DEER VILLAGE
UNITS 1, 2, 3 & 4

FINAL DRAINAGE REPORT

August 9, 1996
Revised: December 12, 1996

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CVL Project No. 95-0101-01

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Deer Village
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1.0 INTRODUCTION

The purpose of this report is to provide hydrologic and hydraulic analyses for the development of a proposed single family subdivision known as Deer Village Units 1, 2, 3 and 4. This report will address offsite drainage, onsite drainage, and required retention. The analysis of Deer Valley Road and 87th Avenue adjacent to the proposed "Deer Village II" (Units 5 and 6) is included in this report.

The site is located south of Deer Valley Road, between 87th and 91st Avenues. It is located in the north half of Section 22, Township 4 North, Range 1 East, of the Gila and Salt River Base and Meridian, within the City of Peoria. The site is irregular in shape and consists of approximately 103 acres. Refer to Plate 1 for the project vicinity and approximate boundary locations.

There is a 40-acre future development known as "Deer Village II" which will be built in conjunction with this project located northeast of the project site. A future development known as 83rd and Deer Valley Road is to be located east of the project site, immediately east of 87th Avenue. Coe & Van Loo Consultants, Inc. (CVL) has coordinated with the owners/engineers of these adjacent parcels and with the City of Peoria to provide an optimal routing scheme of offsite and onsite flows through the area, per the approved *Master Drainage Report Dove Valley Ranch Planned Area Development*, revised June 27, 1996, by Neil/McGill Consultants, Inc. (Ref. 4). Please refer to Plate 1 to locate these proposed developments.

2.0 OFFSITE HYDROLOGY WITH CONTRIBUTORY ONSITE DRAINAGE AREAS

The project site is subject to offsite flows that sheet across Deer Valley Road from the north. A berm, with localized openings, along the south side of Deer Valley Road passes this flow south under existing conditions. The following subsections describe the development of design discharges for the drainage channels within the project.

2.1 Modification of the 91st Avenue Drain Hydrologic Model

The Watershed Management Branch of the Flood Control District of Maricopa County (FCDMC) had developed a hydrologic model to monitor the watershed for the 91st Avenue Drainage Channel along Greenway Road. The Deer Village project site is located within the northern part of this watershed (Plate 3: Offsite Drainage Area Map). As stated (Ref. 3) within the report, *91st Avenue Drain Hydrology Update (June 1994)*, the model was "not intended for any design."

With the foregoing discussion as a backdrop, the FCDMC model was modified by increasing the precipitation amount and changing the rainfall pattern to account for the reduced upstream watershed area (see Table 1: Watershed Area, Precipitation and Rainfall Pattern). Two hydrologic (HEC-1) models 91STMP.DAT and 91STMP6.DAT (see Appendix A: Hydrologic Backup Documentation) were created with precipitation and rainfall distribution based on 1.09 and 0.6 square miles of upstream watershed areas.

2.2 Estimation of Offsite Flows along Deer Valley Road and 87th Avenue

The 91STMP.DAT model is used to obtain design discharges for the main drainage channel through Deer Village (along the 89th Avenue alignment). The 91STMP6.DAT model provides design flows for the side channel (west of 89th Avenue and along the south side of Deer Valley Road) and the 87th Avenue drainage system.

A complication in obtaining offsite design flows for the main channel (along the 89th Avenue alignment) was estimation of the flow that passes through the opening in the berm at 91st Avenue/Deer Valley Road intersection (Concentration Point CPC4A -- see Plate 3: Offsite Drainage Area Map). Not all of the flow at CPC4A crosses through this opening. A portion of the flow combines with the flow from Concentration Point CPD11 to sheet over the berm along the south side

of Deer Valley Road. An approximate hydraulic analysis (see Appendix A) showed that only 20% of the peak 100-year flow would go through the opening in the berm at 91st Avenue/Deer Valley Road intersection.

2.3 Impact of Onsite Drainage Areas on Offsite Flows

The onsite drainage areas were also incorporated into the HEC-1 model 91STMP.DAT to obtain intermediate design discharges in the main drainage channel along the 89th Avenue alignment (see Plate 4: Onsite Drainage Area Map). The Green & Ampt rainfall loss parameters within the project site are based on the existing soils (see Ref. 7 and Appendix for soil map and data) and the planned residential development as shown on the construction plans (see Table 2: Onsite Hydrologic Parameters for HEC-1 input). The proposed retention basin along the south side of the project was also included within the HEC-1 models (see Table 3: Design Data for Retention Basin).

2.4 Design Discharges

The design discharges produced by the computer modeling are shown in Table 4: Peak Design Discharges. Intermediate design discharges along the Deer Valley Road channels were obtained by interpolation/proration and engineering judgment.

3.0 DRAINAGE CHANNELS WITH OFFSITE AND ONSITE DISCHARGES

There are two distinct drainage systems of interceptor and collector channels that convey offsite flows through or along the periphery of the project site. They are:

- Main Drainage System Along the 89th Avenue Alignment, and
- 87th Avenue Drainage System.

Both systems intercept flows in a channel along the south side of Deer Valley Road and are described in more detail below. Also, refer to Plate 4 for location of these drainage systems.

It may be noted that the offsite flow along 91st Avenue will be allowed to flow over the pavement along the west side of the project site in a manner similar to the existing flow at this location.

3.1 Main Drainage System Along the 89th Avenue Alignment

Sheet flow intercepted between the limits of 91st Avenue and 88th Avenue is collected in interceptor channels along the south side of Deer Valley Road and conveyed to a collector channel along the 89th Avenue alignment. This collector channel flows into the proposed retention basin at the south end of the project (see Plates 4 and 5 and the construction plans for channel locations and geometry and Appendix B for backup documentation). The proposed design endeavors to replicate existing drainage divides and patterns of flow.

3.1.1 Backwater Analysis

A backwater analysis with Corps of Engineers' HEC-RAS program (Ref. 6) was performed to estimate the 100-year water surface elevations, velocities, and other flow characteristics (see Table 5: Drainage Channel Design Data and Table 6: Culvert Design Data).

Hydraulic parameters selected for the model are described below.

- Manning's roughness values are based on the channel linings recommended by the project landscape architect and the City of Peoria. Guidance was obtained from the FCDMC Hydraulic Design Manual (Ref. 2) for their selection. Roughness values within pavement and street right of way was taken as 0.025. A roughness

value of 0.02 was selected for shotcrete. Manning's roughness value of 0.03 was used for turf.

- Contraction/Expansion loss coefficients at uniform reaches of the channel are taken as 0.1/0.3 respectively. These values are increased to 0.3/0.5 at the cross sections adjacent to the culverts and channel junctions.
- Reach lengths are taken along the thalweg for low flow channels. Overbank reach lengths are taken approximately between the center of mass flow at adjacent cross-sections.
- Ineffective flow areas are modeled by judiciously selecting cross-section locations and application of the 1:1 contraction and 4:1 expansion criteria suggested by the Corps of Engineers (Ref. 6).
- Beginning water surface elevation at the retention basin was obtained from the HEC-1 hydrologic model 91STMP.DAT.
- Junction of the Deer Valley Road channels (at 89th Avenue) is modelled with the energy loss equations.

3.1.2 Evaluation of Channel Response

At most locations within the main channel, the 100-year flow is confined within the channel section and adequate freeboard per FCDMC criteria (Ref. 2) is provided. However, in some cases a very small portion of the 100-year flow spills over onto the parallel road (along the west side) before reentering the channel at a downstream venue. In all cases the finish floor elevations of the proposed residential lots are set above the adjacent 100-year water surface elevation.

The 100-year flow within the channels along Deer Valley Road overflows the channel section onto the pavement. Due to limited area, a shotcrete lined channel with 1:1 side slopes is recommended. Depressed curbs are located at appropriate locations (refer to Plate 4 and construction plans) to reduce sediment deposition and expeditiously remove low flows from the street. The criteria used for design of the combined roadway/channel section was to replicate

existing conditions as closely as possible. The 100-year water surface is below the finish floor elevations of the existing residences along the north side of Deer Valley Road.

It is recommended that the top of the south shotcrete lined bank be set a minimum of 1 foot above the 100-year water surface elevation and the lining connected to the perimeter wall.

3.1.3 Channel Lining

Channel lining is based on flow velocities and the steepness of side slopes. The flow velocities in the overbank areas will not exceed 8 feet per second and turf with vegetation is proposed. The low flow channel velocities will vary from 4 to 12 feet per second. In channel reaches with velocities greater than 8 feet per second, linings that can withstand higher velocities e.g., soil cement, shotcrete, concrete or riprap are recommended.

3.2 87th Avenue Drainage System

The flow at the intersection of 87th Avenue and Deer Valley Road is a result of concentrated flow coming south on 87th Avenue and lateral flows from Deer Valley Road. The proposed interceptor channel along the south side of Deer Valley Road begins at 89th Avenue and extends east to the proposed 87th Avenue Channel (along the west side of 87th Avenue). Flows in this collector channel will be conveyed south and fan out into natural ground south of the proposed Quail Road (See Plates 4 and 5 and the construction plans for channel location and geometry and Appendix B for backup documentation).

The proposed design incorporates the ultimate 87th Avenue section in order to create flow conditions for estimating finished floor elevations of the proposed subdivision lots. Coordination with the designer of the proposed development along the east side of 87th Avenue resulted in the development of this roadway section. The modeling of this ultimate section is considered more conservative than existing conditions of flow for the purpose of establishing finish floor elevations.

3.2.1 Backwater Analysis

Again, a backwater analysis with Corps of Engineers' HEC-RAS program (Ref. 6) was performed to estimate the 100-year water surface elevations, velocities and other flow characteristics (see Table 5: Drainage Channel Design Data and Table 6: Culvert Design Data).

Hydraulic parameters used for the model were selected in a manner similar to that described above for the main drainage system along the 89th Avenue alignment with the following exceptions:

- Ineffective flow areas were modeled at the cross-sections downstream of Quail Road by using the 4:1 expansion criteria suggested by the Corps of Engineeers (Ref. 6).
- Beginning water surface elevation was obtained by an iterative process whereby similar energy gradient values were achieved at the two most downstream cross-sections.

3.2.2 Evaluation of Channel Response

The 100-year flow will spill over from the channel section onto the ultimate 87th Avenue pavement section as per the guidance contained in the Dove Valley Master Drainage Report (Ref. 4). At most locations, a one-foot freeboard is provided along the west bank. In the vicinity of the culverts across Melinda Road and Quail Road the freeboard is less than a foot. However, in all cases the finish floor elevations of the proposed residential lots are set a foot above the adjacent 100-year water surface elevation.

The 100-year flow within the channel along Deer Valley Road overflows the channel section onto the pavement as well. Depressed curbs are located at appropriate locations (refer to Plate 4 and construction plans) to reduce sediment deposition and expeditiously remove low flows from the street. The criteria used for design of the combined roadway/channel section was to replicate existing conditions as closely as possible and obtain a 100-year water surface elevation below the finish floor elevation of existing residences. Due to limited area, a shotcrete lined channel with 1:1 side slopes is recommended. Again, the top of the south shotcrete lined bank will be set a minimum of one foot above the 100-year water surface elevation and the lining connected to the perimeter wall.

3.2.3 Channel Lining

Channel lining is based on flow velocities and the steepness of side slopes. The low flow channel velocities will vary from 2 to 6 feet per second. In channel reaches with velocities greater than 2.5 feet per second, linings that can withstand higher velocities e.g., turf, reinforced turf, soil cement, shotcrete, concrete or riprap are recommended.

4.0 ONSITE HYDROLOGY

Hydrology for this report was based on the rational method and in accordance with the City of Peoria design criteria. Tributary areas were based on street layouts and grading schemes. Times of concentration were based on street flow and lot flow where applicable. A minimum of ten minutes was used for the lot flow concentration time. Rainfall intensities were based on Maricopa County Flood Control District *Drainage Design Manual, Volume 1, Hydrology* (Ref. 1). A coefficient of runoff (C-value) of 0.65 was used for single family housing (Ref. 1). Hydrologic data and flows are listed in Table 1 of the appendix. Refer to Plate 4 for tributary areas and concentration point locations.

5.0 ONSITE HYDRAULICS

The interior streets within the proposed subdivision will be designed to carry runoff from the 10-year flow to top of curb, per the City of Peoria requirements. All finish floor elevations within the proposed subdivisions will be set to be above the expected water surface elevation from the 100-year storm.

Roll curb was used for the streets where possible. Where the capacity of the roll curb was exceeded by the expected 10-year storm, vertical curb was used. Storm drain or depressed curb openings were used where the 10-year flow exceeds the top of vertical curb (Refer to Plate 4 for locations). Storm drain, depressed curb openings, and box culvert calculations can be found in Appendix C.

6.0 RETENTION

Storm water runoff from the west portion of the site is carried east in the local streets, where it outfalls to the proposed drainage channel. The runoff from the southeast portion of the site drains west within the local streets and outfalls to the proposed drainage channel along the 89th Avenue alignment. Refer to Plate 4 for drainage patterns and outfall locations. The proposed drainage channel will convey flows to the south end of the site into a proposed retention basin.

It is proposed that offsite and onsite flows will be combined and conveyed within the proposed drainage channel. The onsite flows have a substantially shorter time of concentration than the offsite flows; therefore, the peak onsite flow will have passed before the peak offsite flow arrives. Offsite flows will fill and be retained within the proposed retention basin until it overtops and the offsite flows will weir over the basin and flow south as they have historically done.

Retention will be provided for runoff from the 100-year, 2-hour rainfall event, for the entire site per the Maricopa County Flood Control District requirements, as outlined in the Drainage Design Manual, Volume 1, Hydrology (Ref. 1), adopted by the City of Peoria. Refer to the retention calculations in the appendix.

7.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas, Map numbers 04013C1170F, map revision date September 4, 1991, and 04013C1190F, map revision date December 3, 1993, as published by the Federal Emergency Management Agency (FEMA), indicates that this project is in "other flood areas" noted as Zone X (shaded).

> Zone "X" (shaded) is defined by FEMA as: Areas of 500-year flood; areas of 100-year flood with average depth of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

8.0 CONCLUSIONS

1. Onsite flow will be safely conveyed through the site.
2. Offsite flows from the north will be conveyed around as well as through the site to the south, in drainage tracts or easements per Reference 4.
3. Retention for the 100-year, 2-hour storm will be provided in a retention basin along the southern edge of the site.
4. All finished floor elevations will be designed above the expected 100-year high water elevation.
5. This site will be developed based on generally accepted engineering practices and in accordance with City of Peoria requirements.

9.0 REFERENCES

1. Flood Control District of Maricopa County, *Drainage Design Manual, Volume 1 Hydrology*, June 1992.
2. Flood Control District of Maricopa County, *Drainage Design Manual, Volume II, Hydraulics*, November 1991.
3. Flood Control District of Maricopa County, *91st Avenue Drainage Hydrology Update*, June 1994.
4. Neil/McGill Consultants, Inc., *Master Drainage Report - Dove Valley Ranch Planned Area Development*, Revised June 27, 1996.
5. Coe and Van Loo Consultants, Inc., *83rd & Deer Valley Road Preliminary Drainage Report*, April 25, 1996.
6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, *HEC-RAS River Systems Analysis, version 1.2,* 1996.
7. U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Maricopa County, Arizona, Central Part,* September 1977.

DOCUMENT QUALITY ASSURANCE

As part of CVL's policy to provide quality products to its clients, all reports are subject to review for technical accuracy, validity of conclusions and appropriateness of recommendations.

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TABLES

TABLE 1

Watershed Area, Precipitation and Rainfall Pattern

Hydrologic HEC-1 Model	Upstream Watershed Area sq. mi.	Precipitation for 100-year 6-hour Storm		Rainfall Pattern
		No Areal Reduction inches	Areal Reduction inches	
91ST.DAT (FCDMC Model)	10	3.2	3.027	2.7
91STMP.DAT (CVL Model)	1.09	3.2	3.156	1.45
91STMP6.DAT (CVL Model)	0.6	3.2	3.175	1.11

Notes:

1. Precipitation values and patterns are obtained from FCDMC's Hydrologic Design Manual and the use of it's program MCUHP1.

TABLE 2
On-site Hydrologic Parameters for HEC-1 Input

Area I.D.	Area		Impervious Area	Time of Concentration Tc								Storage Coefficient R	Comments
	ac.	sq. mi.	%	Length L		Resistance Coeff. Kb	Slope S		Intensity I	Tc			
				ft	mi.		ft/ft	ft/mi	in/hr	hr	min.	hr	
DV1	8.5	0.0133	45	1400	0.2652	0.035	0.004	21	6.8	0.19	11.6	0.24	DV are areas within Deer Valley residential development providing lateral flows to the main channel
DV2	22.6	0.0353	55	1700	0.3220	0.035	0.005	26	6.5	0.20	12.1	0.17	
DV3	9.4	0.0147	55	1600	0.3030	0.035	0.002	11	5.8	0.27	16.3	0.37	
DV4	6.7	0.0105	55	1050	0.1989	0.035	0.002	11	6.2	0.21	12.8	0.25	
DV5	15.2	0.0238	55	1400	0.2652	0.035	0.002	11	6	0.25	15.0	0.23	
DV6	3.8	0.0059	55	1200	0.2273	0.035	0.0035	18	6.8	0.19	11.1	0.32	
DV7	11.5	0.0180	55	1600	0.3030	0.035	0.0037	20	6.6	0.21	12.8	0.25	
DV8	10.3	0.0161	55	1150	0.2178	0.035	0.003	16	6.7	0.19	11.5	0.18	
DV9	13.6	0.0213	0	500	0.0947	0.035	0.005	26	8.5	0.10	5.9	0.04	
DVC1	1.05	0.0016	0	600	0.1136	0.04	0.009	48	8.6	0.10	5.8	0.19	DVC are areas within the main channel
DVC2	0.48	0.0008	0	260	0.0492	0.04	0.01	53	9	0.06	3.6	0.09	
DVC3	0.55	0.0009	0	300	0.0568	0.04	0.004	21	9	0.09	5.2	0.14	
DVC4	0.48	0.0008	0	260	0.0492	0.04	0.003	16	9	0.09	5.2	0.13	
DVC5	0.63	0.0010	0	240	0.0455	0.04	0.0007	4	7.4	0.14	8.5	0.19	
DVC6	0.76	0.0012	0	300	0.0568	0.04	0.0007	4	7	0.16	9.7	0.23	

Notes:

1. Following parameter values are common to all the above drainage areas:

   Initial Abstraction IA = 0.10 inches for desert landscaping
   Due to the presence of Laveen or Tucson Loam soils throughout this area (per Soil Survey of Maricopa Co., Central Part by the U.S. Soil Conservation Service, 1977)
   XKSAT = 0.25 in/hr
   PSIF = 3.5 inches
   DTHETA (dry) = 0.35

TABLE 3

Design Data for Retention Basin

	Retention Basin Characteristics						Detention Basin Response for 100 yr Storm			
Elevation	Area ac.	Average Area ac.	Depth ft.	Volume ac. ft.	Storage (Cum. Vol.) ac. ft.	Discharge 'Q' cfs	Inflow cfs	Outflow cfs	100 yr Elev. ft.	Comments
1259	0.65				0.00	0	1516	-	-	
1260	4.48	2.565	1	2.565	2.57	0	-	-	-	
1261	6.79	5.635	1	5.635	8.20	0	-	-	-	
1262	8.16	7.475	1	7.475	15.68	0	-	-	-	
1262.5	8.71	8.435	0.5	4.2175	19.89	0	-	-	-	
1263	9.26	8.985	0.5	4.4925	24.39	1273	-	1515	1263	Emergency Spillway/weir
1263.5	10.36	9.81	0.5	4.905	29.29	3600	-	-	-	1200' long

TABLE 4

Peak Design Discharges

Location/Concentration Point	Peak 100 yr 6hr Discharges cfs	Comments
Deer Valley Road		
Deer Valley Rd/91st Ave CPC4A	426 (483)	
Deer Valley Rd/91st Ave DC2	340 (386)	Flow from CPC4A diverted east
Deer Valley Rd/91st Ave D-C2	85 (97)	Flow from CPC4A headed south
Deer Valley Rd/89th Ave CPD11	1010	Before combining with diverted flow from CPC4A
Deer Valley Rd/89th Ave CPD11A	1351	After combining with diverted flow from CPC4A
Deer Valley Rd/87th Ave CPD5	(634)	
Deer Village Main Channel Along the 89th Ave Alignment		
Melinda Lane CPDV1	1367	
Salter Avenue CPDV2	1402	
W. Lone Cactus Drive CPDV3	1421	
W. Adam Avenue CPDV4	1435	
W. Quail Avenue CPDV5	1465	
W. Deanna Drive CPDV6	1473	At Retention Basin

Notes:

1. Peak flows without parentheses are from the HEC-1 model 91STMP.DAT based on 1.09 sq. mile of upstream watershed area and primarily developed for obtaining flows for the main channel along the 89th Ave alignment.

2. Peak flows with parentheses are from the HEC-1 model 91STMP6.DAT based on 0.6 sq. miles of upstream watershed area and primarily developed for obtaining flows for the 87th Ave. channel and part of the Deer Valley Road channels.

Table 5
Drainage Channel Design Data

Channel Section/ Location	Low Flow Channel						Left Overbank			Right Overbank			Overall Channel Response to 100 yr Flow				Comments
	Bottom Width ft.	Depth ft.	Side Slopes horiz./vert.	Manning's Roughness	Discharge cfs	Velocity fps	Manning's Roughness	Discharge cfs	Velocity fps	Manning's Roughness	Discharge cfs	Velocity fps	Discharge cfs	Depth ft.	Water Surface Elevation ft.	Froude #	
Main Channel Along 89th Avenue Alignment																	
0.4 W. Deanna Dr. Culvert Downstream Side	54	4	0	0.02	1473	9.6	-	-	-	-	-	-	1473	2.8	1263	1	Water Surface Elev. at Retention Basin Selected for this Location
1.0 W. Deanna Dr. Culvert Upstream Side	54	4	0	0.02	1473	5.9	-	-	-	-	-	-	1473	4.6	1264.8	1	
2.0	38	5	2:1 Left 4:1 Right	0.02	1465	6.2	-	-	-	-	-	-	1465	4.7	1264.8	0.6	
3.0	5	2	2:1	0.02	617	8.1	-	-	-	0.035	848	4.1	1465	5.5	1266.8	0.7	
4.0	5	2	2:1	0.02	691	7.5	-	-	-	0.035	744	3.9	1435	6.3	1268.4	0.6	
5.0	5	2	2:1	0.02	785	9.1	0.035	2	1.3	0.035	634	4.4	1421	6	1268.7	0.8	
6.0	5	2	2:1	0.02	797	9.2	0.035	-	-	0.035	605	4.6	1402	6	1269	0.8	
6.5 W. Salter Ave. Culvert Downstream Side	43	5	0	0.02	1392	5	0.035	4.7	0.8	0.035	5.4	0.8	1402	6.4	1269.7	0.4	
7.0 W. Salter Ave. Culvert Upstream Side	43	5	0	0.02	1372	4.4	0.035	14	0.8	0.035	16	0.8	1402	7.3	1270.6	0.4	
8.0	43	8.5	2:1 Left 4:1 Right	0.02	1402	2.9	-	-	-	-	-	-	1402	7.5	1270.9	0.2	
9.0	5	2	2:1	0.02	650	8.3	0.035	717	4.2	0.035	-	-	1367	5.6	1273.2	0.7	
10.0 Most Upstream Section Just South of Deer Valley Rd	10	2	2:1	0.02	823	11.3	0.035	528	5.4	0.035	-	-	1351	5.3	1275.8	1	Junction of E. & W. Deer Valley Rd Channels with Main Channel

Notes:
1. Froude Number applies to low flow channel and not the overbanks.
2. Normal bottom width of the channel is 5 feet -- widens near box culverts.
3. Discharges and velocities shown for low flow channel apply to all of the shotcrete lined section.
4. Left and right overbanks are defined by looking downstream.

Table 5 (Continued)
Drainage Channel Design Data

Channel Section/ Location	Low Flow Channel						Left Overbank			Right Overbank			Overall Channel Response to 100 yr Flow				Comments
	Bottom Width ft.	Depth ft.	Side Slopes horiz./vert.	Manning's Roughness	Discharge cfs	Velocity fps	Manning's Roughness	Discharge cfs	Velocity fps	Manning's Roughness	Discharge cfs	Velocity fps	Discharge cfs	Depth ft.	Water Surface Elevation ft.	Froude #	
Northwest Tributary to Main Channel (Along South Side of Deer Valley Rd between 89th Ave and 91st Ave)																	
1.1	20	Varies	3:1 Right 1:1 Left	0.02	1060	8.3	0.025	-	-	-	-	-	1060	4.4	1276.8	0.8	
1.3	16	Varies	1:1	0.02	790	8.7	0.025	-	-	-	-	-	790	4.4	1277.4	0.8	
1.4	10	Varies	1:1	0.02	520	4.2	0.025	3	0.5	-	-	-	520	5.2	1278.6	0.4	
1.5 N. 90th Ave. Culvert Downstream Side	10	Varies	0	0.02	319	4.5	0.025	21	0.9	-	-	-	340	4.8	1278.7	0.4	
1.6 N. 90th Ave. Culvert Upstream Side	10	Varies	0	0.02	281	3.8	0.025	39	0.7	-	-	-	320	5	1279.1	0.4	
1.7	10	Varies	1:1	0.02	234	3.4	0.025	16	0.5	-	-	-	250	4.7	1279.2	0.3	
Northeast Tributary to Main Channel (Along South Side of Deer Valley Rd between 89th Ave and 88th Ave)																	
2.1	15	Varies	1:1	0.02	570	6	-	-	-	-	-	-	570	5	1277.2	0.5	
2.2 88th Lane Culvert Downstream Side	10	4	0	0.02	460	4.8	-	-	-	-	-	-	460	5	1277.5	0.4	
2.3 88th Lane Culvert Upstream Side	10	4	0	0.02	366	3	-	-	-	0.025	34	0.6	400	6	1278.8	0.4	
2.4	15	Varies	1:1	0.02	304	2.5	-	-	-	0.025	36	0.6	340	6	1278.9	0.2	
2.5	10	Varies	1:1	0.02	74	0.9	-	-	-	0.025	26	0.2	100	5.5	1279	0.1	

Notes:
1. Froude Number applies to low flow channel and not the overbanks.
2. Normal bottom width of the channel is 10 feet -- widens adjacent to the main channel.
3. Discharges and velocities shown for low flow channel apply to all of the shotcrete lined section.
4. Left and right overbanks are defined by looking downstream.

Table 5 (Continued)
Drainage Channel Design Data

Channel Section/ Location	Low Flow Channel						Left Overbank			Right Overbank			Overall Channel Response to 100 yr Flow				Comments
	Bottom Width ft.	Depth ft.	Side Slopes horiz./vert.	Manning's Roughness	Discharge cfs	Velocity fps	Manning's Roughness	Discharge cfs	Velocity fps	Manning's Roughness	Discharge cfs	Velocity fps	Discharge cfs	Depth ft.	Water Surface Elevation ft.	Froude #	
87th Avenue Channel (South of Deer Valley Rd)																	
10	4	1.5	4:1	0.03	120	5.2	0.025	357	4.3	0.03	158	2.9	634	2.2	1266.9	0.7	
11	4	2	4:1	0.03	222	5.5	0.025	313	4.1	0.03	99	2.8	634	2.8	1267.5	0.7	
12 Melinda Lane Culvert Downstream Side	21	3	0	0.03	432	5.5	0.025	197	2.7	0.03	5	1.9	634	3.6	1267.9	0.5	
13 Melinda Lane Culvert Upstream Side	21	3	0	0.03	421	3.9	0.025	213	2.3	-	-	-	634	4.3	1268.8	0.5	
14	2	Varies	4:1	0.03	353	6.5	0.025	281	4.3	-	-	-	634	3.5	1269.7	0.8	
15	2	Varies	4:1	0.03	338	6.1	0.025	296	4.2	-	-	-	634	3.5	1271.1	0.8	
16	2	Varies	4:1	0.03	311	5	0.025	323	3.9	-	-	-	634	3.7	1272.2	0.6	
17	2	Varies	4:1	0.03	317	5.4	0.025	317	3.9	-	-	-	634	3.7	1273.2	0.7	
18 Quail Ave. Culvert Downstream Side	17	3	0	0.03	463	5.2	0.025	171	2.6	-	-	-	634	4	1273.9	0.5	
19 Quail Ave. Culvert Upstream Side	17	3	0	0.03	409	4.1	0.025	225	2.4	-	-	-	634	4.3	1274.8	0.5	
20	2	Varies	4:1	0.03	347	6.4	0.025	287	4.3	-	-	-	634	3.5	1276.2	0.8	
21 Most Upstream Section Just South of Deer Valley Rd	2	Varies	4:1	0.03	349	6.5	0.025	285	4.3	-	-	-	634	3.5	1278.1	0.9	
Northwest Tributary to 87th Avenue Channel (Along South Side of Deer Valley Rd between 88th Ave and 87th Ave)																	
22	10	2	1:1	0.02	202	3.7	0.025	68	0.9	-	-	-	270	4	1278.9	0.4	
23	10	2	1:1	0.02	119	2.3	0.025	91	0.7	-	-	-	210	3.8	1279.1	0.2	
24	10	2	1:1	0.02	44	1	0.025	66	0.3	-	-	-	110	3.4	1279.2	0.1	
25	10	2	1:1	0.02			0.025			0.025							

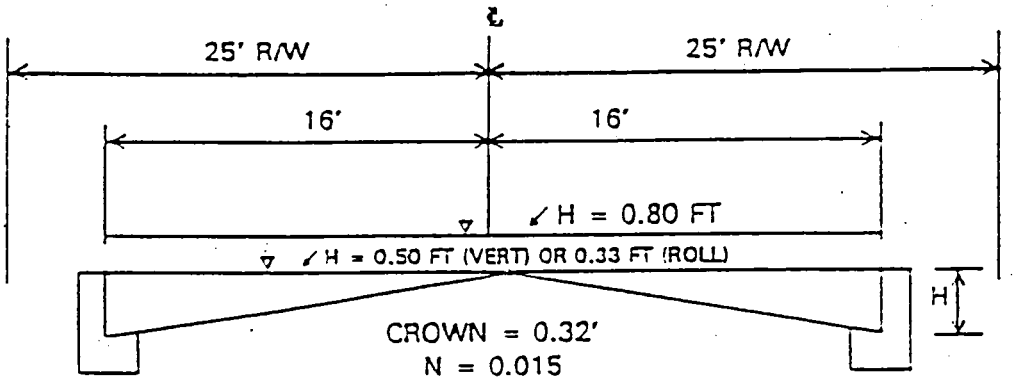
Notes:
1. Froude Number applies to low flow channel and not the overbanks.
2. Normal bottom width of the channel is 2 feet along 87th Avenue and 10 feet along Deer Valley Road -- widens near the culverts and outfall.
3. Discharges and velocities shown for low flow channel apply to all of the shotcrete lined section.
4. Left and right overbanks are defined by looking downstream.

Table 7
HYDROLOGY & STREET HYDRAULICS
(Refer to Plate 4)

CP	Area (ac)	C_{10}/C_{100}	Flow Length (ft)	T_c (min)	i_{10}/i_{100} [a] (in/hr)	Q_{10}/Q_{100} (cfs)	Q Removed From Street (cfs)	Q Remaining in Street (cfs)	Street Slope (%)	Street Capacity (cfs)	
										Roll	Vert
1	7.2	0.52/0.65	1140	13.6/11.1	3.8/6.5	14/30	--	--	0.20		23
2	9.3	0.52/0.65	1540	13.9/11.3	3.7/6.4	18/39	--	--	1.10		53
3	3.5	0.52/0.65	600	7.4/6.1	4.9/8.1	9/19	--	--	0.20		23
4	6.6	0.52/0.65	985	10.0/8.2	4.3/7.3	15/31	--	--	0.52		36
5	15.9	0.52/0.65	1550	13.3/10.9	3.8/6.5	31/67	13	18	0.35		30
6	16.4	0.52/0.65	1910	15.5/12.6	3.5/6.1	30/65	21 [b]	9	0.28		27
7	6.2	0.52/0.65	1055	9.8/8.1	4.3/7.4	14/30	--	--	0.20		23
8	22.6	0.52/0.65	1945	15.2/12.4	3.6/6.2	42/91	--	21	0.20		23
9	3.1	0.52/0.65	770	7.8/6.5	4.8/8.0	8/16	--	--	0.90	15	
10	9.4	0.52/0.65	1820	15.1/12.3	3.6/6.2	18/38	--	--	0.20		23
11	7.8	0.52/0.65	1405	13.8/11.2	3.8/6.4	15/33	--	--	0.52		36
12	7.4	0.52/0.65	1250	12.7/10.3	3.9/6.7	15/32	--	--	0.20		23
13	15.2	0.52/0.65	1405	13.3/10.8	3.8/6.5	30/64	--	--			
14	3.8	0.52/0.65	1150	12.8/10.4	3.9/6.6	8/16	--	--	0.28	8	
15	3.1	0.52/0.65	1050	13.0/10.6	3.9/6.6	6/13	--	--	0.70	13	
16	7.2	0.52/0.65	1390	14.1/11.5	3.7/6.4	14/30	--	--	0.20		23
17	10.3	0.52/0.65	1390	13.8/11.3	3.7/6.4	20/43	--	--			
18	6.7	0.52/0.65	1155	16.7/13.5	3.4/5.9	12/26	--	--	0.20		23
19	2.4	0.52/0.65	515	6.5/5.4	5.2/8.5	6/13	--	--	0.60	12	
20	7.7	0.52/0.65	1435	14.7/11.9	3.6/6.3	15/31	--	--	0.20		23
21	1.0	0.52/0.65	365	5.0/5.0	5.7/8.7	3/6	--	--	1.86	22	
22	8.7	0.52/0.65	1435	14.0/11.4	3.7/6.4	17/36	--	--	0.25		25
23	9.9	0.52/0.65	1760	16.1/13.0	3.5/6.0	18/39	--	--	0.25		25
24	1.6	0.52/0.65	445	8.0/6.6	4.7/7.9	4/8	--	--	0.20	7	
25	11.5	0.52/0.65	1760	16.0/12.9	3.5/6.1	21/45	--	--			

(a) The intensity curves are provided in the appendix.
(b) 21 cfs (13 @ CP5 plus 8 @ CP6)

TABLE 8
RESIDENTIAL STREET CAPACITY



H = 0.80 FT
A = 20.48 SF
WP = 33.00 FT

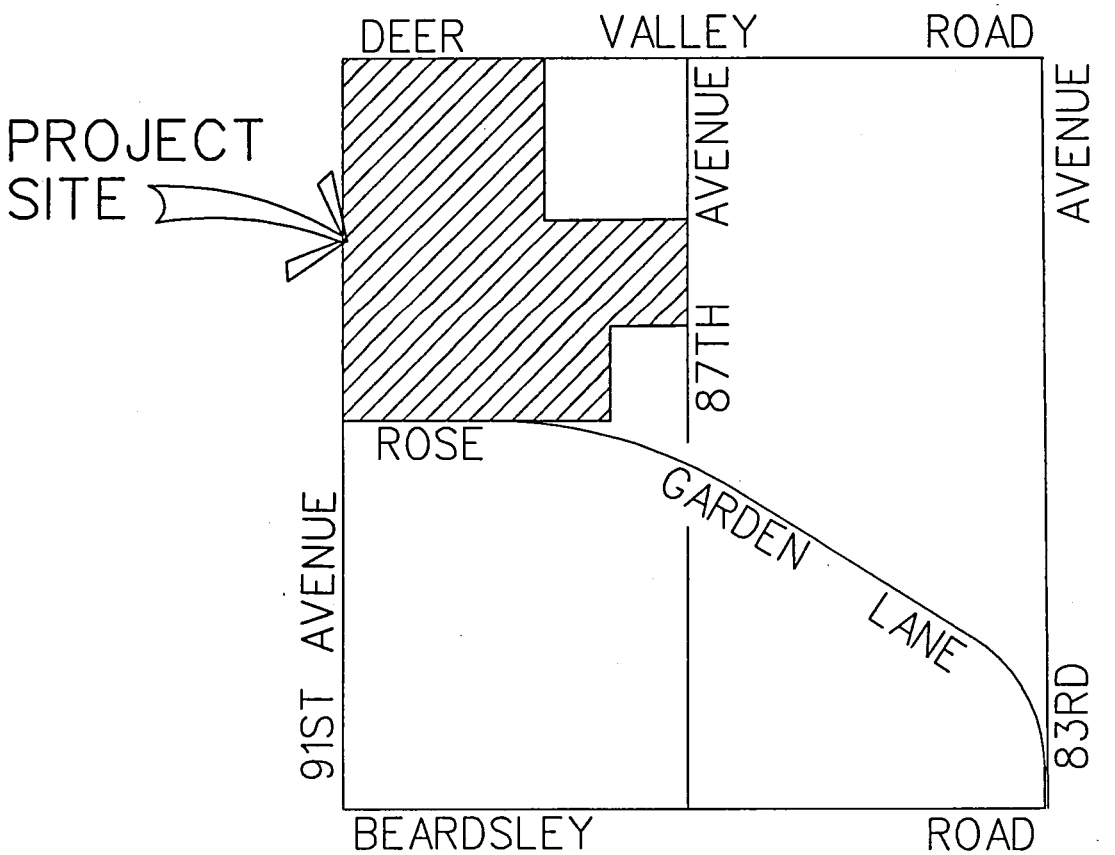
H = 0.50 FT
A = 10.88 SF
WP = 33.00 FT

H = 0.33 FT
A = 5.44 SF
WP = 32.66 FT

H = .33 (ROLL CURB)			H = .50 (6" VERTICAL CURB)			H = 0.80 (6" VERTICAL PLUS 0.30 FT)		
SLOPE (%)	V (fps)	Q (cfs)	SLOPE (%)	V (fps)	Q (cfs)	SLOPE (%)	V (fps)	Q (cfs)
0.15	1.2	6.3	0.15	1.8	19.9	0.15	2.8	57.2
0.20	1.3	7.3	0.20	2.1	23.0	0.20	3.2	66.0
0.25	1.5	8.2	0.25	2.4	25.7	0.25	3.6	73.8
0.30	1.6	8.9	0.30	2.6	28.2	0.30	3.9	80.9
0.35	1.8	9.7	0.35	2.8	30.4	0.35	4.3	87.4
0.40	1.9	10.3	0.40	3.0	32.5	0.40	4.6	93.4
0.50	2.1	11.5	0.50	3.3	36.4	0.50	5.1	104
0.60	2.3	12.6	0.60	3.7	39.9	0.60	5.6	114
0.70	2.5	13.7	0.70	4.0	43.1	0.70	6.0	124
0.80	2.7	14.6	0.80	4.2	46.0	0.80	6.4	132
0.90	2.8	15.5	0.90	4.5	48.8	0.90	6.8	140
1.00	3.0	16.3	1.00	4.7	51.5	1.00	7.2	148
1.50	3.7	20.0	1.50	5.8	63.0	1.50	8.8	181
2.00	4.2	23.1	2.00	6.7	72.8	2.00	10.2	209
2.50	4.7	25.8	2.50	7.5	81.4	2.50	11.4	234
3.00	5.2	28.3	3.00	8.2	89.1	3.00	12.5	256

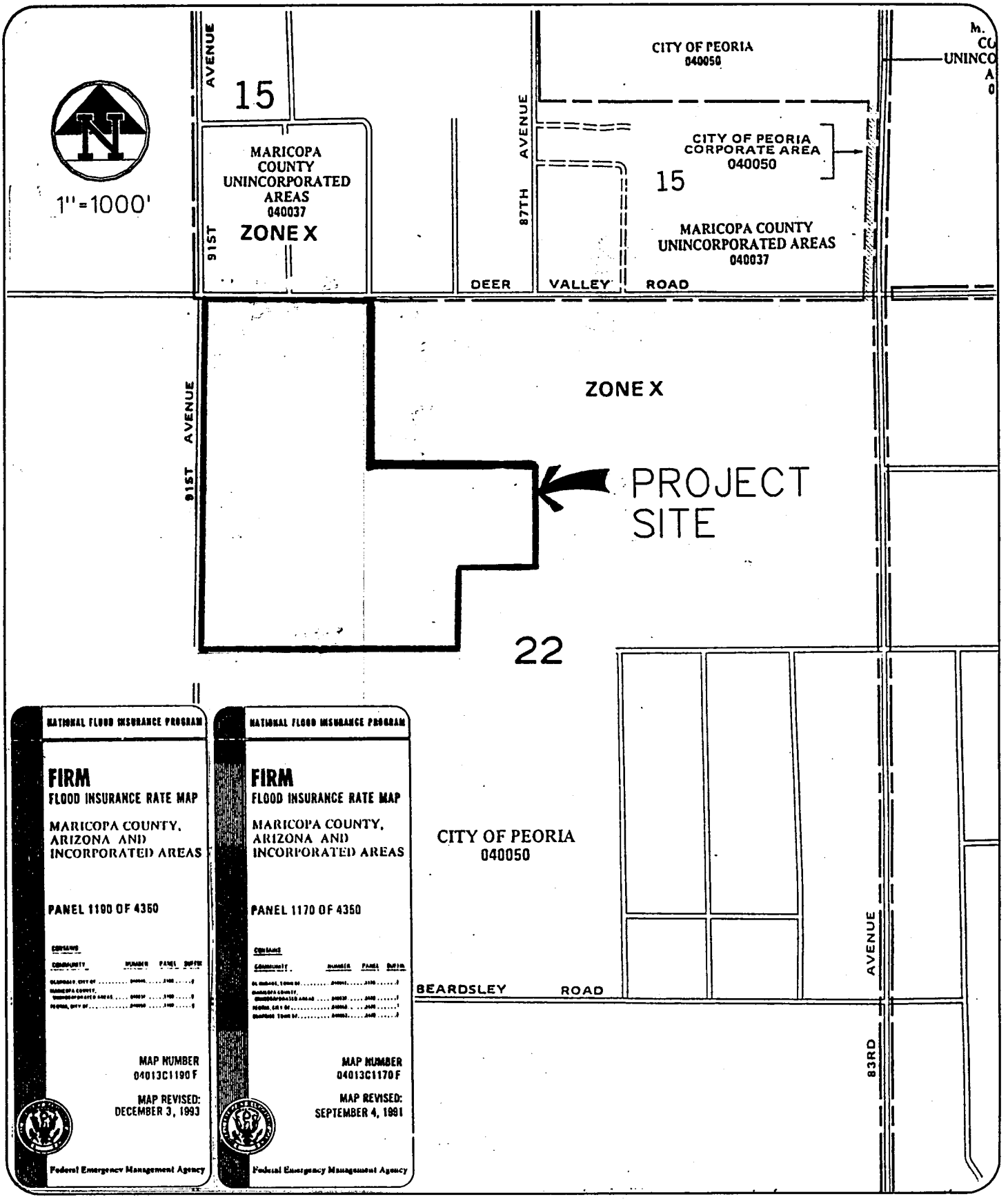
A = AREA IN SQUARE FEET
V = VELOCITY IN FEET PER SECOND
Q = FLOW IN CUBIC FEET PER SECOND

PLATES

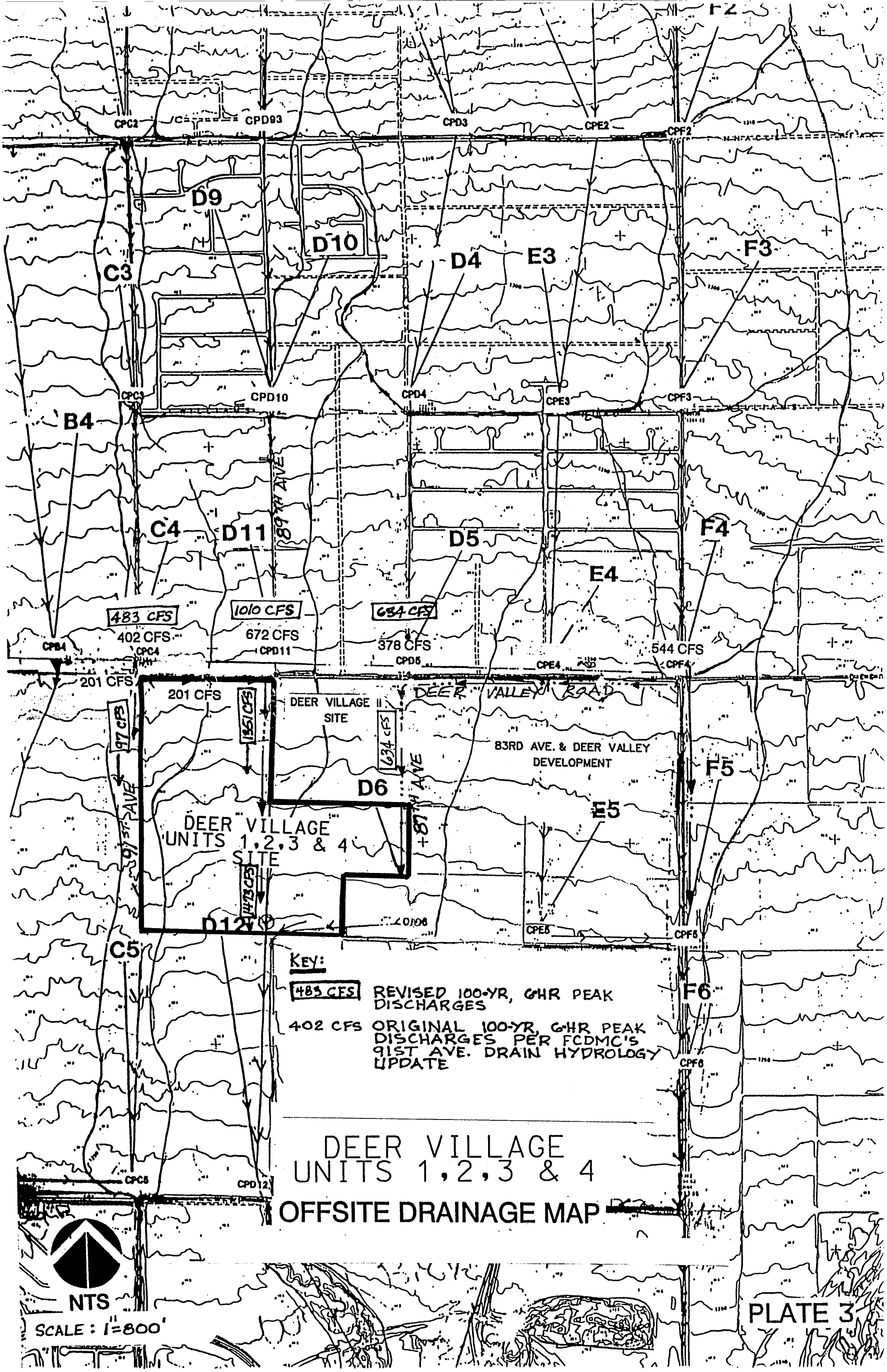


N.T.S.

VICINITY MAP	DEER VILLAGE UNITS 1,2,3 & 4	JOB NO 950101
4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING•ENGINEERING•LANDSCAPE ARCHITECTURE	PLATE 1



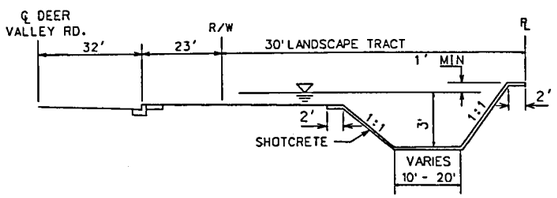
FLOOD INSURANCE RATE MAP	DEER VILLAGE UNITS 1,2,3 & 4	JOB NO 950101
4550 NORTH 12TH STREET PHOENIX, ARIZONA 85014 TELEPHONE (602) 264-6831	COE & VAN LOO PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE	PLATE 2



DEER VILLAGE
UNITS 1,2,3 & 4

OFFSITE DRAINAGE MAP

PLATE 3



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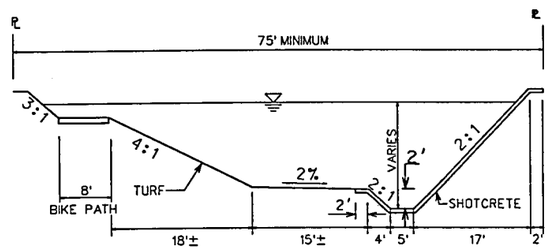

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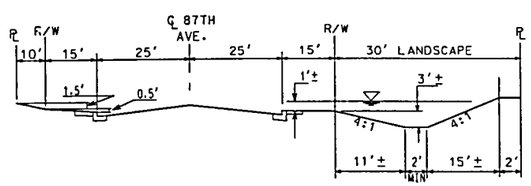

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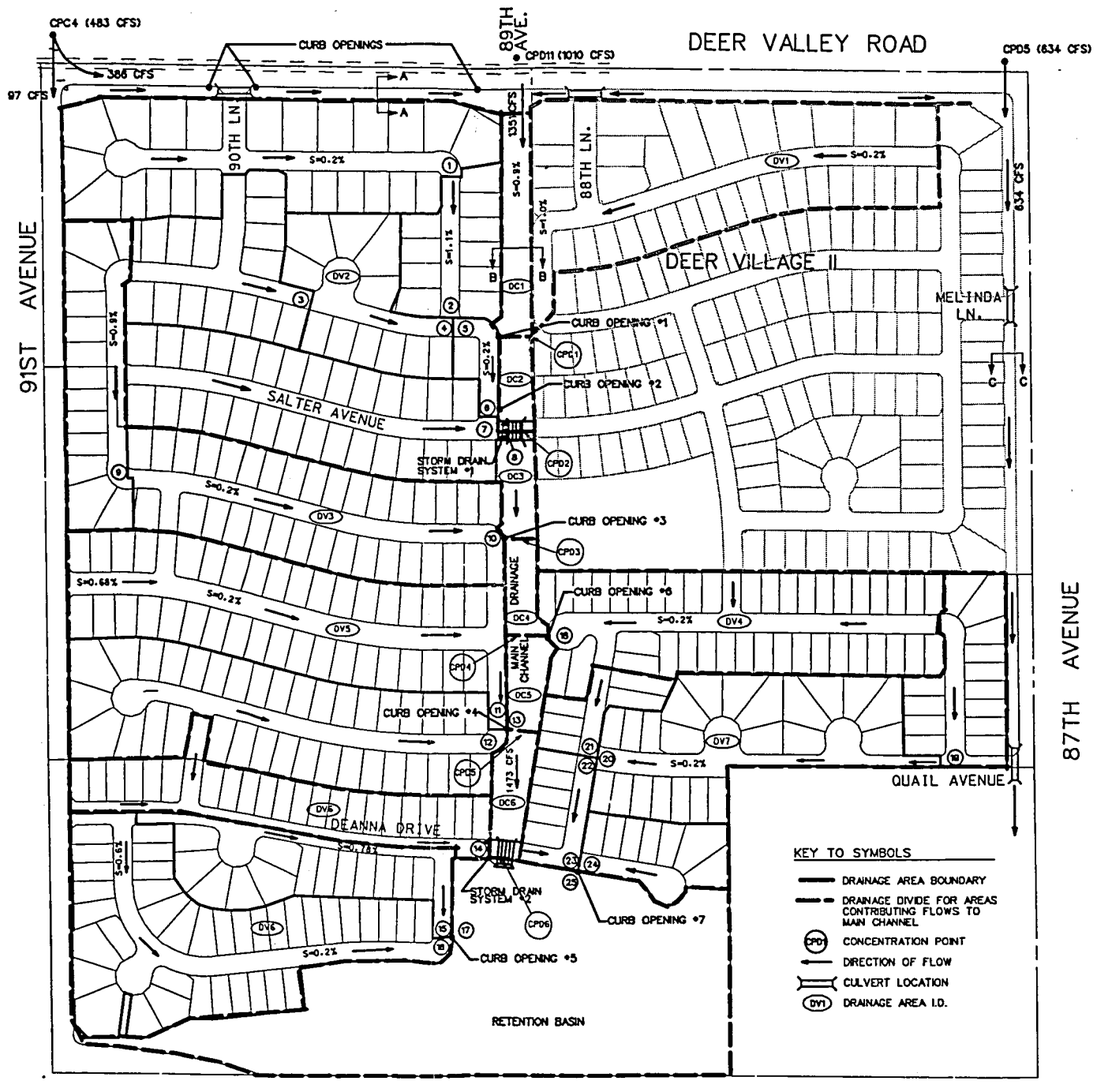

SCALE
1" = 400'

NOTE:
PEAK 100 YR. FLOWS ARE SHOWN IN THE CHANNELS AND AT CONCENTRATE POINTS

DEER VILLAGE UNITS 1,2,3 & 4

COE & VAN LOO
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ON-SITE DRAINAGE MAP

4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
TELEPHONE (602) 264-6831

JOB NO
950101

PLATE 4

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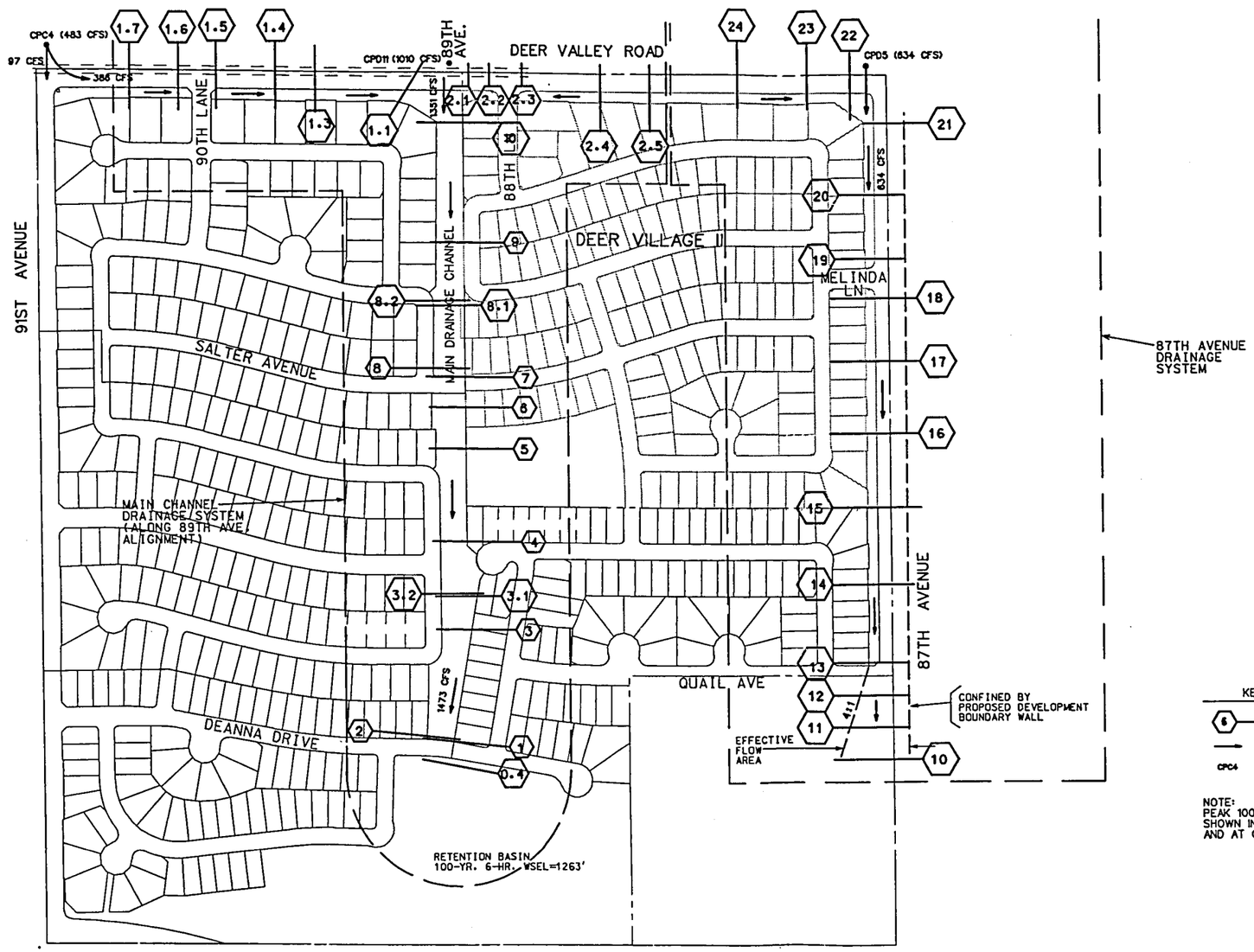

SCALE
1" = 400

KEY TO SYMBOLS

- HEC-RAS CROSS-SECTION
- DIRECTION OF FLOW
- CPC4 CONCENTRATION POINT

NOTE:
PEAK 100 YR. FLOWS ARE SHOWN IN THE CHANNELS AND AT CONCENTRATE POINTS

DEER VILLAGE UNITS 1,2,3 & 4

COE & VAN LOO
PLANNING·ENGINEERING·LANDSCAPE ARCHITECTURE

HEC-RAS SCHEMATIC

4550 NORTH 12TH STREET
PHOENIX, ARIZONA 85014
TELEPHONE (602) 264-6831

JOB NO
950101

PLATE 5

FILE: N:\950101\LAND\SDHEC2.DGN DATE:8-96

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APPENDIX A

BACKUP HYDROLOGIC DOCUMENTATION FOR OFFSITE FLOWS

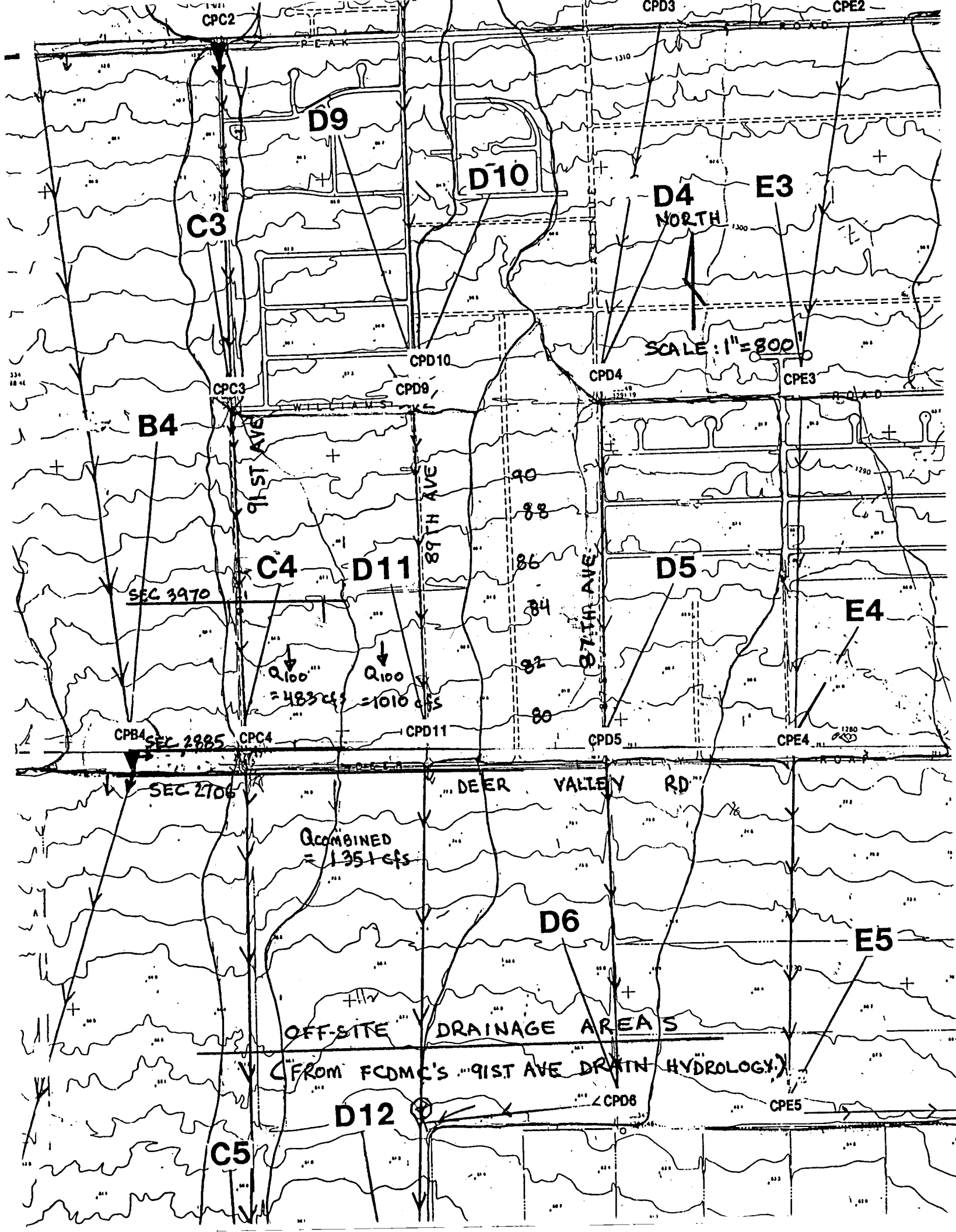
PRECIPITATION AND RAINFALL PATTERNS DUE TO AREAL REDUCTION

```
ID DEER VILLAGE UNITS 1 - 4, N. RAZA, 110696, FILE: DVRAIN
ID
IT     5                    300
IO     3
KK
KM SUB-BASIN DV87-91
KM 6-HOUR RAINFALL, PATTERN NO. 1.11 WAS USED TO FIND TC & R FOR THIS BASIN
KM THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .992
KM   L = 2.30  Kb = .050  Adj. Slope =   66.0
BA  .600
IN    15
KM RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
PB 3.175
KM THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.11
PC  .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
PC  .087    .099    .118    .141    .220    .385    .819    .903    .928    .949
PC  .961    .971    .982    .991   1.000
LG  .350    .150   9.400    .020   2.000
UC  .654    .602
UA     0       3       5       8      12      20      43      75      90      96
UA   100
ZZ
```

```
ID DEER VILLAGE UNITS 1-4 N. RAZA  110696 FILE: DVRAIN2
ID
IT     5                    300
IO     3
KK
KM SUB-BASIN DV
KM 6-HOUR RAINFALL, PATTERN NO. 1.45 WAS USED TO FIND TC & R FOR THIS BASIN
KM THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .986
KM   L = 2.30  Kb = .050  Adj. Slope =   66.0
BA 1.090
IN    15
KM RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
PB 3.156
KM THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.45
PC  .000    .008    .016    .025    .033    .041    .050    .058    .066    .075
PC  .087    .099    .119    .149    .232    .410    .771    .878    .917    .945
PC  .957    .968    .979    .990   1.000
LG  .350    .150   9.400    .020   2.000
UC  .679    .446
UA     0       3       5       8      12      20      43      75      90      96
JA   100
ZZ
```

HYDRAULIC ANALYSIS OF EXISTING FLOW CONDITIONS AT DEER VALLEY ROAD BETWEEN 91ST AVENUE AND 89TH AVENUE

CVL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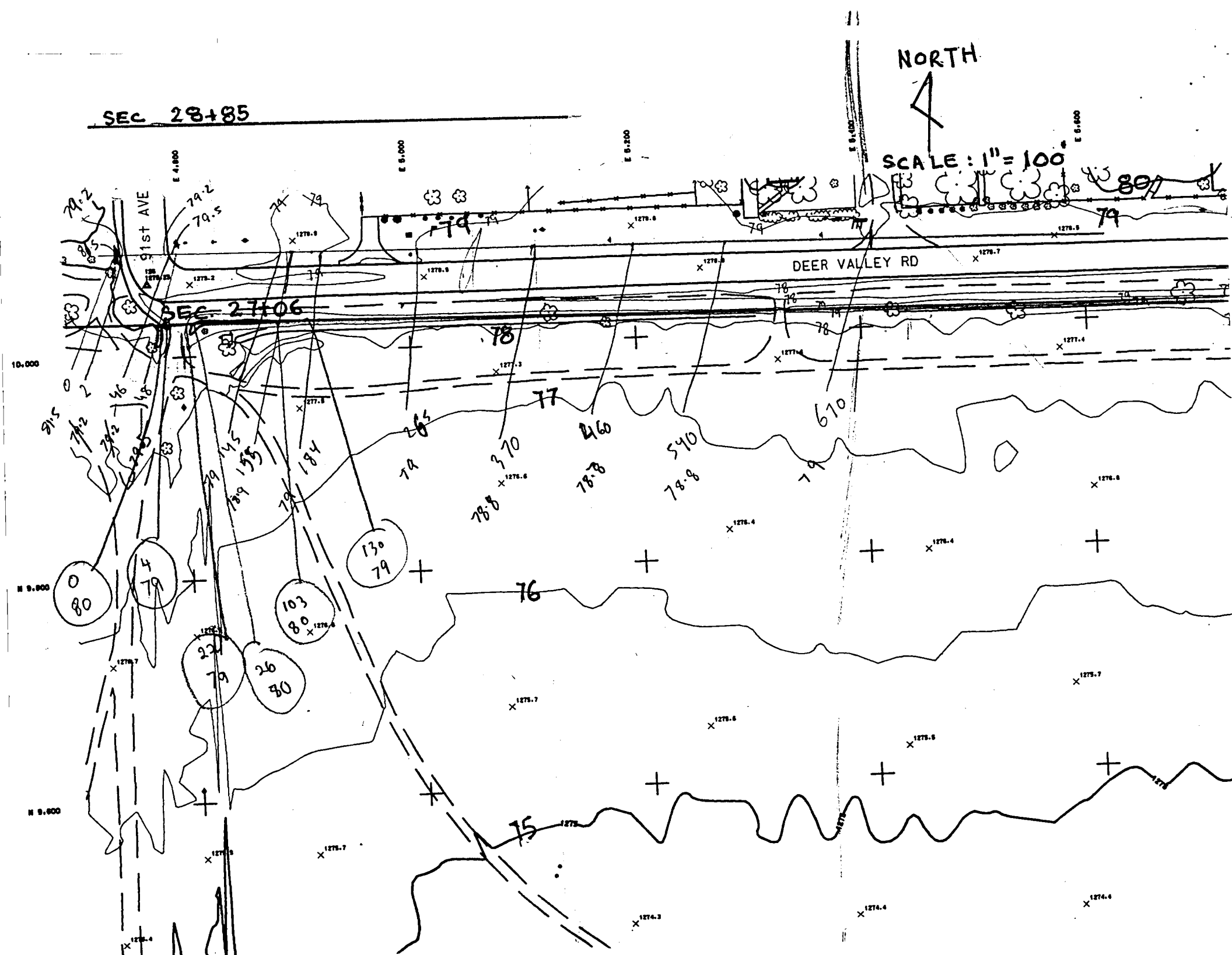
CPD3
CPE2
D9
D10
D4
E3
C3
NORTH
SCALE: 1" = 800'
CPD10
CPD4
CPE3
CPC3
CPD9
B4
91ST AVE
89TH AVE
87TH AVE
90
88
86
84
82
80
C4
D11
D5
SEC 3970
E4
Q100 = 483 cfs
Q100 = 1010 cfs
CPB4
SEC 2885
CPC4
CPD11
CPD5
CPE4
SEC 2706
DEER VALLEY RD
Q COMBINED = 1351 cfs
D6
E5
OFF-SITE DRAINAGE AREAS
(FROM FCDMC'S 91ST AVE DRAIN HYDROLOGY)
CPD6
CPE5
D12
C5


SEC 28+85
NORTH
SCALE: 1" = 100'
91st AVE
DEER VALLEY RD
SEC 27+06
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E 5,000
E 5,200
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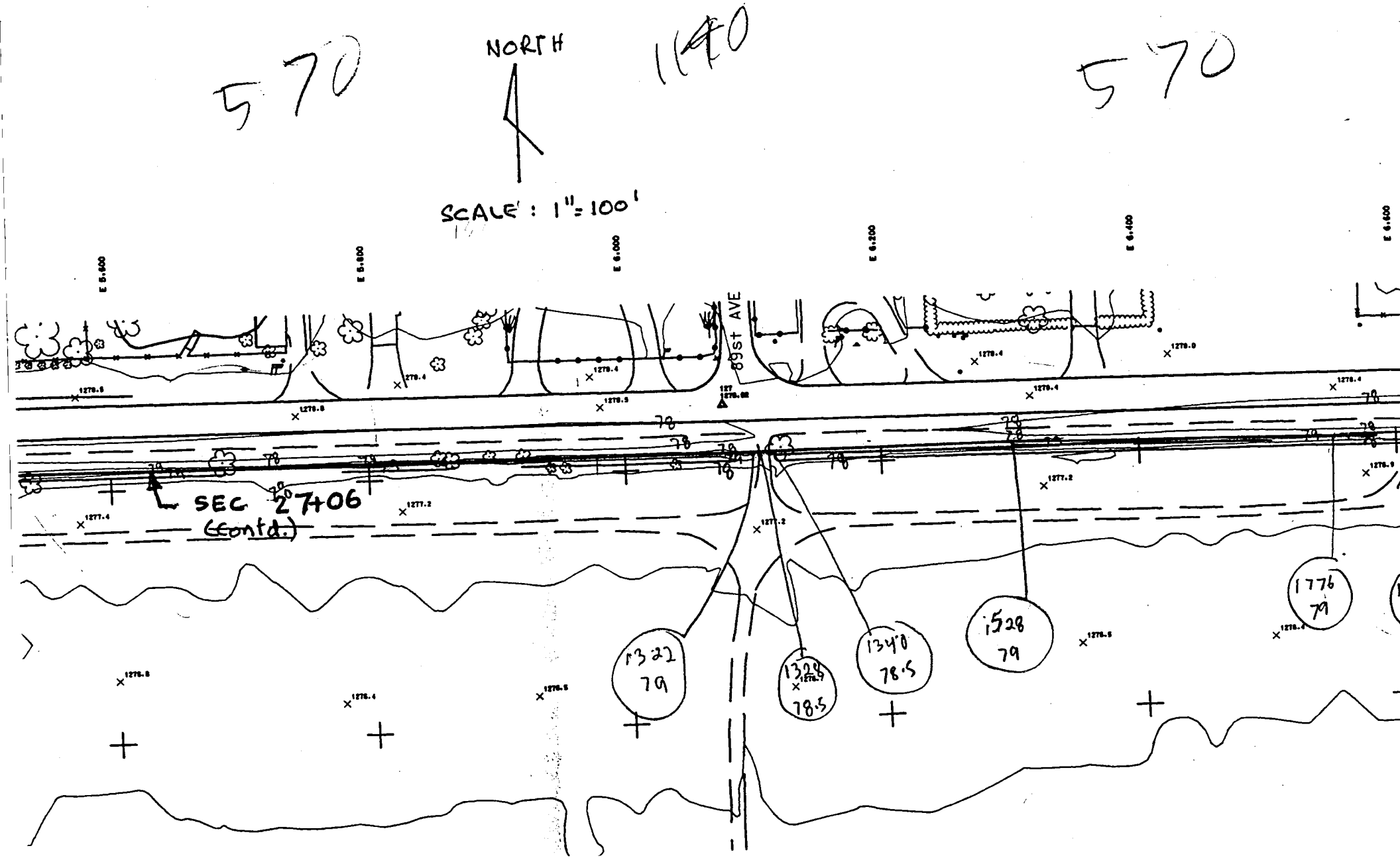
E 5,600
10,000
N 9,800
N 9,600


570
NORTH
1140
570
SCALE : 1" = 100'
E 5+600
E 5+800
E 6+000
E 6+200
E 6+400
E 6+600
89st AVE
SEC 27+06
(Contd.)
1322
79
1328
78.5
1340
78.5
1528
79
1776
79

NG WATERLINE

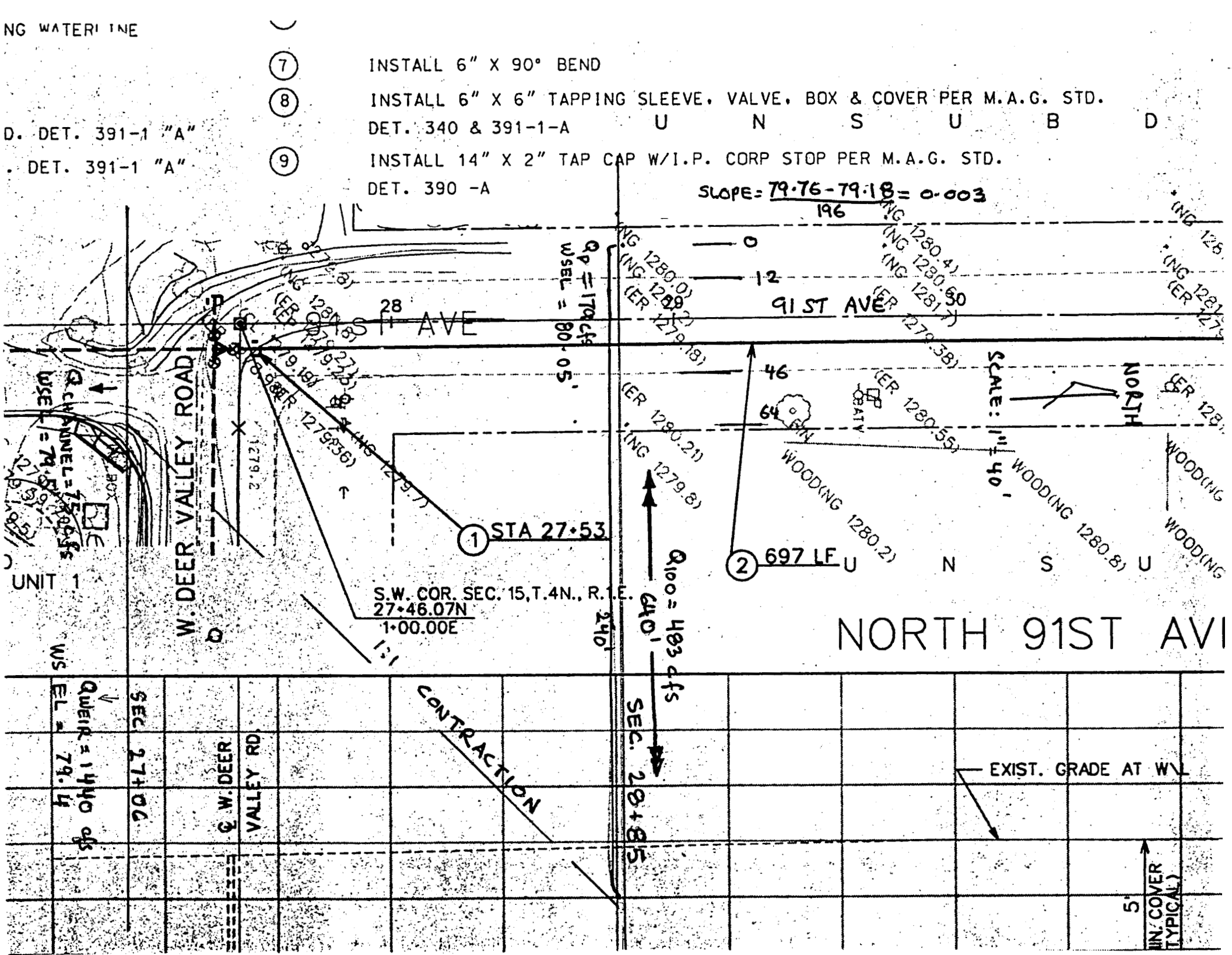
D. DET. 391-1 "A"

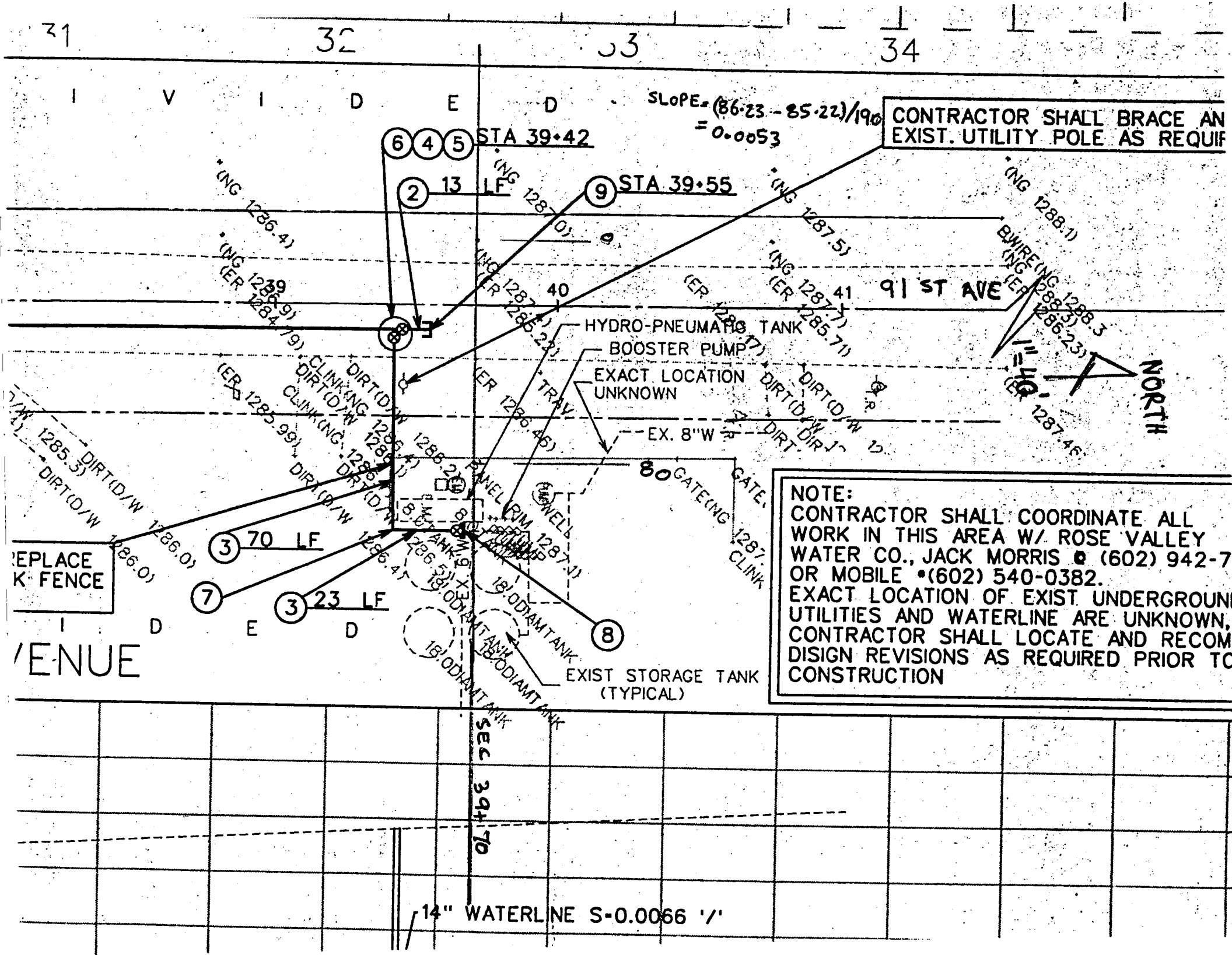
. DET. 391-1 "A"

(7) INSTALL 6" X 90° BEND

(8) INSTALL 6" X 6" TAPPING SLEEVE, VALVE, BOX & COVER PER M.A.G. STD. DET. 340 & 391-1-A

(9) INSTALL 14" X 2" TAP CAP W/I.P. CORP STOP PER M.A.G. STD. DET. 390 -A




31
32
33
34
I V I D E D
SLOPE = (86.23 - 85.22)/190
= 0.0053
CONTRACTOR SHALL BRACE AN
EXIST. UTILITY POLE AS REQUIF
6 4 5 STA 39+42
2 13 LF
9 STA 39+55
(NG 1286.4)
(NG 1287.0)
(NG 1287.5)
(NG 1288.1)
BWIRE(NG 1288.3
(ER 1288.3)
(ER 1286.23)
39
40
41
91 ST AVE
HYDRO-PNEUMATIC TANK
BOOSTER PUMP
EXACT LOCATION
UNKNOWN
EX. 8"W
1" = 40'
NORTH
CLINK(NG
DIRT(D/W
TRAY
PANEL PUM
GATE(NG 1287
CLINK
3 70 LF
7
3 23 LF
8
18' DIAM TANK
EXIST STORAGE TANK
(TYPICAL)
EPLACE
K FENCE
I D E D
VENUE
SEC 39+70
14" WATERLINE S-0.0066 '/'
NOTE:
CONTRACTOR SHALL COORDINATE ALL
WORK IN THIS AREA W/ ROSE VALLEY
WATER CO., JACK MORRIS @ (602) 942-7
OR MOBILE •(602) 540-0382.
EXACT LOCATION OF EXIST UNDERGROUN
UTILITIES AND WATERLINE ARE UNKNOWN,
CONTRACTOR SHALL LOCATE AND RECOM
DISIGN REVISIONS AS REQUIRED PRIOR TO
CONSTRUCTION

Project DEER VILLAGE 1-4
Project No. 950101
Sheet No. 1 of
Calculated by N. RAZA Date 11-6-96

UNIFORM FLOW COMPUTATIONS

LOCATION/DESCRIPTION:
SEC. 27+06
DIRT PATH/CHANNEL S. OF 91ST AVE/DEER VALLEY RD
INTERSECTION

CROSS SECTION PARAMETERS: FILENAME: dvs.SEC 27+06

No. of Cross Section Points:	13	Bed Slope:	0.00600	Max Elev.:	80.00
Bank Stations.....Left:	0.0	Right....:	26.0	Min Elev.:	78.50
Encroachment Stations..Left:	0.0	Right....:	26.0		
Manning-n Values.....LOB:	0.025	CHANNEL..:	0.025	ROB.....:	0.025

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	80.00	0.00	2)	79.00	4.00	3)	78.50	5.00
4)	78.50	21.00	5)	79.00	22.00	6)	80.00	26.00
7)	80.00	103.00	8)	79.00	130.00	9)	79.00	1322.00
10)	78.50	1328.00	11)	78.50	1340.00	12)	79.00	1528.00
13)	79.00	1776.00						

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	V(fps)	Fr No.	ne	ALPHA	TW(ft)	A(sf)	WP(ft)	CRWS(ft)
79.00	23.5	2.8	0.71	0.025	1.0	18.0	8.5	18.2	78.90
79.50	75.1	4.1	0.78	0.025	1.0	22.0	18.5	22.4	79.36
80.00	154.3	5.1	0.82	0.025	1.0	26.0	30.5	26.5	79.84

NOTES:

Project DEER VILLAGE
Project No. 95010
Sheet No. 1 of
Calculated by MRAM Date 11/8/96

WEIR FLOW COMPUTATIONS

LOCATION/DESCRIPTION:
SEC. 27+06
WEIR FLOW S. OF DEER VALLEY RD & 103' E
OF 91ST AVE. (OVER EARTH BERM)

CROSS SECTION PARAMETERS: FILENAME: DVS2.SEC
SEC. 27+06 91ST AVE

No. of Cross Section Points: 7 Bed Slope:0.00600 Max Elev.: 80.00
Bank Stations.....Left: 103.0 Right....: 1776.0 Min Elev.: 78.50
Encroachment Stations..Left: Right....: Weir Coef: 3.000

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	80.00	103.00	2)	79.00	130.00	3)	79.00	1322.00
4)	78.50	1328.00	5)	78.50	1340.00	6)	79.00	1528.00
7)	79.00	1776.00						

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	H:max(ft)	H:ave(ft)	TW(ft)	A(sf)
79.40	1437.6	0.90	0.43	1656.8	715.1
79.42	1536.1	0.92	0.45	1657.3	748.2
79.41	1486.6	0.91	0.44	1657.1	731.6
79.43	1586.2	0.93	0.46	1657.6	764.8
79.50	1952.4	1.00	0.53	1659.5	880.9
79.45	1688.1	0.95	0.48	1658.1	797.9

NOTES:

Project DEER VILLAGE
Project No. 950101
Sheet No. 2 of
Calculated by N RAZA Date 11/8/96

UNIFORM FLOW COMPUTATIONS

LOCATION/DESCRIPTION:

SEC. 28 + 85 - FLOW WITHIN 91ST AVE R/W

CROSS SECTION PARAMETERS: FILENAME: d922885e.SEC

No. of Cross Section Points:	8	Bed Slope:	0.00300	Max Elev.:	81.20
Bank Stations.....Left:	0.0	Right....:	64.0	Min Elev.:	79.18
Encroachment Stations..Left:	0.0	Right....:	64.0		
Manning-n Values.....LOB:	0.022	CHANNEL..:	0.022	ROB.....:	0.022

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	81.20	0.00	2)	79.18	2.00	3)	79.18	12.00
4)	80.21	46.00	5)	79.80	64.00	6)	79.70	100.00
7)	79.50	450.00	8)	80.00	640.00			

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	V(fps)	Fr No.	ne	ALPHA	TW(ft)	A(sf)	WP(ft)	CRWS(ft)
80.00	43.6	2.1	0.57	0.022	1.0	46.7	20.5	47.0	79.78
80.21	75.1	2.3	0.58	0.022	1.0	63.0	32.0	63.5	79.99
80.02	46.0	2.1	0.57	0.022	1.0	48.2	21.5	48.6	79.80
80.03	47.3	2.2	0.57	0.022	1.0	49.0	21.9	49.4	79.81
80.04	48.6	2.2	0.57	0.022	1.0	49.8	22.4	50.2	79.82
80.05	49.9	2.2	0.57	0.022	1.0	50.6	22.9	50.9	79.83

NOTES:

Project 950101
Project No. DEER VILLAGE
Sheet No. 1 of
Calculated by N RAZA Date 11/8/96

UNIFORM FLOW COMPUTATIONS

LOCATION/DESCRIPTION:

SEC. 28+85 - FLOW ACROSS DRAINAGE AREA WIDTH

CROSS SECTION PARAMETERS: FILENAME: d922885.SEC

No. of Cross Section Points: 8 Bed Slope: 0.00300 Max Elev.: 81.20
Bank Stations.....Left: 0.0 Right....: 640.0 Min Elev.: 79.18
Encroachment Stations..Left: Right....:
Manning-n Values.....LOB: 0.022 CHANNEL..: 0.022 ROB.....: 0.022

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	81.20	0.00	2)	79.18	2.00	3)	79.18	12.00
4)	80.21	46.00	5)	79.80	64.00	6)	79.70	100.00
7)	79.50	450.00	8)	80.00	640.00			

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	V(fps)	Fr No.	ne	ALPHA	TW(ft)	A(sf)	WP(ft)	CRWS(ft)
79.50	7.0	1.4	0.51	0.022	1.0	20.9	4.9	21.0	79.40
80.00	397.5	1.8	0.55	0.022	1.0	622.7	217.0	623.0	79.87
80.20	838.8	2.4	0.59	0.022	1.0	638.2	343.1	638.7	80.04
80.05	495.2	2.0	0.56	0.022	1.0	626.6	248.2	626.9	79.91

NOTES:

Project DEER VILLAGE
Project No. 950101
Sheet No. 3 of
Calculated by N RAZA Date 11/8/96

UNIFORM FLOW COMPUTATIONS

LOCATION/DESCRIPTION:

SEC 28+85 - FLOW WITHIN 1:1 CONTRACTION ZONE

(FLOW CONTRACTS TO GO THRU DIRT PATH
S. OF 91ST AVE/DEER VALLEY INTERSECTION

CROSS SECTION PARAMETERS: FILENAME: d2285e2.SEC

No. of Cross Section Points:	9	Bed Slope:	0.00300	Max Elev.:	81.20
Bank Stations.....Left:	0.0	Right....:	46.0	Min Elev.:	79.18
Encroachment Stations..Left:	0.0	Right....:	240.0		
Manning-n Values.....LOB:	0.022	CHANNEL..:	0.022	ROB.....:	0.022

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	81.20	0.00	2)	79.18	2.00	3)	79.18	12.00
4)	80.21	46.00	5)	79.80	64.00	6)	79.70	100.00
7)	79.60	240.00	8)	79.50	450.00	9)	80.00	640.00

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	V(fps)	Fr No.	ne	ALPHA	TW(ft)	A(sf)	WP(ft)	CRWS(ft)
80.05	178.9	2.0	0.57	0.022	1.0	226.6	89.7	226.9	79.94
80.00	144.8	1.8	0.57	0.022	1.1	222.7	78.5	223.0	79.91
79.50	7.0	1.4	0.51	0.022	1.0	20.9	4.9	21.0	79.40
79.80	40.6	1.1	0.59	0.022	1.5	207.1	35.5	207.3	79.76

NOTES:

REVISED HEC-1 OUTPUTS 91STMP.DAT AND 91STMP6.DAT

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

Project DEER VILLAGE

Project No. 950101

Sheet No. 1 of 1

Calculated by N. RAZA Date

Checked by Date

HEC-1 OUTPUT 91 STMP.DAT

FCDMC'S 91ST AVE DRAIN HYDROLOGY MODEL MODIFIED BY:

- CHANGING PRECIPITATION AMOUNT TO 3.156 INCHES BASED ON UPSTREAM WATERSHED AREA OF 1.09 MI^2.
- CHANGING RAINFALL PATTERN FOR 1.09 MI^2 AREA.

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  11/13/1996  TIME  08:38:21 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   91ST AVENUE HYDROLOGY NORTH OF GREENWAY ROAD
  2           ID
  3           ID         DATAFILE: N:\950101\HYDRO\HEC1\91STMP.DAT
  4           ID
  5           ID         CVL MODIFICATION 2 DATE: NOVEMBER 6, 1996
  6           ID         MODIFICATION DESCRIPTION: RAINFALL ON PB CARD CHANGED FROM
  7           ID                                   3.027 INCHES TO 3.156 INCHES AND DISTRIBU-
  8           ID                                   TION CHANGED ON THE PC CARD AS SHOWN BELOW.
  9           ID
 10           ID                                   TO OBTAIN DESIGN DISCHARGES FOR CHANNELS
 11           ID                                   ALONG DEER VALLEY, 87TH, 89TH AND 91ST AVE,
 12           ID                                   WATERSHED AREA TAKEN AS 1.09 SQ. MI. TO
 13           ID                                   DERIVE RAINFALL DISTRIBUTION THRU FCDMC
 14           ID                                   PROGRAM MCUHP1
 15           ID
 16           ID                                   SUBAREAS D6 AND D12 SUBDIVIDED TO ACCOUNT
 17           ID                                   FOR DEVELOPMENT WITHIN DEER VILLAGE
 18           ID
 19           ID   FCD-WSMB HEC-1 MODEL DEVELOPMENT FOR EXISTING CONDITIONS
 20           ID   REVISION DATE: JUNE 20, 1994.  AA AND FT COMMENTS HAVE BEEN INCORPORATED.
 21           ID     *** THIS EXCLUDED A SUBDIVISION AREA THRU COUNTRY CLUB ROAD AND INCLUDED
```

```
 73          RC     .04     .03     .04    2800   .0064
 74          RX       0      25      50      80     120     150     175     200
 75          RY     102     101     100     100     100     100     101     102

 76          KK   SB-A2
 77          BA    .205
 78          LG     .35     .25     4.1     .44       5
 79          UC   1.125    .835
 80          UA       0       5      16      30      65      77      84      90      94      97
 81          UA     100

 82          KK    CPA2
 83          KM   AT INTERSECTION WITH PINNACLE PEAK RD
 84          HC       2

 85          KK    R-A2
 86          RS       3    FLOW      -1
 87          RC     .04     .03     .04    3600   .0072
 88          RX       0      25      50      80     120     150     175     200
 89          RY     102     101     100     100     100     100     101     102

 90          KK   SB-A3
 91          BA    .175
 92          LG     .35     .25     4.1     .44       2
 93          UC    .954    .820
 94          UA       0       3       5       8      12      20      43      75      90      96
 95          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 96          KK    CPA3
 97          KM   AT INTERSECTION WITH UNNAMED RD
 98          HC       2

 99          KK    R-A3
100          RS       2    FLOW      -1
101          RC     .04     .03     .04    2800   .0064
102          RX       0      25      50      80     120     150     175     200
103          RY     102     101     100     100     100     100     101     102

104          KK   SB-A4
105          BA    .145
106          LG     .35     .25     3.9     .38       2
107          UC    .742    .480
108          UA       0       3       5       8      12      20      43      75      90      96
109          UA     100

110          KK    CPA4
111          KM   AT INTERSECTION WITH UNNAMED RD
112          HC       2

113          KK    R-A4
114          RS       3    FLOW      -1
115          RC     .04     .03     .04    3800   .0058
116          RX       0      25      50      80     120     150     175     200
117          RY     102     101     100     100     100     100     101     102

118          KK   SB-A5
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 166          HC      2

 167          KK    R-B2
 168          RS      1    FLOW      -1
 169          RC    .03     .02     .03    1760   .0250
 170          RX      0      10      20      30      40      50      60      70
 171          RY    102     101     100     100     100     100     101     102

 172          KK   SB-B3
 173          BA    .119
 174          LG    .35     .25     3.9     .38      10
 175          UC  1.096    .934
 176          UA      0       3       5       8      12      20      43      75      90      96
 177          UA    100

 178          KK    CPB3
 179          KM   AT INTERSECTION OF 93RD AVE & PINNACLE PEAK RD
 180          HC      2
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 181          KK    R-B3
 182          RS      3    FLOW      -1
 183          RC    .03     .02    .03     5280   .0066
 184          RX      0      25      50      80     120     150     175     200
 185          RY    102     101     100     100     100     100     101     102

 186          KK   SB-B4
 187          BA    .32
 188          LG    .35     .25     3.9     .38       2
 189          UC  1.375   1.009
 190          UA      0       3       5       8      12      20      43      75      90      96
 191          UA    100

 192          KK    CPB4
 193          KM   AT DEER VALLEY RD
 194          HC      2

 195          KK    D-B4
 196          KM   DIVERT 50% EAST TO 91ST AVENUE
 197          DT     DB4
 198          DI      1      10     100    1000   10000
 199          DQ     .5       5      50     500    5000

 200          KK    R-B4
 201          KM   ROUTE REMAINING FLOW THRU SUB-B7
 202          RS      2    FLOW      -1
 203          RC    .04     .03     .04     5280   .0059
 204          RX      0      25      50      80     120     150     175     200
 205          RY    102     101     100     100     100     100     101     102

 206          KK   SB-B5
 207          BA    .114
 208          LG    .35     .25     4.1     .46       2
 209          UC  1.008   1.045
 210          UA      0       3       5       8      12      20      43      75      90      96
 211          UA    100
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212          KK    R-B5
213          RS       1    FLOW      -1
214          RC     .04     .03     .04    2640   .0064
215          RX       0      25      50      80     120     150     175     200
216          RY     102     101     100     100     100     100     101     102

217          KK   SB-B6
218          BA   0.156
219          LG     .35     .25     3.9     .40       2
220          UC    .692    .407
221          UA       0       3       5       8      12      20      43      75      90      96
222          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


223          KK    CPB6
224          KM   AT INTERSECTION WITH DEER VALLEY RD
225          HC       2

226          KK    R-B6
227          RS       2    FLOW      -1
228          RC     .04     .03     .04    5250   .0059
229          RX       0      25      50      80     120     150     175     200
230          RY     102     101     100     100     100     100     101     102

231          KK   SB-B7
232          BA     .67
233          LG     .35     .25     3.8     .35       2
234          UC    .144    .695
235          UA       0       3       5       8      12      20      43      75      90      96
236          UA     100

237          KK    CPB7
238          KM   AT INLET TO WEST WESTBROOK VILLAGE WEST ALONG BEARDSLY RD
239          HC       4

240          KK   RWBW1
241          KM   ROUTE THRU WEST WESTBROOK VILLAGE GOLF COURSES
242          RS       3    FLOW      -1
243          RC     .03     .02     .03    5280   .0050
244          RX       0      30      60      90     190     300     330     360
245          RY     104     103     101     100     100     101     103     104

246          KK     WBW
247          KM   TOTAL OF PARCELS 1 TO 27 IN WESTBROOK VILLAGE WEST(1983 PROJECT)
248          KM   PLUS PARCELS 28 (GOLF COURSES) ABOUT 23% OF AREA
249          BA    1.00
250          LG     .35     .25     3.5     .28      30
251          UC    1.00     .85
252          UA       0       3       5       8      12      20      43      75      90      96
253          UA     100

254          KK    CWBW
255          HC       2

256          KK    RBWB
257          KM    PER 1983 UDC REPORT AVAILABLE STORAGE IS 472 AC-FT IN GOLF COURSES
258          KM    A MAXIMUM OF 350 AC-FT IS ASSUMED AS PER ERIE'S QUESTIMATE
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259        KM    PER MEETING ON MAY 9, 1994 25 CFS IS ASSUMED AS BLEED OFF THRU 2'DIA PIPE
260        KM    CULVER CROSSING UNION HILLS ROAD AT ABOUT 93RD AVENUE ALIGNMENT
261        RS       1    STOR       0
262        SV       0      50      100      150      200      300      350      400      500
263        SE      26      27       28       29       30       32       34       36       38
264        SQ       0      25       25       25       25       25       25      300      400
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```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

265        KK   RRBOF
266        KM   ALONG UNIONB HILLS RD EASTWARD TOWARDS 93RD AVE
267        RS       1    FLOW      -1
268        RC     .03     .02     .03    2080   .0063
269        RX       0      20      40      60      80     100     120     140
270        RY     102     101     100     100     100     100     101     102

271        KK   SB-C1
272        BA    .100
273        KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED TO FIND TC & R FOR THIS BASIN
274        KM   USED REDUCTION FACTOR OF 0.946
275        LG     .25     .25     4.1     .42       5
276        UC    .513    .406
277        UA       0       5      16      30      65      77      84      90      94      97
278        UA     100

279        KK    R-C1
280        KM   ROUTE A THRU 91ST AVE
281        RS       3    FLOW      -1
282        RC    0.03    0.02     .03    3280   .0091
283        RX       0       2      12      22      42      52      62      64
284        RY     102     100     100     100     100     100     100     102

285        KK   SB-C2
286        KM   SUB-BASIN C2
287        BA    .190
288        LG     .25     .25     3.5     .29      10
289        UC    .400    .238
290        UA       0       5      16      30      65      77      84      90      94      97
291        UA     100

292        KK    CPC2
293        KM   AT INTERSECTION OF 91ST AVE & PINNACLE PEAK RD
294        HC       2

295        KK    D-C2
296        KM   DIVERT 10% EASTWARD THRU PINNACLE PEAK
297        DT     DC2
298        DI       9      90     900    9000
299        DQ       3       9      90     900

300        KK    R-C2
301        KM   ROUTE C2 THRU 91ST AVE FROM WILLIAMS RD TO DEER VALLEY RD
302        RS       2    FLOW      -1
303        RC   0.025     .02    .025    2640   .0068
304        RX       0       2      12      22      42      52      62      64
305        RY     102     100     100     100     100     100     100     102

306        KK      C3
```

```
307          BA    0.04
308          LG     .25     .25     3.5     .29      20
309          UC    .338    .399
310          UA       0       5      16      30      65      77      84      90      96      97
311          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

312          KK    CPC3
313          KM   AT INTERSECTION OF WILLIAMS RD CROSSING W/ 91ST AVE
314          HC       2

315          KK    R-C3
316          RS       2    FLOW      -1
317          RC    .025     .02    .025    2640   .0068
318          RX       0       2      12      22      42      52      62      64
319          RY     102     100     100     100     100     100     100     102

320          KK   SB-C4
321          KM   SUB-BASIN C4
322          BA    .070
323          LG     .15     .25     3.5     .29      15
324          UC    .492    .546
325          UA       0       5      16      30      65      77      84      90      94      97
326          UA     100

327          KK   CPC4A
328          KM   AT INTERSECTION OF 91ST AV & DEER VALLEY RD
329          HC       2

330          KK    D-C4
331          KM   DIVERT 80% EAST OF 91ST AVE
332          DT     DC4
333          DI       1      10     100    1000   10000
334          DQ      .8       8      80     800    8000

335          KK     DB4
336          DR     DB4

337          KK    CPC4
338          KM    91ST AVENUE AT DEER VALLEY ROAD
339          HC       2

340          KK    R-C4
341          KM   ROUTE C4 THRU 91ST AVE
342          RS       4    FLOW      -1
343          RC    .025    .02    .025     5280   .0061
344          RX       0       2      12      22      42      52      62      64
345          RY     102     100     100     100     100     100     100     102

346          KK   SB-C5
347          KM   SUB-BASIN C5
348          BA    .120
349          LG     .25     .25     3.5     .29      30
350          UC    .563    .654
351          UA       0       5      16      30      65      77      84      90      94      97
352          UA     100
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 353          KK    CPC5
 354          KM   AT INTERSECTION OF 91ST AVE & BEARDSLEY RD
 355          HC       2

 356          KK    D-C5
 357          KM   DIVERT 30% OF THE FLOWS EAST TO WEST BROOK VILLAGE EAST DETENTION
 358          DT     DC5
 359          DI       0      50     100     200     300     400
 360          DQ       0      15      30      60      90     120

 361          KK  WB-P8B
 362          KM   WESTBROOK VILLAGE PARCELL B8
 363          KM   THIS PARCEL DISCHARGES DIRECTLY INTO 91ST AVENUE
 364          BA   .0085
 365          LG     .25     .25     3.5     .28      30
 366          UC     .17     .15
 367          UA       0       5      16      30      65      77      84      90      94      96
 368          UA     100

 369          KK    CP5B
 370          KM   91ST AVE, SOUTH OF BEARDSLEY ROAD
 371          HC       2

 372          KK    R-5B
 373          KM    ROUTE FLOWS ON 91ST AVENUE, BEARDSLEY TO UNION HILLS
 374          KM   ROUTE THRU 91ST AVE SOUTHWARD, X-SECTION GIVEN IN 1983 WB REPORT
 375          RS       1    FLOW      -1
 376          RC    0.02    .015     .02    2380   .0045
 377          RX       0      12      22      40      80     121     131     143
 378          RY     103     100     100     102     102     100     100     103

 379          KK     WB9
 380          KM   COMBINE PARCELS 8A,10B,7,6,5,G10,2B,3B
 381          BA   .2814
 382          LG     .25     .25     3.5     .28      45
 383          UC    .290    .250
 384          UA       0       5      16      30      65      77      84      90      94      96
 385          UA     100

 386          KK   R-R10
 387          KM   ROUTE FLOWS THROUGH RESERVOIR 10, WESTBROOK VILLAGE EAST
 388          KM   THE RESERVOIR BLEEDS INTO 91ST AVENUE,
 389          RS       1    STOR      -1       0
 390          SV       0     .35    2.28     6.4   12.82    24.0
 391          SE    27.5    28.5    29.5    30.5    31.5    32.5
 392          SQ       0       2      12      19      22    44.0

 393          KK    91ST
 394          KM    91ST AVENUE AT INTERSECTION WITH UNION HILL DR
 395          HC       2
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 396          KK   SB-D1
```

```
397          BA     .13
398          LG     .35     .25     4.3     .46       2
399          UC    .346    .232
400          UA       0       5      16      30      65      77      84      90      94      96
401          UA     100

402          KK    R-D1
403          RS       2    FLOW      -1
404          RC     .03     .02     .03    2640   .0223
405          RX       0      20      40      60      80     100     120     140
406          RY     103     102     101     100     100     101     102     103

407          KK   SB-D2
408          BA    .073
409          LG     .35     .25     4.3     .46       2
410          UC    .692    .874
411          UA       0       5      16      30      65      77      84      90      94      97
412          UA     100

413          KK    CPD2
414          KM   AT INTERSECTION OF CALLEY LEJOS & 89TH AVE
415          HC       2

416          KK    DVD2
417          KM    DIVERT MAX. OF 137 CFS AS PER AM. ENGINEERING CO. REPORT DEC. 1993
418          DT     DD2
419          DI       0      50     100     137     200     400
420          DQ       0      50     100     137     137     137

421          KK    R-D2
422          RS       2    FLOW      -1
423          RC     .04     .03     .04    2640   .0109
424          RX       0       5      10      20      40      50      55      60
425          RY     102     101     100     100     100     100     101     102

426          KK   SB-D3
427          BA    .114
428          LG     .35     .25     3.5     .29      10
429          UC    .571    .393
430          UA       0       5      16      30      65      77      84      90      94      97
431          UA     100

432          KK    CPD3
433          KM   AT INTERSECTION OF PINNACLE PEAK RD & 87TH AVE
434          HC       2

435          KK    R-D3
436          RS       2    FLOW      -1
437          RC     .03     .02     .03    2640   .0076
438          RX       0       5      10      20      40      50      55      60
439          RY     102     101     100     100     100     100     101     102
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

440          KK   SB-D4
441          BA     .12
442          LG     .35     .25     3.5     .29      15
443          UC    .583    .391
```

```
444        UA      0      5     18     30     65     77     84     90     94     97
445        UA    100

446        KK   CPD4
447        KM   AT INTERSECTION OF WILLIAMS RD & 87TH AVE
448        HC      2

449        KK   R-D4
450        RS      1   FLOW     -1
451        RC    .03    .02    .03   1400   .001
452        RX      0      5     10     20     40     50     55     60
453        RY    103    102    101    100    100    101    102    103

454        KK   SB-D5
455        BA   .188
456        LG    .35    .15    8.5    .06     15
457        UC    .50    .40
458        UA      0      3      5      8     12     20     43     75     90     96
459        UA    100

460        KK   CPD5
461        KM   AT INTERSECTION OF DEER VALLEY RD & 87TH AVE
462        HC      2

463        KK   R-D5
464        RS      2   FLOW     -1
465        RC    .03    .02    .03   2640  .0048
466        RX      0     25     50     80    120    150    175    200
467        RY    102    101    100    100    100    100    101    102

468        KK   SB-D6
469        BA   .145
470        LG    .35    .15    9.4    .02      2
471        UC   .500   .400
472        UA      0      3      5      8     12     20     43     75     90     96
473        UA    100

474        KK   CPD6
475        KM   AT NR INTERSECTION OF 89TH RD & UNNAMED RD
476        HC      2

477        KK   R-D6
478        KM   ROUTE WESTWARD TO D12
479        RS      1   FLOW     -1
480        RC    .03    .02    .03   2640  .0045
481        RX      0     25     50     80    120    150    175    200
482        RY    102    101    100    100    100    100    101    102
```



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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

483        KK   SB-D7
484        KM   SUB-BASIN D7
485        BA   .150
486        LG    .25    .25    4.1    .42      5
487        UC   .296   .227
488        UA      0      3      5      8     12     20     43     75     90     96
489        UA    100
```

```
490          KK    R-D7
491          KM   ROUTE THRU 89TH AVE
492          RS       3    FLOW      -1
493          RC     .03     .02      .03    2640   .0083
494          RX       0       3       6      16      26      37      47      50
495          RY     103     100     100     100     100     100     100     103

496          KK  SB-D93
497          BA     .15
498          LG     .25     .25    3.50    0.29    15.0
499          UC   0.379   0.260
500          UA       0       5      16      30      65      77      84      90      94      97
501          UA     100

502          KK    CPD9
503          HC       2

504          KK    D93E
505          KM   DIVERT 30% EASTWARD ALONG PINNACLE PEAK TO D10
506          DT    D93E
507          DI       0     100    1000
508          DQ       0      30     300

509          KK    RD93
510          RS       1    FLOW      -1
511          RC     .03     .02      .03    2640   .0083
512          RX       0       3       6      16      26      37      47      50
513          RY     103     100     100     100     100     100     100     103

514          KK     DC2
515          KM   RETRIEVE DIVERTED 10%
516          DR     DC2

517          KK   SB-D9
518          KM   SUB-BASIN D9
519          BA    .310
520          LG     .25     .25     3.5     .29      15
521          UC    .546    .426
522          UA       0       5      16      30      65      77      84      90      94      97
523          UA     100
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


524          KK   RD93E
525          DR    D93E

526          KK  SB-D10
527          KM   SUB-BASIN D-10
528          BA    .080
529          LG     .15     .25     3.5     .25      15
530          UC    .433    .474
531          UA       0       5      16      30      65      77      84      90      94      97
532          UA     100

533          KK   CPD10
534          KM   AT INTERSECTION OF 89TH AVE AND WILLIAMS RD
535          KM   SERIOUS FLOODING HAVE BEEN OBSERVED AT THIS POINT
536          HC       5
```

```
537          KK   R-D10
538          KM   ROUTE THRU 89TH AVE TO DEER VALLEY RD
539          RS       2    FLOW      -1
540          RC    .025     .02    .025    2640   .0061
541          RX       0       3       6      16      27      37      47      50
542          RY     103     100     100     100     100     100     100     103

543          KK  SB-D11
544          KM   SUB-BASIN D11
545          BA    .080
546          LG     .15     .25     3.5     .25      15
547          UC    .467    .451
548          UA       0       5      16      30      65      77      84      90      94      97
549          UA     100

550          KK   CPD11
551          KM   AT INTERSECTION OF DEER VALLEY RD & 89TH AVE
552          HC       2

553          KK     DC4
554          KM   RETRIEVE DIVERTED 80% FROM CP4A DEER VALLEY/91ST AVE INTERSECTION
555          DR     DC4

556          KK  CPD11A
557          KM   AT INTERSECTION OF DEER VALLEY RD & 89TH AVE COMBINED WITH EAST FLOW
558          HC       2

559          KK  SB-DV1
560          KM   SUB-BASIN DV1
561          BA    .013
562          LG     .10     .35     3.5     .25      55
563          UC     .19     .24
564          UA       0       5      16      30      65      77      84      90      94      97
565          UA     100
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


566          KK  SB-DC1
567          KM   SUB-BASIN DC1
568          BA   .0016
569          LG     .10     .35     3.5     .25       0
570          UC     .10     .19
571          UA       0       5      16      30      65      77      84      90      94      97
572          UA     100

573          KK   CPDV1
574          KM   AT 600' S. OF DEER VALLEY RD
575          HC       3

576          KK  SB-DV2
577          KM   SUB-BASIN DV2
578          BA    .035
579          LG     .10     .35     3.5     .25      45
580          UC     .20     .17
581          UA       0       5      16      30      65      77      84      90      94      97
582          UA     100
```

```
583          KK  SB-DC2
584          KM   SUB-BASIN DC2
585          BA   .0008
586          LG    .10     .35     3.5     .25      0
587          UC    .06     .09
588          UA      0       5      16      30     65     77     84     90     94     97
589          UA    100

590          KK   CPDV2
591          KM   AT 860' S. OF DEER VALLEY RD
592          HC      3

593          KK  SB-DV3
594          KM   SUB-BASIN DV3
595          BA    .015
596          LG    .10     .35     3.5     .25     55
597          UC    .27     .37
598          UA      0       5      16      30     65     77     84     90     94     97
599          UA    100

600          KK  SB-DC3
601          KM   SUB-BASIN DC3
602          BA   .0009
603          LG    .10     .35     3.5     .25     55
604          UC    .09     .14
605          UA      0       5      16      30     65     77     84     90     94     97
606          UA    100

607          KK   CPDV3
608          KM   AT 1160' S. OF DEER VALLEY RD
609          HC      3
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


610          KK  SB-DV4
611          KM   SUB-BASIN DV4
612          BA    .011
613          LG    .10     .35     3.5     .25     55
614          UC    .21     .25
615          UA      0       5      16      30     65     77     84     90     94     97
616          UA    100

617          KK  SB-DC4
618          KM   SUB-BASIN DC4
619          BA   .0008
620          LG    .10     .35     3.5     .25      0
621          UC    .09     .13
622          UA      0       5      16      30     65     77     84     90     94     97
623          UA    100

624          KK   CPDV4
625          KM   AT 1420' S. OF DEER VALLEY RD
626          HC      3

627          KK  SB-DV5
628          KM   SUB-BASIN DV5
629          BA    .024
630          LG    .10     .35     3.5     .25     55
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```
631          UC     .25     .23
632          UA       0       5      16      30      65      77      84      90      94      97
633          UA     100

634          KK  SB-DC5
635          KM   SUB-BASIN DC5
636          BA    .001
637          LG     .10     .35     3.5     .25       0
638          UC     .14     .19
639          UA       0       5      16      30      65      77      84      90      94      97
640          UA     100

641          KK   CPDV5
642          KM   AT 1660' S. OF DEER VALLEY RD
643          HC       3

644          KK  SB-DV6
645          KM   SUB-BASIN DV6
646          BA    .006
647          LG     .10     .35     3.5     .25      55
648          UC     .19     .32
649          UA       0       5      16      30      65      77      84      90      94      97
650          UA     100

651          KK  SB-DC6
652          KM   SUB-BASIN DC6
653          BA   .0012
654          LG     .10     .35     3.5     .25       0
655          UC     .16     .23
656          UA       0       5      16      30      65      77      84      90      94      97
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

657          UA     100

658          KK   CPDV6
659          KM   AT 1960' S. OF DEER VALLEY RD
660          HC       3

661          KK  SB-DV7
662          KM   SUB-BASIN DV7
663          BA    .018
664          LG     .10     .35     3.5     .25      55
665          UC     .21     .25
666          UA       0       5      16      30      65      77      84      90      94      97
667          UA     100

668          KK  SB-DV8
669          KM   SUB-BASIN DV8
670          BA    .016
671          LG     .10     .35     3.5     .25      55
672          UC     .19     .18
673          UA       0       5      16      30      65      77      84      90      94      97
674          UA     100

675          KK  SB-DV9
676          KM   SUB-BASIN DV9
677          BA    .021
678          LG     .10     .35     3.5     .25       0
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```
679          UC     .10     .04
680          UA       0       5      16      30      65      77      84      90      94      97
681          UA     100

682          KK   CPDV9
683          KM   AT DEER VALLEY SOUTH DETENTION BASIN
684          HC       4

685          KK   R-DV9
686          KM   ROUTE FLOWS THROUGH RESERVOIR IN DEER VILLAGE
687          RS       1    STOR      -1       0
688          SV       0     2.6     8.2    15.7    19.9    24.4    29.3
689          SE    59.0    60.0    61.0    62.0    62.5    63.0    63.5
690          SQ       0     .01     .02     .03     .04  1273.0  3600.0

691          KK   R-D11
692          KM   ROUTE THRU POORLY DEFINED NATURAL DEPRESSIONS?
693          RS       1    FLOW      -1
694          RC     .04     .03     .04    5600   .0054
695          RX       0      20      50      80     120     150     180     200
696          RY     102     101     100     100     100     100     101     102

697          KK  SB-D12
698          KM   SUB-BASIN D12
699          BA    .100
700          LG     .20     .25     3.5     .30       2
701          UC    .917   1.033
702          UA       0       3       5       8      12      20      43      75      90      96
703          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


704          KK     DC5
705          DR     DC5

706          KK    WBE1
707          KM   COMBINE FLOWS FROM SUB-B 9,10,11,12 AND ROUTED FLOWS
708          KM   ABOUT 1280 FT ALONG BEARDSLEY RD EAST OF 91ST AVENUE
709          KM   NOTE***AS PER WESTBROOK DRAINAGE MASTER PLAN CAHNNEL CAPACITY = 500CFS
710          HC       4
711          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   60       SB-A1
                V
                V
   71        R-A1
                .
                .
   76           .       SB-A2
                .          .
                .          .
   82        CPA2............
```

```
            V
            V
 85       R-A2
            .
            .
 90         .       SB-A3
            .           .
            .           .
 96       CPA3............
            V
            V
 99       R-A3
            .
            .
104         .       SB-A4
            .           .
            .           .
110       CPA4............
            V
            V
113       R-A4
            .
            .
118         .       SB-A5
            .           .
            .           .
124       CPA5............
            .
            .
127         .       SB-A6
            .           V
            .           V
133         .        R-A6
            .           .
            .           .
138         .           .       SB-A7
            .           .           .
            .           .           .
144       CPA7........................
            .
            .
147         .       SB-B1
            .           V
            .           V
153         .        R-B1
            .           .
            .           .
158         .           .       SB-B2
            .           .           .
            .           .           .
165         .        CPB2............
            .           V
            .           V
167         .        R-B2
            .           .
            .           .
172         .           .       SB-B3
            .           .           .
            .           .           .
178         .        CPB3............
```

```
            .          V
            .          V
181         .       R-B3
            .          .
            .          .
186         .          .      SB-B4
            .          .         .
            .          .         .
192         .       CPB4............
            .          .
            .          .
197         .          .-------->     DB4
195         .       D-B4
            .          V
            .          V
200         .       R-B4
            .          .
            .          .
206         .          .      SB-B5
            .          .         V
            .          .         V
212         .          .       R-B5
            .          .         .
            .          .         .
217         .          .         .      SB-B6
            .          .         .         .
            .          .         .         .
223         .          .       CPB6............
            .          .         V
            .          .         V
226         .          .       R-B6
            .          .         .
            .          .         .
231         .          .         .      SB-B7
            .          .         .         .
            .          .         .         .
237       CPB7.................................
            V
            V
240      RWBW1
            .
            .
246         .        WBW
            .          .
            .          .
254       CWBW............
            V
            V
256       RBWB
            V
            V
265      RRBOF
            .
            .
271         .      SB-C1
            .          V
            .          V
279         .       R-C1
            .          .
            .          .
```

```
285          .          .       SB-C2
             .          .          .
             .          .          .
292          .       CPC2............
             .          .
             .          .
297          .          .------->     DC2
295          .       D-C2
             .          V
             .          V
300          .       R-C2
             .          .
             .          .
306          .          .          C3
             .          .          .
             .          .          .
312          .       CPC3............
             .          V
             .          V
315          .       R-C3
             .          .
             .          .
320          .          .       SB-C4
             .          .          .
             .          .          .
327          .      CPC4A............
             .          .
             .          .
332          .          .------->     DC4
330          .       D-C4
             .          .
             .          .
336          .          .          .<-------     DB4
335          .          .        DB4
             .          .          .
             .          .          .
337          .       CPC4............
             .          V
             .          V
340          .       R-C4
             .          .
             .          .
346          .          .       SB-C5
             .          .          .
             .          .          .
353          .       CPC5............
             .          .
             .          .
358          .          .------->     DC5
356          .       D-C5
             .          .
             .          .
361          .          .      WB-P8B
             .          .          .
             .          .          .
369          .       CP5B............
             .          V
             .          V
372          .       R-5B
             .          .
```

```
            .          .
379         .          .        WB9
            .          .         V
            .          .         V
386         .          .       R-R10
            .          .         .
            .          .         .
393         .       91ST............
            .          .
            .          .
396         .          .       SB-D1
            .          .         V
            .          .         V
402         .          .        R-D1
            .          .         .
            .          .         .
407         .          .         .       SB-D2
            .          .         .          .
            .          .         .          .
413         .          .        CPD2............
            .          .         .
            .          .         .
418         .          .         .-------->     DD2
416         .          .       DVD2
            .          .         V
            .          .         V
421         .          .        R-D2
            .          .         .
            .          .         .
426         .          .         .       SB-D3
            .          .         .          .
            .          .         .          .
432         .          .       CPD3............
            .          .         V
            .          .         V
435         .          .       R-D3
            .          .         .
            .          .         .
440         .          .         .       SB-D4
            .          .         .          .
            .          .         .          .
446         .          .       CPD4............
            .          .         V
            .          .         V
449         .          .       R-D4
            .          .         .
            .          .         .
454         .          .         .       SB-D5
            .          .         .          .
            .          .         .          .
460         .          .       CPD5............
            .          .         V
            .          .         V
463         .          .       R-D5
            .          .         .
            .          .         .
468         .          .         .       SB-D6
            .          .         .          .
            .          .         .          .
474         .          .       CPD6............
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                .         .         V
                .         .         V
477             .         .       R-D6
                .         .         .
                .         .         .
483             .         .         .      SB-D7
                .         .         .         V
                .         .         .         V
490             .         .         .       R-D7
                .         .         .         .
                .         .         .         .
496             .         .         .         .      SB-D93
                .         .         .         .          .
                .         .         .         .          .
502             .         .         .       CPD9............
                .         .         .         .
                .         .         .         .
506             .         .         .         .-------->    D93E
504             .         .         .       D93E
                .         .         .         V
                .         .         .         V
509             .         .         .       RD93
                .         .         .         .
                .         .         .         .
516             .         .         .         .          .<-------     DC2
514             .         .         .         .        DC2
                .         .         .         .          .
                .         .         .         .          .
517             .         .         .         .          .       SB-D9
                .         .         .         .          .          .
                .         .         .         .          .          .
525             .         .         .         .          .          .          .<-------    D93E
524             .         .         .         .          .          .      RD93E
                .         .         .         .          .          .          .
                .         .         .         .          .          .          .
526             .         .         .         .          .          .          .     SB-D10
                .         .         .         .          .          .          .          .
                .         .         .         .          .          .          .          .
533             .         .         .      CPD10.............................................
                .         .         .         V
                .         .         .         V
537             .         .         .      R-D10
                .         .         .         .
                .         .         .         .
543             .         .         .         .      SB-D11
                .         .         .         .          .
                .         .         .         .          .
550             .         .         .      CPD11............
                .         .         .         .
                .         .         .         .
555             .         .         .         .          .<-------     DC4
553             .         .         .         .        DC4
                .         .         .         .          .
                .         .         .         .          .
556             .         .         .     CPD11A...........
                .         .         .         .
                .         .         .         .
559             .         .         .         .      SB-DV1
                .         .         .         .          .
                .         .         .         .          .
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566          .          .          .          .          .     SB-DC1
             .          .          .          .          .          .
             .          .          .          .          .          .
573          .          .          .     CPDV1.......................
             .          .          .          .
             .          .          .          .
576          .          .          .          .     SB-DV2
             .          .          .          .          .
             .          .          .          .          .
583          .          .          .          .          .     SB-DC2
             .          .          .          .          .          .
             .          .          .          .          .          .
590          .          .          .     CPDV2.......................
             .          .          .          .
             .          .          .          .
593          .          .          .          .     SB-DV3
             .          .          .          .          .
             .          .          .          .          .
600          .          .          .          .          .     SB-DC3
             .          .          .          .          .          .
             .          .          .          .          .          .
607          .          .          .     CPDV3.......................
             .          .          .          .
             .          .          .          .
610          .          .          .          .     SB-DV4
             .          .          .          .          .
             .          .          .          .          .
617          .          .          .          .          .     SB-DC4
             .          .          .          .          .          .
             .          .          .          .          .          .
624          .          .          .     CPDV4.......................
             .          .          .          .
             .          .          .          .
627          .          .          .          .     SB-DV5
             .          .          .          .          .
             .          .          .          .          .
634          .          .          .          .          .     SB-DC5
             .          .          .          .          .          .
             .          .          .          .          .          .
641          .          .          .     CPDV5.......................
             .          .          .          .
             .          .          .          .
644          .          .          .          .     SB-DV6
             .          .          .          .          .
             .          .          .          .          .
651          .          .          .          .          .     SB-DC6
             .          .          .          .          .          .
             .          .          .          .          .          .
658          .          .          .     CPDV6.......................
             .          .          .          .
             .          .          .          .
661          .          .          .          .     SB-DV7
             .          .          .          .          .
             .          .          .          .          .
668          .          .          .          .          .     SB-DV8
             .          .          .          .          .          .
             .          .          .          .          .          .
675          .          .          .          .          .          .     SB-DV9
             .          .          .          .          .          .          .
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682          .          .          .      CPDV9.................................
             .          .          .         V
             .          .          .         V
685          .          .          .      R-DV9
             .          .          .         V
             .          .          .         V
691          .          .          .      R-D11
             .          .          .         .
             .          .          .         .
697          .          .          .         .     SB-D12
             .          .          .         .          .
             .          .          .         .          .
705          .          .          .         .          .          .<-------     DC5
704          .          .          .         .          .        DC5
             .          .          .         .          .          .
             .          .          .         .          .          .
706          .          .       WBE1.................................
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*            SEPTEMBER 1990            *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*             VERSION 4.0              *                                    *         609 SECOND STREET            *
*                                      *                                    *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  11/13/1996  TIME  08:38:21 *                                    *          (916) 756-1104              *
*                                      *                                    *                                      *
****************************************                                    ****************************************
```

91ST AVENUE HYDROLOGY NORTH OF GREENWAY ROAD

DATAFILE: N:\950101\HYDRO\HEC1\91STMP.DAT

CVL MODIFICATION 2 DATE: NOVEMBER 6, 1996
MODIFICATION DESCRIPTION: RAINFALL ON PB CARD CHANGED FROM
3.027 INCHES TO 3.156 INCHES AND DISTRIBU-
TION CHANGED ON THE PC CARD AS SHOWN BELOW.

TO OBTAIN DESIGN DISCHARGES FOR CHANNELS
ALONG DEER VALLEY, 87TH, 89TH AND 91ST AVE,
WATERSHED AREA TAKEN AS 1.09 SQ. MI. TO
DERIVE RAINFALL DISTRIBUTION THRU FCDMC
PROGRAM MCUHP1

SUBAREAS D6 AND D12 SUBDIVIDED TO ACCOUNT
FOR DEVELOPMENT WITHIN DEER VILLAGE

FCD-WSMB HEC-1 MODEL DEVELOPMENT FOR EXISTING CONDITIONS
REVISION DATE: JUNE 20, 1994. AA AND FT COMMENTS HAVE BEEN INCORPORATED.
*** THIS EXCLUDED A SUBDIVISION AREA THRU COUNTRY CLUB ROAD AND INCLUDED
POSSIBLE BLEED OFF THRU WBV WEST AS PER MEETING MAY 9, 1994
WITH DEVELOPMENT SERVICES DIVISION, CITY OF PEORIA
RUN WITH 350 AC-FT RETENTION IN WEST WESTBROOK VILLAGE AND ERIE'S DATA
BASIC ASSUMPTIONS AS PER MEETINGS WITH THE CITY OF PERORIA
:MAX. OF 137 CFS EASTWARD DIVERSION ALONG CALLE LEJOS AT CP-D2 TO 83RD
:DATA FROM PRELIM. DRAINAGE REPORT OF AM. ENGG. CO, DATED 12/1993

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                    :AT 83RD & BEARDSLEY INTERSECTION, 30% GOES WEST AND 70% GO SOUTH
                    :AT INLET TO WEST WB NO EASTWARD DIVERSION OF 30% ALONG BEARDSLEY RD
                    :MAX. OF 100 CFS EASTWARD DIVESION ALONG UNION HILLS TO N.R.
                    :MAX. OF 150 CFS EASTWARD DIVERSION ALONG BELL RD TO N.R.
                    :NO INFLOW FROM SUN CITY AT EITHER BELL RD OR UNION HILLS RD
                    :SPILL THRU 91ST AVE SOUTH OF GREENWAY RO
                MODELED AREA : CATCHMENT AREA NORTH OF GREENWAY RD = 9.80 SQ.MILES
                RAINFALL     : 100YR-6HR = 3.20 INCHES
                LOSS RATES   : GREEN AND AMPT BASED ON 5 DOMINANT SOIL MAPPING UNITS
                             : LS RECORDS IN EAST WESTBROOK VILLAGE CONVERTED TO LG
                             : AMC AT NORMAL CONDITION  W/ DTHETA= 0.10 TO .30
                             : XKSAT CORRECTED FOR VEGETATION COVER
                HYDROGRAPH   : CLARK UNIT HYDROGRAPH (MCUHP1)
                ROUTING METH : NORMAL DEPTH ROUTING PROCEDURE USING HYPOTHE. CHANNEL 700'
                               WIDE WITH DEPTH UP TO 2 FT, S.S. 1:1, BOTTOM N=0.04
                RETENTION    : MAXIMUM STORAGE OF 350 AC-FT IN WESTBROOK VILLAGE WEST
                               AS ESTIMATED BY ERIE & ASSOC WAS USED INSTEAD OF 472 AC-FT
                               AS REPORTED BY CONSULTANT IN UDC REPORT DATED 1983
                               ALL RETENTION BASINS IN WESTBROOK VILLAGE EAST ARE USED
                               AS PER DRAINAGE MASTER PLAN REVISED APRIL 1993 BY IMC
                               CONSULTANTS LTD
                SPLIT FLOWS  : RATING TABLES DEVELOPED BY ERIE & ASSOCIATES, INC. FOR
                             : SOME STREET CROSSINGS WERE INCORPORATED INTO THE MODEL
                             : ASSUMES INFLOW AT DIVERSION AS SUM OF TWO FLOWS PER RATING
                     DIVERSION AT WESTBROOK VILLAGE EAST SOUTH OUTLET INTERSECTION WITH
                     UNION HILLS ROAD SPLITS TO NEW RIVER, COUNTRY CLUB RD AND 91ST AVE
                     WEIR FLOW EXISTS OVER UNION HILLS CROWN SOUTH OF WESTBROOK VILLAGE EAST
                     SOUTHWARD OVERFLOW PRORATED AS PER CREST LENGTH WITH Q=CLH**1.5
                     WHERE C=2.6, L = CREST LENGTH, H = HEAD OVER ROAD CROWN
                     91ST FLOW SPLITS AT 87TH AVE AND 89TH AVE AND REMAINING FLOW TO 91ST AV

 59 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE     20JUN94  STARTING DATE
                    ITIME        1200  STARTING TIME
                       NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     21JUN94  ENDING DATE
                   NDTIME        1255  ENDING TIME
                    ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL     .08 HOURS
                   TOTAL TIME BASE   24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

WARNING --- ROUTED OUTFLOW (     45.) IS GREATER THAN MAXIMUM OUTFLOW (     44.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (     47.) IS GREATER THAN MAXIMUM OUTFLOW (     44.) IN STORAGE-OUTFLOW TABLE
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WARNING --- ROUTED OUTFLOW (     48.) IS GREATER THAN MAXIMUM OUTFLOW (     44.) IN STORAGE-OUTFLOW TABLE

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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT									
	SB-A1	120.	4.33	16.	4.	4.	.12		
ROUTED TO									
	R-A1	94.	4.67	16.	4.	4.	.12		
+								100.41	4.67
HYDROGRAPH AT									
	SB-A2	116.	4.58	29.	7.	7.	.20		
2 COMBINED AT									

+		CPA2	210.	4.58	46.	12.	11.	.32		
	ROUTED TO									
		R-A2	195.	4.92	46.	12.	11.	.32		
+									100.60	4.92
	HYDROGRAPH AT									
+		SB-A3	109.	4.75	24.	6.	6.	.17		
	2 COMBINED AT									
+		CPA3	298.	4.83	70.	18.	17.	.50		
	ROUTED TO									
		R-A3	281.	5.08	70.	18.	17.	.50		
+									100.77	5.08
	HYDROGRAPH AT									
+		SB-A4	139.	4.50	22.	5.	5.	.14		
	2 COMBINED AT									
		CPA4	349.	5.00	91.	23.	22.	.64		
	ROUTED TO									
		R-A4	331.	5.25	90.	23.	22.	.64		
+									100.87	5.25
	HYDROGRAPH AT									
+		SB-A5	43.	4.83	13.	3.	3.	.09		
	2 COMBINED AT									
		CPA5	365.	5.25	103.	26.	25.	.73		
	HYDROGRAPH AT									
		SB-A6	79.	4.42	13.	3.	3.	.09		
	ROUTED TO									
		R-A6	56.	4.75	13.	3.	3.	.09		
+									100.31	4.75
	HYDROGRAPH AT									
		SB-A7	72.	4.50	14.	3.	3.	.08		
	3 COMBINED AT									
		CPA7	438.	5.17	129.	33.	32.	.90		
	HYDROGRAPH AT									
		SB-B1	145.	4.17	14.	4.	3.	.09		
	ROUTED TO									
		R-B1	129.	4.25	14.	4.	3.	.09		
									100.68	4.25
	HYDROGRAPH AT									

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  SB-B4        173.   5.00        47.        12.        11.        .32

2 COMBINED AT
+                    CPB4     401.   4.75      107.       27.       26.       .69

DIVERSION TO
+                     DB4     200.   4.75       54.       14.       13.       .69

HYDROGRAPH AT
+                    D-B4     200.   4.75       54.       13.       13.       .69

ROUTED TO
+                    R-B4     168.   5.25       52.       13.       13.       .69
+                                                                          100.59      5.25

HYDROGRAPH AT
+                   SB-B5      59.   4.75       15.        4.        4.       .11

ROUTED TO
+                    R-B5      47.   5.17       15.        4.        4.       .11
+                                                                          100.27      5.17

HYDROGRAPH AT
+                   SB-B6     162.   4.50       23.        6.        5.       .16

2 COMBINED AT
+                    CPB6     171.   4.50       38.       10.        9.       .27

ROUTED TO
+                    R-B6     122.   5.08       37.       10.        9.       .27
+                                                                          100.48      5.08

HYDROGRAPH AT
+                   SB-B7     578.   4.17      103.       26.       25.       .67

4 COMBINED AT
+                    CPB7     891.   5.08      320.       82.       79.      2.53

ROUTED TO
+                   RWBW1     874.   5.25      317.       82.       79.      2.53
+                                                                          101.09      5.25

HYDROGRAPH AT
+                     WBW     820.   4.75      211.       54.       52.      1.00

2 COMBINED AT
+                    CWBW    1501.   4.92      524.      136.      131.      3.53

ROUTED TO
+                    RBWB      25.   4.67       25.       22.       21.      3.53
+                                                                           31.07     10.58

ROUTED TO
+                   RRBOF      25.   6.92       25.       21.       20.      3.53
+                                                                          100.20      7.00

HYDROGRAPH AT
+                   SB-C1     107.   4.25       15.        4.        4.       .10

ROUTED TO
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+	R-C1	101.	4.42	15.	4.	4.	.10		
+								100.45	4.42
HYDROGRAPH AT									
+	SB-C2	305.	4.17	35.	9.	8.	.19		
2 COMBINED AT									
+	CPC2	352.	4.17	50.	13.	12.	.29		
DIVERSION TO									
+	DC2	35.	4.17	6.	2.	2.	.29		
HYDROGRAPH AT									
+	D-C2	317.	4.17	44.	11.	11.	.29		
ROUTED TO									
+	R-C2	310.	4.33	44.	11.	11.	.29		
+								100.94	4.33
HYDROGRAPH AT									
+	C3	54.	4.17	8.	2.	2.	.04		
2 COMBINED AT									
+	CPC3	359.	4.25	52.	13.	12.	.33		
ROUTED TO									
+	R-C3	351.	4.33	52.	13.	12.	.33		
+								101.01	4.33
HYDROGRAPH AT									
+	SB-C4	76.	4.25	14.	3.	3.	.07		
2 COMBINED AT									
+	CPC4A	426.	4.33	65.	16.	16.	.40		
DIVERSION TO									
+	DC4	340.	4.33	52.	13.	13.	.40		
HYDROGRAPH AT									
+	D-C4	85.	4.33	13.	3.	3.	.40		
HYDROGRAPH AT									
+	DB4	200.	4.75	54.	14.	13.	.00		
2 COMBINED AT									
+	CPC4	265.	4.58	66.	17.	16.	.40		
ROUTED TO									
+	R-C4	258.	4.75	66.	17.	16.	.40		
+								100.87	4.75
HYDROGRAPH AT									
+	SB-C5	120.	4.33	26.	7.	6.	.12		
2 COMBINED AT									
+	CPC5	339.	4.75	91.	23.	22.	.52		
DIVERSION TO									
+	DC5	102.	4.75	27.	7.	7.	.52		

	HYDROGRAPH AT								
+		D-C5	237.	4.75	63.	16.	16.	.52	
	HYDROGRAPH AT								
+		WB-P8B	18.	4.00	2.	0.	0.	.01	
	2 COMBINED AT								
+		CP5B	238.	4.75	65.	17.	16.	.53	
	ROUTED TO								
+		R-5B	228.	4.83	65.	17.	16.	.53	
+									101.15 4.83
	HYDROGRAPH AT								
+		WB9	508.	4.08	69.	17.	17.	.28	
	ROUTED TO								
+		R-R10	50.	5.00	38.	17.	17.	.28	
+									32.79 5.00
	2 COMBINED AT								
+		91ST	278.	4.83	102.	34.	33.	.81	
	HYDROGRAPH AT								
+		SB-D1	177.	4.08	17.	4.	4.	.13	
	ROUTED TO								
+		R-D1	171.	4.17	17.	4.	4.	.13	
+									100.71 4.17
	HYDROGRAPH AT								
+		SB-D2	42.	4.42	10.	2.	2.	.07	
	2 COMBINED AT								
+		CPD2	208.	4.25	27.	7.	7.	.20	
	DIVERSION TO								
+		DD2	137.	4.25	24.	6.	6.	.20	
	HYDROGRAPH AT								
+		DVD2	71.	4.25	3.	1.	1.	.20	
	ROUTED TO								
+		R-D2	46.	4.42	3.	1.	1.	.20	
+									100.40 4.42
	HYDROGRAPH AT								
+		SB-D3	138.	4.25	20.	5.	5.	.11	
	2 COMBINED AT								
+		CPD3	170.	4.33	24.	6.	6.	.32	
	ROUTED TO								
+		R-D3	163.	4.42	24.	6.	6.	.32	
+									100.74 4.42
	HYDROGRAPH AT								
+		SB-D4	147.	4.25	23.	6.	5.	.12	
	2 COMBINED AT								

+		CPD4	294.	4.42	46.	12.	11.	.44		
	ROUTED TO									
+		R-D4	286.	4.50	46.	12.	11.	.44		
+									102.17	4.50
	HYDROGRAPH AT									
+		SB-D5	282.	4.33	45.	11.	11.	.19		
	2 COMBINED AT									
+		CPD5	553.	4.42	91.	23.	22.	.63		
	ROUTED TO									
+		R-D5	536.	4.50	91.	23.	22.	.63		
+									100.96	4.50
	HYDROGRAPH AT									
+		SB-D6	226.	4.33	37.	9.	9.	.14		
	2 COMBINED AT									
+		CPD6	733.	4.50	128.	32.	31.	.77		
	ROUTED TO									
+		R-D6	693.	4.58	127.	32.	31.	.77		
+									101.14	4.58
	HYDROGRAPH AT									
+		SB-D7	234.	4.17	23.	6.	5.	.15		
	ROUTED TO									
+		R-D7	226.	4.25	23.	6.	5.	.15		
+									100.90	4.25
	HYDROGRAPH AT									
+		SB-D93	238.	4.17	29.	7.	7.	.15		
	2 COMBINED AT									
+		CPD9	439.	4.25	52.	13.	12.	.30		
	DIVERSION TO									
+		D93E	132.	4.25	16.	4.	4.	.30		
	HYDROGRAPH AT									
+		D93E	307.	4.25	36.	9.	9.	.30		
	ROUTED TO									
+		RD93	290.	4.33	36.	9.	9.	.30		
+									101.04	4.33
	HYDROGRAPH AT									
+		DC2	35.	4.17	6.	2.	2.	.00		
	HYDROGRAPH AT									
+		SB-D9	375.	4.25	60.	15.	14.	.31		
	HYDROGRAPH AT									
+		RD93E	132.	4.25	16.	4.	4.	.00		
	HYDROGRAPH AT									
+		SB-D10	97.	4.17	16.	4.	4.	.08		

	5 COMBINED AT								
+		CPD10	926.	4.25	134.	34.	32.	.69	
	ROUTED TO								
+		R-D10	916.	4.33	134.	34.	32.	.69	
+									102.23 4.33
	HYDROGRAPH AT								
+		SB-D11	99.	4.25	16.	4.	4.	.08	
	2 COMBINED AT								
+		CPD11	1010.	4.33	150.	38.	36.	.77	
	HYDROGRAPH AT								
+		DC4	340.	4.33	52.	13.	13.	.00	
	2 COMBINED AT								
+		CPD11A	1351.	4.33	202.	51.	49.	.77	
	HYDROGRAPH AT								
+		SB-DV1	25.	4.08	3.	1.	1.	.01	
	HYDROGRAPH AT								
+		SB-DC1	3.	4.00	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV1	1367.	4.33	206.	52.	50.	.78	
	HYDROGRAPH AT								
+		SB-DV2	73.	4.00	9.	2.	2.	.04	
	HYDROGRAPH AT								
+		SB-DC2	2.	4.00	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV2	1402.	4.33	214.	54.	52.	.82	
	HYDROGRAPH AT								
+		SB-DV3	23.	4.08	4.	1.	1.	.01	
	HYDROGRAPH AT								
+		SB-DC3	2.	4.00	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV3	1421.	4.33	218.	55.	53.	.84	
	HYDROGRAPH AT								
+		SB-DV4	21.	4.08	3.	1.	1.	.01	
	HYDROGRAPH AT								
+		SB-DC4	2.	4.00	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV4	1435.	4.33	221.	56.	54.	.85	
	HYDROGRAPH AT								
+		SB-DV5	47.	4.08	6.	2.	2.	.02	
	HYDROGRAPH AT								

+		SB-DC5	2.	4.00	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV5	1465.	4.33	228.	57.	55.	.87	
	HYDROGRAPH AT								
+		SB-DV6	10.	4.08	2.	0.	0.	.01	
	HYDROGRAPH AT								
+		SB-DC6	2.	4.08	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV6	1473.	4.33	230.	58.	56.	.88	
	HYDROGRAPH AT								
+		SB-DV7	34.	4.08	5.	1.	1.	.02	
	HYDROGRAPH AT								
+		SB-DV8	34.	4.00	4.	1.	1.	.02	
	HYDROGRAPH AT								
+		SB-DV9	54.	4.00	4.	1.	1.	.02	
	4 COMBINED AT								
+		CPDV9	1516.	4.33	242.	61.	59.	.94	
	ROUTED TO								
+		R-DV9	1524.	4.33	204.	51.	49.	.94	
+									63.05 4.33
	ROUTED TO								
+		R-D11	1052.	4.67	202.	51.	49.	.94	
+									101.66 4.67
	HYDROGRAPH AT								
+		SB-D12	65.	4.75	17.	4.	4.	.10	
	HYDROGRAPH AT								
+		DC5	102.	4.75	27.	7.	7.	.00	
	4 COMBINED AT								
+		WBE1	1899.	4.67	374.	94.	91.	1.81	

*** NORMAL END OF HEC-1 ***

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

Project DEER VILLAGE

Project No. 950101

Sheet No. 1 of 1

Calculated by N. RAZA Date

Checked by Date

HEC-1 OUTPUT 91 STMP 6.DAT

FCDMC'S 91ST AVE DRAIN HYDROLOGY MODEL MODIFIED BY:

- CHANGING PRECIPITATION AMOUNT TO 3.175 INCHES BASED ON UPSTREAM WATERSHED AREA OF 0.6 MI^2.
- CHANGING RAINFALL PATTERN FOR 0.6 MI^2 AREA.

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  11/13/1996  TIME  09:51:40 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX    X       XXXXX   X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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1                                    HEC-1 INPUT                                    PAGE  1

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

        1           ID   91ST AVENUE HYDROLOGY NORTH OF GREENWAY ROAD
        2           ID
        3           ID         DATAFILE: N:\950101\HYDRO\HEC1\91STMP6.DAT
        4           ID
        5           ID         CVL MODIFICATION 3 DATE: NOVEMBER 6, 1996
        6           ID         MODIFICATION DESCRIPTION: RAINFALL ON PB CARD CHANGED FROM
        7           ID                                   3.027 INCHES TO 3.175 INCHES AND DISTRIBU-
        8           ID                                   TION CHANGED ON THE PC CARD AS SHOWN BELOW.
        9           ID
       10           ID                                   TO OBTAIN DESIGN DISCHARGES FOR CHANNELS
       11           ID                                   ALONG DEER VALLEY, 87TH AND 91ST AVE,
       12           ID                                   WATERSHED AREA TAKEN AS 0.6 SQ. MI. TO
       13           ID                                   DERIVE RAINFALL DISTRIBUTION THRU FCDMC
       14           ID                                   PROGRAM MCUHP1
       15           ID
       16           ID                                   SUBAREAS D6 AND D12 SUBDIVIDED TO ACCOUNT
       17           ID                                   FOR DEVELOPMENT WITHIN DEER VILLAGE
       18           ID
       19           ID   FCD-WSMB HEC-1 MODEL DEVELOPMENT FOR EXISTING CONDITIONS
       20           ID   REVISION DATE: JUNE 20, 1994.  AA AND FT COMMENTS HAVE BEEN INCORPORATED.
       21           ID     *** THIS EXCLUDED A SUBDIVISION AREA THRU COUNTRY CLUB ROAD AND INCLUDED
       22           ID         POSSIBLE BLEED OFF THRU WBV WEST AS PER MEETING MAY 9, 1994
```

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 23          ID        WITH DEVELOPMENT SERVICES DIVISION, CITY OF PEORIA
 24          ID   RUN WITH 350 AC-FT RETENTION IN WEST WESTBROOK VILLAGE AND ERIE'S DATA
 25          ID   BASIC ASSUMPTIONS AS PER MEETINGS WITH THE CITY OF PERORIA
 26          ID         :MAX. OF 137 CFS EASTWARD DIVERSION ALONG CALLE LEJOS AT CP-D2 TO 83RD
 27          ID         :DATA FROM PRELIM. DRAINAGE REPORT OF AM. ENGG. CO, DATED 12/1993
 28          ID         :AT 83RD & BEARDSLEY INTERSECTION, 30% GOES WEST AND 70% GO SOUTH
 29          ID         :AT INLET TO WEST WB NO EASTWARD DIVERSION OF 30% ALONG BEARDSLEY RD
 30          ID         :MAX. OF 100 CFS EASTWARD DIVESION ALONG UNION HILLS TO N.R.
 31          ID         :MAX. OF 150 CFS EASTWARD DIVERSION ALONG BELL RD TO N.R.
 32          ID         :NO INFLOW FROM SUN CITY AT EITHER BELL RD OR UNION HILLS RD
 33          ID         :SPILL THRU 91ST AVE SOUTH OF GREENWAY RO
 34          ID   MODELED AREA : CATCHMENT AREA NORTH OF GREENWAY RD = 9.80 SQ.MILES
 35          ID   RAINFALL     : 100YR-6HR = 3.20 INCHES
 36          ID   LOSS RATES   : GREEN AND AMPT BASED ON 5 DOMINANT SOIL MAPPING UNITS
 37          ID                : LS RECORDS IN EAST WESTBROOK VILLAGE CONVERTED TO LG
 38          ID                : AMC AT NORMAL CONDITION  W/ DTHETA= 0.10 TO .30
 39          ID                : XKSAT CORRECTED FOR VEGETATION COVER
 40          ID   HYDROGRAPH   : CLARK UNIT HYDROGRAPH (MCUHP1)
 41          ID   ROUTING METH : NORMAL DEPTH ROUTING PROCEDURE USING HYPOTHE. CHANNEL 700'
 42          ID                  WIDE WITH DEPTH UP TO 2 FT, S.S. 1:1, BOTTOM N=0.04
 43          ID   RETENTION    : MAXIMUM STORAGE OF 350 AC-FT IN WESTBROOK VILLAGE WEST
 44          ID                  AS ESTIMATED BY ERIE & ASSOC WAS USED INSTEAD OF 472 AC-FT
 45          ID                  AS REPORTED BY CONSULTANT IN UDC REPORT DATED 1983
 46          ID                  ALL RETENTION BASINS IN WESTBROOK VILLAGE EAST ARE USED
 47          ID                  AS PER DRAINAGE MASTER PLAN REVISED APRIL 1993 BY IMC
 48          ID                  CONSULTANTS LTD
 49          ID   SPLIT FLOWS  : RATING TABLES DEVELOPED BY ERIE & ASSOCIATES, INC. FOR
 50          ID                : SOME STREET CROSSINGS WERE INCORPORATED INTO THE MODEL
 51          ID                : ASSUMES INFLOW AT DIVERSION AS SUM OF TWO FLOWS PER RATING
 52          ID        DIVERSION AT WESTBROOK VILLAGE EAST SOUTH OUTLET INTERSECTION WITH
 53          ID        UNION HILLS ROAD SPLITS TO NEW RIVER, COUNTRY CLUB RD AND 91ST AVE
 54          ID        WEIR FLOW EXISTS OVER UNION HILLS CROWN SOUTH OF WESTBROOK VILLAGE EAST
 55          ID        SOUTHWARD OVERFLOW PRORATED AS PER CREST LENGTH WITH Q=CLH**1.5
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 56          ID        WHERE C=2.6, L = CREST LENGTH, H = HEAD OVER ROAD CROWN
 57          ID        91ST FLOW SPLITS AT 87TH AVE AND 89TH AVE AND REMAINING FLOW TO 91ST AV
             *DIAGRAM
             *     FREQ     2YR     5YR    10YR    25YR    50YR   100YR
             * JR  PREC   0.375   0.531   0.634   0.778   0.891   1.000
 58          IT       5 20JUN94    1200     300
 59          IO       5

 60          KK   SB-A1
 61          BA    .117
 62          IN      15
 63          PB   3.175
 64          PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 65          PC    .087    .099    .118    .141    .220    .385    .819    .903    .928    .949
 66          PC    .961    .971    .982    .991   1.000
 67          LG     .35     .25     4.2     .43       3
 68          UC    .483    .441
 69          UA       0       3       5       8      12      20      43      75      90      96
 70          UA     100

 71          KK    R-A1
 72          RS       2    FLOW      -1
 73          RC     .04     .03     .04    2800   .0064
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 74          RX      0     25     50     80    120    150    175    200
 75          RY    102    101    100    100    100    100    101    102

 76          KK   SB-A2
 77          BA    .205
 78          LG     .35    .25    4.1    .44      5
 79          UC   1.125   .835
 80          UA      0      5     16     30     65     77     84     90     94     97
 81          UA    100

 82          KK    CPA2
 83          KM   AT INTERSECTION WITH PINNACLE PEAK RD
 84          HC      2

 85          KK    R-A2
 86          RS      3   FLOW     -1
 87          RC    .04    .03    .04   3600  .0072
 88          RX      0     25     50     80    120    150    175    200
 89          RY    102    101    100    100    100    100    101    102

 90          KK   SB-A3
 91          BA    .175
 92          LG     .35    .25    4.1    .44      2
 93          UC    .954   .820
 94          UA      0      3      5      8     12     20     43     75     90     96
 95          UA    100
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 96          KK    CPA3
 97          KM   AT INTERSECTION WITH UNNAMED RD
 98          HC      2

 99          KK    R-A3
100          RS      2   FLOW     -1
101          RC    .04    .03    .04   2800  .0064
102          RX      0     25     50     80    120    150    175    200
103          RY    102    101    100    100    100    100    101    102

104          KK   SB-A4
105          BA    .145
106          LG     .35    .25    3.9    .38      2
107          UC    .742   .480
108          UA      0      3      5      8     12     20     43     75     90     96
109          UA    100

110          KK    CPA4
111          KM   AT INTERSECTION WITH UNNAMED RD
112          HC      2

113          KK    R-A4
114          RS      3   FLOW     -1
115          RC    .04    .03    .04   3800  .0058
116          RX      0     25     50     80    120    150    175    200
117          RY    102    101    100    100    100    100    101    102

118          KK   SB-A5
119          BA    .088
```

```
120          LG     .35     .25     3.9     .37       2
121          UC   1.008   1.289
122          UA       0       3       5       8      12      20      43      75      90      96
123          UA     100

124          KK    CPA5
125          KM   AT INTERSECTION WITH BEARDSLEY RD
126          HC       2

127          KK   SB-A6
128          BA    .086
129          LG     .35     .25     3.9     .37       2
130          UC    .546    .562
131          UA       0       3       5       8      12      20      43      75      90      96
132          UA     100

133          KK    R-A6
134          RS       1    FLOW      -1
135          RC     .04     .03     .04    2600   .0058
136          RX       0      25      50      80     120     150     175     200
137          RY     102     101     100     100     100     100     101     102
1                                          HEC-1 INPUT                                          PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


138          KK   SB-A7
139          BA    .083
140          LG     .35     .25     3.5     .29       2
141          UC    .688    .679
142          UA       0       3       5       8      12      20      43      75      90      96
143          UA     100

144          KK    CPA7
145          KM   BEARDSLEY RD. AT ABOUT 97TH AVE ALIGNMENT
146          HC       3

147          KK   SB-B1
148          BA    .087
149          LG     .35     .25     3.8     .29    1.00
150          UC    .254    .225
151          UA       0       3       5       8      12      20      43      75      90      96
152          UA     100

153          KK    R-B1
154          RS       1    FLOW      -1
155          RC     .03     .02     .03    2640   .0102
156          RX       0      10      20      30      40      50      60      70
157          RY     102     101     100     100     100     100     101     102

158          KK   SB-B2
159          KM   SUB-BASIN B2
160          BA    .160
161          LG     .35     .25     3.8     .29       3
162          UC    .317    .296
163          UA       0       3       5       8      12      20      43      75      90      96
164          UA     100

165          KK    CPB2
166          HC       2
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167          KK    R-B2
168          RS       1    FLOW      -1
169          RC     .03     .02     .03    1760   .0250
170          RX       0      10      20      30      40      50      60      70
171          RY     102     101     100     100     100     100     101     102

172          KK   SB-B3
173          BA    .119
174          LG     .35     .25     3.9     .38      10
175          UC   1.096    .934
176          UA       0       3       5       8      12      20      43      75      90      96
177          UA     100

178          KK    CPB3
179          KM   AT INTERSECTION OF 93RD AVE & PINNACLE PEAK RD
180          HC       2
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


181          KK    R-B3
182          RS       3    FLOW      -1
183          RC     .03     .02     .03    5280   .0066
184          RX       0      25      50      80     120     150     175     200
185          RY     102     101     100     100     100     100     101     102

186          KK   SB-B4
187          BA     .32
188          LG     .35     .25     3.9     .38       2
189          UC   1.375   1.009
190          UA       0       3       5       8      12      20      43      75      90      96
191          UA     100

192          KK    CPB4
193          KM   AT DEER VALLEY RD
194          HC       2

195          KK    D-B4
196          KM   DIVERT 50% EAST TO 91ST AVENUE
197          DT     DB4
198          DI       1      10     100    1000   10000
199          DQ      .5       5      50     500    5000

200          KK    R-B4
201          KM   ROUTE REMAINING FLOW THRU SUB-B7
202          RS       2    FLOW      -1
203          RC     .04     .03     .04    5280   .0059
204          RX       0      25      50      80     120     150     175     200
205          RY     102     101     100     100     100     100     101     102

206          KK   SB-B5
207          BA    .114
208          LG     .35     .25     4.1     .46       2
209          UC   1.008   1.045
210          UA       0       3       5       8      12      20      43      75      90      96
211          UA     100

212          KK    R-B5
```

```
 213        RS      1    FLOW     -1
 214        RC    .04     .03     .04    2640   .0064
 215        RX      0      25      50      80     120     150     175     200
 216        RY    102     101     100     100     100     100     101     102

 217        KK   SB-B6
 218        BA   0.156
 219        LG    .35     .25     3.9     .40       2
 220        UC   .692    .407
 221        UA      0       3       5       8      12      20      43      75      90      96
 222        UA    100
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 223        KK    CPB6
 224        KM   AT INTERSECTION WITH DEER VALLEY RD
 225        HC      2

 226        KK    R-B6
 227        RS      2    FLOW     -1
 228        RC    .04     .03     .04    5250   .0059
 229        RX      0      25      50      80     120     150     175     200
 230        RY    102     101     100     100     100     100     101     102

 231        KK   SB-B7
 232        BA    .67
 233        LG    .35     .25     3.8     .35       2
 234        UC   .144    .695
 235        UA      0       3       5       8      12      20      43      75      90      96
 236        UA    100

 237        KK    CPB7
 238        KM   AT INLET TO WEST WESTBROOK VILLAGE WEST ALONG BEARDSLY RD
 239        HC      4

 240        KK   RWBW1
 241        KM   ROUTE THRU WEST WESTBROOK VILLAGE GOLF COURSES
 242        RS      3    FLOW     -1
 243        RC    .03     .02     .03    5280   .0050
 244        RX      0      30      60      90     190     300     330     360
 245        RY    104     103     101     100     100     101     103     104

 246        KK     WBW
 247        KM   TOTAL OF PARCELS 1 TO 27 IN WESTBROOK VILLAGE WEST(1983 PROJECT)
 248        KM   PLUS PARCELS 28 (GOLF COURSES) ABOUT 23% OF AREA
 249        BA   1.00
 250        LG    .35     .25     3.5     .28      30
 251        UC   1.00     .85
 252        UA      0       3       5       8      12      20      43      75      90      96
 253        UA    100

 254        KK    CWBW
 255        HC      2

 256        KK    RBWB
 257        KM    PER 1983 UDC REPORT AVAILABLE STORAGE IS 472 AC-FT IN GOLF COURSES
 258        KM    A MAXIMUM OF 350 AC-FT IS ASSUMED AS PER ERIE'S QUESTIMATE
 259        KM    PER MEETING ON MAY 9, 1994 25 CFS IS ASSUMED AS BLEED OFF THRU 2'DIA PIPE
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```
260        KM    CULVER CROSSING UNION HILLS ROAD AT ABOUT 93RD AVENUE ALIGNMENT
261        RS       1    STOR       0
262        SV       0      50     100     150     200     300     350     400     500
263        SE      26      27      28      29      30      32      34      36      38
264        SQ       0      25      25      25      25      25      25     300     400
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

265        KK   RRBOF
266        KM   ALONG UNIONB HILLS RD EASTWARD TOWARDS 93RD AVE
267        RS       1    FLOW      -1
268        RC     .03     .02     .03    2080   .0063
269        RX       0      20      40      60      80     100     120     140
270        RY     102     101     100     100     100     100     101     102

271        KK   SB-C1
272        BA    .100
273        KM   RAINFALL DEPTH OF 3.20 WAS SPACIALLY REDUCED TO FIND TC & R FOR THIS BASIN
274        KM   USED REDUCTION FACTOR OF 0.946
275        LG     .25     .25     4.1     .42       5
276        UC    .513    .406
277        UA       0       5      16      30      65      77      84      90      94      97
278        UA     100

279        KK    R-C1
280        KM   ROUTE A THRU 91ST AVE
281        RS       3    FLOW      -1
282        RC    0.03    0.02     .03    3280   .0091
283        RX       0       2      12      22      42      52      62      64
284        RY     102     100     100     100     100     100     100     102

285        KK   SB-C2
286        KM   SUB-BASIN C2
287        BA    .190
288        LG     .25     .25     3.5     .29      10
289        UC    .400    .238
290        UA       0       5      16      30      65      77      84      90      94      97
291        UA     100

292        KK    CPC2
293        KM   AT INTERSECTION OF 91ST AVE & PINNACLE PEAK RD
294        HC       2

295        KK    D-C2
296        KM   DIVERT 10% EASTWARD THRU PINNACLE PEAK
297        DT     DC2
298        DI       9      90     900    9000
299        DQ       3       9      90     900

300        KK    R-C2
301        KM   ROUTE C2 THRU 91ST AVE FROM WILLIAMS RD TO DEER VALLEY RD
302        RS       2    FLOW      -1
303        RC   0.025     .02    .025    2640   .0068
304        RX       0       2      12      22      42      52      62      64
305        RY     102     100     100     100     100     100     100     102

306        KK      C3
307        BA    0.04
```

```
308        LG    .25     .25     3.5     .29     20
309        UC   .338    .399
310        UA      0       5      16      30     65     77     84     90     96     97
311        UA    100
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

312        KK   CPC3
313        KM   AT INTERSECTION OF WILLIAMS RD CROSSING W/ 91ST AVE
314        HC      2

315        KK   R-C3
316        RS      2   FLOW     -1
317        RC   .025     .02    .025    2640   .0068
318        RX      0       2      12      22     42     52     62     64
319        RY    102     100     100     100    100    100    100    102

320        KK   SB-C4
321        KM   SUB-BASIN C4
322        BA   .070
323        LG    .15     .25     3.5     .29     15
324        UC   .492    .546
325        UA      0       5      16      30     65     77     84     90     94     97
326        UA    100

327        KK   CPC4A
328        KM   AT INTERSECTION OF 91ST AV & DEER VALLEY RD
329        HC      2

330        KK   D-C4
331        KM   DIVERT 80% EAST OF 91ST AVE
332        DT    DC4
333        DI      1      10     100    1000   10000
334        DQ     .8       8      80     800    8000

335        KK    DB4
336        DR    DB4

337        KK   CPC4
338        KM   91ST AVENUE AT DEER VALLEY ROAD
339        HC      2

340        KK   R-C4
341        KM   ROUTE C4 THRU 91ST AVE
342        RS      4   FLOW     -1
343        RC   .025    .02    .025    5280   .0061
344        RX      0       2      12      22     42     52     62     64
345        RY    102     100     100     100    100    100    100    102

346        KK   SB-C5
347        KM   SUB-BASIN C5
348        BA   .120
```

Project_____
Project No._____
Sheet No._____of_____
Calculated by_____Date_____

```
349          LG     .25     .25     3.5     .29      30
350          UC    .563    .654
351          UA       0       5      16      30      65      77      84      90      94      97
352          UA     100
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

353          KK    CPC5
354          KM   AT INTERSECTION OF 91ST AVE & BEARDSLEY RD
355          HC       2

356          KK    D-C5
357          KM   DIVERT 30% OF THE FLOWS EAST TO WEST BROOK VILLAGE EAST DETENTION
358          DT     DC5
359          DI       0      50     100     200     300     400
360          DQ       0      15      30      60      90     120

361          KK  WB-P8B
362          KM   WESTBROOK VILLAGE PARCELL B8
363          KM   THIS PARCEL DISCHARGES DIRECTLY INTO 91ST AVENUE
364          BA   .0085
365          LG     .25     .25     3.5     .28      30
366          UC     .17     .15
367          UA       0       5      16      30      65      77      84      90      94      96
368          UA     100

369          KK    CP5B
370          KM   91ST AVE, SOUTH OF BEARDSLEY ROAD
371          HC       2

372          KK    R-5B
373          KM    ROUTE FLOWS ON 91ST AVENUE, BEARDSLEY TO UNION HILLS
374          KM   ROUTE THRU 91ST AVE SOUTHWARD, X-SECTION GIVEN IN 1983 WB REPORT
375          RS       1    FLOW      -1
376          RC    0.02    .015     .02    2380   .0045
377          RX       0      12      22      40      80     121     131     143
378          RY     103     100     100     102     102     100     100     103

379          KK     WB9
380          KM   COMBINE PARCELS 8A,10B,7,6,5,G10,2B,3B
381          BA   .2814
382          LG     .25     .25     3.5     .28      45
383          UC    .290    .250
384          UA       0       5      16      30      65      77      84      90      94      96
385          UA     100

386          KK   R-R10
387          KM   ROUTE FLOWS THROUGH RESERVOIR 10, WESTBROOK VILLAGE EAST
388          KM   THE RESERVOIR BLEEDS INTO 91ST AVENUE,
389          RS       1    STOR      -1       0
390          SV       0     .35    2.28     6.4   12.82    24.0
391          SE    27.5    28.5    29.5    30.5    31.5    32.5
392          SQ       0       2      12      19      22    44.0

393          KK    91ST
394          KM    91ST AVENUE AT INTERSECTION WITH UNION HILL DR
```

```
 395          HC      2
1                                    HEC-1 INPUT                                                    PAGE 10

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 396          KK   SB-D1
 397          BA    .13
 398          LG    .35     .25     4.3     .46      2
 399          UC   .346    .232
 400          UA      0       5      16      30      65      77      84      90      94      96
 401          UA    100

 402          KK   R-D1
 403          RS      2    FLOW      -1
 404          RC    .03     .02     .03    2640   .0223
 405          RX      0      20      40      60      80     100     120     140
 406          RY    103     102     101     100     100     101     102     103

 407          KK   SB-D2
 408          BA   .073
 409          LG    .35     .25     4.3     .46      2
 410          UC   .692    .874
 411          UA      0       5      16      30      65      77      84      90      94      97
 412          UA    100

 413          KK   CPD2
 414          KM   AT INTERSECTION OF CALLEY LEJOS & 89TH AVE
 415          HC      2

 416          KK   DVD2
 417          KM   DIVERT MAX. OF 137 CFS AS PER AM. ENGINEERING CO. REPORT DEC. 1993
 418          DT    DD2
 419          DI      0      50     100     137     200     400
 420          DQ      0      50     100     137     137     137

 421          KK   R-D2
 422          RS      2    FLOW      -1
 423          RC    .04     .03     .04    2640   .0109
 424          RX      0       5      10      20      40      50      55      60
 425          RY    102     101     100     100     100     100     101     102

 426          KK   SB-D3
 427          BA   .114
 428          LG    .35     .25     3.5     .29      10
 429          UC   .571    .393
 430          UA      0       5      16      30      65      77      84      90      94      97
 431          UA    100

 432          KK   CPD3
 433          KM   AT INTERSECTION OF PINNACLE PEAK RD & 87TH AVE
 434          HC      2

 435          KK   R-D3
 436          RS      2    FLOW      -1
 437          RC    .03     .02     .03    2640   .0076
 438          RX      0       5      10      20      40      50      55      60
 439          RY    102     101     100     100     100     100     101     102
1                                    HEC-1 INPUT                                                    PAGE 11
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 440          KK   SB-D4
 441          BA    .12
 442          LG    .35     .25     3.5     .29      15
 443          UC   .583    .391
 444          UA      0       5      18      30      65      77      84      90      94      97
 445          UA    100

 446          KK    CPD4
 447          KM   AT INTERSECTION OF WILLIAMS RD & 87TH AVE
 448          HC      2

 449          KK    R-D4
 450          RS      1    FLOW      -1
 451          RC    .03     .02     .03    1400    .001
 452          RX      0       5      10      20      40      50      55      60
 453          RY    103     102     101     100     100     101     102     103

 454          KK   SB-D5
 455          BA   .188
 456          LG    .35     .15     8.5     .06      15
 457          UC    .50     .40
 458          UA      0       3       5       8      12      20      43      75      90      96
 459          UA    100

 460          KK    CPD5
 461          KM   AT INTERSECTION OF DEER VALLEY RD & 87TH AVE
 462          HC      2

 463          KK    R-D5
 464          RS      2    FLOW      -1
 465          RC    .03     .02     .03    2640   .0048
 466          RX      0      25      50      80     120     150     175     200
 467          RY    102     101     100     100     100     100     101     102

 468          KK   SB-D6
 469          BA   .145
 470          LG    .35     .15     9.4     .02       2
 471          UC   .500    .400
 472          UA      0       3       5       8      12      20      43      75      90      96
 473          UA    100

 474          KK    CPD6
 475          KM   AT NR INTERSECTION OF 89TH RD & UNNAMED RD
 476          HC      2

 477          KK    R-D6
 478          KM   ROUTE WESTWARD TO D12
 479          RS      1    FLOW      -1
 480          RC    .03     .02     .03    2640   .0045
 481          RX      0      25      50      80     120     150     175     200
 482          RY    102     101     100     100     100     100     101     102
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 483          KK   SB-D7
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484          KM   SUB-BASIN D7
485          BA    .150
486          LG     .25     .25     4.1     .42       5
487          UC    .296    .227
488          UA       0       3       5       8      12      20      43      75      90      96
489          UA     100

490          KK    R-D7
491          KM   ROUTE THRU 89TH AVE
492          RS       3    FLOW      -1
493          RC     .03     .02     .03    2640   .0083
494          RX       0       3       6      16      26      37      47      50
495          RY     103     100     100     100     100     100     100     103

496          KK  SB-D93
497          BA     .15
498          LG     .25     .25    3.50    0.29    15.0
499          UC   0.379   0.260
500          UA       0       5      16      30      65      77      84      90      94      97
501          UA     100

502          KK    CPD9
503          HC       2

504          KK    D93E
505          KM   DIVERT 30% EASTWARD ALONG PINNACLE PEAK TO D10
506          DT    D93E
507          DI       0     100    1000
508          DQ       0      30     300

509          KK    RD93
510          RS       1    FLOW      -1
511          RC     .03     .02     .03    2640   .0083
512          RX       0       3       6      16      26      37      47      50
513          RY     103     100     100     100     100     100     100     103

514          KK     DC2
515          KM   RETRIEVE DIVERTED 10%
516          DR     DC2

517          KK   SB-D9
518          KM   SUB-BASIN D9
519          BA    .310
520          LG     .25     .25     3.5     .29      15
521          UC    .546    .426
522          UA       0       5      16      30      65      77      84      90      94      97
523          UA     100
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

524          KK   RD93E
525          DR    D93E

526          KK  SB-D10
527          KM   SUB-BASIN D-10
528          BA    .080
529          LG     .15     .25     3.5     .25      15
530          UC    .433    .474
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```
531          UA       0       5      16      30      65      77      84      90      94      97
532          UA     100

533          KK   CPD10
534          KM   AT INTERSECTION OF 89TH AVE AND WILLIAMS RD
535          KM   SERIOUS FLOODING HAVE BEEN OBSERVED AT THIS POINT
536          HC       5

537          KK   R-D10
538          KM   ROUTE THRU 89TH AVE TO DEER VALLEY RD
539          RS       2    FLOW      -1
540          RC    .025     .02    .025    2640   .0061
541          RX       0       3       6      16      27      37      47      50
542          RY     103     100     100     100     100     100     100     103

543          KK  SB-D11
544          KM   SUB-BASIN D11
545          BA    .080
546          LG     .15     .25     3.5     .25      15
547          UC    .467    .451
548          UA       0       5      16      30      65      77      84      90      94      97
549          UA     100

550          KK   CPD11
551          KM   AT INTERSECTION OF DEER VALLEY RD & 89TH AVE
552          HC       2

553          KK     DC4
554          KM   RETRIEVE DIVERTED 80% FROM CP4A DEER VALLEY/91ST AVE INTERSECTION
555          DR     DC4

556          KK  CPD11A
557          KM   AT INTERSECTION OF DEER VALLEY RD & 89TH AVE COMBINED WITH EAST FLOW
558          HC       2

559          KK  SB-DV1
560          KM   SUB-BASIN DV1
561          BA    .013
562          LG     .10     .35     3.5     .25      55
563          UC     .19     .24
564          UA       0       5      16      30      65      77      84      90      94      97
565          UA     100
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


566          KK  SB-DC1
567          KM   SUB-BASIN DC1
568          BA   .0016
569          LG     .10     .35     3.5     .25       0
570          UC     .10     .19
571          UA       0       5      16      30      65      77      84      90      94      97
572          UA     100

573          KK   CPDV1
574          KM   AT 600' S. OF DEER VALLEY RD
575          HC       3

576          KK  SB-DV2
```

```
577          KM   SUB-BASIN DV2
578          BA    .035
579          LG     .10     .35     3.5     .25      45
580          UC     .20     .17
581          UA       0       5      16      30      65      77      84      90      94      97
582          UA     100

583          KK  SB-DC2
584          KM   SUB-BASIN DC2
585          BA   .0008
586          LG     .10     .35     3.5     .25       0
587          UC     .06     .09
588          UA       0       5      16      30      65      77      84      90      94      97
589          UA     100

590          KK   CPDV2
591          KM   AT 860' S. OF DEER VALLEY RD
592          HC       3

593          KK  SB-DV3
594          KM   SUB-BASIN DV3
595          BA    .015
596          LG     .10     .35     3.5     .25      55
597          UC     .27     .37
598          UA       0       5      16      30      65      77      84      90      94      97
599          UA     100

600          KK  SB-DC3
601          KM   SUB-BASIN DC3
602          BA   .0009
603          LG     .10     .35     3.5     .25      55
604          UC     .09     .14
605          UA       0       5      16      30      65      77      84      90      94      97
606          UA     100

607          KK   CPDV3
608          KM   AT 1160' S. OF DEER VALLEY RD
609          HC       3
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


610          KK  SB-DV4
611          KM   SUB-BASIN DV4
612          BA    .011
613          LG     .10     .35     3.5     .25      55
614          UC     .21     .25
615          UA       0       5      16      30      65      77      84      90      94      97
616          UA     100

617          KK  SB-DC4
618          KM   SUB-BASIN DC4
619          BA   .0008
620          LG     .10     .35     3.5     .25       0
621          UC     .09     .13
622          UA       0       5      16      30      65      77      84      90      94      97
623          UA     100

624          KK   CPDV4
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```
625          KM   AT 1420' S. OF DEER VALLEY RD
626          HC       3

627          KK  SB-DV5
628          KM   SUB-BASIN DV5
629          BA    .024
630          LG     .10     .35     3.5     .25      55
631          UC     .25     .23
632          UA       0       5      16      30      65      77      84      90      94      97
633          UA     100

634          KK  SB-DC5
635          KM   SUB-BASIN DC5
636          BA    .001
637          LG     .10     .35     3.5     .25       0
638          UC     .14     .19
639          UA       0       5      16      30      65      77      84      90      94      97
640          UA     100

641          KK   CPDV5
642          KM   AT 1660' S. OF DEER VALLEY RD
643          HC       3

644          KK  SB-DV6
645          KM   SUB-BASIN DV6
646          BA    .006
647          LG     .10     .35     3.5     .25      55
648          UC     .19     .32
649          UA       0       5      16      30      65      77      84      90      94      97
650          UA     100

651          KK  SB-DC6
652          KM   SUB-BASIN DC6
653          BA   .0012
654          LG     .10     .35     3.5     .25       0
655          UC     .16     .23
656          UA       0       5      16      30      65      77      84      90      94      97
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

657          UA     100

658          KK   CPDV6
659          KM   AT 1960' S. OF DEER VALLEY RD
660          HC       3

661          KK  SB-DV7
662          KM   SUB-BASIN DV7
663          BA    .018
664          LG     .10     .35     3.5     .25      55
665          UC     .21     .25
666          UA       0       5      16      30      65      77      84      90      94      97
667          UA     100

668          KK  SB-DV8
669          KM   SUB-BASIN DV8
670          BA    .016
671          LG     .10     .35     3.5     .25      55
672          UC     .19     .18
```

```
673          UA      0      5     16     30     65     77     84     90     94     97
674          UA    100

675          KK  SB-DV9
676          KM   SUB-BASIN DV9
677          BA    .021
678          LG     .10    .35    3.5    .25      0
679          UC     .10    .04
680          UA      0      5     16     30     65     77     84     90     94     97
681          UA    100

682          KK   CPDV9
683          KM   AT DEER VALLEY SOUTH DETENTION BASIN
684          HC       4

685          KK   R-DV9
686          KM   ROUTE FLOWS THROUGH RESERVOIR IN DEER VILLAGE
687          RS       1   STOR     -1      0
688          SV       0    2.6    8.2   15.7   19.9   24.4   29.3
689          SE    59.0   60.0   61.0   62.0   62.5   63.0   63.5
690          SQ       0    .01    .02    .03    .04 1273.0 3600.0

691          KK   R-D11
692          KM   ROUTE THRU POORLY DEFINED NATURAL DEPRESSIONS?
693          RS       1   FLOW     -1
694          RC     .04    .03    .04   5600  .0054
695          RX       0     20     50     80    120    150    180    200
696          RY     102    101    100    100    100    100    101    102

697          KK  SB-D12
698          KM   SUB-BASIN D12
699          BA    .100
700          LG     .20    .25    3.5    .30      2
701          UC    .917  1.033
702          UA       0      3      5      8     12     20     43     75     90     96
703          UA     100
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

704          KK     DC5
705          DR     DC5

706          KK    WBE1
707          KM   COMBINE FLOWS FROM SUB-B 9,10,11,12 AND ROUTED FLOWS
708          KM   ABOUT 1280 FT ALONG BEARDSLEY RD EAST OF 91ST AVENUE
709          KM   NOTE***AS PER WESTBROOK DRAINAGE MASTER PLAN CAHNNEL CAPACITY = 500CFS
710          HC       4
711          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

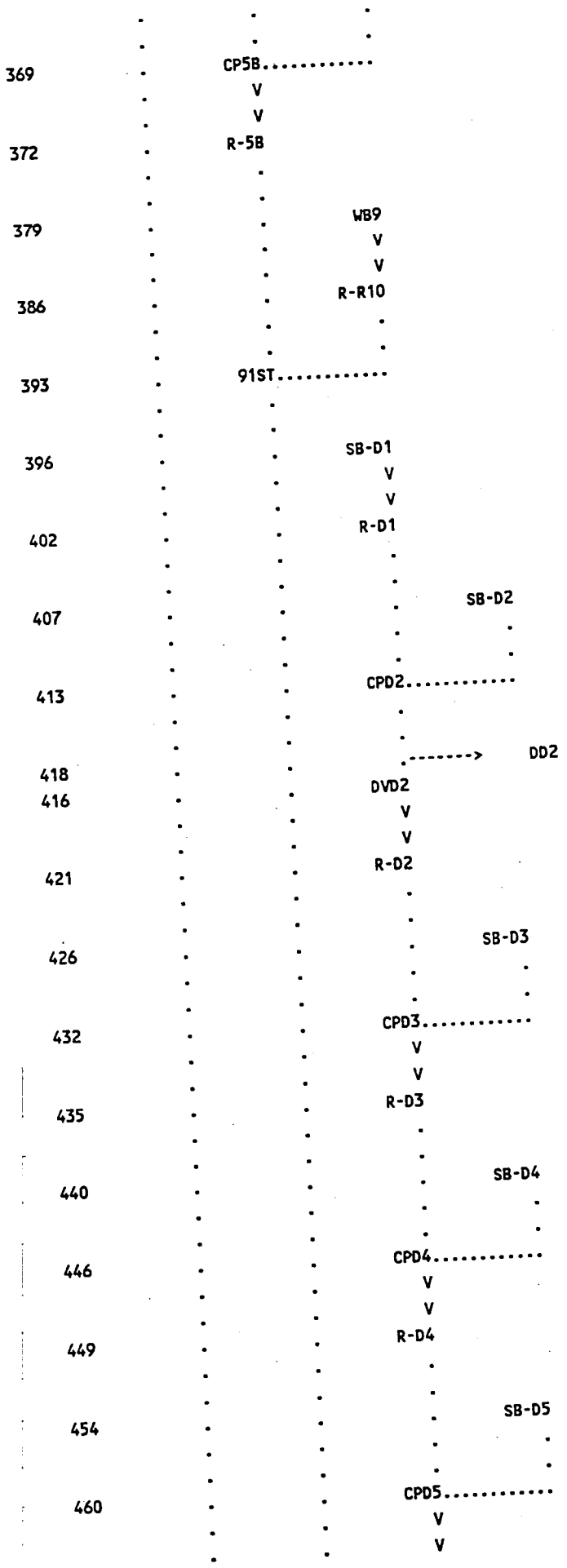
  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   60      SB-A1
               V
               V
```

```
71      R-A1
           .
           .
76         .       SB-A2
           .          .
           .          .
82      CPA2............
           V
           V
85      R-A2
           .
           .
90         .       SB-A3
           .          .
           .          .
96      CPA3............
           V
           V
99      R-A3
           .
           .
104        .       SB-A4
           .          .
           .          .
110     CPA4............
           V
           V
113     R-A4
           .
           .
118        .       SB-A5
           .          .
           .          .
124     CPA5............
           .
           .
127        .       SB-A6
           .          V
           .          V
133        .        R-A6
           .          .
           .          .
138        .          .       SB-A7
           .          .          .
           .          .          .
144     CPA7........................
           .
           .
147        .       SB-B1
           .          V
           .          V
153        .        R-B1
           .          .
           .          .
158        .          .       SB-B2
           .          .          .
           .          .          .
165        .       CPB2............
           .          V
           .          V
```

```
167          .        R-B2
             .           .
             .           .
172          .           .       SB-B3
             .           .           .
             .           .           .
178          .        CPB3............
             .           V
             .           V
181          .        R-B3
             .           .
             .           .
186          .           .       SB-B4
             .           .           .
             .           .           .
192          .        CPB4............
             .           .
             .           .
197          .           .-------->     DB4
195          .        D-B4
             .           V
             .           V
200          .        R-B4
             .           .
             .           .
206          .           .       SB-B5
             .           .           V
             .           .           V
212          .           .        R-B5
             .           .           .
             .           .           .
217          .           .           .       SB-B6
             .           .           .           .
             .           .           .           .
223          .           .        CPB6............
             .           .           V
             .           .           V
226          .           .        R-B6
             .           .           .
             .           .           .
231          .           .           .       SB-B7
             .           .           .           .
             .           .           .           .
237       CPB7.................................
             V
             V
240       RWBW1
             .
             .
246          .         WBW
             .           .
             .           .
254       CWBW............
             V
             V
256       RBWB
             V
             V
265       RRBOF
             .
```

```
          .
271       .      SB-C1
          .         V
          .         V
279       .      R-C1
          .         .
          .         .
285       .         .      SB-C2
          .         .          .
          .         .          .
292       .      CPC2............
          .         .
          .         .
297       .         .------->     DC2
295       .      D-C2
          .         V
          .         V
300       .      R-C2
          .         .
          .         .
306       .         .         C3
          .         .          .
          .         .          .
312       .      CPC3............
          .         V
          .         V
315       .      R-C3
          .         .
          .         .
320       .         .      SB-C4
          .         .          .
          .         .          .
327       .     CPC4A............
          .         .
          .         .
332       .         .------->     DC4
330       .      D-C4
          .         .
          .         .
336       .         .          .<-------     DB4
335       .         .        DB4
          .         .          .
          .         .          .
337       .      CPC4............
          .         V
          .         V
340       .      R-C4
          .         .
          .         .
346       .         .      SB-C5
          .         .          .
          .         .          .
353       .      CPC5............
          .         .
          .         .
358       .         .------->     DC5
356       .      D-C5
          .         .
          .         .
361       .         .     WB-P8B
```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413
CPD2
418
DD2
416
DVD2
421
R-D2
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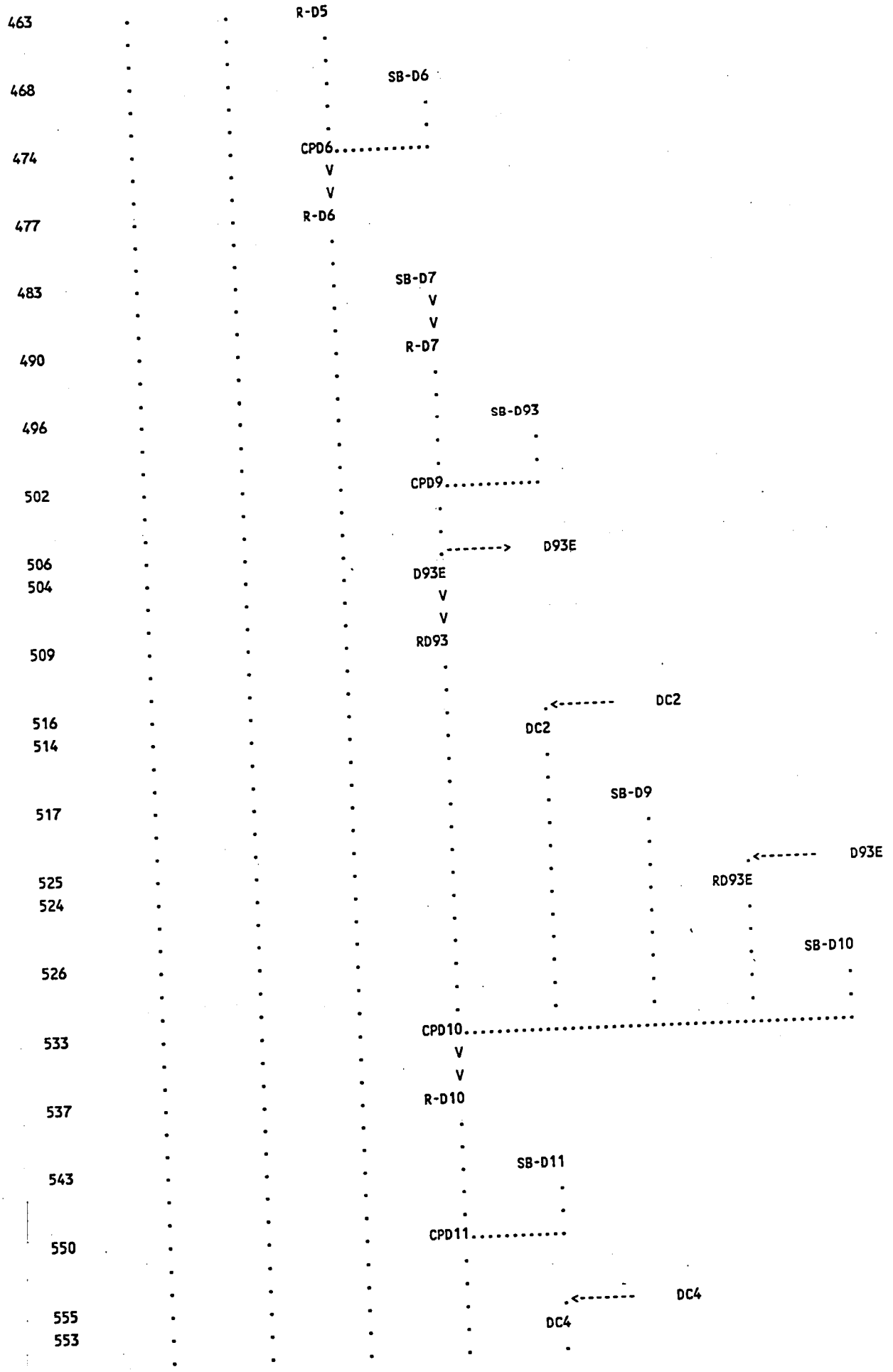
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555
553
R-D5
SB-D6
CPD6
V
V
R-D6
SB-D7
V
V
R-D7
SB-D93
CPD9
D93E
D93E
V
V
RD93
DC2
DC2
SB-D9
D93E
RD93E
SB-D10
CPD10
V
V
R-D10
SB-D11
CPD11
DC4
DC4

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556          CPD11A.............
559                  SB-DV1
566                            SB-DC1
573          CPDV1.........................
576                  SB-DV2
583                            SB-DC2
590          CPDV2.........................
593                  SB-DV3
600                            SB-DC3
607          CPDV3.........................
610                  SB-DV4
617                            SB-DC4
624          CPDV4.........................
627                  SB-DV5
634                            SB-DC5
641          CPDV5.........................
644                  SB-DV6
651                            SB-DC6
658          CPDV6.........................
661                  SB-DV7
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                .         .         .         .         .
668             .         .         .         .         .     SB-DV8
                .         .         .         .         .         .
                .         .         .         .         .         .
675             .         .         .         .         .         .     SB-DV9
                .         .         .         .         .         .         .
                .         .         .         .         .         .         .
682             .         .         .      CPDV9.....................................
                .         .         .         V
                .         .         .         V
685             .         .         .      R-DV9
                .         .         .         V
                .         .         .         V
691             .         .         .      R-D11
                .         .         .         .
                .         .         .         .
697             .         .         .         .     SB-D12
                .         .         .         .         .
                .         .         .         .         .
705             .         .         .         .         .         .<-------     DC5
704             .         .         .         .         .       DC5
                .         .         .         .         .         .
                .         .         .         .         .         .
706             .         .       WBE1.....................................
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  11/13/1996  TIME  09:51:40 *
*                                       *
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*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
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91ST AVENUE HYDROLOGY NORTH OF GREENWAY ROAD

DATAFILE: N:\950101\HYDRO\HEC1\91STMP6.DAT

CVL MODIFICATION 3 DATE: NOVEMBER 6, 1996
MODIFICATION DESCRIPTION: RAINFALL ON PB CARD CHANGED FROM 3.027 INCHES TO 3.175 INCHES AND DISTRIBUTION CHANGED ON THE PC CARD AS SHOWN BELOW.

TO OBTAIN DESIGN DISCHARGES FOR CHANNELS ALONG DEER VALLEY, 87TH AND 91ST AVE, WATERSHED AREA TAKEN AS 0.6 SQ. MI. TO DERIVE RAINFALL DISTRIBUTION THRU FCDMC PROGRAM MCUHP1

SUBAREAS D6 AND D12 SUBDIVIDED TO ACCOUNT FOR DEVELOPMENT WITHIN DEER VILLAGE

FCD-WSMB HEC-1 MODEL DEVELOPMENT FOR EXISTING CONDITIONS
REVISION DATE: JUNE 20, 1994. AA AND FT COMMENTS HAVE BEEN INCORPORATED.

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                    *** THIS EXCLUDED A SUBDIVISION AREA THRU COUNTRY CLUB ROAD AND INCLUDED
                        POSSIBLE BLEED OFF THRU WBV WEST AS PER MEETING MAY 9, 1994
                        WITH DEVELOPMENT SERVICES DIVISION, CITY OF PEORIA
                  RUN WITH 350 AC-FT RETENTION IN WEST WESTBROOK VILLAGE AND ERIE'S DATA
                  BASIC ASSUMPTIONS AS PER MEETINGS WITH THE CITY OF PERORIA
                         :MAX. OF 137 CFS EASTWARD DIVERSION ALONG CALLE LEJOS AT CP-D2 TO 83RD
                         :DATA FROM PRELIM. DRAINAGE REPORT OF AM. ENGG. CO, DATED 12/1993
                         :AT 83RD & BEARDSLEY INTERSECTION, 30% GOES WEST AND 70% GO SOUTH
                         :AT INLET TO WEST WB NO EASTWARD DIVERSION OF 30% ALONG BEARDSLEY RD
                         :MAX. OF 100 CFS EASTWARD DIVESION ALONG UNION HILLS TO N.R.
                         :MAX. OF 150 CFS EASTWARD DIVERSION ALONG BELL RD TO N.R.
                         :NO INFLOW FROM SUN CITY AT EITHER BELL RD OR UNION HILLS RD
                         :SPILL THRU 91ST AVE SOUTH OF GREENWAY RO
                  MODELED AREA : CATCHMENT AREA NORTH OF GREENWAY RD = 9.80 SQ.MILES
                  RAINFALL     : 100YR-6HR = 3.20 INCHES
                  LOSS RATES   : GREEN AND AMPT BASED ON 5 DOMINANT SOIL MAPPING UNITS
                               : LS RECORDS IN EAST WESTBROOK VILLAGE CONVERTED TO LG
                               : AMC AT NORMAL CONDITION  W/ DTHETA= 0.10 TO .30
                               : XKSAT CORRECTED FOR VEGETATION COVER
                  HYDROGRAPH   : CLARK UNIT HYDROGRAPH (MCUHP1)
                  ROUTING METH : NORMAL DEPTH ROUTING PROCEDURE USING HYPOTHE. CHANNEL 700'
                                 WIDE WITH DEPTH UP TO 2 FT, S.S. 1:1, BOTTOM N=0.04
                  RETENTION    : MAXIMUM STORAGE OF 350 AC-FT IN WESTBROOK VILLAGE WEST
                                 AS ESTIMATED BY ERIE & ASSOC WAS USED INSTEAD OF 472 AC-FT
                                 AS REPORTED BY CONSULTANT IN UDC REPORT DATED 1983
                                 ALL RETENTION BASINS IN WESTBROOK VILLAGE EAST ARE USED
                                 AS PER DRAINAGE MASTER PLAN REVISED APRIL 1993 BY IMC
                                 CONSULTANTS LTD
                  SPLIT FLOWS  : RATING TABLES DEVELOPED BY ERIE & ASSOCIATES, INC. FOR
                               : SOME STREET CROSSINGS WERE INCORPORATED INTO THE MODEL
                               : ASSUMES INFLOW AT DIVERSION AS SUM OF TWO FLOWS PER RATING
                        DIVERSION AT WESTBROOK VILLAGE EAST SOUTH OUTLET INTERSECTION WITH
                        UNION HILLS ROAD SPLITS TO NEW RIVER, COUNTRY CLUB RD AND 91ST AVE
                        WEIR FLOW EXISTS OVER UNION HILLS CROWN SOUTH OF WESTBROOK VILLAGE EAST
                        SOUTHWARD OVERFLOW PRORATED AS PER CREST LENGTH WITH Q=CLH**1.5
                        WHERE C=2.6, L = CREST LENGTH, H = HEAD OVER ROAD CROWN
                        91ST FLOW SPLITS AT 87TH AVE AND 89TH AVE AND REMAINING FLOW TO 91ST AV

59 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT        HYDROGRAPH TIME DATA
                    NMIN          5  MINUTES IN COMPUTATION INTERVAL
                   IDATE     20JUN94  STARTING DATE
                   ITIME        1200  STARTING TIME
                      NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     21JUN94  ENDING DATE
                  NDTIME        1255  ENDING TIME
                   ICENT          19  CENTURY MARK

             COMPUTATION INTERVAL     .08 HOURS
                  TOTAL TIME BASE   24.92 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
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STORAGE VOLUME        ACRE-FEET
SURFACE AREA          ACRES
TEMPERATURE           DEGREES FAHRENHEIT

WARNING --- ROUTED OUTFLOW (    45.) IS GREATER THAN MAXIMUM OUTFLOW (    44.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (    48.) IS GREATER THAN MAXIMUM OUTFLOW (    44.) IN STORAGE-OUTFLOW TABLE

WARNING --- ROUTED OUTFLOW (    50.) IS GREATER THAN MAXIMUM OUTFLOW (    44.) IN STORAGE-OUTFLOW TABLE

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WARNING --- ROUTED OUTFLOW (    44.) IS GREATER THAN MAXIMUM OUTFLOW (    44.) IN STORAGE-OUTFLOW TABLE
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE

					6-HOUR	24-HOUR	72-HOUR			
+	HYDROGRAPH AT	SB-A1	140.	4.33	18.	4.	4.	.12		
+	ROUTED TO	R-A1	108.	4.58	18.	4.	4.	.12		
+									100.44	4.58
+	HYDROGRAPH AT	SB-A2	128.	4.50	32.	8.	8.	.20		
+	2 COMBINED AT	CPA2	236.	4.58	50.	12.	12.	.32		
+	ROUTED TO	R-A2	218.	4.83	49.	12.	12.	.32		
+									100.64	4.83
+	HYDROGRAPH AT	SB-A3	123.	4.67	26.	7.	6.	.17		
+	2 COMBINED AT	CPA3	333.	4.83	76.	19.	18.	.50		
+	ROUTED TO	R-A3	314.	5.00	75.	19.	18.	.50		
+									100.82	5.00
+	HYDROGRAPH AT	SB-A4	159.	4.50	23.	6.	6.	.14		
+	2 COMBINED AT	CPA4	388.	4.92	98.	25.	24.	.64		
+	ROUTED TO	R-A4	368.	5.17	97.	25.	24.	.64		
+									100.92	5.17
+	HYDROGRAPH AT	SB-A5	48.	4.75	14.	4.	3.	.09		
+	2 COMBINED AT	CPA5	407.	5.17	111.	28.	27.	.73		
+	HYDROGRAPH AT	SB-A6	90.	4.42	14.	3.	3.	.09		
+	ROUTED TO	R-A6	63.	4.67	14.	3.	3.	.09		
+									100.33	4.67
+	HYDROGRAPH AT	SB-A7	81.	4.50	15.	4.	4.	.08		
+	3 COMBINED AT	CPA7	485.	5.17	140.	36.	34.	.90		
+	HYDROGRAPH AT	SB-B1	170.	4.17	15.	4.	4.	.09		

	ROUTED TO								
+		R-B1	150.	4.25	15.	4.	4.	.09	
+								100.74	4.25
	HYDROGRAPH AT								
+		SB-B2	274.	4.17	28.	7.	7.	.16	
	2 COMBINED AT								
+		CPB2	417.	4.17	44.	11.	11.	.25	
	ROUTED TO								
+		R-B2	420.	4.25	44.	11.	11.	.25	
+								101.02	4.25
	HYDROGRAPH AT								
+		SB-B3	83.	4.83	21.	5.	5.	.12	
	2 COMBINED AT								
+		CPB3	438.	4.25	64.	16.	16.	.37	
	ROUTED TO								
+		R-B3	359.	4.50	64.	16.	16.	.37	
+								100.70	4.50
	HYDROGRAPH AT								
+		SB-B4	192.	5.00	51.	13.	12.	.32	
	2 COMBINED AT								
+		CPB4	433.	4.67	115.	29.	28.	.69	
	DIVERSION TO								
+		DB4	216.	4.67	58.	15.	14.	.69	
	HYDROGRAPH AT								
+		D-B4	216.	4.67	58.	14.	14.	.69	
	ROUTED TO								
+		R-B4	183.	5.25	57.	14.	14.	.69	
+								100.62	5.25
	HYDROGRAPH AT								
+		SB-B5	66.	4.75	17.	4.	4.	.11	
	ROUTED TO								
+		R-B5	52.	5.17	17.	4.	4.	.11	
+								100.28	5.17
	HYDROGRAPH AT								
+		SB-B6	186.	4.50	25.	6.	6.	.16	
	2 COMBINED AT								
+		CPB6	195.	4.50	41.	10.	10.	.27	
	ROUTED TO								
+		R-B6	135.	5.00	40.	10.	10.	.27	
+								100.52	5.00
	HYDROGRAPH AT								
+		SB-B7	661.	4.17	111.	28.	27.	.67	

4 COMBINED AT	CPB7	984.	5.08	345.	88.	85.	2.53		
ROUTED TO	RWBW1	967.	5.25	343.	88.	85.	2.53	101.14	5.25
HYDROGRAPH AT	WBW	894.	4.75	221.	56.	54.	1.00		
2 COMBINED AT	CWBW	1649.	5.00	558.	145.	139.	3.53		
ROUTED TO	RBWB	25.	4.67	25.	22.	21.	3.53	31.41	10.67

RO

TED TO										
		RRBOF	25.	6.92	25.	21.	20.	3.53		
+									100.20	7.00
	HYDROGRAPH AT									
+		SB-C1	122.	4.25	16.	4.	4.	.10		
	ROUTED TO									
		R-C1	115.	4.42	16.	4.	4.	.10		
+									100.49	4.42
	HYDROGRAPH AT									
+		SB-C2	353.	4.17	37.	9.	9.	.19		
	2 COMBINED AT									
.		CPC2	403.	4.17	53.	13.	13.	.29		
	DIVERSION TO									
.		DC2	40.	4.17	7.	2.	2.	.29		
	HYDROGRAPH AT									
.		D-C2	363.	4.17	47.	12.	11.	.29		
	ROUTED TO									
.		R-C2	354.	4.25	47.	12.	11.	.29		
.									101.02	4.25
	HYDROGRAPH AT									
.		C3	62.	4.17	8.	2.	2.	.04		
	2 COMBINED AT									
.		CPC3	410.	4.25	55.	14.	13.	.33		
	ROUTED TO									
.		R-C3	401.	4.33	55.	14.	13.	.33		
.									101.10	4.33
	HYDROGRAPH AT									
.		SB-C4	85.	4.25	14.	4.	4.	.07		
	2 COMBINED AT									
.		CPC4A	483.	4.33	69.	17.	17.	.40		
	DIVERSION TO									
.		DC4	386.	4.33	55.	14.	13.	.40		
	HYDROGRAPH AT									
+		D-C4	97.	4.33	14.	3.	3.	.40		
	HYDROGRAPH AT									
+		DB4	216.	4.67	58.	15.	14.	.00		
	2 COMBINED AT									
+		CPC4	292.	4.50	71.	18.	17.	.40		
	ROUTED TO									
+		R-C4	284.	4.75	71.	18.	17.	.40		
+									100.92	4.75
	HYDROGRAPH AT									

+		SB-C5	132.	4.25	27.	7.	7.	.12	
	2 COMBINED AT								
+		CPC5	368.	4.67	96.	25.	24.	.52	
	DIVERSION TO								
+		DC5	110.	4.67	29.	7.	7.	.52	
	HYDROGRAPH AT								
+		D-C5	257.	4.67	68.	17.	17.	.52	
	HYDROGRAPH AT								
+		WB-P8B	22.	4.00	2.	0.	0.	.01	
	2 COMBINED AT								
+		CP5B	259.	4.67	69.	18.	17.	.53	
	ROUTED TO								
+		R-5B	249.	4.83	69.	18.	17.	.53	
+									101.20 4.83
	HYDROGRAPH AT								
+		WB9	586.	4.08	71.	18.	17.	.28	
	ROUTED TO								
+		R-R10	52.	4.92	39.	18.	17.	.28	
+									32.88 4.92
	2 COMBINED AT								
+		91ST	301.	4.83	108.	36.	34.	.81	
	HYDROGRAPH AT								
+		SB-D1	212.	4.08	19.	5.	5.	.13	
	ROUTED TO								
+		R-D1	203.	4.17	19.	5.	5.	.13	
+									100.77 4.17
	HYDROGRAPH AT								
+		SB-D2	47.	4.33	11.	3.	3.	.07	
	2 COMBINED AT								
+		CPD2	244.	4.25	29.	7.	7.	.20	
	DIVERSION TO								
+		DD2	137.	4.25	24.	6.	6.	.20	
	HYDROGRAPH AT								
+		DVD2	107.	4.25	5.	1.	1.	.20	
	ROUTED TO								
+		R-D2	77.	4.42	5.	1.	1.	.20	
+									100.54 4.42
	HYDROGRAPH AT								
+		SB-D3	156.	4.25	22.	5.	5.	.11	
	2 COMBINED AT								
+		CPD3	221.	4.33	27.	7.	7.	.32	

	ROUTED TO								
+		R-D3	211.	4.42	27.	7.	7.	.32	
+									100.86 4.42
	HYDROGRAPH AT								
+		SB-D4	166.	4.25	24.	6.	6.	.12	
	2 COMBINED AT								
+		CPD4	353.	4.42	51.	13.	12.	.44	
	ROUTED TO								
+		R-D4	339.	4.50	51.	13.	12.	.44	
+									102.37 4.50
	HYDROGRAPH AT								
+		SB-D5	316.	4.33	46.	11.	11.	.19	
	2 COMBINED AT								
+		CPD5	634.	4.42	96.	24.	23.	.63	
	ROUTED TO								
+		R-D5	613.	4.50	96.	24.	23.	.63	
+									101.04 4.50
	HYDROGRAPH AT								
+		SB-D6	252.	4.33	37.	9.	9.	.14	
	2 COMBINED AT								
+		CPD6	823.	4.50	133.	33.	32.	.77	
	ROUTED TO								
+		R-D6	776.	4.58	133.	33.	32.	.77	
+									101.21 4.58
	HYDROGRAPH AT								
+		SB-D7	278.	4.17	25.	6.	6.	.15	
	ROUTED TO								
+		R-D7	269.	4.25	25.	6.	6.	.15	
+									101.00 4.25
	HYDROGRAPH AT								
+		SB-D93	274.	4.17	31.	8.	7.	.15	
	2 COMBINED AT								
+		CPD9	508.	4.25	55.	14.	13.	.30	
	DIVERSION TO								
+		D93E	152.	4.25	17.	4.	4.	.30	
	HYDROGRAPH AT								
+		D93E	355.	4.25	39.	10.	9.	.30	
	ROUTED TO								
+		RD93	334.	4.25	38.	10.	9.	.30	
+									101.14 4.25
	HYDROGRAPH AT								
+		DC2	40.	4.17	7.	2.	2.	.00	

+	HYDROGRAPH AT	SB-D9	422.	4.25	63.	16.	15.	.31	
+	HYDROGRAPH AT	RD93E	152.	4.25	17.	4.	4.	.00	
+	HYDROGRAPH AT	SB-D10	110.	4.17	17.	4.	4.	.08	
+	5 COMBINED AT	CPD10	1055.	4.25	142.	36.	34.	.69	
+	ROUTED TO	R-D10	1037.	4.33	142.	36.	34.	.69	102.40 4.33
+	HYDROGRAPH AT	SB-D11	111.	4.17	17.	4.	4.	.08	
+	2 COMBINED AT	CPD11	1140.	4.33	159.	40.	38.	.77	
+	HYDROGRAPH AT	DC4	386.	4.33	55.	14.	13.	.00	
+	2 COMBINED AT	CPD11A	1526.	4.33	214.	54.	52.	.77	
+	HYDROGRAPH AT	SB-DV1	29.	4.08	3.	1.	1.	.01	
+	HYDROGRAPH AT	SB-DC1	4.	4.00	0.	0.	0.	.00	
+	3 COMBINED AT	CPDV1	1543.	4.33	218.	55.	53.	.78	
+	HYDROGRAPH AT	SB-DV2	85.	4.00	9.	2.	2.	.04	
+	HYDROGRAPH AT	SB-DC2	2.	4.00	0.	0.	0.	.00	
+	3 COMBINED AT	CPDV2	1577.	4.33	226.	57.	55.	.82	
+	HYDROGRAPH AT	SB-DV3	27.	4.08	4.	1.	1.	.01	
+	HYDROGRAPH AT	SB-DC3	3.	4.00	0.	0.	0.	.00	
+	3 COMBINED AT	CPDV3	1597.	4.33	231.	58.	56.	.84	
+	HYDROGRAPH AT	SB-DV4	24.	4.08	3.	1.	1.	.01	
+	HYDROGRAPH AT	SB-DC4	2.	4.00	0.	0.	0.	.00	

	3 COMBINED AT								
+		CPDV4	1611.	4.33	234.	59.	57.	.85	
	HYDROGRAPH AT								
+		SB-DV5	54.	4.08	6.	2.	2.	.02	
	HYDROGRAPH AT								
+		SB-DC5	2.	4.00	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV5	1642.	4.33	240.	61.	58.	.87	
	HYDROGRAPH AT								
+		SB-DV6	12.	4.08	2.	0.	0.	.01	
	HYDROGRAPH AT								
+		SB-DC6	2.	4.08	0.	0.	0.	.00	
	3 COMBINED AT								
+		CPDV6	1650.	4.33	242.	61.	59.	.88	
	HYDROGRAPH AT								
+		SB-DV7	39.	4.08	5.	1.	1.	.02	
	HYDROGRAPH AT								
+		SB-DV8	39.	4.00	4.	1.	1.	.02	
	HYDROGRAPH AT								
+		SB-DV9	66.	4.00	4.	1.	1.	.02	
	4 COMBINED AT								
+		CPDV9	1701.	4.25	255.	64.	62.	.94	
	ROUTED TO								
+		R-DV9	1705.	4.33	217.	54.	52.	.94	
+									63.09 4.33
	ROUTED TO								
+		R-D11	1163.	4.58	215.	54.	52.	.94	
+									101.75 4.58
	HYDROGRAPH AT								
+		SB-D12	72.	4.67	18.	5.	4.	.10	
	HYDROGRAPH AT								
+		DC5	110.	4.67	29.	7.	7.	.00	
	4 COMBINED AT								
+		WBE1	2108.	4.58	395.	100.	96.	1.81	

*** NORMAL END OF HEC-1 ***

APPENDIX B

BACKUP HYDRAULIC ANALYSIS/DESIGN DOCUMENTATION FOR DRAINAGE FACILITIES CONVEYING OFFSITE FLOWS

MAIN DRAINAGE SYSTEM ALONG 89TH AVENUE ALIGNMENT

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

Project DEER VILLAGE

Project No. 950101

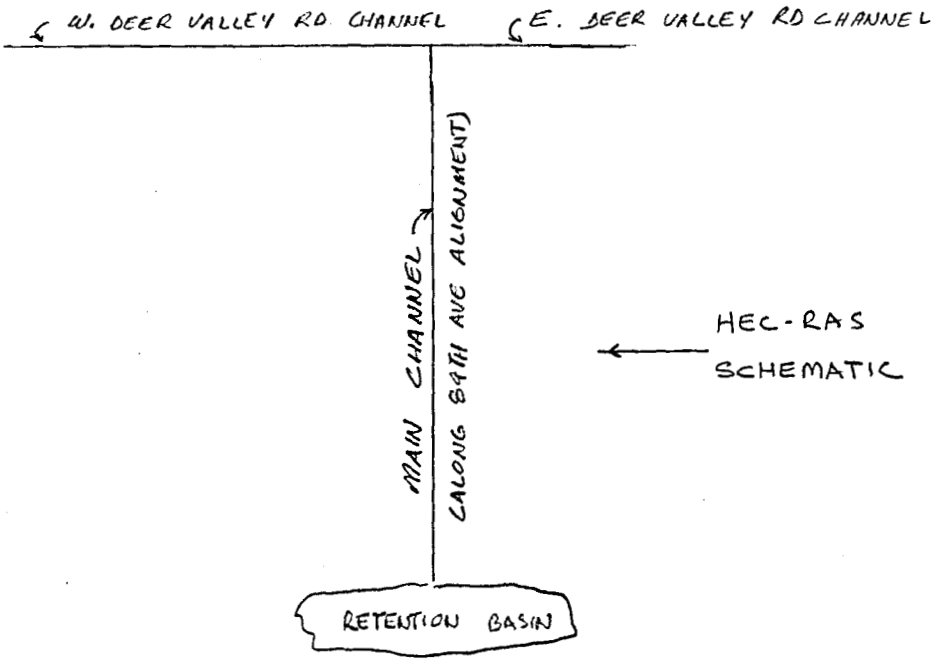
Sheet No. 1 of 1

Calculated by N. RAZA Date 12/9/96

Checked by _____ Date _____

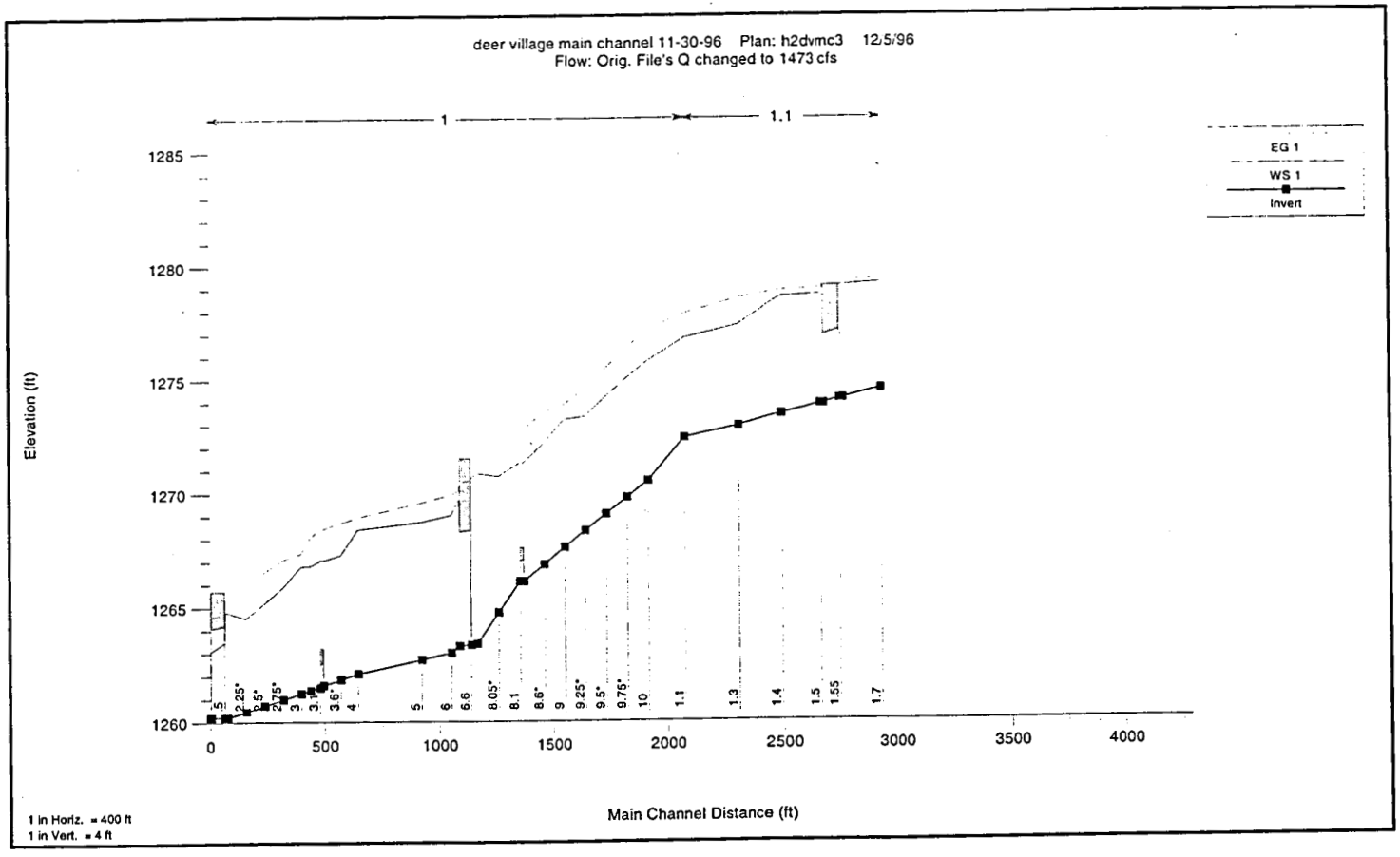
MAIN DRAINAGE SYSTEM
ALONG 89TH AVE ALIGNMENT

1. PROFILE & CROSS-SECTION PLOTS (HALF SCALE)
2. HEC-RAS OUTPUT TABLES FOR PROFILES, CULVERTS AND CROSS-SECTIONS
3. HEC-RAS INPUT DATA

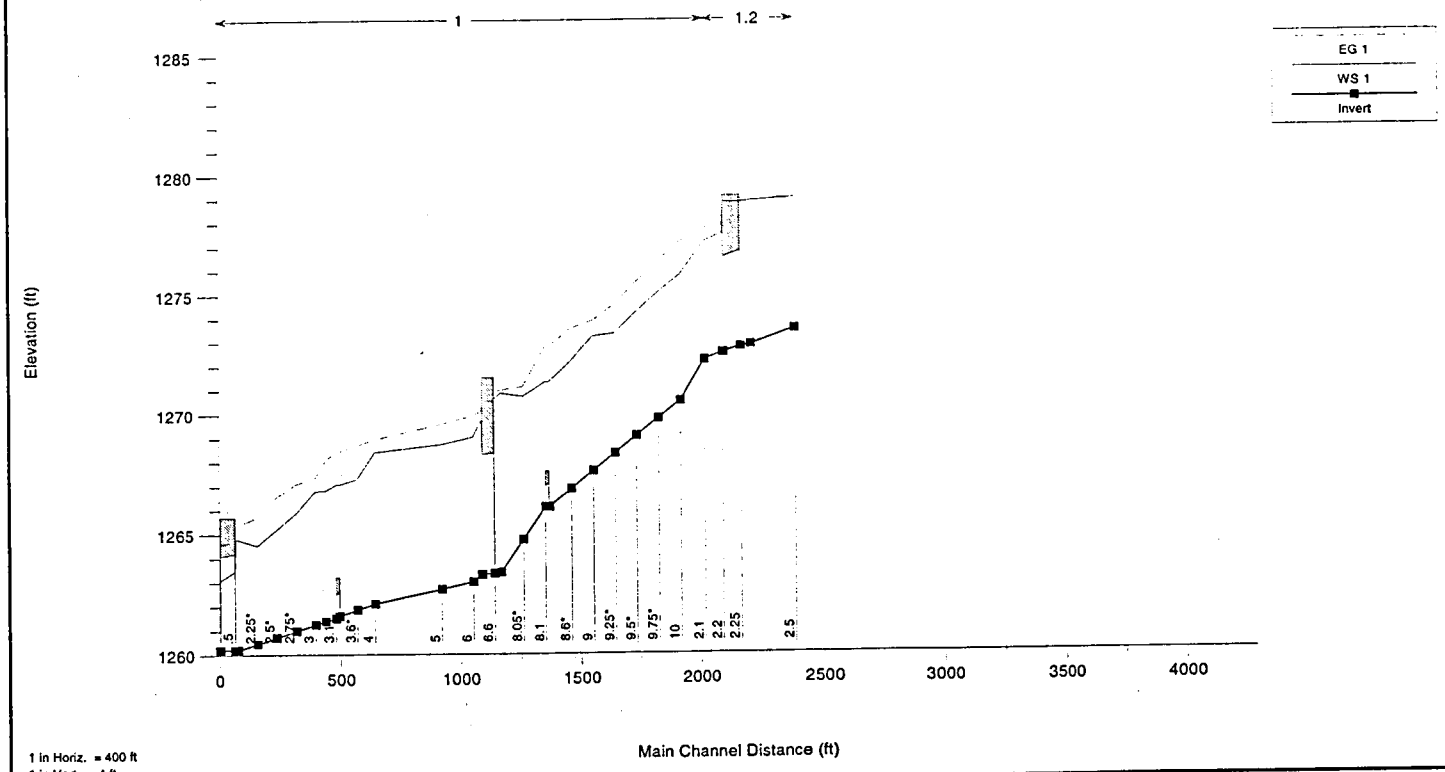


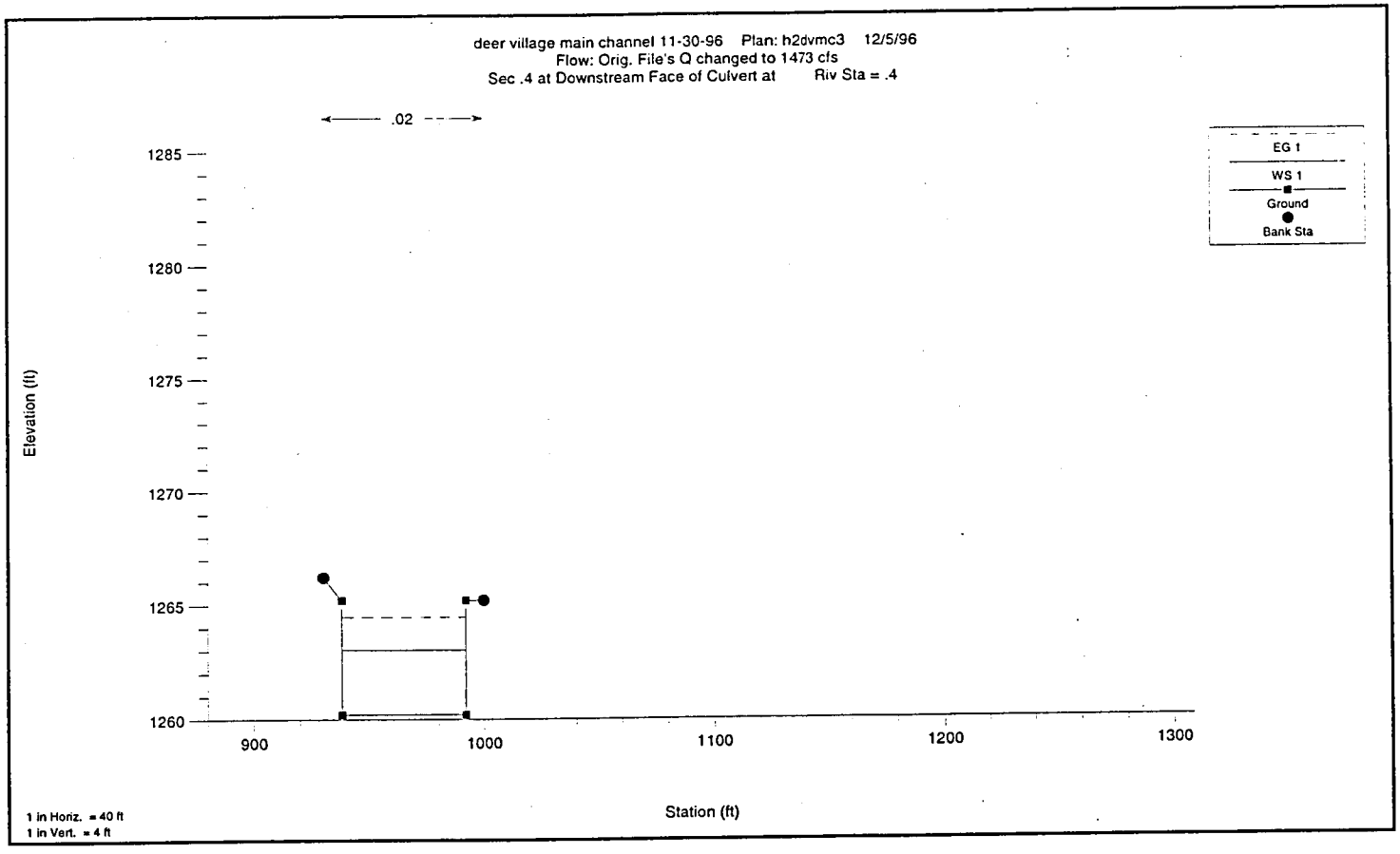
4550 NORTH 12TH STREET • PHOENIX, ARIZONA 85014 • PHONE (602) 264-6831

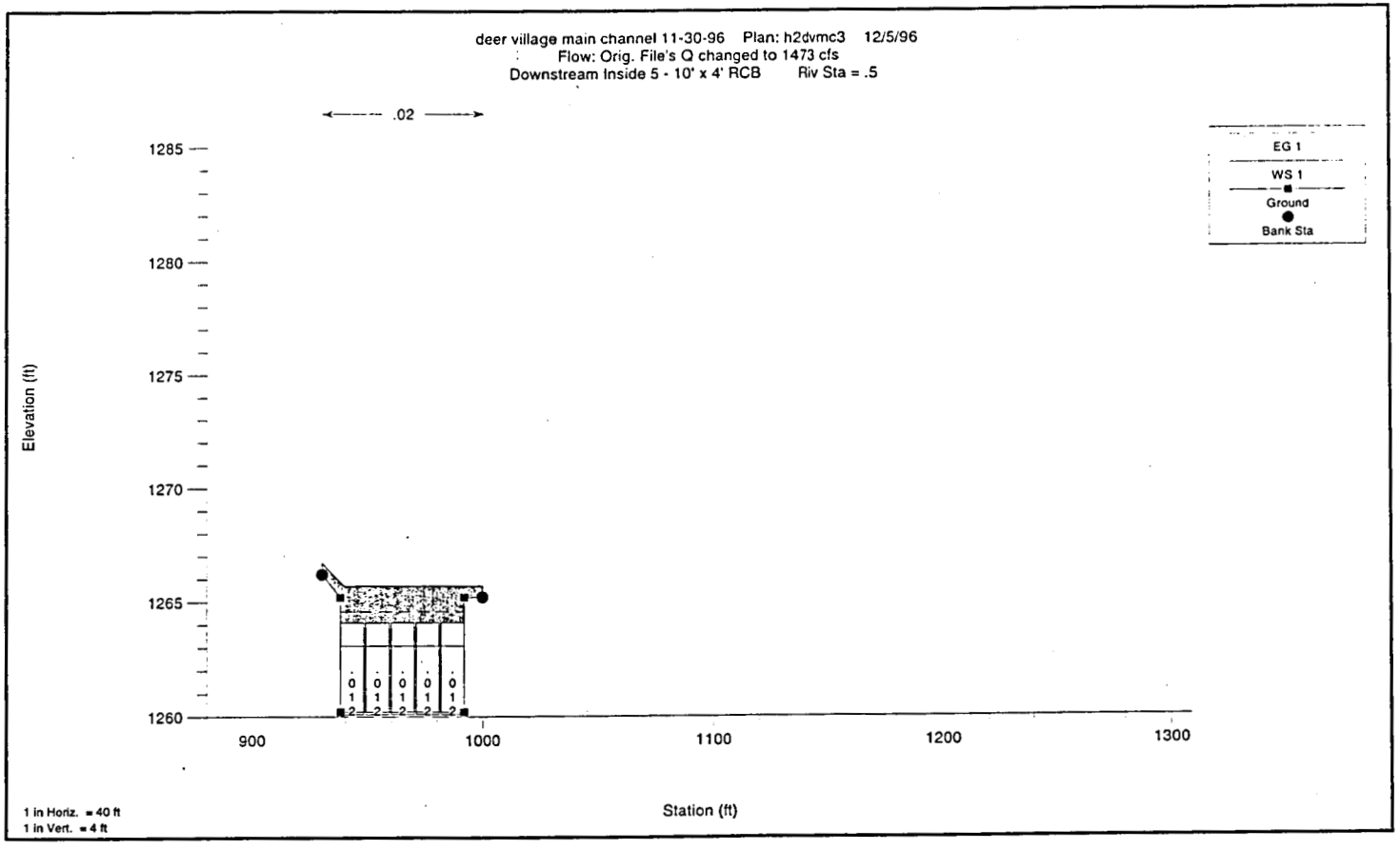
CVL FORM 114


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
1
1.1
EG 1
WS 1
Invert
Elevation (ft)
1285
1280
1275
1270
1265
1260
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)
1 in Horiz. = 400 ft
1 in Vert. = 4 ft

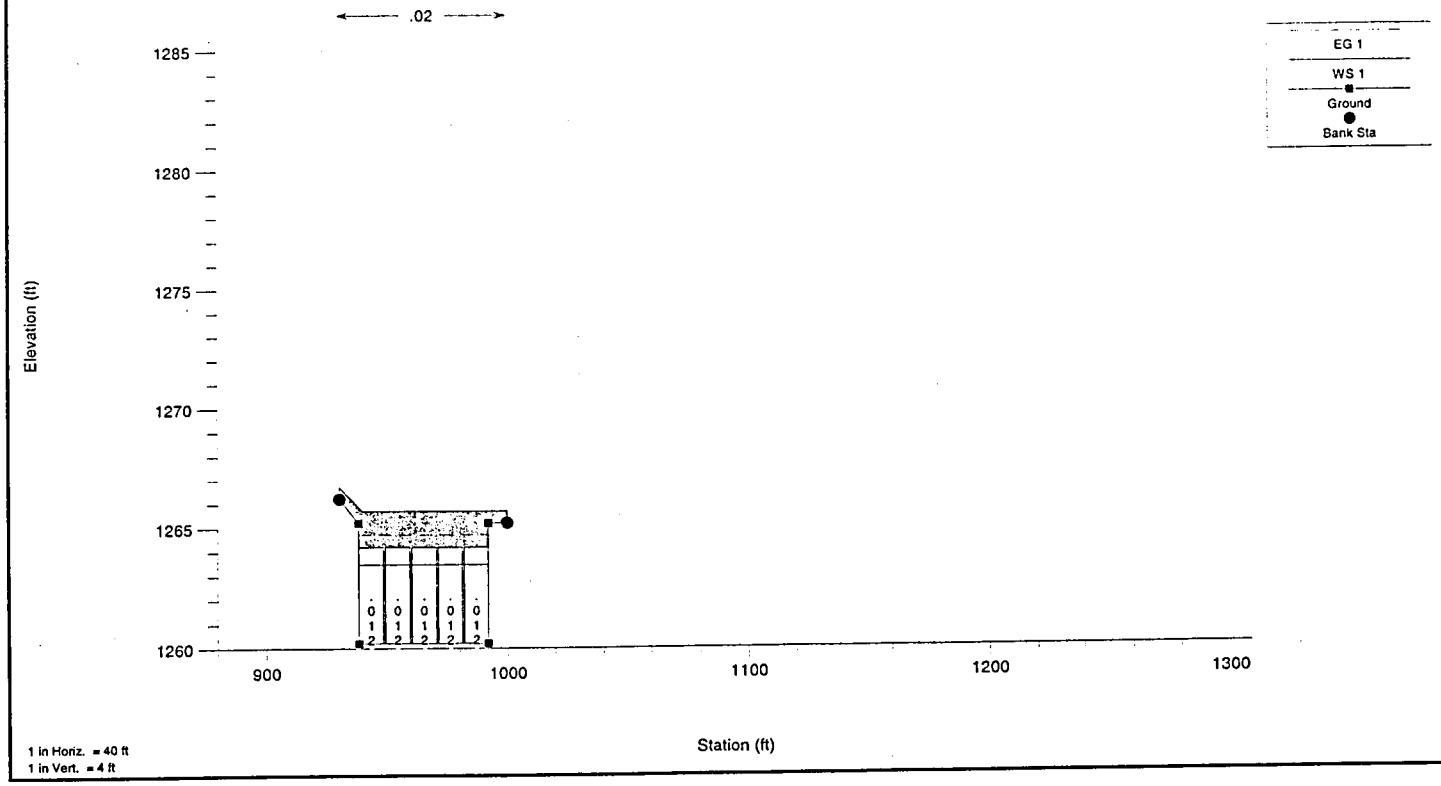
deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs

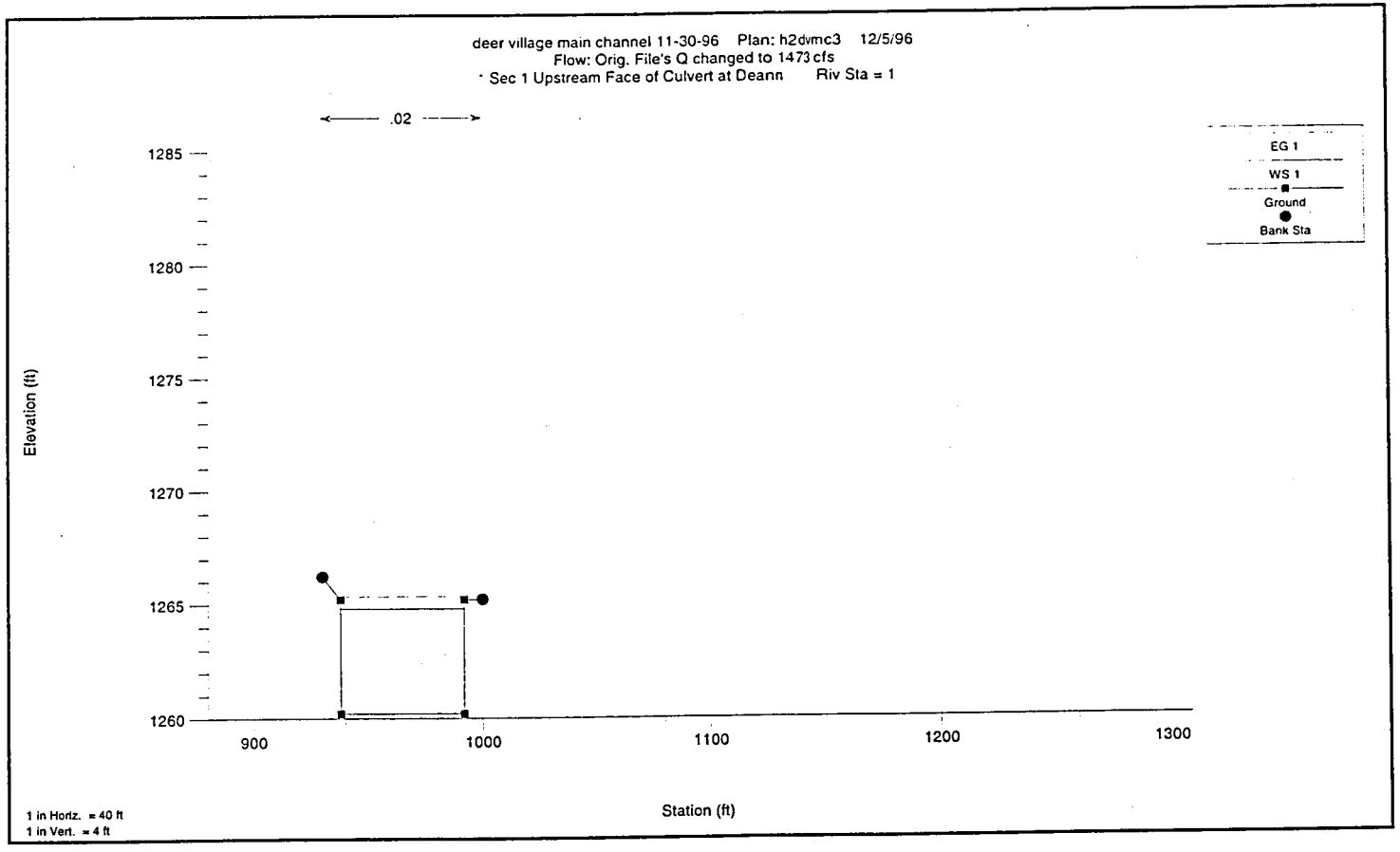


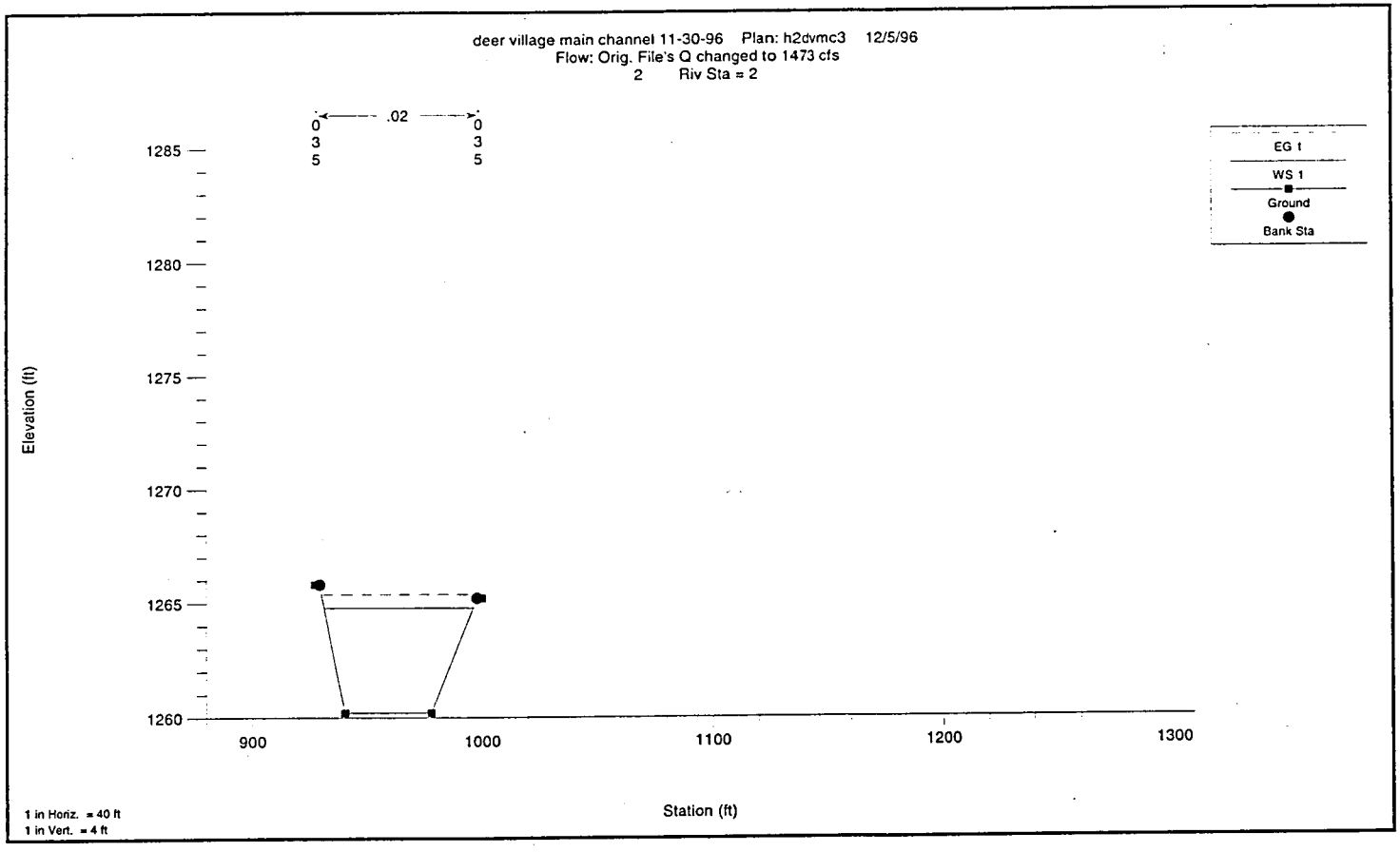

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec .4 at Downstream Face of Culvert at Riv Sta = .4
.02
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

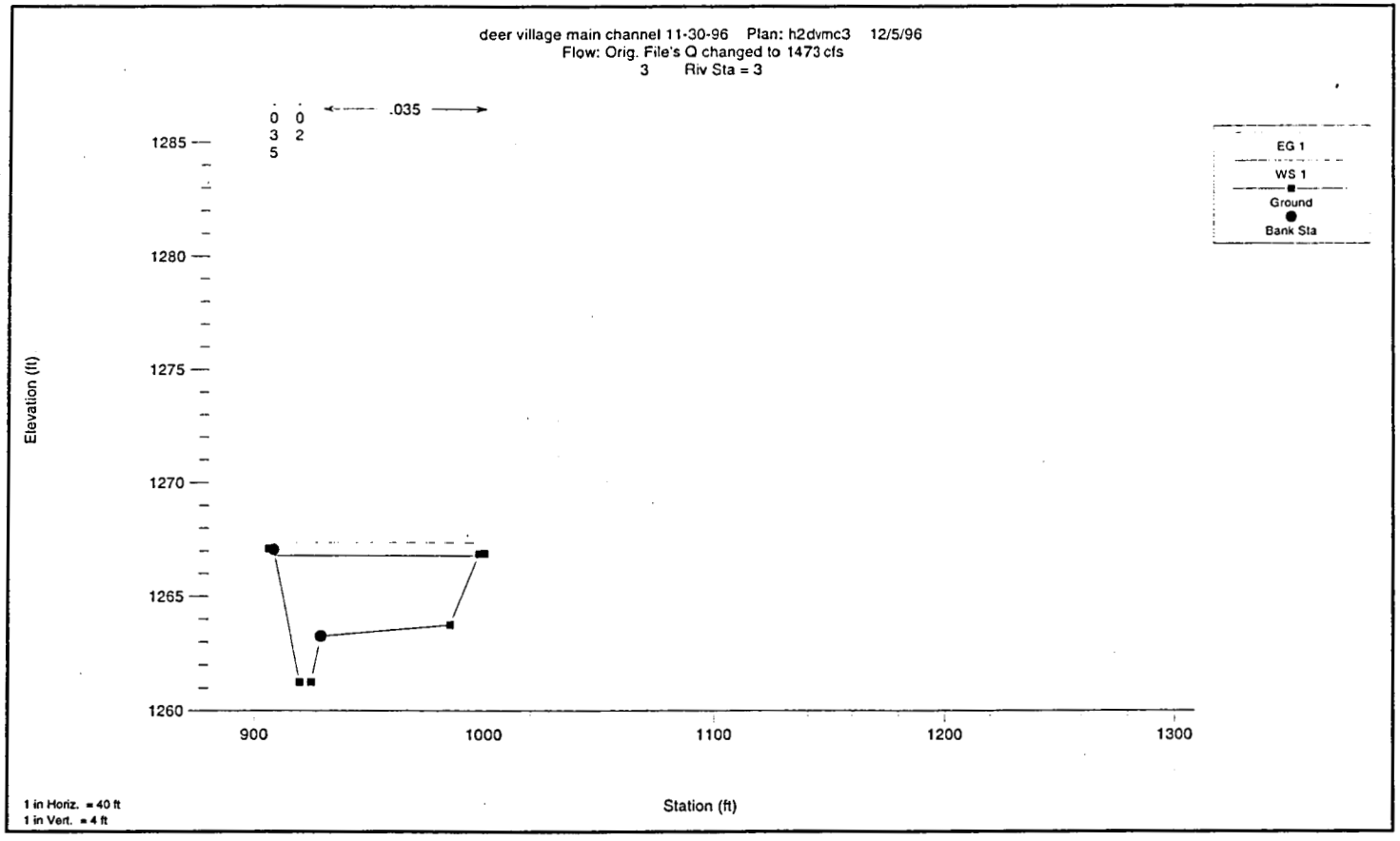

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Inside 5 - 10' x 4' RCB Riv Sta = .5
.02
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

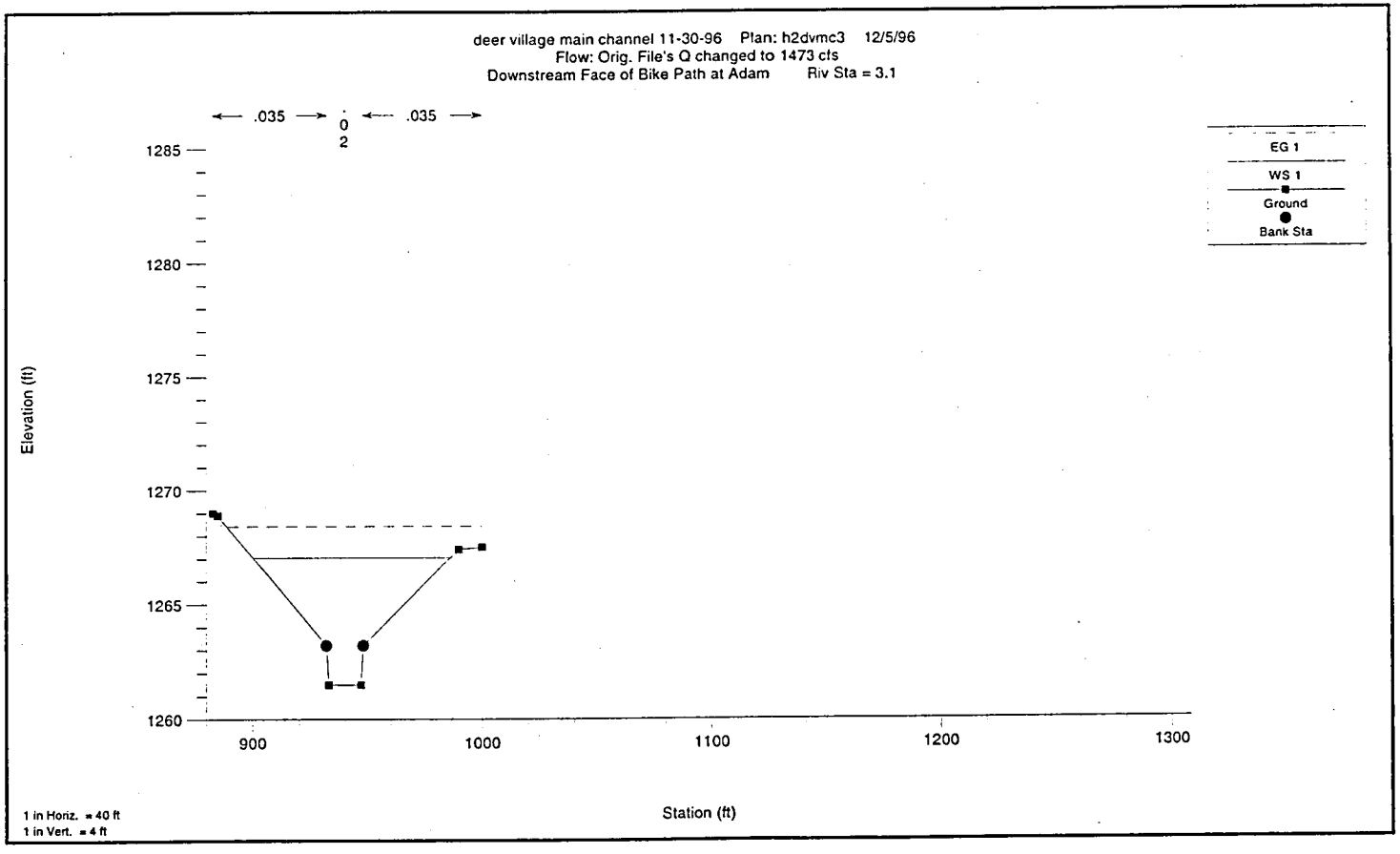
deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Inside 5 - 10' x 4' RCB Riv Sta = .5

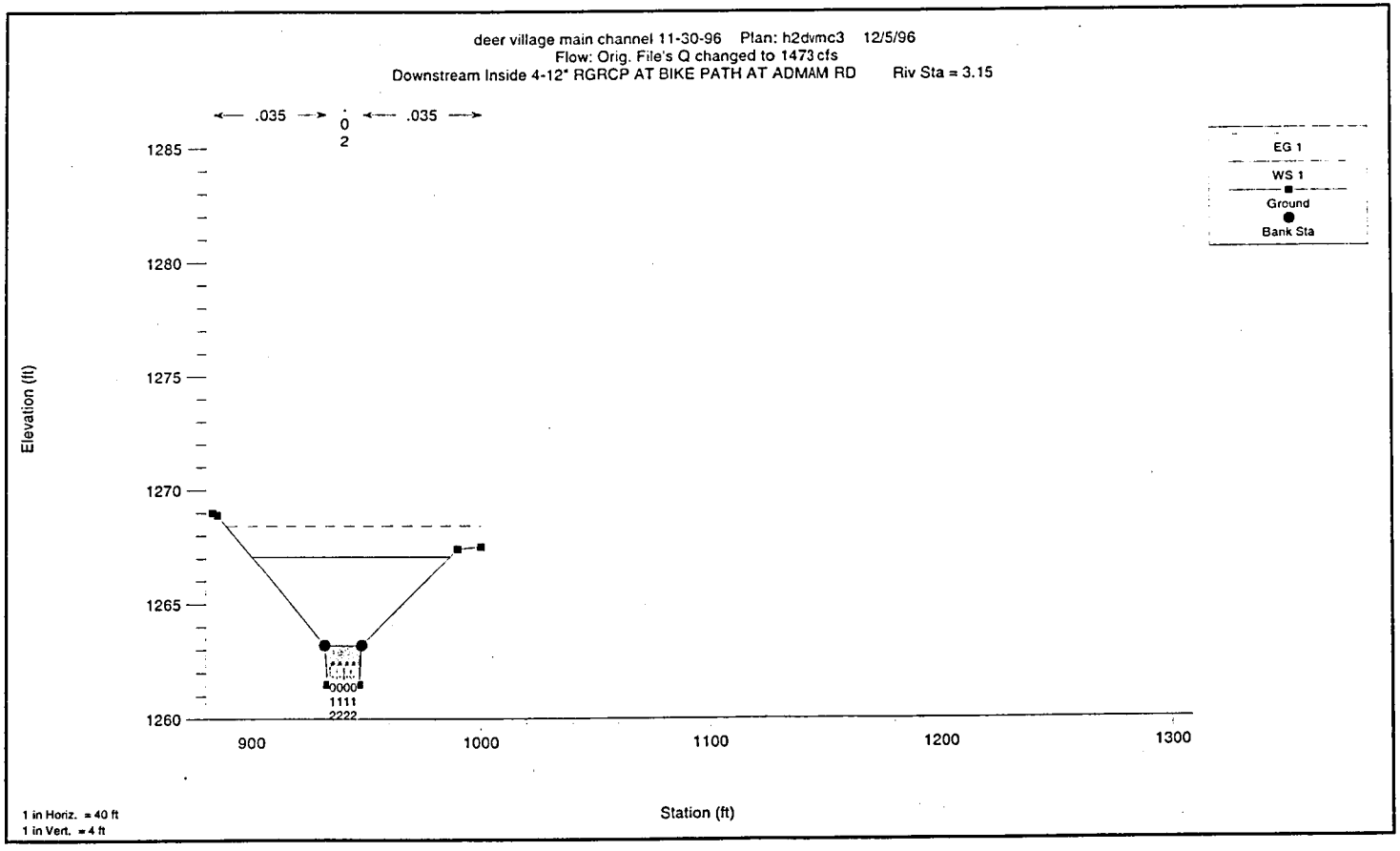



deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1 Upstream Face of Culvert at Deann Riv Sta = 1
.02
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

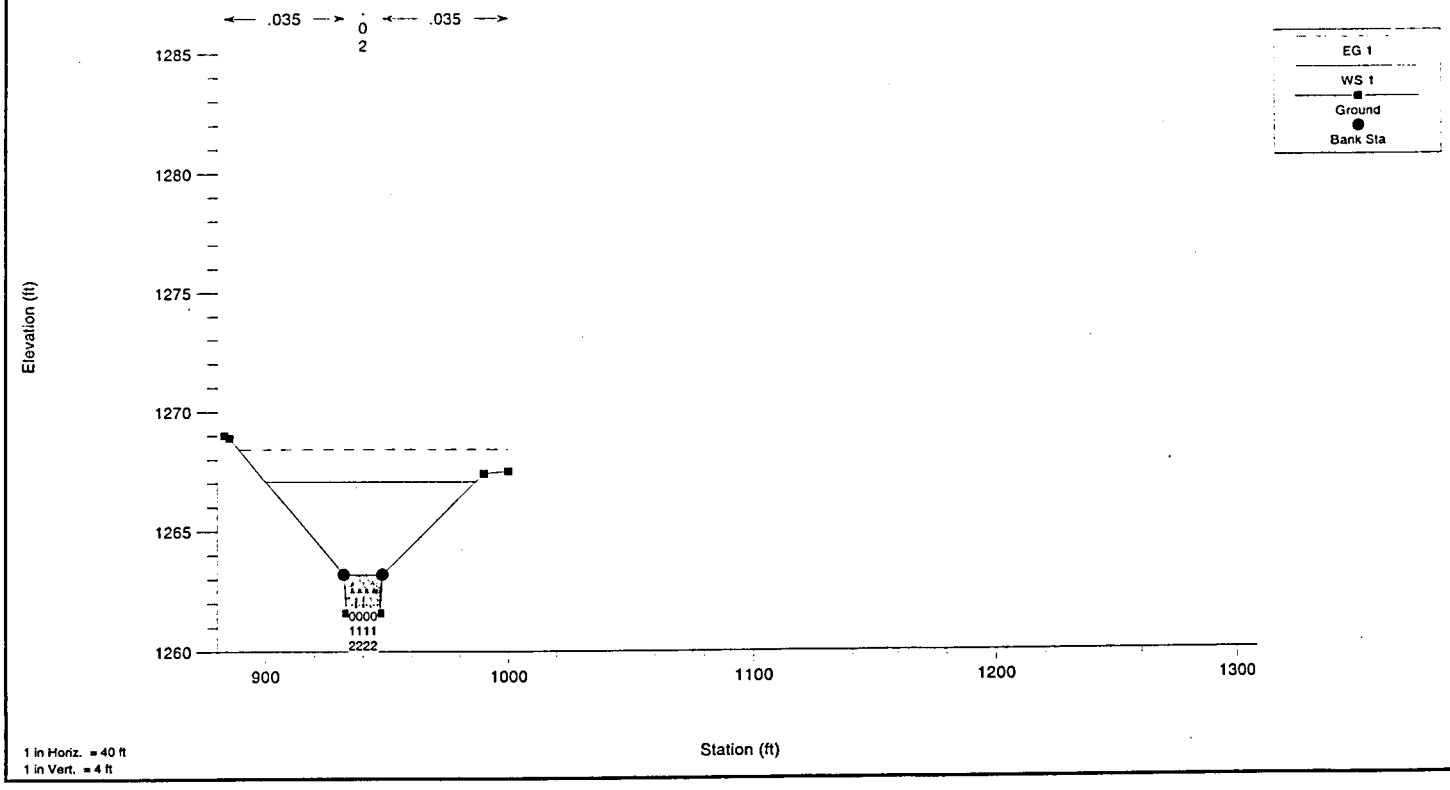

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
2 Riv Sta = 2
.02
0
3
5
0
3
5
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

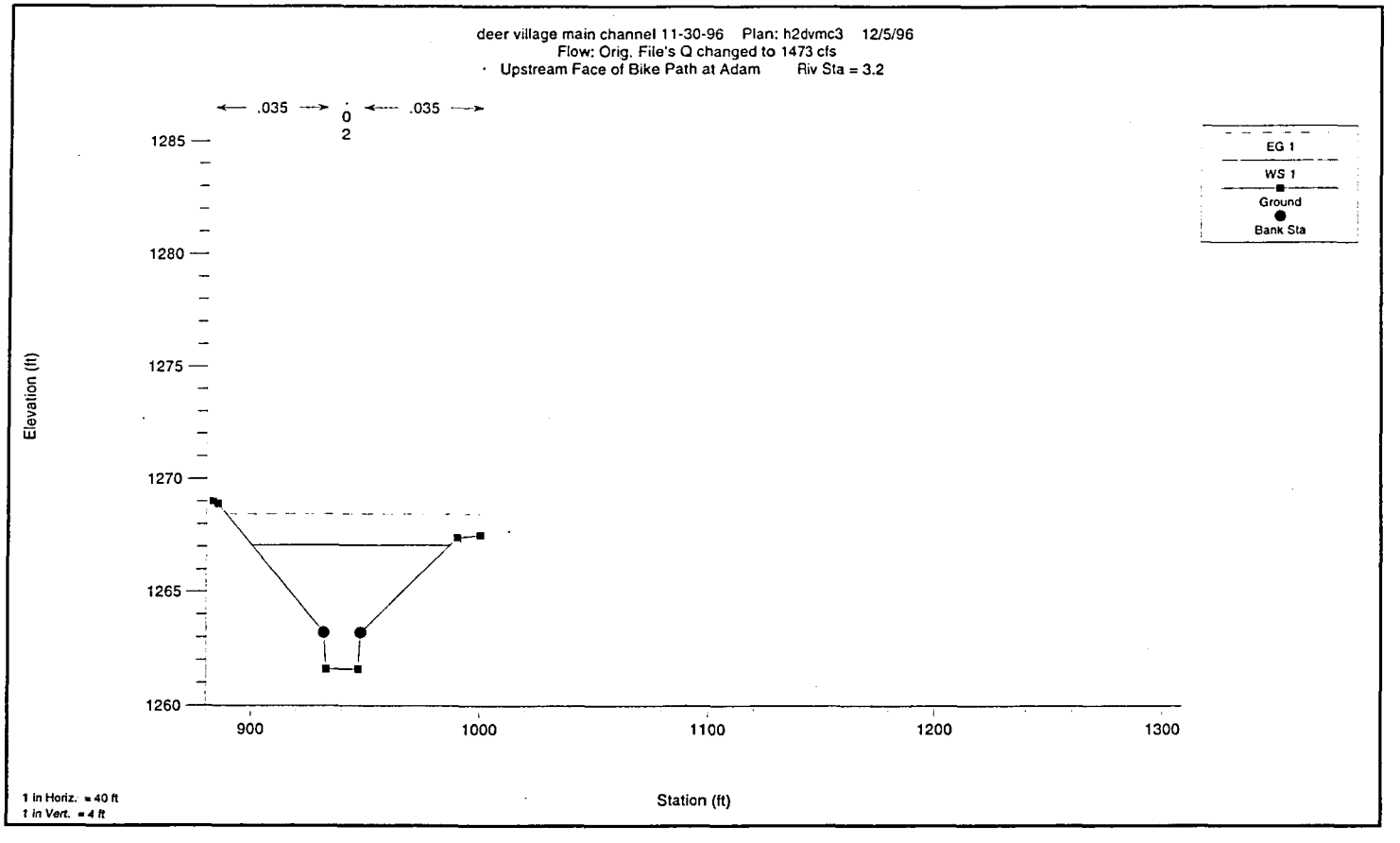

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
3 Riv Sta = 3
.035
.035
.020
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

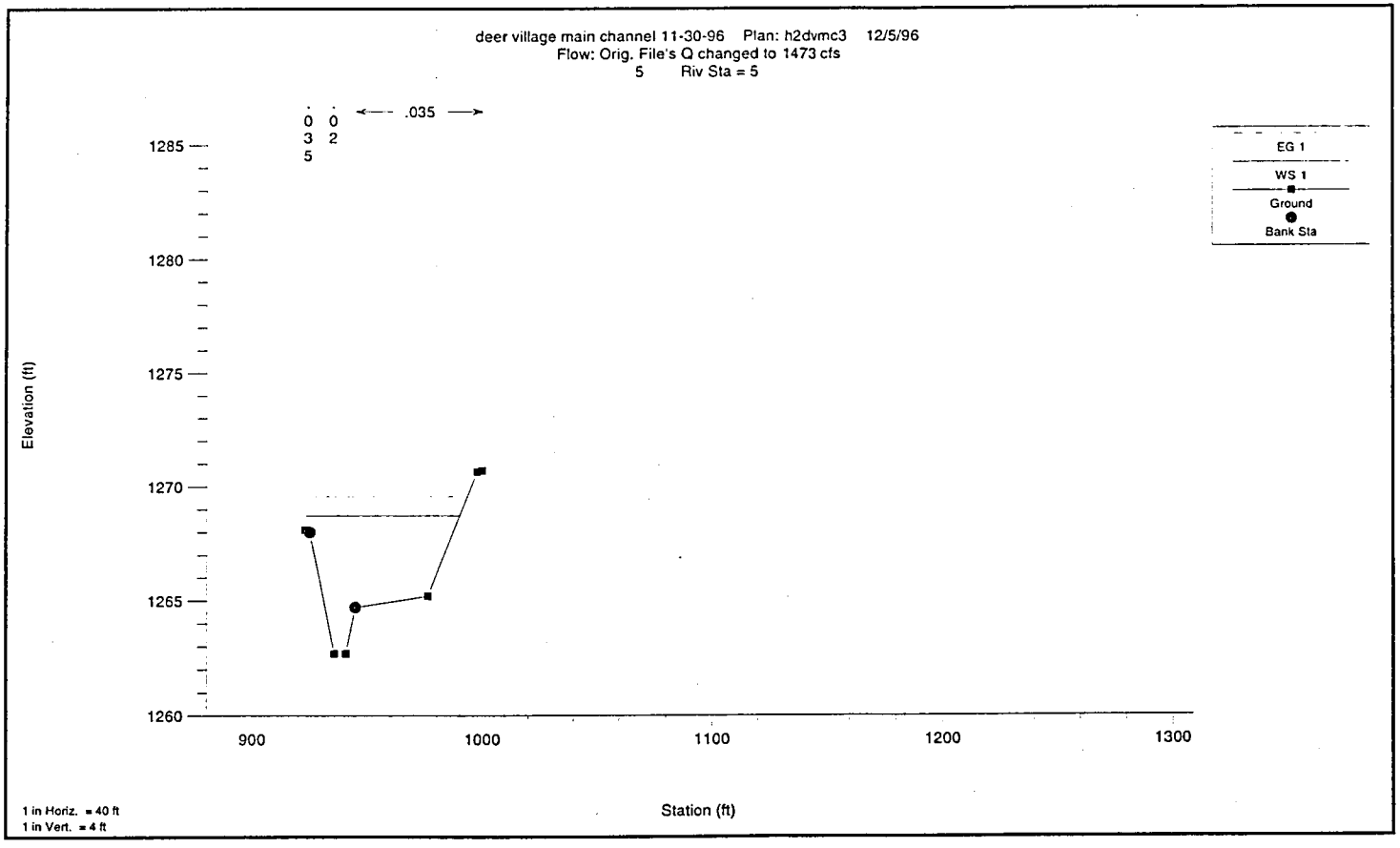

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Face of Bike Path at Adam Riv Sta = 3.1
.035
.02
.035
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

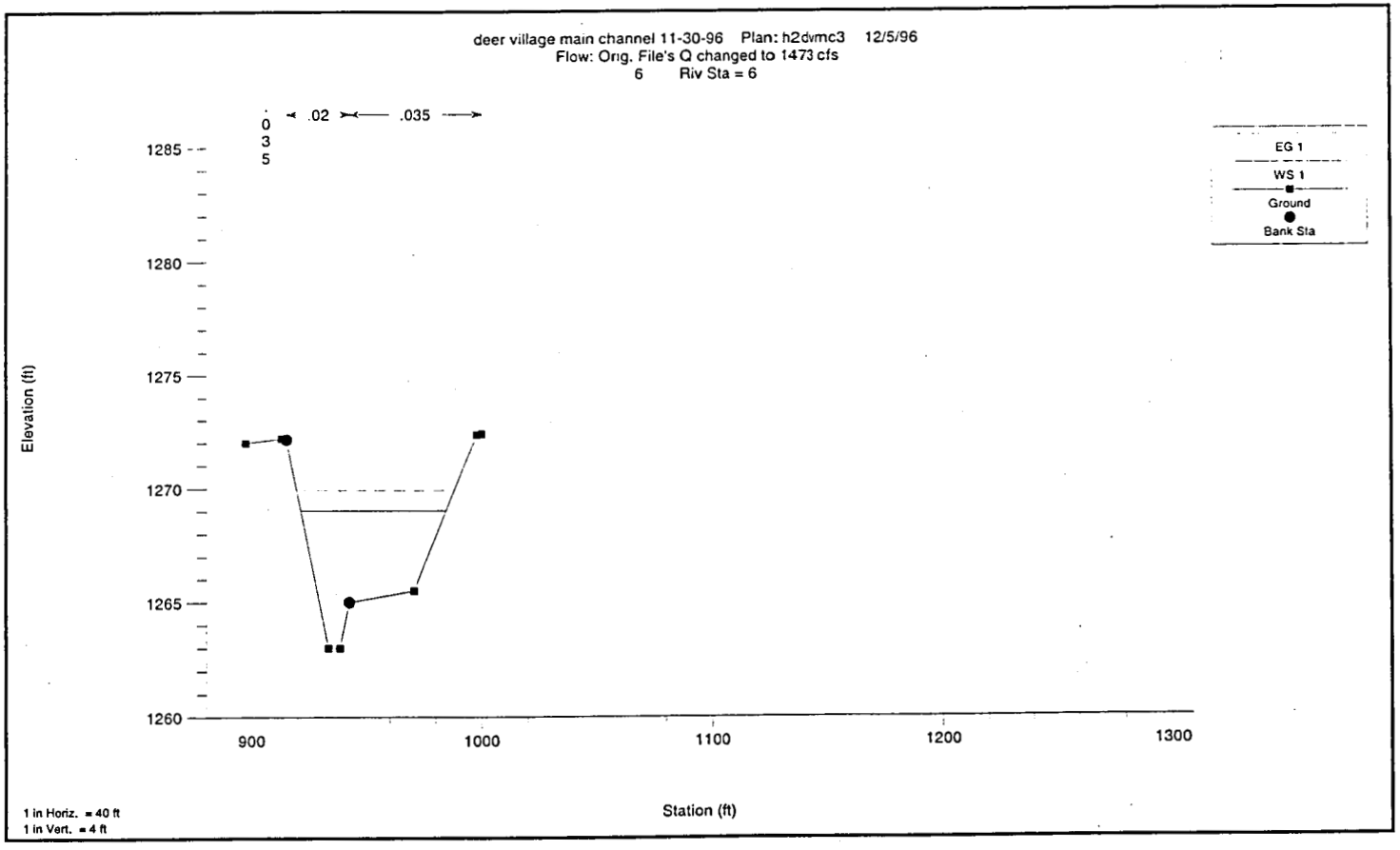

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Inside 4-12" RGRCP AT BIKE PATH AT ADMAM RD Riv Sta = 3.15
.035
.035
0
2
1285
1280
1275
1270
1265
1260
Elevation (ft)
0000
1111
2222
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

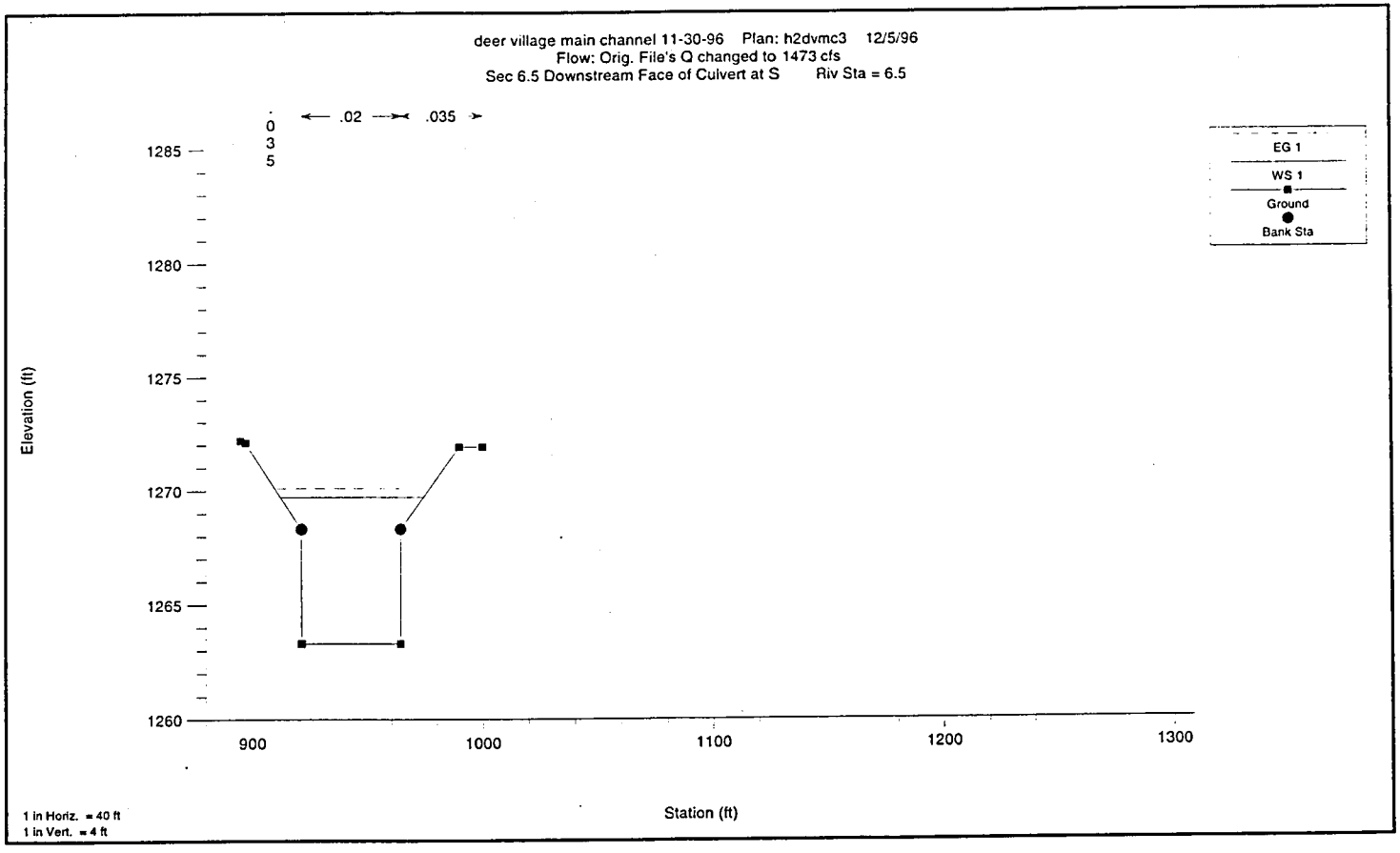
deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Inside 4-12" RGRCP AT BIKE PATH AT ADMAM RD Riv Sta = 3.15

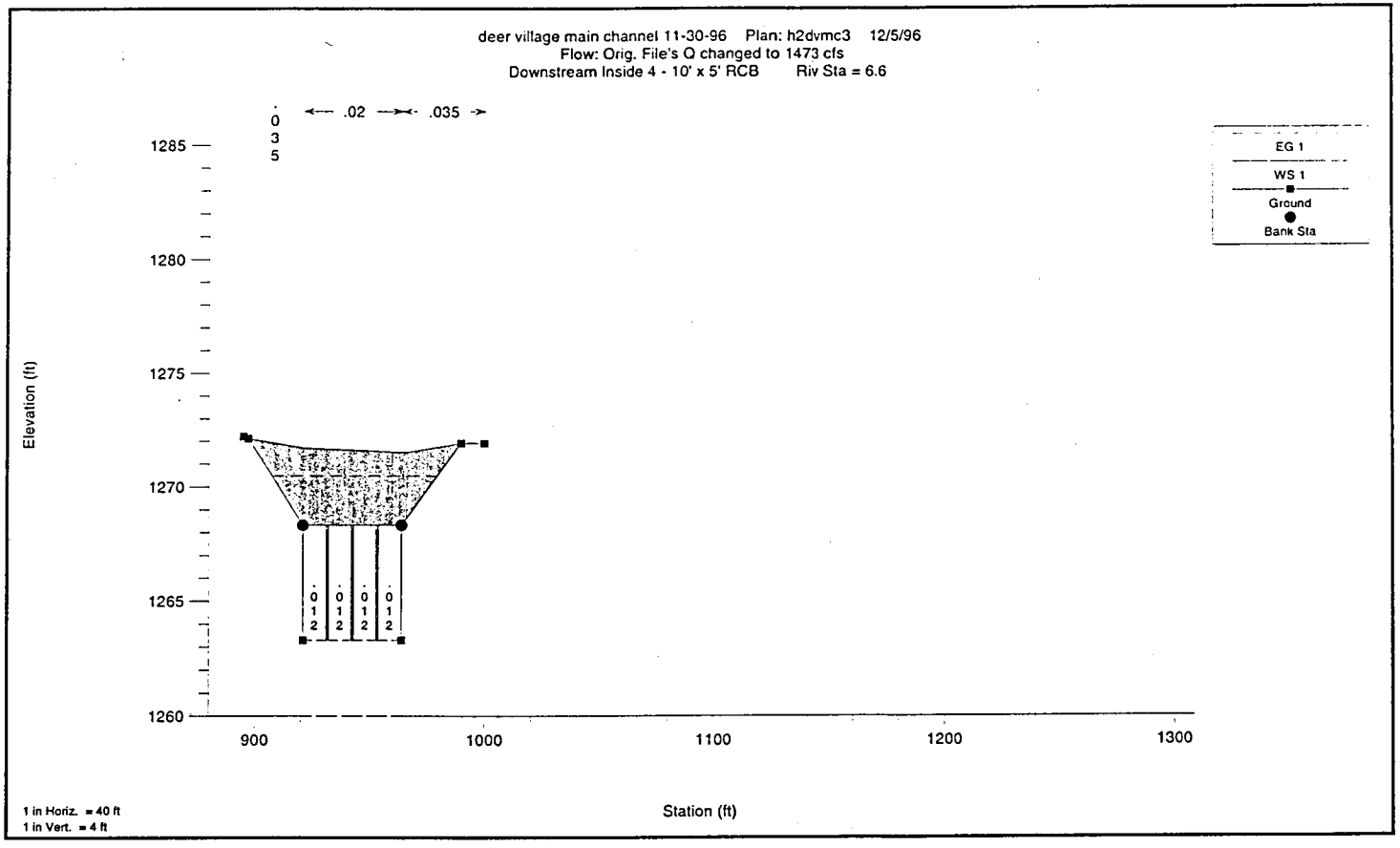


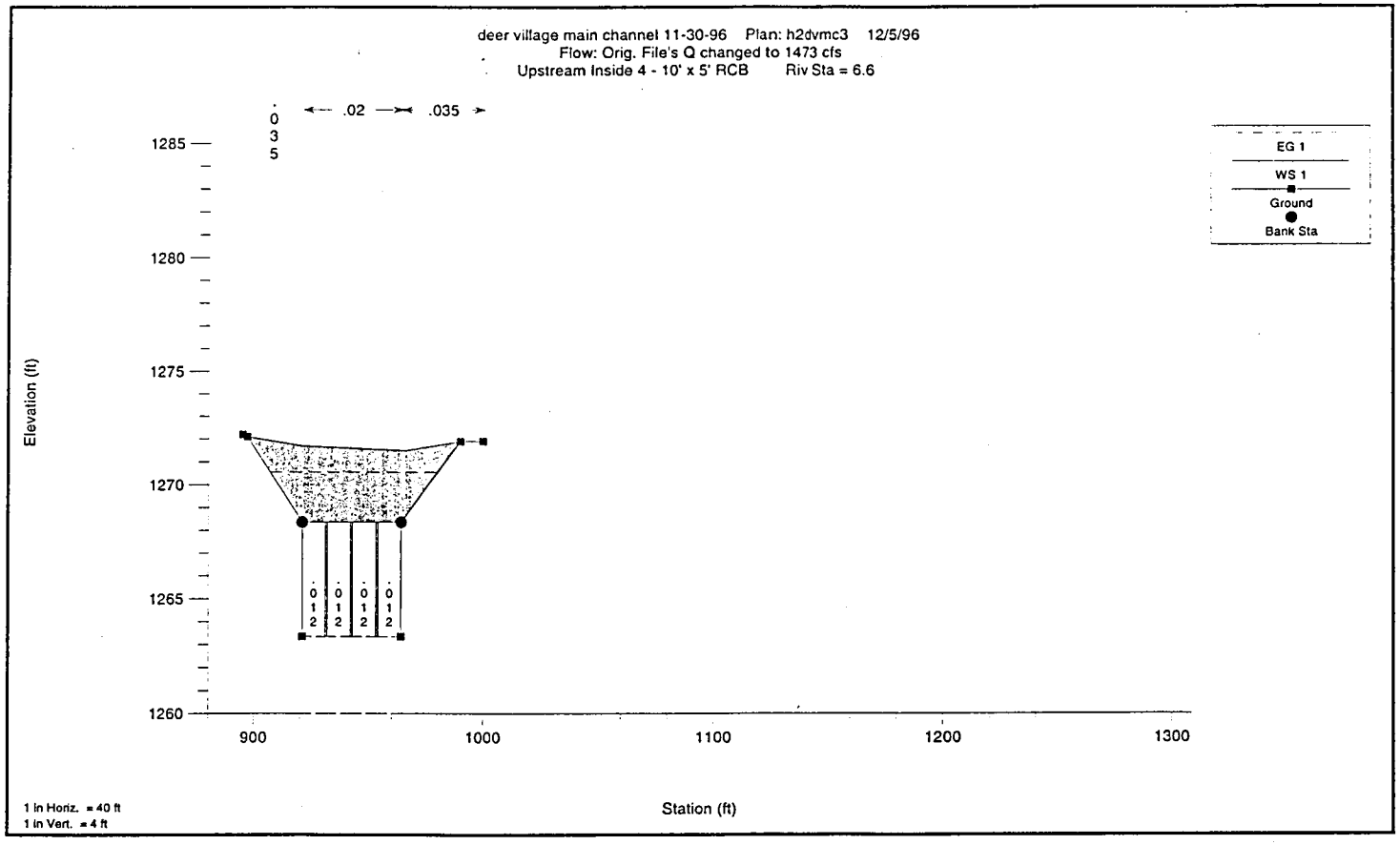

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Face of Bike Path at Adam Riv Sta = 3.2
.035
.035
0
2
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

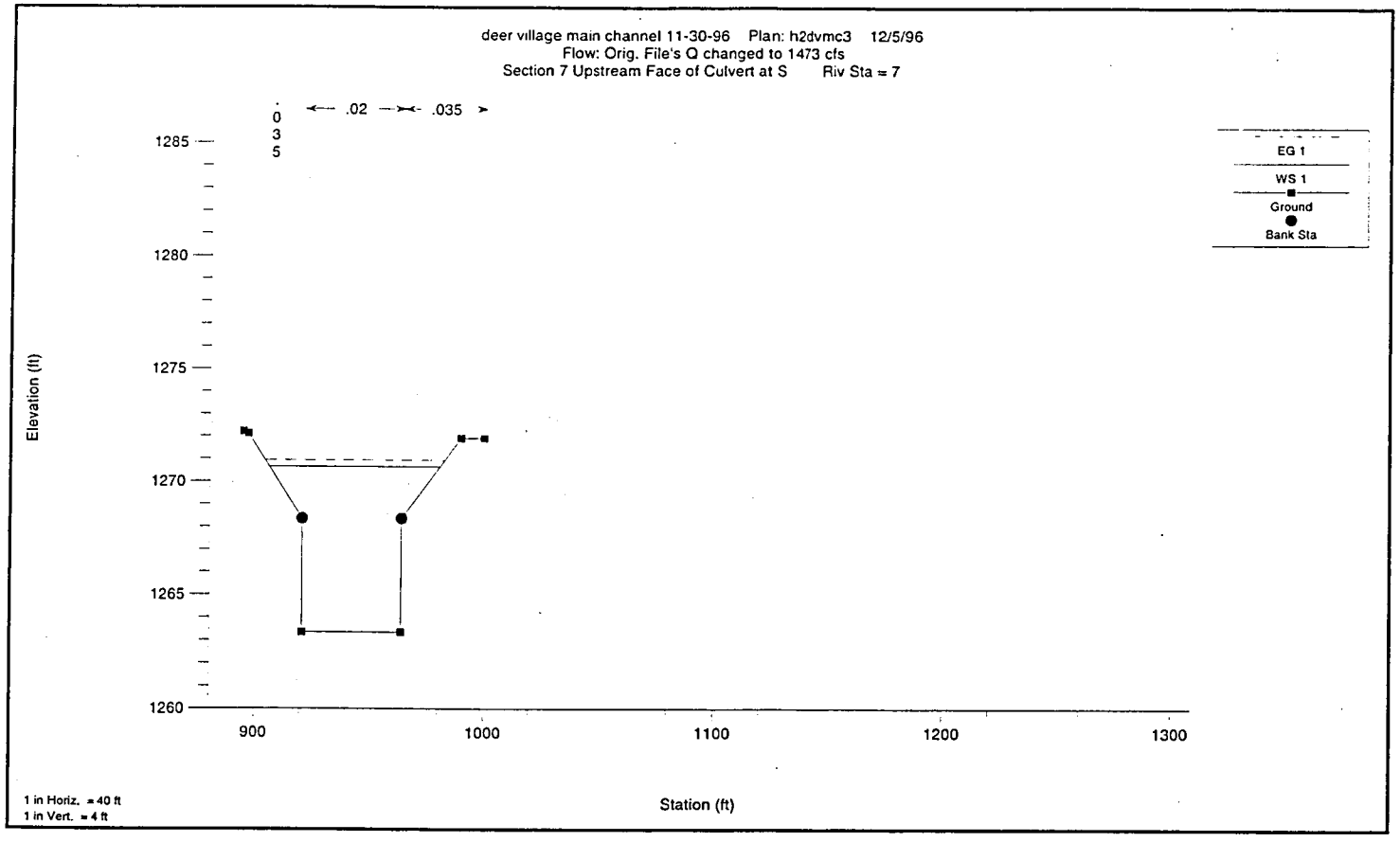

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
5 Riv Sta = 5
.035
.035
.035
.035
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
6 Riv Sta = 6
.035
.02
.035
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

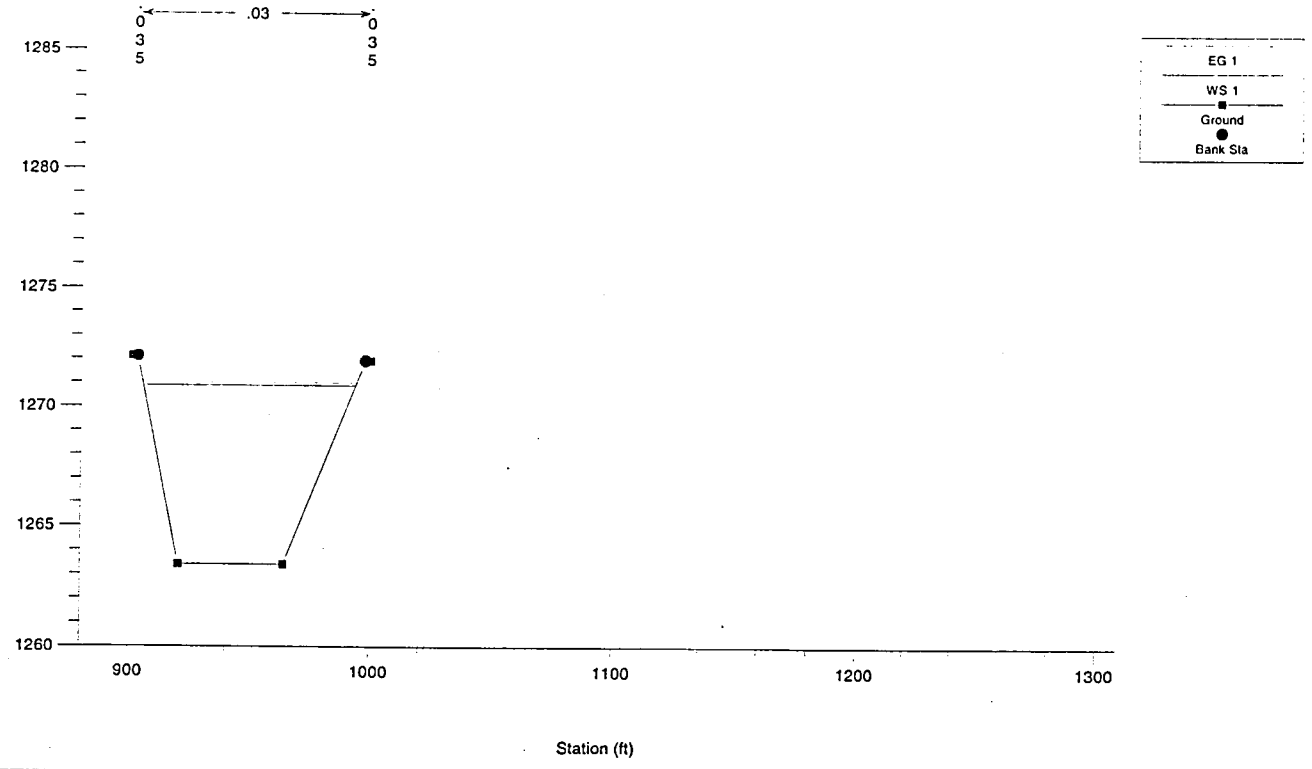

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 6.5 Downstream Face of Culvert at S Riv Sta = 6.5
.035
.02
.035
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

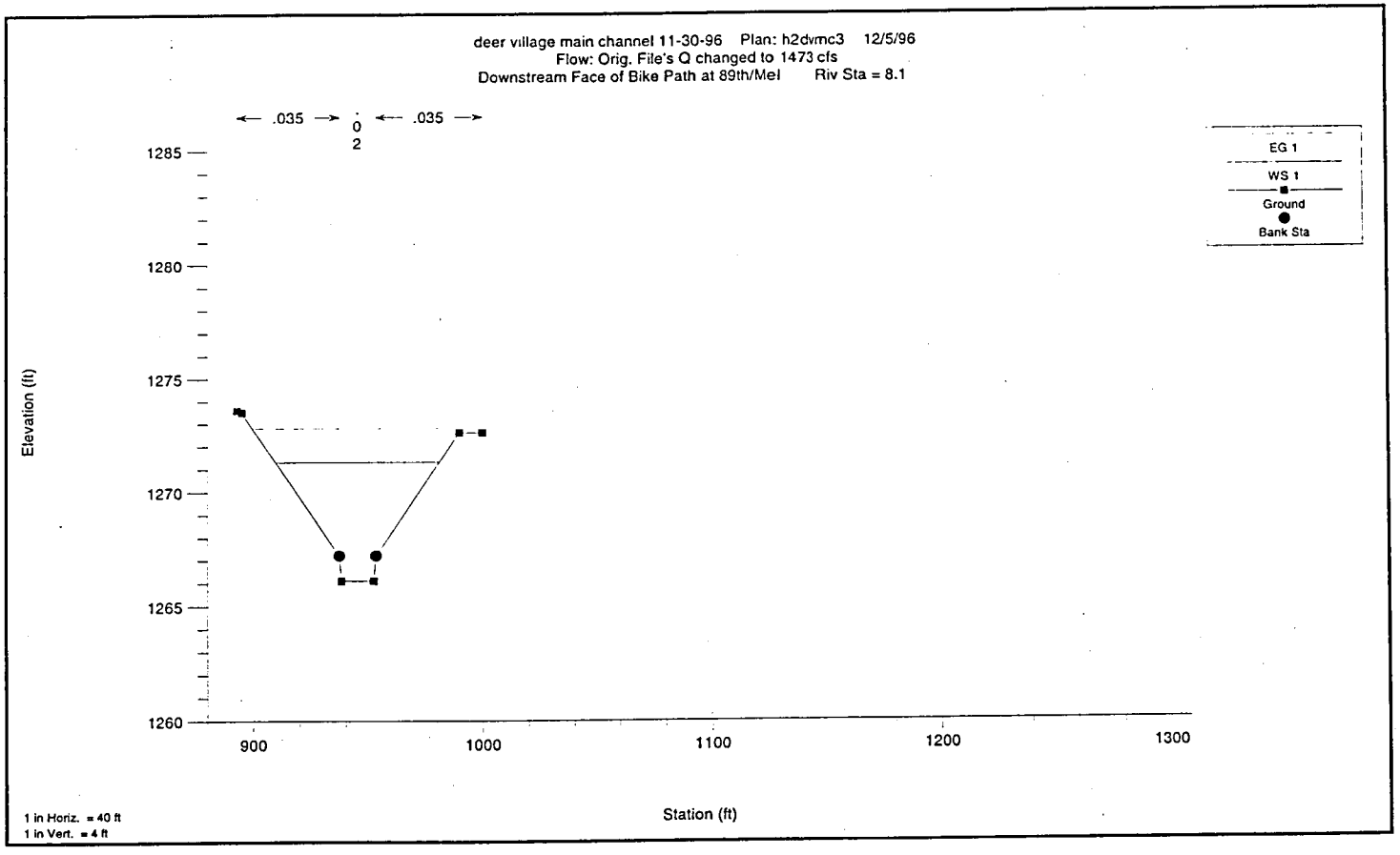

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Inside 4 - 10' x 5' RCB Riv Sta = 6.6
.035
.02
.035
.012
.012
.012
.012
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Inside 4 - 10' x 5' RCB Riv Sta = 6.6
.02
.035
.035
.012
.012
.012
.012
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

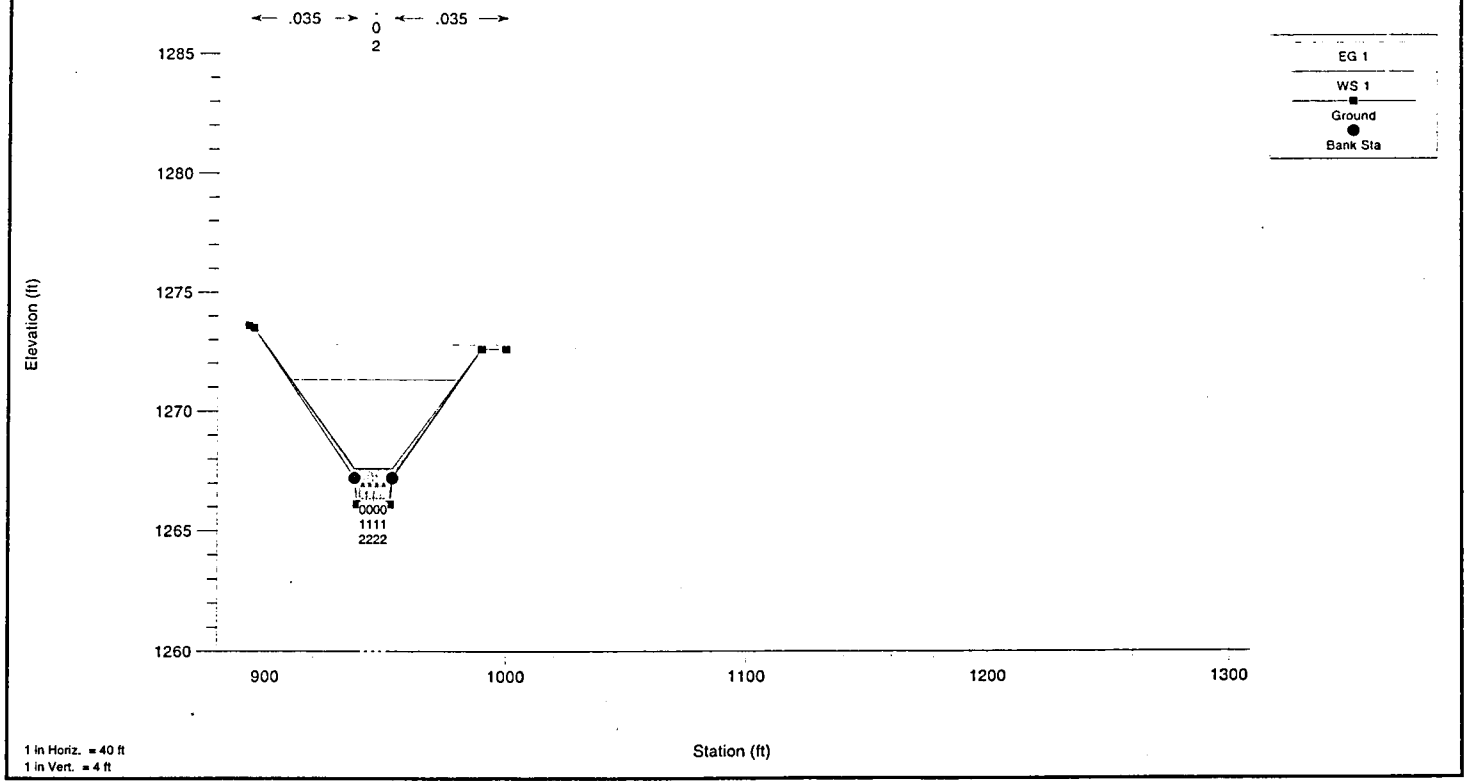

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Section 7 Upstream Face of Culvert at S Riv Sta = 7
.02
.035
.035
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
8 Riv Sta = 8

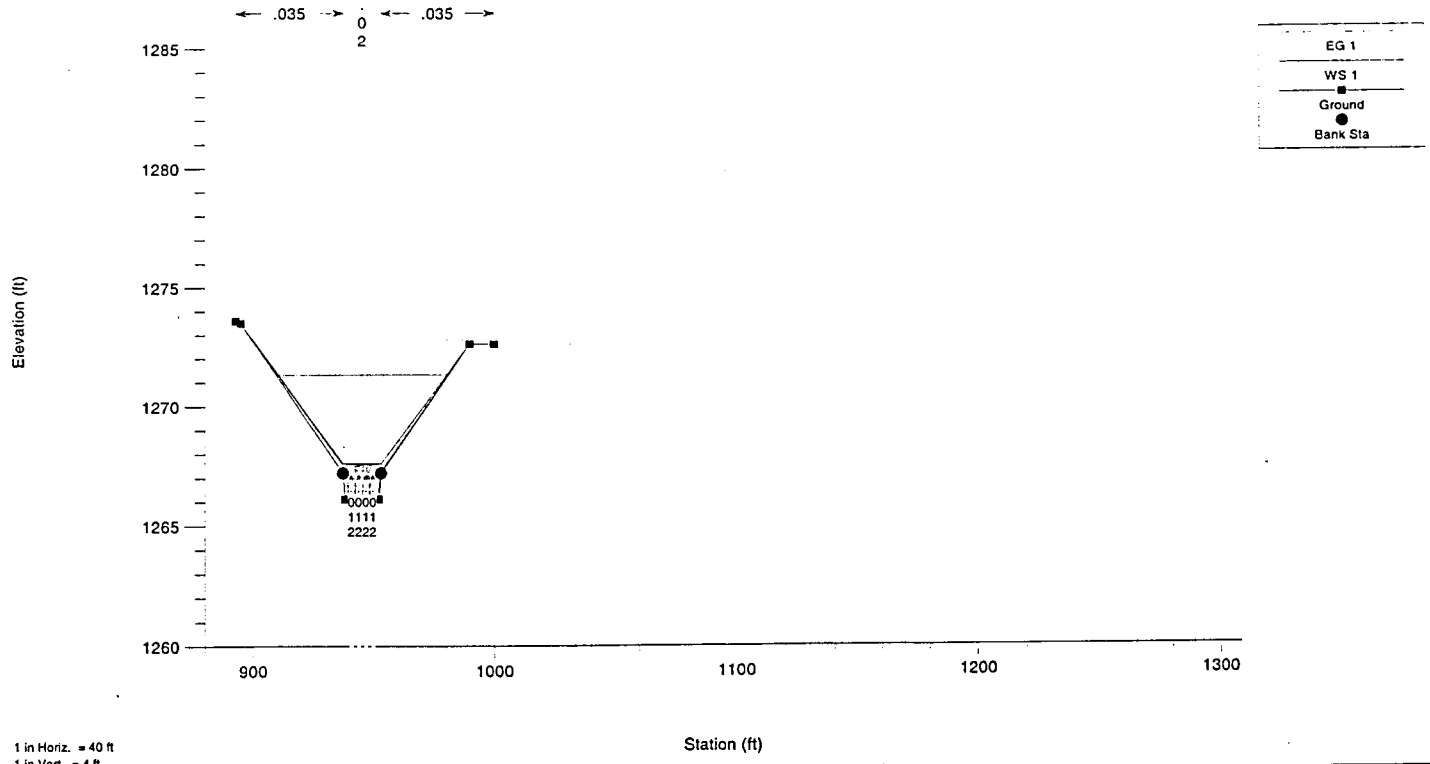



deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Face of Bike Path at 89th/Mel Riv Sta = 8.1
.035
.035
0
2
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Inside 4-12" RGRCP AT BIKE PATH AT 89TH/MELINDA Riv Sta = 8.15

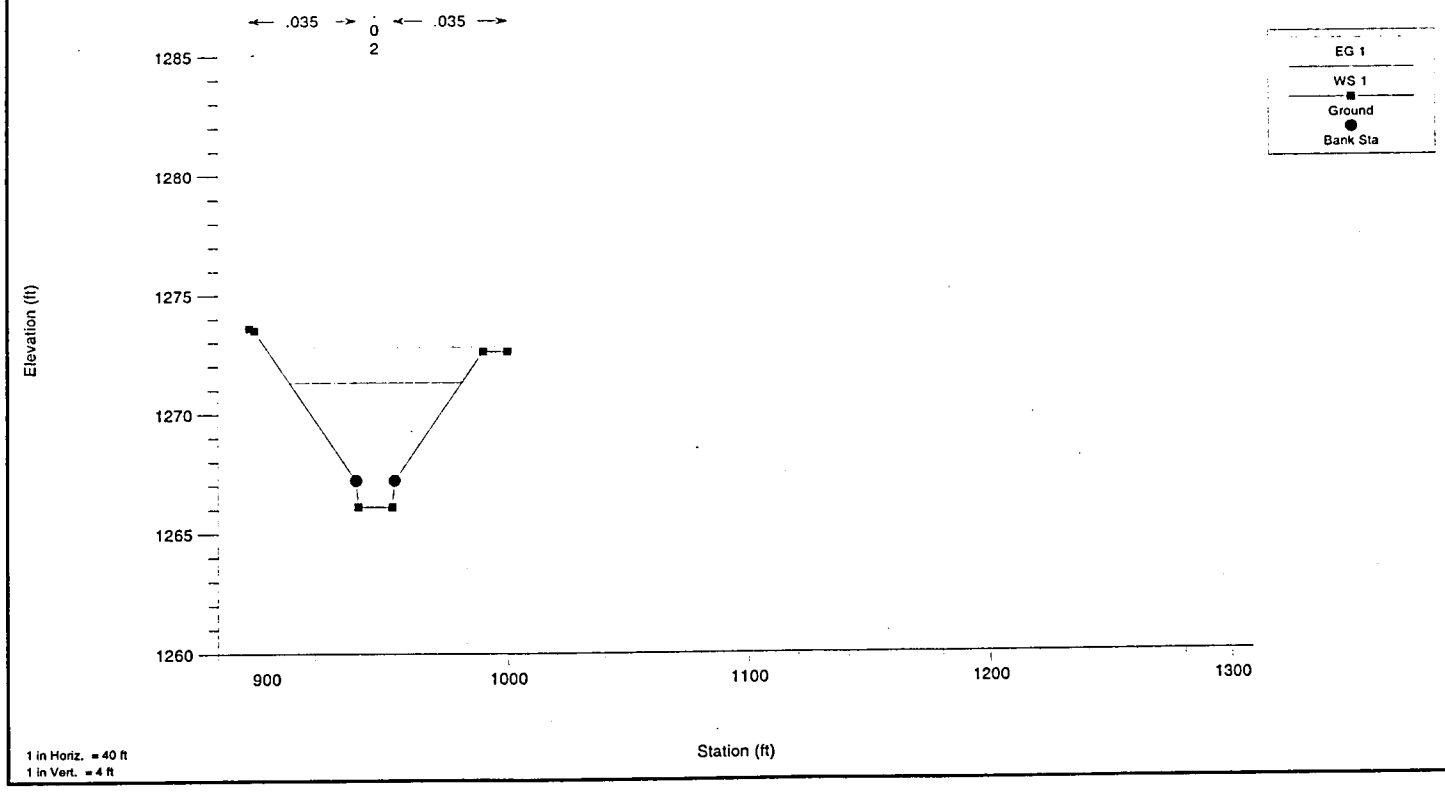


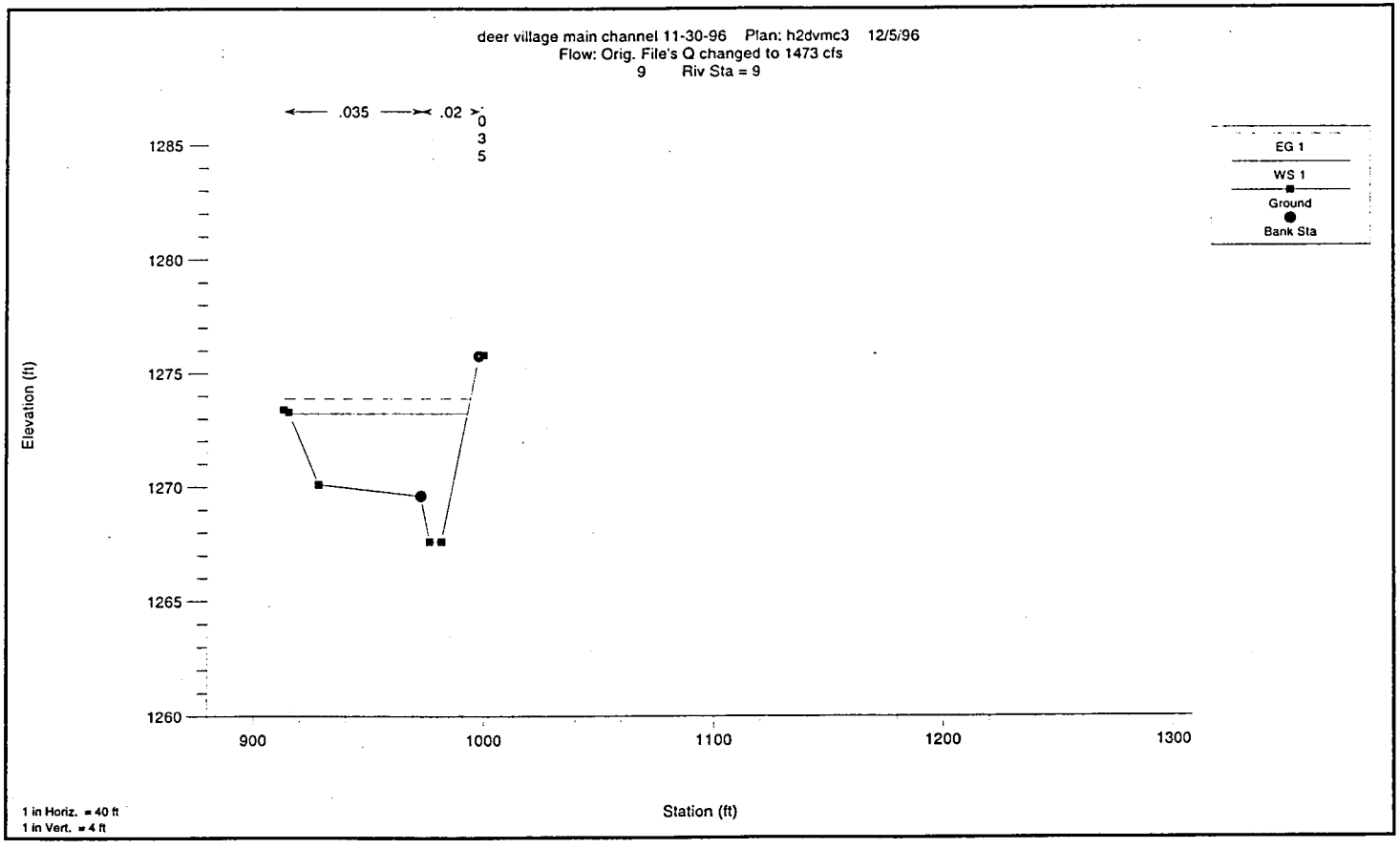
deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Inside 4-12" RGRCP AT BIKE PATH AT 89TH/MELINDA Riv Sta = 8.15

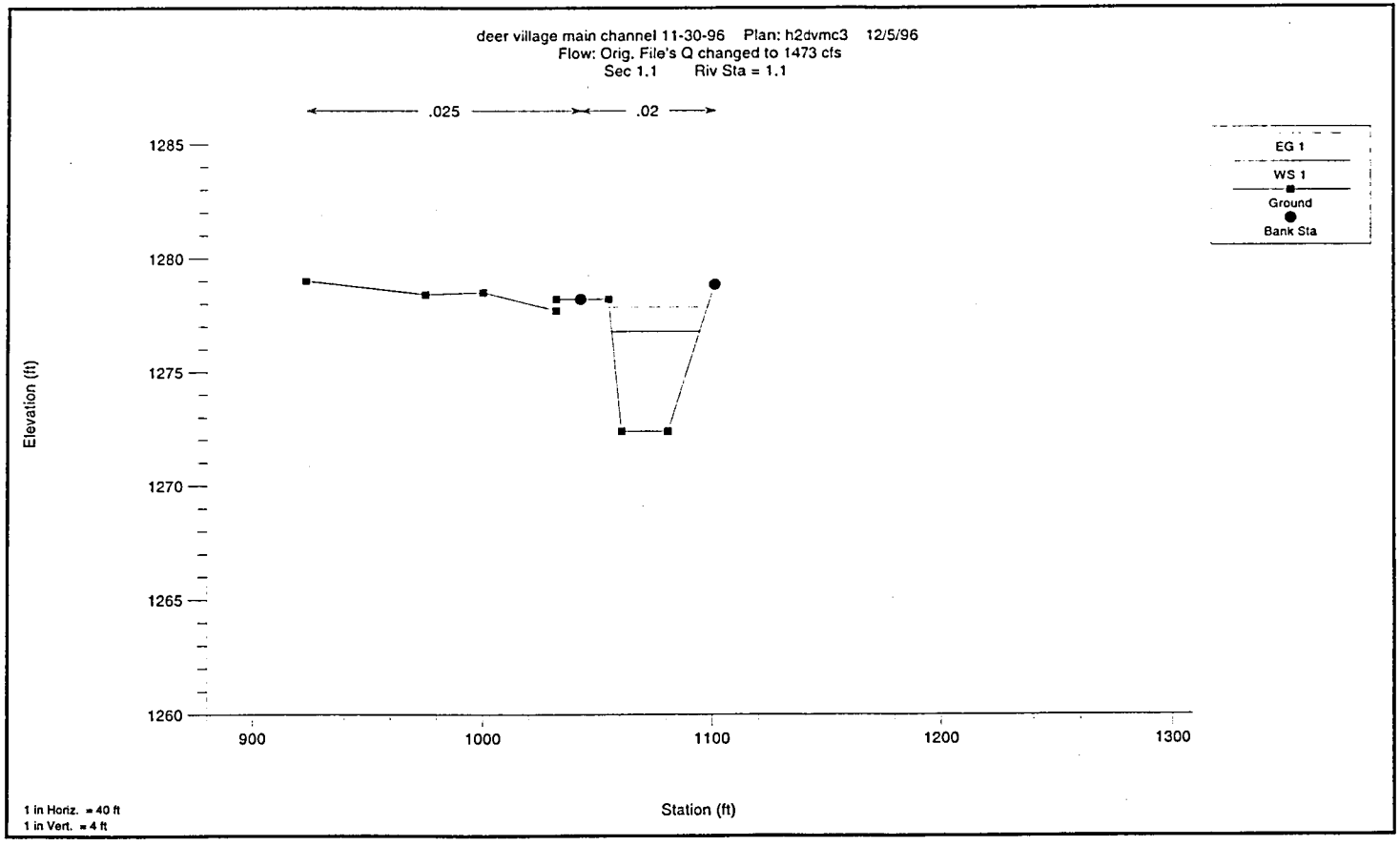


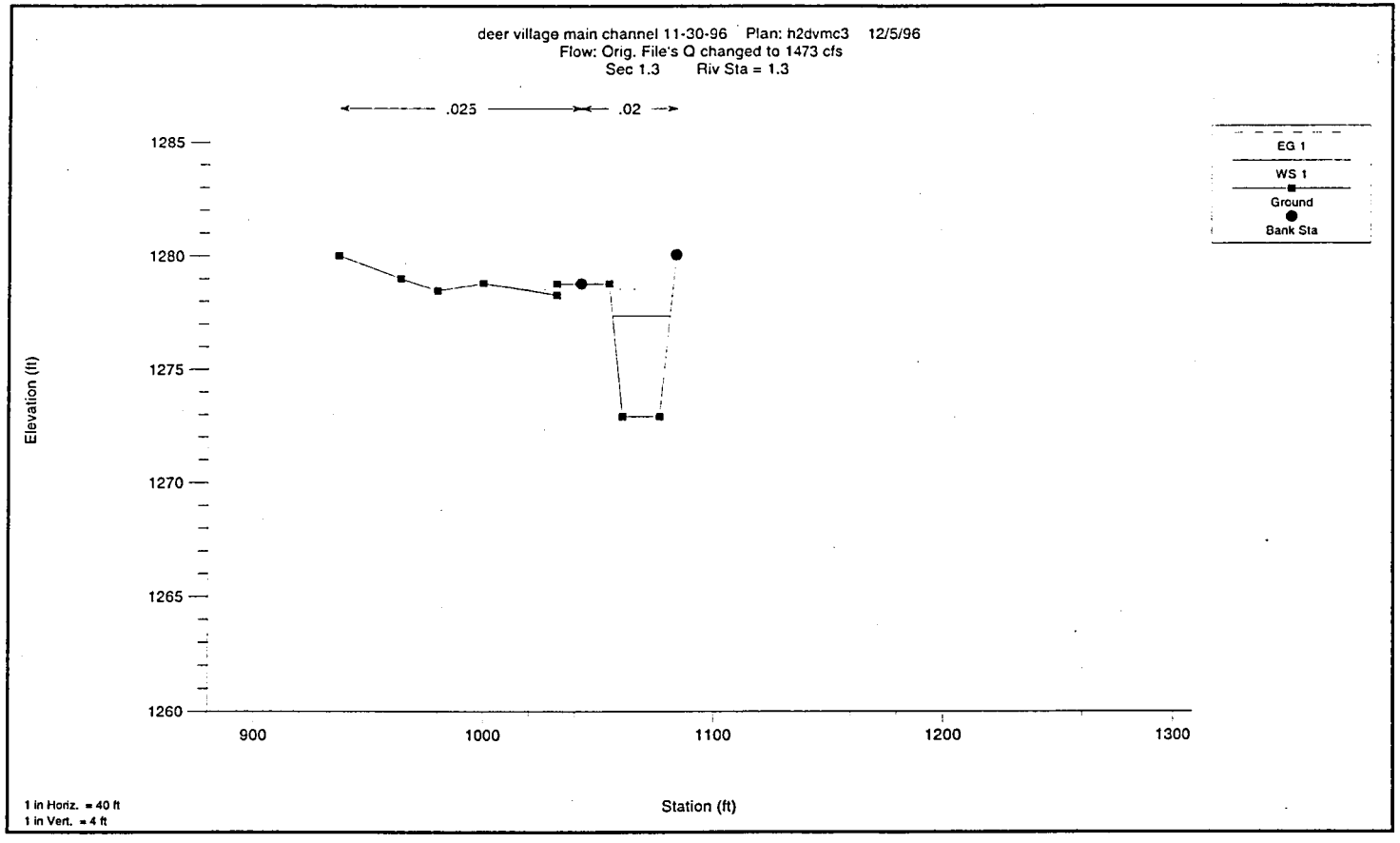
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

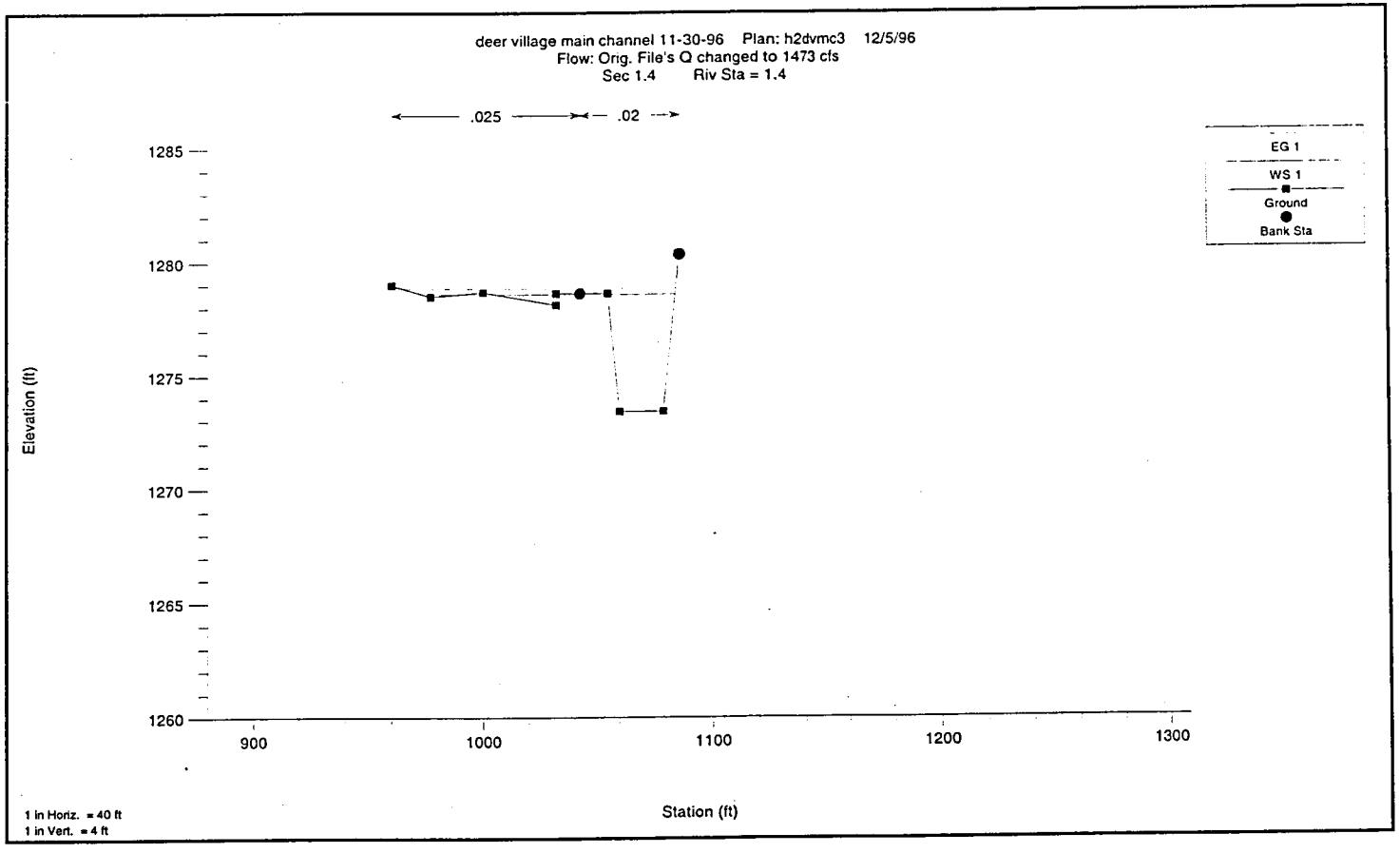
deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Face of Bike Path at 89th/Melin Riv Sta = 8.2

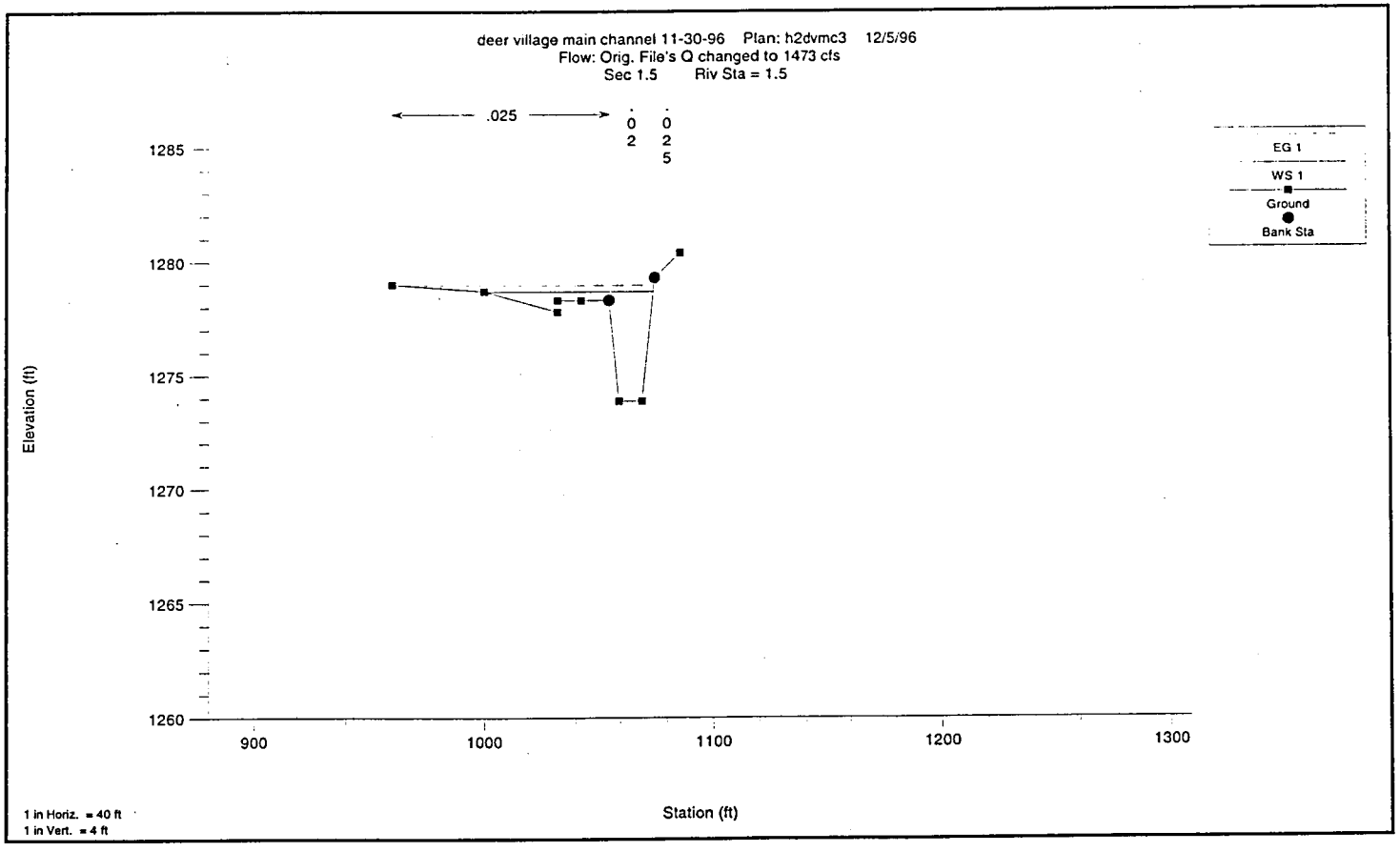


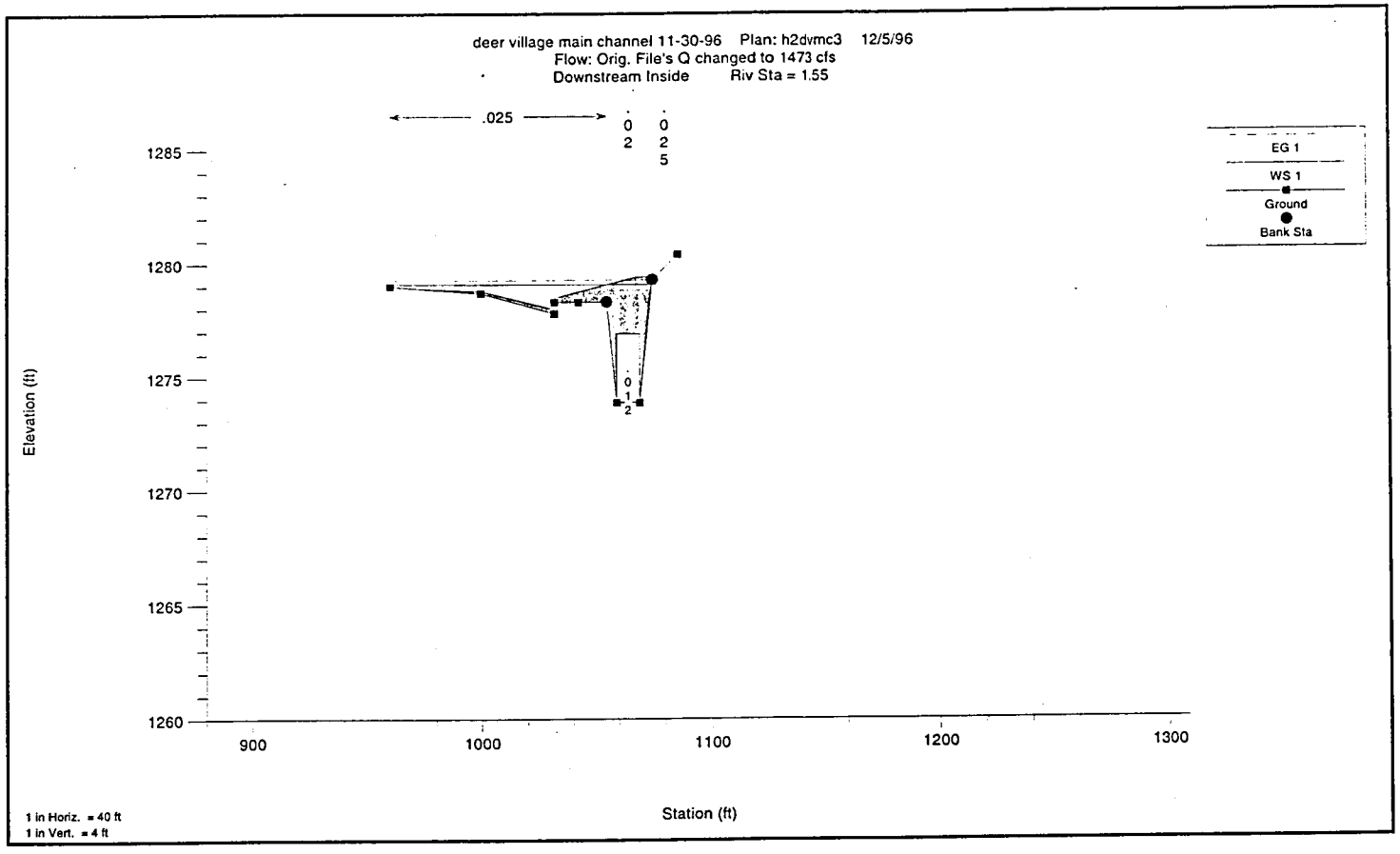

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
9 Riv Sta = 9
.035
.02
.035
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

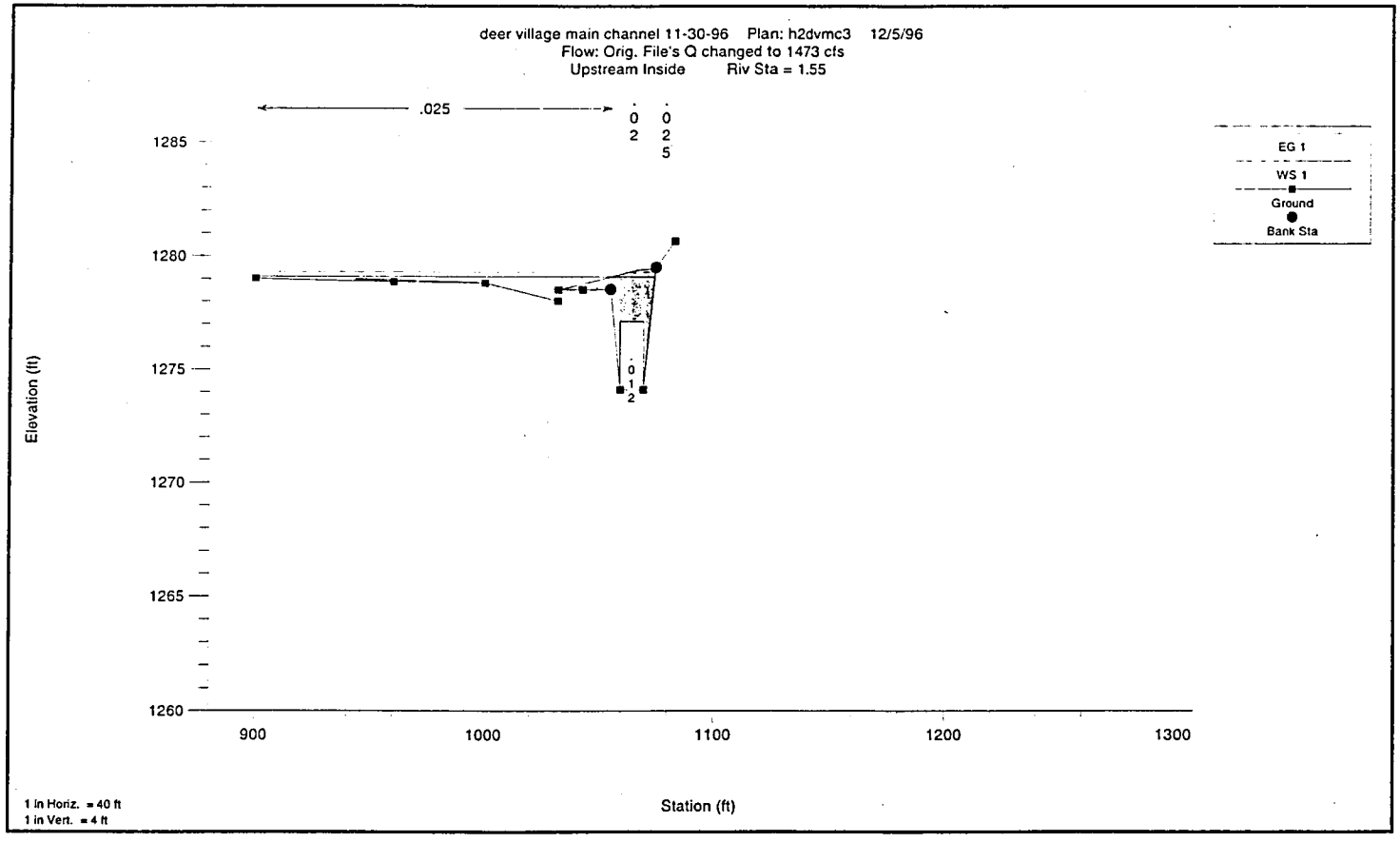

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1.1 Riv Sta = 1.1
.025
.02
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

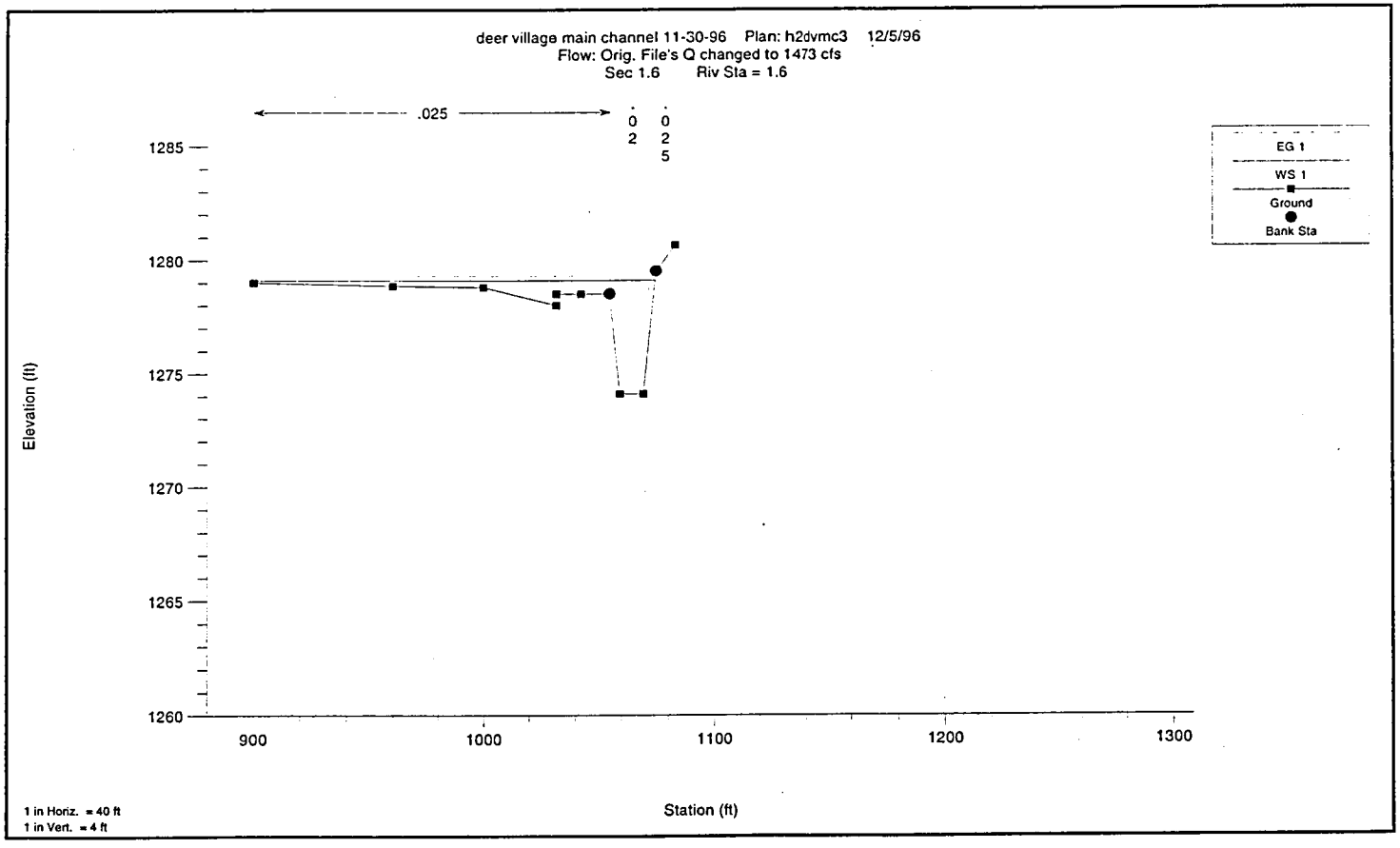

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1.3 Riv Sta = 1.3
.025
.02
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

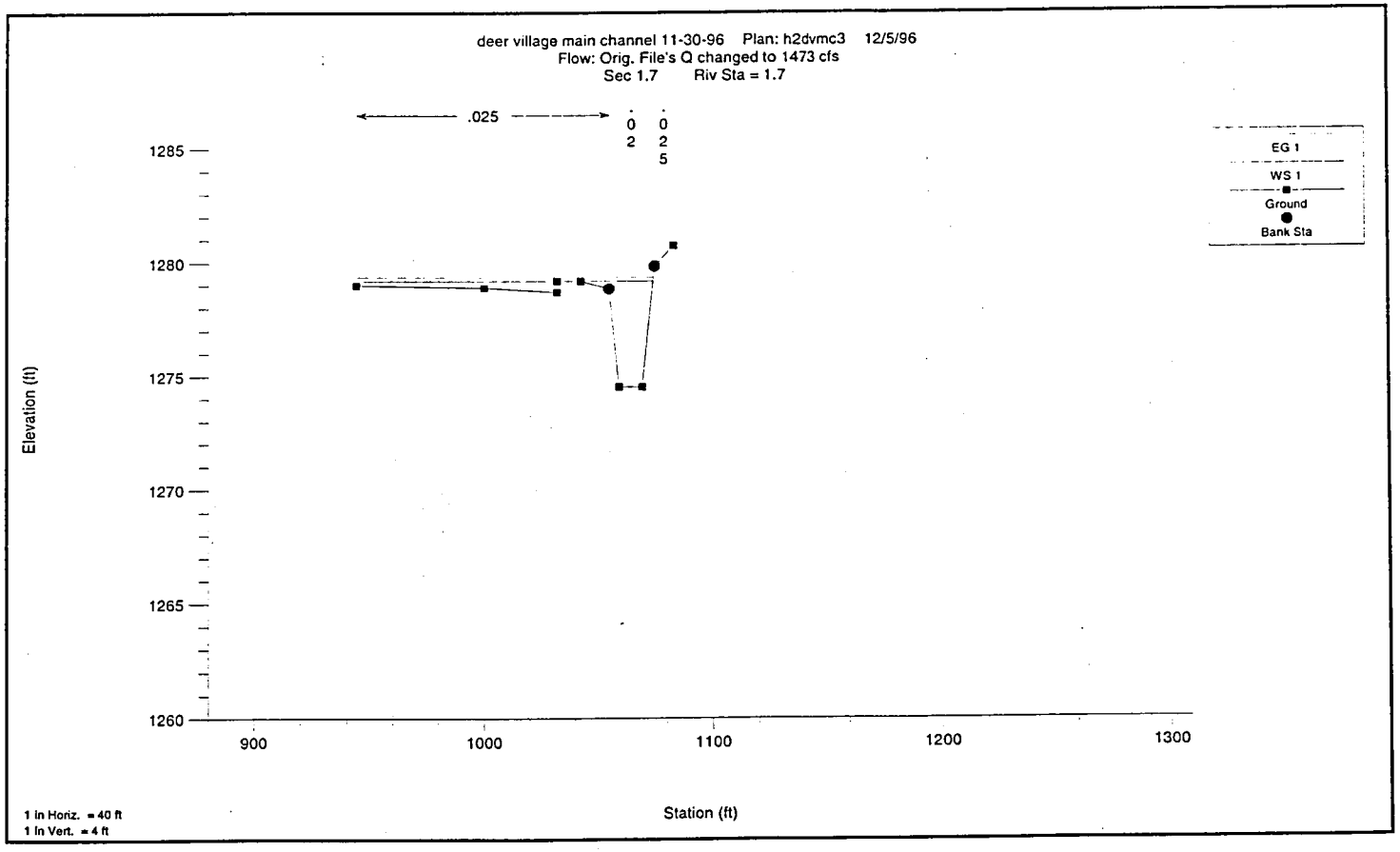

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1.4 Riv Sta = 1.4
.025
.02
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

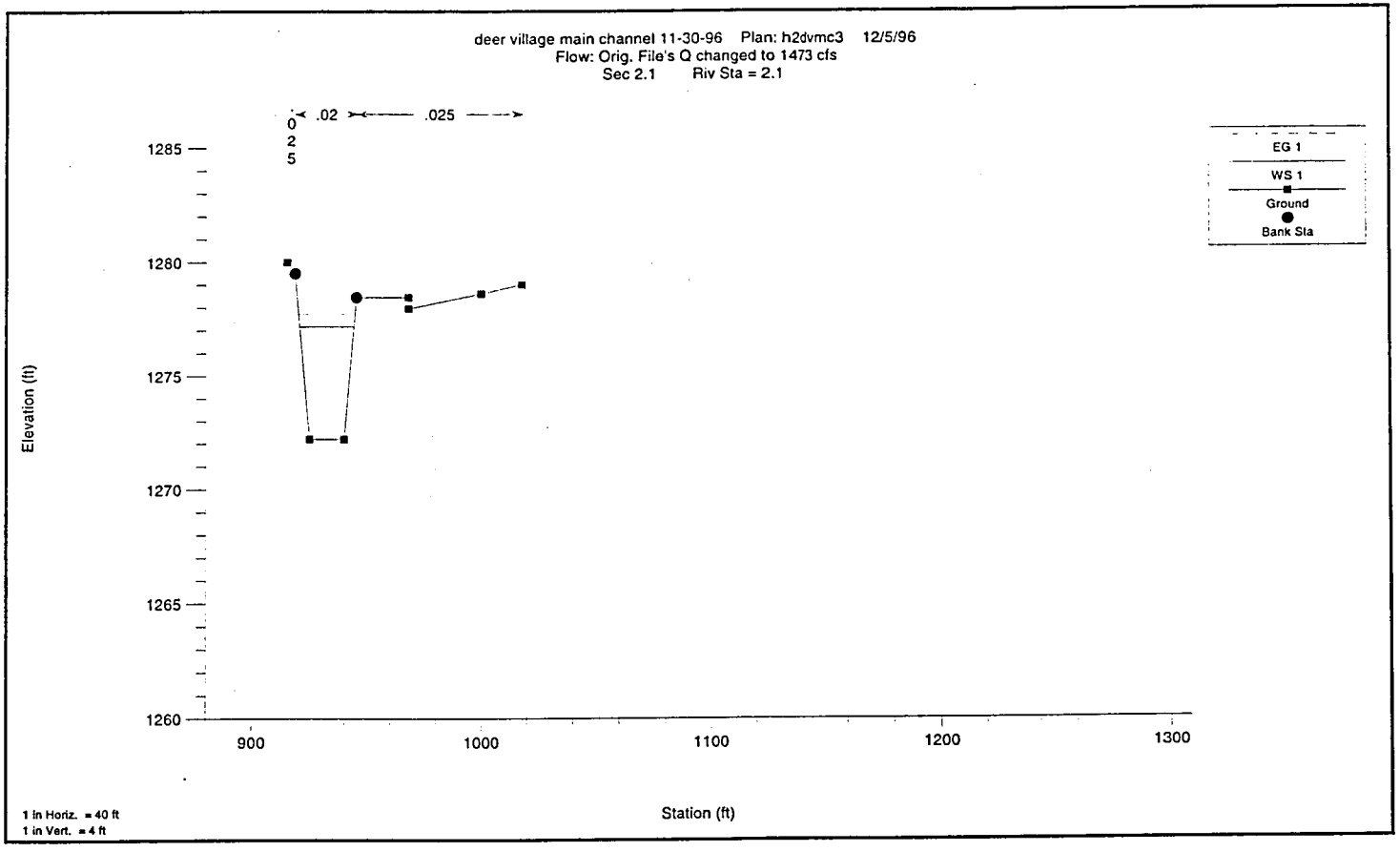

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1.5 Riv Sta = 1.5
.025
.025
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

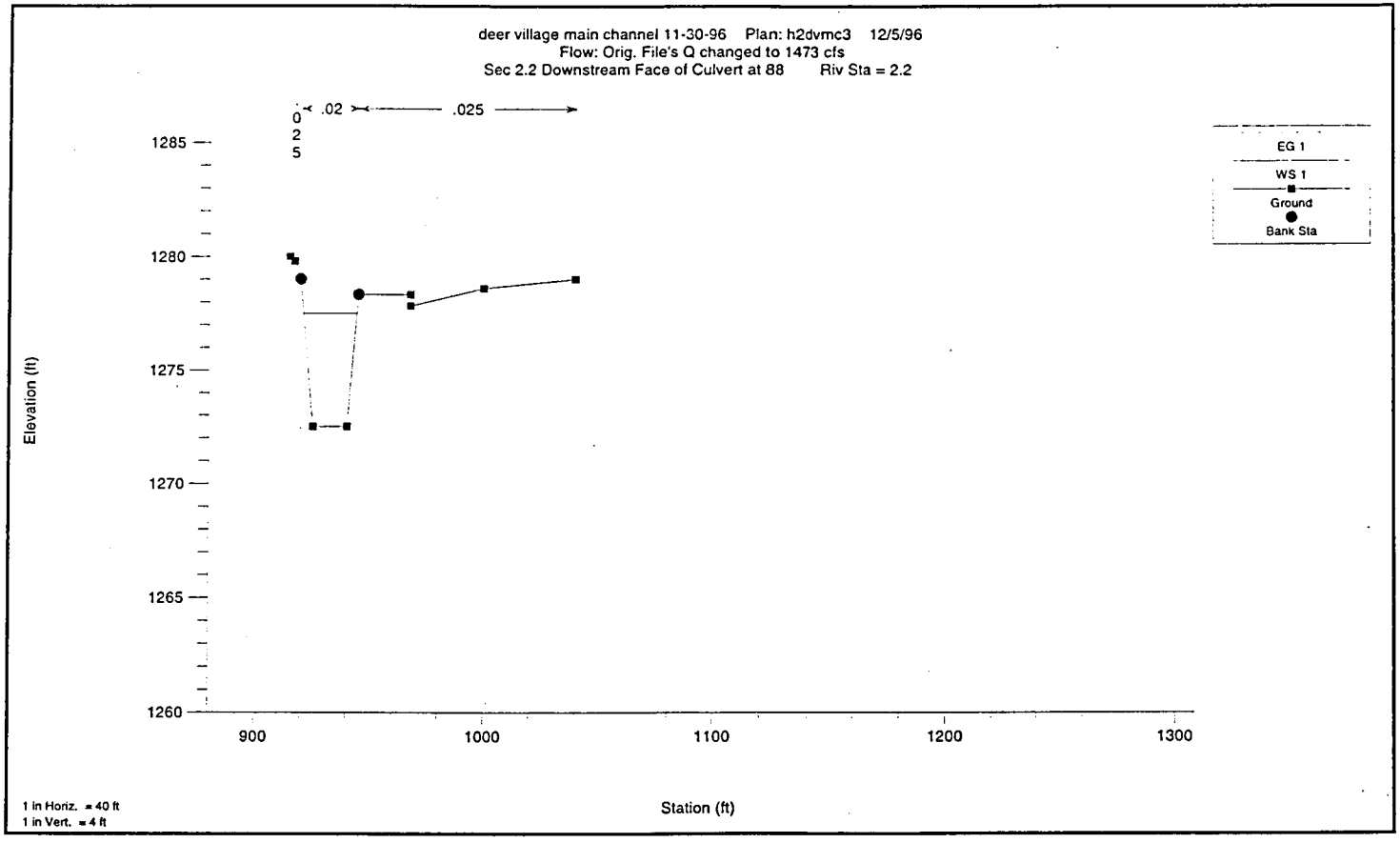

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Inside Riv Sta = 1.55
.025
0
2
0
2
5
0
1
2
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

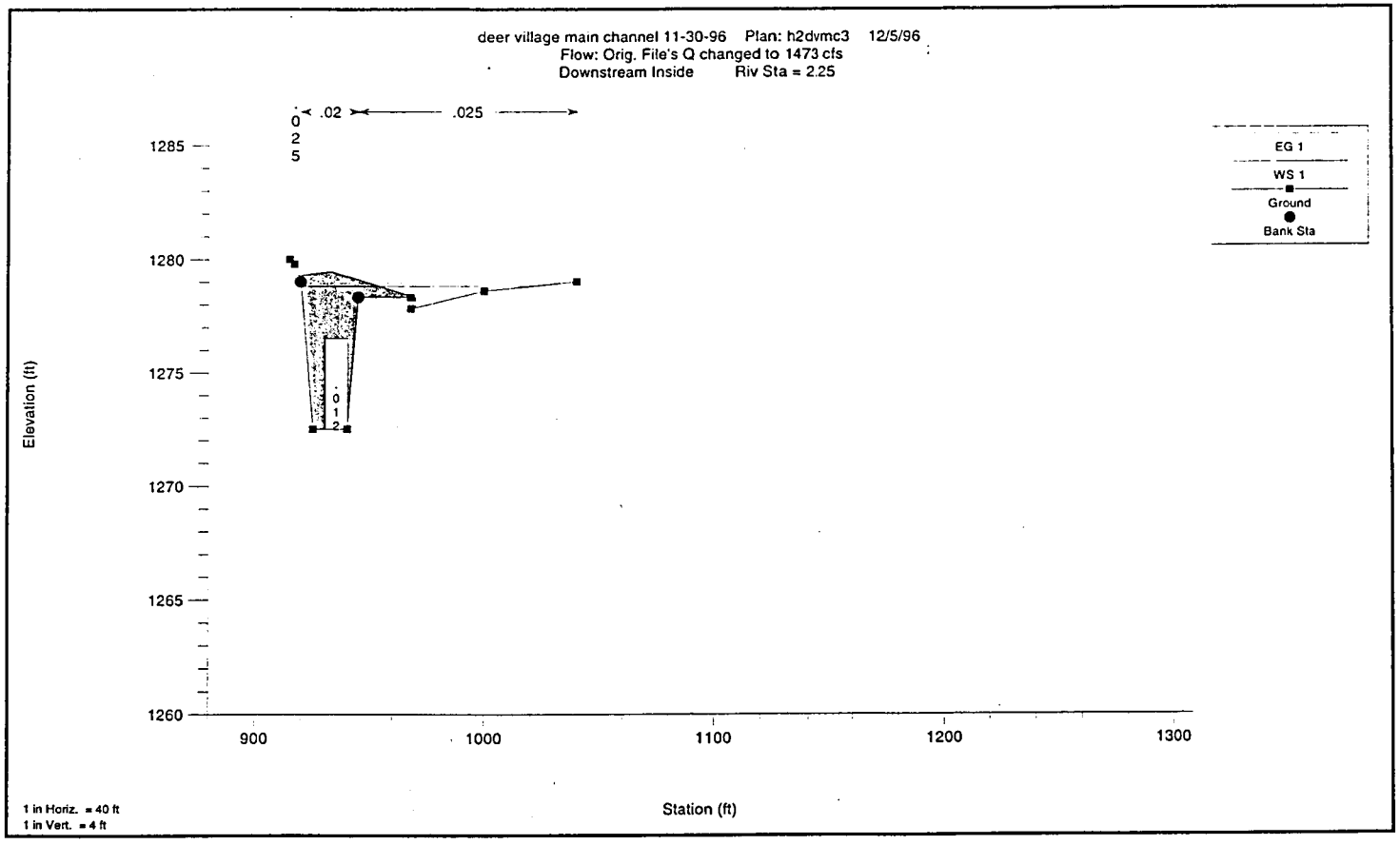

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Inside Riv Sta = 1.55
.025
.025
.025
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

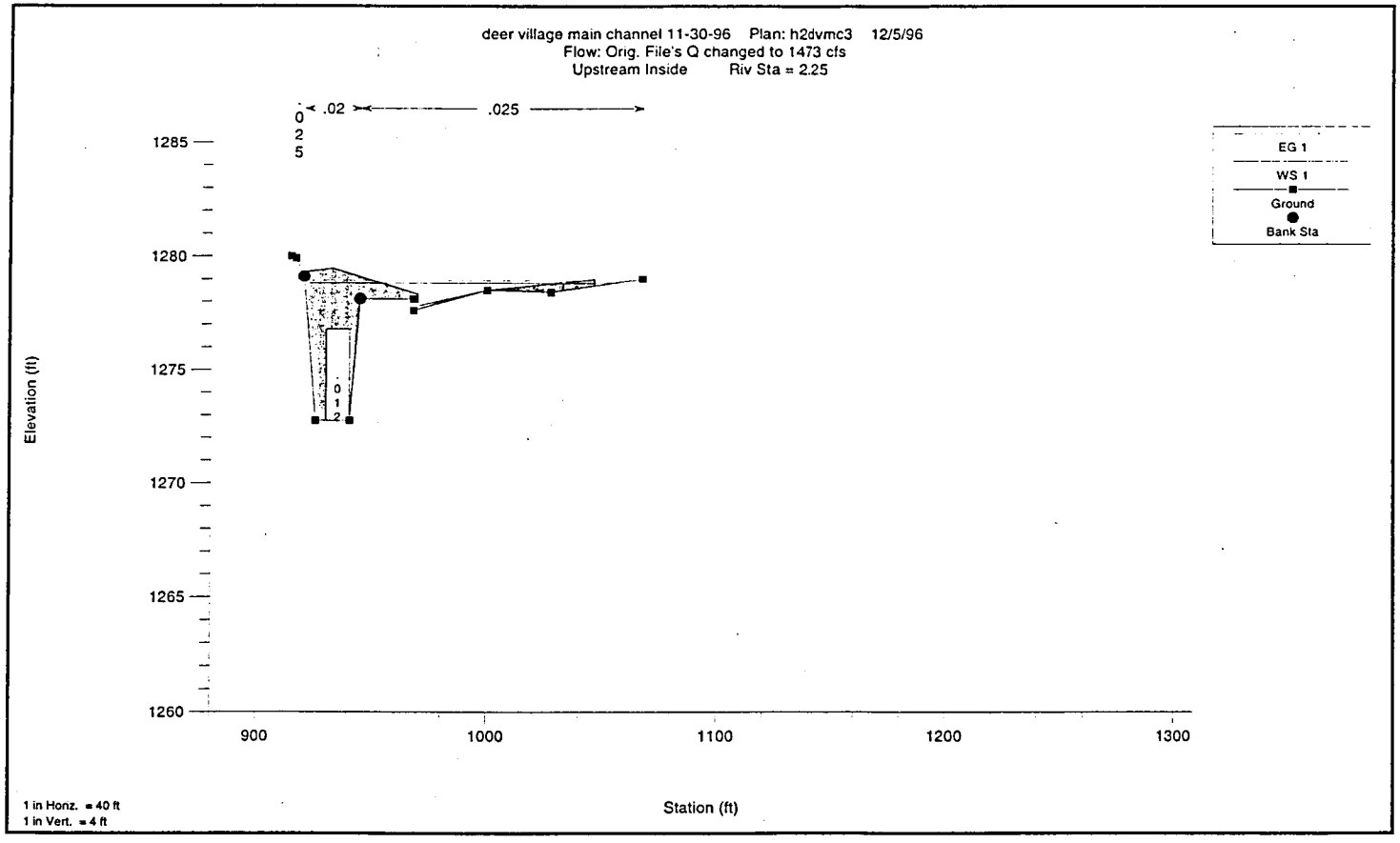

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1.6 Riv Sta = 1.6
.025
0 2
0 2 5
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

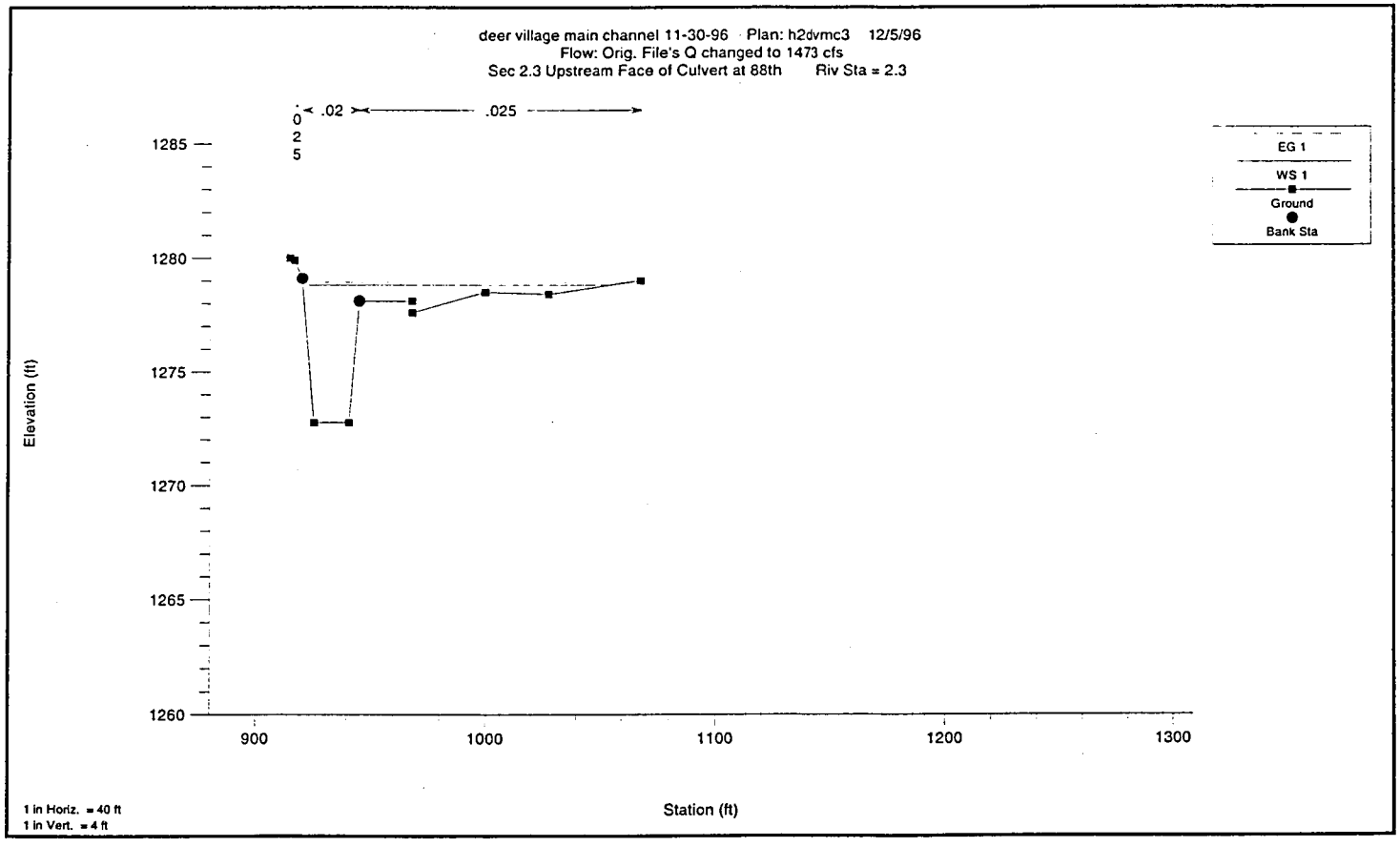

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 1.7 Riv Sta = 1.7
.025
.025
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 In Horiz. = 40 ft
1 In Vert. = 4 ft

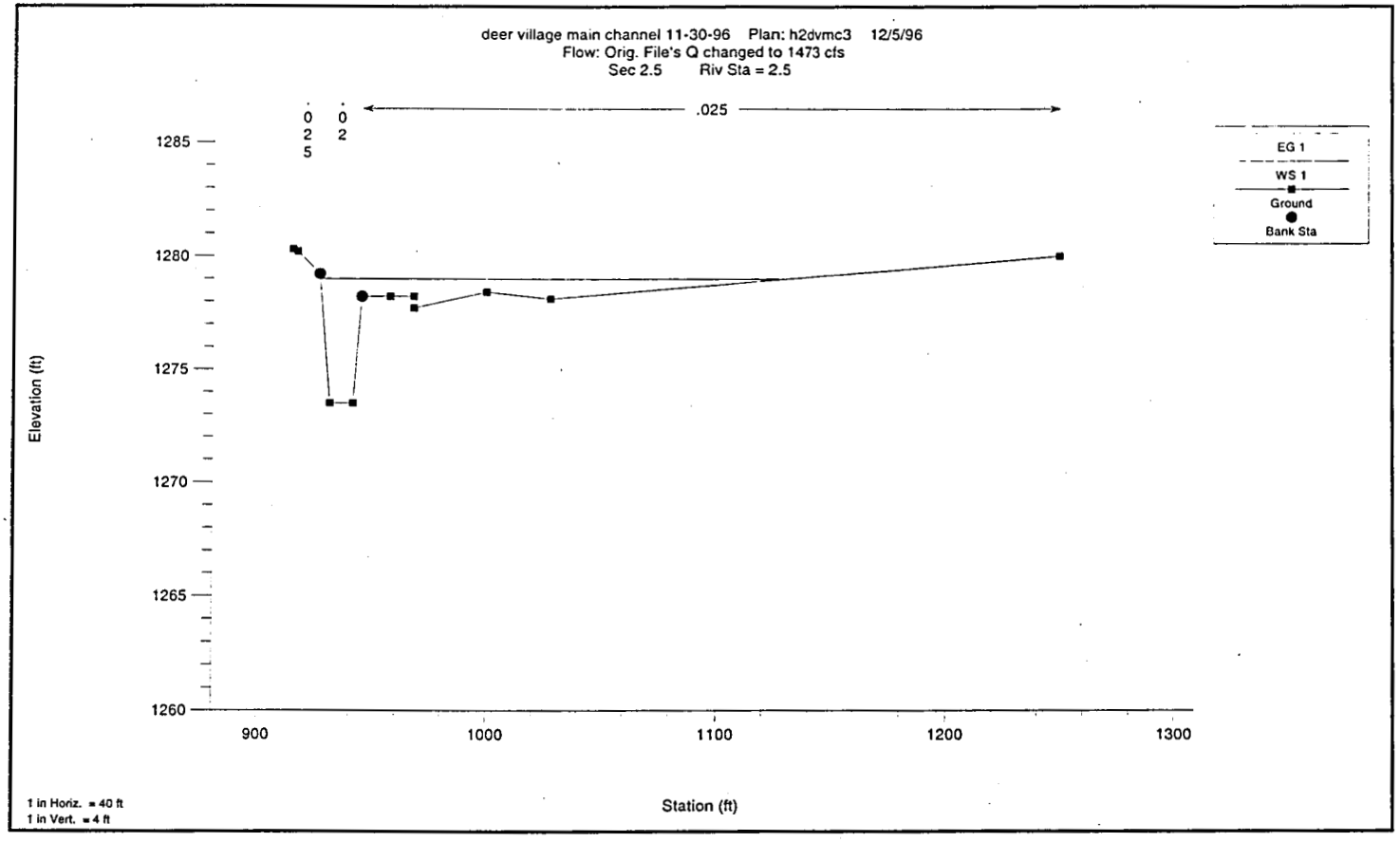

deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 2.1 Riv Sta = 2.1
.02
.025
0
2
5
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 2.2 Downstream Face of Culvert at 88 Riv Sta = 2.2
.02
.025
0
2
5
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Downstream Inside Riv Sta = 2.25
.02
.025
.025
.012
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Upstream Inside Riv Sta = 2.25
.02
.025
0
2
5
0
1
2
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 2.3 Upstream Face of Culvert at 88th Riv Sta = 2.3
.02
.025
0
2
5
1285
1280
1275
1270
1265
1260
Elevation (ft)
900
1000
1100
1200
1300
Station (ft)
EG 1
WS 1
Ground
Bank Sta
1 in Horiz. = 40 ft
1 in Vert. = 4 ft


deer village main channel 11-30-96 Plan: h2dvmc3 12/5/96
Flow: Orig. File's Q changed to 1473 cfs
Sec 2.5 Riv Sta = 2.5
.025
.025
.025
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
1260
900
1000
1100
1200
1300
Station (ft)
1 in Horiz. = 40 ft
1 in Vert. = 4 ft

HEC-RAS Plan: Plan 05 12/5/96

Reach	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)	
1.2	2.5	100.00	1273.50	1278.97		1278.98	0.000031	0.94	190.58	203.12	0.08
1.2	2.4	340.00	1272.85	1278.87		1278.96	0.000180	2.53	183.80	130.64	0.20
1.2	2.3	400.00	1272.76	1278.80	1275.43	1278.93	0.000260	3.04	175.74	134.08	0.42
1.2	2.25	Culvert									
1.2	2.2	460.00	1272.50	1277.49		1277.85	0.000815	4.81	95.61	23.33	0.42
1.2	2.1	570.00	1272.20	1277.15		1277.71	0.001274	5.99	95.11	23.40	0.52
1.1	1.7	250.00	1274.53	1279.20		1279.37	0.000487	3.42	97.67	129.99	0.32
1.1	1.6	320.00	1274.10	1279.09	1276.96	1279.28	0.000542	3.76	130.69	174.39	0.41
1.1	1.55	Culvert									
1.1	1.5	340.00	1273.87	1278.68		1278.98	0.000806	4.47	94.00	73.68	0.41
1.1	1.4	520.00	1273.43	1278.59		1278.86	0.000543	4.15	131.16	69.04	0.35
1.1	1.3	790.00	1272.92	1277.35		1278.53	0.002961	8.73	90.52	24.87	0.81
1.1	1.1	1060.00	1272.38	1276.79		1277.85	0.002685	8.27	128.12	38.15	0.80
1	10	1351.00	1270.50	1275.78	1275.78	1277.17	0.004657	11.34	170.67	58.43	1.05
1	9.75*	1351.00	1269.78	1275.03	1275.03	1276.34	0.004502	11.13	177.87	62.54	1.03
1	9.5*	1351.00	1269.05	1274.22	1274.22	1275.47	0.004492	11.01	183.38	66.26	1.03
1	9.25*	1351.00	1268.32	1273.35	1273.35	1274.55	0.004607	10.97	187.30	69.68	1.13
1	9	1367.00	1267.60	1273.23		1273.88	0.002300	8.29	249.30	77.67	0.74
1	8.6*	1367.00	1266.85	1272.17	1272.17	1273.55	0.003458	10.93	186.04	69.57	0.93
1	8.2	1367.00	1266.10	1271.31	1271.31	1272.80	0.002927	11.51	196.34	71.54	0.89
1	8.15	Culvert									
1	8.1	1367.00	1266.10	1271.31	1271.31	1272.80	0.002927	11.51	196.34	71.54	0.89
1	8.05*	1367.00	1264.75	1270.71		1271.12	0.000956	5.11	274.79	71.25	0.41
1	8	1402.00	1263.40	1270.86		1270.98	0.000352	2.86	490.69	88.30	0.21
1	7	1402.00	1263.35	1270.64	1266.55	1270.93	0.000322	4.37	350.00	74.45	0.35
1	6.6	Culvert									
1	6.5	1402.00	1263.30	1269.71		1270.10	0.000508	5.04	289.74	62.20	0.35
1	6	1402.00	1263.00	1269.02		1269.92	0.002620	9.21	218.18	63.45	0.80
1	5	1421.00	1262.70	1268.72		1269.57	0.002356	9.13	231.33	67.29	0.77
1	4	1435.00	1262.10	1268.39		1268.93	0.001636	7.47	283.15	76.86	0.64
1	3.6*	1435.00	1261.85	1267.28	1267.28	1268.68	0.003420	11.13	198.90	76.42	0.94
1	3.2	1435.00	1261.60	1267.07	1267.07	1268.44	0.002788	11.21	222.22	86.54	0.84
1	3.15	Culvert									
1	3.1	1435.00	1261.50	1267.04	1267.04	1268.42	0.002759	11.18	221.74	86.12	0.84
1	3.05*	1435.00	1261.38	1266.82	1266.82	1268.06	0.003025	10.78	222.63	90.30	0.88
1	3	1465.00	1261.25	1266.79		1267.37	0.002219	8.07	282.09	89.15	0.73
1	2.75*	1465.00	1260.99	1265.87	1265.87	1267.09	0.003217	9.85	206.34	81.12	0.90
1	2.5*	1465.00	1260.72	1265.19	1265.19	1266.54	0.003232	9.51	174.09	74.53	0.90
1	2.25*	1465.00	1260.46	1264.53		1265.70	0.003043	8.69	168.61	53.12	0.86
1	2	1465.00	1260.20	1264.78		1265.38	0.001288	6.19	236.80	65.33	0.57
1	1	1465.00	1260.20	1264.80	1263.03	1265.34	0.001011	5.89	248.76	54.18	1.00

HEC-RAS Plan: Plan 05 12/5/96 (continued)

Reach	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)	
1	.5	Culvert									
1	.4	1473.00	1260.20	1263.04	1263.04	1264.47	0.004737	9.60	153.47	54.11	1.00

HEC-RAS Plan: Plan 05 12/5/96

Reach	River Sta.	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1.2	2.5	1278.98	1278.97	0.01	0.02	0.01		73.55	26.45	203.12
1.2	2.4	1278.96	1278.87	0.09	0.01	0.01		303.82	36.18	130.64
1.2	2.3	1278.93	1278.80	0.13	0.00	0.00		366.44	33.56	134.08
1.2	2.25	Culvert								
1.2	2.2	1277.85	1277.49	0.36	0.08	0.06		460.00		23.33
1.2	2.1	1277.71	1277.15	0.56	0.29	0.25		570.00		23.40
1.1	1.7	1279.37	1279.20	0.17	0.08	0.00	15.66	234.34		129.99
1.1	1.6	1279.28	1279.09	0.19	0.00	0.00	39.33	280.67		174.39
1.1	1.55	Culvert								
1.1	1.5	1278.98	1278.68	0.29	0.11	0.01	21.36	318.64		73.68
1.1	1.4	1278.86	1278.59	0.27	0.23	0.09	3.22	516.78		69.04
1.1	1.3	1278.53	1277.35	1.18	0.65	0.04		790.00		24.87
1.1	1.1	1277.85	1276.79	1.06	0.57	0.10		1060.00		38.15
1	10	1277.17	1275.78	1.39	0.42	0.04	527.80	823.20		58.43
1	9.75*	1276.34	1275.03	1.31	0.41	0.03	551.71	799.29		62.54
1	9.5*	1275.47	1274.22	1.25	0.42	0.02	582.60	768.40		66.26
1	9.25*	1274.55	1273.35	1.20			618.03	732.97		69.68
1	9	1273.88	1273.23	0.65	0.25	0.07	717.13	649.87		77.67
1	8.6*	1273.55	1272.17	1.38	0.29	0.01	405.34	959.51	2.15	69.57
1	8.2	1272.80	1271.31	1.49	0.00	0.00	207.32	946.52	213.16	71.54
1	8.15	Culvert								
1	8.1	1272.80	1271.31	1.49	0.14	0.33	207.32	946.52	213.16	71.54
1	8.05*	1271.12	1270.71	0.40	0.05	0.08	3.39	1359.21	4.40	71.25
1	8	1270.98	1270.86	0.13	0.01	0.05		1402.00		88.30
1	7	1270.93	1270.64	0.29	0.00	0.00	13.76	1372.46	15.78	74.45
1	6.6	Culvert								
1	6.5	1270.10	1269.71	0.39	0.03	0.15	4.69	1391.93	5.38	62.20
1	6	1269.92	1269.02	0.89	0.32	0.02		797.12	604.88	63.45
1	5	1269.57	1268.72	0.85	0.54	0.09	1.78	785.13	634.10	67.29
1	4	1268.93	1268.39	0.54	0.17	0.09		691.27	743.73	76.86
1	3.6*	1268.68	1267.28	1.40			7.76	978.85	448.39	76.42
1	3.2	1268.44	1267.07	1.37	0.00	0.00	213.34	962.53	259.13	86.54
1	3.15	Culvert								
1	3.1	1268.42	1267.04	1.37	0.12	0.04	208.88	972.41	253.71	86.12
1	3.05*	1268.06	1266.82	1.24	0.11	0.20	25.33	921.14	488.53	90.30
1	3	1267.37	1266.79	0.58	0.21	0.06		617.38	847.62	89.15
1	2.75*	1267.09	1265.87	1.22	0.26	0.01		1146.31	318.69	81.12
1	2.5*	1266.54	1265.19	1.36	0.25	0.06		1411.80	53.20	74.53
1	2.25*	1265.70	1264.53	1.17	0.15	0.17		1465.00		53.12
1	2	1265.38	1264.78	0.59	0.01	0.03		1465.00		65.33
1	1	1265.34	1264.80	0.54	0.00	0.00		1465.00		54.18

HEC-RAS Plan: Plan 05 12/5/96 (continued)

Reach	River Sta.	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
1	.5	Culvert								
1	.4	1264.47	1263.04	1.43	0.00	0.00		1473.00		54.11

HEC-RAS Plan: Plan 05 12/5/96

Reach	River Sta.	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min Top Rd	Culv Q	Q Weir	Delta WS	Culv Vel In	Culv Vel Out
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
1.2	2.25	1278.94	1278.80	1277.87	1278.94	1277.82	297.86	102.14	1.31	7.45	7.45
1.1	1.55	1279.29	1279.09	1277.07	1279.29	1278.00	141.85	178.15	0.41	4.73	4.73
1	8.15	1272.80	1271.31	1266.12	1272.80	1267.60	0.01	1367.03	0.00	0.00	0.00
1	6.6	1270.93	1270.64	1268.80	1270.93	1271.50	1402.00		0.93	7.01	7.01
1	3.15	1268.42	1267.07	1261.62	1268.42	1263.20	0.01	1435.07	0.02	0.00	0.00
1	.5	1265.34	1264.80	1265.20	1265.34	1265.70	1465.00		1.76	8.91	9.81

Plan: Plan 05 Reach: 1.2 Riv Sta: 2.5 Profile: 1 12/5/96

W.S. Elev (ft)	1278.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.020	0.025
E.G. Elev (ft)	1278.98	Reach Len. (ft)	180.00	180.00	180.00
E.G. Slope (ft/ft)	0.000031	Flow Area (sq ft)		78.62	111.96
Q Total (cfs)	100.00	Flow (cfs)		73.55	26.45
Top Width (ft)	203.12	Top Width (ft)		18.21	184.91
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.94	0.24
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)		4.32	0.61
Crit W.S. (ft)		Wetted Per. (ft)		23.07	185.33
Conv. Total (cfs)	17981.5	Conv. (cfs)		13226.1	4755.3

Plan: Plan 05 Reach: 1.2 Riv Sta: 2.4 Profile: 1 12/5/96

W.S. Elev (ft)	1278.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.020	0.025
E.G. Elev (ft)	1278.96	Reach Len. (ft)	40.00	40.00	40.00
E.G. Slope (ft/ft)	0.000180	Flow Area (sq ft)		119.93	63.87
Q Total (cfs)	340.00	Flow (cfs)		303.82	36.18
Top Width (ft)	130.64	Top Width (ft)		24.32	106.32
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		2.53	0.57
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		4.93	0.60
Crit W.S. (ft)		Wetted Per. (ft)		29.62	106.74
Conv. Total (cfs)	25330.6	Conv. (cfs)		22635.2	2695.4

Plan: Plan 05 Reach: 1.2 Riv Sta: 2.3 Profile: 1 12/5/96

W.S. Elev (ft)	1278.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.020	0.025
E.G. Elev (ft)	1278.93	Reach Len. (ft)	75.00	75.00	75.00
E.G. Slope (ft/ft)	0.000260	Flow Area (sq ft)		120.36	55.37
Q Total (cfs)	400.00	Flow (cfs)		366.44	33.56
Top Width (ft)	134.08	Top Width (ft)		24.35	109.73
Vel Total (ft/s)	2.28	Avg. Vel. (ft/s)		3.04	0.61
Max Chl Dpth (ft)	6.04	Hydr. Depth (ft)		4.94	0.50
Crit W.S. (ft)	1275.43	Wetted Per. (ft)		29.73	110.16
Conv. Total (cfs)	24796.6	Conv. (cfs)		22716.1	2080.5

Plan: Plan 05 Reach: 1.2 Riv Sta: 2.2 Profile: 1 12/5/96

W.S. Elev (ft)	1277.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.020	
E.G. Elev (ft)	1277.85	Reach Len. (ft)	75.00	75.00	75.00
E.G. Slope (ft/ft)	0.000815	Flow Area (sq ft)		95.61	
Q Total (cfs)	460.00	Flow (cfs)		460.00	
Top Width (ft)	23.33	Top Width (ft)		23.33	
Vel Total (ft/s)	4.81	Avg. Vel. (ft/s)		4.81	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		4.10	
Crit W.S. (ft)		Wetted Per. (ft)		28.00	
Conv. Total (cfs)	16108.2	Conv. (cfs)		16108.2	

Plan: Plan 05 Reach: 1.2 Riv Sta: 2.1 Profile: 1 12/5/96

W.S. Elev (ft)	1277.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.020	
E.G. Elev (ft)	1277.71	Reach Len. (ft)	100.00	100.00	100.00
E.G. Slope (ft/ft)	0.001274	Flow Area (sq ft)		95.11	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	23.40	Top Width (ft)		23.40	
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)		5.99	
Max Chl Dpth (ft)	4.95	Hydr. Depth (ft)		4.06	
Crit W.S. (ft)		Wetted Per. (ft)		27.99	
Conv. Total (cfs)	15970.7	Conv. (cfs)		15970.7	

Plan: Plan 05 Reach: 1.1 Riv Sta: 1.7 Profile: 1 12/5/96

W.S. Elev (ft)	1279.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.025	0.020	
E.G. Elev (ft)	1279.37	Reach Len. (ft)	165.00	165.00	165.00
E.G. Slope (ft/ft)	0.000487	Flow Area (sq ft)	29.19	68.48	
Q Total (cfs)	250.00	Flow (cfs)	15.66	234.34	
Top Width (ft)	129.99	Top Width (ft)	111.00	18.99	
Vel Total (ft/s)	2.56	Avg. Vel. (ft/s)	0.54	3.42	
Max Chl Dpth (ft)	4.67	Hydr. Depth (ft)	0.26	3.61	
Crit W.S. (ft)		Wetted Per. (ft)	111.62	22.72	
Conv. Total (cfs)	11327.2	Conv. (cfs)	709.7	10617.6	

Plan: Plan 05 Reach: 1.1 Riv Sta: 1.6 Profile: 1 12/5/96

W.S. Elev (ft)	1279.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.025	0.020	
E.G. Elev (ft)	1279.28	Reach Len. (ft)	100.00	100.00	100.00
E.G. Slope (ft/ft)	0.000542	Flow Area (sq ft)	56.07	74.61	
Q Total (cfs)	320.00	Flow (cfs)	39.33	280.67	
Top Width (ft)	174.39	Top Width (ft)	155.00	19.39	
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	0.70	3.76	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)	0.36	3.85	
Crit W.S. (ft)	1276.96	Wetted Per. (ft)	155.51	23.28	
Conv. Total (cfs)	13739.6	Conv. (cfs)	1688.5	12051.1	

Plan: Plan 05 Reach: 1.1 Riv Sta: 1.5 Profile: 1 12/5/96

W.S. Elev (ft)	1278.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.025	0.020	
E.G. Elev (ft)	1278.98	Reach Len. (ft)	175.00	175.00	175.00
E.G. Slope (ft/ft)	0.000806	Flow Area (sq ft)	22.76	71.24	
Q Total (cfs)	340.00	Flow (cfs)	21.36	318.64	
Top Width (ft)	73.68	Top Width (ft)	54.44	19.24	
Vel Total (ft/s)	3.62	Avg. Vel. (ft/s)	0.94	4.47	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)	0.42	3.70	
Crit W.S. (ft)		Wetted Per. (ft)	54.86	23.07	
Conv. Total (cfs)	11976.4	Conv. (cfs)	752.4	11224.0	

Plan: Plan 05 Reach: 1.1 Riv Sta: 1.4 Profile: 1 12/5/96

W.S. Elev (ft)	1278.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.025	0.020	
E.G. Elev (ft)	1278.86	Reach Len. (ft)	185.00	185.00	185.00
E.G. Slope (ft/ft)	0.000543	Flow Area (sq ft)	6.66	124.50	
Q Total (cfs)	520.00	Flow (cfs)	3.22	516.78	
Top Width (ft)	69.04	Top Width (ft)	39.80	29.23	
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)	0.48	4.15	
Max Chl Dpth (ft)	5.16	Hydr. Depth (ft)	0.17	4.26	
Crit W.S. (ft)		Wetted Per. (ft)	40.19	33.54	
Conv. Total (cfs)	22314.7	Conv. (cfs)	138.3	22176.3	

Plan: Plan 05 Reach: 1.1 Riv Sta: 1.3 Profile: 1 12/5/96

W.S. Elev (ft)	1277.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.020	
E.G. Elev (ft)	1278.53	Reach Len. (ft)	232.00	232.00	232.00
E.G. Slope (ft/ft)	0.002961	Flow Area (sq ft)		90.52	
Q Total (cfs)	790.00	Flow (cfs)		790.00	
Top Width (ft)	24.87	Top Width (ft)		24.87	
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		8.73	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		3.64	
Crit W.S. (ft)		Wetted Per. (ft)		28.54	
Conv. Total (cfs)	14518.5	Conv. (cfs)		14518.5	

Plan: Plan 05 Reach: 1.1 Riv Sta: 1.1 Profile: 1 12/5/96

W.S. Elev (ft)	1276.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.		0.020	
E.G. Elev (ft)	1277.85	Reach Len. (ft)	160.00	160.00	160.00
E.G. Slope (ft/ft)	0.002685	Flow Area (sq ft)		128.12	
Q Total (cfs)	1060.00	Flow (cfs)		1060.00	
Top Width (ft)	38.15	Top Width (ft)		38.15	
Vel Total (ft/s)	8.27	Avg. Vel. (ft/s)		8.27	
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)		3.36	
Crit W.S. (ft)		Wetted Per. (ft)		40.66	
Conv. Total (cfs)	20457.2	Conv. (cfs)		20457.2	

Plan: Plan 05 Reach: 1 Riv Sta: 10 Profile: 1 12/5/96

W.S. Elev (ft)	1275.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.035	0.020	
E.G. Elev (ft)	1277.17	Reach Len. (ft)	91.25	91.25	91.25
E.G. Slope (ft/ft)	0.004657	Flow Area (sq ft)	98.09	72.57	
Q Total (cfs)	1351.00	Flow (cfs)	527.80	823.20	
Top Width (ft)	58.43	Top Width (ft)	38.41	20.02	
Vel Total (ft/s)	7.92	Avg. Vel. (ft/s)	5.38	11.34	
Max Chl Dpth (ft)	5.28	Hydr. Depth (ft)	2.55	3.63	
Crit W.S. (ft)	1275.78	Wetted Per. (ft)	38.76	21.69	
Conv. Total (cfs)	19797.1	Conv. (cfs)	7734.2	12062.9	

Plan: Plan 05 Reach: 1 Riv Sta: 9.75* Profile: 1 12/5/96

W.S. Elev (ft)	1275.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.	0.035	0.020	
E.G. Elev (ft)	1276.34	Reach Len. (ft)	91.25	91.25	91.25
E.G. Slope (ft/ft)	0.004502	Flow Area (sq ft)	106.04	71.83	
Q Total (cfs)	1351.00	Flow (cfs)	551.71	799.29	
Top Width (ft)	62.54	Top Width (ft)	42.68	19.86	
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)	5.20	11.13	
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)	2.48	3.62	
Crit W.S. (ft)	1275.03	Wetted Per. (ft)	42.95	21.54	
Conv. Total (cfs)	20135.3	Conv. (cfs)	8222.7	11912.6	

Plan: Plan 05 Reach: 1 Riv Sta: 9.5* Profile: 1 12/5/96

W.S. Elev (ft)	1274.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.	0.035	0.020	
E.G. Elev (ft)	1275.47	Reach Len. (ft)	91.25	91.25	91.25
E.G. Slope (ft/ft)	0.004492	Flow Area (sq ft)	113.59	69.79	
Q Total (cfs)	1351.00	Flow (cfs)	582.60	768.40	
Top Width (ft)	66.26	Top Width (ft)	46.70	19.55	
Vel Total (ft/s)	7.37	Avg. Vel. (ft/s)	5.13	11.01	
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)	2.43	3.57	
Crit W.S. (ft)	1274.22	Wetted Per. (ft)	46.94	21.22	
Conv. Total (cfs)	20157.5	Conv. (cfs)	8692.6	11464.9	

Plan: Plan 05 Reach: 1 Riv Sta: 9.25* Profile: 1 12/5/96

W.S. Elev (ft)	1273.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.	0.035	0.020	
E.G. Elev (ft)	1274.55	Reach Len. (ft)	91.25	91.25	91.25
E.G. Slope (ft/ft)	0.004607	Flow Area (sq ft)	120.51	66.79	
Q Total (cfs)	1351.00	Flow (cfs)	618.03	732.97	
Top Width (ft)	69.68	Top Width (ft)	50.52	19.16	
Vel Total (ft/s)	7.21	Avg. Vel. (ft/s)	5.13	10.97	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)	2.39	3.49	
Crit W.S. (ft)	1273.35	Wetted Per. (ft)	50.76	20.80	
Conv. Total (cfs)	19903.4	Conv. (cfs)	9105.1	10798.4	

Plan: Plan 05 Reach: 1 Riv Sta: 9 Profile: 1 12/5/96

W.S. Elev (ft)	1273.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.	0.035	0.020	
E.G. Elev (ft)	1273.88	Reach Len. (ft)	91.00	91.00	91.00
E.G. Slope (ft/ft)	0.002300	Flow Area (sq ft)	170.94	78.35	
Q Total (cfs)	1367.00	Flow (cfs)	717.13	649.87	
Top Width (ft)	77.67	Top Width (ft)	57.41	20.26	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)	4.20	8.29	
Max Chl Dpth (ft)	5.63	Hydr. Depth (ft)	2.98	3.87	
Crit W.S. (ft)		Wetted Per. (ft)	57.79	22.06	
Conv. Total (cfs)	28505.4	Conv. (cfs)	14954.0	13551.4	

Plan: Plan 05 Reach: 1 Riv Sta: 8.6* Profile: 1 12/5/96

W.S. Elev (ft)	1272.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.38	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1273.55	Reach Len. (ft)	91.00	91.00	91.00
E.G. Slope (ft/ft)	0.003458	Flow Area (sq ft)	96.48	87.82	1.75
Q Total (cfs)	1367.00	Flow (cfs)	405.34	959.51	2.15
Top Width (ft)	69.57	Top Width (ft)	43.99	20.60	4.98
Vel Total (ft/s)	7.35	Avg. Vel. (ft/s)	4.20	10.93	1.23
Max Chl Dpth (ft)	5.32	Hydr. Depth (ft)	2.19	4.26	0.35
Crit W.S. (ft)	1272.17	Wetted Per. (ft)	44.19	22.20	5.03
Conv. Total (cfs)	23247.0	Conv. (cfs)	6893.1	16317.2	36.6

Plan: Plan 05 Reach: 1 Riv Sta: 8.2 Profile: 1 12/5/96

W.S. Elev (ft)	1271.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1272.80	Reach Len. (ft)	16.00	16.00	16.00
E.G. Slope (ft/ft)	0.002927	Flow Area (sq ft)	56.27	82.24	57.83
Q Total (cfs)	1367.00	Flow (cfs)	207.32	946.52	213.16
Top Width (ft)	71.54	Top Width (ft)	27.39	16.00	28.15
Vel Total (ft/s)	6.96	Avg. Vel. (ft/s)	3.68	11.51	3.69
Max Chl Dpth (ft)	5.21	Hydr. Depth (ft)	2.05	5.14	2.05
Crit W.S. (ft)	1271.31	Wetted Per. (ft)	27.70	16.97	28.45
Conv. Total (cfs)	25266.8	Conv. (cfs)	3832.0	17494.8	3940.0

Plan: Plan 05 Reach: 1 Riv Sta: 8.1 Profile: 1 12/5/96

W.S. Elev (ft)	1271.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1272.80	Reach Len. (ft)	93.50	93.50	93.50
E.G. Slope (ft/ft)	0.002927	Flow Area (sq ft)	56.27	82.24	57.83
Q Total (cfs)	1367.00	Flow (cfs)	207.32	946.52	213.16
Top Width (ft)	71.54	Top Width (ft)	27.39	16.00	28.15
Vel Total (ft/s)	6.96	Avg. Vel. (ft/s)	3.68	11.51	3.69
Max Chl Dpth (ft)	5.21	Hydr. Depth (ft)	2.05	5.14	2.05
Crit W.S. (ft)	1271.31	Wetted Per. (ft)	27.70	16.97	28.45
Conv. Total (cfs)	25266.8	Conv. (cfs)	3832.0	17494.8	3940.0

Plan: Plan 05 Reach: 1 Riv Sta: 8.05* Profile: 1 12/5/96

W.S. Elev (ft)	1270.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.035	0.025	0.035
E.G. Elev (ft)	1271.12	Reach Len. (ft)	93.50	93.50	93.50
E.G. Slope (ft/ft)	0.000956	Flow Area (sq ft)	3.95	265.99	4.84
Q Total (cfs)	1367.00	Flow (cfs)	3.39	1359.21	4.40
Top Width (ft)	71.25	Top Width (ft)	7.43	55.50	8.32
Vel Total (ft/s)	4.97	Avg. Vel. (ft/s)	0.86	5.11	0.91
Max Chl Dpth (ft)	5.96	Hydr. Depth (ft)	0.53	4.79	0.58
Crit W.S. (ft)		Wetted Per. (ft)	7.51	57.35	8.40
Conv. Total (cfs)	44217.9	Conv. (cfs)	109.5	43965.9	142.5

Plan: Plan 05 Reach: 1 Riv Sta: 8 Profile: 1 12/5/96

W.S. Elev (ft)	1270.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
E.G. Elev (ft)	1270.98	Reach Len. (ft)	25.00	25.00	25.00
E.G. Slope (ft/ft)	0.000352	Flow Area (sq ft)		490.69	
Q Total (cfs)	1402.00	Flow (cfs)		1402.00	
Top Width (ft)	88.30	Top Width (ft)		88.30	
Vel Total (ft/s)	2.86	Avg. Vel. (ft/s)		2.86	
Max Chl Dpth (ft)	7.46	Hydr. Depth (ft)		5.56	
Crit W.S. (ft)		Wetted Per. (ft)		90.97	
Conv. Total (cfs)	74751.8	Conv. (cfs)		74751.8	

Plan: Plan 05 Reach: 1 Riv Sta: 7 Profile: 1 12/5/96

W.S. Elev (ft)	1270.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1270.93	Reach Len. (ft)	55.00	55.00	55.00
E.G. Slope (ft/ft)	0.000322	Flow Area (sq ft)	16.66	314.27	19.07
Q Total (cfs)	1402.00	Flow (cfs)	13.76	1372.46	15.78
Top Width (ft)	74.45	Top Width (ft)	14.57	43.20	16.68
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)	0.83	4.37	0.83
Max Chl Dpth (ft)	7.29	Hydr. Depth (ft)	1.14	7.27	1.14
Crit W.S. (ft)	1266.55	Wetted Per. (ft)	14.75	53.00	16.84
Conv. Total (cfs)	78137.8	Conv. (cfs)	767.0	76491.2	879.6

Plan: Plan 05 Reach: 1 Riv Sta: 6.5 Profile: 1 12/5/96

W.S. Elev (ft)	1269.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1270.10	Reach Len. (ft)	35.00	35.00	35.00
E.G. Slope (ft/ft)	0.000508	Flow Area (sq ft)	6.24	276.36	7.14
Q Total (cfs)	1402.00	Flow (cfs)	4.69	1391.93	5.38
Top Width (ft)	62.20	Top Width (ft)	8.86	43.20	10.14
Vel Total (ft/s)	4.84	Avg. Vel. (ft/s)	0.75	5.04	0.75
Max Chl Dpth (ft)	6.41	Hydr. Depth (ft)	0.70	6.40	0.70
Crit W.S. (ft)		Wetted Per. (ft)	8.97	53.00	10.23
Conv. Total (cfs)	62186.1	Conv. (cfs)	208.0	61739.6	238.4

Plan: Plan 05 Reach: 1 Riv Sta: 6 Profile: 1 12/5/96

W.S. Elev (ft)	1269.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.020	0.035
E.G. Elev (ft)	1269.92	Reach Len. (ft)	130.00	130.00	130.00
E.G. Slope (ft/ft)	0.002620	Flow Area (sq ft)		86.52	131.66
Q Total (cfs)	1402.00	Flow (cfs)		797.12	604.88
Top Width (ft)	63.45	Top Width (ft)		21.05	42.40
Vel Total (ft/s)	6.43	Avg. Vel. (ft/s)		9.21	4.59
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		4.11	3.11
Crit W.S. (ft)		Wetted Per. (ft)		22.94	42.84
Conv. Total (cfs)	27389.0	Conv. (cfs)		15572.3	11816.7

Plan: Plan 05 Reach: 1 Riv Sta: 5 Profile: 1 12/5/96

W.S. Elev (ft)	1268.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1269.57	Reach Len. (ft)	280.00	280.00	280.00
E.G. Slope (ft/ft)	0.002356	Flow Area (sq ft)	1.35	85.95	144.03
Q Total (cfs)	1421.00	Flow (cfs)	1.78	785.13	634.10
Top Width (ft)	67.29	Top Width (ft)	2.00	19.60	45.69
Vel Total (ft/s)	6.14	Avg. Vel. (ft/s)	1.32	9.13	4.40
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)	0.67	4.39	3.15
Crit W.S. (ft)		Wetted Per. (ft)	2.63	21.32	46.13
Conv. Total (cfs)	29273.8	Conv. (cfs)	36.6	16174.3	13063.0

Plan: Plan 05 Reach: 1 Riv Sta: 4 Profile: 1 12/5/96

W.S. Elev (ft)	1268.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.020	0.035
E.G. Elev (ft)	1268.93	Reach Len. (ft)	73.50	73.50	73.50
E.G. Slope (ft/ft)	0.001636	Flow Area (sq ft)		92.55	190.59
Q Total (cfs)	1435.00	Flow (cfs)		691.27	743.73
Top Width (ft)	76.86	Top Width (ft)		21.68	55.18
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		7.47	3.90
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)		4.27	3.45
Crit W.S. (ft)		Wetted Per. (ft)		23.63	55.65
Conv. Total (cfs)	35473.2	Conv. (cfs)		17088.2	18385.0

Plan: Plan 05 Reach: 1 Riv Sta: 3.6* Profile: 1 12/5/96

W.S. Elev (ft)	1267.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1268.68	Reach Len. (ft)	73.50	73.50	73.50
E.G. Slope (ft/ft)	0.003420	Flow Area (sq ft)	4.79	87.92	106.19
Q Total (cfs)	1435.00	Flow (cfs)	7.76	978.85	448.39
Top Width (ft)	76.42	Top Width (ft)	9.03	19.70	47.69
Vel Total (ft/s)	7.21	Avg. Vel. (ft/s)	1.62	11.13	4.22
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)	0.53	4.46	2.23
Crit W.S. (ft)	1267.28	Wetted Per. (ft)	9.09	21.43	47.88
Conv. Total (cfs)	24538.9	Conv. (cfs)	132.7	16738.6	7667.6

Plan: Plan 05 Reach: 1 Riv Sta: 3.2 Profile: 1 12/5/96

W.S. Elev (ft)	1267.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1268.44	Reach Len. (ft)	16.00	16.00	16.00
E.G. Slope (ft/ft)	0.002788	Flow Area (sq ft)	61.63	85.86	74.74
Q Total (cfs)	1435.00	Flow (cfs)	213.34	962.53	259.13
Top Width (ft)	86.54	Top Width (ft)	31.88	16.00	38.66
Vel Total (ft/s)	6.46	Avg. Vel. (ft/s)	3.46	11.21	3.47
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)	1.93	5.37	1.93
Crit W.S. (ft)	1267.07	Wetted Per. (ft)	32.11	17.77	38.85
Conv. Total (cfs)	27176.5	Conv. (cfs)	4040.3	18228.8	4907.5

Plan: Plan 05 Reach: 1 Riv Sta: 3.1 Profile: 1 12/5/96

W.S. Elev (ft)	1267.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1268.42	Reach Len. (ft)	41.00	41.00	41.00
E.G. Slope (ft/ft)	0.002759	Flow Area (sq ft)	60.90	86.99	73.85
Q Total (cfs)	1435.00	Flow (cfs)	208.88	972.41	253.71
Top Width (ft)	86.12	Top Width (ft)	31.69	16.00	38.43
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)	3.43	11.18	3.44
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)	1.92	5.44	1.92
Crit W.S. (ft)	1267.04	Wetted Per. (ft)	31.92	17.94	38.62
Conv. Total (cfs)	27319.6	Conv. (cfs)	3976.6	18512.8	4830.2

Plan: Plan 05 Reach: 1 Riv Sta: 3.05* Profile: 1 12/5/96

W.S. Elev (ft)	1266.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.	0.035	0.020	0.035
E.G. Elev (ft)	1268.06	Reach Len. (ft)	41.00	41.00	41.00
E.G. Slope (ft/ft)	0.003025	Flow Area (sq ft)	12.19	85.44	125.00
Q Total (cfs)	1435.00	Flow (cfs)	25.33	921.14	488.53
Top Width (ft)	90.30	Top Width (ft)	14.43	18.30	57.57
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)	2.08	10.78	3.91
Max Chl Dpth (ft)	5.44	Hydr. Depth (ft)	0.85	4.67	2.17
Crit W.S. (ft)	1266.82	Wetted Per. (ft)	14.53	19.94	57.72
Conv. Total (cfs)	26092.1	Conv. (cfs)	460.5	16748.9	8882.7

Plan: Plan 05 Reach: 1 Riv Sta: 3 Profile: 1 12/5/96

W.S. Elev (ft)	1266.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.		0.020	0.035
E.G. Elev (ft)	1267.37	Reach Len. (ft)	80.50	80.50	80.50
E.G. Slope (ft/ft)	0.002219	Flow Area (sq ft)		76.51	205.58
Q Total (cfs)	1465.00	Flow (cfs)		617.38	847.62
Top Width (ft)	89.15	Top Width (ft)		20.08	69.07
Vel Total (ft/s)	5.19	Avg. Vel. (ft/s)		8.07	4.12
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)		3.81	2.98
Crit W.S. (ft)		Wetted Per. (ft)		21.86	69.45
Conv. Total (cfs)	31100.4	Conv. (cfs)		13106.3	17994.1

Plan: Plan 05 Reach: 1 Riv Sta: 2.75* Profile: 1 12/5/96

W.S. Elev (ft)	1265.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.020	0.035
E.G. Elev (ft)	1267.09	Reach Len. (ft)	80.50	80.50	80.50
E.G. Slope (ft/ft)	0.003217	Flow Area (sq ft)		116.41	89.92
Q Total (cfs)	1465.00	Flow (cfs)		1146.31	318.69
Top Width (ft)	81.12	Top Width (ft)		30.98	50.15
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)		9.85	3.54
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		3.76	1.79
Crit W.S. (ft)	1265.87	Wetted Per. (ft)		32.59	50.36
Conv. Total (cfs)	25829.7	Conv. (cfs)		20210.7	5618.9

Plan: Plan 05 Reach: 1 Riv Sta: 2.5* Profile: 1 12/5/96

W.S. Elev (ft)	1265.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.36	Wt. n-Val.		0.020	0.035
E.G. Elev (ft)	1266.54	Reach Len. (ft)	80.50	80.50	80.50
E.G. Slope (ft/ft)	0.003232	Flow Area (sq ft)		148.41	25.67
Q Total (cfs)	1465.00	Flow (cfs)		1411.80	53.20
Top Width (ft)	74.53	Top Width (ft)		42.34	32.19
Vel Total (ft/s)	8.42	Avg. Vel. (ft/s)		9.51	2.07
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)		3.51	0.80
Crit W.S. (ft)	1265.19	Wetted Per. (ft)		43.91	32.28
Conv. Total (cfs)	25770.6	Conv. (cfs)		24834.8	935.8

Plan: Plan 05 Reach: 1 Riv Sta: 2.25* Profile: 1 12/5/96

W.S. Elev (ft)	1264.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.020	
E.G. Elev (ft)	1265.70	Reach Len. (ft)	80.50	80.50	80.50
E.G. Slope (ft/ft)	0.003043	Flow Area (sq ft)		168.61	
Q Total (cfs)	1465.00	Flow (cfs)		1465.00	
Top Width (ft)	53.12	Top Width (ft)		53.12	
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)		8.69	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.17	
Crit W.S. (ft)		Wetted Per. (ft)		54.63	
Conv. Total (cfs)	26555.4	Conv. (cfs)		26555.4	

Plan: Plan 05 Reach: 1 Riv Sta: 2 Profile: 1 12/5/96

W.S. Elev (ft)	1264.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.020	
E.G. Elev (ft)	1265.38	Reach Len. (ft)	10.00	10.00	10.00
E.G. Slope (ft/ft)	0.001288	Flow Area (sq ft)		236.80	
Q Total (cfs)	1465.00	Flow (cfs)		1465.00	
Top Width (ft)	65.33	Top Width (ft)		65.33	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)		6.19	
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)		3.62	
Crit W.S. (ft)		Wetted Per. (ft)		67.00	
Conv. Total (cfs)	40821.3	Conv. (cfs)		40821.3	

Plan: Plan 05 Reach: 1 Riv Sta: 1 Profile: 1 12/5/96

W.S. Elev (ft)	1264.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.020	
E.G. Elev (ft)	1265.34	Reach Len. (ft)	66.00	66.00	66.00
E.G. Slope (ft/ft)	0.001011	Flow Area (sq ft)		248.76	
Q Total (cfs)	1465.00	Flow (cfs)		1465.00	
Top Width (ft)	54.18	Top Width (ft)		54.18	
Vel Total (ft/s)	5.89	Avg. Vel. (ft/s)		5.89	
Max Chl Dpth (ft)	4.60	Hydr. Depth (ft)		4.59	
Crit W.S. (ft)	1263.03	Wetted Per. (ft)		63.20	
Conv. Total (cfs)	46072.2	Conv. (cfs)		46072.2	

Plan: Plan 05 Reach: 1 Riv Sta: .4 Profile: 1 12/5/96

W.S. Elev (ft)	1263.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.		0.020	
E.G. Elev (ft)	1264.47	Reach Len. (ft)			
E.G. Slope (ft/ft)	0.004737	Flow Area (sq ft)		153.47	
Q Total (cfs)	1473.00	Flow (cfs)		1473.00	
Top Width (ft)	54.11	Top Width (ft)		54.11	
Vel Total (ft/s)	9.60	Avg. Vel. (ft/s)		9.60	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.84	
Crit W.S. (ft)	1263.04	Wetted Per. (ft)		59.68	
Conv. Total (cfs)	21402.9	Conv. (cfs)		21402.9	

HEC-RAS Version 1.2 April 1996
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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X   X XXXXXX  XXXX     XXXX    XX    XXXX
X   X X     X  X    X  X   X X  X
X   X X     X       X  X   X  X  X
XXXXXXX XXXX   X    XXX XXXX   XXXXXX  XXXX
X   X X     X       X X   X  X     X
X   X X     X  X    X  X   X  X     X
X   X XXXXXX  XXXX     X   X  X  X  XXXXX
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****

PROJECT DATA
Project Title: deer village main channel 11-30-96
Project File : h2dvmc3.prj
Run Date and Time: 12/5/96 3:45:38 PM

Project in English units

****

PLAN DATA

Plan Title: h2dvmc3
Plan File : a:\h2dvmc3.p06

Geometry Title: h2dvmc3
Geometry File : a:\h2dvmc3.p06

Flow Title : h2dvmc3
Flow File : a:\h2dvmc3.p06

Plan Summary Information:
Number of: Cross Sections = 37 Mulitple Openings = 0
Culverts = 6 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = .01
Critical depth calculaton tolerance = .01
Maximum number of interations = 20
Maximum difference tolerance = .3
Flow tolerance factor = .001

Computational Flow Regime: Subcritical Flow

Encroachment Data: None

Flow Distribution Locations: None

****

FLOW DATA

Flow Title: Orig. File's Q changed to 1473 cfs
Flow File : a:\h2dvmc3.f02

Flow Data (cfs)

Reach	Riv Sta	PF#1
1.2	2.5	100
1.2	2.4	340
1.2	2.3	400
1.2	2.2	460
1.2	2.1	570
1.1	1.7	250
1.1	1.6	320
1.1	1.5	340
1.1	1.4	520
1.1	1.3	790
1.1	1.1	1060
1	10	1351
1	9	1367
1	8	1402
1	5	1421
1	4	1435
1	3	1465
1	.4	1473

Boundary Conditions

Reach	Profile	Upstream	Downstream
1.2	1	Critical	
1.1	1	Critical	
1	1		Known WS = 1263

****

GEOMETRY DATA

Geometry Title: Deer Valley Main and S Channels 11-30-96
Geometry File : a:\h2dvmc3.g07

Reach Connection Table

Reach Name	Upstream Boundary	Downstream Boundary
1.2		1
1.1		1
1	1	

JUNCTION INFORMATION

Name: 1
Description: Junction 1 at N. End of Main Channel
Energy computation Method

Length across Junction Reaches		Length	Tributary Angle
1.1	to 1	160	
1.2	to 1	100	

CROSS SECTION INPUT Reach: 1.2 River Station: 2.5
Description: Sec 2.5

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
915	1280.3	917	1280.2	926.6	1279.2	931.3	1273.5	941.3	1273.5
945	1278.2	957.4	1278.2	967.9	1278.2	968	1277.7	1000	1278.4
1028	1278.1	1250	1280						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
915	.025	926.6	.02	945	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
926.6	945	180	180	180	.1	.3

CROSS SECTION INPUT Reach: 1.2 River Station: 2.4
Description: Sec 2.4

Station Elevation Data, num = 11

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
915	1280.1	917	1280	920.4	1279.2	925.7	1272.85	940.7	1272.85
945	1278.1	967.9	1278.1	968	1277.6	1000	1278.4	1028	1278.4
1058	1279								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
915	.025	920.4	.02	945	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
920.4	945	40	40	40	.3	.5

CROSS SECTION INPUT Reach: 1.2 River Station: 2.3
Description: Sec 2.3 Upstream Face of Culvert at 88th Lane

Station Elevation Data, num = 11

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
915	1280	917	1279.9	920.4	1279.1	925.7	1272.76	940.7	1272.76
945	1278.1	967.9	1278.1	968	1277.6	1000	1278.5	1028	1278.4
1068	1279								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
915	.025	920.4	.02	945	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
920.4 945 75 75 75 .3 .5

CULVERT INPUT Reach: 1.2 River Station: 2.25
Description:
Distance from Upstream XS = 2
Deck/Roadway Width = 70
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates, num = 6
Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord
****
915 1279.25 933 1279.47 970 1278.32
970.1 1277.82 1000 1278.5 1047 1279
Downstream Deck/Roadway Coordinates, num = 6
Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord
****
915 1279.25 933 1279.47 970 1278.32
970.1 1277.82 1000 1278.5 1047 1279
Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
Culvert #1 Box 4 10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Culvert Length n Value Entrance Loss Coef Exit Loss Coef
70 .012 .5 1
Upstream Elevation = 1272.76
Centerline Station = 935.5
Downstream Elevation = 1272.5
Centerline Station = 935.5

CROSS SECTION INPUT Reach: 1.2 River Station: 2.2
Description: Sec 2.2 Downstream Face of Culvert at 88th Lane

Station Elevation Data, num = 10
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
915 1280 917 1279.8 919.7 1279 925.2 1272.5 940.2 1272.5
945 1278.32 967.9 1278.32 968 1277.82 1000 1278.6 1040 1279

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
915 .025 919.7 .02 945 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
919.7 945 75 75 75 .3 .5

CROSS SECTION INPUT Reach: 1.2 River Station: 2.1
Description: Sec 2.1

Station Elevation Data, num = 9

```
  Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
   915   1280  918.5 1279.5  924.8 1272.2  939.8 1272.2   945 1278.44
 967.9 1278.44   968 1277.94  1000 1278.6   1018   1279

Manning's n Values,  num = 3
  Sta.  Value   Sta.  Value   Sta.  Value
   915   .025  918.5   .02    945   .025

Bank Sta: Left   Right   Lengths: Left Channel  Right   Coeff Contr.  Expan.
      918.5    945                              .3      .5

CROSS SECTION INPUT    Reach: 1.1          River Station: 1.7
Description: Sec 1.7

Station Elevation Data,  num = 10
  Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
   944   1279   1000 1278.9   1032 1278.7 1032.1 1279.2 1042.6 1279.2
  1055 1278.85 1059.32 1274.53 1069.32 1274.53 1074.64 1279.85   1083 1280.75

Manning's n Values,  num = 3
  Sta.  Value   Sta.  Value   Sta.  Value
   944   .025   1055   .02 1074.64   .025

Bank Sta: Left   Right   Lengths: Left Channel  Right   Coeff Contr.  Expan.
      1055 1074.64          165    165    165          .1      .3

CROSS SECTION INPUT    Reach: 1.1          River Station: 1.6
Description: Sec 1.6

Station Elevation Data,  num = 11
  Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
   900   1279    960 1278.85   1000 1278.8   1032   1278 1032.1 1278.5
 1042.6 1278.5   1055 1278.5 1059.4 1274.1 1069.4 1274.1 1074.8 1279.5
  1083 1280.65

Manning's n Values,  num = 3
  Sta.  Value   Sta.  Value   Sta.  Value
   900   .025   1055   .02 1074.8   .025

Bank Sta: Left   Right   Lengths: Left Channel  Right   Coeff Contr.  Expan.
      1055 1074.8          100    100    100          .1      .3

CULVERT INPUT        Reach: 1.1          River Station: 1.55
Description:
Distance from Upstream XS =      16
Deck/Roadway Width       =      70
Weir Coefficient         =     2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates,  num = 6
  Sta. Hi Cord Lo Cord   Sta. Hi Cord Lo Cord   Sta. Hi Cord Lo Cord
***********************************************************************
   943   1279          1000 1278.8          1032   1278
 1032.1 1278.5          1067 1279.4          1137 1279.84
Downstream Deck/Roadway Coordinates,  num = 6
  Sta. Hi Cord Lo Cord   Sta. Hi Cord Lo Cord   Sta. Hi Cord Lo Cord
***********************************************************************
```

943 1279 1000 1278.8 1032 1278
1032.1 1278.5 1067 1279.4 1137 1279.84
Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
Culvert #1 Box 3 10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Culvert Length n Value Entrance Loss Coef Exit Loss Coef
70 .012 .5 1
Upstream Elevation = 1274.1
Centerline Station = 1064.41
Downstream Elevation = 1273.9
Centerline Station = 1064.42

CROSS SECTION INPUT Reach: 1.1 River Station: 1.5
Description: Sec 1.5

Station Elevation Data, num = 10
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
960 1279 1000 1278.7 1032 1277.8 1032.1 1278.3 1042.6 1278.3
1055 1278.3 1059.43 1273.87 1069.43 1273.87 1074.86 1279.3 1085.86 1280.4

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
960 .025 1055 .02 1074.86 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1055 1074.86 175 175 175 .1 .3

CROSS SECTION INPUT Reach: 1.1 River Station: 1.4
Description: Sec 1.4

Station Elevation Data, num = 10
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
960 1279 977 1278.5 1000 1278.7 1032 1278.13 1032.1 1278.63
1042.6 1278.63 1055 1278.63 1060.2 1273.43 1079.2 1273.43 1086 1280.35

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
960 .025 1042.6 .02 1086 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1042.6 1086 185 185 185 .1 .3

CROSS SECTION INPUT Reach: 1.1 River Station: 1.3
Description: Sec 1.3

Station Elevation Data, num = 11
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
937 1280 964 1279 980 1278.45 1000 1278.8 1032 1278.27
1032.1 1278.77 1042.6 1278.77 1055 1278.77 1060.85 1272.92 1076.85 1272.92

1084 1280.05

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
937	.025	1042.6	.02	1084	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1042.6	1084	232	232	232	.1	.3

CROSS SECTION INPUT Reach: 1.1 River Station: 1.1
Description: Sec 1.1

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
923	1279	975	1278.4	1000	1278.5	1032	1277.7	1032.1	1278.2
1042.6	1278.2	1055	1278.2	1060.82	1272.38	1080.82	1272.38	1101	1278.85

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
923	.025	1042.6	.02	1101	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1042.6	1101				.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 10
Description: 10

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
919	1279.1	921	1279	945	1273	972.3	1272.5	976.3	1270.5
981.3	1270.5	998	1278.5	1000	1278.9				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
919	.035	972.3	.02	998	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
972.3	998	91.25	91.25	91.25	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 9.75*
Description:

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
917.5	1277.68	919.3	1277.58	919.6	1277.56	931.3	1274.64	944.3	1272.24
972.4	1271.78	976.4	1269.78	981.4	1269.78	998	1277.81	1000	1278.13

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
917.5	.035	972.4	.02	998	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
972.4	998	91.25	91.25	91.25	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 9.5*
Description:

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
916	1276.25	917.9	1276.16	918.1	1276.12	930.2	1273.13	943.6	1271.47
972.5	1271.05	976.5	1269.05	981.5	1269.05	998	1277.13	1000	1277.35

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
916	.035	972.5	.02	998	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
972.5	998	91.25	91.25	91.25	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 9.25*
Description:

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
914.5	1274.83	916.4	1274.73	916.7	1274.68	929.1	1271.61	942.8	1270.71
972.6	1270.32	976.6	1268.32	981.6	1268.32	998	1276.44	1000	1276.58

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
914.5	.035	972.6	.02	998	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
972.6	998	91.25	91.25	91.25	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 9
Description: 9

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
913	1273.4	915	1273.3	928	1270.1	972.7	1269.6	976.7	1267.6
981.7	1267.6	998	1275.75	1000	1275.8				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
913	.035	972.7	.02	998	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
972.7	998	91	91	91	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 8.6*
Description:

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
903	1273.5	904.7	1273.41	905.4	1273.31	916	1271.12	954.9	1268.4
957.4	1266.85	966.9	1266.85	975.5	1271.47	994.8	1274.19	1000	1274.2

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
903	.035	954.9	.02	975.5	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

954.9 975.5 91 91 91 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 8.2
Description: Upstream Face of Bike Path at 89th/Melinda

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
893	1273.6	895	1273.5	937	1267.2	938	1266.1	952	1266.1
953	1267.2	990	1272.6	1000	1272.6				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
893	.035	937	.02	953	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
937	953	16	16	16	.1	.3

CULVERT INPUT Reach: 1 River Station: 8.15
Description: 4-12" RGRCP AT BIKE PATH AT 89TH/MELINDA
Distance from Upstream XS = 1
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates, num = 6

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
893	1273.6		895	1273.5		937	1267.6	
953	1267.6		990	1272.6		1000	1272.6	

****

Downstream Deck/Roadway Coordinates, num = 6

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
893	1273.6		895	1273.5		937	1267.6	
953	1267.6		990	1272.6		1000	1272.6	

****

Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	1	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall

Culvert Length	n Value	Entrance Loss Coef	Exit Loss Coef
14	.012	.5	1

Number of Barrels = 4
Upstream Elevation = 1266.1
Centerline Stations

Sta.	Sta.	Sta.	Sta.
940.5	943.5	946.5	949.5

Downstream Elevation = 1266
Centerline Stations

Sta.	Sta.	Sta.	Sta.
940.5	943.5	946.5	949.5

CROSS SECTION INPUT Reach: 1 River Station: 8.1

Description: Downstream Face of Bike Path at 89th/Melinda

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
893	1273.6	895	1273.5	937	1267.2	938	1266.1	952	1266.1
953	1267.2	990	1272.6	1000	1272.6				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
893	.035	937	.02	953	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
937	953	93.5	93.5	93.5	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 8.05*
Description:

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
897	1272.85	898	1272.8	920	1269.65	929.3	1264.75	957.9	1264.75
975.5	1269.55	994.8	1272.25	1000	1272.25				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
897	.035	920	.025	975.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
920	975.5	93.5	93.5	93.5	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 8
Description: 8

Station Elevation Data, num = 6

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
901	1272.1	903	1272.1	920.5	1263.4	963.8	1263.4	998	1271.9
1000	1271.9								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
901	.035	903	.03	998	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
903	998	25	25	25	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 7
Description: Section 7 Upstream Face of Culvert at Salter Rd

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
895	1272.2	897	1272.1	920.9	1268.35	921	1263.35	964	1263.35
964.1	1268.35	990	1271.9	1000	1271.9				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
895	.035	920.9	.02	964.1	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
920.9 964.1 55 55 55 .3 .5

CULVERT INPUT Reach: 1 River Station: 6.6
Description: 4 - 10' x 5' RCB
Distance from Upstream XS = 2
Deck/Roadway Width = 50
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates, num = 6
Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord
****
895 1272.2 897 1272.1 921 1271.7
966 1271.5 990 1271.9 1000 1271.9
Downstream Deck/Roadway Coordinates, num = 6
Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord Sta. Hi Cord Lo Cord
****
895 1272.2 897 1272.1 921 1271.7
966 1271.5 990 1271.9 1000 1271.9
Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
Culvert #1 Box 5 10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Culvert Length n Value Entrance Loss Coef Exit Loss Coef
50 .012 .5 1
Number of Barrels = 4
Upstream Elevation = 1263.35
Centerline Stations
Sta. Sta. Sta. Sta.
926 937 948 959
Downstream Elevation = 1263.3
Centerline Stations
Sta. Sta. Sta. Sta.
926 937 948 959

CROSS SECTION INPUT Reach: 1 River Station: 6.5
Description: Sec 6.5 Downstream Face of Culvert at Salter Rd

Station Elevation Data, num = 8
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
895 1272.2 897 1272.1 920.9 1268.3 921 1263.3 964 1263.3
964.1 1268.3 990 1271.9 1000 1271.9

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
895 .035 920.9 .02 964.1 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
920.9 964.1 35 35 35 .3 .5

CROSS SECTION INPUT Reach: 1 River Station: 6
Description: 6

Station Elevation Data, num = 9

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
897.5	1272	913	1272.2	915	1272.15	933.3	1263	938.3	1263
942.3	1265	970.6	1265.5	998	1272.35	1000	1272.4		

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
897.5	.035	915	.02	942.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
915	942.3	130	130	130	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 5
Description: 5

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
923	1268.1	925	1268	935.6	1262.7	940.6	1262.7	944.6	1264.7
976.2	1265.2	998	1270.65	1000	1270.7				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
923	.035	925	.02	944.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
925	944.6	280	280	280	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 4
Description: 4

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
917	1269.3	919	1269.25	933.4	1262.1	938.4	1262.1	942.4	1264.1
982.4	1264.6	998	1268.5	1000	1268.5				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
917	.035	919	.02	942.4	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
919	942.4	73.5	73.5	73.5	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3.6*
Description:

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
900	1269.15	901	1269.1	925.5	1266.22	933.2	1261.85	942.7	1261.85
945.2	1263.65	983.3	1265.71	989.5	1266.82	998.1	1267.99	1000	1268

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
900	.035	925.5	.02	945.2	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
      925.5  945.2          73.5   73.5   73.5          .1      .3

CROSS SECTION INPUT    Reach: 1            River Station: 3.2
Description: Upstream Face of Bike Path at Adam

Station Elevation Data,  num = 8
   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
    883   1269    885  1268.9   932  1263.2   933  1261.6   947  1261.6
    948  1263.2   990  1267.4  1000  1267.5

Manning's n Values,  num = 3
   Sta.  Value   Sta.  Value   Sta.  Value
    883   .035    932   .02    948   .035

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       932    948           16     16     16          .1      .3

CULVERT INPUT          Reach: 1            River Station: 3.15
Description: 4-12" RGRCP AT BIKE PATH AT ADMAM RD
Distance from Upstream XS =       1
Deck/Roadway Width        =      14
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream Deck/Roadway Coordinates,  num = 6
   Sta. Hi Cord Lo Cord    Sta. Hi Cord Lo Cord    Sta. Hi Cord Lo Cord
***************************************************************************
    883   1269          885  1268.9          932  1263.2
    948  1263.2         990  1267.4          1000  1267.5
Downstream Deck/Roadway Coordinates,  num = 6
   Sta. Hi Cord Lo Cord    Sta. Hi Cord Lo Cord    Sta. Hi Cord Lo Cord
***************************************************************************
    883   1269          885  1268.9          932  1263.2
    948  1263.2         990  1267.4          1000  1267.5
Elevation at which weir flow begins        =
Maximum allowable submergence for weir flow =     .95
Submergence criteria :Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1       Circular     1
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Culvert Length    n Value   Entrance Loss Coef   Exit Loss Coef
        14        .012              .5                1
Number of Barrels =  4
Upstream   Elevation =  1261.6
Centerline Stations
   Sta.    Sta.    Sta.    Sta.
  935.5   938.5   941.5   944.5
Downstream Elevation =  1261.5
Centerline Stations
   Sta.    Sta.    Sta.    Sta.
  935.5   938.5   941.5   944.5
```

CROSS SECTION INPUT Reach: 1 River Station: 3.1
Description: Downstream Face of Bike Path at Adam

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
883	1269	885	1268.9	932	1263.2	933	1261.5	947	1261.5
948	1263.2	990	1267.4	1000	1267.5				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
883	.035	932	.02	948	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
932	948	41	41	41	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3.05*
Description:

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
894.5	1268.05	895.5	1268	920	1265.13	926.3	1261.38	935.8	1261.38
938.3	1263.22	987.5	1265.55	988.1	1265.67	998.3	1267.18	1000	1267.2

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
894.5	.035	920	.02	938.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
920	938.3	41	41	41	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 3
Description: 3

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
906	1267.1	908	1267.05	919.6	1261.25	924.6	1261.25	928.6	1263.25
985.5	1263.75	998	1266.87	1000	1266.9				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
906	.035	908	.02	928.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
908	928.6	80.5	80.5	80.5	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 2.75*
Description:

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
911.3	1266.78	913.3	1266.74	924.7	1260.99	937.9	1260.99	946	1263.74
989	1264.11	998.5	1266.45	1000	1266.47				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value

911.3 .035 913.3 .02 946 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
913.3 946 80.5 80.5 80.5 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 2.5*
Description:

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
916.5	1266.45	918.5	1266.43	929.8	1260.72	951.3	1260.72	963.3	1264.22
992.5	1264.47	999	1266.03	1000	1266.05				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
916.5	.035	918.5	.02	963.3	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
918.5 963.3 80.5 80.5 80.5 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 2.25*
Description:

Station Elevation Data, num = 8

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
921.8	1266.13	923.8	1266.11	934.9	1260.46	964.6	1260.46	980.7	1264.71
996.1	1264.84	999.5	1265.62	1000	1265.63				

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
921.8	.035	923.8	.02	980.7	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
923.8 980.7 80.5 80.5 80.5 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 2
Description: 2

Station Elevation Data, num = 6

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
927	1265.8	929	1265.8	940	1260.2	978	1260.2	998	1265.2
1000	1265.2								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
927	.035	929	.02	998	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
929 998 10 10 10 .3 .5

CROSS SECTION INPUT Reach: 1 River Station: 1
Description: Sec 1 Upstream Face of Culvert at Deanna Dr

Station Elevation Data, num = 6

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
930	1266.2	937.9	1265.2	938	1260.2	992	1260.2	992.1	1265.2

1000 1265.2

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
930	.035	930	.02	1000	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
930	1000	66	66	66	.3	.5

CULVERT INPUT Reach: 1 River Station: .5
Description: 5 - 10' x 4' RCB
Distance from Upstream XS = 2
Deck/Roadway Width = 60
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates, num = 4

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
930	1266.7		939.5	1265.7		986.5	1265.7	
1000	1265.7							

****

Downstream Deck/Roadway Coordinates, num = 4

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
930	1266.7		939.5	1265.7		986.5	1265.7	
1000	1265.7							

****

Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	4	10

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.

Culvert Length	n Value	Entrance Loss Coef	Exit Loss Coef
62	.012	.5	1

Number of Barrels = 5
Upstream Elevation = 1260.2
Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.
943	954	965	976	987

Downstream Elevation = 1260.1
Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.
943	954	965	976	987

CROSS SECTION INPUT Reach: 1 River Station: .4
Description: Sec .4 at Downstream Face of Culvert at Deanna Dr

Station Elevation Data, num = 6

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
930	1266.2	937.9	1265.2	938	1260.2	992	1260.2	992.1	1265.2
1000	1265.2								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
930	.035	930	.02	1000	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
930	1000	0	0	0	.3	.5

****

SUMMARY OF MANNING'S N VALUES

Reach	River Sta.	n1	n2	n3
1.2	2.5	.025	.02	.025
1.2	2.4	.025	.02	.025
1.2	2.3	.025	.02	.025
1.2	2.25	Culvert		
1.2	2.2	.025	.02	.025
1.2	2.1	.025	.02	.025
1.1	1.7	.025	.02	.025
1.1	1.6	.025	.02	.025
1.1	1.55	Culvert		
1.1	1.5	.025	.02	.025
1.1	1.4	.025	.02	.025
1.1	1.3	.025	.02	.025
1.1	1.1	.025	.02	.025
1	10	.035	.02	.035
1	9.75	.035	.02	.035
1	9.5	.035	.02	.035
1	9.25	.035	.02	.035
1	9	.035	.02	.035
1	8.6	.035	.02	.035
1	8.2	.035	.02	.035
1	8.15	Culvert		
1	8.1	.035	.02	.035
1	8.05	.035	.025	.035
1	8	.035	.03	.035
1	7	.035	.02	.035
1	6.6	Culvert		
1	6.5	.035	.02	.035
1	6	.035	.02	.035
1	5	.035	.02	.035
1	4	.035	.02	.035
1	3.6	.035	.02	.035
1	3.2	.035	.02	.035
1	3.15	Culvert		
1	3.1	.035	.02	.035
1	3.05	.035	.02	.035
1	3	.035	.02	.035
1	2.75	.035	.02	.035
1	2.5	.035	.02	.035
1	2.25	.035	.02	.035
1	2	.035	.02	.035
1	1	.035	.02	.035
1	.5	Culvert		
1	.4	.035	.02	.035

****

****

SUMMARY OF REACH LENGTHS

****

Reach	River Sta.	Left	Channel	Right
1.2	2.5	180	180	180
1.2	2.4	40	40	40
1.2	2.3	75	75	75
1.2	2.25	Culvert		
1.2	2.2	75	75	75
1.2	2.1			
1.1	1.7	165	165	165
1.1	1.6	100	100	100
1.1	1.55	Culvert		
1.1	1.5	175	175	175
1.1	1.4	185	185	185
1.1	1.3	232	232	232
1.1	1.1			
1	10	91.25	91.25	91.25
1	9.75	91.25	91.25	91.25
1	9.5	91.25	91.25	91.25
1	9.25	91.25	91.25	91.25
1	9	91	91	91
1	8.6	91	91	91
1	8.2	16	16	16
1	8.15	Culvert		
1	8.1	93.5	93.5	93.5
1	8.05	93.5	93.5	93.5
1	8	25	25	25
1	7	55	55	55
1	6.6	Culvert		
1	6.5	35	35	35
1	6	130	130	130
1	5	280	280	280
1	4	73.5	73.5	73.5
1	3.6	73.5	73.5	73.5
1	3.2	16	16	16
1	3.15	Culvert		
1	3.1	41	41	41
1	3.05	41	41	41
1	3	80.5	80.5	80.5
1	2.75	80.5	80.5	80.5
1	2.5	80.5	80.5	80.5
1	2.25	80.5	80.5	80.5
1	2	10	10	10
1	1	66	66	66
1	.5	Culvert		
1	.4	0	0	0

****

****

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

Reach	River Sta.	Contr.	Expan.
1.2	2.5	.1	.3
1.2	2.4	.3	.5
1.2	2.3	.3	.5
1.2	2.25	Culvert	
1.2	2.2	.3	.5
1.2	2.1	.3	.5
1.1	1.7	.1	.3
1.1	1.6	.1	.3
1.1	1.55	Culvert	
1.1	1.5	.1	.3
1.1	1.4	.1	.3
1.1	1.3	.1	.3
1.1	1.1	.3	.5
1	10	.3	.5
1	9.75	.3	.5
1	9.5	.3	.5
1	9.25	.3	.5
1	9	.1	.3
1	8.6	.1	.3
1	8.2	.1	.3
1	8.15	Culvert	
1	8.1	.1	.3
1	8.05	.1	.3
1	8	.3	.5
1	7	.3	.5
1	6.6	Culvert	
1	6.5	.3	.5
1	6	.3	.5
1	5	.1	.3
1	4	.1	.3
1	3.6	.1	.3
1	3.2	.1	.3
1	3.15	Culvert	
1	3.1	.1	.3
1	3.05	.1	.3
1	3	.1	.3
1	2.75	.1	.3
1	2.5	.1	.3
1	2.25	.1	.3
1	2	.3	.5
1	1	.3	.5
1	.5	Culvert	
1	.4	.3	.5

87TH AVENUE DRAINAGE SYSTEM

CVL

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

Project DEER VILLAGE

Project No. 950101

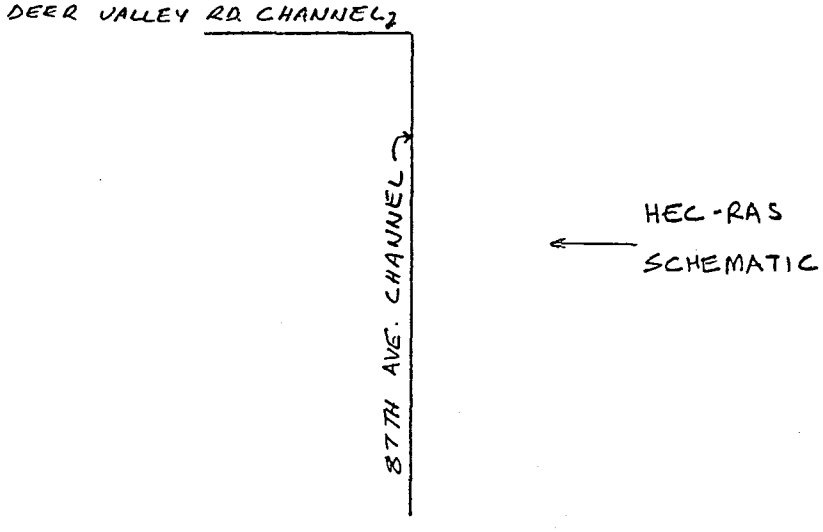
Sheet No. 1 of 1

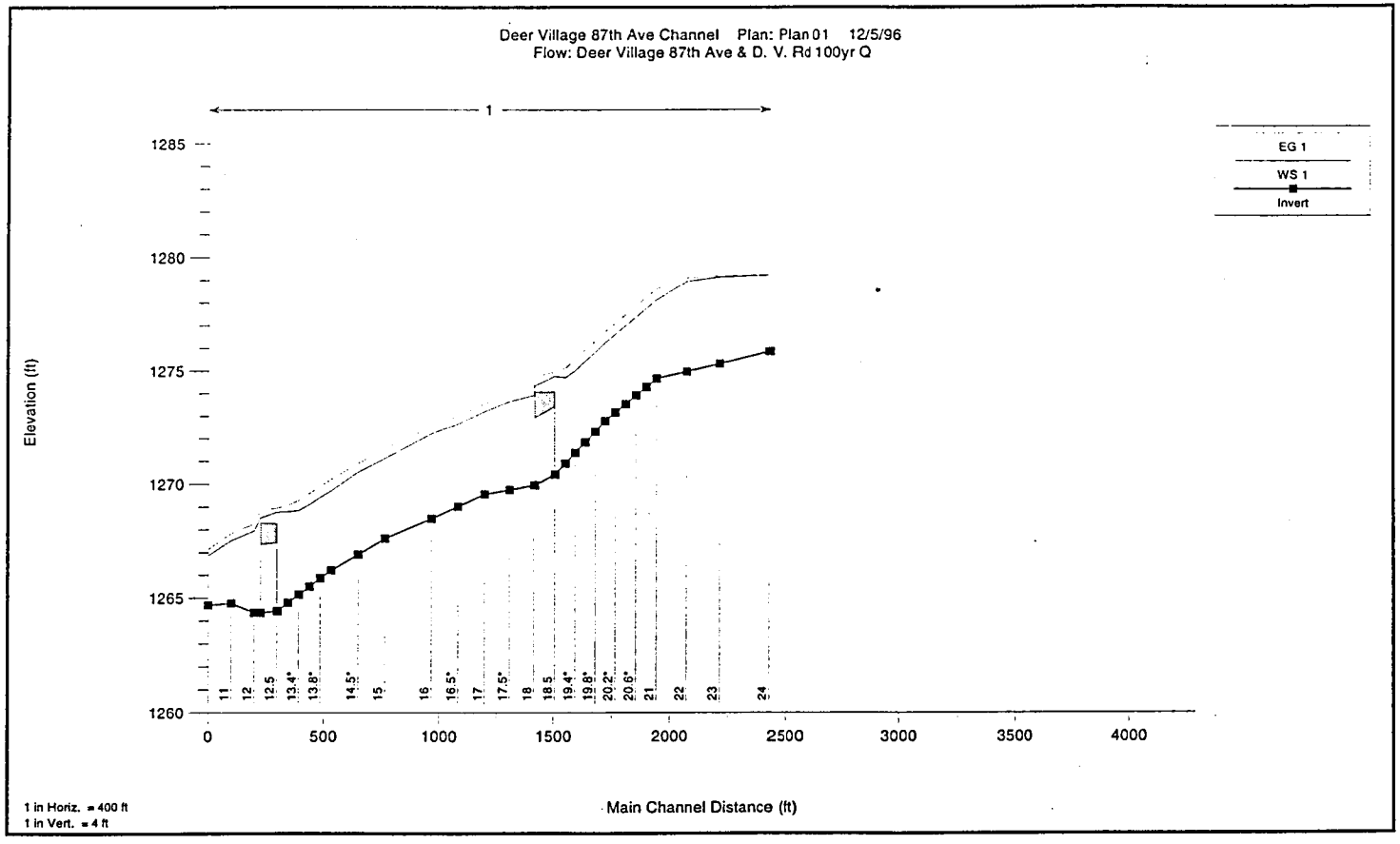
Calculated by N. RAZA Date 12/9/96

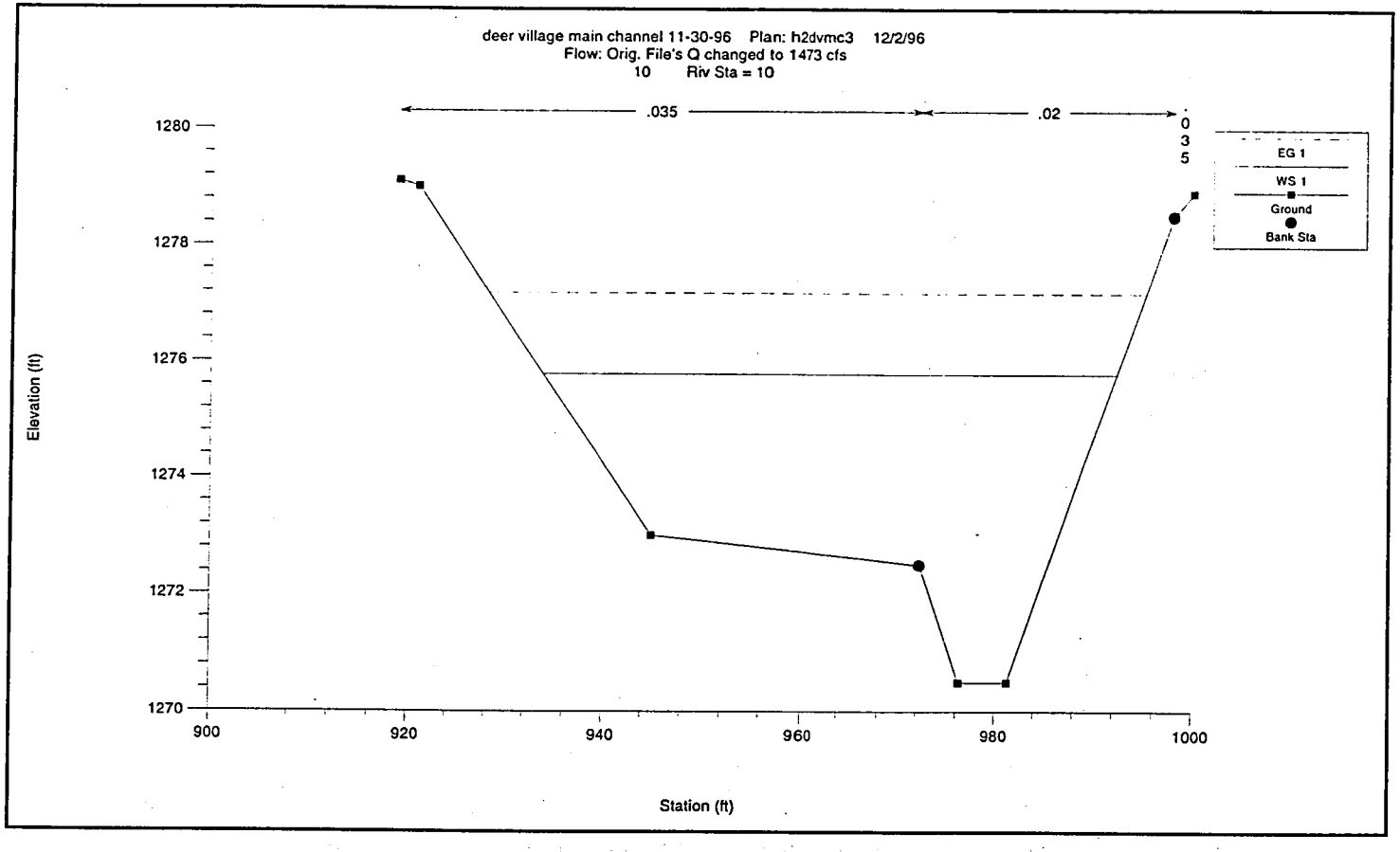
Checked by _____ Date _____

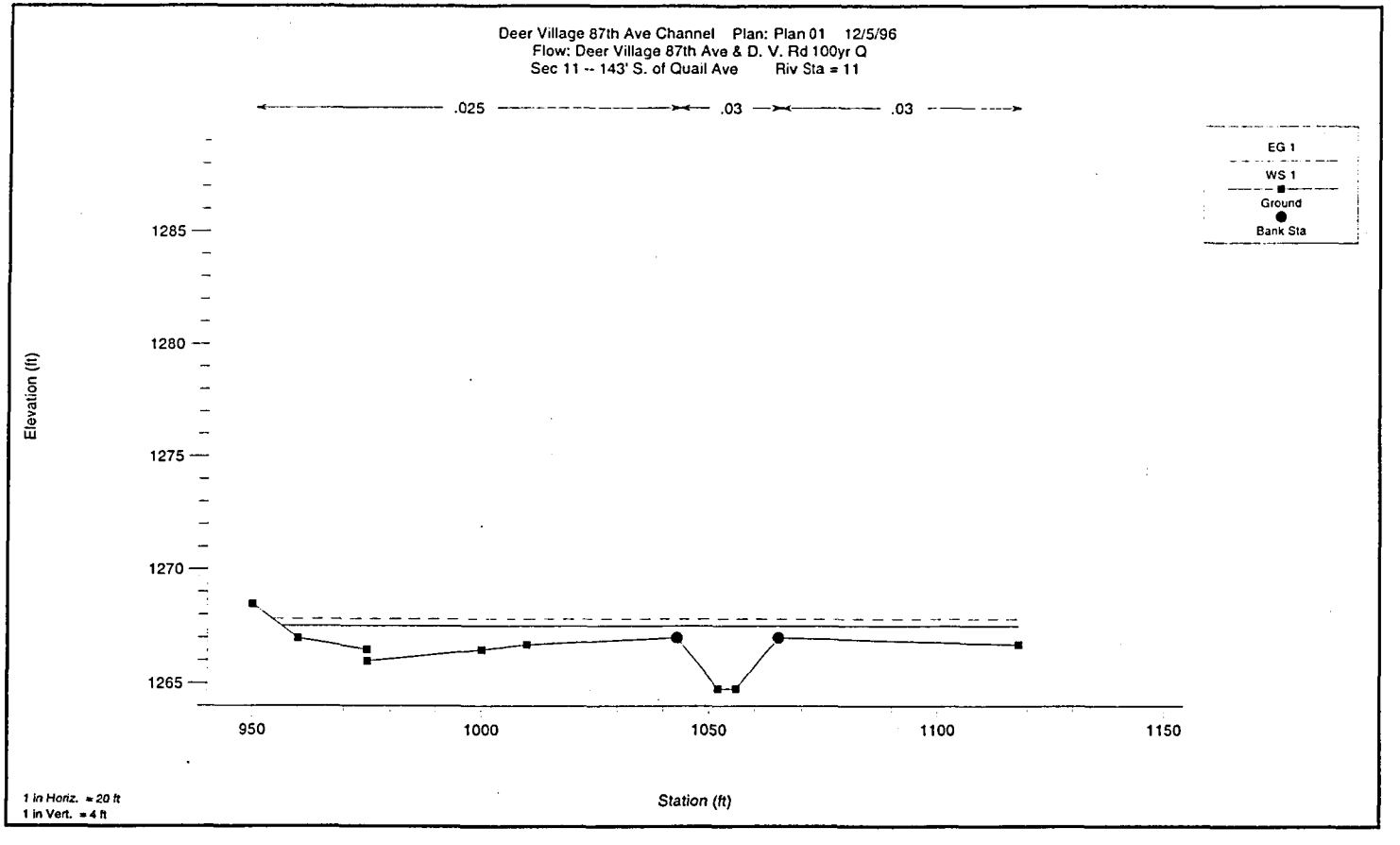
87TH AVENUE DRAINAGE SYSTEM

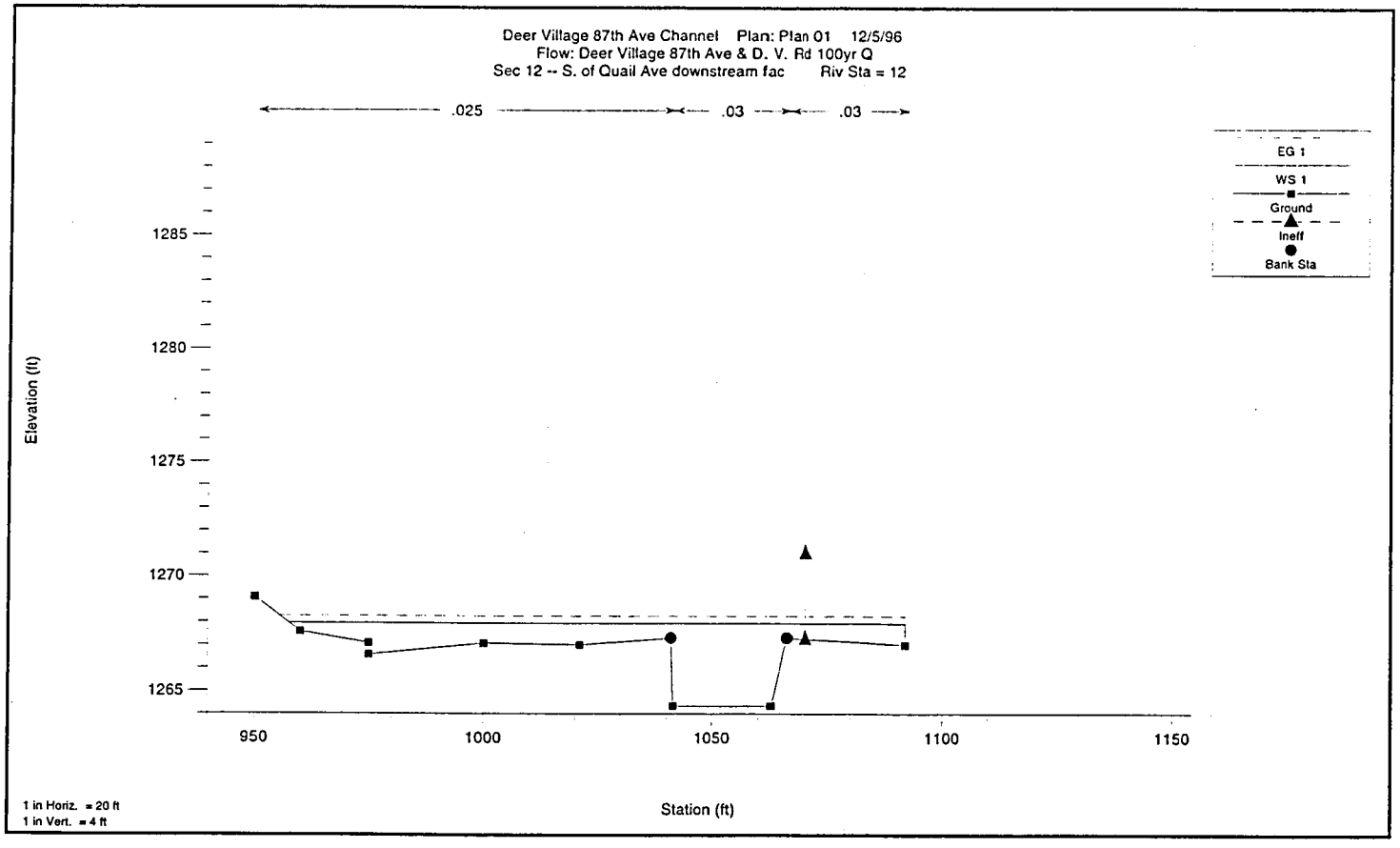
1. PROFILE & CROSS-SECTION PLOTS (HALF SCALE)
2. HEC-RAS OUTPUT TABLES FOR PROFILES, CULVERTS AND CROSS-SECTIONS
3. HEC-RAS INPUT DATA

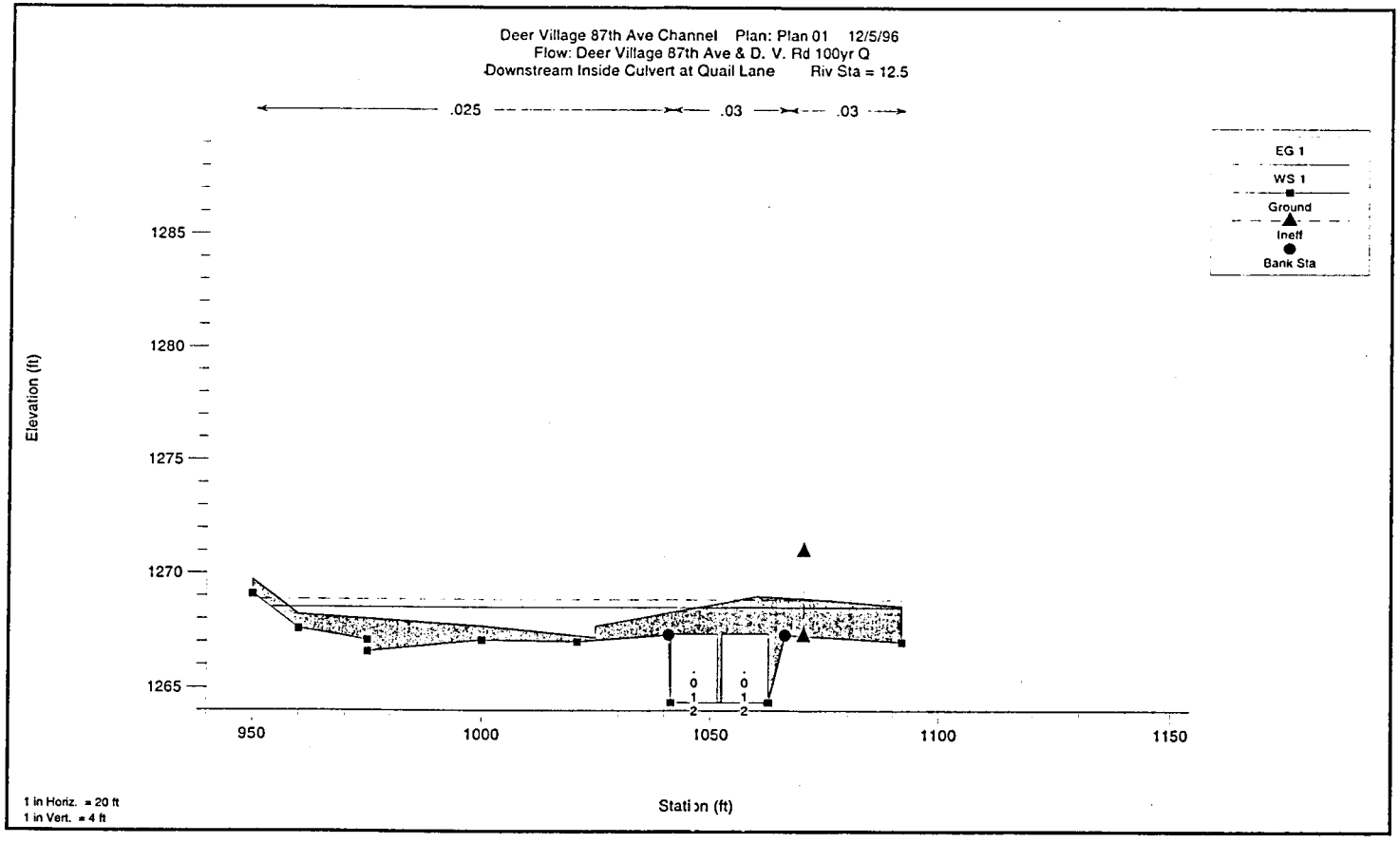


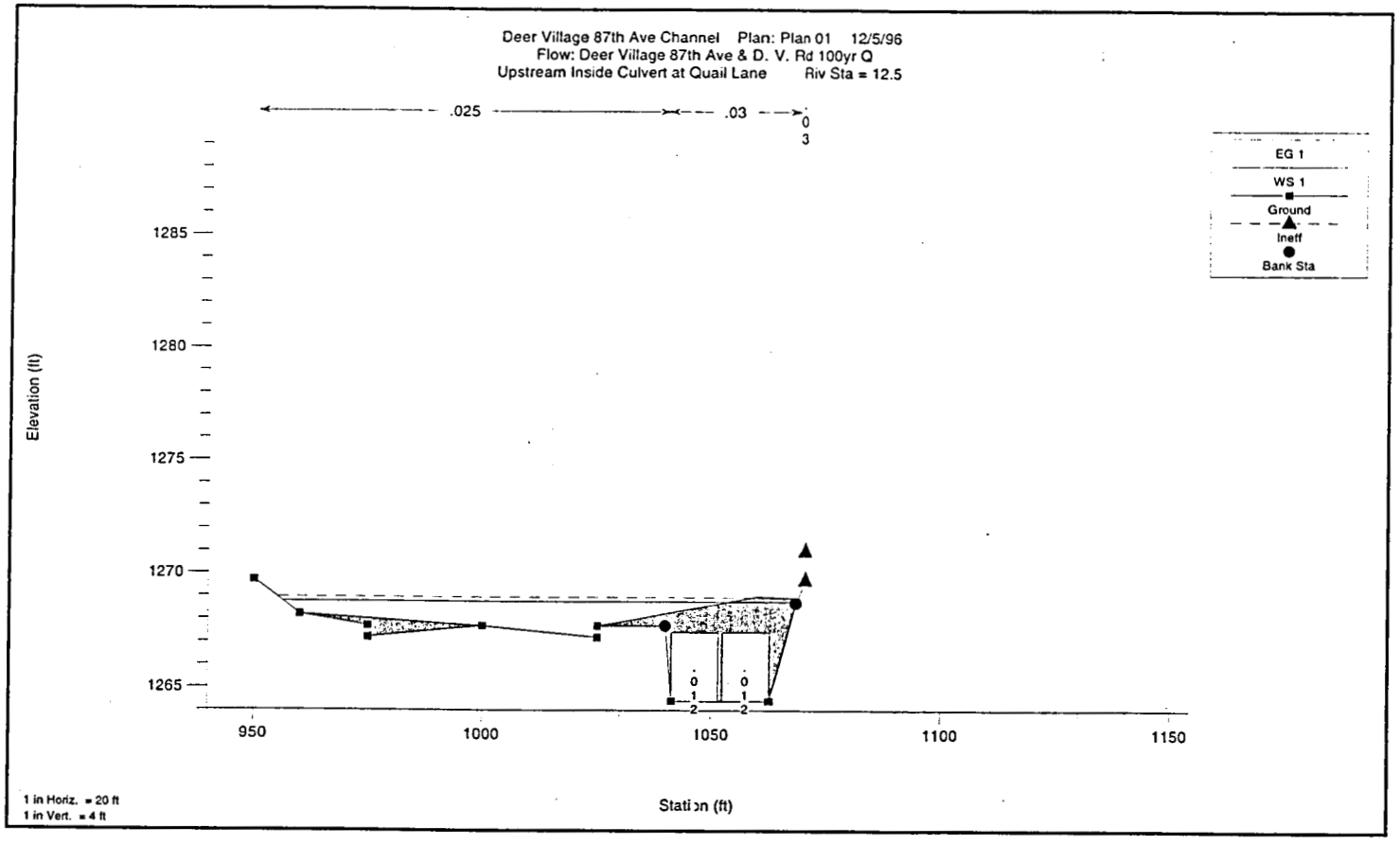

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
1
EG 1
WS 1
Invert
Elevation (ft)
1285
1280
1275
1270
1265
1260
11
12
12.5
13.4*
13.8*
14.5*
15
16
16.5*
17
17.5*
18
18.5
19.4*
19.8*
20.2*
20.6*
21
22
23
24
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)
1 in Horiz. = 400 ft
1 in Vert. = 4 ft

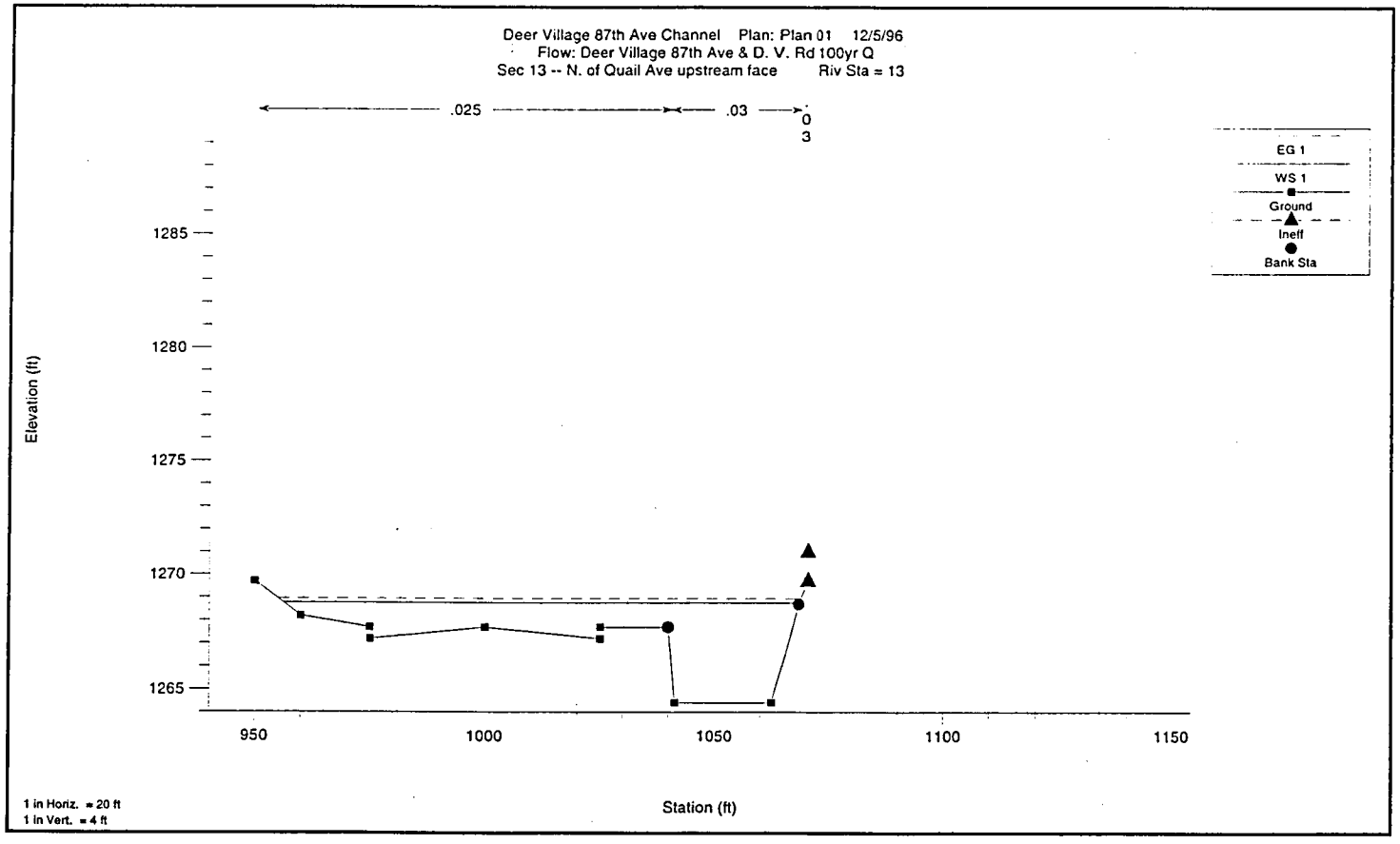

deer village main channel 11-30-96 Plan: h2dvmc3 12/2/96
Flow: Orig. File's Q changed to 1473 cfs
10 Riv Sta = 10
.035
.02
.035
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1280
1278
1276
1274
1272
1270
900
920
940
960
980
1000
Station (ft)

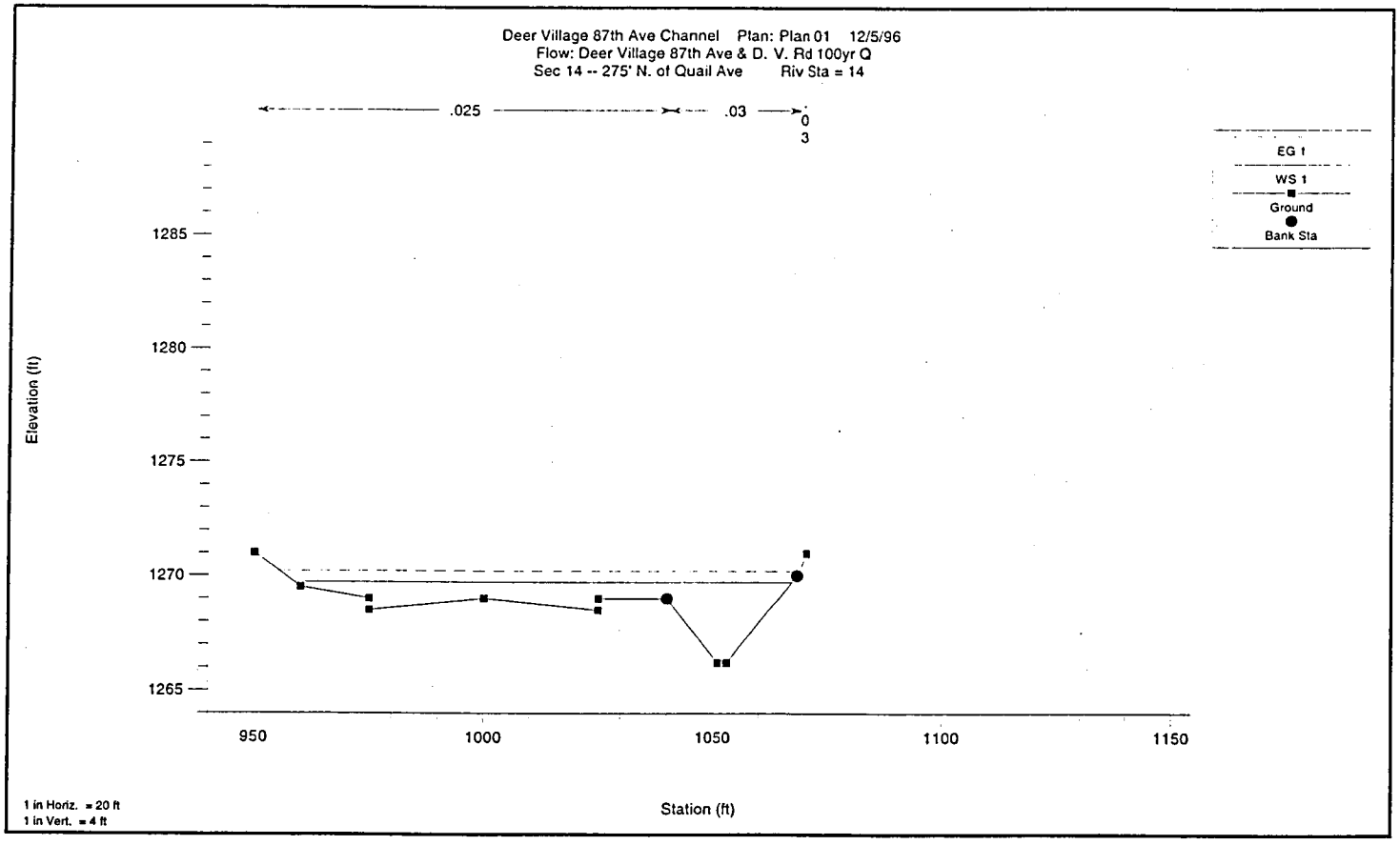

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 11 -- 143' S. of Quail Ave Riv Sta = 11
.025
.03
.03
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

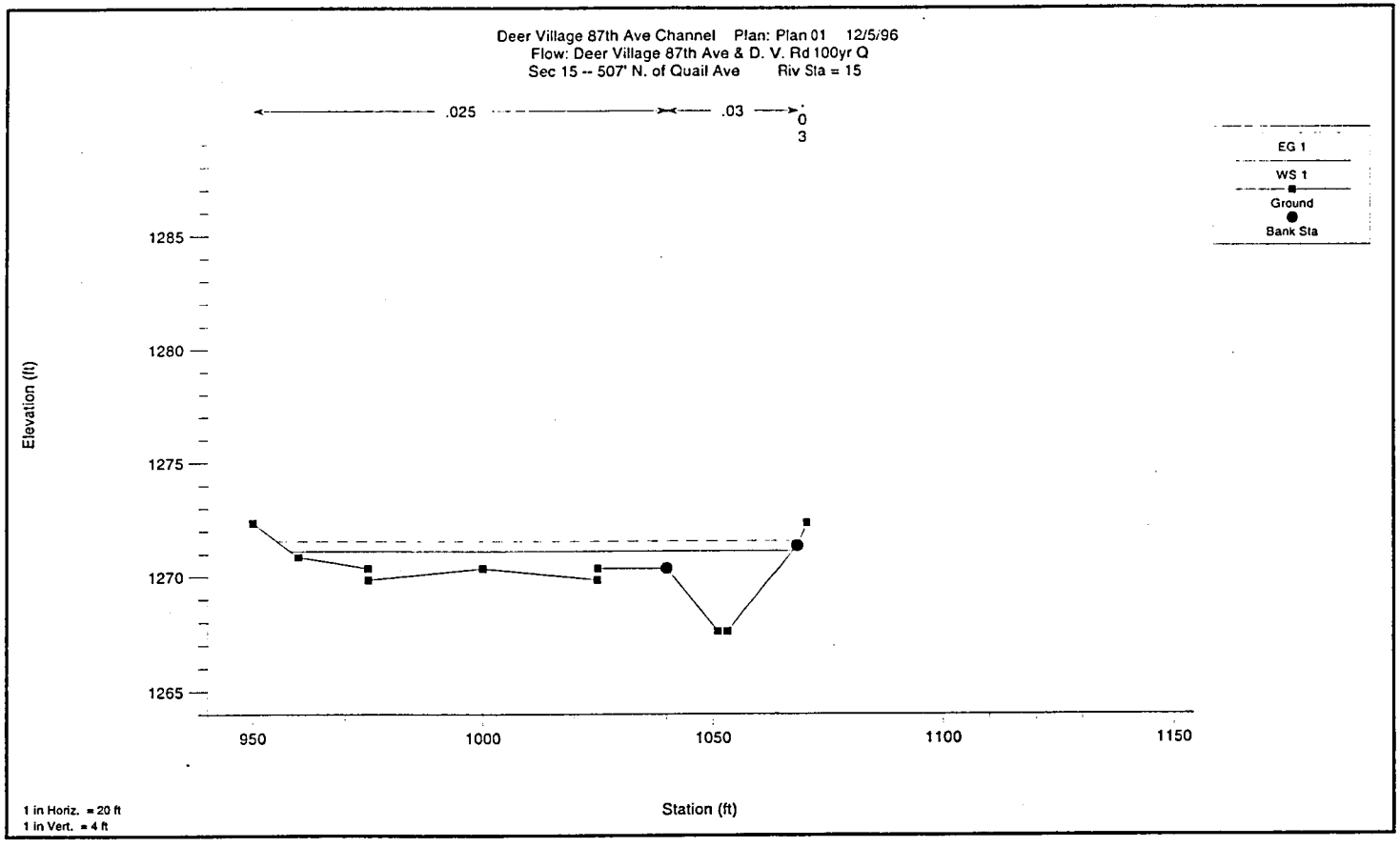

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 12 -- S. of Quail Ave downstream fac Riv Sta = 12
.025
.03
.03
EG 1
WS 1
Ground
Ineff
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

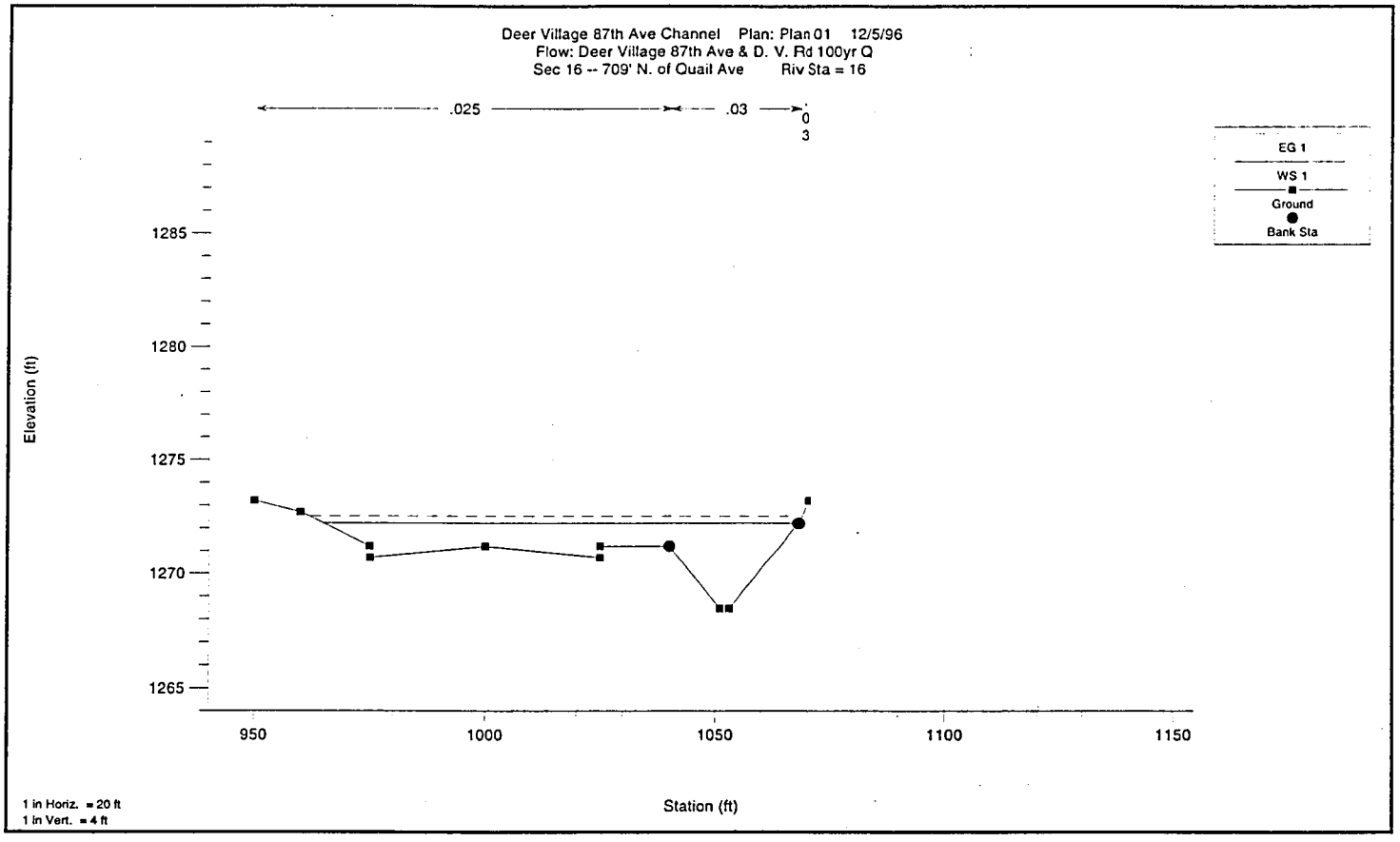

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Downstream Inside Culvert at Quail Lane Riv Sta = 12.5
.025
.03
.03
EG 1
WS 1
Ground
Ineff
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

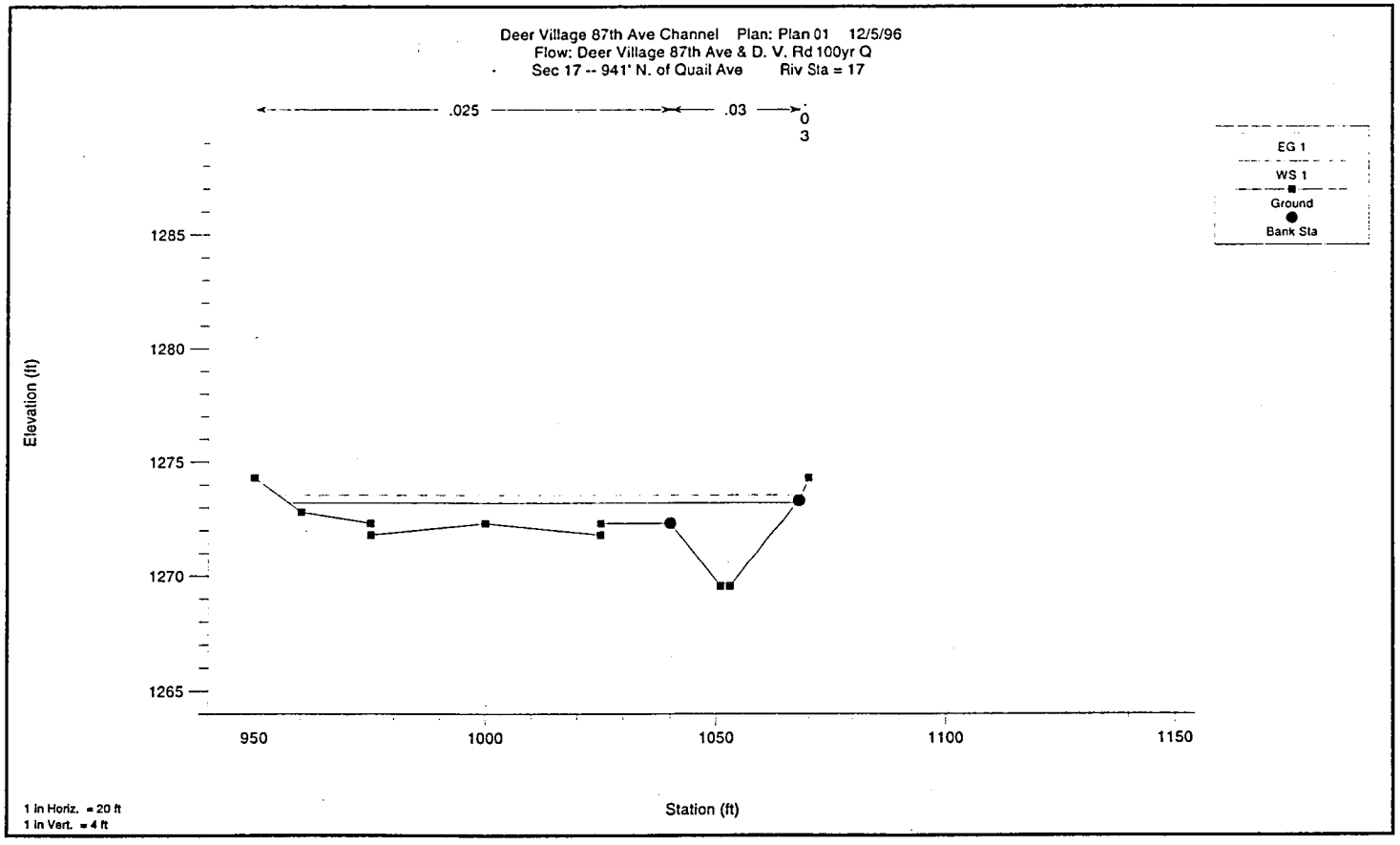

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Upstream Inside Culvert at Quail Lane Riv Sta = 12.5
.025
.03
EG 1
WS 1
Ground
Ineff
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

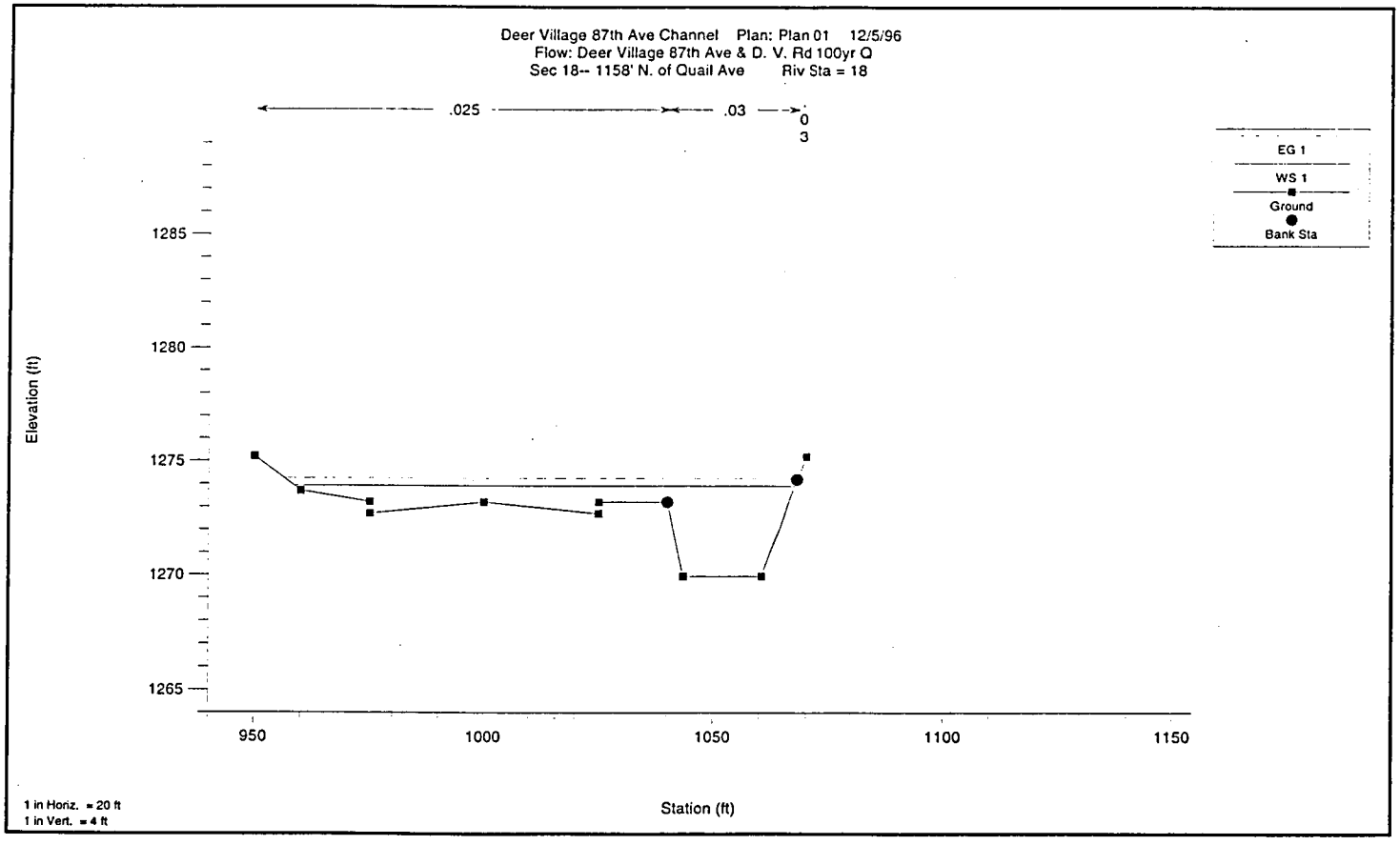

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 13 -- N. of Quail Ave upstream face Riv Sta = 13
.025
.03
0
3
EG 1
WS 1
Ground
Ineff
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

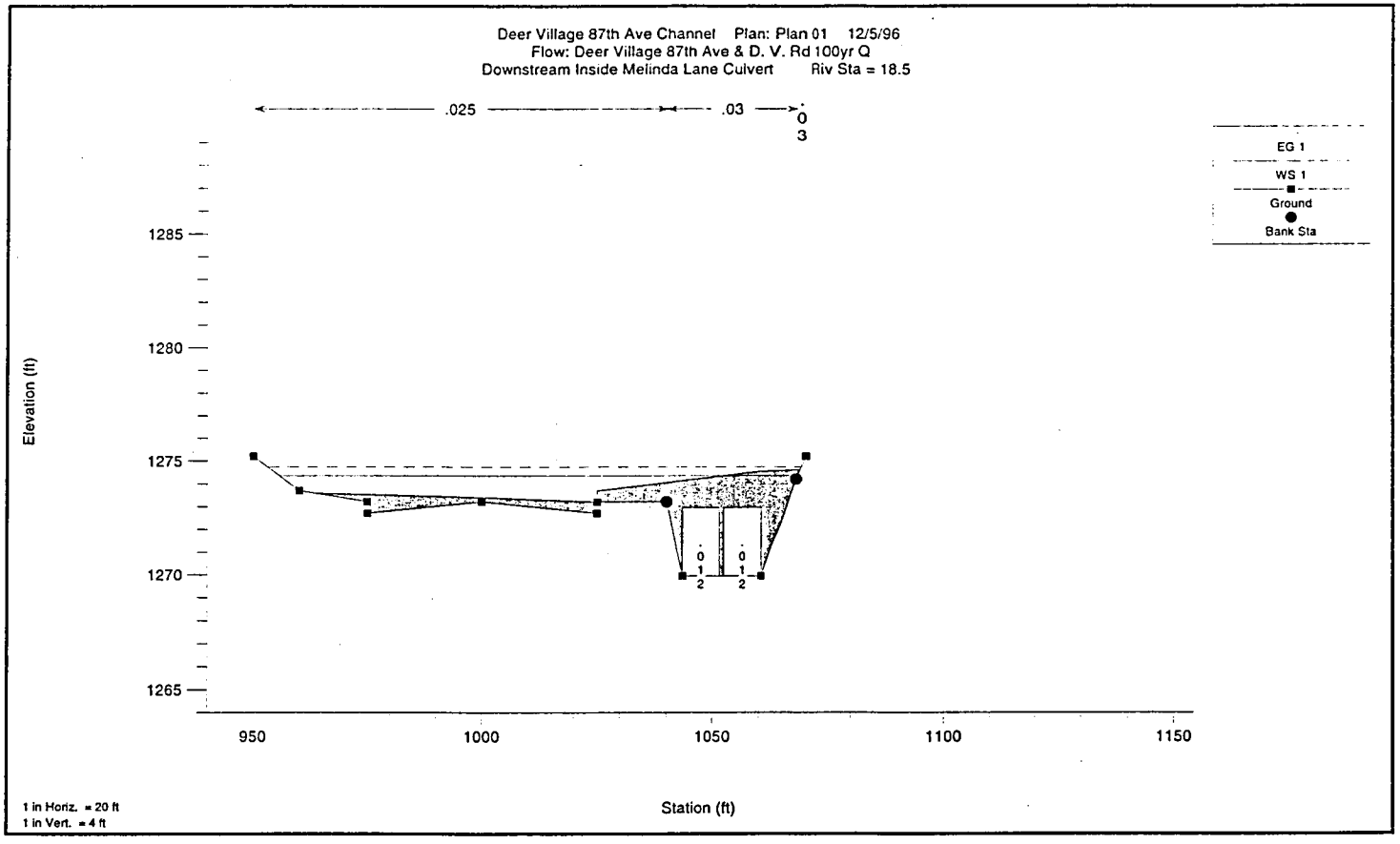

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 14 -- 275' N. of Quail Ave Riv Sta = 14
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

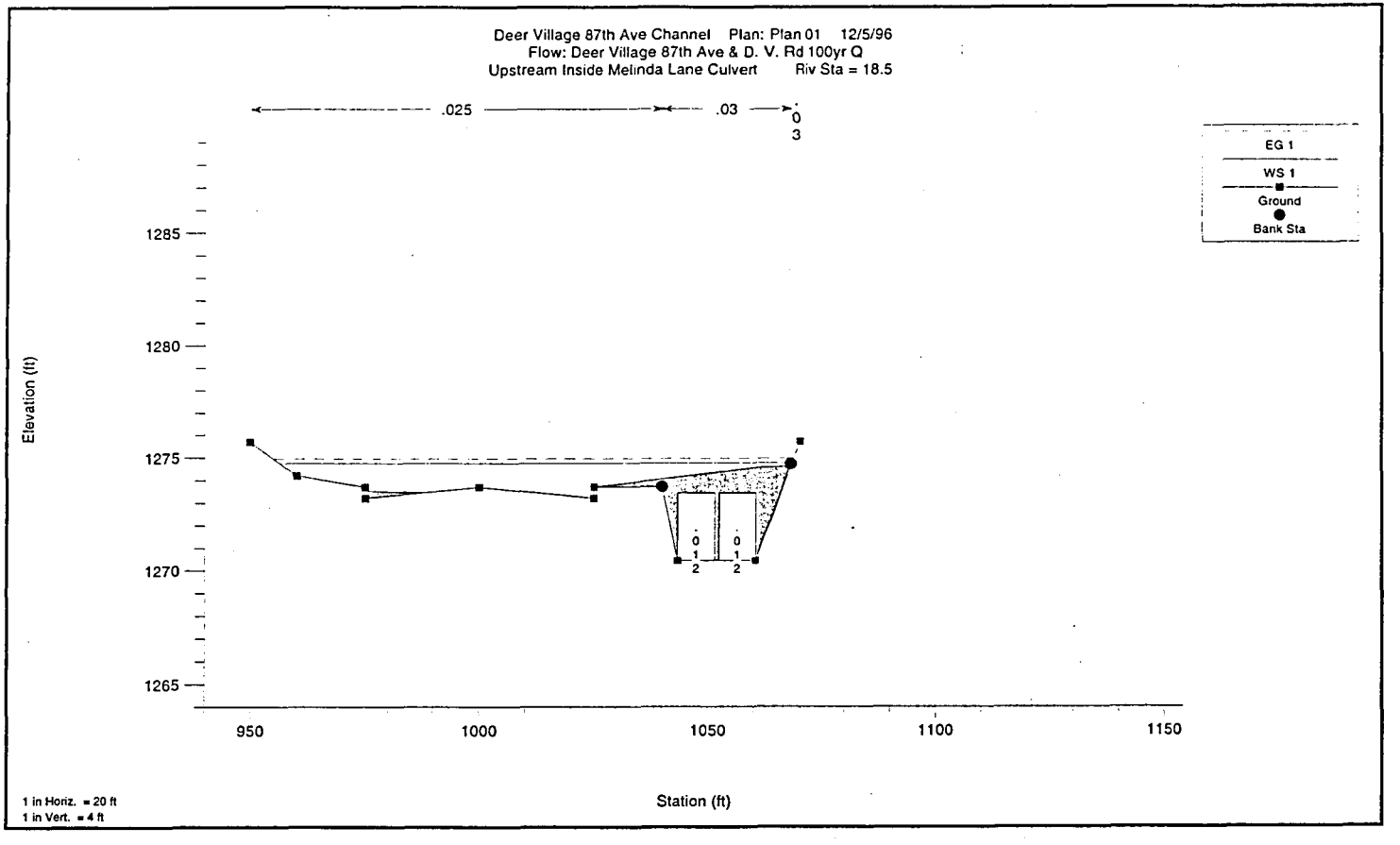

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 15 -- 507' N. of Quail Ave Riv Sta = 15
.025
.03
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

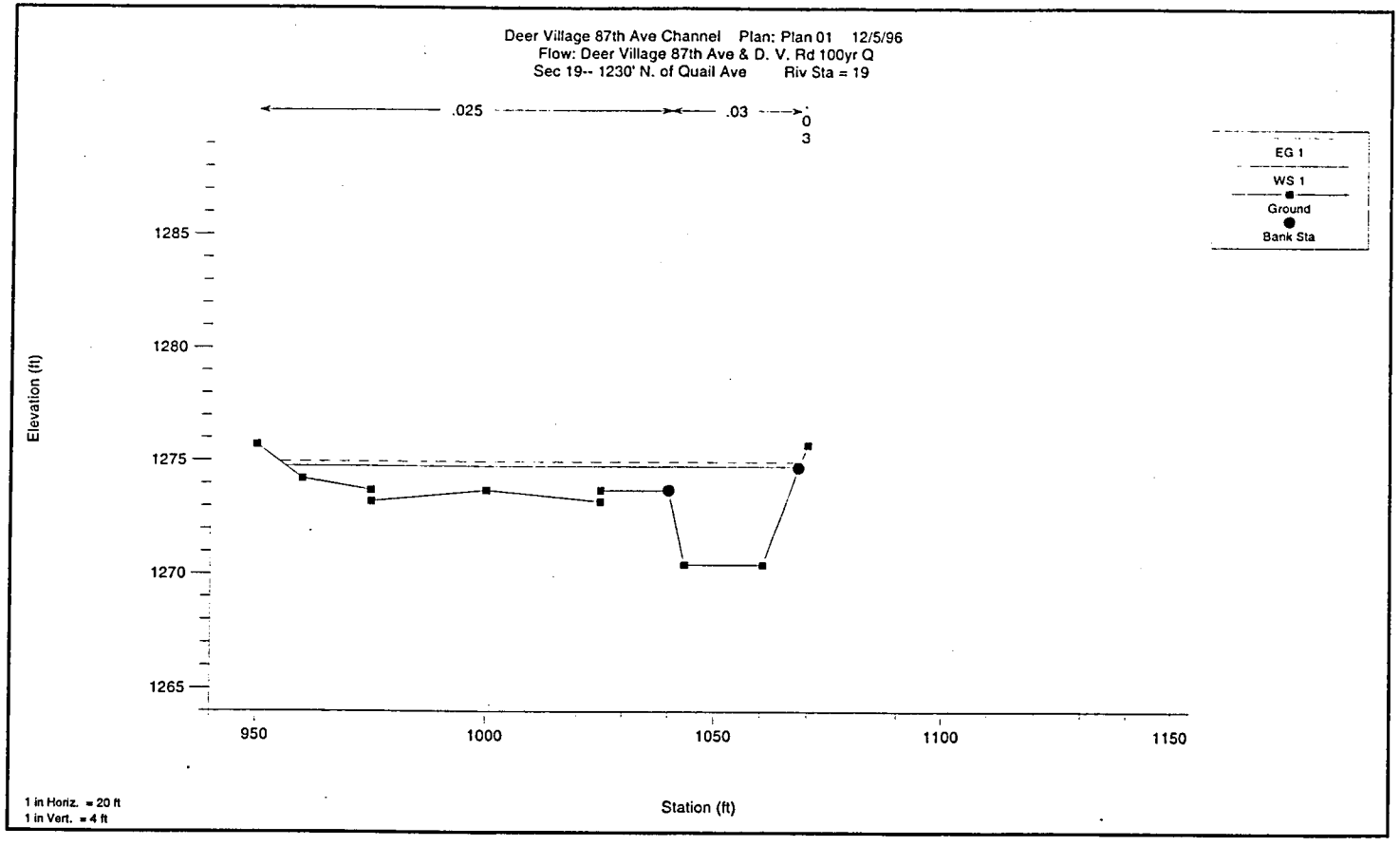

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 16 -- 709' N. of Quail Ave Riv Sta = 16
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

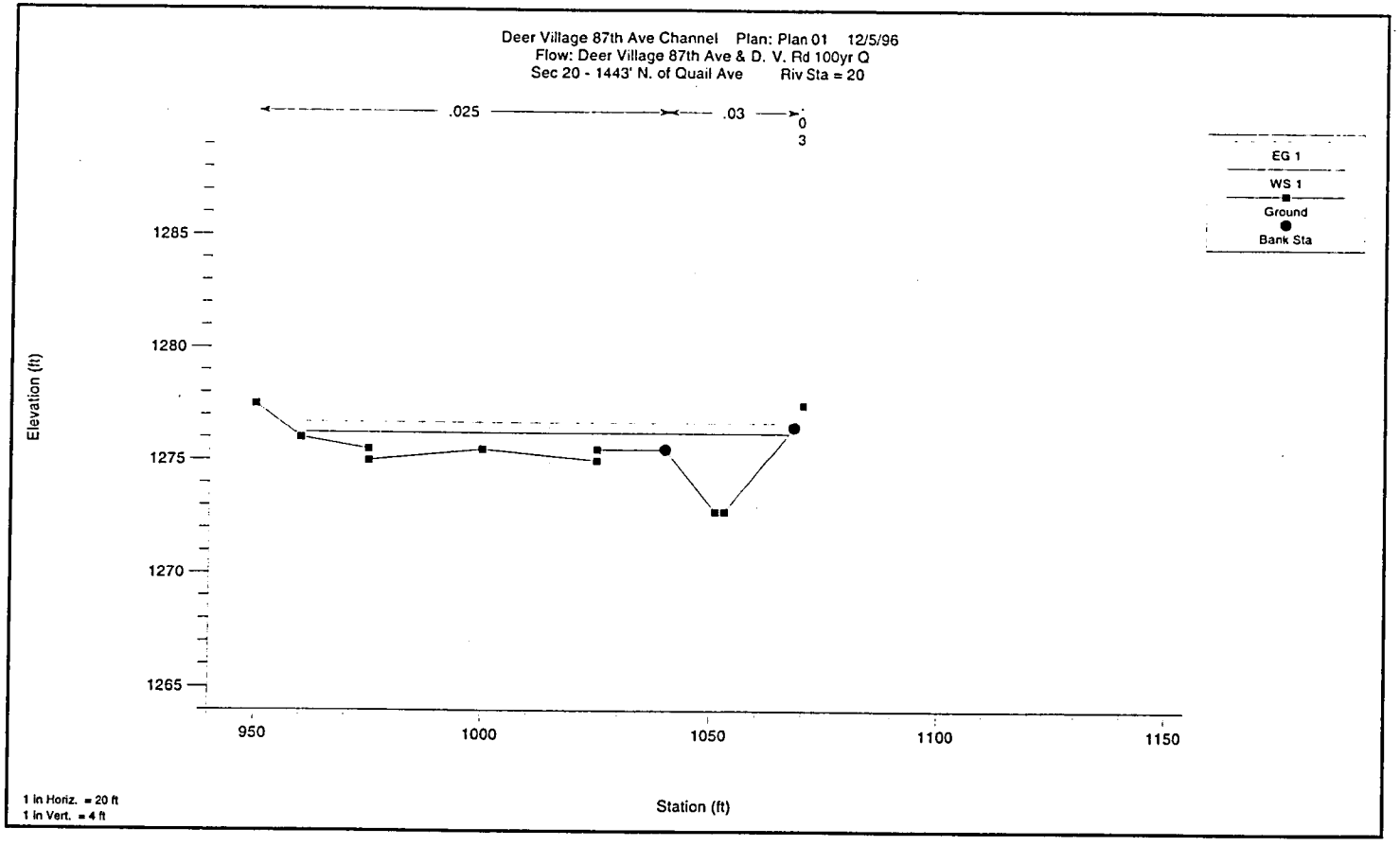

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 17 -- 941' N. of Quail Ave Riv Sta = 17
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

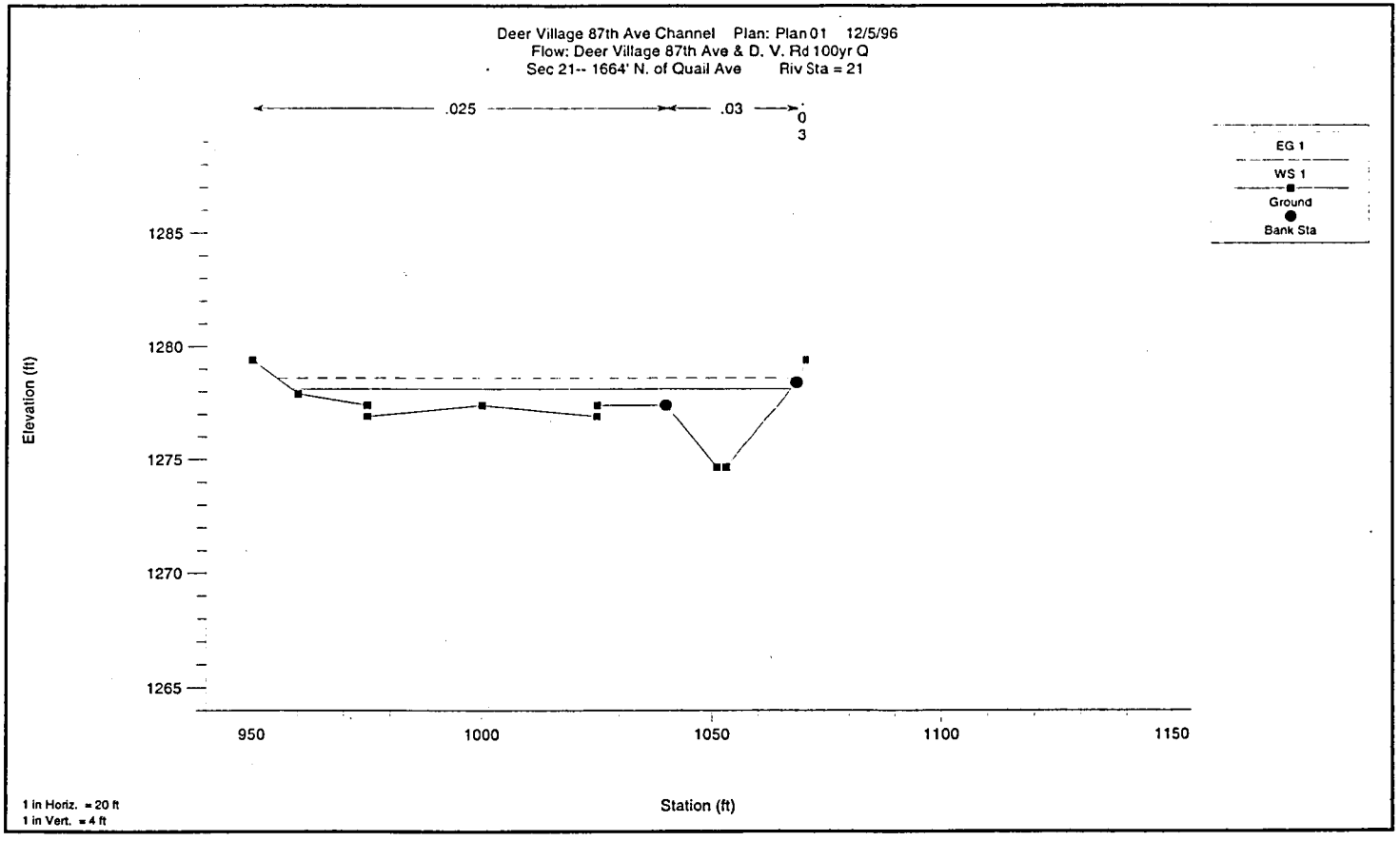

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 18-- 1158' N. of Quail Ave Riv Sta = 18
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

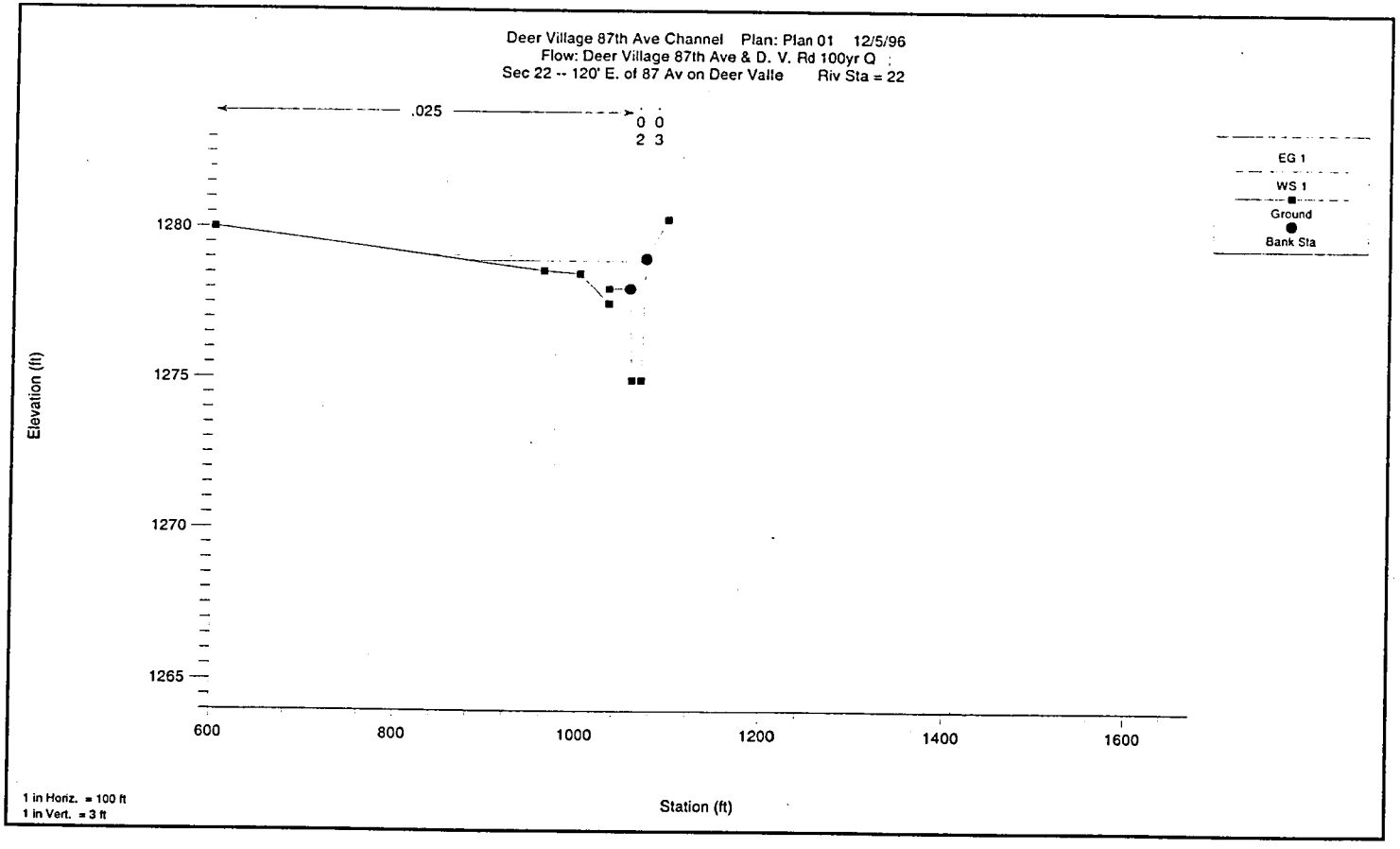

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Downstream Inside Melinda Lane Culvert Riv Sta = 18.5
.025
.03
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

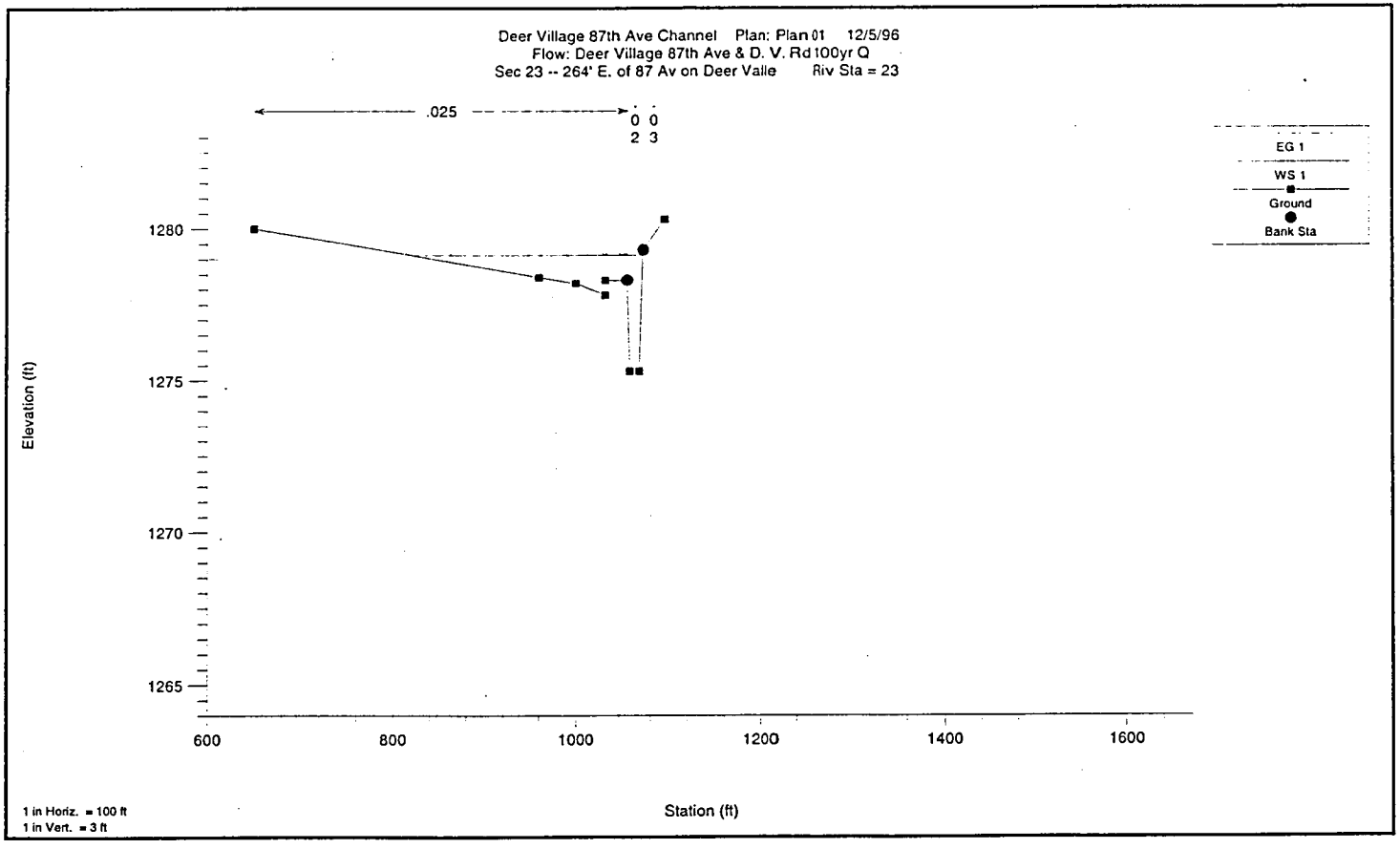

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Upstream Inside Melinda Lane Culvert Riv Sta = 18.5
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
0
1
2
0
1
2
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft

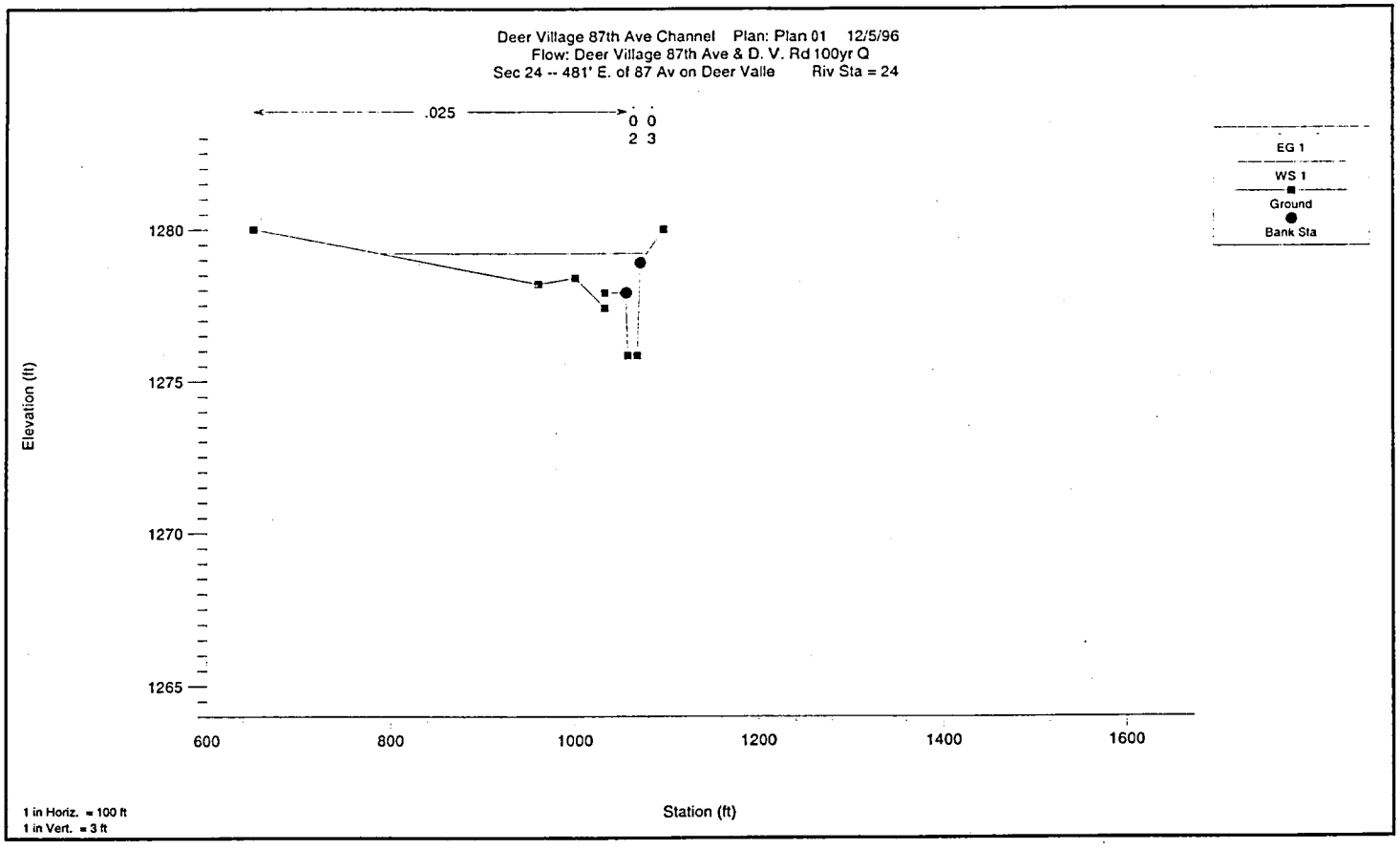

Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 19-- 1230' N. of Quail Ave Riv Sta = 19
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft


Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 20 - 1443' N. of Quail Ave Riv Sta = 20
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft


Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 21-- 1664' N. of Quail Ave Riv Sta = 21
.025
.03
0
3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1285
1280
1275
1270
1265
950
1000
1050
1100
1150
Station (ft)
1 in Horiz. = 20 ft
1 in Vert. = 4 ft


Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 22 -- 120' E. of 87 Av on Deer Valle Riv Sta = 22
.025
0 0
2 3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1280
1275
1270
1265
600
800
1000
1200
1400
1600
Station (ft)
1 in Horiz. = 100 ft
1 in Vert. = 3 ft


Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 23 -- 264' E. of 87 Av on Deer Valle Riv Sta = 23
.025
0 0
2 3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1280
1275
1270
1265
600
800
1000
1200
1400
1600
Station (ft)
1 in Horiz. = 100 ft
1 in Vert. = 3 ft


Deer Village 87th Ave Channel Plan: Plan 01 12/5/96
Flow: Deer Village 87th Ave & D. V. Rd 100yr Q
Sec 24 -- 481' E. of 87 Av on Deer Valle Riv Sta = 24
.025
0 0
2 3
EG 1
WS 1
Ground
Bank Sta
Elevation (ft)
1280
1275
1270
1265
600
800
1000
1200
1400
1600
Station (ft)
1 in Horiz. = 100 ft
1 in Vert. = 3 ft

Deer Village 87th Ave.

HEC-RAS Plan: Plan 01 Reach: 1 12/5/96

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)	
24	110.00	1275.84	1279.20		1279.21	0.000051	0.99	239.59	289.70	0.10
23	210.00	1275.30	1279.12		1279.17	0.000249	2.26	191.15	252.01	0.23
22	270.00	1274.95	1278.92		1279.08	0.000627	3.66	134.11	194.98	0.36
21	634.00	1274.65	1278.12	1278.12	1278.60	0.006951	6.46	120.44	108.33	0.90
20.8*	634.00	1274.27	1277.74	1277.74	1278.22	0.006949	6.45	120.45	108.33	0.89
20.6*	634.00	1273.90	1277.36	1277.36	1277.84	0.006954	6.45	120.47	108.34	0.89
20.4*	634.00	1273.52	1276.98	1276.98	1277.46	0.006950	6.45	120.50	108.34	0.89
20.2*	634.00	1273.15	1276.60	1276.60	1277.08	0.006957	6.44	120.51	108.36	0.89
20	634.00	1272.77	1276.22	1276.22	1276.70	0.006955	6.44	120.52	108.36	0.80
19.8*	634.00	1272.30	1275.82	1275.82	1276.31	0.006144	6.45	123.18	108.12	0.76
19.6*	634.00	1271.83	1275.42	1275.42	1275.91	0.005473	6.44	125.17	107.83	0.73
19.4*	634.00	1271.36	1275.00	1275.00	1275.51	0.004923	6.42	126.35	107.47	0.70
19.2*	634.00	1270.89	1274.69		1275.11	0.003556	5.81	139.23	108.08	0.60
19	634.00	1270.42	1274.75	1274.09	1274.95	0.001420	4.11	193.26	111.76	0.50
18.5	Culvert									
18	634.00	1269.94	1273.92		1274.25	0.002505	5.16	155.99	108.94	0.50
17.5*	634.00	1269.74	1273.64		1273.94	0.002885	5.05	156.35	110.30	0.54
17	634.00	1269.55	1273.20		1273.54	0.004420	5.36	140.63	110.30	0.65
16.5*	634.00	1269.01	1272.66		1273.02	0.004619	5.48	136.93	106.28	0.66
16	634.00	1268.47	1272.21		1272.52	0.003748	5.04	145.12	103.16	0.60
15	634.00	1267.60	1271.12		1271.56	0.006052	6.10	126.34	108.90	0.75
14.5*	634.00	1266.90	1270.52		1270.90	0.005085	5.70	133.96	109.60	0.69
14	634.00	1266.21	1269.71		1270.20	0.006996	6.50	119.95	108.23	0.81
13.8*	634.00	1265.85	1269.42	1269.42	1269.90	0.005816	6.40	124.67	108.11	0.75
13.6*	634.00	1265.49	1269.10	1269.10	1269.59	0.005087	6.37	126.84	107.75	0.81
13.4*	634.00	1265.14	1268.84		1269.28	0.003969	6.00	134.93	107.92	0.63
13.2*	634.00	1264.78	1268.79		1269.07	0.002140	4.81	166.72	109.88	0.47
13	634.00	1264.42	1268.76	1267.95	1268.95	0.001228	3.92	202.09	111.86	0.50
12.5	Culvert									
12	634.00	1264.35	1267.93	1267.66	1268.25	0.002587	5.16	158.48	134.43	0.50
11	634.00	1264.76	1267.52	1267.41	1267.83	0.005610	5.48	152.42	161.64	0.71
10	634.00	1264.68	1266.86	1266.76	1267.14	0.006008	5.22	160.11	187.28	0.72

HEC-RAS Plan: Plan 01 Reach: 1 12/5/96

River Sta.	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
24	1279.21	1279.20	0.01	0.03	0.01	66.26	43.64	0.10	289.70
23	1279.17	1279.12	0.05	0.06	0.03	91.10	118.90		252.01
22	1279.08	1278.92	0.16	0.38	0.10	68.38	201.62		194.98
21	1278.60	1278.12	0.48			285.33	348.67		108.33
20.8*	1278.22	1277.74	0.48			285.35	348.65		108.33
20.6*	1277.84	1277.36	0.48			286.36	347.64		108.34
20.4*	1277.46	1276.98	0.48			286.41	347.59		108.34
20.2*	1277.08	1276.60	0.48			287.40	346.60		108.36
20	1276.70	1276.22	0.48	0.28	0.00	287.42	346.58		108.36
19.8*	1276.31	1275.82	0.49	0.25	0.00	250.78	383.22		108.12
19.6*	1275.91	1275.42	0.49	0.22	0.00	214.52	419.48		107.83
19.4*	1275.51	1275.00	0.50	0.18	0.03	178.83	455.17		107.47
19.2*	1275.11	1274.69	0.42	0.09	0.06	169.96	464.04		108.08
19	1274.95	1274.75	0.20	0.00	0.00	225.25	408.75	0.00	111.76
18.5	Culvert								
18	1274.25	1273.92	0.33	0.29	0.02	170.61	463.39		108.94
17.5*	1273.94	1273.64	0.30	0.38	0.01	251.19	382.81		110.30
17	1273.54	1273.20	0.34	0.53	0.00	317.28	316.72		110.30
16.5*	1273.02	1272.66	0.36	0.48	0.01	310.21	323.79		106.28
16	1272.52	1272.21	0.31	0.95	0.01	322.72	311.28	0.00	103.16
15	1271.56	1271.12	0.43	0.64	0.02	295.64	338.36		108.90
14.5*	1270.90	1270.52	0.38	0.68	0.01	305.28	328.72		109.60
14	1270.20	1269.71	0.49	0.29	0.01	280.56	353.44		108.23
13.8*	1269.90	1269.42	0.48	0.25	0.00	240.79	393.21		108.11
13.6*	1269.59	1269.10	0.49			199.23	434.77		107.75
13.4*	1269.28	1268.84	0.44	0.13	0.08	174.63	459.37		107.92
13.2*	1269.07	1268.79	0.28	0.07	0.05	194.24	439.76		109.88
13	1268.95	1268.76	0.19	0.00	0.00	212.88	421.12	0.00	111.86
12.5	Culvert								
12	1268.25	1267.93	0.32	0.42	0.01	197.22	431.78	5.01	134.43
11	1267.83	1267.52	0.31	0.67	0.02	313.44	221.73	98.83	161.64
10	1267.14	1266.86	0.27	0.00	0.00	356.55	119.86	157.60	187.28

HEC-RAS Plan: Plan 01 Reach: 1 12/5/96

River Sta.	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min Top Rd	Culv Q	Q Weir	Delta WS	Culv Vel In	Culv Vel Out
	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
18.5	1274.95	1274.75	1273.93	1274.95	1273.20	289.17	344.83	0.83	6.02	6.02
12.5	1268.95	1268.76	1267.95	1268.95	1267.20	363.32	270.68	0.83	6.06	6.06

Plan: Plan 01 Reach: 1 Riv Sta: 12 Profile: 1 12/5/96

W.S. Elev (ft)	1267.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.025	0.030	0.030
E.G. Elev (ft)	1268.25	Reach Len. (ft)	130.00	100.00	130.00
E.G. Slope (ft/ft)	0.002587	Flow Area (sq ft)	72.14	83.71	2.63
Q Total (cfs)	634.00	Flow (cfs)	197.22	431.78	5.01
Top Width (ft)	134.43	Top Width (ft)	83.43	25.00	26.00
Vel Total (ft/s)	4.00	Avg. Vel. (ft/s)	2.73	5.16	1.90
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)	0.86	3.35	0.66
Crit W.S. (ft)	1267.66	Wetted Per. (ft)	83.88	28.57	4.00
Conv. Total (cfs)	12465.8	Conv. (cfs)	3877.7	8489.6	98.5

Plan: Plan 01 Reach: 1 Riv Sta: 11 Profile: 1 12/5/96

W.S. Elev (ft)	1267.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.025	0.030	0.030
E.G. Elev (ft)	1267.83	Reach Len. (ft)	120.00	100.00	130.00
E.G. Slope (ft/ft)	0.005610	Flow Area (sq ft)	76.66	40.47	35.29
Q Total (cfs)	634.00	Flow (cfs)	313.44	221.73	98.83
Top Width (ft)	161.64	Top Width (ft)	86.64	22.00	53.00
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)	4.09	5.48	2.80
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)	0.88	1.84	0.67
Crit W.S. (ft)	1267.41	Wetted Per. (ft)	87.11	22.55	53.82
Conv. Total (cfs)	8464.3	Conv. (cfs)	4184.7	2960.2	1319.5

Plan: Plan 01 Reach: 1 Riv Sta: 10 Profile: 1 12/5/96

W.S. Elev (ft)	1266.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.025	0.030	0.030
E.G. Elev (ft)	1267.14	Reach Len. (ft)			
E.G. Slope (ft/ft)	0.006008	Flow Area (sq ft)	82.84	22.95	54.31
Q Total (cfs)	634.00	Flow (cfs)	356.55	119.86	157.60
Top Width (ft)	187.28	Top Width (ft)	91.28	14.00	82.00
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)	4.30	5.22	2.90
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)	0.91	1.64	0.66
Crit W.S. (ft)	1266.76	Wetted Per. (ft)	91.74	14.47	82.66
Conv. Total (cfs)	8179.4	Conv. (cfs)	4599.9	1546.3	2033.2

Plan: Plan 01 Reach: 1 Riv Sta: 13.4* Profile: 1 12/5/96

W.S. Elev (ft)	1268.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1269.28	Reach Len. (ft)	46.40	46.40	46.40
E.G. Slope (ft/ft)	0.003969	Flow Area (sq ft)	58.34	76.59	
Q Total (cfs)	634.00	Flow (cfs)	174.63	459.37	
Top Width (ft)	107.92	Top Width (ft)	80.79	27.13	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)	2.99	6.00	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)	0.72	2.82	
Crit W.S. (ft)		Wetted Per. (ft)	81.64	28.74	
Conv. Total (cfs)	10064.0	Conv. (cfs)	2772.0	7292.0	

Plan: Plan 01 Reach: 1 Riv Sta: 13.2* Profile: 1 12/5/96

W.S. Elev (ft)	1268.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1269.07	Reach Len. (ft)	46.40	46.40	46.40
E.G. Slope (ft/ft)	0.002140	Flow Area (sq ft)	75.36	91.36	
Q Total (cfs)	634.00	Flow (cfs)	194.24	439.76	
Top Width (ft)	109.88	Top Width (ft)	82.18	27.69	
Vel Total (ft/s)	3.80	Avg. Vel. (ft/s)	2.58	4.81	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)	0.92	3.30	
Crit W.S. (ft)		Wetted Per. (ft)	83.04	30.00	
Conv. Total (cfs)	13704.7	Conv. (cfs)	4198.7	9505.9	

Plan: Plan 01 Reach: 1 Riv Sta: 13 Profile: 1 12/5/96

W.S. Elev (ft)	1268.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.025	0.030	0.030
E.G. Elev (ft)	1268.95	Reach Len. (ft)	130.00	100.00	130.00
E.G. Slope (ft/ft)	0.001228	Flow Area (sq ft)	94.77	107.32	0.00
Q Total (cfs)	634.00	Flow (cfs)	212.88	421.12	0.00
Top Width (ft)	111.86	Top Width (ft)	83.74	28.00	0.12
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)	2.25	3.92	0.16
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)	1.13	3.83	0.03
Crit W.S. (ft)	1267.95	Wetted Per. (ft)	84.62	31.58	0.14
Conv. Total (cfs)	18090.8	Conv. (cfs)	6074.3	12016.4	0.0

Plan: Plan 01 Reach: 1 Riv Sta: 14 Profile: 1 12/5/96

W.S. Elev (ft)	1269.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1270.20	Reach Len. (ft)	46.40	46.40	46.40
E.G. Slope (ft/ft)	0.006996	Flow Area (sq ft)	65.61	54.34	
Q Total (cfs)	634.00	Flow (cfs)	280.56	353.44	
Top Width (ft)	108.23	Top Width (ft)	81.39	26.84	
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)	4.28	6.50	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)	0.81	2.02	
Crit W.S. (ft)		Wetted Per. (ft)	82.24	27.63	
Conv. Total (cfs)	7580.0	Conv. (cfs)	3354.4	4225.6	

Plan: Plan 01 Reach: 1 Riv Sta: 13.8* Profile: 1 12/5/96

W.S. Elev (ft)	1269.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1269.90	Reach Len. (ft)	46.40	46.40	46.40
E.G. Slope (ft/ft)	0.005816	Flow Area (sq ft)	63.21	61.46	
Q Total (cfs)	634.00	Flow (cfs)	240.79	393.21	
Top Width (ft)	108.11	Top Width (ft)	81.19	26.92	
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)	3.81	6.40	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)	0.78	2.28	
Crit W.S. (ft)	1269.42	Wetted Per. (ft)	82.04	27.88	
Conv. Total (cfs)	8313.5	Conv. (cfs)	3157.4	5156.1	

Plan: Plan 01 Reach: 1 Riv Sta: 13.6* Profile: 1 12/5/96

W.S. Elev (ft)	1269.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1269.59	Reach Len. (ft)	46.40	46.40	46.40
E.G. Slope (ft/ft)	0.005087	Flow Area (sq ft)	58.62	68.22	
Q Total (cfs)	634.00	Flow (cfs)	199.23	434.77	
Top Width (ft)	107.75	Top Width (ft)	80.81	26.94	
Vel Total (ft/s)	5.00	Avg. Vel. (ft/s)	3.40	6.37	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)	0.73	2.53	
Crit W.S. (ft)	1269.10	Wetted Per. (ft)	81.66	28.16	
Conv. Total (cfs)	8889.1	Conv. (cfs)	2793.4	6095.7	

Plan: Plan 01 Reach: 1 Riv Sta: 16 Profile: 1 12/5/96

W.S. Elev (ft)	1272.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.025	0.030	0.000
E.G. Elev (ft)	1272.52	Reach Len. (ft)	203.00	203.00	203.00
E.G. Slope (ft/ft)	0.003748	Flow Area (sq ft)	83.39	61.74	0.00
Q Total (cfs)	634.00	Flow (cfs)	322.72	311.28	0.00
Top Width (ft)	103.16	Top Width (ft)	75.14	28.00	0.02
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)	3.87	5.04	0.08
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)	1.11	2.20	0.01
Crit W.S. (ft)		Wetted Per. (ft)	76.02	28.79	0.02
Conv. Total (cfs)	10356.5	Conv. (cfs)	5271.6	5084.9	0.0

Plan: Plan 01 Reach: 1 Riv Sta: 15 Profile: 1 12/5/96

W.S. Elev (ft)	1271.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1271.56	Reach Len. (ft)	116.00	116.00	116.00
E.G. Slope (ft/ft)	0.006052	Flow Area (sq ft)	70.86	55.48	
Q Total (cfs)	634.00	Flow (cfs)	295.64	338.36	
Top Width (ft)	108.90	Top Width (ft)	81.82	27.09	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)	4.17	6.10	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)	0.87	2.05	
Crit W.S. (ft)		Wetted Per. (ft)	82.67	27.86	
Conv. Total (cfs)	8149.5	Conv. (cfs)	3800.2	4349.3	

Plan: Plan 01 Reach: 1 Riv Sta: 14.5* Profile: 1 12/5/96

W.S. Elev (ft)	1270.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1270.90	Reach Len. (ft)	116.00	116.00	116.00
E.G. Slope (ft/ft)	0.005085	Flow Area (sq ft)	76.27	57.68	
Q Total (cfs)	634.00	Flow (cfs)	305.28	328.72	
Top Width (ft)	109.60	Top Width (ft)	82.25	27.35	
Vel Total (ft/s)	4.73	Avg. Vel. (ft/s)	4.00	5.70	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)	0.93	2.11	
Crit W.S. (ft)		Wetted Per. (ft)	83.12	28.15	
Conv. Total (cfs)	8890.6	Conv. (cfs)	4280.9	4609.7	

Plan: Plan 01 Reach: 1 Riv Sta: 17.5* Profile: 1 12/5/96

W.S. Elev (ft)	1273.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1273.94	Reach Len. (ft)	108.50	108.50	108.50
E.G. Slope (ft/ft)	0.002885	Flow Area (sq ft)	80.56	75.79	
Q Total (cfs)	634.00	Flow (cfs)	251.19	382.81	
Top Width (ft)	110.30	Top Width (ft)	82.60	27.69	
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	3.12	5.05	
Max Chl Dpth (ft)	3.90	Hydr. Depth (ft)	0.98	2.74	
Crit W.S. (ft)		Wetted Per. (ft)	83.47	28.97	
Conv. Total (cfs)	11803.7	Conv. (cfs)	4676.6	7127.0	

Plan: Plan 01 Reach: 1 Riv Sta: 17 Profile: 1 12/5/96

W.S. Elev (ft)	1273.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1273.54	Reach Len. (ft)	116.00	116.00	116.00
E.G. Slope (ft/ft)	0.004420	Flow Area (sq ft)	81.58	59.04	
Q Total (cfs)	634.00	Flow (cfs)	317.28	316.72	
Top Width (ft)	110.30	Top Width (ft)	82.68	27.61	
Vel Total (ft/s)	4.51	Avg. Vel. (ft/s)	3.89	5.36	
Max Chl Dpth (ft)	3.65	Hydr. Depth (ft)	0.99	2.14	
Crit W.S. (ft)		Wetted Per. (ft)	83.55	28.40	
Conv. Total (cfs)	9536.5	Conv. (cfs)	4772.4	4764.0	

Plan: Plan 01 Reach: 1 Riv Sta: 16.5* Profile: 1 12/5/96

W.S. Elev (ft)	1272.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1273.02	Reach Len. (ft)	116.00	116.00	116.00
E.G. Slope (ft/ft)	0.004619	Flow Area (sq ft)	77.87	59.06	
Q Total (cfs)	634.00	Flow (cfs)	310.21	323.79	
Top Width (ft)	106.28	Top Width (ft)	78.64	27.63	
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	3.98	5.48	
Max Chl Dpth (ft)	3.65	Hydr. Depth (ft)	0.99	2.14	
Crit W.S. (ft)		Wetted Per. (ft)	79.50	28.42	
Conv. Total (cfs)	9328.9	Conv. (cfs)	4564.5	4764.3	

Plan: Plan 01 Reach: 1 Riv Sta: 19.2* Profile: 1 12/5/96

W.S. Elev (ft)	1274.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1275.11	Reach Len. (ft)	42.60	42.60	42.60
E.G. Slope (ft/ft)	0.003556	Flow Area (sq ft)	59.35	79.88	
Q Total (cfs)	634.00	Flow (cfs)	169.96	464.04	
Top Width (ft)	108.08	Top Width (ft)	80.87	27.20	
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)	2.86	5.81	
Max Chl Dpth (ft)	3.80	Hydr. Depth (ft)	0.73	2.94	
Crit W.S. (ft)		Wetted Per. (ft)	81.72	28.96	
Conv. Total (cfs)	10632.0	Conv. (cfs)	2850.2	7781.7	

Plan: Plan 01 Reach: 1 Riv Sta: 19 Profile: 1 12/5/96

W.S. Elev (ft)	1274.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.025	0.030	0.000
E.G. Elev (ft)	1274.95	Reach Len. (ft)	92.00	92.00	92.00
E.G. Slope (ft/ft)	0.001420	Flow Area (sq ft)	93.82	99.44	0.00
Q Total (cfs)	634.00	Flow (cfs)	225.25	408.75	0.00
Top Width (ft)	111.76	Top Width (ft)	83.67	28.00	0.10
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)	2.40	4.11	0.15
Max Chl Dpth (ft)	4.33	Hydr. Depth (ft)	1.12	3.55	0.02
Crit W.S. (ft)	1274.09	Wetted Per. (ft)	84.54	30.43	0.11
Conv. Total (cfs)	16822.9	Conv. (cfs)	5976.8	10846.1	0.0

Plan: Plan 01 Reach: 1 Riv Sta: 18 Profile: 1 12/5/96

W.S. Elev (ft)	1273.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1274.25	Reach Len. (ft)	108.50	108.50	108.50
E.G. Slope (ft/ft)	0.002505	Flow Area (sq ft)	66.27	89.72	
Q Total (cfs)	634.00	Flow (cfs)	170.61	463.39	
Top Width (ft)	108.94	Top Width (ft)	81.44	27.50	
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	2.57	5.16	
Max Chl Dpth (ft)	3.98	Hydr. Depth (ft)	0.81	3.26	
Crit W.S. (ft)		Wetted Per. (ft)	82.29	29.83	
Conv. Total (cfs)	12667.9	Conv. (cfs)	3409.0	9258.9	

Plan: Plan 01 Reach: 1 Riv Sta: 19.8* Profile: 1 12/5/96

W.S. Elev (ft)	1275.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1276.31	Reach Len. (ft)	42.60	42.60	42.60
E.G. Slope (ft/ft)	0.006144	Flow Area (sq ft)	63.72	59.46	
Q Total (cfs)	634.00	Flow (cfs)	250.78	383.22	
Top Width (ft)	108.12	Top Width (ft)	81.23	26.89	
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)	3.94	6.45	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)	0.78	2.21	
Crit W.S. (ft)	1275.82	Wetted Per. (ft)	82.08	27.80	
Conv. Total (cfs)	8088.3	Conv. (cfs)	3199.3	4889.0	

Plan: Plan 01 Reach: 1 Riv Sta: 19.6* Profile: 1 12/5/96

W.S. Elev (ft)	1275.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1275.91	Reach Len. (ft)	42.60	42.60	42.60
E.G. Slope (ft/ft)	0.005473	Flow Area (sq ft)	59.98	65.18	
Q Total (cfs)	634.00	Flow (cfs)	214.52	419.48	
Top Width (ft)	107.83	Top Width (ft)	80.92	26.90	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)	3.58	6.44	
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)	0.74	2.42	
Crit W.S. (ft)	1275.42	Wetted Per. (ft)	81.77	28.00	
Conv. Total (cfs)	8570.1	Conv. (cfs)	2899.7	5670.3	

Plan: Plan 01 Reach: 1 Riv Sta: 19.4* Profile: 1 12/5/96

W.S. Elev (ft)	1275.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1275.51	Reach Len. (ft)	42.60	42.60	42.60
E.G. Slope (ft/ft)	0.004923	Flow Area (sq ft)	55.41	70.94	
Q Total (cfs)	634.00	Flow (cfs)	178.83	455.17	
Top Width (ft)	107.47	Top Width (ft)	80.55	26.92	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)	3.23	6.42	
Max Chl Dpth (ft)	3.64	Hydr. Depth (ft)	0.69	2.64	
Crit W.S. (ft)	1275.00	Wetted Per. (ft)	81.39	28.28	
Conv. Total (cfs)	9035.8	Conv. (cfs)	2548.7	6487.1	

Plan: Plan 01 Reach: 1 Riv Sta: 20.4* Profile: 1 12/5/96

W.S. Elev (ft)	1276.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1277.46	Reach Len. (ft)	44.20	44.20	44.20
E.G. Slope (ft/ft)	0.006950	Flow Area (sq ft)	66.58	53.92	
Q Total (cfs)	634.00	Flow (cfs)	286.41	347.59	
Top Width (ft)	108.34	Top Width (ft)	81.47	26.88	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	4.30	6.45	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)	0.82	2.01	
Crit W.S. (ft)	1276.98	Wetted Per. (ft)	82.32	27.64	
Conv. Total (cfs)	7604.9	Conv. (cfs)	3435.6	4169.4	

Plan: Plan 01 Reach: 1 Riv Sta: 20.2* Profile: 1 12/5/96

W.S. Elev (ft)	1276.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1277.08	Reach Len. (ft)	44.20	44.20	44.20
E.G. Slope (ft/ft)	0.006957	Flow Area (sq ft)	66.70	53.81	
Q Total (cfs)	634.00	Flow (cfs)	287.40	346.60	
Top Width (ft)	108.36	Top Width (ft)	81.48	26.88	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	4.31	6.44	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)	0.82	2.00	
Crit W.S. (ft)	1276.60	Wetted Per. (ft)	82.33	27.64	
Conv. Total (cfs)	7600.9	Conv. (cfs)	3445.5	4155.3	

Plan: Plan 01 Reach: 1 Riv Sta: 20 Profile: 1 12/5/96

W.S. Elev (ft)	1276.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1276.70	Reach Len. (ft)	42.60	42.60	42.60
E.G. Slope (ft/ft)	0.006955	Flow Area (sq ft)	66.71	53.81	
Q Total (cfs)	634.00	Flow (cfs)	287.42	346.58	
Top Width (ft)	108.36	Top Width (ft)	81.48	26.88	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	4.31	6.44	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)	0.82	2.00	
Crit W.S. (ft)	1276.22	Wetted Per. (ft)	82.33	27.64	
Conv. Total (cfs)	7602.1	Conv. (cfs)	3446.4	4155.7	

Plan: Plan 01 Reach: 1 Riv Sta: 21 Profile: 1 12/5/96

W.S. Elev (ft)	1278.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1278.60	Reach Len. (ft)	44.20	44.20	44.20
E.G. Slope (ft/ft)	0.006951	Flow Area (sq ft)	66.42	54.01	
Q Total (cfs)	634.00	Flow (cfs)	285.33	348.67	
Top Width (ft)	108.33	Top Width (ft)	81.45	26.87	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	4.30	6.46	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)	0.82	2.01	
Crit W.S. (ft)	1278.12	Wetted Per. (ft)	82.31	27.64	
Conv. Total (cfs)	7604.2	Conv. (cfs)	3422.2	4181.9	

Plan: Plan 01 Reach: 1 Riv Sta: 20.8* Profile: 1 12/5/96

W.S. Elev (ft)	1277.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1278.22	Reach Len. (ft)	44.20	44.20	44.20
E.G. Slope (ft/ft)	0.006949	Flow Area (sq ft)	66.43	54.02	
Q Total (cfs)	634.00	Flow (cfs)	285.35	348.65	
Top Width (ft)	108.33	Top Width (ft)	81.45	26.87	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	4.30	6.45	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)	0.82	2.01	
Crit W.S. (ft)	1277.74	Wetted Per. (ft)	82.31	27.64	
Conv. Total (cfs)	7605.4	Conv. (cfs)	3423.1	4182.3	

Plan: Plan 01 Reach: 1 Riv Sta: 20.6* Profile: 1 12/5/96

W.S. Elev (ft)	1277.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.025	0.030	
E.G. Elev (ft)	1277.84	Reach Len. (ft)	44.20	44.20	44.20
E.G. Slope (ft/ft)	0.006954	Flow Area (sq ft)	66.56	53.91	
Q Total (cfs)	634.00	Flow (cfs)	286.36	347.64	
Top Width (ft)	108.34	Top Width (ft)	81.46	26.88	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	4.30	6.45	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)	0.82	2.01	
Crit W.S. (ft)	1277.36	Wetted Per. (ft)	82.32	27.64	
Conv. Total (cfs)	7602.5	Conv. (cfs)	3433.9	4168.6	

Deer Village 87th Ave. Channel

Plan: Plan 01 Reach: 1 Riv Sta: 24 Profile: 1 12/5/96

W.S. Elev (ft)	1279.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.025	0.020	0.030
E.G. Elev (ft)	1279.21	Reach Len. (ft)	217.00	217.00	217.00
E.G. Slope (ft/ft)	0.000051	Flow Area (sq ft)	194.35	44.21	1.03
Q Total (cfs)	110.00	Flow (cfs)	66.26	43.64	0.10
Top Width (ft)	289.70	Top Width (ft)	267.68	15.20	6.82
Vel Total (ft/s)	0.46	Avg. Vel. (ft/s)	0.34	0.99	0.10
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)	0.73	2.91	0.15
Crit W.S. (ft)		Wetted Per. (ft)	268.11	17.30	6.83
Conv. Total (cfs)	15475.0	Conv. (cfs)	9321.3	6139.3	14.5

Plan: Plan 01 Reach: 1 Riv Sta: 23 Profile: 1 12/5/96

W.S. Elev (ft)	1279.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.025	0.020	
E.G. Elev (ft)	1279.17	Reach Len. (ft)	142.00	142.00	142.00
E.G. Slope (ft/ft)	0.000249	Flow Area (sq ft)	138.46	52.69	
Q Total (cfs)	210.00	Flow (cfs)	91.10	118.90	
Top Width (ft)	252.01	Top Width (ft)	235.09	16.92	
Vel Total (ft/s)	1.10	Avg. Vel. (ft/s)	0.66	2.26	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)	0.59	3.11	
Crit W.S. (ft)		Wetted Per. (ft)	235.50	19.72	
Conv. Total (cfs)	13313.7	Conv. (cfs)	5775.4	7538.3	

Plan: Plan 01 Reach: 1 Riv Sta: 22 Profile: 1 12/5/96

W.S. Elev (ft)	1278.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.025	0.020	
E.G. Elev (ft)	1279.08	Reach Len. (ft)	200.00	130.00	90.00
E.G. Slope (ft/ft)	0.000627	Flow Area (sq ft)	79.06	55.06	
Q Total (cfs)	270.00	Flow (cfs)	68.38	201.62	
Top Width (ft)	194.98	Top Width (ft)	177.96	17.02	
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.86	3.66	
Max Chl Dpth (ft)	3.97	Hydr. Depth (ft)	0.44	3.23	
Crit W.S. (ft)		Wetted Per. (ft)	178.39	19.93	
Conv. Total (cfs)	10784.6	Conv. (cfs)	2731.3	8053.3	

HEC-RAS Version 1.2 April 1996
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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X   X XXXXXX  XXXX    XXXX    XX   XXXX
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****

PROJECT DATA
Project Title: Deer Village 87th Ave Channel
Project File : dv87.prj
Run Date and Time: 12/5/96 4:56:38 PM

Project in English units

****

PLAN DATA

Plan Title: Plan 01
Plan File : c:\hec\ras\dv87.p01

Geometry Title: Plan 01
Geometry File : c:\hec\ras\dv87.p01

Flow Title : Plan 01
Flow File : c:\hec\ras\dv87.p01

Plan Summary Information:
Number of: Cross Sections = 30 Mulitple Openings = 0
Culverts = 2 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = .01
Critical depth calculaton tolerance = .01
Maximum number of interations = 20
Maximum difference tolerance = .3
Flow tolerance factor = .001

Computational Flow Regime: Subcritical Flow

Encroachment Data: None

Flow Distribution Locations: None

****

FLOW DATA

Flow Title: Deer Village 87th Ave & D. V. Rd 100yr Q
Flow File : c:\hec\ras\dv87.f01

Flow Data (cfs)

Reach	Riv Sta	PF#1
1	24	110
1	23	210
1	22	270
1	21	634
1	10	634

Boundary Conditions

Reach	Profile	Upstream	Downstream
1	1	Normal S = .0025	Normal S = .006

****

GEOMETRY DATA

Geometry Title: Deer Valley East & 87th Ave Prop. Secs.
Geometry File : c:\hec\ras\dv87.g01

CROSS SECTION INPUT Reach: 1 River Station: 24
Description: Sec 24 -- 481' E. of 87 Av on Deer Valley Rd

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
650	1280	960	1278.2	1000	1278.4	1032	1277.4	1032.1	1277.9
1055	1277.9	1057.1	1275.84	1067.1	1275.84	1070.2	1278.9	1095	1280

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
650	.025	1055	.02	1070.2	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1055	1070.2	217	217	217	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 23
Description: Sec 23 -- 264' E. of 87 Av on Deer Valley Rd

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
650	1280	960	1278.4	1000	1278.2	1032	1277.8	1032.1	1278.3
1055	1278.3	1058	1275.3	1068	1275.3	1072.1	1279.3	1095	1280.3

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
650	.025	1055	.02	1072.1	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1055	1072.1	142	142	142	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 22
Description: Sec 22 -- 120' E. of 87 Av on Deer Valley Rd

Station Elevation Data, num = 10

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
600	1280	960	1278.6	1000	1278.5	1032	1277.5	1032.1	1278
1055	1278	1058	1274.95	1068	1274.95	1072.1	1279	1095	1280.3

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
600	.025	1055	.02	1072.1	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1055	1072.1	200	130	90	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 21
Description: Sec 21-- 1664' N. of Quail Ave

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1279.4	960	1277.9	974.9	1277.4	975	1276.9	1000	1277.4
1025	1276.9	1025.1	1277.4	1040	1277.4	1051	1274.65	1053	1274.65
1068	1278.4	1070	1279.4						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	44.2	44.2	44.2	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 20.8*
Description:

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1279.02	960	1277.52	974.9	1277.02	975	1276.52	1000	1277.02
1025	1276.52	1025.1	1277.02	1040	1277.02	1051	1274.27	1053	1274.27
1068	1278.02	1070	1279.02						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	44.2	44.2	44.2	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 20.6*
Description:

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1278.64	960	1277.14	974.9	1276.64	975	1276.14	1000	1276.64
1025	1276.14	1025.1	1276.64	1040	1276.64	1051	1273.9	1053	1273.9
1068	1277.64	1070	1278.64						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	44.2	44.2	44.2	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 20.4*
Description:

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1278.26	960	1276.76	974.9	1276.26	975	1275.76	1000	1276.26
1025	1275.76	1025.1	1276.26	1040	1276.26	1051	1273.52	1053	1273.52
1068	1277.26	1070	1278.26						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	44.2	44.2	44.2	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 20.2*
Description:

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1277.88	960	1276.38	974.9	1275.88	975	1275.38	1000	1275.88
1025	1275.38	1025.1	1275.88	1040	1275.88	1051	1273.15	1053	1273.15
1068	1276.88	1070	1277.88						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	44.2	44.2	44.2	.3	.5

CROSS SECTION INPUT Reach: 1 River Station: 20
Description: Sec 20 - 1443' N. of Quail Ave

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1277.5	960	1276	974.9	1275.5	975	1275	1000	1275.5
1025	1275	1025.1	1275.5	1040	1275.5	1051	1272.77	1053	1272.77
1068	1276.5	1070	1277.5						

Manning's n Values, num = 3

```
  Sta.  Value   Sta.  Value   Sta.  Value
   950   .025   1040   .03   1068   .03

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
      1040   1068          42.6   42.6   42.6          .1      .3

CROSS SECTION INPUT    Reach: 1          River Station: 19.8*
Description:

Station Elevation Data,  num = 12
  Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
   950 1277.14    960 1275.64   974.9 1275.14    975 1274.64   1000 1275.14
  1025 1274.64  1025.1 1275.14   1040 1275.14  1049.5  1272.3  1054.5  1272.3
  1068 1276.14   1070 1277.14

Manning's n Values,  num = 3
  Sta.  Value   Sta.  Value   Sta.  Value
   950   .025   1040   .03   1068   .03

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
      1040   1068          42.6   42.6   42.6          .1      .3

CROSS SECTION INPUT    Reach: 1          River Station: 19.6*
Description:

Station Elevation Data,  num = 12
  Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
   950 1276.78    960 1275.28   974.9 1274.78    975 1274.28   1000 1274.78
  1025 1274.28  1025.1 1274.78   1040 1274.78   1048 1271.83   1056 1271.83
  1068 1275.78   1070 1276.78

Manning's n Values,  num = 3
  Sta.  Value   Sta.  Value   Sta.  Value
   950   .025   1040   .03   1068   .03

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
      1040   1068          42.6   42.6   42.6          .1      .3

CROSS SECTION INPUT    Reach: 1          River Station: 19.4*
Description:

Station Elevation Data,  num = 12
  Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
   950 1276.42    960 1274.92   974.9 1274.42    975 1273.92   1000 1274.42
  1025 1273.92  1025.1 1274.42   1040 1274.42  1046.5 1271.36  1057.5 1271.36
  1068 1275.42   1070 1276.42

Manning's n Values,  num = 3
  Sta.  Value   Sta.  Value   Sta.  Value
   950   .025   1040   .03   1068   .03

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
      1040   1068          42.6   42.6   42.6          .1      .3

CROSS SECTION INPUT    Reach: 1          River Station: 19.2*
Description:
```

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1276.06	960	1274.56	974.9	1274.06	975	1273.56	1000	1274.06
1025	1273.56	1025.1	1274.06	1040	1274.06	1045	1270.89	1059	1270.89
1068	1275.06	1070	1276.06						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	42.6	42.6	42.6	.1	.3

CROSS SECTION INPUT Reach: 1 River Station: 19
Description: Sec 19-- 1230' N. of Quail Ave

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1275.7	960	1274.2	974.9	1273.7	975	1273.2	1000	1273.7
1025	1273.2	1025.1	1273.7	1040	1273.7	1043.5	1270.42	1060.5	1270.42
1068	1274.7	1070	1275.7						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1040	1068	92	92	92	.3	.5

CULVERT INPUT Reach: 1 River Station: 18.5
Description: Melinda Lane Culvert
Distance from Upstream XS = 2
Deck/Roadway Width = 86
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates, num = 6

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
960	1273.6		1000	1273.4		1024.9	1273.2	
1025	1273.7		1060	1274.54		1080	1274.7	

Downstream Deck/Roadway Coordinates, num = 6

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
960	1273.6		1000	1273.4		1024.9	1273.2	
1025	1273.7		1060	1274.54		1080	1274.7	

Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	3	8

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.

```
Culvert Length    n Value   Entrance Loss Coef   Exit Loss Coef
        90      .012              .5                 1
Number of Barrels =  2
Upstream   Elevation =  1270.42
Centerline Stations
   Sta.    Sta.
 1047.5  1056.5
Downstream Elevation =  1269.94
Centerline Stations
   Sta.    Sta.
 1047.5  1056.5

CROSS SECTION INPUT    Reach: 1            River Station: 18
Description: Sec 18-- 1158' N. of Quail Ave

Station Elevation Data,  num = 12
   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
    950  1275.2    960  1273.7   974.9  1273.2    975  1272.7    1000  1273.2
   1025  1272.7  1025.1  1273.2    1040  1273.2  1043.5 1269.94  1060.5 1269.94
   1068  1274.2    1070  1275.2

Manning's n Values,  num = 3
   Sta.  Value    Sta.  Value    Sta.  Value
    950   .025    1040    .03    1068    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1040    1068          108.5   108.5   108.5          .3      .5

CROSS SECTION INPUT    Reach: 1            River Station: 17.5*
Description:

Station Elevation Data,  num = 12
   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
    950 1274.75    960 1273.25   974.9 1272.75    975 1272.25    1000 1272.75
   1025 1272.25  1025.1 1272.75    1040 1272.75  1047.3 1269.74  1056.8 1269.74
   1068 1273.75    1070 1274.75

Manning's n Values,  num = 3
   Sta.  Value    Sta.  Value    Sta.  Value
    950   .025    1040    .03    1068    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1040    1068          108.5   108.5   108.5          .3      .5

CROSS SECTION INPUT    Reach: 1            River Station: 17
Description: Sec 17 -- 941' N. of Quail Ave

Station Elevation Data,  num = 12
   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
    950  1274.3    960  1272.8   974.9  1272.3    975  1271.8    1000  1272.3
   1025  1271.8  1025.1  1272.3    1040  1272.3    1051 1269.55    1053 1269.55
   1068  1273.3    1070  1274.3

Manning's n Values,  num = 3
   Sta.  Value    Sta.  Value    Sta.  Value
    950   .025    1040    .03    1068    .03
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 116 116 116 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 16.5*
Description:

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1273.75	960	1272.75	974.9	1271.75	975	1271.25	1000	1271.75
1025	1271.25	1025.1	1271.75	1040	1271.75	1051	1269.01	1053	1269.01
1068	1272.75	1070	1273.75						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 116 116 116 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 16
Description: Sec 16 -- 709' N. of Quail Ave

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1273.2	960	1272.7	974.9	1271.2	975	1270.7	1000	1271.2
1025	1270.7	1025.1	1271.2	1040	1271.2	1051	1268.47	1053	1268.47
1068	1272.2	1070	1273.2						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 203 203 203 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 15
Description: Sec 15 -- 507' N. of Quail Ave

Station Elevation Data, num = 12

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1272.35	960	1270.85	974.9	1270.35	975	1269.85	1000	1270.35
1025	1269.85	1025.1	1270.35	1040	1270.35	1051	1267.6	1053	1267.6
1068	1271.35	1070	1272.35						

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1040	.03	1068	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 116 116 116 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 14.5*
Description:

Station Elevation Data, num = 12

Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
950 1271.68 960 1270.18 974.9 1269.68 975 1269.17 1000 1269.68
1025 1269.18 1025.1 1269.68 1040 1269.68 1051 1266.9 1053 1266.9
1068 1270.68 1070 1271.68

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
950 .025 1040 .03 1068 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 116 116 116 .1 .3

CROSS SECTION INPUT Reach: 1 River Station: 14
Description: Sec 14 -- 275' N. of Quail Ave

Station Elevation Data, num = 12
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
950 1271 960 1269.5 974.9 1269 975 1268.5 1000 1269
1025 1268.5 1025.1 1269 1040 1269 1051 1266.21 1053 1266.21
1068 1270 1070 1271

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
950 .025 1040 .03 1068 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 46.4 46.4 46.4 .3 .5

CROSS SECTION INPUT Reach: 1 River Station: 13.8*
Description:

Station Elevation Data, num = 12
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
950 1270.74 960 1269.24 974.9 1268.74 975 1268.24 1000 1268.74
1025 1268.24 1025.1 1268.74 1040 1268.74 1049.1 1265.85 1054.9 1265.85
1068 1269.74 1070 1270.74

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
950 .025 1040 .03 1068 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1040 1068 46.4 46.4 46.4 .3 .5

CROSS SECTION INPUT Reach: 1 River Station: 13.6*
Description:

Station Elevation Data, num = 12
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
950 1270.48 960 1268.98 974.9 1268.48 975 1267.98 1000 1268.48
1025 1267.98 1025.1 1268.48 1040 1268.48 1047.2 1265.49 1056.8 1265.49
1068 1269.48 1070 1270.48

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
950 .025 1040 .03 1068 .03

```
Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1040    1068          46.4    46.4    46.4          .3      .5

CROSS SECTION INPUT    Reach: 1            River Station: 13.4*
Description:

Station Elevation Data,  num = 12
   Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    950 1270.22     960 1268.72   974.9 1268.22     975 1267.72    1000 1268.22
   1025 1267.72  1025.1 1268.22    1040 1268.22  1045.3 1265.14  1058.7 1265.14
   1068 1269.22    1070 1270.22

Manning's n Values,  num = 3
   Sta.   Value    Sta.   Value    Sta.   Value
    950    .025     1040    .03     1068    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1040    1068          46.4    46.4    46.4          .3      .5

CROSS SECTION INPUT    Reach: 1            River Station: 13.2*
Description:

Station Elevation Data,  num = 12
   Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    950 1269.96     960 1268.46   974.9 1267.96     975 1267.46    1000 1267.96
   1025 1267.46  1025.1 1267.96    1040 1267.96  1043.4 1264.78  1060.6 1264.78
   1068 1268.96    1070 1269.96

Manning's n Values,  num = 3
   Sta.   Value    Sta.   Value    Sta.   Value
    950    .025     1040    .03     1068    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1040    1068          46.4    46.4    46.4          .3      .5

CROSS SECTION INPUT    Reach: 1            River Station: 13
Description: Sec 13 -- N. of Quail Ave upstream face of culvert

Station Elevation Data,  num = 12
   Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.    Sta.   Elev.
    950  1269.7     960  1268.2   974.9  1267.7     975  1267.2    1000  1267.7
   1025  1267.2  1025.1  1267.7    1040  1267.7  1041.5 1264.42  1062.5 1264.42
   1068  1268.7    1070  1269.7

Manning's n Values,  num = 3
   Sta.   Value    Sta.   Value    Sta.   Value
    950    .025     1040    .03     1068    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1040    1068           130     100     130          .3      .5
Ineffective Flow Areas,  num = 1
  Sta L   Sta R    Elev
************************
   1070    1070    1271
```

CULVERT INPUT Reach: 1 River Station: 12.5
Description: Culvert at Quail Lane
Distance from Upstream XS = 2
Deck/Roadway Width = 70
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates, num = 8

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
950	1269.7		960	1268.2		1000	1267.7	
1024.9	1267.2		1025	1267.7		1060	1269	
1070	1268.9		1168	1267.5				

Downstream Deck/Roadway Coordinates, num = 8

Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord	Sta.	Hi Cord	Lo Cord
950	1269.7		960	1268.2		1000	1267.7	
1024.9	1267.2		1025	1267.7		1060	1269	
1070	1268.9		1168	1267.5				

Elevation at which weir flow begins =
Maximum allowable submergence for weir flow = .95
Submergence criteria :Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	3	10

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.

Culvert Length	n Value	Entrance Loss Coef	Exit Loss Coef
80	.012	.5	1

Number of Barrels = 2
Upstream Elevation = 1264.42
Centerline Stations

Sta.	Sta.
1046.5	1057.5

Downstream Elevation = 1264.35
Centerline Stations

Sta.	Sta.
1046.5	1057.5

CROSS SECTION INPUT Reach: 1 River Station: 12
Description: Sec 12 -- S. of Quail Ave downstream face of culvert

Station Elevation Data, num = 11

Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.	Sta.	Elev.
950	1269.07	960	1267.57	974.9	1267.07	975	1266.57	1000	1267.07
1021	1267	1041	1267.3	1041.5	1264.35	1062.5	1264.35	1066	1267.3
1092	1267								

Manning's n Values, num = 3

Sta.	Value	Sta.	Value	Sta.	Value
950	.025	1041	.03	1066	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1041	1066	130	100	130	.3	.5

Ineffective Flow Areas, num = 1

```
  Sta L   Sta R    Elev
************************
   1070    1092    1271

CROSS SECTION INPUT    Reach: 1            River Station: 11
Description: Sec 11 -- 143' S. of Quail Ave

Station Elevation Data,  num = 11
   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
    950 1268.47    960 1266.97  974.9 1266.47    975 1265.97   1000 1266.47
   1010  1266.7   1043   1267   1052 1264.76   1056 1264.76   1065   1267
   1118  1266.7

Manning's n Values,  num = 3
   Sta.  Value   Sta.  Value   Sta.  Value
    950   .025   1043    .03   1065    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1043    1065            120     100     130            .3      .5

CROSS SECTION INPUT    Reach: 1            River Station: 10
Description: Sec 10 -- 243' S. of Quail Ave

Station Elevation Data,  num = 12
   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.   Sta.  Elev.
    950 1267.87    960 1266.37  974.9 1265.87    975 1265.37   1000 1265.87
   1010  1265.9   1017   1266   1048  1266.2   1052 1264.68   1056 1264.68
   1062  1266.2   1144  1266.2

Manning's n Values,  num = 3
   Sta.  Value   Sta.  Value   Sta.  Value
    950   .025   1048    .03   1062    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right    Coeff Contr.   Expan.
       1048    1062                                    .3      .5

*******************************************************************************

SUMMARY OF MANNING'S N VALUES

*****************************************************
*   Reach   * River Sta. *   n1   *   n2   *   n3   *
*****************************************************
*1         *  24     *  .025*   .02*   .03*
*1         *  23     *  .025*   .02*   .03*
*1         *  22     *  .025*   .02*   .03*
*1         *  21     *  .025*   .03*   .03*
*1         *  20.8*  *  .025*   .03*   .03*
*1         *  20.6*  *  .025*   .03*   .03*
*1         *  20.4*  *  .025*   .03*   .03*
*1         *  20.2*  *  .025*   .03*   .03*
*1         *  20     *  .025*   .03*   .03*
*1         *  19.8*  *  .025*   .03*   .03*
*1         *  19.6*  *  .025*   .03*   .03*
*1         *  19.4*  *  .025*   .03*   .03*
*1         *  19.2*  *  .025*   .03*   .03*
```

*1	*	19	* .025*	.03*	.03*
*1	*	18.5	* Culvert*	*	*
*1	*	18	* .025*	.03*	.03*
*1	*	17.5*	* .025*	.03*	.03*
*1	*	17	* .025*	.03*	.03*
*1	*	16.5*	* .025*	.03*	.03*
*1	*	16	* .025*	.03*	.03*
*1	*	15	* .025*	.03*	.03*
*1	*	14.5*	* .025*	.03*	.03*
*1	*	14	* .025*	.03*	.03*
*1	*	13.8*	* .025*	.03*	.03*
*1	*	13.6*	* .025*	.03*	.03*
*1	*	13.4*	* .025*	.03*	.03*
*1	*	13.2*	* .025*	.03*	.03*
*1	*	13	* .025*	.03*	.03*
*1	*	12.5	* Culvert*	*	*
*1	*	12	* .025*	.03*	.03*
*1	*	11	* .025*	.03*	.03*
*1	*	10	* .025*	.03*	.03*

****

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SUMMARY OF REACH LENGTHS

****

* Reach	* River Sta. *	Left	* Channel*	Right *
*1	* 24	* 217*	217*	217*
*1	* 23	* 142*	142*	142*
*1	* 22	* 200*	130*	90*
*1	* 21	* 44.2*	44.2*	44.2*
*1	* 20.8*	* 44.2*	44.2*	44.2*
*1	* 20.6*	* 44.2*	44.2*	44.2*
*1	* 20.4*	* 44.2*	44.2*	44.2*
*1	* 20.2*	* 44.2*	44.2*	44.2*
*1	* 20	* 42.6*	42.6*	42.6*
*1	* 19.8*	* 42.6*	42.6*	42.6*
*1	* 19.6*	* 42.6*	42.6*	42.6*
*1	* 19.4*	* 42.6*	42.6*	42.6*
*1	* 19.2*	* 42.6*	42.6*	42.6*
*1	* 19	* 92*	92*	92*
*1	* 18.5	* Culvert*	*	*
*1	* 18	* 108.5*	108.5*	108.5*
*1	* 17.5*	* 108.5*	108.5*	108.5*
*1	* 17	* 116*	116*	116*
*1	* 16.5*	* 116*	116*	116*
*1	* 16	* 203*	203*	203*
*1	* 15	* 116*	116*	116*
*1	* 14.5*	* 116*	116*	116*
*1	* 14	* 46.4*	46.4*	46.4*
*1	* 13.8*	* 46.4*	46.4*	46.4*
*1	* 13.6*	* 46.4*	46.4*	46.4*
*1	* 13.4*	* 46.4*	46.4*	46.4*
*1	* 13.2*	* 46.4*	46.4*	46.4*
*1	* 13	* 130*	100*	130*
*1	* 12.5	* Culvert*	*	*

*1	* 12	*	130*	100*	130*
*1	* 11	*	120*	100*	130*
*1	* 10	*	*	*	*

****

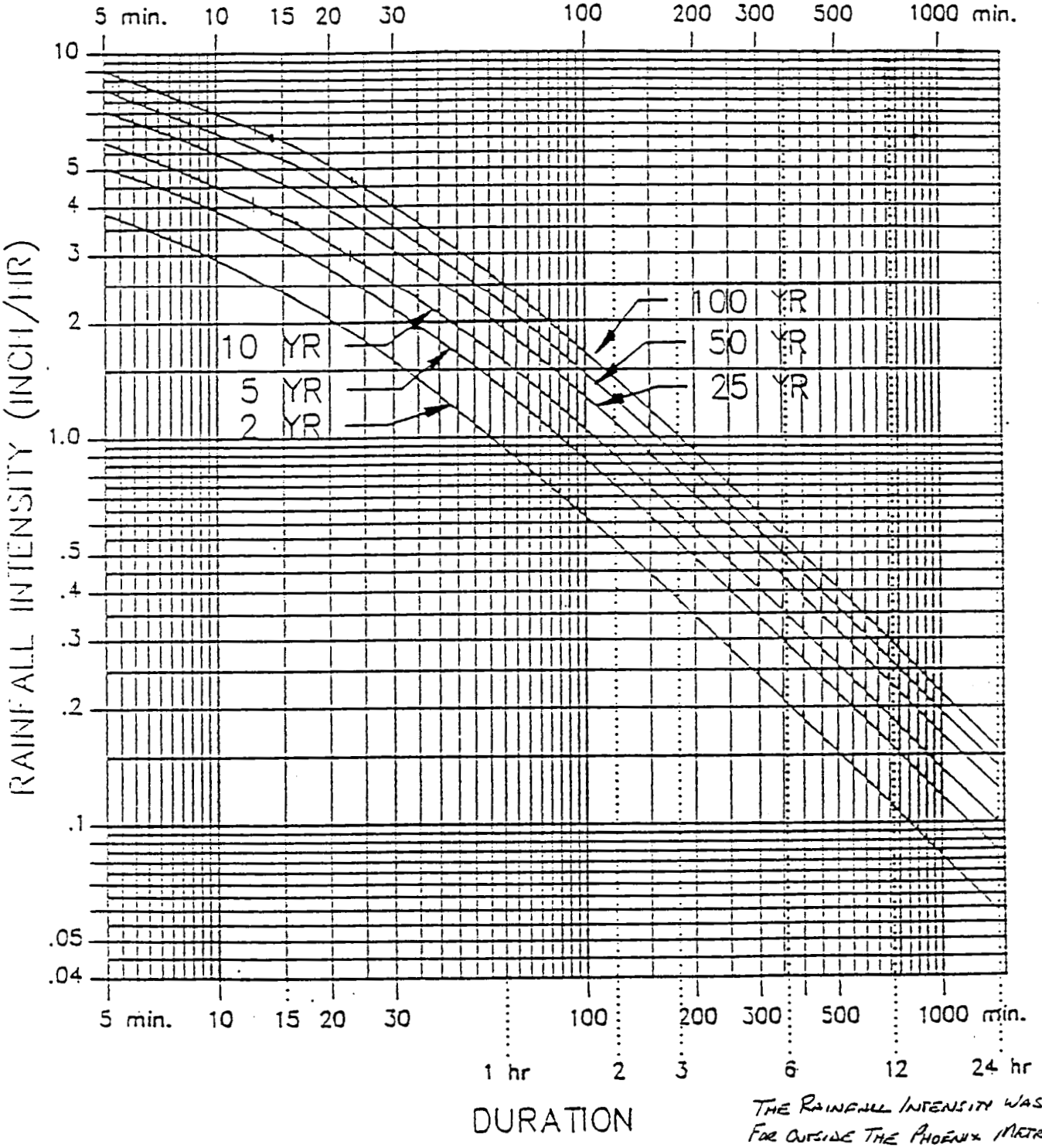
****

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

* Reach	* River Sta.	* Contr.	* Expan. *
*1	* 24	* .3*	.5*
*1	* 23	* .3*	.5*
*1	* 22	* .3*	.5*
*1	* 21	* .3*	.5*
*1	* 20.8*	* .3*	.5*
*1	* 20.6*	* .3*	.5*
*1	* 20.4*	* .3*	.5*
*1	* 20.2*	* .3*	.5*
*1	* 20	* .1*	.3*
*1	* 19.8*	* .1*	.3*
*1	* 19.6*	* .1*	.3*
*1	* 19.4*	* .1*	.3*
*1	* 19.2*	* .1*	.3*
*1	* 19	* .3*	.5*
*1	* 18.5	* Culvert*	*
*1	* 18	* .3*	.5*
*1	* 17.5*	* .3*	.5*
*1	* 17	* .1*	.3*
*1	* 16.5*	* .1*	.3*
*1	* 16	* .1*	.3*
*1	* 15	* .1*	.3*
*1	* 14.5*	* .1*	.3*
*1	* 14	* .3*	.5*
*1	* 13.8*	* .3*	.5*
*1	* 13.6*	* .3*	.5*
*1	* 13.4*	* .3*	.5*
*1	* 13.2*	* .3*	.5*
*1	* 13	* .3*	.5*
*1	* 12.5	* Culvert*	*
*1	* 12	* .3*	.5*
*1	* 11	* .3*	.5*
*1	* 10	* .3*	.5*

APPENDIX C

BACKUP ON-SITE HYDROLOGIC/HYDRAULIC DOCUMENTATION



THE RAINFALL INTENSITY WAS ADJUSTED FOR OUTSIDE THE PHOENIX METRO AREA USING THE FOLLOWING EQUATION:

$$i' = i_p \frac{(P_{10}^{6})}{2.07} = \frac{2.0}{2.07} i_p$$

$$= 0.97 i_p$$

Figure 3.2
Rainfall Intensity-Duration-Frequency Relation
(Phoenix Metro Area)

DEPRESSED CURB OPENING CAPACITIES (FLOW-BY CONDITION)

CALCULATIONS PER DRAINAGE DESIGN MANUAL FOR MARICOPA COUNTY, ARIZONA, VOL. II, HYDRAULICS (REF. 4) (NOMOGRAPH FOR DETERMINING CATCH BASIN/CURB OPENING LENGTH (LT).

Curb Opening	Storm Even	Q Total Remaining in Street (cfs)	Q in half Street (cfs)	Longitudinal Slope (ft/ft)	Depth of Flow in Street (ft)	T Spread of Flow in Street (ft)	Se Composite* Cross Slope (ft/ft)	LT Length from Chart (ft)	La Design Length (ft)	E Efficiency	Q Intercepted (cfs)	Q Flow By (cfs)
#1 (CP #5)	10-Y.	31	15.5	0.0035	0.53	16	0.0553	26	16	0.82	13	3
#2 (CP #6)	10-Y.	17	8.5	0.0028	0.42	16	0.0553	19	16	0.96	8	1

EFFICIENCY FORMULA: $E = 1-(1 - La/LT)^{1.8}$

* BASED ON 2" DEPRESSION

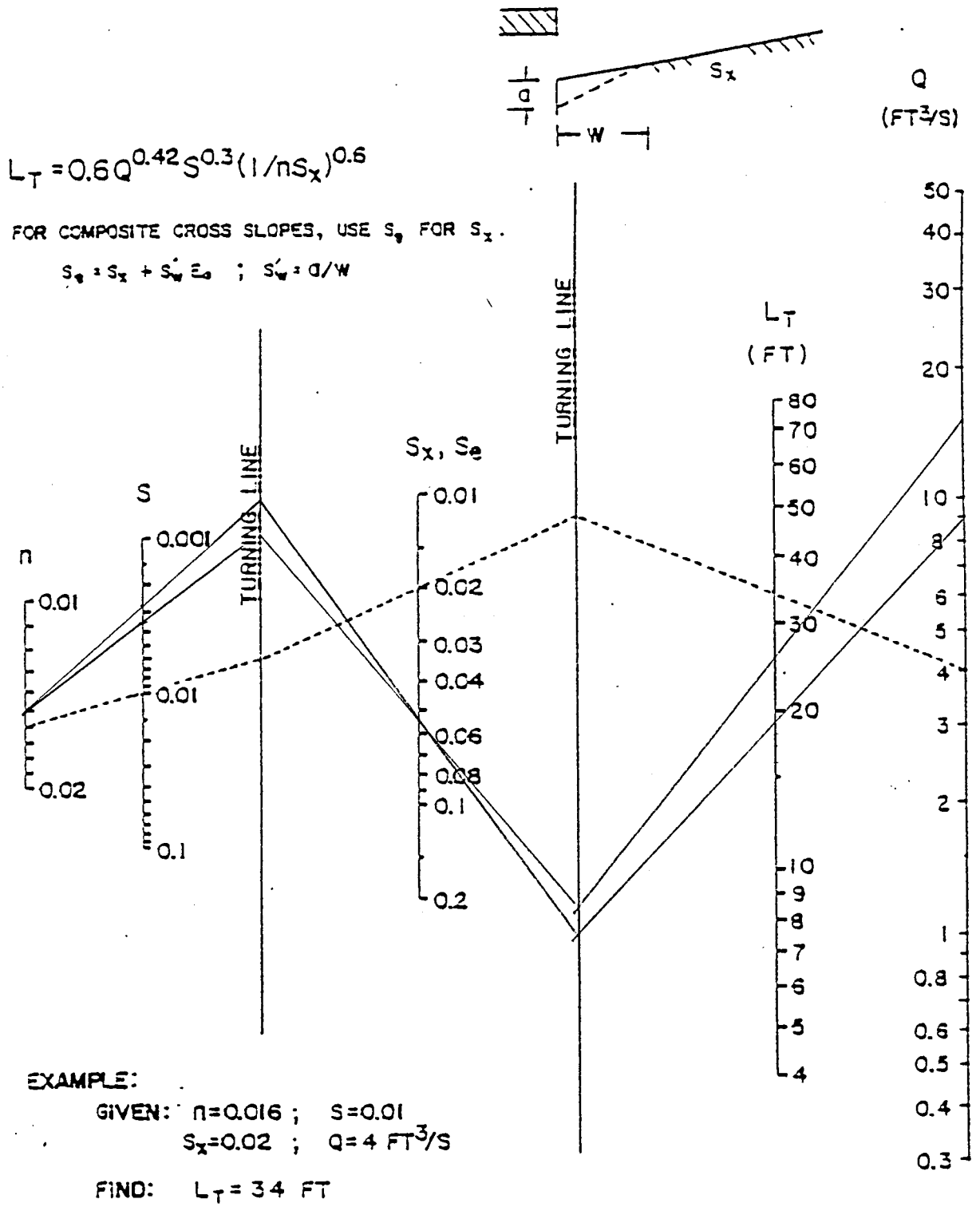
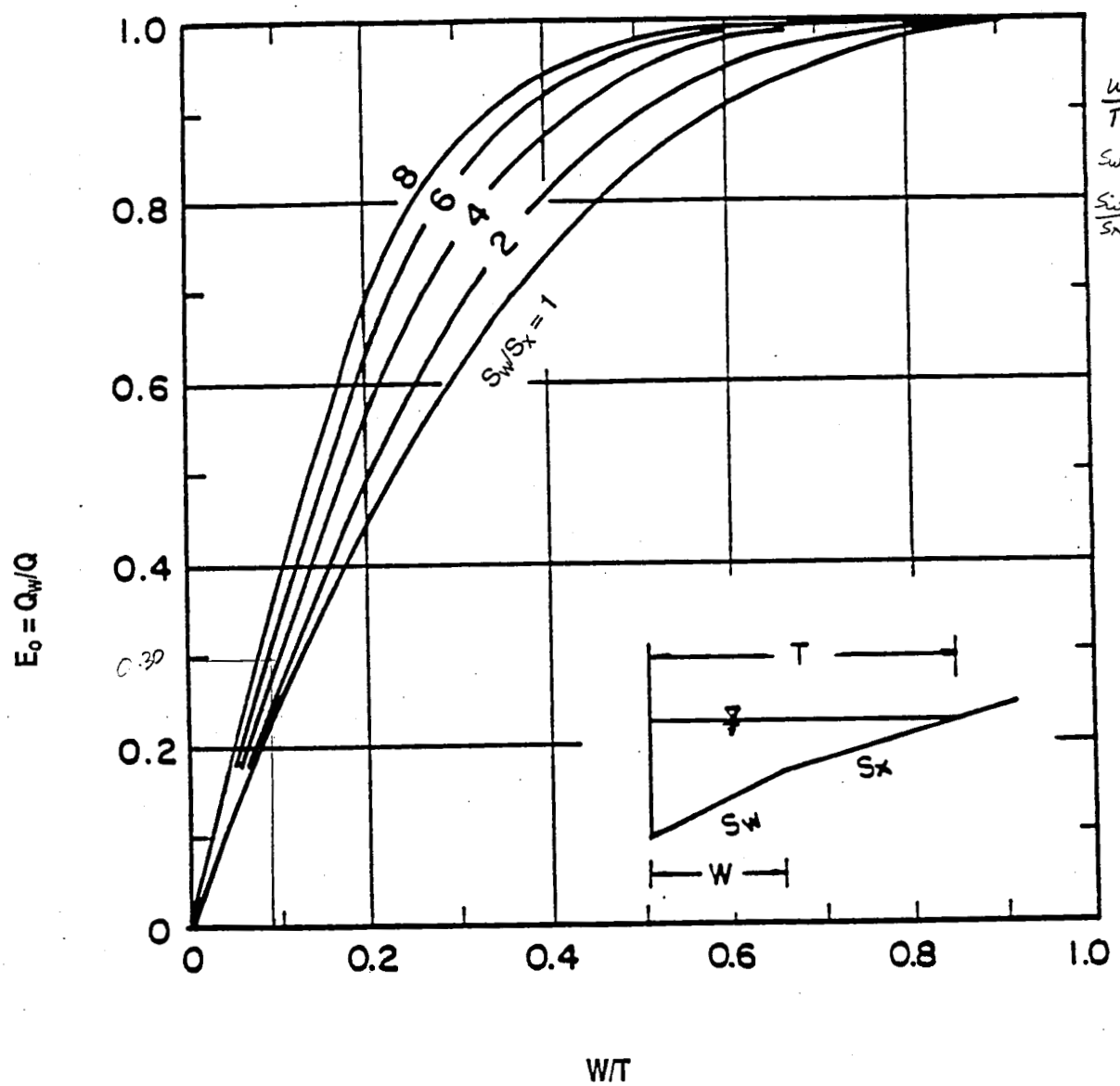


Figure 3.20
Curb Opening and Slotted Drain Inlet Length for Total Interception
(source: FHWA, 1984, HEC-12, Chart 9)

CP # 5&6



$\frac{W}{T} = \frac{17/12}{16} = 0.0885$

$S_w = \frac{a}{w} = \frac{2''}{17} = 0.1176$

$\frac{S_w}{S_x} = \frac{0.1176}{0.02} = 5.882$

CP # 5&6

$S_e = 0.02 + (0.1176 * 0.30) = 0.0553$

Figure 3.23
Ratio of Frontal Flow to Total Gutter Flow
(source: FHWA, 1984, HEC-12, Chart 4)

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UNIFORM FLOW COMPUTATIONS

LOCATION/DESCRIPTION:

CP #5 STREET CAPACITY FOR DEPRESSED CURB OPENING FOR FLOW-BY CONDITION

CROSS SECTION PARAMETERS: FILENAME: ROAD1.SEC

No. of Cross Section Points:	5	Bed Slope:	0.00350	Max Elev.:	0.50
Bank Stations.....Left:	0.0	Right....:	32.0	Min Elev.:	0.00
Encroachment Stations..Left:		Right....:			
Manning-n Values.....LOB:	0.015	CHANNEL..:	0.015	ROB.....:	0.015

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	0.50	0.00	2)	0.00	0.00	3)	0.32	16.00
4)	0.00	32.00	5)	0.50	32.00			

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	V(fps)	Fr No.	ne	D(ft)	TW(ft)	A(sf)	WP(ft)	CRWS(ft)
0.50	30.0	2.8	0.84	0.015	0.3	32.0	10.8	33.0	0.46

NOTES:

Project DEER VILLAGE 1,2,3 & 4
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UNIFORM FLOW COMPUTATIONS

LOCATION/DESCRIPTION:

CP #6 STREET CAPACITY FOR DEPRESSED CURB OPENING FOR FLOW-BY CONDITION

CROSS SECTION PARAMETERS: FILENAME: ROAD1.SEC

No. of Cross Section Points:	5	Bed Slope:	0.00280	Max Elev.:	0.50
Bank Stations.....Left:	0.0	Right....:	32.0	Min Elev.:	0.00
Encroachment Stations..Left:		Right....:			
Manning-n Values.....LOB:	0.015	CHANNEL..:	0.015	ROB.....:	0.015

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	0.50	0.00	2)	0.00	0.00	3)	0.32	16.00
4)	0.00	32.00	5)	0.50	32.00			

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	V(fps)	Fr No.	ne	D(ft)	TW(ft)	A(sf)	WP(ft)	CRWS(ft)
0.42	18.0	2.1	0.73	0.015	0.3	32.0	8.5	32.9	0.37

NOTES:

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DEPRESSED CURB OPENING CALCULATIONS - "SUMP" CONDITION

$Q = C * L * H^{3/2}$ WHERE $C = 2.8$, $H = 0.5'$

CP #10 (CURB OPENING #3)

$Q_{10} = \cancel{17}\ 18$ cfs

↳ SOLVE FOR L FOR 10-YR EVENT

$\cancel{17}\ 18 = 2.8 * L * (0.5)^{1.5}$

$L = \cancel{17.17}\ 18.18 \approx 18'$ USE (14' BOTTOM W/2-4' WINGS)

CP #13 (CURB OPENING #4)

$Q_{10} = 30$ cfs

↳ SOLVE FOR L FOR 10-YR EVENT

$30 = 2.8 * L * (0.5)^{1.5}$

$L = 30.30 \approx 31'$ USE (27' BOTTOM W/2-4' WINGS)

CP #17 (CURB OPENING #5)

$Q_{10} = \cancel{21}\ 20$ cfs

↳ SOLVE FOR L FOR 10-YR EVENT

$\cancel{21}\ 20 = 2.8 * L * (0.5)^{1.5}$

$L = \cancel{21.21}\ 20.20 \approx \cancel{22'}\ 20'$ USE (18' BOTTOM W/2-4' WINGS)

CVL
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DEPRESSED CURB OPENING CALCULATIONS - "SUMP" CONDITION

CP # 18 (CURB OPENING #6) $Q_{10} = \cancel{14}\ 12$ cfs

↳ SOLVE FOR L FOR 10-YEAR EVENT

$\cancel{14}\ 12 = 2.8 * L * (0.5)^{1.5}$

$L = \cancel{14.14}\ 12.12 \approx \cancel{15}\ 12'$ USE (11' BOTTOM W/2-4' WINGS)

CP #25 (CURB OPENING #7) $Q_{10} = \cancel{20}\ 21$ cfs

↳ SOLVE FOR L FOR 10-YR EVENT

$\cancel{20}\ 21 = 2.8 * L * (0.5)^{1.5}$

$L = \cancel{20.20}\ 21.21 \approx 21'$ USE (17' BOTTOM W/2-4' WINGS)

⇒ DEER VALLEY ROAD CURB OPENINGS. (SEE ATTACHED COMPUTER PRINTOUTS)

* PER REFERENCE 3, FLOW FOR THE 100-YR EVENT WILL BE 1' ABOVE THE TOP OF CURB

→ CURB OPENING #8 (H = 1.5') SEE PLATE 4 FOR APPROXIMATE LOCATION.

MAKE L = 20' (16' BOTTOM W/2-4' WINGS)

$Q = 2.8 * 20 * (1.5)^{1.5}$ ⇒ Q = 103 cfs

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DEPRESSED CURB OPENING CALCULATIONS – "SUMP" CONDITION

⇒ CURB OPENING #9 (H=1.5') SEE PLATE 4 FOR APPROXIMATE LOCATION

MAKE L= 40' (36' BOTTOM W/2-4' WINGS)

$Q = 2.8 * 40 * (1.5)^{1.5}$ ⇒ Q= 206 cfs

TOTAL FLOW FROM HALF OF CPC4 AND CPD11 = 201+672 = 873 cfs

FLOW REMOVED = 103 + 206 = 309 cfs

REMAINING FLOW = 873 - 309 = 564 cfs

⇒ CALCULATE LENGTH OF WEIR AT 1' DEPTH FOR 564 cfs

⇒ $564 = 2.8 * L = (1)^{1.5}$

L= 201.43' ≈ 202'

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WEIR FLOW COMPUTATIONS

LOCATION/DESCRIPTION: DEER VALLEY RD AT 90TH AVE. WEIR FLOW OVER DEPRESSED CURBS ON EITHER SIDE OF 90TH AVE

CROSS SECTION PARAMETERS: FILENAME: dv90av.SEC

No. of Cross Section Points: 12 Bed Slope: 0.00500 Max Elev.: 84.00
Bank Stations.....Left: 168.0 Right....: 968.0 Min Elev.: 77.90
Encroachment Stations..Left: Right....: Weir Coef: 3.000

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	79.30	168.00	2)	78.40	526.00	3)	77.90	534.00
4)	77.90	550.00	5)	78.40	558.00	6)	84.00	559.00
7)	84.00	667.00	8)	78.40	668.00	9)	77.90	676.00
10)	77.90	692.00	11)	78.40	700.00	12)	78.90	968.00

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	H:max(ft)	H:ave(ft)	TW(ft)	A(sf)
78.40	47.5	0.50	0.38	64.0	24.0
78.60	106.4	0.70	0.22	250.8	55.5
78.80	246.6	0.90	0.28	437.7	124.3
78.90	357.4	1.00	0.33	531.1	172.8
79.00	497.4	1.10	0.40	570.9	227.9

NOTES:

100 YR FLOW WEIRS OVER DEPRESSED 8 STD. CURBS AT ELEV. 78.9 WHICH IS LESS THAN EXISTING 100 YR WATER SURFACE ELEV OF 79.4.

Project DEER VILLAGE
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WEIR FLOW COMPUTATIONS

LOCATION/DESCRIPTION: DEER VALLEY RD AT 89TH AVE.
WEIR FLOW OVER 40' LONG DEPRESSED CURB
AJUST WEST OF 89TH AVE.

CROSS SECTION PARAMETERS: FILENAME: dv89av.SEC

No. of Cross Section Points: 17 Bed Slope:0.00500 Max Elev.: 84.00
Bank Stations.....Left: 968.0 Right....: 1965.0 Min Elev.: 77.44
Encroachment Stations..Left: Right....: Weir Coef: 3.000

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	78.90	968.00	2)	78.25	1231.50	3)	77.75	1237.50
4)	77.70	1257.50	5)	77.75	1277.50	6)	78.25	1283.50
7)	78.50	1407.50	8)	78.32	1497.00	9)	84.00	1498.00
10)	84.00	1606.00	11)	78.10	1607.00	12)	78.00	1673.00
13)	77.50	1679.00	14)	77.44	1685.00	15)	77.50	1691.00
16)	78.00	1697.00	17)	78.50	1965.00			

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	H:max(ft)	H:ave(ft)	TW(ft)	A(sf)
78.50	371.9	1.06	0.26	724.9	191.3
79.00	1583.1	1.56	0.68	887.3	602.5
78.70	754.5	1.26	0.43	806.1	344.4
78.80	998.5	1.36	0.50	846.7	427.0
78.85	1132.9	1.41	0.54	866.9	469.9

NOTES:

100 YR FLOW WEIRS OVER DEPRESSED
& STD. CURBS AT ELEV. 78.8 ±.
WHICH IS LESS THAN EXIST. 100 YR
WATER SURFACE ELEV OF 79.4'

Project DEER VILLAGE
Project No. 950101
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WEIR FLOW COMPUTATIONS

LOCATION/DESCRIPTION: DEER VALLEY RD AT 88TH LANE WEIR FLOW OVER DEPRESSED CURBS JUST WEST OF 87TH AVE.

CROSS SECTION PARAMETERS: FILENAME: dv88av.SEC

No. of Cross Section Points: 11 Bed Slope:0.00500 Max Elev.: 78.50
Bank Stations.....Left: 1965.0 Right....: 2656.0 Min Elev.: 77.41
Encroachment Stations..Left: Right....: Weir Coef: 3.000

CROSS SECTION POINTS - Elevations & Stations in feet:

No.	Elev.	Sta.	No.	Elev.	Sta.	No.	Elev.	Sta.
1)	78.50	1965.00	2)	77.91	2232.00	3)	77.41	2239.00
4)	77.41	2251.00	5)	77.91	2258.00	6)	78.31	2445.00
7)	78.01	2582.00	8)	77.51	2589.00	9)	77.50	2601.00
10)	78.01	2608.00	11)	78.21	2656.00			

COMPUTED PARAMETERS:

WSEL(ft)	Q(cfs)	H:max(ft)	H:ave(ft)	TW(ft)	A(sf)
78.33	270.0	0.92	0.25	612.7	151.3
78.42	400.0	1.01	0.32	653.6	208.6
78.48	499.8	1.07	0.36	680.5	248.3
78.55	633.8	1.14	0.43	691.0	297.3

NOTES:

100 YR FLOW WEIRS OVER DEPRESSED & STD. CURBS AT ELEV. 78.3' ± WHICH IS LESS THAN LOWEST EXIST. F.F.E (ALONG N. SIDE OF DEER VALLEY RD) OF 79.2'.

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Project DEER VILLAGE - UNITS 1,2,3 & 4
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CATCH BASIN IN "SUMP" CONDITION CALCULATIONS

FROM REF. #2, PAGE 3-18

$\Rightarrow Q_i = C_w (L + 1.8w)(d)^{1.5}$ WHERE $C_w = 2.3$

$w = \frac{17''}{12''} = 1.42$

$d = 0.5'$

CP #8 $Q_{10} = 20$ cfs

SOLVE FOR L FOR 10-YEAR EVENT

* ASSUME HALF FLOW ON BOTH SIDES OF STREET ∴ $20/2 = 10$ cfs/BASIN

$10 = 2.3(L + 1.8(1.42))(0.5)^{1.5}$

$L = 9.74 * 1.25 = 12.18 \approx 13'$

CLOGGING FACTOR

$\boxed{L = 13'}$

10' WING BOTH SIDES STREET

CP #14 $Q_{10} = \cancel{7}\ 8$ cfs $Q_{100} = \cancel{11}\ 16$ cfs

SOLVE FOR L FOR 100-YR FLOW

* ASSUME HALF FLOW ON BOTH SIDES OF STREET ∴ $\cancel{11/2}\ 16/2 = \cancel{5.5}\ 8$ cfs/BASIN

$\cancel{5.5}\ 8 = 2.3(L + 1.8(1.42))(0.5)^{1.5}$

$L = \cancel{4.21}\ 7.28 * 1.25 = \cancel{5.26}\ 9.10 \approx \cancel{6'}\ 10'$

$L = 10'$

$\boxed{L = \cancel{6'}}$

$\cancel{3'}$ 7' WING BOTH SIDES STREET

13-Dec-96

FILE: SDSYS1

DEER VILLAGE – UNITS 1,2,3 & 4
STORM SEWER CAPACITY CALCULATION RECORD
SYSTEM 1

Input Variables

Outlet TW elev. = 69.80 (10-yr Storm)
Manning's n = 0.013

Storm Drain System
CP #8 (NORTHERN BASIN)

Inlet ID no.	From Sta Outlet	To Sta Inlet	Storm Sewer Design Data: Outlet inv.	Inlet inv.	Length (ft)	So (ft/ft)	D (in.)	Q full (cfs)	Qpipe (cfs)	Head Loss Calculations: Vpipe (ft/s)	Sf (ft/ft)	hf (ft)	km	hm (ft)	Hydraulic Grade Line: Elev. @ outlet	Elev. @ inlet	Depth @ outlet	Depth @ inlet	Comments	
OUTLET		0		66.80			18		10.5	5.94			1.00	0.55		69.80			Channel Outlet	OUT=66.80
CB1	0	4	66.80	67.50	4.00	0.1750	18	43.93	10.5	5.94	0.01000	0.04	0.25	0.14	70.35 70.53	70.39	3.55	2.89	Pressure Flow	GUT=70.98

Outlet TW elev. = 68.40 (10-yr Storm)
Manning's n = 0.013

Storm Drain System
CP #8 (SOUTHERN BASIN)

Inlet ID no.	From Sta Outlet	To Sta Inlet	Storm Sewer Design Data: Outlet inv.	Inlet inv.	Length (ft)	So (ft/ft)	D (in.)	Q full (cfs)	Qpipe (cfs)	Head Loss Calculations: Vpipe (ft/s)	Sf (ft/ft)	hf (ft)	km	hm (ft)	Hydraulic Grade Line: Elev. @ outlet	Elev. @ inlet	Depth @ outlet	Depth @ inlet	Comments	
OUTLET		0		66.65			18		10.5	5.94			1.00	0.55		68.40			Channel Outlet	OUT=66.65
CB1	0	6	66.65	67.50	6.00	0.1417	18	39.52	10.5	5.94	0.01000	0.06	0.25	0.14	68.95 69.15	69.01	2.30	1.51	Pressure Flow	GUT=70.98

Notes: Sf = Pipe Friction Slope based on Manning's Eqn. Sf= (Q*n/1.486*A*R^2/3)^2
hf = Head Loss due to friction slope, hf = Sf*L
km = Sum of minor loss coefficients to be used in minor loss Eqn.
hm = Minor head losses, hm = km*(v^2/2g)

13-Dec-96

FILE: SDSYS2

DEER VILLAGE – UNITS 1,2,3 & 4
STORM SEWER CAPACITY CALCULATION RECORD
SYSTEM 2

Input Variables

Outlet TW elev. = 62.00 (100-yr Storm)
Manning's n = 0.013

Storm Drain System
CP #14

Inlet ID no.	From Sta Outlet	To Sta Inlet	Storm Sewer Design Data: Outlet inv.	Inlet inv.	Length (ft)	So (ft/ft)	D (in.)	Q full (cfs)	Qpipe (cfs)	Head Loss Calculations: Vpipe (ft/s)	Sf (ft/ft)	hf (ft)	km	hm (ft)	Hydraulic Grade Line: Elev. @ outlet	Elev. @ inlet	Depth @ outlet	Depth @ inlet	Comments	
OUTLET		0		60.20			24		16	5.09			1.00	0.40		62.00			Channel Outlet	OUT=66.25
CB1	0	25	60.20	60.94	25.00	0.0296	24	38.91	16	5.09	0.00500	0.13	0.25	0.10	62.40	62.94	2.20	2.00	Unsealed @ Sta	GUT=64.44
CB2	25	64	61.04	61.60	39.00	0.0144	18	12.58	8	4.53	0.00580	0.23	0.25	0.08	63.04	63.27	2.00	1.67	Pressure Flow	GUT=64.60
															63.35					

Notes: Sf = Pipe Friction Slope based on Manning's Eqn. Sf= (Q*n/1.486*A*R^2/3)^2
hf = Head Loss due to friction slope, hf = Sf*L
km = Sum of minor loss coefficients to be used in minor loss Eqn.
hm = Minor head losses, hm = km*(v^2/2g)

DEER VILLAGE UNITS 1, 2, 3 & 4

RETENTION CALCULATIONS (100-YEAR, 2-HOUR)

ADEQUATE RETENTION CAN BE PROVIDED AS SHOWN IN THE CALCULATIONS BELOW.

VOLUME REQUIRED:

RETENTION IS TO BE PROVIDED FOR RUNOFF FROM THE 100-YR., 2-HR RAINFALL EVENT.

V_R = VOLUME REQUIRED

D = 100-YR, 2-HR PRECIPITATION DEPTH = 2.76"

A = CONTRIBUTING AREA = 103 ACRES + 8.5 ACRES (PORTION OF UNIT 5) = 111.8 ACRES

C = RUNOFF COEFFICIENT = 0.65

V_R = D/12 X A X C

V_R = 2.76/12 X 111.5 X 0.65

V_R = 16.7 AcFt

VOLUME PROVIDED:

AVERAGE AREA OF RETENTION BASIN	=	8.35 Ac
DEPTH OF RETENTION BASIN	=	3'
VOLUME PROVIDED	=	8.35 Ac x 3' = 25 Ac-Ft

THE RETENTION PROVIDED (25 AcFt) IS GREATER THAN THE RETENTION REQUIRED (16.7 AcFt). THEREFORE, ON-SITE RUNOFF WILL BE CONTAINED.

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Project DEER VILLAGE UNITS 1, 2 & 4

Project No. 95-0101-01

Sheet No. 0 of 0

Calculated by _____ Date _____

Checked by _____ Date _____

ON-SITE HYDROLOGY

Note: Flowrates computed herein are used for design of depressed curb openings, catch basins and storm sewers.

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: ALEX/89TH

Project Name: DEER VILLAGE Subarea id: 1

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	7.20	acres
Watercourse Length	1140.0	feet
Top Elevation	80.9	feet
Bottom Elevation	77.0	feet
Slope	.00342	feet/feet
Roughness Coefficient (Kb)	.03465	
10-Year, 6-Hour Rainfall	2.00	inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	8	12	14	20	25	30
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	16.5	14.6	13.6	12.4	11.7	11.1
i (in/hr)	2.3	3.1	3.8	4.9	5.6	6.5

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH/MELINDA

Project Name: DEER VILLAGE Subarea id: 2

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	9.30	acres
Watercourse Length	1540.0	feet
Top Elevation	80.9	feet
Bottom Elevation	73.0	feet
Slope	.00513	feet/feet
Roughness Coefficient (Kb)	.03395	
10-Year, 6-Hour Rainfall	2.00	inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	11	15	18	26	32	39
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	16.8	14.8	13.9	12.6	11.9	11.3
i (in/hr)	2.2	3.1	3.7	4.8	5.5	6.4

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: MELINDA

Project Name: DEER VILLAGE Subarea id: 3

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	3.50	acres
Watercourse Length	600.0	feet
Top Elevation	78.8	feet
Bottom Elevation	74.6	feet
Slope	.00700	feet/feet
Roughness Coefficient (Kb)	.03660	
10-Year, 6-Hour Rainfall	2.00	inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	5	8	9	12	15	19
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	8.9	7.9	7.4	6.8	6.4	6.1
i (in/hr)	3.0	4.1	4.9	6.1	7.1	8.1

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: MELINDA

Project Name: DEER VILLAGE Subarea id: 4

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	6.60 acres
Watercourse Length	985.0 feet
Top Elevation	78.8 feet
Bottom Elevation	72.6 feet
Slope	.00629 feet/feet
Roughness Coefficient (Kb)	.03488
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	9	12	15	21	26	31
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	12.1	10.7	10.0	9.1	8.6	8.2
i (in/hr)	2.6	3.6	4.3	5.5	6.3	7.3

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: MELINDA NEAR 89TH

Project Name: DEER VILLAGE Subarea id: 5

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	15.90	acres
Watercourse Length	1550.0	feet
Top Elevation	80.9	feet
Bottom Elevation	72.6	feet
Slope	.00535	feet/feet
Roughness Coefficient (Kb)	.03250	
10-Year, 6-Hour Rainfall	2.00	inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	19	26	31	45	56	67
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	16.2	14.3	13.3	12.1	11.5	10.9
i (in/hr)	2.3	3.2	3.8	4.9	5.6	6.5

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH/SALTER

Project Name: DEER VILLAGE Subarea id: 6

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	16.40 acres
Watercourse Length	1910.0 feet
Top Elevation	80.9 feet
Bottom Elevation	71.4 feet
Slope	.00497 feet/feet
Roughness Coefficient (Kb)	.03241
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	18	25	30	43	54	65
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	18.9	16.6	15.5	14.1	13.3	12.6
i (in/hr)	2.1	3.0	3.5	4.6	5.3	6.1

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: SALTER NEAR CHANNEL

Project Name: DEER VILLAGE Subarea id: 7

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	6.20 acres
Watercourse Length	1055.0 feet
Top Elevation	78.8 feet
Bottom Elevation	71.0 feet
Slope	.00739 feet/feet
Roughness Coefficient (Kb)	.03505
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	9	12	14	20	25	30
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	11.9	10.5	9.8	9.0	8.5	8.1
i (in/hr)	2.6	3.7	4.3	5.6	6.4	7.4

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: SALTER NEAR CHANNEL

Project Name: DEER VILLAGE Subarea id: 8

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	22.60 acres
Watercourse Length	1945.0 feet
Top Elevation	80.9 feet
Bottom Elevation	70.9 feet
Slope	.00514 feet/feet
Roughness Coefficient (Kb)	.03154
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	25	35	42	59	75	91
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	18.5	16.3	15.2	13.8	13.1	12.4
i (in/hr)	2.1	3.0	3.6	4.6	5.3	6.2

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 90TH/LONE CACTUS

Project Name: DEER VILLAGE Subarea id: 9

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	3.10 acres
Watercourse Length	770.0 feet
Top Elevation	78.8 feet
Bottom Elevation	71.9 feet
Slope	.00896 feet/feet
Roughness Coefficient (Kb)	.03693
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	5	6	8	11	13	16
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	9.5	8.4	7.8	7.2	6.8	6.5
i (in/hr)	2.9	4.0	4.8	6.0	6.9	8.0

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: LONE CACTUS/89TH

Project Name: DEER VILLAGE Subarea id: 10

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	9.40 acres
Watercourse Length	1820.0 feet
Top Elevation	78.8 feet
Bottom Elevation	69.1 feet
Slope	.00533 feet/feet
Roughness Coefficient (Kb)	.03392
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	10	15	18	25	31	38
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	18.4	16.2	15.1	13.7	13.0	12.3
i (in/hr)	2.1	3.0	3.6	4.6	5.4	6.2

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH

Project Name: DEER VILLAGE Subarea id: 11

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	7.80 acres
Watercourse Length	1405.0 feet
Top Elevation	72.1 feet
Bottom Elevation	65.6 feet
Slope	.00463 feet/feet
Roughness Coefficient (Kb)	.03443
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	9	13	15	22	27	33
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	16.7	14.7	13.8	12.5	11.8	11.2
i (in/hr)	2.3	3.1	3.8	4.8	5.6	6.4

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: QUAIL

Project Name: DEER VILLAGE Subarea id: 12

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	7.40 acres
Watercourse Length	1250.0 feet
Top Elevation	71.6 feet
Bottom Elevation	65.6 feet
Slope	.00480 feet/feet
Roughness Coefficient (Kb)	.03457
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	9	13	15	21	27	32
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	15.4	13.6	12.7	11.5	10.9	10.3
i (in/hr)	2.3	3.3	3.9	5.0	5.8	6.7

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH/QUAIL

Project Name: DEER VILLAGE Subarea id: 13

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	15.20 acres
Watercourse Length	1405.0 feet
Top Elevation	72.1 feet
Bottom Elevation	65.6 feet
Slope	.00463 feet/feet
Roughness Coefficient (Kb)	.03262
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	18	25	30	43	53	64
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	16.1	14.2	13.3	12.1	11.5	10.8
i (in/hr)	2.3	3.2	3.8	4.9	5.6	6.5

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: DEANNA

Project Name: DEER VILLAGE Subarea id: 14

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	3.80 acres
Watercourse Length	1150.0 feet
Top Elevation	69.7 feet
Bottom Elevation	64.6 feet
Slope	.00443 feet/feet
Roughness Coefficient (Kb)	.03638
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	5	6	8	11	14	16
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	15.5	13.7	12.8	11.6	11.0	10.4
i (in/hr)	2.3	3.2	3.9	5.0	5.7	6.6

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH OUTLET

Project Name: DEER VILLAGE Subarea id: 15

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	3.10 acres
Watercourse Length	1050.0 feet
Top Elevation	67.0 feet
Bottom Elevation	63.0 feet
Slope	.00381 feet/feet
Roughness Coefficient (Kb)	.03693
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	4	5	6	9	11	13
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	15.7	13.9	13.0	11.8	11.2	10.6
i (in/hr)	2.3	3.2	3.9	5.0	5.7	6.6

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH OUTLET

Project Name: DEER VILLAGE Subarea id: 16

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	7.20	acres
Watercourse Length	1390.0	feet
Top Elevation	69.0	feet
Bottom Elevation	63.0	feet
Slope	.00432	feet/feet
Roughness Coefficient (Kb)	.03465	
10-Year, 6-Hour Rainfall	2.00	inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	8	12	14	20	25	30
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	17.1	15.1	14.1	12.8	12.1	11.5
i (in/hr)	2.2	3.1	3.7	4.8	5.5	6.4

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 89TH OUTLET

Project Name: DEER VILLAGE Subarea id: 17

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	10.30 acres
Watercourse Length	1390.0 feet
Top Elevation	69.0 feet
Bottom Elevation	63.0 feet
Slope	.00432 feet/feet
Roughness Coefficient (Kb)	.03367
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	12	17	20	28	36	43
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	16.8	14.8	13.8	12.6	11.9	11.3
i (in/hr)	2.2	3.1	3.7	4.8	5.5	6.4

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: ADAM OUTLET

Project Name: DEER VILLAGE Subarea id: 18

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	6.70 acres
Watercourse Length	1155.0 feet
Top Elevation	70.9 feet
Bottom Elevation	68.5 feet
Slope	.00208 feet/feet
Roughness Coefficient (Kb)	.03484
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	7	10	12	17	21	26
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	20.3	17.8	16.7	15.1	14.3	13.5
i (in/hr)	2.0	2.8	3.4	4.4	5.1	5.9

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 87TH/QUAIL

Project Name: DEER VILLAGE Subarea id: 19

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	2.40 acres
Watercourse Length	515.0 feet
Top Elevation	71.0 feet
Bottom Elevation	66.8 feet
Slope	.00816 feet/feet
Roughness Coefficient (Kb)	.03763
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	4	5	6	9	11	13
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	7.8	6.9	6.5	6.0	5.7	5.4
i (in/hr)	3.2	4.3	5.2	6.4	7.4	8.5

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: QUAIL/88TH

Project Name: DEER VILLAGE Subarea id: 20

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	7.70 acres
Watercourse Length	1435.0 feet
Top Elevation	71.0 feet
Bottom Elevation	65.2 feet
Slope	.00404 feet/feet
Roughness Coefficient (Kb)	.03446
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	9	12	15	21	26	31
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	17.8	15.7	14.7	13.3	12.6	11.9
i (in/hr)	2.2	3.0	3.6	4.7	5.4	6.3

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 88TH/QUAIL

Project Name: DEER VILLAGE Subarea id: 21

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	1.00 acres
Watercourse Length	365.0 feet
Top Elevation	69.1 feet
Bottom Elevation	64.5 feet
Slope	.01260 feet/feet
Roughness Coefficient (Kb)	.04000
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	2	3	3	4	5	6
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	5.7	5.0	5.0	5.0	5.0	5.0
i (in/hr)	3.6	4.8	5.7	6.7	7.7	8.7

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: 88TH/QUAIL

Project Name: DEER VILLAGE Subarea id: 22

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	8.70 acres
Watercourse Length	1435.0 feet
Top Elevation	71.0 feet
Bottom Elevation	64.5 feet
Slope	.00453 feet/feet
Roughness Coefficient (Kb)	.03413
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	10	14	17	24	30	36
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	17.0	15.0	14.0	12.7	12.0	11.4
i (in/hr)	2.2	3.1	3.7	4.8	5.5	6.4

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: DEANNA OUTLET

Project Name: DEER VILLAGE Subarea id: 23

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	9.90 acres
Watercourse Length	1760.0 feet
Top Elevation	71.0 feet
Bottom Elevation	63.5 feet
Slope	.00426 feet/feet
Roughness Coefficient (Kb)	.03378
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	11	15	18	25	32	39
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	19.6	17.2	16.1	14.6	13.8	13.0
i (in/hr)	2.1	2.9	3.5	4.5	5.2	6.0

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: DEANNA OUTLET

Project Name: DEER VILLAGE Subarea id: 24

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	1.60 acres
Watercourse Length	445.0 feet
Top Elevation	65.2 feet
Bottom Elevation	63.5 feet
Slope	.00382 feet/feet
Roughness Coefficient (Kb)	.03873
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	2	3	4	5	7	8
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	9.6	8.5	8.0	7.3	6.9	6.6
i (in/hr)	2.9	4.0	4.7	6.0	6.9	7.9

Flood Control District of Maricopa County
Hydrologic Design Manual Rational Method

Computed by: PJM Date: 12-12-96

LOCATION DATA

Location: DEANNA OUTLET

Project Name: DEER VILLAGE Subarea id: 25

Drainage Area Cover: SF

DESIGN DATA

Drainage Area	11.50 acres
Watercourse Length	1760.0 feet
Top Elevation	71.0 feet
Bottom Elevation	63.5 feet
Slope	.00426 feet/feet
Roughness Coefficient (Kb)	.03338
10-Year, 6-Hour Rainfall	2.00 inches

Hydrological Summary Table

Parameter	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
Q (cfs)	12	17	21	30	38	45
C	0.520	0.520	0.520	0.572	0.624	0.650
Tc (min)	19.4	17.1	16.0	14.5	13.7	12.9
i (in/hr)	2.1	2.9	3.5	4.5	5.2	6.1