	15.81	1.68
1682.*	344.00	73.08	75.69	76.45	78.10	0.024814	12.46	27.60	16.85	1.72
1682.*	270.00	73.08	75.43	76.08	77.49	0.024434	11.52	23.43	15.98	1.68
1672.*	344.00	72.84	75.47	76.23	77.86	0.024784	12.41	27.72	17.04	1.72
1672.*	270.00	72.84	75.22	75.86	77.26	0.024521	11.47	23.54	16.26	1.68
1662.*	344.00	72.60	75.25	76.00	77.62	0.025066	12.36	27.84	17.37	1.72
1662.*	270.00	72.60	75.00	75.63	77.02	0.024673	11.41	23.66	16.50	1.68
1637.*	344.00	72.30	74.84	75.50	76.97	0.021095	11.73	29.34	17.49	1.60
1637.*	270.00	72.30	74.58	75.13	76.40	0.020394	10.84	24.90	16.32	1.55
1612	344.00	72.00	74.34	74.98	76.43	0.020009	11.58	29.71	17.20	1.55
1612	270.00	72.00	74.04	74.61	75.91	0.021113	10.98	24.59	16.13	1.57
1587.*	344.00	71.50	73.92	74.52	75.91	0.019039	11.34	30.35	17.52	1.52
1587.*	270.00	71.50	73.64	74.15	75.37	0.019083	10.56	25.56	16.50	1.50
1562	344.00	71.00	73.38	74.01	75.43	0.019461	11.47	30.00	17.34	1.54
1562	270.00	71.00	73.10	73.64	74.88	0.019611	10.70	25.23	16.35	1.52
1537.*	344.00	70.54	73.30	73.70	74.89	0.013538	10.10	34.05	18.04	1.30
1537.*	270.00	70.54	73.02	73.33	74.36	0.012913	9.26	29.14	17.06	1.25
1512	344.00	70.08	73.09	73.39	74.53	0.011967	9.65	35.65	18.35	1.22
1512	270.00	70.08	72.76	73.01	74.03	0.012048	9.03	29.91	17.17	1.21
1462	344.00	69.14	72.06	72.54	73.82	0.014840	10.65	32.29	16.76	1.35
1462	270.00	69.14	71.70	72.15	73.30	0.015602	10.16	26.58	15.46	1.37
1437.*	344.00	68.49	72.86		73.53	0.004137	6.57	52.34	21.27	0.74
1437.*	270.00	68.49	72.14		72.91	0.005731	7.05	38.32	17.91	0.85
1412	344.00	67.83	72.80	72.04	73.42	0.003564	6.31	54.54	20.70	0.68
1412	270.00	67.83	72.07	71.63	72.76	0.004830	6.67	40.49	17.78	0.78

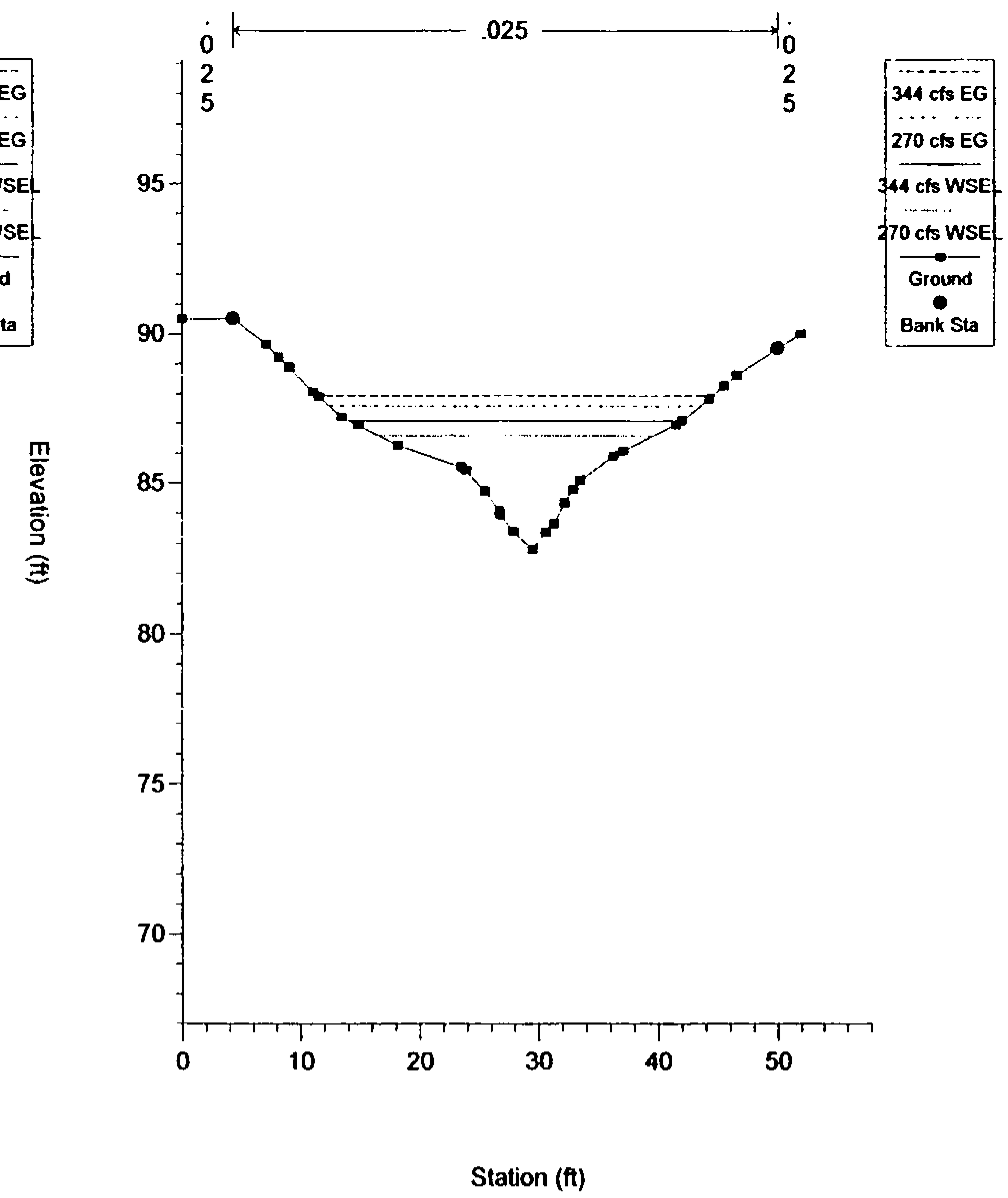
HEC-RAS Plan: Plan 01 Reach: CORONA CHAN

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
2262	344.00	83.20	87.01	87.44	88.41	0.020037	9.49	36.24	28.62	1.49
2262	270.00	83.20	86.76	87.17	88.06	0.020020	9.15	29.52	24.43	1.47
2237.*	344.00	82.80	87.08	87.10	87.95	0.008642	7.45	46.15	27.84	1.02
2237.*	270.00	82.80	86.60	86.77	87.59	0.011927	7.99	33.77	23.19	1.17
2212	344.00	82.40	86.64	86.72	87.70	0.009375	8.29	41.52	22.19	1.07
2212	270.00	82.40	86.20	86.38	87.28	0.011615	8.36	32.31	20.00	1.16
2187.*	344.00	82.10	85.86	86.23	87.39	0.013371	9.92	34.66	18.40	1.27
2187.*	270.00	82.10	85.49	85.86	86.92	0.014528	9.61	28.10	16.67	1.30
2162	344.00	81.80	85.48	85.85	87.07	0.012625	10.12	33.99	16.43	1.24
2162	270.00	81.80	85.08	85.42	86.55	0.013288	9.72	27.78	14.84	1.25
2137.*	344.00	81.40	85.12	85.52	86.75	0.013510	10.25	33.56	16.77	1.28
2137.*	270.00	81.40	84.74	85.12	86.23	0.013851	9.80	27.54	14.96	1.27
2112	344.00	81.00	84.50	85.02	86.35	0.015983	10.93	31.48	16.00	1.37
2112	270.00	81.00	84.13	84.60	85.82	0.016674	10.44	25.87	14.52	1.38
2087.*	344.00	80.75	85.35		85.97	0.003603	6.33	54.35	20.67	0.69
2087.*	270.00	80.75	83.73	84.19	85.40	0.015802	10.35	26.08	14.51	1.36
2062	344.00	80.50	85.42		85.84	0.002107	5.24	65.85	23.53	0.54
2062	270.00	80.50	84.48		85.00	0.003172	5.78	46.68	18.43	0.64
2037.*	344.00	79.94	85.43		85.78	0.001686	4.72	73.17	25.86	0.48
2037.*	270.00	79.94	84.47		84.90	0.002438	5.22	51.68	19.35	0.56
2012	344.00	79.37	83.60	83.60	85.54	0.006901	11.18	30.76	17.09	1.00
2012	270.00	79.37	83.02	83.02	84.68	0.007289	10.32	26.17	15.08	1.00
1992	Culvert									
1972	344.00	78.23	82.08	82.08	84.02	0.005835	11.16	30.83	20.79	1.00
1972	270.00	78.23	81.51	81.51	83.15	0.006141	10.29	26.25	18.30	1.00
1957.*	344.00	78.21	82.37		82.98	0.003606	6.26	54.96	21.75	0.69
1957.*	270.00	78.21	81.94		82.47	0.003591	5.88	45.93	19.94	0.68
1942	344.00	78.20	81.77	81.77	82.85	0.007900	8.37	41.08	19.06	1.01
1942	270.00	78.20	81.38	81.38	82.36	0.008083	7.92	34.08	17.53	1.00
1927.*	344.00	78.10	81.33	81.57	82.69	0.010883	9.39	36.65	18.38	1.17
1927.*	270.00	78.10	80.98	81.20	82.20	0.011161	8.86	30.47	17.06	1.17
1912	344.00	78.00	81.06	81.36	82.51	0.011910	9.68	35.53	18.20	1.22
1912	270.00	78.00	80.72	80.99	82.01	0.012266	9.13	29.59	17.02	1.22
1887.*	344.00	77.25	80.24	80.79	82.14	0.017163	11.06	31.12	17.20	1.45
1887.*	270.00	77.25	79.93	80.42	81.62	0.017967	10.44	25.85	16.22	1.46
1862	344.00	76.50	79.55	80.19	81.67	0.019876	11.67	29.48	16.66	1.55
1862	270.00	76.50	79.24	79.82	81.14	0.020986	11.05	24.44	15.72	1.56
1837.*	344.00	76.00	79.88	79.98	81.08	0.009038	8.80	39.08	18.43	1.07
1837.*	270.00	76.00	79.56	79.58	80.57	0.008589	8.08	33.43	17.32	1.02
1812	344.00	75.50	79.42	79.67	80.82	0.011009	9.49	36.24	17.46	1.16

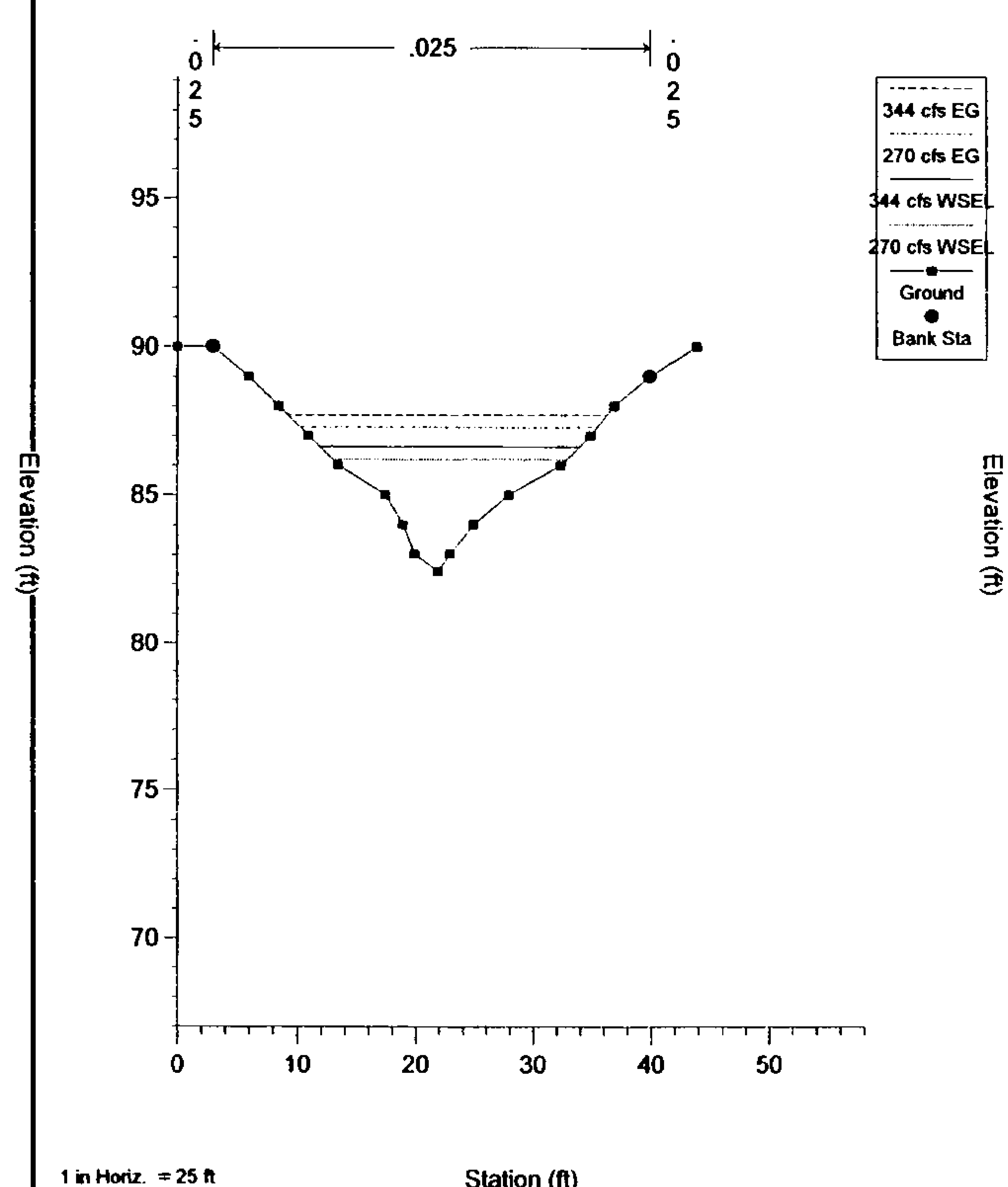
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 2262



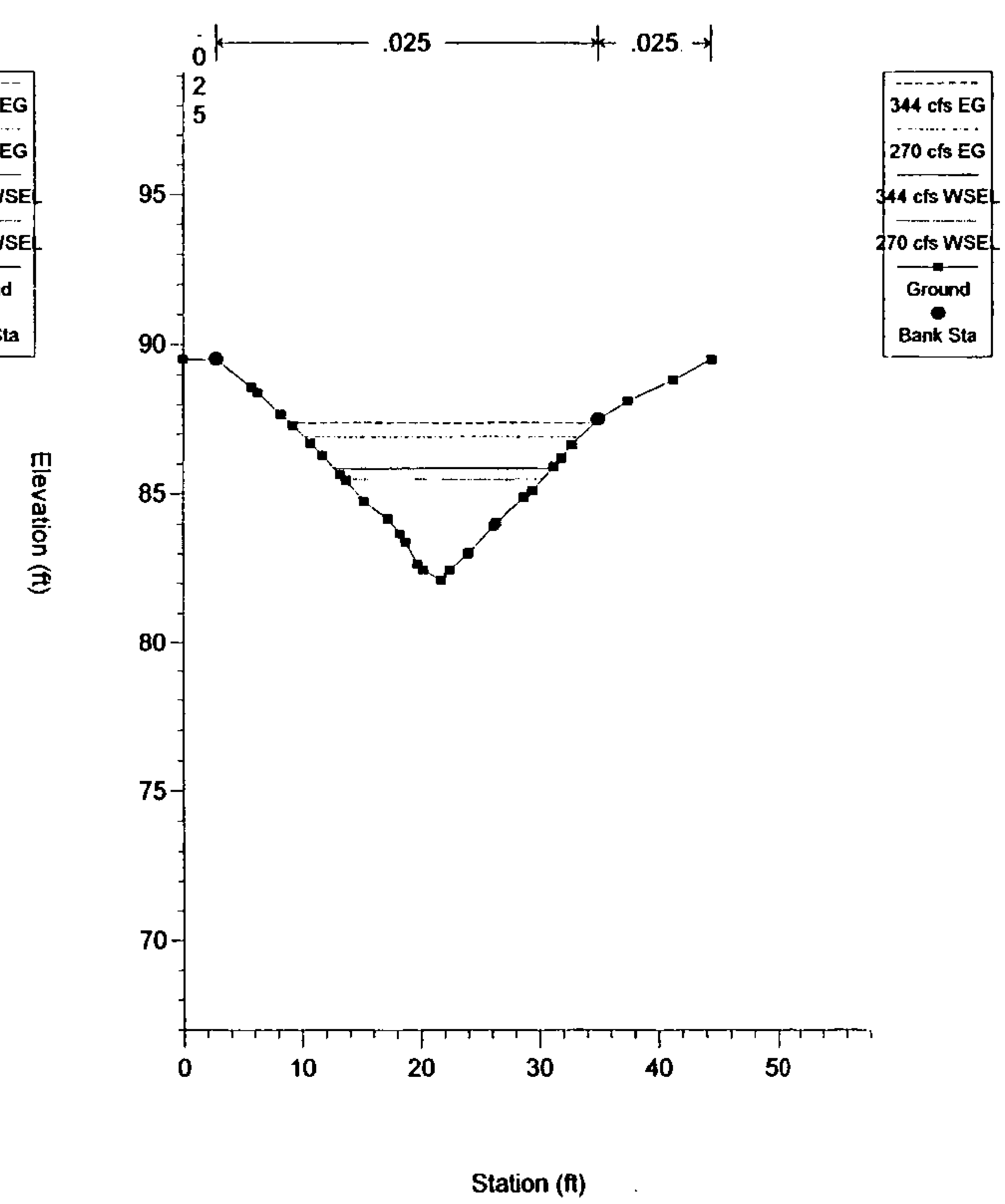
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 2237.*



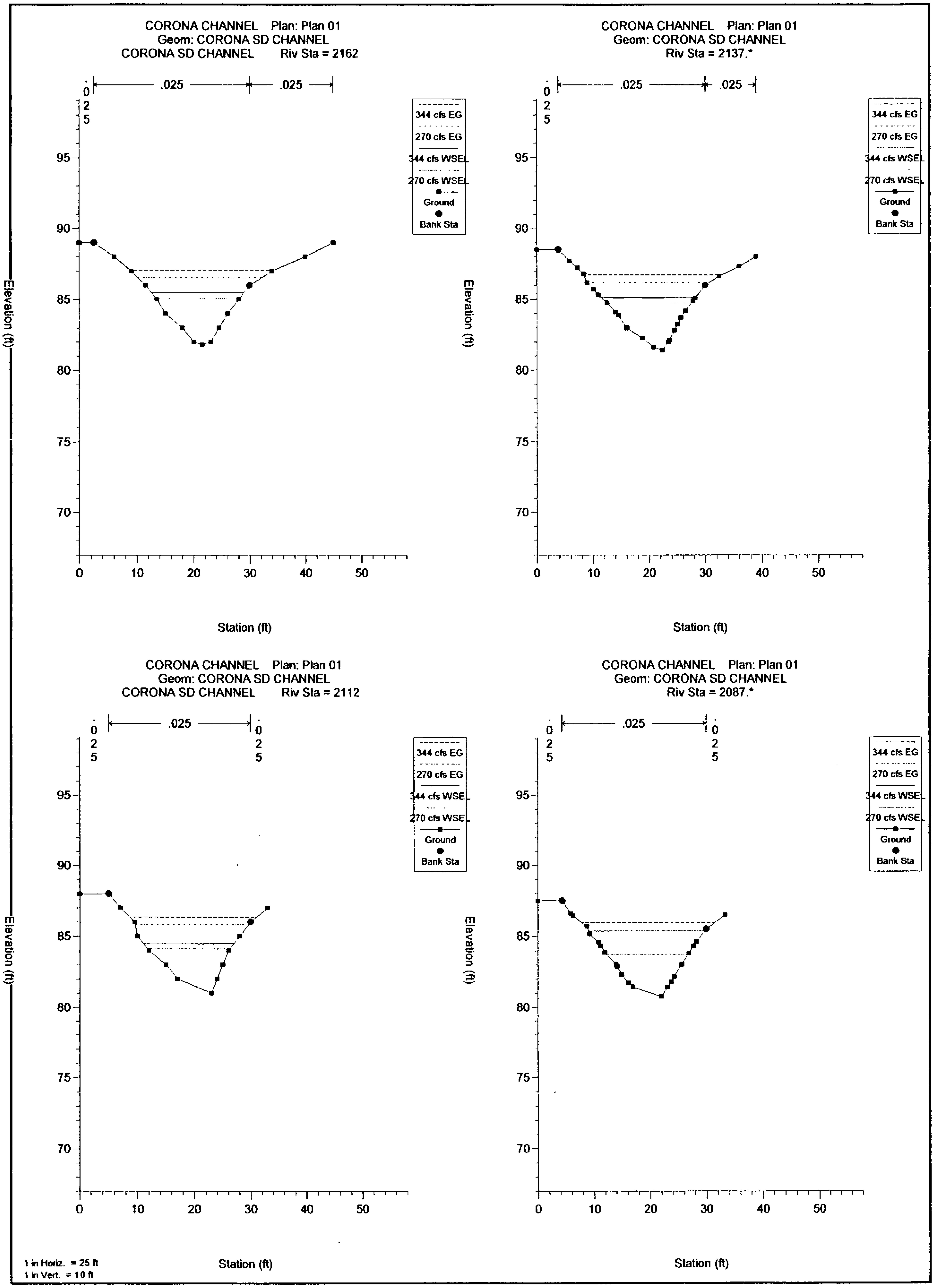
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 2212



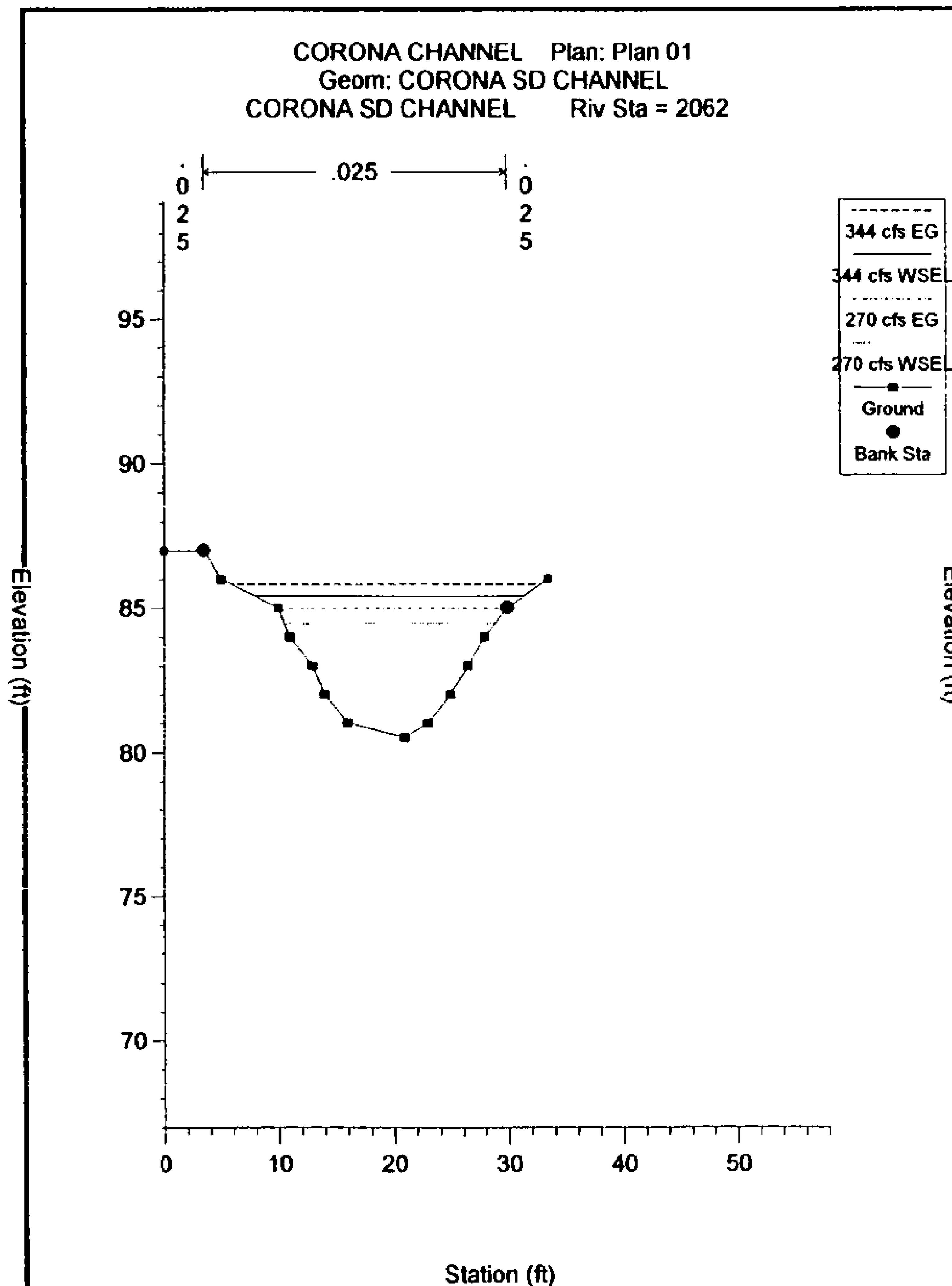
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 2187.*

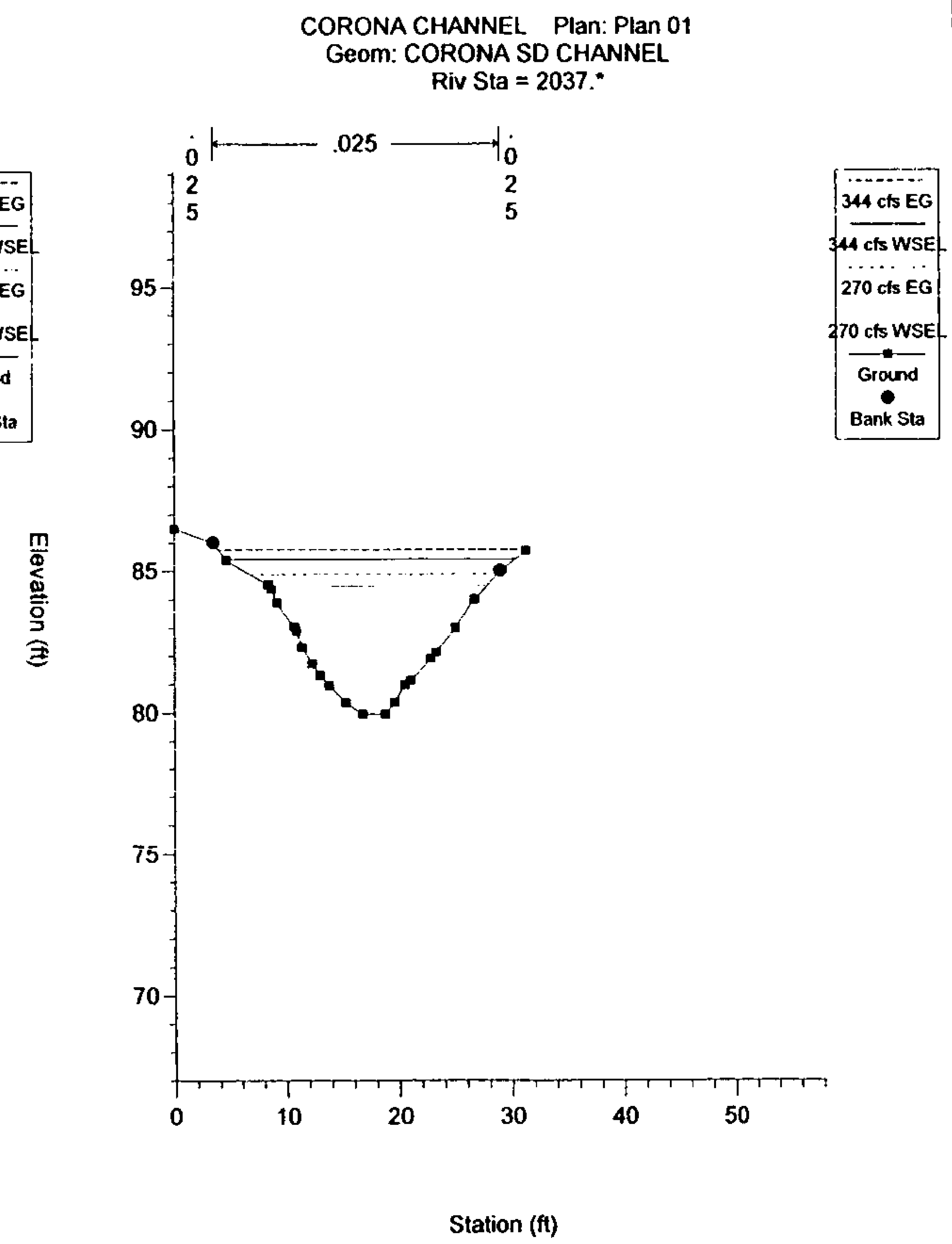


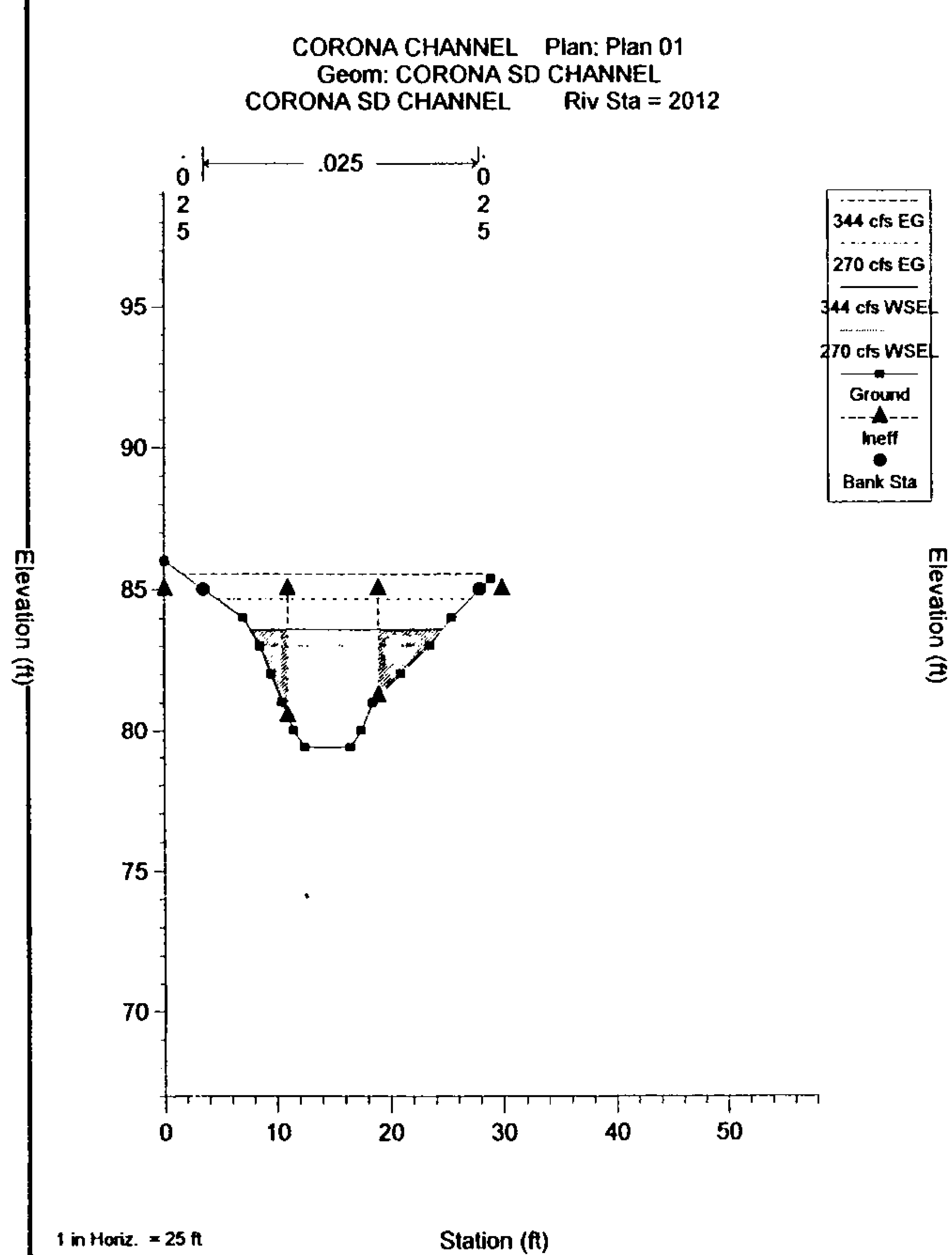
1 in Horiz. = 25 ft
1 in Vert. = 10 ft

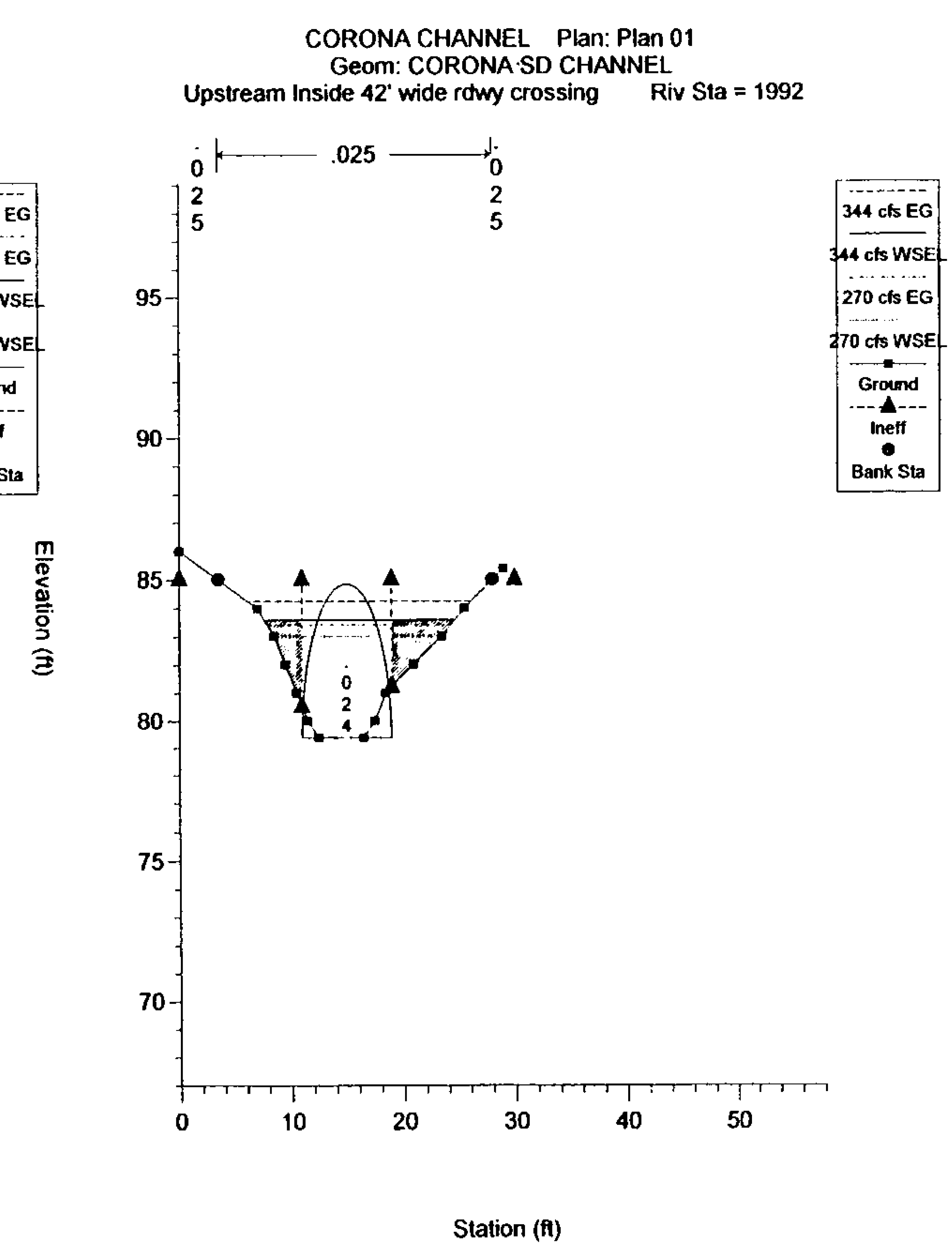


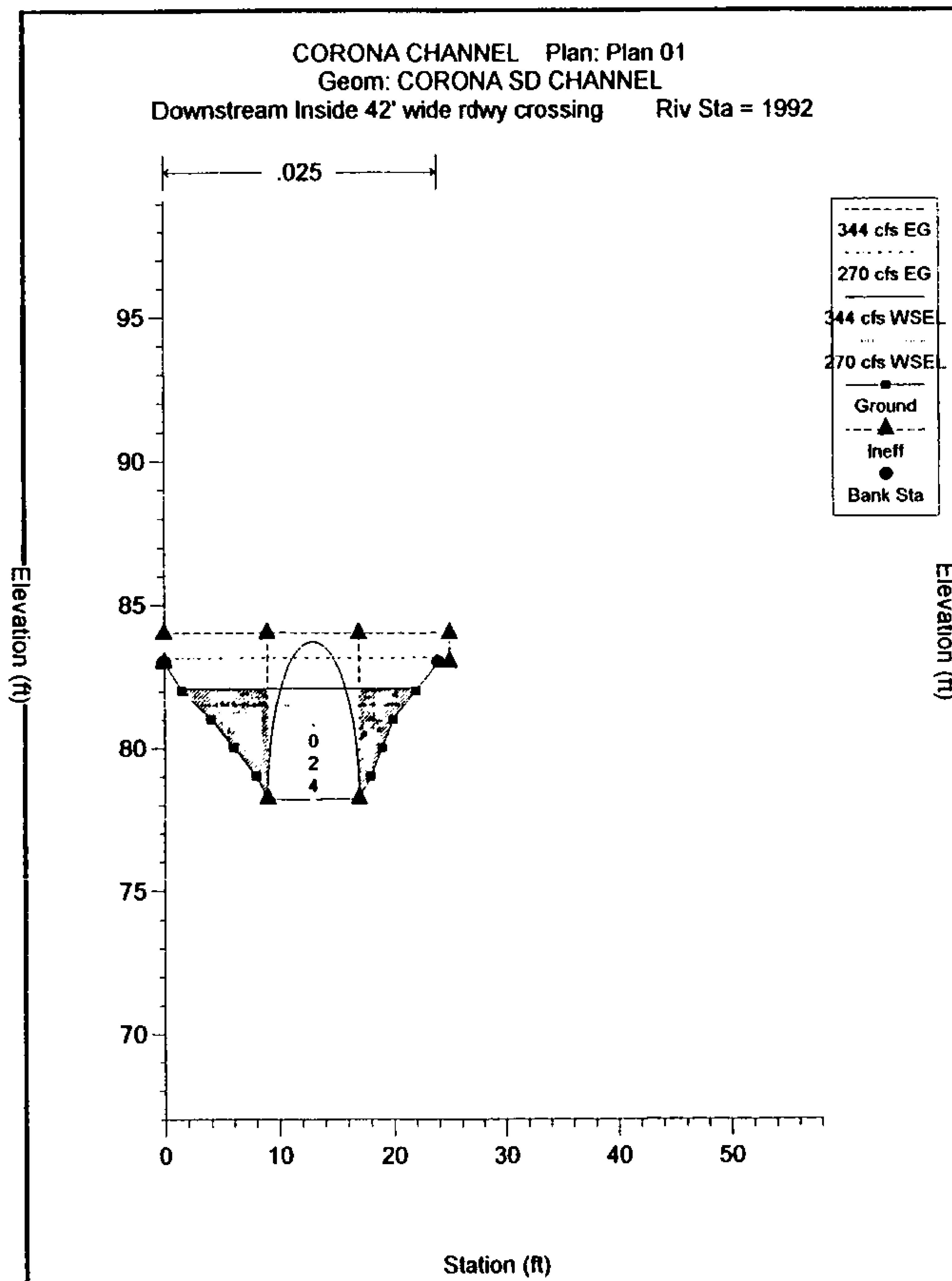
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 2162
.025
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 2137.*
.025
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 2112
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 2087.*
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 25 ft
1 in Vert. = 10 ft

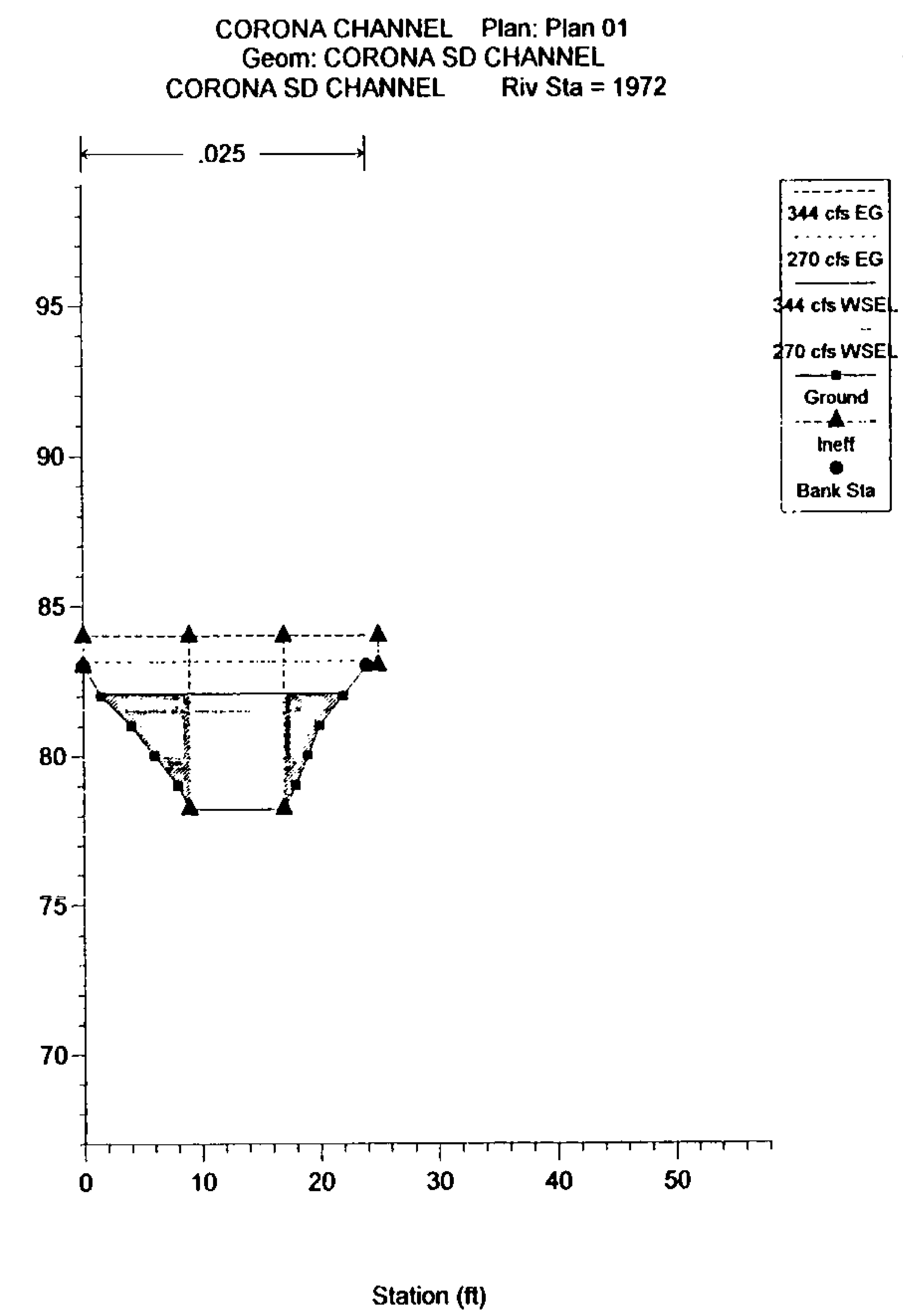

CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 2062
.025
344 cfs EG
344 cfs WSEL
270 cfs EG
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)

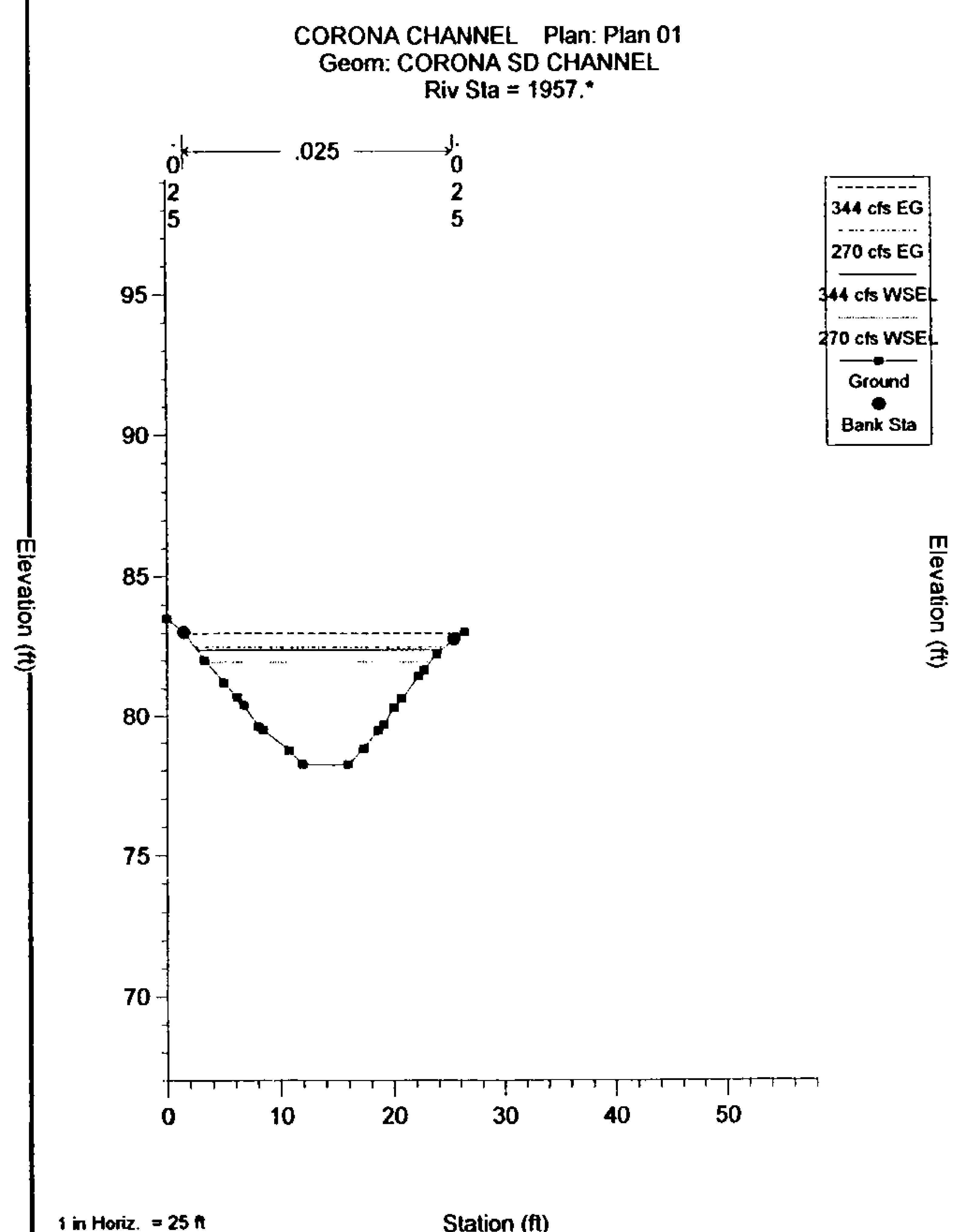

CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 2037.*
.025
344 cfs EG
344 cfs WSEL
270 cfs EG
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)

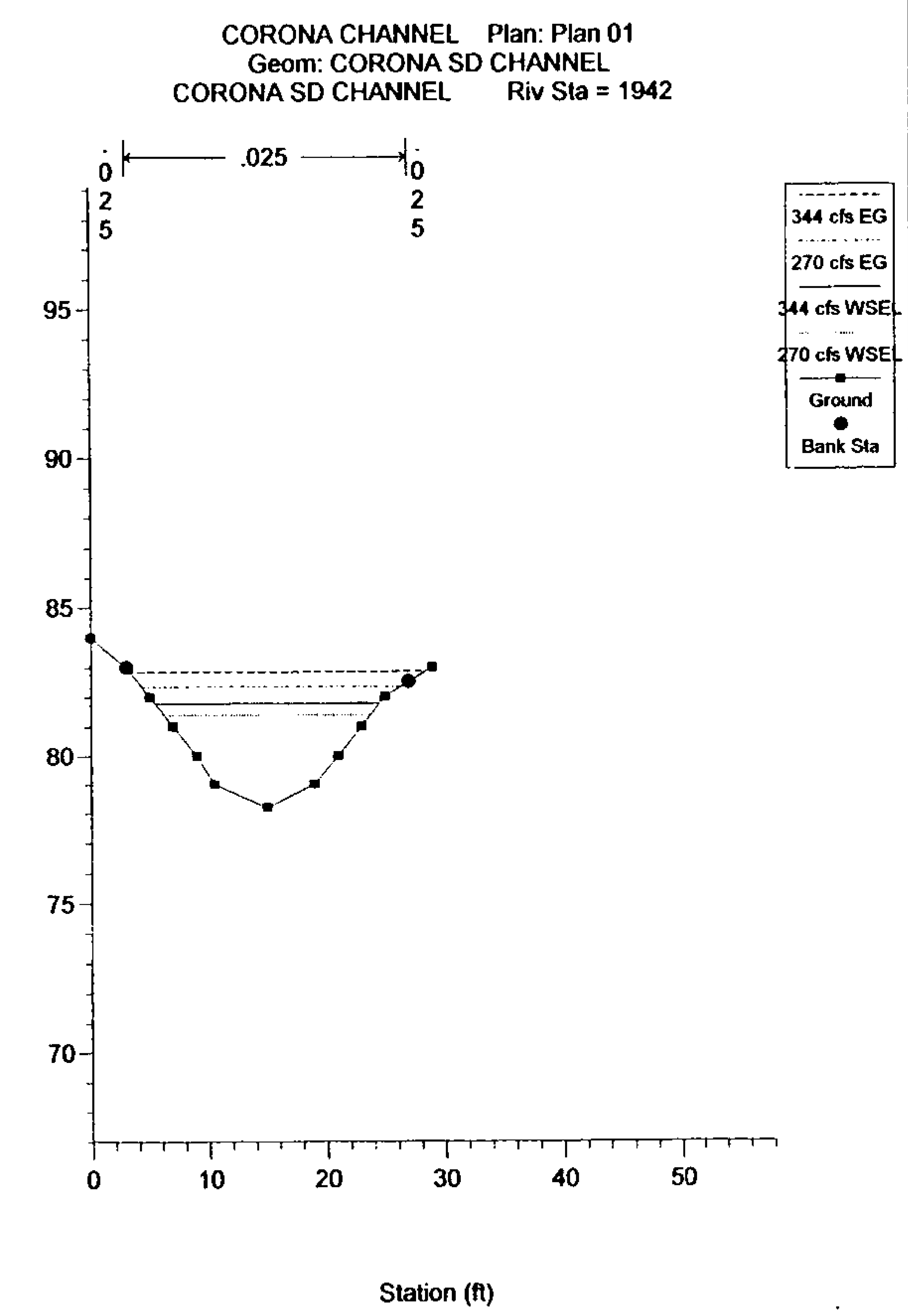

CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 2012
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 25 ft
1 in Vert. = 10 ft


CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Upstream Inside 42' wide rdwy crossing Riv Sta = 1992
.025
344 cfs EG
344 cfs WSEL
270 cfs EG
270 cfs WSEL
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)



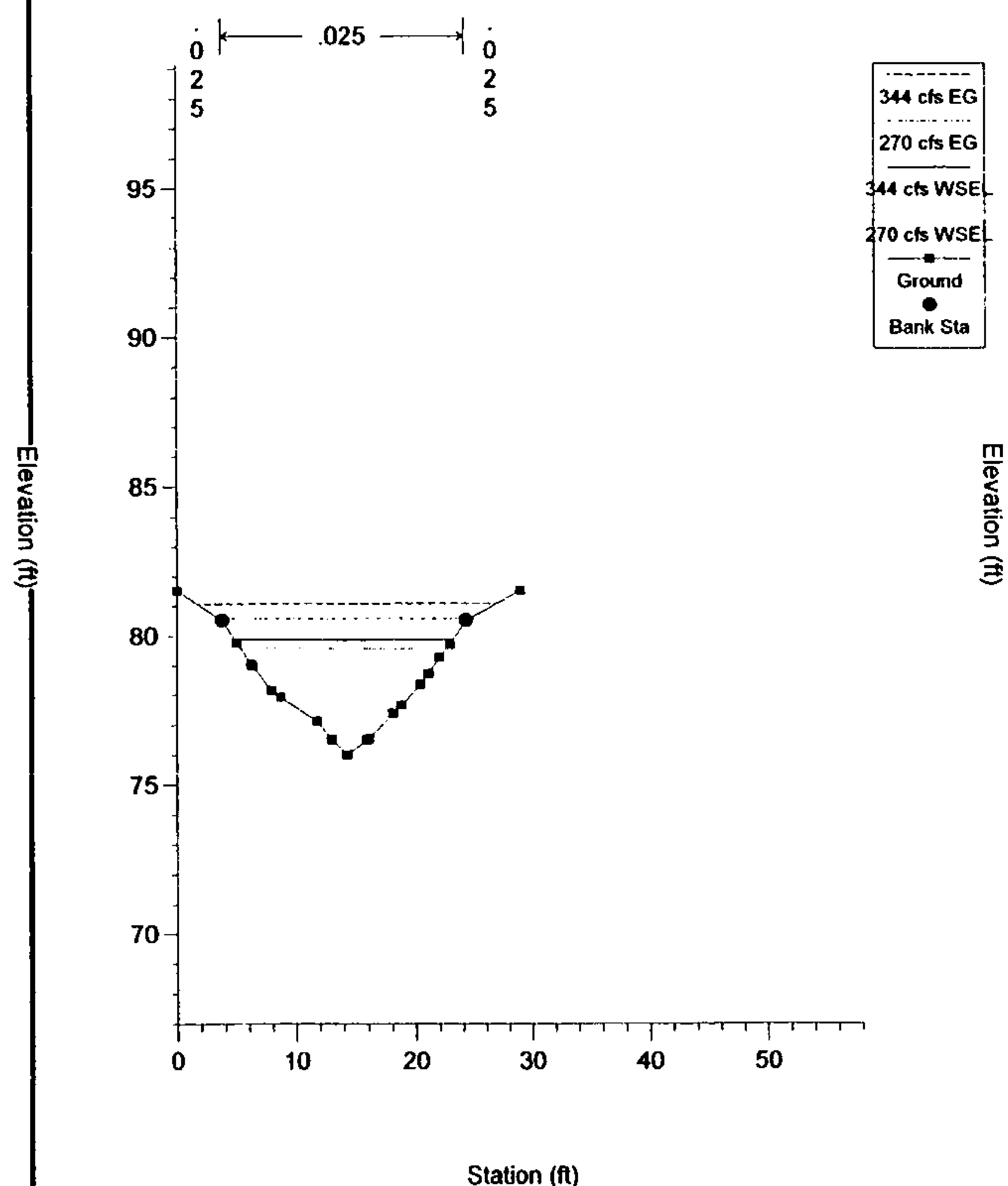




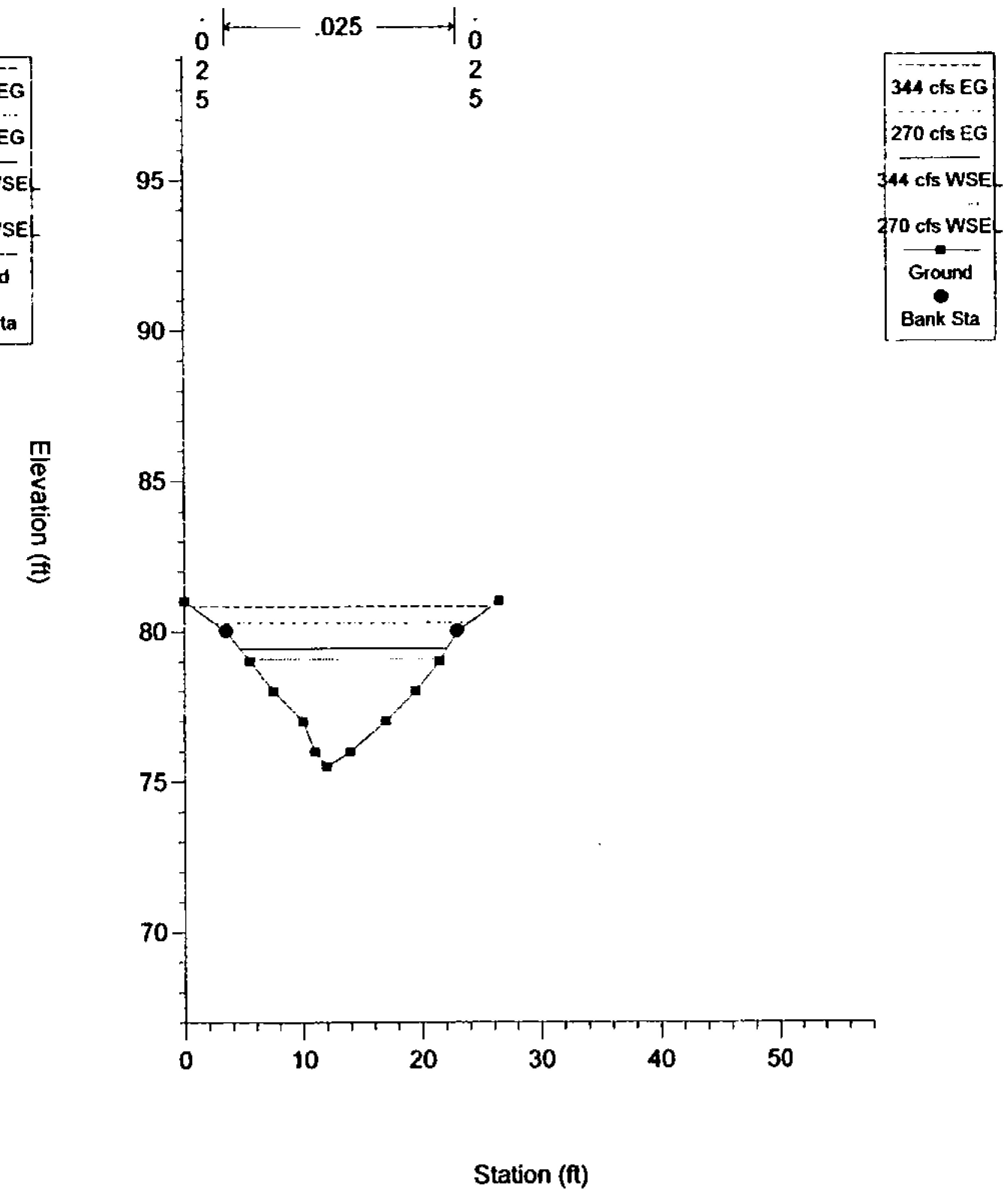


1 in Horiz. = 25 ft
1 in Vert. = 10 ft

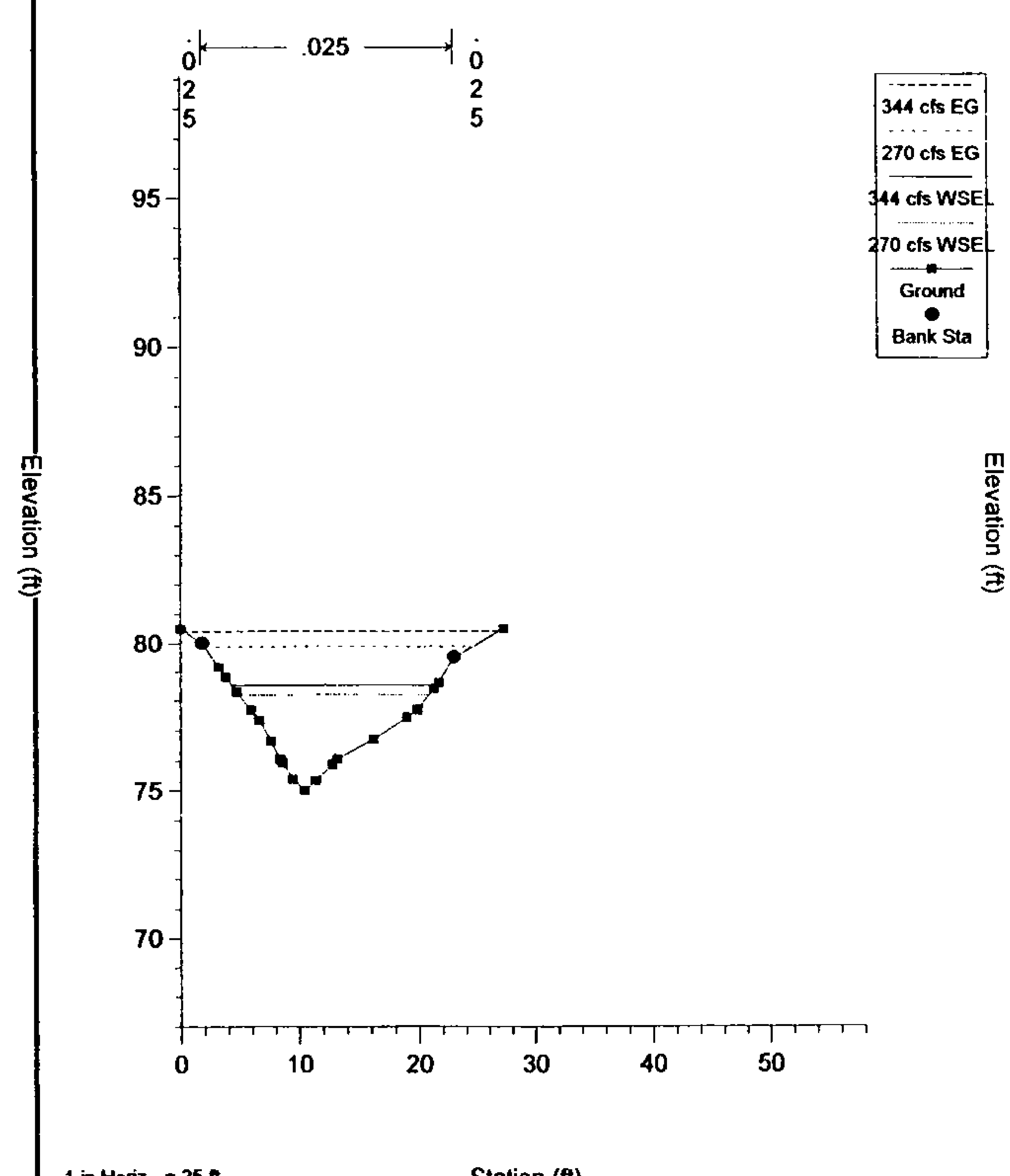
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 1837.*



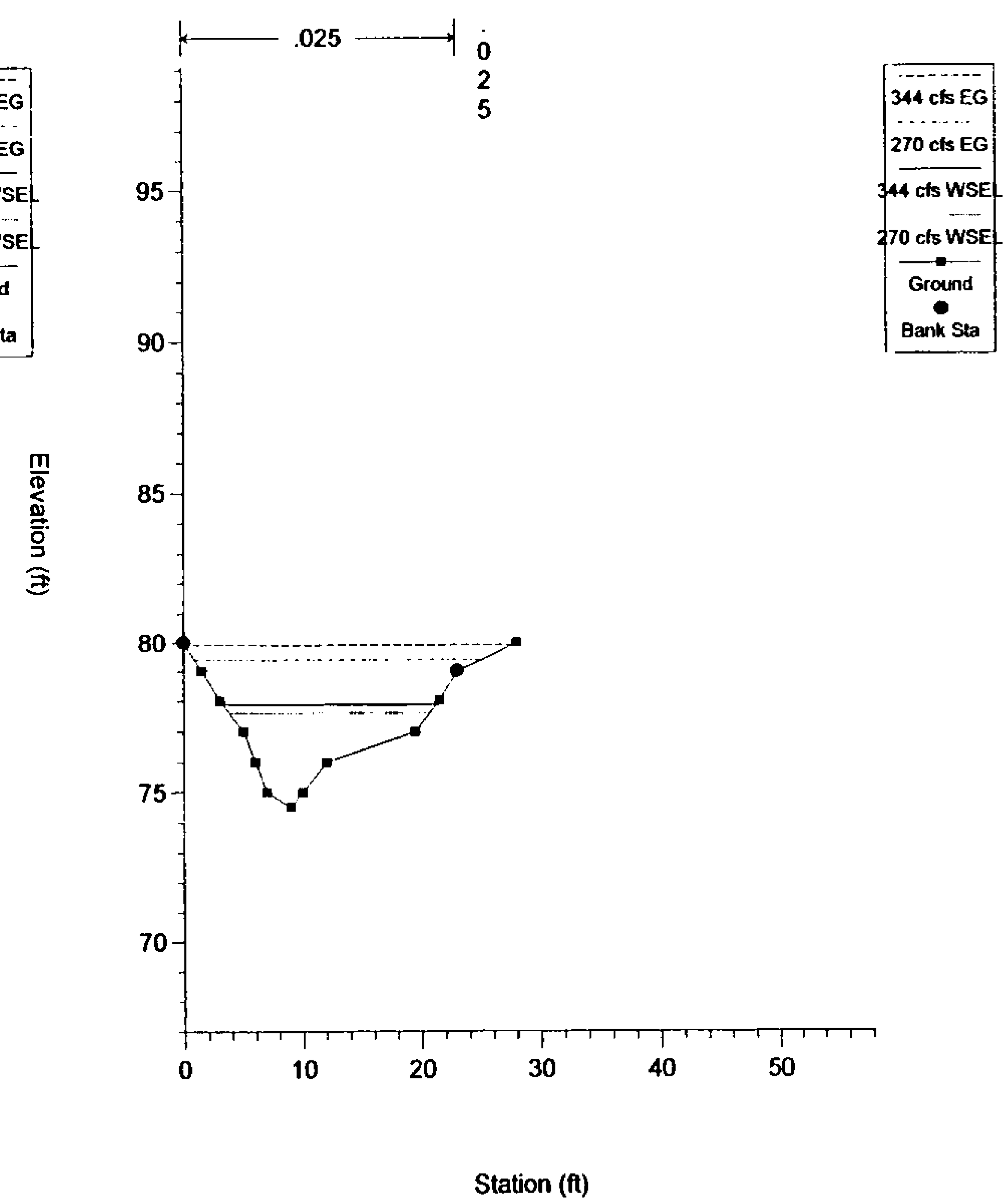
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 1812



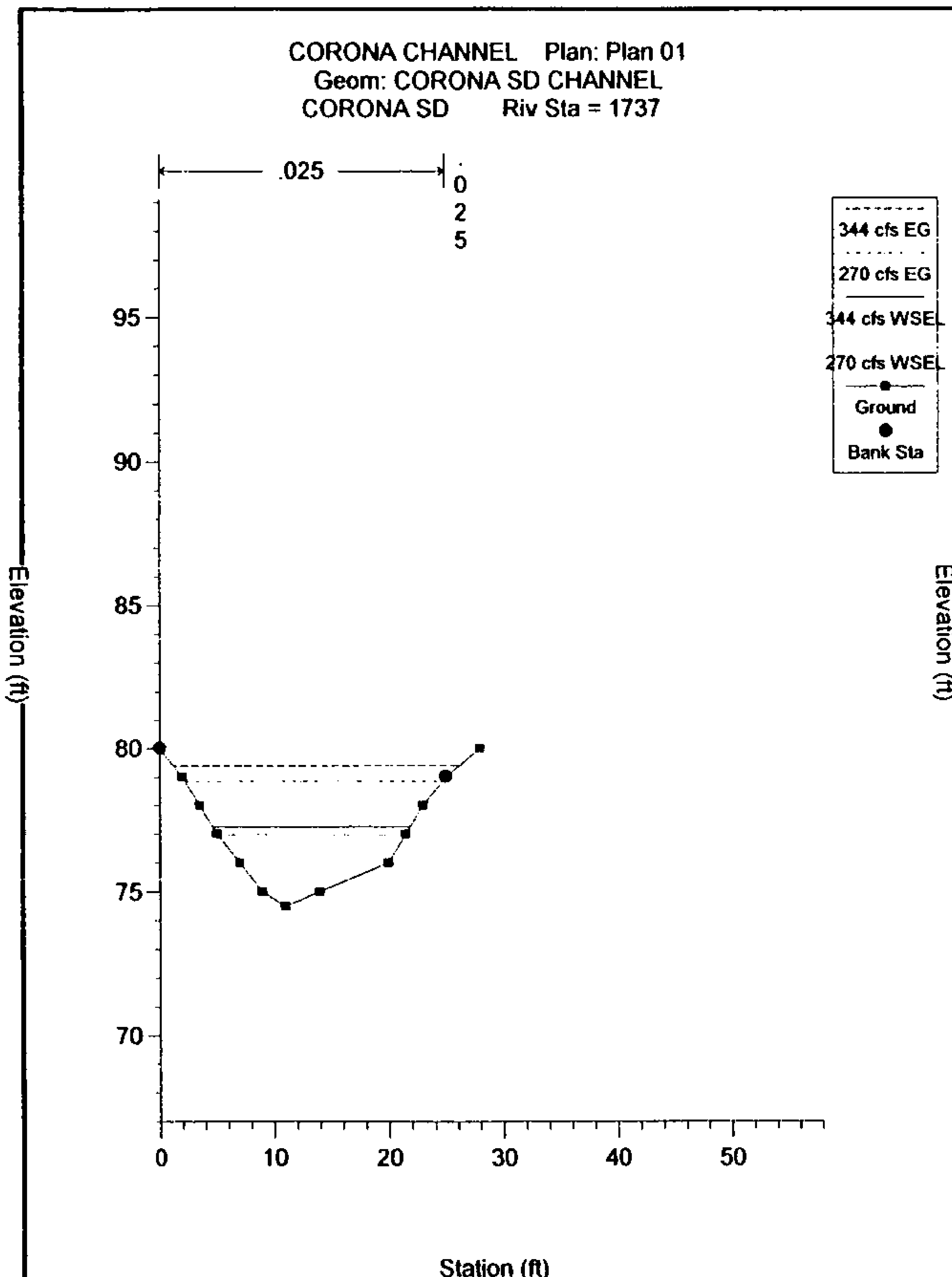
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 1787.*

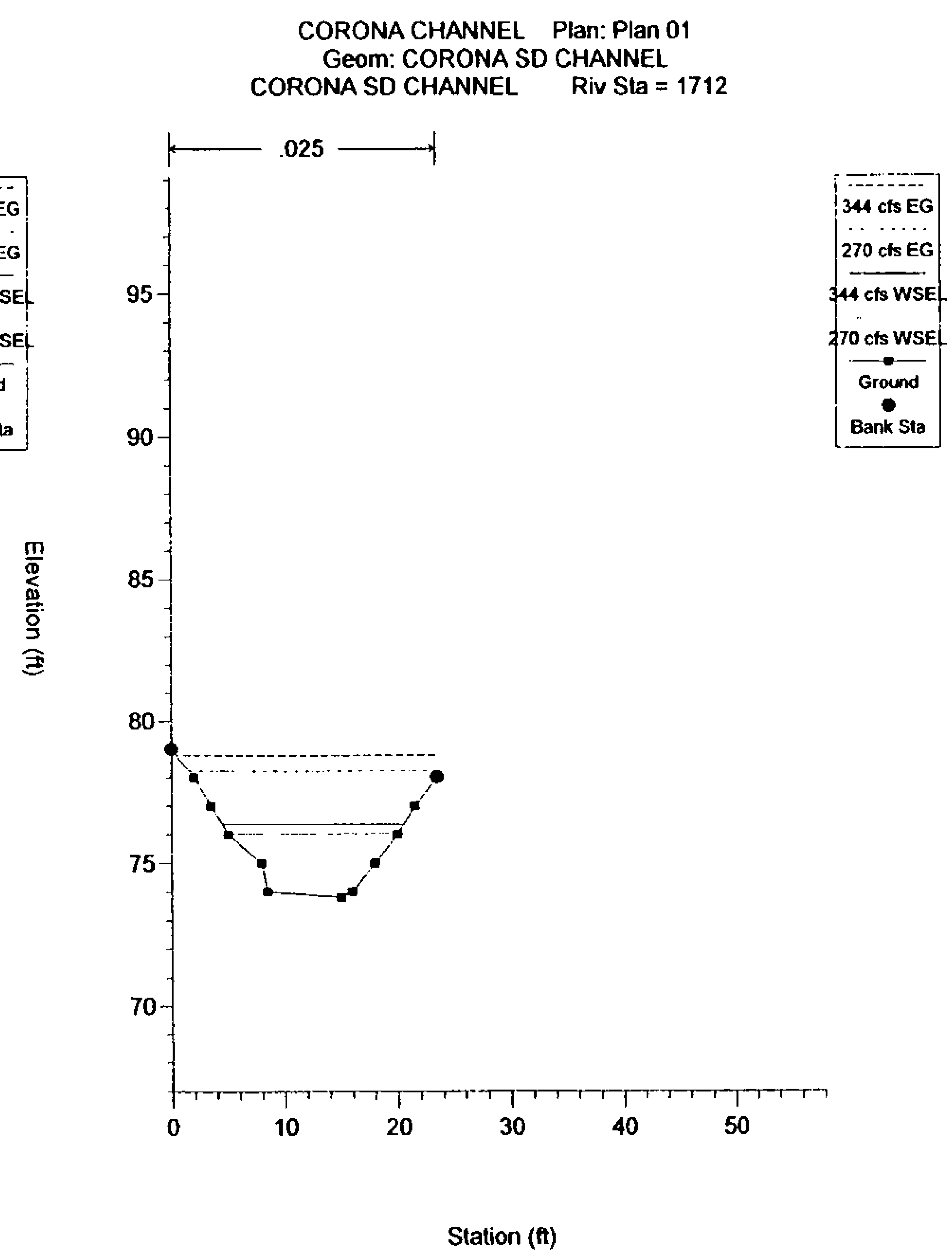


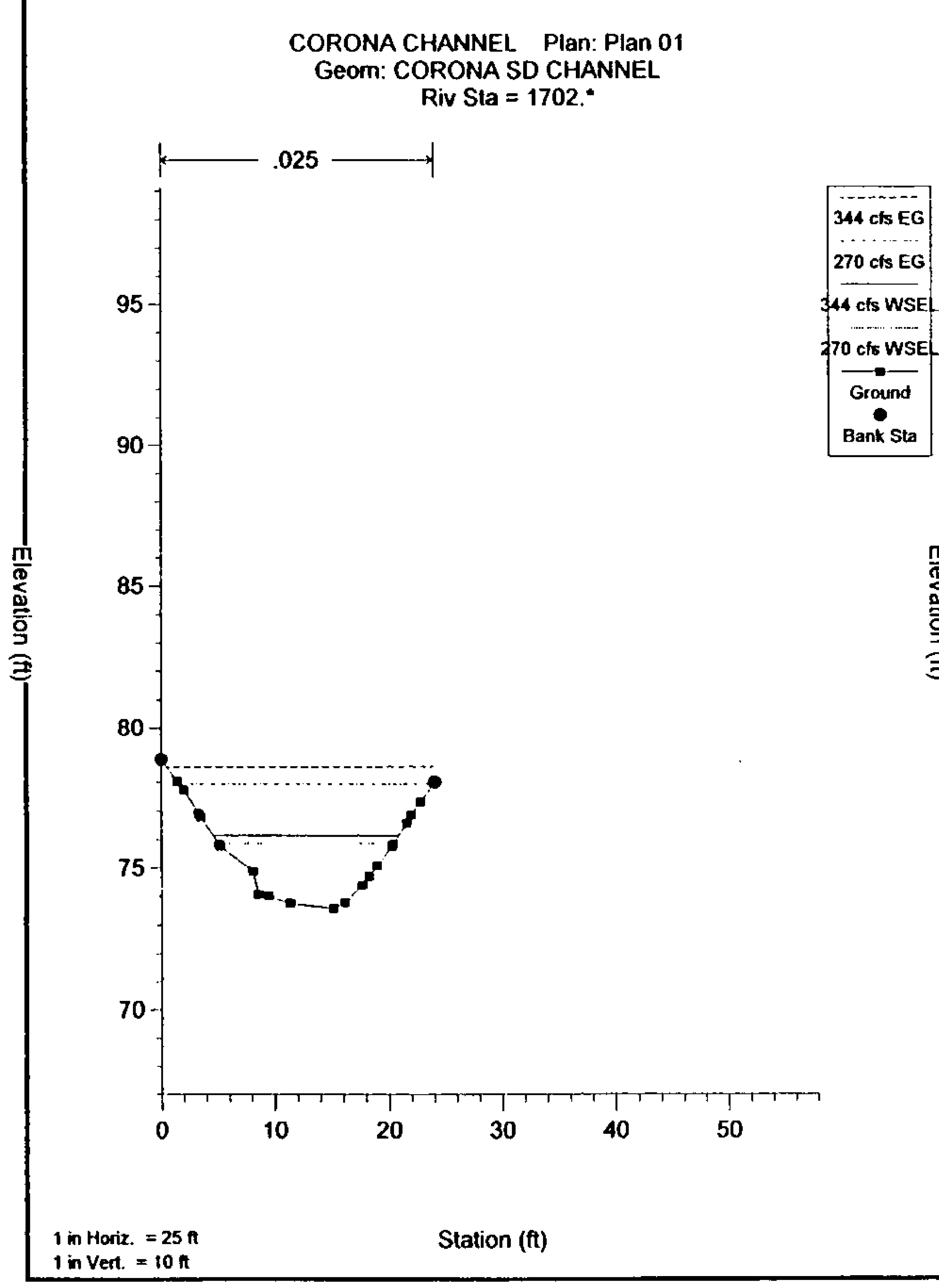
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 1762

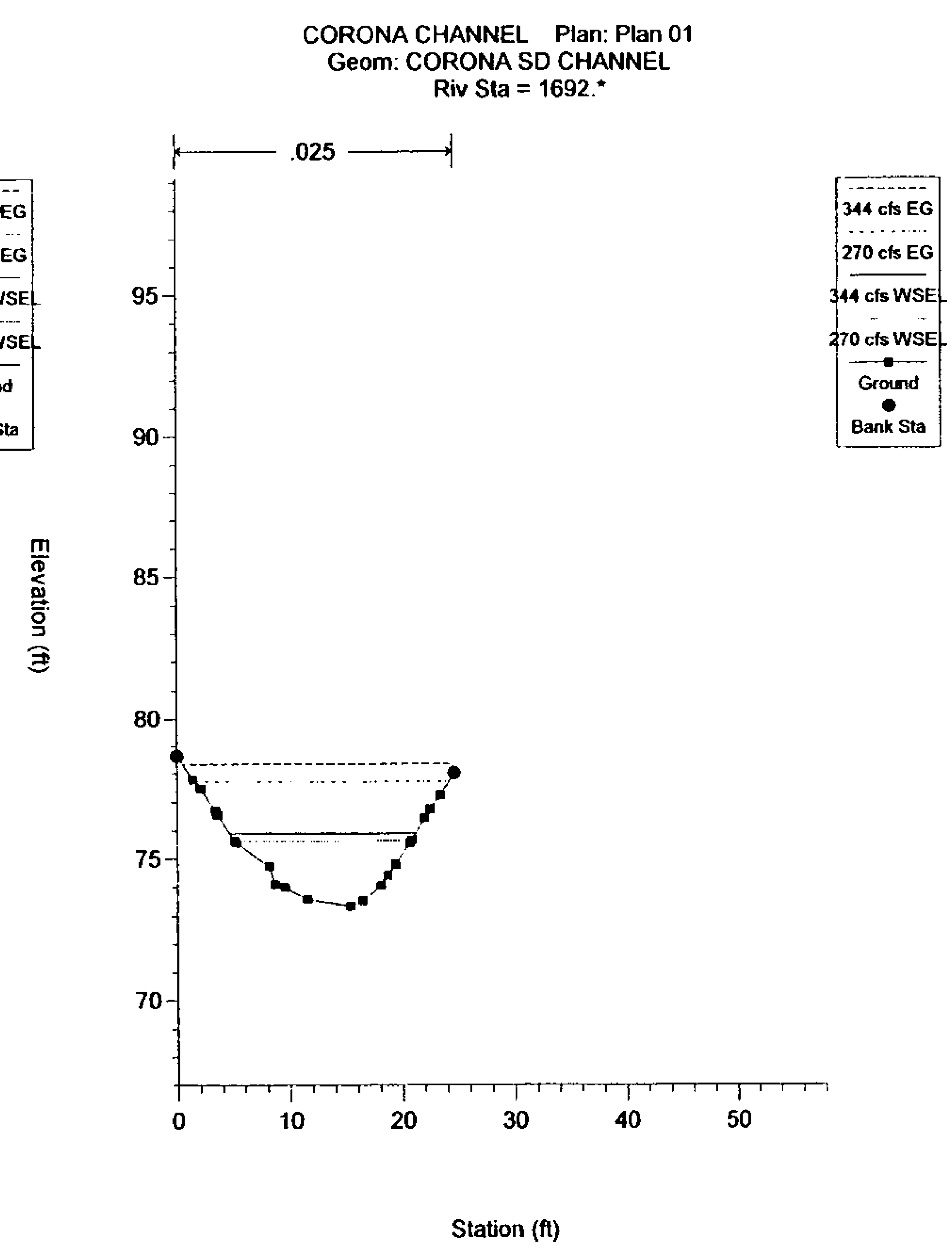


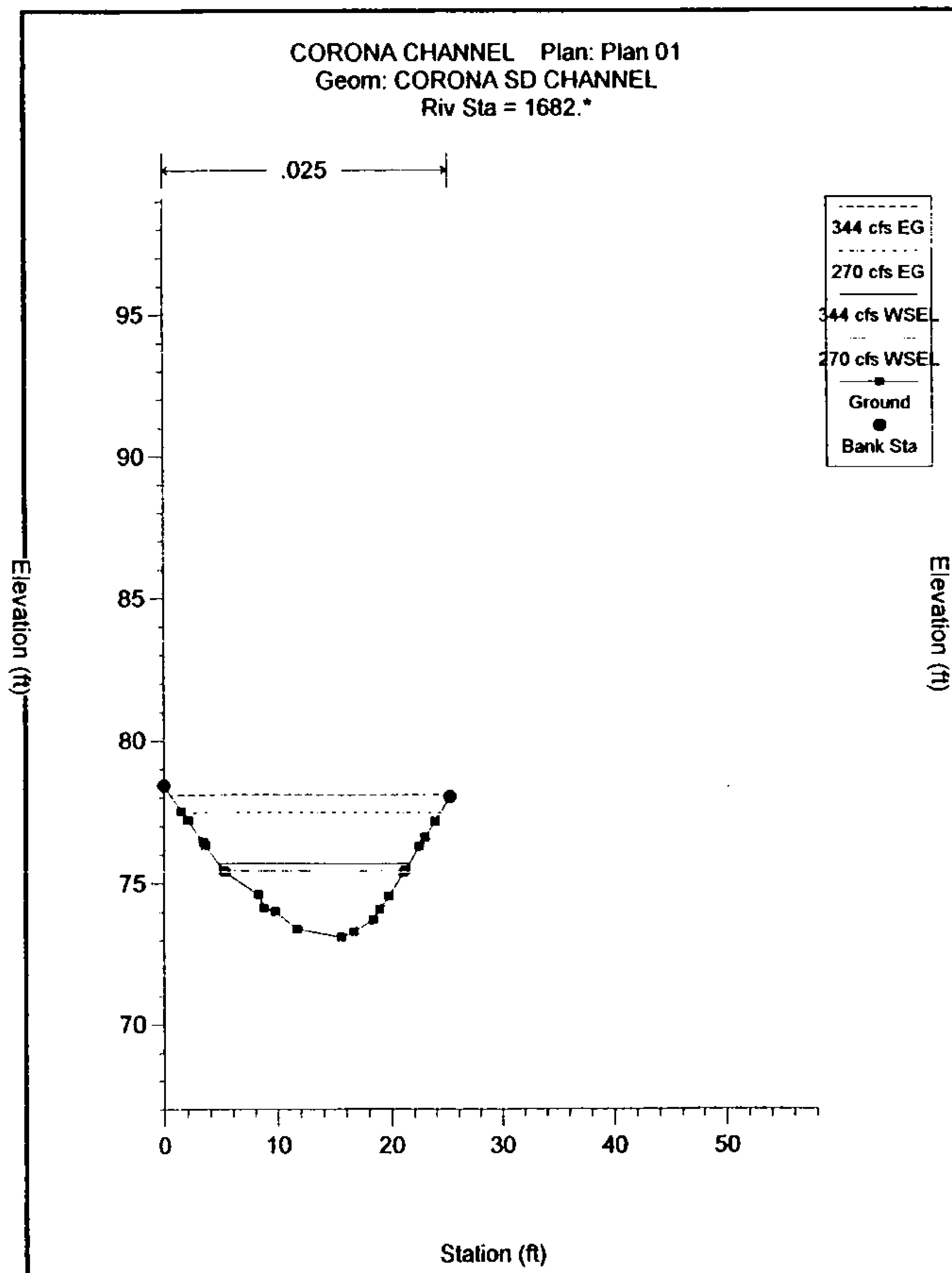
1 in Horiz. = 25 ft
1 in Vert. = 10 ft

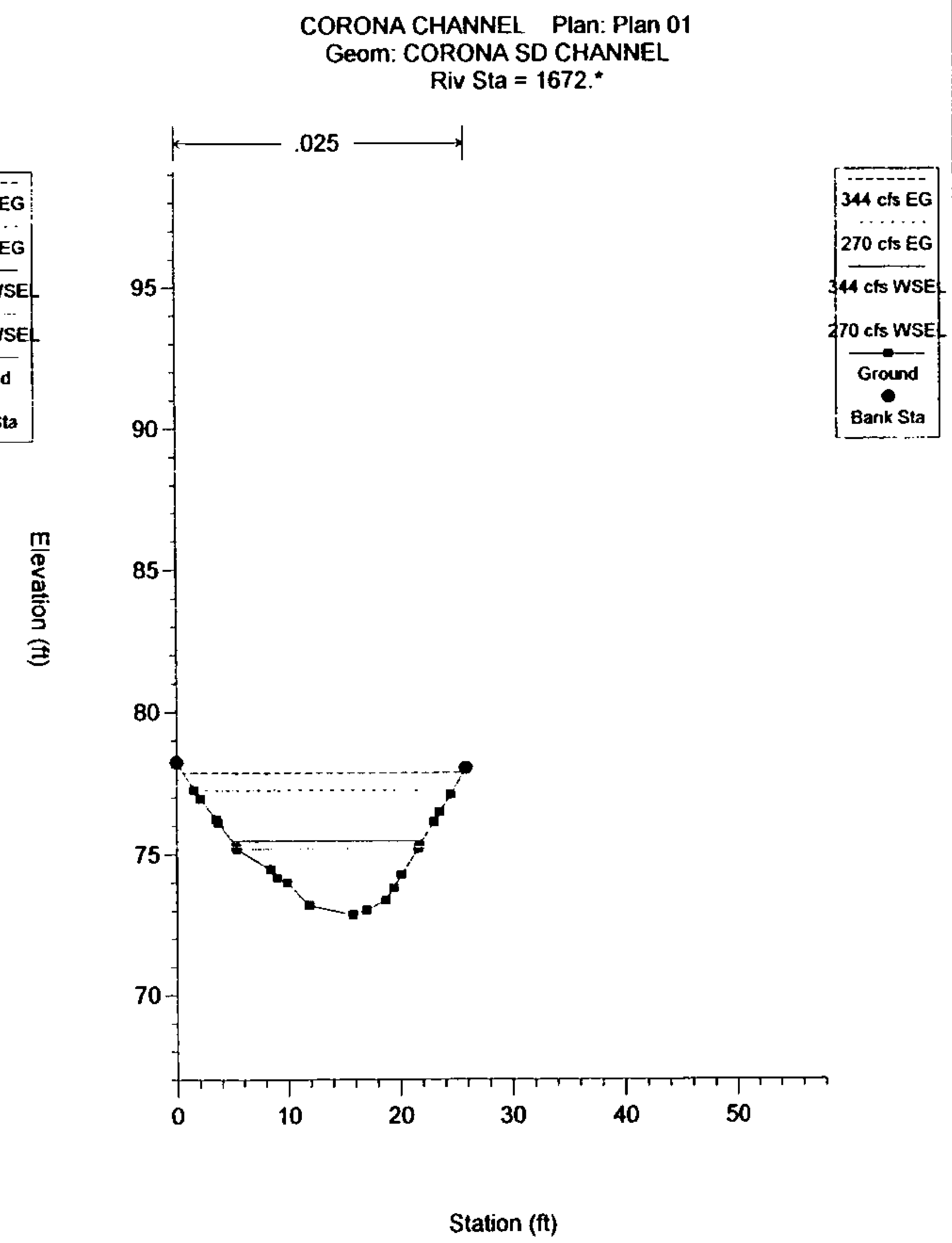

CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD Riv Sta = 1737
.025
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)

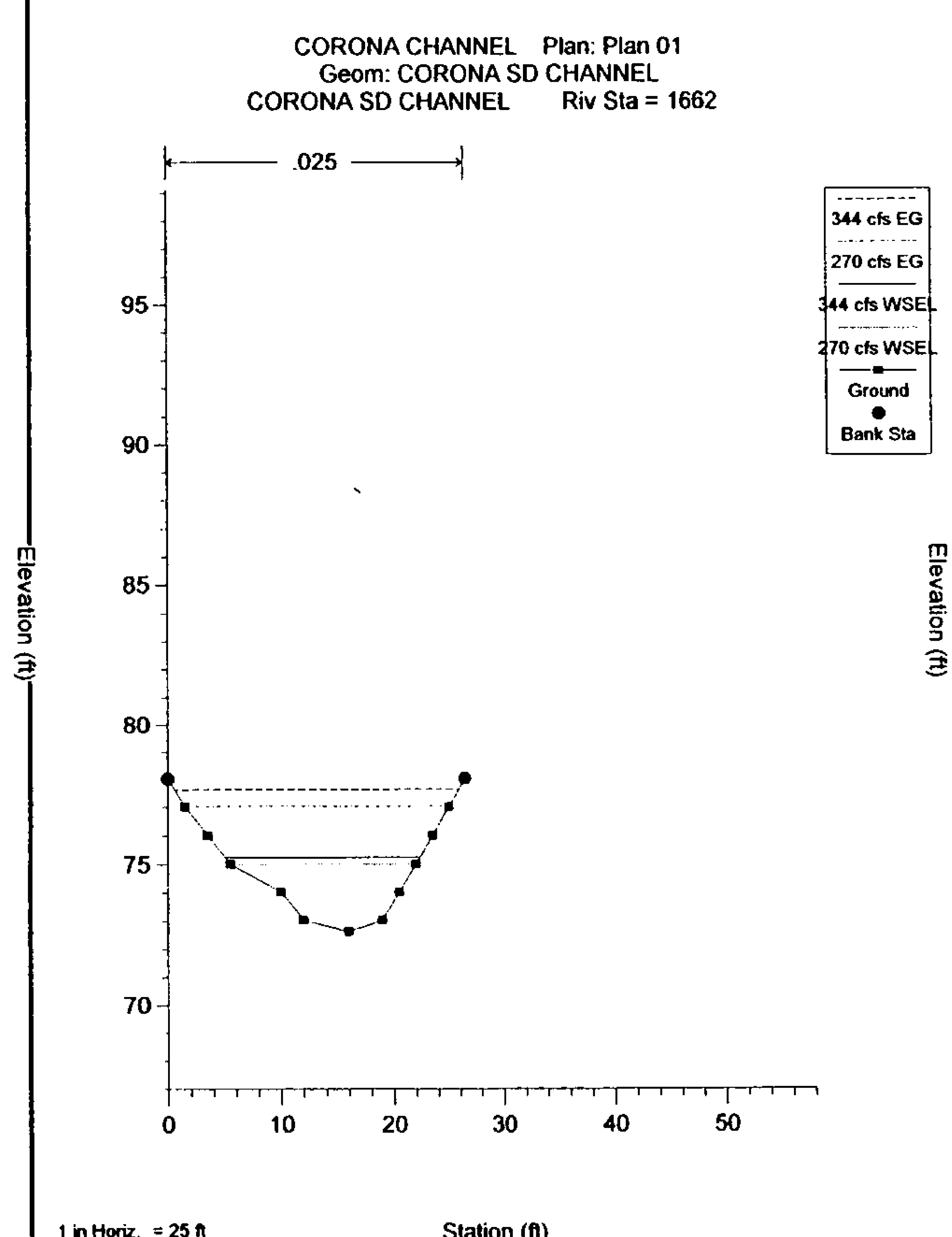

CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 1712
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)

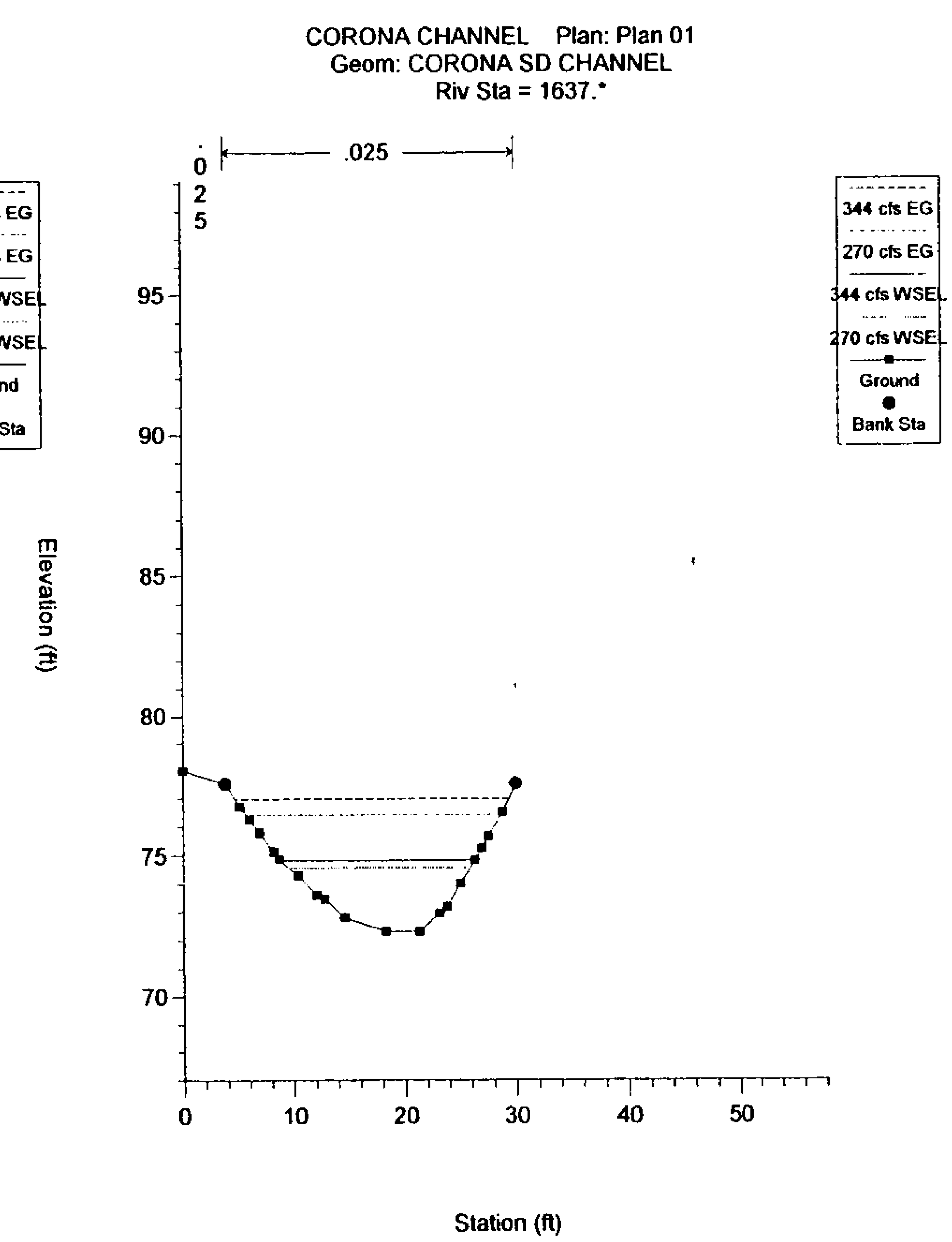

CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 1702.*
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)
1 in Horiz. = 25 ft
1 in Vert. = 10 ft


CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 1692.*
.025
344 cfs EG
270 cfs EG
344 cfs WSEL
270 cfs WSEL
Ground
Bank Sta
Elevation (ft)
Station (ft)



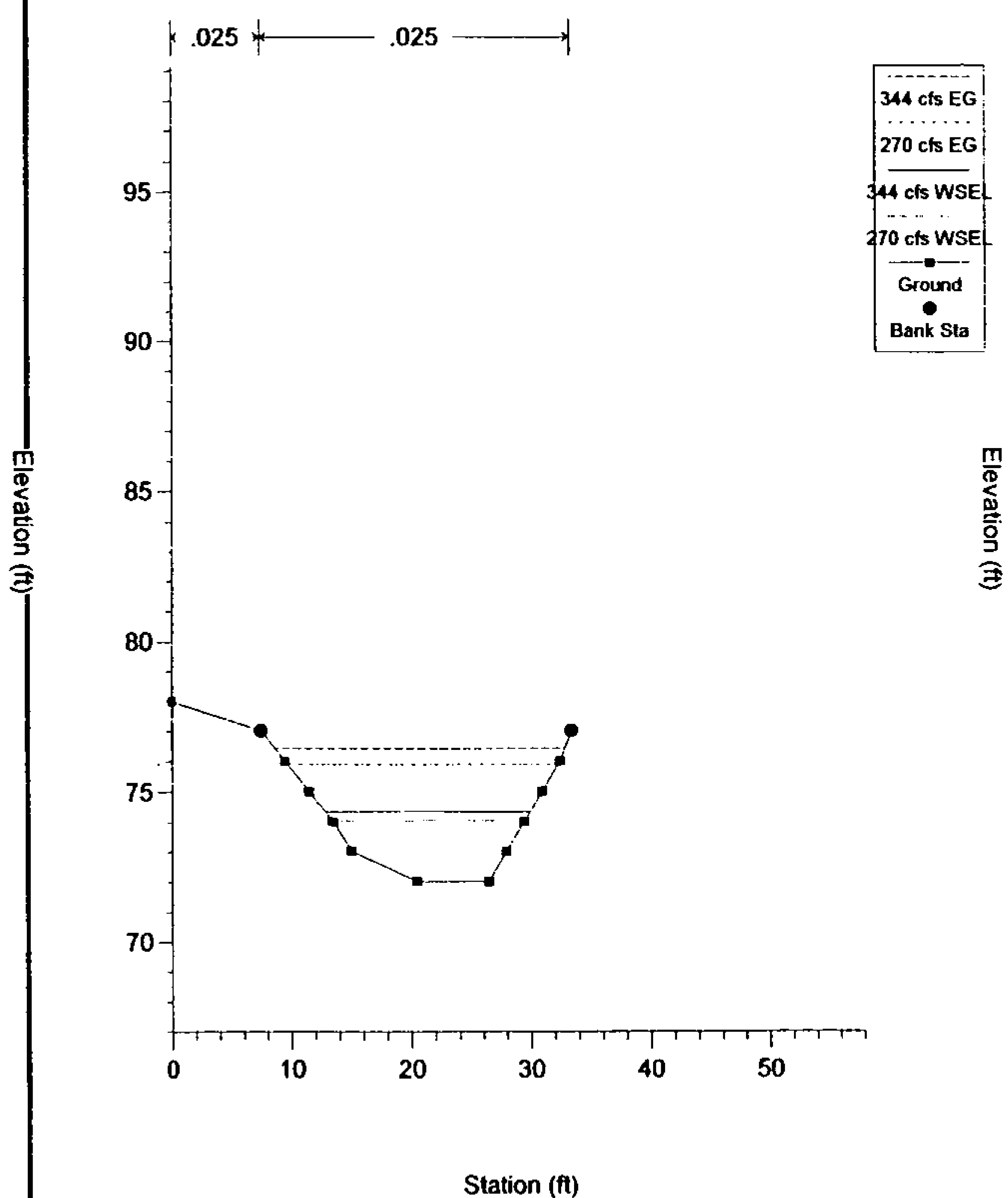




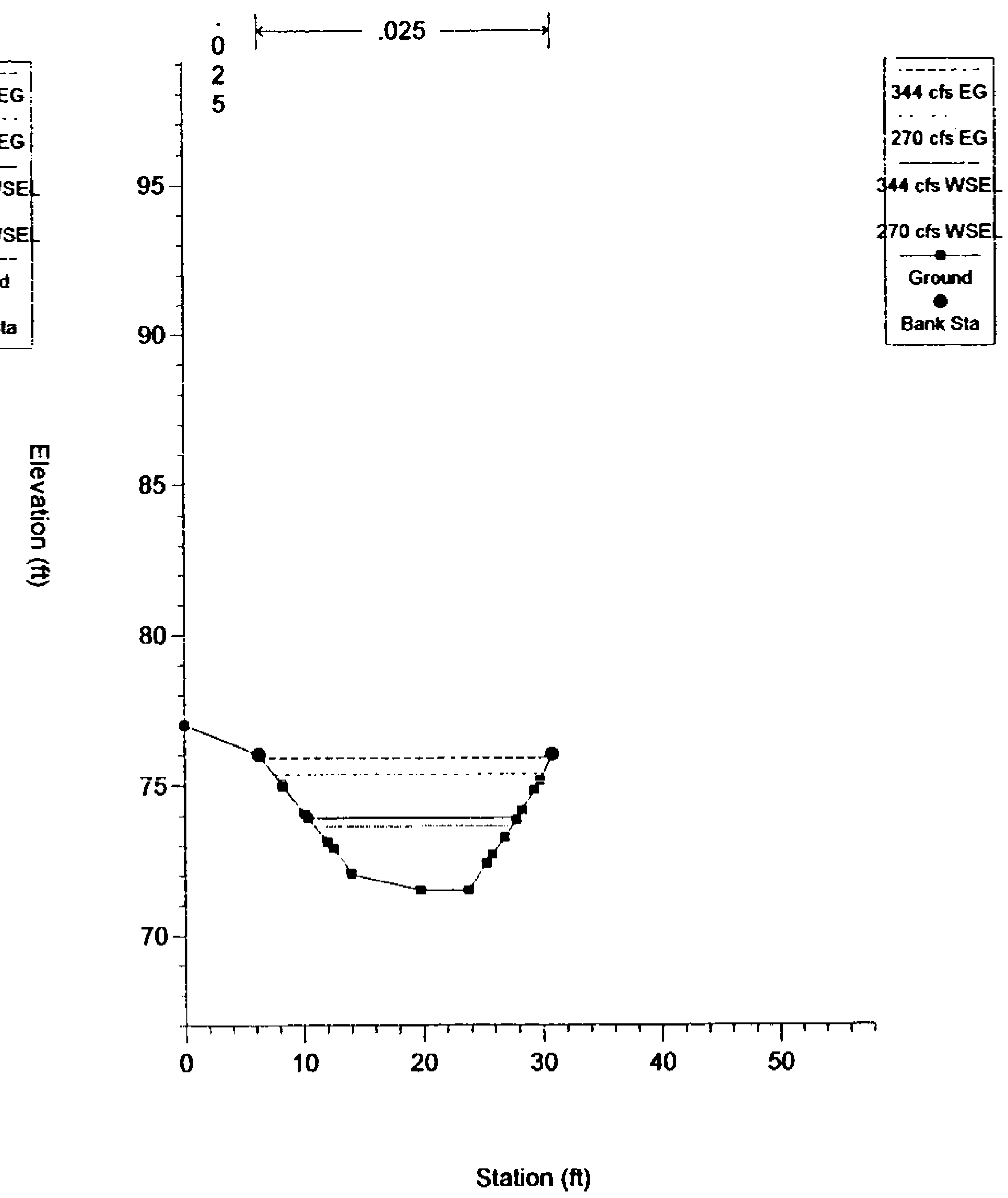


1 in Horiz. = 25 ft
1 in Vert. = 10 ft

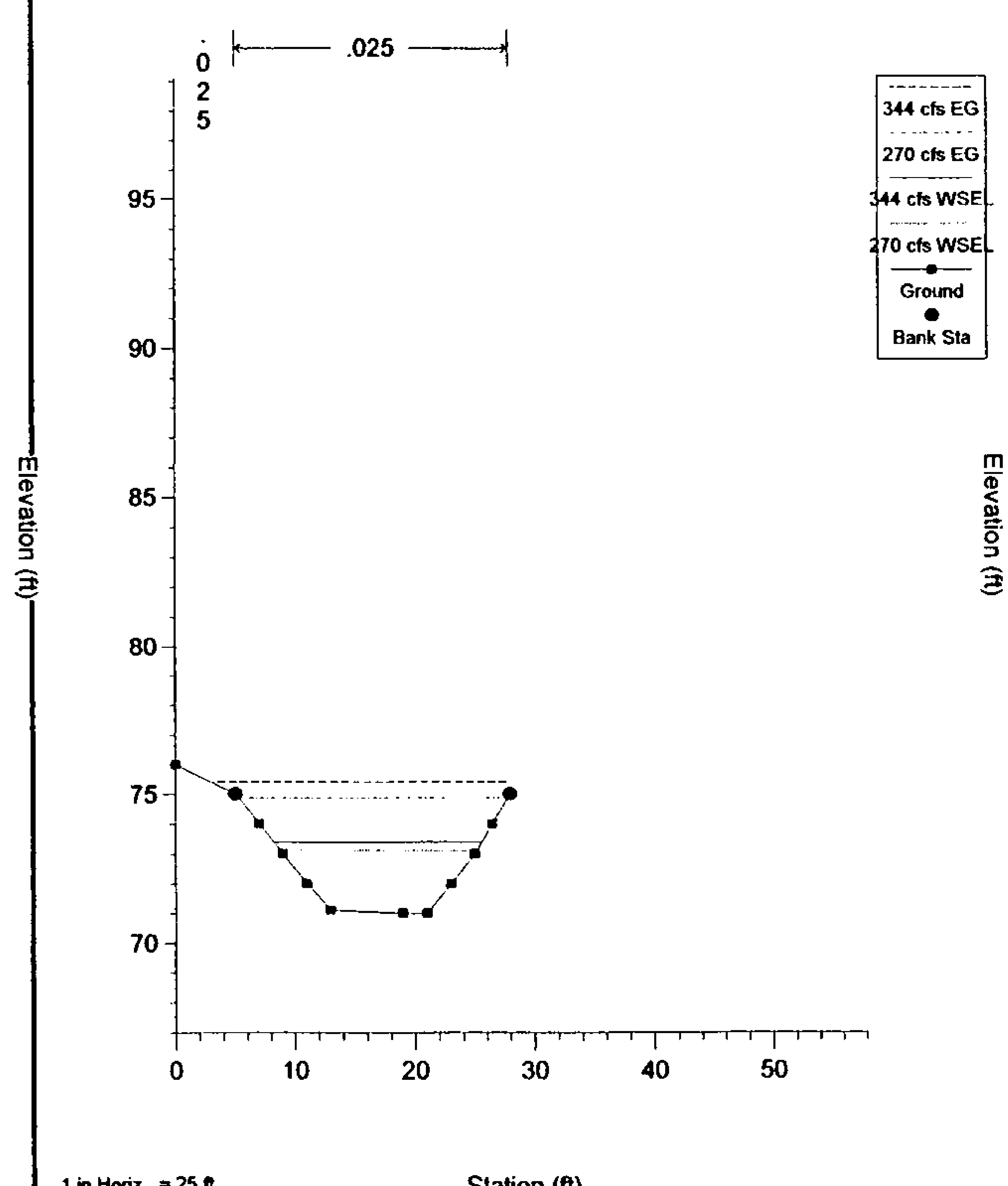
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 1612



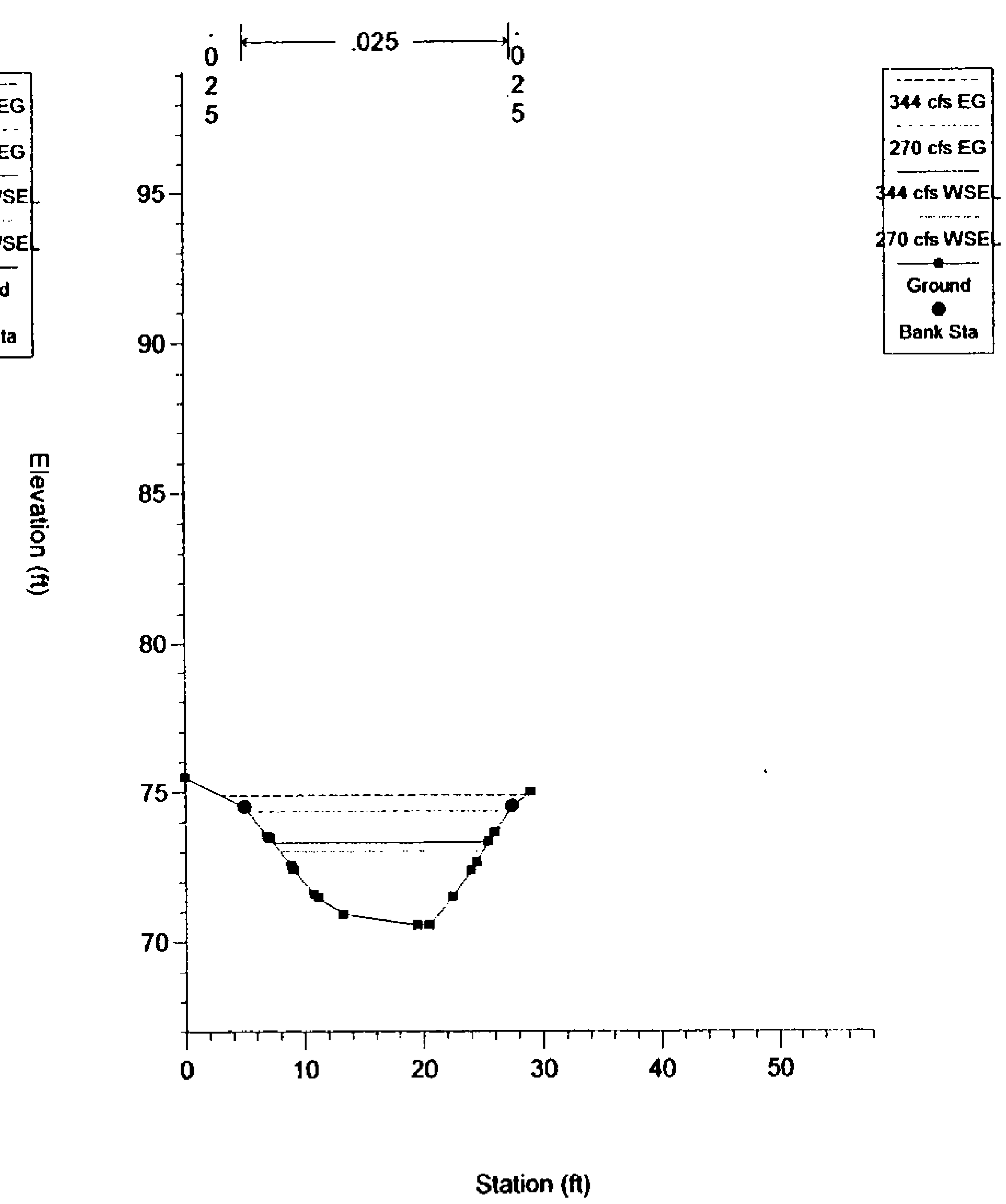
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 1587.*



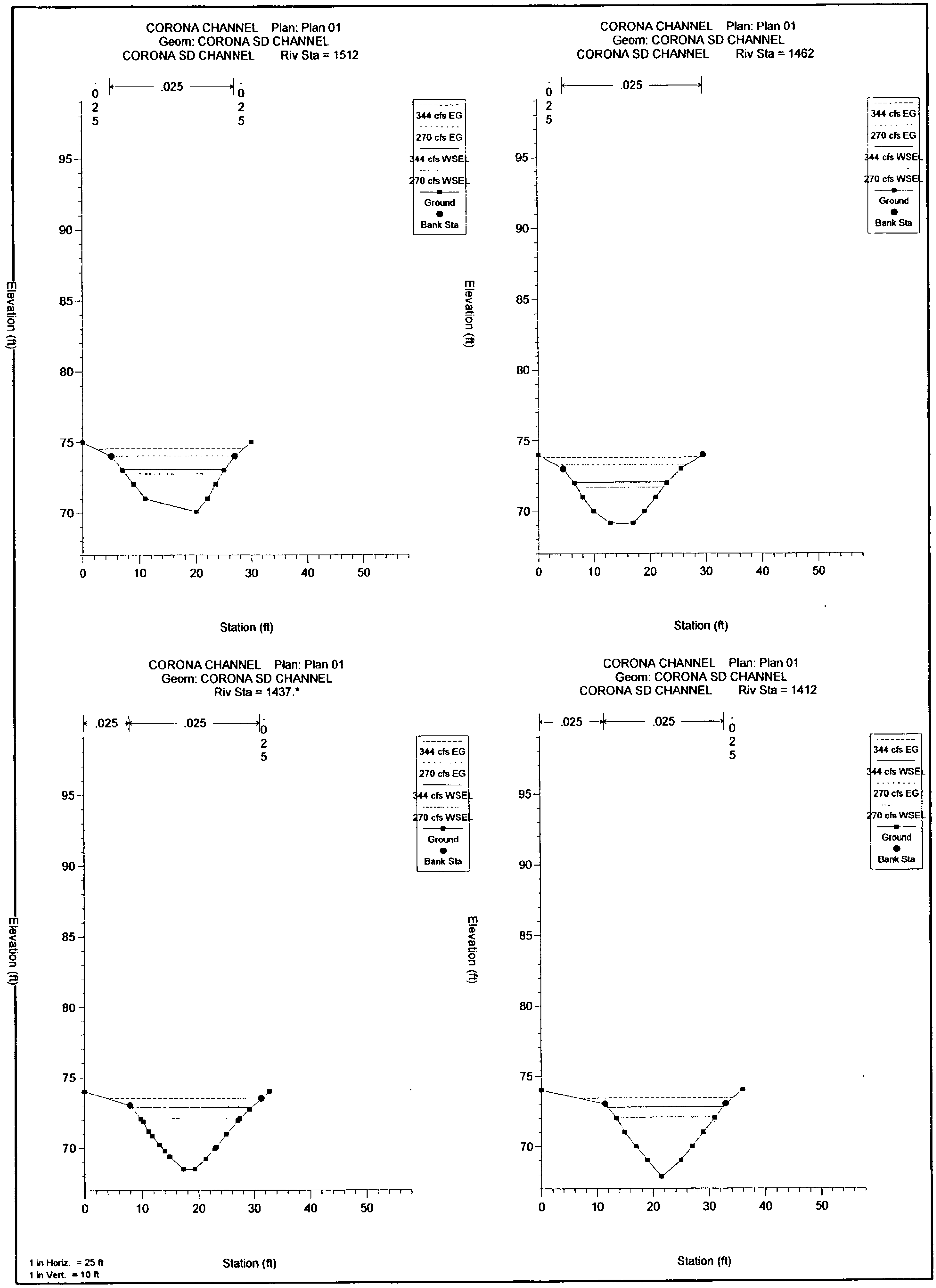
CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
CORONA SD CHANNEL Riv Sta = 1562



CORONA CHANNEL Plan: Plan 01
Geom: CORONA SD CHANNEL
Riv Sta = 1537.*



1 in Horiz. = 25 ft
1 in Vert. = 10 ft



1 in Horiz. = 25 ft
1 in Vert. = 10 ft

dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Corona S.D.
SUBJECT Normal Depth Calcs
BY DLH DATE 8-5-99
CHECKED ____ DATE ____
SHEET ____ OF ____
Rev 9-7-99

REACH 5 1 - 5.2' x 8.0' RCP

$\pi(2.6)(4) = \pi(r^2)$ $r = 3.225'$ $D = 6.45'$

$\frac{D}{d} = .53(6.45) = 3.42'$

$A = .4227(6.45)^2 = 17.585'$

$P = 1.6308(6.45) = 10.519'$

$\frac{A}{P} = .2591(6.45) = 1.6712'$

$Q = \frac{1.49}{.015}(17.585)(1.6712)^{2/3}\sqrt{.0202}$

$Q = 349$ cfs $\cong 344$ cfs (Qallowable)

∴ Assume outfall depth is 3.4 ft (Initial Conditions) (344 cfs)

$\frac{D}{d} = .46(6.45) = 2.97'$

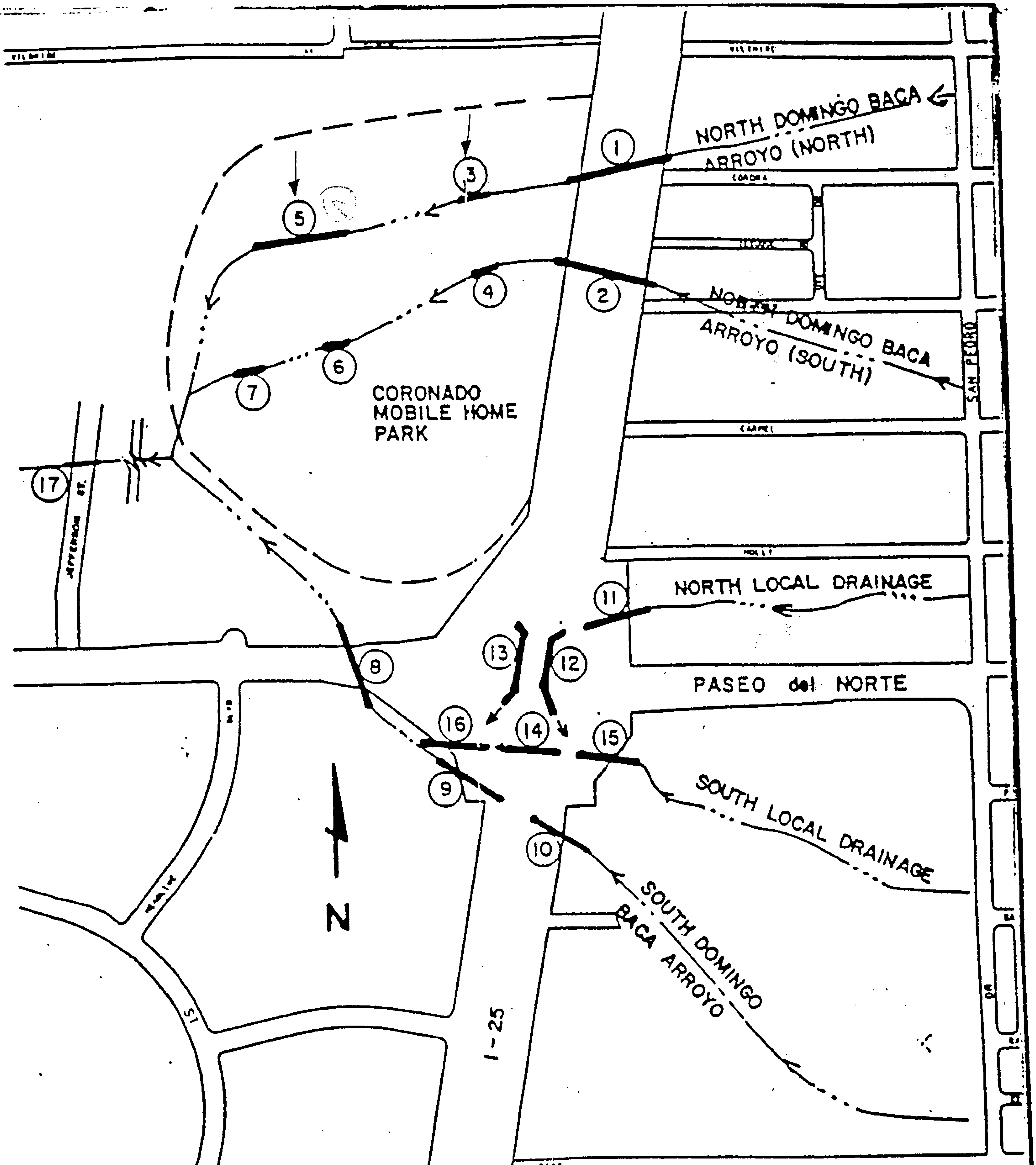
$Area = .3527(6.45)^2 = 14.6732$

$WP = .2366(6.45) = 1.52607$

$Q = \frac{1.49}{.015}(14.6732)(1.52607)^{2/3}\sqrt{.0202}$

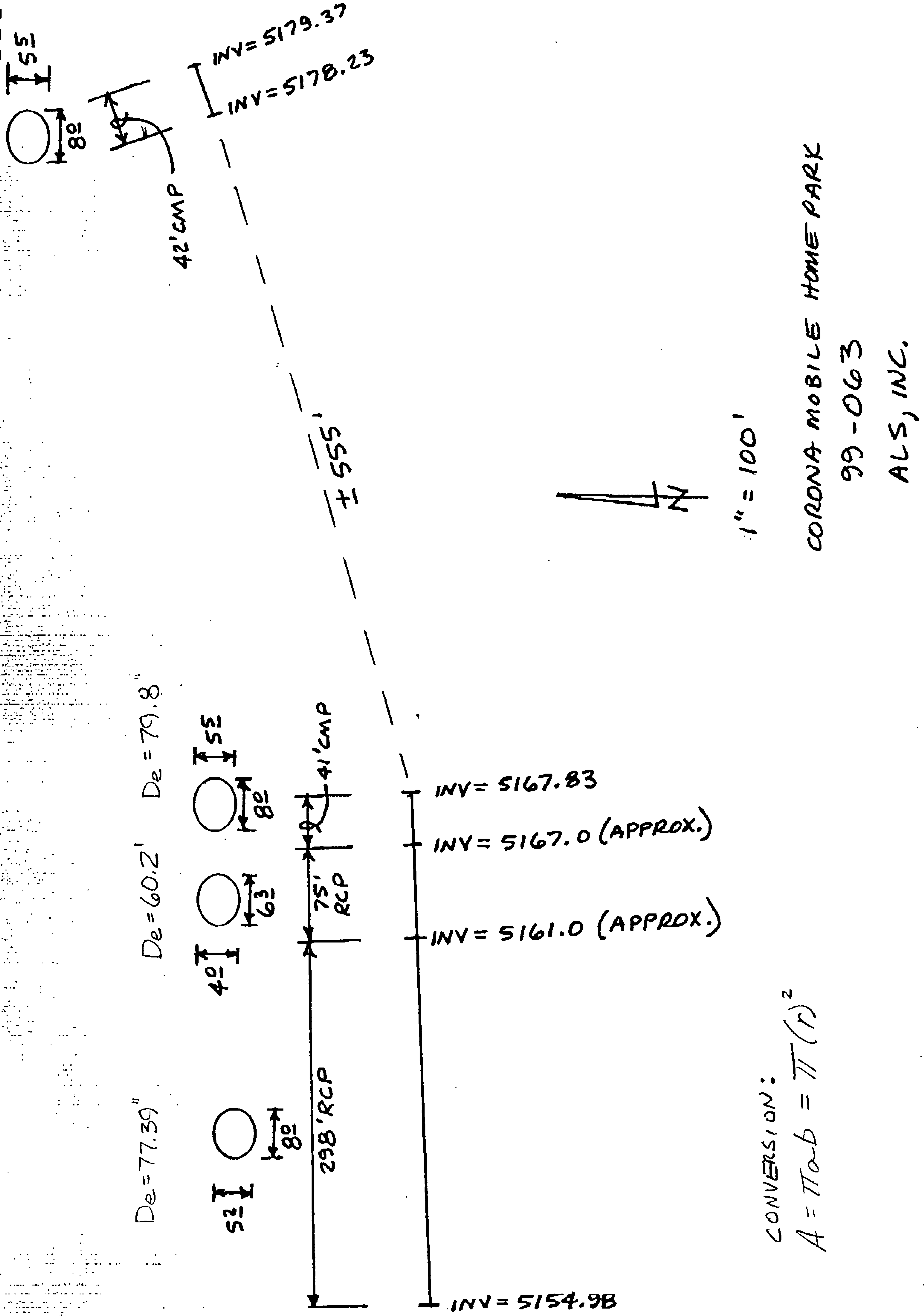
$Q = 274 \cong 270$ cfs (Qallowable)

Assume outfall depth = 2.96' (Initial Condition For Q = 270 cfs)



SUMMARY OF I-25, PASEO DEL NORTE AND
CORONADO MOBILE HOME PARK CULVERTS

FIGURE 6 -1


CORONA MOBILE HOME PARK
99-063
ALS, INC.
1" = 100'
N
INV= 5179.37
INV= 5178.23
42' CMP
55"
80"
±555'
De = 79.8"
De = 60.2"
De = 77.39"
41' CMP
75' RCP
298' RCP
63"
40"
52"
INV= 5167.83
INV= 5167.0 (APPROX.)
INV= 5161.0 (APPROX.)
INV= 5154.98
CONVERSION:
A = πab = π(r)²

Mark H. Burak, P.E.

1512 Sagebrush Trail SE Albuquerque, NM 87123 (505) 296-0461 235-2256 cell 296-0467 fax

Lateral Erosion Setback

AMAFCA Sediment and Erosion Design Guide, (RCE 11/94)

Assumptions:

1. Wide rectangular channel
2. Uniform Flow
3. Manning's n=0.035
4. width/depth ratio, F=(W/D)=40

Flow Characteristics:

input --->	**Q100=**	**344**	**cfs**
input --->	**S=**	**0.02**	**ft/ft**

Dominant Discharge, Qd = 69 cfs

Critical slope, Sc -- Equation 3.80:

	Sc = 0.037 Qd^-0.133 =	0.021

Dominant channel width, Wd.

Supercritical flow	Wd = 4.6 Qd^0.4 =	24.99 feet		
Subcritical flow	Wd =2.46 Qd^(0.375)S^(-0.188)	25.09 feet		
			use-->	25.09 feet

Meander wave length and unconstrained bend length -- Equation 3.74:

for Qd<200 cfs	fee/Wd = 10	10 feet		
for 200<Qd<2000 cfs	fee/Wd = 0.8 + 4*log Qp =	8.15 feet		
for Qd>2000 cfs	fee/Wd = 14	14 feet		
			use-->	10.00 feet

Maximum deviation of a channel from a straight line -- Equation 3.75

for Qd<200 cfs	Delta max = 2.5 Wd	62.72 feet		
for 200<Qd<2000 cfs	Delta max = [0.2+log(Qd)]Wd	51.12 feet		
for Qd>2000 cfs	Delta max = 3.5 Wd	87.80 feet		
			use-->	62.72 feet

Maximum deviation of a channel from a straight line -- Equation 3.81

for Qd<200 cfs	Delta max = (11.5 Qd^0.4)	62.48 feet		
for 200<Qd<2000 cfs	Delta max =[0.92+4.6log(Qd)]Qd^0.4	50.92 feet		
for Qd>2000 cfs	Delta max = 16.1 Qd^0.4	87.47 feet		
			use-->	62.48 feet

Delta max represents the bankline setback (BSB),
The centerline setback is BSB+1/2Wd **Centerline Setback -->** **75.02 feet**

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Lateral Erosion Setback

AMAFCA Sediment and Erosion Design Guide, (RCE 11/94)

Assumptions:

1. Wide rectangular channel
2. Uniform Flow
3. Manning's n=0.035
4. width/depth ratio, F=(W/D)=40

Flow Characteristics:

input --->	**Q100=**	**270**	**cfs**
input --->	**S=**	**0.02**	**ft/ft**

Dominant Discharge, Qd = 54 cfs

Critical slope, Sc -- Equation 3.80:

$Sc = 0.037\ Qd^{-0.133} =$ 0.022

Dominant channel width, Wd.

Supercritical flow	$Wd = 4.6\ Qd^{0.4} =$	22.68 feet	
Subcritical flow	$Wd = 2.46\ Qd^{(0.375)} S^{(-0.188)}$	22.91 feet	
		use-->	22.91 feet

Meander wave length and unconstrained bend length -- Equation 3.74:

for Qd<200 cfs	fee/Wd = 10	10 feet	
for 200<Qd<2000 cfs	fee/Wd = 0.8 + 4*log Qp =	7.73 feet	
for Qd>2000 cfs	fee/Wd = 14	14 feet	
		use-->	10.00 feet

Maximum deviation of a channel from a straight line -- Equation 3.75

for Qd<200 cfs	Delta max = 2.5 Wd	57.27 feet	
for 200<Qd<2000 cfs	Delta max = [0.2+log(Qd)]Wd	44.27 feet	
for Qd>2000 cfs	Delta max = 3.5 Wd	80.18 feet	
		use-->	57.27 feet

Maximum deviation of a channel from a straight line -- Equation 3.81

for Qd<200 cfs	Delta max = $(11.5\ Qd^{0.4})$	56.71 feet	
for 200<Qd<2000 cfs	Delta max = $[0.92+4.6\log(Qd)]Qd^{0.4}$	43.83 feet	
for Qd>2000 cfs	Delta max = $16.1\ Qd^{0.4}$	79.39 feet	
		use-->	56.71 feet

Delta max represents the bankline setback (BSB),
The centerline setback is BSB+1/2Wd **Centerline Setback -->** **68.16 feet**

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Lateral Erosion Setback

AMAFCA Sediment and Erosion Design Guide, (RCE 11/94)

Assumptions:

1. Wide rectangular channel
2. Uniform Flow
3. Manning's n=0.035
4. width/depth ratio, F=(W/D)=40

Flow Characteristics:

input --->	**Q100=**	**35**	**cfs**
input --->	**S=**	**0.02**	**ft/ft**

Dominant Discharge, Qd = 7 cfs

Critical slope, Sc -- Equation 3.80:

	Sc = 0.037 Qd^-0.133 =	0.029	

Dominant channel width, Wd.

Supercritical flow	Wd = 4.6 Qd^0.4 =	10.02 feet	
Subcritical flow	Wd =2.46 Qd^(0.375)S^(-0.188)	10.65 feet	
		use-->	10.65 feet

Meander wave length and unconstrained bend length -- Equation 3.74:

for Qd<200 cfs	fee/Wd = 10	10 feet	
for 200<Qd<2000 cfs	fee/Wd = 0.8 + 4*log Qp =	4.18 feet	
for Qd>2000 cfs	fee/Wd = 14	14 feet	
		use-->	10.00 feet

Maximum deviation of a channel from a straight line -- Equation 3.75

for Qd<200 cfs	Delta max = 2.5 Wd	26.62 feet	
for 200<Qd<2000 cfs	Delta max = [0.2+log(Qd)]Wd	11.13 feet	
for Qd>2000 cfs	Delta max = 3.5 Wd	37.27 feet	
		use-->	26.62 feet

Maximum deviation of a channel from a straight line -- Equation 3.81

for Qd<200 cfs	Delta max = (11.5 Qd^0.4)	25.05 feet	
for 200<Qd<2000 cfs	Delta max =[0.92+4.6log(Qd)]Qd^0.4	10.47 feet	
for Qd>2000 cfs	Delta max = 16.1 Qd^0.4	35.06 feet	
		use-->	25.05 feet

Delta max represents the bankline setback (BSB),
The centerline setback is BSB+1/2Wd **Centerline Setback -->** **30.37 feet**

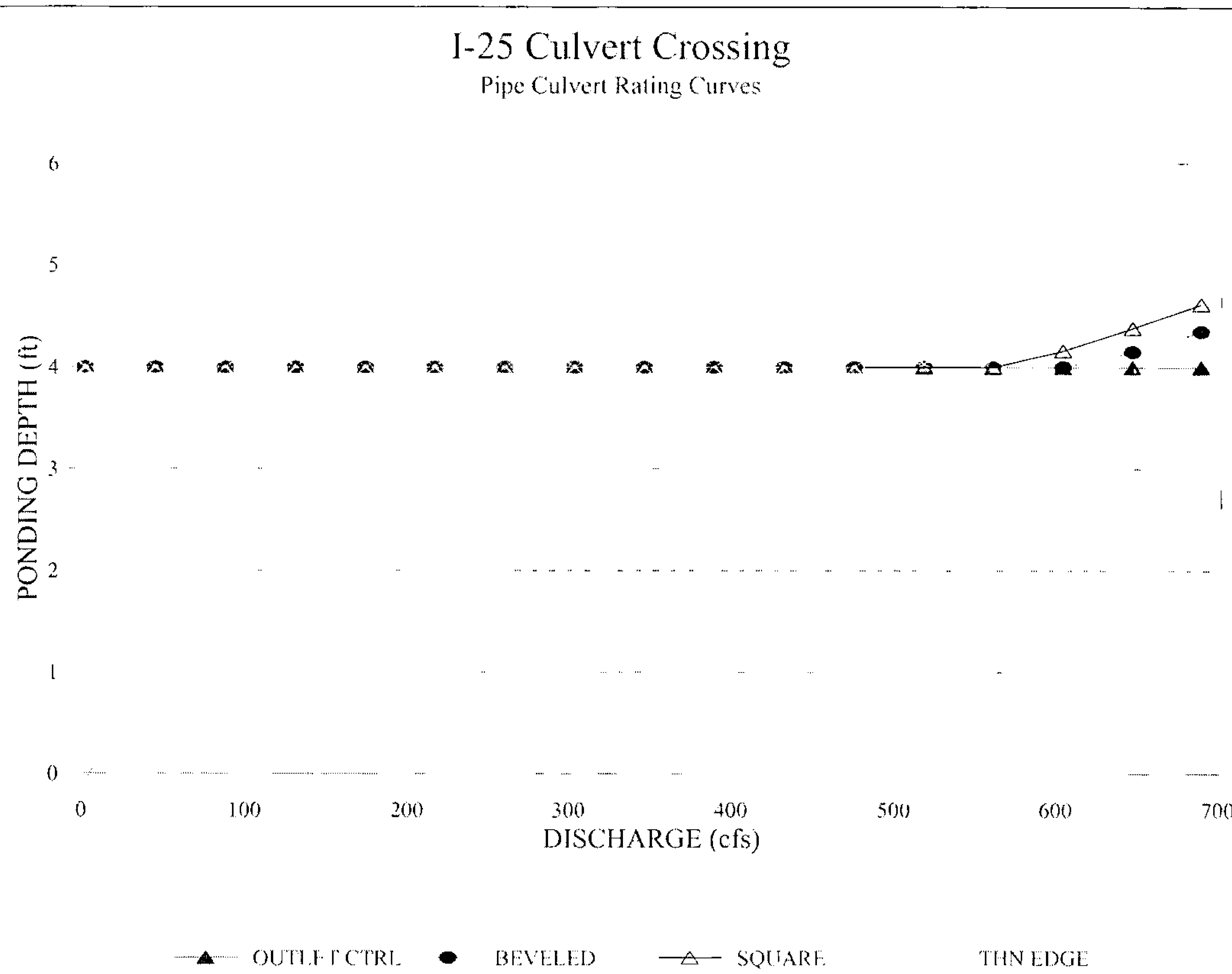
PIPE CULVERT

Inlet control and outlet control parameters

I-25 Culvert Crossing

			INLET CTRL HWo:		
Pipe diameter	48	in	beveled edge	2.82	ft
Number of pipes	8		sq edge headwall	2.88	ft
Slope	0.020	ft/ft	thin edged proj	3.06	ft
Manning's n	0.013		***OUTLET CTRL HWc***	1.33	ft
Culvert length	100	ft	velocity	3.4	fps
Discharge	344.0	cfs	critical depth	1.94	ft

BURAK



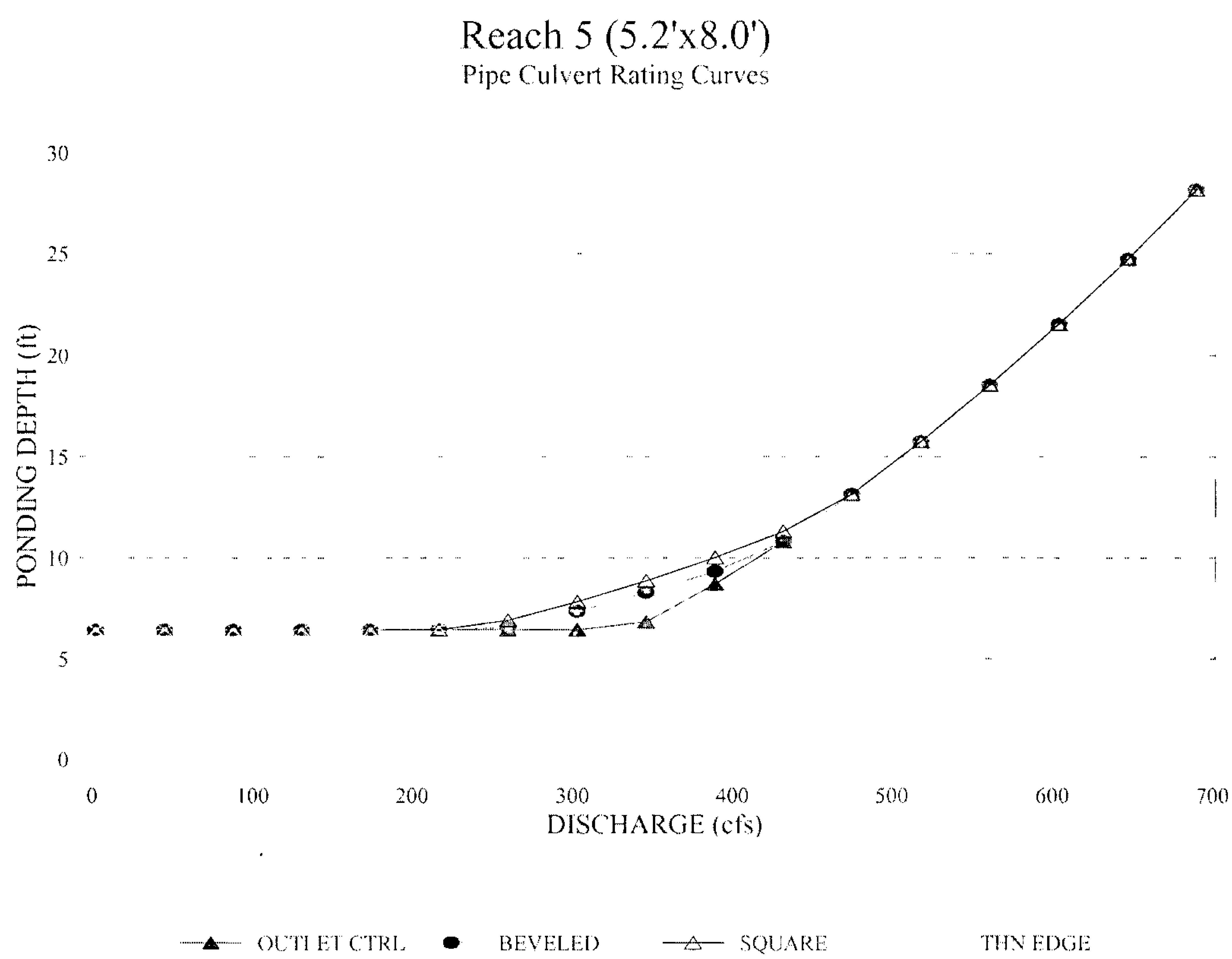
PIPE CULVERT

Inlet control and outlet control parameters

Reach 5 (5.2'x8.0')

Pipe diameter	77	in	***INLET CTRL HWo:***		
Number of pipes	1		beveled edge	8.28	ft
Slope	0.020	ft/ft	sq edge headwall	8.86	ft
Manning's n	0.024		thin edged proj	10.13	ft
Culvert length	298	ft	***OUTLET CTRL HWc***	6.81	ft
Discharge	344.0	cfs	velocity	10.5	fps
			critical depth	4.84	ft

BURAK



PROJECT: Corona Mobile Home Park
JOB # : C18-D017
DATE : September 27, 1999

Tailwater elevation......... 0.00
Manning's Roughness 0.024

DESCRIPTION		Finish Grade	Invert Elevation	Pipe Diameter (inches)	Pipe Length (feet)	Design Discharge (cfs)	friction head loss (feet)	Calculated Minor Head Losses: bend Hb	manhole Hmh	transtn Ht	junction Hj	HGL Elevation	EGL Elevation
Outfall		5175.00	5154.98									5159.62	5162.52
1 (5.2'x8.0')	Pipe 1	5178.00	5161.00	77	298.00	344	non-pressure					5165.64	5168.54
		5178.00	5161.00					0.00	0.00	0.30	0.00	5165.94	5168.84
2 (4.0'x6.3')	Pipe 2	5230.00	5167.00	60	75.00	344	non-pressure					5170.56	5178.72
		5230.00	5167.00					0.00	0.00	0.64	0.00	5171.19	5179.35
3 (5.5'x8.0')	Pipe 3	5225.00	5167.83	80	41.00	344	non-pressure					5172.29	5175.29
		5225.00	5167.83					0.00	0.00	0.00	0.00	5172.29	5176.00

PARTIALLY FULL PIPE

Manning's Equation for flow capacity in a circular pipe.

(5.2'x8.0') pipe

Input variables:			***Output variables:***		
			Capacity at d	343.78	cfs
Normal depth, d	39.3	in	Normal velocity	20.64	fps
Pipe slope	0.0580	ft/ft	Critical depth	62.66	in
Pipe diameter	77.39	in	Critical velocity	23.37	fps
Manning's n	0.024		Critical slope	0.058	ft/ft

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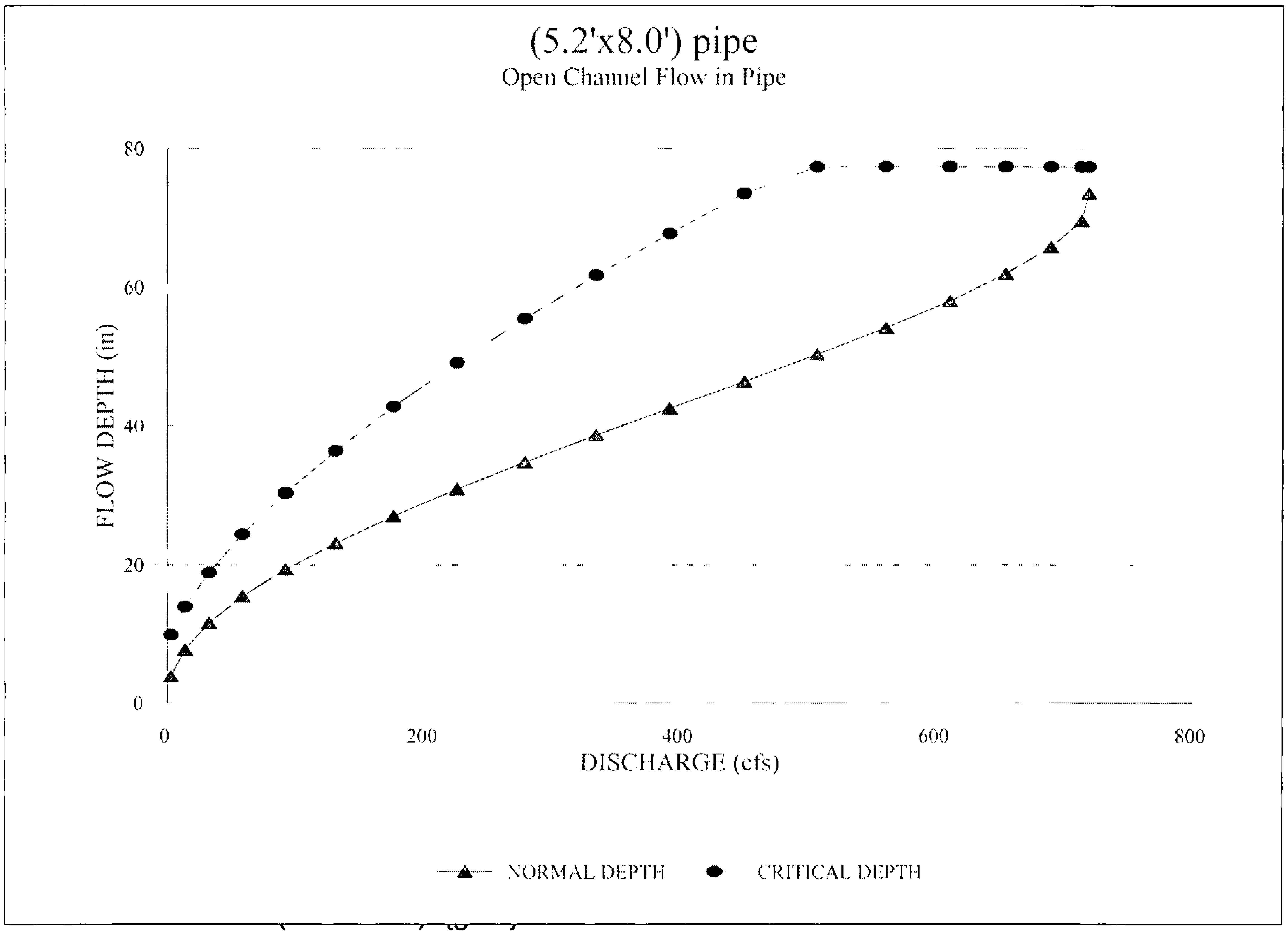
Note: Critical depth cannot exceed top of pipe.



PARTIALLY FULL PIPE

Manning's Equation for flow capacity in a circular pipe.

(5.2'x8.0') pipe

Input variables:			***Output variables:***		
			Capacity at d	270.15	cfs
Normal depth, d	34.2	in	Normal velocity	19.40	fps
Pipe slope	0.0580	ft/ft	Critical depth	54.46	in
Pipe diameter	77.39	in	Critical velocity	22.98	fps
Manning's n	0.024		Critical slope	0.058	ft/ft

BURAK

Note: Critical depth cannot exceed top of pipe.