TETRA TECH

To:	Bob Gardin, FOBC Mary Ellen Stasek, FOBC
From:	Jennifer Olson and George Remias, Tetra Tech
Subject:	**Big Creek Watershed Stormwater Retrofit Ranking Project - Summary Report**
Date:	March 30, 2012

Project Purpose

The Big Creek Watershed Stormwater Retrofit Ranking Project (Project) was initiated to help further the work completed as part of the Big Creek Watershed Balanced Growth Plan. The primary goal of this project was to in identify the optimal stormwater retrofit sites in the watershed that would achieve the following goals:

- Reduce runoff volume
- Reduce the stormwater peak flow rate
- Improve the overall water quality

The Project included three tasks:

- Task 1: Preliminary Screening – Conduct a desktop analysis to rank potential retrofit sites identified in the 2010 Big Creek Watershed Balanced Growth Plan.
- Task 2: Field Assessment and Priority Ranking – Conduct a field assessment for 20 to 30 potential retrofit sites, then rank the sites based upon additional criteria.
- Task 3: Conceptual Design and Cost Estimates – Prepare conceptual designs and cost estimates for up to four sites.

This memorandum briefly summarizes the scope and findings during each of the three tasks of the project, as well as some suggested next steps to further support the overall goals of the Project.

Background

At nearly 39 drainage square miles, the Big Creek watershed is one of the most urbanized and impervious tributaries to the Cuyahoga River. A total of six percent (2.5 square miles) of open space remains within this watershed. The Big Creek watershed encompasses the seven communities as shown in Figure 1.

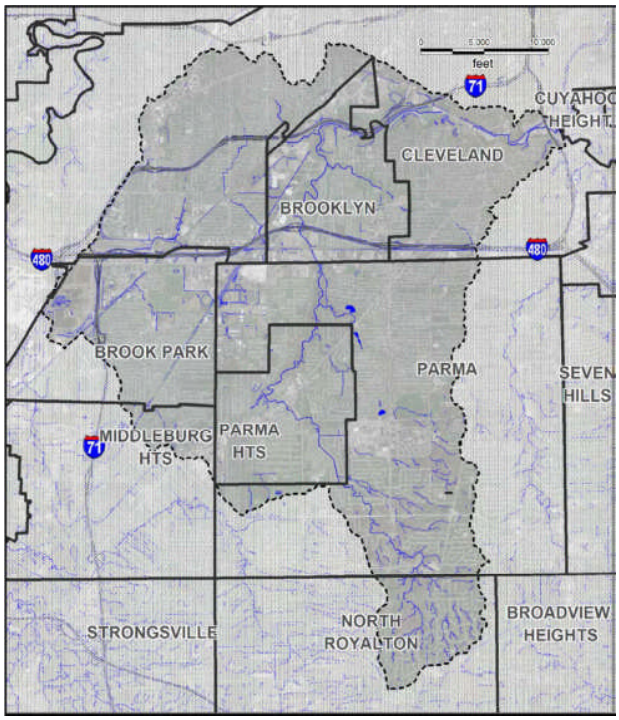


Figure 1. Big Creek Watershed (Big Creek Watershed Balanced Growth Plan, 2010)

Along the nearly 12 miles of stream length, Big Creek's original drainage pattern, wetlands, floodplain, and riparian areas have been severely altered and replaced with concrete lined channelized streams, long culverted segments, spillway structures, significant development and encroachment within the floodplain. Consequently, the surface runoff has increased in total volume, peak rates, and pollutant loads while groundwater recharge and base flow conditions have decreased.

In 2006, Friends of Big Creek (FOBC), with support from the Cuyahoga River Community Planning Organization, developed a Balanced Growth Plan Big Creek Watershed. The plan discusses that a conservation or restoration strategy can include implementation of structural (e.g., stormwater basin) and non-structural (e.g., preservation) practices to improve stream health and reduce erosion and stormwater runoff. It also goes on to suggest that structural restoration practices such as stormwater retrofits are more effective in urban watersheds such as Big Creek.

As part of the 2010 Big Creek Watershed Balanced Growth Plan, 156 potential retrofit sites were identified and organized into four categories:

- 69 Large parking lots > 5 acres
- 35 Modified existing dry basins
- 46 New storage below outfalls
- 6 Storage areas at highway interchanges

Task 1: Preliminary Screening

Task 1 primarily focused on conducting a GIS desktop analysis of the existing 156 potential stormwater retrofit sites and identifying the top 20 to 30 sites. Because the Big Creek Watershed Balanced Growth Plan already conducted a desktop GIS analysis to identify 156 potential stormwater retrofit sites, additional criteria were defined under Task 1 to further screen the sites.

The Task 1 criteria used to conduct the desktop GIS analysis included:

- Drainage Area – area that drains to a retrofit site
- Impervious Area – impervious area within the drainage area
- Estimated Annual Total Suspended Solids (TSS) Loads – estimated pollutant load within the drainage area
- Treatment Area – area at the retrofit site that can be used to treat from the contributing drainage area

Each criterion was defined for each site using available GIS data. The drainage area was calculated using available GIS data sets including the 2006 Cuyahoga County topographic and aerial photo data, Northeast Ohio Regional Sewer District's (NEORSD) and available municipal stormwater GIS datasets, NEORSD's RIDE Study Big Creek watershed model catchments, and best professional judgment. Figure 2 shows an example of a drainage area delineated for one of the sites.

Impervious area was estimated within the drainage area by using NEORSD impervious data for the Big Creek watershed. Estimated annual TSS loads were estimated for each land cover type using unit area loadings as summarized in Figure 3 which also presents the land cover in the watershed.

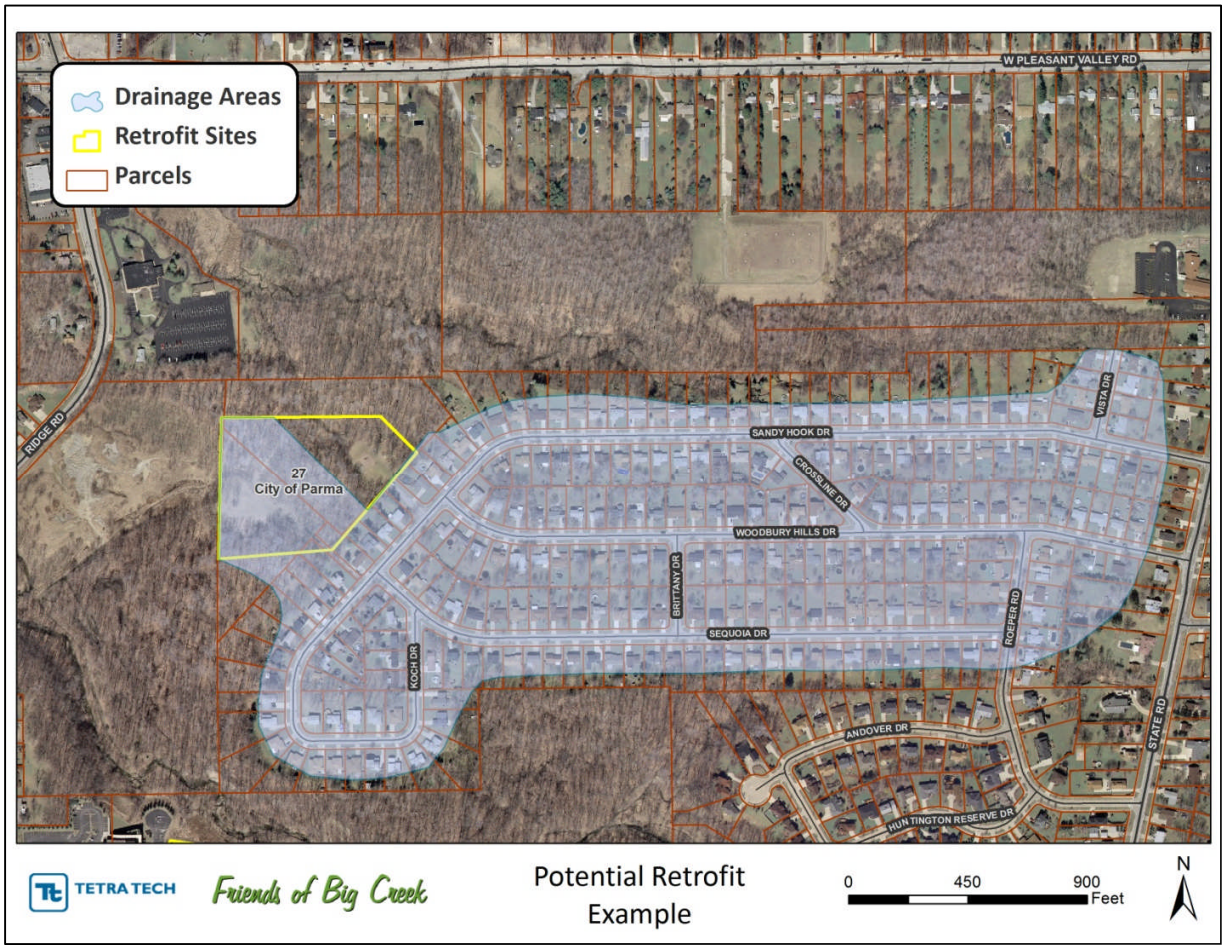


Figure 2.Drainage area delineation example.

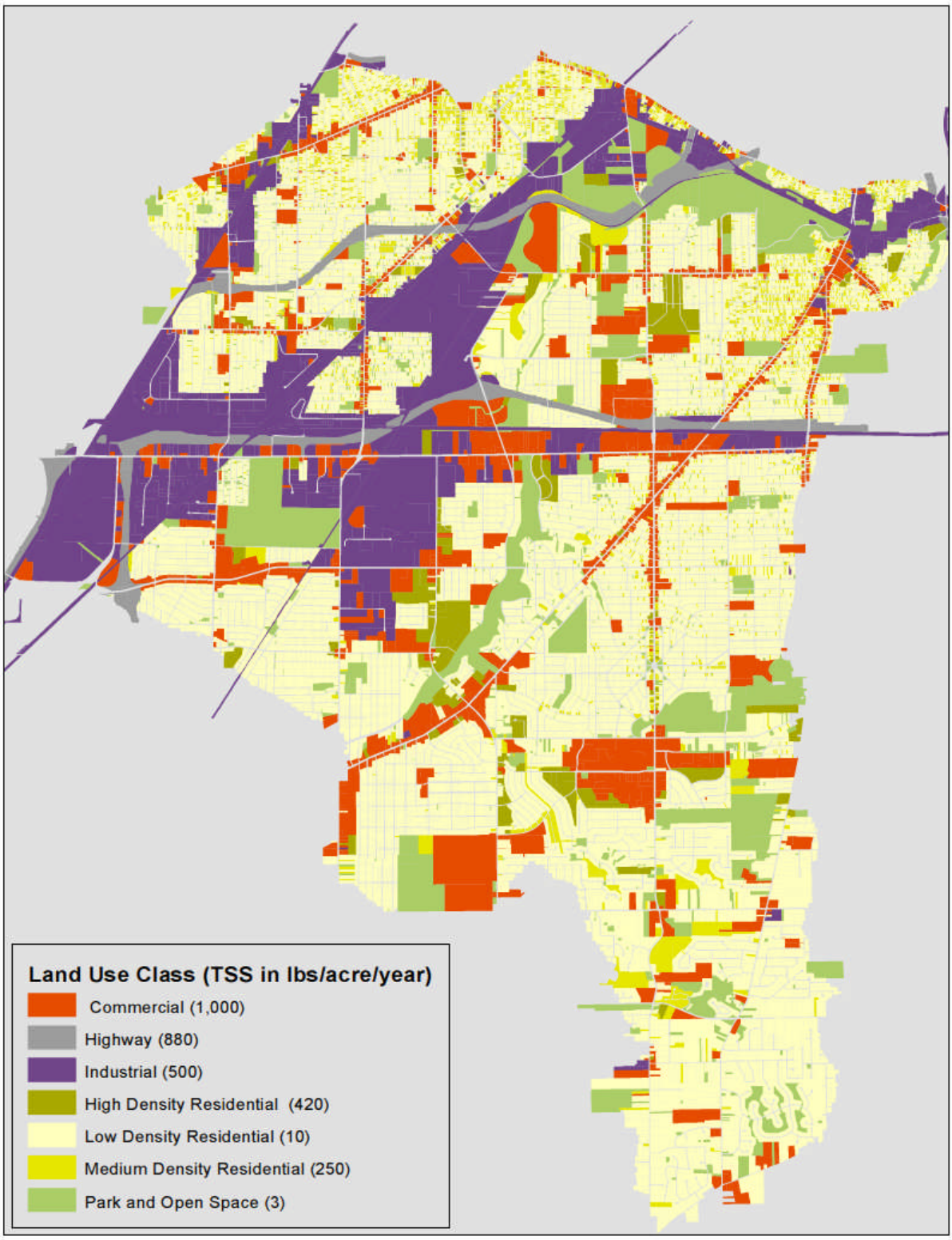


Figure 3. Land cover categories and annual TSS load estimates (land cover data provided by Cuyahoga County, TSS loading rates provided by Pollutant Removal Database, 2nd Edition, 2000).

The treatment area was calculated by looking at the available parcel area and defining the area that could be used for treatment. Some key assumptions included:

- 50 percent of the parking lot impervious area could be retrofitted
- 50 percent of existing detention ponds could be optimized for on-site treatment, since the level of treatment provided by the pond was unknown

The six storage areas at highway interchange retrofit sites are owned by ODOT. ODOT was contacted to determine level of interest in participating in any retrofit projects and it was determined that the sites in the Big Creek watershed were not a high priority for ODOT nor was there interest in pursuing a stormwater retrofit at these locations. The six sites were further excluded from consideration as Task 2 sites.

During the Task 1 evaluation, it was commonly noted that there was more than one potential retrofit on a parcel, (see Figure 4 for examples). In these cases, the overall site was evaluated in place of the specific stormwater retrofits.

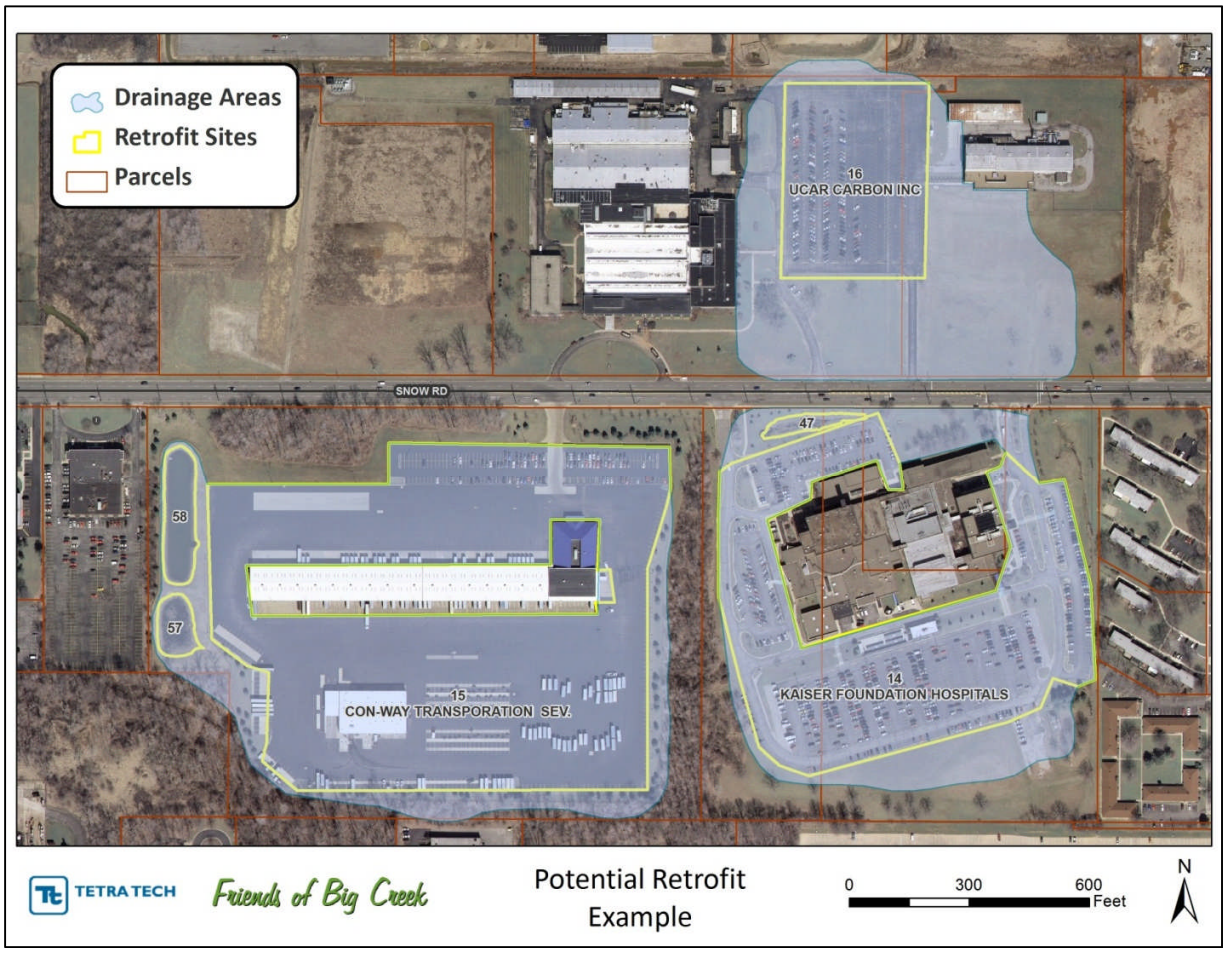


Figure 4. Example of locations that have multiple stormwater retrofit sites.

Each site was evaluated and ranked based on the Task 1 criteria. Two separate scenarios were evaluated under Task 1 including:

- Scenario 1: Equally weight the four criteria
- Scenario 2: Equally weight three criteria excluding drainage area

A second scenario was considered in addition to Scenario 1 since both drainage area and impervious area are indicators of runoff volume and peak flow rate, so considering both was considered potentially skewing the site rankings to those two water quantity-based criteria, while minimizing the water quality and treatment capacity criteria. However, the site rankings had minor variation between the two scenarios. Sites were ranked from first to last, with the highest ranking sites having the highest combined ranking of runoff volume, peak flow rate, and pollutant load, while providing the largest area to treat the runoff.

Figure 5 presents the results of Task 1 site ranking and Appendix A includes the tabular results. The top 28 potential stormwater retrofits (within 16 sites due to multiple potential stormwater retrofits being on the same parcel for a few locations) were chosen for further evaluation under Task 2. Additional information on Task 1 is described in the FOBC Big Creek Watershed Stormwater Retrofit and Ranking Project memorandum titled: “GIS Data Needs”.

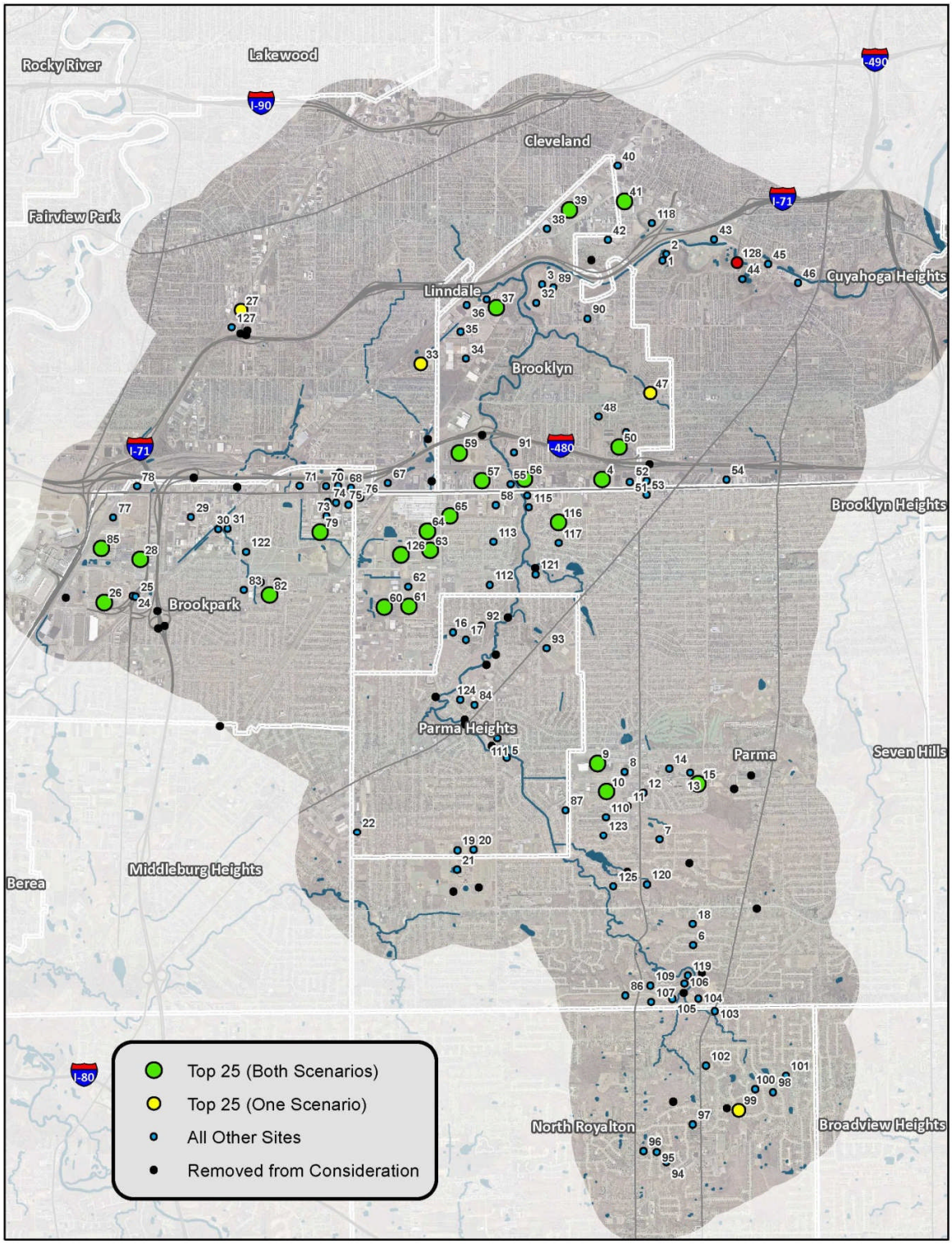


Figure 5. Task 1 site rankings.

Task 2: Field Assessment and Priority Ranking

Task 2 focused on the following general activities:

- Conduct field reconnaissance of 20 to 30 sites
- Define additional criteria to compare and prioritize each of the X sites being further evaluated
- Develop and implement a methodology to rank the Task 2 sites

Prior to field reconnaissance, the majority of property owners were contacted to discuss the goals and purpose of the Project, request access to their property, collect additional information regarding the site (including drainage plans and/or utility plans), and discuss interest in participating in the Project. Property owners who indicated no interest in granting property access were replaced with additional retrofit sites evaluated under Task 1. Field reconnaissance was conducted at 16 locations that included 27 potential stormwater retrofit sites (Appendix B). Figure 6 presents an example of the field form filled out for each Task 2 site.

The primary criteria used to consider Task 2 sites included:

- Estimated percent of on-site Ohio EPA water quality treatment
- Estimated percent of on-site flood treatment
- Potential demonstration project site

The percent of on-site Ohio EPA water quality treatment and on-site flood treatment was estimated by reviewing available design drawings, plan reviews, stakeholder information, date of construction, on-site field assessment, and best professional judgment. The potential as a demonstration project site was defined in coordination with FOBC and the TAC.

Additional factors used to consider each site included:

- Property ownership interest
- Site constraints
- Environmental constraints
- If retrofits were needed to address maintenance or performance issues

The Task 2 sites were given an initial recommendation by the Consultant's by considering the factors described above, while strong consideration to the current treatment on-site:
-Strong Recommendation
-Fair Recommendation
-Limited Recommendation

Appendix C includes the field summary for the Task 2 sites and their initial Consultant prioritization recommendation.

The Task 2 sites were presented to the TAC for further consideration and three primary sites were selected to develop conceptual plans (Table 1). Three alternate sites were also selected in case any primary site was not considered viable upon further evaluation.

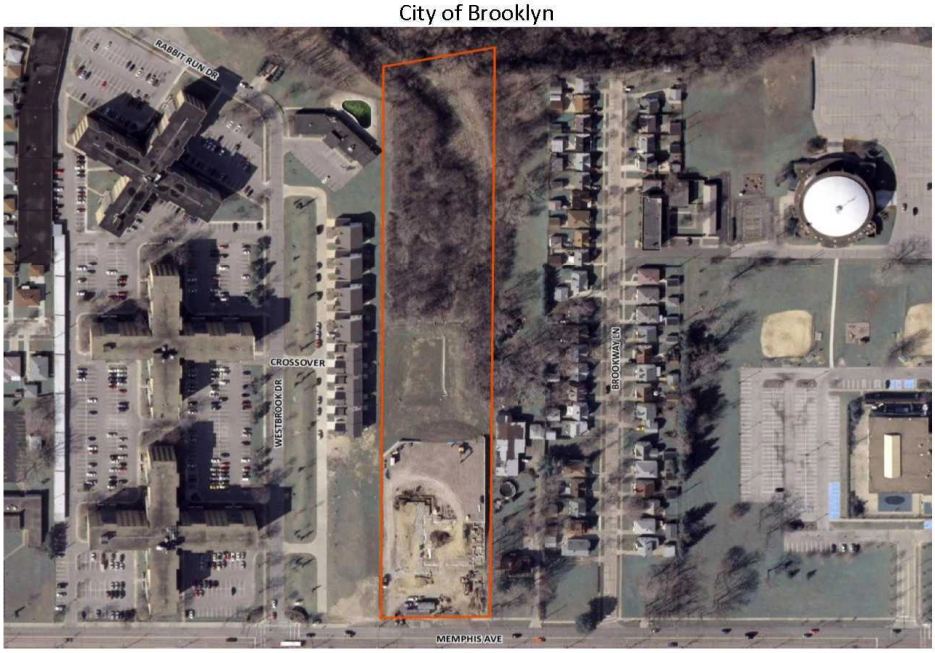
Table 1. Selected sites for Task 3

Primary Sites	Alternate Sites
Site 47 (Biddulph Plaza)	Site 113 (Upper Ridgewood Lakes Basin)
Site 15 (Fern Hill West Bank)	Site 57 (Home Depot)
Site 65 (GM East Parking Lot)	Site 64 (GM South Parking Lot)

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization

Site 90: Brooklyn Fire Station

City of Brooklyn



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.			

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.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

Figure 6. Example field form.

Task 3: Conceptual Designs and Cost Estimates

Task 3 consisted of developing conceptual designs and cost estimates for three sites.

Figure 7 presents the summary of what sites conceptual plans were prepared under Task 3, as well as the general rankings of remaining sites.

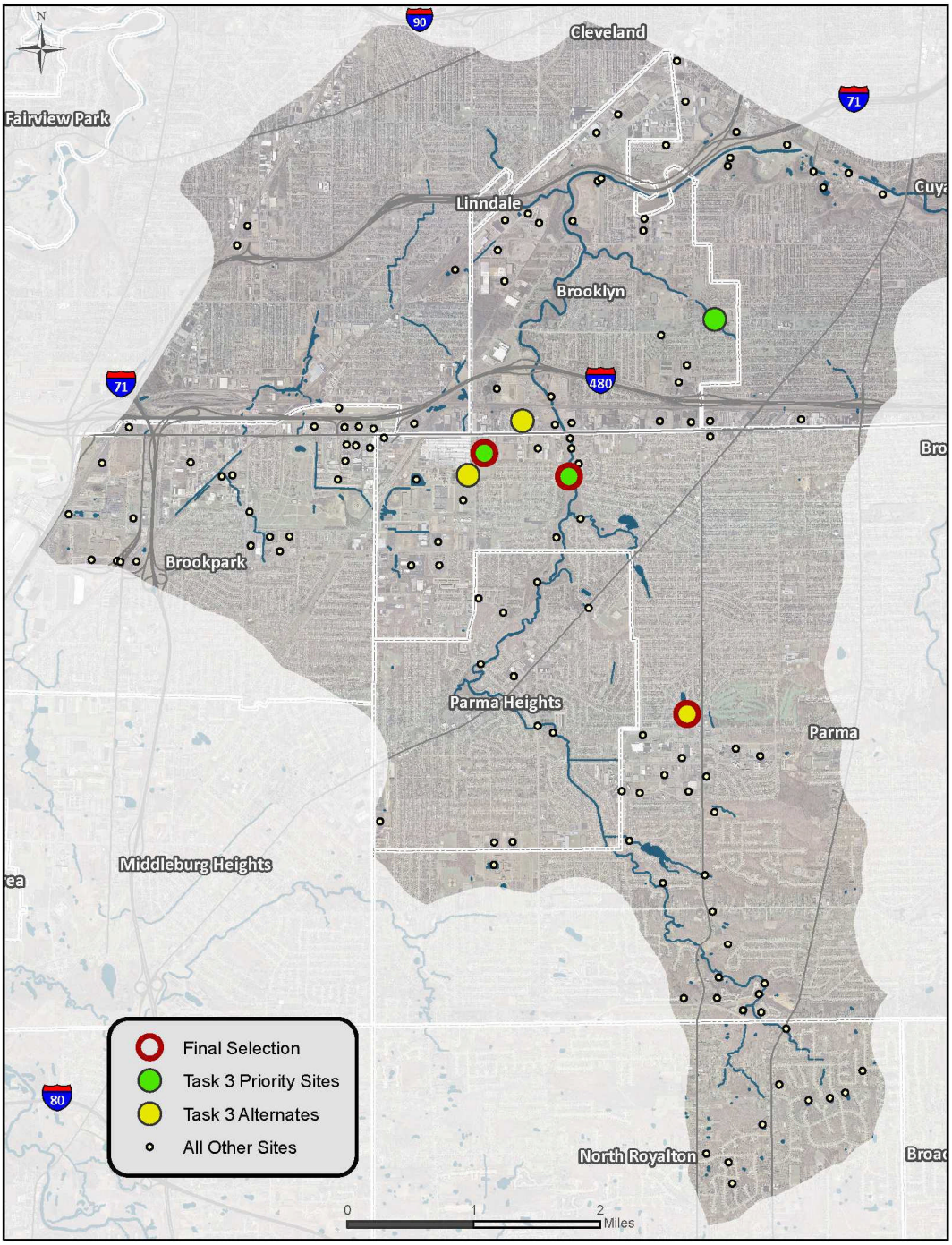


Figure 7. Final Site Rankings.

Prior to developing conceptual plans, the property owner for each of the three primary sites was again contacted to determine their willingness to proceed with the concept plan, request available information, and discuss overall interest in the eventual construction of the retrofit. Primary Site 47 (Biddulph Plaza) was replaced with Site 113 (Upper Ridgewood Lakes Basin) due to lack of response by the property owner.

Development of the conceptual plans included evaluating the effectiveness of a suite of potential best management practices which could be used to retrofit each site. In addition, site and environmental constraints and usefulness as a demonstration project were considered as well as co-benefits that could be achieved through the design such as increasing safety and providing shade.

A draft conceptual plan was developed and shared with FOBC, TAC, and the property owner prior to finalization. Figures 8, 9, and 10 present the proposed conceptual plans with several attributes including:

- Existing conditions
- Proposed conditions
- Retrofit description
- Cost estimate

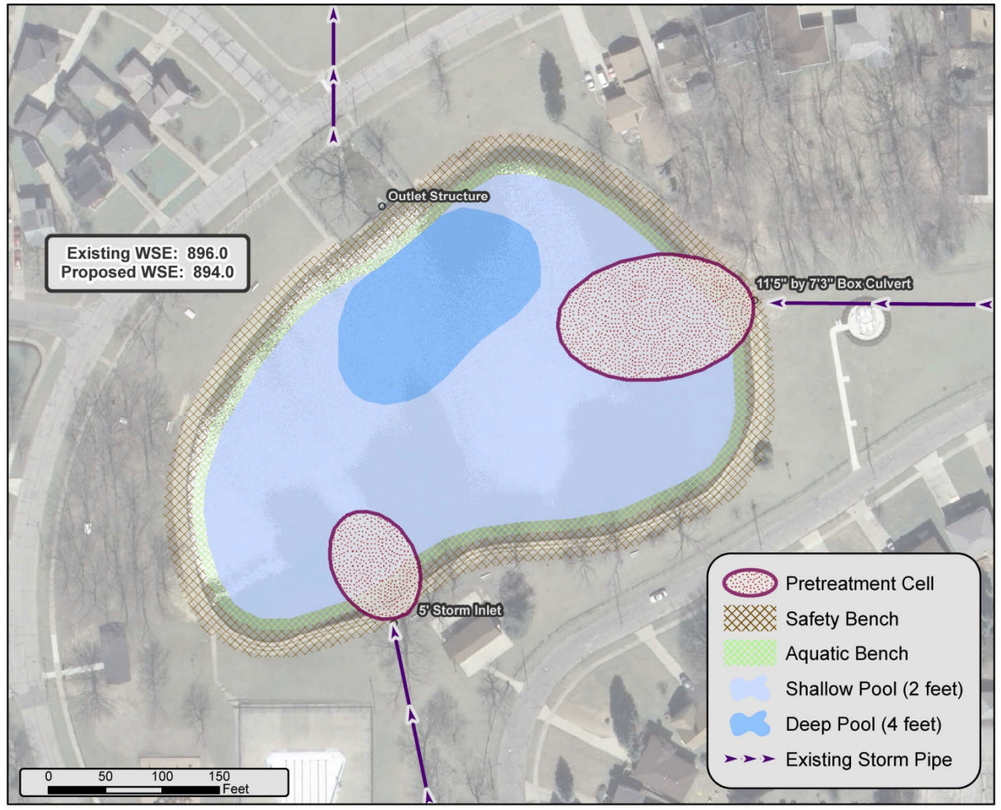
Each site is discussed below including features of the proposed stormwater retrofits, cost estimates, and assumptions.

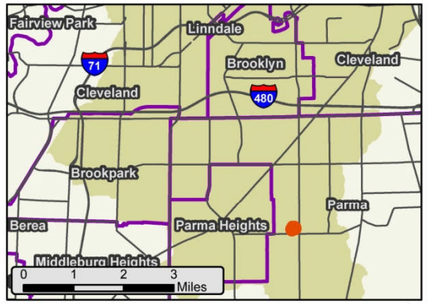
Site 15 - City of Parma: Upper Ridgewood Lakes Basin, Parma, OH

Site 15 is a proposed retrofit of an existing detention basin located in the City of Parma. Using the Ohio EPA water quality volume sizing criteria, the existing 3.4-acre detention basin appears to provide the Ohio EPA water quality volume in addition to providing minor flood control. The goal of the retrofit is to increase flood control, maintain water quality treatment, naturalize the basin, and provide increased accessibility for maintenance.

The proposed retrofit includes lowering the current water elevation by two feet while still maintaining the Ohio EPA water quality control requirement, while providing nearly double the amount of flood control compared to existing conditions (Figure 8). The retrofit includes pretreatment cells to focus sedimentation and allow for routine maintenance. In addition, the retrofit includes removing the existing concrete steps around the basin perimeter and replacing it with a safety bench and an aquatic bench to improve water quality.

The conceptual planning level cost estimate for this stormwater retrofit ranges between $1.1M and $1.9M, and includes probable construction costs, design, survey, permitting, minor sediment testing, and a 25 percent contingency. The largest unknown is regarding the existing sediment volume and environmental makeup of the sediment, which is a large majority of the cost. The lower cost range assumes 2feet of sediment removal (approximately 8,600 cubic yards) is required at a cost of approximately $430,000, while the upper cost range assumes 4 feet of sediment removal (approximately 17,100 cubic yards) at approximate cost of $860,000. Both cost estimates assume the sediment is clean and does not require special handling or disposal. The overall cost per square foot for this stormwater retrofit conceptual planning level cost estimate ranges from $9.13 to $16.11 per square foot.





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		Aquatic Bench (SF)	13,649
Quality Volume Met (%)	100%	Safety Bench (SF)	36,897
Additional Flood Control		TSS Load Reduction (lbs/year)	11,017
Volume (ac-ft)	5.2	in addition to current treatment conditions	

Retrofit Description

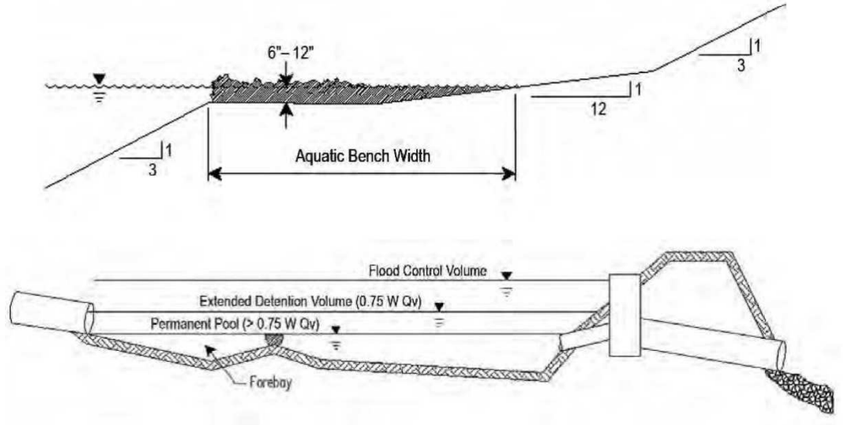
Two large inlets that feed into the detention pond will enter pretreatment cells, which will allow sediment to settle and provide vehicle access for targeted maintenance areas. The concrete steps that line the pond will be replaced with a smooth, earthen gradient, leading to an aquatic bench supporting 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*		
	Lower Range	Upper Range
Total Cost	$1.1 million	$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.

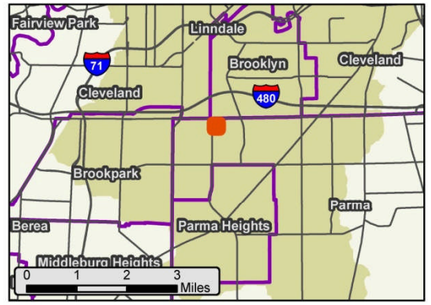
Overflow structure.



Friends of Big Creek: Big CreekWatershed Stormwater Retrofit and Ranking Project
Conceptual Plan
Site 15 (Ridgewood Lake): Wet Extended Detention Basin and Aquatic Bench

Friends of Big Creek
TETRA TECH

Figure 8. Site 15 –Upper Ridgewood Lake concept plan.



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

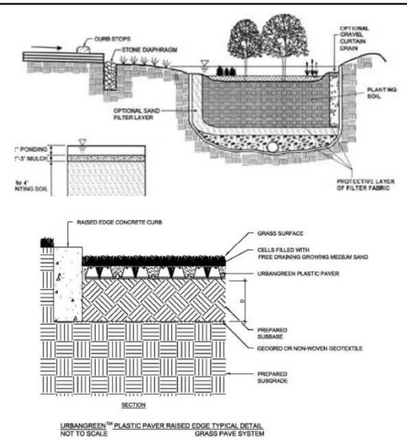
Planning Level Cost Estimate*

	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.



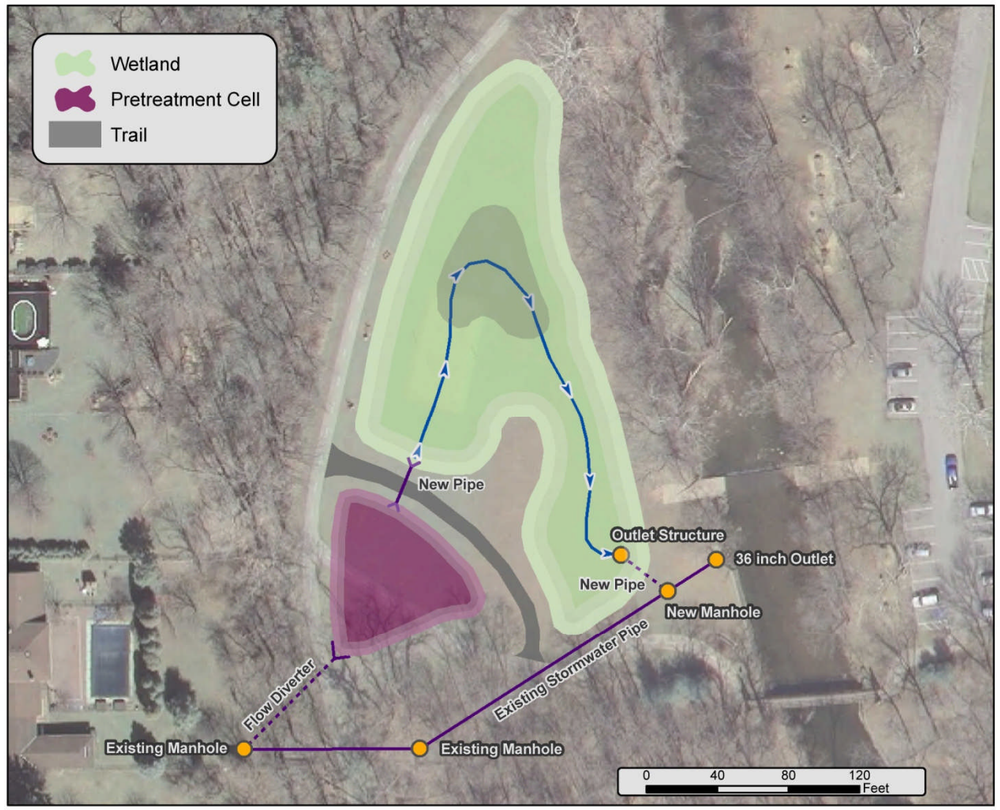
URBANGREEN™ PLASTIC PAVER RAISED EDGE TYPICAL DETAIL
NOT TO SCALE GRASS PAVE SYSTEM

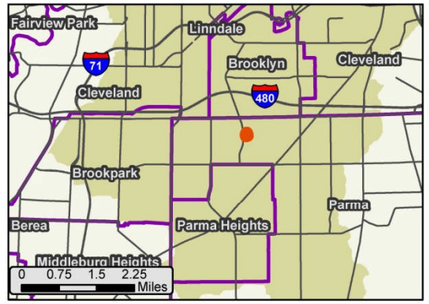
Friends of Big Creek: Big CreekWatershed Stormwater Retrofit and Ranking Project
Conceptual Plan
Site 65 (General Motors Employee Parking Lot): Bioswales/Bioretention and Green Pavers

Friends of Big Creek

TETRA TECH

Figure 9. Site 65 – GM East parking lot concept plan.





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		TSS Load Reduction (lbs/year)	10,744
Quality Volume Met (%)	100%	TN Load Reduction (lbs/year)	35.4
Additional Flood Control		TP Load Reduction (lbs/year)	8.7
Volume (ac-ft)	0.06		

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.

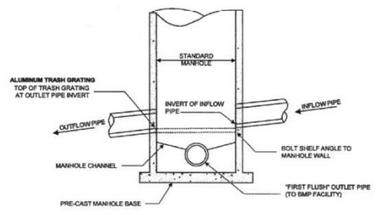
Planning Level Cost Estimate*

	Lower Range	Upper Range
Total Cost	$192,000	$304,000
Cost per Square Foot	$5.73	$9.08

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

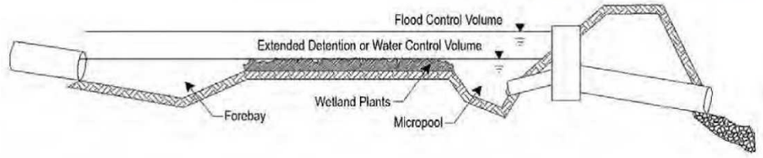
View of the site from trail.

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



TYPICAL ISOLATION / DIVERSION MANHOLE

(Source: Bell, 1998)



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

Friends of Big Creek

TETRA TECH

Figure 10. Site 113 - Fernhill wetland concept plan.

Site 65 - General Motors: East Parking Lot, Parma, OH
Site 65 is a proposed stormwater retrofit of an existing General Motors parking lot that is over 20-acres in size (Figure 9). There is currently no water quality treatment, flood control, or rate control on-site. The goals of the retrofit project include reducing impervious area, providing water quality treatment and volume control, providing shade for the parking lot to minimize thermal impacts, and improving the safety for pedestrians. The proposed design would fully provide the Ohio EPA water quality volume, as well as provide significant on-site flood control treatment.

The concept design includes realigning the parking spaces so the employees have parking lanes that allow for a direct route from their cars to the entrance to the Chevy Boulevard employee entrance, thereby reducing the time it takes to walk from the cars and improving pedestrian safety. The parking spaces will be separated by green space that includes bioswales which includes trees. Three larger bioretention areas are also proposed to treat runoff being delivered via bioswales. The proposed retrofit also includes providing green pavers in the east side of the parking lot to serve parking overflow.105,000 square feet of bioretention and bioswales are included in the concept design, as well as an additional 105,000 square feet of green pavers. The remaining 674,000 square feet of parking spaces is assumed to be either resurfaced or entirely reconstructed.

The conceptual planning level cost estimate for this proposed stormwater retrofit ranges between $5.5M and $7.0M and includes probable construction costs, design, survey, permitting, and a 25 percent contingency. The lower cost estimate assumes the existing parking surface remains and that asphalt only requires resurfacing, whereas the higher cost estimate assumes reconstruction of the parking surface. The overall cost per square foot for this stormwater retrofit conceptual planning level cost estimate ranges from $6.21 to $7.96 per square foot based upon the 20.3-acre parking lot retrofit.

Site 113 - Cleveland Metroparks: Fernhill Wetland, Parma, OH
Site 113 is a proposed stormwater retrofit at the downstream outlet of a 50.8 acre watershed which currently has no known water quality, flood control, or rate control treatment (Figure 10). The goal of the retrofit is to provide water quality treatment meeting the Ohio EPA's water quality volume while creating a public amenity adjacent to Big Creek. A stormwater wetland retrofit was chosen as it represents a habitat that would be common adjacent to a stream and provides for a demonstration opportunity of this habitat type in the city, which is fairly uncommon.

The retrofit includes modification to an existing 36-inch storm sewer that discharges directly to Big Creek. The proposed retrofit includes diverting the first ¾-inch of rainfall to a newly constructed pretreatment basin and wetland within the Cleveland Metroparks property prior to discharging back into the existing 36-inch storm sewer. A trail between the pretreatment cell and wetland is proposed to connect to existing trails and provide for maintenance access.

The conceptual planning level cost estimate for this stormwater retrofit ranges between $192,000 and $304,000 and includes probable construction costs, design, survey, permitting, and a 25 percent contingency. The lower cost range assumes a riprap-lined pre-treatment cell bottom, a minor flow diversion structure, and a mix of seed and plugs for the wetland planting. The upper cost range assumes a concrete-lined pretreatment cell bottom, more extensive flow diversion structure, and plugs for the majority of wetland plantings. The overall cost per square foot for this stormwater retrofit conceptual planning level cost estimate ranges from $5.73 to $9.08 per square foot based upon the size of the wetland and pre-treatment cell.

Next Steps

To further support the goals of this project and FOBC, Tt recommends the following ideas be further considered:

- Task 1: Consider different types of stormwater retrofits under Task 1, e.g., source control retrofits rather than storage below outfall and sites that could greatly benefit from the NEORSD Stormwater Management Program (SMP) credit program. In addition, consider smaller scale

projects to allow for a variety of funding opportunities.

- Task 2: Conduct Task 2 field assessment and prioritization for additional Task 1 sites.

- Task 3: Seek funding to support implementing the Task 3 conceptual designs, which may include considering the following:
    - Fern Hill Constructed Wetland - Ohio Surface Water Improvement Fund.
    - Upper Ridgewood Lakes Basin – NEORSD SMP
    - GM Parking Lot – Great Lakes Restoration Initiative grant.

Additional coordination with local municipalities and stakeholders is also recommended, so new data, projects, and funding initiatives are shared.

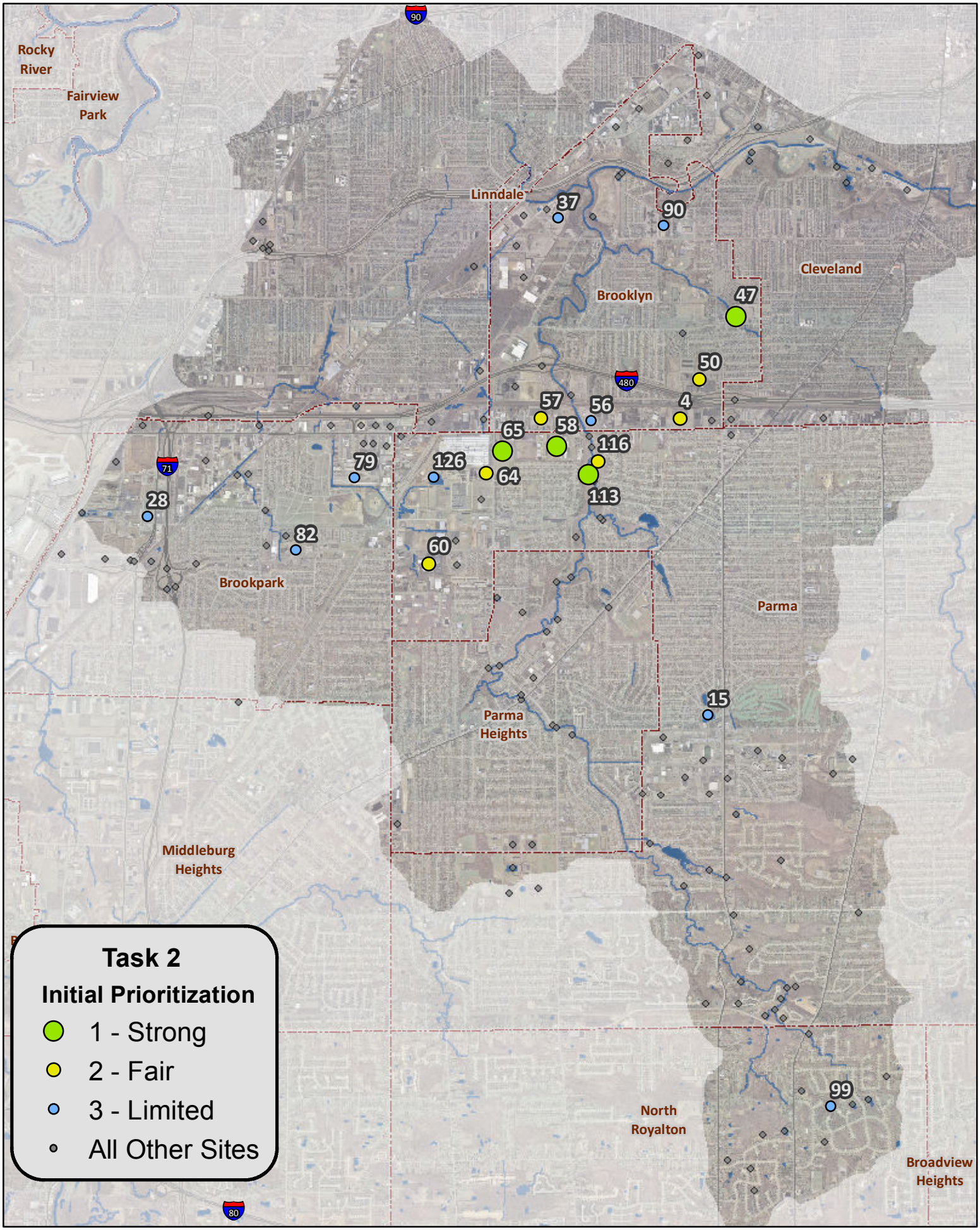
Appendix A. Task 1 Ranking

Big Creek Watershed Project Site ID	OwnType	Balanced Growth Initiative Retrofit SITE ID	Owner Description	Drainage Area (ac)	Impervious Area (ac)	TSS (lbs/yr)	Treatment Area (ac)	Treatment Area (ac) (2:1 pkg lot)	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	2.8	0.0	10	0.2	0.19	129	133	131	129	135	135
2	Public	BAS_15	CLEVELAND CITY OF	3.3	0.0	10	1.2	1.18	126	135	132	93	134	134
3	Public	BAS_23	BROOKLYN VILLAGE OF	32.0	0.0	32,910	2.6	2.61	27	132	10	68	66	89
4	Private	OUT_16-PRK_1	KMART CORPORATION	21.4	17.0	21,396	13.7	8.96	36	20	13	20	19	16
5	Private	OUT_4	CHURCH PARMA PARK REFORMED	4.7	0.7	3,941	0.8	0.78	116	120	82	98	126	128
6	Public	OUT_15	PARMA CITY OF	83.6	22.0	2,093	1.3	1.29	7	14	98	88	51	82
7	Public	BAS_20	PARMA CITY OF	36.6	8.5	309	2.4	2.39	22	57	115	70	78	105
8	Public	PRK_37	BD OF EDUCATION PARMA SCHOOL	9.8	7.6	9,719	4.4	2.60	76	64	36	67	67	66
9	Private	PRK_67	MAY STORES SEVENTY FOUR CORP	44.2	42.6	44,014	49.9	29.24	17	5	6	2	4	4
10	Private	PRK_66	GE DAY DRIVE, L.P.	16.1	14.6	16,096	15.6	9.53	50	27	16	17	21	16
11	Private	PRK_16	DAYTON HUDSON CORP	9.3	8.9	9,341	10.4	6.87	82	52	37	30	47	38
12	Private	PRK_38	RIDGE AND DAY PLAZA, LTD.	3.4	3.2	3,394	5.1	3.39	125	102	87	56	112	102
13	Public	BAS_55	PARMA CITY OF	10.1	5.3	9,337	0.9	0.94	73	80	38	85	78	81
14	Public	PRK_6-OUT_32	PARMA CITY OF	10.4	6.1	9,030	7.2	4.27	71	72	44	45	59	58
15	Public	BAS_21	PARMA CITY OF	683.3	150.2	105,980	6.3	6.25	2	3	4	33	5	9
16	Private	BAS_4-BAS_39	Big Creek Apt I, L.L.C.	17.2	11.2	7,215	0.2	0.21	47	35	57	110	63	76
17	Private	BAS_3	Big Creek Apts Ltd	11.5	7.0	4,935	0.1	0.12	67	67	70	117	94	106
18	Private	BAS_1	BARDOT'S LTD.	72.8	0.6	8,309	0.7	0.69	9	121	50	92	72	110
19	Public	PRK_39	CUYAHOGA COMMUNITY COLLEGE	9.2	6.4	9,159	12.1	8.01	83	70	42	24	53	43
20	Public	PRK_40	CUYAHOGA COMMUNITY COLLEGE	6.9	4.5	6,907	9.2	6.28	97	90	59	31	73	64
21	Public	BAS_42	CUYAHOGA COMMUNITY COLLEGE	7.8	0.4	7,818	5.9	5.94	92	126	52	32	80	77
22	Public	PRK_17	PARMA HEIGHTS LAND DEVELOPMEN	8.4	8.0	8,419	7	4.19	87	62	49	42	58	52
23	Private	PRK_12-BAS_6	T C PINNACLE PROP INC	9.0	8.0	8,953	9.7	5.72	85	61	45	33	53	45
24	Public	BAS_7	UNKNOWN - HIGHWAY	5.4	1.4	0	2	1.99	109	114	134	62	108	110
25	Public	BAS_59	UNKNOWN - HIGHWAY	2.4	1.1	0	0.4	0.41	130	117	134	92	111	111
26	Private	PRK_10	FORD MOTOR CO.	15.4	14.6	7,678	13.5	7.94	52	28	55	24	33	33
27	Private	PRK_63-BAS_12	NATIONAL CITY BANK	12.6	10.9	12,516	10.6	5.29	61	37	25	35	32	30
28	Private	PRK_9	FORD MOTOR CO FOUNDRY	26.8	23.2	13,386	29.7	19.76	28	12	23	6	9	9
29	Private	PRK_29	5160 W.161 LLC	6.8	5.4	3,413	5.4	2.96	98	78	86	50	79	75
30	Private	BAS_62	T C PINNACLE CORP	0.7	0.4	355	0.6	0.64	135	123	112	82	106	106
31	Private	PRK_59	T C PINNACLE CORP	5.4	5.1	2,802	5.6	3.35	109	82	91	46	84	76
32	Public	BAS_26	BROOKLYN VILLAGE OF	24.1	0.4	24,218	0.2	0.23	32	124	12	94	63	79
33	Private	BAS_11-BAS_14	ARAMS FAMILY PROP LLC	95.7	42.3	47,821	0.9	0.85	6	6	5	74	16	25
34	Private	PRK_49	AMERICAN GREETING CORP	15.4	8.4	7,722	10.4	6.83	52	58	54	27	39	41
35	Private	PRK_48	AMERICAN GREETING CORP	11.5	8.8	5,743	13	8.70	67	53	65	18	41	39
36	Private	PRK_31	GATEWAY PARK	6.2	6.1	6,241	7.5	4.34	102	73	61	34	61	53
37	Private	BAS_13-PRK_32a	U.S.F. HOLLAND INC	19.7	16.5	9,933	20.8	12.41	42	23	35	10	18	18
38	Private	PRK_15	CLINTON RD PARTNERSHIP	5.4	4.5	2,630	8.8	6.56	109	86	94	25	74	66
39	Private	PRK_60-PRK_61	WESTON PROPERTY INVESTMENTS I	39.9	35.6	15,751	36.1	23.20	20	7	17	5	7	5
40	Private	PRK_4	BURTON SULTZMAN P & R REALTY	9.6	9.1	8,684	5.5	2.91	78	47	47	43	43	37
41	Private	PRK_14	CLEVELAND ILLUMINATING CO	18.5	18.1	9,228	17	8.51	45	17	40	16	20	19
42	Public	PRK_18	BOARD OF EDUCATION	9.6	8.9	4,780	9.7	4.89	78	51	74	28	45	41
43	Public	PRK_21	CLEVELAND METROPARKS DISTRICT	12.3	5.3	877	12.4	10.06	63	79	104	13	53	58
44	Public	BAS_22	BD OF PARK COMM	17.1	5.1	51	1.8	1.82	48	83	124	50	66	86
45	Public	PRK_19	BD OF PARK COMM	6.2	4.1	470	3.7	1.95	102	94	110	47	80	80
46	Public	PRK_20	CLEVELAND BD OF PARKS	14.5	11.2	42	12.9	7.21	56	34	125	21	45	50
47	Private	PRK_5	BIDDULPH RIDGE EXTENSION LLC	11.4	10.3	11,236	12.3	7.25	69	40	30	20	27	22
48	Private	BAS_32	Terraces At Northridge Ltd	18.1	9.1	8,421	0.4	0.44	46	48	48	70	40	45
49	Private	PRK_3	RIDGE PARK SQUARE LLC	6.8	6.8	6,779	7.2	4.24	98	69	60	26	47	41
50	Private	PRK_35-BAS_10	NORTHCLIFF SHOPPING CENTER	20.8	18.1	20,713	20	11.25	38	16	14	12	12	8
51	Private	PRK_33	MSF BROOKLYN OH LLC	9.0	8.6	8,722	8.5	4.37	85	55	46	24	36	29
52	Private	PRK_34	M&G EQUITIES , A NEW YORK	5.6	4.1	5,497	4.6	2.34	107	93	66	38	58	52
53	Private	PRK_56	GERZENY, DOROTHY NALLE TRUSTE	4.1	3.7	4,092	4.1	2.05	122	98	81	40	71	58
54	Private	PRK_57	IDEAL BLDRS SUPPLY & FUEL CO	7.1	0.4	3,546	7	3.52	96	127	84	30	68	65
55	Private	PRK_2a	BETCO PROPERTIES, LLC	4.6	4.5	4,593	4.7	2.46	117	88	78	36	62	52
56	Private	PRK_2b	ZORN, ERIC S. TRUSTEE	15.0	9.8	14,152	12.5	8.15	54	43	20	16	21	20

Big Creek Watershed Project Site ID	OwnType	Balanced Growth Initiative Retrofit SITE ID	Owner Description	Drainage Area (ac)	Impervious Area (ac)	TSS (lbs/yr)	Treatment Area (ac)	Treatment Area (ac) (2:1 pkg lot)	Rank Drainage Area	Rank Impervious Area	Rank TSS	Rank Treatment Area	Rank Scenario 1 (DA, IA, TSS, TA)	Rank Scenario 2 (IA, TSS, TA)
57	Private	BAS_30-BAS_31-PRK_22	HOME DEPOT U.S.A., INC.	15.6	12.7	15,533	10.5	7.59	51	30	18	17	18	14
58	Private	PRK_23	10701 BROOKPARK ROAD, LLC	10.0	8.2	9,036	6.4	3.77	74	59	43	24	33	27
59	Private	BAS_27-PRK_24-BAS_28-BAS_29	AMERITRUST CO	43.7	27.5	42,351	37.1	27.39	18	8	7	2	4	4
60	Private	PRK_45-BAS_57-BAS_58	CON-WAY TRANSPORATION SEV.	21.2	17.0	10,566	23.4	14.95	37	21	32	5	13	10
61	Private	PRK_44-BAS_38	KAISER FOUNDATION HOSPITALS	13.5	12.4	13,414	14.2	9.16	58	31	22	10	16	11
62	Private	PRK_46	UCAR CARBON INC	12.3	4.8	6,050	7.9	5.85	63	84	63	15	33	33
63	Private	PRK_0	GENERAL MOTORS	14.6	11.1	7,100	29.7	24.28	55	36	58	3	20	18
64	Private	PRK_8	General Motors	20.5	16.2	10,215	8.9	5.32	39	24	34	15	15	14
65	Private	PRK_7	GENERAL MOTORS CORP	24.3	20.3	12,124	25.1	19.42	31	15	26	3	8	7
66	Private	BAS_34	LAICH, WALTER & KARIN	6.5	2.8	3,151	0.8	0.80	100	103	89	44	55	52
67	Private	PRK_54	12800 BROOKPARK ROAD LLC.	8.3	8.1	4,682	7.9	3.95	88	60	76	16	31	27
68	Private	PRK_26	MALLEY REALTY, LLC.	3.6	3.6	1,780	4	2.23	123	99	100	26	57	47
69	Private	PRK_25	KW REAL ESTATE/CLEVELAND COMP	5.3	4.5	5,282	5.8	3.28	112	87	68	21	44	33
70	Private	PRK_65	JDS TRUCKING CO	4.2	4.2	2,094	4.4	2.30	120	92	97	24	51	42
71	Private	PRK_53	WISE HOLDING LLC	7.9	7.1	4,188	7.1	3.53	90	66	80	18	34	30
72	Private	PRK_64	13813 INVESTMENTS LLC, AN OHI	7.5	6.8	3,760	7.4	3.70	93	68	83	16	35	30
73	Private	PRK_52	DENK, FRED W. TRUSTEE	6.5	5.5	3,245	6.2	3.33	100	77	88	18	40	32
74	Private	PRK_51	METRO BROOK PARK PROPERTIES	4.2	4.0	4,205	3.7	1.85	120	95	79	21	46	36
75	Private	PRK_28	TMJ BROOKPARK, LLC	7.9	7.3	5,401	5.2	2.74	90	65	67	19	31	26
76	Private	PRK_27	SPITZER MANAGEMENT,	4.6	4.0	4,619	5.4	3.39	117	96	77	17	43	33
77	Private	PRK_58	FORD MOTOR CO ENGINE PLT	10.3	10.2	5,152	17.3	12.16	72	41	69	6	25	18
78	Public	PRK_30	CLEVELAND RTA	9.5	8.9	4,738	12.2	7.78	80	50	75	10	28	22
79	Private	PRK_50	GLS LEASCO INC	23.6	23.3	11,715	23.8	12.05	34	11	27	6	8	7
80	Private	BAS_9	UNKNOWN - APARTMENTS	11.4	5.9	2,652	0.2	0.22	69	74	92	47	35	33
81	Private	BAS_37	CAMBRIDGE COURT LTD PARTN	7.3	3.8	3,087	0.8	0.76	95	97	90	31	39	33
82	Private	PRK_47	ALBRECHT INC	11.9	10.6	11,672	6	13.48	66	39	29	4	15	11
83	Private	PRK_13	BROOKGATE ASSOCIATES LLC	9.2	9.1	9,222	9.9	5.29	83	49	41	10	20	14
84	Private	PRK_36	PEARL ROAD SHOPPING CENTER,LL	5.7	5.5	5,880	6	3.13	106	76	64	12	28	21
85	Private	BAS_8	FORD MOTOR CO FOUNDRY	60.2	22.2	30,112	1.7	1.75	11	13	11	14	6	6
86	Private	BAS_44	GALL, DEBRA A TRUSTEE	9.7	0.4	322	0.1	0.12	77	125	114	48	41	48
87	Public	BAS_56	CITY OF PARMA	5.8	3.3	2,166	0.3	0.28	105	100	96	38	38	31
88	Private	BAS_5	Bob Evans Farms Inc	1.3	0.9	1,213	0.2	0.25	134	119	102	39	46	44
89	Private	OUT_45	CLEVE ELECTRIC ILL CO	14.2	2.0	80	1.7	1.67	57	107	123	14	32	34
90	Public	BAS_24	BROOKLYN CITY OF	6.0	1.7	2,645	0.6	0.62	104	110	93	29	36	30
91	Private	OUT_9	CLEVE ELEC ILL CO	16.5	13.4	8,242	1.8	1.84	49	29	51	13	14	11
92	Public	OUT_17	CLEVELAND METROPARKS DISTRICT	20.4	4.2	10,897	1.3	1.33	40	91	31	18	16	17
93	Public	OUT_39	PARMA HTS CITY OF	4.9	1.6	40	0.1	0.08	114	111	126	42	41	41
94	Private	BAS_52	HETZEL FREDERICK	35.5	8.6	296	0.4	0.40	24	56	116	30	22	25
95	Private	BAS_51	WILLEY DONALD R & J R	34.5	16.6	583	0.3	0.32	25	22	108	32	18	19
96	Private	BAS_0	LAZUKIC, VLADIMIR TRS.	38.3	1.2	904	0.3	0.25	21	116	103	32	24	33
97	Private	BAS_53	UKRAINIAN AUTOCEPHALOUS	18.9	0.2	3,439	0.5	0.47	43	129	85	27	26	28
98	Private	BAS_50-OUT_22	ROYAL VALLEY HOMEOWNER ASSOC	49.3	9.4	340	0.7	0.74	14	44	113	24	18	20
99	Private	BAS_49-OUT_21-OUT-19-OUT_20	ROYAL VALLEY HOME OWNERS	111.3	12.4	11,701	1.3	1.28	5	32	28	18	8	10
100	Private	BAS_18	ROYAL VALLEY HOMEOWNER ASSOC	26.3	4.5	269	0.4	0.37	29	89	118	27	21	24
101	Private	BAS_54	SHERWOOD CONST	32.2	3.2	292	0.2	0.20	26	101	117	30	21	27
102	Private	BAS_61	YEVTUSHENKO, YEVGENIY	1.5	0.1	15	0.3	0.34	132	131	130	27	33	33
103	Private	OUT_23	OAKRIDGE ESTATES SWIM CLUB I	1.4	1.0	1,328	0.2	0.17	133	118	101	31	31	27
104	Private	BAS_47-OUT_24	THE PEACHTREE HOMEOWNERS ASSO	12.7	5.9	84	0.7	0.69	60	75	122	24	21	23
105	Private	BAS_46	ARBOR PARK VILLAGE HOMEOW	1.7	0.0	7	0.8	0.82	131	134	133	22	31	31
106	Private	BAS_48	ARBOR PARK VILLAGE HOMEOW	4.4	1.2	24	0.5	0.45	119	115	129	23	30	30
107	Private	BAS_45-OUT_2	ARBOR PARK VILLAGE HOMEOWNERS	8.0	0.2	2,414	0.2	0.19	89	130	95	26	25	26
108	Private	BAS_25-PRK_32b	JEWISH COMMUNITY FEDERATION	12.5	9.2	6,180	10.5	6.13	62	46	62	8	14	12
109	Private	BAS_19	SHIVA VISHNU TEMPLE OF	19.8	2.4	9,231	0.2	0.19	41	105	39	25	16	17
110	Private	OUT_13	F.C. PARMATOWN ASSOC L.P.	35.7	10.6	7,371	1.5	1.51	23	38	56	15	11	11
111	Public	OUT_33	PARMA HTS CITY OF	9.9	1.9	230	0.9	0.94	75	108	119	18	20	21
112	Public	OUT_41	BD OF PARK COMMISSIONERS	22.2	6.3	156	0.4	0.45	35	71	121	20	16	19

Big Creek Watershed Project Site ID	OwnType	Balanced Growth Initiative Retrofit SITE ID	Owner Description	Drainage Area (ac)	Impervious Area (ac)	TSS (lbs/yr)	Treatment Area (ac)	Treatment Area (ac) (2:1 pkg lot)	Rank Drainage Area	Rank Impervious Area	Rank TSS	Rank Treatment Area	Rank Scenario 1 (DA, IA, TSS, TA)	Rank Scenario 2 (IA, TSS, TA)
113	Public	OUT_7	BD OF PARK COMMISSIONERS	50.0	15.2	12,945	1.6	1.63	12	25	24	13	6	7
114	Public	OUT_8	BD OF PARK COMMISSIONERS	3.3	0.4	541	1.4	1.37	126	122	109	14	20	19
115	Public	OUT_44	BD OF PARK COMMISSIONERS	3.3	0.3	652	0.7	0.70	126	128	106	17	20	19
116	Public	OUT_99-OUT_43	BD OF PARK COMMISSIONERS	68.6	26.1	7,731	8.2	8.19	10	9	53	7	6	8
117	Public	OUT_98	BD OF PARK COMMISSIONERS	42.6	15.0	366	1.6	1.57	19	26	111	12	10	12
118	Public	BAS_17	CLEVELAND CITY OF	49.9	7.6	13,768	1.7	1.66	13	63	21	11	7	8
119	Private	OUT_26	BRATZ, LLOYD L. & CYNTHIA L.	3.5	1.6	26	0.2	0.24	124	112	128	14	17	16
120	Public	OUT_28	PARMA CITY OF	4.9	2.5	4,918	0.2	0.20	114	104	72	14	14	14
121	Public	OUT_42	BD OF PARK COMMISSIONERS	5.5	1.5	37	0.2	0.15	108	113	127	14	15	15
122	Private	OUT_11	Hoban Edw F Bishop Of Cleve	5.3	2.1	4,895	2.6	2.56	112	106	73	10	13	13
123	Public	OUT_3	PARMA CITY OF	74.2	24.1	591	0.9	0.90	8	10	107	12	8	9
124	Public	OUT_6	CLEVELAND METROPARKS DISTRICT	26.2	10.0	1,962	0	0.05	30	42	99	12	9	10
125	Public	BAS_43	PARMA, CITY OF	7.5	1.8	215	1	0.99	93	109	120	11	11	11
126	Private	BAS_35-BAS_36	General Motors	296.6	151.2	158,131	25.8	25.84	3	2	2	2	2	2
127	Public	PRK_62	CLEVELAND RTA	9.5	8.6	4,919	8.1	5.49	80	54	71	6	8	8
128	Public	PRK_999	CLEVELAND METROPARKS DISTRICT	12.3	5.3	877	12.4	12.4	63	81	104	3	8	8
129	Private	HWY_5	ODOT	227.2	56.3	129,954	14.8	14.8	4	4	3	2	2	2
130	Private	HWY_0-BAS_60-BAS_33	ODOT	12.8	4.7	10,503	3.5	3.5	59	85	33	5	6	6
131	Private	HWY_3	ODOT	47.1	17.2	37,081	8.8	8.8	16	19	8	2	3	2
132	Private	HWY_1-BAS_16-BAS_17	ODOT	48.0	18.1	35,063	8.5	8.5	15	18	9	2	2	2
133	Private	HWY_2	ODOT	18.5	9.2	15,035	4.2	4.2	44	45	19	2	3	3
134	Private	HWY_4	ODOT	23.8	12.0	19,345	1.2	1.2	33	33	15	2	2	2
135	Public	PURITAS BASIN	City of Cleveland	3,356.2	1,613.9	1,062,520	33.4	33.4	1	1	1	1	1	1

Appendix B. Task 2 Field Forms



Big Creek Watershed
Potential Stormwater Retrofit Sites

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization

Site 4: Kmart

City of Brooklyn

Drainage Acres	**21.4**	Flood Control Treatment	**100%**
Impervious Acres	**17.0**	Water Quality Treatment	**0%**
TSS in Pounds	**21,396**	Demonstration Project?	**Yes**
General Findings: The entire lot drains into a large basin on the west side of the property. The basin was filled with water at the time of our visit, which may indicate that it is backed up. Constructed in the 1990s, site plans did not indicate water quality treatment on- site, which became clearly defined in the Ohio EPA general construction permit in 2003.			

View of basin from west side of parking lot

Proposed SW Retrofit Recommendation: **2**

Comment: The site is already providing flood control treatment. Retrofit opportunities exist within the parking lot to provide water quality treatment.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 15: Parma Reservoir
City of Parma

Drainage Acres	**614.4**	Flood Treatment	**25%**
Impervious Acres	**140.5**	Water Quality Treatment	**25%**
TSS in Pounds	**105,980**	Demonstration Project?	**Yes**
General Findings: The lake receives a large amount of upstream runoff from a 4' by 6' box culvert and 4' pipe. Using a few feet of additional storage, the reservoir appears to provide some water quality and flood control treatment prior to flooding the street.			


View of basin from northwest end


View of outlet structure from northwest end

Proposed SW Retrofit Recommendation: **3**

Comment: Basin outlet could be modified (dropped) to allow for extra volume control. Site could be modified in conjunction with adjacent land: d/s opps: 1) new storage at vacant lot across the street, b) retrofit private basin; u/s opps: c) golf course pkg lot, d) floodplain restoration behind bank. Overall strategy would be creating a linked system of BMPs. Overall strategy is too large for existing project.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 28: Ford Foundry
City of Brookpark

Drainage Acres	**26.8**	Flood Treatment	**0%**
Impervious Acres	**23.2**	Water Quality Treatment	**0%**
TSS in Pounds	**13,386**	Demonstration Project?	**Yes**
General Findings: According to site plans, the parking lot drains directly off-site with no treatment. A basin exists behind the plant and treats more than half of overall Ford facility (engine plant no.2 and casting plant). The foundry building is in the process of being deconstructed.			

***Unable to visit site ***

Proposed SW Retrofit Recommendation: **3**

Comment: The associated casting plant bldg. to the pkg lot is being torn down, so there may be an opportunity to treat or completely remove the parking lot during this process.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 37: USF Holland
City of Brooklyn

Drainage Acres	**19.7**	Flood Treatment	**100%**
Impervious Acres	**16.5**	Water Quality Treatment	**0%**
TSS in Pounds	**9,933**	Demonstration Project?	**No**
General Findings: The parking lot was extended in 2002, and two basins provide flood control for existing and new parking lot, but no water quality treatment.			

***Unable to visit site ***

Proposed SW Retrofit Recommendation: **3**

Comment: Since the new parking lot was not fully developed as shown on reviewed site plan, there exists open space to extend treatment at the northern end of the site. However, the property owner has been difficult to contact.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 47: Biddulph Ridge Extension
City of Brooklyn

Drainage Acres	**11.4**	Flood Treatment	**0%**
Impervious Acres	**10.3**	Water Quality Treatment	**0%**
TSS in Pounds	**11,236**	Demonstration Project?	**Yes**
General Findings: Stickney Creek is culverted underneath the parking lot and opens up as it exits to the north end. The plaza building and the parking lot appear to drain directly into the creek (though site plans were not available to confirm this), and the roof mansards drain directly onto the lot in front of the stores, and the bldg. drains to northern/back portion of parking lot.			

View of Giant Eagle from ATM drive-thru

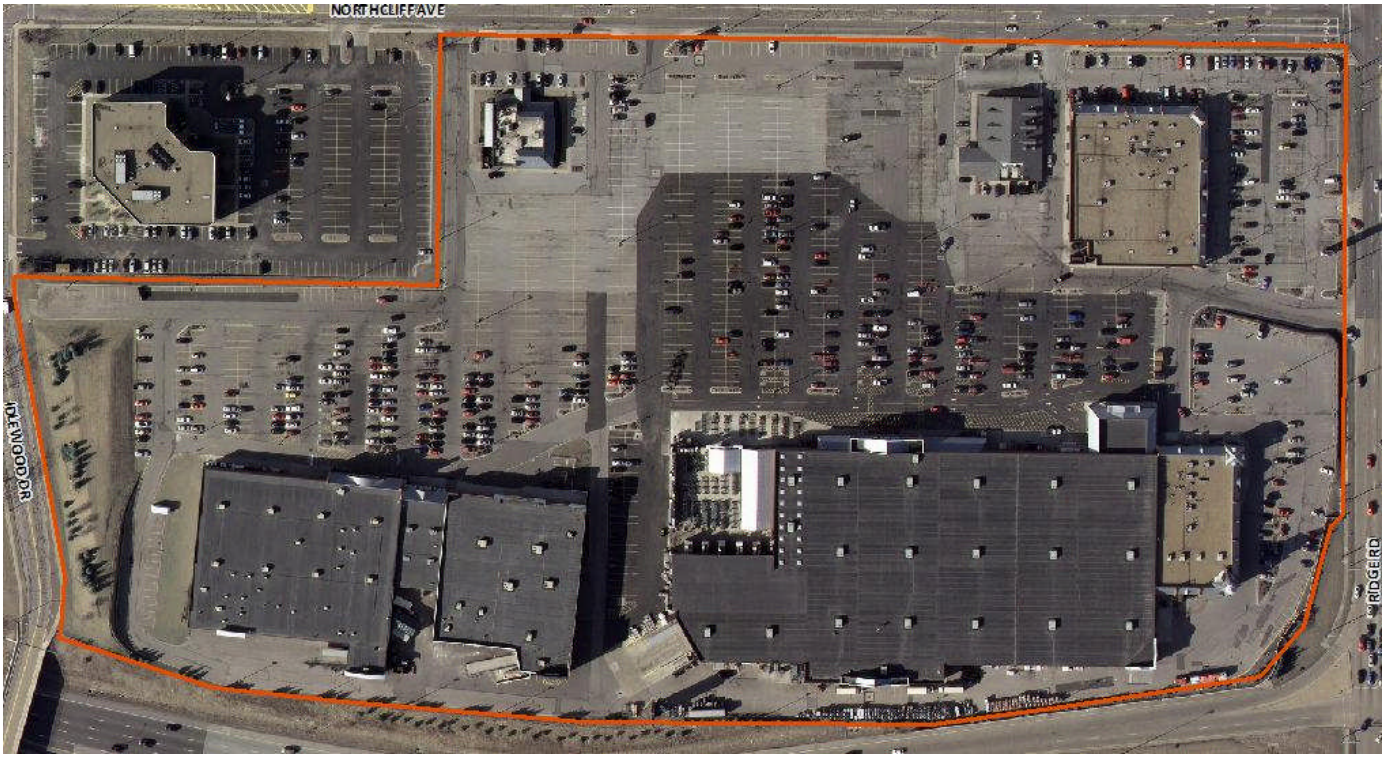

View of Shopping Plaza from ATM drive-thru

Proposed SW Retrofit Recommendation: **1**

Comment: The site receives no treatment before entering waterways. Retrofit opportunities exist within the parking lot and the open space behind the plaza, though utility constraints (water line, overhead powerlines, cell tower) may limit access.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 50: Northcliff Shopping Center (Lowe's Plaza)
City of Brooklyn



Drainage Acres	**20.8**	Flood Treatment	**75%**
Impervious Acres	**18.1**	Water Quality Treatment	**75%**
TSS in Pounds	**20,713**	Demonstration Project?	**Yes**
General Findings: The majority of the lot drains into a basin located off-site to the north, which appears to be designed for both flood control and water quality treatment. The northeast corner of the property drains to the street untreated.			

View toward Marc's from center of lot

View of basin in front of Lowe's from center of lot

Proposed SW Retrofit Recommendation: **2**

Comment: Most of the site is being routed to treatment, but the portion of the site that is untreated can be retrofitted near the inlet basins in the middle of the lot, which appears to be underused and a potential traffic hazard due to so many available/non-used parking spaces.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 56: Wal-Mart
City of Brooklyn

Drainage Acres	**15.0**	Flood Treatment	**-- %**
Impervious Acres	**9.8**	Water Quality Treatment	**-- %**
TSS in Pounds	**14,152**	Demonstration Project?	**Yes**
General Findings: A basin exists next to the building, behind a fence, which receives parking lot runoff. A building addition is currently being built over the basin, and plans have been developed to construct a new basin near the street. Portion of parking lot just west of Walmart building does not appear to be owned by Walmart and is not treated.			

View of parking lot from bridge to Sam's Club

View of Big Creek from bridge to Sam's Club

Proposed SW Retrofit Recommendation: **3**

Comment: The site will be under construction in the near future.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 57: Home Depot
City of Brooklyn

Drainage Acres	**15.6**	Flood Treatment	**100 %**
Impervious Acres	**12.7**	Water Quality Treatment	**0 %**
TSS in Pounds	**15,532**	Demonstration Project?	**Yes**
General Findings: This site has three basins (two near the street, one behind the store) that treat runoff in stages before exiting to the property in the southeast corner. Constructed in the late 1990s, the site plans seem to indicate BMPs are designed for flood control, and do not include water quality treatment.			

View of parking lot from retention basin

View of Home Depot and basin from Brookpark Rd.

Proposed SW Retrofit Recommendation: **2**

Comment: Basin design could be improved to add water quality treatment, and parking lot could be retrofitted with bioswales and rain gardens.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 58: Value City
City of Parma

Drainage Acres	**10.0**	Flood Treatment	**0 %**
Impervious Acres	**8.2**	Water Quality Treatment	**0 %**
TSS in Pounds	**9,036**	Demonstration Project?	**Yes**
General Findings: This site is on a steep grade and receives no treatment. The parking lot is eroding near the inlet basins at the front of the property and has sediment surrounding existing inlets.			

View of parking lot from Brookpark Road

View of parking lot erosion

Proposed SW Retrofit Recommendation: **1**

Comment: Parking lot could be retrofitted with bioswales and rain gardens. A detention area could be installed utilizing the open space at the front of the property.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 60: Conway Transportation
City of Parma

Drainage Acres	**21.2**	Flood Treatment	**85 %**
Impervious Acres	**17.0**	Water Quality Treatment	**85 %**
TSS in Pounds	**10,566**	Demonstration Project?	**No**
General Findings: The northeast section of the parking lot does not appeared to receive treatment before exiting site (roughly 15% of the total surface). The rest of the site is treated by two basins, one of which was recently dredged and plugged due to an oil spill.			

View of parking lot from northwest corner

View of southern basin

Proposed SW Retrofit Recommendation: **2**

Comment: The southern basin needs repair. Both basins could be modified to allow for increased water quality treatment. The employee parking lot provides opportunities for retrofit BMP's. Property owner seemed to be willing participant.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 64: GM Parking Lot
City of Parma

Drainage Acres	**20.5**	Flood Treatment	**100 %**
Impervious Acres	**16.4**	Water Quality Treatment	**0 %**
TSS in Pounds	**10,215**	Demonstration Project?	**No**
General Findings: Runoff from the parking lot is treated in the GM Reservoir (Site 126), which is contributed by 1 2,500 GPM (5.6 cfs) pump, according to site rep, which translates to flood control and partial wq treatment.			

View of parking lot from entrance

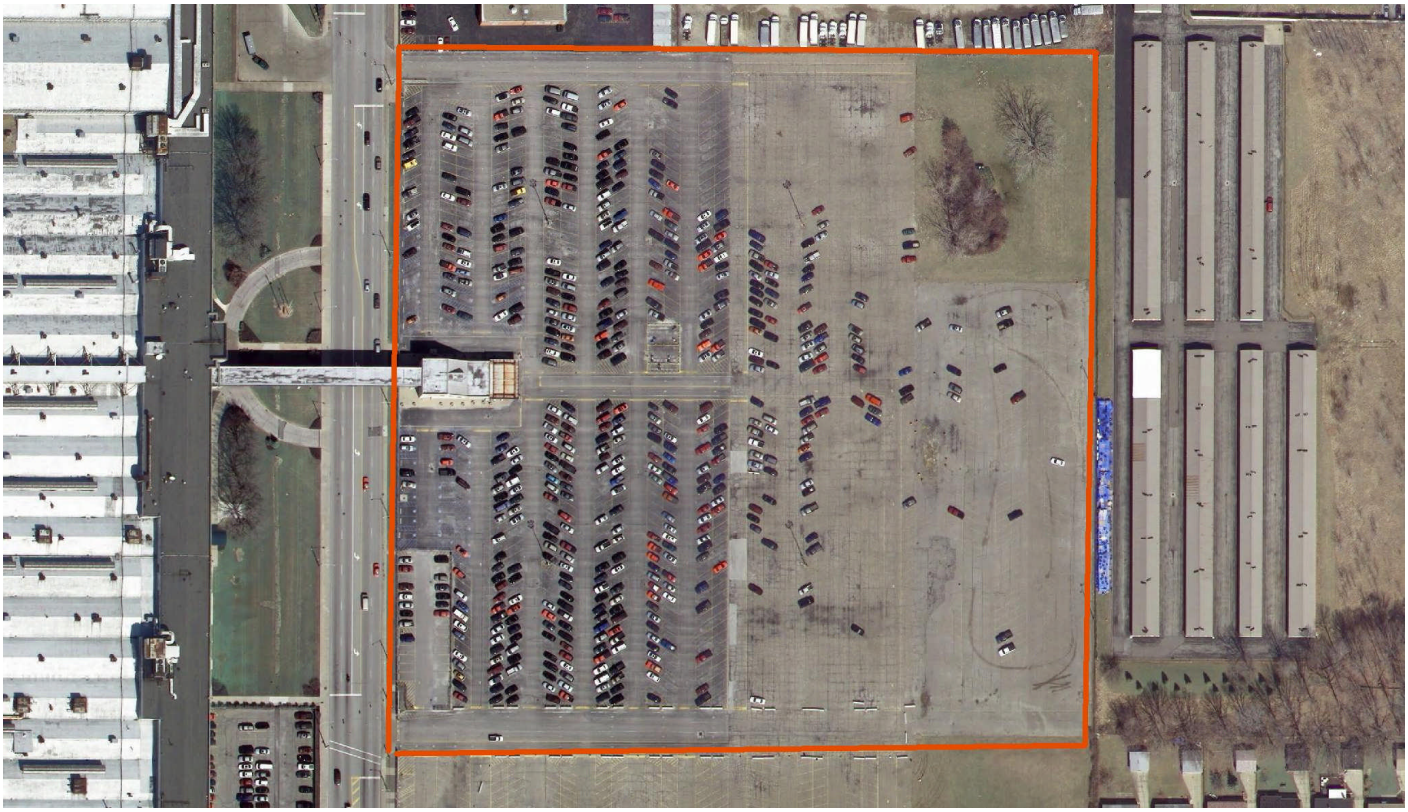
Electric car charging stations near north end of lot

Proposed SW Retrofit Recommendation: **2**

Comment: Parking lot could be treated with BMP's. A electric car charging stations has recently been built, which could be used to tie in an eco-theme.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 65: GM Parking Lot
City of Parma



Drainage Acres	**24.3**	Flood Treatment	**0 %**
Impervious Acres	**20.3**	Water Quality Treatment	**0 %**
TSS in Pounds	**12,124**	Demonstration Project?	**No**
General Findings: Parking lot receives no treatment. West half of pkg lot appears to be asphalt, and eastern half is primarily gravel. Site is used for annual on-site outdoor parties.			

View of parking lot from southern entrance

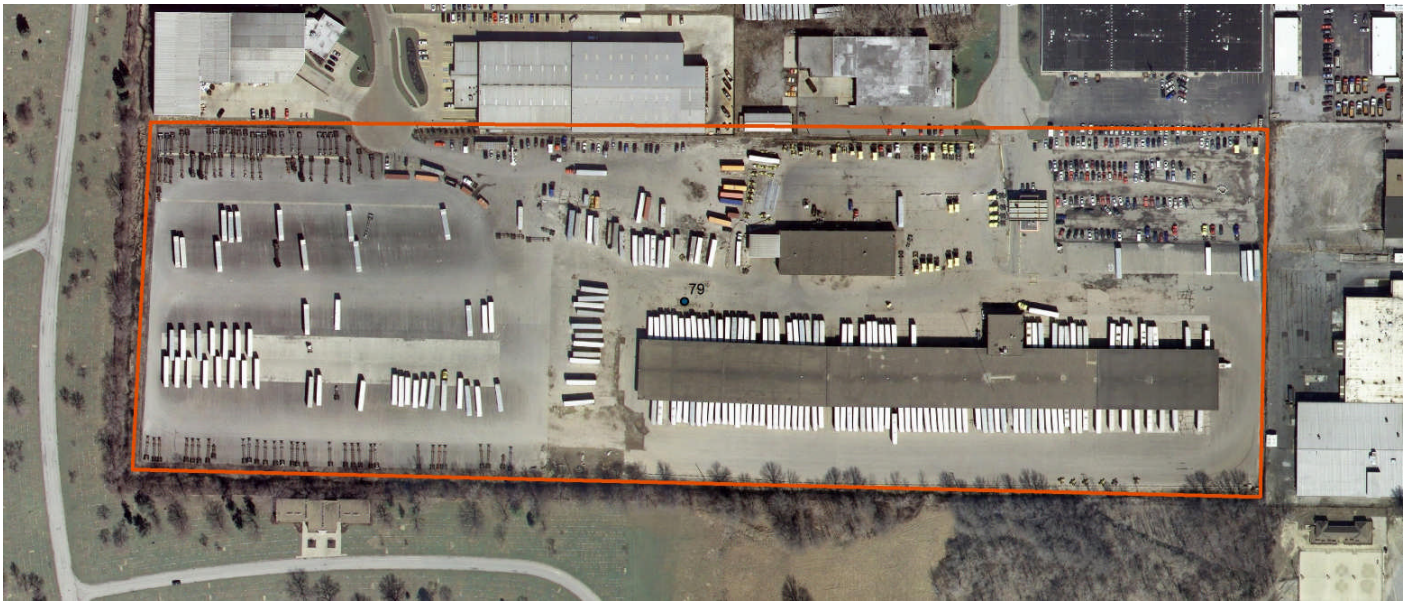
View of employee tunnel from south end

Proposed SW Retrofit Recommendation: **1**

Comment: Overall parking lot design could be modified, and retrofit BMP's could be incorporated.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 79: GLS Leasco
City of Brookpark



Drainage Acres	**23.6**	Flood Treatment	**-- %**
Impervious Acres	**23.3**	Water Quality Treatment	**-- %**
TSS in Pounds	**11,715**	Demonstration Project?	**No**
General Findings: Site appears to have no treatment. Property owner was not willing to participate in the project.			

*** No Site Visit ***

Proposed SW Retrofit Recommendation: **3**

Comment: Parking lot BMP's would be feasible given owner participation. Owner not willing participant, so site was removed from further consideration.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 82: Giant Eagle
City of Brookpark

Drainage Acres	**11.9**	Flood Treatment	**100 %**
Impervious Acres	**10.6**	Water Quality Treatment	**100 %**
TSS in Pounds	**11,672**	Demonstration Project?	**Yes**
General Findings: Parking lot runoff drains to underground storage pipes to the northwest of the property. Basin is not directly utilized for the property but used to control townhomes to the north. Underground storage is substantial (60,000 CF) and with 8-in orifice probably provides both flood control and partial water quality treatment.			


View of Giant Eagle from northwestern basin

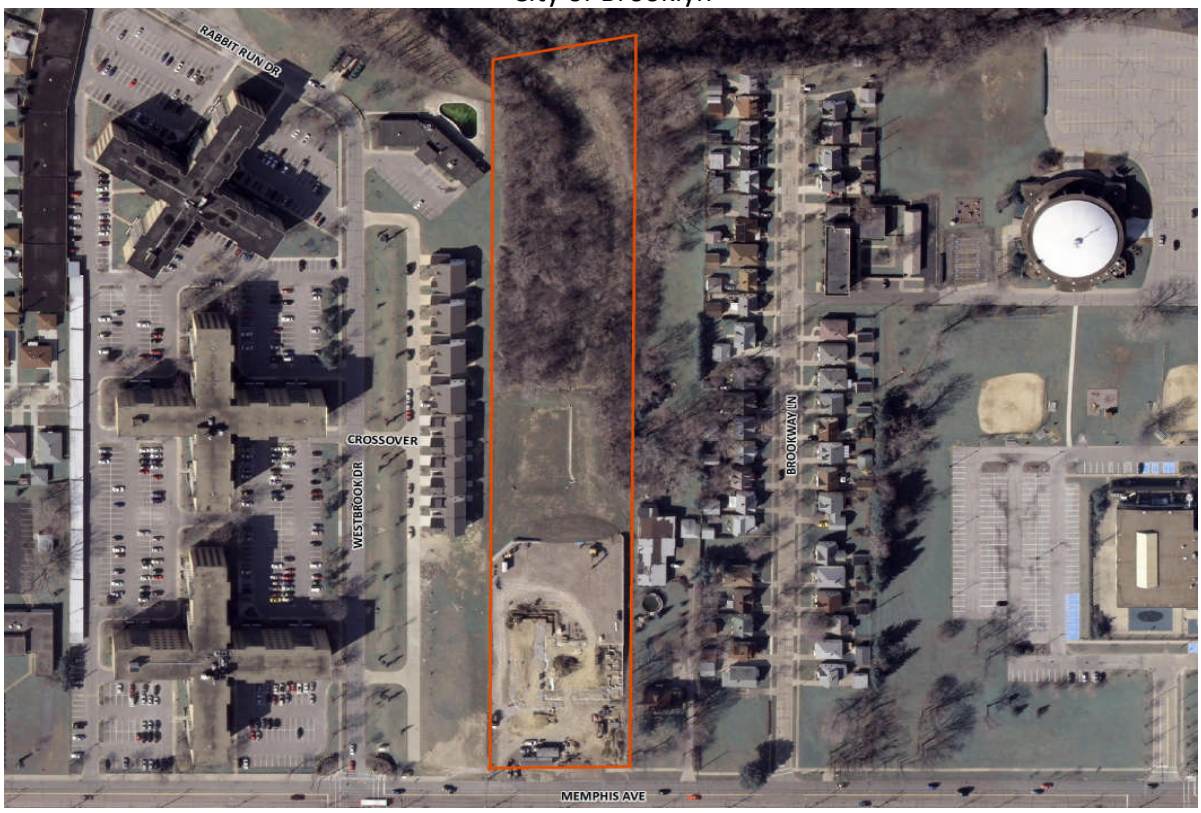

View of basin from Giant Eagle

Proposed SW Retrofit Recommendation: **3**

Comment: Parking lot BMP's could be utilized here to provide additional wq treatment. Basin secondary outlet showed some signs of erosion, but overall basin appeared to be in good condition.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 90: Brooklyn Fire Station
City of Brooklyn



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.			

View of swale from parking lot

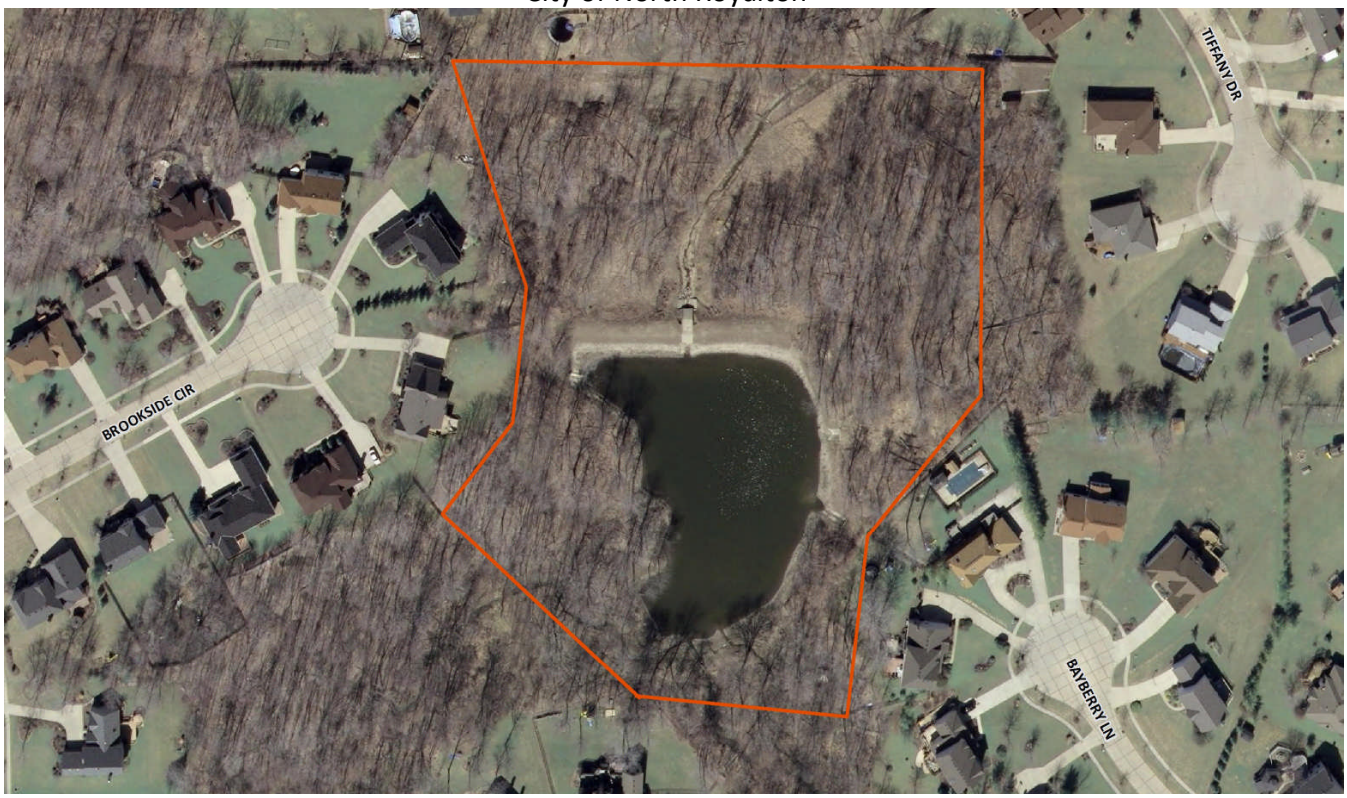
View downhill from swale

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.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 99: Royal Valley Basin
City of North Royalton



Drainage Acres	**111.3**	Flood Treatment	**100 %**
Impervious Acres	**12.4**	Water Quality Treatment	**100 %**
TSS in Pounds	**11,701**	Demonstration Project?	**No**
General Findings: The basin is filled with sediment, the primary outlet structure is fully clogged, and the emergency spillway is eroding on edges, indicating the pond is not function as designed. Stream is eroding d/s of basin outlet. Three outlets enter the basin directly, as well as three streams to the south. Two outlets very close to control structure. One outlet appears fairly dry.			


View of basin from right-of-way on west side


View of outlet structure at north end of basin

Proposed SW Retrofit Recommendation: **3**

Comment: Additional storage volume could be added along the banks. Outlet structure should be redesigned. Regular maintenance of site is necessary to limit accumulated sediments.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 113: Cleveland Metroparks (Fern Hill West Bank)
City of Parma

Drainage Acres	**50.0**	Flood Treatment	**0 %**
Impervious Acres	**14.5**	Water Quality Treatment	**0 %**
TSS in Pounds	**369**	Demonstration Project?	**Yes**
General Findings: 36" pipe enters directly into Big Creek just downstream of the bridge. There is a manhole on private property that would be potential location to intercept and reroute flow to BMP site.			

View of site and pipe from parking lot across the Creek

View of site from trail on the west edge of the park

Proposed SW Retrofit Recommendation: **1**

Comment: The open space provides opportunity for a series of different BMP's with very high visibility to the public.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 116: Cleveland Metroparks (Fern Hill East Bank)
City of Parma

Drainage Acres	**68.6**	Flood Treatment	**0 %**
Impervious Acres	**26.1**	Water Quality Treatment	**0 %**
TSS in Pounds	**7,731**	Demonstration Project?	**Yes**
General Findings: Large pipe (72”) enters into Big Creek directly from stream wall and is buried deep beneath the ground, limiting opportunity to intercept runoff from existing storm sewer and divert it to potential new BMP location. Another pipe was recently reconstructed along with nearby road project. Parking lot is very small and runs off into grass.			

View to the north from north section of parking lot

View to the north from manhole cover near Big Creek

Proposed SW Retrofit Recommendation: **2**

Comment: Plenty of opportunities for rain gardens and small constructed wetlands. Parking lot would be good demonstration site for pervious pavers, bioswales, etc. The nearby storm sewer MHs were too deep to assume same runoff volume can be diverted to site as previously assumed.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

FOBC Big Creek Watershed Stormwater Retrofit Ranking Project: Task 2 Site Prioritization
Site 126: GM Reservoir
City of Parma

Drainage Acres	**296.6**	Flood Treatment	**100 %**
Impervious Acres	**151.2**	Water Quality Treatment	**10-20 %**
TSS in Pounds	**158,131**	Demonstration Project?	**No**
General Findings: Built in 1948 and modified in 1977 to receive increased runoff to solve flooding issues. Currently receives runoff from casting plant and several surrounding facilities, though they are in the process of trying to re-route portions of upstream sw runoff due to property ownership changes. Basin appears very shallow, full of sediment, and is covered with Phragmites grass.			

View of basin from the east

View to the east from the reservoir

Proposed SW Retrofit Recommendation: **3**

Comment: Basin could be altered and dredged to allow for more capacity and water quality treatment. Surrounding area could be utilized as well. However, site is presumably thoroughly contaminated and clean-up costs will be prohibitive.

Note: **1** – Strong Recommendation **2** – Fair Recommendation **3** – Limited Recommendation

Appendix C. Task 2 Ranking

Site ID	Name	Municipality	Task 2 Prioritization
47	Biddulph Plaza	Brooklyn	Task 3 Primary Site
65	GM Parking (East Lot)	Parma	Task 3 Primary Site
116	Cleveland Metroparks (Fernhill West Bank)	Parma	Task 3 Primary Site
15	Upper Ridgewood Lakes	Parma	Task 3 Alternate Site
57	Home Depot	Brooklyn	Task 3 Alternate Site
64	GM Parking (South Lot)	Parma	Task 3 Alternate Site
4	Kmart	Brooklyn	Fair
50	Lowe's	Brooklyn	Fair
58	Value City	Parma	Fair
60	ConWay Transportation	Parma	Fair
28	Ford	Brookpark	Limited
37	USF Holland	Brooklyn	Limited
56	Wal-Mart	Brooklyn	Limited
79	GLS Leasco	Brookpark	Limited
82	Giant Eagle	Brookpark	Limited
90	Brooklyn Fire Station	Brooklyn	Limited
99	Royal Valley Basin	North Royalton	Limited
126	GM Reservoir	Parma	Limited