# Final Report
# Pheasant Branch Watershed Study

City of Madison, WI
October 26, 2022

Accepted by Board of Park Commissioners February 8, 2023, Legistar File No. 75761
Accepted by the Board of Public Works March 8, 2023, Legistar File No. 76225

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# List of Abbreviations

| | |
|---|---|
| 1D | One-Dimensional |
| 2D | Two-Dimensional |
| ATC | American Transmission Company |
| CMP | corrugated metal pipe |
| cfs | cubic feet per second |
| CIP | Capital Improvement Plan |
| City | City of Madison |
| DCIA | directly connected impervious area |
| ESRI | Environmental Systems Research Institute |
| FEMA | Federal Emergency Management Agency |
| H&H | hydrologic and hydraulic |
| GI | Green Infrastructure |
| GIS | Geographic Information System |
| gpm | gallons per minute |
| HERCP | horizontal elliptical reinforced concrete pipe |
| HSG | hydrologic soil group |
| LiDAR | light detecting and ranging |
| LOS | Level of Service |
| MG&E | Madison Gas and Electric |
| MPO | Metropolitan Planning Organization |
| MSE | Midwest/Southeast States |
| NAVD88 | North American Vertical Datum of 1988 |
| NOAA | National Oceanographic and Atmospheric Administration |
| NRCS | Natural Resources Conservation Service |
| PFCI | Peak Flow Control Infrastructure |
| PIM | Public Information Meeting |
| QA/QC | quality assurance/quality control |
| RCP | reinforced concrete pipe |
| ROW | right-of-way |
| SAS | storm access structure |
| SLU | standard land use |
| STH | State Highway |

| | |
|---|---|
| SWMP | stormwater management plan |
| TIN | triangular irregular network |
| USGS | United States Geological Survey |
| UW | University of Wisconsin |
| VC | Volume Control |
| WDNR | Wisconsin Department of Natural Resources |
| WSE | Water Surface Elevation |
| WisDOT | Wisconsin Department of Transportation |
| WPDES | Wisconsin Pollutant Discharge Elimination System |
| XP-SWMM | Autodesk (formally XP-Solutions) Stormwater Management Model |

# Executive Summary

## Background

Recognizing the changing rain patterns, and likelihood of more frequent future large rain events, the City of Madison (City) is conducting a multifaceted approach to address stormwater flooding. As one component of that approach, the City is developing comprehensive stormwater management studies for each watershed within the City. The comprehensive watershed studies are conducted in two phases. Throughout both phases, the City incorporates multiple opportunities for public involvement and interaction.

Phase 1: Development of a hydrologic/hydraulic stormwater runoff model representing the physical and drainage properties of the watershed under existing conditions. The model is then calibrated to measured runoff events and used to identify the areas of the watershed most likely to flood under various rain conditions.

Phase 2: Using the model, alternative methods and/or infrastructure improvements are evaluated to eliminate or reduce flooding impacts from large rain events.

It should be noted that the improvements documented in this report are not meant to be full design-level efforts; they are conceptual solutions that help the City's Engineering Division understand the magnitude of solution needed in a given area to meet the targets. As projects are looked at further, and if they move to the point they are contemplated for programming, then projects will then go into a more detailed design phase. This project phase collects detailed data needed for design and looks at refined design, permitting, and environmental issues associated with the particular project.

This document reports the methods, procedures, and results from Phase 1 of the Pheasant Branch Watershed project. The project area covers approximately 3,300 acres (5.2 square miles). The watershed consists of three distinct areas: 1) Blackhawk, 2) Old Sauk Trails, and 3) Wexford.

Figure 1 shows the extent of the project area.

## City's Flood Mitigation Targets

The analyses conducted for the watershed studies referred back to the City's flood mitigation targets to understand where targets were being met and where there is room for improvement. The City has the following flood mitigation targets. Please note, these targets may change in the future as more information becomes available.

1. No home or business flooding during the 1 percent chance, 24-hour design storm event (6.6 inches).
2. Eliminate flooding (surcharging of the storm sewer system onto the municipal streets) for up to the 10 percent chance, 24-hour design storm event (4.1 inches), with the exception of road low points.
3. Allow no more than 0.5 feet of stormwater ponding above storm sewer inlet rim elevations at inlet-restricted low points for the 10 percent chance, 24-hour design storm event (4.1 inches).
4. Maintain drivability of municipal streets (center of the street with no more than 0.2 feet of water) for the 4 percent chance, 24-hour design storm event (5.0 inches).

5. Enclosed depressions should provide safe storage, or overflow, of stormwater during the 1 percent chance, 24-hour design storm event (6.6 inches). Flooding should be contained within public lands (streets, greenways, easements, etc.).
6. Where greenways cross streets, there should be no road overtopping during the 1 percent chance, 24-hour design storm event (6.6 inches).
7. Flooding solutions should not negatively impact downstream properties.

## Existing Conditions Results

The results of the existing conditions analysis indicates there are numerous locations where the City's flood mitigation targets are not met:

1. 10 percent chance storm event (10-year design storm)
   a. 10.3 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 19 percent of the streets in the watershed.
2. 4 percent chance storm event (25-year design storm)
   a. 2.9 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 6 percent of the streets in the watershed.
3. 1 percent chance storm event (100-year design storm)
   a. 118 structures out of 2,920 structures in the watershed do not meet the target. This equates to 4 percent of the structures in the watershed.
   b. 14 out of 14 greenway crossings in the watershed do not meet the target. This equates to 100 percent of the greenway crossings in the watershed.

Figure ES-1 shows surface flooding locations under the 4 percent chance storm event and how the performance of the stormwater conveyance system compares to the City's flood mitigation targets.

## Proposed Solutions and Cost

Following the existing conditions analysis, an extensive process was conducted to brainstorm, evaluate, and ultimately identify solutions to meet the City's flood mitigation targets. The following table lists the solutions that were recommended, along with estimated design and construction cost for each. Figures depicting each solution can be found later in this report.

Table ES-1. Proposed Solution Design and Construction Cost

| **Project Name** | **Design and Construction Cost ($)** |
|---|---|
| Old Sauk Trails (OSTr) Business Park Pond and Greenways | $9,178,000 |
| *Old Sauk Trails Ponds* | *$3,074,000* |
| *Old Sauk Trails East Greenway* | *$1,714,000* |
| *Old Sauk Trails West Greenway* | *$475,000* |
| *Deming Way west of OSTr Ponds (Culverts)* | *$570,000* |
| *Driveway to OSTr Ponds (Culverts)* | *$145,000* |
| *Deming Way north of OSTr Ponds (Culverts)* | *$1,570,000* |
| *In OSTr Ponds (Culverts)* | *$580,000* |
| *Fourier Drive east of OSTr Ponds (Culverts)* | *$1,050,000* |

| | |
|---|---|
| Swallowtail Pond Reconstruction | $2,373,000 |
| *Swallowtail Pond* | *$2,203,000* |
| *Pleasant View Road (Greenway Crossing)** | *$170,000* |
| Blackhawk Pond Reconstruction | $6,990,000 |
| *Blackhawk Pond* | *$5,326,000* |
| *Blackhawk Outlet Structure and Overflow* | *$1,665,000* |
| Wexford Pond and Greenway Reconstruction | $4,784,000 |
| Sauk Creek Greenway Reconstruction | $4,000,000 |
| Target Pond Relief Sewer | $11,105,000 |
| Old Sauk Trail/Westfield Intersection Reconstruction | $1,938,000 |
| High Point Road west of Wexford Pond (Greenway Crossing) | $739,000 |
| High Point Road from Sauk Creek to Wexford Pond (Greenway Crossing) | $9,768,000 |
| Old Sauk Road (Greenway Crossing) | $664,000 |
| Westfield Road (Greenway Crossing) | $416,000 |
| Tree Lane east of High Point Road (Greenway Crossing) | $1,167,000 |
| High Point Road south of Tree Lane (Greenway Crossing) | $769,000 |
| Tree Lane west of High Point Road (Greenway Crossing) | $711,000 |
| Beltline downstream of Wexford Pond (Greenway Crossing) | $5,390,000 |
| Local sewer upgrades | $15,086,000 |
| **Total** | **$75,079,000** |

Note: Italics indicate sub-projects within a larger, overall project.

## Proposed Solutions Results

As the proposed solutions were being evaluated, they were compared to the flood mitigation targets. The proposed conditions analysis found the following when compared to the City's flood mitigation targets:

1. 10 percent chance storm event
   a. 1.0 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 2 percent of the streets in the watershed. This is a reduction of 17 percent.
2. 4 percent chance storm event
   a. 0.8 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 2 percent of the streets in the watershed. This is a reduction of 4 percent.
3. 1 percent chance event
   a. 57 structures out of 2,920 structures in the watershed do not meet the target. This equates to 2 percent of the structures in the watershed. This is a reduction of 2 percent.
   b. 14 out of 14 greenway crossings in the watershed meet the target. This equates to 100 percent of the greenway crossings in the watershed. This is a reduction of 100 percent.

There are still locations where the flood mitigation targets are not met. The targets cannot be met for various reasons including lack of physical space, topographic relief limitations, and land use change concerns. Information can be found in Section 12 of this report.

Figure ES-2 depicts the flood control summary within the watershed with the recommended solutions implemented. It shows surface flooding locations under the 4 percent change storm event and how the performance of the improved stormwater conveyance system compares to City's flood mitigation targets with the recommended solutions in place.

# Section 1 Introduction

## 1.1 Project Background and Purpose

The City of Madison (City) has experienced increased frequency and intensity of rainfall events over the past ten to 15 years. In August 2018, an unprecedented rainfall event occurred on the City's west side. A nearby United States Geological Survey (USGS) rain gauge recorded 10.5 inches of rain over a 12-hour period. For reference, National Oceanographic and Atmospheric Administration (NOAA) Atlas 14 statistics show the 12-hour, 0.1-percent chance recurrence interval storm at 8.92 inches for the Madison area. This event caused flash flooding, most significantly across the western half of the City, and prompted the City to begin a comprehensive watershed planning process.

This process began with watersheds hardest hit by 2018 flooding and included the area identified as the Pheasant Branch Watershed. The City began the Pheasant Branch Watershed study in April 2019.

The overall purpose of this study is to develop a comprehensive stormwater management plan (SWMP) for the Pheasant Branch Watershed that will guide the City in meeting its flood mitigation targets. This document describes the study's methodology, approach, and results. It documents the following:

1. Development of input parameters for the watershed's hydrologic and hydraulic (H&H) model,
2. Construction of the stormwater H&H model,
3. Calibration process for that model,
4. Modeling results showing flooding under the watershed's existing physical conditions,
5. Analyses of alternative flood mitigation measures,
6. Flood reductions that can be expected from those mitigation measures, and
7. Specific recommendations for flood reduction actions.

Figure 1-1 shows the location of the study area within the City. Figure 1-2 provides a more detailed view of the watershed.

## 1.2 Historic Flooding in the Watershed

Within the Pheasant Branch Watershed, there are several areas that have experienced flooding in the past. Figure 1-3 depicts known flooding reports provided by the City in the Pheasant Branch watershed. The known flooding locations include flood reports from a variety of data sources, including resident reports, emergency services reports, operations staff reports, and inlets with repetitive clogging history. These flood reports are limited to areas within the City (City of Middleton areas are not included).

Known flooding locations from the August 2018 storm event were discussed with City staff at a meeting on February 27, 2020. Figure 1-4 identifies the locations that were discussed during the meeting. A summary of the flooding locations discussed at the meeting are described below:

1. Intersection of Watts Road and Plaza Drive – Commerce Park Pond overtopped
2. Intersection of Commerce Avenue and Plaza Drive – Flooding approximately 3 feet deep
3. Menards Parking Lot – Flooding approximately 1 to 2 feet deep
4. Trek Store – 1 to 2 feet of water inside store
5. Elderberry Road and Augusta Drive flooded
6. Woodstone Ponds overtopped

7. Willows pond overtopped into enclosed depression
8. Greystone Pond, Southwest Blackhawk Pond, and the farm field south of Old Sauk Road all had the same water surface elevation (equalized across all areas)
9. Westfield Road and Old Sauk Road flooded
10. Sawmill Road and Tramore Trail flooded
11. N High Point Road flooded
12. Old Sauk Trails Business Park – Culverts at Fourier Drive and Deming Way overtopped. Several buildings within the business park flooded.
13. Cemetery by Mineral Point Road and Westfield Road – drained onto adjacent property and caused flooding

## 1.3 Flood Mitigation Targets

The City established consistent targets for stormwater management flood control (Level of Service or [LOS]) throughout the City. It is the City's policy to meet the LOS with reconstruction and new construction of its municipal stormwater conveyance system. Specifically, the LOS stormwater flood management targets are:

1. No home or business flooding during the 1 percent chance, 24-hour design storm event (6.6 inches).
2. Eliminate flooding (surcharging of the storm sewer system onto the municipal streets) for up to the 10 percent chance, 24-hour design storm event (4.1 inches), with the exception of road low points.
3. Allow no more than 0.5 feet of stormwater ponding above storm sewer inlet rim elevations at inlet-restricted low points for the 10 percent chance, 24-hour design storm event (4.1 inches).
4. Maintain drivability of municipal streets (center of the street with no more than 0.2 feet of water) for the 4 percent chance, 24-hour design storm event (5.0 inches).
5. Enclosed depressions should provide safe storage, or overflow, of stormwater during the 1 percent chance, 24-hour design storm event (6.6 inches). Flooding should be contained within public lands (streets, greenways, easements, etc.).
6. Where greenways cross streets, there should be no road overtopping during the 1 percent chance, 24-hour design storm event (6.6 inches).
7. Flooding solutions should not negatively impact downstream properties.

It should be noted that although the City strives to meet the above targets with each of its stormwater infrastructure projects, fully achieving these targets is not always feasible because of specific site conditions or other factors which cannot be controlled.

# Section 2 Water Resources Inventory

## 2.1 Study Setting

The Pheasant Branch Watershed is located on the far west side of the City and extends into the city of Middleton (see Figure 1-1) and covers approximately 3,300 acres. The extent of the watershed is shown on Figure 1-2. The watershed project area is made up of three main drainage systems that come together near the outlet of the watershed as described below.

1. Blackhawk - The west/northwest area of the watershed starts just north of Elderberry Road, drains north and crosses Old Sauk Road, then drains through Blackhawk Pond. It then drains through Swallowtail Pond, crosses Pleasant View Road, and drains through the greenway to the Old Sauk Trails Business Park Ponds.
2. Old Sauk Trails - The middle portion of the watershed also starts at Elderberry Road by Pleasant View Road, drains northeast through the greenway to the Attic Angels pond, then north and crosses Old Sauk Road. It continues north along the ditch on the west side of the Beltline to the greenway on the east side of the Old Sauk Trails Business Park Ponds.
3. Wexford - The far east portion of the watershed drains into the Wexford greenway and flows north through the Wexford Pond. Discharge from Wexford pond flows west through the greenway, under the Beltline, and into the Old Sauk Trails Business Park ponds. The southern portion of the watershed drains east and eventually all discharges into the Target Area pond. Drainage from the Target Area pond flows east under the Beltline to the Sauk Creek greenway. The Sauk Creek greenway flows east and then north and eventually drains into Wexford Pond.

The land cover is approximately half agriculture and half urban. The urban areas consist of residential areas and commercial business parks. Other significant land uses include parks or open space, multi-family residential, and commercial. More detail on the watershed's land use is provided in Section 2.5.

## 2.2 Topography

The topographic data was compiled from light detecting and ranging (LiDAR) data on the North American Vertical Datum of 1988 (NAVD88). It should be noted that some data available for the project (such as past construction drawings) are in the previously used City vertical datum. The conversion factor from the historical City datum to NAVD88 was to add 845.6 feet to the City datum elevation. Data provided included 2-foot contours, a digital elevation model (raster format), and LiDAR point clouds.

The lowest elevations in the watershed are approximately 953 feet at the outlet of the watershed just downstream of the Old Sauk Trails Business Park Ponds. The highest elevations are along the extreme southern border of the watershed just north of Applewood Drive at approximately 1,194 feet.

## 2.3 Constructed Drainage System

Approximately half of the Pheasant Branch Watershed is developed and thus has a constructed drainage system. This system generally consists of open channels, storm sewers, and detention facilities,

A summary of the constructed system components in the watershed and in the model are shown in Table 2-1. Note there are less components in the model than in the watershed. The components not

included are generally the smallest diameter storm sewer in the upstream areas; these components are not included to improve model construction efficiency and reduce model run time.

Table 2-1. Constructed System Components

| Constructed System Component | Quantity in Watershed | Quantity in Model |
|---|---|---|
| Public Stormwater Inlets and Access Structures | 2,500 | 1,800 |
| Public Storm Sewer Pipes | 2,200 segments; 31.4 miles | 1,452 segments; 27.4 miles |
| Public Open Channels | 90 segments; 6.7 miles | 90 segments; 6.7 miles |
| Detention Ponds | 50 | 44 |

## 2.4 Existing Natural Drainage and Storage

The remaining portion of Pheasant Branch Watershed is currently undeveloped, primarily agricultural land use with typical agricultural natural drainage (some farm ditches and some natural drainage ways through farm fields.)

These agricultural areas store significant water during storm events. The agricultural areas currently store a total of approximately 135 acre-feet during the 1 percent chance storm event. The agricultural storage areas were represented by the model's 2D surface topography (see Section 4.5).

## 2.5 Runoff Conditions

Stormwater runoff generated from a land surface will vary depending upon several factors including land use, impervious surfaces, soil types, and topography. The factors within the Pheasant Branch Watershed are discussed in this section.

### 2.5.1 Land Use

The Pheasant Branch Watershed includes a mix of land uses, including residential, commercial, and agricultural. Land use data for the area categorizes the watershed into ten different land uses. Table 2-2 provides a generalized breakdown of the land use within the watershed. A map of the generalized land use categories is shown on Figure 2-1.

Table 2-2. Existing Land Use

| Land Use Type | Total | |
|---|---|---|
| | Area (acres) | Percent (%) |
| Cemetery | **25** | **1** |
| Commercial | **449** | **14** |
| Highway | **84** | **3** |
| Industrial | **18** | **1** |
| Institutional | **61** | **2** |
| Open/Undeveloped | **771** | **23** |
| Park | **313** | **9** |
| Residential | **1,164** | **35** |
| Street | **395** | **12** |
| Water | **29** | **1** |
| Total | **3,308** | **100** |

For developing hydrologic factors, more detailed land use categories were used, and a detailed breakdown of the categories is provided in Appendix B. The detailed land use categories were used to determine the amount of impervious area within each watershed and the portion of the impervious area that is directly connected to the municipal stormwater conveyance system.

See Section 4.3.2 for further description of the land use categories and how the land use data was used in the development of the XPSWMM™.

### 2.5.2 Impervious Area

Impervious area data for various land uses was references from existing datasets. They include the following: residential, nonresidential, and right-of-way (ROW) areas. The data provided for each area is summarized below.

- For residential parcels, the percent impervious of each parcel is referenced from the stormwater utility database. This data reported a square footage of impervious area by parcel but was not delineated within residential parcels.
- For nonresidential parcels (industrial, commercial, etc.), the impervious areas are delineated, and thus, this information was used directly for hydrologic conditions. See Figure 2-2 for a map of the commercial impervious areas.
- The impervious area within ROW areas was estimated by offsetting the street centerline based on the width of the street and any sidewalk present along the roadway.

For the areas outside the City, no impervious area delineations were available. The impervious area factors were estimated from existing land use data and ROW information.

### 2.5.3 Soil Types and Noted Geologic Formations

Soils in the Pheasant Branch Watershed are predominantly hydrologic soil group (HSG) B soils. The HSG classifications were used to estimate the infiltration parameters for pervious surfaces within the watershed (see Section 4.3.2). Table 2-3 shows the areas for each soil group in the watershed and the extent of soil group areas are shown on Figure 2-3. This data is based on the Natural Resources Conservation Service (NRCS) Soil Survey for Dane County.

Table 2-3. Hydrologic Soil Groups

| HSG | Area (acres) | Percent (%) |
|---|---|---|
| A | 20 | 0.6 |
| B | 3,178 | 96.1 |
| C | 109 | 3.3 |
| W | 2 | 0.0 |
| Total | 3,309 | 100 |

This watershed is partially underlain by the Prairie du Chien geologic formation. This formation can contain karst features. Evidence of karst features in the watershed is found in documentation describing the rapid drainage of Blackhawk Pond three times between 2000 and 2005. Figure 2-4 shows the location of the Prairie du Chien geologic formation in the watershed.

# Section 3 Guidance and Data Sources

## 3.1 City of Madison Model Guidance

As part of this study a Modeling Guidance document was developed by the City, Brown and Caldwell (BC) (City consultant for the Stricker's/Mendota and Wingra West Watershed studies), and Advanced Engineering and Environmental Services, Inc (AE2S) (City consultant for Spring Harbor Watershed study). This document was used to define consistent modeling parameters across the various watersheds that are being analyzed. The Modeling Guidance was developed at the onset of the project and updated throughout the study. The version of the Modeling Guidance dated December 6, 2019, was used as part of this report. A copy of the Modeling Guidance as of the date of this report is included in Appendix A.

## 3.2 List Data Sources

The Pheasant Branch Watershed study relies on a variety of data sources. A summary of the data sources is provided below.

1. Various datasets from the City's geographic information system (GIS) - GIS data includes: land use, storm sewer (including associated structures), city limits, greenways and ponds, parcels, roads, and other pertinent data sets.
2. The City's GT-Viewer system - This system contains mapping of various City infrastructure including storm sewer, sanitary sewer, and water main. In some cases, this system contained information (such as pipe size or invert elevation) that was missing from the City's GIS data.
3. Construction and as-built drawings.
4. Photographs of various drainage features taken during field visits and surveys.
5. Field surveys of selected items and locations within the watershed. Examples of survey locations include missing storm sewer or culvert inverts at key locations, pond overflow elevations, and cross sections of open channels.
6. Monitoring data to support this study was collected by the City and USGS. Monitoring data included rainfall, flow, and water level data at select locations. Additional information about the data collected and how the data was collected is provided in Section 4.2.2 for rainfall data and Section 5.1 for flow and water level data.

The Pheasant Branch Watershed in the City outlets to the South Fork of Pheasant Branch in the City of Middleton. Some City of Middleton information was collected to understand downstream drainage conditions. Data includes:

1. WinSLAMM land use coverage from the City of Middleton's GIS system.
2. The City of Middleton's storm sewer system as defined in the GIS system.

It should be noted that the City previously used a City vertical datum and the City is in the process of transitioning all data into the NAVD88. The watershed study was conducted in NAVD88. Data that was in the City datum was converted to NAVD88. The City provided the appropriate conversion of adding 845.6 feet to the City datum.

The specific file name and date of the file is listed in Table 3-1.

Table 3-1. Source Files

| Data Type | File Name | File Date |
|---|---|---|
| Land Use | WinSLAMM Landuse.mdb | 4/16/2019 |
| LiDAR | Citywide_Raster_small_cell | 3/12/2019 |
| Storm Sewer | Storm_Sewer_Pipes | 3/21/2019 |
| | Storm_Sewer_Structures | 3/11/2019 |
| | Storm_Pipes_Private | 1/24/2019 |
| | Storm_Structures_Private | 1/24/2019 |
| | STO_E_PVT Graphic Line | 3/19/2019 |
| | STO_E_PVT Graphic Cell | 3/19/2019 |
| Culverts | Storm_Sewer_Pipes | 3/21/2019 |
| | Storm_Sewer_Structures | 3/11/2019 |
| Greenways | Greenways_and_Ponds | 1/11/2019 |
| | PondGwayPipes | 3/14/2019 |
| | PondGwayStructures | 3/14/2019 |
| Planimetric Data | Street_Centerlines_and_Pavement_Data | 3/11/2019 |
| | Lakes_and_Rivers | 10/3/2018 |
| | Greenways_and_Ponds | 1/11/2019 |
| | Pond_Contours | 1/24/2019 |
| | Stormwater_Impervious_Areas | 2/15/2019 |
| Aerial Imagery | WICMAD18_ReDelivery_Gen3_RDG.sid | 12/3/2018 |

# Section 4 Model Development

## 4.1 Modeling Software

To evaluate flooding and stormwater conveyance system capacity within the Pheasant Branch Watershed, an XPSWMM™ version 2019 model was created to simulate the hydrology and hydraulics within the watershed. XPSWMM™ is a proprietary software product of Innovyze® (see www.innovyze.com/en-us). The model created for the Pheasant Branch Watershed is a combination one-dimensional (1D)/two-dimensional (2D) H&H model.

## 4.2 Rainfall Files

The analyses included an evaluation of both design storms and recorded rainfall events. A series of storm events were evaluated as part of this study to identify which event(s) result in flooding, and the severity of that flooding. Both theoretical "design storms", as well as measured local storm events were considered as part of the study. The rainfall events that were used in the analysis are described in the following sections.

### 4.2.1 Design Rain Events

The watershed flooding analysis included a series of different recurrence interval design storms (100, 50, 20, 10, 4, 2, 1, and 0.2 percent chance) with a 24-hour duration. The design storm events used rainfall depths from the NOAA Atlas 14. The Midwest/Southeast states (MSE4) rainfall distribution, developed by the NRCS, was used for the rainfall. Table 4-1 lists the rainfall depth that were used in the H&H modeling of this study.

Table 4-1 Design Rain Events

| Recurrence Interval | Rainfall Depth* (inches) |
|---|---|
| 100 percent chance | 2.49 |
| 50 percent chance | 2.84 |
| 20 percent chance | 3.45 |
| 10 percent chance | 4.09 |
| 4 percent chance | 5.02 |
| 2 percent chance | 5.74 |
| 1 percent chance | 6.66 |
| 0.2 percent chance | 8.94 |

### 4.2.2 Measured Rain Events

Rainfall data was collected from June 2019 through October 2019, across the west-side of Madison in support of the watershed studies. The gauges were installed by the City with support from the USGS. Additionally, existing USGS rain gauges provided data for model input. The Pheasant Branch Watershed study utilized a combination of five rain gauges within and near the watershed to characterize actual, measured rainfall events. The City provided a Thiessen polygon map showing areas within the Pheasant Branch Watershed influenced by the five gauges. Rain gauges used as part of the study and their locations are provided in Table 4-2. Figure 4-1 shows the locations of each station.

Table 4-2 Rain Gage Locations

| Gauge Location | Operated By |
|---|---|
| Memorial High School Detention Pond | USGS |
| Sauk Heights Pond | City |
| Stricker's Pond Forebay (off Longmeadow Drive near Stricker's Pond) | City |
| Swallowtail Park | City |
| UW Agricultural Research Station | University of Wisconsin - Madison |

For gauges operated by the City, rainfall data was obtained from the Trimble Unity web site, the City's partner for providing the monitoring data. Rainfall data from gauges operated by the USGS was provided via email from the USGS. Rainfall data from the University of Wisconsin (UW) Agricultural Research Station was downloaded from the UW Agricultural Research Station web site.

From the monitoring period, three measured rainfall events were selected to be utilized as part of the calibration process under this study. The events selected are provided in Table 4-3.

These events are the largest rain events that were successfully measured and had good corresponding flow and/or water surface elevation measurements at the monitoring stations (see Sections 5.1 and 5.2). The events were selected as part of a meeting with City staff at which available rainfall and monitoring data was reviewed. A consensus was drawn for the events to be used based on the size of the storm events and successfully collected monitoring data.

Table 4-3 Rain Events Selected for Calibration Process

| Event Date | Rain Depth (inches)* | Rain Duration (hours) | Approximate Annual Exceedance Probability (percent chance) |
|---|---|---|---|
| August 5 to 6, 2019 | 1.1 to 1.3 | 3.5 | > 100% |
| August 11, 2019 | 1.2 to 2.0 | 4.5 | > 100% |
| October 1 to 2, 2019 | 2.8 to 3.4 | 19 | 50% to 10% |

*rain depth varied by station

The October storm event was the largest event that was successfully measured in 2019, at the relevant rain gauges. The October event (total rain depth and duration) falls in the range of a 50 to 10 percent recurrence interval based on NOAA Atlas 14 Volume 8 Version 2 data. Both August 2019 events (total rain depth and duration) were greater than a 100 percent recurrence interval.

## 4.3 Hydrologic Model Development

This section describes the steps taken to generate the hydrologic factors used in the XPSWMM™ model.

### 4.3.1 SWMM Runoff Description

Hydrologic calculations were performed in the XPSWMM™ model using Storm Water Management Model (SWMM) runoff methodology. SWMM hydrology uses a combination of drainage area size and

shape, slope, land cover (pervious, impervious not connected, and impervious connected), and soil infiltration parameters to generate runoff from a rain event. Discussions with City staff concluded that the SWMM hydrologic method was preferred over the "curve number" approach because of the urban land cover conditions. Although the curve number method is used in urban settings, it was originally developed for application in rural or agricultural watersheds.

The SWMM runoff methodology and associated parameters is defined in the Modeling Guidance document and is found in Appendix A. The calculations were performed for each subwatershed that was delineated within the watershed. The model developed a runoff hydrograph based on the model input parameters and this is entered by the model into the hydraulic portion of the software.

### 4.3.2 Subwatershed Input Data

The Pheasant Branch Watershed was divided into 451 subwatersheds. The subwatersheds are shown on Figure 4-2. Subwatersheds were delineated based on the storm sewer maps, drainage features (such as open channel versus storm sewer), land use, and topography. For each subwatershed, hydrologic input parameters were calculated. Each subwatershed included three subcatchments based on the land use within the subwatershed. The subcatchments were defined as:

1. Directly connected impervious area - Impervious areas that drain directly to the conveyance system
2. Indirectly connected impervious area - Impervious areas that drain over a pervious surface prior to entering the conveyance system
3. Pervious area - Vegetated land surfaces or areas with no impervious surface

The input parameters and calculation methodology for hydrologic input parameters are described below. The XPSWMM™ model input parameters for each subwatershed are listed in Table B-1.

#### *4.3.2.1 Subwatershed and Subcatchment Areas*

The area for each subwatershed was calculated using the GIS data developed for the project. Subsequently, the areas for each of the three subcatchments were calculated for each subwatershed. Subcatchment areas were calculated using the impervious area information provided by the City (see Section 2.5.2). How each subcatchment area was calculated is described below.

1. For areas in the City, the total impervious area for each subwatershed was calculated based on the impervious area data from the City. For areas outside the City, the total impervious area was calculated based on the estimated WinSLAMM standard land use files (SLU). Impervious area delineations were not available from the City of Middleton. The percent impervious from the WinSLAMM SLU files was used to calculate the total impervious area in a subwatershed based on the composite land use within a subwatershed. The SLU files estimate the source areas for typical land cover conditions for a variety of land uses. The SLU impervious area conditions were originally developed based on extensive aerial photographic analyses and field verifications of urban land cover in several Wisconsin cities.
    a. The directly connected impervious area (DCIA) was estimated using WinSLAMM SLU files. As part of the source area data, the SLU files identified whether a source area was directly or indirectly connected to the municipal stormwater conveyance system. For each land use, the percentage of DCIA was calculated (see Table B-1). Based on the land use present in a subwatershed, the total DCIA was calculated.

b. Indirectly connected impervious area was calculated by subtracting the DCIA from the total impervious area in a subwatershed.

2. Pervious area was calculated by subtracting the total impervious area from the subwatershed area.

It should be noted that the WinSLAMM SLU files incorporate the street ROW as part of the land use category. For example, Medium Density Single Family Residential (No Alleys) SLU data includes the impervious areas of the associated streets and sidewalks. The City's GIS land use coverage did not include street ROWs under a land use category, and treated street ROWs as a separate "land use". This meant that the calculated directly connected and disconnected impervious areas for each land use had to account for this difference between the WinSLAMM and City's GIS land use categories. As such, the street areas were subtracted from the DCIA and total impervious area in the SLU files. The percentage of DCIA was calculated based on the impervious areas outside of the street areas.

Within XPSWMM™, the indirectly connected impervious area was routed onto the pervious area within each subwatershed.

#### *4.3.2.2 Subwatershed and Subcatchment Width*

In SWMM hydrology, "width" refers to the general shape of a hydrologic unit (subwatershed) and the relationship of the surface flow path to the shape of the subwatershed. A line was drawn to represent the longest typical flow path for each subwatershed. The length of this line was calculated and the subwatershed area was divided by the flow path length to calculate the overall width. This width was then prorated based on the DCIA of each subwatershed. The prorated width for indirectly connected impervious area and pervious area was the same and was equal to the overall width minus the DCIA width. For example, if a total subwatershed width of 100 feet was calculated and the directly connected impervious areas were 25 percent of the subwatershed, the DCIA width was 25 feet, and the width of the indirectly connected impervious area and pervious area was 75 feet.

It should be noted that the subwatershed width was used as a calibration parameter. See Section 5 for modifications that were made to develop the calibrated existing conditions model.

#### *4.3.2.3 Slope*

A slope for the flow path described under in Section 4.3.2.2 was calculated. The elevation at the upstream and downstream end of the flow path was assigned based on the topographic data provided by the City. The elevations were used with the flow path length to calculate the slope.

#### *4.3.2.4 Soils and Infiltration*

Soils within the watershed are classified by the HSG. HSG mapping provided by the City as part of the City's "Curve Number Generator" tool was utilized in the project. The soils conditions of the watershed are represented in the hydrologic calculations through the infiltration parameters selected for the study.

The Horton soil infiltration methodology was used within XPSWMM™, and this approach is consistent with the City's Modeling Guidance. This methodology establishes a maximum infiltration rate, a minimum infiltration rate, and the decay rate of infiltration for each HSG. Input parameters were developed for each of HSG and Table 4-4 provides the infiltration values.

Table 4-4 Hydrologic Soil Groups and Associated Infiltration Values

| HSG[1] | Maximum Infiltration Rate (in/hr) | Minimum Infiltration Rate (in/hr) | Decay Rate (1/hr) | Dry Days (day) |
|---|---|---|---|---|
| A | 4.0 | 1.0 | 4.0 | 3.1 |
| B | 2.0 | 0.5 | 4.0 | 4.4 |
| C | 1.0 | 0.2 | 4.0 | 7.0 |
| D | 0.5 | 0.1 | 4.0 | 9.9 |
| Water | 0.0 | 0.0 | 0.0 | 0.0 |

[1]Where soils are classified as A/D, B/D, or C/D a HSG D was assumed.
Note: in/hr = inches/hour

The area within each subwatershed was classified by HSG. For each subwatershed composite, infiltration parameters were developed by area-weighting by each parameter based on the amount of each HSG within a subwatershed. For example, if a subwatershed is 50 percent HSG A and 50 percent HSB B, the maximum infiltration rate would be 3.0 inches/hour.

It should be noted that the values shown in Table 4-4 are the "base conditions" values. Infiltration rates that were used as a calibration parameter may be modified to better represent actual conditions. See Section 5 for modifications that were made to develop the "calibrated existing conditions" model.

#### *4.3.2.5 Antecedent Runoff Conditions*

The antecedent moisture condition represents whether there are saturated or exceptionally dry soil conditions at the start of a storm event. In saturated conditions, the maximum infiltration rate of soils would be decreased and the depressional storage may be reduced. In dry conditions, the maximum infiltration rate may be higher than typical. For this analysis, typical antecedent moisture conditions were used and are represented by the parameters listed in Table 4-4.

#### *4.3.2.6 Depressional Storage*

Within a subwatershed, there are surface depressions that collect runoff (puddles) and reduce the amount of runoff generated from a rainfall. Depressional storage is incorporated into the runoff calculations to account for these areas. For each subwatershed, a depression storage of 0.05 inches for impervious areas and 0.15 inches for pervious areas was included. These values meet the criteria defined in the City's Modeling Guidance.

#### *4.3.2.7 Internally Drained Areas*

Within the watershed, there is only one internally drained area located near Haen Park. Because this internally drained area is essentially hydraulically separated, stormwater does not discharge from it onto the surface and stormwater does not overflow from other parts of the watershed into it; the internally drained area and its subwatershed are removed from the model.

There are additional depressional areas that do not have internally drained subwatersheds delineated. These areas may consist of backyards or other small, local depressions. These depressions are accounted for in the hydrology calculations through the depressional storage parameters described in Section 4.3.2.6. It is possible that small depressions not incorporated may have localized flooding conditions

(such as individual back yards); however, the scope of this study did not allow for the evaluation of each individual area.

## 4.4 Hydraulic Model Development

The 1D hydraulic portion of the XPSWMM™ model represents the storm sewers and culverts that comprise the drainage system within the Pheasant Branch Watershed. The 2D hydraulic portion of the XPSWMM™ model represents the open channels and ponds within the watershed. The hydraulic input parameters required by XPSWMM™ vary depending on the different parts of the drainage system. The source data used to compile the hydraulic model input data is summarized below. Table C-1 in Appendix C provides hydraulic input parameters from the XPSWMM™ model. Figure 4-3 depicts the hydraulic conveyance system.

### 4.4.1 Open Channel Conveyance System

Open channels that are part of the City's stormwater conveyance system within the Pheasant Branch watershed are generally included as part of the 2D hydraulic model. If a modeled pipe discharges into an open channel, that channel is included as part of the 2D hydraulic model. Other channels (generally smaller channels and those located upslope from the storm sewer system) are also simulated as part of the 2D hydraulic model (see Section 4.5).

Survey data was collected for open channels at selected locations within the watershed. The survey data was used in conjunction with LiDAR data, City GIS data, and available construction plans to develop cross sections and longitudinal invert elevations for open channels. Aerial photography and site photographs were used to select Manning's n values (roughness coefficients) for the open channels.

### 4.4.2 Closed Conduit Conveyance System–Storm Sewers and Culverts

City-owned storm sewer mains 18-inches in diameter or greater were included in the XPSWMM™ model, per the project's scope of work. Additionally, selected storm sewers that were smaller than 18-inches were included if they were deemed critical to representing the conveyance systems performance. Smaller storm sewers, private storm sewers, and inlet leads were not included in the model because this phase of the project is focused on identifying and resolving major flooding issues on public property or as a result of stormwater leaving public property. Future phases of the process will likely incorporate smaller components of the conveyance system to aid in the design of specific management infrastructure.

Each storm sewer "link" requires upstream and downstream invert elevations, pipe length, and Manning's n (roughness). Additionally, hydraulic minor losses were added to the model.

The source of the closed conduit conveyance system data for the model included GIS data provided by the City, and information from the City's GT-Viewer system, construction plans, and field surveys at select locations. Where missing data remained, assumptions were developed to fill data gaps. The assumptions made are listed below.

1. Missing invert elevations were obtained by interpolating between the nearest upstream and downstream invert elevations. Where known bounding inverts were unavailable (as in the upper most reaches of the storm sewer), the next downstream slope was continued upstream.
2. Where pipe sizes were unknown, the size of the nearest upstream pipe was used.

3. Missing pipe material was assumed to be the same as the nearest upstream pipe.

Entrance and exit losses (minor losses) were added to storm sewers and culverts based on the Modeling Guidance document. Losses were split evenly between the entry pipe and exit pipe at a storm access structure (SAS). (For example, a total loss of 0.5 was assigned at a 90-degree SAS.) An exit loss of 0.25 was assigned to the influent pipe, and an entry loss of 0.25 was assigned to the effluent pipe. At a tee, or cross SAS structures, a loss of 0.5 was applied to each pipe.

### 4.4.3 Existing Inlet Capacity

Inlet capacity was not included explicitly in the computer modeling for this watershed. If areas are known flooding areas, but the computer modeling showed no flooding, then the parameters for that specific area were modified to reflect observations. In all other areas, the parameters were left to their original values.

### 4.4.4 Existing Detention Ponds

The XPSWMM™ model incorporated 24 existing detention ponds that were identified within the watershed. The stage-storage data for the ponds was defined by the 2D topography (further described in section 4.5). The inlet and outlet structures for the ponds were described using the link-node similar to storm sewer and culverts.

A combination of available site plans, aerial photography, LiDAR data, and site visits were used to determine the appropriate model input data for the detention ponds. Input data included the stage-area relationship to represent the storage in the pond and data to represent the pond outlet.

### 4.4.5 Open Water/Backwater Effects

The Pheasant Branch Watershed does not discharge to an open water (for example, Lake Mendota), thus, there are no backwater effects from this.

## 4.5 2D Hydraulic Model Development

The 2D portion of the hydraulic model is utilized to represent the overland flow across the land's surface. The 2D model uses topographic data to simulate the overland flow which may occur throughout the watershed in areas, such as along streets, between buildings, or over undeveloped lands. The 2D model is connected to the 1D model to allow runoff to pass from the 1D elements in the model into the 2D part of the model and vice-versa. The components of the 2D model are further described in the sections below.

### 4.5.1 Description of Areas Modeled in 2D

Except for the storm sewer, culverts, and detention pond inlet and outlet structures, all of Pheasant Branch Watershed is modeled in 2D.

Specific information on how the 2D area is modeled is provided below.

### 4.5.2 Topographic Data

A triangular irregular network (TIN) was created within XPSWMM™ to represent the topography within the study area. The City-provided elevation raster (Citywide_Raster_small) was used as the basis for the

TIN creation. This raster file was clipped to the approximate project extents. It was converted to an Environmental Systems Research Institute (ESRI) grid format and imported into the XPSWMM™ model.

### 4.5.3 2D Grid

XPSWMM™ uses a grid comprised of squares to complete the 2D model calculations. Water enters the grid and is transferred between grid cells. Elevations are assigned to the vertices and center of each grid cell from the topographic data. The grid size for this project is 10 by 10 feet. The 2D grid covers the entire area model in 2D (as described in Section 4.5.1).

### 4.5.4 2D Land Use and Roughness Values

As part of the 2D model, the land cover is defined, and each land use is assigned a Manning's n. This factor represents the roughness of the land's surface and ability to impede flow. For the Pheasant Branch Watershed, the land cover was divided into five categories and each category was assigned a unique Manning's n value. The land cover categories were water, impervious, pervious, wooded greenways, and grassed greenways. The land cover was imported to XPSWMM™ from GIS data developed for the watershed.

The Manning's n corresponding to each land use is provided in Table 4-5. The land use for the 2D roughness is shown in Figure 4-4. It should be noted that the 2D Manning's n values are the final calibrated values for the computer modeling. As will be described later in this report (Section 5.3), the water surface elevations in the greenways are sensitive to the 2D Manning's n value.

Table 4-5 2D Manning's Roughness

| 2D Land Use | Manning's n |
|---|---|
| Grassed Greenways* | 0.027 to 0.24 |
| Impervious | 0.016 |
| Pervious | 0.085 |
| Water | 0.01 |
| Wooded Greenways* | 0.027 to 0.085 |

*Value changes based on depth of water in channel

### 4.5.5 Inactive Areas

Inactive areas are defined as areas where surface water cannot flow because of physical barriers (such as buildings) or areas already represented by the 1D model. Inactive areas were identified and added to the 2D model to represent building footprints. These are areas where the 2D modeled flow will not occur. Building footprints were imported from the Dane County GIS data.

### 4.5.6 1D/2D Interface

The 1D and 2D models interfaced in two types of areas: model nodes and 1D/2D interface lines. The interface configurations are described below:

1. Model Nodes - Runoff can be transferred from the 1D storm sewer network onto the 2D grids at selected nodes within the model.

2. 1D/2D Interface Lines - Interface lines are included around the perimeter of open channels and detention ponds that are modeled in 1D. Because all open channels and ponds are being modeled in 2D, there are not 1D/2D interface lines in this computer model.

### 4.5.7 2D Boundary Conditions

The boundary of the 2D model (the perimeter of the 2D grid defined for the study) is created in the model to be closed and acts as a vertical wall. The model results were reviewed, and overland flow outfalls were added (termed by XPSWMM™ as "head boundaries") where overland flow leaves the study area.

### 4.5.8 Model Review No. 1

Following the construction of the Existing Conditions computer model, the City contracted with AE2S, a firm conducting the Spring Harbor Watershed Study, to review the computer model. This review occurred in February 2020. The review checked the model for consistency with the City's Modeling Guidance and general modeling professional practice. City staff reviewed the comments and revised the computer model accordingly.

## 4.6 Existing Conditions Non-Calibrated Model Results

The XPSWMM™ model was constructed and executed for each of the design storms (identified in Section 4.2.1), and the measured storm events (identified in Section 4.2.2) under the existing land use and conveyance system conditions. Table D-1 in Appendix D summarizes the peak water surface elevation and the duration of flooding at selected locations throughout the Pheasant Branch Watershed during the design storms. Figure 4-5 provides the location of each of the reporting locations in Table D-1.

# Section 5 Model Calibration

The calibration process focused on identifying consistent model input parameters that would provide reasonably comparable results for each of the three storm events identified in Section 4.2 and also the major storm event that occurred in August 2018.

It is understood that the hydrologic conditions and how runoff is generated from the land surface will vary from storm to storm. Also, it is commonly found that hydrologic factors that best represent larger rain events may not be appropriate for use in smaller rain events. As a result, the focus of the calibration effort was placed on the largest monitored storm event (October 1 to 2, 2019) and the August 2018 event because the target of this study is to assess flooding from large storm events.

If this model is used in the future to analyze smaller rain events, additional review of the calibration parameters should be conducted, and modifications should be considered to better represent the expected runoff from smaller storms.

As part of the model calibration process, the following steps were taken:

1. The data collected from the monitoring equipment and the data collected after the August 2018 storm event were compared to the modeling output in the same location.
2. Where the modeling results did not match the monitoring data collected (for this study, "match" is defined as within +/- 25 percent), model parameters were modified within the range of professional judgement.
3. Where model parameters could not be adjusted within the range of professional judgement, the area was noted.
4. Where model parameters could be adjusted within the range of professional judgement, each parameter was adjusted until the modeling results matched the monitoring data.

## 5.1 Monitored Pond Level and Flow Data

There are six monitoring locations within the Pheasant Branch Watershed that were used as part of the calibration process. Figure 5-1 shows the monitoring locations.

1. Deming Way Culvert Level and Velocity: The culvert under Deming Way just upstream of the outlet for the watershed was monitored by the City (data obtained from Trimble Unity web site.)
2. Fourier Drive Channel Level: The level in the channel just east of Fourier Drive and west of the Beltline was monitored by the City (data obtained from Trimble Unity web site.)
3. Pleasant View Road Level and Velocity: The culvert under Pleasant View Road just south of Elderberry Road was monitored by the City (data obtained from Trimble Unity web site.)
4. Southwest Blackhawk Pond Level: The level of the pond was monitored by City (data obtained from Trimble Unity web site.)
5. Tree Lane Level and Velocity: The culvert under Tree Lane between S High Point Road and Randolph Drive was monitored by the City (data obtained from Trimble Unity web site.)
6. Wexford Pond Level: The level of the pond was monitored by the City (data obtained from Trimble Unity web site.)

## 5.2 Selected Runoff Events

The following events were used for model calibration.

### 5.2.1 August 2018 Storm Event

A historical storm event occurred in August 2018. In the Pheasant Branch Watershed, radar rainfall data indicated that between 10 to15 inches fell during that event. This type of event equates to more than a 1,000-year storm or more than a 0.1 percent chance of occurring in any one year. Although the City did not have flow and level monitoring equipment in place during this event, the City collected topographic survey elevations of high water marks from the storm. The City also collected photographs and flood reporting information from residents in the watershed.

### 5.2.2 2019 Monitoring Storm Events

The rain events selected for the calibration process are defined in Section 4.2.2. The events were selected based on the completeness of recorded data and the severity of the rain event. As mentioned previously, significant flooding events did not occur during the monitoring period. The October 1 to 2, 2019 event was the largest rain (2.8 to 3.4 inches over 19 hours). This event (based on total rainfall depth and duration) falls within the range of a 50 to 10 percent recurrence interval based on NOAA Atlas 14 Volume 8 Version 2 data. Both August 2019 events (total rain depth and duration) were greater than a 100 percent annual exceedance probability.

## 5.3 Calibration Process

The City did not use the monitored data collected above for its calibration process. The data was found to be unavailable or unreliable for the following reasons:

1. The City's monitoring program was in its infancy, and calibration and maintenance protocols had not been implemented
2. In some instances, batteries had died before to the storm and the City was not made aware until after the storm when the data was missing.
3. At two locations, the equipment was installed after the initial monitoring events and adequate monitoring events were not available after installation.
4. Some data appeared to be unreliable when comparing it to the rain gauge data in the watershed or the data from adjacent watersheds.

Instead of the monitoring data, the City utilized surveyed high water marks from the August 2018 event and anecdotal information collected throughout the study. Following the August 2018 storm event, City survey staff collected high water marks in various locations in the watershed. Additionally, City staff spoke with residents and business owners in the watershed.

When the August 2018 storm event was evaluated in the initial model, the water surface elevations were being over-predicted in certain locations and spot on in others. Because the over-prediction was not homogenous across the watershed, adjusting the hydrologic parameters for all the subwatersheds was deemed not appropriate. Instead, locations where the over-prediction occurred were reviewed in more detail.

Because the City's flood reduction targets are aimed at the larger storm events, using the data collected during the August 2018 event seemed reasonable.

## Blackhawk Neighborhood

The Blackhawk neighborhood experienced devastating flooding during the August 2018 event. The large pond in the development is known as Blackhawk Pond and has a drainage area of approximately 500 acres of both agricultural and residential land uses.

A homeowner adjacent to Blackhawk Pond recorded the depth of water at their home. Because the pond is adjacent to their home, the elevation of water at their home is the elevation of water in the pond. When comparing the recorded peak water surface elevation to the peak modeled water surface elevation, the results were within a couple hundredths of a foot. This indicated the hydrologic parameters and conveyance system were replicating the stormwater system in this area well.

## Target Area

The model was reporting 3 feet of flooding in the Target Area (the northwest corner of the intersection of State Highway [STH] 12/18 and Mineral Point Road). Based on flood reports and discussion with the Trek Store (adjacent to Target and next to the large pond serving the commercial area), flood waters were approximately 1.5 feet outside the store and approximately 1 foot inside the store at the peak of the event.

A significant part of the drainage area to this location is agricultural with historically good infiltration characteristics and known karst features. A site investigation was conducted in May 2020. The drainage channels in the agricultural areas were walked in an attempt to observe karst features. Only one karst feature was found and that was outside the area. The conclusion is that the infiltration in this area is higher than the default model parameters utilized in the study. The infiltration parameters for the subwatersheds discharging to this area were modified and the model results came more in line with the reported results.

## Sauk Creek Greenway

The Sauk Creek Greenway is an open channel system that starts just east of the Target Pond and STH 12/18, flows north, northeast through the west side of the City and eventually discharges into Wexford Pond. The City plans to reconstruct this greenway in the near future, and as such, a City staff surveyor was sent to collect highwater marks at various locations in the greenway following the August 2018 event.

The highwater mark elevations were compared to the peak water surface elevations in the model and it was found that the model was over-predicting peak water surface elevations throughout the greenway. Because this area also has known karst features, the greenway was walked to look for signs of karst features; no indications were found.

The greenway is heavily forested, one of the few forested areas in this watershed. The infiltration parameters for the forested area were revised; this resulted in some reduction in the modeled peak water surface elevations, but not a significant amount.

Following discussions with City staff regarding observed flow conditions, the Manning's n values of the greenway were modified. The model was re-run and the results were reviewed. The results indicate the model is sensitive to the Manning's n values in the greenway. The values went from their starting value of a Manning's n with normal wooded channel to a variable Manning's n where the Manning's n changes with depth; a higher Manning's n was used for the lowest depths and transitioned to a lower

Manning's n for the higher depths. Iterations were performed on the variable Manning's n until the peak water surface elevations were within an acceptable range of each other and the Manning's n values were in an acceptable range for their channel type.

### Continued Monitoring

An item to note is that the monitoring equipment has been reinstalled in key locations and the watershed is being continuously monitored. The data will be used to understand the effectiveness of the proposed flood control solutions.

## 5.4 Calibration Results

Calibration results are provided in Table 5-1. Figure 5-2 shows the locations of the August 2018 recorded high WSEs.

Table 5-1. August 2018 Recorded High WSEs and Modeled Peak WSEs

| Location | Recorded Peak Water Surface Elevation (ft) | Initial Modeled Peak Water Surface Elevation (ft) | Calibrated Modeled Peak Water Surface Elevation (ft) |
|---|---|---|---|
| Blackhawk Pond | 1,080.91 | 1,081.08 | 1,080.95 |
| Target Pond | 1,054.35 | 1,055.94 | 1,054.84 |
| *Sauk Creek Greenway* | | | |
| Near Building off Tree Lane | 1,046.22 | 1,047.42 | 1,047.02 |
| Upstream of S High Point Road | 1,045.74 | 1,047.23 | 1,046.86 |
| Downstream of Tree Lane | 1,039.37 | 1,040.48 | 1,040.27 |
| In Greenway by Red Fox Trail | 1,016.80 | 1,019.63 | 1,018.29 |
| By Bus Stop on Old Sauk Road | 993.34 | 994.19 | 994.10 |

Note: ft = feet

## 5.5 Review No. 2

Following model calibration, the City contracted with AE2S again to review the modeling. This review occurred in late July and early August 2020. The review evaluated the assumptions made during calibration and corresponding modeling results. City staff reviewed the comments and revised the computer model accordingly.

## 5.6 Calibration Conclusions

The peak water surface elevations predicted by the model for the August 2018 event match the surveyed high water elevations within +/- 1.0 feet. Given the magnitude of the event, the model is representing this event.

For the monitored events in 2019, the shape and timing of the modeled results compares well to the monitored data.

# Section 6 Model Results

## 6.1 Existing Conditions Calibrated Model Results

The calibrated XPSWMM™ model executed for each of the design storms. Table D-1 in Appendix D summarizes the peak water surface elevation and the duration of flooding at selected locations throughout the Pheasant Branch Watershed. Figure 4-4 provided the location of each of the reporting locations in Table D-1.

The Existing "Maximum Water Depth" maps for each modeled event are found in Figures 6-1 to 6-9 (rain events from the 100 percent chance to the 0.2 percent chance storms). As expected, widespread surface flooding is shown for the larger rain events (2, 1, and 0.2 percent chance events). It should also be noted that presence of shallow water (0 to 0.25 feet) in the street ROW under the smallest modeled event (100 percent chance), does not necessarily indicate "flooding" or a stormwater conveyance capacity problem. Runoff water is expected in the streets during rain events.

## 6.2 Model Results Evaluation

By reviewing the 20 and 10 percent chance events, the most flood-prone areas can begin to be identified. Flooding depths greater than one-half foot in the 20 and 10 percent chance events are indications of flood-prone areas. The areas that appear to be most flood-prone, based on a review of the 10 percent chance rain include:

1. Winding Way between Coneflower Street and Bear Claw Way
2. Various segments of Deming Way, Excelsior Drive, and Fourier Drive in the Old Sauk Trails Business Park
3. Tramore Trail and Sawmill Road
4. N Highpoint Road between Old Sauk Road and Tramore Trail
5. Old Sauk Road and Westfield Road
6. Westfield Road between Whitacre Road and Old Sauk Road
7. Commerce Drive between Watts Road and Mineral Point Road

Several conditions can influence the flooding including inlet capacity, storm sewer capacity, overland flow from other sources, or a combination of all of these conditions. During Phase 2 of the project, these areas will be further evaluated to assess the causes and develop mitigation measures.

### 6.2.1 Comparison to City Flood Control Targets

The existing conditions flooding results were compared to the City's flood control targets to quantify the performance of the stormwater conveyance system in the Pheasant Branch Watershed. The performance of the system relative to greenway crossings, pipe capacity, inlet capacity, and street flooding were considered.

#### *6.2.1.2 Pipe Capacity*

The City's target is to eliminate surcharging from the storm sewer system onto City streets for up to the 10 percent chance, 24-hour design storm event. The pipe capacity was determined to be exceeded if ponding occurs on the street during the 10 percent chance, 24-hour design storm event. Figure 6-10 graphically shows the streets where the 10 percent chance target is not met. Within the watershed, there are a total of 52.1 miles of streets, of which 10.3 miles have water ponding during the 10-percent chance event. This equates to 19 percent of the streets not meeting this target.

#### *6.2.1.3 Inlet Capacity*

For inlet capacity, the flood mitigation target is to allow no more than 0.5-feet of stormwater ponding above storm sewer inlet rim elevations at inlet-restricted low points for the 10 percent chance, 24-hour design storm event. Inlet was not reviewed explicitly in this study. Areas with known flooding were reviewed for additional inlets. Additionally, all proposed storm sewer is assumed to have sufficient inlets to fill the storm sewer pipe.

#### *6.2.1.4 Street Flooding*

Within streets, the City's target is to maintain drivability of municipal streets for the 4 percent chance, 24-hour design storm event. Drivability is defined as having no more than 0.2 feet of flooding at the center of the street. Within the watershed, there are a total of 52.1 miles of streets, of which 2.9 miles have a water depth of more than 0.2 feet at the street centerline during the 4-percent chance event. This equates to 6 percent of the streets not meeting the drivability target. Street areas where the flood mitigation target is not met are identified on Figure 6-11.

#### *6.2.1.5 Structure Flooding*

The City's target is to eliminate structure flooding during the 1 percent chance event. Structure flooding is defined as having 0.5 feet or more water within 5 feet of a building. During the 1 percent chance event in existing conditions there are 118 out of 2,920 structures at risk of flooding (4 percent of the structures in the watershed).

#### *6.2.1.1 Greenway Crossings*

At locations where a greenway crosses under a street, the City's target is to safely pass the 1 percent chance, 24-hour design storm event without overtopping the street. The crossing was determined to be overtopped if the elevation at the upstream side of the culvert is above the street crossing elevation. There are 14 greenway crossings within the Pheasant Branch Watershed; two of them cross under the Beltline (STH 12/18). None of the greenway crossings in the Pheasant Branch Watershed meet the City targets.

### 6.2.2 Comparison to Known Flooding in Watershed

In Section 1-2, known flooding areas in the watershed, were identified based on City staff accounts. The areas that were identified are shown on Figure 1-4. The model results were reviewed for these known flooding areas. In general, the model results mimic what was reported by City staff and residents.

### 6.2.3 Comparison to Focus Group Flooding Reports

As part of the public engagement effort for this project, "focus group" meetings were conducted (see Section 7 for additional information). The initial focus group meetings were focused on allowing City staff gain an understanding on past flooding conditions that were experienced by residents. Subsequent focus group meetings during Public Information Meeting (PIM) No. 2 were focused on confirming that the flooding depicted by the model matched the residents observations from past storm events. The flooding described by residents during focus group meetings is similar to what is depicted on the flood inundation mapping.

## 6.4 Model Uncertainty

In general, all models are approximations, and as such, there is a certain amount of uncertainty in the results. This uncertainty is due to approximations in the input data, simplification of the methods used

to calculate flow and level, uncertainty in the measured flow and level data, etc. This model is built following the City's Modeling Guidance document and is calibrated to monitored storm events as described in previous sections. The model was constructed at the watershed level and is intended to identify flooding problems at that scale. It can be used to determine if the City's flood control targets are met within the watershed. Caution should be exercised when evaluating flooding problems at finer scales as additional refinement of model input parameters may be required.

The model calibration was focused on developing a single set of input parameters that would represent large storm events. Additionally, only a limited amount of calibration data was available for this study. The number of field monitoring locations and the length of the monitoring period were limited. If this model is used in the future to analyze smaller rain events, additional review of the calibration parameters should be conducted, and modifications should be considered to better represent the expected runoff from smaller storms (storm events smaller than the design storms considered in this analysis, such as the August 2018 storm events included as part of the calibration).

It is believed that the calibrated model accurately depicts the impacts of flooding from large storm events because the input parameters are within accepted ranges and the model results correlate to anecdotal flooding information from both City staff and residents.

As part of the design and implementation of flood mitigation solutions, the City may wish to further evaluate the model uncertainty and consider how mitigation solutions could be impacted.

1. Design Flexibility - To address model uncertainty, as well as uncertainty associated with changing future conditions, design flexibility could be considered. An example of design flexibility is to consider increases (or decreases) in pipe sizes as part of a storm sewer improvement flood mitigation measure. For instance, a 48-inch diameter storm sewer may be identified as the required size to provide the desired level of service (elimination of surcharging from the 10 percent chance event). Increased pipe sizes could be considered to determine the added LOS that is provided (i.e., is surcharging prevented in the 4 percent chance event?). This can then be evaluated to determine if it provides a cost-effective factor of safety or increase in LOS.

2. Sensitivity Analysis - A sensitivity analysis could be conducted to determine how changes to model input parameters impact the model results and performance of mitigation measures. If changes to input parameters result in only limited impacts, the level of uncertainty associated with the model would be decreased.

# Section 7 Public Engagement

As part of the Pheasant Branch Watershed study, the City carried out an extensive public information effort. In addition to various social media and web-based communication methods, public meetings were held as summarized below. Figure 7-2 shows a summary of the outreach for the study.

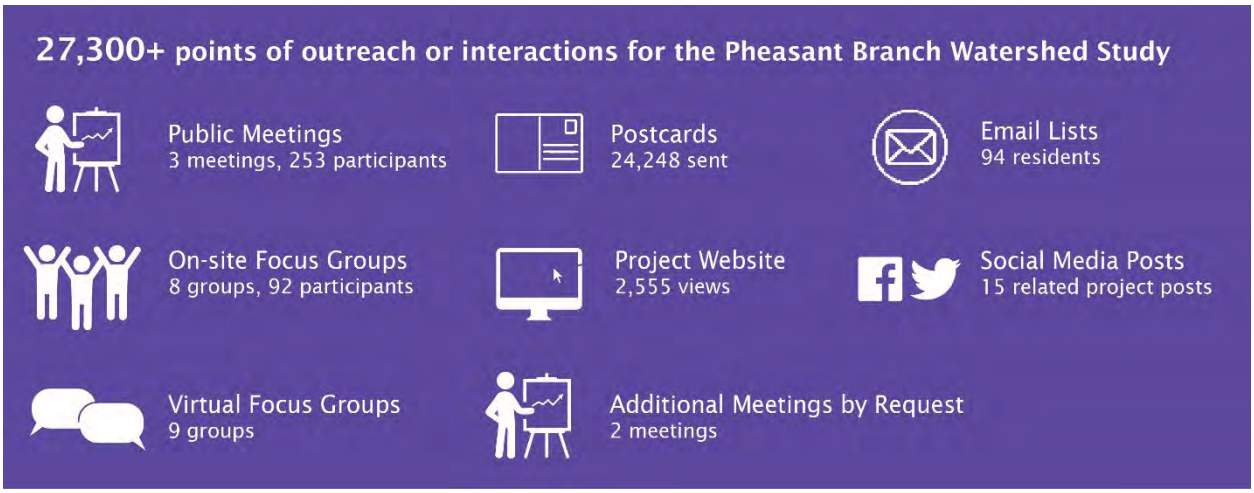



Figure 7-2. Public Outreach Summary

## 7.1 Public Information Meetings

An initial Public Information Meeting (PIM) was held on May 4, 2019, at Edgewood College – Deming Way Campus. According to the sign-in sheet, 35 residents attended the meeting. The purpose of this meeting was to inform the public of the initiation of the study, provide an overview of what will be accomplished during the study, and to collect feedback from residents on flooding experienced. Residents also had the opportunity to request a neighborhood focus group meeting with City staff. Based on resident requests, focus group meetings were held with smaller groups in specific geographic areas that have experienced flooding. Additional information on the PIM and the watershed is provided on the City's project web site: https://www.cityofmadison.com/engineering/projects/madison-pheasant-branch-watershed-study

A second PIM was held virtually on June 16, 2020 and 66 residents registered for the virtual meeting. The purpose of this meeting was to update the public on the status of the study, provide an overview of the work conducted to date, and to display flood inundation mapping for the watershed. The PIM included an open house at the start, a presentation, question and answer session, and focus group break-out meetings. The focus group breakout meetings were held for each of the initial focus group areas listed in Section 7.2. Flood inundation mapping for the 10 percent, 1 percent, and August 2018 storm events were shared with the focus groups. A copy of the PIM #2 presentation is available on the City's project web site listed above.

The third PIM was held virtually on February 10, 2022. The PIM was attended by approximately 152 residents (based on a count of people during the presentation). At this meeting, information on the recommended solutions were shared with residents. The PIM included a presentation, question and answer session, and focus group break-out meetings. The focus group break-out meetings were held for the stand-alone flood mitigation solutions described in Section 10. These focus group meetings were

held simultaneously. A copy of the PIM No. 3 presentation is available on the City's project web site listed above.

## 7.2 Focus Group Meetings

During the initial phase of the Pheasant Branch Watershed study, nine focus group meetings were held. The meetings discussed flooding issues that residents have experienced and allowed for additional information to be collected. A summary of each focus group meeting is included in Appendix E. The location of each meeting is provided below and shown on Figure 7-1.

1. Southwest Blackhawk Pond, 7 to 8 p.m., September 4, 2019
2. North Blackhawk Pond, 7 to 8 p.m., September 5, 2019
3. Menards Area, 11 a.m. to 12 p.m., September 17, 2019
4. Old Sauk Road and Westfield Road, 11 a.m. to 12 p.m., September 18, 2019
5. Wexford Village, 3 to 4 p.m., September 25, 2019
6. Junction Ridge, Attic Angel, 3 to 4 p.m., September 26, 2019
7. Old Sauk Trails Business Park, 11 a.m.to 12 p.m., September 26, 2019
8. Tamarack Trails, 9 to 10 a.m., September 27, 2019

As part of PIM No. 2, focus group meetings were held. These meetings were held for each of the nine areas listed above, along with a focus group for the remaining areas of the watershed (residents not located in one of the areas shown on Figure 7-1). These meetings were held via virtual break-out rooms following the PIM No. 2 presentation and general question and answer session. Flood inundation mapping for the 10 percent, 1 percent, and August 2018 storm events was shared with the focus groups. In general, the inundation mapping shown to the participants reflected what they observed during large flood events.

## 7.3 Public Comment Period

A 30-day Public Comment Period was held for the public to review and comment on the Final Draft Pheasant Branch Watershed Study Report. The Public Comment Period ended September 2, 2022. The public comments and response to comments can be found in Appendix K.

# Section 8 Proposed Solutions Considerations

Upon completion of the existing conditions portion of this project, the project moved onto developing and evaluation the proposed solutions. The proposed solutions tasks are listed below. These tasks outline the general type of proposed solutions that were considered and evaluated in this study.

1. Evaluate Flood Mitigation Alternatives
    a. Volume Control (VC) - The use of VC infrastructure, also commonly referred to as Green Infrastructure (GI), was evaluated. These measures would be distributed throughout the watershed to provide infiltration of stormwater and ultimately work towards meeting the LOS targets for the Pheasant Branch watershed. The technical report describing this analysis is included in Appendix F.
    b. Peak Flow Control Infrastructure (PFCI) - PFCI, or "grey" infrastructure, was evaluated to understand what would be needed to achieve the targeted LOS for stormwater management within the Pheasant Branch Watershed. Peak flow control includes a variety of approaches to convey or store runoff that is currently not being managed to the City's performance targets. Specific components and approaches are described in detail in Section 9.
2. Public Engagement - During this phase of the project, additional opportunities for public interaction were conducted.
3. City Agency Engagement - Engineering staff met with numerous City agencies during the proposed solutions evaluation process. The purpose was to understand the impacts the solutions would have on other City agencies and summarize their support and/or concerns.

# Section 9 Proposed Solutions Development

The proposed solutions development process described in the body of this report focuses on identifying PFCI solutions to resolve flooding. PFCI solutions are defined by the City as any stormwater control measure that has the ability to store or convey water but not infiltrate water.

An evaluation of the flood control benefits of VC measures, commonly referred to as GI, was completed as a separate, but parallel effort. That effort is described in Appendix F.

## 9.1 Overall Evaluation Process Methodology

The process utilized to evaluate potential solutions, and ultimately to select solutions proposed for implementation, is described in the following sections. Section 9.1 includes the process used for solution development. Section 9.2 describes various processes considered, for both solutions that were recommended and not recommended.

### 9.1.1 Data Review

To commence the solutions development process, the existing conditions results were further reviewed to identify constriction points within the watershed. Constriction points were identified by considering existing flooding conditions and identifying the cause, or causes, of flooding at individual areas. Constriction points identified included the following types of areas: where a larger storm sewer discharges into a smaller sewer, a storm sewer that is undersized, inadequate inlet capacity, and/or the lack of an overland flow path.

Additionally, pertinent data within the watershed was reviewed to further determine restrictions to implementation of potential solutions. No major restrictions, such as Madison Gas and Electric (MG&E) high-pressure gas mains, American Transmission Company (ATC) overhead power lines, or archaeological sites were identified.

### 9.1.2 Solution Brainstorming

Numerous informal meetings were held with City Engineering staff to consider various constriction points across the watershed, discuss conceptual scenarios, and identify potential opportunities for flood mitigation measures.

### 9.1.3 Evaluation of Potential Solutions

Following the solutions brainstorming, various potential solutions to flooding were evaluated. The calibrated existing conditions XPSWMM™ model developed as part of Phase I of this study was utilized to evaluate the flood control performance of the various potential solutions. Within the XPSWMM™ model, the hydraulic input parameters for various components of the stormwater conveyance system were modified to simulate potential improvements. The evaluation of various potential solutions is described below.

1. Local Storm Sewers - Throughout the Pheasant Branch Watershed there is flooding caused by insufficient storm sewer capacity. An initial step of the evaluation of potential solutions was to identify proposed “local” storm sewer improvements. Improvements to these storm sewers can have an impact on the sizing of other mitigation measures, such as pond improvements. Enlarged upstream storm sewers can result in increased peak flow rates into a pond and impact the pond’s peak water surface elevation.

For the purposes of the Pheasant Branch watershed, the majority of storm sewers within the system were considered local storm sewers. As part of this study, local storm sewers were defined as those that are not impacted by upstream flood solutions (such as a pond improvement).

To determine potential improvements to these areas, the following steps were taken:

a. Based on the layout of the storm sewer system within the watershed, individual sections of storm sewer were isolated and evaluated for improvements.
b. Improvements were incorporated into the isolated section of storm sewer with a target of meeting the City's 10 percent chance event LOS target.
c. After the 10 percent chance event target was met, the 1 percent chance event was executed in the XPSWMM™ model, and the results were reviewed. Additional storm sewer enhancements were made until the 1 percent chance event target of maintaining flooding within the ROW was met. In cases where the 1 percent chance event could not be maintained within the ROW, an alternative target of preventing structure flooding was considered.
d. Subsequent sections of the storm sewer system were then analyzed until all areas of local storm sewer were evaluated.
e. The local storm sewer improvements were consolidated into an overall watershed XPSWMM™ model where the impacts of the local improvements, in conjunction with regional improvements, were considered. Local storm sewers were then modified iteratively with regional improvements.

2. Big Picture/Theoretical Improvements - Much of the flooding in the Pheasant Branch Watershed is interconnected. To isolate issues, "big picture", or, "theoretical" solutions were evaluated. The likelihood of these solutions being implemented is very low; however, they provide key insights to what solutions could have an effect. These solutions included things such as:
   a. Creating free outfalls for some areas. This provides insight on if the tailwater from certain areas is causing water to back-up and flood upstream areas.
   b. "Turning off" portions of the watershed so that no water is discharging from it. This provides insight on whether the downstream conveyance system is simply too small to convey all the water.

3. Regional Stormwater Detention Improvements - At various locations in the watershed (described in Section 9.2) additional stormwater detention volume was considered. The detention improvements were evaluated within the XPSWMM™ model by modifying the stage-area relationship and outlet structure of an existing pond and adding pertinent pond characteristics for a new pond. The detention improvements were considered after local storm sewer improvements (limited initial evaluation was started before local storm sewer sizing).

Conceptual grading developed by City staff were used for the detention approximations. In addition to considering detention improvements, the downstream storm sewer was also considered.

4. Relief/Mainline Sewer Improvements - After initial regional detention improvements were considered, relief storm sewer and mainline storm sewer improvements were examined. These improvements were considered in conjunction within detention improvements, as the size of relief of mainline sewer improvements are generally tied to detention improvements, and local storm sewer improvements, within the watershed.

### 9.1.4 Discussion of Potential Solutions with City Engineering Staff

Throughout the proposed solutions development, numerous informal meetings were held with City Engineering staff to discuss the solutions evaluated and the corresponding modeling results.

### 9.1.5 Convergence on Solutions

As the evaluation progressed, a set of solutions (described below) were determined to provide what appeared to be the most viable path towards meeting the flood control targets for the project. This convergence of solutions was based upon performance of the solutions, technical feasibility, and the input from City Engineering Staff.

### 9.1.6 City Agency Meetings

Following the convergence on solutions for the Pheasant Branch Watershed, City Engineering staff met with various City agencies to discuss the potential solutions and challenges/obstacles to implementation of those solutions. Input for the solutions was gained via email correspondence from the Mayor's Office, Water Utility, Parks Department, Fire Department, Metro Transit, Planning Department, Operations Department, Streets/Forestry Division, Transportation Engineering, and Streets Design Division. Additionally, individual meetings were held with the Parks Department, Planning Department, and the Mayor's Office. Feedback from the various agencies is included in the discussion for each individual solution below.

### 9.1.7 Finalization of Solutions

Modifications to the solutions were not required following the meetings with the agencies. Therefore, the solutions discussed with the agencies were considered the final solutions.

### 9.1.8 Proposed Solutions Model Quality Assurance/Quality Control (QA/QC)

As a final step of the solutions development process, a QA/QC review of the proposed solutions model was completed by Strand Associates, Inc® (Strand). The model was reviewed and comments were provided to City staff. Model revisions were completed and the proposed solutions model was finalized.

## 9.2 Description of Solutions Considered

Stormwater control measures were considered in various locations across the Pheasant Branch Watershed. Ultimately, a variety of solutions were recommended for implementation, and there were a number of solutions that were reviewed, but not recommended. The following sections provide information about all solutions that were considered.

### 9.2.1 Big Picture/Theoretical

The solutions described in this section (9.2.1) are not realistic or feasible to implement. However, they provide insights to the causes of flooding and what solutions would have an impact to reduce flooding.

#### *9.2.1.1 Tailwater Removed*

Removing the existing conditions tailwater from current stormwater management control measures allows the stormwater to leave the control measure with minimal impediments. The results indicate how much of the flooding is caused by downstream conditions.

##### Old Sauk Trails Business Park Ponds

Issue: The structures around the Old Sauk Trails Business Parks Ponds flood during large storm events.

Theoretical Solution - The outlet for the Old Sauk Trails Business Park Ponds was disconnected from the downstream channel and given a "free outfall." Additionally, the outlet was "opened up" so that the stormwater could leave the ponds easier. With these conditions, stormwater can leave the ponds without constriction from the pond's outlet structure and without influence from the tailwater in the downstream channel.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 2 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 4 feet to remove all the structures in the business park from the 1 percent chance storm flood risk. Therefore, this solution does have impact, but not enough meet the 1 percent chance storm target. This indicates additional storage in the Old Sauk Trails Business Park Ponds is also needed.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. This has the potential to created adverse impacts downstream. Therefore, caution should be used when trying to incorporate aspects of this theoretical solution into the realistic solution.

##### Target Area Pond

Issue - The structures upstream of the Target Area Pond floods during large storm events.

Theoretical Solution - The outlet for the Target Area Pond was disconnected from the downstream channel and given a "free outfall." Additionally, the outlet was "opened up" so that stormwater could leave the pond easier. With these conditions, stormwater can leave the ponds without constriction from the pond's outlet structure and without influence from the tailwater in the downstream channel.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 2.5 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 2 feet to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution indicates the outlet and downstream conditions (Beltline culverts and Sauk Creek Greenway) are contributing to the flooding issues in the Target Area.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. Computer modeling indicates the sections of the Sauk Creek Greenway just downstream of the Beltline culverts do not have capacity for the additional stormwater that would come from this solution. The flooding experienced in the Target Area would be moved downstream to the properties adjacent to the upstream sections of the Sauk Creek Greenway. Therefore, if aspects of this solution are to be

implemented, the design should account for the capacity of the downstream Sauk Creek Greenway sections.

#### Blackhawk Pond

Issue - Some structures around Blackhawk Pond flood during large storm events.

Theoretical Solution - The outlet for the Blackhawk Pond was disconnected from the downstream channel and given a "free outfall." It was not increased in size due to the previous restrictions placed upon the outlet pipe when it was first constructed. With these conditions, stormwater can leave the ponds without influence from the tailwater in the downstream pipe.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 0.2 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 1 foot to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution indicates the downstream conditions are not significantly contributing to the flooding issues in the structures around the Blackhawk Pond.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. Swallowtail Pond is downstream of this pond. Structures around Swallowtail Pond have experienced flooding during large events. Therefore, if aspects of this solution are to be implemented, the design should account for the drainage conditions around Swallowtail Pond.

#### Beltline Culverts downstream of Wexford Pond

Issue - Some structures on Sawmill Road and Tramore Trail flood during large storm events.

Theoretical Solution - The culverts under the Beltline downstream of Wexford Pond were disconnected from the downstream channel and given a "free outfall." Additionally, the culverts were "opened up" so that stormwater could leave the channel easier. With these conditions, stormwater can leave the channel just downstream of Wexford Pond without constriction from the Beltline culverts or without influence from the tailwater in the downstream channel.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 0.7 feet in the channel between the culverts under High Point Road and the Beltline culverts just downstream of Wexford Pond. The 1 percent chance storm event peak water surface elevation must be lowered by at least 2 feet to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution indicates the downstream conditions are partially contributing to the flooding issues on Sawmill Road and Tramore Trail.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. Old Sauk Trails Business Park is downstream of this pond. Structures around Old Sauk Trails Business Park Ponds have experienced flooding during large events. Therefore, if aspects of this solution are to be implemented, the design should account for the drainage conditions around Old Sauk Trails Business Park Pond.

### *9.2.1.2 Farmland Subwatersheds "Turned Off"*

Turning area "off" means the area does not generate any stormwater. This could be thought of as building a holding area large enough to store all the water from the area that is turned off.

### Target Area Pond

Issue - The structures upstream of the Target Area Pond floods during large storm events.

Theoretical Solution - There is a large area of farmland upstream of the Target Area pond. This land will eventually be developed. This land was "turned off" in the model; in other words, no stormwater discharged from this area.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 1.0 foot. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 2 feet to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution shows that significantly restricting discharge (restrictions above and beyond the existing ordinance) from the farmland when it develops would have a positive impact on flood risk, but it will not completely remove the structures from the 1 percent chance event flood risk. Because the structures would still be at flood risk, the solution also indicates the current pond and outlet is not sized for the existing development that discharges to it.

Solution Caution - Because the existing pond and outlet is not sized for the existing development that discharges to it, additional development that has a discharge will likely increase flood risk.

### Blackhawk Pond

Issue - Some structures around Blackhawk Pond flood during large storm events.

Theoretical Solution - There is a large area of farmland upstream of the Blackhawk Pond. This land will eventually be developed. This land was "turned off" in the model; in other words, no stormwater discharged from this area.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 0.1 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 1 foot to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution shows that significantly restricting discharge from the farmland when it develops may not have a positive impact on flood risk. Because the structures would still be at flood risk, the solution also indicates the current pond and outlet is not sized for the existing development that discharges to it.

Solution Caution - Because the existing pond and outlet is not sized for the existing development that discharges to it, additional development that has a discharge will likely increase flood risk.

## 9.2.2 Solutions Reviewed–Not Recommended

The following flood mitigation measures were considered as part of the evaluation process; however, they were not recommended for implementation. The locations of such measures are shown on Figure 9-1. It should be noted that the potential solutions which were reviewed but eliminated from consideration were not evaluated in as much detail as the recommended solutions. It may be possible that, if the recommended solutions cannot be implemented, these solutions could be implemented. However, there may be barriers to implementation that were not identified as a result of the less thorough evaluation.

#### *9.2.2.1 Wexford to Old Sauk Trails Relief Pipe*

1. Conceptual Project Description - The structures around Wexford Pond (Sawmill Road and Tramore Trail) flood during large storm events. Currently the Sauk Creek Greenway is routed into Wexford Pond through a pipe that runs from south to north under High Point Road. Wexford Pond eventually discharges to the Old Sauk Trails Business Park Ponds. This solution would route one-half of the water leaving the Sauk Creek Greenway west on Old Sauk Road, under the Beltline, then north on Excelsior Drive directly into the Old Sauk Trails Ponds.

2. Reason for Exclusion - The solution resulted in very little decrease for the flooding that occurs near Sawmill Road and Tramore Trail and increased peak water surface elevations at Old Sauk Trails Ponds. Because structures around the Old Sauk Trails Park Ponds are already at risk of flooding in the 1 percent chance event, a solution that increases the peak water surface elevations was found to not be acceptable.

#### *9.2.2.2 Sauk Creek Greenway to Wexford Pond Double Box Culvert*

1. Conceptual Project Description - Significant water floods High Point Road and ponds in the greenway between the Beltline and Wexford Pond. This occurs because the conveyance system in the southern portions of the watershed east of the Beltline is not sized to convey the stormwater and when the conveyance system overflows, it naturally flows north (downstream). Additionally the pipe carrying Sauk Creek to Wexford Pond is not sized to carry all the stormwater leaving the Sauk Creek Greenway. This solution would install two 6' x 12' box culverts from Sauk Creek Greenway, north under High Point Road and east into Wexford Pond.

2. Reason for Exclusion- This solution reduces peak water surface elevations, although not as much as the recommended solution (the recommended solution is described in the next section).

#### *9.2.2.3 Reconstruction of Target Area Pond Outlet Structure and Downstream Culverts under Beltline*

1. Conceptual Project Description - Structures upstream of the Target Area Pond and sections of Mineral Point Road flood during larger storm events because water in the Target Area Pond causes stormwater backups. This occurs because the pond is not sized for all the stormwater it receives and the pond outlet structure and downstream culverts under the Beltline restrict the flow. This solution reconstructs the Target Area Pond outlet structure and adds additional culverts under the Beltline just downstream of Target.

2. Reason for Exclusion - The sections of Sauk Creek Greenway just downstream of the beltline and Target Area Pond are not large enough to convey the additional capacity from the improvement.

### 9.2.3 Solutions Reviewed–Recommended

This section provides a brief description of solutions that are recommended for implementation as flood mitigation measures in the Pheasant Branch Watershed. The locations of the various solutions are displayed on Figure 9-2. Further detail for each of the proposed solutions is provided in Section 10. The recommended solutions generally fall into two categories: (1) local storm sewer improvements that are

dispersed across the watershed and will be implemented as part of street reconstruction projects, and (2) stand-alone solutions that will be implemented as individual Capital Improvement Plan (CIP) projects.

#### *9.2.3.1 Local Storm Sewer Improvements*

1. Conceptual Project Description - Improve storm sewers along various streets throughout the watershed. Improvements include increasing pipe size and/or modifying pipe elevations and slopes.

2. Iterations Considered - Various pipe sizes were considered.

#### *9.2.3.2 Terrance Inlets*

1. Conceptual Project Description - Improve inlet capacity at various locations throughout the watershed. Improvements may include increasing the number of inlets and/or modifying the type of inlets.

2. Iterations Considered - None.

#### *9.2.3.3 Old Sauk Trails Business Park Ponds and Greenway Reconstruction*

1. Conceptual Project Description - Regrade the current stormwater ponds to increase storage volume. Modify the outlet structure to improve outflow while not increasing peak flows downstream. Regrade the greenways in the business park to increase capacity. Enlarge the existing greenway crossings within the business park.

2. Iterations Considered - Various pond sizes, shapes, and normal water levels. Various pond outlet structures.

#### *9.2.3.4 Pleasant View Road Reconstruction*

1. Conceptual Project Description - Size the storm sewer in the reconstruction project to meet the City's watershed study targets.

2. Iterations Considered - Various storm sewer pipe sizes.

#### *9.2.3.5 Swallowtail Pond Reconstruction*

1. Conceptual Project Description - Regrade the current stormwater pond to increase storage volume. Lower the pond normal water level to increase the storage volume. Replace the culverts under Pleasant View Road to increase capacity.

2. Iterations Considered - Various pond normal water levels and outlet pipe sizes.

#### *9.2.3.6 Blackhawk Pond Reconstruction*

1. Conceptual Project Description - Regrade the current stormwater pond to increase storage volume. Lower the pond normal water level to increase the storage volume. Expand the wet weather storage into the adjacent park. Replace the outlet structure. Replace the storm sewer from Blackhawk Pond to Swallowtail Pond to allow for the lowering of the pond normal water surface elevation.

2. Iterations Considered - Various pond sizes, shapes, and normal water levels. Various pond outlet structures.

#### *9.2.3.7 Wexford Pond and Greenway Reconstruction*

1. Conceptual Project Description - Regrade the current stormwater pond to increase storage volume. Add a pump to draw down the pond between storm events to allow for more storage. Replace the outlet structure.

2. Iterations Considered - Various pond sizes, shapes, and normal water levels. Various pond outlet structures.

#### *9.2.3.8 Sauk Creek Greenway Stabilization*

1. Conceptual Project Description - Regrade the stormwater greenway to decrease erosion and improve channel capacity.

2. Iterations Considered - Various channel shapes and storage areas.

#### *9.2.3.9 Target Area Relief Sewer*

1. Conceptual Project Description - Install a box culvert within Mineral Point Road that intersects two inlets that discharge into the Target Area Pond. The new box culvert would drain west to High Point Road, then turn north and discharge into the greenway just downstream of High Point Road.

2. Iterations Considered - Various sizes of box culverts.

#### *9.2.3.10Old Sauk Road/Westfield Road Intersection Reconstruction*

1. Conceptual Project Description – Raise the intersection by 1 to 2 feet. Install a larger storm sewer from the intersection under Old Sauk Road west to the greenway.

2. Iterations Considered - Various storm sewer sizes.

#### *9.2.3.11Greenway Crossings*

1. Conceptual Project Description - Increase the size of greenway crossings to eliminate road overflow.

2. Iterations Considered - Various box culvert sizes and configurations.

# Section 10 Recommended Solutions

The recommended solutions were introduced in Section 9 of this report. Figure 9-2 shows an overall proposed improvement map for the Pheasant Branch Watershed identifying the locations of the various recommended solutions.

In Sections 10.1 through 10.11, the proposed improvements included for the Pheasant Branch Watershed are described in detail. Included is pertinent information regarding the nature of the proposed solutions, the flood reduction benefits, and other considerations.

It should be noted that the improvements documented in this report are not meant to be full design-level efforts; they are conceptual solutions that help the City's Engineering Division understand the magnitude of solution needed in a given area to meet the targets. As projects are looked at further, and if they move to the point they are contemplated for programming, then projects will then go into a more detailed design phase. This project phase collects detailed data needed for design and looks at refined design, permitting, and environmental issues associated with the particular project.

## 10.1 Local Storm Sewer Improvements

### Detailed Project Description

During this study it was found that many of the flooding issues throughout the Pheasant Branch Watershed are a result of undersized local storm sewers. These storm sewers are incapable of conveying peak flows during intense rainfall events. During these events, the undersized pipes operate in a surcharged condition, which pushes stormwater to the ground surface and results in overland flow and flood impacts.

Pipes were upsized iteratively until the 10 percent chance event met the City's target of no surface flooding. Pipes were also lowered and slopes were modified as needed to meet the flood control targets.

After verifying the proposed pipes continued to meet the 10 percent chance storm event design target of no street surcharging in the combined model, the model was run for the 4 percent and 1 percent chance event. Where the proposed pipes did not meet the 4 percent and 1 percent chance event targets, they were further modified until City targets were generally met. It should be noted that there are some locations where targets were not met. These are described in further detail in Section 12.

Locations of local storm sewer improvements are shown on Figure 10-1.

### Associated Flood Reduction Benefits

The level of flood reduction associated with the local storm sewer improvements varies. The local sewer improvements are spread across the watershed and the benefits related to these improvements are best described by the comparison to the City's flood reduction targets as documented in Section 11.

### Project Constraints/Considerations

Because local storm sewer improvements involve the replacement of storm sewer in its existing alignment, there are relatively few project constraints. Work will be contained within City-owned ROW and will not impact privately owned property.

Potential conflicts with existing utilities may occur in some locations where upsized pipes must be lowered to maintain cover requirements. As part of this, there are likely to be conflicts with existing water mains and water laterals, which would need to be lowered. There were not sanitary sewer conflicts identified as clearance between storm sewer improvements and sanitary sewer was attempted to be maintained. However, it is anticipated that there will likely be sanitary sewer conflicts that are encountered due to the widespread nature of the local storm sewer improvements. Conflicts encountered can be resolved by lowering sanitary sewer, if feasible, or installing a sanitary sewer siphon.

### Water Quality Benefits

Local storm sewer improvements will not provide water quality benefits.

### Additional Notes/Information

Local storm sewer improvements will increase peak flows to downstream discharge locations. The impact of these improvements on downstream flows have been considered and are incorporated into the recommended solutions discussed later in this section.

## 10.2 Terrance Inlets

### Detailed Project Description

The existing conditions model indicated that in some locations, insufficient inlet capacity is a factor that contributes to flooding. Where feasible, terrace inlets were constructed in these locations.

Construction occurred in summer 2021. The locations where terrace inlets were reconstructed is shown in Figure 10-2.

### Associated Flood Reduction Benefits

Eliminating inlet capacity restrictions improved flooding within the watershed. However, additional improvements, such as storm sewer improvements, are typically needed to meet the City's targets.

The level of flood reduction associated with the inlet capacity improvements varies based on the ponding at each location.

### Project Constraints/Considerations

Inlet capacity improvements were contained within City ROW and did not impact nearby property owners.

### Water Quality Benefits

Inlet capacity improvements will not provide water quality benefits.

### Additional Notes/Information

As with local storm sewer improvements, inlet capacity improvements will increase peak flows downstream as water is moved through the system more efficiently. The impact of these improvements is factored into the recommended solutions described later in this section.

## 10.3 Old Sauk Trails Business Park Ponds and Greenway Reconstruction

### 10.3.1 Detailed Project Description

The Old Sauk Trails Business Park Ponds and Greenways will be reconstructed. The project includes combining and enlarging the existing wet pools to create one large contiguous greenway wet storage area. The outlet structure of the north pond will be reconstructed. The north pond permanent pool elevation will remain approximately the same. Approximately 70 acre-feet of additional storage will be created from the ponds' reconstruction.

The east and west greenways will be reconstructed to allow for additional capacity and reduce channel erosion. The Fourier Drive section will be lowered and become an extension of the south pond. The STH 12 sections will be lowered and widened to provide additional flow capacity.

The existing culverts under Deming Way at the north end of the greenway, under the walking path between the south wet pool and the north wet pool, and under Fourier Drive to the east will be replaced. The culverts under Fourier Drive will be 3 – 6' x 14' box culverts. The culverts between the revised ponds and under Deming Way will be 3 – 6' x 16' box culverts. The existing culvert connecting the west branch inlet north of Excelsior Drive to the pond will be replaced with a 5' x 12' box culvert. The existing culvert draining to the STH 12 north-south section of the east greenway from the south will be extended with a section of 5' x 12' box culvert. The storm sewer along Deming Way east of Blackhawk Road that drains into the open channel west of the pond will be upsized with storm sewer ranging in size from 54" reinforced concrete pipe (RCP) to 53" x 83" horizontal elliptical reinforced concrete pipe (HERCP).

The walking paths will be reconstructed around the new ponds.

The elements of the project are displayed graphically on Figure 10-3.

### 10.3.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 7.0 feet for the 10 percent chance storm event and by approximately 4 feet for the 1 percent chance storm event.

### 10.3.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. This project is the downstream most recommended solution in the Pheasant Branch Watershed Study. It should be constructed before solutions that increase capacity (such as a greenway crossing) are constructed as to not increase the existing flood risk. Solutions that increase storage, such as Swallowtail Pond or Sauk Creek Greenway, can be constructed prior to this solution; modeling results indicate solutions that add storage help reduce flood risk in this location.
2. As stated above, this project is the downstream most recommended solution in the Pheasant Branch Watershed Study. As the solutions upstream are implemented and the watershed further develops, the drainage conditions will change. The outlet structure for the North Pond will need to account for changing conditions. This may include restrictions in the outlet structure that can be manually added or removed or an automated outlet

structure that can adjust based on upstream conditions. The outlet structure will also need to be design so that peak flows are not increased downstream.

3. An existing sanitary sewer is located under what will be the berm separated the future north and south ponds. The berm design and culvert through the pond will need to accommodate this sewer.
4. An existing sanitary sewer is located under Fourier Drive where the future 6' x 14' culverts will be constructed. It is likely that that sanitary sewer will need to be relocated, or, a siphon constructed, to accommodate the box culverts.
5. Wetland delineations were conducted for the ponds and greenways. Wetlands are present in the project area.
6. The pond and greenway reconstruction will result in removal of existing trees that surround the pond.
7. The business park owners and tenants have been supportive and involved with the concept of this solution. It is expected that their input will continue during design and construction.

### 10.3.4 Water Quality Benefits

The reconstructed ponds would provide increased stormwater pollution trapping. The existing detention basins have filled in with sediment and currently have shallow pools. The conceptual layout for the reconstruction of the south pond includes an 8 foot deep permanent pool consistent with City design standards. As described previously, these ponds and greenways are the most downstream ponds and greenways in the watershed and the water quality evaluation should account for the stormwater control measures upstream of this location.

## 10.4 Pleasant View Road Reconstruction

### 10.4.1 Detailed Project Description

Pleasant View Road will be reconstructed from Mineral Point Road to STH 14 as part of a joint project with the City of Middleton. The proposed project will include reconstruction of the existing roadway as an urban four-lane arterial with new pavement and gravel as well as the addition of curb and gutter, a raised median, new multiuse path/sidewalk in selected areas, storm sewer, sanitary sewer and water main. Other improvements include new retaining walls, street lighting, pavement marking, signing, and stormwater detention ponds.

The elements of the project are displayed graphically on Figure 10-4.

### 10.4.2 Associated Flood Reduction Benefits

During the stormwater design process, the storm sewer was sized using the City's watershed study targets. Both the 10 percent chance storm and the 1 percent chance storm targets are met in the City in the Phase I project area. It is anticipated that these same targets will be used during Phase II.

### 10.4.3 Project Constraints/Considerations

Project constraints and considerations were addressed during the design process.

### 10.4.4 Water Quality Benefits

The water quality standards for road reconstruction were met in the design for this project. Water quality improvements include the reconstruction of Swallowtail Pond (described in section 10.5) and the installation of a screen structure.

## 10.5 Swallowtail Pond Reconstruction

### 10.5.1 Detailed Project Description

Swallowtail Pond will be reconstructed. The project includes regrading the pond and lowering the permanent pool to create additional storage for flood events. The outlet structure will be reconstructed. Additionally, the greenway crossing from the pond under Pleasant View Road will be reconstructed. The permanent pool elevation will be lowered to 1,009.0 (2.7 feet lower than existing). Approximately 9 acre-feet of additional storage will be created from the pond's reconstruction.

The elements of the project are displayed graphically on Figure 10-4. Construction documents are available for the solution and can be provided upon request. The pond will be reconstructed as part of the Pleasant View Road project reconstruction occurring in 2022 and 2023.

### 10.5.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 2.0-feet for the 10 percent chance storm event and by approximately 0.9 feet for the 1 percent chance storm event.

### 10.5.3 Project Constraints/Considerations

Project constraints and considerations were addressed during the design process.

### 10.5.4 Water Quality Benefits

The reconstructed pond will provide increased stormwater pollution trapping. Computer modeling conducted during the design process indicates the reconstructed pond will provide an additional 5.1 pounds (lb) of total phosphorus and an additional 0.5 tons of total suspended solids removal per year, above what it currently provides.

## 10.6 Blackhawk Pond Reconstruction

### 10.6.1 Detailed Project Description

Blackhawk Pond will be reconstructed. The project includes regrading the current pond and lowering the permanent pool. Additionally, the pond will be extended into the adjacent park to add additional stormwater storage. The existing pond has no emergency overflow; an overflow will be added during the reconstruction. The outlet structure will be reconstructed. The storm sewer from Blackhawk Pond to Swallowtail Pond will be relayed and enlarged. The permanent pool elevation will be lowered to 1,068.0 (2.8 feet lower than existing). Approximately 82 acre-feet of additional storage will be created from the pond's reconstruction.

The elements of the project are displayed graphically on Figure 10-5.

### 10.6.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 3.7 feet for the 10 percent chance storm event and by approximately 2.0 feet for the 1 percent chance storm event.

### 10.6.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. The pond is proposed to be expanded Park land. Preliminary discussions were held with City Parks Division staff and no red flags were raised during the meeting. A copy of the meeting

summary can be found in Appendix G. City Parks Division staff should be involved during the design and construction process.
2. The proposed emergency overflow will involve some sidewalk reconstruction and may involve some driveway reconstruction.
3. Wetland delineations will need to be conducted for the project.
4. The pond reconstruction will result in removal of existing trees that surround the pond.

### 10.6.4 Water Quality Benefits

The reconstructed pond would provide similar water quality as the existing pond. There are some other stormwater management practices that provide water quality benefits upstream of this pond. As described previously, the water quality evaluation for this pond should account for the stormwater control measures upstream of this location.

## 10.7 Wexford Pond and Greenway Reconstruction

### 10.7.1 Detailed Project Description

The Wexford Pond and Greenway will be reconstructed. The project includes combining the current wet pools and maximizing the pond footprint on the Stormwater Utility-owned land. The outlet structure will be reconstructed. The pond permanent pool elevation will be lowered approximately 3 feet using a stormwater pump which will pump down the pond's permanent pool elevation between rainfall events. Approximately 20 acre-feet of additional storage will be created from the pond's reconstruction.

1. The greenway will be reconstructed to allow for additional capacity and reduce channel erosion.
2. The walking paths will be reconstructed around the new pond.
3. The elements of the project are displayed graphically on Figure 10-6.

Note: This solution is different than the dredging project that will occur in late 2022 and early 2023. This solution is a complete reconstruction of the pond and will occur farther out into the future.

### 10.7.2 Associated Flood Reduction Benefits

The pond peak WSE for the 10 percent chance and 1 percent chance event will not change significantly.

### 10.7.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. Wetland delineations were conducted for the ponds and greenway. Wetlands are present in the project area.
2. No utility conflicts were identified in the area around the pond footprint
3. Potential permitting includes an artificial wetland exemption, Wisconsin Department of Natural Resources (WDNR) Chapter 30, and WDNR Chapter 31.

### 10.7.4 Water Quality Benefits

The reconstructed pond would provide increased stormwater pollution trapping. The conceptual layout for the reconstructed pond includes a larger permanent pool surface area and at least a 5 foot deep permanent pool consistent with City design standards. Pertinent information to allow the City to conduct a detailed evaluation of the increased water quality benefits is provided in Appendix H. This

pond and greenway has stormwater management practices upstream of it that provide water quality benefits; the water quality evaluation should account for the stormwater control measures upstream of this location.

## 10.8 Sauk Creek Greenway Stabilization

### 10.8.1 Detailed Project Description

The channel within the Sauk Creek Greenway is badly eroded. The wooded farm ditch was not engineered when it was turned over to the City. It has been actively eroding for years. The erosion is adding significant sediment to the downstream Wexford Pond. As a result, Wexford pond is filling up and needs to be dredged to restore it to its original capacity.

Additionally, as the watershed that discharges to Sauk Creek greenway develops, and, as stormwater infrastructure is improved in the developed areas, runoff to the Sauk Creek Greenway will increase.

Also, climate change is resulting in larger, more intense storm events. These storm events also increase the runoff to the City's stormwater system, including Sauk Creek Greenway.

The proposed project both stabilizes the greenway and provides additional capacity.

The project includes regrading the channel to stabilize it, providing construction and maintenance access, and improving the two pond areas to improve the storage capacity and water quality effectiveness.

The Sauk Creek Greenway was budgeted for reconstruction prior to the August 2018 flood event and prior to the watershed study due to the need to remediate the active erosion. This watershed study evaluated the flood control benefits of the Sauk Creek Greenway.

The elements of the project are displayed graphically on Figure 10-7.

Note: The project information used in this study is planning level information; the design project will use design-level information.

### 10.8.2 Associated Flood Reduction Benefits

The stabilized greenway will provide effective conveyance of stormwater flows and reduced maintenance of downstream facilities.

### 10.8.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. The greenway contains many high quality trees. The design will want to minimize removal of high quality trees where possible.
2. Wetlands are present in the greenway.

### 10.8.4 Water Quality Benefits

The stabilized greenway will result in a reduction of erosion.

## 10.9 Target Area Relief Sewer

### 10.9.1 Detailed Project Description

A 6' x 12' relief sewer would be installed from just south of the Target Area pond to Sauk Creek Greenway just east of S. High Point Road. The box culvert would be placed under Mineral Point Road and then turn north under S High Point Road until it reaches the greenway.

The elements of the project are displayed graphically on Figure 10-8.

### 10.9.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 2.2 feet for the 10 percent chance storm event and by approximately 4 feet for the 1 percent chance storm event.

### 10.9.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. Considerable fiber-optic and electrical utilities are likely present under Mineral Point Road. These will need to be located, and if necessary, relocated during construction.
2. A section of the box culvert will be constructed under the Beltline. This will likely require specialized equipment.
3. Coordination will be required with the Wisconsin Department of Transportation for areas of the project located within their right-of-way.
4. The commercial areas may be achieving water quality requirements through use of the Target Area Pond. An analysis of if low flows should still be routed to the pond should be completed during design.
5. Traffic control may be a major component of the project during reconstruction and should be accounted for accordingly.

### 10.9.4 Water Quality Benefits

There are no water quality benefits associated with this project.

## 10.10 Old Sauk Road/Westfield Road Intersection Reconstruction

### 10.10.1 Detailed Project Description

The intersection at Old Sauk Road and Westfield Road will be reconstructed. The intersection will be raised approximately 2 feet. This will allow the intersection to naturally drain towards the greenway cross to the west of the intersection. Storm sewer will be replaced from the intersection to the greenway.

The elements of the project are displayed graphically on Figure 10-9.

### 10.10.2 Associated Flood Reduction Benefits

The peak depths will be reduced from approximately 0.5 to almost 0.0 feet in the 10 percent chance storm event and from approximately 1.5 feet to almost 0.0 feet in the 1 percent chance storm event.

### 10.10.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. The project will likely require a full street reconstruction which includes sidewalks, curb and gutter, street light and traffic signal bases, and could potentially require some temporary land acquisitions.
2. Traffic control may be a major component of the project during reconstruction and should be accounted for accordingly.
3. Additional catch basins with sumps or a screen structure could be added for water quality purposes.

### 10.10.4 Water Quality Benefits

There are no water quality benefits associated with this project.

## 10.11 Greenway Crossing Reconstruction

### 10.11.1 Detailed Project Description

Each greenway crossing will be reconstructed.

Each greenway crossing and the elements of each project are displayed graphically on Figures 10-10 through 10-18.

### 10.11.2 Associated Flood Reduction Benefits

The 1 percent chance storm event would not flow out of the greenway over the road.

### 10.11.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. Utilities may need to be relocated.

### 10.11.4 Water Quality Benefits

There are no water quality benefits associated with these projects.

## 10.12 Review No. 3

Following the completion of the proposed conditions model with the recommended solutions, the City contracted with Strand to review the modeling. This review occurred in May 2022. The review encompassed examination of the proposed conditions model to check that the proposed solutions were modeled appropriately and checked that the model results found from the model matched what is described in this report. City staff reviewed the comments and revised the computer model accordingly.

# Section 11 Evaluation of Model Results with Recommended Solutions Implemented

The XPSWMM™ model that included all of the recommended solutions ("Proposed Conditions") was executed for each of the design storms. Table J-1 in Appendix I summarizes the peak water surface elevation and the peak flows at selected locations throughout the Pheasant Branch watershed. Figure 11-1 provides the location of each of the reporting locations in Table J-1. The "Maximum Water Depth" with the recommended solutions implemented maps for each modeled event are found on Figures 11-2 through 11-10 (rain events from the 100 percent chance to the 0.2 percent chance events).

## 11.1 Comparison to City Flood Control Targets with Recommended Solutions

The proposed conditions flooding results were compared to the City's flood control targets to quantify the performance of the recommended solutions in the Pheasant Branch Watershed. The performance of the system relative to greenway crossings, pipe capacity, inlet capacity, and street flooding were considered.

### 11.1.1 Pipe Capacity

The City's target is to eliminate surcharging from the storm sewer system onto city streets for up to the 10 percent chance event. The pipe capacity was determined to be exceeded if ponding occurs on the street during the 10 percent chance, 24-hour design storm event. Under existing conditions 10.3 out of the 52.1 miles of streets have water ponding during the 10 percent chance event; this 19 percent of the streets are not meeting the target.

Within the proposed conditions XPSWMM™ model, 1.0 out of 52.1 miles of streets have water ponding during the 10-percent chance event. This equates to 2 percent of the streets not meeting the target.

### 11.1.2 Inlet Capacity

For inlet capacity, the flood mitigation target is to allow no more than 0.5 feet of stormwater ponding above storm sewer inlets or rim elevations at inlet restricted low-points for the 10 percent chance event. Existing inlet capacity was not evaluated as part of this study.

As part of the proposed solutions, it is assumed that inlet capacity improvements are incorporated such that the inlet capacity is not the limiting factor, and thus this target would be met in all locations. Further detailed analysis is required to determine the exact number, type, and location of inlets required to be implemented.

### 11.1.3 Street Flooding

Within streets, the City's target is to maintain drivability of municipal streets for the 4 percent chance event. Drivability is defined as having no more than 0.2 feet of flooding at the center of the street. Within the watershed there are a total of 52.1 miles of streets. Under existing conditions, 2.9 miles (6 percent) of the streets do not meet the street flooding target.

With the recommended solutions implemented, the length of street that do not meet the street flooding target is reduced to 0.8 miles (2 percent).

### 11.1.4 Structure Flooding

The City's target is to eliminate structure flooding during the 1 percent chance event. Structure flooding is defined as having 0.5 feet or more water within 5 feet of a building. During the 1 percent chance event in existing conditions there are 118 out of 2,920 structures at risk of flooding (4 percent of the structures in the watershed).

In proposed conditions, there are 57 out of the 2,910 structures (2 percent) at risk of flooding during the 1 percent chance event.

### 11.1.5 Greenway Crossings

At locations where a greenway crosses under a street the City's target is to safely pass the 1 percent chance event without overtopping the street. The crossing was determined to be overtopped if the elevation at the upstream side of the culvert is above the street crossing elevation. Within the Pheasant Branch watershed there are 14 greenway crossings.

The existing conditions modeling indicates that all fourteen greenway crossing do not meet City targets. Once all proposed solutions have been implemented, all 14 greenway crossings would meet City targets.

## 11.2 Improvements to Known Flooding in Watershed from Recommended Solutions

In Section 1-2, known flooding areas in the watershed, based on City staff information, were identified. The areas that were identified are shown on Figure 1-4. Additionally, focus group meetings were held in various areas of the watershed that were impacted by flooding. The location of each focus group meeting is shown on Figure 7-1. The locations of the focus groups corresponded with areas of known flooding that were reported by City staff.

The recommended solutions were generally targeted at meeting the City's flood control targets throughout the Pheasant Branch Watershed. Known flooding locations were considered as part of the development of solutions. The following text summarizes how known flooding locations, identified by City staff, are impacted by recommended solutions.

1. Intersection of Watts Road and Plaza Drive – Commerce Park Pond overtopped
    a. Solutions that Benefit Area - The local sewer near the pond has been increased in size to allow the pond to discharge more efficiently
    b. Flood Reductions Observed - The pond no longer overtops during the 1 percent chance event
2. Intersection of Commerce Avenue and Plaza Drive – Flooding approximately 3 feet deep
    a. Solutions that Benefit Area - The local conveyance system (series of culverts and channels) was replaced with a box culvert for the full length. This greatly reduces the inefficiencies in the system.
    b. Flood Reductions Observed - The street now meets the 10 percent and 4 percent targets.
3. Menards Parking Lot – Flooding approximately 1 to 2 feet deep
    a. Solutions that Benefit Area - The local conveyance system (series of culverts and channels) along Commerce Drive was replaced with a box culvert for the full length. This greatly reduces the inefficiencies in the system.
    b. Flood Reductions Observed - The ponding in the Menards parking lot is reduced.
4. Trek Store – 1 to 2 feet of water inside store

a. Solutions that Benefit Area - The Target Area Relief Pipe diverts stormwater from the Target Area pond, thus allowing it to have adequate capacity for the remaining stormwater discharging to it.
b. Flood Reductions Observed - The Target Area pond no longer overtops and backs up into the Trek Store.

5. Elderberry Road and Augusta Drive flooded
   a. Solutions that Benefit Area - Local sewer upgrades and inlet maintenance
   b. Flood Reductions Observed - The modeling found the main reason for the flooding was due to clogged inlets. The local sewers were upsized slightly so the area would meet the targets.
6. Woodstone Ponds overtopped
   a. Solutions that Benefit Area – None; the ponds overtop due to stormwater entering them beyond their design capacity. The outlet is currently an agricultural drainage ditch. When the area downstream of the ponds is developed, the developer will need to account for all the water leaving Woodstone Ponds.
   b. Flood Reductions Observed - None.
7. Willows Pond overtopped into enclosed depression
   a. Solutions that Benefit Area – None; the ponds overtop due to stormwater entering them beyond their design capacity. The outlet is currently an enclosed depression. If the area downstream of the pond is developed, the developer will need to account for all the water leaving the pond.
   b. Flood Reductions Observed - None.
8. Greystone Pond, Southwest Blackhawk Pond, and farm field south of Old Sauk Road all had same water surface elevation (equalized across all areas)
   a. Solutions that Benefit Area – None; this was used as a calibration factor for the computer modeling.
   b. Flood Reductions Observed - None.
9. Westfield Road and Old Sauk Road flooded
   a. Solutions that Benefit Area - Reconstruction of the intersection of Westfield Road and Old Sauk Road.
   b. Flood Reductions Observed - The area now meets the City's targets.
10. Sawmill Road and Tramore Trail flooded
    a. Solutions that Benefit Area - Reconstruction of the Old Sauk Trails Business Park Ponds and Greenways, reconstruction of the culverts under the Beltline just upstream of Old Sauk Trails Business Park, reconstruction of Wexford Pond, reconstruction of the pipes into box culverts from Sauk Creek Greenway to Wexford Pond and the greenway downstream of Wexford Pond, and local sewer upgrades.
    b. Flood Reductions Observed - With all of the recommended proposed solutions are implemented, the flood risk of the structures will be lower, but will still not be below a 1 percent chance flood risk.
11. N High Point Road flooded
    a. Solutions that Benefit Area - Reconstruction of the Old Sauk Trails Business Park Ponds and Greenways, reconstruction of the culverts under the Beltline just upstream of Old Sauk Trails Business Park, reconstruction of Wexford Pond,

reconstruction of the pipes into box culverts from Sauk Creek Greenway to Wexford Pond and the greenway downstream of Wexford Pond, and local sewer upgrades.

b. Flood Reductions Observed - With all of the recommended proposed solutions are implemented, the ponding risk on N High Point will be lower, but it will still not meet City targets for the 10 percent or 4 percent chance event.

12. Old Sauk Trails Business Park – Culverts at Fourier Drive and Deming Way overtopped. Several buildings within the business part flooded.
    a. Solutions that Benefit Area - Reconstruction of the Old Sauk Trails Business Park Ponds and Greenways
    b. Flood Reductions Observed - The greenway crossings will meet the flood targets and all structures will be removed from flood risk.
13. Cemetery by Mineral Point Road and Westfield Road - drained onto adjacent property and caused flooding.
    a. Solutions that Benefit Area – None; public infrastructure improvements are not effective in this location.
    b. Flood Reductions Observed - None.

# Section 12 Areas Flood Control Targets are Not Met

In most of the Pheasant Branch Watershed, the City's flood control targets are met. In limited locations there are cases where the targets are not met. Further consideration of areas not meeting the 1 percent chance event structure flooding target is provided in this section.

As noted in Section 11.1.4, there are 57 structures that have risk of flooding during the 1 percent chance event under the recommended solutions scenario. It is believed that, for the majority of these structures, the identification that they are flooded is due to specific topographic conditions within the XPSWMM™ model. The locations were evaluated in greater detail to determine the nature of the flooding.

Model limitations were found to be the trigger for identifying the majority of the structures as having flood risk during the 1 percent chance event:

1. The results were observed to show that shallow overland flow becomes trapped against a building and results in triggering the flooding criteria. The 2D model uses a 10-foot grid system to simulate overland flow. The grid size is reflective of a watershed study of this nature. However, it does not have the ability to capture, and simulate, all of the nuances within an urban area. For instance, the detailed grading surrounding a building may not be captured by the grid, or the 6-inch curb depth of a road might not be fully captured.
2. In some locations, there may be private storm sewer present that is not incorporated into the model. The private storm sewer may prevent flooding if accounted for in the model.

During the design phase of each solution, the following can be carried out to more accurately determine flood risk in these areas:

1. Refinement of the model during subsequent planning, design and implementation phases for solutions can verify pipe sizing and confirm whether structures are flooded or not. Refining the model could include revising topographic data (such as supplementing LiDAR data with survey data), decreasing the grid size in specific locations of interest, splitting subwatersheds, and/or adding additional storm sewer such as inlets, inlet leads, smaller storm sewer, or private storm sewer. Additionally, further structure elevation data (such as first floor or low opening elevations) could be obtained to verify where the structure would be flooded.
2. The storm sewer improvements could be refined, and sizes potentially increased to provide a greater level of flood protection.

Locations where flood risk is not being reduced include:

1. The Sawmill Road/Tramore Trail/ N High Point Road area continues to show structure flood risk in the 1 percent chance event. The location of the structures compared to the drainage system is relatively low. Additionally, the drainage system has very little topographic relief. These two factors combine to create conditions where reducing flood risk is challenging. The recommended projects will provide some flood risk relief. To fully reduce flood risk, even more significant solutions would need to be evaluated such as filling the area and raising the structures or installing large pumping systems. These options were not

evaluated as part of this study. If they are to be evaluated in the future, attention would need to be paid to the flood risk in the immediate area as well as downstream.

2. Structures in the Tamarack Trails condominiums adjacent to the drainage way that discharges to Sauk Creek Greenway are showing flood risk in the 1 percent chance event. The condominium association is aware of this flood risk and is working with a consultant to evaluate the private property drainage conditions.

# Section 13 Cost Estimating

During the course of this study, planning level cost estimates were prepared for each of the stand-alone solutions described in Section 10. The following sections describe the methodology used for estimating costs.

Cost estimates were not prepared for local storm sewer or inlet capacity improvements. In general, these improvements will be implemented in conjunction with street resurfacing projects. The costs associated with these storm sewer improvements will be developed by the City as they are scheduled for implementation in the City's five-year CIP.

To prepare the cost estimates, estimated quantities were developed for the project. The City provided average units costs for typical bid items included as part of storm water improvement projects. The standard unit costs were adjusted based on specific project conditions that may result in higher, or lower, than average unit costs.

The total estimated cost for each of the stand-alone projects is provided in Table 13-1. Detailed breakdowns of the cost estimates for each project are included in Appendix J.

Table 13-1. Stand-Alone Project Cost Estimates

| **Project Name** | **Construction Cost ($)** |
|---|---|
| Old Sauk Trails Business Park Pond and Greenways | $9,178,000 |
| *Old Sauk Trails Ponds* | *$3,074,000* |
| *Old Sauk Trails East Greenway* | *$1,714,000* |
| *Old Sauk Trails West Greenway* | *$475,000* |
| *Deming Way west of OSTr Ponds (Culverts)* | *$570,000* |
| *Driveway to OSTr Ponds (Culverts)* | *$145,000* |
| *Deming Way north of OSTr Ponds (Culverts)* | *$1,570,000* |
| *In OSTr Ponds (Culverts)* | *$580,000* |
| *Fourier Drive east of OSTr Ponds (Culverts)* | *$1,050,000* |
| Swallowtail Pond Reconstruction | $2,373,000 |
| *Swallowtail Pond* | *$2,203,000* |
| *Pleasant View Road (Greenway Crossing)* | *$170,000* |
| Blackhawk Pond Reconstruction | $6,990,000 |
| *Blackhawk Pond* | *$5,326,000* |
| *Blackhawk Outlet Structure and Overflow* | *$1,665,000* |
| Wexford Pond and Greenway Reconstruction | $4,784,000 |
| Sauk Creek Greenway Stabilization | $4,000,000 |
| Target Pond Relief Sewer | $11,105,000 |
| Old Sauk Trail/Westfield Intersection Reconstruction | $1,938,000 |
| High Point Road west of Wexford Pond (Greenway Crossing) | $739,000 |
| High Point Road from Sauk Creek to Wexford Pond (Greenway Crossing) | $9,768,000 |

| | |
|---|---|
| Old Sauk Road (Greenway Crossing) | $664,000 |
| Westfield Road (Greenway Crossing) | $416,000 |
| Tree Lane east of High Point Road (Greenway Crossing) | $1,167,000 |
| High Point Road south of Tree Lane (Greenway Crossing) | $769,000 |
| Tree Lane west of High Point Road (Greenway Crossing) | $711,000 |
| Beltline downstream of Wexford Pond (Greenway Crossing) | $5,390,000 |
| Local sewer upgrades | $15,086,000 |
| **Total** | **$75,079,000** |

*Italics* indicate subprojects of a larger, overall project.

# Section 14 Implementation Sequence

## 14.1 Technical Implementation Needs

Implementation of individual recommended solutions in the watershed can impact other parts of the watershed. For instance, implementing a conveyance improvement project could have a negative impact on a downstream area by increasing peak flows to the downstream area. Within the Pheasant Branch Watershed there is some flexibility with implementing the various recommended solutions. The following guidelines for implementation are provided.

1. Storm sewer improvements should generally be implemented from downstream to upstream to prevent increased downstream flooding. However, these improvements will typically be implemented with road reconstruction projects. A variety of other factors contribute to the scheduling road reconstruction projects. These factors may dictate that projects be implemented outside of the preferred sequence. As part of this approach, the specific improvements can be reviewed as part of the design process to determine if any temporary measures, such as bulkheads or restriction plates, are needed to offset downstream concerns.
2. The Old Sauk Trails Business Park Pond and Greenway improvements should be implemented before any conveyance improvements, such as the Target Area Relief Sewer or the Greenway Crossings. The conveyance improvements will allow for water to flow downstream more efficiently, and if constructed first, have the potential to increase the existing flood risk of downstream areas.
3. The Sauk Creek Greenway reconstruction should occur before, or within a short time frame of when, Wexford Pond is dredged. The current erosive conditions of the Sauk Creek Greenway would cause any downstream improvements to fill with sediment, thus reducing their maintenance lifecycle.

## 14.2 Citywide Implementation Prioritization

The City is conducting similar watershed studies for all the watersheds in the City. All watersheds are expected to have numerous recommendations resulting from the studies. The City is developing a process to rank and prioritize the order in which the solutions might be implemented if and when funding and public support are obtained. Information on this process will be shared by the City when it is available.

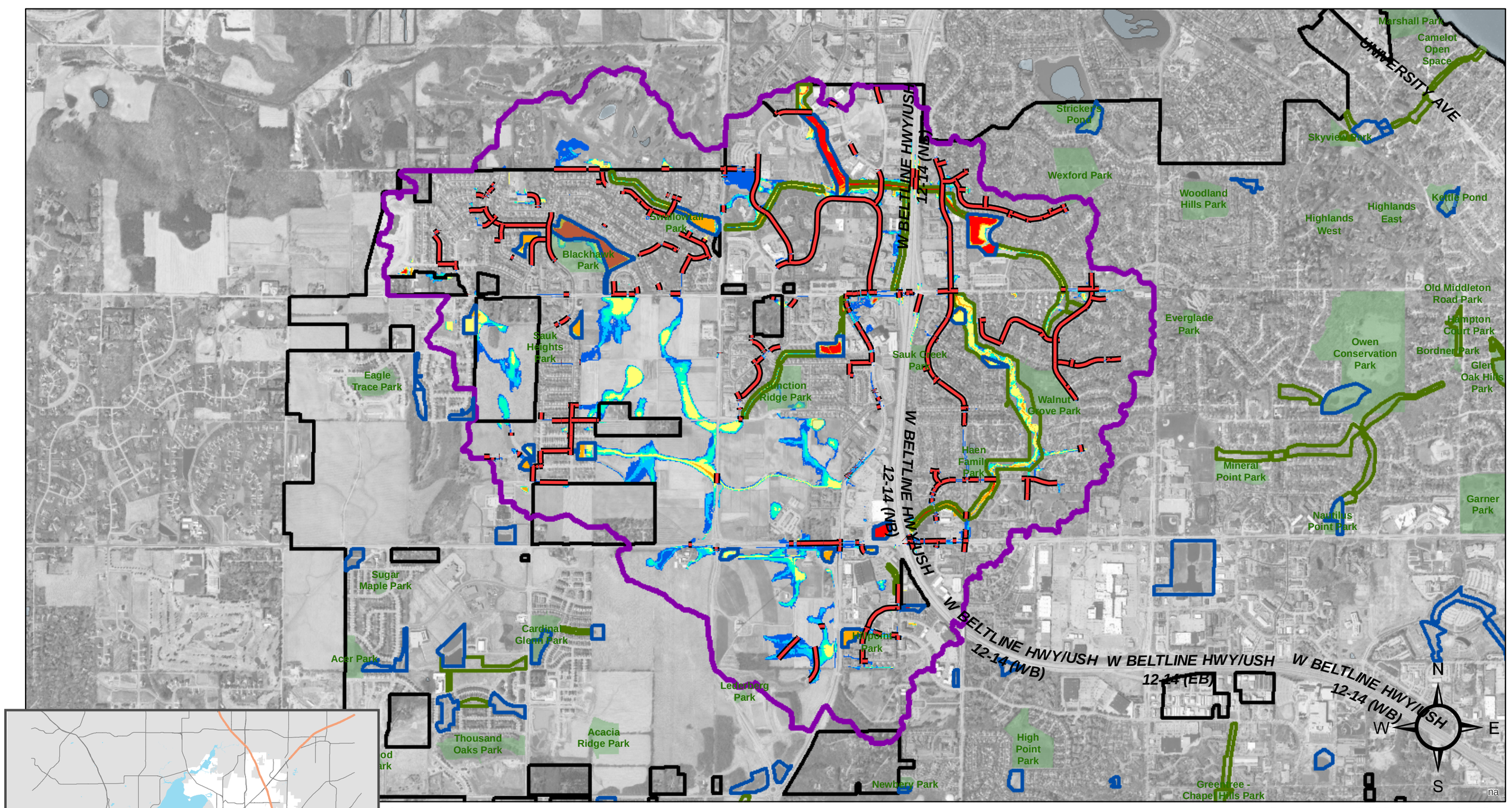
# Section 15 References

Section 3 describes the specific files and data sources used in the development of the XPSWMM™ model. The Model Guidance Document includes a list of references used in creation of that document. Below is a list of additional sources of information consulted or referenced during this study.


University of Wisconsin-Madison. Wisconsin Geological Geologic and Natural History Survey. Soil Survey of Dane County, Wisconsin, 1917. https://wgnhs.wisc.edu/pubs/000057/

Wisconsin Department of Natural Resources. Surface Water Data Viewer. https://dnr.wi.gov/topic/surfacewater/swdv/

Figures




**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

- Street Segments not Meeting Target

# Figure ES-1
# Streets not Meeting Target
# Existing Conditions; 4% Chance Event
# Pheasant Branch Watershed

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Date: 4/12/2022

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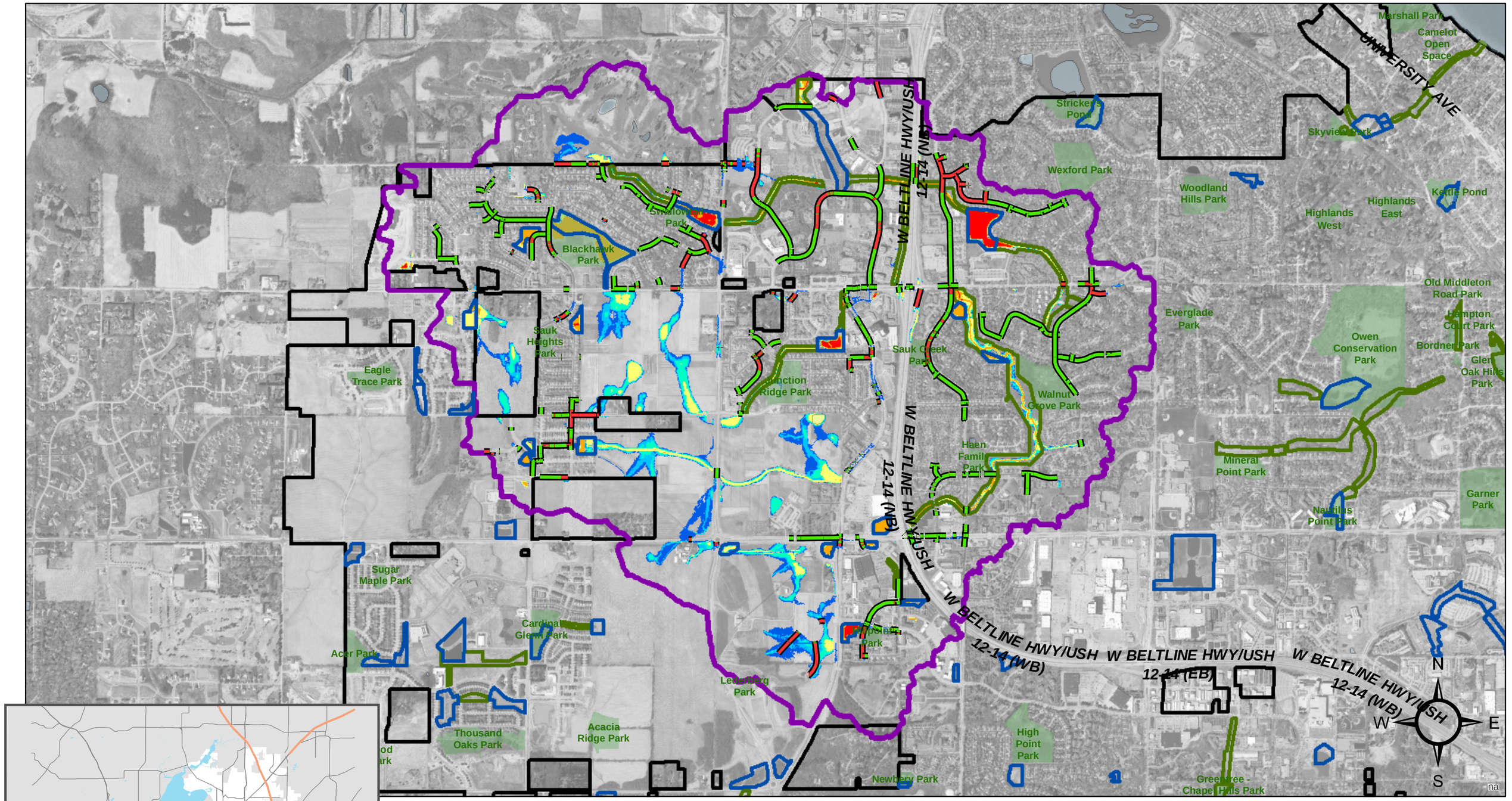


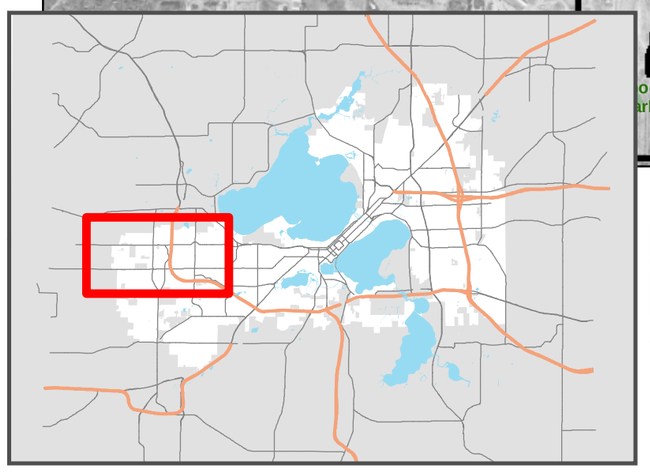

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

- Street Segments not Meeting Target
- Street Segments now Meeting Target

# Figure ES-2
# Streets not Meeting Target
# Proposed Conditions; 4% Chance Event
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 4/12/2022

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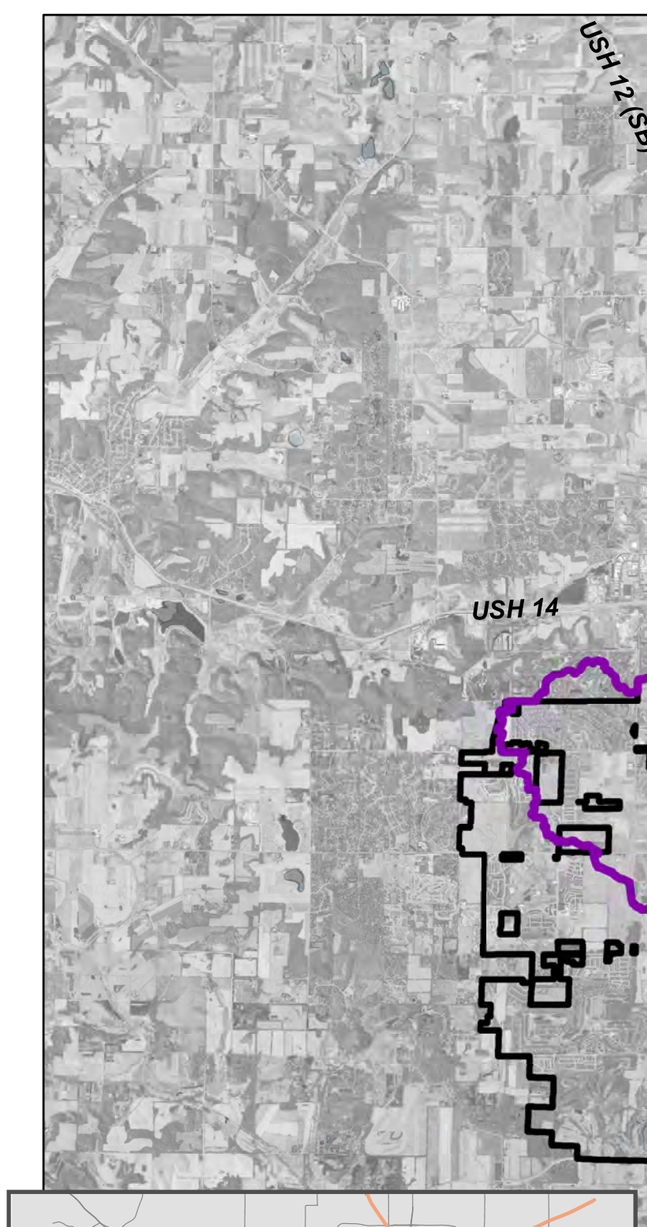

**Legend**

- Municipal Limits
- Watershed Boundary

# Figure 1-1
# Study Location
# Pheasant Branch Watershed

0 8,750 17,500 Feet

Date: 4/29/2021

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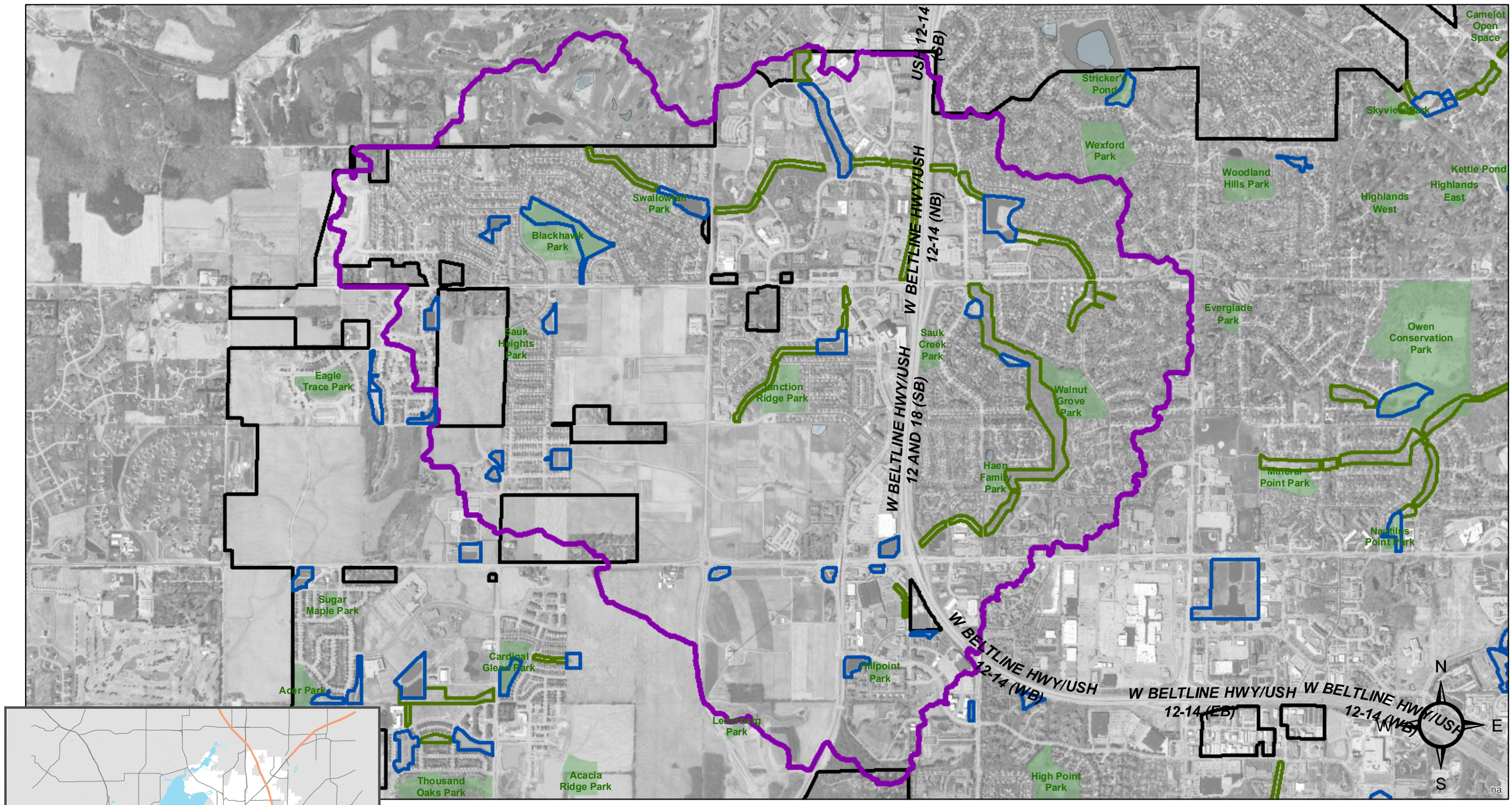


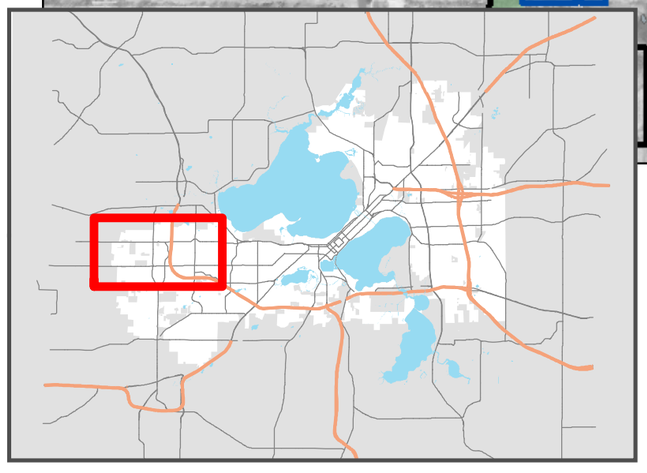

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

# Figure 1-2
# Watershed
# Pheasant Branch Watershed

0 1,875 3,750 Feet

Date: 4/29/2021

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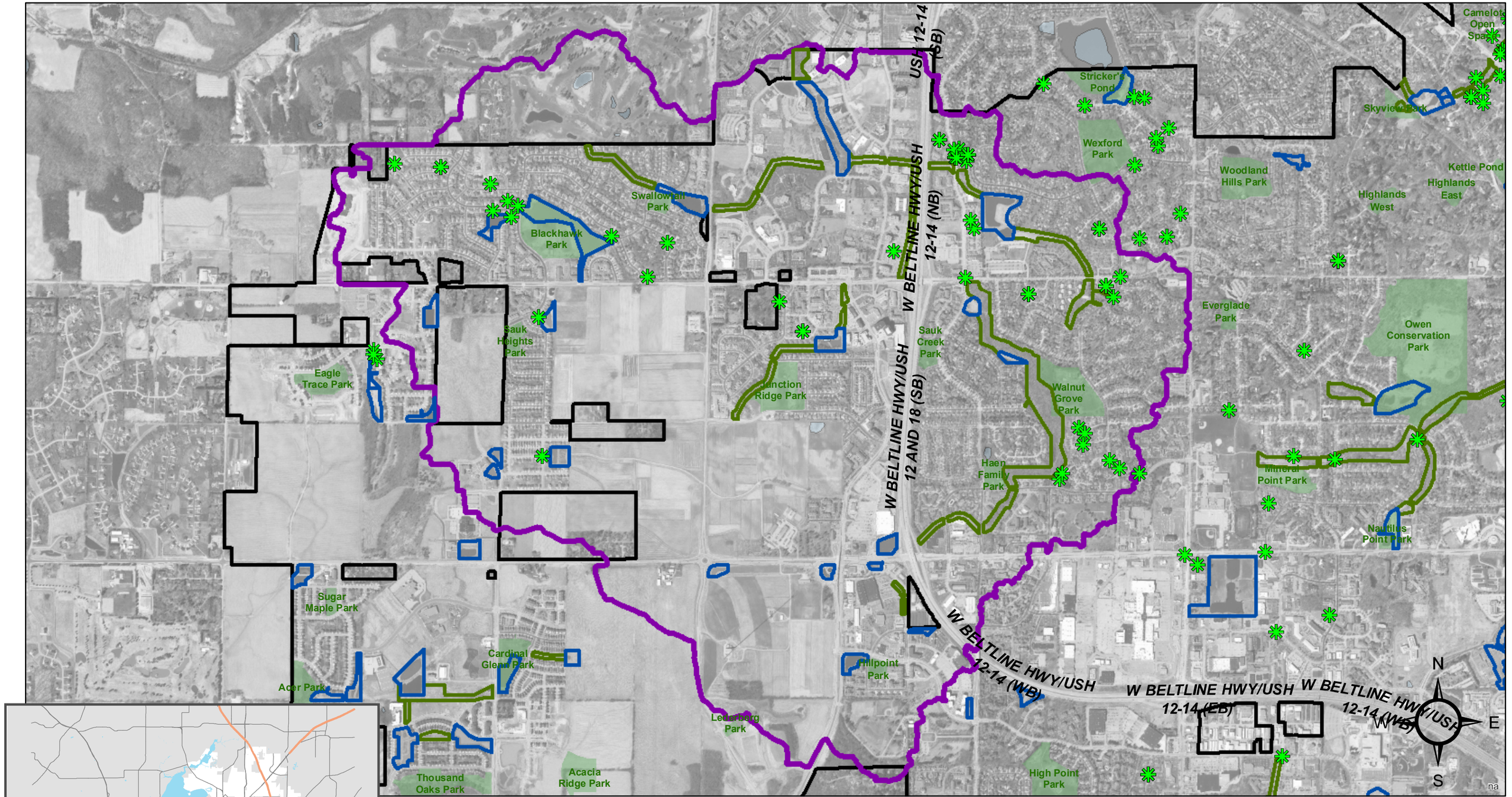


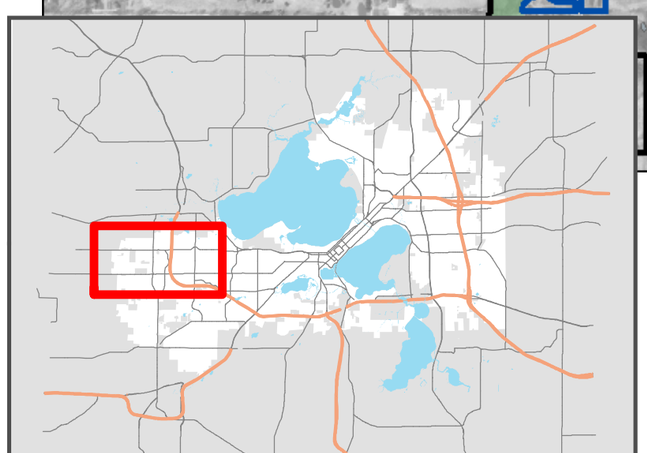

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary
- Flood Report Locations

# Figure 1-3
# Flood Report Locations
# Pheasant Branch Watershed

0 1,875 3,750 Feet

Date: 4/29/2021

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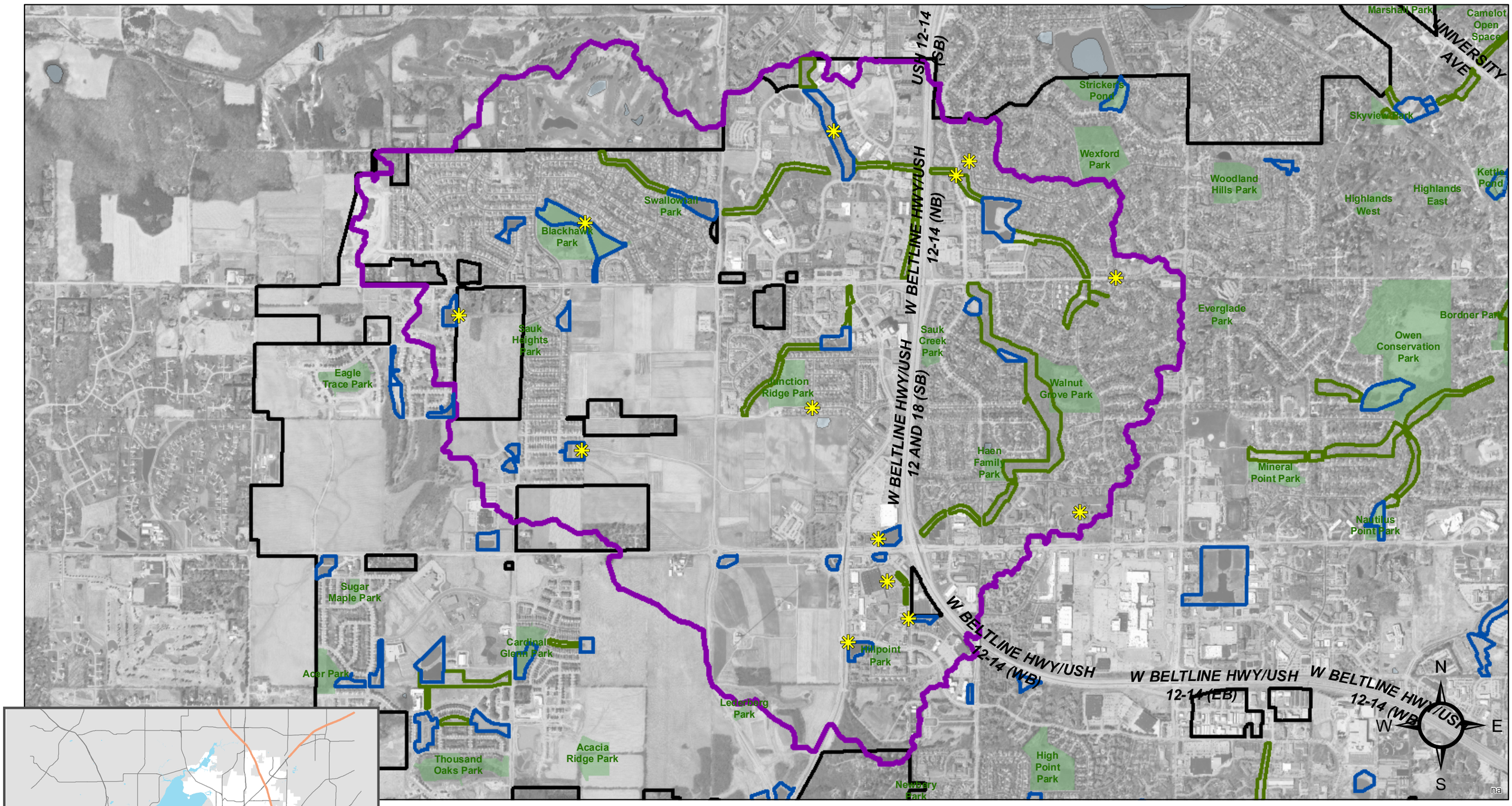


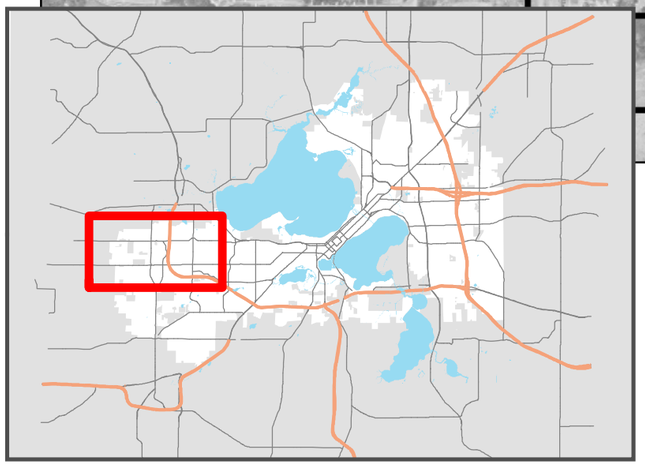

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary
- Flood_History

# Figure 1-4
# Flood Locations Reported by City Staff
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/29/2021

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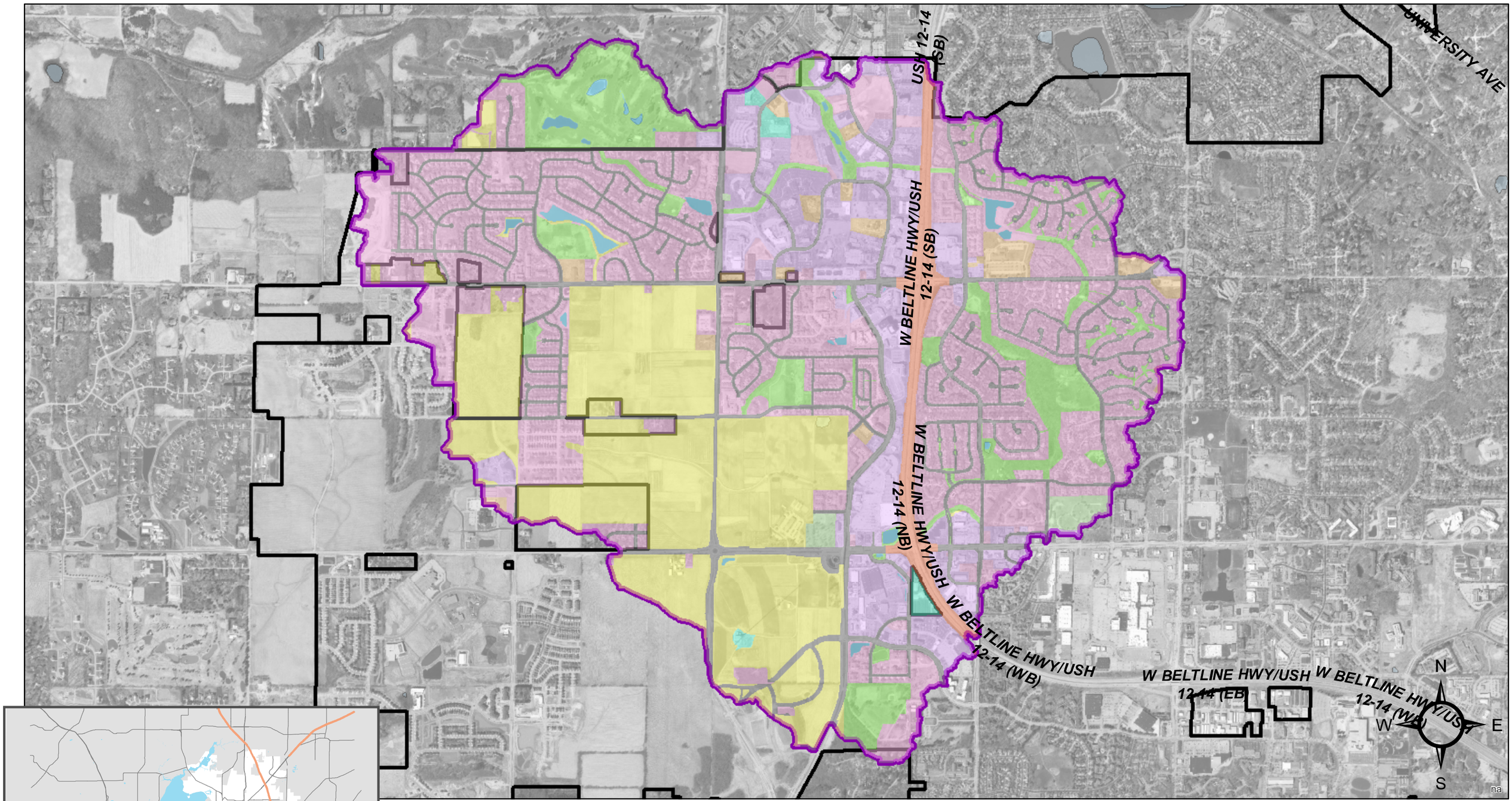


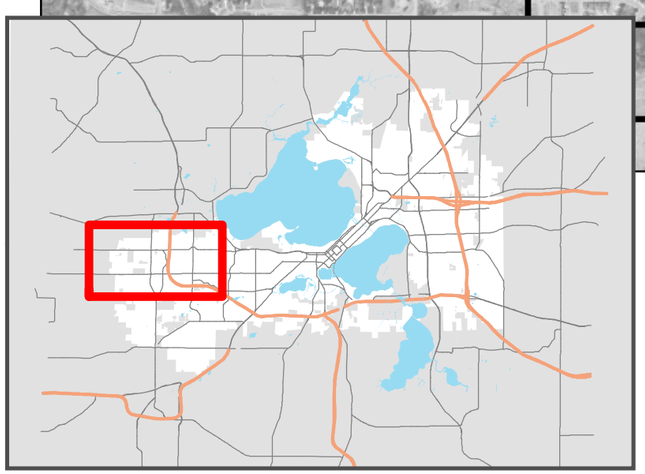

**Legend**

- Municipal Limits
- Watershed Boundary

**Land Use**

- Cemetary
- Commercial
- Highway
- Industrial
- Institutional
- Open
- Park
- Residential
- Street
- Water

# Figure 2-1
# Land Use
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/29/2021

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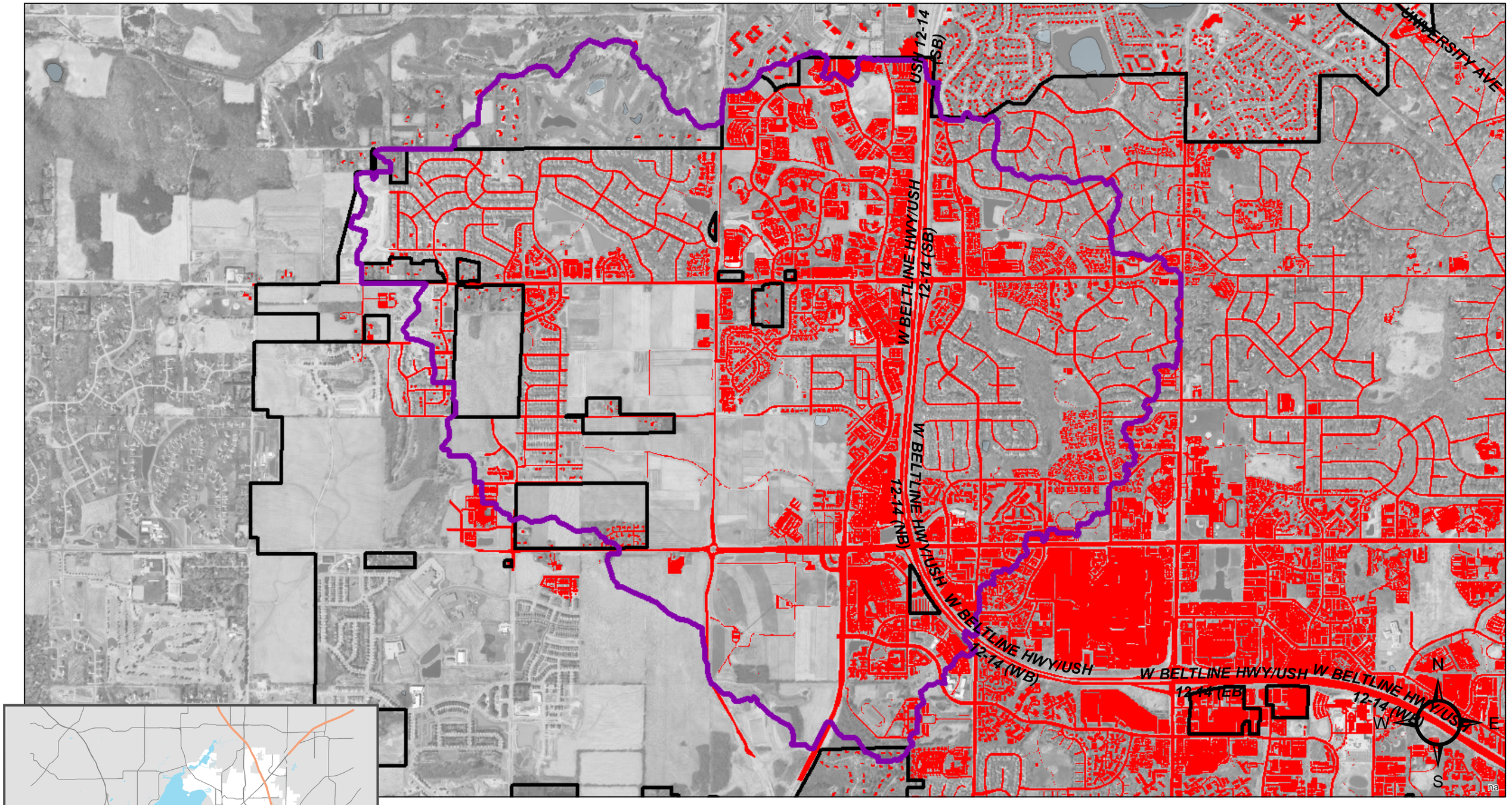


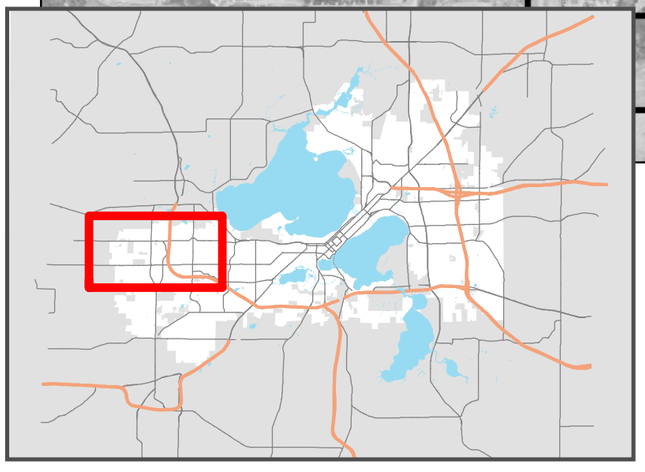

**Legend**

- Municipal Limits
- Watershed Boundary
- Delineated Impervious Areas

# Figure 2-2
# Delineated Impervious Areas
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/30/2021

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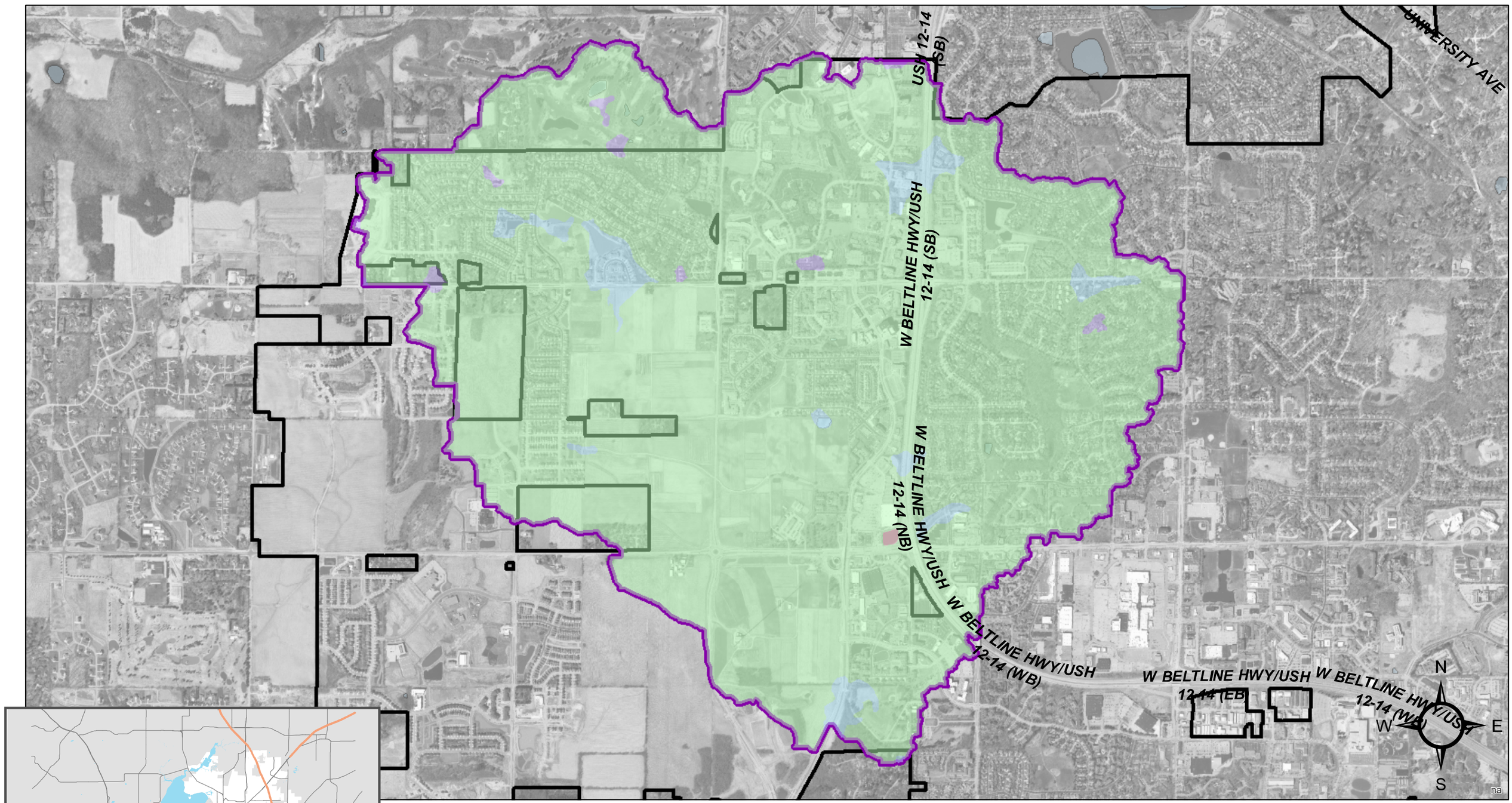


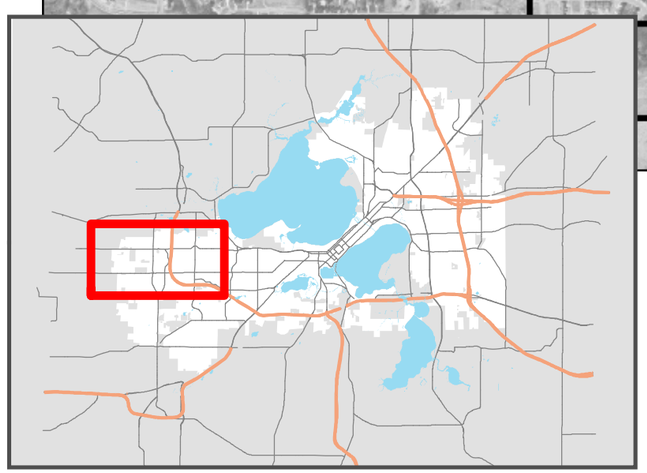

**Legend**

- Municipal Limits
- Watershed Boundary

**Hydrologic Soil Group**

- A
- B
- C
- W

# Figure 2-3
# Hydrologic Soil Group
# Pheasant Branch Watershed

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0 1,950 3,900 Feet

Date: 4/30/2021

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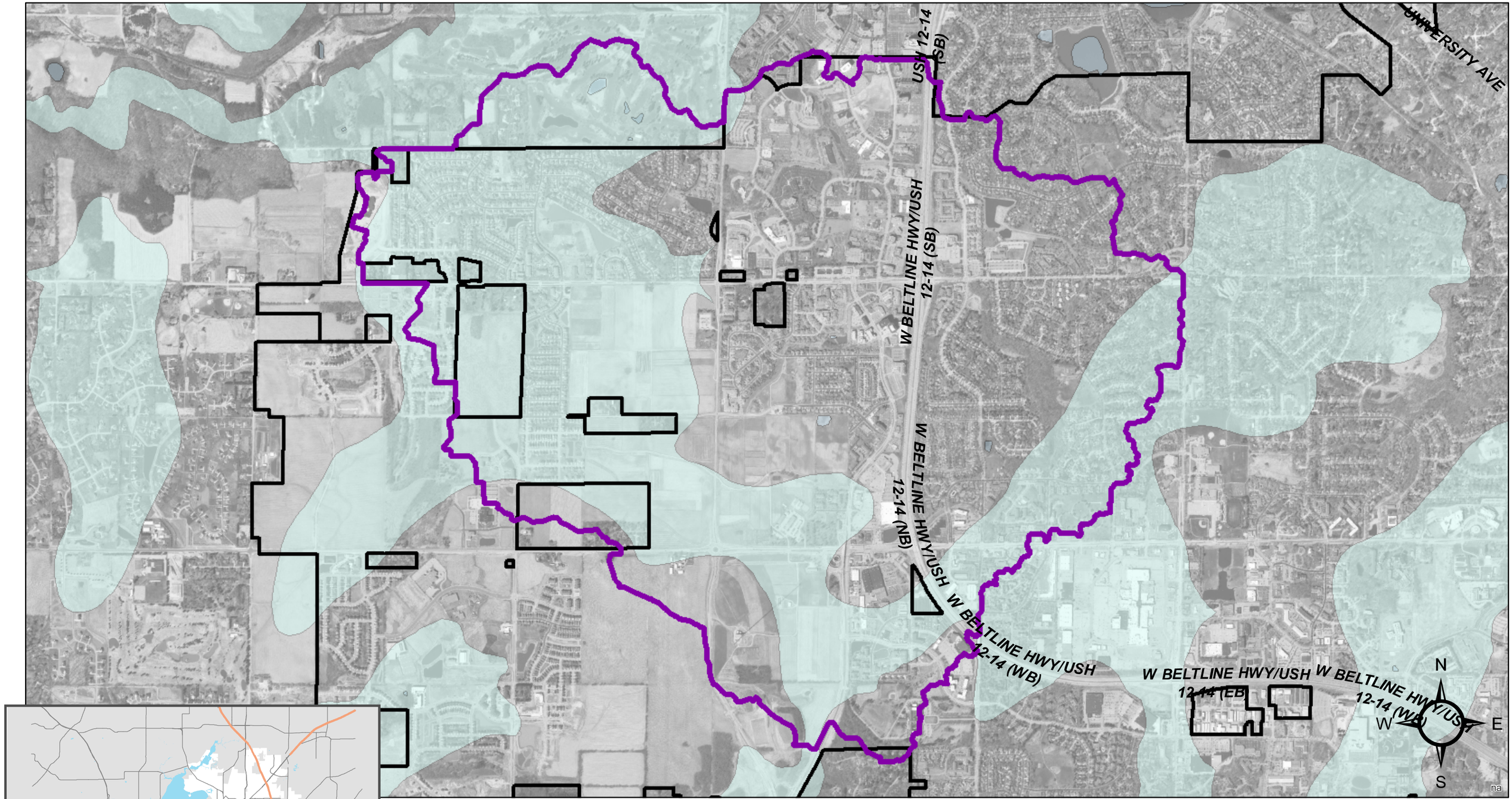


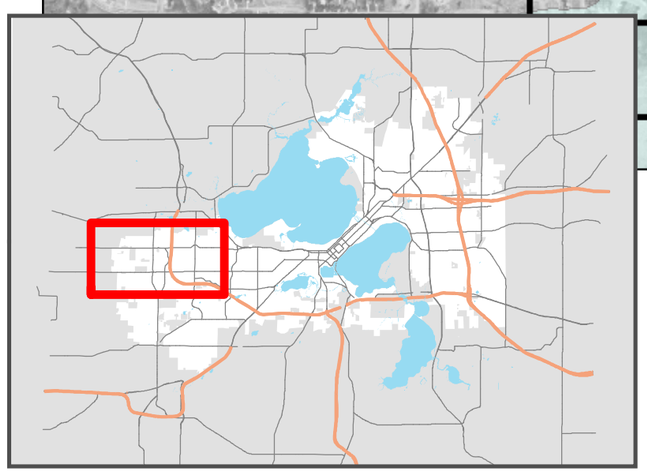

**Legend**

- Municipal Limits
- Watershed Boundary
- Prairie du Chien Group (Op)

# Figure 2-4
# Geological Mapping - Prairie du Chien Group
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 1,950 3,900 Feet

Date: 4/30/2021

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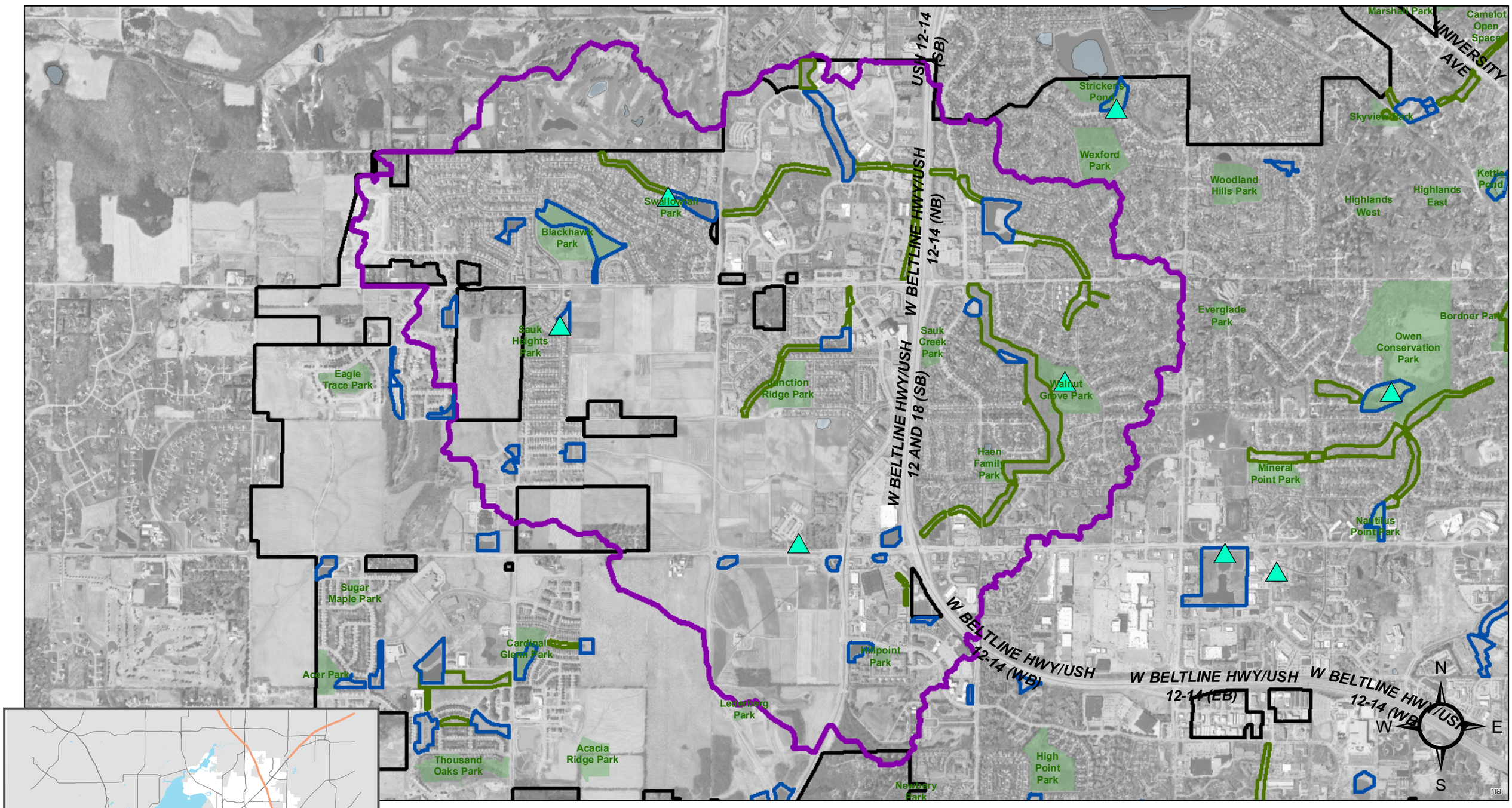


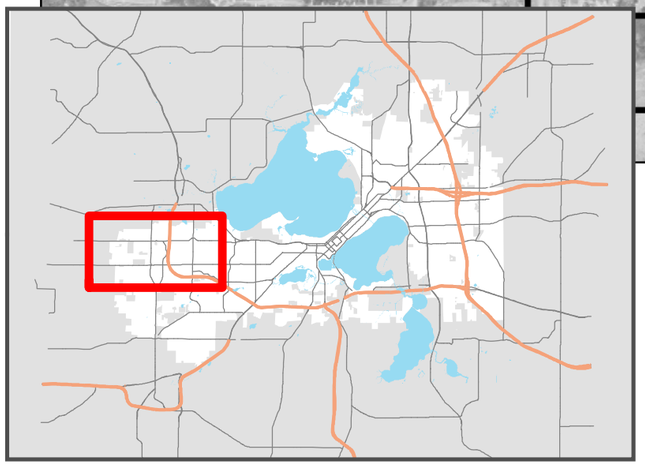

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary
- Rain Gage

# Figure 4-1
# Rain Gage Locations
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_1_MonitoringLocations.mxd
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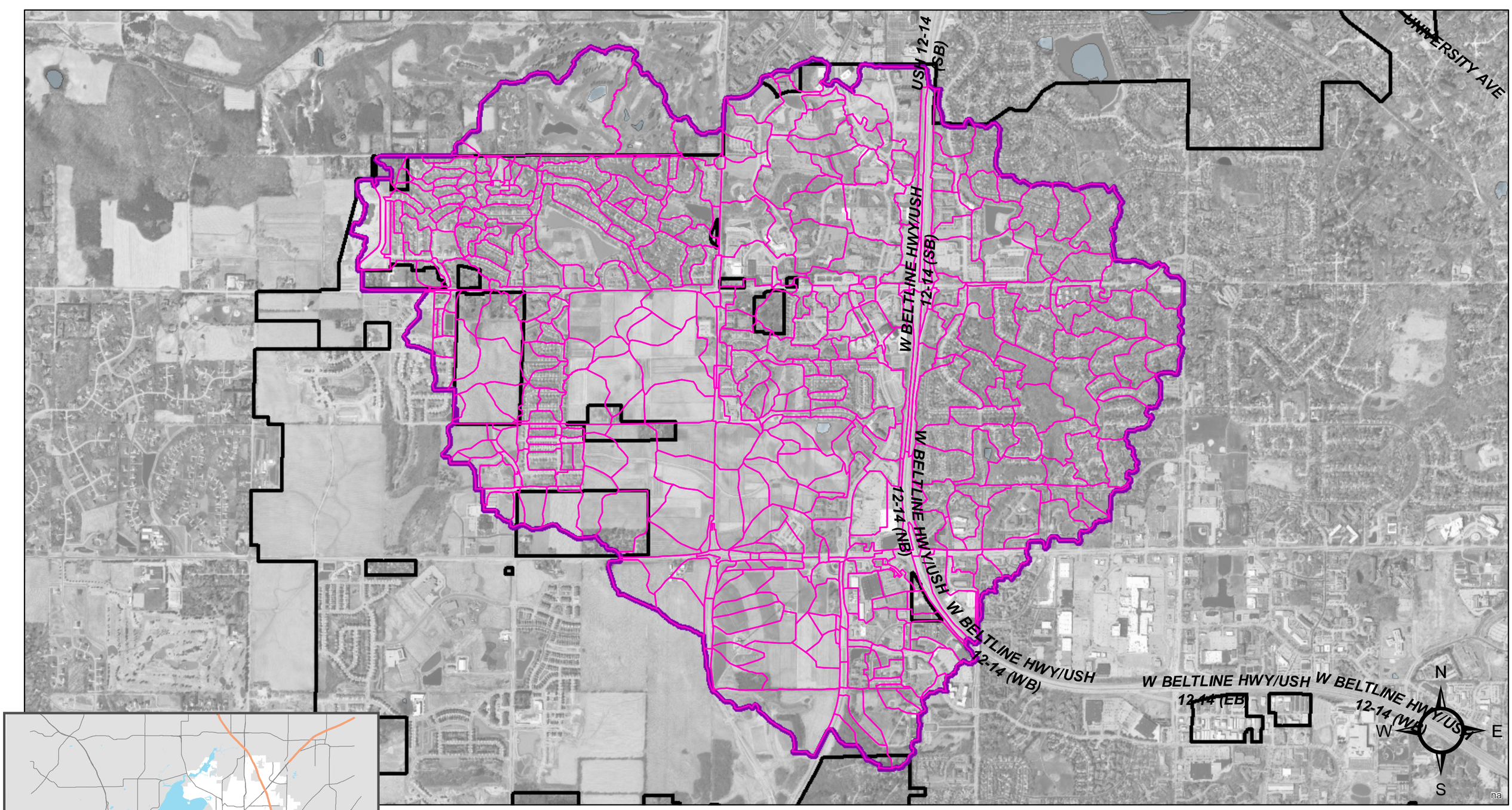


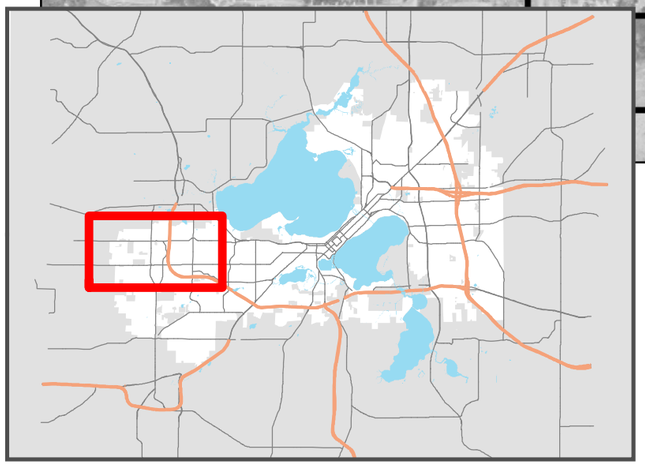

**Legend**

- Municipal Limits
- Watershed Boundary
- Subwatershed

# Figure 4-2
# Subwatersheds
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_2_Subbasins.mxd

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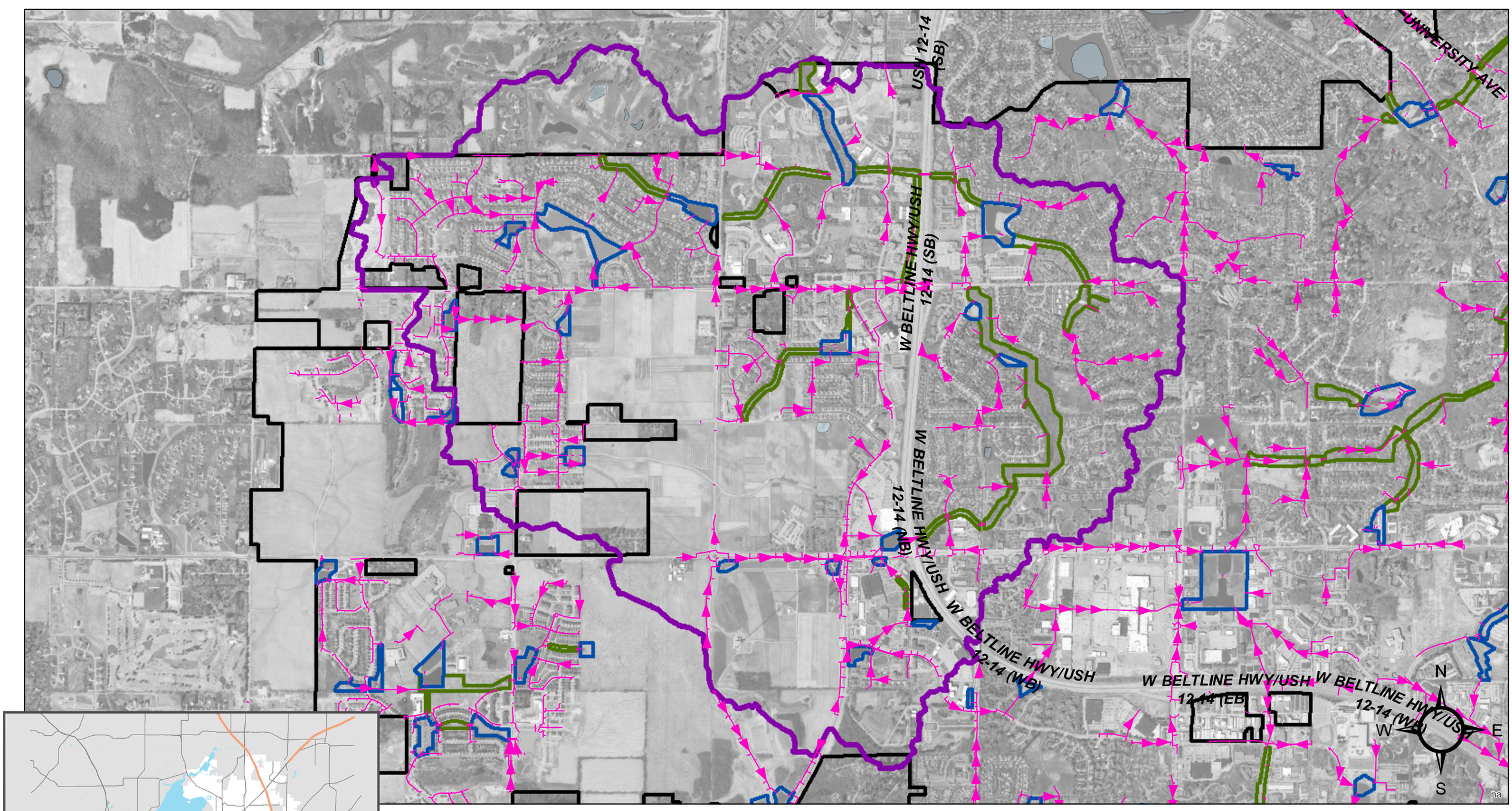
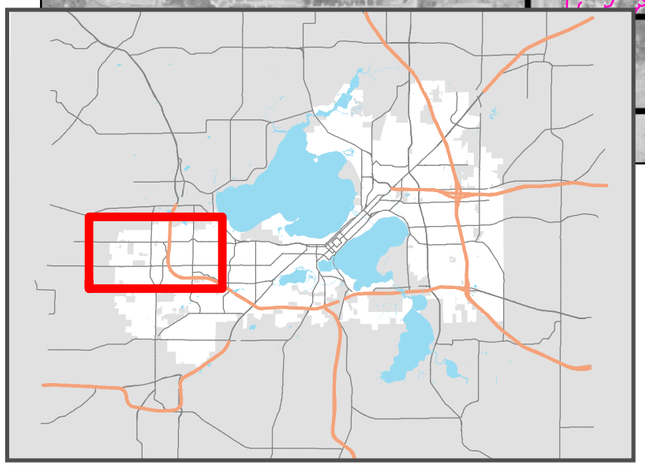


**Legend**

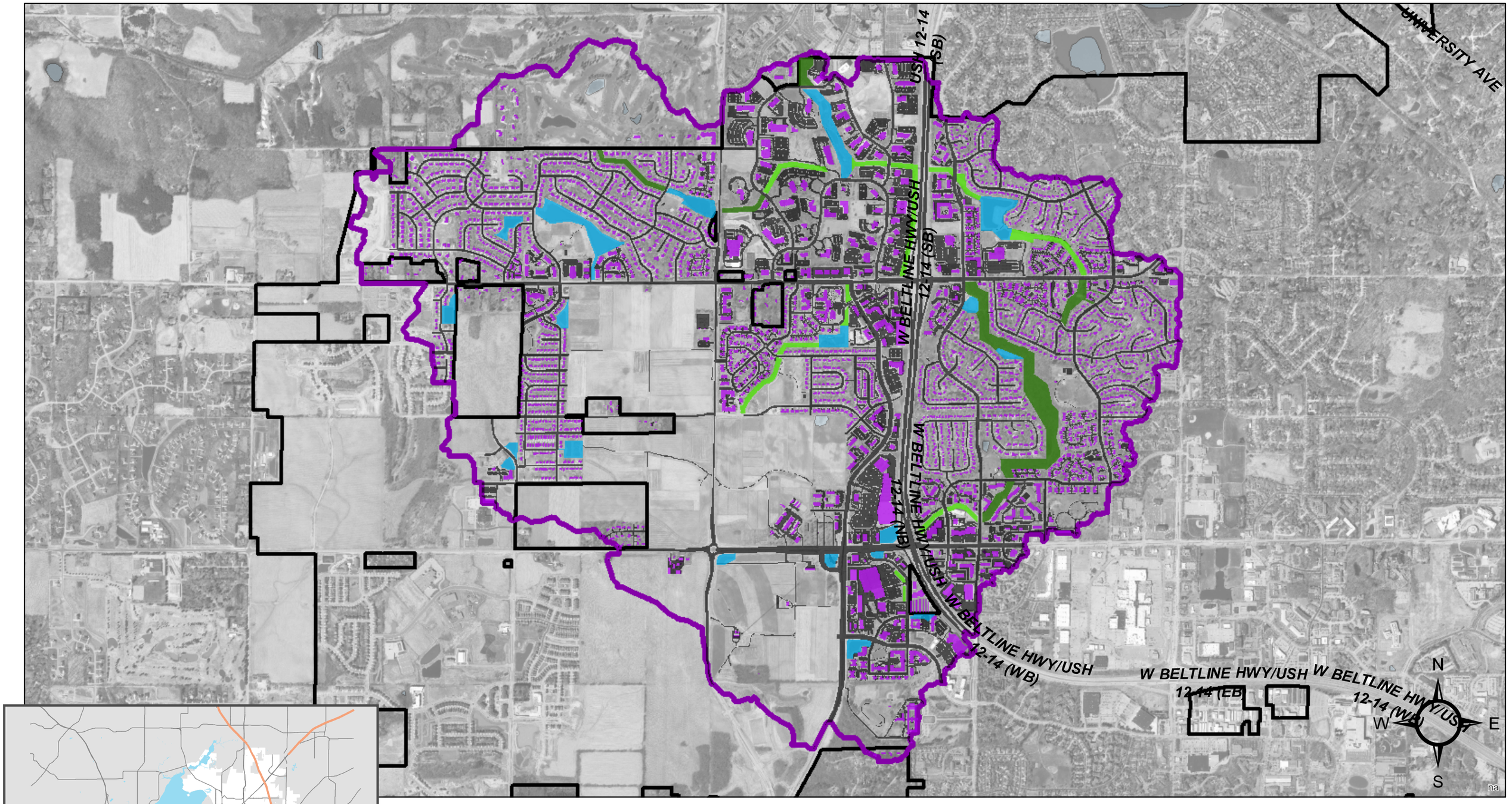
- Greenway
- Pond
- Storm Pipe
- Municipal Limits
- Watershed Boundary

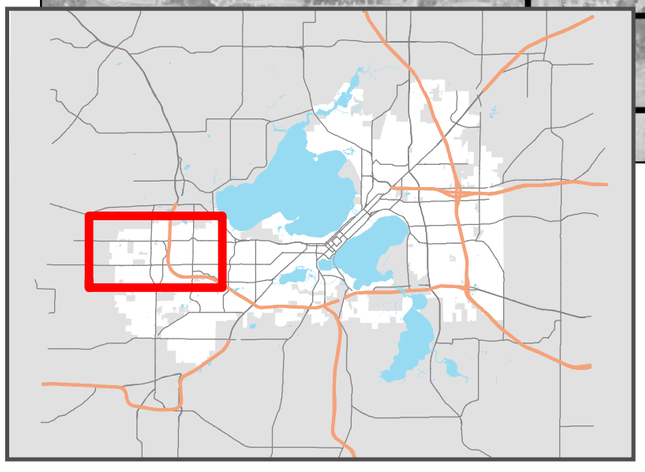
# Figure 4-3
# Stormwater Conveyance System
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

User Name: encjb Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_3_StormwaterConveyanceSystem.mxd



**Legend**

- Municipal Limits
- Watershed Boundary
- Water
- Grassed Greenway
- Wooded Greenway
- Impervious
- Building

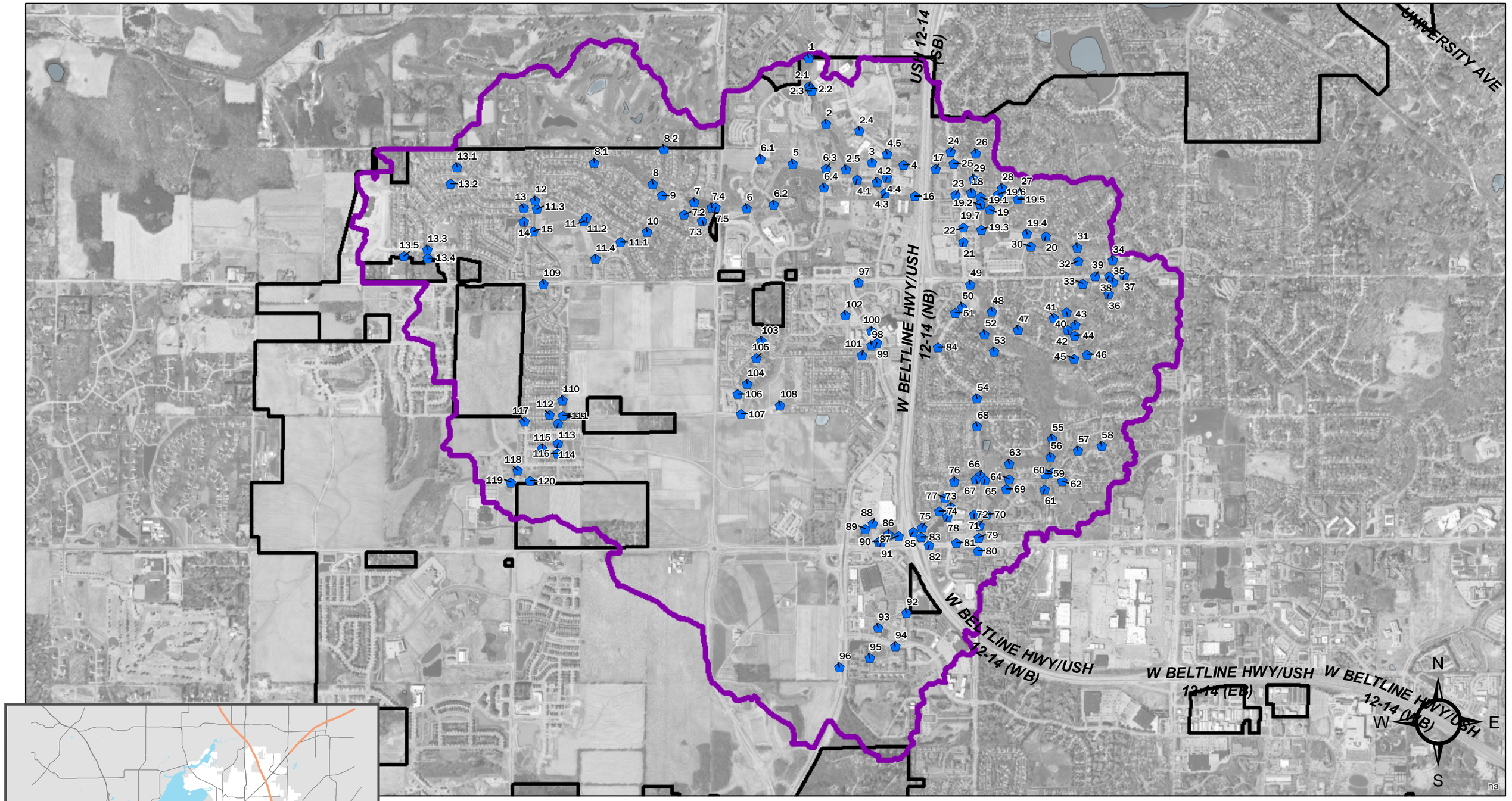
# Figure 4-4
# 2D Model Roughness
# Pheasant Branch Watershed

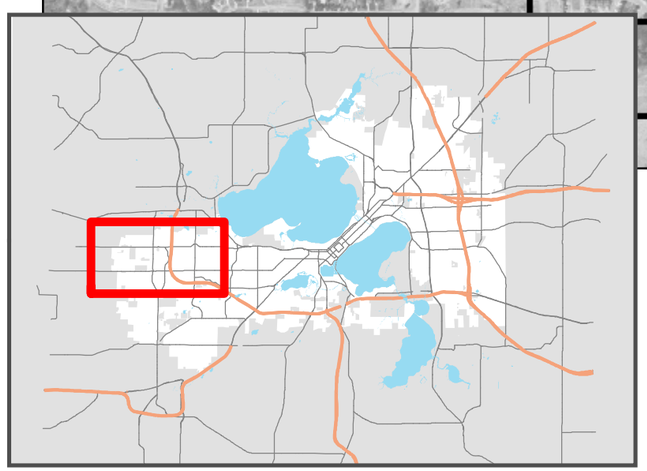
0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_4_2DRoughness.mxd

User Name: encjb



**Legend**

- Municipal Limits
- Watershed Boundary
- Results Reporting Locations

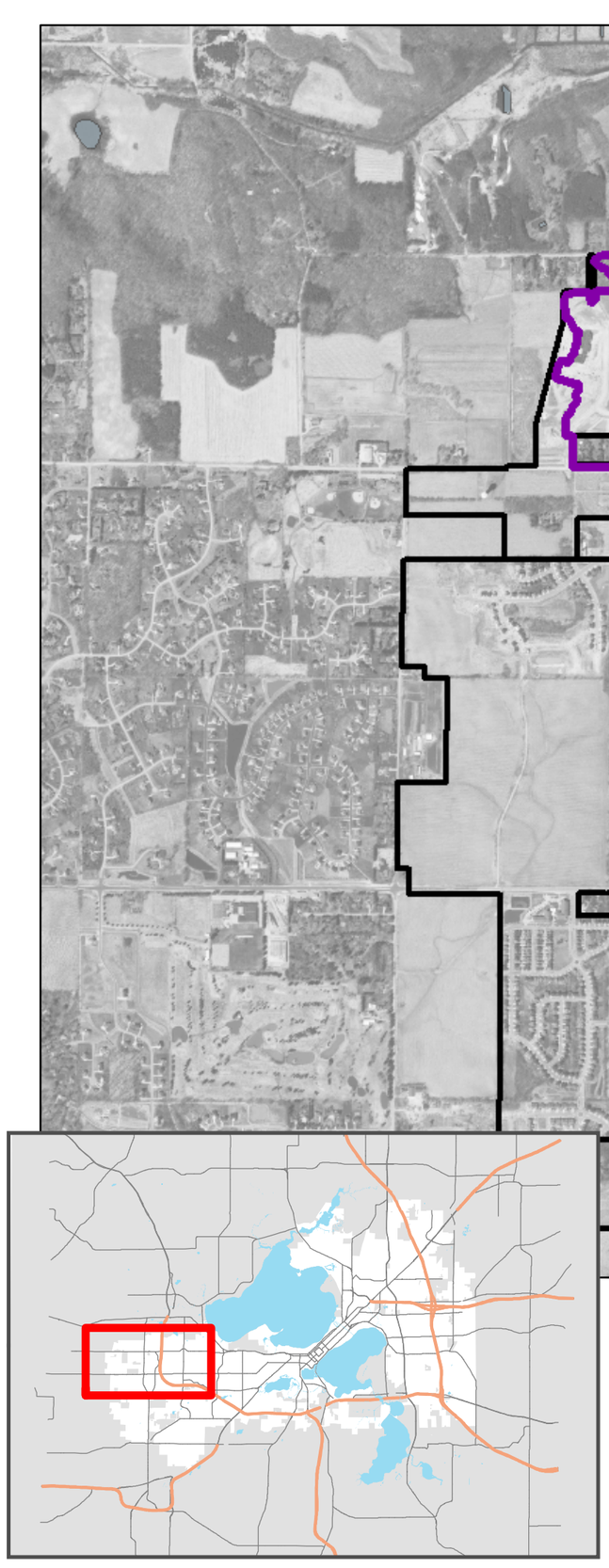
# Figure 4-5
# Reporting Locations
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_5_ReportingLocations.mxd

User Name: encjb



Legend

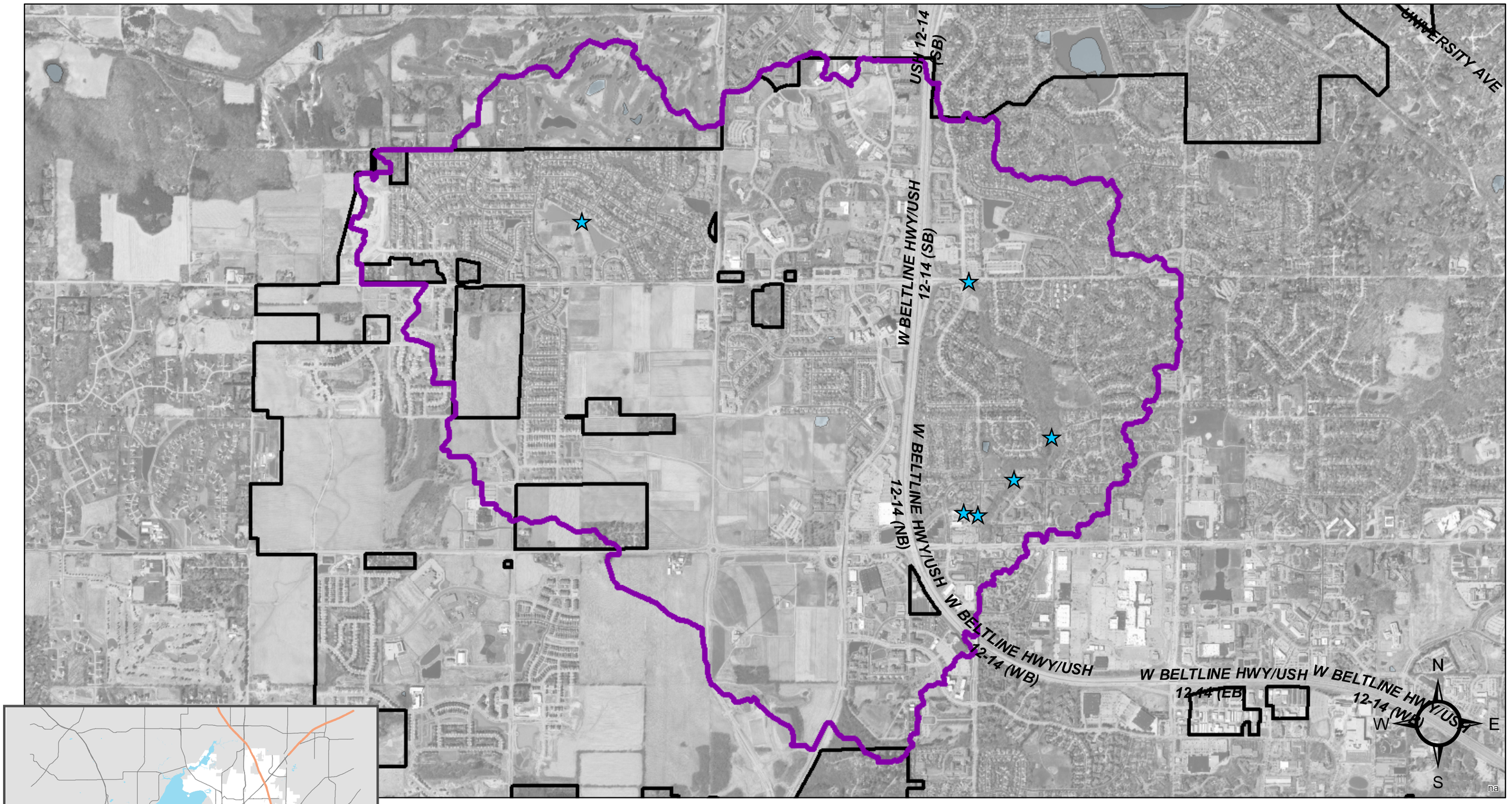
- Municipal Limits
- Watershed Boundary
- Monitoring Locations

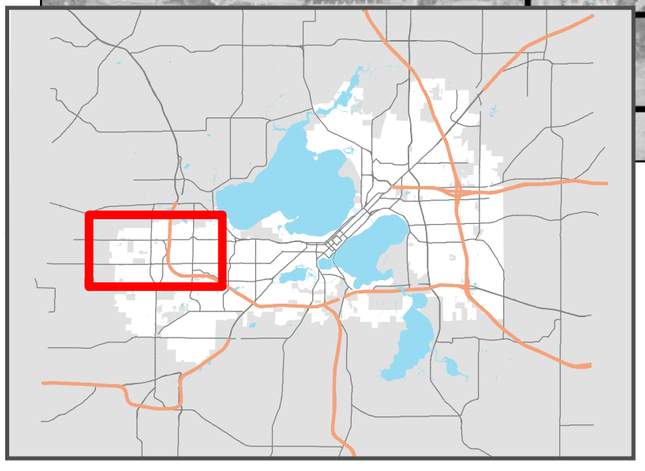
# Figure 5-1
# Monitoring Locations
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

User Name: encjb
Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure5_1_MonitoringLocations.mxd



**Legend**

- Municipal Limits
- Watershed Boundary
- High Water Marks

# Figure 5-2
# August 2018 Recorded High Water Surface Elevations Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure5_2_RecordedHighWaterMarks.mxd

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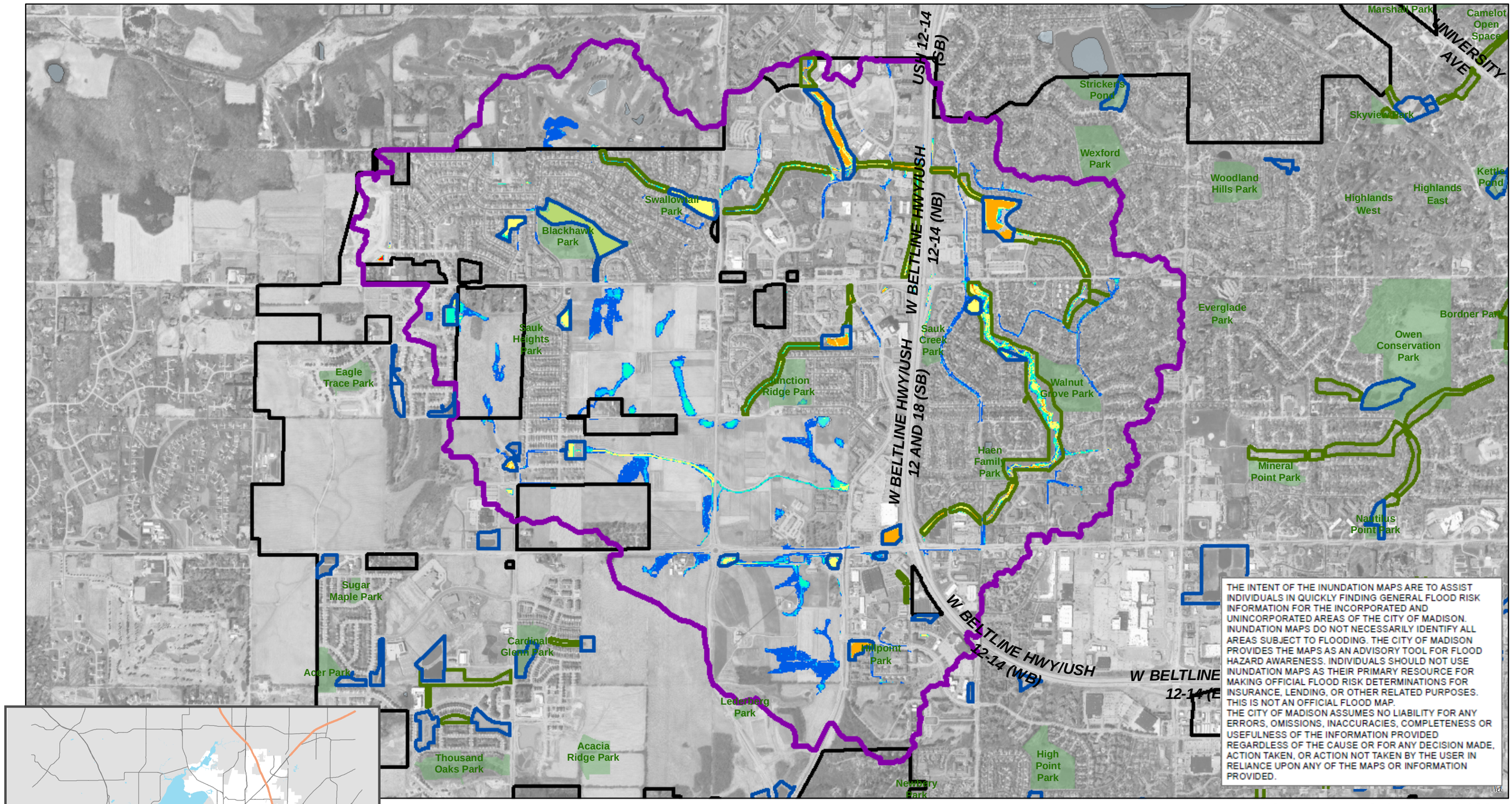


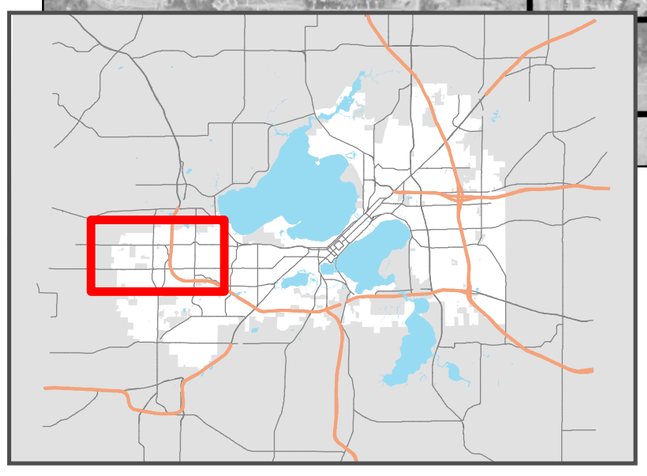

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

# Figure 6-1
# Existing Conditions Inundation Mapping
# 100% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure1_1_Existing100PerChance.mxd
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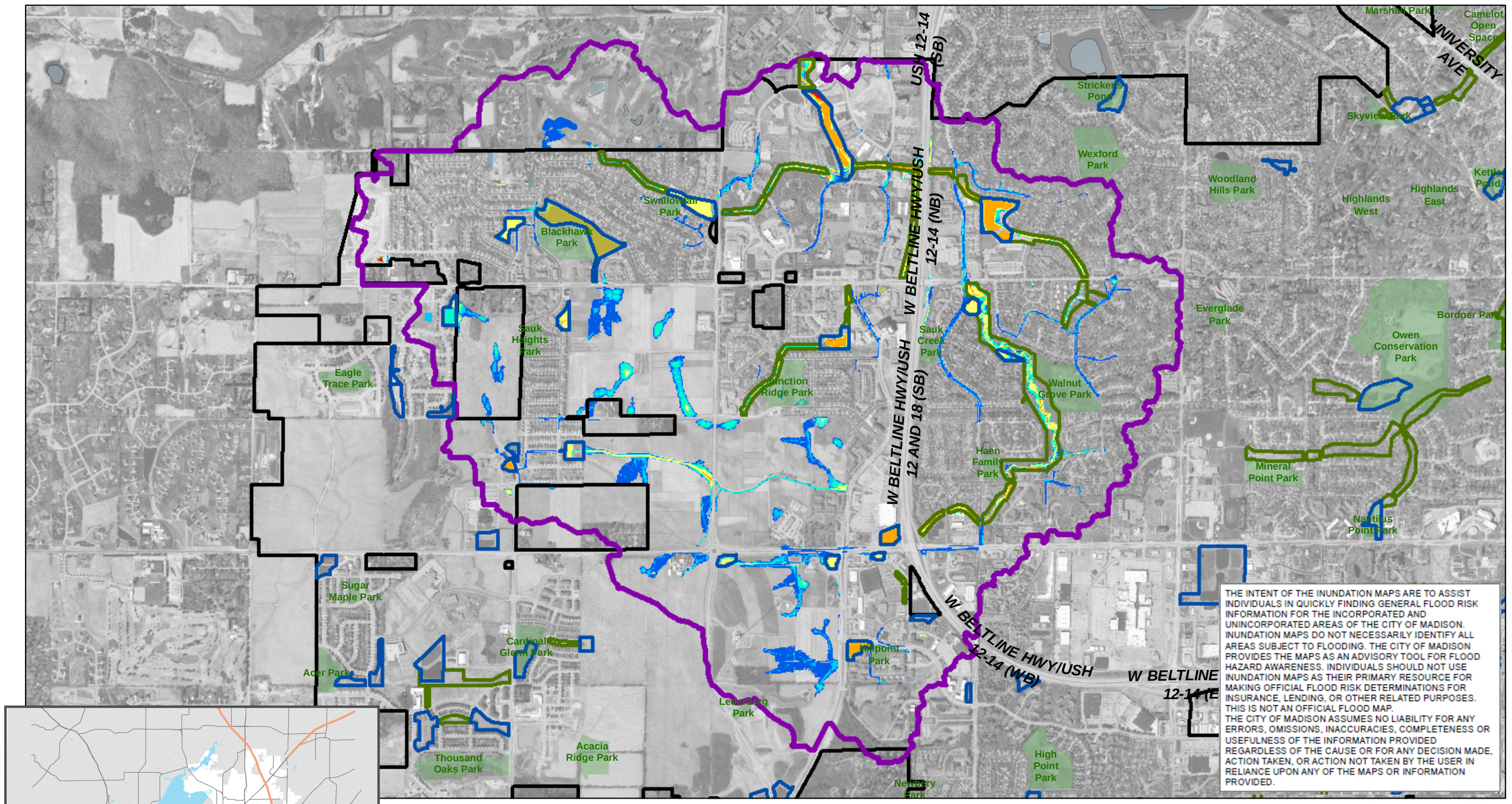


**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

# Figure 6-2
# Existing Conditions Inundation Mapping
# 50% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_2_Existing50PerChance.mxd
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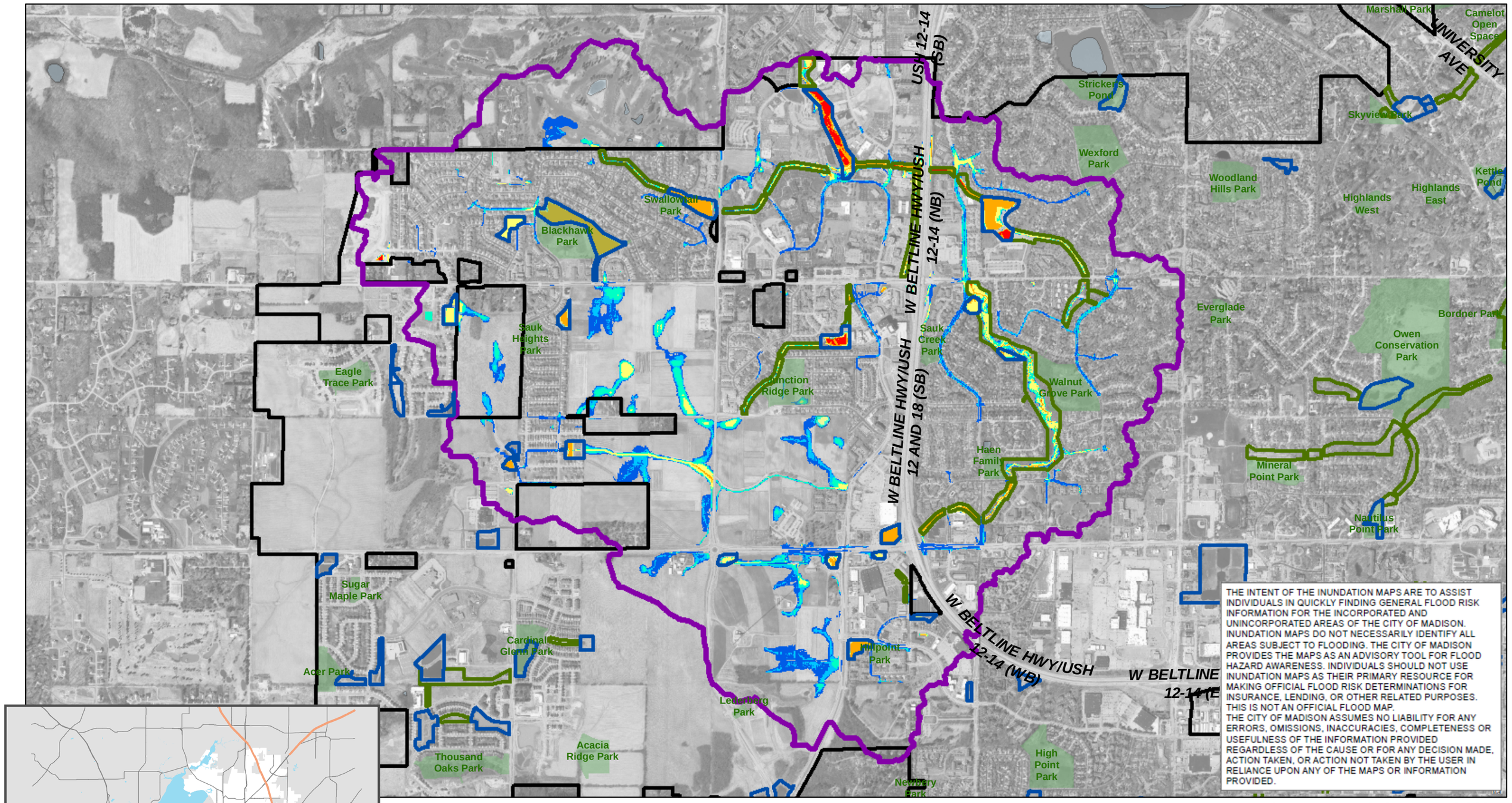


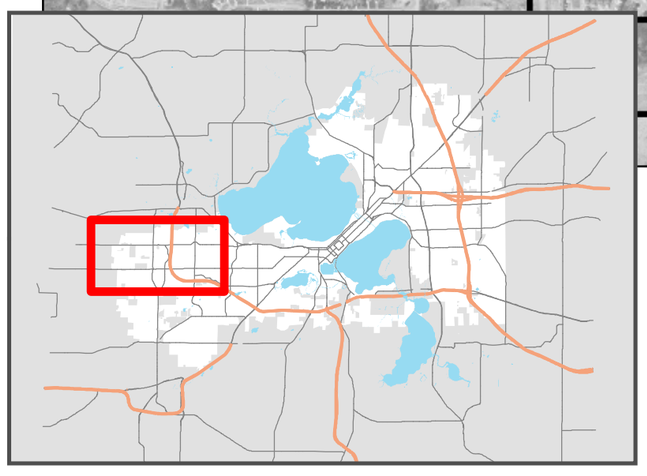

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

# Figure 6-3
# Existing Conditions Inundation Mapping
# 20% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_3_Existing20PerChance.mxd
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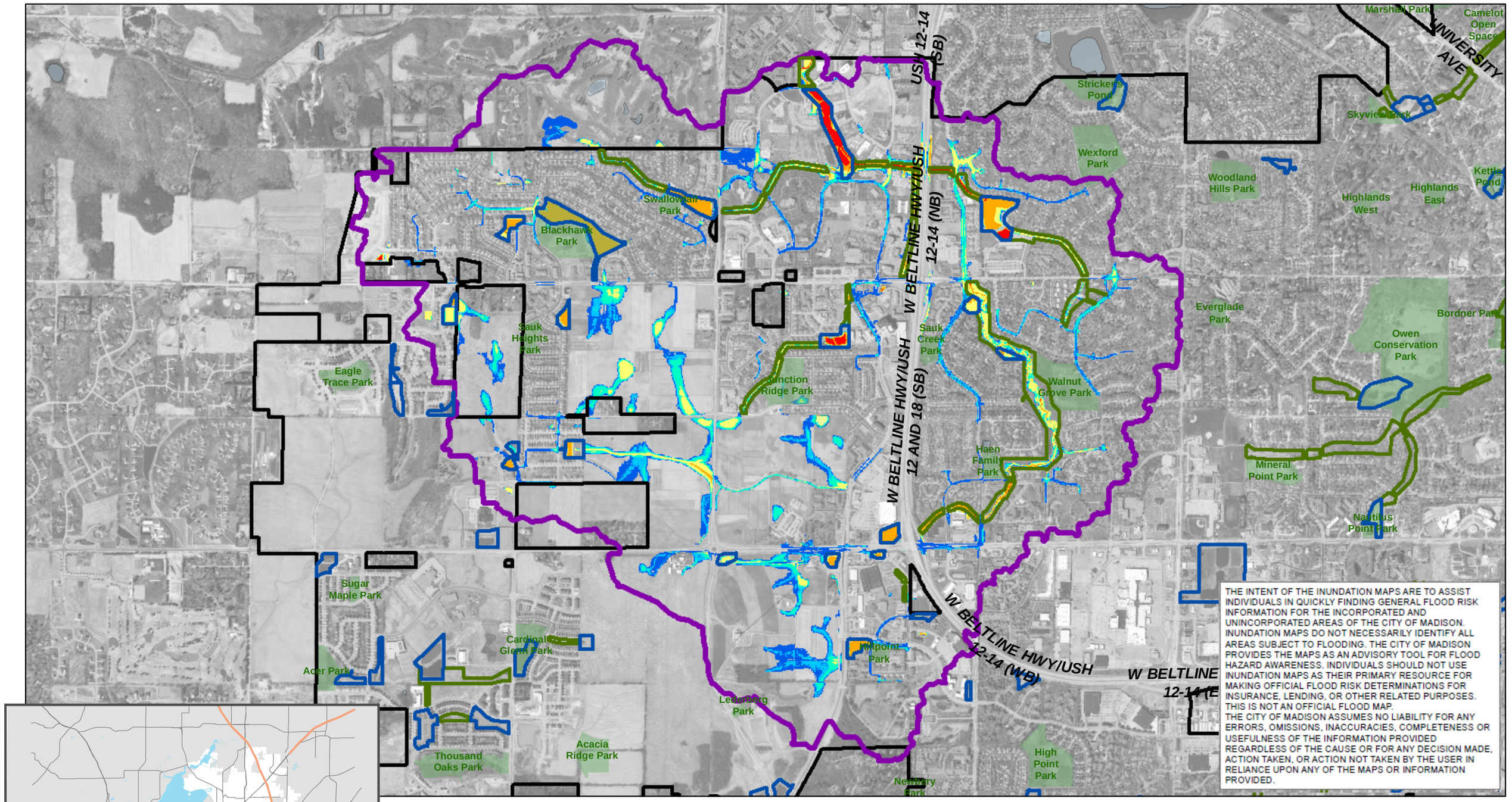


# Figure 6-4
# Existing Conditions Inundation Mapping
# 10% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

User Name: encjb
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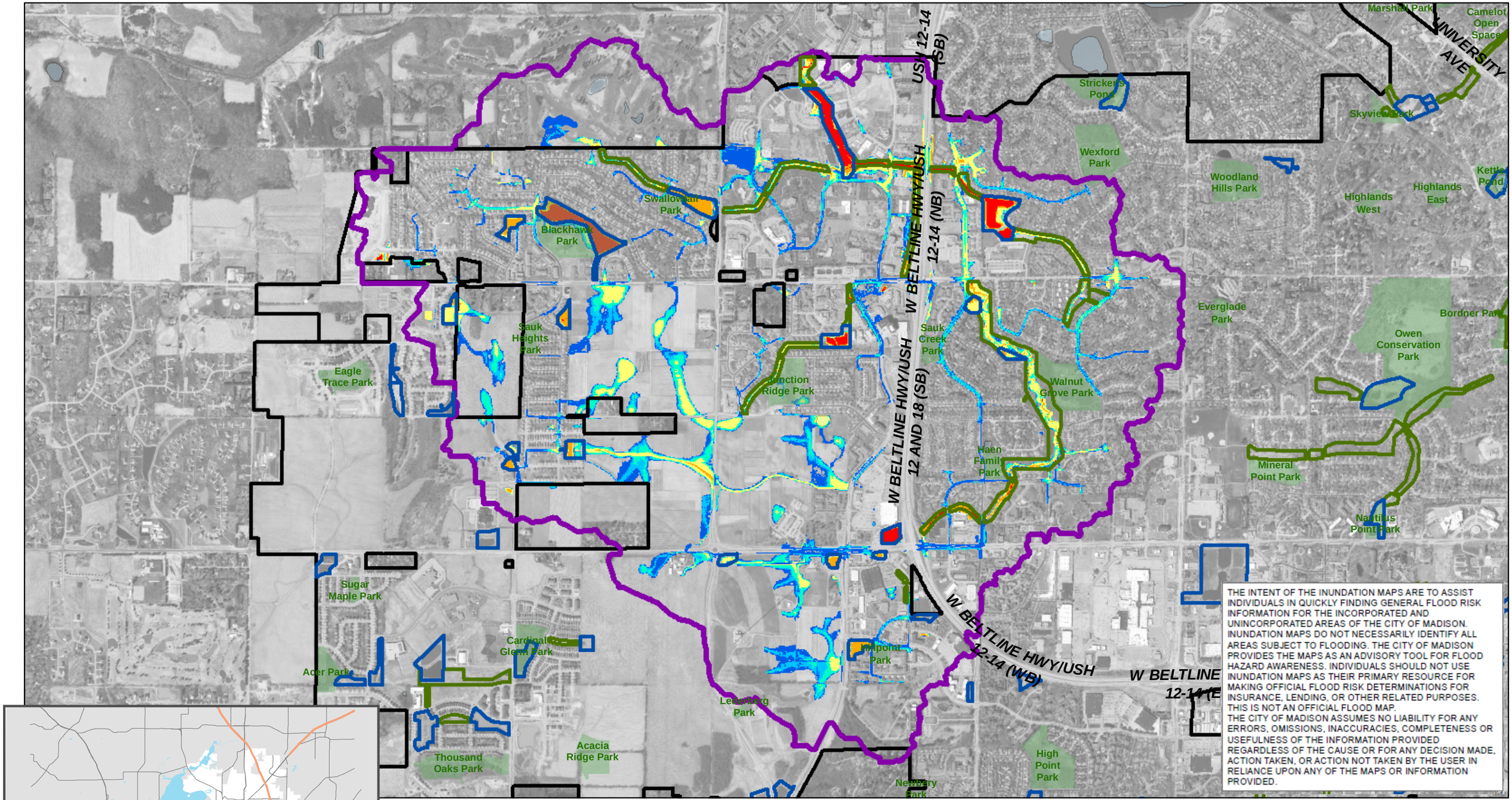


# Figure 6-5
# Existing Conditions Inundation Mapping
# 4% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

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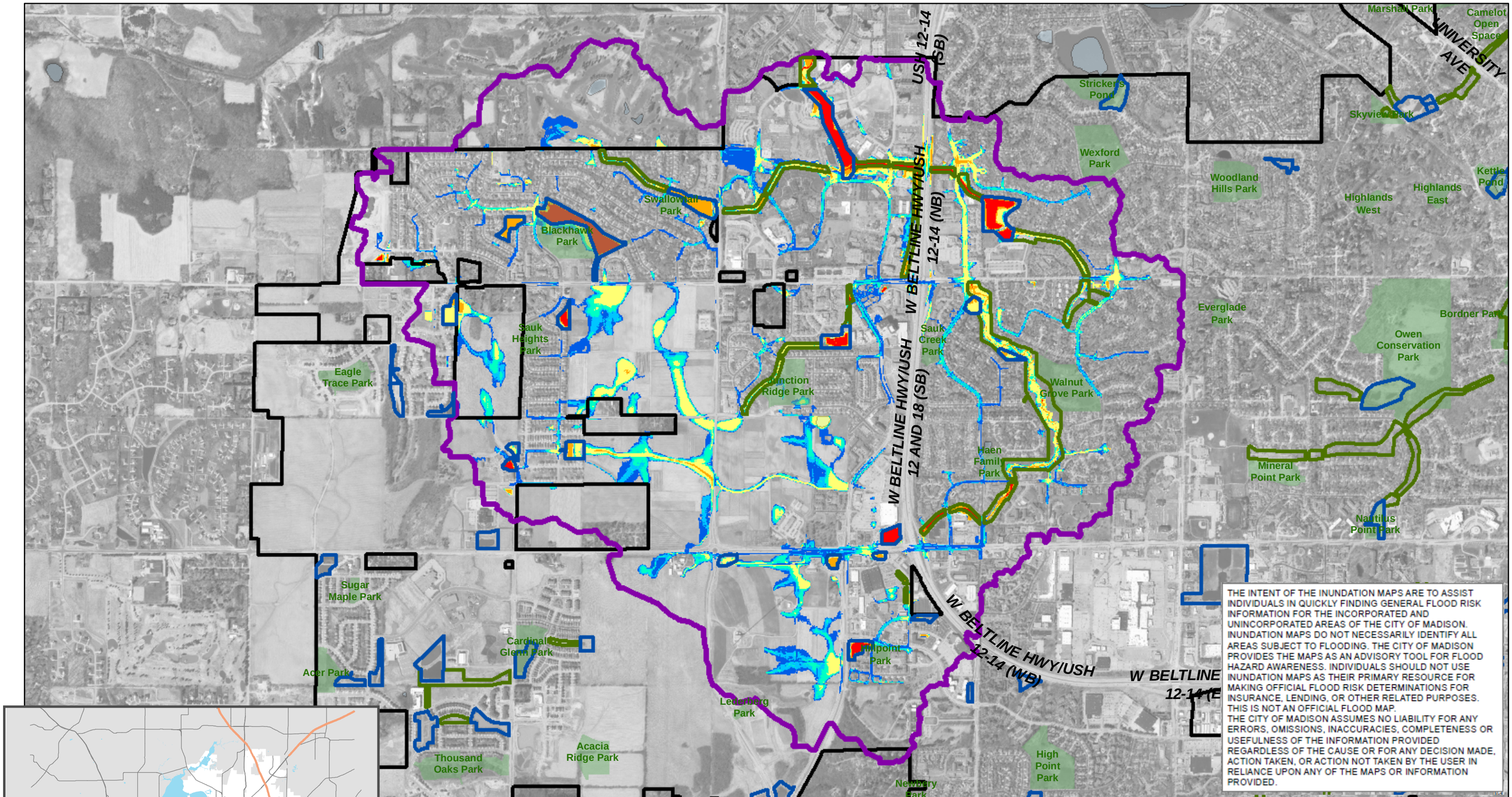


# Figure 6-6
# Existing Conditions Inundation Mapping
# 2% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

User Name: encjb
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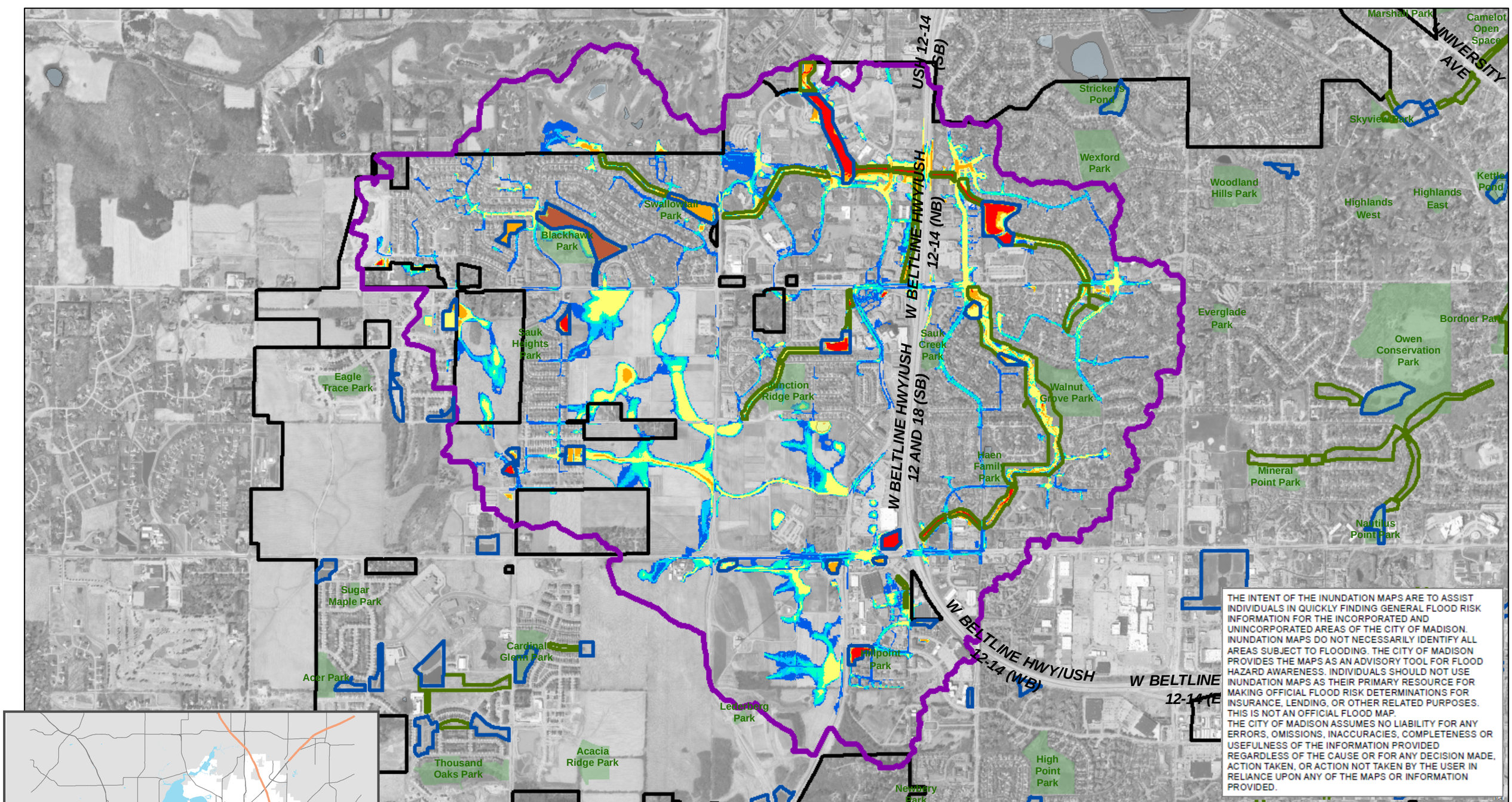


# Figure 6-7
# Existing Conditions Inundation Mapping
# 1% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

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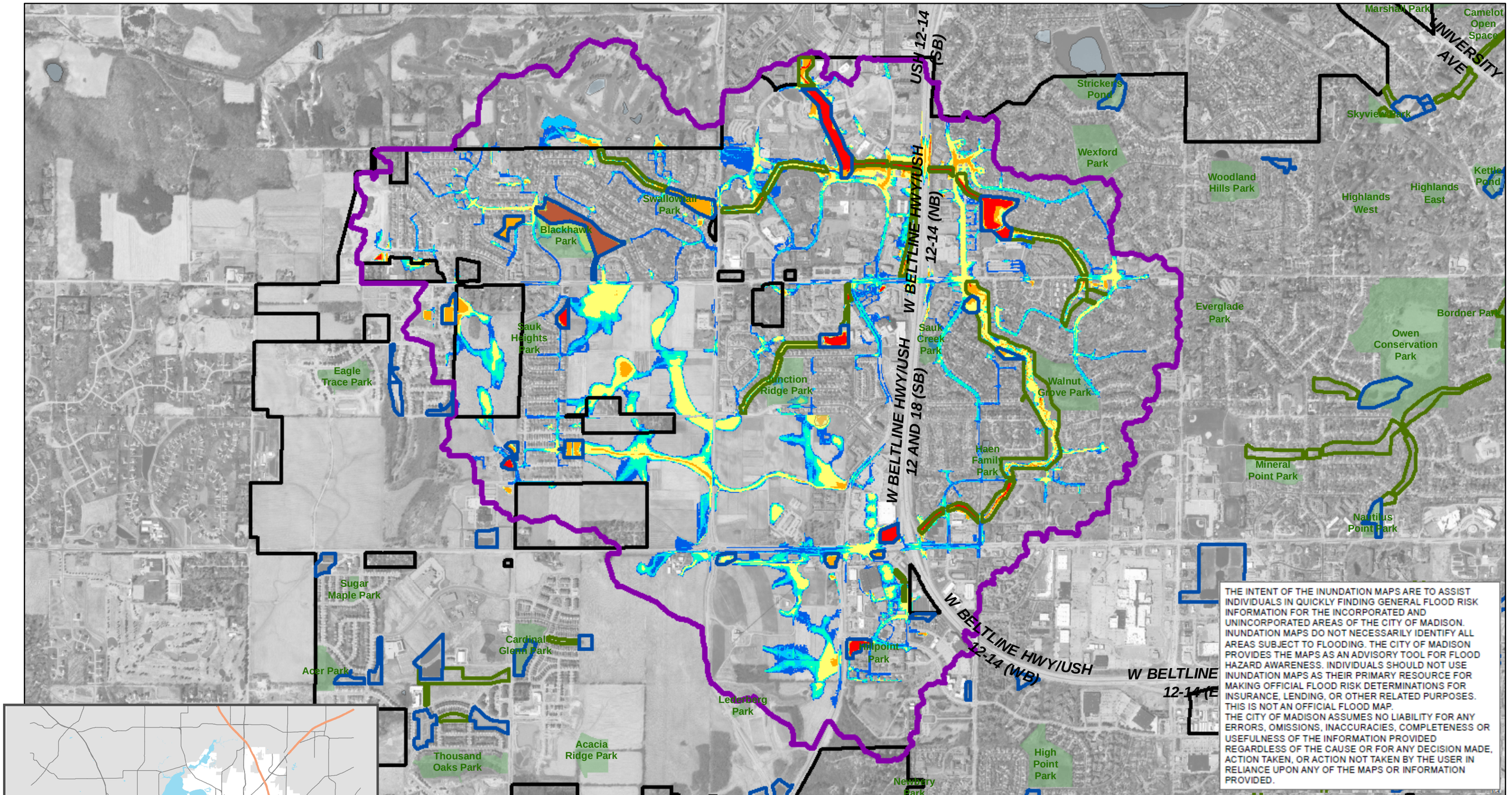


# Figure 6-8
# Existing Conditions Inundation Mapping
# 0.5% Chance Event
# Pheasant Branch Watershed

Date: 5/6/2021

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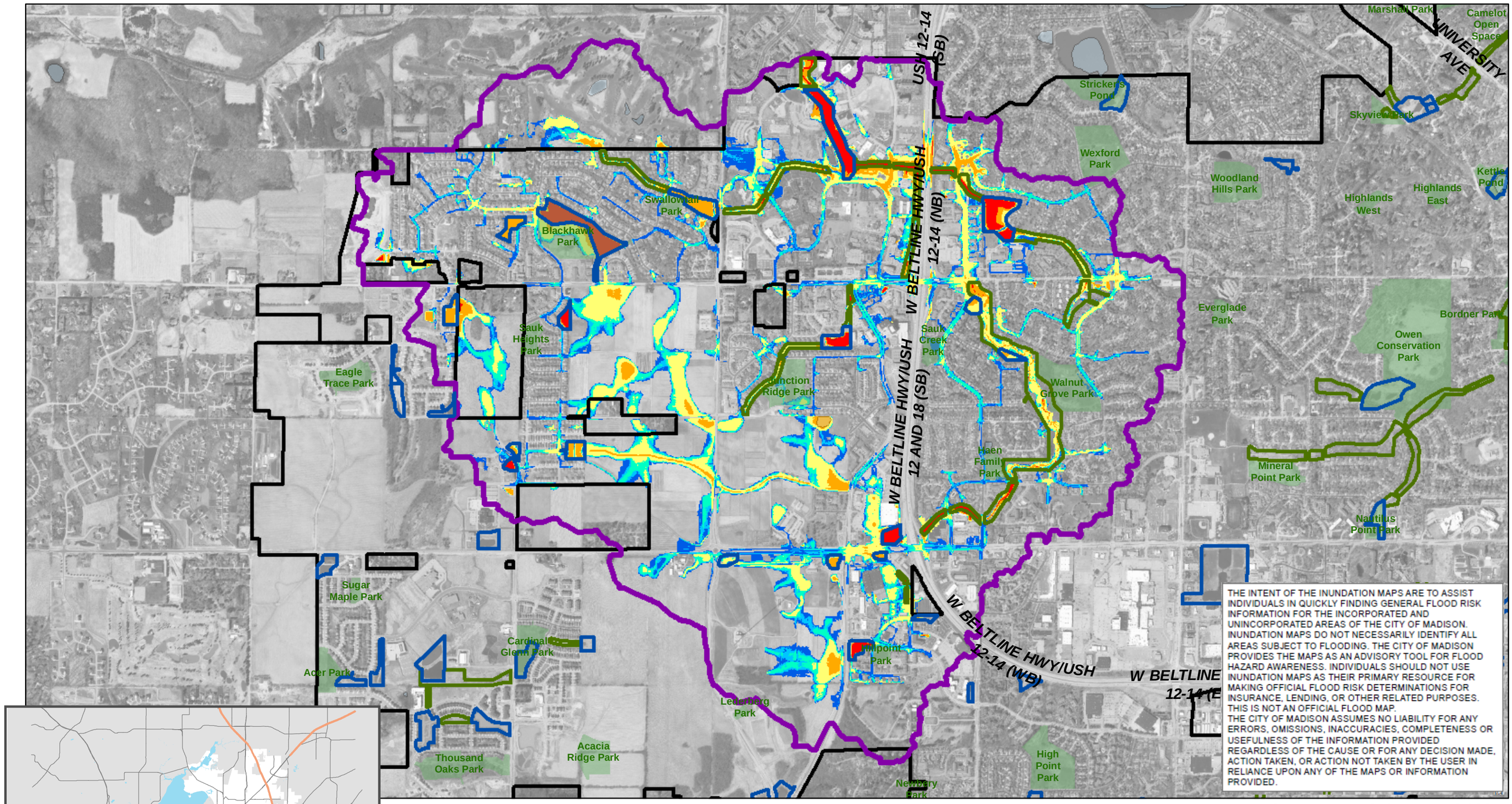


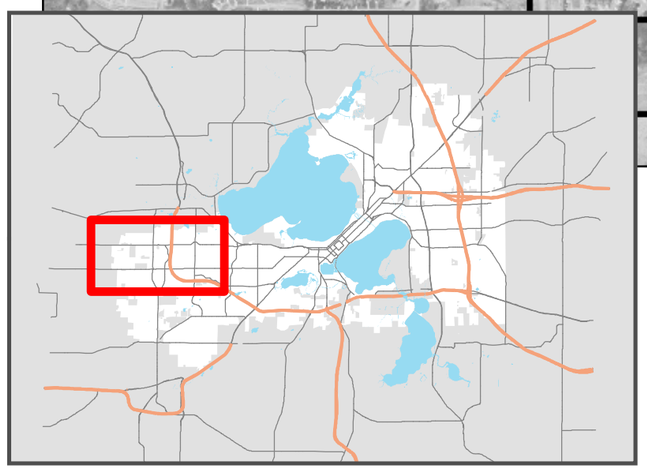

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

# Figure 6-9
# Existing Conditions Inundation Mapping
# 0.2% Chance Event
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_9_ExistingPoint2PerChance.mxd
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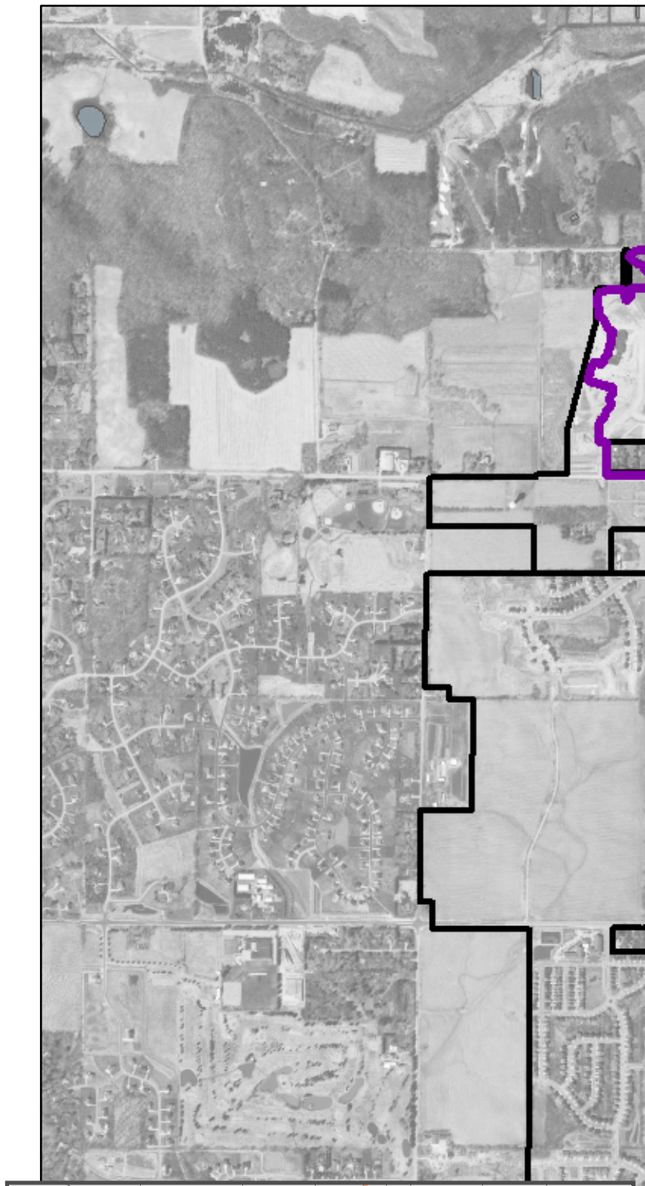

**Legend**

- Municipal Limits
- Watershed Boundary
- Streets Not Meeting 10% Chance Target

# Figure 6-10
# Streets Not Meeting 10% Chance Target
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

User Name: encjb
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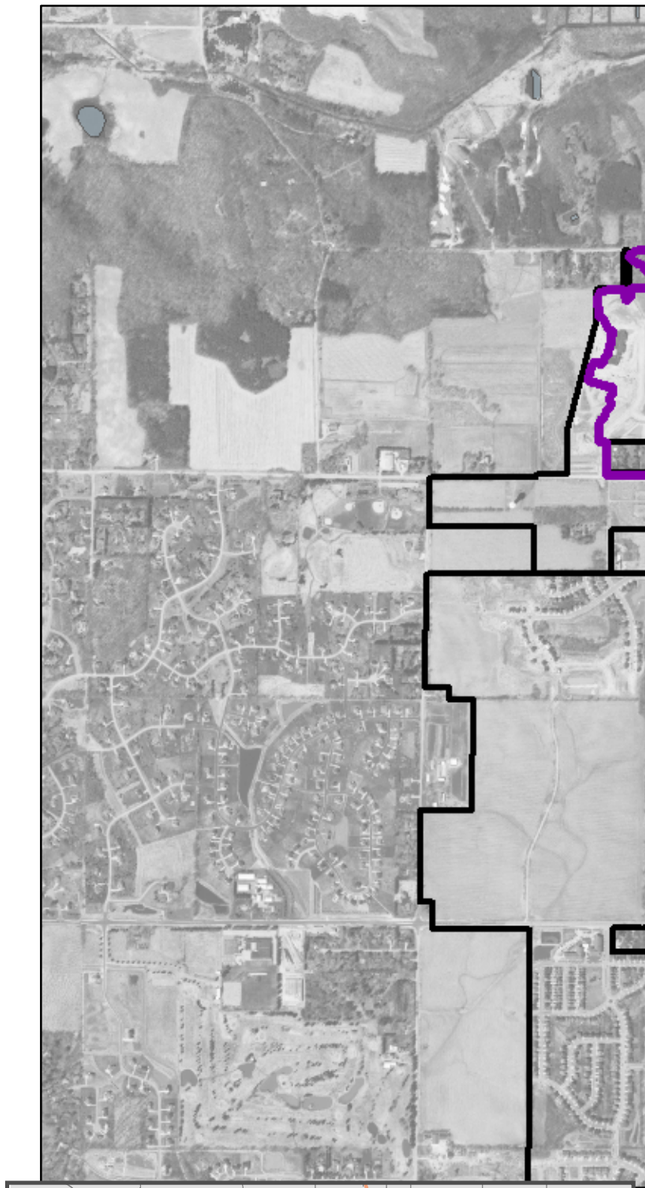

**Legend**

- Municipal Limits
- Watershed Boundary
- Streets Not Meeting 4% Chance Target

# Figure 6-11
# Streets Not Meeting 4% Chance Target
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

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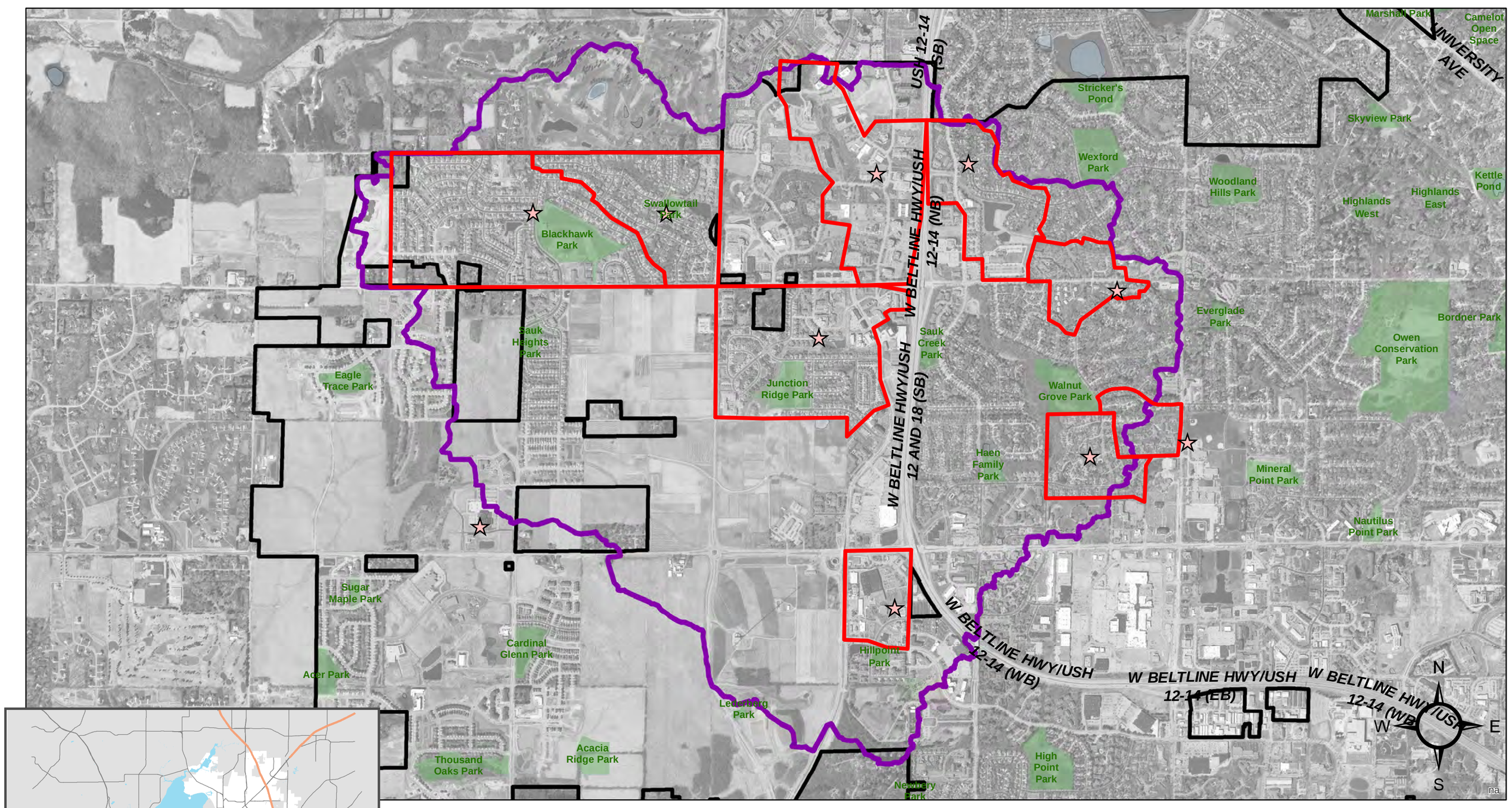


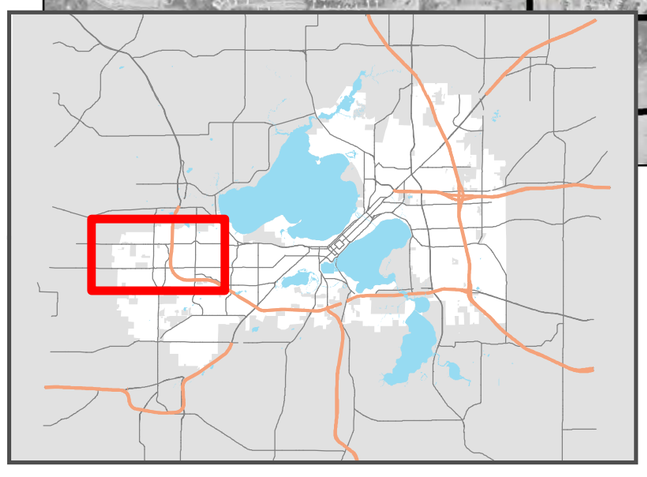

**Legend**

- Municipal Limits
- Park
- Watershed Boundary
- Meeting Location
- Focus Group Area

# Figure 7-1
# Focus Group Meetings
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/6/2021

Document Path: \\Gisserver\dDESIGN\Projects\11981\GIS\MXDs\Figures\Figure7_1_FocusGroupMeetings.mxd

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Sauk Creek Greenway to Wexford Pond Double Box Culvert

Wexford Area Relief Sewer

Target Area Pond Outlet Structure Reconstruction

Project Location

Greenway

Pond

Ownership Parcels

Municipal Limits

Watershed Boundary

# Figure 9-1
# Solutions Evaluated but Not Recommended
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 8/1/2022

User Name: encjb

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure9_1_SolutionsNotSelected.mxd

Old Sauk Trails Business Park and Greenway Reconstruction

Pleasant View Road Reconstruction

Blackhawk Pond Reconstruction

Swallowtail Pond Reconstruction

Greenway Crossing Reconstruction

Wexford Pond Reconstruction

Old Sauk Road and Westfield Road Reconstruction

Sauk Creek Greenway Stabilization

Greenway Crossing Reconstruction

Greenway Crossing Reconstruction

Greenway Crossing Reconstruction

Target Area Relief Sewer

USH 12-14 (SB)

W BELTLINE HWY/USH 12-14 (NB)

W BELTLINE HWY/USH 12-14 (WB)

W BELTLINE HWY/USH 12-14 (EB)

W BELTLINE HWY/USH 12-14 (WB)

UNIVERSITY AVE

Marshall Park

Camelot Open Space

Skyview Park

Wexford

Woodland Hills Park

Highlands West

Highlands East

Kettle Pond

Everglade Park

Bordner Park

Owen Conservation Park

Sauk Creek Park

Walnut Grove Park

Haen Family Park

Point Park

Nautilus Point Park

Swallowtail Park

Blackhawk Park

Sauk Heights Park

Eagle Trace Park

Junction Ridge Park

Sugar Maple Park

Cardinal Glenn Park

Acer Park

Thousand Oaks Park

Acacia Ridge Park

Tellurium Park

Hillpoint Park

Newbury Park

High Point Park

Project Location

## Legend

- Greenway
- Pond
- Storm Pipe
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Municipal Limits
- Park
- Upgraded Storm Sewer
- Proposed Contours

# Figure 9-2
# Recommended Solutions
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 1,950 3,900 Feet

Date: 8/1/2022

N E S W

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure9_2_SolutionsSelected.mxd

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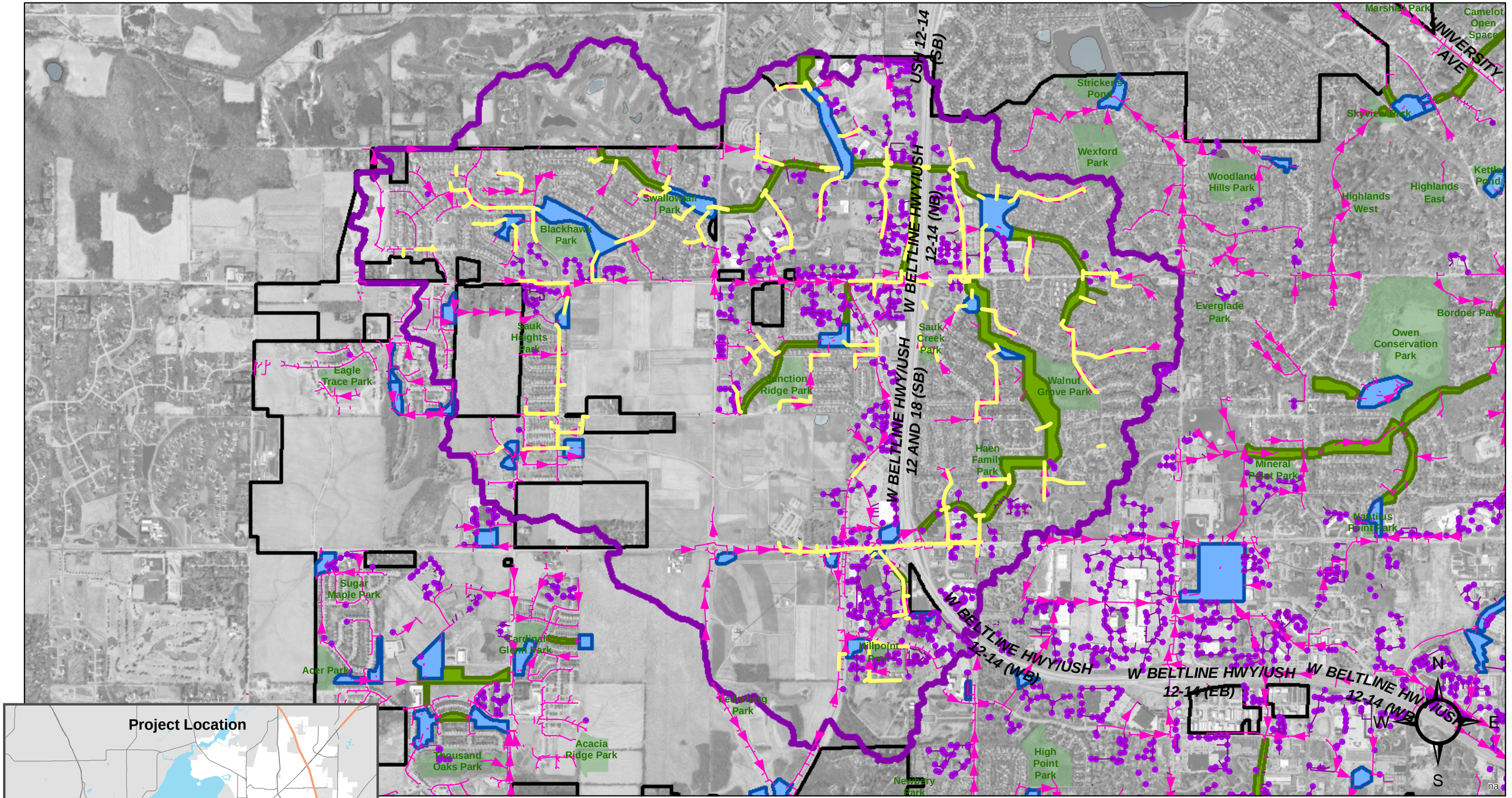


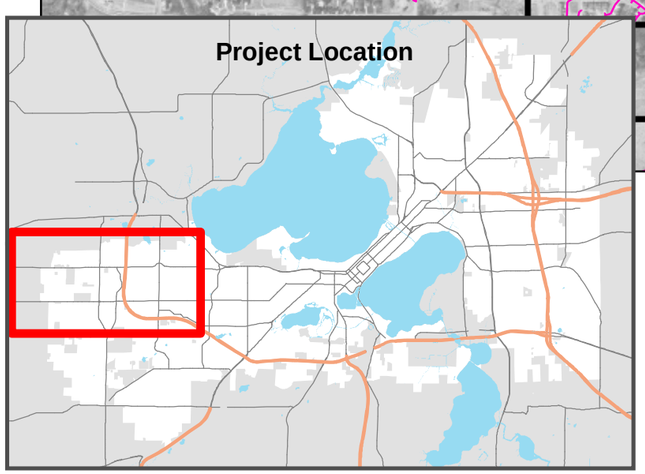


## Legend

- Greenway
- Pond
- Storm Pipe
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Municipal Limits
- Park
- Upgraded Storm Sewer

# Figure 10-1
# Proposed Local Sewer Upgrades
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_1_ProposedLocalSewer.mxd

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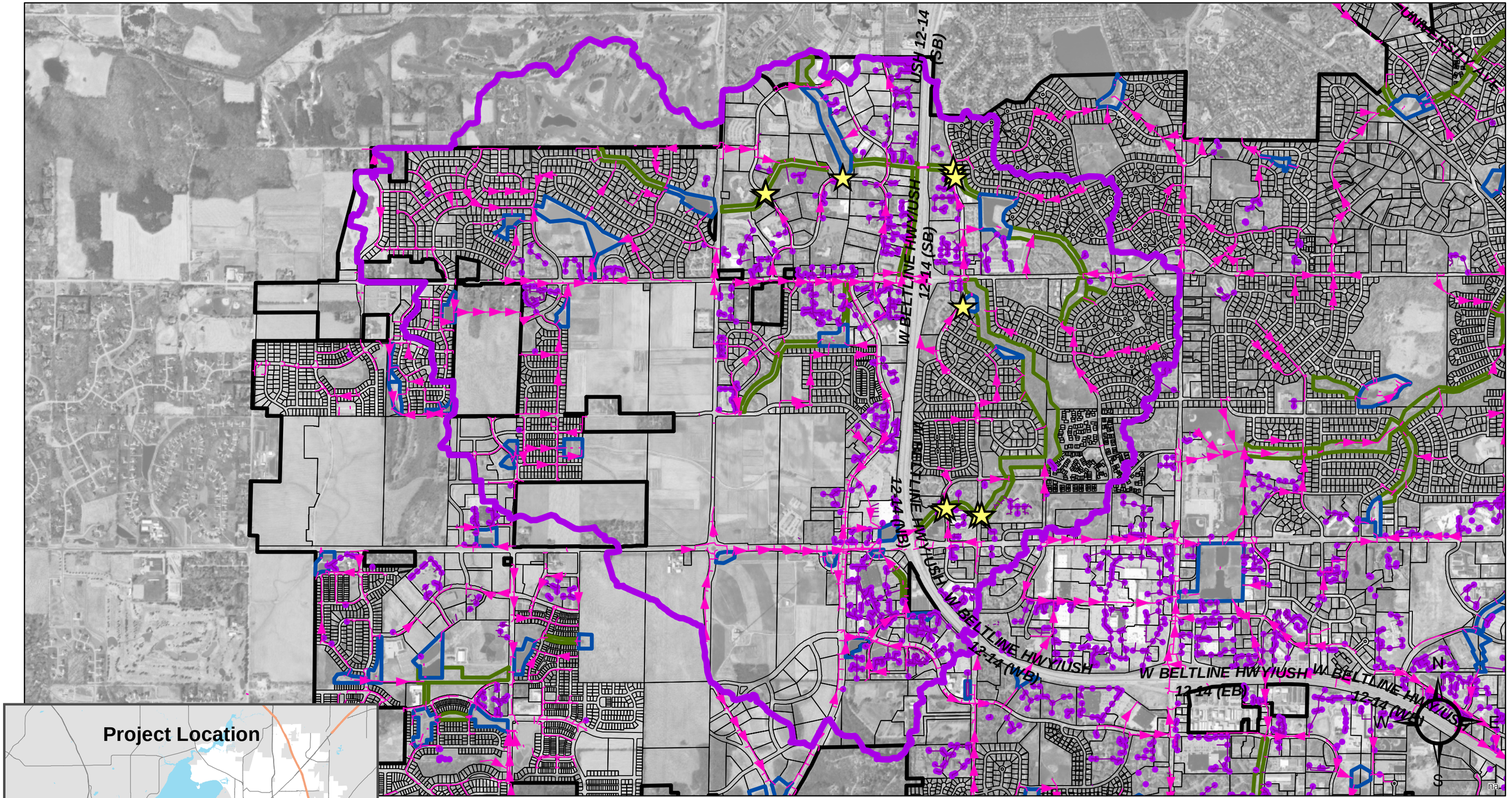
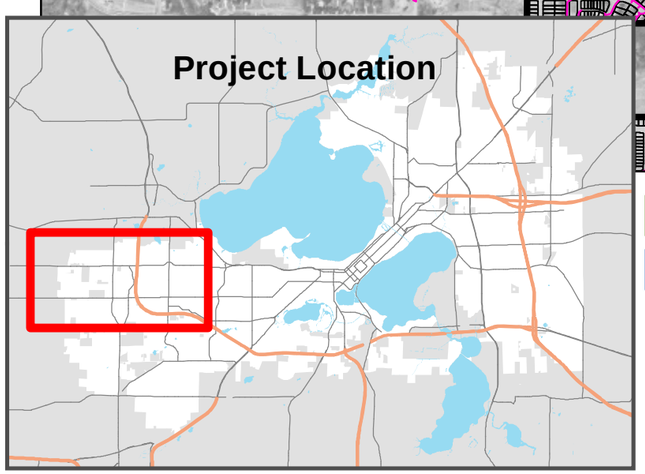



**Project Location**



- Greenway
- Pond
- Storm Pipe
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Ownership Parcels
- Municipal Limits
- Watershed Boundary
- Proposed Terrace Inlets

# Figure 10-2
# Terrace Inlet Reconstruction Locations
# Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_2_TerraceInlets.mxd

User Name: encjb

3 - 6' x 16' Box Culverts

3 - 6' x 16' Box Culverts

Regrade Ponds

3 - 6' x 14' Box Culverts

1 - 5' x 12' Box Culverts

Regrade Greenways

1 - 5' x 10' Box Culverts

New Terrace Inlets

Pleasant View Road
Greenway Boulevard
DEMING WAY
FOURIER DR
JOHN Q HAMMONS DR
RAMP
N High Point Road
HIGH POINT RD
BLACKHAWK RD
FOXGLOVE CIR
N PLEASANT VIEW RD
EXCELSIOR DR
W BELTLINE HWY/USH 12-14 (NB)

Project Location

Greenway
Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Municipal Limits
Park
Upgraded Storm Sewer
Proposed Contours
Proposed Box Culverts

# Figure 10-3
# Old Sauk Trails Business Park
# Pond and Greenway Reconstruction
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 365 730 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT MPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\ProposedSolutions\PBSolutionFigure_OSTrBusinessPark.mxd

User Name: encjb

Pleasant View Road

Lower normal water elevtion and expand storage area

Replace outlet structure

HAWK FEATHER CIR
FOXGLOVE CIR
ASPEN GROVE LN
MONARCH CIR
SWALLOWTAIL DR
Swallowtail Park
TIMBER WOLF TRL
BOULDER CREEK CIR
DEER HOLLOW CT
SETTLERS RD
N PLEASANT VIEW RD

N
W
E
S

na

Project Location

Greenway
Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Municipal Limits
Parks
Proposed Grading
Proposed Pipe Upgrades

# Figure 10-4
# Pleasant View Road and Swallowtail Pond Reconstruction
# Pheasant Branch Watershed

0 137.5 275 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figure10_4_PVR_and_SwallowtailPond.mxd

User Name: encjb

Lower permanent pool to add more flood storage

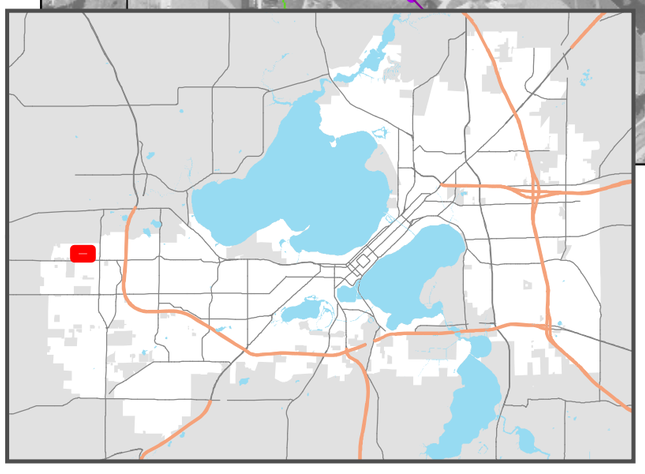
Add flood storage area

Add overflow

Reconstruct outlet structure

HIDDEN CAVE TRL
STAGECOACH TRL
SETTLERS RD
MONARCH CIR
BEAR CLAW WAY
WINDING WAY
CRICKET LN
HIDDEN CAVE RD
SWALLOWTAIL DR
WATERSIDE ST
Blackhawk Park

N
W
E
S



Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Park
Upgraded Storm Sewer
Proposed Contours

# Figure 10-5
# Blackhawk Pond Reconstruction
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 180 360 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_5_BlackhawkPond.mxd

User Name: encjb

Replace outlet structure

New 6'x12' box culvert replacing existing pipes and diverting water around Wexford Pond

Lower normal water elevation and expand storage.

Additional 84" pipe added to existing 78" pipe

New 6'x12' box culvert routing water into Wexford Pond

Project Location

Greenway
Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Other
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
**FYI-Water Utility Restrictions**
**Restriction**
No large scale GI
Water Main
Water Valve
Ownership Parcels
Parks
Proposed Grading
Proposed Pipe Upgrades

# Figure 10-6
# Wexford Pond Reconstruction
# Pheasant Branch Watershed

0 285 570 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_6_WexfordPond.mxd

User Name: encjb

Greenway stabilization

Sauk Creek Park

Walnut Grove Park

Haen Family Park

## Project Location

Greenway
Pond
Storm Pipe
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
MMSD Mains
MMSD SAS
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Parks
Proposed Grading

# Figure 10-7
# Sauk Creek Greenway Stabilization
# Pheasant Branch Watershed

0 500 1,000 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 8/1/2022

CITY OF MADISON ENGINEERING

N S E W

User Name: encjb

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\ProposedSolutions\PBSolutionFigure_SCGreenwayModerate.mxd

6' x 12' Box Relief Sewer
Intercepts flow from Mineral Point Road and South of Mineral Point Road
Discharges at Greenway Crossing on S. High Point Road

RAMP
RAMP
TREE LN
TREE LN
S HIGH POINT RD
S HIGH POINT RD
MINERAL POINT RD
MINERAL POINT RD
MINERAL POINT RD
MINERAL POINT RD
MINERAL POINT RD
W BELTLINE HWY/USH 12-14 (NB)
W BELTLINE HWY/USH 12-14 (SB)
RAMP
RAMP
BIG SKY DR
S HIGH POINT RD
N
W
E
S

**Project Location**

- Greenway
- Pond
- Storm Pipe
- Other Storm Structure
- Access Structures
- Apron
- Inlet
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Sanitary Mains
- SAS
- Sanitary Laterals
- Water Main
- Water Valve
- Water Hydrant
- Ownership Parcels
- Municipal Limits
- Proposed Circular Pipe
- Proposed Rectangular Box

# Figure 10-8
# Target Area Relief Sewer
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 180 360 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_8_TargetRelief.mxd

User Name: encjb

Saukdale Way

Saukdale Dr

Saukdale Tr

Saukdale Way

N WESTFIELD RD

Install upsized storm sewer

OLD SAUK RD

OLD SAUK RD

Raise intersection to create positive drainage towards greenway

N WESTFIELD RD

WALNUT GROVE DR

WALNUT GROVE DR

FOXBORO CIR

N WESTFIELD RD

N

W

E

S

na

Project Location

Greenway

Storm Pipe

Other Storm Structure

Access Structures

Apron

Inlet

Private Stormwater Pipes--Approx

Private Stormwater Structures--A...

Sanitary Mains

SAS

Sanitary Laterals

Water Main

Water Valve

Water Hydrant

Ownership Parcels

Proposed Grading

Old Sauk Westfield Intersection

Proposed PIpe Upgrade

# Figure 10-9
# Old Sauk Road/Westfield Road Intersection
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 7/5/2022

0 50 100 200 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_9_OldSaukWestfield.mxd

User Name: encjb

3 - 6' x 16' Box Culverts

3 - 6' x 16' Box Culverts

3 - 6' x 14' Box Culverts

1- 5' x 12' Box Culvert

3 - 6' x 12' Box Culverts

1 New 4' x 10' Box Culvert
2 Existing 4' x 8' Box Culverts

1- 5' x10' in Box Culvert

1 - 6' x 12' Box Culvert

1 parellel 84" to 1 - 6' x 12' Box Culvert

1 New 5' x 12' Box Culvert
1 Existing 42" RCP

4' x 6' Box Culvert

2 - 6' x 10' Box Culverts

1- 6' x 10' Box Culvert

1 New 6' x 10' Box Culvert
2 Existing 54" RCP

Project Location

Greenway
Pond
Storm Pipe
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Watershed Study Boundary
Municipal Limits
Parks
Railroad ROW Lines
Proposed Storm Sewer/Culvert

# Figure 10-10
# Greenway Crossing Improvement Overview
# Pheasant Branch Watershed

0 1,150 2,300 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_10_GreenwayCrossingOverview.mxd

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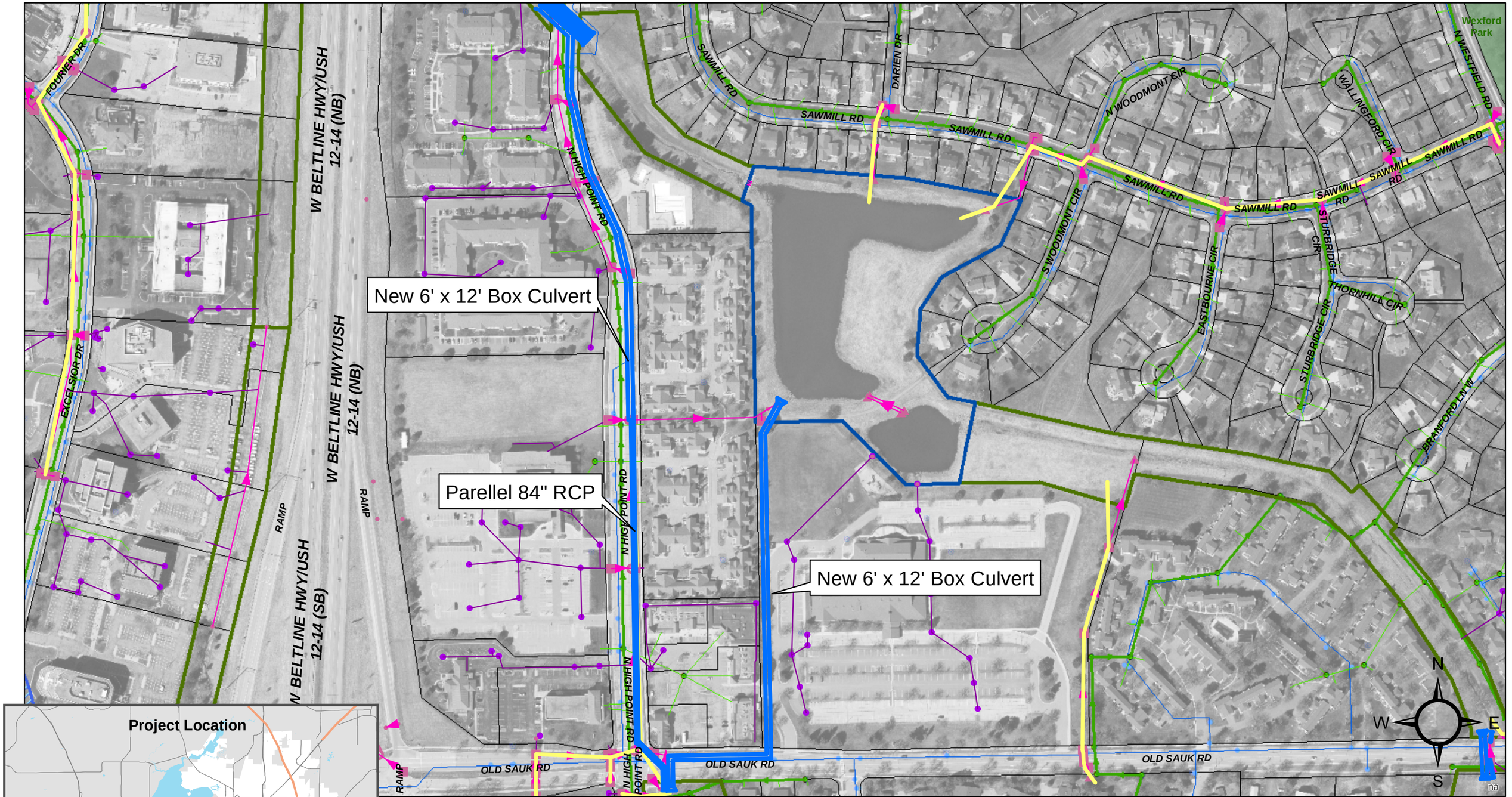


# Figure 10-11
# Sauk Creek to N Highpoint Road and Wexford Pond
# Pheasant Branch Watershed

0 275 550 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DES\GN\Projects\11981\GIS\MXDs\Figures\Figure10_11_HighPointfromSCtoWexford.mxd

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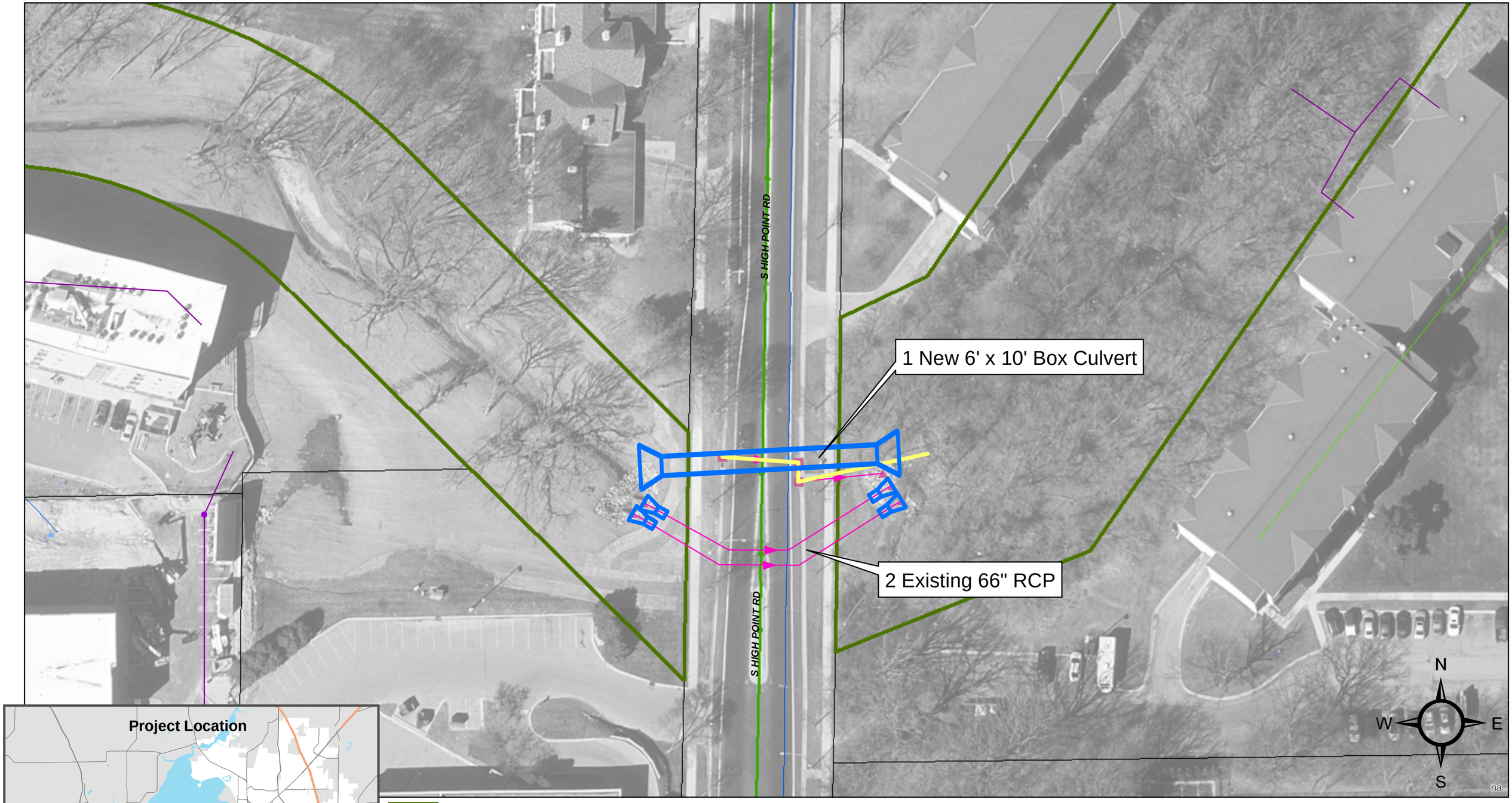


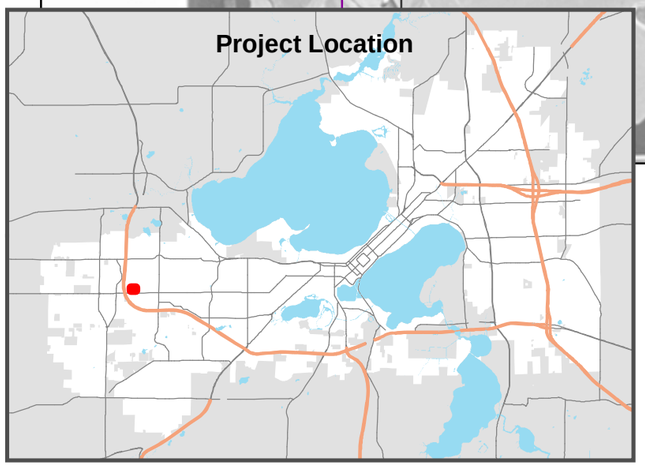


Greenway
Storm Pipe
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Box Culverts

# Figure 10-12
# S High Point Road South of Tree Lane
# Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 7/1/2022

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_12_HighPointRdSofTreeLn.mxd

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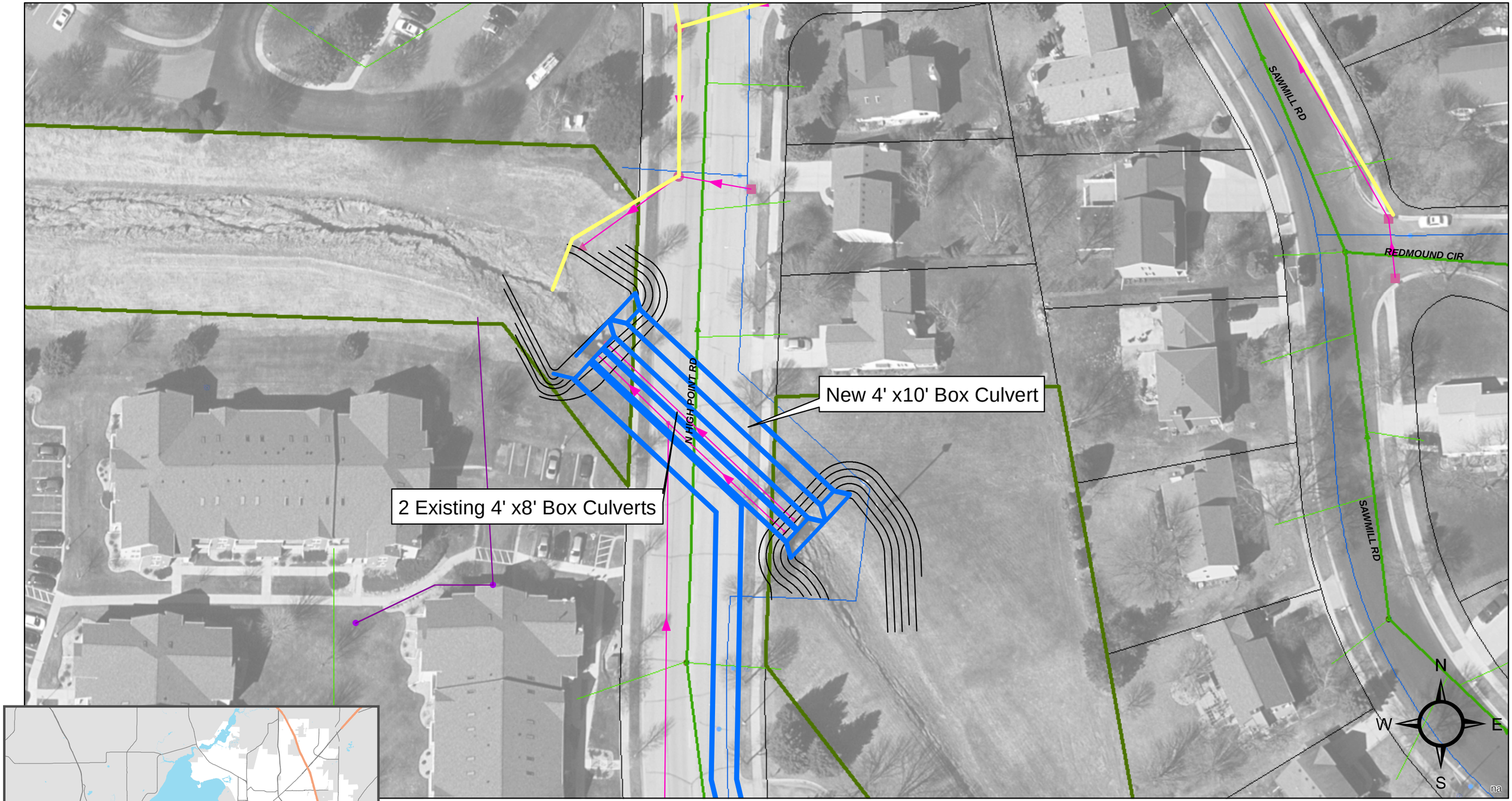


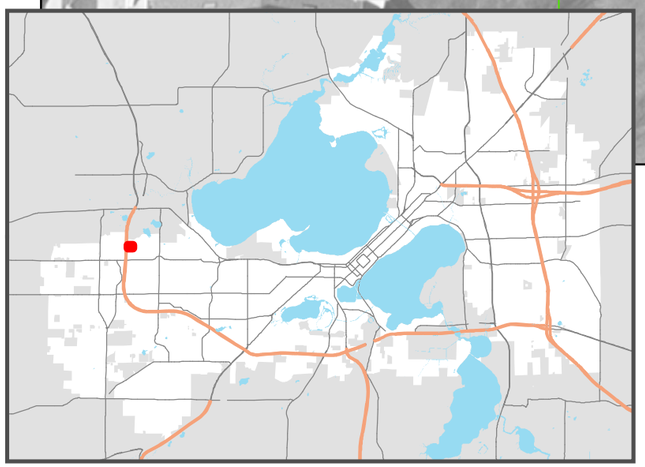

Greenway
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Contours
Proposed Box Culverts

# Figure 10-13
# N High Point Road West of Wexford Pond
# Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_13_HighPointRdWestofWexford.mxd
User Name: encjb

New 5' x12' Box Culvert

Existing 42" RCP

OLD SAUK RD

N

W

E

S

na

**Project Location**

Greenway

Storm Pipe

Other Storm Structure

Apron

Inlet

Private Stormwater Pipes--Approx

Private Stormwater Structures--A...

Sanitary Mains

SAS

Sanitary Laterals

Water Main

Water Valve

Water Hydrant

Ownership Parcels

Upgraded Storm Sewer

Proposed Contours

Proposed Box Culverts

# Figure 10-14
# Old Sauk Road South of Wexford Pond
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

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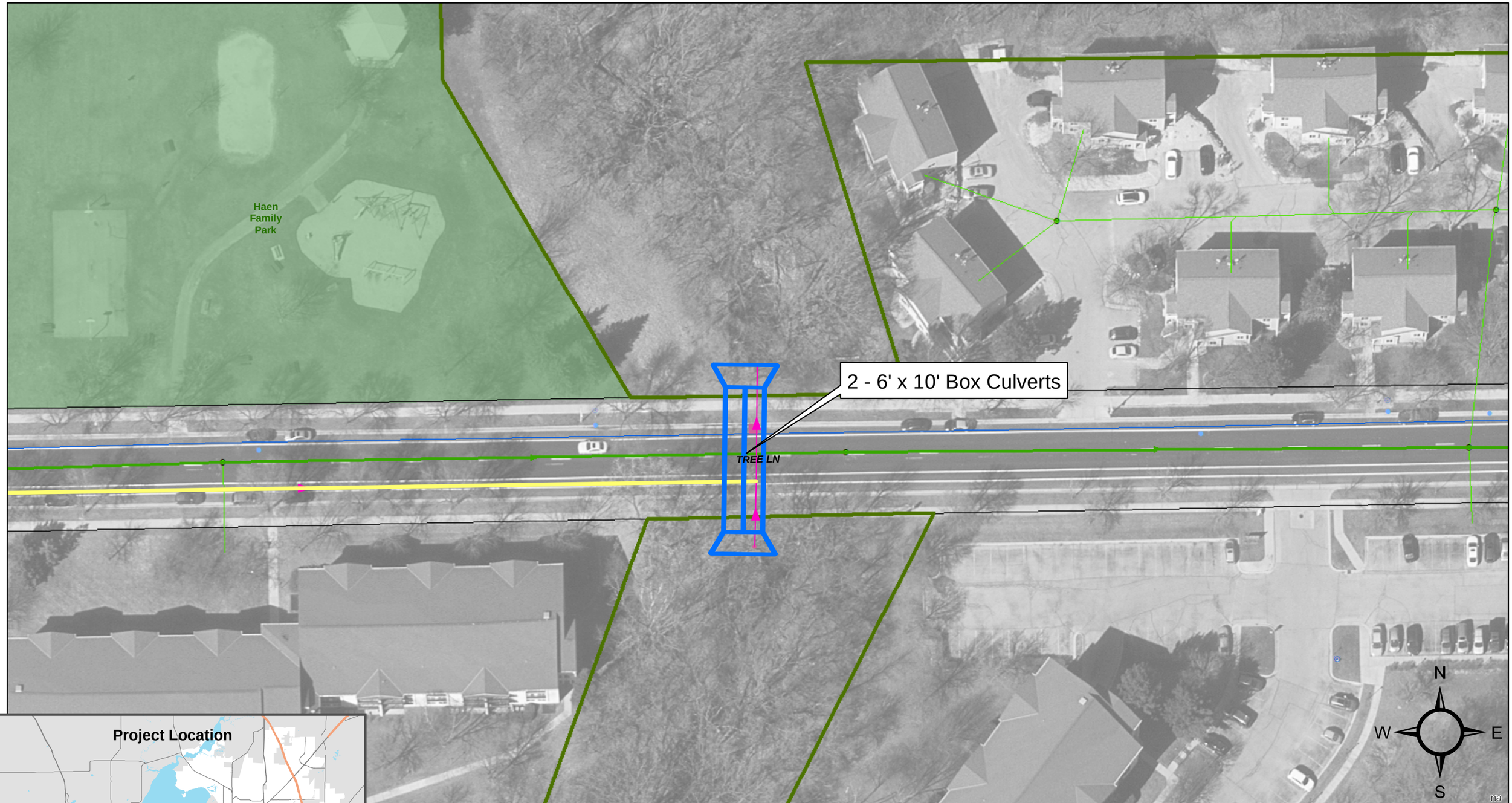


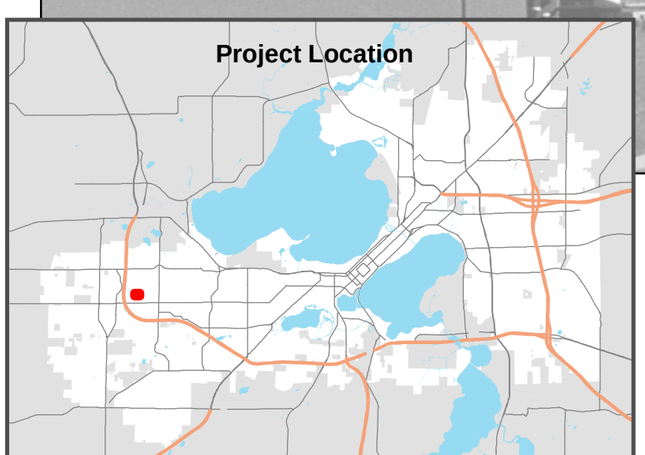


Greenway
Storm Pipe
Other Storm Structure
Inlet
Other
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Park
Upgraded Storm Sewer
Proposed Box Culverts

# Figure 10-15
# Tree Lane East of S High Point Road
# Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_15_TreeLnEofHighPoint.mxd
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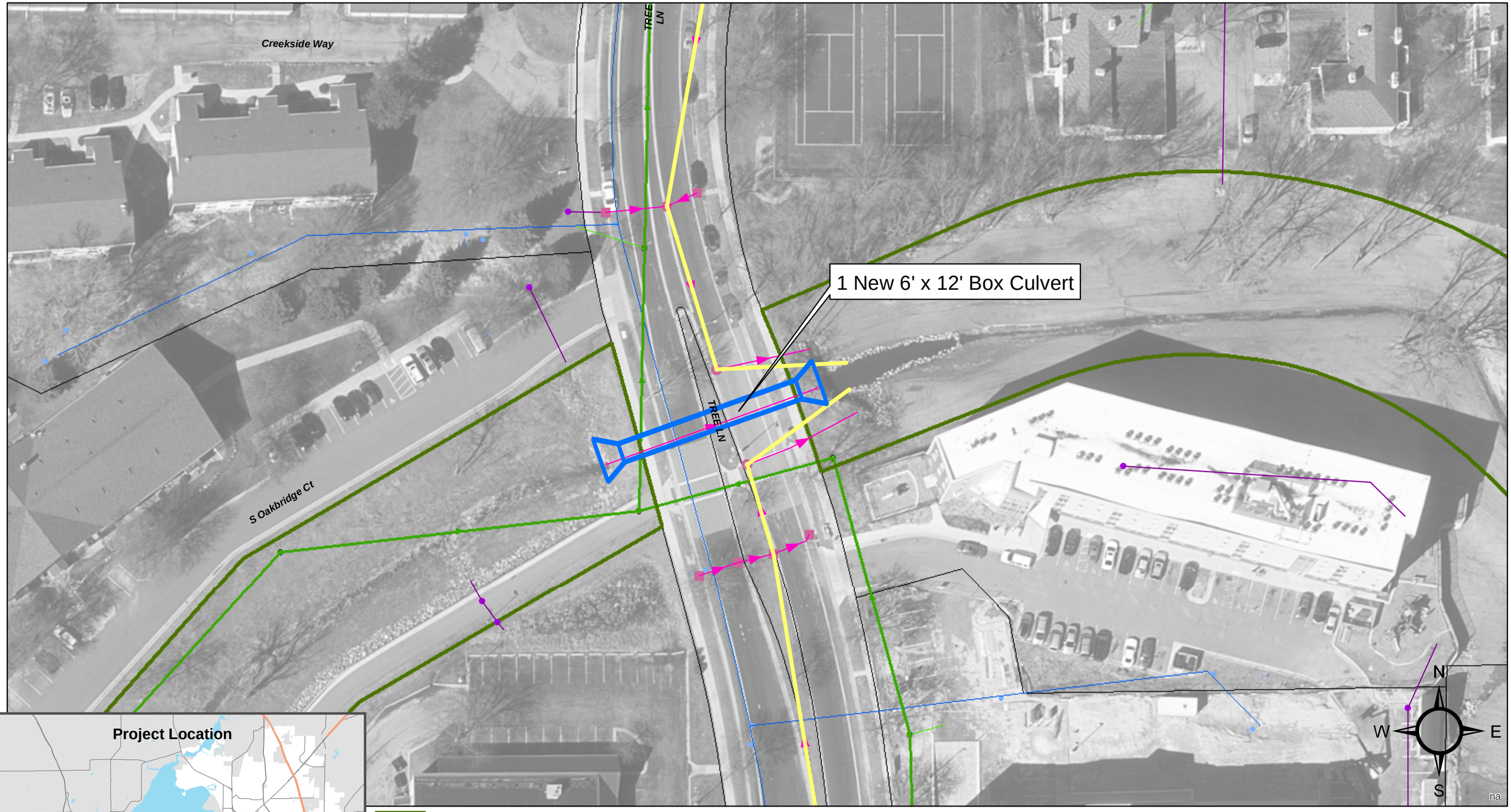
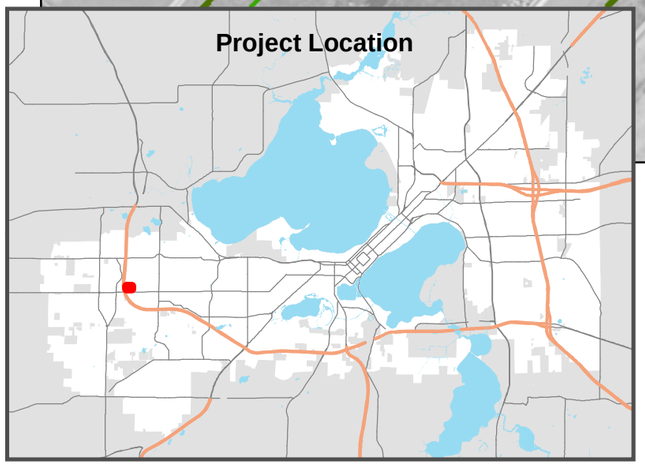



Greenway
Storm Pipe
Other Storm Structure
Access Structures
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Box Culverts

# Figure 10-16
# Tree Lane West of S High Point Road
# Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 7/5/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_16_TreeLnWofHighPointRd.mxd

User Name: encjb

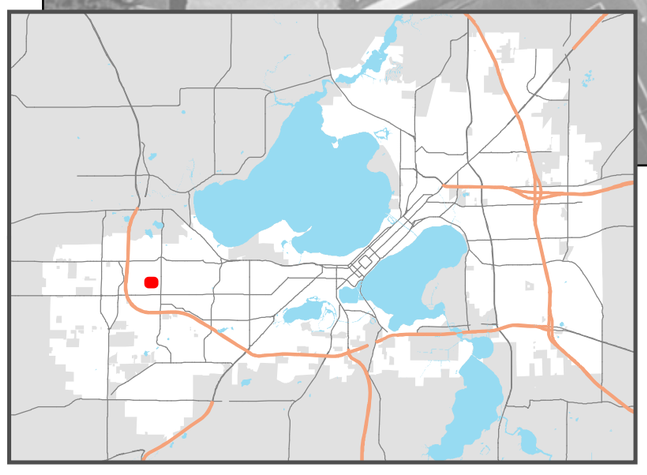
S WESTFIELD RD

4' x 6' Box Culvert

N

W E

S



Storm Pipe

Access Structures

Apron

Inlet

SAS

Sanitary Laterals

Water Main

Water Valve

Water Hydrant

Ownership Parcels

Proposed Box Culverts

# Figure 10-17
# Westfield Road Greenway Crossing
# Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_17_WestfieldRdGWCrossing.mxd

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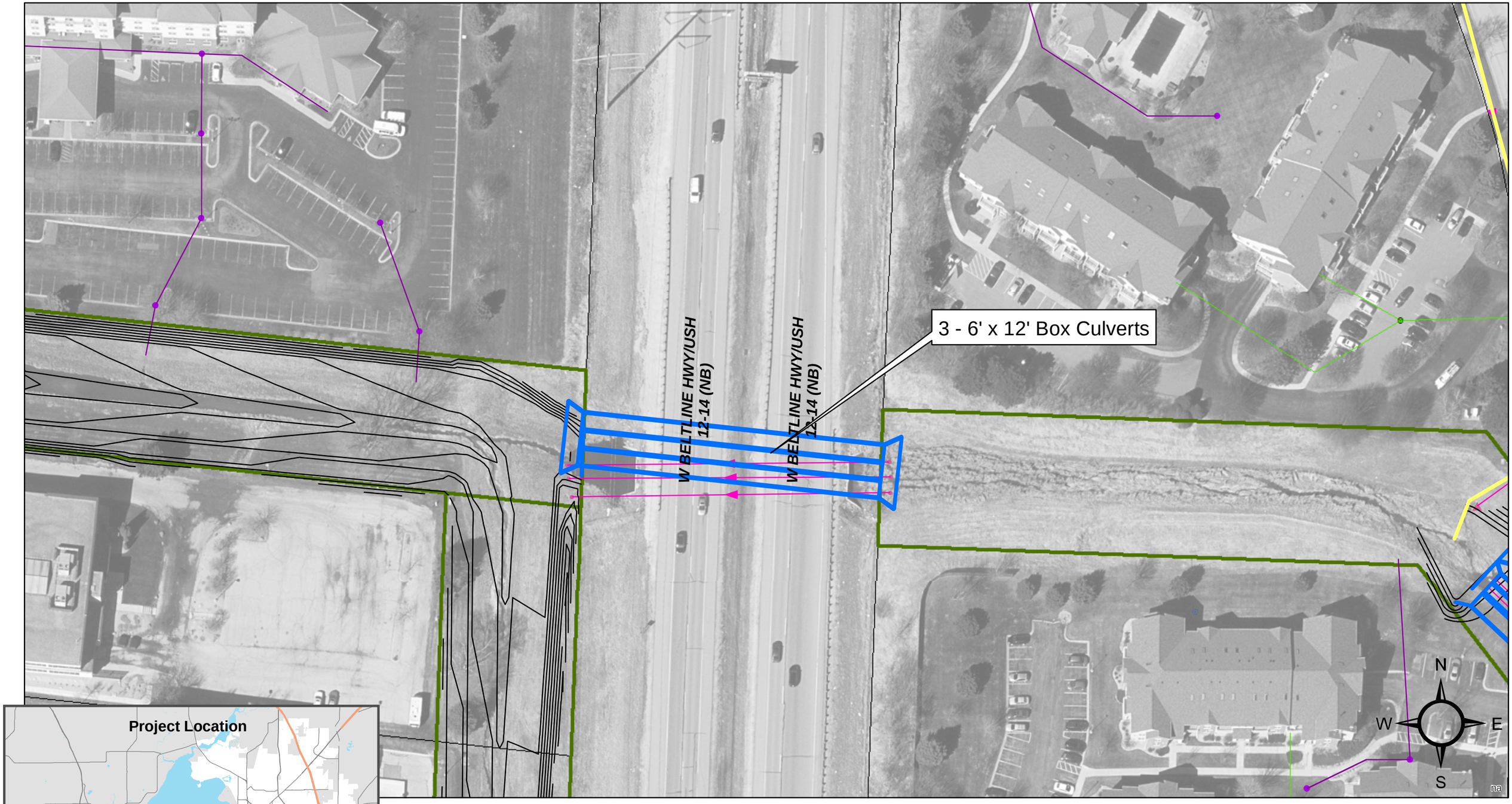


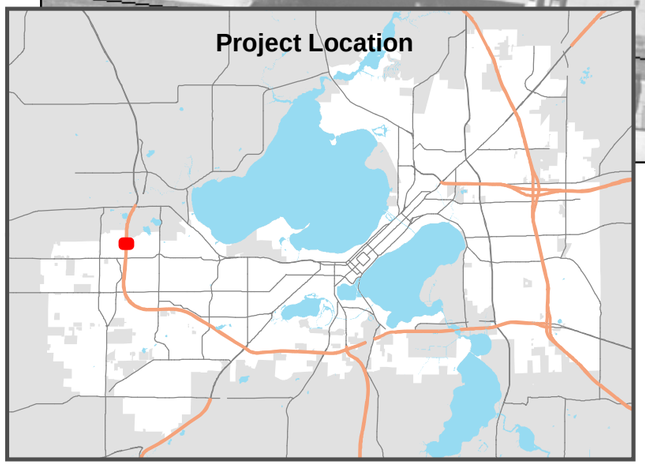


Greenway
Storm Pipe
Other Storm Structure
Apron
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
SAS
Sanitary Laterals
Water Main
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Contours
Proposed Box Culverts

# Figure 10-18
# Beltline Downstream of Wexford Pond
# Pheasant Branch Watershed

0 70 140 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_18_BeltlineDSofWexford.mxd

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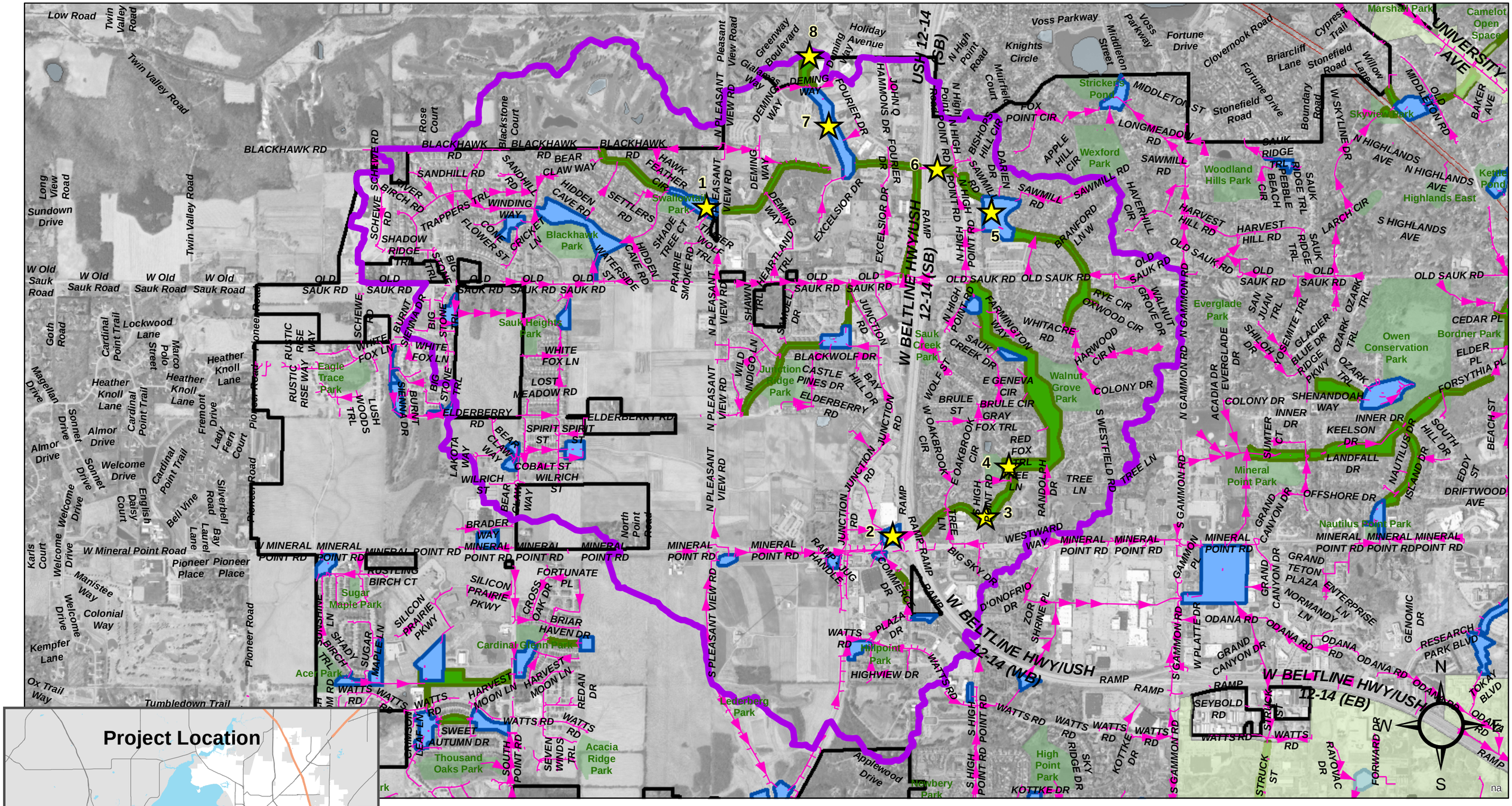


# Figure 11-1
# Proposed Conditions Reporting Locations
# Pheasant Branch Watershed

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

User Name: encjb

Document Path: M:\DES\GIS\MXDs\Figures\Figure11_1_ProposedConditionsReportingLocations.mxd

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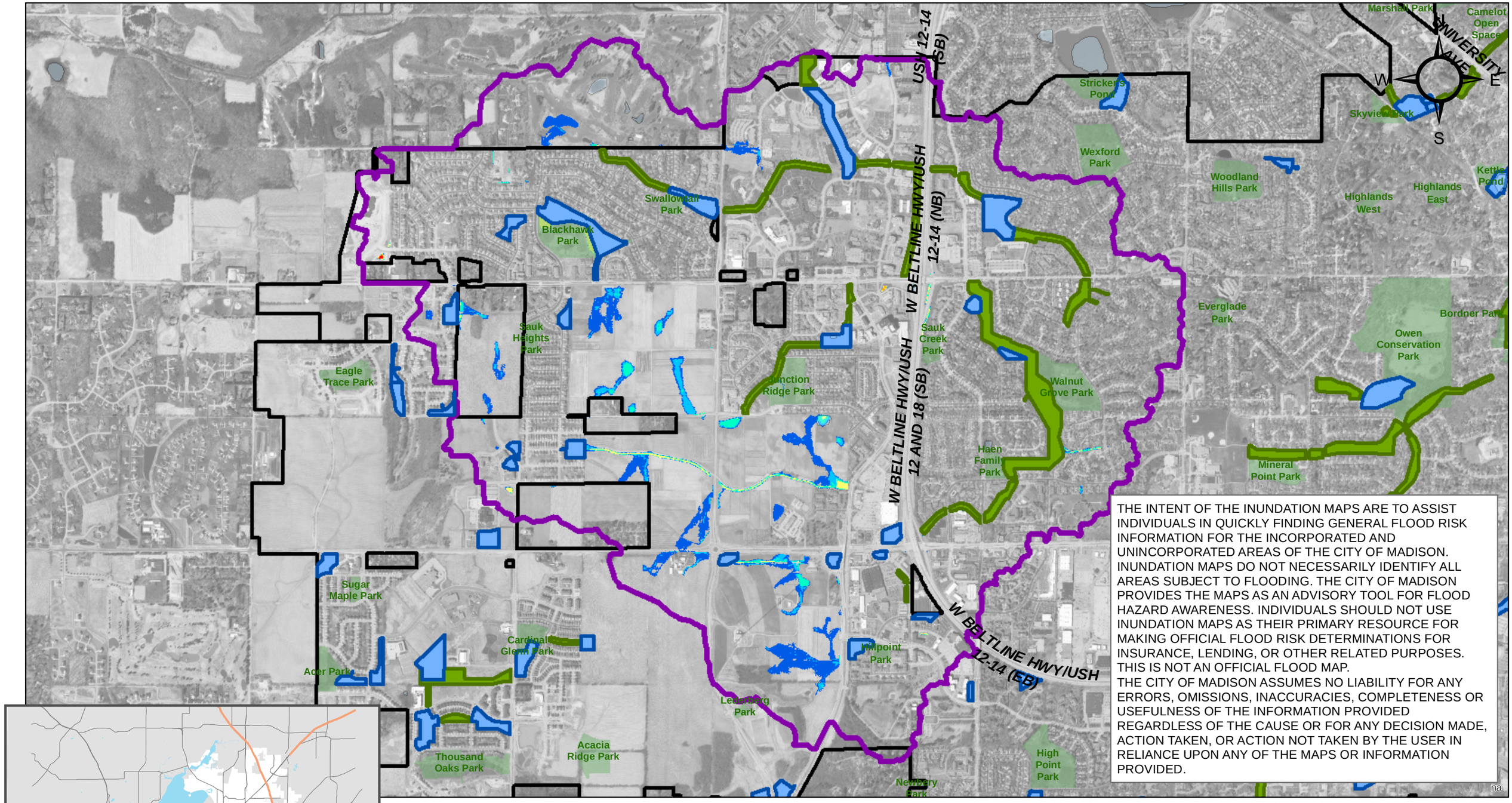


# Figure 11-2
# Proposed Conditions Inundation Mapping
# 100% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_2_Proposed100PerChance.mxd
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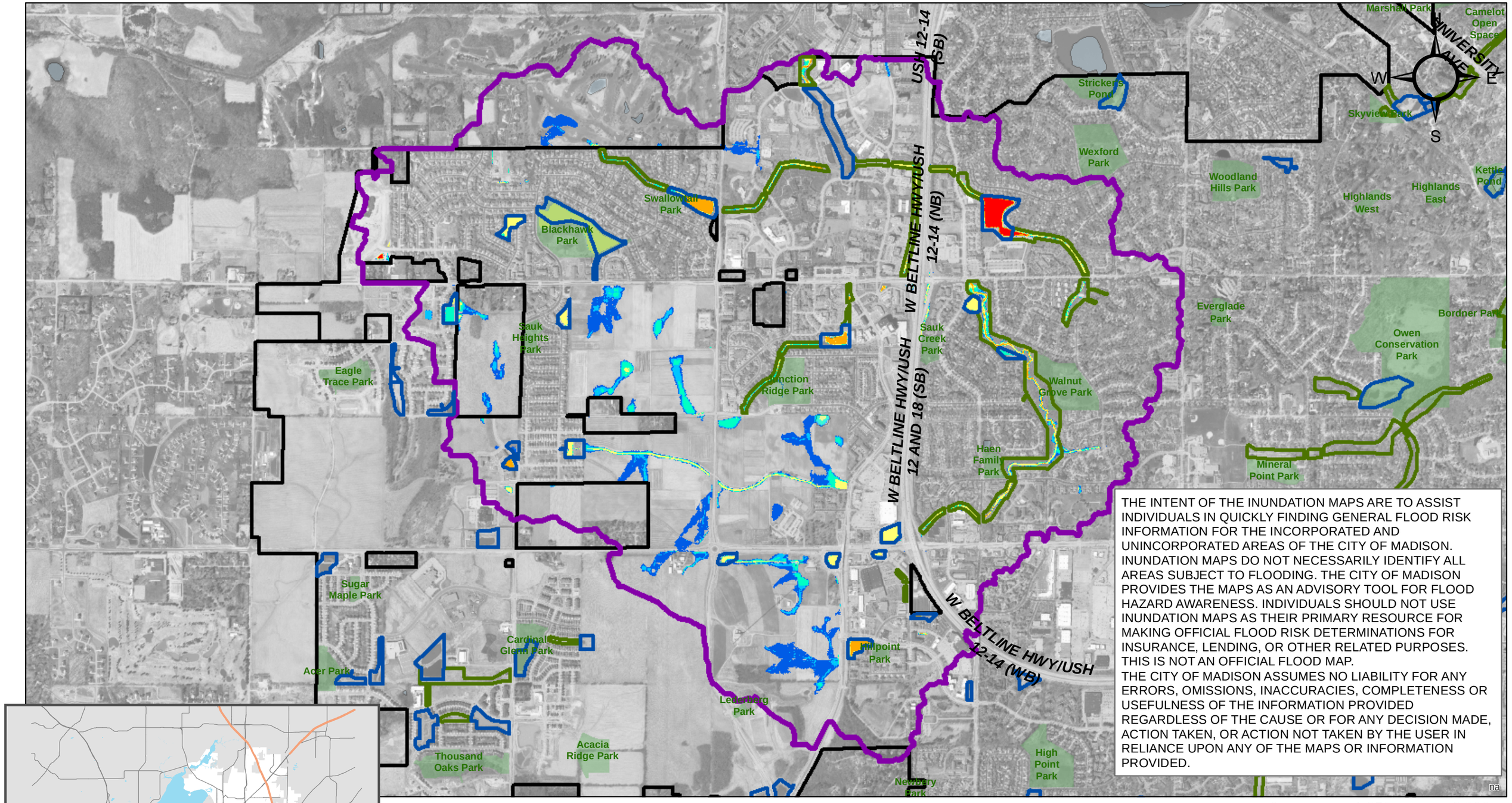


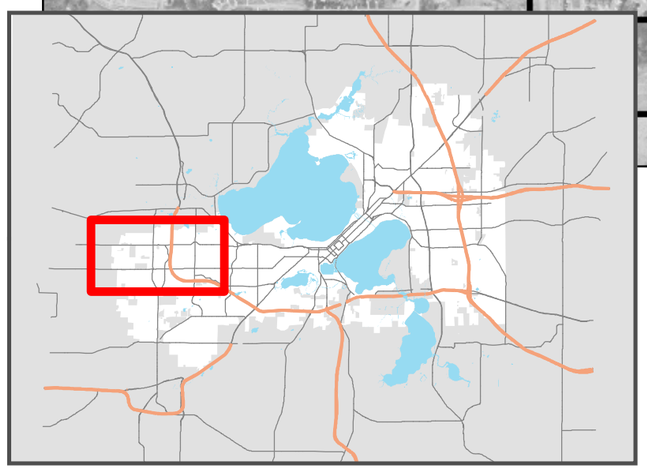

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

# Figure 11-3
# Proposed Conditions Inundation Mapping
# 50% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_3_Proposed50PerChance.mxd
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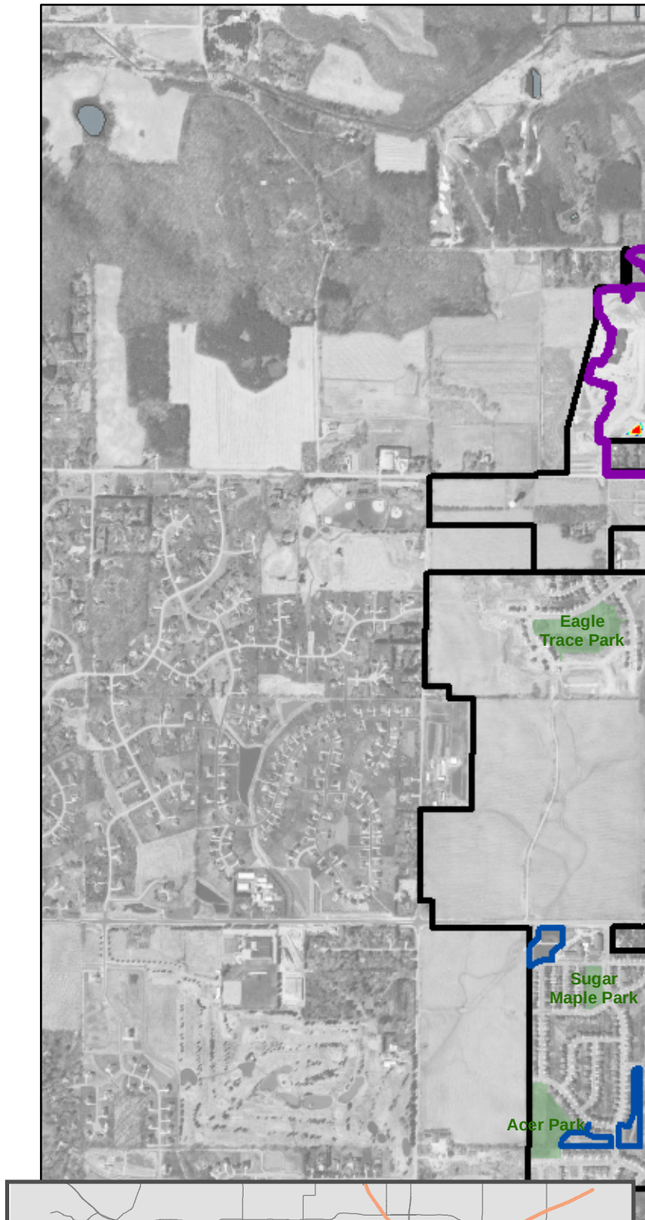

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**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

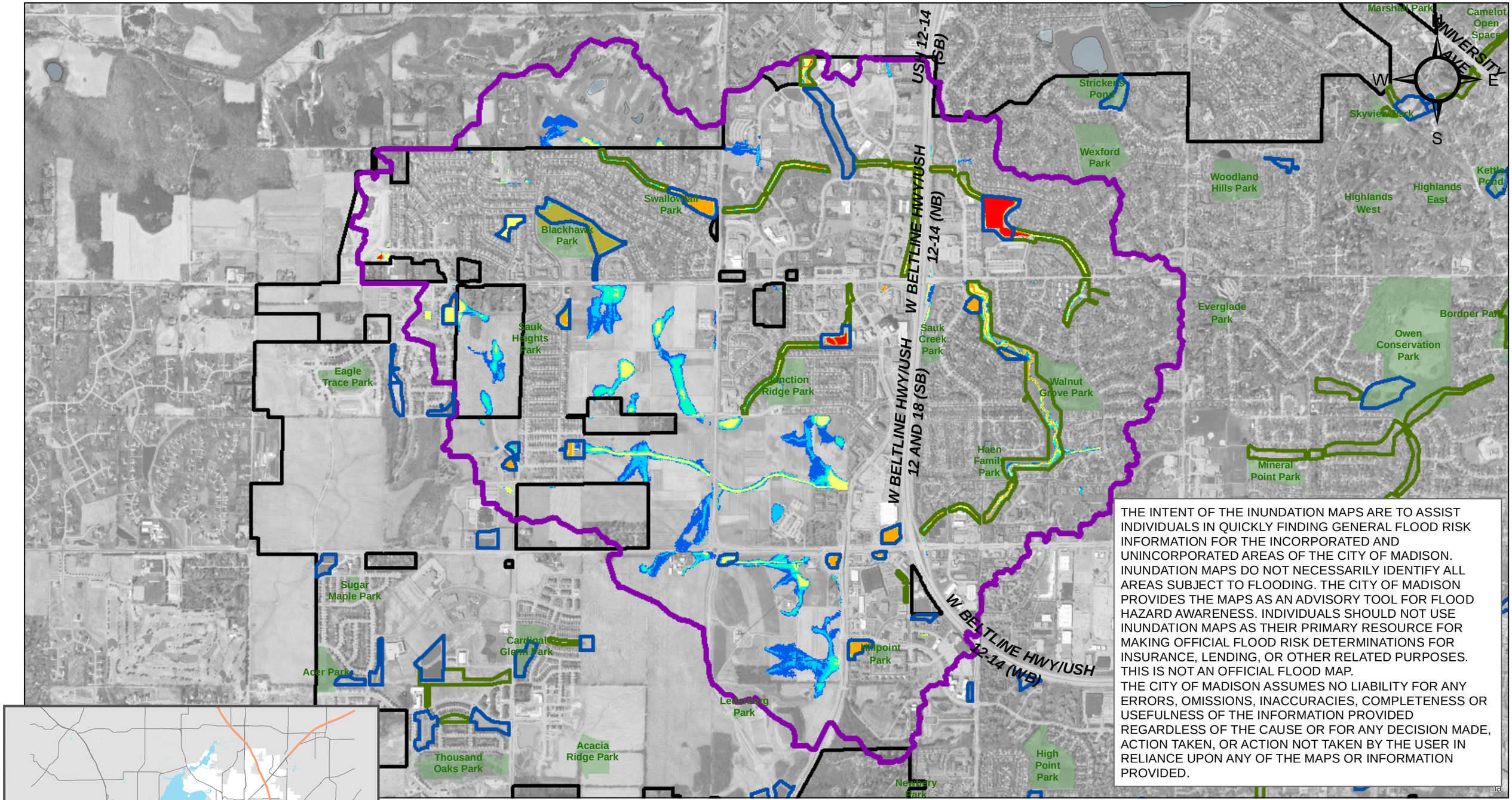
0 1,950 3,900 Feet

# Figure 11-4
# Proposed Conditions Inundation Mapping
# 20% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_4_Proposed20PerChance.mxd

User Name: encjb

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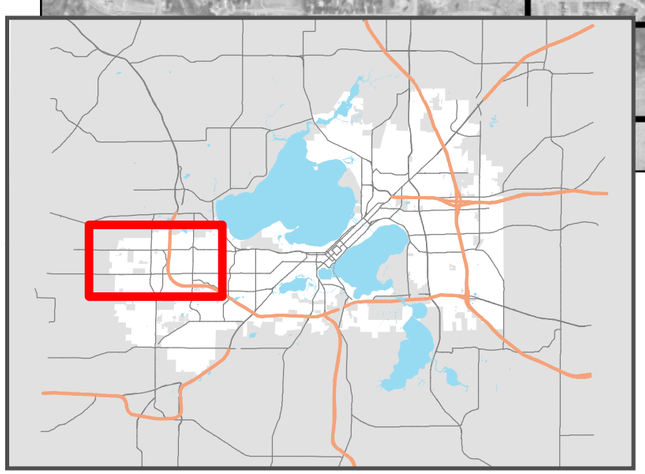

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

# Figure 11-5
# Proposed Conditions Inundation Mapping
# 10% Chance Event
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 4/13/2022

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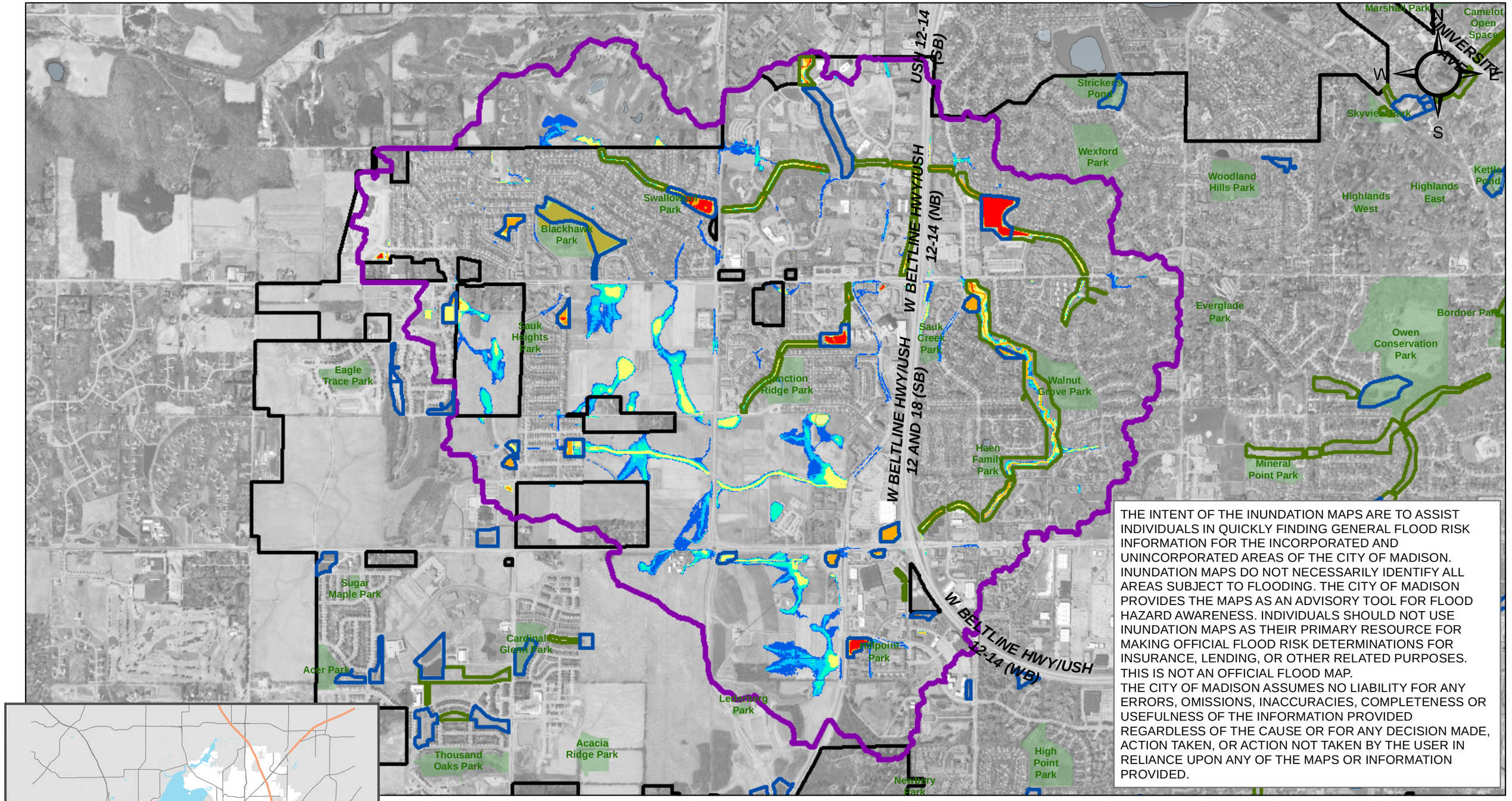


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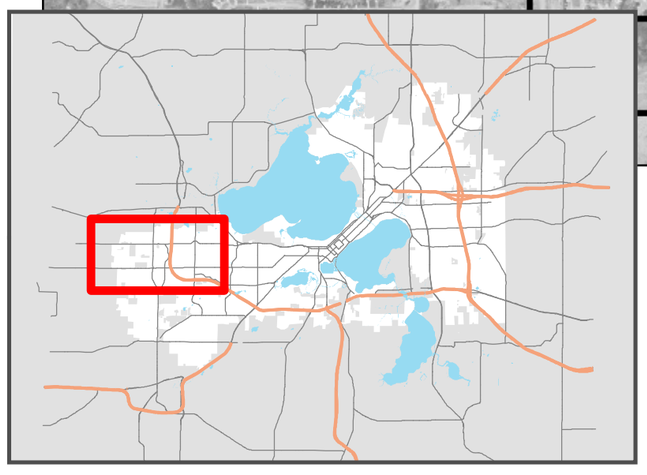


**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

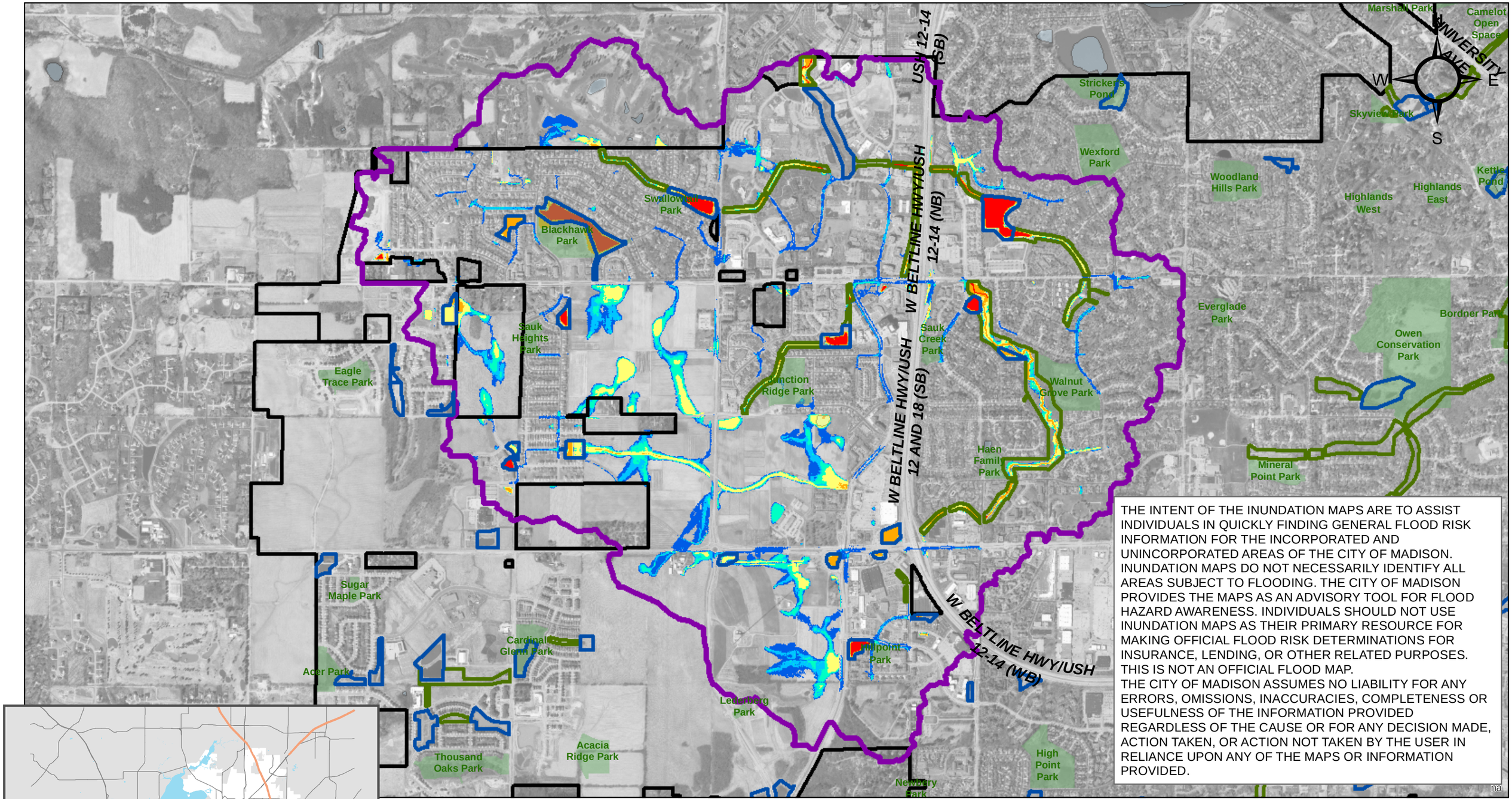
0 1,950 3,900 Feet

# Figure 11-6
# Proposed Conditions Inundation Mapping
# 4% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_6_Proposed4PerChance.mxd

User Name: encjb




# Figure 11-7
# Proposed Conditions Inundation Mapping
# 2% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

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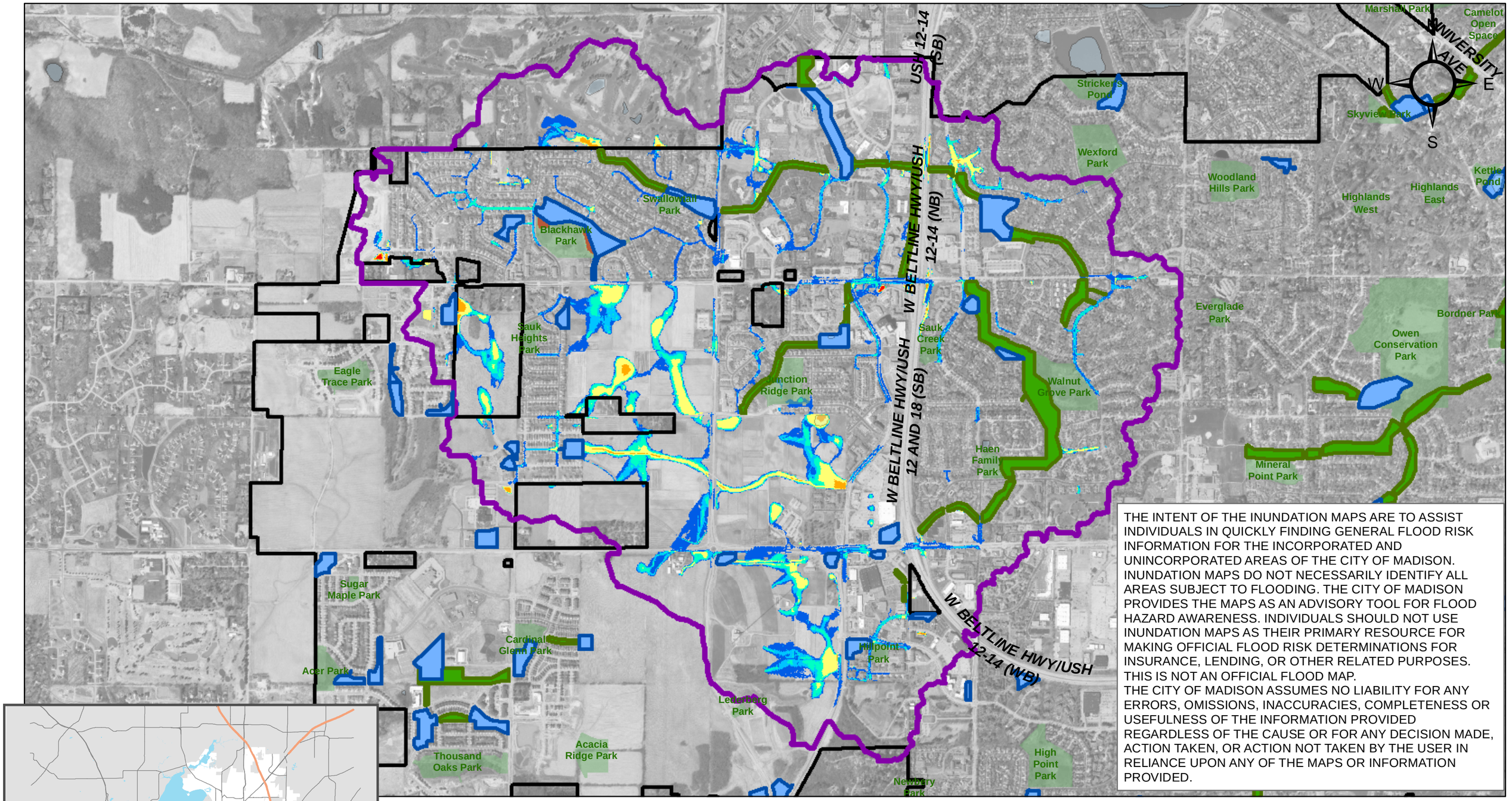
User Name: encjb

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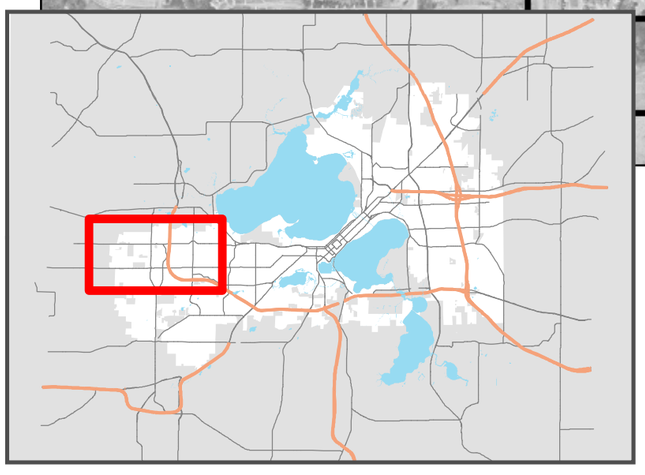

**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

# Figure 11-8
# Proposed Conditions Inundation Mapping
# 1% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

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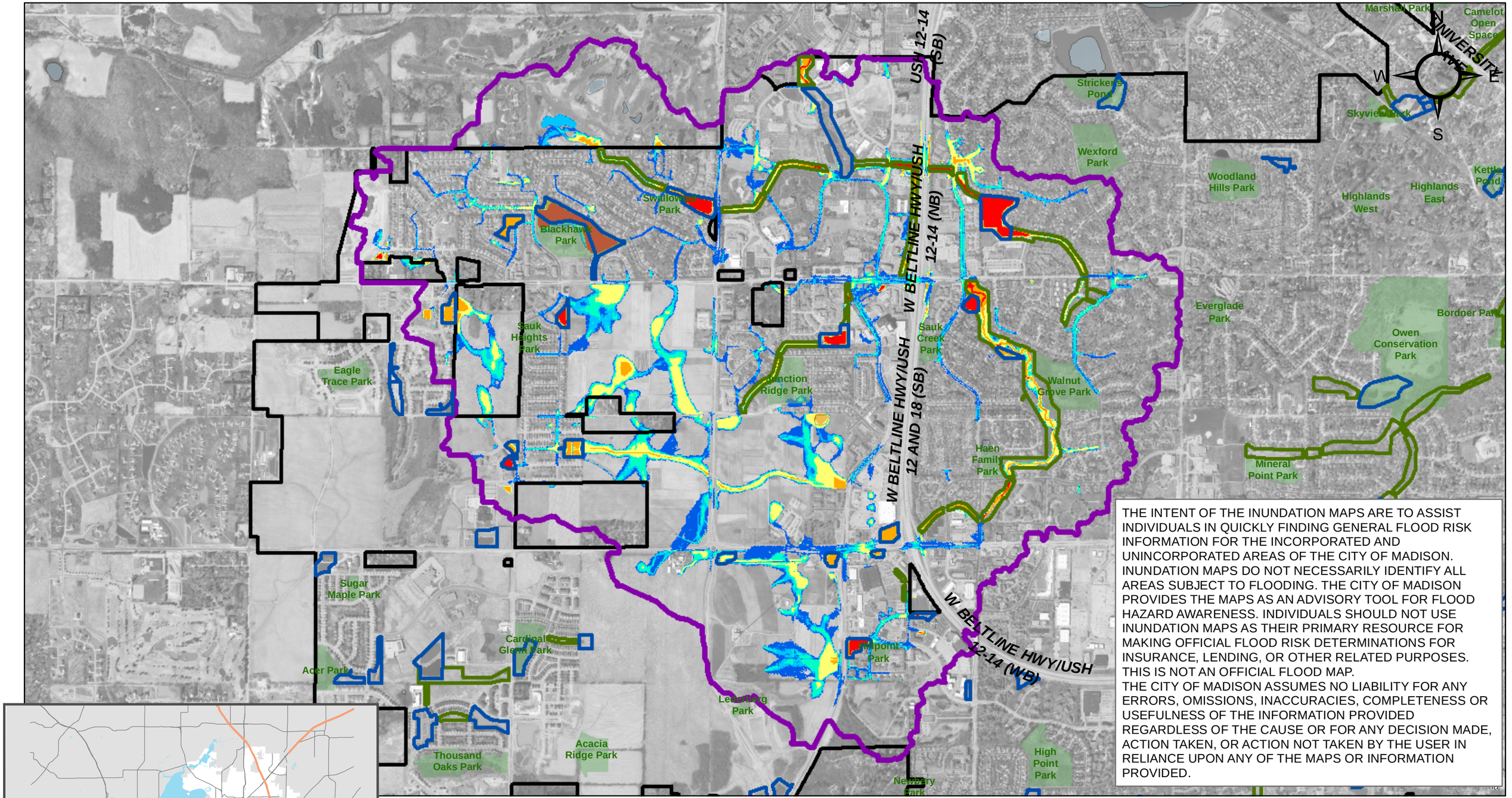
User Name: encjb

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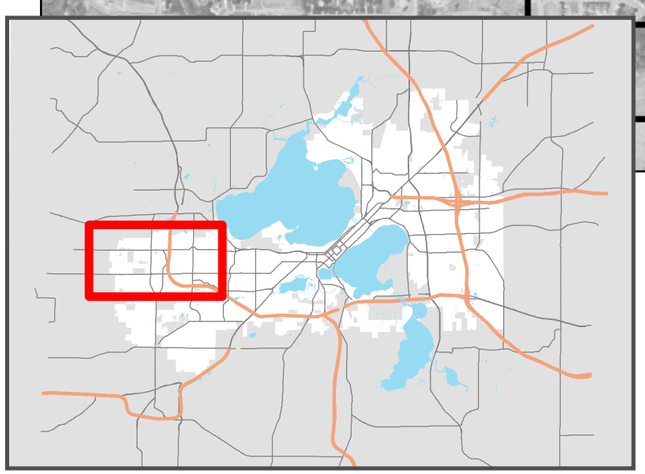


**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

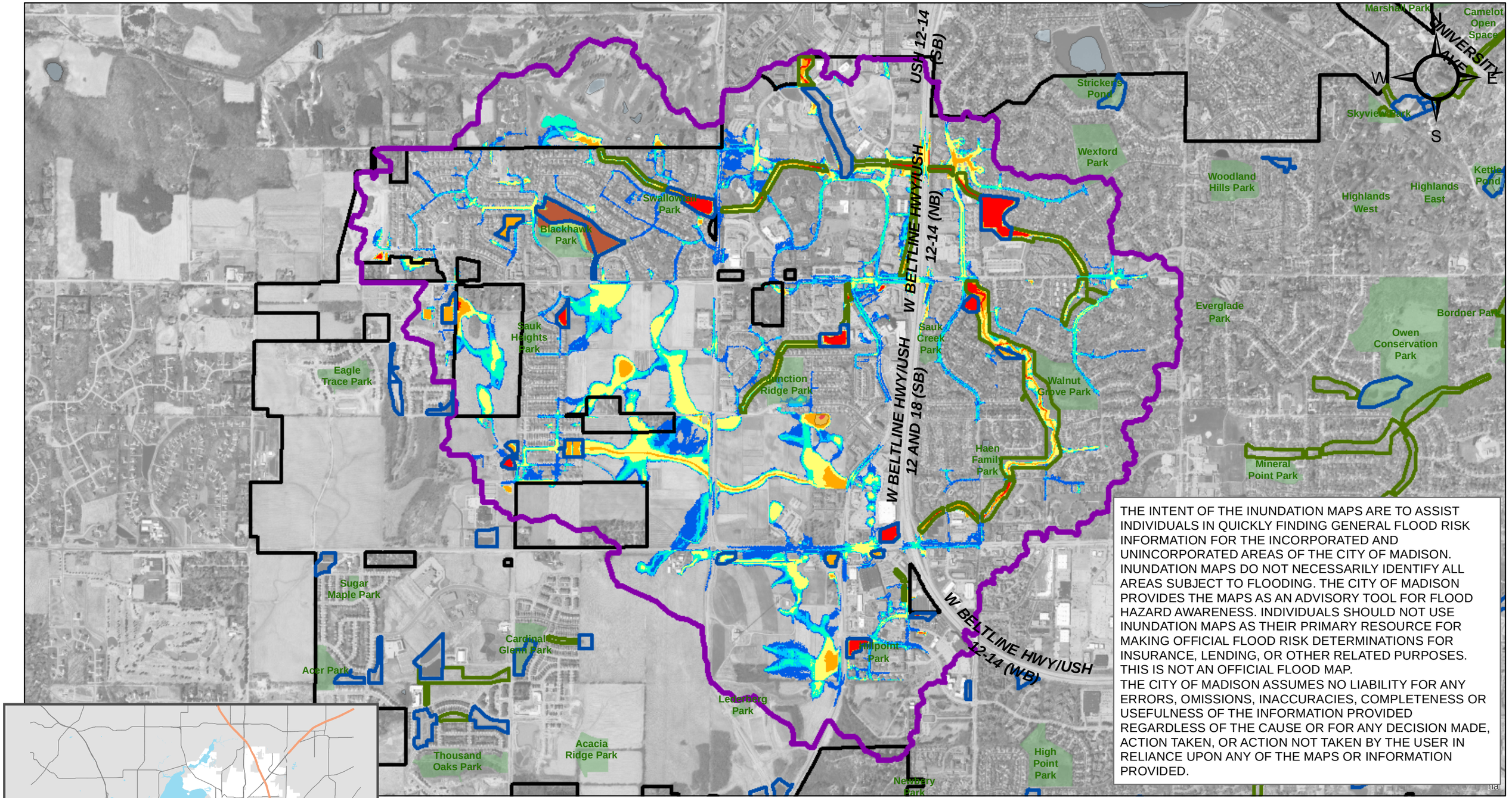
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

# Figure 11-9
# Proposed Conditions Inundation Mapping
# 0.5% Chance Event
# Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_9_ProposedPoint5PerChance.mxd
User Name: encjb

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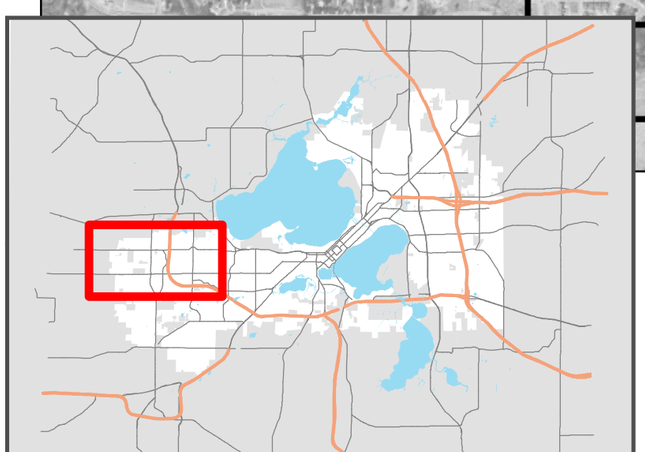


**Legend**

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

**Maximum Depth (ft)**

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

# Figure 11-10
# Proposed Conditions Inundation Mapping
# 0.2% Chance Event
# Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_10_ProposedPoint2PerChance.mxd

User Name: encjb

# Appendix A. Modeling Guidance

## MODELING GUIDANCE

Version 2019-12-06 (DRAFT)

Latest Draft to Round 1 and Round 2 Study Consultants

The City recognizes that an important aspect of modeling is professional judgement; and it will be up to the Consultant to appropriately define parameters, variables, and methodology. However, it is in the City's best interest to aim for relative uniformity amongst all City models. Therefore, the Consultant may be expected to justify, document, and in some instances, modify various model inputs and assumptions.

**City of Madison Flood Mitigation Goals**

1. No home or business will be flooded during the 100-year design storm.
2. Eliminate flooding from the storm sewer system for up to the 10-year design storm; all water shall be contained within the pipes and structures (exception: low points).
3. Allow no more than 0.5 feet of water above storm sewer inlet rim at inlet-restricted low points for up to the 10-year design storm.
4. Centerline of street to remain passable during 25-year design storm with no more than 0.2 feet of water at the centerline.
    a. Note that the Watershed Study modeling approach will not explicitly account for cross flow conditions where more gutter flow on one side of the street can overtop the crown.
5. Enclosed depressions to be served to the 100-year design storm (which can include safe overland flow within street, easements, greenways or other public lands).
6. Greenway crossings at streets to be served to the 100-year design storm.
7. Provide flooding solutions that do not negatively impact downstream properties.
8. For the purpose of the watershed studies "deficiencies" in the system shall be defined as existing infrastructure, drainage capacity or system limitations that fail to meet the goals stated in 1-7 above.

**Guidance for Solutions**

1. Watershed deficiencies will be reviewed, and solutions will be provided up to the 100-yr design storm.
2. In areas where flooding occurs in events exceeding the 100-year storm, those areas will not be prioritized for engineering solutions, but will be identified in existing conditions model for 500-year event storms.
3. Proposed solutions will be identified for only the publicly owned drainage system. Drainage issues that are private (water from the public infrastructure such as streets, greenways, ponds and/or easements is not the cause of the drainage issue) will not require modeling solutions but should be identified where possible in the existing conditions analysis so staff may work with property owners if necessary. (See Also Hydraulics section of Modeling Guidance for discussion on private system existing conditions modeling.)

**DATA SOURCES**:

In the report, document the file name and date for the following data sources:

- Land Use
- LiDAR
- Storm Sewer
- Culverts
- Greenways
- Planimetric Data
- Aerial Imagery

**MODELING PARAMETERS:**

Initial model parameters are the following items:

1. Model all storm sewer and culvert segments 18 inches in diameter (or equivalent) and larger, noting that the model will be required to identify all watershed deficiencies, including inlet capacity. Inclusion of smaller diameter pipes may be required to meet the goals of the model.
2. Street inlets are to be aggregated within the model to the 18-inch diameter (or equivalent) storm sewer level.
3. Incorporate existing storm water management facilities (public and private) into the model.
4. Subdivide provided outfall basins into smaller watersheds as needed in order to properly execute the model.
5. Coordinate System and Vertical Datum
    a. Horizontal Coordinate System: Wisconsin County Coordinate System – Dane Zone NAD83 (HARN).
    b. Vertical Datum: NAVD88 (pre 2007 adjustment) ft (City of Madison Datum + 845.6)
6. Naming convention
    a. Names are limited to 20 characters
    b. Subcatchments:
        i. Begin with Subcatchments naming convention provided by the City in the Outfall Basin feature class.
            1. Add a three-digit designator to the end of the name, beginning with 000
            2. As subcatchments are subdivided, increase the added designator by 1.
            3. Example: ME04-A-0014-H *(Provided by City)* → ME04-A-0014-H-MAD-C-000 *(For the original basin)* → ME04-A-0014-H-001 *(For first subdivision)*
        ii. Final outfall basin feature class file, including supporting files used to compute runoff timing and volume parameters shall be part of the deliverables provided to the City of Madison.
    c. Structures and Junctions:
        i. Node (Junction/Storage/Outfall) names for existing structures shall retain the asset identification provided by the City.
        ii. Proposed Structure names are to be determined by the Consultant but shall be given a “logical” name that reflects general location, function, or other.
        iii. For junctions that need to be added that are storm sewer tees as constructed, use the downstream manhole / structure with “_01” added in increasing order moving from downstream to upstream. For example, the first junction added for a tee upstream of MI3350-001 would be MI3350-001_01
    d. Pipes:
        i. Conduit names for existing pipes shall retain the asset identification provided by the City, except that:
            1. The first two letters (i.e AE, IN, etc) will be removed
            2. Leads with an asset ID that takes up all 20 characters can be shortened to the corresponding assigned ID. For example, 3350-032_3350-007_3350-001 can be changed to 3350-032_3350-001_01
        ii. Proposed Pipe names are to be determined by the Consultant but shall be named in a manner similar to the City pipe naming convention, which includes the upstream and downstream structure names.
    e. Channel/Street Flow Segments:
        i. Conduit names for drainage-ways shall be named in a manner that identifies the greenway segment it represents by Greenway Node Number and the distance from the upstream end. Example: GR7541-062_125 would represent a channel segment that begins 125 feet into the North Door Creek Greenway – Sprecher Road Section.
        ii. Conduit names for streets shall be named with “Rd_”[US_Node_Name]_[DS_Node_Name] and remove the first two letters in the node name similar to how pipes are named.
    f. Natural Channels:
        i. Natural channel transects shall be named with the same ID as the conduit name.

ii. Street models as natural channels shall be named in a manner that is easily identifiable for the street or street type it represents.
iii. A shapefile shall be created documenting where natural channel transects are cut.

g. Other SWMM Features (Weirs, orifices, etc)
   i. Other SWMM features shall have readily identifiable names corresponding to the type of feature they are trying to model. For example, an orifice for a detention pond should have an ID that is "<Detention Pond ID>_ORIF_01", keeping within a 20 character limit.

h. Ponds
   i.

7. Rainfall
   a. MSE4 24-hour Distribution and NOAA Atlas 14 Depths

| Recurrence Interval (years) | Rainfall Depth (inches) |
|---|---|
| 2 | 2.8 |
| 5 | 3.5 |
| 10 | 4.1 |
| 25 | 5.0 |
| 50 | 5.7 |
| 100 | 6.6 |
| 500 | 8.8 |

   b. Long-Duration Storm – Two 24-hour, 100-year MSE4 storm events with the time between peak rainfalls shorted from 24 hours to 12 hours.

8. Hydrology (SWMM Method with Horton Infiltration) (References: A, B, C)
   - Parameters listed are default parameters and may need to be adjusted based on calibration data.

   a. Subcatchment Detail for Street Drainage
      i. Contributing area to the existing storm sewer system that is to be modeled (Determined on a watershed by watershed basis)
      ii. Provides information that there is or is not an issue with upstream street flooding / storm sewer capacity that would be detailed out as part of a future street improvement design project.

   b. SWMM Routing Parameters (if calibration is not available to adjust parameters)
      i. Percent Impervious - Follow Step 1 (pages 1-3) of the "HowTo_CalculateCN" document.
      ii. DCIA – Reference WinSLAMM Standard Land Use DCIA Spreadsheet
      iii. Width – Estimated based on subcatchment shape. Estimation methodology shall be documented.
      A single width shall be calculated for the entire subcatchment. The single width with then be prorated based on sub area acreage for each sub area. DCIA will be prorated based on the area of the DCIA sub area compared to the total subcatchment area. The prorated width for the non-DCIA sub area and pervious sub area will be the same; it will be based on the sum of the non-DCIA plus the pervious area compared to the total subcatchment area.
      It is expected Width is one of the first calibration parameters for peak flow.
      iv. Slope – Computed manually or estimated based on LiDAR. Computation or estimation methodology shall be documented.
      v. Each subcatchment is to be split into area of (1) DCIA, (2) non-DCIA, and (3) pervious area. Within the model, the non-DCIA shall be routed to the pervious area.

   c. Horton Infiltration

i. For typical urban pervious area (Based on range of values for different soil types, moisture conditions, and vegetation conditions found in Reference A):

| HSG Group[a] | Max Infil. Rate (in/hr) | Min Infil. Rate (in/hr) | Decay Rate (1/hr) | Dry Days[b] |
|---|---|---|---|---|
| A | 4.0 | 1.0 | 4.0 | 3.1 |
| B | 2.0 | 0.5 | 4.0 | 4.4 |
| C | 1.0 | 0.2 | 4.0 | 7.0 |
| D | 0.5 | 0.1 | 4.0 | 9.9 |
| Water | 0 | 0 | 0 | 0 |

[a]For HSG listed as A/D, B/D, C/D, the default approach will be to assume the HSG associated with the lower infiltration rate (HSG D).
[b]Use equation 4-12, pg 99, SWMM Reference Manual Volume 1 – Hydrology (Revised), January 2016

ii. Impervious Manning's n – 0.016
iii. Pervious Manning's n – 0.20
iv. Depression Storage for Impervious – 0.05 inches
v. Depression Storage for Pervious – 0.15 inches
vi. Factors for adjusting
    1. Forest – Multiply max and min infiltration rates by 2.
    2. Farmland – Divide max and min infiltration rates by 2.
    3. Other land uses – see reference
vii. Area-weight the Horton Infiltration parameters for each subcatchment based on the area of each soil type within a subcatchment.
viii. It is understood the NRCS/SCS updates the soil mapping at various times. The project teams will identify a date the soils data will be downloaded and that will be the data used for the duration of the project.

**Commented [BC1]:** Add maximum infiltration volume in inches

9. 1D Hydraulics (References: A, B, D, E, F)
    - Dynamic mode with constant / variable timestep sufficient to model system accurately.
    - Conduit lengthening shall not be used unless prior approval from City on reason.
    - Parameters are default parameters and may need to be adjusted based on calibration data.
    - This list is not intended to be exhaustive.

    a. System to be Modeled
        i. Public
            1. Standard: 18" Pipes and Larger
            2. Process for Exceptions: Provide justification for reason that a pipe 18" and larger does not need to be modeled.
            3. Process for requiring inclusion of pipes less than 18": Necessary when they are the only pipes draining parts of the street or drainage system. For example, a 15" pipe stubbing out to a greenway from the street or a long trunk-line that is less than 18".
        ii. Private
            1. Standard: Not included
            2. Process for requiring inclusion of private pipes:
                a. Stormwater management detention facilities
                b. When necessary to understand the functioning of the public system. For example, the West Towne Mall parking lot drainage system.
        iii. All greenways and major surface drainages
        iv. All stormwater detention facilities (public and private). Private systems may be simplified if serving a single site.
        v. Street surface drainage, but not necessary to the block level unless needed to understand major overflow routes

    b. Loss Coefficients
        i. Entry

1. Culverts – Select Inlet Type based on the Help File or HEC-RAS Hydraulic Reference Manual
2. Storm Sewer (internal at MHs) = 0.1
3. Storm Drainage Structures (MH) at 45 degree bend = 0.25
4. Storm Drainage Structures (MH) at 90 degree bend = 0.5
5. For culverts and entrances to storm sewer from an open channel or pond, both the energy loss coefficient and the inlet control (culvert code) shall be used.

ii. Exit
1. Culverts –
   a. Exit closed conduit to open channel = 0.5
   b. Exit closed conduit to lake or pond = 1.0
2. Storm Sewer (internal at MHs) = 0.05
3. Storm Drainage Structures (MH) at 45 degree bend = 0.25
4. Storm Drainage Structures (MH) at 90 degree bend = 0.5

c. Coefficient of Discharge
i. Weirs
1. Sharp Crested – 3.0
2. Roadway embankment – 2.6
3. Flatter overflow – Use engineering judgment

ii. Orifices
1. 0.6

d. Manning's n
i. Pipes
1. Concrete Pipe: 0.013
2. All other n values shall be chosen within generally acceptable ranges.

ii. Channels
1. Use Chow's Open Channel Hydraulics, Reference E

iii. Bank Flow, including developed urban areas
1. Use Chow's Open Channel Hydraulics, Reference E

e. Transect Placement and Modifiers
i. Splitting long open channels
1. Changes in cross section
2. Significant changes in slope and roughness
3. Overflow points

ii. Segment Lengths
iii. Channel Geometry
iv. Provide shapefile where natural channel transects are selected along with XS Identifier

f. Tailwater Conditions:
i. Lake Mendota: one foot over Summer Maximum – 851.10
ii. Lake Wingra:

g. Inlet Clogging Factors
i. Continuous Slopes
1. Street slope < 1% - 25% Clogging
2. Street slope >= 1% - No Clogging

ii. Sags – 50% Clogging

10. 2D Data
a. Surface Roughness – The average Manning's n may vary by land cover / land use. Referencing TR-55, the following roughness shall be used:
i. Impervious areas - 0.1
ii. Turf grass areas - 0.24
iii. Wooded – 0.4
iv. Prairie – 0.15
v. Other – reference TR-55

There is not currently a city-wide impervious area layer. The consultant may choose to delineate the impervious area for the watershed.
Or, the existing data may be utilized. The following assumptions can be made using the existing land use data:

i. For non-residential parcels, impervious and pervious area is available, therefore, that shall be used.
ii. A percent impervious is available for residential parcels. Calculate a composite roughness using the percent impervious area. Remove roofs from the composite roughness calculation – reference the Dane County land use for residential roofs. (roofs will be entered as blocked obstructions)
iii. Average the roughness within the ROW based impervious and pervious area.

b. Blocked Obstructions – enter roofs as blocked obstructions
   i. Non-residential – use City impervious area data for roofs
   ii. Residential – use Dane County roof layer

11. Non-Modeling Data
    a. In the Notes field, include the sources of data

12. Scenarios
    a. Scenarios shall be set up as follows:
       a. 'Children' of the BASE scenario:
          i. EXISTING
             (grandchildren of BASE scenario, children of EXISTING)
             1. EXISTING_002_YR
             2. EXISTING_005_YR
             3. EXISTING_010_YR
             4. EXISTING_025_YR
             5. EXISTING_050_YR
             6. EXISTING_100_YR
             7. EXISTING_500_YR
             8. EXISTING_100YR_LONG_STORM
          ii. PROP_ALT1
             (grandchildren of BASE scenario, children of PROP_ALT1)
             1. PROP_ALT1_002_YR
             2. PROP_ALT1_005_YR
             3. PROP_ALT1_010_YR
             4. PROP_ALT1_025_YR
             5. PROP_ALT1_050_YR
             6. PROP_ALT1_100_YR
             7. PROP_ALT1_500_YR
             8. PROP_ALT1_100YR_LONG_STORM
          iii. PROP_ALT2
             (grandchildren of BASE scenario, children of PROP_ALT2)
             1. PROP_ALT2_002_YR
             2. PROP_ALT2_005_YR
             3. PROP_ALT2_010_YR
             4. PROP_ALT2_025_YR
             5. PROP_ALT2_050_YR
             6. PROP_ALT2_100_YR
             7. PROP_ALT2_500_YR
             8. PROP_ALT2_100YR_LONG_STORM
          iv. PROP_ALT3
             (grandchildren of BASE scenario, children of PROP_ALT3)

             1. PROP_ALT3_002_YR

**Commented [BC2]:** Do we know if the scenario manager works for XP-SWMM? Otherwise we can come up with a model naming convention and use global storms.

2. PROP_ALT3_005_YR
3. PROP_ALT3_010_YR
4. PROP_ALT3_025_YR
5. PROP_ALT3_050_YR
6. PROP_ALT3_100_YR
7. PROP_ALT3_500_YR
8. PROP_ALT3_100YR_LONG_STORM

b. Facility for children of the BASE scenario is defined via database queries. Facility for grandchildren of the BASE scenario are defined by inheritance.
c. Data sets for children of the BASE scenario should be BASE except where needed to define different datasets. Data sets for the grandchildren of the BASE scenario shall be defined by inheritance except for the raingage, which should be set as defined below.
    i. Data set naming convention should match the children of the BASE scenario. For example, if a different junction data set is needed for PROP_ALT2, the junction data set should be called "PROP_ALT2".
    ii. Data set naming convention for raingage sets should be based on the event used in the scenario naming convention, e.g. 002_YR, 005_YR…100YR_LONGSTORM.

**REFERENCES**


A. Help File
B. Storm Water Management Model version 5.1 User's Manual. (Available at: https://www.epa.gov/water-research/storm-water-management-model-swmm-version-51-users-manual)
C. SWMM reference manual volume I – hydrology (Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NYRA.txt)
D. SWMM reference manual volume volume II – hydraulics (Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100S9AS.PDF?Dockey=P100S9AS.PDF)
E. Chow, Open Channel Hydraulics, 1959
F. HEC-RAS Hydraulic Reference Manual. (Available at: https://www.hec.usace.army.mil/software/hec-ras/documentation/HEC-RAS%205.0%20Reference%20Manual.pdf)

# Appendix B. Hydrologic Factors

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AE1547-035 | 1 | 1 | 1 | 0.24 | 242.577 | 100 | 0.032 | SWMM Methods 64 | AE1547-035 | 0 | AE1547-035 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1547-035 | 2 | | 1 | 0.097 | 242.577 | 100 | 0.032 | SWMM Methods 64 | AE1547-035 | 1 | AE1547-035 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1547-035 | 3 | | 1 | 3.435 | 242.577 | 0 | 0.032 | SWMM Methods 64 | AE1547-035 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1549-012 | 1 | 1 | 1 | 0.615 | 544.748 | 100 | 0.023 | SWMM Methods 64 | AE1549-012 | 0 | AE1549-012 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1549-012 | 2 | | 1 | 0.442 | 544.748 | 100 | 0.023 | SWMM Methods 64 | AE1549-012 | 1 | AE1549-012 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1549-012 | 3 | | 1 | 11.385 | 544.748 | 0 | 0.023 | SWMM Methods 64 | AE1549-012 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1549-015 | 1 | 1 | 1 | 0.114 | 406.049 | 100 | 0.01 | SWMM Methods 64 | AE1549-015 | 0 | AE1549-015 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1549-015 | 2 | | 1 | 0.149 | 406.049 | 100 | 0.01 | SWMM Methods 64 | AE1549-015 | 1 | AE1549-015 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1549-015 | 3 | | 1 | 4.817 | 406.049 | 0 | 0.01 | SWMM Methods 64 | AE1549-015 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1550-029 | 1 | 1 | 1 | 0.259 | 80.182 | 100 | 0.024 | SWMM Methods 64 | AE1550-029 | 0 | AE1550-029 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1550-029 | 2 | | 1 | 0.032 | 80.182 | 100 | 0.024 | SWMM Methods 64 | AE1550-029 | 1 | AE1550-029 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1550-029 | 3 | | 1 | 0.286 | 80.182 | 0 | 0.024 | SWMM Methods 64 | AE1550-029 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1647-038 | 1 | 1 | 1 | 0.188 | 183.21 | 100 | 0.007 | SWMM Methods 64 | AE1647-038 | 0 | AE1647-038 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1647-038 | 2 | | 1 | 0.223 | 183.21 | 100 | 0.007 | SWMM Methods 64 | AE1647-038 | 1 | AE1647-038 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1647-038 | 3 | | 1 | 0.835 | 183.21 | 0 | 0.007 | SWMM Methods 64 | AE1647-038 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1652-001 | 1 | 1 | 1 | 0.111 | 97.041 | 100 | 0.01 | SWMM Methods 64 | AE1652-001 | 0 | AE1652-001 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1652-001 | 3 | | 1 | 0.078 | 97.041 | 0 | 0.01 | SWMM Methods 64 | AE1652-001 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1653-022 | 1 | 1 | 1 | 0.242 | 122.015 | 100 | 0.013 | SWMM Methods 64 | AE1653-022 | 0 | AE1653-022 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1653-022 | 3 | | 1 | 0.866 | 122.015 | 0 | 0.013 | SWMM Methods 64 | AE1653-022 | 0 | | SubCatchment 1 | No Redirection | |
| AE1747-023 | 1 | 1 | 1 | 0.692 | 417.814 | 100 | 0.072 | SWMM Methods 64 | AE1747-023 | 0 | AE1747-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AE1747-023 | 2 | | 1 | 0.407 | 417.814 | 100 | 0.072 | SWMM Methods 64 | AE1747-023 | 1 | AE1747-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1747-023 | 3 | | 1 | 3.153 | 417.814 | 0 | 0.072 | SWMM Methods 64 | AE1747-023 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AE1846-003 | 1 | 1 | 1 | 4.664 | 1682.033 | 100 | 0.025 | SWMM Methods 64 | AE1846-003 | 0 | AE1846-003 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AE1846-003 | 2 | | 1 | 2.06 | 1682.033 | 100 | 0.025 | SWMM Methods 64 | AE1846-003 | 1 | AE1846-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE1846-003 | 3 | | 1 | 102.461 | 1682.033 | 0 | 0.025 | SWMM Methods 64 | AE1846-003 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE1946-011 | 1 | 1 | 1 | 0.973 | 968.79 | 100 | 0.037 | SWMM Methods 64 | AE1946-011 | 0 | AE1946-011 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AE1946-011 | 2 | | 1 | 0.332 | 968.79 | 100 | 0.037 | SWMM Methods 64 | AE1946-011 | 1 | AE1946-011 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE1946-011 | 3 | | 1 | 37.672 | 968.79 | 0 | 0.037 | SWMM Methods 64 | AE1946-011 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE2052-041 | 1 | 1 | 1 | 0.004 | 178.254 | 100 | 0.06 | SWMM Methods 64 | AE2052-041 | 0 | AE2052-041 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2052-041 | 2 | | 1 | 0.004 | 178.254 | 100 | 0.06 | SWMM Methods 64 | AE2052-041 | 1 | AE2052-041 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2052-041 | 3 | | 1 | 1.765 | 178.254 | 0 | 0.06 | SWMM Methods 64 | AE2052-041 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AE2156-075 | 1 | 1 | 1 | 0.098 | 521.917 | 100 | 0.032 | SWMM Methods 64 | AE2156-075 | 0 | AE2156-075 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2156-075 | 3 | | 1 | 7.854 | 521.917 | 0 | 0.032 | SWMM Methods 64 | AE2156-075 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2156-078 | 1 | 1 | 1 | 0.294 | 249.832 | 100 | 0.028 | SWMM Methods 64 | AE2156-078 | 0 | AE2156-078 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2156-078 | 3 | | 1 | 2.691 | 249.832 | 0 | 0.028 | SWMM Methods 64 | AE2156-078 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2250-053 | 1 | 1 | 1 | 9.16 | 219.336 | 100 | 0.021 | SWMM Methods 64 | AE2250-053 | 0 | AE2250-053 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2250-053 | 2 | | 1 | 0.119 | 219.336 | 100 | 0.021 | SWMM Methods 64 | AE2250-053 | 1 | AE2250-053 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2250-053 | 3 | | 1 | 7.476 | 219.336 | 0 | 0.021 | SWMM Methods 64 | AE2250-053 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2250-055 | 1 | 1 | 1 | 4.475 | 497.733 | 100 | 0.026 | SWMM Methods 64 | AE2250-055 | 0 | AE2250-055 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2250-055 | 3 | | 1 | 3.401 | 497.733 | 0 | 0.026 | SWMM Methods 64 | AE2250-055 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2256-010 | 1 | 1 | 1 | 2.887 | 424.391 | 100 | 0.01 | SWMM Methods 64 | AE2256-010 | 0 | AE2256-010 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2256-010 | 3 | | 1 | 1.317 | 424.391 | 0 | 0.01 | SWMM Methods 64 | AE2256-010 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2256-083 | 1 | 1 | 1 | 2.821 | 514.375 | 100 | 0.026 | SWMM Methods 64 | AE2256-083 | 0 | AE2256-083 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2256-083 | 2 | | 1 | 0.008 | 514.375 | 100 | 0.026 | SWMM Methods 64 | AE2256-083 | 1 | AE2256-083 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2256-083 | 3 | | 1 | 2.983 | 514.375 | 0 | 0.026 | SWMM Methods 64 | AE2256-083 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2257-001 | 1 | 1 | 1 | 1.943 | 735.866 | 100 | 0.017 | SWMM Methods 64 | AE2257-001 | 0 | AE2257-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2257-001 | 2 | | 1 | 0.075 | 735.866 | 100 | 0.017 | SWMM Methods 64 | AE2257-001 | 1 | AE2257-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AE2257-001 | 3 | | 1 | 2.414 | 735.866 | 0 | 0.017 | SWMM Methods 64 | AE2257-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2350-026 | 1 | 1 | 1 | 0.396 | 111.279 | 100 | 0.027 | SWMM Methods 64 | AE2350-026 | 0 | AE2350-026 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2350-026 | 3 | | 1 | 0.477 | 111.279 | 0 | 0.027 | SWMM Methods 64 | AE2350-026 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2351-002 | 1 | 1 | 1 | 2.288 | 146.78 | 100 | 0.023 | SWMM Methods 64 | AE2351-002 | 0 | AE2351-002 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2351-002 | 2 | | 1 | 0.082 | 146.78 | 100 | 0.023 | SWMM Methods 64 | AE2351-002 | 1 | AE2351-002 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2351-002 | 3 | | 1 | 5.17 | 146.78 | 0 | 0.023 | SWMM Methods 64 | AE2351-002 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2449-003 | 1 | 1 | 1 | 2.493 | 942.107 | 100 | 0.061 | SWMM Methods 64 | AE2449-003 | 0 | AE2449-003 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AE2449-003 | 2 | | 1 | 0.395 | 942.107 | 100 | 0.061 | SWMM Methods 64 | AE2449-003 | 1 | AE2449-003 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AE2449-003 | 3 | | 1 | 7.231 | 942.107 | 0 | 0.061 | SWMM Methods 64 | AE2449-003 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AE2450-022 | 1 | 1 | 1 | 5.227 | 750.194 | 100 | 0.017 | SWMM Methods 64 | AE2450-022 | 0 | AE2450-022 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AE2450-022 | 2 | | 1 | 0.104 | 750.194 | 100 | 0.017 | SWMM Methods 64 | AE2450-022 | 1 | AE2450-022 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AE2450-022 | 3 | | 1 | 4.201 | 750.194 | 0 | 0.017 | SWMM Methods 64 | AE2450-022 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AE2452-014 | 1 | 1 | 1 | 1.31 | 1749.984 | 100 | 0.031 | SWMM Methods 64 | AE2452-014 | 0 | AE2452-014 | SubCatchment 3 | No Redirection | Memorial High School |
| AE2452-014 | 2 | | 1 | 0.93 | 1749.984 | 100 | 0.031 | SWMM Methods 64 | AE2452-014 | 1 | AE2452-014 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AE2452-014 | 3 | | 1 | 18.54 | 1749.984 | 0 | 0.031 | SWMM Methods 64 | AE2452-014 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AE2454-006 | 1 | 1 | 1 | 1.755 | 1699.62 | 100 | 0.061 | SWMM Methods 64 | AE2454-006 | 0 | AE2454-006 | SubCatchment 3 | No Redirection | Memorial High School |
| AE2454-006 | 2 | | 1 | 0.426 | 1699.62 | 100 | 0.061 | SWMM Methods 64 | AE2454-006 | 1 | AE2454-006 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AE2454-006 | 3 | | 1 | 11.207 | 1699.62 | 0 | 0.061 | SWMM Methods 64 | AE2454-006 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AE2553-003 | 1 | 1 | 1 | 4.531 | 838.458 | 100 | 0.036 | SWMM Methods 64 | AE2553-003 | 0 | AE2553-003 | SubCatchment 3 | No Redirection | Memorial High School |
| AE2553-003 | 2 | | 1 | 0.391 | 838.458 | 100 | 0.036 | SWMM Methods 64 | AE2553-003 | 1 | AE2553-003 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AE2553-003 | 3 | | 1 | 6.695 | 838.458 | 0 | 0.036 | SWMM Methods 64 | AE2553-003 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS1547-003 | 1 | 1 | 1 | 0.686 | 836.031 | 100 | 0.03 | SWMM Methods 64 | AS1547-003 | 0 | AS1547-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1547-003 | 2 | | 1 | 0.209 | 836.031 | 100 | 0.03 | SWMM Methods 64 | AS1547-003 | 1 | AS1547-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1547-003 | 3 | | 1 | 1.232 | 836.031 | 0 | 0.03 | SWMM Methods 64 | AS1547-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1547-029 | 1 | 1 | 1 | 1.02 | 303.346 | 100 | 0.059 | SWMM Methods 64 | AS1547-029 | 0 | AS1547-029 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1547-029 | 2 | | 1 | 0.31 | 303.346 | 100 | 0.059 | SWMM Methods 64 | AS1547-029 | 1 | AS1547-029 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1547-029 | 3 | | 1 | 1.655 | 303.346 | 0 | 0.059 | SWMM Methods 64 | AS1547-029 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1548-014 | 1 | 1 | 1 | 1.112 | 393.432 | 100 | 0.032 | SWMM Methods 64 | AS1548-014 | 0 | AS1548-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1548-014 | 2 | | 1 | 0.483 | 393.432 | 100 | 0.032 | SWMM Methods 64 | AS1548-014 | 1 | AS1548-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1548-014 | 3 | | 1 | 2.463 | 393.432 | 0 | 0.032 | SWMM Methods 64 | AS1548-014 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1548-031 | 1 | 1 | 1 | 1.795 | 811.713 | 100 | 0.03 | SWMM Methods 64 | AS1548-031 | 0 | AS1548-031 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1548-031 | 2 | | 1 | 0.942 | 811.713 | 100 | 0.03 | SWMM Methods 64 | AS1548-031 | 1 | AS1548-031 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1548-031 | 3 | | 1 | 4.574 | 811.713 | 0 | 0.03 | SWMM Methods 64 | AS1548-031 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1548-039 | 1 | 1 | 1 | 0.855 | 275.83 | 100 | 0.045 | SWMM Methods 64 | AS1548-039 | 0 | AS1548-039 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1548-039 | 2 | | 1 | 0.245 | 275.83 | 100 | 0.045 | SWMM Methods 64 | AS1548-039 | 1 | AS1548-039 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1548-039 | 3 | | 1 | 1.169 | 275.83 | 0 | 0.045 | SWMM Methods 64 | AS1548-039 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1549-002 | 1 | 1 | 1 | 0.777 | 317.658 | 100 | 0.027 | SWMM Methods 64 | AS1549-002 | 0 | AS1549-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1549-002 | 2 | | 1 | 0.273 | 317.658 | 100 | 0.027 | SWMM Methods 64 | AS1549-002 | 1 | AS1549-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1549-002 | 3 | | 1 | 1.565 | 317.658 | 0 | 0.027 | SWMM Methods 64 | AS1549-002 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1549-034 | 1 | 1 | 1 | 0.677 | 128.962 | 100 | 0.005 | SWMM Methods 64 | AS1549-034 | 0 | AS1549-034 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1549-034 | 2 | | 1 | 0.077 | 128.962 | 100 | 0.005 | SWMM Methods 64 | AS1549-034 | 1 | AS1549-034 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1549-034 | 3 | | 1 | 0.944 | 128.962 | 0 | 0.005 | SWMM Methods 64 | AS1549-034 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1549-042 | 1 | 1 | 1 | 1.247 | 710.514 | 100 | 0.033 | SWMM Methods 64 | AS1549-042 | 0 | AS1549-042 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1549-042 | 2 | | 1 | 0.682 | 710.514 | 100 | 0.033 | SWMM Methods 64 | AS1549-042 | 1 | AS1549-042 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1549-042 | 3 | | 1 | 8.039 | 710.514 | 0 | 0.033 | SWMM Methods 64 | AS1549-042 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-018 | 1 | 1 | 1 | 0.81 | 301.646 | 100 | 0.022 | SWMM Methods 64 | AS1647-018 | 0 | AS1647-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1647-018 | 2 | | 1 | 0.27 | 301.646 | 100 | 0.022 | SWMM Methods 64 | AS1647-018 | 1 | AS1647-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1647-018 | 3 | | 1 | 1.46 | 301.646 | 0 | 0.022 | SWMM Methods 64 | AS1647-018 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-027 | 1 | 1 | 1 | 1.32 | 1325.052 | 100 | 0.029 | SWMM Methods 64 | AS1647-027 | 0 | AS1647-027 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1647-027 | 2 | | 1 | 0.489 | 1325.052 | 100 | 0.029 | SWMM Methods 64 | AS1647-027 | 1 | AS1647-027 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-027 | 3 | | 1 | 2.37 | 1325.052 | 0 | 0.029 | SWMM Methods 64 | AS1647-027 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-048 | 1 | 1 | 1 | 0.413 | 327.853 | 100 | 0.03 | SWMM Methods 64 | AS1647-048 | 0 | AS1647-048 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1647-048 | 2 | | 1 | 0.159 | 327.853 | 100 | 0.03 | SWMM Methods 64 | AS1647-048 | 1 | AS1647-048 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-048 | 3 | | 1 | 0.936 | 327.853 | 0 | 0.03 | SWMM Methods 64 | AS1647-048 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-052 | 1 | 1 | 1 | 0.647 | 424.342 | 100 | 0.033 | SWMM Methods 64 | AS1647-052 | 0 | AS1647-052 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1647-052 | 2 | | 1 | 0.208 | 424.342 | 100 | 0.033 | SWMM Methods 64 | AS1647-052 | 1 | AS1647-052 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1647-052 | 3 | | 1 | 1.18 | 424.342 | 0 | 0.033 | SWMM Methods 64 | AS1647-052 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-006 | 1 | 1 | 1 | 0.662 | 236.613 | 100 | 0.074 | SWMM Methods 64 | AS1648-006 | 0 | AS1648-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1648-006 | 2 | | 1 | 0.243 | 236.613 | 100 | 0.074 | SWMM Methods 64 | AS1648-006 | 1 | AS1648-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-006 | 3 | | 1 | 1.339 | 236.613 | 0 | 0.074 | SWMM Methods 64 | AS1648-006 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-014 | 1 | 1 | 1 | 0.544 | 335.883 | 100 | 0.028 | SWMM Methods 64 | AS1648-014 | 0 | AS1648-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1648-014 | 2 | | 1 | 0.151 | 335.883 | 100 | 0.028 | SWMM Methods 64 | AS1648-014 | 1 | AS1648-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-014 | 3 | | 1 | 0.935 | 335.883 | 0 | 0.028 | SWMM Methods 64 | AS1648-014 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-022 | 1 | 1 | 1 | 1.964 | 707.151 | 100 | 0.022 | SWMM Methods 64 | AS1648-022 | 0 | AS1648-022 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1648-022 | 2 | | 1 | 0.979 | 707.151 | 100 | 0.022 | SWMM Methods 64 | AS1648-022 | 1 | AS1648-022 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-022 | 3 | | 1 | 4.532 | 707.151 | 0 | 0.022 | SWMM Methods 64 | AS1648-022 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-043 | 1 | 1 | 1 | 0.688 | 390.3 | 100 | 0.021 | SWMM Methods 64 | AS1648-043 | 0 | AS1648-043 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1648-043 | 2 | | 1 | 0.263 | 390.3 | 100 | 0.021 | SWMM Methods 64 | AS1648-043 | 1 | AS1648-043 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1648-043 | 3 | | 1 | 1.675 | 390.3 | 0 | 0.021 | SWMM Methods 64 | AS1648-043 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1747-002 | 1 | 1 | 1 | 0.665 | 232.989 | 100 | 0.062 | SWMM Methods 64 | AS1747-002 | 0 | AS1747-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1747-002 | 2 | | 1 | 0.112 | 232.989 | 100 | 0.062 | SWMM Methods 64 | AS1747-002 | 1 | AS1747-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1747-002 | 3 | | 1 | 0.722 | 232.989 | 0 | 0.062 | SWMM Methods 64 | AS1747-002 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1747-010 | 1 | 1 | 1 | 1.323 | 247.655 | 100 | 0.007 | SWMM Methods 64 | AS1747-010 | 0 | AS1747-010 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1747-010 | 2 | | 1 | 0.383 | 247.655 | 100 | 0.007 | SWMM Methods 64 | AS1747-010 | 1 | AS1747-010 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1747-010 | 3 | | 1 | 2.125 | 247.655 | 0 | 0.007 | SWMM Methods 64 | AS1747-010 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1748-011 | 1 | 1 | 1 | 0.452 | 483.37 | 100 | 0.019 | SWMM Methods 64 | AS1748-011 | 0 | AS1748-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1748-011 | 2 | | 1 | 0.113 | 483.37 | 100 | 0.019 | SWMM Methods 64 | AS1748-011 | 1 | AS1748-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1748-011 | 3 | | 1 | 0.796 | 483.37 | 0 | 0.019 | SWMM Methods 64 | AS1748-011 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1748-024 | 1 | 1 | 1 | 0.86 | 363.148 | 100 | 0.015 | SWMM Methods 64 | AS1748-024 | 0 | AS1748-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1748-024 | 2 | | 1 | 0.217 | 363.148 | 100 | 0.015 | SWMM Methods 64 | AS1748-024 | 1 | AS1748-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1748-024 | 3 | | 1 | 1.825 | 363.148 | 0 | 0.015 | SWMM Methods 64 | AS1748-024 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1750-024 | 1 | 1 | 1 | 1.018 | 424.577 | 100 | 0.019 | SWMM Methods 64 | AS1750-024 | 0 | AS1750-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1750-024 | 2 | | 1 | 0.022 | 424.577 | 100 | 0.019 | SWMM Methods 64 | AS1750-024 | 1 | AS1750-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1750-024 | 3 | | 1 | 0.997 | 424.577 | 0 | 0.019 | SWMM Methods 64 | AS1750-024 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1753-005 | 1 | 1 | 1 | 0.846 | 1016.012 | 100 | 0.019 | SWMM Methods 64 | AS1753-005 | 0 | AS1753-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1753-005 | 2 | | 1 | 1.001 | 1016.012 | 100 | 0.019 | SWMM Methods 64 | AS1753-005 | 1 | AS1753-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1753-005 | 3 | | 1 | 5.309 | 1016.012 | 0 | 0.019 | SWMM Methods 64 | AS1753-005 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1754-010 | 1 | 1 | 1 | 0.494 | 254.518 | 100 | 0.033 | SWMM Methods 64 | AS1754-010 | 0 | AS1754-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1754-010 | 2 | | 1 | 0.572 | 254.518 | 100 | 0.033 | SWMM Methods 64 | AS1754-010 | 1 | AS1754-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1754-010 | 3 | | 1 | 2.633 | 254.518 | 0 | 0.033 | SWMM Methods 64 | AS1754-010 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1754-028 | 1 | 1 | 1 | 0.243 | 407.194 | 100 | 0.049 | SWMM Methods 64 | AS1754-028 | 0 | AS1754-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1754-028 | 2 | | 1 | 0.192 | 407.194 | 100 | 0.049 | SWMM Methods 64 | AS1754-028 | 1 | AS1754-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1754-028 | 3 | | 1 | 7.68 | 407.194 | 0 | 0.049 | SWMM Methods 64 | AS1754-028 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1847-009 | 1 | 1 | 1 | 1.422 | 330.317 | 100 | 0.048 | SWMM Methods 64 | AS1847-009 | 0 | AS1847-009 | SubCatchment 3 | No Redirection | Swallowtail Park |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1847-009 | 2 | | 1 | 0.601 | 330.317 | 100 | 0.048 | SWMM Methods 64 | AS1847-009 | 1 | AS1847-009 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1847-009 | 3 | | 1 | 3.324 | 330.317 | 0 | 0.048 | SWMM Methods 64 | AS1847-009 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1848-003 | 1 | 1 | 1 | 0.432 | 148.268 | 100 | 0.047 | SWMM Methods 64 | AS1848-003 | 0 | AS1848-003 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1848-003 | 2 | | 1 | 0.096 | 148.268 | 100 | 0.047 | SWMM Methods 64 | AS1848-003 | 1 | AS1848-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1848-003 | 3 | | 1 | 0.648 | 148.268 | 0 | 0.047 | SWMM Methods 64 | AS1848-003 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1848-018 | 1 | 1 | 1 | 2.601 | 357.914 | 100 | 0.021 | SWMM Methods 64 | AS1848-018 | 0 | AS1848-018 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1848-018 | 2 | | 1 | 0.946 | 357.914 | 100 | 0.021 | SWMM Methods 64 | AS1848-018 | 1 | AS1848-018 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1848-018 | 3 | | 1 | 5.616 | 357.914 | 0 | 0.021 | SWMM Methods 64 | AS1848-018 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1848-027 | 1 | 1 | 1 | 2.646 | 614.536 | 100 | 0.019 | SWMM Methods 64 | AS1848-027 | 0 | AS1848-027 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1848-027 | 2 | | 1 | 1.21 | 614.536 | 100 | 0.019 | SWMM Methods 64 | AS1848-027 | 1 | AS1848-027 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1848-027 | 3 | | 1 | 6.739 | 614.536 | 0 | 0.019 | SWMM Methods 64 | AS1848-027 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1849-009 | 1 | 1 | 1 | 1.054 | 559.704 | 100 | 0.041 | SWMM Methods 64 | AS1849-009 | 0 | AS1849-009 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1849-009 | 2 | | 1 | 0.36 | 559.704 | 100 | 0.041 | SWMM Methods 64 | AS1849-009 | 1 | AS1849-009 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1849-009 | 3 | | 1 | 2.273 | 559.704 | 0 | 0.041 | SWMM Methods 64 | AS1849-009 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1849-026 | 1 | 1 | 1 | 1.679 | 442.132 | 100 | 0.02 | SWMM Methods 64 | AS1849-026 | 0 | AS1849-026 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1849-026 | 2 | | 1 | 0.188 | 442.132 | 100 | 0.02 | SWMM Methods 64 | AS1849-026 | 1 | AS1849-026 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1849-026 | 3 | | 1 | 2.023 | 442.132 | 0 | 0.02 | SWMM Methods 64 | AS1849-026 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1849-053 | 1 | 1 | 1 | 4.025 | 718.806 | 100 | 0.019 | SWMM Methods 64 | AS1849-053 | 0 | AS1849-053 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| AS1849-053 | 2 | | 1 | 0.07 | 718.806 | 100 | 0.019 | SWMM Methods 64 | AS1849-053 | 1 | AS1849-053 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1849-053 | 3 | | 1 | 2.353 | 718.806 | 0 | 0.019 | SWMM Methods 64 | AS1849-053 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| AS1946-004 | 1 | 1 | 1 | 4.391 | 466.577 | 100 | 0.042 | SWMM Methods 64 | AS1946-004 | 0 | AS1946-004 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1946-004 | 2 | | 1 | 0.412 | 466.577 | 100 | 0.042 | SWMM Methods 64 | AS1946-004 | 1 | AS1946-004 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1946-004 | 3 | | 1 | 9.122 | 466.577 | 0 | 0.042 | SWMM Methods 64 | AS1946-004 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1947-009 | 1 | 1 | 1 | 0.473 | 63.215 | 100 | 0.027 | SWMM Methods 64 | AS1947-009 | 0 | AS1947-009 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1947-009 | 2 | | 1 | 0.013 | 63.215 | 100 | 0.027 | SWMM Methods 64 | AS1947-009 | 1 | AS1947-009 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1947-009 | 3 | | 1 | 0.659 | 63.215 | 0 | 0.027 | SWMM Methods 64 | AS1947-009 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1948-004 | 1 | 1 | 1 | 1.185 | 571.287 | 100 | 0.039 | SWMM Methods 64 | AS1948-004 | 0 | AS1948-004 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1948-004 | 2 | | 1 | 0.624 | 571.287 | 100 | 0.039 | SWMM Methods 64 | AS1948-004 | 1 | AS1948-004 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1948-004 | 3 | | 1 | 3.895 | 571.287 | 0 | 0.039 | SWMM Methods 64 | AS1948-004 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1948-017 | 1 | 1 | 1 | 1.252 | 360.841 | 100 | 0.085 | SWMM Methods 64 | AS1948-017 | 0 | AS1948-017 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1948-017 | 2 | | 1 | 0.431 | 360.841 | 100 | 0.085 | SWMM Methods 64 | AS1948-017 | 1 | AS1948-017 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1948-017 | 3 | | 1 | 2.777 | 360.841 | 0 | 0.085 | SWMM Methods 64 | AS1948-017 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1949-007 | 1 | 1 | 1 | 2.881 | 575.906 | 100 | 0.055 | SWMM Methods 64 | AS1949-007 | 0 | AS1949-007 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1949-007 | 2 | | 1 | 1.39 | 575.906 | 100 | 0.055 | SWMM Methods 64 | AS1949-007 | 1 | AS1949-007 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1949-007 | 3 | | 1 | 9.726 | 575.906 | 0 | 0.055 | SWMM Methods 64 | AS1949-007 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1949-032 | 1 | 1 | 1 | 1.437 | 269.246 | 100 | 0.012 | SWMM Methods 64 | AS1949-032 | 0 | AS1949-032 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1949-032 | 2 | | 1 | 0.186 | 269.246 | 100 | 0.012 | SWMM Methods 64 | AS1949-032 | 1 | AS1949-032 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1949-032 | 3 | | 1 | 2.169 | 269.246 | 0 | 0.012 | SWMM Methods 64 | AS1949-032 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1951-005 | 1 | 1 | 1 | 1.926 | 423.426 | 100 | 0.013 | SWMM Methods 64 | AS1951-005 | 0 | AS1951-005 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1951-005 | 2 | | 1 | 0.974 | 423.426 | 100 | 0.013 | SWMM Methods 64 | AS1951-005 | 1 | AS1951-005 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1951-005 | 3 | | 1 | 8.122 | 423.426 | 0 | 0.013 | SWMM Methods 64 | AS1951-005 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2045-006 | 1 | 1 | 1 | 5.452 | 468.558 | 100 | 0.032 | SWMM Methods 64 | AS2045-006 | 0 | AS2045-006 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2045-006 | 2 | | 1 | 0.79 | 468.558 | 100 | 0.032 | SWMM Methods 64 | AS2045-006 | 1 | AS2045-006 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2045-006 | 3 | | 1 | 6.49 | 468.558 | 0 | 0.032 | SWMM Methods 64 | AS2045-006 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2046-011 | 1 | 1 | 1 | 6.758 | 499.497 | 100 | 0.032 | SWMM Methods 64 | AS2046-011 | 0 | AS2046-011 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2046-011 | 2 | | 1 | 0.378 | 499.497 | 100 | 0.032 | SWMM Methods 64 | AS2046-011 | 1 | AS2046-011 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2046-011 | 3 | | 1 | 4.806 | 499.497 | 0 | 0.032 | SWMM Methods 64 | AS2046-011 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2047-006 | 1 | 1 | 1 | 2.949 | 707.258 | 100 | 0.051 | SWMM Methods 64 | AS2047-006 | 0 | AS2047-006 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2047-006 | 2 | | 1 | 0.019 | 707.258 | 100 | 0.051 | SWMM Methods 64 | AS2047-006 | 1 | AS2047-006 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2047-006 | 3 | | 1 | 3.058 | 707.258 | 0 | 0.051 | SWMM Methods 64 | AS2047-006 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2048-010 | 1 | 1 | 1 | 6.357 | 1069.009 | 100 | 0.029 | SWMM Methods 64 | AS2048-010 | 0 | AS2048-010 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2048-010 | 2 | | 1 | 0.043 | 1069.009 | 100 | 0.029 | SWMM Methods 64 | AS2048-010 | 1 | AS2048-010 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2048-010 | 3 | | 1 | 3.879 | 1069.009 | 0 | 0.029 | SWMM Methods 64 | AS2048-010 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2049-002 | 1 | 1 | 1 | 7.95 | 755.235 | 100 | 0.057 | SWMM Methods 64 | AS2049-002 | 0 | AS2049-002 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2049-002 | 2 | | 1 | 0.123 | 755.235 | 100 | 0.057 | SWMM Methods 64 | AS2049-002 | 1 | AS2049-002 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2049-002 | 3 | | 1 | 14.29 | 755.235 | 0 | 0.057 | SWMM Methods 64 | AS2049-002 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2049-005 | 1 | 1 | 1 | 0.582 | 194.077 | 100 | 0.053 | SWMM Methods 64 | AS2049-005 | 0 | AS2049-005 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2049-005 | 2 | | 1 | 0.006 | 194.077 | 100 | 0.053 | SWMM Methods 64 | AS2049-005 | 1 | AS2049-005 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2049-005 | 3 | | 1 | 0.37 | 194.077 | 0 | 0.053 | SWMM Methods 64 | AS2049-005 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2050-012 | 1 | 1 | 1 | 2.316 | 651.346 | 100 | 0.088 | SWMM Methods 64 | AS2050-012 | 0 | AS2050-012 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2050-012 | 2 | | 1 | 0.291 | 651.346 | 100 | 0.088 | SWMM Methods 64 | AS2050-012 | 1 | AS2050-012 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2050-012 | 3 | | 1 | 6.139 | 651.346 | 0 | 0.088 | SWMM Methods 64 | AS2050-012 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2050-024 | 1 | 1 | 1 | 1.521 | 201.89 | 100 | 0.019 | SWMM Methods 64 | AS2050-024 | 0 | AS2050-024 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2050-024 | 2 | | 1 | 0.027 | 201.89 | 100 | 0.019 | SWMM Methods 64 | AS2050-024 | 1 | AS2050-024 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2050-024 | 3 | | 1 | 0.949 | 201.89 | 0 | 0.019 | SWMM Methods 64 | AS2050-024 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2051-023 | 1 | 1 | 1 | 1.875 | 470.706 | 100 | 0.03 | SWMM Methods 64 | AS2051-023 | 0 | AS2051-023 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2051-023 | 2 | | 1 | 0.752 | 470.706 | 100 | 0.03 | SWMM Methods 64 | AS2051-023 | 1 | AS2051-023 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2051-023 | 3 | | 1 | 2.628 | 470.706 | 0 | 0.03 | SWMM Methods 64 | AS2051-023 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2051-041 | 1 | 1 | 1 | 0.541 | 183.275 | 100 | 0.007 | SWMM Methods 64 | AS2051-041 | 0 | AS2051-041 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2051-041 | 2 | | 1 | 0.092 | 183.275 | 100 | 0.007 | SWMM Methods 64 | AS2051-041 | 1 | AS2051-041 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2051-041 | 3 | | 1 | 0.261 | 183.275 | 0 | 0.007 | SWMM Methods 64 | AS2051-041 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2051-051 | 1 | 1 | 1 | 1.541 | 746.898 | 100 | 0.011 | SWMM Methods 64 | AS2051-051 | 0 | AS2051-051 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2051-051 | 2 | | 1 | 0.363 | 746.898 | 100 | 0.011 | SWMM Methods 64 | AS2051-051 | 1 | AS2051-051 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2051-051 | 3 | | 1 | 2.103 | 746.898 | 0 | 0.011 | SWMM Methods 64 | AS2051-051 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2145-001 | 1 | 1 | 1 | 5.754 | 571.1 | 100 | 0.021 | SWMM Methods 64 | AS2145-001 | 0 | AS2145-001 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2145-001 | 2 | | 1 | 0.969 | 571.1 | 100 | 0.021 | SWMM Methods 64 | AS2145-001 | 1 | AS2145-001 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2145-001 | 3 | | 1 | 6.155 | 571.1 | 0 | 0.021 | SWMM Methods 64 | AS2145-001 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2147-001 | 1 | 1 | 1 | 9.768 | 1503.883 | 100 | 0.024 | SWMM Methods 64 | AS2147-001 | 0 | AS2147-001 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2147-001 | 2 | | 1 | 0.161 | 1503.883 | 100 | 0.024 | SWMM Methods 64 | AS2147-001 | 1 | AS2147-001 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2147-001 | 3 | | 1 | 7.911 | 1503.883 | 0 | 0.024 | SWMM Methods 64 | AS2147-001 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2148-007 | 1 | 1 | 1 | 7.44 | 1035.736 | 100 | 0.04 | SWMM Methods 64 | AS2148-007 | 0 | AS2148-007 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2148-007 | 2 | | 1 | 0.067 | 1035.736 | 100 | 0.04 | SWMM Methods 64 | AS2148-007 | 1 | AS2148-007 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2148-007 | 3 | | 1 | 12.359 | 1035.736 | 0 | 0.04 | SWMM Methods 64 | AS2148-007 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2150-012 | 1 | 1 | 1 | 5.716 | 399.036 | 100 | 0.023 | SWMM Methods 64 | AS2150-012 | 0 | AS2150-012 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2150-012 | 2 | | 1 | 0.925 | 399.036 | 100 | 0.023 | SWMM Methods 64 | AS2150-012 | 1 | AS2150-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2150-012 | 3 | | 1 | 4.796 | 399.036 | 0 | 0.023 | SWMM Methods 64 | AS2150-012 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2150-014 | 1 | 1 | 1 | 2.175 | 603.819 | 100 | 0.015 | SWMM Methods 64 | AS2150-014 | 0 | AS2150-014 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2150-014 | 2 | | 1 | 0.222 | 603.819 | 100 | 0.015 | SWMM Methods 64 | AS2150-014 | 1 | AS2150-014 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2150-014 | 3 | | 1 | 2.033 | 603.819 | 0 | 0.015 | SWMM Methods 64 | AS2150-014 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2150-027 | 1 | 1 | 1 | 0.724 | 143.323 | 100 | 0.029 | SWMM Methods 64 | AS2150-027 | 0 | AS2150-027 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2150-027 | 2 | | 1 | 0.018 | 143.323 | 100 | 0.029 | SWMM Methods 64 | AS2150-027 | 1 | AS2150-027 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2150-027 | 3 | | 1 | 0.592 | 143.323 | 0 | 0.029 | SWMM Methods 64 | AS2150-027 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2150-032 | 1 | 1 | 1 | 2.03 | 297.832 | 100 | 0.035 | SWMM Methods 64 | AS2150-032 | 0 | AS2150-032 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2150-032 | 2 | | 1 | 0.158 | 297.832 | 100 | 0.035 | SWMM Methods 64 | AS2150-032 | 1 | AS2150-032 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2150-032 | 3 | | 1 | 2.31 | 297.832 | 0 | 0.035 | SWMM Methods 64 | AS2150-032 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2151-004 | 1 | 1 | 1 | 0.812 | 244.076 | 100 | 0.01 | SWMM Methods 64 | AS2151-004 | 0 | AS2151-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2151-004 | 2 | | 1 | 0.206 | 244.076 | 100 | 0.01 | SWMM Methods 64 | AS2151-004 | 1 | AS2151-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2151-004 | 3 | | 1 | 1.33 | 244.076 | 0 | 0.01 | SWMM Methods 64 | AS2151-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2151-009 | 1 | 1 | 1 | 0.512 | 356.703 | 100 | 0.036 | SWMM Methods 64 | AS2151-009 | 0 | AS2151-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2151-009 | 2 | | 1 | 0.214 | 356.703 | 100 | 0.036 | SWMM Methods 64 | AS2151-009 | 1 | AS2151-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2151-009 | 3 | | 1 | 1.22 | 356.703 | 0 | 0.036 | SWMM Methods 64 | AS2151-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-005 | 1 | 1 | 1 | 1.16 | 145.052 | 100 | 0.029 | SWMM Methods 64 | AS2152-005 | 0 | AS2152-005 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2152-005 | 2 | | 1 | 0.037 | 145.052 | 100 | 0.029 | SWMM Methods 64 | AS2152-005 | 1 | AS2152-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-005 | 3 | | 1 | 1.388 | 145.052 | 0 | 0.029 | SWMM Methods 64 | AS2152-005 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AS2152-010 | 1 | 1 | 1 | 0.393 | 166.118 | 100 | 0.013 | SWMM Methods 64 | AS2152-010 | 0 | AS2152-010 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2152-010 | 2 | | 1 | 0.212 | 166.118 | 100 | 0.013 | SWMM Methods 64 | AS2152-010 | 1 | AS2152-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-010 | 3 | | 1 | 1.184 | 166.118 | 0 | 0.013 | SWMM Methods 64 | AS2152-010 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-022 | 1 | 1 | 1 | 1.566 | 393.904 | 100 | 0.017 | SWMM Methods 64 | AS2152-022 | 0 | AS2152-022 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2152-022 | 2 | | 1 | 0.628 | 393.904 | 100 | 0.017 | SWMM Methods 64 | AS2152-022 | 1 | AS2152-022 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-022 | 3 | | 1 | 3.475 | 393.904 | 0 | 0.017 | SWMM Methods 64 | AS2152-022 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AS2155-011 | 1 | 1 | 1 | 3.014 | 384.855 | 100 | 0.02 | SWMM Methods 64 | AS2155-011 | 0 | AS2155-011 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2155-011 | 3 | | 1 | 3.609 | 384.855 | 0 | 0.02 | SWMM Methods 64 | AS2155-011 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-017 | 1 | 1 | 1 | 0.846 | 177.75 | 100 | 0.041 | SWMM Methods 64 | AS2156-017 | 0 | AS2156-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2156-017 | 2 | | 1 | 0.004 | 177.75 | 100 | 0.041 | SWMM Methods 64 | AS2156-017 | 1 | AS2156-017 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-017 | 3 | | 1 | 0.824 | 177.75 | 0 | 0.041 | SWMM Methods 64 | AS2156-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-020 | 1 | 1 | 1 | 1.737 | 214.306 | 100 | 0.028 | SWMM Methods 64 | AS2156-020 | 0 | AS2156-020 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2156-020 | 3 | | 1 | 1.426 | 214.306 | 0 | 0.028 | SWMM Methods 64 | AS2156-020 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-028 | 1 | 1 | 1 | 1.086 | 145.764 | 100 | 0.01 | SWMM Methods 64 | AS2156-028 | 0 | AS2156-028 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2156-028 | 3 | | 1 | 0.06 | 145.764 | 0 | 0.01 | SWMM Methods 64 | AS2156-028 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-036 | 1 | 1 | 1 | 1.379 | 335.515 | 100 | 0.021 | SWMM Methods 64 | AS2156-036 | 0 | AS2156-036 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2156-036 | 3 | | 1 | 0.308 | 335.515 | 0 | 0.021 | SWMM Methods 64 | AS2156-036 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2245-005 | 1 | 1 | 1 | 16.338 | 1221.809 | 100 | 0.02 | SWMM Methods 64 | AS2245-005 | 0 | AS2245-005 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2245-005 | 2 | | 1 | 1.804 | 1221.809 | 100 | 0.02 | SWMM Methods 64 | AS2245-005 | 1 | AS2245-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2245-005 | 3 | | 1 | 15.887 | 1221.809 | 0 | 0.02 | SWMM Methods 64 | AS2245-005 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2247-001 | 1 | 1 | 1 | 12.241 | 1211.903 | 100 | 0.017 | SWMM Methods 64 | AS2247-001 | 0 | AS2247-001 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS2247-001 | 2 | | 1 | 0.194 | 1211.903 | 100 | 0.017 | SWMM Methods 64 | AS2247-001 | 1 | AS2247-001 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2247-001 | 3 | | 1 | 14.885 | 1211.903 | 0 | 0.017 | SWMM Methods 64 | AS2247-001 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS2249-005 | 1 | 1 | 1 | 0.682 | 227.761 | 100 | 0.019 | SWMM Methods 64 | AS2249-005 | 0 | AS2249-005 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2249-005 | 2 | | 1 | 0.058 | 227.761 | 100 | 0.019 | SWMM Methods 64 | AS2249-005 | 1 | AS2249-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2249-005 | 3 | | 1 | 0.524 | 227.761 | 0 | 0.019 | SWMM Methods 64 | AS2249-005 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-016 | 1 | 1 | 1 | 1.064 | 217.68 | 100 | 0.017 | SWMM Methods 64 | AS2250-016 | 0 | AS2250-016 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2250-016 | 2 | | 1 | 0.007 | 217.68 | 100 | 0.017 | SWMM Methods 64 | AS2250-016 | 1 | AS2250-016 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-016 | 3 | | 1 | 0.588 | 217.68 | 0 | 0.017 | SWMM Methods 64 | AS2250-016 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-019 | 1 | 1 | 1 | 1.606 | 235.466 | 100 | 0.024 | SWMM Methods 64 | AS2250-019 | 0 | AS2250-019 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2250-019 | 2 | | 1 | 0.015 | 235.466 | 100 | 0.024 | SWMM Methods 64 | AS2250-019 | 1 | AS2250-019 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-019 | 3 | | 1 | 1.024 | 235.466 | 0 | 0.024 | SWMM Methods 64 | AS2250-019 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-038 | 1 | 1 | 1 | 5.629 | 826.3 | 100 | 0.02 | SWMM Methods 64 | AS2250-038 | 0 | AS2250-038 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2250-038 | 2 | | 1 | 0.108 | 826.3 | 100 | 0.02 | SWMM Methods 64 | AS2250-038 | 1 | AS2250-038 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-038 | 3 | | 1 | 0.894 | 826.3 | 0 | 0.02 | SWMM Methods 64 | AS2250-038 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2251-008 | 1 | 1 | 1 | 7.995 | 1474.956 | 100 | 0.031 | SWMM Methods 64 | AS2251-008 | 0 | AS2251-008 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2251-008 | 2 | | 1 | 0.816 | 1474.956 | 100 | 0.031 | SWMM Methods 64 | AS2251-008 | 1 | AS2251-008 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2251-008 | 3 | | 1 | 6.277 | 1474.956 | 0 | 0.031 | SWMM Methods 64 | AS2251-008 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2251-018 | 1 | 1 | 1 | 4.806 | 810.73 | 100 | 0.028 | SWMM Methods 64 | AS2251-018 | 0 | AS2251-018 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2251-018 | 2 | | 1 | 1.292 | 810.73 | 100 | 0.028 | SWMM Methods 64 | AS2251-018 | 1 | AS2251-018 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2251-018 | 3 | | 1 | 8.336 | 810.73 | 0 | 0.028 | SWMM Methods 64 | AS2251-018 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2252-008 | 1 | 1 | 1 | 4.523 | 428.376 | 100 | 0.015 | SWMM Methods 64 | AS2252-008 | 0 | AS2252-008 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2252-008 | 2 | | 1 | 0.149 | 428.376 | 100 | 0.015 | SWMM Methods 64 | AS2252-008 | 1 | AS2252-008 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2252-008 | 3 | | 1 | 2.154 | 428.376 | 0 | 0.015 | SWMM Methods 64 | AS2252-008 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2253-012 | 1 | 1 | 1 | 4.866 | 348.296 | 100 | 0.006 | SWMM Methods 64 | AS2253-012 | 0 | AS2253-012 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2253-012 | 2 | | 1 | 0.009 | 348.296 | 100 | 0.006 | SWMM Methods 64 | AS2253-012 | 1 | AS2253-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2253-012 | 3 | | 1 | 2.405 | 348.296 | 0 | 0.006 | SWMM Methods 64 | AS2253-012 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2254-005 | 1 | 1 | 1 | 6.985 | 658.765 | 100 | 0.005 | SWMM Methods 64 | AS2254-005 | 0 | AS2254-005 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2254-005 | 2 | | 1 | 0.192 | 658.765 | 100 | 0.005 | SWMM Methods 64 | AS2254-005 | 1 | AS2254-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2254-005 | 3 | | 1 | 3.819 | 658.765 | 0 | 0.005 | SWMM Methods 64 | AS2254-005 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2254-024 | 1 | 1 | 1 | 7.294 | 696.522 | 100 | 0.017 | SWMM Methods 64 | AS2254-024 | 0 | AS2254-024 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2254-024 | 2 | | 1 | 0.117 | 696.522 | 100 | 0.017 | SWMM Methods 64 | AS2254-024 | 1 | AS2254-024 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2254-024 | 3 | | 1 | 5.229 | 696.522 | 0 | 0.017 | SWMM Methods 64 | AS2254-024 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2255-006 | 1 | 1 | 1 | 3.854 | 1011.526 | 100 | 0.036 | SWMM Methods 64 | AS2255-006 | 0 | AS2255-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2255-006 | 2 | | 1 | 0.036 | 1011.526 | 100 | 0.036 | SWMM Methods 64 | AS2255-006 | 1 | AS2255-006 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2255-006 | 3 | | 1 | 5.983 | 1011.526 | 0 | 0.036 | SWMM Methods 64 | AS2255-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2255-046 | 1 | 1 | 1 | 2.962 | 732.689 | 100 | 0.004 | SWMM Methods 64 | AS2255-046 | 0 | AS2255-046 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2255-046 | 2 | | 1 | 0.096 | 732.689 | 100 | 0.004 | SWMM Methods 64 | AS2255-046 | 1 | AS2255-046 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2255-046 | 3 | | 1 | 0.619 | 732.689 | 0 | 0.004 | SWMM Methods 64 | AS2255-046 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2256-017 | 1 | 1 | 1 | 8.712 | 380.99 | 100 | 0.005 | SWMM Methods 64 | AS2256-017 | 0 | AS2256-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2256-017 | 3 | | 1 | 0.698 | 380.99 | 0 | 0.005 | SWMM Methods 64 | AS2256-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2256-077 | 1 | 1 | 1 | 0.073 | 138.995 | 100 | 0.098 | SWMM Methods 64 | AS2256-077 | 0 | AS2256-077 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2256-077 | 3 | | 1 | 0.172 | 138.995 | 0 | 0.098 | SWMM Methods 64 | AS2256-077 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2257-004 | 1 | 1 | 1 | 11.696 | 1122.615 | 100 | 0.015 | SWMM Methods 64 | AS2257-004 | 0 | AS2257-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2257-004 | 2 | | 1 | 0.024 | 1122.615 | 100 | 0.015 | SWMM Methods 64 | AS2257-004 | 1 | AS2257-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2257-004 | 3 | | 1 | 3.81 | 1122.615 | 0 | 0.015 | SWMM Methods 64 | AS2257-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2257-012 | 1 | 1 | 1 | 1.164 | 150.889 | 100 | 0.022 | SWMM Methods 64 | AS2257-012 | 0 | AS2257-012 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2257-012 | 2 | | 1 | 0.004 | 150.889 | 100 | 0.022 | SWMM Methods 64 | AS2257-012 | 1 | AS2257-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2257-012 | 3 | | 1 | 0.328 | 150.889 | 0 | 0.022 | SWMM Methods 64 | AS2257-012 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-001 | 1 | 1 | 1 | 1.051 | 404.262 | 100 | 0.007 | SWMM Methods 64 | AS2258-001 | 0 | AS2258-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2258-001 | 3 | | 1 | 0.361 | 404.262 | 0 | 0.007 | SWMM Methods 64 | AS2258-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-048 | 1 | 1 | 1 | 2.582 | 249.122 | 100 | 0.02 | SWMM Methods 64 | AS2258-048 | 0 | AS2258-048 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2258-048 | 2 | | 1 | 0.069 | 249.122 | 100 | 0.02 | SWMM Methods 64 | AS2258-048 | 1 | AS2258-048 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-048 | 3 | | 1 | 0.951 | 249.122 | 0 | 0.02 | SWMM Methods 64 | AS2258-048 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-056 | 1 | 1 | 1 | 3.87 | 531.194 | 100 | 0.086 | SWMM Methods 64 | AS2258-056 | 0 | AS2258-056 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2258-056 | 2 | | 1 | 1.179 | 531.194 | 100 | 0.086 | SWMM Methods 64 | AS2258-056 | 1 | AS2258-056 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-056 | 3 | | 1 | 5.988 | 531.194 | 0 | 0.086 | SWMM Methods 64 | AS2258-056 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2259-001 | 1 | 1 | 1 | 2.878 | 557.37 | 100 | 0.047 | SWMM Methods 64 | AS2259-001 | 0 | AS2259-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2259-001 | 2 | | 1 | 1.07 | 557.37 | 100 | 0.047 | SWMM Methods 64 | AS2259-001 | 1 | AS2259-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2259-001 | 3 | | 1 | 16.236 | 557.37 | 0 | 0.047 | SWMM Methods 64 | AS2259-001 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AS2347-001 | 1 | 1 | 1 | 4.983 | 763.296 | 100 | 0.022 | SWMM Methods 64 | AS2347-001 | 0 | AS2347-001 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2347-001 | 2 | | 1 | 0.2 | 763.296 | 100 | 0.022 | SWMM Methods 64 | AS2347-001 | 1 | AS2347-001 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2347-001 | 3 | | 1 | 3.621 | 763.296 | 0 | 0.022 | SWMM Methods 64 | AS2347-001 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2347-010 | 1 | 1 | 1 | 2.774 | 446.348 | 100 | 0.013 | SWMM Methods 64 | AS2347-010 | 0 | AS2347-010 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2347-010 | 2 | | 1 | 0.195 | 446.348 | 100 | 0.013 | SWMM Methods 64 | AS2347-010 | 1 | AS2347-010 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2347-010 | 3 | | 1 | 3.691 | 446.348 | 0 | 0.013 | SWMM Methods 64 | AS2347-010 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2347-018 | 1 | 1 | 1 | 2.6 | 538.203 | 100 | 0.009 | SWMM Methods 64 | AS2347-018 | 0 | AS2347-018 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2347-018 | 2 | | 1 | 1.163 | 538.203 | 100 | 0.009 | SWMM Methods 64 | AS2347-018 | 1 | AS2347-018 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2347-018 | 3 | | 1 | 8.141 | 538.203 | 0 | 0.009 | SWMM Methods 64 | AS2347-018 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2348-005 | 1 | 1 | 1 | 10.876 | 1021.535 | 100 | 0.033 | SWMM Methods 64 | AS2348-005 | 0 | AS2348-005 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2348-005 | 2 | | 1 | 0.16 | 1021.535 | 100 | 0.033 | SWMM Methods 64 | AS2348-005 | 1 | AS2348-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2348-005 | 3 | | 1 | 5.038 | 1021.535 | 0 | 0.033 | SWMM Methods 64 | AS2348-005 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2349-008 | 1 | 1 | 1 | 0.752 | 59.57 | 100 | 0.021 | SWMM Methods 64 | AS2349-008 | 0 | AS2349-008 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2349-008 | 3 | | 1 | 0.357 | 59.57 | 0 | 0.021 | SWMM Methods 64 | AS2349-008 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2351-015 | 1 | 1 | 1 | 5.941 | 1301.748 | 100 | 0.045 | SWMM Methods 64 | AS2351-015 | 0 | AS2351-015 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2351-015 | 2 | | 1 | 2.39 | 1301.748 | 100 | 0.045 | SWMM Methods 64 | AS2351-015 | 1 | AS2351-015 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2351-015 | 3 | | 1 | 17.133 | 1301.748 | 0 | 0.045 | SWMM Methods 64 | AS2351-015 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2353-005 | 1 | 1 | 1 | 3.323 | 373.735 | 100 | 0.024 | SWMM Methods 64 | AS2353-005 | 0 | AS2353-005 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2353-005 | 2 | | 1 | 1.199 | 373.735 | 100 | 0.024 | SWMM Methods 64 | AS2353-005 | 1 | AS2353-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2353-005 | 3 | | 1 | 8.05 | 373.735 | 0 | 0.024 | SWMM Methods 64 | AS2353-005 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2354-006 | 1 | 1 | 1 | 3.842 | 637.588 | 100 | 0.014 | SWMM Methods 64 | AS2354-006 | 0 | AS2354-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2354-006 | 2 | | 1 | 1.621 | 637.588 | 100 | 0.014 | SWMM Methods 64 | AS2354-006 | 1 | AS2354-006 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2354-006 | 3 | | 1 | 12.394 | 637.588 | 0 | 0.014 | SWMM Methods 64 | AS2354-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2355-001 | 1 | 1 | 1 | 3.961 | 597.222 | 100 | 0.024 | SWMM Methods 64 | AS2355-001 | 0 | AS2355-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2355-001 | 2 | | 1 | 0.109 | 597.222 | 100 | 0.024 | SWMM Methods 64 | AS2355-001 | 1 | AS2355-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2355-001 | 3 | | 1 | 3.649 | 597.222 | 0 | 0.024 | SWMM Methods 64 | AS2355-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2355-016 | 1 | 1 | 1 | 4.026 | 429.687 | 100 | 0.028 | SWMM Methods 64 | AS2355-016 | 0 | AS2355-016 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2355-016 | 2 | | 1 | 0.053 | 429.687 | 100 | 0.028 | SWMM Methods 64 | AS2355-016 | 1 | AS2355-016 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2355-016 | 3 | | 1 | 1.381 | 429.687 | 0 | 0.028 | SWMM Methods 64 | AS2355-016 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2356-032 | 1 | 1 | 1 | 12.536 | 414.401 | 100 | 0.025 | SWMM Methods 64 | AS2356-032 | 0 | AS2356-032 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2356-032 | 2 | | 1 | 0.205 | 414.401 | 100 | 0.025 | SWMM Methods 64 | AS2356-032 | 1 | AS2356-032 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2356-032 | 3 | | 1 | 5.956 | 414.401 | 0 | 0.025 | SWMM Methods 64 | AS2356-032 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2448-012 | 1 | 1 | 1 | 3.398 | 865.683 | 100 | 0.035 | SWMM Methods 64 | AS2448-012 | 0 | AS2448-012 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2448-012 | 2 | | 1 | 1.519 | 865.683 | 100 | 0.035 | SWMM Methods 64 | AS2448-012 | 1 | AS2448-012 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2448-012 | 3 | | 1 | 10.134 | 865.683 | 0 | 0.035 | SWMM Methods 64 | AS2448-012 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2450-026 | 1 | 1 | 1 | 3.427 | 838.016 | 100 | 0.011 | SWMM Methods 64 | AS2450-026 | 0 | AS2450-026 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2450-026 | 2 | | 1 | 0.748 | 838.016 | 100 | 0.011 | SWMM Methods 64 | AS2450-026 | 1 | AS2450-026 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2450-026 | 3 | | 1 | 6.199 | 838.016 | 0 | 0.011 | SWMM Methods 64 | AS2450-026 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2451-015 | 1 | 1 | 1 | 4.588 | 531.086 | 100 | 0.014 | SWMM Methods 64 | AS2451-015 | 0 | AS2451-015 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2451-015 | 2 | | 1 | 1.284 | 531.086 | 100 | 0.014 | SWMM Methods 64 | AS2451-015 | 1 | AS2451-015 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2451-015 | 3 | | 1 | 10.348 | 531.086 | 0 | 0.014 | SWMM Methods 64 | AS2451-015 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2452-001 | 1 | 1 | 1 | 2.478 | 1101.479 | 100 | 0.055 | SWMM Methods 64 | AS2452-001 | 0 | AS2452-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2452-001 | 2 | | 1 | 0.935 | 1101.479 | 100 | 0.055 | SWMM Methods 64 | AS2452-001 | 1 | AS2452-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2452-001 | 3 | | 1 | 6.414 | 1101.479 | 0 | 0.055 | SWMM Methods 64 | AS2452-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2454-001 | 1 | 1 | 1 | 1.006 | 314.625 | 100 | 0.015 | SWMM Methods 64 | AS2454-001 | 0 | AS2454-001 | SubCatchment 3 | No Redirection | Memorial High School |
| AS2454-001 | 2 | | 1 | 0.019 | 314.625 | 100 | 0.015 | SWMM Methods 64 | AS2454-001 | 1 | AS2454-001 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2454-001 | 3 | | 1 | 0.926 | 314.625 | 0 | 0.015 | SWMM Methods 64 | AS2454-001 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2455-004 | 1 | 1 | 1 | 5.81 | 523.364 | 100 | 0.03 | SWMM Methods 64 | AS2455-004 | 0 | AS2455-004 | SubCatchment 3 | No Redirection | Memorial High School |
| AS2455-004 | 2 | | 1 | 0.147 | 523.364 | 100 | 0.03 | SWMM Methods 64 | AS2455-004 | 1 | AS2455-004 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2455-004 | 3 | | 1 | 9.901 | 523.364 | 0 | 0.03 | SWMM Methods 64 | AS2455-004 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2548-001 | 1 | 1 | 1 | 4.672 | 806.285 | 100 | 0.008 | SWMM Methods 64 | AS2548-001 | 0 | AS2548-001 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2548-001 | 2 | | 1 | 1.625 | 806.285 | 100 | 0.008 | SWMM Methods 64 | AS2548-001 | 1 | AS2548-001 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2548-001 | 3 | | 1 | 13.836 | 806.285 | 0 | 0.008 | SWMM Methods 64 | AS2548-001 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2548-013 | 1 | 1 | 1 | 2.53 | 859.069 | 100 | 0.009 | SWMM Methods 64 | AS2548-013 | 0 | AS2548-013 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2548-013 | 2 | | 1 | 1.252 | 859.069 | 100 | 0.009 | SWMM Methods 64 | AS2548-013 | 1 | AS2548-013 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2548-013 | 3 | | 1 | 9.261 | 859.069 | 0 | 0.009 | SWMM Methods 64 | AS2548-013 | 0 | | SubCatchment 1 | No Redirection | Strickers Forebay 18 |
| AS2550-016 | 1 | 1 | 1 | 1.927 | 432.899 | 100 | 0.07 | SWMM Methods 64 | AS2550-016 | 0 | AS2550-016 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2550-016 | 2 | | 1 | 0.625 | 432.899 | 100 | 0.07 | SWMM Methods 64 | AS2550-016 | 1 | AS2550-016 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2550-016 | 3 | | 1 | 4.475 | 432.899 | 0 | 0.07 | SWMM Methods 64 | AS2550-016 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2551-008 | 1 | 1 | 1 | 2.551 | 922.52 | 100 | 0.02 | SWMM Methods 64 | AS2551-008 | 0 | AS2551-008 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2551-008 | 2 | | 1 | 0.981 | 922.52 | 100 | 0.02 | SWMM Methods 64 | AS2551-008 | 1 | AS2551-008 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2551-008 | 3 | | 1 | 8.457 | 922.52 | 0 | 0.02 | SWMM Methods 64 | AS2551-008 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2551-020 | 1 | 1 | 1 | 2.419 | 1682.477 | 100 | 0.037 | SWMM Methods 64 | AS2551-020 | 0 | AS2551-020 | SubCatchment 3 | No Redirection | Memorial High School |
| AS2551-020 | 2 | | 1 | 0.682 | 1682.477 | 100 | 0.037 | SWMM Methods 64 | AS2551-020 | 1 | AS2551-020 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2551-020 | 3 | | 1 | 15.561 | 1682.477 | 0 | 0.037 | SWMM Methods 64 | AS2551-020 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2552-004 | 1 | 1 | 1 | 1.123 | 326.686 | 100 | 0.029 | SWMM Methods 64 | AS2552-004 | 0 | AS2552-004 | SubCatchment 3 | No Redirection | Memorial High School |
| AS2552-004 | 2 | | 1 | 0.419 | 326.686 | 100 | 0.029 | SWMM Methods 64 | AS2552-004 | 1 | AS2552-004 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2552-004 | 3 | | 1 | 2.922 | 326.686 | 0 | 0.029 | SWMM Methods 64 | AS2552-004 | 0 | | SubCatchment 1 | No Redirection | Memorial HS 2018 |
| ATTIC_ANGEL_E_POND | 1 | 1 | 1 | 0.733 | 770.877 | 100 | 0.134 | SWMM Methods 64 | ATTIC_ANGEL_E | 0 | ATTIC_ANGEL_E | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ATTIC_ANGEL_E_POND | 2 | | 1 | 0.113 | 770.877 | 100 | 0.134 | SWMM Methods 64 | ATTIC_ANGEL_E | 1 | ATTIC_ANGEL_E | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ATTIC_ANGEL_E_POND | 3 | | 1 | 1.872 | 770.877 | 0 | 0.134 | SWMM Methods 64 | ATTIC_ANGEL_E | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ATTIC_ANGEL_POND_IN | 1 | 1 | 1 | 1.605 | 2197.561 | 100 | 0.131 | SWMM Methods 64 | ATTIC_ANGEL_P | 0 | ATTIC_ANGEL_P | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ATTIC_ANGEL_POND_IN | 2 | | 1 | 0.818 | 2197.561 | 100 | 0.131 | SWMM Methods 64 | ATTIC_ANGEL_P | 1 | ATTIC_ANGEL_P | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ATTIC_ANGEL_POND_IN | 3 | | 1 | 5.606 | 2197.561 | 0 | 0.131 | SWMM Methods 64 | ATTIC_ANGEL_P | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ATTIC_ANGEL_W_POND | 1 | 1 | 1 | 0.454 | 870.025 | 100 | 0.118 | SWMM Methods 64 | ATTIC_ANGEL_W | 0 | ATTIC_ANGEL_W | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ATTIC_ANGEL_W_POND | 2 | | 1 | 0.245 | 870.025 | 100 | 0.118 | SWMM Methods 64 | ATTIC_ANGEL_W | 1 | ATTIC_ANGEL_W | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ATTIC_ANGEL_W_POND | 3 | | 1 | 2.53 | 870.025 | 0 | 0.118 | SWMM Methods 64 | ATTIC_ANGEL_W | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| BH_APARTMENTS | 1 | 1 | 1 | 3.071 | 386.505 | 100 | 0.025 | SWMM Methods 64 | BH_APARTMENT | 0 | BH_APARTMENT | SubCatchment 3 | No Redirection | Swallowtail Park |
| BH_APARTMENTS | 2 | | 1 | 0.084 | 386.505 | 100 | 0.025 | SWMM Methods 64 | BH_APARTMENT | 1 | BH_APARTMENT | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| BH_APARTMENTS | 3 | | 1 | 4.183 | 386.505 | 0 | 0.025 | SWMM Methods 64 | BH_APARTMENT | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| BH_CHURCH_PR | 1 | 1 | 1 | 1.1 | 869.858 | 100 | 0.068 | SWMM Methods 64 | BH_CHURCH_PR | 0 | BH_CHURCH_PR | SubCatchment 3 | No Redirection | |
| BH_CHURCH_PR | 2 | | 1 | 0.425 | 869.858 | 100 | 0.068 | SWMM Methods 64 | BH_CHURCH_PR | 1 | BH_CHURCH_PR | SubCatchment 3 | No Redirection | |
| BH_CHURCH_PR | 3 | | 1 | 4.055 | 869.858 | 0 | 0.068 | SWMM Methods 64 | BH_CHURCH_PR | 0 | | SubCatchment 1 | No Redirection | |
| CAPE_SILVER_WAY_DRY_POND | 1 | 1 | 1 | 0.26 | 738.78 | 100 | 0.069 | SWMM Methods 64 | CAPE_SILVER_W | 0 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| CAPE_SILVER_WAY_DRY_POND | 2 | | 1 | 0.161 | 738.78 | 100 | 0.069 | SWMM Methods 64 | CAPE_SILVER_W | 1 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| CAPE_SILVER_WAY_DRY_POND | 3 | | 1 | 1.436 | 738.78 | 0 | 0.069 | SWMM Methods 64 | CAPE_SILVER_W | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| CAPE_SILVER_WAY_WET_POND | 1 | 1 | 1 | 0.646 | 830.436 | 100 | 0.056 | SWMM Methods 64 | CAPE_SILVER_W | 0 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| CAPE_SILVER_WAY_WET_POND | 2 | | 1 | 0.765 | 830.436 | 100 | 0.056 | SWMM Methods 64 | CAPE_SILVER_W | 1 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| CAPE_SILVER_WAY_WET_POND | 3 | | 1 | 1.412 | 830.436 | 0 | 0.056 | SWMM Methods 64 | CAPE_SILVER_W | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| CEM_SWALE | 1 | 1 | 1 | 0.506 | 459.427 | 100 | 0.011 | SWMM Methods 64 | CEM_SWALE | 0 | CEM_SWALE | SubCatchment 3 | No Redirection | Memorial High School |
| CEM_SWALE | 2 | | 1 | 0.051 | 459.427 | 100 | 0.011 | SWMM Methods 64 | CEM_SWALE | 1 | CEM_SWALE | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| CEM_SWALE | 3 | | 1 | 4.974 | 459.427 | 0 | 0.011 | SWMM Methods 64 | CEM_SWALE | 0 | | SubCatchment 1 | No Redirection | Memorial HS 2018 |
| CH_BIO_BASIN_1 | 1 | 1 | 1 | 1.303 | 639.293 | 100 | 0.006 | SWMM Methods 64 | CH_BIO_BASIN_ | 0 | CH_BIO_BASIN_1 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| CH_BIO_BASIN_1 | 2 | | 1 | 1.212 | 639.293 | 100 | 0.006 | SWMM Methods 64 | CH_BIO_BASIN_ | 1 | CH_BIO_BASIN_1 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| CH_BIO_BASIN_1 | 3 | | 1 | 7.664 | 639.293 | 0 | 0.006 | SWMM Methods 64 | CH_BIO_BASIN_ | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| COMMERCE_SQUARE_POND | 1 | 1 | 1 | 3.913 | 559.767 | 100 | 0.033 | SWMM Methods 64 | COMMERCE_SQ | 0 | COMMERCE_SQU | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| COMMERCE_SQUARE_POND | 2 | | 1 | 0.106 | 559.767 | 100 | 0.033 | SWMM Methods 64 | COMMERCE_SQ | 1 | COMMERCE_SQU | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| COMMERCE_SQUARE_POND | 3 | | 1 | 3.322 | 559.767 | 0 | 0.033 | SWMM Methods 64 | COMMERCE_SQ | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT1853-003 | 1 | 1 | 1 | 0.307 | 338.532 | 100 | 0.017 | SWMM Methods 64 | DT1853-003 | 0 | DT1853-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| DT1853-003 | 2 | | 1 | 0.098 | 338.532 | 100 | 0.017 | SWMM Methods 64 | DT1853-003 | 1 | DT1853-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| DT1853-003 | 3 | | 1 | 2.549 | 338.532 | 0 | 0.017 | SWMM Methods 64 | DT1853-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| DT1947-007 | 1 | 1 | 1 | 0.305 | 211.367 | 100 | 0.035 | SWMM Methods 64 | DT1947-007 | 0 | DT1947-007 | SubCatchment 3 | No Redirection | Swallowtail Park |
| DT1947-007 | 2 | | 1 | 0.003 | 211.367 | 100 | 0.035 | SWMM Methods 64 | DT1947-007 | 1 | DT1947-007 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| DT1947-007 | 3 | | 1 | 0.832 | 211.367 | 0 | 0.035 | SWMM Methods 64 | DT1947-007 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| DT2349-022 | 1 | 1 | 1 | 0.349 | 94.163 | 100 | 0.031 | SWMM Methods 64 | DT2349-022 | 0 | DT2349-022 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| DT2349-022 | 3 | | 1 | 0.921 | 94.163 | 0 | 0.031 | SWMM Methods 64 | DT2349-022 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| E_INF_BASIN | 1 | 1 | 1 | 0.09 | 115.348 | 100 | 0.064 | SWMM Methods 64 | E_INF_BASIN | 0 | E_INF_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| E_INF_BASIN | 2 | | 1 | 0.13 | 115.348 | 100 | 0.064 | SWMM Methods 64 | E_INF_BASIN | 1 | E_INF_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| E_INF_BASIN | 3 | | 1 | 0.69 | 115.348 | 0 | 0.064 | SWMM Methods 64 | E_INF_BASIN | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| ELD_FARM_S1 | 3 | 1 | 1 | 6.424 | 377.506 | 0 | 0.036 | SWMM Methods 64 | ELD_FARM_S1 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_FARM_S2 | 1 | 1 | 1 | 0.062 | 846.913 | 100 | 0.027 | SWMM Methods 64 | ELD_FARM_S2 | 0 | ELD_FARM_S2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_FARM_S2 | 3 | | 1 | 14.364 | 846.913 | 0 | 0.027 | SWMM Methods 64 | ELD_FARM_S2 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_FARM_S3 | 1 | 1 | 1 | 0.051 | 710.294 | 100 | 0.027 | SWMM Methods 64 | ELD_FARM_S3 | 0 | ELD_FARM_S3 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_FARM_S3 | 3 | | 1 | 6.163 | 710.294 | 0 | 0.027 | SWMM Methods 64 | ELD_FARM_S3 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_DEP | 1 | 1 | 1 | 0.156 | 442.82 | 100 | 0.01 | SWMM Methods 64 | ELD_N_DEP | 0 | ELD_N_DEP | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_N_DEP | 2 | | 1 | 0.113 | 442.82 | 100 | 0.01 | SWMM Methods 64 | ELD_N_DEP | 0 | ELD_N_DEP | SubCatchment 3 | No Redirection | |
| ELD_N_DEP | 3 | | 1 | 4.192 | 442.82 | 0 | 0.01 | SWMM Methods 64 | ELD_N_DEP | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_DITCH | 3 | 1 | 1 | 1.867 | 186.536 | 0 | 0.009 | SWMM Methods 64 | ELD_N_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM1 | 1 | 1 | 1 | 1.23 | 1121.859 | 100 | 0.022 | SWMM Methods 64 | ELD_N_FARM1 | 0 | ELD_N_FARM1 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM1 | 2 | | 1 | 0.268 | 1121.859 | 100 | 0.022 | SWMM Methods 64 | ELD_N_FARM1 | 0 | ELD_N_FARM1 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM1 | 3 | | 1 | 18.948 | 1121.859 | 0 | 0.022 | SWMM Methods 64 | ELD_N_FARM1 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM10 | 1 | 1 | 1 | 0.094 | 969.461 | 100 | 0.021 | SWMM Methods 64 | ELD_N_FARM10 | 0 | ELD_N_FARM10 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM10 | 3 | | 1 | 12.207 | 969.461 | 0 | 0.021 | SWMM Methods 64 | ELD_N_FARM10 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM11 | 1 | 1 | 1 | 0.134 | 529.055 | 100 | 0.009 | SWMM Methods 64 | ELD_N_FARM11 | 0 | ELD_N_FARM11 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM11 | 2 | | 1 | 0.148 | 529.055 | 100 | 0.009 | SWMM Methods 64 | ELD_N_FARM11 | 0 | ELD_N_FARM11 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM11 | 3 | | 1 | 8.253 | 529.055 | 0 | 0.009 | SWMM Methods 64 | ELD_N_FARM11 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM12 | 1 | 1 | 1 | 0.12 | 961.197 | 100 | 0.014 | SWMM Methods 64 | ELD_N_FARM12 | 0 | ELD_N_FARM12 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM12 | 2 | | 1 | 0.123 | 961.197 | 100 | 0.014 | SWMM Methods 64 | ELD_N_FARM12 | 0 | ELD_N_FARM12 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM12 | 3 | | 1 | 19.295 | 961.197 | 0 | 0.014 | SWMM Methods 64 | ELD_N_FARM12 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM13 | 1 | 1 | 1 | 0.122 | 1121.491 | 100 | 0.047 | SWMM Methods 64 | ELD_N_FARM13 | 0 | ELD_N_FARM13 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM13 | 2 | | 1 | 0.077 | 1121.491 | 100 | 0.047 | SWMM Methods 64 | ELD_N_FARM13 | 0 | ELD_N_FARM13 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM13 | 3 | | 1 | 16.018 | 1121.491 | 0 | 0.047 | SWMM Methods 64 | ELD_N_FARM13 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM14 | 1 | 1 | 1 | 0.514 | 553.095 | 100 | 0.032 | SWMM Methods 64 | ELD_N_FARM14 | 0 | ELD_N_FARM14 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM14 | 2 | | 1 | 0.185 | 553.095 | 100 | 0.032 | SWMM Methods 64 | ELD_N_FARM14 | 0 | ELD_N_FARM14 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM14 | 3 | | 1 | 8.371 | 553.095 | 0 | 0.032 | SWMM Methods 64 | ELD_N_FARM14 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM15 | 1 | 1 | 1 | 0.348 | 490.695 | 100 | 0.025 | SWMM Methods 64 | ELD_N_FARM15 | 0 | ELD_N_FARM15 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM15 | 2 | | 1 | 0.216 | 490.695 | 100 | 0.025 | SWMM Methods 64 | ELD_N_FARM15 | 0 | ELD_N_FARM15 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM15 | 3 | | 1 | 7.029 | 490.695 | 0 | 0.025 | SWMM Methods 64 | ELD_N_FARM15 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM16 | 3 | 1 | 1 | 4.69 | 350.691 | 0 | 0.017 | SWMM Methods 64 | ELD_N_FARM16 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM17 | 1 | 1 | 1 | 0.039 | 563.217 | 100 | 0.029 | SWMM Methods 64 | ELD_N_FARM17 | 0 | ELD_N_FARM17 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM17 | 3 | | 1 | 4.966 | 563.217 | 0 | 0.029 | SWMM Methods 64 | ELD_N_FARM17 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM2 | 1 | 1 | 1 | 0.464 | 831.07 | 100 | 0.046 | SWMM Methods 64 | ELD_N_FARM2 | 0 | ELD_N_FARM2 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM2 | 2 | | 1 | 0.01 | 831.07 | 100 | 0.046 | SWMM Methods 64 | ELD_N_FARM2 | 0 | ELD_N_FARM2 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM2 | 3 | | 1 | 5.669 | 831.07 | 0 | 0.046 | SWMM Methods 64 | ELD_N_FARM2 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM3 | 1 | 1 | 1 | 0.272 | 1011.467 | 100 | 0.027 | SWMM Methods 64 | ELD_N_FARM3 | 0 | ELD_N_FARM3 | SubCatchment 3 | No Redirection | Sauk Heights Pond |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELD_N_FARM3 | 2 | | 1 | 0.014 | 1011.467 | 100 | 0.027 | SWMM Methods 64 | ELD_N_FARM3 | 0 | ELD_N_FARM3 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM3 | 3 | | 1 | 17.732 | 1011.467 | 0 | 0.027 | SWMM Methods 64 | ELD_N_FARM3 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM4 | 1 | 1 | 1 | 0.866 | 1278.902 | 100 | 0.025 | SWMM Methods 64 | ELD_N_FARM4 | 0 | ELD_N_FARM4 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM4 | 3 | | 1 | 21.872 | 1278.902 | 0 | 0.025 | SWMM Methods 64 | ELD_N_FARM4 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM5 | 1 | 1 | 1 | 0.97 | 2117.459 | 100 | 0.03 | SWMM Methods 64 | ELD_N_FARM5 | 0 | ELD_N_FARM5 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM5 | 2 | | 1 | 0.03 | 2117.459 | 100 | 0.03 | SWMM Methods 64 | ELD_N_FARM5 | 0 | ELD_N_FARM5 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM5 | 3 | | 1 | 30.36 | 2117.459 | 0 | 0.03 | SWMM Methods 64 | ELD_N_FARM5 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM6 | 1 | 1 | 1 | 0.286 | 1089.791 | 100 | 0.022 | SWMM Methods 64 | ELD_N_FARM6 | 0 | ELD_N_FARM6 | SubCatchment 3 | No Redirection | Swallowtail Park |
| ELD_N_FARM6 | 2 | | 1 | 0.01 | 1089.791 | 100 | 0.022 | SWMM Methods 64 | ELD_N_FARM6 | 0 | ELD_N_FARM6 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM6 | 3 | | 1 | 13.715 | 1089.791 | 0 | 0.022 | SWMM Methods 64 | ELD_N_FARM6 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM7 | 3 | 1 | 1 | 9.506 | 739.389 | 0 | 0.022 | SWMM Methods 64 | ELD_N_FARM7 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM8 | 1 | 1 | 1 | 0.077 | 1321.493 | 100 | 0.008 | SWMM Methods 64 | ELD_N_FARM8 | 0 | ELD_N_FARM8 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM8 | 2 | | 1 | 0.01 | 1321.493 | 100 | 0.008 | SWMM Methods 64 | ELD_N_FARM8 | 0 | ELD_N_FARM8 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM8 | 3 | | 1 | 26.945 | 1321.493 | 0 | 0.008 | SWMM Methods 64 | ELD_N_FARM8 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM9 | 1 | 1 | 1 | 0.003 | 266.898 | 100 | 0.016 | SWMM Methods 64 | ELD_N_FARM9 | 0 | ELD_N_FARM9 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| ELD_N_FARM9 | 3 | | 1 | 2.033 | 266.898 | 0 | 0.016 | SWMM Methods 64 | ELD_N_FARM9 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_PLEAS_DEP | 1 | 1 | 1 | 0.372 | 973.335 | 100 | 0.042 | SWMM Methods 64 | ELD_PLEAS_DEP | 0 | ELD_PLEAS_DEP | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_PLEAS_DEP | 3 | | 1 | 14.422 | 973.335 | 0 | 0.042 | SWMM Methods 64 | ELD_PLEAS_DEP | 0 | | SubCatchment 1 | No Redirection | |
| ELD_RD _PLEAS_V_DEP | 1 | 1 | 1 | 0.721 | 946.361 | 100 | 0.02 | SWMM Methods 64 | ELD_RD _PLEAS | 0 | | SubCatchment 1 | No Redirection | UW Ag Research Stati |
| ELD_RD _PLEAS_V_DEP | 2 | | 1 | 0.04 | 946.361 | 100 | 0.02 | SWMM Methods 64 | ELD_RD _PLEAS | 1 | ELD_RD _PLEAS_ | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ELD_RD _PLEAS_V_DEP | 3 | | 1 | 17.434 | 946.361 | 0 | 0.02 | SWMM Methods 64 | ELD_RD _PLEAS | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| ELD_TO_BW1 | 1 | 1 | 1 | 0.054 | 556.832 | 100 | 0.078 | SWMM Methods 64 | ELD_TO_BW1 | 0 | ELD_TO_BW1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_TO_BW1 | 2 | | 1 | 0.064 | 556.832 | 100 | 0.078 | SWMM Methods 64 | ELD_TO_BW1 | 0 | ELD_TO_BW1 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW1 | 3 | | 1 | 1.491 | 556.832 | 0 | 0.078 | SWMM Methods 64 | ELD_TO_BW1 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_TO_BW2 | 1 | 1 | 1 | 0.255 | 410.049 | 100 | 0.042 | SWMM Methods 64 | ELD_TO_BW2 | 0 | ELD_TO_BW2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_TO_BW2 | 2 | | 1 | 0.223 | 410.049 | 100 | 0.042 | SWMM Methods 64 | ELD_TO_BW2 | 0 | ELD_TO_BW2 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW2 | 3 | | 1 | 3.829 | 410.049 | 0 | 0.042 | SWMM Methods 64 | ELD_TO_BW2 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_TO_BW3 | 1 | 1 | 1 | 0.08 | 224.887 | 100 | 0.029 | SWMM Methods 64 | ELD_TO_BW3 | 0 | ELD_TO_BW3 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_TO_BW3 | 2 | | 1 | 0.071 | 224.887 | 100 | 0.029 | SWMM Methods 64 | ELD_TO_BW3 | 0 | ELD_TO_BW3 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW3 | 3 | | 1 | 2.901 | 224.887 | 0 | 0.029 | SWMM Methods 64 | ELD_TO_BW3 | 0 | | SubCatchment 1 | No Redirection | |
| ELD_TO_BW4 | 1 | 1 | 1 | 0.354 | 542.321 | 100 | 0.018 | SWMM Methods 64 | ELD_TO_BW4 | 0 | ELD_TO_BW4 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| ELD_TO_BW4 | 2 | | 1 | 0.273 | 542.321 | 100 | 0.018 | SWMM Methods 64 | ELD_TO_BW4 | 0 | ELD_TO_BW4 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW4 | 3 | | 1 | 7.517 | 542.321 | 0 | 0.018 | SWMM Methods 64 | ELD_TO_BW4 | 0 | | SubCatchment 1 | No Redirection | |
| EMPB_GW_LOSR2 | 1 | 1 | 1 | 4.9 | 638.022 | 100 | 0.016 | SWMM Methods 64 | EMPB_GW_LOS | 0 | EMPB_GW_LOSF | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_LOSR2 | 2 | | 1 | 0.13 | 638.022 | 100 | 0.016 | SWMM Methods 64 | EMPB_GW_LOS | 1 | EMPB_GW_LOSF | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_LOSR2 | 3 | | 1 | 6.598 | 638.022 | 0 | 0.016 | SWMM Methods 64 | EMPB_GW_LOS | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_MPR1 | 1 | 1 | 1 | 5.199 | 265.395 | 100 | 0.014 | SWMM Methods 64 | EMPB_GW_MPI | 0 | EMPB_GW_MPR | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| EMPB_GW_MPR1 | 3 | | 1 | 4.488 | 265.395 | 0 | 0.014 | SWMM Methods 64 | EMPB_GW_MPI | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_NHPR1 | 1 | 1 | 1 | 7.537 | 429.875 | 100 | 0.028 | SWMM Methods 64 | EMPB_GW_NHP | 0 | EMPB_GW_NHP | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_NHPR1 | 3 | | 1 | 6.679 | 429.875 | 0 | 0.028 | SWMM Methods 64 | EMPB_GW_NHP | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_NHPR2 | 1 | 1 | 1 | 1.734 | 624.082 | 100 | 0.038 | SWMM Methods 64 | EMPB_GW_NHP | 0 | EMPB_GW_NHP | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_NHPR2 | 2 | | 1 | 0.046 | 624.082 | 100 | 0.038 | SWMM Methods 64 | EMPB_GW_NHP | 1 | EMPB_GW_NHP | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_NHPR2 | 3 | | 1 | 2.94 | 624.082 | 0 | 0.038 | SWMM Methods 64 | EMPB_GW_NHP | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_NTL3 | 1 | 1 | 1 | 0.696 | 830.13 | 100 | 0.045 | SWMM Methods 64 | EMPB_GW_NTL | 0 | EMPB_GW_NTL3 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_NTL3 | 2 | | 1 | 0.233 | 830.13 | 100 | 0.045 | SWMM Methods 64 | EMPB_GW_NTL | 1 | EMPB_GW_NTL3 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_NTL3 | 3 | | 1 | 5.239 | 830.13 | 0 | 0.045 | SWMM Methods 64 | EMPB_GW_NTL | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_NTL6 | 1 | 1 | 1 | 2.28 | 974.887 | 100 | 0.061 | SWMM Methods 64 | EMPB_GW_NTL | 0 | EMPB_GW_NTL6 | SubCatchment 3 | No Redirection | Memorial High School |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMPB_GW_NTL6 | 2 | | 1 | 0.529 | 974.887 | 100 | 0.061 | SWMM Methods 64 | EMPB_GW_NTL | 1 | EMPB_GW_NTL6 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| EMPB_GW_NTL6 | 3 | | 1 | 9.472 | 974.887 | 0 | 0.061 | SWMM Methods 64 | EMPB_GW_NTL | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| EMPB_GW_NTL7 | 1 | 1 | 1 | 2.474 | 478.761 | 100 | 0.049 | SWMM Methods 64 | EMPB_GW_NTL | 0 | EMPB_GW_NTL7 | SubCatchment 3 | No Redirection | MSE4 |
| EMPB_GW_NTL7 | 2 | | 1 | 0.292 | 478.761 | 100 | 0.049 | SWMM Methods 64 | EMPB_GW_NTL | 1 | EMPB_GW_NTL7 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| EMPB_GW_NTL7 | 3 | | 1 | 4.437 | 478.761 | 0 | 0.049 | SWMM Methods 64 | EMPB_GW_NTL | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| EMPB_GW_NTL8 | 1 | 1 | 1 | 0.33 | 1979.517 | 100 | 0.044 | SWMM Methods 64 | EMPB_GW_NTL | 0 | EMPB_GW_NTL8 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_NTL8 | 2 | | 1 | 0.39 | 1979.517 | 100 | 0.044 | SWMM Methods 64 | EMPB_GW_NTL | 1 | EMPB_GW_NTL8 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_NTL8 | 3 | | 1 | 10.67 | 1979.517 | 0 | 0.044 | SWMM Methods 64 | EMPB_GW_NTL | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_OSR1 | 1 | 1 | 1 | 1.888 | 642.199 | 100 | 0.038 | SWMM Methods 64 | EMPB_GW_OSR | 0 | EMPB_GW_OSR1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| EMPB_GW_OSR1 | 2 | | 1 | 0.015 | 642.199 | 100 | 0.038 | SWMM Methods 64 | EMPB_GW_OSR | 1 | EMPB_GW_OSR1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_OSR1 | 3 | | 1 | 1.84 | 642.199 | 0 | 0.038 | SWMM Methods 64 | EMPB_GW_OSR | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_STL1 | 1 | 1 | 1 | 4.918 | 1217.985 | 100 | 0.014 | SWMM Methods 64 | EMPB_GW_STL1 | 0 | EMPB_GW_STL1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| EMPB_GW_STL1 | 2 | | 1 | 0.111 | 1217.985 | 100 | 0.014 | SWMM Methods 64 | EMPB_GW_STL1 | 1 | EMPB_GW_STL1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_STL1 | 3 | | 1 | 5.366 | 1217.985 | 0 | 0.014 | SWMM Methods 64 | EMPB_GW_STL1 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_UOSR1 | 1 | 1 | 1 | 0.646 | 487.185 | 100 | 0.026 | SWMM Methods 64 | EMPB_GW_UOS | 0 | EMPB_GW_UOS | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_UOSR1 | 2 | | 1 | 0.446 | 487.185 | 100 | 0.026 | SWMM Methods 64 | EMPB_GW_UOS | 1 | EMPB_GW_UOS | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_UOSR1 | 3 | | 1 | 3.582 | 487.185 | 0 | 0.026 | SWMM Methods 64 | EMPB_GW_UOS | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WBH1 | 1 | 1 | 1 | 3.898 | 1100.22 | 100 | 0.042 | SWMM Methods 64 | EMPB_GW_WB | 0 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_WBH1 | 2 | | 1 | 0.036 | 1100.22 | 100 | 0.042 | SWMM Methods 64 | EMPB_GW_WB | 1 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WBH1 | 3 | | 1 | 2.189 | 1100.22 | 0 | 0.042 | SWMM Methods 64 | EMPB_GW_WB | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WBH2 | 1 | 1 | 1 | 2.482 | 166.891 | 100 | 0.007 | SWMM Methods 64 | EMPB_GW_WB | 0 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_WBH2 | 3 | | 1 | 4.155 | 166.891 | 0 | 0.007 | SWMM Methods 64 | EMPB_GW_WB | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WBH3 | 1 | 1 | 1 | 3.851 | 383.51 | 100 | 0.013 | SWMM Methods 64 | EMPB_GW_WB | 0 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_WBH3 | 2 | | 1 | 0.035 | 383.51 | 100 | 0.013 | SWMM Methods 64 | EMPB_GW_WB | 1 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WBH3 | 3 | | 1 | 3.637 | 383.51 | 0 | 0.013 | SWMM Methods 64 | EMPB_GW_WB | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WR1 | 1 | 1 | 1 | 1.226 | 1050.006 | 100 | 0.064 | SWMM Methods 64 | EMPB_GW_WR | 0 | EMPB_GW_WR1 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| EMPB_GW_WR1 | 2 | | 1 | 0.18 | 1050.006 | 100 | 0.064 | SWMM Methods 64 | EMPB_GW_WR | 1 | EMPB_GW_WR1 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| EMPB_GW_WR1 | 3 | | 1 | 4.736 | 1050.006 | 0 | 0.064 | SWMM Methods 64 | EMPB_GW_WR | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| FARGO_COBALT_CHANNEL_JCT | 1 | 1 | 1 | 0.108 | 944.257 | 100 | 0.1 | SWMM Methods 64 | FARGO_COBALT | 0 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARGO_COBALT_CHANNEL_JCT | 2 | | 1 | 0.122 | 944.257 | 100 | 0.1 | SWMM Methods 64 | FARGO_COBALT | 1 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARGO_COBALT_CHANNEL_JCT | 3 | | 1 | 2.355 | 944.257 | 0 | 0.1 | SWMM Methods 64 | FARGO_COBALT | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARGO_COBALT_W_POND | 1 | 1 | 1 | 0.511 | 994.202 | 100 | 0.051 | SWMM Methods 64 | FARGO_COBALT | 0 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARGO_COBALT_W_POND | 2 | | 1 | 0.339 | 994.202 | 100 | 0.051 | SWMM Methods 64 | FARGO_COBALT | 1 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARGO_COBALT_W_POND | 3 | | 1 | 1.898 | 994.202 | 0 | 0.051 | SWMM Methods 64 | FARGO_COBALT | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARM_BD_DEP | 1 | 1 | 1 | 0.381 | 383.199 | 100 | 0.035 | SWMM Methods 64 | FARM_BD_DEP | 0 | FARM_BD_DEP | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARM_BD_DEP | 3 | | 1 | 8.521 | 383.199 | 0 | 0.035 | SWMM Methods 64 | FARM_BD_DEP | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DEP1 | 1 | 1 | 1 | 0.368 | 600.894 | 100 | 0.018 | SWMM Methods 64 | FARM_DEP1 | 0 | FARM_DEP1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARM_DEP1 | 2 | | 1 | 0.039 | 600.894 | 100 | 0.018 | SWMM Methods 64 | FARM_DEP1 | 0 | FARM_DEP1 | SubCatchment 3 | No Redirection | |
| FARM_DEP1 | 3 | | 1 | 4.266 | 600.894 | 0 | 0.018 | SWMM Methods 64 | FARM_DEP1 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DEP2 | 1 | 1 | 1 | 0.917 | 899.792 | 100 | 0.035 | SWMM Methods 64 | FARM_DEP2 | 0 | FARM_DEP2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARM_DEP2 | 2 | | 1 | 0.444 | 899.792 | 100 | 0.035 | SWMM Methods 64 | FARM_DEP2 | 1 | FARM_DEP2 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FARM_DEP2 | 3 | | 1 | 10.512 | 899.792 | 0 | 0.035 | SWMM Methods 64 | FARM_DEP2 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| FARM_DITCH1 | 1 | 1 | 1 | 1.245 | 442.308 | 100 | 0.02 | SWMM Methods 64 | FARM_DITCH1 | 0 | FARM_DITCH1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARM_DITCH1 | 2 | | 1 | 0.225 | 442.308 | 100 | 0.02 | SWMM Methods 64 | FARM_DITCH1 | 0 | FARM_DITCH1 | SubCatchment 3 | No Redirection | |
| FARM_DITCH1 | 3 | | 1 | 10.778 | 442.308 | 0 | 0.02 | SWMM Methods 64 | FARM_DITCH1 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH2 | 1 | 1 | 1 | 1.022 | 667.007 | 100 | 0.037 | SWMM Methods 64 | FARM_DITCH2 | 0 | FARM_DITCH2 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARM_DITCH2 | 2 | | 1 | 0.554 | 667.007 | 100 | 0.037 | SWMM Methods 64 | FARM_DITCH2 | 0 | FARM_DITCH2 | SubCatchment 3 | No Redirection | |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FARM_DITCH2 | 3 | | 1 | 20.965 | 667.007 | 0 | 0.037 | SWMM Methods 64 | FARM_DITCH2 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH3 | 1 | 1 | 1 | 0.047 | 578.875 | 100 | 0.041 | SWMM Methods 64 | FARM_DITCH3 | 0 | FARM_DITCH3 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARM_DITCH3 | 2 | | 1 | 0.027 | 578.875 | 100 | 0.041 | SWMM Methods 64 | FARM_DITCH3 | 0 | FARM_DITCH3 | SubCatchment 3 | No Redirection | |
| FARM_DITCH3 | 3 | | 1 | 15.021 | 578.875 | 0 | 0.041 | SWMM Methods 64 | FARM_DITCH3 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH4 | 3 | 1 | 1 | 6.201 | 486.844 | 0 | 0.026 | SWMM Methods 64 | FARM_DITCH4 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH5 | 1 | 1 | 1 | 0.084 | 525.333 | 100 | 0.075 | SWMM Methods 64 | FARM_DITCH5 | 0 | FARM_DITCH5 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARM_DITCH5 | 2 | | 1 | 0.002 | 525.333 | 100 | 0.075 | SWMM Methods 64 | FARM_DITCH5 | 0 | FARM_DITCH5 | SubCatchment 3 | No Redirection | |
| FARM_DITCH5 | 3 | | 1 | 1.042 | 525.333 | 0 | 0.075 | SWMM Methods 64 | FARM_DITCH5 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH6 | 3 | 1 | 1 | 2.105 | 240.667 | 0 | 0.031 | SWMM Methods 64 | FARM_DITCH6 | 0 | | SubCatchment 1 | No Redirection | |
| FARMRD_SW4 | 1 | 1 | 1 | 1.583 | 864.86 | 100 | 0.039 | SWMM Methods 64 | FARMRD_SW4 | 0 | FARMRD_SW4 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARMRD_SW4 | 3 | | 1 | 11.701 | 864.86 | 0 | 0.039 | SWMM Methods 64 | FARMRD_SW4 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FARMRD_SW5 | 1 | 1 | 1 | 0.354 | 1266.896 | 100 | 0.044 | SWMM Methods 64 | FARMRD_SW5 | 0 | FARMRD_SW5 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARMRD_SW5 | 3 | | 1 | 12.049 | 1266.896 | 0 | 0.044 | SWMM Methods 64 | FARMRD_SW5 | 0 | | SubCatchment 1 | No Redirection | |
| FARMRD_SW6 | 1 | 1 | 1 | 0.218 | 463.261 | 100 | 0.059 | SWMM Methods 64 | FARMRD_SW6 | 0 | FARMRD_SW6 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARMRD_SW6 | 2 | | 1 | 0.001 | 463.261 | 100 | 0.059 | SWMM Methods 64 | FARMRD_SW6 | 0 | FARMRD_SW6 | SubCatchment 3 | No Redirection | |
| FARMRD_SW6 | 3 | | 1 | 4.116 | 463.261 | 0 | 0.059 | SWMM Methods 64 | FARMRD_SW6 | 0 | | SubCatchment 1 | No Redirection | |
| FARMRD_SWALE1 | 1 | 1 | 1 | 4.114 | 1338.369 | 100 | 0.017 | SWMM Methods 64 | FARMRD_SWAL | 0 | FARMRD_SWALE | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARMRD_SWALE1 | 2 | | 1 | 0.104 | 1338.369 | 100 | 0.017 | SWMM Methods 64 | FARMRD_SWAL | 1 | FARMRD_SWALE | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARMRD_SWALE1 | 3 | | 1 | 27.288 | 1338.369 | 0 | 0.017 | SWMM Methods 64 | FARMRD_SWAL | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARMRD_SWALE2 | 1 | 1 | 1 | 0.342 | 1411.606 | 100 | 0.039 | SWMM Methods 64 | FARMRD_SWAL | 0 | FARMRD_SWALE | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARMRD_SWALE2 | 3 | | 1 | 12.007 | 1411.606 | 0 | 0.039 | SWMM Methods 64 | FARMRD_SWAL | 0 | | SubCatchment 1 | No Redirection | |
| FARMRD_SWALE3 | 1 | 1 | 1 | 0.948 | 777.053 | 100 | 0.041 | SWMM Methods 64 | FARMRD_SWAL | 0 | FARMRD_SWALE | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARMRD_SWALE3 | 3 | | 1 | 17.829 | 777.053 | 0 | 0.041 | SWMM Methods 64 | FARMRD_SWAL | 0 | | SubCatchment 1 | No Redirection | |
| FS-10 | 1 | 1 | 1 | 1.974 | 541.188 | 100 | 0.04 | SWMM Methods 64 | FS-10 | 0 | FS-10 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| FS-10 | 2 | | 1 | 0.991 | 541.188 | 100 | 0.04 | SWMM Methods 64 | FS-10 | 1 | FS-10 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| FS-10 | 3 | | 1 | 7.128 | 541.188 | 0 | 0.04 | SWMM Methods 64 | FS-10 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| FS-13 | 1 | 1 | 1 | 2.346 | 715.892 | 100 | 0.051 | SWMM Methods 64 | FS-13 | 0 | FS-13 | SubCatchment 3 | No Redirection | Memorial High School |
| FS-13 | 2 | | 1 | 1.086 | 715.892 | 100 | 0.051 | SWMM Methods 64 | FS-13 | 1 | FS-13 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| FS-13 | 3 | | 1 | 7.813 | 715.892 | 0 | 0.051 | SWMM Methods 64 | FS-13 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| FS-15 | 1 | 1 | 1 | 1.676 | 463.683 | 100 | 0.04 | SWMM Methods 64 | FS-15 | 0 | FS-15 | SubCatchment 3 | No Redirection | Memorial High School |
| FS-15 | 2 | | 1 | 0.69 | 463.683 | 100 | 0.04 | SWMM Methods 64 | FS-15 | 1 | FS-15 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| FS-15 | 3 | | 1 | 5.054 | 463.683 | 0 | 0.04 | SWMM Methods 64 | FS-15 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| GANSER_HEIGHTS_POND | 1 | 1 | 1 | 6.717 | 300.577 | 100 | 0.039 | SWMM Methods 64 | GANSER_HEIGH | 0 | GANSER_HEIGHT | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| GANSER_HEIGHTS_POND | 2 | | 1 | 0.001 | 300.577 | 100 | 0.039 | SWMM Methods 64 | GANSER_HEIGH | 1 | GANSER_HEIGHT | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GANSER_HEIGHTS_POND | 3 | | 1 | 3.545 | 300.577 | 0 | 0.039 | SWMM Methods 64 | GANSER_HEIGH | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2145-003 | 1 | 1 | 1 | 2.683 | 966.511 | 100 | 0.048 | SWMM Methods 64 | GR2145-003 | 0 | GR2145-003 | SubCatchment 3 | No Redirection | Swallowtail Park |
| GR2145-003 | 2 | | 1 | 0.488 | 966.511 | 100 | 0.048 | SWMM Methods 64 | GR2145-003 | 1 | GR2145-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| GR2145-003 | 3 | | 1 | 6.744 | 966.511 | 0 | 0.048 | SWMM Methods 64 | GR2145-003 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| GR2256-019 | 1 | 1 | 1 | 4.138 | 544.889 | 100 | 0.009 | SWMM Methods 64 | GR2256-019 | 0 | GR2256-019 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| GR2256-019 | 2 | | 1 | 0.003 | 544.889 | 100 | 0.009 | SWMM Methods 64 | GR2256-019 | 1 | GR2256-019 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2256-019 | 3 | | 1 | 1.473 | 544.889 | 0 | 0.009 | SWMM Methods 64 | GR2256-019 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2355-009 | 1 | 1 | 1 | 4.194 | 873.139 | 100 | 0.015 | SWMM Methods 64 | GR2355-009 | 0 | GR2355-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| GR2355-009 | 2 | | 1 | 0.1 | 873.139 | 100 | 0.015 | SWMM Methods 64 | GR2355-009 | 1 | GR2355-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2355-009 | 3 | | 1 | 5.676 | 873.139 | 0 | 0.015 | SWMM Methods 64 | GR2355-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2550-020 | 1 | 1 | 1 | 1.476 | 449.457 | 100 | 0.034 | SWMM Methods 64 | GR2550-020 | 0 | GR2550-020 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| GR2550-020 | 2 | | 1 | 0.056 | 449.457 | 100 | 0.034 | SWMM Methods 64 | GR2550-020 | 1 | GR2550-020 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| GR2550-020 | 3 | | 1 | 3.965 | 449.457 | 0 | 0.034 | SWMM Methods 64 | GR2550-020 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GREYSTONE_POND | 1 | 1 | 1 | 1.561 | 1169.492 | 100 | 0.065 | SWMM Methods 64 | GREYSTONE_PO | 0 | GREYSTONE_POI | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| GREYSTONE_POND | 2 | | 1 | 0.58 | 1169.492 | 100 | 0.065 | SWMM Methods 64 | GREYSTONE_PO | 1 | GREYSTONE_POI | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GREYSTONE_POND | 3 | | 1 | 3.89 | 1169.492 | 0 | 0.065 | SWMM Methods 64 | GREYSTONE_PO | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| HD2249-033_INSERT | 1 | 1 | 1 | 3.969 | 1269.165 | 100 | 0.008 | SWMM Methods 64 | HD2249-033_IN | 0 | HD2249-033_INS | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| HD2249-033_INSERT | 2 | | 1 | 0.033 | 1269.165 | 100 | 0.008 | SWMM Methods 64 | HD2249-033_IN | 1 | HD2249-033_INS | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| HD2249-033_INSERT | 3 | | 1 | 1.945 | 1269.165 | 0 | 0.008 | SWMM Methods 64 | HD2249-033_IN | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| HD2454-017 | 1 | 1 | 1 | 11.274 | 1190.635 | 100 | 0.03 | SWMM Methods 64 | HD2454-017 | 0 | HD2454-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HD2454-017 | 2 | | 1 | 0.343 | 1190.635 | 100 | 0.03 | SWMM Methods 64 | HD2454-017 | 1 | HD2454-017 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HD2454-017 | 3 | | 1 | 14.016 | 1190.635 | 0 | 0.03 | SWMM Methods 64 | HD2454-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HIGHVIEW_PR | 1 | 1 | 1 | 0.374 | 91.424 | 100 | 0.021 | SWMM Methods 64 | HIGHVIEW_PR | 0 | HIGHVIEW_PR | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HIGHVIEW_PR | 2 | | 1 | 0.072 | 91.424 | 100 | 0.021 | SWMM Methods 64 | HIGHVIEW_PR | 1 | HIGHVIEW_PR | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HIGHVIEW_PR | 3 | | 1 | 0.559 | 91.424 | 0 | 0.021 | SWMM Methods 64 | HIGHVIEW_PR | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HOMEWOOD_WAY_POND | 1 | 1 | 1 | 2.979 | 287.953 | 100 | 0.049 | SWMM Methods 64 | HOMEWOOD_W | 0 | HOMEWOOD_W | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HOMEWOOD_WAY_POND | 2 | | 1 | 0.054 | 287.953 | 100 | 0.049 | SWMM Methods 64 | HOMEWOOD_W | 1 | HOMEWOOD_W | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HOMEWOOD_WAY_POND | 3 | | 1 | 0.303 | 287.953 | 0 | 0.049 | SWMM Methods 64 | HOMEWOOD_W | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HV_BLUFF_1 | 1 | 1 | 1 | 0.59 | 304.12 | 100 | 0.07 | SWMM Methods 64 | HV_BLUFF_1 | 0 | HV_BLUFF_1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HV_BLUFF_1 | 2 | | 1 | 0.126 | 304.12 | 100 | 0.07 | SWMM Methods 64 | HV_BLUFF_1 | 1 | HV_BLUFF_1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HV_BLUFF_1 | 3 | | 1 | 4.532 | 304.12 | 0 | 0.07 | SWMM Methods 64 | HV_BLUFF_1 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| HV_BLUFF2 | 1 | 1 | 1 | 0.136 | 180.12 | 100 | 0.082 | SWMM Methods 64 | HV_BLUFF2 | 0 | HV_BLUFF2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HV_BLUFF2 | 2 | | 1 | 0.026 | 180.12 | 100 | 0.082 | SWMM Methods 64 | HV_BLUFF2 | 1 | HV_BLUFF2 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HV_BLUFF2 | 3 | | 1 | 2.37 | 180.12 | 0 | 0.082 | SWMM Methods 64 | HV_BLUFF2 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN1547-006 | 1 | 1 | 1 | 0.613 | 240.236 | 100 | 0.042 | SWMM Methods 64 | IN1547-006 | 0 | IN1547-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-006 | 2 | | 1 | 0.163 | 240.236 | 100 | 0.042 | SWMM Methods 64 | IN1547-006 | 1 | IN1547-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-006 | 3 | | 1 | 0.944 | 240.236 | 0 | 0.042 | SWMM Methods 64 | IN1547-006 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-009 | 1 | 1 | 1 | 0.28 | 338.383 | 100 | 0.049 | SWMM Methods 64 | IN1547-009 | 0 | IN1547-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-009 | 2 | | 1 | 0.331 | 338.383 | 100 | 0.049 | SWMM Methods 64 | IN1547-009 | 1 | IN1547-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-009 | 3 | | 1 | 1.439 | 338.383 | 0 | 0.049 | SWMM Methods 64 | IN1547-009 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-010 | 1 | 1 | 1 | 0.481 | 359.155 | 100 | 0.064 | SWMM Methods 64 | IN1547-010 | 0 | IN1547-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-010 | 2 | | 1 | 0.568 | 359.155 | 100 | 0.064 | SWMM Methods 64 | IN1547-010 | 1 | IN1547-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-010 | 3 | | 1 | 2.681 | 359.155 | 0 | 0.064 | SWMM Methods 64 | IN1547-010 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-011 | 1 | 1 | 1 | 0.591 | 284.16 | 100 | 0.015 | SWMM Methods 64 | IN1547-011 | 0 | IN1547-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-011 | 2 | | 1 | 0.094 | 284.16 | 100 | 0.015 | SWMM Methods 64 | IN1547-011 | 1 | IN1547-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-011 | 3 | | 1 | 0.719 | 284.16 | 0 | 0.015 | SWMM Methods 64 | IN1547-011 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-020 | 1 | 1 | 1 | 0.84 | 361.415 | 100 | 0.033 | SWMM Methods 64 | IN1547-020 | 0 | IN1547-020 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-020 | 2 | | 1 | 0.383 | 361.415 | 100 | 0.033 | SWMM Methods 64 | IN1547-020 | 1 | IN1547-020 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-020 | 3 | | 1 | 3.043 | 361.415 | 0 | 0.033 | SWMM Methods 64 | IN1547-020 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-024 | 1 | 1 | 1 | 0.153 | 204.535 | 100 | 0.088 | SWMM Methods 64 | IN1547-024 | 0 | IN1547-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-024 | 2 | | 1 | 0.046 | 204.535 | 100 | 0.088 | SWMM Methods 64 | IN1547-024 | 1 | IN1547-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-024 | 3 | | 1 | 1.334 | 204.535 | 0 | 0.088 | SWMM Methods 64 | IN1547-024 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1548-005 | 1 | 1 | 1 | 0.835 | 367.844 | 100 | 0.068 | SWMM Methods 64 | IN1548-005 | 0 | IN1548-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1548-005 | 2 | | 1 | 0.283 | 367.844 | 100 | 0.068 | SWMM Methods 64 | IN1548-005 | 1 | IN1548-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1548-005 | 3 | | 1 | 1.992 | 367.844 | 0 | 0.068 | SWMM Methods 64 | IN1548-005 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1548-007 | 1 | 1 | 1 | 1.014 | 283.907 | 100 | 0.055 | SWMM Methods 64 | IN1548-007 | 0 | IN1548-007 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1548-007 | 2 | | 1 | 0.62 | 283.907 | 100 | 0.055 | SWMM Methods 64 | IN1548-007 | 1 | IN1548-007 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1548-007 | 3 | | 1 | 3.762 | 283.907 | 0 | 0.055 | SWMM Methods 64 | IN1548-007 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1549-016 | 1 | 1 | 1 | 1.241 | 408.605 | 100 | 0.02 | SWMM Methods 64 | IN1549-016 | 0 | IN1549-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1549-016 | 2 | | 1 | 0.692 | 408.605 | 100 | 0.02 | SWMM Methods 64 | IN1549-016 | 1 | IN1549-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1549-016 | 3 | | 1 | 2.85 | 408.605 | 0 | 0.02 | SWMM Methods 64 | IN1549-016 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1549-024 | 1 | 1 | 1 | 1.782 | 433.295 | 100 | 0.048 | SWMM Methods 64 | IN1549-024 | 0 | IN1549-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1549-024 | 2 | | 1 | 0.818 | 433.295 | 100 | 0.048 | SWMM Methods 64 | IN1549-024 | 1 | IN1549-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1549-024 | 3 | | 1 | 4.59 | 433.295 | 0 | 0.048 | SWMM Methods 64 | IN1549-024 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-014 | 1 | 1 | 1 | 0.327 | 702.184 | 100 | 0.032 | SWMM Methods 64 | IN1550-014 | 0 | IN1550-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1550-014 | 2 | | 1 | 0.387 | 702.184 | 100 | 0.032 | SWMM Methods 64 | IN1550-014 | 1 | IN1550-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-014 | 3 | | 1 | 0.651 | 702.184 | 0 | 0.032 | SWMM Methods 64 | IN1550-014 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-017 | 1 | 1 | 1 | 0.376 | 242.925 | 100 | 0.016 | SWMM Methods 64 | IN1550-017 | 0 | IN1550-017 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1550-017 | 2 | | 1 | 0.445 | 242.925 | 100 | 0.016 | SWMM Methods 64 | IN1550-017 | 1 | IN1550-017 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-017 | 3 | | 1 | 1.118 | 242.925 | 0 | 0.016 | SWMM Methods 64 | IN1550-017 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-027 | 1 | 1 | 1 | 0.052 | 181.689 | 100 | 0.042 | SWMM Methods 64 | IN1550-027 | 0 | IN1550-027 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1550-027 | 2 | | 1 | 0.062 | 181.689 | 100 | 0.042 | SWMM Methods 64 | IN1550-027 | 1 | IN1550-027 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-027 | 3 | | 1 | 0.327 | 181.689 | 0 | 0.042 | SWMM Methods 64 | IN1550-027 | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| IN1550-028 | 1 | 1 | 1 | 0.07 | 201.091 | 100 | 0.04 | SWMM Methods 64 | IN1550-028 | 0 | IN1550-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1550-028 | 2 | | 1 | 0.083 | 201.091 | 100 | 0.04 | SWMM Methods 64 | IN1550-028 | 1 | IN1550-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-028 | 3 | | 1 | 0.413 | 201.091 | 0 | 0.04 | SWMM Methods 64 | IN1550-028 | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| IN1551-005 | 1 | 1 | 1 | 0.74 | 746.916 | 100 | 0.014 | SWMM Methods 64 | IN1551-005 | 0 | IN1551-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1551-005 | 2 | | 1 | 0.876 | 746.916 | 100 | 0.014 | SWMM Methods 64 | IN1551-005 | 1 | IN1551-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1551-005 | 3 | | 1 | 2.47 | 746.916 | 0 | 0.014 | SWMM Methods 64 | IN1551-005 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1551-023 | 1 | 1 | 1 | 1.142 | 733.379 | 100 | 0.037 | SWMM Methods 64 | IN1551-023 | 0 | IN1551-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1551-023 | 2 | | 1 | 1.35 | 733.379 | 100 | 0.037 | SWMM Methods 64 | IN1551-023 | 1 | IN1551-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1551-023 | 3 | | 1 | 3.331 | 733.379 | 0 | 0.037 | SWMM Methods 64 | IN1551-023 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1646-001 | 1 | 1 | 1 | 0.346 | 183.205 | 100 | 0.034 | SWMM Methods 64 | IN1646-001 | 0 | IN1646-001 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1646-001 | 2 | | 1 | 0.081 | 183.205 | 100 | 0.034 | SWMM Methods 64 | IN1646-001 | 1 | IN1646-001 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1646-001 | 3 | | 1 | 1.883 | 183.205 | 0 | 0.034 | SWMM Methods 64 | IN1646-001 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-003 | 1 | 1 | 1 | 0.527 | 444.633 | 100 | 0.02 | SWMM Methods 64 | IN1647-003 | 0 | IN1647-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1647-003 | 2 | | 1 | 0.176 | 444.633 | 100 | 0.02 | SWMM Methods 64 | IN1647-003 | 1 | IN1647-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-003 | 3 | | 1 | 1.078 | 444.633 | 0 | 0.02 | SWMM Methods 64 | IN1647-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-007 | 1 | 1 | 1 | 0.425 | 195.153 | 100 | 0.025 | SWMM Methods 64 | IN1647-007 | 0 | IN1647-007 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1647-007 | 2 | | 1 | 0.12 | 195.153 | 100 | 0.025 | SWMM Methods 64 | IN1647-007 | 1 | IN1647-007 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-007 | 3 | | 1 | 0.722 | 195.153 | 0 | 0.025 | SWMM Methods 64 | IN1647-007 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-011 | 1 | 1 | 1 | 1.19 | 292.494 | 100 | 0.039 | SWMM Methods 64 | IN1647-011 | 0 | IN1647-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1647-011 | 2 | | 1 | 0.361 | 292.494 | 100 | 0.039 | SWMM Methods 64 | IN1647-011 | 1 | IN1647-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-011 | 3 | | 1 | 2.078 | 292.494 | 0 | 0.039 | SWMM Methods 64 | IN1647-011 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-041 | 1 | 1 | 1 | 0.195 | 192.42 | 100 | 0.061 | SWMM Methods 64 | IN1647-041 | 0 | IN1647-041 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1647-041 | 2 | | 1 | 0.115 | 192.42 | 100 | 0.061 | SWMM Methods 64 | IN1647-041 | 1 | IN1647-041 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-041 | 3 | | 1 | 1.245 | 192.42 | 0 | 0.061 | SWMM Methods 64 | IN1647-041 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-064 | 1 | 1 | 1 | 0.17 | 146.733 | 100 | 0.023 | SWMM Methods 64 | IN1647-064 | 0 | IN1647-064 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1647-064 | 2 | | 1 | 0.035 | 146.733 | 100 | 0.023 | SWMM Methods 64 | IN1647-064 | 1 | IN1647-064 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-064 | 3 | | 1 | 0.553 | 146.733 | 0 | 0.023 | SWMM Methods 64 | IN1647-064 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-068 | 1 | 1 | 1 | 0.43 | 113.894 | 100 | 0.027 | SWMM Methods 64 | IN1647-068 | 0 | IN1647-068 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1647-068 | 2 | | 1 | 0.237 | 113.894 | 100 | 0.027 | SWMM Methods 64 | IN1647-068 | 1 | IN1647-068 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-068 | 3 | | 1 | 1.64 | 113.894 | 0 | 0.027 | SWMM Methods 64 | IN1647-068 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-011 | 1 | 1 | 1 | 0.452 | 203.463 | 100 | 0.102 | SWMM Methods 64 | IN1648-011 | 0 | IN1648-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1648-011 | 2 | | 1 | 0.192 | 203.463 | 100 | 0.102 | SWMM Methods 64 | IN1648-011 | 1 | IN1648-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-011 | 3 | | 1 | 1.323 | 203.463 | 0 | 0.102 | SWMM Methods 64 | IN1648-011 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-028 | 1 | 1 | 1 | 0.599 | 257.678 | 100 | 0.019 | SWMM Methods 64 | IN1648-028 | 0 | IN1648-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1648-028 | 2 | | 1 | 0.097 | 257.678 | 100 | 0.019 | SWMM Methods 64 | IN1648-028 | 1 | IN1648-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-028 | 3 | | 1 | 0.831 | 257.678 | 0 | 0.019 | SWMM Methods 64 | IN1648-028 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-041 | 1 | 1 | 1 | 1.157 | 440.497 | 100 | 0.103 | SWMM Methods 64 | IN1648-041 | 0 | IN1648-041 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1648-041 | 2 | | 1 | 0.457 | 440.497 | 100 | 0.103 | SWMM Methods 64 | IN1648-041 | 1 | IN1648-041 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-041 | 3 | | 1 | 2.732 | 440.497 | 0 | 0.103 | SWMM Methods 64 | IN1648-041 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-048 | 1 | 1 | 1 | 0.32 | 163.068 | 100 | 0.039 | SWMM Methods 64 | IN1648-048 | 0 | IN1648-048 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1648-048 | 2 | | 1 | 0.379 | 163.068 | 100 | 0.039 | SWMM Methods 64 | IN1648-048 | 1 | IN1648-048 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1648-048 | 3 | | 1 | 1.756 | 163.068 | 0 | 0.039 | SWMM Methods 64 | IN1648-048 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-002 | 1 | 1 | 1 | 1.049 | 442.024 | 100 | 0.057 | SWMM Methods 64 | IN1649-002 | 0 | IN1649-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1649-002 | 2 | | 1 | 0.603 | 442.024 | 100 | 0.057 | SWMM Methods 64 | IN1649-002 | 1 | IN1649-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-002 | 3 | | 1 | 3.107 | 442.024 | 0 | 0.057 | SWMM Methods 64 | IN1649-002 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-003 | 1 | 1 | 1 | 3.351 | 770.34 | 100 | 0.047 | SWMM Methods 64 | IN1649-003 | 0 | IN1649-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1649-003 | 2 | | 1 | 0.302 | 770.34 | 100 | 0.047 | SWMM Methods 64 | IN1649-003 | 1 | IN1649-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-003 | 3 | | 1 | 3.127 | 770.34 | 0 | 0.047 | SWMM Methods 64 | IN1649-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-011 | 1 | 1 | 1 | 1.778 | 312.1 | 100 | 0.038 | SWMM Methods 64 | IN1649-011 | 0 | IN1649-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1649-011 | 2 | | 1 | 0.508 | 312.1 | 100 | 0.038 | SWMM Methods 64 | IN1649-011 | 1 | IN1649-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-011 | 3 | | 1 | 3.512 | 312.1 | 0 | 0.038 | SWMM Methods 64 | IN1649-011 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-016 | 1 | 1 | 1 | 1.128 | 194.515 | 100 | 0.038 | SWMM Methods 64 | IN1649-016 | 0 | IN1649-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1649-016 | 2 | | 1 | 0.126 | 194.515 | 100 | 0.038 | SWMM Methods 64 | IN1649-016 | 1 | IN1649-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1649-016 | 3 | | 1 | 1.758 | 194.515 | 0 | 0.038 | SWMM Methods 64 | IN1649-016 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1650-009_DEPRESSION | 1 | 1 | 1 | 0.949 | 517.074 | 100 | 0.019 | SWMM Methods 64 | IN1650-009_DE | 0 | IN1650-009_DEP | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1650-009_DEPRESSION | 2 | | 1 | 0.009 | 517.074 | 100 | 0.019 | SWMM Methods 64 | IN1650-009_DE | 1 | IN1650-009_DEP | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1650-009_DEPRESSION | 3 | | 1 | 10.07 | 517.074 | 0 | 0.019 | SWMM Methods 64 | IN1650-009_DE | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1653-007 | 1 | 1 | 1 | 0.605 | 186.841 | 100 | 0.02 | SWMM Methods 64 | IN1653-007 | 0 | IN1653-007 | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN1653-007 | 2 | | 1 | 0.006 | 186.841 | 100 | 0.02 | SWMM Methods 64 | IN1653-007 | 1 | IN1653-007 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1653-007 | 3 | | 1 | 0.802 | 186.841 | 0 | 0.02 | SWMM Methods 64 | IN1653-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1653-014 | 1 | 1 | 1 | 0.319 | 254.496 | 100 | 0.027 | SWMM Methods 64 | IN1653-014 | 0 | IN1653-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1653-014 | 3 | | 1 | 0.415 | 254.496 | 0 | 0.027 | SWMM Methods 64 | IN1653-014 | 0 | | SubCatchment 1 | No Redirection | |
| IN1653-018 | 1 | 1 | 1 | 0.348 | 203.461 | 100 | 0.041 | SWMM Methods 64 | IN1653-018 | 0 | IN1653-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1653-018 | 3 | | 1 | 1.022 | 203.461 | 0 | 0.041 | SWMM Methods 64 | IN1653-018 | 0 | | SubCatchment 1 | No Redirection | |
| IN1653-026 | 1 | 1 | 1 | 0.41 | 415.279 | 100 | 0.007 | SWMM Methods 64 | IN1653-026 | 0 | IN1653-026 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1653-026 | 3 | | 1 | 3.222 | 415.279 | 0 | 0.007 | SWMM Methods 64 | IN1653-026 | 0 | | SubCatchment 1 | No Redirection | |
| IN1654-006 | 1 | 1 | 1 | 1.039 | 204.048 | 100 | 0.026 | SWMM Methods 64 | IN1654-006 | 0 | IN1654-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1654-006 | 2 | | 1 | 0.23 | 204.048 | 100 | 0.026 | SWMM Methods 64 | IN1654-006 | 1 | IN1654-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1654-006 | 3 | | 1 | 0.721 | 204.048 | 0 | 0.026 | SWMM Methods 64 | IN1654-006 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1747-026 | 1 | 1 | 1 | 0.781 | 237.879 | 100 | 0.042 | SWMM Methods 64 | IN1747-026 | 0 | IN1747-026 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1747-026 | 2 | | 1 | 0.443 | 237.879 | 100 | 0.042 | SWMM Methods 64 | IN1747-026 | 1 | IN1747-026 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1747-026 | 3 | | 1 | 2.551 | 237.879 | 0 | 0.042 | SWMM Methods 64 | IN1747-026 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1747-028 | 1 | 1 | 1 | 0.239 | 410.287 | 100 | 0.068 | SWMM Methods 64 | IN1747-028 | 0 | IN1747-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1747-028 | 2 | | 1 | 0.159 | 410.287 | 100 | 0.068 | SWMM Methods 64 | IN1747-028 | 1 | IN1747-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1747-028 | 3 | | 1 | 2.03 | 410.287 | 0 | 0.068 | SWMM Methods 64 | IN1747-028 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1749-003 | 1 | 1 | 1 | 5.245 | 414.36 | 100 | 0.016 | SWMM Methods 64 | IN1749-003 | 0 | IN1749-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1749-003 | 2 | | 1 | 0.118 | 414.36 | 100 | 0.016 | SWMM Methods 64 | IN1749-003 | 1 | IN1749-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1749-003 | 3 | | 1 | 5.798 | 414.36 | 0 | 0.016 | SWMM Methods 64 | IN1749-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-003 | 1 | 1 | 1 | 2.893 | 441.338 | 100 | 0.038 | SWMM Methods 64 | IN1750-003 | 0 | IN1750-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1750-003 | 2 | | 1 | 0.242 | 441.338 | 100 | 0.038 | SWMM Methods 64 | IN1750-003 | 1 | IN1750-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-003 | 3 | | 1 | 4.373 | 441.338 | 0 | 0.038 | SWMM Methods 64 | IN1750-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1750-004 | 1 | 1 | 1 | 0.868 | 369.932 | 100 | 0.022 | SWMM Methods 64 | IN1750-004 | 0 | IN1750-004 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1750-004 | 2 | | 1 | 0.1 | 369.932 | 100 | 0.022 | SWMM Methods 64 | IN1750-004 | 1 | IN1750-004 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-004 | 3 | | 1 | 2.509 | 369.932 | 0 | 0.022 | SWMM Methods 64 | IN1750-004 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-008 | 1 | 1 | 1 | 1.815 | 358.3 | 100 | 0.032 | SWMM Methods 64 | IN1750-008 | 0 | IN1750-008 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1750-008 | 2 | | 1 | 0.385 | 358.3 | 100 | 0.032 | SWMM Methods 64 | IN1750-008 | 1 | IN1750-008 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-008 | 3 | | 1 | 1.477 | 358.3 | 0 | 0.032 | SWMM Methods 64 | IN1750-008 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-019 | 1 | 1 | 1 | 1.311 | 372.25 | 100 | 0.038 | SWMM Methods 64 | IN1750-019 | 0 | IN1750-019 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1750-019 | 2 | | 1 | 0.273 | 372.25 | 100 | 0.038 | SWMM Methods 64 | IN1750-019 | 1 | IN1750-019 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-019 | 3 | | 1 | 1.861 | 372.25 | 0 | 0.038 | SWMM Methods 64 | IN1750-019 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-034 | 1 | 1 | 1 | 1.457 | 352.449 | 100 | 0.033 | SWMM Methods 64 | IN1750-034 | 0 | IN1750-034 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1750-034 | 2 | | 1 | 0.031 | 352.449 | 100 | 0.033 | SWMM Methods 64 | IN1750-034 | 1 | IN1750-034 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1750-034 | 3 | | 1 | 0.777 | 352.449 | 0 | 0.033 | SWMM Methods 64 | IN1750-034 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1751-006 | 1 | 1 | 1 | 1.852 | 590.591 | 100 | 0.019 | SWMM Methods 64 | IN1751-006 | 0 | IN1751-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1751-006 | 2 | | 1 | 0.582 | 590.591 | 100 | 0.019 | SWMM Methods 64 | IN1751-006 | 1 | IN1751-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1751-006 | 3 | | 1 | 4.158 | 590.591 | 0 | 0.019 | SWMM Methods 64 | IN1751-006 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1751-016 | 1 | 1 | 1 | 1.195 | 308.408 | 100 | 0.024 | SWMM Methods 64 | IN1751-016 | 0 | IN1751-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1751-016 | 2 | | 1 | 0.47 | 308.408 | 100 | 0.024 | SWMM Methods 64 | IN1751-016 | 1 | IN1751-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1751-016 | 3 | | 1 | 2.585 | 308.408 | 0 | 0.024 | SWMM Methods 64 | IN1751-016 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1751-023 | 1 | 1 | 1 | 2.101 | 392.629 | 100 | 0.031 | SWMM Methods 64 | IN1751-023 | 0 | IN1751-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1751-023 | 2 | | 1 | 0.831 | 392.629 | 100 | 0.031 | SWMM Methods 64 | IN1751-023 | 1 | IN1751-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1751-023 | 3 | | 1 | 3.543 | 392.629 | 0 | 0.031 | SWMM Methods 64 | IN1751-023 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1752-011 | 1 | 1 | 1 | 1.948 | 546.869 | 100 | 0.048 | SWMM Methods 64 | IN1752-011 | 0 | IN1752-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1752-011 | 2 | | 1 | 0.632 | 546.869 | 100 | 0.048 | SWMM Methods 64 | IN1752-011 | 1 | IN1752-011 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1752-011 | 3 | | 1 | 2.754 | 546.869 | 0 | 0.048 | SWMM Methods 64 | IN1752-011 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1752-022 | 1 | 1 | 1 | 0.987 | 651.078 | 100 | 0.066 | SWMM Methods 64 | IN1752-022 | 0 | IN1752-022 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1752-022 | 2 | | 1 | 0.446 | 651.078 | 100 | 0.066 | SWMM Methods 64 | IN1752-022 | 1 | IN1752-022 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1752-022 | 3 | | 1 | 1.771 | 651.078 | 0 | 0.066 | SWMM Methods 64 | IN1752-022 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1752-029 | 1 | 1 | 1 | 1.569 | 350.197 | 100 | 0.019 | SWMM Methods 64 | IN1752-029 | 0 | IN1752-029 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1752-029 | 2 | | 1 | 0.506 | 350.197 | 100 | 0.019 | SWMM Methods 64 | IN1752-029 | 1 | IN1752-029 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1752-029 | 3 | | 1 | 2.514 | 350.197 | 0 | 0.019 | SWMM Methods 64 | IN1752-029 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-007 | 1 | 1 | 1 | 0.622 | 215.747 | 100 | 0.03 | SWMM Methods 64 | IN1753-007 | 0 | IN1753-007 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-007 | 2 | | 1 | 0.558 | 215.747 | 100 | 0.03 | SWMM Methods 64 | IN1753-007 | 1 | IN1753-007 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-007 | 3 | | 1 | 1.411 | 215.747 | 0 | 0.03 | SWMM Methods 64 | IN1753-007 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-009 | 1 | 1 | 1 | 0.609 | 161.396 | 100 | 0.016 | SWMM Methods 64 | IN1753-009 | 0 | IN1753-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-009 | 2 | | 1 | 0.721 | 161.396 | 100 | 0.016 | SWMM Methods 64 | IN1753-009 | 1 | IN1753-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-009 | 3 | | 1 | 1.044 | 161.396 | 0 | 0.016 | SWMM Methods 64 | IN1753-009 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-010 | 1 | 1 | 1 | 0.34 | 154.39 | 100 | 0.013 | SWMM Methods 64 | IN1753-010 | 0 | IN1753-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-010 | 2 | | 1 | 0.403 | 154.39 | 100 | 0.013 | SWMM Methods 64 | IN1753-010 | 1 | IN1753-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-010 | 3 | | 1 | 1.227 | 154.39 | 0 | 0.013 | SWMM Methods 64 | IN1753-010 | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| IN1753-015 | 1 | 1 | 1 | 0.325 | 143.339 | 100 | 0.013 | SWMM Methods 64 | IN1753-015 | 0 | IN1753-015 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-015 | 2 | | 1 | 0.381 | 143.339 | 100 | 0.013 | SWMM Methods 64 | IN1753-015 | 1 | IN1753-015 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-015 | 3 | | 1 | 0.596 | 143.339 | 0 | 0.013 | SWMM Methods 64 | IN1753-015 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-018 | 1 | 1 | 1 | 0.578 | 100.822 | 100 | 0.018 | SWMM Methods 64 | IN1753-018 | 0 | IN1753-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-018 | 2 | | 1 | 0.264 | 100.822 | 100 | 0.018 | SWMM Methods 64 | IN1753-018 | 1 | IN1753-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-018 | 3 | | 1 | 0.898 | 100.822 | 0 | 0.018 | SWMM Methods 64 | IN1753-018 | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| IN1753-023 | 1 | 1 | 1 | 0.311 | 197.036 | 100 | 0.019 | SWMM Methods 64 | IN1753-023 | 0 | IN1753-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-023 | 2 | | 1 | 0.369 | 197.036 | 100 | 0.019 | SWMM Methods 64 | IN1753-023 | 1 | IN1753-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1753-023 | 3 | | 1 | 1.27 | 197.036 | 0 | 0.019 | SWMM Methods 64 | IN1753-023 | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| IN1753-026 | 1 | 1 | 1 | 0.248 | 195.619 | 100 | 0.019 | SWMM Methods 64 | IN1753-026 | 0 | IN1753-026 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-026 | 2 | | 1 | 0.33 | 195.619 | 100 | 0.019 | SWMM Methods 64 | IN1753-026 | 1 | IN1753-026 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-026 | 3 | | 1 | 1.191 | 195.619 | 0 | 0.019 | SWMM Methods 64 | IN1753-026 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-040 | 1 | 1 | 1 | 0.864 | 882.349 | 100 | 0.034 | SWMM Methods 64 | IN1753-040 | 0 | IN1753-040 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1753-040 | 2 | | 1 | 1.023 | 882.349 | 100 | 0.034 | SWMM Methods 64 | IN1753-040 | 1 | IN1753-040 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1753-040 | 3 | | 1 | 4.071 | 882.349 | 0 | 0.034 | SWMM Methods 64 | IN1753-040 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1754-021 | 1 | 1 | 1 | 0.139 | 102.323 | 100 | 0.009 | SWMM Methods 64 | IN1754-021 | 0 | IN1754-021 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1754-021 | 2 | | 1 | 0.164 | 102.323 | 100 | 0.009 | SWMM Methods 64 | IN1754-021 | 1 | IN1754-021 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1754-021 | 3 | | 1 | 0.65 | 102.323 | 0 | 0.009 | SWMM Methods 64 | IN1754-021 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1754-023 | 1 | 1 | 1 | 0.232 | 182.976 | 100 | 0.031 | SWMM Methods 64 | IN1754-023 | 0 | IN1754-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1754-023 | 2 | | 1 | 0.1 | 182.976 | 100 | 0.031 | SWMM Methods 64 | IN1754-023 | 1 | IN1754-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1754-023 | 3 | | 1 | 0.536 | 182.976 | 0 | 0.031 | SWMM Methods 64 | IN1754-023 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1754-030 | 1 | 1 | 1 | 0.625 | 193.508 | 100 | 0.058 | SWMM Methods 64 | IN1754-030 | 0 | IN1754-030 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1754-030 | 3 | | 1 | 2.37 | 193.508 | 0 | 0.058 | SWMM Methods 64 | IN1754-030 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1847-003 | 1 | 1 | 1 | 0.829 | 378.294 | 100 | 0.042 | SWMM Methods 64 | IN1847-003 | 0 | IN1847-003 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1847-003 | 2 | | 1 | 0.255 | 378.294 | 100 | 0.042 | SWMM Methods 64 | IN1847-003 | 1 | IN1847-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1847-003 | 3 | | 1 | 1.476 | 378.294 | 0 | 0.042 | SWMM Methods 64 | IN1847-003 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1847-017 | 1 | 1 | 1 | 2.774 | 396.18 | 100 | 0.041 | SWMM Methods 64 | IN1847-017 | 0 | IN1847-017 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1847-017 | 2 | | 1 | 1.255 | 396.18 | 100 | 0.041 | SWMM Methods 64 | IN1847-017 | 1 | IN1847-017 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1847-017 | 3 | | 1 | 6.222 | 396.18 | 0 | 0.041 | SWMM Methods 64 | IN1847-017 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1848-004 | 1 | 1 | 1 | 0.078 | 103.46 | 100 | 0.044 | SWMM Methods 64 | IN1848-004 | 0 | IN1848-004 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1848-004 | 2 | | 1 | 0.093 | 103.46 | 100 | 0.044 | SWMM Methods 64 | IN1848-004 | 1 | IN1848-004 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1848-004 | 3 | | 1 | 0.404 | 103.46 | 0 | 0.044 | SWMM Methods 64 | IN1848-004 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN1848-007 | 1 | 1 | 1 | 0.371 | 605.863 | 100 | 0.086 | SWMM Methods 64 | IN1848-007 | 0 | IN1848-007 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1848-007 | 2 | | 1 | 0.336 | 605.863 | 100 | 0.086 | SWMM Methods 64 | IN1848-007 | 1 | IN1848-007 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1848-007 | 3 | | 1 | 2.137 | 605.863 | 0 | 0.086 | SWMM Methods 64 | IN1848-007 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN1848-010 | 1 | 1 | 1 | 0.073 | 105.128 | 100 | 0.064 | SWMM Methods 64 | IN1848-010 | 0 | IN1848-010 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1848-010 | 2 | | 1 | 0.093 | 105.128 | 100 | 0.064 | SWMM Methods 64 | IN1848-010 | 1 | IN1848-010 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1848-010 | 3 | | 1 | 0.636 | 105.128 | 0 | 0.064 | SWMM Methods 64 | IN1848-010 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN1849-004 | 1 | 1 | 1 | 0.766 | 249.527 | 100 | 0.023 | SWMM Methods 64 | IN1849-004 | 0 | IN1849-004 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1849-004 | 2 | | 1 | 0.28 | 249.527 | 100 | 0.023 | SWMM Methods 64 | IN1849-004 | 1 | IN1849-004 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1849-004 | 3 | | 1 | 1.633 | 249.527 | 0 | 0.023 | SWMM Methods 64 | IN1849-004 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1849-018 | 1 | 1 | 1 | 3.477 | 312.981 | 100 | 0.016 | SWMM Methods 64 | IN1849-018 | 0 | IN1849-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1849-018 | 2 | | 1 | 0.213 | 312.981 | 100 | 0.016 | SWMM Methods 64 | IN1849-018 | 1 | IN1849-018 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1849-018 | 3 | | 1 | 1.279 | 312.981 | 0 | 0.016 | SWMM Methods 64 | IN1849-018 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1947-008 | 1 | 1 | 1 | 0.553 | 267.841 | 100 | 0.069 | SWMM Methods 64 | IN1947-008 | 0 | IN1947-008 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1947-008 | 2 | | 1 | 0.374 | 267.841 | 100 | 0.069 | SWMM Methods 64 | IN1947-008 | 1 | IN1947-008 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1947-008 | 3 | | 1 | 2.458 | 267.841 | 0 | 0.069 | SWMM Methods 64 | IN1947-008 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1947-013 | 1 | 1 | 1 | 0.813 | 390.426 | 100 | 0.034 | SWMM Methods 64 | IN1947-013 | 0 | IN1947-013 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1947-013 | 2 | | 1 | 0.552 | 390.426 | 100 | 0.034 | SWMM Methods 64 | IN1947-013 | 1 | IN1947-013 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1947-013 | 3 | | 1 | 2.919 | 390.426 | 0 | 0.034 | SWMM Methods 64 | IN1947-013 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1947-016 | 1 | 1 | 1 | 1.043 | 299.982 | 100 | 0.031 | SWMM Methods 64 | IN1947-016 | 0 | IN1947-016 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1947-016 | 2 | | 1 | 0.571 | 299.982 | 100 | 0.031 | SWMM Methods 64 | IN1947-016 | 1 | IN1947-016 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1947-016 | 3 | | 1 | 4.152 | 299.982 | 0 | 0.031 | SWMM Methods 64 | IN1947-016 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN1947-018 | 1 | 1 | 1 | 0.591 | 161.865 | 100 | 0.069 | SWMM Methods 64 | IN1947-018 | 0 | IN1947-018 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1947-018 | 2 | | 1 | 0.162 | 161.865 | 100 | 0.069 | SWMM Methods 64 | IN1947-018 | 1 | IN1947-018 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1947-018 | 3 | | 1 | 0.967 | 161.865 | 0 | 0.069 | SWMM Methods 64 | IN1947-018 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN1947-019 | 1 | 1 | 1 | 0.415 | 214.614 | 100 | 0.02 | SWMM Methods 64 | IN1947-019 | 0 | IN1947-019 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1947-019 | 2 | | 1 | 0.028 | 214.614 | 100 | 0.02 | SWMM Methods 64 | IN1947-019 | 1 | IN1947-019 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1947-019 | 3 | | 1 | 0.426 | 214.614 | 0 | 0.02 | SWMM Methods 64 | IN1947-019 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1948-002 | 1 | 1 | 1 | 1.096 | 392.572 | 100 | 0.05 | SWMM Methods 64 | IN1948-002 | 0 | IN1948-002 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1948-002 | 2 | | 1 | 0.468 | 392.572 | 100 | 0.05 | SWMM Methods 64 | IN1948-002 | 1 | IN1948-002 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1948-002 | 3 | | 1 | 2.659 | 392.572 | 0 | 0.05 | SWMM Methods 64 | IN1948-002 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1949-004 | 1 | 1 | 1 | 1.344 | 302.493 | 100 | 0.074 | SWMM Methods 64 | IN1949-004 | 0 | IN1949-004 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1949-004 | 2 | | 1 | 0.348 | 302.493 | 100 | 0.074 | SWMM Methods 64 | IN1949-004 | 1 | IN1949-004 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1949-004 | 3 | | 1 | 3.141 | 302.493 | 0 | 0.074 | SWMM Methods 64 | IN1949-004 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1949-010 | 1 | 1 | 1 | 2.509 | 306.983 | 100 | 0.056 | SWMM Methods 64 | IN1949-010 | 0 | IN1949-010 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1949-010 | 2 | | 1 | 0.116 | 306.983 | 100 | 0.056 | SWMM Methods 64 | IN1949-010 | 1 | IN1949-010 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1949-010 | 3 | | 1 | 3.157 | 306.983 | 0 | 0.056 | SWMM Methods 64 | IN1949-010 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1949-039 | 1 | 1 | 1 | 1.865 | 526.308 | 100 | 0.052 | SWMM Methods 64 | IN1949-039 | 0 | IN1949-039 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1949-039 | 3 | | 1 | 1.572 | 526.308 | 0 | 0.052 | SWMM Methods 64 | IN1949-039 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1950-010 | 1 | 1 | 1 | 0.245 | 211.69 | 100 | 0.021 | SWMM Methods 64 | IN1950-010 | 0 | IN1950-010 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1950-010 | 3 | | 1 | 1.207 | 211.69 | 0 | 0.021 | SWMM Methods 64 | IN1950-010 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1955-001 | 1 | 1 | 1 | 0.858 | 116.254 | 100 | 0.029 | SWMM Methods 64 | IN1955-001 | 0 | IN1955-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1955-001 | 3 | | 1 | 0.638 | 116.254 | 0 | 0.029 | SWMM Methods 64 | IN1955-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-003 | 1 | 1 | 1 | 1.044 | 446.918 | 100 | 0.08 | SWMM Methods 64 | IN1956-003 | 0 | IN1956-003 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1956-003 | 3 | | 1 | 1.516 | 446.918 | 0 | 0.08 | SWMM Methods 64 | IN1956-003 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-007 | 1 | 1 | 1 | 1.364 | 426.678 | 100 | 0.076 | SWMM Methods 64 | IN1956-007 | 0 | IN1956-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1956-007 | 3 | | 1 | 2.584 | 426.678 | 0 | 0.076 | SWMM Methods 64 | IN1956-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-014 | 1 | 1 | 1 | 1.415 | 401.256 | 100 | 0.043 | SWMM Methods 64 | IN1956-014 | 0 | IN1956-014 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1956-014 | 2 | | 1 | 0.053 | 401.256 | 100 | 0.043 | SWMM Methods 64 | IN1956-014 | 1 | IN1956-014 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-014 | 3 | | 1 | 7.459 | 401.256 | 0 | 0.043 | SWMM Methods 64 | IN1956-014 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-014-2 | 1 | 1 | 1 | 0.259 | 743.725 | 100 | 0.049 | SWMM Methods 64 | IN1956-014-2 | 0 | IN1956-014-2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1956-014-2 | 3 | | 1 | 16.284 | 743.725 | 0 | 0.049 | SWMM Methods 64 | IN1956-014-2 | 0 | | SubCatchment 1 | No Redirection | |
| IN1956-017 | 1 | 1 | 1 | 2.127 | 329.188 | 100 | 0.026 | SWMM Methods 64 | IN1956-017 | 0 | IN1956-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1956-017 | 2 | | 1 | 0.002 | 329.188 | 100 | 0.026 | SWMM Methods 64 | IN1956-017 | 1 | IN1956-017 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-017 | 3 | | 1 | 7.382 | 329.188 | 0 | 0.026 | SWMM Methods 64 | IN1956-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1956-017-2 | 1 | 1 | 1 | 0.03 | 812.259 | 100 | 0.028 | SWMM Methods 64 | IN1956-017-2 | 0 | IN1956-017-2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1956-017-2 | 2 | | 1 | 0.035 | 812.259 | 100 | 0.028 | SWMM Methods 64 | IN1956-017-2 | 0 | IN1956-017-2 | SubCatchment 3 | No Redirection | |
| IN1956-017-2 | 3 | | 1 | 12.894 | 812.259 | 0 | 0.028 | SWMM Methods 64 | IN1956-017-2 | 0 | | SubCatchment 1 | No Redirection | |
| IN1958-001 | 1 | 1 | 1 | 0.787 | 95.758 | 100 | 0.003 | SWMM Methods 64 | IN1958-001 | 0 | IN1958-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1958-001 | 2 | | 1 | 0.007 | 95.758 | 100 | 0.003 | SWMM Methods 64 | IN1958-001 | 1 | IN1958-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1958-001 | 3 | | 1 | 0.843 | 95.758 | 0 | 0.003 | SWMM Methods 64 | IN1958-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2047-023 | 1 | 1 | 1 | 3.635 | 746.675 | 100 | 0.032 | SWMM Methods 64 | IN2047-023 | 0 | IN2047-023 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2047-023 | 2 | | 1 | 0.019 | 746.675 | 100 | 0.032 | SWMM Methods 64 | IN2047-023 | 1 | IN2047-023 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2047-023 | 3 | | 1 | 10.744 | 746.675 | 0 | 0.032 | SWMM Methods 64 | IN2047-023 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2050-009 | 1 | 1 | 1 | 1.036 | 452.87 | 100 | 0.03 | SWMM Methods 64 | IN2050-009 | 0 | IN2050-009 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2050-009 | 2 | | 1 | 0.071 | 452.87 | 100 | 0.03 | SWMM Methods 64 | IN2050-009 | 1 | IN2050-009 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2050-009 | 3 | | 1 | 3.695 | 452.87 | 0 | 0.03 | SWMM Methods 64 | IN2050-009 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2051-008 | 1 | 1 | 1 | 1.13 | 396.135 | 100 | 0.013 | SWMM Methods 64 | IN2051-008 | 0 | IN2051-008 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2051-008 | 2 | | 1 | 0.21 | 396.135 | 100 | 0.013 | SWMM Methods 64 | IN2051-008 | 1 | IN2051-008 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2051-008 | 3 | | 1 | 1.235 | 396.135 | 0 | 0.013 | SWMM Methods 64 | IN2051-008 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2051-048 | 1 | 1 | 1 | 0.459 | 275.348 | 100 | 0.021 | SWMM Methods 64 | IN2051-048 | 0 | IN2051-048 | SubCatchment 3 | No Redirection | Swallowtail Park |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2051-048 | 2 | | 1 | 0.04 | 275.348 | 100 | 0.021 | SWMM Methods 64 | IN2051-048 | 1 | IN2051-048 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2051-048 | 3 | | 1 | 0.555 | 275.348 | 0 | 0.021 | SWMM Methods 64 | IN2051-048 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2051-056 | 1 | 1 | 1 | 2.444 | 498.931 | 100 | 0.01 | SWMM Methods 64 | IN2051-056 | 0 | IN2051-056 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2051-056 | 2 | | 1 | 1.26 | 498.931 | 100 | 0.01 | SWMM Methods 64 | IN2051-056 | 1 | IN2051-056 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2051-056 | 3 | | 1 | 5.222 | 498.931 | 0 | 0.01 | SWMM Methods 64 | IN2051-056 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2052-004 | 1 | 1 | 1 | 1.322 | 304.142 | 100 | 0.023 | SWMM Methods 64 | IN2052-004 | 0 | IN2052-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2052-004 | 2 | | 1 | 0.779 | 304.142 | 100 | 0.023 | SWMM Methods 64 | IN2052-004 | 1 | IN2052-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2052-004 | 3 | | 1 | 1.766 | 304.142 | 0 | 0.023 | SWMM Methods 64 | IN2052-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2052-009 | 1 | 1 | 1 | 2.002 | 734.448 | 100 | 0.017 | SWMM Methods 64 | IN2052-009 | 0 | IN2052-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2052-009 | 2 | | 1 | 0.932 | 734.448 | 100 | 0.017 | SWMM Methods 64 | IN2052-009 | 1 | IN2052-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2052-009 | 3 | | 1 | 2.89 | 734.448 | 0 | 0.017 | SWMM Methods 64 | IN2052-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2052-026 | 1 | 1 | 1 | 2.034 | 402.283 | 100 | 0.037 | SWMM Methods 64 | IN2052-026 | 0 | IN2052-026 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2052-026 | 2 | | 1 | 1.352 | 402.283 | 100 | 0.037 | SWMM Methods 64 | IN2052-026 | 1 | IN2052-026 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2052-026 | 3 | | 1 | 1.772 | 402.283 | 0 | 0.037 | SWMM Methods 64 | IN2052-026 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2053-004 | 1 | 1 | 1 | 0.989 | 190.496 | 100 | 0.018 | SWMM Methods 64 | IN2053-004 | 0 | IN2053-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2053-004 | 2 | | 1 | 0.267 | 190.496 | 100 | 0.018 | SWMM Methods 64 | IN2053-004 | 1 | IN2053-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2053-004 | 3 | | 1 | 1.636 | 190.496 | 0 | 0.018 | SWMM Methods 64 | IN2053-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2055-007 | 1 | 1 | 1 | 1.135 | 384.902 | 100 | 0.049 | SWMM Methods 64 | IN2055-007 | 0 | IN2055-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2055-007 | 3 | | 1 | 0.8 | 384.902 | 0 | 0.049 | SWMM Methods 64 | IN2055-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2056-009 | 1 | 1 | 1 | 0.817 | 253.414 | 100 | 0.029 | SWMM Methods 64 | IN2056-009 | 0 | IN2056-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2056-009 | 3 | | 1 | 0.266 | 253.414 | 0 | 0.029 | SWMM Methods 64 | IN2056-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2056-039 | 1 | 1 | 1 | 0.409 | 97.474 | 100 | 0.021 | SWMM Methods 64 | IN2056-039 | 0 | IN2056-039 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2056-039 | 3 | | 1 | 0.116 | 97.474 | 0 | 0.021 | SWMM Methods 64 | IN2056-039 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2056-043 | 1 | 1 | 1 | 0.957 | 203.629 | 100 | 0.041 | SWMM Methods 64 | IN2056-043 | 0 | IN2056-043 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2056-043 | 3 | | 1 | 0.81 | 203.629 | 0 | 0.041 | SWMM Methods 64 | IN2056-043 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2145-012 | 1 | 1 | 1 | 3.673 | 363.291 | 100 | 0.003 | SWMM Methods 64 | IN2145-012 | 0 | IN2145-012 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2145-012 | 2 | | 1 | 1.849 | 363.291 | 100 | 0.003 | SWMM Methods 64 | IN2145-012 | 1 | IN2145-012 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2145-012 | 3 | | 1 | 5.987 | 363.291 | 0 | 0.003 | SWMM Methods 64 | IN2145-012 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2150-021 | 1 | 1 | 1 | 1.727 | 585.731 | 100 | 0.061 | SWMM Methods 64 | IN2150-007 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN2150-021 | 2 | | 1 | 0.714 | 585.731 | 100 | 0.061 | SWMM Methods 64 | IN2150-007 | 1 | IN2150-021 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2150-021 | 3 | | 1 | 10.725 | 585.73 | 0 | 0.061 | SWMM Methods 64 | IN2150-007 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2150-045 | 1 | 1 | 1 | 5.292 | 743.768 | 100 | 0.001 | SWMM Methods 64 | IN2150-045 | 0 | IN2150-045 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2150-045 | 2 | | 1 | 0.064 | 743.768 | 100 | 0.001 | SWMM Methods 64 | IN2150-045 | 1 | IN2150-045 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2150-045 | 3 | | 1 | 2.23 | 743.768 | 0 | 0.001 | SWMM Methods 64 | IN2150-045 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2152-007 | 1 | 1 | 1 | 1.343 | 191.372 | 100 | 0.011 | SWMM Methods 64 | IN2152-007 | 0 | IN2152-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2152-007 | 2 | | 1 | 0.326 | 191.372 | 100 | 0.011 | SWMM Methods 64 | IN2152-007 | 1 | IN2152-007 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2152-007 | 3 | | 1 | 2.089 | 191.372 | 0 | 0.011 | SWMM Methods 64 | IN2152-007 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2152-016 | 1 | 1 | 1 | 1.009 | 174.595 | 100 | 0.009 | SWMM Methods 64 | IN2152-016 | 0 | IN2152-016 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2152-016 | 2 | | 1 | 0.228 | 174.595 | 100 | 0.009 | SWMM Methods 64 | IN2152-016 | 1 | IN2152-016 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2152-016 | 3 | | 1 | 1.529 | 174.595 | 0 | 0.009 | SWMM Methods 64 | IN2152-016 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2155-007 | 1 | 1 | 1 | 3.544 | 355.041 | 100 | 0.014 | SWMM Methods 64 | IN2155-007 | 0 | IN2155-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2155-007 | 2 | | 1 | 0.013 | 355.041 | 100 | 0.014 | SWMM Methods 64 | IN2155-007 | 1 | IN2155-007 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2155-007 | 3 | | 1 | 5.888 | 355.041 | 0 | 0.014 | SWMM Methods 64 | IN2155-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2156-072 | 1 | 1 | 1 | 2.342 | 173.634 | 100 | 0.008 | SWMM Methods 64 | IN2156-072 | 0 | IN2156-072 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2156-072 | 2 | | 1 | 0.001 | 173.634 | 100 | 0.008 | SWMM Methods 64 | IN2156-072 | 1 | IN2156-072 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2156-072 | 3 | | 1 | 0.416 | 173.634 | 0 | 0.008 | SWMM Methods 64 | IN2156-072 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2158-009 | 1 | 1 | 1 | 1.398 | 288.817 | 100 | 0.022 | SWMM Methods 64 | IN2158-009 | 0 | IN2158-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2158-009 | 3 | | 1 | 0.415 | 288.817 | 0 | 0.022 | SWMM Methods 64 | IN2158-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2158-017 | 1 | 1 | 1 | 0.843 | 233.989 | 100 | 0.05 | SWMM Methods 64 | IN2158-017 | 0 | IN2158-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2158-017 | 2 | | 1 | 0.277 | 233.989 | 100 | 0.05 | SWMM Methods 64 | IN2158-017 | 1 | IN2158-017 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2158-017 | 3 | | 1 | 6.897 | 233.989 | 0 | 0.05 | SWMM Methods 64 | IN2158-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2159-002 | 1 | 1 | 1 | 1.197 | 344.305 | 100 | 0.065 | SWMM Methods 64 | IN2159-002 | 0 | IN2159-002 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2159-002 | 2 | | 1 | 0.247 | 344.305 | 100 | 0.065 | SWMM Methods 64 | IN2159-002 | 1 | IN2159-002 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2159-002 | 3 | | 1 | 9.008 | 344.305 | 0 | 0.065 | SWMM Methods 64 | IN2159-002 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2159-009 | 1 | 1 | 1 | 0.654 | 261.336 | 100 | 0.084 | SWMM Methods 64 | IN2159-009 | 0 | IN2159-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2159-009 | 3 | | 1 | 3.7 | 261.336 | 0 | 0.084 | SWMM Methods 64 | IN2159-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2246-002 | 1 | 1 | 1 | 3.41 | 515.767 | 100 | 0.016 | SWMM Methods 64 | IN2246-002 | 0 | IN2246-002 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2246-002 | 2 | | 1 | 0.258 | 515.767 | 100 | 0.016 | SWMM Methods 64 | IN2246-002 | 1 | IN2246-002 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2246-002 | 3 | | 1 | 2.28 | 515.767 | 0 | 0.016 | SWMM Methods 64 | IN2246-002 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2247-013 | 1 | 1 | 1 | 3.412 | 378.973 | 100 | 0.008 | SWMM Methods 64 | IN2247-013 | 0 | IN2247-013 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2247-013 | 2 | | 1 | 0.057 | 378.973 | 100 | 0.008 | SWMM Methods 64 | IN2247-013 | 1 | IN2247-013 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2247-013 | 3 | | 1 | 2.592 | 378.973 | 0 | 0.008 | SWMM Methods 64 | IN2247-013 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2249-003 | 1 | 1 | 1 | 11.062 | 698.991 | 100 | 0.037 | SWMM Methods 64 | IN2249-003 | 0 | IN2249-003 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2249-003 | 2 | | 1 | 0.148 | 698.991 | 100 | 0.037 | SWMM Methods 64 | IN2249-003 | 1 | IN2249-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2249-003 | 3 | | 1 | 8.719 | 698.991 | 0 | 0.037 | SWMM Methods 64 | IN2249-003 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2249-024 | 1 | 1 | 1 | 0.568 | 243.777 | 100 | 0.01 | SWMM Methods 64 | IN2249-024 | 0 | IN2249-024 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2249-024 | 3 | | 1 | 0.219 | 243.777 | 0 | 0.01 | SWMM Methods 64 | IN2249-024 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2249-028 | 1 | 1 | 1 | 2.142 | 249.336 | 100 | 0.021 | SWMM Methods 64 | IN2249-028 | 0 | IN2249-028 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2249-028 | 3 | | 1 | 1.693 | 249.336 | 0 | 0.021 | SWMM Methods 64 | IN2249-028 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2250-026 | 1 | 1 | 1 | 1.556 | 242.211 | 100 | 0.012 | SWMM Methods 64 | IN2250-026 | 0 | IN2250-026 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2250-026 | 2 | | 1 | 0.152 | 242.211 | 100 | 0.012 | SWMM Methods 64 | IN2250-026 | 1 | IN2250-026 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2250-026 | 3 | | 1 | 0.43 | 242.211 | 0 | 0.012 | SWMM Methods 64 | IN2250-026 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2251-024 | 1 | 1 | 1 | 0.9 | 168.137 | 100 | 0.018 | SWMM Methods 64 | IN2251-024 | 0 | IN2251-024 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2251-024 | 2 | | 1 | 0.04 | 168.137 | 100 | 0.018 | SWMM Methods 64 | IN2251-024 | 1 | IN2251-024 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2251-024 | 3 | | 1 | 0.605 | 168.137 | 0 | 0.018 | SWMM Methods 64 | IN2251-024 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2251-027 | 1 | 1 | 1 | 1.912 | 390.443 | 100 | 0.021 | SWMM Methods 64 | IN2251-027 | 0 | IN2251-027 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2251-027 | 2 | | 1 | 1.452 | 390.443 | 100 | 0.021 | SWMM Methods 64 | IN2251-027 | 1 | IN2251-027 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2251-027 | 3 | | 1 | 1.703 | 390.443 | 0 | 0.021 | SWMM Methods 64 | IN2251-027 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2255-002 | 1 | 1 | 1 | 15.441 | 1386.713 | 100 | 0.013 | SWMM Methods 64 | IN2255-002 | 0 | IN2255-002 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2255-002 | 3 | | 1 | 2.56 | 1386.713 | 0 | 0.013 | SWMM Methods 64 | IN2255-002 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2256-023 | 1 | 1 | 1 | 0.201 | 90.622 | 100 | 0.01 | SWMM Methods 64 | IN2256-023 | 0 | IN2256-023 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2256-023 | 3 | | 1 | 0.076 | 90.622 | 0 | 0.01 | SWMM Methods 64 | IN2256-023 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2256-048 | 1 | 1 | 1 | 2.414 | 293.681 | 100 | 0.013 | SWMM Methods 64 | IN2256-048 | 0 | IN2256-048 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2256-048 | 3 | | 1 | 0.751 | 293.681 | 0 | 0.013 | SWMM Methods 64 | IN2256-048 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2256-053 | 1 | 1 | 1 | 1.718 | 319.925 | 100 | 0.014 | SWMM Methods 64 | IN2256-053 | 0 | IN2256-053 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2256-053 | 2 | | 1 | 0.001 | 319.925 | 100 | 0.014 | SWMM Methods 64 | IN2256-053 | 1 | IN2256-053 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2256-053 | 3 | | 1 | 0.476 | 319.925 | 0 | 0.014 | SWMM Methods 64 | IN2256-053 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2257-028 | 1 | 1 | 1 | 1.766 | 467.355 | 100 | 0.054 | SWMM Methods 64 | IN2257-028 | 0 | IN2257-028 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2257-028 | 2 | | 1 | 0.169 | 467.355 | 100 | 0.054 | SWMM Methods 64 | IN2257-028 | 1 | IN2257-028 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2257-028 | 3 | | 1 | 2.743 | 467.355 | 0 | 0.054 | SWMM Methods 64 | IN2257-028 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2258-025 | 1 | 1 | 1 | 1.145 | 351.796 | 100 | 0.027 | SWMM Methods 64 | IN2258-025 | 0 | IN2258-025 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-025 | 2 | | 1 | 0.038 | 351.796 | 100 | 0.027 | SWMM Methods 64 | IN2258-025 | 1 | IN2258-025 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2258-025 | 3 | | 1 | 1.484 | 351.796 | 0 | 0.027 | SWMM Methods 64 | IN2258-025 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2258-027 | 1 | 1 | 1 | 1.516 | 791.64 | 100 | 0.01 | SWMM Methods 64 | IN2258-027 | 0 | IN2258-027 | SubCatchment 3 | No Redirection | UW Ag Research Stati |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2258-027 | 2 | | 1 | 0.046 | 791.64 | 100 | 0.01 | SWMM Methods 64 | IN2258-027 | 1 | IN2258-027 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2258-027 | 3 | | 1 | 1.991 | 791.64 | 0 | 0.01 | SWMM Methods 64 | IN2258-027 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2258-054 | 1 | 1 | 1 | 1.061 | 380.798 | 100 | 0.028 | SWMM Methods 64 | IN2258-054 | 0 | IN2258-054 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-054 | 2 | | 1 | 0.047 | 380.798 | 100 | 0.028 | SWMM Methods 64 | IN2258-054 | 1 | IN2258-054 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2258-054 | 3 | | 1 | 1.018 | 380.798 | 0 | 0.028 | SWMM Methods 64 | IN2258-054 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2258-074 | 1 | 1 | 1 | 1.98 | 186.974 | 100 | 0.005 | SWMM Methods 64 | IN2258-074 | 0 | IN2258-074 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-074 | 3 | | 1 | 0.394 | 186.974 | 0 | 0.005 | SWMM Methods 64 | IN2258-074 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2347-005 | 1 | 1 | 1 | 3.175 | 629.731 | 100 | 0.005 | SWMM Methods 64 | IN2347-005 | 0 | IN2347-005 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2347-005 | 2 | | 1 | 0.816 | 629.731 | 100 | 0.005 | SWMM Methods 64 | IN2347-005 | 1 | IN2347-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2347-005 | 3 | | 1 | 7.257 | 629.731 | 0 | 0.005 | SWMM Methods 64 | IN2347-005 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2347-020 | 1 | 1 | 1 | 1.49 | 374.458 | 100 | 0.01 | SWMM Methods 64 | IN2347-020 | 0 | IN2347-020 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2347-020 | 2 | | 1 | 0.561 | 374.458 | 100 | 0.01 | SWMM Methods 64 | IN2347-020 | 1 | IN2347-020 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2347-020 | 3 | | 1 | 4.065 | 374.458 | 0 | 0.01 | SWMM Methods 64 | IN2347-020 | 0 | | SubCatchment 1 | No Redirection | Strickers Forebay 18 |
| IN2348-003 | 1 | 1 | 1 | 2.374 | 369.142 | 100 | 0.027 | SWMM Methods 64 | IN2348-003 | 0 | IN2348-003 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2348-003 | 2 | | 1 | 0.046 | 369.142 | 100 | 0.027 | SWMM Methods 64 | IN2348-003 | 1 | IN2348-003 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2348-003 | 3 | | 1 | 3.872 | 369.142 | 0 | 0.027 | SWMM Methods 64 | IN2348-003 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2349-002 | 1 | 1 | 1 | 3.739 | 478.94 | 100 | 0.026 | SWMM Methods 64 | IN2349-002 | 0 | IN2349-002 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2349-002 | 2 | | 1 | 0.045 | 478.94 | 100 | 0.026 | SWMM Methods 64 | IN2349-002 | 1 | IN2349-002 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2349-002 | 3 | | 1 | 2.854 | 478.94 | 0 | 0.026 | SWMM Methods 64 | IN2349-002 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2350-004 | 1 | 1 | 1 | 3.501 | 263.521 | 100 | 0.022 | SWMM Methods 64 | IN2350-004 | 0 | IN2350-004 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2350-004 | 2 | | 1 | 0.063 | 263.521 | 100 | 0.022 | SWMM Methods 64 | IN2350-004 | 1 | IN2350-004 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2350-004 | 3 | | 1 | 1.856 | 263.521 | 0 | 0.022 | SWMM Methods 64 | IN2350-004 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2350-029 | 1 | 1 | 1 | 2.513 | 349.385 | 100 | 0.029 | SWMM Methods 64 | IN2350-029 | 0 | IN2350-029 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2350-029 | 2 | | 1 | 0.454 | 349.385 | 100 | 0.029 | SWMM Methods 64 | IN2350-029 | 1 | IN2350-029 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2350-029 | 3 | | 1 | 3.81 | 349.385 | 0 | 0.029 | SWMM Methods 64 | IN2350-029 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2351-006 | 1 | 1 | 1 | 0.31 | 185.338 | 100 | 0.026 | SWMM Methods 64 | IN2351-006 | 0 | IN2351-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2351-006 | 2 | | 1 | 0.091 | 185.338 | 100 | 0.026 | SWMM Methods 64 | IN2351-006 | 1 | IN2351-006 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2351-006 | 3 | | 1 | 1.075 | 185.338 | 0 | 0.026 | SWMM Methods 64 | IN2351-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2353-006 | 1 | 1 | 1 | 2.546 | 399.588 | 100 | 0.011 | SWMM Methods 64 | IN2353-006 | 0 | IN2353-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2353-006 | 2 | | 1 | 0.605 | 399.588 | 100 | 0.011 | SWMM Methods 64 | IN2353-006 | 1 | IN2353-006 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2353-006 | 3 | | 1 | 6.677 | 399.588 | 0 | 0.011 | SWMM Methods 64 | IN2353-006 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2355-006 | 1 | 1 | 1 | 3.331 | 672.943 | 100 | 0.013 | SWMM Methods 64 | IN2355-006 | 0 | IN2355-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2355-006 | 2 | | 1 | 0.092 | 672.943 | 100 | 0.013 | SWMM Methods 64 | IN2355-006 | 1 | IN2355-006 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2355-006 | 3 | | 1 | 0.932 | 672.943 | 0 | 0.013 | SWMM Methods 64 | IN2355-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2355-040 | 1 | 1 | 1 | 1.393 | 189.717 | 100 | 0.03 | SWMM Methods 64 | IN2355-040 | 0 | IN2355-040 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2355-040 | 3 | | 1 | 0.505 | 189.717 | 0 | 0.03 | SWMM Methods 64 | IN2355-040 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2356-006 | 1 | 1 | 1 | 4.717 | 261.772 | 100 | 0.033 | SWMM Methods 64 | IN2356-006 | 0 | IN2356-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2356-006 | 2 | | 1 | 0.066 | 261.772 | 100 | 0.033 | SWMM Methods 64 | IN2356-006 | 1 | IN2356-006 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2356-006 | 3 | | 1 | 1.754 | 261.772 | 0 | 0.033 | SWMM Methods 64 | IN2356-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2356-025 | 1 | 1 | 1 | 4.581 | 145.503 | 100 | 0.023 | SWMM Methods 64 | IN2356-025 | 0 | IN2356-025 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2356-025 | 3 | | 1 | 2.362 | 145.503 | 0 | 0.023 | SWMM Methods 64 | IN2356-025 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2358-013 | 1 | 1 | 1 | 3.901 | 409.377 | 100 | 0.022 | SWMM Methods 64 | IN2358-013 | 0 | IN2358-013 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2358-013 | 2 | | 1 | 0.005 | 409.377 | 100 | 0.022 | SWMM Methods 64 | IN2358-013 | 1 | IN2358-013 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2358-013 | 3 | | 1 | 1.532 | 409.377 | 0 | 0.022 | SWMM Methods 64 | IN2358-013 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2358-020 | 1 | 1 | 1 | 0.534 | 168.854 | 100 | 0.062 | SWMM Methods 64 | IN2358-020 | 0 | IN2358-020 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2358-020 | 3 | | 1 | 1.525 | 168.854 | 0 | 0.062 | SWMM Methods 64 | IN2358-020 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2447-001 | 1 | 1 | 1 | 1.373 | 433.573 | 100 | 0.016 | SWMM Methods 64 | IN2447-001 | 0 | IN2447-001 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2447-001 | 2 | | 1 | 0.547 | 433.573 | 100 | 0.016 | SWMM Methods 64 | IN2447-001 | 1 | IN2447-001 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2447-001 | 3 | | 1 | 3.952 | 433.573 | 0 | 0.016 | SWMM Methods 64 | IN2447-001 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2449-002 | 1 | 1 | 1 | 1.824 | 284.313 | 100 | 0.03 | SWMM Methods 64 | IN2449-002 | 0 | IN2449-002 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2449-002 | 2 | | 1 | 0.049 | 284.313 | 100 | 0.03 | SWMM Methods 64 | IN2449-002 | 1 | IN2449-002 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2449-002 | 3 | | 1 | 2.102 | 284.313 | 0 | 0.03 | SWMM Methods 64 | IN2449-002 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2451-009 | 1 | 1 | 1 | 2.191 | 651.232 | 100 | 0.019 | SWMM Methods 64 | IN2451-009 | 0 | IN2451-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2451-009 | 2 | | 1 | 1.168 | 651.232 | 100 | 0.019 | SWMM Methods 64 | IN2451-009 | 1 | IN2451-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2451-009 | 3 | | 1 | 8.779 | 651.232 | 0 | 0.019 | SWMM Methods 64 | IN2451-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2452-009 | 1 | 1 | 1 | 1.276 | 984.543 | 100 | 0.028 | SWMM Methods 64 | IN2452-009 | 0 | IN2452-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2452-009 | 2 | | 1 | 0.454 | 984.543 | 100 | 0.028 | SWMM Methods 64 | IN2452-009 | 1 | IN2452-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2452-009 | 3 | | 1 | 3.287 | 984.543 | 0 | 0.028 | SWMM Methods 64 | IN2452-009 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2453-004 | 1 | 1 | 1 | 1.437 | 294.822 | 100 | 0.039 | SWMM Methods 64 | IN2453-004 | 0 | IN2453-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2453-004 | 2 | | 1 | 0.441 | 294.822 | 100 | 0.039 | SWMM Methods 64 | IN2453-004 | 1 | IN2453-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2453-004 | 3 | | 1 | 4.363 | 294.822 | 0 | 0.039 | SWMM Methods 64 | IN2453-004 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2453-009 | 1 | 1 | 1 | 1.879 | 383.086 | 100 | 0.04 | SWMM Methods 64 | IN2453-009 | 0 | IN2453-009 | SubCatchment 3 | No Redirection | Memorial High School |
| IN2453-009 | 2 | | 1 | 0.65 | 383.086 | 100 | 0.04 | SWMM Methods 64 | IN2453-009 | 1 | IN2453-009 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2453-009 | 3 | | 1 | 5.922 | 383.086 | 0 | 0.04 | SWMM Methods 64 | IN2453-009 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2454-009 | 1 | 1 | 1 | 3.253 | 588.564 | 100 | 0.015 | SWMM Methods 64 | IN2454-009 | 0 | IN2454-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2454-009 | 2 | | 1 | 0.044 | 588.564 | 100 | 0.015 | SWMM Methods 64 | IN2454-009 | 1 | IN2454-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2454-009 | 3 | | 1 | 2.632 | 588.564 | 0 | 0.015 | SWMM Methods 64 | IN2454-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2455-017 | 1 | 1 | 1 | 2.992 | 326.672 | 100 | 0.032 | SWMM Methods 64 | IN2455-017 | 0 | IN2455-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2455-017 | 2 | | 1 | 0.039 | 326.672 | 100 | 0.032 | SWMM Methods 64 | IN2455-017 | 1 | IN2455-017 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2455-017 | 3 | | 1 | 1.047 | 326.672 | 0 | 0.032 | SWMM Methods 64 | IN2455-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2455-021 | 1 | 1 | 1 | 5.505 | 355.922 | 100 | 0.036 | SWMM Methods 64 | IN2455-021 | 0 | IN2455-021 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2455-021 | 2 | | 1 | 0.065 | 355.922 | 100 | 0.036 | SWMM Methods 64 | IN2455-021 | 1 | IN2455-021 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2455-021 | 3 | | 1 | 2.138 | 355.922 | 0 | 0.036 | SWMM Methods 64 | IN2455-021 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2456-003 | 1 | 1 | 1 | 3.981 | 407.481 | 100 | 0.04 | SWMM Methods 64 | IN2456-003 | 0 | IN2456-003 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2456-003 | 2 | | 1 | 0.25 | 407.481 | 100 | 0.04 | SWMM Methods 64 | IN2456-003 | 1 | IN2456-003 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2456-003 | 3 | | 1 | 2.712 | 407.481 | 0 | 0.04 | SWMM Methods 64 | IN2456-003 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2550-001 | 1 | 1 | 1 | 2.424 | 528.683 | 100 | 0.045 | SWMM Methods 64 | IN2550-001 | 0 | IN2550-001 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2550-001 | 2 | | 1 | 1.151 | 528.683 | 100 | 0.045 | SWMM Methods 64 | IN2550-001 | 1 | IN2550-001 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2550-001 | 3 | | 1 | 9.16 | 528.683 | 0 | 0.045 | SWMM Methods 64 | IN2550-001 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2550-021 | 1 | 1 | 1 | 2.366 | 257.309 | 100 | 0.025 | SWMM Methods 64 | IN2550-021 | 0 | IN2550-021 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2550-021 | 2 | | 1 | 0.063 | 257.309 | 100 | 0.025 | SWMM Methods 64 | IN2550-021 | 1 | IN2550-021 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2550-021 | 3 | | 1 | 2.224 | 257.309 | 0 | 0.025 | SWMM Methods 64 | IN2550-021 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2552-007 | 1 | 1 | 1 | 2.041 | 288.746 | 100 | 0.039 | SWMM Methods 64 | IN2552-007 | 0 | IN2552-007 | SubCatchment 3 | No Redirection | Memorial High School |
| IN2552-007 | 2 | | 1 | 0.721 | 288.746 | 100 | 0.039 | SWMM Methods 64 | IN2552-007 | 1 | IN2552-007 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2552-007 | 3 | | 1 | 5.143 | 288.746 | 0 | 0.039 | SWMM Methods 64 | IN2552-007 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2552-010 | 1 | 1 | 1 | 4.418 | 704.752 | 100 | 0.038 | SWMM Methods 64 | IN2552-010 | 0 | IN2552-010 | SubCatchment 3 | No Redirection | Memorial High School |
| IN2552-010 | 2 | | 1 | 1.375 | 704.752 | 100 | 0.038 | SWMM Methods 64 | IN2552-010 | 1 | IN2552-010 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2552-010 | 3 | | 1 | 10.316 | 704.752 | 0 | 0.038 | SWMM Methods 64 | IN2552-010 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2554-002 | 1 | 1 | 1 | 1.796 | 267.387 | 100 | 0.034 | SWMM Methods 64 | IN2554-002 | 0 | IN2554-002 | SubCatchment 3 | No Redirection | Memorial High School |
| IN2554-002 | 2 | | 1 | 0.222 | 267.387 | 100 | 0.034 | SWMM Methods 64 | IN2554-002 | 1 | IN2554-002 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN2554-002 | 3 | | 1 | 2.429 | 267.387 | 0 | 0.034 | SWMM Methods 64 | IN2554-002 | 0 | | SubCatchment 1 | No Redirection | Memorial HS 2018 |
| IN2650-005 | 1 | 1 | 1 | 2.75 | 592.679 | 100 | 0.035 | SWMM Methods 64 | IN2650-005 | 0 | IN2650-005 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN2650-005 | 2 | | 1 | 0.239 | 592.679 | 100 | 0.035 | SWMM Methods 64 | IN2650-005 | 1 | IN2650-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN2650-005 | 3 | | 1 | 6.573 | 592.679 | 0 | 0.035 | SWMM Methods 64 | IN2650-005 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JB2256-060 | 1 | 1 | 1 | 3.157 | 441.107 | 100 | 0.01 | SWMM Methods 64 | JB2256-060 | 0 | JB2256-060 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| JB2256-060 | 3 | | 1 | 1.147 | 441.107 | 0 | 0.01 | SWMM Methods 64 | JB2256-060 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| JCT_CT_POND_OUT | 1 | 1 | 1 | 5.586 | 360.821 | 100 | 0.017 | SWMM Methods 64 | JCT_CT_POND_( | 0 | JCT_CT_POND_C | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| JCT_CT_POND_OUT | 2 | | 1 | 0.084 | 360.821 | 100 | 0.017 | SWMM Methods 64 | JCT_CT_POND_( | 1 | JCT_CT_POND_C | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| JCT_CT_POND_OUT | 3 | | 1 | 2.856 | 360.821 | 0 | 0.017 | SWMM Methods 64 | JCT_CT_POND_( | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| JUNCTION_LOOP_POND | 1 | 1 | 1 | 1.966 | 381.673 | 100 | 0.038 | SWMM Methods 64 | JUNCTION_LOO | 0 | JUNCTION_LOOP | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| JUNCTION_LOOP_POND | 3 | | 1 | 2.753 | 381.673 | 0 | 0.038 | SWMM Methods 64 | JUNCTION_LOO | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| JUNCTION_RIDGE_POND | 1 | 1 | 1 | 9.902 | 870.593 | 100 | 0.012 | SWMM Methods 64 | JUNCTION_RIDG | 0 | JUNCTION_RIDG | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| JUNCTION_RIDGE_POND | 2 | | 1 | 0.121 | 870.593 | 100 | 0.012 | SWMM Methods 64 | JUNCTION_RIDG | 1 | JUNCTION_RIDG | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| JUNCTION_RIDGE_POND | 3 | | 1 | 4.398 | 870.593 | 0 | 0.012 | SWMM Methods 64 | JUNCTION_RIDG | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| MENARDS_POND_BIOFILTER | 1 | 1 | 1 | 0.629 | 258.725 | 100 | 0.033 | SWMM Methods 64 | MENARDS_PON | 0 | MENARDS_POND | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| MENARDS_POND_BIOFILTER | 3 | | 1 | 0.704 | 258.725 | 0 | 0.033 | SWMM Methods 64 | MENARDS_PON | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| MINPT_RD_SW1 | 1 | 1 | 1 | 0.002 | 159.903 | 100 | 0.041 | SWMM Methods 64 | MINPT_RD_SW1 | 0 | MINPT_RD_SW1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| MINPT_RD_SW1 | 3 | | 1 | 3.382 | 159.903 | 0 | 0.041 | SWMM Methods 64 | MINPT_RD_SW1 | 0 | | SubCatchment 1 | No Redirection | |
| MINPT_RD_SW2 | 1 | 1 | 1 | 0.042 | 110.621 | 100 | 0.036 | SWMM Methods 64 | MINPT_RD_SW2 | 0 | MINPT_RD_SW2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| MINPT_RD_SW2 | 3 | | 1 | 1.649 | 110.621 | 0 | 0.036 | SWMM Methods 64 | MINPT_RD_SW2 | 0 | | SubCatchment 1 | No Redirection | |
| MINPT_RD_SW3 | 1 | 1 | 1 | 0.066 | 132.426 | 100 | 0.03 | SWMM Methods 64 | MINPT_RD_SW3 | 0 | MINPT_RD_SW3 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| MINPT_RD_SW3 | 3 | | 1 | 1.324 | 132.426 | 0 | 0.03 | SWMM Methods 64 | MINPT_RD_SW3 | 0 | | SubCatchment 1 | No Redirection | |
| N_PV_ROAD_DS2 | 1 | 1 | 1 | 6.673 | 1408.733 | 100 | 0.083 | SWMM Methods 64 | N_PV_ROAD_DS | 0 | N_PV_ROAD_DS | SubCatchment 3 | No Redirection | Swallowtail Park |
| N_PV_ROAD_DS2 | 2 | | 1 | 0.057 | 1408.733 | 100 | 0.083 | SWMM Methods 64 | N_PV_ROAD_DS | 1 | N_PV_ROAD_DS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| N_PV_ROAD_DS2 | 3 | | 1 | 14.735 | 1408.733 | 0 | 0.083 | SWMM Methods 64 | N_PV_ROAD_DS | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| N_PV_ROAD_US | 1 | 1 | 1 | 0.211 | 243.79 | 100 | 0.12 | SWMM Methods 64 | N_PV_ROAD_US | 0 | N_PV_ROAD_US | SubCatchment 3 | No Redirection | Swallowtail Park |
| N_PV_ROAD_US | 2 | | 1 | 0.063 | 243.79 | 100 | 0.12 | SWMM Methods 64 | N_PV_ROAD_US | 1 | N_PV_ROAD_US | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| N_PV_ROAD_US | 3 | | 1 | 2.036 | 243.79 | 0 | 0.12 | SWMM Methods 64 | N_PV_ROAD_US | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| N_WEXFORD_POND | 1 | 1 | 1 | 6.663 | 2033.252 | 100 | 0.046 | SWMM Methods 64 | N_WEXFORD_P( | 0 | N_WEXFORD_PO | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| N_WEXFORD_POND | 2 | | 1 | 0.435 | 2033.252 | 100 | 0.046 | SWMM Methods 64 | N_WEXFORD_P( | 1 | N_WEXFORD_PO | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| N_WEXFORD_POND | 3 | | 1 | 7.725 | 2033.252 | 0 | 0.046 | SWMM Methods 64 | N_WEXFORD_P( | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| NORTH_BLACKHAWK_POND | 1 | 1 | 1 | 3.971 | 1351.498 | 100 | 0.045 | SWMM Methods 64 | NORTH_BLACKH | 0 | NORTH_BLACKHA | SubCatchment 3 | No Redirection | Swallowtail Park |
| NORTH_BLACKHAWK_POND | 2 | | 1 | 0.648 | 1351.498 | 100 | 0.045 | SWMM Methods 64 | NORTH_BLACKH | 1 | NORTH_BLACKHA | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| NORTH_BLACKHAWK_POND | 3 | | 1 | 9.039 | 1351.498 | 0 | 0.045 | SWMM Methods 64 | NORTH_BLACKH | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| NW_INF_BASIN | 1 | 1 | 1 | 0.151 | 168.144 | 100 | 0.011 | SWMM Methods 64 | NW_INF_BASIN | 0 | NW_INF_BASIN | SubCatchment 1 | No Redirection | Sauk Heights Pond |
| NW_INF_BASIN | 2 | | 1 | 0.2 | 168.144 | 100 | 0.011 | SWMM Methods 64 | NW_INF_BASIN | 1 | NW_INF_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| NW_INF_BASIN | 3 | | 1 | 0.961 | 168.144 | 0 | 0.011 | SWMM Methods 64 | NW_INF_BASIN | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| OLD_SAUK_BELTLINE_NE | 1 | 1 | 1 | 0.688 | 146.436 | 100 | 0.03 | SWMM Methods 64 | OLD_SAUK_BEL | 0 | OLD_SAUK_BELT | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| OLD_SAUK_BELTLINE_NE | 3 | | 1 | 1.231 | 146.436 | 0 | 0.03 | SWMM Methods 64 | OLD_SAUK_BEL | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| OLD_SAUK_BELTLINE_SE | 1 | 1 | 1 | 0.944 | 138.623 | 100 | 0.029 | SWMM Methods 64 | OLD_SAUK_BEL | 0 | OLD_SAUK_BELT | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| OLD_SAUK_BELTLINE_SE | 3 | | 1 | 1.117 | 138.623 | 0 | 0.029 | SWMM Methods 64 | OLD_SAUK_BEL | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| OLD_SAUK_GW3_US | 1 | 1 | 1 | 1.238 | 325.739 | 100 | 0.037 | SWMM Methods 64 | OLD_SAUK_GW | 0 | OLD_SAUK_GW3 | SubCatchment 3 | No Redirection | Swallowtail Park |
| OLD_SAUK_GW3_US | 2 | | 1 | 0.038 | 325.739 | 100 | 0.037 | SWMM Methods 64 | OLD_SAUK_GW | 1 | OLD_SAUK_GW3 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OLD_SAUK_GW3_US | 3 | | 1 | 2.14 | 325.739 | 0 | 0.037 | SWMM Methods 64 | OLD_SAUK_GW | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSR_BL_SERAMP_US | 1 | 1 | 1 | 2.497 | 400.535 | 100 | 0.021 | SWMM Methods 64 | OSR_BL_SERAM | 0 | OSR_BL_SERAMP | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| OSR_BL_SERAMP_US | 2 | | 1 | 0.055 | 400.535 | 100 | 0.021 | SWMM Methods 64 | OSR_BL_SERAM | 1 | OSR_BL_SERAMP | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| OSR_BL_SERAMP_US | 3 | | 1 | 3.739 | 400.535 | 0 | 0.021 | SWMM Methods 64 | OSR_BL_SERAM | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| OSTP_POND_SYSTEM_JCT_1 | 1 | 1 | 1 | 1.497 | 301.567 | 100 | 0.028 | SWMM Methods 64 | OSTP_POND_SY | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park |
| OSTP_POND_SYSTEM_JCT_1 | 2 | | 1 | 0.014 | 301.567 | 100 | 0.028 | SWMM Methods 64 | OSTP_POND_SY | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_1 | 3 | | 1 | 2.419 | 301.567 | 0 | 0.028 | SWMM Methods 64 | OSTP_POND_SY | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_11 | 1 | 1 | 1 | 1.436 | 258.252 | 100 | 0.038 | SWMM Methods 64 | OSTP_POND_SY | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OSTP_POND_SYSTEM_JCT_11 | 2 | | 1 | 0.088 | 258.252 | 100 | 0.038 | SWMM Methods 64 | OSTP_POND_SY | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_11 | 3 | | 1 | 1.507 | 258.252 | 0 | 0.038 | SWMM Methods 64 | OSTP_POND_SY | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_13 | 1 | 1 | 1 | 4.016 | 1213.742 | 100 | 0.04 | SWMM Methods 64 | OSTP_POND_SY | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park |
| OSTP_POND_SYSTEM_JCT_13 | 2 | | 1 | 0.038 | 1213.742 | 100 | 0.04 | SWMM Methods 64 | OSTP_POND_SY | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_13 | 3 | | 1 | 3.798 | 1213.742 | 0 | 0.04 | SWMM Methods 64 | OSTP_POND_SY | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_3 | 1 | 1 | 1 | 4.752 | 733.589 | 100 | 0.021 | SWMM Methods 64 | OSTP_POND_SY | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park |
| OSTP_POND_SYSTEM_JCT_3 | 2 | | 1 | 0.733 | 733.589 | 100 | 0.021 | SWMM Methods 64 | OSTP_POND_SY | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_3 | 3 | | 1 | 7.05 | 733.589 | 0 | 0.021 | SWMM Methods 64 | OSTP_POND_SY | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_6 | 1 | 1 | 1 | 3.637 | 594.039 | 100 | 0.045 | SWMM Methods 64 | OSTP_POND_SY | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park |
| OSTP_POND_SYSTEM_JCT_6 | 2 | | 1 | 0.069 | 594.039 | 100 | 0.045 | SWMM Methods 64 | OSTP_POND_SY | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_6 | 3 | | 1 | 7.479 | 594.039 | 0 | 0.045 | SWMM Methods 64 | OSTP_POND_SY | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_8A | 1 | 1 | 1 | 2.034 | 650.91 | 100 | 0.032 | SWMM Methods 64 | OSTP_POND_SY | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park |
| OSTP_POND_SYSTEM_JCT_8A | 2 | | 1 | 0.083 | 650.91 | 100 | 0.032 | SWMM Methods 64 | OSTP_POND_SY | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| OSTP_POND_SYSTEM_JCT_8A | 3 | | 1 | 5.254 | 650.91 | 0 | 0.032 | SWMM Methods 64 | OSTP_POND_SY | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PARAGON_FF1 | 3 | 1 | 1 | 1.391 | 253.815 | 0 | 0.021 | SWMM Methods 64 | PARAGON_FF1 | 0 | | SubCatchment 1 | No Redirection | |
| PARAGON_FF2 | 3 | 1 | 1 | 3.907 | 240.548 | 0 | 0.015 | SWMM Methods 64 | PARAGON_FF2 | 0 | | SubCatchment 1 | No Redirection | |
| PARAGON_FF3 | 1 | 1 | 1 | 0.27 | 507.316 | 100 | 0.013 | SWMM Methods 64 | PARAGON_FF3 | 0 | PARAGON_FF3 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| PARAGON_FF3 | 3 | | 1 | 8.768 | 507.316 | 0 | 0.013 | SWMM Methods 64 | PARAGON_FF3 | 0 | | SubCatchment 1 | No Redirection | |
| PARAGON_INF_BASIN | 1 | 1 | 1 | 0.006 | 350.257 | 100 | 0.03 | SWMM Methods 64 | PARAGON_INF_ | 0 | PARAGON_INF_E | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| PARAGON_INF_BASIN | 3 | | 1 | 4.395 | 350.257 | 0 | 0.03 | SWMM Methods 64 | PARAGON_INF_ | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PARAGON_WET_POND | 1 | 1 | 1 | 4.326 | 706.323 | 100 | 0.042 | SWMM Methods 64 | PARAGON_WET | 0 | PARAGON_WET_ | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| PARAGON_WET_POND | 2 | | 1 | 0.02 | 706.323 | 100 | 0.042 | SWMM Methods 64 | PARAGON_WET | 1 | PARAGON_WET_ | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PARAGON_WET_POND | 3 | | 1 | 5.178 | 706.323 | 0 | 0.042 | SWMM Methods 64 | PARAGON_WET | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PF_E_INF_BASIN | 1 | 1 | 1 | 0.308 | 112.195 | 100 | 0.024 | SWMM Methods 64 | PF_E_INF_BASIN | 0 | PF_E_INF_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| PF_E_INF_BASIN | 2 | | 1 | 0.364 | 112.195 | 100 | 0.024 | SWMM Methods 64 | PF_E_INF_BASIN | 1 | PF_E_INF_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PF_E_INF_BASIN | 3 | | 1 | 1.982 | 112.195 | 0 | 0.024 | SWMM Methods 64 | PF_E_INF_BASIN | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PF_S_WP | 1 | 1 | 1 | 1.641 | 221.836 | 100 | 0.022 | SWMM Methods 64 | PF_S_WP | 0 | PF_S_WP | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| PF_S_WP | 2 | | 1 | 1.943 | 221.836 | 100 | 0.022 | SWMM Methods 64 | PF_S_WP | 1 | PF_S_WP | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PF_S_WP | 3 | | 1 | 5.624 | 221.836 | 0 | 0.022 | SWMM Methods 64 | PF_S_WP | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PF-S38 | 1 | 1 | 1 | 1.765 | 368.122 | 100 | 0.01 | SWMM Methods 64 | PF-S38 | 0 | PF-S38 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| PF-S38 | 2 | | 1 | 2.09 | 368.122 | 100 | 0.01 | SWMM Methods 64 | PF-S38 | 1 | PF-S38 | SubCatchment 3 | No Redirection | |
| PF-S38 | 3 | | 1 | 9.254 | 368.122 | 0 | 0.01 | SWMM Methods 64 | PF-S38 | 0 | | SubCatchment 1 | No Redirection | |
| PL1951-004 | 1 | 1 | 1 | 0.259 | 55.865 | 100 | 0.014 | SWMM Methods 64 | PL1951-004 | 0 | PL1951-004 | SubCatchment 3 | No Redirection | Swallowtail Park |
| PL1951-004 | 3 | | 1 | 0.242 | 55.865 | 0 | 0.014 | SWMM Methods 64 | PL1951-004 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PLEAS_V_DITCH1 | 1 | 1 | 1 | 0.155 | 828.909 | 100 | 0.021 | SWMM Methods 64 | PLEAS_V_DITCH | 0 | PLEAS_V_DITCH1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| PLEAS_V_DITCH1 | 3 | | 1 | 23.547 | 828.909 | 0 | 0.021 | SWMM Methods 64 | PLEAS_V_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| PLEAS_V_DITCH2 | 1 | 1 | 1 | 0.055 | 411.531 | 100 | 0.066 | SWMM Methods 64 | PLEAS_V_DITCH | 0 | PLEAS_V_DITCH2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| PLEAS_V_DITCH2 | 3 | | 1 | 1.367 | 411.531 | 0 | 0.066 | SWMM Methods 64 | PLEAS_V_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| PLEAS_V_FF_1 | 1 | 1 | 1 | 0.809 | 1437.793 | 100 | 0.04 | SWMM Methods 64 | PLEAS_V_FF_1 | 0 | PLEAS_V_FF_1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| PLEAS_V_FF_1 | 3 | | 1 | 15.981 | 1437.793 | 0 | 0.04 | SWMM Methods 64 | PLEAS_V_FF_1 | 0 | | SubCatchment 1 | No Redirection | |
| PLEASANT_V_MINERAL_PT_P | 1 | 1 | 1 | 0.518 | 507.112 | 100 | 0.12 | SWMM Methods 64 | PLEAS_V_MIN_I | 0 | PLEASANT_V_MI | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| PLEASANT_V_MINERAL_PT_P | 3 | | 1 | 1.121 | 507.112 | 0 | 0.12 | SWMM Methods 64 | PLEAS_V_MIN_I | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| S105 | 1 | 1 | 1 | 0.8 | 279.654 | 100 | 0.019 | SWMM Methods 64 | S105 | 0 | S105 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| S105 | 2 | | 1 | 0.28 | 279.654 | 100 | 0.019 | SWMM Methods 64 | S105 | 1 | S105 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| S105 | 3 | | 1 | 1.5 | 279.654 | 0 | 0.019 | SWMM Methods 64 | S105 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| S33 | 1 | 1 | 1 | 0.21 | 168.3 | 100 | 0.017 | SWMM Methods 64 | S33 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| S33 | 2 | | 1 | 0.03 | 168.3 | 100 | 0.017 | SWMM Methods 64 | S33 | 1 | S33 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S33 | 3 | | 1 | 0.19 | 168.3 | 0 | 0.017 | SWMM Methods 64 | S33 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| SAUK_CREEK_LOWER_STORAGE | 1 | 1 | 1 | 0.916 | 1064.072 | 100 | 0.048 | SWMM Methods 64 | SAUK_CREEK_LO | 0 | SAUK_CREEK_LO | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| SAUK_CREEK_LOWER_STORAGE | 2 | | 1 | 0.745 | 1064.072 | 100 | 0.048 | SWMM Methods 64 | SAUK_CREEK_LO | 1 | SAUK_CREEK_LO | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| SAUK_CREEK_LOWER_STORAGE | 3 | | 1 | 11.617 | 1064.072 | 0 | 0.048 | SWMM Methods 64 | SAUK_CREEK_LO | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| SAUK_CREEK_UPPER_STORAGE | 1 | 1 | 1 | 0.193 | 659.609 | 100 | 0.109 | SWMM Methods 64 | SAUK_CREEK_U | 0 | SAUK_CREEK_UP | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| SAUK_CREEK_UPPER_STORAGE | 2 | | 1 | 0.228 | 659.609 | 100 | 0.109 | SWMM Methods 64 | SAUK_CREEK_U | 1 | SAUK_CREEK_UP | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| SAUK_CREEK_UPPER_STORAGE | 3 | | 1 | 2.309 | 659.609 | 0 | 0.109 | SWMM Methods 64 | SAUK_CREEK_U | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| SAUK_HEIGHTS_POND | 1 | 1 | 1 | 0.977 | 999.322 | 100 | 0.062 | SWMM Methods 64 | SAUK_HEIGHTS_ | 0 | SAUK_HEIGHTS_ | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| SAUK_HEIGHTS_POND | 2 | | 1 | 0.239 | 999.322 | 100 | 0.062 | SWMM Methods 64 | SAUK_HEIGHTS_ | 1 | SAUK_HEIGHTS_ | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| SAUK_HEIGHTS_POND | 3 | | 1 | 1.906 | 999.322 | 0 | 0.062 | SWMM Methods 64 | SAUK_HEIGHTS_ | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| SE_BIO_BASIN | 1 | 1 | 1 | 0.19 | 205.35 | 100 | 0.063 | SWMM Methods 64 | SE_BIO_BASIN | 0 | SE_BIO_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| SE_BIO_BASIN | 2 | | 1 | 0.25 | 205.35 | 100 | 0.063 | SWMM Methods 64 | SE_BIO_BASIN | 1 | SE_BIO_BASIN | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| SE_BIO_BASIN | 3 | | 1 | 0.99 | 205.35 | 0 | 0.063 | SWMM Methods 64 | SE_BIO_BASIN | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| SMPB_BW_AAC1 | 1 | 1 | 1 | 2.266 | 286.18 | 100 | 0.034 | SWMM Methods 64 | SMPB_BW_AAC | 0 | SMPB_BW_AAC1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SMPB_BW_AAC1 | 2 | | 1 | 0.223 | 286.18 | 100 | 0.034 | SWMM Methods 64 | SMPB_BW_AAC | 1 | SMPB_BW_AAC1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_BW_AAC1 | 3 | | 1 | 2.347 | 286.18 | 0 | 0.034 | SWMM Methods 64 | SMPB_BW_AAC | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_GW_AAP | 1 | 1 | 1 | 1.929 | 391.685 | 100 | 0.03 | SWMM Methods 64 | SMPB_GW_AAP | 0 | SMPB_GW_AAP | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SMPB_GW_AAP | 2 | | 1 | 0.83 | 391.685 | 100 | 0.03 | SWMM Methods 64 | SMPB_GW_AAP | 1 | SMPB_GW_AAP | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_GW_AAP | 3 | | 1 | 2.572 | 391.685 | 0 | 0.03 | SWMM Methods 64 | SMPB_GW_AAP | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SW_BLACKHAWK_PD | 1 | 1 | 1 | 9.835 | 3129.803 | 100 | 0.03 | SWMM Methods 64 | SW_BLACKHAW | 0 | SW_BLACKHAWK | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| SW_BLACKHAWK_PD | 2 | | 1 | 1.626 | 3129.803 | 100 | 0.03 | SWMM Methods 64 | SW_BLACKHAW | 1 | SW_BLACKHAWK | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| SW_BLACKHAWK_PD | 3 | | 1 | 29.664 | 3129.803 | 0 | 0.03 | SWMM Methods 64 | SW_BLACKHAW | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| SW_FF_1 | 1 | 1 | 1 | 0.112 | 1298.588 | 100 | 0.016 | SWMM Methods 64 | SW_FF_1 | 0 | SW_FF_1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_1 | 2 | | 1 | 0.005 | 1298.588 | 100 | 0.016 | SWMM Methods 64 | SW_FF_1 | 0 | SW_FF_1 | SubCatchment 3 | No Redirection | |
| SW_FF_1 | 3 | | 1 | 36.944 | 1298.588 | 0 | 0.016 | SWMM Methods 64 | SW_FF_1 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_10 | 1 | 1 | 1 | 0.047 | 164.9 | 100 | 0.01 | SWMM Methods 64 | SW_FF_10 | 0 | SW_FF_10 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_10 | 3 | | 1 | 0.478 | 164.9 | 0 | 0.01 | SWMM Methods 64 | SW_FF_10 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_11 | 3 | 1 | 1 | 0.555 | 238.784 | 0 | 0.009 | SWMM Methods 64 | SW_FF_11 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_12 | 3 | 1 | 1 | 7.375 | 253.204 | 0 | 0.061 | SWMM Methods 64 | SW_FF_12 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_13 | 1 | 1 | 1 | 0.026 | 127.274 | 100 | 0.074 | SWMM Methods 64 | SW_FF_13 | 0 | SW_FF_13 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_13 | 3 | | 1 | 2.211 | 127.274 | 0 | 0.074 | SWMM Methods 64 | SW_FF_13 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_14 | 1 | 1 | 1 | 0.112 | 313.566 | 100 | 0.059 | SWMM Methods 64 | SW_FF_14 | 0 | SW_FF_14 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_14 | 3 | | 1 | 10.044 | 313.566 | 0 | 0.059 | SWMM Methods 64 | SW_FF_14 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_15 | 1 | 1 | 1 | 0.54 | 870.274 | 100 | 0.025 | SWMM Methods 64 | SW_FF_15 | 0 | SW_FF_15 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_15 | 3 | | 1 | 14.455 | 870.274 | 0 | 0.025 | SWMM Methods 64 | SW_FF_15 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_2 | 1 | 1 | 1 | 0.215 | 404.218 | 100 | 0.065 | SWMM Methods 64 | SW_FF_2 | 0 | SW_FF_2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_2 | 2 | | 1 | 0.006 | 404.218 | 100 | 0.065 | SWMM Methods 64 | SW_FF_2 | 0 | SW_FF_2 | SubCatchment 3 | No Redirection | |
| SW_FF_2 | 3 | | 1 | 11.53 | 404.218 | 0 | 0.065 | SWMM Methods 64 | SW_FF_2 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_3 | 1 | 1 | 1 | 0.451 | 278.124 | 100 | 0.083 | SWMM Methods 64 | SW_FF_3 | 0 | SW_FF_3 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_3 | 2 | | 1 | 0.042 | 278.124 | 100 | 0.083 | SWMM Methods 64 | SW_FF_3 | 0 | SW_FF_3 | SubCatchment 3 | No Redirection | |
| SW_FF_3 | 3 | | 1 | 5.99 | 278.124 | 0 | 0.083 | SWMM Methods 64 | SW_FF_3 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_4 | 1 | 1 | 1 | 0.233 | 924.196 | 100 | 0.046 | SWMM Methods 64 | SW_FF_4 | 0 | SW_FF_4 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_4 | 2 | | 1 | 0.008 | 924.196 | 100 | 0.046 | SWMM Methods 64 | SW_FF_4 | 0 | SW_FF_4 | SubCatchment 3 | No Redirection | |
| SW_FF_4 | 3 | | 1 | 27.801 | 924.196 | 0 | 0.046 | SWMM Methods 64 | SW_FF_4 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_5 | 1 | 1 | 1 | 0.043 | 677.162 | 100 | 0.013 | SWMM Methods 64 | SW_FF_5 | 0 | SW_FF_5 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_5 | 3 | | 1 | 7.497 | 677.162 | 0 | 0.013 | SWMM Methods 64 | SW_FF_5 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_6 | 1 | 1 | 1 | 0.829 | 335.08 | 100 | 0.06 | SWMM Methods 64 | SW_FF_6 | 0 | SW_FF_6 | SubCatchment 3 | No Redirection | UW Ag Research Stati |

**Existing Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW_FF_6 | 2 | | 1 | 0.056 | 335.08 | 100 | 0.06 | SWMM Methods 64 | SW_FF_6 | 0 | SW_FF_6 | SubCatchment 3 | No Redirection | |
| SW_FF_6 | 3 | | 1 | 12.426 | 335.08 | 0 | 0.06 | SWMM Methods 64 | SW_FF_6 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_7 | 1 | 1 | 1 | 0.559 | 344.602 | 100 | 0.058 | SWMM Methods 64 | SW_FF_7 | 0 | SW_FF_7 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_7 | 3 | | 1 | 10.881 | 344.602 | 0 | 0.058 | SWMM Methods 64 | SW_FF_7 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_8 | 1 | 1 | 1 | 0.056 | 666.883 | 100 | 0.012 | SWMM Methods 64 | SW_FF_8 | 0 | SW_FF_8 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_8 | 3 | | 1 | 6.079 | 666.883 | 0 | 0.012 | SWMM Methods 64 | SW_FF_8 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_9 | 1 | 1 | 1 | 0.012 | 397.379 | 100 | 0.006 | SWMM Methods 64 | SW_FF_9 | 0 | SW_FF_9 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| SW_FF_9 | 3 | | 1 | 3.384 | 397.379 | 0 | 0.006 | SWMM Methods 64 | SW_FF_9 | 0 | | SubCatchment 1 | No Redirection | |
| TAMARACK_TRAILS | 1 | 1 | 1 | 5.101 | 875.069 | 100 | 0.035 | SWMM Methods 64 | TAMARACK_TRA | 0 | TAMARACK_TRA | SubCatchment 3 | No Redirection | MSE4 |
| TAMARACK_TRAILS | 2 | | 1 | 1.084 | 875.069 | 100 | 0.035 | SWMM Methods 64 | TAMARACK_TRA | 1 | TAMARACK_TRA | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| TAMARACK_TRAILS | 3 | | 1 | 7.738 | 875.069 | 0 | 0.035 | SWMM Methods 64 | TAMARACK_TRA | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| TP2549-008 | 1 | 1 | 1 | 5.651 | 857.999 | 100 | 0.032 | SWMM Methods 64 | TP2549-008 | 0 | TP2549-008 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| TP2549-008 | 2 | | 1 | 0.232 | 857.999 | 100 | 0.032 | SWMM Methods 64 | TP2549-008 | 1 | TP2549-008 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| TP2549-008 | 3 | | 1 | 7.568 | 857.999 | 0 | 0.032 | SWMM Methods 64 | TP2549-008 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| TREE_LN | 1 | 1 | 1 | 2.031 | 582.057 | 100 | 0.028 | SWMM Methods 64 | TREE_LN | 0 | TREE_LN | SubCatchment 3 | No Redirection | Memorial High School |
| TREE_LN | 2 | | 1 | 0.186 | 582.057 | 100 | 0.028 | SWMM Methods 64 | TREE_LN | 1 | TREE_LN | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| TREE_LN | 3 | | 1 | 4.293 | 582.057 | 0 | 0.028 | SWMM Methods 64 | TREE_LN | 0 | | SubCatchment 1 | No Redirection | Memorial HS 2018 |
| WEXFORD_POND_IN | 1 | 1 | 1 | 0.178 | 511.19 | 100 | 0.032 | SWMM Methods 64 | WEXFORD_PON | 0 | WEXFORD_POND | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| WEXFORD_POND_IN | 2 | | 1 | 0.179 | 511.19 | 100 | 0.032 | SWMM Methods 64 | WEXFORD_PON | 1 | WEXFORD_POND | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| WEXFORD_POND_IN | 3 | | 1 | 3.694 | 511.19 | 0 | 0.032 | SWMM Methods 64 | WEXFORD_PON | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| WEXFORD_SOUTH_POND | 1 | 1 | 1 | 8.288 | 1048.128 | 100 | 0.04 | SWMM Methods 64 | WEXFORD_SOU | 0 | WEXFORD_SOUT | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| WEXFORD_SOUTH_POND | 2 | | 1 | 0.605 | 1048.128 | 100 | 0.04 | SWMM Methods 64 | WEXFORD_SOU | 1 | WEXFORD_SOUT | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| WEXFORD_SOUTH_POND | 3 | | 1 | 9.837 | 1048.128 | 0 | 0.04 | SWMM Methods 64 | WEXFORD_SOU | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| WILRICH_FF | 1 | 1 | 1 | 0.08 | 511.568 | 100 | 0.025 | SWMM Methods 64 | WILRICH_FF | 0 | WILRICH_FF | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| WILRICH_FF | 2 | | 1 | 0.095 | 511.568 | 100 | 0.025 | SWMM Methods 64 | WILRICH_FF | 0 | WILRICH_FF | SubCatchment 3 | No Redirection | |
| WILRICH_FF | 3 | | 1 | 12.631 | 511.568 | 0 | 0.025 | SWMM Methods 64 | WILRICH_FF | 0 | | SubCatchment 1 | No Redirection | |
| WMPB_GW_DW3 | 1 | 1 | 1 | 11.36 | 3124.513 | 100 | 0.061 | SWMM Methods 64 | WMPB_GW_DW | 0 | WMPB_GW_DW | SubCatchment 3 | No Redirection | Swallowtail Park |
| WMPB_GW_DW3 | 2 | | 1 | 0.562 | 3124.513 | 100 | 0.061 | SWMM Methods 64 | WMPB_GW_DW | 1 | WMPB_GW_DW | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| WMPB_GW_DW3 | 3 | | 1 | 13.812 | 3124.513 | 0 | 0.061 | SWMM Methods 64 | WMPB_GW_DW | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| WMPB_GW_TRANSFER2 | 1 | 1 | 1 | 0.894 | 2160.563 | 100 | 0.115 | SWMM Methods 64 | WMPB_GW_TR | 0 | WMPB_GW_TRA | SubCatchment 3 | No Redirection | Swallowtail Park |
| WMPB_GW_TRANSFER2 | 2 | | 1 | 1.059 | 2160.563 | 100 | 0.115 | SWMM Methods 64 | WMPB_GW_TR | 1 | WMPB_GW_TRA | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| WMPB_GW_TRANSFER2 | 3 | | 1 | 8.183 | 2160.563 | 0 | 0.115 | SWMM Methods 64 | WMPB_GW_TR | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| WS-3 | 1 | 1 | 1 | 3.345 | 448.796 | 100 | 0.05 | SWMM Methods 64 | WS-3 | 0 | WS-3 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| WS-3 | 2 | | 1 | 1.561 | 448.796 | 100 | 0.05 | SWMM Methods 64 | WS-3 | 1 | WS-3 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| WS-3 | 3 | | 1 | 10.736 | 448.796 | 0 | 0.05 | SWMM Methods 64 | WS-3 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AE1547-035 | 1 | 1 | 1 | 0.24 | 242.577 | 100 | 0.032 | SWMM Method | AE1547-035 | 0 | AE1547-035 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE1547-035 | 2 | | 1 | 0.097 | 242.577 | 100 | 0.032 | SWMM Method | AE1547-035 | 1 | AE1547-035 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE1547-035 | 3 | | 1 | 3.435 | 242.577 | 0 | 0.032 | SWMM Method | AE1547-035 | 0 | | SubCatchment 3 | No Redirection | |
| AE1549-012 | 1 | 1 | 1 | 0.615 | 544.748 | 100 | 0.023 | SWMM Method | AE1549-012 | 0 | AE1549-012 | SubCatchment 3 | No Redirection | |
| AE1549-012 | 2 | | 1 | 0.442 | 544.748 | 100 | 0.023 | SWMM Method | AE1549-012 | 1 | AE1549-012 | SubCatchment 3 | No Redirection | |
| AE1549-012 | 3 | | 1 | 11.385 | 544.748 | 0 | 0.023 | SWMM Method | AE1549-012 | 0 | | SubCatchment 3 | No Redirection | |
| AE1549-015 | 1 | 1 | 1 | 0.114 | 406.049 | 100 | 0.01 | SWMM Method | AE1549-015 | 0 | AE1549-015 | SubCatchment 3 | No Redirection | |
| AE1549-015 | 2 | | 1 | 0.149 | 406.049 | 100 | 0.01 | SWMM Method | AE1549-015 | 1 | AE1549-015 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE1549-015 | 3 | | 1 | 4.817 | 406.049 | 0 | 0.01 | SWMM Method | AE1549-015 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE1550-029 | 1 | 1 | 1 | 0.259 | 80.182 | 100 | 0.024 | SWMM Method | AE1550-029 | 0 | AE1550-029 | SubCatchment 3 | No Redirection | |
| AE1550-029 | 2 | | 1 | 0.032 | 80.182 | 100 | 0.024 | SWMM Method | AE1550-029 | 1 | AE1550-029 | SubCatchment 3 | No Redirection | |
| AE1550-029 | 3 | | 1 | 0.286 | 80.182 | 0 | 0.024 | SWMM Method | AE1550-029 | 0 | | SubCatchment 3 | No Redirection | |
| AE1647-038 | 1 | 1 | 1 | 0.188 | 183.514 | 100 | 0.002 | SWMM Method | AE1647-038 | 0 | AE1647-038 | SubCatchment 3 | No Redirection | |
| AE1647-038 | 2 | | 1 | 0.223 | 183.514 | 100 | 0.002 | SWMM Method | AE1647-038 | 1 | AE1647-038 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AE1647-038 | 3 | | 1 | 0.835 | 183.514 | 0 | 0.002 | SWMM Method | AE1647-038 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE1652-001 | 1 | 1 | 1 | 0.111 | 97.041 | 100 | 0.01 | SWMM Method | AE1652-001 | 0 | AE1652-001 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE1652-001 | 3 | | 1 | 0.078 | 97.041 | 0 | 0.01 | SWMM Method | AE1652-001 | 0 | | SubCatchment 3 | No Redirection | |
| AE1653-022 | 1 | 1 | 1 | 0.242 | 122.015 | 100 | 0.013 | SWMM Method | AE1653-022 | 0 | AE1653-022 | SubCatchment 3 | No Redirection | |
| AE1653-022 | 3 | | 1 | 0.866 | 122.015 | 0 | 0.013 | SWMM Method | AE1653-022 | 0 | | SubCatchment 1 | No Redirection | |
| AE1747-023 | 1 | 1 | 1 | 0.692 | 417.814 | 100 | 0.072 | SWMM Method | AE1747-023 | 0 | AE1747-023 | SubCatchment 3 | No Redirection | |
| AE1747-023 | 2 | | 1 | 0.407 | 417.814 | 100 | 0.072 | SWMM Method | AE1747-023 | 1 | AE1747-023 | SubCatchment 3 | No Redirection | |
| AE1747-023 | 3 | | 1 | 3.153 | 417.814 | 0 | 0.072 | SWMM Method | AE1747-023 | 0 | | SubCatchment 3 | No Redirection | |
| AE1846-003 | 1 | 1 | 1 | 4.664 | 1682.033 | 100 | 0.025 | SWMM Method | AE1846-003 | 0 | AE1846-003 | SubCatchment 3 | No Redirection | |
| AE1846-003 | 2 | | 1 | 2.06 | 1682.033 | 100 | 0.025 | SWMM Method | AE1846-003 | 1 | AE1846-003 | SubCatchment 3 | No Redirection | |
| AE1846-003 | 3 | | 1 | 102.461 | 1682.033 | 0 | 0.025 | SWMM Method | AE1846-003 | 0 | | SubCatchment 3 | No Redirection | |
| AE1946-011 | 1 | 1 | 1 | 0.973 | 968.79 | 100 | 0.037 | SWMM Method | AE1946-011 | 0 | AE1946-011 | SubCatchment 3 | No Redirection | |
| AE1946-011 | 2 | | 1 | 0.332 | 968.79 | 100 | 0.037 | SWMM Method | AE1946-011 | 1 | AE1946-011 | SubCatchment 3 | No Redirection | |
| AE1946-011 | 3 | | 1 | 37.672 | 968.79 | 0 | 0.037 | SWMM Method | AE1946-011 | 0 | | SubCatchment 3 | No Redirection | |
| AE2052-041 | 1 | 1 | 1 | 0.004 | 178.254 | 100 | 0.06 | SWMM Method | AE2052-041 | 0 | AE2052-041 | SubCatchment 3 | No Redirection | |
| AE2052-041 | 2 | | 1 | 0.004 | 178.254 | 100 | 0.06 | SWMM Method | AE2052-041 | 1 | AE2052-041 | SubCatchment 3 | No Redirection | |
| AE2052-041 | 3 | | 1 | 1.765 | 178.254 | 0 | 0.06 | SWMM Method | AE2052-041 | 0 | | SubCatchment 1 | No Redirection | |
| AE2156-075 | 1 | 1 | 1 | 0.098 | 521.917 | 100 | 0.032 | SWMM Method | AE2156-075 | 0 | AE2156-075 | SubCatchment 3 | No Redirection | |
| AE2156-075 | 3 | | 1 | 7.854 | 521.917 | 0 | 0.032 | SWMM Method | AE2156-075 | 0 | | SubCatchment 3 | No Redirection | |
| AE2156-078 | 1 | 1 | 1 | 0.294 | 249.832 | 100 | 0.028 | SWMM Method | AE2156-078 | 0 | AE2156-078 | SubCatchment 3 | No Redirection | |
| AE2156-078 | 3 | | 1 | 2.691 | 249.832 | 0 | 0.028 | SWMM Method | AE2156-078 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park |
| AE2250-053 | 1 | 1 | 1 | 9.16 | 219.336 | 100 | 0.021 | SWMM Method | AE2250-053 | 0 | AE2250-053 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE2250-053 | 2 | | 1 | 0.119 | 219.336 | 100 | 0.021 | SWMM Method | AE2250-053 | 1 | AE2250-053 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AE2250-053 | 3 | | 1 | 7.476 | 219.336 | 0 | 0.021 | SWMM Method | AE2250-053 | 0 | | SubCatchment 3 | No Redirection | |
| AE2250-055 | 1 | 1 | 1 | 4.475 | 497.733 | 100 | 0.026 | SWMM Method | AE2250-055 | 0 | AE2250-055 | SubCatchment 3 | No Redirection | |
| AE2250-055 | 3 | | 1 | 3.401 | 497.733 | 0 | 0.026 | SWMM Method | AE2250-055 | 0 | | SubCatchment 3 | No Redirection | |
| AE2256-010 | 1 | 1 | 1 | 2.887 | 424.391 | 100 | 0.01 | SWMM Method | AE2256-010 | 0 | AE2256-010 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AE2256-010 | 3 | | 1 | 1.317 | 424.391 | 0 | 0.01 | SWMM Method | AE2256-010 | 0 | | SubCatchment 3 | No Redirection | |
| AE2256-083 | 1 | 1 | 1 | 2.821 | 514.375 | 100 | 0.026 | SWMM Method | AE2256-083 | 0 | AE2256-083 | SubCatchment 3 | No Redirection | |
| AE2256-083 | 2 | | 1 | 0.008 | 514.375 | 100 | 0.026 | SWMM Method | AE2256-083 | 1 | AE2256-083 | SubCatchment 3 | No Redirection | |
| AE2256-083 | 3 | | 1 | 2.983 | 514.375 | 0 | 0.026 | SWMM Method | AE2256-083 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2257-001 | 1 | 1 | 1 | 1.943 | 735.866 | 100 | 0.017 | SWMM Method | AE2257-001 | 0 | AE2257-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2257-001 | 2 | | 1 | 0.075 | 735.866 | 100 | 0.017 | SWMM Method | AE2257-001 | 1 | AE2257-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2257-001 | 3 | | 1 | 2.414 | 735.866 | 0 | 0.017 | SWMM Method | AE2257-001 | 0 | | SubCatchment 3 | No Redirection | |
| AE2350-026 | 1 | 1 | 1 | 0.396 | 111.279 | 100 | 0.027 | SWMM Method | AE2350-026 | 0 | AE2350-026 | SubCatchment 3 | No Redirection | |
| AE2350-026 | 3 | | 1 | 0.477 | 111.279 | 0 | 0.027 | SWMM Method | AE2350-026 | 0 | | SubCatchment 3 | No Redirection | |
| AE2351-002 | 1 | 1 | 1 | 2.288 | 146.78 | 100 | 0.023 | SWMM Method | AE2351-002 | 0 | AE2351-002 | SubCatchment 3 | No Redirection | |
| AE2351-002 | 2 | | 1 | 0.082 | 146.78 | 100 | 0.023 | SWMM Method | AE2351-002 | 1 | AE2351-002 | SubCatchment 3 | No Redirection | |
| AE2351-002 | 3 | | 1 | 5.17 | 146.78 | 0 | 0.023 | SWMM Method | AE2351-002 | 0 | | SubCatchment 3 | No Redirection | |
| AE2449-003 | 1 | 1 | 1 | 2.493 | 942.107 | 100 | 0.061 | SWMM Method | AE2449-003 | 0 | AE2449-003 | SubCatchment 3 | No Redirection | |
| AE2449-003 | 2 | | 1 | 0.395 | 942.107 | 100 | 0.061 | SWMM Method | AE2449-003 | 1 | AE2449-003 | SubCatchment 3 | No Redirection | |
| AE2449-003 | 3 | | 1 | 7.231 | 942.107 | 0 | 0.061 | SWMM Method | AE2449-003 | 0 | | SubCatchment 3 | No Redirection | |
| AE2450-022 | 1 | 1 | 1 | 5.227 | 750.194 | 100 | 0.017 | SWMM Method | AE2450-022 | 0 | AE2450-022 | SubCatchment 3 | No Redirection | |
| AE2450-022 | 2 | | 1 | 0.104 | 750.194 | 100 | 0.017 | SWMM Method | AE2450-022 | 1 | AE2450-022 | SubCatchment 3 | No Redirection | |
| AE2450-022 | 3 | | 1 | 4.201 | 750.194 | 0 | 0.017 | SWMM Method | AE2450-022 | 0 | | SubCatchment 3 | No Redirection | |
| AE2452-014 | 1 | 1 | 1 | 1.31 | 1749.984 | 100 | 0.031 | SWMM Method | AE2452-014 | 0 | AE2452-014 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2452-014 | 2 | | 1 | 0.93 | 1749.984 | 100 | 0.031 | SWMM Method | AE2452-014 | 1 | AE2452-014 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2452-014 | 3 | | 1 | 18.54 | 1749.984 | 0 | 0.031 | SWMM Method | AE2452-014 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AE2454-006 | 1 | 1 | 1 | 1.755 | 1699.62 | 100 | 0.061 | SWMM Method | AE2454-006 | 0 | AE2454-006 | SubCatchment 3 | No Redirection | |
| AE2454-006 | 2 | | 1 | 0.426 | 1699.62 | 100 | 0.061 | SWMM Method | AE2454-006 | 1 | AE2454-006 | SubCatchment 3 | No Redirection | |
| AE2454-006 | 3 | | 1 | 11.207 | 1699.62 | 0 | 0.061 | SWMM Method | AE2454-006 | 0 | | SubCatchment 3 | No Redirection | |
| AE2553-003 | 1 | 1 | 1 | 4.531 | 838.458 | 100 | 0.036 | SWMM Method | AE2553-003 | 0 | AE2553-003 | SubCatchment 3 | No Redirection | |
| AE2553-003 | 2 | | 1 | 0.391 | 838.458 | 100 | 0.036 | SWMM Method | AE2553-003 | 1 | AE2553-003 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AE2553-003 | 3 | | 1 | 6.695 | 838.458 | 0 | 0.036 | SWMM Method | AE2553-003 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1547-003 | 1 | 1 | 1 | 0.686 | 836.031 | 100 | 0.03 | SWMM Method | AS1547-003 | 0 | AS1547-003 | SubCatchment 3 | No Redirection | |
| AS1547-003 | 2 | | 1 | 0.209 | 836.031 | 100 | 0.03 | SWMM Method | AS1547-003 | 1 | AS1547-003 | SubCatchment 3 | No Redirection | |
| AS1547-003 | 3 | | 1 | 1.232 | 836.031 | 0 | 0.03 | SWMM Method | AS1547-003 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1547-029 | 1 | 1 | 1 | 1.02 | 303.346 | 100 | 0.059 | SWMM Method | AS1547-029 | 0 | AS1547-029 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1547-029 | 2 | | 1 | 0.31 | 303.346 | 100 | 0.059 | SWMM Method | AS1547-029 | 1 | AS1547-029 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1547-029 | 3 | | 1 | 1.655 | 303.346 | 0 | 0.059 | SWMM Method | AS1547-029 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1548-014 | 1 | 1 | 1 | 1.112 | 393.432 | 100 | 0.032 | SWMM Method | AS1548-014 | 0 | AS1548-014 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1548-014 | 2 | | 1 | 0.483 | 393.432 | 100 | 0.032 | SWMM Method | AS1548-014 | 1 | AS1548-014 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1548-014 | 3 | | 1 | 2.463 | 393.432 | 0 | 0.032 | SWMM Method | AS1548-014 | 0 | | SubCatchment 3 | No Redirection | |
| AS1548-031 | 1 | 1 | 1 | 1.795 | 811.713 | 100 | 0.03 | SWMM Method | AS1548-031 | 0 | AS1548-031 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1548-031 | 2 | | 1 | 0.942 | 811.713 | 100 | 0.03 | SWMM Method | AS1548-031 | 1 | AS1548-031 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1548-031 | 3 | | 1 | 4.574 | 811.713 | 0 | 0.03 | SWMM Method | AS1548-031 | 0 | | SubCatchment 3 | No Redirection | |
| AS1548-039 | 1 | 1 | 1 | 0.855 | 275.83 | 100 | 0.045 | SWMM Method | AS1548-039 | 0 | AS1548-039 | SubCatchment 3 | No Redirection | |
| AS1548-039 | 2 | | 1 | 0.245 | 275.83 | 100 | 0.045 | SWMM Method | AS1548-039 | 1 | AS1548-039 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1548-039 | 3 | | 1 | 1.169 | 275.83 | 0 | 0.045 | SWMM Method | AS1548-039 | 0 | | SubCatchment 3 | No Redirection | |
| AS1549-002 | 1 | 1 | 1 | 0.777 | 317.658 | 100 | 0.027 | SWMM Method | AS1549-002 | 0 | AS1549-002 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1549-002 | 2 | | 1 | 0.273 | 317.658 | 100 | 0.027 | SWMM Method | AS1549-002 | 1 | AS1549-002 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1549-002 | 3 | | 1 | 1.565 | 317.658 | 0 | 0.027 | SWMM Method | AS1549-002 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1549-034 | 1 | 1 | 1 | 0.677 | 128.962 | 100 | 0.005 | SWMM Method | AS1549-034 | 0 | AS1549-034 | SubCatchment 3 | No Redirection | |
| AS1549-034 | 2 | | 1 | 0.077 | 128.962 | 100 | 0.005 | SWMM Method | AS1549-034 | 1 | AS1549-034 | SubCatchment 3 | No Redirection | |
| AS1549-034 | 3 | | 1 | 0.944 | 128.962 | 0 | 0.005 | SWMM Method | AS1549-034 | 0 | | SubCatchment 3 | No Redirection | |
| AS1549-042 | 1 | 1 | 1 | 1.247 | 710.514 | 100 | 0.033 | SWMM Method | AS1549-042 | 0 | AS1549-042 | SubCatchment 3 | No Redirection | |
| AS1549-042 | 2 | | 1 | 0.682 | 710.514 | 100 | 0.033 | SWMM Method | AS1549-042 | 1 | AS1549-042 | SubCatchment 3 | No Redirection | |
| AS1549-042 | 3 | | 1 | 8.039 | 710.514 | 0 | 0.033 | SWMM Method | AS1549-042 | 0 | | SubCatchment 3 | No Redirection | |
| AS1647-018 | 1 | 1 | 1 | 0.806 | 301.646 | 100 | 0.022 | SWMM Method | AS1647-018 | 0 | AS1647-018 | SubCatchment 3 | No Redirection | |
| AS1647-018 | 2 | | 1 | 0.272 | 301.646 | 100 | 0.022 | SWMM Method | AS1647-018 | 1 | AS1647-018 | SubCatchment 3 | No Redirection | |
| AS1647-018 | 3 | | 1 | 1.46 | 301.646 | 0 | 0.022 | SWMM Method | AS1647-018 | 0 | | SubCatchment 3 | No Redirection | |
| AS1647-027 | 1 | 1 | 1 | 1.32 | 1325.052 | 100 | 0.029 | SWMM Method | AS1647-027 | 0 | AS1647-027 | SubCatchment 3 | No Redirection | |
| AS1647-027 | 2 | | 1 | 0.489 | 1325.052 | 100 | 0.029 | SWMM Method | AS1647-027 | 1 | AS1647-027 | SubCatchment 3 | No Redirection | |
| AS1647-027 | 3 | | 1 | 2.37 | 1325.052 | 0 | 0.029 | SWMM Method | AS1647-027 | 0 | | SubCatchment 3 | No Redirection | |
| AS1647-048 | 1 | 1 | 1 | 0.413 | 327.853 | 100 | 0.03 | SWMM Method | AS1647-048 | 0 | AS1647-048 | SubCatchment 3 | No Redirection | |
| AS1647-048 | 2 | | 1 | 0.159 | 327.853 | 100 | 0.03 | SWMM Method | AS1647-048 | 1 | AS1647-048 | SubCatchment 3 | No Redirection | Swallowtail Park |
| AS1647-048 | 3 | | 1 | 0.936 | 327.853 | 0 | 0.03 | SWMM Method | AS1647-048 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1647-052 | 1 | 1 | 1 | 0.647 | 424.342 | 100 | 0.033 | SWMM Method | AS1647-052 | 0 | AS1647-052 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| AS1647-052 | 2 | | 1 | 0.208 | 424.342 | 100 | 0.033 | SWMM Method | AS1647-052 | 1 | AS1647-052 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1647-052 | 3 | | 1 | 1.18 | 424.342 | 0 | 0.033 | SWMM Method | AS1647-052 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1648-006 | 1 | 1 | 1 | 0.662 | 236.613 | 100 | 0.074 | SWMM Method | AS1648-006 | 0 | AS1648-006 | SubCatchment 3 | No Redirection | |
| AS1648-006 | 2 | | 1 | 0.243 | 236.613 | 100 | 0.074 | SWMM Method | AS1648-006 | 1 | AS1648-006 | SubCatchment 3 | No Redirection | |
| AS1648-006 | 3 | | 1 | 1.339 | 236.613 | 0 | 0.074 | SWMM Method | AS1648-006 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS1648-014 | 1 | 1 | 1 | 0.544 | 335.883 | 100 | 0.028 | SWMM Method | AS1648-014 | 0 | AS1648-014 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1648-014 | 2 | | 1 | 0.151 | 335.883 | 100 | 0.028 | SWMM Method | AS1648-014 | 1 | AS1648-014 | SubCatchment 3 | No Redirection | |
| AS1648-014 | 3 | | 1 | 0.935 | 335.883 | 0 | 0.028 | SWMM Method | AS1648-014 | 0 | | SubCatchment 3 | No Redirection | |
| AS1648-022 | 1 | 1 | 1 | 1.964 | 707.151 | 100 | 0.022 | SWMM Method | AS1648-022 | 0 | AS1648-022 | SubCatchment 3 | No Redirection | |
| AS1648-022 | 2 | | 1 | 0.979 | 707.151 | 100 | 0.022 | SWMM Method | AS1648-022 | 1 | AS1648-022 | SubCatchment 3 | No Redirection | |
| AS1648-022 | 3 | | 1 | 4.532 | 707.151 | 0 | 0.022 | SWMM Method | AS1648-022 | 0 | | SubCatchment 3 | No Redirection | |
| AS1648-043 | 1 | 1 | 1 | 0.688 | 390.3 | 100 | 0.021 | SWMM Method | AS1648-043 | 0 | AS1648-043 | SubCatchment 3 | No Redirection | |
| AS1648-043 | 2 | | 1 | 0.263 | 390.3 | 100 | 0.021 | SWMM Method | AS1648-043 | 1 | AS1648-043 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1648-043 | 3 | | 1 | 1.675 | 390.3 | 0 | 0.021 | SWMM Method | AS1648-043 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1747-002 | 1 | 1 | 1 | 0.665 | 232.989 | 100 | 0.062 | SWMM Method | AS1747-002 | 0 | AS1747-002 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1747-002 | 2 | | 1 | 0.112 | 232.989 | 100 | 0.062 | SWMM Method | AS1747-002 | 1 | AS1747-002 | SubCatchment 3 | No Redirection | |
| AS1747-002 | 3 | | 1 | 0.722 | 232.989 | 0 | 0.062 | SWMM Method | AS1747-002 | 0 | | SubCatchment 3 | No Redirection | |
| AS1747-010 | 1 | 1 | 1 | 1.323 | 247.655 | 100 | 0.007 | SWMM Method | AS1747-010 | 0 | AS1747-010 | SubCatchment 3 | No Redirection | |
| AS1747-010 | 2 | | 1 | 0.383 | 247.655 | 100 | 0.007 | SWMM Method | AS1747-010 | 1 | AS1747-010 | SubCatchment 3 | No Redirection | |
| AS1747-010 | 3 | | 1 | 2.125 | 247.655 | 0 | 0.007 | SWMM Method | AS1747-010 | 0 | | SubCatchment 3 | No Redirection | |
| AS1748-011 | 1 | 1 | 1 | 0.452 | 483.37 | 100 | 0.019 | SWMM Method | AS1748-011 | 0 | AS1748-011 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1748-011 | 2 | | 1 | 0.113 | 483.37 | 100 | 0.019 | SWMM Method | AS1748-011 | 1 | AS1748-011 | SubCatchment 3 | No Redirection | |
| AS1748-011 | 3 | | 1 | 0.796 | 483.37 | 0 | 0.019 | SWMM Method | AS1748-011 | 0 | | SubCatchment 3 | No Redirection | |
| AS1748-024 | 1 | 1 | 1 | 0.86 | 363.148 | 100 | 0.015 | SWMM Method | AS1748-024 | 0 | AS1748-024 | SubCatchment 3 | No Redirection | |
| AS1748-024 | 2 | | 1 | 0.217 | 363.148 | 100 | 0.015 | SWMM Method | AS1748-024 | 1 | AS1748-024 | SubCatchment 3 | No Redirection | |
| AS1748-024 | 3 | | 1 | 1.825 | 363.148 | 0 | 0.015 | SWMM Method | AS1748-024 | 0 | | SubCatchment 3 | No Redirection | |
| AS1750-024 | 1 | 1 | 1 | 1.018 | 424.577 | 100 | 0.019 | SWMM Method | AS1750-024 | 0 | AS1750-024 | SubCatchment 3 | No Redirection | |
| AS1750-024 | 2 | | 1 | 0.022 | 424.577 | 100 | 0.019 | SWMM Method | AS1750-024 | 1 | AS1750-024 | SubCatchment 3 | No Redirection | |
| AS1750-024 | 3 | | 1 | 0.997 | 424.577 | 0 | 0.019 | SWMM Method | AS1750-024 | 0 | | SubCatchment 3 | No Redirection | |
| AS1753-005 | 1 | 1 | 1 | 0.846 | 1016.012 | 100 | 0.019 | SWMM Method | AS1753-005 | 0 | AS1753-005 | SubCatchment 3 | No Redirection | |
| AS1753-005 | 2 | | 1 | 1.001 | 1016.012 | 100 | 0.019 | SWMM Method | AS1753-005 | 1 | AS1753-005 | SubCatchment 3 | No Redirection | |
| AS1753-005 | 3 | | 1 | 5.309 | 1016.012 | 0 | 0.019 | SWMM Method | AS1753-005 | 0 | | SubCatchment 3 | No Redirection | |
| AS1754-010 | 1 | 1 | 1 | 0.494 | 254.518 | 100 | 0.033 | SWMM Method | AS1754-010 | 0 | AS1754-010 | SubCatchment 3 | No Redirection | |
| AS1754-010 | 2 | | 1 | 0.572 | 254.518 | 100 | 0.033 | SWMM Method | AS1754-010 | 1 | AS1754-010 | SubCatchment 3 | No Redirection | |
| AS1754-010 | 3 | | 1 | 2.633 | 254.518 | 0 | 0.033 | SWMM Method | AS1754-010 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1754-028 | 1 | 1 | 1 | 0.243 | 407.194 | 100 | 0.049 | SWMM Method | AS1754-028 | 0 | AS1754-028 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1754-028 | 2 | | 1 | 0.192 | 407.194 | 100 | 0.049 | SWMM Method | AS1754-028 | 1 | AS1754-028 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1754-028 | 3 | | 1 | 7.68 | 407.194 | 0 | 0.049 | SWMM Method | AS1754-028 | 0 | | SubCatchment 3 | No Redirection | |
| AS1847-009 | 1 | 1 | 1 | 1.422 | 330.317 | 100 | 0.048 | SWMM Method | AS1847-009 | 0 | AS1847-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1847-009 | 2 | | 1 | 0.601 | 330.317 | 100 | 0.048 | SWMM Method | AS1847-009 | 1 | AS1847-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1847-009 | 3 | | 1 | 3.324 | 330.317 | 0 | 0.048 | SWMM Method | AS1847-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1848-003 | 1 | 1 | 1 | 0.432 | 148.268 | 100 | 0.047 | SWMM Method | AS1848-003 | 0 | AS1848-003 | SubCatchment 3 | No Redirection | |
| AS1848-003 | 2 | | 1 | 0.096 | 148.268 | 100 | 0.047 | SWMM Method | AS1848-003 | 1 | AS1848-003 | SubCatchment 3 | No Redirection | |
| AS1848-003 | 3 | | 1 | 0.648 | 148.268 | 0 | 0.047 | SWMM Method | AS1848-003 | 0 | | SubCatchment 3 | No Redirection | |
| AS1848-018 | 1 | 1 | 1 | 2.601 | 357.914 | 100 | 0.021 | SWMM Method | AS1848-018 | 0 | AS1848-018 | SubCatchment 3 | No Redirection | |
| AS1848-018 | 2 | | 1 | 0.946 | 357.914 | 100 | 0.021 | SWMM Method | AS1848-018 | 1 | AS1848-018 | SubCatchment 3 | No Redirection | |
| AS1848-018 | 3 | | 1 | 5.616 | 357.914 | 0 | 0.021 | SWMM Method | AS1848-018 | 0 | | SubCatchment 3 | No Redirection | |
| AS1848-027 | 1 | 1 | 1 | 2.646 | 614.536 | 100 | 0.019 | SWMM Method | AS1848-027 | 0 | AS1848-027 | SubCatchment 3 | No Redirection | |
| AS1848-027 | 2 | | 1 | 1.21 | 614.536 | 100 | 0.019 | SWMM Method | AS1848-027 | 1 | AS1848-027 | SubCatchment 3 | No Redirection | |
| AS1848-027 | 3 | | 1 | 6.739 | 614.536 | 0 | 0.019 | SWMM Method | AS1848-027 | 0 | | SubCatchment 3 | No Redirection | |
| AS1849-009 | 1 | 1 | 1 | 1.054 | 559.704 | 100 | 0.041 | SWMM Method | AS1849-009 | 0 | AS1849-009 | SubCatchment 3 | No Redirection | |
| AS1849-009 | 2 | | 1 | 0.36 | 559.704 | 100 | 0.041 | SWMM Method | AS1849-009 | 1 | AS1849-009 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1849-009 | 3 | | 1 | 2.273 | 559.704 | 0 | 0.041 | SWMM Method | AS1849-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1849-026 | 1 | 1 | 1 | 1.679 | 442.132 | 100 | 0.02 | SWMM Method | AS1849-026 | 0 | AS1849-026 | SubCatchment 3 | No Redirection | |
| AS1849-026 | 2 | | 1 | 0.188 | 442.132 | 100 | 0.02 | SWMM Method | AS1849-026 | 1 | AS1849-026 | SubCatchment 3 | No Redirection | |
| AS1849-026 | 3 | | 1 | 2.023 | 442.132 | 0 | 0.02 | SWMM Method | AS1849-026 | 0 | | SubCatchment 3 | No Redirection | |
| AS1849-053 | 1 | 1 | 1 | 4.025 | 718.806 | 100 | 0.019 | SWMM Method | AS1849-053 | 0 | AS1849-053 | SubCatchment 3 | No Redirection | |
| AS1849-053 | 2 | | 1 | 0.07 | 718.806 | 100 | 0.019 | SWMM Method | AS1849-053 | 1 | AS1849-053 | SubCatchment 3 | No Redirection | |
| AS1849-053 | 3 | | 1 | 2.353 | 718.806 | 0 | 0.019 | SWMM Method | AS1849-053 | 0 | | SubCatchment 3 | No Redirection | |
| AS1946-004 | 1 | 1 | 1 | 1.474 | 178.17 | 100 | 0.053 | SWMM Method | AS1946-004 | 0 | AS1946-004 | SubCatchment 3 | No Redirection | |
| AS1946-004 | 2 | | 1 | 0.113 | 178.17 | 100 | 0.053 | SWMM Method | AS1946-004 | 1 | AS1946-004 | SubCatchment 3 | No Redirection | |
| AS1946-004 | 3 | | 1 | 0.844 | 178.17 | 0 | 0.053 | SWMM Method | AS1946-004 | 0 | | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1947-009 | 1 | 1 | 1 | 0.473 | 63.215 | 100 | 0.027 | SWMM Method | AS1947-009 | 0 | AS1947-009 | SubCatchment 3 | No Redirection | |
| AS1947-009 | 2 | | 1 | 0.013 | 63.215 | 100 | 0.027 | SWMM Method | AS1947-009 | 1 | AS1947-009 | SubCatchment 3 | No Redirection | |
| AS1947-009 | 3 | | 1 | 0.659 | 63.215 | 0 | 0.027 | SWMM Method | AS1947-009 | 0 | | SubCatchment 3 | No Redirection | |
| AS1948-004 | 1 | 1 | 1 | 1.183 | 553.55 | 100 | 0.043 | SWMM Method | AS1948-004 | 0 | AS1948-004 | SubCatchment 3 | No Redirection | |
| AS1948-004 | 2 | | 1 | 0.623 | 553.55 | 100 | 0.043 | SWMM Method | AS1948-004 | 1 | AS1948-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1948-004 | 3 | | 1 | 3.72 | 553.55 | 0 | 0.043 | SWMM Method | AS1948-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1948-017 | 1 | 1 | 1 | 1.252 | 360.841 | 100 | 0.085 | SWMM Method | AS1948-017 | 0 | AS1948-017 | SubCatchment 3 | No Redirection | |
| AS1948-017 | 2 | | 1 | 0.431 | 360.841 | 100 | 0.085 | SWMM Method | AS1948-017 | 1 | AS1948-017 | SubCatchment 3 | No Redirection | |
| AS1948-017 | 3 | | 1 | 2.777 | 360.841 | 0 | 0.085 | SWMM Method | AS1948-017 | 0 | | SubCatchment 3 | No Redirection | |
| AS1949-007 | 1 | 1 | 1 | 2.881 | 575.906 | 100 | 0.055 | SWMM Method | AS1949-007 | 0 | AS1949-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS1949-007 | 2 | | 1 | 1.39 | 575.906 | 100 | 0.055 | SWMM Method | AS1949-007 | 1 | AS1949-007 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1949-007 | 3 | | 1 | 9.726 | 575.906 | 0 | 0.055 | SWMM Method | AS1949-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS1949-032 | 1 | 1 | 1 | 1.45 | 269.246 | 100 | 0.012 | SWMM Method | AS1949-032 | 0 | AS1949-032 | SubCatchment 3 | No Redirection | |
| AS1949-032 | 2 | | 1 | 0.186 | 269.246 | 100 | 0.012 | SWMM Method | AS1949-032 | 1 | AS1949-032 | SubCatchment 3 | No Redirection | |
| AS1949-032 | 3 | | 1 | 2.16 | 269.246 | 0 | 0.012 | SWMM Method | AS1949-032 | 0 | | SubCatchment 3 | No Redirection | |
| AS2045-006 | 1 | 1 | 1 | 5.45 | 467.18 | 100 | 0.032 | SWMM Method | AS2045-006 | 0 | AS2045-006 | SubCatchment 3 | No Redirection | |
| AS2045-006 | 2 | | 1 | 0.79 | 467.18 | 100 | 0.032 | SWMM Method | AS2045-006 | 1 | AS2045-006 | SubCatchment 3 | No Redirection | |
| AS2045-006 | 3 | | 1 | 6.45 | 467.18 | 0 | 0.032 | SWMM Method | AS2045-006 | 0 | | SubCatchment 3 | No Redirection | |
| AS2046-011 | 1 | 1 | 1 | 6.51 | 475.536 | 100 | 0.032 | SWMM Method | AS2046-011 | 0 | AS2046-011 | SubCatchment 3 | No Redirection | |
| AS2046-011 | 2 | | 1 | 0.378 | 475.536 | 100 | 0.032 | SWMM Method | AS2046-011 | 1 | AS2046-011 | SubCatchment 3 | No Redirection | |
| AS2046-011 | 3 | | 1 | 4.109 | 475.536 | 0 | 0.032 | SWMM Method | AS2046-011 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2047-007 | 1 | 1 | 1 | 2.45 | 273.95 | 100 | 0.044 | SWMM Method | AS2047-007 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AS2047-007 | 2 | | 1 | 0.19 | 273.95 | 100 | 0.044 | SWMM Method | AS2047-007 | 1 | AS2047-007 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2047-007 | 3 | | 1 | 1.529 | 273.95 | 0 | 0.044 | SWMM Method | AS2047-007 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research Stati |
| AS2048-010 | 1 | 1 | 1 | 6.357 | 1069.009 | 100 | 0.029 | SWMM Method | AS2048-010 | 0 | AS2048-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2048-010 | 2 | | 1 | 0.043 | 1069.009 | 100 | 0.029 | SWMM Method | AS2048-010 | 1 | AS2048-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2048-010 | 3 | | 1 | 3.879 | 1069.009 | 0 | 0.029 | SWMM Method | AS2048-010 | 0 | | SubCatchment 3 | No Redirection | |
| AS2049-002 | 1 | 1 | 1 | 7.95 | 755.235 | 100 | 0.057 | SWMM Method | AS2049-002 | 0 | AS2049-002 | SubCatchment 3 | No Redirection | |
| AS2049-002 | 2 | | 1 | 0.123 | 755.235 | 100 | 0.057 | SWMM Method | AS2049-002 | 1 | AS2049-002 | SubCatchment 3 | No Redirection | |
| AS2049-002 | 3 | | 1 | 14.29 | 755.235 | 0 | 0.057 | SWMM Method | AS2049-002 | 0 | | SubCatchment 3 | No Redirection | |
| AS2049-005 | 1 | 1 | 1 | 0.582 | 194.077 | 100 | 0.053 | SWMM Method | AS2049-005 | 0 | AS2049-005 | SubCatchment 3 | No Redirection | |
| AS2049-005 | 2 | | 1 | 0.006 | 194.077 | 100 | 0.053 | SWMM Method | AS2049-005 | 1 | AS2049-005 | SubCatchment 3 | No Redirection | |
| AS2049-005 | 3 | | 1 | 0.37 | 194.077 | 0 | 0.053 | SWMM Method | AS2049-005 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2050-012 | 1 | 1 | 1 | 2.316 | 651.346 | 100 | 0.088 | SWMM Method | AS2050-012 | 0 | AS2050-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2050-012 | 2 | | 1 | 0.291 | 651.346 | 100 | 0.088 | SWMM Method | AS2050-012 | 1 | AS2050-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2050-012 | 3 | | 1 | 6.139 | 651.346 | 0 | 0.088 | SWMM Method | AS2050-012 | 0 | | SubCatchment 3 | No Redirection | |
| AS2050-024 | 1 | 1 | 1 | 1.45 | 348.05 | 100 | 0.03 | SWMM Method | AS2050-024 | 0 | AS2050-024 | SubCatchment 3 | No Redirection | |
| AS2050-024 | 2 | | 1 | 0.025 | 348.05 | 100 | 0.03 | SWMM Method | AS2050-024 | 1 | AS2050-024 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2050-024 | 3 | | 1 | 0.803 | 348.05 | 0 | 0.03 | SWMM Method | AS2050-024 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2051-023 | 1 | 1 | 1 | 1.875 | 470.706 | 100 | 0.03 | SWMM Method | AS2051-023 | 0 | AS2051-023 | SubCatchment 3 | No Redirection | |
| AS2051-023 | 2 | | 1 | 0.752 | 470.706 | 100 | 0.03 | SWMM Method | AS2051-023 | 1 | AS2051-023 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2051-023 | 3 | | 1 | 2.628 | 470.706 | 0 | 0.03 | SWMM Method | AS2051-023 | 0 | | SubCatchment 3 | No Redirection | |
| AS2051-041 | 1 | 1 | 1 | 0.541 | 183.275 | 100 | 0.006 | SWMM Method | AS2051-041 | 0 | AS2051-041 | SubCatchment 3 | No Redirection | |
| AS2051-041 | 2 | | 1 | 0.092 | 183.275 | 100 | 0.006 | SWMM Method | AS2051-041 | 1 | AS2051-041 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2051-041 | 3 | | 1 | 0.261 | 183.275 | 0 | 0.006 | SWMM Method | AS2051-041 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2051-051 | 1 | 1 | 1 | 0.39 | 313.68 | 100 | 0.01 | SWMM Method | AS2051-051 | 0 | AS2051-051 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2051-051 | 2 | | 1 | 0.34 | 313.68 | 100 | 0.01 | SWMM Method | AS2051-051 | 1 | AS2051-051 | SubCatchment 3 | No Redirection | |
| AS2051-051 | 3 | | 1 | 0.949 | 313.68 | 0 | 0.01 | SWMM Method | AS2051-051 | 0 | | SubCatchment 3 | No Redirection | |
| AS2145-001 | 1 | 1 | 1 | 5.754 | 571.1 | 100 | 0.021 | SWMM Method | AS2145-001 | 0 | AS2145-001 | SubCatchment 3 | No Redirection | |
| AS2145-001 | 2 | | 1 | 0.969 | 571.1 | 100 | 0.021 | SWMM Method | AS2145-001 | 1 | AS2145-001 | SubCatchment 3 | No Redirection | |
| AS2145-001 | 3 | | 1 | 6.155 | 571.1 | 0 | 0.021 | SWMM Method | AS2145-001 | 0 | | SubCatchment 3 | No Redirection | |
| AS2147-001 | 1 | 1 | 1 | 9.768 | 1503.883 | 100 | 0.024 | SWMM Method | AS2147-001 | 0 | AS2147-001 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2147-001 | 2 | | 1 | 0.161 | 1503.883 | 100 | 0.024 | SWMM Method | AS2147-001 | 1 | AS2147-001 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2147-001 | 3 | | 1 | 7.911 | 1503.883 | 0 | 0.024 | SWMM Method | AS2147-001 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2148-007 | 1 | 1 | 1 | 7.44 | 1035.736 | 100 | 0.04 | SWMM Method | AS2148-007 | 0 | AS2148-007 | SubCatchment 3 | No Redirection | |
| AS2148-007 | 2 | | 1 | 0.067 | 1035.736 | 100 | 0.04 | SWMM Method | AS2148-007 | 1 | AS2148-007 | SubCatchment 3 | No Redirection | |
| AS2148-007 | 3 | | 1 | 12.359 | 1035.736 | 0 | 0.04 | SWMM Method | AS2148-007 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2150-012 | 1 | 1 | 1 | 5.716 | 399.036 | 100 | 0.023 | SWMM Method | AS2150-012 | 0 | AS2150-012 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2150-012 | 2 | | 1 | 0.925 | 399.036 | 100 | 0.023 | SWMM Method | AS2150-012 | 1 | AS2150-012 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2150-012 | 3 | | 1 | 4.796 | 399.036 | 0 | 0.023 | SWMM Method | AS2150-012 | 0 | | SubCatchment 3 | No Redirection | |
| AS2150-014 | 1 | 1 | 1 | 2.175 | 603.819 | 100 | 0.015 | SWMM Method | AS2150-014 | 0 | AS2150-014 | SubCatchment 3 | No Redirection | |
| AS2150-014 | 2 | | 1 | 0.222 | 603.819 | 100 | 0.015 | SWMM Method | AS2150-014 | 1 | AS2150-014 | SubCatchment 3 | No Redirection | |
| AS2150-014 | 3 | | 1 | 2.033 | 603.819 | 0 | 0.015 | SWMM Method | AS2150-014 | 0 | | SubCatchment 3 | No Redirection | |
| AS2150-027 | 1 | 1 | 1 | 0.724 | 143.323 | 100 | 0.029 | SWMM Method | AS2150-027 | 0 | AS2150-027 | SubCatchment 3 | No Redirection | |
| AS2150-027 | 2 | | 1 | 0.018 | 143.323 | 100 | 0.029 | SWMM Method | AS2150-027 | 1 | AS2150-027 | SubCatchment 3 | No Redirection | |
| AS2150-027 | 3 | | 1 | 0.592 | 143.323 | 0 | 0.029 | SWMM Method | AS2150-027 | 0 | | SubCatchment 3 | No Redirection | |
| AS2150-032 | 1 | 1 | 1 | 2.03 | 297.832 | 100 | 0.035 | SWMM Method | AS2150-032 | 0 | AS2150-032 | SubCatchment 3 | No Redirection | |
| AS2150-032 | 2 | | 1 | 0.158 | 297.832 | 100 | 0.035 | SWMM Method | AS2150-032 | 1 | AS2150-032 | SubCatchment 3 | No Redirection | |
| AS2150-032 | 3 | | 1 | 2.31 | 297.832 | 0 | 0.035 | SWMM Method | AS2150-032 | 0 | | SubCatchment 3 | No Redirection | |
| AS2151-004 | 1 | 1 | 1 | 0.812 | 244.076 | 100 | 0.01 | SWMM Method | AS2151-004 | 0 | AS2151-004 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2151-004 | 2 | | 1 | 0.206 | 244.076 | 100 | 0.01 | SWMM Method | AS2151-004 | 1 | AS2151-004 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2151-004 | 3 | | 1 | 1.33 | 244.076 | 0 | 0.01 | SWMM Method | AS2151-004 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2151-009 | 1 | 1 | 1 | 0.512 | 356.703 | 100 | 0.036 | SWMM Method | AS2151-009 | 0 | AS2151-009 | SubCatchment 3 | No Redirection | |
| AS2151-009 | 2 | | 1 | 0.214 | 356.703 | 100 | 0.036 | SWMM Method | AS2151-009 | 1 | AS2151-009 | SubCatchment 3 | No Redirection | |
| AS2151-009 | 3 | | 1 | 1.22 | 356.703 | 0 | 0.036 | SWMM Method | AS2151-009 | 0 | | SubCatchment 3 | No Redirection | |
| AS2152-005 | 1 | 1 | 1 | 1.16 | 145.052 | 100 | 0.029 | SWMM Method | AS2152-005 | 0 | AS2152-005 | SubCatchment 3 | No Redirection | |
| AS2152-005 | 2 | | 1 | 0.037 | 145.052 | 100 | 0.029 | SWMM Method | AS2152-005 | 1 | AS2152-005 | SubCatchment 3 | No Redirection | |
| AS2152-005 | 3 | | 1 | 1.388 | 145.052 | 0 | 0.029 | SWMM Method | AS2152-005 | 0 | | SubCatchment 1 | No Redirection | |
| AS2152-010 | 1 | 1 | 1 | 0.393 | 166.118 | 100 | 0.013 | SWMM Method | AS2152-010 | 0 | AS2152-010 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2152-010 | 2 | | 1 | 0.212 | 166.118 | 100 | 0.013 | SWMM Method | AS2152-010 | 1 | AS2152-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-010 | 3 | | 1 | 1.184 | 166.118 | 0 | 0.013 | SWMM Method | AS2152-010 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-022 | 1 | 1 | 1 | 1.566 | 393.904 | 100 | 0.017 | SWMM Method | AS2152-022 | 0 | AS2152-022 | SubCatchment 3 | No Redirection | UW Ag Research Stati |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2152-022 | 2 | | 1 | 0.628 | 393.904 | 100 | 0.017 | SWMM Method | AS2152-022 | 1 | AS2152-022 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2152-022 | 3 | | 1 | 3.475 | 393.904 | 0 | 0.017 | SWMM Method | AS2152-022 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AS2155-011 | 1 | 1 | 1 | 3.014 | 384.855 | 100 | 0.02 | SWMM Method | AS2155-011 | 0 | AS2155-011 | SubCatchment 3 | No Redirection | |
| AS2155-011 | 3 | | 1 | 3.609 | 384.855 | 0 | 0.02 | SWMM Method | AS2155-011 | 0 | | SubCatchment 3 | No Redirection | |
| AS2156-017 | 1 | 1 | 1 | 0.846 | 177.75 | 100 | 0.041 | SWMM Method | AS2156-017 | 0 | AS2156-017 | SubCatchment 3 | No Redirection | |
| AS2156-017 | 2 | | 1 | 0.004 | 177.75 | 100 | 0.041 | SWMM Method | AS2156-017 | 1 | AS2156-017 | SubCatchment 3 | No Redirection | |
| AS2156-017 | 3 | | 1 | 0.824 | 177.75 | 0 | 0.041 | SWMM Method | AS2156-017 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2156-020 | 1 | 1 | 1 | 1.737 | 214.306 | 100 | 0.028 | SWMM Method | AS2156-020 | 0 | AS2156-020 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-020 | 3 | | 1 | 1.426 | 214.306 | 0 | 0.028 | SWMM Method | AS2156-020 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2156-028 | 1 | 1 | 1 | 1.086 | 145.764 | 100 | 0.01 | SWMM Method | AS2156-028 | 0 | AS2156-028 | SubCatchment 3 | No Redirection | |
| AS2156-028 | 3 | | 1 | 0.06 | 145.764 | 0 | 0.01 | SWMM Method | AS2156-028 | 0 | | SubCatchment 3 | No Redirection | |
| AS2156-036 | 1 | 1 | 1 | 1.379 | 335.515 | 100 | 0.021 | SWMM Method | AS2156-036 | 0 | AS2156-036 | SubCatchment 3 | No Redirection | |
| AS2156-036 | 3 | | 1 | 0.308 | 335.515 | 0 | 0.021 | SWMM Method | AS2156-036 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2245-005 | 1 | 1 | 1 | 16.338 | 1221.809 | 100 | 0.02 | SWMM Method | AS2245-005 | 0 | AS2245-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2245-005 | 2 | | 1 | 1.804 | 1221.809 | 100 | 0.02 | SWMM Method | AS2245-005 | 1 | AS2245-005 | SubCatchment 3 | No Redirection | |
| AS2245-005 | 3 | | 1 | 15.887 | 1221.809 | 0 | 0.02 | SWMM Method | AS2245-005 | 0 | | SubCatchment 3 | No Redirection | |
| AS2247-001 | 1 | 1 | 1 | 12.241 | 1211.903 | 100 | 0.017 | SWMM Method | AS2247-001 | 0 | AS2247-001 | SubCatchment 3 | No Redirection | |
| AS2247-001 | 2 | | 1 | 0.194 | 1211.903 | 100 | 0.017 | SWMM Method | AS2247-001 | 1 | AS2247-001 | SubCatchment 3 | No Redirection | |
| AS2247-001 | 3 | | 1 | 14.885 | 1211.903 | 0 | 0.017 | SWMM Method | AS2247-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2249-005 | 1 | 1 | 1 | 0.682 | 227.761 | 100 | 0.019 | SWMM Method | AS2249-005 | 0 | AS2249-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2249-005 | 2 | | 1 | 0.058 | 227.761 | 100 | 0.019 | SWMM Method | AS2249-005 | 1 | AS2249-005 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2249-005 | 3 | | 1 | 0.524 | 227.761 | 0 | 0.019 | SWMM Method | AS2249-005 | 0 | | SubCatchment 3 | No Redirection | |
| AS2250-016 | 1 | 1 | 1 | 1.064 | 217.68 | 100 | 0.017 | SWMM Method | AS2250-016 | 0 | AS2250-016 | SubCatchment 3 | No Redirection | |
| AS2250-016 | 2 | | 1 | 0.007 | 217.68 | 100 | 0.017 | SWMM Method | AS2250-016 | 1 | AS2250-016 | SubCatchment 3 | No Redirection | |
| AS2250-016 | 3 | | 1 | 0.588 | 217.68 | 0 | 0.017 | SWMM Method | AS2250-016 | 0 | | SubCatchment 3 | No Redirection | |
| AS2250-019 | 1 | 1 | 1 | 1.606 | 235.466 | 100 | 0.024 | SWMM Method | AS2250-019 | 0 | AS2250-019 | SubCatchment 3 | No Redirection | |
| AS2250-019 | 2 | | 1 | 0.015 | 235.466 | 100 | 0.024 | SWMM Method | AS2250-019 | 1 | AS2250-019 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2250-019 | 3 | | 1 | 1.024 | 235.466 | 0 | 0.024 | SWMM Method | AS2250-019 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2250-038 | 1 | 1 | 1 | 5.629 | 826.3 | 100 | 0.02 | SWMM Method | AS2250-038 | 0 | AS2250-038 | SubCatchment 3 | No Redirection | |
| AS2250-038 | 2 | | 1 | 0.108 | 826.3 | 100 | 0.02 | SWMM Method | AS2250-038 | 1 | AS2250-038 | SubCatchment 3 | No Redirection | |
| AS2250-038 | 3 | | 1 | 0.894 | 826.3 | 0 | 0.02 | SWMM Method | AS2250-038 | 0 | | SubCatchment 3 | No Redirection | |
| AS2251-008 | 1 | 1 | 1 | 7.995 | 1474.956 | 100 | 0.031 | SWMM Method | AS2251-008 | 0 | AS2251-008 | SubCatchment 3 | No Redirection | |
| AS2251-008 | 2 | | 1 | 0.816 | 1474.956 | 100 | 0.031 | SWMM Method | AS2251-008 | 1 | AS2251-008 | SubCatchment 3 | No Redirection | |
| AS2251-008 | 3 | | 1 | 6.277 | 1474.956 | 0 | 0.031 | SWMM Method | AS2251-008 | 0 | | SubCatchment 3 | No Redirection | |
| AS2251-018 | 1 | 1 | 1 | 4.806 | 810.73 | 100 | 0.028 | SWMM Method | AS2251-018 | 0 | AS2251-018 | SubCatchment 3 | No Redirection | |
| AS2251-018 | 2 | | 1 | 1.292 | 810.73 | 100 | 0.028 | SWMM Method | AS2251-018 | 1 | AS2251-018 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2251-018 | 3 | | 1 | 8.336 | 810.73 | 0 | 0.028 | SWMM Method | AS2251-018 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2252-008 | 1 | 1 | 1 | 4.523 | 428.376 | 100 | 0.015 | SWMM Method | AS2252-008 | 0 | AS2252-008 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2252-008 | 2 | | 1 | 0.149 | 428.376 | 100 | 0.015 | SWMM Method | AS2252-008 | 1 | AS2252-008 | SubCatchment 3 | No Redirection | |
| AS2252-008 | 3 | | 1 | 2.154 | 428.376 | 0 | 0.015 | SWMM Method | AS2252-008 | 0 | | SubCatchment 3 | No Redirection | |
| AS2253-012 | 1 | 1 | 1 | 4.866 | 348.296 | 100 | 0.006 | SWMM Method | AS2253-012 | 0 | AS2253-012 | SubCatchment 3 | No Redirection | UW Ag Research Stati |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2253-012 | 2 | | 1 | 0.009 | 348.296 | 100 | 0.006 | SWMM Method | AS2253-012 | 1 | AS2253-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2253-012 | 3 | | 1 | 2.405 | 348.296 | 0 | 0.006 | SWMM Method | AS2253-012 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2254-005 | 1 | 1 | 1 | 6.985 | 658.765 | 100 | 0.005 | SWMM Method | AS2254-005 | 0 | AS2254-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2254-005 | 2 | | 1 | 0.192 | 658.765 | 100 | 0.005 | SWMM Method | AS2254-005 | 1 | AS2254-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2254-005 | 3 | | 1 | 3.819 | 658.765 | 0 | 0.005 | SWMM Method | AS2254-005 | 0 | | SubCatchment 3 | No Redirection | |
| AS2254-024 | 1 | 1 | 1 | 7.294 | 696.522 | 100 | 0.017 | SWMM Method | AS2254-024 | 0 | AS2254-024 | SubCatchment 3 | No Redirection | |
| AS2254-024 | 2 | | 1 | 0.117 | 696.522 | 100 | 0.017 | SWMM Method | AS2254-024 | 1 | AS2254-024 | SubCatchment 3 | No Redirection | |
| AS2254-024 | 3 | | 1 | 5.229 | 696.522 | 0 | 0.017 | SWMM Method | AS2254-024 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2255-006 | 1 | 1 | 1 | 3.854 | 1011.526 | 100 | 0.036 | SWMM Method | AS2255-006 | 0 | AS2255-006 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2255-006 | 2 | | 1 | 0.036 | 1011.526 | 100 | 0.036 | SWMM Method | AS2255-006 | 1 | AS2255-006 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2255-006 | 3 | | 1 | 5.983 | 1011.526 | 0 | 0.036 | SWMM Method | AS2255-006 | 0 | | SubCatchment 3 | No Redirection | |
| AS2255-046 | 1 | 1 | 1 | 2.962 | 732.689 | 100 | 0.004 | SWMM Method | AS2255-046 | 0 | AS2255-046 | SubCatchment 3 | No Redirection | |
| AS2255-046 | 2 | | 1 | 0.096 | 732.689 | 100 | 0.004 | SWMM Method | AS2255-046 | 1 | AS2255-046 | SubCatchment 3 | No Redirection | |
| AS2255-046 | 3 | | 1 | 0.619 | 732.689 | 0 | 0.004 | SWMM Method | AS2255-046 | 0 | | SubCatchment 3 | No Redirection | |
| AS2256-017 | 1 | 1 | 1 | 8.712 | 380.99 | 100 | 0.005 | SWMM Method | AS2256-017 | 0 | AS2256-017 | SubCatchment 3 | No Redirection | |
| AS2256-017 | 3 | | 1 | 0.698 | 380.99 | 0 | 0.005 | SWMM Method | AS2256-017 | 0 | | SubCatchment 3 | No Redirection | |
| AS2256-077 | 1 | 1 | 1 | 0.073 | 138.995 | 100 | 0.098 | SWMM Method | AS2256-077 | 0 | AS2256-077 | SubCatchment 3 | No Redirection | |
| AS2256-077 | 3 | | 1 | 0.172 | 138.995 | 0 | 0.098 | SWMM Method | AS2256-077 | 0 | | SubCatchment 3 | No Redirection | |
| AS2257-004 | 1 | 1 | 1 | 11.696 | 1122.615 | 100 | 0.015 | SWMM Method | AS2257-004 | 0 | AS2257-004 | SubCatchment 3 | No Redirection | |
| AS2257-004 | 2 | | 1 | 0.024 | 1122.615 | 100 | 0.015 | SWMM Method | AS2257-004 | 1 | AS2257-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2257-004 | 3 | | 1 | 3.81 | 1122.615 | 0 | 0.015 | SWMM Method | AS2257-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2257-012 | 1 | 1 | 1 | 1.164 | 150.889 | 100 | 0.022 | SWMM Method | AS2257-012 | 0 | AS2257-012 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2257-012 | 2 | | 1 | 0.004 | 150.889 | 100 | 0.022 | SWMM Method | AS2257-012 | 1 | AS2257-012 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2257-012 | 3 | | 1 | 0.328 | 150.889 | 0 | 0.022 | SWMM Method | AS2257-012 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-001 | 1 | 1 | 1 | 1.051 | 404.262 | 100 | 0.007 | SWMM Method | AS2258-001 | 0 | AS2258-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-001 | 3 | | 1 | 0.361 | 404.262 | 0 | 0.007 | SWMM Method | AS2258-001 | 0 | | SubCatchment 3 | No Redirection | |
| AS2258-048 | 1 | 1 | 1 | 2.582 | 249.122 | 100 | 0.02 | SWMM Method | AS2258-048 | 0 | AS2258-048 | SubCatchment 3 | No Redirection | Memorial High School |
| AS2258-048 | 2 | | 1 | 0.069 | 249.122 | 100 | 0.02 | SWMM Method | AS2258-048 | 1 | AS2258-048 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2258-048 | 3 | | 1 | 0.951 | 249.122 | 0 | 0.02 | SWMM Method | AS2258-048 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2258-056 | 1 | 1 | 1 | 3.87 | 531.194 | 100 | 0.086 | SWMM Method | AS2258-056 | 0 | AS2258-056 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2258-056 | 2 | | 1 | 1.179 | 531.194 | 100 | 0.086 | SWMM Method | AS2258-056 | 1 | AS2258-056 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2258-056 | 3 | | 1 | 5.988 | 531.194 | 0 | 0.086 | SWMM Method | AS2258-056 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2259-001 | 1 | 1 | 1 | 2.878 | 557.37 | 100 | 0.047 | SWMM Method | AS2259-001 | 0 | AS2259-001 | SubCatchment 3 | No Redirection | |
| AS2259-001 | 2 | | 1 | 1.07 | 557.37 | 100 | 0.047 | SWMM Method | AS2259-001 | 1 | AS2259-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2259-001 | 3 | | 1 | 16.236 | 557.37 | 0 | 0.047 | SWMM Method | AS2259-001 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| AS2347-001 | 1 | 1 | 1 | 4.983 | 763.296 | 100 | 0.022 | SWMM Method | AS2347-001 | 0 | AS2347-001 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2347-001 | 2 | | 1 | 0.2 | 763.296 | 100 | 0.022 | SWMM Method | AS2347-001 | 1 | AS2347-001 | SubCatchment 3 | No Redirection | |
| AS2347-001 | 3 | | 1 | 3.621 | 763.296 | 0 | 0.022 | SWMM Method | AS2347-001 | 0 | | SubCatchment 3 | No Redirection | |
| AS2347-010 | 1 | 1 | 1 | 2.774 | 446.348 | 100 | 0.013 | SWMM Method | AS2347-010 | 0 | AS2347-010 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2347-010 | 2 | | 1 | 0.195 | 446.348 | 100 | 0.013 | SWMM Method | AS2347-010 | 1 | AS2347-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2347-010 | 3 | | 1 | 3.691 | 446.348 | 0 | 0.013 | SWMM Method | AS2347-010 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2347-018 | 1 | 1 | 1 | 2.6 | 538.203 | 100 | 0.009 | SWMM Method | AS2347-018 | 0 | AS2347-018 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2347-018 | 2 | | 1 | 1.163 | 538.203 | 100 | 0.009 | SWMM Method | AS2347-018 | 1 | AS2347-018 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2347-018 | 3 | | 1 | 8.141 | 538.203 | 0 | 0.009 | SWMM Method | AS2347-018 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2348-005 | 1 | 1 | 1 | 10.876 | 1021.535 | 100 | 0.033 | SWMM Method | AS2348-005 | 0 | AS2348-005 | SubCatchment 3 | No Redirection | |
| AS2348-005 | 2 | | 1 | 0.16 | 1021.535 | 100 | 0.033 | SWMM Method | AS2348-005 | 1 | AS2348-005 | SubCatchment 3 | No Redirection | |
| AS2348-005 | 3 | | 1 | 5.038 | 1021.535 | 0 | 0.033 | SWMM Method | AS2348-005 | 0 | | SubCatchment 3 | No Redirection | |
| AS2349-008 | 1 | 1 | 1 | 0.752 | 59.57 | 100 | 0.021 | SWMM Method | AS2349-008 | 0 | AS2349-008 | SubCatchment 3 | No Redirection | |
| AS2349-008 | 3 | | 1 | 0.357 | 59.57 | 0 | 0.021 | SWMM Method | AS2349-008 | 0 | | SubCatchment 3 | No Redirection | |
| AS2351-015 | 1 | 1 | 1 | 5.941 | 1301.748 | 100 | 0.045 | SWMM Method | AS2351-015 | 0 | AS2351-015 | SubCatchment 3 | No Redirection | |
| AS2351-015 | 2 | | 1 | 2.39 | 1301.748 | 100 | 0.045 | SWMM Method | AS2351-015 | 1 | AS2351-015 | SubCatchment 3 | No Redirection | |
| AS2351-015 | 3 | | 1 | 17.133 | 1301.748 | 0 | 0.045 | SWMM Method | AS2351-015 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2353-005 | 1 | 1 | 1 | 3.323 | 373.735 | 100 | 0.024 | SWMM Method | AS2353-005 | 0 | AS2353-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2353-005 | 2 | | 1 | 1.199 | 373.735 | 100 | 0.024 | SWMM Method | AS2353-005 | 1 | AS2353-005 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2353-005 | 3 | | 1 | 8.05 | 373.735 | 0 | 0.024 | SWMM Method | AS2353-005 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2354-006 | 1 | 1 | 1 | 3.842 | 637.588 | 100 | 0.014 | SWMM Method | AS2354-006 | 0 | AS2354-006 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2354-006 | 2 | | 1 | 1.621 | 637.588 | 100 | 0.014 | SWMM Method | AS2354-006 | 1 | AS2354-006 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2354-006 | 3 | | 1 | 12.394 | 637.588 | 0 | 0.014 | SWMM Method | AS2354-006 | 0 | | SubCatchment 3 | No Redirection | Memorial High School |
| AS2355-001 | 1 | 1 | 1 | 3.961 | 597.222 | 100 | 0.024 | SWMM Method | AS2355-001 | 0 | AS2355-001 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2355-001 | 2 | | 1 | 0.109 | 597.222 | 100 | 0.024 | SWMM Method | AS2355-001 | 1 | AS2355-001 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2355-001 | 3 | | 1 | 3.649 | 597.222 | 0 | 0.024 | SWMM Method | AS2355-001 | 0 | | SubCatchment 3 | No Redirection | Memorial High School |
| AS2355-016 | 1 | 1 | 1 | 4.026 | 429.687 | 100 | 0.028 | SWMM Method | AS2355-016 | 0 | AS2355-016 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2355-016 | 2 | | 1 | 0.053 | 429.687 | 100 | 0.028 | SWMM Method | AS2355-016 | 1 | AS2355-016 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| AS2355-016 | 3 | | 1 | 1.381 | 429.687 | 0 | 0.028 | SWMM Method | AS2355-016 | 0 | | SubCatchment 3 | No Redirection | |
| AS2356-032 | 1 | 1 | 1 | 12.536 | 414.401 | 100 | 0.025 | SWMM Method | AS2356-032 | 0 | AS2356-032 | SubCatchment 3 | No Redirection | |
| AS2356-032 | 2 | | 1 | 0.205 | 414.401 | 100 | 0.025 | SWMM Method | AS2356-032 | 1 | AS2356-032 | SubCatchment 3 | No Redirection | |
| AS2356-032 | 3 | | 1 | 5.956 | 414.401 | 0 | 0.025 | SWMM Method | AS2356-032 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| AS2448-012 | 1 | 1 | 1 | 3.398 | 865.683 | 100 | 0.035 | SWMM Method | AS2448-012 | 0 | AS2448-012 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2448-012 | 2 | | 1 | 1.519 | 865.683 | 100 | 0.035 | SWMM Method | AS2448-012 | 1 | AS2448-012 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| AS2448-012 | 3 | | 1 | 10.134 | 865.683 | 0 | 0.035 | SWMM Method | AS2448-012 | 0 | | SubCatchment 3 | No Redirection | |
| AS2450-026 | 1 | 1 | 1 | 3.427 | 838.016 | 100 | 0.011 | SWMM Method | AS2450-026 | 0 | AS2450-026 | SubCatchment 3 | No Redirection | |
| AS2450-026 | 2 | | 1 | 0.748 | 838.016 | 100 | 0.011 | SWMM Method | AS2450-026 | 1 | AS2450-026 | SubCatchment 3 | No Redirection | |
| AS2450-026 | 3 | | 1 | 6.199 | 838.016 | 0 | 0.011 | SWMM Method | AS2450-026 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| AS2451-015 | 1 | 1 | 1 | 4.588 | 531.086 | 100 | 0.014 | SWMM Method | AS2451-015 | 0 | AS2451-015 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| AS2451-015 | 2 | | 1 | 1.284 | 531.086 | 100 | 0.014 | SWMM Method | AS2451-015 | 1 | AS2451-015 | SubCatchment 3 | No Redirection | |
| AS2451-015 | 3 | | 1 | 10.348 | 531.086 | 0 | 0.014 | SWMM Method | AS2451-015 | 0 | | SubCatchment 3 | No Redirection | |
| AS2452-001 | 1 | 1 | 1 | 2.478 | 1101.479 | 100 | 0.055 | SWMM Method | AS2452-001 | 0 | AS2452-001 | SubCatchment 3 | No Redirection | |
| AS2452-001 | 2 | | 1 | 0.935 | 1101.479 | 100 | 0.055 | SWMM Method | AS2452-001 | 1 | AS2452-001 | SubCatchment 3 | No Redirection | |
| AS2452-001 | 3 | | 1 | 6.414 | 1101.479 | 0 | 0.055 | SWMM Method | AS2452-001 | 0 | | SubCatchment 3 | No Redirection | |
| AS2454-001 | 1 | 1 | 1 | 1.006 | 314.625 | 100 | 0.015 | SWMM Method | AS2454-001 | 0 | AS2454-001 | SubCatchment 3 | No Redirection | |
| AS2454-001 | 2 | | 1 | 0.019 | 314.625 | 100 | 0.015 | SWMM Method | AS2454-001 | 1 | AS2454-001 | SubCatchment 3 | No Redirection | |
| AS2454-001 | 3 | | 1 | 0.926 | 314.625 | 0 | 0.015 | SWMM Method | AS2454-001 | 0 | | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2455-004 | 1 | 1 | 1 | 5.81 | 523.364 | 100 | 0.03 | SWMM Method | AS2455-004 | 0 | AS2455-004 | SubCatchment 3 | No Redirection | |
| AS2455-004 | 2 | | 1 | 0.147 | 523.364 | 100 | 0.03 | SWMM Method | AS2455-004 | 1 | AS2455-004 | SubCatchment 3 | No Redirection | |
| AS2455-004 | 3 | | 1 | 9.901 | 523.364 | 0 | 0.03 | SWMM Method | AS2455-004 | 0 | | SubCatchment 3 | No Redirection | |
| AS2548-001 | 1 | 1 | 1 | 4.672 | 806.285 | 100 | 0.008 | SWMM Method | AS2548-001 | 0 | AS2548-001 | SubCatchment 3 | No Redirection | |
| AS2548-001 | 2 | | 1 | 1.625 | 806.285 | 100 | 0.008 | SWMM Method | AS2548-001 | 1 | AS2548-001 | SubCatchment 3 | No Redirection | |
| AS2548-001 | 3 | | 1 | 13.836 | 806.285 | 0 | 0.008 | SWMM Method | AS2548-001 | 0 | | SubCatchment 3 | No Redirection | |
| AS2548-013 | 1 | 1 | 1 | 2.53 | 859.069 | 100 | 0.009 | SWMM Method | AS2548-013 | 0 | AS2548-013 | SubCatchment 3 | No Redirection | |
| AS2548-013 | 2 | | 1 | 1.252 | 859.069 | 100 | 0.009 | SWMM Method | AS2548-013 | 1 | AS2548-013 | SubCatchment 3 | No Redirection | |
| AS2548-013 | 3 | | 1 | 9.261 | 859.069 | 0 | 0.009 | SWMM Method | AS2548-013 | 0 | | SubCatchment 1 | No Redirection | |
| AS2550-016 | 1 | 1 | 1 | 1.927 | 432.899 | 100 | 0.07 | SWMM Method | AS2550-016 | 0 | AS2550-016 | SubCatchment 3 | No Redirection | |
| AS2550-016 | 2 | | 1 | 0.625 | 432.899 | 100 | 0.07 | SWMM Method | AS2550-016 | 1 | AS2550-016 | SubCatchment 3 | No Redirection | |
| AS2550-016 | 3 | | 1 | 4.475 | 432.899 | 0 | 0.07 | SWMM Method | AS2550-016 | 0 | | SubCatchment 3 | No Redirection | |
| AS2551-008 | 1 | 1 | 1 | 2.551 | 922.52 | 100 | 0.02 | SWMM Method | AS2551-008 | 0 | AS2551-008 | SubCatchment 3 | No Redirection | |
| AS2551-008 | 2 | | 1 | 0.981 | 922.52 | 100 | 0.02 | SWMM Method | AS2551-008 | 1 | AS2551-008 | SubCatchment 3 | No Redirection | |
| AS2551-008 | 3 | | 1 | 8.457 | 922.52 | 0 | 0.02 | SWMM Method | AS2551-008 | 0 | | SubCatchment 3 | No Redirection | |
| AS2551-020 | 1 | 1 | 1 | 2.419 | 1682.477 | 100 | 0.037 | SWMM Method | AS2551-020 | 0 | AS2551-020 | SubCatchment 3 | No Redirection | |
| AS2551-020 | 2 | | 1 | 0.682 | 1682.477 | 100 | 0.037 | SWMM Method | AS2551-020 | 1 | AS2551-020 | SubCatchment 3 | No Redirection | |
| AS2551-020 | 3 | | 1 | 15.561 | 1682.477 | 0 | 0.037 | SWMM Method | AS2551-020 | 0 | | SubCatchment 3 | No Redirection | |
| AS2552-004 | 1 | 1 | 1 | 1.123 | 326.686 | 100 | 0.029 | SWMM Method | AS2552-004 | 0 | AS2552-004 | SubCatchment 3 | No Redirection | |
| AS2552-004 | 2 | | 1 | 0.419 | 326.686 | 100 | 0.029 | SWMM Method | AS2552-004 | 1 | AS2552-004 | SubCatchment 3 | No Redirection | |
| AS2552-004 | 3 | | 1 | 2.922 | 326.686 | 0 | 0.029 | SWMM Method | AS2552-004 | 0 | | SubCatchment 1 | No Redirection | |
| ATTIC_ANGEL_E_POND | 1 | 1 | 1 | 0.733 | 770.877 | 100 | 0.134 | SWMM Method | ATTIC_ANGE | 0 | ATTIC_ANGEL_E_ | SubCatchment 3 | No Redirection | |
| ATTIC_ANGEL_E_POND | 2 | | 1 | 0.113 | 770.877 | 100 | 0.134 | SWMM Method | ATTIC_ANGE | 1 | ATTIC_ANGEL_E_ | SubCatchment 3 | No Redirection | |
| ATTIC_ANGEL_E_POND | 3 | | 1 | 1.872 | 770.877 | 0 | 0.134 | SWMM Method | ATTIC_ANGE | 0 | | SubCatchment 3 | No Redirection | |
| ATTIC_ANGEL_POND_IN | 1 | 1 | 1 | 1.605 | 2197.561 | 100 | 0.131 | SWMM Method | ATTIC_ANGE | 0 | ATTIC_ANGEL_P( | SubCatchment 3 | No Redirection | |
| ATTIC_ANGEL_POND_IN | 2 | | 1 | 0.818 | 2197.561 | 100 | 0.131 | SWMM Method | ATTIC_ANGE | 1 | ATTIC_ANGEL_P( | SubCatchment 3 | No Redirection | Swallowtail Park |
| ATTIC_ANGEL_POND_IN | 3 | | 1 | 5.606 | 2197.561 | 0 | 0.131 | SWMM Method | ATTIC_ANGE | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| ATTIC_ANGEL_W_POND | 1 | 1 | 1 | 0.454 | 870.025 | 100 | 0.118 | SWMM Method | ATTIC_ANGE | 0 | ATTIC_ANGEL_W | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| ATTIC_ANGEL_W_POND | 2 | | 1 | 0.245 | 870.025 | 100 | 0.118 | SWMM Method | ATTIC_ANGE | 1 | ATTIC_ANGEL_W | SubCatchment 3 | No Redirection | Swallowtail Park |
| ATTIC_ANGEL_W_POND | 3 | | 1 | 2.53 | 870.025 | 0 | 0.118 | SWMM Method | ATTIC_ANGE | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| BeltineNUS2 | 1 | 1 | 1 | 7.537 | 429.875 | 100 | 0.028 | SWMM Method | EMPB_GW_N | 0 | EMPB_GW_NHPI | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| BeltineNUS2 | 3 | | 1 | 6.679 | 429.875 | 0 | 0.028 | SWMM Method | EMPB_GW_N | 0 | | SubCatchment 3 | No Redirection | |
| BeltlineNDS2 | 1 | 1 | 1 | 2.482 | 166.891 | 100 | 0.007 | SWMM Method | EMPB_GW_V | 0 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| BeltlineNDS2 | 3 | | 1 | 4.155 | 166.891 | 0 | 0.007 | SWMM Method | EMPB_GW_V | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| BH_CHURCH_PR | 1 | 1 | 1 | 1.1 | 869.858 | 100 | 0.068 | SWMM Method | BH_CHURCH | 0 | BH_CHURCH_PR | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| BH_CHURCH_PR | 2 | | 1 | 0.425 | 869.858 | 100 | 0.068 | SWMM Method | BH_CHURCH | 1 | BH_CHURCH_PR | SubCatchment 3 | No Redirection | |
| BH_CHURCH_PR | 3 | | 1 | 4.055 | 869.858 | 0 | 0.068 | SWMM Method | BH_CHURCH | 0 | | SubCatchment 1 | No Redirection | |
| CAPE_SILVER_WAY_DRY_POND | 1 | 1 | 1 | 0.26 | 738.78 | 100 | 0.069 | SWMM Method | CAPE_SILVER | 0 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Swallowtail Park |
| CAPE_SILVER_WAY_DRY_POND | 2 | | 1 | 0.161 | 738.78 | 100 | 0.069 | SWMM Method | CAPE_SILVER | 1 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| CAPE_SILVER_WAY_DRY_POND | 3 | | 1 | 1.436 | 738.78 | 0 | 0.069 | SWMM Method | CAPE_SILVER | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| CAPE_SILVER_WAY_WET_POND | 1 | 1 | 1 | 0.646 | 830.436 | 100 | 0.056 | SWMM Method | CAPE_SILVER | 0 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAPE_SILVER_WAY_WET_POND | 2 | | 1 | 0.765 | 830.436 | 100 | 0.056 | SWMM Method | CAPE_SILVER | 1 | CAPE_SILVER_W | SubCatchment 3 | No Redirection | Swallowtail Park |
| CAPE_SILVER_WAY_WET_POND | 3 | | 1 | 1.412 | 830.436 | 0 | 0.056 | SWMM Method | CAPE_SILVER | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| CEM_SWALE | 1 | 1 | 1 | 0.506 | 459.427 | 100 | 0.011 | SWMM Method | CEM_SWALE | 0 | CEM_SWALE | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| CEM_SWALE | 2 | | 1 | 0.051 | 459.427 | 100 | 0.011 | SWMM Method | CEM_SWALE | 1 | CEM_SWALE | SubCatchment 3 | No Redirection | |
| CEM_SWALE | 3 | | 1 | 4.974 | 459.427 | 0 | 0.011 | SWMM Method | CEM_SWALE | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park |
| CH_BIO_BASIN_1 | 1 | 1 | 1 | 1.303 | 639.293 | 100 | 0.006 | SWMM Method | CH_BIO_BAS | 0 | CH_BIO_BASIN_1 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| CH_BIO_BASIN_1 | 2 | | 1 | 1.212 | 639.293 | 100 | 0.006 | SWMM Method | CH_BIO_BAS | 1 | CH_BIO_BASIN_1 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| CH_BIO_BASIN_1 | 3 | | 1 | 7.664 | 639.293 | 0 | 0.006 | SWMM Method | CH_BIO_BAS | 0 | | SubCatchment 3 | No Redirection | |
| COMMERCE_SQUARE_POND | 1 | 1 | 1 | 3.913 | 559.767 | 100 | 0.033 | SWMM Method | COMMERCE_ | 0 | COMMERCE_SQU | SubCatchment 3 | No Redirection | |
| COMMERCE_SQUARE_POND | 2 | | 1 | 0.106 | 559.767 | 100 | 0.033 | SWMM Method | COMMERCE_ | 1 | COMMERCE_SQU | SubCatchment 3 | No Redirection | Swallowtail Park |
| COMMERCE_SQUARE_POND | 3 | | 1 | 3.322 | 559.767 | 0 | 0.033 | SWMM Method | COMMERCE_ | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| DT1853-003 | 1 | 1 | 1 | 0.307 | 338.532 | 100 | 0.017 | SWMM Method | DT1853-003 | 0 | DT1853-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| DT1853-003 | 2 | | 1 | 0.098 | 338.532 | 100 | 0.017 | SWMM Method | DT1853-003 | 1 | DT1853-003 | SubCatchment 3 | No Redirection | |
| DT1853-003 | 3 | | 1 | 2.549 | 338.532 | 0 | 0.017 | SWMM Method | DT1853-003 | 0 | | SubCatchment 3 | No Redirection | |
| DT2349-022 | 1 | 1 | 1 | 0.349 | 94.163 | 100 | 0.031 | SWMM Method | DT2349-022 | 0 | DT2349-022 | SubCatchment 3 | No Redirection | Swallowtail Park |
| DT2349-022 | 3 | | 1 | 0.921 | 94.163 | 0 | 0.031 | SWMM Method | DT2349-022 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| E_INF_BASIN | 1 | 1 | 1 | 0.09 | 115.348 | 100 | 0.064 | SWMM Method | E_INF_BASIN | 0 | E_INF_BASIN | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| E_INF_BASIN | 2 | | 1 | 0.125 | 115.348 | 100 | 0.064 | SWMM Method | E_INF_BASIN | 1 | E_INF_BASIN | SubCatchment 3 | No Redirection | |
| E_INF_BASIN | 3 | | 1 | 0.689 | 115.348 | 0 | 0.064 | SWMM Method | E_INF_BASIN | 0 | | SubCatchment 3 | No Redirection | |
| ELD_FARM_S1 | 3 | 1 | 1 | 6.424 | 377.506 | 0 | 0.036 | SWMM Method | ELD_FARM_S | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park |
| ELD_FARM_S2 | 1 | 1 | 1 | 0.062 | 846.913 | 100 | 0.027 | SWMM Method | ELD_FARM_S | 0 | ELD_FARM_S2 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| ELD_FARM_S2 | 3 | | 1 | 14.364 | 846.913 | 0 | 0.027 | SWMM Method | ELD_FARM_S | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| ELD_FARM_S3 | 1 | 1 | 1 | 0.051 | 710.294 | 100 | 0.027 | SWMM Method | ELD_FARM_S | 0 | ELD_FARM_S3 | SubCatchment 3 | No Redirection | |
| ELD_FARM_S3 | 3 | | 1 | 6.163 | 710.294 | 0 | 0.027 | SWMM Method | ELD_FARM_S | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_DEP | 1 | 1 | 1 | 0.156 | 442.82 | 100 | 0.01 | SWMM Method | ELD_N_DEP | 0 | ELD_N_DEP | SubCatchment 3 | No Redirection | |
| ELD_N_DEP | 2 | | 1 | 0.113 | 442.82 | 100 | 0.01 | SWMM Method | ELD_N_DEP | 0 | ELD_N_DEP | SubCatchment 3 | No Redirection | |
| ELD_N_DEP | 3 | | 1 | 4.192 | 442.82 | 0 | 0.01 | SWMM Method | ELD_N_DEP | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_DITCH | 3 | 1 | 1 | 1.867 | 186.536 | 0 | 0.009 | SWMM Method | ELD_N_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM1 | 1 | 1 | 1 | 1.23 | 1121.859 | 100 | 0.022 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM1 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM1 | 2 | | 1 | 0.268 | 1121.859 | 100 | 0.022 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM1 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM1 | 3 | | 1 | 18.948 | 1121.859 | 0 | 0.022 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM10 | 1 | 1 | 1 | 0.094 | 969.461 | 100 | 0.021 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM10 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM10 | 3 | | 1 | 12.207 | 969.461 | 0 | 0.021 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM11 | 1 | 1 | 1 | 0.134 | 529.055 | 100 | 0.009 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM11 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM11 | 2 | | 1 | 0.148 | 529.055 | 100 | 0.009 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM11 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM11 | 3 | | 1 | 8.253 | 529.055 | 0 | 0.009 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM12 | 1 | 1 | 1 | 0.12 | 961.197 | 100 | 0.014 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM12 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM12 | 2 | | 1 | 0.123 | 961.197 | 100 | 0.014 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM12 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM12 | 3 | | 1 | 19.295 | 961.197 | 0 | 0.014 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM13 | 1 | 1 | 1 | 0.122 | 1121.491 | 100 | 0.047 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM13 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM13 | 2 | | 1 | 0.077 | 1121.491 | 100 | 0.047 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM13 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELD_N_FARM13 | 3 | | 1 | 16.018 | 1121.491 | 0 | 0.047 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM14 | 1 | 1 | 1 | 0.514 | 553.095 | 100 | 0.032 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM14 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM14 | 2 | | 1 | 0.185 | 553.095 | 100 | 0.032 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM14 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM14 | 3 | | 1 | 8.371 | 553.095 | 0 | 0.032 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM15 | 1 | 1 | 1 | 0.348 | 490.695 | 100 | 0.025 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM15 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM15 | 2 | | 1 | 0.216 | 490.695 | 100 | 0.025 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM15 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM15 | 3 | | 1 | 7.029 | 490.695 | 0 | 0.025 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM16 | 3 | 1 | 1 | 4.69 | 350.691 | 0 | 0.017 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM17 | 1 | 1 | 1 | 0.039 | 563.217 | 100 | 0.029 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM17 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM17 | 3 | | 1 | 4.966 | 563.217 | 0 | 0.029 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM2 | 1 | 1 | 1 | 0.464 | 831.07 | 100 | 0.046 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM2 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM2 | 2 | | 1 | 0.01 | 831.07 | 100 | 0.046 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM2 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM2 | 3 | | 1 | 5.669 | 831.07 | 0 | 0.046 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM3 | 1 | 1 | 1 | 0.272 | 1011.467 | 100 | 0.027 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM3 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM3 | 2 | | 1 | 0.014 | 1011.467 | 100 | 0.027 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM3 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM3 | 3 | | 1 | 17.732 | 1011.467 | 0 | 0.027 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM3 | 2 | | 1 | 0.014 | 1011.467 | 100 | 0.027 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM3 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM3 | 3 | | 1 | 17.732 | 1011.467 | 0 | 0.027 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM4 | 1 | 1 | 1 | 0.92 | 1252.54 | 100 | 0.025 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM4 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| ELD_N_FARM4 | 3 | | 1 | 21.354 | 1252.54 | 0 | 0.025 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM5 | 1 | 1 | 1 | 0.55 | 2070.85 | 100 | 0.03 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM5 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM5 | 2 | | 1 | 0.003 | 2070.85 | 100 | 0.03 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM5 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM5 | 3 | | 1 | 30.115 | 2070.85 | 0 | 0.03 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM6 | 1 | 1 | 1 | 0.29 | 1089.791 | 100 | 0.022 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM6 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM6 | 2 | | 1 | 0.01 | 1089.791 | 100 | 0.022 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM6 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM6 | 3 | | 1 | 13.715 | 1089.791 | 0 | 0.022 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM7 | 3 | 1 | 1 | 9.506 | 739.389 | 0 | 0.022 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM8 | 1 | 1 | 1 | 0.077 | 1321.493 | 100 | 0.008 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM8 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM8 | 2 | | 1 | 0.01 | 1321.493 | 100 | 0.008 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM8 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM8 | 3 | | 1 | 26.945 | 1321.493 | 0 | 0.008 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_N_FARM9 | 1 | 1 | 1 | 0.003 | 266.898 | 100 | 0.016 | SWMM Method | ELD_N_FARM | 0 | ELD_N_FARM9 | SubCatchment 3 | No Redirection | |
| ELD_N_FARM9 | 3 | | 1 | 2.033 | 266.898 | 0 | 0.016 | SWMM Method | ELD_N_FARM | 0 | | SubCatchment 1 | No Redirection | |
| ELD_PLEAS_DEP | 1 | 1 | 1 | 0.01 | 912.65 | 100 | 0.042 | SWMM Method | ELD_PLEAS_I | 0 | ELD_PLEAS_DEP | SubCatchment 3 | No Redirection | |
| ELD_PLEAS_DEP | 3 | | 1 | 13.865 | 912.65 | 0 | 0.042 | SWMM Method | ELD_PLEAS_I | 0 | | SubCatchment 1 | No Redirection | |
| ELD_TO_BW1 | 1 | 1 | 1 | 0.054 | 556.832 | 100 | 0.078 | SWMM Method | ELD_TO_BW | 0 | ELD_TO_BW1 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW1 | 2 | | 1 | 0.064 | 556.832 | 100 | 0.078 | SWMM Method | ELD_TO_BW | 0 | ELD_TO_BW1 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW1 | 3 | | 1 | 1.491 | 556.832 | 0 | 0.078 | SWMM Method | ELD_TO_BW | 0 | | SubCatchment 1 | No Redirection | |
| ELD_TO_BW2 | 1 | 1 | 1 | 0.255 | 410.049 | 100 | 0.042 | SWMM Method | ELD_TO_BW | 0 | ELD_TO_BW2 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW2 | 2 | | 1 | 0.223 | 410.049 | 100 | 0.042 | SWMM Method | ELD_TO_BW | 0 | ELD_TO_BW2 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW2 | 3 | | 1 | 3.829 | 410.049 | 0 | 0.042 | SWMM Method | ELD_TO_BW | 0 | | SubCatchment 1 | No Redirection | |
| ELD_TO_BW3 | 1 | 1 | 1 | 0.08 | 224.887 | 100 | 0.029 | SWMM Method | ELD_TO_BW | 0 | ELD_TO_BW3 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW3 | 2 | | 1 | 0.071 | 224.887 | 100 | 0.029 | SWMM Method | ELD_TO_BW | 0 | ELD_TO_BW3 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW3 | 3 | | 1 | 2.901 | 224.887 | 0 | 0.029 | SWMM Method | ELD_TO_BW | 0 | | SubCatchment 1 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ELD_TO_BW4 | 1 | 1 | 1 | 0.354 | 542.321 | 100 | 0.018 | SWMM Method | ELD_TO_BW4 | 0 | ELD_TO_BW4 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW4 | 2 | | 1 | 0.273 | 542.321 | 100 | 0.018 | SWMM Method | ELD_TO_BW4 | 0 | ELD_TO_BW4 | SubCatchment 3 | No Redirection | |
| ELD_TO_BW4 | 3 | | 1 | 7.517 | 542.321 | 0 | 0.018 | SWMM Method | ELD_TO_BW4 | 0 | | SubCatchment 1 | No Redirection | |
| EMPB_GW_LOSR2 | 1 | 1 | 1 | 4.9 | 638.022 | 100 | 0.016 | SWMM Method | EMPB_GW_L | 0 | EMPB_GW_LOSR | SubCatchment 3 | No Redirection | |
| EMPB_GW_LOSR2 | 2 | | 1 | 0.13 | 638.022 | 100 | 0.016 | SWMM Method | EMPB_GW_L | 1 | EMPB_GW_LOSR | SubCatchment 3 | No Redirection | |
| EMPB_GW_LOSR2 | 3 | | 1 | 6.598 | 638.022 | 0 | 0.016 | SWMM Method | EMPB_GW_L | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_MPR1 | 1 | 1 | 1 | 5.199 | 265.395 | 100 | 0.014 | SWMM Method | EMPB_GW_M | 0 | EMPB_GW_MPR | SubCatchment 3 | No Redirection | Swallowtail Park |
| EMPB_GW_MPR1 | 3 | | 1 | 4.488 | 265.395 | 0 | 0.014 | SWMM Method | EMPB_GW_M | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| EMPB_GW_NHPR2 | 1 | 1 | 1 | 1.734 | 624.082 | 100 | 0.038 | SWMM Method | EMPB_GW_M | 0 | EMPB_GW_NHPI | SubCatchment 3 | No Redirection | |
| EMPB_GW_NHPR2 | 2 | | 1 | 0.046 | 624.082 | 100 | 0.038 | SWMM Method | EMPB_GW_M | 1 | EMPB_GW_NHPI | SubCatchment 3 | No Redirection | |
| EMPB_GW_NHPR2 | 3 | | 1 | 2.94 | 624.082 | 0 | 0.038 | SWMM Method | EMPB_GW_M | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_NTL3 | 1 | 1 | 1 | 0.696 | 830.13 | 100 | 0.045 | SWMM Method | EMPB_GW_M | 0 | EMPB_GW_NTL3 | SubCatchment 3 | No Redirection | |
| EMPB_GW_NTL3 | 2 | | 1 | 0.233 | 830.13 | 100 | 0.045 | SWMM Method | EMPB_GW_M | 1 | EMPB_GW_NTL3 | SubCatchment 3 | No Redirection | |
| EMPB_GW_NTL3 | 3 | | 1 | 5.239 | 830.13 | 0 | 0.045 | SWMM Method | EMPB_GW_M | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_NTL6 | 1 | 1 | 1 | 2.28 | 974.887 | 100 | 0.061 | SWMM Method | EMPB_GW_M | 0 | EMPB_GW_NTL6 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| EMPB_GW_NTL6 | 2 | | 1 | 0.529 | 974.887 | 100 | 0.061 | SWMM Method | EMPB_GW_M | 1 | EMPB_GW_NTL6 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| EMPB_GW_NTL6 | 3 | | 1 | 9.472 | 974.887 | 0 | 0.061 | SWMM Method | EMPB_GW_M | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| EMPB_GW_NTL7 | 1 | 1 | 1 | 2.474 | 478.761 | 100 | 0.049 | SWMM Method | EMPB_GW_M | 0 | EMPB_GW_NTL7 | SubCatchment 3 | No Redirection | |
| EMPB_GW_NTL7 | 2 | | 1 | 0.292 | 478.761 | 100 | 0.049 | SWMM Method | EMPB_GW_M | 1 | EMPB_GW_NTL7 | SubCatchment 3 | No Redirection | |
| EMPB_GW_NTL7 | 3 | | 1 | 4.437 | 478.761 | 0 | 0.049 | SWMM Method | EMPB_GW_M | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| EMPB_GW_NTL8 | 1 | 1 | 1 | 0.33 | 1979.517 | 100 | 0.044 | SWMM Method | EMPB_GW_M | 0 | EMPB_GW_NTL8 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| EMPB_GW_NTL8 | 2 | | 1 | 0.39 | 1979.517 | 100 | 0.044 | SWMM Method | EMPB_GW_M | 1 | EMPB_GW_NTL8 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| EMPB_GW_NTL8 | 3 | | 1 | 10.67 | 1979.517 | 0 | 0.044 | SWMM Method | EMPB_GW_M | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| EMPB_GW_OSR1 | 1 | 1 | 1 | 1.888 | 642.199 | 100 | 0.038 | SWMM Method | EMPB_GW_O | 0 | EMPB_GW_OSR1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_OSR1 | 2 | | 1 | 0.015 | 642.199 | 100 | 0.038 | SWMM Method | EMPB_GW_O | 1 | EMPB_GW_OSR1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_OSR1 | 3 | | 1 | 1.84 | 642.199 | 0 | 0.038 | SWMM Method | EMPB_GW_O | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_STL1 | 1 | 1 | 1 | 4.918 | 1217.985 | 100 | 0.014 | SWMM Method | EMPB_GW_S | 0 | EMPB_GW_STL1 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| EMPB_GW_STL1 | 2 | | 1 | 0.111 | 1217.985 | 100 | 0.014 | SWMM Method | EMPB_GW_S | 1 | EMPB_GW_STL1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_STL1 | 3 | | 1 | 5.366 | 1217.985 | 0 | 0.014 | SWMM Method | EMPB_GW_S | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| EMPB_GW_UOSR1 | 1 | 1 | 1 | 0.646 | 487.185 | 100 | 0.026 | SWMM Method | EMPB_GW_U | 0 | EMPB_GW_UOSI | SubCatchment 3 | No Redirection | |
| EMPB_GW_UOSR1 | 2 | | 1 | 0.446 | 487.185 | 100 | 0.026 | SWMM Method | EMPB_GW_U | 1 | EMPB_GW_UOSI | SubCatchment 3 | No Redirection | |
| EMPB_GW_UOSR1 | 3 | | 1 | 3.582 | 487.185 | 0 | 0.026 | SWMM Method | EMPB_GW_U | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_WBH1 | 1 | 1 | 1 | 3.898 | 1100.22 | 100 | 0.042 | SWMM Method | EMPB_GW_W | 0 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | |
| EMPB_GW_WBH1 | 2 | | 1 | 0.036 | 1100.22 | 100 | 0.042 | SWMM Method | EMPB_GW_W | 1 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | |
| EMPB_GW_WBH1 | 3 | | 1 | 2.189 | 1100.22 | 0 | 0.042 | SWMM Method | EMPB_GW_W | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_WBH3 | 1 | 1 | 1 | 3.851 | 383.51 | 100 | 0.013 | SWMM Method | EMPB_GW_W | 0 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | |
| EMPB_GW_WBH3 | 2 | | 1 | 0.035 | 383.51 | 100 | 0.013 | SWMM Method | EMPB_GW_W | 1 | EMPB_GW_WBH | SubCatchment 3 | No Redirection | |
| EMPB_GW_WBH3 | 3 | | 1 | 3.637 | 383.51 | 0 | 0.013 | SWMM Method | EMPB_GW_W | 0 | | SubCatchment 3 | No Redirection | |
| EMPB_GW_WR1 | 1 | 1 | 1 | 1.226 | 1050.006 | 100 | 0.064 | SWMM Method | EMPB_GW_W | 0 | EMPB_GW_WR1 | SubCatchment 3 | No Redirection | |
| EMPB_GW_WR1 | 2 | | 1 | 0.18 | 1050.006 | 100 | 0.064 | SWMM Method | EMPB_GW_W | 1 | EMPB_GW_WR1 | SubCatchment 3 | No Redirection | |
| EMPB_GW_WR1 | 3 | | 1 | 4.736 | 1050.006 | 0 | 0.064 | SWMM Method | EMPB_GW_W | 0 | | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FARGO_COBALT_CHANNEL_JCT | 1 | 1 | 1 | 0.108 | 944.257 | 100 | 0.1 | SWMM Method | FARGO_COB | 0 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | |
| FARGO_COBALT_CHANNEL_JCT | 2 | | 1 | 0.122 | 944.257 | 100 | 0.1 | SWMM Method | FARGO_COB | 1 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | |
| FARGO_COBALT_CHANNEL_JCT | 3 | | 1 | 2.355 | 944.257 | 0 | 0.1 | SWMM Method | FARGO_COB | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| FARGO_COBALT_W_POND | 1 | 1 | 1 | 0.511 | 994.202 | 100 | 0.051 | SWMM Method | FARGO_COB | 0 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| FARGO_COBALT_W_POND | 2 | | 1 | 0.339 | 994.202 | 100 | 0.051 | SWMM Method | FARGO_COB | 1 | FARGO_COBALT_ | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| FARGO_COBALT_W_POND | 3 | | 1 | 1.898 | 994.202 | 0 | 0.051 | SWMM Method | FARGO_COB | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| FARM_BD_DEP | 1 | 1 | 1 | 0.381 | 383.199 | 100 | 0.035 | SWMM Method | FARM_BD_D | 0 | FARM_BD_DEP | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| FARM_BD_DEP | 3 | | 1 | 8.521 | 383.199 | 0 | 0.035 | SWMM Method | FARM_BD_D | 0 | | SubCatchment 1 | No Redirection | Strickers Forebay 18 |
| FARM_DEP1 | 1 | 1 | 1 | 0.368 | 600.894 | 100 | 0.018 | SWMM Method | FARM_DEP1 | 0 | FARM_DEP1 | SubCatchment 3 | No Redirection | |
| FARM_DEP1 | 2 | | 1 | 0.039 | 600.894 | 100 | 0.018 | SWMM Method | FARM_DEP1 | 0 | FARM_DEP1 | SubCatchment 3 | No Redirection | |
| FARM_DEP1 | 3 | | 1 | 4.266 | 600.894 | 0 | 0.018 | SWMM Method | FARM_DEP1 | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DEP2 | 1 | 1 | 1 | 0.917 | 899.792 | 100 | 0.035 | SWMM Method | FARM_DEP2 | 0 | FARM_DEP2 | SubCatchment 3 | No Redirection | |
| FARM_DEP2 | 2 | | 1 | 0.444 | 899.792 | 100 | 0.035 | SWMM Method | FARM_DEP2 | 1 | FARM_DEP2 | SubCatchment 3 | No Redirection | |
| FARM_DEP2 | 3 | | 1 | 10.512 | 899.792 | 0 | 0.035 | SWMM Method | FARM_DEP2 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park |
| FARM_DITCH1 | 1 | 1 | 1 | 1.245 | 442.308 | 100 | 0.02 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH1 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| FARM_DITCH1 | 2 | | 1 | 0.225 | 442.308 | 100 | 0.02 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH1 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| FARM_DITCH1 | 3 | | 1 | 10.778 | 442.308 | 0 | 0.02 | SWMM Method | FARM_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH2 | 1 | 1 | 1 | 1.022 | 667.007 | 100 | 0.037 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH2 | SubCatchment 3 | No Redirection | |
| FARM_DITCH2 | 2 | | 1 | 0.554 | 667.007 | 100 | 0.037 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH2 | SubCatchment 3 | No Redirection | |
| FARM_DITCH2 | 3 | | 1 | 20.965 | 667.007 | 0 | 0.037 | SWMM Method | FARM_DITCH | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park |
| FARM_DITCH3 | 1 | 1 | 1 | 0.047 | 578.875 | 100 | 0.041 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH3 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| FARM_DITCH3 | 2 | | 1 | 0.027 | 578.875 | 100 | 0.041 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH3 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| FARM_DITCH3 | 3 | | 1 | 15.021 | 578.875 | 0 | 0.041 | SWMM Method | FARM_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH4 | 3 | 1 | 1 | 6.201 | 486.844 | 0 | 0.026 | SWMM Method | FARM_DITCH | 0 | | SubCatchment 1 | No Redirection | |
| FARM_DITCH5 | 1 | 1 | 1 | 0.084 | 525.333 | 100 | 0.075 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH5 | SubCatchment 3 | No Redirection | |
| FARM_DITCH5 | 2 | | 1 | 0.002 | 525.333 | 100 | 0.075 | SWMM Method | FARM_DITCH | 0 | FARM_DITCH5 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARM_DITCH5 | 3 | | 1 | 1.042 | 525.333 | 0 | 0.075 | SWMM Method | FARM_DITCH | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| FARM_DITCH6 | 3 | 1 | 1 | 2.105 | 240.667 | 0 | 0.031 | SWMM Method | FARM_DITCH | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| FARMRD_SW4 | 1 | 1 | 1 | 1.583 | 864.86 | 100 | 0.039 | SWMM Method | FARMRD_SW | 0 | FARMRD_SW4 | SubCatchment 3 | No Redirection | |
| FARMRD_SW4 | 3 | | 1 | 11.701 | 864.86 | 0 | 0.039 | SWMM Method | FARMRD_SW | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARMRD_SW5 | 1 | 1 | 1 | 0.354 | 1266.896 | 100 | 0.044 | SWMM Method | FARMRD_SW | 0 | FARMRD_SW5 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FARMRD_SW5 | 3 | | 1 | 12.049 | 1266.896 | 0 | 0.044 | SWMM Method | FARMRD_SW | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| FARMRD_SW6 | 1 | 1 | 1 | 0.218 | 463.261 | 100 | 0.059 | SWMM Method | FARMRD_SW | 0 | FARMRD_SW6 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FARMRD_SW6 | 2 | | 1 | 0.001 | 463.261 | 100 | 0.059 | SWMM Method | FARMRD_SW | 0 | FARMRD_SW6 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FARMRD_SW6 | 3 | | 1 | 4.116 | 463.261 | 0 | 0.059 | SWMM Method | FARMRD_SW | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| FARMRD_SWALE1 | 1 | 1 | 1 | 4.114 | 1338.369 | 100 | 0.017 | SWMM Method | FARMRD_SW | 0 | FARMRD_SWALE | SubCatchment 3 | No Redirection | |
| FARMRD_SWALE1 | 2 | | 1 | 0.104 | 1338.369 | 100 | 0.017 | SWMM Method | FARMRD_SW | 1 | FARMRD_SWALE | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FARMRD_SWALE1 | 3 | | 1 | 27.288 | 1338.369 | 0 | 0.017 | SWMM Method | FARMRD_SW | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARMRD_SWALE2 | 1 | 1 | 1 | 0.342 | 1411.606 | 100 | 0.039 | SWMM Method | FARMRD_SW | 0 | FARMRD_SWALE | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FARMRD_SWALE2 | 3 | | 1 | 12.007 | 1411.606 | 0 | 0.039 | SWMM Method | FARMRD_SW | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond |
| FARMRD_SWALE3 | 1 | 1 | 1 | 0.28 | 700.33 | 100 | 0.041 | SWMM Method | FARMRD_SW | 0 | FARMRD_SWALE | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FARMRD_SWALE3 | 3 | | 1 | 16.639 | 700.33 | 0 | 0.041 | SWMM Method | FARMRD_SW | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| FS-10 | 1 | 1 | 1 | 1.974 | 541.188 | 100 | 0.04 | SWMM Method | FS-10 | 0 | FS-10 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| FS-10 | 2 | | 1 | 0.991 | 541.188 | 100 | 0.04 | SWMM Method | FS-10 | 1 | FS-10 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FS-10 | 3 | | 1 | 7.128 | 541.188 | 0 | 0.04 | SWMM Method | FS-10 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| FS-13 | 1 | 1 | 1 | 2.346 | 715.892 | 100 | 0.051 | SWMM Method | FS-13 | 0 | FS-13 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FS-13 | 2 | | 1 | 1.086 | 715.892 | 100 | 0.051 | SWMM Method | FS-13 | 1 | FS-13 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FS-13 | 3 | | 1 | 7.813 | 715.892 | 0 | 0.051 | SWMM Method | FS-13 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FS-15 | 1 | 1 | 1 | 1.676 | 463.683 | 100 | 0.04 | SWMM Method | FS-15 | 0 | FS-15 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| FS-15 | 2 | | 1 | 0.69 | 463.683 | 100 | 0.04 | SWMM Method | FS-15 | 1 | FS-15 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| FS-15 | 3 | | 1 | 5.054 | 463.683 | 0 | 0.04 | SWMM Method | FS-15 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GANSER_HEIGHTS_POND | 1 | 1 | 1 | 6.717 | 300.577 | 100 | 0.039 | SWMM Method | GANSER_HEI | 0 | GANSER_HEIGHT | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| GANSER_HEIGHTS_POND | 2 | | 1 | 0.001 | 300.577 | 100 | 0.039 | SWMM Method | GANSER_HEI | 1 | GANSER_HEIGHT | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GANSER_HEIGHTS_POND | 3 | | 1 | 3.545 | 300.577 | 0 | 0.039 | SWMM Method | GANSER_HEI | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GR2145-003 | 1 | 1 | 1 | 2.683 | 966.511 | 100 | 0.048 | SWMM Method | GR2145-003 | 0 | GR2145-003 | SubCatchment 3 | No Redirection | |
| GR2145-003 | 2 | | 1 | 0.488 | 966.511 | 100 | 0.048 | SWMM Method | GR2145-003 | 1 | GR2145-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| GR2145-003 | 3 | | 1 | 6.744 | 966.511 | 0 | 0.048 | SWMM Method | GR2145-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GR2256-019 | 1 | 1 | 1 | 4.138 | 544.889 | 100 | 0.009 | SWMM Method | GR2256-019 | 0 | GR2256-019 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GR2256-019 | 2 | | 1 | 0.003 | 544.889 | 100 | 0.009 | SWMM Method | GR2256-019 | 1 | GR2256-019 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| GR2256-019 | 3 | | 1 | 1.473 | 544.889 | 0 | 0.009 | SWMM Method | GR2256-019 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2355-009 | 1 | 1 | 1 | 4.194 | 873.139 | 100 | 0.015 | SWMM Method | GR2355-009 | 0 | GR2355-009 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| GR2355-009 | 2 | | 1 | 0.1 | 873.139 | 100 | 0.015 | SWMM Method | GR2355-009 | 1 | GR2355-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| GR2355-009 | 3 | | 1 | 5.676 | 873.139 | 0 | 0.015 | SWMM Method | GR2355-009 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GR2550-020 | 1 | 1 | 1 | 1.476 | 449.457 | 100 | 0.034 | SWMM Method | GR2550-020 | 0 | GR2550-020 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GR2550-020 | 2 | | 1 | 0.056 | 449.457 | 100 | 0.034 | SWMM Method | GR2550-020 | 1 | GR2550-020 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| GR2550-020 | 3 | | 1 | 3.965 | 449.457 | 0 | 0.034 | SWMM Method | GR2550-020 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GREYSTONE_POND | 1 | 1 | 1 | 1.561 | 1169.492 | 100 | 0.065 | SWMM Method | GREYSTONE_ | 0 | GREYSTONE_PON | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| GREYSTONE_POND | 2 | | 1 | 0.58 | 1169.492 | 100 | 0.065 | SWMM Method | GREYSTONE_ | 1 | GREYSTONE_PON | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| GREYSTONE_POND | 3 | | 1 | 3.89 | 1169.492 | 0 | 0.065 | SWMM Method | GREYSTONE_ | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HD2249-033_INSERT | 1 | 1 | 1 | 3.969 | 1269.165 | 100 | 0.008 | SWMM Method | HD2249-033 | 0 | HD2249-033_INS | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HD2249-033_INSERT | 2 | | 1 | 0.033 | 1269.165 | 100 | 0.008 | SWMM Method | HD2249-033 | 1 | HD2249-033_INS | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HD2249-033_INSERT | 3 | | 1 | 1.945 | 1269.165 | 0 | 0.008 | SWMM Method | HD2249-033 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HD2454-017 | 1 | 1 | 1 | 11.274 | 1190.635 | 100 | 0.03 | SWMM Method | HD2454-017 | 0 | HD2454-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HD2454-017 | 2 | | 1 | 0.343 | 1190.635 | 100 | 0.03 | SWMM Method | HD2454-017 | 1 | HD2454-017 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| HD2454-017 | 3 | | 1 | 14.016 | 1190.635 | 0 | 0.03 | SWMM Method | HD2454-017 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park |
| HIGHVIEW_PR | 1 | 1 | 1 | 0.374 | 91.424 | 100 | 0.021 | SWMM Method | HIGHVIEW_P | 0 | HIGHVIEW_PR | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| HIGHVIEW_PR | 2 | | 1 | 0.072 | 91.424 | 100 | 0.021 | SWMM Method | HIGHVIEW_P | 1 | HIGHVIEW_PR | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| HIGHVIEW_PR | 3 | | 1 | 0.559 | 91.424 | 0 | 0.021 | SWMM Method | HIGHVIEW_P | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| HOMEWOOD_WAY_POND | 1 | 1 | 1 | 2.979 | 287.953 | 100 | 0.049 | SWMM Method | HOMEWOOD | 0 | HOMEWOOD_W | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| HOMEWOOD_WAY_POND | 2 | | 1 | 0.054 | 287.953 | 100 | 0.049 | SWMM Method | HOMEWOOD | 1 | HOMEWOOD_W | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| HOMEWOOD_WAY_POND | 3 | | 1 | 0.303 | 287.953 | 0 | 0.049 | SWMM Method | HOMEWOOD | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| HV_BLUFF_1 | 1 | 1 | 1 | 0.59 | 304.12 | 100 | 0.07 | SWMM Method | HV_BLUFF_1 | 0 | HV_BLUFF_1 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HV_BLUFF_1 | 2 | | 1 | 0.126 | 304.12 | 100 | 0.07 | SWMM Method | HV_BLUFF_1 | 1 | HV_BLUFF_1 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| HV_BLUFF_1 | 3 | | 1 | 4.532 | 304.12 | 0 | 0.07 | SWMM Method | HV_BLUFF_1 | 0 | | SubCatchment 1 | No Redirection | Strickers Pond Foreb |
| HV_BLUFF2 | 1 | 1 | 1 | 0.136 | 180.12 | 100 | 0.082 | SWMM Method | HV_BLUFF2 | 0 | HV_BLUFF2 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| HV_BLUFF2 | 2 | | 1 | 0.026 | 180.12 | 100 | 0.082 | SWMM Method | HV_BLUFF2 | 1 | HV_BLUFF2 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| HV_BLUFF2 | 3 | | 1 | 2.37 | 180.12 | 0 | 0.082 | SWMM Method | HV_BLUFF2 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN1547-006 | 1 | 1 | 1 | 0.613 | 240.236 | 100 | 0.042 | SWMM Method | IN1547-006 | 0 | IN1547-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-006 | 2 | | 1 | 0.163 | 240.236 | 100 | 0.042 | SWMM Method | IN1547-006 | 1 | IN1547-006 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-006 | 3 | | 1 | 0.944 | 240.236 | 0 | 0.042 | SWMM Method | IN1547-006 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-009 | 1 | 1 | 1 | 0.28 | 338.383 | 100 | 0.049 | SWMM Method | IN1547-009 | 0 | IN1547-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-009 | 2 | | 1 | 0.331 | 338.383 | 100 | 0.049 | SWMM Method | IN1547-009 | 1 | IN1547-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-009 | 3 | | 1 | 1.439 | 338.383 | 0 | 0.049 | SWMM Method | IN1547-009 | 0 | | SubCatchment 3 | No Redirection | |
| IN1547-010 | 1 | 1 | 1 | 0.481 | 359.155 | 100 | 0.064 | SWMM Method | IN1547-010 | 0 | IN1547-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-010 | 2 | | 1 | 0.568 | 359.155 | 100 | 0.064 | SWMM Method | IN1547-010 | 1 | IN1547-010 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-010 | 3 | | 1 | 2.681 | 359.155 | 0 | 0.064 | SWMM Method | IN1547-010 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-011 | 1 | 1 | 1 | 0.591 | 284.16 | 100 | 0.015 | SWMM Method | IN1547-011 | 0 | IN1547-011 | SubCatchment 3 | No Redirection | |
| IN1547-011 | 2 | | 1 | 0.094 | 284.16 | 100 | 0.015 | SWMM Method | IN1547-011 | 1 | IN1547-011 | SubCatchment 3 | No Redirection | |
| IN1547-011 | 3 | | 1 | 0.719 | 284.16 | 0 | 0.015 | SWMM Method | IN1547-011 | 0 | | SubCatchment 3 | No Redirection | |
| IN1547-020 | 1 | 1 | 1 | 0.84 | 361.415 | 100 | 0.033 | SWMM Method | IN1547-020 | 0 | IN1547-020 | SubCatchment 3 | No Redirection | |
| IN1547-020 | 2 | | 1 | 0.383 | 361.415 | 100 | 0.033 | SWMM Method | IN1547-020 | 1 | IN1547-020 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1547-020 | 3 | | 1 | 3.043 | 361.415 | 0 | 0.033 | SWMM Method | IN1547-020 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-024 | 1 | 1 | 1 | 0.153 | 204.535 | 100 | 0.088 | SWMM Method | IN1547-024 | 0 | IN1547-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1547-024 | 2 | | 1 | 0.046 | 204.535 | 100 | 0.088 | SWMM Method | IN1547-024 | 1 | IN1547-024 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1547-024 | 3 | | 1 | 1.334 | 204.535 | 0 | 0.088 | SWMM Method | IN1547-024 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1548-005 | 1 | 1 | 1 | 0.835 | 367.844 | 100 | 0.068 | SWMM Method | IN1548-005 | 0 | IN1548-005 | SubCatchment 3 | No Redirection | |
| IN1548-005 | 2 | | 1 | 0.283 | 367.844 | 100 | 0.068 | SWMM Method | IN1548-005 | 1 | IN1548-005 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1548-005 | 3 | | 1 | 1.992 | 367.844 | 0 | 0.068 | SWMM Method | IN1548-005 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1548-007 | 1 | 1 | 1 | 1.014 | 283.907 | 100 | 0.055 | SWMM Method | IN1548-007 | 0 | IN1548-007 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1548-007 | 2 | | 1 | 0.62 | 283.907 | 100 | 0.055 | SWMM Method | IN1548-007 | 1 | IN1548-007 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1548-007 | 3 | | 1 | 3.762 | 283.907 | 0 | 0.055 | SWMM Method | IN1548-007 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1549-016 | 1 | 1 | 1 | 1.241 | 408.605 | 100 | 0.02 | SWMM Method | IN1549-016 | 0 | IN1549-016 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1549-016 | 2 | | 1 | 0.692 | 408.605 | 100 | 0.02 | SWMM Method | IN1549-016 | 1 | IN1549-016 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1549-016 | 3 | | 1 | 2.85 | 408.605 | 0 | 0.02 | SWMM Method | IN1549-016 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1549-024 | 1 | 1 | 1 | 1.782 | 433.295 | 100 | 0.048 | SWMM Method | IN1549-024 | 0 | IN1549-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1549-024 | 2 | | 1 | 0.818 | 433.295 | 100 | 0.048 | SWMM Method | IN1549-024 | 1 | IN1549-024 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1549-024 | 3 | | 1 | 4.59 | 433.295 | 0 | 0.048 | SWMM Method | IN1549-024 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-014 | 1 | 1 | 1 | 0.327 | 702.184 | 100 | 0.032 | SWMM Method | IN1550-014 | 0 | IN1550-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-014 | 2 | | 1 | 0.387 | 702.184 | 100 | 0.032 | SWMM Method | IN1550-014 | 1 | IN1550-014 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1550-014 | 3 | | 1 | 0.651 | 702.184 | 0 | 0.032 | SWMM Method | IN1550-014 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-017 | 1 | 1 | 1 | 0.376 | 242.925 | 100 | 0.016 | SWMM Method | IN1550-017 | 0 | IN1550-017 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-017 | 2 | | 1 | 0.445 | 242.925 | 100 | 0.016 | SWMM Method | IN1550-017 | 1 | IN1550-017 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1550-017 | 3 | | 1 | 1.118 | 242.925 | 0 | 0.016 | SWMM Method | IN1550-017 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1550-027 | 1 | 1 | 1 | 0.052 | 181.689 | 100 | 0.042 | SWMM Method | IN1550-027 | 0 | IN1550-027 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1550-027 | 2 | | 1 | 0.062 | 181.689 | 100 | 0.042 | SWMM Method | IN1550-027 | 1 | IN1550-027 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1550-027 | 3 | | 1 | 0.327 | 181.689 | 0 | 0.042 | SWMM Method | IN1550-027 | 0 | | SubCatchment 1 | No Redirection | Sauk Heights Pond 18 |
| IN1550-028 | 1 | 1 | 1 | 0.07 | 201.091 | 100 | 0.04 | SWMM Method | IN1550-028 | 0 | IN1550-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1550-028 | 2 | | 1 | 0.083 | 201.091 | 100 | 0.04 | SWMM Method | IN1550-028 | 1 | IN1550-028 | SubCatchment 3 | No Redirection | |
| IN1550-028 | 3 | | 1 | 0.413 | 201.091 | 0 | 0.04 | SWMM Method | IN1550-028 | 0 | | SubCatchment 1 | No Redirection | |
| IN1551-005 | 1 | 1 | 1 | 0.74 | 746.916 | 100 | 0.014 | SWMM Method | IN1551-005 | 0 | IN1551-005 | SubCatchment 3 | No Redirection | |
| IN1551-005 | 2 | | 1 | 0.876 | 746.916 | 100 | 0.014 | SWMM Method | IN1551-005 | 1 | IN1551-005 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1551-005 | 3 | | 1 | 2.47 | 746.916 | 0 | 0.014 | SWMM Method | IN1551-005 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1551-023 | 1 | 1 | 1 | 1.142 | 733.379 | 100 | 0.037 | SWMM Method | IN1551-023 | 0 | IN1551-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1551-023 | 2 | | 1 | 1.35 | 733.379 | 100 | 0.037 | SWMM Method | IN1551-023 | 1 | IN1551-023 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1551-023 | 3 | | 1 | 3.331 | 733.379 | 0 | 0.037 | SWMM Method | IN1551-023 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1646-001 | 1 | 1 | 1 | 0.346 | 183.205 | 100 | 0.034 | SWMM Method | IN1646-001 | 0 | IN1646-001 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1646-001 | 2 | | 1 | 0.081 | 183.205 | 100 | 0.034 | SWMM Method | IN1646-001 | 1 | IN1646-001 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1646-001 | 3 | | 1 | 1.883 | 183.205 | 0 | 0.034 | SWMM Method | IN1646-001 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-003 | 1 | 1 | 1 | 0.527 | 444.633 | 100 | 0.02 | SWMM Method | IN1647-003 | 0 | IN1647-003 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1647-003 | 2 | | 1 | 0.176 | 444.633 | 100 | 0.02 | SWMM Method | IN1647-003 | 1 | IN1647-003 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1647-003 | 3 | | 1 | 1.078 | 444.633 | 0 | 0.02 | SWMM Method | IN1647-003 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1647-007 | 1 | 1 | 1 | 0.437 | 195.153 | 100 | 0.025 | SWMM Method | IN1647-007 | 0 | IN1647-007 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1647-007 | 2 | | 1 | 0.108 | 195.153 | 100 | 0.025 | SWMM Method | IN1647-007 | 1 | IN1647-007 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1647-007 | 3 | | 1 | 0.722 | 195.153 | 0 | 0.025 | SWMM Method | IN1647-007 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1647-011 | 1 | 1 | 1 | 1.19 | 292.494 | 100 | 0.039 | SWMM Method | IN1647-011 | 0 | IN1647-011 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1647-011 | 2 | | 1 | 0.361 | 292.494 | 100 | 0.039 | SWMM Method | IN1647-011 | 1 | IN1647-011 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1647-011 | 3 | | 1 | 2.078 | 292.494 | 0 | 0.039 | SWMM Method | IN1647-011 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1647-041 | 1 | 1 | 1 | 0.196 | 192.42 | 100 | 0.061 | SWMM Method | IN1647-041 | 0 | IN1647-041 | SubCatchment 3 | No Redirection | |
| IN1647-041 | 2 | | 1 | 0.114 | 192.42 | 100 | 0.061 | SWMM Method | IN1647-041 | 1 | IN1647-041 | SubCatchment 3 | No Redirection | |
| IN1647-041 | 3 | | 1 | 1.245 | 192.42 | 0 | 0.061 | SWMM Method | IN1647-041 | 0 | | SubCatchment 3 | No Redirection | |
| IN1647-064 | 1 | 1 | 1 | 0.172 | 146.733 | 100 | 0.023 | SWMM Method | IN1647-064 | 0 | IN1647-064 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1647-064 | 2 | | 1 | 0.033 | 146.733 | 100 | 0.023 | SWMM Method | IN1647-064 | 1 | IN1647-064 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1647-064 | 3 | | 1 | 0.553 | 146.733 | 0 | 0.023 | SWMM Method | IN1647-064 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1647-068 | 1 | 1 | 1 | 0.43 | 113.894 | 100 | 0.027 | SWMM Method | IN1647-068 | 0 | IN1647-068 | SubCatchment 3 | No Redirection | |
| IN1647-068 | 2 | | 1 | 0.237 | 113.894 | 100 | 0.027 | SWMM Method | IN1647-068 | 1 | IN1647-068 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1647-068 | 3 | | 1 | 1.64 | 113.894 | 0 | 0.027 | SWMM Method | IN1647-068 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-011 | 1 | 1 | 1 | 0.452 | 203.463 | 100 | 0.102 | SWMM Method | IN1648-011 | 0 | IN1648-011 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-011 | 2 | | 1 | 0.192 | 203.463 | 100 | 0.102 | SWMM Method | IN1648-011 | 1 | IN1648-011 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1648-011 | 3 | | 1 | 1.323 | 203.463 | 0 | 0.102 | SWMM Method | IN1648-011 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-028 | 1 | 1 | 1 | 0.599 | 257.678 | 100 | 0.019 | SWMM Method | IN1648-028 | 0 | IN1648-028 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-028 | 2 | | 1 | 0.097 | 257.678 | 100 | 0.019 | SWMM Method | IN1648-028 | 1 | IN1648-028 | SubCatchment 3 | No Redirection | |
| IN1648-028 | 3 | | 1 | 0.831 | 257.678 | 0 | 0.019 | SWMM Method | IN1648-028 | 0 | | SubCatchment 3 | No Redirection | |
| IN1648-041 | 1 | 1 | 1 | 1.157 | 440.497 | 100 | 0.103 | SWMM Method | IN1648-041 | 0 | IN1648-041 | SubCatchment 3 | No Redirection | |
| IN1648-041 | 2 | | 1 | 0.457 | 440.497 | 100 | 0.103 | SWMM Method | IN1648-041 | 1 | IN1648-041 | SubCatchment 3 | No Redirection | UW Ag Research Stati |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1648-041 | 3 | | 1 | 2.732 | 440.497 | 0 | 0.103 | SWMM Method | IN1648-041 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-048 | 1 | 1 | 1 | 0.32 | 163.068 | 100 | 0.039 | SWMM Method | IN1648-048 | 0 | IN1648-048 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-048 | 2 | | 1 | 0.379 | 163.068 | 100 | 0.039 | SWMM Method | IN1648-048 | 1 | IN1648-048 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1648-048 | 3 | | 1 | 1.756 | 163.068 | 0 | 0.039 | SWMM Method | IN1648-048 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1649-002 | 1 | 1 | 1 | 1.049 | 442.024 | 100 | 0.057 | SWMM Method | IN1649-002 | 0 | IN1649-002 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1649-002 | 2 | | 1 | 0.603 | 442.024 | 100 | 0.057 | SWMM Method | IN1649-002 | 1 | IN1649-002 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1649-002 | 3 | | 1 | 3.107 | 442.024 | 0 | 0.057 | SWMM Method | IN1649-002 | 0 | | SubCatchment 3 | No Redirection | Memorial High School |
| IN1649-003 | 1 | 1 | 1 | 3.351 | 770.34 | 100 | 0.047 | SWMM Method | IN1649-003 | 0 | IN1649-003 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1649-003 | 2 | | 1 | 0.302 | 770.34 | 100 | 0.047 | SWMM Method | IN1649-003 | 1 | IN1649-003 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1649-003 | 3 | | 1 | 3.127 | 770.34 | 0 | 0.047 | SWMM Method | IN1649-003 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1649-011 | 1 | 1 | 1 | 1.778 | 312.1 | 100 | 0.038 | SWMM Method | IN1649-011 | 0 | IN1649-011 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1649-011 | 2 | | 1 | 0.508 | 312.1 | 100 | 0.038 | SWMM Method | IN1649-011 | 1 | IN1649-011 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1649-011 | 3 | | 1 | 3.512 | 312.1 | 0 | 0.038 | SWMM Method | IN1649-011 | 0 | | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1649-016 | 1 | 1 | 1 | 1.128 | 194.515 | 100 | 0.038 | SWMM Method | IN1649-016 | 0 | IN1649-016 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1649-016 | 2 | | 1 | 0.126 | 194.515 | 100 | 0.038 | SWMM Method | IN1649-016 | 1 | IN1649-016 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1649-016 | 3 | | 1 | 1.758 | 194.515 | 0 | 0.038 | SWMM Method | IN1649-016 | 0 | | SubCatchment 3 | No Redirection | |
| IN1650-009_DEPRESSION | 1 | 1 | 1 | 0.949 | 517.074 | 100 | 0.019 | SWMM Method | IN1650-009_ | 0 | IN1650-009_DEP | SubCatchment 3 | No Redirection | Memorial High School |
| IN1650-009_DEPRESSION | 2 | | 1 | 0.009 | 517.074 | 100 | 0.019 | SWMM Method | IN1650-009_ | 1 | IN1650-009_DEP | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1650-009_DEPRESSION | 3 | | 1 | 10.07 | 517.074 | 0 | 0.019 | SWMM Method | IN1650-009_ | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1653-007 | 1 | 1 | 1 | 0.605 | 186.841 | 100 | 0.02 | SWMM Method | IN1653-007 | 0 | IN1653-007 | SubCatchment 1 | No Redirection | |
| IN1653-007 | 2 | | 1 | 0.006 | 186.841 | 100 | 0.02 | SWMM Method | IN1653-007 | 1 | IN1653-007 | SubCatchment 3 | No Redirection | Memorial High School |
| IN1653-007 | 3 | | 1 | 0.802 | 186.841 | 0 | 0.02 | SWMM Method | IN1653-007 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1653-014 | 1 | 1 | 1 | 0.319 | 254.496 | 100 | 0.027 | SWMM Method | IN1653-014 | 0 | IN1653-014 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1653-014 | 3 | | 1 | 0.415 | 254.496 | 0 | 0.027 | SWMM Method | IN1653-014 | 0 | | SubCatchment 1 | No Redirection | |
| IN1653-018 | 1 | 1 | 1 | 0.348 | 203.461 | 100 | 0.041 | SWMM Method | IN1653-018 | 0 | IN1653-018 | SubCatchment 3 | No Redirection | |
| IN1653-018 | 3 | | 1 | 1.022 | 203.461 | 0 | 0.041 | SWMM Method | IN1653-018 | 0 | | SubCatchment 1 | No Redirection | Strickers Pond Foreb |
| IN1653-026 | 1 | 1 | 1 | 0.41 | 415.279 | 100 | 0.007 | SWMM Method | IN1653-026 | 0 | IN1653-026 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1653-026 | 3 | | 1 | 3.222 | 415.279 | 0 | 0.007 | SWMM Method | IN1653-026 | 0 | | SubCatchment 1 | No Redirection | Strickers Forebay 18 |
| IN1654-006 | 1 | 1 | 1 | 1.039 | 204.048 | 100 | 0.026 | SWMM Method | IN1654-006 | 0 | IN1654-006 | SubCatchment 3 | No Redirection | |
| IN1654-006 | 2 | | 1 | 0.23 | 204.048 | 100 | 0.026 | SWMM Method | IN1654-006 | 1 | IN1654-006 | SubCatchment 3 | No Redirection | |
| IN1654-006 | 3 | | 1 | 0.721 | 204.048 | 0 | 0.026 | SWMM Method | IN1654-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1747-026 | 1 | 1 | 1 | 0.781 | 237.879 | 100 | 0.042 | SWMM Method | IN1747-026 | 0 | IN1747-026 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1747-026 | 2 | | 1 | 0.443 | 237.879 | 100 | 0.042 | SWMM Method | IN1747-026 | 1 | IN1747-026 | SubCatchment 3 | No Redirection | |
| IN1747-026 | 3 | | 1 | 2.551 | 237.879 | 0 | 0.042 | SWMM Method | IN1747-026 | 0 | | SubCatchment 3 | No Redirection | |
| IN1747-028 | 1 | 1 | 1 | 0.239 | 410.287 | 100 | 0.068 | SWMM Method | IN1747-028 | 0 | IN1747-028 | SubCatchment 3 | No Redirection | |
| IN1747-028 | 2 | | 1 | 0.159 | 410.287 | 100 | 0.068 | SWMM Method | IN1747-028 | 1 | IN1747-028 | SubCatchment 3 | No Redirection | |
| IN1747-028 | 3 | | 1 | 2.03 | 410.287 | 0 | 0.068 | SWMM Method | IN1747-028 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1749-003 | 1 | 1 | 1 | 5.245 | 414.36 | 100 | 0.016 | SWMM Method | IN1749-003 | 0 | IN1749-003 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1749-003 | 2 | | 1 | 0.118 | 414.36 | 100 | 0.016 | SWMM Method | IN1749-003 | 1 | IN1749-003 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1749-003 | 3 | | 1 | 5.798 | 414.36 | 0 | 0.016 | SWMM Method | IN1749-003 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1750-003 | 1 | 1 | 1 | 2.893 | 441.338 | 100 | 0.038 | SWMM Method | IN1750-003 | 0 | IN1750-003 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1750-003 | 2 | | 1 | 0.242 | 441.338 | 100 | 0.038 | SWMM Method | IN1750-003 | 1 | IN1750-003 | SubCatchment 3 | No Redirection | |
| IN1750-003 | 3 | | 1 | 4.373 | 441.338 | 0 | 0.038 | SWMM Method | IN1750-003 | 0 | | SubCatchment 3 | No Redirection | |
| IN1750-004 | 1 | 1 | 1 | 0.868 | 369.932 | 100 | 0.022 | SWMM Method | IN1750-004 | 0 | IN1750-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1750-004 | 2 | | 1 | 0.1 | 369.932 | 100 | 0.022 | SWMM Method | IN1750-004 | 1 | IN1750-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1750-004 | 3 | | 1 | 2.509 | 369.932 | 0 | 0.022 | SWMM Method | IN1750-004 | 0 | | SubCatchment 3 | No Redirection | |
| IN1750-008 | 1 | 1 | 1 | 1.815 | 358.3 | 100 | 0.032 | SWMM Method | IN1750-008 | 0 | IN1750-008 | SubCatchment 3 | No Redirection | |
| IN1750-008 | 2 | | 1 | 0.385 | 358.3 | 100 | 0.032 | SWMM Method | IN1750-008 | 1 | IN1750-008 | SubCatchment 3 | No Redirection | |
| IN1750-008 | 3 | | 1 | 1.477 | 358.3 | 0 | 0.032 | SWMM Method | IN1750-008 | 0 | | SubCatchment 3 | No Redirection | |
| IN1750-019 | 1 | 1 | 1 | 1.311 | 372.25 | 100 | 0.038 | SWMM Method | IN1750-019 | 0 | IN1750-019 | SubCatchment 3 | No Redirection | |
| IN1750-019 | 2 | | 1 | 0.273 | 372.25 | 100 | 0.038 | SWMM Method | IN1750-019 | 1 | IN1750-019 | SubCatchment 3 | No Redirection | |
| IN1750-019 | 3 | | 1 | 1.861 | 372.25 | 0 | 0.038 | SWMM Method | IN1750-019 | 0 | | SubCatchment 3 | No Redirection | |
| IN1750-034 | 1 | 1 | 1 | 1.457 | 352.449 | 100 | 0.033 | SWMM Method | IN1750-034 | 0 | IN1750-034 | SubCatchment 3 | No Redirection | |
| IN1750-034 | 2 | | 1 | 0.031 | 352.449 | 100 | 0.033 | SWMM Method | IN1750-034 | 1 | IN1750-034 | SubCatchment 3 | No Redirection | |
| IN1750-034 | 3 | | 1 | 0.777 | 352.449 | 0 | 0.033 | SWMM Method | IN1750-034 | 0 | | SubCatchment 3 | No Redirection | |
| IN1751-006 | 1 | 1 | 1 | 1.852 | 590.591 | 100 | 0.019 | SWMM Method | IN1751-006 | 0 | IN1751-006 | SubCatchment 3 | No Redirection | |
| IN1751-006 | 2 | | 1 | 0.582 | 590.591 | 100 | 0.019 | SWMM Method | IN1751-006 | 1 | IN1751-006 | SubCatchment 3 | No Redirection | |
| IN1751-006 | 3 | | 1 | 4.158 | 590.591 | 0 | 0.019 | SWMM Method | IN1751-006 | 0 | | SubCatchment 3 | No Redirection | |
| IN1751-016 | 1 | 1 | 1 | 1.195 | 308.408 | 100 | 0.024 | SWMM Method | IN1751-016 | 0 | IN1751-016 | SubCatchment 3 | No Redirection | |
| IN1751-016 | 2 | | 1 | 0.47 | 308.408 | 100 | 0.024 | SWMM Method | IN1751-016 | 1 | IN1751-016 | SubCatchment 3 | No Redirection | |
| IN1751-016 | 3 | | 1 | 2.585 | 308.408 | 0 | 0.024 | SWMM Method | IN1751-016 | 0 | | SubCatchment 3 | No Redirection | |
| IN1751-023 | 1 | 1 | 1 | 2.101 | 392.629 | 100 | 0.031 | SWMM Method | IN1751-023 | 0 | IN1751-023 | SubCatchment 3 | No Redirection | |
| IN1751-023 | 2 | | 1 | 0.831 | 392.629 | 100 | 0.031 | SWMM Method | IN1751-023 | 1 | IN1751-023 | SubCatchment 3 | No Redirection | |
| IN1751-023 | 3 | | 1 | 3.543 | 392.629 | 0 | 0.031 | SWMM Method | IN1751-023 | 0 | | SubCatchment 3 | No Redirection | |
| IN1752-011 | 1 | 1 | 1 | 1.948 | 546.869 | 100 | 0.048 | SWMM Method | IN1752-011 | 0 | IN1752-011 | SubCatchment 3 | No Redirection | |
| IN1752-011 | 2 | | 1 | 0.632 | 546.869 | 100 | 0.048 | SWMM Method | IN1752-011 | 1 | IN1752-011 | SubCatchment 3 | No Redirection | |
| IN1752-011 | 3 | | 1 | 2.754 | 546.869 | 0 | 0.048 | SWMM Method | IN1752-011 | 0 | | SubCatchment 3 | No Redirection | |
| IN1752-022 | 1 | 1 | 1 | 0.987 | 651.078 | 100 | 0.066 | SWMM Method | IN1752-022 | 0 | IN1752-022 | SubCatchment 3 | No Redirection | |
| IN1752-022 | 2 | | 1 | 0.446 | 651.078 | 100 | 0.066 | SWMM Method | IN1752-022 | 1 | IN1752-022 | SubCatchment 3 | No Redirection | |
| IN1752-022 | 3 | | 1 | 1.771 | 651.078 | 0 | 0.066 | SWMM Method | IN1752-022 | 0 | | SubCatchment 3 | No Redirection | |
| IN1752-029 | 1 | 1 | 1 | 1.569 | 350.197 | 100 | 0.019 | SWMM Method | IN1752-029 | 0 | IN1752-029 | SubCatchment 3 | No Redirection | |
| IN1752-029 | 2 | | 1 | 0.506 | 350.197 | 100 | 0.019 | SWMM Method | IN1752-029 | 1 | IN1752-029 | SubCatchment 3 | No Redirection | |
| IN1752-029 | 3 | | 1 | 2.514 | 350.197 | 0 | 0.019 | SWMM Method | IN1752-029 | 0 | | SubCatchment 3 | No Redirection | |
| IN1753-007 | 1 | 1 | 1 | 0.622 | 215.747 | 100 | 0.03 | SWMM Method | IN1753-007 | 0 | IN1753-007 | SubCatchment 3 | No Redirection | |
| IN1753-007 | 2 | | 1 | 0.558 | 215.747 | 100 | 0.03 | SWMM Method | IN1753-007 | 1 | IN1753-007 | SubCatchment 3 | No Redirection | |
| IN1753-007 | 3 | | 1 | 1.411 | 215.747 | 0 | 0.03 | SWMM Method | IN1753-007 | 0 | | SubCatchment 3 | No Redirection | |
| IN1753-009 | 1 | 1 | 1 | 0.609 | 161.396 | 100 | 0.016 | SWMM Method | IN1753-009 | 0 | IN1753-009 | SubCatchment 3 | No Redirection | |
| IN1753-009 | 2 | | 1 | 0.721 | 161.396 | 100 | 0.016 | SWMM Method | IN1753-009 | 1 | IN1753-009 | SubCatchment 3 | No Redirection | |
| IN1753-009 | 3 | | 1 | 1.044 | 161.396 | 0 | 0.016 | SWMM Method | IN1753-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1753-010 | 1 | 1 | 1 | 0.34 | 154.39 | 100 | 0.013 | SWMM Method | IN1753-010 | 0 | IN1753-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1753-010 | 2 | | 1 | 0.403 | 154.39 | 100 | 0.013 | SWMM Method | IN1753-010 | 1 | IN1753-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1753-010 | 3 | | 1 | 1.227 | 154.39 | 0 | 0.013 | SWMM Method | IN1753-010 | 0 | | SubCatchment 1 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1753-015 | 1 | 1 | 1 | 0.325 | 143.339 | 100 | 0.013 | SWMM Method | IN1753-015 | 0 | IN1753-015 | SubCatchment 3 | No Redirection | |
| IN1753-015 | 2 | | 1 | 0.381 | 143.339 | 100 | 0.013 | SWMM Method | IN1753-015 | 1 | IN1753-015 | SubCatchment 3 | No Redirection | |
| IN1753-015 | 3 | | 1 | 0.596 | 143.339 | 0 | 0.013 | SWMM Method | IN1753-015 | 0 | | SubCatchment 3 | No Redirection | |
| IN1753-018 | 1 | 1 | 1 | 0.578 | 100.822 | 100 | 0.018 | SWMM Method | IN1753-018 | 0 | IN1753-018 | SubCatchment 3 | No Redirection | |
| IN1753-018 | 2 | | 1 | 0.264 | 100.822 | 100 | 0.018 | SWMM Method | IN1753-018 | 1 | IN1753-018 | SubCatchment 3 | No Redirection | |
| IN1753-018 | 3 | | 1 | 0.898 | 100.822 | 0 | 0.018 | SWMM Method | IN1753-018 | 0 | | SubCatchment 1 | No Redirection | |
| IN1753-023 | 1 | 1 | 1 | 0.311 | 197.036 | 100 | 0.019 | SWMM Method | IN1753-023 | 0 | IN1753-023 | SubCatchment 3 | No Redirection | |
| IN1753-023 | 2 | | 1 | 0.369 | 197.036 | 100 | 0.019 | SWMM Method | IN1753-023 | 1 | IN1753-023 | SubCatchment 3 | No Redirection | |
| IN1753-023 | 3 | | 1 | 1.27 | 197.036 | 0 | 0.019 | SWMM Method | IN1753-023 | 0 | | SubCatchment 1 | No Redirection | |
| IN1753-026 | 1 | 1 | 1 | 0.248 | 195.619 | 100 | 0.019 | SWMM Method | IN1753-026 | 0 | IN1753-026 | SubCatchment 3 | No Redirection | |
| IN1753-026 | 2 | | 1 | 0.33 | 195.619 | 100 | 0.019 | SWMM Method | IN1753-026 | 1 | IN1753-026 | SubCatchment 3 | No Redirection | |
| IN1753-026 | 3 | | 1 | 1.191 | 195.619 | 0 | 0.019 | SWMM Method | IN1753-026 | 0 | | SubCatchment 3 | No Redirection | |
| IN1753-040 | 1 | 1 | 1 | 0.864 | 882.349 | 100 | 0.034 | SWMM Method | IN1753-040 | 0 | IN1753-040 | SubCatchment 3 | No Redirection | |
| IN1753-040 | 2 | | 1 | 1.023 | 882.349 | 100 | 0.034 | SWMM Method | IN1753-040 | 1 | IN1753-040 | SubCatchment 3 | No Redirection | |
| IN1753-040 | 3 | | 1 | 4.071 | 882.349 | 0 | 0.034 | SWMM Method | IN1753-040 | 0 | | SubCatchment 3 | No Redirection | |
| IN1754-021 | 1 | 1 | 1 | 0.139 | 102.323 | 100 | 0.009 | SWMM Method | IN1754-021 | 0 | IN1754-021 | SubCatchment 3 | No Redirection | |
| IN1754-021 | 2 | | 1 | 0.164 | 102.323 | 100 | 0.009 | SWMM Method | IN1754-021 | 1 | IN1754-021 | SubCatchment 3 | No Redirection | |
| IN1754-021 | 3 | | 1 | 0.65 | 102.323 | 0 | 0.009 | SWMM Method | IN1754-021 | 0 | | SubCatchment 3 | No Redirection | |
| IN1754-023 | 1 | 1 | 1 | 0.232 | 182.976 | 100 | 0.031 | SWMM Method | IN1754-023 | 0 | IN1754-023 | SubCatchment 3 | No Redirection | |
| IN1754-023 | 2 | | 1 | 0.1 | 182.976 | 100 | 0.031 | SWMM Method | IN1754-023 | 1 | IN1754-023 | SubCatchment 3 | No Redirection | |
| IN1754-023 | 3 | | 1 | 0.536 | 182.976 | 0 | 0.031 | SWMM Method | IN1754-023 | 0 | | SubCatchment 3 | No Redirection | |
| IN1754-030 | 1 | 1 | 1 | 0.625 | 193.508 | 100 | 0.058 | SWMM Method | IN1754-030 | 0 | IN1754-030 | SubCatchment 3 | No Redirection | |
| IN1754-030 | 3 | | 1 | 2.37 | 193.508 | 0 | 0.058 | SWMM Method | IN1754-030 | 0 | | SubCatchment 3 | No Redirection | |
| IN1847-003 | 1 | 1 | 1 | 0.829 | 378.294 | 100 | 0.042 | SWMM Method | IN1847-003 | 0 | IN1847-003 | SubCatchment 3 | No Redirection | |
| IN1847-003 | 2 | | 1 | 0.255 | 378.294 | 100 | 0.042 | SWMM Method | IN1847-003 | 1 | IN1847-003 | SubCatchment 3 | No Redirection | |
| IN1847-003 | 3 | | 1 | 1.476 | 378.294 | 0 | 0.042 | SWMM Method | IN1847-003 | 0 | | SubCatchment 3 | No Redirection | |
| IN1847-017 | 1 | 1 | 1 | 2.774 | 396.18 | 100 | 0.041 | SWMM Method | IN1847-017 | 0 | IN1847-017 | SubCatchment 3 | No Redirection | |
| IN1847-017 | 2 | | 1 | 1.255 | 396.18 | 100 | 0.041 | SWMM Method | IN1847-017 | 1 | IN1847-017 | SubCatchment 3 | No Redirection | |
| IN1847-017 | 3 | | 1 | 6.222 | 396.18 | 0 | 0.041 | SWMM Method | IN1847-017 | 0 | | SubCatchment 3 | No Redirection | |
| IN1848-004 | 1 | 1 | 1 | 0.078 | 103.46 | 100 | 0.044 | SWMM Method | IN1848-004 | 0 | IN1848-004 | SubCatchment 3 | No Redirection | |
| IN1848-004 | 2 | | 1 | 0.093 | 103.46 | 100 | 0.044 | SWMM Method | IN1848-004 | 1 | IN1848-004 | SubCatchment 3 | No Redirection | |
| IN1848-004 | 3 | | 1 | 0.404 | 103.46 | 0 | 0.044 | SWMM Method | IN1848-004 | 0 | | SubCatchment 1 | No Redirection | |
| IN1848-007 | 1 | 1 | 1 | 0.371 | 605.863 | 100 | 0.086 | SWMM Method | IN1848-007 | 0 | IN1848-007 | SubCatchment 3 | No Redirection | |
| IN1848-007 | 2 | | 1 | 0.336 | 605.863 | 100 | 0.086 | SWMM Method | IN1848-007 | 1 | IN1848-007 | SubCatchment 3 | No Redirection | |
| IN1848-007 | 3 | | 1 | 2.137 | 605.863 | 0 | 0.086 | SWMM Method | IN1848-007 | 0 | | SubCatchment 1 | No Redirection | |
| IN1848-010 | 1 | 1 | 1 | 0.073 | 105.128 | 100 | 0.064 | SWMM Method | IN1848-010 | 0 | IN1848-010 | SubCatchment 3 | No Redirection | |
| IN1848-010 | 2 | | 1 | 0.093 | 105.128 | 100 | 0.064 | SWMM Method | IN1848-010 | 1 | IN1848-010 | SubCatchment 3 | No Redirection | |
| IN1848-010 | 3 | | 1 | 0.636 | 105.128 | 0 | 0.064 | SWMM Method | IN1848-010 | 0 | | SubCatchment 1 | No Redirection | |
| IN1849-004 | 1 | 1 | 1 | 0.766 | 249.527 | 100 | 0.023 | SWMM Method | IN1849-004 | 0 | IN1849-004 | SubCatchment 3 | No Redirection | |
| IN1849-004 | 2 | | 1 | 0.28 | 249.527 | 100 | 0.023 | SWMM Method | IN1849-004 | 1 | IN1849-004 | SubCatchment 3 | No Redirection | |
| IN1849-004 | 3 | | 1 | 1.633 | 249.527 | 0 | 0.023 | SWMM Method | IN1849-004 | 0 | | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1849-018 | 1 | 1 | 1 | 3.477 | 312.981 | 100 | 0.016 | SWMM Method | IN1849-018 | 0 | IN1849-018 | SubCatchment 3 | No Redirection | |
| IN1849-018 | 2 | | 1 | 0.213 | 312.981 | 100 | 0.016 | SWMM Method | IN1849-018 | 1 | IN1849-018 | SubCatchment 3 | No Redirection | |
| IN1849-018 | 3 | | 1 | 1.279 | 312.981 | 0 | 0.016 | SWMM Method | IN1849-018 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1947-008 | 1 | 1 | 1 | 0.553 | 267.841 | 100 | 0.069 | SWMM Method | IN1947-008 | 0 | IN1947-008 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1947-008 | 2 | | 1 | 0.374 | 267.841 | 100 | 0.069 | SWMM Method | IN1947-008 | 1 | IN1947-008 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1947-008 | 3 | | 1 | 2.458 | 267.841 | 0 | 0.069 | SWMM Method | IN1947-008 | 0 | | SubCatchment 3 | No Redirection | |
| IN1947-013 | 1 | 1 | 1 | 0.813 | 390.426 | 100 | 0.034 | SWMM Method | IN1947-013 | 0 | IN1947-013 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN1947-013 | 2 | | 1 | 0.552 | 390.426 | 100 | 0.034 | SWMM Method | IN1947-013 | 1 | IN1947-013 | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1947-013 | 3 | | 1 | 2.919 | 390.426 | 0 | 0.034 | SWMM Method | IN1947-013 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond 18 |
| IN1947-016 | 1 | 1 | 1 | 1.043 | 299.982 | 100 | 0.031 | SWMM Method | IN1947-016 | 0 | IN1947-016 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1947-016 | 2 | | 1 | 0.571 | 299.982 | 100 | 0.031 | SWMM Method | IN1947-016 | 1 | IN1947-016 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1947-016 | 3 | | 1 | 4.152 | 299.982 | 0 | 0.031 | SWMM Method | IN1947-016 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN1947-018 | 1 | 1 | 1 | 0.591 | 161.865 | 100 | 0.069 | SWMM Method | IN1947-018 | 0 | IN1947-018 | SubCatchment 3 | No Redirection | |
| IN1947-018 | 2 | | 1 | 0.162 | 161.865 | 100 | 0.069 | SWMM Method | IN1947-018 | 1 | IN1947-018 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1947-018 | 3 | | 1 | 0.967 | 161.865 | 0 | 0.069 | SWMM Method | IN1947-018 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN1947-019 | 1 | 1 | 1 | 0.415 | 214.614 | 100 | 0.02 | SWMM Method | IN1947-019 | 0 | IN1947-019 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1947-019 | 2 | | 1 | 0.028 | 214.614 | 100 | 0.02 | SWMM Method | IN1947-019 | 1 | IN1947-019 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1947-019 | 3 | | 1 | 0.426 | 214.614 | 0 | 0.02 | SWMM Method | IN1947-019 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1948-002 | 1 | 1 | 1 | 1.096 | 392.572 | 100 | 0.05 | SWMM Method | IN1948-002 | 0 | IN1948-002 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1948-002 | 2 | | 1 | 0.468 | 392.572 | 100 | 0.05 | SWMM Method | IN1948-002 | 1 | IN1948-002 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1948-002 | 3 | | 1 | 2.659 | 392.572 | 0 | 0.05 | SWMM Method | IN1948-002 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1949-004 | 1 | 1 | 1 | 1.344 | 302.493 | 100 | 0.074 | SWMM Method | IN1949-004 | 0 | IN1949-004 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1949-004 | 2 | | 1 | 0.348 | 302.493 | 100 | 0.074 | SWMM Method | IN1949-004 | 1 | IN1949-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1949-004 | 3 | | 1 | 3.141 | 302.493 | 0 | 0.074 | SWMM Method | IN1949-004 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1949-010 | 1 | 1 | 1 | 2.42 | 306.983 | 100 | 0.056 | SWMM Method | IN1949-010 | 0 | IN1949-010 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1949-010 | 2 | | 1 | 0.116 | 306.983 | 100 | 0.056 | SWMM Method | IN1949-010 | 1 | IN1949-010 | SubCatchment 3 | No Redirection | |
| IN1949-010 | 3 | | 1 | 2.943 | 306.983 | 0 | 0.056 | SWMM Method | IN1949-010 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1949-039 | 1 | 1 | 1 | 2.22 | 545.23 | 100 | 0.051 | SWMM Method | IN1949-039 | 0 | IN1949-039 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1949-039 | 3 | | 1 | 1.341 | 545.23 | 0 | 0.051 | SWMM Method | IN1949-039 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN1950-010 | 1 | 1 | 1 | 0.529 | 240.71 | 100 | 0.022 | SWMM Method | IN1950-010 | 0 | IN1950-010 | SubCatchment 3 | No Redirection | |
| IN1950-010 | 3 | | 1 | 1.121 | 240.71 | 0 | 0.022 | SWMM Method | IN1950-010 | 0 | | SubCatchment 3 | No Redirection | Memorial High School |
| IN1956-003 | 1 | 1 | 1 | 1.044 | 446.918 | 100 | 0.08 | SWMM Method | IN1956-003 | 0 | IN1956-003 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1956-003 | 3 | | 1 | 1.516 | 446.918 | 0 | 0.08 | SWMM Method | IN1956-003 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1956-007 | 1 | 1 | 1 | 1.364 | 426.678 | 100 | 0.076 | SWMM Method | IN1956-007 | 0 | IN1956-007 | SubCatchment 3 | No Redirection | |
| IN1956-007 | 3 | | 1 | 2.584 | 426.678 | 0 | 0.076 | SWMM Method | IN1956-007 | 0 | | SubCatchment 3 | No Redirection | |
| IN1956-014 | 1 | 1 | 1 | 1.415 | 401.256 | 100 | 0.043 | SWMM Method | IN1956-014 | 0 | IN1956-014 | SubCatchment 3 | No Redirection | Memorial High School |
| IN1956-014 | 2 | | 1 | 0.053 | 401.256 | 100 | 0.043 | SWMM Method | IN1956-014 | 1 | IN1956-014 | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1956-014 | 3 | | 1 | 7.459 | 401.256 | 0 | 0.043 | SWMM Method | IN1956-014 | 0 | | SubCatchment 3 | No Redirection | Memorial HS 2018 |
| IN1956-014-2 | 1 | 1 | 1 | 0.259 | 743.725 | 100 | 0.049 | SWMM Method | IN1956-014-2 | 0 | IN1956-014-2 | SubCatchment 3 | No Redirection | Memorial High School |
| IN1956-014-2 | 3 | | 1 | 16.284 | 743.725 | 0 | 0.049 | SWMM Method | IN1956-014-2 | 0 | | SubCatchment 1 | No Redirection | Memorial HS 2018 |
| IN1956-017 | 1 | 1 | 1 | 2.127 | 329.188 | 100 | 0.026 | SWMM Method | IN1956-017 | 0 | IN1956-017 | SubCatchment 3 | No Redirection | Memorial HS 2018 |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1956-017 | 2 | | 1 | 0.002 | 329.188 | 100 | 0.026 | SWMM Method | IN1956-017 | 1 | IN1956-017 | SubCatchment 3 | No Redirection | Strickers Pond Foreb |
| IN1956-017 | 3 | | 1 | 7.382 | 329.188 | 0 | 0.026 | SWMM Method | IN1956-017 | 0 | | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1956-017-2 | 1 | 1 | 1 | 0.03 | 812.259 | 100 | 0.028 | SWMM Method | IN1956-017-2 | 0 | IN1956-017-2 | SubCatchment 3 | No Redirection | Strickers Forebay 18 |
| IN1956-017-2 | 2 | | 1 | 0.035 | 812.259 | 100 | 0.028 | SWMM Method | IN1956-017-2 | 0 | IN1956-017-2 | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN1956-017-2 | 3 | | 1 | 12.894 | 812.259 | 0 | 0.028 | SWMM Method | IN1956-017-2 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| IN1958-001 | 1 | 1 | 1 | 0.787 | 95.758 | 100 | 0.003 | SWMM Method | IN1958-001 | 0 | IN1958-001 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN1958-001 | 2 | | 1 | 0.007 | 95.758 | 100 | 0.003 | SWMM Method | IN1958-001 | 1 | IN1958-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN1958-001 | 3 | | 1 | 0.843 | 95.758 | 0 | 0.003 | SWMM Method | IN1958-001 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2047-005 | 1 | 1 | 1 | 0.47 | 79.05 | 100 | 0.047 | SWMM Method | IN2047-005 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| IN2047-005 | 3 | | 1 | 0.202 | 79.05 | 0 | 0.047 | SWMM Method | IN2047-005 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research Stati |
| IN2047-023 | 1 | 1 | 1 | 3.44 | 763.72 | 100 | 0.029 | SWMM Method | IN2047-023 | 0 | IN2047-023 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2047-023 | 2 | | 1 | 0.019 | 763.72 | 100 | 0.029 | SWMM Method | IN2047-023 | 1 | IN2047-023 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2047-023 | 3 | | 1 | 11.263 | 763.72 | 0 | 0.029 | SWMM Method | IN2047-023 | 0 | | SubCatchment 3 | No Redirection | |
| IN2050-009 | 1 | 1 | 1 | 1.036 | 452.87 | 100 | 0.03 | SWMM Method | IN2050-009 | 0 | IN2050-009 | SubCatchment 3 | No Redirection | |
| IN2050-009 | 2 | | 1 | 0.071 | 452.87 | 100 | 0.03 | SWMM Method | IN2050-009 | 1 | IN2050-009 | SubCatchment 3 | No Redirection | |
| IN2050-009 | 3 | | 1 | 3.695 | 452.87 | 0 | 0.03 | SWMM Method | IN2050-009 | 0 | | SubCatchment 3 | No Redirection | |
| IN2051-008 | 1 | 1 | 1 | 1.13 | 396.135 | 100 | 0.013 | SWMM Method | IN2051-008 | 0 | IN2051-008 | SubCatchment 3 | No Redirection | |
| IN2051-008 | 2 | | 1 | 0.21 | 396.135 | 100 | 0.013 | SWMM Method | IN2051-008 | 1 | IN2051-008 | SubCatchment 3 | No Redirection | |
| IN2051-008 | 3 | | 1 | 1.235 | 396.135 | 0 | 0.013 | SWMM Method | IN2051-008 | 0 | | SubCatchment 3 | No Redirection | |
| IN2051-048 | 1 | 1 | 1 | 0.44 | 181.14 | 100 | 0.01 | SWMM Method | IN2051-048 | 0 | IN2051-048 | SubCatchment 3 | No Redirection | |
| IN2051-048 | 2 | | 1 | 0.04 | 181.14 | 100 | 0.01 | SWMM Method | IN2051-048 | 1 | IN2051-048 | SubCatchment 3 | No Redirection | |
| IN2051-048 | 3 | | 1 | 0.216 | 181.14 | 0 | 0.01 | SWMM Method | IN2051-048 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2051-056 | 1 | 1 | 1 | 2.444 | 498.931 | 100 | 0.01 | SWMM Method | IN2051-056 | 0 | IN2051-056 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2051-056 | 2 | | 1 | 1.26 | 498.931 | 100 | 0.01 | SWMM Method | IN2051-056 | 1 | IN2051-056 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2051-056 | 3 | | 1 | 5.222 | 498.931 | 0 | 0.01 | SWMM Method | IN2051-056 | 0 | | SubCatchment 3 | No Redirection | |
| IN2052-004 | 1 | 1 | 1 | 1.322 | 304.142 | 100 | 0.023 | SWMM Method | IN2052-004 | 0 | IN2052-004 | SubCatchment 3 | No Redirection | |
| IN2052-004 | 2 | | 1 | 0.779 | 304.142 | 100 | 0.023 | SWMM Method | IN2052-004 | 1 | IN2052-004 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2052-004 | 3 | | 1 | 1.62 | 304.142 | 0 | 0.023 | SWMM Method | IN2052-004 | 0 | | SubCatchment 3 | No Redirection | |
| IN2052-009 | 1 | 1 | 1 | 2.002 | 734.448 | 100 | 0.017 | SWMM Method | IN2052-009 | 0 | IN2052-009 | SubCatchment 3 | No Redirection | |
| IN2052-009 | 2 | | 1 | 0.932 | 734.448 | 100 | 0.017 | SWMM Method | IN2052-009 | 1 | IN2052-009 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2052-009 | 3 | | 1 | 2.89 | 734.448 | 0 | 0.017 | SWMM Method | IN2052-009 | 0 | | SubCatchment 3 | No Redirection | |
| IN2052-026 | 1 | 1 | 1 | 2.034 | 402.283 | 100 | 0.037 | SWMM Method | IN2052-026 | 0 | IN2052-026 | SubCatchment 3 | No Redirection | |
| IN2052-026 | 2 | | 1 | 1.352 | 402.283 | 100 | 0.037 | SWMM Method | IN2052-026 | 1 | IN2052-026 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2052-026 | 3 | | 1 | 1.772 | 402.283 | 0 | 0.037 | SWMM Method | IN2052-026 | 0 | | SubCatchment 3 | No Redirection | |
| IN2053-004 | 1 | 1 | 1 | 0.24 | 106.04 | 100 | 0.024 | SWMM Method | IN2053-004 | 0 | IN2053-004 | SubCatchment 3 | No Redirection | |
| IN2053-004 | 2 | | 1 | 0.069 | 106.04 | 100 | 0.024 | SWMM Method | IN2053-004 | 1 | IN2053-004 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2053-004 | 3 | | 1 | 0.08 | 106.04 | 0 | 0.024 | SWMM Method | IN2053-004 | 0 | | SubCatchment 3 | No Redirection | |
| IN2055-007 | 1 | 1 | 1 | 1.13 | 384.902 | 100 | 0.049 | SWMM Method | IN2055-007 | 0 | IN2055-007 | SubCatchment 3 | No Redirection | |
| IN2055-007 | 3 | | 1 | 0.8 | 384.902 | 0 | 0.049 | SWMM Method | IN2055-007 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2056-009 | 1 | 1 | 1 | 0.817 | 253.414 | 100 | 0.029 | SWMM Method | IN2056-009 | 0 | IN2056-009 | SubCatchment 3 | No Redirection | |
| IN2056-009 | 3 | | 1 | 0.266 | 253.414 | 0 | 0.029 | SWMM Method | IN2056-009 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2056-039 | 1 | 1 | 1 | 0.409 | 97.474 | 100 | 0.021 | SWMM Method | IN2056-039 | 0 | IN2056-039 | SubCatchment 3 | No Redirection | |
| IN2056-039 | 3 | | 1 | 0.116 | 97.474 | 0 | 0.021 | SWMM Method | IN2056-039 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2056-043 | 1 | 1 | 1 | 0.957 | 203.629 | 100 | 0.041 | SWMM Method | IN2056-043 | 0 | IN2056-043 | SubCatchment 3 | No Redirection | |
| IN2056-043 | 3 | | 1 | 0.81 | 203.629 | 0 | 0.041 | SWMM Method | IN2056-043 | 0 | | SubCatchment 3 | No Redirection | |
| IN2145-012 | 1 | 1 | 1 | 3.673 | 363.291 | 100 | 0.003 | SWMM Method | IN2145-012 | 0 | IN2145-012 | SubCatchment 3 | No Redirection | |
| IN2145-012 | 2 | | 1 | 1.849 | 363.291 | 100 | 0.003 | SWMM Method | IN2145-012 | 1 | IN2145-012 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2145-012 | 3 | | 1 | 5.987 | 363.291 | 0 | 0.003 | SWMM Method | IN2145-012 | 0 | | SubCatchment 3 | No Redirection | |
| IN2150-021 | 1 | 1 | 1 | 1.727 | 585.731 | 100 | 0.061 | SWMM Method | IN2150-007 | 0 | | SubCatchment 1 | No Redirection | |
| IN2150-021 | 2 | | 1 | 0.714 | 585.731 | 100 | 0.061 | SWMM Method | IN2150-007 | 1 | IN2150-021 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2150-021 | 3 | | 1 | 10.725 | 585.73 | 0 | 0.061 | SWMM Method | IN2150-007 | 0 | | SubCatchment 3 | No Redirection | |
| IN2150-045 | 1 | 1 | 1 | 5.292 | 743.768 | 100 | 0.001 | SWMM Method | IN2150-045 | 0 | IN2150-045 | SubCatchment 3 | No Redirection | |
| IN2150-045 | 2 | | 1 | 0.064 | 743.768 | 100 | 0.001 | SWMM Method | IN2150-045 | 1 | IN2150-045 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2150-045 | 3 | | 1 | 2.23 | 743.768 | 0 | 0.001 | SWMM Method | IN2150-045 | 0 | | SubCatchment 3 | No Redirection | |
| IN2152-007 | 1 | 1 | 1 | 1.343 | 191.372 | 100 | 0.011 | SWMM Method | IN2152-007 | 0 | IN2152-007 | SubCatchment 3 | No Redirection | |
| IN2152-007 | 2 | | 1 | 0.326 | 191.372 | 100 | 0.011 | SWMM Method | IN2152-007 | 1 | IN2152-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2152-007 | 3 | | 1 | 2.089 | 191.372 | 0 | 0.011 | SWMM Method | IN2152-007 | 0 | | SubCatchment 1 | No Redirection | |
| IN2152-016 | 1 | 1 | 1 | 1.009 | 174.595 | 100 | 0.009 | SWMM Method | IN2152-016 | 0 | IN2152-016 | SubCatchment 3 | No Redirection | |
| IN2152-016 | 2 | | 1 | 0.228 | 174.595 | 100 | 0.009 | SWMM Method | IN2152-016 | 1 | IN2152-016 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| IN2152-016 | 3 | | 1 | 1.529 | 174.595 | 0 | 0.009 | SWMM Method | IN2152-016 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research Stati |
| IN2155-007 | 1 | 1 | 1 | 3.544 | 355.041 | 100 | 0.014 | SWMM Method | IN2155-007 | 0 | IN2155-007 | SubCatchment 3 | No Redirection | |
| IN2155-007 | 2 | | 1 | 0.013 | 355.041 | 100 | 0.014 | SWMM Method | IN2155-007 | 1 | IN2155-007 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2155-007 | 3 | | 1 | 5.888 | 355.041 | 0 | 0.014 | SWMM Method | IN2155-007 | 0 | | SubCatchment 3 | No Redirection | |
| IN2156-072 | 1 | 1 | 1 | 2.342 | 173.634 | 100 | 0.008 | SWMM Method | IN2156-072 | 0 | IN2156-072 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2156-072 | 2 | | 1 | 0.001 | 173.634 | 100 | 0.008 | SWMM Method | IN2156-072 | 1 | IN2156-072 | SubCatchment 3 | No Redirection | |
| IN2156-072 | 3 | | 1 | 0.416 | 173.634 | 0 | 0.008 | SWMM Method | IN2156-072 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2158-009 | 1 | 1 | 1 | 1.398 | 288.817 | 100 | 0.022 | SWMM Method | IN2158-009 | 0 | IN2158-009 | SubCatchment 3 | No Redirection | |
| IN2158-009 | 3 | | 1 | 0.415 | 288.817 | 0 | 0.022 | SWMM Method | IN2158-009 | 0 | | SubCatchment 3 | No Redirection | |
| IN2158-017 | 1 | 1 | 1 | 0.843 | 233.989 | 100 | 0.05 | SWMM Method | IN2158-017 | 0 | IN2158-017 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2158-017 | 2 | | 1 | 0.277 | 233.989 | 100 | 0.05 | SWMM Method | IN2158-017 | 1 | IN2158-017 | SubCatchment 3 | No Redirection | |
| IN2158-017 | 3 | | 1 | 6.897 | 233.989 | 0 | 0.05 | SWMM Method | IN2158-017 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2159-002 | 1 | 1 | 1 | 1.197 | 344.305 | 100 | 0.065 | SWMM Method | IN2159-002 | 0 | IN2159-002 | SubCatchment 3 | No Redirection | |
| IN2159-002 | 2 | | 1 | 0.247 | 344.305 | 100 | 0.065 | SWMM Method | IN2159-002 | 1 | IN2159-002 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2159-002 | 3 | | 1 | 9.008 | 344.305 | 0 | 0.065 | SWMM Method | IN2159-002 | 0 | | SubCatchment 3 | No Redirection | |
| IN2159-009 | 1 | 1 | 1 | 0.654 | 261.336 | 100 | 0.084 | SWMM Method | IN2159-009 | 0 | IN2159-009 | SubCatchment 3 | No Redirection | |
| IN2159-009 | 3 | | 1 | 3.7 | 261.336 | 0 | 0.084 | SWMM Method | IN2159-009 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2246-002 | 1 | 1 | 1 | 3.41 | 515.767 | 100 | 0.016 | SWMM Method | IN2246-002 | 0 | IN2246-002 | SubCatchment 3 | No Redirection | |
| IN2246-002 | 2 | | 1 | 0.258 | 515.767 | 100 | 0.016 | SWMM Method | IN2246-002 | 1 | IN2246-002 | SubCatchment 3 | No Redirection | |
| IN2246-002 | 3 | | 1 | 2.28 | 515.767 | 0 | 0.016 | SWMM Method | IN2246-002 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2247-013 | 1 | 1 | 1 | 3.412 | 378.973 | 100 | 0.008 | SWMM Method | IN2247-013 | 0 | IN2247-013 | SubCatchment 3 | No Redirection | |
| IN2247-013 | 2 | | 1 | 0.057 | 378.973 | 100 | 0.008 | SWMM Method | IN2247-013 | 1 | IN2247-013 | SubCatchment 3 | No Redirection | |
| IN2247-013 | 3 | | 1 | 2.592 | 378.973 | 0 | 0.008 | SWMM Method | IN2247-013 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2249-003 | 1 | 1 | 1 | 11.062 | 698.991 | 100 | 0.037 | SWMM Method | IN2249-003 | 0 | IN2249-003 | SubCatchment 3 | No Redirection | |
| IN2249-003 | 2 | | 1 | 0.148 | 698.991 | 100 | 0.037 | SWMM Method | IN2249-003 | 1 | IN2249-003 | SubCatchment 3 | No Redirection | |
| IN2249-003 | 3 | | 1 | 8.719 | 698.991 | 0 | 0.037 | SWMM Method | IN2249-003 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2249-024 | 1 | 1 | 1 | 0.568 | 243.777 | 100 | 0.01 | SWMM Method | IN2249-024 | 0 | IN2249-024 | SubCatchment 3 | No Redirection | |
| IN2249-024 | 3 | | 1 | 0.219 | 243.777 | 0 | 0.01 | SWMM Method | IN2249-024 | 0 | | SubCatchment 3 | No Redirection | |
| IN2249-028 | 1 | 1 | 1 | 2.142 | 249.336 | 100 | 0.021 | SWMM Method | IN2249-028 | 0 | IN2249-028 | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2249-028 | 3 | | 1 | 1.693 | 249.336 | 0 | 0.021 | SWMM Method | IN2249-028 | 0 | | SubCatchment 3 | No Redirection | |
| IN2250-026 | 1 | 1 | 1 | 1.556 | 242.211 | 100 | 0.012 | SWMM Method | IN2250-026 | 0 | IN2250-026 | SubCatchment 3 | No Redirection | |
| IN2250-026 | 2 | | 1 | 0.152 | 242.211 | 100 | 0.012 | SWMM Method | IN2250-026 | 1 | IN2250-026 | SubCatchment 3 | No Redirection | |
| IN2250-026 | 3 | | 1 | 0.43 | 242.211 | 0 | 0.012 | SWMM Method | IN2250-026 | 0 | | SubCatchment 3 | No Redirection | Sauk Heights Pond |
| IN2251-024 | 1 | 1 | 1 | 0.9 | 168.137 | 100 | 0.018 | SWMM Method | IN2251-024 | 0 | IN2251-024 | SubCatchment 3 | No Redirection | |
| IN2251-024 | 2 | | 1 | 0.04 | 168.137 | 100 | 0.018 | SWMM Method | IN2251-024 | 1 | IN2251-024 | SubCatchment 3 | No Redirection | |
| IN2251-024 | 3 | | 1 | 0.605 | 168.137 | 0 | 0.018 | SWMM Method | IN2251-024 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park |
| IN2251-027 | 1 | 1 | 1 | 1.912 | 390.443 | 100 | 0.021 | SWMM Method | IN2251-027 | 0 | IN2251-027 | SubCatchment 3 | No Redirection | |
| IN2251-027 | 2 | | 1 | 1.452 | 390.443 | 100 | 0.021 | SWMM Method | IN2251-027 | 1 | IN2251-027 | SubCatchment 3 | No Redirection | |
| IN2251-027 | 3 | | 1 | 1.703 | 390.443 | 0 | 0.021 | SWMM Method | IN2251-027 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2255-002 | 1 | 1 | 1 | 15.441 | 1386.713 | 100 | 0.013 | SWMM Method | IN2255-002 | 0 | IN2255-002 | SubCatchment 3 | No Redirection | |
| IN2255-002 | 3 | | 1 | 2.56 | 1386.713 | 0 | 0.013 | SWMM Method | IN2255-002 | 0 | | SubCatchment 3 | No Redirection | |
| IN2256-023 | 1 | 1 | 1 | 0.201 | 90.622 | 100 | 0.01 | SWMM Method | IN2256-023 | 0 | IN2256-023 | SubCatchment 3 | No Redirection | |
| IN2256-023 | 3 | | 1 | 0.076 | 90.622 | 0 | 0.01 | SWMM Method | IN2256-023 | 0 | | SubCatchment 1 | No Redirection | |
| IN2256-048 | 1 | 1 | 1 | 2.414 | 293.681 | 100 | 0.013 | SWMM Method | IN2256-048 | 0 | IN2256-048 | SubCatchment 3 | No Redirection | |
| IN2256-048 | 3 | | 1 | 0.751 | 293.681 | 0 | 0.013 | SWMM Method | IN2256-048 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2256-053 | 1 | 1 | 1 | 1.718 | 319.925 | 100 | 0.014 | SWMM Method | IN2256-053 | 0 | IN2256-053 | SubCatchment 3 | No Redirection | |
| IN2256-053 | 2 | | 1 | 0.001 | 319.925 | 100 | 0.014 | SWMM Method | IN2256-053 | 1 | IN2256-053 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2256-053 | 3 | | 1 | 0.476 | 319.925 | 0 | 0.014 | SWMM Method | IN2256-053 | 0 | | SubCatchment 3 | No Redirection | |
| IN2257-028 | 1 | 1 | 1 | 1.766 | 467.355 | 100 | 0.054 | SWMM Method | IN2257-028 | 0 | IN2257-028 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2257-028 | 2 | | 1 | 0.169 | 467.355 | 100 | 0.054 | SWMM Method | IN2257-028 | 1 | IN2257-028 | SubCatchment 3 | No Redirection | |
| IN2257-028 | 3 | | 1 | 2.743 | 467.355 | 0 | 0.054 | SWMM Method | IN2257-028 | 0 | | SubCatchment 1 | No Redirection | |
| IN2258-025 | 1 | 1 | 1 | 1.145 | 351.796 | 100 | 0.027 | SWMM Method | IN2258-025 | 0 | IN2258-025 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-025 | 2 | | 1 | 0.038 | 351.796 | 100 | 0.027 | SWMM Method | IN2258-025 | 1 | IN2258-025 | SubCatchment 3 | No Redirection | |
| IN2258-025 | 3 | | 1 | 1.484 | 351.796 | 0 | 0.027 | SWMM Method | IN2258-025 | 0 | | SubCatchment 3 | No Redirection | |
| IN2258-027 | 1 | 1 | 1 | 1.516 | 791.64 | 100 | 0.01 | SWMM Method | IN2258-027 | 0 | IN2258-027 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-027 | 2 | | 1 | 0.046 | 791.64 | 100 | 0.01 | SWMM Method | IN2258-027 | 1 | IN2258-027 | SubCatchment 3 | No Redirection | |
| IN2258-027 | 3 | | 1 | 1.991 | 791.64 | 0 | 0.01 | SWMM Method | IN2258-027 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-054 | 1 | 1 | 1 | 1.061 | 380.798 | 100 | 0.028 | SWMM Method | IN2258-054 | 0 | IN2258-054 | SubCatchment 3 | No Redirection | |
| IN2258-054 | 2 | | 1 | 0.047 | 380.798 | 100 | 0.028 | SWMM Method | IN2258-054 | 1 | IN2258-054 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-054 | 3 | | 1 | 1.018 | 380.798 | 0 | 0.028 | SWMM Method | IN2258-054 | 0 | | SubCatchment 1 | No Redirection | |
| IN2258-074 | 1 | 1 | 1 | 1.98 | 186.974 | 100 | 0.005 | SWMM Method | IN2258-074 | 0 | IN2258-074 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2258-074 | 3 | | 1 | 0.394 | 186.974 | 0 | 0.005 | SWMM Method | IN2258-074 | 0 | | SubCatchment 3 | No Redirection | |
| IN2347-005 | 1 | 1 | 1 | 3.175 | 629.731 | 100 | 0.005 | SWMM Method | IN2347-005 | 0 | IN2347-005 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2347-005 | 2 | | 1 | 0.816 | 629.731 | 100 | 0.005 | SWMM Method | IN2347-005 | 1 | IN2347-005 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2347-005 | 3 | | 1 | 7.257 | 629.731 | 0 | 0.005 | SWMM Method | IN2347-005 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2347-020 | 1 | 1 | 1 | 1.49 | 374.458 | 100 | 0.01 | SWMM Method | IN2347-020 | 0 | IN2347-020 | SubCatchment 3 | No Redirection | |
| IN2347-020 | 2 | | 1 | 0.561 | 374.458 | 100 | 0.01 | SWMM Method | IN2347-020 | 1 | IN2347-020 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2347-020 | 3 | | 1 | 4.065 | 374.458 | 0 | 0.01 | SWMM Method | IN2347-020 | 0 | | SubCatchment 1 | No Redirection | |
| IN2348-003 | 1 | 1 | 1 | 2.374 | 369.142 | 100 | 0.027 | SWMM Method | IN2348-003 | 0 | IN2348-003 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2348-003 | 2 | | 1 | 0.046 | 369.142 | 100 | 0.027 | SWMM Method | IN2348-003 | 1 | IN2348-003 | SubCatchment 3 | No Redirection | |
| IN2348-003 | 3 | | 1 | 3.872 | 369.142 | 0 | 0.027 | SWMM Method | IN2348-003 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2349-002 | 1 | 1 | 1 | 3.739 | 478.94 | 100 | 0.026 | SWMM Method | IN2349-002 | 0 | IN2349-002 | SubCatchment 3 | No Redirection | |
| IN2349-002 | 2 | | 1 | 0.045 | 478.94 | 100 | 0.026 | SWMM Method | IN2349-002 | 1 | IN2349-002 | SubCatchment 3 | No Redirection | |
| IN2349-002 | 3 | | 1 | 2.854 | 478.94 | 0 | 0.026 | SWMM Method | IN2349-002 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2350-004 | 1 | 1 | 1 | 3.501 | 263.521 | 100 | 0.022 | SWMM Method | IN2350-004 | 0 | IN2350-004 | SubCatchment 3 | No Redirection | |
| IN2350-004 | 2 | | 1 | 0.063 | 263.521 | 100 | 0.022 | SWMM Method | IN2350-004 | 1 | IN2350-004 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2350-004 | 3 | | 1 | 1.856 | 263.521 | 0 | 0.022 | SWMM Method | IN2350-004 | 0 | | SubCatchment 3 | No Redirection | |
| IN2350-029 | 1 | 1 | 1 | 2.513 | 349.385 | 100 | 0.029 | SWMM Method | IN2350-029 | 0 | IN2350-029 | SubCatchment 3 | No Redirection | |
| IN2350-029 | 2 | | 1 | 0.454 | 349.385 | 100 | 0.029 | SWMM Method | IN2350-029 | 1 | IN2350-029 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2350-029 | 3 | | 1 | 3.81 | 349.385 | 0 | 0.029 | SWMM Method | IN2350-029 | 0 | | SubCatchment 3 | No Redirection | |
| IN2351-006 | 1 | 1 | 1 | 0.31 | 185.338 | 100 | 0.026 | SWMM Method | IN2351-006 | 0 | IN2351-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2351-006 | 2 | | 1 | 0.091 | 185.338 | 100 | 0.026 | SWMM Method | IN2351-006 | 1 | IN2351-006 | SubCatchment 3 | No Redirection | |
| IN2351-006 | 3 | | 1 | 1.075 | 185.338 | 0 | 0.026 | SWMM Method | IN2351-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2353-006 | 1 | 1 | 1 | 2.546 | 399.588 | 100 | 0.011 | SWMM Method | IN2353-006 | 0 | IN2353-006 | SubCatchment 3 | No Redirection | |
| IN2353-006 | 2 | | 1 | 0.605 | 399.588 | 100 | 0.011 | SWMM Method | IN2353-006 | 1 | IN2353-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2353-006 | 3 | | 1 | 6.677 | 399.588 | 0 | 0.011 | SWMM Method | IN2353-006 | 0 | | SubCatchment 1 | No Redirection | |
| IN2355-006 | 1 | 1 | 1 | 3.331 | 672.943 | 100 | 0.013 | SWMM Method | IN2355-006 | 0 | IN2355-006 | SubCatchment 3 | No Redirection | |
| IN2355-006 | 2 | | 1 | 0.092 | 672.943 | 100 | 0.013 | SWMM Method | IN2355-006 | 1 | IN2355-006 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2355-006 | 3 | | 1 | 0.932 | 672.943 | 0 | 0.013 | SWMM Method | IN2355-006 | 0 | | SubCatchment 3 | No Redirection | |
| IN2355-040 | 1 | 1 | 1 | 1.393 | 189.717 | 100 | 0.03 | SWMM Method | IN2355-040 | 0 | IN2355-040 | SubCatchment 3 | No Redirection | |
| IN2355-040 | 3 | | 1 | 0.505 | 189.717 | 0 | 0.03 | SWMM Method | IN2355-040 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2356-006 | 1 | 1 | 1 | 4.717 | 261.772 | 100 | 0.033 | SWMM Method | IN2356-006 | 0 | IN2356-006 | SubCatchment 3 | No Redirection | |
| IN2356-006 | 2 | | 1 | 0.066 | 261.772 | 100 | 0.033 | SWMM Method | IN2356-006 | 1 | IN2356-006 | SubCatchment 3 | No Redirection | |
| IN2356-006 | 3 | | 1 | 1.754 | 261.772 | 0 | 0.033 | SWMM Method | IN2356-006 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2356-025 | 1 | 1 | 1 | 4.581 | 145.503 | 100 | 0.023 | SWMM Method | IN2356-025 | 0 | IN2356-025 | SubCatchment 3 | No Redirection | |
| IN2356-025 | 3 | | 1 | 2.362 | 145.503 | 0 | 0.023 | SWMM Method | IN2356-025 | 0 | | SubCatchment 3 | No Redirection | |
| IN2358-013 | 1 | 1 | 1 | 3.901 | 409.377 | 100 | 0.022 | SWMM Method | IN2358-013 | 0 | IN2358-013 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2358-013 | 2 | | 1 | 0.005 | 409.377 | 100 | 0.022 | SWMM Method | IN2358-013 | 1 | IN2358-013 | SubCatchment 3 | No Redirection | |
| IN2358-013 | 3 | | 1 | 1.532 | 409.377 | 0 | 0.022 | SWMM Method | IN2358-013 | 0 | | SubCatchment 3 | No Redirection | |
| IN2358-020 | 1 | 1 | 1 | 0.534 | 168.854 | 100 | 0.062 | SWMM Method | IN2358-020 | 0 | IN2358-020 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2358-020 | 3 | | 1 | 1.525 | 168.854 | 0 | 0.062 | SWMM Method | IN2358-020 | 0 | | SubCatchment 3 | No Redirection | |
| IN2447-001 | 1 | 1 | 1 | 1.373 | 433.573 | 100 | 0.016 | SWMM Method | IN2447-001 | 0 | IN2447-001 | SubCatchment 3 | No Redirection | |
| IN2447-001 | 2 | | 1 | 0.547 | 433.573 | 100 | 0.016 | SWMM Method | IN2447-001 | 1 | IN2447-001 | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2447-001 | 3 | | 1 | 3.952 | 433.573 | 0 | 0.016 | SWMM Method | IN2447-001 | 0 | | SubCatchment 3 | No Redirection | |
| IN2449-002 | 1 | 1 | 1 | 1.824 | 284.313 | 100 | 0.03 | SWMM Method | IN2449-002 | 0 | IN2449-002 | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2449-002 | 2 | | 1 | 0.049 | 284.313 | 100 | 0.03 | SWMM Method | IN2449-002 | 1 | IN2449-002 | SubCatchment 3 | No Redirection | |
| IN2449-002 | 3 | | 1 | 2.102 | 284.313 | 0 | 0.03 | SWMM Method | IN2449-002 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2451-009 | 1 | 1 | 1 | 2.191 | 651.232 | 100 | 0.019 | SWMM Method | IN2451-009 | 0 | IN2451-009 | SubCatchment 3 | No Redirection | |
| IN2451-009 | 2 | | 1 | 1.168 | 651.232 | 100 | 0.019 | SWMM Method | IN2451-009 | 1 | IN2451-009 | SubCatchment 3 | No Redirection | |
| IN2451-009 | 3 | | 1 | 8.779 | 651.232 | 0 | 0.019 | SWMM Method | IN2451-009 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research Stati |
| IN2452-009 | 1 | 1 | 1 | 1.276 | 984.543 | 100 | 0.028 | SWMM Method | IN2452-009 | 0 | IN2452-009 | SubCatchment 3 | No Redirection | |
| IN2452-009 | 2 | | 1 | 0.454 | 984.543 | 100 | 0.028 | SWMM Method | IN2452-009 | 1 | IN2452-009 | SubCatchment 3 | No Redirection | |
| IN2452-009 | 3 | | 1 | 3.287 | 984.543 | 0 | 0.028 | SWMM Method | IN2452-009 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research Stati |
| IN2453-004 | 1 | 1 | 1 | 1.437 | 294.822 | 100 | 0.039 | SWMM Method | IN2453-004 | 0 | IN2453-004 | SubCatchment 3 | No Redirection | |
| IN2453-004 | 2 | | 1 | 0.441 | 294.822 | 100 | 0.039 | SWMM Method | IN2453-004 | 1 | IN2453-004 | SubCatchment 3 | No Redirection | |
| IN2453-004 | 3 | | 1 | 4.363 | 294.822 | 0 | 0.039 | SWMM Method | IN2453-004 | 0 | | SubCatchment 1 | No Redirection | |
| IN2453-009 | 1 | 1 | 1 | 1.879 | 383.086 | 100 | 0.04 | SWMM Method | IN2453-009 | 0 | IN2453-009 | SubCatchment 3 | No Redirection | |
| IN2453-009 | 2 | | 1 | 0.65 | 383.086 | 100 | 0.04 | SWMM Method | IN2453-009 | 1 | IN2453-009 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2453-009 | 3 | | 1 | 5.922 | 383.086 | 0 | 0.04 | SWMM Method | IN2453-009 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2454-009 | 1 | 1 | 1 | 3.253 | 588.564 | 100 | 0.015 | SWMM Method | IN2454-009 | 0 | IN2454-009 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| IN2454-009 | 2 | | 1 | 0.044 | 588.564 | 100 | 0.015 | SWMM Method | IN2454-009 | 1 | IN2454-009 | SubCatchment 3 | No Redirection | |
| IN2454-009 | 3 | | 1 | 2.632 | 588.564 | 0 | 0.015 | SWMM Method | IN2454-009 | 0 | | SubCatchment 3 | No Redirection | |
| IN2455-017 | 1 | 1 | 1 | 2.992 | 326.672 | 100 | 0.032 | SWMM Method | IN2455-017 | 0 | IN2455-017 | SubCatchment 3 | No Redirection | |
| IN2455-017 | 2 | | 1 | 0.039 | 326.672 | 100 | 0.032 | SWMM Method | IN2455-017 | 1 | IN2455-017 | SubCatchment 3 | No Redirection | |
| IN2455-017 | 3 | | 1 | 1.047 | 326.672 | 0 | 0.032 | SWMM Method | IN2455-017 | 0 | | SubCatchment 3 | No Redirection | |
| IN2455-021 | 1 | 1 | 1 | 5.505 | 355.922 | 100 | 0.036 | SWMM Method | IN2455-021 | 0 | IN2455-021 | SubCatchment 3 | No Redirection | |
| IN2455-021 | 2 | | 1 | 0.065 | 355.922 | 100 | 0.036 | SWMM Method | IN2455-021 | 1 | IN2455-021 | SubCatchment 3 | No Redirection | |
| IN2455-021 | 3 | | 1 | 2.138 | 355.922 | 0 | 0.036 | SWMM Method | IN2455-021 | 0 | | SubCatchment 3 | No Redirection | |
| IN2456-003 | 1 | 1 | 1 | 3.981 | 407.481 | 100 | 0.04 | SWMM Method | IN2456-003 | 0 | IN2456-003 | SubCatchment 3 | No Redirection | |
| IN2456-003 | 2 | | 1 | 0.25 | 407.481 | 100 | 0.04 | SWMM Method | IN2456-003 | 1 | IN2456-003 | SubCatchment 3 | No Redirection | |
| IN2456-003 | 3 | | 1 | 2.712 | 407.481 | 0 | 0.04 | SWMM Method | IN2456-003 | 0 | | SubCatchment 3 | No Redirection | |
| IN2550-001 | 1 | 1 | 1 | 2.424 | 528.683 | 100 | 0.045 | SWMM Method | IN2550-001 | 0 | IN2550-001 | SubCatchment 3 | No Redirection | |
| IN2550-001 | 2 | | 1 | 1.151 | 528.683 | 100 | 0.045 | SWMM Method | IN2550-001 | 1 | IN2550-001 | SubCatchment 3 | No Redirection | |
| IN2550-001 | 3 | | 1 | 9.16 | 528.683 | 0 | 0.045 | SWMM Method | IN2550-001 | 0 | | SubCatchment 3 | No Redirection | |
| IN2550-021 | 1 | 1 | 1 | 2.366 | 257.309 | 100 | 0.025 | SWMM Method | IN2550-021 | 0 | IN2550-021 | SubCatchment 3 | No Redirection | |
| IN2550-021 | 2 | | 1 | 0.063 | 257.309 | 100 | 0.025 | SWMM Method | IN2550-021 | 1 | IN2550-021 | SubCatchment 3 | No Redirection | |
| IN2550-021 | 3 | | 1 | 2.224 | 257.309 | 0 | 0.025 | SWMM Method | IN2550-021 | 0 | | SubCatchment 3 | No Redirection | |
| IN2552-007 | 1 | 1 | 1 | 2.041 | 288.746 | 100 | 0.039 | SWMM Method | IN2552-007 | 0 | IN2552-007 | SubCatchment 3 | No Redirection | |
| IN2552-007 | 2 | | 1 | 0.721 | 288.746 | 100 | 0.039 | SWMM Method | IN2552-007 | 1 | IN2552-007 | SubCatchment 3 | No Redirection | |
| IN2552-007 | 3 | | 1 | 5.143 | 288.746 | 0 | 0.039 | SWMM Method | IN2552-007 | 0 | | SubCatchment 3 | No Redirection | |
| IN2552-010 | 1 | 1 | 1 | 4.418 | 704.752 | 100 | 0.038 | SWMM Method | IN2552-010 | 0 | IN2552-010 | SubCatchment 3 | No Redirection | |
| IN2552-010 | 2 | | 1 | 1.375 | 704.752 | 100 | 0.038 | SWMM Method | IN2552-010 | 1 | IN2552-010 | SubCatchment 3 | No Redirection | |
| IN2552-010 | 3 | | 1 | 10.316 | 704.752 | 0 | 0.038 | SWMM Method | IN2552-010 | 0 | | SubCatchment 3 | No Redirection | |
| IN2554-002 | 1 | 1 | 1 | 1.796 | 267.387 | 100 | 0.034 | SWMM Method | IN2554-002 | 0 | IN2554-002 | SubCatchment 3 | No Redirection | |
| IN2554-002 | 2 | | 1 | 0.222 | 267.387 | 100 | 0.034 | SWMM Method | IN2554-002 | 1 | IN2554-002 | SubCatchment 3 | No Redirection | |
| IN2554-002 | 3 | | 1 | 2.429 | 267.387 | 0 | 0.034 | SWMM Method | IN2554-002 | 0 | | SubCatchment 1 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2650-005 | 1 | 1 | 1 | 2.75 | 592.679 | 100 | 0.035 | SWMM Method | IN2650-005 | 0 | IN2650-005 | SubCatchment 3 | No Redirection | |
| IN2650-005 | 2 | | 1 | 0.239 | 592.679 | 100 | 0.035 | SWMM Method | IN2650-005 | 1 | IN2650-005 | SubCatchment 3 | No Redirection | |
| IN2650-005 | 3 | | 1 | 6.573 | 592.679 | 0 | 0.035 | SWMM Method | IN2650-005 | 0 | | SubCatchment 3 | No Redirection | |
| JB2256-060 | 1 | 1 | 1 | 3.157 | 441.107 | 100 | 0.01 | SWMM Method | JB2256-060 | 0 | JB2256-060 | SubCatchment 3 | No Redirection | |
| JB2256-060 | 3 | | 1 | 1.147 | 441.107 | 0 | 0.01 | SWMM Method | JB2256-060 | 0 | | SubCatchment 3 | No Redirection | |
| JCT_CT_POND_OUT | 1 | 1 | 1 | 5.586 | 360.821 | 100 | 0.017 | SWMM Method | JCT_CT_PON | 0 | JCT_CT_POND_O | SubCatchment 3 | No Redirection | |
| JCT_CT_POND_OUT | 2 | | 1 | 0.084 | 360.821 | 100 | 0.017 | SWMM Method | JCT_CT_PON | 1 | JCT_CT_POND_O | SubCatchment 3 | No Redirection | |
| JCT_CT_POND_OUT | 3 | | 1 | 2.856 | 360.821 | 0 | 0.017 | SWMM Method | JCT_CT_PON | 0 | | SubCatchment 3 | No Redirection | |
| JUNCTION_LOOP_POND | 1 | 1 | 1 | 1.966 | 381.673 | 100 | 0.038 | SWMM Method | JUNCTION_L | 0 | JUNCTION_LOOP | SubCatchment 3 | No Redirection | |
| JUNCTION_LOOP_POND | 3 | | 1 | 2.753 | 381.673 | 0 | 0.038 | SWMM Method | JUNCTION_L | 0 | | SubCatchment 3 | No Redirection | |
| JUNCTION_RIDGE_POND | 1 | 1 | 1 | 9.902 | 870.593 | 100 | 0.012 | SWMM Method | JUNCTION_R | 0 | JUNCTION_RIDG | SubCatchment 3 | No Redirection | |
| JUNCTION_RIDGE_POND | 2 | | 1 | 0.121 | 870.593 | 100 | 0.012 | SWMM Method | JUNCTION_R | 1 | JUNCTION_RIDG | SubCatchment 3 | No Redirection | |
| JUNCTION_RIDGE_POND | 3 | | 1 | 4.398 | 870.593 | 0 | 0.012 | SWMM Method | JUNCTION_R | 0 | | SubCatchment 3 | No Redirection | |
| MENARDS_POND_BIOFILTER | 1 | 1 | 1 | 0.629 | 258.725 | 100 | 0.033 | SWMM Method | MENARDS_P | 0 | MENARDS_POND | SubCatchment 3 | No Redirection | |
| MENARDS_POND_BIOFILTER | 3 | | 1 | 0.704 | 258.725 | 0 | 0.033 | SWMM Method | MENARDS_P | 0 | | SubCatchment 3 | No Redirection | |
| MINPT_RD_SW1 | 1 | 1 | 1 | 0.002 | 159.903 | 100 | 0.041 | SWMM Method | MINPT_RD_S | 0 | MINPT_RD_SW1 | SubCatchment 3 | No Redirection | |
| MINPT_RD_SW1 | 3 | | 1 | 3.382 | 159.903 | 0 | 0.041 | SWMM Method | MINPT_RD_S | 0 | | SubCatchment 1 | No Redirection | |
| MINPT_RD_SW2 | 1 | 1 | 1 | 0.042 | 110.621 | 100 | 0.036 | SWMM Method | MINPT_RD_S | 0 | MINPT_RD_SW2 | SubCatchment 3 | No Redirection | |
| MINPT_RD_SW2 | 3 | | 1 | 1.649 | 110.621 | 0 | 0.036 | SWMM Method | MINPT_RD_S | 0 | | SubCatchment 1 | No Redirection | |
| MINPT_RD_SW3 | 1 | 1 | 1 | 0.066 | 132.426 | 100 | 0.03 | SWMM Method | MINPT_RD_S | 0 | MINPT_RD_SW3 | SubCatchment 3 | No Redirection | |
| MINPT_RD_SW3 | 3 | | 1 | 1.324 | 132.426 | 0 | 0.03 | SWMM Method | MINPT_RD_S | 0 | | SubCatchment 1 | No Redirection | |
| N_PV_ROAD_DS2 | 1 | 1 | 1 | 6.623 | 1339.08 | 100 | 0.081 | SWMM Method | N_PV_ROAD_ | 0 | N_PV_ROAD_DS2 | SubCatchment 3 | No Redirection | |
| N_PV_ROAD_DS2 | 2 | | 1 | 0.057 | 1339.08 | 100 | 0.081 | SWMM Method | N_PV_ROAD_ | 1 | N_PV_ROAD_DS2 | SubCatchment 3 | No Redirection | |
| N_PV_ROAD_DS2 | 3 | | 1 | 14.117 | 1339.08 | 0 | 0.081 | SWMM Method | N_PV_ROAD_ | 0 | | SubCatchment 3 | No Redirection | |
| N_WEXFORD_POND | 1 | 1 | 1 | 6.663 | 2033.252 | 100 | 0.046 | SWMM Method | N_WEXFORD | 0 | N_WEXFORD_PO | SubCatchment 3 | No Redirection | |
| N_WEXFORD_POND | 2 | | 1 | 0.435 | 2033.252 | 100 | 0.046 | SWMM Method | N_WEXFORD | 1 | N_WEXFORD_PO | SubCatchment 3 | No Redirection | |
| N_WEXFORD_POND | 3 | | 1 | 7.725 | 2033.252 | 0 | 0.046 | SWMM Method | N_WEXFORD | 0 | | SubCatchment 3 | No Redirection | |
| NORTH_BLACKHAWK_POND | 1 | 1 | 1 | 3.971 | 1351.498 | 100 | 0.045 | SWMM Method | NORTH_BLAC | 0 | NORTH_BLACKHA | SubCatchment 3 | No Redirection | |
| NORTH_BLACKHAWK_POND | 2 | | 1 | 0.648 | 1351.498 | 100 | 0.045 | SWMM Method | NORTH_BLAC | 1 | NORTH_BLACKHA | SubCatchment 3 | No Redirection | |
| NORTH_BLACKHAWK_POND | 3 | | 1 | 9.039 | 1351.498 | 0 | 0.045 | SWMM Method | NORTH_BLAC | 0 | | SubCatchment 3 | No Redirection | |
| NW_INF_BASIN | 1 | 1 | 1 | 0.153 | 168.144 | 100 | 0.011 | SWMM Method | NW_INF_BAS | 0 | NW_INF_BASIN | SubCatchment 1 | No Redirection | |
| NW_INF_BASIN | 2 | | 1 | 0.198 | 168.144 | 100 | 0.011 | SWMM Method | NW_INF_BAS | 1 | NW_INF_BASIN | SubCatchment 3 | No Redirection | |
| NW_INF_BASIN | 3 | | 1 | 0.961 | 168.144 | 0 | 0.011 | SWMM Method | NW_INF_BAS | 0 | | SubCatchment 3 | No Redirection | |
| OLD_SAUK_BELTLINE_NE | 1 | 1 | 1 | 0.688 | 146.436 | 100 | 0.03 | SWMM Method | OLD_SAUK_B | 0 | OLD_SAUK_BELT | SubCatchment 3 | No Redirection | |
| OLD_SAUK_BELTLINE_NE | 3 | | 1 | 1.231 | 146.436 | 0 | 0.03 | SWMM Method | OLD_SAUK_B | 0 | | SubCatchment 3 | No Redirection | |
| OLD_SAUK_BELTLINE_SE | 1 | 1 | 1 | 0.944 | 138.623 | 100 | 0.029 | SWMM Method | OLD_SAUK_B | 0 | OLD_SAUK_BELT | SubCatchment 3 | No Redirection | |
| OLD_SAUK_BELTLINE_SE | 3 | | 1 | 1.117 | 138.623 | 0 | 0.029 | SWMM Method | OLD_SAUK_B | 0 | | SubCatchment 3 | No Redirection | |
| OLD_SAUK_GW3_US | 1 | 1 | 1 | 1.238 | 325.739 | 100 | 0.037 | SWMM Method | OLD_SAUK_C | 0 | OLD_SAUK_GW3 | SubCatchment 3 | No Redirection | |
| OLD_SAUK_GW3_US | 2 | | 1 | 0.038 | 325.739 | 100 | 0.037 | SWMM Method | OLD_SAUK_C | 1 | OLD_SAUK_GW3 | SubCatchment 3 | No Redirection | |
| OLD_SAUK_GW3_US | 3 | | 1 | 2.14 | 325.739 | 0 | 0.037 | SWMM Method | OLD_SAUK_C | 0 | | SubCatchment 3 | No Redirection | |
| OSR_BL_SERAMP_US | 1 | 1 | 1 | 2.497 | 400.535 | 100 | 0.021 | SWMM Method | OSR_BL_SER | 0 | OSR_BL_SERAMP | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OSR_BL_SERAMP_US | 2 | | 1 | 0.055 | 400.535 | 100 | 0.021 | SWMM Method | OSR_BL_SER | 1 | OSR_BL_SERAMP | SubCatchment 3 | No Redirection | |
| OSR_BL_SERAMP_US | 3 | | 1 | 3.739 | 400.535 | 0 | 0.021 | SWMM Method | OSR_BL_SER | 0 | | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_1 | 1 | 1 | 1 | 1.497 | 301.567 | 100 | 0.028 | SWMM Method | OSTP_POND_ | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_1 | 2 | | 1 | 0.014 | 301.567 | 100 | 0.028 | SWMM Method | OSTP_POND_ | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_1 | 3 | | 1 | 2.419 | 301.567 | 0 | 0.028 | SWMM Method | OSTP_POND_ | 0 | | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_11 | 1 | 1 | 1 | 1.436 | 258.252 | 100 | 0.038 | SWMM Method | OSTP_POND_ | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_11 | 2 | | 1 | 0.088 | 258.252 | 100 | 0.038 | SWMM Method | OSTP_POND_ | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_11 | 3 | | 1 | 1.507 | 258.252 | 0 | 0.038 | SWMM Method | OSTP_POND_ | 0 | | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_13 | 1 | 1 | 1 | 4.016 | 1213.742 | 100 | 0.04 | SWMM Method | OSTP_POND_ | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_13 | 2 | | 1 | 0.038 | 1213.742 | 100 | 0.04 | SWMM Method | OSTP_POND_ | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_13 | 3 | | 1 | 3.798 | 1213.742 | 0 | 0.04 | SWMM Method | OSTP_POND_ | 0 | | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_3 | 1 | 1 | 1 | 4.752 | 733.589 | 100 | 0.021 | SWMM Method | OSTP_POND_ | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_3 | 2 | | 1 | 0.733 | 733.589 | 100 | 0.021 | SWMM Method | OSTP_POND_ | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_3 | 3 | | 1 | 7.05 | 733.589 | 0 | 0.021 | SWMM Method | OSTP_POND_ | 0 | | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_6 | 1 | 1 | 1 | 3.637 | 594.039 | 100 | 0.045 | SWMM Method | OSTP_POND_ | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_6 | 2 | | 1 | 0.069 | 594.039 | 100 | 0.045 | SWMM Method | OSTP_POND_ | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_6 | 3 | | 1 | 7.479 | 594.039 | 0 | 0.045 | SWMM Method | OSTP_POND_ | 0 | | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_8A | 1 | 1 | 1 | 2.034 | 650.91 | 100 | 0.032 | SWMM Method | OSTP_POND_ | 0 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_8A | 2 | | 1 | 0.083 | 650.91 | 100 | 0.032 | SWMM Method | OSTP_POND_ | 1 | OSTP_POND_SYS | SubCatchment 3 | No Redirection | |
| OSTP_POND_SYSTEM_JCT_8A | 3 | | 1 | 5.254 | 650.91 | 0 | 0.032 | SWMM Method | OSTP_POND_ | 0 | | SubCatchment 3 | No Redirection | |
| PARAGON_FF1 | 3 | 1 | 1 | 1.391 | 253.815 | 0 | 0.021 | SWMM Method | PARAGON_F | 0 | | SubCatchment 1 | No Redirection | |
| PARAGON_FF2 | 3 | 1 | 1 | 3.907 | 240.548 | 0 | 0.015 | SWMM Method | PARAGON_F | 0 | | SubCatchment 1 | No Redirection | |
| PARAGON_FF3 | 1 | 1 | 1 | 0.27 | 507.316 | 100 | 0.013 | SWMM Method | PARAGON_F | 0 | PARAGON_FF3 | SubCatchment 3 | No Redirection | |
| PARAGON_FF3 | 3 | | 1 | 8.768 | 507.316 | 0 | 0.013 | SWMM Method | PARAGON_F | 0 | | SubCatchment 1 | No Redirection | |
| PARAGON_INF_BASIN | 1 | 1 | 1 | 0.006 | 350.257 | 100 | 0.03 | SWMM Method | PARAGON_IN | 0 | PARAGON_INF_B | SubCatchment 3 | No Redirection | |
| PARAGON_INF_BASIN | 3 | | 1 | 4.395 | 350.257 | 0 | 0.03 | SWMM Method | PARAGON_IN | 0 | | SubCatchment 3 | No Redirection | |
| PARAGON_WET_POND | 1 | 1 | 1 | 4.326 | 706.323 | 100 | 0.042 | SWMM Method | PARAGON_W | 0 | PARAGON_WET_ | SubCatchment 3 | No Redirection | |
| PARAGON_WET_POND | 2 | | 1 | 0.02 | 706.323 | 100 | 0.042 | SWMM Method | PARAGON_W | 1 | PARAGON_WET_ | SubCatchment 3 | No Redirection | |
| PARAGON_WET_POND | 3 | | 1 | 5.178 | 706.323 | 0 | 0.042 | SWMM Method | PARAGON_W | 0 | | SubCatchment 3 | No Redirection | |
| PF_E_INF_BASIN | 1 | 1 | 1 | 0.308 | 112.195 | 100 | 0.024 | SWMM Method | PF_E_INF_BA | 0 | PF_E_INF_BASIN | SubCatchment 3 | No Redirection | |
| PF_E_INF_BASIN | 2 | | 1 | 0.364 | 112.195 | 100 | 0.024 | SWMM Method | PF_E_INF_BA | 1 | PF_E_INF_BASIN | SubCatchment 3 | No Redirection | |
| PF_E_INF_BASIN | 3 | | 1 | 1.982 | 112.195 | 0 | 0.024 | SWMM Method | PF_E_INF_BA | 0 | | SubCatchment 3 | No Redirection | |
| PF_S_WP | 1 | 1 | 1 | 1.641 | 221.836 | 100 | 0.022 | SWMM Method | PF_S_WP | 0 | PF_S_WP | SubCatchment 3 | No Redirection | |
| PF_S_WP | 2 | | 1 | 1.943 | 221.836 | 100 | 0.022 | SWMM Method | PF_S_WP | 1 | PF_S_WP | SubCatchment 3 | No Redirection | |
| PF_S_WP | 3 | | 1 | 5.624 | 221.836 | 0 | 0.022 | SWMM Method | PF_S_WP | 0 | | SubCatchment 3 | No Redirection | |
| PF-S38 | 1 | 1 | 1 | 1.765 | 368.122 | 100 | 0.01 | SWMM Method | PF-S38 | 0 | PF-S38 | SubCatchment 3 | No Redirection | |
| PF-S38 | 2 | | 1 | 2.09 | 368.122 | 100 | 0.01 | SWMM Method | PF-S38 | 1 | PF-S38 | SubCatchment 3 | No Redirection | |
| PF-S38 | 3 | | 1 | 9.254 | 368.122 | 0 | 0.01 | SWMM Method | PF-S38 | 0 | | SubCatchment 1 | No Redirection | |
| PLEAS_V_DITCH1 | 1 | 1 | 1 | 0.03 | 903.75 | 100 | 0.022 | SWMM Method | PLEAS_V_DIT | 0 | PLEAS_V_DITCH1 | SubCatchment 3 | No Redirection | |
| PLEAS_V_DITCH1 | 3 | | 1 | 23.138 | 903.75 | 0 | 0.022 | SWMM Method | PLEAS_V_DIT | 0 | | SubCatchment 1 | No Redirection | |
| PLEAS_V_DITCH2 | 3 | 1 | 1 | 1.26 | 139.81 | 0 | 0.041 | SWMM Method | PLEAS_V_DIT | 0 | | SubCatchment 1 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PLEAS_V_FF_1 | 1 | 1 | 1 | 0.65 | 1392.08 | 100 | 0.042 | SWMM Method | PLEAS_V_FF_ | 0 | PLEAS_V_FF_1 | SubCatchment 3 | No Redirection | |
| PLEAS_V_FF_1 | 3 | | 1 | 14.058 | 1392.08 | 0 | 0.042 | SWMM Method | PLEAS_V_FF_ | 0 | | SubCatchment 1 | No Redirection | |
| PLEASANT_V_MINERAL_PT_P | 1 | 1 | 1 | 0.518 | 507.112 | 100 | 0.12 | SWMM Method | PLEAS_V_MI | 0 | PLEASANT_V_MI | SubCatchment 3 | No Redirection | |
| PLEASANT_V_MINERAL_PT_P | 3 | | 1 | 1.121 | 507.112 | 0 | 0.12 | SWMM Method | PLEAS_V_MI | 0 | | SubCatchment 3 | No Redirection | |
| Pond B | 1 | 1 | 1 | 0.5 | 937.89 | 100 | 0.016 | SWMM Method | Pond B | 0 | | SubCatchment 1 | No Redirection | |
| Pond B | 2 | | 1 | 0.04 | 937.89 | 100 | 0.016 | SWMM Method | Pond B | 1 | Pond B | SubCatchment 3 | No Redirection | |
| Pond B | 3 | | 1 | 16.639 | 937.89 | 0 | 0.016 | SWMM Method | Pond B | 0 | | SubCatchment 1 | No Redirection | |
| PV211 | 1 | 1 | 1 | 0.96 | 162.6 | 100 | 0.033 | SWMM Method | PV211 | 0 | IN1955-001 | SubCatchment 3 | No Redirection | |
| PV211 | 3 | | 1 | 0.56 | 162.6 | 0 | 0.033 | SWMM Method | PV211 | 0 | | SubCatchment 3 | No Redirection | |
| PV218 | 1 | 1 | 1 | 0.51 | 83.03 | 100 | 0.027 | SWMM Method | PV218 | 0 | | SubCatchment 1 | No Redirection | |
| PV218 | 3 | | 1 | 0.116 | 83.03 | 0 | 0.027 | SWMM Method | PV218 | 0 | | SubCatchment 1 | No Redirection | |
| PV226 | 1 | 1 | 1 | 0.94 | 113.16 | 100 | 0.012 | SWMM Method | PV226 | 0 | | SubCatchment 1 | No Redirection | |
| PV226 | 3 | | 1 | 0.236 | 113.16 | 0 | 0.012 | SWMM Method | PV226 | 0 | | SubCatchment 1 | No Redirection | |
| PV239B.1 | 1 | 1 | 1 | 1.25 | 198.05 | 100 | 0.004 | SWMM Method | PV239B.1 | 0 | | SubCatchment 1 | No Redirection | |
| PV239B.1 | 3 | | 1 | 0.318 | 198.05 | 0 | 0.004 | SWMM Method | PV239B.1 | 0 | | SubCatchment 1 | No Redirection | |
| PV250 | 1 | 1 | 1 | 1.15 | 241.9 | 100 | 0.01 | SWMM Method | PV250 | 0 | | SubCatchment 1 | No Redirection | |
| PV250 | 3 | | 1 | 0.375 | 241.9 | 0 | 0.01 | SWMM Method | PV250 | 0 | | SubCatchment 1 | No Redirection | |
| PV260 | 1 | 1 | 1 | 0.89 | 225.64 | 100 | 0.019 | SWMM Method | PV260 | 0 | | SubCatchment 1 | No Redirection | |
| PV260 | 3 | | 1 | 0.217 | 225.64 | 0 | 0.019 | SWMM Method | PV260 | 0 | | SubCatchment 1 | No Redirection | |
| PV2693 | 1 | 1 | 1 | 1.45 | 214.58 | 100 | 0.016 | SWMM Method | PV2693 | 0 | | SubCatchment 1 | No Redirection | |
| PV2693 | 2 | | 1 | 0.172 | 214.58 | 100 | 0.016 | SWMM Method | PV2693 | 1 | PV2693 | SubCatchment 3 | No Redirection | |
| PV2693 | 3 | | 1 | 1.006 | 214.58 | 0 | 0.016 | SWMM Method | PV2693 | 0 | | SubCatchment 1 | No Redirection | |
| PV292 | 1 | 1 | 1 | 1.07 | 130.17 | 100 | 0.006 | SWMM Method | PV292 | 0 | | SubCatchment 1 | No Redirection | |
| PV292 | 3 | | 1 | 0.976 | 130.17 | 0 | 0.006 | SWMM Method | PV292 | 0 | | SubCatchment 1 | No Redirection | |
| PV300 | 1 | 1 | 1 | 1.82 | 491.36 | 100 | 0.001 | SWMM Method | PV300 | 0 | | SubCatchment 1 | No Redirection | |
| PV300 | 2 | | 1 | 0.052 | 491.36 | 100 | 0.001 | SWMM Method | PV300 | 1 | PV300 | SubCatchment 3 | No Redirection | |
| PV300 | 3 | | 1 | 1.452 | 491.36 | 0 | 0.001 | SWMM Method | PV300 | 0 | | SubCatchment 1 | No Redirection | |
| PV310 | 1 | 1 | 1 | 1.15 | 266.13 | 100 | 0.008 | SWMM Method | PV310 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV310 | 2 | | 1 | 0.646 | 266.13 | 100 | 0.008 | SWMM Method | PV310 | 1 | PV310 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PV310 | 3 | | 1 | 1.407 | 266.13 | 0 | 0.008 | SWMM Method | PV310 | 0 | | SubCatchment 1 | No Redirection | |
| PV315 | 1 | 1 | 1 | 1.03 | 280.47 | 100 | 0.008 | SWMM Method | PV315 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV315 | 2 | | 1 | 0.299 | 280.47 | 100 | 0.008 | SWMM Method | PV315 | 1 | PV315 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PV315 | 3 | | 1 | 0.995 | 280.47 | 0 | 0.008 | SWMM Method | PV315 | 0 | | SubCatchment 1 | No Redirection | |
| PV320 | 1 | 1 | 1 | 0.91 | 396.19 | 100 | 0.023 | SWMM Method | PV320 | 0 | | SubCatchment 1 | No Redirection | |
| PV320 | 2 | | 1 | 0.01 | 396.19 | 100 | 0.023 | SWMM Method | PV320 | 1 | PV320 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PV320 | 3 | | 1 | 3.641 | 396.19 | 0 | 0.023 | SWMM Method | PV320 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV348 | 1 | 1 | 1 | 0.49 | 92.26 | 100 | 0.014 | SWMM Method | PV348 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV348 | 3 | | 1 | 0.077 | 92.26 | 0 | 0.014 | SWMM Method | PV348 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV358 | 1 | 1 | 1 | 0.78 | 178.01 | 100 | 0.065 | SWMM Method | PV358 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV358 | 3 | | 1 | 0.308 | 178.01 | 0 | 0.065 | SWMM Method | PV358 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV362 | 1 | 1 | 1 | 0.623 | 87.9 | 100 | 0.046 | SWMM Method | PV360 | 0 | | SubCatchment 1 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PV362 | 3 | | 1 | 0.194 | 87.9 | 0 | 0.046 | SWMM Method | PV360 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV364 | 1 | 1 | 1 | 0.666 | 184.69 | 100 | 0.013 | SWMM Method | PV365 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV364 | 2 | | 1 | 0.005 | 184.69 | 100 | 0.013 | SWMM Method | PV365 | 1 | PV364 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV364 | 3 | | 1 | 0.558 | 184.69 | 0 | 0.013 | SWMM Method | PV365 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV375 | 1 | 1 | 1 | 0.73 | 189.63 | 100 | 0.004 | SWMM Method | PV375 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV375 | 2 | | 1 | 0.003 | 189.63 | 100 | 0.004 | SWMM Method | PV375 | 1 | PV375 | SubCatchment 3 | No Redirection | |
| PV375 | 3 | | 1 | 0.472 | 189.63 | 0 | 0.004 | SWMM Method | PV375 | 0 | | SubCatchment 1 | No Redirection | |
| PV380 | 1 | 1 | 1 | 1.05 | 160.99 | 100 | 0.058 | SWMM Method | PV380 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV380 | 2 | | 1 | 0.03 | 160.99 | 100 | 0.058 | SWMM Method | PV380 | 1 | PV380 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV380 | 3 | | 1 | 1.046 | 160.99 | 0 | 0.058 | SWMM Method | PV380 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| PV388 | 1 | 1 | 1 | 0.305 | 211.367 | 100 | 0.035 | SWMM Method | DT1947-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV388 | 2 | | 1 | 0.003 | 211.367 | 100 | 0.035 | SWMM Method | DT1947-007 | 1 | PV388 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV388 | 3 | | 1 | 0.832 | 211.367 | 0 | 0.035 | SWMM Method | DT1947-007 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV3903 | 1 | 1 | 1 | 0.56 | 393.97 | 100 | 0.071 | SWMM Method | PV3903 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| PV3903 | 2 | | 1 | 0.007 | 393.97 | 100 | 0.071 | SWMM Method | PV3903 | 1 | PV3903 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV3903 | 3 | | 1 | 0.765 | 393.97 | 0 | 0.071 | SWMM Method | PV3903 | 0 | | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PV3905 | 1 | 1 | 1 | 0.55 | 181.03 | 100 | 0.036 | SWMM Method | PV3905 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| PV3905 | 2 | | 1 | 0.211 | 181.03 | 100 | 0.036 | SWMM Method | PV3905 | 1 | PV3905 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PV3905 | 3 | | 1 | 3.439 | 181.03 | 0 | 0.036 | SWMM Method | PV3905 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| PV392 | 1 | 1 | 1 | 0.13 | 72.73 | 100 | 0.03 | SWMM Method | PV392 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV3921 | 1 | 1 | 1 | 0.62 | 178.29 | 100 | 0.012 | SWMM Method | PV391 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV3921 | 2 | | 1 | 0.003 | 178.29 | 100 | 0.012 | SWMM Method | PV391 | 1 | PV3921 | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| PV3921 | 3 | | 1 | 0.26 | 178.29 | 0 | 0.012 | SWMM Method | PV391 | 0 | | SubCatchment 1 | No Redirection | |
| PV3932 | 1 | 1 | 1 | 0.25 | 76.38 | 100 | 0.031 | SWMM Method | PV3932 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV3932 | 3 | | 1 | 0.52 | 76.38 | 0 | 0.031 | SWMM Method | PV3932 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV398 | 1 | 1 | 1 | 2.19 | 209.88 | 100 | 0.054 | SWMM Method | PV398 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV398 | 2 | | 1 | 0.078 | 209.88 | 100 | 0.054 | SWMM Method | PV398 | 1 | PV398 | SubCatchment 3 | No Redirection | |
| PV398 | 3 | | 1 | 3.202 | 209.88 | 0 | 0.054 | SWMM Method | PV398 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV403 | 1 | 1 | 1 | 0.33 | 140.49 | 100 | 0.056 | SWMM Method | PV403 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PV403 | 3 | | 1 | 0.504 | 140.49 | 0 | 0.056 | SWMM Method | PV403 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park 18 |
| PVRdNew_US | 1 | 1 | 1 | 0.06 | 147.83 | 100 | 0.095 | SWMM Method | PVRdNew_U | 0 | PVRdNew_US | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PVRdNew_US | 2 | | 1 | 0.063 | 147.83 | 100 | 0.095 | SWMM Method | PVRdNew_U | 1 | PVRdNew_US | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| PVRdNew_US | 3 | | 1 | 1.157 | 147.83 | 0 | 0.095 | SWMM Method | PVRdNew_U | 0 | PVRdNew_US | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| S105 | 1 | 1 | 1 | 0.796 | 279.654 | 100 | 0.019 | SWMM Method | S105 | 0 | S105 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| S105 | 2 | | 1 | 0.283 | 279.654 | 100 | 0.019 | SWMM Method | S105 | 1 | S105 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| S105 | 3 | | 1 | 1.498 | 279.654 | 0 | 0.019 | SWMM Method | S105 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| S33 | 1 | 1 | 1 | 0.207 | 168.295 | 100 | 0.017 | SWMM Method | S33 | 0 | | SubCatchment 1 | No Redirection | |
| S33 | 2 | | 1 | 0.029 | 168.295 | 100 | 0.017 | SWMM Method | S33 | 1 | S33 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| S33 | 3 | | 1 | 0.193 | 168.295 | 0 | 0.017 | SWMM Method | S33 | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SAUK_CREEK_LOWER_STORAGE | 1 | 1 | 1 | 0.916 | 1064.072 | 100 | 0.048 | SWMM Method | SAUK_CREEK | 0 | SAUK_CREEK_LO | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SAUK_CREEK_LOWER_STORAGE | 2 | | 1 | 0.745 | 1064.072 | 100 | 0.048 | SWMM Method | SAUK_CREEK | 1 | SAUK_CREEK_LO | SubCatchment 3 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAUK_CREEK_LOWER_STORAGE | 3 | | 1 | 11.617 | 1064.072 | 0 | 0.048 | SWMM Method | SAUK_CREEK | 0 | | SubCatchment 3 | No Redirection | |
| SAUK_CREEK_UPPER_STORAGE | 1 | 1 | 1 | 0.193 | 659.609 | 100 | 0.109 | SWMM Method | SAUK_CREEK | 0 | SAUK_CREEK_UP | SubCatchment 3 | No Redirection | |
| SAUK_CREEK_UPPER_STORAGE | 2 | | 1 | 0.228 | 659.609 | 100 | 0.109 | SWMM Method | SAUK_CREEK | 1 | SAUK_CREEK_UP | SubCatchment 3 | No Redirection | |
| SAUK_CREEK_UPPER_STORAGE | 3 | | 1 | 2.309 | 659.609 | 0 | 0.109 | SWMM Method | SAUK_CREEK | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SAUK_HEIGHTS_POND | 1 | 1 | 1 | 0.977 | 999.322 | 100 | 0.062 | SWMM Method | SAUK_HEIGH | 0 | SAUK_HEIGHTS_ | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SAUK_HEIGHTS_POND | 2 | | 1 | 0.239 | 999.322 | 100 | 0.062 | SWMM Method | SAUK_HEIGH | 1 | SAUK_HEIGHTS_ | SubCatchment 3 | No Redirection | Swallowtail Park 18 |
| SAUK_HEIGHTS_POND | 3 | | 1 | 1.906 | 999.322 | 0 | 0.062 | SWMM Method | SAUK_HEIGH | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SE_BIO_BASIN | 1 | 1 | 1 | 0.191 | 205.352 | 100 | 0.05 | SWMM Method | SE_BIO_BASI | 0 | SE_BIO_BASIN | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SE_BIO_BASIN | 2 | | 1 | 0.246 | 205.352 | 100 | 0.05 | SWMM Method | SE_BIO_BASI | 1 | SE_BIO_BASIN | SubCatchment 3 | No Redirection | |
| SE_BIO_BASIN | 3 | | 1 | 0.989 | 205.352 | 0 | 0.05 | SWMM Method | SE_BIO_BASI | 0 | | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_BW_AAC1 | 1 | 1 | 1 | 2.266 | 286.18 | 100 | 0.034 | SWMM Method | SMPB_BW_A | 0 | SMPB_BW_AAC1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_BW_AAC1 | 2 | | 1 | 0.223 | 286.18 | 100 | 0.034 | SWMM Method | SMPB_BW_A | 1 | SMPB_BW_AAC1 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_BW_AAC1 | 3 | | 1 | 2.347 | 286.18 | 0 | 0.034 | SWMM Method | SMPB_BW_A | 0 | | SubCatchment 3 | No Redirection | |
| SMPB_GW_AAP | 1 | 1 | 1 | 1.929 | 391.685 | 100 | 0.03 | SWMM Method | SMPB_GW_A | 0 | SMPB_GW_AAP | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_GW_AAP | 2 | | 1 | 0.83 | 391.685 | 100 | 0.03 | SWMM Method | SMPB_GW_A | 1 | SMPB_GW_AAP | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SMPB_GW_AAP | 3 | | 1 | 2.572 | 391.685 | 0 | 0.03 | SWMM Method | SMPB_GW_A | 0 | | SubCatchment 3 | No Redirection | |
| SW_BLACKHAWK_PD | 1 | 1 | 1 | 9.835 | 3129.803 | 100 | 0.03 | SWMM Method | SW_BLACKHA | 0 | SW_BLACKHAWK | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SW_BLACKHAWK_PD | 2 | | 1 | 1.626 | 3129.803 | 100 | 0.03 | SWMM Method | SW_BLACKHA | 1 | SW_BLACKHAWK | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SW_BLACKHAWK_PD | 3 | | 1 | 29.664 | 3129.803 | 0 | 0.03 | SWMM Method | SW_BLACKHA | 0 | | SubCatchment 3 | No Redirection | |
| SW_FF_1 | 1 | 1 | 1 | 0.112 | 1298.588 | 100 | 0.016 | SWMM Method | SW_FF_1 | 0 | SW_FF_1 | SubCatchment 3 | No Redirection | |
| SW_FF_1 | 2 | | 1 | 0.005 | 1298.588 | 100 | 0.016 | SWMM Method | SW_FF_1 | 0 | SW_FF_1 | SubCatchment 3 | No Redirection | |
| SW_FF_1 | 3 | | 1 | 36.944 | 1298.588 | 0 | 0.016 | SWMM Method | SW_FF_1 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_10 | 1 | 1 | 1 | 0.047 | 164.9 | 100 | 0.01 | SWMM Method | SW_FF_10 | 0 | SW_FF_10 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SW_FF_10 | 3 | | 1 | 0.478 | 164.9 | 0 | 0.01 | SWMM Method | SW_FF_10 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| SW_FF_11 | 3 | 1 | 1 | 0.555 | 238.784 | 0 | 0.009 | SWMM Method | SW_FF_11 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_12 | 3 | 1 | 1 | 7.375 | 253.204 | 0 | 0.061 | SWMM Method | SW_FF_12 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_13 | 1 | 1 | 1 | 0.026 | 127.274 | 100 | 0.074 | SWMM Method | SW_FF_13 | 0 | SW_FF_13 | SubCatchment 3 | No Redirection | |
| SW_FF_13 | 3 | | 1 | 2.211 | 127.274 | 0 | 0.074 | SWMM Method | SW_FF_13 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_14 | 1 | 1 | 1 | 0.112 | 313.566 | 100 | 0.059 | SWMM Method | SW_FF_14 | 0 | SW_FF_14 | SubCatchment 3 | No Redirection | UW Ag Research 2018 |
| SW_FF_14 | 3 | | 1 | 10.044 | 313.566 | 0 | 0.059 | SWMM Method | SW_FF_14 | 0 | | SubCatchment 1 | No Redirection | UW Ag Research 2018 |
| SW_FF_15 | 1 | 1 | 1 | 0.54 | 870.274 | 100 | 0.025 | SWMM Method | SW_FF_15 | 0 | SW_FF_15 | SubCatchment 3 | No Redirection | |
| SW_FF_15 | 3 | | 1 | 14.455 | 870.274 | 0 | 0.025 | SWMM Method | SW_FF_15 | 0 | | SubCatchment 1 | No Redirection | Swallowtail Park |
| SW_FF_2 | 1 | 1 | 1 | 0.215 | 404.218 | 100 | 0.065 | SWMM Method | SW_FF_2 | 0 | SW_FF_2 | SubCatchment 3 | No Redirection | |
| SW_FF_2 | 2 | | 1 | 0.006 | 404.218 | 100 | 0.065 | SWMM Method | SW_FF_2 | 0 | SW_FF_2 | SubCatchment 3 | No Redirection | |
| SW_FF_2 | 3 | | 1 | 11.53 | 404.218 | 0 | 0.065 | SWMM Method | SW_FF_2 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_3 | 1 | 1 | 1 | 0.451 | 278.124 | 100 | 0.083 | SWMM Method | SW_FF_3 | 0 | SW_FF_3 | SubCatchment 3 | No Redirection | |
| SW_FF_3 | 2 | | 1 | 0.042 | 278.124 | 100 | 0.083 | SWMM Method | SW_FF_3 | 0 | SW_FF_3 | SubCatchment 3 | No Redirection | |
| SW_FF_3 | 3 | | 1 | 5.99 | 278.124 | 0 | 0.083 | SWMM Method | SW_FF_3 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_4 | 1 | 1 | 1 | 0.233 | 924.196 | 100 | 0.046 | SWMM Method | SW_FF_4 | 0 | SW_FF_4 | SubCatchment 3 | No Redirection | |
| SW_FF_4 | 2 | | 1 | 0.008 | 924.196 | 100 | 0.046 | SWMM Method | SW_FF_4 | 0 | SW_FF_4 | SubCatchment 3 | No Redirection | |
| SW_FF_4 | 3 | | 1 | 27.801 | 924.196 | 0 | 0.046 | SWMM Method | SW_FF_4 | 0 | | SubCatchment 1 | No Redirection | |

**Proposed Hydrologic Parameters**

| Name | Subcatchment | Active in Runoff Layer | Sub-Catchment Flag | Area (acres) | Width (ft) | Impervious Percentage (%) | Slope (ft/ft) | Hydrology Methods | Infiltration Reference | Runoff Flow Redirection Flag | Runoff Redirection Drain To Node | Runoff Redirection Drain To Subcatchment Number | Runoff Redirection Type | Rainfall Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW_FF_5 | 1 | 1 | 1 | 0.043 | 677.162 | 100 | 0.013 | SWMM Method | SW_FF_5 | 0 | SW_FF_5 | SubCatchment 3 | No Redirection | |
| SW_FF_5 | 3 | | 1 | 7.497 | 677.162 | 0 | 0.013 | SWMM Method | SW_FF_5 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_6 | 1 | 1 | 1 | 0.829 | 335.08 | 100 | 0.06 | SWMM Method | SW_FF_6 | 0 | SW_FF_6 | SubCatchment 3 | No Redirection | |
| SW_FF_6 | 2 | | 1 | 0.056 | 335.08 | 100 | 0.06 | SWMM Method | SW_FF_6 | 0 | SW_FF_6 | SubCatchment 3 | No Redirection | |
| SW_FF_6 | 3 | | 1 | 12.426 | 335.08 | 0 | 0.06 | SWMM Method | SW_FF_6 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_7 | 1 | 1 | 1 | 0.559 | 344.602 | 100 | 0.058 | SWMM Method | SW_FF_7 | 0 | SW_FF_7 | SubCatchment 3 | No Redirection | |
| SW_FF_7 | 3 | | 1 | 10.881 | 344.602 | 0 | 0.058 | SWMM Method | SW_FF_7 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_8 | 1 | 1 | 1 | 0.056 | 666.883 | 100 | 0.012 | SWMM Method | SW_FF_8 | 0 | SW_FF_8 | SubCatchment 3 | No Redirection | |
| SW_FF_8 | 3 | | 1 | 6.079 | 666.883 | 0 | 0.012 | SWMM Method | SW_FF_8 | 0 | | SubCatchment 1 | No Redirection | |
| SW_FF_9 | 1 | 1 | 1 | 0.012 | 397.379 | 100 | 0.006 | SWMM Method | SW_FF_9 | 0 | SW_FF_9 | SubCatchment 3 | No Redirection | |
| SW_FF_9 | 3 | | 1 | 3.384 | 397.379 | 0 | 0.006 | SWMM Method | SW_FF_9 | 0 | | SubCatchment 1 | No Redirection | |
| TAMARACK_TRAILS | 1 | 1 | 1 | 5.101 | 875.069 | 100 | 0.035 | SWMM Method | TAMARACK_ | 0 | TAMARACK_TRA | SubCatchment 3 | No Redirection | |
| TAMARACK_TRAILS | 2 | | 1 | 1.084 | 875.069 | 100 | 0.035 | SWMM Method | TAMARACK_ | 1 | TAMARACK_TRA | SubCatchment 3 | No Redirection | |
| TAMARACK_TRAILS | 3 | | 1 | 7.738 | 875.069 | 0 | 0.035 | SWMM Method | TAMARACK_ | 0 | | SubCatchment 3 | No Redirection | |
| TP2549-008 | 1 | 1 | 1 | 5.651 | 857.999 | 100 | 0.032 | SWMM Method | TP2549-008 | 0 | TP2549-008 | SubCatchment 3 | No Redirection | |
| TP2549-008 | 2 | | 1 | 0.232 | 857.999 | 100 | 0.032 | SWMM Method | TP2549-008 | 1 | TP2549-008 | SubCatchment 3 | No Redirection | |
| TP2549-008 | 3 | | 1 | 7.568 | 857.999 | 0 | 0.032 | SWMM Method | TP2549-008 | 0 | | SubCatchment 3 | No Redirection | |
| TREE_LN | 1 | 1 | 1 | 2.031 | 582.057 | 100 | 0.028 | SWMM Method | TREE_LN | 0 | TREE_LN | SubCatchment 3 | No Redirection | |
| TREE_LN | 2 | | 1 | 0.186 | 582.057 | 100 | 0.028 | SWMM Method | TREE_LN | 1 | TREE_LN | SubCatchment 3 | No Redirection | |
| TREE_LN | 3 | | 1 | 4.293 | 582.057 | 0 | 0.028 | SWMM Method | TREE_LN | 0 | | SubCatchment 1 | No Redirection | |
| WEXFORD_POND_IN | 1 | 1 | 1 | 0.178 | 511.19 | 100 | 0.032 | SWMM Method | WEXFORD_P | 0 | WEXFORD_POND | SubCatchment 3 | No Redirection | |
| WEXFORD_POND_IN | 2 | | 1 | 0.179 | 511.19 | 100 | 0.032 | SWMM Method | WEXFORD_P | 1 | WEXFORD_POND | SubCatchment 3 | No Redirection | |
| WEXFORD_POND_IN | 3 | | 1 | 3.694 | 511.19 | 0 | 0.032 | SWMM Method | WEXFORD_P | 0 | | SubCatchment 3 | No Redirection | |
| WEXFORD_SOUTH_POND | 1 | 1 | 1 | 8.288 | 1048.128 | 100 | 0.04 | SWMM Method | WEXFORD_S | 0 | WEXFORD_SOUT | SubCatchment 3 | No Redirection | |
| WEXFORD_SOUTH_POND | 2 | | 1 | 0.605 | 1048.128 | 100 | 0.04 | SWMM Method | WEXFORD_S | 1 | WEXFORD_SOUT | SubCatchment 3 | No Redirection | |
| WEXFORD_SOUTH_POND | 3 | | 1 | 9.837 | 1048.128 | 0 | 0.04 | SWMM Method | WEXFORD_S | 0 | | SubCatchment 3 | No Redirection | |
| WILRICH_FF | 1 | 1 | 1 | 0.08 | 511.568 | 100 | 0.025 | SWMM Method | WILRICH_FF | 0 | WILRICH_FF | SubCatchment 3 | No Redirection | |
| WILRICH_FF | 2 | | 1 | 0.095 | 511.568 | 100 | 0.025 | SWMM Method | WILRICH_FF | 0 | WILRICH_FF | SubCatchment 3 | No Redirection | |
| WILRICH_FF | 3 | | 1 | 12.631 | 511.568 | 0 | 0.025 | SWMM Method | WILRICH_FF | 0 | | SubCatchment 1 | No Redirection | |
| WMPB_GW_DW3 | 1 | 1 | 1 | 11.36 | 3124.513 | 100 | 0.061 | SWMM Method | WMPB_GW_ | 0 | WMPB_GW_DW | SubCatchment 3 | No Redirection | |
| WMPB_GW_DW3 | 2 | | 1 | 0.562 | 3124.513 | 100 | 0.061 | SWMM Method | WMPB_GW_ | 1 | WMPB_GW_DW | SubCatchment 3 | No Redirection | |
| WMPB_GW_DW3 | 3 | | 1 | 13.812 | 3124.513 | 0 | 0.061 | SWMM Method | WMPB_GW_ | 0 | | SubCatchment 3 | No Redirection | |
| WMPB_GW_TRANSFER2 | 1 | 1 | 1 | 0.894 | 2160.563 | 100 | 0.115 | SWMM Method | WMPB_GW_ | 0 | WMPB_GW_TRA | SubCatchment 3 | No Redirection | |
| WMPB_GW_TRANSFER2 | 2 | | 1 | 1.059 | 2160.563 | 100 | 0.115 | SWMM Method | WMPB_GW_ | 1 | WMPB_GW_TRA | SubCatchment 3 | No Redirection | |
| WMPB_GW_TRANSFER2 | 3 | | 1 | 8.183 | 2160.563 | 0 | 0.115 | SWMM Method | WMPB_GW_ | 0 | | SubCatchment 3 | No Redirection | |
| WS-3 | 1 | 1 | 1 | 3.345 | 448.796 | 100 | 0.05 | SWMM Method | WS-3 | 0 | WS-3 | SubCatchment 3 | No Redirection | |
| WS-3 | 2 | | 1 | 1.561 | 448.796 | 100 | 0.05 | SWMM Method | WS-3 | 1 | WS-3 | SubCatchment 3 | No Redirection | |
| WS-3 | 3 | | 1 | 10.736 | 448.796 | 0 | 0.05 | SWMM Method | WS-3 | 0 | | SubCatchment 3 | No Redirection | |

# Appendix C. Hydraulic Input Parameters

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18in Pipe | AS1849-013.1 | 1070.88 | Node1910 | 1070.339 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 10 | Free |
| 24inch | OSTP_POND_SYSTEM_JCT_5 | 961.6 | OSTP_POND_SYSTEM_JCT_4 | 961.4 | Circular | | 3 | 2 | 0.024 | 0.9 | 1 | Projecting (Circ, Corr Metal) | 25 | Free |
| AA_POND_IN_FROM_W_PIPE | ATTIC_ANGEL_POND_IN | 1037.35 | AA_W_POND_IN | 1017.1 | Circular | | 1 | 5.5 | 0.013 | 0.5 | 1 | 0 | 165.924 | Free |
| AE1546-001_AE1546-002 | AE1546-001 | 1110.87 | AE1546-002 | 1110.59 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 30.216 | Free |
| AE1546-002_IN1646-001 | AE1546-002 | 1110.59 | IN1646-001 | 1094.69 | Trapezoidal | | 1 | 1 | 0.027 | 0.1 | 0.5 | None (,) | 515.629 | Free |
| AE1546-003_AE1546-004 | AE1546-003 | 1127.36 | AE1546-004 | 1127.17 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 27 | Free |
| AE1546-004_AE1546-001 | AE1546-004 | 1127.17 | AE1546-001 | 1110.87 | Trapezoidal | | 1 | 1 | 0.027 | 0.5 | 0.5 | None (,) | 749.556 | Free |
| AE1547-035_AE1547-036 | AE1547-035 | 1128.25 | AE1547-036 | 1121.5 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 301.651 | Free |
| AE1547-036_IN1647-069 | AE1547-036 | 1121.5 | IN1647-069 | 1097.55 | Trapezoidal | | 1 | 1 | 0.027 | 0.1 | 0.5 | None (,) | 1009.9 | Free |
| AE1549-012_AS1549-010 | AE1549-012 | 1105.9 | AS1549-010 | 1105.51 | Circular | | 1 | 1 | 0.011 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 127.19 | Free |
| AE1549-015_AS1549-014 | AE1549-015 | 1107.37 | AS1549-014 | 1106.9 | Circular | | 1 | 1 | 0.011 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 170.68 | Free |
| AE1549-041_IN1549-039 | AE1549-041 | 1109.9 | IN1549-039 | 1109.7 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 29.196 | Free |
| AE1549-043_AS1549-042 | AE1549-043 | 1104.85 | AS1549-042 | 1103.76 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 40.001 | Free |
| AE1549-044_AS1549-042 | AE1549-044 | 1105.92 | AS1549-042 | 1103.76 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 17.275 | Free |
| AE1550-029_AE1550-030 | AE1550-029 | 1114.77 | AE1550-030 | 1110.26 | Special | Horizontal Ellipse | 1 | 1.91 | 0.013 | 0.2 | 0.5 | Elliptical Tapered Inlet, Square Edges (Throat, Conc) | 118.144 | Free |
| AE1550-030_AE1550-034 | AE1550-030 | 1110.26 | AE1550-034 | 1103.42 | Trapezoidal | | 1 | 2 | 0.027 | 0 | 0 | None (,) | 118.803 | Free |
| AE1550-034_CAPE_SILVER_N | AE1550-034 | 1103.38 | CAPE_SILVER_WAY_DRY_POND | 1100 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 163.666 | Free |
| AE1647-038_IN1647-037 | AE1647-038 | 1076.49 | IN1647-037 | 1075.74 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 30.385 | Free |
| AE1647-066_IN1647-065 | AE1647-066 | 1093.75 | IN1647-065 | 1093.49 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 13.229 | Free |
| AE1648-029_IN1648-028 | AE1648-029 | 1072.6 | IN1648-028 | 1072.59 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 75 | Free |
| AE1648-050_TP1648-049 | AE1648-050 | 1079.6 | TP1648-049 | 1073.99 | Circular | | 1 | 1 | 0.011 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 151.46 | Free |
| AE1649-022_AS1549-042 | AE1649-022 | 1117.1 | AE1549-024 | 1103.76 | Trapezoidal | | 1 | 1.5 | 0.035 | 0 | 0 | None (,) | 627.185 | Free |
| AE1649-023_AE1649-022 | AE1649-023 | 1117.4 | AE1649-022 | 1117.1 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 31.958 | Free |
| AE1649-024_AS1549-042 | AE1549-024 | 1104.87 | AS1549-042 | 1103.76 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 18.761 | Free |
| AE1652-001_IN1752-028 | AE1652-001 | 1110.6 | IN1752-028 | 1107.51 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 73.289 | Free |
| AE1653-024_IN1653-023 | AE1653-024 | 1105.99 | IN1653-023 | 1105.53 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 74.42 | Free |
| AE1746-001_AE1846-003 | AE1746-001 | 1086 | AE1846-003 | 1063 | Trapezoidal | | 1 | 0.5 | 0.027 | 0 | 0 | 0 | 1126.63 | Free |
| AE1747-023_IN1647-039 | AE1747-023 | 1078.64 | IN1647-039 | 1078.53 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 29.723 | Downhill Only |
| AE1750-026 Pipe | AE1750-026 | 1080.35 | IN1750-017A | 1077.6 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 173 | Free |
| AE1750-027 Pipe | AE1750-027 | 1073.6 | IN1750-017 | 1077.6 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 290 | Free |
| AE1846-003_AS1847-021 | AE1846-003 | 1063 | AS1847-021 | 1061.15 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 57.007 | Free |
| AE1946-011_AS1947-010 | AE1946-011 | 1047 | AS1947-010 | 1044.15 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 49.006 | Free |
| AE1947-004_AE1947-006 | WMPB_GW_BHR1 | 1016.35 | AE1947-005 | 1014.81 | Circular | | 2 | 3 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 93 | Free |
| AE1951-006_AS1951-005 | AE1951-006 | 1073.6 | AS1951-005 | 1070.3 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 65.881 | Free |
| AE1951-007_AS1951-005 | AE1951-007 | 1072 | AS1951-005 | 1069.55 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 18.115 | Free |
| AE1952-003_AE1953-002 | AE1952-003 | 1066.4 | AE1953-002 | 1066.1 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 48 | Free |
| AE1954-001_AE2054-001 | AE1954-001 | 1075.14 | AE2054-001 | 1074.27 | Circular | | 1 | 1.25 | 0.024 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 54.977 | Free |
| AE2045-009_IN2045-004 | AE2045-009 | 974.71 | IN2045-004 | 974.71 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 36.372 | Free |
| AE2048-001_AE2047-017 | AE2048-001 | 986.84 | WMPB_GW_DW5 | 986.1 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 73.959 | Free |
| AE2050-017_IN2050-016 | AE2050-017 | 1028.51 | IN2050-016 | 1027.92 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 17.002 | Free |
| AE2054-001_AE2254-014 | AE2054-001 | 1074.27 | FARMRD_SW4 | 1064.73 | Natural | | 1 | 0 | 0.027 | 0.2 | 0 | Groove End with Headwall (Circ, Conc) | 1200 | Free |
| AE2054-001_AE2254-014.1 | FARMRD_SW4 | 1064.73 | AE2054-001_AE2254-014_JCT | 1056.18 | Natural | | 1 | 0 | 0.027 | 0.2 | 0 | Groove End with Headwall (Circ, Conc) | 875 | Free |
| AE2056-023_SS2056-022 | AE2056-023 | 1090.01 | SS2056-022 | 1090 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 16 | Free |
| AE2150-004_IN2250-030 | AE2150-004 | 1001.08 | IN2250-030 | 1000.82 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 25.843 | Free |
| AE2150-022_AE2150-025 | SMPB_GW_AAP | 1006.1 | SMPB_BW_AAC2 | 1001.6 | Special | Horizontal Ellipse | 2 | 4.41 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 130.015 | Free |
| AE2156-063_AS2156-062 | AE2156-063 | 1050 | AS2156-062 | 1049.61 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 39 | Free |
| AE2156-074_AE2156-075 | AE2156-074 | 1063.54 | AE2156-075 | 1055.46 | Trapezoidal | | 1 | 2 | 0.035 | 0.1 | 0.25 | 0 | 186.402 | Free |
| AE2156-075_IN2156-006 | AE2156-075 | 1055.46 | IN2156-006 | 1051.07 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 76.133 | Free |
| AE2156-078_AS2156-077 | AE2156-078 | 1061 | AS2156-077 | 1054.9 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 42.002 | Free |
| AE2157-018_AE2157-019 | AE2157-018 | 1075.54 | AE2157-019 | 1074.59 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 100.004 | Free |
| AE2157-019_AE2156-074 | AE2157-019 | 1074.59 | AE2156-074 | 1063.54 | Trapezoidal | | 1 | 1 | 0.035 | 0.2 | 0.1 | Groove End with Headwall (Circ, Conc) | 446.275 | Free |
| AE2158-008_IN2158-007 | AE2158-008 | 1067.55 | IN2158-007 | 1067.55 | Special | Horizontal Ellipse | 1 | 2.833 | 0.013 | 0.2 | 0.05 | Elliptical Tapered Inlet, Square Edges (Throat, Conc) | 47.005 | Free |
| AE2250-053_IN2250-051 | AE2250-053 | 987.22 | IN2250-051 | 987.08 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 32.639 | Free |
| AE2250-055_IN2250-054 | AE2250-055 | 986.4 | IN2250-054 | 986.08 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 24.462 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AE2254-014_AS2254-015 | AE2254-014 | 1049.11 | AS2254-015 | 1048.53 | Circular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 91.59 | Free |
| AE2255-033_TO_JCT_POND_OUT | AE2255-033 | 1049.08 | JUNCTION_RIDGE_POND_OUT_JCT1 | 1043.5 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 84.217 | Free |
| AE2255-035_AE2255-033 | AE2255-035 | 1049.91 | AE2255-033 | 1049.08 | Natural | | 1 | 0 | 0.013 | 0.1 | 1 | 0 | 7.878 | Free |
| AE2256-010_AE2256-011 | AE2256-010 | 1055.6 | AE2256-011 | 1054.6 | Circular | | 1 | 4.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 90.96 | Free |
| AE2256-033_AE2256-083 | AE2256-033 | 1051.5 | AE2256-083 | 1051.36 | Trapezoidal | | 1 | 1.5 | 0.035 | 0 | 0 | None (,) | 14.631 | Free |
| AE2256-083_IN2256-080 | AE2256-083 | 1051.36 | IN2256-080 | 1050.05 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 80.807 | Free |
| AE2349-026_AS2349-025 | AE2349-026 | 988.3 | AS2349-025 | 988.15 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 30.351 | Free |
| AE2350-022_AS2349-008 | EMPB_GW_NTL1 | 986 | AS2349-008 | 981.8 | Circular | | 1 | 6.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 176.445 | Free |
| AE2350-025_AS2350-024 | AE2350-025 | 987.38 | AS2350-024 | 987.3 | Circular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 12 | Free |
| AE2350-026_AE2350-027 | AE2350-026 | 987.79 | AE2350-027 | 987.4 | Circular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 77 | Free |
| AE2351-002_TO_OSRBL_SERAMP | AE2351-002 | 1009.25 | OSR_BL_SERAMP_US | 999 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 563.472 | Free |
| AE2355-034_AE2455-015 | EMPB_GW_STL1 | 1037.4 | EMPB_GW_SHPR1 | 1035.9 | Circular | | 1 | 5.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 154 | Free |
| AE2356-034_AS2356-032 | AE2356-034 | 1050.25 | AS2356-032 | 1048.95 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 19.001 | Free |
| AE2448-013_MI2448-017 | MI2448-017 | 973.79 | AE2448-013 | 973.6 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 1 | 0 | 26 | Free |
| AE2450-022_IN2450-021 | AE2450-022 | 997.4 | IN2450-021 | 997.3 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 27.607 | Free |
| AE2553-002_TO_GW | AE2553-002 | 1043.6 | TAMARACK_TRAILS | 1032 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 700 | Free |
| AE2553-002_TO_GW.1 | TAMARACK_TRAILS | 1032 | EMPB_GW_NTL7 | 1016.57 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 200 | Free |
| AE2553-003_IN2553-005 | AE2553-003 | 1045.84 | IN2553-005 | 1045.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 22.905 | Free |
| AS1547-003_AS1647-044 | AS1547-003 | 1081.82 | AS1647-044 | 1081.03 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | None (,) | 156.905 | Free |
| AS1547-018_IN1547-012 | AS1547-018 | 1106.28 | IN1547-012 | 1101.84 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 137.473 | Free |
| AS1547-023_IN1547-019 | AS1547-023 | 1115.12 | IN1547-019 | 1108.34 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 95.884 | Free |
| AS1547-029_IN1548-026 | AS1547-029 | 1115.09 | IN1548-026 | 1101.42 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 241.396 | Free |
| AS1547-032_AS1547-029 | AS1547-032 | 1124.5 | AS1547-029 | 1115.09 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 160.745 | Free |
| AS1548-014_IN1548-012 | AS1548-014 | 1097.05 | IN1548-012 | 1095.73 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 179.162 | Free |
| AS1548-031_IN1548-029 | AS1548-031 | 1099.99 | IN1548-029 | 1098.55 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | None (,) | 142.71 | Free |
| AS1548-036_AS1548-031 | AS1548-036 | 1102.46 | AS1548-031 | 1099.99 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 97.973 | Free |
| AS1548-038_AS1548-036 | AS1548-038 | 1106.07 | AS1548-036 | 1102.46 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 98.043 | Free |
| AS1548-039_AS1548-038 | AS1548-039 | 1109.91 | AS1548-038 | 1106.07 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 85.617 | Free |
| AS1548-048_AS1548-031 | AS1548-048 | 1101.47 | AS1548-031 | 1099.99 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.5 | None (,) | 196.245 | Free |
| AS1549-001_MI1548-051 | AS1549-001 | 1103.61 | MI1548-051 | 1102.5 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 209.008 | Free |
| AS1549-002_AS1549-001 | AS1549-002 | 1103.77 | AS1549-001 | 1103.61 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.05 | None (,) | 34.652 | Free |
| AS1549-010_AS1549-002 | AS1549-010 | 1105.51 | AS1549-002 | 1103.77 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 242.196 | Free |
| AS1549-014_MI1549-013 | AS1549-014 | 1106.9 | MI1549-013 | 1105.51 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 42.002 | Free |
| AS1549-032_AS1549-014 | AS1549-032 | 1107.63 | IN1549-024 | 1107.33 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 27.912 | Free |
| AS1549-033_AS1549-032 | AS1549-033 | 1107.76 | AS1549-032 | 1107.63 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 32.03 | Free |
| AS1549-034_AS1549-033 | AS1549-034 | 1108.02 | AS1549-033 | 1107.76 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 78.377 | Free |
| AS1549-042_AE1550-034 | AS1549-042 | 1103.76 | AE1550-034 | 1103.42 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.05 | 0.5 | None (,) | 67.927 | Free |
| AS1550-004_IN1650-009 | AS1550-004 | 1091.43 | IN1650-009 | 1091.28 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 51.548 | Free |
| AS1550-006_AS1550-004 | AS1550-006 | 1096.2 | AS1550-004 | 1091.43 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 253.327 | Free |
| AS1550-008_AS1550-004 | AS1550-008 | 1092.02 | AS1550-004 | 1091.43 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 199.021 | Free |
| AS1550-009_AS1550-008 | AS1550-009 | 1092.81 | AS1550-008 | 1092.02 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 264.423 | Free |
| AS1550-010_AS1550-009 | AS1550-010 | 1093.09 | AS1550-009 | 1092.81 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 94.342 | Free |
| AS1647-002_IN1647-003 | AS1647-002 | 1092.47 | IN1647-003 | 1088.34 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 179.848 | Free |
| AS1647-006_MI1647-055 | AS1647-006 | 1085.6 | MI1647-055 | 1083.9 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 188.374 | Free |
| AS1647-018_IN1647-023 | AS1647-018 | 1080.39 | IN1647-023 | 1080.16 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 42.852 | Free |
| AS1647-024_AS1647-027 | AS1647-024 | 1077.6 | AS1647-027 | 1075.26 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 350.037 | Free |
| AS1647-027_AS1747-019 | AS1647-027 | 1075.26 | NEW_SAS_08_06_19 | 1074.86 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 40.044 | Free |
| AS1647-040_IN1647-039 | AS1647-040 | 1078.7 | IN1647-039 | 1078.53 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 68.215 | Free |
| AS1647-044_AS1647-048 | AS1647-044 | 1081.03 | AS1647-048 | 1080.25 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 54.489 | Free |
| AS1647-048_AS1648-014 | AS1647-048 | 1080.25 | WINDINGWAY_BLIND_CON | 1078.39 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.05 | None (,) | 232.94 | Free |
| AS1647-049_IN1647-050 | AS1647-049 | 1084.11 | IN1647-050 | 1083.6 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | None (,) | 101.2 | Free |
| AS1647-052_AS1647-059 | AS1647-052 | 1081.79 | AS1647-059 | 1080.79 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | None (,) | 127.648 | Free |
| AS1647-056_AS1647-052 | AS1647-056 | 1083.7 | AS1647-052 | 1081.79 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | None (,) | 78.763 | Free |
| AS1647-059_AS1647-048 | AS1647-059 | 1080.79 | AS1647-048 | 1080.25 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.25 | None (,) | 103.918 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1647-062_AS1647-049 | AS1647-062 | 1084.33 | AS1647-049 | 1084.11 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | None (,) | 42.004 | Free |
| AS1648-003_AS1648-006 | AS1648-003 | 1079.02 | AS1648-006 | 1076.82 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 23.056 | Free |
| AS1648-006_AS1648-022 | AS1648-006 | 1076.82 | AS1648-022 | 1074.51 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.05 | None (,) | 464.578 | Free |
| AS1648-008_AS1648-009 | AS1648-008 | 1078.82 | AS1648-009 | 1078.24 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.05 | None (,) | 116.269 | Free |
| AS1648-009_AS1648-014 | AS1648-009 | 1078.24 | AS1648-014 | 1078.14 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.5 | None (,) | 29.003 | Free |
| AS1648-014_AS1648-006 | AS1648-014 | 1078.14 | AS1648-006 | 1076.82 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.25 | None (,) | 258.686 | Free |
| AS1648-015_AS1648-014 | AS1648-015 | 1080.56 | AS1648-014 | 1078.14 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 55.818 | Free |
| AS1648-022_TP1648-049 | AS1648-022 | 1074.51 | TP1648-049 | 1073.99 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | None (,) | 105.155 | Free |
| AS1648-043_IN1648-044 | AS1648-043 | 1084.01 | IN1648-044 | 1083.33 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | None (,) | 49.727 | Free |
| AS1650-003_IN1750-036 | AS1650-003 | 1086.84 | IN1750-036 | 1086.6 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 15.469 | Free |
| AS1650-004_AS1650-003 | AS1650-004 | 1087.51 | AS1650-003 | 1086.84 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 157.006 | Free |
| AS1650-005_AS1650-004 | AS1650-005 | 1087.56 | AS1650-004 | 1087.51 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 28.001 | Free |
| AS1650-006_AS1650-005 | AS1650-006 | 1088.51 | AS1650-005 | 1087.56 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 310.238 | Free |
| AS1650-007_AS1650-006 | AS1650-007 | 1089.46 | AS1650-006 | 1088.51 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 323.329 | Free |
| AS1650-008_AS1650-007 | AS1650-008 | 1090.41 | AS1650-007 | 1089.46 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 321.069 | Free |
| AS1653-003_AS1753-054 | AS1653-003 | 1092.03 | AS1753-054 | 1091.84 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 38.362 | Free |
| AS1653-005_AE1653-006 | AS1653-005 | 1095.03 | AE1653-006 | 1094.5 | Circular | | 1 | 3 | 0.013 | 0.25 | 1 | 0 | 79 | Free |
| AS1747-002_AS1748-014 | AS1747-002 | 1072.9 | AS1748-014 | 1072.36 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | None (,) | 177.47 | Free |
| AS1747-004_AS1747-002 | AS1747-004 | 1077.72 | AS1747-002 | 1072.9 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 44.733 | Free |
| AS1747-007_AS1747-004 | AS1747-007 | 1085.87 | AS1747-004 | 1077.72 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | None (,) | 276.033 | Free |
| AS1747-010_AS1747-007 | AS1747-010 | 1086.72 | AS1747-007 | 1085.87 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | None (,) | 282.03 | Free |
| AS1747-019_AS1747-002 | AS1747-019 | 1073.05 | AS1747-002 | 1072.9 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | None (,) | 48.107 | Free |
| AS1748-003_AE1748-006 | AS1748-003 | 1071.9 | WW_TO_POND_BLIND_TAP | 1071.77 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.25 | 0.05 | None (,) | 23.314 | Free |
| AS1748-007_AS1748-003 | AS1748-007 | 1072.1 | AS1748-003 | 1071.9 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 0.25 | None (,) | 40.004 | Free |
| AS1748-011_AS1748-003 | AS1748-011 | 1072.06 | AS1748-003 | 1071.9 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.5 | None (,) | 57.482 | Free |
| AS1748-014_AS1748-011 | AS1748-014 | 1072.36 | AS1748-011 | 1072.06 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | None (,) | 92.506 | Free |
| AS1748-024_AS1748-003 | AS1748-024 | 1075.18 | AS1748-003 | 1071.9 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 257.932 | Free |
| AS1750-024_IN1850-003 | AS1750-024 | 1076.04 | IN1850-003 | 1073.62 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 485.052 | Free |
| AS1751-010_IN1751-016 | AS1751-010 | 1086.67 | IN1751-016 | 1084.8 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 376.631 | Free |
| AS1752-001_IN1751-025 | AS1752-001 | 1089.68 | IN1751-025 | 1088.29 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 278.032 | Free |
| AS1753-003_IN1753-040 | AS1753-003 | 1087.21 | IN1753-040 | 1085.59 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 58.319 | Free |
| AS1753-004_AS1753-003 | AS1753-004 | 1088.72 | AS1753-003 | 1087.21 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 305.454 | Free |
| AS1753-005_AS1753-004 | AS1753-005 | 1090.2 | AS1753-004 | 1088.72 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | 0 | 261.402 | Free |
| AS1753-044_IN1753-006 | AS1753-044 | 1091.5 | IN1753-006 | 1090.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 140.006 | Free |
| AS1753-045_AE1753-046 | AS1753-045 | 1087.65 | AE1753-046 | 1086 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 1 | 0 | 29 | Free |
| AS1753-045_AS1853-004 | AS1753-045 | 1087.65 | AS1853-004 | 1086.64 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 292.641 | Free |
| AS1753-048_AS1754-009 | AS1753-048 | 1091.42 | AS1754-009 | 1090.59 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.5 | 0.5 | 0 | 279.397 | Free |
| AS1753-054_AS1753-048 | AS1753-054 | 1091.84 | AS1753-048 | 1091.42 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.05 | 0.05 | 0 | 24.507 | Free |
| AS1754-002_AS1753-044 | AS1754-002 | 1093.1 | AS1753-044 | 1091.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 113.032 | Free |
| AS1754-007_MI1753-047 | AS1754-007 | 1088.58 | MI1753-047 | 1088 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 0.5 | 0 | 111.811 | Free |
| AS1754-008_AS1754-007 | AS1754-008 | 1090.28 | AS1754-007 | 1088.58 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.5 | 0 | 568.022 | Free |
| AS1754-009_AS1754-008 | AS1754-009 | 1090.59 | AS1754-008 | 1090.28 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.05 | 0 | 95.004 | Free |
| AS1754-010_IN1753-051 | AS1754-010 | 1097 | IN1753-051 | 1085.59 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 151.08 | Free |
| AS1754-014_AS1754-007 | AS1754-014 | 1098.25 | AS1754-007 | 1091.08 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 67.003 | Free |
| AS1754-015_AS1754-014 | AS1754-015 | 1105.38 | AS1754-014 | 1098.25 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 115.005 | Free |
| AS1754-018_AS1754-015 | AS1754-018 | 1115.5 | AS1754-015 | 1105.38 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 146.5 | Free |
| AS1754-019_AS1754-018 | AS1754-019 | 1115.7 | AS1754-018 | 1115.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 38.001 | Free |
| AS1754-028_IN1754-027 | AS1754-028 | 1104.6 | IN1754-027 | 1104 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 111.116 | Free |
| AS1847-002_IN1847-003 | AS1847-002 | 1073.63 | IN1847-003 | 1069 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 246.557 | Free |
| AS1847-009_TE1848-012 | AS1847-009 | 1031.14 | TE1848-012 | 1029.19 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 25.396 | Free |
| AS1847-018_AE1847-019 | AS1847-018 | 1060.12 | AE1847-019 | 1055.98 | Special | Horizontal Ellipse | 1 | 1.91 | 0.013 | 0.5 | 0.5 | 0 | 190 | Free |
| AS1847-021_AE1847-020 | AS1847-021 | 1061.15 | AE1847-020 | 1059.87 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 55.007 | Free |
| AS1847-022_IN1847-025 | AS1847-022 | 1064.09 | IN1847-025 | 1062.91 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 54.671 | Free |
| AS1848-003_AS1848-002 | AS1848-003 | 1078.32 | AS1847-002 | 1073.63 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 251.253 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1848-013_IN1848-019 | AS1848-013 | 1068.56 | IN1848-019 | 1057.87 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 202.577 | Free |
| AS1848-018_AS1948-012 | AS1848-018 | 1057.13 | AS1948-012 | 1053.75 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 93.116 | Free |
| AS1848-027_IN1848-026 | AS1848-027 | 1075.84 | IN1848-026 | 1075.69 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 33.871 | Free |
| AS1849-001_MI1848-034 | AS1849-001 | 1069.73 | MI1848-034 | 1069.22 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 161.835 | Free |
| AS1849-008_IN1849-005 | AS1849-008 | 1072.13 | IN1849-005 | 1072.11 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 5.727 | Free |
| AS1849-009_AS1849-008 | AS1849-009 | 1073.11 | AS1849-008 | 1072.13 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 326.036 | Free |
| AS1849-011_IN1849-010 | AS1849-011 | 1075.08 | IN1849-010 | 1074.09 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 198.481 | Free |
| AS1849-013_AS1849-001 | AS1849-013 | 1071.206 | AS1849-013.1 | 1070.88 | Circular | | 1 | 1.5 | 0.02 | 1 | 0.5 | None (,) | 74 | Free |
| AS1849-013_AS1849-001.1 | Node1910 | 1070.339 | AS1849-001 | 1069.73 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 214 | Free |
| AS1849-023_AS1849-048 | AS1849-023 | 1072.48 | AS1849-048 | 1071.98 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 68.09 | Free |
| AS1849-026_AS1849-058 | AS1849-026 | 1074.65 | AS1849-058 | 1073.28 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 274.849 | Free |
| AS1849-047_IN1849-018 | AS1849-047 | 1071.93 | IN1849-018 | 1071.34 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 118.012 | Free |
| AS1849-048_AS1849-047 | AS1849-048 | 1071.98 | AS1849-047 | 1071.93 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 11.892 | Free |
| AS1849-053_AS1849-023 | AS1849-053 | 1072.6 | AS1849-023 | 1072.48 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 49.05 | Free |
| AS1849-058_MI1849-055 | AS1849-058 | 1073.28 | MI1849-055 | 1072.7 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 141.135 | Free |
| AS1849-059_AS1849-026 | AS1849-059 | 1074.75 | AS1849-026 | 1074.65 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 10.448 | Free |
| AS1853-004_AE1853-005 | AS1853-004 | 1086.64 | FARGO_COBALT_LEVEL_SPREADER | 1086.2 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.5 | 0 | 130.074 | Free |
| AS1946-002_MI2046-007 | AS1946-002 | 1012.75 | MI2046-007 | 1012.47 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 37.789 | Free |
| AS1946-004_AS1946-002 | AS1946-004 | 1014 | AS1946-002 | 1012.75 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 65.166 | Free |
| AS1947-009_IN1947-008 | AS1947-009 | 1043.84 | IN1947-008 | 1026.4 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 255.03 | Free |
| AS1947-010_AS1947-009 | AS1947-010 | 1044.15 | AS1947-009 | 1043.84 | Circular | | 1 | 3 | 0.013 | 2 | 0.5 | 0 | 37.07 | Free |
| AS1947-017_IN1947-019 | AS1947-017 | 1016.41 | IN1947-019 | 1015.35 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 209.895 | Free |
| AS1947-029_AS1947-010 | AS1947-029 | 1047.68 | AS1947-010 | 1044.15 | Circular | | 1 | 1.5 | 0.013 | 2 | 0.05 | 0 | 106.777 | Free |
| AS1948-004_IN1948-005 | AS1948-004 | 1016.45 | IN1948-005 | 1012.1 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 134.153 | Free |
| AS1948-012_AS1948-013 | AS1948-012 | 1053.75 | AS1948-013 | 1037.1 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 160.733 | Free |
| AS1948-013_IN1948-016 | AS1948-013 | 1037.1 | IN1948-016 | 1023.78 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 185.8 | Free |
| AS1948-017_AE1947-002 | AS1948-017 | 1016.5 | AE1947-002 | 1014.35 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 191 | Free |
| AS1949-007_AS1949-029 | AS1949-007 | 1032.43 | AS1949-029 | 1031.46 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 131.662 | Free |
| AS1949-009_IN1948-011 | AS1949-009 | 1030.11 | IN1948-011 | 1019.3 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 181.311 | Free |
| AS1949-015_AS1849-011 | AS1949-015 | 1075.58 | AS1849-011 | 1075.08 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 99.594 | Free |
| AS1949-019_AS1949-015 | AS1949-019 | 1075.8 | AS1949-015 | 1075.58 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 140.548 | Free |
| AS1949-029_IN1949-004 | AS1949-029 | 1031.46 | IN1949-004 | 1031.46 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | 0 | 48.376 | Free |
| AS1949-032_IN1949-031 | AS1949-032 | 1077.03 | IN1949-031 | 1076.28 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 76.053 | Free |
| AS1949-033_AS1949-032 | AS1949-033 | 1079.42 | AS1949-032 | 1077.03 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 238.949 | Free |
| AS1949-035_IN1949-011 | AS1949-035 | 1052.17 | IN1949-011 | 1048.26 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 74.92 | Free |
| AS1949-041_IN1949-039 | AS1949-041 | 1072.29 | IN1949-039 | 1067.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 276.186 | Free |
| AS1951-005_IN2051-066 | AS1951-005 | 1069.55 | IN2051-066 | 1069.3 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.05 | 0 | 48.451 | Free |
| AS2045-006_AS2045-007 | AS2045-006 | 973.47 | AS2045-007 | 969.45 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.15 | None (,) | 152.281 | Free |
| AS2045-007_AS2145-001 | AS2045-007 | 969.45 | AS2145-001 | 965.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 369.364 | Free |
| AS2046-010_IN2046-001 | AS2046-010 | 985.3 | IN2046-001 | 985.3 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 8.045 | Free |
| AS2046-011_AS2046-010 | AS2046-011 | 986.02 | AS2046-010 | 985.3 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 143.999 | Free |
| AS2047-002_AS2047-006 | AS2047-002 | 1009 | AS2047-006 | 992.16 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 314.425 | Free |
| AS2047-003_AS2047-002 | AS2047-003 | 1010 | AS2047-002 | 1009 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 201.285 | Free |
| AS2047-006_AS2047-007 | AS2047-006 | 992.16 | AS2047-007 | 983.36 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 286.251 | Free |
| AS2047-007_AS2047-008 | AS2047-007 | 983.36 | AS2047-008 | 983.03 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 87.203 | Free |
| AS2047-008_AS2047-011 | AS2047-008 | 983.03 | AS2047-011 | 982.4 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 152.932 | Free |
| AS2047-011_AE2047-016 | AS2047-011 | 982.4 | AE2047-016 | 979.6 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 461.551 | Free |
| AS2048-004_AE2047-018 | AS2048-004 | 988.48 | WMPB_GW_DW5 | 987.67 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 41.66 | Free |
| AS2048-005_AS2048-004 | AS2048-005 | 989.47 | AS2048-004 | 988.48 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 212.596 | Free |
| AS2048-010_AS2048-005 | AS2048-010 | 990.43 | AS2048-005 | 989.47 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 181.417 | Free |
| AS2049-001_AS2049-005 | AS2049-001 | 1025.6 | AS2049-005 | 1010.2 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 348.509 | Free |
| AS2049-002_AS2149-002 | AS2049-002 | 1005.7 | AS2149-002 | 1003.18 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.25 | 0 | 145.093 | Free |
| AS2049-005_AS2049-002 | AS2049-005 | 1010.2 | AS2049-002 | 1005.7 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 197.307 | Free |
| AS2050-004_AS2150-027 | AS2050-004 | 1026.37 | AS2150-027 | 1019.65 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 352.344 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2050-012_AS2050-004 | AS2050-012 | 1027.11 | AS2050-004 | 1026.37 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 123.032 | Free |
| AS2050-015_AS2050-012 | AS2050-015 | 1027.72 | AS2050-012 | 1027.11 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 122.013 | Free |
| AS2050-018_AS2050-015 | AS2050-018 | 1040.59 | AS2050-015 | 1027.72 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 285.926 | Free |
| AS2050-024_AS2050-018 | AS2050-024 | 1066.5 | AS2050-018 | 1040.59 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 316.831 | Free |
| AS2051-005_IN2051-006 | AS2051-005 | 1055.6 | IN2051-006 | 1054.73 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 131.397 | Free |
| AS2051-023_MI2051-022 | AS2051-023 | 1057.34 | MI2051-022 | 1056.6 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.05 | 0 | 138.162 | Free |
| AS2051-029_IN2051-026 | AS2051-029 | 1057.93 | IN2051-026 | 1057.47 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.25 | 0.05 | 0 | 92.177 | Free |
| AS2051-038_AS2051-029 | AS2051-038 | 1058.28 | AS2051-029 | 1057.93 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.25 | 0.25 | 0 | 69.441 | Free |
| AS2051-041_IN2051-039 | AS2051-041 | 1066.85 | IN2051-039 | 1062.56 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.25 | 0 | 225.762 | Free |
| AS2051-051_IN2051-042 | AS2051-051 | 1069.1 | IN2051-042 | 1068.05 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.5 | 0 | 181.856 | Free |
| AS2051-063_MI2051-062 | AS2051-063 | 1069.67 | MI2051-062 | 1068.99 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 32.935 | Free |
| AS2052-006_MI2052-021 | AS2052-006 | 1062.34 | MI2052-021 | 1061.81 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 66.621 | Free |
| AS2052-022_IN2052-026 | AS2052-022 | 1061.52 | IN2052-026 | 1059.33 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 280.632 | Free |
| AS2056-007_AE2056-008 | AS2056-007 | 1095.84 | AE2056-008 | 1092 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 56 | Free |
| AS2056-031_AS2156-036 | AS2056-031 | 1068.12 | AS2156-036 | 1062.55 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 158.971 | Free |
| AS2056-044_AS2056-045 | AS2056-044 | 1078.3 | AS2056-045 | 1066.26 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.25 | 0 | 265.028 | Free |
| AS2056-045_AS2156-040 | AS2056-045 | 1066.26 | AS2156-040 | 1058.76 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.15 | 0.15 | 0 | 185.464 | Free |
| AS2145-001_TP2145-007 | AS2145-001 | 965.1 | TP2145-007 | 961.11 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.6 | None (,) | 99.499 | Free |
| AS2145-011_IN2145-010 | AS2145-011 | 971.23 | IN2145-010 | 970.05 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 61.128 | Free |
| AS2146-003_AE2146-004 | AS2146-003 | 970.6 | OSTP_POND_SYSTEM_JCT_6 | 965.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 33.759 | Free |
| AS2147-001_AS2147-006 | AS2147-001 | 970.76 | AS2147-006 | 969.77 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 164.526 | Free |
| AS2147-006_AS2147-007 | AS2147-006 | 969.77 | AS2147-007 | 968.62 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 235.519 | Free |
| AS2147-007_AE2147-012 | AS2147-007 | 968.62 | AE2147-012 | 968.2 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 60.941 | Free |
| AS2147-013_AE2147-014 | AS2147-013 | 971.7 | WMPB_GW_DW2 | 971.7 | Circular | | 1 | 2 | 0.011 | 0.5 | 0.5 | 0 | 94.832 | Free |
| AS2147-015_AE2147-016 | AS2147-015 | 977.08 | WMPB_GW_DW3 | 976.98 | Circular | | 1 | 1.5 | 0.011 | 0.5 | 0.5 | 0 | 91.01 | Free |
| AS2148-004_AS2147-001 | AS2148-004 | 972.3 | AS2147-001 | 970.76 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 193.656 | Free |
| AS2148-007_AS2148-004 | AS2148-007 | 976.6 | AS2148-004 | 972.3 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 432.627 | Free |
| AS2148-009_AS2148-010 | AS2148-009 | 994.57 | AS2148-010 | 992.63 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 249.651 | Free |
| AS2148-010_AS2048-010 | AS2148-010 | 992.63 | AS2048-010 | 990.43 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 347.835 | Free |
| AS2149-001_AS2148-009 | AS2149-001 | 998.83 | AS2148-009 | 994.57 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 248.358 | Free |
| AS2149-002_AS2149-001 | AS2149-002 | 1003.18 | AS2149-001 | 998.83 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.5 | 0 | 133.589 | Free |
| AS2150-012_AS2150-014 | AS2150-012 | 1007.29 | AS2150-014 | 1003.41 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 339.863 | Free |
| AS2150-014_AS2150-015 | AS2150-014 | 1003.41 | AS2150-015 | 1004.03 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 21.183 | Free |
| AS2150-015_IN2150-044 | AS2150-015 | 1004.03 | IN2150-044 | 998.04 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 279.123 | Free |
| AS2150-027_IN2150-009 | AS2150-027 | 1019.65 | IN2150-009 | 1013.42 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 49.317 | Free |
| AS2150-032_AS2150-012 | AS2150-032 | 1008.36 | AS2150-012 | 1007.29 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 58.333 | Free |
| AS2151-003_AS2151-004 | AS2151-003 | 1049.6 | AS2151-004 | 1049.15 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 90.933 | Free |
| AS2151-004_AS2151-009 | AS2151-004 | 1049.15 | AS2151-009 | 1044.55 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 350.382 | Free |
| AS2151-009_AS2151-010 | AS2151-009 | 1044.55 | AS2151-010 | 1026.8 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 157.644 | Free |
| AS2151-010_AE2151-020 | AS2151-010 | 1026.8 | AE2151-020 | 1017.35 | Circular | | 1 | 3 | 0.013 | 0.25 | 1 | 0 | 75 | Free |
| AS2151-029_AE2151-030 | AS2151-029 | 1018.14 | AE2151-030 | 1018 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 83 | Free |
| AS2152-005_AS2152-008 | AS2152-005 | 1055.11 | AS2152-008 | 1054.16 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 317.086 | Free |
| AS2152-008_TE2152-009 | AS2152-008 | 1054.16 | TE2152-009 | 1053.85 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.05 | 0 | 75.569 | Free |
| AS2152-010_AS2152-015 | AS2152-010 | 1053.02 | AS2152-015 | 1052.31 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 185.832 | Free |
| AS2152-015_AS2152-022 | AS2152-015 | 1052.31 | AS2152-022 | 1050.68 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 322.254 | Free |
| AS2152-022_AS2151-003 | AS2152-022 | 1050.68 | AS2151-003 | 1049.6 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 214.251 | Free |
| AS2152-023_TE2152-009 | AS2152-023 | 1053.83 | TE2152-009 | 1053.85 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 49.546 | Free |
| AS2156-017_IN2156-016 | AS2156-017 | 1051.03 | IN2156-016 | 1050.87 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 12.002 | Free |
| AS2156-020_AS2156-017 | AS2156-020 | 1054 | AS2156-017 | 1051.03 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 195.18 | Free |
| AS2156-028_AS2156-020 | AS2156-028 | 1057.29 | AS2156-020 | 1054 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 326.289 | Free |
| AS2156-036_AS2156-028 | AS2156-036 | 1062.55 | AS2156-028 | 1057.29 | Circular | | 1 | 2 | 0.013 | 0.15 | 0.15 | 0 | 372.39 | Free |
| AS2156-040_AS2156-041 | AS2156-040 | 1058.76 | AS2156-041 | 1053.41 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.15 | 0.15 | 0 | 349.44 | Free |
| AS2156-041_AS2156-042 | AS2156-041 | 1053.41 | AS2156-042 | 1052.35 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | 0 | 105.011 | Free |
| AS2156-042_AS2156-043 | AS2156-042 | 1052.35 | AS2156-043 | 1049.42 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 264.396 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2156-043_AS2156-044 | AS2156-043 | 1049.42 | AS2156-044 | 1047.17 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 232.857 | Free |
| AS2156-044_AS2256-036 | AS2156-044 | 1047.17 | AS2256-036 | 1046.59 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 416.44 | Free |
| AS2156-062_IN2156-061 | AS2156-062 | 1049.61 | IN2156-061 | 1047.77 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.25 | 0.05 | 0 | 85.985 | Free |
| AS2156-077_AS2156-041 | AS2156-077 | 1054.9 | AS2156-041 | 1053.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 30.594 | Free |
| AS2245-003_TO2244-001 | AS2245-003 | 953.57 | TO_MIDDLETON_SS | 951.67 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 73.936 | Free |
| AS2245-004_AS2245-003 | AS2245-004 | 958.38 | AS2245-003 | 953.57 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.25 | None (,) | 187.253 | Free |
| AS2245-005_AS2245-004 | AS2245-005 | 958.4 | AS2245-004 | 958.38 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | None (,) | 123.371 | Free |
| AS2245-012_AS2245-005 | AS2245-012 | 965.9 | AS2245-005 | 958.4 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 325.011 | Free |
| AS2247-001_AS2247-005 | AS2247-001 | 966.22 | AS2247-005 | 965.78 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.25 | None (,) | 230.248 | Free |
| AS2247-005_AS2247-006 | AS2247-005 | 965.78 | AS2247-006 | 965.34 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | None (,) | 199.575 | Free |
| AS2247-006_AE2247-016 | AS2247-006 | 965.34 | EMPB_GW_FD1 | 965.25 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.5 | 0 | 33.237 | Free |
| AS2248-001_IN2248-003 | IN2248-001 | 970.25 | IN2248-003 | 968.1 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 330 | Free |
| AS2248-004_AS2247-001 | AS2248-004 | 967.52 | AS2247-001 | 966.22 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | None (,) | 226.504 | Free |
| AS2249-004_AS2249-005 | AS2249-004 | 992.98 | AS2249-005 | 991.84 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.25 | 0 | 74.698 | Free |
| AS2249-005_AS2249-006 | AS2249-005 | 991.84 | AS2249-006 | 988.26 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 89.275 | Free |
| AS2249-006_AE2249-007 | AS2249-006 | 988.26 | EMPB_GW_OSR1 | 985.35 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 418.678 | Free |
| AS2250-006_AS2250-020 | AS2250-006 | 993.31 | AS2250-020 | 991.68 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.5 | 0 | 25.433 | Free |
| AS2250-016_TP2250-010 | AS2250-016 | 997.91 | TP2250-010 | 997.35 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 33.571 | Free |
| AS2250-019_AS2250-020 | AS2250-019 | 992.93 | AS2250-020 | 991.68 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 18.459 | Free |
| AS2250-020_IN2250-044 | AS2250-020 | 991.68 | IN2250-044 | 991.67 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 106.51 | Free |
| AS2250-021_AS2250-045 | AS2250-021 | 990.21 | AS2250-045 | 987.79 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 251.623 | Free |
| AS2250-031_AS2250-032 | AS2250-031 | 1009.91 | AS2250-032 | 1008 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 112.012 | Free |
| AS2250-032_AS2250-033 | AS2250-032 | 1008 | AS2250-033 | 1006.78 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 64.007 | Free |
| AS2250-033_AS2250-034 | AS2250-033 | 1006.78 | AS2250-034 | 1003.85 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 133.017 | Free |
| AS2250-034_AS2250-035 | AS2250-034 | 1003.85 | AS2250-035 | 999.88 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 203.02 | Free |
| AS2250-035_AS2250-036 | AS2250-035 | 999.88 | AS2250-036 | 998.26 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 102.011 | Free |
| AS2250-036_AS2250-037 | AS2250-036 | 998.26 | AS2250-037 | 997.39 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 43.005 | Free |
| AS2250-037_AS2250-038 | AS2250-037 | 997.39 | AS2250-038 | 994.6 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 98.035 | Free |
| AS2250-038_AS2250-006 | AS2250-038 | 994.6 | AS2250-006 | 993.31 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 220 | Free |
| AS2250-045_DT2249-014 | AS2250-045 | 987.79 | EMPB_GW_OSR1 | 985.29 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 310.299 | Free |
| AS2251-007_AS2251-008 | AS2251-007 | 1025 | AS2251-008 | 1024.72 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 40.152 | Free |
| AS2251-008_AS2251-034 | AS2251-008 | 1024.72 | AS2251-034 | 1019.11 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 214.561 | Free |
| AS2251-010_AS2251-008 | AS2251-010 | 1028.1 | AS2251-008 | 1024.72 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 155.851 | Free |
| AS2251-018_AS2251-021 | AS2251-018 | 1038.5 | AS2251-021 | 1035.17 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 200.942 | Free |
| AS2251-021_AS2251-022 | AS2251-021 | 1035.17 | AS2251-022 | 1034.87 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 38.316 | Free |
| AS2251-022_TP2251-032 | AS2251-022 | 1034.87 | TP2251-032 | 1027.8 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | 0 | 286.033 | Free |
| AS2251-031_AS2250-031 | AS2251-031 | 1013.75 | AS2250-031 | 1009.91 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 206.023 | Free |
| AS2251-035_AS2151-029 | AS2251-035 | 1019.03 | AS2151-029 | 1018.14 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 538.057 | Free |
| AS2251-035_AS2251-034 | AS2251-034 | 1019.11 | AS2251-035 | 1019.03 | Special | Horizontal Ellipse | 1 | 3.75 | 0.013 | 0.5 | 0.05 | 0 | 51.005 | Free |
| AS2252-008_IN2252-009 | AS2252-008 | 1048.9 | IN2252-009 | 1037.24 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 380.932 | Free |
| AS2253-012_AS2253-018 | AS2253-012 | 1054.89 | AS2253-018 | 1054.04 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 122.822 | Free |
| AS2253-013_AS2253-018 | AS2253-013 | 1054.44 | AS2253-018 | 1054.04 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.5 | 0 | 65.984 | Free |
| AS2253-015_AS2253-013 | AS2253-015 | 1055.42 | AS2253-013 | 1054.44 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 154.257 | Free |
| AS2253-016_AS2253-015 | AS2253-016 | 1056.9 | AS2253-015 | 1055.42 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 300.064 | Free |
| AS2253-017_AS2253-016 | AS2253-017 | 1057.5 | AS2253-016 | 1056.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 112.263 | Free |
| AS2253-018_AS2254-004 | AS2253-018 | 1054.04 | AS2254-004 | 1053.27 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 156.074 | Free |
| AS2254-004_AS2254-005 | AS2254-004 | 1053.27 | AS2254-005 | 1052.66 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 126.098 | Free |
| AS2254-005_IN2254-012 | AS2254-005 | 1052.66 | IN2254-012 | 1048.64 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 357.354 | Free |
| AS2254-013_AS2254-016 | AS2254-013 | 1048.92 | AS2254-016 | 1047.78 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | 0 | 238.017 | Free |
| AS2254-013_IN2254-009 | AS2254-013 | 1048.92 | IN2254-009 | 1048.77 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | 0 | 21.384 | Free |
| AS2254-015_IN2254-021 | AS2254-015 | 1048.53 | IN2254-021 | 1048.3 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 77.206 | Free |
| AS2254-016_AS2254-017 | AS2254-016 | 1047.78 | AS2254-017 | 1046.71 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.05 | 0 | 216.103 | Free |
| AS2254-017_IN2255-001 | AS2254-017 | 1046.71 | IN2255-001 | 1045.58 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | 0 | 227.691 | Free |
| AS2254-024_AS2255-008 | AS2254-024 | 1047.55 | AS2255-008 | 1046.82 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 243.438 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2255-006_AE2255-005 | AS2255-006 | 1045.31 | AE2255-005 | 1043.6 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 1 | 0 | 707 | Free |
| AS2255-008_AS2255-009 | AS2255-008 | 1046.82 | AS2255-009 | 1046.07 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 55.592 | Free |
| AS2255-009_AS2255-055 | AS2255-009 | 1046.07 | AS2255-055 | 1045.8 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 113.015 | Free |
| AS2255-046_MI2255-047 | AS2255-046 | 1044.85 | MI2255-047 | 1044.75 | Rectangular | | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 28.638 | Free |
| AS2255-054_AS2255-006 | AS2255-054 | 1045.38 | AS2255-006 | 1045.31 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.5 | 0 | 37.082 | Free |
| AS2255-055_AS2255-054 | AS2255-055 | 1045.8 | AS2255-054 | 1045.38 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 173.144 | Free |
| AS2256-017_IN2256-071 | AS2256-017 | 1051.04 | IN2256-071 | 1049.83 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 199.029 | Free |
| AS2256-036_AS2256-037 | AS2256-036 | 1046.59 | AS2256-037 | 1046.17 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 137.973 | Free |
| AS2256-037_AS2256-042 | AS2256-037 | 1046.17 | AS2256-042 | 1045.74 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 144.179 | Free |
| AS2256-042_AS2256-047 | AS2256-042 | 1045.74 | AS2256-047 | 1045.29 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.25 | 0 | 151.198 | Free |
| AS2256-047_AS2255-046 | AS2256-047 | 1045.29 | AS2255-046 | 1044.85 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | 0 | 121.055 | Free |
| AS2256-055_AS2256-056 | AS2256-055 | 1047.49 | AS2256-056 | 1047.3 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 58.498 | Free |
| AS2256-056_AS2256-057 | AS2256-056 | 1047.3 | AS2256-057 | 1046.93 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 128.005 | Free |
| AS2256-057_JB2256-058 | AS2256-057 | 1046.93 | JB2256-058 | 1046.5 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 147.826 | Free |
| AS2256-073_AE2256-074 | AS2256-073 | 1052.5 | AE2256-074 | 1052.5 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 1 | 0 | 10 | Free |
| AS2256-077_JB2256-065 | AS2256-077 | 1048.89 | JB2256-065 | 1046.92 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 44.031 | Free |
| AS2257-003_AE2257-001 | AS2257-003 | 1056.47 | AE2257-001 | 1054.6 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.5 | 0.5 | 0 | 302.62 | Free |
| AS2257-004_AS2257-003 | AS2257-004 | 1057.79 | AS2257-004.1 | 1056.695 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.5 | 0 | 201.051 | Free |
| AS2257-004_AS2257-003.1 | AS2257-004.1 | 1056.695 | AS2257-003 | 1056.47 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.5 | 0 | 41.353 | Free |
| AS2257-008_AS2257-004 | AS2257-008 | 1059.24 | AS2257-004 | 1057.79 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.25 | 0 | 289.71 | Free |
| AS2257-012_TE2257-014 | AS2257-012 | 1057.87 | TE2257-014 | 1057.35 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 34.125 | Free |
| AS2258-001_AS2257-008 | AS2258-001 | 1061.85 | AS2257-008 | 1059.24 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | 0 | 390.36 | Free |
| AS2258-011_IN2258-067 | AS2258-011 | 1065.13 | IN2258-067 | 1062.68 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 270.185 | Free |
| AS2258-014_AE2258-015 | AS2258-014 | 1066.19 | AE2258-015 | 1065 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 1 | 0 | 42 | Free |
| AS2258-014_AS2258-017 | AS2258-014 | 1067.69 | AS2258-017 | 1065.59 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 272.669 | Free |
| AS2258-017_AS2258-011 | AS2258-017 | 1065.59 | AS2258-011 | 1065.13 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 64.094 | Free |
| AS2258-030_IN2258-028 | AS2258-030 | 1064.04 | IN2258-028 | 1063.36 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.25 | 0 | 116.143 | Free |
| AS2258-031_AS2258-030 | AS2258-031 | 1065.1 | AS2258-030 | 1064.04 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.25 | 0 | 52.006 | Free |
| AS2258-048_AS2258-031 | AS2258-048 | 1066.28 | AS2258-031 | 1065.1 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.05 | 0 | 235.689 | Free |
| AS2258-052_IN2258-025 | AS2258-052 | 1080.75 | IN2258-025 | 1069.43 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 349.298 | Free |
| AS2258-056_IN2258-049 | AS2258-056 | 1070.77 | IN2258-049 | 1068.06 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 125.066 | Free |
| AS2259-001_IN2258-023 | AS2259-001 | 1092.6 | IN2258-023 | 1086.91 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 113.938 | Free |
| AS2347-001_TP2347-023 | AS2347-001 | 971.55 | TP2347-023 | 969.5 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 221.715 | Free |
| AS2347-010_AE2347-012 | AS2347-010 | 969.6 | EMPB_GW_NHPR2 | 969.1 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.5 | 0 | 65.46 | Free |
| AS2347-011_AS2347-010 | AS2347-011 | 970.15 | AS2347-010 | 969.6 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 82.019 | Free |
| AS2347-018_IN2347-034 | AS2347-018 | 970.95 | IN2347-034 | 970.35 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 168.898 | Free |
| AS2348-005_MI2348-010 | AS2348-005 | 975.3 | MI2348-010 | 974.1 | Circular | | 1 | 6.5 | 0.013 | 0.5 | 0.25 | 0 | 389.526 | Free |
| AS2349-006_AS2349-008 | AS2349-006 | 986 | AS2349-008 | 984.59 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 70.462 | Free |
| AS2349-008_AS2349-011 | AS2349-008 | 981.8 | AS2349-011 | 978.1 | Circular | | 1 | 6.5 | 0.013 | 0.25 | 0.05 | 0 | 503.102 | Free |
| AS2349-011_AS2348-005 | AS2349-011 | 978.1 | AS2348-005 | 975.3 | Circular | | 1 | 6.5 | 0.013 | 0.05 | 0.5 | 0 | 410.042 | Free |
| AS2349-025_IN2349-027 | AS2349-025 | 988.15 | IN2349-027 | 986.62 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 259.636 | Free |
| AS2350-024_IN2250-054 | AS2350-024 | 987.3 | IN2250-054 | 986.08 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.5 | 0.25 | None (,) | 304.088 | Free |
| AS2351-003_AE2351-002 | AS2351-003 | 1010.53 | AE2351-002 | 1009.25 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 269.638 | Free |
| AS2351-015_IN2351-014 | AS2351-015 | 1013 | IN2351-014 | 1012.86 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 26.34 | Free |
| AS2353-005_IN2352-004 | AS2353-005 | 1030.7 | IN2352-004 | 1024.9 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 303.067 | Free |
| AS2354-006_AS2354-012 | AS2354-006 | 1048.04 | AS2354-012 | 1045.6 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 282.089 | Free |
| AS2354-012_IN2354-020 | AS2354-012 | 1045.6 | IN2354-020 | 1044.97 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.05 | 0 | 118.019 | Free |
| AS2354-015_AS2355-001 | AS2354-015 | 1044.02 | AS2355-001 | 1043.16 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 180.227 | Free |
| AS2355-001_AS2355-062 | AS2355-001 | 1043.16 | AS2355-062 | 1042.14 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 93.216 | Free |
| AS2355-016_IN2355-051 | AS2355-016 | 1055.63 | IN2355-051 | 1052.87 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 58.462 | Free |
| AS2355-019_AS2355-016 | AS2355-019 | 1058 | AS2355-016 | 1056.63 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 25.111 | Free |
| AS2355-021_AS2355-016 | AS2355-021 | 1058.75 | AS2355-016 | 1055.63 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 242.937 | Free |
| AS2355-059_AE2355-058 | AS2355-059 | 1043.43 | EMPB_GW_MPR1 | 1041.5 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.5 | 0 | 169.153 | Free |
| AS2355-060_AS2355-059 | AS2355-060 | 1044.94 | AS2355-059 | 1043.43 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 50.599 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2355-062_AE2355-063 | AS2355-062 | 1042.14 | EMPB_GW_STL2 | 1041 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 52.002 | Free |
| AS2355-064_AE2355-065 | AS2355-064 | 1041.61 | EMPB_GW_STL2 | 1041 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 67.106 | Free |
| AS2356-032_IN2356-033 | AS2356-032 | 1048.95 | IN2356-033 | 1048.95 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 21.467 | Free |
| AS2448-003_AS2448-007 | AS2448-003 | 979.87 | AS2448-007 | 977.12 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 406.48 | Free |
| AS2448-006_AS2448-012 | AS2448-006 | 976.95 | AS2448-012 | 976.25 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 147.663 | Free |
| AS2448-007_AS2448-006 | AS2448-007 | 977.12 | AS2448-006 | 976.95 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 28.559 | Free |
| AS2448-012_IN2448-008 | AS2448-012 | 976.25 | IN2448-008 | 975.95 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 9.015 | Free |
| AS2450-026_IN2450-024 | AS2450-026 | 992.29 | IN2450-024 | 992.22 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 11.279 | Free |
| AS2450-027_AS2450-026 | AS2450-027 | 993.31 | AS2450-026 | 992.29 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 188.022 | Free |
| AS2451-004_AS2451-010 | AS2451-004 | 1011.2 | AS2451-010 | 1004.01 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.5 | 0 | 219.165 | Free |
| AS2451-010_IN2451-009 | AS2451-010 | 1004.01 | IN2451-009 | 1003.86 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 22.358 | Free |
| AS2451-012_AS2450-027 | AS2451-012 | 994.21 | AS2450-027 | 993.31 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 162.018 | Free |
| AS2451-015_AS2451-012 | AS2451-015 | 995.88 | AS2451-012 | 994.21 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 322.205 | Free |
| AS2452-001_AS2452-008 | AS2452-001 | 1022.9 | AS2452-008 | 1018.8 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 310.35 | Free |
| AS2452-008_IN2452-009 | AS2452-008 | 1018.8 | IN2452-009 | 1016.2 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 321.95 | Free |
| AS2454-001_IN2454-019 | AS2454-001 | 1034.6 | IN2454-019 | 1033.78 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 55.519 | Free |
| AS2454-010_TP2454-013 | AS2454-010 | 1039.2 | TP2454-013 | 1029.33 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 493.555 | Free |
| AS2454-020_AS2454-001 | AS2454-020 | 1034.65 | AS2454-001 | 1034.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 290.091 | Free |
| AS2455-004_AS2454-020 | AS2455-004 | 1042.11 | AS2454-020 | 1039.74 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 113 | Free |
| AS2455-024_AS2355-021 | AS2455-024 | 1061.5 | AS2355-021 | 1058.75 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 288.025 | Free |
| AS2548-001_AS2548-009 | AS2548-001 | 985.71 | AS2548-009 | 984.21 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 293.289 | Free |
| AS2548-003_AS2548-001 | AS2548-003 | 986.1 | AS2548-001 | 985.71 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 59.847 | Free |
| AS2548-009_AS2548-013 | AS2548-009 | 984.21 | AS2548-013 | 982.22 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 217.646 | Free |
| AS2548-013_AS2448-003 | AS2548-013 | 982.22 | AS2448-003 | 979.87 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | None (,) | 265.988 | Free |
| AS2549-001_TP2549-008 | AS2549-001 | 993.34 | TP2549-008 | 992.18 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 238.529 | Free |
| AS2549-003_AS2549-001 | AS2549-003 | 993.81 | AS2549-001 | 993.34 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 37.612 | Free |
| AS2550-012_AS2549-003 | AS2550-012 | 994.81 | AS2549-003 | 993.81 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 86.232 | Free |
| AS2550-016_AS2550-012 | AS2550-016 | 997.5 | AS2550-012 | 994.81 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 153.141 | Free |
| AS2551-004_AS2551-008 | AS2551-004 | 1010.64 | AS2551-008 | 1005.55 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 292.068 | Free |
| AS2551-008_AE2551-009 | AS2551-008 | 1005.55 | AE2551-009 | 1004.9 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 62.549 | Free |
| AS2551-010_AS2551-004 | AS2551-010 | 1016.56 | AS2551-004 | 1010.64 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 410.957 | Free |
| AS2551-020_AS2551-010 | AS2551-020 | 1020.91 | AS2551-010 | 1017.23 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 215.763 | Free |
| AS2552-004_AS2551-020 | AS2552-004 | 1027.31 | AS2551-020 | 1020.91 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 418.326 | Free |
| AS2552-005_AS2552-004 | AS2552-005 | 1030.94 | AS2552-004 | 1027.31 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 301.975 | Free |
| AS2649-008_AS2549-003 | AS2649-008 | 996.6 | AS2549-003 | 993.81 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 68.139 | Free |
| AS2650-004_MI2650-010 | AS2650-004 | 997.19 | MI2650-010 | 996.94 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 37.097 | Free |
| ATTIC_ANGEL_LOW_FLOW_OUT | AA_POND_OUT | 1017.6 | ATTIC_ANGEL_PONDS_OUTLET | 1017.59 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 68 | Free |
| ATTIC_ANGEL_PONDS_GRATE_OU | AA_POND_OUT | | ATTIC_ANGEL_PONDS_OUTLET | | | | | | | | | | | |
| ATTIC_ANGEL_PONDS_OUT_PIPE | ATTIC_ANGEL_PONDS_OUTLET | 1017.6 | ATTIC_ANGEL_POND_OUT | 1016.85 | Circular | | 1 | 5.5 | 0.013 | 0.5 | 0.5 | 0 | 73.385 | Free |
| Attic_Angle_E-W_Pipes | AA_W_POND_OUT | 1017.35 | AA_EAST_POND | 1017.1 | Special | Horizontal Ellipse | 2 | 3.75 | 0.013 | 1 | 1 | 0 | 45 | Free |
| BEAR_CLAW_WAY_ST | BEAR_CLAW_APARTMENTS_DEP | 1086 | IN1749-002 | 1081.648 | Natural | | 1 | 0 | 0.02 | 0 | 0 | None (,) | 498.601 | Free |
| BeltlineSCulv1 | BeltlineSUS1 | 1043.5 | BeltlineSDS1 | 1041.39 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 396 | Free |
| BeltlineSCulv2 | BeltlineSUS2 | 1043.5 | BeltlineSDS2 | 1041.39 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 396 | Free |
| CAPE_SILVER_N_POND_GRATE | CAPE_INF_OUT | | IN1550-007 | | | | | | | | | | | |
| CAPE_SILVER_N_POND_GRATE_OU | IN1550-005 | | CAPE_SILVER_WAY_POND_OUT | | | | | | | | | | | |
| CAPE_SILVER_N_POND_UNDERDR/ | CAPE_INF_OUT | 1096.5 | IN1550-007 | 1096.29 | Circular | | 1 | 0.5 | 0.013 | 1 | 0.5 | None (,) | 102.168 | Free |
| CAPE_SILVER_S_GRATE | CAPE_WP_OUT | | CAPE_SILVER_WAY_WP_TO_DP_US | | | | | | | | | | | |
| CAPE_SILVER_S_POND_ORI | CAPE_WP_OUT | | CAPE_SILVER_WAY_WP_TO_DP_US | | | | | | | | | | | |
| CAPE_SILVER_WAY_WP_ORIFICE | IN1550-005 | | CAPE_SILVER_WAY_POND_OUT | | | | | | | | | | | |
| CAPE_SILVER_WAY_WP_TO_DP_PI | CAPE_SILVER_WAY_WP_TO_DP | 1099.01 | CAPE_INF_IN | 1099 | Circular | | 1 | 1 | 0.013 | 0.5 | 1 | None (,) | 49.95 | Free |
| CAPE_SILVER_WP_PIPE_OUT | CAPE_SILVER_WAY_POND_OUT | 1096 | AS1550-004 | 1095.15 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 27.597 | Free |
| CB2553-007_AE2553-002 | CB2553-007 | 1044.91 | AE2553-002 | 1043.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 27.003 | Free |
| CDT_11 | IN1653-027 | 1105.69 | IN1653-026 | 1105.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 66.453 | Free |
| CDT_15 | PL1447-001 | 1133 | IN1547-033 | 1129.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 103.255 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CDT_17 | PL1548-052 | 1116.09 | IN1548-045 | 1115.84 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 47.998 | Free |
| CDT_27 | IN1550-017 | 1100.87 | IN1550-014 | 1099.04 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 244.629 | Free |
| CDT_29 | IN1550-023 | 1101.52 | IN1550-022 | 1101.02 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 103.522 | Free |
| CDT_33 | IN1550-014 | 1099.04 | AE1550-016 | 1098 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 1 | 0 | 48 | Free |
| CDT_43 | IN1551-005 | 1103.87 | IN1551-002 | 1101.79 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 215.705 | Free |
| CDT_55 | PL1651-001 | 1093.28 | IN1751-004 | 1093.04 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 69.005 | Free |
| CDT_59 | EMPB_GW_NTL7 | 1016.57 | EMPB_GW_NTL6 | 1010.77 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 747.778 | Free |
| CDT_63 | OSTP_POND_SYSTEM_JCT_8A | 963.17 | OSTP_POND_SYSTEM_JCT_7 | 963.27 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 292.634 | Free |
| CDT_67 | EMPB_GW_NTL8 | 998.97 | AE2451-002 | 995.96 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 514.596 | Free |
| CDT_69 | WMPB_GW_TRANSFER1 | 1055.42 | WMPB_GW_TRANSFER2 | 1049.47 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 291.274 | Free |
| CDT_71 | WMPB_GW_TRANSFER2 | 1049.47 | WMPB_GW_BHR1 | 1016.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | 0 | 1131.729 | Free |
| CDT_73 | WINDINGWAY_BLIND_CON | 1078.39 | AS1648-014 | 1078.14 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.25 | None (,) | 31.124 | Free |
| CDT_81 | IN1549-016 | 1106.01 | AS1549-010 | 1105.51 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 102.03 | Free |
| CDT_83 | IN1549-024 | 1107.33 | AS1549-014 | 1106.9 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 88.29 | Free |
| CDT_85 | NEW_SAS_08_06_19 | 1074.86 | AS1747-019 | 1073.05 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 213.606 | Free |
| CH-S21_CH-S20 | CH-S21 | 1097.84 | CH_BIO_BASIN_1 | 1097.5 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 1 | 0 | 35.726 | Free |
| CH-S22A_CH-S22 | CH-S22A | 1102.83 | CH-S22 | 1102.61 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 32.626 | Free |
| CH_BIO_BASIN1_12IN | CH_BIO_BASIN_1 | 1098.1 | CH_BIO_BASIN1_OUT2 | 1098 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13.397 | Free |
| CH_BIO_BASIN1_ORI | CH_BIO_BASIN1_OUT2 | | CH_BIO_BASIN1_OUT | | | | | | | | | | | |
| CH_BIO_BASIN1_OUT_IN1550-011 | CH_BIO_BASIN1_OUT | 1095 | IN1550-011 | 1093.57 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 23.676 | Free |
| CH_BIO_BASIN1_UNDERDRAIN | CH_BIO_BASIN_1 | 1095.1 | CH_BIO_BASIN1_OUT | 1095 | Circular | | 1 | 0.5 | 0.011 | 0.5 | 0.5 | None (,) | 35.857 | Free |
| CH_S31A_CH_S31 | CH_S31A | 1099.74 | CH_S31 | 1099.51 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 34.66 | Free |
| CH_S33A_CH_S33 | CH_SAS33 | 1105.69 | CH_S33 | 1105.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.843 | Free |
| COMMERCE_SQUARE_POND_GRA | COM_SQ_P_OUT | | COMMERCE_SQUARE_POND_OUT | | | | | | | | | | | |
| COMMERCE_SQUARE_POND_LOW | COM_SQ_P_OUT | | COMMERCE_SQUARE_POND_OUT | | | | | | | | | | | |
| COMMERCE_SQUARE_POND_OUT | COMMERCE_SQUARE_POND_OU | 1062.88 | IN2258-034 | 1062.36 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.5 | 0.05 | 0 | 54.042 | Free |
| CV_BIO_BASIN1_WEIR | CH_BIO_BASIN1_OUT2 | | CH_BIO_BASIN1_OUT | | | | | | | | | | | |
| DT1947-007_MI2047-004 | DT1947-007 | 1012 | MI2047-004 | 1011.14 | Circular | | 1 | 2 | 0.024 | 0.5 | 0.05 | 0 | 37.497 | Free |
| DT2349-022_DT2349-021 | DT2349-022 | 991 | DT2349-021 | 990 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 35.208 | Free |
| E_M_PB_GW_COM_DR_CTR_SECT | AE2256-011 | 1054.6 | GR2256-019 | 1049.74 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 262.726 | Free |
| E_M_PB_GW_COM_DR_S_SECTION | AE2257-001 | 1054.6 | AE2256-010 | 1055.6 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 302.114 | Free |
| E_M_PB_GW_EXCELSIOR_DR_SECT | HD2248-006 | 973.6 | EMPB_GW_WBH3 | 966.94 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1030.759 | Free |
| E_M_PB_GW_FOURIER_DR_SECTIO | EMPB_GW_FD1 | 965.1 | OSTP_POND_SYSTEM_JCT_13 | 964.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 654.035 | Free |
| E_M_PB_GW_LOW_OLD_SAUK_RD | AE2449-003 | 982.42 | WEXFORD_POND_IN | 978.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 462.988 | Free |
| E_M_PB_GW_LOW_OLD_SAUK_RD | EMPB_GW_LOSR1 | 991.7 | EMPB_GW_LOSR2 | 989.4 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 617 | Free |
| E_M_PB_GW_LOW_OLD_SAUK_RD | EMPB_GW_LOSR2 | 989.4 | AE2449-003 | 982.42 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 745 | Free |
| E_M_PB_GW_MIN_PT_RD_SECTIO | EMPB_GW_MPR1 | 1041.39 | GR2355-009 | 1040.41 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 616.744 | Free |
| E_M_PB_GW_N_HIGH_PT_RD_SEC | EMPB_GW_NHPR2 | 969.14 | EMPB_GW_NHPR1 | 967.6 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 450.56 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | EMPB_GW_NTL3 | 987.56 | EMPB_GW_NTL1 | 986 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 207.838 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | EMPB_GW_NTL5 | 991.37 | EMPB_GW_NTL3 | 987.56 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 615.681 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | AE2451-002 | 995.96 | SAUK_CREEK_LOWER_STORAGE | 992.62 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 901.726 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | AE2452-014 | 1004.06 | EMPB_GW_NTL8 | 998.97 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 844.309 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | EMPB_GW_NTL6 | 1010.77 | AE2452-014 | 1004.06 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1169.991 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | AE2454-006 | 1019.44 | EMPB_GW_NTL7 | 1016.57 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 306.861 | Free |
| E_M_PB_GW_N_TREE_LN_SECTION | HD2454-016 | 1030.1 | AE2454-006 | 1019.44 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1129.403 | Free |
| E_M_PB_GW_OLD_SAUK_RD_SECT | EMPB_GW_OSR3 | 983.7 | HD2249-033 | 983.16 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 103.36 | Free |
| E_M_PB_GW_OLD_SAUK_RD_SECT | EMPB_GW_OSR1 | 985.29 | EMPB_GW_OSR3 | 983.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 180.275 | Free |
| E_M_PB_GW_OLD_SAUK_RD_SECT | EMPB_GW_OSR2 | 985.3 | EMPB_GW_OSR3 | 983.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 218.158 | Free |
| E_M_PB_GW_S_HP_RD_SECTION1 | EMPB_GW_SHPR1 | 1035.9 | HD2454-017 | 1030.59 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 902.564 | Free |
| E_M_PB_GW_S_TREE_LN_SECTION | EMPB_GW_STL2 | 1039.78 | EMPB_GW_STL1 | 1037.4 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 638.699 | Free |
| E_M_PB_GW_UPPER_OLD_SAUK_F | WEXFORD_POND_OUT | 972.68 | EMPB_GW_UOSR1 | 969.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 609.715 | Free |
| E_M_PB_GW_W_BELTLINE_SECTIO | EMPB_GW_WBH3 | 966.94 | EMPB_GW_WBH1 | 965.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 456.732 | Free |
| E_M_PB_GW_W_BELTLINE_SECTIO | EMPB_GW_WBH2 | 966 | EMPB_GW_WBH3 | 966.94 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 118.224 | Free |
| E_M_PB_GW_WHITACRE_RD_SECT | EMPB_GW_WR1 | 998.45 | GR2550-020 | 992.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 382.785 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E_M_PB_GW_WHITACRE_RD_SECT | AE2551-009 | 1004.9 | EMPB_GW_WR1 | 998.45 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 599.775 | Free |
| FARGO_COBALT_E_POND_OUT_PI | FARGO_COBALT_E_POND_OUT_ | 1086.4 | FARGO_COBALT_LEVEL_SPREADER | 1086.2 | Circular | | 1 | 2 | 0.013 | 1 | 0.5 | None (,) | 44 | Free |
| FARGO_COBALT_W_TO_E_PIPE | FAR_CO_WP_OUT | 1086.6 | FARGO_COBALT_W_TO_E_DS | 1086.4 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 48 | Free |
| GANSER_HEIGHTS_LOW_FLOW_OF | GAN_H_P_OUT | | IN2357-008 | | | | | | | | | | | |
| GANSER_HEIGHTS_POND_LOW_W | GAN_H_P_OUT | | IN2357-008 | | | | | | | | | | | |
| GANSER_HEIGHTS_WEIR_HIGH | GAN_H_P_OUT | | IN2357-008 | | | | | | | | | | | |
| GR2247-017_TP2247-019 | EMPB_GW_WBH1 | 965.35 | TP2247-019 | 965.15 | Rectangular | | 2 | 4 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 58.363 | Free |
| GR2256-019_MI2256-075 | GR2256-019 | 1049.74 | PD2256-019_AE2256-015 | 1048.343 | Circular | | 1 | 4.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 204.979 | Free |
| GR2256-019_MI2256-075.1 | PD2256-019_AE2256-015 | 1048.343 | MI2256-075 | 1046.93 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 207.227 | Free |
| GR2347-021_TP2347-023 | EMPB_GW_UOSR1 | 969.1 | TP2347-023 | 969.5 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.05 | Square Edge with Headwall (Circ, Conc) | 92.365 | Free |
| GR2347-025_GR2247-023 | EMPB_GW_NHPR1 | 967.6 | EMPB_GW_WBH2 | 966 | Circular | | 1 | 5.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 237 | Free |
| GR2347-026_GR2347-027 | HighPointUS1 | 969.1 | EMPB_GW_NHPR2 | 968.6 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 145.425 | Free |
| GR2355-009_GR2355-008 | GR2355-009 | 1040.41 | EMPB_GW_STL2 | 1039.78 | Special | Horizontal Ellipse | 1 | 9.41 | 0.013 | 0.2 | 0.05 | Square Edge with Headwall (Circ, Conc) | 122.193 | Free |
| GR2550-020_IN2550-021 | GR2550-020 | 992.8 | IN2550-021 | 992.7 | Circular | | 1 | 3.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 35.717 | Free |
| HD2051-014_HD2051-015 | HD2051-014 | 1052.35 | SMPB_GW_BWD | 1051.35 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 101.216 | Free |
| HD2249-033_HD2248-006 | HD2249-033 | 983.16 | HD2249-033_INSERT | 978.692 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 394.076 | Free |
| HD2249-033_HD2248-006.1 | HD2249-033_INSERT | 978.692 | HD2248-006 | 973.6 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 449.159 | Free |
| HD2454-017_TP2454-013 | HD2454-017 | 1030.59 | TP2454-013 | 1030.4 | Special | Horizontal Ellipse | 1 | 9.41 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 35.81 | Free |
| IN1547-004_AS1547-003 | IN1547-004 | 1085.82 | AS1547-003 | 1083.57 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 82.739 | Free |
| IN1547-005_AS1547-003 | IN1547-005 | 1082.56 | AS1547-003 | 1081.82 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | None (,) | 147.066 | Free |
| IN1547-005_IN1548-003 | IN1547-005 | 1082.56 | IN1548-003 | 1081.02 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.5 | None (,) | 313.171 | Free |
| IN1547-006_AS1647-062 | IN1547-006 | 1088.12 | AS1647-062 | 1084.33 | Circular | | 1 | 1.25 | 0.013 | 0.33 | 0.05 | None (,) | 111.612 | Free |
| IN1547-007_IN1547-006 | IN1547-007 | 1089.77 | IN1547-006 | 1088.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.33 | None (,) | 32.077 | Free |
| IN1547-008_AS1647-062 | IN1547-008 | 1086.22 | AS1647-062 | 1086.08 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 25.339 | Free |
| IN1547-009_IN1547-004 | IN1547-009 | 1088.12 | IN1547-004 | 1085.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 147.845 | Free |
| IN1547-010_IN1547-008 | IN1547-010 | 1088.42 | IN1547-008 | 1086.22 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 146.363 | Free |
| IN1547-011_IN1548-009 | IN1547-011 | 1101.32 | IN1548-009 | 1092.78 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 273.133 | Free |
| IN1547-012_IN1547-011 | IN1547-012 | 1101.84 | IN1547-011 | 1101.32 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 51.451 | Free |
| IN1547-013_IN1547-011 | IN1547-013 | 1101.73 | IN1547-011 | 1101.32 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 51.527 | Free |
| IN1547-014_1547-013 | IN1547-014 | 1102.28 | IN1547-013 | 1101.73 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 11.413 | Free |
| IN1547-015_IN1547-013 | IN1547-015 | 1102.14 | IN1547-013 | 1101.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.878 | Free |
| IN1547-016_IN1547-015 | IN1547-016 | 1102.43 | IN1547-015 | 1102.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 6.26 | Free |
| IN1547-017_IN1547-012 | IN1547-017 | 1103.31 | IN1547-012 | 1101.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.751 | Free |
| IN1547-019_AS1547-018 | IN1547-019 | 1108.34 | AS1547-018 | 1106.28 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 77.931 | Free |
| IN1547-020_IN1547-019 | IN1547-020 | 1109.52 | IN1547-019 | 1108.34 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 52.613 | Free |
| IN1547-021_IN1547-020 | IN1547-021 | 1109.92 | IN1547-020 | 1109.52 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.473 | Free |
| IN1547-022_IN1547-021 | IN1547-022 | 1110.37 | IN1547-021 | 1109.92 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.802 | Free |
| IN1547-024_AS1547-023 | IN1547-024 | 1116.39 | AS1547-023 | 1115.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 4.721 | Free |
| IN1547-025_AS1547-023 | IN1547-025 | 1116.39 | AS1547-023 | 1115.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.526 | Free |
| IN1547-027_IN1547-020 | IN1547-027 | 1112.18 | IN1547-020 | 1109.52 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 95.352 | Free |
| IN1547-028_IN1547-027 | IN1547-028 | 1112.58 | IN1547-027 | 1112.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.021 | Free |
| IN1547-030_AS1547-029 | IN1547-030 | 1116.79 | AS1547-029 | 1115.09 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.761 | Free |
| IN1547-031_AS1547-029 | IN1547-031 | 1116.79 | AS1547-029 | 1115.09 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 14.537 | Free |
| IN1547-033_AS1547-032 | IN1547-033 | 1129.6 | AS1547-032 | 1124.5 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 149.298 | Free |
| IN1547-034_IN1547-033 | IN1547-034 | 1131.36 | IN1547-033 | 1129.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.984 | Free |
| IN1548-001_IN1547-005 | IN1548-001 | 1089.59 | IN1547-005 | 1082.56 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.25 | None (,) | 211.05 | Free |
| IN1548-002_IN1548-001 | IN1548-002 | 1093.59 | IN1548-001 | 1089.59 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.147 | Free |
| IN1548-003_IN1648-027 | IN1548-003 | 1081.02 | IN1648-027 | 1079.81 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | None (,) | 93.337 | Free |
| IN1548-004_IN1548-003 | IN1548-004 | 1090.72 | IN1548-003 | 1081.02 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.909 | Free |
| IN1548-005_IN1548-003 | IN1548-005 | 1103.56 | IN1548-003 | 1081.02 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 184.485 | Free |
| IN1548-006_IN1548-005 | IN1548-006 | 1105.06 | IN1548-005 | 1103.56 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.417 | Free |
| IN1548-007_IN1548-001 | IN1548-007 | 1090.05 | IN1548-001 | 1089.59 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | None (,) | 52.554 | Free |
| IN1548-008_IN1548-007 | IN1548-008 | 1092.73 | IN1548-007 | 1090.05 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 51.181 | Free |
| IN1548-009_IN1548-008 | IN1548-009 | 1092.78 | IN1548-008 | 1092.73 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 10.126 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1548-010_IN1548-008 | IN1548-010 | 1093.85 | IN1548-008 | 1092.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 29.843 | Free |
| IN1548-011_IN1548-010 | IN1548-011 | 1094.15 | IN1548-010 | 1093.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.173 | Free |
| IN1548-012_IN1548-007 | IN1548-012 | 1095.73 | IN1548-007 | 1090.05 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 148.674 | Free |
| IN1548-013_IN1548-012 | IN1548-013 | 1099.39 | IN1548-012 | 1095.73 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 29.114 | Free |
| IN1548-016_AS1548-014 | IN1548-016 | 1099.76 | AS1548-014 | 1097.05 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | None (,) | 26.421 | Free |
| IN1548-017_IN1548-016 | IN1548-017 | 1100.31 | IN1548-016 | 1099.76 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 11.104 | Free |
| IN1548-018_IN1548-016 | IN1548-018 | 1100.16 | IN1548-016 | 1099.76 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.618 | Free |
| IN1548-019_IN1548-018 | IN1548-019 | 1100.61 | IN1548-018 | 1100.16 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.47 | Free |
| IN1548-020_AS1548-014 | IN1548-020 | 1099.08 | AS1548-014 | 1097.05 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 48.969 | Free |
| IN1548-021_IN1548-020 | IN1548-021 | 1099.12 | IN1548-020 | 1099.08 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 11.671 | Free |
| IN1548-023_IN1548-020 | IN1548-023 | 1099.98 | IN1548-020 | 1099.08 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.307 | Free |
| IN1548-025_IN1548-023 | IN1548-025 | 1100.28 | IN1548-023 | 1099.98 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.687 | Free |
| IN1548-026_IN1548-021 | IN1548-026 | 1101.42 | IN1548-021 | 1099.12 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 96.232 | Free |
| IN1548-029_MI1548-028 | IN1548-029 | 1098.55 | MI1548-028 | 1097.73 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 125.612 | Free |
| IN1548-030_IN1548-029 | IN1548-030 | 1101.65 | IN1548-029 | 1098.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.314 | Free |
| IN1548-032_AS1548-031 | IN1548-032 | 1102.93 | AS1548-031 | 1099.99 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 24.521 | Free |
| IN1548-033_AS1548-031 | IN1548-033 | 1102.17 | AS1548-031 | 1099.99 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 23.482 | Free |
| IN1548-034_IN1548-033 | IN1548-034 | 1102.75 | IN1548-033 | 1102.17 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 16.744 | Free |
| IN1548-035_IN1548-033 | IN1548-035 | 1102.94 | IN1548-033 | 1102.17 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.456 | Free |
| IN1548-037_AS1548-036 | IN1548-037 | 1104.28 | AS1548-036 | 1102.46 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 26.809 | Free |
| IN1548-040_AS1548-039 | IN1548-040 | 1111.86 | AS1548-039 | 1109.91 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 47.513 | Free |
| IN1548-041_AS1548-039 | IN1548-041 | 1110.85 | AS1548-039 | 1109.91 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 28.191 | Free |
| IN1548-042_IN1548-041 | IN1548-042 | 1111.04 | IN1548-041 | 1110.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 28.501 | Free |
| IN1548-043_IN1548-042 | IN1548-043 | 1111.44 | IN1548-042 | 1111.04 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 36.812 | Free |
| IN1548-044_IN1548-043 | IN1548-044 | 1111.87 | IN1548-043 | 1111.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 39.589 | Free |
| IN1548-045_IN1548-005 | IN1548-045 | 1115.84 | IN1548-005 | 1103.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 220.741 | Free |
| IN1549-004_AS1549-002 | IN1549-004 | 1106.2 | AS1549-002 | 1103.77 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 3.759 | Free |
| IN1549-005_IN1549-004 | IN1549-005 | 1106.5 | IN1549-004 | 1106.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.708 | Free |
| IN1549-007_AS1549-001 | IN1549-007 | 1106.59 | AS1549-001 | 1103.61 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 33.29 | Free |
| IN1549-008_AS1549-001 | IN1549-008 | 1106.68 | AS1549-001 | 1103.61 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 49.164 | Free |
| IN1549-017_IN1547-016 | IN1549-017 | 1106.02 | IN1549-016 | 1106.01 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 89.589 | Free |
| IN1549-018_IN1549-017 | IN1549-018 | 1106.78 | IN1549-017 | 1106.02 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 69.279 | Free |
| IN1549-021_IN1549-016 | IN1549-021 | 1108.02 | IN1549-016 | 1106.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 48.538 | Free |
| IN1549-023_IN1549-017 | IN1549-023 | 1107.11 | IN1549-017 | 1106.02 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 130.208 | Free |
| IN1549-025_IN1549-024 | IN1549-025 | 1107.96 | IN1549-024 | 1107.33 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 75.96 | Free |
| IN1549-026_IN1549-024 | IN1549-026 | 1107.87 | IN1549-024 | 1107.33 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 56.69 | Free |
| IN1549-027_IN1549-026 | IN1549-027 | 1108.03 | IN1549-026 | 1107.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 29.093 | Free |
| IN1549-028_IN1549-025 | IN1549-028 | 1108.12 | IN1549-025 | 1107.96 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.225 | Free |
| IN1549-029_AS1549-032 | IN1549-029 | 1107.75 | AS1549-032 | 1107.63 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | None (,) | 9.624 | Free |
| IN1549-02_IN1549-021 | IN1549-022 | 1108.43 | IN1549-021 | 1108.02 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.764 | Free |
| IN1549-030_IN1549-029 | IN1549-030 | 1107.91 | IN1549-029 | 1107.75 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 28.649 | Free |
| IN1549-035_IN1549-034 | IN1549-035 | 1108.25 | AS1549-034 | 1108.02 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 82.872 | Free |
| IN1549-036_IN1549-035 | IN1549-036 | 1108.95 | IN1549-035 | 1108.25 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 198.071 | Free |
| IN1549-038_IN1549-036 | IN1549-038 | 1109.3 | IN1549-036 | 1108.95 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 105.011 | Free |
| IN1549-039_IN1549-038 | IN1549-039 | 1109.7 | IN1549-038 | 1109.3 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 125.932 | Free |
| IN1549-040_IN1549-039 | IN1549-040 | 1109.85 | IN1549-039 | 1109.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.295 | Free |
| IN1550-007_AS1550-006 | IN1550-007 | 1096.29 | AS1550-006 | 1096.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 31.319 | Free |
| IN1550-011_AS1550-010 | IN1550-011 | 1093.57 | AS1550-010 | 1093.09 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 160.039 | Free |
| IN1550-012_IN1550-013 | IN1550-012 | 1101.4 | IN1550-013 | 1100.21 | Circular | | 1 | 3 | 0.011 | 0.25 | 0.05 | None (,) | 148.501 | Free |
| IN1550-013_IN1550-014 | IN1550-013 | 1100.21 | IN1550-014 | 1099.04 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 91.833 | Free |
| IN1550-015_IN1550-014 | IN1550-015 | 1102.85 | IN1550-014 | 1099.04 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 27.421 | Free |
| IN1550-018_IN1550-017 | IN1550-018 | 1103.84 | IN1550-017 | 1100.87 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 76.038 | Free |
| IN1550-019_IN1550-018 | IN1550-019 | 1104.54 | IN1550-018 | 1103.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.978 | Free |
| IN1550-020_IN1550-018 | IN1550-020 | 1106.37 | IN1550-018 | 1103.84 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 126.193 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1550-021_IN1550-020 | IN1550-021 | 1106.78 | IN1550-020 | 1106.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.412 | Free |
| IN1550-022_IN1550-017 | IN1550-022 | 1101.02 | IN1550-017 | 1100.87 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | None (,) | 57.585 | Free |
| IN1550-024_IN1550-025 | IN1550-024 | 1102.27 | IN1550-023 | 1101.52 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 24.182 | Free |
| IN1550-025_IN1550-013 | IN1550-025 | 1100.35 | IN1550-013 | 1100.21 | Circular | | 1 | 1.25 | 0.011 | 0.05 | 0.5 | None (,) | 27.722 | Free |
| IN1550-026_IN1550-025 | IN1550-026 | 1100.93 | IN1550-025 | 1100.35 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.05 | None (,) | 118.54 | Free |
| IN1550-027_IN1550-026 | IN1550-027 | 1101.93 | IN1550-026 | 1100.93 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 151.164 | Free |
| IN1550-028_IN1550-026 | IN1550-028 | 1102.03 | IN1550-026 | 1100.93 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 173.655 | Free |
| IN1551-002_IN1550-012 | IN1551-002 | 1101.79 | IN1550-012 | 1101.4 | Circular | | 1 | 3 | 0.011 | 0.25 | 0.25 | None (,) | 69.684 | Free |
| IN1551-003_IN1551-002 | IN1551-003 | 1103.9 | IN1551-002 | 1101.79 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.5 | None (,) | 66.971 | Free |
| IN1551-004_IN1551-003 | IN1551-004 | 1104.28 | IN1551-003 | 1103.9 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 25.162 | Free |
| IN1551-006_IN1551-005 | IN1551-006 | 1105.57 | IN1551-005 | 1103.87 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.25 | None (,) | 33.36 | Free |
| IN1551-007_IN1551-005 | IN1551-007 | 1104.85 | IN1551-005 | 1103.87 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | None (,) | 134.539 | Free |
| IN1551-008_IN1551-007 | IN1551-008 | 1105.24 | IN1551-007 | 1104.85 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 79.876 | Free |
| IN1551-009_IN1551-008 | IN1551-009 | 1107.16 | IN1551-008 | 1105.24 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.5 | None (,) | 58.7 | Free |
| IN1551-010_IN1551-009 | IN1551-010 | 1107.67 | IN1551-009 | 1107.16 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 41.723 | Free |
| IN1551-011_IN1551-008 | IN1551-011 | 1105.25 | IN1551-008 | 1105.24 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 109.718 | Free |
| IN1551-012_IN1551-011 | IN1551-012 | 1107.74 | IN1551-011 | 1105.24 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 27.606 | Free |
| IN1551-014_IN1551-008 | IN1551-014 | 1105.34 | IN1551-008 | 1105.24 | Circular | | 1 | 1.25 | 0.011 | 0.25 | 0.5 | None (,) | 44.786 | Free |
| IN1551-015_IN1551-014 | IN1551-015 | 1105.53 | IN1551-014 | 1105.34 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.25 | None (,) | 75.956 | Free |
| IN1551-016_IN1551-015 | IN1551-016 | 1105.64 | IN1551-015 | 1105.53 | Circular | | 1 | 1 | 0.011 | 0.05 | 0.5 | None (,) | 42.544 | Free |
| IN1551-017_IN1551-016 | IN1551-017 | 1105.75 | IN1551-016 | 1105.64 | Circular | | 1 | 0.667 | 0.011 | 0.5 | 0.05 | None (,) | 22.242 | Free |
| IN1551-018_IN1551-002 | IN1551-018 | 1102.12 | IN1551-002 | 1101.79 | Circular | | 1 | 1.25 | 0.011 | 0.25 | 0.5 | None (,) | 100.344 | Free |
| IN1551-019_IN1551-018 | IN1551-019 | 1102.65 | IN1551-018 | 1102.12 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.25 | None (,) | 152.852 | Free |
| IN1551-020_IN1551-019 | IN1551-020 | 1102.78 | IN1551-019 | 1102.65 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 24.34 | Free |
| IN1551-021_IN1551-019 | IN1551-021 | 1102.79 | IN1551-019 | 1102.65 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 28.435 | Free |
| IN1551-023_IN1551-011 | IN1551-023 | 1108.48 | IN1551-011 | 1105.24 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 191.098 | Free |
| IN1551-024_IN1551-023 | IN1551-024 | 1112.31 | IN1551-023 | 1108.48 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 75.961 | Free |
| IN1551-025_IN1551-024 | IN1551-025 | 1112.76 | IN1551-024 | 1112.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 29.606 | Free |
| IN1551-026_IN1551-023 | IN1551-026 | 1109.58 | IN1551-023 | 1108.48 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 28.003 | Free |
| IN1551-027_IN1551-026 | IN1551-027 | 1110.35 | IN1551-026 | 1109.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 43.428 | Free |
| IN1551-028_IN1551-027 | IN1551-028 | 1110.82 | IN1551-027 | 1110.35 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.258 | Free |
| IN1551-029_IN1551-027 | IN1551-029 | 1110.89 | IN1551-027 | 1110.35 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.834 | Free |
| IN1551-030_IN1551-029 | IN1551-030 | 1111.21 | IN1551-029 | 1110.89 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.786 | Free |
| IN1646-001_IN1647-067 | IN1646-001 | 1094.69 | IN1647-067 | 1094.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 43.69 | Free |
| IN1647-003_IN1647-004 | IN1647-003 | 1088.34 | IN1647-004 | 1086.5 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 153.121 | Free |
| IN1647-004_AS1647-006 | IN1647-004 | 1086.5 | AS1647-006 | 1085.6 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | None (,) | 48.591 | Free |
| IN1647-005_IN1647-004 | IN1647-005 | 1088.86 | IN1647-004 | 1086.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 30.911 | Free |
| IN1647-007_AS1647-006 | IN1647-007 | 1087.37 | AS1647-006 | 1085.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 25.084 | Free |
| IN1647-008_IN1647-007 | IN1647-008 | 1088.07 | IN1647-007 | 1087.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 10.093 | Free |
| IN1647-009_IN1647-007 | IN1647-009 | 1087.77 | IN1647-007 | 1087.37 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 27.745 | Free |
| IN1647-010_IN1647-009 | IN1647-010 | 1088.07 | IN1647-009 | 1087.77 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.681 | Free |
| IN1647-011_AS1647-006 | IN1647-011 | 1087.37 | AS1647-006 | 1085.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 61.407 | Free |
| IN1647-012_IN1647-011 | IN1647-012 | 1088.07 | IN1647-011 | 1087.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 7.785 | Free |
| IN1647-013_IN1647-011 | IN1647-013 | 1087.77 | IN1647-011 | 1087.37 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.061 | Free |
| IN1647-014_IN1647-013 | IN1647-014 | 1088.02 | IN1647-013 | 1087.77 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.337 | Free |
| IN1647-016_IN1647-017 | IN1647-016 | 1082.86 | IN1647-017 | 1082.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 25.555 | Free |
| IN1647-017_AS1647-018 | IN1647-017 | 1082.45 | AS1647-018 | 1080.39 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 42.166 | Free |
| IN1647-019_AS1647-018 | IN1647-019 | 1081.63 | AS1647-018 | 1080.39 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 43.849 | Free |
| IN1647-020_IN1647-019 | IN1647-020 | 1082.32 | IN1647-019 | 1081.63 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 11.115 | Free |
| IN1647-021_IN1647-019 | IN1647-021 | 1082.03 | IN1647-019 | 1081.63 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.54 | Free |
| IN1647-022_IN1647-021 | IN1647-022 | 1082.33 | IN1647-021 | 1082.03 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.147 | Free |
| IN1647-023_AS1647-024 | IN1647-023 | 1080.16 | AS1647-024 | 1077.6 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | None (,) | 314.361 | Free |
| IN1647-025_AS1647-024 | IN1647-025 | 1080.87 | AS1647-024 | 1077.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 6.5 | Free |
| IN1647-026_AS1647-024 | IN1647-026 | 1080.87 | AS1647-024 | 1077.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.281 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1647-028_AS1647-027 | IN1647-028 | 1079.16 | AS1647-027 | 1075.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.281 | Free |
| IN1647-029_AS1647-027 | IN1647-029 | 1079.12 | AS1647-027 | 1075.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.199 | Free |
| IN1647-030_AS1647-027 | IN1647-030 | 1077.51 | AS1647-027 | 1075.26 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | None (,) | 49.351 | Free |
| IN1647-032_IN1647-030 | IN1647-032 | 1078.32 | IN1647-030 | 1077.51 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.097 | Free |
| IN1647-033_IN147-032 | IN1647-033 | 1078.62 | IN1647-032 | 1078.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.994 | Free |
| IN1647-034_IN1647-030 | IN1647-034 | 1077.56 | IN1647-030 | 1077.51 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | None (,) | 11.548 | Free |
| IN1647-037_IN1647-030 | IN1647-037 | 1078.33 | IN1647-034 | 1077.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 110.85 | Free |
| IN1647-039_IN1647-037 | IN1647-039 | 1078.53 | IN1647-037 | 1078.33 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 53.637 | Free |
| IN1647-041_AS1647-040 | IN1647-041 | 1079.44 | AS1647-040 | 1078.7 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 147.324 | Free |
| IN1647-042_IN1647-041 | IN1647-042 | 1080.71 | IN1647-041 | 1079.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.372 | Free |
| IN1647-045_AS1647-044 | IN1647-045 | 1082.91 | AS1647-044 | 1081.03 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 27.506 | Free |
| IN1647-046_IN1647-045 | IN1647-046 | 1083.21 | IN1647-045 | 1082.91 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 14.859 | Free |
| IN1647-050_IN1647-051 | IN1647-050 | 1083.6 | IN1647-051 | 1083.56 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 9.389 | Free |
| IN1647-051_AS1647-052 | IN1647-051 | 1083.56 | AS1647-052 | 1081.79 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 53.432 | Free |
| IN1647-054_IN1647-053 | IN1647-054 | 1085.6 | IN1647-053 | 1084.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.389 | Free |
| IN1647-055_AS1647-056 | IN1647-055 | 1083.9 | AS1647-056 | 1083.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 15.127 | Free |
| IN1647-058_AS1647-056 | IN1647-058 | 1085.91 | AS1647-056 | 1083.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 15.411 | Free |
| IN1647-060_AS1647-059 | IN1647-060 | 1084.25 | AS1647-059 | 1080.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 5.524 | Free |
| IN1647-061_IN1647-060 | IN1647-061 | 1084.25 | AS1647-059 | 1080.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 26.069 | Free |
| IN1647-063_IN1647-064 | IN1647-063 | 1096.75 | IN1647-064 | 1096.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 116.148 | Free |
| IN1647-064_IN1647-065 | IN1647-064 | 1096.18 | IN1647-065 | 1093.49 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 211.372 | Free |
| IN1647-065_AS1647-002 | IN1647-065 | 1093.49 | AS1647-002 | 1092.47 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 203.868 | Free |
| IN1647-067_AS1647-002 | IN1647-067 | 1094.5 | AS1647-002 | 1092.47 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 83.716 | Free |
| IN1647-068_IN1647-067 | IN1647-068 | 1097.5 | IN1647-067 | 1094.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 116.012 | Free |
| IN1647-069_IN1647-068 | IN1647-069 | 1097.55 | IN1647-068 | 1097.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.438 | Free |
| IN1648-001_IN1648-002 | IN1648-001 | 1079.4 | IN1648-002 | 1079.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.062 | Free |
| IN1648-002_AS1648-003 | IN1648-002 | 1079.1 | AS1648-003 | 1079.02 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 13.25 | Free |
| IN1648-004_IN1648-005 | IN1648-004 | 1079.4 | IN1648-005 | 1079.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.981 | Free |
| IN1648-005_AS1648-003 | IN1648-005 | 1079.1 | AS1648-003 | 1079.02 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 13.32 | Free |
| IN1648-010_AS1648-009 | IN1648-010 | 1080.52 | AS1648-009 | 1078.24 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 3.414 | Free |
| IN1648-010_WW | IN1648-021 | 1080.97 | WINDINGWAY_BLIND_CON | 1080 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 14.438 | Free |
| IN1648-011_IN1648-010 | IN1648-011 | 1080.82 | IN1648-010 | 1080.52 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.04 | Free |
| IN1648-012_IN1648-013 | IN1648-012 | 1080.92 | IN1648-013 | 1080.62 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.025 | Free |
| IN1648-013_AS1648-009 | IN1648-013 | 1080.62 | AS1648-009 | 1078.24 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 23.314 | Free |
| IN1648-016_AS1648-015 | IN1648-016 | 1080.85 | AS1648-015 | 1080.56 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 5.745 | Free |
| IN1648-017_IN1648-016 | IN1648-017 | 1081.15 | IN1648-016 | 1080.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.761 | Free |
| IN1648-018_IN1648-016 | IN1648-018 | 1081.29 | IN1648-016 | 1080.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 40.406 | Free |
| IN1648-019_AS1648-015 | IN1648-019 | 1080.93 | AS1648-015 | 1080.56 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 21.74 | Free |
| IN1648-020_IN1648-019 | IN1648-020 | 1081.23 | IN1648-019 | 1080.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.312 | Free |
| IN1648-023_AS1648-022 | IN1648-023 | 1077.22 | AS1648-022 | 1074.51 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.662 | Free |
| IN1648-024_AS1648-022 | IN1648-024 | 1077.14 | AS1648-022 | 1074.51 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.527 | Free |
| IN1648-025_AS1648-008 | IN1648-025 | 1079.2 | AS1648-008 | 1078.82 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | None (,) | 59.781 | Free |
| IN1648-026_IN1648-025 | IN1648-026 | 1082.57 | IN1648-025 | 1079.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.454 | Free |
| IN1648-027_IN1648-025 | IN1648-027 | 1079.81 | IN1648-025 | 1079.2 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 116.674 | Free |
| IN1648-028_IN1748-025 | IN1648-028 | 1076.4 | IN1748-025 | 1076.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 171.007 | Free |
| IN1648-030_IN1648-031 | IN1648-030 | 1086.9 | IN1648-031 | 1086.71 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 31.574 | Free |
| IN1648-031_IN1648-032 | IN1648-031 | 1086.71 | IN1648-032 | 1086.26 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 29.373 | Free |
| IN1648-032_IN1648-033 | IN1648-032 | 1086.26 | IN1648-033 | 1085.26 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | None (,) | 31.115 | Free |
| IN1648-033_AS1648-043 | IN1648-033 | 1085.26 | AS1648-043 | 1084.01 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | None (,) | 209.845 | Free |
| IN1648-034_IN1648-030 | IN1648-034 | 1087.33 | IN1648-030 | 1086.9 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 29.572 | Free |
| IN1648-036_IN1648-037 | IN1648-036 | 1077.21 | IN1648-037 | 1076.45 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 68.4 | Free |
| IN1648-037_IN1648-038 | IN1648-037 | 1076.45 | IN1648-038 | 1076.29 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.05 | None (,) | 27.034 | Free |
| IN1648-038_AE1648-039 | IN1648-038 | 1076.29 | AE1648-039 | 1076.1 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 1 | 0 | 31 | Free |
| IN1648-040_IN1648-030 | IN1648-040 | 1087.85 | IN1648-030 | 1086.9 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.25 | None (,) | 73.635 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1648-041_IN1648-040 | IN1648-041 | 1091.11 | IN1648-040 | 1087.85 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | None (,) | 66.667 | Free |
| IN1648-042_IN1648-041 | IN1648-042 | 1092.3 | IN1648-041 | 1091.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 29.829 | Free |
| IN1648-044_AE1648-046 | IN1648-044 | 1083.33 | AE1648-046 | 1076.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 1 | 0 | 184 | Free |
| IN1648-045_IN1648-044 | IN1648-045 | 1084.05 | IN1648-044 | 1083.33 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.672 | Free |
| IN1648-048_IN1648-027 | IN1648-048 | 1088.13 | IN1648-027 | 1079.81 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 153.669 | Free |
| IN1649-001_IN1649-002 | IN1649-001 | 1086.18 | IN1649-002 | 1085.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 26.005 | Free |
| IN1649-002_AE1648-035 | IN1649-002 | 1085.73 | AE1648-035 | 1079.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 1 | 0 | 145 | Free |
| IN1649-003_IN1649-004 | IN1649-003 | 1082.5 | IN1649-004 | 1078.98 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 57.022 | Free |
| IN1649-004_IN1648-036 | IN1649-004 | 1078.98 | IN1648-036 | 1077.21 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 340.117 | Free |
| IN1649-005_IN1649-003 | IN1649-005 | 1088.83 | IN1649-003 | 1082.5 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | None (,) | 104.342 | Free |
| IN1649-006_IN1649-003 | IN1649-006 | 1084.6 | IN1649-003 | 1082.5 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 27.705 | Free |
| IN1649-007_IN1649-006 | IN1649-007 | 1086.04 | IN1649-006 | 1084.6 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 35.016 | Free |
| IN1649-008_IN1649-007 | IN1649-008 | 1087.69 | IN1649-007 | 1086.04 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 25.906 | Free |
| IN1649-009_IN1649-008 | IN1649-009 | 1089.19 | IN1649-008 | 1087.69 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 33.93 | Free |
| IN1649-010_IN1649-005 | IN1649-010 | 1101.12 | IN1649-005 | 1088.83 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 208.516 | Free |
| IN1649-011_IN1649-010 | IN1649-011 | 1102.15 | IN1649-010 | 1101.12 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | None (,) | 31.262 | Free |
| IN1649-012_IN1649-011 | IN1649-012 | 1106.83 | IN1649-011 | 1102.15 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 74.57 | Free |
| IN1649-013_IN1649-011 | IN1649-013 | 1103.87 | IN1649-011 | 1102.15 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 29.775 | Free |
| IN1649-014_IN1649-013 | IN1649-014 | 1104.87 | IN1649-013 | 1103.87 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 63.863 | Free |
| IN1649-015_IN1649-014 | IN1649-015 | 1105.54 | IN1649-014 | 1104.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 46.774 | Free |
| IN1649-016_IN1749-010 | IN1649-016 | 1101.79 | IN1749-010 | 1089.94 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 275.213 | Free |
| IN1649-017_IN1649-016 | IN1649-017 | 1102.23 | IN1649-016 | 1101.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 15.104 | Free |
| IN1649-018_IN1649-016 | IN1649-018 | 1102.26 | IN1649-016 | 1101.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.042 | Free |
| IN1649-019_IN1649-016 | IN1649-019 | 1113.18 | IN1649-016 | 1101.79 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | None (,) | 350.522 | Free |
| IN1649-020_IN1649-019 | IN1649-020 | 1113.23 | IN1649-019 | 1113.18 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 13.062 | Free |
| IN1649-021_IN1649-019 | IN1649-021 | 1114.2 | IN1649-019 | 1113.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 76.428 | Free |
| IN1650-001_IN1649-018 | IN1650-001 | 1102.44 | IN1649-018 | 1102.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 14.62 | Free |
| IN1650-002_IN1649-020 | IN1650-002 | 1113.4 | IN1649-020 | 1113.23 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 28.168 | Free |
| IN1650-009_AS1650-008 | IN1650-009 | 1091.28 | AS1650-008 | 1090.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 294.411 | Free |
| IN1650-009_DEP_TRANSFER | IN1650-009_DEPRESSION | 1097.72 | IN1650-009 | 1097.71 | Trapezoidal | | 1 | 1 | 0.001 | 0 | 0 | None (,) | 27.687 | Free |
| IN1650-010_IN1650-009 | IN1650-010 | 1091.94 | IN1650-009 | 1091.28 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 35.999 | Free |
| IN1653-007_AE1653-008 | IN1653-007 | 1095.8 | AE1653-008 | 1094.5 | Circular | | 1 | 3 | 0.013 | 0.05 | 1 | 0 | 47.002 | Free |
| IN1653-009_IN1653-007 | IN1653-009 | 1098.04 | IN1653-007 | 1095.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 45.543 | Free |
| IN1653-010_IN1653-007 | IN1653-010 | 1096.86 | IN1653-007 | 1095.8 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 105.372 | Free |
| IN1653-011_IN1653-010 | IN1653-011 | 1100.82 | IN1653-010 | 1096.86 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 185.036 | Free |
| IN1653-012_IN1653-011 | IN1653-012 | 1103.8 | IN1653-011 | 1101.82 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 36.937 | Free |
| IN1653-013_IN1653-012 | IN1653-013 | 1104.5 | IN1653-012 | 1103.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 31.355 | Free |
| IN1653-014_IN1653-011 | IN1653-014 | 1101.86 | IN1653-011 | 1100.82 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 161.22 | Free |
| IN1653-016_IN1653-014 | IN1653-016 | 1102.22 | IN1653-014 | 1101.86 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 75.387 | Free |
| IN1653-018_IN1653-016 | IN1653-018 | 1104.2 | IN1653-016 | 1102.22 | Circular | | 1 | 1.75 | 0.013 | 0.15 | 0.15 | 0 | 176.112 | Free |
| IN1653-020_IN1653-018 | IN1653-020 | 1105.28 | IN1653-018 | 1104.2 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.15 | 0 | 169.666 | Free |
| IN1653-023_IN1653-020 | IN1653-023 | 1105.53 | IN1653-020 | 1105.28 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 50.407 | Free |
| IN1653-025_IN1653-012 | IN1653-025 | 1104.6 | IN1653-012 | 1103.8 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 112.319 | Free |
| IN1653-026_IN1653-025 | IN1653-026 | 1105.37 | IN1653-025 | 1104.6 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 157.972 | Free |
| IN1654-003_IN1754-026 | IN1654-003 | 1104.84 | IN1754-026 | 1103 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 82.452 | Free |
| IN1654-004_IN1654_003 | IN1654-004 | 1105.81 | IN1654-003 | 1104.84 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 35.007 | Free |
| IN1654-005_1654-004 | IN1654-005 | 1108.25 | IN1654-004 | 1105.81 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 118.67 | Free |
| IN1654-006_IN1654-005 | IN1654-006 | 1113.72 | IN1654-005 | 1108.25 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 134.342 | Free |
| IN1654-007_IN1754-032 | IN1654-007 | 1120.7 | IN1754-032 | 1112.4 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 179.264 | Free |
| IN1654-008_IN1654-006 | IN1654-008 | 1117.32 | IN1654-006 | 1113.72 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 241.778 | Free |
| IN1654-053_IN1647-051 | IN1647-053 | 1084.6 | IN1647-051 | 1083.56 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 27.083 | Free |
| IN1746-006_IN1750-030 | IN1749-006 | 1089.6 | IN1750-030 | 1088.53 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 21.38 | Free |
| IN1747-005_AS1747-004 | IN1747-005 | 1079.56 | AS1747-004 | 1077.72 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 6.733 | Free |
| IN1747-006_AS1747-004 | IN1747-006 | 1079.56 | AS1747-004 | 1077.72 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.705 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1747-009_AS1747-007 | IN1747-009 | 1098 | AS1747-007 | 1085.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 55.191 | Free |
| IN1747-011_AS1747-010 | IN1747-011 | 1087.14 | AS1747-010 | 1086.72 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 32.804 | Free |
| IN1747-012_IN1747-011 | IN1747-012 | 1087.19 | IN1747-011 | 1087.14 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | None (,) | 10.603 | Free |
| IN1747-013_IN1747-012 | IN1747-013 | 1087.73 | IN1747-012 | 1087.19 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 9.412 | Free |
| IN1747-014_AS1747-010 | IN1747-014 | 1087 | AS1747-010 | 1086.72 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 8.795 | Free |
| IN1747-015_IN1747-014 | IN1747-015 | 1087.37 | IN1747-014 | 1087 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 75.663 | Free |
| IN1747-016_IN1747-015 | IN1747-016 | 1087.91 | IN1747-015 | 1087.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 10.259 | Free |
| IN1747-020_AS1747-019 | IN1747-020 | 1077.87 | AS1747-019 | 1073.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.61 | Free |
| IN1747-021_AS1747-019 | IN1747-021 | 1077.16 | AS1747-019 | 1073.05 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 20.622 | Free |
| IN1747-022_IN1747-021 | IN1747-022 | 1077.77 | IN1747-021 | 1077.16 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.479 | Free |
| IN1747-024_AS1847-022 | IN1747-024 | 1064.15 | AS1847-022 | 1064.09 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 32.323 | Free |
| IN1747-025_IN1747-024 | IN1747-025 | 1064.25 | IN1747-024 | 1064.15 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 63.21 | Free |
| IN1747-026_IN1747-025 | IN1747-026 | 1064.53 | IN1747-025 | 1064.25 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 177.089 | Free |
| IN1747-027_IN1747-026 | IN1747-027 | 1064.54 | IN1747-026 | 1064.53 | Circular | | 1 | 0.667 | 0.013 | 0.5 | 0.5 | 0 | 11.111 | Free |
| IN1747-028_IN1747-029 | IN1747-028 | 1086.75 | IN1747-029 | 1086.33 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 50.714 | Free |
| IN1747-029_AE1746-001 | IN1747-029 | 1086.33 | AE1746-001 | 1086 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 26.812 | Free |
| IN1748-004_AS1748-003 | IN1748-004 | 1075.3 | AS1748-003 | 1071.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 37.803 | Free |
| IN1748-008_AS1748-007 | IN1748-008 | 1074.05 | AS1748-007 | 1072.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 23.845 | Free |
| IN1748-009_AS1748-007 | IN1748-009 | 1074.05 | AS1748-007 | 1072.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 10.524 | Free |
| IN1748-012_AS1748-011 | IN1748-012 | 1075.55 | AS1748-011 | 1072.06 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 8.104 | Free |
| IN1748-013_AS1748-011 | IN1748-013 | 1074.55 | AS1748-011 | 1072.06 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 24.298 | Free |
| IN1748-015_AS1748-014 | IN1748-015 | 1075.3 | AS1748-014 | 1072.36 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.211 | Free |
| IN1748-016_AS1748-014 | IN1748-016 | 1075.3 | AS1748-014 | 1072.36 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 22.302 | Free |
| IN1748-023_AS1748-024 | IN1748-023 | 1076.4 | AS1748-024 | 1075.18 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | None (,) | 216.647 | Free |
| IN1748-025_AS1748-024 | IN1748-025 | 1076.25 | AS1748-024 | 1075.18 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 40.603 | Free |
| IN1748-026_AS1748-024 | IN1748-026 | 1076.25 | AS1748-024 | 1075.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.43 | Free |
| IN1748-027_IN1748-025 | IN1748-027 | 1076.41 | IN1748-025 | 1076.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.665 | Free |
| IN1748-028_IN1748-025 | IN1748-028 | 1076.01 | IN1748-025 | 1076.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 27.159 | Free |
| IN1748-029_IN1748-028 | IN1748-029 | 1076.56 | IN1748-028 | 1076.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.882 | Free |
| IN1748-030_IN1748-028 | IN1748-030 | 1076.67 | IN1748-028 | 1076.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 33.541 | Free |
| IN1748-031_IN1748-026 | IN1748-031 | 1076.41 | IN1748-026 | 1076.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.179 | Free |
| IN1748-032_IN1748-008 | IN1748-032 | 1074.6 | IN1748-008 | 1074.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.569 | Free |
| IN1748-033_IN1748-009 | IN1748-033 | 1074.6 | IN1748-009 | 1074.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.771 | Free |
| IN1749-001_IN1749-002 | IN1749-001 | 1078.76 | IN1749-002 | 1078.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 32.394 | Free |
| IN1749-002_IN1749-003 | IN1749-002 | 1078.01 | IN1749-003 | 1077.4 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | None (,) | 128.925 | Free |
| IN1749-003_IN1748-023 | IN1749-003 | 1077.4 | IN1748-023 | 1076.4 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | None (,) | 206.225 | Free |
| IN1749-007_IN1750-032 | IN1749-007 | 1088.28 | IN1750-032 | 1088.17 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 27.22 | Free |
| IN1749-008_IN1749-007 | IN1749-008 | 1088.42 | IN1749-007 | 1088.28 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 24.796 | Free |
| IN1749-009_IN1749-008 | IN1749-009 | 1088.72 | IN1749-008 | 1088.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13.787 | Free |
| IN1749-010_IN1750-035 | IN1749-010 | 1089.94 | IN1750-035 | 1089.72 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 48.789 | Free |
| IN1749-011_IN1749-010 | IN1749-011 | 1092.59 | IN1749-010 | 1089.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 14.89 | Free |
| IN1750-001_IN1750-023 | IN1750-001 | 1084.32 | IN1750-023 | 1083.98 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 64.997 | Free |
| IN1750-002_IN1750-001 | IN1750-002 | 1084.55 | IN1750-001 | 1084.32 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 45.262 | Free |
| IN1750-003_IN1750-002 | IN1750-003 | 1084.81 | IN1750-002 | 1084.55 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 53.184 | Free |
| IN1750-004_IN1750-003 | IN1750-004 | 1085.31 | IN1750-003 | 1084.81 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 103.426 | Free |
| IN1750-005_IN1750-004 | IN1750-005 | 1101.96 | IN1750-004 | 1085.31 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 42.91 | Free |
| IN1750-008_IN1750-017 | IN1750-008 | 1085.22 | IN1750-017 | 1077.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | None (,) | 120.718 | Free |
| IN1750-009_IN1750-008 | IN1750-009 | 1086.6 | IN1750-008 | 1085.22 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 46.631 | Free |
| IN1750-010_IN1750-009 | IN1750-010 | 1088.74 | IN1750-009 | 1086.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 86.802 | Free |
| IN1750-011_IN1750-008 | IN1750-011 | 1086.94 | IN1750-008 | 1085.22 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 56.936 | Free |
| IN1750-012_IN1750-011 | IN1750-012 | 1087.54 | IN1750-011 | 1086.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.241 | Free |
| IN1750-013_IN1750-011 | IN1750-013 | 1087.42 | IN1750-011 | 1086.94 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 43.163 | Free |
| IN1750-014_IN1750-013 | IN1750-014 | 1087.72 | IN1750-013 | 1087.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.293 | Free |
| IN1750-015_IN1750-029 | IN1750-015 | 1087.5 | IN1750-029 | 1086.4 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 109.392 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1750-017_IN1750-018 | IN1750-017 | 1077.6 | IN1750-018 | 1077.32 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | None (,) | 30.256 | Free |
| IN1750-018_AS1750-024 | IN1750-018 | 1077.32 | AS1750-024 | 1076.04 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | None (,) | 256.7 | Free |
| IN1750-019_IN1750-020 | IN1750-019 | 1082.6 | IN1750-020 | 1079.74 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.05 | None (,) | 27.072 | Free |
| IN1750-020_AE1750-025 | IN1750-020 | 1079.74 | AE1750-025 | 1076.6 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 1 | None (,) | 110 | Free |
| IN1750-021_IN1750-020 | IN1750-021 | 1094.16 | IN1750-020 | 1094 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.957 | Free |
| IN1750-022_IN1750-019 | IN1750-022 | 1083.66 | IN1750-019 | 1082.6 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 212.481 | Free |
| IN1750-023_IN1750-022 | IN1750-023 | 1083.98 | IN1750-022 | 1083.66 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 62.731 | Free |
| IN1750-029_AS1750-024 | IN1750-029 | 1086.4 | AS1750-024 | 1076.04 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 104.938 | Free |
| IN1750-030_IN1750-029 | IN1750-030 | 1088.53 | IN1750-029 | 1086.4 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 13.849 | Free |
| IN1750-031_IN1750-015 | IN1750-031 | 1088.04 | IN1750-015 | 1087.5 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 106.037 | Free |
| IN1750-032_IN1750-031 | IN1750-032 | 1088.17 | IN1750-031 | 1088.04 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 19.058 | Free |
| IN1750-033_IN1750-031 | IN1750-033 | 1088.09 | IN1750-031 | 1088.04 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 11.67 | Free |
| IN1750-034_IN1750-033 | IN1750-034 | 1089.56 | IN1750-033 | 1088.09 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 297.245 | Free |
| IN1750-035_IN1750-034 | IN1750-035 | 1089.72 | IN1750-034 | 1089.56 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 27.956 | Free |
| IN1750-036_IN1750-004 | IN1750-036 | 1086.6 | IN1750-004 | 1085.31 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 267.025 | Free |
| IN1751-001_IN1751-006 | IN1751-001 | 1092.6 | IN1751-006 | 1091.58 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 205.107 | Free |
| IN1751-002_IN1751-001 | IN1751-002 | 1104.58 | IN1751-001 | 1092.6 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 40.597 | Free |
| IN1751-003_IN1751-002 | IN1751-003 | 1105.13 | IN1751-002 | 1104.58 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 29.962 | Free |
| IN1751-004_IN1751-001 | IN1751-004 | 1093.04 | IN1751-001 | 1092.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 90.013 | Free |
| IN1751-005_IN1751-004 | IN1751-005 | 1106.04 | IN1751-004 | 1093.04 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 51.341 | Free |
| IN1751-006_IN1751-008 | IN1751-006 | 1091.58 | IN1751-008 | 1087.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 388.183 | Free |
| IN1751-007_IN1751-006 | IN1751-007 | 1102.37 | IN1751-006 | 1091.58 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 63.8 | Free |
| IN1751-008_AS1751-010 | IN1751-008 | 1087.6 | AS1751-010 | 1086.67 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 33.35 | Free |
| IN1751-009_IN1751-008 | IN1751-009 | 1096.3 | IN1751-008 | 1087.6 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 44.705 | Free |
| IN1751-011_AS1751-010 | IN1751-011 | 1086.78 | AS1751-010 | 1086.67 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 17.172 | Free |
| IN1751-012_IN1751-011 | IN1751-012 | 1094.41 | IN1751-011 | 1086.78 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.539 | Free |
| IN1751-013_AS1751-010 | IN1751-013 | 1092.9 | AS1751-010 | 1086.67 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 160.151 | Free |
| IN1751-014_IN1751-013 | IN1751-014 | 1093.4 | IN1751-013 | 1092.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 43.342 | Free |
| IN1751-016_IN1751-020 | IN1751-016 | 1084.8 | IN1751-020 | 1084.2 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 121.539 | Free |
| IN1751-017_IN1751-016 | IN1751-017 | 1095.53 | IN1751-016 | 1084.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 37.997 | Free |
| IN1751-018_IN1751-016 | IN1751-018 | 1094.62 | IN1751-016 | 1084.8 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 44.839 | Free |
| IN1751-019_IN1751-018 | IN1751-019 | 1095.17 | IN1751-018 | 1094.62 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 26.941 | Free |
| IN1751-020_IN1751-022 | IN1751-020 | 1084.2 | IN1751-022 | 1083.86 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | None (,) | 68.56 | Free |
| IN1751-021_IN1751-020 | IN1751-021 | 1094.73 | IN1751-020 | 1084.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 29.776 | Free |
| IN1751-022_IN1750-019 | IN1751-022 | 1083.86 | IN1750-019 | 1082.6 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.5 | None (,) | 52.173 | Free |
| IN1751-023_MI1751-024 | IN1751-023 | 1087.91 | MI1751-024 | 1087.35 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 112.332 | Free |
| IN1751-025_IN1751-023 | IN1751-025 | 1088.29 | IN1751-023 | 1087.91 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 74.058 | Free |
| IN1751-026_IN1751-023 | IN1751-026 | 1097.45 | IN1751-023 | 1087.91 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 64.212 | Free |
| IN1751-027_IN1751-026 | IN1751-027 | 1098 | IN1751-026 | 1097.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.959 | Free |
| IN1751-028_IN1751-023 | IN1751-028 | 1097.45 | IN1751-023 | 1087.91 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 41.428 | Free |
| IN1751-029_IN1751-028 | IN1751-029 | 1098 | IN1751-028 | 1097.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.119 | Free |
| IN1752-002_AS1752-001 | IN1752-002 | 1089.8 | AS1752-001 | 1089.68 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 23.938 | Free |
| IN1752-004_AS1752-001 | IN1752-004 | 1098.9 | AS1752-001 | 1089.68 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 139.613 | Free |
| IN1752-005_IN1752-004 | IN1752-005 | 1099.05 | IN1752-004 | 1098.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.776 | Free |
| IN1752-006_AS1752-001 | IN1752-006 | 1100.54 | AS1752-001 | 1089.68 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 21.644 | Free |
| IN1752-007_IN1752-006 | IN1752-007 | 1100.84 | IN1752-006 | 1100.54 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.766 | Free |
| IN1752-010_IN1752-011 | IN1752-010 | 1094.23 | IN1752-011 | 1090.92 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 32.515 | Free |
| IN1752-011_MI1752-008 | IN1752-011 | 1090.92 | MI1752-008 | 1090.37 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 109.955 | Free |
| IN1752-012_IN1752-010 | IN1752-012 | 1095.16 | IN1752-010 | 1094.23 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.253 | Free |
| IN1752-014_IN1752-011 | IN1752-014 | 1095.42 | IN1752-011 | 1090.92 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.863 | Free |
| IN1752-016_IN1752-011 | IN1752-016 | 1091.95 | IN1752-011 | 1090.92 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 74.015 | Free |
| IN1752-018_IN1752-016 | IN1752-018 | 1092.65 | IN1752-016 | 1091.95 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 233.033 | Free |
| IN1752-019_IN1752-018 | IN1752-019 | 1094.15 | IN1752-018 | 1092.65 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | None (,) | 29.003 | Free |
| IN1752-020_IN1752-018 | IN1752-020 | 1093.6 | IN1752-018 | 1092.65 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.948 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1752-021_IN1752-019 | IN1752-021 | 1094.97 | IN1752-019 | 1094.15 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 16.278 | Free |
| IN1752-022_IN1752-019 | IN1752-022 | 1095.9 | IN1752-019 | 1094.15 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | None (,) | 349.061 | Free |
| IN1752-023_IN1752-022 | IN1752-023 | 1096.72 | IN1752-022 | 1095.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 17.15 | Free |
| IN1752-024_IN1752-022 | IN1752-024 | 1100.64 | IN1752-022 | 1095.9 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | None (,) | 196.143 | Free |
| IN1752-025_IN1752-024 | IN1752-025 | 1101.41 | IN1752-024 | 1100.64 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 16.336 | Free |
| IN1752-026_IN1752-024 | IN1752-026 | 1101.39 | IN1752-024 | 1100.64 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 45.228 | Free |
| IN1752-027_IN1752-026 | IN1752-027 | 1102.29 | IN1752-026 | 1101.39 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.423 | Free |
| IN1752-028_IN1752-024 | IN1752-028 | 1107.51 | IN1752-024 | 1100.64 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | None (,) | 191.01 | Free |
| IN1752-029_IN1752-026 | IN1752-029 | 1103.43 | IN1752-026 | 1101.39 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 120.122 | Free |
| IN1752-030_IN1752-029 | IN1752-030 | 1107.4 | IN1752-029 | 1103.43 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | None (,) | 115.758 | Free |
| IN1752-031_IN1752-030 | IN1752-031 | 1108.04 | IN1752-030 | 1107.4 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 32.678 | Free |
| IN1752-032_IN1752-031 | IN1752-032 | 1108.66 | IN1752-031 | 1108.04 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 27.086 | Free |
| IN1752-033_IN1752-032 | IN1752-033 | 1109.39 | IN1752-032 | 1108.66 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 30.2 | Free |
| IN1752-034_IN1752-033 | IN1752-034 | 1109.83 | IN1752-033 | 1109.39 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.092 | Free |
| IN1753-006_AS1753-005 | IN1753-006 | 1090.5 | AS1753-005 | 1090.2 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 55.766 | Free |
| IN1753-007_IN1753-006 | IN1753-007 | 1095.12 | IN1753-006 | 1090.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 199.985 | Free |
| IN1753-008_IN1753-040 | IN1753-008 | 1086.11 | IN1753-040 | 1085.59 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 175.052 | Free |
| IN1753-009_IN1753-008 | IN1753-009 | 1086.39 | IN1753-008 | 1086.11 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 94.077 | Free |
| IN1753-012_IN1753-009 | IN1753-012 | 1088.32 | IN1753-009 | 1086.39 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 91.486 | Free |
| IN1753-018_IN1753-012 | IN1753-018 | 1088.67 | IN1753-012 | 1088.32 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 67.769 | Free |
| IN1753-028_IN1753-007 | IN1753-028 | 1099.17 | IN1753-007 | 1095.12 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 112.394 | Free |
| IN1753-040_AE1753-001 | IN1753-040 | 1085.59 | AE1753-001 | 1085.1 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 195 | Free |
| IN1753-049_IN1753-040 | IN1753-049 | 1085.59 | IN1753-040 | 1085.59 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 40.046 | Free |
| IN1753-051_IN1753-049 | IN1753-051 | 1085.59 | IN1753-049 | 1085.59 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 143.692 | Free |
| IN1754-011_AS1754-010 | IN1754-011 | 1100.8 | AS1754-010 | 1097 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 23.682 | Free |
| IN1754-012_IN1754-011 | IN1754-012 | 1107.97 | IN1754-011 | 1100.8 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 115.104 | Free |
| IN1754-020_IN1754-012 | IN1754-020 | 1115.87 | IN1754-012 | 1107.97 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 125.535 | Free |
| IN1754-021_IN1754-020 | IN1754-021 | 1117.19 | IN1754-020 | 1115.87 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 44.03 | Free |
| IN1754-023_AS1753-054 | IN1754-023 | 1094.8 | AS1753-054 | 1091.84 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.5 | 0 | 162.768 | Free |
| IN1754-024_IN1754-023 | IN1754-024 | 1095.3 | IN1754-023 | 1094.8 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 71.208 | Free |
| IN1754-025_IN1754-024 | IN1754-025 | 1098.7 | IN1754-024 | 1095.3 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 141.19 | Free |
| IN1754-026_IN1754-025 | IN1754-026 | 1103 | IN1754-025 | 1098.7 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.05 | 0 | 87.145 | Free |
| IN1754-027_IN1754-026 | IN1754-027 | 1104 | IN1754-026 | 1103 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 45.026 | Free |
| IN1754-030_IN1654-004 | IN1754-030 | 1107.22 | IN1654-004 | 1105.81 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 39.744 | Free |
| IN1754-032_IN1754-030 | IN1754-032 | 1112.4 | IN1754-030 | 1107.22 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 116.362 | Free |
| IN1754-033 | IN1754-035 | 1121 | IN1654-007 | 1120.7 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 29.143 | Free |
| IN1847-001_IN1848-002 | IN1847-001 | 1081.97 | IN1848-002 | 1081.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 28.972 | Free |
| IN1847-003_IN1847-005 | IN1847-003 | 1069 | IN1847-005 | 1067.1 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 70.033 | Free |
| IN1847-004_IN1847-003 | IN1847-004 | 1069.5 | IN1847-003 | 1069 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 27.858 | Free |
| IN1847-005_AE1847-006 | IN1847-005 | 1067.1 | AE1847-006 | 1054.6 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 160 | Free |
| IN1847-007_AS1847-009 | IN1847-007 | 1034.16 | AS1847-009 | 1031.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 37.977 | Free |
| IN1847-008_AS1847-009 | IN1847-008 | 1032.01 | AS1847-009 | 1031.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 27.085 | Free |
| IN1847-015_1847-016 | IN1847-015 | 1062.59 | IN1847-016 | 1062.44 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 26.284 | Free |
| IN1847-016_IN1847-017 | IN1847-016 | 1062.44 | IN1847-017 | 1061.77 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 57.285 | Free |
| IN1847-017_AS1847-018 | IN1847-017 | 1061.77 | AS1847-018 | 1060.12 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 77.666 | Free |
| IN1847-023_AS1947-009 | IN1847-023 | 1050.89 | AS1947-009 | 1043.84 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 167.513 | Free |
| IN1847-025_AS1847-021 | IN1847-025 | 1062.91 | AS1847-021 | 1061.15 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | 0 | 114.08 | Free |
| IN1848-001_AS1848-003 | IN1848-001 | 1079.25 | AS1848-003 | 1078.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 33.406 | Free |
| IN1848-002_AS1848-003 | IN1848-002 | 1081.8 | AS1848-003 | 1078.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 38.782 | Free |
| IN1848-004_IN1848-005 | IN1848-004 | 1060.6 | IN1848-005 | 1053.6 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 0.5 | 0 | 203.011 | Free |
| IN1848-005_IN1848-006 | IN1848-005 | 1053.6 | IN1848-006 | 1032.96 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 0.05 | 0 | 139.279 | Free |
| IN1848-006_IN1848-007 | IN1848-006 | 1032.96 | IN1848-007 | 1032.5 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 94.416 | Free |
| IN1848-007_IN1848-009 | IN1848-007 | 1032.5 | IN1848-009 | 1032.13 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 67.533 | Free |
| IN1848-008_TE1848-012 | IN1848-008 | 1029.82 | TE1848-012 | 1029.19 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 30.1 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1848-009_AS1847-009 | IN1848-009 | 1032.13 | AS1847-009 | 1031.14 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 40.819 | Free |
| IN1848-010_IN1848-007 | IN1848-010 | 1037.1 | IN1848-007 | 1032.5 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 0.5 | 0 | 150.565 | Free |
| IN1848-011_IN1948-020 | IN1848-011 | 1026.6 | IN1948-020 | 1017.93 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 262.044 | Free |
| IN1848-014_IN1848-015 | IN1848-014 | 1061.79 | IN1848-015 | 1060.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 29.528 | Free |
| IN1848-015_AS1848-018 | IN1848-015 | 1060.93 | AS1848-018 | 1057.13 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 36.709 | Free |
| IN1848-016_IN1848-015 | IN1848-016 | 1063.04 | IN1848-015 | 1060.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 17.746 | Free |
| IN1848-019_AS1848-018 | IN1848-019 | 1057.87 | AS1848-018 | 1057.13 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 39.825 | Free |
| IN1848-020_IN1848-019 | IN1848-020 | 1058.86 | IN1848-019 | 1057.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 28.458 | Free |
| IN1848-022_AS1848-027 | IN1848-022 | 1077.72 | AS1848-027 | 1075.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 25.187 | Free |
| IN1848-023_AS1848-027 | IN1848-023 | 1077.91 | AS1848-027 | 1075.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 49.276 | Free |
| IN1848-024_IN1848-026 | IN1848-024 | 1077.66 | IN1848-026 | 1075.69 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.931 | Free |
| IN1848-025_IN1848-026 | IN1848-025 | 1077.79 | IN1848-026 | 1075.69 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 30.724 | Free |
| IN1848-026_AE1748-001 | IN1848-026 | 1075.69 | AE1748-001 | 1071.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 1 | 0 | 219 | Free |
| IN1848-028_AS1848-027 | IN1848-028 | 1076.45 | AS1848-027 | 1075.84 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 19.529 | Free |
| IN1848-029_IN1848-028 | IN1848-029 | 1077.16 | IN1848-028 | 1076.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 11.843 | Free |
| IN1848-030_IN1848-028 | IN1848-030 | 1076.61 | IN1848-028 | 1076.45 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 28.074 | Free |
| IN1848-031_IN1848-030 | IN1848-031 | 1077.16 | IN1848-030 | 1076.61 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.938 | Free |
| IN1848-032_IN1848-033 | IN1848-032 | 1076.6 | IN1848-033 | 1075.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 10.942 | Free |
| IN1848-033_AS1849-001 | IN1848-033 | 1075.6 | AS1849-001 | 1069.73 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 24.336 | Free |
| IN1849-002_AS1849-001 | IN1849-002 | 1075.2 | AS1849-001 | 1069.73 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 49.865 | Free |
| IN1849-003_IN1849-002 | IN1849-003 | 1076.2 | IN1849-002 | 1075.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 8.372 | Free |
| IN1849-004_IN1849-005 | IN1849-004 | 1074.28 | IN1849-005 | 1072.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 18.326 | Free |
| IN1849-005_AE1849-014 | IN1849-005 | 1072.11 | AE1849-014 | 1070.032 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 256 | Free |
| IN1849-006_IN1849-005 | IN1849-006 | 1072.79 | IN1849-005 | 1072.11 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 24.974 | Free |
| IN1849-007_IN1849-006 | IN1849-007 | 1073.94 | IN1849-006 | 1072.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 11.39 | Free |
| IN1849-010_AS1849-009 | IN1849-010 | 1074.09 | AS1849-009 | 1073.11 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 195.004 | Free |
| IN1849-012_IN1949-016 | IN1849-012 | 1077.84 | IN1949-016 | 1077.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.573 | Free |
| IN1849-018_AE1849-030 | IN1849-018 | 1071.34 | AE1849-030 | 1069.6 | Circular | | 1 | 3 | 0.013 | 0.05 | 1 | 0 | 585 | Free |
| IN1849-029_AS1849-026 | IN1849-029 | 1077.64 | AS1849-026 | 1074.65 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 73.952 | Free |
| IN1849-031_AS1849-023 | IN1849-031 | 1072.6 | AS1849-023 | 1072.48 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 48.302 | Free |
| IN1849-032_IN1849-031 | IN1849-032 | 1074.34 | IN1849-031 | 1072.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 12.079 | Free |
| IN1849-033_IN1849-031 | IN1849-033 | 1073.8 | IN1849-031 | 1072.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 34.187 | Free |
| IN1849-034_IN1849-033 | IN1849-034 | 1074.34 | IN1849-033 | 1073.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.06 | Free |
| IN1849-035_AS1849-026 | IN1849-035 | 1074.95 | AS1849-026 | 1074.65 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 48.029 | Free |
| IN1849-036_IN1849-035 | IN1849-036 | 1076.8 | IN1849-035 | 1074.95 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 12.077 | Free |
| IN1849-037_IN1849-035 | IN1849-037 | 1076.24 | IN1849-035 | 1074.95 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 30.717 | Free |
| IN1849-038_IN1849-037 | IN1849-038 | 1076.8 | IN1849-037 | 1076.24 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.248 | Free |
| IN1849-049_AS1849-047 | IN1849-049 | 1075.33 | AS1849-047 | 1071.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 16.075 | Free |
| IN1849-050_AS1849-047 | IN1849-050 | 1072.21 | AS1849-047 | 1071.93 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 21.196 | Free |
| IN1849-051_IN1849-050 | IN1849-051 | 1075.25 | IN1849-050 | 1072.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 55.424 | Free |
| IN1849-052_IN1849-051 | IN1849-052 | 1075.5 | IN1849-051 | 1075.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.469 | Free |
| IN1849-056_AS1849-053 | IN1849-056 | 1075.14 | AS1849-053 | 1072.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.158 | Free |
| IN1849-057_AS1849-053 | IN1849-057 | 1073.88 | AS1849-053 | 1072.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 23.23 | Free |
| IN1849-060_AS1849-059 | IN1849-060 | 1075.89 | AS1849-059 | 1074.75 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 219.407 | Free |
| IN1850-003_IN1849-018 | IN1850-003 | 1073.62 | IN1849-018 | 1071.34 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 55.385 | Free |
| IN1850-007_IN1849-050 | IN1850-007 | 1073.87 | IN1849-050 | 1072.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 22.288 | Free |
| IN1850-008_IN1849-056 | IN1850-056 | 1075.39 | IN1849-056 | 1075.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 15.167 | Free |
| IN1850-009_AS1849-058 | IN1850-009 | 1075.19 | AS1849-058 | 1073.28 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 45.249 | Free |
| IN1850-010_AS1849-059 | IN1850-010 | 1075.7 | AS1849-059 | 1074.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 32.932 | Free |
| IN1850-011_AS1849-023 | IN1850-011 | 1072.73 | AS1849-023 | 1072.48 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 50.895 | Free |
| IN1946-005_AS1946-004 | IN1946-005 | 1013.58 | AS1946-004 | 1014 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 16.065 | Free |
| IN1947-008_IN1947-012 | IN1947-008 | 1026.4 | IN1947-012 | 1017.41 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | 0 | 265.642 | Free |
| IN1947-012_IN1947-013 | IN1947-012 | 1017.41 | IN1947-013 | 1016.55 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.25 | 0.05 | 0 | 172.053 | Free |
| IN1947-013_AS1947-017 | IN1947-013 | 1016.55 | AS1947-017 | 1016.41 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 35.591 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1947-014_IN1947-013 | IN1947-014 | 1018.05 | IN1947-013 | 1016.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 24.906 | Free |
| IN1947-016_AS1947-017 | IN1947-016 | 1017.86 | AS1947-017 | 1016.41 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 58.074 | Free |
| IN1947-019_AE1947-020 | IN1947-019 | 1015.35 | AE1947-020 | 1015.05 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 65 | Free |
| IN1947-027_AS1947-029 | IN1947-027 | 1054.01 | AS1947-029 | 1047.68 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 293.462 | Free |
| IN1948-002_AE1948-003 | Inlet_IN1948-002 | 1013.6 | AE1948-003 | 1011.24 | Circular | | 1 | 1.75 | 0.013 | 2 | 1 | 0 | 169 | Free |
| IN1948-005_AE1948-007 | IN1948-005 | 1012.1 | AE1948-007 | 1010.1 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 176 | Free |
| IN1948-006_IN1948-005 | IN1948-006 | 1014.16 | IN1948-005 | 1012.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.706 | Free |
| IN1948-009_IN1948-010 | IN1948-009 | 1019.12 | IN1948-010 | 1018.65 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 28.823 | Free |
| IN1948-010_AS1948-004 | IN1948-010 | 1018.65 | AS1948-004 | 1016.45 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 43.405 | Free |
| IN1948-011_AS1948-004 | IN1948-011 | 1019.3 | AS1948-004 | 1016.45 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 101.827 | Free |
| IN1948-014_AS1948-013 | IN1948-014 | 1038 | AS1948-013 | 1037.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 10.972 | Free |
| IN1948-015_AS1948-013 | IN1948-015 | 1038 | AS1948-013 | 1037.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 20.46 | Free |
| IN1948-016_AS1948-017 | IN1948-016 | 1023.78 | AS1948-017 | 1016.5 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 186.378 | Free |
| IN1948-018_IN1948-019 | IN1948-018 | 1018.63 | IN1948-019 | 1017.69 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 15.38 | Free |
| IN1948-019_AS1948-017 | IN1948-019 | 1017.69 | AS1948-017 | 1016.5 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 51.456 | Free |
| IN1948-020_IN1948-019 | IN1948-020 | 1017.93 | IN1948-019 | 1017.69 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 26.059 | Free |
| IN1948-021_AS1948-017 | IN1948-021 | 1018.25 | AS1948-017 | 1016.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 22.2 | Free |
| IN1949-003_AS1949-009 | IN1949-003 | 1030.56 | AS1949-009 | 1030.11 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 49.588 | Free |
| IN1949-004_IN1949-003 | IN1949-004 | 1031.46 | IN1949-003 | 1030.56 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | 0 | 164.786 | Free |
| IN1949-005_AS1949-007 | IN1949-005 | 1032.63 | AS1949-007 | 1032.43 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 25.542 | Free |
| IN1949-006_IN1949-005 | IN1949-006 | 1032.94 | IN1949-005 | 1032.63 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 26.527 | Free |
| IN1949-010_AS1949-009 | IN1949-010 | 1038.47 | AS1949-009 | 1030.11 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 106.451 | Free |
| IN1949-011_IN1949-010 | IN1949-011 | 1048.26 | IN1949-010 | 1038.47 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 124.331 | Free |
| IN1949-016_AS1949-015 | IN1949-016 | 1077.3 | AS1949-015 | 1075.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 6.983 | Free |
| IN1949-017_IN1949-018 | IN1949-017 | 1077.84 | IN1949-018 | 1077.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.038 | Free |
| IN1949-018_AS1949-015 | IN1949-018 | 1077.3 | AS1949-015 | 1075.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 20.504 | Free |
| IN1949-021_AS1949-019 | IN1949-021 | 1076.1 | AS1949-019 | 1075.8 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 229.602 | Free |
| IN1949-022_IN1949-021 | IN1949-022 | 1076.23 | IN1949-021 | 1076.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 72.989 | Free |
| IN1949-031_IN1949-022 | IN1949-031 | 1076.28 | IN1949-022 | 1076.23 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 11.22 | Free |
| IN1949-034_AS1949-033 | IN1949-034 | 1080.13 | AS1949-033 | 1079.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 20.278 | Free |
| IN1949-036_AS1949-035 | IN1949-036 | 1052.46 | AS1949-035 | 1052.17 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 35.398 | Free |
| IN1949-037_AS1949-035 | IN1949-037 | 1052.75 | AS1949-035 | 1052.17 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 51.213 | Free |
| IN1949-039_IN1949-037 | IN1949-039 | 1067.6 | IN1949-037 | 1052.75 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 317.218 | Free |
| IN1950-001_AS1949-033 | IN1950-001 | 1082.41 | AS1949-033 | 1079.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 174.469 | Free |
| IN1950-002_AS1949-032 | IN1950-002 | 1077.9 | AS1949-032 | 1077.03 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 30.363 | Free |
| IN1950-003_AS1949-033 | IN1950-003 | 1080.13 | AS1949-033 | 1079.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 31.821 | Free |
| IN1950-004_IN1950-001 | IN1950-004 | 1082.57 | IN1950-001 | 1082.41 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.751 | Free |
| IN1950-010_AS1949-041 | IN1950-010 | 1074.29 | AS1949-041 | 1072.29 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 401.101 | Free |
| IN1955-005_IN2055-011 | IN1955-005 | 1100.26 | IN2055-011 | 1099.35 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 122.263 | Free |
| IN1955-007_IN1955-005 | IN1955-007 | 1101.2 | IN1955-005 | 1100.26 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 85.601 | Free |
| IN1955-009_IN1955-007 | IN1955-009 | 1102.1 | IN1955-007 | 1101.2 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 182.062 | Free |
| IN1955-010_IN1955-009 | IN1955-010 | 1102.24 | IN1955-009 | 1102.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 25.438 | Free |
| IN1956-003_IN2056-006 | IN1956-003 | 1100.41 | IN2056-006 | 1097.63 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 74.758 | Free |
| IN1956-004_IN1956-003 | IN1956-004 | 1103.39 | IN1956-003 | 1100.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 149.283 | Free |
| IN1956-005_IN1956-004 | IN1956-005 | 1105.64 | IN1956-004 | 1103.39 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 90.083 | Free |
| IN1956-007_IN1956-005 | IN1956-007 | 1125.64 | IN1956-005 | 1105.64 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 400.8 | Free |
| IN1956-011_IN2056-012 | IN1956-011 | 1098.7 | IN2056-012 | 1098.23 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 50.02 | Free |
| IN1956-012_IN1956-011 | IN1956-012 | 1099.24 | IN1956-011 | 1098.7 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 31.77 | Free |
| IN1956-013_IN1956-012 | IN1956-013 | 1099.53 | IN1956-012 | 1099.24 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 60.809 | Free |
| IN1956-016_IN1955-010 | IN1956-016 | 1102.37 | IN1955-010 | 1102.24 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 29.326 | Free |
| IN1956-017_IN1956-016 | IN1956-017 | 1102.51 | IN1956-016 | 1102.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 25.008 | Free |
| IN1957-001_IN1956-007 | IN1957-001 | 1130.74 | IN1956-007 | 1125.64 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 101.103 | Free |
| IN1957-002_IN1957-001 | IN1957-002 | 1142.58 | IN1957-001 | 1130.74 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 251.079 | Free |
| IN1957-006_IN1957-002 | IN1957-006 | 1155.58 | IN1957-002 | 1142.58 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 250.004 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1957-008_IN1957-006 | IN1957-008 | 1160.58 | IN1957-006 | 1155.58 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 98.519 | Free |
| IN1958-001_IN1957-008 | IN1958-001 | 1172.52 | IN1957-008 | 1160.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 299.292 | Free |
| IN2045-004_IN2045-005 | IN2045-004 | 974.71 | IN2045-005 | 974.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 41.137 | Free |
| IN2045-005_AS2045-006 | IN2045-005 | 974.03 | AS2045-006 | 973.47 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | None (,) | 72.962 | Free |
| IN2046-001_IN2046-002 | IN2046-001 | 985.3 | IN2046-002 | 984.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 67.193 | Free |
| IN2046-002_IN2047-010 | IN2046-002 | 984.9 | IN2047-010 | 984.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 75.283 | Free |
| IN2046-005_IN2046-008 | IN2046-005 | 1011.84 | IN2046-008 | 1010.73 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 64.298 | Free |
| IN2046-008_AS2047-002 | IN2046-008 | 1010.73 | AS2047-002 | 1009 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 52.557 | Free |
| IN2047-005_AS2047-006 | IN2047-005 | 993.2 | AS2047-006 | 992.16 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 11.179 | Free |
| IN2047-009_AS2047-007 | IN2047-009 | 984.86 | AS2047-007 | 983.36 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 11.524 | Free |
| IN2047-010_AS2047-008 | IN2047-010 | 984.6 | AS2047-008 | 984.53 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 16.501 | Free |
| IN2047-019_IN2047-009 | IN2047-019 | 985.05 | IN2047-009 | 984.86 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 42.174 | Free |
| IN2047-022_AS2047-011 | IN2047-022 | 983.5 | AS2047-011 | 982.4 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 10.57 | Free |
| IN2047-023_IN2047-022 | IN2047-023 | 983.72 | IN2047-022 | 983.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 41.635 | Free |
| IN2048-007_AS2048-005 | IN2048-007 | 991.2 | AS2048-005 | 989.47 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 30.628 | Free |
| IN2048-008_AS2048-010 | IN2048-008 | 992.78 | AS2048-010 | 990.43 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.831 | Free |
| IN2049-003_AS2049-002 | IN2049-003 | 1006.6 | AS2049-002 | 1005.7 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 24.965 | Free |
| IN2050-009_MI2050-008 | IN2050-009 | 1067.19 | MI2050-008 | 1067.07 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 6.6 | Free |
| IN2050-016_AS2050-015 | IN2050-016 | 1027.92 | AS2050-015 | 1027.72 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 6.449 | Free |
| IN2051-001_AS2051-005 | IN2051-001 | 1056.46 | AS2051-005 | 1055.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 127.817 | Free |
| IN2051-002_IN2051-001 | IN2051-002 | 1056.7 | IN2051-001 | 1056.46 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 38.154 | Free |
| IN2051-006_IN2051-007 | IN2051-006 | 1054.73 | IN2051-007 | 1053.76 | Circular | | 1 | 4 | 0.013 | 0.15 | 0.25 | 0 | 157.923 | Free |
| IN2051-007_IN2051-008 | IN2051-007 | 1053.76 | IN2051-008 | 1053.55 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 35.334 | Free |
| IN2051-008_AE2051-009 | IN2051-008 | 1053.55 | SMPB_GW_BWD | 1051.6 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 60.411 | Free |
| IN2051-010_IN2051-008 | IN2051-010 | 1055.29 | IN2051-008 | 1053.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 38.923 | Free |
| IN2051-016_AS2051-005 | IN2051-016 | 1056.3 | AS2051-005 | 1055.6 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 111.244 | Free |
| IN2051-017_IN2051-016 | IN2051-017 | 1057.3 | IN2051-016 | 1056.3 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 36.579 | Free |
| IN2051-024_AS2051-023 | IN2051-024 | 1062.19 | AS2051-023 | 1057.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 265.248 | Free |
| IN2051-026_AS2051-023 | IN2051-026 | 1057.47 | AS2051-023 | 1057.34 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 25.045 | Free |
| IN2051-032_AS2051-023 | IN2051-032 | 1058.47 | AS2051-023 | 1057.34 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 58.313 | Free |
| IN2051-033_IN2051-032 | IN2051-033 | 1058.52 | IN2051-032 | 1058.47 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 11.593 | Free |
| IN2051-036_IN2051-033 | IN2051-036 | 1059.22 | IN2051-033 | 1058.52 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 137.536 | Free |
| IN2051-037_IN2051-036 | IN2051-037 | 1059.74 | IN2051-036 | 1059.22 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 103.511 | Free |
| IN2051-039_AS2051-038 | IN2051-039 | 1062.56 | AS2051-038 | 1058.28 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.25 | 0 | 156.705 | Free |
| IN2051-042_AS2051-041 | IN2051-042 | 1068.05 | AS2051-041 | 1066.85 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.5 | 0 | 50.968 | Free |
| IN2051-047_AS2051-041 | IN2051-047 | 1068.33 | AS2051-041 | 1066.85 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.5 | 0 | 235.4 | Free |
| IN2051-048_IN2051-047 | IN2051-048 | 1068.69 | IN2051-047 | 1068.33 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.5 | 0 | 66.292 | Free |
| IN2051-055_MI2051-054 | IN2051-055 | 1057.79 | MI2051-054 | 1056.7 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 72.962 | Free |
| IN2051-056_IN2051-055 | IN2051-056 | 1060.86 | IN2051-055 | 1057.79 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 117.098 | Free |
| IN2051-060_IN2051-056 | IN2051-060 | 1063.66 | IN2051-056 | 1060.86 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 69.386 | Free |
| IN2051-066_AS2051-051 | IN2051-066 | 1069.3 | AS2051-051 | 1069.1 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 38.815 | Free |
| IN2052-004_AS2052-006 | IN2052-004 | 1063.51 | AS2052-006 | 1062.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 138.409 | Free |
| IN2052-009_IN2051-037 | IN2052-009 | 1060.5 | IN2051-037 | 1059.74 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 150.266 | Free |
| IN2052-024_AS2052-022 | IN2052-024 | 1062.17 | AS2052-022 | 1061.52 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 23.029 | Free |
| IN2052-026_TP2052-028 | IN2052-026 | 1059.33 | TP2052-028 | 1059.15 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 40.697 | Free |
| IN2052-029_IN2052-026 | IN2052-029 | 1060.33 | IN2052-026 | 1059.33 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 48.17 | Free |
| IN2052-031_IN2052-029 | IN2052-031 | 1060.92 | IN2052-029 | 1060.33 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 43.83 | Free |
| IN2053-004_IN2052-031 | IN2053-004 | 1064.88 | IN2052-031 | 1060.92 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 170.007 | Free |
| IN2055-007_IN2055-009 | IN2055-007 | 1095.5 | IN2055-009 | 1095.2 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 18.752 | Free |
| IN2055-009_IN2056-014 | IN2055-009 | 1095.2 | IN2056-014 | 1094.66 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 21.296 | Free |
| IN2055-010_IN2055-007 | IN2055-010 | 1098.82 | IN2055-007 | 1095.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 221.203 | Free |
| IN2055-011_IN2055-010 | IN2055-011 | 1099.35 | IN2055-010 | 1098.82 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 54.204 | Free |
| IN2056-006_AS2056-007 | IN2056-006 | 1097.63 | AS2056-007 | 1095.84 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 37.207 | Free |
| IN2056-009_AS2056-007 | IN2056-009 | 1097.41 | AS2056-007 | 1095.84 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 89.832 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2056-012_IN2056-009 | IN2056-012 | 1098.23 | IN2056-009 | 1097.41 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 27.029 | Free |
| IN2056-014_IN2056-015 | IN2056-014 | 1094.66 | IN2056-015 | 1094.14 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 30.597 | Free |
| IN2056-015_IN2056-016 | IN2056-015 | 1094.14 | IN2056-016 | 1093.48 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 28.994 | Free |
| IN2056-016_AE2056-017 | IN2056-016 | 1093.48 | AE2056-017 | 1092 | Circular | | 1 | 2 | 0.013 | 0.25 | 1 | 0 | 77.361 | Free |
| IN2056-021_IN2056-043 | IN2056-021 | 1090.73 | IN2056-043 | 1084.01 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 290.539 | Free |
| IN2056-043_AS2056-044 | IN2056-043 | 1084.01 | AS2056-044 | 1078.3 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 186.001 | Free |
| IN2145-004_AS2145-001 | IN2145-004 | 966.25 | AS2145-001 | 965.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 11.63 | Free |
| IN2145-005_AS2145-001 | IN2145-005 | 966.25 | AS2145-001 | 965.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 27.314 | Free |
| IN2145-009_TP2145-006 | IN2145-009 | 968.35 | TP2145-006 | 961.82 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.4 | None (,) | 182.998 | Free |
| IN2145-010_IN2145-009 | IN2145-010 | 970.05 | IN2145-009 | 968.35 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 258.921 | Free |
| IN2145-012_AS2145-011 | IN2145-012 | 971.85 | AS2145-011 | 971.23 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 73.706 | Free |
| IN2145-013_IN2145-012 | IN2145-013 | 972.2 | IN2145-012 | 971.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 39.208 | Free |
| IN2146-001_IN2146-002 | IN2146-001 | 975.04 | IN2146-002 | 974.65 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 57.404 | Free |
| IN2146-002_IN2246-002 | IN2146-002 | 974.65 | IN2246-002 | 972.96 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | None (,) | 234.241 | Free |
| IN2147-004_AS2147-006 | IN2147-004 | 971.9 | AS2147-006 | 969.77 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 28.036 | Free |
| IN2147-008_AS2147-007 | IN2147-008 | 970.22 | AS2147-007 | 968.62 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 14.984 | Free |
| IN2147-011_IN2147-008 | IN2147-011 | 970.35 | IN2147-008 | 970.22 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 40.431 | Free |
| IN2148-002_AS2148-004 | IN2148-002 | 973.8 | AS2148-004 | 972.3 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 33.416 | Free |
| IN2148-005_AS2148-007 | IN2148-005 | 977.36 | AS2148-007 | 976.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 3.933 | Free |
| IN2148-006_AS2148-007 | IN2148-006 | 977.34 | AS2148-007 | 976.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 37.759 | Free |
| IN2148-008_IN2148-006 | IN2148-008 | 979.7 | IN2148-006 | 977.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 108.784 | Free |
| IN2148-011_AS2148-010 | IN2148-011 | 993.9 | AS2148-010 | 992.63 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 16.814 | Free |
| IN2148-012_AS2148-010 | IN2148-012 | 993.94 | AS2148-010 | 992.63 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 25.81 | Free |
| IN2149-005_AS2149-001 | IN2149-005 | 999.4 | AS2149-001 | 998.83 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 21.443 | Free |
| IN2150-007_IN2150-008 | IN2150-007 | 1016.7 | IN2150-008 | 1015.51 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 68.007 | Free |
| IN2150-008_IN2150-009 | IN2150-008 | 1015.51 | IN2150-009 | 1013.42 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.5 | 0 | 69.24 | Free |
| IN2150-009_AS2150-032 | IN2150-009 | 1013.42 | AS2150-032 | 1008.36 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 285.946 | Free |
| IN2150-019_IN2150-044 | IN2150-019 | 1007.1 | IN2150-044 | 998.04 | Rectangular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 105.18 | Free |
| IN2150-044_IN2150-045 | IN2150-044 | 998.04 | IN2150-045 | 997.75 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 32.595 | Free |
| IN2150-045_TP2250-010 | IN2150-045 | 997.75 | TP2250-010 | 997.35 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 54.043 | Free |
| IN2151-001_AS2151-003 | IN2151-001 | 1053.1 | AS2151-003 | 1049.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.675 | Free |
| IN2151-002_AS2151-003 | IN2151-002 | 1053.1 | AS2151-003 | 1049.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.398 | Free |
| IN2151-005_AS2151-004 | IN2151-005 | 1053.51 | AS2151-004 | 1049.15 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 17.883 | Free |
| IN2152-002_AS2152-005 | IN2152-002 | 1055.84 | AS2152-005 | 1055.11 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 11.078 | Free |
| IN2152-003_AS2152-005 | IN2152-003 | 1056.04 | AS2152-005 | 1055.11 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 28.896 | Free |
| IN2152-013_AS2152-010 | IN2152-013 | 1055.6 | AS2152-010 | 1053.02 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 8.538 | Free |
| IN2152-014_AS2152-010 | IN2152-014 | 1055.6 | AS2152-010 | 1053.02 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.553 | Free |
| IN2152-016_AS2152-015 | IN2152-016 | 1056.04 | AS2152-015 | 1052.31 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 51.49 | Free |
| IN2152-018_AS2152-022 | IN2152-018 | 1054.77 | AS2152-022 | 1050.68 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 44.443 | Free |
| IN2155-013_IN2255-042 | IN2155-013 | 1049.63 | IN2255-042 | 1047.56 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 200.187 | Free |
| IN2155-015_AS2255-054 | IN2155-015 | 1049.05 | AS2255-054 | 1045.38 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 41.291 | Free |
| IN2156-006_AE2156-045 | IN2156-006 | 1051.07 | AE2156-045 | 1049.93 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 153 | Free |
| IN2156-011_AE2156-046 | IN2156-011 | 1050.33 | AE2156-046 | 1049.86 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 43 | Free |
| IN2156-012_2156-011 | IN2156-012 | 1051.67 | IN2156-011 | 1050.33 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 48.724 | Free |
| IN2156-016_AE2156-047 | IN2156-016 | 1050.87 | AE2156-047 | 1049.9 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 65 | Free |
| IN2156-060_AS2256-055 | IN2156-061 | 1047.77 | AS2256-055 | 1047.49 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 99.906 | Free |
| IN2156-066_IN2156-068 | IN2156-066 | 1069.76 | IN2156-068 | 1069.39 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 76.94 | Free |
| IN2156-068_IN2156-069 | IN2156-068 | 1069.39 | IN2156-069 | 1069.27 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 28.944 | Free |
| IN2156-069_IN2156-070 | IN2156-069 | 1069.27 | IN2156-070 | 1068.29 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 47.068 | Free |
| IN2156-070_IN2156-072 | IN2156-070 | 1068.29 | IN2156-072 | 1064.54 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 256.426 | Free |
| IN2156-072_AE2156-074 | IN2156-072 | 1064.54 | AE2156-074 | 1063.54 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 50.002 | Free |
| IN2156-076_IN2156-010 | IN2156-076 | 1056.43 | IN2156-011 | 1050.33 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 166.652 | Free |
| IN2157-013_IN2156-072 | IN2157-013 | 1068.09 | IN2156-072 | 1064.54 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 245.181 | Free |
| IN2157-015_IN2157-013 | IN2157-015 | 1071 | IN2157-013 | 1068.09 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 240.399 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2158-007_AS2258-014 | IN2158-007 | 1067.55 | AS2258-014 | 1068.19 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.25 | 0 | 125.699 | Free |
| IN2158-009_IN2158-007 | IN2158-009 | 1067.98 | IN2158-007 | 1067.55 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 98.587 | Free |
| IN2158-010_IN2158-009 | IN2158-010 | 1068 | IN2158-009 | 1067.98 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 9.976 | Free |
| IN2158-014_IN2158-010 | IN2158-014 | 1070 | IN2158-010 | 1068 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 190.386 | Free |
| IN2158-017_IN2158-014 | IN2158-017 | 1076.66 | IN2158-014 | 1070 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 198.093 | Free |
| IN2159-002_IN2158-017 | IN2159-002 | 1084.16 | IN2158-017 | 1076.66 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 197.112 | Free |
| IN2159-003_IN2159-002 | IN2159-003 | 1085.37 | IN2159-002 | 1084.16 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 10.515 | Free |
| IN2159-009_IN2159-003 | IN2159-009 | 1098.99 | IN2159-003 | 1085.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 336.04 | Free |
| IN2245-006_AS2245-005 | IN2245-006 | 959.78 | AS2245-005 | 958.4 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 9.597 | Free |
| IN2245-008_AS2245-012 | IN2245-008 | 967.81 | AS2245-012 | 965.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 19.094 | Free |
| IN2245-010_AS2245-012 | IN2245-010 | 967.81 | AS2245-012 | 965.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 43.714 | Free |
| IN2246-001_IN2246-002 | IN2246-001 | 973.46 | IN2246-002 | 972.96 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 39.475 | Free |
| IN2246-002_IN2246-003 | IN2246-002 | 972.96 | IN2246-003 | 972.78 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.5 | None (,) | 24.317 | Free |
| IN2246-003_IN2246-004 | IN2246-003 | 972.78 | IN2246-004 | 972.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 5.215 | Free |
| IN2246-004_AS2146-003 | IN2246-004 | 972.6 | AS2146-003 | 970.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 1 | None (,) | 365.694 | Free |
| IN2247-008_AS2247-006 | IN2247-008 | 967.46 | AS2247-006 | 965.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 34.807 | Free |
| IN2247-010_TP2247-019 | IN2247-010 | 967.8 | TP2247-019 | 967.1 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 22.238 | Free |
| IN2247-011_IN2247-010 | IN2247-011 | 968.52 | IN2247-010 | 967.8 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 110.634 | Free |
| IN2247-021_AS2247-001 | IN2247-021 | 968.4 | AS2247-001 | 966.22 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 24.452 | Free |
| IN2247-030_AS2247-006 | IN2247-030 | 967.6 | AS2247-006 | 965.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 7.153 | Free |
| IN2248-002_IN2248-001 | IN2248-002 | 971.8 | IN2248-001 | 970.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 38.11 | Free |
| IN2248-003_AS2248-004 | IN2248-003 | 968.1 | AS2248-004 | 967.52 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 116.053 | Free |
| IN2248-005_AS2248-004 | IN2248-005 | 969.27 | AS2248-004 | 967.52 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 31.985 | Free |
| IN2249-001_IN2249-003 | IN2249-001 | 973.55 | IN2249-003 | 972.7 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 12.374 | Free |
| IN2249-002_IN2249-003 | IN2249-002 | 973.47 | IN2249-003 | 972.7 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 26.535 | Free |
| IN2249-003_IN2248-001 | IN2249-003 | 972.7 | IN2248-001 | 970.25 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 393.03 | Free |
| IN2249-024_IN2249-030 | IN2249-024 | 986.71 | IN2249-030 | 986.55 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 40.09 | Free |
| IN2249-026_IN2249-027 | IN2249-026 | 987.16 | IN2249-027 | 986.32 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 37.384 | Free |
| IN2249-027_IN2249-028 | IN2249-027 | 986.32 | IN2249-028 | 985.76 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 68.908 | Free |
| IN2249-028_AE2249-029 | IN2249-028 | 985.76 | EMPB_GW_OSR2 | 985.3 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 81.246 | Free |
| IN2249-030_AE2249-032 | IN2249-030 | 986.55 | EMPB_GW_OSR2 | 985.4 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 32.935 | Free |
| IN2250-012_AS2250-016 | IN2250-012 | 999.42 | AS2250-016 | 997.91 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 12.186 | Free |
| IN2250-013_AS2250-016 | IN2250-013 | 999.02 | AS2250-016 | 997.91 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 15.7 | Free |
| IN2250-014_IN2250-013 | IN2250-014 | 999.2 | IN2250-013 | 999.02 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 22.176 | Free |
| IN2250-015_IN2250-014 | IN2250-015 | 999.42 | IN2250-014 | 999.2 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 26.722 | Free |
| IN2250-022_IN2250-064 | IN2250-022 | 1011.09 | IN2250-064 | 1009.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 152 | Free |
| IN2250-026_IN2250-030 | IN2250-026 | 1007.6 | IN2250-030 | 1000.82 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 217.246 | Free |
| IN2250-030_AS2250-016 | IN2250-030 | 1000.82 | AS2250-016 | 997.91 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 142.61 | Free |
| IN2250-039_AS2250-019 | IN2250-039 | 997.8 | AS2250-019 | 992.93 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 202.631 | Free |
| IN2250-044_AS2250-021 | IN2250-044 | 991.67 | AS2250-021 | 990.21 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 95.606 | Free |
| IN2250-051_IN2249-024 | IN2250-051 | 987.08 | IN2249-024 | 986.71 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 72.513 | Free |
| IN2250-054_AE2249-025 | IN2250-054 | 986.08 | EMPB_GW_OSR2 | 985.3 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 187.242 | Free |
| IN2250-056_IN2249-026 | IN2250-056 | 987.9 | IN2249-026 | 987.16 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 15.463 | Free |
| IN2250-057_IN2249-024 | IN2250-057 | 988.02 | IN2249-024 | 986.71 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 57.178 | Free |
| IN2250-061_IN2250-022 | IN2250-061 | 1011.59 | IN2250-022 | 1011.09 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 17.661 | Free |
| IN2250-062_IN2250-061 | IN2250-062 | 1012.23 | IN2250-061 | 1011.59 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 55.645 | Free |
| IN2250-063_IN2250-062 | IN2250-063 | 1013.65 | IN2250-062 | 1012.23 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 116.437 | Free |
| IN2250-064_IN2250-026 | IN2250-064 | 1009.41 | IN2250-026 | 1007.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 172.462 | Free |
| IN2251-001_IN2251-002 | IN2251-001 | 1028.15 | IN2251-002 | 1027.33 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 35.171 | Free |
| IN2251-002_IN2251-003 | IN2251-002 | 1027.33 | IN2251-003 | 1027 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 16.153 | Free |
| IN2251-003_AS2251-008 | IN2251-003 | 1027 | AS2251-008 | 1024.72 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 34.611 | Free |
| IN2251-006_AS2251-007 | IN2251-006 | 1026.29 | AS2251-007 | 1025 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 4.274 | Free |
| IN2251-011_AS2251-010 | IN2251-011 | 1029.6 | AS2251-010 | 1028.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 63.023 | Free |
| IN2251-012_AS2251-010 | IN2251-012 | 1029.6 | AS2251-010 | 1028.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 11.325 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2251-013_AS2251-031 | IN2251-013 | 1016.72 | AS2251-031 | 1013.75 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 100.837 | Free |
| IN2251-017_AS2251-018 | IN2251-017 | 1039.23 | AS2251-018 | 1038.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 37.646 | Free |
| IN2251-024_IN2251-013 | IN2251-024 | 1018.48 | IN2251-013 | 1016.72 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 64.279 | Free |
| IN2251-026_IN2251-027 | IN2251-026 | 1018.51 | IN2251-027 | 1014.45 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 194.069 | Free |
| IN2251-027_IN2250-063 | IN2251-027 | 1014.45 | IN2250-063 | 1013.65 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 59.969 | Free |
| IN2252-002_AS2252-008 | IN2252-002 | 1049.44 | AS2252-008 | 1048.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 58.108 | Free |
| IN2252-007_AS2252-008 | IN2252-007 | 1049.4 | AS2252-008 | 1048.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 46.975 | Free |
| IN2252-009_IN2252-011 | IN2252-009 | 1037.24 | IN2252-011 | 1030.58 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 243.079 | Free |
| IN2252-010_IN2252-009 | IN2252-010 | 1039.02 | IN2252-009 | 1037.24 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 75.561 | Free |
| IN2252-011_AS2251-010 | IN2252-011 | 1030.58 | AS2251-010 | 1028.1 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 156.047 | Free |
| IN2254-001_AS2254-004 | IN2254-001 | 1054.31 | AS2254-004 | 1053.27 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.831 | Free |
| IN2254-009_IN2254-012 | IN2254-009 | 1048.77 | IN2254-012 | 1048.64 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.5 | 0 | 31.41 | Free |
| IN2254-012_AS2254-015 | IN2254-012 | 1048.64 | AS2254-015 | 1048.53 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 109.623 | Free |
| IN2254-021_AS2254-024 | IN2254-021 | 1048.3 | AS2254-024 | 1047.55 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 249.348 | Free |
| IN2255-001_IN2255-002 | IN2255-001 | 1045.58 | IN2255-002 | 1044.08 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.25 | 0 | 304.461 | Free |
| IN2255-002_IN2255-003 | IN2255-002 | 1044.08 | IN2255-003 | 1042.96 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.05 | 0 | 230.263 | Free |
| IN2255-003_AE2255-004 | IN2255-003 | 1042.96 | AE2255-004 | 1042.88 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 1 | 0 | 54 | Free |
| IN2255-032_AE2255-033 | IN2255-032 | 1050.2 | AE2255-033 | 1049.08 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 75.118 | Free |
| IN2255-037_MI2255-034 | IN2255-037 | 1050.37 | MI2255-034 | 1050.25 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 39.761 | Free |
| IN2255-042_AS2255-006 | IN2255-042 | 1047.56 | AS2255-006 | 1046.31 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.5 | 0 | 91.03 | Free |
| IN2255-061_HD2255-060 | IN2255-061 | 1044.3 | HD2255-060 | 1044 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 1 | None (,) | 27.226 | Free |
| IN2255-062_IN2255-063 | IN2255-062 | 1049.29 | IN2255-063 | 1049.03 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 26.32 | Free |
| IN2255-063_IN2255-064 | IN2255-063 | 1049.03 | IN2255-064 | 1048.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 58.236 | Free |
| IN2255-064_AE2255-035 | IN2255-064 | 1048.3 | AE2255-035 | 1048.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 23.667 | Free |
| IN2256-020_IN2256-021 | IN2256-020 | 1053.1 | IN2256-021 | 1052.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 57.51 | Free |
| IN2256-021_AS2256-073 | IN2256-021 | 1052.5 | AS2256-073 | 1052.5 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 44.466 | Free |
| IN2256-031_IN2256-032 | IN2256-031 | 1051.81 | IN2256-032 | 1051.88 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 18.958 | Free |
| IN2256-032_AE2256-033 | IN2256-032 | 1051.88 | AE2256-033 | 1051.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 50.793 | Free |
| IN2256-048_IN2256-049 | IN2256-048 | 1061.97 | IN2256-049 | 1058.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 147.214 | Free |
| IN2256-049_IN2256-050 | IN2256-049 | 1058.56 | IN2256-050 | 1053.121 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 148.248 | Free |
| IN2256-050_IN2256-088 | IN2256-050 | 1053.121 | IN2256-088 | 1052.63 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 94.919 | Free |
| IN2256-052_IN2256-053 | IN2256-052 | 1049.66 | IN2256-053 | 1048.5 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 121.252 | Free |
| IN2256-054_AS2256-055 | IN2256-053 | 1048.5 | AS2256-055 | 1047.49 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 47 | Free |
| IN2256-061_IN2256-062 | JB2256-061 | 1044.39 | IN2256-062 | 1044.31 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 28.612 | Free |
| IN2256-062_IN2256-063 | IN2256-062 | 1044.31 | IN2256-063 | 1044.3 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.05 | None (,) | 6.04 | Free |
| IN2256-063_IN2255-061 | IN2256-063 | 1044.3 | IN2255-061 | 1044.3 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 77.105 | Free |
| IN2256-065_IN2255-037 | IN2255-065 | 1050.7 | IN2255-037 | 1050.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 14.204 | Free |
| IN2256-068_JB2256-060 | IN2256-068 | 1045.29 | JB2256-060 | 1046.02 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 25.734 | Free |
| IN2256-069_IN2256-068 | IN2256-069 | 1046.94 | IN2256-068 | 1045.29 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 43.048 | Free |
| IN2256-070_IN2256-069 | IN2256-070 | 1047.5 | IN2256-069 | 1046.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 58.381 | Free |
| IN2256-071_AE2256-072 | IN2256-071 | 1049.83 | Node1799 | 1049.25 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 1 | 0 | 58 | Free |
| IN2256-076_JB2256-065 | IN_2256-076 | 1044.88 | JB2256-065 | 1044.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 31.538 | Free |
| IN2256-080_IN2255-062 | IN2256-080 | 1050.05 | IN2255-062 | 1049.29 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 60.507 | Free |
| IN2256-088_IN2256-051 | IN2256-088 | 1052.63 | IN2256-052 | 1049.66 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 45.794 | Free |
| IN2257-009_AS2257-012 | IN2257-009 | 1060.02 | AS2257-012 | 1058.87 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 47.923 | Free |
| IN2257-034_IN2258-075 | IN2257-034 | 1068.47 | IN2258-075 | 1064.8 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 202.596 | Free |
| IN2258-023_AS2258-052 | IN2258-023 | 1086.91 | AS2258-052 | 1080.75 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 125.419 | Free |
| IN2258-025_IN2258-028 | IN2258-025 | 1069.43 | IN2258-028 | 1063.36 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 176.838 | Free |
| IN2258-027_IN2258-034 | IN2258-027 | 1064.38 | IN2258-034 | 1062.36 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 81.446 | Free |
| IN2258-028_AE2258-029 | IN2258-028 | 1063.36 | AE2258-029 | 1061.6 | Circular | | 1 | 4 | 0.013 | 0.5 | 1 | 0 | 58.006 | Free |
| IN2258-034_AS2258-001 | IN2258-034 | 1062.36 | AS2258-001 | 1061.85 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | 0 | 19.846 | Free |
| IN2258-039_MI2258-038 | IN2258-039 | 1065.19 | MI2258-038 | 1065.1 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 23.721 | Free |
| IN2258-040_IN2258-039 | IN2258-040 | 1065.32 | IN2258-039 | 1065.19 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 25.15 | Free |
| IN2258-049_AS2258-048 | IN2258-049 | 1068.06 | AS2258-048 | 1066.28 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.25 | 0 | 280.602 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2258-053_AS2258-052 | IN2258-053 | 1081.18 | AS2258-052 | 1080.75 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 26.582 | Free |
| IN2258-054_IN2258-053 | IN2258-054 | 1091.44 | IN2258-053 | 1081.18 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 374.155 | Free |
| IN2258-057_AS2258-056 | IN2258-057 | 1070.99 | AS2258-056 | 1070.77 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 39.178 | Free |
| IN2258-067_AS2258-001 | IN2258-067 | 1062.68 | AS2258-001 | 1061.85 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 151.699 | Free |
| IN2258-074_DT2258-080 | IN2258-074 | 1064.75 | COM_SQ_P_IN | 1064 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 47.777 | Free |
| IN2258-075_IN2258-074 | IN2258-075 | 1064.8 | IN2258-074 | 1064.75 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 11.913 | Free |
| IN2258-076_IN2258-074 | IN2258-076 | 1065.66 | IN2258-074 | 1064.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 38.027 | Free |
| IN2258-078_IN2258-074 | IN2258-078 | 1069.03 | IN2258-074 | 1064.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 159.908 | Free |
| IN2347-002_AS2347-001 | IN2347-002 | 974.31 | AS2347-001 | 971.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 7.685 | Free |
| IN2347-005_IN2347-035 | IN2347-005 | 971.6 | IN2347-035 | 970.15 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 249.381 | Free |
| IN2347-032_IN2347-017 | IN2347-032 | 971.2 | IN2347-017 | 971.3 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.05 | None (,) | 37.654 | Free |
| IN2347-034_AS2347-011 | IN2347-034 | 970.35 | AS2347-011 | 970.15 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.05 | None (,) | 94.335 | Free |
| IN2347-035_AS2347-011 | IN2347-035 | 970.15 | AS2347-011 | 970.15 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 47.301 | Free |
| IN2348-001_AS2347-001 | IN2348-001 | 974.45 | AS2347-001 | 971.55 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 237.564 | Free |
| IN2348-003_IN2348-001 | IN2348-003 | 977.25 | IN2348-001 | 974.45 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 253.751 | Free |
| IN2348-006_AS2348-005 | IN2348-006 | 979.74 | AS2348-005 | 975.3 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 60.308 | Free |
| IN2349-001_IN2349-002 | IN2349-001 | 988.72 | IN2349-002 | 988.72 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 41.012 | Free |
| IN2349-002_AS2349-006 | IN2349-002 | 988.72 | AS2349-006 | 986 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 206.639 | Free |
| IN2349-005_AS2349-006 | IN2349-005 | 986.3 | AS2349-006 | 986 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 13.216 | Free |
| IN2349-007_AS2349-006 | IN2349-007 | 986.1 | AS2349-006 | 986 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 24.839 | Free |
| IN2349-009_AS2349-011 | IN2349-009 | 979.3 | AS2349-011 | 978.1 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 11.557 | Free |
| IN2349-010_AS2349-011 | IN2349-010 | 981.24 | AS2349-011 | 978.1 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 57.712 | Free |
| IN2349-023_IN2249-026 | IN2349-023 | 987.66 | IN2249-026 | 987.16 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 51.601 | Free |
| IN2349-024_AS2349-025 | IN2349-024 | 989.39 | AS2349-025 | 988.15 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 84.009 | Free |
| IN2349-027_IN2249-027 | IN2349-027 | 986.62 | IN2249-027 | 986.32 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 51.904 | Free |
| IN2350-001_IN2350-002 | IN2350-001 | 988.9 | IN2350-002 | 988.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 31.687 | Free |
| IN2350-002_IN2349-001 | IN2350-002 | 988.85 | IN2349-001 | 988.72 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 42.21 | Free |
| IN2350-003_IN2349-007 | IN2350-003 | 987.32 | IN2349-007 | 986.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 41.689 | Free |
| IN2350-004_IN2350-007 | IN2350-004 | 987.71 | IN2350-007 | 987.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 50.476 | Free |
| IN2350-007_AE2350-011 | IN2350-007 | 987.6 | EMPB_GW_NTL1 | 986.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 50.482 | Free |
| IN2350-008_GR2350-010 | IN2350-008 | 987.9 | EMPB_GW_NTL1 | 987 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 35.59 | Free |
| IN2350-013_AE2350-016 | IN2350-013 | 994.6 | AE2350-016 | 992.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 1 | 0 | 47.689 | Free |
| IN2350-014_IN2350-013 | IN2350-014 | 995.55 | IN2350-013 | 994.6 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 56.826 | Free |
| IN2350-023_IN2350-028 | IN2350-023 | 988.2 | IN2350-028 | 987.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 36.392 | Free |
| IN2350-028_IN2349-023 | IN2350-028 | 987.8 | IN2349-023 | 987.66 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 15.518 | Free |
| IN2350-029_IN2350-014 | IN2350-029 | 999.21 | IN2350-014 | 995.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 91.011 | Free |
| IN2351-006_AS2351-003 | IN2351-006 | 1012 | AS2351-003 | 1010.53 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 292.038 | Free |
| IN2351-014_IN2351-006 | IN2351-014 | 1012.86 | IN2351-006 | 1012 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 172.392 | Free |
| IN2352-004_AS2452-001 | IN2352-004 | 1024.9 | AS2452-001 | 1022.9 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 401.824 | Free |
| IN2354-020_AS2354-015 | IN2354-020 | 1044.97 | AS2354-015 | 1044.02 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.05 | 0 | 137.958 | Free |
| IN2355-005_IN2355-006 | IN2355-005 | 1045.13 | IN2355-006 | 1042.13 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.8 | Free |
| IN2355-006_AS2355-064 | IN2355-006 | 1042.13 | AS2355-064 | 1041.61 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 50.86 | Free |
| IN2355-020_AS2355-019 | IN2355-020 | 1058.03 | AS2355-019 | 1058 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 10.053 | Free |
| IN2355-037_MI2355-039 | IN2355-037 | 1049.03 | MI2355-039 | 1048.75 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 29.366 | Free |
| IN2355-038_IN2355-040 | IN2355-038 | 1048.43 | IN2355-040 | 1046.7 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 48.435 | Free |
| IN2355-040_AS2355-059 | IN2355-040 | 1046.7 | AS2355-059 | 1043.43 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 92.487 | Free |
| IN2355-042_AS2355-059 | IN2355-042 | 1046.3 | AS2355-059 | 1043.43 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 51.263 | Free |
| IN2355-045_MI2355-046 | IN2355-045 | 1046.3 | MI2355-046 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 9.619 | Free |
| IN2355-051_IN2355-052 | IN2355-051 | 1052.87 | IN2355-052 | 1043.37 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 360.792 | Free |
| IN2355-052_IN2355-006 | IN2355-052 | 1043.37 | IN2355-006 | 1042.13 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 206.345 | Free |
| IN2356-006_IN2356-008 | IN2356-006 | 1058.34 | IN2356-008 | 1058.2 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 52.901 | Free |
| IN2356-008_IN2356-010 | IN2356-008 | 1058.2 | IN2356-010 | 1058.2 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 33.752 | Free |
| IN2356-010_IN2355-020 | IN2356-010 | 1058.2 | IN2355-020 | 1058.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 13.089 | Free |
| IN2356-021_MI2356-023 | IN2356-021 | 1049.62 | MI2356-023 | 1049.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 16.002 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2356-022_IN2355-037 | IN2356-022 | 1049.03 | IN2355-037 | 1049.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 16.251 | Free |
| IN2356-024_IN2355-045 | IN2356-024 | 1046.3 | IN2355-045 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 15.146 | Free |
| IN2356-025_IN2356-024 | IN2356-025 | 1046.65 | IN2356-024 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 50.006 | Free |
| IN2356-033_AS2355-060 | IN2356-033 | 1048.95 | AS2355-060 | 1044.94 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 150.877 | Free |
| IN2357-008_IN2257-009 | IN2357-008 | 1060.41 | IN2257-009 | 1060.02 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 19.102 | Free |
| IN2358-003_AS2258-056 | IN2358-003 | 1072.57 | AS2258-056 | 1070.77 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 28.665 | Free |
| IN2358-007_IN2358-003 | IN2358-007 | 1078.77 | IN2358-003 | 1072.57 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 112.847 | Free |
| IN2358-009_IN2358-007 | IN2358-009 | 1083.18 | IN2358-007 | 1078.77 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 71.211 | Free |
| IN2358-010_IN2358-009 | IN2358-010 | 1087.6 | IN2358-009 | 1083.18 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 67.959 | Free |
| IN2358-012_IN2358-010 | IN2358-012 | 1091.8 | IN2358-010 | 1087.6 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 71.475 | Free |
| IN2358-013_IN2358-012 | IN2358-013 | 1096.44 | IN2358-012 | 1091.8 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 70.754 | Free |
| IN2358-015_IN2358-013 | IN2358-015 | 1100.85 | IN2358-013 | 1096.44 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 70.609 | Free |
| IN2358-016_IN2358-015 | IN2358-016 | 1105.27 | IN2358-015 | 1100.85 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.05 | 0 | 69.644 | Free |
| IN2358-020_IN2358-016 | IN2358-020 | 1118.44 | IN2358-016 | 1105.27 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 212.708 | Free |
| IN2447-001_IN2448-014 | IN2447-001 | 975.23 | IN2448-014 | 974.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 52.044 | Free |
| IN2448-008_MI2448-017 | IN2448-008 | 975.95 | MI2448-017 | 973.79 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | None (,) | 212.162 | Free |
| IN2448-014_AE2448-015 | IN2448-014 | 974.8 | AE2448-015 | 973.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 1 | 0 | 155 | Free |
| IN2449-001_IN2449-002 | IN2449-001 | 995.82 | IN2449-002 | 990.5 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 246.939 | Free |
| IN2449-002_AE2449-003 | IN2449-002 | 990.5 | AE2449-003 | 984.8 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 269.596 | Free |
| IN2449-004_IN2449-001 | IN2449-004 | 997.1 | IN2449-001 | 995.82 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 322.668 | Free |
| IN2449-009_IN2449-004 | IN2449-009 | 997.2 | IN2449-004 | 997.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 9.527 | Free |
| IN2450-013_IN2450-014 | IN2450-013 | 993.6 | IN2450-014 | 993.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 8.829 | Free |
| IN2450-014_AS2450-026 | IN2450-014 | 993.5 | AS2450-026 | 992.29 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 21.468 | Free |
| IN2450-021_IN2450-023 | IN2450-021 | 997.3 | IN2450-023 | 997.25 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 20.483 | Free |
| IN2450-023_IN2449-009 | IN2450-023 | 997.25 | IN2449-009 | 997.2 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 22.794 | Free |
| IN2450-024_AE2450-030 | IN2450-024 | 992.29 | EMPB_GW_NTL5 | 991.37 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 216.29 | Free |
| IN2450-025_AE2450-031 | IN2450-025 | 992.15 | EMPB_GW_NTL5 | 991.37 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 226.099 | Free |
| IN2451-001_AE2451-002 | IN2451-001 | 995.6 | AE2451-002 | 995.25 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 71.032 | Free |
| IN2451-009_IN2451-001 | IN2451-009 | 1003.86 | IN2451-001 | 995.6 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 205.455 | Free |
| IN2452-009_AS2451-004 | IN2452-009 | 1016.2 | AS2451-004 | 1011.2 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 129.088 | Free |
| IN2452-011_AS2452-013 | IN2452-011 | 1007.6 | AE2452-014 | 1006.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 214.406 | Free |
| IN2453-009_AE2553-001 | IN2453-009 | 1025.9 | AE2553-001 | 1012.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 223 | Free |
| IN2454-009_AS2454-010 | IN2454-009 | 1041.01 | AS2454-010 | 1039.2 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 32.575 | Free |
| IN2454-019_AE2454-006 | IN2454-019 | 1033.78 | AE2454-006 | 1021.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 300.527 | Free |
| IN2455-017_IN2455-018 | IN2455-017 | 1041.55 | IN2455-018 | 1041.33 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 42.279 | Free |
| IN2455-018_IN2455-019 | IN2455-018 | 1041.33 | IN2455-019 | 1041.33 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.624 | Free |
| IN2455-019_AE2455-020 | IN2455-019 | 1041.33 | EMPB_GW_SHPR1 | 1036.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 47.005 | Free |
| IN2455-021_AS2455-024 | IN2455-021 | 1063.83 | AS2455-024 | 1061.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 79.865 | Free |
| IN2456-003_IN2456-022 | IN2456-003 | 1065.85 | IN2456-022 | 1062.88 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 168.877 | Free |
| IN2456-022_AS2455-024 | IN2456-022 | 1062.88 | AS2455-024 | 1061.5 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.5 | 0 | 109.98 | Free |
| IN2548-004_AS2548-003 | IN2548-004 | 986.4 | AS2548-003 | 986.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 32.939 | Free |
| IN2548-007_AS2548-003 | IN2548-007 | 986.35 | AS2548-003 | 986.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 9.108 | Free |
| IN2549-009_AE2549-011 | IN2549-009 | 991.8 | EMPB_GW_LOSR1 | 991.7 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.5 | 0 | 19.415 | Free |
| IN2549-013_AS2549-001 | IN2549-013 | 997.2 | AS2549-001 | 993.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.413 | Free |
| IN2549-014_IN2549-015 | IN2549-014 | 996.93 | IN2549-015 | 996.79 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 10.521 | Free |
| IN2549-015_AS2549-003 | IN2549-015 | 996.79 | AS2549-003 | 993.81 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 25.127 | Free |
| IN2550-001_GR2550-006 | IN2550-001 | 1006.46 | GR2550-006 | 1002.86 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 240 | Free |
| IN2550-021_IN2549-009 | IN2550-021 | 992.7 | IN2549-009 | 991.8 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 48.53 | Free |
| IN2552-007_AS2552-005 | IN2552-007 | 1032.31 | AS2552-005 | 1030.94 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 41.541 | Free |
| IN2552-010_AS2552-005 | IN2552-010 | 1032.78 | AS2552-005 | 1030.94 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 62.051 | Free |
| IN2553-005_IN2553-006 | IN2553-005 | 1045.6 | IN2553-006 | 1045.2 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 41.893 | Free |
| IN2553-006_CB2553-007 | IN2553-006 | 1045.2 | CB2553-007 | 1044.91 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 8.508 | Free |
| IN2649-011_AS2649-008 | IN2649-011 | 996.74 | AS2649-008 | 996.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 18.356 | Free |
| IN2650-005_IN2650-006 | IN2650-005 | 1004.1 | IN2650-006 | 1001.48 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 215.008 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2650-006_AS2650-004 | IN2650-006 | 1001.48 | AS2650-004 | 997.19 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 349.758 | Free |
| JB2256-058_JB2256-060 | JB2256-058 | 1046.5 | JB2256-060 | 1046.02 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 167.707 | Free |
| JB2256-060_JB2256-061 | JB2256-060 | 1046.02 | JB2256-061 | 1044.39 | Rectangular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 165.518 | Free |
| JB2256-065_JB2256-061 | JB2256-065 | 1044.42 | JB2256-061 | 1044.39 | Rectangular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 47.349 | Free |
| JCT_RIDGE_P_BACK_WEIR_TOP | JCT_RIDGE_POND_OUT | | JCT_RIDGE_POND_OUT2 | | | | | | | | | | | |
| JCT_RIDGE_POND_BACK_WEIR | JCT_RIDGE_POND_OUT | | JCT_RIDGE_POND_OUT2 | | | | | | | | | | | |
| JCT_RIDGE_POND_HIGH_WEIR | TARGET_P_OUT | | JCT_RIDGE_POND_OUT | | | | | | | | | | | |
| JCT_RIDGE_POND_LO_WEIR | TARGET_P_OUT | | JCT_RIDGE_POND_OUT | | | | | | | | | | | |
| JCT_RIDGE_POND_OUTFLOW_CHA | JCT_RIDGE_POND_OUT2 | 1044.3 | JUNCTION_RIDGE_POND_OUT_JCT1 | 1043.5 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 23.916 | Free |
| Link1723 | WW_TO_POND_BLIND_TAP | 1071.77 | AE1748-006 | 1071.37 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 1 | 0 | 120 | Free |
| Link1728 | DT1853-003 | 1090.9 | IN1753-027 | 1088.83 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 98 | Free |
| Link1729 | IN1753-027 | 1088.83 | IN1853-001 | 1088.36 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 156 | Free |
| Link1730 | IN1853-001 | 1088.36 | IN1753-025 | 1087.88 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 161 | Free |
| Link1731 | IN1753-025 | 1087.88 | IN1753-015 | 1086.53 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | 0 | 454 | Free |
| Link1732 | IN1753-015 | 1086.53 | IN1753-009 | 1086.39 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 45 | Free |
| Link1733 | IN1753-026 | 1088.54 | IN1853-001 | 1088.36 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 59 | Free |
| Link1737 | HOMEWOOD_W_P_OUT | 1072 | Node1694 | 1071.9 | Circular | | 1 | 0.667 | 0.011 | 1 | 0.5 | 0 | 86 | Free |
| Link1738 | Node1694 | 1071.9 | Node1696 | 1071.66 | Circular | | 1 | 0.667 | 0.011 | 0.5 | 0.05 | 0 | 48 | Free |
| Link1739 | Node1695 | 1063.33 | GAN_H_PRIV_P_IN | 1054.6 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 1 | 0 | 263 | Free |
| Link1740 | Node1696 | 1071.66 | Node1695 | 1063.33 | Circular | | 1 | 0.833 | 0.011 | 0.05 | 0.5 | 0 | 106 | Free |
| Link1741 | HIGHVIEW_PR | 1087.58 | Node1698 | 1087.21 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 74 | Free |
| Link1742 | Node1698 | 1087.21 | IN2258-023 | 1086.91 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 58 | Free |
| Link1743 | IN1956-014 | 1100.04 | IN1956-013 | 1099.53 | Circular | | 1 | 1.25 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 52 | Free |
| Link1744 | IN2155-007 | 1055.82 | Node1701 | 1055.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 37 | Free |
| Link1745 | Node1701 | 1055.37 | Node1702 | 1055.24 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 25 | Free |
| Link1746 | Node1702 | 1055.24 | Node1703 | 1055.15 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 19 | Free |
| Link1747 | Node1703 | 1055.15 | AS2156-020 | 1054 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 28 | Free |
| Link1748 | IN1955-001 | 1084.37 | AE2055-001 | 1080.87 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 175 | Free |
| Link1750 | AS2450-026 | 992.29 | IN2450-025 | 992.15 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 10 | Free |
| Link1754 | WS-3 | 1005.59 | WS-2 | 1001.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 168 | Free |
| Link1755 | WS-2 | 1001.47 | AS2550-016 | 997.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 196 | Free |
| Link1756 | FS-15 | 1058.68 | FS-14 | 1045.62 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 258 | Free |
| Link1757 | FS-14 | 1045.62 | FS-13 | 1035.04 | Circular | | 1 | 1.5 | 0.013 | 0.15 | 0.05 | 0 | 341 | Free |
| Link1758 | FS-13 | 1034.46 | FS-12 | 1025.44 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.2 | 0 | 308 | Free |
| Link1759 | FS-12 | 1025.44 | FS-11 | 1023.66 | Circular | | 1 | 1.75 | 0.013 | 0.2 | 0.25 | 0 | 108 | Free |
| Link1760 | FS-11 | 1023.66 | FS-10 | 1022.75 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 51 | Free |
| Link1761 | FS-10 | 1022.5 | FS-9 | 1019.22 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 178 | Free |
| Link1762 | FS-9 | 1017.49 | FS-8A | 1016.68 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.25 | 0 | 164 | Free |
| Link1763 | FS-8A | 1016.68 | AS2551-010 | 1016.56 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.25 | 0 | 29 | Free |
| Link1764 | AS2155-011 | 1059 | IN2155-009 | 1058.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 25 | Free |
| Link1765 | IN2155-009 | 1058.87 | IN2156-034 | 1058.42 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 39 | Free |
| Link1766 | IN2156-034 | 1058.42 | IN2156-033 | 1058.31 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 22 | Free |
| Link1767 | IN2156-033 | 1058.31 | IN2156-031 | 1058.24 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.15 | 0 | 22 | Free |
| Link1768 | IN2156-031 | 1058.24 | AS2156-028 | 1057.29 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 32 | Free |
| Link1769 | BH_APARTMENTS | 1008.78 | N_PV_ROAD_US | 1004.8 | Trapezoidal | | 1 | 2 | 0.027 | 0 | 0 | None (,) | 370 | Free |
| Link1770 | IN2056-039 | 1082.69 | AS2056-031 | 1068.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 350 | Free |
| Link1771 | IN2247-013 | 971.25 | IN2247-012 | 970.05 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 40 | Free |
| Link1772 | IN2247-012 | 970.05 | IN2247-011 | 968.52 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 118 | Free |
| Link1774 | IN2256-023 | 1057.6 | PD2256-019_AE2256-015 | 1054 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 40 | Free |
| Link1775 | IN2347-017 | 971.3 | AS2347-018 | 970.95 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 11 | Free |
| Link1776 | JCT_CT_POND_OUT | 996 | IN2250-044 | 995.17 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 91 | Free |
| Link1777 | IN1753-024 | 1090.8 | IN1753-023 | 1090.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 43 | Free |
| Link1778 | IN1753-023 | 1090.05 | IN1753-022 | 1089.35 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 36 | Free |
| Link1779 | IN1753-022 | 1089.35 | IN1753-018 | 1088.67 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 136 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link1780 | IN1753-010 | 1088.78 | IN1753-008 | 1086.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 51 | Free |
| Link1781 | AE2052-041 | 1056.44 | AS2152-024 | 1055.06 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 283 | Free |
| Link1782 | AS2152-024 | 1055.06 | AS2152-023 | 1053.83 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 372 | Free |
| Link1783 | IN2152-007 | 1057.24 | AS2152-008 | 1054.16 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 42 | Free |
| Link1784 | IN2256-034 | 1059.64 | AE2256-035 | 1058.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 79 | Free |
| Link1785 | IN2257-028 | 1058.4 | IN2257-029 | 1057.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 60 | Free |
| Link1786 | IN2257-029 | 1057.8 | AE2257-030 | 1057.5 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 30 | Free |
| Link1787 | IN2554-002 | 1036.7 | IN2554-001 | 1036.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 22 | Free |
| Link1788 | IN2554-001 | 1036.01 | AS2454-001 | 1034.6 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 32 | Free |
| Link1789 | IN2554-003 | 1036.71 | IN2554-001 | 1036.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.6 | None (,) | 15 | Free |
| Link1790 | IN2347-020 | 971.85 | IN2347-032 | 971.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 200 | Free |
| Link1791 | IN1947-018 | 1021.37 | AS1947-017 | 1016.41 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 148 | Free |
| Link1792 | IN2453-004 | 1031.4 | AS2353-005 | 1030.7 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 57 | Free |
| Link1793 | IN2353-006 | 1032.5 | AS2353-005 | 1030.7 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.15 | None (,) | 70 | Free |
| Link1795 | BH_CHURCH_PR | 1113.37 | IN1654-004 | 1108.56 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 109 | Free |
| Link1796 | BL_DITCH_TO_FOURIER_CH | 970 | BL_D_TO_FOURIER_CH_DS | 969.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 83 | Free |
| Link1798 | DT2157-011 | 1073.04 | IN2157-009 | 1070.32 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.05 | Groove End with Projecting (Circ, Conc) | 29 | Free |
| Link1799 | IN2157-009 | 1070.32 | IN2157-039 | 1069.65 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 71 | Free |
| Link1800 | IN2157-039 | 1069.65 | IN2257-036 | 1068.97 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 20 | Free |
| Link1801 | IN2257-036 | 1068.97 | IN2257-034 | 1068.47 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 29 | Free |
| Link1802 | AE1653-022 | 1106.07 | IN1653-021 | 1105.45 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 93 | Free |
| Link1803 | IN1653-021 | 1105.45 | IN1653-020 | 1105.28 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 32 | Free |
| Link1807 | IN2150-021 | 1024.35 | IN2150-020 | 1022.72 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.5 | 0 | 94 | Free |
| Link1808 | IN2150-020 | 1022.72 | IN2150-006 | 1020.86 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.05 | 0 | 101 | Free |
| Link1809 | IN2150-006 | 1020.86 | IN2150-007 | 1016.7 | Circular | | 1 | 1.25 | 0.014 | 0.5 | 0.05 | None (,) | 98 | Free |
| Link1810 | Node1915 | 1073.81 | Node1919 | 1073.13 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | 0 | 136 | Free |
| Link1811 | Node1916 | 1074.7 | Node1917 | 1074.23 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 68 | Free |
| Link1812 | Node1918 | 1074.02 | Node1915 | 1073.81 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 41 | Free |
| Link1813 | Node1917 | 1074.23 | Node1918 | 1074.02 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 42 | Free |
| Link1814 | Node1919 | 1073.13 | IN1849-057 | 1073.88 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 44 | Free |
| Link1815 | Node1920 | 1075.44 | Node1921 | 1075.09 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 70 | Free |
| Link1816 | Node1921 | 1075.09 | Node1922 | 1074.79 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 61 | Free |
| Link1818 | Node1922 | 1074.79 | Node1924 | 1074.33 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 91 | Free |
| Link1819 | Node1924 | 1074.33 | AS1849-058 | 1073.28 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | 0 | 147 | Free |
| Link1821 | IN1949-001 | 1031.49 | AS1949-009 | 1030.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 25 | Free |
| Link1822 | IN1949-002 | 1031.24 | IN1949-003 | 1030.56 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 33 | Free |
| Link1823 | IN2353-001 | 0.05 | IN2352-002 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1824 | IN2352-002 | 0.05 | IN2352-004 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1825 | IN2352-003 | 0.05 | IN2352-004 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1826 | IN2354-019 | 0.05 | AS2354-006 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1827 | IN2354-007 | 0.05 | AS2354-006 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1828 | IN2354-014 | 0.05 | AS2354-012 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1829 | IN2354-016 | 0.05 | AS2354-015 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1830 | IN2355-050 | 0.05 | AS2355-001 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1831 | IN2355-049 | 0.05 | AS2355-001 | 0 | Circular | | 1 | 0.05 | 0.014 | 0 | 0 | None (,) | 10 | Free |
| Link1832 | IN2253-008 | 1055.95 | AS2253-012 | 1054.89 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 34 | Free |
| Link1833 | IN2253-014 | 1054.2 | AS2254-004 | 1053.27 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 26 | Free |
| Link1834 | IN2254-003 | 1054.95 | IN2254-001 | 1054.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 26 | Free |
| Link1835 | IN2254-026 | 1054.25 | AS2254-005 | 1052.66 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 42 | Free |
| Link1836 | IN2254-025 | 1054.25 | AS2254-005 | 1052.66 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 26 | Free |
| Link1837 | IN2254-008 | 1051.34 | IN2254-012 | 1048.64 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 38 | Free |
| Link1838 | IN2256-012 | 1058.8 | IN2256-013 | 1058.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 60 | Free |
| Link1839 | IN2256-013 | 1058.2 | AE2256-014 | 1056.6 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 40 | Free |
| Link1840 | MenardsPL1 | 1055.09 | AE2256-016 | 1054.6 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 154 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link1841 | MenardsPL2 | 1056.12 | MenardsPL1 | 1055.09 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 80 | Free |
| Link1842 | MenardsPL3 | 1056.63 | MenardsPL1 | 1055.09 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | None (,) | 258 | Free |
| Link1843 | MenardsPL4 | 1057.33 | MenardsDitch | 1055.03 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 288 | Free |
| Link1845 | Node1953 | 1059.06 | TE2257-014 | 1057.35 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 42 | Free |
| Link1846 | IN2257-005 | 1060.42 | AS2257-004 | 1060.06 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 18 | Free |
| Link1847 | IN2257-006 | 1060.42 | AS2257-004 | 1059.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 30 | Free |
| Link1848 | IN2257-007 | 1061.9 | AS2257-008 | 1061.64 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 13 | Free |
| Link1849 | IN2258-071 | 1065.36 | IN2258-070 | 1065.28 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 15 | Free |
| Link1850 | IN2258-070 | 1065.28 | IN2258-069 | 1065.14 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 29 | Free |
| Link1851 | IN2258-069 | 1065.14 | IN2258-068 | 1065.08 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 11 | Free |
| Link1852 | IN2258-068 | 1065.08 | IN2258-027 | 1064.38 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 40 | Free |
| Link1853 | IN2258-050 | 1070 | IN2258-049 | 1068.06 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 79 | Free |
| Link1854 | IN2258-047 | 1067.82 | IN2258-046 | 1067.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 31 | Free |
| Link1855 | IN2258-046 | 1067.6 | IN2258-045 | 1067.24 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 17 | Free |
| Link1856 | IN2258-045 | 1067.24 | IN2258-044 | 1067.06 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 35 | Free |
| Link1857 | IN2258-044 | 1067.06 | IN2258-040 | 1065.32 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 230 | Free |
| Link1858 | IN2258-043 | 1065.71 | IN2258-040 | 1065.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 79 | Free |
| Link1859 | IN2258-032 | 1065.04 | IN2258-033 | 1064.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 35 | Free |
| Link1860 | IN2258-033 | 1064.8 | IN2258-027 | 1064.38 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 44 | Free |
| Link1861 | IN2258-026 | 1070.93 | IN2258-025 | 1069.43 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 35 | Free |
| Link1862 | IN2249-019 | 991.04 | IN2249-018 | 990.63 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 30 | Free |
| Link1863 | IN2249-018 | 990.63 | IN2250-048 | 990.33 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 20 | Free |
| Link1864 | IN2250-048 | 990.33 | IN2250-046 | 989.73 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 50 | Free |
| Link1865 | IN2250-046 | 989.73 | AS2250-045 | 988.61 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 28 | Free |
| Link1866 | AS2250-019 | 991.93 | IN2250-042 | 992 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 10 | Free |
| Link1867 | IN2250-042 | 992 | IN2250-017 | 992.44 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 35 | Free |
| Link1868 | IN2250-017 | 992.44 | IN2249-013 | 992.54 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 8 | Free |
| Link1869 | IN2249-013 | 992.54 | IN2249-017 | 992.88 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 27 | Free |
| Link1870 | IN2249-016 | 996.17 | IN2250-041 | 995.71 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 36 | Free |
| Link1871 | IN2250-041 | 995.71 | IN2250-040 | 995.53 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 8 | Free |
| Link1872 | IN2250-040 | 995.53 | IN2250-039 | 997.8 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 30 | Free |
| Link1873 | IN2249-017 | 992.88 | AS2249-004 | 992.98 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 8 | Free |
| Link1874 | IN2250-029 | 1009.33 | IN2250-028 | 1009.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 27 | Free |
| Link1875 | IN2250-028 | 1009.14 | IN2250-027 | 1008.69 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 19 | Free |
| Link1876 | IN2250-027 | 1008.69 | IN2250-026 | 1007.6 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 27 | Free |
| Link1877 | IN2250-025 | 1012.59 | IN2250-059 | 1012.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 44 | Free |
| Link1878 | IN2250-059 | 1012.55 | IN2250-058 | 1012.5 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 7 | Free |
| Link1879 | IN2250-058 | 1012.5 | IN2250-022 | 1011.09 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 29 | Free |
| Link1880 | IN2251-030 | 1015.95 | IN2251-029 | 1015.48 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 35 | Free |
| Link1881 | IN2251-029 | 1015.48 | IN2251-028 | 1015.09 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 13 | Free |
| Link1882 | IN2251-028 | 1015.09 | IN2251-027 | 1014.45 | Circular | | 1 | 1 | 0.014 | 0.05 | 0.5 | 0 | 29 | Free |
| Link1883 | IN2150-050 | 1008.26 | IN2150-038 | 1007.81 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 18 | Free |
| Link1884 | IN2150-038 | 1007.81 | AS2150-014 | 1007.81 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 20 | Free |
| Link1885 | IN2150-042 | 1007.25 | AS2150-014 | 1006.85 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.5 | 0 | 10 | Free |
| Link1886 | IN2149-016 | 1012.47 | IN2150-033 | 1012.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 28 | Free |
| Link1887 | IN2150-033 | 1012.11 | IN2150-048 | 1011.94 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 12 | Free |
| Link1888 | IN2150-048 | 1011.94 | AS2150-032 | 1010.74 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 30 | Free |
| Link1889 | IN2150-035 | 1011.2 | AS2150-032 | 1010.96 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 6 | Free |
| Link1890 | IN2251-005 | 1026.29 | AS2251-007 | 1025.29 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 25 | Free |
| Link1891 | IN2251-023 | 1036.45 | AS2251-022 | 1035.45 | Circular | | 1 | 1 | 0.015 | 0.5 | 0.5 | 0 | 25 | Free |
| Link1892 | IN2251-020 | 1036.1 | AS2251-021 | 1035.17 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 25 | Free |
| Link1893 | IN2251-019 | 1036.1 | AS2251-021 | 1035.9 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 5 | Free |
| Link1894 | IN2251-016 | 1039.85 | AS2251-018 | 1038.85 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 25 | Free |
| Link1895 | IN2252-014 | 1040.03 | IN2251-017 | 1039.23 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 30 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link1896 | IN2052-010 | 1061.14 | IN2052-009 | 1060.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 27 | Free |
| Link1897 | IN2052-007 | 1062.96 | AS2052-006 | 1062.34 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 23 | Free |
| Link1898 | IN2052-036 | 1058.76 | TP2052-028 | 1058.6 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 8 | Free |
| Link1899 | IN2053-005 | 1059.62 | IN2052-036 | 1058.76 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 43 | Free |
| Link1900 | IN2053-002 | 1061.48 | IN2052-031 | 1060.92 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 43 | Free |
| Link1901 | IN1653-019 | 1104.76 | IN1653-018 | 1104.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 37 | Free |
| Link1902 | IN1653-017 | 1103.02 | IN1653-016 | 1102.22 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 40 | Free |
| Link1903 | IN1653-015 | 1102.64 | IN1653-014 | 1101.86 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 39 | Free |
| Link1904 | IN1754-034 | 1099.46 | IN1754-025 | 1098.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 38 | Free |
| Link1905 | IN1753-043 | 1091.2 | AS1753-005 | 1090.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 50 | Free |
| Link1906 | IN1753-042 | 1091.18 | IN1753-041 | 1090.58 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 30 | Free |
| Link1907 | IN1753-041 | 1090.58 | AS1753-005 | 1090.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 19 | Free |
| Link1908 | IN1753-052 | 1087.59 | AS1753-003 | 1087.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 19 | Free |
| Link1909 | IN1753-053 | 1087.45 | AS1753-003 | 1087.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 12 | Free |
| Link1910 | IN1753-050 | 1086.21 | IN1753-049 | 1085.59 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 31 | Free |
| Link1911 | IN1753-011 | 1089.03 | IN1753-010 | 1088.78 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 14 | Free |
| Link1912 | IN1753-033 | 1103.49 | IN1753-032 | 1101.57 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 48 | Free |
| Link1913 | IN1753-032 | 1100.91 | IN1753-029 | 1099.82 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | 0 | 219 | Free |
| Link1914 | IN1753-029 | 1099.82 | IN1753-028 | 1099.17 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 77 | Free |
| Link1915 | IN1753-035 | 1100.25 | IN1753-029 | 1099.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 36 | Free |
| Link1916 | IN1753-021 | 1094.16 | IN1753-020 | 1093.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 54 | Free |
| Link1917 | IN1753-020 | 1093.18 | IN1753-019 | 1092.35 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 58 | Free |
| Link1918 | IN1753-019 | 1092.35 | IN1753-018 | 1088.67 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 114 | Free |
| Link1919 | IN2155-006 | 1052.6 | IN2156-019 | 1052.59 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 61 | Free |
| Link1920 | IN2156-019 | 1052.29 | IN2156-018 | 1052.25 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 8 | Free |
| Link1921 | IN2156-018 | 1052.25 | AS2156-017 | 1051.03 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 50 | Free |
| Link1922 | IN2156-049 | 1050.43 | IN2155-014 | 1049.99 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 87 | Free |
| Link1923 | IN2155-014 | 1049.99 | IN2155-013 | 1049.86 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 25 | Free |
| Link1924 | IN2255-041 | 1047.35 | IN2255-040 | 1047.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 48 | Free |
| Link1925 | IN2255-040 | 1047.11 | IN2256-039 | 1046.74 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 73 | Free |
| Link1926 | IN2256-039 | 1046.74 | IN2256-038 | 1046.68 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 11 | Free |
| Link1927 | IN2256-038 | 1046.68 | AS2256-036 | 1046.59 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 17 | Free |
| Link1928 | IN2255-044 | 1046.66 | IN2256-041 | 1046.29 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 73 | Free |
| Link1929 | IN2256-041 | 1046.29 | IN2256-040 | 1046.26 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 5 | Free |
| Link1930 | IN2256-040 | 1046.26 | AS2256-037 | 1046.17 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 17 | Free |
| Link1931 | IN2255-045 | 1046.22 | IN2256-044 | 1045.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 64 | Free |
| Link1932 | IN2256-044 | 1045.9 | IN2256-043 | 1045.83 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 13 | Free |
| Link1933 | IN2256-043 | 1045.83 | AS2256-042 | 1045.74 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 17 | Free |
| Link1939 | IN2255-052 | 1045.56 | IN2255-051 | 1045.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 21 | Free |
| Link1940 | IN2255-051 | 1045.45 | IN2255-050 | 1045.32 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 25 | Free |
| Link1941 | IN2255-050 | 1045.32 | IN2255-049 | 1045.18 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 27 | Free |
| Link1942 | IN2255-049 | 1045.18 | IN2255-048 | 1044.97 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 42 | Free |
| Link1943 | IN2255-048 | 1044.97 | AS2255-046 | 1044.85 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | 0 | 23 | Free |
| Link1944 | IN2354-018 | 1041.47 | IN2454-007 | 1041.4 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 25 | Free |
| Link1945 | IN2454-007 | 1041.4 | IN2454-008 | 1041.26 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 45 | Free |
| Link1946 | IN2454-008 | 1041.26 | IN2454-009 | 1041.01 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 30 | Free |
| Link1947 | IN2354-017 | 1041.84 | IN2354-018 | 1041.47 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 40 | Free |
| Link1948 | S101 | 1083.94 | S106 | 1082.37 | Circular | | 1 | 1 | 0.011 | 0.25 | 0.25 | 0 | 80 | Free |
| Link1954 | FourierDr_US2 | 965.15 | EMPB_GW_FD1 | 965.1 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 77 | Free |
| MENARDS_POND_GRATE_OUT | IN2256-076 | | IN_2256-076 | | | | | | | | | | | |
| MI1548-028_AS1548-014 | MI1548-028 | 1097.73 | AS1548-014 | 1097.05 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 48.005 | Free |
| MI1548-051_AS1548-048 | MI1548-051 | 1102.5 | AS1548-048 | 1101.47 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | None (,) | 216.825 | Free |
| MI1549-013_AS1549-002 | MI1549-013 | 1105.51 | AS1549-002 | 1103.77 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 181.746 | Free |
| MI1647-055_AS1647-056 | MI1647-055 | 1083.9 | AS1647-056 | 1083.7 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 16.133 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MI1748-034_AS1748-007 | MI1748-034 | 1072.91 | AS1748-007 | 1072.1 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | None (,) | 145.015 | Free |
| MI1751-024_IN1751-011 | MI1751-024 | 1087.35 | IN1751-011 | 1086.78 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 115.013 | Free |
| MI1752-008_IN1752-002 | MI1752-008 | 1090.37 | IN1752-002 | 1089.8 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 115.013 | Free |
| MI1753-047_AS1753-045 | MI1753-047 | 1088 | AS1753-045 | 1087.65 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 0.05 | 0 | 200.191 | Free |
| MI1848-034_AS1848-013 | MI1848-034 | 1069.22 | AS1848-013 | 1068.56 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 66.187 | Free |
| MI1849-054_AS1849-053 | MI1849-055 | 1072.7 | AS1849-053 | 1072.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 21.068 | Free |
| MI2046-007_IN2046-005 | MI2046-007 | 1012.47 | IN2046-005 | 1011.84 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 38.413 | Free |
| MI2047-004_AS2047-003 | MI2047-004 | 1011.14 | AS2047-003 | 1010 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 35.001 | Free |
| MI2050-008_IN2051-060 | MI2050-008 | 1067.07 | IN2051-060 | 1063.66 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 107.654 | Free |
| MI2051-022_IN2051-016 | MI2051-022 | 1056.6 | IN2051-016 | 1056.3 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 44.005 | Free |
| MI2051-054_IN2051-001 | MI2051-054 | 1056.7 | IN2051-001 | 1056.46 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 25.584 | Free |
| MI2051-062_IN2051-048 | MI2051-062 | 1068.99 | IN2051-048 | 1068.69 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 112.857 | Free |
| MI2052-021_AS2052-022 | MI2052-021 | 1061.81 | AS2052-022 | 1061.52 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 30.415 | Free |
| MI2255-034_IN2255-032 | MI2255-034 | 1050.25 | IN2255-032 | 1050.2 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 10.401 | Free |
| MI2255-047_PD2255-023 | MI2255-047 | 1044.75 | Node1784 | 1043.35 | Rectangular | | 1 | 5 | 0.013 | 0.05 | 1 | 0 | 117 | Free |
| MI2256-075_JB2256-065 | MI2256-075 | 1046.93 | JB2256-065 | 1044.42 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | 0 | 72.167 | Free |
| MI2258-038_IN2258-027 | MI2258-038 | 1065.1 | IN2258-027 | 1064.38 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 89.347 | Free |
| MI2348-010_AE2348-007 | MI2348-010 | 974.1 | AE2348-007 | 974 | Circular | | 1 | 6.5 | 0.013 | 0.25 | 1 | 0 | 28.003 | Free |
| MI2355-039_IN2355-038 | MI2355-039 | 1048.75 | IN2355-038 | 1048.43 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 18.002 | Free |
| MI2355-046_IN2355-042 | MI2355-046 | 1046.3 | IN2355-042 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 51.222 | Free |
| MI2356-023_IN2356-022 | MI2356-023 | 1049.5 | IN2356-022 | 1049.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 31.453 | Free |
| MI2650-010_IN2649-011 | MI2650-010 | 996.94 | IN2649-011 | 996.74 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 34.478 | Free |
| Multi_10 | PF-S15 | 1117.2 | PF-S18 | 1114.86 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 224 | Free |
| Multi_11 | PF-S18 | 1114.36 | PF-S21 | 1113.29 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 224 | Free |
| Multi_12 | PF-S1 | 1139.46 | PF-S4 | 1137.92 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 153 | Free |
| Multi_13 | PF-S26 | 1112.16 | PF-S27 | 1111.48 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 36 | Free |
| Multi_14 | PF-S27 | 1111.48 | PF-S28 | 1110.72 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 134 | Free |
| Multi_15 | PF-S2 | 1140.69 | PF-S1 | 1139.56 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 113 | Free |
| Multi_16 | PF-S30 | 1106.79 | PL1549-019 | 1106.89 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 37.165 | Free |
| Multi_17 | PF-S4 | 1137.82 | PF-S7 | 1136.96 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.25 | 0 | 86 | Free |
| Multi_18 | PF-S7 | 1136.86 | PF-S8 | 1125.05 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 165 | Free |
| Multi_19 | PF-S8 | 1125.05 | PF-S12 | 1120.3 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 153 | Free |
| Multi_2 | CH-S22 | 1102.61 | CH-S21 | 1098.09 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 185.052 | Free |
| Multi_20 | PL1549-019 | 1106.89 | IN1549-018 | 1106.78 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 22.27 | Free |
| Multi_21 | S101 | 1083.94 | SE_BIO_BASIN | 1083 | Circular | | 1 | 1 | 0.013 | 0.5 | 1 | 0 | 119 | Free |
| Multi_22 | S103 | 1085.5 | S106 | 1082.37 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 121 | Free |
| Multi_23 | S104 | 1086.44 | S103 | 1085.5 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 33 | Free |
| Multi_24 | S105 | 1086.73 | S104 | 1086.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 25 | Free |
| Multi_25 | S106 | 1081.87 | IN1647-041 | 1080.38 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 119 | Free |
| Multi_26 | S32 | 1088.55 | S101 | 1084.19 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 128 | Free |
| Multi_27 | S33 | 1088.88 | S32 | 1088.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 29 | Free |
| Multi_3 | CH-S23 | 1103.55 | CH-S22 | 1103.11 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 72.616 | Free |
| Multi_4 | CH-S24 | 1105.49 | CH-S23 | 1103.8 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 171.784 | Free |
| Multi_48 | E_INF_BASIN | 1084.5 | S106 | 1083.85 | Circular | | 1 | 0.5 | 0.011 | 0.5 | 0.5 | None (,) | 32 | Free |
| Multi_5 | CH-S25 | 1106.12 | CH-S24 | 1105.74 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 41.54 | Free |
| Multi_58 | NW_INF_BASIN | 1093.75 | IN1647-065 | 1093.49 | Circular | | 1 | 0.5 | 0.011 | 0.5 | 0.25 | None (,) | 42.981 | Free |
| Multi_6 | CH_S31 | 1099.51 | CH_BIO_BASIN_1 | 1097.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.2 | 0 | 202.956 | Free |
| Multi_68 | IN1549-020 | 1107.3 | IN1549-018 | 1106.78 | Circular | | 1 | 1 | 0.011 | 0.25 | 0.5 | None (,) | 59.464 | Free |
| Multi_7 | CH_S32 | 1101.51 | CH_S31 | 1100.26 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 42.024 | Free |
| Multi_8 | CH_S33 | 1105.19 | CH_S32 | 1101.51 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | 0 | 107.858 | Free |
| Multi_9 | PF-S12 | 1120.2 | PF-S15 | 1117.2 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 300 | Free |
| N_BL_Crossing2 | N_BL_Cross_US2 | 967.6 | N_BL_Cross_DS2 | 966 | Circular | | 1 | 5.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 237 | Free |
| N_BL_Crossing3 | N_BL_Cross_US3 | 967.6 | N_BL_Cross_DS3 | 966 | Circular | | 1 | 5.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 237 | Free |
| N_BLACKHAWK_POND_TO_DS_GW | N_BLACKHAWK_POND_OUT | 1010.6 | N_PV_ROAD_US | 1004.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 80.476 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N_M-PB_GW_DEMING_WAY_SECT | GR2145-003 | 959 | PB_OUTFALL | 952.85 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 813.581 | Free |
| N_M-PB_GW_DEMING_WAY_SECT | PB_OUTFALL | 952.85 | PB_END | 951.74 | Natural | | 1 | 0 | 0.013 | 0.5 | 0.5 | None (,) | 192.15 | Free |
| N_PV_ROAD_PIPE | N_PV_ROAD_US | 1004.8 | N_PV_ROAD_DS | 1003.4 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 54.643 | Free |
| N_WEXFORD_POND_OUT_WEIR1 | Node1769 | | WEXFORD_POND_OUT | | | | | | | | | | | |
| N_WEXFORD_POND_OUT_WEIR2 | Node1769 | | WEXFORD_POND_OUT | | | | | | | | | | | |
| N_WEXFORD_POND_OUT_WEIR3 | Node1769 | | WEXFORD_POND_OUT | | | | | | | | | | | |
| N_WEXFORD_POND_PIPE_OUT | Node1769 | 971.95 | WEXFORD_POND_OUT | 971.85 | Circular | | 3 | 1.5 | 0.013 | 1 | 0.5 | 0 | 10 | Free |
| ND1953-001_ND2053-001 | ND1953-001 | 1064.56 | ND2053-001 | 1063.57 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.5 | 0 | 56 | Free |
| ND2053-001_ND2053-002 | ND2053-001 | 1063.57 | ND2053-002 | 1058.85 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 508.203 | Free |
| ND2053-002_TP2052-028 | ND2053-002 | 1058.85 | TP2052-028 | 1058.6 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.05 | Square Edge with Headwall (Circ, Conc) | 89.017 | Free |
| NEW_PIPE_08_06_2019 | IN1647-037 | 1075.74 | NEW_SAS_08_06_19 | 1074.86 | Special | Horizontal Ellipse | 1 | 3.16 | 0.011 | 0.25 | 0.25 | None (,) | 172.285 | Free |
| NORTH_BLACKHAWK_POND_OUT | N_BH_P_OUTLET | 1011.6 | N_BLACKHAWK_POND_OUT | 1010.6 | Special | Horizontal Ellipse | 1 | 3.75 | 0.013 | 1 | 0.5 | 0 | 45 | Free |
| OLD_SAUK_GW1_PIPE | WMPB_GW_DW1 | 972.23 | OSTP_POND_SYSTEM_JCT_14 | 971.5 | Circular | | 2 | 4 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 161.959 | Free |
| OLD_SAUK_GW3_PIPE | OLD_SAUK_GW3_US | 972.21 | OSTP_POND_SYSTEM_JCT_14 | 972 | Circular | | 1 | 1.5 | 0.024 | 0.5 | 0.5 | 0 | 78.295 | Free |
| OSR_BL_SERAMP | OSR_BL_SERAMP_US | 999 | OSR_BL_SERAMP_DS | 997 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 144.304 | Free |
| OSTP_Pipes | OSTP_POND_SYSTEM_JCT_13 | 964.7 | OSTP_POND_SYSTEM_JCT_12 | 964.1 | Circular | | 2 | 2 | 0.011 | 0.2 | 1 | Square Edge with Headwall (Circ, Conc) | 20 | Free |
| OSTP_POND_SYSTEM1_PIPE | OSTP_POND_SYSTEM1_US | 965.5 | OSTP_POND_SYSTEM1_DS | 965.07 | Special | Horizontal Ellipse | 1 | 3.75 | 0.013 | 0.2 | 1 | Groove End with Projecting (Circ, Conc) | 27 | Free |
| OSTP_POND_SYSTEM7_PIPE | OSTP_POND_SYSTEM_JCT_11 | 969.6 | OSTP_POND_SYSTEM_JCT_10 | 969.5 | Circular | | 2 | 2 | 0.024 | 0.2 | 1 | Headwall (Circ, Corr Metal) | 20.833 | Free |
| OSTP_POND_SYSTEM_CHANNEL_1 | OSTP_POND_SYSTEM_JCT_7 | 963.27 | OSTP_POND_SYSTEM_JCT_6 | 963.17 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 113.806 | Free |
| OSTP_POND_SYSTEM_OUTLET | OSTP_POND_SYSTEM_JCT_1 | | PD2145-002 | | | | | | | | | | | |
| OSTP_POND_SYSTEM_OUTLET2 | OSTP_POND_SYSTEM_JCT_1 | | PD2145-002 | | | | | | | | | | | |
| OSTP_POND_SYSTEM_OUTLET3 | OSTP_POND_SYSTEM_JCT_1 | | PD2145-002 | | | | | | | | | | | |
| OSTP_POND_SYSTEM_STAGE1 | OSTP_POND_SYSTEM_JCT_8 | 963.8 | OSTP_POND_SYSTEM_JCT_8A | 963.27 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 93.2 | Free |
| OSTP_POND_SYSTEM_STAGE2 | OSTP_POND_SYSTEM_JCT_6 | 963.17 | OSTP_POND_SYSTEM_JCT_5 | 961.6 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 400.076 | Free |
| OSTP_POND_SYSTEM_STAGE3 | OSTP_POND_SYSTEM_JCT_4 | 961.4 | OSTP_POND_SYSTEM_JCT_3 | 959.6 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 578.714 | Free |
| OSTP_POND_SYSTEM_STAGE4 | OSTP_POND_SYSTEM_JCT_2 | 959.5 | OSTP_POND_SYSTEM_JCT_1 | 959.5 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 251.565 | Free |
| OSTP_POND_SYSTEM_US_CHANNE | OSTP_POND_SYSTEM_JCT_9 | 964.42 | OSTP_POND_SYSTEM_JCT_8 | 963.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 121.3 | Free |
| OSTP_POND_SYSTEM_US_CHANNE | OSTP_POND_SYSTEM_JCT_10 | 969.5 | OSTP_POND_SYSTEM_JCT_9 | 964.42 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 131.934 | Free |
| OSTP_POND_SYSTEM_US_CHANNE | AE2147-012 | 968.2 | OSTP_POND_SYSTEM_JCT_9 | 964.42 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 194.442 | Free |
| OSTP_POND_SYSTEM_US_CHANNE | OSTP_POND_SYSTEM_JCT_12 | 964.1 | OSTP_POND_SYSTEM_JCT_8 | 963.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 51.323 | Free |
| OSTP_W_GW_TO_POND1_OVERFL | OSTP_POND_SYSTEM_JCT_11 | 969.9 | OSTP_POND_SYSTEM_JCT_8A | 966.21 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 84.727 | Free |
| P2to3pipes | OSTP_POND_SYSTEM_JCT_3 | 959.6 | OSTP_POND_SYSTEM_JCT_2 | 959.5 | Circular | | 2 | 3 | 0.013 | 0.2 | 1 | Groove End with Projecting (Circ, Conc) | 27 | Free |
| PARAGON_INF_BASIN_ORI | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | | |
| PARAGON_INF_BASIN_ORIFICE2 | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | | |
| PARAGON_INF_BASIN_WEIR1 | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | | |
| PARAGON_INF_BASIN_WEIR2 | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | | |
| PARAGON_WP_ORIFICE | PAR_WP_OUT | | PD1654-010 | | | | | | | | | | | |
| PARAGON_WP_V_NOTCH | PAR_WP_OUT | | PD1654-010 | | | | | | | | | | | |
| PD1653-004_PD1753-055 | PD1653-004 | 1094.5 | PD1753-055 | 1094.42 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 18.675 | Free |
| PD1654-010_AS1653-005 | PD1654-010 | 1095.78 | AS1653-005 | 1095.03 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 130.097 | Free |
| PD1753-055_AS1653-003 | PD1753-055 | 1094.42 | AS1653-003 | 1092.03 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 183.634 | Free |
| PD2145-002_TP2145-006 | PD2145-002 | 959.55 | TP2145-006 | 959.35 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.5 | 90 and 15 deg Wingwall Flares (Rect, Conc) | 42.005 | Free |
| PF-AES36_PF-S36 | PF-AES36 | 1117.7 | PF-S36 | 1116.52 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 36.892 | Free |
| PF-DROPOFF_OUT_PF-S42 | PF-DROPOFF | 1122.43 | PF-S42 | 1118.99 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 193.045 | Free |
| PF-LOT1_PF-S2 | PF-LOT1 | 1141.3 | PF-S2 | 1140.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 51 | Free |
| PF-OFFSITE_PF-S17 | POPE_FARMS_OFFSITE | 1126 | PF-S17 | 1123.73 | Natural | | 1 | 0 | 0.02 | 0 | 0 | None (,) | 188.142 | Free |
| PF-OUTLOT2_PF-S5 | PF_OUTLOT2 | 1137.8 | PF-S5 | 1137.54 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 26 | Free |
| PF-OUTLOT3_IN1549-020 | PF-OUTLOT3_SAS | 1108.5 | IN1549-020 | 1107.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.654 | Free |
| PF-OUTLOT3_TO_SAS | PF_E_INF_BASIN | 1111.01 | PF_OUTLOT3_GRATE | 1111 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13.701 | Free |
| PF-OUTLOT4_PF-S32 | PF_S_INF_BASIN | 1110.25 | PF-OUTLOT4-OUT | 1110.26 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | None (,) | 13.805 | Free |
| PF-S10_PF-S12 | PF-S10 | 1124.07 | PF-S12 | 1123.96 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.681 | Free |
| PF-S11_PF-S12 | PF-S11 | 1124.07 | PF-S12 | 1123.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 48.828 | Free |
| PF-S13_PF-S15 | PF-S13 | 1117.81 | PF-S15 | 1117.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.936 | Free |
| PF-S14_PF-S15 | PF-S14 | 1121.8 | PF-S15 | 1117.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 47.743 | Free |

**Existing Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF-S17_PF-S17A | PF-S17 | 1121.5 | PF-S17A | 1121.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 49.51 | Free |
| PF-S17A_TO_SE_WP | PF-S17A | 1121.3 | PF_SE_WET_POND | 1121 | Circular | | 1 | 1 | 0.013 | 0.25 | 1 | None (,) | 51.164 | Free |
| PF-S23_PF-S27 | PF-S23 | 1113.2 | PF-S27 | 1112.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 47 | Free |
| PF-S24_PF-S27 | PF-S24 | 1113.02 | PF-S27 | 1112.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 29 | Free |
| PF-S25_PF-S26 | PF-S25 | 1113.34 | PF-S26 | 1113.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13 | Free |
| PF-S26_PF-S21 | PF-S21 | 1113.19 | PF-S26 | 1112.16 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 123 | Free |
| PF-S28_PF-OUTLOT4 | PF-S28 | 1110.72 | PF_S_WP | 1110.5 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 1 | 0 | 55 | Free |
| PF-S31_PFS28 | PF-S31 | 1112.4 | PF-S28 | 1112.22 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 36 | Free |
| PF-S32_PF-S30 | PF-S32 | 1108 | PF-S30 | 1106.79 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | None (,) | 28.394 | Free |
| PF-S34_PF-S35 | PF-S34 | 1116.41 | PF-S35 | 1116.08 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 53.179 | Free |
| PF-S35_PF-AES35 | PF-S35 | 1116.08 | PF-AES35 | 1115.9 | Circular | | 1 | 1 | 0.013 | 0.25 | 1 | None (,) | 41.588 | Free |
| PF-S36_PF-S34 | PF-S36 | 1116.52 | PF-S34 | 1116.41 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 43.969 | Free |
| PF-S38_PF-S18 | PF-S38 | 1115.28 | PF-S18 | 1114.86 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 45.275 | Free |
| PF-S41_PF-S42 | PF-S41 | 1120.46 | PF-S42 | 1119.24 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 75.488 | Free |
| PF-S42_PF-S38 | PF-S42 | 1118.89 | PF-S38 | 1115.28 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 155 | Free |
| PF-S44_PF-S8 | PF-S44 | 1126.31 | PF-S8 | 1125.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 153 | Free |
| PF-S47_PF-S41 | PF-S47 | 1120.62 | PF-S41 | 1120.56 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | None (,) | 22.131 | Free |
| PF-S48_PF-S52 | PF-S48 | 1124.9 | PF-S52 | 1123.14 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 87.884 | Free |
| PF-S49_PF-S48 | PF-S49 | 1126.76 | PF-S48 | 1125 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 72.139 | Free |
| PF-S52_PF-S47 | PF-S52 | 1123.04 | PF-S47 | 1120.97 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 83.063 | Free |
| PF-S5_PF-S7 | PF-S5 | 1137.44 | PF-S7 | 1137.13 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 31 | Free |
| PF-S60_DROPOFF_IN | PF-S60 | 1127.5 | PF-DROPOFF | 1127 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 52.083 | Free |
| PF-S6_PF-S7 | PF-S6 | 1137.42 | PF-S7 | 1137.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.066 | Free |
| PF-SWALE1 | PF_PLAYGROUND_OUT | 1141.16 | PF_PATH_US | 1138.14 | Trapezoidal | | 1 | 4 | 0.027 | 0 | 0 | None (,) | 235.468 | Free |
| PF-SWALE2 | PF_PATH_DS | 1137.82 | PF_SE_WET_POND | 1124 | Trapezoidal | | 1 | 4 | 0.027 | 0 | 0 | None (,) | 911.921 | Free |
| PF_BH_CULVERT | PF_BH_CULV_US | 1133.33 | PF_BH_CULV_DS | 1133 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 77.048 | Free |
| PF_E_INF_ORIFICE | PF_OUTLOT3_GRATE | | PF-OUTLOT3_SAS | | | | | | | | | | | |
| PF_E_INF_WEIR | PF_OUTLOT3_GRATE | | PF-OUTLOT3_SAS | | | | | | | | | | | |
| PF_PATH_CULVERT | PF_PATH_US | 1138.14 | PF_PATH_DS | 1137.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 35.791 | Free |
| PF_PLAYGROUND_CULVERT | PF_PLAYGROUND_STORAGE | 1141.89 | PF_PLAYGROUND_OUT | 1141.16 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 46.392 | Free |
| PF_S_INF_BASIN_ORIFICE | PF-OUTLOT4-OUT | | PF-S32 | | | | | | | | | | | |
| PF_S_INF_BASIN_PIPE_IN | PF_S_WP_SAS | 1110.01 | PF_S_INF_BASIN | 1110 | Circular | | 2 | 3.5 | 0.013 | 0.5 | 0.5 | None (,) | 9.639 | Free |
| PF_S_INF_BASIN_WEIR | PF-OUTLOT4-OUT | | PF-S32 | | | | | | | | | | | |
| PF_S_WP_ORIFICE | PF_S_WP_OUT | | PF_S_WP_SAS | | | | | | | | | | | |
| PF_S_WP_PIPE_OUT | PF_S_WP | 1106.01 | PF_S_WP_OUT | 1106 | Circular | | 2 | 3.5 | 0.013 | 0.5 | 0.5 | None (,) | 12.568 | Free |
| PF_S_WP_WEIR | PF_S_WP_OUT | | PF_S_WP_SAS | | | | | | | | | | | |
| PF_SE_INF_IN_PIPE | PF_SE_WP_TO_INF_GRATE | 1121 | PF_SE_INF_BASIN | 1121 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 38.116 | Free |
| PF_SE_WP_INF_ORIFICE | PF_SE_WP_INF_BASIN_OUTLET | | PF_SE_WP_INF_OUT_2 | | | | | | | | | | | |
| PF_SE_WP_INF_OUT2 | PF_SE_INF_BASIN | 1121 | PF_SE_WP_INF_BASIN_OUTLET | 1119 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 34.313 | Free |
| PF_SE_WP_INF_OVERFLOW | PF_SE_INF_BASIN | | PF-S36 | | | | | | | | | | | |
| PF_SE_WP_INF_PIPE_OUT | PF_SE_WP_INF_OUT_2 | 1119 | PF-S36 | 1116.52 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 44.662 | Free |
| PF_SE_WP_INF_WEIR | PF_SE_WP_INF_BASIN_OUTLET | | PF_SE_WP_INF_OUT_2 | | | | | | | | | | | |
| PF_SE_WP_PIPE_OUT | PF_SE_WET_POND | 1118 | PF_SE_WP_TO_INF | 1118 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 49.26 | Free |
| PF_SE_WP_TO_INF_BASIN_OVERFL | PF_SE_WET_POND | | PF_SE_INF_BASIN | | | | | | | | | | | |
| PF_SE_WP_TO_INF_BASIN_WEIR | PF_SE_WP_TO_INF | | PF_SE_WP_TO_INF_GRATE | | | | | | | | | | | |
| PL1547-026_AS1547-023 | PL1547-026 | 1124.41 | AS1547-023 | 1115.12 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 89.806 | Free |
| PL1951-004_AS2051-063 | PL1951-004 | 1070.62 | AS2051-063 | 1069.67 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 54.005 | Free |
| PL2052-025_IN2052-024 | PL2052-025 | 1062.35 | IN2052-024 | 1062.17 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 37.001 | Free |
| PL2052-030_IN2052-029 | PL2052-030 | 1060.47 | IN2052-029 | 1060.33 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 29.001 | Free |
| PL2257-013_AS2257-012 | PL2257-013 | 1057.97 | AS2257-012 | 1057.87 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 15.023 | Free |
| PLEASANT_V_MINERAL_PT_GRATE | AE2056-023 | | SS2056-022 | | | | | | | | | | | |
| RAMP_TO_OSR_BL_SE_STORAGE | OSR_BL_SERAMP_DS | 997 | OLD_SAUK_BELTLINE_SE | 994 | Trapezoidal | | 1 | 10 | 0.035 | 0 | 0 | None (,) | 163.663 | Free |
| S_HP_Rd_S_Crossing | S_HP_Rd_US | 1037.4 | S_HP_Rd_DS | 1035.9 | Circular | | 1 | 5.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 154 | Free |
| S_M_PB_GW_ATTIC_ANGEL_CR_SE | SMPB_BW_AAC1 | 1005.27 | IN2150-019 | 1007.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 77.677 | Free |

## Existing Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) | Flow Direction Option |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S_M_PB_GW_ATTIC_ANGEL_CR_SE | SMPB_BW_AAC2 | 1001.6 | SMPB_BW_AAC1 | 1005.27 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 153.85 | Free |
| S_M_PB_GW_ATTIC_ANGEL_P_SE( | ATTIC_ANGEL_POND_OUT | 1016.85 | SMPB_GW_AAP | 1006.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 401.374 | Free |
| S_M_PB_GW_BLACKWOLF_DR_SE( | SMPB_GW_BWD | 1051.35 | ATTIC_ANGEL_POND_IN | 1037.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 823.569 | Free |
| S_M_PB_GW_ELDERBERRY_RD_SE | HD2052-035 | 1058.27 | HD2051-014 | 1052.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1328.938 | Free |
| S_TO_N_WEXFORD_POND_PIPES | WEX_SE_POND_OUT | 972.2 | WEX_NW_POND_IN | 971.9 | Circular | | 2 | 4 | 0.013 | 1 | 1 | 0 | 90 | Free |
| S_WEXFORD_POND_IN_WEIR | WEXFORD_POND_IN | | WEX_SE_POND_IN | | | | | | | | | | | |
| SAUK_CR_UPPER_IN2451-001 | SAUK_CREEK_UPPER_STORAGE | 996.85 | IN2451-001 | 995.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 15.208 | Free |
| SAUK_HEIGHTS_LOW_FLOW | IN1750-017A | | IN1750-017 | | | | | | | | | | | |
| SAUK_HEIGHTS_V_NOTCH | IN1750-017A | | IN1750-017 | | | | | | | | | | | |
| SC_Pipe1 | AE2350-034 | 990.36 | EMPB_GW_NTL3 | 989.43 | Special | Horizontal Ellipse | 1 | 1.91 | 0.013 | 1 | 0.5 | 0 | 69 | Free |
| SC_Pipe2 | AE2350-034 | 990.36 | EMPB_GW_NTL3 | 989.43 | Special | Horizontal Ellipse | 1 | 3.75 | 0.013 | 1 | 0.5 | 0 | 82 | Free |
| SS2056-022_IN2056-021 | SS2056-022 | 1093 | IN2056-021 | 1092.64 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 82.624 | Free |
| SW BH Pond Grate.1 | AS1849-013.1 | | Node1910 | | | | | | | | | | | |
| SWBHLow | AS1849-013.1 | | Node1910 | | | | | | | | | | | |
| TE1848-012_IN1848-011 | TE1848-012 | 1029.19 | IN1848-011 | 1026.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 28.233 | Free |
| TE2152-009_AS2152-010 | TE2152-009 | 1053.85 | AS2152-010 | 1053.02 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 102.208 | Free |
| TE2257-014_AS2257-003 | TE2257-014 | 1057.35 | AS2257-003 | 1056.47 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 50.434 | Free |
| TO2255-024_TO2355-056 | JUNCTION_RIDGE_POND_OUT_J | 1043.5 | EMPB_GW_MPR1 | 1041.39 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 396.456 | Free |
| TO_AE2254-014 | AE2054-001_AE2254-014_JCT | 1056.18 | AE2254-014 | 1049.11 | Trapezoidal | | 1 | 10 | 0.035 | 0 | 0 | None (,) | 830.893 | Free |
| TP1648-049_MI1748-034 | TP1648-049 | 1073.99 | MI1748-034 | 1072.91 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | None (,) | 228.477 | Free |
| TP2052-028_HD2052-035 | TP2052-028 | 1058.6 | HD2052-035 | 1058.27 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 26.043 | Free |
| TP2145-006_TP2145-007 | TP2145-006 | 959.35 | TP2145-007 | 959.25 | Rectangular | | 1 | 6 | 0.013 | 0.05 | 0.05 | None (,) | 15.163 | Free |
| TP2145-007_GR2145-003 | TP2145-007 | 959.25 | GR2145-003 | 959 | Rectangular | | 1 | 6 | 0.013 | 0.05 | 0.5 | None (,) | 78.878 | Free |
| TP2247-019_GR2247-018 | TP2247-019 | 965.15 | Fourier_DrDS1 | 965.1 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | None (,) | 18.646 | Free |
| TP2250-010_IN2250-039 | TP2250-010 | 997.35 | IN2250-039 | 997.8 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 263.746 | Free |
| TP2251-032_AS2251-007 | TP2251-032 | 1027.8 | AS2251-007 | 1025 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | 0 | 101.284 | Free |
| TP2347-023_GR2347-022 | TP2347-023 | 969.5 | HighPointDS2 | 968.6 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 54.89 | Free |
| TP2454-013_HD2454-016 | TP2454-013 | 1030.4 | HD2454-016 | 1030.1 | Special | Horizontal Ellipse | 1 | 9.41 | 0.013 | 0.05 | 0.5 | 0 | 63.347 | Free |
| TP2549-008_AE2549-012 | TP2549-008 | 992.18 | EMPB_GW_LOSR1 | 991.11 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 283.602 | Free |
| W_M_PB_GW_BLACKHAWK_RD_S | AE1847-020 | 1059.87 | WMPB_GW_TRANSFER1 | 1055.42 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 146.146 | Free |
| W_M_PB_GW_DEMING_WAY_SEC | OSTP_POND_SYSTEM_JCT_14 | 971.5 | OSTP_POND_SYSTEM_JCT_11 | 969.9 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 221.404 | Free |
| W_M_PB_GW_DEMING_WAY_SEC | WMPB_GW_DW2 | 971.7 | WMPB_GW_DW1 | 971.3 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 45.341 | Free |
| W_M_PB_GW_DEMING_WAY_SEC | WMPB_GW_DW3 | 976.98 | WMPB_GW_DW2 | 971.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 475.267 | Free |
| W_M_PB_GW_DEMING_WAY_SEC | WMPB_GW_DW4 | 978.8 | WMPB_GW_DW3 | 976.98 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 211.021 | Free |
| W_M_PB_GW_DEMING_WAY_SEC | AE2047-016 | 979.6 | WMPB_GW_DW4 | 978.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 131.427 | Free |
| W_M_PB_GW_DEMING_WAY_SEC | WMPB_GW_DW5 | 986.1 | WMPB_GW_DW4 | 978.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 728.048 | Free |
| W_M_PB_GW_PLEASANT_VIEW_S | N_PV_ROAD_DS | 1003.4 | N_PV_ROAD_DS2 | 990.72 | Natural | | 1 | 0 | 0.035 | 0 | 0 | None (,) | 703.711 | Free |
| W_M_PB_GW_PLEASANT_VIEW_S | N_PV_ROAD_DS2 | 990.72 | AE2048-001 | 986.84 | Natural | | 1 | 0 | 0.035 | 0 | 0 | None (,) | 339.585 | Free |
| WOODSTONE_TO_AE1954-001 | FARGO_COBALT_OUT_JCT | 1085.36 | FARMRD_SWALE1 | 1079.66 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 1600 | Free |
| WOODSTONE_TO_AE1954-001.1 | FARMRD_SWALE1 | 1079.66 | AE1954-001 | 1075.14 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 1134.91 | Free |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3983.1 | EMPB_GW_UOSR1 | 969.1 | HighPointDS2 | 968.6 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.5 | 30 to 75 deg Wingwall Flares (Rect, Conc) | 145 |
| 24inch | OSTP_POND_SYSTEM_J | 961.6 | OSTP_POND_SYSTEM_JCT_4 | 961.4 | Circular | | 3 | 2 | 0.024 | 0.9 | 1 | Projecting (Circ, Corr Metal) | 25 |
| 6x12box | Node2015 | 968.87 | Node2016 | 968.6 | Rectangular | | 1 | 6 | 0.013 | 0.25 | 0.5 | 0 | 60 |
| AA_POND_IN_FROM_W_PIPE | ATTIC_ANGEL_POND_IN | 1037.35 | AA_W_POND_IN | 1017.1 | Circular | | 1 | 5.5 | 0.013 | 0.5 | 1 | 0 | 165.924 |
| AE1546-001_AE1546-002 | AE1546-001 | 1110.87 | AE1546-002 | 1110.59 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 30.216 |
| AE1546-002_IN1646-001 | AE1546-002 | 1110.59 | IN1646-001 | 1094.69 | Trapezoidal | | 1 | 1 | 0.027 | 0.1 | 0.5 | None (,) | 515.629 |
| AE1546-003_AE1546-004 | AE1546-003 | 1127.36 | AE1546-004 | 1127.17 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 27 |
| AE1546-004_AE1546-001 | AE1546-004 | 1127.17 | AE1546-001 | 1110.87 | Trapezoidal | | 1 | 1 | 0.027 | 0.5 | 0.5 | None (,) | 749.556 |
| AE1547-035_AE1547-036 | AE1547-035 | 1128.25 | AE1547-036 | 1121.5 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 301.651 |
| AE1547-036_IN1647-069 | AE1547-036 | 1121.5 | IN1647-069 | 1097.55 | Trapezoidal | | 1 | 1 | 0.027 | 0.1 | 0.5 | None (,) | 1009.9 |
| AE1549-015_AS1549-014 | AE1549-015 | 1107.37 | AS1549-014 | 1106.9 | Circular | | 1 | 1 | 0.011 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 170.68 |
| AE1549-041_IN1549-039 | AE1549-041 | 1109.9 | IN1549-039 | 1109.7 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 29.196 |
| AE1549-043_AS1549-042 | AE1549-043 | 1104.85 | AS1549-042 | 1103.76 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 40.001 |
| AE1549-044_AS1549-042 | AE1549-044 | 1105.92 | AS1549-042 | 1103.76 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 17.275 |
| AE1550-029_AE1550-030 | AE1550-029 | 1114.77 | AE1550-030 | 1110.26 | Special | Horizontal Ellipse | 1 | 1.91 | 0.013 | 0.2 | 0.5 | Elliptical Tapered Inlet, Square Edges (Throat, Cor | 118.144 |
| AE1550-030_AE1550-034 | AE1550-030 | 1110.26 | AE1550-034 | 1103.42 | Trapezoidal | | 1 | 2 | 0.027 | 0 | 0 | None (,) | 118.803 |
| AE1550-034_CAPE_SILVER_N | AE1550-034 | 1103.38 | CAPE_SILVER_WAY_DRY_POND | 1100 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 163.666 |
| AE1647-038_IN1647-037 | AE1647-038 | 1076.49 | IN1647-037 | 1075.74 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 30.385 |
| AE1647-066_IN1647-065 | AE1647-066 | 1093.75 | IN1647-065 | 1093.49 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 13.229 |
| AE1648-029_IN1648-028 | AE1648-029 | 1072.6 | IN1648-028 | 1072.59 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 75 |
| AE1648-050_TP1648-049 | AE1648-050 | 1079.6 | TP1648-049 | 1073.99 | Circular | | 1 | 1 | 0.011 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 151.46 |
| AE1649-022_AS1549-042 | AE1649-022 | 1117.1 | AE1549-024 | 1103.76 | Trapezoidal | | 1 | 1.5 | 0.035 | 0 | 0 | None (,) | 627.185 |
| AE1649-023_AE1649-022 | AE1649-023 | 1117.4 | AE1649-022 | 1117.1 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 31.958 |
| AE1649-024_AS1549-042 | AE1549-024 | 1104.87 | AS1549-042 | 1103.76 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 18.761 |
| AE1652-001_IN1752-028 | AE1652-001 | 1110.6 | IN1752-028 | 1107.51 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 73.289 |
| AE1653-024_IN1653-023 | AE1653-024 | 1105.99 | IN1653-023 | 1105.53 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 74.42 |
| AE1746-001_AE1846-003 | AE1746-001 | 1086 | AE1846-003 | 1063 | Trapezoidal | | 1 | 0.5 | 0.027 | 0 | 0 | 0 | 1126.63 |
| AE1747-023_IN1647-039 | AE1747-023 | 1078.64 | IN1647-039 | 1078.53 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 29.723 |
| AE1750-026 Pipe | AE1750-026 | 1080.35 | IN1750-017A | 1077.6 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 173 |
| AE1750-027 Pipe | AE1750-027 | 1073.6 | IN1750-017 | 1077.6 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 290 |
| AE1846-003_AS1847-021 | AE1846-003 | 1063 | AS1847-021 | 1061.15 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 57.007 |
| AE1946-011_AS1947-010 | AE1946-011 | 1047 | AS1947-010 | 1044.15 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 49.006 |
| AE1951-006_AS1951-005 | AE1951-006 | 1073.6 | AS1951-005 | 1070.3 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 65.881 |
| AE1951-007_AS1951-005 | AE1951-007 | 1072 | AS1951-005 | 1069.55 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 18.115 |
| AE1952-003_AE1953-002 | AE1952-003 | 1066.4 | AE1953-002 | 1066.1 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 48 |
| AE1954-001_AE2054-001 | AE1954-001 | 1075.14 | AE2054-001 | 1074.27 | Circular | | 1 | 1.25 | 0.024 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 54.977 |
| AE2045-009_IN2045-004 | AE2045-009 | 974.71 | IN2045-004 | 974.71 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 36.372 |
| AE2050-017_IN2050-016 | AE2050-017 | 1028.51 | IN2050-016 | 1027.92 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 17.002 |
| AE2054-001_AE2254-014 | AE2054-001 | 1074.27 | FARMRD_SW4 | 1064.73 | Natural | | 1 | 0 | 0.027 | 0.2 | 0 | Groove End with Headwall (Circ, Conc) | 1200 |
| AE2054-001_AE2254-014.1 | FARMRD_SW4 | 1064.73 | AE2054-001_AE2254-014_JCT | 1056.18 | Natural | | 1 | 0 | 0.027 | 0.2 | 0 | Groove End with Headwall (Circ, Conc) | 875 |
| AE2056-023_SS2056-022 | AE2056-023 | 1090.01 | SS2056-022 | 1090 | Circular | | 1 | 1 | 0.013 | 1 | 0.25 | Groove End with Headwall (Circ, Conc) | 16 |
| AE2150-004_IN2250-030 | AE2150-004 | 1001.08 | IN2250-030 | 1000.82 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 25.843 |
| AE2150-022_AE2150-025 | SMPB_GW_AAP | 1006.1 | SMPB_BW_AAC2 | 1001.6 | Special | Horizontal Ellipse | 2 | 4.41 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 130.015 |
| AE2156-063_AS2156-062 | AE2156-063 | 1050 | AS2156-062 | 1049.61 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 39 |
| AE2156-074_AE2156-075 | AE2156-074 | 1063.54 | AE2156-075 | 1055.46 | Trapezoidal | | 1 | 2 | 0.035 | 0.1 | 0.25 | 0 | 186.402 |
| AE2156-075_IN2156-006 | AE2156-075 | 1055.46 | IN2156-006 | 1051.07 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 76.133 |
| AE2157-018_AE2157-019 | AE2157-018 | 1075.54 | AE2157-019 | 1074.59 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 100.004 |
| AE2157-019_AE2156-074 | AE2157-019 | 1074.59 | AE2156-074 | 1063.54 | Trapezoidal | | 1 | 1 | 0.035 | 0.2 | 0.1 | Groove End with Headwall (Circ, Conc) | 446.275 |
| AE2158-008_IN2158-007 | AE2158-008 | 1067.55 | IN2158-007 | 1067.55 | Special | Horizontal Ellipse | 1 | 2.833 | 0.013 | 0.2 | 0.05 | Elliptical Tapered Inlet, Square Edges (Throat, Cor | 47.005 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AE2250-053_IN2250-051 | AE2250-053 | 987.22 | IN2250-051 | 987.08 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 32.639 |
| AE2250-055_IN2250-054 | AE2250-055 | 986.4 | IN2250-054 | 986.08 | Circular | | 1 | 2 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 24.462 |
| AE2254-014_AS2254-015 | AE2254-014 | 1049.11 | AS2254-015 | 1048.53 | Circular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 91.59 |
| AE2255-033_TO_JCT_POND_OUT | AE2255-033 | 1049.08 | JUNCTION_RIDGE_POND_OUT_JCT | 1043.5 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 84.217 |
| AE2255-035_AE2255-033 | AE2255-035 | 1049.91 | AE2255-033 | 1049.08 | Natural | | 1 | 0 | 0.013 | 0.1 | 1 | 0 | 7.878 |
| AE2256-033_AE2256-083 | AE2256-033 | 1051.5 | AE2256-083 | 1051.36 | Trapezoidal | | 1 | 1.5 | 0.035 | 0 | 0 | None (,) | 14.631 |
| AE2256-083_IN2256-080 | AE2256-083 | 1051.36 | IN2256-080 | 1050.05 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 80.807 |
| AE2349-026_AS2349-025 | AE2349-026 | 988.3 | AS2349-025 | 988.15 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 30.351 |
| AE2351-002_TO_OSRBL_SERAMP | AE2351-002 | 1009.25 | OSR_BL_SERAMP_US | 999 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 563.472 |
| AE2355-034_AE2455-015 | EMPB_GW_STL1 | 1037.4 | EMPB_GW_SHPR1 | 1035.9 | Circular | | 2 | 5.5 | 0.013 | 0.2 | 0.05 | Square Edge with Headwall (Circ, Conc) | 154 |
| AE2355-035_AE2455-016 | AE2355-035 | 1037.4 | AE2455-016 | 1035.9 | Circular | | 1 | 5.5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 154 |
| AE2356-034_AS2356-032 | AE2356-034 | 1050.25 | AS2356-032 | 1048.95 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 19.001 |
| AE2553-002_TO_GW | AE2553-002 | 1043.6 | TAMARACK_TRAILS | 1032 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 700 |
| AE2553-002_TO_GW.1 | TAMARACK_TRAILS | 1032 | EMPB_GW_NTL7 | 1016.57 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 200 |
| AS1547-018_IN1547-012 | AS1547-018 | 1106.28 | IN1547-012 | 1101.84 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 137.473 |
| AS1547-023_IN1547-019 | AS1547-023 | 1115.12 | IN1547-019 | 1108.34 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 95.884 |
| AS1547-029_IN1548-026 | AS1547-029 | 1115.09 | IN1548-026 | 1101.42 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 241.396 |
| AS1547-032_AS1547-029 | AS1547-032 | 1124.5 | AS1547-029 | 1115.09 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 160.745 |
| AS1548-014_IN1548-012 | AS1548-014 | 1097.05 | IN1548-012 | 1095.73 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 179.162 |
| AS1548-031_IN1548-029 | AS1548-031 | 1099.99 | IN1548-029 | 1098.55 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | None (,) | 142.71 |
| AS1548-036_AS1548-031 | AS1548-036 | 1102.46 | AS1548-031 | 1099.99 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 97.973 |
| AS1548-038_AS1548-036 | AS1548-038 | 1106.07 | AS1548-036 | 1102.46 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 98.043 |
| AS1548-039_AS1548-038 | AS1548-039 | 1109.91 | AS1548-038 | 1106.07 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 85.617 |
| AS1548-048_AS1548-031 | AS1548-048 | 1101.47 | AS1548-031 | 1099.99 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.5 | None (,) | 196.245 |
| AS1549-001_MI1548-051 | AS1549-001 | 1103.61 | MI1548-051 | 1102.5 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 209.008 |
| AS1549-002_AS1549-001 | AS1549-002 | 1103.77 | AS1549-001 | 1103.61 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.05 | None (,) | 34.652 |
| AS1549-010_AS1549-002 | AS1549-010 | 1105.51 | AS1549-002 | 1103.77 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 242.196 |
| AS1549-033_AS1549-032 | AS1549-033 | 1107.76 | AS1549-032 | 1107.63 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 32.03 |
| AS1549-034_AS1549-033 | AS1549-034 | 1108.02 | AS1549-033 | 1107.76 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 78.377 |
| AS1549-042_AE1550-034 | AS1549-042 | 1103.76 | AE1550-034 | 1103.42 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.05 | 0.5 | None (,) | 67.927 |
| AS1550-004_IN1650-009 | AS1550-004 | 1091.43 | IN1650-009 | 1091.28 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 51.548 |
| AS1550-006_AS1550-004 | AS1550-006 | 1096.2 | AS1550-004 | 1091.43 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 253.327 |
| AS1550-008_AS1550-004 | AS1550-008 | 1092.02 | AS1550-004 | 1091.43 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 199.021 |
| AS1550-009_AS1550-008 | AS1550-009 | 1092.81 | AS1550-008 | 1092.02 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 264.423 |
| AS1550-010_AS1550-009 | AS1550-010 | 1093.09 | AS1550-009 | 1092.81 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 94.342 |
| AS1647-002_IN1647-003 | AS1647-002 | 1092.47 | IN1647-003 | 1088.34 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 179.848 |
| AS1647-006_MI1647-055 | AS1647-006 | 1085.6 | MI1647-055 | 1083.9 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | None (,) | 188.374 |
| AS1647-018_IN1647-023 | AS1647-018 | 1080.39 | IN1647-023 | 1080.16 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 42.852 |
| AS1647-024_AS1647-027 | AS1647-024 | 1077.6 | AS1647-027 | 1075.26 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 350.037 |
| AS1647-027_AS1747-019 | AS1647-027 | 1075.26 | NEW_SAS_08_06_19 | 1074.86 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 40.044 |
| AS1647-049_IN1647-050 | AS1647-049 | 1084.11 | IN1647-050 | 1083.6 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | None (,) | 101.2 |
| AS1647-052_AS1647-059 | AS1647-052 | 1081.79 | AS1647-059 | 1080.79 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | None (,) | 127.648 |
| AS1647-056_AS1647-052 | AS1647-056 | 1083.7 | AS1647-052 | 1081.79 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | None (,) | 78.763 |
| AS1647-059_AS1647-048 | AS1647-059 | 1080.79 | AS1647-048 | 1080.25 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.25 | None (,) | 103.918 |
| AS1647-062_AS1647-049 | AS1647-062 | 1084.33 | AS1647-049 | 1084.11 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | None (,) | 42.004 |
| AS1648-003_AS1648-006 | AS1648-003 | 1079.02 | AS1648-006 | 1076.82 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 23.056 |
| AS1648-015_AS1648-014 | AS1648-015 | 1080.56 | AS1648-014 | 1078.14 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 55.818 |
| AS1650-003_IN1750-036 | AS1650-003 | 1086.84 | IN1750-036 | 1086.6 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 15.469 |
| AS1650-004_AS1650-003 | AS1650-004 | 1087.51 | AS1650-003 | 1086.84 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 157.006 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1650-005_AS1650-004 | AS1650-005 | 1087.56 | AS1650-004 | 1087.51 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 28.001 |
| AS1650-006_AS1650-005 | AS1650-006 | 1088.51 | AS1650-005 | 1087.56 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 310.238 |
| AS1650-007_AS1650-006 | AS1650-007 | 1089.46 | AS1650-006 | 1088.51 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 323.329 |
| AS1650-008_AS1650-007 | AS1650-008 | 1090.41 | AS1650-007 | 1089.46 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 321.069 |
| AS1653-003_AS1753-054 | AS1653-003 | 1092.03 | AS1753-054 | 1091.84 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 38.362 |
| AS1653-005_AE1653-006 | AS1653-005 | 1095.03 | AE1653-006 | 1094.5 | Circular | | 1 | 3 | 0.013 | 0.25 | 1 | 0 | 79 |
| AS1747-002_AS1748-014 | AS1747-002 | 1072.9 | AS1748-014 | 1072.36 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | None (,) | 177.47 |
| AS1747-004_AS1747-002 | AS1747-004 | 1077.72 | AS1747-002 | 1072.9 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 44.733 |
| AS1747-007_AS1747-004 | AS1747-007 | 1085.87 | AS1747-004 | 1077.72 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | None (,) | 276.033 |
| AS1747-010_AS1747-007 | AS1747-010 | 1086.72 | AS1747-007 | 1085.87 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | None (,) | 282.03 |
| AS1747-019_AS1747-002 | AS1747-019 | 1073.05 | AS1747-002 | 1072.9 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | None (,) | 48.107 |
| AS1748-011_AS1748-003 | AS1748-011 | 1072.06 | AS1748-003 | 1071.9 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.5 | None (,) | 57.482 |
| AS1748-014_AS1748-011 | AS1748-014 | 1072.36 | AS1748-011 | 1072.06 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | None (,) | 92.506 |
| AS1750-024_IN1850-003 | AS1750-024 | 1076.04 | IN1850-003 | 1073.62 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 485.052 |
| AS1753-044_IN1753-006 | AS1753-044 | 1091.5 | IN1753-006 | 1090.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 140.006 |
| AS1753-045_AE1753-046 | AS1753-045 | 1087.65 | AE1753-046 | 1086 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 1 | 0 | 29 |
| AS1753-045_AS1853-004 | AS1753-045 | 1087.65 | AS1853-004 | 1086.64 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 292.641 |
| AS1753-048_AS1754-009 | AS1753-048 | 1091.42 | AS1754-009 | 1090.59 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.5 | 0.5 | 0 | 279.397 |
| AS1753-054_AS1753-048 | AS1753-054 | 1091.84 | AS1753-048 | 1091.42 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.05 | 0.05 | 0 | 24.507 |
| AS1754-002_AS1753-044 | AS1754-002 | 1093.1 | AS1753-044 | 1091.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 113.032 |
| AS1754-007_MI1753-047 | AS1754-007 | 1088.58 | MI1753-047 | 1088 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 0.5 | 0 | 111.811 |
| AS1754-008_AS1754-007 | AS1754-008 | 1090.28 | AS1754-007 | 1088.58 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.5 | 0 | 568.022 |
| AS1754-009_AS1754-008 | AS1754-009 | 1090.59 | AS1754-008 | 1090.28 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.05 | 0 | 95.004 |
| AS1754-010_IN1753-051 | AS1754-010 | 1097 | IN1753-051 | 1085.59 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 151.08 |
| AS1754-014_AS1754-007 | AS1754-014 | 1098.25 | AS1754-007 | 1091.08 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 67.003 |
| AS1754-015_AS1754-014 | AS1754-015 | 1105.38 | AS1754-014 | 1098.25 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 115.005 |
| AS1754-018_AS1754-015 | AS1754-018 | 1115.5 | AS1754-015 | 1105.38 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 146.5 |
| AS1754-019_AS1754-018 | AS1754-019 | 1115.7 | AS1754-018 | 1115.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 38.001 |
| AS1754-028_IN1754-027 | AS1754-028 | 1104.6 | IN1754-027 | 1104 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 111.116 |
| AS1847-002_IN1847-003 | AS1847-002 | 1073.63 | IN1847-003 | 1069 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 246.557 |
| AS1847-021_AE1847-020 | AS1847-021 | 1061.15 | AE1847-020 | 1059.87 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 55.007 |
| AS1847-022_IN1847-025 | AS1847-022 | 1064.09 | IN1847-025 | 1062.91 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 54.671 |
| AS1848-003_AS1848-002 | AS1848-003 | 1078.32 | AS1847-002 | 1073.63 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 251.253 |
| AS1848-027_IN1848-026 | AS1848-027 | 1075.84 | IN1848-026 | 1075.69 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 33.871 |
| AS1849-008_IN1849-005 | AS1849-008 | 1072.13 | IN1849-005 | 1072.11 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 5.727 |
| AS1849-009_AS1849-008 | AS1849-009 | 1073.11 | AS1849-008 | 1072.13 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 326.036 |
| AS1849-011_IN1849-010 | AS1849-011 | 1075.08 | IN1849-010 | 1074.09 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 198.481 |
| AS1849-026_AS1849-058 | AS1849-026 | 1074.65 | AS1849-058 | 1073.28 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 274.849 |
| AS1849-058_MI1849-055 | AS1849-058 | 1073.28 | MI1849-055 | 1072.7 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 141.135 |
| AS1849-059_AS1849-026 | AS1849-059 | 1074.75 | AS1849-026 | 1074.65 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 10.448 |
| AS1853-004_AE1853-005 | AS1853-004 | 1086.64 | FARGO_COBALT_LEVEL_SPREADER | 1086.2 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.5 | 0 | 130.074 |
| AS1947-009_IN1947-008 | AS1947-009 | 1043.84 | IN1947-008 | 1026.4 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 255.03 |
| AS1947-010_AS1947-009 | AS1947-010 | 1044.15 | AS1947-009 | 1043.84 | Circular | | 1 | 3 | 0.013 | 2 | 0.5 | 0 | 37.07 |
| AS1947-029_AS1947-010 | AS1947-029 | 1047.68 | AS1947-010 | 1044.15 | Circular | | 1 | 1.5 | 0.013 | 2 | 0.05 | 0 | 106.777 |
| AS1948-012_AS1948-013 | AS1948-012 | 1053.75 | AS1948-013 | 1037.1 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 160.733 |
| AS1948-013_IN1948-016 | AS1948-013 | 1037.1 | IN1948-016 | 1023.78 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 185.8 |
| AS1949-015_AS1849-011 | AS1949-015 | 1075.58 | AS1849-011 | 1075.08 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 99.594 |
| AS1949-019_AS1949-015 | AS1949-019 | 1075.8 | AS1949-015 | 1075.58 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 140.548 |
| AS1949-032_IN1949-031 | AS1949-032 | 1077.03 | IN1949-031 | 1076.28 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 76.053 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS1949-033_AS1949-032 | AS1949-033 | 1079.42 | AS1949-032 | 1077.03 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 238.949 |
| AS1949-035_IN1949-011 | AS1949-035 | 1052.17 | IN1949-011 | 1048.26 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 74.92 |
| AS1949-041_IN1949-039 | AS1949-041 | 1072.29 | IN1949-039 | 1067.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 276.186 |
| AS1951-005_IN2051-066 | AS1951-005 | 1069.55 | IN2051-066 | 1069.3 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.05 | 0 | 48.451 |
| AS2046-010_IN2046-001 | AS2046-010 | 985.3 | IN2046-001 | 985.3 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 8.045 |
| AS2047-002_AS2047-006.1 | PV3924 | 1003.62 | AS2047-006 | 992.16 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 157.21 |
| AS2047-006_AS2047-007 | AS2047-006 | 992.16 | AS2047-007 | 983.36 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 286.251 |
| AS2047-007_AS2047-008 | AS2047-007 | 983.36 | AS2047-008 | 983.03 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 87.203 |
| AS2049-001_AS2049-005 | AS2049-001 | 1025.6 | AS2049-005 | 1010.2 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 348.509 |
| AS2049-005_AS2049-002 | AS2049-005 | 1010.2 | AS2049-002 | 1005.7 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 197.307 |
| AS2050-004_AS2150-027 | AS2050-004 | 1026.37 | AS2150-027 | 1019.65 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 352.344 |
| AS2050-012_AS2050-004 | AS2050-012 | 1027.11 | AS2050-004 | 1026.37 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 123.032 |
| AS2050-015_AS2050-012 | AS2050-015 | 1027.72 | AS2050-012 | 1027.11 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 122.013 |
| AS2050-018_AS2050-015 | AS2050-018 | 1040.59 | AS2050-015 | 1027.72 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 285.926 |
| AS2050-024_AS2050-018 | AS2050-024 | 1066.5 | AS2050-018 | 1040.59 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 316.831 |
| AS2051-023.1 | AS2051-023 | 1057.34 | MI2051-022 | 1056.6 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.05 | 0 | 138.162 |
| AS2051-029.1 | AS2051-029 | 1057.93 | IN2051-026 | 1057.47 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.25 | 0.05 | 0 | 92.177 |
| AS2051-038.1 | AS2051-038 | 1058.28 | AS2051-029 | 1057.93 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.25 | 0.25 | 0 | 69.441 |
| AS2051-041_IN2051-039 | AS2051-041 | 1066.85 | IN2051-039 | 1062.56 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.25 | 0 | 225.762 |
| AS2051-051_IN2051-042 | AS2051-051 | 1069.1 | IN2051-042 | 1068.05 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.5 | 0 | 181.856 |
| AS2051-063_MI2051-062 | AS2051-063 | 1069.67 | MI2051-062 | 1068.99 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 32.935 |
| AS2056-007_AE2056-008 | AS2056-007 | 1095.84 | AE2056-008 | 1092 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 56 |
| AS2056-031_AS2156-036 | AS2056-031 | 1068.12 | AS2156-036 | 1062.55 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 158.971 |
| AS2056-044_AS2056-045 | AS2056-044 | 1078.3 | AS2056-045 | 1066.26 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.25 | 0 | 265.028 |
| AS2056-045_AS2156-040 | AS2056-045 | 1066.26 | AS2156-040 | 1058.76 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.15 | 0.15 | 0 | 185.464 |
| AS2145-011_IN2145-010 | AS2145-011 | 971.23 | IN2145-010 | 970.05 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 61.128 |
| AS2146-003_AE2146-004 | AS2146-003 | 970.6 | OSTP_POND_SYSTEM_JCT_6 | 965.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 33.759 |
| AS2147-013_AE2147-014 | AS2147-013 | 971.7 | WMPB_GW_DW2 | 971.7 | Circular | | 1 | 2 | 0.011 | 0.5 | 0.5 | 0 | 94.832 |
| AS2147-015_AE2147-016 | AS2147-015 | 977.08 | WMPB_GW_DW3 | 976.98 | Circular | | 1 | 1.5 | 0.011 | 0.5 | 0.5 | 0 | 91.01 |
| AS2150-012_AS2150-014 | AS2150-012 | 1007.29 | AS2150-014 | 1003.41 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 339.863 |
| AS2150-014_AS2150-015 | AS2150-014 | 1003.41 | AS2150-015 | 1004.03 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 21.183 |
| AS2150-015_IN2150-044 | AS2150-015 | 1004.03 | IN2150-044 | 998.04 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 279.123 |
| AS2150-027_IN2150-009 | AS2150-027 | 1019.65 | IN2150-009 | 1013.42 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 49.317 |
| AS2150-032_AS2150-012 | AS2150-032 | 1008.36 | AS2150-012 | 1007.29 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 58.333 |
| AS2151-009_AS2151-010 | AS2151-009 | 1044.55 | AS2151-010 | 1026.8 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 157.644 |
| AS2151-010_AE2151-020 | AS2151-010 | 1026.8 | AE2151-020 | 1017.35 | Circular | | 1 | 3 | 0.013 | 0.25 | 1 | 0 | 75 |
| AS2152-005_AS2152-008 | AS2152-005 | 1055.11 | AS2152-008 | 1054.16 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 317.086 |
| AS2152-008_TE2152-009 | AS2152-008 | 1054.16 | TE2152-009 | 1053.85 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.05 | 0 | 75.569 |
| AS2152-010_AS2152-015 | AS2152-010 | 1053.02 | AS2152-015 | 1052.31 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 185.832 |
| AS2152-015_AS2152-022 | AS2152-015 | 1052.31 | AS2152-022 | 1050.68 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 322.254 |
| AS2156-040_AS2156-041 | AS2156-040 | 1058.76 | AS2156-041 | 1053.41 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.15 | 0.15 | 0 | 349.44 |
| AS2156-041_AS2156-042 | AS2156-041 | 1053.41 | AS2156-042 | 1052.35 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | 0 | 105.011 |
| AS2156-042_AS2156-043 | AS2156-042 | 1052.35 | AS2156-043 | 1049.42 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 264.396 |
| AS2156-062_IN2156-061 | AS2156-062 | 1049.61 | IN2156-061 | 1047.77 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.25 | 0.05 | 0 | 85.985 |
| AS2245-003_TO2244-001 | AS2245-003 | 953.57 | TO_MIDDLETON_SS | 951.67 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 73.936 |
| AS2245-004_AS2245-003 | AS2245-004 | 958.38 | AS2245-003 | 953.57 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.25 | None (,) | 187.253 |
| AS2245-005_AS2245-004 | AS2245-005 | 958.4 | AS2245-004 | 958.38 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | None (,) | 123.371 |
| AS2245-012_AS2245-005 | AS2245-012 | 965.9 | AS2245-005 | 958.4 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 325.011 |
| AS2249-004_AS2249-005 | AS2249-004 | 992.98 | AS2249-005 | 991.84 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.25 | 0 | 74.698 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2249-005_AS2249-006 | AS2249-005 | 991.84 | AS2249-006 | 988.26 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 89.275 |
| AS2249-006_AE2249-007 | AS2249-006 | 988.26 | EMPB_GW_OSR1 | 985.35 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 418.678 |
| AS2250-016_TP2250-010 | AS2250-016 | 997.91 | TP2250-010 | 997.35 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 33.571 |
| AS2250-020.1 | AS2250-020 | 991.68 | IN2250-044 | 991.67 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 106.51 |
| AS2250-021.1 | AS2250-021 | 990.21 | AS2250-045 | 987.79 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 251.623 |
| AS2250-031_AS2250-032 | AS2250-031 | 1009.91 | AS2250-032 | 1008 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 112.012 |
| AS2250-032_AS2250-033 | AS2250-032 | 1008 | AS2250-033 | 1006.78 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 64.007 |
| AS2250-033_AS2250-034 | AS2250-033 | 1006.78 | AS2250-034 | 1003.85 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 133.017 |
| AS2250-034_AS2250-035 | AS2250-034 | 1003.85 | AS2250-035 | 999.88 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 203.02 |
| AS2250-035_AS2250-036 | AS2250-035 | 999.88 | AS2250-036 | 998.26 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 102.011 |
| AS2250-036_AS2250-037 | AS2250-036 | 998.26 | AS2250-037 | 997.39 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 43.005 |
| AS2250-037_AS2250-038 | AS2250-037 | 997.39 | AS2250-038 | 994.6 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 98.035 |
| AS2250-045.1 | AS2250-045 | 987.79 | EMPB_GW_OSR1 | 985.29 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 310.299 |
| AS2251-010_AS2251-008 | AS2251-010 | 1028.1 | AS2251-008 | 1024.72 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 155.851 |
| AS2251-031_AS2250-031 | AS2251-031 | 1013.75 | AS2250-031 | 1009.91 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 206.023 |
| AS2252-008_IN2252-009 | AS2252-008 | 1048.9 | IN2252-009 | 1037.24 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 380.932 |
| AS2253-012_AS2253-018 | AS2253-012 | 1054.89 | AS2253-018 | 1054.04 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 122.822 |
| AS2253-013_AS2253-018 | AS2253-013 | 1054.44 | AS2253-018 | 1054.04 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.5 | 0 | 65.984 |
| AS2253-015_AS2253-013 | AS2253-015 | 1055.42 | AS2253-013 | 1054.44 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 154.257 |
| AS2253-016_AS2253-015 | AS2253-016 | 1056.9 | AS2253-015 | 1055.42 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 300.064 |
| AS2253-017_AS2253-016 | AS2253-017 | 1057.5 | AS2253-016 | 1056.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 112.263 |
| AS2253-018_AS2254-004 | AS2253-018 | 1054.04 | AS2254-004 | 1053.27 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 156.074 |
| AS2254-004_AS2254-005 | AS2254-004 | 1053.27 | AS2254-005 | 1052.66 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 126.098 |
| AS2254-013_AS2254-016 | AS2254-013 | 1048.92 | AS2254-016 | 1047.78 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | 0 | 238.017 |
| AS2254-013_IN2254-009 | AS2254-013 | 1048.92 | IN2254-009 | 1048.77 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | 0 | 21.384 |
| AS2254-015_IN2254-021 | AS2254-015 | 1048.53 | IN2254-021 | 1048.3 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 77.206 |
| AS2254-016_AS2254-017 | AS2254-016 | 1047.78 | AS2254-017 | 1046.71 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.05 | 0 | 216.103 |
| AS2254-017_IN2255-001 | AS2254-017 | 1046.71 | IN2255-001 | 1045.58 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | 0 | 227.691 |
| AS2254-024_AS2255-008 | AS2254-024 | 1047.55 | AS2255-008 | 1046.82 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 243.438 |
| AS2255-006_AE2255-005 | AS2255-006 | 1045.31 | AE2255-005 | 1043.6 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 1 | 0 | 707 |
| AS2255-008_AS2255-009 | AS2255-008 | 1046.82 | AS2255-009 | 1046.07 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 55.592 |
| AS2255-009_AS2255-055 | AS2255-009 | 1046.07 | AS2255-055 | 1045.8 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 113.015 |
| AS2255-046_MI2255-047 | AS2255-046 | 1044.85 | MI2255-047 | 1044.75 | Rectangular | | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 28.638 |
| AS2255-054_AS2255-006 | AS2255-054 | 1045.38 | AS2255-006 | 1045.31 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.5 | 0 | 37.082 |
| AS2255-055_AS2255-054 | AS2255-055 | 1045.8 | AS2255-054 | 1045.38 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 173.144 |
| AS2256-017_IN2256-071 | AS2256-017 | 1051.04 | IN2256-071 | 1049.83 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 199.029 |
| AS2256-047_AS2255-046 | AS2256-047 | 1045.29 | AS2255-046 | 1044.85 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | 0 | 121.055 |
| AS2256-055_AS2256-056 | AS2256-055 | 1047.49 | AS2256-056 | 1047.3 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 58.498 |
| AS2256-056_AS2256-057 | AS2256-056 | 1047.3 | AS2256-057 | 1046.93 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 128.005 |
| AS2256-057_JB2256-058 | AS2256-057 | 1046.93 | JB2256-058 | 1046.5 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 147.826 |
| AS2256-073_AE2256-074 | AS2256-073 | 1052.5 | AE2256-074 | 1052.5 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 1 | 0 | 10 |
| AS2256-077_JB2256-065 | AS2256-077 | 1048.89 | JB2256-065 | 1046.92 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 44.031 |
| AS2257-008_AS2257-004 | AS2257-008 | 1059.24 | AS2257-004 | 1057.79 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.25 | 0 | 289.71 |
| AS2257-012_TE2257-014 | AS2257-012 | 1057.87 | TE2257-014 | 1057.35 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 34.125 |
| AS2258-001_AS2257-008 | AS2258-001 | 1061.85 | AS2257-008 | 1059.24 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | 0 | 390.36 |
| AS2258-011_IN2258-067 | AS2258-011 | 1065.13 | IN2258-067 | 1062.68 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 270.185 |
| AS2258-014_AE2258-015 | AS2258-014 | 1066.19 | AE2258-015 | 1065 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 1 | 0 | 42 |
| AS2258-014_AS2258-017 | AS2258-014 | 1067.69 | AS2258-017 | 1065.59 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 272.669 |
| AS2258-017_AS2258-011 | AS2258-017 | 1065.59 | AS2258-011 | 1065.13 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 64.094 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AS2258-052_IN2258-025 | AS2258-052 | 1080.75 | IN2258-025 | 1069.43 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 349.298 |
| AS2349-008.1 | AS2349-008 | 981.8 | AS2349-011 | 978.1 | Circular | | 1 | 6.5 | 0.013 | 0.25 | 0.05 | 0 | 503.102 |
| AS2349-011.1 | AS2349-011 | 978.1 | AS2348-005 | 975.3 | Circular | | 1 | 6.5 | 0.013 | 0.05 | 0.5 | 0 | 410.042 |
| AS2349-025_IN2349-027 | AS2349-025 | 988.15 | IN2349-027 | 986.62 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 259.636 |
| AS2355-059_AE2355-058 | AS2355-059 | 1043.43 | EMPB_GW_MPR1 | 1041.5 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.5 | 0 | 169.153 |
| AS2355-060_AS2355-059 | AS2355-060 | 1044.94 | AS2355-059 | 1043.43 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 50.599 |
| AS2356-032_IN2356-033 | AS2356-032 | 1048.95 | IN2356-033 | 1048.95 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 21.467 |
| AspenGrPr1 | AS1847-018 | 1059.78 | AE1847-019 | 1055.98 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 190 |
| AspenGrPr10 | TE1848-012 | 1025.73 | IN1848-011 | 1024.6 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 28.23 |
| AspenGrPr11 | IN1848-009 | 1027.05 | AS1847-009 | 1026.23 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 41 |
| AspenGrPr12 | IN1848-007 | 1028.41 | IN1848-009 | 1027.05 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 68 |
| AspenGrPr2 | IN1847-017 | 1061.34 | AS1847-018 | 1059.78 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 77.67 |
| AspenGrPr3 | IN1847-016 | 1062.44 | IN1847-017 | 1061.34 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 57.29 |
| AspenGrPr4 | IN1847-005 | 1065.6 | AE1847-006 | 1054.6 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 160 |
| AspenGrPr5 | AS1847-009 | 1026.23 | TE1848-012 | 1025.73 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 25 |
| AspenGrPr6 | IN1847-003 | 1067 | IN1847-005 | 1065.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 70.03 |
| AspenGrPr7 | IN1948-019 | 1016.29 | AS1948-017 | 1015.26 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 51.46 |
| AspenGrPr8 | IN1948-020 | 1016.81 | IN1948-019 | 1016.29 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 26.06 |
| AspenGrPr9 | IN1848-011 | 1024.6 | IN1948-020 | 1016.81 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 262.04 |
| ATTIC_ANGEL_LOW_FLOW_OUT | AA_POND_OUT | 1017.6 | ATTIC_ANGEL_PONDS_OUTLET | 1017.59 | Circular | | 1 | 1.5 | 0.013 | 1 | 0.5 | None (,) | 68 |
| ATTIC_ANGEL_PONDS_GRATE_OUT | AA_POND_OUT | | ATTIC_ANGEL_PONDS_OUTLET | | | | | | | | | | |
| ATTIC_ANGEL_PONDS_OUT_PIPE | ATTIC_ANGEL_PONDS_( | 1017.6 | ATTIC_ANGEL_POND_OUT | 1016.85 | Circular | | 1 | 5.5 | 0.013 | 0.5 | 0.5 | 0 | 73.385 |
| Attic_Angle_E-W_Pipes | AA_W_POND_OUT | 1017.35 | AA_EAST_POND | 1017.1 | Special | Horizontal Ellipse | 2 | 3.75 | 0.013 | 1 | 1 | 0 | 45 |
| BEAR_CLAW_WAY_ST | BEAR_CLAW_APARTME | 1086 | IN1749-002 | 1081.648 | Natural | | 1 | 0 | 0.02 | 0 | 0 | None (,) | 498.601 |
| BearClawPr1 | AS1748-024 | 1073.18 | AS1748-003 | 1070.23 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 257.93 |
| BearClawPr2 | IN1748-023 | 1075.35 | AS1748-024 | 1073.18 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 216.65 |
| BearClawPr3 | IN1749-003 | 1076.39 | IN1748-023 | 1075.35 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 206.23 |
| BeltlineSCulv1 | BeltlineSUS1 | 1043.5 | BeltlineSDS1 | 1041.39 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 396 |
| BeltlineSCulv2 | BeltlineSUS2 | 1043.5 | BeltlineSDS2 | 1041.39 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 396 |
| BHPondInPr1 | WW_TO_POND_BLIND_ | 1070 | AE1748-006 | 1068.8 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 1 | 0 | 120 |
| BHPondInPr2 | AS1748-003 | 1070.23 | WW_TO_POND_BLIND_TAP | 1070 | Rectangular | | 1 | 4 | 0.013 | 0.1 | 0.05 | 0 | 23 |
| BoulderCrPr1 | Inlet_IN1948-002 | 1011.69 | AE1948-003 | 1010 | Circular | | 1 | 3 | 0.013 | 0.25 | 1 | 0 | 169 |
| BoulderCrPr2 | IN1948-002 | 1014.34 | Inlet_IN1948-002 | 1011.69 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 268 |
| BYPr1 | IN1753-026 | 1088.44 | IN1853-001 | 1088.44 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 59 |
| CAPE_SILVER_N_POND_GRATE | CAPE_INF_OUT | | IN1550-007 | | | | | | | | | | |
| CAPE_SILVER_N_POND_GRATE_OUT | IN1550-005 | | CAPE_SILVER_WAY_POND_OUT | | | | | | | | | | |
| CAPE_SILVER_N_POND_UNDERDRAIN | CAPE_INF_OUT | 1096.5 | IN1550-007 | 1096.29 | Circular | | 1 | 0.5 | 0.013 | 1 | 0.5 | None (,) | 102.168 |
| CAPE_SILVER_S_GRATE | CAPE_WP_OUT | | CAPE_SILVER_WAY_WP_TO_DP_US | | | | | | | | | | |
| CAPE_SILVER_S_POND_ORI | CAPE_WP_OUT | | CAPE_SILVER_WAY_WP_TO_DP_US | | | | | | | | | | |
| CAPE_SILVER_WAY_WP_ORIFICE | IN1550-005 | | CAPE_SILVER_WAY_POND_OUT | | | | | | | | | | |
| CAPE_SILVER_WAY_WP_TO_DP_PIPE | CAPE_SILVER_WAY_WP | 1099.01 | CAPE_INF_IN | 1099 | Circular | | 1 | 1 | 0.013 | 0.5 | 1 | None (,) | 49.95 |
| CAPE_SILVER_WP_PIPE_OUT | CAPE_SILVER_WAY_PO | 1096 | AS1550-004 | 1095.15 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 27.597 |
| CDT_11 | IN1653-027 | 1105.69 | IN1653-026 | 1105.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 66.453 |
| CDT_15 | PL1447-001 | 1133 | IN1547-033 | 1129.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 103.255 |
| CDT_17 | PL1548-052 | 1116.09 | IN1548-045 | 1115.84 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 47.998 |
| CDT_27 | IN1550-017 | 1100.87 | IN1550-014 | 1099.04 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 244.629 |
| CDT_29 | IN1550-023 | 1101.52 | IN1550-022 | 1101.02 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 103.522 |
| CDT_33 | IN1550-014 | 1099.04 | AE1550-016 | 1098 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 1 | 0 | 48 |
| CDT_43 | IN1551-005 | 1103.87 | IN1551-002 | 1101.79 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 215.705 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CDT_55 | PL1651-001 | 1093.28 | IN1751-004 | 1093.04 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 69.005 |
| CDT_59 | EMPB_GW_NTL7 | 1016.57 | EMPB_GW_NTL6 | 1010.77 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 747.778 |
| CDT_63 | OSTP_POND_SYSTEM_J | 963.17 | OSTP_POND_SYSTEM_JCT_7 | 963.27 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 292.634 |
| CDT_67 | EMPB_GW_NTL8 | 998.97 | AE2451-002 | 995.96 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 514.596 |
| CDT_69 | WMPB_GW_TRANSFER1 | 1055.42 | WMPB_GW_TRANSFER2 | 1049.47 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 291.274 |
| CDT_71 | WMPB_GW_TRANSFER2 | 1049.47 | WMPB_GW_BHR1 | 1016.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | 0 | 1131.729 |
| CDT_81 | IN1549-016 | 1106.01 | AS1549-010 | 1105.51 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 102.03 |
| CDT_85 | NEW_SAS_08_06_19 | 1074.86 | AS1747-019 | 1073.05 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 213.606 |
| CH_BIO_BASIN1_12IN | CH_BIO_BASIN_1 | 1098.1 | CH_BIO_BASIN1_OUT2 | 1098 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13.397 |
| CH_BIO_BASIN1_ORI | CH_BIO_BASIN1_OUT2 | | CH_BIO_BASIN1_OUT | | | | | | | | | | |
| CH_BIO_BASIN1_OUT_IN1550-011 | CH_BIO_BASIN1_OUT | 1095 | IN1550-011 | 1093.57 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 23.676 |
| CH_BIO_BASIN1_UNDERDRAIN | CH_BIO_BASIN_1 | 1095.1 | CH_BIO_BASIN1_OUT | 1095 | Circular | | 1 | 0.5 | 0.011 | 0.5 | 0.5 | None (,) | 35.857 |
| CH_S31A_CH_S31 | CH_S31A | 1099.74 | CH_S31 | 1099.51 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 34.66 |
| CH_S33A_CH_S33 | CH_SAS33 | 1105.69 | CH_S33 | 1105.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.843 |
| CH-S21_CH-S20 | CH-S21 | 1097.84 | CH_BIO_BASIN_1 | 1097.5 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 1 | 0 | 35.726 |
| CH-S22A_CH-S22 | CH-S22A | 1102.83 | CH-S22 | 1102.61 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 32.626 |
| COMMERCE_SQUARE_POND_GRATE | COM_SQ_P_OUT | | COMMERCE_SQUARE_POND_OUT | | | | | | | | | | |
| COMMERCE_SQUARE_POND_LOW_FLOW | COM_SQ_P_OUT | | COMMERCE_SQUARE_POND_OUT | | | | | | | | | | |
| COMMERCE_SQUARE_POND_OUT_PIPE | COMMERCE_SQUARE_P | 1062.88 | IN2258-034 | 1062.36 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.5 | 0.05 | 0 | 54.042 |
| CondoToWexPr1 | IN2449-002 | 990.5 | AE2449-003 | 984.8 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 269 |
| CondotoWexPr2 | IN2449-001 | 995.82 | IN2449-002 | 990.5 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.1 | 0 | 245 |
| CondotoWexPr3 | IN2449-004 | 997.1 | IN2449-001 | 995.82 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.1 | 0 | 323 |
| CondotoWexPr4 | IN2449-009 | 997.2 | IN2449-004 | 997.1 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.1 | 0 | 9 |
| CondotoWexPr5 | IN2450-023 | 997.25 | IN2449-009 | 997.2 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.1 | 0 | 23 |
| CondotoWexPr6 | IN2450-021 | 997.3 | IN2450-023 | 997.25 | Circular | | 1 | 3 | 0.013 | 0.15 | 0.1 | 0 | 20 |
| CondotoWexPr8 | AE2450-022 | 997.4 | IN2450-021 | 997.3 | Circular | | 1 | 3 | 0.013 | 1 | 0.15 | 0 | 27 |
| CricketLnPr1 | IN1648-038 | 1076.29 | AE1648-039 | 1076.1 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 1 | 0 | 31 |
| CricketLnPr2 | IN1648-037 | 1076.45 | IN1648-038 | 1076.29 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.05 | 0 | 27.03 |
| CricketLnPr3 | IN1648-036 | 1077.21 | IN1648-037 | 1076.45 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 68.3 |
| CricketLnPr4 | IN1649-004 | 1078.98 | IN1648-036 | 1077.21 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.1 | 0 | 340.12 |
| CricketPr5 | IN1649-003 | 1082.5 | IN1649-004 | 1078.98 | Circular | | 1 | 2.5 | 0.013 | 0.1 | 0.1 | 0 | 57.02 |
| CV_BIO_BASIN1_WEIR | CH_BIO_BASIN1_OUT2 | | CH_BIO_BASIN1_OUT | | | | | | | | | | |
| DeerHoPr1 | IN1948-005 | 1011.76 | AE1948-007 | 1008.24 | Circular | | 1 | 4 | 0.013 | 0.1 | 1 | 0 | 176 |
| DeerHoPr2 | AS1948-004 | 1014.44 | IN1948-005 | 1011.76 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.1 | 0 | 134.15 |
| DemingPr1 | IN2046-001 | 982.44 | IN2046-002 | 981.94 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 67 |
| DemingPr2 | IN2046-002 | 981.94 | AS2047-008 | 981.38 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 75 |
| DemingPr3 | AS2145-001 | 959.44 | DemingDS1 | 957.46 | Circular | | 1 | 3 | 0.013 | 0.4 | 0.5 | 0 | 99 |
| DemingPr6 | IN2045-005 | 971.32 | AS2045-006 | 969.86 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 73 |
| DemingWayPr1 | AE2048-001 | 986.84 | WMPB_GW_DW5 | 986.1 | Rectangular | | 1 | 5 | 0.013 | 0.2 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 74 |
| DemingWayPr4 | AS2045-007 | 966.82 | AS2145-001 | 959.44 | Circular | | 1 | 3 | 0.013 | 0.2 | 0.3 | 0 | 369 |
| DemingWayPr5 | AS2045-006 | 969.86 | AS2045-007 | 966.82 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.1 | 0 | 152 |
| DT2349-022_DT2349-021 | DT2349-022 | 991 | DT2349-021 | 990 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 35.208 |
| E_M_PB_GW_EXCELSIOR_DR_SECTION | HD2248-006 | 973.6 | EMPB_GW_WBH3 | 966.94 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1030.759 |
| E_M_PB_GW_FOURIER_DR_SECTION1 | EMPB_GW_FD1 | 965.1 | OSTP_POND_SYSTEM_JCT_13 | 964.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 654.035 |
| E_M_PB_GW_LOW_OLD_SAUK_RD_SEC1 | AE2449-003 | 982.42 | WEXFORD_POND_IN | 978.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 462.988 |
| E_M_PB_GW_LOW_OLD_SAUK_RD_SEC2 | EMPB_GW_LOSR1 | 991.7 | EMPB_GW_LOSR2 | 989.4 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 617 |
| E_M_PB_GW_LOW_OLD_SAUK_RD_SEC2.1 | EMPB_GW_LOSR2 | 989.4 | AE2449-003 | 982.42 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 745 |
| E_M_PB_GW_MIN_PT_RD_SECTION | EMPB_GW_MPR1 | 1041.39 | GR2355-009 | 1040.41 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 616.744 |
| E_M_PB_GW_N_HIGH_PT_RD_SECTION1 | EMPB_GW_NHPR2 | 969.14 | BeltineNUS2 | 967.6 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 450.56 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E_M_PB_GW_N_TREE_LN_SECTION1 | EMPB_GW_NTL3 | 987.56 | EMPB_GW_NTL1 | 986 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 207.838 |
| E_M_PB_GW_N_TREE_LN_SECTION2 | EMPB_GW_NTL5 | 991.37 | EMPB_GW_NTL3 | 987.56 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 615.681 |
| E_M_PB_GW_N_TREE_LN_SECTION3 | AE2451-002 | 995.96 | SAUK_CREEK_LOWER_STORAGE | 992.62 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 901.726 |
| E_M_PB_GW_N_TREE_LN_SECTION4 | AE2452-014 | 1004.06 | EMPB_GW_NTL8 | 998.97 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 844.309 |
| E_M_PB_GW_N_TREE_LN_SECTION5 | EMPB_GW_NTL6 | 1010.77 | AE2452-014 | 1004.06 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1169.991 |
| E_M_PB_GW_N_TREE_LN_SECTION6 | AE2454-006 | 1019.44 | EMPB_GW_NTL7 | 1016.57 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 306.861 |
| E_M_PB_GW_N_TREE_LN_SECTION7 | HD2454-016 | 1030.1 | AE2454-006 | 1019.44 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1129.403 |
| E_M_PB_GW_OLD_SAUK_RD_SECTION1 | EMPB_GW_OSR3 | 983.7 | HD2249-033 | 983.16 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 103.36 |
| E_M_PB_GW_OLD_SAUK_RD_SECTION2 | EMPB_GW_OSR1 | 985.29 | EMPB_GW_OSR3 | 983.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 180.275 |
| E_M_PB_GW_OLD_SAUK_RD_SECTION3 | EMPB_GW_OSR2 | 985.3 | EMPB_GW_OSR3 | 983.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 218.158 |
| E_M_PB_GW_S_HP_RD_SECTION1 | EMPB_GW_SHPR1 | 1035.9 | HD2454-017 | 1030.59 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 902.564 |
| E_M_PB_GW_S_TREE_LN_SECTION | EMPB_GW_STL2 | 1039.78 | EMPB_GW_STL1 | 1037.4 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 638.699 |
| E_M_PB_GW_UPPER_OLD_SAUK_RD_SEC | WEXFORD_POND_OUT | 972.68 | EMPB_GW_UOSR1 | 969.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 609.715 |
| E_M_PB_GW_W_BELTLINE_SECTION1 | EMPB_GW_WBH3 | 966.94 | EMPB_GW_WBH1 | 965.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 456.732 |
| E_M_PB_GW_W_BELTLINE_SECTION2 | BeltlineNDS2 | 966 | EMPB_GW_WBH3 | 966.94 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 118.224 |
| E_M_PB_GW_WHITACRE_RD_SECTION1 | EMPB_GW_WR1 | 998.45 | GR2550-020 | 992.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 382.785 |
| E_M_PB_GW_WHITACRE_RD_SECTION2 | AE2551-009 | 1004.9 | EMPB_GW_WR1 | 998.45 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 599.775 |
| EldRdPr1 | DT1853-003 | 1089.31 | IN1753-027 | 1088.33 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 98 |
| EldRdPr22 | IN1752-024 | 1095.5 | IN1752-022 | 1094.52 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 196 |
| EldRdPr23 | IN1752-026 | 1095.73 | IN1752-024 | 1095.5 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 45 |
| EldRdPr24 | IN1752-023 | 1094.76 | IN1752-022 | 1094.67 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 17 |
| EldTrPr20 | IN1752-019 | 1092.42 | IN1752-018 | 1092.27 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | 0 | 29 |
| EldTrPr21 | IN1752-022 | 1094.17 | IN1752-019 | 1092.42 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 350 |
| ExcelsDW_Pr | OLD_SAUK_GW3_US | 966.56 | OSTP_POND_SYSTEM_JCT_14 | 965 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 78 |
| FallenLfPr1 | AS1647-044 | 1081.03 | AS1647-048 | 1080.25 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 55 |
| FallenLfPr2 | AS1547-003 | 1081.82 | AS1647-044 | 1081.03 | Rectangular | | 1 | 4 | 0.013 | 0.1 | 0.05 | 0 | 157 |
| FallenLfPr3 | IN1547-004 | 1085.82 | AS1547-003 | 1084.17 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.1 | 0 | 82 |
| FallenLfPr4 | IN1547-009 | 1088.12 | IN1547-004 | 1085.82 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 147 |
| FARGO_COBALT_E_POND_OUT_PIPE | FARGO_COBALT_E_PON | 1086.4 | FARGO_COBALT_LEVEL_SPREADER | 1086.2 | Circular | | 1 | 2 | 0.013 | 1 | 0.5 | None (,) | 44 |
| FARGO_COBALT_W_TO_E_PIPE | FAR_CO_WP_OUT | 1086.6 | FARGO_COBALT_W_TO_E_DS | 1086.4 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 48 |
| FargoTr15 | AS1752-001 | 1089.48 | IN1751-025 | 1088.09 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 278.03 |
| FargoTrPr1 | IN1753-008 | 1086.03 | IN1753-040 | 1085.59 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 175 |
| FargoTrPr10 | IN1751-011 | 1086.58 | AS1751-010 | 1086.49 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 17 |
| FargoTrPr11 | MI1751-024 | 1087.16 | IN1751-011 | 1086.58 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 115 |
| FargoTrPr12 | IN1751-023 | 1087.72 | MI1751-024 | 1087.16 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 112 |
| FargoTrPr14 | IN1751-025 | 1088.09 | IN1751-023 | 1087.72 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 74 |
| FargoTrPr16 | IN1752-002 | 1089.6 | AS1752-001 | 1089.48 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 24 |
| FargoTrPr17 | MI1752-008 | 1090.18 | IN1752-002 | 1089.6 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 115 |
| FargoTrPr18 | IN1752-011 | 1090.73 | MI1752-008 | 1090.18 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 110 |
| FargoTrPr19 | IN1752-016 | 1091.1 | IN1752-011 | 1090.73 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 74 |
| FargoTrPr2 | IN1753-009 | 1086.27 | IN1753-008 | 1086.03 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 94 |
| FargoTrPr20 | IN1752-018 | 1092.27 | IN1752-016 | 1091.1 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.05 | 0 | 233 |
| FargoTrPr3 | IN1753-015 | 1086.39 | IN1753-009 | 1086.27 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 45 |
| FargoTrPr5 | IN1751-022 | 1083.64 | IN1750-019 | 1082.6 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.5 | 0 | 52 |
| FargoTrPr6 | IN1751-020 | 1083.99 | IN1751-022 | 1083.64 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | 0 | 69 |
| FargoTrPr8 | IN1751-016 | 1084.6 | IN1751-020 | 1083.99 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 121 |
| FargoTrPr9 | AS1751-010 | 1086.49 | IN1751-016 | 1084.6 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 377 |
| FarmingPr1 | FS-8A | 1014.12 | AS2551-010 | 1013.54 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.25 | 0 | 29 |
| FarmingPr10 | AS2450-026 | 992.44 | IN2450-024 | 992.39 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 11 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FarmingPr11 | AS2450-027 | 993.31 | AS2450-026 | 992.44 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 188 |
| FarmingPr12 | AS2451-012 | 994.12 | AS2450-027 | 993.31 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 162 |
| FarmingPr13 | AS2451-015 | 995.73 | AS2451-012 | 994.12 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 322 |
| FarmingPr14 | AS2450-026 | 992.29 | IN2450-025 | 992.15 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 10 |
| FarmingPr15 | IN2450-025 | 992.15 | EMPB_GW_NTL5 | 991.3 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 226 |
| FarmingPr3 | FS-10 | 1020.96 | FS-9 | 1017.4 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.1 | 0 | 178 |
| FarmingPr4 | FS-11 | 1021.98 | FS-10 | 1020.96 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.25 | 0 | 51 |
| FarmingPr5 | FS-12 | 1024.14 | FS-11 | 1021.98 | Circular | | 1 | 4 | 0.013 | 0.1 | 0.25 | 0 | 108 |
| FarmingPr6 | FS-13 | 1031.47 | FS-12 | 1025.31 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.1 | 0 | 308 |
| FarmingPr7 | FS-14 | 1041.7 | FS-13 | 1031.47 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.05 | 0 | 341 |
| FarmingPr8 | FS-15 | 1052.02 | FS-14 | 1042.2 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.1 | 0 | 258 |
| FarmingPr9 | IN2450-024 | 992.39 | EMPB_GW_NTL5 | 991.3 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 217 |
| FarmingtonPr2 | FS-9 | 1017.4 | FS-8A | 1014.12 | Circular | | 1 | 4 | 0.013 | 0.1 | 0.25 | 0 | 164 |
| FourierCulv1 | FourierUS1 | 961.3 | OSTrSouthPond | 960.4 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 1 | 45 deg Wingwall Flares (Rect, Conc) | 95 |
| FourierCulv2 | EMPB_GW_WBH1 | 961.3 | OSTrSouthPond | 960.4 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 1 | 90 deg Headwall with 45 deg Bevels (Rect, Conc) | 95 |
| FourierCulv3 | FourierUS3 | 961.3 | OSTrSouthPond | 960.4 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 1 | 45 deg Wingwall Flares (Rect, Conc) | 95 |
| FourierPr1 | AS2247-006 | 963.34 | OSTrSouthPond | 963.17 | Circular | | 1 | 5 | 0.013 | 0.5 | 1 | 0 | 33 |
| Fox_PrP1 | IN2453-009 | 1025.9 | AE2553-001 | 1012.6 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 223 |
| GANSER_HEIGHTS_LOW_FLOW_ORI | GAN_H_P_OUT | | IN2357-008 | | | | | | | | | | |
| GANSER_HEIGHTS_POND_LOW_WEIR | GAN_H_P_OUT | | IN2357-008 | | | | | | | | | | |
| GANSER_HEIGHTS_WEIR_HIGH | GAN_H_P_OUT | | IN2357-008 | | | | | | | | | | |
| GR2347-021_TP2347-023 | HighPointUS3 | 969.1 | TP2347-023 | 969.5 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.05 | 30 to 75 deg Wingwall Flares (Rect, Conc) | 90 |
| GR2347-026_GR2347-027 | HighPointUS1 | 969.1 | EMPB_GW_NHPR2 | 968.6 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.5 | 30 to 75 deg Wingwall Flares (Rect, Conc) | 145.425 |
| GR2550-020_IN2550-021 | GR2550-020 | 992.8 | IN2550-021 | 992.7 | Circular | | 1 | 3.5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Circ, Conc) | 35.717 |
| Greystone Pr3 | IN1648-033 | 1085.26 | AS1648-043 | 1084.01 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 209.85 |
| GreyStonePr1 | IN1648-044 | 1083.33 | AE1648-046 | 1079.65 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 1 | 0 | 184 |
| GreystonePr2 | AS1648-043 | 1084.01 | IN1648-044 | 1083.33 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 49.73 |
| GreystonePr4 | IN1648-032 | 1086.26 | IN1648-033 | 1085.26 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 31.12 |
| GreystonePr5 | IN1648-031 | 1086.71 | IN1648-032 | 1086.26 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 29.37 |
| GreystonePr6 | IN1648-030 | 1086.9 | IN1648-031 | 1086.71 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 31.57 |
| GreystonePr7 | IN1648-040 | 1087.85 | IN1648-030 | 1086.9 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 73.64 |
| GreystonePr8 | IN1648-041 | 1091.11 | IN1648-040 | 1087.85 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 66.67 |
| HD2051-014_HD2051-015 | HD2051-014 | 1052.35 | SMPB_GW_BWD | 1051.35 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 101.216 |
| HighPoint_Pr5 | IN2347-035 | 969.58 | AS2347-011 | 969.34 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 47 |
| HighPoint_Pr6 | IN2347-005 | 970.83 | IN2347-035 | 969.58 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 249 |
| HighPointGWPr1 | HighPointSUS1 | 1037.4 | HighPointSDS1 | 1035.9 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 154 |
| HighPointPr1 | AS2349-011 | 976.56 | AS2348-005 | 974.51 | Circular | | 1 | 7 | 0.013 | 0.5 | 0.5 | 0 | 410 |
| HighPointPr10 | IN2350-013 | 992.77 | AE2350-016 | 992.3 | Circular | | 1 | 3 | 0.013 | 0.05 | 1 | 0 | 47 |
| HighPointPr11 | IN2350-014 | 993.34 | IN2350-013 | 992.77 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 57 |
| HighPointPR12 | IN2350-029 | 995.16 | IN2350-014 | 993.34 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 91 |
| HighPointPr2 | AS2349-008 | 980.33 | AS2349-011 | 976.56 | Circular | | 1 | 7 | 0.013 | 0.5 | 0.5 | 0 | 503 |
| HighPointPr20 | IN2455-019 | 1038.37 | EMPB_GW_SHPR1 | 1037.9 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 47 |
| HighPointPr21 | IN2455-018 | 1038.47 | IN2455-019 | 1038.37 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 10 |
| HighPointPr22 | IN2455-017 | 1038.89 | IN2455-018 | 1038.47 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 42 |
| HighPointPr3 | SC_Out_Pr1 | 986 | AS2349-008 | 980.33 | Circular | | 1 | 7 | 0.013 | 0.2 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 176 |
| HighPointPr5 | AS2347-001 | 969.98 | Node2015 | 968.87 | Rectangular | | 1 | 6 | 0.013 | 0.1 | 0.25 | 0 | 221 |
| HighPointPr6 | IN2348-001 | 971.17 | AS2347-001 | 969.98 | Rectangular | | 1 | 6 | 0.013 | 0.1 | 0.1 | None (,) | 237 |
| HighPointPr7 | AS2347-010 | 968.93 | EMPB_GW_NHPR2 | 968.6 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 65 |
| HighPointPr8 | AS2347-011 | 969.34 | AS2347-010 | 968.93 | Circular | | 1 | 3 | 0.013 | 0.4 | 0.5 | 0 | 82 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HighPointPr9 | IN2348-003 | 972.44 | IN2348-001 | 971.17 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 0.1 | 0 | 254 |
| HighPtPr20 | IN2456-022 | 1060.8 | AS2455-024 | 1059.7 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 110 |
| HighPtPr21 | IN2456-003 | 1064.18 | IN2456-022 | 1060.8 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 169 |
| HighPtRelief | Node2009 | 983.96 | AE2348-007 | 968.8 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 1 | 0 | 1330 |
| HillPrP1 | BC_HV_Bluff | 1096.939 | IN2258-023 | 1086.91 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 65.2 |
| HillPrP2 | HV_BLUFF_1 | 1101.98 | BC_HV_Bluff | 1096.939 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 168.03 |
| HillPrP3 | HV_BLUFF2 | 1105.84 | HV_BLUFF_1 | 1101.98 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 200 |
| IN1547-005_AS1547-003 | IN1547-005 | 1082.56 | AS1547-003 | 1081.82 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | None (,) | 147.066 |
| IN1547-005_IN1548-003 | IN1547-005 | 1082.56 | IN1548-003 | 1081.02 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.5 | None (,) | 313.171 |
| IN1547-006_AS1647-062 | IN1547-006 | 1088.12 | AS1647-062 | 1084.33 | Circular | | 1 | 1.25 | 0.013 | 0.33 | 0.05 | None (,) | 111.612 |
| IN1547-007_IN1547-006 | IN1547-007 | 1089.77 | IN1547-006 | 1088.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.33 | None (,) | 32.077 |
| IN1547-011_IN1548-009 | IN1547-011 | 1101.32 | IN1548-009 | 1092.78 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 273.133 |
| IN1547-012_IN1547-011 | IN1547-012 | 1101.84 | IN1547-011 | 1101.32 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 51.451 |
| IN1547-013_IN1547-011 | IN1547-013 | 1101.73 | IN1547-011 | 1101.32 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 51.527 |
| IN1547-014_1547-013 | IN1547-014 | 1102.28 | IN1547-013 | 1101.73 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 11.413 |
| IN1547-015_IN1547-013 | IN1547-015 | 1102.14 | IN1547-013 | 1101.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.878 |
| IN1547-016_IN1547-015 | IN1547-016 | 1102.43 | IN1547-015 | 1102.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 6.26 |
| IN1547-017_IN1547-012 | IN1547-017 | 1103.31 | IN1547-012 | 1101.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.751 |
| IN1547-019_AS1547-018 | IN1547-019 | 1108.34 | AS1547-018 | 1106.28 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 77.931 |
| IN1547-020_IN1547-019 | IN1547-020 | 1109.52 | IN1547-019 | 1108.34 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 52.613 |
| IN1547-021_IN1547-020 | IN1547-021 | 1109.92 | IN1547-020 | 1109.52 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.473 |
| IN1547-022_IN1547-021 | IN1547-022 | 1110.37 | IN1547-021 | 1109.92 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.802 |
| IN1547-024_AS1547-023 | IN1547-024 | 1116.39 | AS1547-023 | 1115.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 4.721 |
| IN1547-025_AS1547-023 | IN1547-025 | 1116.39 | AS1547-023 | 1115.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.526 |
| IN1547-027_IN1547-020 | IN1547-027 | 1112.18 | IN1547-020 | 1109.52 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 95.352 |
| IN1547-028_IN1547-027 | IN1547-028 | 1112.58 | IN1547-027 | 1112.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.021 |
| IN1547-030_AS1547-029 | IN1547-030 | 1116.79 | AS1547-029 | 1115.09 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.761 |
| IN1547-031_AS1547-029 | IN1547-031 | 1116.79 | AS1547-029 | 1115.09 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 14.537 |
| IN1547-033_AS1547-032 | IN1547-033 | 1129.6 | AS1547-032 | 1124.5 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 149.298 |
| IN1547-034_IN1547-033 | IN1547-034 | 1131.36 | IN1547-033 | 1129.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.984 |
| IN1548-001_IN1547-005 | IN1548-001 | 1089.59 | IN1547-005 | 1082.56 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.25 | None (,) | 211.05 |
| IN1548-002_IN1548-001 | IN1548-002 | 1093.59 | IN1548-001 | 1089.59 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.147 |
| IN1548-003_IN1648-027 | IN1548-003 | 1081.02 | IN1648-027 | 1079.81 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | None (,) | 93.337 |
| IN1548-004_IN1548-003 | IN1548-004 | 1090.72 | IN1548-003 | 1081.02 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.909 |
| IN1548-005_IN1548-003 | IN1548-005 | 1103.56 | IN1548-003 | 1081.02 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 184.485 |
| IN1548-006_IN1548-005 | IN1548-006 | 1105.06 | IN1548-005 | 1103.56 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.417 |
| IN1548-007_IN1548-001 | IN1548-007 | 1090.05 | IN1548-001 | 1089.59 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.25 | None (,) | 52.554 |
| IN1548-008_IN1548-007 | IN1548-008 | 1092.73 | IN1548-007 | 1090.05 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 51.181 |
| IN1548-009_IN1548-008 | IN1548-009 | 1092.78 | IN1548-008 | 1092.73 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 10.126 |
| IN1548-010_IN1548-008 | IN1548-010 | 1093.85 | IN1548-008 | 1092.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 29.843 |
| IN1548-011_IN1548-010 | IN1548-011 | 1094.15 | IN1548-010 | 1093.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.173 |
| IN1548-012_IN1548-007 | IN1548-012 | 1095.73 | IN1548-007 | 1090.05 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | None (,) | 148.674 |
| IN1548-013_IN1548-012 | IN1548-013 | 1099.39 | IN1548-012 | 1095.73 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 29.114 |
| IN1548-016_AS1548-014 | IN1548-016 | 1099.76 | AS1548-014 | 1097.05 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | None (,) | 26.421 |
| IN1548-017_IN1548-016 | IN1548-017 | 1100.31 | IN1548-016 | 1099.76 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 11.104 |
| IN1548-018_IN1548-016 | IN1548-018 | 1100.16 | IN1548-016 | 1099.76 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.618 |
| IN1548-019_IN1548-018 | IN1548-019 | 1100.61 | IN1548-018 | 1100.16 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.47 |
| IN1548-020_AS1548-014 | IN1548-020 | 1099.08 | AS1548-014 | 1097.05 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 48.969 |
| IN1548-021_IN1548-020 | IN1548-021 | 1099.12 | IN1548-020 | 1099.08 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | None (,) | 11.671 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1548-023_IN1548-020 | IN1548-023 | 1099.98 | IN1548-020 | 1099.08 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.307 |
| IN1548-025_IN1548-023 | IN1548-025 | 1100.28 | IN1548-023 | 1099.98 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.687 |
| IN1548-026_IN1548-021 | IN1548-026 | 1101.42 | IN1548-021 | 1099.12 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 96.232 |
| IN1548-029_MI1548-028 | IN1548-029 | 1098.55 | MI1548-028 | 1097.73 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 125.612 |
| IN1548-030_IN1548-029 | IN1548-030 | 1101.65 | IN1548-029 | 1098.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.314 |
| IN1548-032_AS1548-031 | IN1548-032 | 1102.93 | AS1548-031 | 1099.99 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 24.521 |
| IN1548-033_AS1548-031 | IN1548-033 | 1102.17 | AS1548-031 | 1099.99 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 23.482 |
| IN1548-034_IN1548-033 | IN1548-034 | 1102.75 | IN1548-033 | 1102.17 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 16.744 |
| IN1548-035_IN1548-033 | IN1548-035 | 1102.94 | IN1548-033 | 1102.17 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.456 |
| IN1548-037_AS1548-036 | IN1548-037 | 1104.28 | AS1548-036 | 1102.46 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 26.809 |
| IN1548-040_AS1548-039 | IN1548-040 | 1111.86 | AS1548-039 | 1109.91 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 47.513 |
| IN1548-041_AS1548-039 | IN1548-041 | 1110.85 | AS1548-039 | 1109.91 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 28.191 |
| IN1548-042_IN1548-041 | IN1548-042 | 1111.04 | IN1548-041 | 1110.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 28.501 |
| IN1548-043_IN1548-042 | IN1548-043 | 1111.44 | IN1548-042 | 1111.04 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 36.812 |
| IN1548-044_IN1548-043 | IN1548-044 | 1111.87 | IN1548-043 | 1111.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 39.589 |
| IN1548-045_IN1548-005 | IN1548-045 | 1115.84 | IN1548-005 | 1103.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 220.741 |
| IN1549-004_AS1549-002 | IN1549-004 | 1106.2 | AS1549-002 | 1103.77 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 3.759 |
| IN1549-005_IN1549-004 | IN1549-005 | 1106.5 | IN1549-004 | 1106.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.708 |
| IN1549-007_AS1549-001 | IN1549-007 | 1106.59 | AS1549-001 | 1103.61 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 33.29 |
| IN1549-008_AS1549-001 | IN1549-008 | 1106.68 | AS1549-001 | 1103.61 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 49.164 |
| IN1549-017_IN1547-016 | IN1549-017 | 1106.02 | IN1549-016 | 1106.01 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 89.589 |
| IN1549-018_IN1549-017 | IN1549-018 | 1106.78 | IN1549-017 | 1106.02 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 69.279 |
| IN1549-02_IN1549-021 | IN1549-022 | 1108.43 | IN1549-021 | 1108.02 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.764 |
| IN1549-021_IN1549-016 | IN1549-021 | 1108.02 | IN1549-016 | 1106.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 48.538 |
| IN1549-023_IN1549-017 | IN1549-023 | 1107.11 | IN1549-017 | 1106.02 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 130.208 |
| IN1549-027_IN1549-026 | IN1549-027 | 1108.03 | IN1549-026 | 1107.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 29.093 |
| IN1549-028_IN1549-025 | IN1549-028 | 1108.12 | IN1549-025 | 1107.96 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.225 |
| IN1549-029_AS1549-032 | IN1549-029 | 1107.75 | AS1549-032 | 1107.63 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | None (,) | 9.624 |
| IN1549-030_IN1549-029 | IN1549-030 | 1107.91 | IN1549-029 | 1107.75 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 28.649 |
| IN1549-035_IN1549-034 | IN1549-035 | 1108.25 | AS1549-034 | 1108.02 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 82.872 |
| IN1549-036_IN1549-035 | IN1549-036 | 1108.95 | IN1549-035 | 1108.25 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 198.071 |
| IN1549-038_IN1549-036 | IN1549-038 | 1109.3 | IN1549-036 | 1108.95 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 105.011 |
| IN1549-039_IN1549-038 | IN1549-039 | 1109.7 | IN1549-038 | 1109.3 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 125.932 |
| IN1549-040_IN1549-039 | IN1549-040 | 1109.85 | IN1549-039 | 1109.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.295 |
| IN1550-007_AS1550-006 | IN1550-007 | 1096.29 | AS1550-006 | 1096.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 31.319 |
| IN1550-011_AS1550-010 | IN1550-011 | 1093.57 | AS1550-010 | 1093.09 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 160.039 |
| IN1550-012_IN1550-013 | IN1550-012 | 1101.4 | IN1550-013 | 1100.21 | Circular | | 1 | 3 | 0.011 | 0.25 | 0.05 | None (,) | 148.501 |
| IN1550-013_IN1550-014 | IN1550-013 | 1100.21 | IN1550-014 | 1099.04 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 91.833 |
| IN1550-015_IN1550-014 | IN1550-015 | 1102.85 | IN1550-014 | 1099.04 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 27.421 |
| IN1550-018_IN1550-017 | IN1550-018 | 1103.84 | IN1550-017 | 1100.87 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 76.038 |
| IN1550-019_IN1550-018 | IN1550-019 | 1104.54 | IN1550-018 | 1103.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.978 |
| IN1550-020_IN1550-018 | IN1550-020 | 1106.37 | IN1550-018 | 1103.84 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 126.193 |
| IN1550-021_IN1550-020 | IN1550-021 | 1106.78 | IN1550-020 | 1106.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.412 |
| IN1550-022_IN1550-017 | IN1550-022 | 1101.02 | IN1550-017 | 1100.87 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | None (,) | 57.585 |
| IN1550-024_IN1550-025 | IN1550-024 | 1102.27 | IN1550-023 | 1101.52 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 24.182 |
| IN1550-025_IN1550-013 | IN1550-025 | 1100.35 | IN1550-013 | 1100.21 | Circular | | 1 | 1.25 | 0.011 | 0.05 | 0.5 | None (,) | 27.722 |
| IN1550-026_IN1550-025 | IN1550-026 | 1100.93 | IN1550-025 | 1100.35 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.05 | None (,) | 118.54 |
| IN1550-027_IN1550-026 | IN1550-027 | 1101.93 | IN1550-026 | 1100.93 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 151.164 |
| IN1550-028_IN1550-026 | IN1550-028 | 1102.03 | IN1550-026 | 1100.93 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 173.655 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1551-002_IN1550-012 | IN1551-002 | 1101.79 | IN1550-012 | 1101.4 | Circular | | 1 | 3 | 0.011 | 0.25 | 0.25 | None (,) | 69.684 |
| IN1551-003_IN1551-002 | IN1551-003 | 1103.9 | IN1551-002 | 1101.79 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.5 | None (,) | 66.971 |
| IN1551-004_IN1551-003 | IN1551-004 | 1104.28 | IN1551-003 | 1103.9 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 25.162 |
| IN1551-006_IN1551-005 | IN1551-006 | 1105.57 | IN1551-005 | 1103.87 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.25 | None (,) | 33.36 |
| IN1551-007_IN1551-005 | IN1551-007 | 1104.85 | IN1551-005 | 1103.87 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | None (,) | 134.539 |
| IN1551-008_IN1551-007 | IN1551-008 | 1105.24 | IN1551-007 | 1104.85 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 79.876 |
| IN1551-009_IN1551-008 | IN1551-009 | 1107.16 | IN1551-008 | 1105.24 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.5 | None (,) | 58.7 |
| IN1551-010_IN1551-009 | IN1551-010 | 1107.67 | IN1551-009 | 1107.16 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 41.723 |
| IN1551-011_IN1551-008 | IN1551-011 | 1105.25 | IN1551-008 | 1105.24 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 109.718 |
| IN1551-012_IN1551-011 | IN1551-012 | 1107.74 | IN1551-011 | 1105.24 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 27.606 |
| IN1551-014_IN1551-008 | IN1551-014 | 1105.34 | IN1551-008 | 1105.24 | Circular | | 1 | 1.25 | 0.011 | 0.25 | 0.5 | None (,) | 44.786 |
| IN1551-015_IN1551-014 | IN1551-015 | 1105.53 | IN1551-014 | 1105.34 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.25 | None (,) | 75.956 |
| IN1551-016_IN1551-015 | IN1551-016 | 1105.64 | IN1551-015 | 1105.53 | Circular | | 1 | 1 | 0.011 | 0.05 | 0.5 | None (,) | 42.544 |
| IN1551-017_IN1551-016 | IN1551-017 | 1105.75 | IN1551-016 | 1105.64 | Circular | | 1 | 0.667 | 0.011 | 0.5 | 0.05 | None (,) | 22.242 |
| IN1551-018_IN1551-002 | IN1551-018 | 1102.12 | IN1551-002 | 1101.79 | Circular | | 1 | 1.25 | 0.011 | 0.25 | 0.5 | None (,) | 100.344 |
| IN1551-019_IN1551-018 | IN1551-019 | 1102.65 | IN1551-018 | 1102.12 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.25 | None (,) | 152.852 |
| IN1551-020_IN1551-019 | IN1551-020 | 1102.78 | IN1551-019 | 1102.65 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 24.34 |
| IN1551-021_IN1551-019 | IN1551-021 | 1102.79 | IN1551-019 | 1102.65 | Circular | | 1 | 1 | 0.011 | 0.5 | 0.5 | None (,) | 28.435 |
| IN1551-023_IN1551-011 | IN1551-023 | 1108.48 | IN1551-011 | 1105.24 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 191.098 |
| IN1551-024_IN1551-023 | IN1551-024 | 1112.31 | IN1551-023 | 1108.48 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 75.961 |
| IN1551-025_IN1551-024 | IN1551-025 | 1112.76 | IN1551-024 | 1112.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 29.606 |
| IN1551-026_IN1551-023 | IN1551-026 | 1109.58 | IN1551-023 | 1108.48 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 28.003 |
| IN1551-027_IN1551-026 | IN1551-027 | 1110.35 | IN1551-026 | 1109.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 43.428 |
| IN1551-028_IN1551-027 | IN1551-028 | 1110.82 | IN1551-027 | 1110.35 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.258 |
| IN1551-029_IN1551-027 | IN1551-029 | 1110.89 | IN1551-027 | 1110.35 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.834 |
| IN1551-030_IN1551-029 | IN1551-030 | 1111.21 | IN1551-029 | 1110.89 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.786 |
| IN1646-001_IN1647-067 | IN1646-001 | 1094.69 | IN1647-067 | 1094.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 43.69 |
| IN1647-003_IN1647-004 | IN1647-003 | 1088.34 | IN1647-004 | 1086.5 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 153.121 |
| IN1647-004_AS1647-006 | IN1647-004 | 1086.5 | AS1647-006 | 1085.6 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | None (,) | 48.591 |
| IN1647-005_IN1647-004 | IN1647-005 | 1088.86 | IN1647-004 | 1086.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 30.911 |
| IN1647-007_AS1647-006 | IN1647-007 | 1087.37 | AS1647-006 | 1085.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 25.084 |
| IN1647-008_IN1647-007 | IN1647-008 | 1088.07 | IN1647-007 | 1087.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 10.093 |
| IN1647-009_IN1647-007 | IN1647-009 | 1087.77 | IN1647-007 | 1087.37 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 27.745 |
| IN1647-010_IN1647-009 | IN1647-010 | 1088.07 | IN1647-009 | 1087.77 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.681 |
| IN1647-011_AS1647-006 | IN1647-011 | 1087.37 | AS1647-006 | 1085.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 61.407 |
| IN1647-012_IN1647-011 | IN1647-012 | 1088.07 | IN1647-011 | 1087.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 7.785 |
| IN1647-013_IN1647-011 | IN1647-013 | 1087.77 | IN1647-011 | 1087.37 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.061 |
| IN1647-014_IN1647-013 | IN1647-014 | 1088.02 | IN1647-013 | 1087.77 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.337 |
| IN1647-016_IN1647-017 | IN1647-016 | 1082.86 | IN1647-017 | 1082.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 25.555 |
| IN1647-017_AS1647-018 | IN1647-017 | 1082.45 | AS1647-018 | 1080.39 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 42.166 |
| IN1647-019_AS1647-018 | IN1647-019 | 1081.63 | AS1647-018 | 1080.39 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 43.849 |
| IN1647-020_IN1647-019 | IN1647-020 | 1082.32 | IN1647-019 | 1081.63 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 11.115 |
| IN1647-021_IN1647-019 | IN1647-021 | 1082.03 | IN1647-019 | 1081.63 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 26.54 |
| IN1647-022_IN1647-021 | IN1647-022 | 1082.33 | IN1647-021 | 1082.03 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.147 |
| IN1647-023_AS1647-024 | IN1647-023 | 1080.16 | AS1647-024 | 1077.6 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | None (,) | 314.361 |
| IN1647-025_AS1647-024 | IN1647-025 | 1080.87 | AS1647-024 | 1077.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 6.5 |
| IN1647-026_AS1647-024 | IN1647-026 | 1080.87 | AS1647-024 | 1077.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.281 |
| IN1647-028_AS1647-027 | IN1647-028 | 1079.16 | AS1647-027 | 1075.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.281 |
| IN1647-029_AS1647-027 | IN1647-029 | 1079.12 | AS1647-027 | 1075.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.199 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1647-032_IN1647-030 | IN1647-032 | 1078.32 | IN1647-030 | 1077.51 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 28.097 |
| IN1647-033_IN147-032 | IN1647-033 | 1078.62 | IN1647-032 | 1078.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.994 |
| IN1647-042_IN1647-041 | IN1647-042 | 1080.71 | IN1647-041 | 1079.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.372 |
| IN1647-045_AS1647-044 | IN1647-045 | 1082.91 | AS1647-044 | 1081.03 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 27.506 |
| IN1647-046_IN1647-045 | IN1647-046 | 1083.21 | IN1647-045 | 1082.91 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 14.859 |
| IN1647-050_IN1647-051 | IN1647-050 | 1083.6 | IN1647-051 | 1083.56 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | None (,) | 9.389 |
| IN1647-051_AS1647-052 | IN1647-051 | 1083.56 | AS1647-052 | 1081.79 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | None (,) | 53.432 |
| IN1647-054_IN1647-053 | IN1647-054 | 1085.6 | IN1647-053 | 1084.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.389 |
| IN1647-055_AS1647-056 | IN1647-055 | 1083.9 | AS1647-056 | 1083.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 15.127 |
| IN1647-058_AS1647-056 | IN1647-058 | 1085.91 | AS1647-056 | 1083.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 15.411 |
| IN1647-060_AS1647-059 | IN1647-060 | 1084.25 | AS1647-059 | 1080.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 5.524 |
| IN1647-061_IN1647-060 | IN1647-061 | 1084.25 | AS1647-059 | 1080.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 26.069 |
| IN1647-063_IN1647-064 | IN1647-063 | 1096.75 | IN1647-064 | 1096.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 116.148 |
| IN1647-064_IN1647-065 | IN1647-064 | 1096.18 | IN1647-065 | 1093.49 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 211.372 |
| IN1647-065_AS1647-002 | IN1647-065 | 1093.49 | AS1647-002 | 1092.47 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | None (,) | 203.868 |
| IN1647-067_AS1647-002 | IN1647-067 | 1094.5 | AS1647-002 | 1092.47 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 83.716 |
| IN1647-068_IN1647-067 | IN1647-068 | 1097.5 | IN1647-067 | 1094.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 116.012 |
| IN1647-069_IN1647-068 | IN1647-069 | 1097.55 | IN1647-068 | 1097.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.438 |
| IN1648-001_IN1648-002 | IN1648-001 | 1079.4 | IN1648-002 | 1079.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.062 |
| IN1648-002_AS1648-003 | IN1648-002 | 1079.1 | AS1648-003 | 1079.02 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 13.25 |
| IN1648-004_IN1648-005 | IN1648-004 | 1079.4 | IN1648-005 | 1079.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.981 |
| IN1648-005_AS1648-003 | IN1648-005 | 1079.1 | AS1648-003 | 1079.02 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 13.32 |
| IN1648-010_AS1648-009 | IN1648-010 | 1080.52 | AS1648-009 | 1078.24 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 3.414 |
| IN1648-010_WW | IN1648-021 | 1080.97 | WINDINGWAY_BLIND_CON | 1080 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 14.438 |
| IN1648-011_IN1648-010 | IN1648-011 | 1080.82 | IN1648-010 | 1080.52 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.04 |
| IN1648-012_IN1648-013 | IN1648-012 | 1080.92 | IN1648-013 | 1080.62 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.025 |
| IN1648-013_AS1648-009 | IN1648-013 | 1080.62 | AS1648-009 | 1078.24 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 23.314 |
| IN1648-016_AS1648-015 | IN1648-016 | 1080.85 | AS1648-015 | 1080.56 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 5.745 |
| IN1648-017_IN1648-016 | IN1648-017 | 1081.15 | IN1648-016 | 1080.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.761 |
| IN1648-018_IN1648-016 | IN1648-018 | 1081.29 | IN1648-016 | 1080.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 40.406 |
| IN1648-019_AS1648-015 | IN1648-019 | 1080.93 | AS1648-015 | 1080.56 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 21.74 |
| IN1648-020_IN1648-019 | IN1648-020 | 1081.23 | IN1648-019 | 1080.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.312 |
| IN1648-023_AS1648-022 | IN1648-023 | 1077.22 | AS1648-022 | 1074.51 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.662 |
| IN1648-024_AS1648-022 | IN1648-024 | 1077.14 | AS1648-022 | 1074.51 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.527 |
| IN1648-026_IN1648-025 | IN1648-026 | 1082.57 | IN1648-025 | 1079.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.454 |
| IN1648-027_IN1648-025 | IN1648-027 | 1079.81 | IN1648-025 | 1079.2 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | None (,) | 116.674 |
| IN1648-028_IN1748-025 | IN1648-028 | 1076.4 | IN1748-025 | 1076.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 171.007 |
| IN1648-034_IN1648-030 | IN1648-034 | 1087.33 | IN1648-030 | 1086.9 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 29.572 |
| IN1648-042_IN1648-041 | IN1648-042 | 1092.3 | IN1648-041 | 1091.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 29.829 |
| IN1648-045_IN1648-044 | IN1648-045 | 1084.05 | IN1648-044 | 1083.33 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.672 |
| IN1648-048_IN1648-027 | IN1648-048 | 1088.13 | IN1648-027 | 1079.81 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 153.669 |
| IN1649-001_IN1649-002 | IN1649-001 | 1086.18 | IN1649-002 | 1085.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 26.005 |
| IN1649-002_AE1648-035 | IN1649-002 | 1085.73 | AE1648-035 | 1079.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 1 | 0 | 145 |
| IN1649-005_IN1649-003 | IN1649-005 | 1088.83 | IN1649-003 | 1082.5 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | None (,) | 104.342 |
| IN1649-006_IN1649-003 | IN1649-006 | 1084.6 | IN1649-003 | 1082.5 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 27.705 |
| IN1649-007_IN1649-006 | IN1649-007 | 1086.04 | IN1649-006 | 1084.6 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 35.016 |
| IN1649-008_IN1649-007 | IN1649-008 | 1087.69 | IN1649-007 | 1086.04 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 25.906 |
| IN1649-009_IN1649-008 | IN1649-009 | 1089.19 | IN1649-008 | 1087.69 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 33.93 |
| IN1649-010_IN1649-005 | IN1649-010 | 1101.12 | IN1649-005 | 1088.83 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 208.516 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1649-011_IN1649-010 | IN1649-011 | 1102.15 | IN1649-010 | 1101.12 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | None (,) | 31.262 |
| IN1649-012_IN1649-011 | IN1649-012 | 1106.83 | IN1649-011 | 1102.15 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 74.57 |
| IN1649-013_IN1649-011 | IN1649-013 | 1103.87 | IN1649-011 | 1102.15 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 29.775 |
| IN1649-014_IN1649-013 | IN1649-014 | 1104.87 | IN1649-013 | 1103.87 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 63.863 |
| IN1649-015_IN1649-014 | IN1649-015 | 1105.54 | IN1649-014 | 1104.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 46.774 |
| IN1649-017_IN1649-016 | IN1649-017 | 1102.23 | IN1649-016 | 1101.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 15.104 |
| IN1649-018_IN1649-016 | IN1649-018 | 1102.26 | IN1649-016 | 1101.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.042 |
| IN1649-019_IN1649-016 | IN1649-019 | 1113.18 | IN1649-016 | 1101.79 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | None (,) | 350.522 |
| IN1649-020_IN1649-019 | IN1649-020 | 1113.23 | IN1649-019 | 1113.18 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 13.062 |
| IN1649-021_IN1649-019 | IN1649-021 | 1114.2 | IN1649-019 | 1113.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 76.428 |
| IN1650-001_IN1649-018 | IN1650-001 | 1102.44 | IN1649-018 | 1102.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 14.62 |
| IN1650-002_IN1649-020 | IN1650-002 | 1113.4 | IN1649-020 | 1113.23 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 28.168 |
| IN1650-009_AS1650-008 | IN1650-009 | 1091.28 | AS1650-008 | 1090.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 294.411 |
| IN1650-009_DEP_TRANSFER | IN1650-009_DEPRESSIO | 1097.72 | IN1650-009 | 1097.71 | Trapezoidal | | 1 | 1 | 0.001 | 0 | 0 | None (,) | 27.687 |
| IN1650-010_IN1650-009 | IN1650-010 | 1091.94 | IN1650-009 | 1091.28 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 35.999 |
| IN1653-007_AE1653-008 | IN1653-007 | 1095.8 | AE1653-008 | 1094.5 | Circular | | 1 | 3 | 0.013 | 0.05 | 1 | 0 | 47.002 |
| IN1653-009_IN1653-007 | IN1653-009 | 1098.04 | IN1653-007 | 1095.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 45.543 |
| IN1653-010_IN1653-007 | IN1653-010 | 1096.86 | IN1653-007 | 1095.8 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 105.372 |
| IN1653-011_IN1653-010 | IN1653-011 | 1100.82 | IN1653-010 | 1096.86 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 185.036 |
| IN1653-012.1 | IN1653-012 | 1103.8 | IN1653-011 | 1101.82 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 36.937 |
| IN1653-013_IN1653-012 | IN1653-013 | 1104.5 | IN1653-012 | 1103.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 31.355 |
| IN1653-014_IN1653-011 | IN1653-014 | 1101.86 | IN1653-011 | 1100.82 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 161.22 |
| IN1653-016_IN1653-014 | IN1653-016 | 1102.22 | IN1653-014 | 1101.86 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 75.387 |
| IN1653-018_IN1653-016 | IN1653-018 | 1104.2 | IN1653-016 | 1102.22 | Circular | | 1 | 1.75 | 0.013 | 0.15 | 0.15 | 0 | 176.112 |
| IN1653-020_IN1653-018 | IN1653-020 | 1105.28 | IN1653-018 | 1104.2 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.15 | 0 | 169.666 |
| IN1653-023_IN1653-020 | IN1653-023 | 1105.53 | IN1653-020 | 1105.28 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 50.407 |
| IN1653-025.1 | IN1653-025 | 1104.6 | IN1653-012 | 1103.8 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 112.319 |
| IN1653-026_IN1653-025 | IN1653-026 | 1105.37 | IN1653-025 | 1104.6 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 157.972 |
| IN1654-003_IN1754-026 | IN1654-003 | 1104.84 | IN1754-026 | 1103 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 82.452 |
| IN1654-004_IN1654_003 | IN1654-004 | 1105.81 | IN1654-003 | 1104.84 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 35.007 |
| IN1654-005_1654-004 | IN1654-005 | 1108.25 | IN1654-004 | 1105.81 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 118.67 |
| IN1654-006_IN1654-005 | IN1654-006 | 1113.72 | IN1654-005 | 1108.25 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 134.342 |
| IN1654-007_IN1754-032 | IN1654-007 | 1120.7 | IN1754-032 | 1112.4 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 179.264 |
| IN1654-008_IN1654-006 | IN1654-008 | 1117.32 | IN1654-006 | 1113.72 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 241.778 |
| IN1654-053_IN1647-051 | IN1647-053 | 1084.6 | IN1647-051 | 1083.56 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 27.083 |
| IN1746-006_IN1750-030 | IN1749-006 | 1089.6 | IN1750-030 | 1088.53 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 21.38 |
| IN1747-005_AS1747-004 | IN1747-005 | 1079.56 | AS1747-004 | 1077.72 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 6.733 |
| IN1747-006_AS1747-004 | IN1747-006 | 1079.56 | AS1747-004 | 1077.72 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 21.705 |
| IN1747-009_AS1747-007 | IN1747-009 | 1098 | AS1747-007 | 1085.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 55.191 |
| IN1747-011_AS1747-010 | IN1747-011 | 1087.14 | AS1747-010 | 1086.72 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 32.804 |
| IN1747-012_IN1747-011 | IN1747-012 | 1087.19 | IN1747-011 | 1087.14 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | None (,) | 10.603 |
| IN1747-013_IN1747-012 | IN1747-013 | 1087.73 | IN1747-012 | 1087.19 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 9.412 |
| IN1747-014_AS1747-010 | IN1747-014 | 1087 | AS1747-010 | 1086.72 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 8.795 |
| IN1747-015_IN1747-014 | IN1747-015 | 1087.37 | IN1747-014 | 1087 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 75.663 |
| IN1747-016_IN1747-015 | IN1747-016 | 1087.91 | IN1747-015 | 1087.37 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 10.259 |
| IN1747-020_AS1747-019 | IN1747-020 | 1077.87 | AS1747-019 | 1073.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.61 |
| IN1747-021_AS1747-019 | IN1747-021 | 1077.16 | AS1747-019 | 1073.05 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 20.622 |
| IN1747-022_IN1747-021 | IN1747-022 | 1077.77 | IN1747-021 | 1077.16 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.479 |
| IN1747-024_AS1847-022 | IN1747-024 | 1064.15 | AS1847-022 | 1064.09 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 32.323 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1747-025_IN1747-024 | IN1747-025 | 1064.25 | IN1747-024 | 1064.15 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 63.21 |
| IN1747-026_IN1747-025 | IN1747-026 | 1064.53 | IN1747-025 | 1064.25 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 177.089 |
| IN1747-027_IN1747-026 | IN1747-027 | 1064.54 | IN1747-026 | 1064.53 | Circular | | 1 | 0.667 | 0.013 | 0.5 | 0.5 | 0 | 11.111 |
| IN1747-028_IN1747-029 | IN1747-028 | 1086.75 | IN1747-029 | 1086.33 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 50.714 |
| IN1747-029_AE1746-001 | IN1747-029 | 1086.33 | AE1746-001 | 1086 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 26.812 |
| IN1748-004_AS1748-003 | IN1748-004 | 1075.3 | AS1748-003 | 1071.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 37.803 |
| IN1748-008_AS1748-007 | IN1748-008 | 1074.05 | AS1748-007 | 1072.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 23.845 |
| IN1748-009_AS1748-007 | IN1748-009 | 1074.05 | AS1748-007 | 1072.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 10.524 |
| IN1748-012_AS1748-011 | IN1748-012 | 1075.55 | AS1748-011 | 1072.06 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 8.104 |
| IN1748-013_AS1748-011 | IN1748-013 | 1074.55 | AS1748-011 | 1072.06 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 24.298 |
| IN1748-015_AS1748-014 | IN1748-015 | 1075.3 | AS1748-014 | 1072.36 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 7.211 |
| IN1748-016_AS1748-014 | IN1748-016 | 1075.3 | AS1748-014 | 1072.36 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 22.302 |
| IN1748-025_AS1748-024 | IN1748-025 | 1076.25 | AS1748-024 | 1075.18 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 40.603 |
| IN1748-026_AS1748-024 | IN1748-026 | 1076.25 | AS1748-024 | 1075.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.43 |
| IN1748-027_IN1748-025 | IN1748-027 | 1076.41 | IN1748-025 | 1076.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.665 |
| IN1748-028_IN1748-025 | IN1748-028 | 1076.01 | IN1748-025 | 1076.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 27.159 |
| IN1748-029_IN1748-028 | IN1748-029 | 1076.56 | IN1748-028 | 1076.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.882 |
| IN1748-030_IN1748-028 | IN1748-030 | 1076.67 | IN1748-028 | 1076.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 33.541 |
| IN1748-031_IN1748-026 | IN1748-031 | 1076.41 | IN1748-026 | 1076.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 23.179 |
| IN1748-032_IN1748-008 | IN1748-032 | 1074.6 | IN1748-008 | 1074.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.569 |
| IN1748-033_IN1748-009 | IN1748-033 | 1074.6 | IN1748-009 | 1074.05 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.771 |
| IN1749-001_IN1749-002 | IN1749-001 | 1078.76 | IN1749-002 | 1078.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 32.394 |
| IN1749-002_IN1749-003 | IN1749-002 | 1078.01 | IN1749-003 | 1077.4 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | None (,) | 128.925 |
| IN1749-007_IN1750-032 | IN1749-007 | 1088.28 | IN1750-032 | 1088.17 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 27.22 |
| IN1749-008_IN1749-007 | IN1749-008 | 1088.42 | IN1749-007 | 1088.28 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 24.796 |
| IN1749-009_IN1749-008 | IN1749-009 | 1088.72 | IN1749-008 | 1088.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13.787 |
| IN1749-011_IN1749-010 | IN1749-011 | 1092.59 | IN1749-010 | 1089.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 14.89 |
| IN1750-001_IN1750-023 | IN1750-001 | 1084.32 | IN1750-023 | 1083.98 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 64.997 |
| IN1750-002_IN1750-001 | IN1750-002 | 1084.55 | IN1750-001 | 1084.32 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 45.262 |
| IN1750-003_IN1750-002 | IN1750-003 | 1084.81 | IN1750-002 | 1084.55 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 53.184 |
| IN1750-004_IN1750-003 | IN1750-004 | 1085.31 | IN1750-003 | 1084.81 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 103.426 |
| IN1750-005_IN1750-004 | IN1750-005 | 1101.96 | IN1750-004 | 1085.31 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 42.91 |
| IN1750-008_IN1750-017 | IN1750-008 | 1085.22 | IN1750-017 | 1077.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | None (,) | 120.718 |
| IN1750-009_IN1750-008 | IN1750-009 | 1086.6 | IN1750-008 | 1085.22 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 46.631 |
| IN1750-010_IN1750-009 | IN1750-010 | 1088.74 | IN1750-009 | 1086.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 86.802 |
| IN1750-011_IN1750-008 | IN1750-011 | 1086.94 | IN1750-008 | 1085.22 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 56.936 |
| IN1750-012_IN1750-011 | IN1750-012 | 1087.54 | IN1750-011 | 1086.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.241 |
| IN1750-013_IN1750-011 | IN1750-013 | 1087.42 | IN1750-011 | 1086.94 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 43.163 |
| IN1750-014_IN1750-013 | IN1750-014 | 1087.72 | IN1750-013 | 1087.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.293 |
| IN1750-017_IN1750-018 | IN1750-017 | 1077.6 | IN1750-018 | 1077.32 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | None (,) | 30.256 |
| IN1750-018_AS1750-024 | IN1750-018 | 1077.32 | AS1750-024 | 1076.04 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | None (,) | 256.7 |
| IN1750-019_IN1750-020 | IN1750-019 | 1082.6 | IN1750-020 | 1079.74 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.05 | None (,) | 27.072 |
| IN1750-020_AE1750-025 | IN1750-020 | 1079.74 | AE1750-025 | 1076.6 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 1 | None (,) | 110 |
| IN1750-021_IN1750-020 | IN1750-021 | 1094.16 | IN1750-020 | 1094 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.957 |
| IN1750-022_IN1750-019 | IN1750-022 | 1083.66 | IN1750-019 | 1082.6 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 212.481 |
| IN1750-023_IN1750-022 | IN1750-023 | 1083.98 | IN1750-022 | 1083.66 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 62.731 |
| IN1750-030_IN1750-029 | IN1750-030 | 1088.53 | IN1750-029 | 1086.4 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 13.849 |
| IN1750-032_IN1750-031 | IN1750-032 | 1088.17 | IN1750-031 | 1088.04 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 19.058 |
| IN1750-036_IN1750-004 | IN1750-036 | 1086.6 | IN1750-004 | 1085.31 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 267.025 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1751-001_IN1751-006 | IN1751-001 | 1092.6 | IN1751-006 | 1091.58 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 205.107 |
| IN1751-002_IN1751-001 | IN1751-002 | 1104.58 | IN1751-001 | 1092.6 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 40.597 |
| IN1751-003_IN1751-002 | IN1751-003 | 1105.13 | IN1751-002 | 1104.58 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 29.962 |
| IN1751-004_IN1751-001 | IN1751-004 | 1093.04 | IN1751-001 | 1092.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 90.013 |
| IN1751-005_IN1751-004 | IN1751-005 | 1106.04 | IN1751-004 | 1093.04 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 51.341 |
| IN1751-006_IN1751-008 | IN1751-006 | 1091.58 | IN1751-008 | 1087.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | None (,) | 388.183 |
| IN1751-007_IN1751-006 | IN1751-007 | 1102.37 | IN1751-006 | 1091.58 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 63.8 |
| IN1751-008_AS1751-010 | IN1751-008 | 1087.6 | AS1751-010 | 1086.67 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 33.35 |
| IN1751-009_IN1751-008 | IN1751-009 | 1096.3 | IN1751-008 | 1087.6 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 44.705 |
| IN1751-012_IN1751-011 | IN1751-012 | 1094.41 | IN1751-011 | 1093.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.539 |
| IN1751-013_AS1751-010 | IN1751-013 | 1092.9 | AS1751-010 | 1086.67 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 160.151 |
| IN1751-014_IN1751-013 | IN1751-014 | 1093.4 | IN1751-013 | 1092.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 43.342 |
| IN1751-017_IN1751-016 | IN1751-017 | 1095.53 | IN1751-016 | 1084.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 37.997 |
| IN1751-018_IN1751-016 | IN1751-018 | 1094.62 | IN1751-016 | 1084.8 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 44.839 |
| IN1751-019_IN1751-018 | IN1751-019 | 1095.17 | IN1751-018 | 1094.62 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 26.941 |
| IN1751-021_IN1751-020 | IN1751-021 | 1094.73 | IN1751-020 | 1084.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 29.776 |
| IN1751-026_IN1751-023 | IN1751-026 | 1097.45 | IN1751-023 | 1094.88 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 64.212 |
| IN1751-027_IN1751-026 | IN1751-027 | 1098 | IN1751-026 | 1097.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.959 |
| IN1751-028_IN1751-023 | IN1751-028 | 1097.45 | IN1751-023 | 1095.79 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 41.428 |
| IN1751-029_IN1751-028 | IN1751-029 | 1098 | IN1751-028 | 1097.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.119 |
| IN1752-005_IN1752-004 | IN1752-005 | 1099.05 | IN1752-004 | 1098.9 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.776 |
| IN1752-006_AS1752-001 | IN1752-006 | 1100.54 | AS1752-001 | 1099.67 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 21.644 |
| IN1752-007_IN1752-006 | IN1752-007 | 1100.84 | IN1752-006 | 1100.54 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.766 |
| IN1752-012_IN1752-010 | IN1752-012 | 1095.16 | IN1752-010 | 1094.23 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.253 |
| IN1752-014_IN1752-011 | IN1752-014 | 1095.42 | IN1752-011 | 1094.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 27.863 |
| IN1752-020_IN1752-018 | IN1752-020 | 1093.6 | IN1752-018 | 1092.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 26.948 |
| IN1752-021_IN1752-019 | IN1752-021 | 1094.97 | IN1752-019 | 1094.15 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 16.278 |
| IN1752-025_IN1752-024 | IN1752-025 | 1101.41 | IN1752-024 | 1100.64 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 16.336 |
| IN1752-027_IN1752-026 | IN1752-027 | 1102.29 | IN1752-026 | 1101.39 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.423 |
| IN1752-028_IN1752-024 | IN1752-028 | 1107.51 | IN1752-024 | 1100.64 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | None (,) | 191.01 |
| IN1752-030_IN1752-029 | IN1752-030 | 1107.4 | IN1752-029 | 1103.43 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | None (,) | 115.758 |
| IN1752-031_IN1752-030 | IN1752-031 | 1108.04 | IN1752-030 | 1107.4 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 32.678 |
| IN1752-032_IN1752-031 | IN1752-032 | 1108.66 | IN1752-031 | 1108.04 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | None (,) | 27.086 |
| IN1752-033_IN1752-032 | IN1752-033 | 1109.39 | IN1752-032 | 1108.66 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 30.2 |
| IN1752-034_IN1752-033 | IN1752-034 | 1109.83 | IN1752-033 | 1109.39 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 27.092 |
| IN1753-007_IN1753-006 | IN1753-007 | 1095.12 | IN1753-006 | 1090.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 199.985 |
| IN1753-028_IN1753-007 | IN1753-028 | 1099.17 | IN1753-007 | 1095.12 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 112.394 |
| IN1753-049_IN1753-040 | IN1753-049 | 1085.59 | IN1753-040 | 1085.59 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 40.046 |
| IN1753-051_IN1753-049 | IN1753-051 | 1085.59 | IN1753-049 | 1085.59 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 143.692 |
| IN1754-011_AS1754-010 | IN1754-011 | 1100.8 | AS1754-010 | 1097 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 23.682 |
| IN1754-012_IN1754-011 | IN1754-012 | 1107.97 | IN1754-011 | 1100.8 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 115.104 |
| IN1754-020_IN1754-012 | IN1754-020 | 1115.87 | IN1754-012 | 1107.97 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 125.535 |
| IN1754-021_IN1754-020 | IN1754-021 | 1117.19 | IN1754-020 | 1115.87 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 44.03 |
| IN1754-023_AS1753-054 | IN1754-023 | 1094.8 | AS1753-054 | 1091.84 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.5 | 0 | 162.768 |
| IN1754-024_IN1754-023 | IN1754-024 | 1095.3 | IN1754-023 | 1094.8 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 71.208 |
| IN1754-025_IN1754-024 | IN1754-025 | 1098.7 | IN1754-024 | 1095.3 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 141.19 |
| IN1754-026_IN1754-025 | IN1754-026 | 1103 | IN1754-025 | 1098.7 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.05 | 0 | 87.145 |
| IN1754-027_IN1754-026 | IN1754-027 | 1104 | IN1754-026 | 1103 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 45.026 |
| IN1754-030_IN1654-004 | IN1754-030 | 1107.22 | IN1654-004 | 1105.81 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 39.744 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1754-032_IN1754-030 | IN1754-032 | 1112.4 | IN1754-030 | 1107.22 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 116.362 |
| IN1754-033 | IN1754-035 | 1121 | IN1654-007 | 1120.7 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 29.143 |
| IN1847-001_IN1848-002 | IN1847-001 | 1081.97 | IN1848-002 | 1081.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 28.972 |
| IN1847-004_IN1847-003 | IN1847-004 | 1069.5 | IN1847-003 | 1069 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 27.858 |
| IN1847-007_AS1847-009 | IN1847-007 | 1034.16 | AS1847-009 | 1031.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 37.977 |
| IN1847-008_AS1847-009 | IN1847-008 | 1032.01 | AS1847-009 | 1031.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 27.085 |
| IN1847-015_1847-016 | IN1847-015 | 1062.59 | IN1847-016 | 1062.44 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 26.284 |
| IN1847-023_AS1947-009 | IN1847-023 | 1050.89 | AS1947-009 | 1043.84 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 167.513 |
| IN1847-025_AS1847-021 | IN1847-025 | 1062.91 | AS1847-021 | 1061.15 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.25 | 0 | 114.08 |
| IN1848-001_AS1848-003 | IN1848-001 | 1079.25 | AS1848-003 | 1078.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 33.406 |
| IN1848-002_AS1848-003 | IN1848-002 | 1081.8 | AS1848-003 | 1078.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 38.782 |
| IN1848-004_IN1848-005 | IN1848-004 | 1060.6 | IN1848-005 | 1053.6 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 0.5 | 0 | 203.011 |
| IN1848-005_IN1848-006 | IN1848-005 | 1053.6 | IN1848-006 | 1032.96 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 0.05 | 0 | 139.279 |
| IN1848-006_IN1848-007 | IN1848-006 | 1032.96 | IN1848-007 | 1032.5 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 94.416 |
| IN1848-008_TE1848-012 | IN1848-008 | 1029.82 | TE1848-012 | 1029.19 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 30.1 |
| IN1848-010_IN1848-007 | IN1848-010 | 1037.1 | IN1848-007 | 1032.5 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 0.5 | 0 | 150.565 |
| IN1848-014_IN1848-015 | IN1848-014 | 1061.79 | IN1848-015 | 1060.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 29.528 |
| IN1848-015_AS1848-018 | IN1848-015 | 1060.93 | AS1848-018 | 1057.13 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 36.709 |
| IN1848-016_IN1848-015 | IN1848-016 | 1063.04 | IN1848-015 | 1060.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 17.746 |
| IN1848-020_IN1848-019 | IN1848-020 | 1058.86 | IN1848-019 | 1057.87 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 28.458 |
| IN1848-022_AS1848-027 | IN1848-022 | 1077.72 | AS1848-027 | 1075.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 25.187 |
| IN1848-023_AS1848-027 | IN1848-023 | 1077.91 | AS1848-027 | 1075.84 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 49.276 |
| IN1848-024_IN1848-026 | IN1848-024 | 1077.66 | IN1848-026 | 1075.69 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 28.931 |
| IN1848-025_IN1848-026 | IN1848-025 | 1077.79 | IN1848-026 | 1075.69 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 30.724 |
| IN1848-026_AE1748-001 | IN1848-026 | 1075.69 | AE1748-001 | 1071.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 1 | 0 | 219 |
| IN1848-028_AS1848-027 | IN1848-028 | 1076.45 | AS1848-027 | 1075.84 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 19.529 |
| IN1848-029_IN1848-028 | IN1848-029 | 1077.16 | IN1848-028 | 1076.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 11.843 |
| IN1848-030_IN1848-028 | IN1848-030 | 1076.61 | IN1848-028 | 1076.45 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 28.074 |
| IN1848-031_IN1848-030 | IN1848-031 | 1077.16 | IN1848-030 | 1076.61 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.938 |
| IN1848-032_IN1848-033 | IN1848-032 | 1076.6 | IN1848-033 | 1075.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 10.942 |
| IN1848-033_AS1849-001 | IN1848-033 | 1075.6 | AS1849-001 | 1069.73 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 24.336 |
| IN1849-002_AS1849-001 | IN1849-002 | 1075.2 | AS1849-001 | 1069.73 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 49.865 |
| IN1849-003_IN1849-002 | IN1849-003 | 1076.2 | IN1849-002 | 1075.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 8.372 |
| IN1849-004_IN1849-005 | IN1849-004 | 1074.28 | IN1849-005 | 1072.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 18.326 |
| IN1849-006_IN1849-005 | IN1849-006 | 1072.79 | IN1849-005 | 1072.11 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 24.974 |
| IN1849-007_IN1849-006 | IN1849-007 | 1073.94 | IN1849-006 | 1072.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 11.39 |
| IN1849-010_AS1849-009 | IN1849-010 | 1074.09 | AS1849-009 | 1073.11 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | None (,) | 195.004 |
| IN1849-012_IN1949-016 | IN1849-012 | 1077.84 | IN1949-016 | 1077.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.573 |
| IN1849-029_AS1849-026 | IN1849-029 | 1077.64 | AS1849-026 | 1074.65 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 73.952 |
| IN1849-031_AS1849-023 | IN1849-031 | 1072.6 | AS1849-023 | 1072.48 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 48.302 |
| IN1849-032_IN1849-031 | IN1849-032 | 1074.34 | IN1849-031 | 1072.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 12.079 |
| IN1849-033_IN1849-031 | IN1849-033 | 1073.8 | IN1849-031 | 1072.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 34.187 |
| IN1849-034_IN1849-033 | IN1849-034 | 1074.34 | IN1849-033 | 1073.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 9.06 |
| IN1849-035_AS1849-026 | IN1849-035 | 1074.95 | AS1849-026 | 1074.65 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 48.029 |
| IN1849-036_IN1849-035 | IN1849-036 | 1076.8 | IN1849-035 | 1074.95 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 12.077 |
| IN1849-037_IN1849-035 | IN1849-037 | 1076.24 | IN1849-035 | 1074.95 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 30.717 |
| IN1849-038_IN1849-037 | IN1849-038 | 1076.8 | IN1849-037 | 1076.24 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.248 |
| IN1849-049_AS1849-047 | IN1849-049 | 1075.33 | AS1849-047 | 1071.93 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 16.075 |
| IN1849-050_AS1849-047 | IN1849-050 | 1072.21 | AS1849-047 | 1071.93 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 21.196 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1849-051_IN1849-050 | IN1849-051 | 1075.25 | IN1849-050 | 1072.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 55.424 |
| IN1849-052_IN1849-051 | IN1849-052 | 1075.5 | IN1849-051 | 1075.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 10.469 |
| IN1849-056_AS1849-053 | IN1849-056 | 1075.14 | AS1849-053 | 1072.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.158 |
| IN1849-057_AS1849-053 | IN1849-057 | 1073.88 | AS1849-053 | 1072.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 23.23 |
| IN1849-060_AS1849-059 | IN1849-060 | 1075.89 | AS1849-059 | 1074.75 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 219.407 |
| IN1850-003_IN1849-018 | IN1850-003 | 1073.62 | IN1849-018 | 1071.34 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 55.385 |
| IN1850-007_IN1849-050 | IN1850-007 | 1073.87 | IN1849-050 | 1072.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 22.288 |
| IN1850-008_IN1849-056 | IN1850-056 | 1075.39 | IN1849-056 | 1075.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 15.167 |
| IN1850-009_AS1849-058 | IN1850-009 | 1075.19 | AS1849-058 | 1073.28 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 45.249 |
| IN1850-010_AS1849-059 | IN1850-010 | 1075.7 | AS1849-059 | 1074.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 32.932 |
| IN1850-011_AS1849-023 | IN1850-011 | 1072.73 | AS1849-023 | 1072.48 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 50.895 |
| IN1947-008_IN1947-012 | IN1947-008 | 1026.4 | IN1947-012 | 1017.41 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | 0 | 265.642 |
| IN1947-012_IN1947-013 | IN1947-012 | 1017.41 | IN1947-013 | 1016.55 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.25 | 0.05 | 0 | 172.053 |
| IN1947-013_AS1947-017 | IN1947-013 | 1016.55 | AS1947-017 | 1016.41 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 35.591 |
| IN1947-014_IN1947-013 | IN1947-014 | 1018.05 | IN1947-013 | 1016.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 24.906 |
| IN1947-016_AS1947-017 | IN1947-016 | 1017.86 | AS1947-017 | 1016.41 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 58.074 |
| IN1947-027_AS1947-029 | IN1947-027 | 1054.01 | AS1947-029 | 1047.68 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 293.462 |
| IN1948-006_IN1948-005 | IN1948-006 | 1014.16 | IN1948-005 | 1012.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.706 |
| IN1948-009_IN1948-010 | IN1948-009 | 1019.12 | IN1948-010 | 1018.65 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 28.823 |
| IN1948-010_AS1948-004 | IN1948-010 | 1018.65 | AS1948-004 | 1016.45 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 43.405 |
| IN1948-014_AS1948-013 | IN1948-014 | 1038 | AS1948-013 | 1037.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 10.972 |
| IN1948-015_AS1948-013 | IN1948-015 | 1038 | AS1948-013 | 1037.1 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 20.46 |
| IN1948-016_AS1948-017 | IN1948-016 | 1023.78 | AS1948-017 | 1016.5 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 186.378 |
| IN1948-018_IN1948-019 | IN1948-018 | 1018.63 | IN1948-019 | 1017.69 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 15.38 |
| IN1948-021_AS1948-017 | IN1948-021 | 1018.25 | AS1948-017 | 1016.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 22.2 |
| IN1949-005_AS1949-007 | IN1949-005 | 1032.63 | AS1949-007 | 1032.43 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 25.542 |
| IN1949-006_IN1949-005 | IN1949-006 | 1032.94 | IN1949-005 | 1032.63 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 26.527 |
| IN1949-011_IN1949-010 | IN1949-011 | 1048.26 | IN1949-010 | 1038.47 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 124.331 |
| IN1949-016_AS1949-015 | IN1949-016 | 1077.3 | AS1949-015 | 1075.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 6.983 |
| IN1949-017_IN1949-018 | IN1949-017 | 1077.84 | IN1949-018 | 1077.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.038 |
| IN1949-018_AS1949-015 | IN1949-018 | 1077.3 | AS1949-015 | 1075.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 20.504 |
| IN1949-021_AS1949-019 | IN1949-021 | 1076.1 | AS1949-019 | 1075.8 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | None (,) | 229.602 |
| IN1949-022_IN1949-021 | IN1949-022 | 1076.23 | IN1949-021 | 1076.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 72.989 |
| IN1949-031_IN1949-022 | IN1949-031 | 1076.28 | IN1949-022 | 1076.23 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | None (,) | 11.22 |
| IN1949-034_AS1949-033 | IN1949-034 | 1080.13 | AS1949-033 | 1079.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 20.278 |
| IN1949-036_AS1949-035 | IN1949-036 | 1052.46 | AS1949-035 | 1052.17 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 35.398 |
| IN1949-037_AS1949-035 | IN1949-037 | 1052.75 | AS1949-035 | 1052.17 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 51.213 |
| IN1949-039_IN1949-037 | IN1949-039 | 1067.6 | IN1949-037 | 1052.75 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 317.218 |
| IN1950-001_AS1949-033 | IN1950-001 | 1082.41 | AS1949-033 | 1079.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 174.469 |
| IN1950-002_AS1949-032 | IN1950-002 | 1077.9 | AS1949-032 | 1077.03 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 30.363 |
| IN1950-003_AS1949-033 | IN1950-003 | 1080.13 | AS1949-033 | 1079.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 31.821 |
| IN1950-004_IN1950-001 | IN1950-004 | 1082.57 | IN1950-001 | 1082.41 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.751 |
| IN1950-010_AS1949-041 | IN1950-010 | 1074.29 | AS1949-041 | 1072.29 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 401.101 |
| IN1955-005_IN2055-011 | IN1955-005 | 1100.26 | IN2055-011 | 1099.35 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 122.263 |
| IN1955-007_IN1955-005 | IN1955-007 | 1101.2 | IN1955-005 | 1100.26 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 85.601 |
| IN1955-009_IN1955-007 | IN1955-009 | 1102.1 | IN1955-007 | 1101.2 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 182.062 |
| IN1955-010_IN1955-009 | IN1955-010 | 1102.24 | IN1955-009 | 1102.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 25.438 |
| IN1956-003_IN2056-006 | IN1956-003 | 1100.41 | IN2056-006 | 1097.63 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 74.758 |
| IN1956-004_IN1956-003 | IN1956-004 | 1103.39 | IN1956-003 | 1100.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 149.283 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN1956-005_IN1956-004 | IN1956-005 | 1105.64 | IN1956-004 | 1103.39 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 90.083 |
| IN1956-007_IN1956-005 | IN1956-007 | 1125.64 | IN1956-005 | 1105.64 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 400.8 |
| IN1956-011_IN2056-012 | IN1956-011 | 1098.7 | IN2056-012 | 1098.23 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 50.02 |
| IN1956-012_IN1956-011 | IN1956-012 | 1099.24 | IN1956-011 | 1098.7 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 31.77 |
| IN1956-013_IN1956-012 | IN1956-013 | 1099.53 | IN1956-012 | 1099.24 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 60.809 |
| IN1956-016_IN1955-010 | IN1956-016 | 1102.37 | IN1955-010 | 1102.24 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 29.326 |
| IN1956-017_IN1956-016 | IN1956-017 | 1102.51 | IN1956-016 | 1102.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 25.008 |
| IN1957-001_IN1956-007 | IN1957-001 | 1130.74 | IN1956-007 | 1125.64 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 101.103 |
| IN1957-002_IN1957-001 | IN1957-002 | 1142.58 | IN1957-001 | 1130.74 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 251.079 |
| IN1957-006_IN1957-002 | IN1957-006 | 1155.58 | IN1957-002 | 1142.58 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 250.004 |
| IN1957-008_IN1957-006 | IN1957-008 | 1160.58 | IN1957-006 | 1155.58 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 98.519 |
| IN1958-001_IN1957-008 | IN1958-001 | 1172.52 | IN1957-008 | 1160.58 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 299.292 |
| IN2045-004_IN2045-005 | IN2045-004 | 974.71 | IN2045-005 | 974.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 41.137 |
| IN2047-005_AS2047-006 | IN2047-005 | 993.2 | AS2047-006 | 992.16 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 11.179 |
| IN2047-009_AS2047-007 | IN2047-009 | 984.86 | AS2047-007 | 983.36 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 11.524 |
| IN2047-010_AS2047-008 | IN2047-010 | 984.6 | AS2047-008 | 984.53 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 16.501 |
| IN2047-019_IN2047-009 | IN2047-019 | 985.05 | IN2047-009 | 984.86 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 42.174 |
| IN2047-022.1 | IN2047-022 | 983.5 | AS2047-011 | 982.4 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 10.57 |
| IN2048-007_AS2048-005 | IN2048-007 | 991.2 | AS2048-005 | 989.47 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 30.628 |
| IN2048-008_AS2048-010 | IN2048-008 | 992.78 | AS2048-010 | 990.43 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.831 |
| IN2049-003_AS2049-002 | IN2049-003 | 1006.6 | AS2049-002 | 1005.7 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 24.965 |
| IN2050-009_MI2050-008 | IN2050-009 | 1067.19 | MI2050-008 | 1067.07 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 6.6 |
| IN2050-016_AS2050-015 | IN2050-016 | 1027.92 | AS2050-015 | 1027.72 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 6.449 |
| IN2051-002_IN2051-001 | IN2051-002 | 1056.7 | IN2051-001 | 1056.46 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 38.154 |
| IN2051-010_IN2051-008 | IN2051-010 | 1055.29 | IN2051-008 | 1053.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 38.923 |
| IN2051-016.1 | IN2051-016 | 1056.3 | AS2051-005 | 1055.6 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 111.244 |
| IN2051-017_IN2051-016 | IN2051-017 | 1057.3 | IN2051-016 | 1056.3 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 36.579 |
| IN2051-024_AS2051-023 | IN2051-024 | 1062.19 | AS2051-023 | 1057.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 265.248 |
| IN2051-026.1 | IN2051-026 | 1057.47 | AS2051-023 | 1057.34 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 25.045 |
| IN2051-039_AS2051-038 | IN2051-039 | 1062.56 | AS2051-038 | 1058.28 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.25 | 0 | 156.705 |
| IN2051-042_AS2051-041 | IN2051-042 | 1068.05 | AS2051-041 | 1066.85 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.5 | 0 | 50.968 |
| IN2051-047_AS2051-041 | IN2051-047 | 1068.33 | AS2051-041 | 1066.85 | Circular | | 1 | 2.25 | 0.013 | 0.5 | 0.5 | 0 | 235.4 |
| IN2051-048_IN2051-047 | IN2051-048 | 1068.69 | IN2051-047 | 1068.33 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.5 | 0 | 66.292 |
| IN2051-056_IN2051-055 | IN2051-056 | 1060.86 | IN2051-055 | 1057.79 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 117.098 |
| IN2051-060_IN2051-056 | IN2051-060 | 1063.66 | IN2051-056 | 1060.86 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 69.386 |
| IN2051-066_AS2051-051 | IN2051-066 | 1069.3 | PV3093 | 1069.189 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 21.57 |
| IN2051-066_AS2051-051.1 | PV3093 | 1069.19 | AS2051-051 | 1069.1 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 17.245 |
| IN2052-024_AS2052-022 | IN2052-024 | 1062.17 | AS2052-022 | 1061.52 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 23.029 |
| IN2052-029_IN2052-026 | IN2052-029 | 1060.33 | IN2052-026 | 1059.33 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 48.17 |
| IN2052-031_IN2052-029 | IN2052-031 | 1060.92 | IN2052-029 | 1060.33 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 43.83 |
| IN2053-004_IN2052-031 | IN2053-004 | 1064.88 | IN2052-031 | 1060.92 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 170.007 |
| IN2055-007_IN2055-009 | IN2055-007 | 1095.5 | IN2055-009 | 1095.2 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 18.752 |
| IN2055-009_IN2056-014 | IN2055-009 | 1095.2 | IN2056-014 | 1094.66 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 21.296 |
| IN2055-010_IN2055-007 | IN2055-010 | 1098.82 | IN2055-007 | 1095.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 221.203 |
| IN2055-011_IN2055-010 | IN2055-011 | 1099.35 | IN2055-010 | 1098.82 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 54.204 |
| IN2056-006_AS2056-007 | IN2056-006 | 1097.63 | AS2056-007 | 1095.84 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 37.207 |
| IN2056-009_AS2056-007 | IN2056-009 | 1097.41 | AS2056-007 | 1095.84 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 89.832 |
| IN2056-012_IN2056-009 | IN2056-012 | 1098.23 | IN2056-009 | 1097.41 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 27.029 |
| IN2056-014_IN2056-015 | IN2056-014 | 1094.66 | IN2056-015 | 1094.14 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 30.597 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2056-015_IN2056-016 | IN2056-015 | 1094.14 | IN2056-016 | 1093.48 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | None (,) | 28.994 |
| IN2056-016_AE2056-017 | IN2056-016 | 1093.48 | AE2056-017 | 1092 | Circular | | 1 | 2 | 0.013 | 0.25 | 1 | 0 | 77.361 |
| IN2056-021_IN2056-043 | IN2056-021 | 1090.73 | IN2056-043 | 1084.01 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 290.539 |
| IN2056-043_AS2056-044 | IN2056-043 | 1084.01 | AS2056-044 | 1078.3 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 186.001 |
| IN2145-004_AS2145-001 | IN2145-004 | 966.25 | AS2145-001 | 965.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 11.63 |
| IN2145-005_AS2145-001 | IN2145-005 | 966.25 | AS2145-001 | 965.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 27.314 |
| IN2145-009_TP2145-006 | IN2145-009 | 968.35 | DemingDS3 | 961.82 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.4 | None (,) | 182.998 |
| IN2145-010_IN2145-009 | IN2145-010 | 970.05 | IN2145-009 | 968.35 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 258.921 |
| IN2145-012_AS2145-011 | IN2145-012 | 971.85 | AS2145-011 | 971.23 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | None (,) | 73.706 |
| IN2145-013_IN2145-012 | IN2145-013 | 972.2 | IN2145-012 | 971.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 39.208 |
| IN2146-001_IN2146-002 | IN2146-001 | 975.04 | IN2146-002 | 974.65 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 57.404 |
| IN2146-002_IN2246-002 | IN2146-002 | 974.65 | IN2246-002 | 972.96 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.05 | None (,) | 234.241 |
| IN2147-004_AS2147-006 | IN2147-004 | 971.9 | AS2147-006 | 969.77 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 28.036 |
| IN2147-008_AS2147-007 | IN2147-008 | 970.22 | AS2147-007 | 968.62 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.25 | 0 | 14.984 |
| IN2147-011_IN2147-008 | IN2147-011 | 970.35 | IN2147-008 | 970.22 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 40.431 |
| IN2148-002_AS2148-004 | IN2148-002 | 973.8 | AS2148-004 | 972.3 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 33.416 |
| IN2148-005_AS2148-007 | IN2148-005 | 977.36 | AS2148-007 | 976.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | None (,) | 3.933 |
| IN2148-006_AS2148-007 | IN2148-006 | 977.34 | AS2148-007 | 976.6 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 37.759 |
| IN2148-008_IN2148-006 | IN2148-008 | 979.7 | IN2148-006 | 977.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 108.784 |
| IN2148-011_AS2148-010 | IN2148-011 | 993.9 | AS2148-010 | 992.63 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 16.814 |
| IN2148-012_AS2148-010 | IN2148-012 | 993.94 | AS2148-010 | 992.63 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 25.81 |
| IN2149-005_AS2149-001 | IN2149-005 | 999.4 | AS2149-001 | 998.83 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 21.443 |
| IN2150-007_IN2150-008 | IN2150-007 | 1016.7 | IN2150-008 | 1015.51 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 68.007 |
| IN2150-008_IN2150-009 | IN2150-008 | 1015.51 | IN2150-009 | 1013.42 | Circular | | 1 | 1.75 | 0.013 | 0.25 | 0.5 | 0 | 69.24 |
| IN2150-009_AS2150-032 | IN2150-009 | 1013.42 | AS2150-032 | 1008.36 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 285.946 |
| IN2150-019_IN2150-044 | IN2150-019 | 1007.1 | IN2150-044 | 998.04 | Rectangular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 105.18 |
| IN2150-044_IN2150-045 | IN2150-044 | 998.04 | IN2150-045 | 997.75 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 32.595 |
| IN2150-045_TP2250-010 | IN2150-045 | 997.75 | TP2250-010 | 997.35 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 54.043 |
| IN2151-001_AS2151-003 | IN2151-001 | 1053.1 | AS2151-003 | 1049.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.675 |
| IN2151-002_AS2151-003 | IN2151-002 | 1053.1 | AS2151-003 | 1049.6 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.398 |
| IN2151-005_AS2151-004 | IN2151-005 | 1053.51 | AS2151-004 | 1049.15 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 17.883 |
| IN2152-002_AS2152-005 | IN2152-002 | 1055.84 | AS2152-005 | 1055.11 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 11.078 |
| IN2152-003_AS2152-005 | IN2152-003 | 1056.04 | AS2152-005 | 1055.11 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 28.896 |
| IN2152-013_AS2152-010 | IN2152-013 | 1055.6 | AS2152-010 | 1053.02 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 8.538 |
| IN2152-014_AS2152-010 | IN2152-014 | 1055.6 | AS2152-010 | 1053.02 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.553 |
| IN2152-016_AS2152-015 | IN2152-016 | 1056.04 | AS2152-015 | 1052.31 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 51.49 |
| IN2152-018_AS2152-022 | IN2152-018 | 1054.77 | AS2152-022 | 1050.68 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 44.443 |
| IN2155-013_IN2255-042 | IN2155-013 | 1049.63 | IN2255-042 | 1047.56 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.05 | 0 | 200.187 |
| IN2155-015_AS2255-054 | IN2155-015 | 1049.05 | AS2255-054 | 1045.38 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 41.291 |
| IN2156-006_AE2156-045 | IN2156-006 | 1051.07 | AE2156-045 | 1049.93 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 153 |
| IN2156-011_AE2156-046 | IN2156-011 | 1050.33 | AE2156-046 | 1049.86 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 43 |
| IN2156-012_2156-011 | IN2156-012 | 1051.67 | IN2156-011 | 1050.33 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 48.724 |
| IN2156-060_AS2256-055 | IN2156-061 | 1047.77 | AS2256-055 | 1047.49 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 99.906 |
| IN2156-066_IN2156-068 | IN2156-066 | 1069.76 | IN2156-068 | 1069.39 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 76.94 |
| IN2156-068_IN2156-069 | IN2156-068 | 1069.39 | IN2156-069 | 1069.27 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 28.944 |
| IN2156-069_IN2156-070 | IN2156-069 | 1069.27 | IN2156-070 | 1068.29 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 47.068 |
| IN2156-070_IN2156-072 | IN2156-070 | 1068.29 | IN2156-072 | 1064.54 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 256.426 |
| IN2156-072_AE2156-074 | IN2156-072 | 1064.54 | AE2156-074 | 1063.54 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 50.002 |
| IN2156-076_IN2156-010 | IN2156-076 | 1056.43 | IN2156-011 | 1050.33 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 166.652 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2157-013_IN2156-072 | IN2157-013 | 1068.09 | IN2156-072 | 1064.54 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 245.181 |
| IN2157-015_IN2157-013 | IN2157-015 | 1071 | IN2157-013 | 1068.09 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 240.399 |
| IN2158-017_IN2158-014 | IN2158-017 | 1076.66 | IN2158-014 | 1070 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 198.093 |
| IN2159-002_IN2158-017 | IN2159-002 | 1084.16 | IN2158-017 | 1076.66 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 197.112 |
| IN2159-003_IN2159-002 | IN2159-003 | 1085.37 | IN2159-002 | 1084.16 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 10.515 |
| IN2159-009_IN2159-003 | IN2159-009 | 1098.99 | IN2159-003 | 1085.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 336.04 |
| IN2245-006_AS2245-005 | IN2245-006 | 959.78 | AS2245-005 | 958.4 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 9.597 |
| IN2245-008_AS2245-012 | IN2245-008 | 967.81 | AS2245-012 | 965.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 19.094 |
| IN2245-010_AS2245-012 | IN2245-010 | 967.81 | AS2245-012 | 965.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 43.714 |
| IN2246-001_IN2246-002 | IN2246-001 | 973.46 | IN2246-002 | 972.96 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 39.475 |
| IN2247-008_AS2247-006 | IN2247-008 | 967.46 | AS2247-006 | 965.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 34.807 |
| IN2247-010_TP2247-019 | IN2247-010 | 966 | OSTrSouthPond | 965.778 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 22.238 |
| IN2247-021_AS2247-001 | IN2247-021 | 968.4 | AS2247-001 | 966.22 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 24.452 |
| IN2247-030_AS2247-006 | IN2247-030 | 967.6 | AS2247-006 | 965.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 7.153 |
| IN2248-002_IN2248-001 | IN2248-002 | 971.8 | IN2248-001 | 970.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 38.11 |
| IN2248-005_AS2248-004 | IN2248-005 | 969.27 | AS2248-004 | 967.52 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 31.985 |
| IN2249-001_IN2249-003 | IN2249-001 | 973.55 | IN2249-003 | 972.7 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 12.374 |
| IN2249-002_IN2249-003 | IN2249-002 | 973.47 | IN2249-003 | 972.7 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 26.535 |
| IN2249-024_IN2249-030 | IN2249-024 | 986.71 | IN2249-030 | 986.55 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 40.09 |
| IN2249-026_IN2249-027 | IN2249-026 | 987.16 | IN2249-027 | 986.32 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 37.384 |
| IN2249-027_IN2249-028 | IN2249-027 | 986.32 | IN2249-028 | 985.76 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | None (,) | 68.908 |
| IN2249-028_AE2249-029 | IN2249-028 | 985.76 | EMPB_GW_OSR2 | 985.3 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | 0 | 81.246 |
| IN2249-030_AE2249-032 | IN2249-030 | 986.55 | EMPB_GW_OSR2 | 985.4 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 32.935 |
| IN2250-012_AS2250-016 | IN2250-012 | 999.42 | AS2250-016 | 997.91 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 12.186 |
| IN2250-013_AS2250-016 | IN2250-013 | 999.02 | AS2250-016 | 997.91 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 15.7 |
| IN2250-014_IN2250-013 | IN2250-014 | 999.2 | IN2250-013 | 999.02 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 22.176 |
| IN2250-015_IN2250-014 | IN2250-015 | 999.42 | IN2250-014 | 999.2 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 26.722 |
| IN2250-022_IN2250-064 | IN2250-022 | 1011.09 | IN2250-064 | 1009.41 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 152 |
| IN2250-026_IN2250-030 | IN2250-026 | 1007.6 | IN2250-030 | 1000.82 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 217.246 |
| IN2250-030_AS2250-016 | IN2250-030 | 1000.82 | AS2250-016 | 997.91 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 142.61 |
| IN2250-044.1 | IN2250-044 | 991.67 | AS2250-021 | 990.21 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 95.606 |
| IN2250-051_IN2249-024 | IN2250-051 | 987.08 | IN2249-024 | 986.71 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | None (,) | 72.513 |
| IN2250-056_IN2249-026 | IN2250-056 | 987.9 | IN2249-026 | 987.16 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 15.463 |
| IN2250-057_IN2249-024 | IN2250-057 | 988.02 | IN2249-024 | 986.71 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 57.178 |
| IN2250-061_IN2250-022 | IN2250-061 | 1011.59 | IN2250-022 | 1011.09 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 17.661 |
| IN2250-062_IN2250-061 | IN2250-062 | 1012.23 | IN2250-061 | 1011.59 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 55.645 |
| IN2250-063_IN2250-062 | IN2250-063 | 1013.65 | IN2250-062 | 1012.23 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 116.437 |
| IN2250-064_IN2250-026 | IN2250-064 | 1009.41 | IN2250-026 | 1007.6 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 172.462 |
| IN2251-001_IN2251-002 | IN2251-001 | 1028.15 | IN2251-002 | 1027.33 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 35.171 |
| IN2251-002_IN2251-003 | IN2251-002 | 1027.33 | IN2251-003 | 1027 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 16.153 |
| IN2251-003_AS2251-008 | IN2251-003 | 1027 | AS2251-008 | 1024.72 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 34.611 |
| IN2251-006_AS2251-007 | IN2251-006 | 1026.29 | AS2251-007 | 1025 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 4.274 |
| IN2251-011_AS2251-010 | IN2251-011 | 1029.6 | AS2251-010 | 1028.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 63.023 |
| IN2251-012_AS2251-010 | IN2251-012 | 1029.6 | AS2251-010 | 1028.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 11.325 |
| IN2251-013_AS2251-031 | IN2251-013 | 1016.72 | AS2251-031 | 1013.75 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 100.837 |
| IN2251-017_AS2251-018 | IN2251-017 | 1039.23 | AS2251-018 | 1038.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 37.646 |
| IN2251-024_IN2251-013 | IN2251-024 | 1018.48 | IN2251-013 | 1016.72 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 64.279 |
| IN2251-026_IN2251-027 | IN2251-026 | 1018.51 | IN2251-027 | 1014.45 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 194.069 |
| IN2251-027_IN2250-063 | IN2251-027 | 1014.45 | IN2250-063 | 1013.65 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 59.969 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2252-002_AS2252-008 | IN2252-002 | 1049.44 | AS2252-008 | 1048.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 58.108 |
| IN2252-007_AS2252-008 | IN2252-007 | 1049.4 | AS2252-008 | 1048.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 46.975 |
| IN2252-009_IN2252-011 | IN2252-009 | 1037.24 | IN2252-011 | 1030.58 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 243.079 |
| IN2252-010_IN2252-009 | IN2252-010 | 1039.02 | IN2252-009 | 1037.24 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 75.561 |
| IN2252-011_AS2251-010 | IN2252-011 | 1030.58 | AS2251-010 | 1028.1 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 156.047 |
| IN2254-001_AS2254-004 | IN2254-001 | 1054.31 | AS2254-004 | 1053.27 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.831 |
| IN2254-009_IN2254-012 | IN2254-009 | 1048.77 | IN2254-012 | 1048.64 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.5 | 0 | 31.41 |
| IN2254-012_AS2254-015 | IN2254-012 | 1048.64 | AS2254-015 | 1048.53 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 109.623 |
| IN2254-021_AS2254-024 | IN2254-021 | 1048.3 | AS2254-024 | 1047.55 | Circular | | 1 | 4.5 | 0.013 | 0.05 | 0.05 | 0 | 249.348 |
| IN2255-001_IN2255-002 | IN2255-001 | 1045.58 | IN2255-002 | 1044.08 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.25 | 0 | 304.461 |
| IN2255-002_IN2255-003 | IN2255-002 | 1044.08 | IN2255-003 | 1042.96 | Circular | | 1 | 4.5 | 0.013 | 0.25 | 0.05 | 0 | 230.263 |
| IN2255-003_AE2255-004 | IN2255-003 | 1042.96 | AE2255-004 | 1042.88 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 1 | 0 | 54 |
| IN2255-032_AE2255-033 | IN2255-032 | 1050.2 | AE2255-033 | 1049.08 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 75.118 |
| IN2255-037_MI2255-034 | IN2255-037 | 1050.37 | MI2255-034 | 1050.25 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 39.761 |
| IN2255-042_AS2255-006 | IN2255-042 | 1047.56 | AS2255-006 | 1046.31 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.5 | 0 | 91.03 |
| IN2255-061_HD2255-060 | IN2255-061 | 1044.3 | HD2255-060 | 1044 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 1 | None (,) | 27.226 |
| IN2255-062_IN2255-063 | IN2255-062 | 1049.29 | IN2255-063 | 1049.03 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 26.32 |
| IN2255-063_IN2255-064 | IN2255-063 | 1049.03 | IN2255-064 | 1048.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 58.236 |
| IN2255-064_AE2255-035 | IN2255-064 | 1048.3 | AE2255-035 | 1048.1 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 23.667 |
| IN2256-020_IN2256-021 | IN2256-020 | 1053.1 | IN2256-021 | 1052.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 57.51 |
| IN2256-021_AS2256-073 | IN2256-021 | 1052.5 | AS2256-073 | 1052.5 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 44.466 |
| IN2256-031_IN2256-032 | IN2256-031 | 1051.81 | IN2256-032 | 1051.88 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 18.958 |
| IN2256-032_AE2256-033 | IN2256-032 | 1051.88 | AE2256-033 | 1051.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 50.793 |
| IN2256-048_IN2256-049 | IN2256-048 | 1061.97 | IN2256-049 | 1058.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 147.214 |
| IN2256-049_IN2256-050 | IN2256-049 | 1058.56 | IN2256-050 | 1053.121 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 148.248 |
| IN2256-050_IN2256-088 | IN2256-050 | 1053.121 | IN2256-088 | 1052.63 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 94.919 |
| IN2256-052_IN2256-053 | IN2256-052 | 1049.66 | IN2256-053 | 1048.5 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 121.252 |
| IN2256-054_AS2256-055 | IN2256-053 | 1048.5 | AS2256-055 | 1047.49 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 47 |
| IN2256-061_IN2256-062 | JB2256-061 | 1044.39 | IN2256-062 | 1044.31 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 28.612 |
| IN2256-062_IN2256-063 | IN2256-062 | 1044.31 | IN2256-063 | 1044.3 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.05 | None (,) | 6.04 |
| IN2256-063_IN2255-061 | IN2256-063 | 1044.3 | IN2255-061 | 1044.3 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 77.105 |
| IN2256-065_IN2255-037 | IN2255-065 | 1050.7 | IN2255-037 | 1050.37 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 14.204 |
| IN2256-076_JB2256-065 | IN_2256-076 | 1044.88 | JB2256-065 | 1044.42 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 31.538 |
| IN2256-080_IN2255-062 | IN2256-080 | 1050.05 | IN2255-062 | 1049.29 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 60.507 |
| IN2256-088_IN2256-051 | IN2256-088 | 1052.63 | IN2256-052 | 1049.66 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 45.794 |
| IN2257-034_IN2258-075 | IN2257-034 | 1068.47 | IN2258-075 | 1064.8 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 202.596 |
| IN2258-027_IN2258-034 | IN2258-027 | 1064.38 | IN2258-034 | 1062.36 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 81.446 |
| IN2258-034_AS2258-001 | IN2258-034 | 1062.36 | AS2258-001 | 1061.85 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 0.05 | 0 | 19.846 |
| IN2258-039_MI2258-038 | IN2258-039 | 1065.19 | MI2258-038 | 1065.1 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 23.721 |
| IN2258-040_IN2258-039 | IN2258-040 | 1065.32 | IN2258-039 | 1065.19 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 25.15 |
| IN2258-053_AS2258-052 | IN2258-053 | 1081.18 | AS2258-052 | 1080.75 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 26.582 |
| IN2258-054_IN2258-053 | IN2258-054 | 1091.44 | IN2258-053 | 1081.18 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 374.155 |
| IN2258-057_AS2258-056 | IN2258-057 | 1070.99 | AS2258-056 | 1070.77 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 39.178 |
| IN2258-067_AS2258-001 | IN2258-067 | 1062.68 | AS2258-001 | 1061.85 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 151.699 |
| IN2258-074_DT2258-080 | IN2258-074 | 1064.75 | COM_SQ_P_IN | 1064 | Circular | | 1 | 2 | 0.013 | 0.5 | 1 | 0 | 47.777 |
| IN2258-075_IN2258-074 | IN2258-075 | 1064.8 | IN2258-074 | 1064.75 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 11.913 |
| IN2258-076_IN2258-074 | IN2258-076 | 1065.66 | IN2258-074 | 1064.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 38.027 |
| IN2258-078_IN2258-074 | IN2258-078 | 1069.03 | IN2258-074 | 1064.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 159.908 |
| IN2347-002_AS2347-001 | IN2347-002 | 974.31 | AS2347-001 | 971.55 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 7.685 |

## Proposed Conditions Hydraulic Parameters

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN2349-005_AS2349-006 | IN2349-005 | 986.3 | AS2349-006 | 986 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 13.216 |
| IN2349-009_AS2349-011 | IN2349-009 | 979.3 | AS2349-011 | 978.1 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 11.557 |
| IN2349-010_AS2349-011 | IN2349-010 | 981.24 | AS2349-011 | 978.1 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 57.712 |
| IN2349-023_IN2249-026 | IN2349-023 | 987.66 | IN2249-026 | 987.16 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 51.601 |
| IN2349-024_AS2349-025 | IN2349-024 | 989.39 | AS2349-025 | 988.15 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 84.009 |
| IN2349-027_IN2249-027 | IN2349-027 | 986.62 | IN2249-027 | 986.32 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | None (,) | 51.904 |
| IN2350-008_GR2350-010 | IN2350-008 | 987.9 | EMPB_GW_NTL1 | 987 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 35.59 |
| IN2350-023_IN2350-028 | IN2350-023 | 988.2 | IN2350-028 | 987.8 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 36.392 |
| IN2350-028_IN2349-023 | IN2350-028 | 987.8 | IN2349-023 | 987.66 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 15.518 |
| IN2355-005_IN2355-006 | IN2355-005 | 1045.13 | IN2355-006 | 1042.13 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 19.8 |
| IN2355-037_MI2355-039 | IN2355-037 | 1049.03 | MI2355-039 | 1048.75 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 29.366 |
| IN2355-038_IN2355-040 | IN2355-038 | 1048.43 | IN2355-040 | 1046.7 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 48.435 |
| IN2355-040_AS2355-059 | IN2355-040 | 1046.7 | AS2355-059 | 1043.43 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 92.487 |
| IN2355-042_AS2355-059 | IN2355-042 | 1046.3 | AS2355-059 | 1043.43 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 51.263 |
| IN2355-045_MI2355-046 | IN2355-045 | 1046.3 | MI2355-046 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 9.619 |
| IN2356-021_MI2356-023 | IN2356-021 | 1049.62 | MI2356-023 | 1049.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 16.002 |
| IN2356-022_IN2355-037 | IN2356-022 | 1049.03 | IN2355-037 | 1049.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 16.251 |
| IN2356-024_IN2355-045 | IN2356-024 | 1046.3 | IN2355-045 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 15.146 |
| IN2356-025_IN2356-024 | IN2356-025 | 1046.65 | IN2356-024 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 50.006 |
| IN2356-033_AS2355-060 | IN2356-033 | 1048.95 | AS2355-060 | 1044.94 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 150.877 |
| IN2358-003_AS2258-056 | IN2358-003 | 1072.57 | AS2258-056 | 1070.77 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 28.665 |
| IN2358-007_IN2358-003 | IN2358-007 | 1078.77 | IN2358-003 | 1072.57 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 112.847 |
| IN2358-009_IN2358-007 | IN2358-009 | 1083.18 | IN2358-007 | 1078.77 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 71.211 |
| IN2358-010_IN2358-009 | IN2358-010 | 1087.6 | IN2358-009 | 1083.18 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 67.959 |
| IN2358-012_IN2358-010 | IN2358-012 | 1091.8 | IN2358-010 | 1087.6 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 71.475 |
| IN2358-013_IN2358-012 | IN2358-013 | 1096.44 | IN2358-012 | 1091.8 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 70.754 |
| IN2358-015_IN2358-013 | IN2358-015 | 1100.85 | IN2358-013 | 1096.44 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 70.609 |
| IN2358-016_IN2358-015 | IN2358-016 | 1105.27 | IN2358-015 | 1100.85 | Circular | | 1 | 2.25 | 0.013 | 0.25 | 0.05 | 0 | 69.644 |
| IN2358-020_IN2358-016 | IN2358-020 | 1118.44 | IN2358-016 | 1105.27 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | 0 | 212.708 |
| IN2450-013_IN2450-014 | IN2450-013 | 993.6 | IN2450-014 | 993.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 8.829 |
| IN2450-014_AS2450-026 | IN2450-014 | 993.5 | AS2450-026 | 992.29 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 21.468 |
| IN2452-011_AS2452-013 | IN2452-011 | 1007.6 | AE2452-014 | 1006.56 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 214.406 |
| IN2548-004_AS2548-003 | IN2548-004 | 986.4 | AS2548-003 | 986.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 32.939 |
| IN2548-007_AS2548-003 | IN2548-007 | 986.35 | AS2548-003 | 986.1 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 9.108 |
| IN2549-009_AE2549-011 | IN2549-009 | 991.8 | EMPB_GW_LOSR1 | 991.7 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.5 | 0 | 19.415 |
| IN2549-013_AS2549-001 | IN2549-013 | 997.2 | AS2549-001 | 993.34 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 10.413 |
| IN2549-014_IN2549-015 | IN2549-014 | 996.93 | IN2549-015 | 996.79 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 10.521 |
| IN2549-015_AS2549-003 | IN2549-015 | 996.79 | AS2549-003 | 993.81 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 25.127 |
| IN2550-021_IN2549-009 | IN2550-021 | 992.7 | IN2549-009 | 991.8 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 48.53 |
| IN2650-005_IN2650-006 | IN2650-005 | 1004.1 | IN2650-006 | 1001.48 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 215.008 |
| IN2650-006_AS2650-004 | IN2650-006 | 1001.48 | AS2650-004 | 997.19 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 349.758 |
| JB2256-058_JB2256-060 | JB2256-058 | 1046.5 | JB2256-060 | 1046.02 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 167.707 |
| JB2256-065_JB2256-061 | JB2256-065 | 1044.42 | JB2256-061 | 1044.39 | Rectangular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 47.349 |
| JCT_RIDGE_P_BACK_WEIR_TOP | JCT_RIDGE_POND_OUT | | JCT_RIDGE_POND_OUT2 | | | | | | | | | | |
| JCT_RIDGE_POND_BACK_WEIR | JCT_RIDGE_POND_OUT | | JCT_RIDGE_POND_OUT2 | | | | | | | | | | |
| JCT_RIDGE_POND_HIGH_WEIR | TARGET_P_OUT | | JCT_RIDGE_POND_OUT | | | | | | | | | | |
| JCT_RIDGE_POND_LO_WEIR | TARGET_P_OUT | | JCT_RIDGE_POND_OUT | | | | | | | | | | |
| JCT_RIDGE_POND_OUTFLOW_CHANNEL | JCT_RIDGE_POND_OUT2 | 1044.3 | JUNCTION_RIDGE_POND_OUT_JCT | 1043.5 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 23.916 |
| JuncOver | AS2251-034 | | Node2121 | | | | | | | | | | |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L_InlJunc | Node2122 | 1020 | IN2251-024 | 1019.67 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 33 |
| L_InlJunc2 | Node2123 | 1020 | IN2251-024 | 1019.67 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 33 |
| Link1737 | HOMEWOOD_W_P_OU | 1072 | Node1694 | 1071.9 | Circular | | 1 | 0.667 | 0.011 | 1 | 0.5 | 0 | 86 |
| Link1738 | Node1694 | 1071.9 | Node1696 | 1071.66 | Circular | | 1 | 0.667 | 0.011 | 0.5 | 0.05 | 0 | 48 |
| Link1739 | Node1695 | 1063.33 | GAN_H_PRIV_P_IN | 1054.6 | Circular | | 1 | 0.833 | 0.011 | 0.5 | 1 | 0 | 263 |
| Link1740 | Node1696 | 1071.66 | Node1695 | 1063.33 | Circular | | 1 | 0.833 | 0.011 | 0.05 | 0.5 | 0 | 106 |
| Link1741 | HIGHVIEW_PR | 1087.58 | Node1698 | 1087.21 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 74 |
| Link1742 | Node1698 | 1087.21 | IN2258-023 | 1086.91 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 58 |
| Link1743 | IN1956-014 | 1100.04 | IN1956-013 | 1099.53 | Circular | | 1 | 1.25 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 52 |
| Link1770 | IN2056-039 | 1082.69 | AS2056-031 | 1068.12 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 350 |
| Link1774 | IN2256-023 | 1057.6 | PD2256-019_AE2256-015 | 1054 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 40 |
| Link1776 | JCT_CT_POND_OUT | 996 | IN2250-044 | 995.17 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 91 |
| Link1780 | IN1753-010 | 1088.78 | IN1753-008 | 1086.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 51 |
| Link1783 | IN2152-007 | 1057.24 | AS2152-008 | 1054.16 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | None (,) | 42 |
| Link1784 | IN2256-034 | 1059.64 | AE2256-035 | 1058.85 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 79 |
| Link1789 | IN2554-003 | 1036.71 | IN2554-001 | 1036.01 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.6 | None (,) | 15 |
| Link1791 | IN1947-018 | 1021.37 | AS1947-017 | 1016.41 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 148 |
| Link1795 | BH_CHURCH_PR | 1113.37 | IN1654-004 | 1108.56 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 109 |
| Link1796 | BL_DITCH_TO_FOURIER | 970 | BL_D_TO_FOURIER_CH_DS | 969.94 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 83 |
| Link1798 | DT2157-011 | 1073.04 | IN2157-009 | 1070.32 | Circular | | 1 | 1 | 0.013 | 0.2 | 0.05 | Groove End with Projecting (Circ, Conc) | 29 |
| Link1799 | IN2157-009 | 1070.32 | IN2157-039 | 1069.65 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 71 |
| Link1800 | IN2157-039 | 1069.65 | IN2257-036 | 1068.97 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 20 |
| Link1801 | IN2257-036 | 1068.97 | IN2257-034 | 1068.47 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 29 |
| Link1802 | AE1653-022 | 1106.07 | IN1653-021 | 1105.45 | Circular | | 1 | 1.5 | 0.013 | 0.2 | 0.25 | Groove End with Headwall (Circ, Conc) | 93 |
| Link1803 | IN1653-021 | 1105.45 | IN1653-020 | 1105.28 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 32 |
| Link1807 | IN2150-021 | 1024.35 | IN2150-020 | 1022.72 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.5 | 0 | 94 |
| Link1808 | IN2150-020 | 1022.72 | IN2150-006 | 1020.86 | Circular | | 1 | 1.25 | 0.011 | 0.5 | 0.05 | 0 | 101 |
| Link1809 | IN2150-006 | 1020.86 | IN2150-007 | 1016.7 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | None (,) | 98 |
| Link1810 | Node1915 | 1073.81 | Node1919 | 1073.13 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | 0 | 136 |
| Link1811 | Node1916 | 1074.7 | Node1917 | 1074.23 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 68 |
| Link1812 | Node1918 | 1074.02 | Node1915 | 1073.81 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 41 |
| Link1813 | Node1917 | 1074.23 | Node1918 | 1074.02 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 42 |
| Link1814 | Node1919 | 1073.13 | IN1849-057 | 1073.88 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 44 |
| Link1815 | Node1920 | 1075.44 | Node1921 | 1075.09 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 70 |
| Link1816 | Node1921 | 1075.09 | Node1922 | 1074.79 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 61 |
| Link1818 | Node1922 | 1074.79 | Node1924 | 1074.33 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 91 |
| Link1819 | Node1924 | 1074.33 | AS1849-058 | 1073.28 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | 0 | 147 |
| Link1821 | IN1949-001 | 1031.49 | AS1949-009 | 1030.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 25 |
| Link1822 | IN1949-002 | 1031.24 | IN1949-003 | 1030.56 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 33 |
| Link1823 | IN2353-001 | 0.05 | IN2352-002 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1824 | IN2352-002 | 0.05 | IN2352-004 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1825 | IN2352-003 | 0.05 | IN2352-004 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1826 | IN2354-019 | 0.05 | AS2354-006 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1827 | IN2354-007 | 0.05 | AS2354-006 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1828 | IN2354-014 | 0.05 | AS2354-012 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1829 | IN2354-016 | 0.05 | AS2354-015 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1830 | IN2355-050 | 0.05 | AS2355-001 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1831 | IN2355-049 | 0.05 | AS2355-001 | 0 | Circular | | 1 | 0.05 | 0.013 | 0 | 0 | None (,) | 10 |
| Link1832 | IN2253-008 | 1055.95 | AS2253-012 | 1054.89 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 34 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link1833 | IN2253-014 | 1054.2 | AS2254-004 | 1053.27 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 26 |
| Link1834 | IN2254-003 | 1054.95 | IN2254-001 | 1054.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 26 |
| Link1835 | IN2254-026 | 1054.25 | AS2254-005 | 1052.66 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 42 |
| Link1836 | IN2254-025 | 1054.25 | AS2254-005 | 1052.66 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 26 |
| Link1837 | IN2254-008 | 1051.34 | IN2254-012 | 1048.64 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 38 |
| Link1838 | IN2256-012 | 1058.8 | IN2256-013 | 1058.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 60 |
| Link1839 | IN2256-013 | 1058.2 | GR2256-019 | 1056.6 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 40 |
| Link1840 | MenardsPL1 | 1055.09 | GR2256-019 | 1054.6 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | None (,) | 154 |
| Link1841 | MenardsPL2 | 1056.12 | MenardsPL1 | 1055.09 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 80 |
| Link1842 | MenardsPL3 | 1056.63 | MenardsPL1 | 1055.09 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.25 | None (,) | 258 |
| Link1843 | MenardsPL4 | 1057.33 | AE2256-035 | 1055.03 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 288 |
| Link1845 | Node1953 | 1059.06 | TE2257-014 | 1057.35 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 42 |
| Link1846 | IN2257-005 | 1060.42 | AS2257-004 | 1060.06 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 18 |
| Link1847 | IN2257-006 | 1060.42 | AS2257-004 | 1059.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 30 |
| Link1848 | IN2257-007 | 1061.9 | AS2257-008 | 1061.64 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 13 |
| Link1849 | IN2258-071 | 1065.36 | IN2258-070 | 1065.28 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 15 |
| Link1850 | IN2258-070 | 1065.28 | IN2258-069 | 1065.14 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 29 |
| Link1851 | IN2258-069 | 1065.14 | IN2258-068 | 1065.08 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 11 |
| Link1852 | IN2258-068 | 1065.08 | IN2258-027 | 1064.38 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 40 |
| Link1853 | IN2258-050 | 1070 | IN2258-049 | 1068.06 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 79 |
| Link1854 | IN2258-047 | 1067.82 | IN2258-046 | 1067.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 31 |
| Link1855 | IN2258-046 | 1067.6 | IN2258-045 | 1067.24 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 17 |
| Link1856 | IN2258-045 | 1067.24 | IN2258-044 | 1067.06 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 35 |
| Link1857 | IN2258-044 | 1067.06 | IN2258-040 | 1065.32 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 230 |
| Link1858 | IN2258-043 | 1065.71 | IN2258-040 | 1065.32 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 79 |
| Link1859 | IN2258-032 | 1065.04 | IN2258-033 | 1064.8 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 35 |
| Link1860 | IN2258-033 | 1064.8 | IN2258-027 | 1064.38 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 44 |
| Link1861 | IN2258-026 | 1070.93 | IN2258-025 | 1069.43 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 35 |
| Link1862 | IN2249-019 | 991.04 | IN2249-018 | 990.63 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 30 |
| Link1863 | IN2249-018 | 990.63 | IN2250-048 | 990.33 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 20 |
| Link1864 | IN2250-048 | 990.33 | IN2250-046 | 989.73 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 50 |
| Link1865 | IN2250-046 | 989.73 | AS2250-045 | 988.61 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 28 |
| Link1866 | AS2250-019 | 991.93 | IN2250-042 | 992 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 10 |
| Link1867 | IN2250-042 | 992 | IN2250-017 | 992.44 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 35 |
| Link1868 | IN2250-017 | 992.44 | IN2249-013 | 992.54 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 8 |
| Link1869 | IN2249-013 | 992.54 | IN2249-017 | 992.88 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 27 |
| Link1870 | IN2249-016 | 996.17 | IN2250-041 | 995.71 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 36 |
| Link1871 | IN2250-041 | 995.71 | IN2250-040 | 995.53 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 8 |
| Link1872 | IN2250-040 | 995.53 | IN2250-039 | 997.8 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 30 |
| Link1873 | IN2249-017 | 992.88 | AS2249-004 | 992.98 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 8 |
| Link1874 | IN2250-029 | 1009.33 | IN2250-028 | 1009.14 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 27 |
| Link1875 | IN2250-028 | 1009.14 | IN2250-027 | 1008.69 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 19 |
| Link1876 | IN2250-027 | 1008.69 | IN2250-026 | 1007.6 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 27 |
| Link1877 | IN2250-025 | 1012.59 | IN2250-059 | 1012.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 44 |
| Link1878 | IN2250-059 | 1012.55 | IN2250-058 | 1012.5 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 7 |
| Link1879 | IN2250-058 | 1012.5 | IN2250-022 | 1011.09 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 29 |
| Link1880 | IN2251-030 | 1015.95 | IN2251-029 | 1015.48 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 35 |
| Link1881 | IN2251-029 | 1015.48 | IN2251-028 | 1015.09 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 13 |
| Link1882 | IN2251-028 | 1015.09 | IN2251-027 | 1014.45 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 29 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link1883 | IN2150-050 | 1008.26 | IN2150-038 | 1007.81 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 18 |
| Link1884 | IN2150-038 | 1007.81 | AS2150-014 | 1007.81 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 20 |
| Link1885 | IN2150-042 | 1007.25 | AS2150-014 | 1006.85 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.5 | 0 | 10 |
| Link1886 | IN2149-016 | 1012.47 | IN2150-033 | 1012.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 28 |
| Link1887 | IN2150-033 | 1012.11 | IN2150-048 | 1011.94 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 12 |
| Link1888 | IN2150-048 | 1011.94 | AS2150-032 | 1010.74 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 30 |
| Link1889 | IN2150-035 | 1011.2 | AS2150-032 | 1010.96 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 6 |
| Link1890 | IN2251-005 | 1026.29 | AS2251-007 | 1025.29 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 25 |
| Link1891 | IN2251-023 | 1036.45 | AS2251-022 | 1035.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 25 |
| Link1892 | IN2251-020 | 1036.1 | AS2251-021 | 1035.17 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 25 |
| Link1893 | IN2251-019 | 1036.1 | AS2251-021 | 1035.9 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 5 |
| Link1894 | IN2251-016 | 1039.85 | AS2251-018 | 1038.85 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 25 |
| Link1895 | IN2252-014 | 1040.03 | IN2251-017 | 1039.23 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | 0 | 30 |
| Link1896 | IN2052-010 | 1061.14 | IN2052-009 | 1060.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 27 |
| Link1897 | IN2052-007 | 1062.96 | AS2052-006 | 1062.34 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 23 |
| Link1898 | IN2052-036 | 1058.76 | TP2052-028 | 1058.6 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 8 |
| Link1899 | IN2053-005 | 1059.62 | IN2052-036 | 1058.76 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 43 |
| Link1900 | IN2053-002 | 1061.48 | IN2052-031 | 1060.92 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 43 |
| Link1901 | IN1653-019 | 1104.76 | IN1653-018 | 1104.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 37 |
| Link1902 | IN1653-017 | 1103.02 | IN1653-016 | 1102.22 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 40 |
| Link1903 | IN1653-015 | 1102.64 | IN1653-014 | 1101.86 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 39 |
| Link1904 | IN1754-034 | 1099.46 | IN1754-025 | 1098.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 38 |
| Link1905 | IN1753-043 | 1091.2 | AS1753-005 | 1090.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 50 |
| Link1906 | IN1753-042 | 1091.18 | IN1753-041 | 1090.58 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 30 |
| Link1907 | IN1753-041 | 1090.58 | AS1753-005 | 1090.2 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 19 |
| Link1908 | IN1753-052 | 1087.59 | AS1753-003 | 1087.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 19 |
| Link1909 | IN1753-053 | 1087.45 | AS1753-003 | 1087.21 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 12 |
| Link1910 | IN1753-050 | 1086.21 | IN1753-049 | 1085.59 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 31 |
| Link1911 | IN1753-011 | 1089.03 | IN1753-010 | 1088.78 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 14 |
| Link1912 | IN1753-033 | 1103.49 | IN1753-032 | 1101.57 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 48 |
| Link1913 | IN1753-032 | 1100.91 | IN1753-029 | 1099.82 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.05 | 0 | 219 |
| Link1914 | IN1753-029 | 1099.82 | IN1753-028 | 1099.17 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.05 | 0 | 77 |
| Link1915 | IN1753-035 | 1100.25 | IN1753-029 | 1099.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 36 |
| Link1916 | IN1753-021 | 1094.16 | IN1753-020 | 1093.18 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 54 |
| Link1917 | IN1753-020 | 1093.18 | IN1753-019 | 1092.35 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | 0 | 58 |
| Link1918 | IN1753-019 | 1092.35 | IN1753-018 | 1090.07 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 114 |
| Link1919 | IN2155-006 | 1052.6 | IN2156-019 | 1052.59 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 61 |
| Link1920 | IN2156-019 | 1052.29 | IN2156-018 | 1052.25 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 8 |
| Link1921 | IN2156-018 | 1052.25 | AS2156-017 | 1051.03 | Circular | | 1 | 0.16 | 0.013 | 0.05 | 0.05 | 0 | 50 |
| Link1922 | IN2156-049 | 1050.43 | IN2155-014 | 1049.99 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.05 | 0 | 87 |
| Link1923 | IN2155-014 | 1049.99 | IN2155-013 | 1049.86 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 25 |
| Link1924 | IN2255-041 | 1047.35 | IN2255-040 | 1047.11 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 48 |
| Link1925 | IN2255-040 | 1047.11 | IN2256-039 | 1046.74 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 73 |
| Link1926 | IN2256-039 | 1046.74 | IN2256-038 | 1046.68 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 11 |
| Link1927 | IN2256-038 | 1046.68 | AS2256-036 | 1046.59 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 17 |
| Link1928 | IN2255-044 | 1046.66 | IN2256-041 | 1046.29 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 73 |
| Link1929 | IN2256-041 | 1046.29 | IN2256-040 | 1046.26 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 5 |
| Link1930 | IN2256-040 | 1046.26 | AS2256-037 | 1046.17 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | 0 | 17 |
| Link1931 | IN2255-045 | 1046.22 | IN2256-044 | 1045.9 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 64 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link1932 | IN2256-044 | 1045.9 | IN2256-043 | 1045.83 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 13 |
| Link1933 | IN2256-043 | 1045.83 | AS2256-042 | 1045.74 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 17 |
| Link1939 | IN2255-052 | 1045.56 | IN2255-051 | 1045.45 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 21 |
| Link1940 | IN2255-051 | 1045.45 | IN2255-050 | 1045.32 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 25 |
| Link1941 | IN2255-050 | 1045.32 | IN2255-049 | 1045.18 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | 0 | 27 |
| Link1942 | IN2255-049 | 1045.18 | IN2255-048 | 1044.97 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 42 |
| Link1943 | IN2255-048 | 1044.97 | AS2255-046 | 1044.85 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | 0 | 23 |
| Link1944 | IN2354-018 | 1041.47 | IN2454-007 | 1041.4 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 25 |
| Link1947 | IN2354-017 | 1041.84 | IN2354-018 | 1041.47 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 40 |
| Link1983 | PV292 | 1070.75 | PV294 | 1070.24 | Circular | | 1 | 1.5 | 0.013 | 0.45 | 0.45 | 0 | 76 |
| Link1994 | PV226 | 1074.36 | PV228 | 1074.2 | Special | Horizontal Ellipse | 1 | 1.91 | 0.013 | 0.5 | 0.05 | 0 | 80 |
| Link1998 | S101 | 1083.94 | S106 | 1081.87 | Circular | | 1 | 1 | 0.011 | 0.25 | 0.25 | 0 | 80 |
| Link2010 | OSTP_POND_SYSTEM_J | 965 | OSTrSouthPond | 964.75 | Rectangular | | 2 | 5 | 0.013 | 0.25 | 1 | 0 | 20 |
| Link2011 | OSTP_POND_SYSTEM_J | 976 | OSTrSouthPond | 975 | Trapezoidal | | 1 | 5 | 0.013 | 0 | 0 | None (,) | 33 |
| Link2012 | OSTP_POND_SYSTEM_J | 976 | OSTrSouthPond | 975 | Trapezoidal | | 1 | 5 | 0.013 | 0 | 0 | None (,) | 33 |
| Link2013 | OSTP_POND_SYSTEM_J | 976 | OSTrSouthPond | 975 | Trapezoidal | | 1 | 5 | 0.013 | 0 | 0 | None (,) | 33 |
| Link2014 | OSTP_POND_SYSTEM_J | 976 | OSTrSouthPond | 975 | Trapezoidal | | 1 | 5 | 0.013 | 0 | 0 | None (,) | 33 |
| Link2015 | OSTP_POND_SYSTEM_J | 976 | OSTrSouthPond | 975 | Trapezoidal | | 1 | 5 | 0.013 | 0 | 0 | None (,) | 33 |
| Link2051 | PV35812 | 1003.52 | PV3582 | 1003 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 52 |
| Link2052 | PV3594 | 1003.15 | PV3593 | 1003 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 68 |
| Link2053 | PV391 | 1011.4 | PV3921 | 1010.17 | Circular | | 1 | 2 | 0.013 | 0.1 | 0.1 | 0 | 41 |
| Link2054 | PV3922 | 1007 | PV3924 | 1003.62 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 71 |
| LittleBearPr1 | IN1752-029 | 1096.33 | IN1752-026 | 1095.73 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 120 |
| LostMwPr1 | IN1752-004 | 1098.9 | AS1752-001 | 1093.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 140 |
| MENARDS_POND_GRATE_OUT | IN2256-076 | | IN_2256-076 | | | | | | | | | | |
| MI1548-028_AS1548-014 | MI1548-028 | 1097.73 | AS1548-014 | 1097.05 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 48.005 |
| MI1548-051_AS1548-048 | MI1548-051 | 1102.5 | AS1548-048 | 1101.47 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | None (,) | 216.825 |
| MI1647-055_AS1647-056 | MI1647-055 | 1083.9 | AS1647-056 | 1083.7 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | None (,) | 16.133 |
| MI1753-047_AS1753-045 | MI1753-047 | 1088 | AS1753-045 | 1087.65 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 0.05 | 0 | 200.191 |
| MI1849-054_AS1849-053 | MI1849-055 | 1072.7 | AS1849-053 | 1072.6 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | None (,) | 21.068 |
| MI2050-008_IN2051-060 | MI2050-008 | 1067.07 | IN2051-060 | 1063.66 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 107.654 |
| MI2051-022.1 | MI2051-022 | 1056.6 | IN2051-016 | 1056.3 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 44.005 |
| MI2051-062_IN2051-048 | MI2051-062 | 1068.99 | IN2051-048 | 1068.69 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 112.857 |
| MI2255-034_IN2255-032 | MI2255-034 | 1050.25 | IN2255-032 | 1050.2 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 10.401 |
| MI2255-047_PD2255-023 | MI2255-047 | 1044.75 | Node1784 | 1043.35 | Rectangular | | 1 | 5 | 0.013 | 0.05 | 1 | 0 | 117 |
| MI2258-038_IN2258-027 | MI2258-038 | 1065.1 | IN2258-027 | 1064.38 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 89.347 |
| MI2355-039_IN2355-038 | MI2355-039 | 1048.75 | IN2355-038 | 1048.43 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 18.002 |
| MI2355-046_IN2355-042 | MI2355-046 | 1046.3 | IN2355-042 | 1046.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 51.222 |
| MI2356-023_IN2356-022 | MI2356-023 | 1049.5 | IN2356-022 | 1049.03 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 31.453 |
| MinPrPr1 | AS2355-016 | 1053.4 | IN2355-051 | 1052.24 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.25 | 0 | 58 |
| MinPt_Pr2 | IN2256-069 | 1046.94 | IN2256-068 | 1046.29 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 43 |
| MinPt_Pr20 | IN2256-068 | 1045.29 | JB2256-060 | 1045.26 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 25 |
| MinPt_Pr22 | IN2256-070 | 1047.5 | IN2256-069 | 1046.94 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 58 |
| MinPtPr10 | IN2455-021 | 1060.1 | AS2455-024 | 1059.7 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 80 |
| MinPtPr2 | AS2355-021 | 1058.26 | AS2355-016 | 1053.4 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 243 |
| MinPtPr3 | AS2455-024 | 1059.7 | AS2355-021 | 1058.26 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 288 |
| MinPtPr40 | AS2256-042 | 1045.74 | AS2256-047 | 1045.29 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 0.25 | 0 | 151 |
| MinPtPR41 | AS2256-037 | 1046.17 | AS2256-042 | 1045.74 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 0.05 | 0 | 144 |
| MinPtPr42 | AS2256-036 | 1046.59 | AS2256-037 | 1046.17 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 0.05 | 0 | 138 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MinPtPr43 | AS2156-044 | 1047.17 | AS2256-036 | 1046.59 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.1 | 0.1 | 0 | 416 |
| MinPtPr44 | AS2156-043 | 1049.42 | AS2156-044 | 1047.17 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 0.1 | 0 | 233 |
| MinPtPr5 | AS2355-019 | 1053.9 | AS2355-016 | 1053.4 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 25 |
| MinPtPr6 | IN2355-020 | 1054.1 | AS2355-019 | 1053.9 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 10 |
| MinPtPr7 | IN2356-010 | 1054.36 | IN2355-020 | 1054.1 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 13 |
| MinPtPr8 | IN2356-008 | 1055.04 | IN2356-010 | 1054.36 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 34 |
| MinPtPr9 | IN2356-006 | 1056.1 | IN2356-008 | 1055.04 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.25 | 0 | 53 |
| Multi_10 | PF-S15 | 1117.2 | PF-S18 | 1114.86 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 224 |
| Multi_11 | PF-S18 | 1114.36 | PF-S21 | 1113.29 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 224 |
| Multi_12 | PF-S1 | 1139.46 | PF-S4 | 1137.92 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | 0 | 153 |
| Multi_13 | PF-S26 | 1112.16 | PF-S27 | 1111.48 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 36 |
| Multi_14 | PF-S27 | 1111.48 | PF-S28 | 1110.72 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 134 |
| Multi_15 | PF-S2 | 1140.69 | PF-S1 | 1139.56 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 113 |
| Multi_16 | PF-S30 | 1106.79 | PL1549-019 | 1106.89 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 37.165 |
| Multi_17 | PF-S4 | 1137.82 | PF-S7 | 1136.96 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.25 | 0 | 86 |
| Multi_18 | PF-S7 | 1136.86 | PF-S8 | 1125.05 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.05 | 0 | 165 |
| Multi_19 | PF-S8 | 1125.05 | PF-S12 | 1120.3 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 153 |
| Multi_2 | CH-S22 | 1102.61 | CH-S21 | 1098.09 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 185.052 |
| Multi_20 | PL1549-019 | 1106.89 | IN1549-018 | 1106.78 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 22.27 |
| Multi_21 | S101 | 1084.19 | SE_BIO_BASIN | 1083 | Circular | | 1 | 1 | 0.013 | 0.5 | 1 | 0 | 120.664 |
| Multi_26 | S32 | 1088.55 | S101 | 1084.19 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 128 |
| Multi_27 | S33 | 1088.88 | S32 | 1088.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 29 |
| Multi_3 | CH-S23 | 1103.55 | CH-S22 | 1103.11 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.25 | 0 | 72.616 |
| Multi_4 | CH-S24 | 1105.49 | CH-S23 | 1103.8 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 171.784 |
| Multi_48 | E_INF_BASIN | 1084.5 | S106 | 1083.35 | Circular | | 1 | 0.5 | 0.011 | 0.5 | 0.5 | None (,) | 32 |
| Multi_5 | CH-S25 | 1106.12 | CH-S24 | 1105.74 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | 0 | 41.54 |
| Multi_58 | NW_INF_BASIN | 1093.75 | IN1647-065 | 1093.49 | Circular | | 1 | 0.5 | 0.011 | 0.5 | 0.25 | None (,) | 42.981 |
| Multi_6 | CH_S31 | 1099.51 | CH_BIO_BASIN_1 | 1097.5 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.2 | 0 | 202.956 |
| Multi_68 | IN1549-020 | 1107.3 | IN1549-018 | 1106.78 | Circular | | 1 | 1 | 0.011 | 0.25 | 0.5 | None (,) | 59.464 |
| Multi_7 | CH_S32 | 1101.51 | CH_S31 | 1100.26 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.5 | 0 | 42.024 |
| Multi_8 | CH_S33 | 1105.19 | CH_S32 | 1101.51 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | 0 | 107.858 |
| Multi_9 | PF-S12 | 1120.2 | PF-S15 | 1117.2 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 300 |
| N_3645.1 | IN2155-007 | 1055.82 | Node1701 | 1055.37 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 37 |
| N_3646.1 | Node1701 | 1055.37 | Node1702 | 1055.24 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 25 |
| N_3647.1 | Node1702 | 1055.24 | Node1703 | 1055.15 | Circular | | 1 | 2.5 | 0.014 | 0.05 | 0.05 | 0 | 19 |
| N_3648.1 | Node1703 | 1055.15 | AS2156-020 | 1054 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 28 |
| N_3664.1 | AS2155-011 | 1059 | IN2155-009 | 1058.87 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 25 |
| N_3665.1 | IN2155-009 | 1058.87 | IN2156-034 | 1058.42 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 39 |
| N_3666.1 | IN2156-034 | 1058.42 | IN2156-033 | 1058.31 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 22 |
| N_3667.1 | IN2156-033 | 1058.31 | IN2156-031 | 1058.24 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.15 | 0 | 22 |
| N_3668.1 | IN2156-031 | 1058.24 | AS2156-028 | 1057.29 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 32 |
| N_3671.1 | IN2247-013 | 968.75 | IN2247-012 | 968.49 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 40 |
| N_3672.1 | IN2247-012 | 968.49 | IN2247-011 | 967.72 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 118 |
| N_3677.1 | IN1753-024 | 1089.8 | IN1753-023 | 1089.5 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 43 |
| N_3678.1 | IN1753-023 | 1089.5 | IN1753-022 | 1089.35 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 36 |
| N_3679.1 | IN1753-022 | 1089.35 | IN1753-018 | 1088.67 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 136 |
| N_3681.1 | AE2052-041 | 1056.44 | AS2152-024 | 1055.06 | Circular | | 1 | 1.75 | 0.013 | 0.5 | 0.5 | 0 | 283 |
| N_3682.1 | AS2152-024 | 1055.06 | AS2152-023 | 1053.85 | Circular | | 1 | 1.75 | 0.013 | 0.05 | 0.05 | 0 | 372 |
| N_3685.1 | IN2257-028 | 1057.18 | IN2257-029 | 1057.06 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 60 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N_3686.1 | IN2257-029 | 1057.06 | AE2257-030 | 1057 | Special | Horizontal Ellipse | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 30 |
| N_3694.1 | IN2248-001 | 968.75 | IN2248-003 | 966.6 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 330 |
| N_4214.1 | AS2250-038 | 994.6 | AS2250-006 | 991.98 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 220 |
| N_AE2156-078.1 | AE2156-078 | 1061 | AS2156-077 | 1054.9 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 42.002 |
| N_AE2256-010.1 | AE2256-010 | 1055 | AE2256-011 | 1054.6 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 90.96 |
| N_AS2046-011.1 | AS2046-011 | 984.123 | IN2046-001 | 983.547 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 143.999 |
| N_AS2047-008.1 | AS2047-008 | 981.381 | AS2047-011 | 980.754 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 0.5 | 0 | 152.932 |
| N_AS2047-011.1 | AS2047-011 | 980.754 | AE2047-016 | 979.6 | Special | Horizontal Ellipse | 1 | 6.91 | 0.013 | 0.5 | 0.5 | 0 | 461.551 |
| N_AS2048-004.1 | AS2048-004 | 987.48 | WMPB_GW_DW5 | 986.1 | Circular | | 1 | 4.5 | 0.013 | 0.5 | 0.5 | 0 | 41.66 |
| N_AS2048-005.1 | AS2048-005 | 988.47 | AS2048-004 | 987.48 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 212.596 |
| N_AS2048-010.1 | AS2048-010 | 989.43 | AS2048-005 | 988.47 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 181.417 |
| N_AS2049-002.1 | AS2049-002 | 1005.7 | AS2149-002 | 1001.6 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 145.093 |
| N_AS2051-005.1 | AS2051-005 | 1055.1 | IN2051-006 | 1053.73 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 131.397 |
| N_AS2052-006.1 | AS2052-006 | 1062.34 | MI2052-021 | 1061.81 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 66.621 |
| N_AS2052-022.1 | AS2052-022 | 1061.52 | IN2052-026 | 1059.33 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 280.632 |
| N_AS2147-001.1 | AS2147-001 | 970.76 | AS2147-006 | 969.77 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.25 | 0 | 164.526 |
| N_AS2147-006.1 | AS2147-006 | 969.77 | AS2147-007 | 968.62 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.25 | 0.05 | 0 | 235.519 |
| N_AS2147-007.1 | AS2147-007 | 968.62 | OSTrSouthPond | 968.2 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.05 | 1 | 0 | 60.941 |
| N_AS2148-004.1 | AS2148-004 | 972.3 | AS2147-001 | 970.76 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | 0 | 193.656 |
| N_AS2148-007.1 | AS2148-007 | 976.6 | AS2148-004 | 972.3 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.25 | 0 | 432.627 |
| N_AS2148-009.1 | AS2148-009 | 993.57 | AS2148-010 | 991.63 | Circular | | 1 | 3.5 | 0.013 | 0.25 | 0.25 | 0 | 249.651 |
| N_AS2148-010.1 | AS2148-010 | 991.63 | AS2048-010 | 989.43 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 347.835 |
| N_AS2149-001.1 | AS2149-001 | 997.83 | AS2148-009 | 993.57 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.25 | 0 | 248.358 |
| N_AS2149-002.1 | AS2149-002 | 1001.6 | AS2149-001 | 997.83 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 133.589 |
| N_AS2151-003.1 | AS2151-003 | 1048.697 | AS2151-004 | 1047.843 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.5 | 0 | 90.933 |
| N_AS2151-004.1 | AS2151-004 | 1047.843 | AS2151-009 | 1044.55 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 350.382 |
| N_AS2151-029.1 | AS2151-029 | 1018.14 | AE2151-030 | 1018 | Circular | | 1 | 5 | 0.013 | 0.25 | 1 | 0 | 83 |
| N_AS2152-022.1 | AS2152-022 | 1050.68 | AS2151-003 | 1048.697 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 214.251 |
| N_AS2152-023.1 | AS2152-023 | 1053.83 | TE2152-009 | 1053.666 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 49.546 |
| N_AS2156-017.1 | AS2156-017 | 1051.03 | IN2156-016 | 1050.87 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 12.002 |
| N_AS2156-020.1 | AS2156-020 | 1054 | AS2156-017 | 1051.03 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 195.18 |
| N_AS2156-028.1 | AS2156-028 | 1057.29 | AS2156-020 | 1054 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 326.289 |
| N_AS2156-036.1 | AS2156-036 | 1062.55 | AS2156-028 | 1057.29 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 372.39 |
| N_AS2156-077.1 | AS2156-077 | 1054.9 | AS2156-041 | 1053.41 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 30.594 |
| N_AS2247-001.1 | AS2247-001 | 964.7 | AS2247-005 | 964.28 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.25 | 0 | 230.248 |
| N_AS2247-005.1 | AS2247-005 | 964.28 | AS2247-006 | 963.84 | Circular | | 1 | 5 | 0.013 | 0.25 | 0.25 | 0 | 199.575 |
| N_AS2248-004.1 | AS2248-004 | 966.02 | AS2247-001 | 964.7 | Circular | | 1 | 5 | 0.013 | 0.25 | 0.5 | 0 | 226.504 |
| N_AS2250-006.1 | AS2250-006 | 991.98 | AS2250-020 | 991.68 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 25.433 |
| N_AS2250-019.1 | AS2250-019 | 991.89 | AS2250-020 | 991.68 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 18.459 |
| N_AS2251-007.1 | AS2251-007 | 1025 | AS2251-008 | 1024 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.5 | 0 | 40.152 |
| N_AS2251-008.1 | AS2251-008 | 1024 | AS2251-034 | 1019.11 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 214.561 |
| N_AS2251-018.1 | AS2251-018 | 1038.5 | AS2251-021 | 1035.17 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 200.942 |
| N_AS2251-021.1 | AS2251-021 | 1035.17 | AS2251-022 | 1034.87 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 38.316 |
| N_AS2251-022.1 | AS2251-022 | 1034.87 | TP2251-032 | 1027.8 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 286.033 |
| N_AS2251-035.1 | AS2251-035 | 1019.03 | AS2151-029 | 1018.14 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.25 | 0 | 538.057 |
| N_AS2251-035.2 | AS2251-034 | 1019.11 | AS2251-035 | 1019.03 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.5 | 0.05 | 0 | 51.005 |
| N_AS2254-005.1 | AS2254-005 | 1052.66 | IN2254-012 | 1048.64 | Special | Horizontal Ellipse | 1 | 3.75 | 0.013 | 0.05 | 0.5 | 0 | 357.354 |
| N_AS2257-003.1 | AS2257-003 | 1056.47 | AE2257-001 | 1055.864 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 302.62 |
| N_AS2257-004.2 | AS2257-004.1 | 1056.695 | AS2257-003 | 1056.47 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 41.353 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N_AS2257-004.3 | AS2257-004 | 1057.79 | AS2257-004.1 | 1056.695 | Rectangular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 201.051 |
| N_AS2258-030.1 | AS2258-030 | 1064.04 | IN2258-028 | 1063.36 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.25 | 0 | 116.143 |
| N_AS2258-031.1 | AS2258-031 | 1065.1 | AS2258-030 | 1064.04 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.25 | 0 | 52.006 |
| N_AS2258-048.1 | AS2258-048 | 1066.28 | AS2258-031 | 1065.1 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.25 | 0.05 | 0 | 235.689 |
| N_AS2258-056.1 | AS2258-056 | 1070.77 | IN2258-049 | 1068.06 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 125.066 |
| N_AS2259-001.1 | AS2259-001 | 1092.6 | IN2258-023 | 1086.91 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 113.938 |
| N_AS2351-003.1 | AS2351-003 | 1010.53 | AE2351-002 | 1009.25 | Special | Horizontal Ellipse | 2 | 3.5 | 0.013 | 0.5 | 0.5 | 0 | 269.638 |
| N_AS2351-015.1 | AS2351-015 | 1013 | IN2351-014 | 1012.86 | Special | Horizontal Ellipse | 2 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 26.34 |
| N_ELD_N_Dep | ELD_N_DEP | 1055 | AS2152-023 | 1054.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 50 |
| N_GR2256-019.1 | PD2256-019_AE2256-01 | 1048.343 | MI2256-075 | 1046.93 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 207.227 |
| N_GR2256-019.2 | GR2256-019 | 1049.76 | PD2256-019_AE2256-015 | 1048.343 | Rectangular | | 1 | 4 | 0.013 | 0.1 | 0.05 | None (,) | 204.979 |
| N_HD2249-033.1 | HD2249-033_INSERT | 978.692 | HD2248-006 | 973.6 | Rectangular | | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 449.159 |
| N_HD2249-033.2 | HD2249-033 | 982.16 | HD2249-033_INSERT | 978.692 | Rectangular | | 1 | 5 | 0.013 | 0.5 | 0.05 | 56 | 394.076 |
| N_IN1753-012.1 | IN1753-012 | 1088.32 | IN1753-009 | 1086.39 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 91.486 |
| N_IN1753-018.1 | IN1753-018 | 1088.67 | IN1753-012 | 1088.32 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 67.769 |
| N_IN1753-040.1 | IN1753-040 | 1085.56 | AE1753-001 | 1085.1 | Special | Horizontal Ellipse | 1 | 5.66 | 0.013 | 0.5 | 1 | 0 | 195 |
| N_IN2047-023.1 | IN2047-023 | 983.72 | IN2047-022 | 983.5 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 41.635 |
| N_IN2051-001.1 | IN2051-001 | 1055.46 | AS2051-005 | 1055.1 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 127.817 |
| N_IN2051-006.1 | IN2051-006 | 1053.73 | IN2051-007 | 1052.76 | Circular | | 1 | 5 | 0.013 | 0.15 | 0.25 | 0 | 157.923 |
| N_IN2051-007.1 | IN2051-007 | 1052.76 | IN2051-008 | 1052.55 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.05 | 0 | 35.334 |
| N_IN2051-008.1 | IN2051-008 | 1052.55 | SMPB_GW_BWD | 1051.35 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 60.411 |
| N_IN2051-032.1 | IN2051-032 | 1057.47 | AS2051-023 | 1057.34 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.5 | 0 | 58.313 |
| N_IN2051-033.1 | IN2051-033 | 1057.52 | IN2051-032 | 1057.47 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.05 | 0 | 11.593 |
| N_IN2051-036.1 | IN2051-036 | 1058.22 | IN2051-033 | 1057.52 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 137.539 |
| N_IN2051-037.1 | IN2051-037 | 1058.74 | IN2051-036 | 1058.22 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | 0 | 103.511 |
| N_IN2051-055.1 | IN2051-055 | 1056.79 | MI2051-054 | 1055.7 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 72.962 |
| N_IN2052-004.1 | IN2052-004 | 1063.51 | AS2052-006 | 1062.34 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 138.409 |
| N_IN2052-009.1 | IN2052-009 | 1059.5 | IN2051-037 | 1058.74 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 150.266 |
| N_IN2156-016.1 | IN2156-016 | 1050.87 | AE2156-047 | 1049.9 | Circular | | 1 | 4 | 0.013 | 0.5 | 1 | 0 | 65 |
| N_IN2158-007.1 | IN2158-007 | 1067.55 | AS2258-014 | 1066.19 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.25 | 0 | 125.699 |
| N_IN2158-009.1 | IN2158-009 | 1067.98 | IN2158-007 | 1067.55 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 98.587 |
| N_IN2158-010.1 | IN2158-010 | 1068 | IN2158-009 | 1067.98 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 9.976 |
| N_IN2158-014.1 | IN2158-014 | 1070 | IN2158-010 | 1068 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 190.386 |
| N_IN2246-002.1 | IN2246-002 | 972.96 | IN2246-003 | 972.78 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 24.317 |
| N_IN2246-003.1 | IN2246-003 | 972.78 | IN2246-004 | 972.6 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 5.215 |
| N_IN2246-004.1 | IN2246-004 | 972.6 | OSTrSouthPond | 968.083 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 365.694 |
| N_IN2247-011.1 | IN2247-011 | 967.72 | IN2247-010 | 967 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 110.634 |
| N_IN2248-003.1 | IN2248-003 | 966.6 | AS2248-004 | 966.02 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 116.053 |
| N_IN2249-003.1 | IN2249-003 | 972.7 | IN2248-001 | 968.75 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 393.03 |
| N_IN2250-039.1 | IN2250-039 | 994.26 | AS2250-019 | 991.89 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 202.631 |
| N_IN2256-071.1 | IN2256-071 | 1049.83 | Node1799 | 1049.25 | Special | Horizontal Ellipse | 1 | 4.08 | 0.013 | 0.5 | 1 | 0 | 58 |
| N_IN2257-009.1 | IN2257-009 | 1059.02 | AS2257-012 | 1057.87 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 47.923 |
| N_IN2258-023.1 | IN2258-023 | 1086.91 | AS2258-052 | 1080.75 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 125.419 |
| N_IN2258-028.1 | IN2258-028 | 1063.36 | AE2258-029 | 1061.6 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.5 | 1 | 0 | 58.006 |
| N_IN2258-049.1 | IN2258-049 | 1068.06 | AS2258-048 | 1066.28 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.25 | 0 | 280.602 |
| N_IN2351-006.1 | IN2351-006 | 1012 | AS2351-003 | 1010.53 | Special | Horizontal Ellipse | 2 | 3.5 | 0.013 | 0.25 | 0.5 | 0 | 292.038 |
| N_IN2351-014.1 | IN2351-014 | 1012.86 | IN2351-006 | 1012 | Special | Horizontal Ellipse | 2 | 3.5 | 0.013 | 0.05 | 0.25 | 0 | 172.392 |
| N_IN2357-008.1 | IN2357-008 | 1059.41 | IN2257-009 | 1059.02 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 19.102 |
| N_Junction | Node2121 | 1019 | IN2251-024 | 1018.48 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 103.86 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N_MI2051-054.1 | MI2051-054 | 1055.7 | IN2051-001 | 1055.46 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 25.584 |
| N_MI2052-021.1 | MI2052-021 | 1061.81 | AS2052-022 | 1061.52 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 30.415 |
| N_MI2256-075.1 | MI2256-075 | 1046.93 | JB2256-065 | 1044.42 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 72.167 |
| N_M-PB_GW_DEMING_WAY_SECTION | GR2145-003 | 959 | PB_OUTFALL | 952.85 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 813.581 |
| N_M-PB_GW_DEMING_WAY_SECTION_DS | PB_OUTFALL | 952.85 | PB_END | 951.74 | Natural | | 1 | 0 | 0.013 | 0.5 | 0.5 | None (,) | 192.15 |
| N_N2052-026.1 | IN2052-026 | 1059.33 | TP2052-028 | 1058.6 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 40.697 |
| N_OSL_BLRamp | OSR_BL_SERAMP_US | 999 | OSR_BL_SERAMP_DS | 997 | Special | Horizontal Ellipse | 2 | 3.16 | 0.013 | 0.5 | 0.5 | 0 | 144.304 |
| N_PVcon | Node2005 | 1062.914 | AS2156-036 | 1062.55 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 36.46 |
| N_PVcon2 | MINPT_RD_SW1 | 1060.044 | AS2156-040 | 1058.76 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 128.48 |
| N_TE2152-009.1 | TE2152-009 | 1053.666 | AS2152-010 | 1053.02 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 102.208 |
| N_TP2250-010.1 | TP2250-010 | 997.35 | IN2250-039 | 994.26 | Rectangular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 263.746 |
| N_TP2251-032.1 | TP2251-032 | 1027.8 | AS2251-007 | 1025 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 101.284 |
| ND1953-001_ND2053-001 | ND1953-001 | 1064.56 | ND2053-001 | 1063.57 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.5 | 0 | 56 |
| ND2053-001_ND2053-002 | ND2053-001 | 1063.57 | ND2053-002 | 1058.85 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 508.203 |
| ND2053-002_TP2052-028 | ND2053-002 | 1058.85 | TP2052-028 | 1058.6 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 0.05 | Square Edge with Headwall (Circ, Conc) | 89.017 |
| New_Box4 | AE2256-011 | 1054.6 | GR2256-019 | 1053.779 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.1 | 0 | 241.32 |
| NEW_PIPE_08_06_2019 | IN1647-037 | 1075.74 | NEW_SAS_08_06_19 | 1074.86 | Special | Horizontal Ellipse | 1 | 3.16 | 0.011 | 0.25 | 0.25 | None (,) | 172.285 |
| NewBox | AE2257-001 | 1055.864 | AE2257-030 | 1055.66 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 59.94 |
| NewBox2 | AE2257-030 | 1055.66 | AE2256-035 | 1055.173 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 143.17 |
| NewBox3 | AE2256-035 | 1055.03 | AE2256-010 | 1055 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | None (,) | 49.55 |
| OakbrookPr1 | AS2354-006 | 1047.12 | AS2354-012 | 1045.71 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 282 |
| OldSauk_Pr1 | AS2349-006 | 985.5 | AS2349-008 | 984.8 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.4 | 0 | 70 |
| OldSauk_Pr2 | IN2349-002 | 987.05 | AS2349-006 | 985.5 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.1 | 0 | 207 |
| OldSauk_Pr3 | IN2349-001 | 987.46 | IN2349-002 | 987.05 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 41 |
| OldSauk_Pr4 | IN2350-002 | 987.67 | IN2349-001 | 987.46 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 42 |
| OldSauk_Pr5 | IN2350-001 | 987.99 | IN2350-002 | 987.67 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 32 |
| OldSauk_Pr6 | IN2349-007 | 986 | AS2349-006 | 985.5 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 25 |
| OldSauk_Pr8 | IN2350-003 | 986.21 | IN2349-007 | 986 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 42 |
| OldSaukGWPr1 | Node1993 | 992.8 | Node1994 | 991.7 | Rectangular | | 1 | 5 | 0.013 | 0.2 | 0.5 | 30 to 75 deg Wingwall Flares (Rect, Conc) | 103 |
| OldSaukPr1 | IN1750-029 | 1078.14 | AS1750-024 | 1076.04 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 104.94 |
| OldSaukPr10 | IN1649-016 | 1101.04 | IN1749-010 | 1091.25 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 275.21 |
| OldSaukPr11 | IN1849-018 | 1070.93 | AE1849-030 | 1068 | Circular | | 1 | 5 | 0.013 | 0.5 | 1 | 0 | 585 |
| OldSaukPr12 | AS1849-047 | 1071.52 | IN1849-018 | 1070.93 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 118.01 |
| OldSaukPr13 | AS1849-048 | 1071.64 | AS1849-047 | 1071.52 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 11.82 |
| OldSaukPr14 | TP2549-008 | 992.18 | EMPB_GW_LOSR1 | 991.11 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 284 |
| OldSaukPr15 | AS1849-023 | 1072.32 | AS1849-048 | 1071.64 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 68.09 |
| OldSaukPr16 | AS1849-053 | 1072.57 | AS1849-023 | 1072.32 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 49.05 |
| OldSaukPr17 | AS2549-001 | 993.34 | TP2549-008 | 992.18 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.05 | 0 | 238 |
| OldSaukPr18 | AS2549-003 | 993.81 | AS2549-001 | 993.34 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.05 | 0 | 37 |
| OldSaukPr19 | AS2550-012 | 994.81 | AS2549-003 | 993.81 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 86 |
| OldSaukPr2 | IN1750-015 | 1080.33 | IN1750-029 | 1078.14 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 109.39 |
| OldSaukPr20 | AS2649-008 | 995.17 | AS2549-003 | 993.81 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 68 |
| OldSaukPr21 | IN2649-011 | 995.53 | AS2649-008 | 995.17 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 18 |
| OldSaukPr22 | MI2650-010 | 995.87 | IN2649-011 | 995.53 | Circular | | 1 | 3 | 0.013 | 0.15 | 0.05 | 0 | 34 |
| OldSaukPr23 | AS2650-004 | 996.24 | MI2650-010 | 995.87 | Circular | | 1 | 3 | 0.013 | 0.4 | 0.1 | 0 | 37 |
| OldSaukPr24 | IN2250-054 | 985.4 | EMPB_GW_OSR2 | 984 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.25 | 0.5 | 0 | 187 |
| OldSaukPr25 | AS2350-024 | 986.92 | IN2250-054 | 985.4 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.5 | 0.25 | 0 | 304 |
| OldSaukPr26 | AE2350-025 | 987.04 | AS2350-024 | 986.92 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 1 | 0.5 | 0 | 12 |
| OldSaukPr27 | AE2350-026 | 987.79 | AE2350-027 | 987.4 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.5 | 0.5 | None (,) | 77 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OldSaukPr28 | IN2350-007 | 986.25 | SC_Out_Pr1 | 986 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.1 | 0.5 | 0 | 50 |
| OldSaukPr29 | IN2350-004 | 986.5 | IN2350-007 | 986.25 | Special | Horizontal Ellipse | 1 | 3.16 | 0.013 | 0.5 | 0.1 | 0 | 50 |
| OldSaukPr3 | IN1750-031 | 1082.45 | IN1750-015 | 1080.33 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 106.04 |
| OldSaukPr4 | IN1750-033 | 1082.69 | IN1750-031 | 1082.45 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 11.67 |
| OldSaukPr6 | IN1750-034 | 1088.64 | IN1750-033 | 1082.69 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 297.45 |
| OldSaukPr7 | IN1750-035 | 1089.2 | IN1750-034 | 1088.64 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 27.96 |
| OldSaukPr9 | IN1749-010 | 1089.94 | IN1750-035 | 1089.2 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 48.79 |
| OSTP_Pipes | OSTP_POND_SYSTEM_J | 964.7 | OSTP_POND_SYSTEM_JCT_12 | 964.1 | Circular | | 2 | 2 | 0.011 | 0.2 | 1 | Square Edge with Headwall (Circ, Conc) | 20 |
| OSTP_POND_SYSTEM_CHANNEL_1_TO_2 | OSTP_POND_SYSTEM_J | 963.27 | OSTP_POND_SYSTEM_JCT_6 | 963.17 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 113.806 |
| OSTP_POND_SYSTEM_OUTLET | OSTP_POND_SYSTEM_JCT_1 | | PD2145-002 | | | | | | | | | | |
| OSTP_POND_SYSTEM_OUTLET2 | OSTP_POND_SYSTEM_JCT_1 | | PD2145-002 | | | | | | | | | | |
| OSTP_POND_SYSTEM_OUTLET3 | OSTP_POND_SYSTEM_JCT_1 | | PD2145-002 | | | | | | | | | | |
| OSTP_POND_SYSTEM_STAGE1 | OSTP_POND_SYSTEM_J | 963.8 | OSTP_POND_SYSTEM_JCT_8A | 963.27 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 93.2 |
| OSTP_POND_SYSTEM_STAGE2 | OSTP_POND_SYSTEM_J | 963.17 | OSTP_POND_SYSTEM_JCT_5 | 961.6 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 400.076 |
| OSTP_POND_SYSTEM_STAGE3 | OSTP_POND_SYSTEM_J | 961.4 | OSTP_POND_SYSTEM_JCT_3 | 959.6 | Natural | | 1 | 5 | 0.013 | 0 | 0 | None (,) | 33 |
| OSTP_POND_SYSTEM_STAGE4 | OSTP_POND_SYSTEM_J | 959.5 | OSTP_POND_SYSTEM_JCT_1 | 959.5 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 251.565 |
| OSTP_POND_SYSTEM_US_CHANNEL1 | OSTP_POND_SYSTEM_J | 964.42 | OSTP_POND_SYSTEM_JCT_8 | 963.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 121.3 |
| OSTP_POND_SYSTEM_US_CHANNEL2 | OSTP_POND_SYSTEM_J | 969.5 | OSTP_POND_SYSTEM_JCT_9 | 964.42 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 131.934 |
| OSTP_POND_SYSTEM_US_CHANNEL3 | AE2147-012 | 968.2 | OSTP_POND_SYSTEM_JCT_9 | 964.42 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 194.442 |
| OSTP_POND_SYSTEM_US_CHANNEL4 | OSTP_POND_SYSTEM_J | 964.1 | OSTP_POND_SYSTEM_JCT_8 | 963.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 51.323 |
| OSTP_POND_SYSTEM1_PIPE | OSTP_POND_SYSTEM1_ | 965.5 | OSTP_POND_SYSTEM1_DS | 965.07 | Special | Horizontal Ellipse | 1 | 3.75 | 0.013 | 0.2 | 1 | Groove End with Projecting (Circ, Conc) | 27 |
| OSTP_POND_SYSTEM7_PIPE | OSTP_POND_SYSTEM_J | 965 | OSTP_POND_SYSTEM_JCT_10 | 964.75 | Rectangular | | 2 | 5 | 0.013 | 0.2 | 1 | 45 deg Wingwall Flares (Rect, Conc) | 20.833 |
| OSTP_W_GW_TO_POND1_OVERFLO | OSTP_POND_SYSTEM_J | 969.9 | OSTP_POND_SYSTEM_JCT_8A | 966.21 | Trapezoidal | | 1 | 1 | 0.035 | 0 | 0 | None (,) | 84.727 |
| OSTrOut1 | OSTP_POND_SYSTEM_J | 957.8 | DemingDS1 | 957.46 | Rectangular | | 1 | 6 | 0.013 | 1 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 160 |
| OSTrOut2 | OSTP_POND_SYSTEM_J | 957.8 | GR2145-003 | 957.46 | Rectangular | | 1 | 6 | 0.013 | 1 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 160 |
| OSTrOut3 | OSTP_POND_SYSTEM_J | 957.8 | DemingDS3 | 957.46 | Rectangular | | 1 | 6 | 0.013 | 1 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 160 |
| OxwoodCrPr1 | IN2550-001 | 1005.46 | GR2550-006 | 1002 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 240 |
| PARAGON_INF_BASIN_ORI | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | |
| PARAGON_INF_BASIN_ORIFICE2 | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | |
| PARAGON_INF_BASIN_WEIR1 | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | |
| PARAGON_INF_BASIN_WEIR2 | PAR_INF_OUT | | PD1653-004 | | | | | | | | | | |
| PARAGON_WP_ORIFICE | PAR_WP_OUT | | PD1654-010 | | | | | | | | | | |
| PARAGON_WP_V_NOTCH | PAR_WP_OUT | | PD1654-010 | | | | | | | | | | |
| PD1653-004_PD1753-055 | PD1653-004 | 1094.5 | PD1753-055 | 1094.42 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 18.675 |
| PD1654-010_AS1653-005 | PD1654-010 | 1095.78 | AS1653-005 | 1095.03 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 130.097 |
| PD1753-055_AS1653-003 | PD1753-055 | 1094.42 | AS1653-003 | 1092.03 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 183.634 |
| PD2145-002_TP2145-006 | PD2145-002 | 957.8 | TP2145-006 | 957.46 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.5 | 90 deg Headwall with 45 deg Bevels (Rect, Conc) | 160 |
| PF_BH_CULVERT | PF_BH_CULV_US | 1133.33 | PF_BH_CULV_DS | 1133 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 77.048 |
| PF_E_INF_ORIFICE | PF_OUTLOT3_GRATE | | PF-OUTLOT3_SAS | | | | | | | | | | |
| PF_E_INF_WEIR | PF_OUTLOT3_GRATE | | PF-OUTLOT3_SAS | | | | | | | | | | |
| PF_PATH_CULVERT | PF_PATH_US | 1138.14 | PF_PATH_DS | 1137.82 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 35.791 |
| PF_PLAYGROUND_CULVERT | PF_PLAYGROUND_STOR | 1141.89 | PF_PLAYGROUND_OUT | 1141.16 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 46.392 |
| PF_S_INF_BASIN_ORIFICE | PF-OUTLOT4-OUT | | PF-S32 | | | | | | | | | | |
| PF_S_INF_BASIN_PIPE_IN | PF_S_WP_SAS | 1110.01 | PF_S_INF_BASIN | 1110 | Circular | | 2 | 3.5 | 0.013 | 0.5 | 0.5 | None (,) | 9.639 |
| PF_S_INF_BASIN_WEIR | PF-OUTLOT4-OUT | | PF-S32 | | | | | | | | | | |
| PF_S_WP_ORIFICE | PF_S_WP_OUT | | PF_S_WP_SAS | | | | | | | | | | |
| PF_S_WP_PIPE_OUT | PF_S_WP | 1106.01 | PF_S_WP_OUT | 1106 | Circular | | 2 | 3.5 | 0.013 | 0.5 | 0.5 | None (,) | 12.568 |
| PF_S_WP_WEIR | PF_S_WP_OUT | | PF_S_WP_SAS | | | | | | | | | | |
| PF_SE_INF_IN_PIPE | PF_SE_WP_TO_INF_GR/ | 1121 | PF_SE_INF_BASIN | 1121 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 38.116 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF_SE_WP_INF_ORIFICE | PF_SE_WP_INF_BASIN_OUTLET | | PF_SE_WP_INF_OUT_2 | | | | | | | | | | |
| PF_SE_WP_INF_OUT2 | PF_SE_INF_BASIN | 1121 | PF_SE_WP_INF_BASIN_OUTLET | 1119 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 34.313 |
| PF_SE_WP_INF_OVERFLOW | PF_SE_INF_BASIN | | PF-S36 | | | | | | | | | | |
| PF_SE_WP_INF_PIPE_OUT | PF_SE_WP_INF_OUT_2 | 1119 | PF-S36 | 1116.52 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 44.662 |
| PF_SE_WP_INF_WEIR | PF_SE_WP_INF_BASIN_OUTLET | | PF_SE_WP_INF_OUT_2 | | | | | | | | | | |
| PF_SE_WP_PIPE_OUT | PF_SE_WET_POND | 1118 | PF_SE_WP_TO_INF | 1118 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | None (,) | 49.26 |
| PF_SE_WP_TO_INF_BASIN_OVERFLOW | PF_SE_WET_POND | | PF_SE_INF_BASIN | | | | | | | | | | |
| PF_SE_WP_TO_INF_BASIN_WEIR | PF_SE_WP_TO_INF | | PF_SE_WP_TO_INF_GRATE | | | | | | | | | | |
| PF-AES36_PF-S36 | PF-AES36 | 1117.7 | PF-S36 | 1116.52 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 36.892 |
| PF-DROPOFF_OUT_PF-S42 | PF-DROPOFF | 1122.43 | PF-S42 | 1118.99 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | None (,) | 193.045 |
| PF-LOT1_PF-S2 | PF-LOT1 | 1141.3 | PF-S2 | 1140.79 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 51 |
| PF-OFFSITE_PF-S17 | POPE_FARMS_OFFSITE | 1126 | PF-S17 | 1123.73 | Natural | | 1 | 0 | 0.02 | 0 | 0 | None (,) | 188.142 |
| PF-OUTLOT2_PF-S5 | PF_OUTLOT2 | 1137.8 | PF-S5 | 1137.54 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 26 |
| PF-OUTLOT3_IN1549-020 | PF-OUTLOT3_SAS | 1108.5 | IN1549-020 | 1107.6 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 12.654 |
| PF-OUTLOT3_TO_SAS | PF_E_INF_BASIN | 1111.01 | PF_OUTLOT3_GRATE | 1111 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13.701 |
| PF-OUTLOT4_PF-S32 | PF_S_INF_BASIN | 1110.25 | PF-OUTLOT4-OUT | 1110.26 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | None (,) | 13.805 |
| PF-S10_PF-S12 | PF-S10 | 1124.07 | PF-S12 | 1123.96 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 8.681 |
| PF-S11_PF-S12 | PF-S11 | 1124.07 | PF-S12 | 1123.44 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 48.828 |
| PF-S13_PF-S15 | PF-S13 | 1117.81 | PF-S15 | 1117.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.936 |
| PF-S14_PF-S15 | PF-S14 | 1121.8 | PF-S15 | 1117.7 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 47.743 |
| PF-S17_PF-S17A | PF-S17 | 1121.5 | PF-S17A | 1121.3 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 49.51 |
| PF-S17A_TO_SE_WP | PF-S17A | 1121.3 | PF_SE_WET_POND | 1121 | Circular | | 1 | 1 | 0.013 | 0.25 | 1 | None (,) | 51.164 |
| PF-S23_PF-S27 | PF-S23 | 1113.2 | PF-S27 | 1112.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 47 |
| PF-S24_PF-S27 | PF-S24 | 1113.02 | PF-S27 | 1112.73 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.5 | None (,) | 29 |
| PF-S25_PF-S26 | PF-S25 | 1113.34 | PF-S26 | 1113.26 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 13 |
| PF-S26_PF-S21 | PF-S21 | 1113.19 | PF-S26 | 1112.16 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.5 | None (,) | 123 |
| PF-S28_PF-OUTLOT4 | PF-S28 | 1110.72 | PF_S_WP | 1110.5 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 1 | 0 | 55 |
| PF-S31_PFS28 | PF-S31 | 1112.4 | PF-S28 | 1112.22 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.25 | None (,) | 36 |
| PF-S32_PF-S30 | PF-S32 | 1108 | PF-S30 | 1106.79 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | None (,) | 28.394 |
| PF-S34_PF-S35 | PF-S34 | 1116.41 | PF-S35 | 1116.08 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 53.179 |
| PF-S35_PF-AES35 | PF-S35 | 1116.08 | PF-AES35 | 1115.9 | Circular | | 1 | 1 | 0.013 | 0.25 | 1 | None (,) | 41.588 |
| PF-S36_PF-S34 | PF-S36 | 1116.52 | PF-S34 | 1116.41 | Circular | | 1 | 1 | 0.013 | 0.25 | 0.25 | None (,) | 43.969 |
| PF-S38_PF-S18 | PF-S38 | 1115.28 | PF-S18 | 1114.86 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 45.275 |
| PF-S41_PF-S42 | PF-S41 | 1120.46 | PF-S42 | 1119.24 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.5 | None (,) | 75.488 |
| PF-S42_PF-S38 | PF-S42 | 1118.89 | PF-S38 | 1115.28 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | None (,) | 155 |
| PF-S44_PF-S8 | PF-S44 | 1126.31 | PF-S8 | 1125.55 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 153 |
| PF-S47_PF-S41 | PF-S47 | 1120.62 | PF-S41 | 1120.56 | Circular | | 1 | 1.25 | 0.013 | 0.05 | 0.25 | None (,) | 22.131 |
| PF-S48_PF-S52 | PF-S48 | 1124.9 | PF-S52 | 1123.14 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 87.884 |
| PF-S49_PF-S48 | PF-S49 | 1126.76 | PF-S48 | 1125 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | None (,) | 72.139 |
| PF-S5_PF-S7 | PF-S5 | 1137.44 | PF-S7 | 1137.13 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.5 | None (,) | 31 |
| PF-S52_PF-S47 | PF-S52 | 1123.04 | PF-S47 | 1120.97 | Circular | | 1 | 1 | 0.013 | 0.05 | 0.05 | None (,) | 83.063 |
| PF-S6_PF-S7 | PF-S6 | 1137.42 | PF-S7 | 1137.31 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | None (,) | 11.066 |
| PF-S60_DROPOFF_IN | PF-S60 | 1127.5 | PF-DROPOFF | 1127 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | None (,) | 52.083 |
| PF-SWALE1 | PF_PLAYGROUND_OUT | 1141.16 | PF_PATH_US | 1138.14 | Trapezoidal | | 1 | 4 | 0.027 | 0 | 0 | None (,) | 235.468 |
| PF-SWALE2 | PF_PATH_DS | 1137.82 | PF_SE_WET_POND | 1124 | Trapezoidal | | 1 | 4 | 0.027 | 0 | 0 | None (,) | 911.921 |
| Pipe Out | Pond A | 1074 | PV2292 | 1073.9 | Circular | | 1 | 1.5 | 0.013 | 1 | 0.5 | 0 | 17 |
| PL1547-026_AS1547-023 | PL1547-026 | 1124.41 | AS1547-023 | 1115.12 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | None (,) | 89.806 |
| PL1951-004_AS2051-063 | PL1951-004 | 1070.62 | PV294 | 1070.243 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 21.413 |
| PL1951-004_AS2051-063.1 | PV294 | 1070.243 | AS2051-063 | 1069.67 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 32.592 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PL2052-025_IN2052-024 | PL2052-025 | 1062.35 | IN2052-024 | 1062.17 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 37.001 |
| PL2052-030_IN2052-029 | PL2052-030 | 1060.47 | IN2052-029 | 1060.33 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 29.001 |
| PL2257-013_AS2257-012 | PL2257-013 | 1057.97 | AS2257-012 | 1057.87 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 15.023 |
| PlazaDrPr1 | IN2258-025 | 1069.43 | IN2258-028 | 1063.36 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 176 |
| PLEASANT_V_MINERAL_PT_GRATE | AE2056-023 | | SS2056-022 | | | | | | | | | | |
| PondA Overflow | Pond A | | PV2292 | | | | | | | | | | |
| PondBoxCulv | OSTP_POND_SYSTEM_J | 959 | OSTP_POND_SYSTEM_JCT_2 | 958.5 | Rectangular | | 3 | 6 | 0.013 | 1 | 1 | 90 deg Headwall with 45 deg Bevels (Rect, Conc) | 50 |
| Pr_BH_1 | AS1849-013 | 1068 | AS1849-013.1 | 1067.7 | Circular | | 1 | 2 | 0.013 | 1 | 0.05 | Groove End with Headwall (Circ, Conc) | 60 |
| Pr_BH3 | Node1910 | 1067.7 | AS1849-001 | 1063.42 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 214 |
| Pr_BH5 | AS1849-001 | 1063.42 | MI1848-034 | 1060.18 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 161.84 |
| Pr_BH6 | MI1848-034 | 1060.18 | AS1848-013 | 1058.85 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 66.19 |
| Pr_BH7 | AS1848-013 | 1058.85 | IN1848-019 | 1055.75 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 202.58 |
| Pr_BH8 | IN1848-019 | 1055.75 | AS1848-018 | 1055.15 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 39.83 |
| Pr_BH9 | AS1848-018 | 1055.15 | AS1948-012 | 1053.75 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 93.12 |
| Pr_Box_Out | Node1769 | 971.95 | WEXFORD_POND_OUT | 971.85 | Rectangular | | 1 | 6 | 0.013 | 1 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 60 |
| Pr24_2 | AS1849-013.1 | 1067.7 | Node1910 | 1067.67 | Circular | | 1 | 2 | 0.011 | 0.5 | 0.5 | 0 | 10 |
| PrBLBox1 | BeltineNUS1 | 967.6 | BeltlineNDS1 | 966 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 237 |
| PrBLBox2 | BeltineNUS2 | 967.6 | BeltlineNDS2 | 966 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 237 |
| PrBLBox3 | BeltlineNUS3 | 967.5 | BeltlineNDS3 | 966 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 237 |
| Proposed Bpx | AS1849-013.1 | | Node1910 | | | | | | | | | | |
| PVR1 | PV403 | 1016.5 | PV398 | 1013.25 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 206 |
| PVR11 | PV388 | 1009.35 | PV392 | 1007.85 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.5 | 0 | 200 |
| PVR12 | PV380 | 1009 | PV375 | 1005.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 223 |
| PVR13 | PV375 | 1005.75 | PV379 | 1004.96 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 125 |
| PVR14 | PV379 | 1004.96 | PV364 | 1004.46 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 103 |
| PVR16 | PV364 | 1004.46 | PV362 | 1003.72 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.05 | 0 | 262 |
| PVR17 | PV362 | 1003.72 | PV3592 | 1003.37 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 132 |
| PVR18 | PV3592 | 1003.37 | PV3594 | 1003.15 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 99 |
| PVR19 | PV3581 | 1014 | PV35812 | 1013.86 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 14 |
| PVR2 | PV398 | 1012.75 | PV3932 | 1012 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 88 |
| PVR20 | PV358 | 1023.5 | PV3581 | 1019 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.5 | 0 | 90 |
| PVR21 | PV353 | 1040 | PV358 | 1028 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | 0 | 206 |
| PVR22 | PV348 | 1049 | PV353 | 1040.5 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.05 | 0 | 205 |
| PVR23 | PV320 | 1073 | PV315 | 1071.3 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 258 |
| PVR24 | PV315 | 1071.3 | PV310 | 1069.85 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 250 |
| PVR25 | PV310 | 1069.85 | PV3091 | 1069.34 | Circular | | 1 | 2.25 | 0.013 | 0.05 | 0.05 | 0 | 155 |
| PVR26 | PV3091 | 1069.34 | PV300 | 1069.08 | Circular | | 1 | 2.27 | 0.013 | 0.05 | 0.25 | 0 | 78 |
| PVR27 | PV300 | 1069.08 | Pond G | 1069 | Circular | | 1 | 2.27 | 0.013 | 0.25 | 1 | 0 | 51 |
| PVR28 | Pond G | 1071 | Pond G Out | 1070.1 | Circular | | 1 | 2.27 | 0.013 | 1 | 0.75 | 0 | 157 |
| PVR29 | Pond G Out | 1070.1 | PV3093 | 1069.19 | Circular | | 1 | 2.27 | 0.013 | 0.75 | 0.5 | 0 | 182 |
| PVR3 | PV3932 | 1011.5 | PV392 | 1008.3 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.5 | 0 | 86 |
| PVR30 | PV2693 | 1066.11 | PV2691 | 1065.5 | Circular | | 1 | 1.25 | 0.013 | 0.5 | 0.25 | 0 | 46 |
| PVR31 | PV2691 | 1065.5 | Pond B | 1065 | Circular | | 1 | 2 | 0.013 | 0.25 | 1 | 0 | 84 |
| PVR32 | PV260 | 1065.3 | Pond B | 1065 | Circular | | 1 | 2 | 0.013 | 0.25 | 1 | 0 | 81 |
| PVR33 | Pond B | 1065 | PV2641 | 1064 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 1 | 0.5 | 0 | 207 |
| PVR34 | PV255 | 1066.75 | PV260 | 1065.3 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.245 | 0 | 209 |
| PVR35 | PV250 | 1072.25 | PV255 | 1066.75 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 220 |
| PVR36 | PV239B | 1074.75 | PV239B.1 | 1074.382 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.2 | 0.05 | Groove End with Headwall (Horiz. Ellipse, Conc) | 46.483 |
| PVR37 | PV239B.1 | 1074.382 | PV2391B | 1073 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.05 | 0.5 | Groove End with Headwall (Horiz. Ellipse, Conc) | 174.517 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PVR38 | PV239A | 1074.75 | PV2391A | 1073 | Special | Horizontal Ellipse | 1 | 5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Horiz. Ellipse, Conc) | 221 |
| PVR39 | PV228 | 1074.2 | Pond A | 1074 | Special | Horizontal Ellipse | 1 | 1.91 | 0.013 | 0.05 | 1 | 0 | 50 |
| PVR4 | PV3905 | 1029.67 | PV3903 | 1015.25 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.05 | 0 | 189 |
| PVR41 | PV218 | 1079 | PV219 | 1078 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.5 | 0 | 57 |
| PVR42 | PV211 | 1084.69 | PV218 | 1079 | Circular | | 1 | 1.5 | 0.013 | 0.5 | 0.25 | 0 | 156 |
| PVR5 | PV3903 | 1015.25 | PV390 | 1013.5 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.25 | 0 | 102 |
| PVR6 | PV390 | 1013.5 | PV391 | 1011.9 | Circular | | 1 | 1.5 | 0.013 | 0.25 | 0.05 | 0 | 78 |
| PVR7 | PV3921 | 1007.85 | PV392 | 1007.8 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 10 |
| PVR8 | PV392 | 1007.8 | PV3922 | 1007 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.5 | 0 | 32 |
| RAMP_TO_OSR_BL_SE_STORAGE | OSR_BL_SERAMP_DS | 997 | OLD_SAUK_BELTLINE_SE | 994 | Trapezoidal | | 1 | 10 | 0.035 | 0 | 0 | None (,) | 163.663 |
| RandolfDrPr2 | AS2455-004 | 1035.62 | AS2454-020 | 1033.36 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 113 |
| RandolphDrPr1 | AS2454-020 | 1033.36 | AS2454-001 | 1027.56 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 290 |
| RedSky1 | IN1547-010 | 1087.42 | IN1547-008 | 1085.22 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 146 |
| RedSkyPr2 | IN1547-008 | 1085.22 | AS1647-062 | 1084.71 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 25 |
| S_M_PB_GW_ATTIC_ANGEL_CR_SEC1 | SMPB_BW_AAC1 | 1005.27 | IN2150-019 | 1007.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 77.677 |
| S_M_PB_GW_ATTIC_ANGEL_CR_SEC2 | SMPB_BW_AAC2 | 1001.6 | SMPB_BW_AAC1 | 1005.27 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 153.85 |
| S_M_PB_GW_ATTIC_ANGEL_P_SEC | ATTIC_ANGEL_POND_O | 1016.85 | SMPB_GW_AAP | 1006.1 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 401.374 |
| S_M_PB_GW_BLACKWOLF_DR_SECTION | SMPB_GW_BWD | 1051.35 | ATTIC_ANGEL_POND_IN | 1037.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 823.569 |
| S_M_PB_GW_ELDERBERRY_RD_SECTION | HD2052-035 | 1058.27 | HD2051-014 | 1052.35 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 1328.938 |
| S_TO_N_WEXFORD_POND_PIPES | WEX_SE_POND_OUT | 972.2 | WEX_NW_POND_IN | 971.9 | Circular | | 2 | 4 | 0.013 | 1 | 1 | 0 | 90 |
| S_WEXFORD_POND_IN_WEIR | WEXFORD_POND_IN | | WEX_SE_POND_IN | | | | | | | | | | |
| SanBerm | OSTP_POND_SYSTEM_JCT_3 | | OSTP_POND_SYSTEM_JCT_2 | | | | | | | | | | |
| SandhillPr1 | S106 | 1080.63 | IN1647-041 | 1079.44 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.25 | 0 | 119 |
| SandhillPr10 | IN1647-030 | 1076.22 | AS1647-027 | 1075.72 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.6 | 0 | 49.35 |
| SandhillPr2 | IN1647-041 | 1079.44 | AS1647-040 | 1078.7 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.1 | 0 | 147.32 |
| SandhillPr3 | AS1647-040 | 1078.7 | IN1647-039 | 1078.53 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.5 | 0 | 68.12 |
| SandhillPr4 | S103 | 1082.77 | S106 | 1080.63 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.05 | 0 | 121 |
| SandhillPr5 | S104 | 1083.65 | S103 | 1082.77 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 33 |
| SandhillPr6 | S105 | 1084.67 | S104 | 1083.65 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 25 |
| SandhillPr7 | IN1647-039 | 1078.53 | IN1647-037 | 1077.45 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 53.64 |
| SandhillPr8 | IN1647-037 | 1077.45 | IN1647-034 | 1076.34 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 110.85 |
| SandhillPr9 | IN1647-034 | 1076.34 | IN1647-030 | 1076.22 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.25 | 0 | 11.55 |
| SanitaryBerm | OSTrSouthPond | | OSTP_POND_SYSTEM_JCT_1 | | | | | | | | | | |
| SAUK_CR_UPPER_IN2451-001 | SAUK_CREEK_UPPER_ST | 996.85 | IN2451-001 | 995.6 | Circular | | 1 | 1.5 | 0.013 | 0.05 | 0.05 | None (,) | 15.208 |
| SAUK_HEIGHTS_LOW_FLOW | IN1750-017A | | IN1750-017 | | | | | | | | | | |
| SAUK_HEIGHTS_V_NOTCH | IN1750-017A | | IN1750-017 | | | | | | | | | | |
| SawmillPr1 | AS2448-006 | 976.95 | AS2448-012 | 976.25 | Circular | | 2 | 3 | 0.013 | 0.25 | 0.5 | 0 | 148 |
| SawmillPr10 | AS2548-003 | 985.32 | AS2548-001 | 985.02 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.5 | 0 | 60 |
| SawmillPr2 | AS2448-007 | 977.12 | AS2448-006 | 976.95 | Circular | | 2 | 3 | 0.013 | 0.5 | 0.5 | 0 | 29 |
| SawmillPr3 | AS2448-003 | 979.87 | AS2448-007 | 977.12 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 406 |
| SawMillPr5 | AS2347-018 | 970.65 | IN2347-034 | 969.81 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 168 |
| SawMillPr6 | IN2347-017 | 970.71 | AS2347-018 | 970.65 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 11 |
| SawmillPr7 | AS2548-013 | 981.2 | AS2448-003 | 979.87 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.1 | 0.1 | 0 | 266 |
| SawmillPr8 | AS2548-009 | 982.83 | AS2548-013 | 981.2 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.05 | 0.1 | 0 | 217 |
| SawmillPr9 | AS2548-001 | 985.02 | AS2548-009 | 982.83 | Special | Horizontal Ellipse | 1 | 4.41 | 0.013 | 0.5 | 0.05 | 0 | 293 |
| SawMilPr3 | IN2347-034 | 969.81 | AS2347-011 | 969.34 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.1 | 0 | 94 |
| SC_AS2349-008 | SC_Out_Pr1 | 986 | AS2349-008 | 981.8 | Circular | | 1 | 6.5 | 0.013 | 0.5 | 0.25 | Groove End with Headwall (Circ, Conc) | 176.445 |
| SC_Dr_Pr1 | IN2451-001 | 995 | AE2451-002 | 994 | Circular | | 1 | 4 | 0.013 | 1 | 0.5 | 0 | 71 |
| SC_Dr_Pr10 | IN2353-006 | 1030.74 | AS2353-005 | 1029.34 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.25 | 0 | 70 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC_Dr_Pr11 | IN2453-004 | 1030.48 | AS2353-005 | 1029.34 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 57 |
| SC_Dr_Pr3 | AS2451-010 | 999.96 | IN2451-009 | 999.52 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 22 |
| SC_Dr_Pr4 | AS2451-004 | 1004.34 | AS2451-010 | 999.96 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.5 | 0 | 219 |
| SC_Dr_Pr5 | IN2452-009 | 1006.92 | AS2451-004 | 1004.34 | Circular | | 1 | 4 | 0.013 | 0.1 | 0.25 | 0 | 129 |
| SC_Dr_Pr6 | AS2452-008 | 1010.14 | IN2452-009 | 1006.92 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.1 | 0 | 322 |
| SC_Dr_Pr7 | AS2452-001 | 1013.24 | AS2452-008 | 1010.14 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 310 |
| SC_Dr_Pr8 | IN2352-004 | 1021.28 | AS2452-001 | 1013.24 | Circular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 402 |
| SC_Dr_Pr9 | AS2353-005 | 1028.34 | IN2352-004 | 1022.28 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 303 |
| SC_Lower_Pr1 | AE2350-034 | 988 | EMPB_GW_NTL3 | 987.56 | Circular | | 1 | 4 | 0.013 | 1 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 82 |
| SCDr_Pr2 | IN2451-009 | 999.52 | IN2451-001 | 995.42 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 205 |
| SCOut_Pr2 | EMPB_GW_NTL1 | 986 | Node2009 | 983.96 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 102 |
| SettlerRdPr1 | IN1949-003 | 1022.02 | AS1949-009 | 1021.91 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 45.59 |
| SettlerRdPr2 | IN1949-004 | 1025.32 | IN1949-003 | 1022.02 | Circular | | 1 | 3 | 0.013 | 0.1 | 0.05 | 0 | 164.79 |
| SettlerRdPr3 | AS1949-029 | 1026.29 | IN1949-004 | 1025.32 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.1 | 0 | 48.38 |
| SettlerRdPr4 | AS1949-007 | 1028.93 | AS1949-029 | 1026.29 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 131.66 |
| ShadowRidgePr5 | IN1549-026 | 1107.8 | IN1549-024 | 1107.23 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 56 |
| ShadowRiPr1 | MI1549-013 | 1105.51 | AS1549-002 | 1103.77 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 181 |
| ShadowRiPr2 | AS1549-014 | 1106.35 | MI1549-013 | 1105.51 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 42 |
| ShadowRiPr3 | IN1549-024 | 1107.23 | AS1549-014 | 1106.35 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.05 | 0 | 88 |
| ShadowRiPR4 | AE1549-012 | 1105.9 | AS1549-010 | 1105.51 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.5 | 0 | 121 |
| ShadowRiPr6 | IN1549-025 | 1107.96 | IN1549-024 | 1107.23 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 76 |
| ShadowRiPr7 | AS1549-032 | 1107.63 | IN1549-024 | 1107.23 | Circular | | 1 | 2 | 0.013 | 0.25 | 0.25 | 0 | 22 |
| SpiritStPr1 | IN1753-025 | 1087.53 | IN1753-015 | 1086.39 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 454 |
| SpiritStPr2 | IN1853-001 | 1087.94 | IN1753-025 | 1087.53 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.5 | 0 | 161 |
| SpiritStPr3 | IN1753-027 | 1088.33 | IN1853-001 | 1087.94 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.05 | 0 | 156 |
| SS2056-022_IN2056-021 | SS2056-022 | 1093 | IN2056-021 | 1092.64 | Circular | | 1 | 1 | 0.013 | 0.5 | 0.5 | 0 | 82.624 |
| StoNCulv | OSTrSouthPond | 959 | OSTP_POND_SYSTEM_JCT_1 | 958.5 | Rectangular | | 3 | 6 | 0.013 | 1 | 1 | 45 deg Wingwall Flares (Rect, Conc) | 50 |
| StonywoodPr1 | AS1753-003 | 1085.87 | IN1753-040 | 1085.56 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 58 |
| StonywoodPr2 | AS1753-004 | 1088.16 | AS1753-003 | 1085.87 | Circular | | 1 | 2.5 | 0.013 | 0.05 | 0.05 | 0 | 305 |
| StonywoodPr3 | AS1753-005 | 1090.12 | AS1753-004 | 1088.16 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 261 |
| StonywoodPr4 | IN1753-006 | 1090.45 | AS1753-005 | 1090.17 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.25 | None (,) | 56 |
| STPond48 | N_BH_P_OUTLET | 1008.92 | PVRdNew_US | 1008.62 | Circular | | 2 | 4 | 0.013 | 0.05 | 0.05 | 0 | 60 |
| SwalGWCulvPr | WMPB_GW_BHR1 | 1016.35 | AE1947-005 | 1014.81 | Rectangular | | 1 | 4 | 0.013 | 0.2 | 1 | 30 to 75 deg Wingwall Flares (Rect, Conc) | 93 |
| SwallowTPr1 | IN1849-005 | 1071.11 | AE1849-014 | 1069 | Circular | | 1 | 3 | 0.013 | 0.5 | 1 | 0 | 256 |
| SwallowWeir | Node2014 | | N_BH_P_OUTLET | | | | | | | | | | |
| SwalPr5 | IN1947-019 | 1014.38 | AE1947-020 | 1014.05 | Circular | | 1 | 5 | 0.013 | 0.5 | 1 | 0 | 65 |
| SwalPr6 | AS1947-017 | 1015.43 | IN1947-019 | 1014.38 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 209.9 |
| SwalPr9 | AS1948-017 | 1015.26 | AE1947-002 | 1013.35 | Circular | | 1 | 4 | 0.013 | 0.5 | 1 | 0 | 191 |
| SwP12in | Node2014 | 1010 | N_BH_P_OUTLET | 1009.95 | Circular | | 1 | 1 | 0.013 | 1 | 0.05 | Groove End with Headwall (Circ, Conc) | 15 |
| SwP15in | Node2014 | 1009 | N_BH_P_OUTLET | 1008.92 | Circular | | 1 | 1.25 | 0.013 | 1 | 0.05 | Groove End with Headwall (Circ, Conc) | 19 |
| SwP60Inch | PVRdNew_US | 1002.85 | PVRdNew_DS | 1002 | Circular | | 2 | 5 | 0.013 | 0.2 | 0.5 | Groove End with Headwall (Circ, Conc) | 180 |
| TarConnect | AS2256-047 | 1045.29 | JB2256-060 | 1045.26 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.25 | 0.25 | 0 | 10 |
| TargetRe1 | JB2256-061 | 1044.39 | Node2003 | 1043.136 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 0.05 | 0 | 624 |
| TargetRe2 | Node2003 | 1043.136 | Node2004 | 1041.734 | Rectangular | | 1 | 6 | 0.013 | 0.05 | 0.25 | 0 | 701.45 |
| TargetRe3 | Node2004 | 1041.734 | N_BC_TargOut | 1035.9 | Rectangular | | 1 | 6 | 0.013 | 0.25 | 0.5 | 0 | 1215 |
| TargetRe4 | JB2256-060 | 1045.26 | JB2256-061 | 1044.39 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 165.518 |
| TE2257-014_AS2257-003 | TE2257-014 | 1057.35 | AS2257-003 | 1056.47 | Circular | | 1 | 2 | 0.013 | 0.05 | 0.05 | 0 | 50.434 |
| TimberWoPr1 | IN1948-011 | 1016.48 | AS1948-004 | 1014.44 | Circular | | 1 | 3.5 | 0.013 | 0.05 | 0.25 | 0 | 101.83 |
| TimberWoPr3 | AS1949-009 | 1021.91 | IN1948-011 | 1016.48 | Circular | | 1 | 3.5 | 0.013 | 0.5 | 0.05 | 0 | 181.31 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TimberWoPr4 | IN1949-010 | 1026.59 | AS1949-009 | 1023.41 | Circular | | 1 | 2.5 | 0.013 | 0.25 | 0.05 | 0 | 106 |
| TO_AE2254-014 | AE2054-001_AE2254-01 | 1056.18 | AE2254-014 | 1049.11 | Trapezoidal | | 1 | 10 | 0.035 | 0 | 0 | None (,) | 830.893 |
| TO2255-024_TO2355-056 | JUNCTION_RIDGE_POND | 1043.5 | EMPB_GW_MPR1 | 1041.39 | Circular | | 1 | 5 | 0.013 | 0.2 | 0.5 | Square Edge with Headwall (Circ, Conc) | 396.456 |
| TP2052-028_HD2052-035 | TP2052-028 | 1058.6 | HD2052-035 | 1058.27 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.5 | 0 | 26.043 |
| TP2145-006_TP2145-007 | TP2145-006 | 959.35 | TP2145-007 | 959.25 | Rectangular | | 1 | 6 | 0.013 | 0.05 | 0.05 | None (,) | 15.163 |
| TP2145-007_GR2145-003 | TP2145-007 | 959.25 | GR2145-003 | 959 | Rectangular | | 1 | 6 | 0.013 | 0.05 | 0.5 | None (,) | 78.878 |
| TP2247-019_GR2247-018 | TP2247-019 | 965.15 | EMPB_GW_FD1 | 965.1 | Rectangular | | 2 | 4 | 0.013 | 0.05 | 0.5 | 0 | 18.646 |
| TP2347-023_GR2347-022 | TP2347-023 | 969.5 | HighPointDS3 | 968.6 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 1 | 0 | 54.89 |
| TramorePr1 | IN2347-032 | 970.9 | IN2347-017 | 970.71 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 37 |
| TramorePr2 | IN2347-020 | 971.9 | IN2347-032 | 970.9 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.5 | 0 | 200 |
| TrappersTrPr3 | IN1648-025 | 1079.2 | AS1648-008 | 1078.82 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 60 |
| TrapperTrPr1 | AS1648-009 | 1078.24 | AS1648-014 | 1078.14 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 29 |
| TrapperTrPr2 | AS1648-008 | 1078.82 | AS1648-009 | 1078.24 | Rectangular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 116 |
| TreeLanePr1 | IN2454-019 | 1025.44 | AE2454-006 | 1019.44 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 300 |
| TreeLnGWPr1 | HD2454-017 | 1029.51 | TP2454-013 | 1029.33 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.05 | 45 deg Wingwall Flares (Rect, Conc) | 35.81 |
| TreeLnGWPr2 | TP2454-013 | 1029.33 | HD2454-016 | 1029 | Rectangular | | 1 | 6 | 0.013 | 0.05 | 0.5 | 0 | 63.35 |
| TreeLnGWPr3 | Node1998 | 1029.53 | Node1999 | 1029 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 98 |
| TreeLnGWPr4 | GR2355-009 | 1040.41 | EMPB_GW_STL2 | 1039.78 | Rectangular | | 1 | 6 | 0.013 | 0.2 | 0.5 | 45 deg Wingwall Flares (Rect, Conc) | 122 |
| TreeLnPr10 | AS2454-010 | 1036.74 | TP2454-013 | 1029.33 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.5 | 0 | 494 |
| TreeLnPr11 | IN2454-009 | 1037.24 | AS2454-010 | 1036.74 | Circular | | 1 | 3 | 0.013 | 0.15 | 0.05 | 0 | 33 |
| TreeLnPr12 | IN2454-008 | 1037.69 | IN2454-009 | 1037.24 | Circular | | 1 | 3 | 0.013 | 0.15 | 0.15 | 0 | 30 |
| TreeLnPr14 | IN2454-007 | 1038.37 | IN2454-008 | 1037.69 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.15 | 0 | 45 |
| TreeLnPr16 | AS2355-064 | 1041.45 | AE2355-065 | 1040.78 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 67 |
| TreeLnPr17 | IN2355-006 | 1041.96 | AS2355-064 | 1041.45 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 51 |
| TreeLnPr18 | IN2355-052 | 1044.02 | IN2355-006 | 1041.96 | Special | Horizontal Ellipse | 1 | 6.33 | 0.013 | 0.05 | 0.05 | 0 | 206 |
| TreeLnPr19 | IN2355-051 | 1051.24 | IN2355-052 | 1044.02 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 361 |
| TreeLnPr2 | AS2454-001 | 1026.56 | IN2454-019 | 1025.44 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 56 |
| TreeLnPr20 | AS2354-012 | 1045.71 | IN2354-020 | 1045.12 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 118 |
| TreeLnPr21 | IN2354-020 | 1045.12 | AS2354-015 | 1044.43 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.05 | 0 | 138 |
| TreeLnPr22 | AS2354-015 | 1043.43 | AS2355-001 | 1042.51 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 180 |
| TreeLnPr23 | AS2355-001 | 1042.51 | AS2355-062 | 1042.04 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.4 | 0 | 93 |
| TreeLnPr25 | AS2355-062 | 1042.04 | AE2355-063 | 1041.78 | Circular | | 1 | 4 | 0.013 | 0.4 | 0.5 | 0 | 52 |
| TreeLnPr3 | IN2554-001 | 1028.2 | AS2454-001 | 1027.56 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.5 | 0 | 32 |
| TreeLnPr4 | IN2554-002 | 1028.64 | IN2554-001 | 1028.2 | Circular | | 1 | 3 | 0.013 | 0.25 | 0.25 | 0 | 22 |
| TreeLnPr5 | Node1997 | 1041.12 | IN2554-002 | 1028.64 | Circular | | 1 | 3 | 0.013 | 0.05 | 0.25 | 0 | 624 |
| TreeLnPr6 | TREE_LN | 1044.78 | Node1997 | 1042.12 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.05 | 0 | 133 |
| W_M_PB_GW_BLACKHAWK_RD_SECTION | AE1847-020 | 1059.87 | WMPB_GW_TRANSFER1 | 1055.42 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 146.146 |
| W_M_PB_GW_DEMING_WAY_SECTION1 | OSTP_POND_SYSTEM_JC | 971.5 | OSTP_POND_SYSTEM_JCT_11 | 969.9 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 221.404 |
| W_M_PB_GW_DEMING_WAY_SECTION2 | WMPB_GW_DW2 | 971.7 | WMPB_GW_DW1 | 971.3 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 45.341 |
| W_M_PB_GW_DEMING_WAY_SECTION3 | WMPB_GW_DW3 | 976.98 | WMPB_GW_DW2 | 971.7 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 475.267 |
| W_M_PB_GW_DEMING_WAY_SECTION4 | WMPB_GW_DW4 | 978.8 | WMPB_GW_DW3 | 976.98 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 211.021 |
| W_M_PB_GW_DEMING_WAY_SECTION5 | AE2047-016 | 979.6 | WMPB_GW_DW4 | 978.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 131.427 |
| W_M_PB_GW_DEMING_WAY_SECTION6 | WMPB_GW_DW5 | 986.1 | WMPB_GW_DW4 | 978.8 | Natural | | 1 | 0 | 0.013 | 0 | 0 | None (,) | 728.048 |
| W_M_PB_GW_PLEASANT_VIEW_SECTION.1 | N_PV_ROAD_DS2 | 990.72 | AE2048-001 | 986.84 | Natural | | 1 | 0 | 0.035 | 0 | 0 | None (,) | 339.585 |
| WalnutGrPr1 | WS-2 | 1001.48 | AS2550-016 | 997.5 | Circular | | 1 | 2 | 0.013 | 0.1 | 0.5 | 0 | 196 |
| WalnutGrPr2 | WS-3 | 1005.59 | WS-2 | 1001.47 | Circular | | 1 | 2 | 0.013 | 0.5 | 0.1 | 0 | 168 |
| WestfieldPr1 | AS2550-016 | 997.5 | AS2550-012 | 994.81 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 153 |
| WestfieldPr10 | IN2553-005 | 1045.14 | IN2553-006 | 1044.3 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 42 |
| WestfieldPr11 | AE2553-003 | 1045.6 | IN2553-005 | 1045.14 | Rectangular | | 1 | 4 | 0.013 | 1 | 0.05 | 45 deg Wingwall Flares (Rect, Conc) | 23 |

**Proposed Conditions Hydraulic Parameters**

| Name | Upstream Node Name | Upstream Invert Elevation (ft) | Downstream Node Name | Downstream Invert Elevation (ft) | Shape | Special Conduit Shape | Number of Barrels | Diameter (Height) (ft) | Roughness | Entrance Loss | Exit Loss | Inlet Type | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WestfieldPr2 | AS2551-010 | 1012.54 | AS2551-004 | 1008.44 | Circular | | 1 | 5 | 0.013 | 0.05 | 0.5 | 0 | 410 |
| WestfieldPr3 | AS2551-020 | 1017.84 | AS2551-010 | 1013.54 | Circular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 215 |
| WestfieldPr4 | AS2552-004 | 1024.11 | AS2551-020 | 1017.84 | Circular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 418 |
| WestfieldPr5 | AS2552-005 | 1029.64 | AS2552-004 | 1025.11 | Circular | | 1 | 3 | 0.013 | 0.5 | 0.05 | 0 | 302 |
| WestfieldPr6 | IN2552-010 | 1031.38 | AS2552-005 | 1030.14 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.25 | 0 | 62 |
| WestfieldPr7 | IN2552-007 | 1030.98 | AS2552-005 | 1030.14 | Circular | | 1 | 2.5 | 0.013 | 0.5 | 0.5 | 0 | 42 |
| WestfieldPr8 | CB2553-007 | 1044.14 | AE2553-002 | 1043.6 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.5 | 0 | 27 |
| WestfieldPr9 | IN2553-006 | 1044.3 | CB2553-007 | 1044.14 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 8 |
| WestGWDrCulvPr | WMPB_GW_DW1 | 971.3 | OSTP_POND_SYSTEM_JCT_14 | 970 | Rectangular | | 1 | 5 | 0.013 | 0.5 | 1 | Square Edge with Headwall (Circ, Conc) | 161.959 |
| Wex_In_Pr | MI2348-010 | 974.1 | AE2348-007 | 974 | Rectangular | | 1 | 6 | 0.013 | 0.25 | 1 | None (,) | 28 |
| Wex_in_Pr3 | IN2348-006 | 976.5 | AS2348-005 | 975.3 | Rectangular | | 2 | 6 | 0.013 | 0.5 | 0.05 | None (,) | 60 |
| Wex_In_Pr4 | IN2448-008 | 975.95 | MI2448-017 | 973.9 | Circular | | 4 | 3 | 0.013 | 0.5 | 0.25 | None (,) | 212 |
| Wex_In_Pr5 | MI2448-017 | 973.79 | AE2448-013 | 973.6 | Circular | | 4 | 3 | 0.013 | 0.25 | 1 | None (,) | 25 |
| Wex_In_Pr6 | AS2448-012 | 976.25 | IN2448-008 | 975.95 | Circular | | 4 | 3 | 0.013 | 0.5 | 0.1 | None (,) | 9 |
| Wex_in_Pr7 | IN2448-014 | 974.8 | AE2448-015 | 973.85 | Special | Horizontal Ellipse | 2 | 3.5 | 0.013 | 0.1 | 1 | 0 | 155 |
| Wex_In_Pr8 | IN2447-001 | 975.23 | IN2448-014 | 974.8 | Special | Horizontal Ellipse | 2 | 3.5 | 0.013 | 0.5 | 0.1 | 0 | 52 |
| Wex_Re1 | AS2348-005 | 974.51 | IN2348-003 | 972.44 | Rectangular | | 1 | 6 | 0.013 | 0.5 | 0.25 | None (,) | 414 |
| WexIn_Pr2 | MI2348-010 | 974.1 | WexInPr | 974 | Rectangular | | 1 | 6 | 0.013 | 0.25 | 1 | 0 | 28 |
| WhipWayPr1 | IN1752-010 | 1094.23 | IN1752-011 | 1092.91 | Circular | | 1 | 1.25 | 0.013 | 0.25 | 0.25 | 0 | 33 |
| WhitacrePr1 | AS2551-008 | 1005.52 | AE2551-009 | 1004.9 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 62 |
| WhitacrePr2 | AS2551-004 | 1008.44 | AS2551-008 | 1005.52 | Circular | | 1 | 5 | 0.013 | 0.5 | 0.5 | 0 | 292 |
| WindingWayPr1 | AS1647-048 | 1080.25 | WINDINGWAY_BLIND_CON | 1078.39 | Rectangular | | 1 | 4 | 0.013 | 0.5 | 0.05 | 0 | 233 |
| WindingWayPr10 | AS1748-007 | 1070.63 | AS1748-003 | 1070.23 | Rectangular | | 1 | 4 | 0.013 | 0.1 | 0.1 | 0 | 40 |
| WindingWayPr2 | WINDINGWAY_BLIND_C | 1078.39 | AS1648-014 | 1078.14 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.25 | 0 | 31 |
| WindingWayPr5 | AS1648-014 | 1078.14 | AS1648-006 | 1076.82 | Rectangular | | 1 | 4 | 0.013 | 0.25 | 0.25 | 0 | 259 |
| WindingWayPr6 | AS1648-006 | 1076.82 | AS1648-022 | 1074.51 | Rectangular | | 1 | 4 | 0.013 | 0.25 | 0.05 | 0 | 464 |
| WindingWayPr7 | AS1648-022 | 1074.51 | TP1648-049 | 1073.99 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 105 |
| WindingWayPr8 | TP1648-049 | 1073.99 | MI1748-034 | 1072.08 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.05 | 0 | 228 |
| WindingWayPr9 | MI1748-034 | 1072.08 | AS1748-007 | 1070.63 | Rectangular | | 1 | 4 | 0.013 | 0.05 | 0.2 | 0 | 145 |
| WOODSTONE_TO_AE1954-001 | FARGO_COBALT_OUT_J | 1085.36 | FARMRD_SWALE1 | 1079.66 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 1600 |
| WOODSTONE_TO_AE1954-001.1 | FARMRD_SWALE1 | 1079.66 | AE1954-001 | 1075.14 | Natural | | 1 | 0 | 0.027 | 0 | 0 | None (,) | 1134.91 |

# Appendix D. Existing Condition Flood Depths and Peak Flows

# Table D-1
## Pheasant Branch Watershed Existing Conditions Flooding Results
## Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
## City of Madison FY2020 BRIC

| | | | | 10% Chance Storm | | | | 1% Chance Storm | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point | Location Description | Location Address | Ground Elevation | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) |
| 1 | Outlet of watershed | Just downstream of Deming Way at City Boundary | 957.6 | 960.4 | 2.8 | N/A | 686.2 | 962.8 | 5.2 | N/A | 1985.8 |
| 2 | OSTr Business Park Ponds | Middle of OSTr Business Park Ponds | 963.0 | 971.3 | 8.3 | N/A | 708.7 | 973.9 | 10.9 | N/A | 1978.5 |
| 2.1 | Pheasant Branch Outlet under Deming Way | Pheasant Branch Outlet under Deming Way | 969.8 | 968.8 | None | 647.33 | 50.8 | 972.2 | 2.4 | 861.5 | 1124.9 |
| 2.2 | Outlet of Old Sauk Trail Business Park Ponds | Deming Way | 970.5 | 968.8 | None | 611.28 | 50.8 | 972.2 | 1.7 | 689.3 | 1124.9 |
| 2.3 | Just upstream of OSTr Pond Outlet | Just upstream of OSTr Pond Outlet | 959.9 | 971.9 | 12.0 | N/A | 805.6 | 974.3 | 14.4 | N/A | 1957.2 |
| 2.4 | Fourier Drive into OSTr Ponds | Fourier Drive between Deming Way and John Q Hammons Drive | 977.3 | 977.7 | 0.4 | 13.18 | N/A | 978.4 | 1.1 | 14.4 | N/A |
| 2.5 | OSTr Ponds in just north of Excelsior Drive | OSTr Ponds in just north of Excelsior Drive | 969.2 | 971.3 | 2.1 | N/A | 279.5 | 973.9 | 4.7 | N/A | 494.7 |
| 3 | Channel between OSTr Business Park Ponds and Fourier Drive | Between OSTr Business Park Ponds and Fourier Drive | 965.4 | 971.3 | 5.9 | N/A | 689.6 | 974.0 | 8.5 | N/A | 1652.8 |
| 4 | Channel between Fourier Drive and Beltline | Between Fourier Drive and Beltline | 967.0 | 973.4 | 6.3 | N/A | 696.8 | 975.1 | 8.0 | N/A | 1578.6 |
| 4.1 | Excelsior overflow mid-Excelsior | Excelsior overflow mid-Excelsior | 974.6 | N/A | N/A | N/A | 14.0 | 975.1 | 0.5 | N/A | 53.3 |
| 4.2 | Excelsior overflow west to east | Excelsior overflow west to east | 972.4 | N/A | N/A | N/A | 14.2 | 974.7 | 2.4 | N/A | 52.7 |
| 4.3 | Excelsior from South on East side of ponds | Excelsior from South on East side of ponds | 972.7 | N/A | N/A | 32.23 | 21.1 | 974.5 | 1.8 | 24.7 | 130.7 |
| 4.4 | Fourier going north from Excelsior to Channel | Fourier going north from Excelsior to Channel | 971.6 | N/A | N/A | 54 | 56.4 | 974.5 | 2.9 | 49.5 | 199.5 |
| 4.5 | Fourier Drive going South to Channel | Fourier Drive going South to Channel | 972.2 | 972.9 | 0.7 | 8.32 | 13.5 | 974.8 | 2.6 | 7.5 | 31.5 |
| 5 | Channel between OSTr Business Park Ponds and Deming Way | Betweek OSTr Business Park Ponds and Deming Way | 978.0 | 980.6 | 2.6 | N/A | 192.1 | 980.8 | 2.8 | N/A | 373.5 |
| 6 | Channel between Pleasant View Road and Deming Way | Between Deming Way and Pleasant View Road | 993.6 | 993.8 | 0.2 | N/A | 55.9 | 994.6 | 1.0 | N/A | 286.5 |
| 6.1 | Pipe between Deming Way east to Channel | Pipe between Deming Way east to Channel | 988.4 | 989.7 | 1.3 | 58.42 | 20.9 | 989.0 | 0.6 | 63.7 | 130.6 |
| 6.2 | Deming north to Channel on west side of business park | Deming north to Channel on west side of business park | 995.2 | 995.6 | 0.4 | 59.51 | 13.1 | 995.9 | 0.8 | 59.5 | 59.7 |
| 6.3 | Culvert under 8310 Excelsior Drive | Culvert under 8310 Excelsior Drive | 978.4 | N/A | N/A | 140.93 | 100.9 | 976.6 | None | 169.8 | 327.1 |
| 6.4 | Excelsior from West to East enter on west side of ponds | Excelsior from West to East enter on west side of ponds | 976.4 | 977.1 | 0.7 | 24.73 | 28.8 | 977.8 | 1.4 | 23.3 | 110.0 |
| 7 | Swallowtail Pond | Just downstream of Swallowtail Drive | 1011.5 | 1016.4 | 4.9 | 0 | 0.0 | 1017.0 | 5.5 | 0.0 | 0.0 |
| 7.2 | Boulder Creek Circle | Boulder Creek Circle | 1018.3 | 1017.7 | None | 10.79 | N/A | 1018.6 | 0.3 | 16.3 | N/A |
| 7.3 | Deer Hollow Court | Deer Hollow Court | 1017.8 | 1018.4 | 0.6 | 73.09 | N/A | 1021.2 | 3.4 | 83.8 | N/A |
| 7.4 | Swallowtail Pond Outlet | Swallowtail Pond Outlet | 1017.3 | 1016.1 | None | 60.12 | 56.2 | 1016.7 | None | 79.1 | 336.1 |
| 7.5 | Downstream Swallowtail Pond | Downstream Swallowtail Pond | 1009.5 | 1009.3 | None | N/A | 33.5 | 1013.4 | 3.9 | N/A | 278.0 |
| 8 | Swallowtail Greenway | Just upstream of Swallowtail Drive | 1020.5 | 1023.2 | 2.8 | N/A | 88.6 | 1023.5 | 3.0 | N/A | 141.5 |
| 8.1 | Aspen Grove Lane | Aspen Grove Lane between Bear Claw Way and Stagecoach Trail | 1067.5 | 1067.3 | None | 14.32 | N/A | 1068.1 | 0.6 | 17.8 | N/A |
| 8.2 | Blackhawk Road near Hawk Feather Circle | Blackhawk Road between Hawk Feather Circle and Swallowtail Drive | 1051.5 | N/A | N/A | 0 | 0.0 | N/A | N/A | 0.0 | 0.0 |
| 9 | Swallowtail Drive | Swallowtail Drive between Aspen Grove Drive and Greenway | 1021.4 | 1021.5 | 0.1 | 50.4 | 10.6 | 1022.2 | 0.8 | 65.3 | 84.8 |

# Table D-1
## Pheasant Branch Watershed Existing Conditions Flooding Results
## Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
## City of Madison FY2020 BRIC

| Point | Location Description | Location Address | Ground Elevation | 10% Chance Storm | | | | 1% Chance Storm | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) |
| 10 | Swallowtail Drive | Swallowtail Drive between Hidden Cave Road and Settlers Road | 1068.1 | 1069.1 | 1.0 | 6.82 | N/A | 1074.2 | 6.1 | 29.0 | 1.7 |
| 11 | SW Blackhawk Pond | SW Blackhawk Pond | 1070.8 | 1076.4 | 5.7 | 0 | 0.0 | 1078.1 | 7.4 | 0.0 | 0.0 |
| 11.1 | SW Blackhawk Pond In from Northeast | SW Blackhawk Pond In from Northeast | 1074.3 | 1076.4 | 2.2 | 25.33 | N/A | 1078.1 | 3.8 | 27.5 | N/A |
| 11.2 | SW Blackhawk Pond in from North | SW Blackhawk Pond in from North | 1078.4 | 1076.4 | None | 24.89 | N/A | 1078.1 | None | 35.2 | N/A |
| 11.3 | SW Blackhawk Pond in from West | SW Blackhawk Pond in from West | 1078.8 | 1076.4 | None | 231.29 | 26.7 | 1078.1 | None | 278.8 | 211.2 |
| 11.4 | SW Blackhawk Pond in from South | SW Blackhawk Pond in from South | 1081.7 | 1076.4 | None | 60.24 | N/A | 1078.1 | None | 59.9 | N/A |
| 12 | Bear Claw Way from North | Bear Claw Way between Blue Heron Drive and Winding Way | 1078.3 | 1079.5 | 1.2 | 44.16 | 5.2 | 1080.1 | 1.8 | 47.1 | 8.4 |
| 13 | Winding Way from West | Winding Way between Coneflower Street and Bear Claw Way | 1078.2 | 1079.6 | 1.4 | 118.61 | 86.0 | 1080.4 | 2.2 | 122.8 | 268.9 |
| 13.1 | Red Sky Drive | Red Sky Drive | 1093.1 | 1092.8 | None | 6.22 | 3.4 | 1093.5 | 0.3 | 6.7 | 12.8 |
| 13.2 | Fallen Leaf Drive | Fallen Leaf Drive between Meadow Mist Road and Winding Way | 1091.7 | 1092.0 | 0.3 | 5.54 | N/A | 1092.8 | 1.1 | 6.1 | 2.4 |
| 13.3 | Shadow Ridge Trail | Shadow Ridge Trail between Silver Sage Trail and Big Stone Trail | 1110.3 | 1110.5 | 0.2 | 13.711 | 8.8 | 1110.7 | 0.4 | 13.7 | 31.3 |
| 13.4 | Behind homes on Shadow Ridge Trail - east | Behind homes on Shadow Ridge Trail - east | 1109.4 | 1111.9 | 2.4 | 3.56 | Backflow | 1112.1 | 2.7 | 4.5 | Backflow |
| 13.5 | Behind homes on Shadow Ridge Trail - west | Behind homes on Shadow Ridge Trail - west | 1107.7 | 1109.4 | 1.8 | 5.92 | Backflow | 1109.9 | 2.2 | 6.1 | Backflow |
| 14 | Cricket Lane | Cricket Land downstream of Greystone Pond | 1079.9 | 1079.9 | None | 7.19 | 7.8 | 1080.4 | 0.4 | 7.0 | 30.7 |
| 15 | Bear Claw Way from South | Bear Claw Way between apartments and Cricket Lane | 1080.1 | 1080.6 | 0.5 | 14.09 | 15.0 | 1080.9 | 0.7 | 13.2 | 43.3 |
| 16 | Along Beltline from South to Fourier Drive Greenway | Beltline Ditch near Fourier Drive | 975.1 | 975.9 | 0.8 | N/A | 329.6 | 976.1 | 1.0 | N/A | 471.6 |
| 17 | Greenway between High Point Road and Beltline | Greenway between High Point Road and Beltline | 968.1 | 976.0 | 7.9 | N/A | 594.9 | 977.6 | 9.5 | N/A | 1315.2 |
| 18 | Wexford Pond Greenway downstream of Wexford Pond | Wexford Pond Greenway Downstream | 970.8 | 977.5 | 6.6 | N/A | 594.5 | 978.7 | 7.8 | N/A | 775.6 |
| 19 | Wexford Pond | Wexford Pond | 971.7 | 977.6 | 5.9 | 0 | 0.0 | 978.8 | 7.1 | 0.0 | 0.0 |
| 19.1 | Wexford Pond Outlet | Wexford Pond Outlet | 974.8 | 977.5 | 2.7 | 39.812 | 421.9 | 978.8 | 3.9 | 39.8 | 657.9 |
| 19.2 | Wexford Pond Inlet Overflow NW 1 | Wexford Pond Inlet Overflow NW 1 | 978.6 | N/A | N/A | N/A | N/A | 981.6 | 3.0 | N/A | 17.8 |
| 19.3 | Wexford Pond Inlet SW | Wexford Pond Inlet SW | 982.8 | 981.6 | None | 366.55 | N/A | 982.1 | None | 391.5 | 19.5 |
| 19.4 | Wexford Pond Greenway In | Wexford Pond Greenway In | 980.9 | 983.2 | 2.3 | N/A | 280.6 | 983.7 | 2.7 | N/A | 410.8 |
| 19.5 | Wexford Pond Inlet NE | Wexford Pond Inlet NE | 983.0 | 978.4 | None | 46.36 | N/A | 979.8 | None | 45.7 | N/A |
| 19.6 | Wexford Pond Inlet N | Wexford Pond Inlet N | 982.1 | 977.6 | None | 11.73 | N/A | 978.8 | None | 11.6 | N/A |
| 19.7 | Wexford Pond Inlet Overflow NW 2 | Wexford Pond Inlet Overflow NW 2 | 979.2 | N/A | N/A | N/A | N/A | 980.0 | 0.8 | N/A | 1.1 |
| 20 | Wexford Pond Greenway In Upstream | Wexford Pond Greenway In Upstream | 984.1 | 985.9 | 1.8 | N/A | 222.7 | 986.2 | 2.1 | N/A | 313.9 |
| 21 | High Point Road flowing North Overflow from Pipe to Wexford | High Point Road flowing North 1 | 985.9 | 979.4 | None | 20.05 | 172.2 | 980.4 | None | 18.7 | 633.6 |
| 22 | High Point Road flowing North Overflow from Pipe to Wexford 2 | High Point Road flowing North 2 | 983.7 | 984.4 | 0.8 | N/A | 189.6 | 985.5 | 1.8 | N/A | 671.8 |
| 23 | High Point Road flowing North Overflow from Pipe | High Point Road flowing North 3 | 978.3 | 986.3 | 8.0 | 355.03 | 195.8 | 987.4 | 9.1 | 382.1 | 691.1 |

# Table D-1
## Pheasant Branch Watershed Existing Conditions Flooding Results
## Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
## City of Madison FY2020 BRIC

| | | | | 10% Chance Storm | | | | 1% Chance Storm | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point | Location Description | Location Address | Ground Elevation | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) |
| 24 | High Point Road flowing South Overflow from Pipe 1 | High Point Road flowing South 1 | 975.7 | 976.5 | 0.8 | 8.57 | 13.3 | 977.8 | 2.1 | 7.8 | 36.7 |
| 25 | High Point Road flowing South Overflow from Pipe 1 | High Point Road flowing South 2 | 974.0 | 976.5 | 2.4 | 8.44 | 28.3 | 977.8 | 3.8 | 7.5 | 110.3 |
| 26 | Tramore Trail | Tramore Trail between Sawmill Road and Bishops Hill Circle | 975.7 | 976.5 | 0.8 | NA | N/A | 977.8 | 2.1 | N/A | -11.2 |
| 27 | Sawmill Road flowing West 1 | Sawmill Road between Darien Drive and N Woodmont Circle 1 | 981.1 | 981.6 | 0.4 | 27.52 | 10.0 | 982.1 | 0.9 | 26.7 | 67.1 |
| 28 | Sawmill Road flowing West 2 | Sawmill Road between Darien Drive and N Woodmont Circle 2 | 979.4 | 979.5 | 0.1 | N/A | 15.6 | 980.0 | 0.7 | N/A | 89.0 |
| 29 | Sawmill Road flowing West 3 | Sawmill Road between Redmound Circle and Darien Drive | 976.2 | 976.5 | 0.2 | N/A | 6.7 | 977.8 | 1.6 | N/A | 89.8 |
| 30 | Old Sauk Road to Wexford Pond Greenway | Old Sauk Road to Wexford Pond Greenway Old Sauk Road to Wexford Pond Greenway | 994.6 | 992.0 | None | 30.07 | N/A | 995.8 | 1.2 | 41.5 | 1.4 |
| 31 | Overflow from condos to Wexford Greenway | Overflow from condos to Wexford Greenway | 994.8 | N/A | N/A | N/A | N/A | 994.7 | None | N/A | 4.3 |
| 32 | Wexford Pond Greenway just downstream Old Sauk Road | Wexford Pond Greenway just downstream Old Sauk Road | 990.5 | 992.5 | 2.0 | N/A | 205.5 | 992.8 | 2.3 | N/A | 293.7 |
| 33 | Wexford Pond Greenway just upstream of Old Sauk Road | Wexford Pond Greenway just upstream of Old Sauk Road | 997.1 | 999.1 | 2.0 | N/A | 81.9 | 1001.1 | 4.0 | N/A | 108.7 |
| 34 | Westfield flowing south to Old Sauk Road | Westfield flowing south to Old Sauk Road | 1001.4 | N/A | N/A | N/A | N/A | 1002.4 | 1.0 | N/A | -9.2 |
| 35 | Westfield flowing north to Old Sauk Road 1 | Westfield flowing north to Old Sauk Road 1 | 1000.7 | 1001.3 | 0.6 | 27.69 | 99.4 | 1002.4 | 1.7 | 27.6 | 275.2 |
| 36 | Westfield flowing north to Old Sauk Road 2 | Westfield flowing north to Old Sauk Road 2 | 1006.5 | 1006.5 | 0.0 | N/A | 92.9 | 1006.9 | 0.4 | N/A | 238.8 |
| 37 | Old Sauk Road flowing west to Westfield | Old Sauk Road flowing west to Westfield | 1002.5 | N/A | N/A | N/A | N/A | 1002.7 | 0.2 | N/A | 14.4 |
| 38 | Old Sauk Road flowing west to Greenway 1 | Old Sauk Road flowing west to Greenway 1 | 1000.5 | 1001.1 | 0.6 | 100.3 | 6.0 | 1002.3 | 1.8 | 117.4 | 160.2 |
| 39 | Old Sauk Road flowing west to Greenway 2 | Old Sauk Road flowing west to Greenway 2 | 1001.3 | N/A | N/A | 112.55 | N/A | 1001.6 | 0.3 | 146.8 | 76.4 |
| 40 | Wexford Greenway Upstream End | Just downstream of Whitacre Road | 1003.5 | 1004.3 | 0.7 | N/A | 68.0 | 1004.4 | 0.8 | N/A | 87.9 |
| 41 | Whitacre Road flowing east to Greenway | Whitacre Road flowing east to Greenway | 1012.0 | 1012.5 | 0.4 | N/A | 26.7 | 1012.7 | 0.6 | N/A | 62.5 |
| 42 | Whitacre Road flowing west to Greenway | Whitacre Road flowing west to Greenway | 1014.4 | 1014.7 | 0.3 | 46.48 | 28.2 | 1015.1 | 0.7 | 46.4 | 83.6 |
| 43 | Westfield Road Overflow north of Whitacre | Westfield Road Overflow north of Whitacre | 1014.0 | 1014.4 | 0.4 | N/A | 76.9 | 1014.9 | 0.9 | N/A | 217.2 |
| 44 | Westfield Road Overflow south of Whitacre | Westfield Road Overflow south of Whitacre | 1016.9 | 1017.4 | 0.5 | 50.58 | 111.9 | 1017.8 | 0.9 | 51.1 | 283.8 |
| 45 | Westifled Road Overflow South of Farmington Way | Westifled Road Overflow South of Farmington Way | 1024.1 | 1024.7 | 0.6 | 33.34 | 66.5 | 1025.0 | 0.9 | 31.2 | 171.9 |
| 46 | Farmington way Overflow east of Westfield Road | Farmington way Overflow east of Westfield Road | 1025.5 | 1025.3 | None | 35.48 | 28.9 | 1025.6 | 0.1 | 35.6 | 95.7 |
| 47 | Whitacre Road overflow north of Farmington Way | Whitacre Road overflow north of Farmington Way | 1001.8 | 1001.9 | 0.1 | N/A | 23.5 | 1002.1 | 0.3 | N/A | 61.3 |
| 48 | Farmington Way overflow near Canvas Back Circle | Farmington Way overflow near Canvas Back Circle | 998.3 | N/A | N/A | 22.29 | N/A | 998.9 | 0.6 | 27.9 | 37.0 |
| 49 | SC Greenway just downstream of Old Sauk Road | SC Greenway just downstream of Old Sauk Road | 987.3 | 992.7 | 5.5 | N/A | 546.0 | 993.6 | 6.4 | N/A | 1068.2 |
| 50 | High Point Road into Lower Pond | High Point Road into Lower Pond | 998.4 | N/A | N/A | 17.32 | N/A | N/A | N/A | 17.6 | N/A |

**Table D-1**
**Pheasant Branch Watershed Existing Conditions Flooding Results**
**Old Sauk Trails Business Park Pond and Greenway Flood Mitigation**
**City of Madison FY2020 BRIC**

| | | | | 10% Chance Storm | | | | 1% Chance Storm | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point | Location Description | Location Address | Ground Elevation | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) |
| 51 | High Point Road south of Sauk Creek Drive | High Point Road south of Sauk Creek Drive | 1003.8 | 1004.4 | 0.5 | 17.55 | 65.0 | 1004.8 | 1.0 | 18.0 | 170.3 |
| 52 | SC Greenway by Whitacre Road | SC Greenway by Whitacre Road | 995.6 | 997.1 | 1.5 | N/A | 478.9 | 997.7 | 2.1 | N/A | 840.7 |
| 53 | Sauk Creek Drive into SC Greenway near Plover Circle | Sauk Creek Drive into SC Greenway near Plover Circle | 1005.0 | N/A | N/A | 77.71 | N/A | N/A | N/A | 109.9 | N/A |
| 54 | High Point Road north of Brule Street | High Point Road north of Brule Street | 1026.8 | 1027.1 | 0.3 | N/A | 48.9 | 1027.1 | 0.3 | N/A | 115.4 |
| 55 | SC Greenway between Red and Grey Fox Trail | SC Greenway between Red and Grey Fox Trail | 1016.0 | 1016.9 | 0.9 | N/A | 389.5 | 1017.6 | 1.6 | N/A | 651.0 |
| 56 | SC Greenway south of Red Fox Trail | SC Greenway south of Red Fox Trail | 1019.6 | 1020.6 | 1.0 | N/A | 343.2 | 1020.8 | 1.3 | N/A | 550.3 |
| 57 | Tamarack Trails | Tamarack Trails | 1038.7 | 1039.2 | 0.5 | N/A | 23.7 | 1040.0 | 1.2 | N/A | 55.3 |
| 58 | Westfield Overflow into Tamarack Trails | Westfield Overflow into Tamarack Trails | 1049.6 | 1051.1 | 1.5 | 15.79 | 28.4 | 1050.5 | 0.9 | 15.8 | 62.2 |
| 59 | Randolf and Tree Lane into Greenway | Randolf and Tree Lane into Greenway | 1035.0 | 1031.3 | None | 46.54 | 22.4 | 1032.2 | None | 47.8 | 81.0 |
| 60 | Tree Lane overflow through condos | Tree Lane overflow through condos | 1037.8 | 1036.7 | None | N/A | 2.0 | 1036.8 | None | N/A | 7.3 |
| 61 | Randolf south of Tree Lane | Randolf south of Tree Lane | 1042.1 | 1041.3 | None | 15.93 | 23.4 | 1041.4 | None | 15.9 | 64.1 |
| 62 | Tree Lane east of Randolph | Tree Lane east of Randolph | 1044.8 | 1045.0 | 0.2 | N/A | 20.0 | 1045.2 | 0.4 | N/A | 46.8 |
| 63 | SC greenway downstream of Tree Lane | SC greenway downstream of Tree Lane | 1027.6 | 1029.7 | 2.1 | N/A | 316.1 | 1030.1 | 2.5 | N/A | 470.1 |
| 64 | Tree Lane at Randolph | Tree Lane at Randolph | 1038.8 | 1039.1 | 0.3 | 315.56 | 1.4 | 1039.4 | 0.6 | 470.2 | 13.4 |
| 65 | Tree Lane east of High Point | Tree Lane east of High Point | 1043.9 | 1044.2 | 0.2 | 14.57 | 7.3 | 1044.3 | 0.4 | 14.3 | 22.8 |
| 66 | High Point north of Tree Lane | High Point north of Tree Lane | 1044.0 | 1043.4 | None | N/A | 0.6 | 1043.8 | None | N/A | 23.7 |
| 67 | Tree Lane west of High Point | Tree Lane west of High Point | 1045.4 | N/A | N/A | N/A | N/A | 1046.2 | 0.8 | N/A | 29.4 |
| 68 | High Point south of Gray Fox Trail | High Point south of Gray Fox Trail | 1037.9 | N/A | N/A | N/A | N/A | 1037.6 | None | N/A | 21.6 |
| 69 | SC greenway upstream of Tree Lane | SC greenway upstream of Tree Lane | 1034.0 | 1036.9 | 2.8 | N/A | 304.2 | 1038.5 | 4.4 | N/A | 461.2 |
| 70 | SC greenway downstream of High Point | SC greenway downstream of High Point | 1034.4 | 1038.0 | 3.6 | N/A | 305.5 | 1039.1 | 4.7 | N/A | 462.5 |
| 71 | SC greenway upstream of High Point | SC greenway upstream of High Point | 1037.4 | 1043.1 | 5.7 | N/A | 264.0 | 1045.1 | 7.7 | N/A | 457.2 |
| 72 | High Point south of SC Greenway | High Point south of SC Greenway | 1051.1 | 1046.5 | None | N/A | 0.0 | 1046.6 | None | N/A | 21.6 |
| 73 | SC greenway downstream of Tree Lane south | SC greenway downstream of Tree Lane south | 1040.8 | 1043.1 | 2.3 | N/A | 310.9 | 1045.1 | 4.3 | N/A | 460.3 |
| 74 | SC greenway upstream of Tree Lane south | SC greenway upstream of Tree Lane south | 1040.6 | 1048.3 | 7.7 | N/A | 264.0 | 1050.8 | 10.2 | N/A | 429.2 |
| 75 | SC greenway downstream of beltline | SC greenway downstream of beltline | 1042.6 | 1048.3 | 5.6 | N/A | 305.0 | 1050.8 | 8.2 | N/A | 479.8 |
| 76 | Tree Lane east of Oakbrook Circle | Tree Lane east of Oakbrook Circle | 1050.5 | 1049.9 | None | N/A | 0.0 | 1050.4 | None | N/A | 29.6 |
| 77 | Tree Lane north of SC Greenway | Tree Lane north of SC Greenway | 1050.2 | 1049.7 | None | 23.96 | 0.0 | 1050.0 | None | 23.9 | 6.4 |
| 78 | Tree Lane south of SC Greenway | Tree Lane south of SC Greenway | 1049.8 | 1049.7 | None | 57.59 | 3.6 | 1050.3 | 0.5 | 55.7 | 19.5 |
| 79 | High Point north of Mineral Point Road | High Point north of Mineral Point Road | 1063.7 | 1061.4 | None | N/A | 14.7 | 1061.4 | None | N/A | 38.6 |
| 80 | High Point south of Mineral Point Road | High Point south of Mineral Point Road | 1067.4 | 1067.2 | None | N/A | 3.3 | 1067.4 | None | N/A | 25.5 |
| 81 | Mineral Point Rd east of Tree Lane | Mineral Point Rd east of Tree Lane | 1062.3 | 1062.4 | 0.1 | 28.25 | 15.7 | 1067.4 | 5.1 | 28.1 | 35.9 |
| 82 | Mineral Point Road east of the Beltline | Mineral Point Road east of the Beltline | 1057.5 | 1056.5 | None | N/A | 15.0 | 1056.7 | None | N/A | 59.5 |

**Table D-1**
**Pheasant Branch Watershed Existing Conditions Flooding Results**
**Old Sauk Trails Business Park Pond and Greenway Flood Mitigation**
**City of Madison FY2020 BRIC**

| | | | | 10% Chance Storm | | | | 1% Chance Storm | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point | Location Description | Location Address | Ground Elevation | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) |
| 83 | Mineral Point Rd to SC Greenway | Mineral Point Rd to SC Greenway | 1046.4 | 1048.5 | 2.0 | 56.98 | 30.1 | 1050.8 | 4.4 | 55.3 | 109.6 |
| 84 | High Point North of Wolf St | High Point North of Wolf St | 1015.3 | 1015.7 | 0.4 | N/A | 64.6 | 1016.2 | 0.8 | N/A | 1085.6 |
| 85 | Pipe under beltline north of Mineral Point Road | Pipe under beltline north of Mineral Point Road | 1061.2 | N/A | N/A | 252.84 | N/A | N/A | N/A | 409.2 | N/A |
| 86 | Target Pond | Target Pond | 1044.3 | 1049.6 | 5.3 | N/A | N/A | 1053.2 | 8.9 | N/A | N/A |
| 87 | Target Pond Outfall | Target Pond Outfall | 1043.8 | 1049.5 | 5.7 | 8.096 | 250.7 | 1053.1 | 9.4 | 8.0 | 411.2 |
| 88 | Pipe thru Target Parking Lot | Pipe thru Target Parking Lot | 1051.5 | N/A | N/A | 93.87 | N/A | 1053.2 | 1.6 | 140.5 | 12.4 |
| 89 | Pipe just south of Target Parking Lot | Pipe just south of Target Parking Lot | 1053.7 | N/A | N/A | 83.23 | N/A | N/A | N/A | 119.0 | N/A |
| 90 | Pipe to Target Pond from Southwest | Pipe to Target Pond from Southwest | 1051.2 | N/A | N/A | 21.207 | N/A | 1053.2 | 2.0 | 115.2 | 74.1 |
| 91 | Pipe to Target Pond from South | Pipe to Target Pond from South | 1049.3 | N/A | N/A | 187.97 | N/A | N/A | N/A | 267.0 | N/A |
| 92 | Commerce Drive just north of Plaza Drive | Commerce Drive just north of Plaza Drive | 1062.7 | 1062.8 | 0.1 | 109.92 | 20.3 | 1063.8 | 1.1 | 124.7 | 204.1 |
| 93 | Plaza Drive between Commerce and Watts | Plaza Drive between Commerce and Watts | 1065.2 | 1065.4 | 0.2 | 52.05 | 16.0 | 1065.7 | 0.5 | 126.9 | 107.3 |
| 94 | Watts Road between Plaza Drive and Commerce Drive | Watts Road between Plaza Drive and Commerce Drive | 1071.8 | 1072.4 | 0.6 | 25.04 | 40.0 | 1072.7 | 0.9 | 25.1 | 99.7 |
| 95 | Plaza Drive south of Watts Road | Plaza Drive south of Watts Road | 1076.4 | 1076.6 | 0.3 | 52.01 | 0.4 | 1076.8 | 0.5 | 63.4 | 14.9 |
| 96 | Pleasant View south of Mineral Point Road | Pleasant View south of Mineral Point Road | 1075.6 | 1075.5 | None | 30.49 | 10.0 | 1075.8 | 0.3 | 30.6 | 58.5 |
| 97 | Old Sauk Road between Junction Road and Beltline | Old Sauk Road between Junction Road and Beltline | 1001.8 | 1002.5 | 0.7 | 216.85 | 21.7 | 1002.8 | 1.0 | 264.3 | 202.6 |
| 98 | Pipe into Attic Angels Pond from East | Pipe into Attic Angels Pond from East | 1029.5 | N/A | N/A | 49.97 | N/A | N/A | N/A | 46.0 | N/A |
| 99 | Overflow down Junction Rd | Overflow down Junction Rd | 1024.8 | 1025.6 | 0.8 | N/A | 73.9 | 1025.8 | 1.0 | N/A | 176.8 |
| 100 | Flow northwest down Junction Road | Flow northwest down Junction Road | 1020.5 | 1021.2 | 0.7 | 10.17 | 50.6 | 1021.4 | 0.9 | 12.1 | 148.0 |
| 101 | Bay Hill to Blackwolf Dr to Junction Rd | Bay Hill to Blackwolf Dr to Junction Rd | 1035.8 | 1036.3 | 0.5 | 23.07 | 16.9 | 1036.4 | 0.6 | 24.6 | 53.5 |
| 102 | Channel downstream of Attic Angel Pond | Channel downstream of Attic Angel Pond | 1011.7 | 1010.7 | None | N/A | 83.6 | 1011.8 | 0.1 | N/A | 217.9 |
| 103 | Blackwolf Dr between Shawn Trail and Samuel Dr | Blackwolf Dr between Shawn Trail and Samuel Dr | 1060.7 | 1061.1 | 0.4 | 28.77 | 2.7 | 1062.1 | 1.4 | 32.8 | 28.3 |
| 104 | Wild Indigo Lane between Samuel Drive | Wild Indigo Lane between Samuel Drive | 1064.9 | 1064.9 | None | N/A | N/A | 1065.0 | 0.1 | N/A | 8.0 |
| 105 | Wild Indigo Lane between Samuel Drive north | Wild Indigo Lane between Samuel Drive north | 1062.2 | 1062.1 | None | 12.55 | 8.5 | 1062.5 | 0.3 | 10.8 | 33.4 |
| 106 | Samuel Drive just south of Wild Indigo Lane | Samuel Drive just south of Wild Indigo Lane | 1066.4 | 1066.7 | 0.3 | 8.89 | N/A | 1066.8 | 0.4 | 8.8 | 0.9 |
| 107 | Greenway Crossing under Elderberry | Greenway Crossing under Elderberry | 1064.8 | 1064.6 | None | 40.84 | 0.2 | 1064.8 | None | 58.0 | 4.7 |
| 108 | Farm runoff Elderberry to Augusta | Farm runoff Elderberry to Augusta | 1061.2 | N/A | N/A | 2.66 | N/A | N/A | N/A | 2.4 | N/A |
| 109 | Old Sauk Road between Cricket Ln and Bear Claw Way | Old Sauk Road between Cricket Ln and Bear Claw Way | 1092.7 | 1092.6 | None | 13.62 | 6.4 | 1092.7 | 0.0 | 13.6 | 19.9 |
| 110 | Whippoorwill Way east of Fargo Trail | Whippoorwill Way east of Fargo Trail | 1096.6 | N/A | N/A | N/A | N/A | 1096.9 | 0.4 | N/A | 20.2 |
| 111 | Elderberry Road east of Fargo Trail flowing west | Elderberry Road east of Fargo Trail flowing west | 1096.3 | 1096.2 | None | N/A | 20.5 | 1096.3 | 0.0 | N/A | 38.8 |
| 112 | Elderberry Road west of Fargo Trail | Elderberry Road west of Fargo Trail | 1098.4 | 1098.2 | None | 14.52 | 11.8 | 1098.8 | 0.5 | 15.0 | 34.0 |
| 113 | Fargo Trail between Elderberry and Spirit St | Fargo Trail between Elderberry and Spirit St | 1094.7 | 1095.2 | 0.4 | 4.26 | 0.5 | 1095.3 | 0.6 | 4.2 | 34.8 |

**Table D-1**
**Pheasant Branch Watershed Existing Conditions Flooding Results**
**Old Sauk Trails Business Park Pond and Greenway Flood Mitigation**
**City of Madison FY2020 BRIC**

| | | | | 10% Chance Storm | | | | 1% Chance Storm | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point | Location Description | Location Address | Ground Elevation | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) | Peak WSE | Water Depth (feet) | Peak Pipe Flow (cfs) | Peak Overland Flow (cfs) |
| 114 | Fargo Trail between Spirit St and Stoneywood Blvd | Fargo Trail between Spirit St and Stoneywood Blvd | 1091.8 | 1092.4 | 0.6 | 16.88 | 10.8 | 1093.3 | 1.5 | 16.1 | 58.7 |
| 115 | Stoneywood Blvd between Little Bear Dr and Fargo Trail | Stoneywood Blvd between Little Bear Dr and Fargo Trail | 1093.0 | 1093.0 | None | 13.64 | 11.9 | 1093.4 | 0.4 | 13.6 | 45.6 |
| 116 | Fargo Trail between Stoneywood and Cobalt St | Fargo Trail between Stoneywood and Cobalt St | 1092.9 | N/A | N/A | 11.64 | N/A | 1093.7 | 0.8 | 17.1 | 3.1 |
| 117 | Little Bear Drive between Stoneywood and Cobalt | Little Bear Drive between Stoneywood and Cobalt | 1104.5 | 1096.0 | None | 1.4 | 1.1 | 1096.1 | None | 7.5 | 10.0 |
| 118 | Bear Clay Way between Cobalt St and Wilrich St | Bear Clay Way between Cobalt St and Wilrich St | 1100.8 | 1100.6 | None | 25.98 | 1.6 | 1100.8 | None | 48.5 | 16.1 |
| 119 | Wilrich St just west of Bear Claw Way | Wilrich St just west of Bear Claw Way | 1110.8 | N/A | N/A | 8.78 | N/A | 1110.2 | None | 12.4 | 3.0 |
| 120 | Wilrich St overflow east of Bear Claw Way | Wilrich St overflow east of Bear Claw Way | 1112.4 | 1113.7 | 1.3 | N/A | 8.4 | 1113.8 | 1.4 | N/A | 24.5 |

# Appendix E. Focus Group Summaries

Pheasant Branch Focus Group Summaries

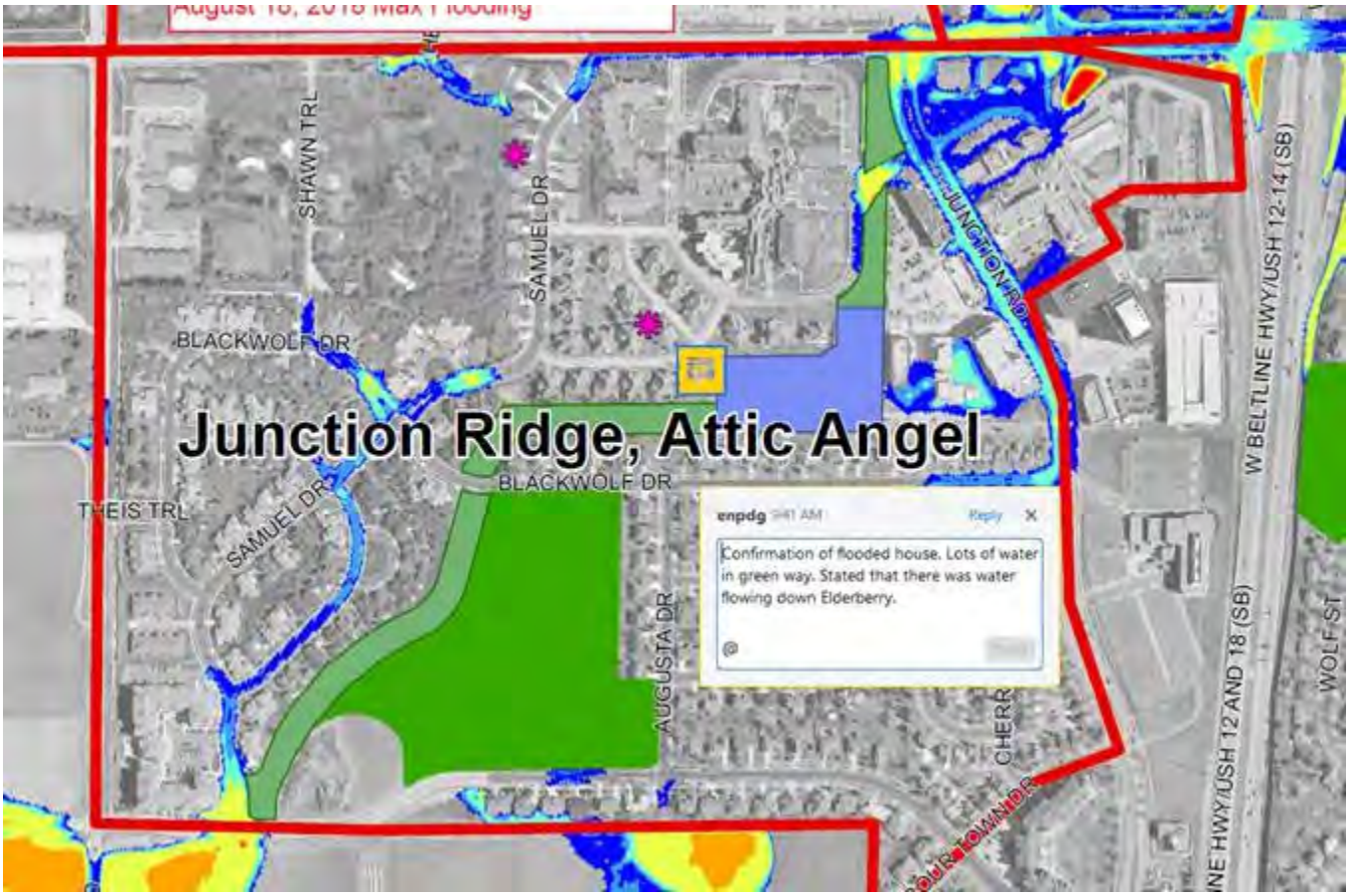
1. Junction Ridge/Attic Angel

Junction Ridge/Attic Angel Focus Group for the Pheasant Branch Watershed Study
In-Person
September 26th, 2019 from 3:00-4:00 pm
Meeting Location: Corner of Reid Drive and McGuffey Drive
Attendees: 11

- During the August 2018 Storm Event:
  - The pond behind Blackwolf Drive overtopped the northern berm and flooded homes
  - The grate for the pond was clogged with debris
  - Runoff from the wooded area west of Samuel Drive caused flooding in the backyards of the homes along Samuel Drive and also damage to one home.

After PIM 2

Virtual
One attendee. They confirmed the mapping at the house with the stone retaining wall looks representative of what was experienced.



2. Menards Area

Menards Area Focus Group for the Pheasant Branch Watershed Study
In Person
September 17th, 2019 from 11:00 am-12:00 pm
Meeting Location: Pet Smart Parking Lot near Tires Plus Parking Lot
Attendees: 3

- During the August 2018 event:
  - Water was ponding in the Menard's Parking Lot and cars in the Employee Parking lot had 2-4 feet of water with some cars being totaled from the damage.
  - Water was coming into the Menard's store
  - Water flooded the Menards Loading docks
  - Rouse Management had reconstructed the driveway into the apartments on Plaza and Commerce. Due to the reconstruction, water did not enter the parking garage and flood the underground parking as it had done in previous years.
- During moderate to large rain events, water ponds in the intersection of Commerce Drive and Mineral Point Road

After PIM 2

Virtual
No attendees

Pheasant Branch Focus Group Summaries

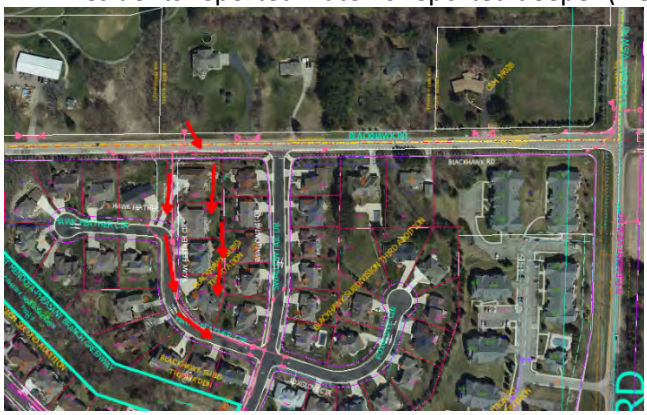
3. North Blackhawk Pond

North Blackhawk Pond Focus Group for the Pheasant Branch Watershed Study
In-Person
September 5th, 2019 from 7:00 - 8:00 pm
Meeting Location: Swallowtail Park
Attendees: 7

- During the August 2018 event:
    - Water was overtopping Swallowtail.
    - Swallowtail had flooded water from Aspen Grove Lane to Hawk's Feather Circle
    - There was water on the back patio at 5 Foxglove Circle
    - Water was up to the base of the tree closest to Swallowtail at 2 Hawk Feather Circle
    - There was water adjacent to the buildings the south side of the buildings at Boulder Creek but it didn't enter the basement
    - Wood logs from a property north of Blackhawk Road flowed south over Blackhawk Road and were found in backwards
    - The intersection of Blackhawk Road and Aspen Grove Lane still has standing water the day after the storm
- During moderate to large rain events, N Pleasant View Road overtops and the gravel shoulders are washed out.

After PIM#2
Virtual

- Residents on Swallowtail Dr just south of Blackhawk Rd reported that in Aug 2018, water flowed through their backyards from Blackhawk Rd on its way to the North BH pond. This was evidenced by the debris trail left behind.
    - The 2018 maps captured a drainage path from Blackhawk Rd through yards to Hawk Feather Cir, but not the path described above. Residents confirmed that this path exists.
    - Residents in this area stated that their yards are generally wet and do not drain well, although 2018 was the worst case.
- One resident noted that the 2018 flood reports looked insufficient (ie there should have been more)
- A resident wanted to know exactly how Pope Farms was accounted for in the models (PB and LBMC). Greg and I answered but we should confirm.
- 2 residents reported water is reported deeper (2.5') rather than 1' on Boulder Court

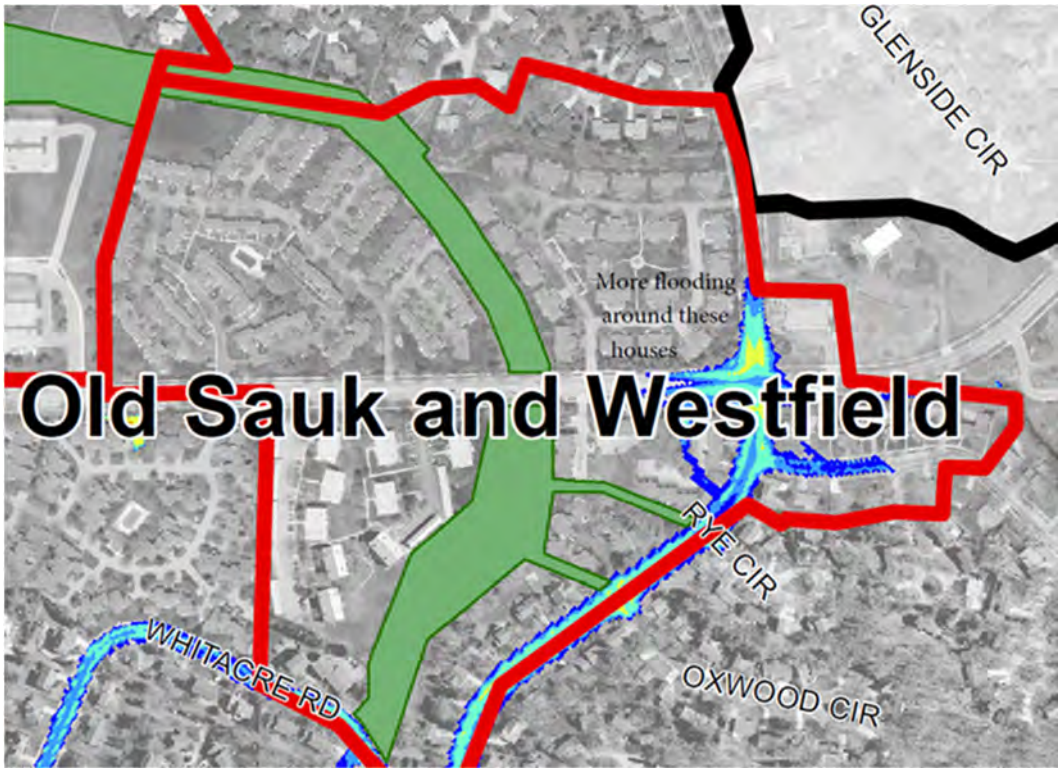


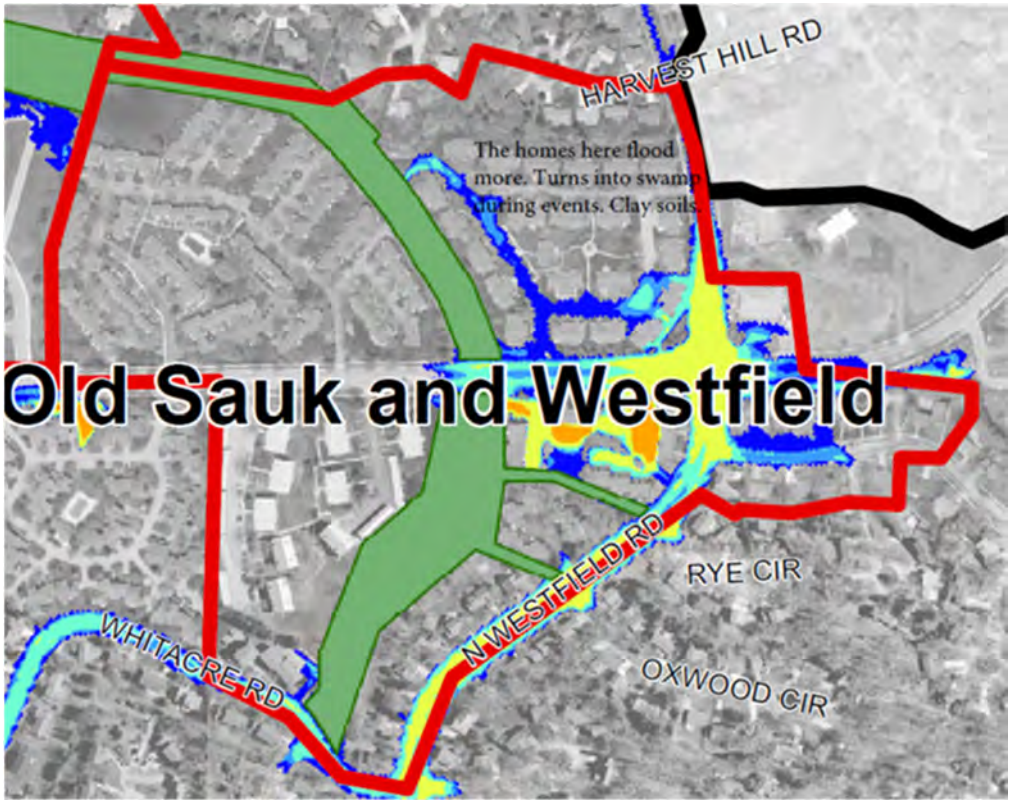
4. Old Sauk and Westfield

Old Sauk and Westfield Focus Group for the Pheasant Branch Watershed Study
In-Person
September 18th, 2019 from 11:00 am-12:00 pm
Meeting Location: Corner of N Westfield Road and Walnut Grove Drive
Attendees: 22

- During moderate to large rain events, the intersection of Old Sauk Trail and Westfield Road has street flooding.
- During large rain events, Old Sauk Road near the greenway overtops.
- During moderate to large rain events, some homes on Saukdale Way, Drive, and Trail and Loon Lane have structure flooding.
- The inlets along Westfield frequently clog with debris.
- The pipe located at the "X" is clogged and will be cleaned out this winter. This work will involve the removal of trees to get large equipment in to haul out the sediment.
- Street trees drop significant debris throughout the year. Forestry trimmed them following the focus group.
- During the August 2018 event, there was significant flooding on Old Sauk Road and Westfield Road.

After PIM2
Virtual
Feedback from attendees indicated maps looked pretty accurate.






A few other notes. Another person mentioned that the greenway below frequently gets full of debris and branches, but there is no property damage in this area. They also said they have lived in the area right by the little pond for 20 years and that that pond has never filled up.

2 StoryMap responses indicated mapping looked reasonable (Elderberry & Samuel and 1109 N High Point Road)

Pheasant Branch Focus Group Summaries

Old Sauk Trails Business Park
Old Sauk Trails Focus Group for the Pheasant Branch Watershed Study
In-Person
September 26th, 2019 from 11:00 am-12:00 pm
Meeting Location: GHC Parking Lot; 8202 Excelsior Drive, Madison
Attendees: 8

- During the August 2018 event:
  - The intersection of Fourier Drive and Excelsior Drive was impassable.
  - The Old Sauk Trails ponds overtopped and in some places the water entered buildings.
  - The greenway between the Beltline and Excelsior Drive overtopped and some water entered the building.
- There is a desire to clean out the dead/dying vegetation in the Old Sauk Trails ponds
- The Old Sauk Trails Ponds are a targeted location for a flood reduction project; the business park owners would not object to removing the trees inside the current walking path, but would prefer to keep some trees between the walking paths and businesses

After PIM2
Virtual
Feedback indicated that generally maps looked okay. Sent maps to Gialamas representative to share with businesses for more verification

5. Southwest Blackhawk Pond

Southwest Blackhawk Pond Focus Group for the Pheasant Branch Watershed Study
In-Person
September 4th, 2019 from 7:00 - 8:00 pm
Meeting Location: Corner of Bear Claw Way and Winding Way
Attendees: 15

- During moderate to large rain events
    - The intersection of Winding Way and Bear Claw Way has street flooding.
    - The yard drain on the north side of Red Sky Drive becomes overwhelmed and water flows on the drainage way between the homes to Red Sky Drive.
    - Sediment laden runoff from the 9th Addition Construction is observed.
- The outlet to the Southwest Blackhawk Pond frequently has debris on it and a resident in the neighborhood cleans it during rainstorms.
- During the August 2018 event, there was significant flooding on Bear Claw Way and Winding Way and at the outlet of the Southwest Blackhawk Pond.

After PIM 2
Virtual
Combined with North Blackhawk Pond group, see notes above

6. Tamarack Trails

Tamarack Trails Focus Group for the Pheasant Branch Watershed Study
In-Person
September 27th, 2019 from 9:00 am-10:00 am
Meeting Location: Tamarack Trails Clubhouse Parking Lot
Attendees: 14

- During the August 2018 Storm Event:
    - The channel from Westfield Road to the Greenway filled but did not flood structures
    - Drainage from the cemetery south of Tamarack Trails flooded some homes south of Tree Lane
    - There was flooding internal to the Tamarack Trails property that is being addressed

After PIM2
Virtual
Feedback indicated generally maps looked reasonable

7. Wexford Ridge

Wexford Learning Session for the Pheasant Branch Watershed Study
In-Person
September 27th, 2019 from 5:30 -7:30 pm
Location: Lussier Community Education Center Community Dinner; 55 South Gammon Road
Attendees: Not counted, Table at event

Focus group was held at a neighborhood dinner; specific flooding experiences were not shared.

After PIM2
Virtual
No attendees

8. Wexford Village

Wexford Ridge Focus Group for the Pheasant Branch Watershed Study
In-Person
September 25th, 2019 from 3:00-4:00 pm
Meeting Location: Corner of Tramore Trail and Sawmill Road
Attendees: 12

- Water was over four feet deep at the intersection of Sawmill Road and Tramore Trail, extending up and down Sawmill Road, Tramore Trail, and High Point Road
- Water was over four feet deep in High Point Road near Sawmill Road
- The water in the Wexford North and South Ponds rose such that it looked like one pond; the "bridge" was fully covered

After PIM2
Virtual
Overall, feedback indicated the maps for the 10, 100, and August 2018 storm event looked accurate.

Other information shared:

- 7641 Sawmill Road: They had water around the house (covered ~1" of their siding), but no water in the house. They do not have basement window wells. They had 2-3 feet of water in the garage. They did report this via the flood reporting page.
- 893 High Point Road: They had 18 – 24" of sewage in their basement, but no stormwater. They did report this via the flood reporting page.
- Although out of our focus group boundary, they said the High Point and Old Sauk intersection flooding looked accurate.

# Appendix F. Green Infrastructure Analysis

# Green Infrastructure Effectiveness Analysis

v11/16/2021

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# Executive Summary

The City of Madison wanted to understand if traditionally-sized green infrastructure (also known as volume control infrastructure (VCI)) can be used for flood control. For purposes of this study, traditionally-sized green infrastructure is stormwater management sized for the small storm events – typically the 1-year or 100% chance storm event.

The computer models created for the watershed studies were utilized for this study. These computer models were used because they were constructed for purposes of flood control and they reflect the current conditions of the watershed study areas.

The majority of the analysis described in this document is for the Pheasant Branch watershed, a 3,300-acre, mixed land use, watershed located on the far west side of the City of Madison.

The computer model hydrology (the component that generates the stormwater runoff) is separated into three parts: 1) directly connected impervious area (DCIA), non-directly connected impervious area (NDCIA), and 3) pervious area. DCIA is impervious that drains to a hard surface (like a street or driveway) and then into the stormwater conveyance system. Non-directly connected impervious area is impervious area than drains to a pervious area (like a lawn) before it reaches the stormwater conveyance system. This separation was initially done to aid in calibration of the models, but, was then taken advantage of for this study.

The analysis was conducted in two phases, with a peer review conducted after phase one.

The first phase evaluated the peak flow reductions for traditionally-sized infrastructure installed at typical levels of DCIA treatment. The levels were 10, 15, 20, and 25% of the DCIA. The results peak flow reduction was between 4 and 10.5%.

The second phase evaluated how much traditionally-sized green infrastructure it would take to achieve 1) 20% reduction in the 100-year (1% chance) event peak flow and 2) the watershed study flood targets. The results found that 75% of the DCIA would need to be treated to achieve a 20% reduction in the 1% chance (100-year) peak flow. The results also found that even if all DCIA was treated (100% DCIA), the watershed study targets would still not be met.

Cost estimates were completed for the various scenarios. Constructing VCI to treat 25% of the DCIA is estimated to cost approximately $78 million. Constructing VCI to treat 75% of the DCIA is estimated to cost $147 million.

The final step in the analysis was to understand how much the grey infrastructure (infrastructure typically installed for peak flow control such as larger pipes, detention basins, etc) could be downsized if the 75% DCIA VCI was also constructed. The results indicated that the grey infrastructure could be reduced by one size if VCI treating 75% of the DCIA was installed. The grey infrastructure cost savings is approximately $7 million.

# Section 1. Introduction

The City of Madison, Wisconsin Engineering Division would like to understand the effectiveness of green infrastructure to help meet the City's flood mitigation goals. The City is evaluating traditional flood control solutions (increase pipe capacity, detention basins, etc.), so for simplicity, the City is referring to green infrastructure as "volume control infrastructure". Volume control infrastructure will be infrastructure meant to infiltrate or evapotranspire stormwater. Types of volume control infrastructure includes rain gardens, pervious pavement, green roofs, biofilters, and infiltration basins.

City Engineering conducted a pilot planning level analysis for the Pheasant Branch Watershed known as Phase I. The purpose of the analysis was to understand the data available and how it could efficiently be used to evaluate the effectiveness of volume control infrastructure. Engineering staff conducted the iterative analysis with check-ins and discussion.

Following the Phase I analysis, the City asked for a peer review from a consultant with extensive experience in Green Infrastructure Modeling and Design. Based on feedback, the City revised some components of the analysis. The City conducted the revised analysis known as Phase II.

In parallel, the City contracted with two consultants conducting flood mitigation watershed studies for different watersheds in the city. The consultants were asked to repeat Phase I of the analysis to understand if the results from the Pheasant Branch Watershed Study were repeatable.

Once the City's Phase II and the consultant's Phase I analysis were complete, the City used the results from both to create the analysis all consultants would complete for all watershed studies.

The analysis and results are described in this document.

## Pheasant Branch Watershed

Pheasant Branch Watershed is located on the far west side of Madison and comprises approximately 3,300 acres of urban and agricultural land use.

Development in the watershed began in the 1970s and is still occurring today. Areas of the watershed developed after 1983 were subject to the City's stormwater management requirements. From 1983 to present data, stormwater management requirements became more robust, and today's requirements involve some volume control infrastructure.

The hydrologic and hydraulic model for the watershed was built in XP-SWMM 1D/2D. The hydrology and stormwater infrastructure are modeled in 1D while the large open channels and overland flow is modeled in 2D.

The watershed is broken up into 452 subcatchments. The hydrology for the watershed utilizes SWMM hydrology and Horton Infiltration. Each subcatchment is broken into three components: 1) Directly Connected Impervious Area (DCIA), 2) Non-Directly Connected Impervious Area (NDCIA), and 3) Pervious Area.

The percent of DCIA and NDCIA is taken from the WinSLAMM model's standard land uses. The standard

land uses representative the average source areas (roofs, driveways, sidewalks, etc) and connectedness in a typical land use. The standard land uses were developed by aerial photograph and field investigations of over 500 sites. A spreadsheet showing the breakdown of the standard land uses can be found in Appendix A. More information on the WinSLAMM model can be found here: http://www.winslamm.com/.

In each subcatchment, the NDCIA is routed to the pervious area through subcatchment routing. The flow path and slope for all components is the same – that calculated for the overall subcatchment.

## City of Madison Flooding Level of Service Goals

The City of Madison has the following level of service goals for flood mitigation:

1. 10-year design storm event:
    a. No surcharging onto the street for up to the 10-year design storm; water shall becontained within the pipes and structures.
    b. There are locations within the City where low points exist that pond water; theselow points are excluded from this goal and will be addressed as streets are redesigned.
    c. For locations limited by known inlet capacity, allow no more than 0.5 feet of waterabove storm sewer inlet rim.
2. 25-year design storm event:
    a. Centerline of street to remain passable during 25-year design storm with no morethan 0.2 feet of water at the centerline.
    b. Note that the Watershed Study modeling approach will not explicitly account for cross flow conditions where more gutter flow on one side of the street can overtopthe crown.
3. 100-year design storm event:
    a. No home or business will be flooded during the 100-year design storm.
    b. Enclosed depressions to be served to the 100-year design storm (which can includesafe overland flow within street, easements, greenways or other public lands).
    c. Greenway crossings at streets to be served to the 100-year design storm.
    d. No more than 0.5 feet of water on the centerline of arterial roads for passage ofemergency vehicles
4. 500-year design storm event:
    a. Safely convey stormwater; i.e. limited impact on private property
5. Provide flooding solutions that do not negatively impact downstream properties.

Table 1-1 provided the Design Storm Depths and Distribution used for evaluating the City's Flood Mitigation goals.

**Table 1-1. Design Storm Depths and Distribution**

| Recurrence Storm | Rainfall Depth (in) | Rainfall Distribution |
|---|---|---|
| 1-year (100% Chance) | 2.49 | MSE4 – 24 hour |
| 2-year (50% Chance) | 2.84 | MSE4 – 24 hour |
| 5-year (20% Chance) | 3.45 | MSE4 – 24 hour |
| 10-year (10% Chance) | 4.09 | MSE4 – 24 hour |
| 25-year (4% Chance) | 5.02 | MSE4 – 24 hour |
| 100-year (1% Chance) | 6.66 | MSE4 – 24 hour |
| 500-year (0.2% Chance) | 8.94 | MSE4 – 24 hour |

## Volume Control Modeling Goals

The purpose of this analysis was to understand the following:

1. Determine the volume of water that would need to be managed if a certain percentage of DCIA were to be treated,
2. Determine if there is a break point/ target for volume control treatment,
3. Assess the watershed to see how much area is available for volume control,
4. Assess the impact of infiltration size for the 1- year event on larger storms,
5. Assess the sensitivity of the existing drainage system to the implementation of volume controlstormwater devices to treat directly connected impervious areas, and
6. Determine if the combination of the peak flow control efforts and volume control efforts canprovide a quantifiable increase in the level of service.

# Section 2. Phase I Analysis

The Phase I Analysis was conducted in three parts. First, the volume of water that could be treated for each of the impervious area treatment goals was calculated. Second, the land available for treatment was calculated and compared to the land needed. Finally, a watershed model with the treatment was developed and executed. The results were summarized and an initial conceptual cost estimate was prepared.

A Microsoft Excel spreadsheet (called “GI Analysis Phase I 2020_07_03.xlsx”) accompanies this document and is referred to in numerous locations.

## Part 1 – Estimate Potential Volume Control Effects per Subcatchment

Initially, the City wanted to understand if treating a certain percentage of the DCIA would generate a significant reduction in runoff volume or peak flows. 10%, 15%, 20%, and 25% of DCIA in each subcatchment was routed out of the drainage network. To do this, the associated impervious area from the DCIA for each subcatchment was simply removed from the model. The assumption in this step was that each DCIA percentage was fully treated by volume control infrastructure. “Step 1 Calc DCIA Removed” and “Step 1 Areas Table” in the accompanying spreadsheet were used to calculate the areas for each percentage.

The Runoff Block of XP-SWMM was run for 10%, 15%, 20%, and 25% DCIA removed scenarios. The peak flows and runoff volumes for each subcatchment were summarized in the “Step 1 Flow cfs Results” and “Step 1 Volume ac_ft Results” tabs. The results are graphed in the “Flow Results Chart Per”, “Volume Results Chart ac-ft”, and “Volume Results Chart Per” tabs.  Figure 2-1 shows a graph of the peak flow results.

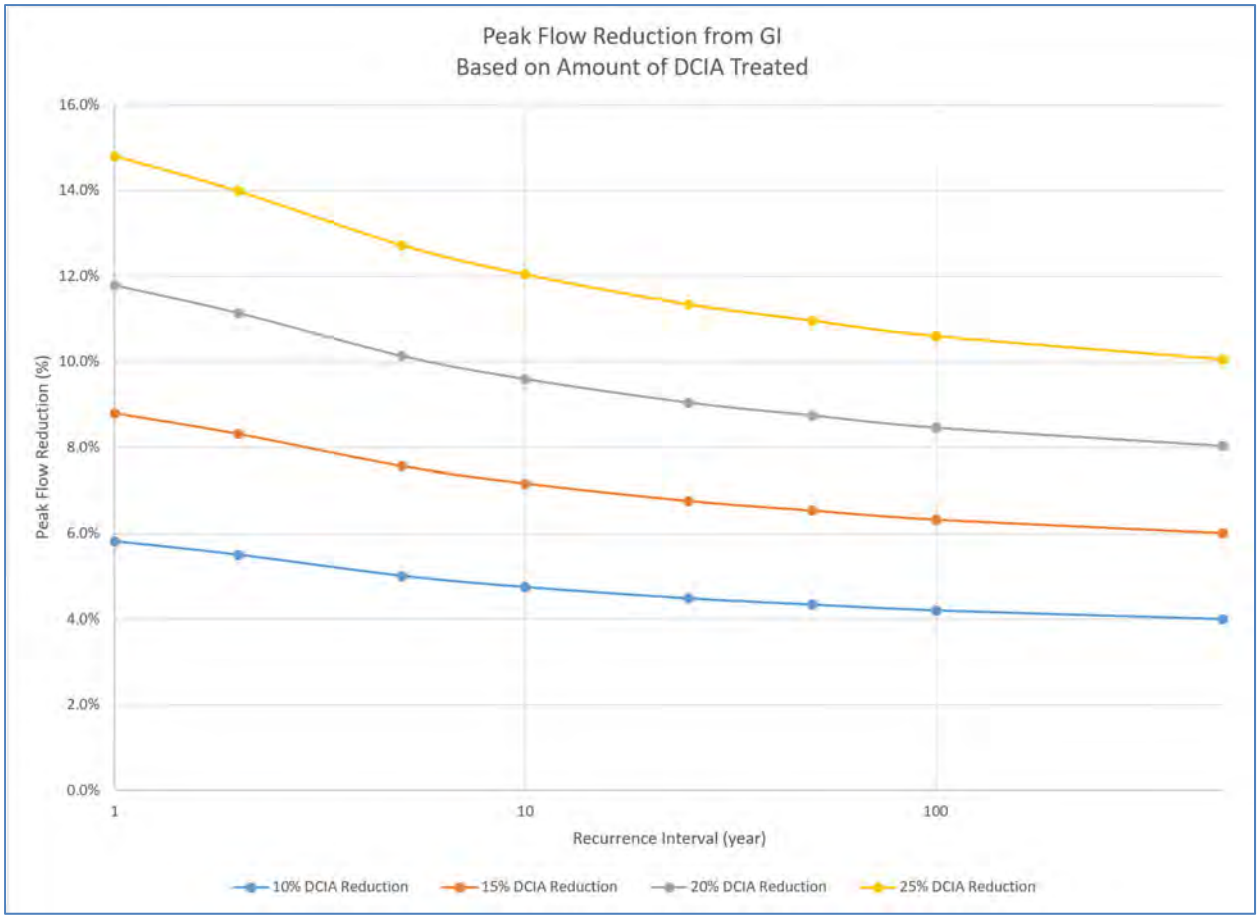


**Figure 2-1. Peak flow reduction for each DCIA Scenario**

## Part 2 – Initial Opportunities Analysis

### Volume Control Infrastructure Layer

The City conducted a desktop analysis utilizing available Geographic Information Systems (GIS) data to understand where there are opportunities to install volume control infrastructure. This analysis was conducted over the span of several months and in conjunction with various City agencies including Forestry, Historic & Cultural Resources, Parks, and Water Utility.

Following the inter-agency meetings and review, the following areas were removed from the available area:

- Airports
- Primary building footprints with a 10 foot buffer
- Accessory building footprints
- Buffer of 3 feet along parcel boundaries
- Cemeteries
- Depth to bedrock < 5’
- Depth to groundwater < 5’
- Hydrologic soil group D

- Open water
- Landfills
- Railroads
- Springs
- Wellhead protection zone
- Wetlands
- Salt routes
- Arterial and collector streets (0 < function class < 5)
- Slope > 12 %

The remaining pervious and impervious areas were considered available for volume control infrastructure.

## Initial Volume Control Infrastructure Scenarios

The City decided upon three scenarios for the size of volume control infrastructure that could be installed. They are described below:

1. Realistic (sf): The area for green infrastructure assuming realistic size green infrastructure isinstalled
2. Maximize (sf): The area for green infrastructure assuming the realistic sized area is maximized
3. Available GI Space (sf): The area for green infrastructure if all the available space is utilized.

The Table 2-1 below shows the parameters used for each scenario. All scenarios include a 3-foot buffer around the volume control infrastructure as a transition to the existing land cover.

**Table 2-1. Scenario Land Use and VCI Area Assumptions**

| Parcel Land Use | All Available GI Space (sf) | Maximize (sf) | Realistic (sf) |
|---|---|---|---|
| Residential | if >3000 SF | 240 | 120 |
| Residential | If <3000 SF and >1000 SF | 120 | 60 |
| Residential | If <1000 SF and >60 SF | 60 | 30 |
| Commercial/Industrial/ Institutional | Any size | All available | All available |
| Parks | Any size | 10% of available | 5% of available |
| Open space (not parks) | Any size | 20% of available | 10% of available |
| Streets | Any size | 20% of available | 10% of available |

This layer was intersected with each subcatchment and the areas for each scenario were calculated for each subcatchment. Tabs"PB_GI_Areas_More_Restrictive" and "PB_GI_Less_Restrictive" show the results of the calculations.

Note, this analysis was done with both a "More Restrictive" layer and a "Less Restrictive" layer. The More Restrictive layer excluded additional areas where volume control infrastructure could be implemented such as areas within the wellhead protection zone, areas with shallow bedrock or

groundwater, and areas with high slope.

The area of available space for volume control infrastructure in the Pheasant Branch Watershed for the more restrictive layer for this initial analysis was calculated to be 1,736 acres and the less restrictive layer's available area was calculated to be 2,197 acres.

After internal discussions, it was decided the "Less Restrictive" layer would be the layer to use in determining the available space in each subbasin for VCI.

### Step 1: Calculate the Area needed for Volume Control Infrastructure for each Subcatchment

Using the potential volume that could be infiltrated from Part 1, the area needed to capture that volume was calculated for each subcatchment, for each of the three scenarios. An assumed depth of 1-foot (open area storage) was assumed for each VCI (the potential storage from subgrade porosity was ignored).

Tab "Step 1b Area Needed for GI" shows the results of the calculations.

Please note, this analysis was done for both the 1-year and 10-year storm event volumes. Following internal discussions, it was decided that future calculations would only be done for the 1-year storm event volume.

### Step 2: Compare the Potential VCI Volume to the Volume Reduction Calculated in Part 1 for each Subcatchment

The area needed to treat the volume was compared to the area available for each scenario.

Tab "2 Step 5 Compare Areas" shows the results of the comparison. Columns DV-EN summarize the results.

The Figure 2-2 shows the maximum percent of DCIA that can be treated for each subcatchment for the 1- year, 24-event with the land available for the More Restrictive, Realistic Scenario.

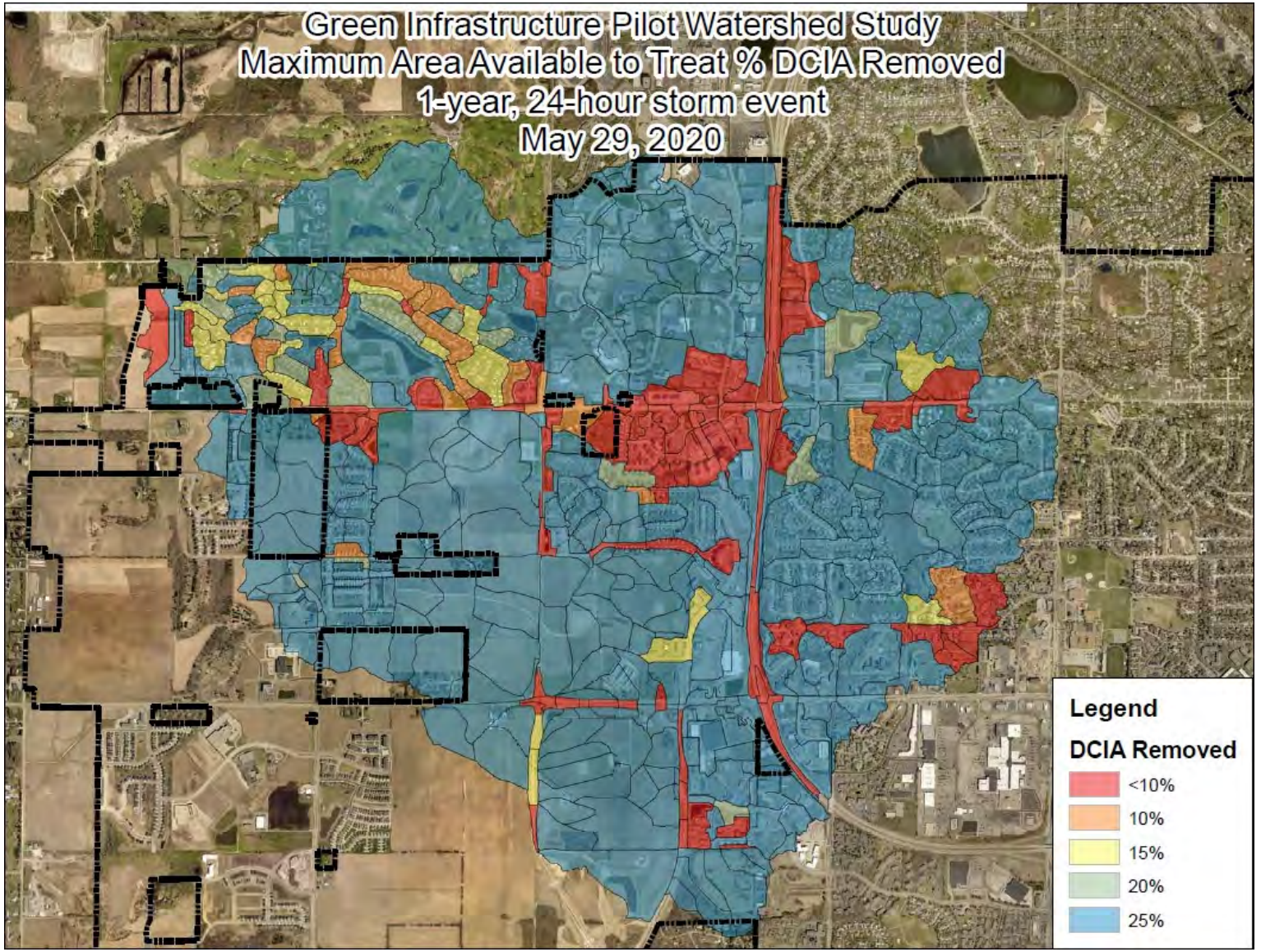


**Figure 2-2. Maximum percent of DCIA that can be treated for each subcatchment for the 1-year, 24-event for the More Restrictive, Realistic Scenario**

Figure 2-2 indicates that the majority of the watershed has land available to treat 25% of the DCIA.

Additional calculations were conducted to understand if at least ½ inch of runoff volume was being treated from all impervious surfaces. The results of the analysis show that treating 25% of the DCIA equates to treating ½ inch of runoff from all impervious surfaces.

Columns DA – DF of tab "Step 1 Volume ac-ft Results" summarize the results of the impervious surfaces runoff volume calculations.

As a result of this Phase I analysis, the City chose a treatment goal of 25% of the DCIA for Pheasant Branch Watershed. This goal was selected for two reasons:

1. Overall, land is available to treat 25% of the DCIA in the watershed
2. Treating 25% of the DCIA also treats ½ inch of runoff from all impervious surfaces (using a weighted average). ½ inch of runoff is the treatment goal for the City of Milwaukee greeninfrastructure plan and represents the "first flush" of stormwater.

### Step 3: Create Max Available Scenario

Step 1 above assumes that land in some subcatchments can be over-treated to account for the subcatchments where land is not available to treat 25% of the DCIA. The Max Available Scenario was created to understand what the impacts of runoff volume and peak flow reduction would be if overtreatment did not occur. This scenario was set up using the maximum DCIA that could be treated given the available area (up to 25%).

Tab "2 Step 5 CA Figure" shows the maximum % DCIA that can be treated (up to 25%). The runoff volume and peak flow calculations from this step are not summarized in the spreadsheet.

## Part 3 – Develop Final VCI Model

The final part to the Phase I Analysis evaluates the impact volume control infrastructure has on the conveyance system of the watershed. The volume control infrastructure for this analysis will be sized for the 1-year storm event. For storms in excess of the 1-year event, the volume control infrastructure will overflow. Therefore, a model representing the volume control from the 1-yr volume control infrastructure is needed to understand the net impact from the volume control infrastructure.

Running the full model (hydrology, 1D hydraulics, and 2D) for the work done in Part 1 would overestimate the reductions for storm events above the 1-year storm event. This is because the representative area of DCIA was removed and, as a result, the runoff volume for that sub-area for each storm event was also removed.

To develop the final VCI model, 25% of the DCIA was added to the NDCIA for each subcatchment. Then, the pervious depression storage was adjusted until the 1-year storm event results from Part 1 matched the 1-year storm events from this Part for the subcatchments.

The same methodology was utilized for the Max Available Scenario.

Tabs “Step 2a Move DCIA to NDCIA” and “Step 2a Move DCIA to NDCIA Avai” show the calculations to move the DCIA to the NDCIA. Tabs “Step 2c Pervious Dep Stor Calc” and “Step 2c Pervious Dep Stor C Av” show the calculations to modify the pervious depression storage. Tabs “Step 3 Flow cfs Results” and “Step 3 Volume ac_ft Results” show the results of the analysis for each subcatchment.

The model was then run for both scenarios for the 1-, 10-, and 100-year, 24-hour events. Figures 2-3 and 2-4 show the resulting peak flows at two locations within the watershed.

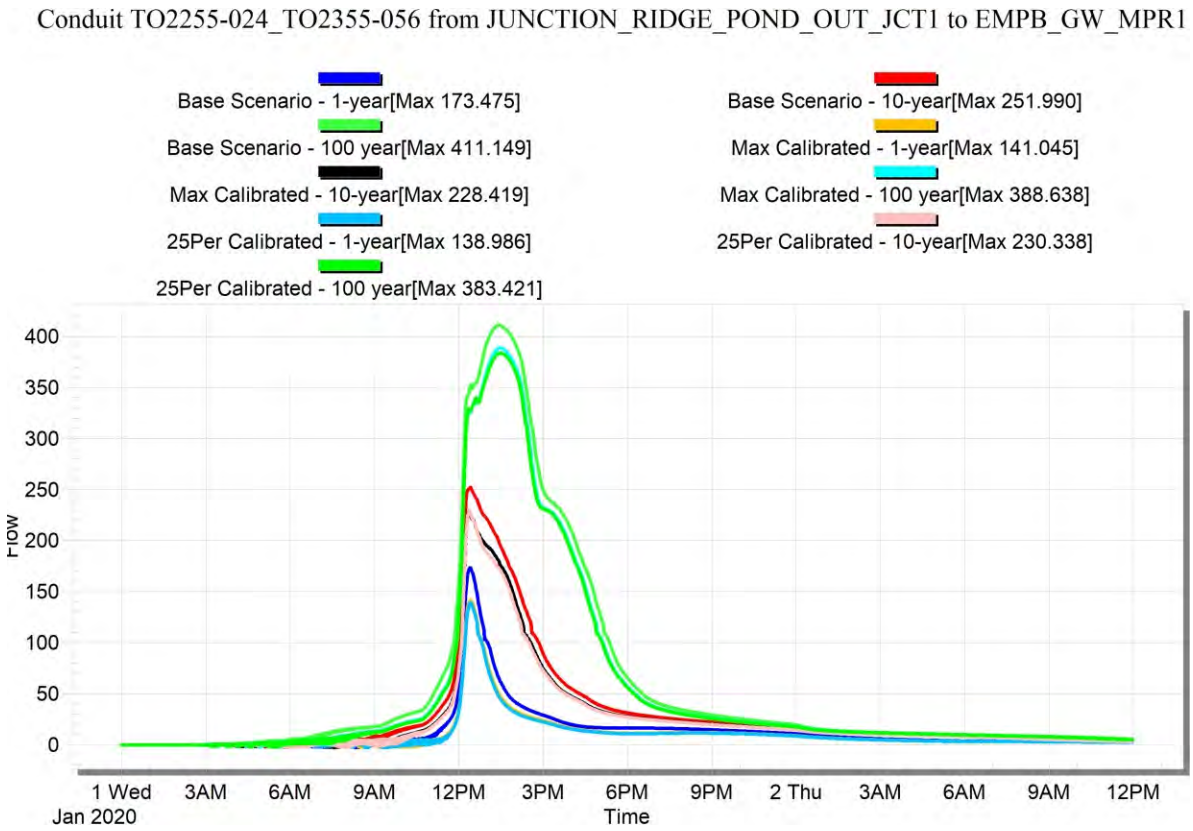


**Figure 2-3. XP-SWMM Output at culvert from Target Pond under Beltline to Sauk Creek Greenway**

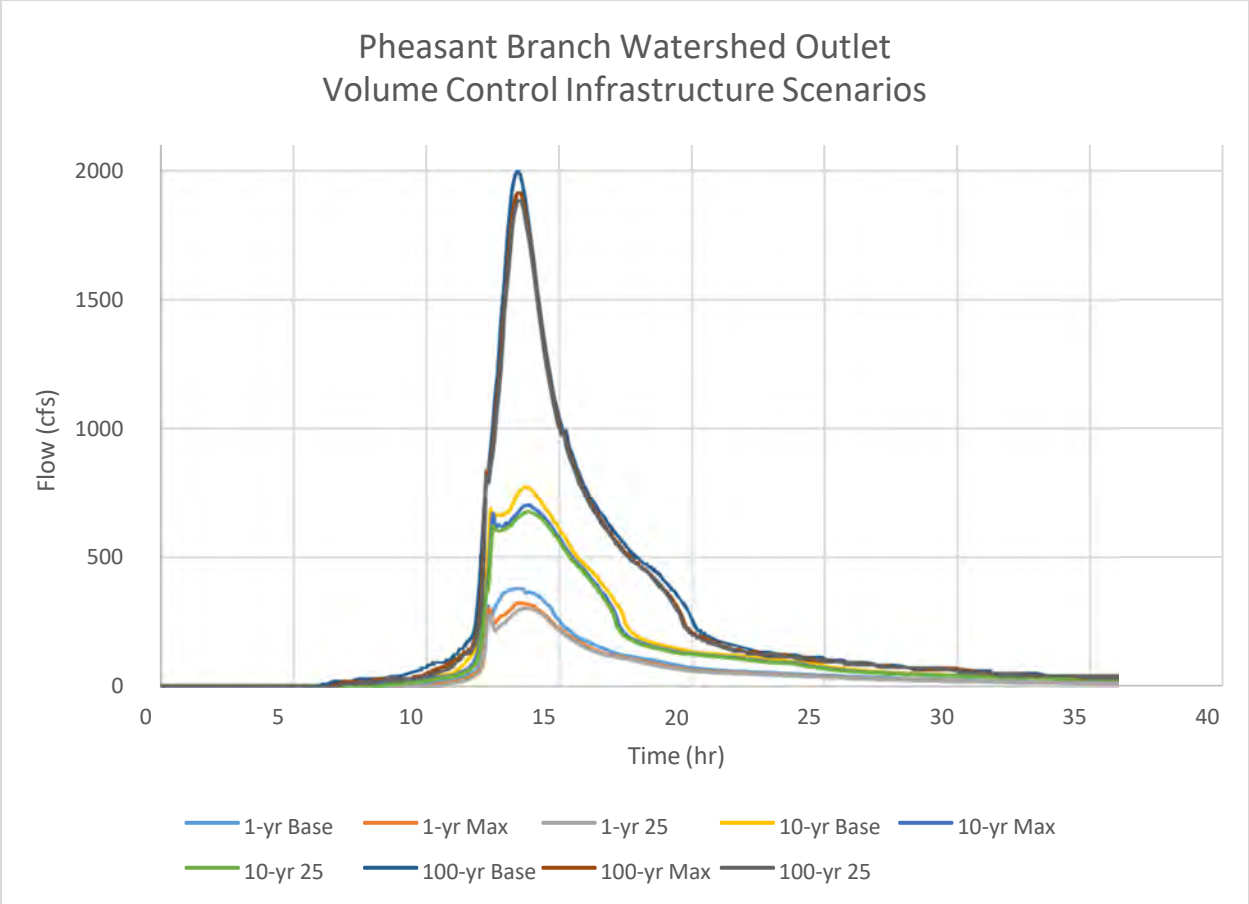


**Figure 2-4. Outlet of Pheasant Branch Watershed (Upstream of Greenway Boulevard)**

Table 2-2 shows a summary of the peak flows at the outlet of the Pheasant Branch Watershed and the reductions.

**Table 2-2. Peak Flow Comparison at Outlet of Pheasant Branch**

| Storm Event | Base Scenario | 25% DCIA Rerouted | | Max DCIA Rerouted | |
|---|---|---|---|---|---|
| | Peak Flow (cfs) | Peak Flow (cfs) | Percent Reduction (%) | Peak Flow (cfs) | Percent Reduction (%) |
| 1-yr | 377 | 302 | 20% | 322 | 15% |
| 10-yr | 772 | 677 | 12% | 702 | 9% |
| 100-yr | 1,998 | 1,889 | 5% | 1,920 | 4% |

As expected the more frequent storm events have a higher peak flow reduction than the less frequentstorm events.

## Phase I Conceptual Cost Estimate

The City recently completed construction of volume control infrastructure in a pilot study area in the City. Utilizing the bid tab from that project, construction of the volume control infrastructure is approximately $40 per square foot. The volume control installed in the pilot study area is a mix of residential rain gardens, pervious pavement, and underground storage trenches. This combination of practices is representative of the combination that would be constructed in the Pheasant Branch Watershed.

The City has conducted research regarding the average maintenance cost for volume control infrastructure. The average cost is approximately $3 per square foot of volume control infrastructureper year.

The costs from the pilot study area and maintenance research were applied to the potential treatment area for Pheasant Branch Watershed. Table 2-3 shows the results of the conceptual cost estimate.

**Table 2-3. Conceptual Cost Estimate**

| Scenario | Total Impervious Area Treated (acres) | Total TreatmentArea (ac) | Estimated VCI Construction Cost ($) | Estimated VCI Maintenance Cost ($/yr) |
|---|---|---|---|---|
| 25% DCIA Rerouted | 221.2 | 45.0 | $78,359,000 | $5,877,000 |
| Max % DCIA Rerouted | 164.5 | 35.0 | $60,954,000 | $4,572,000 |

## Phase I Total Phosphorus Load Reduction Estimate

Volume control infrastructure can be constructed for several reasons. A common reason is stormwater pollution reduction. The City of Madison has a WPDES Individual MS4 Permit and is part of the Rock River Total Maximum Daily Loads (TMDL). The Rock River TMDL requires reductions in total phosphorus.

A simplified analysis of the total phosphorus that would be removed from the treated area was conducted in WinSLAMM. WinSLAMM is a continuous simulation, water quality model using small storm hydrology. It has the ability to simulate many types of source areas, included directly connected and disconnected impervious areas. It can evalute many types of traditional and volume control infrastructure.

In the model, the treated area was assumed to be half roofs and half streets (streets with an assumed width of 40 feet and intermediate texture) in a residential land use. The roofs and streets were routed to a biofilter with a 1 foot of depth and a native soil seepage rate of 0.3 inch/hr. The, the City estimated that the total phosphorus reduction from the 25% DCIA Rerouted scenario is approximately 382 pounds per year. The total phosphorus reduction from theMaximum Rerouted scenario is approximately 284 pounds per year.

## Section 3. Peer Review

The City contracted with Birchline Planning, LLC to revise the City of Madison's ordinances and policies with respect the distributed green infrastructure. Tetra Tech, Inc. is on the Birchline team for the project. Tetra Tech is a leader of green infrastructure analysis and design in the stormwater industry. The City asked Tetra Tech to review the City's Phase I analysis for technical soundness as well as areas where the analysis could be revised/modified to further meet the City's goals. The review can be found in Appendix A.

In general, the peer reviewer found the Phase I Analysis to be technically sound.

Tetra Tech offered ideas to enhance the analysis. After internal discussions, the following were incorporated into the Phase II Analysis discussed in the next section:

- Expand the Opportunities Analysis to include flat roofs that could have green roofs installed
- Because the purpose of the analysis is for flood control, expand the targeted amount of area to be treated. The City thinks that about 20% reduction in peak flows for the 100-year event could result in a decrease in infrastructure size. As such, an analysis was conducted to determine the percentage of DCIA to treat to achieve 20% reduction in peak flow for the 100-year event at the outlet of the watershed.
- Expand the benefits to more than just flood control and water quality improvement. Green infrastructure has many other benefits besides the direct effect on stormwater, including improved aesthetics, reduction in heat island effect, climate resiliency, etc. These additional benefits will be summarized.

# Section 4. Phase II Analysis

The Phase II Analysis was conducted in a similar manner as Phase I. First, the reductions in peak flows that could be achieved by routing 25%, 75%, and 100% of the DCIA to appropriately sized green infrastructure was determined. Second, the opportunities analysis was expanded to include sidewalks, flat roofs, and residential streets that are not salt results. Finally, the land needed to treat both the 25%, 75%, and 100% DCIA was overlaid onto the watershed map for Pheasant Branch Watershed. The results were summarized, benefits were documented, and a conceptual cost estimate was prepared.

A Microsoft Excel spreadsheet accompanies this document (called "GI Analysis Phase 2 2021_02_08.xlx") and is referred to in numerous locations.

## Part 1 – Estimate Peak Flow Reductions from 25%, 75%, and 100% DCIA

### Part 1: Determine 25%, 75%, and 100% DCIA

25%, 75%, and 100% of DCIA in each subcatchment was routed out of the drainage network. To do this, the associated impervious area from the DCIA for each subcatchment was simply removed from the model. The assumption in this step was that each DCIA percentage was fully treated by volume control infrastructure. "Step 1a Calc DCIA Removed" and "Step 1 Areas Table" in the accompanying spreadsheet were used to calculate the areas for each percentage.

The Runoff Block of XP-SWMM was run for 25%, 75%, and 100% DCIA removed scenarios. The peak flows and runoff volumes for each subcatchment were recorded.

### Part 2: Develop full VCI model for 25% DCIA, 75%, and 100% DCIA

To develop the full VCI model, 25% of the DCIA was added to the NDCIA for each subcatchment for the 25% DCIA scenario, 75% of the DCIA was added to the NDCIA for each subcatchment for the 75% DCIA scenario, and 100% of the DCIA was added to the NDCIA for each subcatchment for the 100% DCIA scenario. Then, the pervious depression storage was adjusted until the 1-year storm event results from Part 1 matched the 1-year storm events from this Part for the subcatchments.

Tab "Step 2a Move DCIA to NDCIA" shows the calculations to move the DCIA to the NDCIA. Tab "Step 2c Pervious Dep Stor Calc" shows the calculations to modify the pervious depression storage. Tabs "Step 3 Flow cfs Results" and "Step 3 Volume ac_ft Results" show the results of the analysis for each subcatchment.

The model was then run for all scenarios for the 1-, 10-, and 100-year, 24-hour events. Tables 4-1a through 4-1c below show the results for the scenarios for the 1-, 10-, and 100-year, 24-hour events.

**Table 4-1a. 25% DCIA Scenario Peak Flow Results and Comparison**

| | | Existing Conditions | | | 25% DCIA Treated | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | |
| Recording Location | Location | 1-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) |
| 1 | Outlet of Swallowtail Pond crossing Pleasant View Road | 47 | 68 | 359 | 48 | -2% | 64 | 5% | 337 | 6% |
| 2 | Target Pond Outlet (3 culverts) West to East Under Beltline | 166 | 292 | 468 | 131 | 21% | 245 | 16% | 445 | 5% |
| 3 | Culverts East to West under Beltline just downstream of Wexford Pond | 260 | 646 | 1,435 | 214 | 18% | 561 | 13% | 1,342 | 6% |
| 4 | Watershed Outlet | 228 | 744 | 2,114 | 220 | 3% | 649 | 13% | 1,998 | 5% |

**Table 4-1b. 75% DCIA Scenario Peak Flow Results and Comparison**

| | | Existing Conditions | | | 75% DCIA Treated | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | |
| Recording Location | Location | 1-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) |
| 1 | Outlet of Swallowtail Pond crossing Pleasant View Road | 47 | 68 | 359 | 36 | 24% | 48 | 29% | 294 | 18% |
| 2 | Target Pond Outlet (3 culverts) West to East Under Beltline | 166 | 292 | 468 | 63 | 62% | 164 | 44% | 396 | 15% |
| 3 | Culverts East to West under Beltline just downstream of Wexford Pond | 260 | 646 | 1,435 | 110 | 58% | 419 | 35% | 1,109 | 23% |
| 4 | Watershed Outlet | 228 | 744 | 2,114 | 175 | 23% | 515 | 31% | 1,699 | 20% |

**Table 4-1c. 100% DCIA Scenario Peak Flow Results and Comparison**

| | | Existing Conditions | | | 100% DCIA Treated | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | |
| Recording Location | Location | 1-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) |
| 1 | Outlet of Swallowtail Pond crossing Pleasant View Road | 47 | 68 | 359 | 19 | 59% | 47 | 31% | 211 | 41% |
| 2 | Target Pond Outlet (3 culverts) West to East Under Beltline | 166 | 292 | 468 | 34 | 80% | 123 | 58% | 348 | 26% |
| 3 | Culverts East to West under Beltline just downstream of Wexford Pond | 260 | 646 | 1,435 | 32 | 88% | 319 | 51% | 862 | 40% |
| 4 | Watershed Outlet | 228 | 744 | 2,114 | 112 | 51% | 425 | 43% | 1,346 | 36% |

As an additional scenario, all of the surface cover in each subcatchment was revised to be pervious. This was done as a comparison of the effectiveness of green infrastructure to something that can be visualized. The built conveyance system remained in the model. This scenario was run in the full VCI model. The results provided in Table 4-1d show that treating 100% of the DCIA is very close to a scenario where all the surface cover in a watershed is pervious.

**Table 4-1d. 100% Land in Watershed is Pervious Scenario Peak Flow Results and Comparison**

| | | Existing Conditions | | | Entire Watershed 100% Pervious | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | |
| Recording Location | Location | 1-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) |
| 1 | Outlet of Swallowtail Pond crossing Pleasant View Road | 47 | 68 | 359 | 22 | 54% | 46 | 31% | 223 | 38% |
| 2 | Target Pond Outlet (3 culverts) West to East Under Beltline | 166 | 292 | 468 | 17 | 90% | 134 | 54% | 384 | 18% |
| 3 | Culverts East to West under Beltline just downstream of Wexford Pond | 260 | 646 | 1,435 | 26 | 90% | 286 | 56% | 917 | 36% |
| 4 | Watershed Outlet | 228 | 744 | 2,114 | 95 | 58% | 265 | 64% | 1,332 | 37% |

The all-pervious analysis shown in Table 4-1d still resulted in street and structure flooding. This indicates that even if 100% of all impervious surfaces were returned to pervious, the built stormwater conveyance system is not sized large enough.

## Progress towards City's Flood Mitigation Targets

The beginning of this document describes the City's Flood Mitigation Level of Service goals. The modeling results were reviewed to understand how the 25% DCIA, 75% DCIA, and 100% DCIA scenarios helped the City meet the goals.

Figures 4-1 and 4-2 below show the impact of the 25% DCIA scenario on the 10-year and 100-year goals. Figures 4-3 and 4-4 below show the impact of the 75% DCIA scenario on the 10-year and 100-year goals. Figures 4-5 and 4-6 below show the impact of the 100% DCIA scenario on the 10-year and 100-year goals.

For purposes of this analysis, streets are considered removed from flooding if there is no longer water along the centerline of the road and structures are considered removed from flooding if there is no longer water touching the 5-foot buffer placed around the building's outline.

Table 4-2 shows the existing streets and structures impacted and how they are reduced for each scenario.

**Table 4-2. Street Segments and Structures Removed From Flooding**

| | **Street Segments (miles) 10-year Storm Event** | | | **Structures (#) 100-year Storm Event** | | |
|---|---|---|---|---|---|---|
| **Total** | 52.1 | | | 2,920 | | |
| **Scenario** | **Flooded** | **Percent** | **Removed** | **Flooded** | **Percent** | **Removed** |
| **Existing Conditions** | 9.9 | 19% | N/A | 118 | 4% | N/A |
| **Grey Infrastructure** | | | | | | |
| **Proposed Conditions** | 1.0 | 2% | 8.9 | 57 | 2% | 61 |
| **Green Infrastructure** | | | | | | |
| **25% DCIA** | 8.7 | 17% | 1.1 | 109 | 4% | 9 |
| **75% DCIA** | 5.8 | 11% | 4.1 | 79 | 3% | 39 |
| **100% DCIA** | 2.3 | 4% | 7.5 | 51 | 2% | 67 |
| **Both Green and Grey** | 0.5 | 1% | 9.3 | 15 | 1% | 103 |

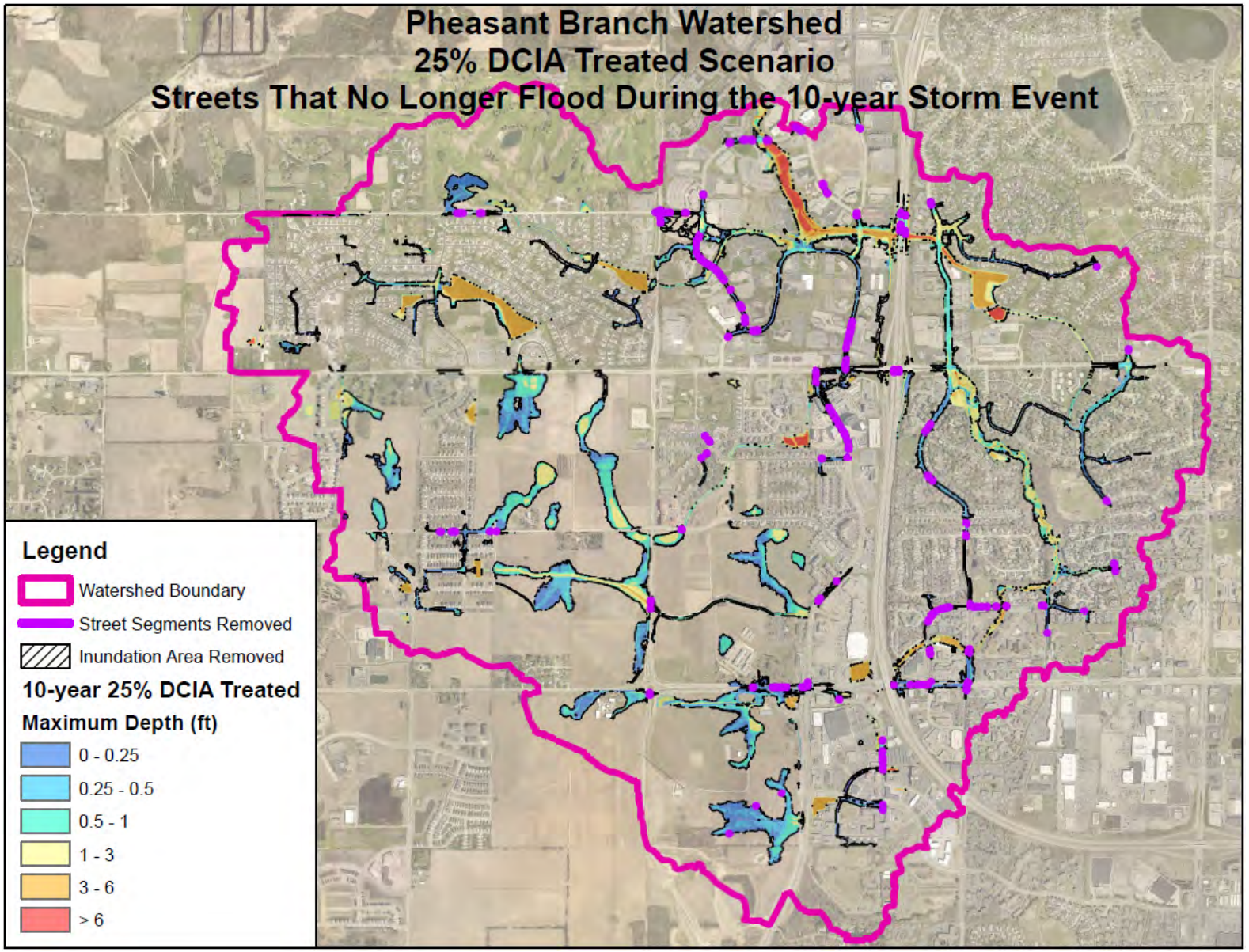


**Figure 4-1. 25% DCIA Treated Scenario, 10-year Storm Event**

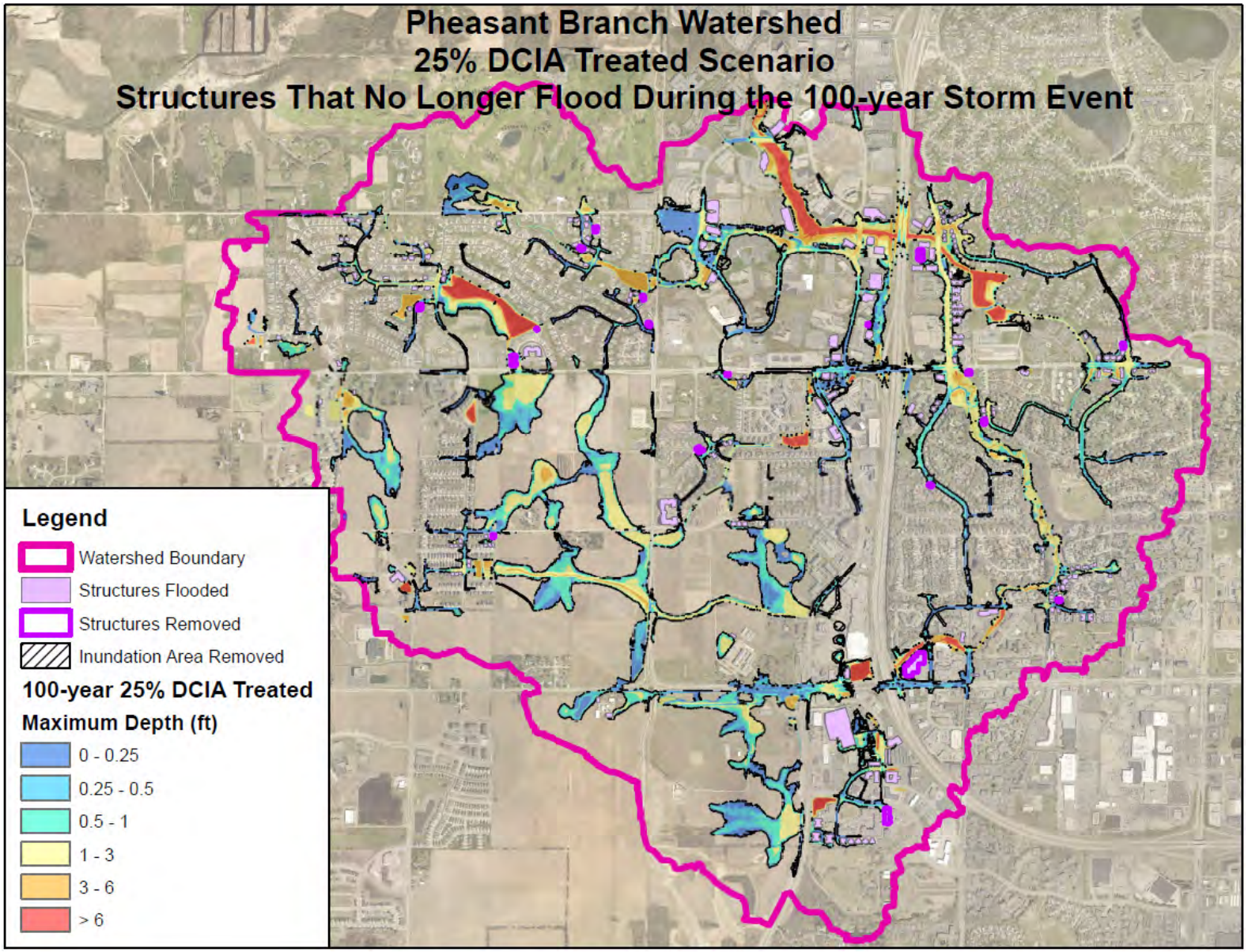


**Figure 4-2. 25% DCIA Treated Scenario, 100-year Storm Event**

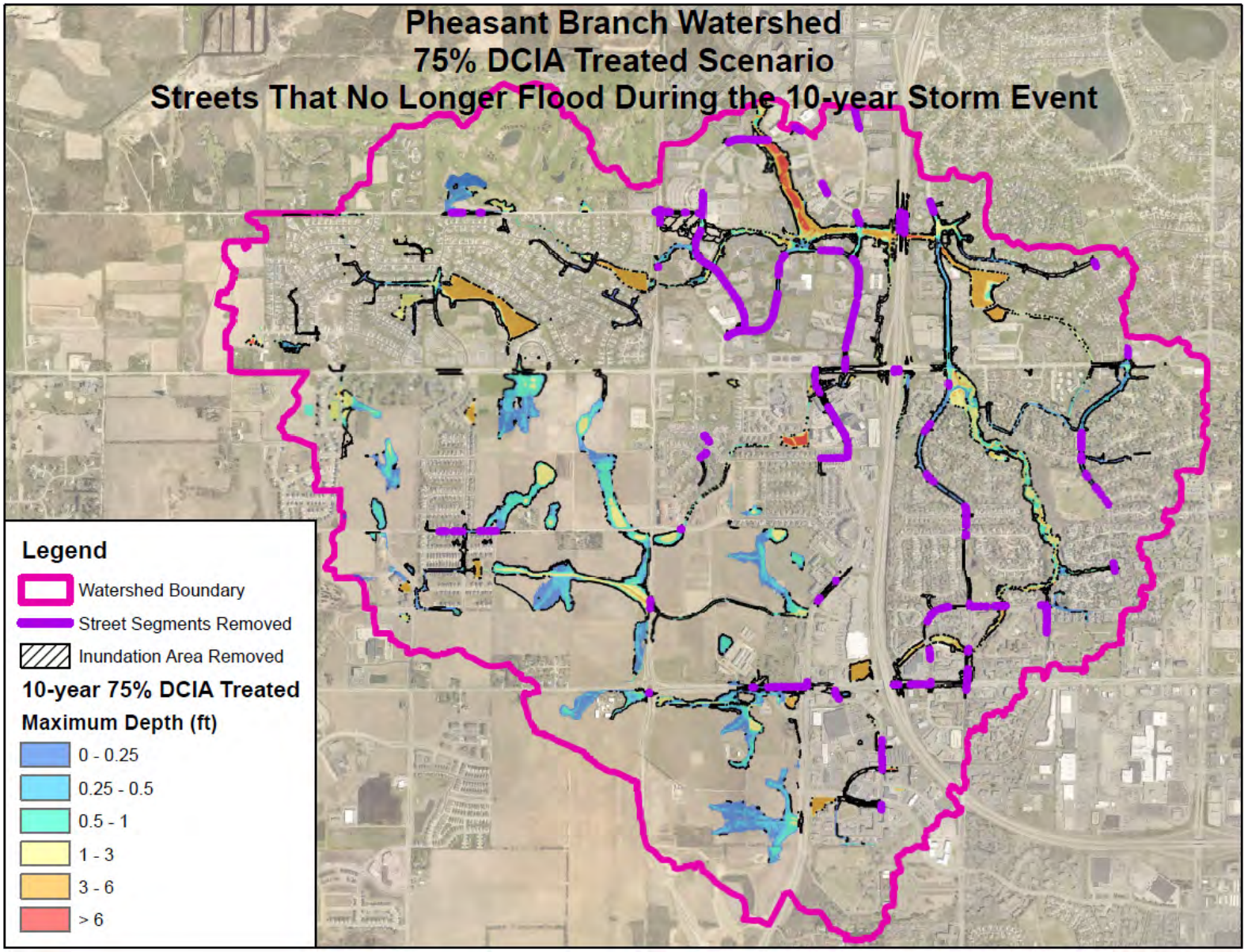


**Figure 4-3. 75% DCIA Treated Scenario, 10-year Storm Event**

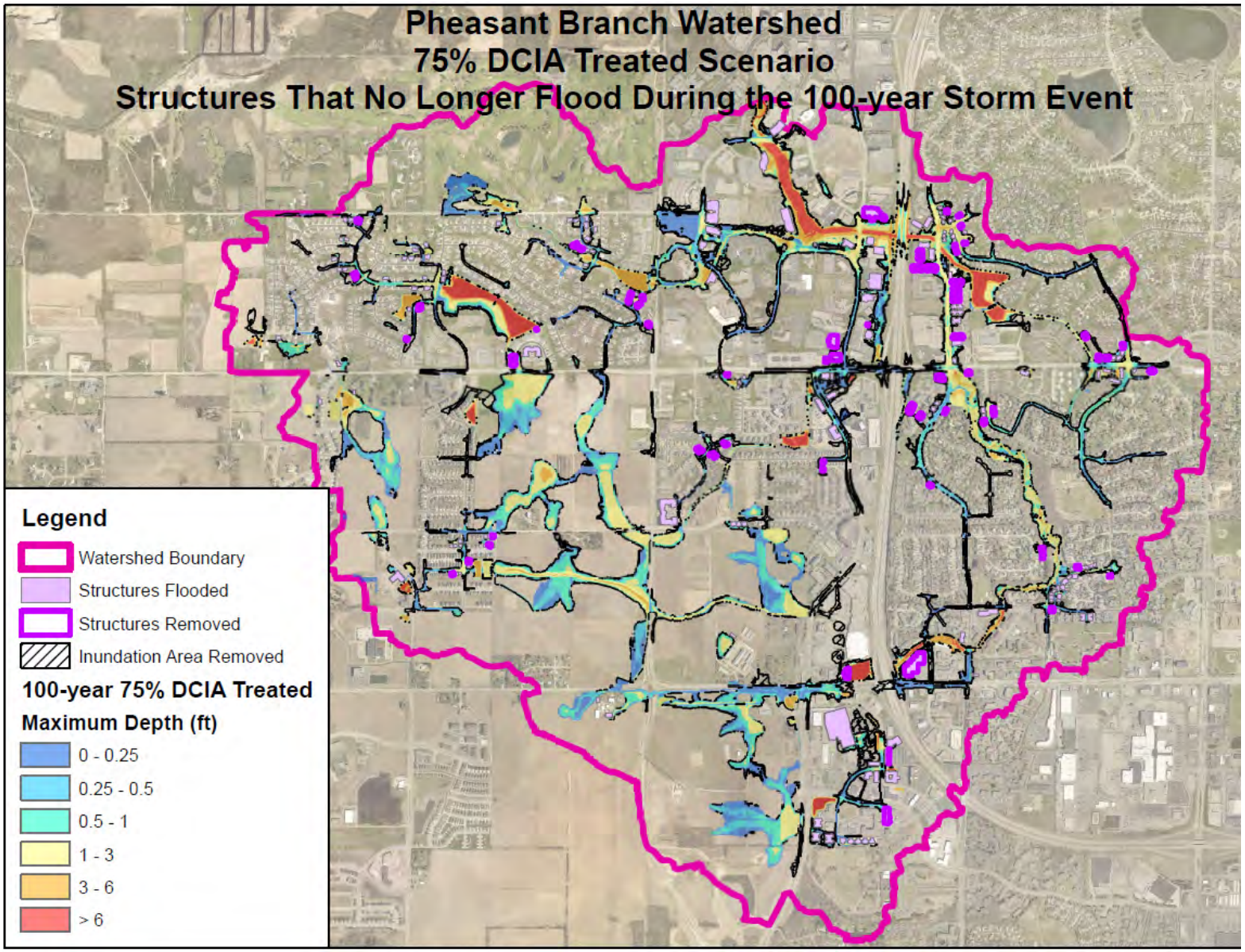


**Figure 4-4. 75% DCIA Treated Scenario, 100-year Storm Event**

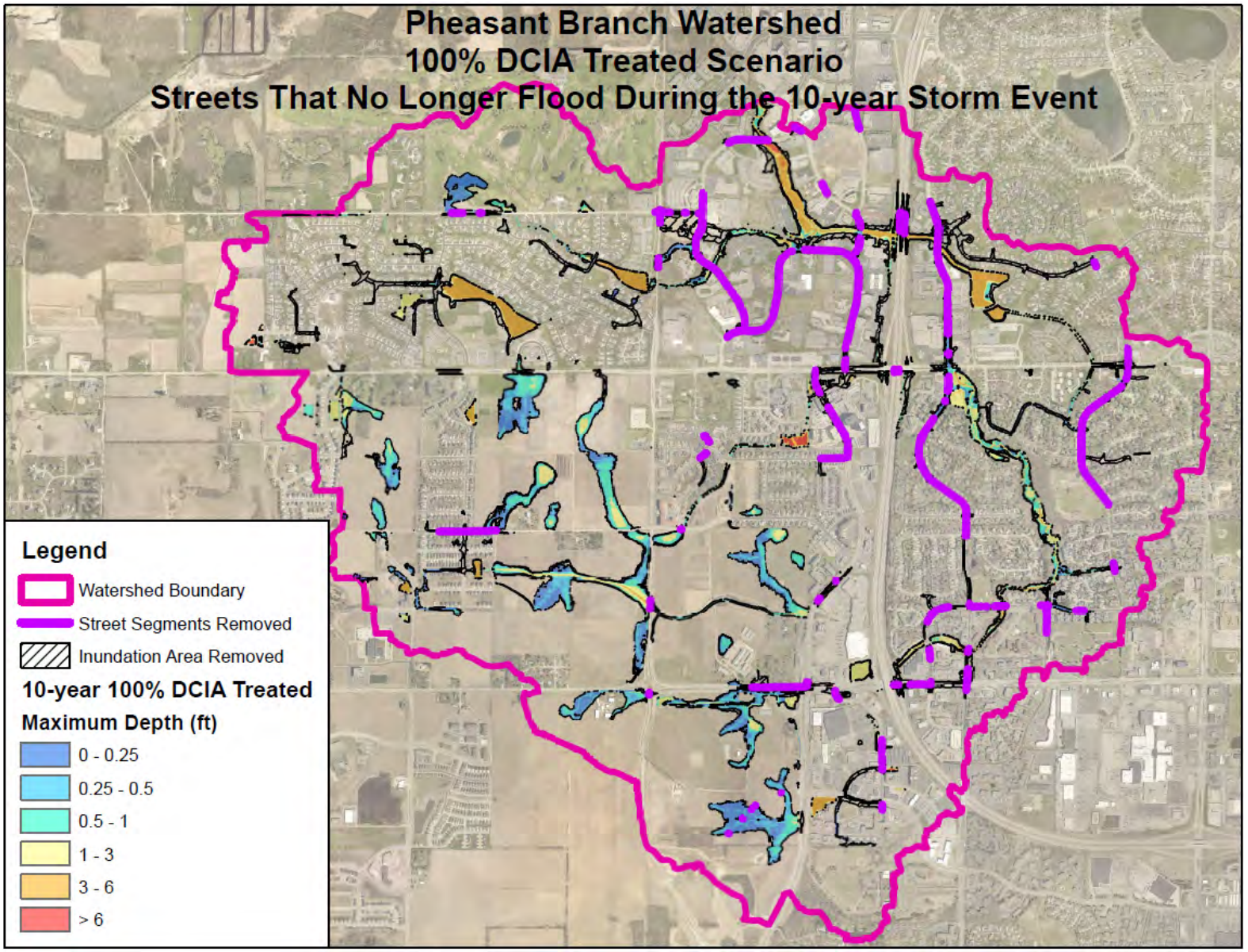


**Figure 4-5. 100% DCIA Treated Scenario, 10-year Storm Event**

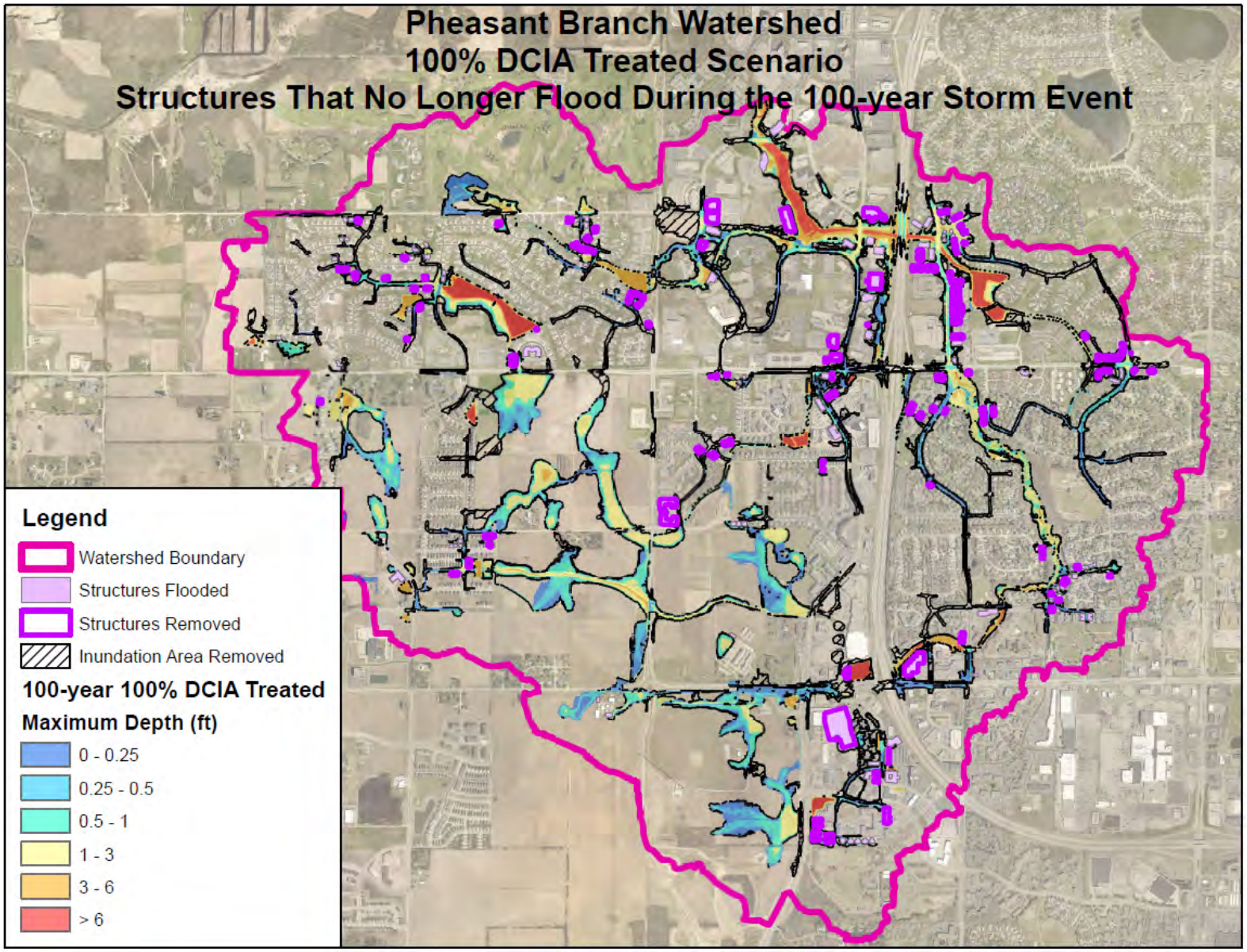


**Figure 4-6. 100% DCIA Treated Scenario, 100-year Storm Event**

## Part 2 – Expand the Opportunities Analysis

The opportunities analysis conducted in Phase I was expanded to include non-residential flat roofs. The analysis was also updated to separately consider pervious areas, streets, and sidewalks available for volume control infrastructure.

The analysis was mostly the same as before except that the three foot buffer was only excluded along parcel boundaries that have residential land use on both sides (instead of along all parcel boundaries). Also, the universal three foot buffer was changed so that there is a three foot buffer around driveways only, and a one foot buffer around the other types of impervious. The potential pervious areas and sidewalks were then calculated separately, and slopes greater than 12 percent were not excluded for pervious areas nor sidewalks.

To find the streets that could potentially be pervious, all of the areas that were excluded as described above were removed from the street polygons along with large areas (greater than 1000 $ft^2$) of street that had a slope greater than 12 percent.

The area of available space for volume control infrastructure in the Pheasant Branch Watershed for this revised analysis was calculated to be: 2,009 acres.

Figure 4-7 shows the area available for volume control infrastructure.

Note, this is a planning level, desktop analysis. Each site needs a detailed investigation before volume control infrastructure could be installed.

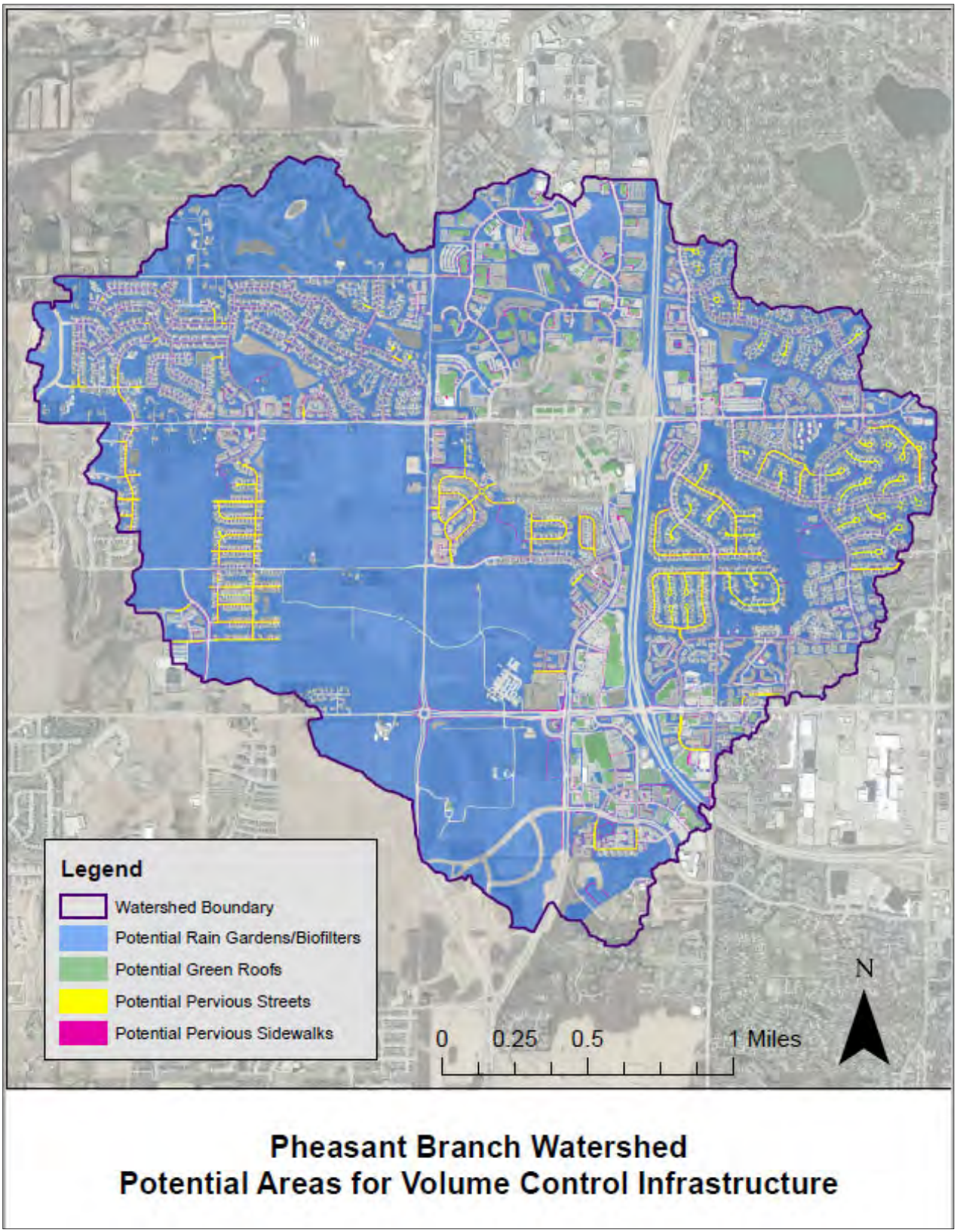


**Figure 4-7. Potential Areas for Volume Control Infrastructure**

## Part 3 –Amount of Land Needed for VCI

Using the potential volume that could be infiltrated from Part 1, the area needed to capture that volume was calculated for each subcatchment, for each of the three scenarios. An assumed depth of 1-foot (open area storage) with an additional foot of rock-filled depth with a porosity of 0.30 was assumed for each VCI. Tab "Step 3 Area Needed for GI" includes the calculation to determine the area for each subcatchment.

Because numbers in a table can be tough to visualize, the area needed was rendered. Figures 4-8, 4-9, and 4-10 show the area needed to treat 25% of the DCIA, 75% of the DCIA, or 100% of the DCIA for each subcatchment.

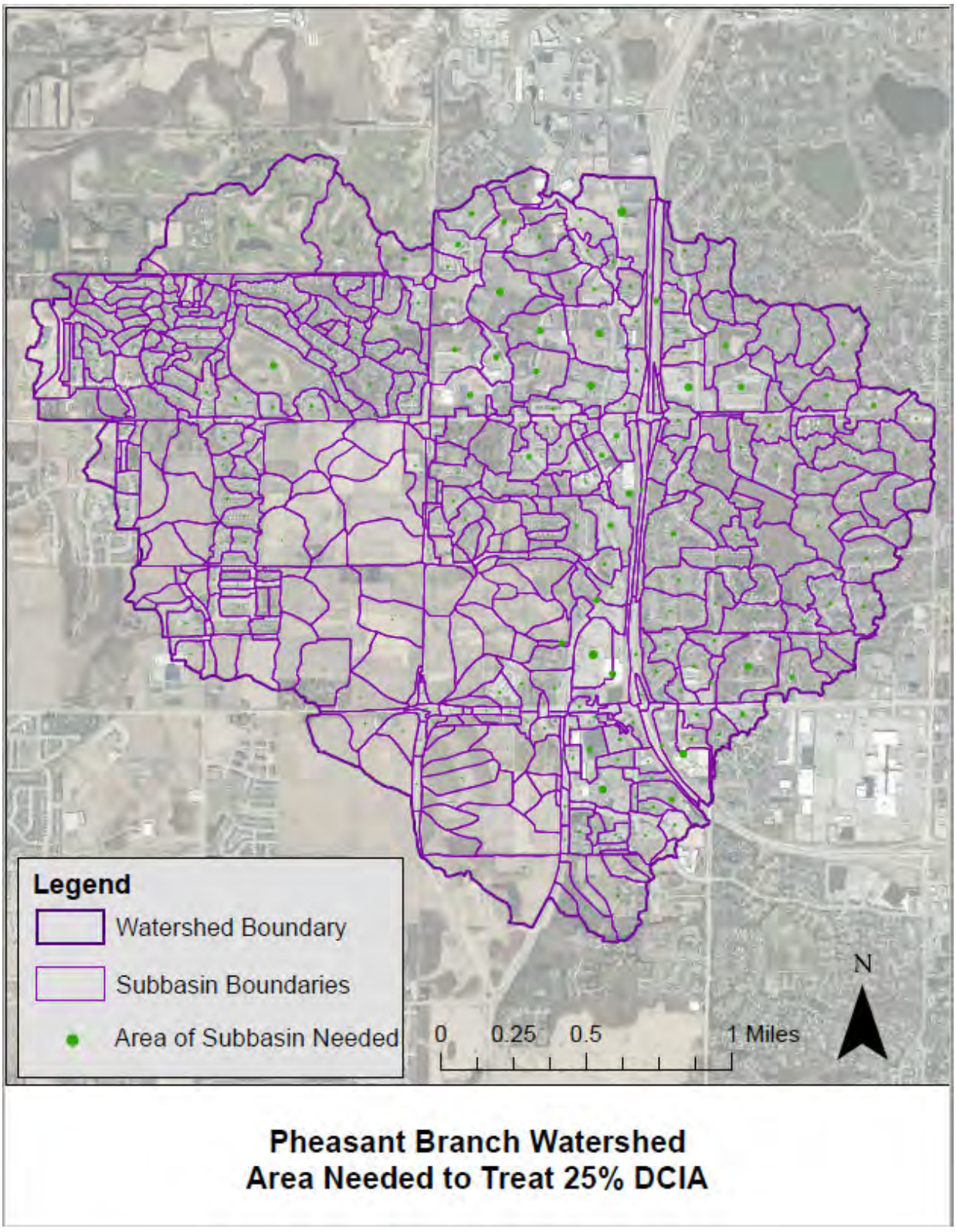


**Figure 4-8. Area of Each Subbasin Needed to Treat 25% DCIA**

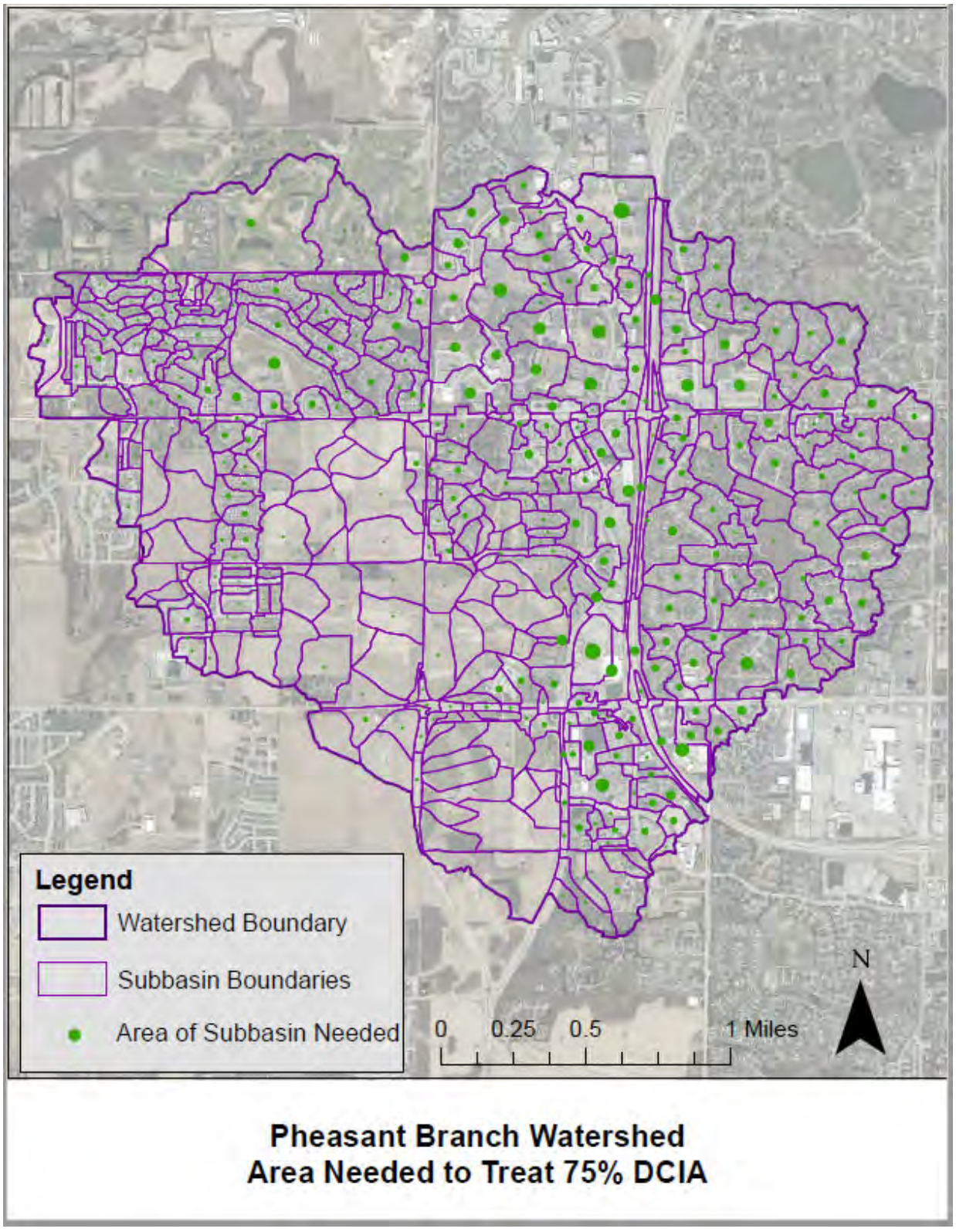


**Figure 4-9. Area of Each Subbasin Needed to Treat 75% DCIA**

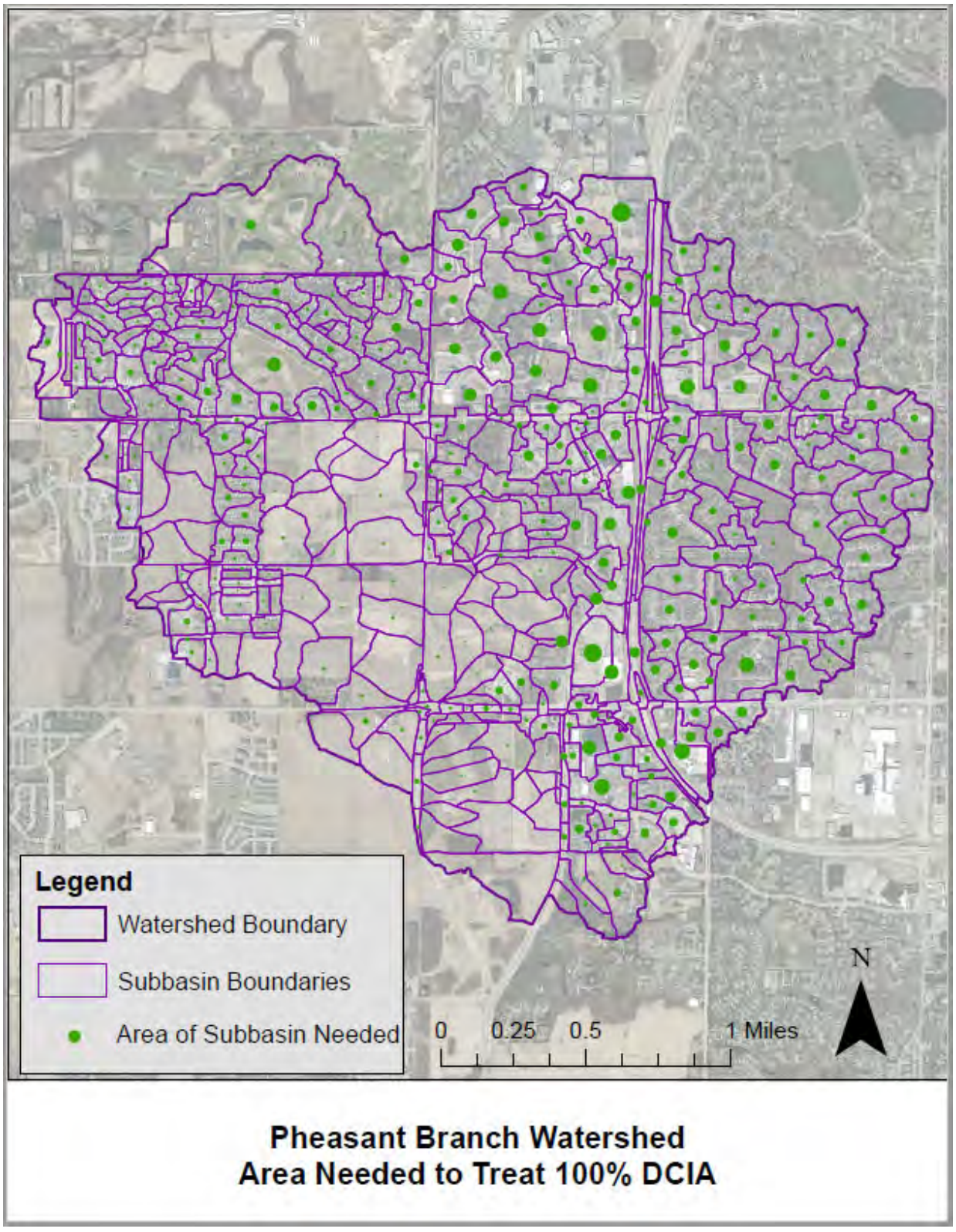


**Figure 4-10. Area of Each Subbasin Needed to Treat 100% DCIA**

## Phase II Conceptual Cost Estimate

Utilizing the unit costs from Phase I, the construction and maintenance costs were estimated for all scenarios. A unit cost for construction of $40 per square foot was used. A unit cost of $3 per square foot was used for maintenance costs.

Table 4-3 shows the results of the conceptual cost estimate.

**Table 4-3. Phase II Conceptual Cost Estimates**

| Scenario | Total Impervious Area Treated (acres) | Total Treatment Area (ac) | Estimated VCI Construction Cost ($) | Estimated VCI Maintenance Cost ($/yr) |
|---|---|---|---|---|
| 25% DCIA Treated | 221.4 | 28.1 | $49,025,000 | $3,677,000 |
| 75% DCIA Treated | 664.2 | 84.4 | $147,076,000 | $11,031,000 |
| 100% DCIA Treated | 885.6 | 112.5 | $196,101,000 | $14,708,000 |

## Phase II Total Phosphorus Load Reduction Estimate

As noted in Phase I, volume control infrastructure can be constructed for several reasons, including stormwater pollution reduction. Using WinSLAMM, the City estimated that the total phosphorus reduction from the 25% DCIA Treated scenario is approximately 382 pounds per year, the total phosphorus reduction from the 75% Treated scenario is 1,141, and the total phosphorus from the 100% DCIA Treated scenario is 1,528.

# Section 5. Reduce Size of Traditional Infrastructure

Following the evaluation in Section 4, Engineering wanted to understand if the traditional flood control infrastructure (storm sewer, detention ponds, etc) could be downsized and still meet flood control goals if the VCI was installed.

The 75% DCIA Scenario was selected for this exercise. This scenario was chosen because it results in a 20% reduction of peak flows at the watershed outlet and it was theorized that a 20% reduction in peak flow could equate to downsizing infrastructure by one size.

The hydrologic parameters from the 75% DCIA Scenario were entered into the computer model with the Ultimate Proposed Conditions solutions. The Ultimate Proposed Conditions solutions are all the infrastructure improvements that need to be made to meet the City's flood control goals, including regional detention, greenway improvements, and local sewer upgrades. The computer model with the traditional infrastructure and VCI was run and the results were summarized.

## One-Size Infrastructure Reduction

Next the infrastructure in the Ultimate Proposed Solutions model was downsized by one size. For purposes of this exercise, one size is:

- Circular Pipe = 6 inches from the diameter
- Rectangular Box Culvert = 1 foot from the span, 1 foot from the rise
- Elliptical = 1 size in the Elliptical sizing chart, i.e. 53"x34" went to 49"x32"

The computer model with the downsized infrastructure was run and the results were summarized. This was then compared to the results from the Ultimate Proposed Conditions model. The comparison showed that the downsized infrastructure with the 75% DCIA scenario hydrology could be downsized and still meet results.

## Two-Size Infrastructure Reduction

To understand how much the traditional infrastructure could be downsized, the traditional infrastructure was downsized by one more size. The computer model with the VCI and traditional infrastructure that was downsized by two sizes was run and the results were summarized. This time, the results showed that the flood reduction targets could not be met with the two-size down traditional infrastructure and the VCI.

## Infrastructure Cost Reduction

The cost estimate for the Ultimate Proposed Conditions traditional infrastructure was compared to the cost of the one-size reduced infrastructure. The one-size reduced infrastructure is approximately $7 million dollars less than the Ultimate Proposed Conditions traditional infrastructure cost. The cost estimate for the 75% DCIA VCI scenario is approximately $147 million. Therefore, the reduction in cost from downsizing the traditional infrastructure in the Ultimate Proposed Conditions solution will not offset the cost of installing VCI.

## Section 6. Additional Benefits of Volume Control Infrastructure

Volume control infrastructure has more benefits than traditional grey infrastructure (peak flow control) solutions. The Dane County Office of Energy and Climate Change published a paper in 2020 entitled "Green Infrastructure for Dane County: Benefits Add Up." This paper describes the type of volume control infrastructure, its benefits and challenges, and provides cost information. References from the paper have been included at the end of this document for ease of reference.

Page 3 of the report describes some major findings in the study, including:

1. A green roof installation cost is about $100 per month less than that of the conventional roof considering their lifespans of 50 years and 20 years respectively (GSA, 2011).
2. Employee's health and productivity are strongly linked to the offices' green environment with Green Infrastructure (National Geographic, 2017).
3. A green roof increases solar panels' efficiency to generate electricity by cooling solar panels' micro-climate, ranging from 3 percent to 16 percent (BuildingGreen 2013).
4. Pervious pavements will decrease about 77 percent of annual salt usage during winter maintenance (County Materials Corporation, 2016).

Section IV includes a long list of benefits including:

- Environmental
    - Increases climate resiliency
    - Improves Water Quality
    - Improves Air Quality
    - Reduced Urban Heat Island Effect
    - Less Salt Use Reduce Water Pollution
    - Enhanced Biodiversity/ Habitat Connectivity
- Societal Benefits
    - Improved Health
    - Health Equity in Community Engagement
    - Reduced Crime Rate
    - Improved Aesthetics
    - Increased Public Education with More Exposure to Green Infrastructure and Nature
    - Social Cohesion
    - More Green Jobs
- Economic Benefits
    - Increased Property Value
    - Increased Employee Productivity
    - Increased Green Jobs
    - Energy Savings from GI with Efficiency Measures

Details regarding each benefit can be found in the Dane County Office of Energy and Climate Change. Many other similar publications are available that document the non-stormwater benefits of green infrastructure.

# Section 7. City of Madison Initial Agency Comments

As part of the watershed study efforts, Engineering staff met with various agency staff to discuss the proposed peak flow control solutions. During these meetings, green infrastructure was touched on by some agencies. Below are the initial comments. This section will be expanded as more meetings occur specifically regarding implementation of volume control infrastructure citywide.

## Traffic Engineering

Some streets in the City of Madison do not lend themselves to volume control infrastructure. Examples include densely urbanized, space-limited, traffic corridors with large traffic counts, such as Atwood Avenue and Winnebago Street.

## Water Utility

Water utility staff are supportive of volume control infrastructure in pervious areas and sidewalks. Pervious pavement in streets can cause challenges for water utility infrastructure. Water mains are generally older and have separation requirements from stormwater systems. Installation of pervious pavement could cause watermain replacement and realignment where it would not have been required with typical pavement.

Additionally, water utility wells have a mandatory 400 foot buffer around any well that exempts construction of a stormwater control measures. Beyond this buffer are the wellhead protection zones where infiltration is prohibited for purposes of protecting groundwater quality. Stormwater control measure in the wellhead protection zones require a clay liner, thus allowing no infiltration.

These areas were removed from the opportunities analysis early on in this study.

## Parks

In the recent past, City of Madison Parks has installed green infrastructure where possible on Parks projects. Parks is generally supportive of green infrastructure installation.

## Fire Department

Engineering discussed use of volume control infrastructure, specifically pervious pavement, in the Fire Lanes with the Madison Fire Department. Some equipment the Fire Department uses, including the ladder trucks, require a strong base to set the equipment supports on. If pervious pavement is to be used in these areas, the Fire Department requests that the load capacity of the pervious pavement is reviewed to ensure Fire Department equipment can be used safely.

# Section 8. Results of Parallel Watershed Phase I Analysis

The City of Madison chose two watersheds currently under study to conduct a modified Phase I Analysis. The purpose of the analyses was to understand if watersheds with different development characteristics found the same results as was found for the Pheasant Branch Watershed Phase I Analysis. The scope for the analyses conducted by the watershed study consultants can be found in Appendix C.

## Wingra West Watershed

Wingra West Watershed is a 1,763-acre, fully urbanized watershed with a large detention area in approximately the center of the watershed's stormwater conveyance system. Development occurred in this watershed from the 1930's to the 1970's, before many of the City's stormwater management requirements were put in place. This watershed was selected due to the large detention area as opposed to the distributed detention in the Pheasant Branch Watershed. The intent is to understand if that has an effect on the Phase I results.

The analysis found similar results to those found for Pheasant Branch. Some areas had larger peak flow reductions depending upon the storm event and some had smaller peak flow reductions. The outlet of the Wingra West Watershed found a 6.8% reduction in the 100-year peak flow for the 25% DCIA scenario. This is very similar to the 5% found for the Pheasant Branch Watershed.

Details of the Phase I Analysis for the Wingra West Watershed can be found in Appendix D.

## Willow Creek Watershed

Willow Creek Watershed is a 1,953-acre, fully urbanized watershed with very few detention areas. Development occurred in this watershed from the 1930's to the 1970's, before many of the City's stormwater management requirements were put in place. This watershed was selected due to the lack of detention areas as opposed to the distributed detention in the Pheasant Branch Watershed.

Additionally, the hydrologic modeling uses for this watershed uses a rain-on-grid method as opposed to the traditional hydrology method of delineating subcatchments and flow paths of the Pheasant Branch and Wingra West Watershed Studies.

The intent is to understand if the differences have an effect on the Phase I results.

The analysis found similar results to those found for Pheasant Branch with a few exceptions. Some areas had larger peak flow reductions depending upon the storm event and some had smaller peak flow reductions. Additionally, some areas saw significance increases in peak flow (the Pheasant Branch and Wingra West Watersheds saw minor increases a few locations, but none were of the magnitude found in the Willow Creek Watershed.) The consultant conducting this analysis indicated the results for these locations are due to the instability in the model calculations in these areas. Therefore, these specific results can be ignored for purposes of this analysis.

Details of the Phase I Analysis for the Willow Creek Watershed can be found in Appendix E.

## Section 9. Additional Analysis – Pervious Area Infiltration Rates

Engineering met to discuss the results from Section 4 and 5. Following the discussion, Engineering conducted further analysis. The first analysis involved evaluating the significance of pervious infiltration rates on peak flow reductions. The infiltration rate parameters for the watershed studies generally used the parameters for turf areas in urban environments. Many of the pervious volume control infrastructure will be planted with deep rooted vegetation. Studies have found that deep routed vegetation significantly increase the infiltration rates of the infrastructure (Selbig, W.R., and Balster, Nicholas, 2010).

Two alternatives were evaluated for the 75% DCIA Scenario. The first alternative assumed all pervious areas were planted with deep rooted vegetation, regardless of if it is volume control infrastructure. The second alternative assumed only the pervious volume control infrastructure was planted with deep rooted vegetation. To simulate the deep routed vegetation, the Maximum and Minimum Infiltration Rates for the Horton Infiltration Parameters were doubled.

Tables 9-1 and 9-2 shows the results of the alternatives evaluation.

**Table 9-1. 75% DCIA Scenario with Deep Routed Vegetation for All Pervious Area**

| | | Existing Conditions | | | 75% DCIA Treated | | | | | | 75% Modified DCIA - All Pervious Area has Roots that Promote Infiltration | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | |
| Recording Location | Location | 1-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) |
| 1 | Outlet of Swallowtail Pond crossing Pleasant View Road | 47 | 68 | 359 | 36 | 24% | 48 | 29% | 294 | 18% | 9 | 80% | 50 | 26% | 185 | 48% |
| 2 | Target Pond Outlet (3 culverts) West to East Under Beltline | 166 | 292 | 468 | 63 | 62% | 164 | 44% | 396 | 15% | 38 | 77% | 129 | 56% | 299 | 36% |
| 3 | Culverts East to West under Beltline just downstream of Wexford Pond | 260 | 646 | 1,435 | 110 | 58% | 419 | 35% | 1,109 | 23% | 27 | 90% | 255 | 61% | 808 | 44% |
| 4 | Watershed Outlet | 228 | 744 | 2,114 | 175 | 23% | 515 | 31% | 1,699 | 20% | 103 | 55% | 234 | 68% | 1,122 | 47% |

**Table 9-2. 75% DCIA Scenario with Deep Routed Vegetation for Pervious Volume Control Infrastructure Only**

| | | Existing Conditions | | | 75% DCIA Treated | | | | | | 75% Modified DCIA - Pervious GI has Roots that Promote Infiltration | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | | 1-yr | | 10-yr (cfs) | | 100-yr (cfs) | |
| Recording Location | Location | 1-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) | Peak Flow (cfs) | Difference (%) |
| 1 | Outlet of Swallowtail Pond crossing Pleasant View Road | 47 | 68 | 359 | 36 | 24% | 48 | 29% | 294 | 18% | 39 | 17% | 53 | 22% | 291 | 19% |
| 2 | Target Pond Outlet (3 culverts) West to East Under Beltline | 166 | 292 | 468 | 63 | 62% | 164 | 44% | 396 | 15% | 60 | 64% | 157 | 46% | 392 | 16% |
| 3 | Culverts East to West under Beltline just downstream of Wexford Pond | 260 | 646 | 1,435 | 110 | 58% | 419 | 35% | 1,109 | 23% | 99 | 62% | 412 | 36% | 1,091 | 24% |
| 4 | Watershed Outlet | 228 | 744 | 2,114 | 175 | 23% | 515 | 31% | 1,699 | 20% | 160 | 30% | 507 | 32% | 1,664 | 21% |

The results of the analysis show a minor increase in the reduction of peak flow rates for the alternative where deep rooted vegetation is only evaluated in the pervious volume control infrastructure. The alternative with all pervious vegetation assumed to have deep roots provided a significant reduction in peak flow rates compared to the 75% DCIA Base Scenario, in some instances, almost doubling the reduction.

## Section 10. Green Infrastructure Pilot Study with USGS

The City of Madison, in conjunction with the United States Geological Survey (USGS), started a Green Infrastructure Pilot Study in late 2019. Volume control infrastructure was installed with the Toepfer, Holly, Euclid, and St. Clair Street Reconstruction Project completed in late 2020. The following volume control infrastructure was installed:

- Pervious Pavement: installed on the south side of Euclid Ave and St Clair St
- Stormwater Terraces: There are different options for stormwater terraces, and the treatments are rated as a bronze, silver or gold treatment, depending on the anticipated impact of the treatment. All Stormwater Terraces will help improve water quality in the lakes, as well as reduce flooding.
- Rock Cribs: Sited in suitable terraces to infiltrate driveway and sidewalk stormwater runoff. These include pervious pavement and a buried section of rocks with grass over the top.
- Pervious sidewalk panels: Installed on the sidewalk between the driveway and street where rock cribs were installed.

The above is treating 15% of the DCIA in one of the Pilot Study subcatchments.

Figure 10-1 shows the location of the project and the volume control infrastructure.

The USGS began monitoring the pilot study area in late 2019. Monitoring equipment was set up in four locations; 3 locations to measure the volume reduction from the volume control infrastructure, and one as a control site. Fully automated, continuously recording, rain gages and flow monitoring equipment was installed at the four sites.

The initial monitoring of the Pilot Study area shows no measurable reduction in runoff volume at the outlet. Monitoring will continue for the next 4 years to monitoring changes of runoff volume in the subcatchments.

More information on the Pilot Study can be found here:
https://www.cityofmadison.com/engineering/projects/green-infrastructure-study

**Figure 10-1. Green Infrastructure Pilot Study Infrastructure Types and Locations**

# Section 11. Conclusions and Next Steps

Traditionally-sized green infrastructure can be used for flood control, however, it takes a significate amount of it to be successful. Additionally, even though it can be used to help with flood control, traditional infrastructure is also needed to meet the City's watershed study flood targets.

The amount of directly connected impervious area treated to make a measurable difference in peak flows for large storm events is about 75%. This means that 75% of the DCIA in a watershed must be treated with green infrastructure. DCIA makes up a mix of roofs, driveways, sidewalks, and streets.

- In the Medium Density Residential No Alleys (MDRNA) standard land use, roofs are approximately 19 percent, streets make up approximately 53 percent, sidewalks make up approximately 5 percent, and driveways make up approximately 23 percent.
- In the Strip Mall Commercial (STRIPCOM) standard land use, roofs are approximately 22 percent, streets make up approximately 22 percent, sidewalks make up approximately 5 percent, driveways make up approximately 2 percent, and parking makes up approximately 45 percent.

### Need to Treat More than Private Property

Table 11-1 below show the average make up for each major land use. The detailed breakdown for each standard land use can be found in Appendix A.

**Table 11-1 DCIA Source Area Breakdown per Major Land Use**

| Source Area | Residential | Institutional | Commercial | Industrial | Other Urban |
|---|---|---|---|---|---|
| Roofs | 23% | 32% | 27% | 31% | 6% |
| Parking | 9% | 30% | 48% | 51% | 20% |
| Driveways | 17% | 6% | 3% | 3% | 25% |
| Sidewalks | 6% | 4% | 4% | 1% | 6% |
| Streets | 45% | 17% | 17% | 14% | 40% |

This means that for residential and other urban land uses (parks) land uses, the streets will need to be treated if the City wants to achieve the goal of treating 75% DCIA. For commercial, institutional, and industrial areas, if all other DCIA is treated, it is possible to reach the goal without treating the streets.

## Next Steps

The next step in this study is to take these results to the various City agencies and the Mayor.

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# Appendix A. WinSLAMM Standard Land Use Source Area Breakdown

**WinSLAMM Standard Land Use Source Area Breakdown**

| | Residential | | | | | | | | | | Institutional | | | Commercial | | | | Industrial | | Other Urban | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| StandardLandUseCode | SUBR | HDRWA | HDRNA | MOBH | DUPLEX | MDRNA | MDRWA | MFR | LDR | HRR | INST | SCH | HOSP | OFFPARK | STRIPCOM | DOWNTOV | SHOPCEN | LI | MI | CEM | OPEN | PARK |
| StandardLandUseDescription | Suburban | High Dens | High Densi | Mobile Hor | Duplex | Medium De | Medium De | Multi Famil | Low Densit | High Rise | Misc. Instit | Schools | Hospital | Office Park | Strip Comr | Downtown | Shopping ( | Light Indus | Medium In | Cemetary | Open Spac | Parks |
| Roof_FlatDirectlyConnected | 0 | 0 | 0 | 16.9 | 0 | 0 | 0 | 3.4 | 0 | 19 | 5.39 | 15 | 31.8 | 13.17 | 19.7 | 40.73 | 21.61 | 20.51 | 16.8 | 0.55 | 0.55 | 0.1 |
| Roof_FlatDisconnected | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.27 | 4.46 | 0 | 0 | 0 |
| Roof_PitchedDirectlyConnected | 0 | 13.6 | 10.3 | 0 | 4.48 | 4.5 | 3.2 | 14.1 | 1.9 | 0 | 8.44 | 0 | 3.92 | 0 | 3.7 | 0 | 0 | 2.57 | 1.85 | 0 | 0 | 0.11 |
| Roof_PitchedDisconnected | 2.6 | 10.6 | 11.1 | 0 | 12.06 | 10.5 | 13.6 | 3.2 | 6.1 | 0 | 0.58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.55 | 0 | 0.25 |
| PavedParking_DirectlyConnected | 0 | 0.4 | 0 | 13.4 | 0 | 0.2 | 0.7 | 10.8 | 0.1 | 21.8 | 27.21 | 10.65 | 20.78 | 42.87 | 40.9 | 23.01 | 60.68 | 32.94 | 34.09 | 2.24 | 0 | 4.19 |
| PavedParking_Disconnected | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| UnpavedParking_DirectlyConnected | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.34 | 0 | 0 | 0 | 0 | 0 |
| UnpavedParking_Disconnected | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.59 | 0 | 1.4 | 0 | 0 | 6.34 | 14.61 | 0.07 | 0 | 0.22 |
| Driveways_DirectlyConnected | 1.6 | 0.7 | 14.1 | 12.3 | 5.31 | 5.6 | 1.6 | 1.9 | 3.2 | 0.9 | 3 | 1.98 | 6.12 | 4.62 | 2 | 1.48 | 1.81 | 2.56 | 1.8 | 7.67 | 0 | 1.21 |
| Driveways_Disconnected | 1.2 | 0 | 0 | 0 | 0 | 1.9 | 0.4 | 0.9 | 1.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Sidewalks_DirectlyConnected | 0 | 3.2 | 2 | 0.5 | 3.96 | 1.1 | 3 | 2.1 | 0.35 | 3.4 | 2.2 | 2.91 | 2.8 | 1.36 | 4.3 | 8.35 | 0.54 | 1.28 | 0.45 | 0.06 | 0.58 | 0.49 |
| Sidewalks_Disconnected | 0.1 | 3.2 | 2 | 0.5 | 0 | 1.1 | 2.9 | 2.1 | 0.35 | 1.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.45 | 0 | 0 | 0 |
| Streets1_Area | 0.7 | 5.4 | 4.5 | 0.6 | 0 | 3.7 | 0 | 6.1 | 2.2 | 9.1 | 4 | 2.68 | 4.24 | 3.11 | 11.5 | 19.96 | 4.22 | 1.84 | 1.13 | 0.72 | 1.72 | 1 |
| Streets2_Area | 3.3 | 13.2 | 9 | 3 | 13.31 | 7.6 | 13.5 | 8.5 | 4.2 | 4.5 | 6.76 | 4.33 | 6.64 | 8 | 8.6 | 2.21 | 2.17 | 8.68 | 6.2 | 0.72 | 2.02 | 2.27 |
| Streets3_Area | 0 | 1.6 | 0 | 0 | 0 | 1.5 | 2.2 | 0 | 0.6 | 4.5 | 1.32 | 1.64 | 0 | 0 | 0 | 0 | 0 | 0.32 | 0.22 | 0 | 0 | 0 |
| LargeLandscapedArea | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 1.4 | 0 | 0 | 5.34 | 22.09 | 5.32 | 5.82 | 0 | 0 | 0 | 3.51 | 2.81 | 86.4 | 0.59 | 77.95 |
| SmallLandscapedArea | 84.8 | 41.5 | 41 | 44.7 | 60.88 | 57.5 | 52.5 | 38 | 74.8 | 22.9 | 26.55 | 17.43 | 14.05 | 18.19 | 5.8 | 3.56 | 4.53 | 9.86 | 4 | 0.23 | 0 | 0.85 |
| UndevelopedArea | 5.5 | 0.3 | 0 | 4.5 | 0 | 0.4 | 0 | 3 | 4.4 | 9.5 | 1.83 | 0.42 | 0.19 | 0 | 0.2 | 0 | 2.93 | 4.34 | 5.37 | 0.48 | 94.54 | 0 |
| Playgrounds_DirectlyConnected | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7 | 17.33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 |
| Playgrounds_Disconnected | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | 0 | 1.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 |
| IsolatedAreas | 0.1 | 0 | 0.1 | 1 | 0 | 0.2 | 0.1 | 0.1 | 0.2 | 0 | 0 | 0 | 1.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0.28 | 0 | 7.08 |
| WaterBodyAreas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OtherPerviousAreas | 0 | 6.3 | 5.9 | 0 | 0 | 4 | 6.3 | 3.8 | 0.2 | 3.2 | 2.65 | 2.19 | 2.5 | 2.29 | 1.9 | 0.62 | 0.82 | 2.77 | 4.53 | 0 | 0 | 0 |
| OtherDirectlyConnectedImperviousAreas | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.35 | 0 | 0 | 0 | 0 | 0 |
| OtherPartiallyConnectedImperviousAreas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | 1.33 | 1.35 | 0 | 0.57 | 0 | 0.08 | 0 | 0.21 | 0.23 | 0.03 | 0 | 2.48 |
| Summary | | | | | | | | | | | | | | | | | | | | | | |
| Directly Connected Impervious Area | 5.6 | 38.1 | 39.9 | 48.7 | 27.06 | 24.2 | 24.2 | 47.4 | 12.55 | 63.2 | 60.02 | 56.52 | 76.3 | 73.13 | 90.7 | 95.74 | 91.72 | 70.7 | 62.54 | 11.96 | 4.87 | 10.27 |
| Disconnected Impervious Area | 4 | 13.8 | 13.1 | 1.1 | 12.06 | 13.5 | 16.9 | 6.3 | 7.85 | 1.2 | 3.61 | 1.35 | 0.59 | 0.57 | 1.4 | 0.08 | 0 | 8.82 | 20.75 | 0.65 | 0 | 3.85 |
| Total Impervious Area | 9.6 | 51.9 | 53 | 49.8 | 39.12 | 37.7 | 41.1 | 53.7 | 20.4 | 64.4 | 63.63 | 57.87 | 76.89 | 73.7 | 92.1 | 95.82 | 91.72 | 79.52 | 83.29 | 12.61 | 4.87 | 14.12 |
| Pervious Area | 90.3 | 48.1 | 46.9 | 49.2 | 60.88 | 62.1 | 58.8 | 46.2 | 79.4 | 35.6 | 36.37 | 42.13 | 22.06 | 26.3 | 7.9 | 4.18 | 8.28 | 20.48 | 16.71 | 87.11 | 95.13 | 78.8 |
| Isolated Area | 0.1 | 0 | 0.1 | 1 | 0 | 0.2 | 0.1 | 0.1 | 0.2 | 0 | 0 | 0 | 1.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0.28 | 0 | 7.08 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Source Area DCIA Breakdown | | | | | | | | | | | | | | | | | | | | | | |
| Roofs | 0% | 36% | 26% | 35% | 17% | 19% | 13% | 37% | 15% | 30% | 23% | 27% | 47% | 18% | 26% | 43% | 24% | 33% | 30% | 5% | 11% | 2% |
| Parking | 0% | 1% | 0% | 28% | 0% | 1% | 3% | 23% | 1% | 34% | 45% | 19% | 27% | 59% | 45% | 24% | 66% | 47% | 55% | 19% | 0% | 41% |
| Driveways | 29% | 2% | 35% | 25% | 20% | 23% | 7% | 4% | 25% | 1% | 5% | 4% | 8% | 6% | 2% | 2% | 2% | 4% | 3% | 64% | 0% | 12% |
| Sidewalks | 0% | 8% | 5% | 1% | 15% | 5% | 12% | 4% | 3% | 5% | 4% | 5% | 4% | 2% | 5% | 9% | 1% | 2% | 1% | 1% | 12% | 5% |
| Streets | 71% | 53% | 34% | 7% | 49% | 53% | 65% | 31% | 56% | 29% | 20% | 15% | 14% | 15% | 22% | 23% | 7% | 15% | 12% | 12% | 77% | 32% |

# Appendix B. Phase I Peer Review

# MEMO

| | |
|---|---|
| ***To:*** | Caroline Burger, Greg Fries, and Janet Schmidt |
| ***Cc:*** | Juli Beth Hinds |
| ***From:*** | Dan Christian and Jim Bachhuber |
| ***Date:*** | October 8, 2020 |
| ***Subject:*** | Distributed Green Infrastructure Analysis Review |

# 1.0 INTRODUCTION

## 1.1 BACKGROUND INFORMATION

Watershed studies for purposes of flood control are being conducted across the City of Madison. Although these studies evaluate a variety of flood control approaches for their performance, the City is particularly interested in the role green infrastructure (GI) can play in stormwater flood control. There is no universal definition of green infrastructure, however the term is generally characterized as non-regional stormwater management measures that are located close to high runoff sources, and promote storage, infiltration and/or evapotranspiration of stormwater. The City conducted a modeling analysis of the impacts of GI utilizing the Pheasant Branch Watershed as a test area. The analysis showed that GI reduced the peak flow from the 1 percent AEP by 4% to 5% at the outlet of the watershed.

The City plans on providing a GI analysis approach for the consultants conducting the first three watershed studies (Spring Harbor, Stricker's/Mendota, and Wingra West) to utilize in their analyses. After studying results from the first three watersheds, the City will determine if this analysis should be conducted in other watersheds being modeled for flood control purposes

## 1.2 REVIEW OBJECTIVE

City Engineering conducted a pilot planning level analysis of GI performance for the Pheasant Branch Watershed. The purpose of the analysis was to understand the data available and how it could efficiently be used to evaluate the effectiveness of GI to reduce the peak flow during large storm events.

# 2.0 SCOPE

## 2.1 REVIEW THE GI ANALYSIS FOR PHEASANT BRANCH WATERSHED

Through an amendment to an existing contract, The City requested Birchline Planning LLC (and the subconsultants Tetra Tech and Jim Bachhuber) to review the modeling analysis information provided by the City (7/14/20) for the Pheasant Branch Watershed. Specifically, the scope of work required a review and comment on the following files:

- GI Analysis 2020_07_03.xls
- GreenInfrastructureEffectivenessAnalysis_PheasantBranchWatershed_v2020_07_14.pdf
- Proposed VCI Scope v2020_07_14_for_Review.pdf

The review addressed the following questions:

1) Is the basis of the analysis technically sound based on current professional standards/methodologies to evaluate the effectiveness of green infrastructure on a large scale?
2) Is the analysis missing something? Should the City look at something additional during this analysis?
3) Is there something in the analysis that is not needed?

4) Does the proposed scope describe the analysis the City is asking for?
5) Is there a better way to do this type of analysis understanding the tools the City has? Tools include a green infrastructure suitability layer, XP-SWMM models using SWMM Hydrology and Horton Infiltration.

## 2.2 DISCUSS ALTERNATIVE DISTRIBUTED GI MODELING APPROACHES

Based on best professional judgement provide opinions on the additional issues listed below:

6) Within the watersheds being modeled in Madison, is there justification for analyzing multiple locations within a watershed for DGI impacts on large storm peak flow rates as opposed to only evaluating the peak flow rate at the outlet of the watershed? (NOTE: The City uses the term "distributed green infrastructure" – DGI – to describe the concept of using GI at multiple locations throughout a watershed.)
7) What are the benefits and limitations of modeling the "extreme DGI" scenario of converting all non-right-of-way (ROW) impervious surfaces to pervious? The purpose of the analysis is to determine if the City's existing stormwater detention and conveyance system is able to safely pass a target design storm peak flow even under the "extreme DGI" scenario.
8) Should the City evaluate stormwater management scenario(s) that looks at the amount of TSS and TP reduction that could be achieved in the areas where there is no current treatment?

# 3.0 TECHNICAL REVIEW

The focus of the review is the *Green Infrastructure Planning Level Analysis for Pheasant Branch Watershed* document (v07/14/2020) prepared by the City. The *GI Analysis 2020_07_03.xls* file was used as supplemental information to understand some of the technical details. The City refers to green infrastructure as "volume control infrastructure", which is meant to promote stormwater infiltration. The stated intent of the modeling analysis was to:

1) Determine the volume of water that would need to be managed if a certain percent of the directly connected impervious area (DCIA) were to be treated,
2) Determine if there is a break point or target for volume control treatment
3) Assess the watershed to see how much area is available for volume control,
4) Assess the impact of infiltration (from DGI) sized for the 1-year event on larger storms,
5) Assess the sensitivity of the existing drainage system to the implementation of volume control stormwater devices to treat directly connected impervious areas, and
6) Determine if the combination of the peak flow control efforts and volume control efforts can provide a quantifiable improvement in the level of service.

## 3.1 CITY'S APPROACH FOR ANALYZING DGI

The City's analysis was conducted in three parts.

Part 1. Determine the resulting flows after assuming complete retention of a certain fraction of DCIA. In this step selected percentages of DCIA (10%, 15%, 20% and 25%) were removed from each subcatchment in the model. For example, if a subcatchment had 1-acre of DCIA, the area would be decreased to 0.90, 0.85, 0.80, and 0.75-acres respectively.

Part 2. This part of the analysis identified potential locations for GI to be conceptually placed. The analysis utilized the City's Geographic Information System (GIS) and was conducted in in conjunction with various City agencies. For each land use type, three scenarios were developed (1) the total available space for GI (meaning 100% placement of GI in all areas. This scenario is not meant to reflect reality, but it represents an idealistic maximum level of control.), (2) the maximum practical space for GI, and (3) a realistic space for GI. Additionally, restricted areas were identified including wellhead protection zones, shallow bedrock, high groundwater and steep slopes. However, the restricted areas were not factored into the final analysis. The runoff reduction volume from Part 1 for

a 1-year storm event was determined and converted to an equivalent total area needed (assuming 1-ft storage depth). The area needed was then compared to the available space determined through the GIS analysis.

Part 3. Using the hydrologic / hydraulic model (SWMM) , 25% of the DCIA for each subcatchment was moved to the non-directly connected impervious area (NDCIA) and depression storage was increased in the NDCIA portion of the subcatchment to offset the increased flow from the 1-year storm event. Hence, this simulates GI sized for the 1-year storm event for 25% of the DCIA. The model was then solved for a range of storm events, up to the 100-year event. An opinion of probable construction and maintenance costs were estimated based on a fixed unit cost. A total phosphorus load reduction was estimated using WinSLAMM.

## 3.2 MANAGING LARGE STORM PEAK FLOW WITH GI

Results of the City's analysis show a 5% peak flow reduction when rerouting 25% of the DCIA area to NDCIA, and a 4% reduction for the "Max DCIA Rerouted" (to NDCIA ) scenario at the outlet of the Pheasant Branch Watershed for a 1% AEP (100-year) event. The principle reason for the relatively low percent removal during a large storm event is that the GI practice (represented by depression storage) is filled by the initial rainfall-runoff so that during the peak intensity of the rainfall the primary mechanism for reducing runoff is infiltration. The selected rainfall distribution plays a significant role in this. It should also be noted that the percent change in peak flow reported under the different scenarios are likely within the error range of the model itself. Hence this means the resulting values from the various scenarios may be considered as "no change" or very little change.

## 3.3 REVIEW COMMENTS ON THE APPROACH

The following comments and questions are offered as we worked through the analysis approach and results.

Removing Areas in the Model. Part 1 took an overly simplistic approach to determining the impact GI would have on the resulting flows. Removing the area from the model assumes that no runoff, regardless of the storm size, contributes flow to the collection system which is not realistic. However, this does provide a quick and simple first approximation and the approach was improved in Part 3. In the future, if the Part 1 approach is used, we recommend maintaining the total area of the subcatchment and instead shifting the DCIA to NDCIA or pervious area.

GI for DCIA Only. GI was only considered for DCIAs. Implementation of GI for NDCIA should also be considered. NDCIAs can still have a significant runoff contribution, particularly for large storm events. A common example of NDCIA would be a rooftop with disconnected downspouts discharging onto a lawn. A common GI practice to use in this scenario would be to covert a portion of the lawn to bioretention thereby increasing the storage and infiltration of the stormwater.

Types of GI Assumed. The memo did not state what types of GI practices were assumed to be applicable in the analysis. Based on the information presented, it appears that only a common bioretention was conceptually placed on existing vegetated areas. Hence no loss of impervious surface was anticipated. For example, a bioretention system in a bump-out along a road or in the corner of a parking lot was not considered which would reduce the impervious area and provide a level of management. Additionally, it does not appear that any type of porous pavement, tree boxes or green roofs were considered. Water harvesting practices could also be used in place of some of the bioretention areas. Leaching systems are another type of practice which might be considered. These may include discrete systems such as a leaching catch basin or subsurface storage vaults but may also include long linear piped systems designed to exfiltrate water. Leaching systems can be placed under impervious surfaces with no net loss or negative impact to the impervious surface. All these systems could be represented in the model.

Old Sauk Rd
Summit Credit Union
Old Sauk Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Old Sauk Rd
Old Sauk Rd
Old Sauk

The impact of only considering open green space for GI implementation is that dense commercial areas (e.g. southwest corner of Old Sauk Rd & W Beltline Hwy, shown in Figure 1) are determined to only have a relatively small amount of GI possible (<10% DCIA removed) and yet these types of development are exactly the area's most in need of improved stormwater management. We suggest documenting the analysis to explain the types of GI considered and under what circumstances. This documentation will also provide a consistent approach for subsequent watershed analysis with generic DGI application.

25% DCIA Max Scenario. Part 1 of the analysis limited the maximum amount DCIA removed to 25%. We were unsure why this limit was placed. Part 2 shows that even with the modest 10-25% DCIA reduction more space is needed than available and would suggest that a 25% reduction in DCIA may be physically not feasible. On the other hand, the reason not enough space is shown may be due to the limited types of GI assumed and if a wider range of GI practices was considered (i.e. the previously mentioned green roofs, impervious pavement, etc.) a larger amount of DCIA removal may be possible.

25% DCIA Reduction Target for Pheasant Branch. Part 2 Step 2 of the analysis (bottom of page 5 of the City's memo) states that the City chose a treatment goal of 25% of the DCIA for Pheasant Branch Watershed for two reasons, one of which was that overall, "land is available to treat 25% of the DCIA in the watershed." According the MS Excel worksheet *2 Step 5 Compare Areas* the cumulative area needed for the 1-year event with a 25% DCIA reduction is 1,958,970 square feet (column EK) and the cumulative area still needed (column EL) is shown in Table 1. Unless we're interpreting the information incorrectly, since the cumulative area still needed is greater than zero, this suggests that land is not available to treat the 25% DCIA reduction.

Table 1 25% DCIA Reduction, 1-year Event

| Restrictions | GI Area | Cumulative Area Still Needed (sf) |
|---|---|---|
| More Restrictive | Realistic | 435,108 |
| Less Restrictive | Realistic | 275,598 |
| More Restrictive | Maximized | 334,975 |
| Less Restrictive | Maximized | 208,655 |
| More Restrictive | All Available | 203,834 |
| Less Restrictive | All Available | 56,161 |

Size GI for 1-year Event Volume. Part 2 of the analysis initially considered the 1- and 10-year event volumes but then stated that "*future calculations would only be done for the 10-year storm*". If the objective is to manage the peak flow from severe storms, sizing stormwater management practices (including GI) for larger storm events would be beneficial. There is no assessment regarding the feasibility of "upsizing" the standard GI design to capture and hold a larger amount of runoff.

## 3.4 SCOPE QUESTIONS

The following specific questions were identified in the scope of work to be addressed (refer to Section 2.1 and 2.2). The questions and answers are provided below.

### *Question 1: Is the basis of the analysis technically sound?*

Based on our opinion and professional judgement the methodology followed to evaluate DGI on a large watershed scale is technically sound. Specifically, the approach used in Part 3 of the analysis whereby depression storage on pervious surface was increased to represent an equivalent amount of DGI is a reasonable approach to use in a SWMM model.

### *Question 2: Is the analysis missing something?*

As mentioned in our review comments, we suggest: 1) broadening the type of GI practices considered and 2) including GI for NDCIA. These two changes should result in GI practices possible on more land which then will lead to a reconsideration of the upper "treatable" limit (currently set at 25% of the DCIA).

The current approach focuses only on DGI practices. It is our understanding that the City has already assessed larger scale management measures (i.e. enhancing existing and/or adding new regional stormwater basins) and "grey infrastructure (i.e. larger storm sewers, re-routing, pumps, etc.). If this is the case, the City may wish to combine the "regional" approach, the "DGI approach", and grey infrastructure to assess flood benefits from a comprehensive management scheme. It is very likely that no one solution will achieve the flood control goals.

Green (or living) roofs do not appear to be considered in the analysis and would require a slightly different approach than relying on modeling them as pervious area depression storage. If green roofs are considered in the evaluation, a similar modeling approach would be to increase the impervious area depression storage by the equivalent storage amount provided by a typical green roof design. Although green roofs are designed to drain, during a discrete design storm the use of impervious area depression storage is a reasonable approximation.

We suggest expanding the way in which the benefits of GI are documented. Currently the primary measure of success is the expected peak flow reduction from the 1 percent AEP (100-year) discrete design storm with a MSE 4 distribution at the downstream end of the watershed. This is a very high standard to meet with DGI practices. The peak flow reduction at an intermediate point (for example conduit TO2255-024_TO2355-056 in the memo) was also quantified along with total phosphorus (TP) pollution reduction. We suggest processing the model with a continuous rainfall record and quantifying the reduced magnitude, frequency and duration of flooding as a result of the GI practices to document the improved resiliency of the system. Other additional benefits of GI (such as heat island benefits, pollution reduction, etc.) could be quantified as well for a holistic approach.

***Question 3: Is there something in the analysis that is not needed?***

Part 1 of the analysis was a good first step to begin to quantify the impact of distributed GI but is not needed moving forward. Quantifying the available space (Part 2) and modeling the impact of GI (Part 3) are still needed.

***Question 4: Does the proposed scope describe the analysis the City is asking for?***

Our review found the draft scope of work was technically sound to address the analyses. We suggest changing the scope approach to be consistent with the recommendations in this memo such as:

- Part 1 - remove
- Part 2 - expand the opportunity analysis to include other types of DGI and addressing GI management on NDCIA
- Part 3 - solve the model for fractions of the total the total DGI opportunities up to 100%.

We did not review the scope of work for its clarity to carry out the tasks, or legal aspects.

***Question 5: Is there a better way to do this type of analysis understanding the tools the City has?***

Based on our current review and our understanding of the City's objectives, we do not have a preferred alternative approach to recommended beyond the suggested changes discussed in this memo.

***Question 6: Within the watersheds being modeled in Madison, is there justification for analyzing multiple locations within a watershed for DGI impacts on large storm peak flow rates as opposed to only evaluating the peak flow rate at the outlet of the watershed?***

We suggest quantifying the benefits at multiple points within the watersheds. Portions of the watershed may be more amenable to GI practices than others and the results of this may not be apparent unless results at intermediate points in the watershed are considered. Key locations for discharge analysis may be identified based upon the drainage areas' density of land use and potential for DGI, important locations from a safety and/or emergency access perspective, or other factors.

***Question 7: What are the benefits and limitations of modeling the "extreme DGI" scenario of converting all not right-of-way (ROW) impervious surfaces to pervious.***

Modeling any extreme condition provides a boundary for the expected results. Understanding if the municipal collection system can handle just the road rights-of-way (ROWs) may be useful in understanding the scope of the problem. If the existing collection system cannot handle the runoff from the roadway, regardless of what is done on private property, it would then suggest that improvements within the ROW are required regardless of what is done outside of the ROW.

***Question 8: Should the City evaluate stormwater management scenario(s) that looks at the amount of TSS and TP reduction that could be achieved get in the areas where there is no current treatment?***

When selecting a preferred alternative, we believe it is important to equitably compare the options. This means quantifying a range of benefits, including water quality improvements, for all the options. However, since the focus of the analysis, and primary goal of the program is flood management (i.e. large events), a weighting system or prioritization value should be given to the flood control benefits over water quality.

# 4.0 IDEAS TO CONSIDER

## 4.1 MODIFIED GI DESIGN APPROACHES

Traditionally GI practices have been designed and constructed for water quality treatment purposes. For water quality treatment purposes, capturing and treating the initial runoff, and the more frequent storms are the most beneficial. If a primary objective is to manage the peak flow from large storm events, criteria for design and construction of GI practices should be revisited. Presumably the City still wants the water quality improvement benefits of the GI in addition to peak flow control. Some ideas to achieve both a water quality and peak flow control objectives include:

- Increase the size the GI practice to capture more water.
- A multistage outlet control structure whereby small storm events are fully captured, and large storm events receive peak flow control. This approach will require additional storage volume.
- A smart outlet control structure whereby discharge from the practice is automatically regulated by looking at forecasted rainfall and minimizes discharge during times of peak rainfall. Multiple smart outlets may be coordinated to stagger discharge in order to minimize the combined peak discharge.

## 4.2 ROAD CORRIDORS

Determining where GI practices can fit within roadway corridors is challenging. The City has conducted this approach over several years. One approach to consider is to group roadways into common classes and based on representative block(s) determine the amount of GI that could be constructed. Refer to Figure 2 for of an example GI quantity along a commercial street. The amount of GI can then be presented on a unit basis, e.g. square feet of GI per linear foot of roadway. Refer to Table 2 for an example of GI by typical street (note this is an example for a specific watershed study, not a generic case). The quantity of GI to include for modeling purposes can then be calculated within a GIS once the quality of different roadway typologies is known.

Figure 2 Example GI on a Commercial Street Section

Table 2 Characteristics of Typical Street Sections with Area of Practical Maximum GI

| Street Classification | Practice Area (sft) | | | ROW Width (ft) | Ex. Sidewalk width (ft) | Ex. Street Width (ft) | Street Length (ft) |
|---|---|---|---|---|---|---|---|
| | Bioretention | Pervious Pavement | Planter Box (Lined) | | | | |
| Alley | | 8,100 | | 16 | | | 585 |
| Commercial | 4,900 | 11,100 | | 66 | 5 | 46 | 956 |
| Industrial | | | 9,500 | 66 | 12 | 42 | 1218 |
| Residential | 4,400 | 13,000 | | 66 | 5 | 30 | 722 |

## 4.3 ECOSYSTEMS SERVICES ANALYSIS

Another option to consider involves a more holistic approach by incorporating city goals beyond flood control. For example, a multifunctional benefits analysis involving issues such as infrastructure resilience, heat island, air quality, groundwater recharge, erosion, plant biodiversity, tree canopy, habitat, access to greenspace, landscape aesthetics, and social vulnerability. This type of analysis can demonstrate the true benefits of GI over constructing larger storm sewers to only increase conveyance. An analysis of this type often identifies the demand within the study area for various services (based on city goals) and pairs that with potential benefits provided by each type of stormwater management practice.

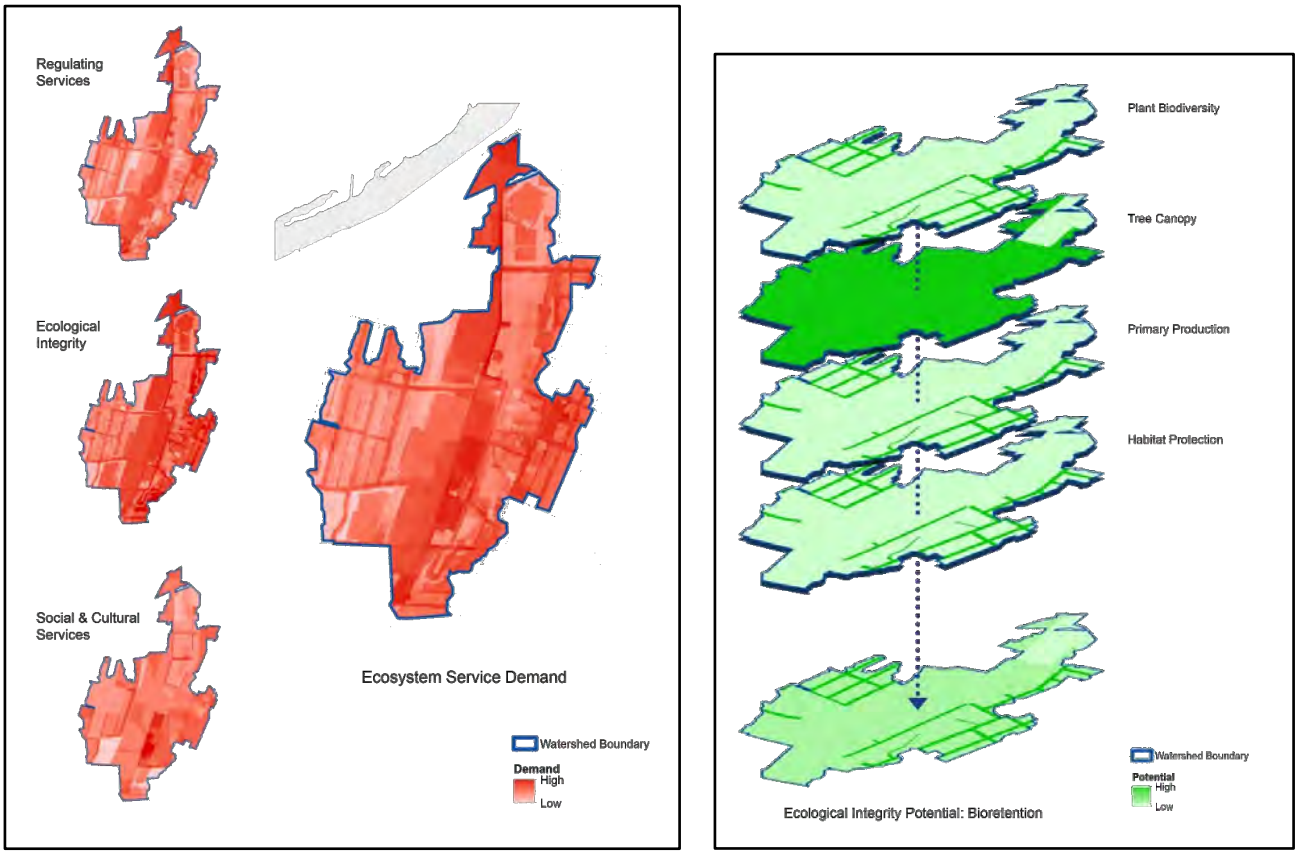



Figure 3 Example Ecosystem Services Analysis

# Appendix C. Phase I Analysis Scope for Consultants

**Watershed Studies – Phase I Volume Control Proposed Tasks**
v10/08/2020

The City has conducted an initial analysis of the effect of distributed green infrastructure (volume control practices) in the Pheasant Branch Watershed. The intent of the analysis is to understand if sizing distributed green infrastructure in the traditional manner (generally the smaller, more frequent events) has an effect on the peak flows for the large storm events (> 10-yr recurrence interval).

The City requests this analysis be repeated in two more watersheds in the City to understand if the results are similar. The two watersheds chosen are Wingra West and Willow Creek.

a. Wingra West was chosen because it's fully urbanized (unlike Pheasant Branch) and it has a large storage area (Odana Hills Golf Course Ponds) in the middle.
b. Willow Creek was chosen because it's a fully urbanized watershed with little to no storage and is being done with rain-on-grid. If The City goes forward with more rain-on-grid, we want to see how the distributed GI analysis would be done with that approach.

The scope below describes Phase 1 of the distributed green infrastructure (volume control) analysis. There may be additional Phases depending upon the results of this analysis and the extended analysis the City is conducting in-house.

The City has also created a working spreadsheet that the Consultant may utilize for this effort if they deem appropriate.

**Task 6.1 – Phase I Volume Control Analysis (VC)**

<u>Step 1 – Create the models</u>

Determine the effect on peak flows for the 10-year and 100-year, 24-hour events if 1) 10% of the DCIA (Directly Connected Impervious Area) is routed to green infrastructure and 2) 25% of the DCIA is routed to green infrastructure.

To do this, move the %DCIA removed to NDCIA (Non-Directly Connected Impervious Area) for each subcatchment. Then, adjust the pervious area storage based on the assumed sizing of the distributed green infrastructure (DGI). For purposes of this exercise, when adjusting the pervious area storage assume: 1) the DGI has a depth of 1 foot of open air storage, 2) no engineered media, and 3) the porosity of the underlying native soil is not taken into account.

Create one model for the 10% DCIA removed and a second model for the 25% DCIA removed.

Run both models for the 1-yr, 10-yr, and 100-yr events and tabulate results.

Initial deliverable includes:

1) Table noting the flooding depth (ft) and peak flow (cfs) for the 25 locations identified during Task 4.

Step 2 – Meet with the City to go over the results.

Following Step 1, the Consultant will meet with the City to go over the results.

Deliverable includes:

1. Meeting minutes from meeting

Step 3 – Finalize analysis based on meeting with City

Revise the analysis based on feedback from the City.

Deliverables for this step shall include:

1) Color figures showing the maximum extent of flooding during each storm event. The figures shall be color coded to show depth of flooding (typical ranges utilized are: 0.01'-0.25', 0.25'-0.5', 0.5'-1.0', and greater than 1').
2) Table noting the flooding depth (ft) and peak flow (cfs) for the 25 locations identified during Task 4.
3) Model files and documentation.
4) GIS files generated for model development. All files shall be delivered to the City on an external hard drive.

**Task 6.1 – Phase II Volume Control Analysis (VC) - TBD**

# Appendix D. Wingra West Phase I Analysis

# Memorandum

8383 Greenway Blvd. # 600
Middleton, WI 53562

**Date:** April 21, 2021

**Prepared for:** City of Madison: Caroline Burger, PE, Env SP
Lauren Striegl, PE
Phil Gaebler, PE

**Subject:** Wingra West Watershed – Green Infrastructure Evaluation
**Project No.:** City of Madison: 8412, BC: 153394

**From:** Mike Wegner, PE & Doug Joachim, PE
**Copy:**

## Background

In response to recent flooding events, including an extreme flood event resulting from 10.5 inches of rain over a 12-hour period in August 2018, the City of Madison (City) has begun conducting comprehensive stormwater management studies for each major watershed within the City. The studies are intended to help the City better understand the causes of flooding in each watershed and identify potential improvements to their stormwater management system to mitigate future flooding issues.

The stormwater management studies are conducted in two phases: The first phase includes the development of a hydrologic/hydraulic (H&H) stormwater runoff model that represents the physical and drainage properties of the watershed under existing conditions. The second phase utilizes the model developed in the first phase to evaluate alternative methods and infrastructure improvements that can eliminate or reduce flooding impacts from large rain events.

As part of this program, Brown and Caldwell (BC) is currently completing the Wingra West Watershed Study in western Madison. An existing conditions model was developed and calibrated using XPSWMM™ 2D modeling software. The results of the existing conditions analysis are detailed in a report dated April 17, 2020 entitled "Wingra West Watershed: Existing Conditions Report."

As part of the second phase of the Wingra West Watershed Study, an evaluation of the potential benefits that could be achieved using distributed green infrastructure (GI) for volume control (VC) was conducted. Conceptually, GI will facilitate the infiltration of stormwater runoff, which will reduce peak stormwater flows and reduce downstream flood impacts while also limiting the size and cost of future infrastructure improvements designed for flood control. This tech memo details the modeling process and results obtained from this analysis.

## Model Assumptions

A detailed evaluation of GI, and its potential impacts on flooding during larger storm events, was completed for the Pheasant Branch Watershed by the City of Madison. The analysis of GI for the

Wingra West Watershed was completed following the methodology developed by the City for the Pheasant Branch Watershed.

To simplify the GI analysis, the following model assumptions were used:

- GI will be applied uniformly across the watershed.
- Each subcatchment in the watershed has adequate space available to implement GI.
- The GI will be sized to fully contain the 100% chance storm event from the GI contributing area. Infiltration within the GI practices is ignored.
- The effects of GI will be approximated in the model by moving a portion of each subcatchment's directly connected impervious area (DCIA) to non-DCIA and increasing the depth of storage in the subcatchment's pervious area.

## Analysis Scenarios

For this analysis, two GI scenarios were analyzed in the Wingra West watershed for the 100%, 10% and 1% chance rainfall events. The scenarios considered the impacts to the watershed if different amount of impervious area within the watershed are directed to GI.

The first scenario assumed 10% of DCIA will be re-directed to GI. The second scenario assumed 25% of the DCIA will be re-directed to GI.

## Model Modifications

The Wingra West existing conditions model was modified to incorporate GI through the following steps:

1. A model was created and run for the 100% chance storm event (2.49 inches of rainfall over 24 hours) with 10% and 25% DCIA removed entirely for Scenarios 1 and 2 respectively for each modeled subcatchment. The results of this model run were then compared with the model results from Step 2.
2. A model was created and run for the 100% chance storm event with 10% and 25% DCIA moved to non-DCIA for Scenarios 1 and 2 respectively for each subcatchment. The storage available in each sub-catchment's pervious area was "scaled up" to allow additional storage equal to the 100% chance storm event (2.49 inches) multiplied by the DCIA area moved.
3. Because infiltration occurs as part of the hydrologic calculations within the model in the pervious area, the models created in Step 2 were shown to be reducing peak flows more than the models in Step 1. To rectify this situation, the models in Step 2 were run iteratively by reducing the amount of storage available in the pervious area until the peak flows generated in these models were approximately equal to the peak flows generated in Step 1.

## Evaluation of GI Impacts

The final models identified in Step 3 above were executed for the 100%, 10% and 1% chance rainfall events for Scenarios 1 and 2 to determine the resulting impact of GI in the Wingra West watershed. Peak flows and peak water surface elevations at twenty-five locations (key locations identified in the existing conditions report) and at the watershed outlet were compared to existing conditions results. The complete results are summarized in Tables VC-1, VC-2, and VC-3 following this memo. The locations that correspond to the comparison points on the table are shown on Figure 4-6 (excerpted from the Wingra West Watershed: Existing Conditions Report).

The analysis showed larger reductions (measured by percent change) in peak water surface elevations and peak flow rates during the smallest event (100% chance rainfall event) considered.

The impact of GI was more limited during the 10% and 1% chance events. The largest reduction in flow rate observed for the 1% chance event was 8% with reductions of 2% to 3% more typical. At the outfall from the watershed (the outlet from Secret Pond); the reduction in peak flow rate was 6.8%, 5.6%, and 2.4% for the 100%, 10%, and 1% chance storm events, respectively.

N

MINERAL POINT RD

ODANA RD

ODANA RD

SW BIKE PATH

NAKOMA RD

S MIDVALE BLVD

S WHITNEY WAY

MONROE

## Legend

- Results Reporting Locations
- Storm Sewer
- Open Channel
- Wingra West Watershed

Note: See Tables D-1 and D-2 for each Reporting Location's corresponding flood elevation.

2/14/2020

**Figure 4-6**
**Results Reporting Locations**
Wingra West Watershed Study:
Existing Conditions Report
City of Madison, WI

0 500 1,000
Feet

Brown AND Caldwell

*Air Photo: City of Madison, 2018*

Path: P:\Madison, City of\153394 West Wingra Watershed Study\GIS\MXDs\ExCondReportFigures\Fig4-6-ReportingLocations.mxd

**Table VC-1 - 100% Chance Storm Event**
**Volume Control Analysis Results**
**Wingra West Watershed Study, City of Madison, WI**

| | | | | | Existing Conditions Results | | | 10% DCIA Rerouted to Green Infrastructure | | | | | | 25% DCIA Rerouted to Green Infrastructure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 100% Chance Storm | | | 100% Chance Storm | | | | | | 100% Chance Storm | | | | | |
| Point | XP-SWMM Node | XPSWMM Link | Location | Flood Elevation | Peak WSE | Flood Depth (ft) | Peak Flow (cfs) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) |
| | PD_4061-006 | MMY_1_WW_OUTFALL_1 | Secret Pond Outfall | 867.5 | 860.4 | -7.1 | 229.1 | 860.4 | -7.1 | 0.0 | 223.8 | -5.4 | -2.3% | 860.3 | -7.2 | -0.1 | 213.5 | -15.6 | -6.8% |
| 1 | WI02-D-0193-H-001 | 3961-075_3961-076 | Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd | 862.6 | 863.1 | 0.4 | 41.9 | 863.0 | 0.4 | -0.1 | 33.0 | -9.0 | -21.4% | 862.9 | 0.2 | -0.2 | 19.9 | -22.0 | -52.4% |
| 2 | WI02-D-0193-H-009 | 3964-009_3964-008 | Intersection of Seminole Hwy & Manitou Way | 929.3 | 925.5 | -3.8 | 4.3 | 925.4 | -3.9 | -0.1 | 4.1 | -0.2 | -4.9% | 925.2 | -4.1 | -0.3 | 3.7 | -0.5 | -12.7% |
| 3 | WI02-C-0190-H-000 | BC_JCT_51_BC_JCT_52 | Intersection of Chippewa Dr & Nakoma Rd | 873.0 | 874.7 | 1.7 | 284.9 | 874.5 | 1.5 | -0.2 | 268.2 | -16.7 | -5.9% | 874.1 | 1.1 | -0.6 | 239.2 | -45.7 | -16.0% |
| 4 | WI02-C-0188-H-000 | 3961-050_BC_JCT_50 | Intersection of Chippewa Dr & Cherokee Dr | 892.8 | 894.2 | 1.3 | 271.8 | 894.1 | 1.3 | -0.1 | 256.5 | -15.3 | -5.6% | 894.0 | 1.2 | -0.2 | 234.0 | -37.8 | -13.9% |
| 5 | AS3862-003 | 3862-018_3862-003 | Intersection of Yuma Dr & Cherokee Dr | 912.8 | 910.8 | -2.0 | 75.5 | 910.7 | -2.1 | -0.2 | 70.7 | -4.7 | -6.3% | 910.4 | -2.4 | -0.4 | 61.6 | -13.8 | -18.3% |
| 6 | WI02-C-0188-H-011 | 3763-008_3763-016 | Intersection of Midvale Blvd & Cherokee Dr | 967.5 | 968.0 | 0.5 | 28.5 | 968.0 | 0.5 | 0.0 | 26.5 | -2.1 | -7.2% | 967.9 | 0.4 | -0.1 | 23.1 | -5.4 | -19.0% |
| 7 | WI02-C-0188-H-017 | BC_JCT_140_BC_JCT_142 | Intersection of Chippewa Dr & Council Crest | 937.9 | 938.1 | 0.1 | 184.8 | 938.0 | 0.1 | 0.0 | 174.7 | -10.1 | -5.5% | 938.0 | 0.1 | 0.0 | 156.4 | -28.4 | -15.4% |
| 8 | IN3761-056 | WAITECIRCLE_3861-045 | West end of Waite Circle | 956.8 | 958.4 | 1.6 | 174.3 | 958.2 | 1.4 | -0.1 | 163.8 | -10.4 | -6.0% | 957.9 | 1.1 | -0.4 | 146.3 | -27.9 | -16.0% |
| 9 | AS3760-034 | 3760-034_3760-015 | Intersection of Midvale Blvd & Odana Rd | 986.9 | 986.4 | -0.5 | 37.5 | 986.3 | -0.6 | -0.2 | 37.2 | -0.3 | -0.8% | 985.9 | -1.0 | -0.6 | 36.7 | -0.9 | -2.3% |
| 10 | AS3762-026 | 3762-035_3762-026 | Intersection of Midvale Blvd & SW Bike Path | 972.7 | 969.1 | -3.6 | 4.4 | 969.1 | -3.6 | 0.0 | 4.3 | -0.1 | -2.4% | 969.1 | -3.6 | -0.1 | 4.1 | -0.3 | -6.3% |
| 11 | WI02-C-0324-H-000 | 3765-017_BC_JCT_129 | Verona Road, Immediately North of Beltline Highway | 1002.7 | 1002.7 | 0.0 | 29.2 | 1002.7 | 0.0 | 0.0 | 26.0 | -3.2 | -10.9% | 1002.7 | 0.0 | 0.0 | 20.4 | -8.8 | -30.0% |
| 12 | WI02-C-0324-H-005 | 7645-023_10_BC_JCT_106 | Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy | 997.2 | 998.6 | 1.5 | 9.7 | 998.6 | 1.4 | -0.1 | 8.8 | -0.9 | -9.4% | 998.5 | 1.3 | -0.2 | 7.5 | -2.2 | -22.3% |
| 13 | STOR_12 | 3562-001_3662-002 | Odana Golf Course - Entrance of 42" Storm Sewer | 978.0 | 979.5 | 1.5 | 21.7 | 979.4 | 1.4 | -0.1 | 19.8 | -1.9 | -8.6% | 979.2 | 1.2 | -0.3 | 16.8 | -4.9 | -22.5% |
| 14 | PD_3462-002 | PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636 | Odana Pond | 980.0 | 979.5 | -0.5 | 111.0 | 979.4 | -0.6 | -0.1 | 87.3 | -23.7 | -21.4% | 979.2 | -0.8 | -0.3 | 60.4 | -50.6 | -45.6% |
| 15 | WI01-A-0179-H-001 | 3460-019_3461-001 | Intersection of Milward Dr & Wedgewood Way | 982.3 | 983.5 | 1.1 | 13.5 | 983.3 | 1.0 | -0.1 | 12.5 | -0.9 | -6.9% | 983.1 | 0.7 | -0.4 | 10.9 | -2.6 | -19.2% |
| 16 | WI01-A-0179-H-003 | 3461-007_3461-008 | Intersection of Milward Dr & Dearholt Rd | 981.3 | 982.4 | 1.1 | 20.2 | 982.4 | 1.1 | 0.0 | 18.8 | -1.5 | -7.3% | 982.3 | 1.0 | -0.1 | 16.6 | -3.7 | -18.2% |
| 17 | WI01-A-0179-H-006 | 3460-002_3460-003 | Intersection of Sherwood Rd & Dearholt Rd | 989.6 | 990.5 | 1.0 | 8.7 | 990.5 | 0.9 | -0.1 | 8.6 | -0.1 | -0.9% | 990.4 | 0.8 | -0.1 | 8.5 | -0.2 | -2.3% |
| 18 | WI01-A-0180-H-002 | 3360-020_3360-019 | Intersection of Odana Rd & Segoe Rd | 1005.9 | 1006.6 | 0.7 | 7.7 | 1006.5 | 0.6 | -0.1 | 6.9 | -0.8 | -10.6% | 1006.5 | 0.6 | -0.1 | 5.3 | -2.4 | -31.2% |
| 19 | WI01-A-0187-H-006 | 3359-006_3359-008 | Intersection of Tokay Blvd & Whitney Way | 1018.7 | 1018.8 | 0.1 | 24.6 | 1018.8 | 0.1 | 0.0 | 21.9 | -2.7 | -11.1% | 1018.8 | 0.1 | 0.0 | 17.7 | -6.9 | -28.1% |
| 20 | WI01-A-0183-H-001 | 3160-002_BC_JCT_21 | Odana Rd, approximately 325-ft west of Medical Circle | 1028.6 | 1029.5 | 0.9 | 134.9 | 1029.4 | 0.8 | -0.1 | 121.1 | -13.8 | -10.2% | 1029.3 | 0.7 | -0.2 | 102.9 | -32.0 | -23.7% |
| 21 | PD_3362-020 | WW_GW_07_WW_GW_09 | Orchard Ridge Valley Park Pond | 979.0 | 979.8 | 0.8 | 119.3 | 979.6 | 0.6 | -0.1 | 116.0 | -3.3 | -2.8% | 979.4 | 0.4 | -0.4 | 110.3 | -9.0 | -7.5% |
| 22 | WI01-B-0184-H-010 | 3261-016_3261-017 | Intersection of Shroeder Rd & Shroeder Ct | 1002.0 | 1002.1 | 0.1 | 52.2 | 1002.1 | 0.1 | 0.0 | 48.3 | -3.9 | -7.6% | 1002.1 | 0.1 | 0.0 | 40.7 | -11.5 | -22.0% |
| 23 | WI01-B-0184-H-000 | 3362-012_3362-015 | Intersection of Whitney Way & Gilbert Rd | 981.7 | 982.2 | 0.5 | 150.5 | 982.1 | 0.5 | 0.0 | 141.3 | -9.2 | -6.1% | 982.0 | 0.4 | -0.1 | 125.4 | -25.1 | -16.7% |
| 24 | WI01-B-0181-H-001 | 3365-013_3365-024 | Tolman Ter low-point, approximately 425-ft east of Gilbert Rd | 1038.6 | 1039.8 | 1.2 | 4.5 | 1039.6 | 1.1 | -0.1 | 4.3 | -0.1 | -3.0% | 1039.4 | 0.9 | -0.3 | 4.1 | -0.3 | -6.9% |
| 25 | WI01-B-0182-H-006 | 3164-028_3164-008 | Intersection of Piping Rock Rd & Manhasset Pl | 1004.9 | 1005.1 | 0.2 | 23.7 | 1005.1 | 0.2 | 0.0 | 22.3 | -1.4 | -6.1% | 1005.1 | 0.2 | 0.0 | 20.0 | -3.7 | -15.4% |

**Table VC-2 - 10% Chance Storm Event**
**Volume Control Analysis Results**
**Wingra West Watershed Study, City of Madison, WI**

| | | | | | Existing Conditions Results | | | 10% DCIA Rerouted to Green Infrastructure | | | | | | 25% DCIA Rerouted to Green Infrastructure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10% Chance Storm | | | 10% Chance Storm | | | | | | 10% Chance Storm | | | | | |
| Point | XP-SWMM Node | XPSWMM Link | Location | Flood Elevation | Peak WSE | Flood Depth (ft) | Peak Flow (cfs) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) |
| | PD_4061-006 | MMY_1_WW_OUTFALL_1 | Secret Pond Outfall | 867.5 | 860.9 | -6.6 | 302.2 | 860.9 | -6.6 | 0.0 | 299.1 | -3.1 | -1.0% | 860.8 | -6.7 | -0.1 | 285.4 | -16.8 | -5.6% |
| 1 | WI02-D-0193-H-001 | 3961-075_3961-076 | Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd | 862.6 | 866.2 | 3.5 | 138.4 | 866.1 | 3.5 | -0.1 | 137.6 | -0.8 | -0.6% | 866.1 | 3.5 | -0.1 | 138.4 | -0.1 | -0.1% |
| 2 | WI02-D-0193-H-009 | 3964-009_3964-008 | Intersection of Seminole Hwy & Manitou Way | 929.3 | 930.4 | 1.2 | 11.5 | 930.4 | 1.1 | -0.1 | 11.2 | -0.3 | -2.7% | 930.3 | 1.0 | -0.2 | 10.6 | -1.0 | -8.4% |
| 3 | WI02-C-0190-H-000 | BC_JCT_51_BC_JCT_52 | Intersection of Chippewa Dr & Nakoma Rd | 873.0 | 875.9 | 2.9 | 489.6 | 875.9 | 2.9 | 0.0 | 482.8 | -6.9 | -1.4% | 875.8 | 2.8 | -0.1 | 468.5 | -21.1 | -4.3% |
| 4 | WI02-C-0188-H-000 | 3961-050_BC_JCT_50 | Intersection of Chippewa Dr & Cherokee Dr | 892.8 | 894.9 | 2.1 | 503.1 | 894.9 | 2.1 | 0.0 | 491.6 | -11.5 | -2.3% | 894.8 | 2.0 | -0.1 | 475.6 | -27.5 | -5.5% |
| 5 | AS3862-003 | 3862-018_3862-003 | Intersection of Yuma Dr & Cherokee Dr | 912.8 | 912.6 | -0.2 | 145.3 | 912.5 | -0.3 | -0.1 | 139.5 | -5.7 | -4.0% | 912.3 | -0.5 | -0.3 | 132.4 | -12.9 | -8.9% |
| 6 | WI02-C-0188-H-011 | 3763-008_3763-016 | Intersection of Midvale Blvd & Cherokee Dr | 967.5 | 968.8 | 1.3 | 62.3 | 968.8 | 1.3 | 0.0 | 61.2 | -1.1 | -1.7% | 968.7 | 1.2 | -0.1 | 59.3 | -3.0 | -4.8% |
| 7 | WI02-C-0188-H-017 | BC_JCT_140_BC_JCT_142 | Intersection of Chippewa Dr & Council Crest | 937.9 | 938.2 | 0.3 | 308.7 | 938.2 | 0.3 | 0.0 | 302.7 | -6.1 | -2.0% | 938.2 | 0.2 | 0.0 | 294.7 | -14.0 | -4.5% |
| 8 | IN3761-056 | WAITECIRCLE_3861-045 | West end of Waite Circle | 956.8 | 958.8 | 2.0 | 302.6 | 958.8 | 2.0 | 0.0 | 295.2 | -7.4 | -2.4% | 958.8 | 2.0 | 0.0 | 285.6 | -17.1 | -5.6% |
| 9 | AS3760-034 | 3760-034_3760-015 | Intersection of Midvale Blvd & Odana Rd | 986.9 | 986.9 | 0.0 | 44.0 | 986.9 | 0.0 | -0.1 | 43.2 | -0.8 | -1.9% | 986.8 | -0.1 | -0.1 | 41.9 | -2.1 | -4.9% |
| 10 | AS3762-026 | 3762-035_3762-026 | Intersection of Midvale Blvd & SW Bike Path | 972.7 | 972.3 | -0.4 | 48.1 | 972.2 | -0.5 | -0.1 | 44.5 | -3.6 | -7.5% | 972.0 | -0.7 | -0.3 | 40.0 | -8.1 | -16.9% |
| 11 | WI02-C-0324-H-000 | 3765-017_BC_JCT_129 | Verona Road, Immediately North of Beltline Highway | 1002.7 | 1002.8 | 0.1 | 45.0 | 1002.8 | 0.1 | 0.0 | 44.6 | -0.4 | -1.0% | 1002.8 | 0.1 | 0.0 | 43.4 | -1.6 | -3.6% |
| 12 | WI02-C-0324-H-005 | 7645-023_10_BC_JCT_106 | Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy | 997.2 | 999.1 | 1.9 | 21.8 | 999.1 | 1.9 | 0.0 | 21.7 | -0.2 | -0.7% | 999.0 | 1.9 | 0.0 | 21.4 | -0.4 | -1.8% |
| 13 | STOR_12 | 3562-001_3662-002 | Odana Golf Course - Entrance of 42" Storm Sewer | 978.0 | 981.0 | 3.0 | 52.2 | 980.9 | 2.9 | -0.1 | 50.1 | -2.1 | -4.0% | 980.8 | 2.8 | -0.2 | 47.2 | -5.0 | -9.5% |
| 14 | PD_3462-002 | PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636 | Odana Pond | 980.0 | 981.0 | 1.0 | 355.6 | 980.9 | 0.9 | -0.1 | 338.9 | -16.7 | -4.7% | 980.8 | 0.8 | -0.2 | 317.7 | -37.9 | -10.7% |
| 15 | WI01-A-0179-H-001 | 3460-019_3461-001 | Intersection of Milward Dr & Wedgewood Way | 982.3 | 984.1 | 1.8 | 23.5 | 984.1 | 1.8 | 0.0 | 23.5 | -0.1 | -0.3% | 984.1 | 1.7 | -0.1 | 23.4 | -0.1 | -0.6% |
| 16 | WI01-A-0179-H-003 | 3461-007_3461-008 | Intersection of Milward Dr & Dearholt Rd | 981.3 | 983.1 | 1.8 | 42.8 | 983.1 | 1.8 | -0.1 | 38.4 | -4.4 | -10.3% | 983.0 | 1.7 | -0.1 | 33.4 | -9.5 | -22.2% |
| 17 | WI01-A-0179-H-006 | 3460-002_3460-003 | Intersection of Sherwood Rd & Dearholt Rd | 989.6 | 991.2 | 1.6 | 12.6 | 991.2 | 1.6 | 0.0 | 12.3 | -0.3 | -2.7% | 991.2 | 1.6 | 0.0 | 11.9 | -0.8 | -6.1% |
| 18 | WI01-A-0180-H-002 | 3360-020_3360-019 | Intersection of Odana Rd & Segoe Rd | 1005.9 | 1007.1 | 1.2 | 18.5 | 1007.0 | 1.1 | -0.1 | 15.0 | -3.5 | -18.8% | 1006.9 | 1.0 | -0.2 | 15.0 | -3.6 | -19.2% |
| 19 | WI01-A-0187-H-006 | 3359-006_3359-008 | Intersection of Tokay Blvd & Whitney Way | 1018.7 | 1018.9 | 0.2 | 43.3 | 1018.9 | 0.2 | 0.0 | 39.6 | -3.7 | -8.5% | 1018.9 | 0.2 | 0.0 | 37.2 | -6.1 | -14.1% |
| 20 | WI01-A-0183-H-001 | 3160-002_BC_JCT_21 | Odana Rd, approximately 325-ft west of Medical Circle | 1028.6 | 1029.9 | 1.4 | 172.9 | 1029.9 | 1.3 | -0.1 | 172.9 | 0.0 | 0.0% | 1029.7 | 1.2 | -0.2 | 171.6 | -1.2 | -0.7% |
| 21 | PD_3362-020 | WW_GW_07_WW_GW_09 | Orchard Ridge Valley Park Pond | 979.0 | 981.8 | 2.8 | 181.0 | 981.7 | 2.7 | -0.1 | 181.5 | 0.4 | 0.2% | 981.6 | 2.6 | -0.2 | 181.8 | 0.8 | 0.4% |
| 22 | WI01-B-0184-H-010 | 3261-016_3261-017 | Intersection of Shroeder Rd & Shroeder Ct | 1002.0 | 1003.1 | 1.1 | 107.4 | 1003.0 | 1.0 | -0.1 | 102.3 | -5.1 | -4.8% | 1002.9 | 0.9 | -0.2 | 93.8 | -13.7 | -12.7% |
| 23 | WI01-B-0184-H-000 | 3362-012_3362-015 | Intersection of Whitney Way & Gilbert Rd | 981.7 | 983.5 | 1.8 | 245.2 | 983.4 | 1.7 | -0.1 | 245.8 | 0.6 | 0.3% | 983.3 | 1.6 | -0.2 | 247.2 | 2.0 | 0.8% |
| 24 | WI01-B-0181-H-001 | 3365-013_3365-024 | Tolman Ter low-point, approximately 425-ft east of Gilbert Rd | 1038.6 | 1040.9 | 2.4 | 6.8 | 1040.9 | 2.3 | 0.0 | 6.7 | -0.1 | -1.2% | 1040.9 | 2.3 | 0.0 | 6.6 | -0.1 | -1.9% |
| 25 | WI01-B-0182-H-006 | 3164-028_3164-008 | Intersection of Piping Rock Rd & Manhasset Pl | 1004.9 | 1005.3 | 0.4 | 59.4 | 1005.3 | 0.4 | 0.0 | 58.3 | -1.1 | -1.8% | 1005.3 | 0.4 | 0.0 | 56.0 | -3.3 | -5.6% |

**Table VC-3 - 1% Chance Storm Event**
**Volume Control Analysis Results**
**Wingra West Watershed Study, City of Madison, WI**

| | | | | | Existing Conditions Results | | | 10% DCIA Rerouted to Green Infrastructure | | | | | | 25% DCIA Rerouted to Green Infrastructure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1% Chance Storm | | | 1% Chance Storm | | | | | | 1% Chance Storm | | | | | |
| Point | XP-SWMM Node | XPSWMM Link | Location | Flood Elevation | Peak WSE | Flood Depth (ft) | Peak Flow (cfs) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) |
| | PD_4061-006 | MMY_1_WW_OUTFALL_1 | Secret Pond Outfall | 867.5 | 861.5 | -6.0 | 447.5 | 861.5 | -6.0 | 0.0 | 443.7 | -3.7 | -0.8% | 861.5 | -6.0 | 0.0 | 436.7 | -10.7 | -2.4% |
| 1 | WI02-D-0193-H-001 | 3961-075_3961-076 | Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd | 862.6 | 866.5 | 3.9 | 168.9 | 866.5 | 3.9 | 0.0 | 169.5 | 0.6 | 0.3% | 866.5 | 3.9 | 0.1 | 167.4 | -1.5 | -0.9% |
| 2 | WI02-D-0193-H-009 | 3964-009_3964-008 | Intersection of Seminole Hwy & Manitou Way | 929.3 | 931.2 | 1.9 | 25.1 | 931.2 | 1.9 | 0.0 | 24.9 | -0.2 | -0.7% | 931.1 | 1.9 | 0.0 | 24.6 | -0.5 | -1.9% |
| 3 | WI02-C-0190-H-000 | BC_JCT_51_BC_JCT_52 | Intersection of Chippewa Dr & Nakoma Rd | 873.0 | 876.7 | 3.7 | 757.3 | 876.7 | 3.7 | 0.0 | 748.5 | -8.8 | -1.2% | 876.6 | 3.7 | 0.0 | 747.8 | -9.5 | -1.2% |
| 4 | WI02-C-0188-H-000 | 3961-050_BC_JCT_50 | Intersection of Chippewa Dr & Cherokee Dr | 892.8 | 895.6 | 2.8 | 811.7 | 895.6 | 2.8 | 0.0 | 805.9 | -5.8 | -0.7% | 895.6 | 2.7 | 0.0 | 795.4 | -16.4 | -2.0% |
| 5 | AS3862-003 | 3862-018_3862-003 | Intersection of Yuma Dr & Cherokee Dr | 912.8 | 913.9 | 1.1 | 283.8 | 913.8 | 1.0 | 0.0 | 280.6 | -3.1 | -1.1% | 913.8 | 1.0 | -0.1 | 276.0 | -7.7 | -2.7% |
| 6 | WI02-C-0188-H-011 | 3763-008_3763-016 | Intersection of Midvale Blvd & Cherokee Dr | 967.5 | 969.4 | 1.9 | 109.4 | 969.4 | 1.9 | 0.0 | 108.9 | -0.4 | -0.4% | 969.4 | 1.9 | 0.0 | 108.3 | -1.1 | -1.0% |
| 7 | WI02-C-0188-H-017 | BC_JCT_140_BC_JCT_142 | Intersection of Chippewa Dr & Council Crest | 937.9 | 939.4 | 1.5 | 423.8 | 939.4 | 1.4 | 0.0 | 418.5 | -5.3 | -1.3% | 939.3 | 1.4 | -0.1 | 411.4 | -12.3 | -2.9% |
| 8 | IN3761-056 | WAITECIRCLE_3861-045 | West end of Waite Circle | 956.8 | 963.1 | 6.3 | 400.5 | 963.0 | 6.2 | -0.1 | 399.8 | -0.6 | -0.2% | 963.0 | 6.2 | -0.1 | 398.8 | -1.6 | -0.4% |
| 9 | AS3760-034 | 3760-034_3760-015 | Intersection of Midvale Blvd & Odana Rd | 986.9 | 987.4 | 0.5 | 69.3 | 987.4 | 0.5 | 0.0 | 68.7 | -0.6 | -0.9% | 987.4 | 0.5 | 0.0 | 67.5 | -1.8 | -2.6% |
| 10 | AS3762-026 | 3762-035_3762-026 | Intersection of Midvale Blvd & SW Bike Path | 972.7 | 973.6 | 0.9 | 149.2 | 973.6 | 0.9 | 0.0 | 147.1 | -2.1 | -1.4% | 973.6 | 0.9 | 0.0 | 144.7 | -4.5 | -3.0% |
| 11 | WI02-C-0324-H-000 | 3765-017_BC_JCT_129 | Verona Road, Immediately North of Beltline Highway | 1002.7 | 1003.8 | 1.1 | 52.5 | 1003.8 | 1.1 | 0.0 | 52.4 | 0.0 | -0.1% | 1003.7 | 1.0 | -0.1 | 52.4 | 0.0 | -0.1% |
| 12 | WI02-C-0324-H-005 | 7645-023_10_BC_JCT_106 | Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy | 997.2 | 999.5 | 2.4 | 22.1 | 999.5 | 2.3 | 0.0 | 22.2 | 0.1 | 0.4% | 999.5 | 2.3 | 0.0 | 22.2 | 0.1 | 0.5% |
| 13 | STOR_12 | 3562-001_3662-002 | Odana Golf Course - Entrance of 42" Storm Sewer | 978.0 | 983.0 | 5.0 | 71.4 | 982.9 | 4.9 | -0.1 | 71.0 | -0.3 | -0.5% | 982.8 | 4.8 | -0.2 | 70.6 | -0.8 | -1.1% |
| 14 | PD_3462-002 | PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636 | Odana Pond | 980.0 | 983.0 | 3.0 | 480.3 | 982.9 | 2.9 | -0.1 | 468.4 | -11.9 | -2.5% | 982.8 | 2.8 | -0.2 | 449.2 | -31.1 | -6.5% |
| 15 | WI01-A-0179-H-001 | 3460-019_3461-001 | Intersection of Milward Dr & Wedgewood Way | 982.3 | 984.5 | 2.2 | 25.6 | 984.5 | 2.2 | 0.0 | 25.6 | 0.0 | 0.0% | 984.5 | 2.1 | 0.0 | 25.6 | 0.0 | 0.0% |
| 16 | WI01-A-0179-H-003 | 3461-007_3461-008 | Intersection of Milward Dr & Dearholt Rd | 981.3 | 984.0 | 2.7 | 110.2 | 984.0 | 2.7 | 0.0 | 108.3 | -2.0 | -1.8% | 983.9 | 2.7 | 0.0 | 104.7 | -5.5 | -5.0% |
| 17 | WI01-A-0179-H-006 | 3460-002_3460-003 | Intersection of Sherwood Rd & Dearholt Rd | 989.6 | 991.7 | 2.1 | 30.9 | 991.7 | 2.1 | 0.0 | 30.6 | -0.4 | -1.1% | 991.7 | 2.1 | 0.0 | 30.0 | -0.9 | -2.9% |
| 18 | WI01-A-0180-H-002 | 3360-020_3360-019 | Intersection of Odana Rd & Segoe Rd | 1005.9 | 1007.8 | 1.9 | 34.6 | 1007.8 | 1.9 | 0.0 | 33.3 | -1.3 | -3.9% | 1007.7 | 1.8 | -0.1 | 31.9 | -2.8 | -8.0% |
| 19 | WI01-A-0187-H-006 | 3359-006_3359-008 | Intersection of Tokay Blvd & Whitney Way | 1018.7 | 1019.5 | 0.7 | 93.5 | 1019.4 | 0.7 | 0.0 | 92.8 | -0.7 | -0.8% | 1019.4 | 0.6 | -0.1 | 90.8 | -2.7 | -2.9% |
| 20 | WI01-A-0183-H-001 | 3160-002_BC_JCT_21 | Odana Rd, approximately 325-ft west of Medical Circle | 1028.6 | 1030.5 | 2.0 | 230.0 | 1030.5 | 1.9 | 0.0 | 228.5 | -1.5 | -0.6% | 1030.4 | 1.9 | -0.1 | 225.9 | -4.1 | -1.8% |
| 21 | PD_3362-020 | WW_GW_07_WW_GW_09 | Orchard Ridge Valley Park Pond | 979.0 | 983.9 | 4.9 | 201.5 | 983.9 | 4.9 | -0.1 | 202.0 | 0.5 | 0.3% | 983.8 | 4.8 | -0.2 | 202.8 | 1.3 | 0.7% |
| 22 | WI01-B-0184-H-010 | 3261-016_3261-017 | Intersection of Shroeder Rd & Shroeder Ct | 1002.0 | 1003.8 | 1.8 | 188.0 | 1003.8 | 1.8 | 0.0 | 185.7 | -2.3 | -1.2% | 1003.7 | 1.7 | -0.1 | 181.9 | -6.1 | -3.3% |
| 23 | WI01-B-0184-H-000 | 3362-012_3362-015 | Intersection of Whitney Way & Gilbert Rd | 981.7 | 985.2 | 3.5 | 268.3 | 985.1 | 3.4 | 0.0 | 268.9 | 0.6 | 0.2% | 985.1 | 3.4 | -0.1 | 269.4 | 1.1 | 0.4% |
| 24 | WI01-B-0181-H-001 | 3365-013_3365-024 | Tolman Ter low-point, approximately 425-ft east of Gilbert Rd | 1038.6 | 1041.9 | 3.4 | 22.5 | 1041.9 | 3.4 | 0.0 | 22.3 | -0.2 | -0.7% | 1041.9 | 3.3 | 0.0 | 22.0 | -0.5 | -2.1% |
| 25 | WI01-B-0182-H-006 | 3164-028_3164-008 | Intersection of Piping Rock Rd & Manhasset Pl | 1004.9 | 1005.8 | 0.9 | 113.0 | 1005.8 | 0.9 | 0.0 | 112.6 | -0.5 | -0.4% | 1005.8 | 0.8 | -0.1 | 112.0 | -1.1 | -1.0% |

N

MINERAL POINT RD

ODANA RD

ODANA RD

SW BIKE PATH

NAKOMA RD

S MIDVALE BLVD

S WHITNEY WAY

MONROE

## Legend

- Results Reporting Locations
- Storm Sewer
- Open Channel
- Wingra West Watershed

Note: See Tables D-1 and D-2 for each Reporting Location's corresponding flood elevation.

2/14/2020

**Figure 4-6**
**Results Reporting Locations**
Wingra West Watershed Study:
Existing Conditions Report
City of Madison, WI

0 500 1,000
Feet

Brown AND Caldwell

*Air Photo: City of Madison, 2018*

Path: P:\Madison, City of\153394 West Wingra Watershed Study\GIS\MXDs\ExCondReportFigures\Fig4-6-ReportingLocations.mxd

**Table VC-3 - 1% Chance Storm Event**
**Volume Control Analysis Results**
**Wingra West Watershed Study, City of Madison, WI**

| | | | | | Existing Conditions Results | | | 10% DCIA Rerouted to Green Infrastructure | | | | | | 25% DCIA Rerouted to Green Infrastructure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1% Chance Storm | | | 1% Chance Storm | | | | | | 1% Chance Storm | | | | | |
| Point | XP-SWMM Node | XPSWMM Link | Location | Flood Elevation | Peak WSE | Flood Depth (ft) | Peak Flow (cfs) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) |
| | PD_4061-006 | MMY_1_WW_OUTFALL_1 | Secret Pond Outfall | 867.5 | 861.5 | -6.0 | 447.5 | 861.5 | -6.0 | 0.0 | 443.7 | -3.7 | -0.8% | 861.5 | -6.0 | 0.0 | 436.7 | -10.7 | -2.4% |
| 1 | WI02-D-0193-H-001 | 3961-075_3961-076 | Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd | 862.6 | 866.5 | 3.9 | 168.9 | 866.5 | 3.9 | 0.0 | 169.5 | 0.6 | 0.3% | 866.5 | 3.9 | 0.1 | 167.4 | -1.5 | -0.9% |
| 2 | WI02-D-0193-H-009 | 3964-009_3964-008 | Intersection of Seminole Hwy & Manitou Way | 929.3 | 931.2 | 1.9 | 25.1 | 931.2 | 1.9 | 0.0 | 24.9 | -0.2 | -0.7% | 931.1 | 1.9 | 0.0 | 24.6 | -0.5 | -1.9% |
| 3 | WI02-C-0190-H-000 | BC_JCT_51_BC_JCT_52 | Intersection of Chippewa Dr & Nakoma Rd | 873.0 | 876.7 | 3.7 | 757.3 | 876.7 | 3.7 | 0.0 | 748.5 | -8.8 | -1.2% | 876.6 | 3.7 | 0.0 | 747.8 | -9.5 | -1.2% |
| 4 | WI02-C-0188-H-000 | 3961-050_BC_JCT_50 | Intersection of Chippewa Dr & Cherokee Dr | 892.8 | 895.6 | 2.8 | 811.7 | 895.6 | 2.8 | 0.0 | 805.9 | -5.8 | -0.7% | 895.6 | 2.7 | 0.0 | 795.4 | -16.4 | -2.0% |
| 5 | AS3862-003 | 3862-018_3862-003 | Intersection of Yuma Dr & Cherokee Dr | 912.8 | 913.9 | 1.1 | 283.8 | 913.8 | 1.0 | 0.0 | 280.6 | -3.1 | -1.1% | 913.8 | 1.0 | -0.1 | 276.0 | -7.7 | -2.7% |
| 6 | WI02-C-0188-H-011 | 3763-008_3763-016 | Intersection of Midvale Blvd & Cherokee Dr | 967.5 | 969.4 | 1.9 | 109.4 | 969.4 | 1.9 | 0.0 | 108.9 | -0.4 | -0.4% | 969.4 | 1.9 | 0.0 | 108.3 | -1.1 | -1.0% |
| 7 | WI02-C-0188-H-017 | BC_JCT_140_BC_JCT_142 | Intersection of Chippewa Dr & Council Crest | 937.9 | 939.4 | 1.5 | 423.8 | 939.4 | 1.4 | 0.0 | 418.5 | -5.3 | -1.3% | 939.3 | 1.4 | -0.1 | 411.4 | -12.3 | -2.9% |
| 8 | IN3761-056 | WAITECIRCLE_3861-045 | West end of Waite Circle | 956.8 | 963.1 | 6.3 | 400.5 | 963.0 | 6.2 | -0.1 | 399.8 | -0.6 | -0.2% | 963.0 | 6.2 | -0.1 | 398.8 | -1.6 | -0.4% |
| 9 | AS3760-034 | 3760-034_3760-015 | Intersection of Midvale Blvd & Odana Rd | 986.9 | 987.4 | 0.5 | 69.3 | 987.4 | 0.5 | 0.0 | 68.7 | -0.6 | -0.9% | 987.4 | 0.5 | 0.0 | 67.5 | -1.8 | -2.6% |
| 10 | AS3762-026 | 3762-035_3762-026 | Intersection of Midvale Blvd & SW Bike Path | 972.7 | 973.6 | 0.9 | 149.2 | 973.6 | 0.9 | 0.0 | 147.1 | -2.1 | -1.4% | 973.6 | 0.9 | 0.0 | 144.7 | -4.5 | -3.0% |
| 11 | WI02-C-0324-H-000 | 3765-017_BC_JCT_129 | Verona Road, Immediately North of Beltline Highway | 1002.7 | 1003.8 | 1.1 | 52.5 | 1003.8 | 1.1 | 0.0 | 52.4 | 0.0 | -0.1% | 1003.7 | 1.0 | -0.1 | 52.4 | 0.0 | -0.1% |
| 12 | WI02-C-0324-H-005 | 7645-023_10_BC_JCT_106 | Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy | 997.2 | 999.5 | 2.4 | 22.1 | 999.5 | 2.3 | 0.0 | 22.2 | 0.1 | 0.4% | 999.5 | 2.3 | 0.0 | 22.2 | 0.1 | 0.5% |
| 13 | STOR_12 | 3562-001_3662-002 | Odana Golf Course - Entrance of 42" Storm Sewer | 978.0 | 983.0 | 5.0 | 71.4 | 982.9 | 4.9 | -0.1 | 71.0 | -0.3 | -0.5% | 982.8 | 4.8 | -0.2 | 70.6 | -0.8 | -1.1% |
| 14 | PD_3462-002 | PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636 | Odana Pond | 980.0 | 983.0 | 3.0 | 480.3 | 982.9 | 2.9 | -0.1 | 468.4 | -11.9 | -2.5% | 982.8 | 2.8 | -0.2 | 449.2 | -31.1 | -6.5% |
| 15 | WI01-A-0179-H-001 | 3460-019_3461-001 | Intersection of Milward Dr & Wedgewood Way | 982.3 | 984.5 | 2.2 | 25.6 | 984.5 | 2.2 | 0.0 | 25.6 | 0.0 | 0.0% | 984.5 | 2.1 | 0.0 | 25.6 | 0.0 | 0.0% |
| 16 | WI01-A-0179-H-003 | 3461-007_3461-008 | Intersection of Milward Dr & Dearholt Rd | 981.3 | 984.0 | 2.7 | 110.2 | 984.0 | 2.7 | 0.0 | 108.3 | -2.0 | -1.8% | 983.9 | 2.7 | 0.0 | 104.7 | -5.5 | -5.0% |
| 17 | WI01-A-0179-H-006 | 3460-002_3460-003 | Intersection of Sherwood Rd & Dearholt Rd | 989.6 | 991.7 | 2.1 | 30.9 | 991.7 | 2.1 | 0.0 | 30.6 | -0.4 | -1.1% | 991.7 | 2.1 | 0.0 | 30.0 | -0.9 | -2.9% |
| 18 | WI01-A-0180-H-002 | 3360-020_3360-019 | Intersection of Odana Rd & Segoe Rd | 1005.9 | 1007.8 | 1.9 | 34.6 | 1007.8 | 1.9 | 0.0 | 33.3 | -1.3 | -3.9% | 1007.7 | 1.8 | -0.1 | 31.9 | -2.8 | -8.0% |
| 19 | WI01-A-0187-H-006 | 3359-006_3359-008 | Intersection of Tokay Blvd & Whitney Way | 1018.7 | 1019.5 | 0.7 | 93.5 | 1019.4 | 0.7 | 0.0 | 92.8 | -0.7 | -0.8% | 1019.4 | 0.6 | -0.1 | 90.8 | -2.7 | -2.9% |
| 20 | WI01-A-0183-H-001 | 3160-002_BC_JCT_21 | Odana Rd, approximately 325-ft west of Medical Circle | 1028.6 | 1030.5 | 2.0 | 230.0 | 1030.5 | 1.9 | 0.0 | 228.5 | -1.5 | -0.6% | 1030.4 | 1.9 | -0.1 | 225.9 | -4.1 | -1.8% |
| 21 | PD_3362-020 | WW_GW_07_WW_GW_09 | Orchard Ridge Valley Park Pond | 979.0 | 983.9 | 4.9 | 201.5 | 983.9 | 4.9 | -0.1 | 202.0 | 0.5 | 0.3% | 983.8 | 4.8 | -0.2 | 202.8 | 1.3 | 0.7% |
| 22 | WI01-B-0184-H-010 | 3261-016_3261-017 | Intersection of Shroeder Rd & Shroeder Ct | 1002.0 | 1003.8 | 1.8 | 188.0 | 1003.8 | 1.8 | 0.0 | 185.7 | -2.3 | -1.2% | 1003.7 | 1.7 | -0.1 | 181.9 | -6.1 | -3.3% |
| 23 | WI01-B-0184-H-000 | 3362-012_3362-015 | Intersection of Whitney Way & Gilbert Rd | 981.7 | 985.2 | 3.5 | 268.3 | 985.1 | 3.4 | 0.0 | 268.9 | 0.6 | 0.2% | 985.1 | 3.4 | -0.1 | 269.4 | 1.1 | 0.4% |
| 24 | WI01-B-0181-H-001 | 3365-013_3365-024 | Tolman Ter low-point, approximately 425-ft east of Gilbert Rd | 1038.6 | 1041.9 | 3.4 | 22.5 | 1041.9 | 3.4 | 0.0 | 22.3 | -0.2 | -0.7% | 1041.9 | 3.3 | 0.0 | 22.0 | -0.5 | -2.1% |
| 25 | WI01-B-0182-H-006 | 3164-028_3164-008 | Intersection of Piping Rock Rd & Manhasset Pl | 1004.9 | 1005.8 | 0.9 | 113.0 | 1005.8 | 0.9 | 0.0 | 112.6 | -0.5 | -0.4% | 1005.8 | 0.8 | -0.1 | 112.0 | -1.1 | -1.0% |

**Table VC-2 - 10% Chance Storm Event**
**Volume Control Analysis Results**
**Wingra West Watershed Study, City of Madison, WI**

| | | | | | Existing Conditions Results | | | 10% DCIA Rerouted to Green Infrastructure | | | | | | 25% DCIA Rerouted to Green Infrastructure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10% Chance Storm | | | 10% Chance Storm | | | | | | 10% Chance Storm | | | | | |
| Point | XP-SWMM Node | XPSWMM Link | Location | Flood Elevation | Peak WSE | Flood Depth (ft) | Peak Flow (cfs) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) |
| | PD_4061-006 | MMY_1_WW_OUTFALL_1 | Secret Pond Outfall | 867.5 | 860.9 | -6.6 | 302.2 | 860.9 | -6.6 | 0.0 | 299.1 | -3.1 | -1.0% | 860.8 | -6.7 | -0.1 | 285.4 | -16.8 | -5.6% |
| 1 | WI02-D-0193-H-001 | 3961-075_3961-076 | Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd | 862.6 | 866.2 | 3.5 | 138.4 | 866.1 | 3.5 | -0.1 | 137.6 | -0.8 | -0.6% | 866.1 | 3.5 | -0.1 | 138.4 | -0.1 | -0.1% |
| 2 | WI02-D-0193-H-009 | 3964-009_3964-008 | Intersection of Seminole Hwy & Manitou Way | 929.3 | 930.4 | 1.2 | 11.5 | 930.4 | 1.1 | -0.1 | 11.2 | -0.3 | -2.7% | 930.3 | 1.0 | -0.2 | 10.6 | -1.0 | -8.4% |
| 3 | WI02-C-0190-H-000 | BC_JCT_51_BC_JCT_52 | Intersection of Chippewa Dr & Nakoma Rd | 873.0 | 875.9 | 2.9 | 489.6 | 875.9 | 2.9 | 0.0 | 482.8 | -6.9 | -1.4% | 875.8 | 2.8 | -0.1 | 468.5 | -21.1 | -4.3% |
| 4 | WI02-C-0188-H-000 | 3961-050_BC_JCT_50 | Intersection of Chippewa Dr & Cherokee Dr | 892.8 | 894.9 | 2.1 | 503.1 | 894.9 | 2.1 | 0.0 | 491.6 | -11.5 | -2.3% | 894.8 | 2.0 | -0.1 | 475.6 | -27.5 | -5.5% |
| 5 | AS3862-003 | 3862-018_3862-003 | Intersection of Yuma Dr & Cherokee Dr | 912.8 | 912.6 | -0.2 | 145.3 | 912.5 | -0.3 | -0.1 | 139.5 | -5.7 | -4.0% | 912.3 | -0.5 | -0.3 | 132.4 | -12.9 | -8.9% |
| 6 | WI02-C-0188-H-011 | 3763-008_3763-016 | Intersection of Midvale Blvd & Cherokee Dr | 967.5 | 968.8 | 1.3 | 62.3 | 968.8 | 1.3 | 0.0 | 61.2 | -1.1 | -1.7% | 968.7 | 1.2 | -0.1 | 59.3 | -3.0 | -4.8% |
| 7 | WI02-C-0188-H-017 | BC_JCT_140_BC_JCT_142 | Intersection of Chippewa Dr & Council Crest | 937.9 | 938.2 | 0.3 | 308.7 | 938.2 | 0.3 | 0.0 | 302.7 | -6.1 | -2.0% | 938.2 | 0.2 | 0.0 | 294.7 | -14.0 | -4.5% |
| 8 | IN3761-056 | WAITECIRCLE_3861-045 | West end of Waite Circle | 956.8 | 958.8 | 2.0 | 302.6 | 958.8 | 2.0 | 0.0 | 295.2 | -7.4 | -2.4% | 958.8 | 2.0 | 0.0 | 285.6 | -17.1 | -5.6% |
| 9 | AS3760-034 | 3760-034_3760-015 | Intersection of Midvale Blvd & Odana Rd | 986.9 | 986.9 | 0.0 | 44.0 | 986.9 | 0.0 | -0.1 | 43.2 | -0.8 | -1.9% | 986.8 | -0.1 | -0.1 | 41.9 | -2.1 | -4.9% |
| 10 | AS3762-026 | 3762-035_3762-026 | Intersection of Midvale Blvd & SW Bike Path | 972.7 | 972.3 | -0.4 | 48.1 | 972.2 | -0.5 | -0.1 | 44.5 | -3.6 | -7.5% | 972.0 | -0.7 | -0.3 | 40.0 | -8.1 | -16.9% |
| 11 | WI02-C-0324-H-000 | 3765-017_BC_JCT_129 | Verona Road, Immediately North of Beltline Highway | 1002.7 | 1002.8 | 0.1 | 45.0 | 1002.8 | 0.1 | 0.0 | 44.6 | -0.4 | -1.0% | 1002.8 | 0.1 | 0.0 | 43.4 | -1.6 | -3.6% |
| 12 | WI02-C-0324-H-005 | 7645-023_10_BC_JCT_106 | Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy | 997.2 | 999.1 | 1.9 | 21.8 | 999.1 | 1.9 | 0.0 | 21.7 | -0.2 | -0.7% | 999.0 | 1.9 | 0.0 | 21.4 | -0.4 | -1.8% |
| 13 | STOR_12 | 3562-001_3662-002 | Odana Golf Course - Entrance of 42" Storm Sewer | 978.0 | 981.0 | 3.0 | 52.2 | 980.9 | 2.9 | -0.1 | 50.1 | -2.1 | -4.0% | 980.8 | 2.8 | -0.2 | 47.2 | -5.0 | -9.5% |
| 14 | PD_3462-002 | PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636 | Odana Pond | 980.0 | 981.0 | 1.0 | 355.6 | 980.9 | 0.9 | -0.1 | 338.9 | -16.7 | -4.7% | 980.8 | 0.8 | -0.2 | 317.7 | -37.9 | -10.7% |
| 15 | WI01-A-0179-H-001 | 3460-019_3461-001 | Intersection of Milward Dr & Wedgewood Way | 982.3 | 984.1 | 1.8 | 23.5 | 984.1 | 1.8 | 0.0 | 23.5 | -0.1 | -0.3% | 984.1 | 1.7 | -0.1 | 23.4 | -0.1 | -0.6% |
| 16 | WI01-A-0179-H-003 | 3461-007_3461-008 | Intersection of Milward Dr & Dearholt Rd | 981.3 | 983.1 | 1.8 | 42.8 | 983.1 | 1.8 | -0.1 | 38.4 | -4.4 | -10.3% | 983.0 | 1.7 | -0.1 | 33.4 | -9.5 | -22.2% |
| 17 | WI01-A-0179-H-006 | 3460-002_3460-003 | Intersection of Sherwood Rd & Dearholt Rd | 989.6 | 991.2 | 1.6 | 12.6 | 991.2 | 1.6 | 0.0 | 12.3 | -0.3 | -2.7% | 991.2 | 1.6 | 0.0 | 11.9 | -0.8 | -6.1% |
| 18 | WI01-A-0180-H-002 | 3360-020_3360-019 | Intersection of Odana Rd & Segoe Rd | 1005.9 | 1007.1 | 1.2 | 18.5 | 1007.0 | 1.1 | -0.1 | 15.0 | -3.5 | -18.8% | 1006.9 | 1.0 | -0.2 | 15.0 | -3.6 | -19.2% |
| 19 | WI01-A-0187-H-006 | 3359-006_3359-008 | Intersection of Tokay Blvd & Whitney Way | 1018.7 | 1018.9 | 0.2 | 43.3 | 1018.9 | 0.2 | 0.0 | 39.6 | -3.7 | -8.5% | 1018.9 | 0.2 | 0.0 | 37.2 | -6.1 | -14.1% |
| 20 | WI01-A-0183-H-001 | 3160-002_BC_JCT_21 | Odana Rd, approximately 325-ft west of Medical Circle | 1028.6 | 1029.9 | 1.4 | 172.9 | 1029.9 | 1.3 | -0.1 | 172.9 | 0.0 | 0.0% | 1029.7 | 1.2 | -0.2 | 171.6 | -1.2 | -0.7% |
| 21 | PD_3362-020 | WW_GW_07_WW_GW_09 | Orchard Ridge Valley Park Pond | 979.0 | 981.8 | 2.8 | 181.0 | 981.7 | 2.7 | -0.1 | 181.5 | 0.4 | 0.2% | 981.6 | 2.6 | -0.2 | 181.8 | 0.8 | 0.4% |
| 22 | WI01-B-0184-H-010 | 3261-016_3261-017 | Intersection of Shroeder Rd & Shroeder Ct | 1002.0 | 1003.1 | 1.1 | 107.4 | 1003.0 | 1.0 | -0.1 | 102.3 | -5.1 | -4.8% | 1002.9 | 0.9 | -0.2 | 93.8 | -13.7 | -12.7% |
| 23 | WI01-B-0184-H-000 | 3362-012_3362-015 | Intersection of Whitney Way & Gilbert Rd | 981.7 | 983.5 | 1.8 | 245.2 | 983.4 | 1.7 | -0.1 | 245.8 | 0.6 | 0.3% | 983.3 | 1.6 | -0.2 | 247.2 | 2.0 | 0.8% |
| 24 | WI01-B-0181-H-001 | 3365-013_3365-024 | Tolman Ter low-point, approximately 425-ft east of Gilbert Rd | 1038.6 | 1040.9 | 2.4 | 6.8 | 1040.9 | 2.3 | 0.0 | 6.7 | -0.1 | -1.2% | 1040.9 | 2.3 | 0.0 | 6.6 | -0.1 | -1.9% |
| 25 | WI01-B-0182-H-006 | 3164-028_3164-008 | Intersection of Piping Rock Rd & Manhasset Pl | 1004.9 | 1005.3 | 0.4 | 59.4 | 1005.3 | 0.4 | 0.0 | 58.3 | -1.1 | -1.8% | 1005.3 | 0.4 | 0.0 | 56.0 | -3.3 | -5.6% |

**Table VC-1 - 100% Chance Storm Event**
**Volume Control Analysis Results**
**Wingra West Watershed Study, City of Madison, WI**

| | | | | | Existing Conditions Results | | | 10% DCIA Rerouted to Green Infrastructure | | | | | | 25% DCIA Rerouted to Green Infrastructure | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 100% Chance Storm | | | 100% Chance Storm | | | | | | 100% Chance Storm | | | | | |
| Point | XP-SWMM Node | XPSWMM Link | Location | Flood Elevation | Peak WSE | Flood Depth (ft) | Peak Flow (cfs) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) | Peak WSE | Flood Depth (ft) | Change in Flood Depth (ft) | Peak Flow (cfs) | Change in Peak Flow (cfs) | Change in Peak Flow (%) |
| | PD_4061-006 | MMY_1_WW_OUTFALL_1 | Secret Pond Outfall | 867.5 | 860.4 | -7.1 | 229.1 | 860.4 | -7.1 | 0.0 | 223.8 | -5.4 | -2.3% | 860.3 | -7.2 | -0.1 | 213.5 | -15.6 | -6.8% |
| 1 | WI02-D-0193-H-001 | 3961-075_3961-076 | Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd | 862.6 | 863.1 | 0.4 | 41.9 | 863.0 | 0.4 | -0.1 | 33.0 | -9.0 | -21.4% | 862.9 | 0.2 | -0.2 | 19.9 | -22.0 | -52.4% |
| 2 | WI02-D-0193-H-009 | 3964-009_3964-008 | Intersection of Seminole Hwy & Manitou Way | 929.3 | 925.5 | -3.8 | 4.3 | 925.4 | -3.9 | -0.1 | 4.1 | -0.2 | -4.9% | 925.2 | -4.1 | -0.3 | 3.7 | -0.5 | -12.7% |
| 3 | WI02-C-0190-H-000 | BC_JCT_51_BC_JCT_52 | Intersection of Chippewa Dr & Nakoma Rd | 873.0 | 874.7 | 1.7 | 284.9 | 874.5 | 1.5 | -0.2 | 268.2 | -16.7 | -5.9% | 874.1 | 1.1 | -0.6 | 239.2 | -45.7 | -16.0% |
| 4 | WI02-C-0188-H-000 | 3961-050_BC_JCT_50 | Intersection of Chippewa Dr & Cherokee Dr | 892.8 | 894.2 | 1.3 | 271.8 | 894.1 | 1.3 | -0.1 | 256.5 | -15.3 | -5.6% | 894.0 | 1.2 | -0.2 | 234.0 | -37.8 | -13.9% |
| 5 | AS3862-003 | 3862-018_3862-003 | Intersection of Yuma Dr & Cherokee Dr | 912.8 | 910.8 | -2.0 | 75.5 | 910.7 | -2.1 | -0.2 | 70.7 | -4.7 | -6.3% | 910.4 | -2.4 | -0.4 | 61.6 | -13.8 | -18.3% |
| 6 | WI02-C-0188-H-011 | 3763-008_3763-016 | Intersection of Midvale Blvd & Cherokee Dr | 967.5 | 968.0 | 0.5 | 28.5 | 968.0 | 0.5 | 0.0 | 26.5 | -2.1 | -7.2% | 967.9 | 0.4 | -0.1 | 23.1 | -5.4 | -19.0% |
| 7 | WI02-C-0188-H-017 | BC_JCT_140_BC_JCT_142 | Intersection of Chippewa Dr & Council Crest | 937.9 | 938.1 | 0.1 | 184.8 | 938.0 | 0.1 | 0.0 | 174.7 | -10.1 | -5.5% | 938.0 | 0.1 | 0.0 | 156.4 | -28.4 | -15.4% |
| 8 | IN3761-056 | WAITECIRCLE_3861-045 | West end of Waite Circle | 956.8 | 958.4 | 1.6 | 174.3 | 958.2 | 1.4 | -0.1 | 163.8 | -10.4 | -6.0% | 957.9 | 1.1 | -0.4 | 146.3 | -27.9 | -16.0% |
| 9 | AS3760-034 | 3760-034_3760-015 | Intersection of Midvale Blvd & Odana Rd | 986.9 | 986.4 | -0.5 | 37.5 | 986.3 | -0.6 | -0.2 | 37.2 | -0.3 | -0.8% | 985.9 | -1.0 | -0.6 | 36.7 | -0.9 | -2.3% |
| 10 | AS3762-026 | 3762-035_3762-026 | Intersection of Midvale Blvd & SW Bike Path | 972.7 | 969.1 | -3.6 | 4.4 | 969.1 | -3.6 | 0.0 | 4.3 | -0.1 | -2.4% | 969.1 | -3.6 | -0.1 | 4.1 | -0.3 | -6.3% |
| 11 | WI02-C-0324-H-000 | 3765-017_BC_JCT_129 | Verona Road, Immediately North of Beltline Highway | 1002.7 | 1002.7 | 0.0 | 29.2 | 1002.7 | 0.0 | 0.0 | 26.0 | -3.2 | -10.9% | 1002.7 | 0.0 | 0.0 | 20.4 | -8.8 | -30.0% |
| 12 | WI02-C-0324-H-005 | 7645-023_10_BC_JCT_106 | Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy | 997.2 | 998.6 | 1.5 | 9.7 | 998.6 | 1.4 | -0.1 | 8.8 | -0.9 | -9.4% | 998.5 | 1.3 | -0.2 | 7.5 | -2.2 | -22.3% |
| 13 | STOR_12 | 3562-001_3662-002 | Odana Golf Course - Entrance of 42" Storm Sewer | 978.0 | 979.5 | 1.5 | 21.7 | 979.4 | 1.4 | -0.1 | 19.8 | -1.9 | -8.6% | 979.2 | 1.2 | -0.3 | 16.8 | -4.9 | -22.5% |
| 14 | PD_3462-002 | PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636 | Odana Pond | 980.0 | 979.5 | -0.5 | 111.0 | 979.4 | -0.6 | -0.1 | 87.3 | -23.7 | -21.4% | 979.2 | -0.8 | -0.3 | 60.4 | -50.6 | -45.6% |
| 15 | WI01-A-0179-H-001 | 3460-019_3461-001 | Intersection of Milward Dr & Wedgewood Way | 982.3 | 983.5 | 1.1 | 13.5 | 983.3 | 1.0 | -0.1 | 12.5 | -0.9 | -6.9% | 983.1 | 0.7 | -0.4 | 10.9 | -2.6 | -19.2% |
| 16 | WI01-A-0179-H-003 | 3461-007_3461-008 | Intersection of Milward Dr & Dearholt Rd | 981.3 | 982.4 | 1.1 | 20.2 | 982.4 | 1.1 | 0.0 | 18.8 | -1.5 | -7.3% | 982.3 | 1.0 | -0.1 | 16.6 | -3.7 | -18.2% |
| 17 | WI01-A-0179-H-006 | 3460-002_3460-003 | Intersection of Sherwood Rd & Dearholt Rd | 989.6 | 990.5 | 1.0 | 8.7 | 990.5 | 0.9 | -0.1 | 8.6 | -0.1 | -0.9% | 990.4 | 0.8 | -0.1 | 8.5 | -0.2 | -2.3% |
| 18 | WI01-A-0180-H-002 | 3360-020_3360-019 | Intersection of Odana Rd & Segoe Rd | 1005.9 | 1006.6 | 0.7 | 7.7 | 1006.5 | 0.6 | -0.1 | 6.9 | -0.8 | -10.6% | 1006.5 | 0.6 | -0.1 | 5.3 | -2.4 | -31.2% |
| 19 | WI01-A-0187-H-006 | 3359-006_3359-008 | Intersection of Tokay Blvd & Whitney Way | 1018.7 | 1018.8 | 0.1 | 24.6 | 1018.8 | 0.1 | 0.0 | 21.9 | -2.7 | -11.1% | 1018.8 | 0.1 | 0.0 | 17.7 | -6.9 | -28.1% |
| 20 | WI01-A-0183-H-001 | 3160-002_BC_JCT_21 | Odana Rd, approximately 325-ft west of Medical Circle | 1028.6 | 1029.5 | 0.9 | 134.9 | 1029.4 | 0.8 | -0.1 | 121.1 | -13.8 | -10.2% | 1029.3 | 0.7 | -0.2 | 102.9 | -32.0 | -23.7% |
| 21 | PD_3362-020 | WW_GW_07_WW_GW_09 | Orchard Ridge Valley Park Pond | 979.0 | 979.8 | 0.8 | 119.3 | 979.6 | 0.6 | -0.1 | 116.0 | -3.3 | -2.8% | 979.4 | 0.4 | -0.4 | 110.3 | -9.0 | -7.5% |
| 22 | WI01-B-0184-H-010 | 3261-016_3261-017 | Intersection of Shroeder Rd & Shroeder Ct | 1002.0 | 1002.1 | 0.1 | 52.2 | 1002.1 | 0.1 | 0.0 | 48.3 | -3.9 | -7.6% | 1002.1 | 0.1 | 0.0 | 40.7 | -11.5 | -22.0% |
| 23 | WI01-B-0184-H-000 | 3362-012_3362-015 | Intersection of Whitney Way & Gilbert Rd | 981.7 | 982.2 | 0.5 | 150.5 | 982.1 | 0.5 | 0.0 | 141.3 | -9.2 | -6.1% | 982.0 | 0.4 | -0.1 | 125.4 | -25.1 | -16.7% |
| 24 | WI01-B-0181-H-001 | 3365-013_3365-024 | Tolman Ter low-point, approximately 425-ft east of Gilbert Rd | 1038.6 | 1039.8 | 1.2 | 4.5 | 1039.6 | 1.1 | -0.1 | 4.3 | -0.1 | -3.0% | 1039.4 | 0.9 | -0.3 | 4.1 | -0.3 | -6.9% |
| 25 | WI01-B-0182-H-006 | 3164-028_3164-008 | Intersection of Piping Rock Rd & Manhasset Pl | 1004.9 | 1005.1 | 0.2 | 23.7 | 1005.1 | 0.2 | 0.0 | 22.3 | -1.4 | -6.1% | 1005.1 | 0.2 | 0.0 | 20.0 | -3.7 | -15.4% |

# Appendix E. Willow Creek Phase I Analysis

# MSA Memo

**To:** Caroline Burger, PE – City of Madison

**From:** Alistair Hancox, PE and Eric Thompson, PE – MSA Professional Services

**Subject:** Willow Creek – Green Infrastructure Assessment

**Date:** September 21, 2021

## PURPOSE

This memorandum summarizes results of modeling simulations of the installation of Distributed Green Infrastructure (DGI) uniformly throughout the Willow Creek watershed for purposes of reducing the frequency and/or severity of flooding. Specific to this evaluation, DGI means installation of practices designed to reduce runoff volumes during rainfall events. While this implies infiltration of runoff, for this event-based study, the target volumes were simply retained in the upper watershed areas and not allowed to pass downstream.

## METHODOLOGY

The City of Madison, in conjunction with other consultants, had conducted green infrastructure assessments in studies predating MSA's work in the Willow Creek Watershed. These prior studies all utilized a traditional hydrology model which divided each sub-watershed up into Directly Connected Impervious Area (DCIA), Unconnected Impervious Area (UCIA), and Pervious Area. To estimate the benefits of green infrastructure, and simulate the interception of flow from impervious areas and the subsequent diversion of these flows to pervious areas where they were allowed a chance to infiltrate, a fraction of the estimated existing DCIA was converted to UCIA (10% and 25%, for the respective simulations).

The Willow Creek Watershed Study model was built using a Rain-on-Grid hydrologic method which generates runoff everywhere throughout the catchment simultaneously, depending on the unique ground cover and infiltration parameters of each individual grid cell. Impervious areas cannot be designated by the user as either DCIA or UCIA and so allocations could not be reapportioned as they were with the prior studies. To estimate the effects of a 10% and 25% reduction in DCIA, MSA built a greatly simplified version of the watershed model, reducing all input to a single traditional-hydrology 1-D node representing the entire 1,913-acre watershed. This model was calibrated by adjusting the subcatchment width parameter until runoff volumes matched, within reason, those of the full detail calibrated rain-on-grid Existing Conditions model. The single 1-D node model was then adjusted to convert 10% and 25% of DCIA to UCIA and solved to determine the resulting reduction in total watershed runoff volume for the 50% AEP, 10% AEP, and 1% AEP (a total of six scenarios). The single 1-D node model was then set aside from this study and the full detail rain-on-grid model was modified to include distributed 1-D hydraulic storage nodes distributed proportionately throughout the study area such that their cumulative volume equaled the volume reduction reported for each scenario evaluated using the single 1-D node model.

**RESULTS**

Attached are detailed tabulated results for peak elevation and peak flow rates at 28 selected locations within the rain-on-grid Willow Creek model. The locations were chosen to provide an even distribution throughout the watershed, as well as at key locations where known flooding occurs.

The Willow Creek XP-SWMM model results did show some instabilities in 1D results at some of the nodes and links analyzed during this assessment. The result of such instabilities was for some nodes to show greater flood depths during the greater DCIA disconnected scenarios. These instances were reviewed, and it was determined that these conditions result from specific issues associated with flood conditions occurring within the model during selected flood event resulting from specific physical conditions that the model is predicting to occur and are independent of the DGI analysis. An unfortunate effect of these instabilities is that without interpretation they provide misleading results. For purposed of this study, those nodes should be ignored.

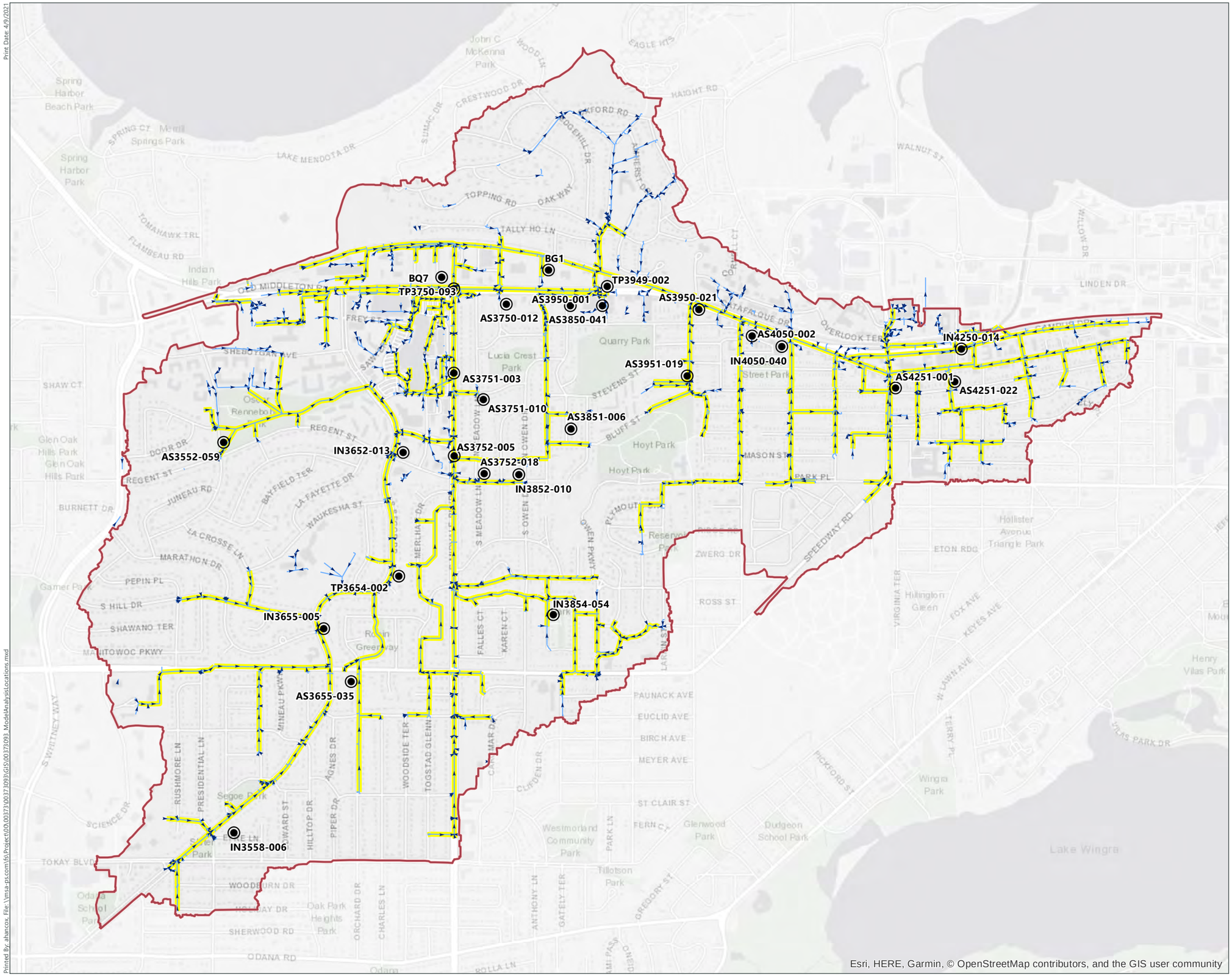
In general, the Flood Elevation Results show minor improvements throughout the watershed for 10% DCIA disconnection and slightly greater improvements for 25% DCIA disconnection. Improvements were most evident during the 50% AEP (smaller) event and were somewhat negligible for the 1% AEP (large) event.

Print Date: 4/9/2021

# Model Analysis Locations

WIllow Creek Watershed Study

**City of Madison**




Willow Creek Watershed

Existing Stormwater Pipe

Modeled Pipes in XPSWMM

Proposed Analysis Location (27)

*Data Sources:*
*Storm System: City of Madison*
*Proposed 96" Pipe: KL Engineering*

MSA

0 0.125 0.25 Miles

Printed By: ahancox, File: \\msa-ps.com\fs\Project\00\00373\00373093\GIS\00373093_ModelAnalysisLocations.mxd

# Green Infrastructure Analysis - Willow Creek Watershed Study

## Flood Elevation Results

| Node | Ground Elevation | Existing | | | | | | 10% DCIA Disconnected | | | | | | 25% DCIA Disconnected | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-Year | | 10-Year | | 100-Year | | 2-Year | | 10-Year | | 100-Year | | 2-Year | | 10-Year | | 100-Year | |
| | | Elevation | Depth | Elevation | Depth | Elevation | Depth | Elevation | Change | Elevation | Change | Elevation | Change | Elevation | Change | Elevation | Change | Elevation | Change |
| IN3854-054 | 986.74 | 984.43 | 0.00 | 986.75 | 0.01 | 988.09 | 1.35 | 984.21 | 0.0 | 986.18 | 0.0 | 988.10 | 0.0 | 983.83 | 0.0 | 984.66 | 0.0 | 988.02 | -0.1 |
| IN3558-006 | 983.90 | 983.16 | 0.00 | 985.48 | 1.58 | 985.98 | 2.08 | 983.08 | 0.0 | 985.43 | -0.1 | 985.98 | 0.0 | 983.01 | 0.0 | 985.40 | -0.1 | 985.94 | 0.0 |
| AS3655-035 | 938.30 | 937.13 | 0.00 | 939.80 | 1.50 | 940.66 | 2.36 | 937.14 | 0.0 | 939.80 | 0.0 | 940.65 | 0.0 | 937.16 | 0.0 | 939.63 | -0.2 | 940.62 | 0.0 |
| AS3552-059 | 931.16 | 932.51 | 1.35 | 933.52 | 2.36 | 934.17 | 3.01 | 932.37 | -0.1 | 933.42 | -0.1 | 934.13 | 0.0 | 932.23 | -0.3 | 933.16 | -0.4 | 934.07 | -0.1 |
| IN3655-005 | 926.50 | 925.52 | 0.00 | 927.34 | 0.84 | 928.03 | 1.53 | 925.31 | 0.0 | 927.31 | 0.0 | 928.04 | 0.0 | 925.05 | 0.0 | 927.31 | 0.0 | 927.85 | -0.2 |
| TP3654-002 | 911.21 | 911.66 | 0.45 | 912.25 | 1.04 | 912.94 | 1.73 | 911.54 | -0.1 | 912.26 | 0.0 | 912.94 | 0.0 | 911.33 | -0.3 | 912.01 | -0.2 | 912.81 | -0.1 |
| IN3652-013 | 901.54 | 903.23 | 1.69 | 904.40 | 2.86 | 904.92 | 3.38 | 903.06 | -0.2 | 904.24 | -0.2 | 904.92 | 0.0 | 902.65 | -0.6 | 903.62 | -0.8 | 904.76 | -0.2 |
| AS3851-006 | 897.67 | 899.55 | 1.88 | 899.98 | 2.31 | 900.71 | 3.04 | 899.54 | 0.0 | 899.98 | 0.0 | 900.70 | 0.0 | 899.50 | 0.0 | 899.94 | 0.0 | 900.67 | 0.0 |
| AS3752-018 | 893.84 | 894.77 | 0.93 | 896.15 | 2.31 | 897.14 | 3.30 | 894.51 | -0.3 | 896.04 | -0.1 | 897.14 | 0.0 | 891.85 | -0.9 | 893.57 | -2.3 | 896.76 | -0.4 |
| IN3852-010 | 893.63 | 894.72 | 1.09 | 896.07 | 2.44 | 897.14 | 3.51 | 894.54 | -0.2 | 895.87 | -0.2 | 897.15 | 0.0 | 893.77 | -1.0 | 894.85 | -1.2 | 896.76 | -0.4 |
| AS3752-005 | 893.09 | 894.76 | 1.67 | 895.73 | 2.64 | 896.76 | 3.67 | 894.58 | -0.2 | 895.69 | 0.0 | 896.74 | 0.0 | 888.79 | -1.7 | 889.12 | -2.6 | 896.29 | -0.5 |
| AS3751-003 | 890.10 | 891.16 | 1.06 | 891.90 | 1.80 | 892.65 | 2.55 | 891.01 | -0.2 | 891.86 | 0.0 | 892.64 | 0.0 | 884.90 | -1.1 | 887.61 | -1.8 | 892.29 | -0.4 |
| AS3751-010 | 889.77 | 891.69 | 1.92 | 892.48 | 2.71 | 893.34 | 3.57 | 891.49 | -0.2 | 892.43 | 0.0 | 893.32 | 0.0 | 890.69 | -1.0 | 891.30 | -1.2 | 892.93 | -0.4 |
| AS3951-019 | 889.35 | 890.69 | 1.34 | 890.87 | 1.51 | 891.09 | 1.74 | 890.70 | 0.0 | 890.86 | 0.0 | 891.09 | 0.0 | 890.68 | 0.0 | 890.87 | 0.0 | 891.09 | 0.0 |
| TP3750-093 | 884.99 | 889.25 | 4.26 | 890.61 | 5.62 | 889.31 | 4.32 | 890.71 | 1.5 | 888.23 | -2.4 | 891.63 | 2.3 | 879.34 | -4.3 | 887.50 | -3.1 | 889.15 | -0.2 |
| AS3750-012 | 884.20 | 886.62 | 2.42 | 887.21 | 3.01 | 887.92 | 3.72 | 886.46 | -0.2 | 887.16 | 0.0 | 887.92 | 0.0 | 880.80 | -2.4 | 882.23 | -3.0 | 887.62 | -0.3 |
| BQ7 | 883.35 | 886.61 | 3.26 | 887.48 | 4.13 | 888.56 | 5.21 | 885.89 | -0.7 | 887.45 | 0.0 | 888.51 | 0.0 | 881.10 | -3.3 | 884.34 | -3.1 | 888.10 | -0.5 |
| BG1 | 881.57 | 881.88 | 0.31 | 883.36 | 1.79 | 883.83 | 2.26 | 881.67 | -0.2 | 883.05 | -0.3 | 883.83 | 0.0 | 876.46 | -0.3 | 881.69 | -1.7 | 883.56 | -0.3 |
| TP3949-002 | 880.18 | 880.45 | 0.27 | 882.35 | 2.17 | 882.77 | 2.59 | 880.80 | 0.4 | 882.31 | 0.0 | 882.77 | 0.0 | 874.69 | -0.3 | 880.49 | -1.9 | 882.55 | -0.2 |
| AS3950-021 | 879.78 | 880.94 | 1.16 | 882.46 | 2.68 | 881.86 | 2.08 | 881.04 | 0.1 | 882.22 | -0.2 | 882.10 | 0.2 | 873.43 | -1.2 | 880.92 | -1.5 | 882.53 | 0.7 |
| AS3950-001 | 879.30 | 881.07 | 1.77 | 882.71 | 3.41 | 883.32 | 4.02 | 880.22 | -0.8 | 882.64 | -0.1 | 883.29 | 0.0 | 876.56 | -1.8 | 880.12 | -2.6 | 882.91 | -0.4 |
| AS3850-041 | 879.03 | 881.07 | 2.04 | 882.76 | 3.73 | 883.34 | 4.31 | 880.24 | -0.8 | 882.69 | -0.1 | 883.37 | 0.0 | 876.53 | -2.0 | 880.14 | -2.6 | 882.98 | -0.4 |
| AS4050-002 | 875.54 | 876.40 | 0.86 | 878.10 | 2.56 | 880.08 | 4.54 | 874.45 | -0.9 | 877.93 | -0.2 | 879.59 | -0.5 | 873.00 | -0.9 | 876.43 | -1.7 | 878.78 | -1.3 |
| IN4050-040 | 874.68 | 873.98 | 0.00 | 878.04 | 3.36 | 880.02 | 5.34 | 873.84 | 0.0 | 877.29 | -0.7 | 879.48 | -0.5 | 872.66 | 0.0 | 873.44 | -3.4 | 878.69 | -1.3 |
| AS4251-001 | 871.38 | 868.24 | 0.00 | 870.93 | 0.00 | 874.45 | 3.07 | 867.81 | 0.0 | 870.44 | 0.0 | 873.67 | -0.8 | 866.85 | 0.0 | 868.23 | 0.0 | 872.80 | -1.7 |
| AS4251-022 | 870.26 | 866.59 | 0.00 | 869.74 | 0.00 | 871.00 | 0.74 | 866.26 | 0.0 | 868.32 | 0.0 | 870.28 | -0.7 | 865.09 | 0.0 | 866.72 | 0.0 | 870.26 | -0.7 |
| IN4250-014 | 857.08 | 859.28 | 2.20 | 860.14 | 3.06 | 865.60 | 8.52 | 859.19 | -0.1 | 859.83 | -0.3 | 864.48 | -1.1 | 858.75 | -0.5 | 859.59 | -0.5 | 861.36 | -4.2 |

* Denotes a node were minor instabilities have occurred in the 1D model results.
* Flood Depths Reduced due to DCIA Reduction.
* Flood Depths Increased due to DCIA Reduction.

# Green Infrastructure Analysis - Willow Creek Watershed Study

## Pipe Flow Results

| Pipe | Existing | | | 10% DCIA Disconnected | | | | | | 25% DCIA Disconnected | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2-Year | 10-Year | 100-Year | 2-Year | | 10-Year | | 100-Year | | 2-Year | | 10-Year | | 100-Year | |
| | Flow (cfs) | Flow (cfs) | Flow (cfs) | Flow (cfs) | Change | Flow (cfs) | Change | Flow (cfs) | Change | Flow (cfs) | Change | Flow (cfs) | Change | Flow (cfs) | Change |
| IN3558-006_IN3558-001 | 100.9 | 132.2 | 132.0 | 89.3 | -11% | 129.4 | -2% | 128.7 | -3% | 86.7 | -14% | 129.0 | -2% | 130.1 | -1% |
| IN3854-054_DT3854-006 | 60.2 | 90.4 | 102.3 | 56.3 | -6% | 83.8 | -7% | 102.3 | 0% | 49.9 | -17% | 63.2 | -30% | 101.7 | -1% |
| AS3655-035_DT3655-036 | 9.3 | 20.0 | 20.4 | 9.3 | 0% | 20.0 | 0% | 20.3 | -1% | 9.4 | 1% | 19.9 | 0% | 20.2 | -1% |
| AS3552-059_AS3552-057 | 15.6 | 15.9 | 16.0 | 14.8 | -5% | 15.9 | 0% | 15.7 | -2% | 12.3 | -21% | 15.5 | -3% | 16.1 | 1% |
| IN3655-005_IN3654-041 | 317.4 | 350.2 | 349.6 | 308.7 | -3% | 351.5 | 0% | 351.3 | 0% | 296.0 | -7% | 349.4 | 0% | 353.4 | 1% |
| TP3654-002_IN3653-012 | 267.7 | 266.7 | 264.5 | 266.7 | 0% | 265.9 | 0% | 260.8 | -1% | 271.7 | 2% | 264.7 | -1% | 261.1 | -1% |
| IN3652-013_TEE5 | 312.1 | 324.8 | 288.7 | 303.5 | -3% | 313.8 | -3% | 279.5 | -3% | 290.1 | -7% | 332.8 | 2% | 362.2 | 25% |
| AS3851-006_AS3851-001 | 9.8 | 10.3 | 10.6 | 9.9 | 1% | 10.3 | 0% | 10.6 | 0% | 11.5 | 17% | 12.1 | 18% | 10.7 | 0% |
| AS3752-018_AS3752-056 | 29.6 | 49.9 | 51.9 | 30.2 | 2% | 48.9 | -2% | 51.1 | -1% | 31.0 | 5% | 38.3 | -23% | 51.1 | -1% |
| IN3852-010_AS3752-022 | 18.2 | 22.0 | 22.5 | 18.7 | 3% | 21.9 | -1% | 22.8 | 1% | 18.9 | 4% | 22.1 | 0% | 22.8 | 1% |
| AS3752-005_TP3752-004 | 387.6 | 368.4 | 363.9 | 338.8 | -13% | 380.3 | 3% | 399.0 | 10% | 106.1 | -73% | 69.0 | -81% | 264.8 | -27% |
| AS3751-003_AS3751-002 | 555.7 | 539.7 | 552.7 | 539.7 | -3% | 540.9 | 0% | 552.7 | 0% | 183.9 | -67% | 316.7 | -41% | 550.3 | 0% |
| AS3751-010_AS3751-017 | 9.5 | 9.2 | 8.5 | 9.4 | -1% | 9.3 | 1% | 8.6 | 1% | 8.5 | -11% | 9.1 | -1% | 9.0 | 5% |
| AS3951-019_AS3951-018 | 3.5 | 2.8 | 2.9 | 3.4 | -2% | 2.8 | 0% | 3.0 | 1% | 3.4 | -3% | 3.4 | 19% | 3.0 | 0% |
| TP3750-093_TP3750-058 | 483.2 | 472.6 | 423.9 | 482.1 | 0% | 457.3 | -3% | 464.0 | 9% | 233.6 | -52% | 400.6 | -15% | 284.4 | -33% |
| AS3750-012_AS3849-026 | 69.7 | 65.8 | 41.6 | 75.4 | 8% | 50.0 | -24% | 54.7 | 32% | 15.7 | -78% | 31.5 | -52% | 53.3 | 28% |
| BQ6_BQ5 | 39.6 | 38.5 | 37.7 | 38.0 | -4% | 38.5 | 0% | 37.9 | 0% | 6.3 | -84% | 20.4 | -47% | 37.9 | 1% |
| BG1_TP3849-005 | 440.9 | 431.5 | 428.6 | 489.5 | 11% | 434.8 | 1% | 430.8 | 1% | 331.0 | -25% | 442.1 | 2% | 441.8 | 3% |
| TP3949-002_TP3949-001 | 540.5 | 498.2 | 517.0 | 515.0 | -5% | 501.9 | 1% | 528.0 | 2% | 354.0 | -35% | 475.3 | -5% | 502.1 | -3% |
| AS3950-021_TP4050-008 | 586.2 | 659.1 | 646.4 | 547.8 | -7% | 640.8 | -3% | 674.1 | 4% | 370.7 | -37% | 484.2 | -27% | 658.4 | 2% |
| AS3950-001_IN3949-010 | 30.8 | 30.8 | 31.0 | 25.4 | -18% | 30.1 | -2% | 30.1 | -3% | 20.6 | -33% | 30.4 | -1% | 30.4 | -2% |
| AS3850-041_IN3850-036 | 102.0 | 123.0 | 84.9 | 102.3 | 0% | 117.9 | -4% | 89.4 | 5% | 21.2 | -79% | 106.8 | -13% | 135.6 | 60% |
| AS4050-002_TP4150-004 | 585.3 | 560.7 | 537.5 | 525.3 | -10% | 667.1 | 19% | 589.6 | 10% | 404.7 | -31% | 571.9 | 2% | 540.2 | 1% |
| AS4050-002_TP4150-004.1 | 542.8 | 769.9 | 717.4 | 536.8 | -1% | 764.7 | -1% | 721.5 | 1% | 424.2 | -22% | 512.4 | -33% | 713.3 | -1% |
| AS4251-001_AS4251-033 | 597.1 | 746.8 | 817.6 | 570.6 | -4% | 680.8 | -9% | 820.1 | 0% | 451.8 | -24% | 571.5 | -23% | 743.2 | -9% |
| AS4251-022_AS4251-016 | 643.9 | 731.2 | 846.2 | 612.0 | -5% | 715.6 | -2% | 837.4 | -1% | 479.9 | -25% | 641.3 | -12% | 796.9 | -6% |
| IN4250-014_IN4250-013 | 4.8 | 4.1 | 6.3 | 6.1 | 27% | 4.6 | 11% | 6.4 | 2% | 4.8 | -1% | 5.4 | 31% | 6.3 | 0% |

* Denotes a pipe were minor instabilities have occurred in the 1D model results.
* Flows Reduced due to DCIA Reduction.
* Flows Increased due to DCIA Reduction.

# MSA Memo

**To:** Lauren Striegl P.E., City of Madison

**From:** Alistair Hancox P.E. & Eric Thompson P.E., MSA Professional Services

**Subject:** Willow Creek Watershed Study - Hydraulic Model Instabilities

**Date:** September 24, 2021

The purpose of this memo is to discuss the variability in modeling results across Existing and Proposed condition scenarios for the Willow Creek Watershed Study XP SWMM model. It has been known to MSA, and we have shared with the City, that 1D modeling results recorded at some locations within the model have identified rapid changes in pipe flow and water elevation. The model calibration process and the August 2018 simulation results give us confidence that the model is producing reliable outputs, irrespective of the 1D instabilities. The model results were also discussed with multiple Innovyze technical experts who also saw no reason for concern.

However, with the hope of producing a better product for the City, we have strived to reduce the occurrences of the instabilities as much as possible. Variables modified to increase stability were:

- Reducing the 1D Hydraulic timestep from 60 seconds to 1 second. Additional timesteps were tested (5 seconds and 0.5 seconds), but the best balance of model accuracy and simulation time was achieved with the 1 second timestep.
- Checking “Additional mass balance iteration” within the 2D Job Controls.

The main changes to previous model results can be observed in the smaller storm events. On the following page, images of both the Existing Conditions 2-year and 100-year simulation change in peak depth are shown. Raster depth changes of less than 0.1 ft are not shown on these maps. It should be reiterated that these images are not inundation maps, but the difference between the two versions of the peak inundation depth raster. We can see in Image 1 that the 2-year event produces less inundation along Midvale Blvd and University Ave, when incorporating the above modeling changes. The changes had little to no influence on the 100-year results. As the storm frequency reduced, the difference became less significant.

The 1D elevation results from the University Ave/Shorewood intersection give greater insight into why the peak inundation depths may have changed. See Figures 1 and 2 below. These show that with the smaller 1D timestep there is less oscillation between the spill elevation of the node (Ground Elevation) and the surcharged water level. There is a significant reduction in peak elevation during the 2-year event, but not during the 100-year event. The oscillations which occur when the node begins to surcharge are smoothed slightly in the revised model which is then reflected on the inundation depth result file.

As mentioned above, decreasing the 1D timestep does come at a cost to model solve time, which is why this was initially set high, at 60 seconds. Reducing this to 1 second, seems to add approximately 20 – 30% to model solve time.

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WWW.MSA-PS.COM

*Image 1 – Existing Condition 2-year Peak Depth Change*

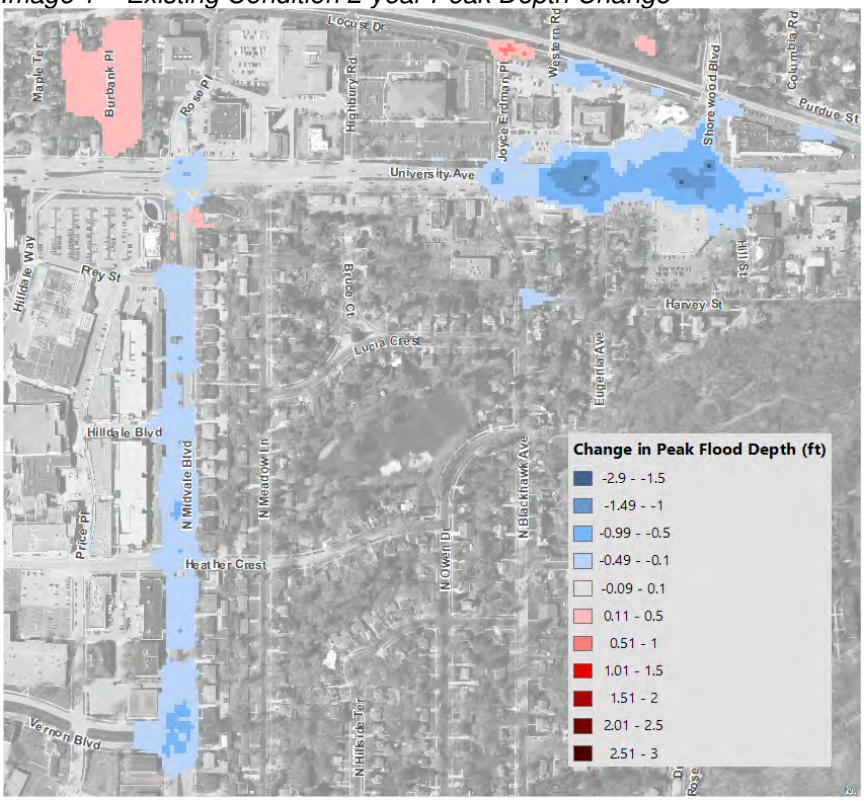



*Image 2 – Existing Condition 100-year Peak Depth Change*

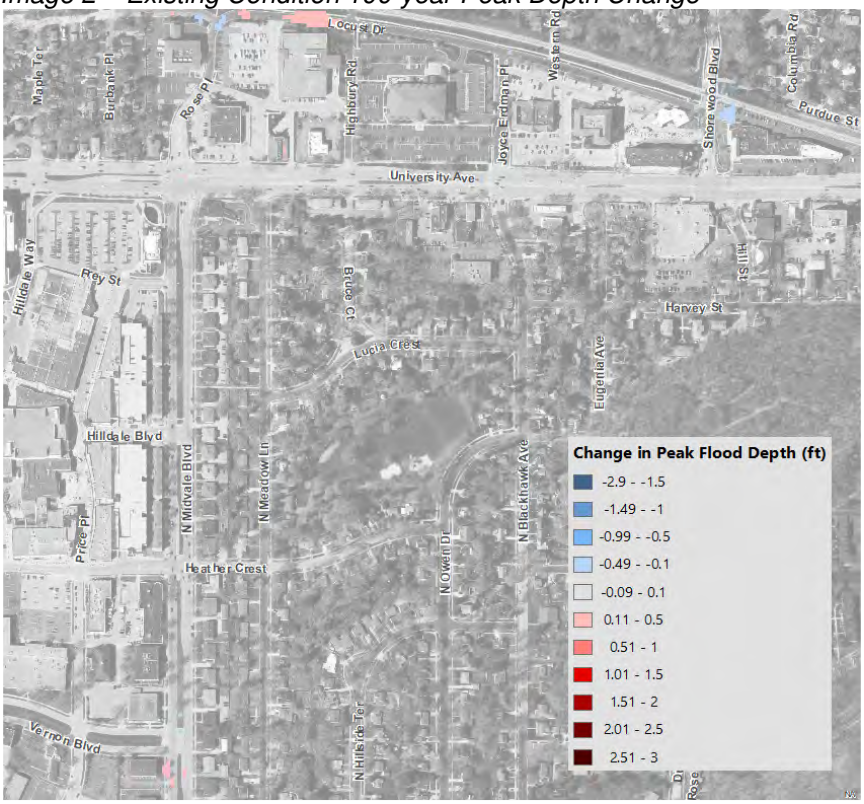


*Figure 1 - Water Elevation Result at Node P900E (University Ave/Shorewood Blvd) during the 2-year Event*

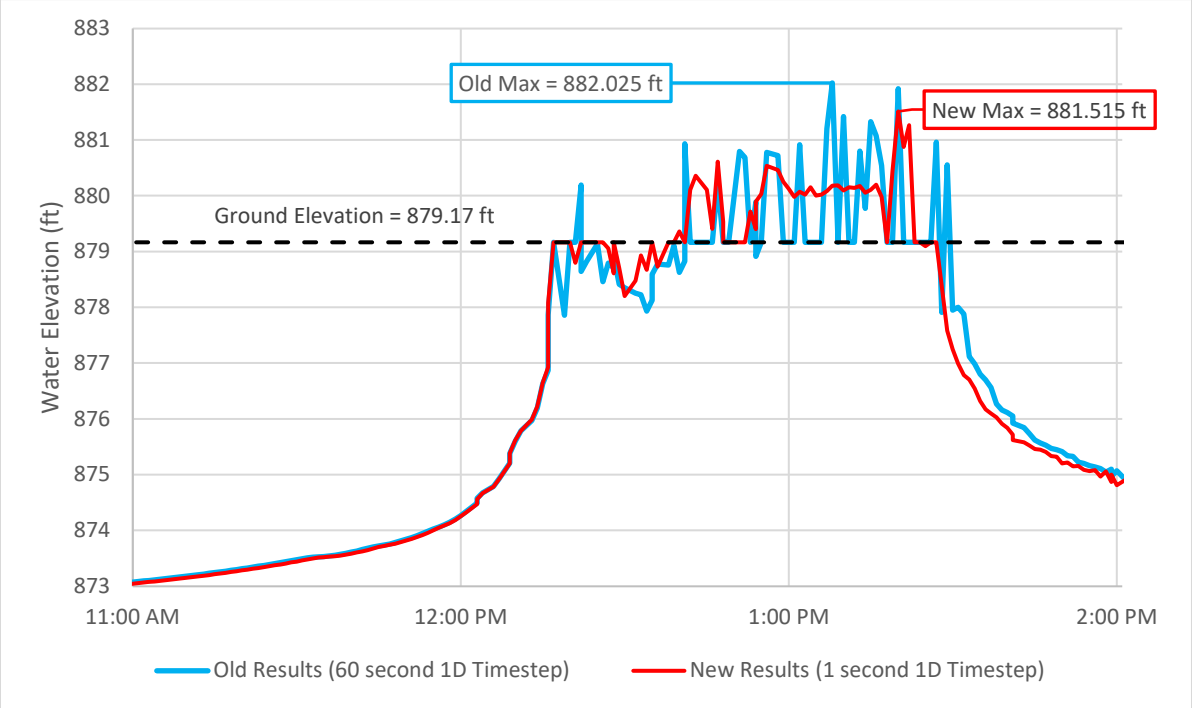
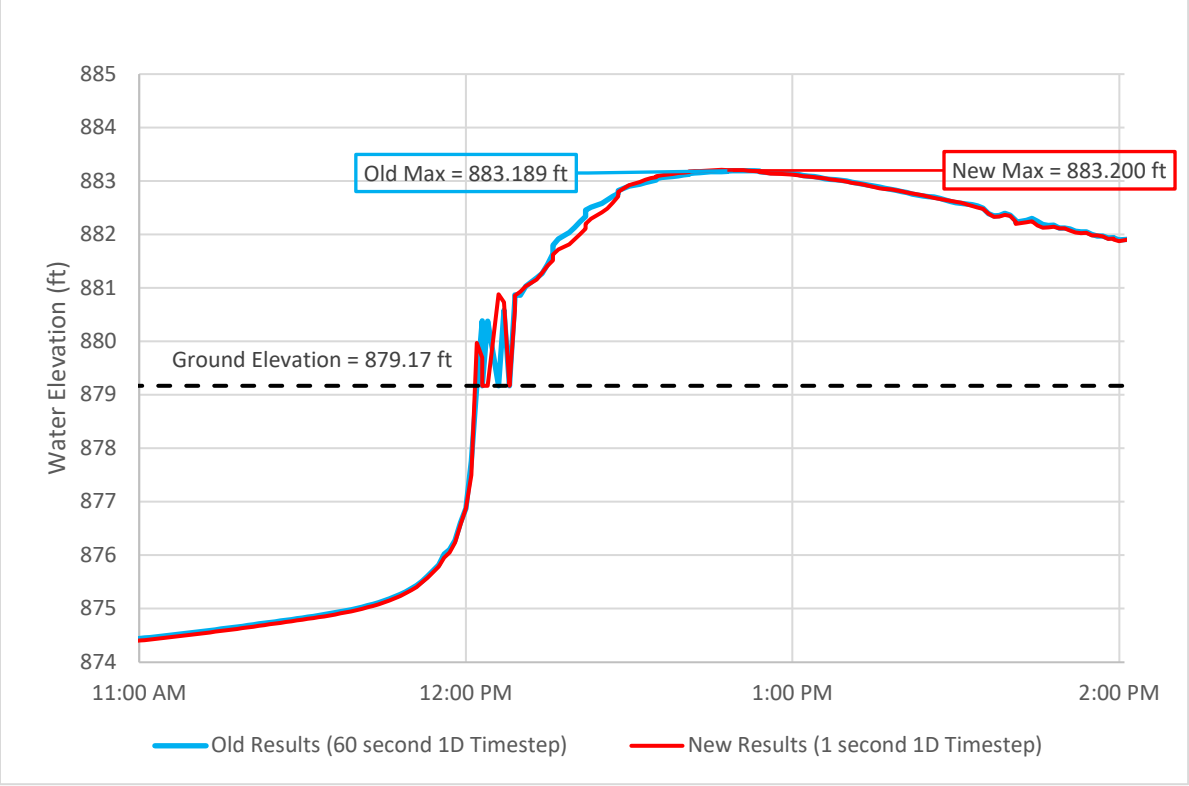



*Figure 2 - Water Elevation Result at Node P900E (University Ave/Shorewood Blvd) during the 100-year Event*



# Appendix G. Meeting Summary – Meeting with Parks regarding Blackhawk Pond Reconstruction

## Burger, Caroline

**From:** Burger, Caroline
**Sent:** Wednesday, December 8, 2021 8:13 AM
**To:** Knepp, Eric; Freiwald, Ann; Close, Sarah; Kane, Kathleen
**Cc:** Schmidt, Janet; Fries, Gregory; OBrien, Joanna; Lerner, Sarah
**Subject:** Engineering/Parks - Pheasant Branch Watershed Study - Blackhawk Pond Discussion Summary

Hello,

Thank you all for taking the time to talk about the proposed Blackhawk Pond mitigation measure for the Pheasant Branch Watershed Study last Friday.

Below is a summary of the discussion. Please let me know if there are revisions, or, if the summary reflects your understanding of the discussion.

The homes and streets around Blackhawk Pond experience chronic flooding issues in medium to large storm events. Many homes experienced significant flood damages during the August 2018 event. The results of the Pheasant Branch Watershed Study show that improvements to Blackhawk Pond can reduce and/or eliminate the flood risk during medium and larger storm events.

The majority of the improvements would occur on Stormwater Utility land and City ROW. However, to be most effective, some City Park land would be required. The proposal is to add additional wet weather storage to the pond by expanding the flood storage area south into City Park land. The current proposal is to add the storage where the current low mow/no mow area is located. And, if amenable, some of the excavated soil could be used to improve the current soccer fields, if they are in need of additional soil.

Parks representatives indicated they see no red flags to the proposal. There is currently a tennis court area sited for one of the proposed pond storage areas, however, Parks representatives did not think that would be going forward, and as such, expanding pond storage in this area should be acceptable.

Parks and Engineering representatives both agreed that, if the project goes forward, the improvements to the pond would also add Park amenities where feasible.

As a result of the discussion, Engineering will continue to include the Blackhawk Pond improvements as a flood mitigation measure for the watershed study. If/when the project begins, Engineering will work cooperatively with Parks staff on the improvements.

During the meeting, the improvements to Glen Oak Park, as well as a potential watershed study overview presentation to the Parks Commission, were briefly discussed. Follow-up discussions will be scheduled to further explore both of those topics.

Thank you,

**Caroline Burger, PE, ENV SP**
(she/her/hers) (what's this?)
Engineer 4
Engineering Division
City-County Building, Room 115
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703

☎ Desk: 608-266-4913
✉ cburger@cityofmadison.com

Please note some City offices currently closed to the public due to COVID-19, but most staff is still working. See our website (link below) for the most up to date information on how to best continue working with each department.
https://www.cityofmadison.com/health-safety/coronavirus/service-updates

# Appendix H. Water Quality Modeling Information

# Wexford Pond Stage Storage

## "Minimum" Project

| North Pond | |
|---|---|
| Elevation | Area (SF) |
| 967 | 66336 |
| 968 | 66895 |
| 969 | 177841 |
| 970 | 183353 |
| 971 | 201504 |
| 972 | 222939 |
| 973 | 233622 |
| 974 | 245948 |
| 975 | 257633 |
| 976 | 268441 |
| 977 | 278827 |
| 978 | 289905 |

Dredging and removing peninsula

| South Pond | |
|---|---|
| Elevation | Area (SF) |
| 969 | 18938 |
| 970 | 20522 |
| 971 | 27128 |
| 972 | 33946 |
| 973 | 37438 |
| 974 | 40859 |
| 975 | 44040 |
| 976 | 47094 |
| 977 | 50549 |
| 978 | 56052 |

Dredging Only

Areas are same as existing since we aren't altering the pond at all.

## "Full" Project

| North Pond | |
|---|---|
| Elevation | Area (SF) |
| 965 | 10717 |
| 966 | 12589 |
| 967 | 165513 |
| 968 | 172880 |
| 969 | 180476 |
| 970 | 188183 |
| 971 | 197036 |
| 972 | 221573 |
| 973 | 233622 |
| 974 | 245948 |
| 975 | 257633 |
| 976 | 268441 |
| 977 | 278827 |
| 978 | 289905 |

Dredging, forebay installation, and removing peninsula

Area above 972 is same as above

| South Pond | |
|---|---|
| Elevation | Area (SF) |
| 965 | 7456 |
| 966 | 8618 |
| 967 | 15246 |
| 968 | 17700 |
| 969 | 20628 |
| 970 | 22949 |
| 971 | 25851 |
| 972 | 34635 |
| 973 | 37438 |
| 974 | 40859 |
| 975 | 44040 |
| 976 | 47094 |
| 977 | 50549 |
| 978 | 56052 |

Dredging, excavation to 967 and Forebay Installation

Area above 972 is same as above

# Appendix I. Proposed Conditions Peak Water Surface Elevations and Peak Flows

**Table I-1 Proposed Solutions Results**

**2-year, 24-hour MS4 Storm Event**

| | | | Existing Conditions | | Proposed Conditions | |
|---|---|---|---|---|---|---|
| **Recording Location** | **SWMM Recording Line/Node** | **Location** | **Peak Flow** | **Peak WSE** | **Peak Flow** | **Peak WSE** |
| 1 | Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond | Outlet of Swallowtail Pond crossing Pleasant View Road | 49 | 1,014.16 | 70 | 1,012.20 |
| 2 | Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond | Target Pond Outlet (3 culverts) West to East Under Beltline | 208 | 1,047.86 | 96 | 1,046.61 |
| 2b | TargetRelief1 | Target Relief Pipe | N/A | N/A | 173 | N/A |
| 3 | 2D Flow Line 104 | Sauk Creek Greenway, Downstream of S High Point Road | 255 | 1,038.60 | 392 | 1,038.43 |
| *4* | *2D Flow Line 8* | *Sauk Creek Greenway, Downstream of Tree Lane* | *260* | *1,029.31* | *411* | *1,028.14* |
| *5* | *2D Flow Line 54/1D Node N_Wexford_Pond* | *Wexford Pond (middle)* | *342* | *976.35* | *102* | *974.61* |
| 5b | 1D Conduit AS2349-008_AS2349-011 | Wexford Inflow from High Point Road | 251 | N/A | 261 | N/A |
| 6 | 2D Flow Line 44 | Culverts East to West under Beltline just downstream of Wexford Pond | 378 | 972.40 | 279 | 970.96 |
| 7 | Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond | Old Sauk Trails Business Park Ponds (middle)* | 480 | 968.83 | 480 | 962.94 |
| 8 | 2D Flow Line 17 | Watershed Outlet* | 440 | 957.98 | 440 | 958.20 |

*Old Sauk Trails North Pond Outlet Structure will be designed to reduce flows to no greater than existing conditions peak flows

**10-year, 24-hour MS4 Storm Event**

| | | | Existing Conditions | | Proposed Conditions | |
|---|---|---|---|---|---|---|
| **Recording Location** | **SWMM Recording Line/Node** | **Location** | **Peak Flow** | **Peak WSE** | **Peak Flow** | **Peak WSE** |
| 1 | Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond | Outlet of Swallowtail Pond crossing Pleasant View Road | 68 | 1,016.33 | 136 | 1,013.44 |
| 2 | Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond | Target Pond Outlet (3 culverts) West to East Under Beltline | 310 | 1,049.14 | 160 | 1,047.43 |
| 2b | TargetRelief1 | Target Relief Pipe | N/A | N/A | 278 | N/A |
| 3 | 2D Flow Line 104 | Sauk Creek Greenway, Downstream of S High Point Road | 376 | 1,039.22 | 602 | 1,039.07 |
| *4* | *2D Flow Line 8* | *Sauk Creek Greenway, Downstream of Tree Lane* | *376* | *1,029.67* | *646* | *1,028.62* |
| *5* | *2D Flow Line 54/1D Node N_Wexford_Pond* | *Wexford Pond (middle)* | *521* | *977.29* | *273* | *976.52* |
| 5b | 1D Conduit AS2349-008_AS2349-011 | Wexford Inflow from High Point Road | 293 | N/A | 386 | N/A |
| *6* | *2D Flow Line 44* | *Culverts East to West under Beltline just downstream of Wexford Pond* | *670* | *975.49* | 598 | 972.06 |
| 7 | Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond | Old Sauk Trails Business Park Ponds (middle)* | 821 | 971.57 | 821 | 964.95 |
| 8 | 2D Flow Line 17 | Watershed Outlet* | 812 | 958.84 | 812 | 959.19 |

**Table I-1 Proposed Solutions Results**

**25-year, 24-hour MS4 Storm Event**

| | | | Existing Conditions | | Proposed Conditions | |
|---|---|---|---|---|---|---|
| **Recording Location** | **SWMM Recording Line/Node** | **Location** | **Peak Flow** | **Peak WSE** | **Peak Flow** | **Peak WSE** |
| 1 | Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond | Outlet of Swallowtail Pond crossing Pleasant View Road | 176 | 1,016.65 | 189 | 1,014.34 |
| 2 | Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond | Target Pond Outlet (3 culverts) West to East Under Beltline | 385 | 1,050.45 | 210 | 1,047.99 |
| 2b | TargetRelief1 | Target Relief Pipe | N/A | N/A | 386 | N/A |
| 3 | 2D Flow Line 104 | Sauk Creek Greenway, Downstream of S High Point Road | 463 | 1,039.57 | 782 | 1,039.24 |
| *4* | *2D Flow Line 8* | *Sauk Creek Greenway, Downstream of Tree Lane* | *473* | *1,029.92* | *839* | *1,029.01* |
| *5* | *2D Flow Line 54/1D Node N_Wexford_Pond* | *Wexford Pond (middle)* | *615* | *977.86* | *438* | *978.04* |
| 5b | 1D Conduit AS2349-008_AS2349-011 | Wexford Inflow from High Point Road | 309 | N/A | 527 | N/A |
| 6 | 2D Flow Line 44 | Culverts East to West under Beltline just downstream of Wexford Pond | 958 | 976.51 | 887 | 972.83 |
| 7 | Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond | Old Sauk Trails Business Park Ponds (middle)* | 1,295 | 972.52 | 1,295 | 966.60 |
| 8 | 2D Flow Line 17 | Watershed Outlet* | 1,299 | 959.66 | 1,299 | 959.74 |

**100-year, 24-hour MS4 Storm Event**

| | | | Existing Conditions | | Proposed Conditions | |
|---|---|---|---|---|---|---|
| **Recording Location** | **SWMM Recording Line/Node** | **Location** | **Peak Flow** | **Peak WSE** | **Peak Flow** | **Peak WSE** |
| 1 | Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond | Outlet of Swallowtail Pond crossing Pleasant View Road | 248 | 1,016.95 | 266 | 1,015.98 |
| 2 | Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond | Target Pond Outlet (3 culverts) West to East Under Beltline | 497 | 1,052.52 | 281 | 1,048.84 |
| 2b | TargetRelief1 | Target Relief Pipe | N/A | N/A | 625 | N/A |
| 3 | 2D Flow Line 104 | Sauk Creek Greenway, Downstream of S High Point Road | 576 | 1,040.01 | 1,171 | 1,040.09 |
| *4* | *2D Flow Line 8* | *Sauk Creek Greenway, Downstream of Tree Lane* | *591* | *1,030.22* | *1,230* | *1,029.57* |
| *5* | *2D Flow Line 54/1D Node N_Wexford_Pond* | *Wexford Pond (middle)* | *797* | *978.54* | *823* | *979.93* |
| 5b | 1D Conduit AS2349-008_AS2349-011 | Wexford Inflow from High Point Road | 394 | N/A | 819 | N/A |
| 6 | 2D Flow Line 44 | Culverts East to West under Beltline just downstream of Wexford Pond | 1,506 | 977.36 | 1,532 | 975.00 |
| 7 | Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond | Old Sauk Trails Business Park Ponds (middle)* | 2,255 | 973.70 | 2,255 | 969.69 |
| 8 | 2D Flow Line 17 | Watershed Outlet* | 2,278 | 960.85 | 2,278 | 960.54 |

# Appendix J. Planning Level Cost Estimates

**Conceptual Cost Estimate - Old Sauk Trails Business Park Ponds and Greenways** PB_1

v2021_10_08

BRIC Grant Estimate
$8,600,000

\\Gisserver\d\DESIGN\Projects\11981\Proposed Solutions\OSTrPonds\ForFEMAGrant\Sub-Application\04 Budget

| Includes the following plus other misc items | | Construction C | Design/Permitting Cost | Percent of Construction | Total Design/Permitting/Construction |
|---|---|---|---|---|---|
| Old Sauk Trails Ponds | PB_1_1 | $ 2,823,500 | $ 250,000 | 35% | $ 3,073,500 |
| Old Sauk Trails East Greenway | PB_1_2 | $ 1,539,350 | $ 175,000 | 19% | $ 1,714,350 |
| Driveway to OSTr Ponds (Culverts) | PB_1_5 | $ 120,000 | $ 25,000 | 2% | $ 145,000 |
| Deming Way north of OSTr Ponds (Culverts) | PB_1_6 | $ 1,509,975 | $ 60,000 | 19% | $ 1,569,975 |
| In OSTr Ponds (Culverts) | PB_1_7 | $ 505,000 | $ 75,000 | 6% | $ 580,000 |
| Fourier Drive east of OSTr Ponds (Culverts) | PB_1_8 | $ 1,004,925 | $ 45,000 | 13% | $ 1,049,925 |
| Deming Way SS (included in local sewer) | | $ 458,950 | $ 20,000 | 6% | $ 478,950 |
| | | $ 7,961,700 | $ 650,000 | 100% | $ 8,611,700 |

| | | | |
|---|---|---|---|
| | FEMA BRIC Grant Estimate: | $ 8,611,700 | 8611700 |
| FEMA BRIC | | | $ - |
| Engineering | 300000 | | |
| Permitting/We | 350000 | | |
| Construction | 7961700 | | |
| Deming Way SS | $ 458,950 | | |
| | $ 7,502,750 | | |

**Conceptual Cost Estimate - Deming Way west of OSTr Ponds (Culverts)** PB_1_4

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 20,039 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 120 | L.F. | $ 15 | N/A | $ 1,800 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 267 | S.Y. | $ 80 | N/A | $ 21,333 | Assume 20' wide trench |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB11 | 5'x10' BOX CULVERT | 120 | L.F. | $ 1,700 | N/A | $ 204,000 | |
| PB19 | 5'x10' / 6'x10' BOX CULVERT WING WALLS | 1 | EACH | $ 40,000 | N/A | $ 40,000 | |
| PB25 | 5'x10' / 6'x10' BOX CULVERT GATES | 1 | EACH | $ 15,750 | N/A | $ 15,750 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 4 | EACH | $ 4,000 | N/A | $ 16,000 | Counted 2 sewer/water/storm utility conflict/crossings; assuming same number of other utility conflict |
| | | | | **Subtotal** | | **$ 421,000** | |
| | | | | **Contingency** | **25%** | **$ 106,000** | |
| | | | | **Design** | **10%** | **$ 43,000** | |
| | | | | **Total** | | **$ 570,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 570,000** | |

**Conceptual Cost Estimate - Blackhawk Pond** PB_3

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 246,485 | Set to 5% of subtotal cost |
| 20101 | EXCAVATION CUT | 131,800 | C.Y. | $ 25 | $ 15 | $ 1,977,000 | Reduced unit cost due to larger amount of excavation for project |
| 20221 | TOPSOIL | 19,580 | S.Y. | $ 9.50 | $ 7.50 | $ 146,850 | Reduced unit cost due to larger amount of topsoil for project |
| 20705 | DETENTION BASIN SEEDING | 19,580 | S.Y. | $ 3 | N/A | $ 58,740 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 19,580 | S.Y. | $ 4 | N/A | $ 68,530 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 16,000 | S.Y. | $ 80 | N/A | $ 1,280,000 | Assume 10 foot wide trench to reconstruct storm sewer |
| 50409 | 36 INCH TYPE I RCP STORM SEWER PIPE | 1,600 | L.F. | $ 175 | N/A | $ 280,000 | |
| 50726 | 6'X6' STORM SAS | 11 | EACH | $ 9,500 | N/A | $ 104,500 | |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB3 | DETENTION BASIN OUTLET STRUCTURE | 1 | EACH | $ 10,000 | N/A | $ 10,000 | |
| PB4 | CLAY LINER | 21,160 | C.Y. | $ 40 | N/A | $ 846,406 | |
| PB39 | CLEARING & GRUBBING | 4 | ACRE | $ 15,000 | N/A | $ 60,668 | |
| PB41 | UTILITY CONFLICT ALLOWANCE | 3 | EACH | $ 4,000 | N/A | $ 12,000 | Assume storm sewer can be reconstructed on same alignment but will be a few conflicts due to larger pipe |
| | | | | **Subtotal** | | **$ 5,177,000** | |
| | | | | **Contingency** | **25%** | **$ 1,295,000** | |
| | | | | **Design** | **10%** | **$ 518,000** | |
| | | | | **Total** | | **$ 6,990,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation. |
| | | | | **Total Total** | | **$ 6,990,000** | |

**Conceptual Cost Estimate - Swallowtail Pond Reconstruction** PB_2
v2022_01_25

Use draft estimate from Strand, will be updated as get further into design, added
$2,203,300

\\Gisserver\d\DESIGN\Projects\11981\Proposed Solutions\SwallowtailPond\Estimate

**Conceptual Cost Estimate - Wexford** PB_4

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 138,521 | N/A | $ 171,449 | Set to 5% of subtotal cost |
| 20101 | EXCAVATION CUT | 84,100 | C.Y. | $ 25 | $ 15 | $ 1,261,500 | Reduced unit cost due to larger amount of excavation for project |
| 20221 | TOPSOIL | 9,720 | S.Y. | $ 9.50 | $ 7.50 | $ 72,900 | Reduced unit cost due to larger amount of topsoil for project |
| 20705 | DETENTION BASIN SEEDING | 9,720 | S.Y. | $ 3 | N/A | $ 29,160 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 9,720 | S.Y. | $ 4 | N/A | $ 34,020 | |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB3 | DETENTION BASIN OUTLET STRUCTURE | 1 | EACH | $ 10,000 | $ 20,000 | $ 20,000 | Outlet structure assumed to be larger than typical pond outlet structure |
| PB4 | CLAY LINER | 18,910 | C.Y. | $ 40 | N/A | $ 756,400 | |
| PB5 | DREDGING | 4,000 | C.Y. | $ 45 | N/A | $ 180,000 | |
| PB39 | CLEARING & GRUBBING | 10 | ACRE | $ 15,000 | N/A | $ 150,000 | |
| PB41 | UTILITY CONFLICT ALLOWANCE | 5 | EACH | $ 4,000 | N/A | $ 20,000 | Assumed 5 conflicts for purposes of this estimate |
| PB49 | PEDESTRIAN BRIDGE - 230 LF | 1 | EACH | $ 520,000 | N/A | $ 520,000 | |
| PB50 | STORMWATER PUMP STATION - 4-12 CFS CAPACITY | 1 | EACH | $ 300,000 | N/A | $ 300,000 | |
| | | | | **Subtotal** | | **$ 3,601,000** | |
| | | | | **Contingency** | **25%** | **$ 901,000** | |
| | | | | **Design** | | **$ 282,100** | Cost of current design contract |
| 255253.1076 | | | | **Total** | | **$ 4,784,100** | |
| | | | | **Land Acquisition** | | **$ -** | |
| 428703.4211 | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation. |
| 88992 | | | | **Total Total** | | **$ 4,784,100** | |

**Conceptual Cost Estimate - Sauk Creek Greenway Reconstruction, Stabilization**
v2021_10_08

PB_5

Draft estimate from previous design work
$4,000,000

**Conceptual Cost Estimate - Target Relief Pipe** PB_6

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 391,659 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40101 | CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 1 | 53,778 | TON | $ 23 | N/A | $ 1,236,889 | Assuming 2 lanes (12' wide) will be reconstructed |
| 40102 | CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 2 OR NO. 3 | 4,889 | TON | $ 23 | N/A | $ 112,444 | Assuming 2 lanes (12' wide) will be reconstructed |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 2,750 | L.F. | $ 15 | N/A | $ 41,250 | |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB14 | 6'x12' BOX CULVERT | 2,750 | L.F. | $ 2,000 | N/A | $ 5,500,000 | |
| PB20 | 5'x12' / 6'x12' BOX CULVERT WING WALLS | 1 | EACH | $ 45,000 | N/A | $ 45,000 | |
| PB26 | 5'x12' / 6'x12' BOX CULVERT GATES | 1 | EACH | $ 16,500 | N/A | $ 16,500 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 4 | EACH | $ 2,500 | N/A | $ 10,000 | 2 known connections plus 2 additional assumed connections |
| PB41 | UTILITY CONFLICT ALLOWANCE | 28 | EACH | $ 4,000 | N/A | $ 112,000 | Counted 14 sewer/water/storm utility crossings/conflicts; assuming same number of other utility conf |
| PB48 | CONCRETE PAVEMENT, 9 INCHES THICK | 7,330 | S.Y. | $ 90 | N/A | $ 659,700 | Assuming 2 lanes (12' wide) will be reconstructed |
| | | | | **Subtotal** | | **$ 8,225,000** | |
| | | | | **Contingency** | **25%** | **$ 2,057,000** | |
| | | | | **Design** | **10%** | **$ 823,000** | |
| | | | | **Total** | | **$ 11,105,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 11,105,000** | |

**Conceptual Cost Estimate - Old Sauk Road and Westfield Road Intersection Reconstruction** PB_7

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment |
|---|---|---|---|---|---|---|---|
| 50413 | 60 INCH TYPE I RCP STORM SEWER PIPE | 660 | L.F. | $ 250 | N/A | $ 165,000 | |
| 50726 | 6'X6' STORM SAS | 4 | EACH | $ 9,500 | N/A | $ 38,000 | Assume 4 access structures |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB41 | UTILITY CONFLICT ALLOWANCE | 6 | EACH | $ 4,000 | N/A | $ 24,000 | Count 3 sewer/water crossings/conflicts; assume 3 additional other utility conflicts |
| Other | STREET RECONST ESTIMATE FROM ENG STREETS | | | | | $ 1,132,600 | |
| | | | | **Subtotal** | | **$ 1,435,000** | |
| | | | | **Contingency** | **25%** | **$ 359,000** | |
| | | | | **Design** | **10%** | **$ 144,000** | |
| | | | | **Total** | | **$ 1,938,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 1,938,000** | |

**Conceptual Cost Estimate - High Point Road west of Wexford Pond (Greenway Crossing)** PB_8

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 26,023 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 200 | L.F. | $ 15 | N/A | $ 3,000 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 444 | S.Y. | $ 80 | N/A | $ 35,556 | Assume 20' wide trench |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB9 | 4'x10' BOX CULVERT | 200 | L.F. | $ 1,600 | N/A | $ 320,000 | |
| PB18 | 4'x10' BOX CULVERT WING WALLS | 1 | EACH | $ 37,000 | N/A | $ 37,000 | |
| PB24 | 4'x10' BOX CULVERT GATES | 1 | EACH | $ 15,000 | N/A | $ 15,000 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 2 | EACH | $ 4,000 | N/A | $ 8,000 | Counted 0 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts |
| | | | | **Subtotal** | | **$ 547,000** | |
| | | | | **Contingency** | **25%** | **$ 137,000** | |
| | | | | **Design** | **10%** | **$ 55,000** | |
| | | | | **Total** | | **$ 739,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 739,000** | |

**Conceptual Cost Estimate - High Point Road from Sauk Creek to Wexford Pond (Greenway Crossing)** PB_9

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 344,520 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40101 | CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 1 | 1,516 | TON | $ 23 | N/A | $ 34,858 | Assuming 2 lanes (12' wide) will be reconstructed |
| 40102 | CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 2 OR NO. 3 | 1,378 | TON | $ 23 | N/A | $ 31,689 | Assuming 2 lanes (12' wide) will be reconstructed |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 1,550 | L.F. | $ 15 | N/A | $ 23,250 | |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB14 | 6'x12' BOX CULVERT | 3,100 | L.F. | $ 2,000 | N/A | $ 6,200,000 | 2 parallel box culverts |
| PB20 | 5'x12' / 6'x12' BOX CULVERT WING WALLS | 1 | EACH | $ 45,000 | N/A | $ 45,000 | |
| PB26 | 5'x12' / 6'x12' BOX CULVERT GATES | 1 | EACH | $ 16,500 | N/A | $ 16,500 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 8 | EACH | $ 2,500 | N/A | $ 20,000 | 6 known connections plus 2 additional assumed connections |
| PB41 | UTILITY CONFLICT ALLOWANCE | 12 | EACH | $ 4,000 | N/A | $ 48,000 | Counted 6 sewer/water/storm utility crossings/conflicts; assuming same number of other utility |
| PB48 | CONCRETE PAVEMENT, 9 INCHES THICK | 4,130 | S.Y. | $ 90 | N/A | $ 371,700 | Assuming 2 lanes (12' wide) will be reconstructed |
| | | | | **Subtotal** | | **$ 7,235,000** | |
| | | | | **Contingency** | **25%** | **$ 1,809,000** | |
| | | | | **Design** | **10%** | **$ 724,000** | |
| | | | | **Total** | | **$ 9,768,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 9,768,000** | |

**Conceptual Cost Estimate - Old Sauk Road Greenway Crossing** PB_10

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 23,345 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 0 | L.F. | $ 15 | N/A | $ - | Cost included in Old Sauk Road/Westfied Road Intersection Reconstruction |
| 50226 | UTILITY TRENCH PATCH TYPE III | 0 | S.Y. | $ 80 | N/A | $ - | Cost included in Old Sauk Road/Westfied Road Intersection Reconstruction |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB12 | 5'x12' BOX CULVERT | 180 | L.F. | $ 1,700 | N/A | $ 306,000 | |
| PB20 | 5'x12' / 6'x12' BOX CULVERT WING WALLS | 1 | EACH | $ 45,000 | N/A | $ 45,000 | |
| PB26 | 5'x12' / 6'x12' BOX CULVERT GATES | 1 | EACH | $ 16,500 | N/A | $ 16,500 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 0 | EACH | $ 2,500 | N/A | $ - | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 0 | EACH | $ 4,000 | N/A | $ - | Assume 1 connection |
| | | | | **Subtotal** | | **$ 491,000** | |
| | | | | **Contingency** | **25%** | **$ 123,000** | |
| | | | | **Design** | **10%** | **$ 50,000** | |
| | | | | **Total** | | **$ 664,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 664,000** | |

**Conceptual Cost Estimate - Westfield Road (Greenway Crossing)** PB_11

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 14,658 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 150 | L.F. | $ 15 | N/A | $ 2,250 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 250 | S.Y. | $ 80 | N/A | $ 20,000 | Assume 15' wide trench |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB7 | 4'x6' BOX CULVERT | 150 | L.F. | $ 800 | N/A | $ 120,000 | |
| PB16 | 4'x6' BOX CULVERT WING WALLS | 1 | EACH | $ 28,000 | N/A | $ 28,000 | |
| PB22 | 4'x6' BOX CULVERT GATES | 1 | EACH | $ 9,000 | N/A | $ 9,000 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 3 | EACH | $ 4,000 | N/A | $ 12,000 | Counted 1 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts |
| | | | | **Subtotal** | | **$ 308,000** | |
| | | | | **Contingency** | **25%** | **$ 77,000** | |
| | | | | **Design** | **10%** | **$ 31,000** | |
| | | | | **Total** | | **$ 416,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 416,000** | |

**Conceptual Cost Estimate - Tree Lane east of High Point Road (Greenway Crossing)** PB_12

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 41,136 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 160 | L.F. | $ 15 | N/A | $ 2,400 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 533 | S.Y. | $ 80 | N/A | $ 42,667 | Assume 30' wide trench |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB13 | 6'x10' BOX CULVERT | 320 | L.F. | $ 1,900 | N/A | $ 608,000 | |
| PB19 | 5'x10' / 6'x10' BOX CULVERT WING WALLS | 1 | EACH | $ 40,000 | N/A | $ 40,000 | |
| PB25 | 5'x10' / 6'x10' BOX CULVERT GATES | 1 | EACH | $ 15,750 | N/A | $ 15,750 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 3 | EACH | $ 4,000 | N/A | $ 12,000 | Counted 1 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts |
| | | | | **Subtotal** | | **$ 864,000** | |
| | | | | **Contingency** | **25%** | **$ 216,000** | |
| | | | | **Design** | **10%** | **$ 87,000** | |
| | | | | **Total** | | **$ 1,167,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 1,167,000** | |

**Conceptual Cost Estimate - High Point Road south of Tree Lane (Greenway Crossing)** PB_13

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 27,050 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 90 | L.F. | $ 15 | N/A | $ 1,350 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 300 | S.Y. | $ 80 | N/A | $ 24,000 | Assume 15' wide trench |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB13 | 6'x10' BOX CULVERT | 180 | L.F. | $ 1,900 | N/A | $ 342,000 | |
| PB19 | 5'x10' / 6'x10' BOX CULVERT WING WALLS | 1 | EACH | $ 40,000 | N/A | $ 40,000 | |
| PB25 | 5'x10' / 6'x10' BOX CULVERT GATES | 1 | EACH | $ 15,750 | N/A | $ 15,750 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 4 | EACH | $ 4,000 | N/A | $ 16,000 | Counted 2 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts |
| | | | | **Subtotal** | | **$ 569,000** | |
| | | | | **Contingency** | **25%** | **$ 143,000** | |
| | | | | **Design** | **10%** | **$ 57,000** | |
| | | | | **Total** | | **$ 769,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 769,000** | |

**Conceptual Cost Estimate - Tree Lane west of High Point Road (Greenway Crossing)** PB_14

v2021_10_08

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | N/A | $ 10,000 | |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 25,009 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 80 | L.F. | $ 15 | N/A | $ 1,200 | |
| 50226 | UTILITY TRENCH PATCH TYPE III | 267 | S.Y. | $ 80 | N/A | $ 21,333 | Assume 15' wide trench |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB13 | 6'x10' BOX CULVERT | 160 | L.F. | $ 1,900 | N/A | $ 304,000 | |
| PB19 | 5'x10' / 6'x10' BOX CULVERT WING WALLS | 1 | EACH | $ 40,000 | N/A | $ 40,000 | |
| PB25 | 5'x10' / 6'x10' BOX CULVERT GATES | 1 | EACH | $ 15,750 | N/A | $ 15,750 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 4 | EACH | $ 4,000 | N/A | $ 16,000 | Counted 2 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts |
| | | | | **Subtotal** | | **$ 526,000** | |
| | | | | **Contingency** | **25%** | **$ 132,000** | |
| | | | | **Design** | **10%** | **$ 53,000** | |
| | | | | **Total** | | **$ 711,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 711,000** | |

**Conceptual Cost Estimate - Beltline downstream of Wexford Pond (Greenway Crossing)** PB_15

v2022_01_06

DRAFT

| Item # | Item | Quantity | Unit | "Average" Unit Cost | Revised Unit Cost | Cost | Reason for Adjustment/Notes |
|---|---|---|---|---|---|---|---|
| 10701 | TRAFFIC CONTROL | 1 | LUMP SUM | $ 10,000 | $ 2,000,000 | $ 2,000,000 | Added significant cost due to Beltline location |
| 10911 | MOBILIZATION | 1 | LUMP SUM | $ 145,000 | N/A | $ 190,084 | Set to 5% of subtotal cost |
| 20221 | TOPSOIL | 400 | S.Y. | $ 10 | N/A | $ 3,800 | |
| 20231 | MEDIUM RIPRAP - GLACIAL FIELD STONE | 50 | C.Y. | $ 160 | N/A | $ 8,000 | |
| 20704 | INFILTRATION SEEDING | 400 | S.Y. | $ 3 | N/A | $ 1,200 | |
| 21073 | EROSION MATTING, CLASS II, TYPE C - ORGANIC | 400 | S.Y. | $ 4 | N/A | $ 1,400 | |
| 40381 | REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING | 353 | L.F. | $ 15 | N/A | $ 5,288 | Placeholder for Beltline restoration over box culverts; additional costs included in Traffic Control |
| 50226 | UTILITY TRENCH PATCH TYPE III | 1,175 | S.Y. | $ 80 | N/A | $ 94,000 | Placeholder for Beltline restoration over box culverts; additional costs included in Traffic Control |
| PB1 | EROSION CONTROL | 1 | LUMP SUM | $ 25,000 | N/A | $ 25,000 | |
| PB2 | SITE DEWATERING / STORM CONTROL | 1 | LUMP SUM | $ 50,000 | N/A | $ 50,000 | |
| PB14 | 6'x12' BOX CULVERT | 705 | L.F. | $ 2,000 | N/A | $ 1,410,000 | |
| PB20 | 5'x12' / 6'x12' BOX CULVERT WING WALLS | 3 | EACH | $ 45,000 | N/A | $ 135,000 | |
| PB26 | 5'x12' / 6'x12' BOX CULVERT GATES | 3 | EACH | $ 16,500 | N/A | $ 49,500 | |
| PB40 | MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE | 1 | EACH | $ 2,500 | N/A | $ 2,500 | Assume 1 connection |
| PB41 | UTILITY CONFLICT ALLOWANCE | 4 | EACH | $ 4,000 | N/A | $ 16,000 | Assuming 4 utility conflicts |
| | | | | **Subtotal** | | **$ 3,992,000** | |
| | | | | **Contingency** | **25%** | **$ 998,000** | |
| | | | | **Design** | **10%** | **$ 400,000** | |
| | | | | **Total** | | **$ 5,390,000** | |
| | | | | **Land Acquisition** | | **$ -** | |
| | | | | **Wetland Mitigation** | | **$ -** | Assume no mitigation |
| | | | | **Total Total** | | **$ 5,390,000** | |

# Appendix K. Public Comments and Response to Comments

# Pheasant Branch Public Comment Period – Comments and Responses

A 30-day Public Comment Period was held for the Pheasant Branch Watershed Study. The Public Comment Period ended September 2, 2022.

The City received a variety of questions and comments from residents. All comments and questions received are shown below with identifying information removed. Where questions were similar, the City copied the question received, then and provided a response below for each. Where a commenter provided multiple questions, responses are listed below each question.

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## Sauk Creek Greenway Stabilization

The majority of the comments provided were regarding the Sauk Creek Greenway Project. The comments are found below.

A general response and clarifications about the Sauk Creek Greenway project is listed below, and individual replies are in-line beneath each comment.

General Response:

The Sauk Creek Greenway project was initially proposed to address excessive erosion that occurs in this channel. The eroded materials find their way downstream and impact other waters such as the Wexford Pond and also the Old Sauk Trails Business Park greenway and pond. That water also eventually drains into the Pheasant Branch Conservancy. This channel was never engineered when it was dedicated to the public and needs to be repaired to solve the excessive erosion that occurs.

Being able to stabilize this channel, which was impacted in the 2018 flooding, is important to prevent further damage and tree loss in the areas immediately adjacent to the channel.

There was one public input meeting to date, held in March of 2018, prior to the historic and damaging flooding event that occurred on the west side. After that flood event occurred the project was halted to evaluate the channel from a flood perspective.

The purpose of the Watershed Study was to understand the causes of flooding and what can be done to reduce the flooding. Through the computer modeling, the City learned that using the Sauk Creek

Greenway for extensive stormwater storage (removing trees and creating new ponds within the greenway) will not significantly reduce flooding downstream. As such, that option is listed as "not recommended".

The recommended solutions resulting from the Watershed Study are high-level, conceptual solutions. They do not include many of the details the comments ask for including tree removal estimates, restoration plans or details on features unrelated to the flood study, such as a multi-use path. Those details are determined during the design process. The City expects to begin engagement in spring 2023 once there is a preliminary design to share. We appreciate your patience.

A fact sheet has been created about the design specifics of the Sauk Creek Greenway Restoration Project. You can view it here: https://www.cityofmadison.com/engineering/documents/projects/SaukCreekGreenway2022_10_17_FAQ.pdf

1. *With regard to the Sauk Creek stabilization, I strongly support the professional staff of the City and I am disturbed by the scare tactics and misinformation coming out of ad hoc groups of residents.*

   Response: Thank you for your comment.

2. *Removing trees from the greenway will not help a situation caused by a small culvert under Old Sauk Road. If water is allowed to move faster through this section, it will only overwhelm the ponds behind High Point church and cause more flooding in the Wexford Park neighborhood. Please consider alternative ways to mitigate flood damage upstream with modern water control techniques.*

   Response: The model shows that the greenway needs to be able to convey additional water as part of the overall suite of solutions for the study. The solution proposed at Wexford pond, and the pipe upsizing needed on High Point Road, Old Sauk Road and under the beltline all function together to reach the flood mitigation targets.

3. *There surely is a need to engage in Sauk Creek stabilization in the Sauk Creek Greenway. However it can and should be done carefully: stabilizing the bank and doing some stream back modifications at specific locations in the stream (not a wholesale channelization). There should be a limited targeted removal of trees aimed at removing current tree snags, trees on the bank that are likely to topple in the near future and limited careful harvest of a modest amount of other trees in the Greenway. The current forested nature of the Greenway is a textbook new generation storm water management practice. A forested canopy will have reduce erosion in the Greenway. If selective cutting is done it will allow natural regeneration. Retention of as many trees as possible consistent with the prime use of stormwater management is necessary and appropriate for the City to undertake to meet climate change and sustainability goals. The forested Greenway has the ancillary benefits of providing important urban wildlife. It is also important to have a conservatively designed maintenance road in the Greenway to permit access to do proper management of the stream and to allow access to do proper silvicultural management of the forest, such as removing trees that become downfalls. Be smart about the reconstruction. The aforementioned conservation and climate changes goal are complimentary to proper storm water management.*

Response: Thank you for your comment. Many of these suggestions will be utilized when the greenway is designed and you will have a variety of opportunities to provide feedback on the how these suggestions were implemented in the design.

4. *We are grateful for the work the city is planning to do in our Pheasant Branch Watershed to prevent floods like this! But we would hate to lose the wooded area right behind out house in this process. This green corridor was one of the main reasons we purchased this home many years ago. We enjoyed countless walks through these wonderful woods since – in all seasons! The woods protect us from the noise from the beltline. Please let us not sacrifice this green oasis during the much-needed flood prevention work. Especially - let us not sacrifice these woods for a bike path, which is not even necessary.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

5. *We've heard that the proposed "stabilization" will include the removal of more than half of the trees in the Greenway and the addition of a paved bicycle path. The loss of so many trees is contrary to the City's professed desire to keep green areas and protect trees. The loss of trees will increase noise levels from the nearby Beltline. Adding paved bikeway will dramatically change the character of the neighborhood and endanger walkers who frequently use the current unpaved paths/trails. Neighbors who have attended recent meeting (I note that most of the meetings listed above occurred 3 years ago) say that the nature and extent of changes (including the destruction of so many trees) was not made clear and only further investigation revealed that VERY drastic plans are being rushed through despite high levels of neighborhood dissatisfaction over the loss of trees and addition of paved recreational use bike paths -- a tradeoff that is at odds with the city's professed desire to protect nature rather than encourage more development and paving.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

6. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
   The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

7. *There are less destructive solutions than the proposed clearing of many of the trees.*

   Response: Thank you for your comment.

8. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects. - Why aren't the undersized underground stormwater drainage culverts being addressed first? Until larger stormwater drainage culverts under*

*the beltline and High Point Road are replaced, the bottlenecks will continue and street and Westfield flooding will continue. - Cost!! $8-12 million dollars and we lose an incredibly valuable, beautiful urban woods forever. - Bikes and walkers do not mix well. Our homes/neighborhood were not designed with a bike path right behind them. The bike path's close proximity to houses will negatively affected neighborhood since it was not in original neighborhood plan.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
Additionally, the Sauk Creek greenway project was previously budgeted due to the erosion issues within the channel, so there is already some funding available to address this part of the suggested Pheasant Branch Watershed Study solutions.
The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

9. *I am very concerned about three aspects: the number of trees being cut down in the greenway; the proposal to add a bike path to the greenway; and the proposal to connect the bike path to a bike path in Wexford Park.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

10. *I would like to have a more thoughtful approach with planning so that the maximum number of trees are saved in our area. I would like this urban woodland to remain an urban woodland. This would include saving as many trees as possible and making sure that May path that is created remains as natural as possible.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

11. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects. Why aren't the undersized underground stormwater drainage culverts being addressed first? Until larger stormwater drainage culverts under the beltline and High Point Road are replaced, the bottlenecks will continue and street and Westfield flooding will continue. - Cost!! $8-12 million dollars and we lose an incredibly valuable, beautiful urban woods forever.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
    Additionally, the Sauk Creek greenway project was previously budgeted due to the erosion issues within the channel, so there is already funding available to address this part of the suggested Pheasant Branch Watershed Study solutions.
    The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

12. *1. Minimize tree removal in the Sauk Creek Greenway Project. 2. Develop project like Owen Woods Park that spared hundreds of trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

13. *I understand that regarding the Sauk Creek greenway is necessary to prevent further eroding and flooding. However, I am VERY concerned about the wording used in the plan (along the lines of healthy trees will be preserved if possible). This forested area is an urban oasis and is home to a variety of wildlife. I am worried more trees than desired will be removed, leaving us with an open space instead of our cherished wooded walking space.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

14. *Keep the trees*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

15. *In contrast to verbal assurances that existing tree preservation would be given a high priority, report text is disturbingly vague. The density of trees and the resulting canopy make this space a sanctuary for many people. I urge you to explicitly give tree preservation a top priority in this report, and in your follow-up actions. There are model greenway-park areas in Madison and statewide, Owen Park being an example, which show it is possible to achieve water control and a tree-rich environment which welcomes the public to enter. I also urge you to not include a bike path in your solution, as this will only add noise and bike-pedestrian conflict in the narrow space available.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

16. *There is no need to destroy all the trees in the greenway! Leave the greenway alone and find another project that would benefit from the ridiculous amount of money being provided to destroy our greenway.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

17. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects. Additionally, I don't see how removing a lot of trees is going to help environmentally as we know that trees help prevent flooding and provide huge benefits to the ecology of an area.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

18. *1. To begin with, the Sauk Creek Greenway budget is missing from the report. It also states the $4M is based on the previous design work. Can you explain what previous design work-the neighbors have not seen a design yet? 2. Can you please update the report with this missing information? 3. The two Federal wetlands are not mentioned in the report. The one that is by my house is not working at all given the sewer road that was installed through it; if it were fixed such that the water could drain properly into it, then it can house/hold any excess water and save some trees by doing so. This would be a cost effective solution. 4. The piping in the channel near my house and the federal wetland is clogged with debris/trees. I believe the piping leads into the wetland or an underground storage tank. This was not mentioned in the report; fixing it would be a cost effective solution to move water to the wetland and/or underground tank nearby. 5. The large freshwater emergent federal wetland near High Point and Old Sauk could be deepened to hold more water, if it is not a jurisdictional wetland and subject to 404 regulations. 6. There was no focus group for the Sauk Creek Greenway since there was no flooding to the houses near the channel in 2018. Therefore, no community input for the Sauk Creek Greenway is in the report. 7. With no flooding in 2018 to houses near the channel, then why should the trees pay the price for root cause upstream and the undersized culverts in High Point Road and the beltline. Until these culverts are addressed/fixed first the flooding problem with not be addressed. 8. Madison is a Green city. It would be horrible if thousands of trees were removed in Sauk Creek without considering other solutions. Thank you for your consideration*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. Your questions about the wetlands, which are where the existing ponds are, are answered in the FAQ as well. To note, the amount of water flowing down the greenway would fill up the pond area very quickly, even if it was maximized. Therefore it is possible that the pond areas could be a part of the solution, but there is not enough space in the pond areas to make them big enough to prevent doing any work within the greenway.

19. *I am very concerned about the proposed tree removal of the Sauk Creek Greenway project. This is important for wildlife, to keep the noise level from the Beltline down, and it's a very beautiful area. It would be much better if the city developed a project to spare the trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

20. *Any solution should require community engagement in the design of the proposed. This his has not happened. Several residents met with the Mayor on this and asked about community engagement, she said the engineering department would hold a public meeting to discuss the project. There is a vast difference between a public meeting and public engagement. A public meeting is where Engineering will come in with their design, let the community vent for two hours, which allows them to say they held public comment, and then they do what they were going to do before the meeting ever took place. Public engagement is where the public is invited to provide feedback into the design process, which is usually a multiple step process, and results in a collaborative design between the needs of the city and the residents being impacted. That is what is needed with this project. Get the Community engaged in helping to design the final project plan for this greenway. For everyone that*

*lives in the area, the impact of a clearcutting of the greenway would have negative impacts on most people who live in the area. The trees and ground vegetation in forest ecosystems slow water movement and help stabilize soil. Prevention or reduction of soil erosion helps reduce sedimentation type pollution. Trees reduce the effect of erosive forces using their root systems and foliage. Tree roots begin as thick stems that branch into fine filaments to create a network of flexible tendrils that help stabilize the soil around the tree and hold it in place. The leaves and branches of trees create a flexible screen that reduces the force of wind and rain in the surrounding area. There have been numerous studies published on the negative financial impacts that occur on property values when adjacent or proximal green space is removed. The loss of so many trees would impact our local environment causing higher daily pollution counts and higher temperatures, let alone the impact on the entire city. As an environmentally friendly city, it is counter intuitive to me that they don't take a more surgical approach to the removal of established and healthy trees that remove a substantial amount of carbon from the air. The loss of habitats. The greenspace is home to many species, and they would be displaced or lost. This habitat adds to the uniqueness of this area, and it would be a shame to lose that. Last, you have significant expertise that live in this area, engage them in the process to develop a win-win solution for the city and the residents.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

21. *Please don't remove trees. We need them.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

22. *Tree preservation, concern for property. Again excessive tree removal*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

23. *Very concerned about the number of trees being proposed to be cut down.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

24. *The proposed mitigation is very hard to find in the content provided online. My understanding is that the mitigation plan is to remove most of the trees in the Sauk Creek area. This is a mistake. Studies show that a healthy tree canopy provides numerous environmental benefits, including reductions in stormwater runoff, air pollution and greenhouse gases. Please see this report: https://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1125/cityofvancouver_watershed_health_assessment_finalreport2019.pdf*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

25. *No flooding on Sauk Creek Cir. during 2018 event. Sauk Creek Circle is the lowest lying area along the greenway. Flooding took place in the intersection of Old Sauk Road and High Point Road due to the culverts being covered in debris. The report noted that the Sauk Creek Greenway is one of only a*

*few forested areas in the watershed. It should be vital to maintain of the "few forested areas in the watershed."*

Response: The flood model showed flooding without debris clogging the culverts. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions including how tree preservation would be balanced with the other goals of the project.

26. *It is important that we are environmentally friendly in any storm water projects. The Sauk Creek greenway is also important wildlife habitat that helps link other small patches of ponds and parks.*

    Response: Thank you for your comment.

27. *Please minimize the removal of trees along this greenway. One solution would be to make the Sauk Creek deeper with minimal widening so more water could be moved during and after storms. Another solution is to clean out and repair retention ponds so they perform their intended function. The city is capable of creating a functional and pleasing greenway, as evidenced by what was done in Owen Park.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. The City will work to decrease the footprint of the channel as much as possible, while still designing a stable channel, in order to preserve more trees.

28. *I want to comment on plans for the Sauk Creek Greenway Stabilization project (p. 58?). I think there needs to be more consultation with the neighborhoods affected, and also consultation between the Engineering Department and the Parks Department (and any other appropriate city entities) on this project. I have lived in my home for 34 years, and was the second president of the Sauk Creek Neighborhood Association. I have appreciated the joys and benefits of residing in the Sauk Creek Conservancy area, have enjoyed and appreciated its natural beauty and have marveled at the wildlife, plants, etc. that have made the conservancy area their homes over the years. As Neighborhood President, I worked with the Parks Department, the Engineering Department and other city entities to try to ensure that the area retained and enhanced its beauty and attractiveness while working together to address some of the issues that arise in a neighborhood--parks, traffic, noise, soil erosion, etc. At this point, I have attended a few meetings recently to try to gain a better understanding of what is proposed. I have listened to some discussions and reviewed the proposal. There are definitely certain changes needed. At the moment, there are dead trees that are clogging the creek's natural flow, which need to be removed. The creek running through the greenway needs to be dredged and deepened, the slopes need to be stabilized to prevent erosion, the detention ponds need to be dredged, and the storm pipes have to be fixed so that they can become operational. Nonetheless, I have some concerns:*
    - *First, a substantial number of trees are likely to be removed. A recent tree inventory showed that there are 5,595 trees in the Greenway. It is estimated that 50% will be removed for the new straightened drainage channel, the graded banks on each side of the drainage channel, and for the maintenance path. (Question: Can trees that are located on banks help prevent further erosion, as well as help reduce carbon emissions that are part of the climate change issue? And does the drainage channel have to be straightened in terms of the speed and power that will occur with a straight line channel versus having some natural bends and flows? Finally, does the maintenance path have to be expanded to include a proposed bicycle path*

*that will result in even more trees being removed when bicycle improvements and lanes have been established recently in the areas that surround the Greenway?) It is also estimated from the tree inventory that only 976 of the 5,595 trees are considered to be "quality trees." (There are some "noxious trees"—box elders, buckthorns, et. al. that should be removed.) All in all, there are estimates that by the completion of the project up to 80% of the trees may eventually be removed. If there is any doubt, the area that is behind the Walgreen's store on Mineral Point Road reflects how the Sauk Creek Greenway might look. • Second, there does not appear to be much substantive discussion or coordination between the City Engineering Department and the Parks Department, or between the city departments and the neighborhoods on the project. The Engineering Department might send a postcard alerting you to some work in the area and the opportunity to express concerns. However, the project is generally ready to go. A few decades ago, we met with the Engineering Department when the detention area, berm, storm pipes and service path near the Old Sauk Road/High Point intersection were in the final planning stages before construction. The engineer assured us our concerns regarding the oak trees, water flows, storm pipe effectiveness, etc. would be taken care of. I appreciate his commitment and sincerity. However, in the first week, the contractors came in and immediately removed two giant oak trees, and the sizes of the storm pipes subsequently were not large enough to handle the water flow effectively. I might add that the City Engineering Department has recently requested the authority to allow staff to remove or prune trees in city greenways when necessary. Based on past experience, these decisions are likely to be made on the spot or with either token or no neighborhood input. I appreciate the opportunity to provide input and a long-term neighborhood perspective. Thank you.*

Response: Thank you for your comments. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to many of the questions you asked. A few additional things to note—there is no estimate that 50% of the trees will be removed. Additionally, the channel will not be straightened. While the exact shape of the channel is unknown (depth and width), it will primarily be located along the same alignment as the current channel. This will reduce the amount of tree removals needed.

29. *Page 58 provided little information on the Sauk Creek Greenway project, so specific comments are very difficult. It seems like you are just checking off the box that says you allowed community input, but we have no plans to respond to. What are the plans for the broken retaining pond behind St Lawrence Circle? Do you plan to dredge the Highpoint Rd/Old Sauk retaining pond? It seems very shallow. With 80% of trees in the inventory deemed poor quality, will we have many trees left after the large machinery leaves? If you lived along these woods, you'd understand why we are so passionate to want to save it so much!! Mature trees are magnificent and do so much for us. Just look at the grass and see where it is brown and where it is still lush green under the trees. Two upstream projects, and Nautilus Point Park removed too many trees and unfortunately you have lost the communities' trust. This beautiful, urban woods needs to be respected and preserved as best as possible. We do not support a bike path in this greenway. We are concerned the bike federation has so much power and citizens do not. That is not democracy, that is lobbying. I have neighbors trying to decide if they should sell and move out of Madison, before they have a bike trail outside their bathroom windows, much less the increased tax assessments. Why not work with upstream commercial properties (who caused the problem) to add more retaining ponds, ditches, Restorative Stormwater Conveyance systems, etc. That option seems to be tossed aside. Better PR is needed to provide more information for the community. People who feel helpless/unheard get anxious and this has caused divisions and mistrust in Madison government that did not need to occur. Patting us on the head and saying it's all going to be fine, "We are engineering experts", then seeing upstream*

*projects completed that took out so many trees, has caused the community to be very upset. Please create a great tree saving plan and save the Sauk Creek trees/wildlife and climate. Each of these projects, that cut down mature trees, does affect climate and heat zones, one tree at a time. This woods is a blessing to so many, across all socio-economic classes. The community needs more calm, safe areas to decompress and commune with nature that prairies do not provide. Please tell us what you are planning and help us understand why. Thank you.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. The comment period of the Pheasant Branch Watershed Study Draft Final Report was intended to allow community input on the Sauk Creek Greenway as a conceptual solution in relation to the watershed study solutions—that the greenway will need to accommodate greater flows of stormwater as flooding is mitigated in other areas of the watershed. There will be specific engagement on the Sauk Creek greenway project once the project is re-started. At that point, the City would provide a more detailed design for the community to provide feedback on. Additionally, at that point the City would be able to have an estimate of how many trees may be removed based on the initial design as well as general information about the restoration goals and long-term maintenance of the greenway. The City anticipates that there will be variety of opportunities for residents to provide feedback, and that this process would last the majority of 2023.
All upstream development was constructed in accord with the requirements in place at the time of development (as was the development along the channel). Stormwater requirements have increased significantly since the first ordinance that was put in place in 1983. Functionally, lands east of the channel had no stormwater management requirements, and lands west of the channel to the beltline had to meet the very first iteration of stormwater requirements. Development of lands west of the beltline have met ever more stringent requirements as the lands move west. In regards to solutions on upstream lands, the City does not have the ability to mandate that upstream commercial properties fix downstream flooding issues. However, when properties re-develop, additional redevelopment requirements are in place. Madison is one of only two (2) municipalities with redevelopment requirements in the State. For information about future development and redevelopment of commercial properties, please see the Watershed Study Learning Hub and view the "New Development/Re-Development Flood Prevention" topic or visit the Development Services Center and view the "Storm Water Management" topic.

30. *Minimize tree removal in the Sauk Creek Greenway Project Develop this project like Owen Woods Park that spared hundreds of trees. Minimize tree removal.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

31. *I'm sad to hear that part of the forest will be destroyed for a bike path that is not needed. I'm a HUGE road and mountain cyclist and really do not see the value in adding a 0.5 mile stretch of path that doesn't connect up with any other major bike paths. There are owls in the woods, it's beautiful, a path is not needed.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

32. *Minimize tree removal in the Sauk Creek Greenway Project Develop this project like Owen Woods Park that spared hundreds of trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

33. *Please minimize tree removal in the Sauk Creek Greenway project and develop this like the Owen Woods Park project that spared hundreds of trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

34. *Minimize tree removal in the Sauk creek Greenway Project*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

35. *Sauk Creek Greenway Reconstruction, maximize tree retention. Native tree cover in place over time has produced "natural habitat" for wildlife including mammals, birds, salamanders and the like as well as insects and soil inhabitants. Given that destruction of some habitat is necessary to reshape and stabilize the waterway, I would like to see native trees outside the bank stabilization zone retained. If trees need to be destroyed to allow equipment access it would be advisable to prioritize native trees for retention and invasives like locust and buckthorn removed. In addition, the notion of allowing bike riders in close proximity to/on walking trails is dangerous to both types of users.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

36. *Minimize tree removal and destruction of natural habitats, look at other methods to control runoff with native grass species in areas other than just the greenway, we have a river running thru some of the houses, this all ends up multiplying the impact on the greenway.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
    Additionally, you can find more information on Green Infrastructure and Watershed Studies at please see the Watershed Study Learning Hub and view the "Green Infrastructure/Water Quality/Ecological Information" topic.

37. *The lack of a plan, or perhaps lack of transparency, is concerning. Can the woods be preserved? If preservation is not a priority, why isn't it?*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. The City will share details about the design once there is something for the community to provide feedback on. Preservation of the woods is a priority to the City.

38. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen*

*many species of birds, some of which I believe to be rare in this area. We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

39. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen many species of birds, some of which I believe to be rare in this area. We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

40. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen many species of birds, including wild turkeys and the Yellow-throated Warbler (currently listed as endangered in Wisconsin). We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

41. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen many species of birds, including wild turkeys and the Yellow-throated Warbler (currently listed as endangered in Wisconsin). We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

42. *I am concerned that this project may remove an unnecessary amount of trees on the Sauk Creek. If the city proposes to take out as many as it did for the southern length (behind Walgreens on Mineral point) then I oppose this approach. The amount of trees removed was excessive and it seemed entirely possible to leave twice as many while still having access to the stream for construction purposes. The greenway is very important to me and many others in the area. We would hate to see the canopy removed. Please consider this when making decisions about tree removals.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

43. *I am very concerned with human impact on climate and nature. It is highly preferable to minimize tree removal in the Sauk Creek Greenway Project, and to have a strong plan for sparing trees and replanting in a way that preserves the environment. Thank you for your consideration.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

44. *I object to the removal of non-invasive trees and distraction of this creek forest. It is important to wildlife and conservation of natural habitats. Please work to preserve as much of this sanctuary as possible. Work with neighbors and parks district to assure the character of this space is protected.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

45. *A mountain biking loop will not correct any ongoing issues, Thin out the trees obviously here and everywhere else they have been neglected. Too residential for proposed mountain biking loop! Already too much congestion and not enough parking, just like the rest of Madison. Dog park will be a waste of time w/ excess traffic on a residential street.*

    Response: The single track project is proposed on Park land and is not related to the watershed study.

46. *Clearly the Sauk Creek Greenway needs to be cleared of debris, including fallen trees, original farm wind mill fan, etc. That debris has caused erosion on the bank as water from larger storms rerouting. However, the houses on the Tamarack Community side of the creek that experienced damage from the 2018, 11" rain revived water from poor water control and plugged sewers on Tamarack Property, not the condition of nor the capacity of Sauk Creek. That night Sauk Creek carried all the water collected from the drainage south of Tree Lane and Tamarack without flooding Tamarack. All of the neighbors bordering this end are concerned about the planned removal of trees and other vegetation that provides both sound and visual screening for our neighborhoods. I and my neighbors understand that invasive plant removal is long overdue, but we have several concerns with the report: 1. Unnecessary removal of many mature trees not obstructing water flow in the Creek. 2. No plan to replace/replant trees and understory in order to replace the current sound+visual screen trees and vegetation provide. 3. A lack of plan for follow up maintenance of Sauk Creek. 4. No mention of the purpose/need for adding a bike trail along the Creek.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

47. *We want you to spare trees and maximize greenery and healthy ground cover. The woods are a source of enjoyment for families, a safe place for animals, and necessary for our ecosystem. We don't want it destroyed.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

48. *Minimize tree removal in the Sauk Creek Greenway Project & Develop project like Owen Woods Park that spared hundreds of trees.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

49. *I am writing this letter in opposition to the City of Madison's current reconstruction plan for the Sauk Creek Greenway, and instead encourage the development of a more ecologically friendly approach to improve the stormwater situation at the Sauk Creek Waterway. Such an ecologically responsible plan should not significantly disrupt the greenway's rich diversity in ecological habitats (southern hardwood forest, prairie/savannah, wet prairie, floodplain forest, pine plantation, and black locust), abundant population of 5,595 trees across 25.4 acres, wildflower diversity across its wet prairies, and winter habitat for wildlife across its pine plantations. My family lives at 317 Sauk Creek Drive. I would like to take this time to explain my qualifications to justify my viewpoint. I am the Director and Senior Scientist of the Nelson Institute Center for Climatic Research at the University of Wisconsin-Madison, where I have worked for 20 years. I am a member of the Climate Working Group of the Wisconsin Initiative on Climate Change Impacts (WICCI). I hold a PhD in Atmospheric Sciences from the University at Albany. To clarify, I am not writing this letter to express the views of UW-Madison or WICCI but from my own perspective, given my vast expertise in regional climate change and its impacts on terrestrial and aquatic ecosystems. According to Governor Evers' Executive Order #52 (https://evers.wi.gov/Documents/EO/EO052-ClimateChange.pdf), "climate change is a grave threat to the health, safety, and economic well-being of people and communities throughout the State of Wisconsin." The executive order established the Governor's Task Force on Climate Change, with the charge to "assess the best-available scientific research from both state and national sources to evaluate the impacts of climate change on the state's citizens and environment," to "work with the University of Wisconsin System, the Wisconsin Technical College System, other state educational institutions, and Wisconsin's business community," and to "work with the Wisconsin Initiative on Climate Change Impacts (WICCI) and the University of Wisconsin Nelson Institute for Environmental Studies to update and re-issue the WICCI's 2011 report, 'Wisconsin's Changing Climate: Impacts and Adaptation." This effort led to the "2021 Assessment Report: Wisconsin's Changing Climate." The 2021 WICCI report recommends the following actions: (1) Wisconsin should "maintain and expand forest cover and urban tree canopy, targeting lands that offer the greatest potential for continued carbon storage and sequestration." (2) Wisconsin should "improve resilience to increasing precipitation and flood events that cause nutrient and sediment runoff by avoiding…natural vegetation conversion to…urban development." (3) Wisconsin should "preserve and protect large tracts of land for wildlife, implement habitat management changes to provide food and cover for wildlife that align with expected future climate conditions…" (4) "Large canopy trees can play a big role in helping urban areas become more resilient to climate change. A diverse tree canopy, both in terms of age and species type, can not only make cities more resilient as the climate changes, but can also cool urban landscapes and capture and slow runoff during extreme rain events." (5) "Forests…provide a unique opportunity to address climate change because they can both reduce concentrations of greenhouse gases while simultaneously providing essential social, environmental, and economic benefits. Forests are a natural carbon sink that absorb 10-15 percent of our nation's greenhouse gases." At the county level, the Dane County Office of Energy and Climate Change issued the "2020 Dane County Climate Action Plan: Today's Opportunity for a Better Tomorrow" (https://daneclimateaction.org/climate-action-plan#Download%20Here). Within the sector of forestry, the report focuses on strategies to "keep forests as forests", "create new forests through reforestation and afforestation", "manage existing forests", "protect, maintain, and increase urban forests", and "increase the use of forest products". The report states that: (1) "Dane County will encourage land use planning that maintains existing forest canopy…" (2) The "Office of Energy & Climate Change will work with*

*cities and villages in Dane County to increase public investments in restoring, maintaining, and expanding urban forests, particularly to address insect and disease impacts." At the City of Madison level, "The Madison Sustainability Plan: Fostering Environmental, Economic and Social Resilience" report urges city planners to: (1) "minimize loss of tree cover and green space in public rights of way" (2) "promote, expand and replace tree canopy trees whenever possible and encourage landowner collaboration on strengthening tree canopy and woodlands" (3) "create and adopt strategies and requirements to minimize urban heat islands, optimize carbon sequestration and promote water retention (e.g., green roof, bio swales, urban tree canopy, vegetative parking)" To summarize, the environmental marching orders from the state, county, and city are clear that urban green spaces, such as the Sauk Creek Woods, should be protected in order to minimize the urban heat island effect, support carbon sequestration and lower concentrations of atmospheric greenhouse gases, reduce runoff from increased intensity precipitation events, foster biodiversity, and continue to provide shelter and food to wildlife. I urge the City of Madison to develop an alternative plan to clean up the Sauk Creek Greenway that does not involve significant loss of trees and natural habitats.*

Response: The City values urban forests as a resource both for climate resiliency as well as for habitat and biodiversity. We will be working to mitigate the impact to the woods while balancing the stormwater conveyance needs within the channel. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

50. *Minimize tree removal in Sauk Creek Greenway Project. Do tree removal like Owen Woods that saved many trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

51. *Our duty to protect of the environment and the mayor's plans for more trees in the city mandate that a critical mass of the trees in the Sauk Creek Greenway remain. The creek needs repair. Many invasive species need to be removed. However, the city engineering plans for Sauk Creek Greenway Stabilization that call for excessive widening of the creek, erosion controlled by grasses on the banks rather than trees, more retention ponds in the greenway, a bike trail, and no attention for the current quality trees along the banks that need help to survive erosion challenges are great concerns. We cannot thoughtlessly remove 4000 trees (the number of non-quality trees from your study) and allow city engineering's unneeded destruction of trees, wildlife and trails during its scorch-the-earth practices of bulldozing greenways to get equipment into construction areas. Our needs to stop the ravages of climate change and adhere to the mayor's and the neighbors' mandates to protect the environment need to guide this project. I do not see any indication that the city engineers are hearing that concern. Communication with the engineers has been poor.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

52. *Our duty to protect of the environment and the mayor's plans for more trees in the city mandate that a critical mass of the trees in the Sauk Creek Greenway remain. The creek needs repair. Many invasive species need to be removed. However, the city engineering plans for Sauk Creek Greenway Stabilization that call for excessive widening of the creek, erosion controlled by grasses on the banks*

*rather than trees, more retention ponds in the greenway, a bike trail, and no attention for the current quality trees along the banks that need help to survive erosion challenges are great concerns. We cannot thoughtlessly remove 4000 trees (the number of non-quality trees from your study) and allow city engineering's unneeded destruction of trees, wildlife and trails during its scorch-the-earth practices of bulldozing greenways to get equipment into construction areas. Our needs to stop the ravages of climate change and adhere to the mayor's and the neighbors' mandates to protect the environment need to guide this project. I do not see any indication that the city engineers are hearing that concern. Communication with the engineers has been poor.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

## Report Figures

53. *First - there is a tremendous amount of very good work in this report, but it is too difficult to read. The text refers to diagrams where it is impossible to decipher where on the map I am located or even nearby street names. Would it be possible to link to a map that can be enlarged with detail of street names? Thanks.*

Response: Current online mapping showing the existing inundation for the 1% chance event can be found here: https://cityofmadison.maps.arcgis.com/apps/webappviewer/index.html?id=939cd73b0b594a0aa2d926a6b0e41f40

## Status

54. *What is the real status of the project?*

Response: The project schedule is posted on the project website and in the Public Information Presentations. The next step is to finalize the Watershed Study Report and bring it before the Board of Park Commissioners and Board of Public Works for final approvals.

## Commenter 55

55.

1. *The proposed culvert size increase on Westfield Road north of the intersection with Tree Lane, i.e., the location upstream of the TT swale that flows west into the Sauk Creek Greenway.*

   Response: The current culvert at this location does not meet the City's target of passing the 1% chance event without road overtopping. The recommended solution is to increase the size of the culvert to meet the City's target.

2. *Any planned stormwater improvements planned for Tree Lane from Westfield west to Randolph Drive.*

   Response: A local sewer project is recommended in this location. It would be constructed when the street is reconstructed.

3. *What impacts would the any project mentioned in 2 have on the flooding problems occurring on Tamarack property south of Tree Lane that result from storm and groundwater flowing from the cemetery on to Tamarack property?*

   Response: The proposed storm sewer and inlets would intercept some of the water flowing overland from the cemetery.

4. *What impact would the changes proposed in the study have on the flooding condition that occurs at the intersection of Tree Lane and Randolph Drive?*

   Response: The proposed storm sewer and inlets should reduce flooding at this intersection.

5. *Can a channel be completed from the aforementioned Randolph/Tree Lane intersection directly north into the Sauk Creek Greenway?*

   Response: A channel in this location is not proposed at this time. The model shows we can reach our flood targets by upsizing the storm sewer without the additional cost of a channel.

6. *What is proposed to be done to reduce stormwater flow down the Randolph Drive hill southward from Mineral Point Road to the intersection with Tree Lane and into the Sauk Creek Greenway?*

   Response: A local sewer project is recommended for this section. It would be constructed when the street is reconstructed.

7. *Is the City looking to properly locate the stormwater inlet currently on the cemetery property south of Tamarack property adjacent to Randolph Drive? It does not intercept any significant stormwater flowing west on the cemetery property to Randolph Drive?*

   Response: This is a local drainage issue. The inlet is a private inlet. The City will require that additional measures will be taken the next time a permit is required.

8. *What will the impact be on the Sauk Creek Greenway north of Tree Lane by the increase in culvert size under Tree Lane adjacent to Haen Park?*

   Response: Flow will be increased to Sauk Creek Greenway. Sauk Creek is part of the City stormwater conveyance system, therefore, this is where stormwater is designed to go.

9. *A general discussion on the current Engineering Division plans regarding the changes to the Sauk Creek Greenway north of Tree Lane bordering Tamarack Trails and adjacent neighborhoods to the north including methods being looked at for stabilizing Sauk Creek, impact on the forest in the Greenway, timeframe for proposing a conceptual plan, proposed public input process, current status of the budget for the project including what is being proposed in the City's 2023 budget.*

   Response: Please view the general information above, as well as the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

10. *What major new major flood retention proposals are being proposed by the City west of the Beltline on the large existing commercial properties (Menards/Target) to reduce downstream flooding of properties resulting from those large impervious properties?*

    Response: No new regional detention on existing developed lands is proposed. New development will be required to comply with the stormwater retention requirements of the City's stormwater ordinance, which now includes requirements to account for existing unintended detention For additional information about future development and redevelopment of commercial properties, please see the Watershed Study Learning Hub and view the "New Development/Re-Development Flood Prevention" topic or visit the Development Services Center and view the "Storm Water Management" topic

## Commenter 56

56. *Thank you for your hard work on the Watershed projects. This is a very complex issue. The Pheasant Branch Watershed survey did not have much room for public comments so I am sending you my questions/comments regarding the project in this email.*
    *How can we provide meaningful public comments when there is no Project Plan for the Sauk Creek Greenway Restoration in the August 1, 2022, 393 page, Pheasant Branch Watershed Study?*
    *Page 58. One page only. "The project information used in this study is planning level information; the design project will use design-level information."*

    Response: The recommended solutions included in the watershed study report are high-level, conceptual solutions to understand what can be done to meet the City's flood targets and reduce flooding. They are not design-level solutions. The public comment period is for the watershed study approach, processes, and methodology. Robust public input for each recommended solution will occur during the design of each project when there are more specific details to share with the public based on design-level information.

    1. *Will the Sauk Creek Greenway project follow regenerative stormwater conveyance practices, that includes trees in their projects plans to stabilize the banks?*

    Response: A Regenerative Stormwater Conveyance channel is not feasible in this location. Per the Regenerative Stormwater Conveyance System design practices, the longitudinal slope needs to be greater than it is in Sauk Creek, and the drainage area to the practice should be less than 50 acres. While the design details are not known for Sauk Creek, the design would consider what natural features could be sustainably included into the system.

    2. *It appears Greenbriar Apartments owns the section of land between the already completed SC Greenway segment and the 1 mile proposed project (see attached picture below, Red roofed apartments bottom right).*
    *What is the cost to taxpayers and plan for that section of the creek which appears to be on private property?*

    Response: There are currently no plans to improve this section as it is not owned by the City.

*3. How will the contracted loggers accomplish selective forestry on this project when they have not on previous Watershed projects? (See before and after pictures below)*
*Is it a conflict of interest for contacted loggers to determine which trees to remove? Will the "Do Not Cut" trees be marked before the loggers arrive?*

Response: The City contracts the construction of the greenway, and the contractors hire a tree removal company to remove the trees called out on the plans. When and how trees are marked prior to the removals depends on how each contract is written, which is done at the end of the design and outreach process, so this detail is not yet figured out for this project. It is important to note that on projects with high quality trees, the City charges damages for any trees that are removed that were not called out on the plans and critical trees are protected with construction fence to provide a visual to keep contractors away from the tree. The way the contracts are written, there is no incentive for the Contractors to remove any trees that are not specifically called to be removed on the plans.

*4. What will be the total loss of carbon credits when the mature trees are removed? Along with the trees that were removed in previous projects, and proposed projects throughout the city?*
*How will the loss of trees affect bats, birds, deer, other wildlife, and sound barrier from the Beltline noise?*

Response: Calculation of carbon credits is outside the scope of the watershed study and was not completed. Noise impacts will vary with the season due to leaf cover and the source of noise that you are tracking (neighbor's lawn mower, High Point Road, or the Beltline. These potential impacts are not part of the watershed study. The concerns regarding the impact from loss of trees will be reviewed during the design of the project. Please see the Ecological Restoration in Stormwater Ponds and Greenways Storymap for more information on the impact of restoration projects on habitat.

*5. Why hasn't there been any maintenance of the creek channel or retention ponds in the past?*
*Many neighbors have put on their own waders and removed fallen limbs and dams on the creek over the years that city crews never cleared out. It would have been a much less expensive option.*
*Even without any maintenance of the creek, in the 2018 deluge, there were no houses flooded from rising creek water along the creek; no Sauk Creek Neighborhood focus groups (Pg 279).*

Response: The City has completed routine maintenance to clean the sanitary sewer since the sanitary maintenance path was built in the early 2010's. However, the sanitary sewer maintenance path does not allow access to the majority of the channel. Maintenance access would be included as part of the design to stabilize, both for the contractor to have access to the channel to improve it, as well as the City to be able to maintain it.

*6. What exactly are the plans for reconstructing/dredging the "broken" retention pond in Sauk Creek Greenway, by Sauk Creek Dr and St. Lawrence? It is shown as outside the Greenway Project Area on the Project Maps. Although it has been "broken" for over 15 years, it is on all of the*

*watershed maps as a retention pond. It does not collect any street water. We don't hear anything about the plans for this valuable non-functioning retention pond. It could be incorporated into a Regenerative Stormwater Conveyance system.*

Response: Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

*7. Who is funding the proposed single track bike path that the neighborhood does not feel is a good fit in this location? We hear that the Bike Federation is pushing hard for these paths that the neighborhood community does not support.*
*The neighborhood has repeatedly suggested the other proposed Walnut Grove Park mountain bike trail for the schools' Mountain Bike teams be located in Mineral Point Park providing easy access for Vel Phillips Memorial High School/Jefferson Middle School, and nearby John Muir and Stevenson Elementary School students and their families. It would really increase use of that park. With adequate parking, rolling hills, and other amenities.*

Response: The bike path and single track pike path is outside the scope of the watershed study. That project is being explored through the Parks Division.

*8. The $4million dollar budget for this one project seems to be the same since 2018. Is that really an accurate budget in 2022? Page 58 The Sauk Creek Greenway was budgeted for reconstruction prior to the August 2018 flood event and prior to the watershed study.*

Response: Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

*9. The answer to the incredibly undersized, poorly planned Menard/Pet Smart area and Target Mall area retention ponds, seems to be to just push all of the water towards Sauk Creek faster. With new building being planned SW of Menards, these commercial areas will still continue to have flooding with high rain storm events.*

Response: All upstream development was and is constructed in accord with the requirements in place at the time of development (as was the development along the channel). Storm water requirements have increased significantly since the first ordinance that was put in place in 1983. Functionally, lands East of the channel had no stormwater management requirements, and lands West of the channel to the beltline had to meet the very first iteration of stormwater requirements. Development of lands West of the beltline have met ever more stringent requirements as the lands move west. In regards to solutions on upstream lands, the City does not have the ability to mandate that upstream commercial properties fix downstream flooding issues. However, when properties re-develop, additional redevelopment requirements are in place. Madison is one of only two (2) municipalities with redevelopment requirements in the State. Currently, New Development is required to comply with the City's stormwater ordinance, including detention up to the 200-yr storm event and infiltration practices. For more information, please see the Watershed Study Learning Hub and view the "New Development/Re-Development Flood Prevention" topic or visit the Development Services Center and view the "Storm Water Management" topic

*10. From the Survey pg 46: "Solution Caution - If this solution (Draining Target pond under Beltline into Sauk Creek) could be implemented, it would send stormwater downstream faster. Computer modeling indicates the sections of the Sauk Creek Greenway just downstream of the Beltline culverts do not have capacity for the additional stormwater that would come from this solution. The flooding experienced in the Target Area would be moved downstream to the properties adjacent to the upstream sections of the Sauk Creek Greenway. Therefore, if aspects of this solution are to be implemented, the design should account for the capacity of the downstream Sauk Creek Greenway sections. Any back of the creek would cause more flooding in residential areas.*
*Page 49 "Reason for Exclusion - The sections of Sauk Creek Greenway just downstream of the beltline and Target Area Pond are not large enough to convey the additional capacity from the improvement."*

Response: Extensive computer modeling evaluations were conducted to understand the most effective solutions to relieve the flooding on Mineral Point Road for purposes of emergency vehicle passability and relieve the flooding in the Target Area. Alternatives include detaining 100 percent of the stormwater from undeveloped areas, increasing the size of the outlet of the Target Area pond, and rerouting some of the stormwater from the Target Area Pond. Computer modeling indicates the most effective solution for this area is the Target Area Relief Sewer.

*11. Page 58 3. Menards Parking Lot – Flooding approximately 1 to 2 feet deep a. Solutions that Benefit Area - The local conveyance system (series of culverts and channels) along Commerce Drive was replaced with a box culvert for the full length. This greatly reduces the inefficiencies in the system. b. Flood Reductions Observed - The ponding in the Menards parking lot is* ***reduced. (Not eliminated)***
*These commercial areas need larger ponds!! Menard' pond is basically non-existent. Dredging and deforesting Sauk Creek is not the answer!*

Response: Construction of additional retention in the Target/Menards are required land acquisition of existing developed land. At this time, the City is not evaluating solutions that require this type of land acquisition. All upstream development was constructed in accord with the requirements in place at the time of development (as was the development along the channel). Storm water requirements have increased significantly since the first ordinance that was put in place in 1983. Functionally, lands East of the channel had no stormwater management requirements, and lands West of the channel to the beltline had to meet the very first iteration of stormwater requirements. Development of lands West of the beltline have met ever more stringent requirements as the lands move west. In regards to solutions on upstream lands, the City does not have the ability to mandate that upstream commercial properties fix downstream flooding issues. However, when properties re-develop, additional redevelopment requirements are in place. Madison is one of only two (2) municipalities with redevelopment requirements in the State.

*12. Focus Groups: Page 279: There was no focus group for Sauk Creek Neighborhood, because here was no flooding along Sauk Creek.*

Response: Focus groups were held in the neighborhoods that experienced the most devastating flooding to receive information about the flooding that was experienced to help build a useful computer model.