



Big Creek Stormwater Retrofit Ranking Project

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Friends of Big Creek

Big Creek Watershed Balanced Growth Meeting
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Retrofit Ranking Project Overview

- Task 1: Preliminary screening (156 sites)
- Task 2: Field assessment and priority ranking (20 sites)
- Task 3: Conceptual designs and cost estimates (3 sites)



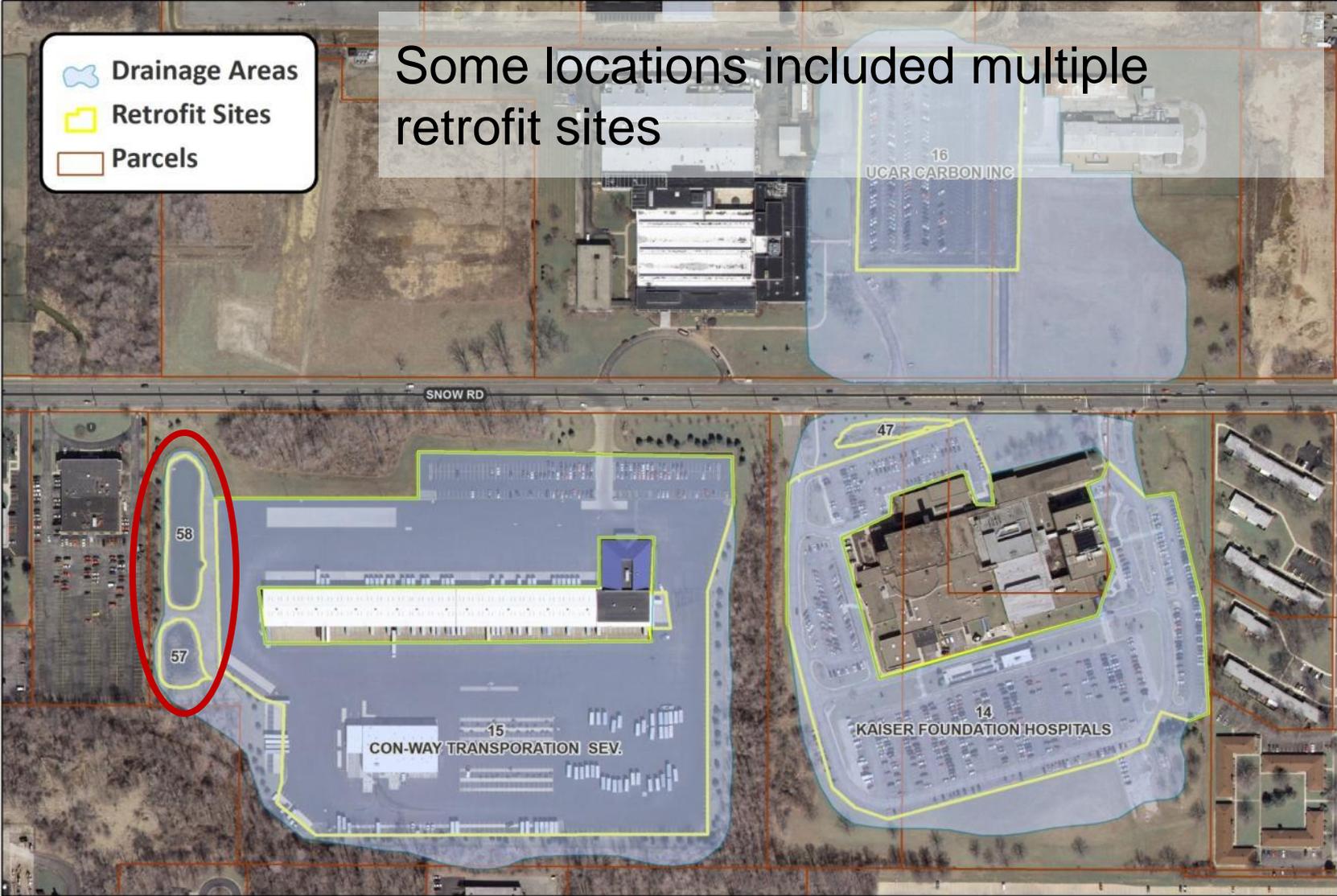
Task 1: Preliminary Screening

- Four general types of retrofits evaluated:
 - Parking lots greater than 5 acres
 - Existing detention basins
 - Storage below outfalls
 - Highway Interchanges
- Large amount of GIS data collected & reviewed
- Extensive stakeholder coordination required
- Evaluated approximately 185 sites (more than the original 156 sites)



Some locations included multiple retrofit sites

-  Drainage Areas
-  Retrofit Sites
-  Parcels



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Potential Retrofit Example

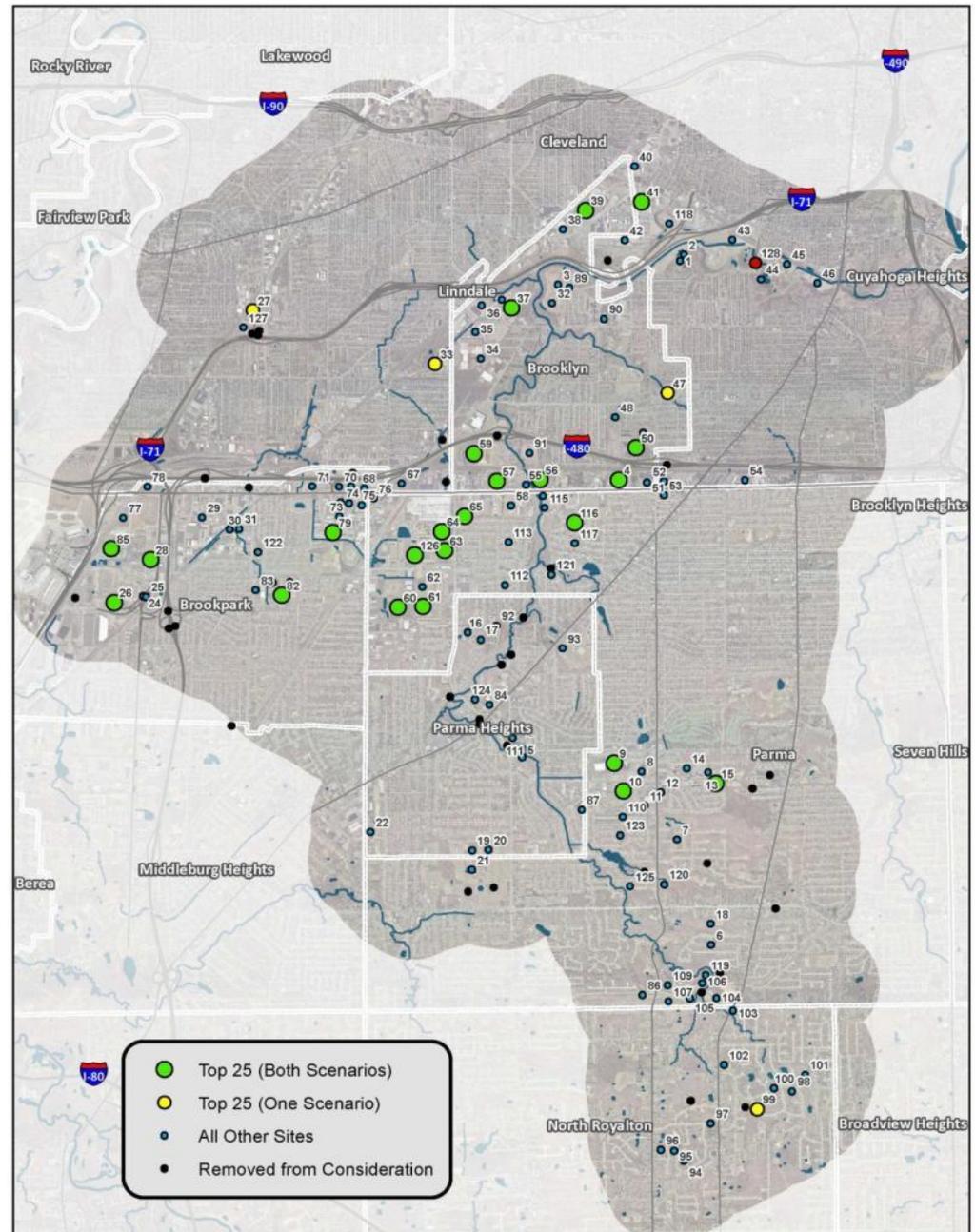


Task 1: Preliminary Screening

➤ Ranked sites under two scenarios by comparing them for each criteria:

- Impervious area
- Treatable area
- TSS loads
- Drainage area (scenario 1 only)

➤ Highway interchanges were excluded



Task 1:

Preliminary Screening Spreadsheet

Big Creek Watershed Project Site ID	OwnType	Balanced Growth Initiative Retrofit SITE ID	Owner Description	Rank Drainage Area	Rank Impervious Area	Rank TSS	Rank Treatment Area	Rank Scenario 1 (DA, IA, TSS, TA)	Rank Scenario 2 (IA, TSS, TA)
1	Public	BAS_16	CLEVELAND CITY OF	129	133	131	129	135	135
2	Public	BAS_15	CLEVELAND CITY OF	126	135	132	93	134	134
3	Public	BAS_23	BROOKLYN VILLAGE OF	27	132	10	68	66	89
4	Private	OUT_16-PRK_1	KMART CORPORATION	36	20	13	20	19	16
5	Private	OUT_4	CHURCH PARMA PARK REFORMED	116	120	82	98	126	128
6	Public	OUT_15	PARMA CITY OF	7	14	98	88	51	82
7	Public	BAS_20	PARMA CITY OF	22	57	115	70	78	105
8	Public	PRK_37	BD OF EDUCATION PARMA SCHOOL	76	64	36	67	67	66
9	Private	PRK_67	MAY STORES SEVENTY FOUR CORP	17	5	6	2	4	4
10	Private	PRK_66	GE DAY DRIVE, L.P.	50	27	16	17	21	16
11	Private	PRK_16	DAYTON HUDSON CORP	82	52	37	30	47	38
12	Private	PRK_38	RIDGE AND DAY PLAZA, LTD.	125	102	87	56	112	102
13	Public	BAS_55	PARMA CITY OF	73	80	38	85	78	81
14	Public	PRK_6-OUT_32	PARMA CITY OF	71	72	44	45	59	58
15	Public	BAS_21	PARMA CITY OF	2	3	4	33	5	9
16	Private	BAS_4-BAS_39	Big Creek Apt I, L.L.C.	47	35	57	110	63	76
17	Private	BAS_3	Big Creek Apts Ltd	67	67	70	117	94	106
18	Private	BAS_1	BARDOT'S LTD.	9	121	50	92	72	110
19	Public	PRK_39	CUYAHOGA COMMUNITY COLLEGE	83	70	42	24	53	43
20	Public	PRK_40	CUYAHOGA COMMUNITY COLLEGE	97	90	59	31	73	64
21	Public	BAS_42	CUYAHOGA COMMUNITY COLLEGE	92	126	52	32	80	77
22	Public	PRK_17	PARMA HEIGHTS LAND DEVELOPMEN	87	62	49	42	58	52
23	Private	PRK_12-BAS_6	T C PINNACLE PROP INC	85	61	45	33	53	45
24	Public	BAS_7	UNKNOWN - HIGHWAY	109	114	134	62	108	110
25	Public	BAS_59	UNKNOWN - HIGHWAY	130	117	134	92	111	111
26	Private	PRK_10	FORD MOTOR CO.	52	28	55	24	33	33
27	Private	PRK_63-BAS_12	NATIONAL CITY BANK	61	37	25	35	32	30
28	Private	PRK_9	FORD MOTOR CO FOUNDRY	28	12	23	6	9	9
29	Private	PRK_29	5160 W.161 LLC	98	78	86	50	79	75

Task 2: Field Assessment & Priority Ranking

- 20 locations consisting of 20+ retrofit sites
- Observed stormwater mgmt varied -- level of existing treatment became a critical factor when prioritizing sites
- ✓ Low Priority - Sites having BOTH water quality AND flood control
- ✓ Medium Priority - Sites providing water quality OR flood control
- ✓ High Priority - Sites with NO flood control OR water quality control



➤ Additional Task 2 criteria:

- Property owner interest
- Site constraints
- Environmental concerns
- Maintenance issues vs performance issues





Drainage Acres	2.6	Flood Treatment	100 %
Impervious Acres	1.7	Water Quality Treatment	100 %
TSS in Pounds	2,645	Demonstration Project?	No
General Findings: Site was recently renovated. Swale/basin in the rear appears to provide flood control and water quality treatment to the fire station runoff. Outflow is trying to carve stream channel into the valley to the north.			

Task 2: Field Assessment

- Ground-truthed Task 1 criteria
- Considered three additional criteria :
 - Percent of Ohio EPA water quality treatment provided
 - Percent of flood treatment provided
 - Good demonstration project



View of swale from parking lot

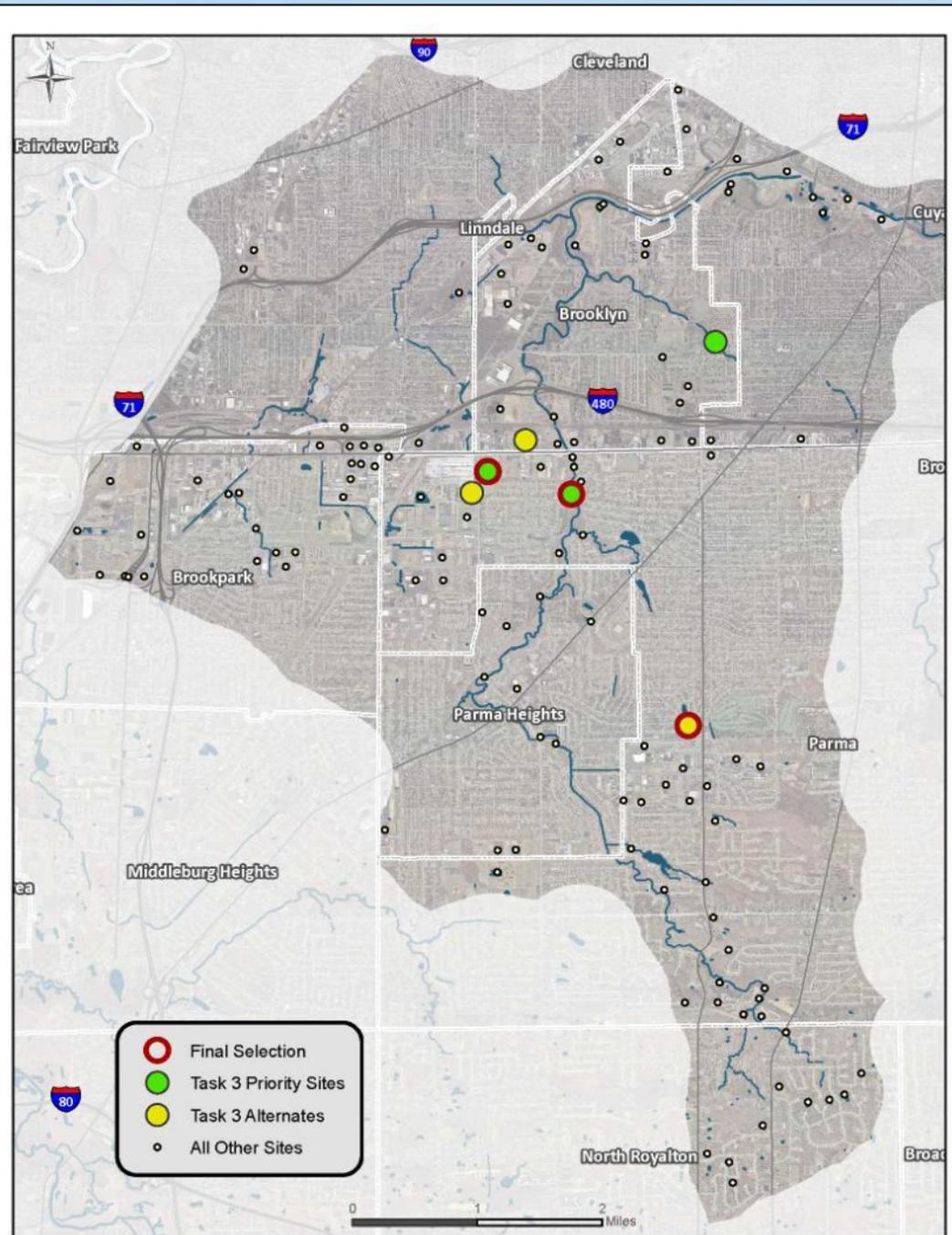


View downhill from swale

Proposed SW Retrofit Recommendation: **3** Comment: Site has potential to be a zero runoff site with modifications to the basin. Need a rigid stream design to safely convey basin outlet discharges to main tributary.

Task 2: Priority Ranking

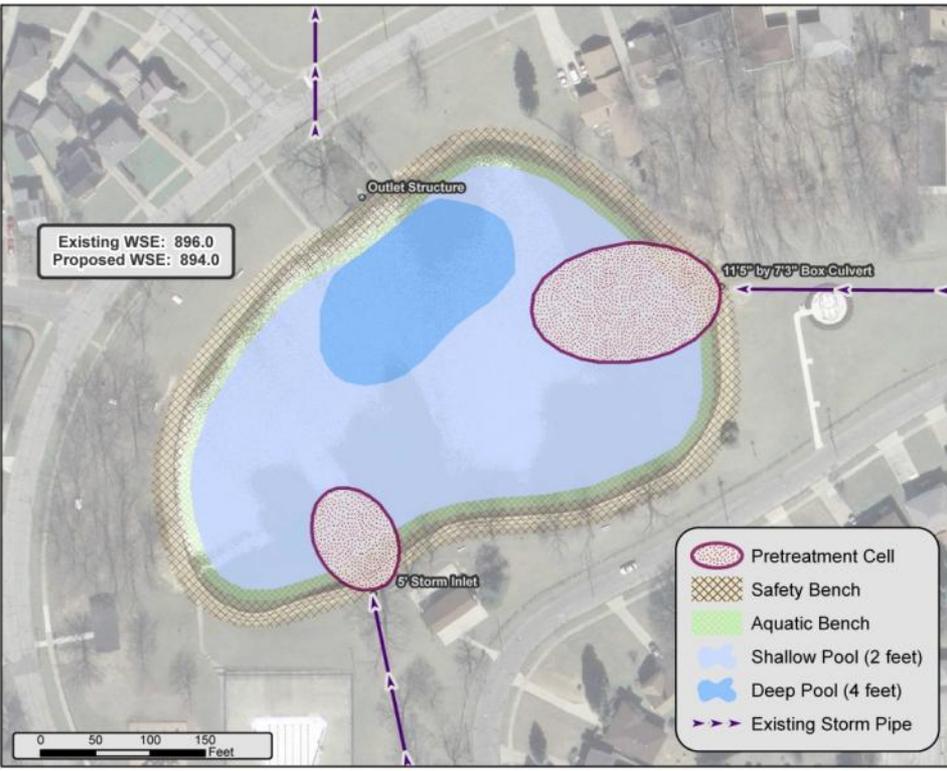
- Task 2 locations were initially prioritized into three groups:
 - Strong (4)
 - Fair (6)
 - Limited (9)
- Three primary sites were selected for conceptual design
- Three alternative/backup sites were also selected



Task 3: Conceptual Plans

- Contact landowners and discussed initial concepts to get preliminary feedback (e.g., presented concept plan to GM's E-Team)
- Presented draft conceptual plan to FOBC TAC.
- Final Conceptual Plans included:
 - Existing Conditions
 - Proposed Conditions
 - Field Photos
 - Retrofit Description
 - Concept drawing
 - Typical Details
 - Planning Level Cost Estimates

City of Parma: Upper Ridgewood Lakes Basin



Existing Conditions			
Drainage Acres	683.3	TN Load (lbs/year)	1,238.4
Impervious Acres	150.2	TP Load (lbs/year)	184.8
Flood / Water Quality Treatment	33 / 95 %	TSS Load (lbs/year)	110,173

General Finding: The pond receives a massive amount of water from a box culvert and 60" pipe. The reservoir appears to hold most of the drainage and has several feet of additional storage, but does overflow during exceptional storm events.

Proposed Conditions			
Existing Storage Volume (ac-ft)	10.6	Pretreatment Cells (SF)	4,566
Proposed Storage Volume (ac-ft)	16.1	Pool Area (SF)	115,527
Proposed Ohio EPA Water Quality Volume Met (%)	100%	Aquatic Bench (SF)	13,649
Additional Flood Control Volume (ac-ft)	5.2	Safety Bench (SF)	36,897
		TSS Load Reduction (lbs/year) in addition to current treatment conditions	11,017

Retrofit Description
 Two large inlets that feed into the detention pond will enter pretreatment cells, which will allow sediment to settle and provide vehicle access for targeted maintenance areas. The concrete steps that line the pond will be replaced with a smooth, earthen gradient, leading to an aquatic bench supporting various types of wetland vegetation. The pond will be excavated and the outlet structure modified to lower the permanent pond elevation, while providing 2 to 4 feet of depth and preserving the functionality of the overflow spillway.

Planning Level Cost Estimate*		
Total Cost	Lower Range \$1.1 million	Upper Range \$1.9 million
Sediment Removal Only	\$430,000	\$860,000
Cost per Square Foot	\$9.13	\$16.11

*Includes probable construction costs, design, survey, permitting, sediment testing, and a 25% contingency.

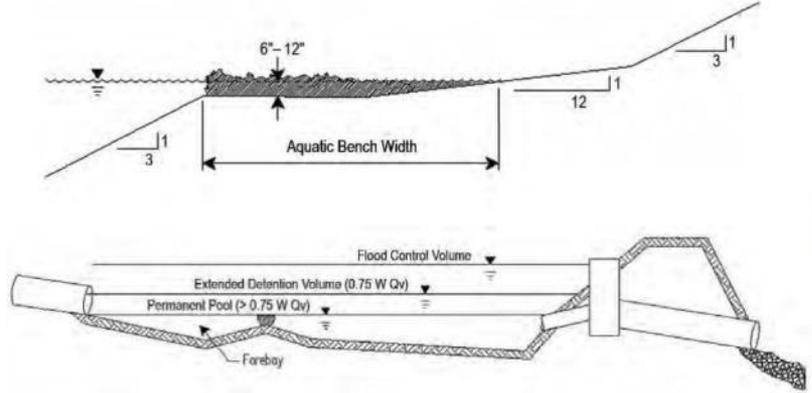


View of basin from western edge.



Overflow structure.

Assumed Existing (Proposed) Control Structure Elevations:
 - Emergency Spillway: 899.5 (899.5) msl
 - Secondary Spillway: 898.5 (898.5) msl
 - Primary Outlet (15" RCP): 896.0 (894.0) msl



General Motors: East Parking Lot



Existing Conditions			
Drainage Acres	24.3	TN Load (lbs/year)	114.0
Impervious Acres	20.3	TP Load (lbs/year)	31.5
Flood / Water Quality Treatment	0 / 0 %	TSS Load (lbs/year)	12,124

General Finding: Parking lot receives no treatment.

Proposed Conditions			
Existing Storage Volume (ac-ft)	0	Bioswale/Bioretenion (SF)	104,973
Proposed Storage Volume (ac-ft)	2.41	Green Paver (SF)	105,131
Proposed Ohio EPA Water Quality Volume Met (%)	100%	Parking Spaces (SF)	149,275
Additional Flood Control Volume (ac-ft)	1.75	TSS Load Reduction (lbs/year)	10,973
		TN Load Reduction (lbs/year)	59.7
		TP Load Reduction (lbs/year)	20.5

Retrofit Description
 The parking spaces will be aligned to improve safety for workers as they enter the facility. Bioswales, lined with trees and located between parking spaces, will guide stormwater runoff into numerous bioretention areas. The rear section of the parking lot will be surfaced with green pavers, allowing water to percolate directly into the ground. The proposed site includes over 800 parking spaces.

Planning Level Cost Estimate*		
	Lower Range	Upper Range
Total Cost	\$5.5 million	\$7.0 million
Cost per Square Foot	\$6.21	\$7.96

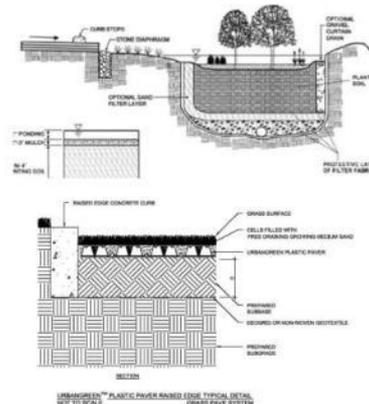
*Includes probable construction costs, design, survey, permitting, sediment testing, and a 25% contingency.



View of parking lot from east side, looking at employee entrance.

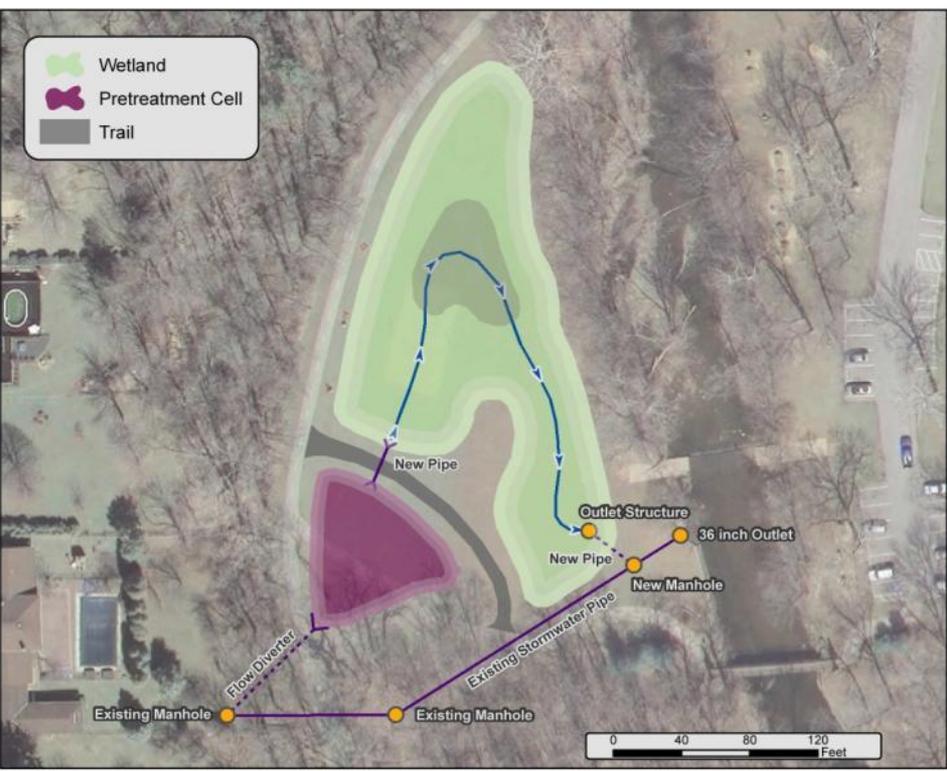


View of parking lot from east side, looking toward the back of the lot.



Cleveland Metroparks, Fernhill West Bank (Recently Awarded \$150,000 Cuyahoga SWIF Grant)

Friends of Big Creek: Big Creek Watershed Stormwater Retrofit and Ranking Project
 Conceptual Plan
 Site 113 (Cleveland Metroparks Upper Fern Hill - West Bank): Constructed Wetland



Existing Conditions		
Drainage Acres	50.8	TN Load (lbs/year) 136.1
Impervious Acres	15.2	TP Load (lbs/year) 20.2
Flood / Water Quality Treatment	0 / 0 %	TSS Load (lbs/year) 12,945

General Finding: 36 inch pipe enters directly into Big Creek just downstream of the bridge. There is a manhole on private property that would provide access to the pipe.

Proposed Conditions		
Existing Storage Volume (ac-ft)	0	Pretreatment Cell (SF) 5,701
Proposed Storage Volume (ac-ft)	0.77	Wetland (SF) 27,807
Proposed Ohio EPA Water Quality Volume Met (%)	100%	TSS Load Reduction (lbs/year) 10,744
Additional Flood Control Volume (ac-ft)	0.06	TN Load Reduction (lbs/year) 35.4
		TP Load Reduction (lbs/year) 8.7

Retrofit Description		
Runoff associated with small storm events will be diverted from an existing pipe into a pretreatment cell, which will allow sediment to fall out of suspension. Water will then meander through a constructed wetland, whose depth will be maintained by a flow control structure that empties into the existing stormwater pipe. Vehicle access will be provided to ensure ease of maintenance.		

Planning Level Cost Estimate*		
	Lower Range	Upper Range
Total Cost	\$192,000	\$304,000
Cost per Square Foot	\$5.73	\$9.08

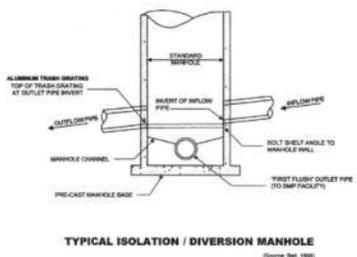
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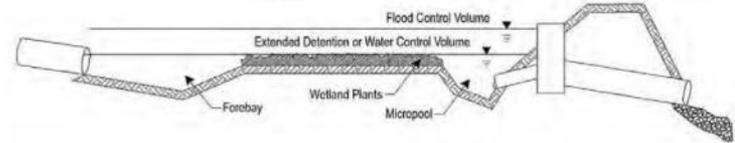
View of the site from trail.



Manhole leading to the underground pipe that will be diverted to treatment areas.



TYPICAL ISOLATION / DIVERSION MANHOLE
(Source: SM, 199)



Thank You!

For more information:

www.friendsofbigcreek.org

Friends of Big Creek

Big Creek Watershed Stormwater Retrofit Ranking Project

July 22, 2011



Submitted to:

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Submitted by:



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