



Green Infrastructure Rapid Assessment Plan Tufa Glen Creek Watershed

May 2013

Prepared by:

**The Stormwater Coalition
of Monroe County and
Monroe County
Department of
Environmental Services**

Prepared for:

**New York State Environmental
Protection Fund - Round 10**

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Cover Photo: Upper - Looking downstream at Creek Street; Lower - looking upstream at Creek Street

List of Abbreviations

cfs	cubic feet per second
CWP	Center for Watershed Protection
E	Education
EMC	Event Mean Concentration
EPA	US Environmental Protection Agency
GI	Green Infrastructure
GIS	Geographic Information System
GPS	Global Positioning System
IC	Impervious Cover
I	Infiltration
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
POC	Pollutant of Concern
S	Flood Storage
CP	Channel Protection
CR	Community Revitalization
Sc	Source Control
SWAAP	Stormwater Assessment and Action Plan
RH	Riparian Habitat
Wq	Water Quality
WS	Watershed
USGS	US Geological Survey

Section 1. Assessment Overview

1.1 PROBLEM STATEMENT:

Similar to many developing areas, growth in Monroe County has caused some unfortunate consequences to water quality. One consequence is that developed areas shed larger volumes of stormwater from impervious surfaces (roads, buildings and parking lots) than natural landscapes. Because there is more volume, there is more pollution. Typical pollutants include: petroleum products and heavy metals from vehicles; fertilizers, chemicals and animal waste from lawns; and, sediment from eroded streambanks, construction sites and roadways.

A second consequence is that streams more frequently flow full or overflow their banks. High stormwater flows can cause flooding, damage property, and harm fish and wildlife habitat. Common damages from high flows are eroded stream banks, wider and deeper stream channels, and excessive sediment deposition. The degradation results in poor water quality and added maintenance costs to municipalities and property owners. In Monroe County, stormwater pollution and associated wet weather flows have harmed virtually all urban streams, the Genesee River and Lake Ontario's shoreline.

1.2 PURPOSE:

Developing plans to improve our impacted water resources is the objective of this the Rapid Green Infrastructure Assessment Plan (Plan). Due to limited funding, a method was devised to quickly evaluate multiple watersheds for stormwater retrofit potential. The main product is a ranked inventory of retrofit projects that, if constructed, have the potential to improve water quality and stream health while also providing flow attenuation to reduce erosive storm flows and localized drainage problems. A second significant product is the creation of multiple, electronic data files and maps that lay the foundation for future, more in-depth studies. These files are listed and described in Appendix A. The Plan is a simplified version of more detailed Stormwater Assessment and Action Plans being done in other parts of Monroe County. These larger studies include water quality sampling as well as modeling the effects of the current watershed's condition and the potential improvement from proposed retrofits. The field work completed for this report was kept to a minimum and only a summary report is produced (herein). The project was conducted with funding from New York's Environmental Protection Fund, the Monroe County Department of Environmental Services, and the Stormwater Coalition of Monroe County.

1.3 SETTING:

The entire 1900 acre Tufa Glen Creek watershed lies in the Town of Penfield (Figure 1). The creek's headwaters are East of Five Mile Line Road and south of Scribner Road in the Winchester Woods Subdivision. The main land use throughout the watershed is residential with a small agricultural area in the northeast (Figure 2). Table 1 shows key watershed characteristics.

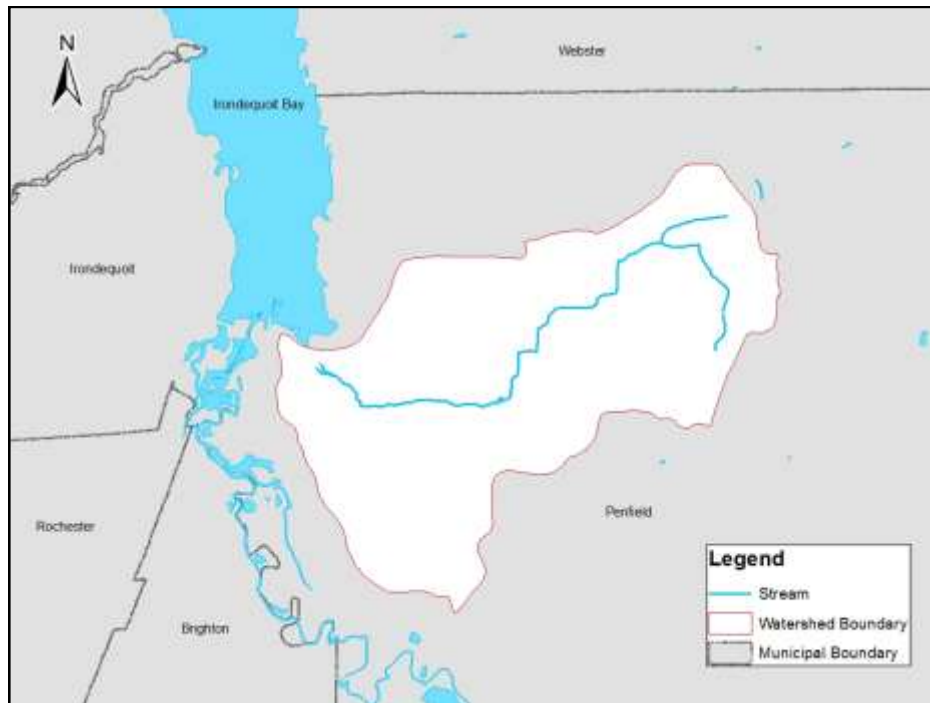


Figure 1: Tufa Glen Creek Watershed.

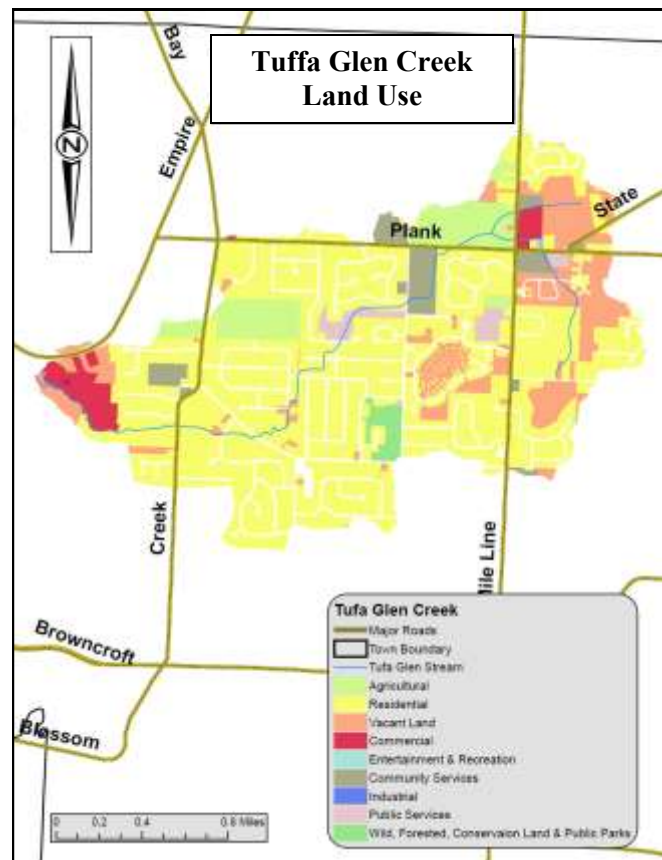


Figure 2: Land use within Tufa Glen Creek Watershed.

Table 1. Watershed Data	
Metric	Value
Area	1,866 (Acres)
Mapped Stream Length	6.96 (Miles)
Percent of Stream Channelized	21%
Primary/secondary land use	Residential/Vacant Land
Land Use (percent of watershed)	
Agricultural	6
Residential	67
Vacant Land	14
Commercial	3
Recreation & Entertainment	0
Community Service	4
Industrial	0
Public Services	2
Wild, Forested, Conservation Lands & Public Parks	1
# of Stormwater Treatment Ponds	8
# of Stormwater Outfalls	68
Percent Current Impervious Cover	22 %
Estimated Future Impervious Cover (%)*	26 %
Wetland acres	68.5
Municipal Jurisdiction	Penfield NY

* estimated for 20 year build out

1.4 WATERSHED CHARACTERISTICS:

1.4.1 Water Quality Concerns The New York State Department of Environmental Conservation (NYSDEC), has grouped Tufa Glen Creek with two other minor tributaries of Irondequoit Bay and designated the streams impaired from urban stormwater runoff (see separate reports for Glen Haven and Densmore Creeks, Stormwater Coalition of Monroe County 2013). The full NYSDEC waterbody datasheet is included in Appendix B. In 2010, these minor tributaries of Irondequoit Creek were added to NYSDEC's Waterbody Inventory/Priority Waterbodies List (revised 2013, NYSDEC), or the "303d" list (because it refers to section 303(d) of the Federal Clean Water Act). The 303d list is generated and updated every two years by NYSDEC who must consider a restoration strategy to reduce the input of the specific pollutant(s) that restrict a listed waterbody's uses or, "impairments".

An impaired water does not support appropriate uses (drinking, swimming, fishing etc.) and may require the development of a Total Maximum Daily Load (TMDL), a prescribed diet that limits the inputs of the listed problem pollutants or, some other restoration strategy. Pollutants noted on the 303d list for these tributaries are oxygen demand, urban runoff, and phosphorus from municipal sources. Adding to the complexity of the 303d process is how the list is divided into three parts, depending on how much information is known about the impairments. The tributaries are listed as a “Waterbody for which TMDL Development May be Deferred (Requiring Verification of Cause/Pollutant)”. It is anticipated that implementation of this report’s retrofit projects will help to reduce the impairment level and avoid the regulatory approach of State and Federal mandates.

1.4.2 Impervious Cover Analysis The Center for Watershed Protection created the “Impervious Cover Model” (ICM) to predict a typical stream’s health using the relationship between subwatershed impervious cover and stream quality indicators and has been confirmed by nearly 60 peer-reviewed stream research studies (Figure 3) . The ICM shows that stream quality decline becomes evident when the watershed impervious cover exceeds ten percent. Tuffa Glen has an average of 22 percent impervious cover placing stream quality somewhere between poor and good and impacted aquatic life. Based on current zoning, future impervious cover (over the next 20 years) will increase by 4 percent.

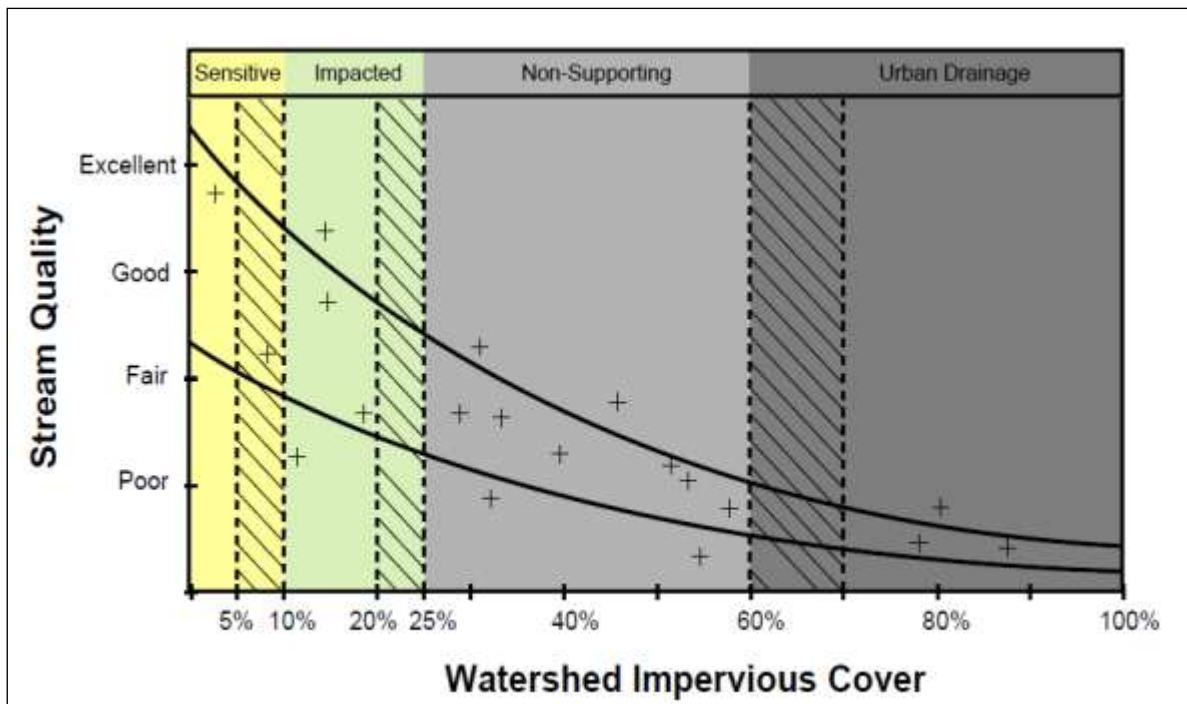


Figure 3. Impervious Cover Model

1.4.3 Drainage Concerns Interviews with DPW staff at the Town of Penfield and a review of their drainage studies identified drainage issue areas. While most drainage issues have been addressed by an active stormwater management program in the Town, some minor drainage concerns persist in low-lying areas

1.4.4 Streambank Erosion There were no reported erosion sites on Tufa GlenCreek from assessments done by the Monroe County Soil & Water Conservation District in 2001. However, there is extensive lengths of eroded stream bank in the lower segment as the Creek falls approximately 100 feet in elevation from Creek Street to Irondequoit Bay through highly erodible glacial soils (Figure 4).

Staff at the Town of Penfield found no recent reports of erosion complaints in the upper watershed however, as the stream has been channelized and heavily armored where it flows through residential subdivisions built in the 1960's and 70's (Figure 5).



Figure 4. Eroded Streambank downstream of Creek Street on Tufa Glen



Figure 5. Tufa Glen Creek (blue dashed line) rock-lined and channelized

1.4.5 Soils A simplistic yet useful way to define how much stormwater runs off the pervious land surface is to determine soils' infiltration capabilities, their ability to absorb stormwater. Soil scientist have categorized soils into four categories, A through D. A and B soils are well drained and absorb much of the stormwater that drains on or over them. C and D soils are more poorly drained. However, the soils in some parts of this watershed are not categorized, denoting areas that have been so altered by land development that grouping a specific soil type is not feasible. The amount of each soil type in Tufa Glen Creek is: A soils 1%; B soils 32%; C soils 41%; D soils or not verified 26% (Figure 6).

The fairly large percentage of B soils will allow for infiltration-type stormwater retrofits. These practices installed in the watershed can prevent and reduce flooding, drainage problems, and streambank erosion as well as greatly improving water quality in Tufa Glen Creek.

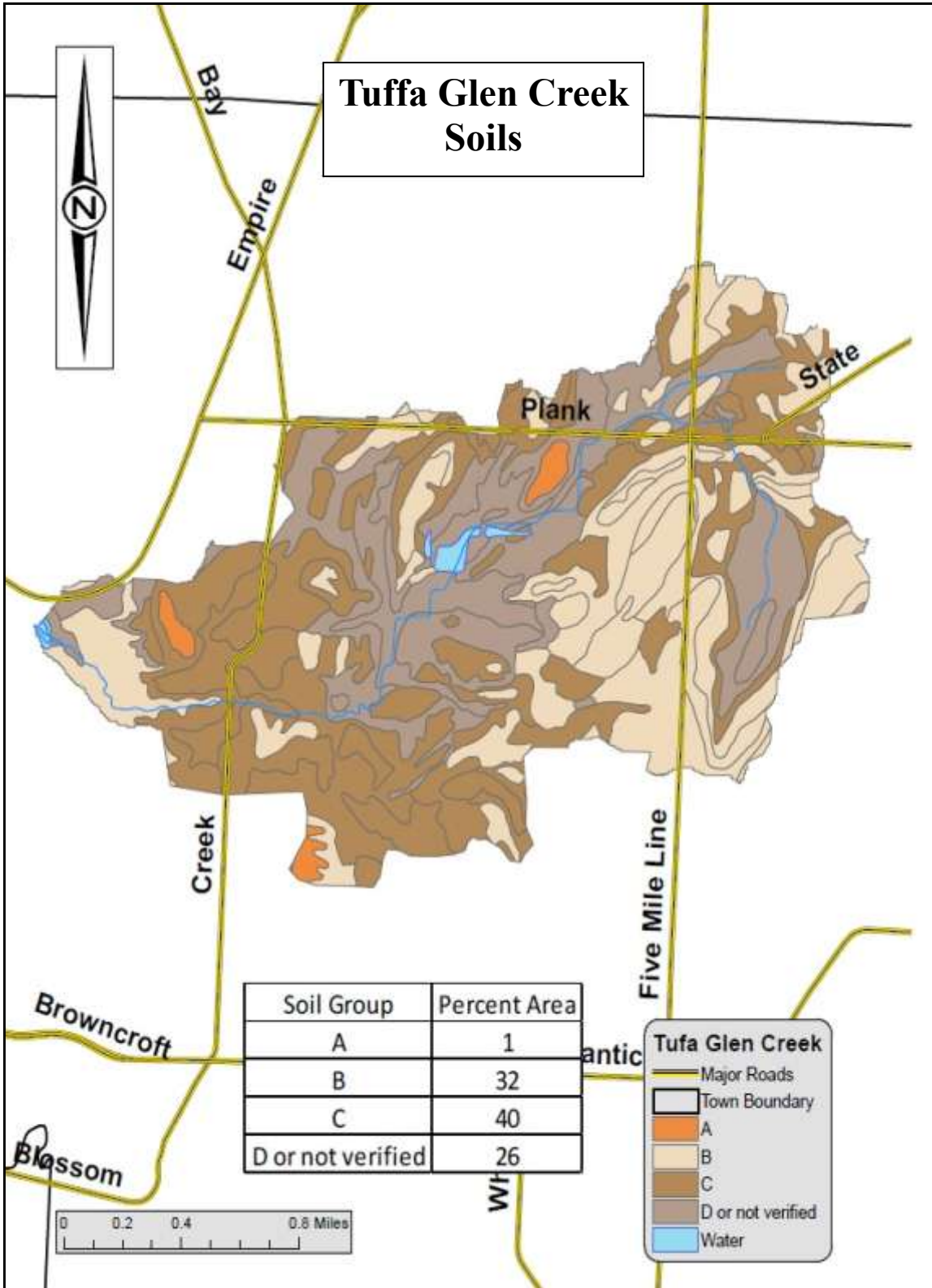


Figure 6. Hydric Soils Map of Tufa Glen Creek

Section 2. Retrofit Inventory

An inventory of potential retrofit sites was generated using GIS mapping tools to locate public properties, stormwater practices like ponds, old urban areas (built before stormwater management requirements) and, pervious soil areas. Next, the appropriate stormwater management practice was determined for the properties identified and those were ranked based on their feasibility, how much they would improve water quality and, cost-effectiveness. While the stormwater management practice types focused on green infrastructure (stormwater volume-reducing practices such as infiltration) retrofitting stormwater ponds is a highly cost-effective practice and these projects rank well and are recommended. Complete details of *methods used to complete the rapid assessment and retrofit ranking is explained in a reference document titled “Assessment Methodology, Project Descriptions, and Retrofit Ranking Criteria For Monroe County Green Infrastructure Rapid Assessment Plans”*.

Two broad categories of retrofit project types were considered:

- 1) New stormwater ponds, upgrades to existing stormwater ponds and new stormwater storage to existing drainage channels.
- 2) Green Infrastructure (GI). This category was divided and ranked by where a GI project might be installed and includes:
 - Public Right of Ways,
 - Older Residential Neighborhoods, and
 - Other Locations (such as areas with large impervious surfaces ie shopping malls)

Other watershed retrofitting that would help meet water quality goals though considered outside of the scope of this report include the investigation and remediation of any stormwater hotspots and dechannelization and revegetation of straightened and degraded stream corridors.

Figure 7 shows project locations and project number within the watershed. Table 2 lists project addresses and how they scored. Diagrams of the top scoring projects follow the table.

Table 2 Tufa Glen Retrofit Ranking List

Map ID	Project Type	Overall Rank	Project Location	Feasibility	Watershed Benefits	Cost Effectiveness	Score
D2	Dry Pond	1	1451 Five Mile Line Rd	5	I, FS, WQ	3	13
D3	Dry Pond	1	1550 Scribner Rd	5	FS, WQ, CP	3	13
D1	Dry Pond	1	1575 Five Mile Line Rd	5	I, FS, WQ, CP	3	13
P2	New Pond	2	construct new pond in mowed area (no recreation)	5	I, F, WQ, CP	3	11
P1	New Pond	2	Plank Road South at southwest property corner	4	F, WQ, CP, E	3	11
W1	Wet Pond Conversion	2	1480 Scribner Rd (Beacon Hills)	5	F, WQ, CP	3	11
O5	Other GI Projects	3	T/O Penfield capture runoff from cor embury and scribner	2	I, WQ, SC, E	3	10
W2	Wet Pond Conversion	3	36A Woodfield Dr (across from Plank Rd S. Elem)	5	WQ, CP	3	10
N8	NGI	4	Beacon Hill	2	CR, WQ, E, SC	3	9
N2	NGI	4	Belvista	2	CR, WQ, E, SC	3	9
N9	NGI	4	Glenbrook	2	CR, WQ, E, SC	3	9
N11	NGI	4	Indian Ridge. witherspoon hitchcock stockton	2	CR, WQ, E, SC	3	9
N14	NGI	4	Manse Lane	2	CR, WQ, E, SC	3	9
N7	NGI	4	Piccidilly Park	2	CR, WQ, E, SC	3	9
N4	NGI	4	Royal Crest	2	CR, WQ, E, SC	3	9
N12	NGI	4	Royal Woods	2	CR, WQ, E, SC	3	9
N10	NGI	4	Sheffield Square	2	CR, WQ, E, SC	3	9
N13	NGI	4	Sheffield Square	2	CR, WQ, E, SC	3	9
N3	NGI	4	The Hamptons	2	CR, WQ, E, SC	3	9
N15	NGI	4	Thomas Maria Circle	2	CR, WQ, E, SC	3	9
N1	NGI	4	Tufa Glen	2	CR, WQ, E, SC	3	9
N5	NGI	4	Winchester	2	CR, WQ, E, SC	3	9
N6	NGI	4	Wyandale	2	CR, WQ, E, SC	3	9
O15	Other GI Projects	4	c-d-s bioretention Bethal Green	3	I, WQ	3	9
O16	Other GI Projects	4	c-d-s bioretention Cavendish	3	I, WQ	3	9
O8	Other GI Projects	4	c-d-s bioretention Cedarbrook Cir	3	I, WQ	3	9
O21	Other GI Projects	4	c-d-s bioretention Morning Woods	3	I, WQ	3	9

Tufa Glen Creek Retrofit Ranking List

Map I.D.	Project Type	Overall Rank	Project Location	Feasibility	Watershed Benefits	Cost Effectiveness	Score
O17	Other GI Projects	4	c-d-s bioretention Piccadilly	3	I, WQ	3	9
O10	Other GI Projects	4	c-d-s bioretention Robert Road	3	I, WQ	3	9
O25	Other GI Projects	4	c-d-s bioretention sunleaf	3	I,WQ	3	9
O9	Other GI Projects	4	c-d-s bioretention Winners Cir	3	I, WQ	3	9
O1	Other GI Projects	5	Bioretention - Capture runoff from parking lot	3	WQ,SC, E	3	8
W5	Wet Pond Conversion	5	406 Embury Road (Sanfilippo)	2	F,WQ,CP	3	8
O11	Other GI Projects	6	c-d-s bioretention Beechbrook(private dr)	2	WQ,SC	3	7
O19	Other GI Projects	6	c-d-s bioretention Crabtree	3	WQ	3	7
O14	Other GI Projects	6	c-d-s bioretention Creek Hill	3	WQ	3	7
O22	Other GI Projects	6	c-d-s bioretention Crestview	3	WQ	3	7
O18	Other GI Projects	6	c-d-s bioretention Flower Valley	3	WQ	3	7
O23	Other GI Projects	6	c-d-s bioretention Royal View	3	WQ	3	7
O12	Other GI Projects	6	c-d-s bioretention Sanfilippo Cir	3	WQ	3	7
O13	Other GI Projects	6	c-d-s bioretention Savannah Cir	3	WQ	3	7
O20	Other GI Projects	6	c-d-s bioretention Thomas Maria	3	WQ	3	7
O24	Other GI Projects	6	c-d-s bioretention woodfield	3	WQ	3	7
W3	Wet Pond Conversion	6	1350 Five Mile Line Rd (Church on cor of Plank)	3	FS, WQ, CP	3	7
W4	Wet Pond Conversion	6	5 Seawatch Trail	1	FS, WQ, CP	3	7

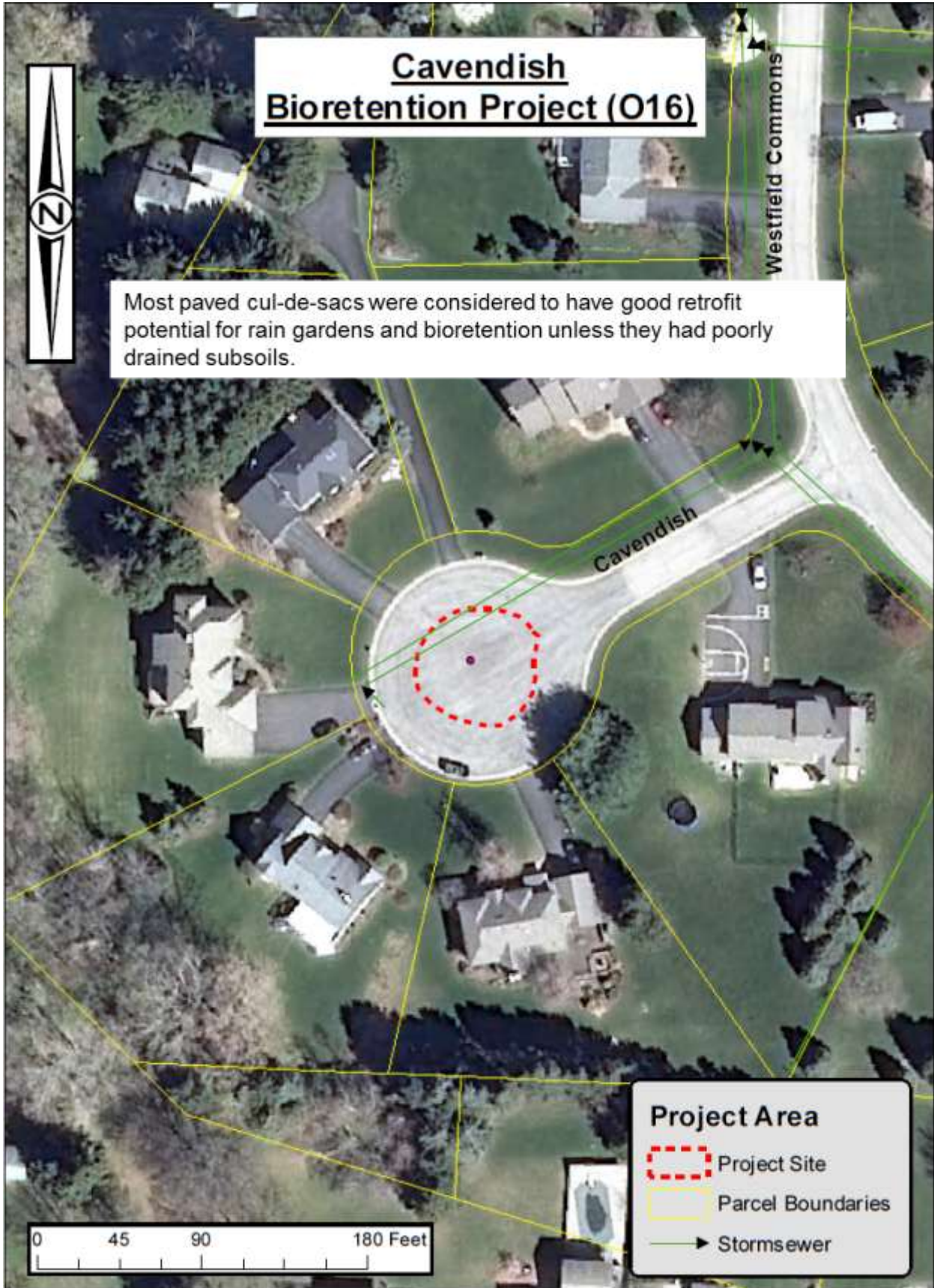




Belvista Neighborhood Green Infrastructure (N2)

This neighborhood was built in the 1960's before stormwater facilities were required so stormwater flows off this 113 lot residential subdivision untreated to Tufa Glen Creek. GI retrofits would be installed to capture roof runoff such as dry wells, vegetated filters, rain gardens and or rain barrels in order to increase water quality, flood storage, and community aesthetics.







References:

Center for Watershed Protection. 2004a. *Unified Stream Assessment: A User's Manual*. Manual 10 in the Urban Subwatershed Restoration Manual Series. Center for Watershed Protection, Inc. Ellicott City, MD.

2004b. *Unified Subwatershed and Site Reconnaissance: A User's Manual*. Manual 11 in the Urban Subwatershed Restoration Manual Series.

2005. *An Integrated Framework to Restore Small Urban Streams User's Manual*. Manual 1 in the Urban Subwatershed Restoration Manual Series.

2007. *Stormwater Retrofit Practices*. Manual 3 in the Urban Subwatershed Restoration Manual Series.

New York State Department of Environmental Conservation. 2004. *Ontario Basin Waterbody Inventory and Priority Waterbodies List, Revised 2007*

APPENDIX A

Rapid Assessment Compiled Data

Tufa Glen Creek Rapid Assessment Data

All files are located in the following parent directory if not otherwise stated: H:\IW\Stormwater\Asmnt\Tufa Glen\

Folder Name	Description	File Name	Data Origin
GIS Data			
	Parcel data clipped to the extent of the watershed boundary	TufaGlen_Parcels.shp	Monroe County
	Displays soil types and the drainage characteristics of the soils. An "A" soil has the highest drainage rate and "D" soils the lowest.	TufaGlen_HydroSoils.shp	Monroe County
	Points show the location of all the new pond, pond retrofit, impervious cover, and storage projects.	TufaGlen_Project_Sites.shp	Monroe County
	Shapefile of the watershed from the USGS StreamStats website. The boundary was reshaped to reflect the influence of stormwater and combined sewer system.	TufaGlen_Watershed_Boundary.shp	Originally from USGS StreamStats and then edited.
	A mostly complete shapefile from Monroe County GIS of storm sewers.	TufaGlen_Pittsford_SWMF.shp	Monroe County
	Indicates the basic stream channel path through the watershed.	TufaGlen_Streams.shp	Monroe County
Maps			
	A map of the watershed boundary.	Tufa Glen Watershed.pdf	Monroe County
	A map of the watershed displaying the different land use types based upon parcel data.	Tufa Glen LULC.pdf	Monroe County
	This map displays all of the hot spot locations throughout the watershed.	Tufa Glen HS.pdf	Monroe County
	This map displays all of the outfall locations throughout the watershed. The outfalls are rated based upon possible illicit discharge.	Tufa Glen Outfalls.pdf	Monroe County
	This map displays the hydrologic soils (A, B, C, D) throughout the watershed.	Tufa Glen Soils.pdf	Monroe County
	This map displays the locations of various stream projects throughout the watershed.	Tufa Glen Stream Projects.pdf	Monroe County
	This map displays the locations of the potential projects sites throughout the watershed.	Tufa Glen Project Sites.pdf	Monroe County

Tufa Glen Creek Rapid Assessment Data

All file are located in the following parent directory if not otherwise stated: H:\W\Stormwater\Asmnt\Tufa Glen\

Folder Name	Description	File Name	Data Origin
Retrofit Diagrams			
D2	1451 Five Mile Line Rd	.pdf and .mxd	Monroe County
D3	1550 Scribner Rd	.pdf and .mxd	Monroe County
D1	1575 Five Mile Line Rd	.pdf and .mxd	Monroe County
P2	construct new pond in mowed area (no recreation)	.pdf and .mxd	Monroe County
P1	Plank Road South at sothwest property corner	.pdf and .mxd	Monroe County
W1	1480 Scribner Rd (Beacon Hills)	.pdf and .mxd	Monroe County
O5	T/O Penfield capture runoff from cor embury and scribner	.pdf and .mxd	Monroe County
W2	36A Woodfield Dr (across from Plank Rd S. Elem)	.pdf and .mxd	Monroe County
N8	Beacon Hill	.pdf and .mxd	Monroe County
N2	Belvista	.pdf and .mxd	Monroe County
N9	Glenbrook	.pdf and .mxd	Monroe County
N11	Indian Ridge. witherspoon hitchcock stockton	.pdf and .mxd	Monroe County
N14	Manse Lane	.pdf and .mxd	Monroe County
N7	Piccidilly Park	.pdf and .mxd	Monroe County
N4	Royal Crest	.pdf and .mxd	Monroe County
N12	Royal Woods	.pdf and .mxd	Monroe County
N10	Sheffield Square	.pdf and .mxd	Monroe County
N13	Sheffield Square	.pdf and .mxd	Monroe County
N3	The Hamptons	.pdf and .mxd	Monroe County
N15	Thomas Maria Circle	.pdf and .mxd	Monroe County
N1	Tufa Glen	.pdf and .mxd	Monroe County
N5	Winchester	.pdf and .mxd	Monroe County
N6	Wyandale	.pdf and .mxd	Monroe County
O15	c-d-s bioretention Bethal Green	.pdf and .mxd	Monroe County
O16	c-d-s bioretention Cavendish	.pdf and .mxd	Monroe County
O8	c-d-s bioretention Cedarbrook Cir	.pdf and .mxd	Monroe County
O21	c-d-s bioretention Morning Woods	.pdf and .mxd	Monroe County
O17	c-d-s bioretention Piccadilly	.pdf and .mxd	Monroe County
O10	c-d-s bioretention Robert Road	.pdf and .mxd	Monroe County
O25	c-d-s bioretention sunleaf	.pdf and .mxd	Monroe County
O9	c-d-s bioretention Winners Cir	.pdf and .mxd	Monroe County

Tufo Glen Creek Rapid Assessment Data

All file are located in the following parent directory if not otherwise stated: H:\W\Stormwater\Asmnt\Tufo Glen\

Folder Name	Description	File Name	Data Origin
O1	Bioretention -Capture runoff from parking lot	.pdf and .mxd	Monroe County
W5	406 Embury Road (Sanfilippo)	.pdf and .mxd	Monroe County
O11	c-d-s bioretention Beechbrook(private dr)	.pdf and .mxd	Monroe County
O19	c-d-s bioretention Crabtree	.pdf and .mxd	Monroe County
O14	c-d-s bioretention Creek Hill	.pdf and .mxd	Monroe County
O22	c-d-s bioretention Crestview	.pdf and .mxd	Monroe County
O18	c-d-s bioretention Flower Valley	.pdf and .mxd	Monroe County
O23	c-d-s bioretention Royal View	.pdf and .mxd	Monroe County
O12	c-d-s bioretention Sanfilippo Cir	.pdf and .mxd	Monroe County
O13	c-d-s bioretention Savannah Cir	.pdf and .mxd	Monroe County
O20	c-d-s bioretention Thomas Maria	.pdf and .mxd	Monroe County
O24	c-d-s bioretention woodfield	.pdf and .mxd	Monroe County
W3	1350 Five Mile Line Rd (Church on cor of Plank)	.pdf and .mxd	Monroe County
W4	5 Seawatch Trail	.pdf and .mxd	Monroe County

APPENDIX B

NYSDEC PWL Datasheet

Minor Tribs to Irondequoit Bay (0302-0038)**Impaired Seg****Waterbody Location Information**

Revised: 05/04/2007

Water Index No:	Ont 108/P113- 1 thru 6 (selected)	Drain Basin:	Lake Ontario
Hydro Unit Code:	04140101/020	Str Class:	C
Waterbody Type:	River (Low Flow)	Reg/County:	8/Monroe Co. (28)
Waterbody Size:	9.7 Miles	Quad Map:	ROCHESTER EAST (I-10-2)
Seg Description:	total length of smaller/selected tribs		

Water Quality Problem/Issue Information (CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
AQUATIC LIFE	Impaired	Suspected
RECREATION	Impaired	Suspected

Type of Pollutant(s)

Known: NUTRIENTS (phosphorus)
 Suspected: D.O./OXYGEN DEMAND, PATHOGENS
 Possible: - - -

Source(s) of Pollutant(s)

Known: URBAN/STORM RUNOFF
 Suspected: MUNICIPAL (unknown), ON-SITE/SEPTIC SYST
 Possible: Other Sanitary Disch

Resolution/Management Information

Issue Resolvability:	1 (Needs Verification/Study (see STATUS))	
Verification Status:	3 (Cause Identified, Source Unknown)	
Lead Agency/Office:	DOW/Reg8	Resolution Potential: Medium
TMDL/303d Status:	3b*	

Further Details

Aquatic life support and recreational uses of Densmore Creek is thought to be limited by sewage inputs and various urban runoff impacts. Various nonpoint urban and stormwater runoff sources are suspected of causing water quality impacts to most of the smaller minor tribs to the bay.

A biological (macroinvertebrate) assessment of Densmore Creek in Newport (at Bayshore Drive) was conducted in 1999. Sampling results indicated moderately impacted water quality conditions. Impact Source Determination identified sewage wastes as the primary factor affecting the fauna. (DEC/DOW, BWAM/SBU, January 2001)

This segment includes the total length of selected/smaller tribs to Irondequoit Bay. Tribs within this segment, including Densmore Creek (-5), are Class C. Irondequoit Creek (-3) is listed separately.