



**FSA 2021 Winter Conference  
December 2, 2021**

**FSAEF Stormwater BMP  
Life-Cycle Costing Tool**

# Nonpoint Source Funds

- State Water-quality Assistance Grants
- Cost effectiveness based on the cost per pound of total nitrogen and/or total phosphorus removed per acre treated.

The screenshot shows a web browser window displaying the Florida Department of Environmental Protection (DEP) website. The page title is "Nonpoint Source Funds | Florida" and the URL is "floridadep.gov/wra/319-tmdl-fund". The page features a dark blue header with the DEP logo and navigation links for "About DEP", "How Do I", "Divisions", "Air", "Lands", "Parks & Rec", "Waste", and "Water". A search bar is located in the top right corner. The main content area is titled "Nonpoint Source Funds" and includes a breadcrumb trail: "Home » Divisions » Division of Water Restoration Assistance » Nonpoint Source Funds". On the left side, there is a "Nonpoint Source Funds Quick Links" section with links for "Contacts", "How to Apply?", "Program Resources", "Frequently Asked Questions (Grants Q&A)", "Nonpoint Source Pollution Education", "Green Infrastructure/Low Impact Development", and "Story Map of Florida's Nonpoint Source Projects". The main text area is titled "About Nonpoint Source Funds" and contains the following text: "Funding for control of water pollution from nonpoint sources is managed by the Nonpoint Source Management Program. Nonpoint source pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources, including stormwater. The program administers both the **Federal Clean Water Act Section 319(h) Grants** (also known as "**319 Grants**") and the **State Water-quality Assistance Grants** (also known as "**SWAG**"). The goal of these grants is to reduce nonpoint source pollution from land use activities. Total funding amounts available each year in these two grant programs depends on Federal and state appropriations, but is usually around \$8 - \$9 million." Below this is a section titled "How to Apply" with the text: "Project proposals may be submitted anytime throughout the year. Department review and evaluation periods are expected to occur in September/October and March/April of each year, or as needed. If the project is not funded in the current selection cycle, it will be considered in the following cycle with no need to resubmit (unless there is a need to update the proposal). If your project is not selected within the current state fiscal year, the proposal will need to be resubmitted for evaluation."

# SJRWMD Funding



## Districtwide

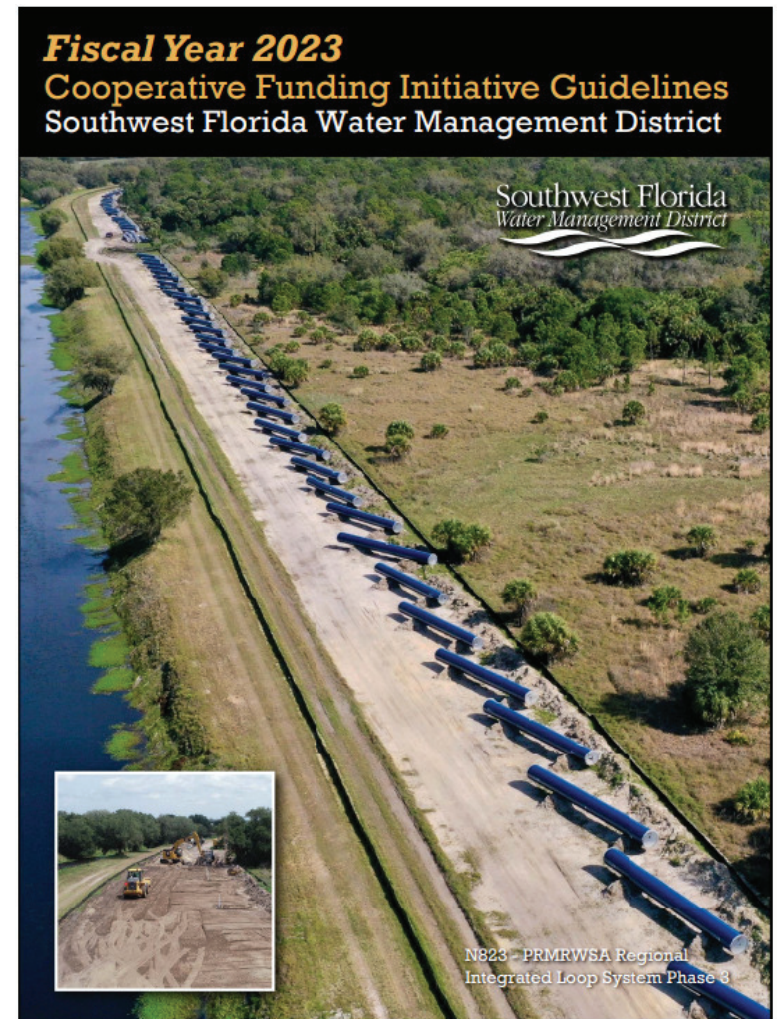
**ST. JOHNS RIVER  
WATER MANAGEMENT  
DISTRICT**

Fiscal Year 2021 - 2022  
Districtwide Cost-Share  
Funding Program Guidance

Cost Share Program Cost Effectiveness Calculator					
Interest rate (annual %) =		2.500%	FY2021 Federal Water Resource Planning Discoun		
Project / components	lbs TN removed/ year	Total Project Cost*	O&M (\$/year)	Service Life	\$/lbs TN removed
Example Treatment Project	2,300	\$ 2,000,000	\$ 2,000	20	\$ 56.65
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -

# SWFWMD Funding

- **FY2023 CFI EVALUATION FORM**
- Project Benefit
- Cost Effectiveness



# Conventional BMPs vs. Low-Impact Design/Green Infrastructure



# What Was Lacking

- Consistent, unified approach
  - BMP Trains for water quality
- A more detailed accounting of service life
- Guidance on service life of BMP components



# What Was Working

- Opinions of probable cost
  - Moves rapidly with the state of the economy
- Regional differences

OPINION OF PROBABLE COST				
OWNER:	Volusia County		ESTIMATED BY:	Amy Goodden
CLIENT:	Volusia County		CHECKED BY:	Jamie Bell
PROJECT TITLE:	Mosquito Lagoon Reasonable Assurance Plan Options Analysis		PROJECT SEGMENT:	
PROJECT NUMBER:	22015-012-01		DATE:	10/23/2017
ESTIMATE TYPE (ROM, BUDGET, DEFINITIVE):	ROM		SUBJECT:	Option 1 - Roslyn Avenue Pond
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
<b>LAND ACQUISITION</b>				
Long-term Lease Agreement	LS	1	\$ -	\$ -
<b>CONSTRUCTION</b>				
Dewatering and Flow Diversion	LS	2	\$ 15,000	\$ 30,000.00
Sheetpile Low Head Dam - 70 LF X 15 ft	SF	1050	\$ 40	\$ 42,000.00
Temporary Rock Check Dam	LS	2	\$ 1,500	\$ 3,000.00
Diversion Weir - FDOT Type H DBI, Assumed depth 10 ft	EA	1	\$ 11,000	\$ 11,000
Diversion Weir - 36" RCP	LF	32	\$ 133	\$ 4,256
Outlet Structure - FDOT Type H, Modified, Assumed depth 10 ft	EA	1	\$ 11,000	\$ 11,000
Outlet Structure - 36" RCP	LF	32	\$ 133	\$ 4,256
Outlet Structure - Manatee Grate 36" RCP	EA	1	\$ 3,600	\$ 3,600
Concrete driveway apron- FDOT turnout	SY	49	\$ 23	\$ 1,124
Gravel access road 1800LF, clearing and grubbing	AC	0.58	\$ 12,000	\$ 6,942
Gravel access road 1800LF, Stabilized base, Group 6	SY	2400	\$ 14	\$ 33,600
Gravel access road 1800LF, #57 stone	TN	835	\$ 90	\$ 75,150
Soil Tracking Prevention Device	EA	1	\$ 2,500	\$ 2,500
Staked Silt Fence	LF	1800	\$ 4	\$ 7,200
Staked Turbidity Barrier	LF	80	\$ 4	\$ 320
Subtotal				\$ 236,000
Miscellaneous Items and Fine Grading (15%)	LS	1	\$ 35,400	\$ 35,400
Mobilization (10%)	LS	1	\$ 23,600	\$ 23,600
<b>TOTAL CONSTRUCTION COST ESTIMATE</b>				<b>\$ 300,000</b>
<b>PLANNING, DESIGN, PERMITTING</b>				
FAA Permitting and Management Plan	LS	1	\$ 50,000	\$ 50,000
Wetland Mitigation	CR	2	\$ 150,000	\$ 300,000
Engineering & SJRWMD Permitting (15%)	LS	1	\$ 45,000	\$ 45,000
Subtotal				\$ 395,000
<b>SUBTOTAL PROJECT COST ESTIMATE</b>				<b>\$ 700,000</b>
<b>TOTAL PROJECT COST ESTIMATE RANGE</b>			<b>\$ 560,000</b>	<b>to \$ 910,000</b>

# Framework

- Working group of FSAEF Board, DEP, WMDs, and FSA members
- Reviewed existing tools
- Performed a literature review
- Developed BMP components and expected service life
- Built the spreadsheet tool
- Developed documentation



## **LIFE-CYCLE COSTING TOOL SUMMARY REPORT**

Florida Stormwater Association Educational Foundation (FSAEF)  
October 2021

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# Acknowledgements

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## **FSAEF Board Members**

Brett Cunningham, Chair (Jones Edmunds)

Tim Kelly (Wood Environment & Infrastructure Solutions)

Amy Eason (AECOM)

Melissa Long (City of Jacksonville)

Kimberley Tracy (City of Maitland)

## **FDEP Member**

Jared Searcy

## **NWFWMD Member**

Linda Chaisson

## **SJRWMD Member**

Cammie Dewey

## **SFWMD Member**

Jesse Markle

## **SRWMD Members**

Pat Webster

Leroy Marshall

## **SWFWMD Member**

Nancy Norton

## **FSA Members**

Lee Mullan (Drummond Carpenter)

Mike Hardin (Geosyntec)

Amy Goodden (Jones Edmunds)

Jason Icerman (Jones Edmunds)

## **Association Management**

### **Professionals**

Danielle Hopkins

# **AND NOW, INTRODUCING, THE FSA BMP LIFE-CYCLE TOOL!**

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Live demonstration

## FSA BMP Life-Cycle Tool

### Directions for Data Entry

The Florida Stormwater Association BMP Life Cycle Tool requires the input of data on each of the five worksheets. Note that input fields are highlighted in blue. To best utilize this tool, only enter data in the blue highlighted cells. **If you choose to modify information other than the highlighted cells, formulas could change which could result in incorrect summary information.**

1. Go to "Background Information" worksheet and complete project details, only enter data in highlighted cells.
2. Go to the "Life Cycle Cost Analysis" worksheet, only enter the data in the highlighted cells.
3. In completing the Life Cycle Cost Analysis, you will be picking the major project elements that can influence the operations and maintenance cost part of the life cycle cost. The major project elements come from the "Water Quality System Database". Select the Design Element # from the worksheet and place in Column C as well as enter replacement costs in the appropriate columns. For annual costs, note that the Design Elements listed in the Replacement Cost section are automatically populated due to the estimated annual costs being related to the replacement costs.
4. Go to "Discount Rate Factors" worksheet and enter interest rate.
5. Go to the "Unit Cost Summary" worksheet, enter data in the highlighted cells.
6. Go to "Unit Cost Summary" worksheet. Enter project annual pollutant load removal estimates. The total life cycle removal and associated unit costs will be automatically computed.

Questions or need assistance? Contact the FSAEF at 888-221-3124 or [info@florida-stormwater.org](mailto:info@florida-stormwater.org)

DESCRIPTIONS  
 BY CELL BY  
 WORKSHEET  
 FOLLOW

#### Background Information Worksheet

Input Data	Cell	Description
Project Title	B2	Enter a short project title or description
Project Identification	B3	Enter project Identification
Location	F2	Enter project location, city
Date	H2	Enter date
User Identification	B4	Enter name of the user
User Identification	B5	Enter name of the organization
User Identification	B6 & B7	Enter name address of the user
User Identification	F4	Enter e-mail address of the user
User Identification	F5	Enter telephone number of the user

#### Life Cycle Cost Analysis Worksheet

Input Data	Cell	Description
Description of the system	C3 & C4	Brief Description of the system

### FSA BMP Life-Cycle Tool

Component	C14:C22	Component to be replaced during the project life (Re: Systems Database)
Engineer's Opinion of Construction Cost (OCC) and OCC plus contingency	J7, K7	Used to establish the best approximation of the capital cost for a project whether it is a planning value or an engineer's estimate off a completed set of plans.
Equipment Replacement Cost	J14:J22	Cost of equipment to be replaced
Equipment Replacement Cost (Optional if a high end of potential equipment replacement costs is	M14:M22	This optional entry box is for those projects with less certain O&M costs where estimates on the high side (contingencies) are desired.
Electrical Energy consumption	H47	Annual Electrical Energy Consumption for Alternate 1 in KWH
Annual Cost Items (Major Elements)	C28:C38	Annual costs associated with some equipment items
Annual Cost Items ("Other Routine")	C40:C46	Annual routine maintenance costs
Annual Cost Items (Optional if a high end estimate of potential annual costs is desired)	M28:M38	This optional entry box is for those projects with less certain O&M costs where estimates on the high side (contingencies) are desired.
Annual Cost Items (Optional if a high end estimate of potential annual costs is desired)	M40:M46	This optional entry box is for those projects with less certain O&M costs where estimates on the high side (contingencies) are desired.
Units	G40:G46	Number of that component used in the project.
Economic Evaluation Duration	J5	Period during which the life-cycle cost analysis is calculated. This period should be sufficiently long to account for all relevant costs.

### Water Quality System Database Worksheet

Input Data	Cell	Description
Expected Service Life	C6:C22	The anticipated duration that an improvement or component will be useable and meet its intended function before requiring replacement. This assumes proper maintenance occurs throughout its active use period.
Typical Annual Maint % of System Cost	D6:D55	The expected annual maintenance cost as a percent of the capital cost.
Expected Service Life	H6:H55	Same as two above.
Annual Maintenance \$ / unit	I6:I55	The expected annual maintenance cost in present year dollars.

### Unit Cost Summary Worksheet

Input Data	Cell	Description
Annual Pollutant Load Removal Estimates Projected for Project	C7, D7, E7, F7	Relative Costs (\$/Lb removed) are automatically computed to provide effective benefit of project.

# FSA BMP Life-Cycle Tool

POPULATES UNIT  
COST SUMMARY  
SHEET

## Background Information

Project Title:	Project A- Dry Retention Regional Stormwater	Location:	<input type="text"/>	Date:	<input type="text"/>
Project ID:	<input type="text"/>				
Prepared by:	<input type="text"/>	e-mail:	<input type="text"/>		
Organization:	<input type="text"/>	Telephone:	<input type="text"/>		
Address:	<input type="text"/>				
City, State Zip:	<input type="text"/>				

### ASSUMPTIONS:

Economic Evaluation Duration:  years

Discount Rate:  based on the long-term average CPI from 1915-2015

*Cells C10 & C11 are populating from Cell J 5 of the "Life Cycle Cost Analysis" sheet and Cell C2 of the "Discount Rate Factors" sheet, respectively*

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NOTE SOURCE  
FOR ENTRIES  
INTO THESE TWO  
CELLS

THESE CELLS CAN BE MODIFIED TO FIT USER'S PROJECT SPECIFICS BASED ON PROFESSIONAL JUDGMENT.

FSA BMP Life-Cycle Tool

Water Quality System Database

FSA 2021

Stormwater Management					Stormwater Management-Other Maintenance Costs			
Equipment or Element	Expected service life	Typical Annual Maintenance % of System Cost	Estimated Range of Annual Maintenance % of System Cost	Feature	Expected service life	Annual Maintenance \$/unit		
0				100				
1	Pump Station, Continuous	10	2.5%	2-4%	101	Canal Maintenance, \$/mile	\$ 24,000	
2	Pump Station, Intermittent	20	0.5%	0.5-3%	110	STA Maintenance, \$/acre	\$ 550	
3	Electrical Service	20	1.0%	0.5-2%	120	AquaFiber	\$ 800,000	
4	Piping, Force Main	30	1.0%	0.5-1.5%	130	Miscellaneous Slope & Berm Repair	\$ 150	
5	Piping, Gravity Flow <sup>1</sup>	60	1.0%	0.2-1.25%	140	Mowing/Vegetation Control/Litter Removal	\$ 1,850	
6	Wet Storage <sup>2</sup>	1000	0.1%	0.005-0.25%	150	Clean/Repair Drainage Structures	\$ 30	
7	Dry Storage	1000	1.5%	1-6%	160	Sump Cleaning	\$ 500	
8	Overflow Gate Structure	20	2.0%	0.8-2%				
9	Outlet Structure, Fixed	60	0.3%	0.03-0.4%				
10	Outlet Structure, Adjustable	20	2.0%	0.5-2%				
11	Baffle Box/ Gross Pollutant Separators	50	6.0%	5-10%				
12	Underdrain	20	6.0%	4-15%				
13	Biosorption Activated Media (BAM) <sup>3</sup>	25	6.5%	1-7%				
14	Wetland, Small	30	4.0%	1-10%				
15	Wetland, Large Stormwater Treatment Area (STA)	60	4.0%	0.4-5%				
16	Lined (hardened) Canal	1000	3.0%	0.5-3%				
17	Unlined Canal	1000	4.0%	2-5%				
18	Underground Storage	20	4.0%	2-6%				
19								
20								
21								

GOOD EXAMPLE OF A COST USER MUST EVALUATE AND MODIFY TO FIT PROJECT-SPECIFIC DESIGN.

MULTIPLE OPEN CELLS FOR USER ADDITIONS

1 - See <https://csle.fdot.gov/#/calculators/serviceLife/serviceLifeEstimator> for better estimator of service life

2 - A service life of 1,000 years is used for any feature that can be renewed indefinitely. A wet detention facility with a designed sediment forebay/sump will take decades before treatment volume is reduced and treatment effectiveness goes down.

Dry storage was assumed to be of dry retention design and assumed "storage" maintenance is driven by the removal/management of detritus/shallow sediments on bottom of basin to restore design infiltration rates. A long service life was used similar to wet storage (wet detention type system) since "replacement" is not applicable- the user needs to add sump cleaning as a maintenance item as appropriate to fit user's project site conditions.

3 - BAM life will depend on many factors such as BAM thickness, type of BAM, BAM residence time, and influent concentrations

CHECK WITH FUNDING AGENCY TO SEE IF THIS IS FIXED FOR THEIR PARTICULAR GRANT APPLICATION

### FSA BMP Life-Cycle Tool

#### Compound Discount Rate Factors

Discount Rate ( i ) = 3.30%

This rate is a place holder. Please update a  
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A	B	C	D	E
	Present Worth Factor of Future Expense	Annual Payment Factor of Future Expense	Present Worth Factor of Annual Expense	Annual Payment Factor of Present Worth Expense
	(P/F, i, n)	(A/F, i, n)	(P/A, i, n)	(A/P i, n)
Year (n)	$\frac{1}{(1+i)^n}$	$\left\{ \frac{i}{(1+i)^n - 1} \right\}$	$\frac{(((1+i)^n) - 1)}{(i * ((1+i)^n))}$	$\frac{i(1+i)^n}{(1+i)^n - 1}$
0				
1	0.9681	1.0000	0.9681	1.0330
2	0.9371	0.4919	1.9052	0.5249
3	0.9072	0.3226	2.8124	0.3556
4	0.8782	0.2380	3.6906	0.2710
5	0.8502	0.1872	4.5407	0.2202
6	0.8230	0.1534	5.3637	0.1864
7	0.7967	0.1293	6.1604	0.1623
8	0.7713	0.1113	6.9317	0.1443
9	0.7466	0.0972	7.6783	0.1302
10	0.7228	0.0860	8.4011	0.1190
11	0.6997	0.0769	9.1008	0.1099
12	0.6773	0.0693	9.7781	0.1023
13	0.6557	0.0628	10.4338	0.0958
14	0.6347	0.0573	11.0685	0.0903
15	0.6145	0.0526	11.6830	0.0856
16	0.5948	0.0484	12.2778	0.0814
17	0.5758	0.0448	12.8536	0.0778
18	0.5574	0.0416	13.4111	0.0746
19	0.5396	0.0387	13.9507	0.0717
20	0.5224	0.0361	14.4731	0.0691
21	0.5057	0.0338	14.9788	0.0668
22	0.4895	0.0316	15.4683	0.0646
23	0.4739	0.0297	15.9422	0.0627
24	0.4588	0.0280	16.4010	0.0610
25	0.4441	0.0264	16.8451	0.0594
26	0.4299	0.0249	17.2750	0.0579
27	0.4162	0.0235	17.6912	0.0565
28	0.4029	0.0223	18.0941	0.0553
29	0.3900	0.0211	18.4841	0.0541
30	0.3776	0.0200	18.8617	0.0530
31	0.3655	0.0190	19.2272	0.0520
32	0.3538	0.0181	19.5810	0.0511
33	0.3425	0.0172	19.9236	0.0502

FSA BMP Life-Cycle Tool

Unit Cost Summary

Florida Stormwater Association 2021

Project A- Dry Retention Regional Stormwater Retrofit Project				
Estimated Present Worth Nutrient Removal Unit Costs				
For Life Cycle Of: 60 Years				
	TOTAL N	TOTAL P	TSS	PARAMETER- USER CHOICE
	FOR 60 YEAR			DURATION
ESTIMATED POLLUTANT REMOVAL (LBS/YR)	500	100	200000	25
ESTIMATED POLLUTANT REMOVAL (LBS FOR LIFE CYCLE DURATION)	30000	6000	12000000	1500
ESTIMATED COST PER POUND OF POLLUTANT REMOVED (LOW END OF RANGE) (\$/LB)	\$116	\$578	\$0.29	\$2,313
ESTIMATED COST PER POUND OF POLLUTANT REMOVED (HIGH END OF RANGE)(\$/LB)	\$134	\$670	\$0.34	\$2,680

FROM USER'S  
WATER QUALITY  
CALCULATIONS

POLLUTANT  
LOAD  
REMOVED  
DURING THE  
EVALUATED  
LIFE TERM

PROVIDES  
BENEFIT /  
COST RANGE  
FOR  
EVALUATION  
OF PROJECT'S  
COST  
EFFECTIVENESS



Water Quality Project Life Cycle Cost Analysis

Florida Stormwater Association 2021

EXAMPLE #1

Alternative	Project A- Regional Dry Retention Facility with Biosorption Activated Media (BAM)						
	Duration	Economic Evaluation Duration		60	years		
Construction Cost		Initial Capital Cost		Estimated Cost Low <sup>1</sup>	Estimated Cost High <sup>2</sup>		
	Capital Cost, Range		\$ 3,000,000	\$ 3,450,000			
	Capital Cost Annualized over the Project Evaluation Duration		\$ 115,459	\$ 132,778			
Replacement Costs	Replacement Costs		Expected Service Life (Years)	# Replacements Over Project Life	1 time Replacement Cost	Replacement Cost (Present Worth Assumed)	
	7	Dry Storage	1000	0.1	\$ -	\$ -	
	13	Biosorption Activated Media (BAM) <sup>3</sup>	25	2.0	\$ 200,000	\$ 400,000	
		#N/A	#N/A	#N/A		\$ -	
		#N/A	#N/A	#N/A		\$ -	
		#N/A	#N/A	#N/A		\$ -	
		#N/A	#N/A	#N/A		\$ -	
		#N/A	#N/A	#N/A		\$ -	
		#N/A	#N/A	#N/A		\$ -	
		#N/A	#N/A	#N/A		\$ -	
TOTAL PRESENT WORTH OF REPLACEMENT COST						\$ 400,000	
Replacement Costs Annualized over the Project Life						\$ 15,395	
Annual Costs	Annual Costs		Unit	% of Initial Cost	Present Worth Factor	Present Worth	Annual cost
	Maintenance Cost of Items Listed in Replacement Cost Section. NOTE!: Must be in same order as Replacement Costs above as Annual Costs link to Replacement Cost Entries				25.9832		
	7	Dry Storage	1	1.50%		\$ -	\$ -
	13	Biosorption Activated Media (BAM) <sup>3</sup>	0	6.50%		\$ -	\$ -
		#N/A	1	0.00%		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -
Other Maintenance Costs, \$/unit		Unit	\$/ unit	Present Worth Factor	Present Worth	Annual cost	
130	Miscellaneous Slope & Berm Repair	1	\$ 150		\$ 3,897	\$ 150	
140	Mowing/Vegetation Control/Litter Removal	1	\$ 1,850		\$ 48,069	\$ 1,850	
150	Clean/Repair Drainage Structures	1	\$ 30		\$ 779	\$ 30	
160	Sump Cleaning	1	\$ 500		\$ 12,992	\$ 500	
	0				\$ -	\$ -	
	0				\$ -	\$ -	
	0				\$ -	\$ -	
Electrical Energy				0 kwh	\$ -	\$ -	
TOTAL PRESENT WORTH OF ANNUAL COST						\$ 65,737	
TOTAL OF ANNUAL COSTS						\$ 2,530	
LCC	ESTIMATED REPLACEMENT + O&M ANNUALIZED COST RANGE		\$ 17,920	TO	\$ 22,130		
	TOTAL ANNUALIZED COST RANGE		\$ 130,000	TO	\$ 150,000		
LCC	TOTAL PRESENT WORTH COST RANGE <sup>3</sup>		\$ 3,470,000	TO	\$ 4,020,000		

USER'S CHOICE BUT OFTEN DICTATED BY FUNDING AGENCY

BELOW COLUMNS TO BE USED FOR UPPER END ESTIMATE OF FUTURE COSTS

FOR UNDERGROUND BAM, NO O&M ASSUMED. FOR BAM IN A POLLUTION CONTROL DEVICE, AN ENTRY WOULD BE APPROPRIATE DUE TO MAINTENANCE NEEDS

USE JUDGMENT. BASED ON MAINTENANCE FREQUENCY ON CASE-BY-CASE BASIS

THIS ROW ROUNDED TO NEAREST 10,000. CONSIDER PARTICULARLY FOR VERY SMALL PROJECTS.

THESE VALUES ARE USED IN THE UNIT COST SUMMARY SHEET FOR THE ULTIMATE BENEFIT TO COST COMPARISON

1 - Opinion of Probable Construction Cost on Base Bid Item List Projected Out to Time of Construction  
 2 - Opinion of Probable Construction Cost plus Contingency plus Add-Alternate Bid Items as Applicable  
 3 - These are the values used on the Unit Cost Summary Sheet for computing benefit/cost information

Water Quality Project Life Cycle Cost Analysis

EXAMPLE #2

Florida Stormwater Association 2021

Alternative	Project B- Flood Control Facility with Wet Detention Treatment & Supplemental Pump Station									
Duration	Economic Evaluation Duration			60	years					
Construction Cost	Initial Capital Cost			Estimated Cost Low <sup>1</sup>	Estimated Cost High <sup>2</sup>					
	Capital Cost, Range			\$ 3,000,000	\$ 3,450,000					
	Capital Cost Annualized over the Project Evaluation Duration			\$ 115,459	\$ 132,778					
Replacement Costs	Replacement Costs		Expected Service Life (Years)	# Replacements Over Project Life	1 time Replacement Cost	Replacement Cost (Present Worth Assumed)	Upper End of Estimated Replacement Costs for Selected Elements (Optional)			
	2	Pump Station, Intermittent	20	2.0	\$ 150,000	\$ 300,000	1 time Replacement Cost	Replacement Cost (Present Worth Assumed)		
	3	Electrical Service	20	2.0	\$ 5,000	\$ 10,000	\$ 200,000	\$ 400,000		
	9	Outlet Structure, Fixed	60	0.0		\$ -	\$ 7,500	\$ 15,000		
		#N/A	#N/A	#N/A		\$ -		\$ -		
		#N/A	#N/A	#N/A		\$ -		\$ -		
		#N/A	#N/A	#N/A		\$ -		\$ -		
		#N/A	#N/A	#N/A		\$ -		\$ -		
		#N/A	#N/A	#N/A		\$ -		\$ -		
		#N/A	#N/A	#N/A		\$ -		\$ -		
TOTAL PRESENT WORTH OF REPLACEMENT COST						\$ 310,000		\$ 415,000		
Replacement Costs Annualized over the Project Life						\$ 11,931		\$ 15,972		
Annual Costs	Annual Costs		Unit	% of Initial Cost	Present Worth Factor	Present Worth	Annual cost	Upper End of Estimated Annual Costs for Selected Elements (Optional)		
	Maintenance Cost of Items Listed in Replacement Cost Section. NOTE!: Must be in same order as Replacement Costs above as Annual Costs link to Replacement Cost Entries				25.9832			% of Initial Cost	Present Worth	Annual Cost
	2	Pump Station, Intermittent	1	0.50%		\$ 19,487	\$ 750	0.50%	\$ 25,983	\$ 1,000
	3	Electrical Service	1	1.00%		\$ 1,299	\$ 50	1.00%	\$ 1,949	\$ 75
	9	Outlet Structure, Fixed	1	0.25%		\$ -	\$ -		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -		\$ -	\$ -
		#N/A	0	0.00%		\$ -	\$ -		\$ -	\$ -
Other Maintenance Costs, \$/unit		Unit	\$/ unit	Present Worth Factor	Present Worth	Annual cost	\$/ unit	Present Worth	Annual Cost	
130	Miscellaneous Slope & Berm Repair	1	\$ 150		\$ 3,897	\$ 150	\$ 600.00	\$ 15,589.92	\$ 600.00	
140	Mowing/Vegetation Control/Litter Removal	1	\$ 1,850		\$ 48,069	\$ 1,850	\$ 2,000.00	\$ 51,966.40	\$ 2,000.00	
150	Clean/Repair Drainage Structures	2	\$ 30		\$ 1,559	\$ 60	\$ 35.00	\$ 1,818.82	\$ 70.00	
	0	0	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	
	0	0	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	
	0	0	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	
	0	0	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	
	Electrical Energy		25000 kwh		\$ 74,702	\$ 2,875		\$ 74,702	\$ 2,875	
TOTAL PRESENT WORTH OF ANNUAL COST						\$ 149,014		\$ 172,009		
TOTAL OF ANNUAL COSTS								\$ 5,735		
LCC	ESTIMATED REPLACEMENT + O&M ANNUALIZED COST RANGE		\$ 17,670	TO	\$ 22,590					
	TOTAL ANNUALIZED COST RANGE		\$ 130,000	TO	\$ 160,000					
LCC	TOTAL PRESENT WORTH COST RANGE <sup>3</sup>		\$ 3,460,000	TO	\$ 4,040,000					

NO REPLACEMENT OCCURS DURING LIFE SPAN OF THIS ELEMENT

POWER COST

1 - Opinion of Probable Construction Cost on Base Bid Item List Projected Out to Time of Construction  
 2 - Opinion of Probable Construction Cost plus Contingency plus Add-Alternate Bid Items as Applicable  
 3 - These are the values used on the Unit Cost Summary Sheet for computing benefit/cost information

Need additional rows above? Contact the FSA EF at info@florida-stormwater.org

# Thank you on behalf of the FSA Educational Foundation

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## Questions/Answers and Discussion

You can find the tool in a section of the Research page on the FSA website:

<https://www.florida-stormwater.org/research>