DRAINAGE REPORT

FOR

SIERRA EXECUTIVE CENTRE - PHASE I
RENO, NEVADA

PREPARED BY:
CFA, INC.
1150 CORPORATE BLVD.
RENO, NV 89502

AS NOTED
ME
12-24-90

December 12, 1990

Project No. 90-020.01

REGISTERED PROFESSIONAL ENGINEER - STATE OF NEVADA
SAMUAL CHACON
12/14/90
CIVIL
No. 4800

INTRODUCTION

The project site covers 58.6 acres east of South Virginia Street and south of DeLucchi Lane in the City of Reno, Nevada (see Plate 1, Site Location Map). Phase I covers 41.5 acres north of Dry Creek. The site comprises portions of Section 31, T.19 N., R.20 E. and Section 6, T.18 N., R.20 E., M.D.M., Washoe County. The site is bordered on the north by the Sierra Pacific Power Company, on the east by vacant land, on the south by Balsi Ranch, and on the west by strip commercial development on Virginia Street. Dry Creek, a major drainageway, crosses the site from southwest to northeast. The Cochran Ditch, a private irrigation channel, flows near the west and south property lines. Numerous irrigation ditches cross the site.

The site is currently used for agriculture. Ground cover consists of grasses and crops. The existing ground slopes toward the northeast at about one percent. According to the preliminary geotechnical investigation by Kleinfelder, the native soils consist of clayey sands and silty sands. Groundwater depths at the time of Kleinfelder's investigation varied from about 5 to 9-1/2 feet below existing ground surface.

According to the Flood Insurance Rate Map, Panel ~~1442~~ 1461 D, dated April 16, 1990, portions of the site lie within flood zones A, B, and C (see Plate 2, Flood Zone Map). Zone A indicates 100-year flood limits and is confined to Dry Creek. No part of Phase I is within Flood Zone A. Areas within Zone B are between the limits of the 100-year and the 500-year storm. Areas within Zone C are subject to minimal flooding.

The proposed project will consist of office and commercial parcels with a system of paved roads and landscaped areas. Initially, only the roads and storm drain collector system for Phase I will be constructed, leaving the parcels at natural grade. The project also includes two non-contiguous road improvements: Maestro Drive and the extension of DeLucchi Lane.

HISTORIC DRAINAGE SYSTEM

The site lies between Evans Creek and Dry Creek and has been subject to shallow overbank flooding from both drainageways in the past. In addition, sheet flow has crossed Virginia Street in major storms, prompting Sierra Pacific Power Company to construct a diversion channel just south of their property, on the project site.

The construction of the I-580 embankment between DeLucchi Lane and Huffaker Lane in 1989 diverted sheet flow from the west into Evans Creek and reduced the runoff reaching Virginia Street and the project site. Evans Creek is now piped through a double 10 x 4 reinforced concrete box from I-580 to Virginia Street. Several 24" RCP culverts carry irrigation water through the I-580 embankment from west to east, but these culverts are assumed to be ineffectual in a major storm. Thus, the off-site watershed affecting the project site is limited to the area between I-580 and the site.

The off-site watershed comprises 65.6 acres between I-580 and the Cochran Ditch (see Plate 3, Off-Site Hydrology). The area consists of numerous small parcels in various stages of development. A build-up runoff coefficient of 0.50 was calculated for this area. It is assumed that further development will be designed not to increase 100-year sheet flow across Virginia Street, as no public drainage easement exists for this purpose.

PROPOSED DRAINAGE SYSTEM

The drainage plan for Sierra Executive Centre, Phase I, has two main objectives:

1. Carry the existing 100-year off-site runoff through the site.

2. Collect on-site runoff generated by the 5-year storm.

The first objective will be achieved by enlarging and improving the existing channel on the north property line (the Power Company channel). This channel will be approximately seventeen (17) feet wide and three (3) feet deep, with a five (5) foot base and side slopes of two horizontal to one vertical (2:1). Lining will be rip-rap, and the channel will outlet to Dry Creek at the east project boundary.

An underground storm drain within the proposed street right-of-way or in a drainage easement has been designed to satisfy the second objective. Pipes are twelve (12) to thirty (30) inch diameter reinforced concrete pipe. The majority of the storm drain system drains to Dry Creek. Runoff exceeding the capacity of the storm drain will flow in the streets or in paved drainage channels to Dry Creek.

The project site drainage was analyzed using the Rational Method. The site was divided into nineteen (19) drainage subareas and peak flows were calculated for 5-year, 10-year, and 100-year storms. The increase in 5-year runoff due to the proposed development was also computed. It should be noted that the contribution of runoff from the project site is small compared to the peak flow in Dry Creek.

What is the increase?

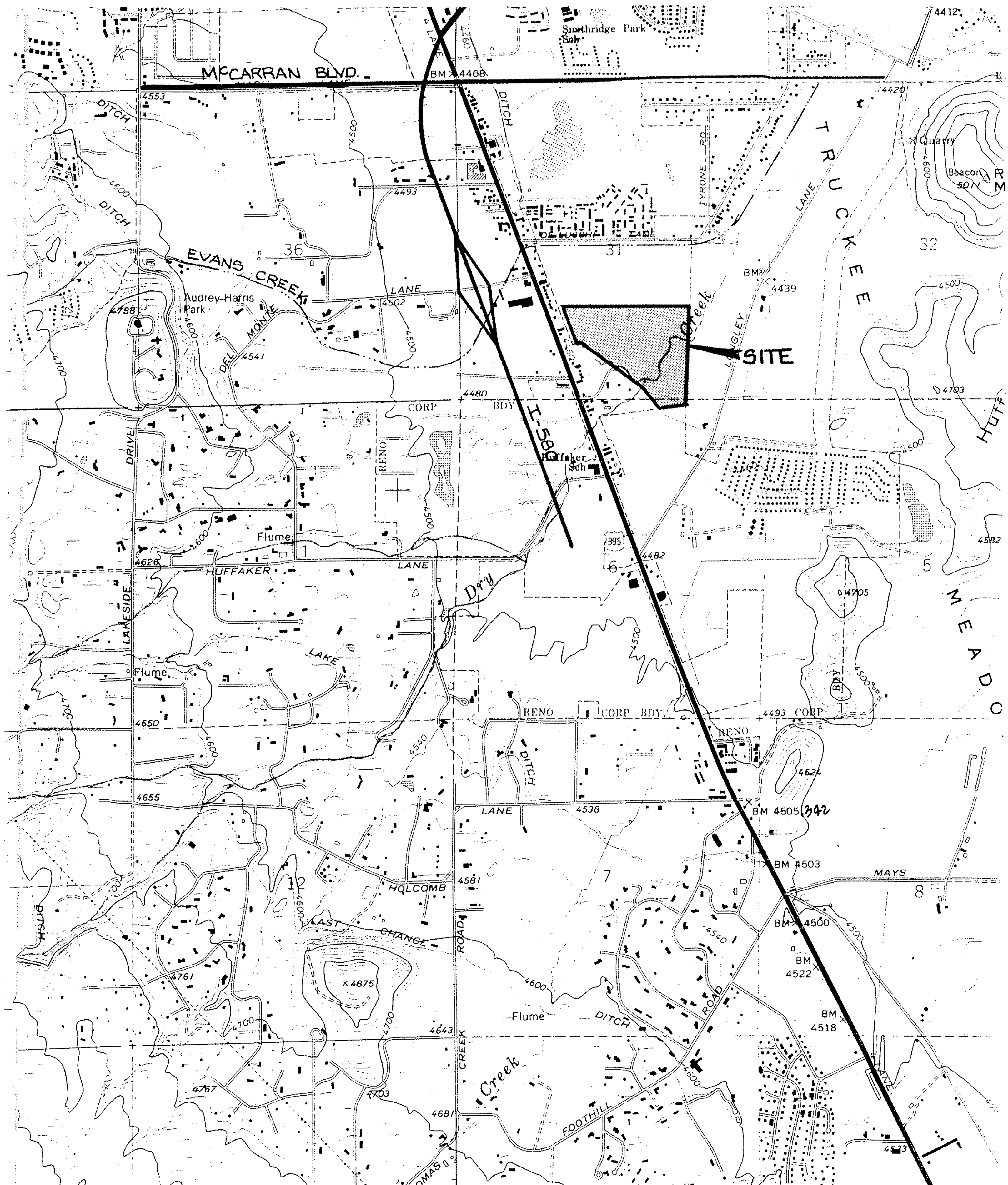
CONCLUSIONS

The site can be developed as planned without adverse hydrologic impact to neighboring and downstream properties.

What are the offsite flows arriving to the site?
5-yr & 100-yr.
- needed to verify sizing of drainage structures

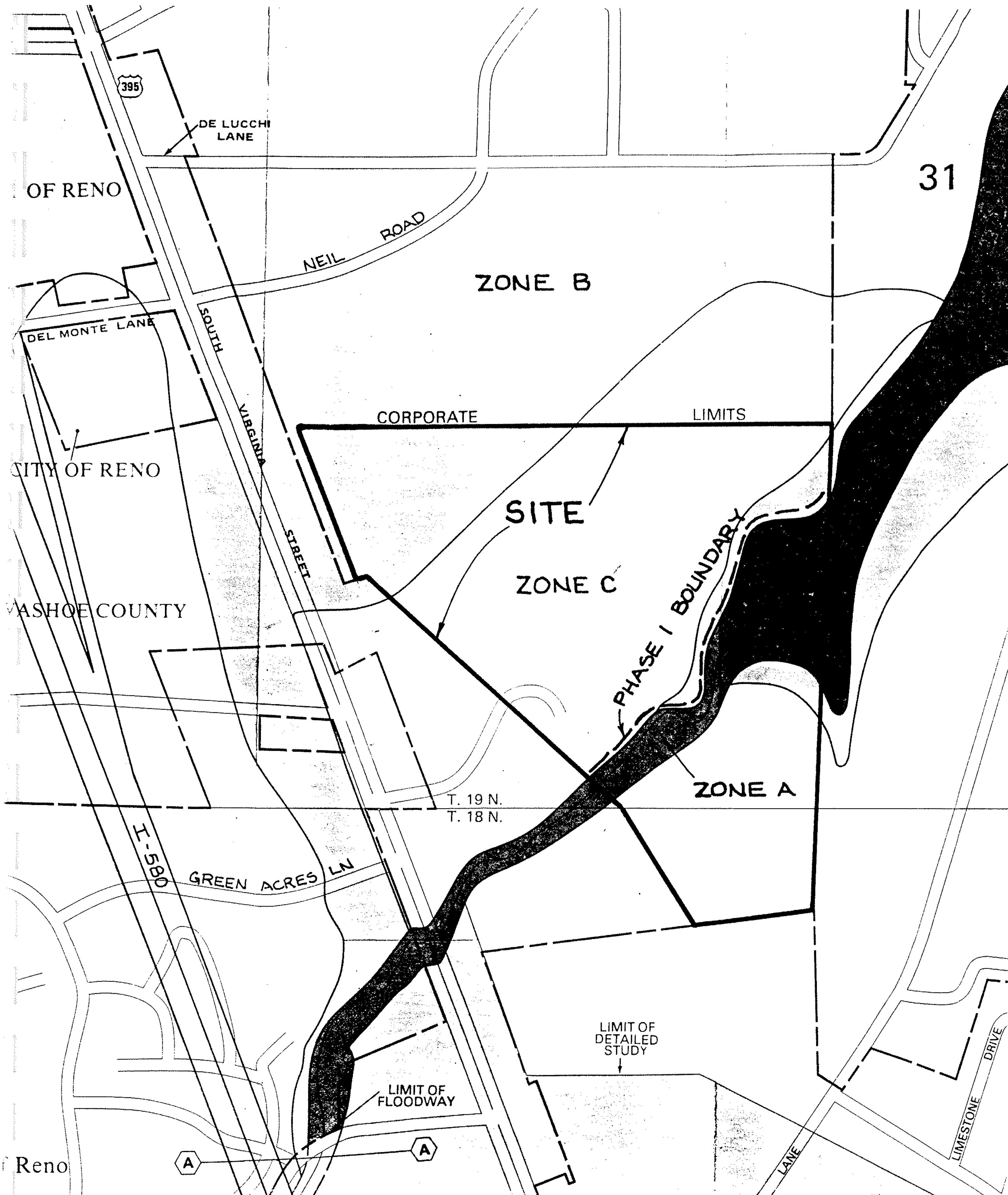
APPENDIX A

PLATES



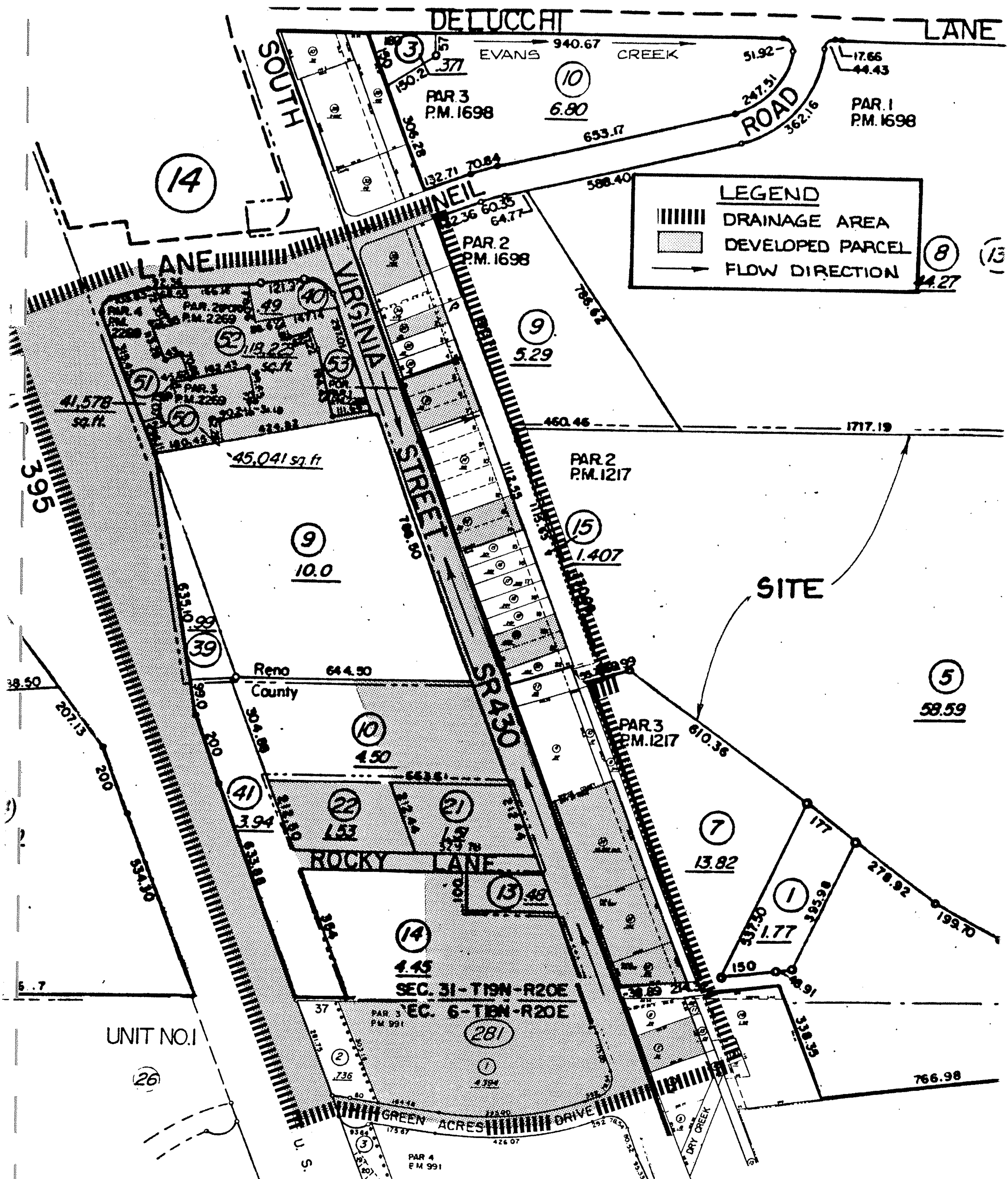
cfa

PLATE 1
SITE LOCATION MAP
SIERRA EXECUTIVE CENTRE



cfa

PLATE 2
FLOOD ZONE MAP
SIERRA EXECUTIVE CENTRE



cfa

PLATE 3
OFF-SITE HYDROLOGY
SIERRA EXECUTIVE CENTRE

RATIONAL METHOD

The rational method is used to estimate the peak runoff resulting from a rain storm of given intensity falling on a specific watershed. The peak flow is expressed as:

$$Q = CiA$$

where Q = Peak runoff, cubic feet per second
C = Runoff coefficient
i = Average rainfall intensity in inches per hour
A = Watershed area in acres

Calculations are made using criteria provided by the City of Reno Public Works Design Manual. Runoff coefficients used are 0.30 for undeveloped areas and 0.85 for built-up areas. Rainfall intensities are determined from the rainfall intensity-duration-frequency (IDF) curves for the City of Reno. The initial time of concentration (T_c) is calculated by the formula:

$$T_c = 10 \text{ or } \frac{L}{60 \times V} \quad \text{(whichever is greater)}$$

where T_c = Time of concentration in minutes
L = Watershed length in feet
V = Velocity in feet per second

Velocities used are 2 fps for swale and gutter flow and 3 fps for pipe flow.

The time of concentration at successive points downstream is determined by adding travel time to the upstream time of concentration. Travel time (T_t) is computed as:

$$T_t = \frac{L}{V \times 60}$$

where L = Length of flow path within subarea

Hydrologic tabling is done in two parts. First, the peak flow for each drainage area is determined using the corresponding time of concentration. Second, flows are accumulated starting with the most upstream subarea and proceeding downstream. At each point of interest the total time of concentration is calculated and the peak flow is computed using the total tributary area, the cumulative average runoff coefficient, and the intensity corresponding to the total time of concentration at that point.

STORM DRAIN DESIGN

Storm drain will be reinforced concrete pipe, 12 inch to 30 inch diameter. Pipe size was determined using the Manning Equation:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

where Q = flow rate, cubic feet per second

n = friction factor = 0.014

A = area of cross-section of flow in pipe, square feet

R = hydraulic radius, feet

S = slope of hydraulic grade line, feet/foot

Manning's formula can also be expressed as:

$$Q = K S^{1/2}$$

where $K = \frac{1.49}{n} A R^{2/3}$

For pipes flowing full, K is a constant that varies only with pipe diameter and n value. Therefore if Q and S are given, the pipe size required is determined from:

$$K = Q/S^{1/2}$$

Pipe were sized flowing just full and rounded to the next larger size in 6-inch increments. Therefore most pipes will be under part-full conditions in the 5-year storm.

RATIONAL METHOD HYDROLOGY

CITY OF RENO IDF CURVES

SIERRA EXECUTIVE CENTRE - PHASE 1

EXIST. RUNOFF COEFF. = 0.30

DESIGN POINT	DRAINAGE AREA	AREA (ACRES)	WATERSHED LENGTH (FT)	VEL (FPS)	TC (MIN)	RUNOFF COEFF.	RAINFALL INTENSITY (in/hr) 5-YEAR	10-YEAR	100-YEAR	DEVELOPED FLOWRATE (cfs) 5-YEAR	10-YEAR	100-YEAR	5-YR. INCREASED FLOWRATE (cfs)
CB #1,2	1	1.0	270	2	10.00	0.85	1.40	1.86	3.80	1.19	1.58	3.23	0.77
FUTURE	2	5.0	900	2	10.00	0.85	1.40	1.86	3.80	5.95	7.91	16.15	3.85
CB #3	3	6.5	600	2	10.00	0.85	1.40	1.86	3.80	7.74	10.28	21.00	5.01
CB #4	4	0.7	380	2	10.00	0.85	1.40	1.86	3.80	0.83	1.11	2.26	0.54
CB #5	5	0.6	360	2	10.00	0.85	1.40	1.86	3.80	0.71	0.95	1.94	0.46
CB #6	6	5.9	730	2	10.00	0.85	1.40	1.86	3.80	7.02	9.33	19.06	4.54
CB #7	7	0.9	720	2	10.00	0.85	1.40	1.86	3.80	1.07	1.42	2.91	0.69
CB #8	8	3.1	430	2	10.00	0.85	1.40	1.86	3.80	3.69	4.90	10.01	2.39
CB #9	9	0.7	400	2	10.00	0.85	1.40	1.86	3.80	0.83	1.11	2.26	0.54
CB #10	10	0.8	450	2	10.00	0.85	1.40	1.86	3.80	0.95	1.26	2.58	0.62
CB #11	11	0.2	110	2	10.00	0.85	1.40	1.86	3.80	0.24	0.32	0.65	0.15
CB #12	12	0.8	200	2	10.00	0.85	1.40	1.86	3.80	0.95	1.26	2.58	0.62
FUTURE	13	1.2	220	2	10.00	0.85	1.40	1.86	3.80	1.43	1.90	3.88	0.92
CB #13	14	6.4	700	2	10.00	0.85	1.40	1.86	3.80	7.62	10.12	20.67	4.93
CB #14	15	0.8	460	2	10.00	0.85	1.40	1.86	3.80	0.95	1.26	2.58	0.62
CB #15	16	5.1	720	2	10.00	0.85	1.40	1.86	3.80	6.07	8.06	16.47	3.93
CB #16	17	0.5	320	2	10.00	0.85	1.40	1.86	3.80	0.60	0.79	1.62	0.39
END CHAN	18	6.7	1500	2	12.50	0.85	1.25	1.70	3.40	7.12	9.68	19.36	4.61
CB #17,18	19	1.0	250	2	10.00	0.85	1.40	1.86	3.80	1.19	1.58	3.23	0.77
OFFSITE	O-1	65.6	1950	2	16.25	0.50	1.05	1.40	2.80	34.44	45.92	91.84	13.78

please state if all the 5-yr flows will enter the SD. ie. the 7+ cfs into the Type I inlets. ponding depth? clogging factors? need to be considered.

DESIGN POINT	SUMMED AREAS	AREA (ACRES)	TRAVEL LENGTH (FT)	VEL (FPS)	TC (MIN)	RUNOFF COEFF.	RAINFALL INTENSITY (in/hr)			DEVELOPED FLOWRATE (cfs)			5-YR. INCREASED FLOWRATE (CFS)
							5-YEAR	10-YEAR	100-YEAR	5-YEAR	10-YEAR	100-YEAR	
SDMH #1	1	1.0	270	2	10.00	0.85	1.40	1.86	3.80	1.19	1.58	3.23	0.77
SDMH #5	8 - 9	3.8	430	2	10.00	0.85	1.40	1.86	3.80	4.52	6.01	12.27	2.93
SDMH #2	3 - 4	7.2	600	2	10.00	0.85	1.40	1.86	3.80	8.57	11.38	23.26	5.54
SDMH #3	3 - 5	7.8	70	3	10.39	0.85	1.40	1.86	3.80	9.28	12.33	25.19	6.01
SDMH #4	3 - 7	14.6	370	3	12.44	0.85	1.25	1.70	3.40	15.51	21.10	42.19	10.04
SDMH #6	3 - 9	18.4	320	3	14.22	0.85	1.14	1.50	3.05	17.83	23.46	47.70	11.54
SDMH #7	3 - 11	19.4	65	3	14.58	0.85	1.14	1.50	3.05	18.80	24.74	50.29	12.16
SDMH #8	3 - 13	21.4	260	3	16.03	0.85	1.05	1.40	2.80	19.10	25.47	50.93	12.36
SDMH #9	14 - 15	7.2	700	2	10.00	0.85	1.40	1.86	3.80	8.57	11.38	23.26	5.54
SDMH #10	14 - 17	12.8	350	3	11.94	0.85	1.32	1.78	3.60	14.36	19.37	39.17	9.29
BEG CHAN	O-1,14-17	78.4	1950	2	16.25	0.56	1.05	1.40	2.80	45.86	61.15	122.30	21.17
END CHAN	O-1,14-18	85.1	1600	3	25.14	0.58	0.78	1.00	2.10	38.51	49.38	103.69	18.60

STORM DRAIN HYDRAULICS
SIERRA EXECUTIVE CENTRE

MANNINGS N = 0.014

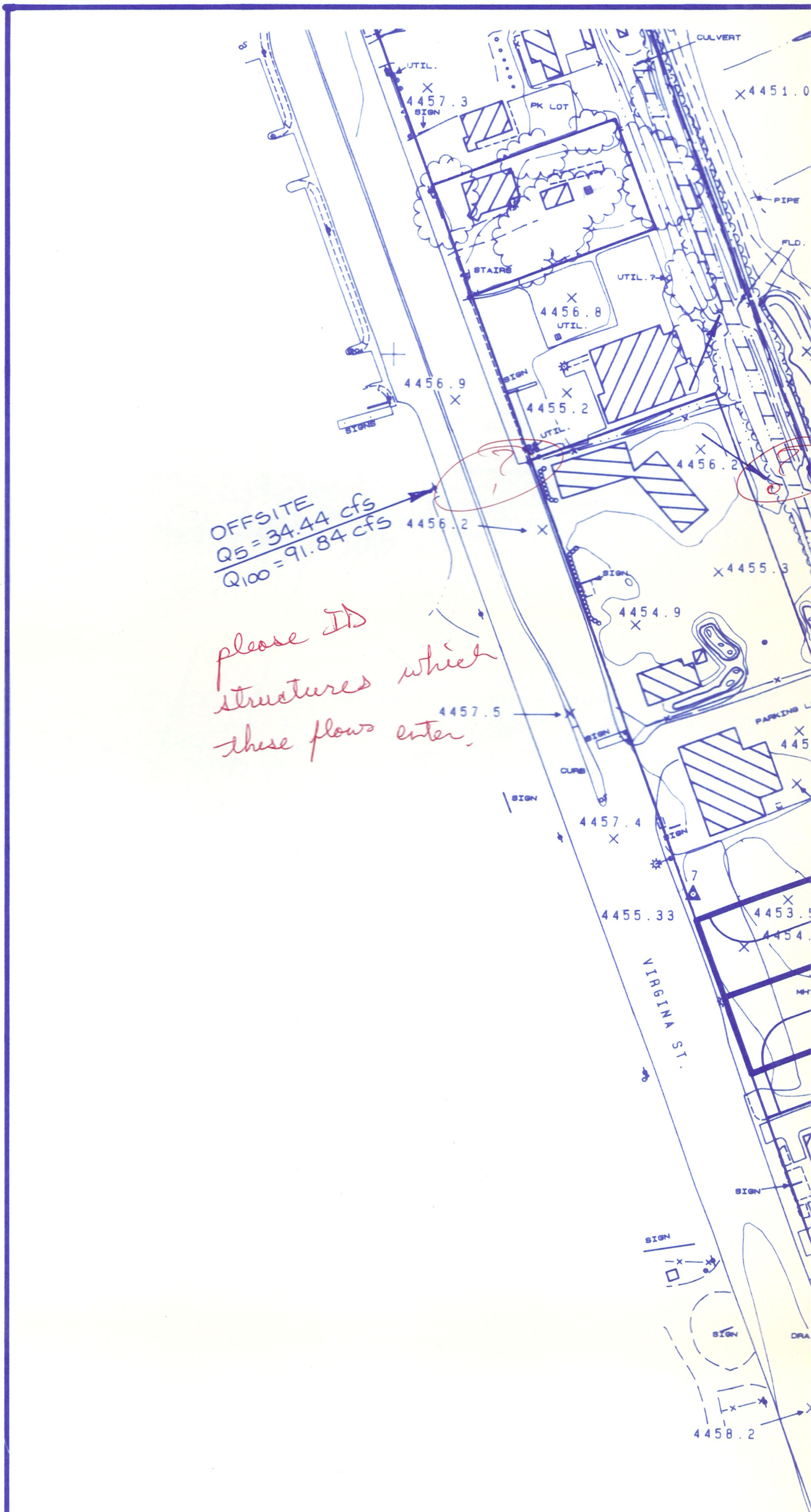
DESIGN POINT	UPSTRM ELEV	DNSTRM ELEV	PIPE LENGTH	SLOPE (FT/FT)	FLOW (CFS)	REQUIRED K VALUE	SELECT PIPE SIZE	ACTUAL K VALUE	FRICTION SLOPE	FLOW CONDITION
SDMH #1	57.50	56.28	247	0.0049	1.19	16.9	12	33.1	0.0013	PART
SDMH #5	45.42	44.22	476	0.0025	4.52	90.0	18	97.5	0.0021	(FULL)
SDMH #2	48.71	48.35	48	0.0075	8.57	99.0	18	97.5	0.0077	FULL
SDMH #3	48.35	46.50	347	0.0053	9.28	127.1	24	210.0	0.0020	PART
SDMH #4	46.50	44.22	350	0.0065	15.51	192.2	24	210.0	0.0055	(FULL)
SDMH #6	44.22	43.66	84	0.0067	17.83	218.4	24	210.0	0.0072	FULL
SDMH #7	43.66	41.90	262	0.0067	18.80	229.4	24	210.0	0.0080	FULL
CB #12	41.69	40.70	268	0.0037	19.10	314.3	30	380.7	0.0025	PART
SDMH #9	47.50	46.24	360	0.0035	8.57	144.9	24	210.0	0.0017	PART
SDMH #11	32.78	29.00	60	0.0630	1.19	4.7	12	33.1	0.0013	PART

UPSTR PT	FLOW	S	n	D	K	d/D	A/D^2	Dn	Vn
SDMH #1	1.19	0.0049	0.014	12	0.2380	0.51	0.4027	6.1	2.96
SDMH #5	4.52	0.0025	0.014	18	0.4293	(FULL)			2.56
SDMH #2	8.57	0.0075	0.014	18	0.4699	FULL			4.85
SDMH #3	9.28	0.0053	0.014	24	0.2811	0.56	0.4526	13.4	5.13
SDMH #4	15.51	0.0065	0.014	24	0.4242	(FULL)			4.94
SDMH #6	17.83	0.0067	0.014	24	0.4803	FULL			5.68
SDMH #7	18.80	0.0067	0.014	24	0.5064	FULL			5.99
CB #12	19.10	0.0037	0.014	30	0.3818	0.69	0.5780	20.7	5.29
SDMH #9	8.57	0.0035	0.014	24	0.3194	0.61	0.5018	14.6	4.27
SDMH #11	1.19	0.0630	0.014	12	0.0664	0.26	0.1623	3.1	7.33

TRAPEZOIDAL CHANNEL CAPACITY

BASE WIDTH (FT)	5.00
SIDE SLOPE (X:1)	2.00
MANNINGS N	0.030

DEPTH (FT)	AREA (SQ FT)	PERIM (FT)	HYD RAD (FT)	V/SQRT(S)	Q/SQRT(S)
2.00	18.00	13.94	1.29	58.88	1059.88
2.05	18.66	14.17	1.32	59.67	1113.07
2.10	19.32	14.39	1.34	60.44	1167.72
2.15	19.99	14.62	1.37	61.21	1223.86
2.20	20.68	14.84	1.39	61.97	1281.50
2.25	21.37	15.06	1.42	62.72	1340.65
2.30	22.08	15.29	1.44	63.47	1401.32
2.35	22.79	15.51	1.47	64.20	1463.52
2.40	23.52	15.73	1.49	64.94	1527.27
2.45	24.25	15.96	1.52	65.66	1592.59
2.50	25.00	16.18	1.55	66.38	1659.48
2.55	25.75	16.40	1.57	67.09	1727.97
2.60	26.52	16.63	1.59	67.80	1798.05
2.65	27.29	16.85	1.62	68.50	1869.75
2.70	28.08	17.07	1.64	69.20	1943.08
2.75	28.87	17.30	1.67	69.89	2018.05
2.80	29.68	17.52	1.69	70.58	2094.67
2.85	30.49	17.75	1.72	71.26	2172.96
2.90	31.32	17.97	1.74	71.93	2252.94
2.95	32.15	18.19	1.77	72.60	2334.60
3.00	33.00	18.42	1.79	73.27	2417.97
3.05	33.85	18.64	1.82	73.93	2503.07
3.10	34.72	18.86	1.84	74.59	2589.89
3.15	35.59	19.09	1.86	75.25	2678.46
3.20	36.48	19.31	1.89	75.90	2768.78
3.25	37.37	19.53	1.91	76.55	2860.88
3.30	38.28	19.76	1.94	77.19	2954.76
3.35	39.19	19.98	1.96	77.83	3050.44
3.40	40.12	20.21	1.99	78.46	3147.92
3.45	41.05	20.43	2.01	79.09	3247.22
3.50	42.00	20.65	2.03	79.72	3348.36
3.55	42.95	20.88	2.06	80.35	3451.35
3.60	43.92	21.10	2.08	80.97	3556.19
3.65	44.89	21.32	2.11	81.59	3662.90
3.70	45.88	21.55	2.13	82.20	3771.50


OFFSITE
Q5 = 34.44 cfs
Q100 = 91.84 cfs
please ID structures which these flows enter.
VIRGINA ST.
4457.3
PK LOT
UTIL.
SIGN
STAIRS
UTIL.
4456.8
4456.9
4455.2
SIGNS
4456.2
4456.2
CULVERT
4451.0
PIPE
FLD.
4455.3
4454.9
4457.5
CURB
PARKING
4457.4
4455.33
4453.5
4458.2

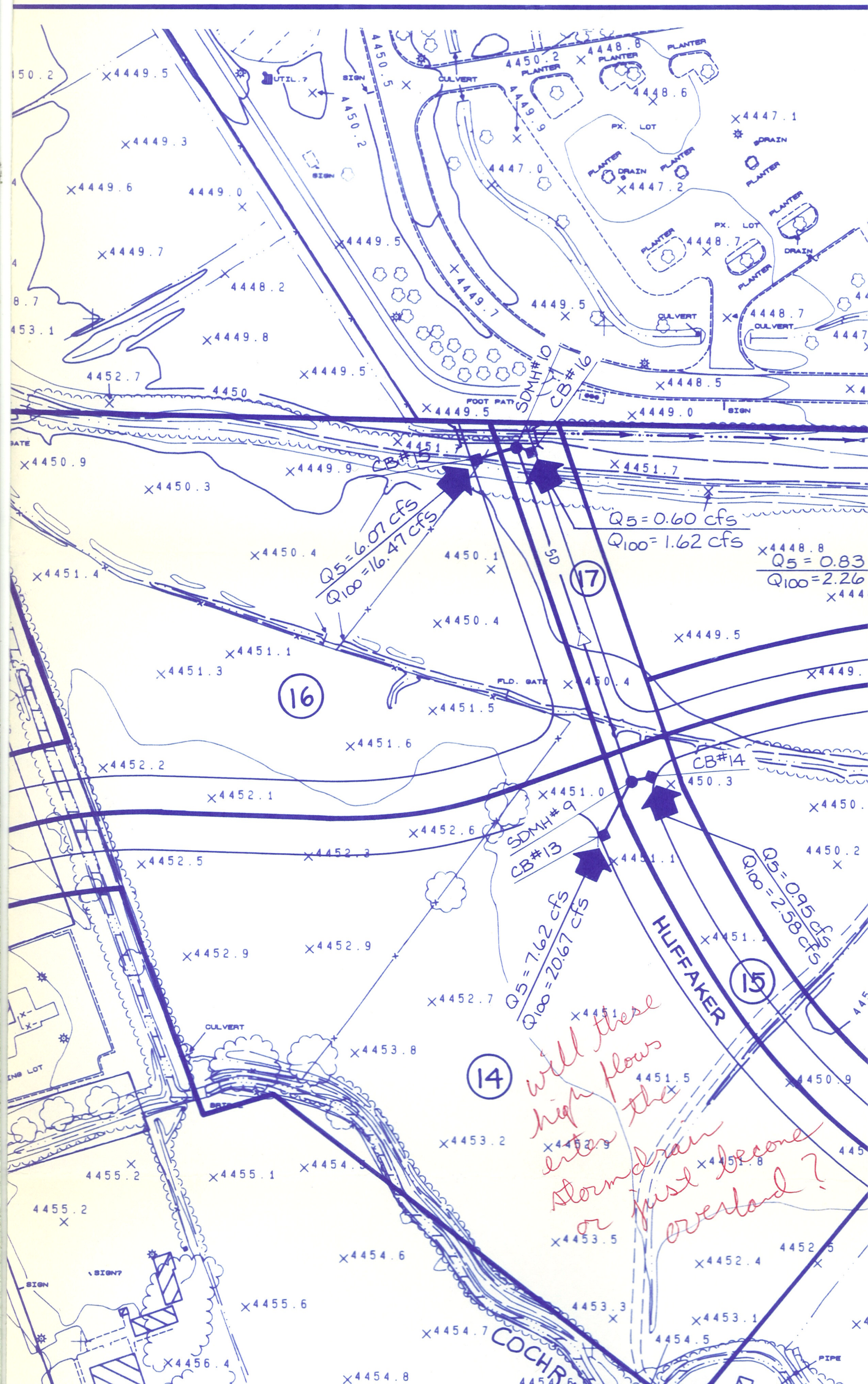
RATIONAL METHOD HYDROLOGY

CITY OF RENO IDF CURVES

SIERRA EXECUTIVE CENTRE - PHASE 1

DESIGN POINT	DRAINAGE AREA	AREA (ACRES)	WATERSHED LENGTH (FT)	VEL (FPS)	TC (MIN)	RUNOFF COEFF.	RAINFALL INTENSITY (in/hr) 5-YEAR	10-YEAR	100-YEAR	DEV… 5-YE…
CB #1,2	1	1.0	270	2	10.00	0.85	1.40	1.86	3.80	[illegible]
FUTURE	2	5.0	900	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #3	3	6.5	600	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #4	4	0.7	380	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #5	5	0.6	360	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #6	6	5.9	730	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #7	7	0.9	720	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #8	8	3.1	430	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #9	9	0.7	400	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #10	10	0.8	450	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #11	11	0.2	110	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #12	12	0.8	200	2	10.00	0.85	1.40	1.86	3.80	[illegible]
FUTURE	13	1.2	220	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #13	14	6.4	700	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #14	15	0.8	460	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #15	16	5.1	720	2	10.00	0.85	1.40	1.86	3.80	[illegible]
CB #16	17	0.5	320	2	10.00	0.85	1.40	1.86	3.80	[illegible]
END CHAN	18	6.7	1500	2	12.50	0.85	1.25	1.70	3.40	[illegible]
CB #17,18	19	1.0	250	2	10.00	0.85	1.40	1.86	3.80	[illegible]
OFFSITE	O-1	65.6	1950	2	16.25	0.50	1.05	1.40	2.80	[illegible]

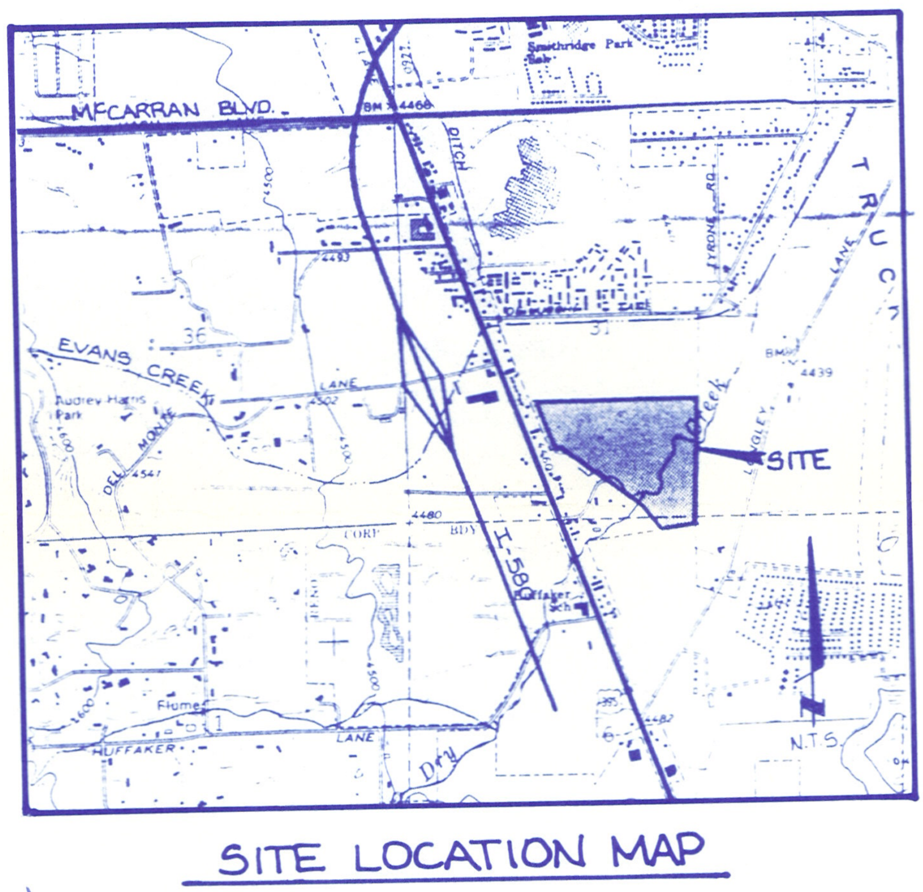
DESIGN POINT	SUMMED AREAS	AREA (ACRES)	TRAVEL LENGTH (FT)	VEL (FPS)	TC (MIN)	RUNOFF COEFF.	RAINFALL INTENSITY (in/hr) 5-YEAR	10-YEAR	100-YEAR	DE… 5-Y…
SDMH #1	1	1.0	270	2	10.00	0.85	1.40	1.86	3.80	[illegible]
SDMH #5	8 - 9	3.8	430	2	10.00	0.85	1.40	1.86	3.80	[illegible]
SDMH #2	3 - 4	7.2	600	2	10.00	0.85	1.40	1.86	3.80	[illegible]
SDMH #3	3 - 5	7.8	70	3	10.39	0.85	1.40	1.86	3.80	[illegible]
SDMH #4	3 - 7	14.6	370	3	12.44	0.85	1.25	1.70	3.40	[illegible]
SDMH #6	3 - 9	18.4	320	3	14.22	0.85	1.14	1.50	3.05	[illegible]
SDMH #7	3 - 11	19.4	65	3	14.58	0.85	1.14	1.50	3.05	[illegible]
SDMH #8	3 - 13	21.4	260	3	16.03	0.85	1.05	1.40	2.80	[illegible]
SDMH #9	14 - 15	7.2	700	2	10.00	0.85	1.40	1.86	3.80	[illegible]
SDMH #10	14 - 17	12.8	350	3	11.94	0.85	1.32	1.78	3.60	[illegible]
BEG CHAN	O-1,14-17	78.4	1950	2	16.25	0.56	1.05	1.40	2.80	[illegible]
END CHAN	O-1,14-18	85.1	1600	3	25.14	0.58	0.78	1.00	2.10	[illegible]



HUFFAKER
COCHR
14
15
16
17
Q5 = 7.62 cfs
Q100 = 20.67 cfs
Q5 = 0.95 cfs
Q100 = 2.58 cfs
Q5 = 6.07 cfs
Q100 = 16.47 cfs
Q5 = 0.60 cfs
Q100 = 1.62 cfs
Q5 = 0.83
Q100 = 2.26
CB#13
CB#14
CB#15
CB#16
SDMH#9
SDMH#10
SD
FLD. GATE
FOOT PATH
CULVERT
PLANTER
DRAIN
PX. LOT
UTIL.?
SIGN
PIPE
will these high flows enter the storm drain or just become overland?

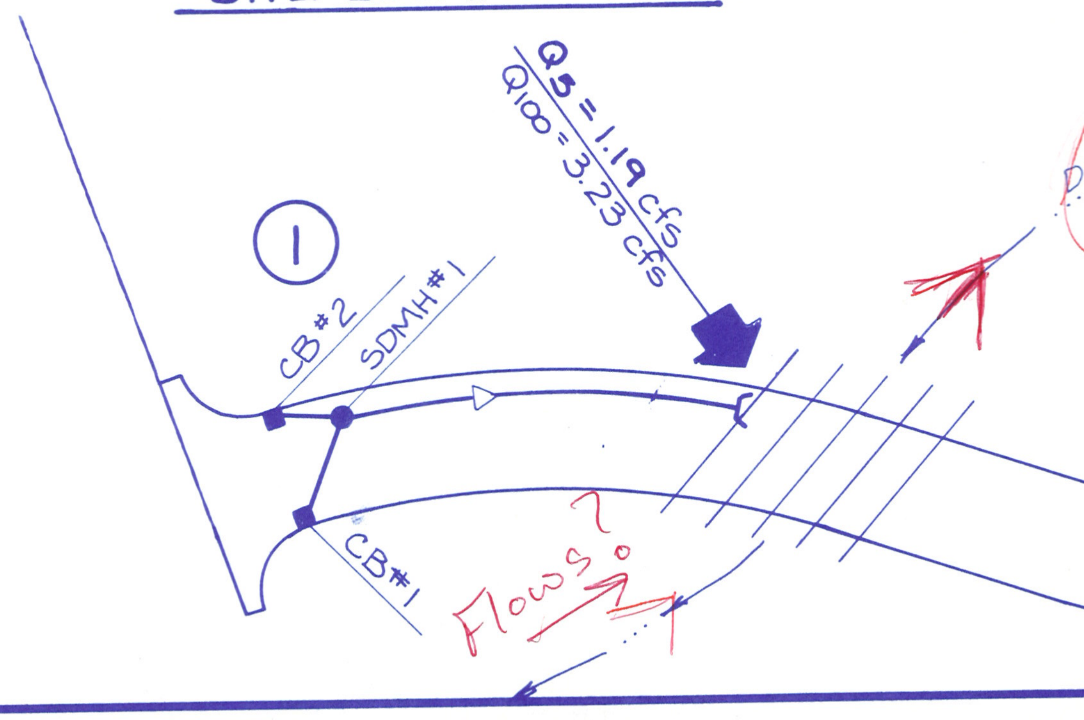
OFF COEFF. = 0.30

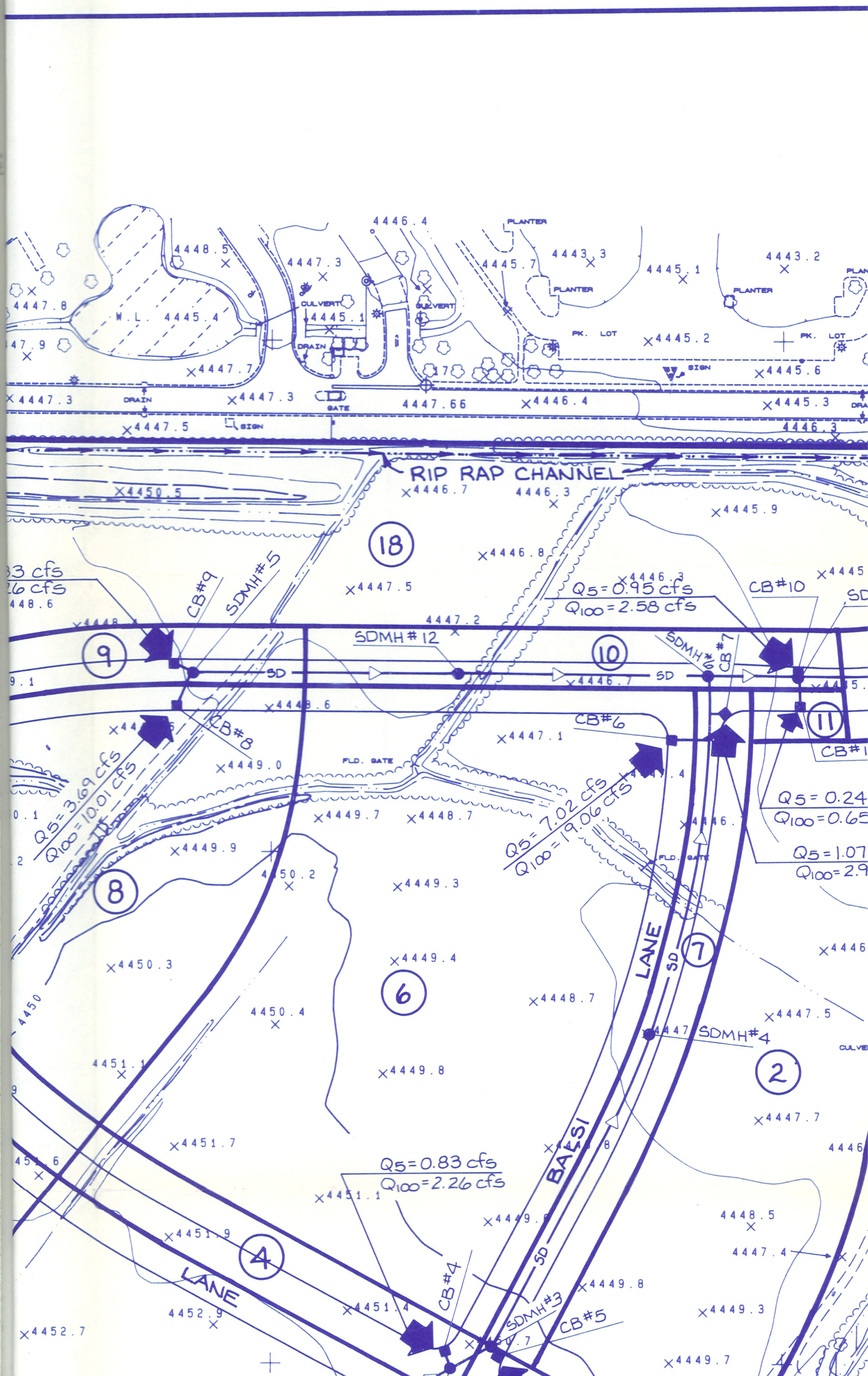
…WRATE (cfs)		5-YR. INCREASED
…AR	100-YEAR	FLOWRATE (cfs)
3	3.23	0.77
	16.15	3.85
8	21.00	5.01
	2.26	0.54
5	1.94	0.46
3	19.06	4.54
2	2.91	0.69
0	10.01	2.39
	2.26	0.54
5	2.58	0.62
2	0.65	0.15
5	2.58	0.62
0	3.88	0.92
2	20.67	4.93
5	2.58	0.62
5	16.47	3.93
9	1.62	0.39
3	19.36	4.61
3	3.23	0.77
2	91.84	13.78

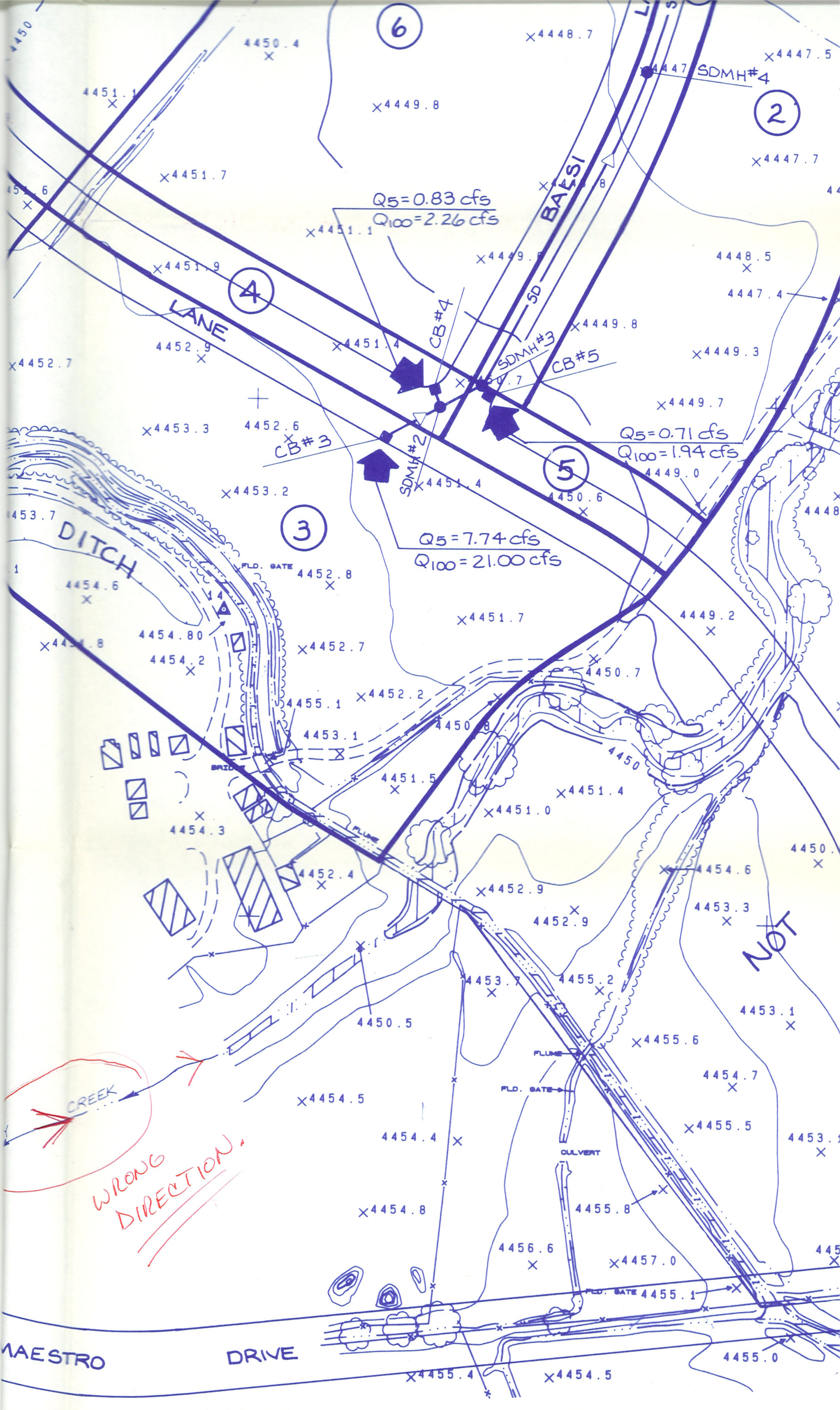


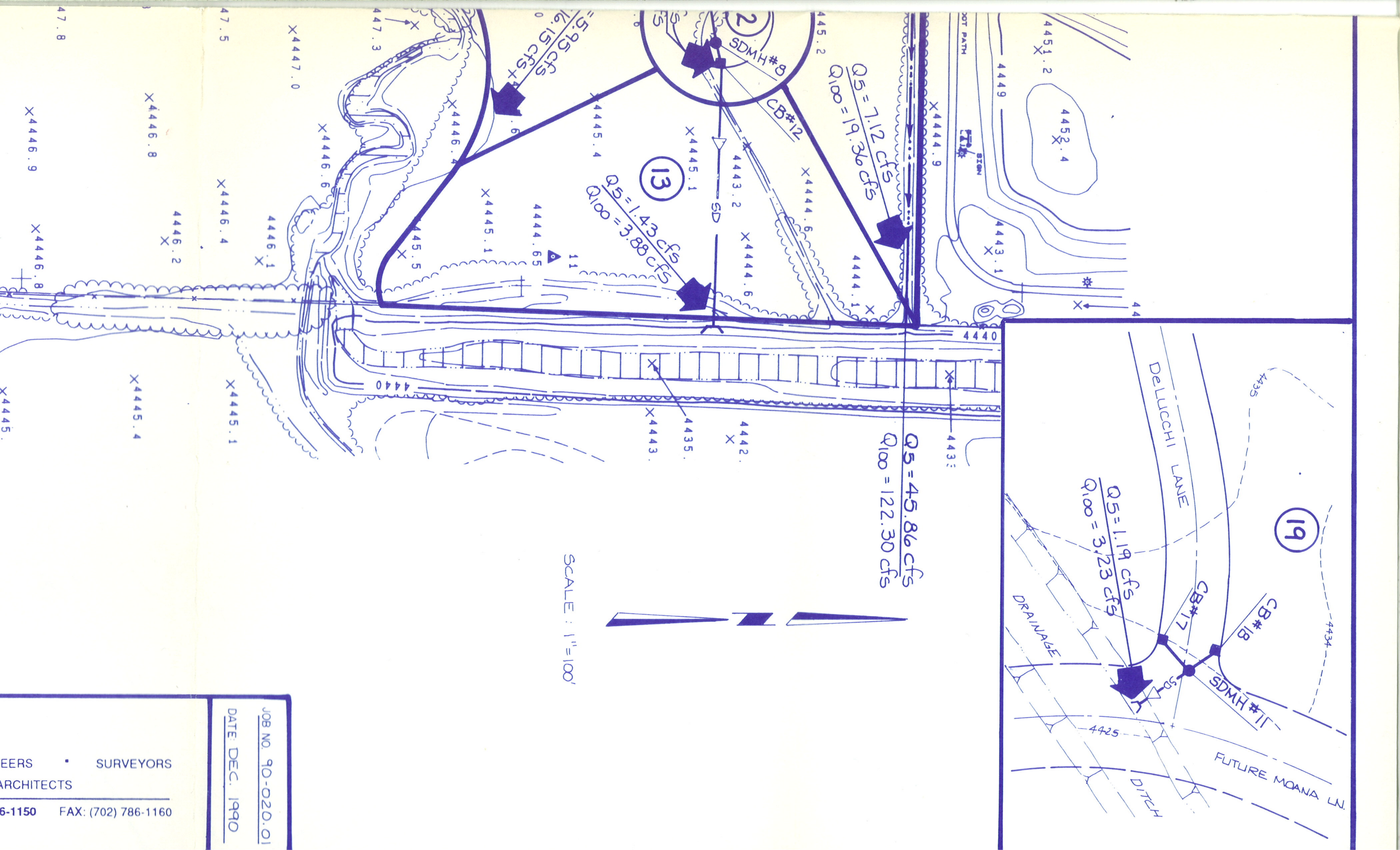
SITE LOCATION MAP

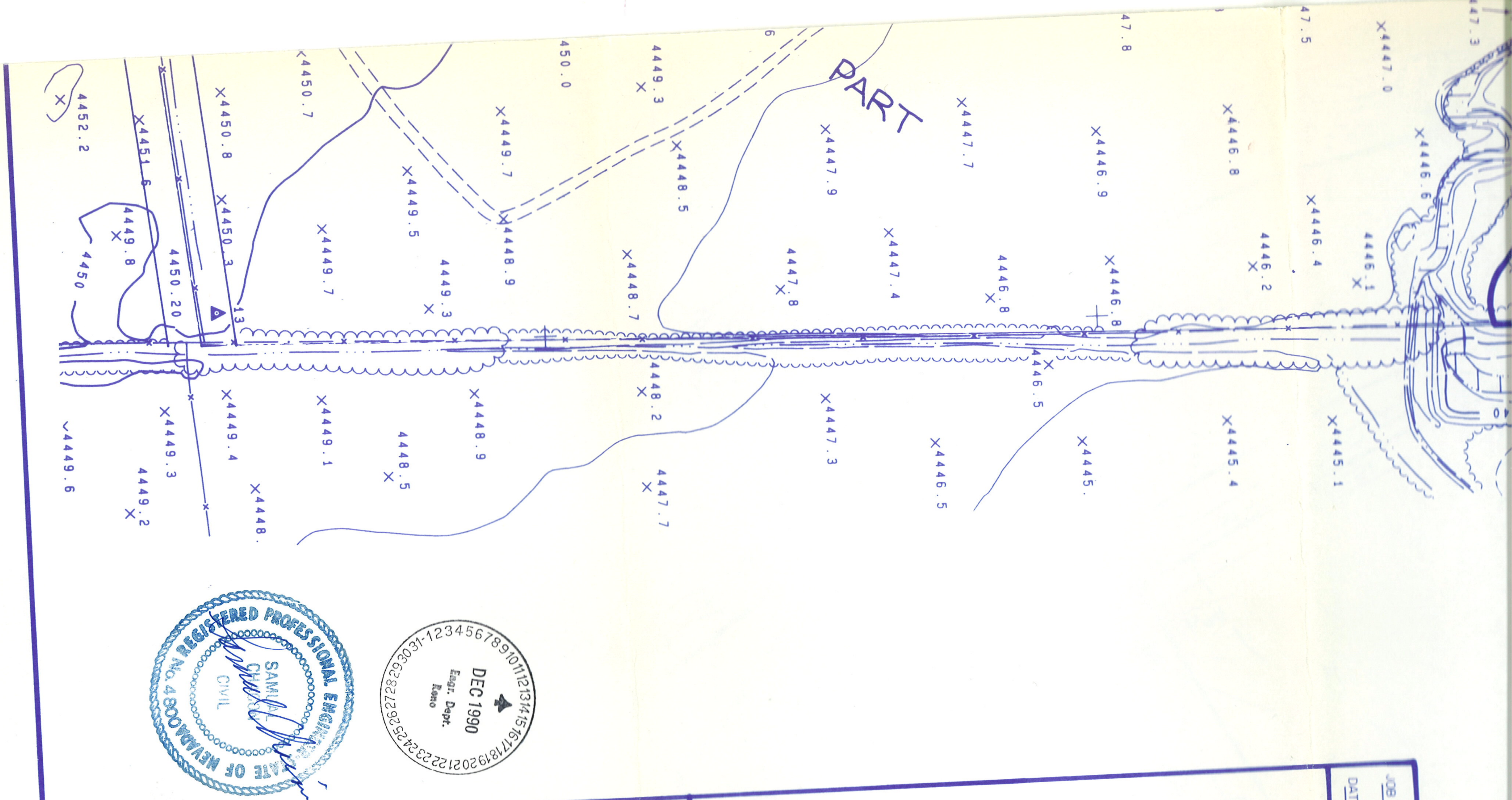
…OWRATE (cfs)		5-YR. INCREASED
…EAR	100-YEAR	FLOWRATE (CFS)
8	3.23	0.77
1	12.27	2.93
38	23.26	5.54
33	25.19	6.01
10	42.19	10.04
46	47.70	11.54
74	50.29	12.16
47	50.93	12.36
38	23.26	5.54
37	39.17	9.29
15	122.30	21.17
38	103.69	18.60




RIP RAP CHANNEL
BAESI LANE
LANE
Q5=3.69 cfs
Q100=10.01 cfs
Q5=0.95 cfs
Q100=2.58 cfs
Q5=7.02 cfs
Q100=19.06 cfs
Q5=0.83 cfs
Q100=2.26 cfs
Q5=0.24
Q5=1.07
CB#4
CB#5
CB#6
CB#7
CB#8
CB#9
CB#10
SDMH#3
SDMH#4
SDMH#5
SDMH#6
SDMH#12
SD
FLD. GATE
PLANTER
PK. LOT
CULVERT
DRAIN
GATE
SIGN
W.L. 4445.4
18
9
10
11
8
6
7
2
4


MAESTRO DRIVE
LANE
BALSI
DITCH
CREEK
WRONG DIRECTION.
NOT
Q5=0.83 cfs
Q100=2.26 cfs
Q5=7.74 cfs
Q100=21.00 cfs
Q5=0.71 cfs
Q100=1.94 cfs
CB#3
CB#4
CB#5
SDMH#2
SDMH#3
SDMH#4
SD
FLD. GATE
FLUME
CULVERT
BRIDGE
2
3
4
5
6


SDMH#8
CB#12
Q5 = 7.12 cfs
Q100 = 19.36 cfs
Q5 = 1.43 cfs
Q100 = 3.88 cfs
13
SD
Q5 = 45.86 cfs
Q100 = 122.30 cfs
19
DeLUCCHI LANE
Q5 = 1.19 cfs
Q100 = 3.23 cfs
CB#17
CB#18
SDMH #11
DRAINAGE
DITCH
FUTURE MOANA LN.
4425
SCALE: 1"=100'
N
EERS • SURVEYORS
ARCHITECTS
6-1150 FAX: (702) 786-1160
JOB NO. 90-020.01
DATE: DEC. 1990



SIERRA EXECUTIVE CENTRE

DRAINAGE PLAN

cfa PLANNERS • ENGINEERS • SURVEYORS
LANDSCAPE ARCHITECTS
1150 CORPORATE BLVD. RENO, NV 89502 (702) 786-1150 FAX: (702) 786-1160

DATE: DEC. 1990

JOB NO. 90-020.0