Appendix B – Hydraulic Calculations

- Normal Depth Calculations – Existing Conditions Street Sections
- Normal Depth Calculations - Proposed Conditions Street Sections
- Normal Depth Calculations – Onsite Sections
- Normal Depth Sections – Swales
- Normal Depth Calculations – Block Wall Openings
- Emergency Overflow Calculations
- Drop Inlet Calculations
- Trench Drain Calculations
- Full Flow Capacity Calculations
- HEC-Ras Proposed Conditions Analysis (SiriusAve.prj)
    - Proposed Conditions Report
    - Summary Tables
    - Reach Profile
    - Cross Sections
    - Model (On Data CD)

Worksheet for RA - Rigel 100-Yr (West Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.00 %
Discharge	22.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+30.00	0.63

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+30.00, 0.63)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.63 ft
Roughness Coefficient	0.016
Elevation	0.63 ft
Elevation Range	0.00 to 0.63 ft
Flow Area	6.6 ft²
Wetted Perimeter	30.52 ft
Hydraulic Radius	0.22 ft
Top Width	29.96 ft
Normal Depth	0.63 ft
Critical Depth	0.67 ft
Critical Slope	0.60 %
Velocity	3.34 ft/s

Worksheet for RA - Rigel 100-Yr (West Capacity)

Results	
Velocity Head	0.17 ft
Specific Energy	0.80 ft
Froude Number	1.257
Flow Type	Supercritical

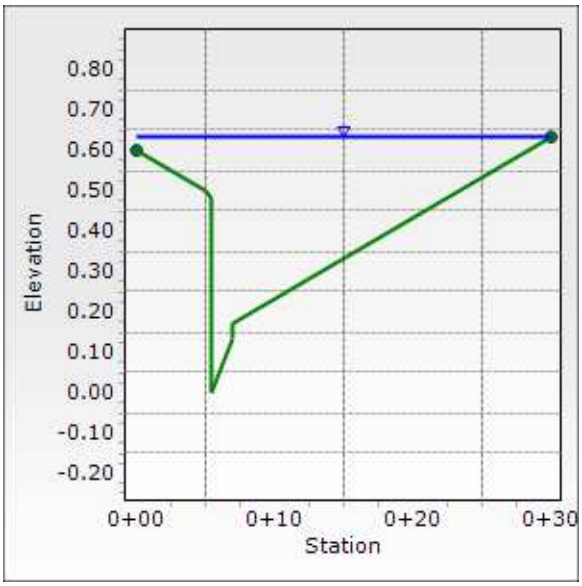
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.63 ft
Critical Depth	0.67 ft
Channel Slope	1.00 %
Critical Slope	0.60 %

Cross Section for RA - Rigel 100-Yr (West Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.00 %
Normal Depth	0.63 ft
Discharge	22.00 cfs



Worksheet for RA - Rigel 100-Yr (East Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.00 %
Discharge	19.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.50 ft
Roughness Coefficient	0.016
Elevation	0.50 ft
Elevation Range	0.00 to 0.63 ft

Worksheet for RA - Rigel 100-Yr (East Capacity)

Results	
Flow Area	6.7 ft²
Wetted Perimeter	37.68 ft
Hydraulic Radius	0.18 ft
Top Width	36.62 ft
Normal Depth	0.50 ft
Critical Depth	0.53 ft
Critical Slope	0.68 %
Velocity	2.92 ft/s
Velocity Head	0.13 ft
Specific Energy	0.63 ft
Froude Number	1.208
Flow Type	Supercritical

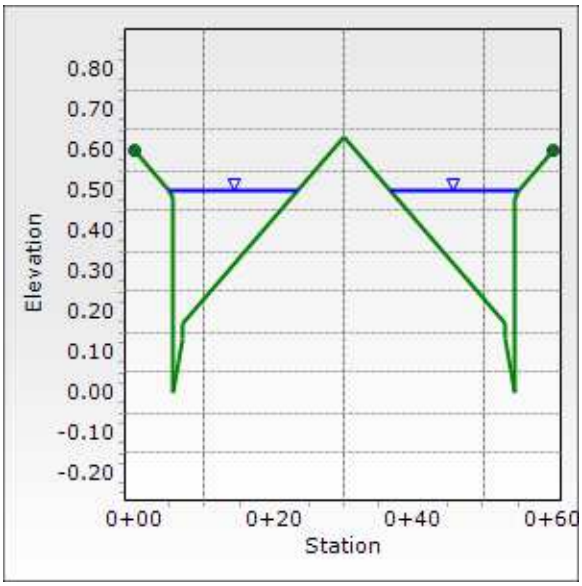
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.50 ft
Critical Depth	0.53 ft
Channel Slope	1.00 %
Critical Slope	0.68 %

Cross Section for RA - Rigel 100-Yr (East Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.00 %
Normal Depth	0.50 ft
Discharge	19.50 cfs



Worksheet for RA-1 - Rigel 100-Yr (Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.70 %
Discharge	18.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.59
0+05.00	1.49
0+05.50	1.47
0+05.50	0.99
0+07.00	1.12
0+07.00	1.16
0+30.00	0.35
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.59)	(0+60.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.50 ft
Roughness Coefficient	0.016
Elevation	0.50 ft
Elevation Range	0.00 to 1.59 ft
Flow Area	6.4 ft²
Wetted Perimeter	29.66 ft
Hydraulic Radius	0.22 ft

Worksheet for RA-1 - Rigel 100-Yr (Capacity)

Results	
Top Width	29.13 ft
Normal Depth	0.50 ft
Critical Depth	0.51 ft
Critical Slope	0.63 %
Velocity	2.80 ft/s
Velocity Head	0.12 ft
Specific Energy	0.62 ft
Froude Number	1.051
Flow Type	Supercritical

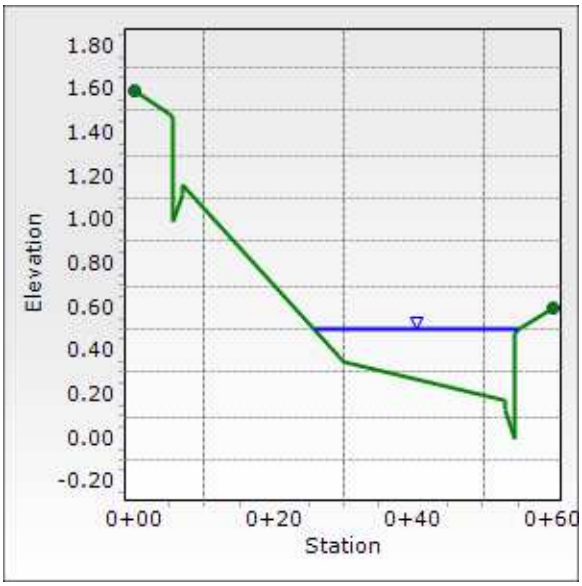
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.50 ft
Critical Depth	0.51 ft
Channel Slope	0.70 %
Critical Slope	0.63 %

Cross Section for RA-1 - Rigel 100-Yr (Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.70 %
Normal Depth	0.50 ft
Discharge	18.00 cfs



Worksheet for RA-2 - Rigel 100-Yr (Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.30 %
Discharge	5.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.91
0+05.00	1.81
0+05.50	1.79
0+05.50	1.31
0+07.00	1.44
0+07.00	1.48
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.91)	(0+60.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.49 ft
Roughness Coefficient	0.016
Elevation	0.49 ft
Elevation Range	0.00 to 1.91 ft
Flow Area	3.2 ft²
Wetted Perimeter	18.09 ft
Hydraulic Radius	0.17 ft

Worksheet for RA-2 - Rigel 100-Yr (Capacity)

Results	
Top Width	17.56 ft
Normal Depth	0.49 ft
Critical Depth	0.43 ft
Critical Slope	0.73 %
Velocity	1.59 ft/s
Velocity Head	0.04 ft
Specific Energy	0.53 ft
Froude Number	0.659
Flow Type	Subcritical

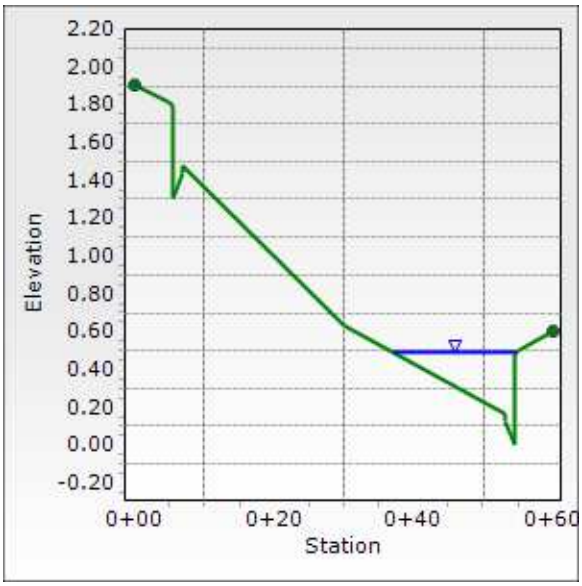
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.49 ft
Critical Depth	0.43 ft
Channel Slope	0.30 %
Critical Slope	0.73 %

Cross Section for RA-2 - Rigel 100-Yr (Capacity)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.30 %
Normal Depth	0.49 ft
Discharge	5.00 cfs



Worksheet for EX_MA-1 Meade 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.30 %
Discharge	86.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+65.00	0.70
0+65.00	1.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+65.00, 1.10)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.64 ft
Roughness Coefficient	0.016
Elevation	0.64 ft
Elevation Range	0.00 to 1.10 ft
Flow Area	14.0 ft²
Wetted Perimeter	63.21 ft

Worksheet for EX_MA-1 Meade 100-Yr

Results	
Hydraulic Radius	0.22 ft
Top Width	62.11 ft
Normal Depth	0.64 ft
Critical Depth	0.81 ft
Critical Slope	0.53 %
Velocity	6.18 ft/s
Velocity Head	0.59 ft
Specific Energy	1.24 ft
Froude Number	2.297
Flow Type	Supercritical

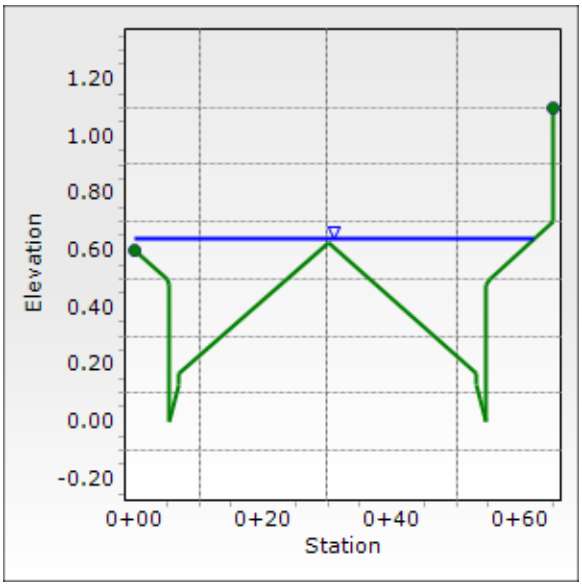
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.64 ft
Critical Depth	0.81 ft
Channel Slope	3.30 %
Critical Slope	0.53 %

Cross Section for EX_MA-1 Meade 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.30 %
Normal Depth	0.64 ft
Discharge	86.50 cfs



Worksheet for MA-1 Meade 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.30 %
Discharge	84.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+65.00	0.70
0+65.00	1.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+65.00, 1.10)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.64 ft
Roughness Coefficient	0.016
Elevation	0.64 ft
Elevation Range	0.00 to 1.10 ft
Flow Area	13.8 ft²
Wetted Perimeter	63.05 ft

Worksheet for MA-1 Meade 100-Yr

Results	
Hydraulic Radius	0.22 ft
Top Width	61.95 ft
Normal Depth	0.64 ft
Critical Depth	0.80 ft
Critical Slope	0.53 %
Velocity	6.13 ft/s
Velocity Head	0.58 ft
Specific Energy	1.22 ft
Froude Number	2.289
Flow Type	Supercritical

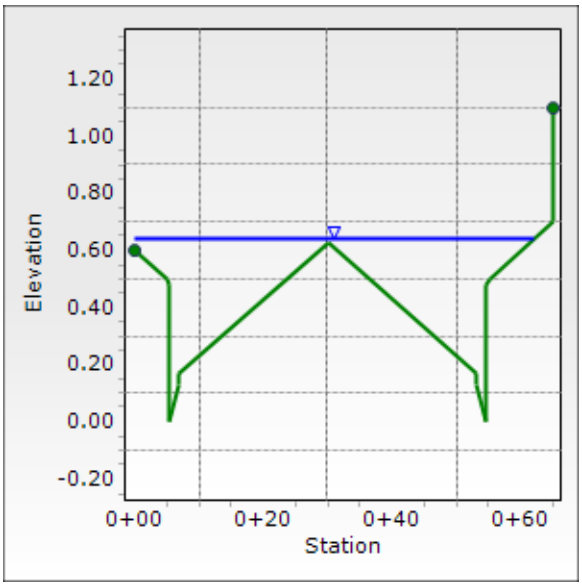
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.64 ft
Critical Depth	0.80 ft
Channel Slope	3.30 %
Critical Slope	0.53 %

Cross Section for MA-1 Meade 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.30 %
Normal Depth	0.64 ft
Discharge	84.50 cfs



Worksheet for MA-2 Meade 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.30 %
Discharge	135.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+65.00	0.70
0+65.00	1.10

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+65.00, 1.10)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.02 ft
Roughness Coefficient	0.016
Elevation	1.02 ft
Elevation Range	0.00 to 1.10 ft
Flow Area	38.4 ft²
Wetted Perimeter	66.80 ft

Worksheet for MA-2 Meade 100-Yr

Results	
Hydraulic Radius	0.57 ft
Top Width	65.00 ft
Normal Depth	1.02 ft
Critical Depth	0.94 ft
Critical Slope	0.48 %
Velocity	3.52 ft/s
Velocity Head	0.19 ft
Specific Energy	1.21 ft
Froude Number	0.807
Flow Type	Subcritical

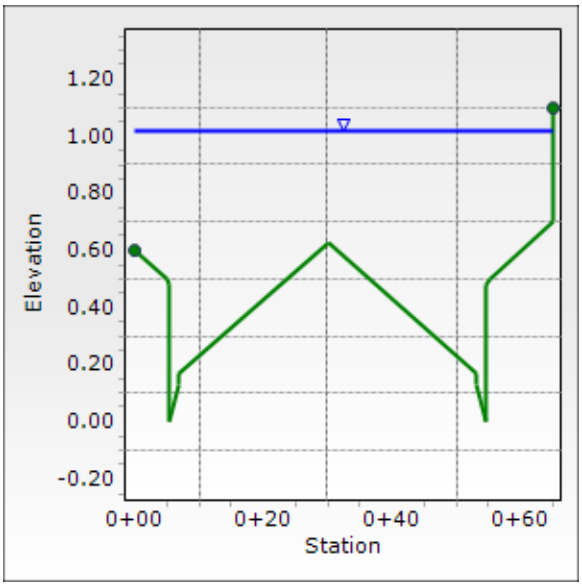
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.02 ft
Critical Depth	0.94 ft
Channel Slope	0.30 %
Critical Slope	0.48 %

Cross Section for MA-2 Meade 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.30 %
Normal Depth	1.02 ft
Discharge	135.00 cfs



Worksheet for F-F(ROAD) Rancho 100-yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.70 %
Discharge	2,538.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+50.00	2,112.00
0+50.00	2,107.75
0+97.00	2,107.00
1+05.00	2,107.00
1+12.00	2,107.00
1+20.00	2,108.00
1+36.00	2,112.00
1+58.00	2,112.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+50.00, 2,112.00)	(0+50.00, 2,107.75)	0.013
(0+50.00, 2,107.75)	(0+97.00, 2,107.00)	0.016
(0+97.00, 2,107.00)	(1+12.00, 2,107.00)	0.025
(1+12.00, 2,107.00)	(1+58.00, 2,112.00)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	3.58 ft
Roughness Coefficient	0.024
Elevation	2,110.58 ft
Elevation Range	2,107.00 to 2,112.00 ft
Flow Area	242.7 ft²
Wetted Perimeter	83.56 ft
Hydraulic Radius	2.90 ft
Top Width	80.34 ft
Normal Depth	3.58 ft
Critical Depth	3.71 ft

Worksheet for F-F(ROAD) Rancho 100-yr

Results	
Critical Slope	0.62 %
Velocity	10.46 ft/s
Velocity Head	1.70 ft
Specific Energy	5.28 ft
Froude Number	1.061
Flow Type	Supercritical

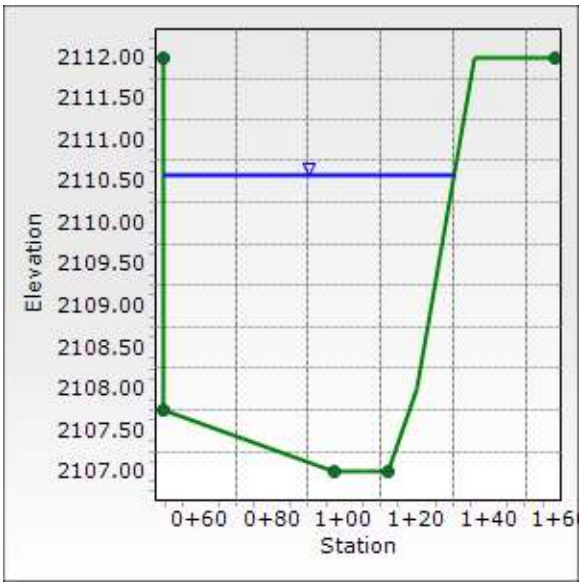
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.58 ft
Critical Depth	3.71 ft
Channel Slope	0.70 %
Critical Slope	0.62 %

Cross Section for F-F(ROAD) Rancho 100-yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.70 %
Normal Depth	3.58 ft
Discharge	2,538.00 cfs



Worksheet for ST1.5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.41 %
Discharge	2,538.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+15.67	2,110.93
0+15.67	2,106.93
0+25.67	2,106.73
0+26.17	2,106.23
0+27.72	2,106.36
0+46.41	2,106.81
0+67.42	2,106.20
0+67.46	2,106.66
0+71.50	2,107.12
0+81.85	2,102.45
0+87.55	2,102.45
0+98.18	2,108.42

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+15.67, 2,110.93)	(0+26.17, 2,106.23)	0.013
(0+26.17, 2,106.23)	(0+67.42, 2,106.20)	0.016
(0+67.42, 2,106.20)	(0+71.50, 2,107.12)	0.013
(0+71.50, 2,107.12)	(0+87.55, 2,102.45)	0.025
(0+87.55, 2,102.45)	(0+98.18, 2,108.42)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	6.84 ft
Roughness Coefficient	0.022
Elevation	2,109.29 ft
Elevation Range	2,102.45 to 2,110.93 ft
Flow Area	275.9 ft²

Worksheet for ST1.5

Results	
Wetted Perimeter	88.98 ft
Hydraulic Radius	3.10 ft
Top Width	82.51 ft
Normal Depth	6.84 ft
Critical Depth	6.58 ft
Critical Slope	0.53 %
Velocity	9.20 ft/s
Velocity Head	1.31 ft
Specific Energy	8.15 ft
Froude Number	0.887
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.84 ft
Critical Depth	6.58 ft
Channel Slope	0.41 %
Critical Slope	0.53 %

Worksheet for ST1.5

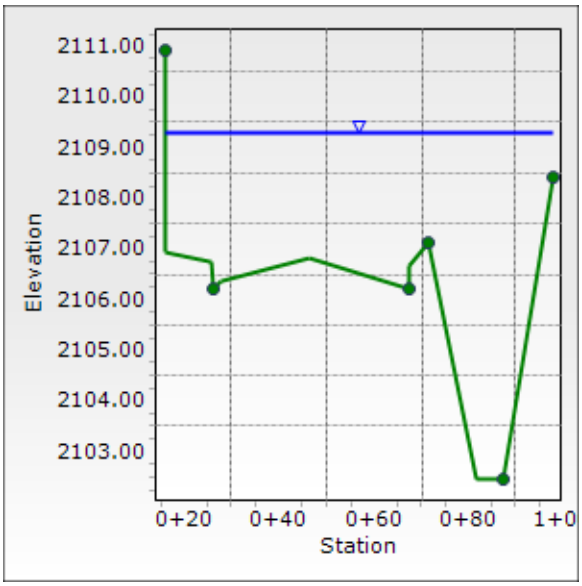
Messages:

Water Surface Elevation exceeds lowest end station by 0.867679278157539ft.

Cross Section for ST1.5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.41 %
Normal Depth	6.84 ft
Discharge	2,538.00 cfs



Worksheet for ST2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.90 %
Discharge	2,538.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+19.77	2,110.44
0+19.77	2,106.44
0+29.77	2,106.23
0+29.79	2,105.77
0+29.86	2,105.79
0+31.15	2,105.89
0+49.46	2,106.26
0+68.88	2,105.84
0+70.33	2,105.69
0+74.31	2,106.76
0+84.72	2,102.72
0+86.09	2,101.71
0+91.96	2,101.71
1+07.91	2,108.66

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+19.77, 2,110.44)	(0+29.79, 2,105.77)	0.013
(0+29.79, 2,105.77)	(0+70.33, 2,105.69)	0.016
(0+70.33, 2,105.69)	(0+74.31, 2,106.76)	0.013
(0+74.31, 2,106.76)	(0+86.09, 2,101.71)	0.025
(0+86.09, 2,101.71)	(1+07.91, 2,108.66)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	6.35 ft
Roughness Coefficient	0.024
Elevation	2,108.06 ft

Worksheet for ST2

Results	
Elevation Range	2,101.71 to 2,110.44 ft
Flow Area	232.0 ft²
Wetted Perimeter	91.39 ft
Hydraulic Radius	2.54 ft
Top Width	86.75 ft
Normal Depth	6.35 ft
Critical Depth	6.66 ft
Critical Slope	0.63 %
Velocity	10.94 ft/s
Velocity Head	1.86 ft
Specific Energy	8.20 ft
Froude Number	1.179
Flow Type	Supercritical

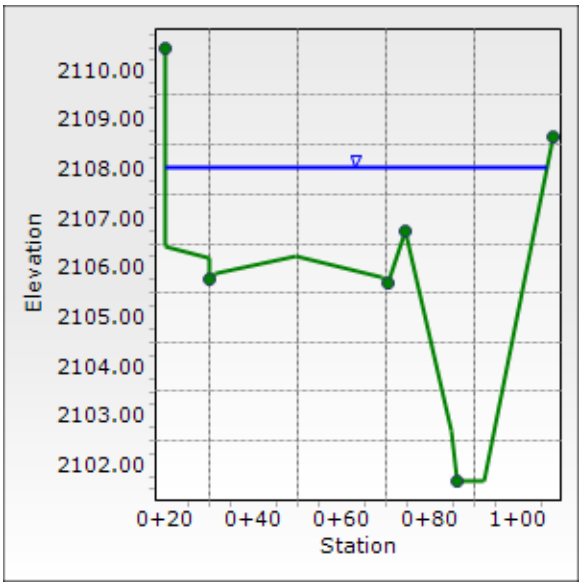
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.35 ft
Critical Depth	6.66 ft
Channel Slope	0.90 %
Critical Slope	0.63 %

Cross Section for ST2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.90 %
Normal Depth	6.35 ft
Discharge	2,538.00 cfs



Worksheet for ST2.5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.90 %
Discharge	2,538.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+18.30	2,106.55
0+18.95	2,105.98
0+29.66	2,105.82
0+30.11	2,105.73
0+34.39	2,105.83
0+56.65	2,105.77
0+69.15	2,105.51
0+70.63	2,105.38
0+70.73	2,105.78
0+73.69	2,105.79
0+74.24	2,105.85
0+83.89	2,101.62
0+88.99	2,101.29
0+90.71	2,101.18
1+06.66	2,115.13

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+18.30, 2,106.55)	(0+30.11, 2,105.73)	0.013
(0+30.11, 2,105.73)	(0+70.63, 2,105.38)	0.016
(0+70.63, 2,105.38)	(0+73.69, 2,105.79)	0.013
(0+73.69, 2,105.79)	(0+90.71, 2,101.18)	0.025
(0+90.71, 2,101.18)	(1+06.66, 2,115.13)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	6.48 ft
Roughness Coefficient	0.021
Elevation	2,107.66 ft

Worksheet for ST2.5

Results	
Elevation Range	2,101.18 to 2,115.13 ft
Flow Area	209.9 ft²
Wetted Perimeter	84.81 ft
Hydraulic Radius	2.47 ft
Top Width	79.82 ft
Normal Depth	6.48 ft
Critical Depth	7.01 ft
Critical Slope	0.50 %
Velocity	12.09 ft/s
Velocity Head	2.27 ft
Specific Energy	8.75 ft
Froude Number	1.315
Flow Type	Supercritical

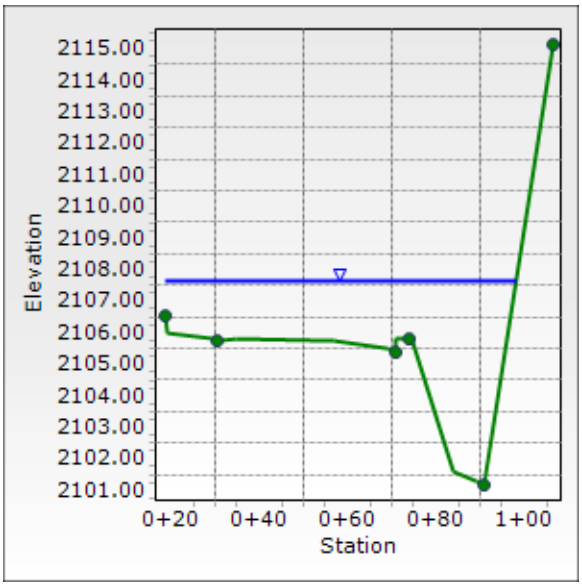
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.48 ft
Critical Depth	7.01 ft
Channel Slope	0.90 %
Critical Slope	0.50 %

Cross Section for ST2.5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.90 %
Normal Depth	6.48 ft
Discharge	2,538.00 cfs



Worksheet for RD - Rancho 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.25 %
Discharge	2,546.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,108.58
0+00.00	2,104.88
0+00.97	2,104.88
0+05.93	2,104.84
0+06.35	2,104.83
0+06.41	2,104.82
0+06.43	2,104.47
0+06.43	2,104.41
0+06.56	2,104.41
0+07.56	2,104.50
0+07.59	2,104.50
0+07.76	2,104.51
0+23.43	2,104.94
0+25.97	2,105.00
0+28.83	2,104.93
0+45.63	2,104.51
0+46.93	2,104.37
0+47.10	2,104.36
0+47.10	2,104.36
0+47.12	2,104.77
0+47.12	2,104.84
0+47.19	2,104.84
0+47.60	2,104.86
0+50.51	2,105.10
0+51.00	2,105.14
0+63.02	2,100.04
0+63.46	2,099.85
0+63.61	2,099.86
0+68.17	2,100.09
0+69.57	2,100.74
0+77.46	2,104.36
0+93.46	2,107.36
1+15.46	2,107.36

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,108.58)	(0+07.56, 2,104.50)	0.013

Worksheet for RD - Rancho 100-Yr

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+07.56, 2,104.50)	(0+45.63, 2,104.51)	0.016
(0+45.63, 2,104.51)	(0+51.00, 2,105.14)	0.013
(0+51.00, 2,105.14)	(0+68.17, 2,100.09)	0.025
(0+68.17, 2,100.09)	(1+15.46, 2,107.36)	0.038

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	8.56 ft
Roughness Coefficient	0.028
Elevation	2,108.42 ft
Elevation Range	2,099.85 to 2,108.58 ft
Flow Area	421.0 ft²
Wetted Perimeter	123.24 ft
Hydraulic Radius	3.42 ft
Top Width	115.46 ft
Normal Depth	8.56 ft
Critical Depth	7.13 ft
Critical Slope	0.86 %
Velocity	6.05 ft/s
Velocity Head	0.57 ft
Specific Energy	9.13 ft
Froude Number	0.558
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.56 ft
Critical Depth	7.13 ft
Channel Slope	0.25 %
Critical Slope	0.86 %

Worksheet for RD - Rancho 100-Yr

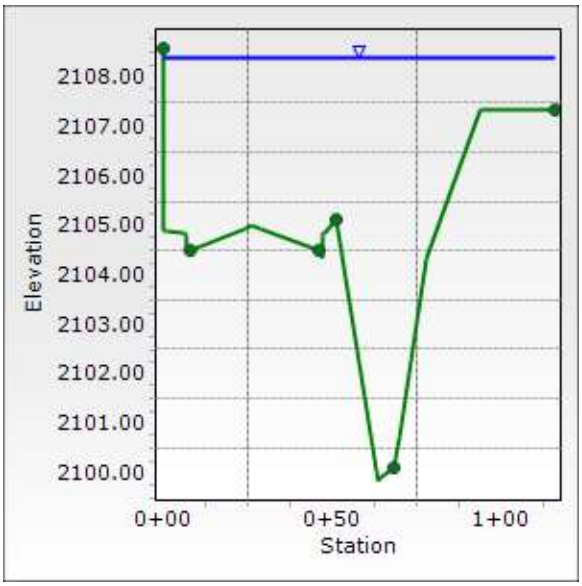
Messages:

Water Surface Elevation exceeds lowest end station by 1.05659964490178ft.

Cross Section for RD - Rancho 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.25 %
Normal Depth	8.56 ft
Discharge	2,546.50 cfs



Worksheet for ST3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.67 %
Discharge	2,546.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+22.48	2,106.68
0+22.48	2,103.68
0+32.98	2,103.46
0+32.98	2,103.46
0+32.98	2,102.98
0+34.48	2,103.11
0+34.48	2,103.15
0+52.53	2,103.85
0+73.50	2,103.28
0+77.85	2,104.33
0+89.53	2,098.85
0+91.03	2,098.96
0+95.38	2,099.05
1+13.81	2,109.53

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+22.48, 2,106.68)	(0+34.48, 2,103.11)	0.013
(0+34.48, 2,103.11)	(0+73.50, 2,103.28)	0.016
(0+73.50, 2,103.28)	(0+77.85, 2,104.33)	0.013
(0+77.85, 2,104.33)	(0+95.38, 2,099.05)	0.025
(0+95.38, 2,099.05)	(1+13.81, 2,109.53)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	6.80 ft
Roughness Coefficient	0.022
Elevation	2,105.65 ft

Worksheet for ST3

Results	
Elevation Range	2,098.85 to 2,109.53 ft
Flow Area	240.8 ft²
Wetted Perimeter	90.11 ft
Hydraulic Radius	2.67 ft
Top Width	84.50 ft
Normal Depth	6.80 ft
Critical Depth	7.00 ft
Critical Slope	0.54 %
Velocity	10.58 ft/s
Velocity Head	1.74 ft
Specific Energy	8.54 ft
Froude Number	1.104
Flow Type	Supercritical

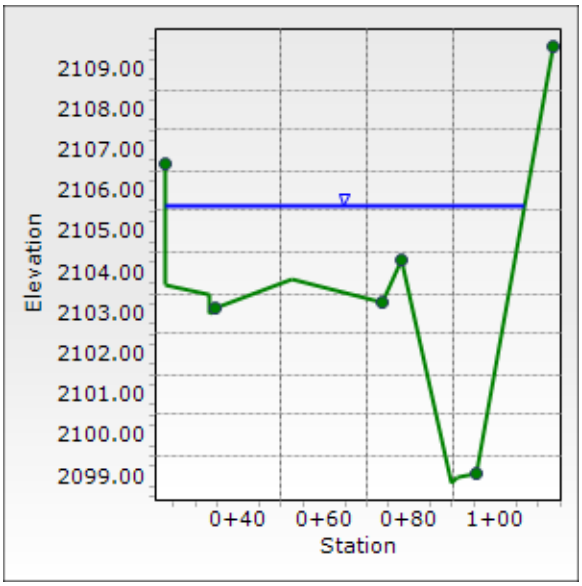
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.80 ft
Critical Depth	7.00 ft
Channel Slope	0.67 %
Critical Slope	0.54 %

Cross Section for ST3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.67 %
Normal Depth	6.80 ft
Discharge	2,546.50 cfs



Worksheet for RD-1 - Rancho 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.25 %
Discharge	2,582.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,104.00
0+00.00	2,102.71
0+10.50	2,102.50
0+11.00	2,102.48
0+11.00	2,102.00
0+12.50	2,102.13
0+12.50	2,102.17
0+30.50	2,102.58
0+48.50	2,102.17
0+48.50	2,102.13
0+50.00	2,102.30
0+50.00	2,102.78
0+50.50	2,102.80
0+55.50	2,102.90
0+61.23	2,102.76
0+70.21	2,098.28
0+78.38	2,098.39
0+93.31	2,107.67
0+99.30	2,108.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,104.00)	(0+50.50, 2,102.80)	0.016
(0+50.50, 2,102.80)	(0+78.38, 2,098.39)	0.025
(0+78.38, 2,098.39)	(0+99.30, 2,108.00)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	7.41 ft

Worksheet for RD-1 - Rancho 100-Yr

Results	
Roughness Coefficient	0.023
Elevation	2,105.69 ft
Elevation Range	2,098.28 to 2,108.00 ft
Flow Area	345.3 ft²
Wetted Perimeter	97.31 ft
Hydraulic Radius	3.55 ft
Top Width	90.12 ft
Normal Depth	7.41 ft
Critical Depth	6.50 ft
Critical Slope	0.59 %
Velocity	7.48 ft/s
Velocity Head	0.87 ft
Specific Energy	8.28 ft
Froude Number	0.673
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.41 ft
Critical Depth	6.50 ft
Channel Slope	0.25 %
Critical Slope	0.59 %

Worksheet for RD-1 - Rancho 100-Yr

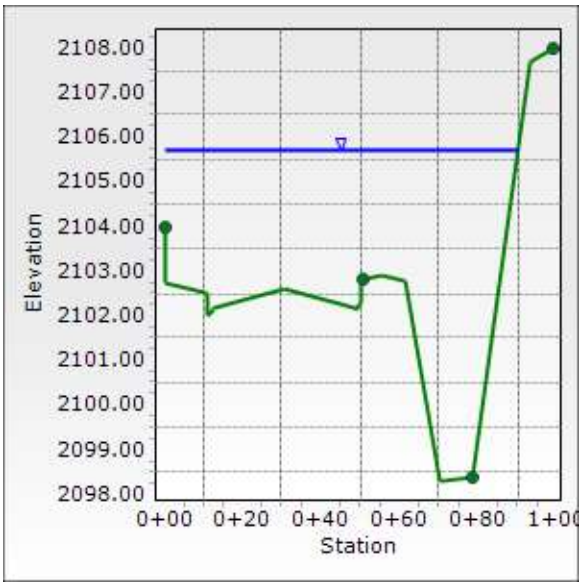
Messages:

Water Surface Elevation exceeds lowest end station by 1.68918705860506ft.

Cross Section for RD-1 - Rancho 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.25 %
Normal Depth	7.41 ft
Discharge	2,582.00 cfs



Worksheet for RA - Rigel 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.46 %
Discharge	99.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60
0+60.00	3.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 3.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.86 ft
Roughness Coefficient	0.016
Elevation	0.86 ft

Worksheet for RA - Rigel 100-Yr

Results	
Elevation Range	0.00 to 3.60 ft
Flow Area	27.1 ft²
Wetted Perimeter	61.59 ft
Hydraulic Radius	0.44 ft
Top Width	60.00 ft
Normal Depth	0.86 ft
Critical Depth	0.85 ft
Critical Slope	0.51 %
Velocity	3.65 ft/s
Velocity Head	0.21 ft
Specific Energy	1.07 ft
Froude Number	0.956
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.86 ft
Critical Depth	0.85 ft
Channel Slope	0.46 %
Critical Slope	0.51 %

Worksheet for RA - Rigel 100-Yr

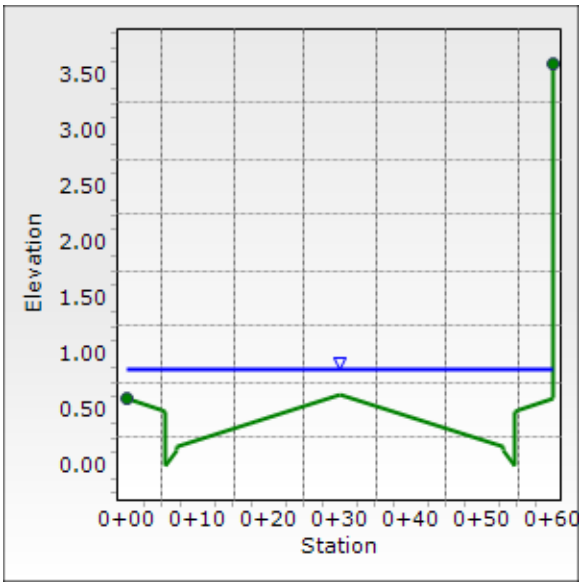
Messages:

Water Surface Elevation exceeds lowest end station by 0.262061715228924ft.

Cross Section for RA - Rigel 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.46 %
Normal Depth	0.86 ft
Discharge	99.00 cfs



Worksheet for RA-1 - Rigel 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.68 %
Discharge	103.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2.90
0+05.00	2.80
0+05.50	2.78
0+05.50	2.30
0+07.00	2.43
0+07.00	2.47
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60
0+60.00	3.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2.90)	(0+60.00, 3.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.30 ft
Roughness Coefficient	0.016
Elevation	1.30 ft
Elevation Range	0.00 to 3.60 ft
Flow Area	18.8 ft²
Wetted Perimeter	30.88 ft
Hydraulic Radius	0.61 ft

Worksheet for RA-1 - Rigel 100-Yr

Results	
Top Width	29.62 ft
Normal Depth	1.30 ft
Critical Depth	1.40 ft
Critical Slope	0.45 %
Velocity	5.50 ft/s
Velocity Head	0.47 ft
Specific Energy	1.77 ft
Froude Number	1.218
Flow Type	Supercritical

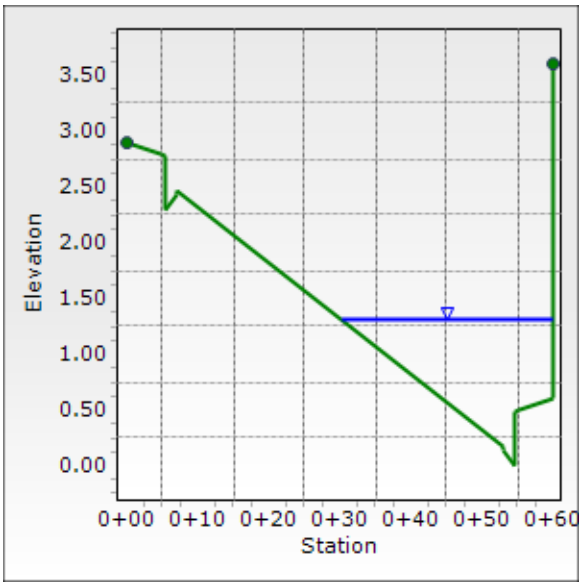
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.30 ft
Critical Depth	1.40 ft
Channel Slope	0.68 %
Critical Slope	0.45 %

Cross Section for RA-1 - Rigel 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.68 %
Normal Depth	1.30 ft
Discharge	103.50 cfs



Worksheet for RA-2 - Rigel 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.60 %
Discharge	103.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	5.91
0+00.00	2.91
0+05.00	2.81
0+05.50	2.79
0+05.50	2.31
0+07.00	2.44
0+07.00	2.47
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60
0+60.00	3.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 5.91)	(0+60.00, 3.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.33 ft
Roughness Coefficient	0.016
Elevation	1.33 ft
Elevation Range	0.00 to 5.91 ft
Flow Area	19.7 ft²
Wetted Perimeter	31.49 ft

Worksheet for RA-2 - Rigel 100-Yr

Results	
Hydraulic Radius	0.62 ft
Top Width	30.21 ft
Normal Depth	1.33 ft
Critical Depth	1.40 ft
Critical Slope	0.45 %
Velocity	5.26 ft/s
Velocity Head	0.43 ft
Specific Energy	1.76 ft
Froude Number	1.149
Flow Type	Supercritical

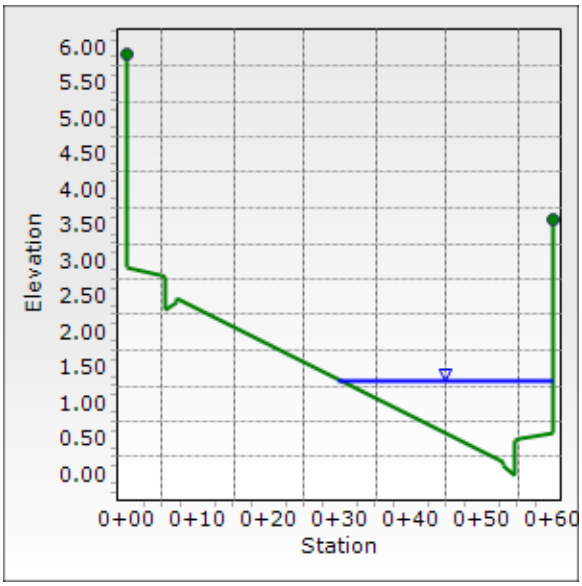
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.33 ft
Critical Depth	1.40 ft
Channel Slope	0.60 %
Critical Slope	0.45 %

Cross Section for RA-2 - Rigel 100-Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.60 %
Normal Depth	1.33 ft
Discharge	103.50 cfs



Worksheet for MA-1 Meade 100-Yr w/ Wall

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.37 %
Discharge	85.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.72
0+05.00	0.62
0+05.50	0.60
0+05.50	0.12
0+07.00	0.25
0+07.00	0.29
0+30.00	0.68
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.72)	(0+60.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.69 ft
Roughness Coefficient	0.016
Elevation	0.69 ft
Elevation Range	0.00 to 0.72 ft
Flow Area	13.5 ft²
Wetted Perimeter	59.64 ft
Hydraulic Radius	0.23 ft
Top Width	58.49 ft

Worksheet for MA-1 Meade 100-Yr w/ Wall

Results	
Normal Depth	0.69 ft
Critical Depth	0.86 ft
Critical Slope	0.52 %
Velocity	6.32 ft/s
Velocity Head	0.62 ft
Specific Energy	1.31 ft
Froude Number	2.322
Flow Type	Supercritical

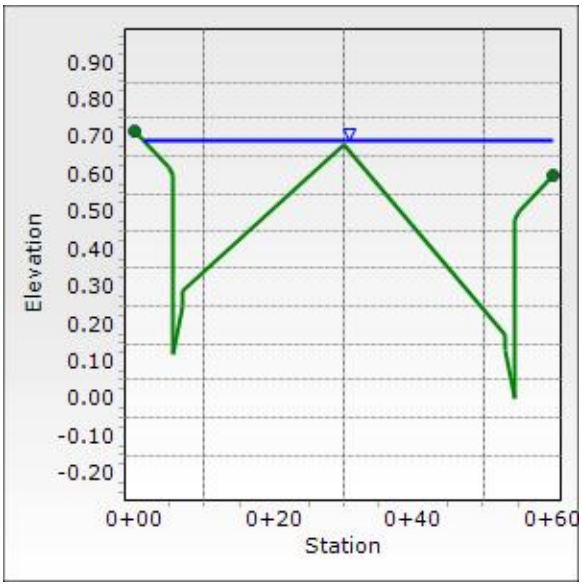
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.69 ft
Critical Depth	0.86 ft
Channel Slope	3.37 %
Critical Slope	0.52 %

Cross Section for MA-1 Meade 100-Yr w/ Wall

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.37 %
Normal Depth	0.69 ft
Discharge	85.00 cfs



Worksheet for MA-2A Meade 100-Yr - 0.30%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.30 %
Discharge	196.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.61
0+53.00	0.31
0+53.00	0.27
0+54.50	0.14
0+54.50	0.62
0+55.00	0.64
0+60.00	0.74

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.74)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.22 ft
Roughness Coefficient	0.016
Elevation	1.22 ft
Elevation Range	0.00 to 0.74 ft
Flow Area	46.7 ft²
Wetted Perimeter	62.17 ft
Hydraulic Radius	0.75 ft
Top Width	60.00 ft

Worksheet for MA-2A Meade 100-Yr - 0.30%

Results	
Normal Depth	1.22 ft
Critical Depth	1.14 ft
Critical Slope	0.44 %
Velocity	4.21 ft/s
Velocity Head	0.27 ft
Specific Energy	1.50 ft
Froude Number	0.840
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.22 ft
Critical Depth	1.14 ft
Channel Slope	0.30 %
Critical Slope	0.44 %

Worksheet for MA-2A Meade 100-Yr - 0.30%

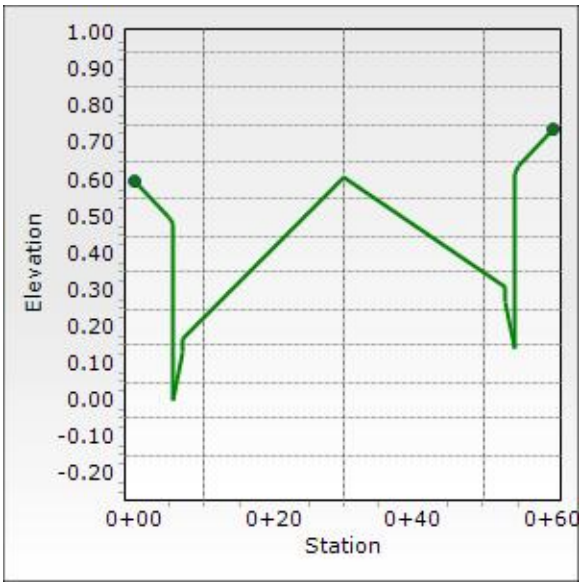
Messages:

Water Surface Elevation exceeds lowest end station by 0.624062100882412ft.

Cross Section for MA-2A Meade 100-Yr - 0.30%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.30 %
Normal Depth	1.22 ft
Discharge	196.50 cfs



Worksheet for MA-2B Meade 100-Yr - 0.51%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.51 %
Discharge	195.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	1.07 ft
Roughness Coefficient	0.016
Elevation	1.07 ft
Elevation Range	0.00 to 0.63 ft
Flow Area	39.7 ft²
Wetted Perimeter	62.01 ft
Hydraulic Radius	0.64 ft

Worksheet for MA-2B Meade 100-Yr - 0.51%

Results	
Top Width	60.00 ft
Normal Depth	1.07 ft
Critical Depth	1.10 ft
Critical Slope	0.44 %
Velocity	4.92 ft/s
Velocity Head	0.38 ft
Specific Energy	1.45 ft
Froude Number	1.067
Flow Type	Supercritical

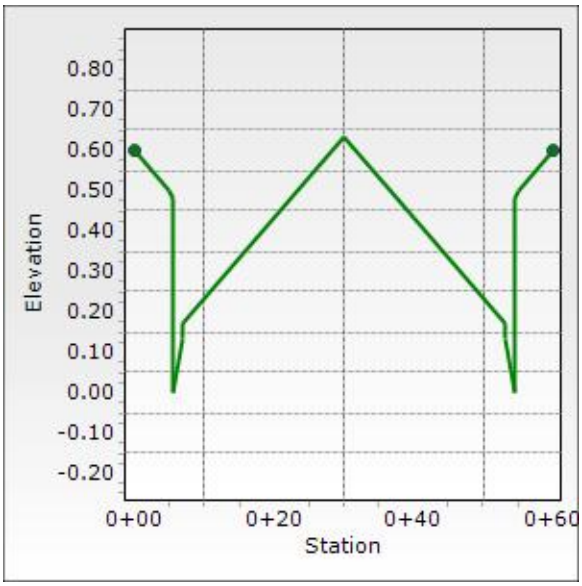
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.07 ft
Critical Depth	1.10 ft
Channel Slope	0.51 %
Critical Slope	0.44 %

Cross Section for MA-2B Meade 100-Yr - 0.51%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.51 %
Normal Depth	1.07 ft
Discharge	195.50 cfs



Worksheet for MA-2C Meade 100-Yr - 1.41%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.41 %
Discharge	190.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.75
0+05.00	0.65
0+05.50	0.63
0+05.50	0.15
0+07.00	0.28
0+07.00	0.32
0+30.00	0.45
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.75)	(0+60.00, 0.60)	0.016

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.86 ft
Roughness Coefficient	0.016
Elevation	0.86 ft
Elevation Range	0.00 to 0.75 ft
Flow Area	28.6 ft²
Wetted Perimeter	61.43 ft
Hydraulic Radius	0.47 ft
Top Width	60.00 ft

Worksheet for MA-2C Meade 100-Yr - 1.41%

Results	
Normal Depth	0.86 ft
Critical Depth	1.07 ft
Critical Slope	0.44 %
Velocity	6.63 ft/s
Velocity Head	0.68 ft
Specific Energy	1.55 ft
Froude Number	1.693
Flow Type	Supercritical

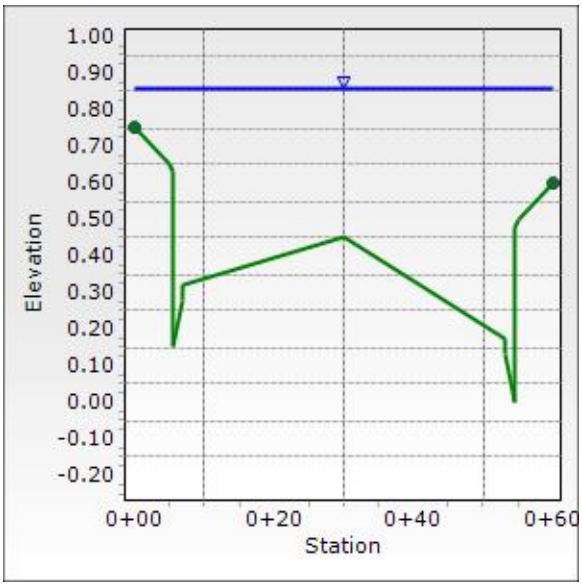
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.86 ft
Critical Depth	1.07 ft
Channel Slope	1.41 %
Critical Slope	0.44 %

Cross Section for MA-2C Meade 100-Yr - 1.41%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.41 %
Normal Depth	0.86 ft
Discharge	190.00 cfs



Worksheet for ONA

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.54	%
Discharge	2.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+25.00	0.86

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+25.00, 0.86)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.35	ft
Roughness Coefficient	0.013	
Elevation	0.35	ft
Elevation Range	0.00 to 0.86	ft
Flow Area	1.0	ft^2
Wetted Perimeter	7.90	ft
Hydraulic Radius	0.12	ft
Top Width	7.50	ft
Normal Depth	0.35	ft
Critical Depth	0.35	ft
Critical Slope	0.52	%
Velocity	2.07	ft/s
Velocity Head	0.07	ft
Specific Energy	0.42	ft
Froude Number	1.015	

Worksheet for ONA

Results	
Flow Type	Supercritical

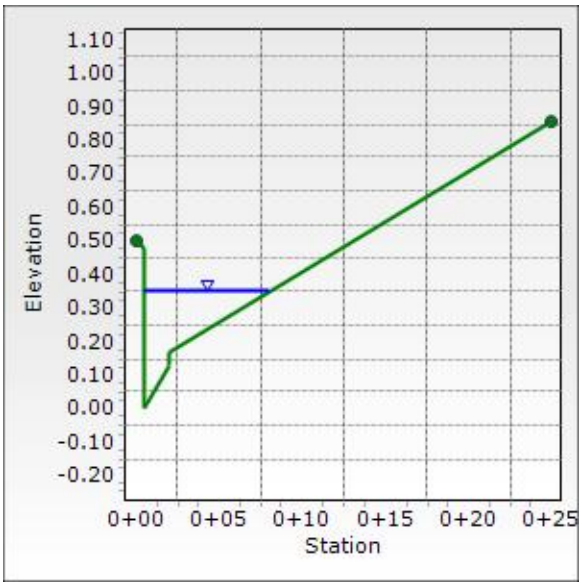
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.35 ft
Critical Depth	0.35 ft
Channel Slope	0.54 %
Critical Slope	0.52 %

Cross Section for ONA

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.54 %
Normal Depth	0.35 ft
Discharge	2.00 cfs



Worksheet for ONE2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.50	%
Discharge	2.50	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.49
0+81.40	0.00
1+01.90	0.14

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.49)	(1+01.90, 0.14)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.14	ft
Roughness Coefficient	0.013	
Elevation	0.14	ft
Elevation Range	0.00 to 1.49	ft
Flow Area	1.9	ft²
Wetted Perimeter	27.33	ft
Hydraulic Radius	0.07	ft
Top Width	27.33	ft
Normal Depth	0.14	ft
Critical Depth	0.13	ft
Critical Slope	0.61	%
Velocity	1.35	ft/s
Velocity Head	0.03	ft
Specific Energy	0.16	ft
Froude Number	0.910	
Flow Type	Subcritical	

GVF Input Data

Worksheet for ONE2

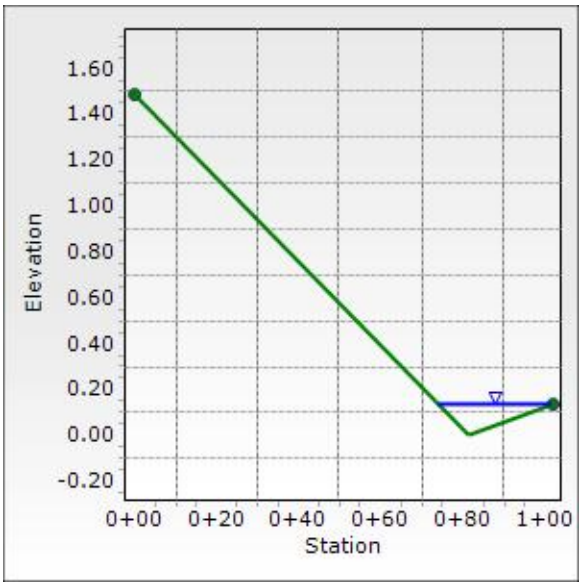
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.14 ft
Critical Depth	0.13 ft
Channel Slope	0.50 %
Critical Slope	0.61 %

Cross Section for ONE2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.50 %
Normal Depth	0.14 ft
Discharge	2.50 cfs



Worksheet for ONE4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	3.60	%
Discharge	1.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.05
0+16.80	0.25
0+67.40	0.00
0+86.20	1.20

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.05)	(0+86.20, 1.20)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.06	ft
Roughness Coefficient	0.013	
Elevation	0.06	ft
Elevation Range	0.00 to 1.20	ft
Flow Area	0.5	ft²
Wetted Perimeter	14.09	ft
Hydraulic Radius	0.03	ft
Top Width	14.09	ft
Normal Depth	0.06	ft
Critical Depth	0.09	ft
Critical Slope	0.70	%
Velocity	2.20	ft/s
Velocity Head	0.07	ft
Specific Energy	0.14	ft
Froude Number	2.155	
Flow Type	Supercritical	

Worksheet for ONE4

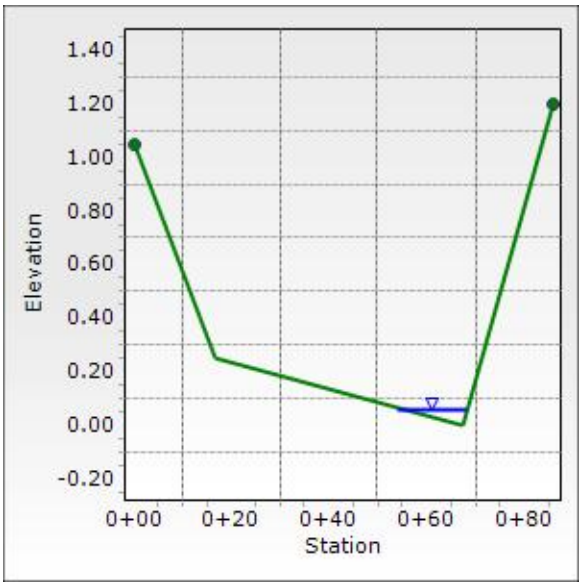
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.06 ft
Critical Depth	0.09 ft
Channel Slope	3.60 %
Critical Slope	0.70 %

Cross Section for ONE4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.60 %
Normal Depth	0.06 ft
Discharge	1.00 cfs



Worksheet for ONG1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.15	%
Discharge	2.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.34
0+18.60	0.00
0+19.10	0.00
0+41.40	0.44

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.34)	(0+41.40, 0.44)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.19	ft
Roughness Coefficient	0.013	
Elevation	0.19	ft
Elevation Range	0.00 to 0.44	ft
Flow Area	2.1	ft²
Wetted Perimeter	21.04	ft
Hydraulic Radius	0.10	ft
Top Width	21.03	ft
Normal Depth	0.19	ft
Critical Depth	0.15	ft
Critical Slope	0.58	%
Velocity	0.95	ft/s
Velocity Head	0.01	ft
Specific Energy	0.21	ft
Froude Number	0.532	
Flow Type	Subcritical	

Worksheet for ONG1

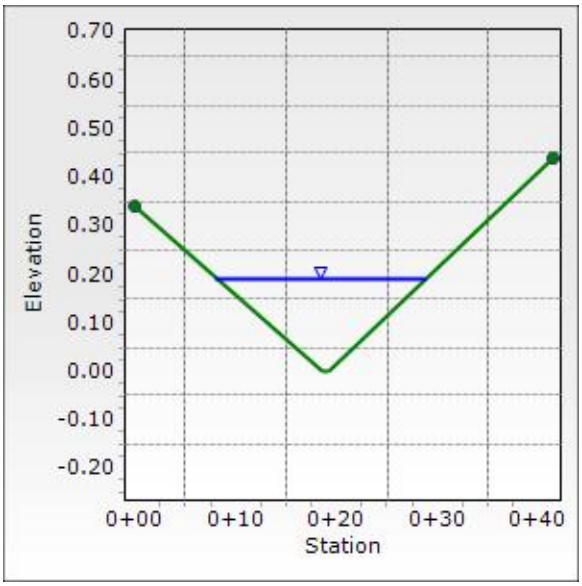
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.19 ft
Critical Depth	0.15 ft
Channel Slope	0.15 %
Critical Slope	0.58 %

Cross Section for ONG1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.15 %
Normal Depth	0.19 ft
Discharge	2.00 cfs



Worksheet for ONG2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.80	%
Discharge	2.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.65
0+42.00	0.00
0+42.50	0.00
0+75.20	0.43

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.65)	(0+75.20, 0.43)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.13	ft
Roughness Coefficient	0.013	
Elevation	0.13	ft
Elevation Range	0.00 to 0.65	ft
Flow Area	1.2	ft²
Wetted Perimeter	18.39	ft
Hydraulic Radius	0.07	ft
Top Width	18.38	ft
Normal Depth	0.13	ft
Critical Depth	0.13	ft
Critical Slope	0.60	%
Velocity	1.67	ft/s
Velocity Head	0.04	ft
Specific Energy	0.17	ft
Froude Number	1.149	
Flow Type	Supercritical	

Worksheet for ONG2

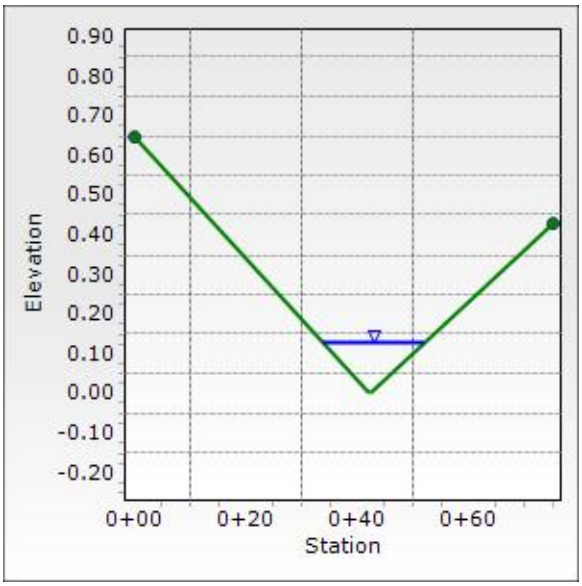
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.13 ft
Critical Depth	0.13 ft
Channel Slope	0.80 %
Critical Slope	0.60 %

Cross Section for ONG2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.80 %
Normal Depth	0.13 ft
Discharge	2.00 cfs



Worksheet for ONG3N

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	3.02	%
Discharge	2.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	4.00
0+00.00	0.00
0+77.70	1.24

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 4.00)	(0+77.70, 1.24)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.14	ft
Roughness Coefficient	0.013	
Elevation	0.14	ft
Elevation Range	0.00 to 4.00	ft
Flow Area	0.6	ft²
Wetted Perimeter	8.82	ft
Hydraulic Radius	0.07	ft
Top Width	8.68	ft
Normal Depth	0.14	ft
Critical Depth	0.19	ft
Critical Slope	0.55	%
Velocity	3.32	ft/s
Velocity Head	0.17	ft
Specific Energy	0.31	ft
Froude Number	2.227	
Flow Type	Supercritical	

GVF Input Data

Worksheet for ONG3N

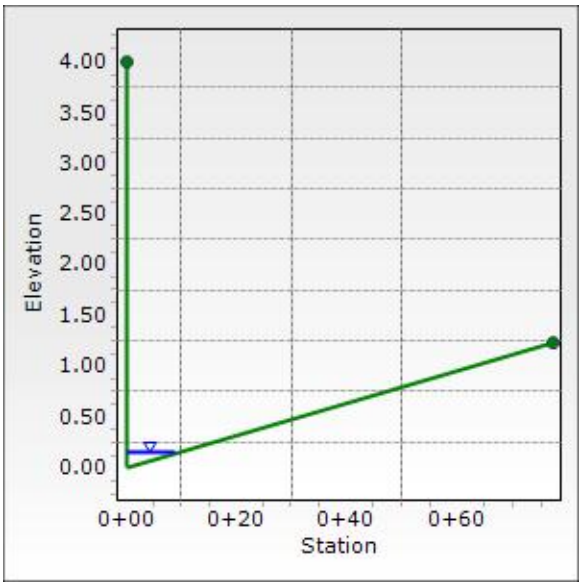
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.14 ft
Critical Depth	0.19 ft
Channel Slope	3.02 %
Critical Slope	0.55 %

Cross Section for ONG3N

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.02 %
Normal Depth	0.14 ft
Discharge	2.00 cfs



Worksheet for ONG3S

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	3.02	%
Discharge	2.00	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.19
0+09.30	0.00
0+09.80	0.00
0+09.80	4.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.19)	(0+09.80, 4.00)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.14	ft
Roughness Coefficient	0.013	
Elevation	0.14	ft
Elevation Range	0.00 to 4.00	ft
Flow Area	0.6	ft²
Wetted Perimeter	7.61	ft
Hydraulic Radius	0.07	ft
Top Width	7.47	ft
Normal Depth	0.14	ft
Critical Depth	0.20	ft
Critical Slope	0.53	%
Velocity	3.53	ft/s
Velocity Head	0.19	ft
Specific Energy	0.34	ft
Froude Number	2.255	
Flow Type	Supercritical	

Worksheet for ONG3S

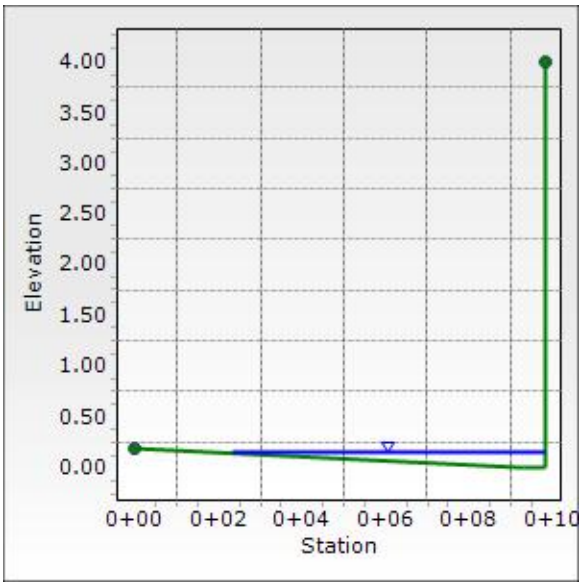
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.14 ft
Critical Depth	0.20 ft
Channel Slope	3.02 %
Critical Slope	0.53 %

Cross Section for ONG3S

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.02 %
Normal Depth	0.14 ft
Discharge	2.00 cfs



Worksheet for F-F(CHNL) Rancho 100-yr

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.70 %
Normal Depth	3.00 ft

Section Definitions

Station (ft)	Elevation (ft)
0+50.00	2,112.00
0+50.00	2,107.75
0+97.00	2,107.00
1+05.00	2,104.00
1+12.00	2,104.00
1+20.00	2,108.00
1+36.00	2,112.00
1+58.00	2,112.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+50.00, 2,112.00)	(0+50.00, 2,107.75)	0.013
(0+50.00, 2,107.75)	(0+97.00, 2,107.00)	0.016
(0+97.00, 2,107.00)	(1+12.00, 2,104.00)	0.025
(1+12.00, 2,104.00)	(1+58.00, 2,112.00)	0.038

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Discharge	270.07 cfs
Roughness Coefficient	0.030
Elevation Range	2,104.00 to 2,112.00 ft
Flow Area	42.0 ft²
Wetted Perimeter	22.25 ft
Hydraulic Radius	1.89 ft
Top Width	21.00 ft
Normal Depth	3.00 ft
Critical Depth	2.67 ft
Critical Slope	1.12 %

Worksheet for F-F(CHNL) Rancho 100-yr

Results	
Velocity	6.43 ft/s
Velocity Head	0.64 ft
Specific Energy	3.64 ft
Froude Number	0.802
Flow Type	Subcritical

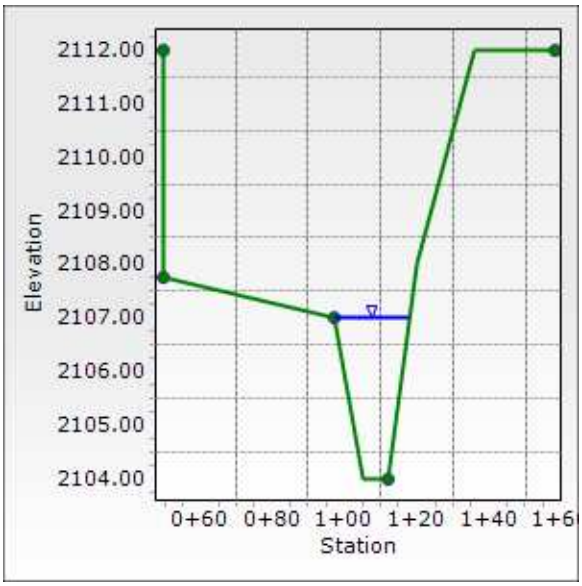
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.00 ft
Critical Depth	2.67 ft
Channel Slope	0.70 %
Critical Slope	1.12 %

Cross Section for F-F(CHNL) Rancho 100-yr

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.70 %
Normal Depth	3.00 ft
Discharge	270.07 cfs



Worksheet for SW1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	1.00 %
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	0.54 ft
Flow Area	1.2 ft²
Wetted Perimeter	4.43 ft
Hydraulic Radius	0.26 ft
Top Width	4.30 ft
Critical Depth	0.43 ft
Critical Slope	3.09 %
Velocity	1.73 ft/s
Velocity Head	0.05 ft
Specific Energy	0.58 ft
Froude Number	0.589
Flow Type	Subcritical

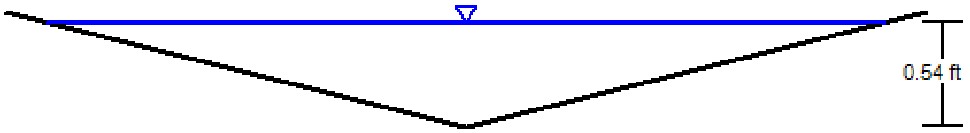
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

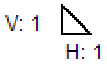
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.54 ft
Critical Depth	0.43 ft
Channel Slope	1.00 %
Critical Slope	3.09 %

Cross Section for SW1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	1.00 %
Normal Depth	0.54 ft
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	2.00 cfs





Worksheet for SW2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.25 %
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	2.00 cfs

Results	
Normal Depth	0.70 ft
Flow Area	1.9 ft²
Wetted Perimeter	5.74 ft
Hydraulic Radius	0.34 ft
Top Width	5.57 ft
Critical Depth	0.43 ft
Critical Slope	3.09 %
Velocity	1.03 ft/s
Velocity Head	0.02 ft
Specific Energy	0.71 ft
Froude Number	0.308
Flow Type	Subcritical

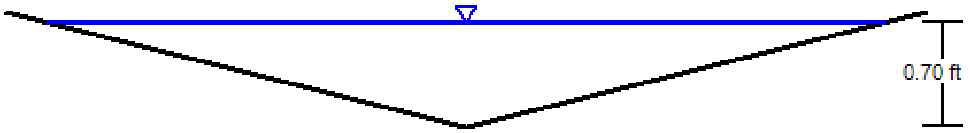
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

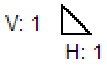
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.70 ft
Critical Depth	0.43 ft
Channel Slope	0.25 %
Critical Slope	3.09 %

Cross Section for SW2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.25 %
Normal Depth	0.70 ft
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	2.00 cfs





Worksheet for SW3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	1.00 %
Left Side Slope	4.000 H:V
Right Side Slope	4.000 H:V
Discharge	2.50 cfs

Results	
Normal Depth	0.58 ft
Flow Area	1.4 ft²
Wetted Perimeter	4.82 ft
Hydraulic Radius	0.28 ft
Top Width	4.67 ft
Critical Depth	0.48 ft
Critical Slope	3.00 %
Velocity	1.83 ft/s
Velocity Head	0.05 ft
Specific Energy	0.64 ft
Froude Number	0.598
Flow Type	Subcritical

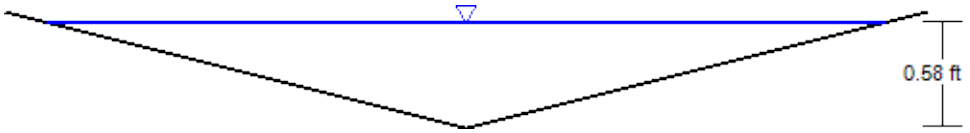
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

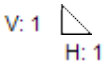
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.58 ft
Critical Depth	0.48 ft
Channel Slope	1.00 %
Critical Slope	3.00 %

Cross Section for SW3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.035	
Channel Slope	1.00	%
Normal Depth	0.58	ft
Left Side Slope	4.000	H:V
Right Side Slope	4.000	H:V
Discharge	2.50	cfs





Worksheet for SW4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.01 %
Discharge	1.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.75
0+27.70	0.06
0+29.20	0.00
0+30.70	0.06
0+30.70	3.06

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.75)	(0+30.70, 3.06)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.15 ft
Roughness Coefficient	0.013
Elevation	0.15 ft
Elevation Range	0.00 to 3.06 ft
Flow Area	0.4 ft²
Wetted Perimeter	4.56 ft
Hydraulic Radius	0.09 ft
Top Width	4.47 ft
Normal Depth	0.15 ft
Critical Depth	0.17 ft
Critical Slope	0.53 %
Velocity	2.36 ft/s
Velocity Head	0.09 ft
Specific Energy	0.24 ft
Froude Number	1.349
Flow Type	Supercritical

Worksheet for SW4

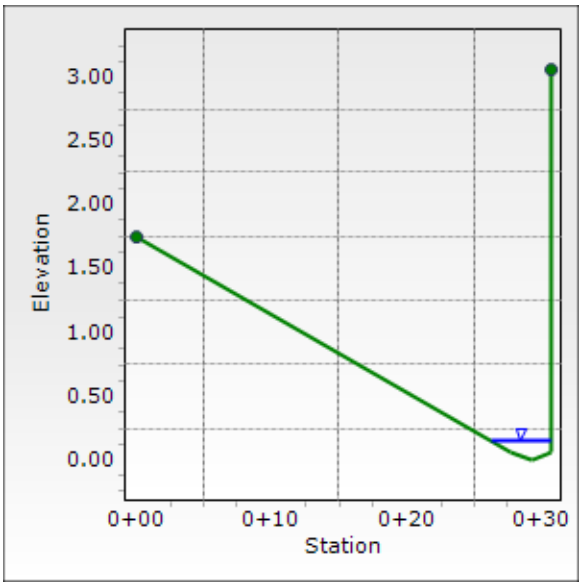
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.15 ft
Critical Depth	0.17 ft
Channel Slope	1.01 %
Critical Slope	0.53 %

Cross Section for SW4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.01 %
Normal Depth	0.15 ft
Discharge	1.00 cfs



Worksheet for OF5 (West)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	2.74	%
Bottom Width	3.00	ft
Discharge	0.50	cfs

Results		
Normal Depth	0.06	ft
Flow Area	0.2	ft²
Wetted Perimeter	3.12	ft
Hydraulic Radius	0.06	ft
Top Width	3.00	ft
Critical Depth	0.10	ft
Critical Slope	0.59	%
Velocity	2.81	ft/s
Velocity Head	0.12	ft
Specific Energy	0.18	ft
Froude Number	2.029	
Flow Type	Supercritical	

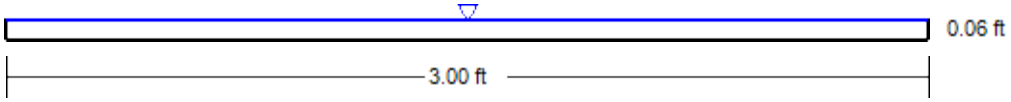
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

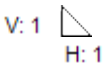
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.06	ft
Critical Depth	0.10	ft
Channel Slope	2.74	%
Critical Slope	0.59	%

Cross Section for OF5 (West)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	2.74	%
Normal Depth	0.06	ft
Bottom Width	3.00	ft
Discharge	0.50	cfs





Worksheet for OF5 (South)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.01	%
Left Side Slope	4.000	H:V
Right Side Slope	4.000	H:V
Discharge	2.50	cfs

Results		
Normal Depth	0.40	ft
Flow Area	0.6	ft²
Wetted Perimeter	3.31	ft
Hydraulic Radius	0.19	ft
Top Width	3.22	ft
Critical Depth	0.48	ft
Critical Slope	0.41	%
Velocity	3.87	ft/s
Velocity Head	0.23	ft
Specific Energy	0.63	ft
Froude Number	1.521	
Flow Type	Supercritical	

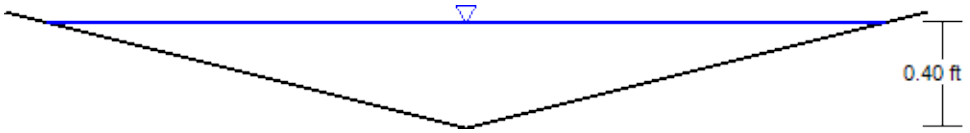
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

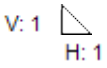
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.48	ft
Channel Slope	1.01	%
Critical Slope	0.41	%

Cross Section for OF5 (South)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.01	%
Normal Depth	0.40	ft
Left Side Slope	4.000	H:V
Right Side Slope	4.000	H:V
Discharge	2.50	cfs





Worksheet for Wall Opening 0.5OF5 NW

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.02	%
Bottom Width	4.00	ft
Discharge	0.50	cfs

Results		
Normal Depth	0.07	ft
Flow Area	0.3	ft²
Wetted Perimeter	4.13	ft
Hydraulic Radius	0.06	ft
Top Width	4.00	ft
Critical Depth	0.08	ft
Critical Slope	0.61	%
Velocity	1.86	ft/s
Velocity Head	0.05	ft
Specific Energy	0.12	ft
Froude Number	1.267	
Flow Type	Supercritical	

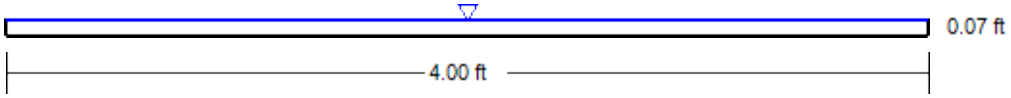
GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

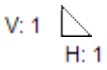
GVF Output Data		
Upstream Depth	0.00	ft
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.07	ft
Critical Depth	0.08	ft
Channel Slope	1.02	%
Critical Slope	0.61	%

Cross Section for Wall Opening 0.5OF5 NW

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	1.02	%
Normal Depth	0.07	ft
Bottom Width	4.00	ft
Discharge	0.50	cfs





Worksheet for Wall Opening ONB NE

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	1.00 %
Bottom Width	4.00 ft
Discharge	2.00 cfs

Results	
Normal Depth	0.29 ft
Flow Area	1.2 ft²
Wetted Perimeter	4.59 ft
Hydraulic Radius	0.26 ft
Top Width	4.00 ft
Critical Depth	0.20 ft
Critical Slope	3.47 %
Velocity	1.71 ft/s
Velocity Head	0.05 ft
Specific Energy	0.34 ft
Froude Number	0.556
Flow Type	Subcritical

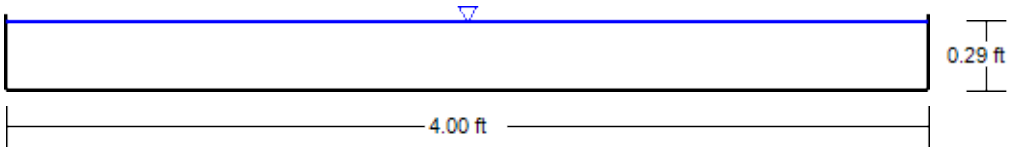
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

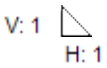
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.29 ft
Critical Depth	0.20 ft
Channel Slope	1.00 %
Critical Slope	3.47 %

Cross Section for Wall Opening ONB NE

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.035	
Channel Slope	1.00	%
Normal Depth	0.29	ft
Bottom Width	4.00	ft
Discharge	2.00	cfs





Worksheet for ONE2 EMERGENCY OVERFLOW

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Channel Slope	0.50	%
Discharge	9.50	cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.49
0+81.40	0.00
1+01.90	0.14

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.49)	(1+01.90, 0.14)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results		
Normal Depth	0.22	ft
Roughness Coefficient	0.013	
Elevation	0.22	ft
Elevation Range	0.00 to 1.49	ft
Flow Area	4.4	ft²
Wetted Perimeter	32.67	ft
Hydraulic Radius	0.14	ft
Top Width	32.59	ft
Normal Depth	0.22	ft
Critical Depth	0.22	ft
Critical Slope	0.48	%
Velocity	2.14	ft/s
Velocity Head	0.07	ft
Specific Energy	0.29	ft
Froude Number	1.023	
Flow Type	Supercritical	

GVF Input Data

Worksheet for ONE2 EMERGENCY OVERFLOW

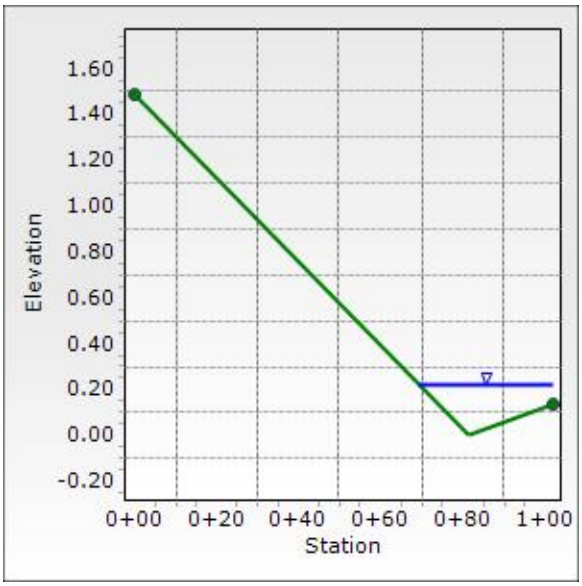
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.22 ft
Critical Depth	0.22 ft
Channel Slope	0.50 %
Critical Slope	0.48 %

Cross Section for ONE2 EMERGENCY OVERFLOW

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.50 %
Normal Depth	0.22 ft
Discharge	9.50 cfs



Worksheet for ONE4 EMERGENCY OVERFLOW

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.60 %
Discharge	5.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.05
0+16.80	0.25
0+67.40	0.00
0+86.20	1.20

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.05)	(0+86.20, 1.20)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.12 ft
Roughness Coefficient	0.013
Elevation	0.12 ft
Elevation Range	0.00 to 1.20 ft
Flow Area	1.5 ft²
Wetted Perimeter	25.77 ft
Hydraulic Radius	0.06 ft
Top Width	25.77 ft
Normal Depth	0.12 ft
Critical Depth	0.17 ft
Critical Slope	0.56 %
Velocity	3.28 ft/s
Velocity Head	0.17 ft
Specific Energy	0.29 ft
Froude Number	2.382
Flow Type	Supercritical

Worksheet for ONE4 EMERGENCY OVERFLOW

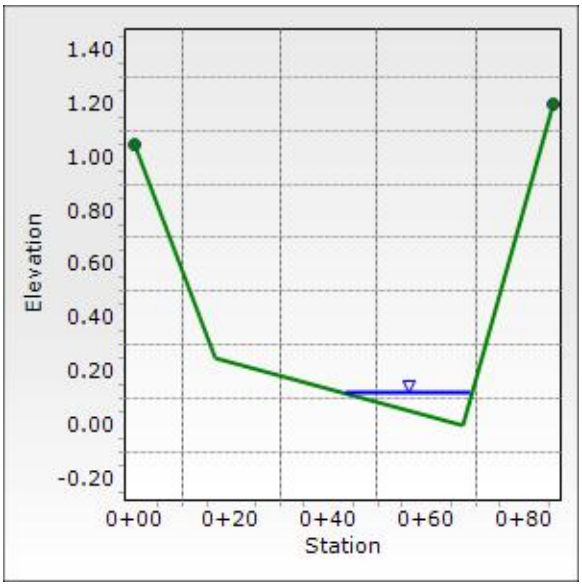
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.12 ft
Critical Depth	0.17 ft
Channel Slope	3.60 %
Critical Slope	0.56 %

Cross Section for ONE4 EMERGENCY OVERFLOW

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.60 %
Normal Depth	0.12 ft
Discharge	5.00 cfs



Grate Inlet Headwater Depth Calculation

2-ft by 2-ft Jensen Grate at ONE1 Low Point DI #1

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	2.0
L=	Length of Grate (ft)	2.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	8.0
Pc=	Perimeter (w/clogging) (ft)	4.0
Hw=	Headwater depth (ft)	0.20

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	4.0
Gf=	Grate Opening Factor	0.64
Ac=	Grate Open Area (w/ clogging) (ft^2)	1.3
Hw=	Headwater depth (ft)	0.02

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.20

Grate Inlet Headwater Depth Calculation

2-ft by 2-ft Jensen Grate at ONE1 Low Point DI #2

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	2.0
L=	Length of Grate (ft)	2.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	8.0
Pc=	Perimeter (w/clogging) (ft)	4.0
Hw=	Headwater depth (ft)	0.20

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	4.0
Gf=	Grate Opening Factor	0.64
Ac=	Grate Open Area (w/ clogging) (ft^2)	1.3
Hw=	Headwater depth (ft)	0.02

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.20

Type C Drop Inlet Sizing in Sump

DI#3

Known:

D_p=	Ponding Depth at Inlet	0.12	ft
W=	Gutter Width	1.5	ft
L_g=	Length of Grate	2.5	ft
L_c=	Length of Curb Opening	4.0	ft
H_c=	Curb Opening Height	0.5	ft
C_{wc}=	Weir coefficient for curb opening	2.3	
C_{wg}=	Weir coefficient for grate	3.0	
C_o=	Orifice coefficient	0.67	
R_o=	Grate opening factor	0.60	
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

P_g=	Active grate weir length (agwl) = 2*W+Lg	5.50	ft
P_{agl}	Adjusted agwl = 2*(1-Cfg/100)*W+Lg	4.00	ft
A_g=	Grate area = W*L_g	3.75	ft^2
A_{aga}=	Adjusted open grate area = Ag*Ro*(1-Cfg/100)	1.13	ft^2
	check - If Dp<1.792*Aaga/Pagl; weir; else orifice	weir	
Q_{ig}=	Flow intercepted by grate If "weir" controls Qig=Cwg*Pagl*$Dp^{1.5}$ If "orifice" controls Qig=Co*Aaga*$(64.4*Dp)^{0.5}$	0.5	cfs

Curb Opening Capacity Calculations

Pc =	Active curb opening weir length (acowl) = Lc+1.8*W	6.70	ft
Pacl =	Adjusted acowl = Lc+1.8*(1-Cfc/100)*W	5.35	ft
Ac=	curb opening area (coa) = Lc*Hc	2.00	ft^2
A_{aca}=	Adjusted coa = Ac*(1-Cfc/100)	1.00	ft^2
	check - If Dp<Hc; weir; else orifice	weir	
Qic=	Flow intercepted by curb opening If "weir" controls Qic=Cwc*Pacl*Dp1.5 If "orifice" controls Qic=Co*Aaca*(64.4*Dp-Hc/2)0.5	0.5	cfs

Total Inlet Calculations

Qti =	Total flow intercepted = Qig+Qic	1.0	cfs
q =	Interception per unit ratio = Q_{ti}/L_g	0.25	cfs/ft

Grate Inlet Headwater Depth Calculation

4.5-in by 163-ft Trench Drain at ONA Low Point

Known:

Q=	Flow (cfs)	2.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	163.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	326.8
Pc=	Perimeter (w/clogging) (ft)	163.4
Hw=	Headwater depth (ft)	0.03

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	61.1
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	7.6
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.03

Grate Inlet Headwater Depth Calculation

4.5-in by 329-ft Trench Drain at OND.2 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	329.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	658.8
Pc=	Perimeter (w/clogging) (ft)	329.4
Hw=	Headwater depth (ft)	0.01

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	123.4
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	15.4
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.01

Grate Inlet Headwater Depth Calculation

4.5-in by 166-ft Trench Drain at OND.2 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	166.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	332.8
Pc=	Perimeter (w/clogging) (ft)	166.4
Hw=	Headwater depth (ft)	0.02

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	62.3
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	7.8
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.02

Grate Inlet Headwater Depth Calculation

4.5-in by 85-ft Trench Drain at ONE.2 Low Point

Known:

Q=	Flow (cfs)	2.5
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	85.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	170.8
Pc=	Perimeter (w/clogging) (ft)	85.4
Hw=	Headwater depth (ft)	0.05

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	31.9
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	4.0
Hw=	Headwater depth (ft)	0.01

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.05

Grate Inlet Headwater Depth Calculation

4.5-in by 126-ft Trench Drain at ONE.3 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	126.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	252.8
Pc=	Perimeter (w/clogging) (ft)	126.4
Hw=	Headwater depth (ft)	0.02

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	47.3
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	5.9
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.02

Grate Inlet Headwater Depth Calculation

4.5-in by 109-ft Trench Drain at ONE.3 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	109.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	218.8
Pc=	Perimeter (w/clogging) (ft)	109.4
Hw=	Headwater depth (ft)	0.02

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	40.9
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	5.1
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.02

Grate Inlet Headwater Depth Calculation

4.5-in by 80-ft Trench Drain at 1/2ONE.4 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	80.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	160.8
Pc=	Perimeter (w/clogging) (ft)	80.4
Hw=	Headwater depth (ft)	0.03

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	30.0
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	3.8
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.03

Grate Inlet Headwater Depth Calculation

4.5-in by 44-ft Trench Drain at 1/2ONE.4 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	44.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	88.8
Pc=	Perimeter (w/clogging) (ft)	44.4
Hw=	Headwater depth (ft)	0.04

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	16.5
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	2.1
Hw=	Headwater depth (ft)	0.01

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.04

Grate Inlet Headwater Depth Calculation

4.5-in by 25-ft Trench Drain at 1/2ONE.4 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	25.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	50.8
Pc=	Perimeter (w/clogging) (ft)	25.4
Hw=	Headwater depth (ft)	0.06

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	9.4
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	1.2
Hw=	Headwater depth (ft)	0.03

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.06

Grate Inlet Headwater Depth Calculation

4.5-in by 245-ft Trench Drain at ONF.1 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	245.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	490.8
Pc=	Perimeter (w/clogging) (ft)	245.4
Hw=	Headwater depth (ft)	0.01

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	91.9
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	11.5
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.01

Grate Inlet Headwater Depth Calculation

4.5-in by 77-ft Trench Drain at ONF.1 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	77.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	154.8
Pc=	Perimeter (w/clogging) (ft)	77.4
Hw=	Headwater depth (ft)	0.03

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	28.9
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	3.6
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.03

Grate Inlet Headwater Depth Calculation

4.5-in by 152-ft Trench Drain at ONF.2 Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	152.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	304.8
Pc=	Perimeter (w/clogging) (ft)	152.4
Hw=	Headwater depth (ft)	0.02

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	57.0
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	7.1
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.02

Grate Inlet Headwater Depth Calculation

4.5-in by 417-ft Trench Drain at ONG Low Point

Known:

Q=	Flow (cfs)	4.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	417.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	834.8
Pc=	Perimeter (w/clogging) (ft)	417.4
Hw=	Headwater depth (ft)	0.02

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	156.4
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	19.5
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.02

Grate Inlet Headwater Depth Calculation

4.5-in by 190-ft Trench Drain at ONG Low Point

Known:

Q=	Flow (cfs)	4.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	190.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	380.8
Pc=	Perimeter (w/clogging) (ft)	190.4
Hw=	Headwater depth (ft)	0.04

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	71.3
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	8.9
Hw=	Headwater depth (ft)	0.01

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.04

Grate Inlet Headwater Depth Calculation

4.5-in by 102-ft Trench Drain at 1/4ONG Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	102.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	204.8
Pc=	Perimeter (w/clogging) (ft)	102.4
Hw=	Headwater depth (ft)	0.02

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	38.3
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	4.8
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.02

Grate Inlet Headwater Depth Calculation

4.5-in by 135-ft Trench Drain at ONG Low Point

Known:

Q=	Flow (cfs)	4.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	135.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	270.8
Pc=	Perimeter (w/clogging) (ft)	135.4
Hw=	Headwater depth (ft)	0.05

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	50.6
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	6.3
Hw=	Headwater depth (ft)	0.01

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.05

Grate Inlet Headwater Depth Calculation

4.5-in by 61-ft Trench Drain at 1/4ONG Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	61.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	122.8
Pc=	Perimeter (w/clogging) (ft)	61.4
Hw=	Headwater depth (ft)	0.03

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	22.9
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	2.9
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.03

Grate Inlet Headwater Depth Calculation

4.5-in by 334-ft Trench Drain at ONH Low Point

Known:

Q=	Flow (cfs)	1.0
W=	Width of Grate (ft)	0.375
L=	Length of Grate (ft)	334.0
D=	Diameter of Circle (in)	
Cf=	Clogging Factor (%)	50

Weir Conditions:

$Hw=(Q/(Cw*P))^{2/3}$

Cw=	Weir Coefficient	2.7
P=	Perimeter of grate (ft)	668.8
Pc=	Perimeter (w/clogging) (ft)	334.4
Hw=	Headwater depth (ft)	0.01

Orifice Conditions:

$Hw=(Q/(Co*Ac))^{2}/2*g$

Co=	Orifice Coefficient	0.67
Ag=	Grate Area (ft^2)	125.3
Gf=	Grate Opening Factor	0.25
Ac=	Grate Open Area (w/ clogging) (ft^2)	15.7
Hw=	Headwater depth (ft)	0.00

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth (ft) = 0.01

Rating Table for 6"

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.50	%
Normal Depth	0.50	ft
Diameter	6.0	in
Discharge	0.52	cfs

Channel Slope (%)	Normal Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	0.50	0.52	2.63	0.2	1.57	0.00
1.00	0.50	0.73	3.71	0.2	1.57	0.00
1.50	0.50	0.89	4.55	0.2	1.57	0.00
2.00	0.50	1.03	5.25	0.2	1.57	0.00
2.50	0.50	1.15	5.87	0.2	1.57	0.00
3.00	0.50	1.26	6.43	0.2	1.57	0.00
3.50	0.50	1.36	6.95	0.2	1.57	0.00
4.00	0.50	1.46	7.43	0.2	1.57	0.00

Rating Table for 8"

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.50	%
Normal Depth	0.67	ft
Diameter	8.0	in
Discharge	1.11	cfs

Channel Slope (%)	Normal Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	0.67	1.11	3.18	0.3	2.09	0.00
1.00	0.67	1.57	4.50	0.3	2.09	0.00
1.50	0.67	1.92	5.51	0.3	2.09	0.00
2.00	0.67	2.22	6.36	0.3	2.09	0.00
2.50	0.67	2.48	7.12	0.3	2.09	0.00
3.00	0.67	2.72	7.79	0.3	2.09	0.00
3.50	0.67	2.94	8.42	0.3	2.09	0.00
4.00	0.67	3.14	9.00	0.3	2.09	0.00
4.50	0.67	3.33	9.55	0.3	2.09	0.00
5.00	0.67	3.51	10.06	0.3	2.09	0.00
5.50	0.67	3.68	10.55	0.3	2.09	0.00
6.00	0.67	3.85	11.02	0.3	2.09	0.00

Rating Table for 10"

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.50	%
Normal Depth	0.83	ft
Diameter	10.0	in
Discharge	2.01	cfs

Channel Slope (%)	Normal Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	0.83	2.01	3.69	0.5	2.62	0.00
1.00	0.83	2.85	5.22	0.5	2.62	0.00
1.50	0.83	3.49	6.40	0.5	2.62	0.00
2.00	0.83	4.03	7.38	0.5	2.62	0.00
2.50	0.83	4.50	8.26	0.5	2.62	0.00
3.00	0.83	4.93	9.04	0.5	2.62	0.00
3.50	0.83	5.33	9.77	0.5	2.62	0.00
4.00	0.83	5.70	10.44	0.5	2.62	0.00
4.50	0.83	6.04	11.08	0.5	2.62	0.00
5.00	0.83	6.37	11.68	0.5	2.62	0.00
5.50	0.83	6.68	12.25	0.5	2.62	0.00
6.00	0.83	6.98	12.79	0.5	2.62	0.00

Rating Table for 12"

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.010	
Channel Slope	0.50	%
Normal Depth	1.00	ft
Diameter	12.0	in
Discharge	3.27	cfs

Channel Slope (%)	Normal Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	1.00	3.27	4.17	0.8	3.14	0.00
1.00	1.00	4.63	5.90	0.8	3.14	0.00
1.50	1.00	5.67	7.22	0.8	3.14	0.00
2.00	1.00	6.55	8.34	0.8	3.14	0.00
2.50	1.00	7.32	9.32	0.8	3.14	0.00
3.00	1.00	8.02	10.21	0.8	3.14	0.00
3.50	1.00	8.66	11.03	0.8	3.14	0.00
4.00	1.00	9.26	11.79	0.8	3.14	0.00
4.50	1.00	9.82	12.51	0.8	3.14	0.00
5.00	1.00	10.36	13.19	0.8	3.14	0.00
5.50	1.00	10.86	13.83	0.8	3.14	0.00
6.00	1.00	11.34	14.44	0.8	3.14	0.00

Rating Table for 18"

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.010
Channel Slope	0.50 %
Normal Depth	1.50 ft
Diameter	18.0 in
Discharge	9.66 cfs

Channel Slope (%)	Normal Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	1.50	9.66	5.46	1.8	4.71	0.00
1.00	1.50	13.65	7.73	1.8	4.71	0.00
1.50	1.50	16.72	9.46	1.8	4.71	0.00
2.00	1.50	19.31	10.93	1.8	4.71	0.00
2.50	1.50	21.59	12.22	1.8	4.71	0.00
3.00	1.50	23.65	13.38	1.8	4.71	0.00
3.50	1.50	25.55	14.46	1.8	4.71	0.00
4.00	1.50	27.31	15.45	1.8	4.71	0.00
4.50	1.50	28.97	16.39	1.8	4.71	0.00
5.00	1.50	30.53	17.28	1.8	4.71	0.00
5.50	1.50	32.02	18.12	1.8	4.71	0.00
6.00	1.50	33.45	18.93	1.8	4.71	0.00

HEC-RAS HEC-RAS 5.0.7 March 2019
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Sirius Avenue
Project File : SiriusAvenue.prj
Run Date and Time: 11/17/2022 10:15:24 AM

Project in English units

PLAN DATA

Plan Title: Proposed Conditions_District2_UP
Plan File : k:\LAV_Civil\092965012 - Area 15 District 2 (Fisher Brothers)\Reports\DRAINAGE\01_TDS\Calculations\Hydraulics\HECRAS\SiriusAvenue.p02

Geometry Title: Proposed Conditions Geom_District2
Geometry File : k:\LAV_Civil\092965012 - Area 15 District 2 (Fisher Brothers)\Reports\DRAINAGE\01_TDS\Calculations\Hydraulics\HECRAS\SiriusAvenue.g01

Flow Title : Sirius_EventLots
Flow File : k:\LAV_Civil\092965012 - Area 15 District 2 (Fisher Brothers)\Reports\DRAINAGE\01_TDS\Calculations\Hydraulics\HECRAS\SiriusAvenue.f02

Plan Summary Information:
Number of: Cross Sections = 6 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 1

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed at all cross sections
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Program Selects Appropriate method
Computational Flow Regime: Supercritical Flow

FLOW DATA

Flow Title: Sirius_EventLots
Flow File : k:\LAV_Civil\092965012 - Area 15 District 2 (Fisher Brothers)\Reports\DRAINAGE\01_TDS\Calculations\Hydraulics\HECRAS\SiriusAvenue.f02

Flow Data (cfs)

River	Reach	RS	100-yr
SIRIUS AVE	SIRIUS	1916	1158
SIRIUS AVE	SIRIUS	1215	1158
SIRIUS AVE	SIRIUS	1036	1158

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
SIRIUS AVE	SIRIUS	100-yr	Critical	Critical

GEOMETRY DATA

Geometry Title: Proposed Conditions Geom_District2
Geometry File : k:\LAV_Civil\092965012 - Area 15 District 2 (Fisher Brothers)\Reports\DRAINAGE\01_TDS\Calculations\Hydraulics\HECRAS\SiriusAvenue.g01

CROSS SECTION

RIVER: SIRIUS AVE
REACH: SIRIUS RS: 1916

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2124	45.66	2124	47.74	2123.09	50.09	2122	52.26	2121.54
58.04	2121.25	58.1	2120.75	59.6	2120.86	82.6	2121	105.6	2120.81
107.1	2120.7	107.1	2121.2	112.1	2121.2	115.24	2121.48	115.44	2121.47
116.39	2121.5	117.08	2121.52	124.01	2121.77	127.89	2121.9	128.11	2121.92
128.26	2121.93	216.93	2122	219.4	2121.94	219.67	2121.94	226.29	2121.76
229.79	2121.74	234.52	2121.87	234.72	2121.86	236.6	2121.87	236.67	2121.87
240.82	2122	339.66	2122.04	339.8	2122.02	339.82	2122.02	343.87	2122.35
344.04	2122.35	348.23	2122.68	350.49	2122.83	357.66	2122.9	363.61	2123.1
364.9	2123.14	365.91	2123.19						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	58.04	.013	59.6	.016	105.6	.013	112.1	.025
339.82	.016								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	365.91	166.86	166.86	.1	.3

CROSS SECTION

RIVER: SIRIUS AVE
REACH: SIRIUS RS: 1750

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2120.4	0	2118	53	2117	53	2116.5	54.5	2116.61
77.5	2117.2	90.5	2116.66	92	2116.55	92	2117.05	97	2117.58
97	2120	97.5	2120	97.5	2117.58	100.5	2117.6		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	53	.013	54.5	.016	90.5	.013	97.5	.02

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           53      92           216.84  216.84  216.84             .1       .3
Right Levee     Station=      97      Elevation=    2120

CROSS SECTION


RIVER: SIRIUS AVE
REACH: SIRIUS             RS: 1533

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2114.3       0    2112      17  2111.7      34    2112      59  2113.2
      59    2116      59  2120.5    59.5  2120.5    59.5    2116    59.5  2113.2
    65.5  2112.5    65.5    2112      67 2112.11      90 2112.67     113 2112.11
     118 2112.58     118 2113.08     124    2113     150    2114

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      59     .02    59.5    .016    65.5    .013      67    .016
     113    .013     124     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          65.5     118           318.07  318.07  318.07             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     124     150 2115.42        F
Left Levee      Station=    59.5      Elevation=    2116

LATERAL STRUCTURE


RIVER: SIRIUS AVE
REACH: SIRIUS             RS: 1245

INPUT
Description:
Lateral structure position     = Left overbank
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       3
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =        3
     Sta    Elev     Sta    Elev     Sta    Elev
       0  2109.8      30  2110.3      60  2109.9

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: SIRIUS AVE
REACH: SIRIUS             RS: 1215

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2110.3      93    2110     119  2109.5     123 2109.25     127  2109.5
     150    2110     173  2109.8   174.5 2109.69   174.5 2110.11   179.5 2110.19
   184.5 2110.26   184.5 2112.68     185 2112.68     185 2110.26     203    2111

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016     119    .013     127    .016     173    .013   179.5     .02
   184.5    .015
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           119   174.5               45      45      45             .1       .3
Right Levee     Station=   184.5      Elevation= 2112.68

CROSS SECTION


RIVER: SIRIUS AVE
REACH: SIRIUS             RS: 1170

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   66.31    211185.95999 2109.5385.95999 2111.9587.10001 2111.9587.10001 2109.53
    98.5 2109.43    98.5 2108.93  107.61 2109.03  164.52 2109.03   225.3 2109.06
  229.26 2108.95  229.26 2109.45     257 2109.55  284.54  2109.8  284.54 2111.75

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
   66.31    .016     257    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          98.5  229.26              134     134     134             .1       .3
Left Levee      Station=87.10001      Elevation= 2111.95

CROSS SECTION


RIVER: SIRIUS AVE
REACH: SIRIUS             RS: 1036

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   226.7 2111.22   227.4 2111.22   227.4  2110.3   227.4  2108.8   232.4 2108.72
   232.4 2108.22   233.9 2108.33   256.9  2108.3   279.9  2108.3   283.9  2108.2
   283.9  2108.7   288.9  2108.8   288.9 2111.22   289.4 2111.22   289.4  2108.8
   295.4    2109

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
   226.7    .013   227.4    .016   233.9    .016   279.9    .013   283.9    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         232.4   283.9               0       0       0             .1       .3
Right Levee     Station=   288.9      Elevation= 2111.22



SUMMARY OF MANNING'S N VALUES

River:SIRIUS AVE

      Reach          River Sta.       n1        n2        n3        n4        n5        n6        n7

 SIRIUS               1916              .016      .013      .016      .013      .025      .016
 SIRIUS               1750              .016      .013      .016      .013       .02
 SIRIUS               1533              .016       .02      .016      .013      .016      .013       .02
 SIRIUS               1245         Lat Struct
 SIRIUS               1215              .016      .013      .016      .013       .02      .015
 SIRIUS               1170              .016      .013
 SIRIUS               1036              .013      .016      .016      .013      .016
```

SUMMARY OF REACH LENGTHS

River: SIRIUS AVE

Reach	River Sta.	Left	Channel	Right
SIRIUS	1916	166.86	166.86	166.86
SIRIUS	1750	216.84	216.84	216.84
SIRIUS	1533	318.07	318.07	318.07
SIRIUS	1245	Lat Struct		
SIRIUS	1215	45	45	45
SIRIUS	1170	134	134	134
SIRIUS	1036	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: SIRIUS AVE

Reach	River Sta.	Contr.	Expan.
SIRIUS	1916	.1	.3
SIRIUS	1750	.1	.3
SIRIUS	1533	.1	.3
SIRIUS	1245	Lat Struct	
SIRIUS	1215	.1	.3
SIRIUS	1170	.1	.3
SIRIUS	1036	.1	.3

HEC-RAS Plan: PROP2UP River: SIRIUS AVE Reach: SIRIUS Profile: 100-yr

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)	
SIRIUS	1916	100-yr	1158.00	2120.70	2122.55	2122.55	2122.93	0.008145	4.96	233.59	297.67	0.99
SIRIUS	1750	100-yr	1158.00	2116.50	2118.23	2118.93	2120.74	0.015487	14.09	95.80	97.00	2.14
SIRIUS	1533	100-yr	1158.00	2112.00	2113.71	2114.66	2117.09	0.017377	15.05	79.46	83.06	2.29
SIRIUS	1245		Lat Struct									
SIRIUS	1215	100-yr	1095.50	2109.25	2110.68	2111.04	2111.89	0.011742	10.27	129.87	184.50	1.88
SIRIUS	1170	100-yr	1081.44	2108.93	2109.81	2110.22	2111.24	0.016094	9.89	117.19	197.44	1.98
SIRIUS	1036	100-yr	1081.44	2108.20	2110.52	2110.52	2111.60	0.002889	8.52	132.14	61.50	1.01

Plan: PROP2UP SIRIUS AVE SIRIUS RS: 1916 Profile: 100-yr

E.G. Elev (ft)	2122.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.023	
W.S. Elev (ft)	2122.55	Reach Len. (ft)	166.86	166.86	166.86
Crit W.S. (ft)	2122.55	Flow Area (sq ft)		233.59	
E.G. Slope (ft/ft)	0.008145	Area (sq ft)		233.59	
Q Total (cfs)	1158.00	Flow (cfs)		1158.00	
Top Width (ft)	297.67	Top Width (ft)		297.67	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	1.85	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	12831.4	Conv. (cfs)		12831.4	
Length Wtd. (ft)	166.86	Wetted Per. (ft)		298.85	
Min Ch El (ft)	2120.70	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		1.97	
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)	0.53	1.71	0.14
C & E Loss (ft)	0.21	Cum SA (acres)	0.80	1.64	0.34

Plan: PROP2UP SIRIUS AVE SIRIUS RS: 1750 Profile: 100-yr

E.G. Elev (ft)	2120.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.51	Wt. n-Val.	0.016	0.016	0.013
W.S. Elev (ft)	2118.23	Reach Len. (ft)	216.84	216.84	216.84
Crit W.S. (ft)	2118.93	Flow Area (sq ft)	38.81	52.41	4.59
E.G. Slope (ft/ft)	0.015487	Area (sq ft)	38.81	52.41	4.59
Q Total (cfs)	1158.00	Flow (cfs)	363.23	738.22	56.55
Top Width (ft)	97.00	Top Width (ft)	53.00	39.00	5.00
Vel Total (ft/s)	12.09	Avg. Vel. (ft/s)	9.36	14.09	12.33
Max Chl Dpth (ft)	1.73	Hydr. Depth (ft)	0.73	1.34	0.92
Conv. Total (cfs)	9305.1	Conv. (cfs)	2918.7	5932.0	454.4
Length Wtd. (ft)	216.84	Wetted Per. (ft)	53.24	40.03	5.68
Min Ch El (ft)	2116.50	Shear (lb/sq ft)	0.70	1.27	0.78
Alpha	1.10	Stream Power (lb/ft s)	6.60	17.83	9.63
Frctn Loss (ft)	3.56	Cum Volume (acre-ft)	0.46	1.16	0.14
C & E Loss (ft)	0.09	Cum SA (acres)	0.70	1.00	0.33

Plan: PROP2UP SIRIUS AVE SIRIUS RS: 1533 Profile: 100-yr

E.G. Elev (ft)	2117.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.38	Wt. n-Val.	0.016	0.016	0.013
W.S. Elev (ft)	2113.71	Reach Len. (ft)	318.07	318.07	318.07
Crit W.S. (ft)	2114.66	Flow Area (sq ft)	5.18	70.23	4.04
E.G. Slope (ft/ft)	0.017377	Area (sq ft)	5.18	70.23	10.67
Q Total (cfs)	1158.00	Flow (cfs)	54.26	1056.92	46.82
Top Width (ft)	83.06	Top Width (ft)	6.00	52.50	24.56
Vel Total (ft/s)	14.57	Avg. Vel. (ft/s)	10.47	15.05	11.58
Max Chl Dpth (ft)	2.01	Hydr. Depth (ft)	0.86	1.34	0.67
Conv. Total (cfs)	8784.7	Conv. (cfs)	411.7	8017.8	355.2
Length Wtd. (ft)	318.07	Wetted Per. (ft)	6.55	53.54	6.00
Min Ch El (ft)	2112.00	Shear (lb/sq ft)	0.86	1.42	0.73
Alpha	1.02	Stream Power (lb/ft s)	8.98	21.42	8.46
Frctn Loss (ft)	4.54	Cum Volume (acre-ft)	0.35	0.85	0.10
C & E Loss (ft)	0.65	Cum SA (acres)	0.55	0.77	0.25

Plan: PROP2UP SIRIUS AVE SIRIUS RS: 1215 Profile: 100-yr

E.G. Elev (ft)	2111.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.	0.016	0.015	0.015
W.S. Elev (ft)	2110.68	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2111.04	Flow Area (sq ft)	73.66	51.26	4.94
E.G. Slope (ft/ft)	0.011742	Area (sq ft)	73.66	51.26	4.94
Q Total (cfs)	1095.50	Flow (cfs)	537.27	526.30	31.93
Top Width (ft)	184.50	Top Width (ft)	119.00	55.50	10.00
Vel Total (ft/s)	8.44	Avg. Vel. (ft/s)	7.29	10.27	6.46
Max Chl Dpth (ft)	1.43	Hydr. Depth (ft)	0.62	0.92	0.49
Conv. Total (cfs)	10109.7	Conv. (cfs)	4958.2	4856.9	294.7
Length Wtd. (ft)	45.00	Wetted Per. (ft)	119.39	55.95	10.42
Min Ch El (ft)	2109.25	Shear (lb/sq ft)	0.45	0.67	0.35
Alpha	1.10	Stream Power (lb/ft s)	3.30	6.90	2.25
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.06	0.41	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	0.38	0.13

Plan: PROP2UP SIRIUS AVE SIRIUS RS: 1170 Profile: 100-yr

E.G. Elev (ft)	2111.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.	0.016	0.016	0.015
W.S. Elev (ft)	2109.81	Reach Len. (ft)	134.00	134.00	134.00
Crit W.S. (ft)	2110.22	Flow Area (sq ft)	3.73	101.29	12.17
E.G. Slope (ft/ft)	0.016094	Area (sq ft)	3.73	101.29	12.17
Q Total (cfs)	1081.44	Flow (cfs)	20.56	1001.41	59.47
Top Width (ft)	197.44	Top Width (ft)	11.40	130.76	55.28
Vel Total (ft/s)	9.23	Avg. Vel. (ft/s)	5.51	9.89	4.89
Max Chl Dpth (ft)	0.88	Hydr. Depth (ft)	0.33	0.77	0.22
Conv. Total (cfs)	8524.5	Conv. (cfs)	162.0	7893.6	468.8
Length Wtd. (ft)	134.00	Wetted Per. (ft)	11.68	131.76	55.29
Min Ch El (ft)	2108.93	Shear (lb/sq ft)	0.32	0.77	0.22
Alpha	1.09	Stream Power (lb/ft s)	1.77	7.64	1.08
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.02	0.33	0.03
C & E Loss (ft)	0.11	Cum SA (acres)	0.03	0.28	0.09

Plan: PROP2UP SIRIUS AVE SIRIUS RS: 1036 Profile: 100-yr

E.G. Elev (ft)	2111.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.	0.016	0.016	0.016
W.S. Elev (ft)	2110.52	Reach Len. (ft)			
Crit W.S. (ft)	2110.52	Flow Area (sq ft)	8.82	114.45	8.87
E.G. Slope (ft/ft)	0.002889	Area (sq ft)	8.82	114.45	8.87
Q Total (cfs)	1081.44	Flow (cfs)	52.77	975.40	53.27
Top Width (ft)	61.50	Top Width (ft)	5.00	51.50	5.00
Vel Total (ft/s)	8.18	Avg. Vel. (ft/s)	5.98	8.52	6.00
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)	1.76	2.22	1.77
Conv. Total (cfs)	20119.8	Conv. (cfs)	981.8	18146.9	991.1
Length Wtd. (ft)		Wetted Per. (ft)	6.73	52.51	6.73
Min Ch El (ft)	2108.20	Shear (lb/sq ft)	0.24	0.39	0.24
Alpha	1.03	Stream Power (lb/ft s)	1.42	3.35	1.43
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Sirius Avenue

Flow: Sirius_EventLots

SIRIUS AVE SIRIUS

Legend

EG 100-yr

WS 100-yr

Crit 100-yr

Lat Struct

Ground

Left Levee

Right Levee

Elevation (ft)

2124

2122

2120

2118

2116

2114

2112

2110

2108

0

200

400

600

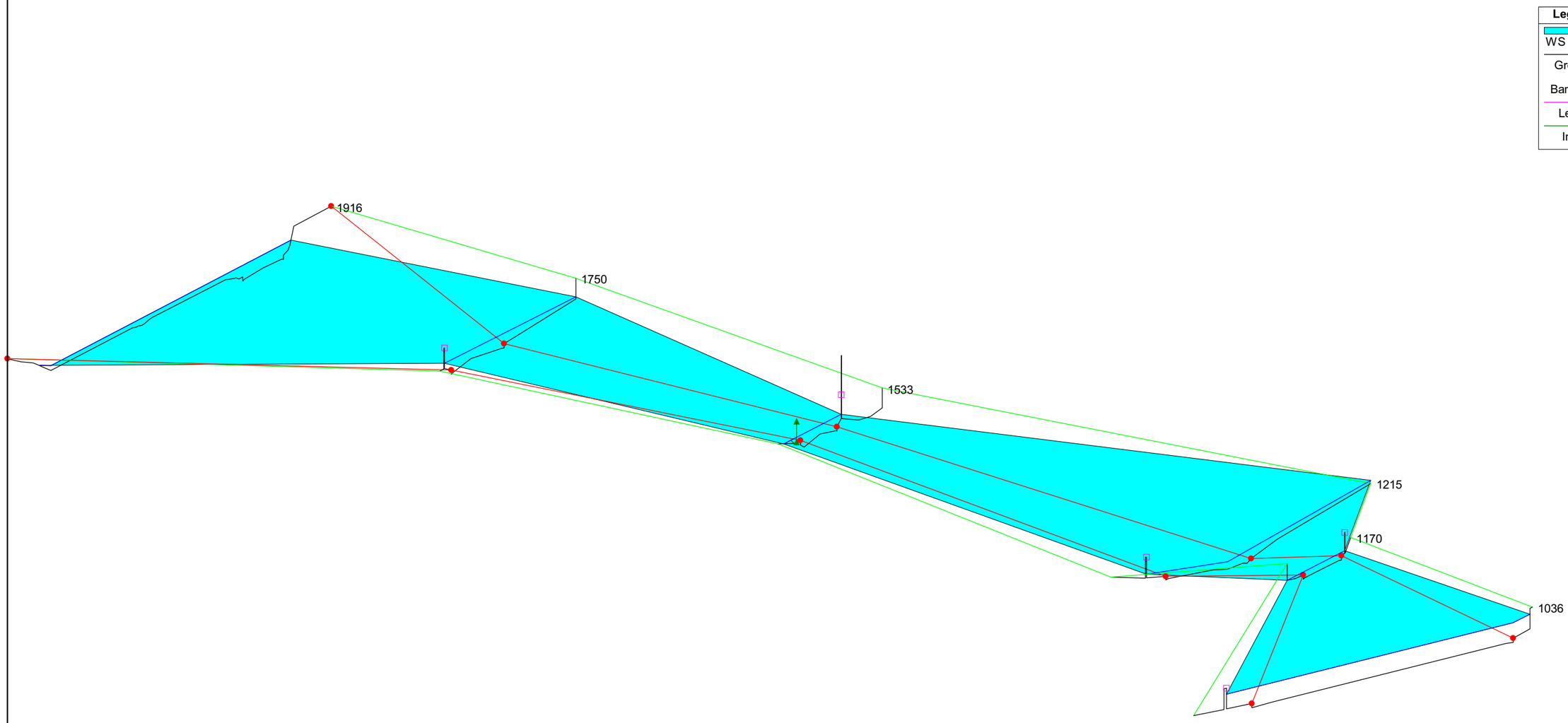
800

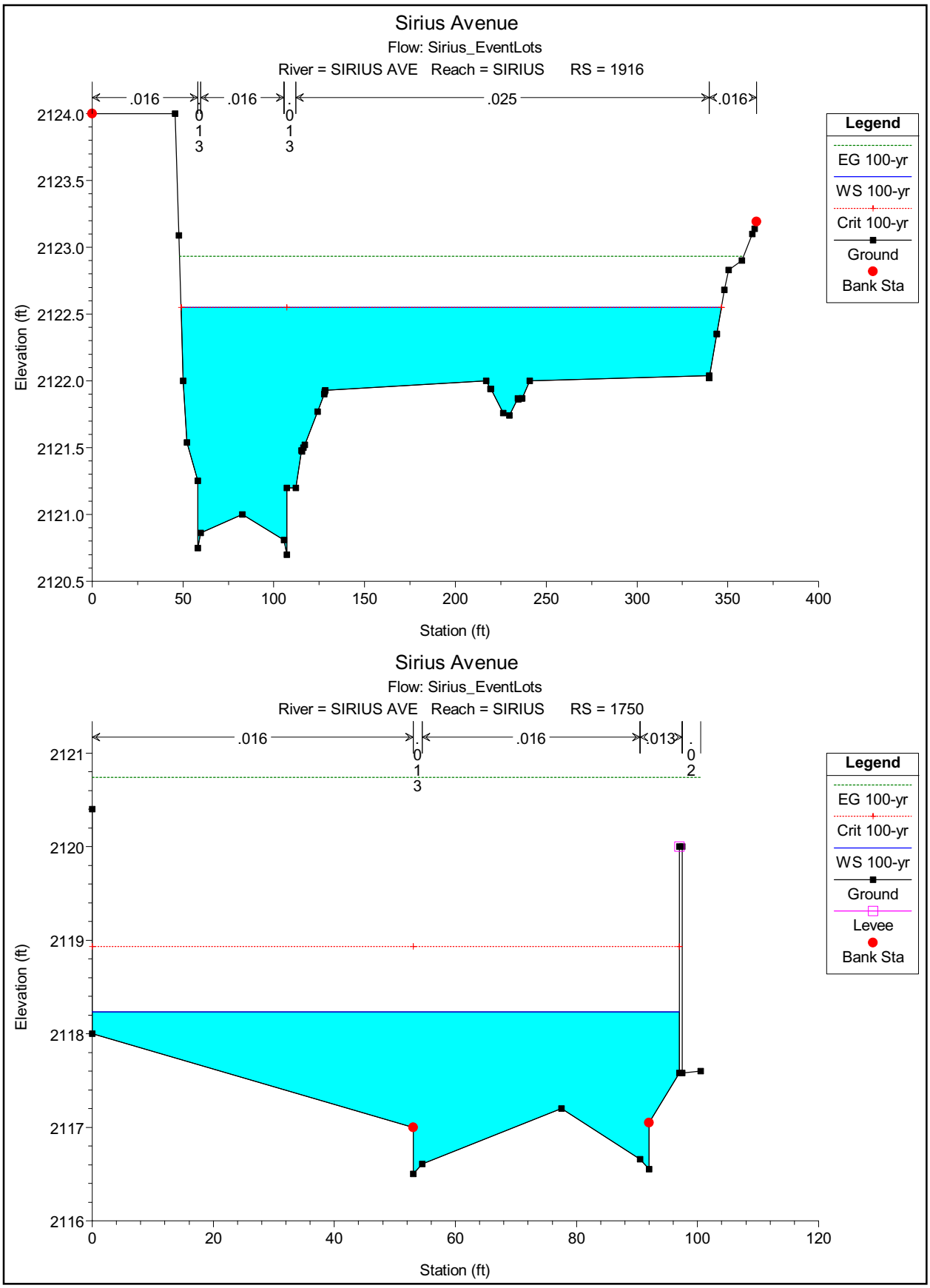
1000

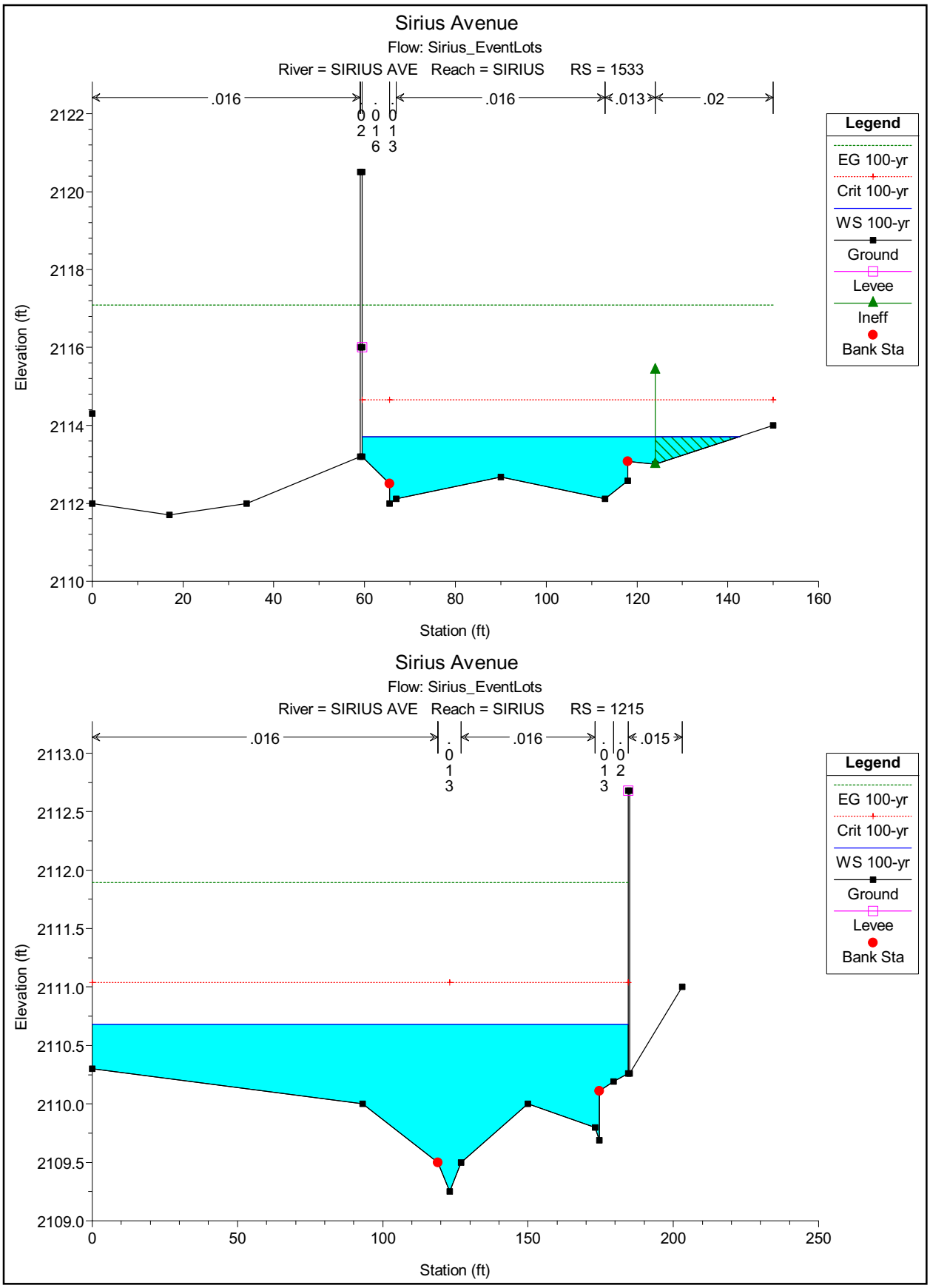
Main Channel Distance (ft)

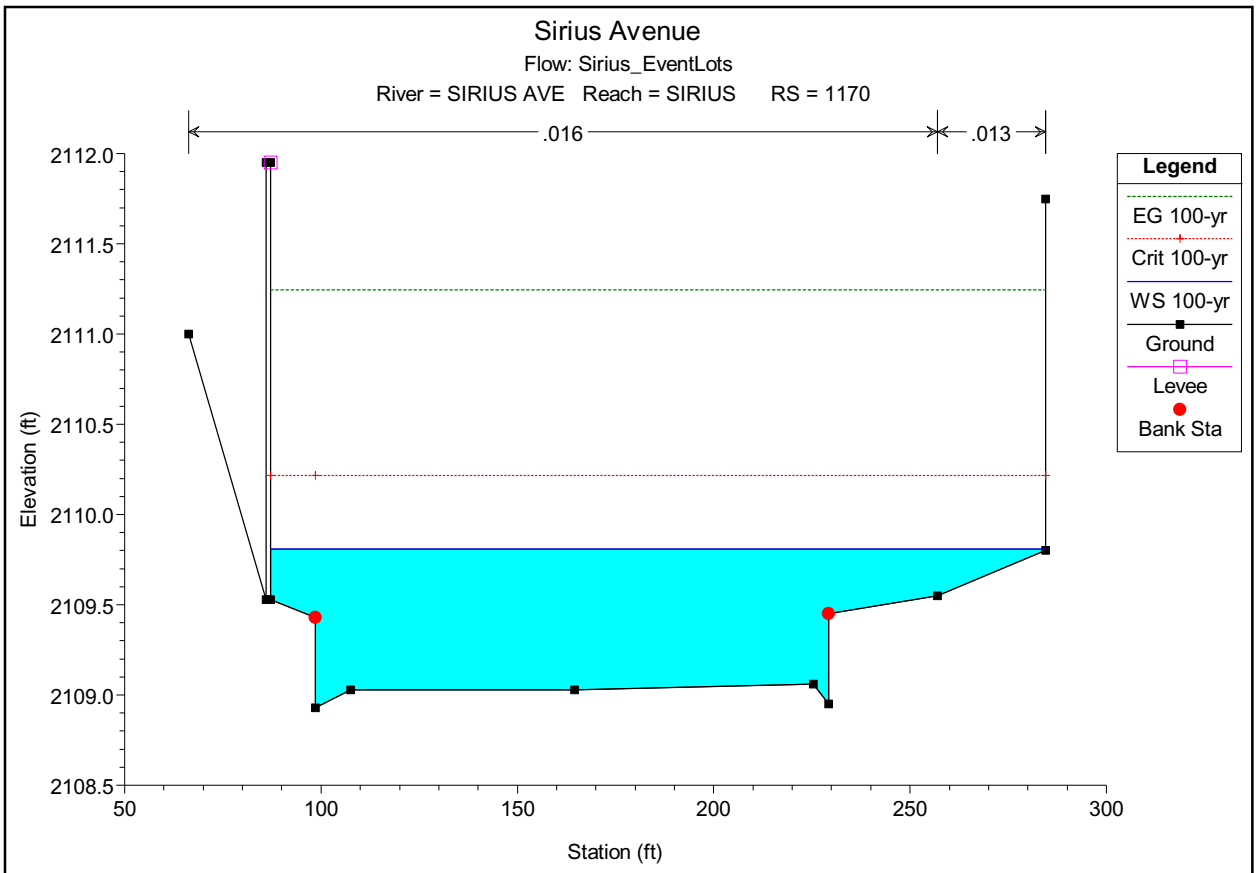
Sirius Avenue

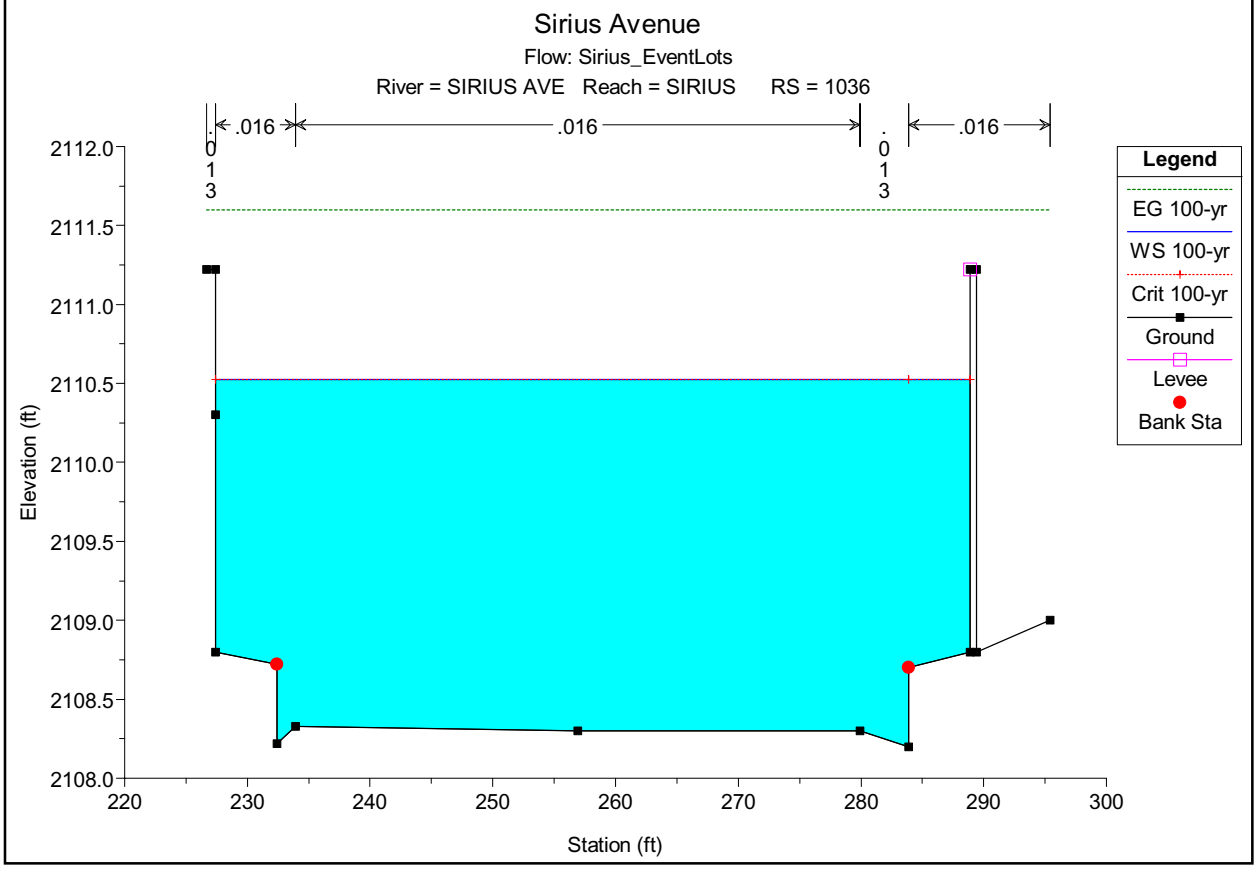
Flow: Sirius_EventLots




Sirius Avenue
Flow: Sirius_EventLots
River = SIRIUS AVE Reach = SIRIUS RS = 1916
.016
.016
.025
.016
0
1
3
0
1
3
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
Elevation (ft)
2124.0
2123.5
2123.0
2122.5
2122.0
2121.5
2121.0
2120.5
0
50
100
150
200
250
300
350
400
Station (ft)
Sirius Avenue
Flow: Sirius_EventLots
River = SIRIUS AVE Reach = SIRIUS RS = 1750
.016
.016
.013
0
1
3
0
2
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Levee
Bank Sta
Elevation (ft)
2121
2120
2119
2118
2117
2116
0
20
40
60
80
100
120
Station (ft)


Sirius Avenue
Flow: Sirius_EventLots
River = SIRIUS AVE Reach = SIRIUS RS = 1533
.016
.021
.016
.013
.016
.02
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sirius Avenue
Flow: Sirius_EventLots
River = SIRIUS AVE Reach = SIRIUS RS = 1215
.016
.013
.016
.013
.015
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Sirius Avenue
Flow: Sirius_EventLots
River = SIRIUS AVE Reach = SIRIUS RS = 1170
.016
.013
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
2112.0
2111.5
2111.0
2110.5
2110.0
2109.5
2109.0
2108.5
50
100
150
200
250
300


Sirius Avenue
Flow: Sirius_EventLots
River = SIRIUS AVE Reach = SIRIUS RS = 1036
.013
.016
.016
.013
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
2112.0
2111.5
2111.0
2110.5
2110.0
2109.5
2109.0
2108.5
2108.0
220
230
240
250
260
270
280
290
300

HEC-RAS Plan: PROP2UP River: SIRIUS AVE Reach: SIRIUS Profile: 100-yr

Reach	River Sta	Profile	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
			(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
SIRIUS	1245	100-yr	1158.00	77.77	1081.44	77.77		60.00	1.17	0.53	2109.80	2112.39	2110.97	2111.46	2110.10