

# APPENDIX A

## EXAMPLE SCREEN SIZING CALCULATION



## Design Tables

**Table A-1. Design Table for In-line Gate and Screening Option**

Description		Calculations	Notes
<b>Station information</b>			
Trunk Horizontal ID	d1		To Be Entered During Preliminary Design Typical for egg-shape $d1 < v1$
Trunk Horizontal OD	d2		To Be Entered During Preliminary Design
Trunk Vertical ID	v1		To Be Entered During Preliminary Design
Trunk Vertical OD	v2		To Be Entered During Preliminary Design
Invert Elevation at Diversion Weir	Inv		To Be Entered During Preliminary Design
River Normal Summer Elevation	NWL		To Be Entered During Preliminary Design
<b>Gate Chamber Design Information</b>			
Control Gate Height	GH		To Be Entered During Preliminary Design
Control Gate Width	GW		Default to d1
Control Gate Top Elevation	GTE		Invert + gate height
Side Weir Crest Elevation	SWCE		Default Invert + (GH x 0.50)
Side Weir Length	SWL		Default 50 percent of pipe width
<b>Screen Chamber Design Information</b>			
Peak Screen Rate			To Be Entered During Preliminary Design
Screen Chamber Maximum Head	Head		To Be Entered During Preliminary Design
Screen Channel Head Loss	hl_SC	0.100 m	Default value
Outfall Head Loss	hl_Out	0.100 m	Default value
Maximum Screen Loss	hl_max		Maximum head available minus hl_SC minus hl_Out
<b>Mechanical Screen Design</b>			
Design Screen Flow			Normally designed for peak
Design Screen Head Loss			Must not exceed maximum
Number of Rows			Maximum of 2
Screen Width	SW		Either 0.800 or 1.600 m
Design Screen Length			Based on manufacturer's information, selected from Table A-2
Screen Length	SL		Calculated
Screening Area			Normally designed for peak
<b>Screen Chamber Design Information</b>			
Screen Chamber Width	SCW		SW + default 0.500 m
Screen Chamber Length	SCL		SL + SWL + default 1.000 m
<b>Gate Chamber Dimensions</b>			

**Table A-1. Design Table for In-line Gate and Screening Option**

Description		Calculations	Notes
Gate Chamber Length	GCL		GH + default 4.500 m
Gate Chamber Width			d2 + default 1.000 m
Counter Weight Chamber	GCW		Manufacturer's recommendations

**Table A-2. Screen Sizing Table, based on ACU-SCREEN**  
*(Assuming 2 rows of 0.8 m wide linear screen and horizontal screens)*

Linear Screen Length (m) for Peak flow (m <sup>3</sup> /s) and Head (m)					
Flow (m <sup>3</sup> /s)	Head (m)				
	0.1	0.2	0.3	0.4	0.5
0.2	2.67	1.04	0.65	0.47	0.37
0.4	5.33	2.09	1.30	0.94	0.74
0.6	8.00	3.13	1.95	1.41	1.11
0.8	10.67	4.17	2.59	1.88	1.48
1.0	13.33	5.22	3.24	2.35	1.85
1.2	16.00	6.26	3.89	2.82	2.22
1.4	18.67	7.30	4.54	3.29	2.58
1.6	21.33	8.35	5.19	3.76	2.95
1.8	24.00	9.39	5.84	4.24	3.32
2.0	26.67	10.43	6.49	4.71	3.69
2.2	29.33	11.48	7.13	5.18	4.06
2.4	32.00	12.52	7.78	5.65	4.43
2.8	37.33	14.61	9.08	6.59	5.17
3.0	40.00	15.65	9.73	7.06	5.54
3.2	42.66	16.70	10.38	7.53	5.91
3.4	45.33	17.74	11.03	8.00	6.28
3.6	48.00	18.78	11.68	8.47	6.65
3.8	50.66	19.83	12.32	8.94	7.02
4.0	53.33	20.87	12.97	9.41	7.38

## Example Screen Sizing Calculation

Design Parameters – Cockburn:

- $Q_{\text{peak}} = 0.520 \text{ m}^3/\text{second}$
- $H_{\text{max}} = 0.650 \text{ m}$
- Inside Pipe Dimensions = 2.700 m wide x 2.075 m high
- Outside Pipe Dimensions = 3.000 m wide x 2.375 m high (assumed 0.15 m wall thickness)
- Invert Elevation = 223.070 m
- Normal Summer River Level = 223.750 m
- Control Gate Height = 1.35 m

Use Tables A-1 and A-2 and the following figures to calculate screening chamber size.

Yellow highlights are input data.

Blue highlights are calculated.

### Example Screen Sizing Calculation

Description		Calculations	Notes
<b>Station Information</b>			
Trunk Horizontal ID	d1	2.700 m	Typical for egg-shaped, $d1 < v1$
Trunk Horizontal OD	d2	3.000 m	
Trunk Vertical ID	v1	2.075 m	
Trunk Vertical OD	v2	2.375 m	
Invert Elevation at Diversion Weir	Inv	223.070 m	
River Normal Summer Elevation	NWL	223.750 m	
<b>Gate Chamber Design Information</b>			
Control Gate Height	GH	1.350 m	
Control Gate Width	GW	2.700 m	Default to d1
Control Gate Top Elevation	GTE	$223.070 + 1.350 = 224.420 \text{ m}$	Invert + gate height
Side Weir Crest Elevation	SWCE	$223.070 + (1.350 \times 0.50) = 223.745 \text{ m}$	Default Invert + (GH x 0.50)
Side Weir Length	SWL	$2.700 / 2 = 1.350 \text{ m}$	Default 50 percent of pipe width
<b>Screen Chamber Design Information</b>			
Peak Screen Rate		0.520 m <sup>3</sup> /second	
Screen Chamber Maximum Head	Head	0.650 m	
Screen Channel Head Loss	hl_SC	0.100 m	Default value
Outfall Head Loss	hl_Out	0.100 m	Default value
Maximum Screen Loss	hl_max	$0.650 - 0.100 - 0.100 = 0.450 \text{ m}$	Maximum head available minus hl_SC minus hl_Out

**Example Screen Sizing Calculation**

Description		Calculations	Notes
<b>Mechanical Screen Design</b>			
Design Screen Flow		0.520 m <sup>3</sup> /second	Normally designed for peak
Design Screen Head Loss		0.200 m	Must not exceed maximum
Number of Rows		2	Maximum of 2
Screen Width	SW	1.600 m	Either 0.800 or 1.600 m
Design Screen Length		3.13 m	Based on manufacturer's information – <b>From Table 4</b>
Screen Length	SL	3.500 m	
Screening Area		1.600 m x 3.500 m = 5.600 m <sup>2</sup>	Based on horizontal screens
<b>Screen Chamber Design Information</b>			
Screen Chamber Width	SCW	1.600 + 0.500 = 2.100 m	SW + default 0.500 m
Screen Chamber Length	SCL	3.500 m + 1.350 m + 1.000 m = 5.850 m	SL + SWL + default 1.000 m
<b>Gate Chamber Dimensions</b>			
Gate Chamber Length	GCL	1.350 - 4.500 = 5.350 m	GH + default 4.500 m
Gate Chamber Width	GCW	3.000 + 1.000 = 4.000 m	d2 + default 1.000 m
Counter Weight Chamber		Not applicable in this example	Manufacturer's recommendation

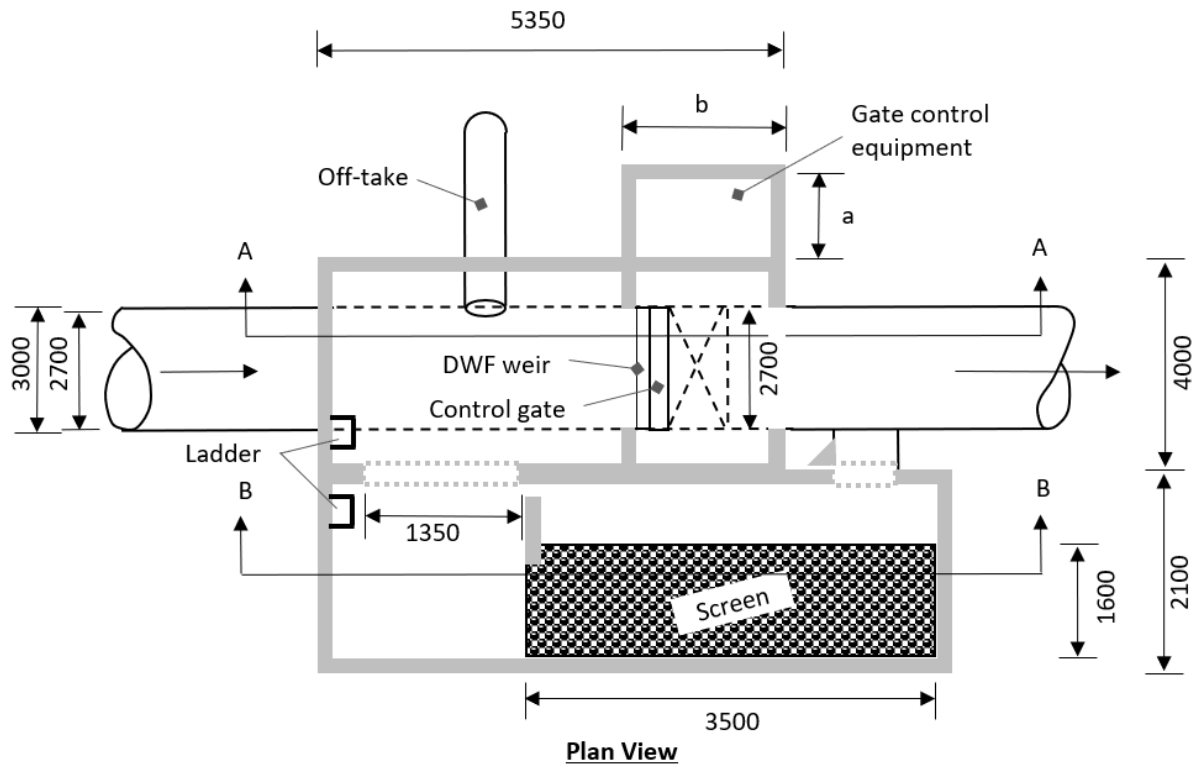
**Example Screen Sizing Table, based on ACU-SCREEN**

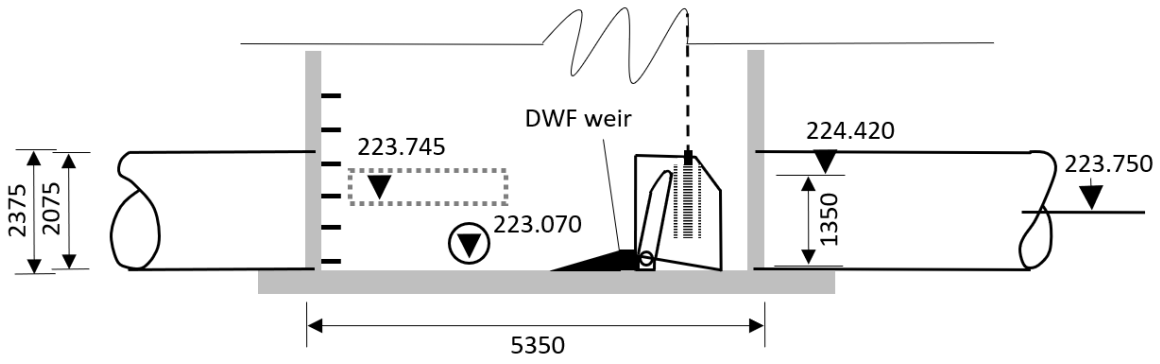
(Assuming 2 rows of 0.8 m wide linear screen and horizontal screens)

Linear Screen Length (m) for Peak flow (m <sup>3</sup> /s) and Head (m)					
Flow (m <sup>3</sup> /s)	Head (m)				
	0.1	0.2	0.3	0.4	0.5
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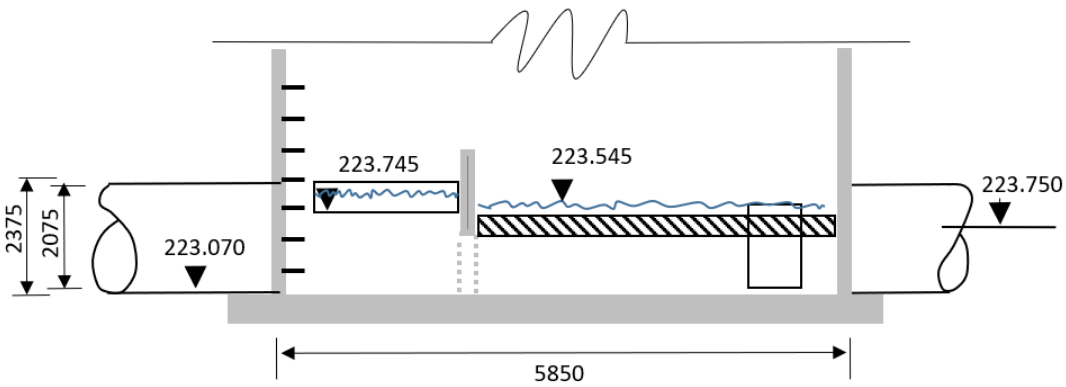
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3.4	45.33	17.74	11.03	8.00	6.28
3.6	48.00	18.78	11.68	8.47	6.65
3.8	50.66	19.83	12.32	8.94	7.02
4.0	53.33	20.87	12.97	9.41	7.38





**Section A - A**



**Section B - B**