

## **Appendix B – Hydraulic Calculations**

- Normal Depth Calculations – Onsite
- Normal Depth Calculations – Swale

## Worksheet for DON1-A1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

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Input Data	
Channel Slope	0.500 %
Discharge	1.50 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+23.00	0.28
	0+23.00	1.26
	0+24.00	1.28

### Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+24.00, 1.28)	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	0.28 ft
Roughness Coefficient	0.016
Elevation	0.28 ft
Elevation Range	0.00 to 1.28 ft
Flow Area	1.4 ft <sup>2</sup>
Wetted Perimeter	22.42 ft
Hydraulic Radius	0.06 ft
Top Width	22.10 ft
Normal Depth	0.28 ft
Critical Depth	0.26 ft
Critical Slope	0.986 %
Velocity	1.05 ft/s
Velocity Head	0.02 ft

## Worksheet for DON1-A1

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### Results

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Specific Energy	0.29 ft
Froude Number	0.727
Flow Type	Subcritical

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### GVF Input Data

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Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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### GVF Output Data

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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	0.28 ft
Critical Depth	0.26 ft
Channel Slope	0.500 %
Critical Slope	0.986 %

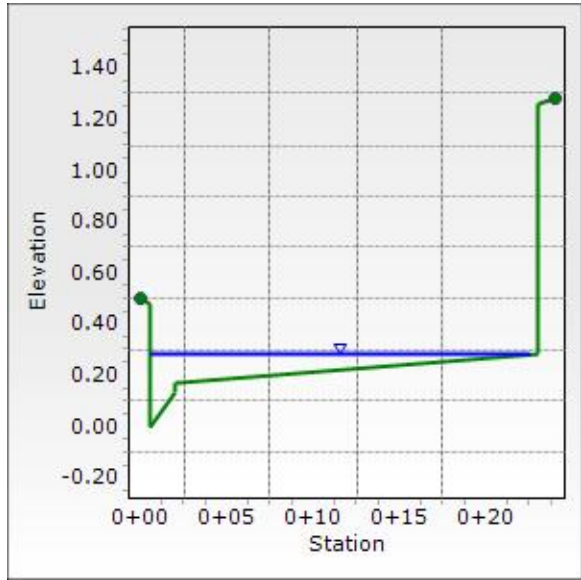
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# Cross Section for DON1-A1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.500 %
Normal Depth	0.28 ft
Discharge	1.50 cfs



## Worksheet for DON1-A2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

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Input Data	
Channel Slope	0.690 %
Discharge	1.50 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+24.50	0.73
	0+24.50	2.21
	0+25.00	2.23

### Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+25.00, 2.23)	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	0.32 ft
Roughness Coefficient	0.016
Elevation	0.32 ft
Elevation Range	0.00 to 2.23 ft
Flow Area	0.9 ft <sup>2</sup>
Wetted Perimeter	8.02 ft
Hydraulic Radius	0.11 ft
Top Width	7.65 ft
Normal Depth	0.32 ft
Critical Depth	0.32 ft
Critical Slope	0.832 %
Velocity	1.74 ft/s
Velocity Head	0.05 ft

## Worksheet for DON1-A2

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### Results

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Specific Energy	0.37 ft
Froude Number	0.917
Flow Type	Subcritical

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### GVF Input Data

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Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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### GVF Output Data

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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	0.32 ft
Critical Depth	0.32 ft
Channel Slope	0.690 %
Critical Slope	0.832 %

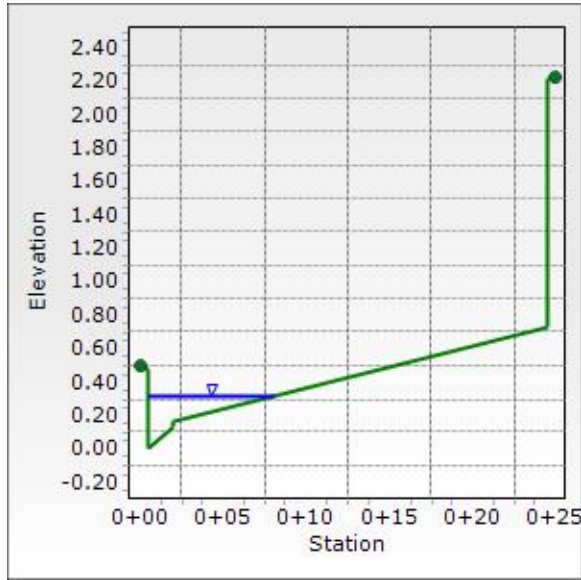
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# Cross Section for DON1-A2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.690 %
Normal Depth	0.32 ft
Discharge	1.50 cfs



## Worksheet for CH-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.000 %
Discharge	5.00 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+09.00		0.42
	0+09.00		3.42

### Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+09.00, 3.42)	0.015

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	0.44 ft
Roughness Coefficient	0.015
Elevation	0.44 ft
Elevation Range	0.00 to 3.42 ft
Flow Area	1.6 ft <sup>2</sup>
Wetted Perimeter	9.02 ft
Hydraulic Radius	0.18 ft
Top Width	8.50 ft
Normal Depth	0.44 ft
Critical Depth	0.48 ft
Critical Slope	0.592 %
Velocity	3.13 ft/s
Velocity Head	0.15 ft
Specific Energy	0.59 ft

## Worksheet for CH-1

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### Results

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Froude Number	1.271
Flow Type	Supercritical

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### GVF Input Data

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Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

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### GVF Output Data

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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	0.44 ft
Critical Depth	0.48 ft
Channel Slope	1.000 %
Critical Slope	0.592 %

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# Cross Section for CH-1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	1.000 %
Normal Depth	0.44 ft
Discharge	5.00 cfs

