PALOMINO RIDGE DR.

VISTA

JENNINGS

BLOSSOM VALLEY ROAD

LAKE JENNINGS PARK ROAD

NODE8
EX. 30" RCP
Q_{100}=34.9 CFS
V_{100}=7.1FT/S

EX.
18"RCP

SUB BASIN P–P
0.03 AC | 0.08 cfs

NODE10
ELEV750

SUB BASIN P
0.25 AC | 0.67 cfs

NODE15
ELEV735

NODE30
ELEV732FL
ELEV727IE

SUB BASIN Q
0.34 AC | 0.72 cfs

24"RCP

NODE31
ELEV726IE

SUB BASIN Q–Q
0.03 AC | 0.07 cfs

NODE25
ELEV776

NODE20
ELEV778

NODE50
ELEV773.5

SUB BASIN B–B
0.08 AC | 0.19 cfs

NODE40
ELEV728

SUB BASIN A–A
0.20 AC | 0.48 cfs

NODE45
ELEV725

24"RCP

NODE60
ELEV773

NODE32
ELEV721.4IE

L=343'

NODE33
ELEV711IE

L=164'

24"RCP

SUB BASIN A
1.60 AC | 3.40 cfs

L=232'

24"RCP

L=254'

SUB BASIN B
3.13 AC | 6.52 cfs

NODE65
ELEV706.8

Q_{100}=10.27CFS
V_{100}=14.2FT/S

NODE70
ELEV703.6

24"RCP

NODE34
ELEV696.8IE

SUB BASIN G
0.11 AC | 0.12 cfs

36"RCP

NODE88
ELEV694.6

EXISTING HEADWALL

NODE80
EX. 30" RCP
Q_{100}=49.04 CFS
V_{100}=10.0FT/S

EXISTING 30" RCP

NODE84
ELEV704.4

36"RCP

NODE35
ELEV696.3

42"RCP

48"RCP

NODE86
ELEV695.4

EXISTING HEADWALL

EXISTING 72"X44" CMP SD PIPE

EXISTING 18" RCP

NODE82
EX. 18" RCP
Q_{100}=7.42 CFS
V_{100}=4.2FT/S

EXISTING 18" RCP

0 20 40 80 120

SCALE: 1"= 40'

LEGEND

BASIN DESIGNATOR
AREA (AC)
Q (CFS)

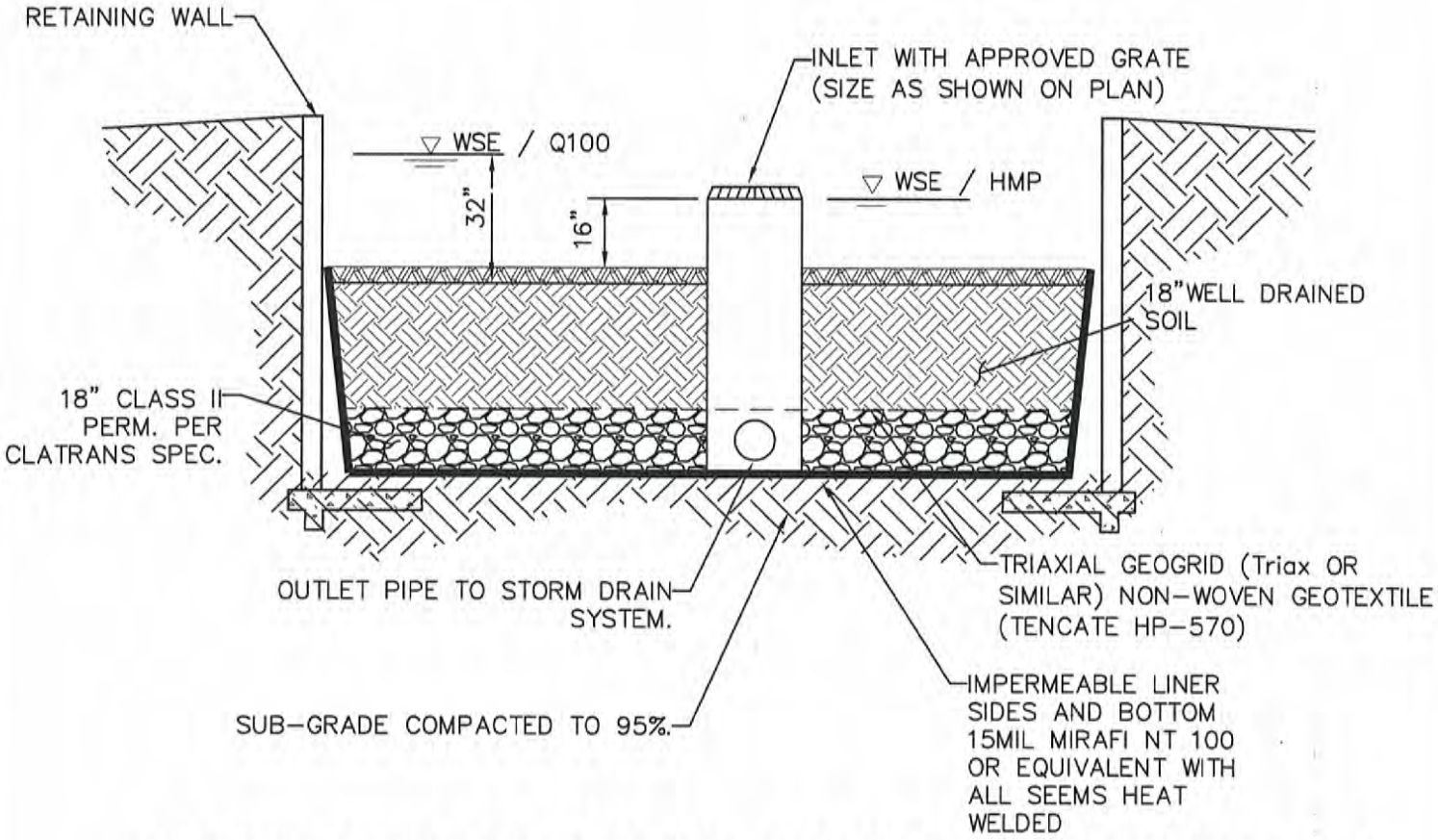
BASIN LIMITS
PROJECT BOUNDARY
NODE ELEV. 2295
NODE NUMBER 5
FLOW–LINE

"LAKE JENNINGS PARK ROAD"
HYDROLOGY MAP
PROPOSED CONDITIONS

REC Consultants, Inc.
Civil Engineering - Environmental
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax

SHEET 1 OF 1

APPENDIX C
BASIN ROUTING – FLOW ATTENUATION



BIORETENTION ENGINEERED SOIL LAYER SHALL BE 85-88% SAND, 8-12% FINES (SILT & CLAY)
3-5% ORGANIC MATTER. PERCOLATION RATE 5-10in/hr MINIMUM SUSTAINED

BIORETENTION DETAIL FOR IMP

SECTION A-A

NTS

R·E·C Consultants, Inc.
Civil Engineering Environmental
Land Surveying
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax

```
flow capacity is being calculated using depth = diameter
Depth above pipe =   2.90(Ft.)    Capacity =   0.05(CFS)

Total outflow at this depth =      0.05(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.33(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.15(Ft.) HMP ORIFICE
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.15(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.23(Ft.)    Capacity =   0.05(CFS)

Total outflow at this depth =      0.05(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    5.70(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.15(Ft.) HMP ORIFICE
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.15(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   5.60(Ft.)    Capacity =   0.05(CFS)


Free outlet pipe flow:  Pipe Diameter =     0.83(Ft.)100-YR OUTLET CONTROL
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.83(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   1.37(Ft.)    Capacity =   3.98(CFS)

Total outflow at this depth =      4.03(CFS)

-------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 363
Hydrograph time unit =  1.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
-------------------------------------------------------------------------
-------------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
-------------------------------------------------------------------------
-------------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)     (Ac.Ft)
-------------------------------------------------------------------------
    0.000      0.000      0.000      0.000       0.000
    1.500      0.041      0.051      0.041       0.041
    3.000      0.082      0.051      0.082       0.082
    4.330      0.221      0.051      0.221       0.221
    5.700      0.364      4.030      0.361       0.367
-------------------------------------------------------------------------
           Hydrograph Detention Basin Routing
-------------------------------------------------------------------------
```

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012
Study date: 03/25/14

LAKE JENNINGS - BASIN ROUTING FOR 100-YR FLOW ATTENUATION

Program License Serial Number 6292

********** HYDROGRAPH INFORMATION **********

From study/file name: PROPOLJR.rte

**********HYDROGRAPH DATA**********

Number of intervals = 363
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 10.395 (CFS)
Total volume = 0.554 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++++++++++

Process from Point/Station 75.000 to Point/Station 75.000
**** RETARDING BASIN ROUTING ****

Program computation of outflow v. depth

CALCULATED OUTFLOW DATA AT DEPTH = 1.50(Ft.))

Free outlet pipe flow: Pipe Diameter = 0.15(Ft.) **HMP ORIFICE**
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of 0.15(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe = 1.40(Ft.) Capacity = 0.05(CFS)

Total outflow at this depth = 0.05(CFS)

CALCULATED OUTFLOW DATA AT DEPTH = 3.00(Ft.))

Free outlet pipe flow: Pipe Diameter = 0.15(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of 0.15(Ft.) is greater than diameter of pipe,

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.6 5.20 7.80 10.40	Depth (Ft.)
0.017	0.04	0.00	0.000	O	0.00
0.033	0.07	0.00	0.000	O	0.00
0.050	0.11	0.00	0.000	O	0.01
0.067	0.15	0.00	0.000	O	0.01
0.083	0.18	0.00	0.001	O	0.02
0.100	0.22	0.00	0.001	O	0.03
0.117	0.26	0.00	0.001	O	0.05
0.133	0.29	0.00	0.002	O	0.06
0.150	0.33	0.00	0.002	OI	0.07
0.167	0.37	0.00	0.003	OI	0.09
0.183	0.40	0.00	0.003	OI	0.11
0.200	0.40	0.00	0.004	OI	0.13
0.217	0.40	0.01	0.004	OI	0.15
0.233	0.41	0.01	0.005	OI	0.17
0.250	0.41	0.01	0.005	OI	0.19
0.267	0.41	0.01	0.006	OI	0.21
0.283	0.41	0.01	0.006	OI	0.23
0.300	0.41	0.01	0.007	OI	0.25
0.317	0.41	0.01	0.007	OI	0.27
0.333	0.41	0.01	0.008	OI	0.29
0.350	0.41	0.01	0.009	OI	0.31
0.367	0.41	0.01	0.009	OI	0.33
0.383	0.41	0.01	0.010	OI	0.35
0.400	0.41	0.01	0.010	OI	0.37
0.417	0.42	0.01	0.011	OI	0.39
0.433	0.42	0.01	0.011	OI	0.41
0.450	0.42	0.01	0.012	OI	0.43
0.467	0.42	0.02	0.012	OI	0.45
0.483	0.42	0.02	0.013	OI	0.47
0.500	0.42	0.02	0.014	OI	0.50
0.517	0.43	0.02	0.014	OI	0.52
0.533	0.43	0.02	0.015	OI	0.54
0.550	0.43	0.02	0.015	OI	0.56
0.567	0.43	0.02	0.016	OI	0.58
0.583	0.43	0.02	0.016	OI	0.60
0.600	0.43	0.02	0.017	OI	0.62
0.617	0.43	0.02	0.017	OI	0.64
0.633	0.43	0.02	0.018	OI	0.66
0.650	0.43	0.02	0.019	OI	0.68
0.667	0.44	0.02	0.019	OI	0.70
0.683	0.44	0.02	0.020	OI	0.72
0.700	0.44	0.03	0.020	OI	0.74
0.717	0.44	0.03	0.021	OI	0.76
0.733	0.44	0.03	0.021	OI	0.78
0.750	0.44	0.03	0.022	OI	0.81
0.767	0.44	0.03	0.023	OI	0.83
0.783	0.44	0.03	0.023	OI	0.85
0.800	0.45	0.03	0.024	OI	0.87
0.817	0.45	0.03	0.024	OI	0.89
0.833	0.45	0.03	0.025	OI	0.91
0.850	0.45	0.03	0.025	OI	0.93
0.867	0.45	0.03	0.026	OI	0.95

0.883	0.46	0.03	0.027	OI				0.97
0.900	0.46	0.03	0.027	OI				1.00
0.917	0.46	0.03	0.028	OI				1.02
0.933	0.46	0.04	0.028	OI				1.04
0.950	0.46	0.04	0.029	OI				1.06
0.967	0.46	0.04	0.030	OI				1.08
0.983	0.46	0.04	0.030	OI				1.10
1.000	0.46	0.04	0.031	OI				1.12
1.017	0.47	0.04	0.031	OI				1.15
1.033	0.47	0.04	0.032	OI				1.17
1.050	0.47	0.04	0.032	OI				1.19
1.067	0.47	0.04	0.033	OI				1.21
1.083	0.47	0.04	0.034	OI				1.23
1.100	0.47	0.04	0.034	OI				1.25
1.117	0.47	0.04	0.035	OI				1.27
1.133	0.48	0.04	0.035	OI				1.30
1.150	0.48	0.04	0.036	OI				1.32
1.167	0.48	0.05	0.037	OI				1.34
1.183	0.48	0.05	0.037	OI				1.36
1.200	0.49	0.05	0.038	OI				1.38
1.217	0.49	0.05	0.038	OI				1.41
1.233	0.49	0.05	0.039	OI				1.43
1.250	0.49	0.05	0.040	OI				1.45
1.267	0.49	0.05	0.040	OI				1.47
1.283	0.50	0.05	0.041	OI				1.50
1.300	0.50	0.05	0.041	OI				1.52
1.317	0.50	0.05	0.042	OI				1.54
1.333	0.50	0.05	0.043	OI				1.56
1.350	0.50	0.05	0.043	OI				1.59
1.367	0.50	0.05	0.044	OI				1.61
1.383	0.50	0.05	0.045	OI				1.63
1.400	0.51	0.05	0.045	OI				1.65
1.417	0.51	0.05	0.046	OI				1.68
1.433	0.51	0.05	0.046	OI				1.70
1.450	0.51	0.05	0.047	OI				1.72
1.467	0.51	0.05	0.048	OI				1.75
1.483	0.51	0.05	0.048	OI				1.77
1.500	0.52	0.05	0.049	OI				1.79
1.517	0.52	0.05	0.050	OI				1.82
1.533	0.52	0.05	0.050	OI				1.84
1.550	0.53	0.05	0.051	OI				1.86
1.567	0.53	0.05	0.052	OI				1.89
1.583	0.53	0.05	0.052	OI				1.91
1.600	0.53	0.05	0.053	OI				1.94
1.617	0.54	0.05	0.054	OI				1.96
1.633	0.54	0.05	0.054	OI				1.99
1.650	0.54	0.05	0.055	OI				2.01
1.667	0.54	0.05	0.056	OI				2.03
1.683	0.55	0.05	0.056	OI				2.06
1.700	0.55	0.05	0.057	OI				2.08
1.717	0.55	0.05	0.058	OI				2.11
1.733	0.55	0.05	0.058	OI				2.14
1.750	0.55	0.05	0.059	OI				2.16
1.767	0.55	0.05	0.060	OI				2.19
1.783	0.56	0.05	0.060	OI				2.21
1.800	0.56	0.05	0.061	OI				2.24
1.817	0.56	0.05	0.062	OI				2.26

1.833	0.56	0.05	0.063	OI				2.29
1.850	0.56	0.05	0.063	OI				2.31
1.867	0.57	0.05	0.064	OI				2.34
1.883	0.57	0.05	0.065	OI				2.37
1.900	0.58	0.05	0.065	OI				2.39
1.917	0.58	0.05	0.066	OI				2.42
1.933	0.58	0.05	0.067	OI				2.44
1.950	0.59	0.05	0.068	OI				2.47
1.967	0.59	0.05	0.068	OI				2.50
1.983	0.59	0.05	0.069	OI				2.53
2.000	0.60	0.05	0.070	OI				2.55
2.017	0.60	0.05	0.071	OI				2.58
2.033	0.60	0.05	0.071	OI				2.61
2.050	0.61	0.05	0.072	OI				2.64
2.067	0.61	0.05	0.073	OI				2.66
2.083	0.61	0.05	0.074	OI				2.69
2.100	0.61	0.05	0.074	OI				2.72
2.117	0.61	0.05	0.075	OI				2.75
2.133	0.62	0.05	0.076	OI				2.78
2.150	0.62	0.05	0.077	OI				2.81
2.167	0.62	0.05	0.077	OI				2.83
2.183	0.62	0.05	0.078	OI				2.86
2.200	0.62	0.05	0.079	OI				2.89
2.217	0.63	0.05	0.080	OI				2.92
2.233	0.63	0.05	0.081	OI				2.95
2.250	0.64	0.05	0.081	OI				2.98
2.267	0.64	0.05	0.082	OI				3.00
2.283	0.65	0.05	0.083	OI				3.01
2.300	0.65	0.05	0.084	O I				3.02
2.317	0.66	0.05	0.085	O I				3.03
2.333	0.66	0.05	0.086	O I				3.03
2.350	0.67	0.05	0.086	O I				3.04
2.367	0.67	0.05	0.087	O I				3.05
2.383	0.68	0.05	0.088	O I				3.06
2.400	0.68	0.05	0.089	O I				3.07
2.417	0.68	0.05	0.090	O I				3.08
2.433	0.69	0.05	0.091	O I				3.08
2.450	0.69	0.05	0.092	O I				3.09
2.467	0.69	0.05	0.093	O I				3.10
2.483	0.70	0.05	0.093	O I				3.11
2.500	0.70	0.05	0.094	O I				3.12
2.517	0.70	0.05	0.095	O I				3.13
2.533	0.70	0.05	0.096	O I				3.13
2.550	0.71	0.05	0.097	O I				3.14
2.567	0.71	0.05	0.098	O I				3.15
2.583	0.72	0.05	0.099	O I				3.16
2.600	0.72	0.05	0.100	O I				3.17
2.617	0.73	0.05	0.101	O I				3.18
2.633	0.74	0.05	0.102	O I				3.19
2.650	0.75	0.05	0.103	O I				3.20
2.667	0.75	0.05	0.104	O I				3.21
2.683	0.76	0.05	0.104	O I				3.22
2.700	0.77	0.05	0.105	O I				3.22
2.717	0.77	0.05	0.106	O I				3.23
2.733	0.78	0.05	0.107	O I				3.24
2.750	0.79	0.05	0.108	O I				3.25
2.767	0.79	0.05	0.109	O I				3.26

2.783	0.80	0.05	0.111	O I	|	|	|	3.27
2.800	0.80	0.05	0.112	O I	|	|	|	3.28
2.817	0.81	0.05	0.113	O I	|	|	|	3.29
2.833	0.81	0.05	0.114	O I	|	|	|	3.30
2.850	0.81	0.05	0.115	O I	|	|	|	3.31
2.867	0.82	0.05	0.116	O I	|	|	|	3.32
2.883	0.82	0.05	0.117	O I	|	|	|	3.33
2.900	0.83	0.05	0.118	O I	|	|	|	3.34
2.917	0.83	0.05	0.119	O I	|	|	|	3.35
2.933	0.84	0.05	0.120	O I	|	|	|	3.36
2.950	0.85	0.05	0.121	O I	|	|	|	3.37
2.967	0.86	0.05	0.122	O I	|	|	|	3.38
2.983	0.87	0.05	0.123	O I	|	|	|	3.40
3.000	0.88	0.05	0.124	O I	|	|	|	3.41
3.017	0.89	0.05	0.126	O I	|	|	|	3.42
3.033	0.90	0.05	0.127	O I	|	|	|	3.43
3.050	0.91	0.05	0.128	O I	|	|	|	3.44
3.067	0.92	0.05	0.129	O I	|	|	|	3.45
3.083	0.94	0.05	0.130	O I	|	|	|	3.46
3.100	0.95	0.05	0.132	O I	|	|	|	3.47
3.117	0.96	0.05	0.133	O I	|	|	|	3.49
3.133	0.97	0.05	0.134	O I	|	|	|	3.50
3.150	0.97	0.05	0.135	O I	|	|	|	3.51
3.167	0.98	0.05	0.137	O I	|	|	|	3.52
3.183	0.99	0.05	0.138	O I	|	|	|	3.53
3.200	0.99	0.05	0.139	O I	|	|	|	3.55
3.217	1.00	0.05	0.140	O I	|	|	|	3.56
3.233	1.01	0.05	0.142	O I	|	|	|	3.57
3.250	1.02	0.05	0.143	O I	|	|	|	3.58
3.267	1.02	0.05	0.144	O I	|	|	|	3.60
3.283	1.03	0.05	0.146	O I	|	|	|	3.61
3.300	1.04	0.05	0.147	O I	|	|	|	3.62
3.317	1.06	0.05	0.149	O I	|	|	|	3.64
3.333	1.08	0.05	0.150	O I	|	|	|	3.65
3.350	1.10	0.05	0.151	O I	|	|	|	3.66
3.367	1.12	0.05	0.153	O I	|	|	|	3.68
3.383	1.14	0.05	0.154	O I	|	|	|	3.69
3.400	1.16	0.05	0.156	O I	|	|	|	3.71
3.417	1.19	0.05	0.157	O I	|	|	|	3.72
3.433	1.21	0.05	0.159	O I	|	|	|	3.74
3.450	1.23	0.05	0.161	O I	|	|	|	3.75
3.467	1.25	0.05	0.162	O I	|	|	|	3.77
3.483	1.27	0.05	0.164	O I	|	|	|	3.78
3.500	1.29	0.05	0.166	O I	|	|	|	3.80
3.517	1.30	0.05	0.167	O I	|	|	|	3.82
3.533	1.32	0.05	0.169	O I	|	|	|	3.83
3.550	1.33	0.05	0.171	O I	|	|	|	3.85
3.567	1.35	0.05	0.173	O I	|	|	|	3.87
3.583	1.37	0.05	0.174	O I	|	|	|	3.88
3.600	1.38	0.05	0.176	O I	|	|	|	3.90
3.617	1.40	0.05	0.178	O I	|	|	|	3.92
3.633	1.41	0.05	0.180	O I	|	|	|	3.94
3.650	1.43	0.05	0.182	O I	|	|	|	3.95
3.667	1.45	0.05	0.184	O I	|	|	|	3.97
3.683	1.51	0.05	0.186	O I	|	|	|	3.99
3.700	1.57	0.05	0.188	O I	|	|	|	4.01
3.717	1.63	0.05	0.190	O I	|	|	|	4.03

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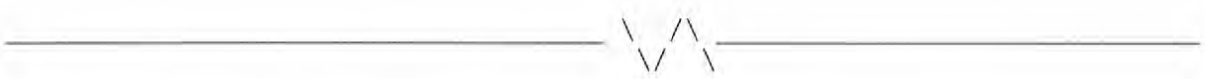
3.733   1.69   0.05   0.192   O    I  |       |       |       |     4.05
3.750   1.75   0.05   0.194   O    I  |       |       |       |     4.07
3.767   1.82   0.05   0.197   O    I  |       |       |       |     4.10
3.783   1.88   0.05   0.199   O    I  |       |       |       |     4.12
3.800   1.94   0.05   0.202   O    I  |       |       |       |     4.15
3.817   2.00   0.05   0.204   O     I |       |       |       |     4.17
3.833   2.06   0.05   0.207   O     I |       |       |       |     4.20
3.850   2.12   0.05   0.210   O     I |       |       |       |     4.22
3.867   2.20   0.05   0.213   O     I |       |       |       |     4.25
3.883   2.28   0.05   0.216   O      I|       |       |       |     4.28
3.900   2.36   0.05   0.219   O      I|       |       |       |     4.31
3.917   2.44   0.08   0.222   O      I|       |       |       |     4.34
3.933   2.52   0.17   0.225   O      I|       |       |       |     4.37
3.950   2.60   0.26   0.229   O      I|       |       |       |     4.40
3.967   2.68   0.35   0.232   |O      I       |       |       |     4.43
3.983   2.75   0.44   0.235   |O      I       |       |       |     4.46
4.000   2.83   0.53   0.238   |O      I       |       |       |     4.49
4.017   2.91   0.62   0.241   |O      I       |       |       |     4.53
4.033   2.99   0.71   0.245   | O     |I      |       |       |     4.56
4.050   3.66   0.80   0.248   | O     |  I    |       |       |     4.59
4.067   4.34   0.92   0.252   | O     |    I  |       |       |     4.63
4.083   5.01   1.07   0.257   |  O    |      I|       |       |     4.68
4.100   5.68   1.23   0.263   |  O    |       |I      |       |     4.73
4.117   6.36   1.41   0.270   |   O   |       |  I    |       |     4.80
4.133   7.03   1.61   0.277   |   O   |       |    I  |       |     4.87
4.150   7.70   1.82   0.285   |    O  |       |      I|       |     4.94
4.167   8.38   2.06   0.293   |     O |       |       |I      |     5.02
4.183   9.05   2.31   0.302   |      O|       |       |  I    |     5.11
4.200   9.72   2.57   0.312   |      O|       |       |    I  |     5.20
4.217  10.40   2.85   0.322   |       O       |       |       I     5.30 INFLOW
4.233   9.60   3.12   0.331   |       |O      |       |    I  |     5.39
4.250   8.81   3.35   0.340   |       | O     |       |  I    |     5.47
4.267   8.02   3.54   0.346   |       | O     |       I       |     5.53
4.283   7.23   3.70   0.352   |       |  O    |     I |       |     5.58
4.300   6.44   3.81   0.356   |       |  O    |  I    |       |     5.63
4.317   5.65   3.90   0.359   |       |   O   |I      |       |     5.65
4.333   4.86   3.95   0.361   |       |   O I |       |       |     5.67
4.350   4.07   3.97   0.362   |       |   O   |       |       |     5.68 OUTFLOW
4.367   3.28   3.96   0.361   |       | I O   |       |       |     5.68
4.383   2.49   3.92   0.360   |      I|   O   |       |       |     5.66
4.400   1.70   3.85   0.357   |    I  |  O    |       |       |     5.64
4.417   1.65   3.77   0.355   |    I  |  O    |       |       |     5.61
4.433   1.60   3.69   0.352   |   I   |  O    |       |       |     5.58
4.450   1.55   3.61   0.349   |   I   |  O    |       |       |     5.55
4.467   1.50   3.53   0.346   |   I   | O     |       |       |     5.53
4.483   1.45   3.45   0.343   |   I   | O     |       |       |     5.50
4.500   1.40   3.38   0.340   |   I   | O     |       |       |     5.47
4.517   1.34   3.30   0.338   |   I   | O     |       |       |     5.45
4.533   1.29   3.23   0.335   |  I    |O      |       |       |     5.42
4.550   1.24   3.15   0.332   |  I    |O      |       |       |     5.40
4.567   1.19   3.08   0.330   |  I    |O      |       |       |     5.37
4.583   1.14   3.01   0.327   |  I    |O      |       |       |     5.35
4.600   1.12   2.94   0.325   |  I    |O      |       |       |     5.32
4.617   1.09   2.87   0.322   |  I    O       |       |       |     5.30
4.633   1.07   2.80   0.320   |  I    O       |       |       |     5.28
4.650   1.05   2.74   0.317   |  I    O       |       |       |     5.25
4.667   1.03   2.67   0.315   |  I    O       |       |       |     5.23
```

4.683	1.00	2.61	0.313	I O				5.21
4.700	0.98	2.55	0.311	I O				5.19
4.717	0.96	2.49	0.309	I O				5.17
4.733	0.94	2.43	0.307	I O				5.15
4.750	0.91	2.37	0.304	I O				5.13
4.767	0.89	2.32	0.302	I O				5.11
4.783	0.88	2.26	0.301	I O				5.09
4.800	0.87	2.21	0.299	I O				5.07
4.817	0.85	2.16	0.297	I O				5.06
4.833	0.84	2.11	0.295	I O				5.04
4.850	0.83	2.06	0.293	I O				5.02
4.867	0.81	2.02	0.292	I O				5.01
4.883	0.80	1.97	0.290	I O				4.99
4.900	0.79	1.93	0.288	I O				4.98
4.917	0.77	1.88	0.287	I O				4.96
4.933	0.76	1.84	0.285	I O				4.95
4.950	0.75	1.80	0.284	I O				4.93
4.967	0.74	1.76	0.282	I O				4.92
4.983	0.73	1.72	0.281	I O				4.91
5.000	0.72	1.69	0.280	I O				4.89
5.017	0.71	1.65	0.278	I O				4.88
5.033	0.70	1.61	0.277	I O				4.87
5.050	0.69	1.58	0.276	I O				4.86
5.067	0.69	1.55	0.275	I O				4.84
5.083	0.68	1.51	0.274	I O				4.83
5.100	0.67	1.48	0.272	I O				4.82
5.117	0.66	1.45	0.271	I O				4.81
5.133	0.65	1.42	0.270	I O				4.80
5.150	0.64	1.39	0.269	I O				4.79
5.167	0.64	1.36	0.268	I O				4.78
5.183	0.63	1.34	0.267	I O				4.77
5.200	0.62	1.31	0.266	I O				4.76
5.217	0.62	1.28	0.265	I O				4.75
5.233	0.61	1.26	0.264	I O				4.75
5.250	0.61	1.23	0.263	I O				4.74
5.267	0.60	1.21	0.263	I O				4.73
5.283	0.59	1.19	0.262	I O				4.72
5.300	0.59	1.16	0.261	I O				4.71
5.317	0.58	1.14	0.260	I O				4.71
5.333	0.57	1.12	0.259	I O				4.70
5.350	0.57	1.10	0.259	I O				4.69
5.367	0.57	1.08	0.258	I O				4.68
5.383	0.56	1.06	0.257	I O				4.68
5.400	0.56	1.04	0.257	I O				4.67
5.417	0.55	1.02	0.256	I O				4.66
5.433	0.55	1.01	0.255	I O				4.66
5.450	0.54	0.99	0.255	I O				4.65
5.467	0.54	0.97	0.254	IO				4.65
5.483	0.53	0.96	0.253	IO				4.64
5.500	0.53	0.94	0.253	IO				4.64
5.517	0.52	0.92	0.252	IO				4.63
5.533	0.52	0.91	0.252	IO				4.63
5.550	0.51	0.89	0.251	IO				4.62
5.567	0.51	0.88	0.251	IO				4.62
5.583	0.51	0.87	0.250	IO				4.61
5.600	0.50	0.85	0.250	IO				4.61
5.617	0.50	0.84	0.249	IO				4.60

5.633	0.50	0.83	0.249	IO				4.60
5.650	0.49	0.81	0.248	IO				4.59
5.667	0.49	0.80	0.248	IO				4.59
5.683	0.48	0.79	0.248	IO				4.58
5.700	0.48	0.78	0.247	IO				4.58
5.717	0.48	0.77	0.247	IO				4.58
5.733	0.47	0.76	0.246	IO				4.57
5.750	0.47	0.74	0.246	IO				4.57
5.767	0.47	0.73	0.246	IO				4.57
5.783	0.46	0.72	0.245	IO				4.56
5.800	0.46	0.71	0.245	IO				4.56
5.817	0.46	0.70	0.244	IO				4.56
5.833	0.46	0.70	0.244	IO				4.55
5.850	0.45	0.69	0.244	IO				4.55
5.867	0.45	0.68	0.244	IO				4.55
5.883	0.45	0.67	0.243	IO				4.54
5.900	0.44	0.66	0.243	IO				4.54
5.917	0.44	0.65	0.243	IO				4.54
5.933	0.44	0.64	0.242	O				4.53
5.950	0.44	0.64	0.242	O				4.53
5.967	0.43	0.63	0.242	O				4.53
5.983	0.43	0.62	0.241	O				4.53
6.000	0.43	0.61	0.241	O				4.52
6.017	0.43	0.61	0.241	O				4.52
6.033	0.42	0.60	0.241	O				4.52
6.050	0.42	0.59	0.240	O				4.52
6.067	0.00	0.58	0.240	IO				4.51
6.083	0.00	0.56	0.239	IO				4.50
6.100	0.00	0.54	0.238	IO				4.50
6.117	0.00	0.52	0.238	IO				4.49
6.133	0.00	0.50	0.237	IO				4.48
6.150	0.00	0.48	0.236	IO				4.48
6.167	0.00	0.46	0.236	IO				4.47
6.183	0.00	0.44	0.235	IO				4.46
6.200	0.00	0.43	0.234	IO				4.46
6.217	0.00	0.41	0.234	IO				4.45
6.233	0.00	0.39	0.233	IO				4.45
6.250	0.00	0.38	0.233	IO				4.44
6.267	0.00	0.37	0.232	IO				4.44
6.283	0.00	0.35	0.232	IO				4.43
6.300	0.00	0.34	0.231	IO				4.43
6.317	0.00	0.33	0.231	IO				4.42
6.333	0.00	0.31	0.230	O				4.42
6.350	0.00	0.30	0.230	O				4.42
6.367	0.00	0.29	0.230	O				4.41
6.383	0.00	0.28	0.229	O				4.41
6.400	0.00	0.27	0.229	O				4.41
6.417	0.00	0.26	0.228	O				4.40
6.433	0.00	0.25	0.228	O				4.40
6.450	0.00	0.24	0.228	O				4.39
6.467	0.00	0.23	0.227	O				4.39
6.483	0.00	0.22	0.227	O				4.39
6.500	0.00	0.21	0.227	O				4.39
6.517	0.00	0.21	0.227	O				4.38
6.533	0.00	0.20	0.226	O				4.38
6.550	0.00	0.19	0.226	O				4.38
6.567	0.00	0.18	0.226	O				4.38

6.583	0.00	0.18	0.226	O				4.37
6.600	0.00	0.17	0.225	O				4.37
6.617	0.00	0.16	0.225	O				4.37
6.633	0.00	0.16	0.225	O				4.37
6.650	0.00	0.15	0.225	O				4.36
6.667	0.00	0.15	0.224	O				4.36
6.683	0.00	0.14	0.224	O				4.36
6.700	0.00	0.13	0.224	O				4.36
6.717	0.00	0.13	0.224	O				4.36
6.733	0.00	0.12	0.224	O				4.36
6.750	0.00	0.12	0.223	O				4.35
6.767	0.00	0.12	0.223	O				4.35
6.783	0.00	0.11	0.223	O				4.35
6.800	0.00	0.11	0.223	O				4.35
6.817	0.00	0.10	0.223	O				4.35
6.833	0.00	0.10	0.223	O				4.35
6.850	0.00	0.10	0.223	O				4.35
6.867	0.00	0.09	0.222	O				4.34
6.883	0.00	0.09	0.222	O				4.34
6.900	0.00	0.09	0.222	O				4.34
6.917	0.00	0.08	0.222	O				4.34
6.933	0.00	0.08	0.222	O				4.34
6.950	0.00	0.08	0.222	O				4.34
6.967	0.00	0.07	0.222	O				4.34
6.983	0.00	0.07	0.222	O				4.34
7.000	0.00	0.07	0.222	O				4.34
7.017	0.00	0.07	0.222	O				4.33
7.033	0.00	0.06	0.221	O				4.33
7.050	0.00	0.06	0.221	O				4.33
7.067	0.00	0.06	0.221	O				4.33
7.083	0.00	0.06	0.221	O				4.33
7.100	0.00	0.05	0.221	O				4.33
7.117	0.00	0.05	0.221	O				4.33
7.133	0.00	0.05	0.221	O				4.33
7.150	0.00	0.05	0.221	O				4.33
7.167	0.00	0.05	0.221	O				4.33
7.183	0.00	0.05	0.221	O				4.33
7.200	0.00	0.05	0.221	O				4.33
7.217	0.00	0.05	0.221	O				4.33
7.233	0.00	0.05	0.221	O				4.33
7.250	0.00	0.05	0.220	O				4.32
7.267	0.00	0.05	0.220	O				4.32
7.283	0.00	0.05	0.220	O				4.32
7.300	0.00	0.05	0.220	O				4.32
7.317	0.00	0.05	0.220	O				4.32
7.333	0.00	0.05	0.220	O				4.32
7.350	0.00	0.05	0.220	O				4.32
7.367	0.00	0.05	0.220	O				4.32
7.383	0.00	0.05	0.220	O				4.32
7.400	0.00	0.05	0.220	O				4.32
7.417	0.00	0.05	0.220	O				4.32
7.433	0.00	0.05	0.220	O				4.32
7.450	0.00	0.05	0.220	O				4.32
7.467	0.00	0.05	0.220	O				4.32
7.483	0.00	0.05	0.219	O				4.32
7.500	0.00	0.05	0.219	O				4.31
7.517	0.00	0.05	0.219	O				4.31

7.533	0.00	0.05	0.219	O	|	|	|	4.31
7.550	0.00	0.05	0.219	O	|	|	|	4.31
7.567	0.00	0.05	0.219	O	|	|	|	4.31
7.583	0.00	0.05	0.219	O	|	|	|	4.31
7.600	0.00	0.05	0.219	O	|	|	|	4.31
7.617	0.00	0.05	0.219	O	|	|	|	4.31
7.633	0.00	0.05	0.219	O	|	|	|	4.31
7.650	0.00	0.05	0.219	O	|	|	|	4.31
7.667	0.00	0.05	0.219	O	|	|	|	4.31
7.683	0.00	0.05	0.219	O	|	|	|	4.31
7.700	0.00	0.05	0.219	O	|	|	|	4.31
7.717	0.00	0.05	0.218	O	|	|	|	4.31
7.733	0.00	0.05	0.218	O	|	|	|	4.31
7.750	0.00	0.05	0.218	O	|	|	|	4.30
7.767	0.00	0.05	0.218	O	|	|	|	4.30
7.783	0.00	0.05	0.218	O	|	|	|	4.30
7.800	0.00	0.05	0.218	O	|	|	|	4.30
7.817	0.00	0.05	0.218	O	|	|	|	4.30
7.833	0.00	0.05	0.218	O	|	|	|	4.30
7.850	0.00	0.05	0.218	O	|	|	|	4.30
7.867	0.00	0.05	0.218	O	|	|	|	4.30
7.883	0.00	0.05	0.218	O	|	|	|	4.30
7.900	0.00	0.05	0.218	O	|	|	|	4.30
7.917	0.00	0.05	0.218	O	|	|	|	4.30
7.933	0.00	0.05	0.218	O	|	|	|	4.30
7.950	0.00	0.05	0.217	O	|	|	|	4.30
7.967	0.00	0.05	0.217	O	|	|	|	4.30
7.983	0.00	0.05	0.217	O	|	|	|	4.30
8.000	0.00	0.05	0.217	O	|	|	|	4.29
8.017	0.00	0.05	0.217	O	|	|	|	4.29
8.033	0.00	0.05	0.217	O	|	|	|	4.29
8.050	0.00	0.05	0.217	O	|	|	|	4.29
8.067	0.00	0.05	0.217	O	|	|	|	4.29
8.083	0.00	0.05	0.217	O	|	|	|	4.29
8.100	0.00	0.05	0.217	O	|	|	|	4.29
8.117	0.00	0.05	0.217	O	|	|	|	4.29



82.583	0.00	0.00	0.001	O	|	|	|	0.05
82.600	0.00	0.00	0.001	O	|	|	|	0.05
82.617	0.00	0.00	0.001	O	|	|	|	0.05
82.633	0.00	0.00	0.001	O	|	|	|	0.05
82.650	0.00	0.00	0.001	O	|	|	|	0.05
82.667	0.00	0.00	0.001	O	|	|	|	0.05
82.683	0.00	0.00	0.001	O	|	|	|	0.05
82.700	0.00	0.00	0.001	O	|	|	|	0.05
82.717	0.00	0.00	0.001	O	|	|	|	0.05
82.733	0.00	0.00	0.001	O	|	|	|	0.05
82.750	0.00	0.00	0.001	O	|	|	|	0.05

82.767	0.00	0.00	0.001	O	|	|	|	0.05
82.783	0.00	0.00	0.001	O	|	|	|	0.05
82.800	0.00	0.00	0.001	O	|	|	|	0.05
82.817	0.00	0.00	0.001	O	|	|	|	0.05
82.833	0.00	0.00	0.001	O	|	|	|	0.05
82.850	0.00	0.00	0.001	O	|	|	|	0.05
82.867	0.00	0.00	0.001	O	|	|	|	0.05
82.883	0.00	0.00	0.001	O	|	|	|	0.05
82.900	0.00	0.00	0.001	O	|	|	|	0.05
82.917	0.00	0.00	0.001	O	|	|	|	0.05
82.933	0.00	0.00	0.001	O	|	|	|	0.05
82.950	0.00	0.00	0.001	O	|	|	|	0.05
82.967	0.00	0.00	0.001	O	|	|	|	0.05
82.983	0.00	0.00	0.001	O	|	|	|	0.05
83.000	0.00	0.00	0.001	O	|	|	|	0.05
83.017	0.00	0.00	0.001	O	|	|	|	0.05
83.033	0.00	0.00	0.001	O	|	|	|	0.05
83.050	0.00	0.00	0.001	O	|	|	|	0.05
83.067	0.00	0.00	0.001	O	|	|	|	0.05
83.083	0.00	0.00	0.001	O	|	|	|	0.05
83.100	0.00	0.00	0.001	O	|	|	|	0.05
83.117	0.00	0.00	0.001	O	|	|	|	0.05
83.133	0.00	0.00	0.001	O	|	|	|	0.05
83.150	0.00	0.00	0.001	O	|	|	|	0.05
83.167	0.00	0.00	0.001	O	|	|	|	0.05
83.183	0.00	0.00	0.001	O	|	|	|	0.05
83.200	0.00	0.00	0.001	O	|	|	|	0.05
83.217	0.00	0.00	0.001	O	|	|	|	0.05
83.233	0.00	0.00	0.001	O	|	|	|	0.05
83.250	0.00	0.00	0.001	O	|	|	|	0.05
83.267	0.00	0.00	0.001	O	|	|	|	0.05
83.283	0.00	0.00	0.001	O	|	|	|	0.05
83.300	0.00	0.00	0.001	O	|	|	|	0.05
83.317	0.00	0.00	0.001	O	|	|	|	0.05
83.333	0.00	0.00	0.001	O	|	|	|	0.05

Remaining water in basin = 0.00 (Ac.Ft)

**********HYDROGRAPH DATA**********

Number of intervals = 5001
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 3.969 (CFS)
Total volume = 0.553 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX D
OFFSITE PIPE ANALYSIS

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2014

Existing 18in RCP Storm Drain

Circular

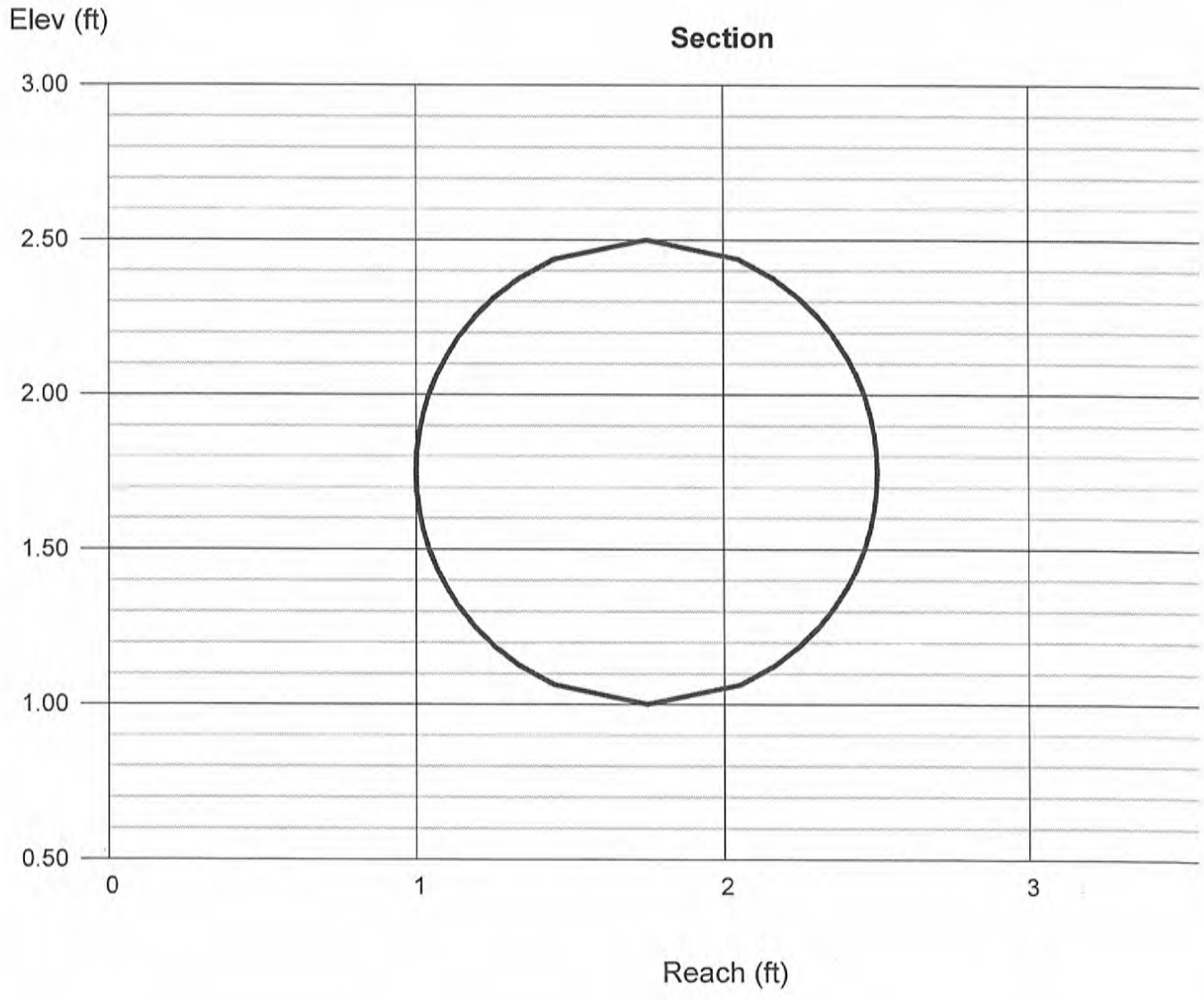
Diameter (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 1.50

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 7.425
Area (sqft)	= 1.77
Velocity (ft/s)	= 4.20
Wetted Perim (ft)	= 4.71
Crit Depth, Yc (ft)	= 1.06
Top Width (ft)	= 0.00
EGL (ft)	= 1.77



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2014

Existing 30in RCP Storm Drain

Circular

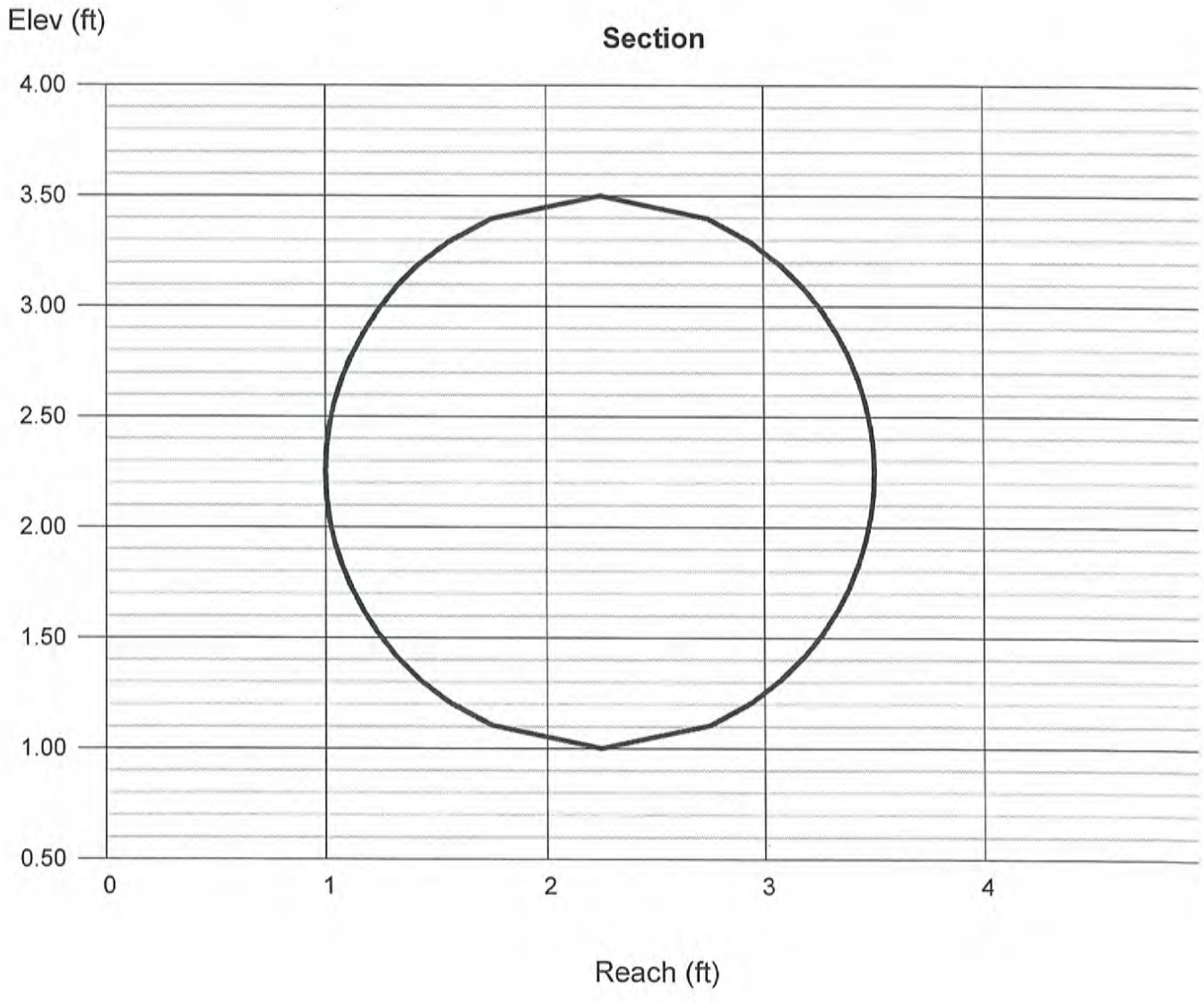
Diameter (ft)	= 2.50
Invert Elev (ft)	= 1.00
Slope (%)	= 1.43
N-Value	= 0.013

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 2.50

Highlighted

Depth (ft)	= 2.50
Q (cfs)	= 49.04
Area (sqft)	= 4.91
Velocity (ft/s)	= 9.99
Wetted Perim (ft)	= 7.85
Crit Depth, Yc (ft)	= 2.29
Top Width (ft)	= 0.00
EGL (ft)	= 4.05



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2014

Proposed 36in RCP Storm Drain from node 84 to 35

Circular

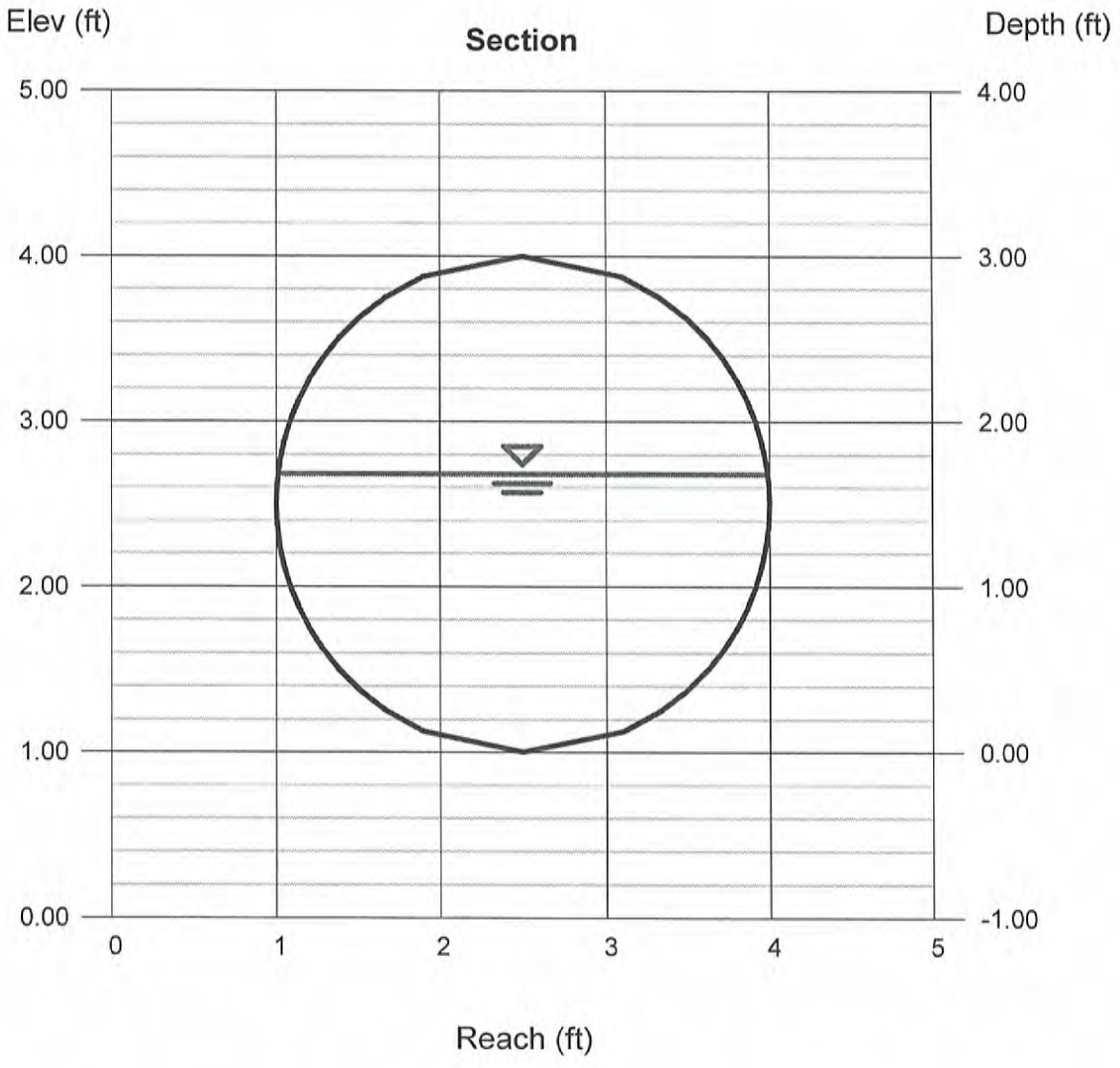
Diameter (ft)	= 3.00
Invert Elev (ft)	= 1.00
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 56.46

Highlighted

Depth (ft)	= 1.68
Q (cfs)	= 56.46
Area (sqft)	= 4.09
Velocity (ft/s)	= 13.80
Wetted Perim (ft)	= 5.08
Crit Depth, Yc (ft)	= 2.44
Top Width (ft)	= 2.98
EGL (ft)	= 4.64



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2014

Proposed 42in RCP Storm Drain from node 35 to 86

Circular

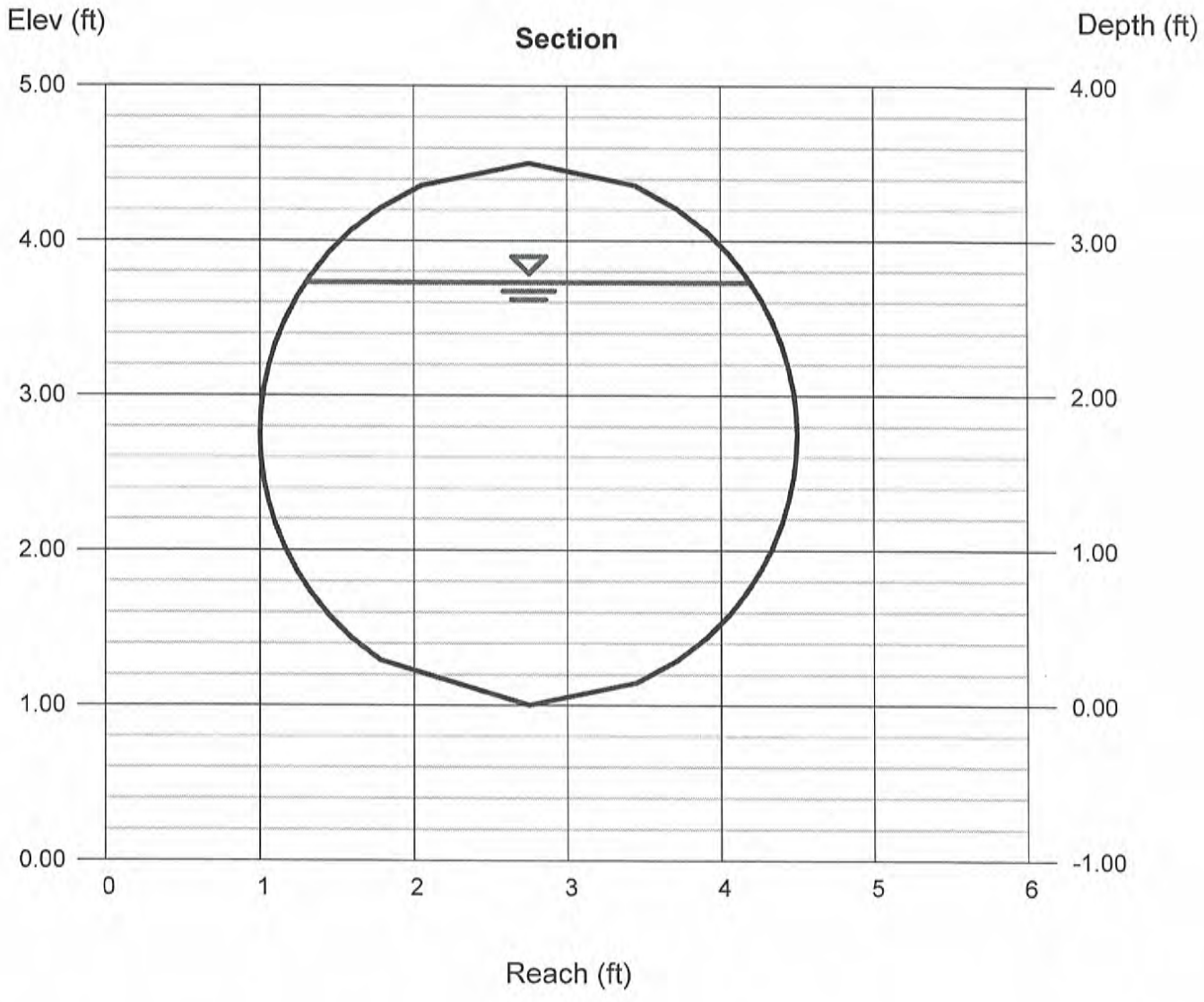
Diameter (ft)	= 3.50
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 95.86

Highlighted

Depth (ft)	= 2.73
Q (cfs)	= 95.86
Area (sqft)	= 8.07
Velocity (ft/s)	= 11.88
Wetted Perim (ft)	= 7.60
Crit Depth, Yc (ft)	= 3.02
Top Width (ft)	= 2.89
EGL (ft)	= 4.92



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2014

Existing 18in RCP storm drain

Circular

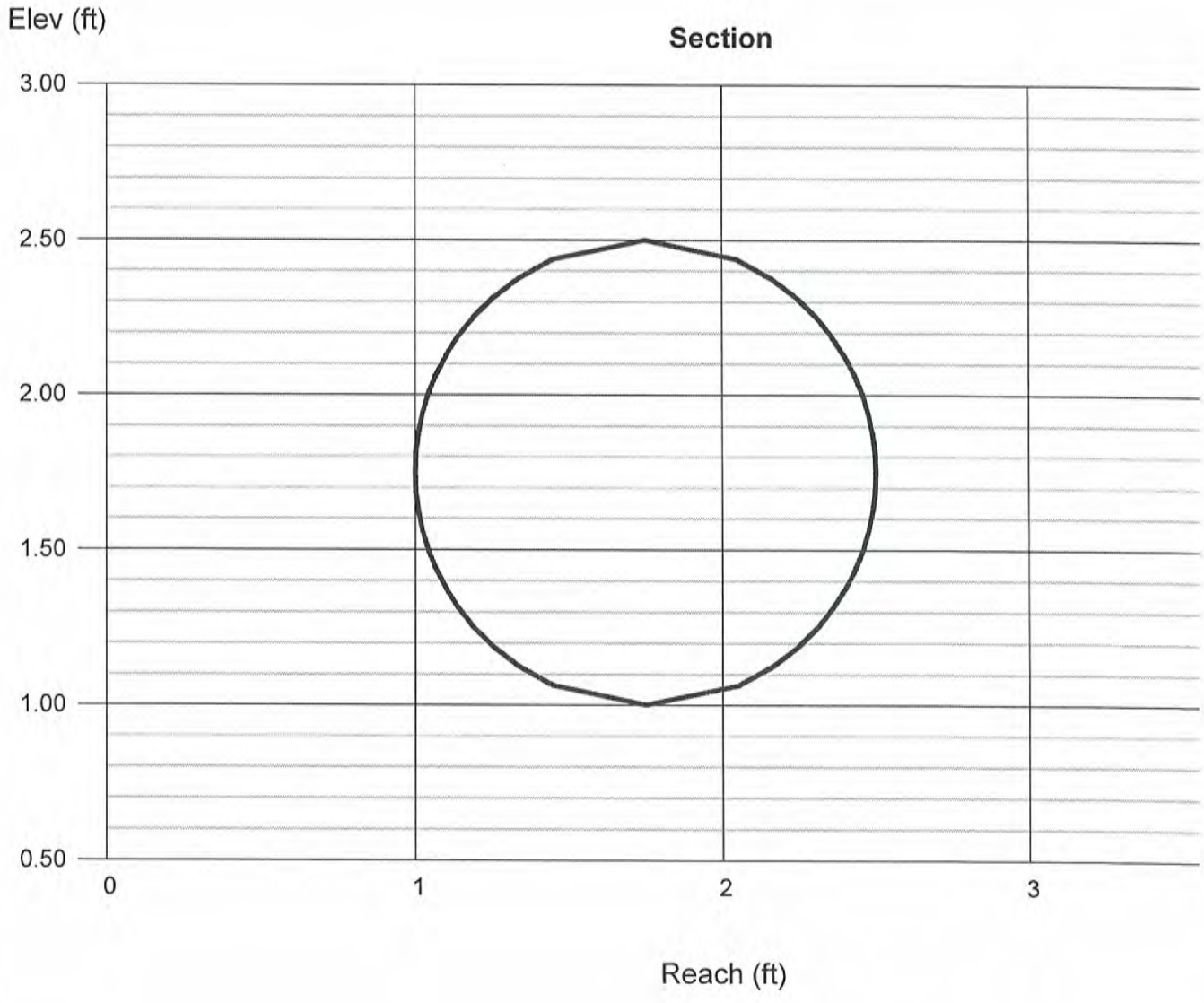
Diameter (ft)	= 1.50
Invert Elev (ft)	= 1.00
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Depth
Known Depth (ft)	= 1.50

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 14.85
Area (sqft)	= 1.77
Velocity (ft/s)	= 8.40
Wetted Perim (ft)	= 4.71
Crit Depth, Yc (ft)	= 1.41
Top Width (ft)	= 0.00
EGL (ft)	= 2.60



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2014

Proposed 48in RCP Storm Drain from node 86 to 88

Circular

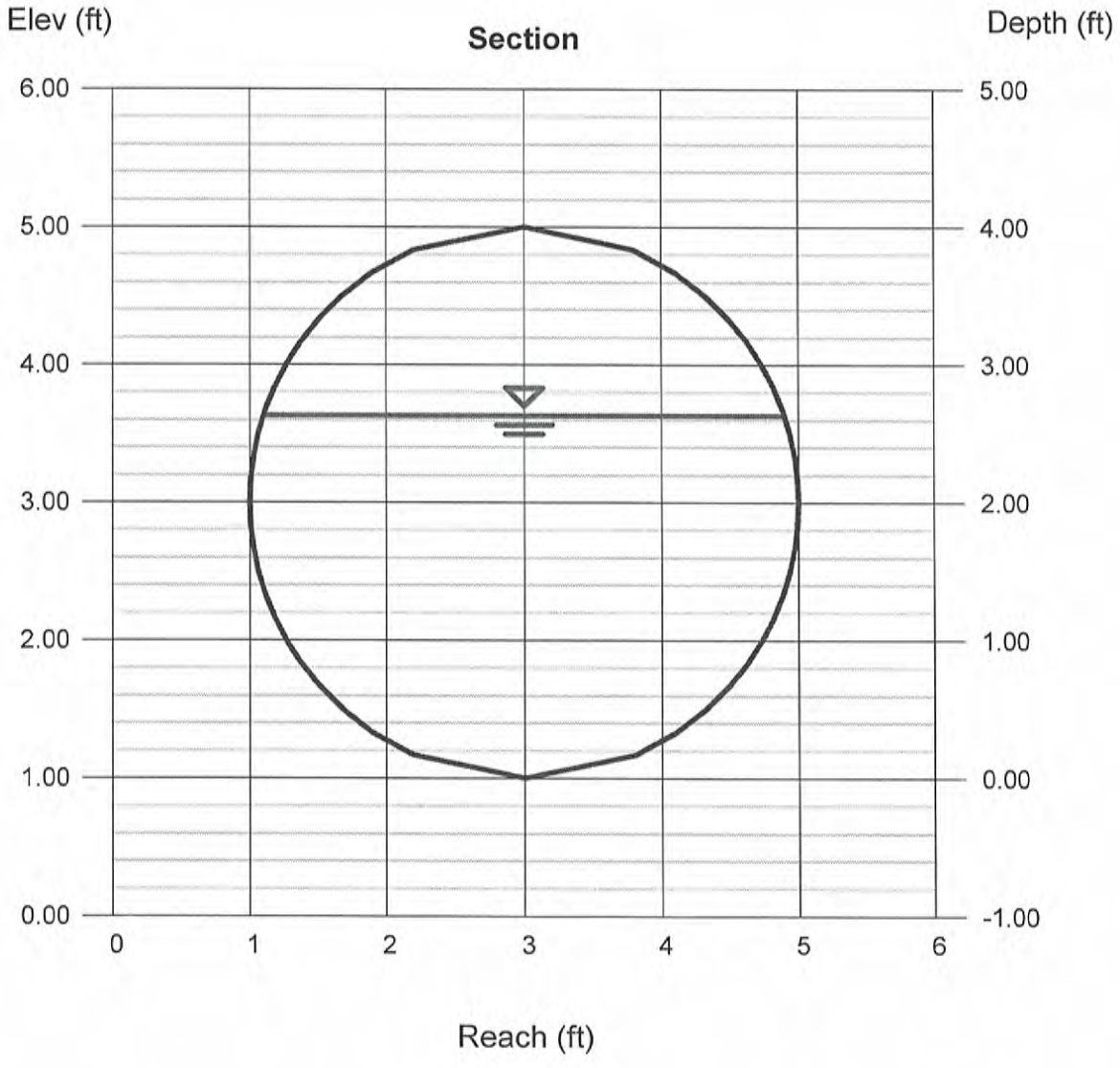
Diameter (ft)	= 4.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

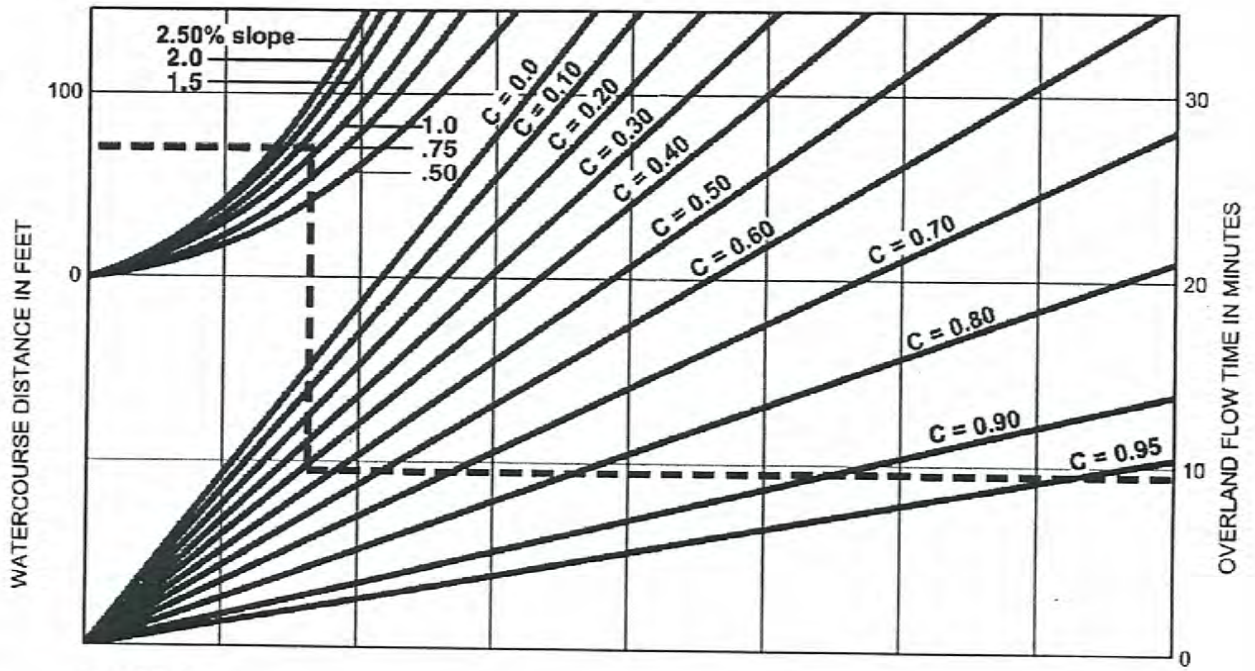
Compute by:	Known Q
Known Q (cfs)	= 110.71

Highlighted

Depth (ft)	= 2.63
Q (cfs)	= 110.71
Area (sqft)	= 8.79
Velocity (ft/s)	= 12.60
Wetted Perim (ft)	= 7.58
Crit Depth, Yc (ft)	= 3.18
Top Width (ft)	= 3.79
EGL (ft)	= 5.10



APPENDIX E
HYDROLOGIC SUPPLEMENTS



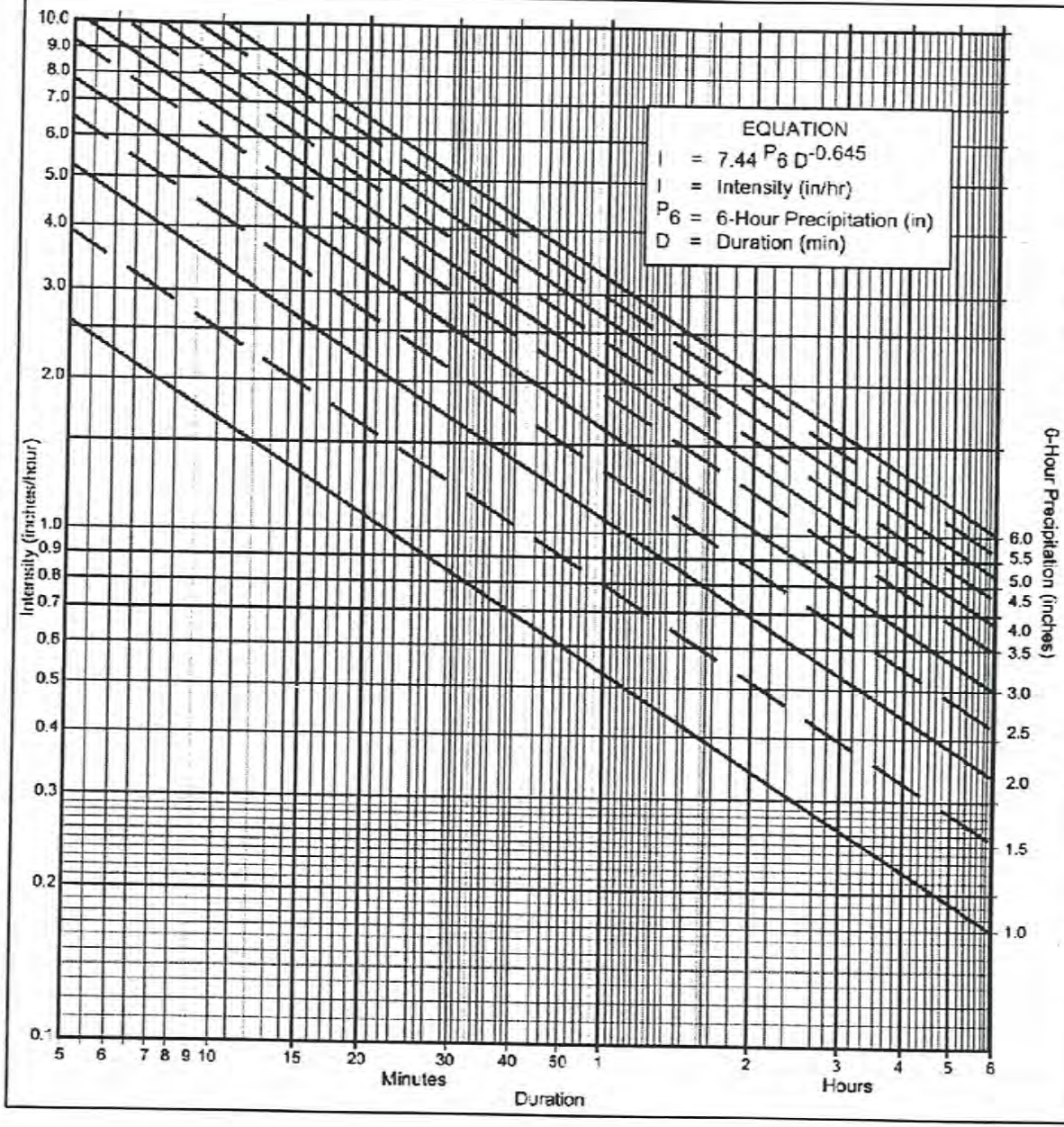
EXAMPLE:
Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE 3-3

Rational Formula - Overland Time of Flow Nomograph



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency _____ year

(b) P_6 = _____ in., P_{24} = _____ $\frac{P_6}{P_{24}}$ = _____ %(2)

(c) Adjusted P_6(2) = _____ in.

(d) I_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6 / Duration	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.76	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

OCEANSIDE

VISTA

CARLSBAD

ESCONDIDO

ENCINITAS

SOLANA BEACH

DEL MAR

POWAY

S.D. COUNTY

SANTEE

SAN DIEGO

EL CAJON

LA MESA

LEMON GROVE

CORONADO

SD

CHULA VISTA

IMPERIAL BEACH

33°30'

33°15'

33°00'

32°45'

32°30'

117°30'

117°15'

117°00'

116°45'

116°30'

116°15'

DPW GIS

Department of Public Works Geographic Information Services

SanGIS

We Have San Diego Covered!

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N W E S

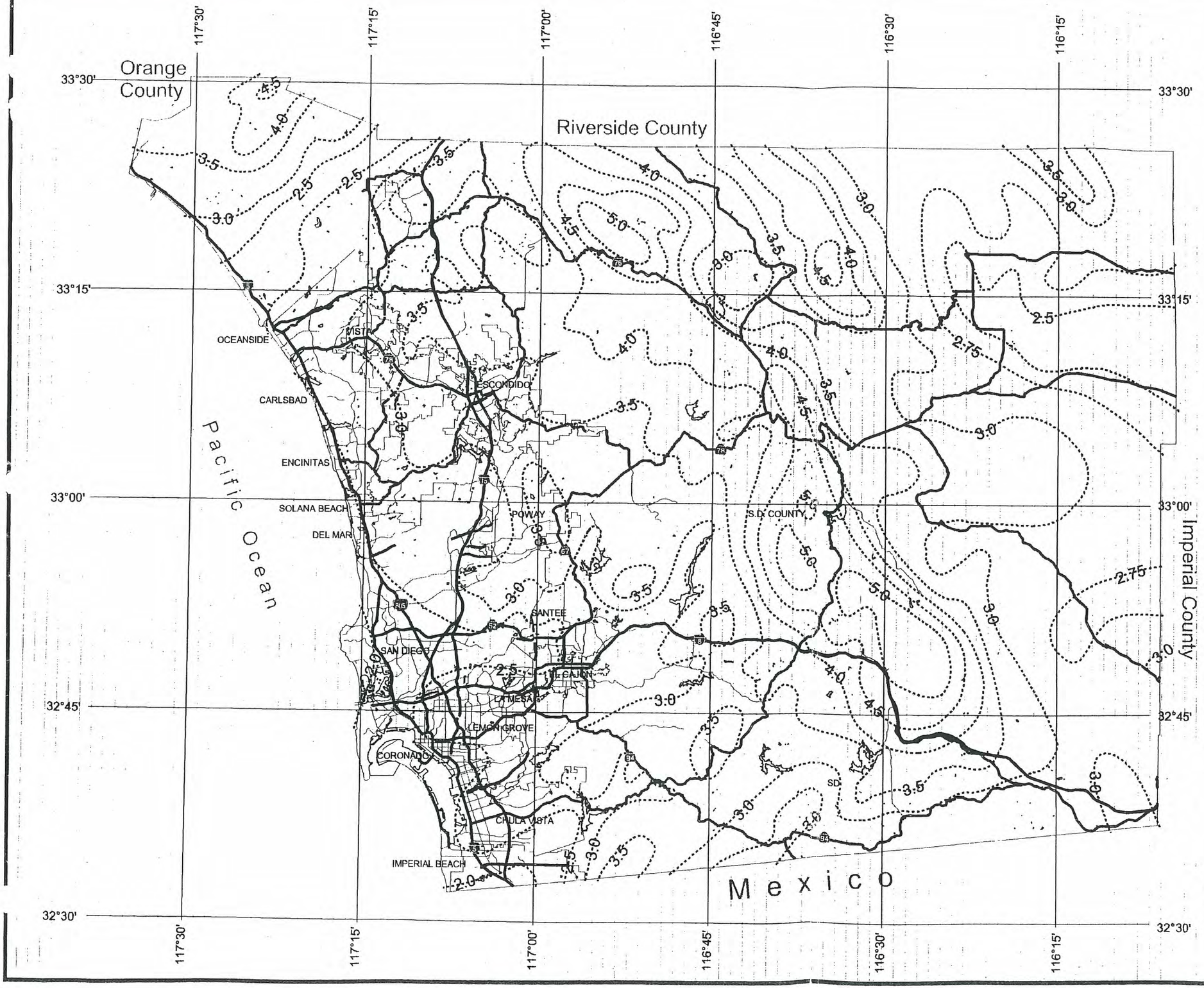
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works
Strategic Information Systems

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N
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3 0 3 Miles

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