Appendix I:
Preliminary Drainage Study

PRELIMINARY DRAINAGE REPORT

FOR

DIAMOND SPRINGS PARKWAY

MAY 2009

cta Engineering & Surveying

Civil Engineering ▪ Land Surveying ▪ Land Planning

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DIAMOND SPRINGS PARKWAY

May 2009

Prepared By:
CTA Engineering & Surveying, Inc.
3233 Monier Circle
Rancho Cordova, CA 95742
916-638-0919

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Figure 1: Location Map

Figure 2: Vicinity Map

(Source: Google Maps)

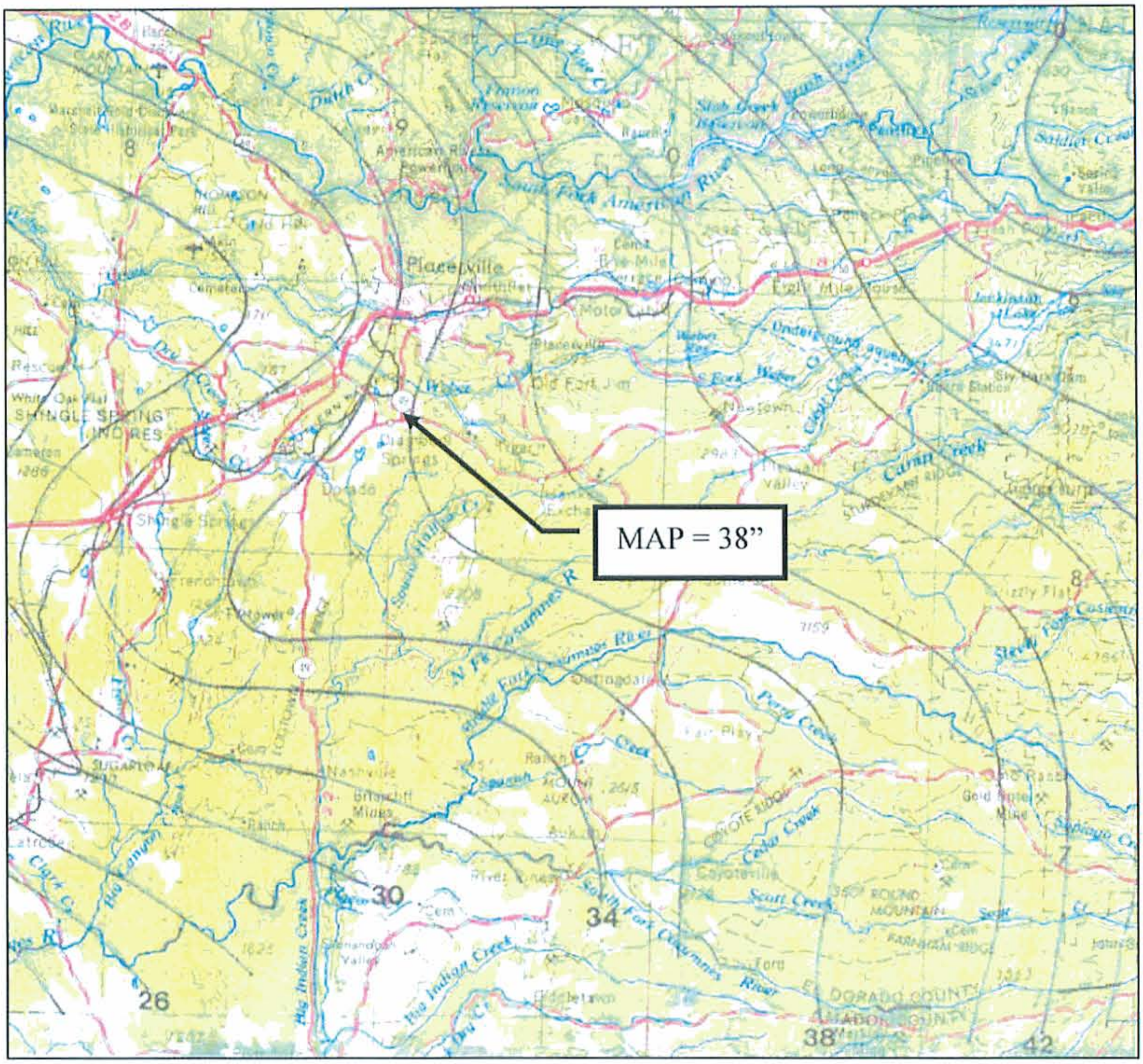


Figure 3: Mean Annual Precipitation

I. PROJECT INTRODUCTION

The project is located within unincorporated El Dorado County, California, south of the Missouri Flat Road/U.S. Route 50 (US-50) Interchange, west of the City of Placerville, and north of the town of Diamond Springs (see Figure 1). As illustrated in Figure 2, the principle roadway network in the vicinity of the project includes Missouri Flat Road, Pleasant Valley Road (SR-49), Diamond Road (SR-49), Lime Kiln Road, and China Garden Road.

The project area roughly corresponds with the southeast corner of Section 24 and the northeastern corner of Section 25, Township 10 N, Range 10 E and the southwestern portion of Section 19 and northwest corner of Section 30 Township 10 N, Range 11 E (Mount Diablo Baseline and Principal Meridian) on the U.S. Geological Survey (USGS) *Placerville* 7.5-minute quadrangle.

Land use within the project area is designated industrial and commercial according to the County's General Plan Land Use Map. Actual land uses adjacent to the project corridor are more variable and include pockets of residential development, various manufacturing and materials storage areas, and vacant industrial lots.

Diamond Springs Parkway would connect Missouri Flat Road with State Route 49 (SR-49). The project is identified in the County General Plan Circulation Map (El Dorado County 2004, as amended 2008) as a planned roadway and is part of DOT's 5-year Capital Improvement Plan (CIP) and the County's 20-year Traffic Impact Mitigation (TIM) Fee Program.

This report addresses pre- and post-development drainage patterns associated with the development of the new road construction and realignments required of the project.

II. METHODOLOGY

The information and calculations presented in this report follow the requirements of El Dorado County through use of the methodology outlined in the "County of El Dorado Drainage Manual", March 14, 1995, hereafter referred to as the Drainage Manual. Computer models used include HEC-HMS version 3.2 for hydrology, and StormCAD V8 XM Edition for pipe network hydraulics.

III. OBJECTIVE

An existing conditions hydrologic model will be created and used as a baseline with which to aid in design of storm drain facilities such as pipe networks and culverts. The impact of the proposed roadways will be analyzed and compared to the baseline to minimize changes to existing drainage patterns. A hydraulic model will be created to determine preliminary hydraulic grade lines throughout the systems to verify pipe and drainage crossing sizing.

IV. SUMMARY

Peak flows to the points of interest have been calculated and are summarized in Table 1. See Appendix A for a schematic of the hydrologic model. The construction of the roads results in minor changes to the drainage patterns in the vicinity.

Table 1: Summary of Peak Flows at Project Boundaries

Drainage flows at Project Boundaries			
Location	Drainage Area (acres)	10-Year Peak Flow (cfs)	100-Year Peak Flow (cfs)
Sub-basin A (Missouri Flat Rd Tie-in)			
Pre-Development	23.90	1.40	2.00
Post-Development	24.45	3.30	4.70
Difference	0.55	1.90	2.70
Sub-basin B (Northwest Ditch)			
Pre-Development	2.12	2.00	3.10
Post-Development	1.38	1.40	2.10
Difference	-0.74	-0.60	-1.00
Sub-basin C-D (North Ditch)			
Pre-Development	114.57	68.90	112.00
Post-Development	114.06	71.20	114.30
Difference	-0.51	2.30	2.30
Sub-basin E (Northeast Ditch)			
Pre-Development	26.92	24.50	37.90
Post-Development	27.37	25.30	38.80
Difference	0.45	0.80	0.90
Sub-basin F-1a (Hwy 49 North)			
Pre-Development	4.72	3.80	6.10
Post-Development	4.40	3.60	5.80
Difference	-0.32	-0.20	-0.30
Sub-basin F-1b (East Ditch)			
Pre-Development	6.34	4.80	7.90
Post-Development	6.59	5.10	8.30
Difference	0.25	0.30	0.40
Sub-basin G (Hwy 49 at Pleasant Valley Rd)			
Pre-Development	33.94	20.00	35.20
Post-Development	33.78	19.50	34.70
Difference	-0.16	-0.50	-0.50

The drainage shed patterns are maintained between the pre-development and post-development condition which minimizes impacts to the existing hydraulic system. The largest increase in post development flows are found at Sub-basin A, which is the tie in to the existing Missouri Flat Road system at the west end of the project. The 100-year runoff increases by 2.7 cfs, attributed to the increase in impervious area. The remaining shed areas have changes in pre-development to post-development flows of less between 2% and 5%. The 5% change in shed flow characteristics is a function of a change in shed area.

A well-defined channel crosses the proposed Parkway alignment at Station 82+50. For the purposes of this study, it is assumed that a structure of adequate conveyance area will be constructed to pass the 100-year flow. Culvert type selection and hydraulic analysis will be conducted at a later date pending the disposition of regulatory permitting.

V. HYDROLOGY

The hydrologic analysis was performed and analyzed as set forth in the Drainage Manual. USDA Soil Conservation Service (SCS) Technical Release 55 (TR-55) is used to assign curve numbers (CN) in calculating runoff. TR-55 is also used to compute time of concentration, or the time it takes for runoff to travel from the most hydraulically distant part of the watershed to the point of concentration.

A. WATERSHED PARAMETERS

1. PRECIPITATION

Mean annual rainfall for the project site is 38 inches per year (Figure 3). Using the tables in the Drainage Manual (Jim Goodridge, 1989), the rainfall depth is 4.911 inches for the 10-year storm and 6.962 inches for the 100-year storm (Appendix C).

2. SOILS

Soil classification is made using data from the National Resources Conservation Service (NRCS, previously known as SCS) Web Soil Survey. The soils in the project area are generally well draining, consisting primarily of Placer Diggings (PrD) with a corresponding hydrologic soil group rating (HSG) of "A". At the east end of the project there are regions of Diamond Springs very fine sandy loam (DfC and DfB) with HSG rating of "C". A small area of mixed alluvial land with HSG "D" exists near the intersection of Highway 49 and Pleasant Valley Road. See Appendix C for soils map and descriptions.

3. INFILTRATION

With the hydrologic soil group established, infiltration rates can be estimated using SCS runoff curve numbers (CN) found by comparing existing land uses against WinTR-55 Table 2-2 (Appendix C). For subcatchment areas with multiple land uses and/or soil types, a

weighted CN is calculated to be used for the total area of the subcatchment. Weighted CN calculations can be found for the existing and proposed watersheds in Appendix A and B, respectively.

4. TOPOGRAPHY
Topographic information used in the calculations was obtained from a recent aerial survey and from 7.5-minute quadrangle maps for the areas outside of the survey limits. Supplemental ground surveys were conducted by CTA Engineering & Surveying to obtain storm drain grate and flow line elevations.

5. TIME OF CONCENTRATION
Time of concentration was calculated in a computer spreadsheet using the equations presented in TR-55. Summary output can be found in Appendix A and B for existing and proposed watersheds, respectively.

6. REACH ROUTING
Channelized flow is analyzed within the HEC-HMS model using the Kinematic Wave routing method, which takes into account channel shape, size, slope and roughness to estimate travel time through a reach.

VI. HYDRAULICS

A. SUMMARY
Storm drain structures and pipes are designed using closed conduit flow criteria outlined in the El Dorado County Drainage Manual. A Manning's n Value of 0.013 was assumed for all pipes. Schematic layouts, tables and profiles can be found in Appendix D.

B. DESIGN CONSIDERATIONS
1. DESIGN STORM FREQUENCY
Per the El Dorado County Drainage Manual Section 4, the drainage system is designed to convey a 10-year storm with the water surface elevation contained within all pipes. The design will also pass a 100-year event without damage to structures or flooding of roadways.

2. DESIGN STORM DURATION
The goal in storm drain design is to convey the maximum peak flow for a given design storm. This involves choosing a storm with the same duration as the time of concentration for the watershed (critical duration). In this case, the minimum time of concentration is five minutes and the corresponding intensity will be used. As the storm flow is passed down the collection system the time of concentration at each point downstream of the headwater sheds will increase according to shed minimum time of concentration plus travel time in pipes. StormCAD automatically

calculates the new time of concentration at each junction and adjusts the intensity accordingly.

3. INLET CAPACITY
It is assumed for this preliminary study that the at-grade inlets capture 100% of the flow. For the final hydraulic analysis, each inlet's capacity should be further analyzed to determine if bypass flow is occurring.

4. MINOR LOSSES
Hydraulic energy losses and transformation calculations are performed within StormCAD. Head losses are estimated using the "Standard" head loss method with coefficients varying with pipe inlet/outlet configuration based on Figure 4.

5. ROADWAY GUTTER CAPACITY
Spacing of drainage inlets was based upon containment of the 100yr storm event between the curb face and extending to one foot from the traveled way. Supporting calculations can be found in Appendix D.

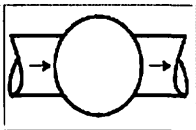
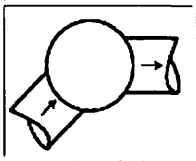
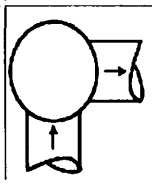
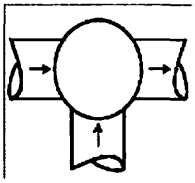
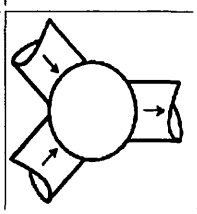
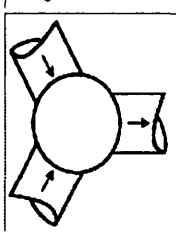
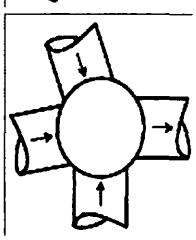
Type of Manhole	Diagram	Headloss Coefficient
Trunkline only with no bend at the junction		0.5
Trunkline only with 45° bend at the junction		0.6
Trunkline only with 90° bend at the junction		0.8
Trunkline with one lateral		Small 0.6 Large 0.7
Two roughly equivalent entrance lines with angle < 90° between lines		0.8
Two roughly equivalent entrance lines with angle > 90° between lines		0.9
Three or more entrance lines		1.0

Figure 4: Junction Headloss Coefficients

6. OVERLAND RELEASE

Overland release was not considered in detail in this preliminary study, although by inspection there are no potential areas of concern. During final road and storm sewer design, the overland path of travel should be considered, assuming that each drainage structure inlet is fully plugged. The overland release path requires that the highest water surface elevation is at least one foot below finished floor elevation of the lowest structure affected by the backwater.

C. WATER SURFACE PROFILES

Water surface profiles for key components of the storm sewer pipe network are shown graphically and in a tabulated summary in Appendix D.

VII. CONCLUSIONS

- The proposed road surface drainage system and storm sewer network was preliminarily designed to direct anticipated storm flow from the roadways toward well-defined channels or existing storm drain systems, while at the same time carrying existing flows from the surrounding areas through the roadways in pipe crossings.

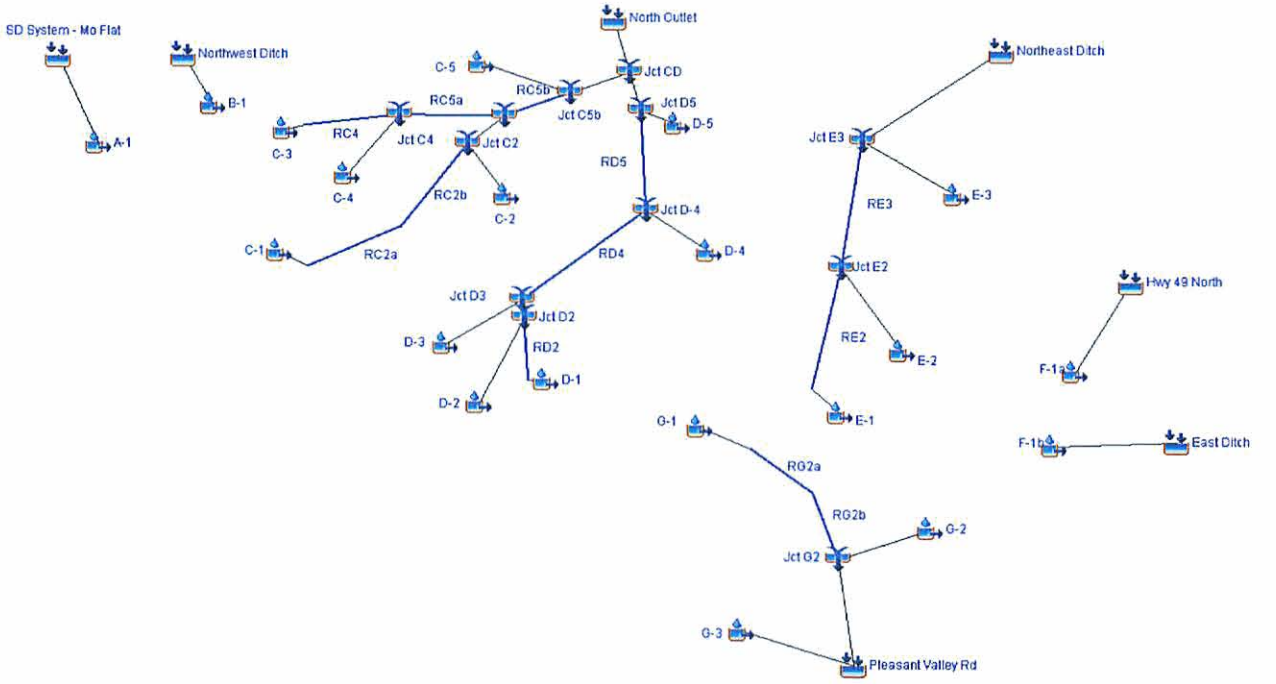
- Only minor changes in drainage patterns are proposed. Table 1 details the changes in area of each drainage shed.

- Increases in peak flows are expected to the following watersheds (all flows are for the 100-year event):

    - A (Missouri Flat Road, +2.7 cfs),
    - C/D (North Ditch, +2.3 cfs),

- A site visit and walk of the north ditch, northeast ditch and east ditch confirmed their capacity is adequate for the increases in peak flows.

VIII. APPENDIX A: EXISTING CONDITIONS



Hydrologic Element	Drainage Area (mi2)	Peak Flow (cfs)	Time of Peak	Volume (in)	area (ac)
A-1	0.03734	1.4	01Jan2008, 09:00	0.45	23.90
B-1	0.00331	2	01Jan2008, 09:00	3.76	2.12
C-1	0.0086875	3.1	01Jan2008, 09:00	2.49	5.56
C-2	0.01984	0.6	01Jan2008, 17:33	0.74	12.70
C-3	0.004375	2.3	01Jan2008, 08:59	3.51	2.80
C-4	0.009	2.3	01Jan2008, 09:00	2.03	5.76
C-5	0.02078	0	02Jan2008, 01:01	0	13.30
D-1	0.02625	14.1	01Jan2008, 09:00	3.59	16.80
D-2	0.06484	37.6	01Jan2008, 09:00	3.85	41.50
D-3	0.01278	8.2	01Jan2008, 08:59	4.1	8.18
D-4	0.00216	1	01Jan2008, 08:56	2.96	1.38
D-5	0.0103	0.6	01Jan2008, 09:08	0.93	6.59
E-1	0.018	8.4	01Jan2008, 08:59	2.91	11.52
E-2	0.005938	4.4	01Jan2008, 08:58	4.7	3.80
E-3	0.018125	11.8	01Jan2008, 09:00	4.16	11.60
East Ditch	0.0099	4.8	01Jan2008, 09:03	3.19	6.34
F-1a	0.007375	3.8	01Jan2008, 09:01	3.29	4.72
F-1b	0.0099	4.8	01Jan2008, 09:03	3.19	6.34
G-1	0.01303	5.5	01Jan2008, 09:01	2.74	8.34
G-2	0.0239	9.2	01Jan2008, 09:02	2.79	15.30
G-3	0.0161	5.2	01Jan2008, 09:01	2.26	10.30
Hwy 49 North	0.007375	3.8	01Jan2008, 09:01	3.29	4.72
Jct C2	0.0285275	3.4	01Jan2008, 09:04	1.27	18.26
Jct C4	0.013375	4.6	01Jan2008, 09:00	2.51	8.56
Jct C5a	0.0419025	8.1	01Jan2008, 09:03	1.66	26.82
Jct C5b	0.0626825	8	01Jan2008, 09:05	1.11	40.12
Jct CD	0.1790125	68.9	01Jan2008, 09:02	2.69	114.57
Jct D2	0.09109	51.6	01Jan2008, 09:01	3.77	58.30
Jct D3	0.10387	59.7	01Jan2008, 09:00	3.81	66.48
Jct D-4	0.10603	60.6	01Jan2008, 09:00	3.79	67.86
Jct D5	0.11633	61	01Jan2008, 09:01	3.54	74.45
Jct E2	0.023938	12.7	01Jan2008, 08:59	3.36	15.32
Jct E3	0.042063	24.5	01Jan2008, 09:00	3.7	26.92
Jct G2	0.03693	14.8	01Jan2008, 09:01	2.77	23.64
Northeast Ditch	0.042063	24.5	01Jan2008, 09:00	3.7	26.92
North Outlet	0.1790125	68.9	01Jan2008, 09:02	2.69	114.57
Northwest Ditch	0.00331	2	01Jan2008, 09:00	3.76	2.12
Pleasant Valley Rd	0.05303	20	01Jan2008, 09:01	2.62	33.94
RC2a	0.0086875	3.1	01Jan2008, 09:03	2.48	5.56
RC2b	0.0086875	3.1	01Jan2008, 09:03	2.48	5.56
RC4	0.004375	2.3	01Jan2008, 09:01	3.5	2.80
RC5a	0.013375	4.6	01Jan2008, 09:02	2.51	8.56
RC5b	0.0419025	8	01Jan2008, 09:05	1.66	26.82
RD2	0.02625	14.1	01Jan2008, 09:03	3.58	16.80
RD4	0.10387	59.7	01Jan2008, 09:01	3.81	66.48
RD5	0.10603	60.6	01Jan2008, 09:01	3.79	67.86
RE2	0.018	8.4	01Jan2008, 08:59	2.91	11.52
RE3	0.023938	12.7	01Jan2008, 09:00	3.35	15.32
RG2a	0.01303	5.5	01Jan2008, 09:01	2.74	8.34
RG2b	0.01303	5.5	01Jan2008, 09:01	2.74	8.34
SD System - Mo Flat	0.03734	1.4	01Jan2008, 09:00	0.45	23.90

Hydrologic Element	Drainage Area (mi2)	Peak Flow (cfs)	Time of Peak	Volume (in)
A-1	0.03734	2	01Jan2008, 09:00	1.12
B-1	0.00331	3.1	01Jan2008, 09:00	5.72
C-1	0.0086875	5.5	01Jan2008, 09:00	4.17
C-2	0.01984	3.3	01Jan2008, 09:02	1.74
C-3	0.004375	3.6	01Jan2008, 08:58	5.37
C-4	0.009	4.5	01Jan2008, 09:00	3.52
C-5	0.02078	0.3	01Jan2008, 22:56	0.2
D-1	0.02625	22.1	01Jan2008, 09:00	5.47
D-2	0.06484	57.4	01Jan2008, 09:00	5.76
D-3	0.01278	12.2	01Jan2008, 08:59	6.07
D-4	0.00216	1.6	01Jan2008, 08:56	4.74
D-5	0.0103	2.4	01Jan2008, 09:04	2.08
E-1	0.018	14.2	01Jan2008, 08:59	4.76
E-2	0.005938	6.3	01Jan2008, 08:57	6.74
E-3	0.018125	17.6	01Jan2008, 09:00	6.15
East Ditch	0.0099	7.9	01Jan2008, 09:03	5.07
F-1a	0.007375	6.1	01Jan2008, 09:01	5.19
F-1b	0.0099	7.9	01Jan2008, 09:03	5.07
G-1	0.01303	9.6	01Jan2008, 09:00	4.55
G-2	0.0239	15.7	01Jan2008, 09:02	4.48
G-3	0.0161	9.8	01Jan2008, 09:01	3.94
Hwy 49 North	0.007375	6.1	01Jan2008, 09:01	5.19
Jct C2	0.0285275	8.8	01Jan2008, 09:02	2.48
Jct C4	0.013375	8.2	01Jan2008, 09:00	4.12
Jct C5a	0.0419025	17	01Jan2008, 09:02	3
Jct C5b	0.0626825	17	01Jan2008, 09:03	2.07
Jct CD	0.1790125	112	01Jan2008, 09:02	4.22
Jct D2	0.09109	79.4	01Jan2008, 09:01	5.67
Jct D3	0.10387	91.6	01Jan2008, 09:00	5.72
Jct D-4	0.10603	93	01Jan2008, 09:00	5.7
Jct D5	0.11633	95.3	01Jan2008, 09:01	5.38
Jct E2	0.023938	20.4	01Jan2008, 08:59	5.25
Jct E3	0.042063	37.9	01Jan2008, 09:00	5.64
Jct G2	0.03693	25.3	01Jan2008, 09:01	4.5
Northeast Ditch	0.042063	37.9	01Jan2008, 09:00	5.64
North Outlet	0.1790125	112	01Jan2008, 09:02	4.22
Northwest Ditch	0.00331	3.1	01Jan2008, 09:00	5.72
Pleasant Valley Rd	0.05303	35.2	01Jan2008, 09:01	4.33
RC2a	0.0086875	5.5	01Jan2008, 09:02	4.16
RC2b	0.0086875	5.5	01Jan2008, 09:03	4.15
RC4	0.004375	3.6	01Jan2008, 09:00	5.36
RC5a	0.013375	8.2	01Jan2008, 09:01	4.12
RC5b	0.0419025	17	01Jan2008, 09:03	2.99
RD2	0.02625	22.1	01Jan2008, 09:02	5.45
RD4	0.10387	91.5	01Jan2008, 09:01	5.72
RD5	0.10603	92.9	01Jan2008, 09:01	5.7
RE2	0.018	14.2	01Jan2008, 08:59	4.76
RE3	0.023938	20.4	01Jan2008, 09:00	5.25
RG2a	0.01303	9.6	01Jan2008, 09:00	4.55
RG2b	0.01303	9.6	01Jan2008, 09:00	4.55
SD System - Mo Flat	0.03734	2	01Jan2008, 09:00	1.12

DIAMOND SPRINGS PARKWAY
PRE-DEVELOPMENT RUNOFF CURVE NUMBER CALCULATIONS

Sub-shed	Type of Land Use	Area	%	HSG	CN	Weighted CN
A-1		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Fair)	17.90	74.90%	A	36	27
	Residential (1 acre)	6.00	25.10%	A	51	13
		23.90	100.00%			**40**
		0.037	**=mi²**			
B-1		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	1.60	75.47%	A	81	61
	Roads	0.52	24.53%	A	98	24
		2.12	100.00%			**85**
		0.003	**=mi²**			
C-1		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	3.60	64.75%	A	81	52
	Brush (Poor)	1.96	35.25%	A	48	17
		5.56	100.00%			**69**
		0.009	**=mi²**			
C-2		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	0.60	4.72%	A	81	4
	Brush (Poor)	12.10	95.28%	A	48	46
		12.70	100.00%			**50**
		0.020	**=mi²**			
C-3		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	2.00	71.43%	A	81	58
	Brush (Poor)	0.80	28.57%	A	48	14
		2.80	100.00%			**72**
		0.004	**=mi²**			
C-4		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	2.30	39.93%	A	81	32
	Brush (Poor)	3.46	60.07%	A	48	29
		5.76	100.00%			**61**
		0.009	**=mi²**			
C-5		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Good)	10.60	79.70%	A	30	24
	Woods/Grass (Good)	2.70	20.30%	A	32	6
		13.30	100.00%			**30**
		0.021	**=mi²**			
D-1		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	0.45	2.68%	C	98	3
	Woods (Fair)	2.70	16.07%	C	73	12
	Residential (1 acre)	1.35	8.04%	C	79	6
	Industrial	6.20	36.90%	A	81	30
	Brush (Poor)	6.10	36.31%	A	48	17
		16.80	100.00%			**68**
		0.026	**=mi²**			
D-2		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Fair)	10.80	26.02%	C	73	19
	Brush (Poor)	6.10	14.70%	A	48	7
	Industrial	24.60	59.28%	A	81	48
		41.50	100.00%			**74**
		0.065	**=mi²**			
D-3		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	8.18	100.00%	A	81	81
		8.18	100.00%			**81**
		0.013	**=mi²**			

DIAMOND SPRINGS PARKWAY
PRE-DEVELOPMENT RUNOFF CURVE NUMBER CALCULATIONS

Sub-shed	Type of Land Use	Area	%	HSG	CN	Weighted CN
D-4		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	1.00	72.46%	A	81	59
	Brush (Poor)	0.38	27.54%	A	48	13
		1.38	100.00%			**72**
		0.002	**=mi²**			
D-5		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Good)	4.10	62.12%	C	70	43
	Woods (Good)	2.50	37.88%	A	30	11
		6.60	100.00%			**55**
		0.010	**=mi²**			
E-1		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	4.50	39.13%	C	91	36
	Woods (Fair)	0.50	4.35%	C	70	3
	Industrial	5.40	46.96%	A	81	38
	Woods (Fair)	1.10	9.57%	A	30	3
		11.50	100.00%			**80**
		0.018	**=mi²**			
E-2		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	3.80	100.00%	C	91	91
		3.80	100.00%			**91**
		0.006	**=mi²**			
E-3		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	7.00	60.34%	C	91	55
	Industrial	4.10	35.34%	A	81	29
	Woods (Fair)	0.50	4.31%	A	30	1
		11.60	100.00%			**85**
		0.018	**=mi²**			
F-1a		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	4.72	100.00%	A	81	81
		4.72	100.00%			**81**
		0.007	**=mi²**			
F-1b		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	6.31	100.00%	A	81	81
		6.31	100.00%			**81**
		0.010	**=mi²**			
G-1		Acres	Percentage	Soil Group	Curve No.	CN
	Residential (1 acre)	7.50	89.93%	C	79	71
	Woods (Fair)	0.84	10.07%	C	73	7
		8.34	100.00%			**78**
		0.013	**=mi²**			
G-2		Acres	Percentage	Soil Group	Curve No.	CN
	Residential (1 acre)	4.20	27.45%	C	79	22
	Woods (Fair)	4.20	27.45%	C	73	20
	Residential (1 acre)	6.40	41.83%	A	51	21
	Brush (Poor)	0.25	1.63%	D	83	1
	Roads	0.25	1.63%	D	98	2
		15.30	100.00%			**66**
		0.024	**=mi²**			
G-3		Acres	Percentage	Soil Group	Curve No.	CN
	Residential (1 acre)	1.30	12.62%	C	79	10
	Woods (Fair)	7.10	68.93%	C	73	50
	Residential (1 acre)	0.85	8.25%	D	51	4
	Woods (Fair)	0.55	5.34%	D	48	3
	Roads	0.50	4.85%	D	98	5
		10.30	100.00%			**72**
		0.016	**=mi²**			

Tab: Pre-Dev-Curve Number
F:\0-CTA OFFICE\07-044-002 Diamond Springs Parkway Phase II\Drainage Report\
Drainage Data - 092208.xls

DIAMOND SPRINGS PARKWAY
DIAMOND SPRINGS, EL DORADO COUNTY, CA

PRE-DEVELOPMENT TIME OF CONCENTRATION

	Sheet Flow (SH)					Shallow Concentrated Flow (SC)				Channel Flow (CH)																Total Time of Concentration	Lag = 0.6 Tc
Basin	n	L	P_2	S	Time (T_{SH})	S_o	V	L	Time (T_{SC})	A	P	H	Q_2	Cum. Q	Z_1	Z_2	Depth	n	A_{ch}	P_{ch}	R	S	V_2	L	Time(T_{CH})		
		(ft)	(in)	(ft/ft)	(min)	(ft/ft)	(ft/s)	(ft)	(min)	(sq mi)	(in)	(ft)	(cfs)	(cfs)	ft/ft	ft/ft	(ft)		(sq ft)	(ft)			(ft/s)	(ft)	(min)	(min)	(hours)
A-1	0.150	100	3.336	0.0200	9.60	0.088	4.77	1085	3.79	0.037	38	1.79	2.43	2.43	4.0	4.0	0.45	0.030	0.81	2.55	0.32	0.036	4.39	418	1.59	15.0	8.98
B-1	0.150	140	3.336	0.0320	10.41	0.070	5.38	100	0.31	0.003	38	1.79	0.29	0.29	20.0	20.0	0.15	0.035	0.45	4.2	0.106	0.056	2.26	320	2.36	13.1	7.84
C-1	0.150	70	3.336	0.0200	7.21	0.110	5.35	700	2.18	0.009	38	1.82	0.66	0.66	2.0	2.0	0.35	0.030	0.25	1.0	0.247	0.106	6.38	330	0.86	10.3	6.15
C-2	0.150	100	3.336	0.0600	6.18	0.056	3.82	650	2.84	0.020	38	1.82	1.37												0.00	9.0	5.41
C-3	0.050	60	3.336	0.1200	1.29	0.005	1.14	385	5.62	0.004	38	1.79	0.37	0.37	5.0	5.0	0.20	0.030	0.20	1.4	0.141	0.005	0.98	75	1.27	8.2	4.91
C-4	0.150	100	3.336	0.0500	6.65	0.050	3.61	425	1.96	0.009	38	1.82	0.69												0.00	8.6	5.17
C-5	0.150	100	3.336	0.1100	4.85	0.055	3.78	900	3.96	0.021	38	1.77	1.47	4.56	10.0	10.0	0.42	0.030	1.76	5.9	0.297	0.023	3.33	485	2.43		
														4.56	5.0	5.0	0.55	0.030	1.51	3.9	0.389	0.029	4.48	1255	4.67		
																									7.09	15.9	9.55
D-1	0.050	105	3.336	0.0250	3.79	0.072	4.33	685	2.64	0.026	38	1.80	1.78	1.78	6.0	10.0	0.30	0.030	0.72	3.5	0.206	0.035	3.25	1150	5.90	12.3	7.40
D-2	0.150	70	3.336	0.1000	3.79	0.064	4.08	580	2.37	0.065	38	1.79	3.96	5.74	2.0	2.0	0.90	0.030	1.62	2.5	0.636	0.018	4.90	2225	7.57	13.7	8.24
D-3	0.150	85	3.336	0.1500	3.76	0.037	3.10	380	2.04	0.013	38	1.80	0.94	0.94	2.0	2.0	0.41	0.030	0.34	1.2	0.290	0.044	4.57	1200	4.37	10.2	6.11
D-4	0.011	100	3.336	0.0200	1.19	0.050	3.61	120	0.55	0.002	38	1.80	0.20	6.88	2.0	2.0	1.00	0.030	2.00	2.8	0.707	0.015	4.89	130	0.44	2.2	1.31
D-5	0.240	100	3.336	0.0450	10.10	0.061	3.98	555	2.32	0.010	38	1.80	0.78	7.66	10.0	10.0	0.55	0.040	3.03	7.8	0.389	0.026	3.17	470	2.47	14.9	8.94
E-1	0.050	145	3.336	0.0240	4.99				0.00	0.018	38	1.80	1.27	1.70	3.0	3.0	0.45	0.030	0.61	1.9	0.318	0.063	5.79	1280	3.69	8.7	5.20
E-2	0.050	80	3.336	0.0100	4.40				0.00	0.006	38	1.80	0.48	2.18	1.0	1.0	0.15	0.020	0.02	0.2	0.106	0.036	3.15	730	3.86	8.3	4.96
E-3	0.150	114	3.336	0.0500	7.39	0.080	4.56	50	0.18	0.018	38	1.80	1.28	3.47	2.0	2.0	0.50	0.030	0.50	1.4	0.354	0.003	1.46	580	6.63	14.2	8.52
F-1a	0.150	100	3.336	0.0150	10.77	0.080	4.56	950	3.47	0.007	38	1.80	0.58	0.75	5.0	10.0	0.14	0.035	0.15	1.6	0.094	0.188	3.82	85	0.37	14.6	8.76
F-1b	0.050	265	3.336	0.0130	10.32	0.005	1.14	164	2.40	0.010	38	1.80	0.75	0.75	10.0	10.0	0.14	0.030	0.20	2.0	0.099	0.026	1.72	610	5.91	18.6	11.18
G-1	0.240	86	3.336	0.0470	8.80	0.110	5.35	138	0.43	0.013	38	1.80	0.96	0.96	2.0	2.0	0.51	0.030	0.52	1.4	0.361	0.062	6.25	810	2.16	11.4	6.83
G-2	0.240	86	3.336	0.0500	8.59	0.100	5.10	400	1.31	0.024	38	1.80	1.64	2.60	2.0	2.0	0.50	0.030	0.50	1.4	0.354	0.032	4.46	1520	5.68	15.6	9.34
G-3	0.150	71	3.336	0.0420	5.42	0.116	5.50	388	1.18	0.016	38	1.80	1.15	1.15	2.0	2.0	0.50	0.030	0.50	1.4	0.354	0.032	4.46	1520	5.68	12.3	7.37

$$T_{SH} = \frac{0.007 \times (nL)^{0.8}}{[(P_2)^{0.5} \times (S)^{0.4}]}$$

Where,
- n = overland flow roughness (TR-55 Table 3-1)
- L = length of overland flow surface
- P_2 = 2-yr, 24 hr rainfall depth (For MAP = 38"/yr, 3.336)
- S = land slope

$$T_{SC} = \frac{L}{V}$$

Where,
- V (unpaved) = $16.1345 \times (S_o)^{0.5}$
- V (paved) = $20.3282 \times (S_o)^{0.5}$
- S_o = land slope

USGS Regional Flood Frequency Equation: $Q_2 = 0.24 \times (A^{0.88}) \times (P^{1.56}) \times (H^{-0.80})$ [Sierra Region]

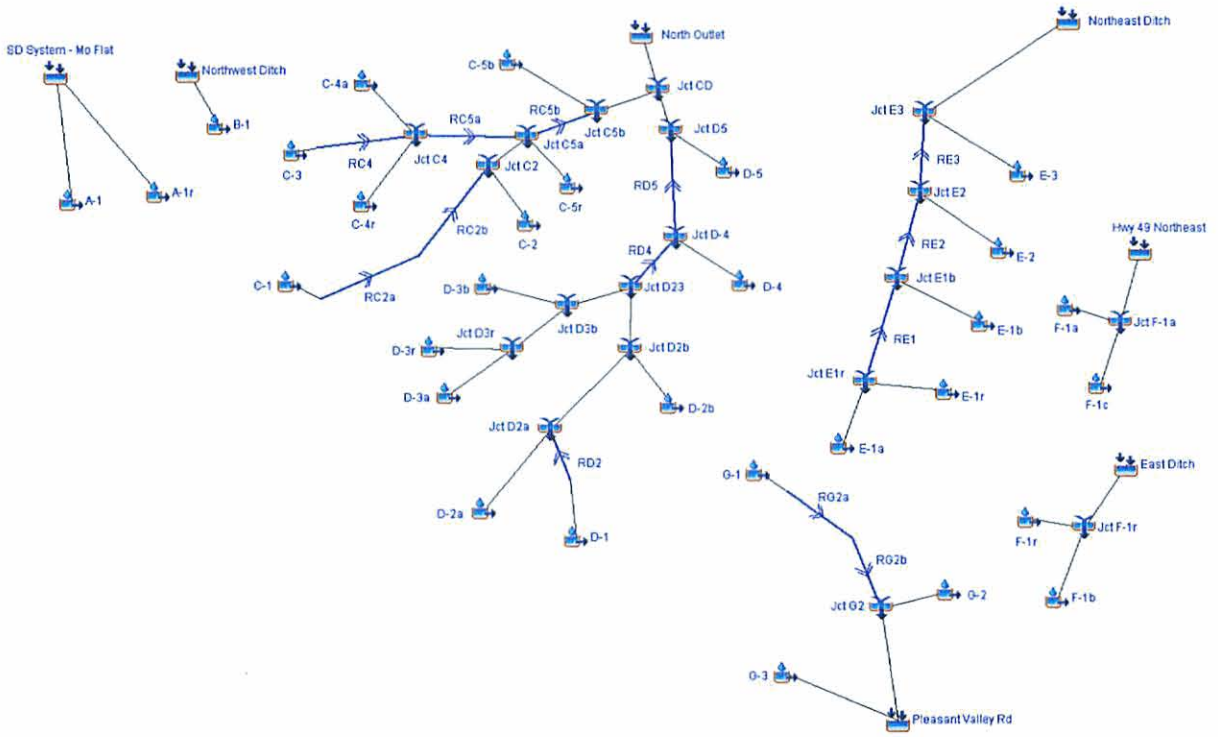
Where,
- A = Drainage Area (in sq mi)
- P = mean annual precipitation
- H = altitude index (in thousands ft.)
- $V_2 = (1.49/n) \times (R^{(2/3)}) \times (S^{0.5})$

Where,
- n = Mannings coefficient "n"
- Z_1, Z_2 = Left/Right v-ditch side slopes
- R = A_{ch} / P_{ch}
- A_{ch} = Channel Area
- S = land slope
- P_{ch} = Wetted Perimeter

$T_C = T_{SH} + T_{SC} + T_{CH}$

Lag = 0.6 Tc

IX. APPENDIX B: PROPOSED CONDITIONS



Hydrologic Element	Drainage Area (mi2)	Peak Flow (cfs)	Time of Peak	Volume (in)	Area (ac)
A-1	0.035532	1.3	01Jan2008, 09:00	0.45	22.74
A-1r	0.002669	2.0	01Jan2008, 08:50	4.91	1.71
B-1	0.002155	1.4	01Jan2008, 09:00	3.97	1.38
C-1	0.008000	3.2	01Jan2008, 09:00	2.76	5.12
C-2	0.018000	0.6	01Jan2008, 17:33	0.74	11.52
C-3	0.004580	3.1	01Jan2008, 08:58	4.33	2.93
C-4a	0.004375	0.9	01Jan2008, 09:00	1.79	2.80
C-4r	0.003663	2.8	01Jan2008, 08:52	4.90	2.34
C-5b	0.021271	0.0	02Jan2008, 01:01	0.00	13.61
C-5r	0.004688	3.5	01Jan2008, 08:59	4.90	3.00
D-1	0.025344	9.9	01Jan2008, 09:00	2.70	16.22
D-2a	0.058281	35.4	01Jan2008, 09:00	4.01	37.30
D-2b	0.003400	1.5	01Jan2008, 08:57	2.96	2.18
D-3a	0.010300	6.6	01Jan2008, 08:59	4.10	6.59
D-3b	0.001380	0.9	01Jan2008, 08:57	4.11	0.88
D-3r	0.002932	2.2	01Jan2008, 08:58	4.90	1.88
D-4	0.002000	0.9	01Jan2008, 08:56	2.96	1.28
D-5	0.010000	0.5	01Jan2008, 09:08	0.93	6.40
E-1a	0.014109	5.8	01Jan2008, 09:00	2.70	9.03
E-1b	0.004031	2.5	01Jan2008, 08:58	4.03	2.58
E-1r	0.003422	2.6	01Jan2008, 08:51	4.90	2.19
E-2	0.010000	7.2	01Jan2008, 08:58	4.50	6.40
E-3	0.011200	7.3	01Jan2008, 09:00	4.16	7.17
East Ditch	0.010297	5.1	01Jan2008, 09:00	3.31	6.59
F-1a	0.003125	2.2	01Jan2008, 08:58	4.22	2.00
F-1b	0.009734	4.8	01Jan2008, 09:02	3.22	6.23
F-1c	0.003750	1.5	01Jan2008, 09:00	2.54	2.40
F-1r	0.000563	0.4	01Jan2008, 08:48	4.91	0.36
G-1	0.033000	10.7	01Jan2008, 09:03	2.32	21.12
G-2	0.006780	4.9	01Jan2008, 08:58	4.49	4.34
G-3	0.013000	4.2	01Jan2008, 09:01	2.26	8.32
Hwy 49 Northeast	0.006875	3.6	01Jan2008, 08:59	3.30	4.40
Jct C2	0.026000	3.6	01Jan2008, 09:04	1.36	16.64
Jct C4	0.012618	6.8	01Jan2008, 08:59	3.62	8.08
Jct C5a	0.043306	13.7	01Jan2008, 09:01	2.40	27.72
Jct C5b	0.064577	13.7	01Jan2008, 09:03	1.60	41.33
Jct CD	0.178214	71.2	01Jan2008, 09:01	2.76	114.06
Jct D23	0.101637	56.2	01Jan2008, 09:00	3.68	65.05
Jct D2a	0.083625	45.2	01Jan2008, 09:00	3.61	53.52
Jct D2b	0.087025	46.6	01Jan2008, 09:00	3.59	55.70
Jct D3b	0.014612	9.7	01Jan2008, 08:58	4.26	9.35
Jct D3r	0.013232	8.8	01Jan2008, 08:59	4.28	8.47
Jct D-4	0.103637	57.1	01Jan2008, 09:00	3.67	66.33
Jct D5	0.113637	57.5	01Jan2008, 09:01	3.42	72.73
Jct E1b	0.021562	10.9	01Jan2008, 08:59	3.30	13.80
Jct E1r	0.017531	8.4	01Jan2008, 08:59	3.13	11.22
Jct E2	0.031562	18.0	01Jan2008, 08:59	3.68	20.20
Jct E3	0.042762	25.3	01Jan2008, 08:59	3.80	27.37
Jct F-1a	0.006875	3.6	01Jan2008, 08:59	3.30	4.40
Jct F-1r	0.010297	5.1	01Jan2008, 09:00	3.31	6.59
Jct G2	0.039780	15.3	01Jan2008, 09:01	2.69	25.46
Northeast Ditch	0.042762	25.3	01Jan2008, 08:59	3.80	27.37
North Outlet	0.178214	71.2	01Jan2008, 09:01	2.76	114.06
Northwest Ditch	0.002155	1.4	01Jan2008, 09:00	3.97	1.38
Pleasant Valley Rd	0.052780	19.5	01Jan2008, 09:01	2.58	33.78
RC2a	0.008000	3.2	01Jan2008, 09:03	2.75	5.12
RC2b	0.008000	3.2	01Jan2008, 09:03	2.75	5.12
RC4	0.004580	3.1	01Jan2008, 09:00	4.33	2.93
RC5a	0.012618	6.8	01Jan2008, 09:00	3.61	8.08
RC5b	0.043306	13.7	01Jan2008, 09:03	2.39	27.72
RD2	0.025344	9.9	01Jan2008, 09:01	2.69	16.22
RD4	0.101637	56.2	01Jan2008, 09:00	3.68	65.05
RD5	0.103637	57.0	01Jan2008, 09:01	3.66	66.33
RE1	0.017531	8.4	01Jan2008, 08:59	3.13	11.22
RE2	0.021562	10.9	01Jan2008, 08:59	3.30	13.80
RE3	0.031562	18.0	01Jan2008, 08:59	3.68	20.20
RG2a	0.033000	10.6	01Jan2008, 09:03	2.32	21.12
RG2b	0.033000	10.6	01Jan2008, 09:03	2.32	21.12
SD System - Mo Flat	0.038201	3.3	01Jan2008, 08:57	0.76	24.45

Hydrologic Element	Drainage Area (mi2)	Peak Flow (cfs)	Time of Peak	Volume (in)	Area (ac)
A-1	0.035532	1.9	01Jan2008, 09:00	1.12	22.74
A-1r	0.002669	2.9	01Jan2008, 08:50	6.95	1.71
B-1	0.002155	2.1	01Jan2008, 09:00	5.96	1.38
C-1	0.008000	5.6	01Jan2008, 09:00	4.50	5.12
C-2	0.018000	3.0	01Jan2008, 09:02	1.74	11.52
C-3	0.004580	4.5	01Jan2008, 08:58	6.32	2.93
C-4a	0.004375	2.0	01Jan2008, 09:00	3.22	2.80
C-4r	0.003663	3.9	01Jan2008, 08:52	6.95	2.34
C-5b	0.021271	0.3	01Jan2008, 22:56	0.20	13.61
C-5r	0.004688	5.0	01Jan2008, 08:59	6.94	3.00
D-1	0.025344	17.2	01Jan2008, 09:00	4.42	16.22
D-2a	0.058281	53.3	01Jan2008, 09:00	5.95	37.30
D-2b	0.003400	2.4	01Jan2008, 08:57	4.69	2.18
D-3a	0.010300	9.9	01Jan2008, 08:59	6.07	6.59
D-3b	0.001380	1.3	01Jan2008, 08:57	6.08	0.88
D-3r	0.002932	3.1	01Jan2008, 08:58	6.94	1.88
D-4	0.002000	1.5	01Jan2008, 08:56	4.74	1.28
D-5	0.010000	2.3	01Jan2008, 09:04	2.08	6.40
E-1a	0.014109	10.2	01Jan2008, 08:59	4.48	9.03
E-1b	0.004031	3.8	01Jan2008, 08:58	5.99	2.58
E-1r	0.003422	3.7	01Jan2008, 08:51	6.95	2.19
E-2	0.010000	10.4	01Jan2008, 08:58	6.53	6.40
E-3	0.011200	10.9	01Jan2008, 09:00	6.15	7.17
East Ditch	0.010297	8.3	01Jan2008, 09:00	5.20	6.59
F-1a	0.003125	3.2	01Jan2008, 08:58	6.24	2.00
F-1b	0.009734	7.8	01Jan2008, 09:02	5.09	6.23
F-1c	0.003750	2.7	01Jan2008, 08:59	4.32	2.40
F-1r	0.000563	0.6	01Jan2008, 08:48	6.96	0.36
G-1	0.033000	19.9	01Jan2008, 09:02	4.00	21.12
G-2	0.006780	7.0	01Jan2008, 08:58	6.52	4.34
G-3	0.013000	7.9	01Jan2008, 09:01	3.94	8.32
Hwy 49 Northeast	0.006875	5.8	01Jan2008, 08:59	5.19	4.40
Jct C2	0.026000	8.6	01Jan2008, 09:02	2.59	16.64
Jct C4	0.012618	10.4	01Jan2008, 08:59	5.43	8.08
Jct C5a	0.043306	23.9	01Jan2008, 09:01	3.88	27.72
Jct C5b	0.064577	23.8	01Jan2008, 09:03	2.67	41.33
Jct CD	0.178214	114.3	01Jan2008, 09:01	4.31	114.06
Jct D23	0.101637	87.0	01Jan2008, 08:59	5.56	65.05
Jct D2a	0.083625	70.5	01Jan2008, 09:00	5.48	53.52
Jct D2b	0.087025	72.8	01Jan2008, 09:00	5.45	55.70
Jct D3b	0.014612	14.3	01Jan2008, 08:58	6.25	9.35
Jct D3r	0.013232	13.0	01Jan2008, 08:59	6.26	8.47
Jct D-4	0.103637	88.4	01Jan2008, 08:59	5.55	66.33
Jct D5	0.113637	90.6	01Jan2008, 09:00	5.24	72.73
Jct E1b	0.021562	17.6	01Jan2008, 08:59	5.16	13.80
Jct E1r	0.017531	13.8	01Jan2008, 08:59	4.97	11.22
Jct E2	0.031562	28.0	01Jan2008, 08:58	5.59	20.20
Jct E3	0.042762	38.8	01Jan2008, 08:59	5.74	27.37
Jct F-1a	0.006875	5.8	01Jan2008, 08:59	5.19	4.40
Jct F-1r	0.010297	8.3	01Jan2008, 09:00	5.20	6.59
Jct G2	0.039780	26.8	01Jan2008, 09:01	4.43	25.46
Northeast Ditch	0.042762	38.8	01Jan2008, 08:59	5.74	27.37
North Outlet	0.178214	114.3	01Jan2008, 09:01	4.31	114.06
Northwest Ditch	0.002155	2.1	01Jan2008, 09:00	5.96	1.38
Pleasant Valley Rd	0.052780	34.7	01Jan2008, 09:01	4.31	33.78
RC2a	0.008000	5.6	01Jan2008, 09:02	4.48	5.12
RC2b	0.008000	5.6	01Jan2008, 09:02	4.48	5.12
RC4	0.004580	4.5	01Jan2008, 09:00	6.31	2.93
RC5a	0.012618	10.4	01Jan2008, 09:00	5.42	8.08
RC5b	0.043306	23.8	01Jan2008, 09:03	3.88	27.72
RD2	0.025344	17.2	01Jan2008, 09:00	4.41	16.22
RD4	0.101637	87.0	01Jan2008, 09:00	5.56	65.05
RD5	0.103637	88.4	01Jan2008, 09:00	5.54	66.33
RE1	0.017531	13.8	01Jan2008, 08:59	4.96	11.22
RE2	0.021562	17.6	01Jan2008, 08:59	5.15	13.80
RE3	0.031562	28.0	01Jan2008, 08:59	5.59	20.20
RG2a	0.033000	19.9	01Jan2008, 09:02	4.00	21.12
RG2b	0.033000	19.9	01Jan2008, 09:03	4.00	21.12
SD System - Mo Flat	0.038201	4.7	01Jan2008, 08:57	1.53	24.45

DIAMOND SPRINGS PARKWAY
POST-DEVELOPMENT RUNOFF CURVE NUMBER CALCULATIONS

Sub-shed	Type of Land Use	Area	%	HSG	CN	Weighted CN
A-1a		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Fair)	16.70	73.57%	A	36	26
	Residential (1 acre)	6.00	26.43%	A	51	13
		22.70	100.00%			**40**
		0.035	**=mi²**			
A-1r		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	1.68	100.00%	A	98	98
		1.68	100.00%			**98**
		0.003	**=mi²**			
B-1		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	0.84	61.76%	A	81	50
	Roads	0.52	38.24%	A	98	37
		1.36	100.00%			**88**
		0.002	**=mi²**			
C-1		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	3.60	70.31%	A	81	57
	Brush (Poor)	1.52	29.69%	A	48	14
		5.12	100.00%			**71**
		0.008	**=mi²**			
C-2		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	0.60	5.23%	A	81	4
	Brush (Poor)	10.88	94.77%	A	48	45
		11.48	100.00%			**50**
		0.018	**=mi²**			
C-3		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	1.90	43.88%	A	81	36
	Roads	1.90	43.88%	A	98	43
	Brush (Poor)	0.53	12.24%	A	48	6
		4.33	100.00%			**84**
		0.007	**=mi²**			
C-4a		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	1.00	35.71%	A	81	29
	Brush (Poor)	1.80	64.29%	A	48	31
		2.80	100.00%			**60**
		0.004	**=mi²**			
C-4r		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	2.34	100.00%	A	98	98
		2.34	100.00%			**98**
		0.004	**=mi²**			
C-5b		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Good)	10.60	77.88%	A	30	23
	Woods/Grass (Good)	3.01	22.12%	A	32	7
		13.61	100.00%			**30**
		0.021	**=mi²**			
C-5r		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	3.00	100.00%	A	98	98
		3.00	100.00%			**98**
		0.005	**=mi²**			
D-1		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	0.45	2.77%	C	98	3
	Woods (Fair)	2.70	16.65%	C	73	12
	Residential (1 acre)	1.35	8.32%	C	79	7
	Industrial	6.20	38.22%	A	81	31
	Brush (Poor)	5.52	34.03%	A	48	16
		16.22	100.00%			**69**
		0.025	**=mi²**			
D-2a		Acres	Percentage	Soil Group	Curve No.	CN
	Woods (Fair)	10.80	28.95%	C	73	21
	Brush (Poor)	4.00	10.72%	A	48	5
	Industrial	22.50	60.32%	A	81	49
		37.30	100.00%			**75**
		0.058	**=mi²**			

Tab: Post-Dev-Curve Number
F:\0-CTA OFFICE\08-026-001 Diamond Springs Parkway\Drainage\052009 Drainage\
052009 CJK DRAINAGE DATA.xls

DIAMOND SPRINGS PARKWAY
POST-DEVELOPMENT RUNOFF CURVE NUMBER CALCULATIONS

Sub-shed	Type of Land Use	Area	%	HSG	CN	Weighted CN
D-2b		Acres	Percentage	Soil Group	Curve No.	CN
	Brush (Poor)	1.00	45.87%	A	48	22
	Industrial	1.18	54.13%	A	81	44
		2.18	100.00%			**66**
		0.003	**=mi²**			
D-3a		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	6.58	100.00%	A	81	81
		6.58	100.00%			**81**
		0.010	**=mi²**			
D-3r		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	*1.88*	*100.00%*	A	*98*	*98*
		1.88	100.00%			**98**
		0.003	**=mi²**			
D-3b		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	0.88	100.00%	A	81	81
		0.88	100.00%			**81**
		0.001	***=mi²***			
D-4		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	1.00	72.46%	A	81	59
	Brush (Poor)	0.38	27.54%	A	48	13
		1.38	100.00%			**72**
		0.002	**=mi²**			
D-5		*Acres*	*Percentage*	*Soil Group*	*Curve No.*	CN
	Woods (Good)	4.10	62.12%	C	70	43
	Woods (Good)	2.50	37.88%	A	30	11
		6.60	100.00%			**55**
		0.010	**=mi²**			
E-1a		Acres	Percentage	Soil Group	Curve No.	CN
	Brush (Poor)	1.16	12.85%	A	48	6
	Brush (Poor)	0.34	3.77%	C	77	3
	Industrial	6.00	66.45%	A	81	54
	Newly Graded	1.53	16.94%	A	77	13
		9.03	100.00%			**76**
		0.014	**=mi²**			
E-1r		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	2.37	100.00%	A & C	98	98
		2.37	100.00%			**98**
		0.004	**=mi²**			
E-1b		Acres	Percentage	Soil Group	Curve No.	CN
	Brush (Poor)	1.00	38.76%	C	77	30
	Industrial	1.58	61.24%	A	81	50
		2.58	100.00%			***79***
		0.004	**=mi²**			
E-2		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	6.34	100.00%	C	91	91
		6.34	100.00%			**91**
		0.010	**=mi²**			
E-3		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	5.72	79.78%	C	91	73
	Industrial	0.95	13.25%	A	81	11
	Woods (Fair)	0.50	6.97%	A	30	2
		7.17	100.00%			**85**
		0.011	**=mi²**			

DIAMOND SPRINGS PARKWAY
POST-DEVELOPMENT RUNOFF CURVE NUMBER CALCULATIONS

Sub-shed	Type of Land Use	Area	%	HSG	CN	Weighted CN
F-1a		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	0.40	20.00%	A	98	20
	Industrial	1.60	80.00%	C	91	73
		2.00	100.00%			**92**
		0.003	**=mi²**			
F-1b		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	0.70	11.24%	A	98	11
	Industrial	1.40	22.47%	A	81	18
	Newly Graded	4.13	66.29%	A	77	51
		6.23	100.00%			**80**
		0.010	**=mi²**			
F-1c		Acres	Percentage	Soil Group	Curve No.	CN
	Newly Graded	2.40	100.00%	A	77	77
		2.40	100.00%			**77**
		0.004	**=mi²**			
F-1r		Acres	Percentage	Soil Group	Curve No.	CN
	Roads	0.36	100.00%	A	98	98
		0.36	100.00%			**98**
		0.001	**=mi²**			
G-1		Acres	Percentage	Soil Group	Curve No.	CN
	Residential (1 acre)	5.40	25.35%	C	79	20
	Residential (1 acre)	7.20	33.80%	A	51	17
	Roads	3.20	15.02%	C	98	15
	Brush (Poor)	0.25	1.17%	D	83	1
	Woods (Fair)	5.25	24.65%	C	73	18
		21.30	100.00%			**71**
		0.033	**=mi²**			
G-2		Acres	Percentage	Soil Group	Curve No.	CN
	Industrial	3.60	82.95%	C	91	75
	Roads	0.74	17.05%	D	98	17
		4.34	100.00%			**92**
		0.007	**=mi²**			
G-3		Acres	Percentage	Soil Group	Curve No.	CN
	Residential (1 acre)	1.10	12.97%	C	79	10
	Woods (Fair)	5.73	67.57%	C	73	49
	Residential (1 acre)	0.60	7.08%	D	51	4
	Woods (Fair)	0.55	6.49%	D	48	3
	Roads	0.50	5.90%	D	98	6
		8.48	100.00%			**72**
		0.013	**=mi²**			

DIAMOND SPRINGS PARKWAY
DIAMOND SPRINGS, EL DORADO COUNTY, CA

POST-DEVELOPMENT TIME OF CONCENTRATION

Basin	Sheet Flow (SH)					Gutter Flow					Pipe Flow				Shallow Concentrated Flow (SC)				Channel Flow (CH)													Total Time of Concentration	Lag = 0.6 Tc
	n	L	P_2	S	Time (T_{SH})	S_o	Q	V	L	Time	S_o	V	L	Time	S_o	V	L	Time (T_{SC})	A	H	Q_2	Cum. Q	Z_1	Z_2	Depth	n	A_{ch}	P_{ch}	R	S	V_2	L	Time(T_{CH})		
		(ft)	(in)	(ft/ft)	(min)	(ft/ft)	(cfs)	(ft/s)	(ft)	(min)	(ft/ft)	(ft/s)	(ft)	(min)	(ft/ft)	(ft/s)	(ft)	(min)	(sq mi)	(ft)	(cfs)	(cfs)	ft/ft	ft/ft	(ft)		(sq ft)	(ft)	(ft)		(ft/s)	(ft)	(min)	(min)	(min)
A-1a	0.150	100	3.336	0.0200	9.60										0.088	4.77	1085	3.79	0.035	1.79	2.32	2.32	4.0	4.0	0.45	0.030	0.81	2.55	0.32	0.036	4.39	418	1.59	15.0	8.98
A-1r	0.011	100	3.336	0.0210	1.16	0.021	1.96	2.85	730	4.27	0.005	3.50	50	0.24					0.003														0.00	5.7	3.40
B-1	0.150	140	3.336	0.0320	10.41										0.070	5.38	100	0.31	0.002	1.79	0.20	0.20	20.0	20.0	0.15	0.035	0.45	4.2	0.106	0.056	2.26	320	2.36	13.1	7.84
C-1	0.150	70	3.336	0.0200	7.21										0.110	5.35	700	2.18	0.008	1.82	0.62	0.62	2.0	2.0	0.35	0.030	0.25	1.0	0.247	0.106	6.38	330	0.86	10.3	6.15
C-2	0.150	100	3.336	0.0600	6.18										0.056	3.82	650	2.84	0.018														0.00	9.0	5.41
C-3	0.050	60	3.336	0.1200	1.29										0.005	1.14	385	5.62	0.007	1.79	0.54	0.54	5.0	5.0	0.20	0.030	0.20	1.4	0.141	0.005	0.98	75	1.27	8.2	4.91
C-4a	0.150	100	3.336	0.0500	6.65						0.035	6.87	120	0.29	0.050	3.61	425	1.96	0.004														0.00	8.9	5.34
C-4r	0.011	100	3.336	0.0116	1.48	0.012	2.73	1.36	362	4.44	0.010	2.67	272	1.70					0.004														0.00	7.6	4.57
C-5b	0.150	100	3.336	0.1100	4.85										0.055	3.78	900	3.96	0.021	1.77	1.50	2.66	10.0	10.0	0.42	0.030	1.76	5.9	0.297	0.023	3.33	485	2.43		
																						2.66	5.0	5.0	0.55	0.030	1.51	3.9	0.389	0.029	4.48	1255	4.67		
																																	7.09	15.9	9.55
C-5r	0.011	100	3.336	0.0210	1.16	0.012	3.50	1.48	885	9.97	0.010	2.82	234	1.38					0.005														0.00	12.5	7.51
D-1	0.050	100	3.336	0.0250	3.64										0.072	4.33	310	1.19	0.025	1.80	1.73	1.73	6.0	10.0	0.30	0.030	0.72	3.5	0.206	0.035	3.25	1150	5.90	10.7	6.44
D-2a	0.150	70	3.336	0.1000	3.79										0.064	4.08	580	2.37	0.058	1.79	3.60	5.33	2.0	2.0	0.90	0.030	1.62	2.5	0.636	0.018	4.90	2225	7.57	13.7	8.24
D-2b	0.150	52	3.336	0.5000	1.57														0.003	1.79	0.30	0.30	2.0	2.0	0.90	0.030	1.62	2.5	0.636	0.024	5.69	583	1.71	3.3	1.97
D-3a	0.150	85	3.336	0.1500	3.76										0.037	3.10	380	2.04	0.010	1.80	0.78	0.78	2.0	2.0	0.41	0.030	0.34	1.2	0.290	0.044	4.57	1200	4.37	10.2	6.11
D-3r	0.011	100	3.336	0.0150	1.33	0.026	2.20	1.80	925	8.56	0.010	2.60	323	2.07					0.003														0.00	12.0	7.18
D-3b	0.150	40	3.336	0.5000	1.27										0.025	2.55	420	2.74	0.001														0.00	4.0	2.41
D-4	0.011	100	3.336	0.0200	1.19										0.050	3.61	120	0.55	0.002	1.79	0.20	0.20	2.0	2.0	1.00	0.030	2.00	2.8	0.707	0.015	4.89	130	0.44	2.2	1.31
D-5	0.240	100	3.336	0.0450	10.10										0.061	3.98	555	2.32	0.010	1.78	0.79	0.79	10.0	10.0	0.55	0.040	3.03	7.8	0.389	0.026	3.17	470	2.47	14.9	8.94
E-1a	0.150	100	3.336	0.0700	5.81														0.014	1.80	1.03	1.03	3.0	3.0	0.33	0.030	0.33	1.4	0.233	0.055	4.41	984	3.71	9.5	5.72
E-1r	0.011	115	3.336	0.0210	1.30	0.020	2.77	2.86	735	4.28	0.010	3.80	208	0.91					0.004														0.00	6.5	3.90
E-1b	0.150	75	3.336	0.1500	3.41										0.037	3.10	190	1.02	0.004	1.80	0.34	0.34	3.0	3.0	0.45	0.030	0.61	1.9	0.318	0.080	6.54	1002	2.55	7.0	4.19
E-2	0.050	80	3.336	0.0100	4.40														0.010	1.80	0.75	1.10	1.0	1.0	0.15	0.020	0.02	0.2	0.106	0.036	3.15	730	3.86	8.3	4.96
E-3	0.150	114	3.336	0.0500	7.39										0.080	4.56	50	0.18	0.011	1.79	0.84	1.94	2.0	2.0	0.50	0.030	0.50	1.4	0.354	0.003	1.46	580	6.63	14.2	8.52
F-1a	0.150	100	3.336	0.1370	4.44										0.018	2.16	162	1.25	0.003	1.80	0.27	0.27	5.0	10.0	0.14	0.035	0.15	1.6	0.094	0.016	1.10	193	2.93	8.6	5.18
F-1b	0.150	100	3.336	0.0180	10.01						0.010	7.23	157	0.36	0.012	1.77	326	3.07	0.010	1.80	0.74	0.74	4.0	4.0	0.28	0.030	0.31	1.6	0.198	0.034	3.11	675	3.61	17.1	10.23
F-1c	0.050	100	3.336	0.0200	3.98						0.010	4.53	147	0.54					0.004	1.80	0.32	0.32	4.0	4.0	0.25	0.030	0.25	1.4	0.177	0.013	1.80	453	4.19	8.7	5.23
F-1r	0.011	75	3.336	0.0200	0.94	0.020	0.42	5.50	214	0.65	0.010	3.20	105	0.55					0.001														0.00	2.1	1.28
G-1	0.240	86	3.336	0.0470	8.80										0.110	5.35	410	1.28	0.033	1.80	2.19	2.19	2.0	2.0	0.51	0.030	0.52	1.4	0.361	0.032	4.50	1520	5.63	15.7	9.42
G-2	0.240	86	3.336	0.0500	8.59										0.100	5.10	400	1.31	0.007	1.79	0.54	2.73	2.0	2.0	0.50	0.030	0.50	1.4	0.354	0.223	11.72	220	0.31	10.2	6.12
G-3	0.150	71	3.336	0.0420	5.42										0.116	5.50	388	1.18	0.013	1.78	0.98	0.98	2.0	2.0	0.50	0.030	0.50	1.4	0.354	0.032	4.46	1520	5.68	12.3	7.37

$$T_{sh} = \frac{0.007 \times (nL)^{0.8}}{[(P_2)^{0.5} \times (S)^{0.4}]}$$

Where,
- n = overland flow roughness (TR-55 Table 3-1)
- L = length of overland flow surface
- P_2 = 2-yr, 24 hr rainfall depth (For MAP = 38"/yr, 3.336)
- S = land slope

$$T_{sc} = \frac{L}{V}$$

Where,
- V (unpaved) = $16.1345 \times (S_o)^{0.5}$
- V (paved) = $20.3282 \times (S_o)^{0.5}$
- S_o = land slope

USGS Regional Flood Frequency Equation: $Q_2 = 0.24 \times (A^{0.88}) \times (P^{1.56}) \times (H^{-0.80})$ [Sierra Region]

Where,
- A = Drainage Area (in sq mi)
- P = mean annual precipitation= 38 in/year
- H = altitude index (in thousands ft.)
- $V_2 = (1.49/n) \times (R^{(2/3)}) \times (S^{0.5})$

Where,
- n = Mannings coefficient "n"
- Z_1, Z_2 = Left/Right v-ditch side slopes
- $R = A_{ch} / P_{ch}$ (A_{ch} = Channel Area)
- S = land slope (P_{ch} = Wetted Perimeter)

$T_C = T_{SH} + T_{SC} + T_{CH}$

Lag = 0.6 Tc

X. APPENDIX C: REFERENCES

El Dorado Design Rainfall

Rainfall Depth in Inches for Return Period = 10 years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hrs	3 Hrs	6 Hrs	12 Hrs	24 Hrs
20	0.167	0.239	0.295	0.422	0.603	0.863	1.065	1.524	2.180	3.120
22	0.177	0.254	0.313	0.448	0.640	0.916	1.130	1.617	2.314	3.311
24	0.188	0.269	0.332	0.475	0.679	0.972	1.198	1.715	2.454	3.511
26	0.199	0.284	0.350	0.502	0.718	1.027	1.267	1.812	2.594	3.711
28	0.209	0.300	0.369	0.529	0.756	1.082	1.335	1.910	2.733	3.911
30	0.220	0.315	0.388	0.556	0.795	1.138	1.403	2.008	2.873	4.111
32	0.231	0.330	0.407	0.583	0.834	1.193	1.471	2.105	3.013	4.311
34	0.241	0.345	0.426	0.610	0.872	1.248	1.540	2.203	3.153	4.511
36	0.252	0.361	0.445	0.637	0.911	1.304	1.608	2.301	3.292	4.711
38	0.263	0.376	0.464	0.664	0.950	1.359	1.676	2.398	3.432	4.911
40	0.274	0.391	0.483	0.691	0.988	1.414	1.744	2.496	3.572	5.111
42	0.284	0.407	0.502	0.718	1.027	1.470	1.813	2.594	3.712	5.311
44	0.295	0.422	0.520	0.745	1.066	1.525	1.881	2.691	3.851	5.511
46	0.306	0.437	0.539	0.772	1.104	1.580	1.949	2.789	3.991	5.711
48	0.316	0.453	0.558	0.799	1.143	1.636	2.017	2.887	4.131	5.911
50	0.327	0.468	0.577	0.826	1.182	1.691	2.086	2.984	4.271	6.111
52	0.338	0.483	0.596	0.853	1.221	1.747	2.154	3.082	4.410	6.311
54	0.348	0.499	0.615	0.880	1.259	1.802	2.222	3.180	4.550	6.511
56	0.359	0.514	0.634	0.907	1.298	1.857	2.290	3.277	4.690	6.711
58	0.370	0.529	0.653	0.934	1.337	1.913	2.359	3.375	4.830	6.911
60	0.381	0.545	0.672	0.961	1.375	1.968	2.427	3.473	4.969	7.111
62	0.391	0.560	0.690	0.988	1.414	2.023	2.495	3.570	5.109	7.311
64	0.402	0.575	0.709	1.015	1.453	2.079	2.563	3.668	5.249	7.511
66	0.413	0.591	0.728	1.042	1.491	2.134	2.632	3.766	5.389	7.711
68	0.423	0.606	0.747	1.069	1.530	2.189	2.700	3.863	5.528	7.911
70	0.434	0.621	0.766	1.096	1.569	2.245	2.768	3.961	5.668	8.111
72	0.445	0.636	0.785	1.123	1.607	2.300	2.836	4.059	5.808	8.311
74	0.455	0.652	0.804	1.150	1.646	2.355	2.905	4.156	5.948	8.511
76	0.466	0.667	0.823	1.177	1.685	2.411	2.973	4.254	6.087	8.711
78	0.477	0.682	0.842	1.204	1.723	2.466	3.041	4.352	6.227	8.911
80	0.488	0.698	0.860	1.231	1.762	2.521	3.109	4.449	6.367	9.111
82	0.498	0.713	0.879	1.258	1.801	2.577	3.178	4.547	6.507	9.311
84	0.509	0.728	0.898	1.285	1.839	2.632	3.246	4.645	6.646	9.511
86	0.520	0.744	0.917	1.312	1.878	2.687	3.314	4.742	6.786	9.711
88	0.530	0.759	0.936	1.339	1.917	2.743	3.382	4.840	6.926	9.911
90	0.541	0.774	0.955	1.366	1.955	2.798	3.451	4.938	7.066	10.111

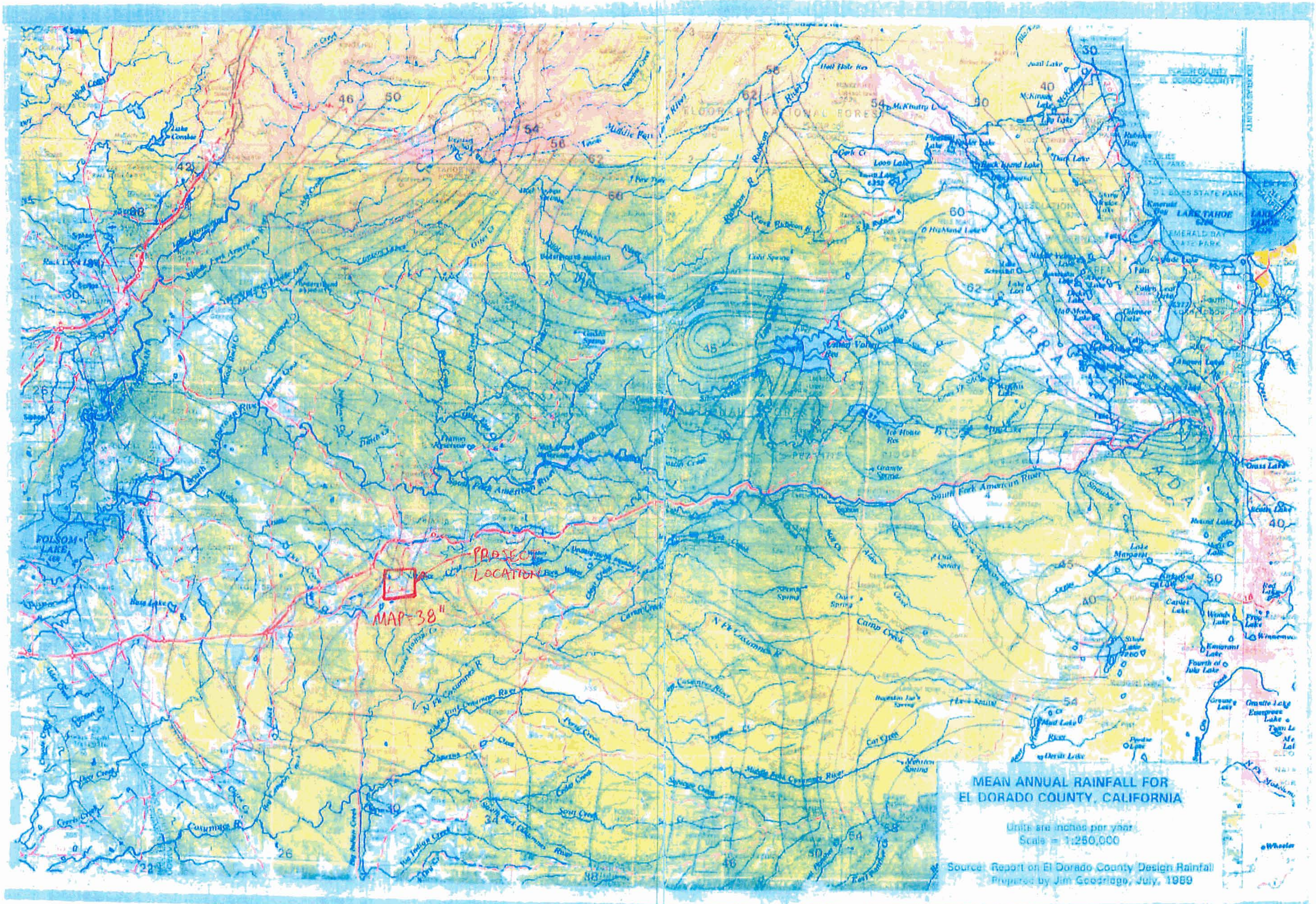
Source: Design Rainfall Tables for El Dorado County, prepared by Jim Goodridge, July 29, 1989

El Dorado Design Rainfall

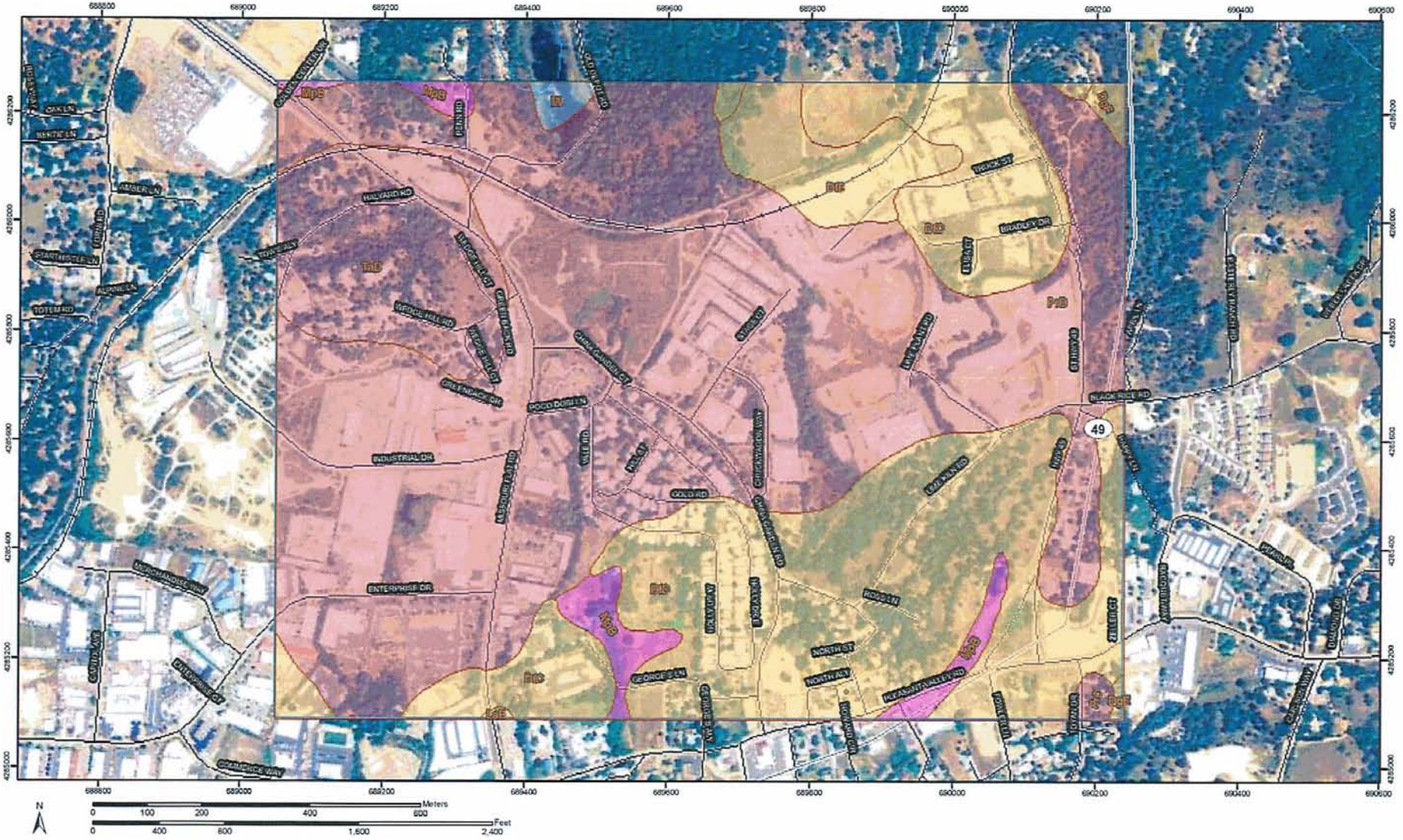
Rainfall Depth in Inches for Return Period = 100 years

Mean Annual Precipitation	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hrs	3 Hrs	6 Hrs	12 Hrs	24 Hrs
20	0.237	0.339	0.418	0.598	0.855	1.224	1.509	2.160	3.091	4.423
22	0.251	0.359	0.443	0.634	0.908	1.299	1.602	2.292	3.280	4.694
24	0.266	0.381	0.470	0.673	0.963	1.377	1.699	2.431	3.478	4.977
26	0.282	0.403	0.497	0.711	1.017	1.456	1.795	2.569	3.676	5.261
28	0.297	0.425	0.524	0.749	1.072	1.534	1.892	2.708	3.874	5.544
30	0.312	0.446	0.550	0.788	1.127	1.613	1.989	2.846	4.073	5.828
32	0.327	0.468	0.577	0.826	1.182	1.691	2.086	2.984	4.271	6.111
34	0.342	0.490	0.604	0.864	1.237	1.770	2.182	3.123	4.469	6.395
36	0.357	0.511	0.631	0.903	1.291	1.848	2.279	3.261	4.667	6.678
38	0.373	0.533	0.657	0.941	1.346	1.927	2.376	3.400	4.865	6.962
40	0.388	0.555	0.684	0.979	1.401	2.005	2.473	3.538	5.063	7.245
42	0.403	0.577	0.711	1.017	1.456	2.083	2.569	3.677	5.261	7.529
44	0.418	0.598	0.738	1.056	1.511	2.162	2.666	3.815	5.459	7.812
46	0.433	0.620	0.765	1.094	1.566	2.240	2.763	3.954	5.657	8.096
48	0.448	0.642	0.791	1.132	1.620	2.319	2.860	4.092	5.856	8.379
50	0.464	0.663	0.818	1.171	1.675	2.397	2.956	4.230	6.054	8.663
52	0.479	0.685	0.845	1.209	1.730	2.476	3.053	4.369	6.252	8.946
54	0.494	0.707	0.872	1.247	1.785	2.554	3.150	4.507	6.450	9.230
56	0.509	0.729	0.898	1.286	1.840	2.633	3.247	4.646	6.648	9.513
58	0.524	0.750	0.925	1.324	1.895	2.711	3.343	4.784	6.846	9.797
60	0.539	0.772	0.952	1.362	1.949	2.790	3.440	4.923	7.044	10.080
62	0.555	0.794	0.979	1.401	2.004	2.868	3.537	5.061	7.242	10.364
64	0.570	0.815	1.006	1.439	2.059	2.946	3.634	5.200	7.440	10.647
66	0.585	0.837	1.032	1.477	2.114	3.025	3.730	5.338	7.639	10.931
68	0.600	0.859	1.059	1.516	2.169	3.103	3.827	5.476	7.837	11.214
70	0.615	0.881	1.086	1.544	2.223	3.182	3.924	5.615	8.035	11.498
72	0.630	0.902	1.113	1.592	2.278	3.260	4.021	5.753	8.233	11.781
74	0.646	0.924	1.139	1.630	2.333	3.339	4.117	5.892	8.431	12.064
76	0.661	0.946	1.166	1.669	2.388	3.417	4.214	6.030	8.629	12.348
78	0.676	0.967	1.193	1.707	2.443	3.496	4.311	6.169	8.827	12.631
80	0.691	0.989	1.220	1.745	2.498	3.574	4.408	6.307	9.025	12.915
82	0.706	1.011	1.246	1.784	2.552	3.652	4.504	6.446	9.223	13.198
84	0.722	1.032	1.273	1.822	2.607	3.731	4.601	6.584	9.421	13.482
86	0.737	1.054	1.300	1.860	2.662	3.809	4.698	6.722	9.620	13.765
88	0.752	1.076	1.327	1.899	2.717	3.888	4.795	6.861	9.818	14.049
90	0.767	1.098	1.354	1.937	2.772	3.966	4.891	6.999	10.016	14.332

Source: Design Rainfall Tables for El Dorado County, prepared by Jim Goodridge, July 29, 1989


MEAN ANNUAL RAINFALL FOR
EL DORADO COUNTY, CALIFORNIA
Units are inches per year
Scale = 1:250,000
Source: Report on El Dorado County Design Rainfall
Prepared by Jim Goodridge, July, 1989
PROJECT LOCATION
MAP-38"
LAKE TAHOE
FOLSOM LAKE
South Fork American River
Camp Creek

Hydrologic Soil Group—El Dorado Area, California
(Diamond Springs Parkway)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Dorado Area, California
Survey Area Data: Version 4, Dec 14, 2007

Date(s) aerial images were photographed: 5/9/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — El Dorado Area, California				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DfB	Diamond Springs very fine sandy loam, 3 to 9 percent slopes	C	15.3	3.4%
DfC	Diamond Springs very fine sandy loam, 9 to 15 percent slopes	C	132.3	29.8%
DgE	Diamond Springs very rocky very fine sandy loam, 3 to 50 percent slopes	C	1.7	0.4%
LaB	Loamy alluvial land	C	0.2	0.1%
MpB	Mixed alluvial land	D	10.4	2.3%
PrD	Placer diggings	A	248.3	55.9%
TaD	Tailings	A	34.2	7.7%
W	Water		1.8	0.4%
Totals for Area of Interest (AOI)			444.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area [2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

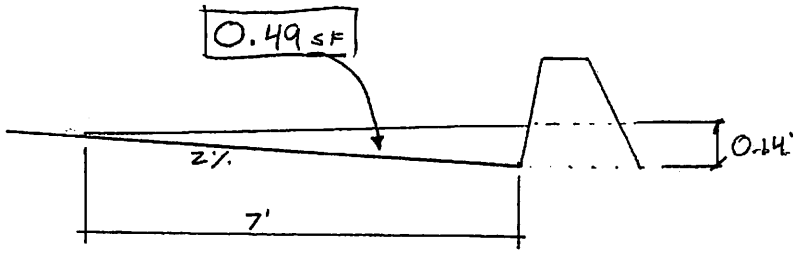
[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2]	A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

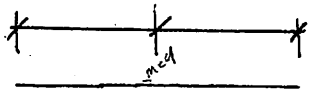
1 Average runoff condition, and I_a = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

XI. APPENDIX D: HYDRAULICS



$0.49\ SF \cdot \frac{1\ LF}{LF} = 0.49\ CF/LF$

Cross Sectional Drainage Area



$W = 80'$ $W/2 = 40$

$Q = C i A$

$C = 0.98$

$A = L \cdot W$

$A = 40\ LF \cdot 1\ unit\ ft = 40\ SF/LF$ of Roadway

↳ 0.00092 Acres

Storm Event 100yr	i (in rainfall)	C	A acres	Q CFS/LF	L_{max} LF
1 hr	1.346	0.98	0.00087	0.00115	1020
30 min	(0.941)x2	0.98	0.00087	0.0016	731
15 min	(0.657)x4	0.98	0.00087	0.0022	532

At 1.5% road slope and 2% cross slope the maximum flow rate is 1.17 cfs as calculated by FlowMaster.

$Q\ max = 1.17$

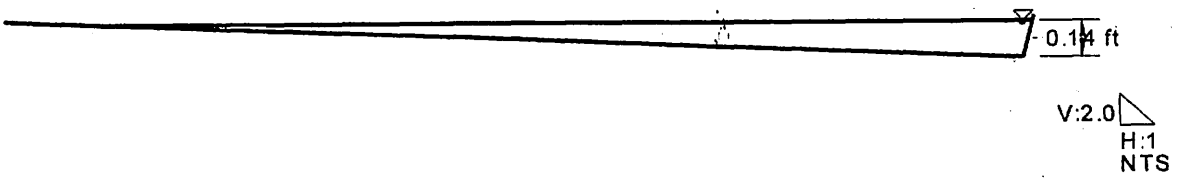
The maximum length of Parkway that can be drained with out introducing curb-water closer than 1 foot from the traveled way is calculated as follows: using dimensional analysis.
100 yr 1 hr event.

$$1.17 \frac{CF}{S} \times \frac{\text{LF of Roadway}}{0.0015 \cdot CF/S} = 1020 \text{ LF}$$

Cross Section
Cross Section for Triangular Channel

Project Description	
Worksheet	PKWY Curb
Flow Element	Triangular Char
Method	Manning's Forr
Solve For	Discharge

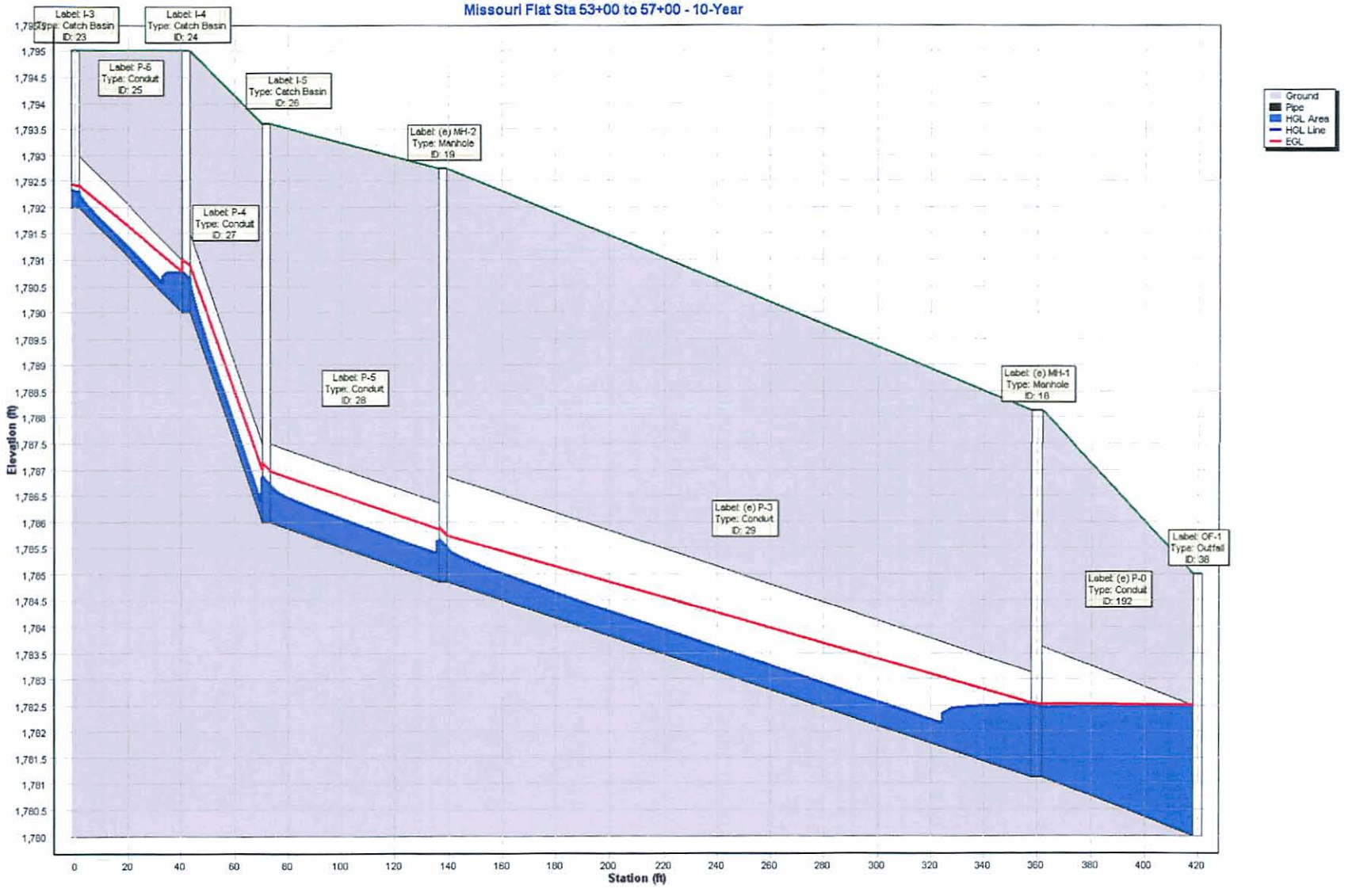
Section Data		
Mannings Coeffic	0.013	
Slope	015000	ft/ft
Depth	0.14	ft
Left Side Slope	0.02	V : H
Right Side Slope	2.00	V : H
Discharge	1.17	cfs

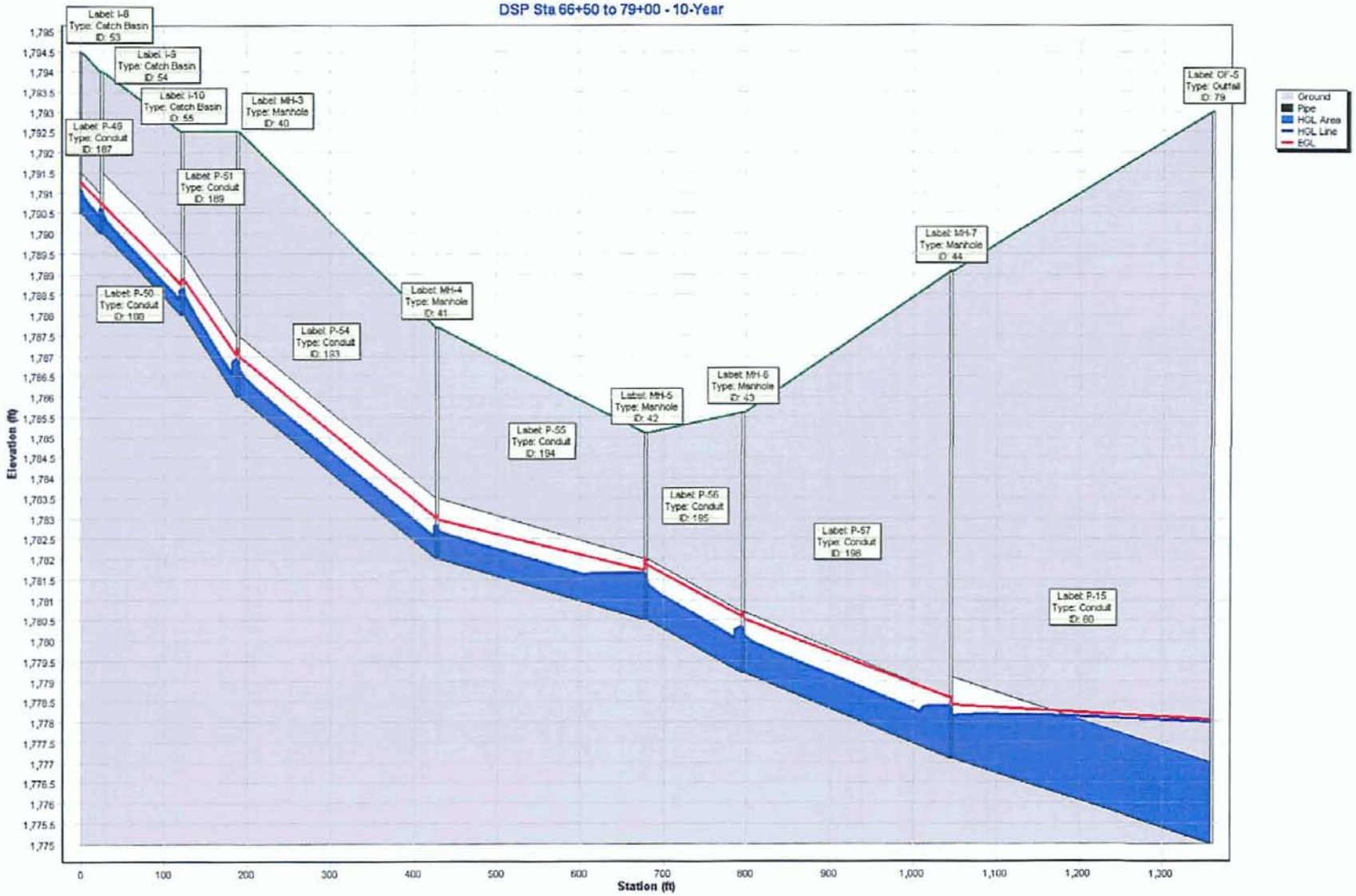


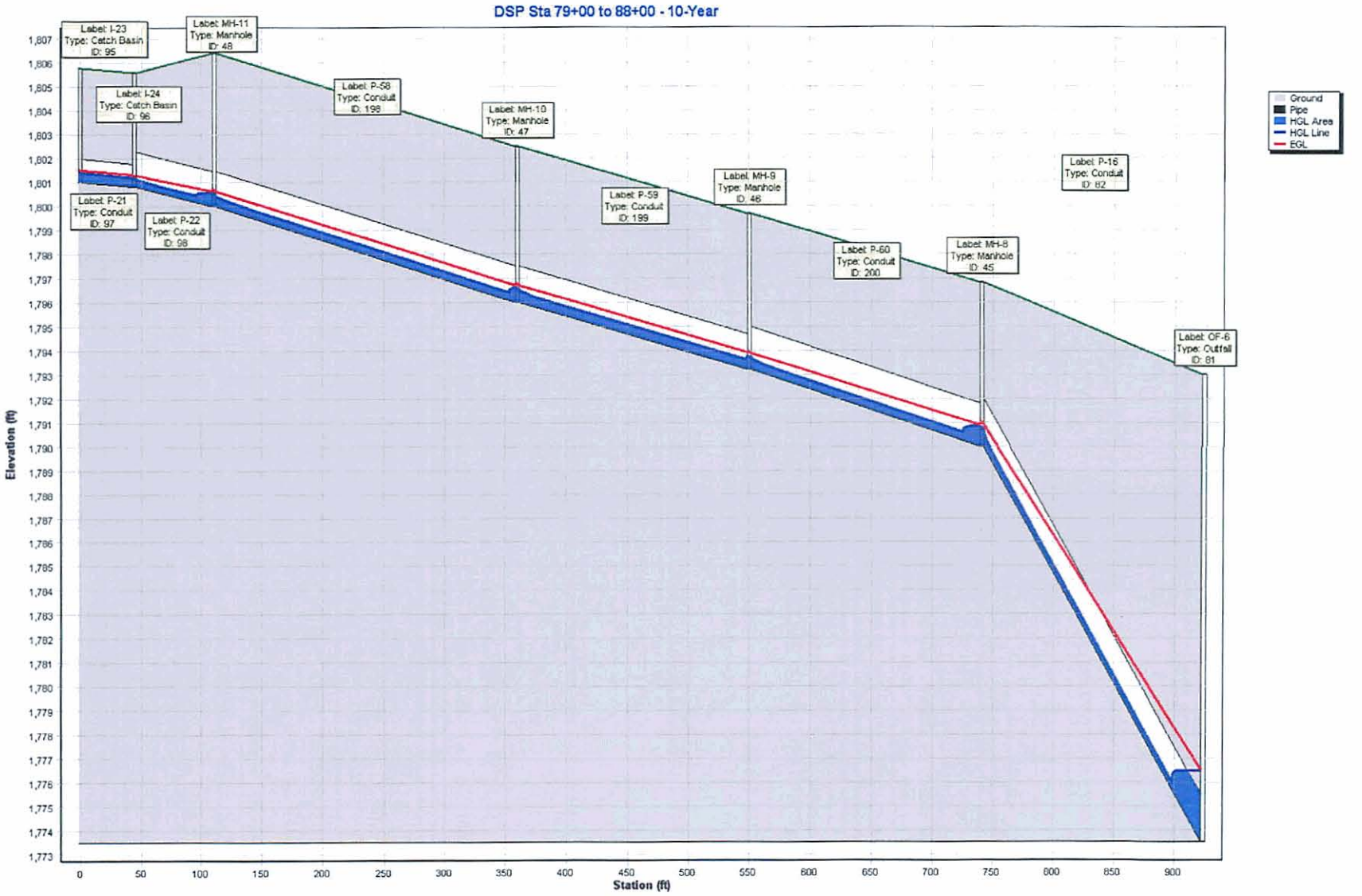
Cooper Thorne & Assoc Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

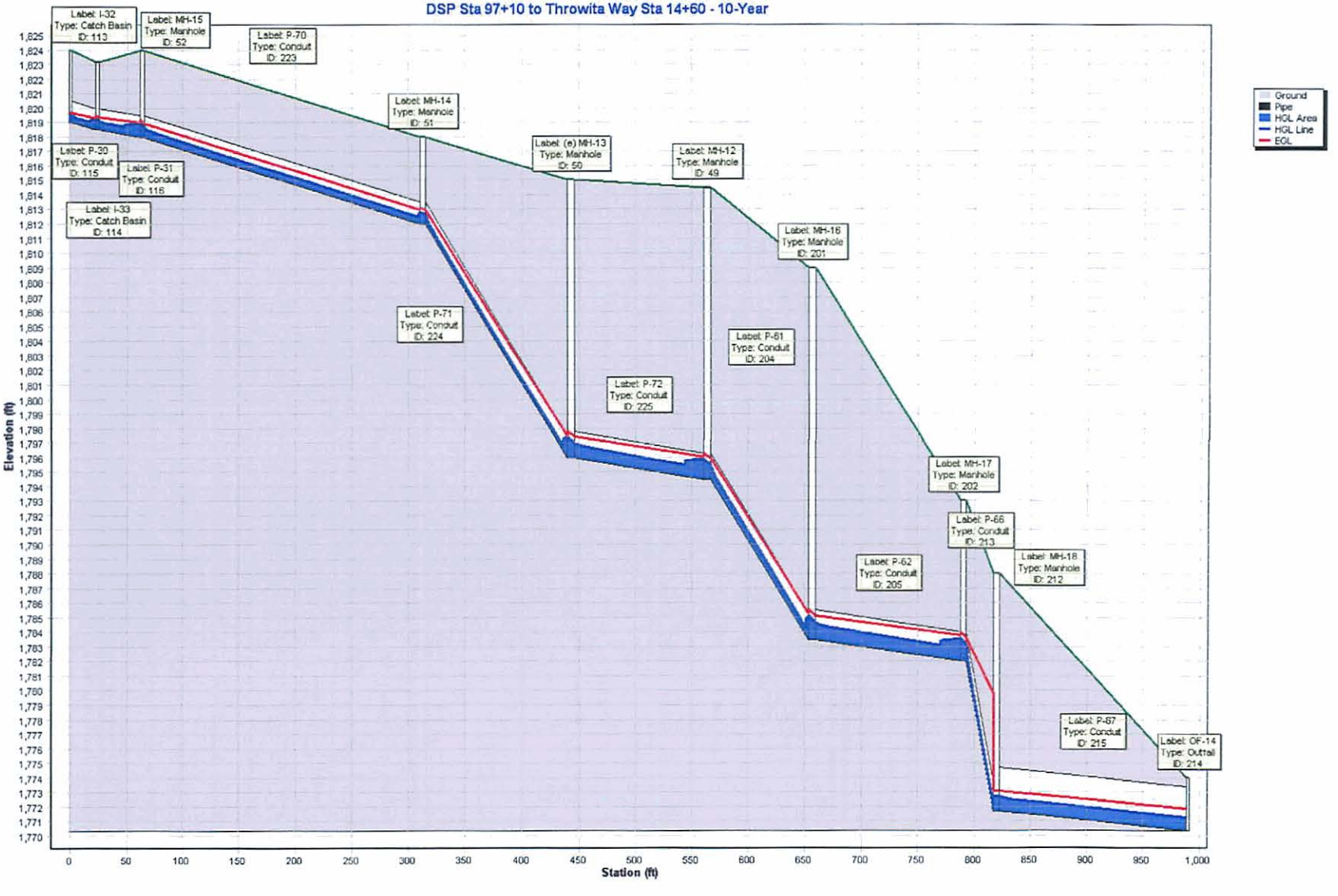
Diamond Springs Parkway
Conduit Report - 10 Year

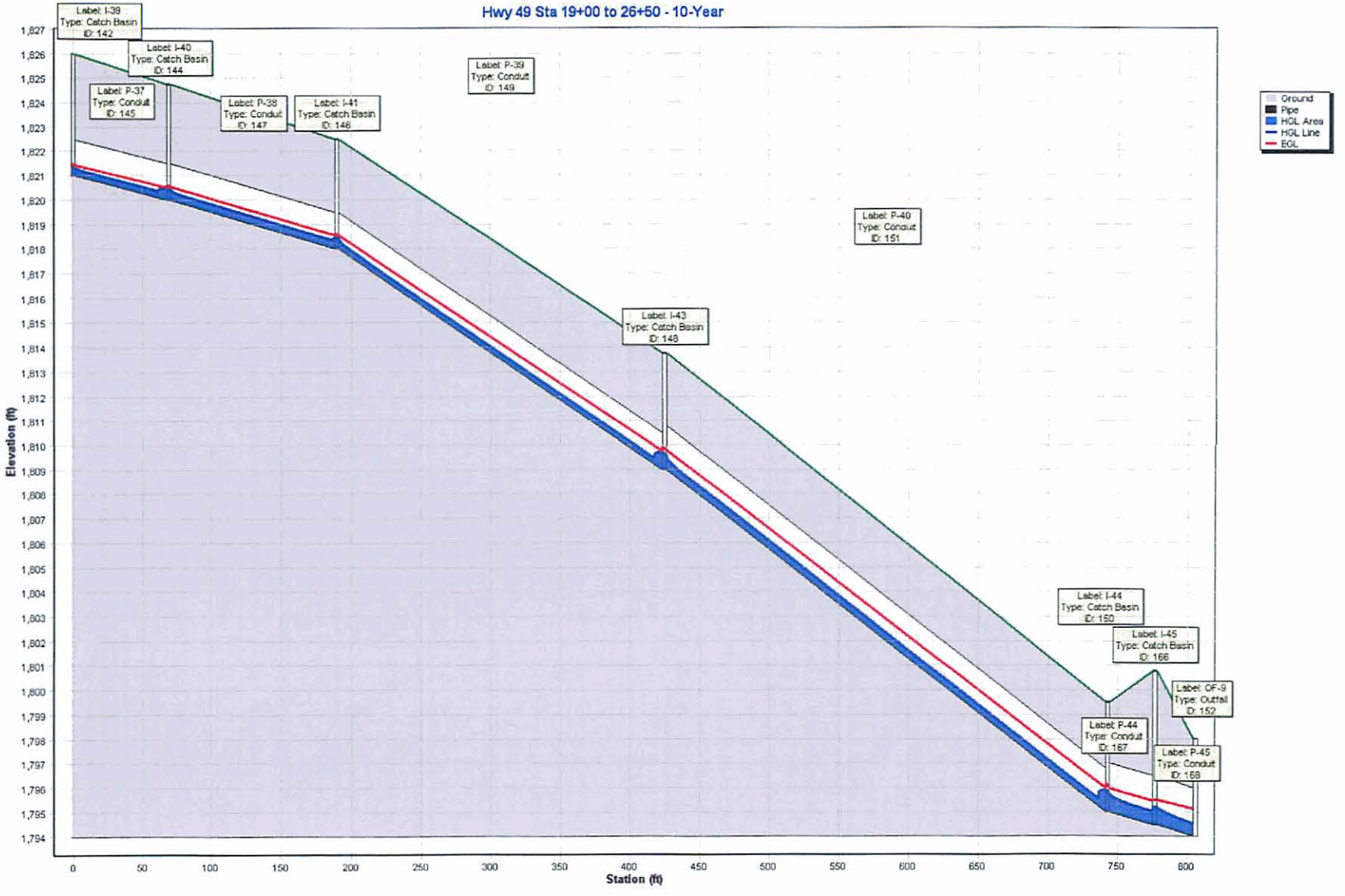
Label	Diameter (in)	Start Node	Invert (Upstream) (ft)	Stop Node	Invert (Downstream) (ft)	Upstream CA (acres)	System Intensity (in/hr)	Flow (ft³/s)	Length (Unified) (ft)	Slope (ft/ft)	Capacity (Full Flow) (ft³/s)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
(e) P-1	12	(e) I-1	1,783.07	(e) MH-1	1,781.13	0.483	3.028	1.47	39	0.050	7.95	1,783.58	1,782.52
P-6	12	I-3	1,791.00	I-4	1,790.50	0.505	1.855	0.94	37	0.014	4.14	1,791.41	1,790.82
P-4	18	I-4	1,790.00	I-5	1,789.60	1.936	1.679	3.28	32	0.013	11.74	1,790.69	1,790.53
P-5	18	I-5	1,789.60	(e) MH-2	1,785.37	2.309	1.676	3.90	65	0.065	26.80	1,790.36	1,785.76
(e) P-3	24	(e) MH-2	1,784.87	(e) MH-1	1,781.63	2.309	1.672	3.89	222	0.015	27.33	1,785.56	1,782.52
P-9	12	I-13	1,790.00	OF-4	1,789.50	0.242	2.688	0.66	40	0.013	3.98	1,790.49	1,790.50
P-10	12	I-14	1,780.11	MH-5	1,779.00	0.996	2.056	2.06	26	0.043	7.36	1,780.72	1,779.91
P-11	12	I-15	1,780.11	MH-5	1,779.50	0.933	2.056	1.93	56	0.011	3.72	1,780.70	1,780.01
P-16	18	MH-8	1,792.20	OF-6	1,782.50	1.225	2.083	2.57	283	0.034	19.45	1,792.81	1,784.00
P-17	12	I-19	1,793.10	MH-8	1,792.70	0.645	2.096	1.36	40	0.010	3.56	1,793.59	1,793.13
P-18	12	I-20	1,793.10	MH-8	1,792.70	0.58	2.096	1.23	40	0.010	3.56	1,793.57	1,793.10
P-27	18	I-29	1,808.00	(e) MH-13	1,796.00	0.807	2.885	2.35	7	1.714	137.53	1,808.58	1,797.58
P-29	12	I-31	1,808.00	MH-12	1,794.50	0.618	2.885	1.80	60	0.225	16.90	1,808.57	1,796.15
P-33	30	I-35	1,825.00	I-36	1,824.00	0.108	3.154	0.34	82	0.012	45.29	1,833.63	1,833.63
P-34	18	I-36	1,824.00	OF-7	1,823.88	0.13	3.064	0.40	11	0.011	10.97	1,824.23	1,824.08
P-35	12	I-37	1,827.00	OF-8	1,826.50	0.079	3.154	0.25	25	0.020	5.04	1,827.21	1,826.65
P-37	18	I-39	1,822.80	I-40	1,822.00	0.287	3.154	0.91	66	0.012	11.56	1,823.16	1,822.50
P-38	18	I-40	1,822.00	I-41	1,819.10	0.405	3.103	1.27	108	0.027	17.21	1,822.42	1,819.59
P-39	18	I-41	1,819.10	I-43	1,810.15	0.405	3.047	1.24	235	0.038	20.50	1,819.52	1,810.63
P-40	21	I-43	1,809.90	I-44	1,795.95	1.307	1.855	2.44	304	0.046	33.94	1,810.47	1,797.05
P-42	12	I-42	1,811.15	I-43	1,810.65	0.101	3.154	0.32	77	0.006	2.87	1,811.38	1,810.88
P-7	18	I-7	1,779.50	MH-6	1,774.00	5.459	1.552	8.54	81	0.068	27.37	1,780.63	1,775.48
P-44	24	I-44	1,795.70	I-45	1,795.20	2.25	1.82	4.13	81	0.006	17.77	1,797.01	1,797.00
P-45	24	I-45	1,795.20	OF-9	1,795.00	2.291	1.809	4.18	20	0.010	22.62	1,797.00	1,797.00
P-46	12	I-47	1,787.90	I-48	1,787.50	1.032	1.855	1.93	73	0.005	2.64	1,788.54	1,788.09
P-47	18	I-48	1,787.00	OF-11	1,786.50	1.075	1.843	2.00	48	0.010	10.72	1,787.53	1,786.94
(e) P-48	12	(e) I-6	1,799.00	(e) OF-2	1,798.50	0.501	1.855	0.94	42	0.012	3.89	1,799.41	1,798.83
P-49	12	I-8	1,791.00	I-9	1,790.50	0.66	2.688	1.79	25	0.020	5.04	1,791.57	1,790.92
P-50	18	I-9	1,790.00	I-10	1,788.00	0.76	2.675	2.05	97	0.021	15.08	1,790.54	1,788.66
P-51	18	I-10	1,788.00	MH-3	1,786.00	1.135	2.626	3.00	67	0.030	18.15	1,788.66	1,786.97
P-52	12	I-11	1,790.00	MH-3	1,788.00	0.29	2.688	0.79	105	0.038	6.95	1,790.37	1,786.97
(e) P-0	30	(e) MH-1	1,781.13	OF-1	1,780.00	3.023	1.651	5.03	60	0.019	56.29	1,782.48	1,782.50
P-56	18	MH-5	1,779.00	MH-6	1,774.50	1.93	2.04	3.97	178	0.025	16.70	1,779.76	1,775.48
P-61	21	MH-12	1,794.50	MH-16	1,783.50	4.588	2.28	10.55	87	0.126	56.34	1,795.71	1,785.38
P-62	24	MH-16	1,783.50	MH-17	1,782.00	6.146	2.245	13.91	134	0.011	23.93	1,784.84	1,783.81
P-64	12	I-50	1,803.00	MH-16	1,783.50	0.043	3.154	0.14	22	0.886	33.54	1,803.15	1,785.38
P-65	18	(e) I-51	1,784.00	MH-16	1,783.50	1.515	2.257	3.45	47	0.011	10.83	1,785.43	1,785.38
P-66	24	MH-17	1,782.00	MH-18	1,771.71	6.146	2.223	13.77	35	0.294	122.66	1,783.34	1,772.21
P-67	36	MH-18	1,771.71	OF-14	1,770.39	6.146	2.221	13.76	166	0.008	59.47	1,772.89	1,771.37
P-68	24	I-52	1,768.71	I-53	1,767.22	6.418	1.673	10.82	98	0.015	27.89	1,769.89	1,768.64
P-69	24	I-53	1,767.22	OF-15	1,759.00	6.418	1.666	10.78	265	0.031	39.84	1,768.40	1,759.71
P-72	21	(e) MH-13	1,796.00	MH-12	1,794.50	3.969	2.329	9.32	121	0.012	17.64	1,797.14	1,796.15
(e) P-2	12	(e) I-2	1,783.00	(e) MH-1	1,781.13	0.231	3.154	0.73	53	0.035	6.69	1,783.36	1,782.52
P-76	24	MH-6	1,774.00	OF-10	1,768.00	7.388	1.549	11.53	67	0.090	67.69	1,775.22	1,768.57
P-79	18	I-12	1,785.10	MH-19	1,784.50	0.529	2.454	1.31	60	0.010	10.50	1,785.53	1,785.34
P-80	18	MH-19	1,784.50	OF-3	1,783.80	1.954	2.41	4.75	66	0.011	10.82	1,785.34	1,785.30
P-81	18	MH-3	1,786.00	MH-19	1,784.50	1.425	2.6	3.73	108	0.014	12.38	1,786.74	1,785.34
P-83	12	I-38	1,827.92	OF-16	1,826.50	6.072	1.781	10.90	157	0.009	3.39	1,842.20	1,827.50
P-84	12	I-57	1,800.00	I-56	1,796.70	0.37	3.154	1.18	123	0.027	5.84	1,800.46	1,800.05
P-85	12	I-56	1,796.70	(e) MH-13	1,796.00	3.163	2.347	7.48	56	0.013	3.98	1,800.05	1,797.58
P-86	18	I-58	1,819.40	OF-19	1,812.00	0.83	2.49	2.08	147	0.050	23.57	1,819.94	1,812.30


Missouri Flat Sta 53+00 to 57+00 - 10-Year
Label: I-3
Type: Catch Basin
ID: 23
Label: I-4
Type: Catch Basin
ID: 24
Label: P-6
Type: Conduit
ID: 25
Label: I-5
Type: Catch Basin
ID: 26
Label: (e) MH-2
Type: Manhole
ID: 19
Label: P-4
Type: Conduit
ID: 27
Label: P-5
Type: Conduit
ID: 28
Label: (e) MH-1
Type: Manhole
ID: 18
Label: (e) P-3
Type: Conduit
ID: 29
Label: OF-1
Type: Outfall
ID: 38
Label: (e) P-0
Type: Conduit
ID: 192
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)


DSP Sta 66+50 to 79+00 - 10-Year
Label: I-8
Type: Catch Basin
ID: 53
Label: I-9
Type: Catch Basin
ID: 54
Label: I-10
Type: Catch Basin
ID: 55
Label: MH-3
Type: Manhole
ID: 40
Label: P-49
Type: Conduit
ID: 187
Label: P-51
Type: Conduit
ID: 189
Label: P-50
Type: Conduit
ID: 188
Label: P-54
Type: Conduit
ID: 193
Label: MH-4
Type: Manhole
ID: 41
Label: P-55
Type: Conduit
ID: 194
Label: MH-5
Type: Manhole
ID: 42
Label: P-56
Type: Conduit
ID: 195
Label: MH-6
Type: Manhole
ID: 43
Label: P-57
Type: Conduit
ID: 196
Label: MH-7
Type: Manhole
ID: 44
Label: P-15
Type: Conduit
ID: 60
Label: OF-5
Type: Outfall
ID: 79
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)
1,795
1,794.5
1,794
1,793.5
1,793
1,792.5
1,792
1,791.5
1,791
1,790.5
1,790
1,789.5
1,789
1,788.5
1,788
1,787.5
1,787
1,786.5
1,786
1,785.5
1,785
1,784.5
1,784
1,783.5
1,783
1,782.5
1,782
1,781.5
1,781
1,780.5
1,780
1,779.5
1,779
1,778.5
1,778
1,777.5
1,777
1,776.5
1,776
1,775.5
1,775
0
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300

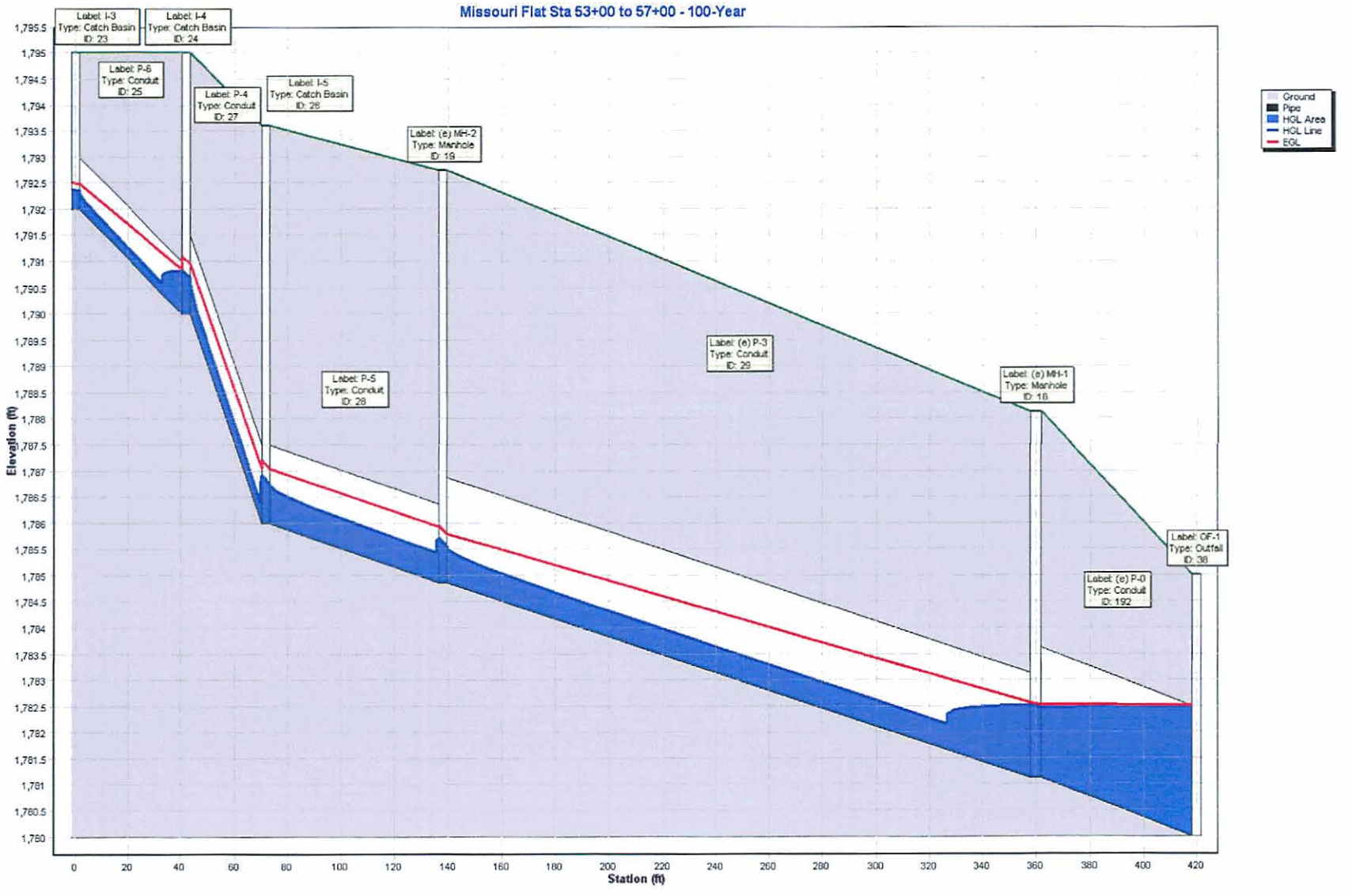

DSP Sta 79+00 to 88+00 - 10-Year
Label: I-23
Type: Catch Basin
ID: 95
Label: MH-11
Type: Manhole
ID: 48
Label: I-24
Type: Catch Basin
ID: 96
Label: P-58
Type: Conduit
ID: 198
Label: MH-10
Type: Manhole
ID: 47
Label: P-21
Type: Conduit
ID: 97
Label: P-22
Type: Conduit
ID: 98
Label: P-59
Type: Conduit
ID: 199
Label: MH-9
Type: Manhole
ID: 46
Label: P-16
Type: Conduit
ID: 82
Label: P-60
Type: Conduit
ID: 200
Label: MH-8
Type: Manhole
ID: 45
Label: OF-6
Type: Outfall
ID: 81
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
1,807
1,806
1,805
1,804
1,803
1,802
1,801
1,800
1,799
1,798
1,797
1,796
1,795
1,794
1,793
1,792
1,791
1,790
1,789
1,788
1,787
1,786
1,785
1,784
1,783
1,782
1,781
1,780
1,779
1,778
1,777
1,776
1,775
1,774
1,773
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
Station (ft)

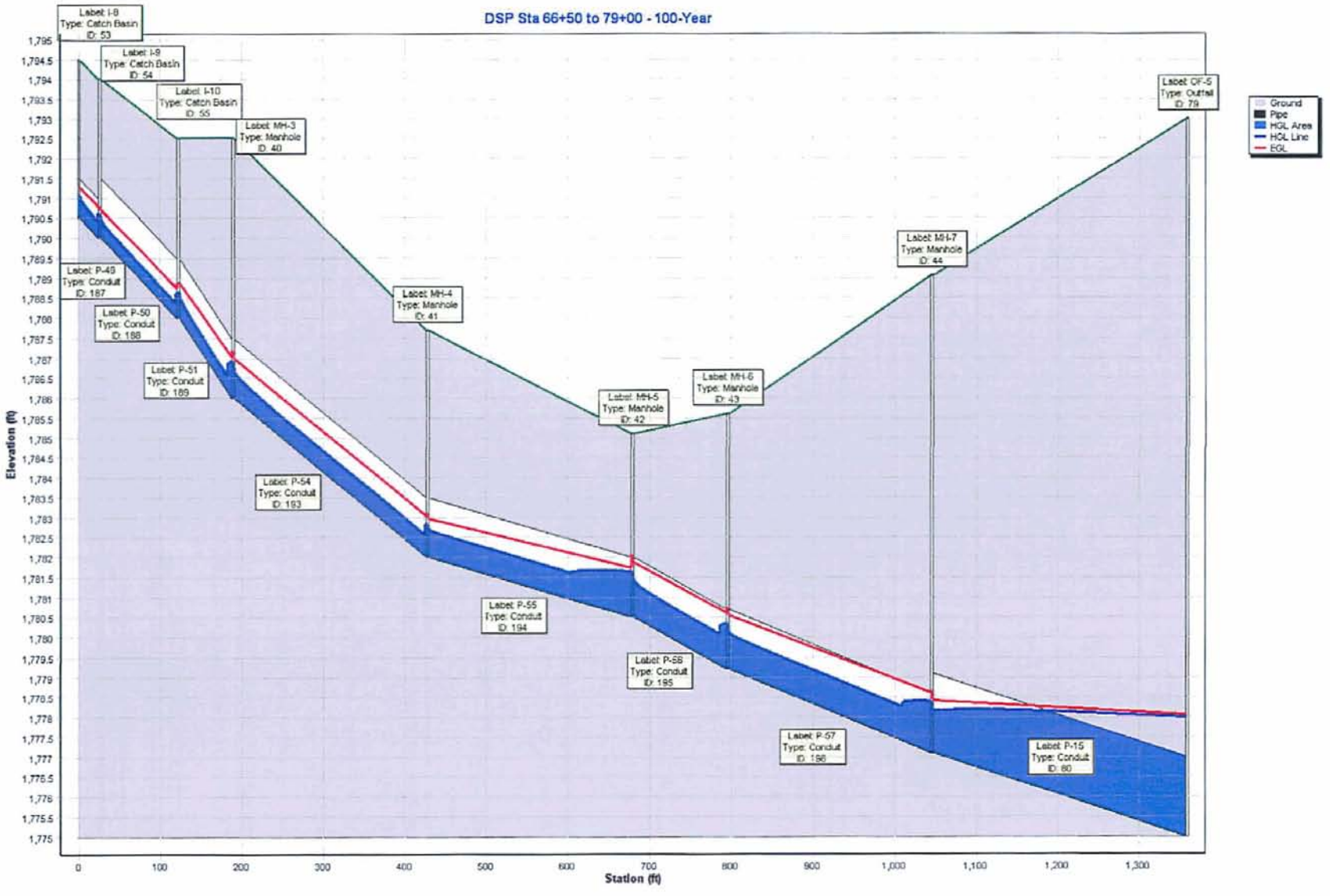

DSP Sta 97+10 to Throwita Way Sta 14+60 - 10-Year
Label: I-32
Type: Catch Basin
ID: 113
Label: MH-15
Type: Manhole
ID: 52
Label: P-70
Type: Conduit
ID: 223
Label: MH-14
Type: Manhole
ID: 51
Label: (e) MH-13
Type: Manhole
ID: 50
Label: MH-12
Type: Manhole
ID: 49
Label: MH-16
Type: Manhole
ID: 201
Label: P-30
Type: Conduit
ID: 115
Label: P-31
Type: Conduit
ID: 116
Label: I-33
Type: Catch Basin
ID: 114
Label: P-71
Type: Conduit
ID: 224
Label: P-72
Type: Conduit
ID: 225
Label: P-61
Type: Conduit
ID: 204
Label: MH-17
Type: Manhole
ID: 202
Label: P-66
Type: Conduit
ID: 213
Label: MH-18
Type: Manhole
ID: 212
Label: P-62
Type: Conduit
ID: 205
Label: P-67
Type: Conduit
ID: 215
Label: OF-14
Type: Outfall
ID: 214
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)


Hwy 49 Sta 19+00 to 26+50 - 10-Year
Label: I-39
Type: Catch Basin
ID: 142
Label: I-40
Type: Catch Basin
ID: 144
Label: P-37
Type: Conduit
ID: 145
Label: P-38
Type: Conduit
ID: 147
Label: I-41
Type: Catch Basin
ID: 146
Label: P-39
Type: Conduit
ID: 149
Label: P-40
Type: Conduit
ID: 151
Label: I-43
Type: Catch Basin
ID: 148
Label: I-44
Type: Catch Basin
ID: 150
Label: I-45
Type: Catch Basin
ID: 166
Label: OF-9
Type: Outfall
ID: 152
Label: P-44
Type: Conduit
ID: 167
Label: P-45
Type: Conduit
ID: 168
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
1,827
1,826
1,825
1,824
1,823
1,822
1,821
1,820
1,819
1,818
1,817
1,816
1,815
1,814
1,813
1,812
1,811
1,810
1,809
1,808
1,807
1,806
1,805
1,804
1,803
1,802
1,801
1,800
1,799
1,798
1,797
1,796
1,795
1,794
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
Station (ft)

Diamond Springs Parkway
Conduit Report - 100Year

Label	Diameter (in)	Start Node	Invert (Upstream) (ft)	Stop Node	Invert (Downstream) (ft)	Upstream CA (acres)	System Intensity (in/hr)	Flow (ft³/s)	Length (Unified) (ft)	Slope (ft/ft)	Capacity (Full Flow) (ft³/s)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
(e) P-1	12	(e) I-1	1,783.07	(e) MH-1	1,781.13	0.483	4.293	2.09	39	0.050	7.95	1,783.69	1,782.54
P-6	12	I-3	1,791.00	I-4	1,790.50	0.505	2.63	1.34	37	0.014	4.14	1,791.49	1,791.00
P-4	18	I-4	1,790.00	I-5	1,789.60	1.936	2.381	4.65	32	0.013	11.74	1,790.83	1,790.74
P-5	18	I-5	1,789.60	(e) MH-2	1,785.37	2.309	2.376	5.53	65	0.065	26.80	1,790.51	1,785.83
(e) P-3	24	(e) MH-2	1,784.87	(e) MH-1	1,781.63	2.309	2.372	5.52	222	0.015	27.33	1,785.70	1,782.54
P-9	12	I-13	1,790.00	OF-4	1,789.50	0.242	3.81	0.93	40	0.013	3.98	1,790.46	1,790.50
P-10	12	I-14	1,780.11	MH-5	1,779.00	0.996	2.914	2.93	26	0.043	7.36	1,780.84	1,780.11
P-11	12	I-15	1,780.11	MH-5	1,779.50	0.933	2.914	2.74	56	0.011	3.72	1,780.82	1,780.14
P-16	18	MH-8	1,792.20	OF-6	1,782.50	1.225	2.955	3.65	283	0.034	19.45	1,792.93	1,784.00
P-17	12	I-19	1,793.10	MH-8	1,792.70	0.645	2.971	1.93	40	0.010	3.56	1,793.69	1,793.22
P-18	12	I-20	1,793.10	MH-8	1,792.70	0.580	2.971	1.74	40	0.010	3.56	1,793.66	1,793.19
P-27	18	I-29	1,808.00	(e) MH-13	1,796.00	0.807	4.089	3.33	7	1.714	137.53	1,808.69	1,797.97
P-29	12	I-31	1,808.00	MH-12	1,794.50	0.618	4.089	2.55	60	0.225	16.90	1,808.68	1,796.56
P-33	30	I-35	1,825.00	I-36	1,824.00	0.108	4.471	0.49	82	0.012	45.29	1,825.23	1,824.28
P-34	18	I-36	1,824.00	OF-7	1,823.88	0.130	4.356	0.57	11	0.011	10.97	1,824.28	1,824.11
P-35	12	I-37	1,827.00	OF-8	1,826.50	0.079	4.471	0.36	25	0.020	5.04	1,827.25	1,826.68
P-37	18	I-39	1,822.80	I-40	1,822.00	0.287	4.471	1.29	66	0.012	11.56	1,823.23	1,822.60
P-38	18	I-40	1,822.00	I-41	1,819.10	0.405	4.406	1.80	108	0.027	17.21	1,822.50	1,819.69
P-39	18	I-41	1,819.10	I-43	1,810.15	0.405	4.334	1.77	235	0.038	20.50	1,819.60	1,810.78
P-40	21	I-43	1,809.90	I-44	1,795.95	1.307	2.63	3.46	304	0.046	33.94	1,810.58	1,797.11
P-42	12	I-42	1,811.15	I-43	1,810.65	0.101	4.471	0.45	77	0.006	2.87	1,811.43	1,810.92
P-7	18	I-7	1,779.50	MH-6	1,774.00	5.459	2.201	12.11	81	0.068	27.37	1,780.82	1,775.80
P-44	24	I-44	1,795.70	I-45	1,795.20	2.250	2.58	5.85	81	0.006	17.77	1,797.02	1,797.01
P-45	24	I-45	1,795.20	OF-9	1,795.00	2.291	2.567	5.93	20	0.010	22.62	1,797.01	1,797.00
P-46	12	I-47	1,787.90	I-48	1,787.50	1.032	2.63	2.74	73	0.005	2.64	1,788.74	1,788.21
P-47	18	I-48	1,787.00	OF-11	1,786.50	1.075	2.614	2.83	48	0.010	10.72	1,787.64	1,787.03
(e) P-48	12	(e) I-8	1,799.00	(e) OF-2	1,798.50	0.501	2.63	1.33	42	0.012	3.89	1,799.49	1,798.90
P-49	12	I-8	1,791.00	I-9	1,790.50	0.660	3.81	2.53	25	0.020	5.04	1,791.68	1,791.02
P-50	18	I-9	1,790.00	I-10	1,788.00	0.760	3.793	2.91	97	0.021	15.08	1,790.65	1,788.79
P-51	18	I-10	1,788.00	MH-3	1,786.00	1.135	3.731	4.27	67	0.030	18.15	1,788.79	1,787.18
P-52	12	I-11	1,790.00	MH-3	1,786.00	0.290	3.81	1.11	105	0.038	6.95	1,790.44	1,787.18
(e) P-0	30	(e) MH-1	1,781.13	OF-1	1,780.00	3.023	2.345	7.14	60	0.019	56.29	1,782.44	1,782.50
P-56	18	MH-5	1,779.00	MH-6	1,774.50	1.930	2.894	5.63	178	0.025	16.70	1,779.92	1,775.80
P-61	21	MH-12	1,794.50	MH-16	1,783.50	4.588	3.245	15.01	87	0.126	56.34	1,795.94	1,785.84
P-62	24	MH-16	1,783.50	MH-17	1,782.00	6.146	3.167	19.62	134	0.011	23.93	1,785.09	1,784.24
P-64	12	I-50	1,803.00	MH-16	1,783.50	0.043	4.471	0.19	22	0.886	33.54	1,803.18	1,785.84
P-65	18	(e) I-51	1,784.00	MH-16	1,783.50	1.515	3.199	4.89	47	0.011	10.83	1,785.94	1,785.84
P-66	24	MH-17	1,782.00	MH-18	1,771.71	6.146	3.137	19.43	35	0.294	122.66	1,783.59	1,772.33
P-67	36	MH-18	1,771.71	OF-14	1,770.39	6.146	3.135	19.42	166	0.008	59.47	1,773.12	1,771.57
P-68	24	I-52	1,768.71	I-53	1,767.22	6.418	2.372	15.35	98	0.015	27.89	1,770.12	1,768.95
P-69	24	I-53	1,767.22	OF-15	1,759.00	6.418	2.363	15.29	265	0.031	39.84	1,768.63	1,759.86
P-72	21	(e) MH-13	1,796.00	MH-12	1,794.50	3.969	3.309	13.24	121	0.012	17.64	1,797.35	1,796.56
(e) P-2	12	(e) I-2	1,783.00	(e) MH-1	1,781.13	0.231	4.471	1.04	53	0.035	6.69	1,783.43	1,782.54
P-76	24	MH-6	1,774.00	OF-10	1,768.00	7.388	2.197	16.36	67	0.090	67.69	1,775.46	1,768.70
P-79	18	I-12	1,785.10	MH-19	1,784.50	0.529	3.479	1.86	60	0.010	10.50	1,785.61	1,785.50
P-80	18	MH-19	1,784.50	OF-3	1,783.80	1.954	3.422	6.74	66	0.011	10.82	1,785.50	1,785.30
P-81	18	MH-3	1,786.00	MH-19	1,784.50	1.425	3.697	5.31	108	0.014	12.38	1,786.89	1,785.50
P-83	12	I-38	1,827.92	OF-16	1,826.50	6.072	2.525	15.46	157	0.009	3.39	1,857.05	1,827.50
P-84	12	I-57	1,800.00	I-56	1,796.70	0.370	4.471	1.67	123	0.027	5.84	1,800.97	1,800.70
P-85	12	I-56	1,796.70	(e) MH-13	1,796.00	3.163	3.326	10.60	56	0.013	3.98	1,802.93	1,797.97
P-86	18	I-58	1,819.40	OF-19	1,812.00	0.830	3.53	2.95	147	0.050	23.57	1,820.05	1,812.36


Missouri Flat Sta 53+00 to 57+00 - 100-Year
Label: I-3
Type: Catch Basin
ID: 23
Label: I-4
Type: Catch Basin
ID: 24
Label: P-6
Type: Conduit
ID: 25
Label: P-4
Type: Conduit
ID: 27
Label: I-5
Type: Catch Basin
ID: 26
Label: (e) MH-2
Type: Manhole
ID: 19
Label: P-5
Type: Conduit
ID: 28
Label: (e) P-3
Type: Conduit
ID: 29
Label: (e) MH-1
Type: Manhole
ID: 18
Label: OF-1
Type: Outfall
ID: 38
Label: (e) P-0
Type: Conduit
ID: 192
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)
1,795.5
1,795
1,794.5
1,794
1,793.5
1,793
1,792.5
1,792
1,791.5
1,791
1,790.5
1,790
1,789.5
1,789
1,788.5
1,788
1,787.5
1,787
1,786.5
1,786
1,785.5
1,785
1,784.5
1,784
1,783.5
1,783
1,782.5
1,782
1,781.5
1,781
1,780.5
1,780
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420


DSP Sta 66+50 to 79+00 - 100-Year
Label: I-8
Type: Catch Basin
ID: 53
Label: I-9
Type: Catch Basin
ID: 54
Label: I-10
Type: Catch Basin
ID: 55
Label: MH-3
Type: Manhole
ID: 40
Label: MH-4
Type: Manhole
ID: 41
Label: MH-5
Type: Manhole
ID: 42
Label: MH-6
Type: Manhole
ID: 43
Label: MH-7
Type: Manhole
ID: 44
Label: OF-5
Type: Outfall
ID: 79
Label: P-49
Type: Conduit
ID: 187
Label: P-50
Type: Conduit
ID: 188
Label: P-51
Type: Conduit
ID: 189
Label: P-54
Type: Conduit
ID: 193
Label: P-55
Type: Conduit
ID: 194
Label: P-56
Type: Conduit
ID: 195
Label: P-57
Type: Conduit
ID: 196
Label: P-15
Type: Conduit
ID: 80
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)
1,795
1,794.5
1,794
1,793.5
1,793
1,792.5
1,792
1,791.5
1,791
1,790.5
1,790
1,789.5
1,789
1,788.5
1,788
1,787.5
1,787
1,786.5
1,786
1,785.5
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1,784.5
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1,783.5
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1,782.5
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1,781
1,780.5
1,780
1,779.5
1,779
1,778.5
1,778
1,777.5
1,777
1,776.5
1,776
1,775.5
1,775
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100
200
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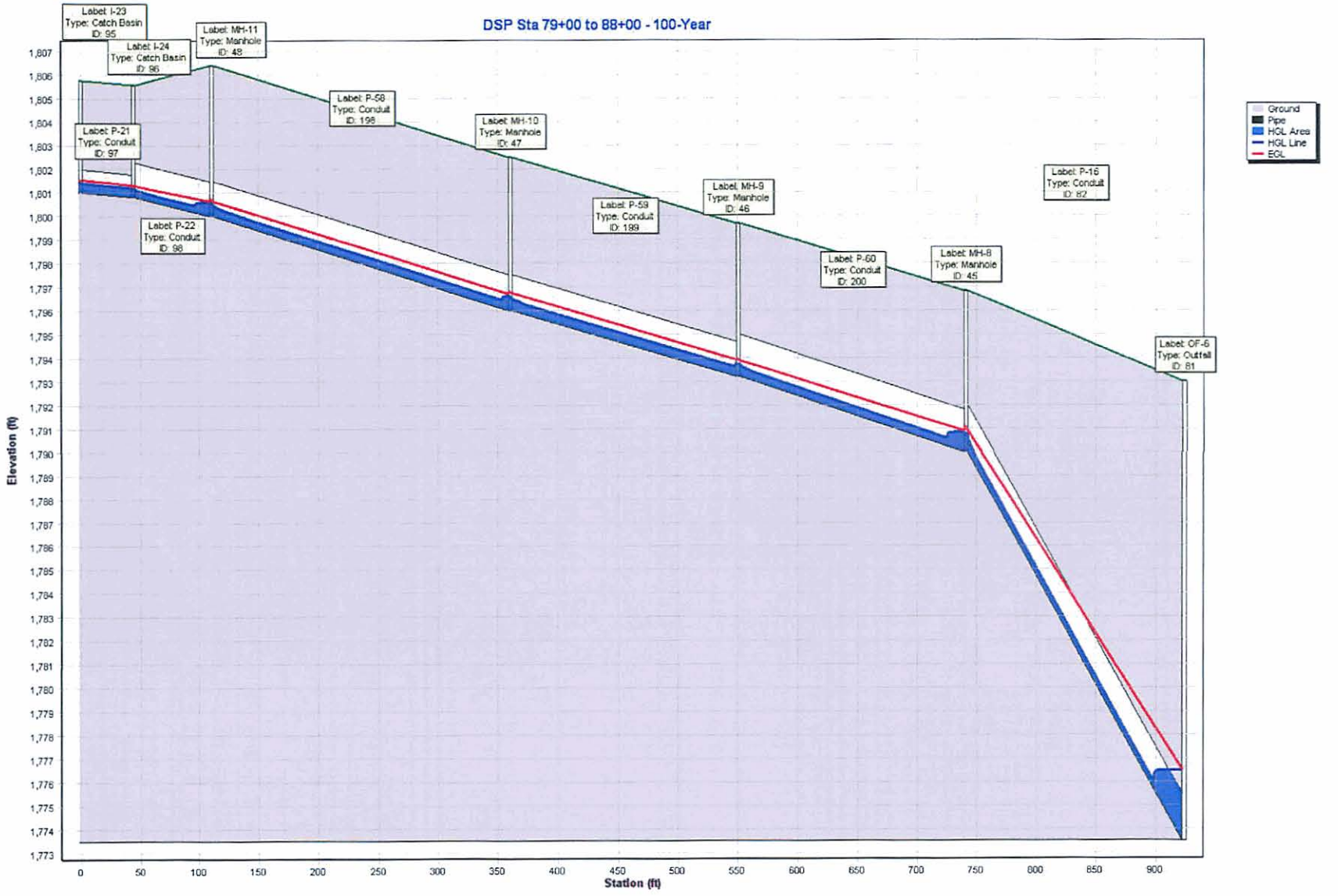
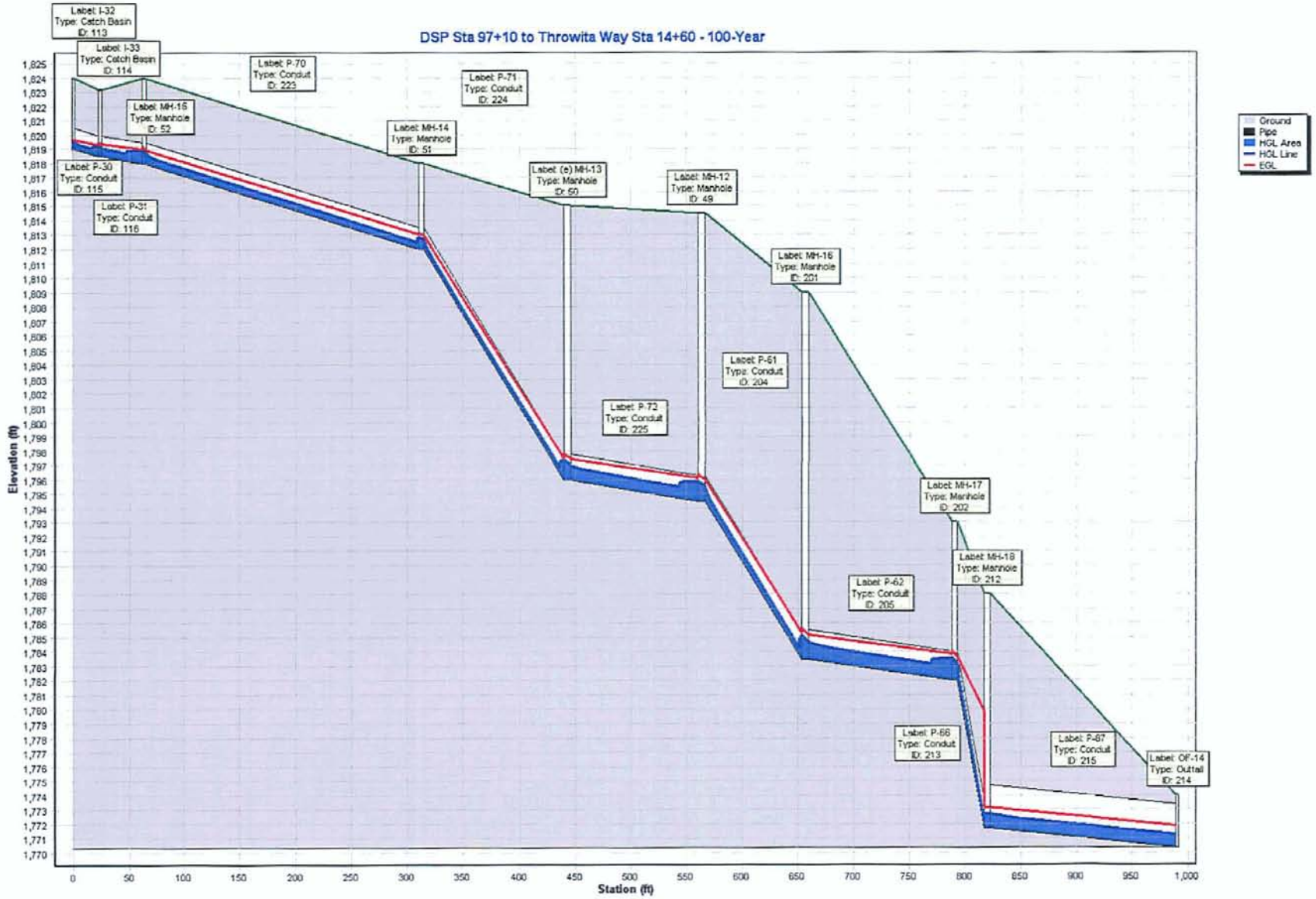
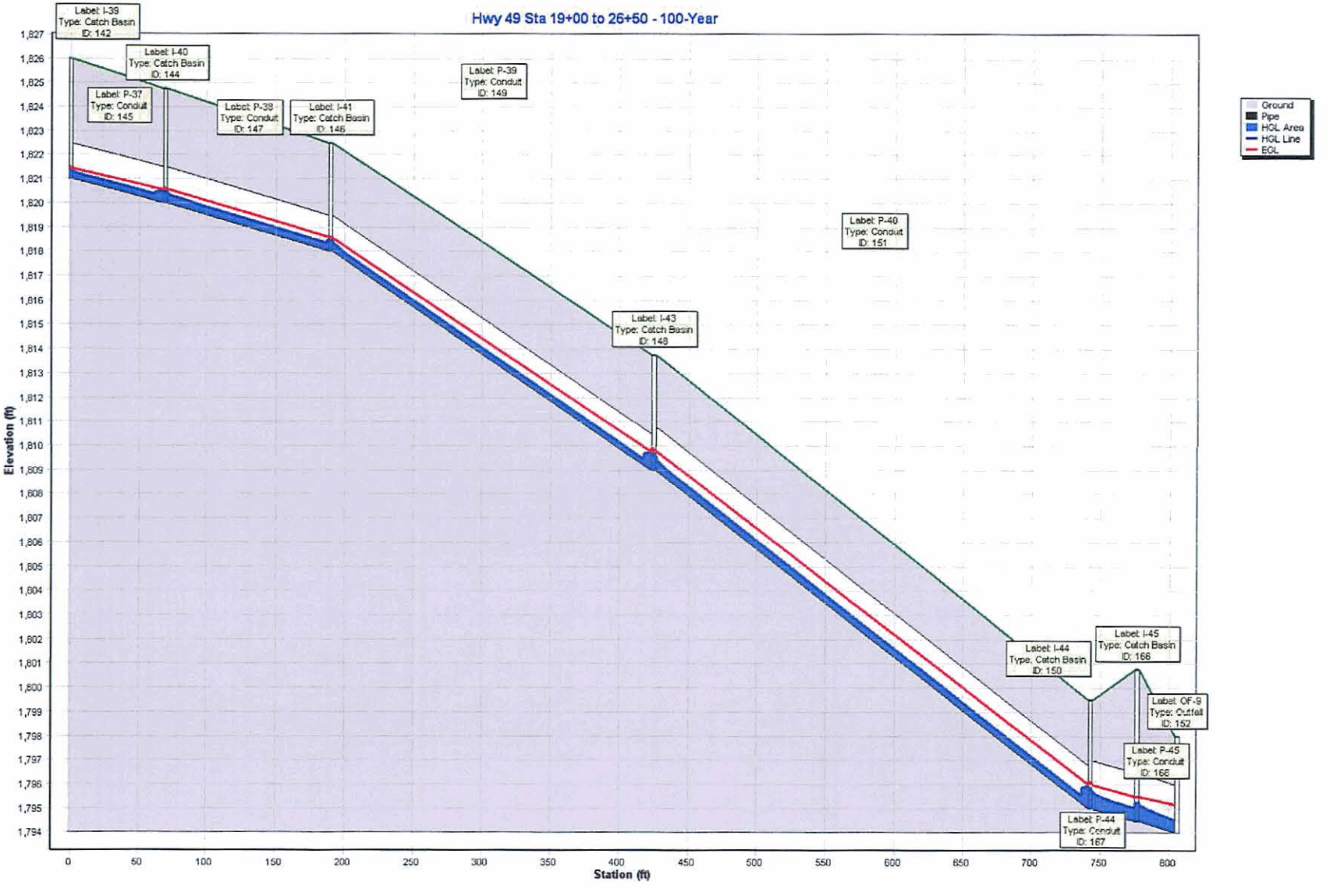
400
500
600
700
800
900
1,000
1,100
1,200
1,300


DSP Sta 79+00 to 88+00 - 100-Year
Label: I-23
Type: Catch Basin
ID: 95
Label: I-24
Type: Catch Basin
ID: 96
Label: MH-11
Type: Manhole
ID: 48
Label: P-58
Type: Conduit
ID: 198
Label: MH-10
Type: Manhole
ID: 47
Label: P-59
Type: Conduit
ID: 199
Label: MH-9
Type: Manhole
ID: 46
Label: P-60
Type: Conduit
ID: 200
Label: MH-8
Type: Manhole
ID: 45
Label: P-16
Type: Conduit
ID: 82
Label: OF-6
Type: Outfall
ID: 81
Label: P-21
Type: Conduit
ID: 97
Label: P-22
Type: Conduit
ID: 98
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)
1,807
1,806
1,805
1,804
1,803
1,802
1,801
1,800
1,799
1,798
1,797
1,796
1,795
1,794
1,793
1,792
1,791
1,790
1,789
1,788
1,787
1,786
1,785
1,784
1,783
1,782
1,781
1,780
1,779
1,778
1,777
1,776
1,775
1,774
1,773
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900


DSP Sta 97+10 to Throwita Way Sta 14+60 - 100-Year
Label: I-32
Type: Catch Basin
ID: 113
Label: I-33
Type: Catch Basin
ID: 114
Label: MH-15
Type: Manhole
ID: 52
Label: P-70
Type: Conduit
ID: 223
Label: P-71
Type: Conduit
ID: 224
Label: MH-14
Type: Manhole
ID: 51
Label: P-30
Type: Conduit
ID: 115
Label: P-31
Type: Conduit
ID: 116
Label: (e) MH-13
Type: Manhole
ID: 50
Label: MH-12
Type: Manhole
ID: 49
Label: MH-16
Type: Manhole
ID: 201
Label: P-61
Type: Conduit
ID: 204
Label: P-72
Type: Conduit
ID: 225
Label: MH-17
Type: Manhole
ID: 202
Label: MH-18
Type: Manhole
ID: 212
Label: P-62
Type: Conduit
ID: 205
Label: P-66
Type: Conduit
ID: 213
Label: P-67
Type: Conduit
ID: 215
Label: OF-14
Type: Outfall
ID: 214
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)


Hwy 49 Sta 19+00 to 26+50 - 100-Year
Label: I-39
Type: Catch Basin
ID: 142
Label: I-40
Type: Catch Basin
ID: 144
Label: P-37
Type: Conduit
ID: 145
Label: P-38
Type: Conduit
ID: 147
Label: I-41
Type: Catch Basin
ID: 146
Label: P-39
Type: Conduit
ID: 149
Label: P-40
Type: Conduit
ID: 151
Label: I-43
Type: Catch Basin
ID: 148
Label: I-44
Type: Catch Basin
ID: 150
Label: I-45
Type: Catch Basin
ID: 166
Label: OF-9
Type: Outfall
ID: 152
Label: P-45
Type: Conduit
ID: 168
Label: P-44
Type: Conduit
ID: 167
Ground
Pipe
HGL Area
HGL Line
EGL
Elevation (ft)
Station (ft)
1,827
1,826
1,825
1,824
1,823
1,822
1,821
1,820
1,819
1,818
1,817
1,816
1,815
1,814
1,813
1,812
1,811
1,810
1,809
1,808
1,807
1,806
1,805
1,804
1,803
1,802
1,801
1,800
1,799
1,798
1,797
1,796
1,795
1,794
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800

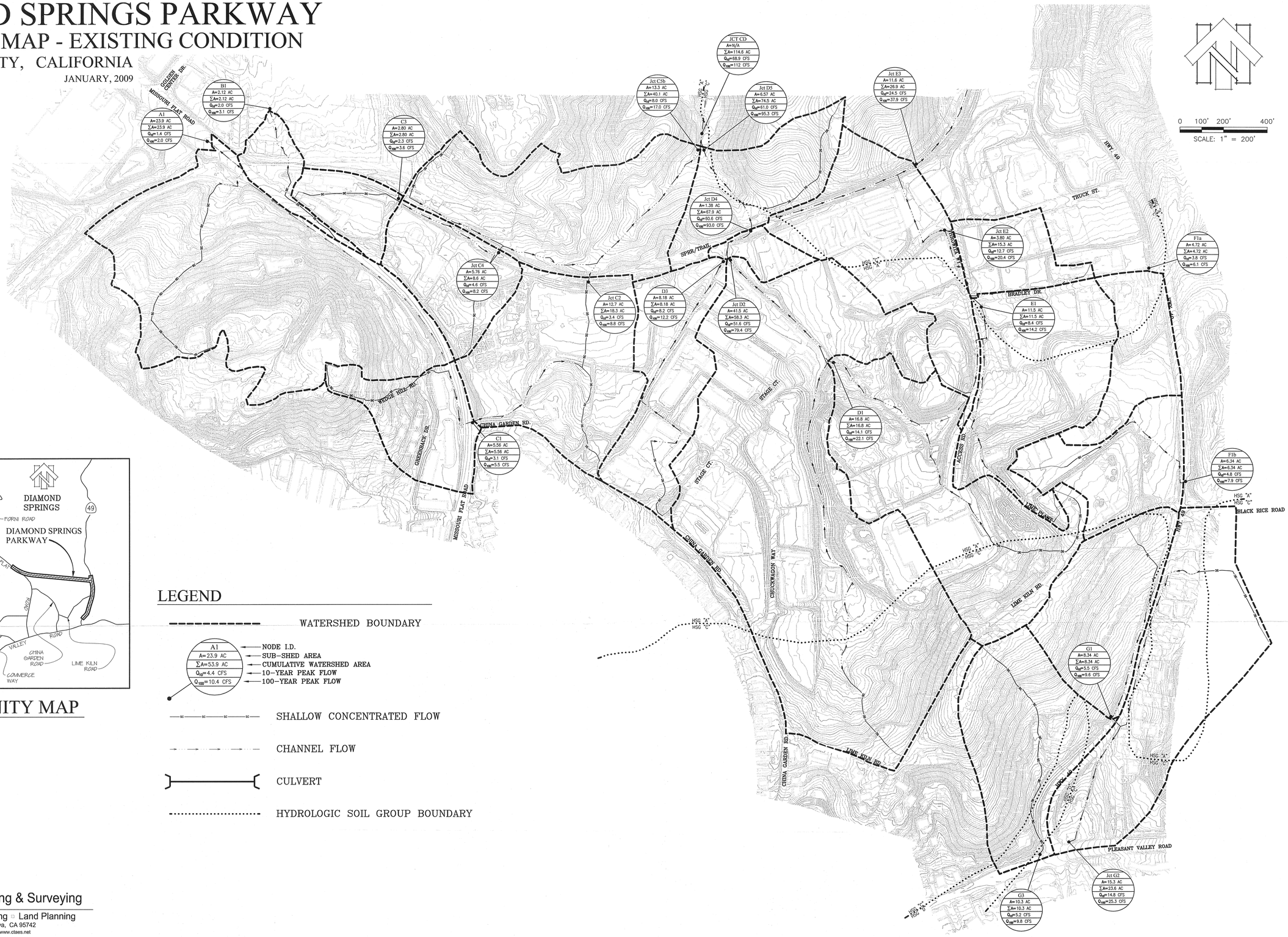
XII. APPENDIX E: WATERSHED MAPS

DIAMOND SPRINGS PARKWAY

WATERSHED MAP - EXISTING CONDITION

EL DORADO COUNTY, CALIFORNIA

SCALE: 1"=200' JANUARY, 2009



VICINITY MAP

LEGEND

- WATERSHED BOUNDARY
- A1 / A=23.9 AC / ΣA=53.9 AC / Q_{10}=4.4 CFS / Q_{100}=10.4 CFS
  - NODE I.D.
  - SUB-SHED AREA
  - CUMULATIVE WATERSHED AREA
  - 10-YEAR PEAK FLOW
  - 100-YEAR PEAK FLOW
- SHALLOW CONCENTRATED FLOW
- CHANNEL FLOW
- CULVERT
- HYDROLOGIC SOIL GROUP BOUNDARY

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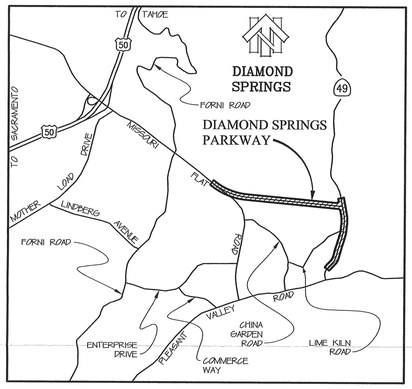
DIAMOND SPRINGS PARKWAY

WATERSHED MAP - PROPOSED CONDITION - CASE 3

EL DORADO COUNTY, CALIFORNIA

SCALE: 1"=200'

MAY, 2009



VICINITY MAP

LEGEND

- WATERSHED BOUNDARY
- A1 — NODE I.D.
  A=23.9 AC — SUB-SHED AREA
  ΣA=53.9 AC — CUMULATIVE WATERSHED AREA
  Q_{10}=4.4 CFS — 10-YEAR PEAK FLOW
  Q_{100}=10.4 CFS — 100-YEAR PEAK FLOW
- SHALLOW CONCENTRATED FLOW
- CHANNEL FLOW
- CULVERT
- HYDROLOGIC SOILS GROUP BOUNDARY
- OF-15 — STORMCAD OUTFALL ID
- P-69 — STORMCAD PIPE ID
- MH-1 — STORMCAD MANHOLE ID
- P-68 I-53 — STORMCAD INLET ID

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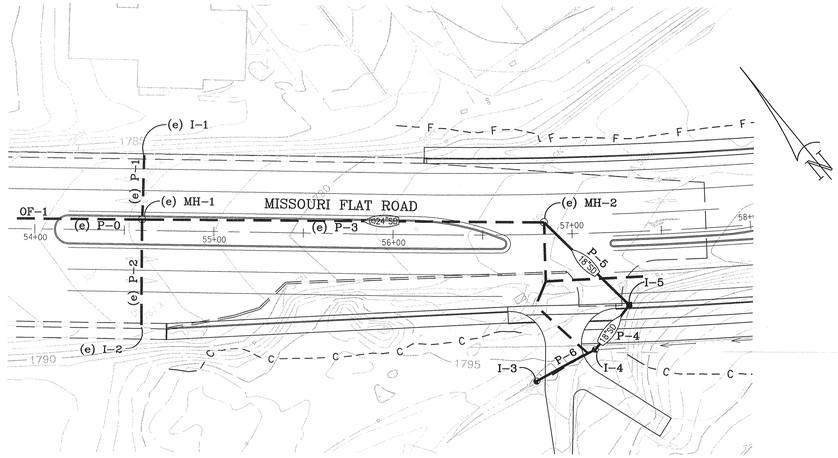
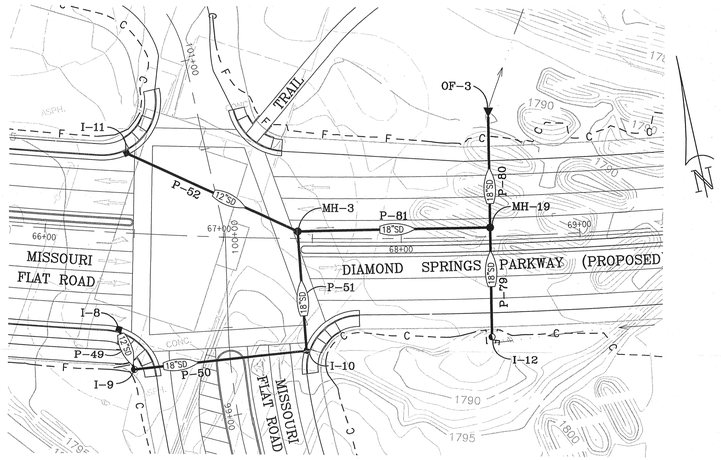
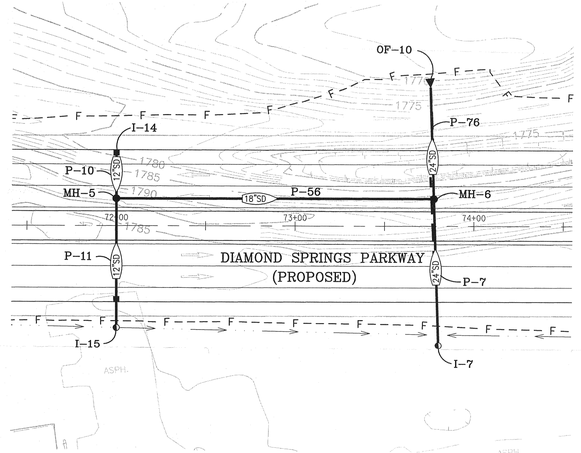


AREA 1

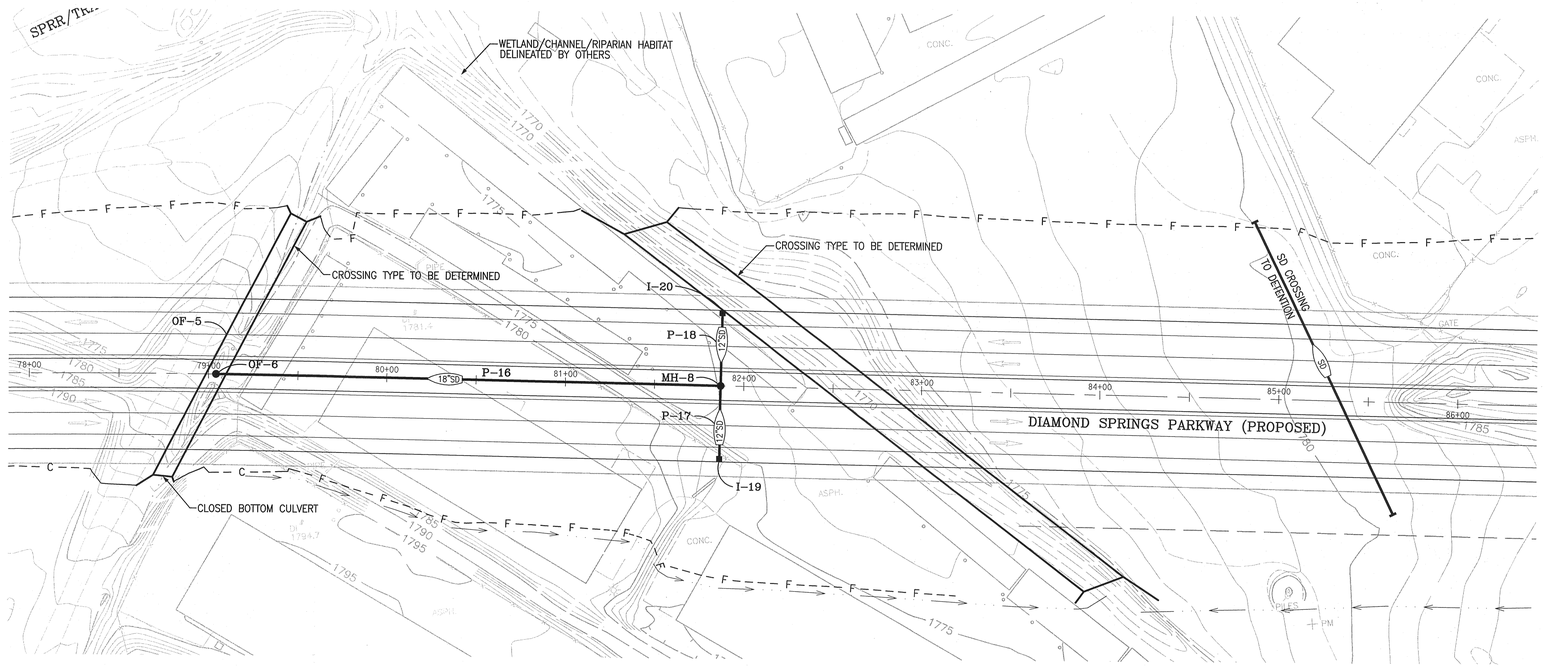


AREA 2

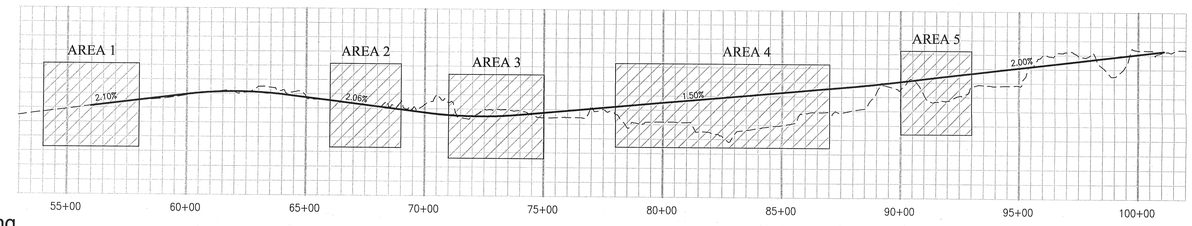


AREA 3

0 20' 40' 80'
SCALE: 1" = 40'



AREA 4



DIAMOND SPRINGS PARKWAY PROFILE

SCALE 1"=300'

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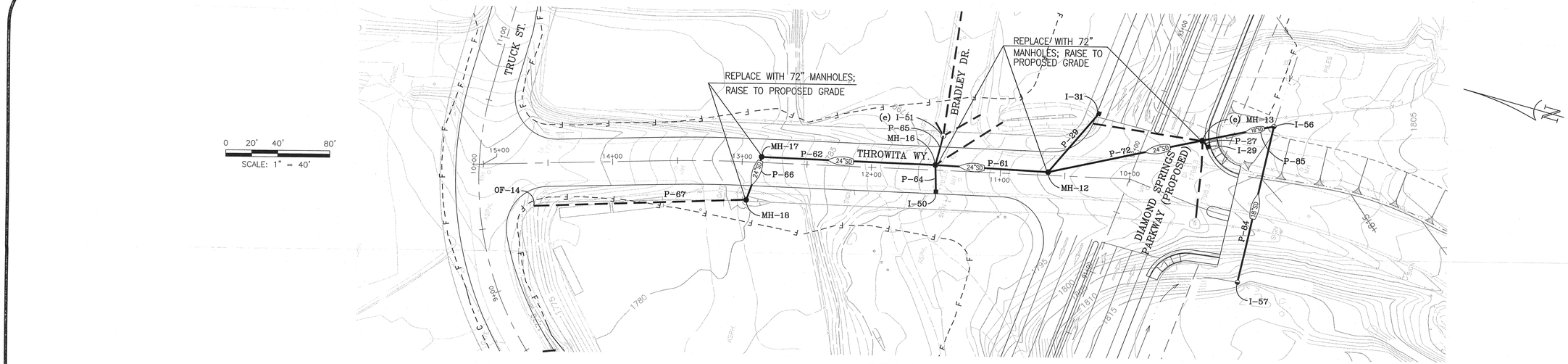
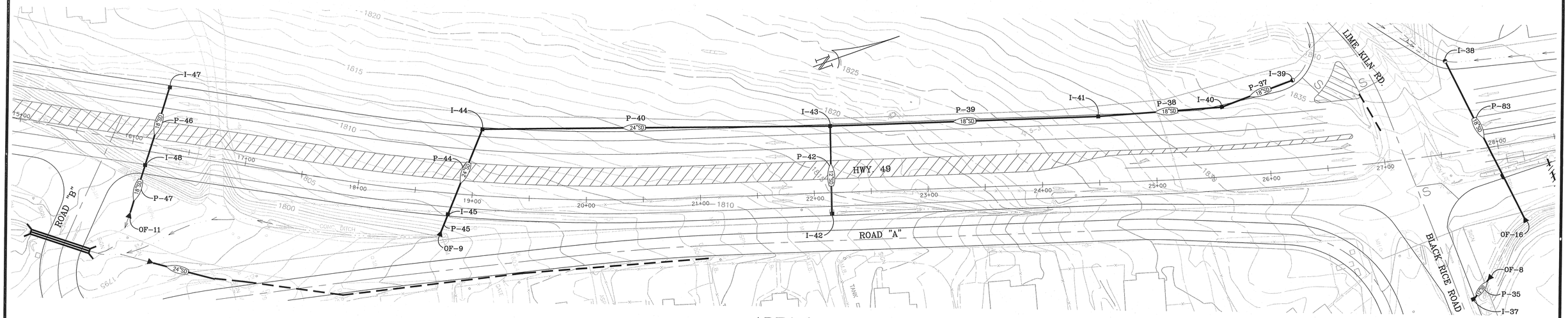
PRELIMINARY STORM DRAINAGE PLAN
EL DORADO COUNTY, CALIFORNIA
MAY, 2009

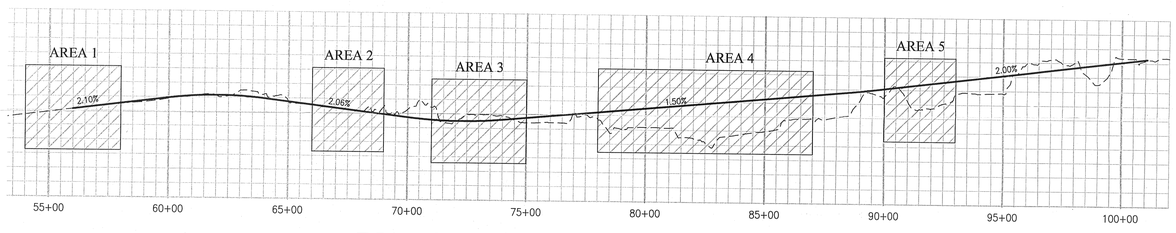
M:\07-044-002\ENGINEERING\EXHIBITS\Storm Sewer Layout.dwg, SHEET 1, 5/28/2009 11:51:45 AM, ckinn



AREA 5

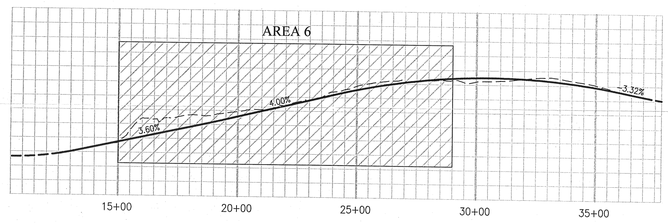


AREA 6



DIAMOND SPRINGS PARKWAY PROFILE

SCALE 1"=300'



HIGHWAY 49 PROFILE

SCALE 1"=300'

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DIAMOND SPRINGS PARKWAY
PRELIMINARY STORM DRAINAGE PLAN
EL DORADO COUNTY, CALIFORNIA

MAY, 2009