BOROUGH OF ZELIENOPLE
Butler County,
Pennsylvania

Stormwater Evaluation Report
(Spring Street & Glade Run Watersheds)

July 2019

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Mercer, PA

Table of Contents

ATTACHMENTS

1.0 INTRODUCTION

Through the past few years, the Borough of Zelienople and the surrounding areas within Butler County have been experiencing several significant flooding events. The Borough has been proactive in trying to alleviate flooding impacts within the Borough through mitigation efforts such as stream restoration and implementation of flood control measures such as the installation of three earth filled berms in the Unnamed Tributary to the Connoquenessing Creek for the community park. However, even with these efforts, there are several areas throughout the Borough where flooding has and is continuing to be a major issue.

Therefore, pursuant to the Borough of Zelienople Board's request, Gannett Fleming (GF) has completed a storm evaluation of the Spring Street and Glad Run Watersheds located within the Borough. This report summarizes GF's evaluation of the streams within these two watersheds, list the significance of each stream obstruction observed and provides recommendation as to how the Borough should deal with/eliminate each obstruction.

2.0 WATERSHED EVALUATION

On June 21, 2019, a representative from GF identified various stream obstructions in the most critical areas of the Borough. Obstructions were divided into three separate categories: Debris, Structural and Natural Obstructions. Below provides a list of various items observed during the field visit per category:

Debris Obstructions:

- Wooden Objects
- Tires
- Pipe Supports
- Fire Pits
- Bricks
- Homeowner Debris
- Brush
- Firewood
- Lawn Clippings

Structural Obstructions:

- Bridges
- Utility Poles
- Sheds
- Culverts
- Retaining Walls
- Gazebos
- Utility Pipe (Aerial Crossings)

Natural Obstructions:

- Fallen Trees
- Wooden Brush

As previously stated, the two critical watersheds that were analyzed and evaluated were Glad Run and Spring Street Watersheds. Both Glade Run and Spring Street are two out of the four major watersheds that exist within the Borough of Zelienople. A Watershed Delineation outlining the four major watersheds within the Borough can be seen in Attachment A.

To illustrate the severity of each stream obstruction, a ranking system was created classifying each obstruction as high, medium, or low priority within each watershed. Each obstruction can be referenced in GF's stream survey report, which is included as Attachment B.

Spring Street Watershed

The Spring Street Watershed, which has a footprint of approximately 428 acres, is considered the most critical watershed because it runs through the center of the Borough and also through the center of the high value commercial district. The network of sewers through

this watershed consists of a variety of shapes, sizes and materials of construction. During GF's field visit, a number of obstructions and bottlenecks were identified in the various stream channels of this watershed. After evaluating all the obstructions within the watershed, the following provides a list classifying each as high, medium and low priority as well as the location of the obstruction.

High Priority

1. Pipe Culverts:
    - Culvert located near the intersection of S High St and E Beaver St. The culvert consists of two 20" diameter concrete pipes. Refer to Page 16 of the Survey Report in Attachment B.
    - Culvert located off S Division St. near Zelienople Pool. The culvert consists of two 24" diameter concrete pipes. Refer to Page 13 of the Survey Report in Attachment B.
    - Culvert located near the intersection of S Oliver Ave. and E Culvert St. The culvert consists of one 45" diameter concrete pipe. Refer to Page 15 of the Survey Report in Attachment B.
    - Culvert located off S High St in between E Beaver St. and E Culvert St. The culvert consists of one 50" diameter concrete pipe. Refer to Page 16 of the Survey Report in Attachment B.
    - Culvert located off Linden St. Due to the location of the culvert, the diameter was unable to be recorded. Refer to Page 17 of the Survey Report in Attachment B.
    - Culvert/Walking Bridge located on the westside S Oliver St. between E Beaver St. and E Culvert St. The culvert consists of one 41" diameter Corrugated Metal Pipe. Refer to Page 15 of the Survey Report in Attachment B. As can be seen from the pictures in attachment B, significant debris is currently coking the flow through this culvert.
    - Culvert located on the eastside of S Oliver St. between E Beaver St. and E Culvert St. The culvert consists of one 40" diameter Corrugated Metal Pipe. Refer to Page 15 of the Survey Report in Attachment B.

Medium Priority

1. Footbridges
    - Footbridge located off of Parkedge Dr. Current clearance above streambed is approximately 12.5". Refer to Page 12 of the Survey Report in Attachment B.
    - Footbridge located east of the intersection of S Pittsburgh St. and Terrace Ave Exd. Current clearance above streambed varies from 4" to 19" across the length of the bridge. Refer to Page 12 of the Survey Report in Attachment B.
    - Footbridge located north of E Culvert St. near the community baseball field. Current clearance above streambed is approximately 25". Refer to Page 14 of the Survey Report in Attachment B.
    - Footbridge located north of 305 E Culvert St. near the community baseball field. Current clearance above streambed is approximately 25". Refer to Page 14 of the Survey Report in Attachment B.
    - Footbridge located north 309 E Culvert St. near the community baseball field. Current clearance above streambed is approximately 34.5". Homeowner confirmed water level reaches 6" below bridges during rain events. Refer to Page 14 of the Survey Report in Attachment B.
    - Footbridge located off Tom Schneider Circle east of the Zelienople Pool. Current clearance above streambed is approximately 36". Refer to Page 12 of the Survey Report in Attachment B.
    - Footbridge located north 307 E Culvert St. near the community baseball field. Current clearance above streambed is approximately 37". Refer to Page 14 of the Survey Report in Attachment B.
2. Aerial Utility Pipe Crossing
    - Aerial utility pipe crossing located to the south of 180 Walnut St. Diameter of the pipe crossing is approximately 8" - 12". Also, several cinder blocks were observed near the crossing.

Low Priority

1. Fallen Trees
    - Through the Spring Street Watershed, 17 location were identified where trees had fallen directly into the stream channel. It was observed during GF's field visit that at each of the 17 location, the natural stream flow had been coked as a result of these impacts. Refer to Pages 19 – 23 of the Survey Report in Attachment B.
2. Debris from Human Activity
    - A number of locations throughout the Spring Street Watershed where debris from human activity is currently impacting streams were identified. Debris included lawn clippings, planting beds, brush, fire pits, large piles of gravel and dirt, and etc. Most of the debris identified was located on the banks of the stream. This debris may cause water backups and the potential for more flooding. Refer to Pages 3 – 9 of the Survey Report in Attachment B.

Glade Run Watershed

The Glade Run Watershed, which has a footprint of approximately 3,035 acres, originates outside the Borough entering the southern part of the Borough near the Perry Highway. As compared to the Spring Street Watershed, the number of obstructions observed throughout Glade Run Watershed was found to be significant smaller during GF's field visit. Also, no culverts were identified throughout this watershed during the field visit. As with the Spring Street Watershed, the following provides a list classifying each obstruction as high, medium and low priority as well as the location of the obstruction within the Glade Run Watershed.

Medium Priority

1. Shed On Stream Bank
    - Shed of homeowner at 701 Market St. is currently fallen into Glade Run Stream. As the bank continues to erode, the entire shed will eventually block all or most of the existing stream channel. Refer to Page 17 of the Survey Report in Attachment B.

Low Priority

2. Fallen Trees
    - Through the Glade Run Watershed, five location were identified where trees had fallen directly into the stream channel. It was observed during GF's field visit that at each of the five location, the natural stream flow had been coked as a result of these impacts. Refer to Pages 23 and 24 of the Survey Report in Attachment B.
3. Debris from Human Activity
    - A number of locations throughout the Spring Street Watershed where debris from human activity is currently impacting streams were identified. Debris included asphalt from an adjacent parking lot falling into stream and wooden debris. Debris identified was located on the banks of the stream. This debris may cause water backups and the potential for more flooding. Refer to Pages 9 and 10 of the Survey Report in Attachment B.,

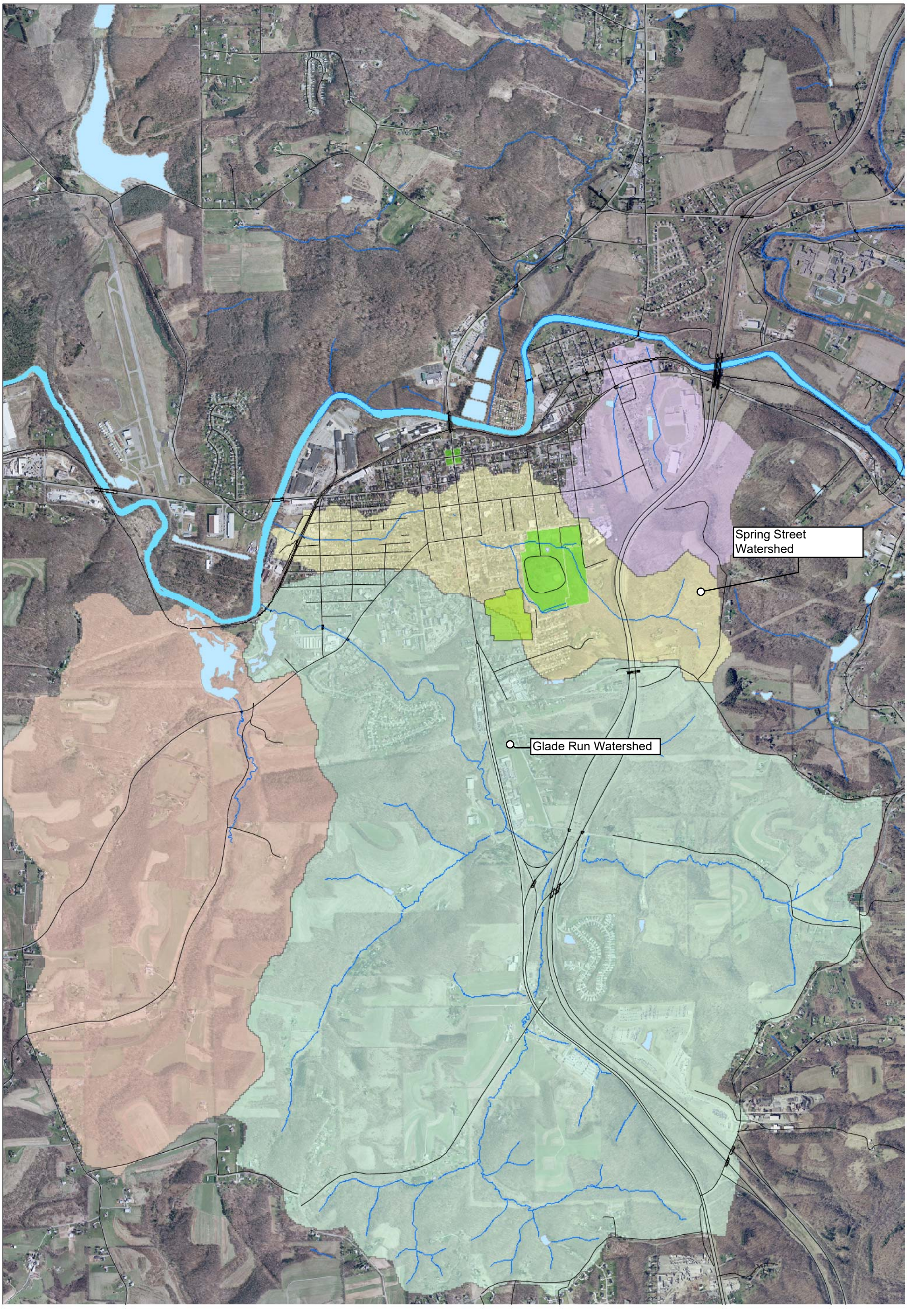
3.0 RECOMMENDATIONS

After extensive review of the information gathered from the June 21, 2019 field visit, GF recommends stormwater rehabilitation be focused towards the Spring Street Watershed mainly at the seven culvert locations identified in the Survey Report. These seven locations are potential bottlenecks in the storm system making them high priority rehabilitation sites. Additional analysis should be performed for these seven sites to confirm they all have the capacity to convey the peak design flow and size them appropriately if they cannot. GF also recommends the Borough monitor all the footbridges and aerial crossing locations to ensure debris is not getting caught creating blockage in the stream at these locations.

Lastly, creating a cleanup plan for both the Spring Street and Glade Run Watersheds is recommended. The Borough should first look to remove all fallen trees and debris (tires, wooden object, etc.) that are directly impacting stream channels throughout the two watersheds. The Borough should then contact Borough residences that have or could potential impact stream flow as a result of activity outlined in the Survey Report in Attachment B.

ATTACHMENT A

(WATERSHED DELINEATION MAP)


Spring Street
Watershed
Glade Run Watershed

ATTACHMENT B

(ZELIENOPLE STORM SURVEY REPORT)

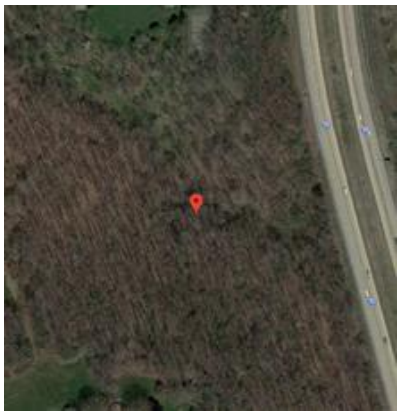
Zelienople Storm Evaluation:

Stream Survey

21 June 2019

Debris Obstructions

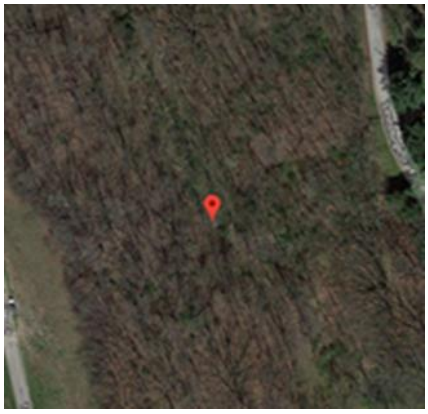
Spring Street Watershed



Type of Obstruction: Wooden Object

GPS Coordinates: 40°47'19.4"N 80°07'33.4"W

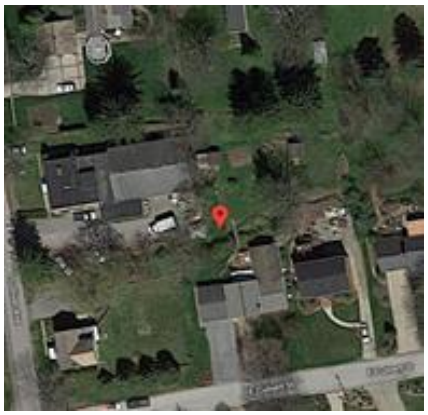
Notes:



Type of Obstruction: Tire

GPS Coordinates: 40°47'27.1"N 80°07'41.1"W

Notes:



Type of Obstruction: Fire Pit

GPS Coordinates: 40°47'31.8"N 80°07'59.1"W

Notes: I don't believe that this was secured

Type of Obstruction: Many

GPS Coordinates: 40°47'31.6"N 80°08'02.0"W

Notes: Bricks, brush, wooden supports, rock retaining wall next to pipe opening

Type of Obstruction: Firewood Pile

GPS Coordinates: 40°47'31.6"N 80°08'02.4"W

Notes:

Type of Obstruction: Pipe Supports

GPS Coordinates: 40°47'32.6"N 80°08'06.5"W

Notes: Located immediately next to stream

Type of Obstruction: Wooden Brush and Bricks

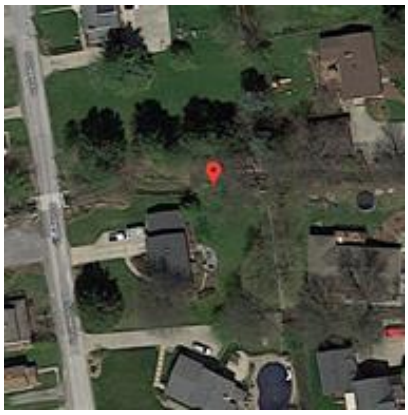
GPS Coordinates: 40°47'32.6"N 80°08'06.5"W

Notes: Bricks appear to be homemade retaining wall.

Type of Obstruction: Firewood Pile and Wooden Brush

GPS Coordinates: 40°47'38.8"N 80°08'21.3"W

Notes:



Type of Obstruction: Rock and Firewood

GPS Coordinates: 40°47'38.4"N 80°08'24.4"W

Notes: Firewood File Supports appear unstable. Various pieces of rock, brick, and wood next to it.

Type of Obstruction: Misc. Homeowner Debris

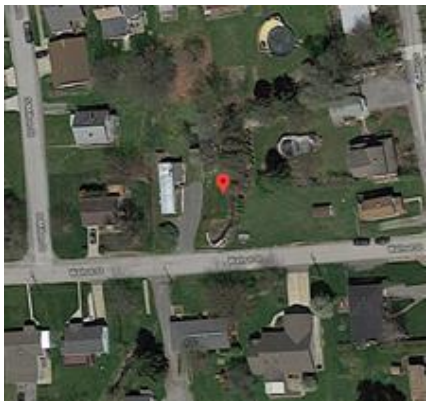
GPS Coordinates: 40°47'38.3"N 80°08'26.4"W

Notes: Other various items to the right of this image

Type of Obstruction: Lawn Clippings and Various Debris

GPS Coordinates: 40°47'38.2"N 80°08'27.6"W

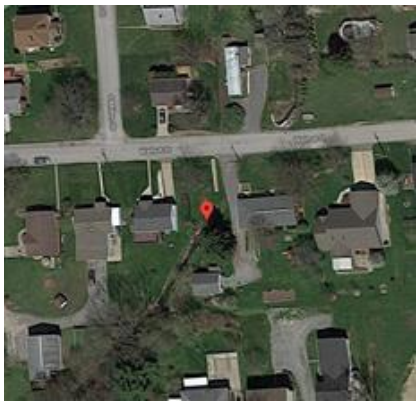
Notes: Brush, loose items, lawn clippings, metal piping, large rocks



Type of Obstruction: Turf and Various Debris

GPS Coordinates: 40°47'36.9"N 80°08'28.5"W

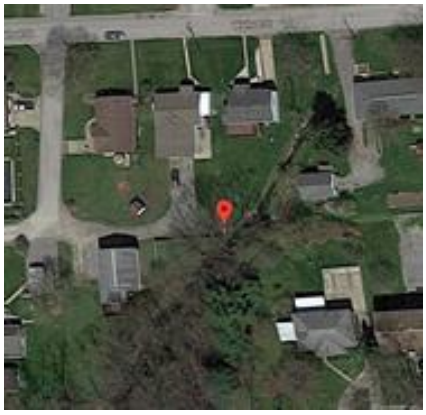
Notes: Large piece of cloth turf folded on stream bank



Type of Obstruction: Lawn Clippings

GPS Coordinates: 40°47'35.5"N 80°08'29.6"W

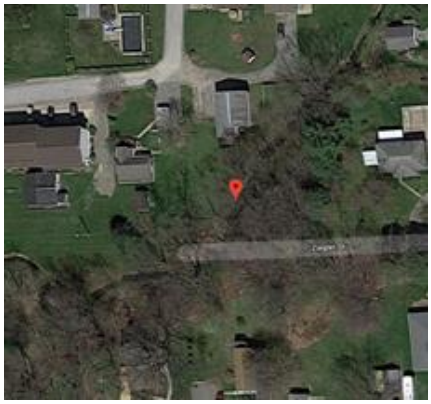
Notes: Large Pile



Type of Obstruction: Horizontal Pipe

GPS Coordinates: 40°47'34.5"N 80°08'30.6"W

Notes:



Type of Obstruction: Lawn Clippings

GPS Coordinates: 40°47'33.4"N 80°08'31.6"W

Notes: Large Pile

Type of Obstruction: Various Debris

GPS Coordinates: 40°47'32.8"N 80°08'32.8"W

Notes: Bricks, brush, lawn clippings, secured fire pit

Type of Obstruction: Homemade planting Bed

GPS Coordinates: 40°47'32.8"N 80°08'34.8"W

Notes: Rocks, wooden planks, brush

Type of Obstruction: Various Debris

GPS Coordinates: 40°47'32.5"N 80°08'35.5"W

Notes: Wooden planks, metal, mesh netting, bricks, wooden brush

Type of Obstruction: Lawn Clippings

GPS Coordinates: 40°47'32.7"N 80°08'37.6"W

Notes: Large Pile

Type of Obstruction: Wood and Blocks

GPS Coordinates: 40°47'32.0"N 80°08'42.0"W

Notes:

Type of Obstruction: Gravel Pile

GPS Coordinates: 40°47'32.3"N 80°08'49.2"W

Notes: Huge Gravel Pile bordering edge of stream from industrial park

Type of Obstruction: Various Debris

GPS Coordinates: 40°47'34.1"N 80°08'58.3"W

Notes: Trash by edge overlooking stream from materials plant.

Glade Run Watershed

Type of Obstruction: Parking Lot

GPS Coordinates: 40°47'12.7"N 80°08'43.1"W

Notes: Portion of parking lot sliding into stream

Type of Obstruction: Various wooden Debris

GPS Coordinates: 40°47'14.8"N 80°08'49.5"W

Notes: Including Plywood

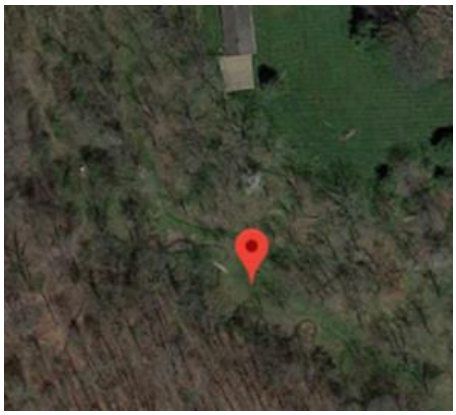
Type of Obstruction: Wooden Pallet

GPS Coordinates: 40°47'14.6"N 80°08'51.6"W

Notes:

Structural Obstructions

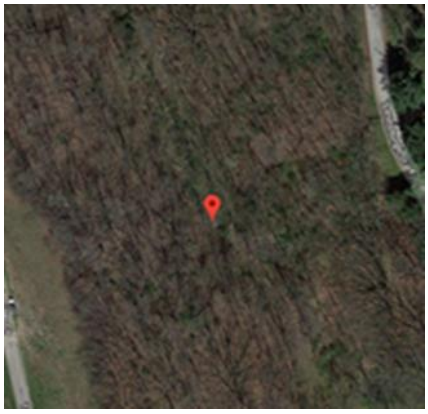
Spring Street Watershed



Type of Obstruction: Bridge

GPS Coordinates: 40°47'22.5"N 80°07'36.7"W

Notes: Bridge Clearance is ~12.5 in. from stream bed



Type of Obstruction: Bridge

GPS Coordinates: 40°47'27.1"N 80°07'41.1"W

Notes: Bridge Clearance is max ~19 in, min ~4 in. from stream bed

Type of Obstruction: Bridge

GPS Coordinates: 40°47'31.2"N 80°07'45.8"W

Notes: Bridge Clearance is ~36 in. from stream bed

Type of Obstruction: Bridge & Pipe

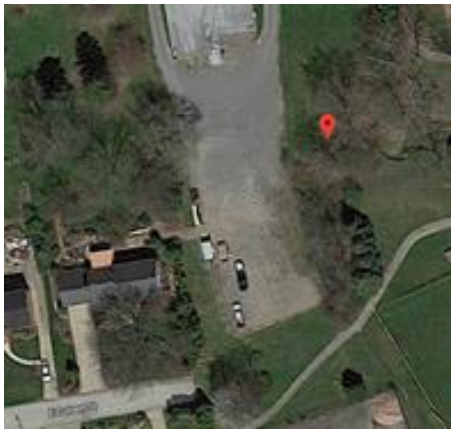
GPS Coordinates: 40°47'32.6"N 80°07'50.1"W

Notes: Two pipe bridge. Both diameters ~23.5 in.

Type of Obstruction: Gazebo

GPS Coordinates: 40°47'32.8"N 80°07'53.4"W

Notes: Gazebo support and gazebo on direct edge of stream bed



Type of Obstruction: Pipe

GPS Coordinates: 40°47'32.7"N 80°07'54.8"W 40°47'32.2"N 80°07'56.6"W

Notes: Brush covering pipe. Estimated between 36-39 in. diameter.

Type of Obstruction: Bridge

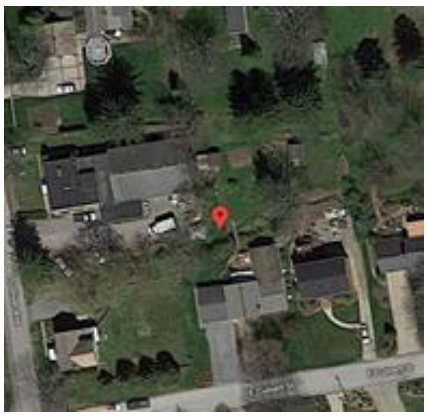
GPS Coordinates: 40°47'32.1"N 80°07'57.2"W

Notes: Clearance: 34.5 in. Homeowner said water level reached about 6 inches below bridge .

Type of Obstruction: Bridge

GPS Coordinates: 40°47'31.9"N 80°07'58.2"W

Notes: Bridge clearance ~37 in.



Type of Obstruction: Bridge

GPS Coordinates: 40°47'31.8"N 80°07'59.1"W

Notes: Bridge clearance ~25 in.

Type of Obstruction: Snapped Post

GPS Coordinates: 40°47'31.8"N 80°07'59.1"W

Notes:

Type of Obstruction: Pipe

GPS Coordinates: 40°47'31.6"N 80°08'01.0"W

Notes: Pipe diameter ~40 in, driveway immediately next to screen

Type of Obstruction: Pipe & Wood Supports

GPS Coordinates: 40°47'31.6"N 80°08'02.0"W

Notes: Pipe diameter ~45 in. Wood supports in stream, rock pile to stream side.

Type of Obstruction: Bridge & Pipe

GPS Coordinates: 40°47'31.6"N 80°08'02.4"W

Notes: Pipe diameter ~41 in. Large debris in front of pipe.

Type of Obstruction: Pipe

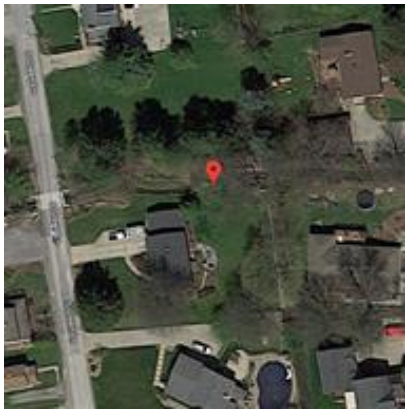
GPS Coordinates: 40°47'31.8"N 80°08'05.1"W

Notes: Pipe diameter ~49-51 in.

Type of Obstruction: Pipe

GPS Coordinates: 40°47'32.6"N 80°08'06.5"W

Notes: Both pipe diameters ~19-21 in.



Type of Obstruction: Retaining Wall

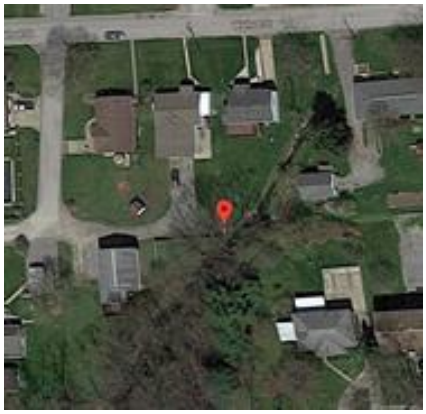
GPS Coordinates: 40°47'38.4"N 80°08'24.4"W

Notes: Retaining Wall possibly made by homeowner

Type of Obstruction: Retaining Wall

GPS Coordinates: 40°47'38.3"N 80°08'26.4"W

Notes: Retaining Wall possibly made by homeowner



Type of Obstruction: Horizontal Pipe

GPS Coordinates: 40°47'34.5"N 80°08'30.6"W

Notes:

Type of Obstruction: Pipe

GPS Coordinates: 40°47'32.1"N 80°08'40.5"W

Notes: Unable to get pipe diameter due to location

Glade Run Watershed

Type of Obstruction: Shed

GPS Coordinates: 40°47'14.8"N 80°08'49.5"W

Notes: Shed beginning to fall into stream

Natural Obstructions

Spring Street Watershed

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'19.3"N 80°07'31.4"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'19.3"N 80°07'32.5"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'19.4"N 80°07'33.4"W

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'20.7"N
80°07'34.6"W

Type of Obstruction: Wooden Brush

GPS Coordinates: 40°47'21.8"N
80°07'34.7"W

Type of Obstruction: Wooden Brush

GPS Coordinates: 40°47'22.0"N
80°07'35.8"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'23.2"N
80°07'37.8"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'26.2"N 80°07'40.3"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'28.4"N 80°07'42.1"W

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'30.9"N 80°07'45.0"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'36.9"N 80°08'28.5"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'33.4"N 80°08'31.6"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'32.8"N 80°08'34.8"W

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'32.5"N 80°08'35.5"W

Type of Obstruction: Wooden Brush

GPS Coordinates: 40°47'32.1"N 80°08'45.0"W

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'34.5"N
80°08'59.5"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'34.8"N
80°09'00.7"W

Glade Run Watershed

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'10.3"N
80°08'38.2"W

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'13.4"N
80°08'44.5"W

Type of Obstruction: Fallen Tree

GPS Coordinates: 40°47'14.6"N
80°08'51.6"W

Type of Obstruction: Wooden Brush

GPS Coordinates: 40°47'15.6"N
80°08'53.7"W

Type of Obstruction: Fallen Tree
Wooden Brush

GPS Coordinates: 40°47'17.4"N
80°09'01.2"W