

CITY OF REDLANDS
MASTER PLAN OF DRAINAGE (MPD)



TECHNICAL APPENDIX B.2

Normal Depth Calculations

FlowMaster Output Files (Collector Storm Drains) Report

Label	Solve For	Friction Method	Roughness Coefficient
SD 4-39C-1	Normal Depth	Manning Formula	0.013
SD 4-39C-2	Normal Depth	Manning Formula	0.013
SD 4-39C-3	Normal Depth	Manning Formula	0.013
SD 4-37A-1	Normal Depth	Manning Formula	0.013
SD 4-37A-2	Normal Depth	Manning Formula	0.013
SD 4-37A-3	Normal Depth	Manning Formula	0.013
SD 4-37-1	Normal Depth	Manning Formula	0.013
SD 4-37-2	Normal Depth	Manning Formula	0.013
SD 4-37-3	Normal Depth	Manning Formula	0.013
SD 4-39A-1	Normal Depth	Manning Formula	0.013
SD 4-39A-2	Normal Depth	Manning Formula	0.013
SD 4-39A-3	Normal Depth	Manning Formula	0.013
SD 4-18A	Normal Depth	Manning Formula	0.013
SD 4-18B-1	Normal Depth	Manning Formula	0.013
SD 4-18B-2	Normal Depth	Manning Formula	0.013
SD 4-18B-3	Normal Depth	Manning Formula	0.013
SD 4-38-1	Normal Depth	Manning Formula	0.032
SD 4-38-2	Normal Depth	Manning Formula	0.032
SD 4-38-3	Normal Depth	Manning Formula	0.032
SD 4-18A-1	Normal Depth	Manning Formula	0.013
SD 4-18A-2	Normal Depth	Manning Formula	0.013
SD 4-10-1	Normal Depth	Manning Formula	0.013
SD 4-10-2	Normal Depth	Manning Formula	0.013
SD 4-10-3	Normal Depth	Manning Formula	0.013
SD 4-10-4	Normal Depth	Manning Formula	0.013
SD 4-23	Normal Depth	Manning Formula	0.013

FlowMaster Output Files (Collector Storm Drains) Report

Channel Slope (ft/ft)	Normal Depth (ft)	Diameter (ft)	Discharge (ft ³ /s)
0.01000	2.45	3.50	84.02
0.02800	1.94	3.00	84.02
0.04200	2.05	2.50	84.02
0.01640	0.33	3.00	2.19
0.00420	0.46	3.00	2.19
0.01000	0.42	2.00	2.19
0.01710	0.66	2.75	8.77
0.03380	0.58	2.50	8.77
0.03560	0.62	2.00	8.77
0.01970	2.77	3.50	136.42
0.03400	2.23	3.50	136.42
0.03140	2.29	3.50	136.42
0.00400	1.37	2.50	15.11
0.01000	1.22	2.50	19.71
0.01260	1.32	2.00	19.71
0.01530	1.24	2.00	19.71
0.03200	1.92	2.50	27.95
0.05160	1.60	2.50	27.95
0.07190	1.43	2.50	27.95
0.08168	1.00	2.00	32.28
0.00908	1.73	2.50	32.28
0.00300	5.13	6.50	277.00
0.00300	5.13	6.50	277.00
0.00400	5.13	6.00	277.00
0.01580	3.53	5.00	277.00
0.03300	1.50	2.50	49.89

Flow Area (ft ²)	Wetted Perimeter (ft)	Critical Depth (ft)	Critical Slope (ft/ft)
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FlowMaster Output Files (Collector Storm Drains) Report

Flow Area (ft ²)	Wetted Perimeter (ft)	Critical Depth (ft)	Critical Slope (ft/ft)
7.18	6.93	2.86	0.00703
4.85	5.61	2.80	0.01372
4.30	5.66	2.47	0.03843
0.42	2.03	0.46	0.00418
0.68	2.41	0.46	0.00418
0.48	1.91	0.51	0.00447
1.10	2.82	0.96	0.00403
0.85	2.50	0.99	0.00423
0.82	2.35	1.06	0.00500
8.16	7.67	3.34	0.01596
6.47	6.47	3.34	0.01596
6.68	6.60	3.34	0.01596
2.75	4.17	1.31	0.00463
2.38	3.87	1.51	0.00505
2.21	3.80	1.60	0.00799
2.04	3.62	1.60	0.00799
4.05	5.35	1.80	0.03721
3.31	4.63	1.80	0.03720
2.91	4.29	1.80	0.03719
1.57	3.14	1.89	0.01761
3.63	4.92	1.93	0.00694
28.10	14.22	4.47	0.00418
28.10	14.22	4.47	0.00418
25.72	14.15	4.56	0.00500
14.81	9.97	4.57	0.00985
3.07	4.42	2.30	0.01285

Velocity Head (ft)	Specific Energy (ft)	Discharge Full (ft ³ /s)	Slope Full (ft/ft)
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FlowMaster Output Files (Collector Storm Drains) Report

Velocity Head (ft)	Specific Energy (ft)	Discharge Full (ft ³ /s)	Slope Full (ft/ft)
2.13	4.57	100.60	0.00697
4.67	6.62	111.60	0.01587
5.92	7.97	84.06	0.04196
0.41	0.74	85.41	0.00001
0.16	0.62	43.22	0.00001
0.32	0.74	22.62	0.00009
0.99	1.65	69.15	0.00028
1.64	2.21	75.40	0.00046
1.78	2.39	42.68	0.00150
4.34	7.11	141.20	0.01839
6.90	9.13	185.51	0.01839
6.48	8.77	178.27	0.01839
0.47	1.84	25.94	0.00136
1.06	2.28	41.01	0.00231
1.24	2.56	25.39	0.00759
1.45	2.68	27.98	0.00759
0.74	2.66	29.81	0.02814
1.11	2.70	37.85	0.02814
1.43	2.87	44.68	0.02814
6.57	7.57	64.65	0.02036
1.23	2.96	39.08	0.00619
1.51	6.64	287.14	0.00279
1.51	6.64	287.14	0.00279
1.80	6.93	267.84	0.00428
5.43	8.96	327.35	0.01131
4.11	5.61	74.51	0.01480

Flow Type

FlowMaster Output Files (Collector Storm Drains) Report

Flow Type

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SubCritical

SuperCritical

SuperCritical

SuperCritical

SubCritical

SuperCritical

SuperCritical

SuperCritical

SuperCritical

SubCritical

SubCritical

SubCritical

SuperCritical

SuperCritical