VALDEURRACA 9M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	9.00	m
Discharge	27.33	m³/s

Results		
Depth	1.54	m
Flow Area	15.27	m²
Wetted Perimeter	12.57	m
Top Width	10.78	m
Critical Depth	0.96	m
Critical Slope	0.023569	m/m
Velocity	1.79	m/s
Velocity Head	0.16	m
Specific Energy	1.71	m
Froude Number	0.48	

Flow is subcritical.

11/05/10 18:16:19 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

VALDEURRACA 10M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	10.00	m
Discharge	27.33	m³/s

Results		
Depth	1.44	m
Flow Area	15.64	m²
Wetted Perimeter	13.33	m
Top Width	11.67	m
Critical Depth	0.90	m
Critical Slope	0.023581	m/m
Velocity	1.75	m/s
Velocity Head	0.16	m
Specific Energy	1.60	m
Froude Number	0.48	

Flow is subcritical.

11/05/10 18:17:00 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

VALDEURRACA 11M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	11.00	m
Discharge	27.33	m³/s

Results		
Depth	1.36	m
Flow Area	16.01	m²
Wetted Perimeter	14.14	m
Top Width	12.57	m
Critical Depth	0.84	m
Critical Slope	0.023648	m/m
Velocity	1.71	m/s
Velocity Head	0.15	m
Specific Energy	1.51	m
Froude Number	0.48	

Flow is subcritical.

11/05/10 18:17:20 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

VALDEURRACA 12M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	12.00	m
Discharge	27.33	m³/s

Results		
Depth	1.29	m
Flow Area	16.38	m²
Wetted Perimeter	14.97	m
Top Width	13.48	m
Critical Depth	0.80	m
Critical Slope	0.023753	m/m
Velocity	1.67	m/s
Velocity Head	0.14	m
Specific Energy	1.43	m
Froude Number	0.48	

Flow is subcritical.

11/05/10 18:17:38 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

VALDEURRACA 13M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	13.00	m
Discharge	27.33	m³/s

Results		
Depth	1.22	m
Flow Area	16.75	m²
Wetted Perimeter	15.82	m
Top Width	14.41	m
Critical Depth	0.76	m
Critical Slope	0.023885	m/m
Velocity	1.63	m/s
Velocity Head	0.14	m
Specific Energy	1.36	m
Froude Number	0.48	

Flow is subcritical.

11/05/10 18:17:51 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

VALDEURRACA 14M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	14.00	m
Discharge	27.33	m³/s

Results		
Depth	1.17	m
Flow Area	17.11	m²
Wetted Perimeter	16.69	m
Top Width	15.35	m
Critical Depth	0.72	m
Critical Slope	0.024034	m/m
Velocity	1.60	m/s
Velocity Head	0.13	m
Specific Energy	1.30	m
Froude Number	0.48	

Flow is subcritical.

11/05/10 18:17:58 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

VALDEURRACA 15M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	VALDEURRACA
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	15.00	m
Discharge	27.33	m³/s

Results		
Depth	1.12	m
Flow Area	17.47	m²
Wetted Perimeter	17.58	m
Top Width	16.29	m
Critical Depth	0.69	m
Critical Slope	0.024196	m/m
Velocity	1.56	m/s
Velocity Head	0.12	m
Specific Energy	1.24	m
Froude Number	0.48	
Flow is subcritical.		

RESULTADOS. ARROYO CANTOS. TRAMO INFERIOR

CANTOS 5M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	5.00	m
Discharge	8.32	m³/s

Results		
Depth	1.08	m
Flow Area	6.09	m²
Wetted Perimeter	7.50	m
Top Width	6.25	m
Critical Depth	0.64	m
Critical Slope	0.027695	m/m
Velocity	1.37	m/s
Velocity Head	0.10	m
Specific Energy	1.18	m
Froude Number	0.44	
Flow is subcritical.		

11/05/10
18:19:10

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FlowMaster v5.13
Page 1 of 1

CANTOS 6M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	6.00	m
Discharge	8.32	m³/s

Results		
Depth	0.96	m
Flow Area	6.31	m²
Wetted Perimeter	8.22	m
Top Width	7.11	m
Critical Depth	0.57	m
Critical Slope	0.027621	m/m
Velocity	1.32	m/s
Velocity Head	0.09	m
Specific Energy	1.05	m
Froude Number	0.45	

Flow is subcritical.

11/05/10 18:19:24 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS 7M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	7.00	m
Discharge	8.32	m³/s

Results		
Depth	0.87	m
Flow Area	6.55	m²
Wetted Perimeter	9.02	m
Top Width	8.01	m
Critical Depth	0.52	m
Critical Slope	0.027742	m/m
Velocity	1.27	m/s
Velocity Head	0.08	m
Specific Energy	0.96	m
Froude Number	0.45	

Flow is subcritical.

11/05/10 18:19:40 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS 8M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.005000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	8.00	m
Discharge	8.32	m³/s

Results		
Depth	0.80	m
Flow Area	6.79	m²
Wetted Perimeter	9.85	m
Top Width	8.93	m
Critical Depth	0.47	m
Critical Slope	0.027969	m/m
Velocity	1.23	m/s
Velocity Head	0.08	m
Specific Energy	0.88	m
Froude Number	0.45	
Flow is subcritical.		

RESULTADOS. ARROYO CANTOS. TRAMO COMÚN

CANTOS TRAMO COMÚN 6M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	6.00	m
Discharge	30.27	m³/s

Results		
Depth	1.72	m
Flow Area	12.02	m²
Wetted Perimeter	9.97	m
Top Width	7.98	m
Critical Depth	1.32	m
Critical Slope	0.024003	m/m
Velocity	2.52	m/s
Velocity Head	0.32	m
Specific Energy	2.04	m
Froude Number	0.66	

Flow is subcritical.

11/05/10 18:21:09 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS TRAMO COMÚN 7M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	7.00	m
Discharge	30.27	m³/s

Results		
Depth	1.56	m
Flow Area	12.32	m²
Wetted Perimeter	10.60	m
Top Width	8.80	m
Critical Depth	1.20	m
Critical Slope	0.023588	m/m
Velocity	2.46	m/s
Velocity Head	0.31	m
Specific Energy	1.87	m
Froude Number	0.66	

Flow is subcritical.

11/05/10 18:21:23 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS TRAMO COMÚN 8M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	8.00	m
Discharge	30.27	m³/s

Results		
Depth	1.43	m
Flow Area	12.64	m²
Wetted Perimeter	11.31	m
Top Width	9.65	m
Critical Depth	1.10	m
Critical Slope	0.023363	m/m
Velocity	2.39	m/s
Velocity Head	0.29	m
Specific Energy	1.72	m
Froude Number	0.67	

Flow is subcritical.

11/05/10 18:21:35 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS TRAMO COMÚN 9M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	9.00	m
Discharge	30.27	m³/s

Results		
Depth	1.33	m
Flow Area	12.98	m²
Wetted Perimeter	12.07	m
Top Width	10.53	m
Critical Depth	1.03	m
Critical Slope	0.023264	m/m
Velocity	2.33	m/s
Velocity Head	0.28	m
Specific Energy	1.61	m
Froude Number	0.67	

Flow is subcritical.

11/05/10 18:21:47 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS TRAMO COMÚN 10M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	10.00	m
Discharge	30.27	m³/s

Results		
Depth	1.24	m
Flow Area	13.32	m²
Wetted Perimeter	12.87	m
Top Width	11.43	m
Critical Depth	0.96	m
Critical Slope	0.023250	m/m
Velocity	2.27	m/s
Velocity Head	0.26	m
Specific Energy	1.51	m
Froude Number	0.67	

Flow is subcritical.

11/05/10 18:22:00 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS TRAMO COMÚN 11M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	11.00	m
Discharge	30.27	m³/s

Results		
Depth	1.17	m
Flow Area	13.65	m²
Wetted Perimeter	13.70	m
Top Width	12.35	m
Critical Depth	0.90	m
Critical Slope	0.023294	m/m
Velocity	2.22	m/s
Velocity Head	0.25	m
Specific Energy	1.42	m
Froude Number	0.67	

Flow is subcritical.

11/05/10 18:22:11 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

CANTOS TRAMO COMÚN 12M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\cantos\t.fm2
Worksheet	CANTOS TRAMO COMÚN
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.010000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	12.00	m
Discharge	30.27	m³/s

Results		
Depth	1.11	m
Flow Area	13.99	m²
Wetted Perimeter	14.56	m
Top Width	13.28	m
Critical Depth	0.85	m
Critical Slope	0.023378	m/m
Velocity	2.16	m/s
Velocity Head	0.24	m
Specific Energy	1.35	m
Froude Number	0.67	
Flow is subcritical.		

3.2.2.- Cuenca 2.4. Arroyo Somera. T=10 años

ARROYO SOMERA. TRAMO 1

Q (T=10 años) = 9,93 m3/s

Cota inicio = 46
Cota fin = 30
L = 736
i = 0,022

Calados para una sección trapecial con talud de 60º:

B (m)	H (m)
4	0,88
5	0,77
6	0,68
7	0,62
8	0,57

ARROYO SOMERA. TRAMO 2

Q (T=10 años) = 9,93 m3/s

Cota inicio = 30
Cota fin = 28
L = 241
i = 0,0083

Calados para una sección trapecial con talud de 60º:

B (m)	H (m)
10	0,67
11	0,63
12	0,59
13	0,56
14	0,54
15	0,52

RESULTADOS. ARROYO SOMERA. TRAMO 1

SOMERA TRAMO 1 4M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.022000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	4.00	m
Discharge	9.93	m³/s

Results		
Depth	0.88	m
Flow Area	3.98	m²
Wetted Perimeter	6.04	m
Top Width	5.02	m
Critical Depth	0.82	m
Critical Slope	0.027704	m/m
Velocity	2.50	m/s
Velocity Head	0.32	m
Specific Energy	1.20	m
Froude Number	0.90	
Flow is subcritical.		

11/05/10 17:32:57 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

SOMERA TRAMO 1 5M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.022000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	5.00	m
Discharge	9.93	m³/s

Results		
Depth	0.77	m
Flow Area	4.16	m²
Wetted Perimeter	6.77	m
Top Width	5.88	m
Critical Depth	0.72	m
Critical Slope	0.027144	m/m
Velocity	2.38	m/s
Velocity Head	0.29	m
Specific Energy	1.06	m
Froude Number	0.91	
Flow is subcritical.		

11/05/10 17:33:12 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

SOMERA TRAMO 1 6M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.022000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	6.00	m
Discharge	9.93	m³/s

Results		
Depth	0.68	m
Flow Area	4.36	m²
Wetted Perimeter	7.57	m
Top Width	6.79	m
Critical Depth	0.64	m
Critical Slope	0.026976	m/m
Velocity	2.28	m/s
Velocity Head	0.26	m
Specific Energy	0.95	m
Froude Number	0.91	
Flow is subcritical.		

11/05/10 17:33:29 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

SOMERA TRAMO 1 7M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.022000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	7.00	m
Discharge	9.93	m³/s

Results		
Depth	0.62	m
Flow Area	4.55	m²
Wetted Perimeter	8.43	m
Top Width	7.71	m
Critical Depth	0.58	m
Critical Slope	0.027021	m/m
Velocity	2.18	m/s
Velocity Head	0.24	m
Specific Energy	0.86	m
Froude Number	0.91	
Flow is subcritical.		

11/05/10 17:33:52 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

SOMERA TRAMO 1 8M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyo~1\somera\t.fm2
Worksheet	SOMERA TRAMO 1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.022000	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	8.00	m
Discharge	9.93	m³/s

Results		
Depth	0.57	m
Flow Area	4.73	m²
Wetted Perimeter	9.31	m
Top Width	8.66	m
Critical Depth	0.53	m
Critical Slope	0.027186	m/m
Velocity	2.10	m/s
Velocity Head	0.22	m
Specific Energy	0.79	m
Froude Number	0.91	
Flow is subcritical.		

11/05/10 17:46:09 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

RESULTADOS. ARROYO SOMERA. TRAMO 2

SOMERA TRAMO 2 10M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.008300	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	10.00	m
Discharge	9.93	m³/s

Results		
Depth	0.67	m
Flow Area	6.91	m²
Wetted Perimeter	11.54	m
Top Width	10.77	m
Critical Depth	0.46	m
Critical Slope	0.027691	m/m
Velocity	1.44	m/s
Velocity Head	0.11	m
Specific Energy	0.77	m
Froude Number	0.57	
Flow is subcritical.		

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SOMERA TRAMO 2 11M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.008300	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	11.00	m
Discharge	9.93	m³/s

Results		
Depth	0.63	m
Flow Area	7.12	m²
Wetted Perimeter	12.45	m
Top Width	11.72	m
Critical Depth	0.43	m
Critical Slope	0.027985	m/m
Velocity	1.39	m/s
Velocity Head	0.10	m
Specific Energy	0.73	m
Froude Number	0.57	
Flow is subcritical.		

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SOMERA TRAMO 2 12M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.008300	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	12.00	m
Discharge	9.93	m³/s

Results		
Depth	0.59	m
Flow Area	7.33	m²
Wetted Perimeter	13.37	m
Top Width	12.68	m
Critical Depth	0.41	m
Critical Slope	0.028291	m/m
Velocity	1.36	m/s
Velocity Head	0.09	m
Specific Energy	0.69	m
Froude Number	0.57	
Flow is subcritical.		

11/05/10 17:36:24 Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666 FlowMaster v5.13 Page 1 of 1

SOMERA TRAMO 2 13M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.008300	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	13.00	m
Discharge	9.93	m³/s

Results		
Depth	0.56	m
Flow Area	7.53	m²
Wetted Perimeter	14.30	m
Top Width	13.65	m
Critical Depth	0.39	m
Critical Slope	0.028601	m/m
Velocity	1.32	m/s
Velocity Head	0.09	m
Specific Energy	0.65	m
Froude Number	0.57	
Flow is subcritical.		

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SOMERA TRAMO 2 14M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.008300	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	14.00	m
Discharge	9.93	m³/s

Results		
Depth	0.54	m
Flow Area	7.72	m²
Wetted Perimeter	15.25	m
Top Width	14.62	m
Critical Depth	0.37	m
Critical Slope	0.028911	m/m
Velocity	1.29	m/s
Velocity Head	0.08	m
Specific Energy	0.62	m
Froude Number	0.57	
Flow is subcritical.		

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17:37:01
Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666
FlowMaster v5.13
Page 1 of 1

SOMERA TRAMO 2 15M
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\arroyos gmu documento abril 2010\somera\t.fm2
Worksheet	SOMERA TRAMO 2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.045	
Channel Slope	0.008300	m/m
Left Side Slope	0.577000	H : V
Right Side Slope	0.577000	H : V
Bottom Width	15.00	m
Discharge	9.93	m³/s

Results		
Depth	0.52	m
Flow Area	7.91	m²
Wetted Perimeter	16.19	m
Top Width	15.60	m
Critical Depth	0.35	m
Critical Slope	0.029218	m/m
Velocity	1.26	m/s
Velocity Head	0.08	m
Specific Energy	0.60	m
Froude Number	0.56	
Flow is subcritical.		

11/05/10
17:37:12
Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 (203) 755-1666
FlowMaster v5.13
Page 1 of 1

APENDICE:

4.- DETERMINACION DE LAS ZONAS DE DOMINIO PUBLICO, ZONAS DE SERVIDUMBRE Y ZONAS DE POLICIA

1

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3

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ARROYO VALDEURRACA

ARROYO COSTILLA

ARROYO ROJAS

ARROYO LIRIA

ARROYO REZNADILLA

ARROYO PILONES

RIO CAMPANILLAS

ARROYO CIPRES

ARROYO COLMENAREJO

ARROYO SOMERA

CAÑADA DE LA CALERA

ARROYO BIENQUERIDO

CAÑADA DE PEUAS

CAÑADA CAÑUELO

ARROYO HONDONADA

ARROYO CANUTO

Ayuntamiento de Málaga
Gerencia Municipal de Urbanismo, Obras e Infraestructuras

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NARVAL Ingeniería, s.a.
Ingeniería civil, Urbanismo, Medio Ambiente

AUTORES:
INMACULADA BARQUERO ZAFRA
Ingeniero de Caminos, Canales y Puertos

RAFAEL GALLEGO LOPEZ
Ingeniero de Caminos, Canales y Puertos

TITULO:
DETERMINACION DE LOS LIMITES DEL DOMINIO PUBLICO HIDRÁULICO Y LAS ZONAS INUNDABLES EN LA MARGEN IZQUIERDA DEL GUADALHORCE DESDE EL CAMPANILLAS AL LIMITE DEL T.M. EN EL ARROYO CAÑUELO, EN LOS DESARROLLOS PREVISTOS POR EL PGOU EN REVISION

FECHA:
JUNIO 2010

ESCALA:
1:20000
0 200 400 600 800 1250 m

PLANO:
APENDICE 4: DETERMINACION DE LAS ZONAS DE DOMINIO PUBLICO, ZONAS DE SERVIDUMBRE Y ZONAS DE POLICIA. DOMINIO PUBLICO,SERVIDUMBRE Y POLICIA. REPARTO

NUMERO DE PLANO:
4.1

HOJA:
1 DE 1