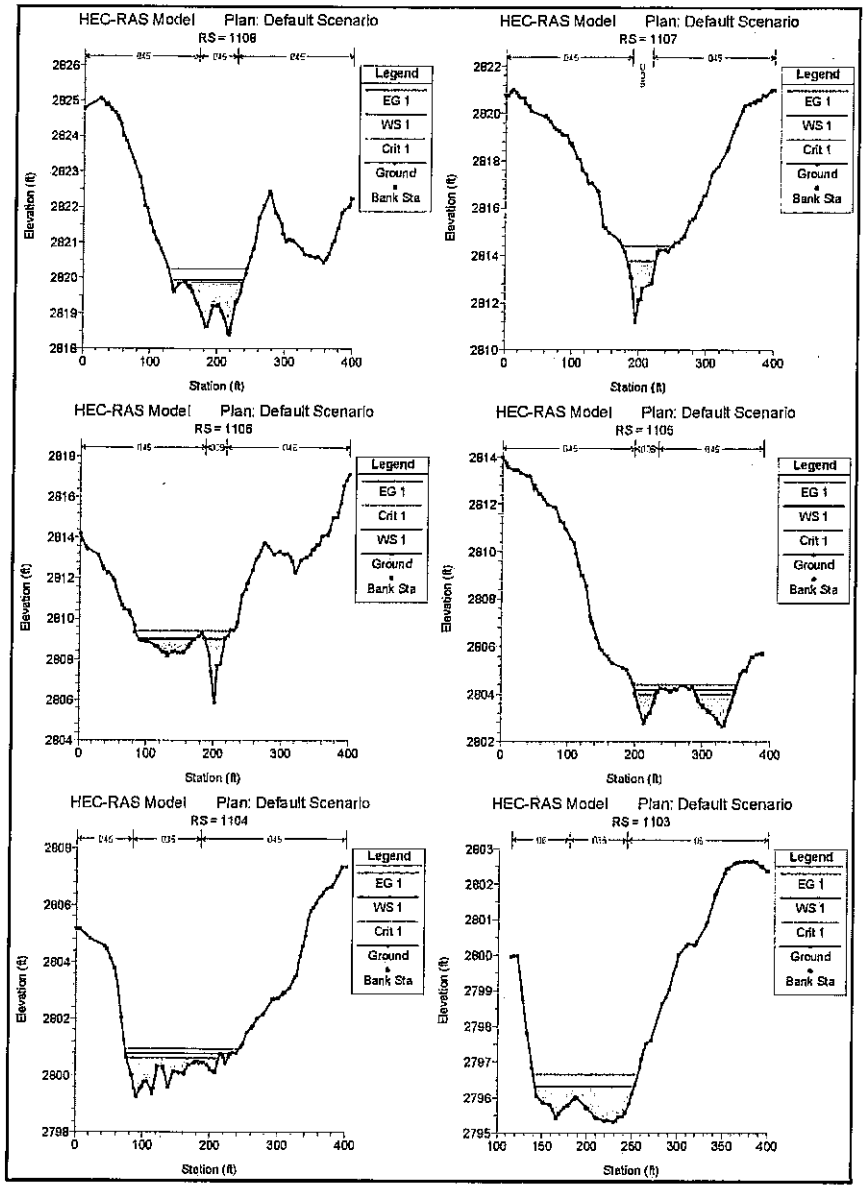
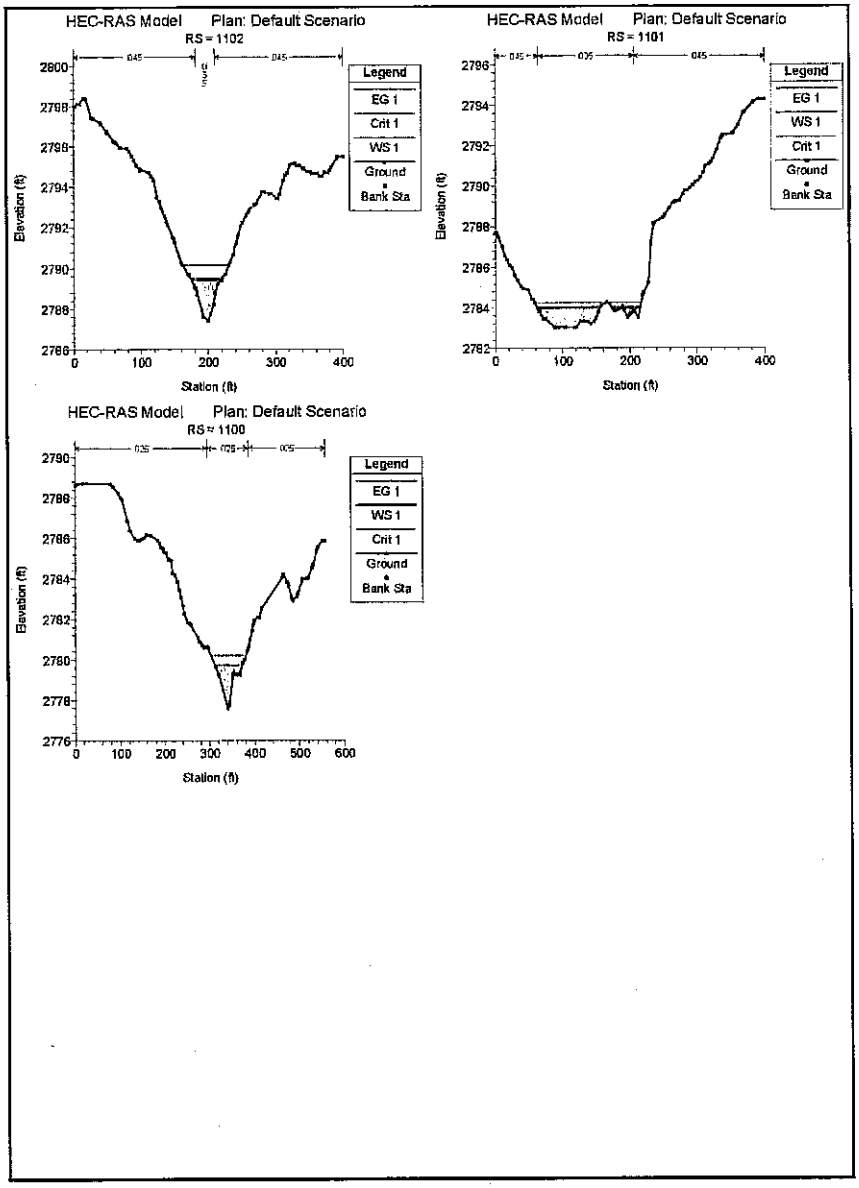
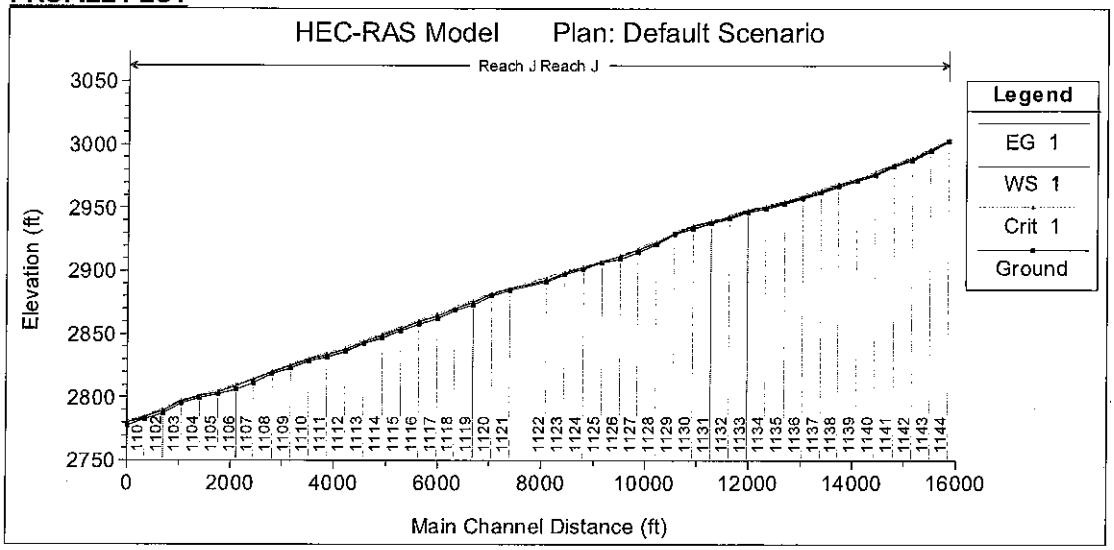

HEC-RAS Model Plan: Default Scenario
RS = 1106
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1107
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1105
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1105
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1104
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1103
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


HEC-RAS Model Plan: Default Scenario
RS = 1102
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1101
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1100
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

PROFILE PLOT



STANDARD TABLE 1

HEC-RAS Plan: Default Scenario River: Reach J Reach: Reach J Profile: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach J	1144	1	286.10	3002.48	3003.81	3003.83	3003.99	0.018789	5.51	87.73	101.92	1.01
Reach J	1143	1	286.10	2984.89	2985.92	2985.98	2986.26	0.026877	5.35	71.78	149.70	1.13
Reach J	1142	1	286.10	2987.23	2988.02	2988.19	2988.55	0.014547	6.46	66.24	111.52	0.96
Reach J	1141	1	286.10	2982.72	2983.61	2983.65	2983.93	0.017225	5.88	80.37	153.50	1.11
Reach J	1140	1	286.10	2975.98	2977.47	2977.59	2977.91	0.018875	6.02	74.77	163.58	0.99
Reach J	1139	1	286.10	2971.17	2972.51	2972.31	2972.77	0.009367	4.69	82.57	98.46	0.75
Reach J	1138	1	286.10	2968.71	2968.45	2968.44	2968.89	0.013028	6.34	69.02	66.13	0.91
Reach J	1137	1	286.10	2962.17	2963.68	2963.68	2964.03	0.014489	5.85	78.65	112.15	0.93
Reach J	1136	1	286.10	2957.34	2959.22	2959.23	2959.48	0.011624	4.79	93.28	189.30	0.81
Reach J	1135	1	286.10	2952.93	2954.51	2954.53	2954.89	0.014642	6.03	76.62	122.23	0.94
Reach J	1134	1	286.10	2949.77	2951.29	2951.15	2951.46	0.005722	3.71	109.99	180.54	0.59
Reach J	1133	1	286.10	2946.92	2947.86	2947.86	2948.15	0.017739	4.99	71.44	127.92	0.97
Reach J	1132	1	286.10	2941.23	2942.97	2942.92	2943.35	0.010131	5.57	67.92	77.87	0.80
Reach J	1131	1	286.10	2937.99	2939.38	2938.32	2939.67	0.010632	4.88	71.48	85.46	0.78
Reach J	1130	1	286.10	2933.03	2935.55	2935.55	2935.92	0.010559	5.64	66.07	97.98	0.82
Reach J	1129	1	286.10	2926.94	2930.02	2930.14	2930.51	0.024101	6.69	55.25	94.92	1.17
Reach J	1128	1	286.10	2921.20	2922.75	2922.68	2923.28	0.017717	8.11	54.43	74.12	1.01
Reach J	1127	1	286.10	2914.80	2916.70	2916.88	2917.34	0.015998	7.30	54.75	82.28	1.02
Reach J	1126	1	286.10	2909.20	2911.35	2911.52	2911.91	0.014718	6.73	55.12	80.63	0.98
Reach J	1125	1	286.10	2906.71	2907.23	2907.22	2907.38	0.012093	3.17	83.39	276.42	0.96
Reach J	1124	1	286.10	2901.18	2902.80	2902.80	2903.19	0.011638	5.48	60.90	78.56	0.84
Reach J	1123	1	286.10	2896.83	2898.74	2898.77	2899.13	0.011388	5.90	65.60	90.67	0.85
Reach J	1122	1	286.10	2890.96	2893.08	2893.25	2893.82	0.020594	7.05	49.04	40.31	1.11
Reach J	1121	1	286.10	2884.89	2885.84	2885.66	2886.09	0.012207	5.09	79.98	90.28	0.84
Reach J	1120	1	286.10	2880.31	2881.45	2881.45	2881.74	0.012416	4.84	83.14	139.93	0.84
Reach J	1119	1	286.10	2873.29	2875.80	2876.98	2876.40	0.018187	7.20	42.70	52.70	1.09
Reach J	1118	1	286.10	2868.37	2870.25	2870.28	2870.71	0.013984	6.03	66.41	92.28	0.92
Reach J	1117	1	286.10	2861.94	2864.65	2864.78	2865.48	0.019863	7.29	40.60	29.83	1.10
Reach J	1116	1	286.10	2857.81	2860.04	2860.04	2860.47	0.014453	5.78	65.02	78.38	0.92
Reach J	1115	1	286.10	2852.83	2854.27	2854.36	2854.77	0.018183	6.09	59.33	83.64	1.02
Reach J	1114	1	286.10	2847.03	2849.25	2849.29	2849.77	0.013065	6.13	60.23	73.87	0.90
Reach J	1113	1	286.10	2842.75	2844.10	2844.20	2844.53	0.018804	5.85	68.87	135.11	0.99
Reach J	1112	1	286.10	2835.88	2838.37	2838.42	2839.01	0.014470	8.47	49.08	55.83	0.95
Reach J	1111	1	286.10	2831.20	2833.74	2833.94	2834.39	0.011956	6.86	54.89	106.86	0.89
Reach J	1110	1	286.10	2828.29	2828.97	2829.93	2830.26	0.014292	5.21	77.34	119.88	0.90
Reach J	1109	1	286.10	2822.68	2825.07	2825.07	2825.61	0.012306	6.46	61.04	67.11	0.88
Reach J	1108	1	286.10	2818.40	2819.86	2818.88	2820.25	0.018712	4.60	72.45	108.25	0.80
Reach J	1107	1	286.10	2811.18	2813.77	2813.77	2814.41	0.014648	6.51	48.79	42.38	0.95
Reach J	1106	1	286.10	2805.87	2808.99	2809.02	2809.37	0.013513	5.62	74.13	112.20	0.89
Reach J	1105	1	286.10	2802.77	2804.20	2803.99	2804.41	0.012908	4.14	81.48	112.16	0.82
Reach J	1104	1	286.10	2799.24	2800.78	2800.60	2800.93	0.007757	3.25	101.98	157.54	0.64
Reach J	1103	1	286.10	2795.91	2798.32	2798.32	2798.66	0.021265	5.04	71.62	111.13	1.04
Reach J	1102	1	286.10	2787.43	2789.43	2789.52	2790.16	0.018107	8.91	45.83	45.34	1.01
Reach J	1101	1	286.10	2783.00	2784.02	2783.95	2784.23	0.014883	3.77	89.28	136.06	0.84
Reach J	1100	1	286.10	2777.62	2779.76	2779.76	2780.22	0.009823	5.43	54.50	60.35	1.01

STANDARD TABLE 2

HEC-RAS Plan: Default Scenario River: Reach J Reach: Reach J Profile: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Reach J	1144	1	3003.99	3003.61	0.38			57.26	218.58	20.25	101.92
Reach J	1143	1	2996.26	2995.92	0.35	7.72	0.01	32.06	210.99	53.05	149.70
Reach J	1142	1	2989.55	2989.02	0.53	6.70	0.02	28.43	238.34	29.33	111.52
Reach J	1141	1	2983.93	2983.61	0.32	5.57	0.06	14.88	159.84	121.58	153.50
Reach J	1140	1	2977.91	2977.47	0.44	6.01	0.01	5.38	227.02	63.70	163.59
Reach J	1139	1	2972.77	2972.51	0.26	3.87	0.02	18.99	194.09	83.02	98.46
Reach J	1138	1	2968.89	2968.45	0.44	4.84	0.03	70.05	186.51	39.55	86.13
Reach J	1137	1	2964.03	2963.68	0.35	4.49	0.03	89.81	168.63	37.65	112.15
Reach J	1136	1	2959.48	2959.22	0.26	4.53	0.03	71.16	199.49	25.45	183.30
Reach J	1135	1	2954.89	2954.51	0.37	4.58	0.01	21.03	170.66	104.41	122.23
Reach J	1134	1	2951.45	2951.29	0.16	3.28	0.01	162.20	103.15	30.75	160.54
Reach J	1133	1	2948.15	2947.86	0.29	4.63	0.01	141.92	60.10	94.08	127.92
Reach J	1132	1	2943.35	2942.97	0.38	3.66	0.03	33.83	210.50	51.77	77.87
Reach J	1131	1	2939.67	2939.38	0.29	3.73	0.01	162.96	130.56	2.58	95.45
Reach J	1130	1	2935.92	2935.55	0.38	4.31	0.01	53.00	196.11	47.00	87.96
Reach J	1129	1	2930.51	2930.02	0.49	5.41	0.01	149.38	78.65	68.07	94.92
Reach J	1128	1	2923.28	2922.75	0.52	7.24	0.00	41.44	254.20	0.46	74.12
Reach J	1127	1	2917.34	2916.70	0.63	5.93	0.01	73.52	206.71	15.88	92.26
Reach J	1126	1	2911.91	2911.35	0.56	5.40	0.02	77.31	209.88	8.90	80.63
Reach J	1125	1	2907.38	2907.23	0.16	4.18	0.02		296.10		276.42
Reach J	1124	1	2903.19	2902.80	0.39	3.83	0.01	144.11	149.46	2.53	79.56
Reach J	1123	1	2899.13	2898.74	0.39	4.06	0.00	120.69	175.12	0.30	90.67
Reach J	1122	1	2893.82	2893.06	0.76	5.28	0.04	1.53	293.23	1.34	40.31
Reach J	1121	1	2888.09	2885.84	0.25	4.34	0.00	177.55	98.12	20.43	90.28
Reach J	1120	1	2881.74	2881.45	0.29	3.13	0.01	70.17	222.44	3.48	139.93
Reach J	1119	1	2876.40	2875.60	0.80	5.28	0.05	0.09	294.67	1.34	52.70
Reach J	1118	1	2870.71	2870.25	0.46	5.59	0.10	34.69	232.02	29.39	92.26
Reach J	1117	1	2865.48	2864.65	0.83	5.32	0.02		296.10		29.63
Reach J	1116	1	2860.47	2860.04	0.42			71.18	223.25	1.67	78.38
Reach J	1115	1	2854.77	2854.27	0.50	5.69	0.01	35.52	247.28	13.30	83.64
Reach J	1114	1	2849.77	2849.25	0.52	5.04	0.01	18.96	258.86	18.28	73.87
Reach J	1113	1	2844.53	2844.10	0.43	5.21	0.03	31.79	223.78	40.53	135.11
Reach J	1112	1	2839.01	2838.37	0.64	5.50	0.02	2.09	290.86	3.15	55.63
Reach J	1111	1	2834.39	2833.74	0.65	4.62	0.00	6.49	281.20	8.41	106.86
Reach J	1110	1	2830.28	2829.97	0.31	4.66	0.02	31.89	196.31	67.91	113.89
Reach J	1109	1	2825.61	2825.07	0.54			15.35	235.36	45.38	67.11
Reach J	1108	1	2820.25	2819.95	0.30	5.81	0.03	18.42	268.46	11.22	108.25
Reach J	1107	1	2814.41	2813.77	0.64	4.77	0.08	4.59	284.76	6.75	42.38
Reach J	1106	1	2809.37	2808.99	0.38	4.95	0.08	78.26	217.84		112.20
Reach J	1105	1	2804.41	2804.20	0.21	3.47	0.02		109.47	186.63	112.16
Reach J	1104	1	2800.93	2800.78	0.15	4.25	0.02	6.16	267.50	22.44	157.54
Reach J	1103	1	2796.66	2796.32	0.34	5.77	0.03	50.21	238.90	6.99	111.13
Reach J	1102	1	2790.16	2789.43	0.73	6.46	0.04	2.48	289.97	3.65	45.34
Reach J	1101	1	2784.23	2784.02	0.22	3.98	0.02	0.15	290.27	5.68	136.06
Reach J	1100	1	2780.22	2779.76	0.46				296.10		60.35

HYDRAULIC DEPTH TABLE

HEC-RAS Plan: Default Scenario River: Reach J Reach: Reach J Profile: 1

Reach	River Sta	Profile	Q Total	W.S. Elev	Hydr Depth L	Hydr Depth C	Hydr Depth R	Q Left	Q Channel	Q Right
			(cfs)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)
Reach J	1144	1	296.10	3003.61	0.48	0.92	0.48	57.26	218.58	20.25
Reach J	1143	1	296.10	2995.92	0.32	0.69	0.37	32.06	210.99	53.05
Reach J	1142	1	296.10	2989.02	0.31	1.42	0.39	28.43	238.34	29.33
Reach J	1141	1	296.10	2983.61	0.25	0.82	0.51	14.88	159.64	121.58
Reach J	1140	1	296.10	2977.47	0.21	1.14	0.30	5.38	227.02	63.70
Reach J	1139	1	296.10	2972.51	0.41	1.22	0.79	18.99	194.09	83.02
Reach J	1138	1	296.10	2968.45	0.82	1.50	0.45	70.05	186.51	39.55
Reach J	1137	1	296.10	2963.88	0.62	1.23	0.43	89.81	168.63	37.85
Reach J	1136	1	296.10	2959.22	0.36	1.08	0.34	71.16	199.49	25.45
Reach J	1135	1	296.10	2954.51	0.30	1.28	0.61	21.03	170.66	104.41
Reach J	1134	1	296.10	2951.29	0.58	1.24	0.43	162.20	103.15	30.75
Reach J	1133	1	296.10	2947.86	0.44	0.83	0.66	141.92	60.10	94.08
Reach J	1132	1	296.10	2942.97	0.44	1.49	0.67	33.83	210.50	51.77
Reach J	1131	1	296.10	2939.38	0.64	1.18	0.32	162.96	130.56	2.58
Reach J	1130	1	296.10	2935.55	0.40	1.47	0.72	53.00	196.11	47.00
Reach J	1129	1	296.10	2930.02	0.49	1.02	0.62	149.38	78.65	68.07
Reach J	1128	1	296.10	2922.75	0.36	1.13	0.16	41.44	254.20	0.46
Reach J	1127	1	296.10	2916.70	0.32	1.59	0.56	73.52	206.71	15.88
Reach J	1126	1	296.10	2911.35	0.39	1.51	0.42	77.31	209.88	8.90
Reach J	1125	1	296.10	2907.23		0.34			296.10	
Reach J	1124	1	296.10	2902.80	0.58	1.31	0.43	144.11	149.46	2.53
Reach J	1123	1	296.10	2898.74	0.51	1.50	0.18	120.69	175.12	0.30
Reach J	1122	1	296.10	2893.06	0.17	1.25	0.24	1.53	293.23	1.34
Reach J	1121	1	296.10	2885.84	0.89	1.13	0.57	177.55	98.12	20.43
Reach J	1120	1	296.10	2881.45	0.41	1.04	0.24	70.17	222.44	3.48
Reach J	1119	1	296.10	2875.60	0.05	1.43	0.08	0.09	294.67	1.34
Reach J	1118	1	296.10	2870.25	0.52	1.32	0.38	34.69	232.02	29.39
Reach J	1117	1	296.10	2864.65		1.37			296.10	
Reach J	1116	1	296.10	2860.04	0.61	1.22	0.26	71.18	223.25	1.67
Reach J	1115	1	296.10	2854.27	0.51	1.10	0.28	35.52	247.28	13.30
Reach J	1114	1	296.10	2849.25	0.43	1.44	0.38	18.96	258.86	18.28
Reach J	1113	1	296.10	2844.10	0.54	1.09	0.24	31.79	223.78	40.53
Reach J	1112	1	296.10	2838.37	0.13	1.44	0.23	2.09	290.86	3.15
Reach J	1111	1	296.10	2833.74	0.26	1.74	0.13	6.49	281.20	8.41
Reach J	1110	1	296.10	2829.97	0.47	1.05	0.53	31.88	196.31	67.91
Reach J	1109	1	296.10	2825.07	0.54	1.63	0.56	15.35	235.36	45.38
Reach J	1108	1	296.10	2819.95	0.24	1.03	0.39	16.42	268.46	11.22
Reach J	1107	1	296.10	2813.77	0.36	1.45	0.48	4.59	284.76	6.75
Reach J	1106	1	296.10	2808.99	0.44	1.25		78.28	217.84	
Reach J	1105	1	296.10	2804.20		0.80	0.70		109.47	186.63
Reach J	1104	1	296.10	2800.78	0.43	0.81	0.34	6.16	267.50	22.44
Reach J	1103	1	296.10	2796.32	0.56	0.74	0.37	50.21	238.90	6.99
Reach J	1102	1	296.10	2789.43	0.23	1.46	0.23	2.48	289.97	3.65
Reach J	1101	1	296.10	2784.02	0.08	0.62	0.32	0.15	290.27	5.68
Reach J	1100	1	296.10	2779.76		0.90			296.10	

MANNING'S N-VALUE TABLE

HEC-RAS Plan: Default Scenario River: Reach J Reach: Reach J Profile: 1

Reach	River Sta	Profile	Q Total	Mann Wtd Left	Mann Wtd Chnl	Mann Wtd Right	Mann Wtd Total
			(cfs)				
Reach J	1144	1	296.10	0.045	0.035	0.045	0.035
Reach J	1143	1	296.10	0.045	0.035	0.045	0.035
Reach J	1142	1	296.10	0.045	0.035	0.045	0.038
Reach J	1141	1	296.10	0.045	0.030	0.045	0.034
Reach J	1140	1	296.10	0.045	0.035	0.045	0.029
Reach J	1139	1	296.10	0.045	0.035	0.045	0.036
Reach J	1138	1	296.10	0.045	0.035	0.045	0.034
Reach J	1137	1	296.10	0.045	0.035	0.045	0.036
Reach J	1136	1	296.10	0.045	0.035	0.045	0.032
Reach J	1135	1	296.10	0.045	0.035	0.045	0.034
Reach J	1134	1	296.10	0.025	0.035	0.045	0.028
Reach J	1133	1	296.10	0.025	0.035	0.045	0.032
Reach J	1132	1	296.10	0.025	0.035	0.045	0.031
Reach J	1131	1	296.10	0.030	0.035	0.045	0.030
Reach J	1130	1	296.10	0.025	0.035	0.045	0.030
Reach J	1129	1	296.10	0.025	0.035	0.045	0.031
Reach J	1128	1	296.10	0.030	0.035	0.045	0.030
Reach J	1127	1	296.10	0.025	0.035	0.045	0.025
Reach J	1126	1	296.10	0.025	0.035	0.045	0.026
Reach J	1125	1	296.10		0.025		0.025
Reach J	1124	1	296.10	0.025	0.035	0.045	0.028
Reach J	1123	1	296.10	0.030	0.035	0.030	0.028
Reach J	1122	1	296.10	0.030	0.035	0.045	0.032
Reach J	1121	1	296.10	0.045	0.035	0.045	0.041
Reach J	1120	1	296.10	0.045	0.035	0.045	0.033
Reach J	1119	1	296.10	0.045	0.035	0.045	0.025
Reach J	1118	1	296.10	0.045	0.035	0.045	0.032
Reach J	1117	1	296.10		0.035		0.035
Reach J	1116	1	296.10	0.045	0.035	0.060	0.035
Reach J	1115	1	296.10	0.045	0.035	0.045	0.032
Reach J	1114	1	296.10	0.045	0.035	0.045	0.030
Reach J	1113	1	296.10	0.045	0.035	0.045	0.029
Reach J	1112	1	296.10	0.045	0.035	0.045	0.027
Reach J	1111	1	296.10	0.045	0.035	0.045	0.019
Reach J	1110	1	296.10	0.045	0.035	0.045	0.036
Reach J	1109	1	296.10	0.045	0.035	0.045	0.032
Reach J	1108	1	296.10	0.045	0.045	0.045	0.038
Reach J	1107	1	296.10	0.045	0.035	0.045	0.032
Reach J	1106	1	296.10	0.045	0.035		0.033
Reach J	1105	1	296.10		0.035	0.045	0.037
Reach J	1104	1	296.10	0.045	0.035	0.045	0.034
Reach J	1103	1	296.10	0.060	0.035	0.060	0.039
Reach J	1102	1	296.10	0.045	0.035	0.045	0.029
Reach J	1101	1	296.10	0.045	0.035	0.045	0.035
Reach J	1100	1	296.10		0.025		0.025

WATERHSED K

HEC-RAS OUTPUT

Plan: Default Scenario Reach K Reach K RS: 1130 Profile: 1

E.G. Elev (ft)	2747.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2746.73	Reach Len. (ft)	266.15	266.15	266.15
Crit W.S. (ft)	2746.73	Flow Area (sq ft)	18.23	50.36	9.40
E.G. Slope (ft/ft)	0.019427	Area (sq ft)	18.23	50.36	9.40
Q Total (cfs)	488.20	Flow (cfs)	74.03	390.36	23.81
Top Width (ft)	59.12	Top Width (ft)	14.07	22.91	22.14
Vel Total (ft/s)	6.26	Avg. Vel. (ft/s)	4.06	7.75	2.53
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)	1.30	2.20	0.42
Conv. Total (cfs)	3502.6	Conv. (cfs)	531.2	2800.7	170.8
Length Wtd. (ft)	266.15	Wetted Per. (ft)	14.28	23.04	22.21
Min Ch El (ft)	2744.04	Shear (lb/sq ft)	1.55	2.65	0.51
Alpha	1.30	Stream Power (lb/ft s)	161.02	0.00	0.00
Frctn Loss (ft)	3.16	Cum Volume (acre-ft)	5.89	8.68	4.21
C & E Loss (ft)	0.04	Cum SA (acres)	7.74	6.11	6.22

Plan: Default Scenario Reach K Reach K RS: 1129 Profile: 1

E.G. Elev (ft)	2743.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	2743.06	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2743.19	Flow Area (sq ft)	26.12	46.00	26.70
E.G. Slope (ft/ft)	0.010148	Area (sq ft)	26.12	46.00	26.70
Q Total (cfs)	488.20	Flow (cfs)	49.07	377.21	61.92
Top Width (ft)	86.63	Top Width (ft)	39.82	17.14	29.67
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)	1.88	8.20	2.32
Max Chl Dpth (ft)	2.93	Hydr. Depth (ft)	0.66	2.68	0.90
Conv. Total (cfs)	4846.2	Conv. (cfs)	487.1	3744.4	614.7
Length Wtd. (ft)	299.09	Wetted Per. (ft)	39.98	17.33	29.80
Min Ch El (ft)	2740.13	Shear (lb/sq ft)	0.41	1.68	0.57
Alpha	2.17	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.64	Cum Volume (acre-ft)	5.75	8.39	4.10
C & E Loss (ft)	0.00	Cum SA (acres)	7.57	5.99	6.06

Plan: Default Scenario Reach K Reach K RS: 1128 Profile: 1

E.G. Elev (ft)	2737.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2737.07	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2737.24	Flow Area (sq ft)	51.16	18.82	0.11
E.G. Slope (ft/ft)	0.057319	Area (sq ft)	51.16	18.82	0.11
Q Total (cfs)	488.20	Flow (cfs)	330.30	157.71	0.19
Top Width (ft)	95.30	Top Width (ft)	69.17	25.01	1.13
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	6.46	8.38	1.67
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)	0.74	0.75	0.10
Conv. Total (cfs)	2039.1	Conv. (cfs)	1379.6	658.7	0.8
Length Wtd. (ft)	299.09	Wetted Per. (ft)	69.32	25.13	1.14
Min Ch El (ft)	2736.07	Shear (lb/sq ft)	2.64	2.68	0.35
Alpha	1.05	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	6.01	Cum Volume (acre-ft)	5.49	8.17	4.01
C & E Loss (ft)	0.01	Cum SA (acres)	7.20	5.84	5.96

Plan: Default Scenario Reach K Reach K RS: 1127 Profile: 1

E.G. Elev (ft)	2733.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.060	0.030	0.060
W.S. Elev (ft)	2732.78	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2732.62	Flow Area (sq ft)	46.29	40.27	23.98
E.G. Slope (ft/ft)	0.011912	Area (sq ft)	46.29	40.27	23.98
Q Total (cfs)	488.20	Flow (cfs)	142.91	294.04	51.25
Top Width (ft)	97.49	Top Width (ft)	37.82	25.59	34.08
Vel Total (ft/s)	4.42	Avg. Vel. (ft/s)	3.09	7.30	2.14
Max Chl Dpth (ft)	2.33	Hydr. Depth (ft)	1.22	1.57	0.70
Conv. Total (cfs)	4473.0	Conv. (cfs)	1309.4	2694.1	469.5
Length Wtd. (ft)	299.09	Wetted Per. (ft)	37.91	25.65	34.13
Min Ch El (ft)	2730.45	Shear (lb/sq ft)	0.91	1.17	0.52
Alpha	1.81	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.53	Cum Volume (acre-ft)	5.15	7.96	3.92
C & E Loss (ft)	0.07	Cum SA (acres)	6.83	5.67	5.84

Plan: Default Scenario Reach K Reach K RS: 1126 Profile: 1

E.G. Elev (ft)	2728.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2728.42	Reach Len. (ft)	304.80	304.80	304.80
Crit W.S. (ft)	2728.30	Flow Area (sq ft)	57.38	28.18	27.65
E.G. Slope (ft/ft)	0.019861	Area (sq ft)	57.38	28.18	27.65
Q Total (cfs)	488.20	Flow (cfs)	214.81	155.65	117.74
Top Width (ft)	142.67	Top Width (ft)	79.46	31.77	31.45
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)	3.74	5.52	4.26
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)	0.72	0.89	0.88
Conv. Total (cfs)	3464.1	Conv. (cfs)	1524.3	1104.5	835.4
Length Wtd. (ft)	304.80	Wetted Per. (ft)	79.53	31.78	31.60
Min Ch El (ft)	2727.36	Shear (lb/sq ft)	0.89	1.10	1.09
Alpha	1.09	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	6.05	Cum Volume (acre-ft)	4.80	7.73	3.75
C & E Loss (ft)	0.01	Cum SA (acres)	6.43	5.47	5.61

Plan: Default Scenario Reach K Reach K RS: 1125 Profile: 1

E.G. Elev (ft)	2722.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.	0.060	0.035	
W.S. Elev (ft)	2722.31	Reach Len. (ft)	293.38	293.38	293.38
Crit W.S. (ft)	2722.18	Flow Area (sq ft)	55.94	48.41	
E.G. Slope (ft/ft)	0.019810	Area (sq ft)	55.94	48.41	
Q Total (cfs)	488.20	Flow (cfs)	216.68	271.52	
Top Width (ft)	100.84	Top Width (ft)	47.65	53.19	
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)	3.87	5.61	
Max Chl Dpth (ft)	1.64	Hydr. Depth (ft)	1.17	0.91	
Conv. Total (cfs)	3468.6	Conv. (cfs)	1539.5	1929.1	
Length Wtd. (ft)	293.38	Wetted Per. (ft)	47.74	53.23	
Min Ch El (ft)	2720.67	Shear (lb/sq ft)	1.45	1.12	
Alpha	1.10	Stream Power (lb/ft s)	217.45	0.00	0.00
Frctn Loss (ft)	4.59	Cum Volume (acre-ft)	4.40	7.46	3.65
C & E Loss (ft)	0.00	Cum SA (acres)	5.98	5.18	5.50

Plan: Default Scenario Reach K Reach K RS: 1124 Profile: 1

E.G. Elev (ft)	2718.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.045	0.035	0.060
W.S. Elev (ft)	2717.69	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2717.69	Flow Area (sq ft)	38.61	59.07	20.52
E.G. Slope (ft/ft)	0.012655	Area (sq ft)	38.61	59.07	20.52
Q Total (cfs)	488.20	Flow (cfs)	96.02	347.15	45.03
Top Width (ft)	143.01	Top Width (ft)	70.47	43.20	29.34
Vel Total (ft/s)	4.13	Avg. Vel. (ft/s)	2.49	5.88	2.19
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)	0.55	1.37	0.70
Conv. Total (cfs)	4339.8	Conv. (cfs)	853.6	3086.0	400.3
Length Wtd. (ft)	299.09	Wetted Per. (ft)	70.50	43.27	29.37
Min Ch El (ft)	2715.90	Shear (lb/sq ft)	0.43	1.08	0.55
Alpha	1.54	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.11	Cum Volume (acre-ft)	4.08	7.10	3.58
C & E Loss (ft)	0.01	Cum SA (acres)	5.59	4.85	5.40

Plan: Default Scenario Reach K Reach K RS: 1123 Profile: 1

E.G. Elev (ft)	2713.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2712.79	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2712.76	Flow Area (sq ft)	72.77	35.83	2.66
E.G. Slope (ft/ft)	0.014941	Area (sq ft)	72.77	35.83	2.66
Q Total (cfs)	488.20	Flow (cfs)	254.09	226.76	7.35
Top Width (ft)	121.50	Top Width (ft)	90.39	26.56	4.55
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	3.49	6.33	2.77
Max Chl Dpth (ft)	1.71	Hydr. Depth (ft)	0.81	1.35	0.58
Conv. Total (cfs)	3994.1	Conv. (cfs)	2078.8	1855.2	60.1
Length Wtd. (ft)	299.09	Wetted Per. (ft)	90.45	26.60	4.68
Min Ch El (ft)	2711.08	Shear (lb/sq ft)	0.75	1.26	0.53
Alpha	1.30	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.83	Cum Volume (acre-ft)	3.70	6.77	3.50
C & E Loss (ft)	0.01	Cum SA (acres)	5.03	4.61	5.29

Plan: Default Scenario Reach K Reach K RS: 1122 Profile: 1

E.G. Elev (ft)	2708.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.045	0.035	0.060
W.S. Elev (ft)	2708.00	Reach Len. (ft)	393.12	393.12	393.12
Crit W.S. (ft)	2707.90	Flow Area (sq ft)	29.64	25.87	64.25
E.G. Slope (ft/ft)	0.017474	Area (sq ft)	29.64	25.87	64.25
Q Total (cfs)	488.20	Flow (cfs)	100.93	169.69	217.58
Top Width (ft)	124.41	Top Width (ft)	42.97	20.46	60.97
Vel Total (ft/s)	4.08	Avg. Vel. (ft/s)	3.41	6.56	3.39
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)	0.69	1.26	1.05
Conv. Total (cfs)	3693.2	Conv. (cfs)	763.6	1283.7	1646.0
Length Wtd. (ft)	393.12	Wetted Per. (ft)	43.00	20.48	61.06
Min Ch El (ft)	2706.55	Shear (lb/sq ft)	0.75	1.38	1.15
Alpha	1.35	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	7.66	Cum Volume (acre-ft)	3.35	6.56	3.27
C & E Loss (ft)	0.01	Cum SA (acres)	4.58	4.45	5.06

Plan: Default Scenario Reach K Reach K RS: 1121 Profile: 1

E.G. Elev (ft)	2700.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	2700.28	Reach Len. (ft)	244.11	244.11	244.11
Crit W.S. (ft)	2700.28	Flow Area (sq ft)	45.79	24.65	50.35
E.G. Slope (ft/ft)	0.021850	Area (sq ft)	45.79	24.65	50.35
Q Total (cfs)	488.20	Flow (cfs)	140.61	180.36	167.23
Top Width (ft)	137.29	Top Width (ft)	59.54	19.57	58.18
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)	3.07	7.32	3.32
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)	0.77	1.26	0.87
Conv. Total (cfs)	3302.7	Conv. (cfs)	951.2	1220.1	1131.3
Length Wtd. (ft)	244.11	Wetted Per. (ft)	59.62	19.58	58.27
Min Ch El (ft)	2698.83	Shear (lb/sq ft)	1.05	1.72	1.18
Alpha	1.61	Stream Power (lb/ft s)	207.12	0.00	0.00
Frctn Loss (ft)	4.27	Cum Volume (acre-ft)	3.01	6.33	2.75
C & E Loss (ft)	0.04	Cum SA (acres)	4.11	4.27	4.53

Plan: Default Scenario Reach K Reach K RS: 1120 Profile: 1

E.G. Elev (ft)	2695.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2694.74	Reach Len. (ft)	260.03	260.03	260.03
Crit W.S. (ft)	2694.88	Flow Area (sq ft)	31.29	29.81	6.60
E.G. Slope (ft/ft)	0.018361	Area (sq ft)	31.29	29.81	6.60
Q Total (cfs)	488.20	Flow (cfs)	182.71	281.25	24.24
Top Width (ft)	43.63	Top Width (ft)	20.77	14.14	8.72
Vel Total (ft/s)	7.21	Avg. Vel. (ft/s)	5.84	9.44	3.67
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)	1.51	2.11	0.76
Conv. Total (cfs)	3602.9	Conv. (cfs)	1348.4	2075.6	178.9
Length Wtd. (ft)	260.03	Wetted Per. (ft)	20.99	14.19	8.89
Min Ch El (ft)	2692.43	Shear (lb/sq ft)	1.71	2.41	0.85
Alpha	1.24	Stream Power (lb/ft s)	131.19	0.00	0.00
Frctn Loss (ft)	4.88	Cum Volume (acre-ft)	2.79	6.18	2.59
C & E Loss (ft)	0.06	Cum SA (acres)	3.89	4.18	4.34

Plan: Default Scenario Reach K Reach K RS: 1119 Profile: 1

E.G. Elev (ft)	2691.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.	0.045	0.035	0.060
W.S. Elev (ft)	2690.03	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2690.15	Flow Area (sq ft)	0.02	47.01	11.59
E.G. Slope (ft/ft)	0.015509	Area (sq ft)	0.02	47.01	11.59
Q Total (cfs)	488.20	Flow (cfs)	0.01	447.88	40.31
Top Width (ft)	28.38	Top Width (ft)	0.12	18.92	9.35
Vel Total (ft/s)	8.33	Avg. Vel. (ft/s)	0.59	9.53	3.48
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)	0.16	2.48	1.24
Conv. Total (cfs)	3920.2	Conv. (cfs)	0.1	3596.4	323.7
Length Wtd. (ft)	299.09	Wetted Per. (ft)	0.34	19.44	9.68
Min Ch El (ft)	2686.66	Shear (lb/sq ft)	0.05	2.34	1.16
Alpha	1.21	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.38	Cum Volume (acre-ft)	2.70	5.95	2.54
C & E Loss (ft)	0.03	Cum SA (acres)	3.83	4.08	4.28

Plan: Default Scenario Reach K Reach K RS: 1118 Profile: 1

E.G. Elev (ft)	2685.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	2684.37	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2684.82	Flow Area (sq ft)	8.21	41.94	5.70
E.G. Slope (ft/ft)	0.020486	Area (sq ft)	8.21	41.94	5.70
Q Total (cfs)	488.20	Flow (cfs)	24.25	447.29	16.65
Top Width (ft)	35.90	Top Width (ft)	10.59	17.87	7.43
Vel Total (ft/s)	8.74	Avg. Vel. (ft/s)	2.95	10.66	2.92
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)	0.77	2.35	0.77
Conv. Total (cfs)	3410.9	Conv. (cfs)	169.5	3125.1	116.4
Length Wtd. (ft)	299.09	Wetted Per. (ft)	10.78	18.04	7.63
Min Ch El (ft)	2681.51	Shear (lb/sq ft)	0.97	2.97	0.96
Alpha	1.37	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	5.31	Cum Volume (acre-ft)	2.67	5.65	2.48
C & E Loss (ft)	0.03	Cum SA (acres)	3.79	3.95	4.23

Plan: Default Scenario Reach K Reach K RS: 1117 Profile: 1

E.G. Elev (ft)	2681.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	2680.52	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2680.52	Flow Area (sq ft)	19.93	41.20	21.78
E.G. Slope (ft/ft)	0.011570	Area (sq ft)	19.93	41.20	21.78
Q Total (cfs)	488.20	Flow (cfs)	64.84	357.87	65.49
Top Width (ft)	48.14	Top Width (ft)	14.56	15.58	18.00
Vel Total (ft/s)	5.89	Avg. Vel. (ft/s)	3.25	8.69	3.01
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)	1.37	2.64	1.21
Conv. Total (cfs)	4538.7	Conv. (cfs)	602.8	3327.1	608.9
Length Wtd. (ft)	299.09	Wetted Per. (ft)	14.76	15.70	18.17
Min Ch El (ft)	2677.50	Shear (lb/sq ft)	0.98	1.90	0.87
Alpha	1.67	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.06	Cum Volume (acre-ft)	2.58	5.36	2.39
C & E Loss (ft)	0.06	Cum SA (acres)	3.70	3.84	4.14

Plan: Default Scenario Reach K Reach K RS: 1116 Profile: 1

E.G. Elev (ft)	2677.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.	0.045	0.030	0.060
W.S. Elev (ft)	2676.40	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2676.65	Flow Area (sq ft)	15.70	44.40	10.19
E.G. Slope (ft/ft)	0.015393	Area (sq ft)	15.70	44.40	10.19
Q Total (cfs)	488.20	Flow (cfs)	83.44	391.16	13.59
Top Width (ft)	71.45	Top Width (ft)	10.27	25.57	35.61
Vel Total (ft/s)	6.95	Avg. Vel. (ft/s)	5.31	8.81	1.33
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	1.53	1.74	0.29
Conv. Total (cfs)	3934.9	Conv. (cfs)	672.6	3152.8	109.6
Length Wtd. (ft)	299.09	Wetted Per. (ft)	10.63	25.87	35.62
Min Ch El (ft)	2673.35	Shear (lb/sq ft)	1.42	1.65	0.27
Alpha	1.39	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.97	Cum Volume (acre-ft)	2.45	5.07	2.28
C & E Loss (ft)	0.01	Cum SA (acres)	3.62	3.69	3.95

Plan: Default Scenario Reach K Reach K RS: 1115 Profile: 1

E.G. Elev (ft)	2673.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	2672.90	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2672.69	Flow Area (sq ft)	42.23	46.26	27.28
E.G. Slope (ft/ft)	0.007916	Area (sq ft)	42.23	46.26	27.28
Q Total (cfs)	488.20	Flow (cfs)	123.15	312.85	52.21
Top Width (ft)	80.32	Top Width (ft)	27.54	19.14	33.65
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)	2.92	6.76	1.91
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)	1.53	2.42	0.81
Conv. Total (cfs)	5487.0	Conv. (cfs)	1384.1	3516.2	586.8
Length Wtd. (ft)	299.09	Wetted Per. (ft)	27.73	19.32	33.70
Min Ch El (ft)	2669.92	Shear (lb/sq ft)	0.75	1.18	0.40
Alpha	1.79	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)	2.25	4.75	2.15
C & E Loss (ft)	0.00	Cum SA (acres)	3.49	3.54	3.72

Plan: Default Scenario Reach K Reach K RS: 1114 Profile: 1

E.G. Elev (ft)	2669.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.060	0.035	0.045
W.S. Elev (ft)	2669.40	Reach Len. (ft)	276.66	276.66	276.66
Crit W.S. (ft)	2669.40	Flow Area (sq ft)	16.33	70.45	1.21
E.G. Slope (ft/ft)	0.018343	Area (sq ft)	16.33	70.45	1.21
Q Total (cfs)	488.20	Flow (cfs)	51.58	434.05	2.57
Top Width (ft)	84.33	Top Width (ft)	17.78	62.92	3.63
Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)	3.16	6.16	2.13
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)	0.92	1.12	0.33
Conv. Total (cfs)	3604.6	Conv. (cfs)	380.8	3204.8	19.0
Length Wtd. (ft)	276.66	Wetted Per. (ft)	17.86	63.51	3.69
Min Ch El (ft)	2666.95	Shear (lb/sq ft)	1.05	1.27	0.38
Alpha	1.13	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.81	Cum Volume (acre-ft)	2.05	4.35	2.05
C & E Loss (ft)	0.04	Cum SA (acres)	3.33	3.26	3.59

Plan: Default Scenario Reach K Reach K RS: 1113 Profile: 1

E.G. Elev (ft)	2665.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2665.34	Reach Len. (ft)	321.51	321.51	321.51
Crit W.S. (ft)	2665.38	Flow Area (sq ft)	17.94	75.73	2.31
E.G. Slope (ft/ft)	0.012333	Area (sq ft)	17.94	75.73	2.31
Q Total (cfs)	488.20	Flow (cfs)	50.72	433.10	4.38
Top Width (ft)	131.47	Top Width (ft)	48.68	71.39	11.40
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)	2.83	5.72	1.90
Max Chl Dpth (ft)	1.46	Hydr. Depth (ft)	0.37	1.06	0.20
Conv. Total (cfs)	4396.0	Conv. (cfs)	456.7	3899.8	39.5
Length Wtd. (ft)	321.51	Wetted Per. (ft)	48.68	71.43	11.41
Min Ch El (ft)	2663.88	Shear (lb/sq ft)	0.28	0.82	0.16
Alpha	1.15	Stream Power (lb/ft s)	299.45	0.00	0.00
Frctn Loss (ft)	4.12	Cum Volume (acre-ft)	1.94	3.89	2.04
C & E Loss (ft)	0.02	Cum SA (acres)	3.12	2.83	3.54

Plan: Default Scenario Reach K Reach K RS: 1112 Profile: 1

E.G. Elev (ft)	2657.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2655.60	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2656.03	Flow Area (sq ft)	0.09	49.39	0.92
E.G. Slope (ft/ft)	0.096982	Area (sq ft)	0.09	49.39	0.92
Q Total (cfs)	488.20	Flow (cfs)	0.18	484.79	3.23
Top Width (ft)	56.19	Top Width (ft)	0.61	52.67	2.91
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)	2.01	9.82	3.51
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)	0.15	0.94	0.32
Conv. Total (cfs)	1567.7	Conv. (cfs)	0.6	1556.7	10.4
Length Wtd. (ft)	299.09	Wetted Per. (ft)	0.68	52.96	2.99
Min Ch El (ft)	2654.01	Shear (lb/sq ft)	0.80	5.65	1.86
Alpha	1.02	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	8.62	Cum Volume (acre-ft)	1.88	3.43	2.03
C & E Loss (ft)	0.10	Cum SA (acres)	2.94	2.38	3.49

Plan: Default Scenario Reach K Reach K RS: 1111 Profile: 1

E.G. Elev (ft)	2653.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.	0.045	0.035	0.060
W.S. Elev (ft)	2651.92	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2651.92	Flow Area (sq ft)	8.41	40.28	11.55
E.G. Slope (ft/ft)	0.010852	Area (sq ft)	8.41	40.28	11.55
Q Total (cfs)	488.20	Flow (cfs)	32.37	419.20	36.64
Top Width (ft)	24.77	Top Width (ft)	6.37	10.49	7.91
Vel Total (ft/s)	8.10	Avg. Vel. (ft/s)	3.85	10.41	3.17
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)	1.32	3.84	1.46
Conv. Total (cfs)	4686.4	Conv. (cfs)	310.7	4024.0	351.7
Length Wtd. (ft)	299.09	Wetted Per. (ft)	7.10	11.16	8.47
Min Ch El (ft)	2647.21	Shear (lb/sq ft)	0.80	2.45	0.92
Alpha	1.44	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.29	Cum Volume (acre-ft)	1.85	3.12	1.98
C & E Loss (ft)	0.06	Cum SA (acres)	2.92	2.16	3.45

Plan: Default Scenario Reach K Reach K RS: 1110 Profile: 1

E.G. Elev (ft)	2648.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.00	Wt. n-Val.	0.060	0.035	0.060
W.S. Elev (ft)	2646.85	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2647.38	Flow Area (sq ft)	4.56	40.05	3.01
E.G. Slope (ft/ft)	0.021965	Area (sq ft)	4.56	40.05	3.01
Q Total (cfs)	488.20	Flow (cfs)	15.30	465.20	7.70
Top Width (ft)	25.35	Top Width (ft)	4.87	15.47	5.01
Vel Total (ft/s)	10.25	Avg. Vel. (ft/s)	3.35	11.61	2.56
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)	0.94	2.59	0.60
Conv. Total (cfs)	3294.0	Conv. (cfs)	103.3	3138.8	51.9
Length Wtd. (ft)	299.09	Wetted Per. (ft)	5.22	15.97	5.16
Min Ch El (ft)	2643.50	Shear (lb/sq ft)	1.20	3.44	0.80
Alpha	1.23	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.48	Cum Volume (acre-ft)	1.80	2.84	1.93
C & E Loss (ft)	0.05	Cum SA (acres)	2.88	2.07	3.41

Plan: Default Scenario Reach K Reach K RS: 1109 Profile: 1

E.G. Elev (ft)	2643.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.	0.045	0.030	0.045
W.S. Elev (ft)	2642.92	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2642.94	Flow Area (sq ft)	44.47	29.83	17.94
E.G. Slope (ft/ft)	0.012452	Area (sq ft)	44.47	29.83	17.94
Q Total (cfs)	488.20	Flow (cfs)	166.06	254.49	67.65
Top Width (ft)	76.40	Top Width (ft)	43.64	15.56	17.20
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)	3.73	8.53	3.77
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)	1.02	1.92	1.04
Conv. Total (cfs)	4374.9	Conv. (cfs)	1488.1	2280.6	606.2
Length Wtd. (ft)	299.09	Wetted Per. (ft)	44.04	15.56	17.33
Min Ch El (ft)	2640.92	Shear (lb/sq ft)	0.78	1.49	0.80
Alpha	1.59	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.85	Cum Volume (acre-ft)	1.64	2.60	1.86
C & E Loss (ft)	0.39	Cum SA (acres)	2.71	1.96	3.33

Plan: Default Scenario Reach K Reach K RS: 1108 Profile: 1

E.G. Elev (ft)	2638.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2638.29	Reach Len. (ft)	311.67	311.67	311.67
Crit W.S. (ft)	2638.35	Flow Area (sq ft)	30.26	54.98	0.89
E.G. Slope (ft/ft)	0.020512	Area (sq ft)	30.26	54.98	0.89
Q Total (cfs)	488.20	Flow (cfs)	117.18	369.63	1.39
Top Width (ft)	92.71	Top Width (ft)	40.76	47.23	4.72
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)	3.87	6.72	1.56
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)	0.74	1.16	0.19
Conv. Total (cfs)	3408.8	Conv. (cfs)	818.2	2580.9	9.7
Length Wtd. (ft)	311.67	Wetted Per. (ft)	40.84	47.28	4.73
Min Ch El (ft)	2636.81	Shear (lb/sq ft)	0.95	1.49	0.24
Alpha	1.18	Stream Power (lb/ft s)	208.29	0.00	0.00
Frctn Loss (ft)	4.71	Cum Volume (acre-ft)	1.38	2.31	1.80
C & E Loss (ft)	0.03	Cum SA (acres)	2.42	1.75	3.26

Plan: Default Scenario Reach K Reach K RS: 1107 Profile: 1

E.G. Elev (ft)	2634.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2634.08	Reach Len. (ft)	286.51	286.51	286.51
Crit W.S. (ft)	2634.22	Flow Area (sq ft)	9.25	68.42	2.14
E.G. Slope (ft/ft)	0.009085	Area (sq ft)	9.25	68.42	2.14
Q Total (cfs)	488.20	Flow (cfs)	14.40	469.06	4.73
Top Width (ft)	94.23	Top Width (ft)	48.77	38.85	6.61
Vel Total (ft/s)	6.12	Avg. Vel. (ft/s)	1.56	6.86	2.22
Max Chl Dpth (ft)	2.33	Hydr. Depth (ft)	0.19	1.76	0.32
Conv. Total (cfs)	5122.0	Conv. (cfs)	151.1	4921.2	49.7
Length Wtd. (ft)	286.51	Wetted Per. (ft)	48.78	39.11	6.65
Min Ch El (ft)	2631.75	Shear (lb/sq ft)	0.11	0.99	0.18
Alpha	1.21	Stream Power (lb/ft s)	187.81	0.00	0.00
Frctn Loss (ft)	4.08	Cum Volume (acre-ft)	1.24	1.87	1.79
C & E Loss (ft)	0.01	Cum SA (acres)	2.10	1.44	3.22

Plan: Default Scenario Reach K Reach K RS: 1106 Profile: 1

E.G. Elev (ft)	2629.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.045	
W.S. Elev (ft)	2627.62	Reach Len. (ft)	299.09	299.09	299.09
Crit W.S. (ft)	2628.12	Flow Area (sq ft)		48.08	
E.G. Slope (ft/ft)	0.062825	Area (sq ft)		48.08	
Q Total (cfs)	488.20	Flow (cfs)		488.20	
Top Width (ft)	35.01	Top Width (ft)		35.01	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	1947.7	Conv. (cfs)		1947.7	
Length Wtd. (ft)	299.09	Wetted Per. (ft)		35.39	
Min Ch El (ft)	2625.36	Shear (lb/sq ft)		5.33	
Alpha	1.00	Stream Power (lb/ft s)	200.49	0.00	0.00
Frctn Loss (ft)	5.47	Cum Volume (acre-ft)	1.21	1.49	1.78
C & E Loss (ft)	0.09	Cum SA (acres)	1.94	1.20	3.19

Plan: Default Scenario Reach K Reach K RS: 1105 Profile: 1

E.G. Elev (ft)	2624.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.045	0.045	0.045
W.S. Elev (ft)	2623.89	Reach Len. (ft)	279.21	279.21	279.21
Crit W.S. (ft)	2623.89	Flow Area (sq ft)	38.14	32.93	60.17
E.G. Slope (ft/ft)	0.011355	Area (sq ft)	38.14	32.93	60.17
Q Total (cfs)	488.20	Flow (cfs)	111.68	213.37	163.15
Top Width (ft)	173.66	Top Width (ft)	50.15	13.13	110.38
Vel Total (ft/s)	3.72	Avg. Vel. (ft/s)	2.93	6.48	2.71
Max Chl Dpth (ft)	2.68	Hydr. Depth (ft)	0.76	2.51	0.55
Conv. Total (cfs)	4581.5	Conv. (cfs)	1048.1	2002.4	1531.0
Length Wtd. (ft)	279.21	Wetted Per. (ft)	50.25	13.18	110.52
Min Ch El (ft)	2621.21	Shear (lb/sq ft)	0.54	1.77	0.39
Alpha	1.65	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	3.38	Cum Volume (acre-ft)	1.08	1.21	1.57
C & E Loss (ft)	0.01	Cum SA (acres)	1.77	1.03	2.81

Plan: Default Scenario Reach K Reach K RS: 1104 Profile: 1

E.G. Elev (ft)	2619.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2618.17	Reach Len. (ft)	318.97	318.97	318.97
Crit W.S. (ft)	2618.49	Flow Area (sq ft)	19.56	43.85	6.73
E.G. Slope (ft/ft)	0.032890	Area (sq ft)	19.56	43.85	6.73
Q Total (cfs)	488.20	Flow (cfs)	95.91	379.29	12.99
Top Width (ft)	100.17	Top Width (ft)	26.27	36.60	37.30
Vel Total (ft/s)	6.96	Avg. Vel. (ft/s)	4.90	8.65	1.93
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)	0.74	1.20	0.18
Conv. Total (cfs)	2691.9	Conv. (cfs)	528.9	2091.4	71.7
Length Wtd. (ft)	318.97	Wetted Per. (ft)	26.40	36.82	37.33
Min Ch El (ft)	2616.28	Shear (lb/sq ft)	1.52	2.45	0.37
Alpha	1.30	Stream Power (lb/ft s)	284.08	0.00	0.00
Frctn Loss (ft)	5.03	Cum Volume (acre-ft)	0.89	0.96	1.36
C & E Loss (ft)	0.06	Cum SA (acres)	1.52	0.87	2.34

Plan: Default Scenario Reach K Reach K RS: 1103 Profile: 1

E.G. Elev (ft)	2613.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.045	0.030	0.045
W.S. Elev (ft)	2612.56	Reach Len. (ft)	225.02	225.02	225.02
Crit W.S. (ft)	2612.56	Flow Area (sq ft)	61.45	16.46	14.20
E.G. Slope (ft/ft)	0.026294	Area (sq ft)	61.45	16.46	14.20
Q Total (cfs)	488.20	Flow (cfs)	304.58	118.71	64.91
Top Width (ft)	105.85	Top Width (ft)	68.79	19.26	17.80
Vel Total (ft/s)	5.30	Avg. Vel. (ft/s)	4.96	7.21	4.57
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)	0.89	0.85	0.80
Conv. Total (cfs)	3010.7	Conv. (cfs)	1878.3	732.1	400.3
Length Wtd. (ft)	225.02	Wetted Per. (ft)	69.00	19.34	18.01
Min Ch El (ft)	2610.94	Shear (lb/sq ft)	1.46	1.40	1.29
Alpha	1.09	Stream Power (lb/ft s)	250.00	0.00	0.00
Frctn Loss (ft)	4.14	Cum Volume (acre-ft)	0.60	0.74	1.28
C & E Loss (ft)	0.09	Cum SA (acres)	1.18	0.67	2.14

Plan: Default Scenario Reach K Reach K RS: 1102 Profile: 1

E.G. Elev (ft)	2607.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2607.67	Reach Len. (ft)	336.34	336.34	336.34
Crit W.S. (ft)	2607.60	Flow Area (sq ft)	0.02	32.92	125.32
E.G. Slope (ft/ft)	0.013614	Area (sq ft)	0.02	32.92	125.32
Q Total (cfs)	488.20	Flow (cfs)	0.01	153.76	334.43
Top Width (ft)	256.68	Top Width (ft)	0.60	35.79	220.29
Vel Total (ft/s)	3.08	Avg. Vel. (ft/s)	0.46	4.67	2.67
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)	0.04	0.92	0.57
Conv. Total (cfs)	4184.1	Conv. (cfs)	0.1	1317.8	2866.2
Length Wtd. (ft)	336.34	Wetted Per. (ft)	0.61	35.95	220.47
Min Ch El (ft)	2606.12	Shear (lb/sq ft)	0.03	0.78	0.48
Alpha	1.23	Stream Power (lb/ft s)	457.23	0.00	0.00
Frctn Loss (ft)	4.50	Cum Volume (acre-ft)	0.44	0.62	0.92
C & E Loss (ft)	0.01	Cum SA (acres)	1.00	0.52	1.52

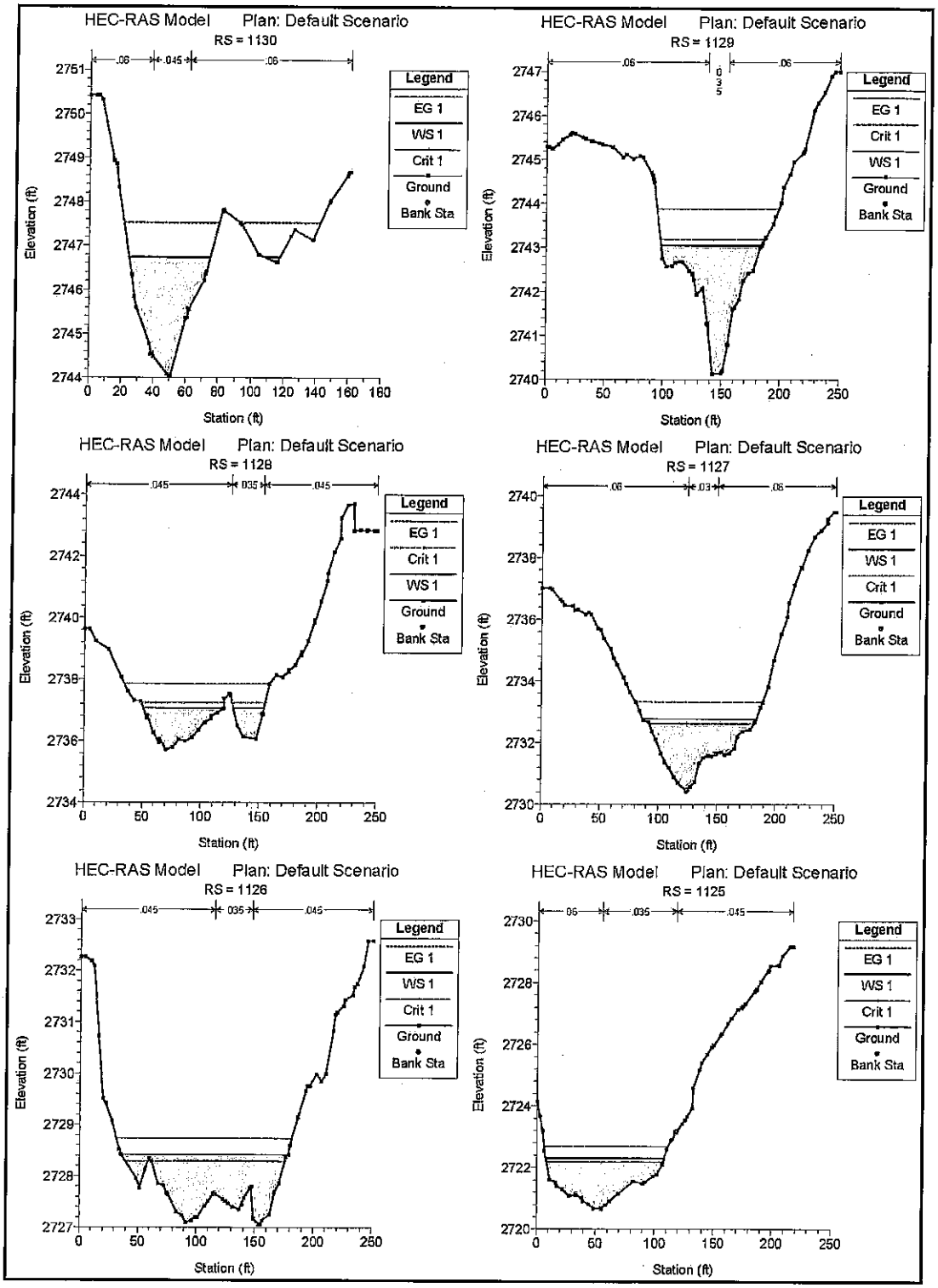
Plan: Default Scenario Reach K Reach K RS: 1101 Profile: 1

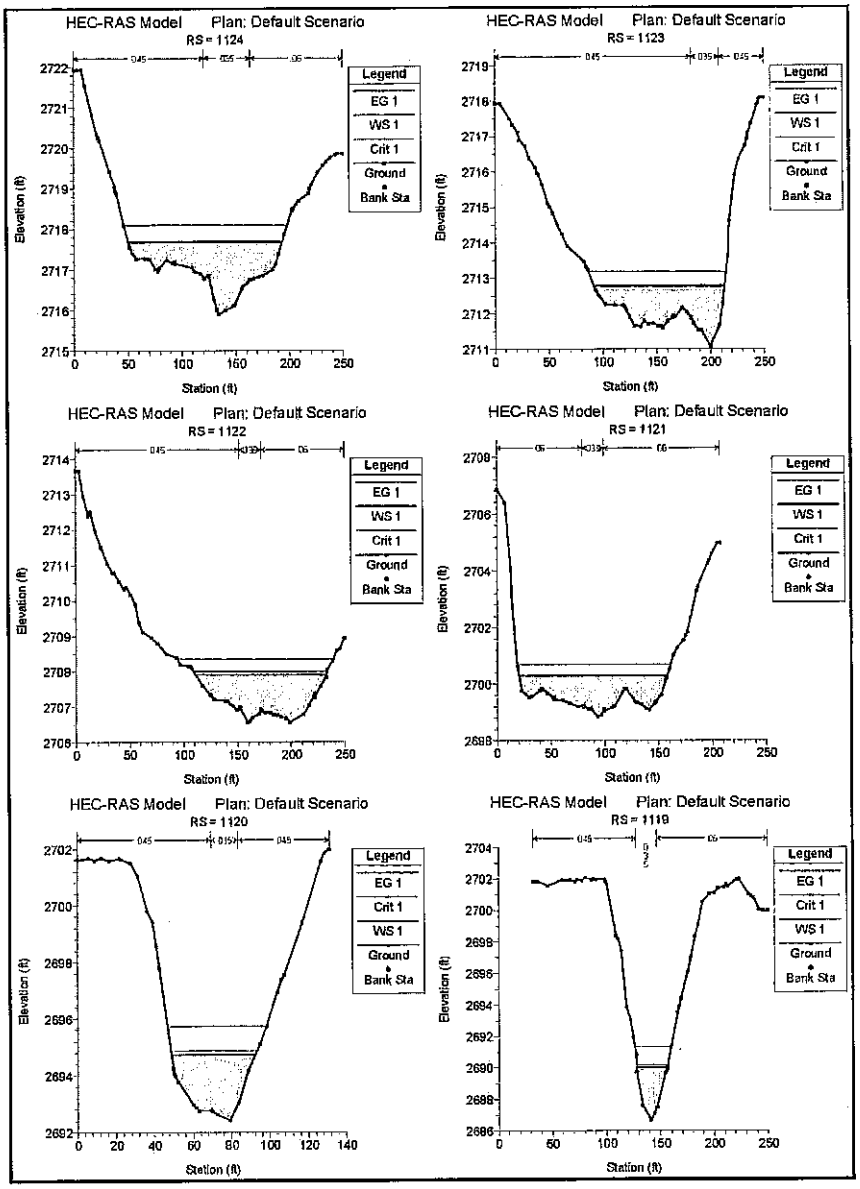
E.G. Elev (ft)	2603.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.045	0.030	0.045
W.S. Elev (ft)	2603.04	Reach Len. (ft)	306.78	306.78	306.78
Crit W.S. (ft)	2603.04	Flow Area (sq ft)	56.06	30.56	58.80
E.G. Slope (ft/ft)	0.013157	Area (sq ft)	56.06	30.56	58.80
Q Total (cfs)	488.20	Flow (cfs)	127.89	192.35	167.96
Top Width (ft)	235.57	Top Width (ft)	119.78	26.17	89.61
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	2.28	6.30	2.86
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)	0.47	1.17	0.66
Conv. Total (cfs)	4256.2	Conv. (cfs)	1114.9	1677.0	1464.3
Length Wtd. (ft)	306.78	Wetted Per. (ft)	119.92	26.20	89.77
Min Ch El (ft)	2601.53	Shear (lb/sq ft)	0.38	0.96	0.54
Alpha	1.76	Stream Power (lb/ft s)	388.90	0.00	0.00
Frctn Loss (ft)	4.16	Cum Volume (acre-ft)	0.22	0.37	0.21
C & E Loss (ft)	0.03	Cum SA (acres)	0.53	0.29	0.33

Plan: Default Scenario Reach K Reach K RS: 1100 Profile: 1

E.G. Elev (ft)	2599.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2598.41	Reach Len. (ft)			
Crit W.S. (ft)	2598.44	Flow Area (sq ft)	6.34	74.87	1.23
E.G. Slope (ft/ft)	0.014912	Area (sq ft)	6.34	74.87	1.23
Q Total (cfs)	488.20	Flow (cfs)	9.85	475.95	2.40
Top Width (ft)	89.62	Top Width (ft)	31.10	54.97	3.55
Vel Total (ft/s)	5.92	Avg. Vel. (ft/s)	1.55	6.36	1.96
Max Chl Dpth (ft)	1.78	Hydr. Depth (ft)	0.20	1.36	0.35
Conv. Total (cfs)	3997.8	Conv. (cfs)	80.6	3897.5	19.7
Length Wtd. (ft)		Wetted Per. (ft)	31.16	55.14	3.62
Min Ch El (ft)	2596.63	Shear (lb/sq ft)	0.19	1.26	0.32
Alpha	1.13	Stream Power (lb/ft s)	238.93	0.00	0.00
Frctn Loss (ft)	4.29	Cum Volume (acre-ft)			
C & E Loss (ft)	0.03	Cum SA (acres)			

CROSS SECTION PLOTS

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WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1123
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1122
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1121
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1120
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
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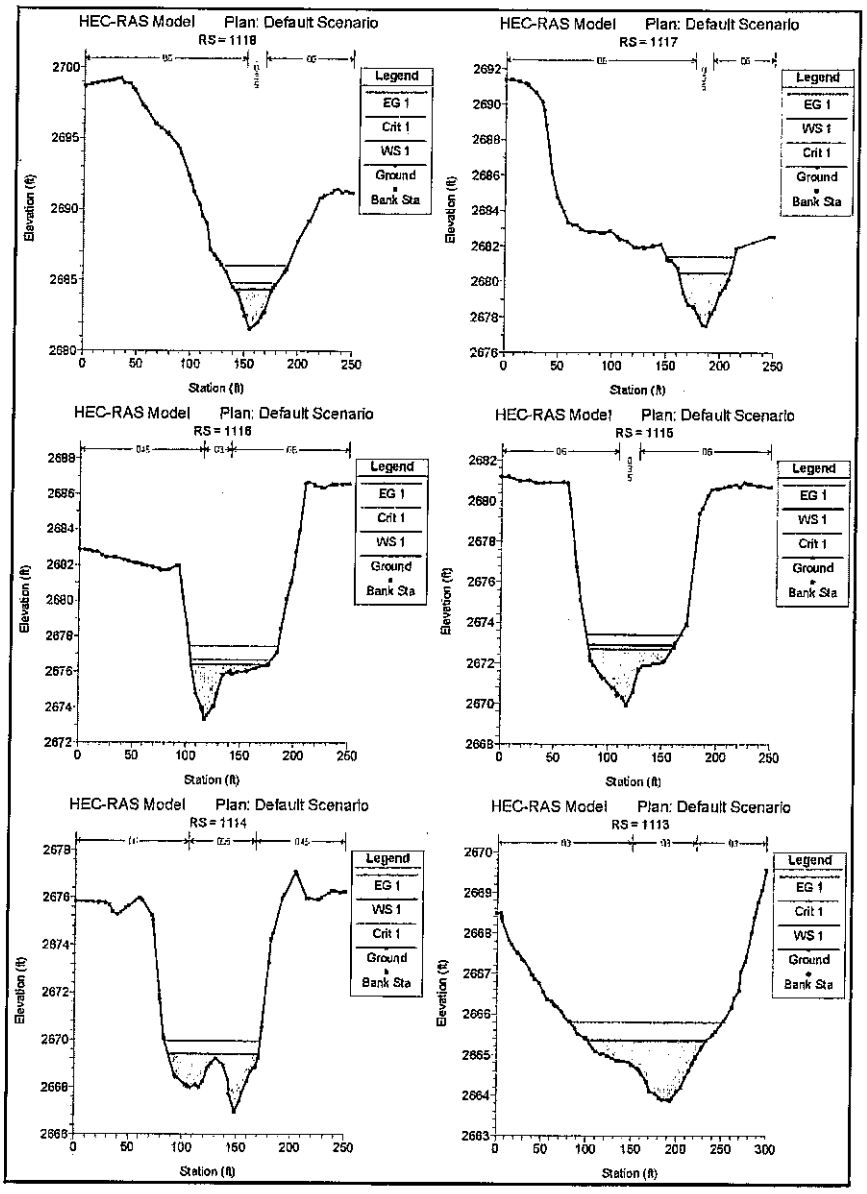
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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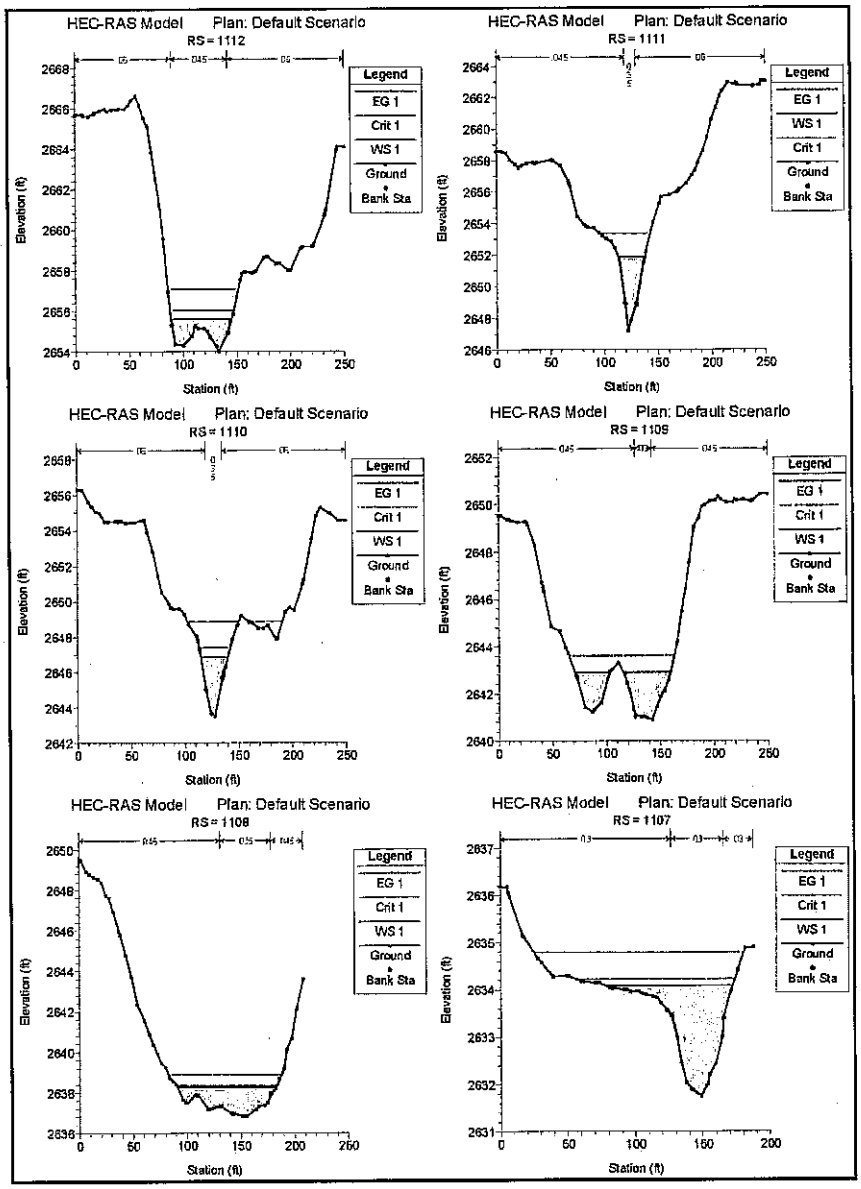
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1117
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1116
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1115
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1114
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1113
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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RS = 1111
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1110
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1109
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1108
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
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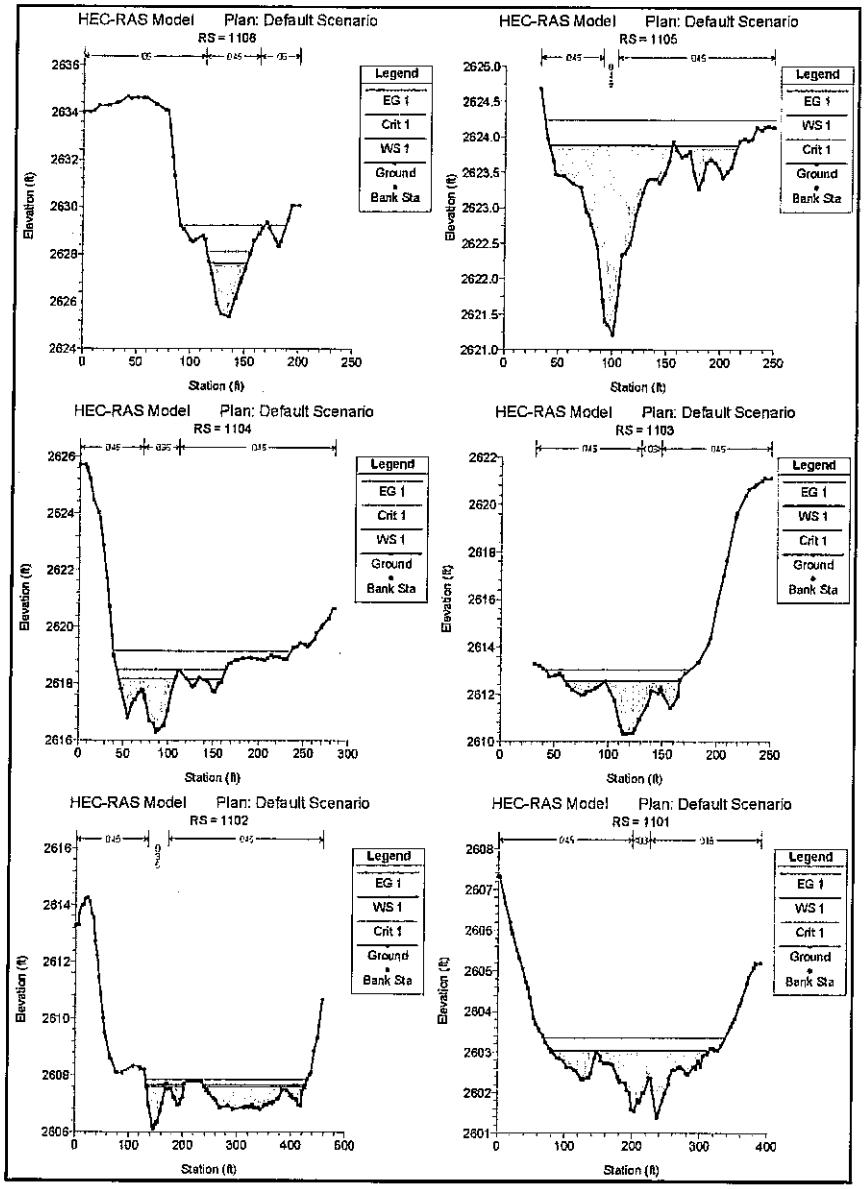
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1105
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1104
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1103
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
RS = 1102
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
HEC-RAS Model Plan: Default Scenario
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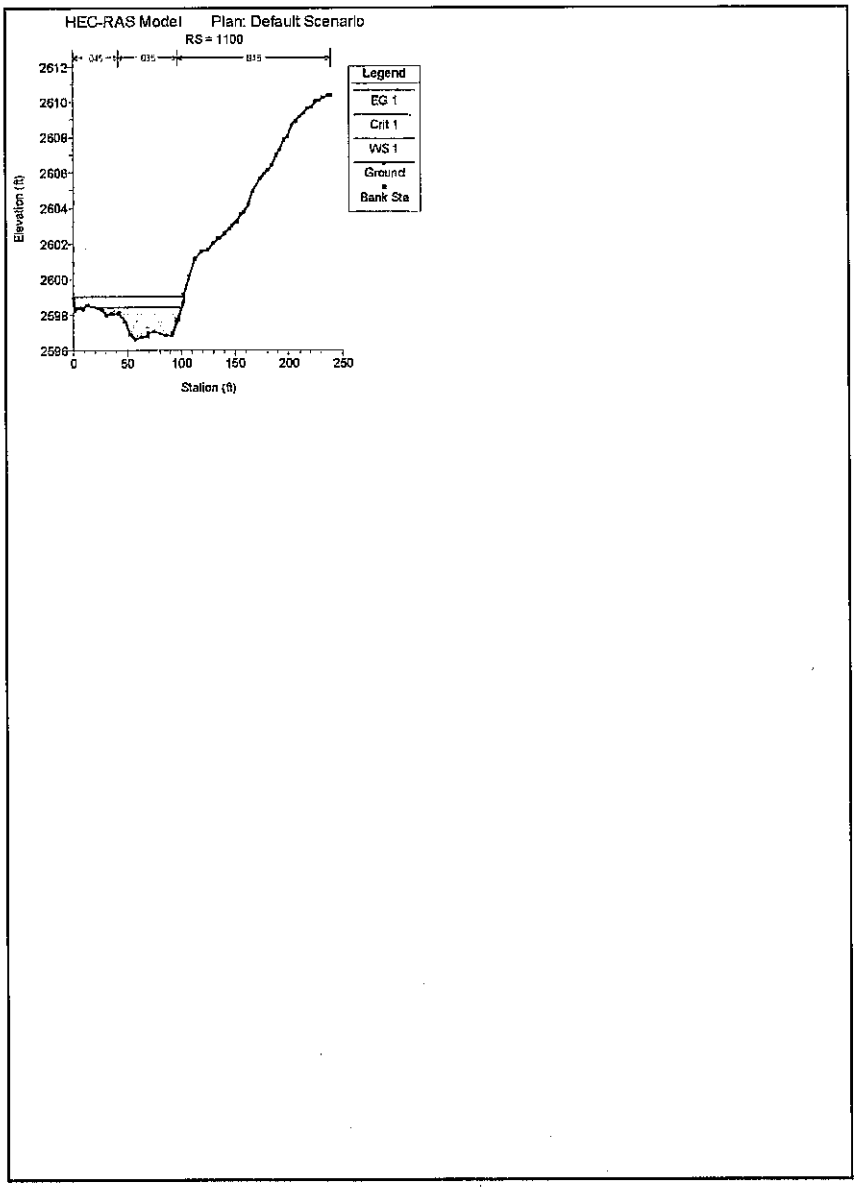
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


HEC-RAS Model Plan: Default Scenario
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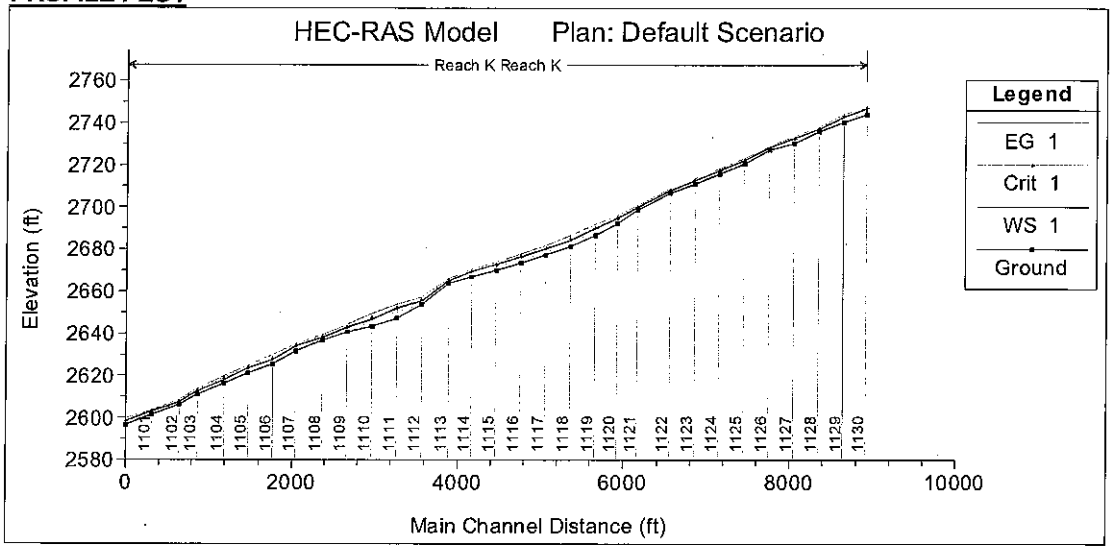
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2612
2610
2608
2606
2604
2602
2600
2598
2596
0
50
100
150
200
250

PROFILE PLOT



STANDARD TABLE 1

HEC-RAS Plan: Default Scenario River: Reach K Reach: Reach K Profile: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach K	1130	1	488.20	2744.04	2746.73	2746.73	2747.52	0.019427	7.75	77.98	59.12	0.92
Reach K	1129	1	488.20	2740.13	2743.06	2743.19	2743.89	0.010148	6.20	98.82	88.63	0.68
Reach K	1128	1	488.20	2736.07	2737.07	2737.24	2737.86	0.057318	9.38	70.09	95.30	1.70
Reach K	1127	1	488.20	2730.45	2732.78	2732.62	2733.33	0.011912	7.30	110.54	97.49	1.03
Reach K	1126	1	488.20	2727.36	2728.42	2728.30	2728.74	0.019861	5.52	113.22	142.67	1.03
Reach K	1125	1	488.20	2720.67	2722.31	2722.18	2722.68	0.018810	5.81	104.34	100.84	1.04
Reach K	1124	1	488.20	2715.90	2717.69	2717.69	2718.10	0.012655	5.98	118.21	143.01	0.88
Reach K	1123	1	488.20	2711.06	2712.79	2712.76	2713.18	0.014941	6.93	111.26	121.50	0.96
Reach K	1122	1	488.20	2708.55	2708.00	2707.90	2708.95	0.017474	6.56	119.75	124.41	1.03
Reach K	1121	1	488.20	2698.83	2700.28	2700.28	2700.68	0.021860	7.92	120.80	137.29	1.15
Reach K	1120	1	488.20	2692.43	2694.74	2694.88	2695.74	0.019381	9.44	67.70	43.63	1.15
Reach K	1119	1	488.20	2686.66	2690.03	2690.15	2691.33	0.015508	9.53	59.62	28.38	1.07
Reach K	1118	1	488.20	2681.51	2684.37	2684.82	2685.98	0.020486	10.66	55.85	35.80	1.23
Reach K	1117	1	488.20	2677.50	2680.52	2680.52	2681.42	0.011570	8.58	82.90	48.14	0.94
Reach K	1116	1	488.20	2673.35	2676.40	2676.85	2677.44	0.015393	9.81	70.29	71.45	1.18
Reach K	1115	1	488.20	2669.92	2672.90	2672.89	2673.39	0.007916	6.76	115.77	80.32	0.77
Reach K	1114	1	488.20	2666.95	2669.40	2669.40	2669.94	0.018343	8.16	87.88	84.33	1.03
Reach K	1113	1	488.20	2663.88	2665.34	2665.38	2665.80	0.012339	5.72	85.98	131.47	0.98
Reach K	1112	1	488.20	2654.01	2656.80	2656.03	2657.08	0.086882	9.82	50.40	56.19	1.79
Reach K	1111	1	488.20	2647.21	2651.82	2651.92	2653.39	0.010852	10.41	60.24	24.77	0.84
Reach K	1110	1	488.20	2643.50	2646.85	2647.38	2648.86	0.021985	11.61	47.62	25.35	1.27
Reach K	1109	1	488.20	2640.92	2642.92	2642.84	2643.62	0.012452	8.53	92.24	76.40	1.09
Reach K	1108	1	488.20	2638.81	2638.29	2638.35	2638.88	0.020512	6.72	88.13	92.71	1.10
Reach K	1107	1	488.20	2631.75	2634.08	2634.22	2634.78	0.009086	6.86	79.81	94.29	0.91
Reach K	1106	1	488.20	2625.36	2627.82	2628.12	2629.22	0.062925	10.16	48.08	35.01	1.53
Reach K	1105	1	488.20	2621.21	2623.89	2623.89	2624.24	0.011355	6.48	131.24	173.66	0.72
Reach K	1104	1	488.20	2616.28	2618.17	2618.48	2619.15	0.032880	9.65	70.14	100.17	1.39
Reach K	1103	1	488.20	2610.94	2612.58	2612.58	2613.03	0.026284	7.21	82.11	105.85	1.38
Reach K	1102	1	488.20	2606.12	2607.67	2607.80	2607.85	0.013614	4.67	158.26	256.68	0.86
Reach K	1101	1	488.20	2601.53	2603.04	2603.04	2603.35	0.013157	6.30	145.41	235.57	1.03
Reach K	1100	1	488.20	2598.83	2598.41	2598.44	2599.02	0.014912	6.36	82.44	89.82	0.96

STANDARD TABLE 2

HEC-RAS Plan: Default Scenario River: Reach K Reach: Reach K Profile: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Reach K	1130	1	2747.52	2746.73	0.79	3.16	0.04	74.03	390.36	23.81	59.12
Reach K	1129	1	2743.88	2743.06	0.82	3.64	0.00	49.07	377.21	61.92	86.63
Reach K	1128	1	2737.86	2737.07	0.79	6.01	0.01	330.30	157.71	0.19	95.30
Reach K	1127	1	2733.33	2732.78	0.55	4.53	0.07	142.91	294.04	51.25	97.49
Reach K	1126	1	2728.74	2728.42	0.31	6.05	0.01	214.81	155.65	117.74	142.67
Reach K	1125	1	2722.68	2722.31	0.38	4.59	0.00	216.68	271.52		100.84
Reach K	1124	1	2718.10	2717.69	0.41	4.11	0.01	96.02	347.15	45.03	143.01
Reach K	1123	1	2713.18	2712.79	0.39	4.83	0.01	254.09	226.76	7.35	121.50
Reach K	1122	1	2708.35	2708.00	0.35	7.66	0.01	100.93	169.69	217.58	124.41
Reach K	1121	1	2700.68	2700.28	0.41	4.27	0.04	140.61	180.36	167.23	137.29
Reach K	1120	1	2695.74	2694.74	1.01	4.88	0.06	182.71	281.25	24.24	43.63
Reach K	1119	1	2691.33	2690.03	1.31	4.38	0.03	0.01	447.88	40.31	28.38
Reach K	1118	1	2685.99	2684.37	1.63	5.31	0.03	24.25	447.29	16.65	35.90
Reach K	1117	1	2681.42	2680.52	0.90	3.96	0.06	64.84	357.87	65.49	48.14
Reach K	1116	1	2677.44	2676.40	1.04	3.97	0.01	83.44	391.16	13.59	71.45
Reach K	1115	1	2673.39	2672.90	0.49	3.45	0.00	123.15	312.85	52.21	80.32
Reach K	1114	1	2669.94	2669.40	0.54	3.81	0.04	51.58	434.05	2.57	84.33
Reach K	1113	1	2665.80	2665.34	0.46	4.12	0.02	50.72	433.10	4.38	131.47
Reach K	1112	1	2657.08	2655.60	1.48	8.62	0.10	0.18	484.79	3.23	56.19
Reach K	1111	1	2653.39	2651.92	1.47	3.29	0.06	32.37	419.20	36.64	24.77
Reach K	1110	1	2648.86	2646.85	2.00	4.48	0.05	15.30	465.20	7.70	25.35
Reach K	1109	1	2643.62	2642.92	0.69	4.85	0.39	166.06	254.49	67.65	76.40
Reach K	1108	1	2638.88	2638.29	0.59	4.71	0.03	117.18	369.63	1.39	92.71
Reach K	1107	1	2634.78	2634.08	0.70	4.08	0.01	14.40	469.06	4.73	94.23
Reach K	1106	1	2629.22	2627.62	1.60	5.47	0.09		488.20		35.01
Reach K	1105	1	2624.24	2623.89	0.35	3.38	0.01	111.68	213.37	163.15	173.66
Reach K	1104	1	2619.15	2618.17	0.98	5.03	0.06	95.91	379.29	12.99	100.17
Reach K	1103	1	2613.03	2612.56	0.48	4.14	0.09	304.58	118.71	64.91	105.85
Reach K	1102	1	2607.85	2607.67	0.18	4.50	0.01	0.01	153.76	334.43	256.68
Reach K	1101	1	2603.35	2603.04	0.31	4.16	0.03	127.89	192.35	167.96	235.57
Reach K	1100	1	2599.02	2598.41	0.61	4.29	0.03	9.85	475.95	2.40	89.62

HYDRAULIC DEPTH TABLE

HEC-RAS Plan: Default Scenario River: Reach K Reach: Reach K Profile: 1

Reach	River Sta	Profile	Q Total	W.S. Elev	Hydr Depth L	Hydr Depth C	Hydr Depth R	Q Left	Q Channel	Q Right
			(cfs)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)
Reach K	1130	1	488.20	2746.73	1.30	2.20	0.42	74.03	390.36	23.81
Reach K	1129	1	488.20	2743.06	0.66	2.68	0.90	49.07	377.21	61.92
Reach K	1128	1	488.20	2737.07	0.74	0.75	0.10	330.30	157.71	0.19
Reach K	1127	1	488.20	2732.78	1.22	1.57	0.70	142.91	294.04	51.25
Reach K	1126	1	488.20	2728.42	0.72	0.89	0.88	214.81	155.65	117.74
Reach K	1125	1	488.20	2722.31	1.17	0.91		216.68	271.52	
Reach K	1124	1	488.20	2717.69	0.55	1.37	0.70	96.02	347.15	45.03
Reach K	1123	1	488.20	2712.79	0.81	1.35	0.58	254.09	226.76	7.35
Reach K	1122	1	488.20	2708.00	0.69	1.26	1.05	100.93	169.69	217.58
Reach K	1121	1	488.20	2700.28	0.77	1.26	0.87	140.61	180.36	167.23
Reach K	1120	1	488.20	2694.74	1.51	2.11	0.76	182.71	281.25	24.24
Reach K	1119	1	488.20	2690.03	0.16	2.48	1.24	0.01	447.88	40.31
Reach K	1118	1	488.20	2684.37	0.77	2.35	0.77	24.25	447.29	16.65
Reach K	1117	1	488.20	2680.52	1.37	2.64	1.21	64.84	357.87	65.49
Reach K	1116	1	488.20	2676.40	1.53	1.74	0.29	83.44	391.16	13.59
Reach K	1115	1	488.20	2672.90	1.53	2.42	0.81	123.15	312.85	52.21
Reach K	1114	1	488.20	2669.40	0.92	1.12	0.33	51.58	434.05	2.57
Reach K	1113	1	488.20	2665.34	0.37	1.06	0.20	50.72	433.10	4.38
Reach K	1112	1	488.20	2655.60	0.15	0.94	0.32	0.18	484.79	3.23
Reach K	1111	1	488.20	2651.92	1.32	3.84	1.46	32.37	419.20	36.64
Reach K	1110	1	488.20	2646.85	0.94	2.59	0.60	15.30	465.20	7.70
Reach K	1109	1	488.20	2642.92	1.02	1.92	1.04	166.06	254.49	67.65
Reach K	1108	1	488.20	2638.29	0.74	1.16	0.19	117.18	369.63	1.39
Reach K	1107	1	488.20	2634.08	0.19	1.76	0.32	14.40	469.06	4.73
Reach K	1106	1	488.20	2627.62		1.37			488.20	
Reach K	1105	1	488.20	2623.89	0.76	2.51	0.55	111.68	213.37	163.15
Reach K	1104	1	488.20	2618.17	0.74	1.20	0.18	95.91	379.29	12.99
Reach K	1103	1	488.20	2612.56	0.89	0.85	0.80	304.58	118.71	64.91
Reach K	1102	1	488.20	2607.67	0.04	0.92	0.57	0.01	153.76	334.43
Reach K	1101	1	488.20	2603.04	0.47	1.17	0.66	127.89	192.35	167.96
Reach K	1100	1	488.20	2598.41	0.20	1.36	0.35	9.85	475.95	2.40

MANNING'S N-VALUE TABLE

HEC-RAS Plan: Default Scenario River: Reach K Reach: Reach K Profile: 1

Reach	River Sta	Profile	Q Total	Mann Wtd Left	Mann Wtd Chnl	Mann Wtd Rght	Mann Wtd Total
			(cfs)				
Reach K	1130	1	488.20	0.060	0.045	0.060	0.040
Reach K	1129	1	488.20	0.060	0.035	0.060	0.033
Reach K	1128	1	488.20	0.045	0.035	0.045	0.042
Reach K	1127	1	488.20	0.060	0.030	0.060	0.040
Reach K	1126	1	488.20	0.045	0.035	0.045	0.042
Reach K	1125	1	488.20	0.060	0.035		0.046
Reach K	1124	1	488.20	0.045	0.035	0.060	0.036
Reach K	1123	1	488.20	0.045	0.035	0.045	0.039
Reach K	1122	1	488.20	0.045	0.035	0.060	0.047
Reach K	1121	1	488.20	0.060	0.035	0.060	0.050
Reach K	1120	1	488.20	0.045	0.035	0.045	0.037
Reach K	1119	1	488.20	0.045	0.035	0.060	0.035
Reach K	1118	1	488.20	0.060	0.035	0.060	0.032
Reach K	1117	1	488.20	0.060	0.035	0.060	0.039
Reach K	1116	1	488.20	0.045	0.030	0.060	0.028
Reach K	1115	1	488.20	0.060	0.035	0.060	0.040
Reach K	1114	1	488.20	0.060	0.035	0.045	0.037
Reach K	1113	1	488.20	0.030	0.030	0.030	0.026
Reach K	1112	1	488.20	0.060	0.045	0.060	0.044
Reach K	1111	1	488.20	0.045	0.035	0.060	0.033
Reach K	1110	1	488.20	0.060	0.035	0.060	0.032
Reach K	1109	1	488.20	0.045	0.030	0.045	0.035
Reach K	1108	1	488.20	0.045	0.035	0.045	0.036
Reach K	1107	1	488.20	0.030	0.030	0.030	0.021
Reach K	1106	1	488.20		0.045		0.045
Reach K	1105	1	488.20	0.045	0.045	0.045	0.035
Reach K	1104	1	488.20	0.045	0.035	0.045	0.030
Reach K	1103	1	488.20	0.045	0.030	0.045	0.041
Reach K	1102	1	488.20	0.045	0.035	0.045	0.041
Reach K	1101	1	488.20	0.045	0.030	0.045	0.037
Reach K	1100	1	488.20	0.045	0.035	0.045	0.029

WATERHSED CP2

HEC-RAS OUTPUT

Plan: Default Scenario CP 2 CP 2 RS: 2016 Profile: 1

E.G. Elev (ft)	2500.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2500.37	Reach Len. (ft)	113.05	113.05	113.05
Crit W.S. (ft)	2500.29	Flow Area (sq ft)	1.15	26.55	0.97
E.G. Slope (ft/ft)	0.013322	Area (sq ft)	1.15	26.55	0.97
Q Total (cfs)	82.40	Flow (cfs)	1.58	79.98	0.84
Top Width (ft)	69.25	Top Width (ft)	5.33	55.09	8.83
Vel Total (ft/s)	2.87	Avg. Vel. (ft/s)	1.37	3.01	0.87
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)	0.22	0.48	0.11
Conv. Total (cfs)	713.9	Conv. (cfs)	13.7	692.9	7.3
Length Wtd. (ft)	113.05	Wetted Per. (ft)	5.35	55.10	8.84
Min Ch El (ft)	2499.75	Shear (lb/sq ft)	0.18	0.40	0.09
Alpha	1.07	Stream Power (lb/ft s)	354.23	0.00	0.00
Frctn Loss (ft)	1.57	Cum Volume (acre-ft)	0.36	1.47	0.03
C & E Loss (ft)	0.01	Cum SA (acres)	1.50	4.15	0.16

Plan: Default Scenario CP 2 CP 2 RS: 2015 Profile: 1

E.G. Elev (ft)	2498.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2498.72	Reach Len. (ft)	48.22	48.22	48.22
Crit W.S. (ft)	2498.72	Flow Area (sq ft)	1.16	15.16	11.58
E.G. Slope (ft/ft)	0.014534	Area (sq ft)	1.16	15.16	11.58
Q Total (cfs)	82.40	Flow (cfs)	2.45	62.05	17.90
Top Width (ft)	71.94	Top Width (ft)	2.91	21.19	47.84
Vel Total (ft/s)	2.95	Avg. Vel. (ft/s)	2.11	4.09	1.55
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)	0.40	0.72	0.24
Conv. Total (cfs)	683.5	Conv. (cfs)	20.3	514.7	148.5
Length Wtd. (ft)	48.22	Wetted Per. (ft)	3.02	21.21	47.84
Min Ch El (ft)	2497.74	Shear (lb/sq ft)	0.35	0.65	0.22
Alpha	1.52	Stream Power (lb/ft s)	171.10	0.00	0.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.36	1.41	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	1.49	4.05	0.08

Plan: Default Scenario CP 2 CP 2 RS: 2014 Profile: 1

E.G. Elev (ft)	2498.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2497.88	Reach Len. (ft)	28.85	28.85	28.85
Crit W.S. (ft)	2497.89	Flow Area (sq ft)	0.40	18.76	3.71
E.G. Slope (ft/ft)	0.019690	Area (sq ft)	0.40	18.76	3.71
Q Total (cfs)	82.40	Flow (cfs)	0.42	75.18	6.81
Top Width (ft)	52.55	Top Width (ft)	3.70	33.98	14.86
Vel Total (ft/s)	3.60	Avg. Vel. (ft/s)	1.04	4.01	1.84
Max Chl Dpth (ft)	0.68	Hydr. Depth (ft)	0.11	0.55	0.25
Conv. Total (cfs)	587.2	Conv. (cfs)	3.0	535.7	48.5
Length Wtd. (ft)	28.85	Wetted Per. (ft)	3.71	34.02	14.87
Min Ch El (ft)	2497.20	Shear (lb/sq ft)	0.13	0.68	0.31
Alpha	1.15	Stream Power (lb/ft s)	121.57	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	0.36	1.40	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	1.48	4.02	0.05

Plan: Default Scenario CP 2 CP 2 RS: 2013 Profile: 1

E.G. Elev (ft)	2496.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.		0.035	
W.S. Elev (ft)	2495.32	Reach Len. (ft)	178.15	178.15	178.15
Crit W.S. (ft)	2495.78	Flow Area (sq ft)		8.22	
E.G. Slope (ft/ft)	0.100044	Area (sq ft)		8.22	
Q Total (cfs)	82.40	Flow (cfs)		82.40	
Top Width (ft)	12.49	Top Width (ft)		12.49	
Vel Total (ft/s)	10.03	Avg. Vel. (ft/s)		10.03	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	260.5	Conv. (cfs)		260.5	
Length Wtd. (ft)	178.15	Wetted Per. (ft)		12.73	
Min Ch El (ft)	2494.34	Shear (lb/sq ft)		4.03	
Alpha	1.00	Stream Power (lb/ft s)	183.74	0.00	0.00
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)	0.36	1.39	0.00
C & E Loss (ft)	0.13	Cum SA (acres)	1.48	4.01	0.04

Plan: Default Scenario CP 2 CP 2 RS: 2012 Profile: 1

E.G. Elev (ft)	2491.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.045	0.045	
W.S. Elev (ft)	2490.97	Reach Len. (ft)	285.24	285.24	285.24
Crit W.S. (ft)	2490.88	Flow Area (sq ft)	4.27	19.60	
E.G. Slope (ft/ft)	0.023083	Area (sq ft)	4.27	19.60	
Q Total (cfs)	82.40	Flow (cfs)	12.60	69.80	
Top Width (ft)	42.11	Top Width (ft)	9.40	32.71	
Vel Total (ft/s)	3.45	Avg. Vel. (ft/s)	2.95	3.56	
Max Chl Dpth (ft)	1.01	Hydr. Depth (ft)	0.45	0.60	
Conv. Total (cfs)	542.3	Conv. (cfs)	82.9	459.4	
Length Wtd. (ft)	285.24	Wetted Per. (ft)	9.49	32.78	
Min Ch El (ft)	2489.96	Shear (lb/sq ft)	0.65	0.86	
Alpha	1.01	Stream Power (lb/ft s)	400.00	0.00	0.00
Frctn Loss (ft)	6.23	Cum Volume (acre-ft)	0.35	1.33	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	1.46	3.92	0.04

Plan: Default Scenario CP 2 CP 2 RS: 2011 Profile: 1

E.G. Elev (ft)	2484.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.045	0.045	0.045
W.S. Elev (ft)	2484.79	Reach Len. (ft)	137.32	137.32	137.32
Crit W.S. (ft)	2484.72	Flow Area (sq ft)	6.85	25.65	0.41
E.G. Slope (ft/ft)	0.020724	Area (sq ft)	6.85	25.65	0.41
Q Total (cfs)	82.40	Flow (cfs)	14.37	67.61	0.42
Top Width (ft)	89.61	Top Width (ft)	23.37	62.06	4.18
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	2.10	2.64	1.01
Max Chl Dpth (ft)	0.68	Hydr. Depth (ft)	0.29	0.41	0.10
Conv. Total (cfs)	572.4	Conv. (cfs)	99.8	469.7	2.9
Length Wtd. (ft)	137.32	Wetted Per. (ft)	23.38	62.13	4.19
Min Ch El (ft)	2484.11	Shear (lb/sq ft)	0.38	0.53	0.13
Alpha	1.03	Stream Power (lb/ft s)	243.60	0.00	0.00
Frctn Loss (ft)	2.58	Cum Volume (acre-ft)	0.31	1.18	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	1.36	3.61	0.03

Plan: Default Scenario CP 2 CP 2 RS: 2010 Profile: 1

E.G. Elev (ft)	2482.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.045	0.030	
W.S. Elev (ft)	2482.07	Reach Len. (ft)	149.81	149.81	149.81
Crit W.S. (ft)	2482.07	Flow Area (sq ft)	0.20	21.34	
E.G. Slope (ft/ft)	0.017072	Area (sq ft)	0.20	21.34	
Q Total (cfs)	82.40	Flow (cfs)	0.14	82.26	
Top Width (ft)	49.46	Top Width (ft)	3.04	46.42	
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)	0.70	3.85	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)	0.07	0.46	
Conv. Total (cfs)	630.6	Conv. (cfs)	1.1	629.6	
Length Wtd. (ft)	149.81	Wetted Per. (ft)	3.04	46.45	
Min Ch El (ft)	2481.37	Shear (lb/sq ft)	0.07	0.49	
Alpha	1.01	Stream Power (lb/ft s)	439.09	0.00	0.00
Frctn Loss (ft)	2.20	Cum Volume (acre-ft)	0.30	1.11	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	1.31	3.43	0.02

Plan: Default Scenario CP 2 CP 2 RS: 2009 Profile: 1

E.G. Elev (ft)	2479.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.045	0.030	
W.S. Elev (ft)	2478.73	Reach Len. (ft)	107.15	107.15	107.15
Crit W.S. (ft)	2478.85	Flow Area (sq ft)	3.24	15.02	
E.G. Slope (ft/ft)	0.026870	Area (sq ft)	3.24	15.02	
Q Total (cfs)	82.40	Flow (cfs)	5.20	77.20	
Top Width (ft)	50.80	Top Width (ft)	21.00	29.80	
Vel Total (ft/s)	4.51	Avg. Vel. (ft/s)	1.60	5.14	
Max Chl Dpth (ft)	0.63	Hydr. Depth (ft)	0.15	0.50	
Conv. Total (cfs)	502.7	Conv. (cfs)	31.7	471.0	
Length Wtd. (ft)	107.15	Wetted Per. (ft)	21.02	29.83	
Min Ch El (ft)	2478.10	Shear (lb/sq ft)	0.26	0.84	
Alpha	1.22	Stream Power (lb/ft s)	208.54	0.00	0.00
Frctn Loss (ft)	3.17	Cum Volume (acre-ft)	0.30	1.05	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	1.27	3.30	0.02

Plan: Default Scenario CP 2 CP 2 RS: 2008 Profile: 1

E.G. Elev (ft)	2476.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.045	0.030	
W.S. Elev (ft)	2476.10	Reach Len. (ft)	123.66	123.66	123.66
Crit W.S. (ft)	2476.17	Flow Area (sq ft)	4.33	18.19	
E.G. Slope (ft/ft)	0.024014	Area (sq ft)	4.33	18.19	
Q Total (cfs)	82.40	Flow (cfs)	5.96	76.44	
Top Width (ft)	77.01	Top Width (ft)	32.14	44.87	
Vel Total (ft/s)	3.66	Avg. Vel. (ft/s)	1.38	4.20	
Max Chl Dpth (ft)	0.59	Hydr. Depth (ft)	0.13	0.41	
Conv. Total (cfs)	531.7	Conv. (cfs)	38.5	493.3	
Length Wtd. (ft)	123.66	Wetted Per. (ft)	32.16	44.90	
Min Ch El (ft)	2475.51	Shear (lb/sq ft)	0.20	0.61	
Alpha	1.23	Stream Power (lb/ft s)	173.95	0.00	0.00
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	0.29	1.00	0.00
C & E Loss (ft)	0.04	Cum SA (acres)	1.21	3.21	0.02

Plan: Default Scenario CP 2 CP 2 RS: 2007 Profile: 1

E.G. Elev (ft)	2473.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.045	0.035	
W.S. Elev (ft)	2473.31	Reach Len. (ft)	301.61	301.61	301.61
Crit W.S. (ft)	2473.30	Flow Area (sq ft)	20.57	5.71	
E.G. Slope (ft/ft)	0.034290	Area (sq ft)	20.57	5.71	
Q Total (cfs)	82.40	Flow (cfs)	64.79	17.61	
Top Width (ft)	80.51	Top Width (ft)	57.26	23.25	
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)	3.15	3.08	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)	0.36	0.25	
Conv. Total (cfs)	445.0	Conv. (cfs)	349.9	95.1	
Length Wtd. (ft)	301.61	Wetted Per. (ft)	57.35	23.26	
Min Ch El (ft)	2472.72	Shear (lb/sq ft)	0.77	0.53	
Alpha	1.00	Stream Power (lb/ft s)	382.58	0.00	0.00
Frctn Loss (ft)	8.91	Cum Volume (acre-ft)	0.25	0.97	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	1.08	3.12	0.02

Plan: Default Scenario CP 2 CP 2 RS: 2006 Profile: 1

E.G. Elev (ft)	2464.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2464.42	Reach Len. (ft)	272.27	272.27	272.27
Crit W.S. (ft)	2464.40	Flow Area (sq ft)	20.77	10.76	0.06
E.G. Slope (ft/ft)	0.025724	Area (sq ft)	20.77	10.76	0.06
Q Total (cfs)	82.40	Flow (cfs)	49.79	32.59	0.03
Top Width (ft)	122.30	Top Width (ft)	83.45	36.23	2.63
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)	2.40	3.03	0.44
Max Chl Dpth (ft)	0.67	Hydr. Depth (ft)	0.25	0.30	0.02
Conv. Total (cfs)	513.8	Conv. (cfs)	310.4	203.2	0.2
Length Wtd. (ft)	272.27	Wetted Per. (ft)	83.52	36.28	2.63
Min Ch El (ft)	2463.75	Shear (lb/sq ft)	0.40	0.48	0.04
Alpha	1.04	Stream Power (lb/ft s)	400.00	0.00	0.00
Frctn Loss (ft)	7.69	Cum Volume (acre-ft)	0.11	0.91	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.59	2.91	0.01

Plan: Default Scenario CP 2 CP 2 RS: 2005 Profile: 1

E.G. Elev (ft)	2456.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.045	0.035	
W.S. Elev (ft)	2456.73	Reach Len. (ft)	206.50	206.50	206.50
Crit W.S. (ft)	2456.73	Flow Area (sq ft)	3.36	30.51	
E.G. Slope (ft/ft)	0.031141	Area (sq ft)	3.36	30.51	
Q Total (cfs)	82.40	Flow (cfs)	5.69	76.71	
Top Width (ft)	179.85	Top Width (ft)	23.12	156.73	
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)	1.69	2.51	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)	0.15	0.19	
Conv. Total (cfs)	466.9	Conv. (cfs)	32.3	434.7	
Length Wtd. (ft)	206.50	Wetted Per. (ft)	23.14	156.90	
Min Ch El (ft)	2456.15	Shear (lb/sq ft)	0.28	0.38	
Alpha	1.03	Stream Power (lb/ft s)	539.33	0.00	0.00
Frctn Loss (ft)	3.86	Cum Volume (acre-ft)	0.03	0.78	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.26	2.31	0.01

Plan: Default Scenario CP 2 CP 2 RS: 2004 Profile: 1

E.G. Elev (ft)	2451.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.045	0.035	
W.S. Elev (ft)	2451.62	Reach Len. (ft)	143.74	143.74	143.74
Crit W.S. (ft)	2451.52	Flow Area (sq ft)	0.04	29.02	
E.G. Slope (ft/ft)	0.012461	Area (sq ft)	0.04	29.02	
Q Total (cfs)	82.40	Flow (cfs)	0.01	82.39	
Top Width (ft)	63.63	Top Width (ft)	1.08	62.55	
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)	0.39	2.84	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)	0.03	0.46	
Conv. Total (cfs)	738.2	Conv. (cfs)	0.1	738.0	
Length Wtd. (ft)	143.74	Wetted Per. (ft)	1.08	62.59	
Min Ch El (ft)	2450.91	Shear (lb/sq ft)	0.03	0.36	
Alpha	1.00	Stream Power (lb/ft s)	423.45	0.00	0.00
Frctn Loss (ft)	2.50	Cum Volume (acre-ft)	0.02	0.64	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.20	1.79	0.01

Plan: Default Scenario CP 2 CP 2 RS: 2003 Profile: 1

E.G. Elev (ft)	2449.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2449.05	Reach Len. (ft)	208.80	208.80	208.80
Crit W.S. (ft)	2449.05	Flow Area (sq ft)		24.11	
E.G. Slope (ft/ft)	0.026006	Area (sq ft)		24.11	
Q Total (cfs)	82.40	Flow (cfs)		82.40	
Top Width (ft)	68.30	Top Width (ft)		68.30	
Vel Total (ft/s)	3.42	Avg. Vel. (ft/s)		3.42	
Max Chl Dpth (ft)	0.55	Hydr. Depth (ft)		0.35	
Conv. Total (cfs)	511.0	Conv. (cfs)		511.0	
Length Wtd. (ft)	208.80	Wetted Per. (ft)		68.33	
Min Ch El (ft)	2448.50	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	524.88	0.00	0.00
Frctn Loss (ft)	4.95	Cum Volume (acre-ft)	0.02	0.56	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.20	1.57	0.01

Plan: Default Scenario CP 2 CP 2 RS: 2002 Profile: 1

E.G. Elev (ft)	2443.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.045	0.035	0.045
W.S. Elev (ft)	2442.96	Reach Len. (ft)	223.85	223.85	223.85
Crit W.S. (ft)	2443.01	Flow Area (sq ft)	4.79	20.89	0.12
E.G. Slope (ft/ft)	0.032826	Area (sq ft)	4.79	20.89	0.12
Q Total (cfs)	82.40	Flow (cfs)	6.91	75.34	0.15
Top Width (ft)	106.73	Top Width (ft)	40.50	64.99	1.23
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)	1.44	3.61	1.25
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)	0.12	0.32	0.10
Conv. Total (cfs)	454.8	Conv. (cfs)	38.1	415.8	0.8
Length Wtd. (ft)	223.85	Wetted Per. (ft)	40.52	65.07	1.25
Min Ch El (ft)	2442.17	Shear (lb/sq ft)	0.24	0.66	0.20
Alpha	1.18	Stream Power (lb/ft s)	370.44	0.00	0.00
Frctn Loss (ft)	6.08	Cum Volume (acre-ft)	0.01	0.45	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	1.25	0.00

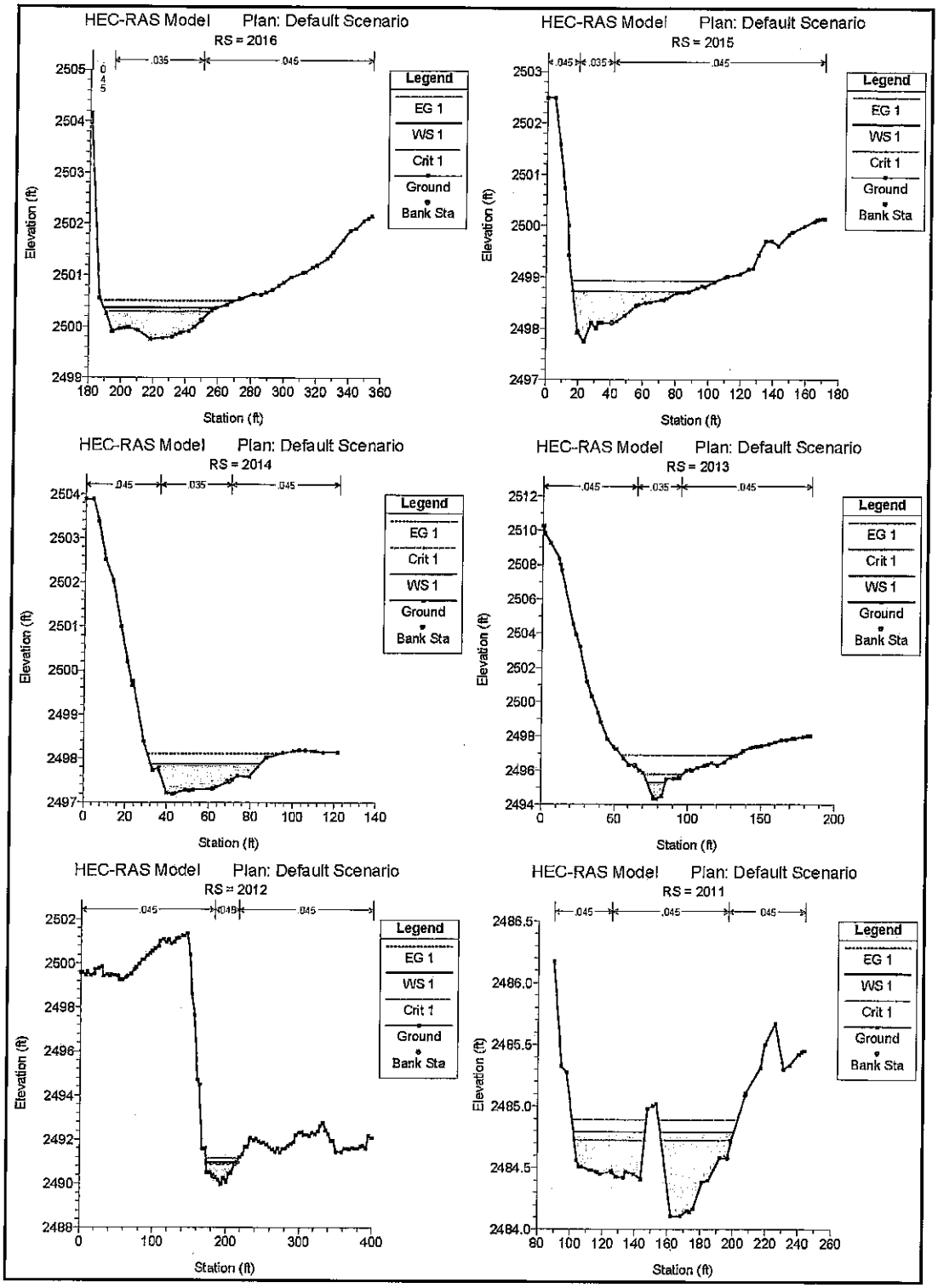
Plan: Default Scenario CP 2 CP 2 RS: 2001 Profile: 1

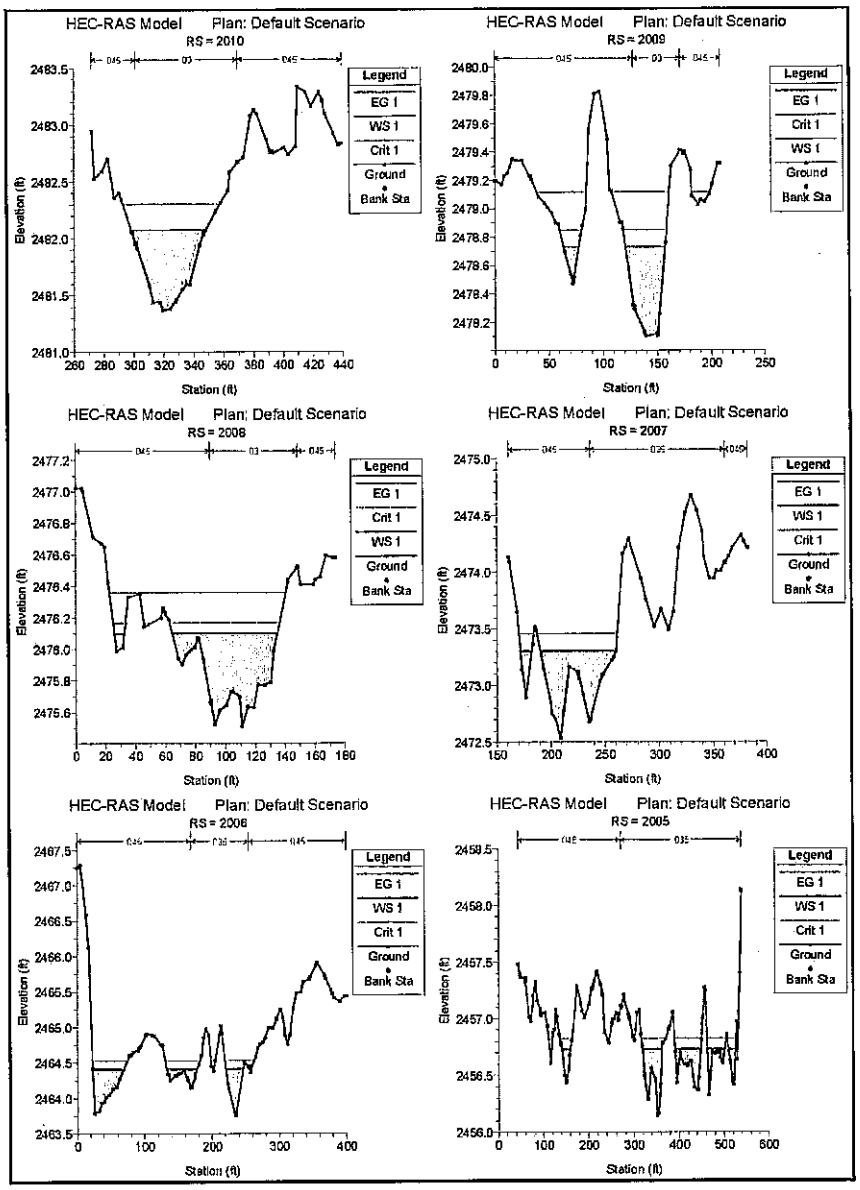
E.G. Elev (ft)	2437.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.045	
W.S. Elev (ft)	2437.68	Reach Len. (ft)	417.90	417.90	417.90
Crit W.S. (ft)	2437.55	Flow Area (sq ft)		30.92	
E.G. Slope (ft/ft)	0.020912	Area (sq ft)		30.92	
Q Total (cfs)	82.40	Flow (cfs)		82.40	
Top Width (ft)	74.08	Top Width (ft)		74.08	
Vel Total (ft/s)	2.66	Avg. Vel. (ft/s)		2.66	
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)		0.42	
Conv. Total (cfs)	569.8	Conv. (cfs)		569.8	
Length Wtd. (ft)	417.90	Wetted Per. (ft)		74.16	
Min Ch El (ft)	2436.78	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)	542.40	0.00	0.00
Frctn Loss (ft)	9.52	Cum Volume (acre-ft)		0.31	
C & E Loss (ft)	0.01	Cum SA (acres)		0.89	

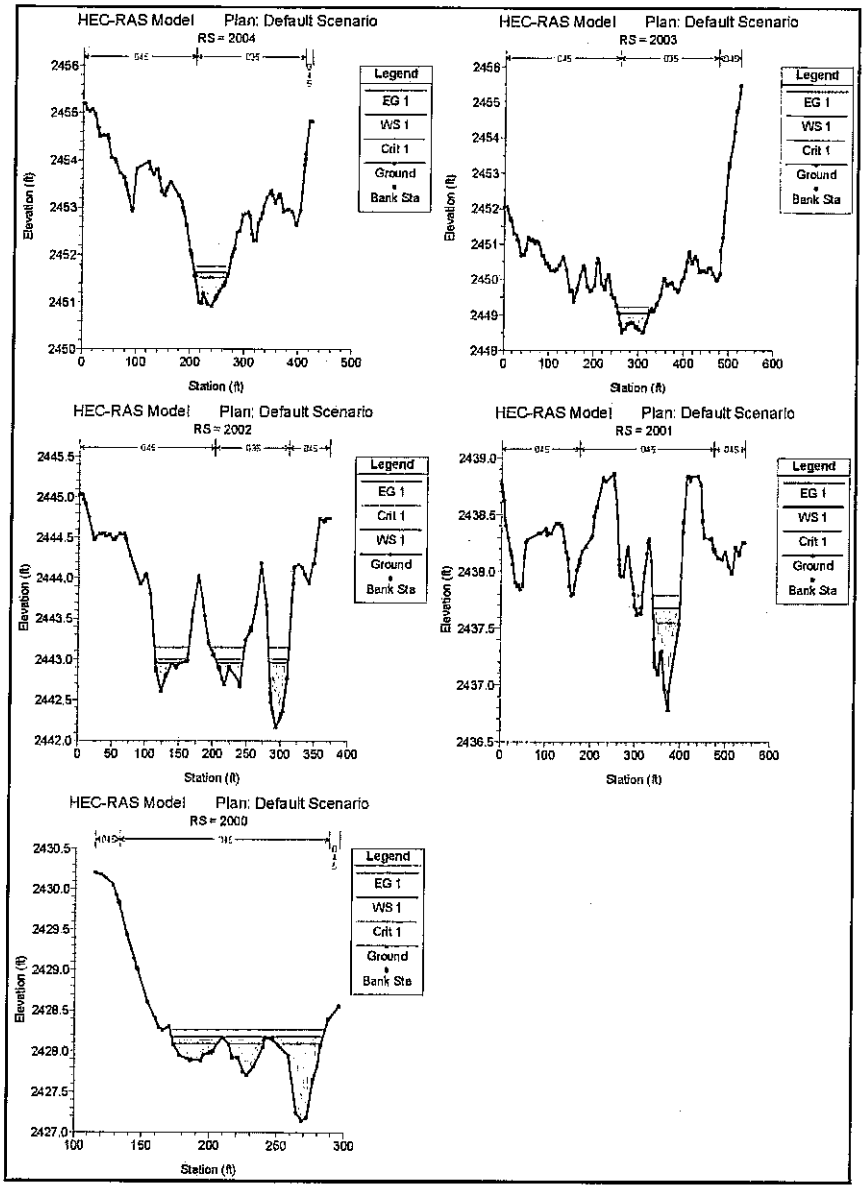
Plan: Default Scenario CP 2 CP 2 RS: 2000 Profile: 1

E.G. Elev (ft)	2428.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.045	
W.S. Elev (ft)	2428.18	Reach Len. (ft)			
Crit W.S. (ft)	2428.10	Flow Area (sq ft)		34.65	
E.G. Slope (ft/ft)	0.024894	Area (sq ft)		34.65	
Q Total (cfs)	82.40	Flow (cfs)		82.40	
Top Width (ft)	112.28	Top Width (ft)		112.28	
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)		2.38	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	522.2	Conv. (cfs)		522.2	
Length Wtd. (ft)		Wetted Per. (ft)		112.40	
Min Ch El (ft)	2427.15	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	296.01	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

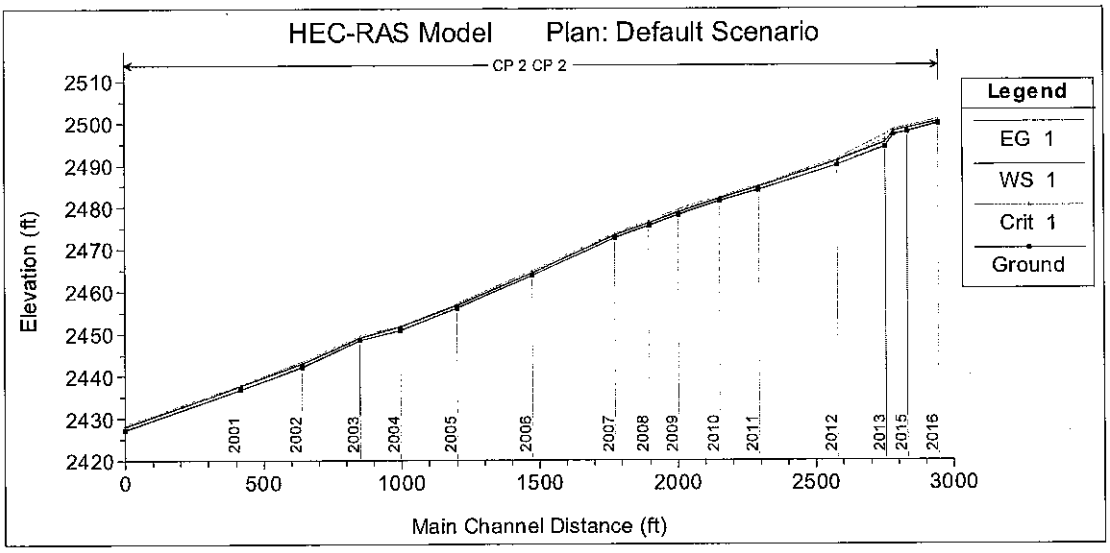
CROSS SECTION PLOTS




HEC-RAS Model Plan: Default Scenario
RS = 2010
RS = 2009
RS = 2008
RS = 2007
RS = 2006
RS = 2005
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


HEC-RAS Model Plan: Default Scenario
RS = 2004
Elevation (ft)
Station (ft)
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
HEC-RAS Model Plan: Default Scenario
RS = 2003
Elevation (ft)
Station (ft)
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
HEC-RAS Model Plan: Default Scenario
RS = 2002
Elevation (ft)
Station (ft)
Legend
EG 1
Crit 1
WS 1
Ground
Bank Sta
HEC-RAS Model Plan: Default Scenario
RS = 2001
Elevation (ft)
Station (ft)
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta
HEC-RAS Model Plan: Default Scenario
RS = 2000
Elevation (ft)
Station (ft)
Legend
EG 1
WS 1
Crit 1
Ground
Bank Sta

PROFILE PLOT



STANDARD TABLE 1

HEC-RAS Plan: Default Scenario River: CP 2 Reach: CP 2 Profile: 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
CP 2	2016	1	82.40	2499.75	2500.37	2500.29	2500.50	0.013322	3.01	28.87	69.25	0.76
CP 2	2015	1	82.40	2497.74	2498.72	2498.72	2498.92	0.014534	4.09	27.91	71.84	0.85
CP 2	2014	1	82.40	2497.20	2497.88	2497.89	2498.11	0.019680	4.01	22.87	52.55	0.95
CP 2	2013	1	82.40	2494.34	2495.32	2495.78	2495.88	0.100044	10.03	8.22	12.49	2.18
CP 2	2012	1	82.40	2489.95	2490.97	2490.83	2491.15	0.023083	3.56	23.88	42.11	0.81
CP 2	2011	1	82.40	2484.11	2484.79	2484.72	2484.89	0.020724	2.64	32.92	88.51	0.72
CP 2	2010	1	82.40	2481.37	2482.07	2482.07	2482.30	0.017072	3.85	21.54	49.46	1.00
CP 2	2009	1	82.40	2478.10	2478.73	2478.85	2479.12	0.028670	5.14	16.26	50.80	1.29
CP 2	2008	1	82.40	2475.51	2476.10	2476.17	2476.36	0.024014	4.20	22.52	77.01	1.16
CP 2	2007	1	82.40	2472.72	2473.31	2473.30	2473.46	0.034290	3.08	26.28	80.51	1.10
CP 2	2006	1	82.40	2463.75	2464.42	2464.40	2464.53	0.025724	3.08	31.69	122.30	0.98
CP 2	2005	1	82.40	2456.15	2456.73	2456.73	2456.83	0.031141	2.51	33.87	179.85	1.00
CP 2	2004	1	82.40	2450.91	2451.62	2451.52	2451.75	0.012461	2.84	29.06	63.63	0.79
CP 2	2003	1	82.40	2448.50	2449.05	2449.05	2449.23	0.036908	3.42	24.11	68.30	1.01
CP 2	2002	1	82.40	2442.17	2442.96	2443.01	2443.15	0.032826	3.81	25.80	106.73	1.12
CP 2	2001	1	82.40	2436.79	2437.68	2437.55	2437.79	0.020912	2.68	30.92	74.08	0.73
CP 2	2000	1	82.40	2427.15	2428.18	2428.10	2428.27	0.024894	2.38	34.65	112.28	0.75

STANDARD TABLE 2

HEC-RAS Plan: Default Scenario River: CP 2 Reach: CP 2 Profile: 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
CP 2	2016	1	2500.50	2500.37	0.14	1.57	0.01	1.58	79.98	0.84	69.25
CP 2	2015	1	2498.92	2498.72	0.21	0.80	0.00	2.45	62.05	17.90	71.84
CP 2	2014	1	2498.11	2497.88	0.23	0.81	0.00	0.42	75.18	6.81	52.55
CP 2	2013	1	2496.88	2495.32	1.56	1.09	0.13		82.40		12.49
CP 2	2012	1	2491.15	2490.97	0.19	6.28	0.03	12.60	69.80		42.11
CP 2	2011	1	2484.89	2484.79	0.10	2.58	0.01	14.37	67.61	0.42	89.61
CP 2	2010	1	2482.30	2482.07	0.23	2.20	0.00	0.14	82.26		49.46
CP 2	2009	1	2479.12	2478.73	0.39	3.17	0.02	5.20	77.20		50.80
CP 2	2008	1	2476.36	2476.10	0.26	2.72	0.04	5.96	76.44		77.01
CP 2	2007	1	2473.46	2473.31	0.15	8.91	0.01	64.79	17.61		80.51
CP 2	2006	1	2464.53	2464.42	0.11	7.89	0.00	49.79	32.59	0.03	122.30
CP 2	2005	1	2456.83	2456.73	0.09	3.86	0.00	5.69	76.71		179.85
CP 2	2004	1	2451.75	2451.62	0.13	2.50	0.01	0.01	82.39		63.63
CP 2	2003	1	2449.23	2449.05	0.18	4.95	0.01		82.40		68.30
CP 2	2002	1	2443.15	2442.96	0.19	6.08	0.00	6.91	75.34	0.15	106.73
CP 2	2001	1	2437.79	2437.68	0.11	9.52	0.01		82.40		74.08
CP 2	2000	1	2428.27	2428.18	0.09				82.40		112.28

HYDRAULIC DEPTH TABLE

HEC-RAS Plan: Default Scenario River: CP 2 Reach: CP 2 Profile: 1

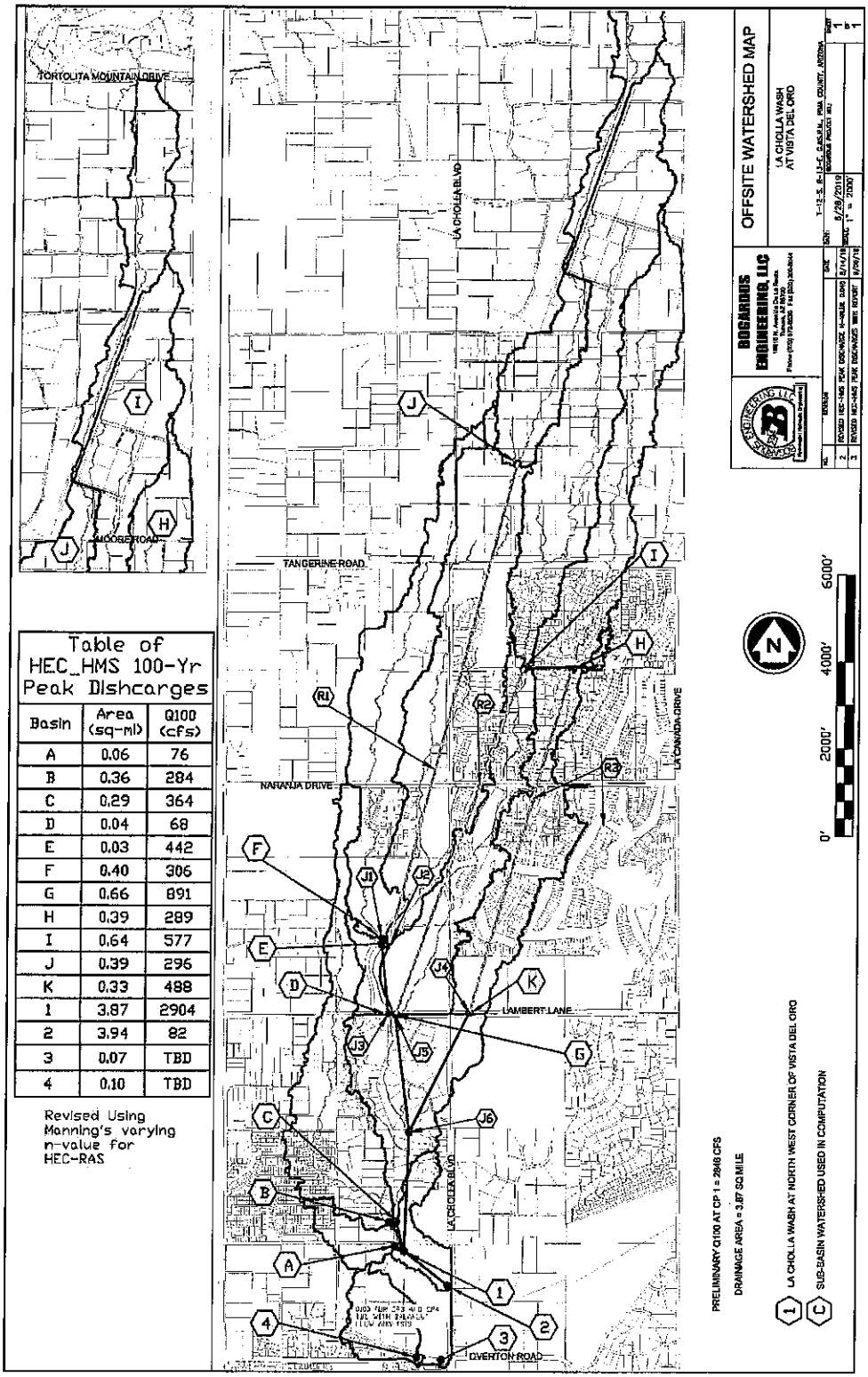
Reach	River Sta	Profile	Q Total	W.S. Elev	Hydr Depth L	Hydr Depth C	Hydr Depth R	Q Left	Q Channel	Q Right
			(cfs)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)
CP 2	2016	1	82.40	2500.37	0.22	0.48	0.11	1.58	79.98	0.84
CP 2	2015	1	82.40	2498.72	0.40	0.72	0.24	2.45	62.05	17.90
CP 2	2014	1	82.40	2497.88	0.11	0.55	0.25	0.42	75.18	6.81
CP 2	2013	1	82.40	2495.32		0.66			82.40	
CP 2	2012	1	82.40	2490.97	0.45	0.60		12.60	69.80	
CP 2	2011	1	82.40	2484.79	0.29	0.41	0.10	14.37	67.61	0.42
CP 2	2010	1	82.40	2482.07	0.07	0.46		0.14	82.26	
CP 2	2009	1	82.40	2478.73	0.15	0.50		5.20	77.20	
CP 2	2008	1	82.40	2476.10	0.13	0.41		5.96	76.44	
CP 2	2007	1	82.40	2473.31	0.36	0.25		64.79	17.61	
CP 2	2006	1	82.40	2464.42	0.25	0.30	0.02	49.79	32.59	0.03
CP 2	2005	1	82.40	2456.73	0.15	0.19		5.69	76.71	
CP 2	2004	1	82.40	2451.62	0.03	0.46		0.01	82.39	
CP 2	2003	1	82.40	2449.05		0.35			82.40	
CP 2	2002	1	82.40	2442.96	0.12	0.32	0.10	6.91	75.34	0.15
CP 2	2001	1	82.40	2437.68		0.42			82.40	
CP 2	2000	1	82.40	2428.18		0.31			82.40	

MANNING'S N-VALUE TABLE

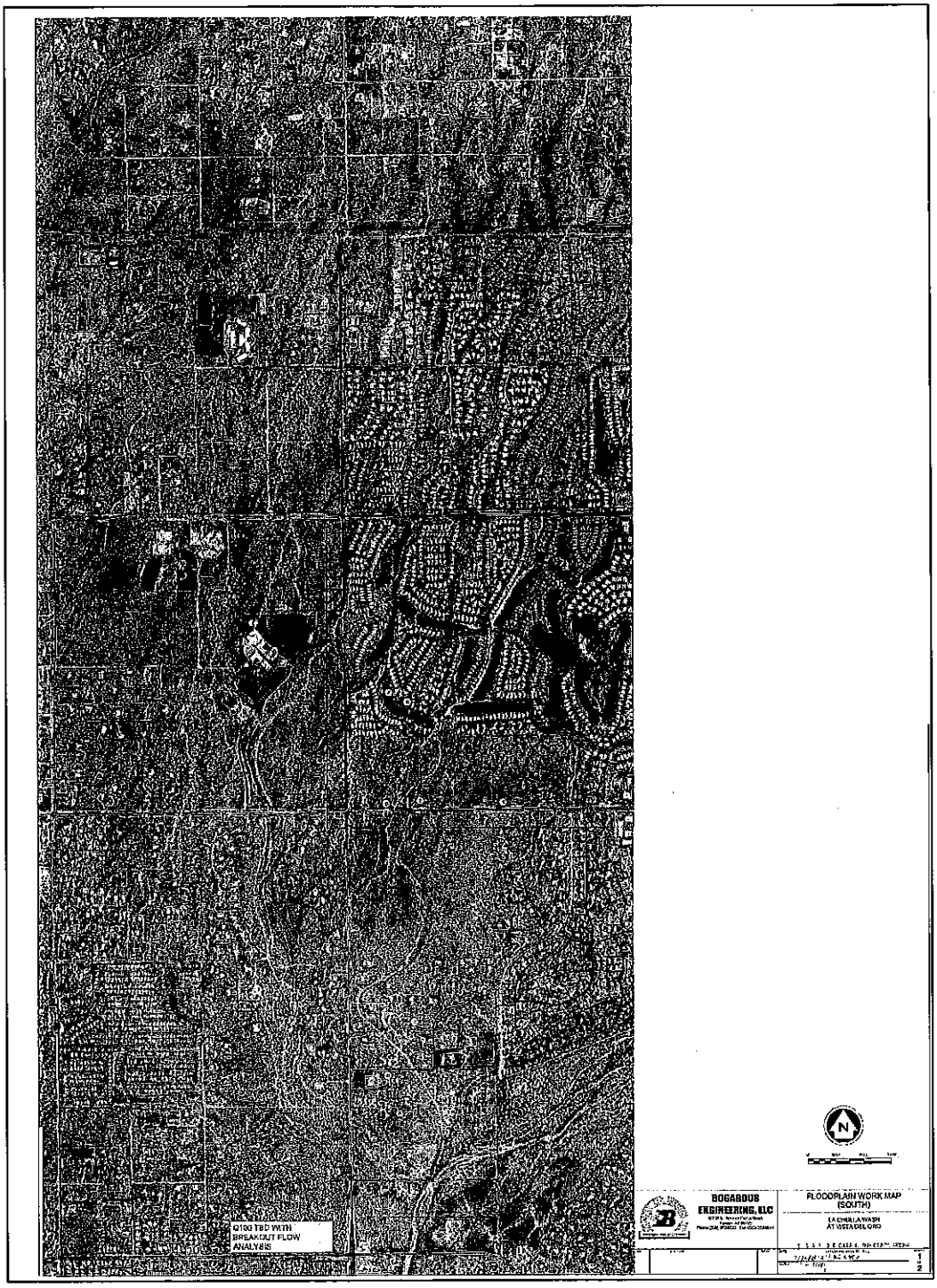
HEC-RAS Plan: Default Scenario River: CP 2 Reach: CP 2 Profile: 1

Reach	River Sta	Profile	Q Total	Mann Wtd Left	Mann Wtd Chnl	Mann Wtd Rght	Mann Wtd Total
			(cfs)				
CP 2	2016	1	82.40	0.045	0.035	0.045	0.033
CP 2	2015	1	82.40	0.045	0.035	0.045	0.032
CP 2	2014	1	82.40	0.045	0.035	0.045	0.033
CP 2	2013	1	82.40		0.035		0.035
CP 2	2012	1	82.40	0.045	0.045		0.045
CP 2	2011	1	82.40	0.045	0.045	0.045	0.044
CP 2	2010	1	82.40	0.045	0.030		0.029
CP 2	2009	1	82.40	0.045	0.030		0.027
CP 2	2008	1	82.40	0.045	0.030		0.028
CP 2	2007	1	82.40	0.045	0.035		0.042
CP 2	2006	1	82.40	0.045	0.035	0.045	0.037
CP 2	2005	1	82.40	0.045	0.035		0.035
CP 2	2004	1	82.40	0.045	0.035		0.035
CP 2	2003	1	82.40		0.035		0.035
CP 2	2002	1	82.40	0.045	0.035	0.045	0.033
CP 2	2001	1	82.40		0.045		0.045
CP 2	2000	1	82.40		0.045		0.045

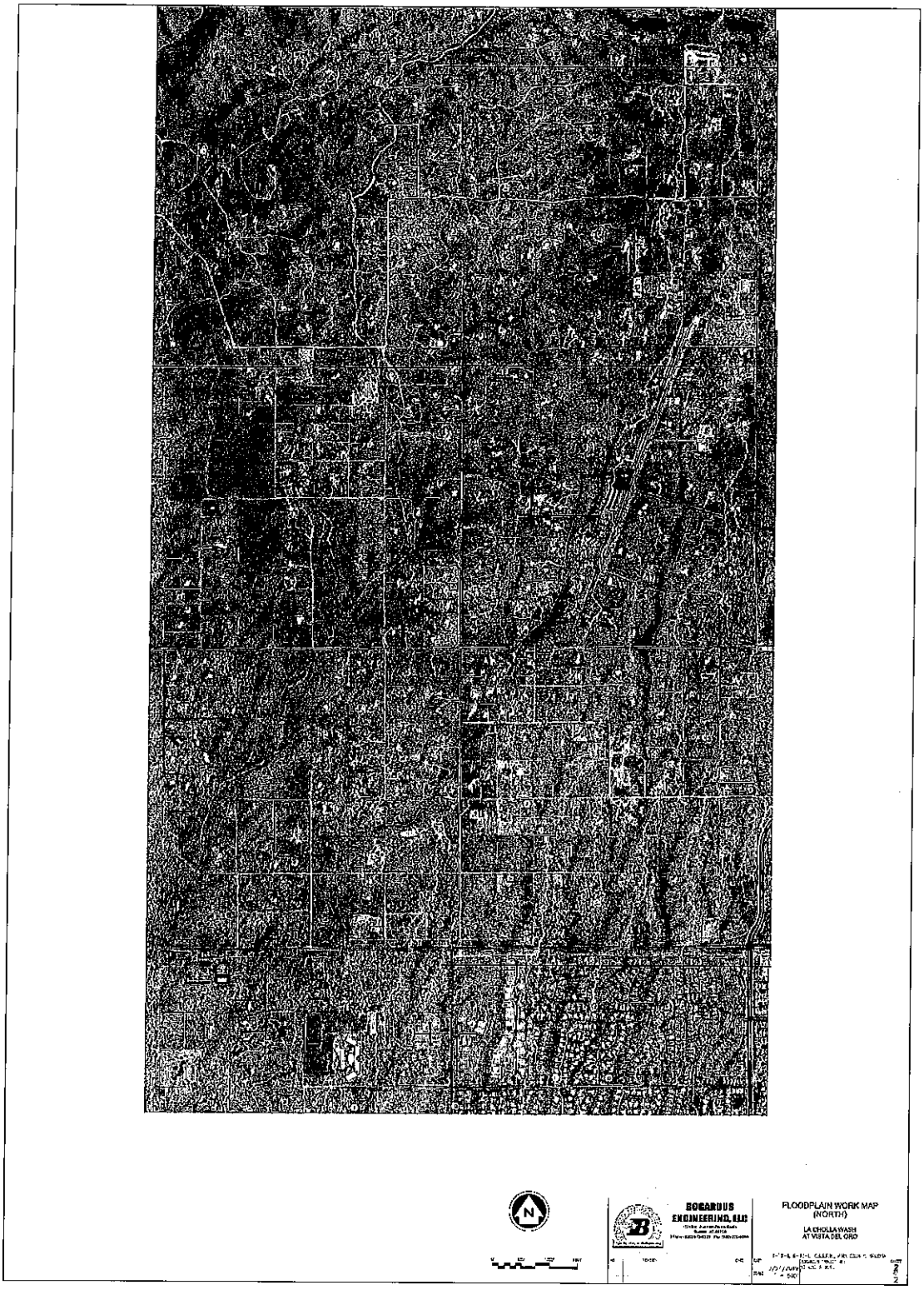
Appendix B – Maps and Plans



• Figure 1- OFFSITE WATERSHED MAP, HEC-HMS WORK MAP



• Figure 2- Floodplain Work Map South



• Figure 3- Floodplain Work Map North

Appendix B:

Technical Analysis Procedures Memo

by

Bogardus Engineering, LLC

October 1, 2019

This Memorandum Addresses the La Cholla Wash Breakout Flow Across the Subject Property

TECHNICAL ANALYSIS PROCEDURES

Project Name:	Vista Del Oro Rezoning
Prepared By:	Bogardus Engineering, LLC
BE Job Number:	18-002-A-001D
Presidio Number:	118003-12-0103
Date:	October 1, 2019

PURPOSE

The purpose of this statement is to outline the summary of the technical requirements, procedures and Conclusion of results in the preparation of the preliminary breakout flow analysis of the La Cholla Wash between approximately 1500 feet upstream of the La Cholla Boulevard and the road crossing. This preliminary study will be used in support of the Vista Del Oro Rezoning.

TECHNICAL REQUIREMENTS

Procedures, Methods and Assumptions

- Breakout flow determined by HEC-RAS
    - GeoHECRAS 2D, Version 2.7.0.23211
        - HEC-RAS 5.0.7
    - GeoHECRAS 1D, Version 2.7.0.23211
        - HEC-RAS 5.0.7

- Procedures
    - Preliminary HEC-RAS 2D prepared
        - Used HEC-HMS 100-year peak discharge for La Cholla Wash of 2904 cfs (Previous Study)
        - Generated the 100-year hydrograph for input into HEC-RAS 2D
        - Model not provided with this study
            - Model only used to generate water surface elevation contours to use in the 1D model

- Existing HEC-RAS 1D Model
  - PAG LIDAR used
    - T12SR13ES15, T12SR13ES16, T12SR13ES21, and T12SR13ES22
  - Terrain Grid 16 feet with medium resolution
    - Grid size chosen to minimize points to less than 500 points for each cross section (500 Points is maximum allowed in HEC-RAS)
    - Generated contour interval = 1'
  - Cross Sections
    - Water Surface contours established in the HEC-RAS 2D model were used to establish the approximate configuration of the HEC-RAS 1D cross sections
    - Interval between cross sections approximate average of 75 feet or less
    - Average hydraulic depth of the section from Cross Sections 140-129 was 1.42 feet.
      - After Cross Section 129 the flow spreads out and is braided
    - Average hydraulic depth of the sections from Cross Sections 130 to 100 was 0.72 feet
  - Manning's n-value was set at 0.060
    - Used for general shallow flow (0.72 feet) and smoother surface
      - Sandy braids
      - Low vegetation
    - Maximize breakout flow for conservative estimate of breakout conditions
  - Overbank Stations
    - The main channel of the La Cholla Wash was marked such that the right overbank was the location of the breakout flow

- Between Cross Section 140 to 135 La Cholla Wash contained without breakout

- Breakout begins at section 134 and continues to section 120

- Location of the right overbank was set based on aerial photo and the cross-section topography
    - Typically located on a peak

- The flow in the right overbank was considered the breakout flow
    - The total breakout flow typically would increase with distance
    - The maximum breakout or right overbank flow was used for the design of the existing conditions flow conveyed to the south
    - Maximum breakout flow occurs at Cross Section 123, (Approximately 1182 cfs)
    - Channel flow and left overbank is conveyed across La Cholla Boulevard (Approximately 1722 cfs)

- Q100 = 2904 cfs was used for Cross Sections 140 – 120

- Q100 Breakout = 1182 cfs was used for Cross Sections 119-100
    - Left overbank now set at west side of La Cholla Boulevard
    - Cross sections extended across floodplain as depicted in the 2D model with split flow
    - Breakout across La Cholla Blvd between Cross Sections 114 to 111 occurred prior to the construction of La Cholla Blvd (Up to 250 cfs)

        - This breakout across La Cholla Blvd was ignored for the flow across Overton Road as new road prevents flow under the current existing conditions
    - Overton Road
        - Two road dip crossings
        - East dip crossing, 619 cfs
        - West dip crossing, 563 cfs
        - The Bluffs Channel was designed for 771 cfs
        - This study shows the existing breakout flow across Overton Road exceeds the existing channel design by approximately 411 cfs

- Local onsite hydrology
    - The peak discharge occurs at approximately 187 minutes into the hydrograph reaching Cross Section 140
    - The time to travel from Cross Section 140 to Cross Section 100 is another 11 minutes for a total of 198 minutes (3.3 hours)
    - Local onsite hydrology has a 100-year peak discharge for a 1-hour storm at Overton Road of 433 cfs from 116.5 acres)
    - The total time of the local storm is 117 minutes (1.95 hours)
    - The local storm is past before the peak discharge of the offsite flow as it crosses Overton Road and has no impact

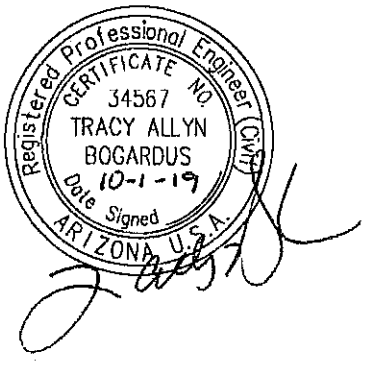
CONCLUSIONS

Results

- The preliminary 100-year peak discharge of 2904 cfs as determined by the HEC-HMS study prepared September 13, 2019 was used for the floodplain modeling in this analysis

- The HEC-RAS 1D model shows the following
  - that approximately 1722 cfs cross La Cholla Blvd
  - Approximately 1182 cfs breaks out to the south
  - The breakout flow is further divided into a western and eastern floodplain
    - The western floodplain has approximately 563 cfs
    - The eastern floodplain has approximately 619 cfs
  - The Bluffs channel was designed for 771 cfs
  - This analysis generates approximately 411 cfs more than the design discharge
  - The local watersheds drain an area of approximately 116.5 ac
    - Generating 433 cfs

- The local drainage does not add to the breakout flow from the La Cholla Wash
  - The breakout flow from the La Cholla Wash reaches the Overton Road crossing in approximately 199 minutes
  - The local drainage has a total length of the storm of 117 minutes



0' 100' 200' 300'

BOGARDUS ENGINEERING, LLC
10616 N. Avenida De La Reina
Tucson, AZ 85737
Phone (520) 572-6537 Fax (520) 306-5044

FLOODPLAIN WORK MAP
EXISTING BREAKOUT CONDITIONS

LA CHOLLA WASH
AT VISTA DEL ORO

T-12-S, R-13-E, G.&S.R.M., PIMA COUNTY, ARIZONA

NO.	REVISION	DATE

DATE: 9/30/2019
SCALE: 1" = 100'
BOGARDUS PROJECT NO.: 17-065-AA-0010
SHEET: 1 OF 1

Appendix C:

Class III Cultural Resources Survey

by

MCA Consulting
August, 2018

A CLASS III CULTURAL RESOURCES SURVEY OF 51 ACRES OF PRIVATE LAND NORTHWEST OF OVERTON ROAD AND LA CHOLLA BOULEVARD, VISTA DEL ORO, PIMA COUNTY, ARIZONA

Prepared for:
Bowers Environmental

Prepared and submitted by:
Michael Cook
MCA Consulting
1240 West Lodestone Place
Oro Valley, Arizona 85737
mcaconsultingaz.com

MCA Cultural Resources Report No. 2018.018

August 8, 2018

MCA

STATE HISTORIC PRESERVATION OFFICE
SURVEY REPORT SUMMARY FORM

1. REPORT TITLE

1a. Report Title: A Class III Cultural Resources Survey of 51 Acres of Private Land Northwest of Overton Road and La Cholla Boulevard, Vista Del Oro, Pima County, Arizona

1b. Report Author: Michael Cook

1c. Date: August 8, 2018 **1d. Report No.:** MCA 2018.018

2. PROJECT REGISTRATION/PERMITS

2a. ASM Accession Number: N/A

2b. AAA Permit Number: N/A

2c. ASLD Lease Application Number(s): N/A

2d. Other Permit Number(s): N/A

3. ORGANIZATION/CONSULTING FIRM

3a. Name: MCA Consulting

3b. Internal Project Number: MCA 2018.018

3c. Internal Project Name: Vista del Oro 51-Acre Class III Survey

3d. Contact Name: Michael Cook

3e. Contact Address: 1240 West Lodestone Place, Oro Valley, Arizona 85737

3f. Contact Phone: (520) 203-4902

3g. Contact Email: mike@mcaconsultingaz.com

4. SPONSOR/LEAD AGENCY

4a. Sponsor: Bowers Environmental

4b. Lead Agency: Pima County Office of Cultural Resources and Historic Preservation (OCRHP)

4c. Agency Project Number: N/A

4d. Agency Project Name: N/A

4e. Funding Source: Private

4f. Other Involved Agencies: N/A

4g. Applicable Regulations: Pima County Board of Supervisors Policy C 3.17 and Pima County Board of Supervisors Resolution 1983-104.

5. DESCRIPTION OF PROJECT OR UNDERTAKING: Residential development.

6. PROJECT AREA: The project area consists of one contiguous, irregular-shaped 5-acre parcel of undeveloped land.

7. PROJECT LOCATION

7a. Address: Northwest of Overton Road and La Cholla Boulevard; Pima County Parcels 225-04-003N (21.63 acres), 225-04-002A (13.36 acres), 225-04-002B (16.03 acres), and 225-04-008B (0.85 acres)

7b. Route: N/A **7c. Mileposts Limits:** N/A

7d. Nearest Cities: Oro Valley, Arizona **7e. County:** Pima

7f. Project Locator UTM: 498555 Easting; 3582248 Northing **7g. NAD** 83 **7h. Zone:** 12

7i. Baseline & Meridian: GSRB&M **7j. USGS Quadrangle:** *Ruelas Canyon* and *Jaynes, Ariz.*

7k. Legal Description(s): Township 12 South, Range 13 East, portions of the NW ¼ of Section 21

8. SURVEY AREA

8a. Total Acres: 51

8b. Survey Area.

1. Land Jurisdiction	2. Total Acres Surveyed	3. Total Acres Not Surveyed	4. Justification for Areas Not Surveyed
Private	51	0	N/A

9. ENVIRONMENTAL CONTEXTS

9a. Landform: The project area is located within the Basin and Range physiographic zone of Arizona (*Ruelas Canyon* and *Jaynes, Ariz.* 7.5' USGS Quadrangles). Geomorphological surfaces in the project area consist of southeast-sloping alluvial fans and narrow finger ridges.

9b. Elevation: Elevation within the project area averages approximately 2400 feet above sea level A.M.S.L. (NAVD 88).

9c. Surrounding Topographic Features: The project area is located 5.5 kilometers (3.4 miles) west of the Catalina Mountains.

9d. Nearest Drainage: The project area is located 350 meters west of the Canada del Oro. The largest wash in the project area is located in the northeast corner. This unnamed wash drains into the Canada del Oro southeast of the project area.

9e. Local Geology: Surficial geologic deposits within the project area are Holocene River Alluvium (0-10 ka) consisting of unconsolidated to weakly consolidated sand and gravel in river channels and sand, silt, and clay on floodplains.

9f. Vegetation: The project area lies within the Arizona Upland Subdivision, Sonoran Desertscrub biotic community (Brown 1994). Vegetation within the project area is consistent with plants

typically found in this biotic community and includes palo verde (*Parkinsonia microphylla*), creosote (*Larrea tridentate*), triangle-leaf bursage (*Ambrosia deltoidea*), mesquite (*Prosopis* sp.), prickly pear (*Opuntia phaeacantha),* and cholla (*Opuntia* sp.). Vegetative ground cover was sparse during fieldwork and consisted of very short, dispersed annual grasses and forbs.

9g. Soils/Deposition: Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA) soil survey maps for the project area were obtained from the Soil Survey Geographic Database (NRCS, USDA 2018). These maps depict soils in project area as a complex of Palos Verdes, Pinaleno, Stagecoach, Anthony, and Arizo series soils. Palos Verdes series soils consist of very deep, well drained soils that formed in fan alluvium from granitic, volcanic and metamorphic rocks. The Pinaleno series consists of very deep, well drained soils formed in fan alluvium from mixed rock. The Stagecoach series consists of very deep, well drained soils formed in mixed alluvium. The Anthony series consists of very deep, well drained soils formed in stratified alluvium. The Arizo series consists of very deep, excessively drained soils that formed in mixed alluvium. Soils are very disturbed within most of the project area due to heavy sheet wash and water flow.

9h. Buried Deposits: The potential for buried cultural deposits is *not likely.*

9i. Justification: There is a lack of sufficient surface artifacts or cultural features in the project area.

I0. BUILT ENVIRONMENT: The built environment within the project area includes two dirt roads and a number of small foot paths. The foot paths are located in the northwestern portion of the project area. One dirt road extends east from W. Camino del Aurora at the northwest corner of the project area. The other dirt road extends east from W. La Cresta Road near the southwest corner of the project area. Aerial maps depict both roads as modern. Two major roads are located just outside the project area. North La Cholla Boulevard is a modern, paved road located along the east edge of the project area. Overton Road is also a modern paved road and runs along the south edge of the project area. Residential housing is located west of the project area.

11. INVENTORY CLASS COMPLETED

11a. Class I Inventory: ☒

11b. Researcher(s): Michael Cook

11c. Class II Survey: ☐

11d. Sampling Strategy: N/A

11e. Class III Inventory: ☒

12. BACKGROUND RESEARCH SOURCES

12a. AZSITE: ☒

12b. ASM Archaeological Records Office: ☒

12c. SHPO Inventories and/or SHPO Library: ☐

12d. NRHP Database: ☒

12e. ADOT Portal: ☐

12f. GLO Maps: The 1915 historic GLO survey plat was published in November of 1914 for the section, township and range encompassing the project area (GLO 1915; Map No. 1957). A fence is depicted as cutting southwest-northeast through the current project area on the 1915 GLO plat. This fence forms a rectangle encompassing approximately 56 acres. A house, part of the Matt Lockas homestead, is located within the confines of the fence but is south of the current project area. Federal land patent records indicate that the land encompassing the project area (N½ of Section 21) was initially transferred from the Federal government to Barney William Reynolds in a serial patent under the Sale-Cash Entry Act of 1829 (3 Stat. 566). The patent was filed on December 21, 1938 (Record of Patents No. 1100550). Although outside (south of) the current project area, the E ½ of SE ¼ of Section 21 was initially transferred from the Federal government to Matt Lockas in a patent under the Homestead Entry Original Act of 1862 (12 Stat. 392; May 20, 1862). The patent was filed on June 22, 1917 (Record of Patents No. 588987).

12g. Land-Managing Agency Files: N/A

12h. Tribal Cultural Resources Files: N/A

12i. Local Government Websites: N/A

12j. Other: The earliest U.S. Geological Survey (USGS) topographic maps of the area include the 1947 and 1957 1:62,500-scale maps (*Cortaro, Ariz.*, 1947 and 1957 editions). An unimproved east-west road is depicted near the south end of the project area on the 1947 map. The 1957 map depicts Overton Road running east-west near this same road at the south end of the project area.

13. BACKGROUND RESEARCH RESULTS

13a. Previous Projects Within Study Area. Thirty-five (35) previous survey projects have been conducted within the Class I one-mile study area buffer. None of these projects intersect with the current project area.

1. Project Number	2. Project Name	3. Author	4. Year
2014-71.ASM	Atlas 0673 Survey, 3.9 acres, no new sites recorded	Tierra Right of Way Services (Copperstone 2014)	2014
2014-314.ASM	Atlas 0378 Survey, 1 acres, no new sites recorded	Tierra Right of Way Services (Howell 2014)	2014
2014-301.ASM	Atlas 0375 Survey, 4.7 acres, no new sites recorded	Tierra Right of Way Services, Ltd. (Hamlin 2014)	2014
2013-173.ASM	Linear Park Improvements Along the CDO between La Canada Drive and La Cholla Boulevard	William Self and Associates (O'Mack 2013a, 2013b)	2013
2012-93.ASM	Atlas 663 Survey, 1.4 acres, no new sites recorded	Aztlan Archaeology (Slawson 2012)	2012
2012-717.ASM	Atlas 0654 Survey, 3.20 acres, no new sites recorded	Tierra Right of Way Services (Doak 2014)	2012
2011-440.ASM	HDRP Atlas 0375 Survey. 1.4 acres, no new sites recorded	Tierra Right of Way Services, Ltd. (Doak 2011)	2011

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1. Project Number	2. Project Name	3. Author	4. Year
2011-128.ASM	Atlas 0378	Aztlan Archaeology (Doak 2011)	2010
2010-395.ASM	Shannon Road M-09-014 Survey, 43 acres, no new sites recorded	Engineering and Environmental Consultants, Inc. (Stone 2010)	2010
2010-29.ASM	La Cholla Boulevard Supplemental Survey	URS Corporation (Cox et al. 2010)	2009
2009-324.ASM	Repair Lomas del Oro Valley Wash, 8 acres, no new sites recorded	FEMA/URS Corporation (FEMA 2009)	2009
2008-538.ASM	Camino del Sur Survey, 3.6 acres, no new sites recorded	Tierra Right of Way Services (Howell 2008)	2008
2007-328.ASM	CDO Omni, 46 acres, no new sites recorded	SAGE Landscape Architecture & Environmental (Stone 2007)	2007
2005-845.ASM	Tucson Omni Reclaimed Water lines, 13 acres, no new sites recorded	Harris Environmental Group (Twilling 2005b) (Twilling 2005b)	2005
2005-511.ASM	Overton and Shannon Survey, 13 acres, no new sites recorded	Harris Environmental Group (Twilling 2005a)	2005
2005-248.ASM	Tucson National Golf Course Improvements Project	SWCA Environmental Consultants (Barr 2004)	2004
2005-1238.ASM	Alive Church Survey, 4.7 acres, no new sites recorded	Tierra Right of Way Services (Klimas 2005)	2005
2004-18.ASM	La Cholla/Overton Survey	Tierra Right of Way Services, Ltd. (Moses 2004)	2004
2003-22.ASM	Linda Vista Transmission Line Survey, 4.4 acres, no new sites recorded	SWCA Environmental Consultants (Hesse 2003)	2003
2001-583.ASM	Quest Shannon, 0.7 acres, no new sites recorded	Engineering and Environmental Consultants (Fuller 2001)	2001
2001-136.ASM	La Cholla and Overton Survey, 0.64 miles, no new sites recorded	Tierra Environmental and Archaeological Services (Olsson and Klune 2001)	2001
1999-312.ASM	Cañada del Oro Wash to Magee Road Transmission Main Corridor Survey, 1.8 miles, no new sites recorded	Old Pueblo Archaeology Center (Jones 1999)	1999
1997-201.ASM	Tucson National Golf Course Survey, 163 acres, 3 new sites recorded	Professional Archaeological Services Technologies (Stephen 1994)	1997
1996-433.ASM	Owl Head Survey, 27 acres, no new sites recorded	Tierra Environmental and Archaeological Services (Tompkins 1996)	1996
1996-22.ASM	Overton Road Survey, 13.6 acres, no new sites recorded	Tierra Environmental and Archaeological Services (Carpenter 1996)	1996
1995-36.ASM	Shannon-Overton Survey, 18 acres, no new sites recorded	Old Pueblo Archaeology Center (Jones 1995)	1995
1990-159.ASM	La Cholla Hills Survey, 10 acres, no new sites recorded	Desert Archaeology Inc. (Mabry 1990)	1990

1. Project Number	2. Project Name	3. Author	4. Year
1986-33.ASM	WLB Survey, 4 acres, no new sites recorded	Institute for American Research (Mayro 1986)	1986
1985-96.ASM	Unknown, no report or PRF available	unknown	1985
1985-89.ASM	Cella Bar Survey, 160 acres, no new sites recorded	New World Research (Phillips 1985)	1985
1985-75.ASM	RA Homes Tract Survey, 7 acres, no new sites recorded	New World Research (Weed 1985)	1985
1981-174.ASM	Northern Tucson Basin Survey, 695-square mile, numerous sites recorded (none in APE)	Arizona State Museum (Fish et al. 1992; Madsen et al. 1993; Fish and Fish 2008)	1981
1980-150.ASM	Linda Vista Terrace and LV Estates Survey, 147 acres, no new sites recorded	Arizona State Museum (Urban 1980)	1980
1979-35.ASM	Rancho Feliz Survey, 244 acres, no new sites recorded	Arizona State Museum (Urban 1979)	1979
1976-1.ASM	Cañada del Oro Sewer Survey, 120 acres, no new sites recorded	ASM (Rogge and Brew 1976) (Rogge and Brew 1976)	1976
1975-36.ASM	Unknown, no report or PRF available, may be duplicate of 1995-36.ASM	unknown	1975

13b. Previously Recorded Cultural Resources Within Study Area.

Six (6) archaeological sites have been documented within one mile of the project area. None of these sites are located within the current project area.

1. Site Number	2. Affiliation	3. Site Type	4. Eligibility Status	5. Associated Reference
AZ AA:12:8(ASM)	Prehistoric, Hohokam	Sherd and lithic surface scatter	Determined ineligible individually per SHPO in 2009.	ASM Site Card, recorded by Haury in 1937
AZ AA:12:677(ASM)	Prehistoric, Native American	One rock pile, lithic scatter	Not formally evaluated.	(Fish and Fish 2008)
AZ AA:12:676(ASM)	Prehistoric, Native American	One rock pile, no artifacts	Not formally evaluated.	(Fish and Fish 2008)
AZ AA:12:378(ASM)	Historic, Euro American	Matt Lockas Homestead	Determined ineligible individually per SHPO in 2003.	Originally recorded in 1982 (Fish and Fish 2008). Subsurface testing in 2001 (Olsson 2001).
AZ AA:12:1135(ASM)	Historic, Euro American	Historic 1950s-1960s house foundation and associated features and historic artifacts	Not formally evaluated. Recommended ineligible per recorder in 2013.	(O'Mack 2013a, 2013b)
AZ AA:12:1093(ASM)	Historic, Euro American	Historic 1940s house foundations and associated features and historic artifacts	Not formally evaluated. Recommended ineligible per recorder in 2005.	(Cox et al. 2010)

13c. Historic Buildings/Districts/Neighborhoods.

1. Property Name or Address	2. Year	3. Eligibility Status
None		

14. CULTURAL CONTEXTS

14a. Prehistoric Culture: Archaic, Early Agricultural, Hohokam

14b. Protohistoric Culture: Spanish, A.D. 1452 to 1700s

14c. Indigenous Historic Culture: O'odham, Apache

14d. Euro-American Culture: A.D. 1700s to 1950s

15. FIELD SURVEY PERSONNEL

15a. Principal Investigator: Michael Cook

15b. Field Supervisor: Michael Cook

15c. Crew: N/A

15d. Fieldwork Date(s): August 8, 2018

16. SURVEY METHODS

16a. Transect Intervals: 20 m apart

16b. Coverage (%): 100

16c. Site Recording Criteria: Arizona State Museum

16d. Ground Surface Visibility: 95 %

16e. Observed Disturbances: Dirt roads, foot paths, small amounts of modern trash.

17. FIELD SURVEY RESULTS

17a. No Cultural Resources Identified: ☐

17b. Isolated Occurrences (IOs) Only: ☒

17c. Number of IOs Recorded: 4

17d. Table of IOs:

1. IO Number	2. Description	3. Date Range	4. UTMs
1	hole-in-top tin can	Historic	E 498644, N 3582170
2	rock-lined, labyrinth spiral shrine	Modern	E 498316, N 3582264
3	core fragment, yellow-red chert	Prehistoric	E 498385, N 3582431
4	sherd, plainware, body sherd	Prehistoric	E 498667, N 3582359

18. COMMENTS: No archaeological sites or historic properties are located within project area. Accordingly, MCA recommends a finding of *No Historic Properties Affected* for the proposed undertaking within the project area.

SECTION 19. ATTACHMENTS
19a. Project Location Map: ☒
19b. Land Jurisdiction Map: ☒
19c. Background Research Map, Previous Surveys: ☒
19d. Background Research Map, Previous Sites: ☒
19e. GLO Map: ☒
19f. Isolates: ☒
19g. References: ☒

SECTION 20. CONSULTANT CERTIFICATION

I certify the information provided herein has been reviewed for content and accuracy and all work meets applicable agency standards.

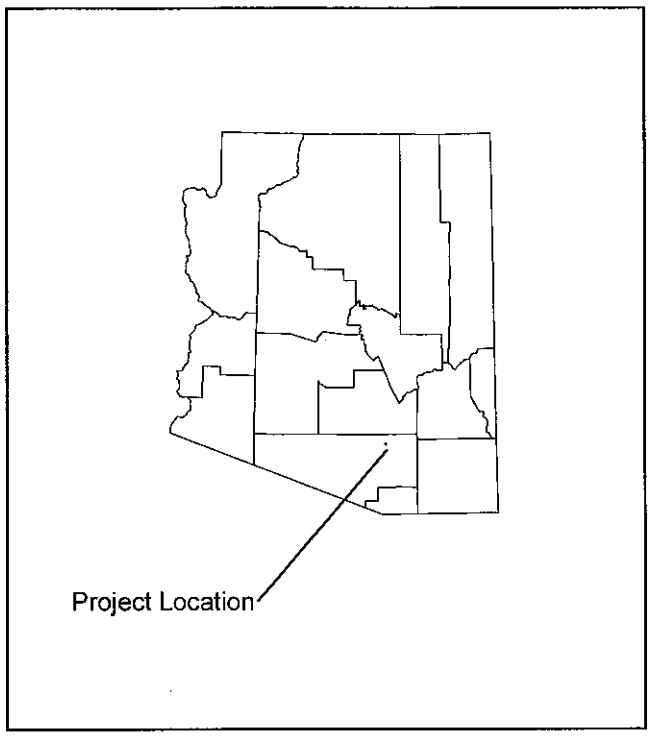
Signature

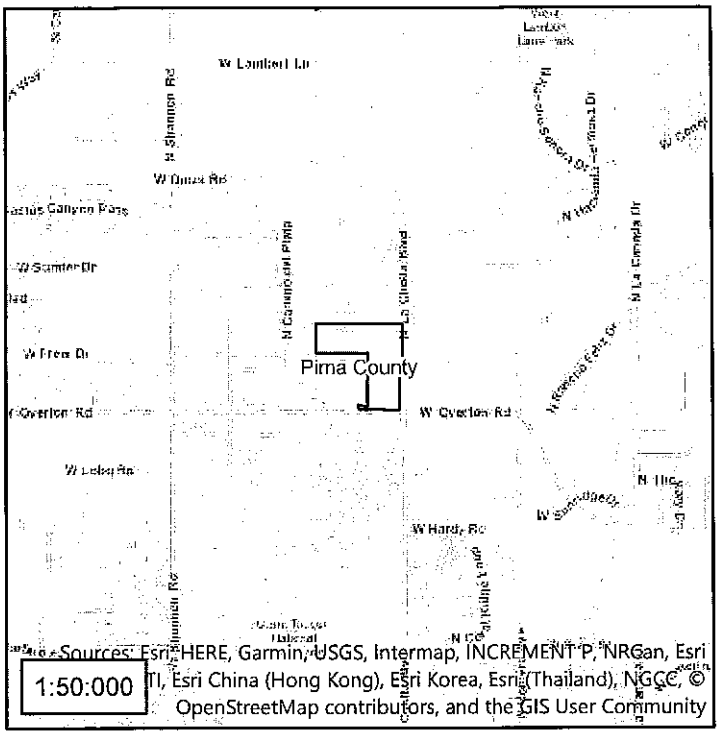
Owner, Principal Investigator
Title

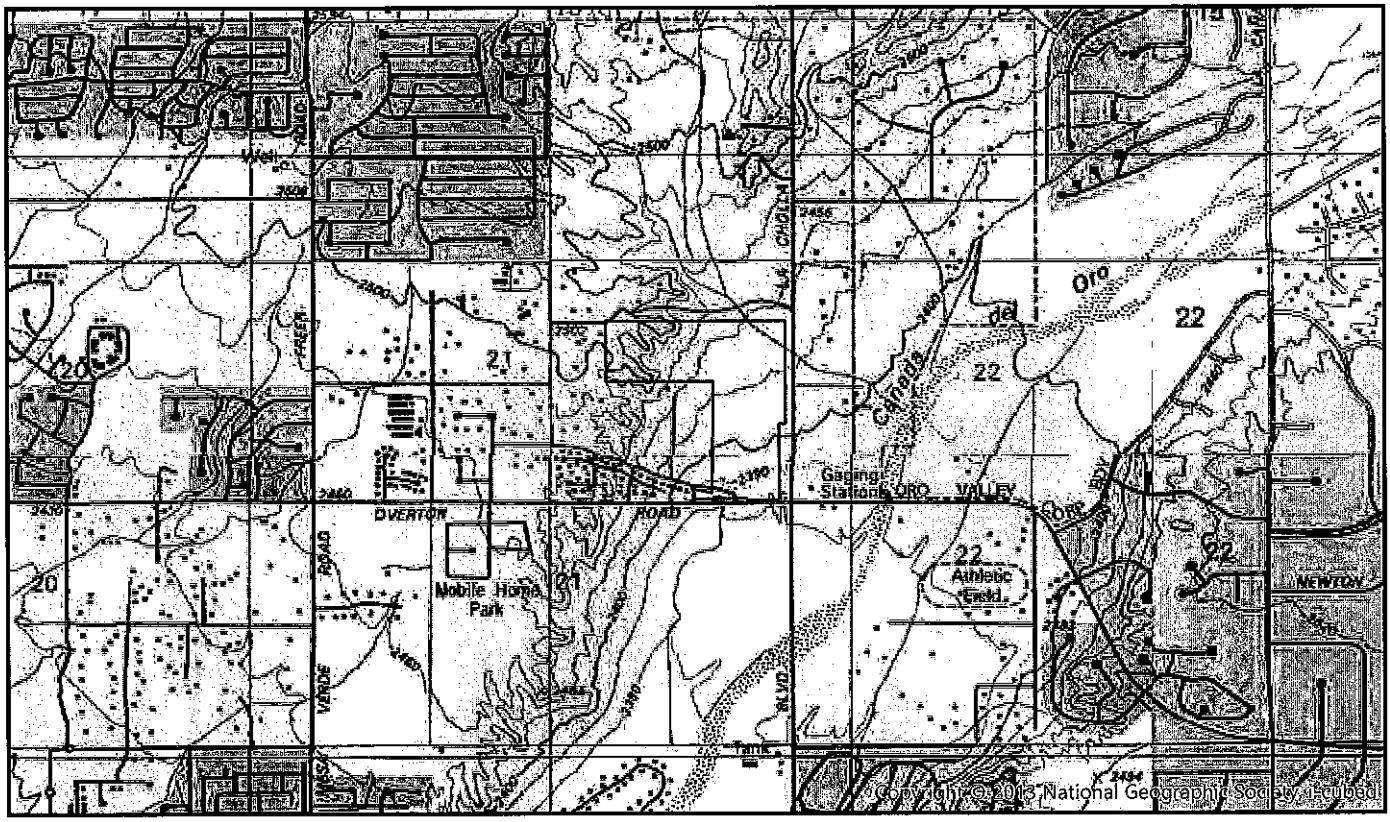
SECTION 21. DISCOVERY CLAUSE

In the event that previously unreported cultural resources are encountered during ground disturbing activities, all work must immediately cease within 30 meters (100 feet) until a qualified archaeologist has documented the discovery and evaluated its eligibility for the National Register of Historic Places in consultation with the lead agency, the SHPO, and Tribes, as appropriate. Work must not resume in this area without approval of the lead agency.

If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 meters (100 feet) of the discovery and the area must be secured. The Arizona State Museum, lead agency, SHPO, and appropriate Tribes must be notified of the discovery. All discoveries will be treated in accordance with NAGPRA (Public Law 101-601; 25 U.S.C. 3001-3013) or Arizona Revised Statutes (A.R.S. § 41-844 and A.R.S. § 41-865), as appropriate, and work must not resume in this area without authorization from ASM and the lead agency.







Vista del Oro Class III
T12S, R13E, NE 1/4 of Section 21
Ruelas Canyon and Jaynes, Ariz. USGS Quadrangles
Pima County, Arizona
NAD 1983, Z12

N

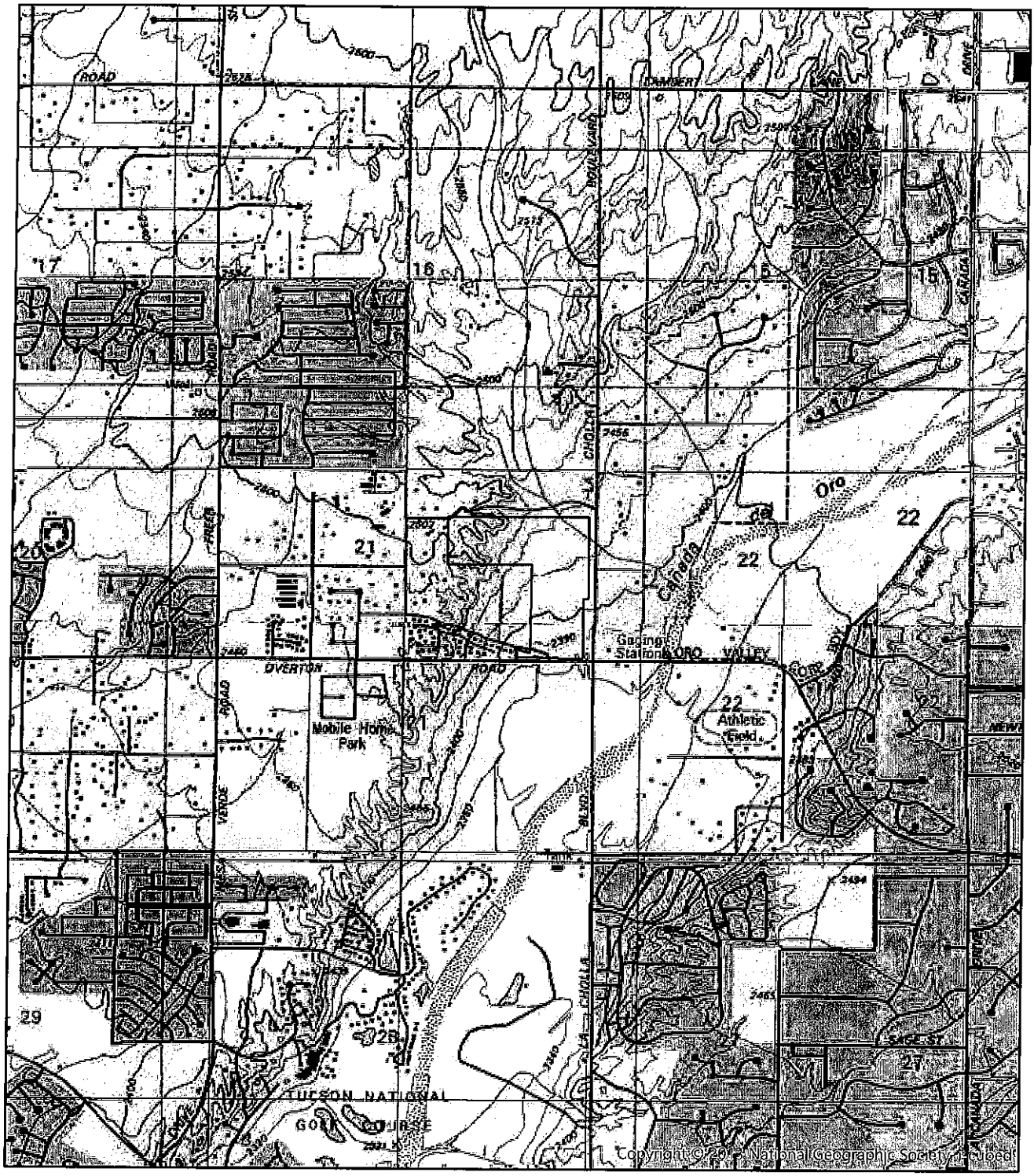
1 0.5 0

Miles

Legend

Project area

Attachment 19a. Project Location Map.



Legend

Project area

Arizona Surface Managment

CATEGORY

Private

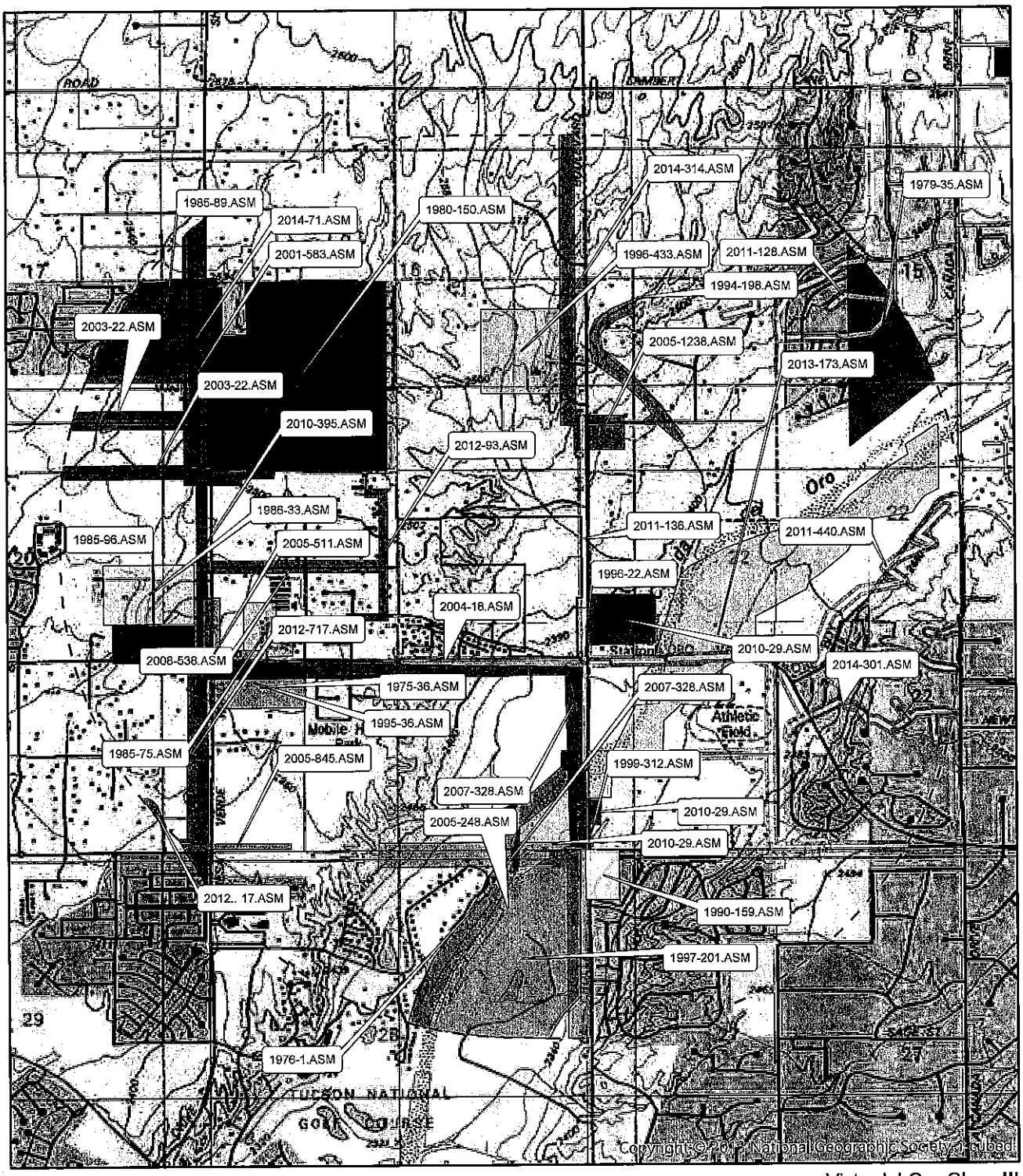
Vista del Oro Class III
T12S, R13E, NE 1/4 of Section 21
Ruelas Canyon and Jaynes, Ariz. USGS Quadrangles
Pima County, Arizona
NAD 1983, Z12

N

0 0.5 1 km

0 0.5 1 mi

Attachment 19b. Land Jurisdiction Map.



Legend

- Project area
- 1-mile Class I study area buffer

Vista del Oro Class III
T12S, R13E, NE 1/4 of Section 21
Ruelas Canyon and Jaynes, Ariz. USGS Quadrangles
Pima County, Arizona
NAD 1983, Z12

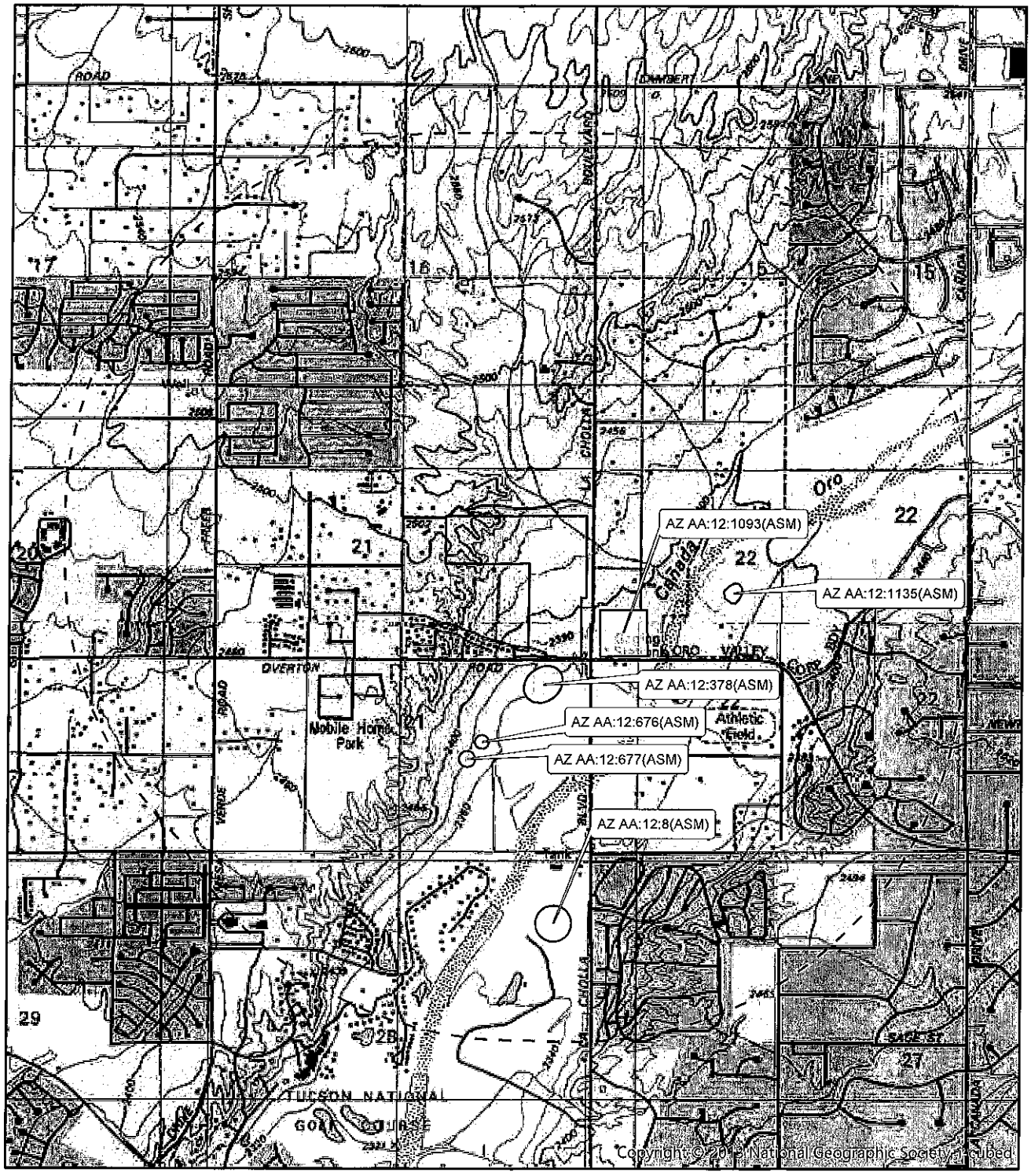
N

0 0.5 1 km

0 0.5 1 mi

MCA

Attachment 19c. Background Research Map, Previous Surveys.



Legend

- Project area
- 1-mile Class I study area buffer
- Previously recorded site

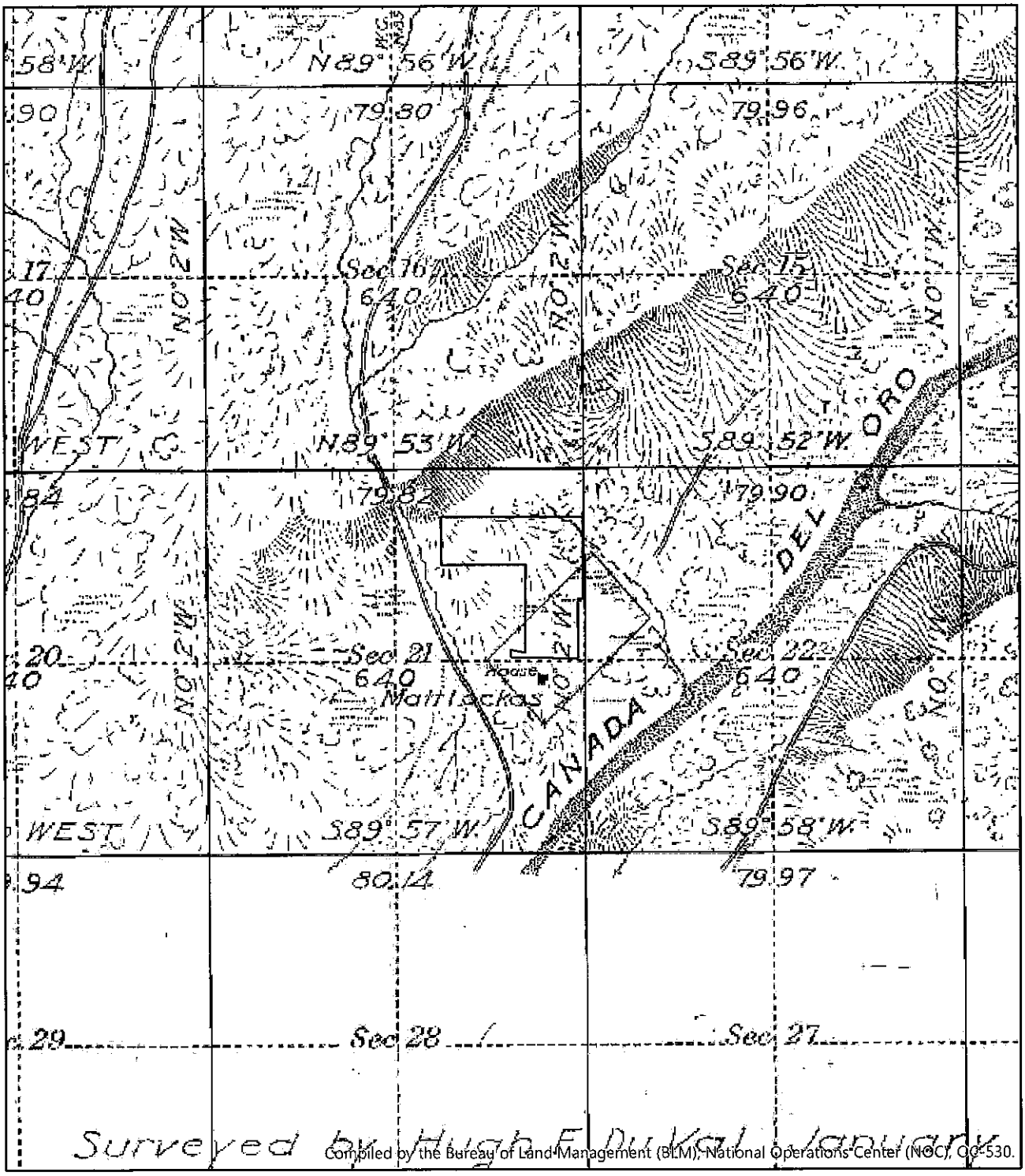
Vista del Oro Class III
T12S, R13E, NE 1/4 of Section 21
Ruelas Canyon and Jaynes, Ariz. USGS Quadrangles
Pima County, Arizona
NAD 1983, Z12

N

0 0.5 1 km

0 0.5 1 mi

Attachment 19d. Background Research Map, Previous Sites.



Legend

Project area

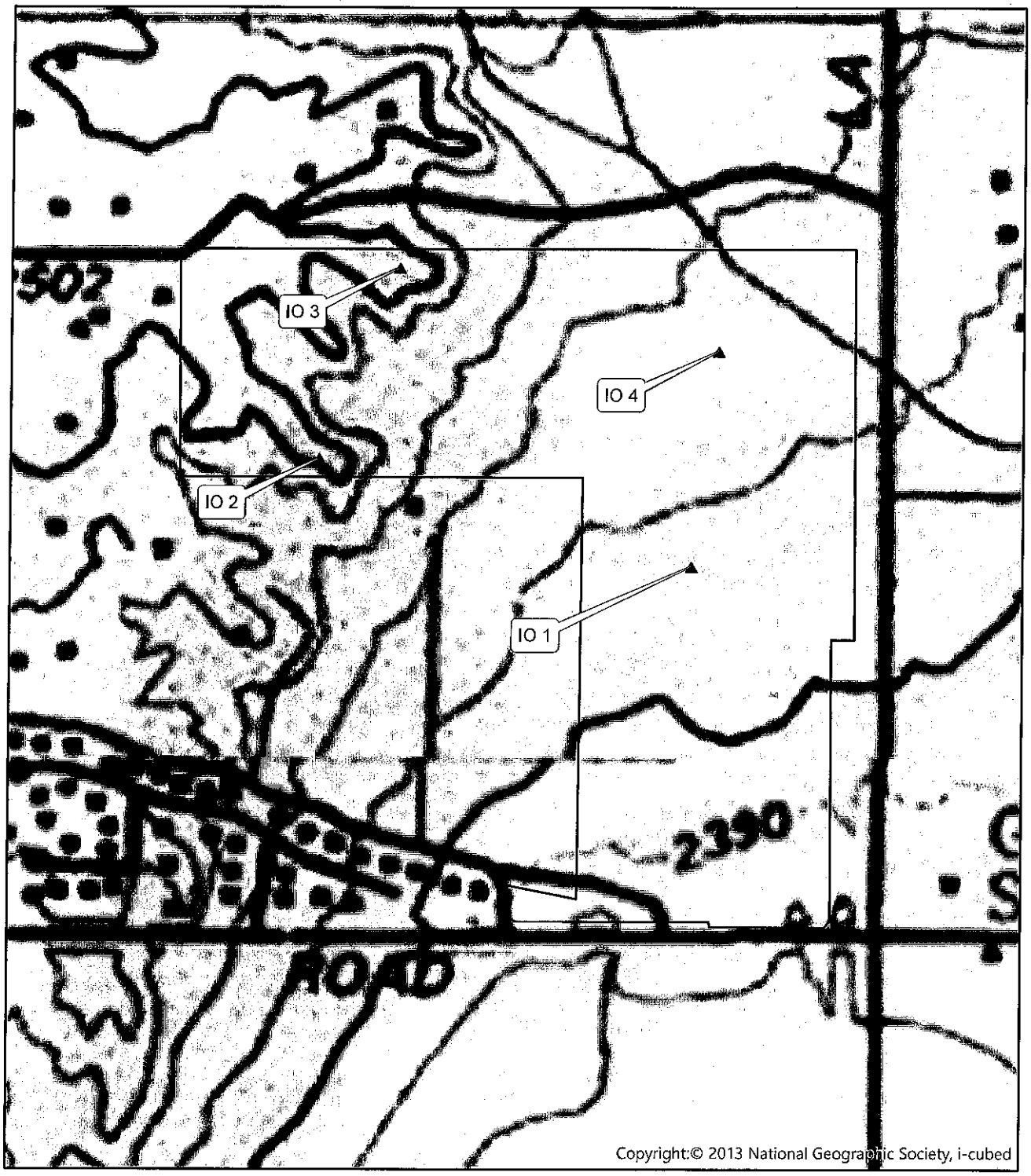
Vista del Oro Class III
T12S, R13E, NE 1/4 of Section 21
Ruelas Canyon and Jaynes, Ariz. USGS Quadrangles
Pima County, Arizona
NAD 1983, Z12

N

km 0 0.5 1

mi 0 0.5 1

Attachment 19e. GLO Map (GLO 1915).



Legend

Project area

Isolates

Vista del Oro Class III
T12S, R13E, NE 1/4 of Section 21
Ruelas Canyon and Jaynes, Ariz. USGS Quadrangles
Pima County, Arizona
NAD 1983, Z12

N

0 0.25 km

0 0.25 mi

Attachment 19f. Isolates.

STATE HISTORIC PRESERVATION OFFICE
SURVEY REPORT SUMMARY FORM

Attachment 19g. References:

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2018 *Geologic Map of Arizona.* Arizona Geologic Survey. Electronic document accessed August 3rd, 2018. http://data.azgs.az.gov/geologic-map-of-arizona/.

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2014 *A Class III Cultural Resource Survey of Proposed Natural Gas Line Rights-of-Way Near River Road for Southwest Gas in Pima County, Arizona.* Tierra Right of Way Services, Inc., Tucson, Arizona.

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2014 *A Class III Cultural Resource Survey of Proposed Natural Gas Line Rights-of-Way near Overton Road Between North La Cholla Boulevard and North La Canada Drive, for Southwest Gas in Pima County, Arizona (AAREPL [2015] - ATLAS 0375).* Tierra Archaeological Report No. 2014-71. Tierra Right of Way Services, Inc., Tucson, Arizona.

Hesse, Jerome S.
2003 *The Linda Vista Transmission Main Cultural Resource Survey, Pima County, Arizona.* Cultural Resource Report No. 03-32. SWCA Environmental Consultants, Tucson, Arizona.

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Mabry, Jonathan B.

1990 *Letter Report 90-115.* Desert Archaeology, Inc., Tucson, Arizona.

Madsen, J.H., P.R. Fish, and S.K. Fish (editors)

1993 *Northern Tucson Basin Survey: Research Directions and Background Studies.* Archaeological Series No. 182. Tucson, Arizona.

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Moses, James

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O'Mack, Scott

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Phillips, David A.
1985 *Letter Report to Mr. Don Laidlaw, Cella Bar Associates.* New World Reseach, Inc.

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1976 *Arizona State Museum Survey Project Form for 1976-1.ASM, On file, Arizona State Museum.* University of Arizona, Tucson, Arizona.

Slawson, Laurie
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Stephen, David V.M.
1994 *Letter Report for Tucson National Golf Course Project.* P.A.S.T. Report 94556. Professional Archaeological Services and Technologies, Tucson, Arizona.

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2005a *A Class III Cultural Resources Survey of the Intersection of Shannon Road and Overton Road, Pima County, Arizona.* Harris Environmental Group, Inc. Project 05-097. Harris Environmental Group, Tucson, Arizona.

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Appendix D:

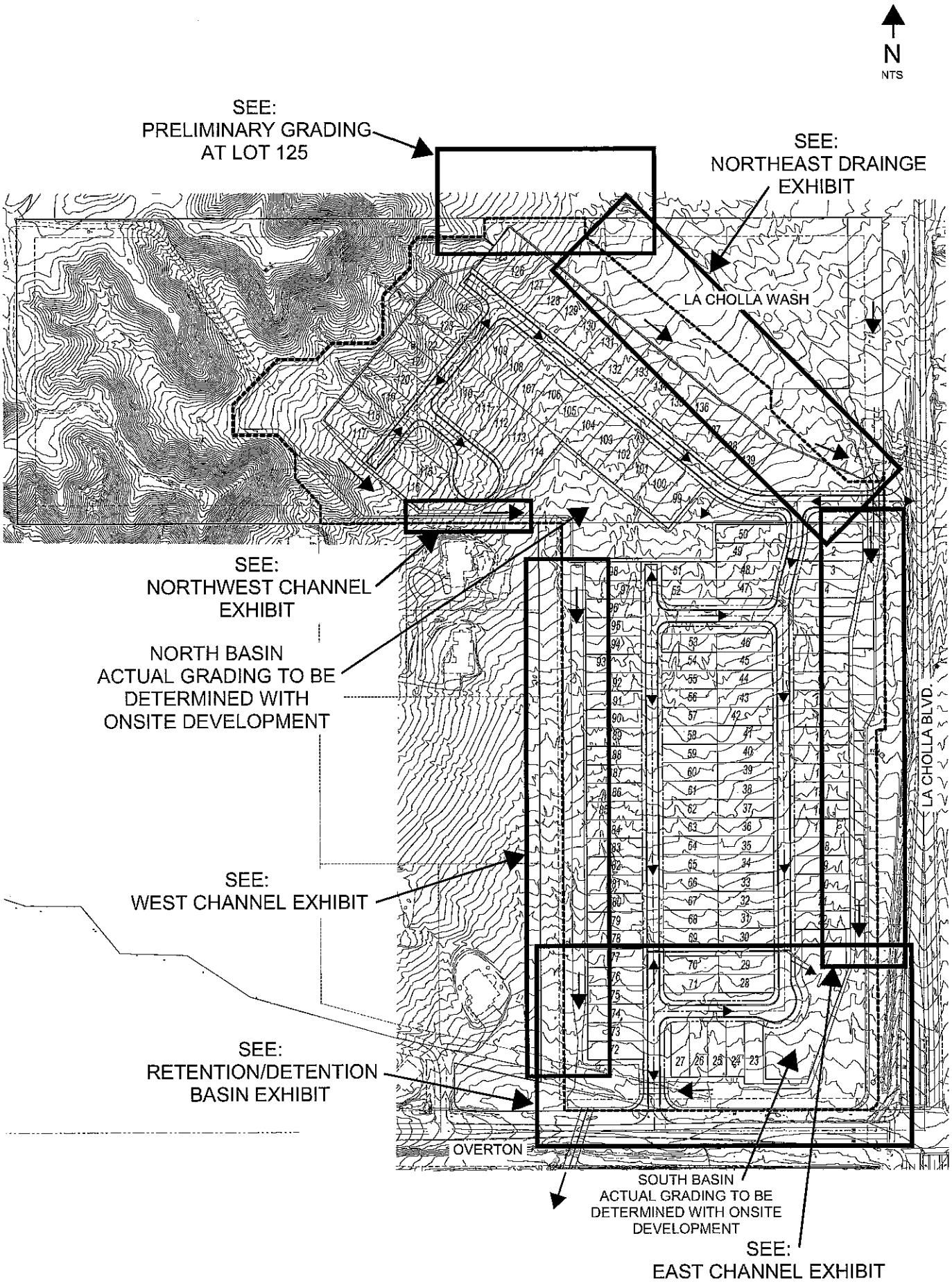
Preliminary Regional Distribution of Flow Via Culverts at La Cholla Wash & Basin Routing Technical Analysis Procedures

by

Bogardus Engineering, LLC

February 19, 2020

This Memorandum Addresses the On-Site Routing of Stormwater Flows Through the Proposed Residential Development



LA CHOLLA BOULEVARD REZONING
PRELIMINARY PERIMETER DRAINAGE EXHIBIT KEYMAP

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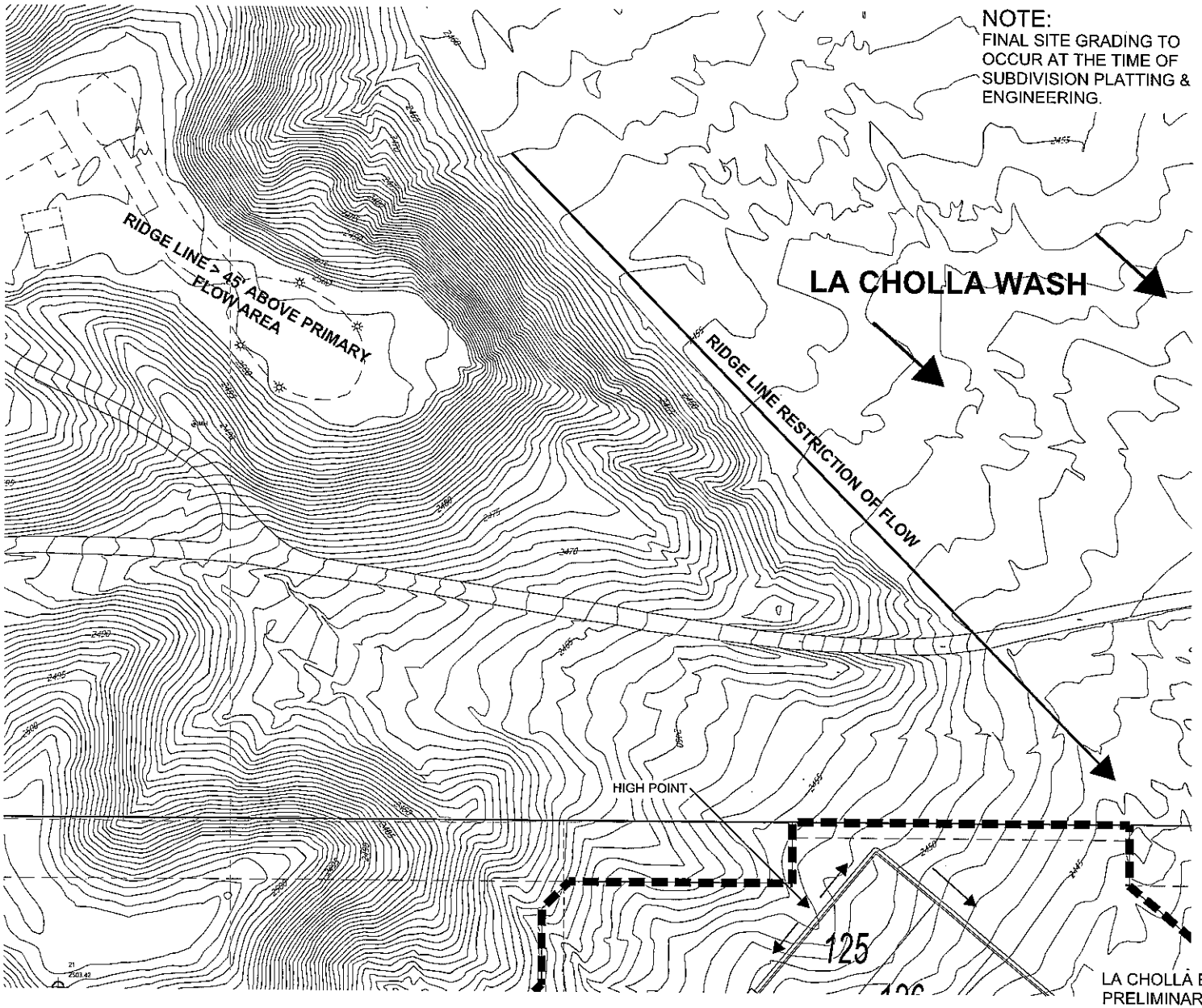
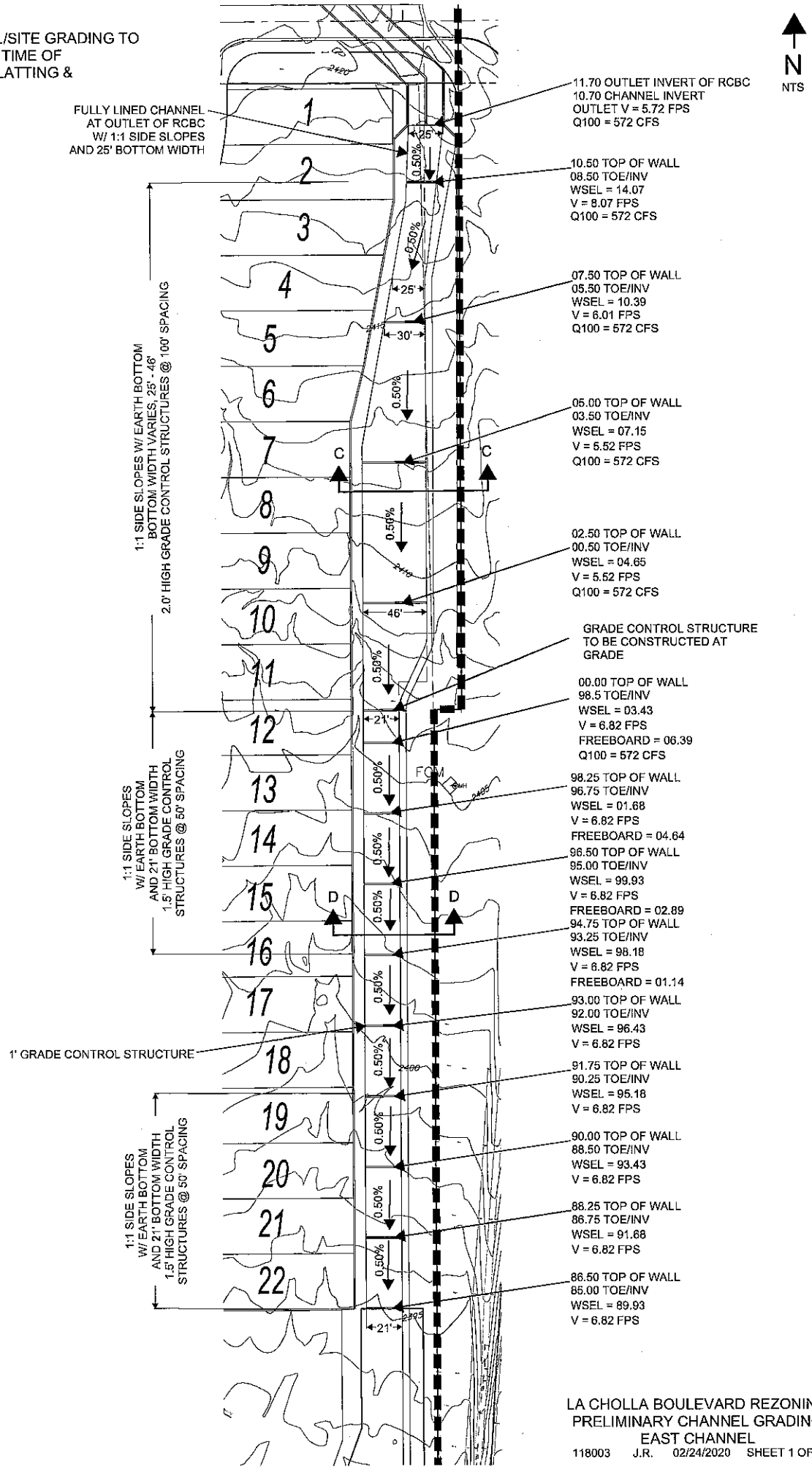
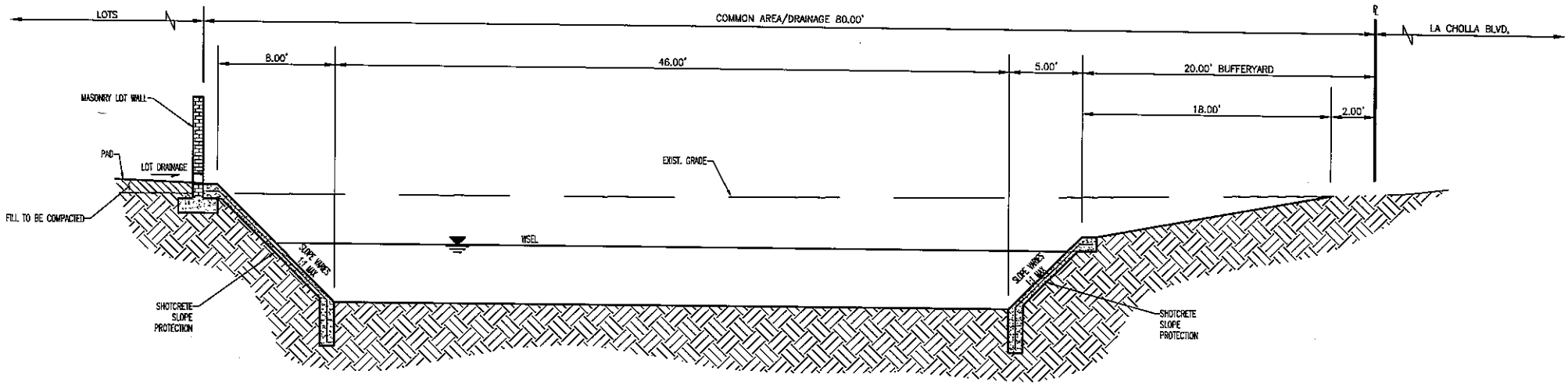


LA CHOLLA BOULEVARD REZONING
PRELIMINARY GRADING AT LOT 125
118003 J.R. 02/24/2020 SHEET 1 OF 1

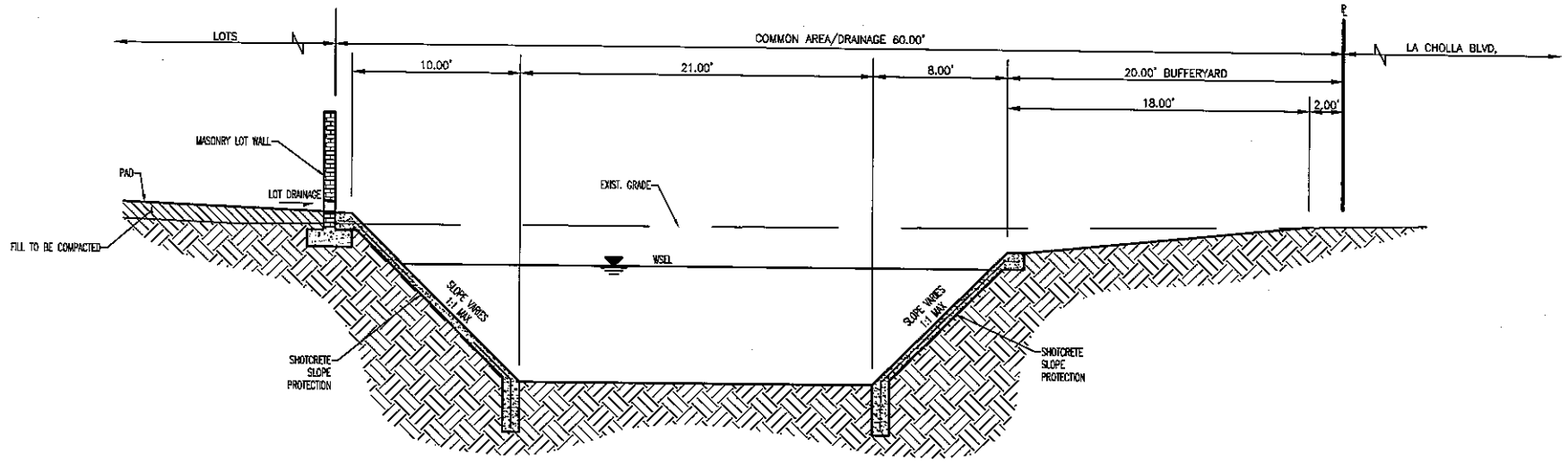
NOTE:
FINAL CHANNEL/SITE GRADING TO OCCUR AT THE TIME OF SUBDIVISION PLATTING & ENGINEERING.



LA CHOLLA BOULEVARD REZONING
PRELIMINARY CHANNEL GRADING
EAST CHANNEL
118003 J.R. 02/24/2020 SHEET 1 OF 2

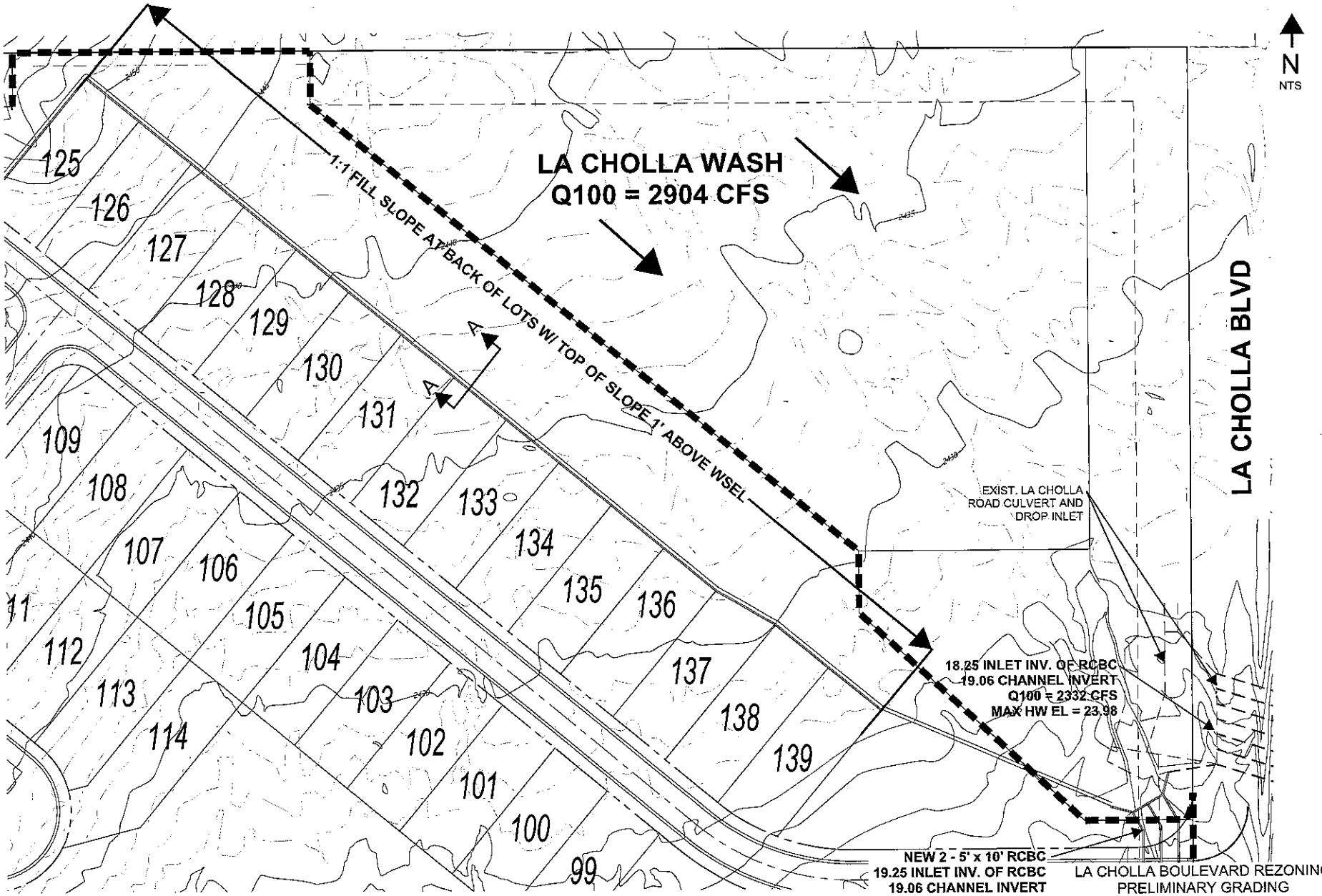


C-C

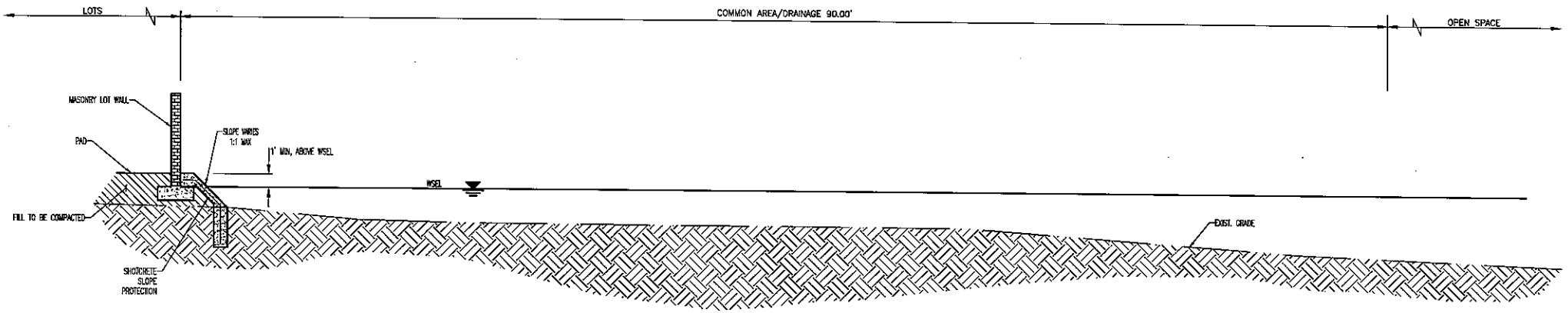


D-D

SHEET 2 OF 2



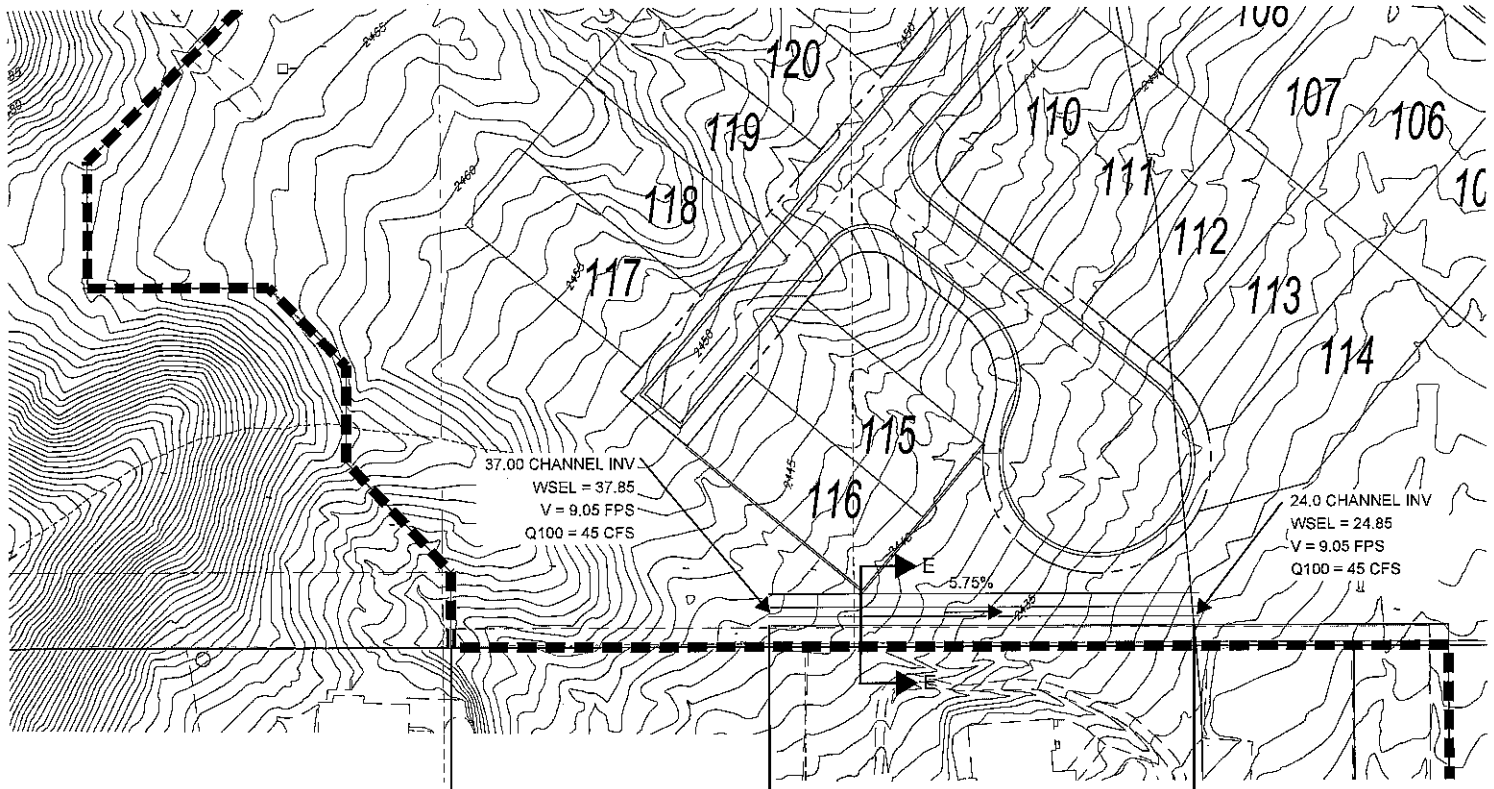
LA CHOLLA BOULEVARD REZONING
PRELIMINARY GRADING
NORTH EAST DRAINAGE
118003 J.R. 02/24/2020 SHEET 1 OF 2


LOTS
COMMON AREA/DRAINAGE 90.00'
OPEN SPACE
MASONRY LOT WALL
PAD
SLOPE VARIES
1:1 MAX
1' MIN. ABOVE WSEL
WSEL
FILL TO BE COMPACTED
EXIST. GRADE
SHOTCRETE
SLOPE
PROTECTION

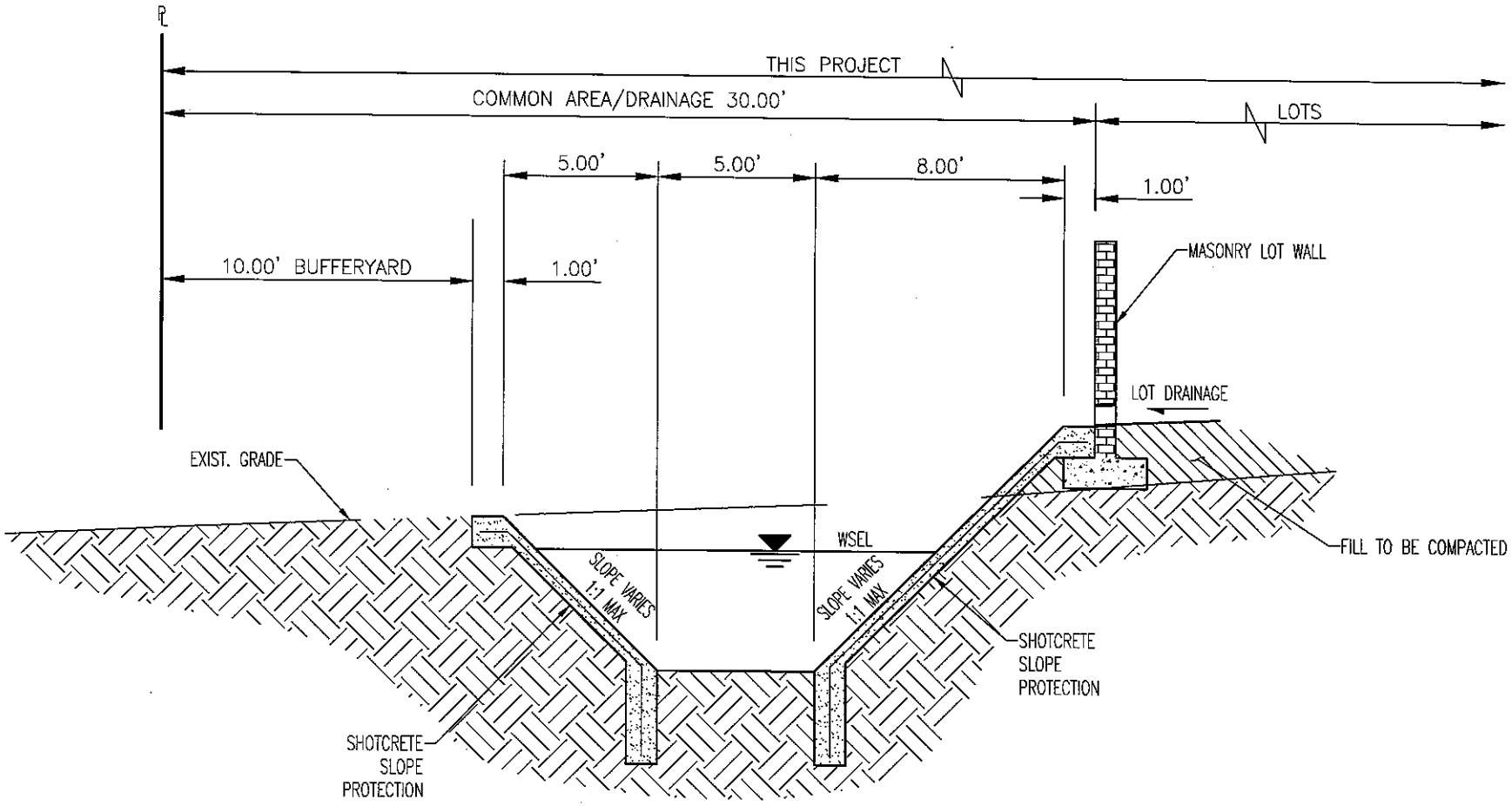
A-A

NOTE:
FINAL CHANNEL/SITE GRADING TO OCCUR AT THE TIME OF SUBDIVISION PLATTING & ENGINEERING.

N
NTS

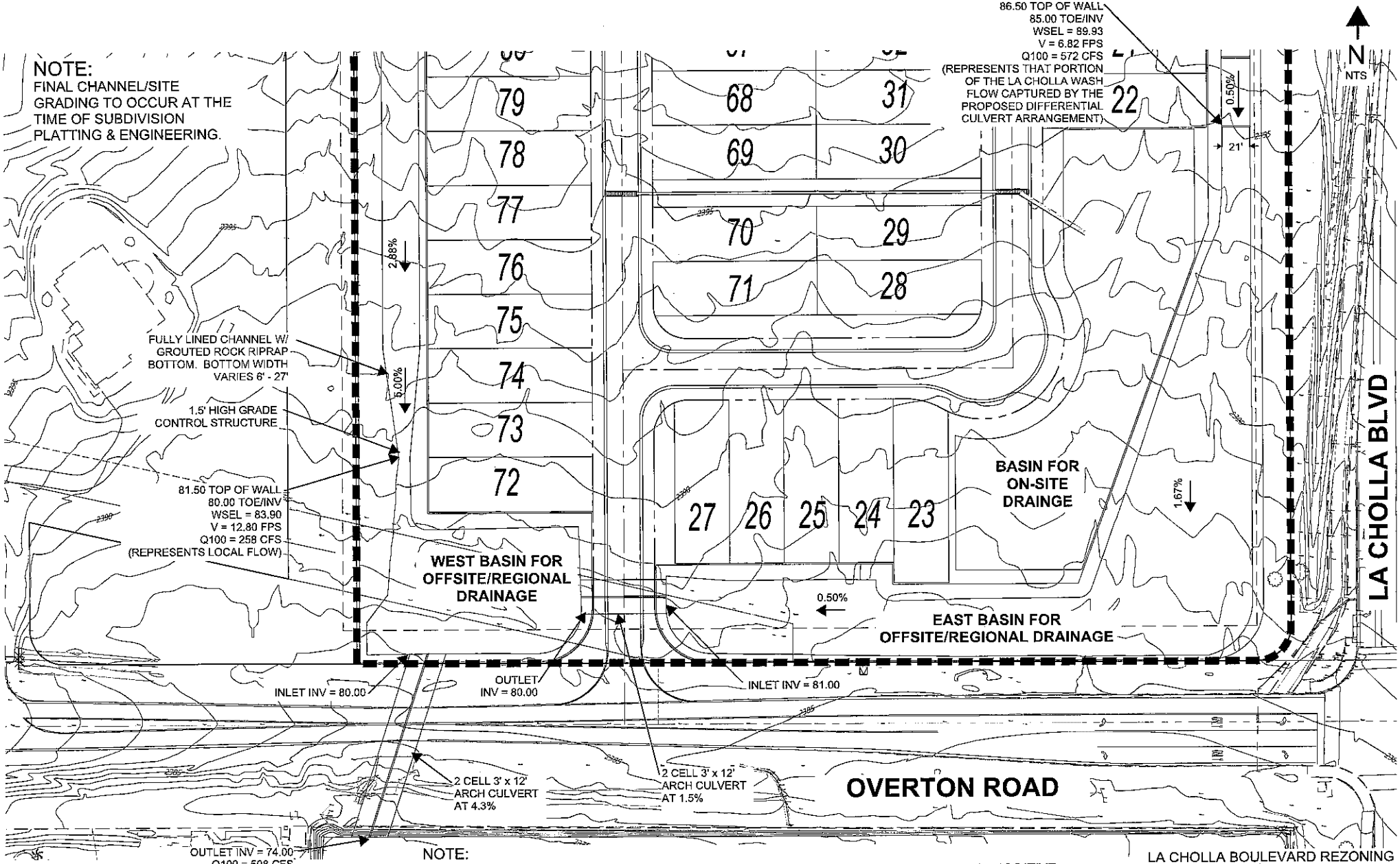


LA CHOLLA BOULEVARD REZONING
PRELIMINARY CHANNEL GRADING
NORTHWEST CHANNEL
118003 J.R. 02/24/2020 SHEET 1 OF 2



E-E

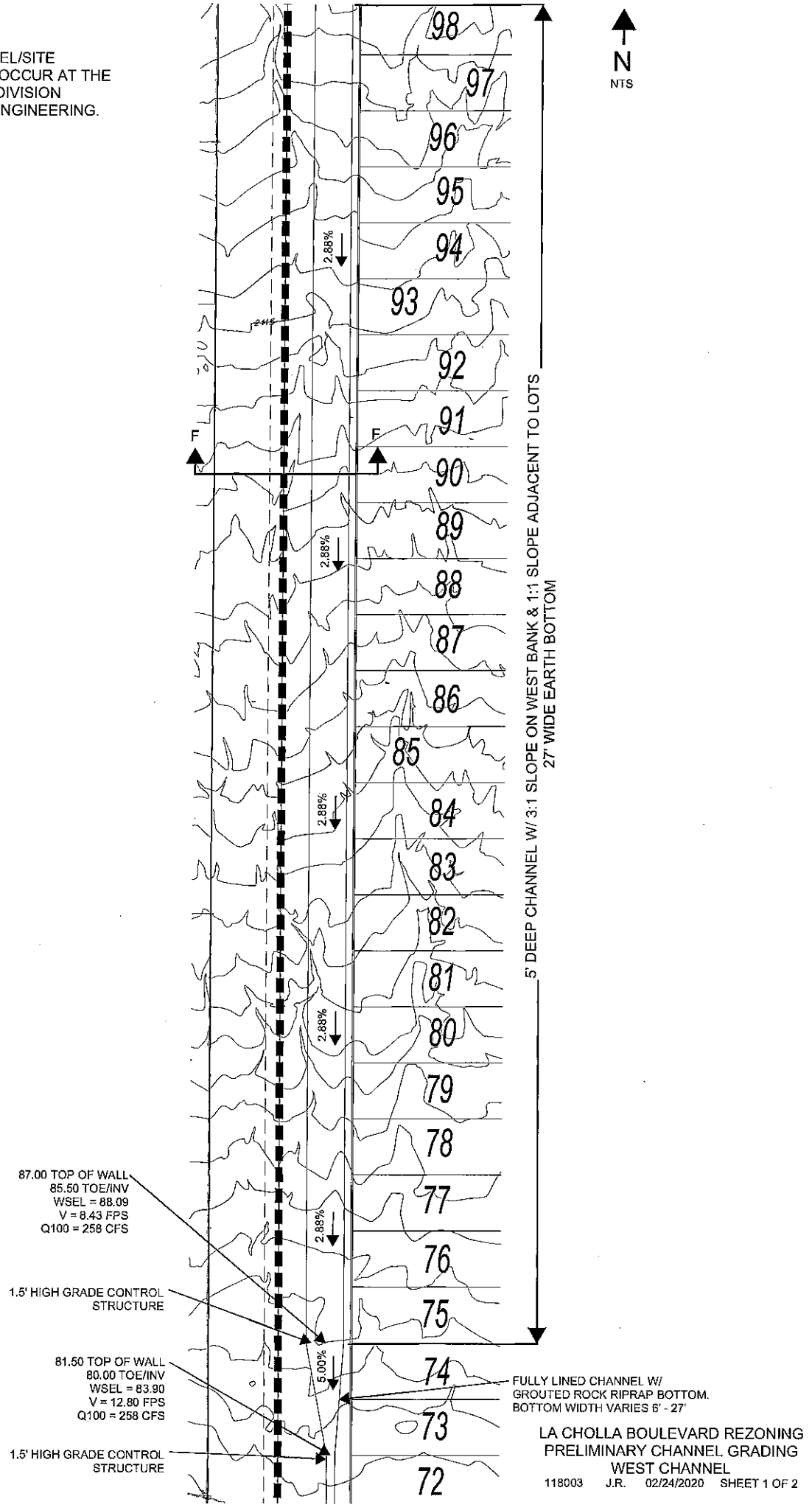
SHEET 2 OF 2



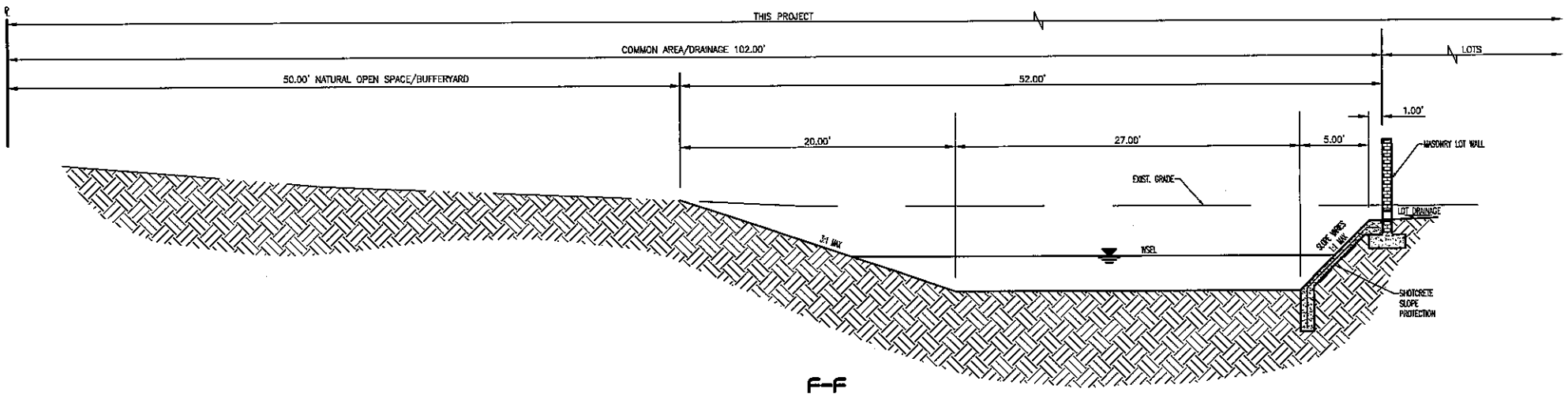
NOTE:
1. FLOWS SHOWN HEREON HAVE DIFFERENT TIMES OF CONCENTRATION AND ARE NOT ADDITIVE.
2. ON-SITE GENERATED FLOWS ARE TO BE REDUCED TO 10% BELOW EXISTING CONDITIONS AND WILL BE LESS THAN THE ROUTED LA CHOLLA WASH FLOW.

LA CHOLLA BOULEVARD REZONING
PRELIMINARY GRADING
RETENTION/DETENTION BASIN
118003 J.R. 02/24/2020 SHEET 1 OF 1

NOTE:
FINAL CHANNEL/SITE GRADING TO OCCUR AT THE TIME OF SUBDIVISION PLATTING & ENGINEERING.



LA CHOLLA BOULEVARD REZONING
PRELIMINARY CHANNEL GRADING
WEST CHANNEL
118003 J.R. 02/24/2020 SHEET 1 OF 2



F-F

SHEET 2 OF 2

PRELIMINARY REGIONAL DISTRIBTION OF FLOW VIA CULVERTS AT LA CHOLLA WASH AND BASIN ROUTING TECHNICAL ANALYSIS PROCEDURES

Project Name:	Vista Del Oro Rezoning
Prepared By:	Bogardus Engineering, LLC
BE Job Number:	18-002-A-001D
Presidio Number:	118003-12-0103
Date:	February 19, 2020

PURPOSE

The purpose of this statement is to outline the summary of the technical requirements, procedures and Conclusion of results in the preparation of the preliminary flow distribution of La Cholla Wash, conveyance of breakout flow in east channel, and basin routing at Overton Road. This preliminary study will be used in support of the Vista Del Oro Rezoning.

TECHNICAL REQUIREMENTS

PRELIMINARY LA CHOLLA WASH CULVERT FLOW DISTRIBUTION

Procedures, Methods and Assumptions

- **Combined routed breakout flow**
  - GeoHECRAS 1D, Version 2.7.0.25377
    - HEC-RAS 5.0.7
    - A detailed survey will be prepared with the Final Drainage Report supporting the Plat for existing culverts and downstream channel
  - Ratios of lesser magnitude floods based on Table D-8 from PC-Hydro User Guide
    - Assumed the La Cholla Wash was a Suburban watershed
    - 2-year was 15% of 100-year
    - 10-year was 40% of 100-year

- **Procedures**
  - The La Cholla Wash HEC-HMS peak discharge
    - La Cholla Wash designed Q_{100} = 2904 cfs
  - Existing and Proposed HEC-RAS 1D Model
    - PAG LIDAR used T12SR13ES21
    - Terrain Grid 16 feet with medium resolution
    - Generated contour interval = 1'
  - Cross Sections
    - The same cross sections for pre and post analyses were used to compare encroachment
      - Cross sections were modified for post-developed conditions at La Cholla Blvd to collect and convey water to boxes
    - Only one proposed cross section was used downstream of box culverts
    - An existing survey will be incorporated into the model for Final Drainage Report with Tentative Plat
  - Encroachments
    - Placed obstruction of flow at the toe of slope of Lots 125-139 and to isolate flow at cross sections 117-119 for developed conditions
    - WSELs compared pre and post

- **Floodplain Model parameters**
  - Modeled using DOT design of 6 - 6'x10' RCBC per plan
    - Existing conditions there are 3 - 6' x 20'ARCH
    - Inverts
      - Upstream= 2418.25
      - Downstream= 2416.61
  - Added 2 cell 5'x10' RCBC to convey the breakout flow to the south
    - Inverts
      - Upstream invert= 2419.25
      - Downstream invert = 2411.70
  - Both box systems operate inlet outlet control so the slope, inverts and shape will not affect the amount of water conveyed to the south