

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
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- 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
Solve For	Formula
	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

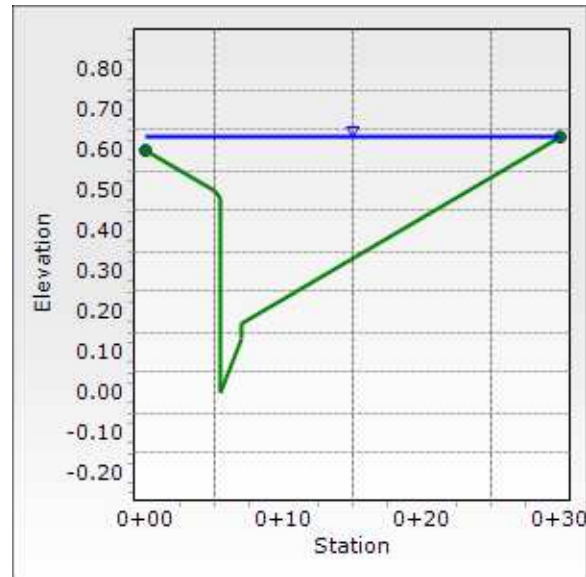
Normal Depth	0.63 ft
Roughness Coefficient	0.016
Elevation	0.63 ft
Elevation Range	0.00 to 0.63 ft
Flow Area	6.6 ft ²
Wetted Perimeter	30.52 ft
Hydraulic Radius	0.22 ft
Top Width	29.96 ft
Normal Depth	0.63 ft
Critical Depth	0.67 ft
Critical Slope	0.60 %
Velocity	3.34 ft/s

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 ft ²
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

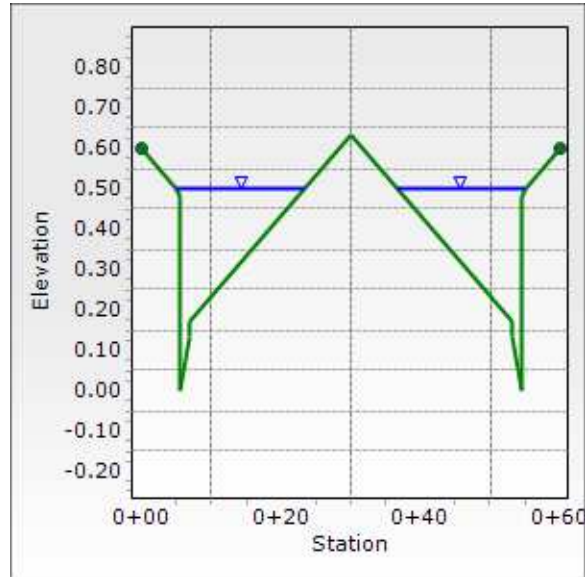
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

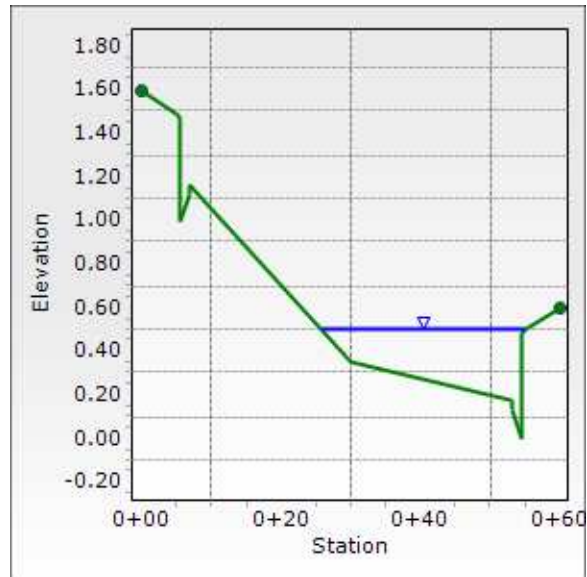
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

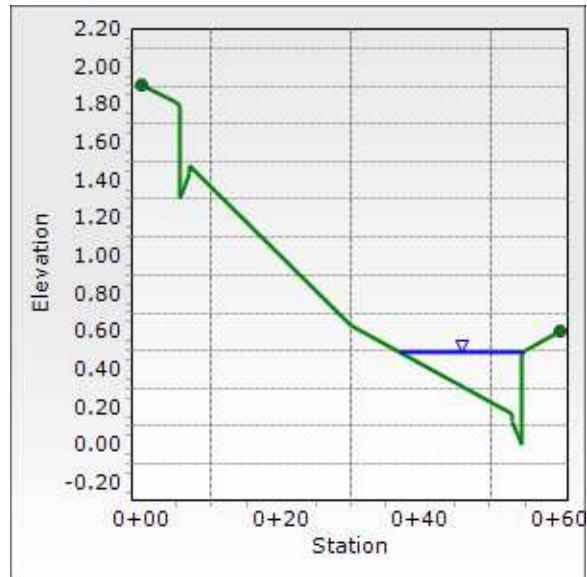
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

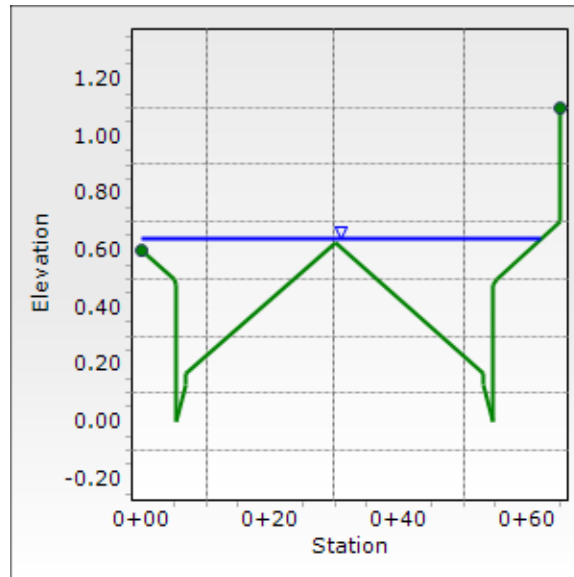
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

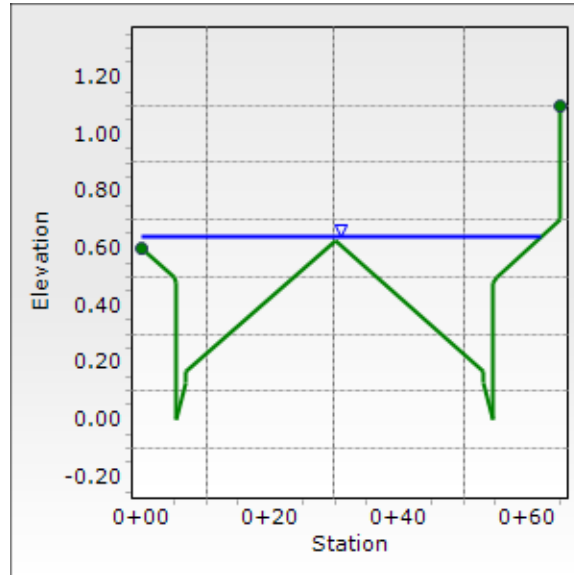
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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
Solve For	Formula
	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 ft ²
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

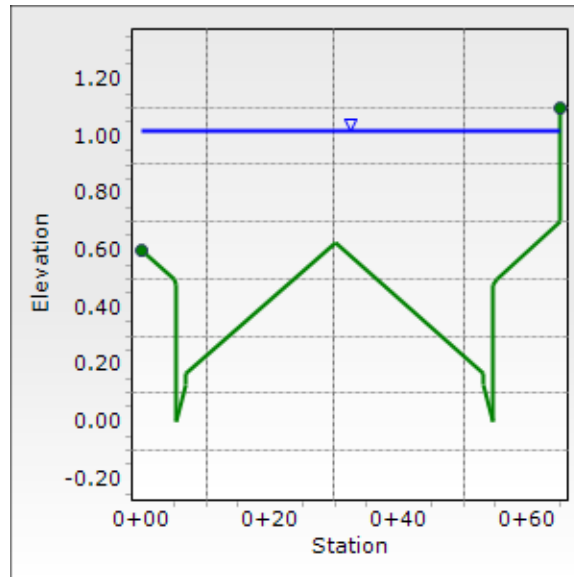
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

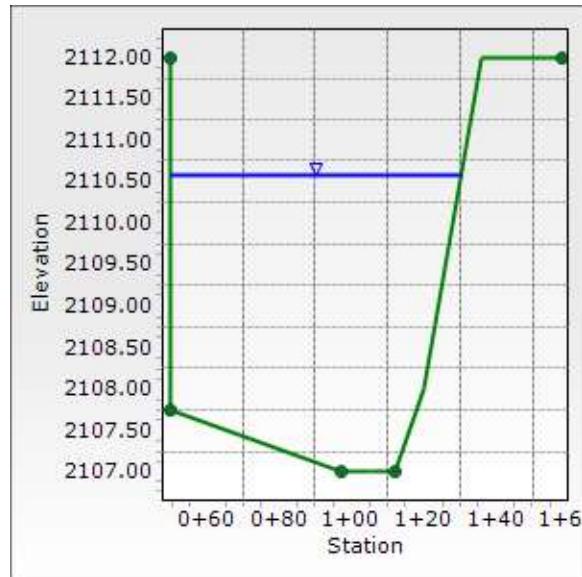
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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
Solve For	Formula
	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 ft ²

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 %

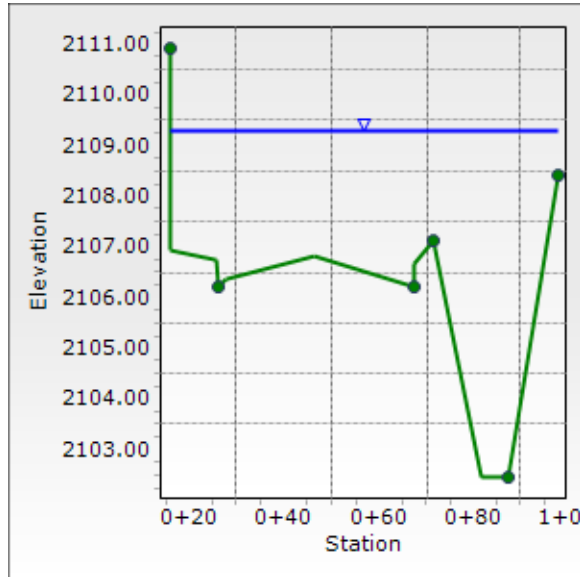
Worksheet for ST1.5

Messages:

Water Surface Elevation exceeds lowest end station by 0.867679278157539ft.

Cross Section for ST1.5

Project Description	
Friction Method	Manning
Solve For	Formula
	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 ft ²
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

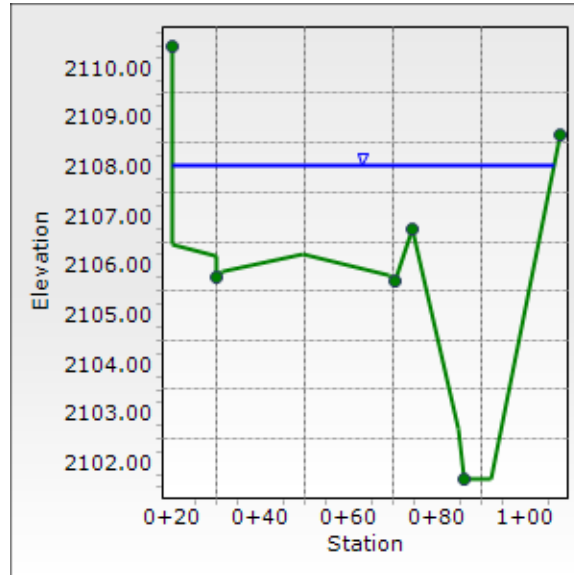
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

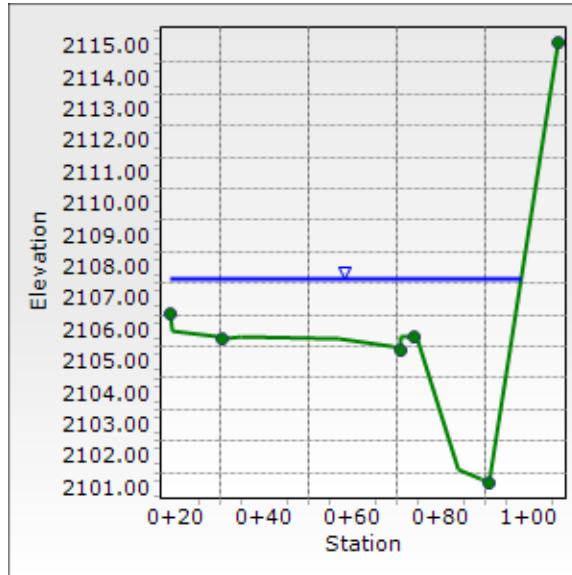
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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
Solve For	Formula
	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
Solve For	Formula
	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 ft ²
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 %

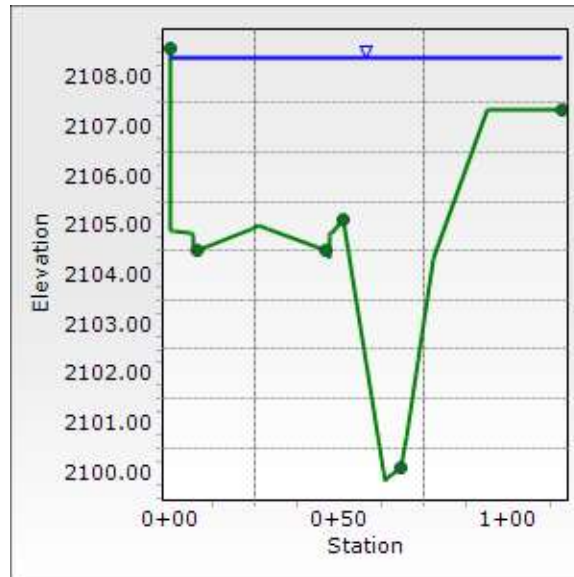
Worksheet for RD - Rancho 100-Yr

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 ft ²
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

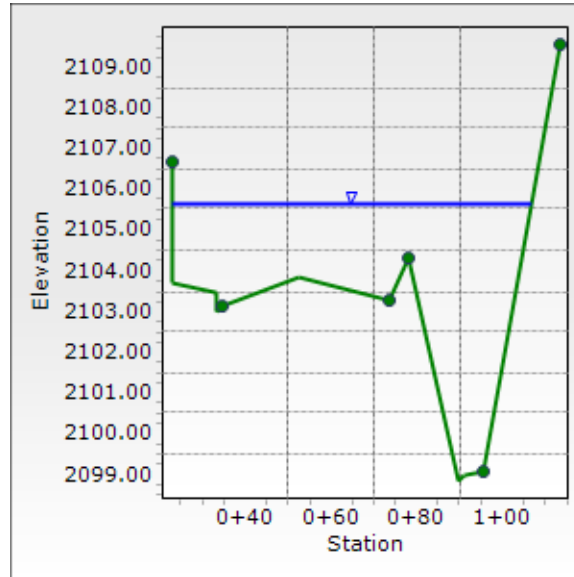
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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 %

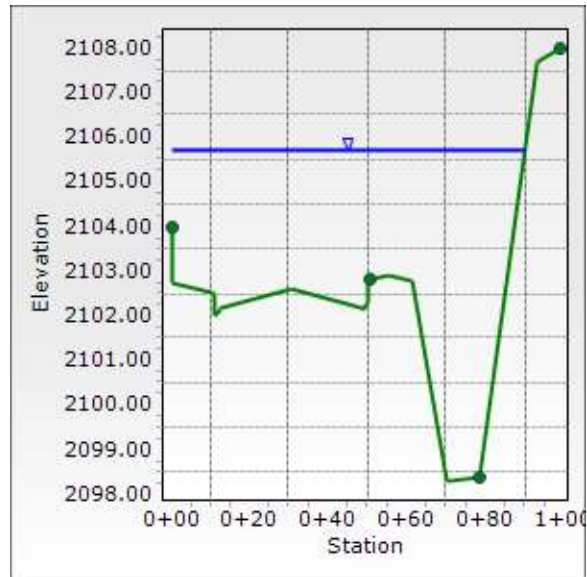
Worksheet for RD-1 - Rancho 100-Yr

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 ft ²
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 %

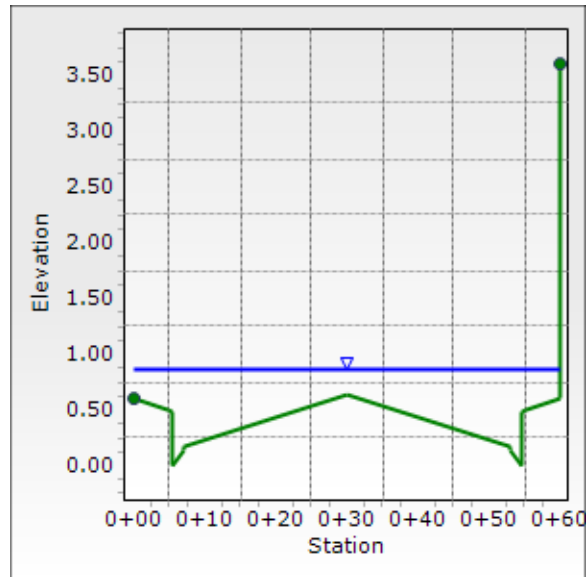
Worksheet for RA - Rigel 100-Yr

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 ft ²
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

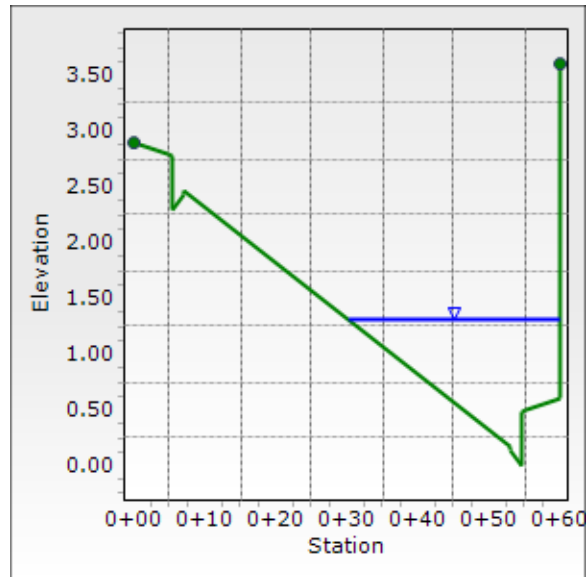
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

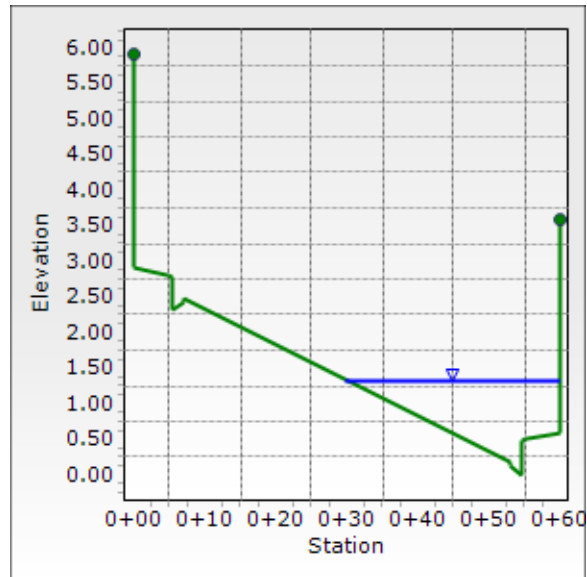
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

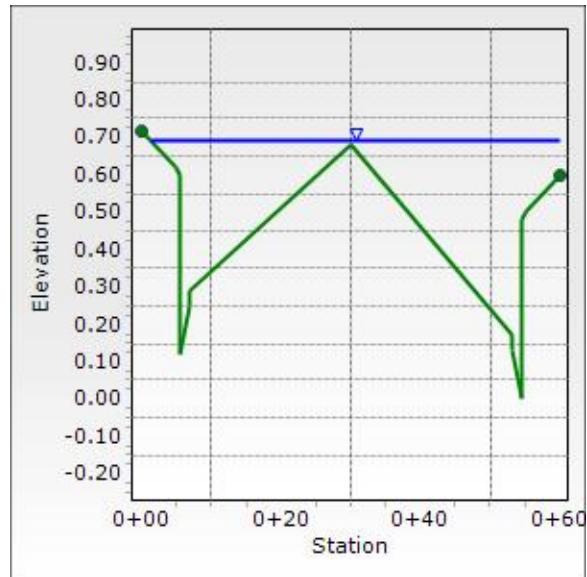
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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 %

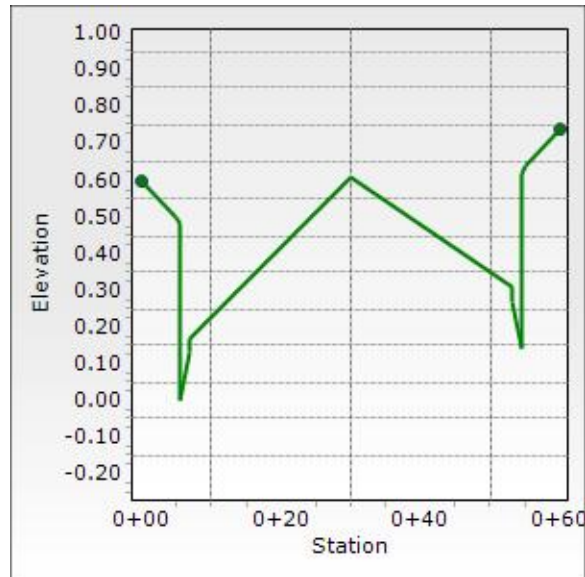
Worksheet for MA-2A Meade 100-Yr - 0.30%

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 ft ²
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

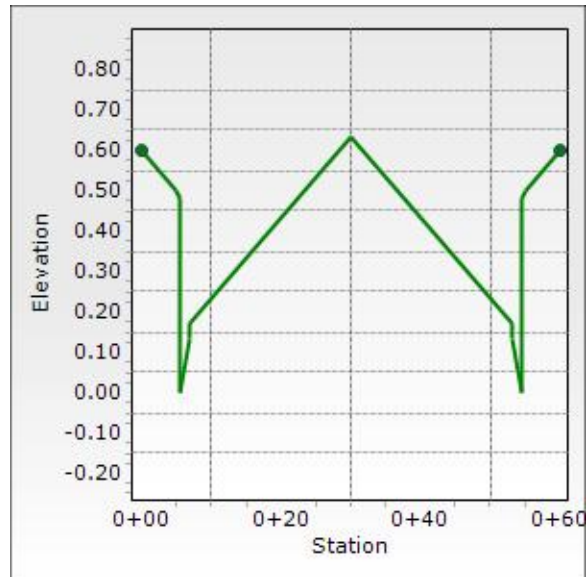
GVF Output Data

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 ft ²
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

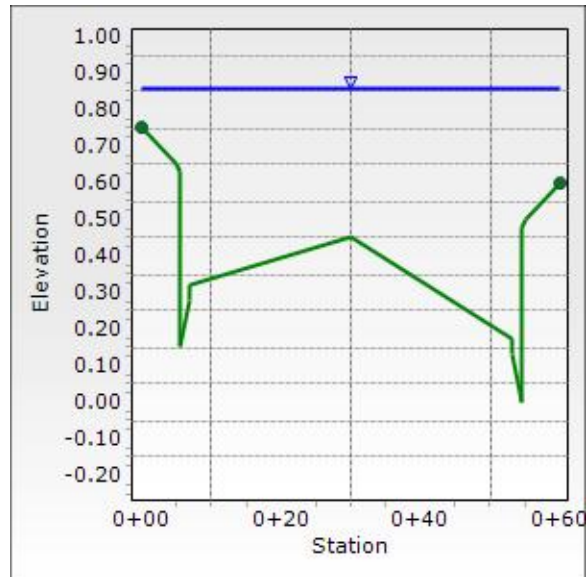
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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

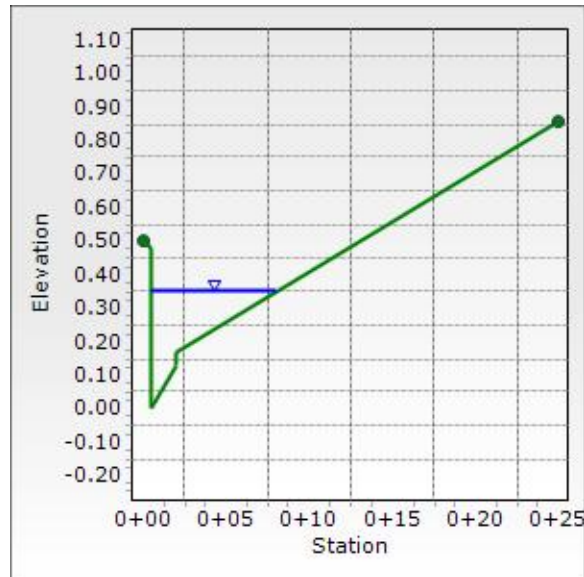
Normal Depth	0.35 ft
Roughness Coefficient	0.013
Elevation	0.35 ft
Elevation Range	0.00 to 0.86 ft
Flow Area	1.0 ft ²
Wetted Perimeter	7.90 ft
Hydraulic Radius	0.12 ft
Top Width	7.50 ft
Normal Depth	0.35 ft
Critical Depth	0.35 ft
Critical Slope	0.52 %
Velocity	2.07 ft/s
Velocity Head	0.07 ft
Specific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

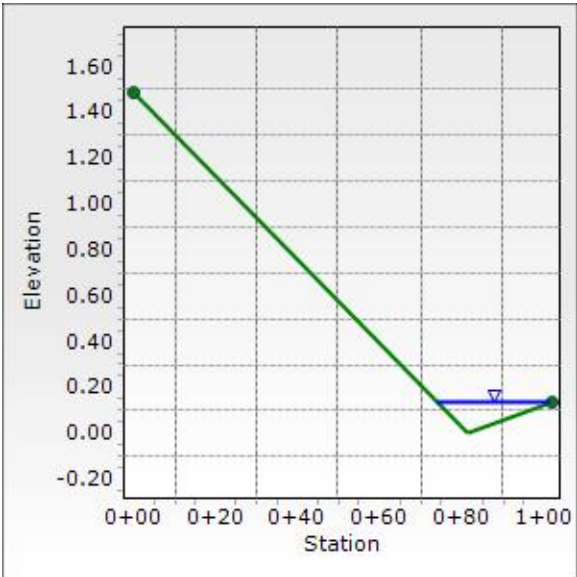
GVF Input Data

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

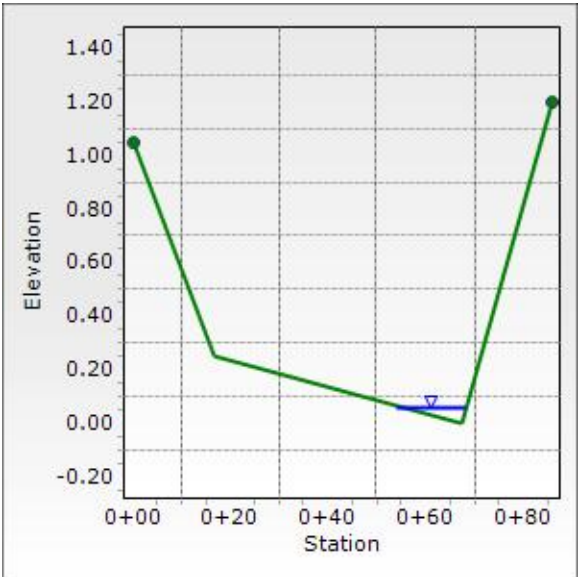
Results	
Normal Depth	0.06 ft
Roughness Coefficient	0.013
Elevation	0.06 ft
Elevation Range	0.00 to 1.20 ft
Flow Area	0.5 ft ²
Wetted Perimeter	14.09 ft
Hydraulic Radius	0.03 ft
Top Width	14.09 ft
Normal Depth	0.06 ft
Critical Depth	0.09 ft
Critical Slope	0.70 %
Velocity	2.20 ft/s
Velocity Head	0.07 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 ft ²
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

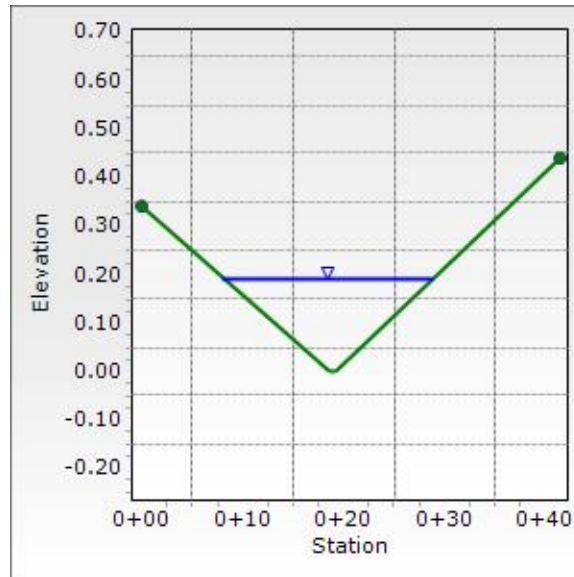
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

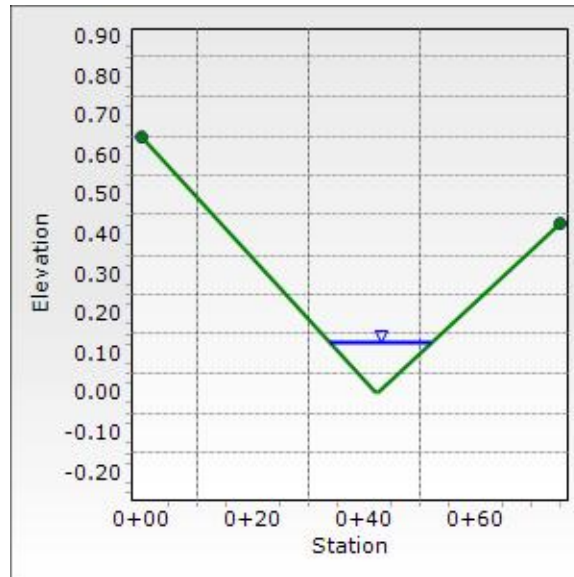
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

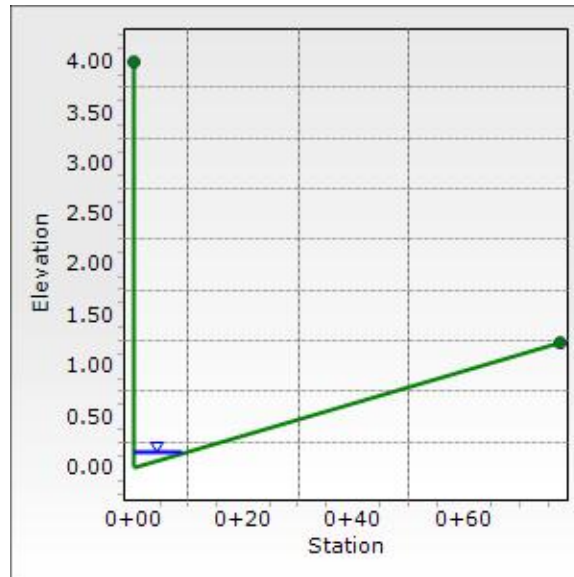
GVF Input Data

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 ft ²
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

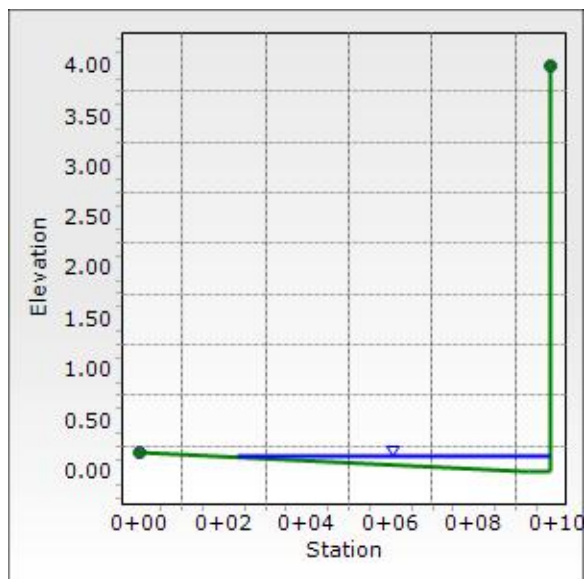
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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
Solve For	Formula
	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 ft ²
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

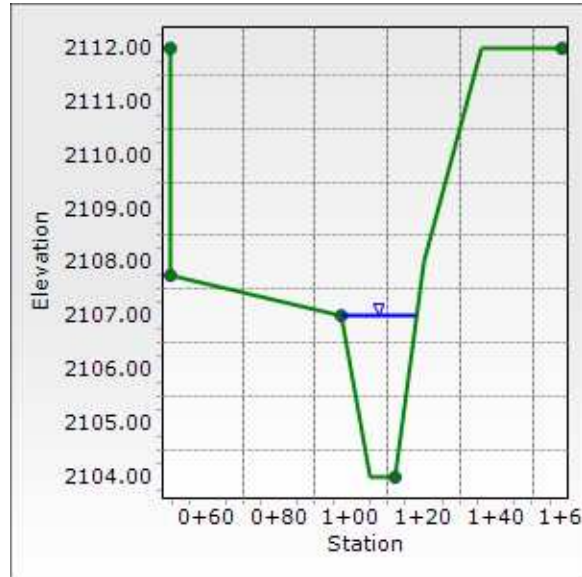
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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

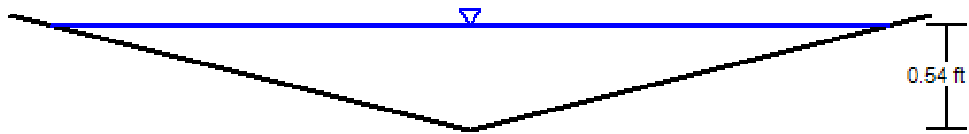


Worksheet for SW1

Project Description	
Friction Method	Manning
Solve For	Formula
	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 ft ²
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



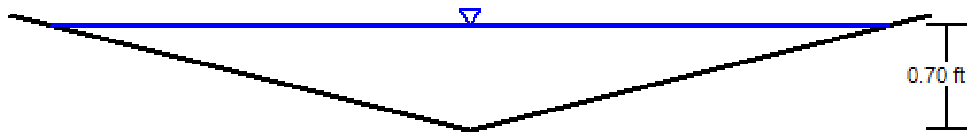
V: 1 
H: 1

Worksheet for SW2

Project Description	
Friction Method	Manning
Solve For	Formula
	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 ft ²
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
Solve For	Formula
	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



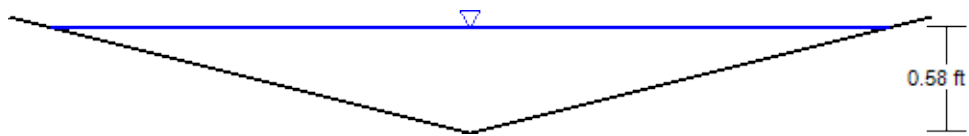
V: 1
H: 1

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 ft ²
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



V: 1
H: 1

Worksheet for SW4

Project Description	
Friction Method	Manning
Solve For	Formula
	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 ft ²
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

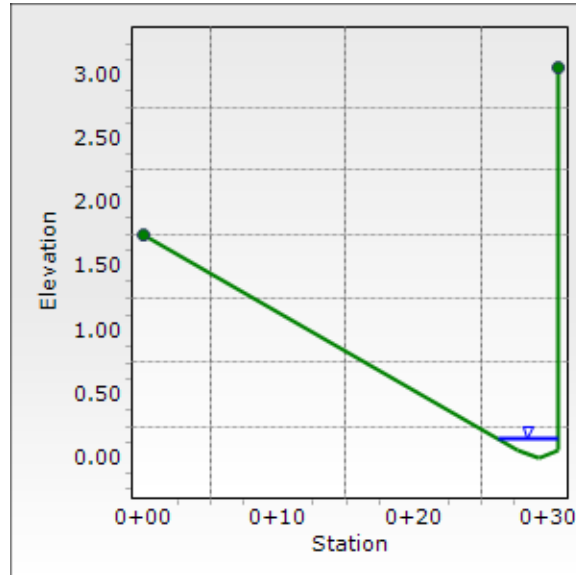
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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

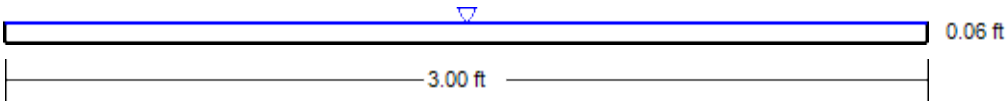


Worksheet for OF5 (West)

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 ft ²
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



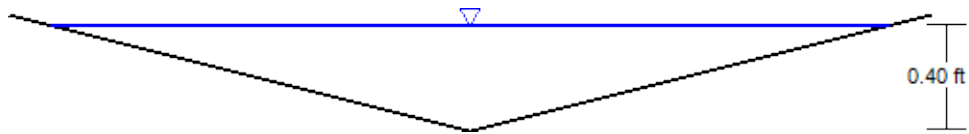
V: 1
H: 1

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 ft ²
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



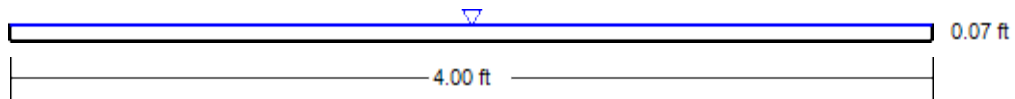
V: 1 
H: 1

Worksheet for Wall Opening 0.50F5 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 ft ²
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 0.50F5 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



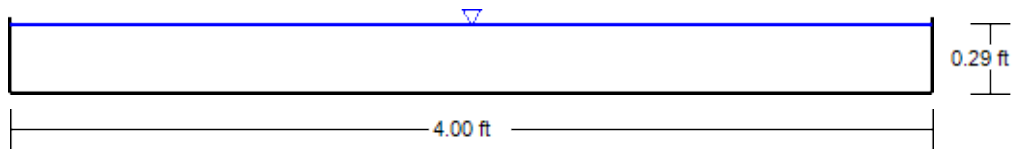
V: 1
H: 1

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 ft ²
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



V: 1
H: 1

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 ft ²
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

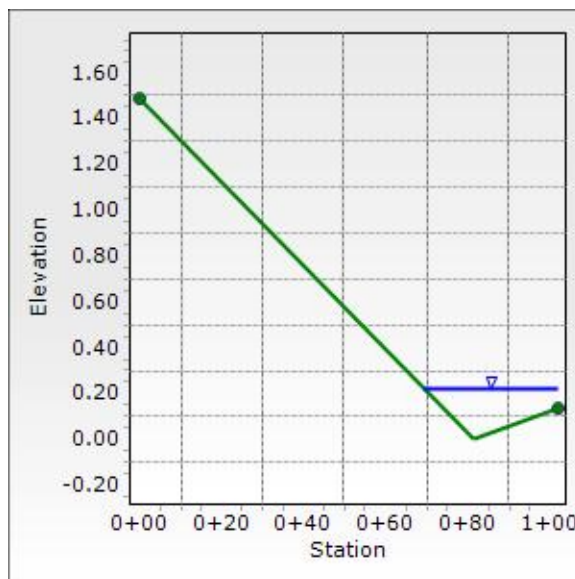
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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 ft ²
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

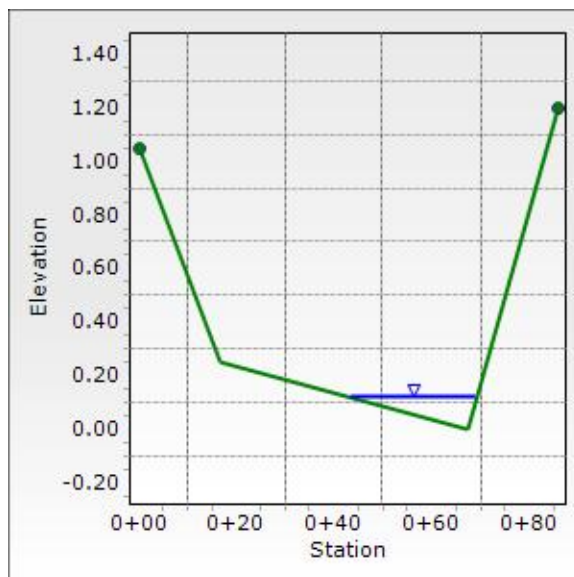
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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) = $2*W+L_g$	5.50 ft
P_{agl} Adjusted agwl = $2*(1-C_{fg}/100)*W+L_g$	4.00 ft
A_g = Grate area = $W*L_g$	3.75 ft ²
A_{aga} = Adjusted open grate area = $A_g*R_o*(1-C_{fg}/100)$	1.13 ft ²
check - If $D_p < 1.792*A_{aga}/P_{agl}$; weir; else orifice	weir
Q_{ig} = Flow intercepted by grate If "weir" controls $Q_{ig}=C_{wg}*P_{agl}*D_p^{1.5}$ If "orifice" controls $Q_{ig}=C_o*A_{aga}*(64.4*D_p)^{0.5}$	0.5 cfs

Curb Opening Capacity Calculations

P_c = Active curb opening weir length (acowl) = $L_c+1.8*W$	6.70 ft
P_{acl} Adjusted acowl = $L_c+1.8*(1-C_{fc}/100)*W$	5.35 ft
A_c = curb opening area (coa) = L_c*H_c	2.00 ft ²
A_{aca} = Adjusted coa = $A_c*(1-C_{fc}/100)$	1.00 ft ²
check - If $D_p < H_c$; weir; else orifice	weir
Q_{ic} = Flow intercepted by curb opening If "weir" controls $Q_{ic}=C_{wc}*P_{acl}*D_p^{1.5}$ If "orifice" controls $Q_{ic}=C_o*A_{aca}*(64.4*D_p-H_c/2)^{0.5}$	0.5 cfs

Total Inlet Calculations

Q_{ti} = Total flow intercepted = $Q_{ig}+Q_{ic}$	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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:	
	$H_w = (Q / (C_w * P))^{2/3}$	
	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:	
	$H_w = (Q / (C_o * A_c))^2 / 2 * g$	
	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 (ft²)	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 (ft²)	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 (ft²)	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 (ft²)	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 (ft²)	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

SiriusAvenue.rep

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

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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      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   X  XXXXXX  XXXX      X   X      X   X      XXXXX
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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

SiriusAvenue.rep

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	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

SiriusAvenue.rep

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
0	2114.3	0	2112	17
59	2116	59	2120.5	59.5
65.5	2112.5	65.5	2112	67
118	2112.58	118	2113.08	124

Manning's n	Values	num=	7
Sta	n Val	Sta	n Val
0	.016	59	.02
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
0	2110.3	93	2110	119
150	2110	173	2109.8	174.5
184.5	2110.26	184.5	2112.68	185

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

SiriusAvenue.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 119 174.5 45 45 45
 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 2111.85 95.999 2109.53 85.95999 2111.95 87.10001 2111.95 87.10001 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
 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 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
 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 (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
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

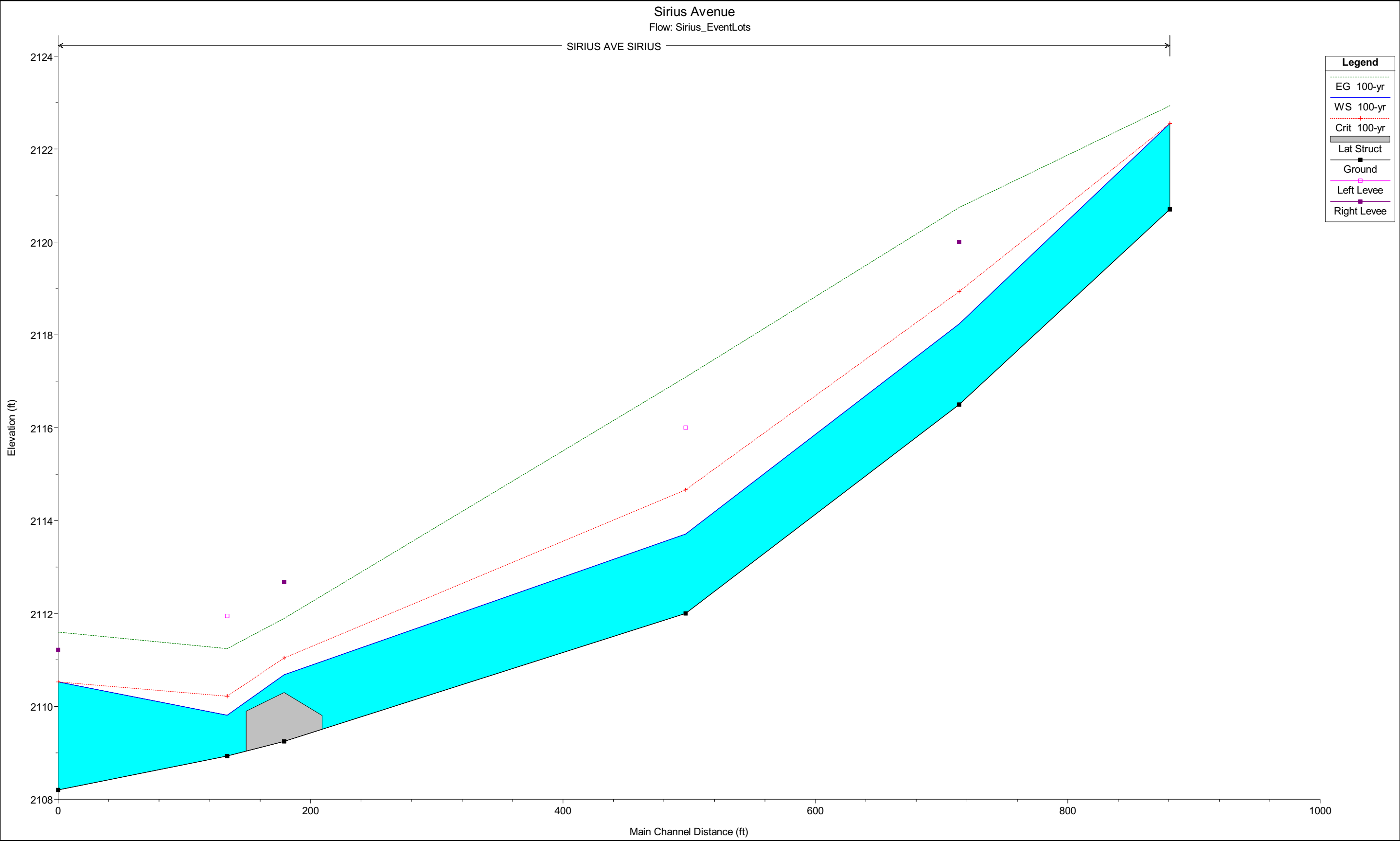
E.G. Elev (ft)	2111.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.	0.016	0.015	0.015
W.S. Elev (ft)	2110.68	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2111.04	Flow Area (sq ft)	73.66	51.26	4.94
E.G. Slope (ft/ft)	0.011742	Area (sq ft)	73.66	51.26	4.94
Q Total (cfs)	1095.50	Flow (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

Legend

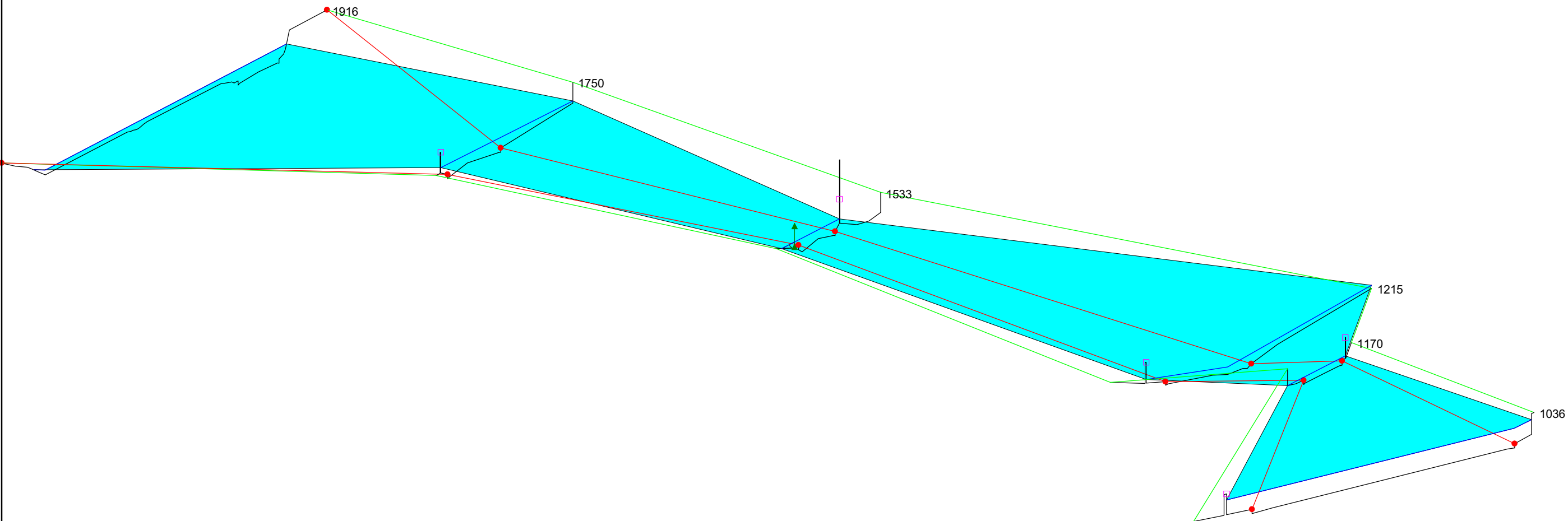
WS 100-yr

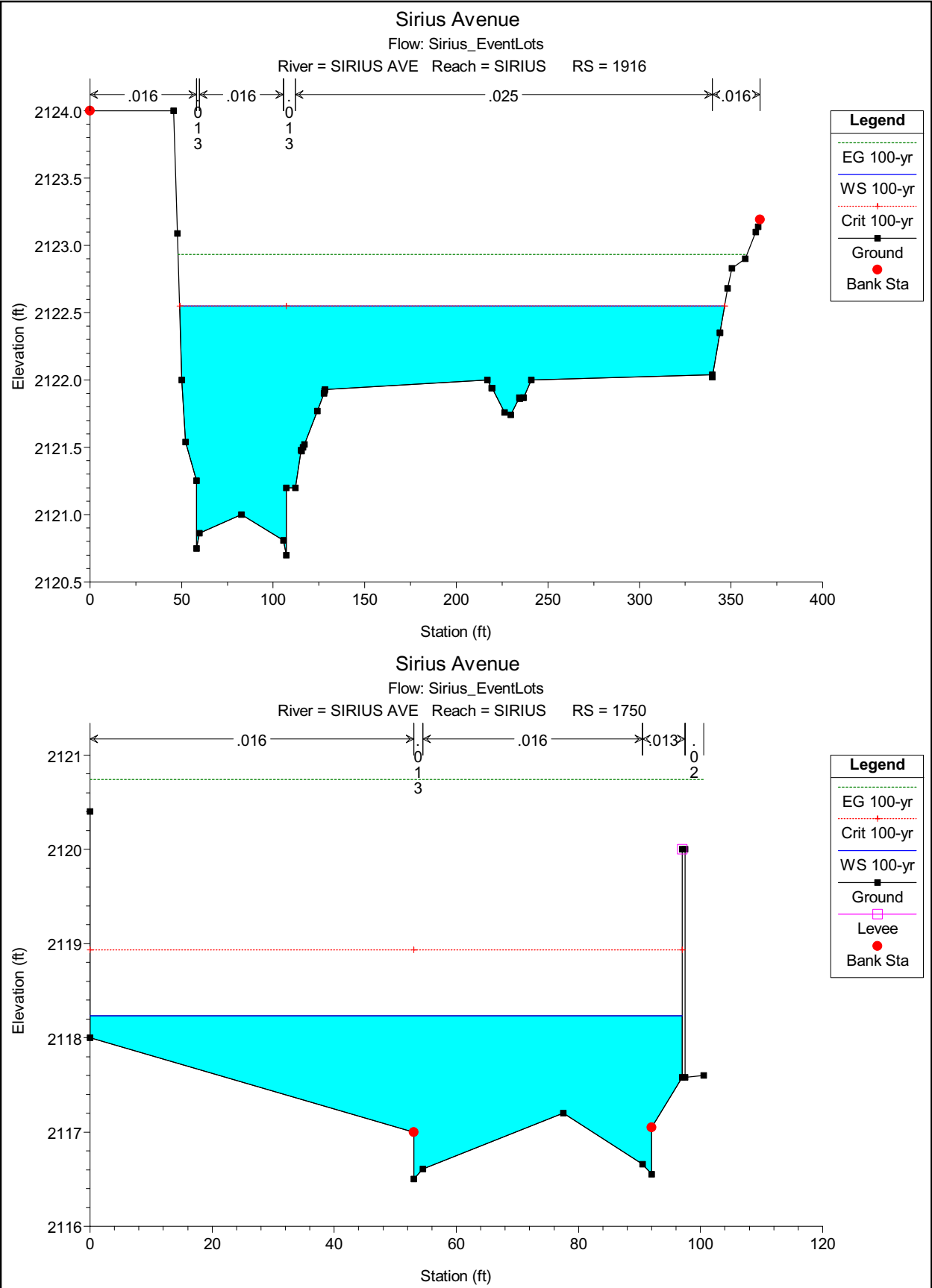
Ground

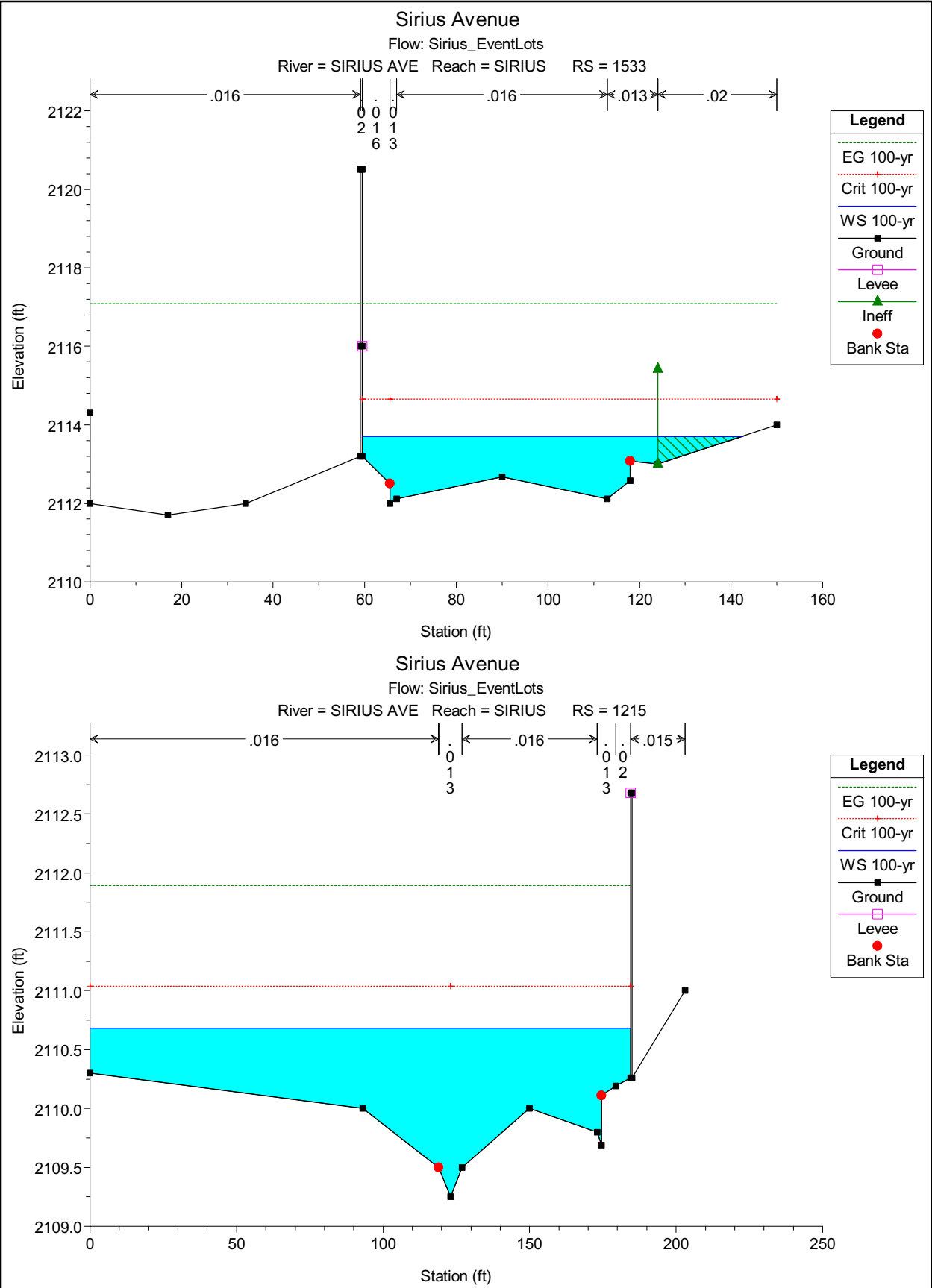
Bank Sta

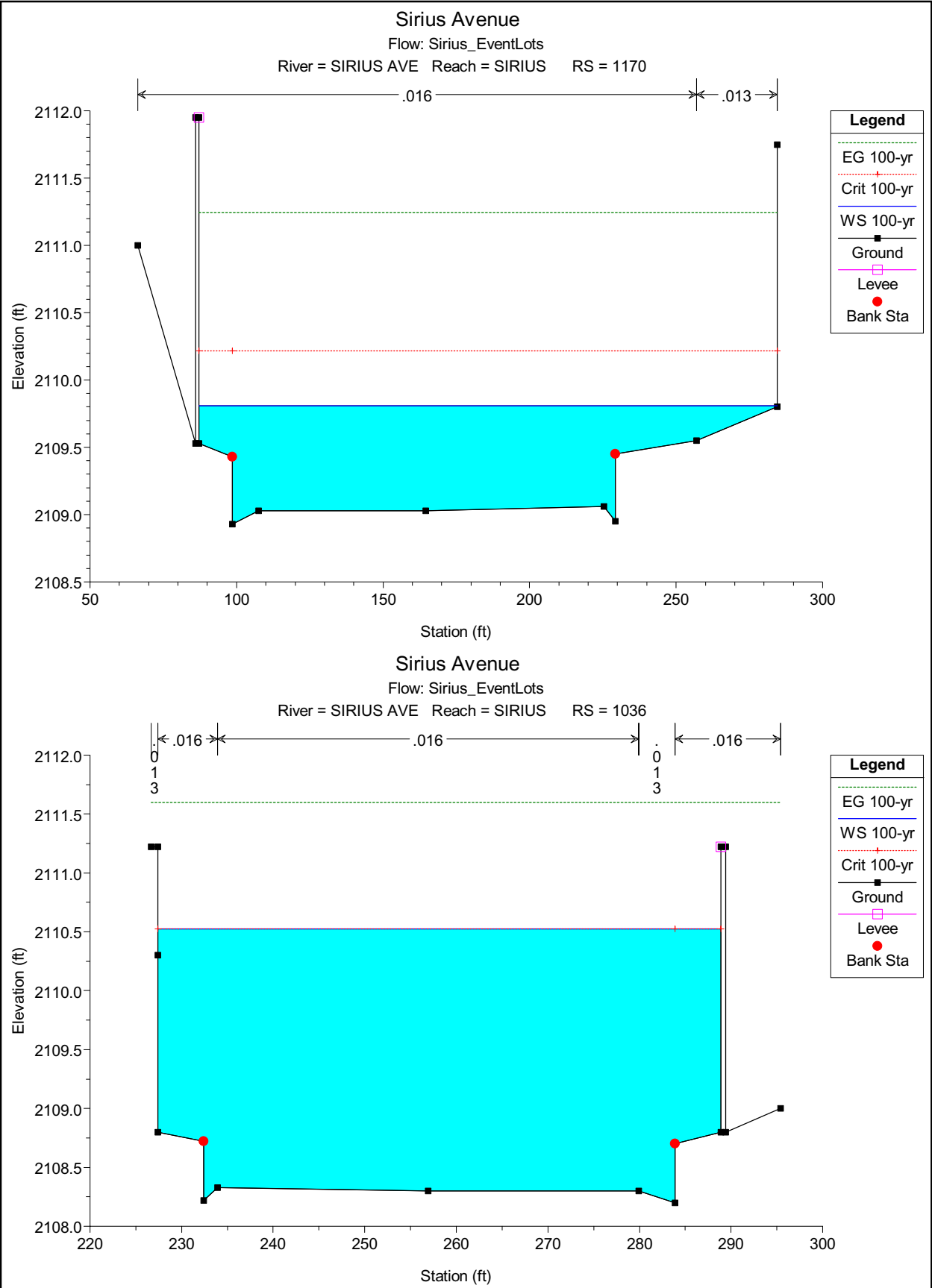
Levee

Ineff









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

Reach	River Sta	Profile	Q US (cfs)	Q Leaving Total (cfs)	Q DS (cfs)	Q Weir (cfs)	Q Gates (cfs)	Wr Top Wdth (ft)	Weir Max Depth (ft)	Weir Avg Depth (ft)	Min El Weir Flow (ft)	E.G. US. (ft)	W.S. US. (ft)	E.G. DS (ft)	W.S. DS (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