UNIVERSITY OF MINNESOTA
ST. ANTHONY FALLS LABORATORY
Engineering, Environmental and Geophysical Fluid Dynamics

Project Report Number: 566

Third-Party Rating Curve Development and Debris Testing for Thirsty Duck® TD Series Buoyant Flow Control Device

by

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Project General Information

Title:
Third-Party Rating Curve Development and Debris Testing for Thirsty Duck®: TD Series Buoyant Flow Control Device

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1. Introduction

The University of Minnesota, St. Anthony Falls Laboratory (SAFL) was contracted by Thirsty Duck, Ltd to conduct a testing program on a series of buoyant flow devices (BFDs). The focus of the study was to develop rating curves and analyze performance under extreme debris loading conditions for the TD series line of BFDs. The models tested include the TD248-48, TD246-48, and TD244-48. Performance under debris load was evaluated using a mixture of leaves, grass (hay), and aluminum cans. The discharge rate was monitored during the debris performance tests to determine if the debris impaired the function of the device.

Figure 1 contains a concept diagram of the TD system. Major device components include an orifice to control discharge, a float to suspend the orifice at a fixed distance below the water surface, a skimmer to prevent fouling, and an expanding conduit ("bellows") to convey water from the orifice to the outlet pipe. The device is designed to connect to the outlet pipe with a standard 150# ANSI flange connection. The three devices tested differ in their orifice and bellows diameters; however, the bellows length for each was the same. Device specifications are provided in Table 1.

Figure 1 – TD Series Diagram provided by Thirsty Duck, Ltd.

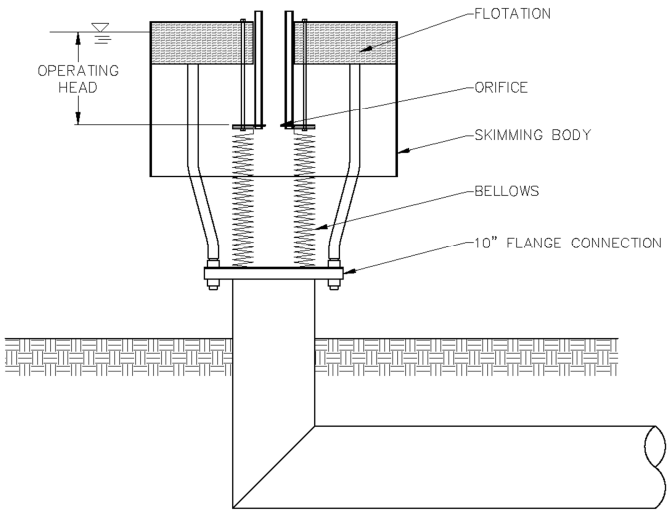


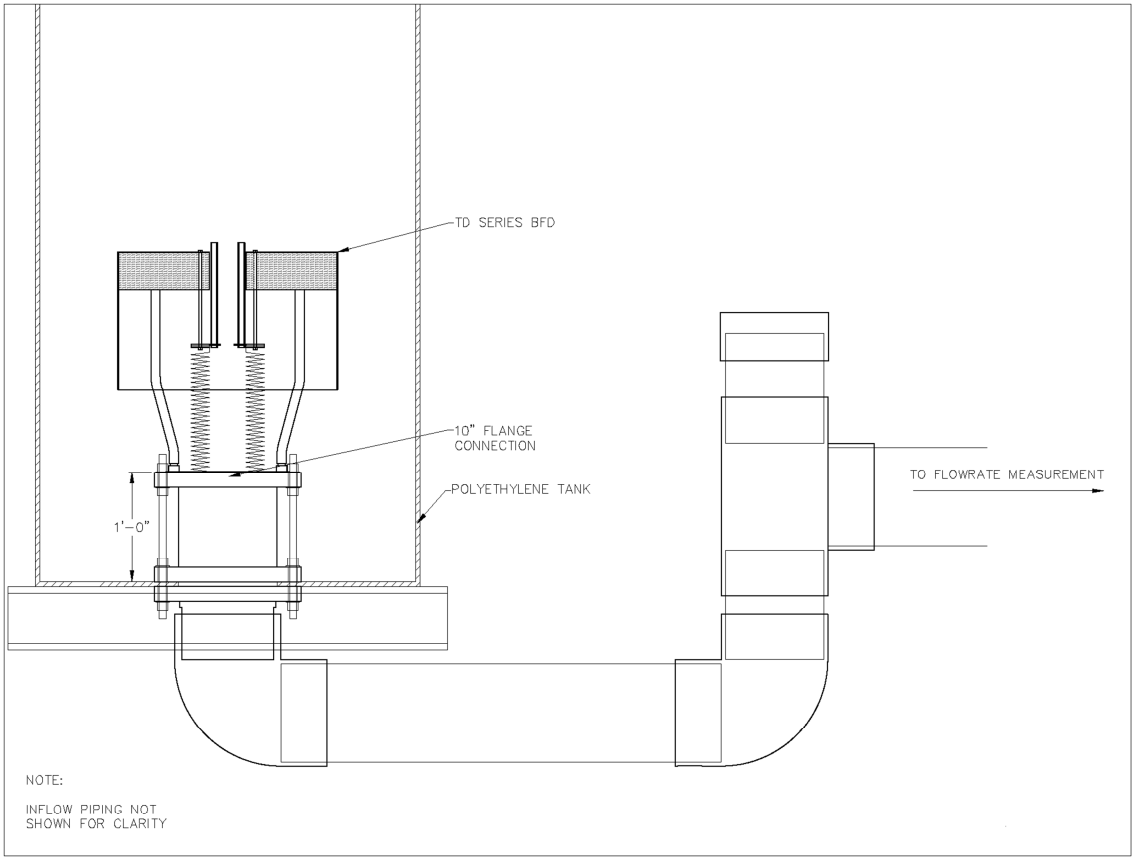
Table 1 – TD Series Specifications

Model Number	Orifice Diameter (in)	Operating Head (ft)	Nominal Bellows Inside Diameter (in)	Nominal Bellows Length (in)
TD248-48	5.34	0.79	8.0	48
TD246-48	3.34	0.69	6.0	48
TD244-48	2.25	0.62	4.0	48

2. Experimental Setup

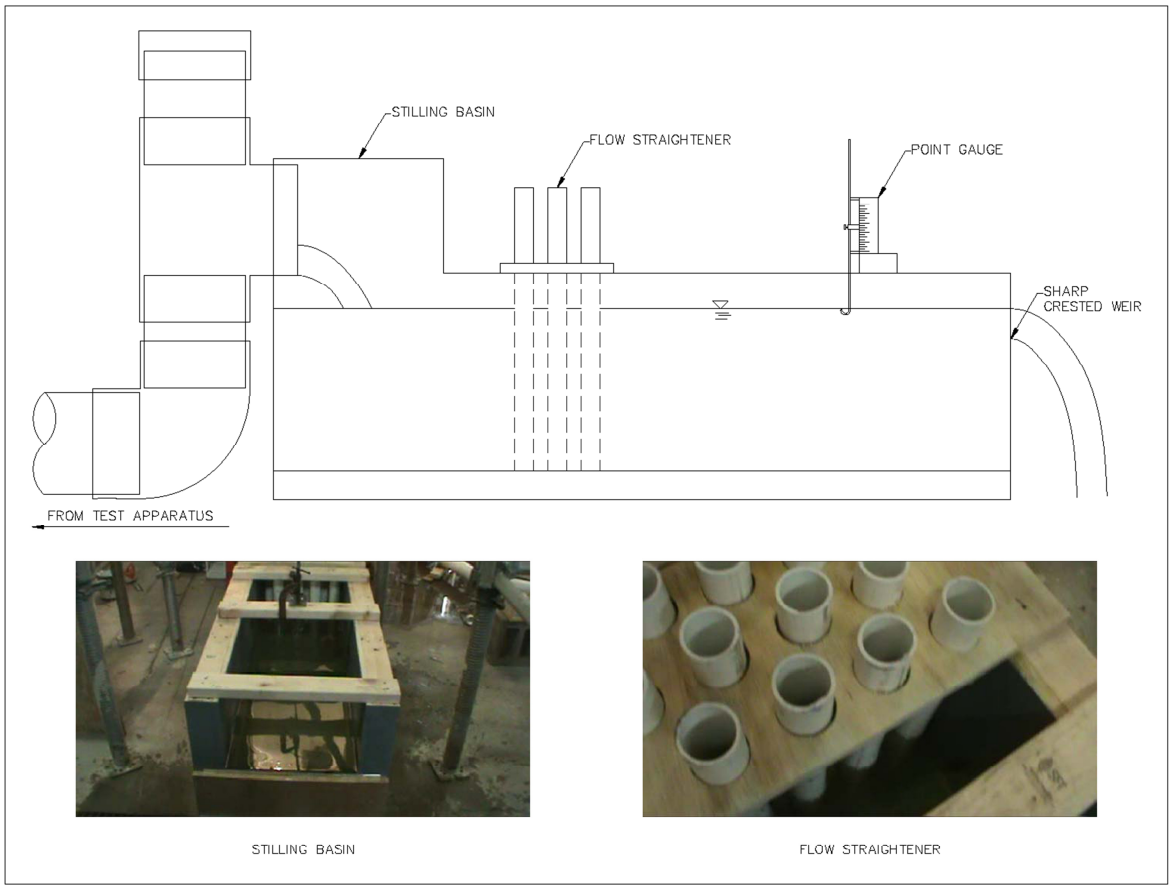
A test basin was installed in the basement level of SAFL and sized to operate full scale TD series devices. The basin was a 40-inch diameter by 7-feet tall polyethylene tank. The bottom of the tank was fitted with a 10-inch outlet flange and two, 2-inch inlet bulkhead fittings. The inlets were fed from water drawn from the Mississippi River, 50 feet above, and conveyed through the laboratory. Flow into the basin was controlled with a gate valve.

Figure 2 – Basin and outfall pipe diagram of the test apparatus



The outlet was plumbed with 10-inch PVC which discharged into a stilling basin equipped with a flow straightening device fabricated from a series of vertically oriented 2" PVC pipes arranged in an alternating fashion. The stilling basin discharged over a sharp crested weir, where discharge was measured. Figure 3 is a diagram of the test apparatus. The elevation of the water surface in the basin was measured directly from a scale affixed to the side of the basin. The discharge rate was measured via the weir at the outfall of the stilling basin. The height of the water over the weir was measured using a point gauge. For the purpose of determining the depth of submergence of the device, the relative position of the top of the device was measured using a portable laser range finder mounted above the basin.

Figure 3 – Stilling basin diagram of the test apparatus



3. Rating Curve Data

Stage-discharge rating curves for a free discharge condition were developed for each device via three test runs. The results of these runs are provided in Tables 2, 3, & 4. Figures 4, 5, & 6 contain plots of the collected rating curve data.

Table 2 – TD248-48 Free Discharge Rating Curve Data

TD248-48	Trial #1		TD248-48	Trial #2		TD248-48	Trial #3	
Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)	Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)	Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)
35.38	46.25	0.04	34.75	46.25	0.00	34.00	45.50	0.00
36.25	46.25	0.15	35.50	46.25	0.10	35.75	45.50	0.21
38.63	46.25	0.39	36.25	46.53	0.24	38.00	45.50	0.35
43.50	46.56	0.57	37.25	46.21	0.31	39.50	45.50	0.43
53.50	55.90	0.64	39.50	46.21	0.48	44.00	47.35	0.56
59.50	61.88	0.59	43.00	46.60	0.60	48.75	51.44	0.58
64.00	65.70	0.64	45.25	48.57	0.64	57.75	59.91	0.61
69.50	69.79	0.65	46.75	49.44	0.64	62.50	64.32	0.65
72.50	73.30	0.69	47.50	50.70	0.64	64.25	65.97	0.68
74.50	75.23	0.70	48.75	51.80	0.64	66.00	67.51	0.68
77.00	77.39	0.70	49.75	52.79	0.64	67.00	68.41	0.68
78.50	78.69	0.70	52.00	55.07	0.64	67.25	68.45	0.69
79.50	79.64	0.70	53.00	55.86	0.64	69.75	71.13	0.73
79.75	79.91	0.71	57.25	60.11	0.65	73.25	74.08	0.72
			61.50	63.85	0.65	77.00	77.59	0.72
			65.25	67.19	0.65	79.50	79.40	0.72
			67.75	69.44	0.66			
			70.00	71.45	0.66			
			71.50	72.94	0.68			
			72.75	74.16	0.68			
			73.75	75.03	0.68			
			74.50	75.78	0.71			
			75.00	76.33	0.72			
			75.50	76.17	0.72			
			75.50	76.53	0.71			
			76.75	77.71	0.79			
			78.00	78.73	0.78			
			79.50	80.19	0.76			

Figure 4 – TD248-48 Free Discharge Rating Curve

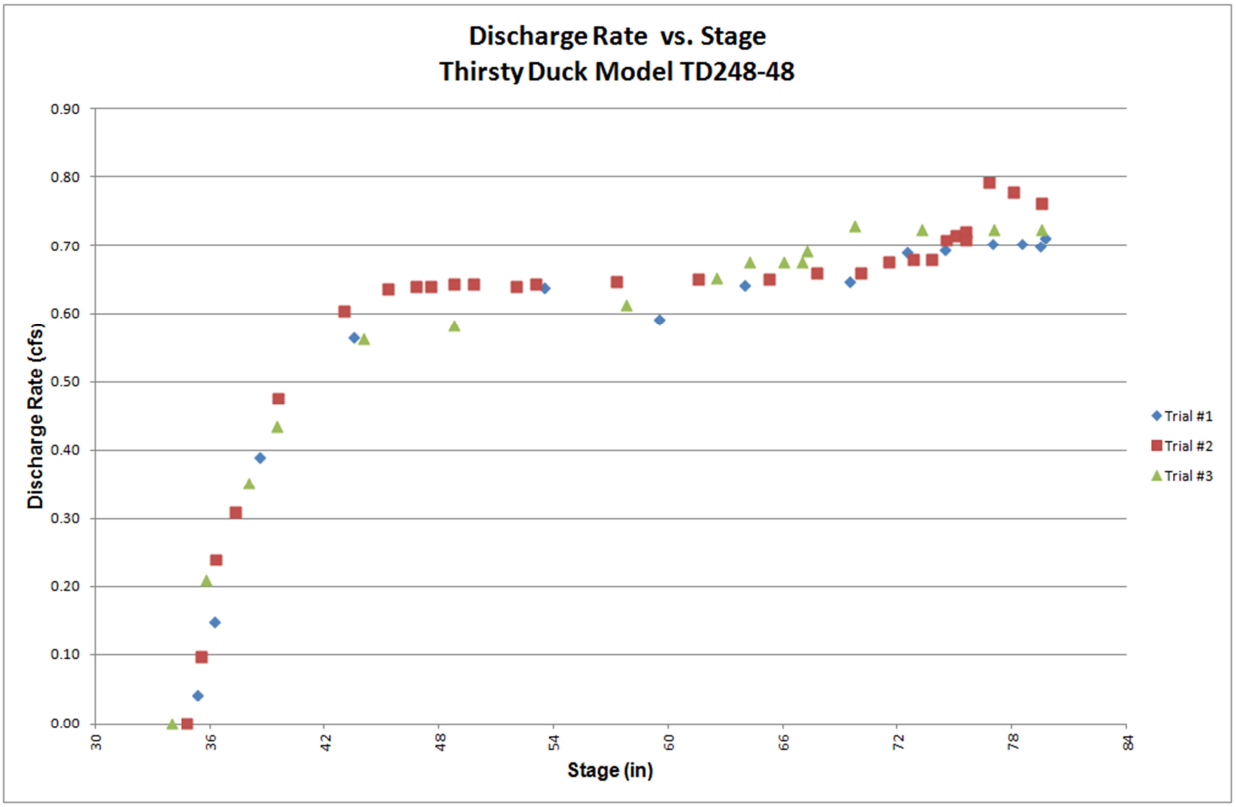


Table 5 – TD246-48 Free Discharge Rating Curve Data

TD246-48	Trial #1		TD246-48	Trial #2		TD246-48	Trial #3	
Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)	Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)	Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)
40.25	46.21	0.17	36.00	46.25	0.08	37.00	46.21	0.11
47.50	51.49	0.23	36.38	46.21	0.09	38.75	46.17	0.14
54.50	58.10	0.22	38.00	46.21	0.11	42.50	46.37	0.21
59.50	62.90	0.22	40.00	46.17	0.17	44.00	47.31	0.21
64.25	67.51	0.22	43.50	46.45	0.21	44.75	48.14	0.21
69.00	71.64	0.22	49.00	52.71	0.22	47.75	51.05	0.21
74.50	77.23	0.23	52.50	56.05	0.22	49.75	53.06	0.22
80.53	83.10	0.24	55.50	59.08	0.22	52.25	55.50	0.22
85.50	87.71	0.24	59.00	62.47	0.22	58.75	61.76	0.23
91.00	92.27	0.24	61.75	65.15	0.22	62.75	65.66	0.23
95.50	97.27	0.24	64.75	68.02	0.23	66.50	69.01	0.23
			67.00	70.07	0.23	77.50	79.56	0.24
			68.75	71.88	0.23	82.50	84.01	0.24
			71.00	74.01	0.23	86.50	88.18	0.24
			73.00	75.70	0.23	92.50	93.45	0.25
			75.50	78.26	0.23	98.00	98.57	0.26
			77.75	80.15	0.23			
			79.50	82.00	0.24			
			82.50	84.87	0.24			
			84.25	86.53	0.24			
			86.00	88.14	0.24			
			87.50	89.32	0.24			
			89.00	90.82	0.24			
			90.50	92.08	0.24			
			91.50	93.34	0.25			

Figure 5 – TD246-48 Free Discharge Rating Curve

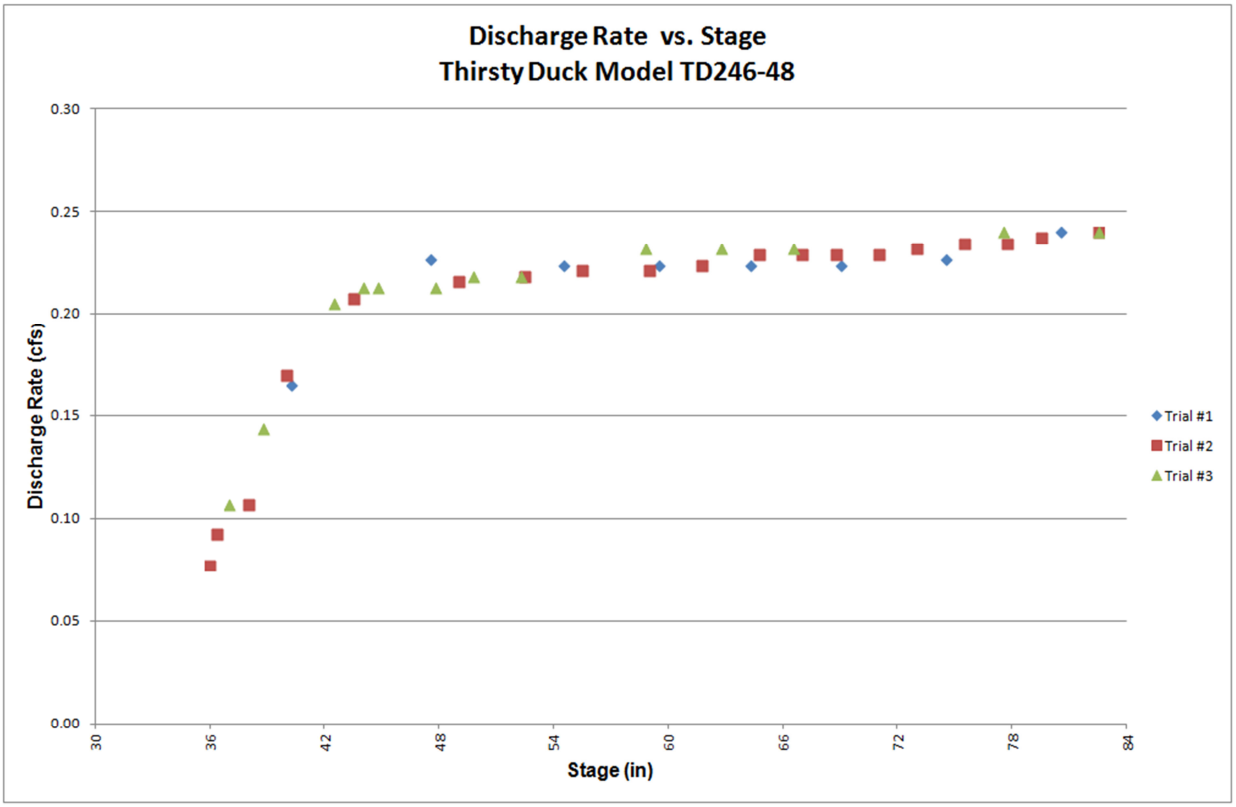
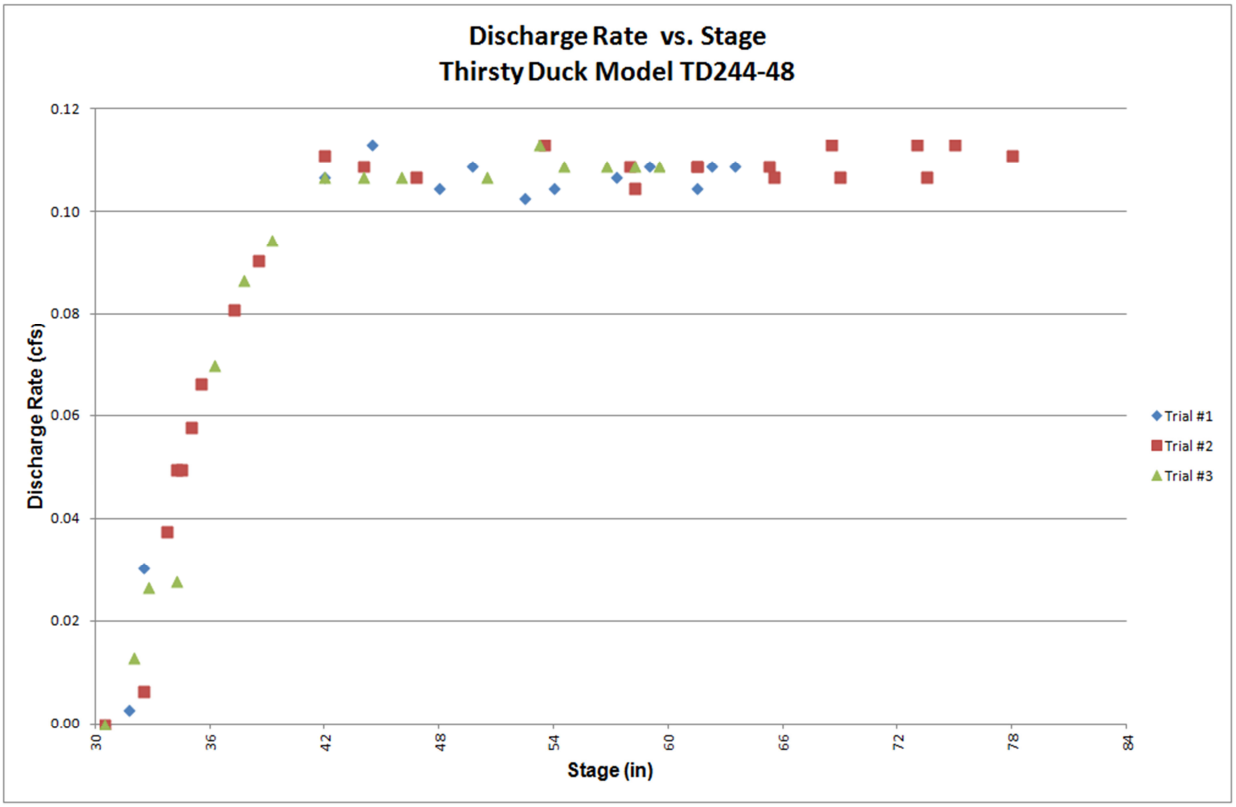


Table 4 – TD244-48 Free Discharge Rating Curve Data

TD244-48	Trial #1		TD244-48	Trial #2		TD244-48	Trial #3	
Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)	Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)	Water Height (in)	Top of Device Height (in)	Measured Discharge (cfs)
30.50	42.00	0.00	30.50	42.00	0.00	30.50	42.00	0.00
31.75	42.00	0.00	32.50	42.00	0.01	32.00	42.00	0.01
32.50	42.00	0.03	33.75	42.00	0.04	32.75	42.00	0.03
42.00	42.71	0.11	34.25	42.00	0.05	34.25	42.00	0.03
44.50	45.07	0.11	34.50	42.00	0.05	36.25	42.00	0.07
48.00	48.73	0.10	35.00	42.00	0.06	37.75	42.00	0.09
49.75	50.11	0.11	35.50	42.00	0.07	39.25	42.00	0.09
52.50	53.06	0.10	37.25	42.00	0.08	42.00	42.94	0.11
54.00	54.17	0.10	38.50	42.00	0.09	44.00	44.87	0.11
57.25	57.67	0.11	42.00	42.55	0.11	46.00	46.57	0.11
59.00	59.28	0.11	44.00	45.07	0.11	50.50	51.29	0.11
61.50	62.20	0.10	46.75	47.75	0.11	53.25	53.97	0.11
62.25	62.00	0.11	53.50	54.20	0.11	54.50	55.15	0.11
63.50	64.44	0.11	58.00	58.97	0.11	56.75	57.43	0.11
65.50	65.58	0.11	58.25	58.85	0.10	58.25	59.09	0.11
69.00	69.68	0.11	61.50	62.24	0.11	59.50	60.03	0.11
70.50	70.46	0.11	61.50	62.35	0.11	62.25	62.79	0.11
74.50	74.20	0.11	65.25	65.54	0.11	62.75	63.65	0.11
77.00	76.45	0.11	65.50	66.72	0.11	65.50	65.90	0.11
80.50	79.99	0.12	68.50	68.97	0.11	67.75	68.54	0.11
			69.00	69.60	0.11	69.00	69.32	0.11
			73.00	72.87	0.11	72.50	73.89	0.11
			73.50	74.13	0.11	73.00	73.14	0.11
			75.00	74.76	0.11	76.00	75.94	0.11
			78.00	78.06	0.11	78.50	78.38	0.11

Figure 6 – TD244-48 Free Discharge Rating Curve



4. Rating Curve Models

Thirsty Duck, Ltd developed a spreadsheet model to predict the stage-discharge relationship for each of the TD series devices tested. There are two important considerations for their model. Firstly, due to the nature of the fabrication process for TD Series' orifice plate, the theoretical sharp-edged orifice coefficient (0.62) is not applicable. As such, the orifice coefficient needs to be calibrated from experimental data. The Thirsty Duck model uses a calibrated orifice coefficient of 0.55. Secondly, as the device rises and the bellows is extended, the downward force acting against the buoyant force produced by the float increases. The reduction in net buoyancy results in an increased rate of discharge as the head over the orifice increases with increasing depth of submergence of the float. The Thirsty Duck model adjusts the discharge rate produced by accounting for the decreasing net buoyancy of the float as the bellows is extended. Copies of the Thirsty Duck rating curve model for each device are included in Appendices A, B, and C. Figures 7, 8, and 9 are plots of the measured rating curve and model rating curve.

Figure 7 – TD248-48 measured and modeled stage-discharge curve

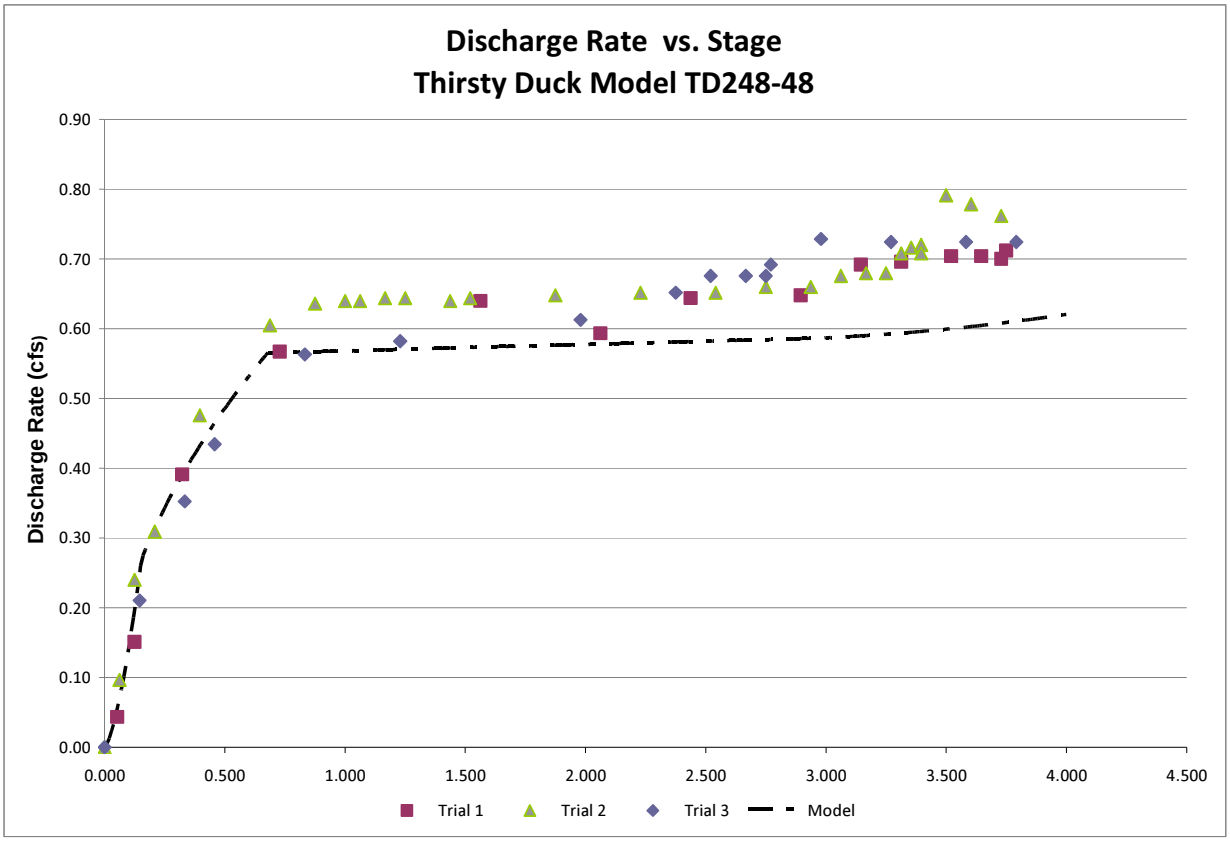


Figure 8 – TD246-48 measured and modeled stage-discharge curve

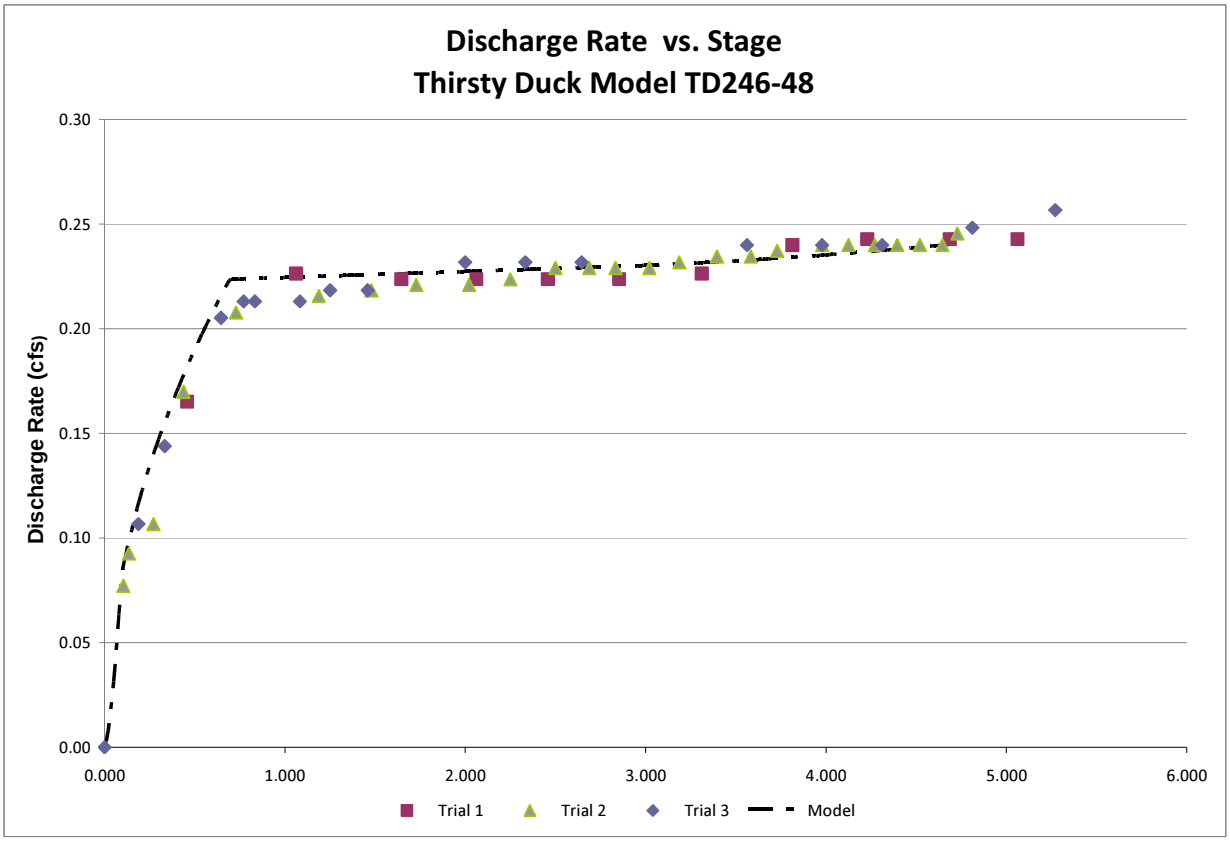
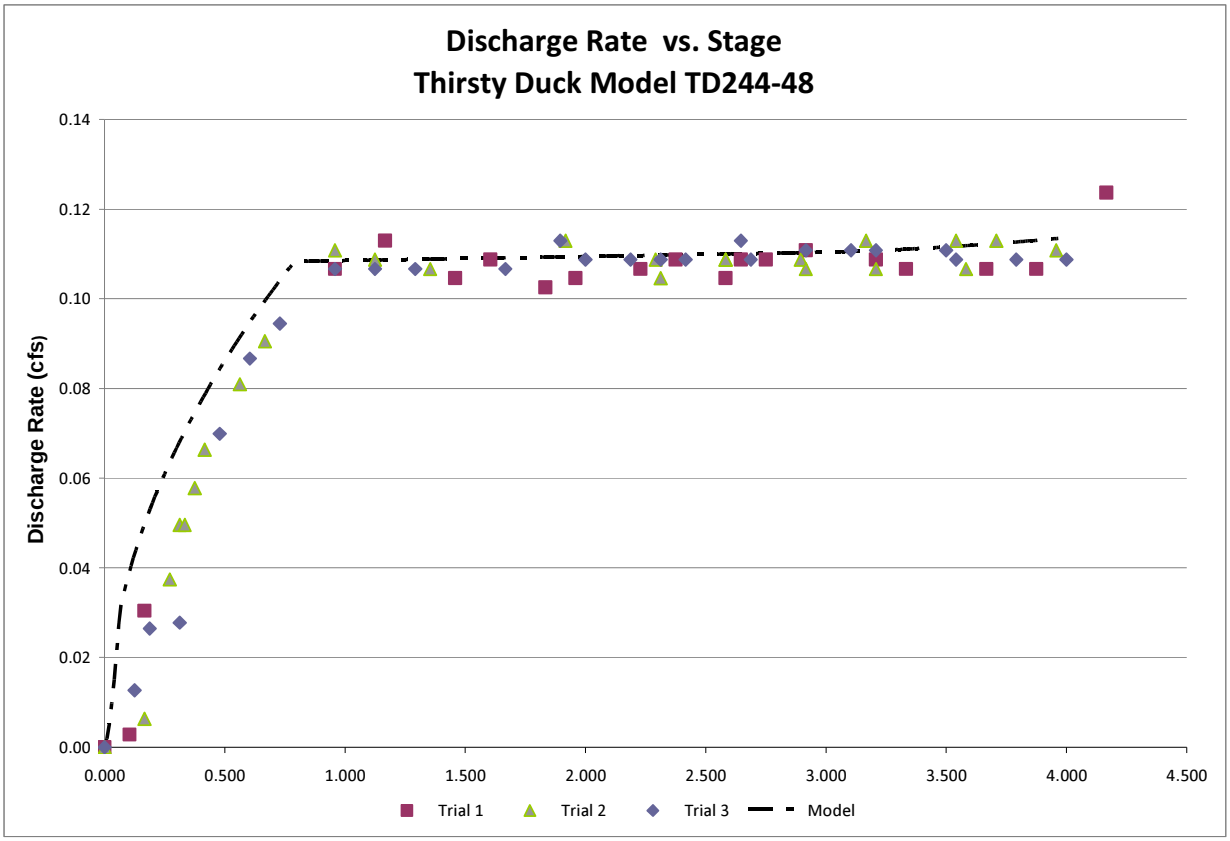


Figure 9 – TD244-48 measured and modeled stage-discharge curve



5. Debris Performance

Debris performance testing was performed for the full range of device operation. The debris tests were conducted with a mixture of dried leaves, hay, and aluminum cans. The mat of debris measured approximately 2.5 inches thick. Tests began with the basin fully drained which allowed some debris to bypass the skimmer as the basin filled. This condition simulates an extreme debris loading condition and is considered conservative. Video documentation of the debris testing experiments is provided in Appendix D.

None of the debris tests were able to foul the device or diminish the rating curve.

6. Summary

SAFL conducted third-party testing on three TD series buoyant flow devices manufactured by Thirsty Duck, Ltd. SAFL measured the stage-discharge relationship for each device and found that it could be accurately predicted using the spreadsheet model developed by Thirsty Duck, Ltd. Performance under extreme debris loading conditions was tested using a mixture of dried leaves, hay, and aluminum cans. The debris loads tested were unable to foul the devices or measurably modify the rating curve determined for each device.

Appendix A – TD248-48 Design Spreadsheet

St. Anthony Falls Testing (TD248-48)

THIRSTY DUCK TD SERIES

STAGE VS. DISCHARGE RELATIONSHIP CONSIDERING TAILWATER EFFECTS

TAILWATER ELEVATION 0 FT ASSUMED

ENTER VALUES IN YELLOW CELLS ONLY

Need Help?

E-mail Thirsty Duck for Assistance

www.Thirsty-Duck.com/technical-info

Call a Thirsty Duck Engineer
(727) 376-2400
Mon.-Fri. 8 am to 5 pm (EST)

DATUM: ASSUMED

INNER AND OUTER ORIFICE SIZE:

	DIAMETER (inches)	DIAMETER (feet)	AREA (sq. inches)	AREA (sq. ft)
INNER ORIFICE DIAMETER	5.34	0.45	22.3961	0.1555
INNER ORIFICE PERIMETER	16.7761	1.40		
WEIR COEFFICIENT	3.2			
ORIFICE COEFFICIENT	0.55			
WEIR TO ORIFICE TRANSITION HEAD (Co x Ao)/(Cw x Lw)	1.84	0.153		

DESIGN ELEVATIONS (FT NGVD29):

TOP OF BANK	4.00	ft ASSUMED
MINIMUM DISCHARGE ELEVATION	0.00	ft ASSUMED
DESIGN PEAK STAGE	4.00	ft ASSUMED
DESIGN TAILWATER	0.00	ft ASSUMED
ATTACHMENT FLANGE ELEVATION	-0.92	ft ASSUMED

ORIFICE DATA:

C (INNER ORIFICE)	0.55	unitless
PROPOSED SUBMERGENCE (INNER ORIFICE)	0.00	ft
DESIGN OPERATING HEAD	0.68	ft

MAX FLOW RATE **0.565237 cfs**

HOUSING BOX DATA (CASE C – Inflow through slot(s)):

SLOT LENGTH	10000.00	ft.
SLOT HEIGHT	10000.00	ft.
WEIR COEFFICIENT	3.20	unitless
ORIFICE COEFFICIENT	0.80	unitless
SLOT INVERT ELEVATION	0.00	ft ASSUMED
SLOT CENTROID ELEVATION	5000.00	ft ASSUMED
SLOT CROWN ELEVATION	10000.00	ft ASSUMED

BELLOWS DATA:

BELLOWS INSIDE DIAMETER	8.00	in
BELLOWS LENGTH	4.08	ft.
BELLOWS COLLAPSED HEIGHT	0.583333333	ft.
BODY WEIGHT	36	lbs
NET FLOTATION AREA	2.924790036	sq. ft.
NET BODY AREA	0.065108962	sq. ft.
THICKNESS OF FOAM	0.510416667	ft.
HEIGHT OF BODY	1.5	ft.
LINEAR FORCE COEFFICIENT	4.2	x
FIRST PARABOLIC FORCE COEFFICIENT	8.94	x^2
SECOND PARABOLIC FORCE COEFFICIENT	40.5	x
THIRD PARABOLIC FORCE COEFFICIENT	55.875	x^0

RATING CURVE COMPUTATION INCREMENT: 0.01 ft

Maximum Round Orifice Sizes:

Bellows ID	Max Orifice (in)	Flow (cfs) at 6" head	Flow (cfs) at 9" head	Flow (cfs) at 12" head
4" bellows	1.94"	0.0722	0.08845	0.102
6" bellows	3.34"	0.214062	0.26217	0.303
8" bellows	5.34"	0.547179	0.670155	0.773828

Maximum Equivalent Orifice Sizes:

Bellows ID	Max Orifice (in)	Flow (cfs) at 6" head	Flow (cfs) at 9" head	Flow (cfs) at 12" head
4" bellows	3.66"	0.26	0.315	0.364
6" bellows	5.65"	0.612	0.75	0.866
8" bellows	7.50"	1.078	1.322	1.526

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
0.00	0.00	0.34	23%	37.414	1.168570179	0.0000	SUBMERGED	0.000	0.0000	0.0000000
0.01	0.00	0.34	23%	37.414	1.168570179	32.0000	SUBMERGED	0.010	0.0045	0.0044736
0.02	0.00	0.34	23%	37.414	1.168570179	90.5097	SUBMERGED	0.020	0.0127	0.0126533
0.03	0.00	0.34	23%	37.414	1.168570179	166.2769	SUBMERGED	0.030	0.0232	0.0232457
0.04	0.00	0.34	23%	37.414	1.168570179	256.0000	SUBMERGED	0.040	0.0358	0.0357890
0.05	0.00	0.34	23%	37.414	1.168570179	357.7709	SUBMERGED	0.050	0.0500	0.0500167
0.06	0.00	0.34	23%	37.414	1.168570179	470.3020	SUBMERGED	0.060	0.0657	0.0657486
0.07	0.00	0.34	23%	37.414	1.168570179	592.6483	SUBMERGED	0.070	0.0829	0.0828527
0.08	0.00	0.34	23%	37.414	1.168570179	724.0773	SUBMERGED	0.080	0.1012	0.1012266
0.09	0.00	0.34	23%	37.414	1.168570179	864.0000	SUBMERGED	0.090	0.1208	0.1207880
0.10	0.00	0.34	23%	37.414	1.168570179	1011.9289	SUBMERGED	0.100	0.1415	0.1414685
0.11	0.00	0.34	23%	37.414	1.168570179	1167.4519	SUBMERGED	0.110	0.1632	0.1632108
0.12	0.00	0.34	23%	37.414	1.168570179	1330.2150	SUBMERGED	0.120	0.1860	0.1859652
0.13	0.00	0.34	23%	37.414	1.168570179	1499.9093	SUBMERGED	0.130	0.2097	0.2096886
0.14	0.00	0.34	23%	37.414	1.168570179	1676.2625	SUBMERGED	0.140	0.2343	0.2343430
0.15	0.00	0.34	23%	37.414	1.168570179	1859.0320	SUBMERGED	0.150	0.2599	0.2598943
0.16	0.00	0.34	23%	37.414	1.168570179	2048.0000	SUBMERGED	0.160	0.2746	0.2745842
0.17	0.00	0.34	23%	37.414	1.168570179	2242.9695	SUBMERGED	0.170	0.2830	0.2830349
0.18	0.00	0.34	23%	37.414	1.168570179	2443.7610	SUBMERGED	0.180	0.2912	0.2912405
0.19	0.00	0.34	23%	37.414	1.168570179	2650.2106	SUBMERGED	0.190	0.2992	0.2992212
0.20	0.00	0.34	23%	37.414	1.168570179	2862.1670	SUBMERGED	0.200	0.3070	0.3069945
0.21	0.00	0.34	23%	37.414	1.168570179	3079.4909	SUBMERGED	0.210	0.3146	0.3145757
0.22	0.00	0.34	23%	37.414	1.168570179	3302.0527	SUBMERGED	0.220	0.3220	0.3219785
0.23	0.00	0.34	23%	37.414	1.168570179	3529.7320	SUBMERGED	0.230	0.3292	0.3292149
0.24	0.00	0.34	23%	37.414	1.168570179	3762.4162	SUBMERGED	0.240	0.3363	0.3362956
0.25	0.00	0.34	23%	37.414	1.168570179	4000.0000	SUBMERGED	0.250	0.3432	0.3432302
0.26	0.00	0.34	23%	37.414	1.168570179	4242.3842	SUBMERGED	0.260	0.3500	0.3500275
0.27	0.00	0.34	23%	37.414	1.168570179	4489.4757	SUBMERGED	0.270	0.3567	0.3566953
0.28	0.00	0.34	23%	37.414	1.168570179	4741.1863	SUBMERGED	0.280	0.3632	0.3632407
0.29	0.00	0.34	23%	37.414	1.168570179	4997.4329	SUBMERGED	0.290	0.3697	0.3696703
0.30	0.00	0.34	23%	37.414	1.168570179	5258.1366	SUBMERGED	0.300	0.3760	0.3759899
0.31	0.00	0.34	23%	37.414	1.168570179	5523.2222	SUBMERGED	0.310	0.3822	0.3822050
0.32	0.00	0.34	23%	37.414	1.168570179	5792.6188	SUBMERGED	0.320	0.3883	0.3883207
0.33	0.00	0.34	23%	37.414	1.168570179	6066.2582	SUBMERGED	0.330	0.3943	0.3943415
0.34	0.00	0.34	23%	37.414	1.168570179	6344.0757	SUBMERGED	0.340	0.4003	0.4002718
0.35	0.00	0.34	23%	37.414	1.168570179	6626.0094	SUBMERGED	0.350	0.4061	0.4061155
0.36	0.00	0.34	23%	37.414	1.168570179	6912.0000	SUBMERGED	0.360	0.4119	0.4118763
0.37	0.00	0.34	23%	37.414	1.168570179	7201.9908	SUBMERGED	0.370	0.4176	0.4175576
0.38	0.00	0.34	23%	37.414	1.168570179	7495.9274	SUBMERGED	0.380	0.4232	0.4231626
0.39	0.00	0.34	23%	37.414	1.168570179	7793.7575	SUBMERGED	0.390	0.4287	0.4286944
0.40	0.00	0.34	23%	37.414	1.168570179	8095.4308	SUBMERGED	0.400	0.4342	0.4341557
0.41	0.00	0.34	23%	37.414	1.168570179	8400.8990	SUBMERGED	0.410	0.4395	0.4395492
0.42	0.00	0.34	23%	37.414	1.168570179	8710.1155	SUBMERGED	0.420	0.4449	0.4448772
0.43	0.00	0.34	23%	37.414	1.168570179	9023.0354	SUBMERGED	0.430	0.4501	0.4501422
0.44	0.00	0.34	23%	37.414	1.168570179	9339.6154	SUBMERGED	0.440	0.4553	0.4553464
0.45	0.00	0.34	23%	37.414	1.168570179	9659.8137	SUBMERGED	0.450	0.4605	0.4604917
0.46	0.00	0.34	23%	37.414	1.168570179	9983.5897	SUBMERGED	0.460	0.4656	0.4655801
0.47	0.00	0.34	23%	37.414	1.168570179	10310.9045	SUBMERGED	0.470	0.4706	0.4706136
0.48	0.00	0.34	23%	37.414	1.168570179	10641.7202	SUBMERGED	0.480	0.4756	0.4755938
0.49	0.00	0.34	23%	37.414	1.168570179	10976.0000	SUBMERGED	0.490	0.4805	0.4805223
0.50	0.00	0.34	23%	37.414	1.168570179	11313.7085	SUBMERGED	0.500	0.4854	0.4854008
0.51	0.00	0.34	23%	37.414	1.168570179	11654.8112	SUBMERGED	0.510	0.4902	0.4902308
0.52	0.00	0.34	23%	37.414	1.168570179	11999.2746	SUBMERGED	0.520	0.4950	0.4950137
0.53	0.00	0.34	23%	37.414	1.168570179	12347.0664	SUBMERGED	0.530	0.4998	0.4997508
0.54	0.00	0.34	23%	37.414	1.168570179	12698.1548	SUBMERGED	0.540	0.5044	0.5044434
0.55	0.00	0.34	23%	37.414	1.168570179	13052.5093	SUBMERGED	0.550	0.5091	0.5090927
0.56	0.00	0.34	23%	37.414	1.168570179	13410.1001	SUBMERGED	0.560	0.5137	0.5137000
0.57	0.00	0.34	23%	37.414	1.168570179	13770.8980	SUBMERGED	0.570	0.5183	0.5182663
0.58	0.00	0.34	23%	37.414	1.168570179	14134.8749	SUBMERGED	0.580	0.5228	0.5227927
0.59	0.00	0.34	23%	37.414	1.168570179	14502.0032	SUBMERGED	0.590	0.5273	0.5272803
0.60	0.00	0.34	23%	37.414	1.168570179	14872.2560	SUBMERGED	0.600	0.5317	0.5317300
0.61	0.00	0.34	23%	37.414	1.168570179	15245.6074	SUBMERGED	0.610	0.5361	0.5361428
0.62	0.00	0.34	23%	37.414	1.168570179	15622.0316	SUBMERGED	0.620	0.5405	0.5405195
0.63	0.00	0.34	23%	37.414	1.168570179	16001.5039	SUBMERGED	0.630	0.5449	0.5448611
0.64	0.00	0.34	23%	37.414	1.168570179	16384.0000	SUBMERGED	0.640	0.5492	0.5491684
0.65	0.00	0.34	23%	37.414	1.168570179	16769.4961	SUBMERGED	0.650	0.5534	0.5534421
0.66	0.00	0.34	23%	37.414	1.168570179	17157.9691	SUBMERGED	0.660	0.5577	0.5576831
0.67	0.00	0.34	23%	37.414	1.168570179	17549.3963	SUBMERGED	0.670	0.5619	0.5618921
0.68	0.00	0.34	23%	37.4224	1.168615202	17943.7557	FREE	0.678	0.5653	0.5652555
0.69	0.01	0.35	23%	37.4644	1.168840319	18341.0255	FREE	0.678	0.5653	0.5653493
0.70	0.02	0.36	23%	37.5064	1.169065436	18741.1846	FREE	0.678	0.5654	0.5654431
0.71	0.03	0.37	23%	37.5484	1.169290553	19144.2123	FREE	0.679	0.5655	0.5655369
0.72	0.04	0.38	24%	37.5904	1.16951567	19550.0883	FREE	0.679	0.5656	0.5656307
0.73	0.05	0.39	24%	37.6324	1.169740787	19958.7927	FREE	0.679	0.5657	0.5657245
0.74	0.06	0.40	24%	37.6744	1.169965904	20370.3062	FREE	0.679	0.5658	0.5658182
0.75	0.07	0.41	24%	37.7164	1.170191021	20784.6097	FREE	0.680	0.5659	0.5659120
0.76	0.08	0.42	25%	37.7584	1.170416138	21201.6845	FREE	0.680	0.5660	0.5660057
0.77	0.09	0.43	25%	37.8004	1.170641254	21621.5123	FREE	0.680	0.5661	0.5660994
0.78	0.10	0.44	25%	37.8424	1.170866371	22044.0751	FREE	0.680	0.5662	0.5661931
0.79	0.11	0.45	25%	37.8844	1.171091488	22469.3555	FREE	0.681	0.5663	0.5662867
0.80	0.12	0.46	26%	37.9264	1.171316605	22897.3361	FREE	0.681	0.5664	0.5663804
0.81	0.13	0.47	26%	37.9684	1.171541722	23328.0000	FREE	0.681	0.5665	0.5664740
0.82	0.14	0.48	26%	38.0104	1.171766839	23761.3306	FREE	0.681	0.5666	0.5665677
0.83	0.15	0.49	26%	38.0524	1.171991956	24197.3116	FREE	0.681	0.5667	0.5666613
0.84	0.16	0.50	26%	38.0944	1.172217073	24635.9269	FREE	0.682	0.5668	0.5667549
0.85	0.17	0.51	27%	38.1364	1.17244219	25077.1609	FREE	0.682	0.5668	0.5668484
0.86	0.18	0.52	27%	38.1784	1.172667307	25520.9981	FREE	0.682	0.5669	0.5669420
0.87	0.19	0.53	27%	38.2204	1.172892424	25967.4233	FREE	0.682	0.5670	0.5670356
0.88	0.20	0.54	27%	38.2624	1.173117541	26416.4216	FREE	0.683	0.5671	0.5671291
0.89	0.21	0.55	28%	38.3044	1.173342658	26867.9783	FREE	0.683	0.5672	0.5672226
0.90	0.22	0.56	28%	38.3464	1.173567775	27322.0790	FREE	0.683	0.5673	0.5673161
0.91	0.23	0.57	28%	38.3884	1.173792892	27778.7095	FREE	0.683	0.5674	0.5674096
0.92	0.24	0.58	28%	38.4304	1.174018009	28237.8560	FREE	0.683	0.5675	0.5675031
0.93	0.25	0.59	29%	38.4724	1.174243126	28699.5047	FREE	0.684	0.5676	0.5675965
0.94	0.26	0.60	29%	38.5144	1.174468243	29163.6420	FREE	0.684	0.5677	0.5676900
0.95	0.27	0.61	29%	38.5564	1.174693359	29630.2548	FREE	0.684	0.5678	0.5677834
0.96	0.28	0.62	29%	38.5984	1.174918476	30099.3300	FREE	0.684	0.5679	0.5678768
0.97	0.29	0.63	30%	38.6404	1.175143593	30570.8546	FREE	0.685	0.5680	0.5679702
0.98	0.30	0.64	30%	38.6824	1.17536871	31044.8161	FREE	0.685	0.5681	0.5680636
0.99	0.31	0.65	30%	38.7244	1.175593827	31521.2020	FREE	0.685	0.5682	0.5681569
1.00	0.32	0.66	30%	38.7664	1.175818944	32000.0000	FREE	0.685	0.5683	0.5682503

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
1.01	0.33	0.67	31%	38.8084	1.176044061	32481.1980	FREE	0.685	0.5683	0.5683436
1.02	0.34	0.68	31%	38.8504	1.176269178	32964.7841	FREE	0.686	0.5684	0.5684369
1.03	0.35	0.69	31%	38.8924	1.176494295	33450.7466	FREE	0.686	0.5685	0.5685302
1.04	0.36	0.70	31%	38.9344	1.176719412	33939.0739	FREE	0.686	0.5686	0.5686235
1.05	0.37	0.71	32%	38.9764	1.176944529	34429.7546	FREE	0.686	0.5687	0.5687168
1.06	0.38	0.72	32%	39.0184	1.177169646	34922.7774	FREE	0.687	0.5688	0.5688100
1.07	0.39	0.73	32%	39.0604	1.177394763	35418.1314	FREE	0.687	0.5689	0.5689033
1.08	0.40	0.74	32%	39.1024	1.17761988	35915.8055	FREE	0.687	0.5690	0.5689965
1.09	0.41	0.75	33%	39.1444	1.177844997	36415.7891	FREE	0.687	0.5691	0.5690897
1.10	0.42	0.76	33%	39.1864	1.178070114	36918.0715	FREE	0.687	0.5692	0.5691829
1.11	0.43	0.77	33%	39.2284	1.178295231	37422.6421	FREE	0.688	0.5693	0.5692761
1.12	0.44	0.78	33%	39.2704	1.178520348	37929.4908	FREE	0.688	0.5694	0.5693693
1.13	0.45	0.79	34%	39.3124	1.178745464	38438.6073	FREE	0.688	0.5695	0.5694624
1.14	0.46	0.80	34%	39.3544	1.178970581	38949.9815	FREE	0.688	0.5696	0.5695555
1.15	0.47	0.81	34%	39.3964	1.179195698	39463.6035	FREE	0.689	0.5696	0.5696487
1.16	0.48	0.82	34%	39.4384	1.179420815	39979.4635	FREE	0.689	0.5697	0.5697418
1.17	0.49	0.83	35%	39.4804	1.179645932	40497.5519	FREE	0.689	0.5698	0.5698349
1.18	0.50	0.84	35%	39.5224	1.179871049	41017.8591	FREE	0.689	0.5699	0.5699279
1.19	0.51	0.85	35%	39.5644	1.180096166	41540.3757	FREE	0.690	0.5700	0.5700210
1.20	0.52	0.86	35%	39.6064	1.180321283	42065.0924	FREE	0.690	0.5701	0.5701140
1.21	0.53	0.87	36%	39.6484	1.1805464	42592.0000	FREE	0.690	0.5702	0.5702071
1.22	0.54	0.88	36%	39.6904	1.180771517	43121.0894	FREE	0.690	0.5703	0.5703001
1.23	0.55	0.89	36%	39.7324	1.180996634	43652.3517	FREE	0.690	0.5704	0.5703931
1.24	0.56	0.90	36%	39.7744	1.181221751	44185.7780	FREE	0.691	0.5705	0.5704860
1.25	0.57	0.91	37%	39.8164	1.181446868	44721.3595	FREE	0.691	0.5706	0.5705790
1.26	0.58	0.92	37%	39.8584	1.181671985	45259.0878	FREE	0.691	0.5707	0.5706720
1.27	0.59	0.93	37%	39.9004	1.181897102	45798.9540	FREE	0.691	0.5708	0.5707649
1.28	0.60	0.94	37%	39.9424	1.182122219	46340.9500	FREE	0.692	0.5709	0.5708578
1.29	0.61	0.95	38%	39.9844	1.182347336	46885.0673	FREE	0.692	0.5710	0.5709507
1.30	0.62	0.96	38%	40.0264	1.182572452	47431.2977	FREE	0.692	0.5710	0.5710436
1.31	0.63	0.97	38%	40.0684	1.182797569	47979.6330	FREE	0.692	0.5711	0.5711365
1.32	0.64	0.98	38%	40.1104	1.183022686	48530.0652	FREE	0.692	0.5712	0.5712294
1.33	0.65	0.99	38%	40.1524	1.183247803	49082.5864	FREE	0.693	0.5713	0.5713222
1.34	0.66	1.00	39%	40.1944	1.18347292	49637.1886	FREE	0.693	0.5714	0.5714150
1.35	0.67	1.01	39%	40.2364	1.183698037	50193.8642	FREE	0.693	0.5715	0.5715079
1.36	0.68	1.02	39%	40.2784	1.183923154	50752.6053	FREE	0.693	0.5716	0.5716007
1.37	0.69	1.03	39%	40.3204	1.184148271	51313.4044	FREE	0.694	0.5717	0.5716934
1.38	0.70	1.04	40%	40.3624	1.184373388	51876.2540	FREE	0.694	0.5718	0.5717862
1.39	0.71	1.05	40%	40.4044	1.184598505	52441.1466	FREE	0.694	0.5719	0.5718790
1.40	0.72	1.06	40%	40.4464	1.184823622	53008.0749	FREE	0.694	0.5720	0.5719717
1.41	0.73	1.07	40%	40.4884	1.185048739	53577.0315	FREE	0.694	0.5721	0.5720644
1.42	0.74	1.08	41%	40.5304	1.185273856	54148.0093	FREE	0.695	0.5722	0.5721571
1.43	0.75	1.09	41%	40.5724	1.185498973	54721.0012	FREE	0.695	0.5722	0.5722498
1.44	0.76	1.10	41%	40.6144	1.18572409	55296.0000	FREE	0.695	0.5723	0.5723425
1.45	0.77	1.11	41%	40.6564	1.185949207	55872.9988	FREE	0.695	0.5724	0.5724352
1.46	0.78	1.12	42%	40.6984	1.186174324	56451.9908	FREE	0.696	0.5725	0.5725278
1.47	0.79	1.13	42%	40.7404	1.186399441	57032.9690	FREE	0.696	0.5726	0.5726205
1.48	0.80	1.14	42%	40.7824	1.186624557	57615.9267	FREE	0.696	0.5727	0.5727131
1.49	0.81	1.15	42%	40.8244	1.186849674	58200.8572	FREE	0.696	0.5728	0.5728057
1.50	0.82	1.16	43%	40.8664	1.187074791	58787.7538	FREE	0.697	0.5729	0.5728983
1.51	0.83	1.17	43%	40.9084	1.187299908	59376.6101	FREE	0.697	0.5730	0.5729909
1.52	0.84	1.18	43%	40.9504	1.187525025	59967.4194	FREE	0.697	0.5731	0.5730834
1.53	0.85	1.19	43%	40.9924	1.187750142	60560.1754	FREE	0.697	0.5732	0.5731760
1.54	0.86	1.20	44%	41.0344	1.187975259	61154.8717	FREE	0.697	0.5733	0.5732685
1.55	0.87	1.21	44%	41.0764	1.188200376	61751.5020	FREE	0.698	0.5734	0.5733610
1.56	0.88	1.22	44%	41.1184	1.188425493	62350.0600	FREE	0.698	0.5735	0.5734535
1.57	0.89	1.23	44%	41.1604	1.18865061	62950.5396	FREE	0.698	0.5735	0.5735460
1.58	0.90	1.24	45%	41.2024	1.188875727	63552.9345	FREE	0.698	0.5736	0.5736385
1.59	0.91	1.25	45%	41.2444	1.189100844	64157.2388	FREE	0.699	0.5737	0.5737309
1.60	0.92	1.26	45%	41.2864	1.189325961	64763.4465	FREE	0.699	0.5738	0.5738234
1.61	0.93	1.27	45%	41.3284	1.189551078	65371.5515	FREE	0.699	0.5739	0.5739158
1.62	0.94	1.28	46%	41.3704	1.189776195	65981.5480	FREE	0.699	0.5740	0.5740082
1.63	0.95	1.29	46%	41.4124	1.190001312	66593.4301	FREE	0.699	0.5741	0.5741006
1.64	0.96	1.30	46%	41.4544	1.190226429	67207.1920	FREE	0.700	0.5742	0.5741930
1.65	0.97	1.31	46%	41.4964	1.190451546	67822.8280	FREE	0.700	0.5743	0.5742854
1.66	0.98	1.32	47%	41.5384	1.190676662	68440.3324	FREE	0.700	0.5744	0.5743777
1.67	0.99	1.33	47%	41.5804	1.190901779	69059.6996	FREE	0.700	0.5745	0.5744700
1.68	1.00	1.34	47%	41.6224	1.191126896	69680.9240	FREE	0.701	0.5746	0.5745624
1.69	1.01	1.35	47%	41.6644	1.191352013	70304.0000	FREE	0.701	0.5747	0.5746547
1.70	1.02	1.36	48%	41.7064	1.19157713	70928.9222	FREE	0.701	0.5747	0.5747470
1.71	1.03	1.37	48%	41.7484	1.191802247	71555.6851	FREE	0.701	0.5748	0.5748392
1.72	1.04	1.38	48%	41.7904	1.192027364	72184.2833	FREE	0.701	0.5749	0.5749315
1.73	1.05	1.39	48%	41.8324	1.192252481	72814.7115	FREE	0.702	0.5750	0.5750238
1.74	1.06	1.40	49%	41.8744	1.192477598	73446.9644	FREE	0.702	0.5751	0.5751160
1.75	1.07	1.41	49%	41.9164	1.192702715	74081.0367	FREE	0.702	0.5752	0.5752082
1.76	1.08	1.42	49%	41.9584	1.192927832	74716.9233	FREE	0.702	0.5753	0.5753004
1.77	1.09	1.43	49%	42.0004	1.193152949	75354.6189	FREE	0.703	0.5754	0.5753926
1.78	1.10	1.44	50%	42.0424	1.193378066	75994.1185	FREE	0.703	0.5755	0.5754848
1.79	1.11	1.45	50%	42.0844	1.193603183	76635.4170	FREE	0.703	0.5756	0.5755769
1.80	1.12	1.46	50%	42.1264	1.1938283	77278.5093	FREE	0.703	0.5757	0.5756691
1.81	1.13	1.47	50%	42.1684	1.194053417	77923.3905	FREE	0.703	0.5758	0.5757612
1.82	1.14	1.48	50%	42.2104	1.194278534	78570.0556	FREE	0.704	0.5759	0.5758533
1.83	1.15	1.49	51%	42.2524	1.19450365	79218.4997	FREE	0.704	0.5759	0.5759454
1.84	1.16	1.50	51%	42.2944	1.194728767	79868.7179	FREE	0.704	0.5760	0.5760375
1.85	1.17	1.51	51%	42.3364	1.194953884	80520.7054	FREE	0.704	0.5761	0.5761296
1.86	1.18	1.52	51%	42.3784	1.195179001	81174.4575	FREE	0.705	0.5762	0.5762216
1.87	1.19	1.53	52%	42.4204	1.195404118	81829.9693	FREE	0.705	0.5763	0.5763137
1.88	1.20	1.54	52%	42.4624	1.195629235	82487.2362	FREE	0.705	0.5764	0.5764057
1.89	1.21	1.55	52%	42.5044	1.195854352	83146.2534	FREE	0.705	0.5765	0.5764977
1.90	1.22	1.56	52%	42.5464	1.196079469	83807.0164	FREE	0.706	0.5766	0.5765897
1.91	1.23	1.57	53%	42.5884	1.196304586	84469.5206	FREE	0.706	0.5767	0.5766817
1.92	1.24	1.58	53%	42.6304	1.196529703	85133.7613	FREE	0.706	0.5768	0.5767737
1.93	1.25	1.59	53%	42.6724	1.19675482	85799.7341	FREE	0.706	0.5769	0.5768656
1.94	1.26	1.60	53%	42.7144	1.196979937	86467.4344	FREE	0.706	0.5770	0.5769576
1.95	1.27	1.61	54%	42.7564	1.197205054	87136.8579	FREE	0.707	0.5770	0.5770495
1.96	1.28	1.62	54%	42.7984	1.197430171	87808.0000	FREE	0.707	0.5771	0.5771414
1.97	1.29	1.63	54%	42.8404	1.197655288	88480.8564	FREE	0.707	0.5772	0.5772333
1.98	1.30	1.64	54%	42.8824	1.197880405	89155.4228	FREE	0.707	0.5773	0.5773252
1.99	1.31	1.65	55%	42.9244	1.198105522	89831.6947	FREE	0.708	0.5774	0.5774170
2.00	1.32	1.66	55%	42.9664	1.198330639	90509.6680	FREE	0.708	0.5775	0.5775089
2.01	1.33	1.67	55%	43.0084	1.198555755	91189.3383	FREE	0.708	0.5776	0.5776007

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
2.02	1.34	1.68	55%	43.0504	1.198780872	91870.7015	FREE	0.708	0.5777	0.5776925
2.03	1.35	1.69	56%	43.0924	1.199005989	92553.7533	FREE	0.708	0.5778	0.5777844
2.04	1.36	1.70	56%	43.1344	1.199231106	93238.4896	FREE	0.709	0.5779	0.5778761
2.05	1.37	1.71	56%	43.1764	1.199456223	93924.9062	FREE	0.709	0.5780	0.5779679
2.06	1.38	1.72	56%	43.2184	1.19968134	94612.9990	FREE	0.709	0.5781	0.5780597
2.07	1.39	1.73	57%	43.2604	1.199906457	95302.7640	FREE	0.709	0.5782	0.5781514
2.08	1.40	1.74	57%	43.3024	1.200131574	95994.1972	FREE	0.710	0.5782	0.5782432
2.09	1.41	1.75	57%	43.3444	1.200356691	96687.2944	FREE	0.710	0.5783	0.5783349
2.10	1.42	1.76	57%	43.3864	1.200581808	97382.0517	FREE	0.710	0.5784	0.5784266
2.11	1.43	1.77	58%	43.4284	1.200806925	98078.4652	FREE	0.710	0.5785	0.5785183
2.12	1.44	1.78	58%	43.4704	1.201032042	98776.5310	FREE	0.710	0.5786	0.5786100
2.13	1.45	1.79	58%	43.5124	1.201257159	99476.2450	FREE	0.711	0.5787	0.5787016
2.14	1.46	1.80	58%	43.5544	1.201482276	100177.6036	FREE	0.711	0.5788	0.5787933
2.15	1.47	1.81	59%	43.5964	1.201707393	100880.6027	FREE	0.711	0.5789	0.5788849
2.16	1.48	1.82	59%	43.6384	1.20193251	101585.2386	FREE	0.711	0.5790	0.5789765
2.17	1.49	1.83	59%	43.6804	1.202157627	102291.5075	FREE	0.712	0.5791	0.5790681
2.18	1.50	1.84	59%	43.7224	1.202382743	102999.4057	FREE	0.712	0.5792	0.5791597
2.19	1.51	1.85	60%	43.7644	1.20260786	103708.9293	FREE	0.712	0.5793	0.5792513
2.20	1.52	1.86	60%	43.8064	1.202832977	104420.0747	FREE	0.712	0.5793	0.5793429
2.21	1.53	1.87	60%	43.8484	1.203058094	105132.8382	FREE	0.712	0.5794	0.5794344
2.22	1.54	1.88	60%	43.8904	1.203283211	105847.2161	FREE	0.713	0.5795	0.5795259
2.23	1.55	1.89	61%	43.9324	1.203508328	106563.2048	FREE	0.713	0.5796	0.5796175
2.24	1.56	1.90	61%	43.9744	1.203733445	107280.8006	FREE	0.713	0.5797	0.5797090
2.25	1.57	1.91	61%	44.0164	1.203958562	108000.0000	FREE	0.713	0.5798	0.5798004
2.26	1.58	1.92	61%	44.0584	1.204183679	108720.7994	FREE	0.714	0.5799	0.5798919
2.27	1.59	1.93	62%	44.1004	1.204408796	109443.1953	FREE	0.714	0.5800	0.5799834
2.28	1.60	1.94	62%	44.1424	1.204633913	110167.1841	FREE	0.714	0.5801	0.5800748
2.29	1.61	1.95	62%	44.1844	1.20485903	110892.7623	FREE	0.714	0.5802	0.5801663
2.30	1.62	1.96	62%	44.2264	1.205084147	111619.9265	FREE	0.715	0.5803	0.5802577
2.31	1.63	1.97	62%	44.2684	1.205309264	112348.6733	FREE	0.715	0.5803	0.5803491
2.32	1.64	1.98	63%	44.3104	1.205534381	113078.9991	FREE	0.715	0.5804	0.5804405
2.33	1.65	1.99	63%	44.3524	1.205759498	113810.9006	FREE	0.715	0.5805	0.5805318
2.34	1.66	2.00	63%	44.3944	1.205984615	114544.3744	FREE	0.715	0.5806	0.5806232
2.35	1.67	2.01	63%	44.4364	1.206209732	115279.4171	FREE	0.716	0.5807	0.5807145
2.36	1.68	2.02	64%	44.4784	1.206434848	116016.0254	FREE	0.716	0.5808	0.5808059
2.37	1.69	2.03	64%	44.5204	1.206659965	116754.1960	FREE	0.716	0.5809	0.5808972
2.38	1.70	2.04	64%	44.5624	1.206885082	117493.9255	FREE	0.716	0.5810	0.5809885
2.39	1.71	2.05	64%	44.6044	1.207110199	118235.2107	FREE	0.717	0.5811	0.5810798
2.40	1.72	2.06	65%	44.6464	1.207335316	118978.0484	FREE	0.717	0.5812	0.5811710
2.41	1.73	2.07	65%	44.6884	1.207560433	119722.4353	FREE	0.717	0.5813	0.5812623
2.42	1.74	2.08	65%	44.7304	1.20778555	120468.3681	FREE	0.717	0.5814	0.5813535
2.43	1.75	2.09	65%	44.7724	1.208010667	121215.8437	FREE	0.717	0.5814	0.5814448
2.44	1.76	2.10	66%	44.8144	1.208235784	121964.8589	FREE	0.718	0.5815	0.5815360
2.45	1.77	2.11	66%	44.8564	1.208460901	122715.4106	FREE	0.718	0.5816	0.5816272
2.46	1.78	2.12	66%	44.8984	1.208686018	123467.4956	FREE	0.718	0.5817	0.5817184
2.47	1.79	2.13	66%	44.9404	1.208911135	124221.1107	FREE	0.718	0.5818	0.5818095
2.48	1.80	2.14	67%	44.9824	1.209136252	124976.2530	FREE	0.719	0.5819	0.5819007
2.49	1.81	2.15	67%	45.0244	1.209361369	125732.9192	FREE	0.719	0.5820	0.5819918
2.50	1.82	2.16	67%	45.0664	1.209586486	126491.1064	FREE	0.719	0.5821	0.5820830
2.51	1.83	2.17	67%	45.1084	1.209811603	127250.8115	FREE	0.719	0.5822	0.5821741
2.52	1.84	2.18	68%	45.1504	1.21003672	128012.0314	FREE	0.719	0.5823	0.5822652
2.53	1.85	2.19	68%	45.1924	1.210261837	128774.7632	FREE	0.720	0.5824	0.5823563
2.54	1.86	2.20	68%	45.2344	1.210486953	129539.0039	FREE	0.720	0.5824	0.5824473
2.55	1.87	2.21	68%	45.2764	1.21071207	130304.7505	FREE	0.720	0.5825	0.5825384
2.56	1.88	2.22	69%	45.3184	1.210937187	131072.0000	FREE	0.720	0.5826	0.5826295
2.57	1.89	2.23	69%	45.3604	1.211162304	131840.7495	FREE	0.721	0.5827	0.5827205
2.58	1.90	2.24	69%	45.4024	1.211387421	132610.9961	FREE	0.721	0.5828	0.5828115
2.59	1.91	2.25	69%	45.4444	1.211612538	133382.7369	FREE	0.721	0.5829	0.5829025
2.60	1.92	2.26	70%	45.4864	1.211837655	134155.9689	FREE	0.721	0.5830	0.5829935
2.61	1.93	2.27	70%	45.5284	1.212062772	134930.6894	FREE	0.721	0.5831	0.5830845
2.62	1.94	2.28	70%	45.5704	1.212287889	135706.8954	FREE	0.722	0.5832	0.5831754
2.63	1.95	2.29	70%	45.6124	1.212513006	136484.5842	FREE	0.722	0.5833	0.5832664
2.64	1.96	2.30	71%	45.6544	1.212738123	137263.7529	FREE	0.722	0.5834	0.5833573
2.65	1.97	2.31	71%	45.6964	1.21296324	138044.3987	FREE	0.722	0.5834	0.5834482
2.66	1.98	2.32	71%	45.7384	1.213188357	138826.5187	FREE	0.723	0.5835	0.5835391
2.67	1.99	2.33	71%	45.7804	1.213413474	139610.1104	FREE	0.723	0.5836	0.5836300
2.68	2.00	2.34	72%	45.8224	1.213638591	140395.1707	FREE	0.723	0.5837	0.5837209
2.69	2.01	2.35	72%	45.8644	1.213863708	141181.6972	FREE	0.723	0.5838	0.5838117
2.70	2.02	2.36	72%	45.9064	1.214088825	141969.6869	FREE	0.724	0.5839	0.5839026
2.71	2.03	2.37	72%	45.9484	1.214313941	142759.1372	FREE	0.724	0.5840	0.5839934
2.72	2.04	2.38	73%	45.9904	1.214539058	143550.0455	FREE	0.724	0.5841	0.5840842
2.73	2.05	2.39	73%	46.0324	1.214764175	144342.4089	FREE	0.724	0.5842	0.5841750
2.74	2.06	2.40	73%	46.0744	1.214989292	145136.2249	FREE	0.724	0.5843	0.5842658
2.75	2.07	2.41	73%	46.1164	1.215214409	145931.4908	FREE	0.725	0.5844	0.5843566
2.76	2.08	2.42	74%	46.1584	1.215439526	146728.2039	FREE	0.725	0.5844	0.5844474
2.77	2.09	2.43	74%	46.2004	1.215664643	147526.3617	FREE	0.725	0.5845	0.5845381
2.78	2.10	2.44	74%	46.2424	1.21588976	148325.9615	FREE	0.725	0.5846	0.5846288
2.79	2.11	2.45	74%	46.2844	1.216114877	149127.0007	FREE	0.726	0.5847	0.5847195
2.80	2.12	2.46	74%	46.3264	1.216339994	149929.4768	FREE	0.726	0.5848	0.5848103
2.81	2.13	2.47	75%	46.3684	1.216565111	150733.3871	FREE	0.726	0.5849	0.5849009
2.82	2.14	2.48	75%	46.4104	1.216790228	151538.7291	FREE	0.726	0.5850	0.5849916
2.83	2.15	2.49	75%	46.4535483	1.2170215	152345.5004	FREE	0.726	0.5851	0.5850848
2.84	2.16	2.50	75%	46.4944159	1.217240547	153153.6983	FREE	0.727	0.5852	0.5851730
2.85	2.17	2.51	76%	46.5370715	1.217469178	153963.3203	FREE	0.727	0.5853	0.5852650
2.86	2.18	2.52	76%	46.5815151	1.217707392	154774.3640	FREE	0.727	0.5854	0.5853609
2.87	2.19	2.53	76%	46.6277467	1.21795519	155586.8268	FREE	0.727	0.5855	0.5854606
2.88	2.20	2.54	76%	46.6757663	1.218212572	156400.7063	FREE	0.728	0.5856	0.5855642
2.89	2.21	2.55	77%	46.7255739	1.218479537	157216.0000	FREE	0.728	0.5857	0.5856716
2.90	2.22	2.56	77%	46.7771695	1.218756086	158032.7055	FREE	0.728	0.5858	0.5857829
2.91	2.23	2.57	77%	46.8305531	1.219042218	158850.8203	FREE	0.728	0.5859	0.5858979
2.92	2.24	2.58	77%	46.8857247	1.219337934	159670.3420	FREE	0.729	0.5860	0.5860168
2.93	2.25	2.59	78%	46.9426843	1.219643233	160491.2682	FREE	0.729	0.5861	0.5861396
2.94	2.26	2.60	78%	47.0014319	1.219958116	161313.5965	FREE	0.729	0.5863	0.5862661
2.95	2.27	2.61	78%	47.0619675	1.220282582	162137.3245	FREE	0.730	0.5864	0.5863965
2.96	2.28	2.62	78%	47.1242911	1.220616632	162962.4499	FREE	0.730	0.5865	0.5865307
2.97	2.29	2.63	79%	47.1884027	1.220960266	163788.9702	FREE	0.730	0.5867	0.5866688
2.98	2.30	2.64	79%	47.2543023	1.221313483	164616.8831	FREE	0.731	0.5868	0.5868106
2.99	2.31	2.65	79%	47.3219899	1.221676283	165446.1863	FREE	0.731	0.5870	0.5869563
3.00	2.32	2.66	79%	47.3914655	1.222048668	166276.8775	FREE	0.731	0.5871	0.5871057
3.01	2.33	2.67	80%	47.4627291	1.222430635	167108.9544	FREE	0.732	0.5873	0.5872590
3.02	2.34	2.68	80%	47.5357807	1.222822186	167942.4145	FREE	0.732	0.5874	0.5874161

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
3.03	2.35	2.69	80%	47.6106203	1.223223321	168777.2557	FREE	0.733	0.5876	0.5875769
3.04	2.36	2.70	80%	47.6872479	1.22363404	169613.4757	FREE	0.733	0.5877	0.5877416
3.05	2.37	2.71	81%	47.7656635	1.224054342	170451.0722	FREE	0.733	0.5879	0.5879101
3.06	2.38	2.72	81%	47.8458671	1.224484227	171290.0429	FREE	0.734	0.5881	0.5880823
3.07	2.39	2.73	81%	47.9278587	1.224923696	172130.3856	FREE	0.734	0.5883	0.5882584
3.08	2.40	2.74	81%	48.0116383	1.225372749	172972.0980	FREE	0.735	0.5884	0.5884382
3.09	2.41	2.75	82%	48.0972059	1.225831385	173815.1780	FREE	0.735	0.5886	0.5886218
3.10	2.42	2.76	82%	48.1845615	1.226299604	174659.6233	FREE	0.736	0.5888	0.5888092
3.11	2.43	2.77	82%	48.2737051	1.226777408	175505.4317	FREE	0.736	0.5890	0.5890004
3.12	2.44	2.78	82%	48.3646367	1.227264794	176352.6010	FREE	0.737	0.5892	0.5891953
3.13	2.45	2.79	83%	48.4573563	1.227761765	177201.1290	FREE	0.737	0.5894	0.5893940
3.14	2.46	2.80	83%	48.5518639	1.228268318	178051.0136	FREE	0.738	0.5896	0.5895965
3.15	2.47	2.81	83%	48.6481595	1.228784456	178902.2526	FREE	0.738	0.5898	0.5898027
3.16	2.48	2.82	83%	48.7462431	1.229310177	179754.8439	FREE	0.739	0.5900	0.5900127
3.17	2.49	2.83	84%	48.8461147	1.229845481	180608.7853	FREE	0.739	0.5902	0.5902264
3.18	2.50	2.84	84%	48.9477743	1.230390369	181464.0746	FREE	0.740	0.5904	0.5904439
3.19	2.51	2.85	84%	49.0512219	1.230944841	182320.7098	FREE	0.740	0.5907	0.5906651
3.20	2.52	2.86	84%	49.1564575	1.231508896	183178.6887	FREE	0.741	0.5909	0.5908900
3.21	2.53	2.87	85%	49.2634811	1.232082535	184038.0093	FREE	0.742	0.5911	0.5911187
3.22	2.54	2.88	85%	49.3722927	1.232665757	184898.6694	FREE	0.742	0.5914	0.5913512
3.23	2.55	2.89	85%	49.4828923	1.233258563	185760.6670	FREE	0.743	0.5916	0.5915873
3.24	2.56	2.90	85%	49.5952799	1.233860952	186624.0000	FREE	0.743	0.5918	0.5918272
3.25	2.57	2.91	86%	49.7094555	1.234472925	187488.6663	FREE	0.744	0.5921	0.5920708
3.26	2.58	2.92	86%	49.8254191	1.235094482	188354.6639	FREE	0.745	0.5923	0.5923180
3.27	2.59	2.93	86%	49.9431707	1.235725622	189221.9908	FREE	0.745	0.5926	0.5925691
3.28	2.60	2.94	86%	50.0627103	1.236366345	190090.6448	FREE	0.746	0.5928	0.5928238
3.29	2.61	2.95	86%	50.1840379	1.237016652	190960.6240	FREE	0.746	0.5931	0.5930822
3.30	2.62	2.96	87%	50.3071535	1.237676543	191831.9264	FREE	0.747	0.5933	0.5933443
3.31	2.63	2.97	87%	50.4320571	1.238346017	192704.5500	FREE	0.748	0.5936	0.5936100
3.32	2.64	2.98	87%	50.5587487	1.239025075	193578.4927	FREE	0.748	0.5939	0.5938795
3.33	2.65	2.99	87%	50.6872283	1.239713716	194453.7526	FREE	0.749	0.5942	0.5941527
3.34	2.66	3.00	88%	50.8174959	1.240411941	195330.3276	FREE	0.750	0.5944	0.5944295
3.35	2.67	3.01	88%	50.9495515	1.24111975	196208.2159	FREE	0.751	0.5947	0.5947100
3.36	2.68	3.02	88%	51.0833951	1.241837141	197087.4155	FREE	0.751	0.5950	0.5949941
3.37	2.69	3.03	88%	51.2190267	1.242564117	197967.9244	FREE	0.752	0.5953	0.5952819
3.38	2.70	3.04	89%	51.3564463	1.243300676	198849.7406	FREE	0.753	0.5956	0.5955734
3.39	2.71	3.05	89%	51.4956539	1.244046819	199732.8622	FREE	0.753	0.5959	0.5958685
3.40	2.72	3.06	89%	51.6366495	1.244802545	200617.2874	FREE	0.754	0.5962	0.5961672
3.41	2.73	3.07	89%	51.7794331	1.245567854	201503.0141	FREE	0.755	0.5965	0.5964696
3.42	2.74	3.08	90%	51.9240047	1.246342748	202390.0405	FREE	0.756	0.5968	0.5967756
3.43	2.75	3.09	90%	52.0703643	1.247127225	203278.3647	FREE	0.757	0.5971	0.5970853
3.44	2.76	3.10	90%	52.2185119	1.247921285	204167.9848	FREE	0.757	0.5974	0.5973985
3.45	2.77	3.11	90%	52.3684475	1.248724929	205058.8989	FREE	0.758	0.5977	0.5977154
3.46	2.78	3.12	91%	52.5201711	1.249538156	205951.1050	FREE	0.759	0.5980	0.5980359
3.47	2.79	3.13	91%	52.6736827	1.250360967	206844.6015	FREE	0.760	0.5984	0.5983600
3.48	2.80	3.14	91%	52.8289823	1.251193362	207739.3863	FREE	0.761	0.5987	0.5986877
3.49	2.81	3.15	91%	52.9860699	1.25203534	208635.4576	FREE	0.761	0.5990	0.5990189
3.50	2.82	3.16	92%	53.1449455	1.252886902	209532.8137	FREE	0.762	0.5994	0.5993538
3.51	2.83	3.17	92%	53.3056091	1.253748047	210431.4526	FREE	0.763	0.5997	0.5996922
3.52	2.84	3.18	92%	53.4680607	1.254618776	211331.3725	FREE	0.764	0.6000	0.6000342
3.53	2.85	3.19	92%	53.6323003	1.255499088	212232.5716	FREE	0.765	0.6004	0.6003798
3.54	2.86	3.20	93%	53.7983279	1.256388984	213135.0481	FREE	0.766	0.6007	0.6007289
3.55	2.87	3.21	93%	53.9661435	1.257288463	214038.8002	FREE	0.767	0.6011	0.6010816
3.56	2.88	3.22	93%	54.1357471	1.258197526	214943.8261	FREE	0.768	0.6014	0.6014378
3.57	2.89	3.23	93%	54.3071387	1.259116173	215850.1240	FREE	0.769	0.6018	0.6017976
3.58	2.90	3.24	94%	54.4803183	1.260044403	216757.6921	FREE	0.769	0.6022	0.6021609
3.59	2.91	3.25	94%	54.6552859	1.260982216	217666.5287	FREE	0.770	0.6025	0.6025278
3.60	2.92	3.26	94%	54.8320415	1.261929613	218576.6319	FREE	0.771	0.6029	0.6028981
3.61	2.93	3.27	94%	55.0105851	1.262886594	219488.0000	FREE	0.772	0.6033	0.6032720
3.62	2.94	3.28	95%	55.1909167	1.263853158	220400.6313	FREE	0.773	0.6036	0.6036494
3.63	2.95	3.29	95%	55.3730363	1.264829306	221314.5240	FREE	0.774	0.6040	0.6040303
3.64	2.96	3.30	95%	55.5569439	1.265815037	222229.6764	FREE	0.775	0.6044	0.6044146
3.65	2.97	3.31	95%	55.7426395	1.266810352	223146.0867	FREE	0.776	0.6048	0.6048025
3.66	2.98	3.32	96%	55.9301231	1.267815251	224063.7532	FREE	0.777	0.6052	0.6051939
3.67	2.99	3.33	96%	56.1193947	1.268829733	224982.6742	FREE	0.778	0.6056	0.6055887
3.68	3.00	3.34	96%	56.3104543	1.269853798	225902.8481	FREE	0.779	0.6060	0.6059870
3.69	3.01	3.35	96%	56.5033019	1.270887447	226824.2730	FREE	0.780	0.6064	0.6063888
3.70	3.02	3.36	97%	56.6979375	1.27193068	227746.9473	FREE	0.781	0.6068	0.6067940
3.71	3.03	3.37	97%	56.8943611	1.272983496	228670.8693	FREE	0.782	0.6072	0.6072026
3.72	3.04	3.38	97%	57.0925727	1.274045896	229596.0373	FREE	0.783	0.6076	0.6076147
3.73	3.05	3.39	97%	57.2925723	1.275117879	230522.4497	FREE	0.785	0.6080	0.6080303
3.74	3.06	3.40	98%	57.4943599	1.276199446	231450.1047	FREE	0.786	0.6084	0.6084492
3.75	3.07	3.41	98%	57.6979355	1.277290597	232379.0008	FREE	0.787	0.6089	0.6088716
3.76	3.08	3.42	98%	57.9032991	1.278391331	233309.1362	FREE	0.788	0.6093	0.6092974
3.77	3.09	3.43	98%	58.1104507	1.279501648	234240.5093	FREE	0.789	0.6097	0.6097266
3.78	3.10	3.44	98%	58.3193903	1.280621549	235173.1185	FREE	0.790	0.6102	0.6101592
3.79	3.11	3.45	99%	58.5301179	1.281751034	236106.9621	FREE	0.791	0.6106	0.6105952
3.80	3.12	3.46	99%	58.7426335	1.282890102	237042.0385	FREE	0.792	0.6110	0.6110346
3.81	3.13	3.47	99%	58.9569371	1.284038754	237978.3460	FREE	0.793	0.6115	0.6114774
3.82	3.14	3.48	99%	59.1730287	1.285196989	238915.8832	FREE	0.795	0.6119	0.6119235
3.83	3.15	3.49	100%	59.3909083	1.286364808	239854.6483	FREE	0.796	0.6124	0.6123730
3.84	3.16	3.50	100%	59.6105759	1.28754221	240794.6397	FREE	0.797	0.6128	0.6128258
3.85	3.17	3.51	100%	59.8320315	1.288729196	241735.8558	FREE	0.798	0.6133	0.6132820
3.86	3.18	3.52	100%	60.0552751	1.289925765	242678.2952	FREE	0.799	0.6137	0.6137416
3.87	3.19	3.53	101%	60.2803067	1.291131918	243621.9561	FREE	0.801	0.6142	0.6142044
3.88	3.20	3.54	101%	60.5071263	1.292347655	244566.8369	FREE	0.802	0.6147	0.6146706
3.89	3.21	3.55	101%	60.7357339	1.293572975	245512.9362	FREE	0.803	0.6151	0.6151401
3.90	3.22	3.56	101%	60.9661295	1.294807879	246460.2524	FREE	0.804	0.6156	0.6156129
3.91	3.23	3.57	102%	61.1983131	1.296052366	247408.7838	FREE	0.805	0.6161	0.6160891
3.92	3.24	3.58	102%	61.4322847	1.297306437	248358.5290	FREE	0.807	0.6166	0.6165685
3.93	3.25	3.59	102%	61.6680443	1.298570091	249309.4863	FREE	0.808	0.6171	0.6170512
3.94	3.26	3.60	102%	61.9055919	1.299843329	250261.6543	FREE	0.809	0.6175	0.6175372
3.95	3.27	3.61	103%	62.1449275	1.30112615	251215.0314	FREE	0.811	0.6180	0.6180264
3.96	3.28	3.62	103%	62.3860511	1.302418555	252169.6161	FREE	0.812	0.6185	0.6185189
3.97	3.29	3.63	103%	62.6289627	1.303720544	253125.4068	FREE	0.813	0.6190	0.6190147
3.98	3.30	3.64	103%	62.8736623	1.305032116	254082.4020	FREE	0.814	0.6195	0.6195137
3.99	3.31	3.65	104%	63.1201499	1.306353271	255040.6003	FREE	0.816	0.6200	0.6200160
4.00	3.32	3.66	104%	63.3684255	1.30768401	256000.0000	FREE	0.817	0.6205	0.6205215
4.01	3.33	3.67	104%	63.6184891	1.309024333	256960.5998	FREE	0.818	0.6210	0.6210302
4.02	3.34	3.68	104%	63.8703407	1.310374239	257922.3980	FREE	0.820	0.6215	0.6215421
4.03	3.35	3.69	105%	64.1239803	1.311733729	258885.3933	FREE	0.821	0.6221	0.6220573

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
4.04	3.36	3.70	105%	64.3794079	1.313102802	259849.5841	FREE	0.823	0.6226	0.6225756
4.05	3.37	3.71	105%	64.6366235	1.314481459	260814.9689	FREE	0.824	0.6231	0.6230971
4.06	3.38	3.72	105%	64.8956271	1.3158697	261781.5463	FREE	0.825	0.6236	0.6236218
4.07	3.39	3.73	106%	65.1564187	1.317267524	262749.3148	FREE	0.827	0.6241	0.6241497
4.08	3.40	3.74	106%	65.4189983	1.318674931	263718.2730	FREE	0.828	0.6247	0.6246808
4.09	3.41	3.75	106%	65.6833659	1.320091922	264688.4193	FREE	0.830	0.6252	0.6252150
4.10	3.42	3.76	106%	65.9495215	1.321518497	265659.7523	FREE	0.831	0.6258	0.6257524
4.11	3.43	3.77	107%	66.2174651	1.322954655	266632.2706	FREE	0.832	0.6263	0.6262929
4.12	3.44	3.78	107%	66.4871967	1.324400397	267605.9728	FREE	0.834	0.6268	0.6268366
4.13	3.45	3.79	107%	66.7587163	1.325855722	268580.8573	FREE	0.835	0.6274	0.6273834
4.14	3.46	3.80	107%	67.0320239	1.327320631	269556.9228	FREE	0.837	0.6279	0.6279333
4.15	3.47	3.81	108%	67.3071195	1.328795124	270534.1679	FREE	0.838	0.6285	0.6284863
4.16	3.48	3.82	108%	67.5840031	1.330279199	271512.5911	FREE	0.840	0.6290	0.6290424
4.17	3.49	3.83	108%	67.8626747	1.331772859	272492.1909	FREE	0.841	0.6296	0.6296016
4.18	3.50	3.84	108%	68.1431343	1.333276102	273472.9661	FREE	0.843	0.6302	0.6301639
4.19	3.51	3.85	109%	68.4253819	1.334788929	274454.9151	FREE	0.844	0.6307	0.6307293
4.20	3.52	3.86	109%	68.7094175	1.336311339	275438.0366	FREE	0.846	0.6313	0.6312978
4.21	3.53	3.87	109%	68.9952411	1.337843332	276422.3292	FREE	0.847	0.6319	0.6318693
4.22	3.54	3.88	109%	69.2828527	1.33938491	277407.7914	FREE	0.849	0.6324	0.6324439
4.23	3.55	3.89	110%	69.5722523	1.34093607	278394.4220	FREE	0.850	0.6330	0.6330215
4.24	3.56	3.90	110%	69.8634399	1.342496815	279382.2195	FREE	0.852	0.6336	0.6336021
4.25	3.57	3.91	110%	70.1564155	1.344067143	280371.1825	FREE	0.853	0.6342	0.6341858
4.26	3.58	3.92	110%	70.4511791	1.345647054	281361.3097	FREE	0.855	0.6348	0.6347725
4.27	3.59	3.93	110%	70.7477307	1.347236549	282352.5998	FREE	0.857	0.6354	0.6353622
4.28	3.60	3.94	111%	71.0460703	1.348835628	283345.0512	FREE	0.858	0.6360	0.6359549
4.29	3.61	3.95	111%	71.3461979	1.35044429	284338.6628	FREE	0.860	0.6366	0.6365506
4.30	3.62	3.96	111%	71.6481135	1.352062535	285333.4330	FREE	0.861	0.6371	0.6371493
4.31	3.63	3.97	111%	71.9518171	1.353690365	286329.3607	FREE	0.863	0.6378	0.6377510
4.32	3.64	3.98	112%	72.2573087	1.355327777	287326.4444	FREE	0.865	0.6384	0.6383557
4.33	3.65	3.99	112%	72.5645883	1.356974774	288324.6828	FREE	0.866	0.6390	0.6389633
4.34	3.66	4.00	112%	72.8736559	1.358631353	289324.0745	FREE	0.868	0.6396	0.6395738
4.35	3.67	4.01	112%	73.1845115	1.360297517	290324.6183	FREE	0.870	0.6402	0.6401873
4.36	3.68	4.02	113%	73.4971551	1.361973264	291326.3128	FREE	0.871	0.6408	0.6408038
4.37	3.69	4.03	113%	73.8115867	1.363658594	292329.1567	FREE	0.873	0.6414	0.6414232
4.38	3.70	4.04	113%	74.1278063	1.365353508	293333.1487	FREE	0.875	0.6420	0.6420455
4.39	3.71	4.05	113%	74.4458139	1.367058006	294338.2874	FREE	0.876	0.6427	0.6426707
4.40	3.72	4.06	114%	74.7656095	1.368772087	295344.5716	FREE	0.878	0.6433	0.6432988
4.41	3.73	4.07	114%	75.0871931	1.370495752	296352.0000	FREE	0.880	0.6439	0.6439298
4.42	3.74	4.08	114%	75.4105647	1.372229	297360.5712	FREE	0.882	0.6446	0.6445636
4.43	3.75	4.09	114%	75.7357243	1.373971832	298370.2840	FREE	0.883	0.6452	0.6452004
4.44	3.76	4.10	115%	76.0626719	1.375724247	299381.1370	FREE	0.885	0.6458	0.6458400
4.45	3.77	4.11	115%	76.3914075	1.377486246	300393.1291	FREE	0.887	0.6465	0.6464825
4.46	3.78	4.12	115%	76.7219311	1.379257828	301406.2588	FREE	0.889	0.6471	0.6471279
4.47	3.79	4.13	115%	77.0542427	1.381038994	302420.5250	FREE	0.890	0.6478	0.6477760
4.48	3.80	4.14	116%	77.3883423	1.382829744	303435.9264	FREE	0.892	0.6484	0.6484271
4.49	3.81	4.15	116%	77.7242299	1.384630077	304452.4616	FREE	0.894	0.6491	0.6490809
4.50	3.82	4.16	116%	78.0619055	1.386439994	305470.1295	FREE	0.896	0.6497	0.6497376
4.51	3.83	4.17	116%	78.4013691	1.388259494	306488.9287	FREE	0.898	0.6504	0.6503970
4.52	3.84	4.18	117%	78.7426207	1.390088578	307508.8581	FREE	0.900	0.6511	0.6510593
4.53	3.85	4.19	117%	79.0856603	1.391927245	308529.9163	FREE	0.901	0.6517	0.6517244
4.54	3.86	4.20	117%	79.4304879	1.393775496	309552.1021	FREE	0.903	0.6524	0.6523922
4.55	3.87	4.21	117%	79.7771035	1.39563333	310575.4144	FREE	0.905	0.6531	0.6530628
4.56	3.88	4.22	118%	80.1255071	1.397500748	311599.8517	FREE	0.907	0.6537	0.6537362
4.57	3.89	4.23	118%	80.4756987	1.39937775	312625.4130	FREE	0.909	0.6544	0.6544124
4.58	3.90	4.24	118%	80.8276783	1.401264335	313652.0969	FREE	0.911	0.6551	0.6550913
4.59	3.91	4.25	118%	81.1814459	1.403160503	314679.9023	FREE	0.913	0.6558	0.6557729
4.60	3.92	4.26	119%	81.5370015	1.405066255	315708.8279	FREE	0.914	0.6565	0.6564573
4.61	3.93	4.27	119%	81.8943451	1.406981591	316738.8725	FREE	0.916	0.6571	0.6571443
4.62	3.94	4.28	119%	82.2534767	1.40890651	317770.0349	FREE	0.918	0.6578	0.6578341
4.63	3.95	4.29	119%	82.6143963	1.410841013	318802.3139	FREE	0.920	0.6585	0.6585267
4.64	3.96	4.30	120%	82.9771039	1.412785099	319835.7082	FREE	0.922	0.6592	0.6592219
4.65	3.97	4.31	120%	83.3415995	1.414738769	320870.2168	FREE	0.924	0.6599	0.6599198
4.66	3.98	4.32	120%	83.7078831	1.416702023	321905.8383	FREE	0.926	0.6606	0.6606203
4.67	3.99	4.33	120%	84.0759547	1.41867486	322942.5715	FREE	0.928	0.6613	0.6613236
4.68	4.00	4.34	121%	84.4458143	1.42065728	323980.4154	FREE	0.930	0.6620	0.6620295
4.69	4.01	4.35	121%	84.8174619	1.422649284	325019.3687	FREE	0.932	0.6627	0.6627381
4.70	4.02	4.36	121%	85.1908975	1.424650872	326059.4302	FREE	0.934	0.6634	0.6634493
4.71	4.03	4.37	121%	85.5661211	1.426662043	327100.5987	FREE	0.936	0.6642	0.6641631
4.72	4.04	4.38	122%	85.9431327	1.428682798	328142.8731	FREE	0.938	0.6649	0.6648796
4.73	4.05	4.39	122%	86.3219323	1.430713136	329186.2522	FREE	0.940	0.6656	0.6655987
4.74	4.06	4.40	122%	86.7025199	1.432753058	330230.7348	FREE	0.942	0.6663	0.6663204
4.75	4.07	4.41	122%	87.0848955	1.434802563	331276.3197	FREE	0.944	0.6670	0.6670448
4.76	4.08	4.42	122%	87.4690591	1.436861652	332323.0059	FREE	0.946	0.6678	0.6677717
4.77	4.09	4.43	123%	87.8550107	1.438930325	333370.7920	FREE	0.948	0.6685	0.6685012
4.78	4.10	4.44	123%	88.2427503	1.441008581	334419.6771	FREE	0.950	0.6692	0.6692333
4.79	4.11	4.45	123%	88.6322779	1.44309642	335469.6599	FREE	0.953	0.6700	0.6699679
4.80	4.12	4.46	123%	89.0235935	1.445193844	336520.7393	FREE	0.955	0.6707	0.6707051
4.81	4.13	4.47	124%	89.4166971	1.44730085	337572.9142	FREE	0.957	0.6714	0.6714449
4.82	4.14	4.48	124%	89.8115887	1.449417441	338626.1833	FREE	0.959	0.6722	0.6721872
4.83	4.15	4.49	124%	90.2082683	1.451543614	339680.5456	FREE	0.961	0.6729	0.6729321
4.84	4.16	4.50	124%	90.6067359	1.453679372	340736.0000	FREE	0.963	0.6737	0.6736794
4.85	4.17	4.51	125%	91.0069915	1.455824713	341792.5453	FREE	0.965	0.6744	0.6744293
4.86	4.18	4.52	125%	91.4090351	1.457979637	342850.1803	FREE	0.967	0.6752	0.6751817
4.87	4.19	4.53	125%	91.8128667	1.460144145	343908.9040	FREE	0.970	0.6759	0.6759367
4.88	4.20	4.54	125%	92.2184863	1.462318237	344968.7153	FREE	0.972	0.6767	0.6766941
4.89	4.21	4.55	126%	92.6258939	1.464501912	346029.6130	FREE	0.974	0.6775	0.6774540
4.90	4.22	4.56	126%	93.0350895	1.46669517	347091.5960	FREE	0.976	0.6782	0.6782163
4.91	4.23	4.57	126%	93.4460731	1.468898012	348154.6632	FREE	0.978	0.6790	0.6789812
4.92	4.24	4.58	126%	93.8588447	1.471110438	349218.8135	FREE	0.981	0.6797	0.6797485
4.93	4.25	4.59	127%	94.2734043	1.473332447	350284.0458	FREE	0.983	0.6805	0.6805182
4.94	4.26	4.60	127%	94.6897519	1.47556404	351350.3591	FREE	0.985	0.6813	0.6812904
4.95	4.27	4.61	127%	95.1078875	1.477805217	352417.7521	FREE	0.987	0.6821	0.6820651
4.96	4.28	4.62	127%	95.5278111	1.480055977	353486.2239	FREE	0.989	0.6828	0.6828421
4.97	4.29	4.63	128%	95.9495227	1.48231632	354555.7733	FREE	0.992	0.6836	0.6836216
4.98	4.30	4.64	128%	96.3730223	1.484586247	355626.3992	FREE	0.994	0.6844	0.6844035
4.99	4.31	4.65	128%	96.7983099	1.486865758	356698.1006	FREE	0.996	0.6852	0.6851878
5.00	4.32	4.66	128%	97.2253855	1.489154852	357770.8764	FREE	0.999	0.6860	0.6859745

Appendix B – TD246-48 Design Spreadsheet

St. Anthony Falls Testing (TD246-48)

THIRSTY DUCK TD SERIES

STAGE VS. DISCHARGE RELATIONSHIP CONSIDERING TAILWATER EFFECTS

TAILWATER ELEVATION 0 FT ASSUMED

ENTER VALUES IN YELLOW CELLS ONLY

Need Help?

E-mail Thirsty Duck for Assistance

www.Thirsty-Duck.com/technical-info

Call a Thirsty Duck Engineer
(727) 376-2400
Mon.-Fri. 8 am to 5 pm (EST)

DATUM: ASSUMED

INNER AND OUTER ORIFICE SIZE:

	DIAMETER (inches)	DIAMETER (feet)	AREA (sq. inches)	AREA (sq. ft)
INNER ORIFICE DIAMETER	3.34	0.28	8.7616	0.0608
INNER ORIFICE PERIMETER	10.4929	0.87		
WEIR COEFFICIENT	3.2			
ORIFICE COEFFICIENT	0.55			
WEIR TO ORIFICE TRANSITION HEAD (Co x Ao)/(Cw x Lw)	1.15	0.096		

DESIGN ELEVATIONS (FT NGVD29):

TOP OF BANK	4.00	ft ASSUMED
MINIMUM DISCHARGE ELEVATION	0.00	ft ASSUMED
DESIGN PEAK STAGE	4.00	ft ASSUMED
DESIGN TAILWATER	0.00	ft ASSUMED
ATTACHMENT FLANGE ELEVATION	-0.92	ft ASSUMED

ORIFICE DATA:

C (INNER ORIFICE)	0.55	unitless
PROPOSED SUBMERGENCE (INNER ORIFICE)	0.00	ft
DESIGN OPERATING HEAD	0.69	ft

MAX FLOW RATE **0.223559 cfs**

HOUSING BOX DATA (CASE C – Inflow through slot(s)):

SLOT LENGTH	10000.00	ft.
SLOT HEIGHT	10000.00	ft.
WEIR COEFFICIENT	3.20	unitless
ORIFICE COEFFICIENT	0.80	unitless
SLOT INVERT ELEVATION	0.00	ft ASSUMED
SLOT CENTROID ELEVATION	5000.00	ft ASSUMED
SLOT CROWN ELEVATION	10000.00	ft ASSUMED

BELLOWS DATA:

BELLOWS INSIDE DIAMETER	6.00	in
BELLOWS LENGTH	4.00	ft.
BELLOWS COLLAPSED HEIGHT	0.5	ft.
BODY WEIGHT	36	lbs
NET FLOTATION AREA	2.924790036	sq. ft.
NET BODY AREA	0.065108962	sq. ft.
THICKNESS OF FOAM	0.510416667	ft.
HEIGHT OF BODY	1.5	ft.
LINEAR FORCE COEFFICIENT	3.3818	x
FIRST PARABOLIC FORCE COEFFICIENT	1.8	x^2
SECOND PARABOLIC FORCE COEFFICIENT	5.6182	x
THIRD PARABOLIC FORCE COEFFICIENT	11.25	x^0

RATING CURVE COMPUTATION INCREMENT: 0.01 ft

Maximum Round Orifice Sizes:

Bellows ID	Max Orifice (in)	Flow (cfs) at 6" head	Flow (cfs) at 9" head	Flow (cfs) at 12" head
4" bellows	1.94"	0.0722	0.08845	0.102
6" bellows	3.34"	0.214062	0.26217	0.303
8" bellows	5.34"	0.547179	0.670155	0.773828

Maximum Equivalent Orifice Sizes:

Bellows ID	Max Orifice (in)	Flow (cfs) at 6" head	Flow (cfs) at 9" head	Flow (cfs) at 12" head
4" bellows	3.66"	0.26	0.315	0.364
6" bellows	5.65"	0.612	0.75	0.866
8" bellows	7.50"	1.078	1.322	1.526

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
0.00	0.00	0.42	23%	37.420356	1.168604246	0.0000	SUBMERGED	0.000	0.0000	0.0000000
0.01	0.00	0.42	23%	37.420356	1.168604246	32.0000	SUBMERGED	0.010	0.0028	0.0027981
0.02	0.00	0.42	23%	37.420356	1.168604246	90.5097	SUBMERGED	0.020	0.0079	0.0079143
0.03	0.00	0.42	23%	37.420356	1.168604246	166.2769	SUBMERGED	0.030	0.0145	0.0145394
0.04	0.00	0.42	23%	37.420356	1.168604246	256.0000	SUBMERGED	0.040	0.0224	0.0223849
0.05	0.00	0.42	23%	37.420356	1.168604246	357.7709	SUBMERGED	0.050	0.0313	0.0312838
0.06	0.00	0.42	23%	37.420356	1.168604246	470.3020	SUBMERGED	0.060	0.0411	0.0411237
0.07	0.00	0.42	23%	37.420356	1.168604246	592.6483	SUBMERGED	0.070	0.0518	0.0518218
0.08	0.00	0.42	23%	37.420356	1.168604246	724.0773	SUBMERGED	0.080	0.0633	0.0633140
0.09	0.00	0.42	23%	37.420356	1.168604246	864.0000	SUBMERGED	0.090	0.0755	0.0755490
0.10	0.00	0.42	23%	37.420356	1.168604246	1011.9289	SUBMERGED	0.100	0.0849	0.0849231
0.11	0.00	0.42	23%	37.420356	1.168604246	1167.4519	SUBMERGED	0.110	0.0891	0.0890681
0.12	0.00	0.42	23%	37.420356	1.168604246	1330.2150	SUBMERGED	0.120	0.0930	0.0930286
0.13	0.00	0.42	23%	37.420356	1.168604246	1499.9093	SUBMERGED	0.130	0.0968	0.0968273
0.14	0.00	0.42	23%	37.420356	1.168604246	1676.2625	SUBMERGED	0.140	0.1005	0.1004824
0.15	0.00	0.42	23%	37.420356	1.168604246	1859.0320	SUBMERGED	0.150	0.1040	0.1040092
0.16	0.00	0.42	23%	37.420356	1.168604246	2048.0000	SUBMERGED	0.160	0.1074	0.1074202
0.17	0.00	0.42	23%	37.420356	1.168604246	2242.9695	SUBMERGED	0.170	0.1107	0.1107262
0.18	0.00	0.42	23%	37.420356	1.168604246	2443.7610	SUBMERGED	0.180	0.1139	0.1139363
0.19	0.00	0.42	23%	37.420356	1.168604246	2650.2106	SUBMERGED	0.190	0.1171	0.1170584
0.20	0.00	0.42	23%	37.420356	1.168604246	2862.1670	SUBMERGED	0.200	0.1201	0.1200994
0.21	0.00	0.42	23%	37.420356	1.168604246	3079.4909	SUBMERGED	0.210	0.1231	0.1230653
0.22	0.00	0.42	23%	37.420356	1.168604246	3302.0527	SUBMERGED	0.220	0.1260	0.1259613
0.23	0.00	0.42	23%	37.420356	1.168604246	3529.7320	SUBMERGED	0.230	0.1288	0.1287923
0.24	0.00	0.42	23%	37.420356	1.168604246	3762.4162	SUBMERGED	0.240	0.1316	0.1315623
0.25	0.00	0.42	23%	37.420356	1.168604246	4000.0000	SUBMERGED	0.250	0.1343	0.1342752
0.26	0.00	0.42	23%	37.420356	1.168604246	4242.3842	SUBMERGED	0.260	0.1369	0.1369344
0.27	0.00	0.42	23%	37.420356	1.168604246	4489.4757	SUBMERGED	0.270	0.1395	0.1395429
0.28	0.00	0.42	23%	37.420356	1.168604246	4741.1863	SUBMERGED	0.280	0.1421	0.1421036
0.29	0.00	0.42	23%	37.420356	1.168604246	4997.4329	SUBMERGED	0.290	0.1446	0.1446189
0.30	0.00	0.42	23%	37.420356	1.168604246	5258.1366	SUBMERGED	0.300	0.1471	0.1470912
0.31	0.00	0.42	23%	37.420356	1.168604246	5523.2222	SUBMERGED	0.310	0.1495	0.1495226
0.32	0.00	0.42	23%	37.420356	1.168604246	5792.6188	SUBMERGED	0.320	0.1519	0.1519151
0.33	0.00	0.42	23%	37.420356	1.168604246	6066.2582	SUBMERGED	0.330	0.1543	0.1542705
0.34	0.00	0.42	23%	37.420356	1.168604246	6344.0757	SUBMERGED	0.340	0.1566	0.1565905
0.35	0.00	0.42	23%	37.420356	1.168604246	6626.0094	SUBMERGED	0.350	0.1589	0.1588766
0.36	0.00	0.42	23%	37.420356	1.168604246	6912.0000	SUBMERGED	0.360	0.1611	0.1611303
0.37	0.00	0.42	23%	37.420356	1.168604246	7201.9908	SUBMERGED	0.370	0.1634	0.1633529
0.38	0.00	0.42	23%	37.420356	1.168604246	7495.9274	SUBMERGED	0.380	0.1655	0.1655456
0.39	0.00	0.42	23%	37.420356	1.168604246	7793.7575	SUBMERGED	0.390	0.1677	0.1677097
0.40	0.00	0.42	23%	37.420356	1.168604246	8095.4308	SUBMERGED	0.400	0.1698	0.1698462
0.41	0.00	0.42	23%	37.420356	1.168604246	8400.8990	SUBMERGED	0.410	0.1720	0.1719562
0.42	0.00	0.42	23%	37.420356	1.168604246	8710.1155	SUBMERGED	0.420	0.1740	0.1740406
0.43	0.00	0.42	23%	37.420356	1.168604246	9023.0354	SUBMERGED	0.430	0.1761	0.1761003
0.44	0.00	0.42	23%	37.420356	1.168604246	9339.6154	SUBMERGED	0.440	0.1781	0.1781362
0.45	0.00	0.42	23%	37.420356	1.168604246	9659.8137	SUBMERGED	0.450	0.1801	0.1801491
0.46	0.00	0.42	23%	37.420356	1.168604246	9983.5897	SUBMERGED	0.460	0.1821	0.1821398
0.47	0.00	0.42	23%	37.420356	1.168604246	10310.9045	SUBMERGED	0.470	0.1841	0.1841089
0.48	0.00	0.42	23%	37.420356	1.168604246	10641.7202	SUBMERGED	0.480	0.1861	0.1860572
0.49	0.00	0.42	23%	37.420356	1.168604246	10976.0000	SUBMERGED	0.490	0.1880	0.1879853
0.50	0.00	0.42	23%	37.420356	1.168604246	11313.7085	SUBMERGED	0.500	0.1899	0.1898939
0.51	0.00	0.42	23%	37.420356	1.168604246	11654.8112	SUBMERGED	0.510	0.1918	0.1917834
0.52	0.00	0.42	23%	37.420356	1.168604246	11999.2746	SUBMERGED	0.520	0.1937	0.1936545
0.53	0.00	0.42	23%	37.420356	1.168604246	12347.0664	SUBMERGED	0.530	0.1955	0.1955077
0.54	0.00	0.42	23%	37.420356	1.168604246	12698.1548	SUBMERGED	0.540	0.1973	0.1973435
0.55	0.00	0.42	23%	37.420356	1.168604246	13052.5093	SUBMERGED	0.550	0.1992	0.1991624
0.56	0.00	0.42	23%	37.420356	1.168604246	13410.1001	SUBMERGED	0.560	0.2010	0.2009648
0.57	0.00	0.42	23%	37.420356	1.168604246	13770.8980	SUBMERGED	0.570	0.2028	0.2027512
0.58	0.00	0.42	23%	37.420356	1.168604246	14134.8749	SUBMERGED	0.580	0.2045	0.2045220
0.59	0.00	0.42	23%	37.420356	1.168604246	14502.0032	SUBMERGED	0.590	0.2063	0.2062775
0.60	0.00	0.42	23%	37.420356	1.168604246	14872.2560	SUBMERGED	0.600	0.2080	0.2080183
0.61	0.00	0.42	23%	37.420356	1.168604246	15245.6074	SUBMERGED	0.610	0.2097	0.2097446
0.62	0.00	0.42	23%	37.420356	1.168604246	15622.0316	SUBMERGED	0.620	0.2115	0.2114569
0.63	0.00	0.42	23%	37.420356	1.168604246	16001.5039	SUBMERGED	0.630	0.2132	0.2131553
0.64	0.00	0.42	23%	37.420356	1.168604246	16384.0000	SUBMERGED	0.640	0.2148	0.2148404
0.65	0.00	0.42	23%	37.420356	1.168604246	16769.4961	SUBMERGED	0.650	0.2165	0.2165123
0.66	0.00	0.42	23%	37.420356	1.168604246	17157.9691	SUBMERGED	0.660	0.2182	0.2181714
0.67	0.00	0.42	23%	37.420356	1.168604246	17549.3963	SUBMERGED	0.670	0.2198	0.2198180
0.68	0.00	0.42	23%	37.420356	1.168604246	17943.7557	SUBMERGED	0.680	0.2215	0.2214524
0.69	0.00	0.42	23%	37.420356	1.168604246	18341.0255	SUBMERGED	0.690	0.2231	0.2230748
0.70	0.01	0.43	23%	37.4440286	1.16873113	18741.1846	FREE	0.693	0.2236	0.2235797
0.71	0.02	0.44	23%	37.4778466	1.168912392	19144.2123	FREE	0.693	0.2236	0.2236089
0.72	0.03	0.45	24%	37.5116646	1.169093654	19550.0883	FREE	0.693	0.2236	0.2236381
0.73	0.04	0.46	24%	37.5454826	1.169274916	19958.7927	FREE	0.694	0.2237	0.2236674
0.74	0.05	0.47	24%	37.5793006	1.169456178	20370.3062	FREE	0.694	0.2237	0.2236966
0.75	0.06	0.48	24%	37.6131186	1.16963744	20784.6097	FREE	0.694	0.2237	0.2237258
0.76	0.07	0.49	25%	37.6469366	1.169818702	21201.6845	FREE	0.694	0.2238	0.2237550
0.77	0.08	0.50	25%	37.6807546	1.169999964	21621.5123	FREE	0.694	0.2238	0.2237842
0.78	0.09	0.51	25%	37.7145726	1.170181226	22044.0751	FREE	0.695	0.2238	0.2238134
0.79	0.10	0.52	25%	37.7483906	1.170362488	22469.3555	FREE	0.695	0.2238	0.2238426
0.80	0.11	0.53	26%	37.7822086	1.17054375	22897.3361	FREE	0.695	0.2239	0.2238718
0.81	0.12	0.54	26%	37.8160266	1.170725012	23328.0000	FREE	0.695	0.2239	0.2239010
0.82	0.13	0.55	26%	37.8498446	1.170906274	23761.3306	FREE	0.695	0.2239	0.2239302
0.83	0.14	0.56	26%	37.8836626	1.171087536	24197.3116	FREE	0.695	0.2240	0.2239594
0.84	0.15	0.57	27%	37.9174806	1.171268798	24635.9269	FREE	0.696	0.2240	0.2239886
0.85	0.16	0.58	27%	37.9512986	1.17145006	25077.1609	FREE	0.696	0.2240	0.2240178
0.86	0.17	0.59	27%	37.9851166	1.171631322	25520.9981	FREE	0.696	0.2240	0.2240469
0.87	0.18	0.60	27%	38.0189346	1.171812584	25967.4233	FREE	0.696	0.2241	0.2240761
0.88	0.19	0.61	28%	38.0527526	1.171993846	26416.4216	FREE	0.696	0.2241	0.2241053
0.89	0.20	0.62	28%	38.0865706	1.172175108	26867.9783	FREE	0.697	0.2241	0.2241344
0.90	0.21	0.63	28%	38.1203886	1.17235637	27322.0790	FREE	0.697	0.2242	0.2241636
0.91	0.22	0.64	28%	38.1542066	1.172537632	27778.7095	FREE	0.697	0.2242	0.2241928
0.92	0.23	0.65	29%	38.1880246	1.172718894	28237.8560	FREE	0.697	0.2242	0.2242219
0.93	0.24	0.66	29%	38.2218426	1.172900156	28699.5047	FREE	0.697	0.2243	0.2242511
0.94	0.25	0.67	29%	38.2556606	1.173081418	29163.6420	FREE	0.697	0.2243	0.2242802
0.95	0.26	0.68	29%	38.2894786	1.17326268	29630.2548	FREE	0.698	0.2243	0.2243093
0.96	0.27	0.69	30%	38.3232966	1.173443942	30099.3300	FREE	0.698	0.2243	0.2243385
0.97	0.28	0.70	30%	38.3571146	1.173625204	30570.8546	FREE	0.698	0.2244	0.2243676
0.98	0.29	0.71	30%	38.3909326	1.173806466	31044.8161	FREE	0.698	0.2244	0.2243967
0.99	0.30	0.72	30%	38.4247506	1.173987728	31521.2020	FREE	0.698	0.2244	0.2244259
1.00	0.31	0.73	31%	38.4585686	1.17416899	32000.0000	FREE	0.699	0.2245	0.2244550

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
1.01	0.32	0.74	31%	38.4923866	1.174350252	32481.1980	FREE	0.699	0.2245	0.2244841
1.02	0.33	0.75	31%	38.5262046	1.174531514	32964.7841	FREE	0.699	0.2245	0.2245132
1.03	0.34	0.76	31%	38.5600226	1.174712776	33450.7466	FREE	0.699	0.2245	0.2245423
1.04	0.35	0.77	32%	38.5938406	1.174894038	33939.0739	FREE	0.699	0.2246	0.2245714
1.05	0.36	0.78	32%	38.6276586	1.1750753	34429.7546	FREE	0.699	0.2246	0.2246006
1.06	0.37	0.79	32%	38.6614766	1.175256562	34922.7774	FREE	0.700	0.2246	0.2246297
1.07	0.38	0.80	32%	38.6952946	1.175437824	35418.1314	FREE	0.700	0.2247	0.2246587
1.08	0.39	0.81	33%	38.7291126	1.175619086	35915.8055	FREE	0.700	0.2247	0.2246878
1.09	0.40	0.82	33%	38.7629306	1.175800348	36415.7891	FREE	0.700	0.2247	0.2247169
1.10	0.41	0.83	33%	38.7967486	1.17598161	36918.0715	FREE	0.700	0.2247	0.2247460
1.11	0.42	0.84	33%	38.8305666	1.176162872	37422.6421	FREE	0.701	0.2248	0.2247751
1.12	0.43	0.85	34%	38.8643846	1.176344135	37929.4908	FREE	0.701	0.2248	0.2248042
1.13	0.44	0.86	34%	38.8982026	1.176525397	38438.6073	FREE	0.701	0.2248	0.2248332
1.14	0.45	0.87	34%	38.9320206	1.176706659	38949.9815	FREE	0.701	0.2249	0.2248623
1.15	0.46	0.88	34%	38.9658386	1.176887921	39463.6035	FREE	0.701	0.2249	0.2248914
1.16	0.47	0.89	35%	38.9996566	1.177069183	39979.4635	FREE	0.701	0.2249	0.2249204
1.17	0.48	0.90	35%	39.0334746	1.177250445	40497.5519	FREE	0.702	0.2249	0.2249495
1.18	0.49	0.91	35%	39.0672926	1.177431707	41017.8591	FREE	0.702	0.2250	0.2249786
1.19	0.50	0.92	35%	39.1011106	1.177612969	41540.3757	FREE	0.702	0.2250	0.2250076
1.20	0.51	0.93	36%	39.1349286	1.177794231	42065.0924	FREE	0.702	0.2250	0.2250367
1.21	0.52	0.94	36%	39.1687466	1.177975493	42592.0000	FREE	0.702	0.2251	0.2250657
1.22	0.53	0.95	36%	39.2025646	1.178156755	43121.0894	FREE	0.703	0.2251	0.2250947
1.23	0.54	0.96	36%	39.2363826	1.178338017	43652.3517	FREE	0.703	0.2251	0.2251238
1.24	0.55	0.97	37%	39.2702006	1.178519279	44185.7780	FREE	0.703	0.2252	0.2251528
1.25	0.56	0.98	37%	39.3040186	1.178700541	44721.3595	FREE	0.703	0.2252	0.2251818
1.26	0.57	0.99	37%	39.3378366	1.178881803	45259.0878	FREE	0.703	0.2252	0.2252109
1.27	0.58	1.00	37%	39.3716546	1.179063065	45798.9540	FREE	0.703	0.2252	0.2252399
1.28	0.59	1.01	38%	39.4054726	1.179244327	46340.9500	FREE	0.704	0.2253	0.2252689
1.29	0.60	1.02	38%	39.4392906	1.179425589	46885.0673	FREE	0.704	0.2253	0.2252979
1.30	0.61	1.03	38%	39.4731086	1.179606851	47431.2977	FREE	0.704	0.2253	0.2253269
1.31	0.62	1.04	38%	39.5069266	1.179788113	47979.6330	FREE	0.704	0.2254	0.2253559
1.32	0.63	1.05	39%	39.5407446	1.179969375	48530.0652	FREE	0.704	0.2254	0.2253849
1.33	0.64	1.06	39%	39.5745626	1.180150637	49082.5864	FREE	0.705	0.2254	0.2254139
1.34	0.65	1.07	39%	39.6083806	1.180331899	49637.1886	FREE	0.705	0.2254	0.2254429
1.35	0.66	1.08	39%	39.6421986	1.180513161	50193.8642	FREE	0.705	0.2255	0.2254719
1.36	0.67	1.09	40%	39.6760166	1.180694423	50752.6053	FREE	0.705	0.2255	0.2255009
1.37	0.68	1.10	40%	39.7098346	1.180875685	51313.4044	FREE	0.705	0.2255	0.2255299
1.38	0.69	1.11	40%	39.7436526	1.181056947	51876.2540	FREE	0.705	0.2256	0.2255589
1.39	0.70	1.12	40%	39.7774706	1.181238209	52441.1466	FREE	0.706	0.2256	0.2255878
1.40	0.71	1.13	41%	39.8112886	1.181419471	53008.0749	FREE	0.706	0.2256	0.2256168
1.41	0.72	1.14	41%	39.8451066	1.181600733	53577.0315	FREE	0.706	0.2256	0.2256458
1.42	0.73	1.15	41%	39.8789246	1.181781995	54148.0093	FREE	0.706	0.2257	0.2256747
1.43	0.74	1.16	41%	39.9127426	1.181963257	54721.0012	FREE	0.706	0.2257	0.2257037
1.44	0.75	1.17	42%	39.9465606	1.182144519	55296.0000	FREE	0.707	0.2257	0.2257327
1.45	0.76	1.18	42%	39.9803786	1.182325781	55872.9988	FREE	0.707	0.2258	0.2257616
1.46	0.77	1.19	42%	40.0141966	1.182507043	56451.9908	FREE	0.707	0.2258	0.2257906
1.47	0.78	1.20	42%	40.0480146	1.182688305	57032.9690	FREE	0.707	0.2258	0.2258195
1.48	0.79	1.21	43%	40.0818326	1.182869567	57615.9267	FREE	0.707	0.2258	0.2258485
1.49	0.80	1.22	43%	40.1156506	1.183050829	58200.8572	FREE	0.707	0.2259	0.2258774
1.50	0.81	1.23	43%	40.1494686	1.183232091	58787.7538	FREE	0.708	0.2259	0.2259063
1.51	0.82	1.24	43%	40.1832866	1.183413353	59376.6101	FREE	0.708	0.2259	0.2259353
1.52	0.83	1.25	44%	40.2171046	1.183594615	59967.4194	FREE	0.708	0.2260	0.2259642
1.53	0.84	1.26	44%	40.2509226	1.183775877	60560.1754	FREE	0.708	0.2260	0.2259931
1.54	0.85	1.27	44%	40.2847406	1.183957139	61154.8717	FREE	0.708	0.2260	0.2260220
1.55	0.86	1.28	44%	40.3185586	1.184138401	61751.5020	FREE	0.709	0.2261	0.2260510
1.56	0.87	1.29	45%	40.3523766	1.184319663	62350.0600	FREE	0.709	0.2261	0.2260799
1.57	0.88	1.30	45%	40.3861946	1.184500925	62950.5396	FREE	0.709	0.2261	0.2261088
1.58	0.89	1.31	45%	40.4200126	1.184682187	63552.9345	FREE	0.709	0.2261	0.2261377
1.59	0.90	1.32	45%	40.4538306	1.184863449	64157.2388	FREE	0.709	0.2262	0.2261666
1.60	0.91	1.33	46%	40.4876486	1.185044711	64763.4465	FREE	0.709	0.2262	0.2261955
1.61	0.92	1.34	46%	40.5214666	1.185225973	65371.5515	FREE	0.710	0.2262	0.2262244
1.62	0.93	1.35	46%	40.5552846	1.185407235	65981.5480	FREE	0.710	0.2263	0.2262533
1.63	0.94	1.36	46%	40.5891026	1.185588497	66593.4301	FREE	0.710	0.2263	0.2262822
1.64	0.95	1.37	47%	40.6229206	1.185769759	67207.1920	FREE	0.710	0.2263	0.2263110
1.65	0.96	1.38	47%	40.6567386	1.185951022	67822.8280	FREE	0.710	0.2263	0.2263399
1.66	0.97	1.39	47%	40.6905566	1.186132284	68440.3324	FREE	0.711	0.2264	0.2263688
1.67	0.98	1.40	47%	40.7243746	1.186313546	69059.6996	FREE	0.711	0.2264	0.2263977
1.68	0.99	1.41	48%	40.7581926	1.186494808	69680.9240	FREE	0.711	0.2264	0.2264265
1.69	1.00	1.42	48%	40.7920106	1.18667607	70304.0000	FREE	0.711	0.2265	0.2264554
1.70	1.01	1.43	48%	40.8258286	1.186857332	70928.9222	FREE	0.711	0.2265	0.2264843
1.71	1.02	1.44	48%	40.8596466	1.187038594	71555.6851	FREE	0.711	0.2265	0.2265131
1.72	1.03	1.45	49%	40.8934646	1.187219856	72184.2833	FREE	0.712	0.2265	0.2265420
1.73	1.04	1.46	49%	40.9272826	1.187401118	72814.7115	FREE	0.712	0.2266	0.2265708
1.74	1.05	1.47	49%	40.9611006	1.18758238	73446.9644	FREE	0.712	0.2266	0.2265997
1.75	1.06	1.48	49%	40.9949186	1.187763642	74081.0367	FREE	0.712	0.2266	0.2266285
1.76	1.07	1.49	50%	41.0287366	1.187944904	74716.9233	FREE	0.712	0.2267	0.2266574
1.77	1.08	1.50	50%	41.0625546	1.188126166	75354.6189	FREE	0.713	0.2267	0.2266862
1.78	1.09	1.51	50%	41.0963726	1.188307428	75994.1185	FREE	0.713	0.2267	0.2267150
1.79	1.10	1.52	50%	41.1301906	1.18848869	76635.4170	FREE	0.713	0.2267	0.2267438
1.80	1.11	1.53	51%	41.1640086	1.188669952	77278.5093	FREE	0.713	0.2268	0.2267727
1.81	1.12	1.54	51%	41.1978266	1.188851214	77923.3905	FREE	0.713	0.2268	0.2268015
1.82	1.13	1.55	51%	41.2316446	1.189032476	78570.0556	FREE	0.713	0.2268	0.2268303
1.83	1.14	1.56	51%	41.2654626	1.189213738	79218.4997	FREE	0.714	0.2269	0.2268591
1.84	1.15	1.57	52%	41.2992806	1.189395	79868.7179	FREE	0.714	0.2269	0.2268879
1.85	1.16	1.58	52%	41.3330986	1.189576262	80520.7054	FREE	0.714	0.2269	0.2269167
1.86	1.17	1.59	52%	41.3669166	1.189757524	81174.4575	FREE	0.714	0.2269	0.2269455
1.87	1.18	1.60	52%	41.4007346	1.189938786	81829.9693	FREE	0.714	0.2270	0.2269743
1.88	1.19	1.61	53%	41.4345526	1.190120048	82487.2362	FREE	0.715	0.2270	0.2270031
1.89	1.20	1.62	53%	41.4683706	1.19030131	83146.2534	FREE	0.715	0.2270	0.2270319
1.90	1.21	1.63	53%	41.5021886	1.190482572	83807.0164	FREE	0.715	0.2271	0.2270607
1.91	1.22	1.64	53%	41.5360066	1.190663834	84469.5206	FREE	0.715	0.2271	0.2270895
1.92	1.23	1.65	54%	41.5698246	1.190845096	85133.7613	FREE	0.715	0.2271	0.2271183
1.93	1.24	1.66	54%	41.6036426	1.191026358	85799.7341	FREE	0.715	0.2271	0.2271471
1.94	1.25	1.67	54%	41.6374606	1.19120762	86467.4344	FREE	0.716	0.2272	0.2271758
1.95	1.26	1.68	54%	41.6712786	1.191388882	87136.8579	FREE	0.716	0.2272	0.2272046
1.96	1.27	1.69	55%	41.7050966	1.191570144	87808.0000	FREE	0.716	0.2272	0.2272334
1.97	1.28	1.70	55%	41.7389146	1.191751406	88480.8564	FREE	0.716	0.2273	0.2272621
1.98	1.29	1.71	55%	41.7727326	1.191932668	89155.4228	FREE	0.716	0.2273	0.2272909
1.99	1.30	1.72	55%	41.8065506	1.19211393	89831.6947	FREE	0.717	0.2273	0.2273196
2.00	1.31	1.73	56%	41.8403686	1.192295192	90509.6680	FREE	0.717	0.2273	0.2273484
2.01	1.32	1.74	56%	41.8741866	1.192476454	91189.3383	FREE	0.717	0.2274	0.2273771

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
2.02	1.33	1.75	56%	41.9080046	1.192657716	91870.7015	FREE	0.717	0.2274	0.2274059
2.03	1.34	1.76	56%	41.9418226	1.192838978	92553.7533	FREE	0.717	0.2274	0.2274346
2.04	1.35	1.77	57%	41.9756406	1.19302024	93238.4896	FREE	0.717	0.2275	0.2274634
2.05	1.36	1.78	57%	42.0094586	1.193201502	93924.9062	FREE	0.718	0.2275	0.2274921
2.06	1.37	1.79	57%	42.0432766	1.193382764	94612.9990	FREE	0.718	0.2275	0.2275208
2.07	1.38	1.80	57%	42.0770946	1.193564026	95302.7640	FREE	0.718	0.2275	0.2275496
2.08	1.39	1.81	58%	42.1109126	1.193745288	95994.1972	FREE	0.718	0.2276	0.2275783
2.09	1.40	1.82	58%	42.1447306	1.19392655	96687.2944	FREE	0.718	0.2276	0.2276070
2.10	1.41	1.83	58%	42.1785486	1.194107812	97382.0517	FREE	0.719	0.2276	0.2276357
2.11	1.42	1.84	58%	42.2123666	1.194289074	98078.4652	FREE	0.719	0.2277	0.2276644
2.12	1.43	1.85	59%	42.2461846	1.194470336	98776.5310	FREE	0.719	0.2277	0.2276931
2.13	1.44	1.86	59%	42.2800026	1.194651598	99476.2450	FREE	0.719	0.2277	0.2277218
2.14	1.45	1.87	59%	42.3138206	1.19483286	100177.6036	FREE	0.719	0.2278	0.2277505
2.15	1.46	1.88	59%	42.3476386	1.195014122	100880.6027	FREE	0.719	0.2278	0.2277792
2.16	1.47	1.89	60%	42.3814566	1.195195384	101585.2386	FREE	0.720	0.2278	0.2278079
2.17	1.48	1.90	60%	42.4152746	1.195376646	102291.5075	FREE	0.720	0.2278	0.2278366
2.18	1.49	1.91	60%	42.4490926	1.195557909	102999.4057	FREE	0.720	0.2279	0.2278653
2.19	1.50	1.92	60%	42.4829106	1.195739171	103708.9293	FREE	0.720	0.2279	0.2278940
2.20	1.51	1.93	61%	42.5167286	1.195920433	104420.0747	FREE	0.720	0.2279	0.2279227
2.21	1.52	1.94	61%	42.5505466	1.196101695	105132.8382	FREE	0.720	0.2280	0.2279514
2.22	1.53	1.95	61%	42.5843646	1.196282957	105847.2161	FREE	0.721	0.2280	0.2279800
2.23	1.54	1.96	61%	42.6181826	1.196464219	106563.2048	FREE	0.721	0.2280	0.2280087
2.24	1.55	1.97	62%	42.6520006	1.196645481	107280.8006	FREE	0.721	0.2280	0.2280374
2.25	1.56	1.98	62%	42.6858186	1.196826743	108000.0000	FREE	0.721	0.2281	0.2280660
2.26	1.57	1.99	62%	42.7196366	1.197008005	108720.7994	FREE	0.721	0.2281	0.2280947
2.27	1.58	2.00	62%	42.7534546	1.197189267	109443.1953	FREE	0.722	0.2281	0.2281233
2.28	1.59	2.01	63%	42.7872726	1.197370529	110167.1841	FREE	0.722	0.2282	0.2281520
2.29	1.60	2.02	63%	42.8210906	1.197551791	110892.7623	FREE	0.722	0.2282	0.2281806
2.30	1.61	2.03	63%	42.8549086	1.197733053	111619.9265	FREE	0.722	0.2282	0.2282093
2.31	1.62	2.04	63%	42.8887266	1.197914315	112348.6733	FREE	0.722	0.2282	0.2282379
2.32	1.63	2.05	64%	42.9225446	1.198095577	113078.9991	FREE	0.722	0.2283	0.2282665
2.33	1.64	2.06	64%	42.9563626	1.198276839	113810.9006	FREE	0.723	0.2283	0.2282952
2.34	1.65	2.07	64%	42.9901806	1.198458101	114544.3744	FREE	0.723	0.2283	0.2283238
2.35	1.66	2.08	64%	43.0239986	1.198639363	115279.4171	FREE	0.723	0.2284	0.2283524
2.36	1.67	2.09	65%	43.0578166	1.198820625	116016.0254	FREE	0.723	0.2284	0.2283811
2.37	1.68	2.10	65%	43.0916346	1.199001887	116754.1960	FREE	0.723	0.2284	0.2284097
2.38	1.69	2.11	65%	43.1254526	1.199183149	117493.9255	FREE	0.724	0.2284	0.2284383
2.39	1.70	2.12	65%	43.1592706	1.199364411	118235.2107	FREE	0.724	0.2285	0.2284669
2.40	1.71	2.13	66%	43.1930886	1.199545673	118978.0484	FREE	0.724	0.2285	0.2284955
2.41	1.72	2.14	66%	43.2269066	1.199726935	119722.4353	FREE	0.724	0.2285	0.2285241
2.42	1.73	2.15	66%	43.2607246	1.199908197	120468.3681	FREE	0.724	0.2286	0.2285527
2.43	1.74	2.16	66%	43.2945426	1.200089459	121215.8437	FREE	0.724	0.2286	0.2285813
2.44	1.75	2.17	67%	43.3283606	1.200270721	121964.8589	FREE	0.725	0.2286	0.2286099
2.45	1.76	2.18	67%	43.3621786	1.200451983	122715.4106	FREE	0.725	0.2286	0.2286385
2.46	1.77	2.19	67%	43.3959966	1.200633245	123467.4956	FREE	0.725	0.2287	0.2286671
2.47	1.78	2.20	67%	43.4298146	1.200814507	124221.1107	FREE	0.725	0.2287	0.2286957
2.48	1.79	2.21	68%	43.4636326	1.200995769	124976.2530	FREE	0.725	0.2287	0.2287242
2.49	1.80	2.22	68%	43.4974506	1.201177031	125732.9192	FREE	0.726	0.2288	0.2287528
2.50	1.81	2.23	68%	43.5312686	1.201358293	126491.1064	FREE	0.726	0.2288	0.2287814
2.51	1.82	2.24	68%	43.5650866	1.201539555	127250.8115	FREE	0.726	0.2288	0.2288100
2.52	1.83	2.25	69%	43.5989046	1.201720817	128012.0314	FREE	0.726	0.2288	0.2288385
2.53	1.84	2.26	69%	43.6327226	1.201902079	128774.7632	FREE	0.726	0.2289	0.2288671
2.54	1.85	2.27	69%	43.6665406	1.202083341	129539.0039	FREE	0.726	0.2289	0.2288956
2.55	1.86	2.28	69%	43.7003586	1.202264603	130304.7505	FREE	0.727	0.2289	0.2289242
2.56	1.87	2.29	70%	43.7341766	1.202445865	131072.0000	FREE	0.727	0.2290	0.2289527
2.57	1.88	2.30	70%	43.7679946	1.202627127	131840.7495	FREE	0.727	0.2290	0.2289813
2.58	1.89	2.31	70%	43.8018126	1.202808389	132610.9961	FREE	0.727	0.2290	0.2290098
2.59	1.90	2.32	70%	43.8356306	1.202989651	133382.7369	FREE	0.727	0.2290	0.2290384
2.60	1.91	2.33	71%	43.8694486	1.203170913	134155.9689	FREE	0.728	0.2291	0.2290669
2.61	1.92	2.34	71%	43.9032666	1.203352175	134930.6894	FREE	0.728	0.2291	0.2290954
2.62	1.93	2.35	71%	43.9370846	1.203533437	135706.8954	FREE	0.728	0.2291	0.2291240
2.63	1.94	2.36	71%	43.9709026	1.203714699	136484.5842	FREE	0.728	0.2292	0.2291525
2.64	1.95	2.37	72%	44.0047206	1.203895961	137263.7529	FREE	0.728	0.2292	0.2291810
2.65	1.96	2.38	72%	44.0385386	1.204077223	138044.3987	FREE	0.728	0.2292	0.2292095
2.66	1.97	2.39	72%	44.0723566	1.204258485	138826.5187	FREE	0.729	0.2292	0.2292380
2.67	1.98	2.40	72%	44.1061746	1.204439747	139610.1104	FREE	0.729	0.2293	0.2292666
2.68	1.99	2.41	73%	44.1399926	1.204621009	140395.1707	FREE	0.729	0.2293	0.2292951
2.69	2.00	2.42	73%	44.1738106	1.204802271	141181.6972	FREE	0.729	0.2293	0.2293236
2.70	2.01	2.43	73%	44.2076286	1.204983533	141969.6869	FREE	0.729	0.2294	0.2293521
2.71	2.02	2.44	73%	44.2414466	1.205164795	142759.1372	FREE	0.730	0.2294	0.2293806
2.72	2.03	2.45	74%	44.2752646	1.205346058	143550.0455	FREE	0.730	0.2294	0.2294091
2.73	2.04	2.46	74%	44.3090826	1.20552732	144342.4089	FREE	0.730	0.2294	0.2294375
2.74	2.05	2.47	74%	44.3429006	1.205708582	145136.2249	FREE	0.730	0.2295	0.2294660
2.75	2.06	2.48	74%	44.3767186	1.205889844	145931.4908	FREE	0.730	0.2295	0.2294945
2.76	2.07	2.49	75%	44.4105366	1.206071106	146728.2039	FREE	0.730	0.2295	0.2295230
2.77	2.08	2.50	75%	44.4443546	1.206252368	147526.3617	FREE	0.731	0.2296	0.2295515
2.78	2.09	2.51	75%	44.4782608	1.206434102	148325.9615	FREE	0.731	0.2296	0.2295800
2.79	2.10	2.52	75%	44.5125108	1.20661768	149127.0007	FREE	0.731	0.2296	0.2296089
2.80	2.11	2.53	76%	44.5471208	1.206803187	149929.4768	FREE	0.731	0.2296	0.2296380
2.81	2.12	2.54	76%	44.5820908	1.206990624	150733.3871	FREE	0.731	0.2297	0.2296674
2.82	2.13	2.55	76%	44.6174208	1.20717999	151538.7291	FREE	0.732	0.2297	0.2296971
2.83	2.14	2.56	76%	44.6531108	1.207371286	152345.5004	FREE	0.732	0.2297	0.2297272
2.84	2.15	2.57	77%	44.6891608	1.207564511	153153.6983	FREE	0.732	0.2298	0.2297575
2.85	2.16	2.58	77%	44.7255708	1.207759666	153963.3203	FREE	0.732	0.2298	0.2297881
2.86	2.17	2.59	77%	44.7623408	1.207956751	154774.3640	FREE	0.732	0.2298	0.2298191
2.87	2.18	2.60	77%	44.7994708	1.208155765	155586.8268	FREE	0.733	0.2299	0.2298503
2.88	2.19	2.61	78%	44.8369608	1.208356708	156400.7063	FREE	0.733	0.2299	0.2298818
2.89	2.20	2.62	78%	44.8748108	1.208559582	157216.0000	FREE	0.733	0.2299	0.2299136
2.90	2.21	2.63	78%	44.9130208	1.208764384	158032.7055	FREE	0.733	0.2299	0.2299457
2.91	2.22	2.64	78%	44.9515908	1.208971117	158850.8203	FREE	0.733	0.2300	0.2299782
2.92	2.23	2.65	79%	44.9905208	1.209179779	159670.3420	FREE	0.734	0.2300	0.2300109
2.93	2.24	2.66	79%	45.0298108	1.20939037	160491.2682	FREE	0.734	0.2300	0.2300439
2.94	2.25	2.67	79%	45.0694608	1.209602891	161313.5965	FREE	0.734	0.2301	0.2300772
2.95	2.26	2.68	79%	45.1094708	1.209817342	162137.3245	FREE	0.734	0.2301	0.2301108
2.96	2.27	2.69	80%	45.1498408	1.210033722	162962.4499	FREE	0.734	0.2301	0.2301447
2.97	2.28	2.70	80%	45.1905708	1.210252032	163788.9702	FREE	0.735	0.2302	0.2301789
2.98	2.29	2.71	80%	45.2316608	1.210472272	164616.8831	FREE	0.735	0.2302	0.2302134
2.99	2.30	2.72	80%	45.2731108	1.210694441	165446.1863	FREE	0.735	0.2302	0.2302482
3.00	2.31	2.73	81%	45.3149208	1.210918539	166276.8775	FREE	0.735	0.2303	0.2302833
3.01	2.32	2.74	81%	45.3570908	1.211144567	167108.9544	FREE	0.736	0.2303	0.2303187
3.02	2.33	2.75	81%	45.3996208	1.211372525	167942.4145	FREE	0.736	0.2304	0.2303544

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
3.03	2.34	2.76	81%	45.4425108	1.211602412	168777.2557	FREE	0.736	0.2304	0.2303904
3.04	2.35	2.77	82%	45.4857608	1.211834229	169613.4757	FREE	0.736	0.2304	0.2304266
3.05	2.36	2.78	82%	45.5293708	1.212067975	170451.0722	FREE	0.736	0.2305	0.2304632
3.06	2.37	2.79	82%	45.5733408	1.212303651	171290.0429	FREE	0.737	0.2305	0.2305001
3.07	2.38	2.80	82%	45.6176708	1.212541257	172130.3856	FREE	0.737	0.2305	0.2305373
3.08	2.39	2.81	83%	45.6623608	1.212780792	172972.0980	FREE	0.737	0.2306	0.2305747
3.09	2.40	2.82	83%	45.7074108	1.213022257	173815.1780	FREE	0.737	0.2306	0.2306125
3.10	2.41	2.83	83%	45.7528208	1.213265651	174659.6233	FREE	0.738	0.2307	0.2306505
3.11	2.42	2.84	83%	45.7985908	1.213510975	175505.4317	FREE	0.738	0.2307	0.2306889
3.12	2.43	2.85	84%	45.8447208	1.213758229	176352.6010	FREE	0.738	0.2307	0.2307275
3.13	2.44	2.86	84%	45.8912108	1.214007412	177201.1290	FREE	0.738	0.2308	0.2307665
3.14	2.45	2.87	84%	45.9380608	1.214258524	178051.0136	FREE	0.739	0.2308	0.2308057
3.15	2.46	2.88	84%	45.9852708	1.214511566	178902.2526	FREE	0.739	0.2308	0.2308452
3.16	2.47	2.89	85%	46.0328408	1.214766538	179754.8439	FREE	0.739	0.2309	0.2308851
3.17	2.48	2.90	85%	46.0807708	1.215023439	180608.7853	FREE	0.739	0.2309	0.2309252
3.18	2.49	2.91	85%	46.1290608	1.21528227	181464.0746	FREE	0.740	0.2310	0.2309656
3.19	2.50	2.92	85%	46.1777108	1.215543031	182320.7098	FREE	0.740	0.2310	0.2310063
3.20	2.51	2.93	86%	46.2267208	1.215805721	183178.6887	FREE	0.740	0.2310	0.2310473
3.21	2.52	2.94	86%	46.2760908	1.21607034	184038.0093	FREE	0.740	0.2311	0.2310886
3.22	2.53	2.95	86%	46.3258208	1.21633689	184898.6694	FREE	0.741	0.2311	0.2311302
3.23	2.54	2.96	86%	46.3759108	1.216605368	185760.6670	FREE	0.741	0.2312	0.2311721
3.24	2.55	2.97	87%	46.4263608	1.216875777	186624.0000	FREE	0.741	0.2312	0.2312143
3.25	2.56	2.98	87%	46.4771708	1.217148114	187488.6663	FREE	0.742	0.2313	0.2312567
3.26	2.57	2.99	87%	46.5283408	1.217422382	188354.6639	FREE	0.742	0.2313	0.2312995
3.27	2.58	3.00	87%	46.5798708	1.217698579	189221.9908	FREE	0.742	0.2313	0.2313425
3.28	2.59	3.01	88%	46.6317608	1.217976706	190090.6448	FREE	0.742	0.2314	0.2313859
3.29	2.60	3.02	88%	46.6840108	1.218256762	190960.6240	FREE	0.743	0.2314	0.2314295
3.30	2.61	3.03	88%	46.7366208	1.218538748	191831.9264	FREE	0.743	0.2315	0.2314735
3.31	2.62	3.04	88%	46.7895908	1.218822663	192704.5500	FREE	0.743	0.2315	0.2315177
3.32	2.63	3.05	89%	46.8429208	1.219108508	193578.4927	FREE	0.744	0.2316	0.2315622
3.33	2.64	3.06	89%	46.8966108	1.219396282	194453.7526	FREE	0.744	0.2316	0.2316070
3.34	2.65	3.07	89%	46.9506608	1.219685986	195330.3276	FREE	0.744	0.2317	0.2316521
3.35	2.66	3.08	89%	47.0050708	1.21997762	196208.2159	FREE	0.744	0.2317	0.2316975
3.36	2.67	3.09	90%	47.0598408	1.220271183	197087.4155	FREE	0.745	0.2317	0.2317432
3.37	2.68	3.10	90%	47.1149708	1.220566676	197967.9244	FREE	0.745	0.2318	0.2317892
3.38	2.69	3.11	90%	47.1704608	1.220864098	198849.7406	FREE	0.745	0.2318	0.2318354
3.39	2.70	3.12	90%	47.2263108	1.22116345	199732.8622	FREE	0.746	0.2319	0.2318820
3.40	2.71	3.13	91%	47.2825208	1.221464732	200617.2874	FREE	0.746	0.2319	0.2319288
3.41	2.72	3.14	91%	47.3390908	1.221767943	201503.0141	FREE	0.746	0.2320	0.2319760
3.42	2.73	3.15	91%	47.3960208	1.222073084	202390.0405	FREE	0.746	0.2320	0.2320234
3.43	2.74	3.16	91%	47.4533108	1.222380154	203278.3647	FREE	0.747	0.2321	0.2320711
3.44	2.75	3.17	92%	47.5109608	1.222689154	204167.9848	FREE	0.747	0.2321	0.2321191
3.45	2.76	3.18	92%	47.5689708	1.223000083	205058.8989	FREE	0.747	0.2322	0.2321674
3.46	2.77	3.19	92%	47.6273408	1.223312942	205951.1050	FREE	0.748	0.2322	0.2322160
3.47	2.78	3.20	92%	47.6860708	1.223627731	206844.6015	FREE	0.748	0.2323	0.2322649
3.48	2.79	3.21	93%	47.7451608	1.223944449	207739.3863	FREE	0.748	0.2323	0.2323141
3.49	2.80	3.22	93%	47.8046108	1.224263096	208635.4576	FREE	0.749	0.2324	0.2323635
3.50	2.81	3.23	93%	47.8644208	1.224583674	209532.8137	FREE	0.749	0.2324	0.2324133
3.51	2.82	3.24	93%	47.9245908	1.22490618	210431.4526	FREE	0.749	0.2325	0.2324633
3.52	2.83	3.25	94%	47.9851208	1.225230617	211331.3725	FREE	0.750	0.2325	0.2325136
3.53	2.84	3.26	94%	48.0460108	1.225556983	212232.5716	FREE	0.750	0.2326	0.2325642
3.54	2.85	3.27	94%	48.1072608	1.225885278	213135.0481	FREE	0.750	0.2326	0.2326151
3.55	2.86	3.28	94%	48.1688708	1.226215503	214038.8002	FREE	0.751	0.2327	0.2326663
3.56	2.87	3.29	95%	48.2308408	1.226547658	214943.8261	FREE	0.751	0.2327	0.2327178
3.57	2.88	3.30	95%	48.2931708	1.226881742	215850.1240	FREE	0.751	0.2328	0.2327695
3.58	2.89	3.31	95%	48.3558608	1.227217756	216757.6921	FREE	0.752	0.2328	0.2328216
3.59	2.90	3.32	95%	48.4189108	1.2275557	217666.5287	FREE	0.752	0.2329	0.2328739
3.60	2.91	3.33	96%	48.4823208	1.227895573	218576.6319	FREE	0.752	0.2329	0.2329265
3.61	2.92	3.34	96%	48.5460908	1.228237375	219488.0000	FREE	0.753	0.2330	0.2329794
3.62	2.93	3.35	96%	48.6102208	1.228581107	220400.6313	FREE	0.753	0.2330	0.2330326
3.63	2.94	3.36	96%	48.6747108	1.228926769	221314.5240	FREE	0.753	0.2331	0.2330861
3.64	2.95	3.37	97%	48.7395608	1.22927436	222229.6764	FREE	0.754	0.2331	0.2331399
3.65	2.96	3.38	97%	48.8047708	1.229623881	223146.0867	FREE	0.754	0.2332	0.2331939
3.66	2.97	3.39	97%	48.8703408	1.229975332	224063.7532	FREE	0.754	0.2332	0.2332483
3.67	2.98	3.40	97%	48.9362708	1.230328712	224982.6742	FREE	0.755	0.2333	0.2333029
3.68	2.99	3.41	98%	49.0025608	1.230684021	225902.8481	FREE	0.755	0.2334	0.2333578
3.69	3.00	3.42	98%	49.0692108	1.23104126	226824.2730	FREE	0.755	0.2334	0.2334130
3.70	3.01	3.43	98%	49.1362208	1.231400429	227746.9473	FREE	0.756	0.2335	0.2334685
3.71	3.02	3.44	98%	49.2035908	1.231761527	228670.8693	FREE	0.756	0.2335	0.2335243
3.72	3.03	3.45	99%	49.2713208	1.232124555	229596.0373	FREE	0.757	0.2336	0.2335803
3.73	3.04	3.46	99%	49.3394108	1.232489513	230522.4497	FREE	0.757	0.2336	0.2336367
3.74	3.05	3.47	99%	49.4078608	1.2328564	231450.1047	FREE	0.757	0.2337	0.2336933
3.75	3.06	3.48	99%	49.4766708	1.233225216	232379.0008	FREE	0.758	0.2338	0.2337502
3.76	3.07	3.49	100%	49.5458408	1.233595962	233309.1362	FREE	0.758	0.2338	0.2338074
3.77	3.08	3.50	100%	49.6153708	1.233968638	234240.5093	FREE	0.758	0.2339	0.2338648
3.78	3.09	3.51	100%	49.6852608	1.234343243	235173.1185	FREE	0.759	0.2339	0.2339226
3.79	3.10	3.52	100%	49.7555108	1.234719778	236106.9621	FREE	0.759	0.2340	0.2339806
3.80	3.11	3.53	101%	49.8261208	1.235098243	237042.0385	FREE	0.759	0.2340	0.2340389
3.81	3.12	3.54	101%	49.8970908	1.235478637	237978.3460	FREE	0.760	0.2341	0.2340975
3.82	3.13	3.55	101%	49.9684208	1.23586096	238915.8832	FREE	0.760	0.2342	0.2341564
3.83	3.14	3.56	101%	50.0401108	1.236245214	239854.6483	FREE	0.761	0.2342	0.2342156
3.84	3.15	3.57	102%	50.1121608	1.236631396	240794.6397	FREE	0.761	0.2343	0.2342750
3.85	3.16	3.58	102%	50.1845708	1.237019509	241735.8558	FREE	0.761	0.2343	0.2343348
3.86	3.17	3.59	102%	50.2573408	1.237409551	242678.2952	FREE	0.762	0.2344	0.2343948
3.87	3.18	3.60	102%	50.3304708	1.237801522	243621.9561	FREE	0.762	0.2345	0.2344551
3.88	3.19	3.61	103%	50.4039608	1.238195423	244566.8369	FREE	0.763	0.2345	0.2345157
3.89	3.20	3.62	103%	50.4778108	1.238591254	245512.9362	FREE	0.763	0.2346	0.2345765
3.90	3.21	3.63	103%	50.5520208	1.238989014	246460.2524	FREE	0.763	0.2346	0.2346376
3.91	3.22	3.64	103%	50.6265908	1.239388704	247408.7838	FREE	0.764	0.2347	0.2346991
3.92	3.23	3.65	104%	50.7015208	1.239790323	248358.5290	FREE	0.764	0.2348	0.2347608
3.93	3.24	3.66	104%	50.7768108	1.240193872	249309.4863	FREE	0.765	0.2348	0.2348227
3.94	3.25	3.67	104%	50.8524608	1.24059935	250261.6543	FREE	0.765	0.2349	0.2348850
3.95	3.26	3.68	104%	50.9284708	1.241006759	251215.0314	FREE	0.765	0.2349	0.2349475
3.96	3.27	3.69	105%	51.0048408	1.241416096	252169.6161	FREE	0.766	0.2350	0.2350103
3.97	3.28	3.70	105%	51.0815708	1.241827363	253125.4068	FREE	0.766	0.2351	0.2350734
3.98	3.29	3.71	105%	51.1586608	1.24224056	254082.4020	FREE	0.767	0.2351	0.2351368
3.99	3.30	3.72	105%	51.2361108	1.242655687	255040.6003	FREE	0.767	0.2352	0.2352005
4.00	3.31	3.73	106%	51.3139208	1.243072742	256000.0000	FREE	0.767	0.2353	0.2352644
4.01	3.32	3.74	106%	51.3920908	1.243491728	256960.5998	FREE	0.768	0.2353	0.2353286
4.02	3.33	3.75	106%	51.4706208	1.243912643	257922.3980	FREE	0.768	0.2354	0.2353931
4.03	3.34	3.76	106%	51.5495108	1.244335488	258885.3933	FREE	0.769	0.2355	0.2354579

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
4.04	3.35	3.77	107%	51.6287608	1.244760262	259849.5841	FREE	0.769	0.2355	0.2355229
4.05	3.36	3.78	107%	51.7083708	1.245186966	260814.9689	FREE	0.770	0.2356	0.2355882
4.06	3.37	3.79	107%	51.7883408	1.245615599	261781.5463	FREE	0.770	0.2357	0.2356538
4.07	3.38	3.80	107%	51.8686708	1.246046162	262749.3148	FREE	0.770	0.2357	0.2357197
4.08	3.39	3.81	108%	51.9493608	1.246478655	263718.2730	FREE	0.771	0.2358	0.2357859
4.09	3.40	3.82	108%	52.0304108	1.246913077	264688.4193	FREE	0.771	0.2359	0.2358523
4.10	3.41	3.83	108%	52.1118208	1.247349428	265659.7523	FREE	0.772	0.2359	0.2359190
4.11	3.42	3.84	108%	52.1935908	1.24778771	266632.2706	FREE	0.772	0.2360	0.2359860
4.12	3.43	3.85	109%	52.2757208	1.24822792	267605.9728	FREE	0.773	0.2361	0.2360532
4.13	3.44	3.86	109%	52.3582108	1.248670061	268580.8573	FREE	0.773	0.2361	0.2361208
4.14	3.45	3.87	109%	52.4410608	1.249114131	269556.9228	FREE	0.774	0.2362	0.2361886
4.15	3.46	3.88	109%	52.5242708	1.24956013	270534.1679	FREE	0.774	0.2363	0.2362567
4.16	3.47	3.89	110%	52.6078408	1.25000806	271512.5911	FREE	0.774	0.2363	0.2363250
4.17	3.48	3.90	110%	52.6917708	1.250457918	272492.1909	FREE	0.775	0.2364	0.2363936
4.18	3.49	3.91	110%	52.7760608	1.250909706	273472.9661	FREE	0.775	0.2365	0.2364625
4.19	3.50	3.92	110%	52.8607108	1.251363424	274454.9151	FREE	0.776	0.2365	0.2365317
4.20	3.51	3.93	111%	52.9457208	1.251819072	275438.0366	FREE	0.776	0.2366	0.2366012
4.21	3.52	3.94	111%	53.0310908	1.252276649	276422.3292	FREE	0.777	0.2367	0.2366709
4.22	3.53	3.95	111%	53.1168208	1.252736155	277407.7914	FREE	0.777	0.2367	0.2367409
4.23	3.54	3.96	111%	53.2029108	1.253197591	278394.4220	FREE	0.778	0.2368	0.2368112
4.24	3.55	3.97	112%	53.2893608	1.253660957	279382.2195	FREE	0.778	0.2369	0.2368817
4.25	3.56	3.98	112%	53.3761708	1.254126252	280371.1825	FREE	0.779	0.2370	0.2369526
4.26	3.57	3.99	112%	53.4633408	1.254593477	281361.3097	FREE	0.779	0.2370	0.2370236
4.27	3.58	4.00	112%	53.5508708	1.255062632	282352.5998	FREE	0.779	0.2371	0.2370950
4.28	3.59	4.01	113%	53.6387608	1.255533716	283345.0512	FREE	0.780	0.2372	0.2371666
4.29	3.60	4.02	113%	53.7270108	1.256006729	284338.6628	FREE	0.780	0.2372	0.2372386
4.30	3.61	4.03	113%	53.8156208	1.256481672	285333.4330	FREE	0.781	0.2373	0.2373107
4.31	3.62	4.04	113%	53.9045908	1.256958545	286329.3607	FREE	0.781	0.2374	0.2373832
4.32	3.63	4.05	114%	53.9939208	1.257437347	287326.4444	FREE	0.782	0.2375	0.2374559
4.33	3.64	4.06	114%	54.0836108	1.257918079	288324.6828	FREE	0.782	0.2375	0.2375289
4.34	3.65	4.07	114%	54.1736608	1.258400741	289324.0745	FREE	0.783	0.2376	0.2376022
4.35	3.66	4.08	114%	54.2640708	1.258885332	290324.6183	FREE	0.783	0.2377	0.2376757
4.36	3.67	4.09	115%	54.3548408	1.259371852	291326.3128	FREE	0.784	0.2377	0.2377495
4.37	3.68	4.10	115%	54.4459708	1.259860303	292329.1567	FREE	0.784	0.2378	0.2378236
4.38	3.69	4.11	115%	54.5374608	1.260350682	293333.1487	FREE	0.785	0.2379	0.2378979
4.39	3.70	4.12	115%	54.6293108	1.260842992	294338.2874	FREE	0.785	0.2380	0.2379725
4.40	3.71	4.13	116%	54.7215208	1.26133723	295344.5716	FREE	0.786	0.2380	0.2380474
4.41	3.72	4.14	116%	54.8140908	1.261833399	296352.0000	FREE	0.786	0.2381	0.2381225
4.42	3.73	4.15	116%	54.9070208	1.262331497	297360.5712	FREE	0.787	0.2382	0.2381980
4.43	3.74	4.16	116%	55.0003108	1.262831525	298370.2840	FREE	0.787	0.2383	0.2382736
4.44	3.75	4.17	117%	55.0939608	1.263333482	299381.1370	FREE	0.788	0.2383	0.2383496
4.45	3.76	4.18	117%	55.1879708	1.263837369	300393.1291	FREE	0.788	0.2384	0.2384258
4.46	3.77	4.19	117%	55.2823408	1.264343185	301406.2588	FREE	0.789	0.2385	0.2385023
4.47	3.78	4.20	117%	55.3770708	1.264850931	302420.5250	FREE	0.789	0.2386	0.2385791
4.48	3.79	4.21	118%	55.4721608	1.265360606	303435.9264	FREE	0.790	0.2387	0.2386561
4.49	3.80	4.22	118%	55.5676108	1.265872211	304452.4616	FREE	0.790	0.2387	0.2387334
4.50	3.81	4.23	118%	55.6634208	1.266385746	305470.1295	FREE	0.791	0.2388	0.2388109
4.51	3.82	4.24	118%	55.7595908	1.26690121	306488.9287	FREE	0.791	0.2389	0.2388887
4.52	3.83	4.25	119%	55.8561208	1.267418604	307508.8581	FREE	0.792	0.2390	0.2389668
4.53	3.84	4.26	119%	55.9530108	1.267937927	308529.9163	FREE	0.792	0.2390	0.2390452
4.54	3.85	4.27	119%	56.0502608	1.26845918	309552.1021	FREE	0.793	0.2391	0.2391238
4.55	3.86	4.28	119%	56.1478708	1.268982363	310575.4144	FREE	0.793	0.2392	0.2392027
4.56	3.87	4.29	120%	56.2458408	1.269507475	311599.8517	FREE	0.794	0.2393	0.2392818
4.57	3.88	4.30	120%	56.3441708	1.270034516	312625.4130	FREE	0.794	0.2394	0.2393612
4.58	3.89	4.31	120%	56.4428608	1.270563488	313652.0969	FREE	0.795	0.2394	0.2394409
4.59	3.90	4.32	120%	56.5419108	1.271094388	314679.9023	FREE	0.795	0.2395	0.2395209
4.60	3.91	4.33	121%	56.6413208	1.271627219	315708.8279	FREE	0.796	0.2396	0.2396011
4.61	3.92	4.34	121%	56.7410908	1.272161979	316738.8725	FREE	0.797	0.2397	0.2396815
4.62	3.93	4.35	121%	56.8412208	1.272698668	317770.0349	FREE	0.797	0.2398	0.2397623
4.63	3.94	4.36	121%	56.9417108	1.273237287	318802.3139	FREE	0.798	0.2398	0.2398433
4.64	3.95	4.37	122%	57.0425608	1.273777836	319835.7082	FREE	0.798	0.2399	0.2399245
4.65	3.96	4.38	122%	57.1437708	1.274320314	320870.2168	FREE	0.799	0.2400	0.2400060
4.66	3.97	4.39	122%	57.2453408	1.274864722	321905.8383	FREE	0.799	0.2401	0.2400878
4.67	3.98	4.40	122%	57.3472708	1.275411059	322942.5715	FREE	0.800	0.2402	0.2401699
4.68	3.99	4.41	123%	57.4495608	1.275959326	323980.4154	FREE	0.800	0.2403	0.2402522
4.69	4.00	4.42	123%	57.5522108	1.276509523	325019.3687	FREE	0.801	0.2403	0.2403347
4.70	4.01	4.43	123%	57.6552208	1.277061649	326059.4302	FREE	0.801	0.2404	0.2404176
4.71	4.02	4.44	123%	57.7585908	1.277615705	327100.5987	FREE	0.802	0.2405	0.2405006
4.72	4.03	4.45	124%	57.8623208	1.27817169	328142.8731	FREE	0.803	0.2406	0.2405840
4.73	4.04	4.46	124%	57.9664108	1.278729605	329186.2522	FREE	0.803	0.2407	0.2406676
4.74	4.05	4.47	124%	58.0708608	1.279289449	330230.7348	FREE	0.804	0.2408	0.2407515
4.75	4.06	4.48	124%	58.1756708	1.279851223	331276.3197	FREE	0.804	0.2408	0.2408356
4.76	4.07	4.49	125%	58.2808408	1.280414927	332323.0059	FREE	0.805	0.2409	0.2409200
4.77	4.08	4.50	125%	58.3863708	1.28098056	333370.7920	FREE	0.805	0.2410	0.2410046
4.78	4.09	4.51	125%	58.4922608	1.281548122	334419.6771	FREE	0.806	0.2411	0.2410895
4.79	4.10	4.52	125%	58.5985108	1.282117615	335469.6599	FREE	0.807	0.2412	0.2411747
4.80	4.11	4.53	126%	58.7051208	1.282689037	336520.7393	FREE	0.807	0.2413	0.2412601
4.81	4.12	4.54	126%	58.8120908	1.283262388	337572.9142	FREE	0.808	0.2413	0.2413458
4.82	4.13	4.55	126%	58.9194208	1.283837669	338626.1833	FREE	0.808	0.2414	0.2414317
4.83	4.14	4.56	126%	59.0271108	1.28441488	339680.5456	FREE	0.809	0.2415	0.2415179
4.84	4.15	4.57	127%	59.1351608	1.28499402	340736.0000	FREE	0.809	0.2416	0.2416044
4.85	4.16	4.58	127%	59.2435708	1.285575089	341792.5453	FREE	0.810	0.2417	0.2416911
4.86	4.17	4.59	127%	59.3523408	1.286158089	342850.1803	FREE	0.811	0.2418	0.2417781
4.87	4.18	4.60	127%	59.4614708	1.286743018	343908.9040	FREE	0.811	0.2419	0.2418653
4.88	4.19	4.61	128%	59.5709608	1.287329876	344968.7153	FREE	0.812	0.2420	0.2419528
4.89	4.20	4.62	128%	59.6808108	1.287918664	346029.6130	FREE	0.812	0.2420	0.2420405
4.90	4.21	4.63	128%	59.7910208	1.288509382	347091.5960	FREE	0.813	0.2421	0.2421285
4.91	4.22	4.64	128%	59.9015908	1.289102029	348154.6632	FREE	0.813	0.2422	0.2422167
4.92	4.23	4.65	129%	60.0125208	1.289696605	349218.8135	FREE	0.814	0.2423	0.2423052
4.93	4.24	4.66	129%	60.1238108	1.290293112	350284.0458	FREE	0.815	0.2424	0.2423940
4.94	4.25	4.67	129%	60.2354608	1.290891548	351350.3591	FREE	0.815	0.2425	0.2424830
4.95	4.26	4.68	129%	60.3474708	1.291491913	352417.7521	FREE	0.816	0.2426	0.2425723
4.96	4.27	4.69	130%	60.4598408	1.292094208	353486.2239	FREE	0.816	0.2427	0.2426618
4.97	4.28	4.70	130%	60.5725708	1.292698433	354555.7733	FREE	0.817	0.2428	0.2427515
4.98	4.29	4.71	130%	60.6856608	1.293304587	355626.3992	FREE	0.818	0.2428	0.2428416
4.99	4.30	4.72	130%	60.7991108	1.293912671	356698.1006	FREE	0.818	0.2429	0.2429318
5.00	4.31	4.73	131%	60.9129208	1.294522684	357770.8764	FREE	0.819	0.2430	0.2430224

Appendix C – TD244-48 Design Spreadsheet

St. Anthony Falls Testing (TD244-48)

THIRSTY DUCK TD SERIES

STAGE VS. DISCHARGE RELATIONSHIP CONSIDERING TAILWATER EFFECTS

TAILWATER ELEVATION 0 FT ASSUMED

ENTER VALUES IN YELLOW CELLS ONLY

Need Help?

E-mail Thirsty Duck for Assistance

www.Thirsty-Duck.com/technical-info

Call a Thirsty Duck Engineer
(727) 376-2400
Mon.-Fri. 8 am to 5 pm (EST)

DATUM: ASSUMED

INNER AND OUTER ORIFICE SIZE:

	DIAMETER (inches)	DIAMETER (feet)	AREA (sq. inches)	AREA (sq. ft)
INNER ORIFICE DIAMETER	2.25	0.19	3.9761	0.0276
INNER ORIFICE PERIMETER	7.0686	0.59		
WEIR COEFFICIENT	3.2			
ORIFICE COEFFICIENT	0.55			
WEIR TO ORIFICE TRANSITION HEAD (Co x Ao)/(Cw x Lw)	0.78	0.065		

DESIGN ELEVATIONS (FT NGVD29):

TOP OF BANK	4.00	ft ASSUMED
MINIMUM DISCHARGE ELEVATION	0.00	ft ASSUMED
DESIGN PEAK STAGE	4.00	ft ASSUMED
DESIGN TAILWATER	0.00	ft ASSUMED
ATTACHMENT FLANGE ELEVATION	-0.92	ft ASSUMED

ORIFICE DATA:

C (INNER ORIFICE)	0.55	unitless
PROPOSED SUBMERGENCE (INNER ORIFICE)	0.00	ft
DESIGN OPERATING HEAD	0.79	ft

MAX FLOW RATE **0.108321 cfs**

HOUSING BOX DATA (CASE C – Inflow through slot(s)):

SLOT LENGTH	10000.00	ft.
SLOT HEIGHT	10000.00	ft.
WEIR COEFFICIENT	3.20	unitless
ORIFICE COEFFICIENT	0.80	unitless
SLOT INVERT ELEVATION	0.00	ft ASSUMED
SLOT CENTROID ELEVATION	5000.00	ft ASSUMED
SLOT CROWN ELEVATION	10000.00	ft ASSUMED

BELLOWS DATA:

BELLOWS INSIDE DIAMETER	6.00	in
BELLOWS LENGTH	4.00	ft.
BELLOWS COLLAPSED HEIGHT	0.5	ft.
BODY WEIGHT	36	lbs
NET FLOTATION AREA	2.924790036	sq. ft.
NET BODY AREA	0.065108962	sq. ft.
THICKNESS OF FOAM	0.510416667	ft.
HEIGHT OF BODY	1.5	ft.
LINEAR FORCE COEFFICIENT	2.5581	x
FIRST PARABOLIC FORCE COEFFICIENT	5.18	x^2
SECOND PARABOLIC FORCE COEFFICIENT	23.3419	x
THIRD PARABOLIC FORCE COEFFICIENT	32.375	x^0

RATING CURVE COMPUTATION INCREMENT: 0.01 ft

Maximum Round Orifice Sizes:

Bellows ID	Max Orifice (in)	Flow (cfs) at 6" head	Flow (cfs) at 9" head	Flow (cfs) at 12" head
4" bellows	1.94"	0.0722	0.08845	0.102
6" bellows	3.34"	0.214062	0.26217	0.303
8" bellows	5.34"	0.547179	0.670155	0.773828

Maximum Equivalent Orifice Sizes:

Bellows ID	Max Orifice (in)	Flow (cfs) at 6" head	Flow (cfs) at 9" head	Flow (cfs) at 12" head
4" bellows	3.66"	0.26	0.315	0.364
6" bellows	5.65"	0.612	0.75	0.866
8" bellows	7.50"	1.078	1.322	1.526

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
0.00	0.00	0.42	23%	37.074402	1.166749958	0.0000	SUBMERGED	0.000	0.0000	0.0000000
0.01	0.00	0.42	23%	37.074402	1.166749958	32.0000	SUBMERGED	0.010	0.0019	0.0018850
0.02	0.00	0.42	23%	37.074402	1.166749958	90.5097	SUBMERGED	0.020	0.0053	0.0053315
0.03	0.00	0.42	23%	37.074402	1.166749958	166.2769	SUBMERGED	0.030	0.0098	0.0097945
0.04	0.00	0.42	23%	37.074402	1.166749958	256.0000	SUBMERGED	0.040	0.0151	0.0150796
0.05	0.00	0.42	23%	37.074402	1.166749958	357.7709	SUBMERGED	0.050	0.0211	0.0210744
0.06	0.00	0.42	23%	37.074402	1.166749958	470.3020	SUBMERGED	0.060	0.0277	0.0277031
0.07	0.00	0.42	23%	37.074402	1.166749958	592.6483	SUBMERGED	0.070	0.0322	0.0322439
0.08	0.00	0.42	23%	37.074402	1.166749958	724.0773	SUBMERGED	0.080	0.0345	0.0344701
0.09	0.00	0.42	23%	37.074402	1.166749958	864.0000	SUBMERGED	0.090	0.0366	0.0365611
0.10	0.00	0.42	23%	37.074402	1.166749958	1011.9289	SUBMERGED	0.100	0.0385	0.0385388
0.11	0.00	0.42	23%	37.074402	1.166749958	1167.4519	SUBMERGED	0.110	0.0404	0.0404198
0.12	0.00	0.42	23%	37.074402	1.166749958	1330.2150	SUBMERGED	0.120	0.0422	0.0422171
0.13	0.00	0.42	23%	37.074402	1.166749958	1499.9093	SUBMERGED	0.130	0.0439	0.0439410
0.14	0.00	0.42	23%	37.074402	1.166749958	1676.2625	SUBMERGED	0.140	0.0456	0.0455997
0.15	0.00	0.42	23%	37.074402	1.166749958	1859.0320	SUBMERGED	0.150	0.0472	0.0472002
0.16	0.00	0.42	23%	37.074402	1.166749958	2048.0000	SUBMERGED	0.160	0.0487	0.0487481
0.17	0.00	0.42	23%	37.074402	1.166749958	2242.9695	SUBMERGED	0.170	0.0502	0.0502484
0.18	0.00	0.42	23%	37.074402	1.166749958	2443.7610	SUBMERGED	0.180	0.0517	0.0517052
0.19	0.00	0.42	23%	37.074402	1.166749958	2650.2106	SUBMERGED	0.190	0.0531	0.0531221
0.20	0.00	0.42	23%	37.074402	1.166749958	2862.1670	SUBMERGED	0.200	0.0545	0.0545021
0.21	0.00	0.42	23%	37.074402	1.166749958	3079.4909	SUBMERGED	0.210	0.0558	0.0558480
0.22	0.00	0.42	23%	37.074402	1.166749958	3302.0527	SUBMERGED	0.220	0.0572	0.0571623
0.23	0.00	0.42	23%	37.074402	1.166749958	3529.7320	SUBMERGED	0.230	0.0584	0.0584470
0.24	0.00	0.42	23%	37.074402	1.166749958	3762.4162	SUBMERGED	0.240	0.0597	0.0597040
0.25	0.00	0.42	23%	37.074402	1.166749958	4000.0000	SUBMERGED	0.250	0.0609	0.0609352
0.26	0.00	0.42	23%	37.074402	1.166749958	4242.3842	SUBMERGED	0.260	0.0621	0.0621419
0.27	0.00	0.42	23%	37.074402	1.166749958	4489.4757	SUBMERGED	0.270	0.0633	0.0633257
0.28	0.00	0.42	23%	37.074402	1.166749958	4741.1863	SUBMERGED	0.280	0.0645	0.0644877
0.29	0.00	0.42	23%	37.074402	1.166749958	4997.4329	SUBMERGED	0.290	0.0656	0.0656292
0.30	0.00	0.42	23%	37.074402	1.166749958	5258.1366	SUBMERGED	0.300	0.0668	0.0667511
0.31	0.00	0.42	23%	37.074402	1.166749958	5523.2222	SUBMERGED	0.310	0.0679	0.0678545
0.32	0.00	0.42	23%	37.074402	1.166749958	5792.6188	SUBMERGED	0.320	0.0689	0.0689403
0.33	0.00	0.42	23%	37.074402	1.166749958	6066.2582	SUBMERGED	0.330	0.0700	0.0700092
0.34	0.00	0.42	23%	37.074402	1.166749958	6344.0757	SUBMERGED	0.340	0.0711	0.0710620
0.35	0.00	0.42	23%	37.074402	1.166749958	6626.0094	SUBMERGED	0.350	0.0721	0.0720995
0.36	0.00	0.42	23%	37.074402	1.166749958	6912.0000	SUBMERGED	0.360	0.0731	0.0731222
0.37	0.00	0.42	23%	37.074402	1.166749958	7201.9908	SUBMERGED	0.370	0.0741	0.0741308
0.38	0.00	0.42	23%	37.074402	1.166749958	7495.9274	SUBMERGED	0.380	0.0751	0.0751259
0.39	0.00	0.42	23%	37.074402	1.166749958	7793.7575	SUBMERGED	0.390	0.0761	0.0761080
0.40	0.00	0.42	23%	37.074402	1.166749958	8095.4308	SUBMERGED	0.400	0.0771	0.0770776
0.41	0.00	0.42	23%	37.074402	1.166749958	8400.8990	SUBMERGED	0.410	0.0780	0.0780351
0.42	0.00	0.42	23%	37.074402	1.166749958	8710.1155	SUBMERGED	0.420	0.0790	0.0789810
0.43	0.00	0.42	23%	37.074402	1.166749958	9023.0354	SUBMERGED	0.430	0.0799	0.0799157
0.44	0.00	0.42	23%	37.074402	1.166749958	9339.6154	SUBMERGED	0.440	0.0808	0.0808396
0.45	0.00	0.42	23%	37.074402	1.166749958	9659.8137	SUBMERGED	0.450	0.0818	0.0817531
0.46	0.00	0.42	23%	37.074402	1.166749958	9983.5897	SUBMERGED	0.460	0.0827	0.0826565
0.47	0.00	0.42	23%	37.074402	1.166749958	10310.9045	SUBMERGED	0.470	0.0836	0.0835501
0.48	0.00	0.42	23%	37.074402	1.166749958	10641.7202	SUBMERGED	0.480	0.0844	0.0844343
0.49	0.00	0.42	23%	37.074402	1.166749958	10976.0000	SUBMERGED	0.490	0.0853	0.0853092
0.50	0.00	0.42	23%	37.074402	1.166749958	11313.7085	SUBMERGED	0.500	0.0862	0.0861753
0.51	0.00	0.42	23%	37.074402	1.166749958	11654.8112	SUBMERGED	0.510	0.0870	0.0870328
0.52	0.00	0.42	23%	37.074402	1.166749958	11999.2746	SUBMERGED	0.520	0.0879	0.0878820
0.53	0.00	0.42	23%	37.074402	1.166749958	12347.0664	SUBMERGED	0.530	0.0887	0.0887230
0.54	0.00	0.42	23%	37.074402	1.166749958	12698.1548	SUBMERGED	0.540	0.0896	0.0895560
0.55	0.00	0.42	23%	37.074402	1.166749958	13052.5093	SUBMERGED	0.550	0.0904	0.0903815
0.56	0.00	0.42	23%	37.074402	1.166749958	13410.1001	SUBMERGED	0.560	0.0912	0.0911994
0.57	0.00	0.42	23%	37.074402	1.166749958	13770.8980	SUBMERGED	0.570	0.0920	0.0920101
0.58	0.00	0.42	23%	37.074402	1.166749958	14134.8749	SUBMERGED	0.580	0.0928	0.0928137
0.59	0.00	0.42	23%	37.074402	1.166749958	14502.0032	SUBMERGED	0.590	0.0936	0.0936104
0.60	0.00	0.42	23%	37.074402	1.166749958	14872.2560	SUBMERGED	0.600	0.0944	0.0944004
0.61	0.00	0.42	23%	37.074402	1.166749958	15245.6074	SUBMERGED	0.610	0.0952	0.0951838
0.62	0.00	0.42	23%	37.074402	1.166749958	15622.0316	SUBMERGED	0.620	0.0960	0.0959608
0.63	0.00	0.42	23%	37.074402	1.166749958	16001.5039	SUBMERGED	0.630	0.0967	0.0967316
0.64	0.00	0.42	23%	37.074402	1.166749958	16384.0000	SUBMERGED	0.640	0.0975	0.0974963
0.65	0.00	0.42	23%	37.074402	1.166749958	16769.4961	SUBMERGED	0.650	0.0983	0.0982550
0.66	0.00	0.42	23%	37.074402	1.166749958	17157.9691	SUBMERGED	0.660	0.0990	0.0990079
0.67	0.00	0.42	23%	37.074402	1.166749958	17549.3963	SUBMERGED	0.670	0.0998	0.0997552
0.68	0.00	0.42	23%	37.074402	1.166749958	17943.7557	SUBMERGED	0.680	0.1005	0.1004969
0.69	0.00	0.42	23%	37.074402	1.166749958	18341.0255	SUBMERGED	0.690	0.1012	0.1012331
0.70	0.00	0.42	23%	37.074402	1.166749958	18741.1846	SUBMERGED	0.700	0.1020	0.1019640
0.71	0.00	0.42	23%	37.074402	1.166749958	19144.2123	SUBMERGED	0.710	0.1027	0.1026898
0.72	0.00	0.42	23%	37.074402	1.166749958	19550.0883	SUBMERGED	0.720	0.1034	0.1034104
0.73	0.00	0.42	23%	37.074402	1.166749958	19958.7927	SUBMERGED	0.730	0.1041	0.1041261
0.74	0.00	0.42	23%	37.074402	1.166749958	20370.3062	SUBMERGED	0.740	0.1048	0.1048368
0.75	0.00	0.42	23%	37.074402	1.166749958	20784.6097	SUBMERGED	0.750	0.1055	0.1055428
0.76	0.00	0.42	23%	37.074402	1.166749958	21201.6845	SUBMERGED	0.760	0.1062	0.1062441
0.77	0.00	0.42	23%	37.074402	1.166749958	21621.5123	SUBMERGED	0.770	0.1069	0.1069408
0.78	0.00	0.42	23%	37.074402	1.166749958	22044.0751	SUBMERGED	0.780	0.1076	0.1076330
0.79	0.00	0.42	23%	37.074402	1.166749958	22469.3555	SUBMERGED	0.790	0.1083	0.1083207
0.80	0.01	0.43	23%	37.099983	1.16688707	22897.3361	FREE	0.790	0.1083	0.1083301
0.81	0.02	0.44	24%	37.125564	1.167024183	23328.0000	FREE	0.790	0.1083	0.1083395
0.82	0.03	0.45	24%	37.151145	1.167161295	23761.3306	FREE	0.790	0.1083	0.1083489
0.83	0.04	0.46	24%	37.176726	1.167298407	24197.3116	FREE	0.791	0.1084	0.1083583
0.84	0.05	0.47	24%	37.202307	1.16743552	24635.9269	FREE	0.791	0.1084	0.1083677
0.85	0.06	0.48	25%	37.227888	1.167572632	25077.1609	FREE	0.791	0.1084	0.1083771
0.86	0.07	0.49	25%	37.253469	1.167709744	25520.9981	FREE	0.791	0.1084	0.1083865
0.87	0.08	0.50	25%	37.27905	1.167846856	25967.4233	FREE	0.791	0.1084	0.1083959
0.88	0.09	0.51	25%	37.304631	1.167983969	26416.4216	FREE	0.791	0.1084	0.1084053
0.89	0.10	0.52	26%	37.330212	1.168121081	26867.9783	FREE	0.791	0.1084	0.1084147
0.90	0.11	0.53	26%	37.355793	1.168258193	27322.0790	FREE	0.792	0.1084	0.1084241
0.91	0.12	0.54	26%	37.381374	1.168395306	27778.7095	FREE	0.792	0.1084	0.1084335
0.92	0.13	0.55	26%	37.406955	1.168532418	28237.8560	FREE	0.792	0.1084	0.1084429
0.93	0.14	0.56	27%	37.432536	1.16866953	28699.5047	FREE	0.792	0.1085	0.1084523
0.94	0.15	0.57	27%	37.458117	1.168806643	29163.6420	FREE	0.792	0.1085	0.1084616
0.95	0.16	0.58	27%	37.483698	1.168943755	29630.2548	FREE	0.792	0.1085	0.1084710
0.96	0.17	0.59	27%	37.509279	1.169080867	30099.3300	FREE	0.792	0.1085	0.1084804
0.97	0.18	0.60	28%	37.53486	1.169217979	30570.8546	FREE	0.792	0.1085	0.1084898
0.98	0.19	0.61	28%	37.560441	1.169355092	31044.8161	FREE	0.793	0.1085	0.1084992
0.99	0.20	0.62	28%	37.586022	1.169492204	31521.2020	FREE	0.793	0.1085	0.1085086
1.00	0.21	0.63	28%	37.611603	1.169629316	32000.0000	FREE	0.793	0.1085	0.1085180

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
1.01	0.22	0.64	29%	37.637184	1.169766429	32481.1980	FREE	0.793	0.1085	0.1085273
1.02	0.23	0.65	29%	37.662765	1.169903541	32964.7841	FREE	0.793	0.1085	0.1085367
1.03	0.24	0.66	29%	37.688346	1.170040653	33450.7466	FREE	0.793	0.1085	0.1085461
1.04	0.25	0.67	29%	37.713927	1.170177766	33939.0739	FREE	0.793	0.1086	0.1085555
1.05	0.26	0.68	30%	37.739508	1.170314878	34429.7546	FREE	0.794	0.1086	0.1085649
1.06	0.27	0.69	30%	37.765089	1.17045199	34922.7774	FREE	0.794	0.1086	0.1085742
1.07	0.28	0.70	30%	37.79067	1.170589102	35418.1314	FREE	0.794	0.1086	0.1085836
1.08	0.29	0.71	30%	37.816251	1.170726215	35915.8055	FREE	0.794	0.1086	0.1085930
1.09	0.30	0.72	31%	37.841832	1.170863327	36415.7891	FREE	0.794	0.1086	0.1086024
1.10	0.31	0.73	31%	37.867413	1.171000439	36918.0715	FREE	0.794	0.1086	0.1086117
1.11	0.32	0.74	31%	37.892994	1.171137552	37422.6421	FREE	0.794	0.1086	0.1086211
1.12	0.33	0.75	31%	37.918575	1.171274664	37929.4908	FREE	0.795	0.1086	0.1086305
1.13	0.34	0.76	32%	37.944156	1.171411776	38438.6073	FREE	0.795	0.1086	0.1086399
1.14	0.35	0.77	32%	37.969737	1.171548888	38949.9815	FREE	0.795	0.1086	0.1086492
1.15	0.36	0.78	32%	37.995318	1.171686001	39463.6035	FREE	0.795	0.1087	0.1086586
1.16	0.37	0.79	32%	38.020899	1.171823113	39979.4635	FREE	0.795	0.1087	0.1086680
1.17	0.38	0.80	33%	38.04648	1.171960225	40497.5519	FREE	0.795	0.1087	0.1086773
1.18	0.39	0.81	33%	38.072061	1.172097338	41017.8591	FREE	0.795	0.1087	0.1086867
1.19	0.40	0.82	33%	38.097642	1.17223445	41540.3757	FREE	0.795	0.1087	0.1086961
1.20	0.41	0.83	33%	38.123223	1.172371562	42065.0924	FREE	0.796	0.1087	0.1087055
1.21	0.42	0.84	34%	38.148804	1.172508675	42592.0000	FREE	0.796	0.1087	0.1087148
1.22	0.43	0.85	34%	38.174385	1.172645787	43121.0894	FREE	0.796	0.1087	0.1087242
1.23	0.44	0.86	34%	38.199966	1.172782899	43652.3517	FREE	0.796	0.1087	0.1087336
1.24	0.45	0.87	34%	38.225547	1.172920011	44185.7780	FREE	0.796	0.1087	0.1087429
1.25	0.46	0.88	35%	38.251128	1.173057124	44721.3595	FREE	0.796	0.1088	0.1087523
1.26	0.47	0.89	35%	38.276709	1.173194236	45259.0878	FREE	0.796	0.1088	0.1087616
1.27	0.48	0.90	35%	38.30229	1.173331348	45798.9540	FREE	0.797	0.1088	0.1087710
1.28	0.49	0.91	35%	38.327871	1.173468461	46340.9500	FREE	0.797	0.1088	0.1087804
1.29	0.50	0.92	36%	38.353452	1.173605573	46885.0673	FREE	0.797	0.1088	0.1087897
1.30	0.51	0.93	36%	38.379033	1.173742685	47431.2977	FREE	0.797	0.1088	0.1087991
1.31	0.52	0.94	36%	38.404614	1.173879798	47979.6330	FREE	0.797	0.1088	0.1088084
1.32	0.53	0.95	36%	38.430195	1.17401691	48530.0652	FREE	0.797	0.1088	0.1088178
1.33	0.54	0.96	37%	38.455776	1.174154022	49082.5864	FREE	0.797	0.1088	0.1088272
1.34	0.55	0.97	37%	38.481357	1.174291134	49637.1886	FREE	0.798	0.1088	0.1088365
1.35	0.56	0.98	37%	38.506938	1.174428247	50193.8642	FREE	0.798	0.1088	0.1088459
1.36	0.57	0.99	37%	38.532519	1.174565359	50752.6053	FREE	0.798	0.1089	0.1088552
1.37	0.58	1.00	38%	38.5581	1.174702471	51313.4044	FREE	0.798	0.1089	0.1088646
1.38	0.59	1.01	38%	38.583681	1.174839584	51876.2540	FREE	0.798	0.1089	0.1088739
1.39	0.60	1.02	38%	38.609262	1.174976696	52441.1466	FREE	0.798	0.1089	0.1088833
1.40	0.61	1.03	38%	38.634843	1.175113808	53008.0749	FREE	0.798	0.1089	0.1088926
1.41	0.62	1.04	39%	38.660424	1.175250921	53577.0315	FREE	0.799	0.1089	0.1089020
1.42	0.63	1.05	39%	38.686005	1.175388033	54148.0093	FREE	0.799	0.1089	0.1089113
1.43	0.64	1.06	39%	38.711586	1.175525145	54721.0012	FREE	0.799	0.1089	0.1089207
1.44	0.65	1.07	39%	38.737167	1.175662257	55296.0000	FREE	0.799	0.1089	0.1089300
1.45	0.66	1.08	40%	38.762748	1.17579937	55872.9988	FREE	0.799	0.1089	0.1089394
1.46	0.67	1.09	40%	38.788329	1.175936482	56451.9908	FREE	0.799	0.1089	0.1089487
1.47	0.68	1.10	40%	38.81391	1.176073594	57032.9690	FREE	0.799	0.1090	0.1089581
1.48	0.69	1.11	40%	38.839491	1.176210707	57615.9267	FREE	0.799	0.1090	0.1089674
1.49	0.70	1.12	41%	38.865072	1.176347819	58200.8572	FREE	0.800	0.1090	0.1089768
1.50	0.71	1.13	41%	38.890653	1.176484931	58787.7538	FREE	0.800	0.1090	0.1089861
1.51	0.72	1.14	41%	38.916234	1.176622044	59376.6101	FREE	0.800	0.1090	0.1089954
1.52	0.73	1.15	41%	38.941815	1.176759156	59967.4194	FREE	0.800	0.1090	0.1090048
1.53	0.74	1.16	42%	38.967396	1.176896268	60560.1754	FREE	0.800	0.1090	0.1090141
1.54	0.75	1.17	42%	38.992977	1.17703338	61154.8717	FREE	0.800	0.1090	0.1090235
1.55	0.76	1.18	42%	39.018558	1.177170493	61751.5020	FREE	0.800	0.1090	0.1090328
1.56	0.77	1.19	42%	39.044139	1.177307605	62350.0600	FREE	0.801	0.1090	0.1090421
1.57	0.78	1.20	43%	39.06972	1.177444717	62950.5396	FREE	0.801	0.1091	0.1090515
1.58	0.79	1.21	43%	39.095301	1.17758183	63552.9345	FREE	0.801	0.1091	0.1090608
1.59	0.80	1.22	43%	39.120882	1.177718942	64157.2388	FREE	0.801	0.1091	0.1090701
1.60	0.81	1.23	43%	39.146463	1.177856054	64763.4465	FREE	0.801	0.1091	0.1090795
1.61	0.82	1.24	44%	39.172044	1.177993167	65371.5515	FREE	0.801	0.1091	0.1090888
1.62	0.83	1.25	44%	39.197625	1.178130279	65981.5480	FREE	0.801	0.1091	0.1090981
1.63	0.84	1.26	44%	39.223206	1.178267391	66593.4301	FREE	0.802	0.1091	0.1091075
1.64	0.85	1.27	44%	39.248787	1.178404503	67207.1920	FREE	0.802	0.1091	0.1091168
1.65	0.86	1.28	45%	39.274368	1.178541616	67822.8280	FREE	0.802	0.1091	0.1091261
1.66	0.87	1.29	45%	39.299949	1.178678728	68440.3324	FREE	0.802	0.1091	0.1091355
1.67	0.88	1.30	45%	39.32553	1.17881584	69059.6996	FREE	0.802	0.1091	0.1091448
1.68	0.89	1.31	45%	39.351111	1.178952953	69680.9240	FREE	0.802	0.1092	0.1091541
1.69	0.90	1.32	46%	39.376692	1.179090065	70304.0000	FREE	0.802	0.1092	0.1091635
1.70	0.91	1.33	46%	39.402273	1.179227177	70928.9222	FREE	0.802	0.1092	0.1091728
1.71	0.92	1.34	46%	39.427854	1.179364289	71555.6851	FREE	0.803	0.1092	0.1091821
1.72	0.93	1.35	46%	39.453435	1.179501402	72184.2833	FREE	0.803	0.1092	0.1091914
1.73	0.94	1.36	47%	39.479016	1.179638514	72814.7115	FREE	0.803	0.1092	0.1092008
1.74	0.95	1.37	47%	39.504597	1.179775626	73446.9644	FREE	0.803	0.1092	0.1092101
1.75	0.96	1.38	47%	39.530178	1.179912739	74081.0367	FREE	0.803	0.1092	0.1092194
1.76	0.97	1.39	47%	39.555759	1.180049851	74716.9233	FREE	0.803	0.1092	0.1092287
1.77	0.98	1.40	48%	39.58134	1.180186963	75354.6189	FREE	0.803	0.1092	0.1092381
1.78	0.99	1.41	48%	39.606921	1.180324076	75994.1185	FREE	0.804	0.1092	0.1092474
1.79	1.00	1.42	48%	39.632502	1.180461188	76635.4170	FREE	0.804	0.1093	0.1092567
1.80	1.01	1.43	48%	39.658083	1.1805983	77278.5093	FREE	0.804	0.1093	0.1092660
1.81	1.02	1.44	49%	39.683664	1.180735412	77923.3905	FREE	0.804	0.1093	0.1092753
1.82	1.03	1.45	49%	39.709245	1.180872525	78570.0556	FREE	0.804	0.1093	0.1092847
1.83	1.04	1.46	49%	39.734826	1.181009637	79218.4997	FREE	0.804	0.1093	0.1092940
1.84	1.05	1.47	49%	39.760407	1.181146749	79868.7179	FREE	0.804	0.1093	0.1093033
1.85	1.06	1.48	50%	39.785988	1.181283862	80520.7054	FREE	0.805	0.1093	0.1093126
1.86	1.07	1.49	50%	39.811569	1.181420974	81174.4575	FREE	0.805	0.1093	0.1093219
1.87	1.08	1.50	50%	39.83715	1.181558086	81829.9693	FREE	0.805	0.1093	0.1093312
1.88	1.09	1.51	50%	39.862731	1.181695199	82487.2362	FREE	0.805	0.1093	0.1093405
1.89	1.10	1.52	51%	39.888312	1.181832311	83146.2534	FREE	0.805	0.1093	0.1093499
1.90	1.11	1.53	51%	39.913893	1.181969423	83807.0164	FREE	0.805	0.1094	0.1093592
1.91	1.12	1.54	51%	39.939474	1.182106535	84469.5206	FREE	0.805	0.1094	0.1093685
1.92	1.13	1.55	51%	39.965055	1.182243648	85133.7613	FREE	0.805	0.1094	0.1093778
1.93	1.14	1.56	52%	39.990636	1.18238076	85799.7341	FREE	0.806	0.1094	0.1093871
1.94	1.15	1.57	52%	40.016217	1.182517872	86467.4344	FREE	0.806	0.1094	0.1093964
1.95	1.16	1.58	52%	40.041798	1.182654985	87136.8579	FREE	0.806	0.1094	0.1094057
1.96	1.17	1.59	52%	40.067379	1.182792097	87808.0000	FREE	0.806	0.1094	0.1094150
1.97	1.18	1.60	53%	40.09296	1.182929209	88480.8564	FREE	0.806	0.1094	0.1094243
1.98	1.19	1.61	53%	40.118541	1.183066322	89155.4228	FREE	0.806	0.1094	0.1094336
1.99	1.20	1.62	53%	40.144122	1.183203434	89831.6947	FREE	0.806	0.1094	0.1094429
2.00	1.21	1.63	53%	40.169703	1.183340546	90509.6680	FREE	0.807	0.1095	0.1094522
2.01	1.22	1.64	54%	40.195284	1.183477658	91189.3383	FREE	0.807	0.1095	0.1094615

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
2.02	1.23	1.65	54%	40.220865	1.183614771	91870.7015	FREE	0.807	0.1095	0.1094708
2.03	1.24	1.66	54%	40.246446	1.183751883	92553.7533	FREE	0.807	0.1095	0.1094801
2.04	1.25	1.67	54%	40.272027	1.183888995	93238.4896	FREE	0.807	0.1095	0.1094894
2.05	1.26	1.68	55%	40.297608	1.184026108	93924.9062	FREE	0.807	0.1095	0.1094987
2.06	1.27	1.69	55%	40.323189	1.18416322	94612.9990	FREE	0.807	0.1095	0.1095080
2.07	1.28	1.70	55%	40.34877	1.184300332	95302.7640	FREE	0.808	0.1095	0.1095173
2.08	1.29	1.71	55%	40.374351	1.184437445	95994.1972	FREE	0.808	0.1095	0.1095266
2.09	1.30	1.72	56%	40.399932	1.184574557	96687.2944	FREE	0.808	0.1095	0.1095359
2.10	1.31	1.73	56%	40.425513	1.184711669	97382.0517	FREE	0.808	0.1095	0.1095452
2.11	1.32	1.74	56%	40.451094	1.184848781	98078.4652	FREE	0.808	0.1096	0.1095545
2.12	1.33	1.75	56%	40.476675	1.184985894	98776.5310	FREE	0.808	0.1096	0.1095638
2.13	1.34	1.76	57%	40.502256	1.185123006	99476.2450	FREE	0.808	0.1096	0.1095731
2.14	1.35	1.77	57%	40.527837	1.185260118	100177.6036	FREE	0.809	0.1096	0.1095824
2.15	1.36	1.78	57%	40.553418	1.185397231	100880.6027	FREE	0.809	0.1096	0.1095917
2.16	1.37	1.79	57%	40.578999	1.185534343	101585.2386	FREE	0.809	0.1096	0.1096010
2.17	1.38	1.80	58%	40.60458	1.185671455	102291.5075	FREE	0.809	0.1096	0.1096103
2.18	1.39	1.81	58%	40.630161	1.185808568	102999.4057	FREE	0.809	0.1096	0.1096196
2.19	1.40	1.82	58%	40.655742	1.18594568	103708.9293	FREE	0.809	0.1096	0.1096288
2.20	1.41	1.83	58%	40.681323	1.186082792	104420.0747	FREE	0.809	0.1096	0.1096381
2.21	1.42	1.84	59%	40.706904	1.186219904	105132.8382	FREE	0.809	0.1096	0.1096474
2.22	1.43	1.85	59%	40.732485	1.186357017	105847.2161	FREE	0.810	0.1097	0.1096567
2.23	1.44	1.86	59%	40.758066	1.186494129	106563.2048	FREE	0.810	0.1097	0.1096660
2.24	1.45	1.87	59%	40.783647	1.186631241	107280.8006	FREE	0.810	0.1097	0.1096753
2.25	1.46	1.88	60%	40.809228	1.186768354	108000.0000	FREE	0.810	0.1097	0.1096846
2.26	1.47	1.89	60%	40.834809	1.186905466	108720.7994	FREE	0.810	0.1097	0.1096938
2.27	1.48	1.90	60%	40.86039	1.187042578	109443.1953	FREE	0.810	0.1097	0.1097031
2.28	1.49	1.91	60%	40.885971	1.18717969	110167.1841	FREE	0.810	0.1097	0.1097124
2.29	1.50	1.92	61%	40.911552	1.187316803	110892.7623	FREE	0.811	0.1097	0.1097217
2.30	1.51	1.93	61%	40.937133	1.187453915	111619.9265	FREE	0.811	0.1097	0.1097310
2.31	1.52	1.94	61%	40.962714	1.187591027	112348.6733	FREE	0.811	0.1097	0.1097402
2.32	1.53	1.95	61%	40.988295	1.18772814	113078.9991	FREE	0.811	0.1097	0.1097495
2.33	1.54	1.96	62%	41.013876	1.187865252	113810.9006	FREE	0.811	0.1098	0.1097588
2.34	1.55	1.97	62%	41.039457	1.188002364	114544.3744	FREE	0.811	0.1098	0.1097681
2.35	1.56	1.98	62%	41.065038	1.188139477	115279.4171	FREE	0.811	0.1098	0.1097774
2.36	1.57	1.99	62%	41.090619	1.188276589	116016.0254	FREE	0.812	0.1098	0.1097866
2.37	1.58	2.00	63%	41.1162	1.188413701	116754.1960	FREE	0.812	0.1098	0.1097959
2.38	1.59	2.01	63%	41.141781	1.188550813	117493.9255	FREE	0.812	0.1098	0.1098052
2.39	1.60	2.02	63%	41.167362	1.188687926	118235.2107	FREE	0.812	0.1098	0.1098144
2.40	1.61	2.03	63%	41.192943	1.188825038	118978.0484	FREE	0.812	0.1098	0.1098237
2.41	1.62	2.04	64%	41.218524	1.18896215	119722.4353	FREE	0.812	0.1098	0.1098330
2.42	1.63	2.05	64%	41.244105	1.189099263	120468.3681	FREE	0.812	0.1098	0.1098423
2.43	1.64	2.06	64%	41.269686	1.189236375	121215.8437	FREE	0.812	0.1099	0.1098515
2.44	1.65	2.07	64%	41.295267	1.189373487	121964.8589	FREE	0.813	0.1099	0.1098608
2.45	1.66	2.08	65%	41.320848	1.1895106	122715.4106	FREE	0.813	0.1099	0.1098701
2.46	1.67	2.09	65%	41.346429	1.189647712	123467.4956	FREE	0.813	0.1099	0.1098793
2.47	1.68	2.10	65%	41.37201	1.189784824	124221.1107	FREE	0.813	0.1099	0.1098886
2.48	1.69	2.11	65%	41.397591	1.189921936	124976.2530	FREE	0.813	0.1099	0.1098979
2.49	1.70	2.12	66%	41.423172	1.190059049	125732.9192	FREE	0.813	0.1099	0.1099071
2.50	1.71	2.13	66%	41.448753	1.190196161	126491.1064	FREE	0.813	0.1099	0.1099164
2.51	1.72	2.14	66%	41.474334	1.190333273	127250.8115	FREE	0.814	0.1099	0.1099257
2.52	1.73	2.15	66%	41.499915	1.190470386	128012.0314	FREE	0.814	0.1099	0.1099349
2.53	1.74	2.16	67%	41.525496	1.190607498	128774.7632	FREE	0.814	0.1099	0.1099442
2.54	1.75	2.17	67%	41.551077	1.19074461	129539.0039	FREE	0.814	0.1100	0.1099534
2.55	1.76	2.18	67%	41.576658	1.190881723	130304.7505	FREE	0.814	0.1100	0.1099627
2.56	1.77	2.19	67%	41.602239	1.191018835	131072.0000	FREE	0.814	0.1100	0.1099720
2.57	1.78	2.20	68%	41.62782	1.191155947	131840.7495	FREE	0.814	0.1100	0.1099812
2.58	1.79	2.21	68%	41.653401	1.191293059	132610.9961	FREE	0.815	0.1100	0.1099905
2.59	1.80	2.22	68%	41.678982	1.191430172	133382.7369	FREE	0.815	0.1100	0.1099997
2.60	1.81	2.23	68%	41.704563	1.191567284	134155.9689	FREE	0.815	0.1100	0.1100090
2.61	1.82	2.24	69%	41.730144	1.191704396	134930.6894	FREE	0.815	0.1100	0.1100182
2.62	1.83	2.25	69%	41.755725	1.191841509	135706.8954	FREE	0.815	0.1100	0.1100275
2.63	1.84	2.26	69%	41.781306	1.191978621	136484.5842	FREE	0.815	0.1100	0.1100368
2.64	1.85	2.27	69%	41.806887	1.192115733	137263.7529	FREE	0.815	0.1100	0.1100460
2.65	1.86	2.28	70%	41.832468	1.192252846	138044.3987	FREE	0.816	0.1101	0.1100553
2.66	1.87	2.29	70%	41.858049	1.192389958	138826.5187	FREE	0.816	0.1101	0.1100645
2.67	1.88	2.30	70%	41.88363	1.19252707	139610.1104	FREE	0.816	0.1101	0.1100738
2.68	1.89	2.31	70%	41.909211	1.192664182	140395.1707	FREE	0.816	0.1101	0.1100830
2.69	1.90	2.32	71%	41.934792	1.192801295	141181.6972	FREE	0.816	0.1101	0.1100923
2.70	1.91	2.33	71%	41.960373	1.192938407	141969.6869	FREE	0.816	0.1101	0.1101015
2.71	1.92	2.34	71%	41.985954	1.193075519	142759.1372	FREE	0.816	0.1101	0.1101108
2.72	1.93	2.35	71%	42.011535	1.193212632	143550.0455	FREE	0.816	0.1101	0.1101200
2.73	1.94	2.36	72%	42.037116	1.193349744	144342.4089	FREE	0.817	0.1101	0.1101292
2.74	1.95	2.37	72%	42.062697	1.193486856	145136.2249	FREE	0.817	0.1101	0.1101385
2.75	1.96	2.38	72%	42.088278	1.193623969	145931.4908	FREE	0.817	0.1101	0.1101477
2.76	1.97	2.39	72%	42.113859	1.193761081	146728.2039	FREE	0.817	0.1102	0.1101570
2.77	1.98	2.40	73%	42.13944	1.193898193	147526.3617	FREE	0.817	0.1102	0.1101662
2.78	1.99	2.41	73%	42.165021	1.194035305	148325.9615	FREE	0.817	0.1102	0.1101755
2.79	2.00	2.42	73%	42.190602	1.194172418	149127.0007	FREE	0.817	0.1102	0.1101847
2.80	2.01	2.43	73%	42.216183	1.19430953	149929.4768	FREE	0.818	0.1102	0.1101940
2.81	2.02	2.44	74%	42.241764	1.194446642	150733.3871	FREE	0.818	0.1102	0.1102032
2.82	2.03	2.45	74%	42.267345	1.194583755	151538.7291	FREE	0.818	0.1102	0.1102124
2.83	2.04	2.46	74%	42.292926	1.194720867	152345.5004	FREE	0.818	0.1102	0.1102217
2.84	2.05	2.47	74%	42.318507	1.194857979	153153.6983	FREE	0.818	0.1102	0.1102309
2.85	2.06	2.48	75%	42.344088	1.194995091	153963.3203	FREE	0.818	0.1102	0.1102401
2.86	2.07	2.49	75%	42.369669	1.195132204	154774.3640	FREE	0.818	0.1102	0.1102494
2.87	2.08	2.50	75%	42.39525	1.195269316	155586.8268	FREE	0.819	0.1103	0.1102586
2.88	2.09	2.51	75%	42.421349	1.195409205	156400.7063	FREE	0.819	0.1103	0.1102680
2.89	2.10	2.52	76%	42.448484	1.195554646	157216.0000	FREE	0.819	0.1103	0.1102778
2.90	2.11	2.53	76%	42.476655	1.195705641	158032.7055	FREE	0.819	0.1103	0.1102880
2.91	2.12	2.54	76%	42.505862	1.195862188	158850.8203	FREE	0.819	0.1103	0.1102985
2.92	2.13	2.55	76%	42.536105	1.196024289	159670.3420	FREE	0.819	0.1103	0.1103095
2.93	2.14	2.56	77%	42.567384	1.196191942	160491.2682	FREE	0.819	0.1103	0.1103207
2.94	2.15	2.57	77%	42.599699	1.196365148	161313.5965	FREE	0.820	0.1103	0.1103324
2.95	2.16	2.58	77%	42.63305	1.196543907	162137.3245	FREE	0.820	0.1103	0.1103444
2.96	2.17	2.59	77%	42.667437	1.196728219	162962.4499	FREE	0.820	0.1104	0.1103568
2.97	2.18	2.60	78%	42.70286	1.196918083	163788.9702	FREE	0.820	0.1104	0.1103696
2.98	2.19	2.61	78%	42.739319	1.197113501	164616.8831	FREE	0.820	0.1104	0.1103828
2.99	2.20	2.62	78%	42.776814	1.197314471	165446.1863	FREE	0.821	0.1104	0.1103963
3.00	2.21	2.63	78%	42.815345	1.197520995	166276.8775	FREE	0.821	0.1104	0.1104102
3.01	2.22	2.64	79%	42.854912	1.197733071	167108.9544	FREE	0.821	0.1104	0.1104244
3.02	2.23	2.65	79%	42.895515	1.1979507	167942.4145	FREE	0.821	0.1104	0.1104391

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
3.03	2.24	2.66	79%	42.937154	1.198173882	168777.2557	FREE	0.821	0.1105	0.1104541
3.04	2.25	2.67	79%	42.979829	1.198402617	169613.4757	FREE	0.822	0.1105	0.1104694
3.05	2.26	2.68	80%	43.02354	1.198636905	170451.0722	FREE	0.822	0.1105	0.1104852
3.06	2.27	2.69	80%	43.068287	1.198876745	171290.0429	FREE	0.822	0.1105	0.1105013
3.07	2.28	2.70	80%	43.11407	1.199122139	172130.3856	FREE	0.822	0.1105	0.1105178
3.08	2.29	2.71	80%	43.160889	1.199373085	172972.0980	FREE	0.823	0.1105	0.1105347
3.09	2.30	2.72	81%	43.208744	1.199629585	173815.1780	FREE	0.823	0.1106	0.1105519
3.10	2.31	2.73	81%	43.257635	1.199891637	174659.6233	FREE	0.823	0.1106	0.1105695
3.11	2.32	2.74	81%	43.307562	1.200159242	175505.4317	FREE	0.823	0.1106	0.1105875
3.12	2.33	2.75	81%	43.358525	1.2004324	176352.6010	FREE	0.824	0.1106	0.1106058
3.13	2.34	2.76	82%	43.410524	1.200711111	177201.1290	FREE	0.824	0.1106	0.1106245
3.14	2.35	2.77	82%	43.463559	1.200995375	178051.0136	FREE	0.824	0.1106	0.1106436
3.15	2.36	2.78	82%	43.51763	1.201285191	178902.2526	FREE	0.825	0.1107	0.1106631
3.16	2.37	2.79	82%	43.572737	1.201580561	179754.8439	FREE	0.825	0.1107	0.1106829
3.17	2.38	2.80	83%	43.62888	1.201881483	180608.7853	FREE	0.825	0.1107	0.1107031
3.18	2.39	2.81	83%	43.686059	1.202187958	181464.0746	FREE	0.825	0.1107	0.1107236
3.19	2.40	2.82	83%	43.744274	1.202499987	182320.7098	FREE	0.826	0.1107	0.1107445
3.20	2.41	2.83	83%	43.803525	1.202817568	183178.6887	FREE	0.826	0.1108	0.1107658
3.21	2.42	2.84	84%	43.863812	1.203140702	184038.0093	FREE	0.826	0.1108	0.1107875
3.22	2.43	2.85	84%	43.925135	1.203469388	184898.6694	FREE	0.827	0.1108	0.1108095
3.23	2.44	2.86	84%	43.987494	1.203803628	185760.6670	FREE	0.827	0.1108	0.1108319
3.24	2.45	2.87	84%	44.050889	1.204143421	186624.0000	FREE	0.827	0.1109	0.1108547
3.25	2.46	2.88	85%	44.11532	1.204488766	187488.6663	FREE	0.828	0.1109	0.1108778
3.26	2.47	2.89	85%	44.180787	1.204839664	188354.6639	FREE	0.828	0.1109	0.1109013
3.27	2.48	2.90	85%	44.24729	1.205196116	189221.9908	FREE	0.828	0.1109	0.1109252
3.28	2.49	2.91	85%	44.314829	1.20555812	190090.6448	FREE	0.829	0.1109	0.1109494
3.29	2.50	2.92	86%	44.383404	1.205925677	190960.6240	FREE	0.829	0.1110	0.1109740
3.30	2.51	2.93	86%	44.453015	1.206298787	191831.9264	FREE	0.830	0.1110	0.1109990
3.31	2.52	2.94	86%	44.523662	1.20667745	192704.5500	FREE	0.830	0.1110	0.1110243
3.32	2.53	2.95	86%	44.595345	1.207061665	193578.4927	FREE	0.830	0.1111	0.1110500
3.33	2.54	2.96	87%	44.668064	1.207451434	194453.7526	FREE	0.831	0.1111	0.1110761
3.34	2.55	2.97	87%	44.741819	1.207846755	195330.3276	FREE	0.831	0.1111	0.1111025
3.35	2.56	2.98	87%	44.81661	1.208247629	196208.2159	FREE	0.831	0.1111	0.1111293
3.36	2.57	2.99	87%	44.892437	1.208654057	197087.4155	FREE	0.832	0.1112	0.1111565
3.37	2.58	3.00	88%	44.9693	1.209066037	197967.9244	FREE	0.832	0.1112	0.1111840
3.38	2.59	3.01	88%	45.047199	1.20948357	198849.7406	FREE	0.833	0.1112	0.1112119
3.39	2.60	3.02	88%	45.126134	1.209906656	199732.8622	FREE	0.833	0.1112	0.1112401
3.40	2.61	3.03	88%	45.206105	1.210335294	200617.2874	FREE	0.834	0.1113	0.1112687
3.41	2.62	3.04	89%	45.287112	1.210769486	201503.0141	FREE	0.834	0.1113	0.1112977
3.42	2.63	3.05	89%	45.369155	1.21120923	202390.0405	FREE	0.834	0.1113	0.1113270
3.43	2.64	3.06	89%	45.452234	1.211654528	203278.3647	FREE	0.835	0.1114	0.1113567
3.44	2.65	3.07	89%	45.536349	1.212105378	204167.9848	FREE	0.835	0.1114	0.1113868
3.45	2.66	3.08	90%	45.6215	1.212561781	205058.8989	FREE	0.836	0.1114	0.1114172
3.46	2.67	3.09	90%	45.707687	1.213023737	205951.1050	FREE	0.836	0.1114	0.1114480
3.47	2.68	3.10	90%	45.79491	1.213491246	206844.6015	FREE	0.837	0.1115	0.1114791
3.48	2.69	3.11	90%	45.883169	1.213964308	207739.3863	FREE	0.837	0.1115	0.1115107
3.49	2.70	3.12	91%	45.972464	1.214442923	208635.4576	FREE	0.838	0.1115	0.1115425
3.50	2.71	3.13	91%	46.062795	1.21492709	209532.8137	FREE	0.838	0.1116	0.1115748
3.51	2.72	3.14	91%	46.154162	1.215416811	210431.4526	FREE	0.839	0.1116	0.1116073
3.52	2.73	3.15	91%	46.246565	1.215912084	211331.3725	FREE	0.839	0.1116	0.1116403
3.53	2.74	3.16	92%	46.340004	1.21641291	212232.5716	FREE	0.840	0.1117	0.1116736
3.54	2.75	3.17	92%	46.434479	1.21691929	213135.0481	FREE	0.840	0.1117	0.1117073
3.55	2.76	3.18	92%	46.52999	1.217431222	214038.8002	FREE	0.841	0.1117	0.1117413
3.56	2.77	3.19	92%	46.626537	1.217948706	214943.8261	FREE	0.841	0.1118	0.1117757
3.57	2.78	3.20	93%	46.72412	1.218471744	215850.1240	FREE	0.842	0.1118	0.1118104
3.58	2.79	3.21	93%	46.822739	1.219000335	216757.6921	FREE	0.842	0.1118	0.1118455
3.59	2.80	3.22	93%	46.922394	1.219534478	217666.5287	FREE	0.843	0.1119	0.1118810
3.60	2.81	3.23	93%	47.023085	1.220074175	218576.6319	FREE	0.843	0.1119	0.1119168
3.61	2.82	3.24	94%	47.124812	1.220619424	219488.0000	FREE	0.844	0.1120	0.1119530
3.62	2.83	3.25	94%	47.227575	1.221170226	220400.6313	FREE	0.844	0.1120	0.1119895
3.63	2.84	3.26	94%	47.331374	1.221726581	221314.5240	FREE	0.845	0.1120	0.1120264
3.64	2.85	3.27	94%	47.436209	1.222288489	222229.6764	FREE	0.846	0.1121	0.1120636
3.65	2.86	3.28	95%	47.54208	1.22285595	223146.0867	FREE	0.846	0.1121	0.1121012
3.66	2.87	3.29	95%	47.648987	1.223428964	224063.7532	FREE	0.847	0.1121	0.1121392
3.67	2.88	3.30	95%	47.75693	1.224007531	224982.6742	FREE	0.847	0.1122	0.1121775
3.68	2.89	3.31	95%	47.865909	1.22459165	225902.8481	FREE	0.848	0.1122	0.1122162
3.69	2.90	3.32	96%	47.975924	1.225181323	226824.2730	FREE	0.848	0.1123	0.1122552
3.70	2.91	3.33	96%	48.086975	1.225776548	227746.9473	FREE	0.849	0.1123	0.1122946
3.71	2.92	3.34	96%	48.199062	1.226377326	228670.8693	FREE	0.850	0.1123	0.1123343
3.72	2.93	3.35	96%	48.312185	1.226983657	229596.0373	FREE	0.850	0.1124	0.1123744
3.73	2.94	3.36	97%	48.426344	1.227595541	230522.4497	FREE	0.851	0.1124	0.1124148
3.74	2.95	3.37	97%	48.541539	1.228212978	231450.1047	FREE	0.851	0.1125	0.1124556
3.75	2.96	3.38	97%	48.65777	1.228835968	232379.0008	FREE	0.852	0.1125	0.1124967
3.76	2.97	3.39	97%	48.775037	1.22946451	233309.1362	FREE	0.853	0.1125	0.1125382
3.77	2.98	3.40	98%	48.89334	1.230098606	234240.5093	FREE	0.853	0.1126	0.1125800
3.78	2.99	3.41	98%	49.012679	1.230738254	235173.1185	FREE	0.854	0.1126	0.1126222
3.79	3.00	3.42	98%	49.133054	1.231383455	236106.9621	FREE	0.855	0.1127	0.1126647
3.80	3.01	3.43	98%	49.254465	1.232034209	237042.0385	FREE	0.855	0.1127	0.1127076
3.81	3.02	3.44	99%	49.376912	1.232690516	237978.3460	FREE	0.856	0.1128	0.1127509
3.82	3.03	3.45	99%	49.500395	1.233352376	238915.8832	FREE	0.857	0.1128	0.1127944
3.83	3.04	3.46	99%	49.624914	1.234019789	239854.6483	FREE	0.857	0.1128	0.1128384
3.84	3.05	3.47	99%	49.750469	1.234692755	240794.6397	FREE	0.858	0.1129	0.1128827
3.85	3.06	3.48	100%	49.87706	1.235371273	241735.8558	FREE	0.859	0.1129	0.1129273
3.86	3.07	3.49	100%	50.004687	1.236055345	242678.2952	FREE	0.859	0.1130	0.1129723
3.87	3.08	3.50	100%	50.13335	1.236744969	243621.9561	FREE	0.860	0.1130	0.1130176
3.88	3.09	3.51	100%	50.263049	1.237440146	244566.8369	FREE	0.861	0.1131	0.1130633
3.89	3.10	3.52	101%	50.393784	1.238140876	245512.9362	FREE	0.861	0.1131	0.1131093
3.90	3.11	3.53	101%	50.525555	1.238847159	246460.2524	FREE	0.862	0.1132	0.1131556
3.91	3.12	3.54	101%	50.658362	1.239558995	247408.7838	FREE	0.863	0.1132	0.1132023
3.92	3.13	3.55	101%	50.792205	1.240276384	248358.5290	FREE	0.864	0.1132	0.1132494
3.93	3.14	3.56	102%	50.927084	1.240999325	249309.4863	FREE	0.864	0.1133	0.1132968
3.94	3.15	3.57	102%	51.062999	1.24172782	250261.6543	FREE	0.865	0.1133	0.1133445
3.95	3.16	3.58	102%	51.19995	1.242461867	251215.0314	FREE	0.866	0.1134	0.1133926
3.96	3.17	3.59	102%	51.337937	1.243201468	252169.6161	FREE	0.866	0.1134	0.1134410
3.97	3.18	3.60	103%	51.47696	1.243946621	253125.4068	FREE	0.867	0.1135	0.1134898
3.98	3.19	3.61	103%	51.617019	1.244697327	254082.4020	FREE	0.868	0.1135	0.1135389
3.99	3.20	3.62	103%	51.758114	1.245453586	255040.6003	FREE	0.869	0.1136	0.1135884
4.00	3.21	3.63	103%	51.900245	1.246215398	256000.0000	FREE	0.869	0.1136	0.1136382
4.01	3.22	3.64	104%	52.043412	1.246982762	256960.5998	FREE	0.870	0.1137	0.1136883
4.02	3.23	3.65	104%	52.187615	1.24775568	257922.3980	FREE	0.871	0.1137	0.1137388
4.03	3.24	3.66	104%	52.332854	1.24853415	258885.3933	FREE	0.872	0.1138	0.1137896

RATING CURVE

Stage (ft ASSUMED)	Inner Orifice Elevation (ft ASSUMED)	Bellows Extension (ft)	Bellows % Length	Total Force (lbs)	Sub-mergence (ft)	Housing Box Inflow (cfs)	Free or Submerged Discharge	Differential Head On Orifice (ft)	Discharge Discharge Through Inner Orifice (cfs)	Total Discharge (cfs)
4.04	3.25	3.67	104%	52.479129	1.249318174	259849.5841	FREE	0.873	0.1138	0.1138407
4.05	3.26	3.68	105%	52.62644	1.25010775	260814.9689	FREE	0.873	0.1139	0.1138922
4.06	3.27	3.69	105%	52.774787	1.250902879	261781.5463	FREE	0.874	0.1139	0.1139441
4.07	3.28	3.70	105%	52.92417	1.251703561	262749.3148	FREE	0.875	0.1140	0.1139962
4.08	3.29	3.71	105%	53.074589	1.252509796	263718.2730	FREE	0.876	0.1140	0.1140488
4.09	3.30	3.72	106%	53.226044	1.253321584	264688.4193	FREE	0.877	0.1141	0.1141016
4.10	3.31	3.73	106%	53.378535	1.254138924	265659.7523	FREE	0.877	0.1142	0.1141548
4.11	3.32	3.74	106%	53.532062	1.254961818	266632.2706	FREE	0.878	0.1142	0.1142083
4.12	3.33	3.75	106%	53.686625	1.255790264	267605.9728	FREE	0.879	0.1143	0.1142622
4.13	3.34	3.76	107%	53.842224	1.256624264	268580.8573	FREE	0.880	0.1143	0.1143164
4.14	3.35	3.77	107%	53.998859	1.257463816	269556.9228	FREE	0.881	0.1144	0.1143709
4.15	3.36	3.78	107%	54.15653	1.258308921	270534.1679	FREE	0.882	0.1144	0.1144257
4.16	3.37	3.79	107%	54.315237	1.259159579	271512.5911	FREE	0.882	0.1145	0.1144809
4.17	3.38	3.80	108%	54.47498	1.26001579	272492.1909	FREE	0.883	0.1145	0.1145365
4.18	3.39	3.81	108%	54.635759	1.260877553	273472.9661	FREE	0.884	0.1146	0.1145923
4.19	3.40	3.82	108%	54.797574	1.26174487	274454.9151	FREE	0.885	0.1146	0.1146485
4.20	3.41	3.83	108%	54.960425	1.26261774	275438.0366	FREE	0.886	0.1147	0.1147050
4.21	3.42	3.84	109%	55.124312	1.263496162	276422.3292	FREE	0.887	0.1148	0.1147619
4.22	3.43	3.85	109%	55.289235	1.264380137	277407.7914	FREE	0.888	0.1148	0.1148191
4.23	3.44	3.86	109%	55.455194	1.265269665	278394.4220	FREE	0.889	0.1149	0.1148766
4.24	3.45	3.87	109%	55.622189	1.266164746	279382.2195	FREE	0.889	0.1149	0.1149344
4.25	3.46	3.88	110%	55.79022	1.26706538	280371.1825	FREE	0.890	0.1150	0.1149926
4.26	3.47	3.89	110%	55.959287	1.267971567	281361.3097	FREE	0.891	0.1151	0.1150511
4.27	3.48	3.90	110%	56.12939	1.268883307	282352.5998	FREE	0.892	0.1151	0.1151100
4.28	3.49	3.91	110%	56.300529	1.2698006	283345.0512	FREE	0.893	0.1152	0.1151691
4.29	3.50	3.92	111%	56.472704	1.270723445	284338.6628	FREE	0.894	0.1152	0.1152286
4.30	3.51	3.93	111%	56.645915	1.271651843	285333.4330	FREE	0.895	0.1153	0.1152884
4.31	3.52	3.94	111%	56.820162	1.272585795	286329.3607	FREE	0.896	0.1153	0.1153486
4.32	3.53	3.95	111%	56.995445	1.273525299	287326.4444	FREE	0.897	0.1154	0.1154091
4.33	3.54	3.96	112%	57.171764	1.274470356	288324.6828	FREE	0.898	0.1155	0.1154698
4.34	3.55	3.97	112%	57.349119	1.275420966	289324.0745	FREE	0.899	0.1155	0.1155310
4.35	3.56	3.98	112%	57.52751	1.276377128	290324.6183	FREE	0.900	0.1156	0.1155924
4.36	3.57	3.99	112%	57.706937	1.277338844	291326.3128	FREE	0.901	0.1157	0.1156542
4.37	3.58	4.00	113%	57.8874	1.278306113	292329.1567	FREE	0.902	0.1157	0.1157163
4.38	3.59	4.01	113%	58.068899	1.279278934	293333.1487	FREE	0.903	0.1158	0.1157787
4.39	3.60	4.02	113%	58.251434	1.280257308	294338.2874	FREE	0.904	0.1158	0.1158414
4.40	3.61	4.03	113%	58.435005	1.281241236	295344.5716	FREE	0.904	0.1159	0.1159045
4.41	3.62	4.04	114%	58.619612	1.282230716	296352.0000	FREE	0.905	0.1160	0.1159679
4.42	3.63	4.05	114%	58.805255	1.283225749	297360.5712	FREE	0.906	0.1160	0.1160316
4.43	3.64	4.06	114%	58.991934	1.284226334	298370.2840	FREE	0.907	0.1161	0.1160956
4.44	3.65	4.07	114%	59.179649	1.285232473	299381.1370	FREE	0.908	0.1162	0.1161599
4.45	3.66	4.08	115%	59.3684	1.286244165	300393.1291	FREE	0.909	0.1162	0.1162246
4.46	3.67	4.09	115%	59.558187	1.287261409	301406.2588	FREE	0.911	0.1163	0.1162896
4.47	3.68	4.10	115%	59.74901	1.288284207	302420.5250	FREE	0.912	0.1164	0.1163549
4.48	3.69	4.11	115%	59.940869	1.289312557	303435.9264	FREE	0.913	0.1164	0.1164205
4.49	3.70	4.12	116%	60.133764	1.29034646	304452.4616	FREE	0.914	0.1165	0.1164864
4.50	3.71	4.13	116%	60.327695	1.291385916	305470.1295	FREE	0.915	0.1166	0.1165527
4.51	3.72	4.14	116%	60.522662	1.292430925	306488.9287	FREE	0.916	0.1166	0.1166192
4.52	3.73	4.15	116%	60.718665	1.293481487	307508.8581	FREE	0.917	0.1167	0.1166861
4.53	3.74	4.16	117%	60.915704	1.294537602	308529.9163	FREE	0.918	0.1168	0.1167533
4.54	3.75	4.17	117%	61.113779	1.295599269	309552.1021	FREE	0.919	0.1168	0.1168208
4.55	3.76	4.18	117%	61.31289	1.29666649	310575.4144	FREE	0.920	0.1169	0.1168886
4.56	3.77	4.19	117%	61.513037	1.297739263	311599.8517	FREE	0.921	0.1170	0.1169568
4.57	3.78	4.20	118%	61.71422	1.298817589	312625.4130	FREE	0.922	0.1170	0.1170252
4.58	3.79	4.21	118%	61.916439	1.299901468	313652.0969	FREE	0.923	0.1171	0.1170940
4.59	3.80	4.22	118%	62.119694	1.3009909	314679.9023	FREE	0.924	0.1172	0.1171630
4.60	3.81	4.23	118%	62.323985	1.302085885	315708.8279	FREE	0.925	0.1172	0.1172324
4.61	3.82	4.24	119%	62.529312	1.303186423	316738.8725	FREE	0.926	0.1173	0.1173021
4.62	3.83	4.25	119%	62.735675	1.304292514	317770.0349	FREE	0.928	0.1174	0.1173721
4.63	3.84	4.26	119%	62.943074	1.305404157	318802.3139	FREE	0.929	0.1174	0.1174424
4.64	3.85	4.27	119%	63.151509	1.306521354	319835.7082	FREE	0.930	0.1175	0.1175131
4.65	3.86	4.28	120%	63.36098	1.307644103	320870.2168	FREE	0.931	0.1176	0.1175840
4.66	3.87	4.29	120%	63.571487	1.308772405	321905.8383	FREE	0.932	0.1177	0.1176552
4.67	3.88	4.30	120%	63.78303	1.30990626	322942.5715	FREE	0.933	0.1177	0.1177268
4.68	3.89	4.31	120%	63.995609	1.311045668	323980.4154	FREE	0.934	0.1178	0.1177986
4.69	3.90	4.32	121%	64.209224	1.312190629	325019.3687	FREE	0.935	0.1179	0.1178708
4.70	3.91	4.33	121%	64.423875	1.313341143	326059.4302	FREE	0.937	0.1179	0.1179432
4.71	3.92	4.34	121%	64.639562	1.314497209	327100.5987	FREE	0.938	0.1180	0.1180160
4.72	3.93	4.35	121%	64.856285	1.315658829	328142.8731	FREE	0.939	0.1181	0.1180891
4.73	3.94	4.36	122%	65.074044	1.316826001	329186.2522	FREE	0.940	0.1182	0.1181625
4.74	3.95	4.37	122%	65.292839	1.317998727	330230.7348	FREE	0.941	0.1182	0.1182361
4.75	3.96	4.38	122%	65.51267	1.319177005	331276.3197	FREE	0.942	0.1183	0.1183101
4.76	3.97	4.39	122%	65.733537	1.320360836	332323.0059	FREE	0.944	0.1184	0.1183844
4.77	3.98	4.40	123%	65.95544	1.32155022	333370.7920	FREE	0.945	0.1185	0.1184590
4.78	3.99	4.41	123%	66.178379	1.322745157	334419.6771	FREE	0.946	0.1185	0.1185339
4.79	4.00	4.42	123%	66.402354	1.323945646	335469.6599	FREE	0.947	0.1186	0.1186091
4.80	4.01	4.43	123%	66.627365	1.325151689	336520.7393	FREE	0.948	0.1187	0.1186846
4.81	4.02	4.44	124%	66.853412	1.326363284	337572.9142	FREE	0.950	0.1188	0.1187603
4.82	4.03	4.45	124%	67.080495	1.327580433	338626.1833	FREE	0.951	0.1188	0.1188364
4.83	4.04	4.46	124%	67.308614	1.328803134	339680.5456	FREE	0.952	0.1189	0.1189128
4.84	4.05	4.47	124%	67.537769	1.330031388	340736.0000	FREE	0.953	0.1190	0.1189895
4.85	4.06	4.48	125%	67.76796	1.331265195	341792.5453	FREE	0.955	0.1191	0.1190665
4.86	4.07	4.49	125%	67.999187	1.332504555	342850.1803	FREE	0.956	0.1191	0.1191437
4.87	4.08	4.50	125%	68.23145	1.333749468	343908.9040	FREE	0.957	0.1192	0.1192213
4.88	4.09	4.51	125%	68.464749	1.334999933	344968.7153	FREE	0.958	0.1193	0.1192992
4.89	4.10	4.52	126%	68.699084	1.336255952	346029.6130	FREE	0.960	0.1194	0.1193773
4.90	4.11	4.53	126%	68.934455	1.337517523	347091.5960	FREE	0.961	0.1195	0.1194558
4.91	4.12	4.54	126%	69.170862	1.338784648	348154.6632	FREE	0.962	0.1195	0.1195345
4.92	4.13	4.55	126%	69.408305	1.340057325	349218.8135	FREE	0.963	0.1196	0.1196136
4.93	4.14	4.56	127%	69.646784	1.341335555	350284.0458	FREE	0.965	0.1197	0.1196929
4.94	4.15	4.57	127%	69.886299	1.342619338	351350.3591	FREE	0.966	0.1198	0.1197725
4.95	4.16	4.58	127%	70.12685	1.343908674	352417.7521	FREE	0.967	0.1199	0.1198525
4.96	4.17	4.59	127%	70.368437	1.345203563	353486.2239	FREE	0.968	0.1199	0.1199327
4.97	4.18	4.60	128%	70.61106	1.346504004	354555.7733	FREE	0.970	0.1200	0.1200132
4.98	4.19	4.61	128%	70.854719	1.347809999	355626.3992	FREE	0.971	0.1201	0.1200939
4.99	4.20	4.62	128%	71.099414	1.349121546	356698.1006	FREE	0.972	0.1202	0.1201750
5.00	4.21	4.63	128%	71.345145	1.350438646	357770.8764	FREE	0.974	0.1203	0.1202564

Appendix D – Debris Performance Video