Windsor
Growing Forward

November 9, 2026

RE: Gray Road & North Towne Road Sewer Service Area Amendment

The Village of Windsor (Village) is requesting a 85.75-acre addition to its Sewer Service Area to provide municipal water and sanitary sewer service to lands located along Gray Road and North Towne Road. Of the 85.75, 76.89-acres are planned for new development including the recently approved The Graylands development, a mixed-residential subdivision.

The Sewer Service Area Amendment application is divided into two subareas, the Gray Road Subarea and the North Towne Road Subarea.

The Gray Road Subarea is designated for Traditional Single-Family Residential. This designation allows for traditional detached single-family neighborhoods including two-family development, with an overall gross density range of 2 to 4 dwelling units per acre. The Graylands development recently approved in this subarea is consistent with this designation, proposing 67 single-family residential units and 26 two-family units for a total of 93 residential units on 80 residential lots.

The North Towne Road Subarea is designated for North Towne Road Mixed Use. This designation allows for a mix of commercial and multi-family residential uses. Commercial and multi-family residential developments shall adhere to the Village's site plan review design standards. Large scale apartment buildings shall be carefully evaluated specific to the Village's housing policies. The gross residential density shall not exceed 20 dwelling units per acre for any parcel. Access points in the North Towne Road Subarea shall be coordinated with the DeForest Area School District Harvest Intermediate School.

At the time of this Sewer Service Area Amendment application, the Village does not have any developments proposed for the North Towne Road Subarea. It is the Village's desire to include this subarea in the application as this subarea is within the Village's growth area, the Village has limited land available for development, and development pressures are inevitable.

On Thursday, November 5, 2026, the Village Board adopted Resolution 2026-86 authorizing Staff to file the Sewer Service Area Amendment application.

Sincerely,

Jamie Rybarczyk

Jamie Rybarczyk
Community Development Director | Deputy Administrator

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Section 1 – Contact Information

1.1 Applicant Information

Sponsoring Municipality: Village of Windsor

Point of Contact Name/Title: Jamie Rybarcyzk, Community Development Director | Deputy Administrator

Point of Contact Phone/Email: (608) 888-0066 x105, jamie@windsorwi.gov

1.2 Representative Submitting Application (on behalf of Applicant, if different than above): N/A

1.3 Other Technical Support (e.g., Planner/Engineer)

Company/Firm: Town & Country Engineering, Inc.

Point of Contact Name/Title: Nick Bubolz, P.E.

Point of Contact Phone/Email: (608) 273-3350, nbubolz@tcengineers.net

Section 2 – Project Information

2.1 Project/Amendment Area Name: Gray Road & North Towne Road Sewer Service Area Amendment

2.2 Current Jurisdiction of Lands within Amendment Areas: Village of Windsor

2.3 Final Jurisdiction of Lands with Amendment Area: Village of Windsor

2.4 Date of Annexation to Final Jurisdiction (if applicable): Not applicable

2.5 Owner/Name of WWTF Serving Area: Madison Metropolitan Sewerage District

2.6 Owners(s) of Wastewater Collection System Servicing Area: Madison Metropolitan Sewerage District

2.7 Amendment Area Location (address or relative location): Gray Road & North Towne Road

2.8 Total Acreage of Amendment: 85.75

Gray Road Subarea

Parcel ID	Property Owner	Property Address	Acreage
196/0910-204-9240-7	Kristine Nordness	4348 Gray Road	00.72
196/0910-204-9110-1	NG Windsor Land LLC	N/A	37.66
196/0910-204-9120-1	Steve Kreger	4302 Gray Road	01.00
		Subtotal	39.38

North Towne Road Subarea

Parcel ID	Property Owner	Property Address	Acreage
196/0910-291-0001-1	Ascent Building Group LLC	N/A	18.69
196/0910-291-8010-0	B 10 Properties LLC	6859 North Towne Road	00.43
196/0910-291-8470-6	Connor P Lane	6849 North Towne Road	00.57
196/0910-291-6002-1	Ascent Building Group LLC	N/A	20.54
196/0910-291-4003-1	Village of Windsor	N/A	01.66
196/0910-291-6001-1	Windsor Congregational Cemetery Assoc	N/A	02.27
196/0910-291-9792-0	Windsor Congregational Cemetery Assoc	4250 Windsor Road	02.21
		Subtotal	46.37

2.9 Does this application include a request for a deviation from the Policies & Criteria for Environmental Corridors (i.e. Environmental Corridor Major Change Amendment) (yes/no): No

Section 3 – Pre-Application Documentation

3.1 Pre-Application Meeting

Date of Pre-Application Meeting: July 01, 2026

Representative of the Applicant Present: Nick Bauer, Melissa Michaud, Jamie Rybarczyk, & Cole Martin

3.2 Process Selection

Process Selection: Expedited Process

3.3 Applicant has met with affected units of government (or provided documentation that invitation was declined or not responded to within 10 business days)

Date of Meeting with Affected Units of Government: September 30, 2026

Representatives of the Applicant Present: Nick Bauer, Melissa Michaud, Alex Allon, Jamie Rybarczyk, & Cole Martin

Section 4 – Fees

The fee for the Gray Road & North Towne Road Sewer Service Area amendment is a non-refundable, fixed application fee of $3,500 plus actual cost of CARPC staff time (less application fee) paid by the Village of Windsor.

Section 5 – Checklist

Consistency with Local and Regional Plans

1.1 Consistency with Village of Windsor Comprehensive Plan 2050

Gray Road Subarea

The future land use designation for this subarea is Traditional Single-Family Residential. This designation allows for traditional detached single-family neighborhoods including two-family development, with an overall gross density range of 2 to 4 dwelling units per acre. The Graylands development recently approved in this subarea is consistent with this designation, proposing 67 single-family residential units and 26 two-family units for a total of 93 residential units on 80 residential lots.

In addition, The Graylands development achieves the following goals, objectives and policies:

- Encourage the balanced development of a variety of housing types in the Village;
- Focus new non-agricultural related development in Urban Service Areas and in other areas designated for non-agricultural development;
- Maintain and promote the Village of Windsor Agricultural Enterprise Area (AEA);
- Ensure adequate utility corridors for public water and sewer, stormwater management, collector streets, solid waste collection, telecommunication systems, electric and natural gas distribution are provided as part of land development;
- Ensure adequate Village road capacities to accommodate traffic for the benefit of Village residents, visitors, businesses, and agricultural industry;

- Ensure interconnectivity of roads to the greatest extent possible to accommodate future growth and efficiently distribute traffic; and
- Assure efficient, safe, and interconnected multi-modal travel.

North Towne Road Subarea

The future land use designation for this subarea is North Towne Road Mixed Use. This designation allows for a mix of commercial and multi-family residential uses. Commercial and multi-family residential developments shall adhere to the Village's site plan review design standards. Large scale apartment buildings shall be carefully evaluated specific to the Village's housing policies. The gross residential density shall not exceed 20 dwelling units per acre for any parcel. Access points in the North Towne Road Subarea shall be coordinated with the DeForest Area School District Harvest Intermediate School.

At the time of this Sewer Service Area Amendment application, the Village does not have any developments proposed for this subarea. It is the Village's desire to include this subarea in the application as this subarea is within the Village's growth area, the Village has limited land available for development, and development pressures are inevitable.

Under the guidance of the Village of Windsor Comprehensive Plan 2050, this subarea will be required to address the following goals, objectives, and policies:

- Preserve important landscape elements, unique/environmentally sensitive natural features;
- Focus new non-agricultural related development in Urban Service Areas and in other areas designated for non-agricultural development;
- Maintain and promote the Village of Windsor Agricultural Enterprise Area (AEA);
- Ensure adequate utility corridors for public water and sewer, stormwater management, collector streets, solid waste collection, telecommunication systems, electric and natural gas distribution are provided as part of land development;
- Maintain an active economic development program to assist existing businesses and pursue new desirable businesses;
- Ensure adequate Village road capacities to accommodate traffic for the benefit of Village residents, visitors, businesses, and agricultural industry;
- Ensure interconnectivity of roads to the greatest extent possible to accommodate future growth and efficiently distribute traffic;
- Assure efficient, safe, and interconnected multi-modal travel;
- Evaluate the impact of traffic generated by new development on the DeForest Area School District Harvest Intermediary School;
- Encourage high-quality architecture, site design, public spaces, landscaping and signage for commercial, industrial and mixed-uses; and
- Encourage the balanced development of a variety of housing types in the Village.

1.2 Consistency with 2050 Regional Development Plan

Gray Road Subarea

This subarea is an opportunity for planned well-coordinated growth in the Village. The Graylands development, recently approved in this subarea achieves the goals, objectives, and strategies of the Regional Development Plan by expanding attainable housing options, preserving agricultural land and natural resources, reducing greenhouse gas emissions, and reinforcing efficient and fiscally responsible urban development patterns.

The Graylands development provides a compact, walkable neighborhood design consisting of a mix of single-family and two-family residential units. This mix of housing types enhances affordability and increases the variety of available housing. Sidewalks, short block lengths, and a connected internal street grid promote walkability and reduce the desire for vehicle trip generation.

The Village and the developer of The Graylands are working with the Dane County Land and Water Resources Department to implement best management practices for stormwater management to reduce runoff volumes, improve water quality, and protect the Yahara watershed.

North Towne Road Subarea

At the time of this Sewer Service Area Amendment application, the Village does not have any development proposed for this subarea. It is the Village's desire to include this subarea in the application as this subarea is within the Village's growth area, the Village has limited land available for development, and development pressures are inevitable.

The future land use designation for this subarea allows for a mix of commercial and multi-family residential uses encouraging compact, efficient mixed-use growth as well as addressing the housing demand in the region. Development of this subarea also allows the Village to maintain and promote its Agricultural Enterprise Area (AEA).

This subarea includes an intermittent tributary, riparian steep slopes along the intermittent tributary, and wetlands. These natural resources will be identified and preserved under the Dane County Water Quality Plan policies and criteria for environmental corridors. Stormwater management will be identified and designed according to Dane County Land and Water Resources Department best management practices.

Intergovernmental Cooperation

2.1 Notification

On Wednesday, July 01, 2026, Nick Bauer and Melissa Michaud representing Capital Area Regional Planning Commission (CARPC) and Jamie Rybarczyk and Cole Martin representing the Village of Windsor met for the pre-application meeting.

On Monday, July 27, 2026, Robert Wipperfurth, Jamie Rybarczyk, and Nick Bubolz representing the Village of Windsor met with the DeForest Area School District Board to discuss the planned extension of water and sanitary sewer service infrastructure.

On Wednesday, September 30, 2026, Nick Bauer and Melissa Michaud representing CARPC, Alex Allon representing the Village of DeForest, and Jamie Rybarczyk and Cole Martin representing the Village of Windsor met for the Affected Units of Government meeting.

On Monday, October 19, 2026, the Village of Windsor held a public information meeting with property owners located within the Gray Road & North Towne Road Sewer Service Area amendment boundary to discuss the planned extension of water and sanitary sewer service infrastructure.

On Thursday, November 5, 2026, the Village Board adopted Resolution 2026-86 authorizing Staff to file the Sewer Service Area Amendment application.

See Appendices, Exhibit 1.

2.2 Responses

The Village received no opposition to the Sewer Service Area Amendment application.

2.3 Supporting Resolution (SSA Amendment)

See Appendices, Exhibit 1

2.4 Supporting Resolution (Nonpoint Pollution)

See Appendices, Exhibit 1

2.5 Supporting Resolution (Environmental Corridors)

See Appendices, Exhibit 1

2.6 Statement of Capacity (Wastewater Treatment)

See Appendices, Exhibit 2

2.7 Statement of Capacity (Wastewater Collection)

See Appendices, Exhibit 2

Land Use and Geography

3.1 Existing Map & SSA Boundary

See Appendices, Map 1

3.2 Proposed Map & SSA Boundary

See Appendices, Map 2

3.3 Plat / Concept Layout

Gray Road Subarea

See Appendices, Maps 3 and 4 for the preliminary plat and final plat for The Graylands development.

North Towne Road Subarea

Not applicable.

3.4 Land Use Tables

Existing Land Use	Total Area (ac)	Housing Units (Count)
Agricultural	78.55	0
Cemetery	4.48	
Commercial	0.43	
Extractive		
Governmental/Institutional		
Manufacturing		
Military		
Open Land		
Parks and Recreation		
Residential		
• Single-Unit	2.29	3
• Multi-Unit		
• Rural		
• Group Quarters		
• Mixed-Use		
Road Rights-of-Way		
Stormwater Management		
Water and Wetlands		
Woodlands		
Total Acreage / Housing Units	85.75	3

Proposed Land Use	Total Area (ac)	Existing Development (ac)	New Development (ac)	Housing Units (Count)
Agricultural	1.66	1.66		
Cemetery	4.48	4.48		
Commercial	20.97	0.43	20.54	
Extractive				
Governmental/Institutional				
Manufacturing				
Military				
Open Land				
Parks and Recreation				
Residential				
• Single-Unit	39.95	2.29	37.66	96
• Multi-Unit	18.69		18.69	374[1]
• Rural				
• Group Quarters				
• Mixed-Use				
Road Rights-of-Way				
Stormwater Management				
Water and Wetlands				
Woodlands				
Total Acreage / Housing Units	85.75	8.86	76.89	470

Footnote[1]: This is the gross density allowed per the Village of Windsor Comprehensive Plan

3.5 Proposed Land Uses

Gray Road Subarea

In this 39.38-acre subarea, 37.66 acres will be new development. The Graylands development, recently approved by the Village, will be located on the 37.66 acres. The Graylands development proposes 67 single-family residential units and 26 two-family units for a total of 93 residential units on 80 residential lots.

The remaining parcels in this subarea are developed and the Village does not anticipate a change in use.

North Towne Road Subarea

In this 46.37-acre subarea, 39.23 acres will be new development under the guidance of the Village of Windsor Comprehensive Plan 2050. The future land use designation for this acreage allows for a mix of commercial and multi-family residential uses. Commercial and multi-family residential developments shall adhere to the Village's site plan review design standards. Large scale apartment buildings shall be carefully evaluated specific to the Village's housing policies. The gross residential density shall not exceed 20 dwelling units per acre for any parcel. Access points for this acreage shall be coordinated with the DeForest Area School District Harvest Intermediate School.

The remaining parcels, within the exception of Parcel ID 196/0910-291-4003-1 and Parcel ID 196/0910-291-6001-1, are developed and the Village does not anticipate a change in use. Parcel ID 196/0910-291-4003-1 was recently acquired by the Village of Windsor and at the time of this application the Village does not have any development plans for this parcel. Parcel ID 196/0910-291-6001-1 is owned by the Windsor Congregational Cemetery Association and is an expansion area for the cemetery.

3.6 Phasing

Gray Road Subarea

The Graylands development anticipates two phases, 42 residential lots in phase 1 and 38 residential lots in phase 2 subject to market conditions and demands. The Graylands development anticipates the start of construction in Spring of 2027.

North Towne Road Subarea

Not applicable.

Ecosystem Resources & Environmental Corridors

4.1 Ecosystem Resource Features

Gray Road Subarea

The Grayland Development, located in this subarea, will include a 3-acre wet pond and a 3-acre infiltration basin located on the west side of the development, and a 30- to 35-foot-wide bypass drainageway located on the northwest and northeast sides of the development.

See Appendices, Maps 3 and 4.

North Towne Road Subarea

This subarea includes an intermittent tributary, riparian steep slopes along the intermittent tributary, wetlands, and potentially restorable wetlands.

A preliminary review of environmental corridors was provided to the Village by CARPC on January 20, 2026. The Village acknowledges that the preliminary review of the environmental corridors was conducted using the 2008 policies and criteria for environmental corridors and that all new development in this subarea will be subject to the recently adopted 2026 policies and criteria for environmental corridors.

See Appendices, Exhibit 3 and Maps 5 and 6.

4.2 Map of Proposed Environmental Corridors

See Appendices, Exhibit 3 and Maps 5 and 6.

4.3 Proposed Environmental Corridors

Gray Road Subarea

The Graylands Development, located in this subarea, will include stormwater management areas and conveyance channels which are categorized as required environmental corridors. The development will include a 3-acre wet pond and a 3-acre infiltration basin located on the west side of the development, and a 30- to 35-foot-wide bypass drainageway located on the northwest and northeast sides of the development.

This subarea does not include any voluntary environmental corridors.

See Appendices, Exhibit 3 and Maps 3 and 4.

North Towne Road Subarea

This subarea includes required and voluntary environmental corridors. The required environmental corridors include an intermittent tributary, riparian steep slopes along the intermittent tributary, and wetlands. The Village acknowledges these environmental corridors will require a 75 foot vegetated buffer from the ordinary high water mark of a water body, as well as, the edge of a wetland. The voluntary environmental corridors include potentially restorable wetlands where soil and water pooling data indicate wetland restoration may be possible.

A preliminary review of environmental corridors was provided to the Village by CARPC on January 20, 2026. The Village acknowledges that the preliminary review of the environmental corridors was conducted using the 2008 policies and criteria for environmental corridors and that all new development in this subarea will be subject to the recently adopted 2026 policies and criteria for environmental corridors.

See Appendices, Exhibit 3 and Maps 5 and 6.

4.4 Protection of Environmental Corridors

The Village acknowledges environmental corridors as a network of open space and natural areas containing environmentally sensitive lands and natural resources requiring protection from disturbance and development, as well as lands needed for open space and recreational use.

The Village identifies required and voluntary environmental corridors as outlines in the recently adopted CARPC 2026 policies and criteria for environmental corridors.

The Village intends to protect required and voluntary environmental corridors through the implementation of:

- Comprehensive Plan 2050;
- Comprehensive Outdoor Recreation Plan 2028;

- Code of Ordinance, Chapter 25 Floodplain Zoning;
- Code of Ordinance, Chapter 38 Planning and Development;
- Code of Ordinance, Chapter 52 Zoning Districts;
- Code of Ordinance, Chapter 54 Shoreland Zoning District; and
- Code of Ordinances, Chapter 56 Shoreland Wetland Zoning.

In addition, the Village will collaborate with CARPC to identify and protect the required and voluntary environmental corridors (where feasible) for the North Towne Road Subarea per the Dane County Water Quality Plan.

4.5 Major Change (if applicable)

Not applicable.

4.6 Supporting Documentation

On January 20, 2026, the CARPC staff completed a preliminary review of environmental corridors for the application.

See Appendices, Exhibit 3.

Utilities (Sanitary Sewer)

5.1 Proposed Sanitary Sewer

The Windsor Utilities provides sanitary sewer service to users in the Village of DeForest (limited circumstances) and Village of Windsor. The sanitary sewer flows through the Madison Metropolitan Sewerage District (MMSD) collection system ending at its wastewater treatment facility.

The existing and proposed sanitary sewer service infrastructure for the Gray Road Subarea and North Towne Road Subarea was evaluated by the Village's engineering consultant Town & Country Engineering, Inc in June 2024. Each of the subareas will be served by a designated sanitary sewer main. The analysis identifies existing and proposed loadings, capacity, and location of the existing and proposed sanitary sewer service infrastructure. The Village proposes new 8" diameter sanitary sewer service for the subareas. The proposed sanitary sewer service infrastructure will be constructed and funded by the Village.

Since the completion of the analysis, Town & Country Engineering, Inc. has been working closely with the Village to refine the final routes of the proposed utilities. The anticipated routes were presented to impacted property owners at a Public Information Meeting on Monday, October 19, 2026.

See Appendices, Exhibit 4 and Map 7.

5.2 Proposed Loadings

See Appendices, Exhibit 4.

5.3 Existing Loadings

See Appendices, Exhibit 4.

5.4 Capacity Evaluation

See Appendices, Exhibit 4.

5.5 Existing Utility Map

See Appendices, Exhibit 4

Utilities (Water Supply)

6.1 Proposed Water Supply

The Windsor Utilities provides water service to users in the Village of DeForest (limited circumstances) and Village of Windsor. Water service to service the Gray Road Subarea and North Towne Road Subarea will be extended from the Village's existing booster station located at 6665 North Towne Road.

The existing and proposed water service infrastructure for the Gray Road Subarea and North Towne Road Subarea was evaluated by the Village's engineering consultant Town & Country Engineering, Inc in June 2024. The analysis identifies existing and proposed loadings, capacity, and location of the existing and proposed water service infrastructure. The Village proposes new 12" diameter water service for the subareas. The proposed water service infrastructure will be constructed and funded by the Village.

Since the completion of the analysis, Town & Country Engineering, Inc. has been working closely with the Village to refine the final routes of the proposed utilities. The anticipated routes were presented to impacted property owners at a Public Information Meeting on Monday, October 19, 2026.

See Appendices, Exhibit 4 and Map 7.

6.2 Proposed Demand

See Appendices, Exhibit 4.

6.3 Existing Demand

See Appendices, Exhibit 4.

6.4 Capacity Evaluation

See Appendices, Exhibit 4.

Stormwater Management

7.1 Map of Existing Watersheds

Gray Road Subarea

The Graylands Development, located in this subarea, has prepared a Stormwater Drainage Report identifying the existing (predevelopment) watersheds.

See Appendices, Exhibit 5.

North Towne Road Subarea

At the time of this Sewer Service Area Amendment application, the Village does not have any development proposed for this subarea; therefore, the existing (predevelopment) watersheds have not been mapped.

7.2 Map of Proposed Watersheds

Gray Road Subarea

The Graylands Development, located in this subarea, has prepared a Stormwater Drainage Report identifying the proposed (post-development) watersheds.

See Appendices, Exhibit 5.

North Towne Road Subarea

At the time of this Sewer Service Area Amendment application, the Village does not have any development proposed for this subarea; therefore, the proposed (post-development) watersheds have not been mapped.

7.3 Map of BMPs

Gray Road Subarea

The Grayland Development, located in this subarea, will include a 3-acre wet pond and a 3-acre infiltration basin located on the west side of the development, and a 30- to 35-foot-wide bypass drainageway located on the northwest and northeast sides of the development.

The Graylands Development has prepared a Stormwater Drainage Report identifying the proposed stormwater management facilities and best management practices.

See Appendices, Exhibit 5 and Maps 3 and 4.

North Towne Road

At the time of this Sewer Service Area Amendment application, the Village does not have any development proposed for this subarea; therefore, the best management practices for stormwater management have not been officially identified or mapped.

CARPC staff completed a preliminary review of this subarea and identified an intermittent tributary, riparian steep slopes along the intermittent tributary, and wetlands. These natural resources will be identified and preserved under the Dane County Water Quality Plan policies and criteria for environmental corridors. Stormwater management will be identified and designed according to Dane County Land and Water Resources Department best management practices.

The Village will promote best management practices for stormwater management through its site plan review process which includes compliance with:

- Comprehensive Plan 2050;
- Comprehensive Outdoor Recreation Plan 2028;
- Code of Ordinance, Chapter 10 Building and Building Regulations;
- Code of Ordinance, Chapter 38 Planning and Development;
- Code of Ordinance, Chapter 52 Zoning Districts;
- Dane County Water Quality Plan; and
- Dane County Land and Water Resources Department Chapter 14 Erosion Control and Stormwater Management Ordinance.

7.4 Proposed BMPs

Gray Road Subarea

The Graylands Development, located in this subarea, has prepared a Stormwater Drainage Report identifying the proposed stormwater management facilities and best management practices.

See Appendices, Exhibit 5 and Maps 3 and 4.

North Towne Road

At the time of this Sewer Service Area Amendment application, the Village does not have any development proposed for this subarea; therefore, the best management practices for stormwater management have not been officially identified or mapped.

CARPC staff completed a preliminary review of this subarea and identified an intermittent tributary, riparian steep slopes along the intermittent tributary, and wetlands. These natural resources will be identified and preserved under the Dane County Water Quality Plan policies and criteria for environmental corridors. Stormwater management will be identified and designed according to Dane County Land and Water Resources Department best management practices.

The Village will promote best management practices for stormwater management through its site plan review process which includes compliance with:

- Comprehensive Plan 2050;
- Comprehensive Outdoor Recreation Plan 2028;
- Code of Ordinance, Chapter 10 Building and Building Regulations;
- Code of Ordinance, Chapter 38 Planning and Development;
- Code of Ordinance, Chapter 52 Zoning Districts;
- Dane County Water Quality Plan; and
- Dane County Land and Water Resources Department Chapter 14 Erosion Control and Stormwater Management Ordinance.

See Appendices, Exhibit 3 and Maps 5 and 6.

7.5 Performance Standards

Gray Road Subarea

The Graylands Development, located in this subarea, has prepared a Stormwater Drainage Report identifying the performance standards for the stormwater management facilities. At a minimum, all applicable performance standards for the stormwater management facilities will be complied with at the time of development.

See Appendices, Exhibit 5 and Maps 3 and 4.

North Towne Road Subarea

At the time of this Sewer Service Area Amendment application, the Village does not have any development proposed for this subarea; therefore, the performance standards have not been identified.

The Village will collaborate with CARPC and the Dane County Land and Water Resources Department to promote performance standards through the Village's site plan review process which includes compliance with:

- Comprehensive Plan 2050;
- Comprehensive Outdoor Recreation Plan 2028;

- Code of Ordinance, Chapter 10 Building and Building Regulations;
- Code of Ordinance, Chapter 38 Planning and Development;
- Code of Ordinance, Chapter 52 Zoning Districts;
- Code of Ordinance, Chapter 54 Shoreland Zoning District;
- Code of Ordinances, Chapter 56 Shoreland Wetland Zoning;
- Dane County Water Quality Plan; and
- Dane County Land and Water Resources Department Chapter 14 Erosion Control and Stormwater Management Ordinance.

At a minimum, all applicable performance standards for the stormwater management facilities will be complied with at the time of development.

7.6 Maintenance

All new development in the Village must comply with Dane County's Chapter 14 Erosion Control and Stormwater Management requirements. In addition, all new development executes with the Village and Dane County a Declaration of Restrictions and Maintenance Requirements for Stormwater Management Measures and Waiver of Right to Contest Special Assessments and Charges agreement.

For the Graylands Development, the initial developer will be responsible for the short-term maintenance of the stormwater facilities. The long-term maintenance will be transferred from the developer to the Homeowners Association of the Graylands Development.

See Appendices, Exhibit 6.

7.7 Supporting Documentation

Gray Road Subarea

See Appendices, Exhibit 5.

North Towne Road Subarea

Not applicable.

Section 6 – Certification

I, Jamie Rybarczyk, on behalf of the Village of Windsor, certify in accordance with Wis. Stat. § 283.83 that the proposed change to the Sewer Service Area, an amendment to the Dane County Water Quality Plan, is consistent with applicable water quality standards under Wis. Stat. § 281.15 and the information provided herein is accurate, complete, and in support of this certification.

Furthermore, I acknowledge that I/we, as Applicant, are responsible for paying all invoices issued upon formal application and completion of work by CARPC, in accordance with CARPC Resolution No. 2026-06, regardless of whether payment has been delegated to another party, and regardless of whether the application receives a final DNR determination.

Authorized Representative of Applicant



Jamie Rybarczyk, Community Development Director

November 09, 2026

Appendices

Exhibit 1 – Village Board Resolution

Exhibit 2 – Madison Metropolitan Sewerage District (MMSD) Statement of Capacity

Map 1 – Existing Land Use

Map 2 – Future Land Use

Map 3 – The Graylands Preliminary Plat

Map 4 – The Graylands Final Plat

Exhibit 3 – CARPC Memorandum Environmental Conditions Review

Map 5 – Environmentally Sensitive Areas

Map 6 – Proposed Environmental Corridors

Exhibit 4 – Town & Country Engineering, Inc Municipal Service Evaluation Analysis

Map 7 – Municipal Utility Extension

Exhibit 5 – The Graylands Stormwater Drainage Report

Exhibit 6 – Declaration of Restrictions and Maintenance Requirements for Stormwater Management Measures and Waiver of Right to Contest Special Assessments and Charges

Exhibit 1

Village Board Resolution

VILLAGE OF WINDSOR
VILLAGE BOARD RESOLUTION 2026-86

RESOLUTION AUTHORIZING THE VILLAGE OF WINDSOR TO FILE A SEWER SERVICE AREA AMENDMENT FOR THE GRAY ROAD & NORTH TOWNE ROAD AREA TO INCLUDE 85.75 ACRES OF LAND IN THE VILLAGE OF WINDSOR FOR FUTURE DEVELOPMENT

WHEREAS, the Village Staff has prepared an application to expand the Village's Sewer Service Area to include approximately 85.75 acres of land located adjacent to Gray Road and North Towne Road in the Village of Windsor for future development; and

WHEREAS, the boundary amendment will accommodate future single-family and two-family development and mixed-use development by planning for additional municipal utilities, streets, and stormwater management best practices, subject to approval of the amendment and the Village's approval of all development review applications; and

WHEREAS, the application requires the Village to adopt a resolution certifying that the application is consistent with the Village of Windsor Comprehensive Plan 2050; and

WHEREAS, the Village acknowledges its authority and obligation to enforce nonpoint source pollution control, and will do so in accordance with Village of Windsor Code of Ordinances, Chapter 38, Article VIII, and all applicable County and State regulations; and

WHEREAS, the Village acknowledges its role in helping to protect environmental corridors designated in the Dane County Water Quality Plan, which may include coordination with the Capital Area Regional Planning Commission on the delineation of corridors and enforcement of restrictions on development and other activity within the environmental corridors through the Village's development review process.

WHEREAS, the Village Board held a meeting regarding the application on November 5, 2026; and

WHEREAS, following review of application presented at the Village Board meeting, the Village Board has determined that the application is in compliance with the Village of Windsor Comprehensive Plan 2050 and is in the best interest of the Village for future development and should therefore be authorized.

NOW, THEREFORE, BE IT RESOLVED that the Village Board authorizes the submittal of an application to the Capital Area Regional Planning Commission to amendment the Sewer Service Area to include 85.75 acres of land adjacent to Gray Road & North Towne Road in the Village of Windsor for future development.

The above and foregoing Resolution was duly adopted at a meeting of the Village Board of the Village of Windsor held on November 5, 2026, by a vote of 5 in favor, 0 opposed, and 0 abstentions.

VILLAGE OF WINDSOR

Robert E. Wipperfurth

Robert E. Wipperfurth, President

Attested by:

John Moe

John Moe, Clerk

Incorporated by Reference:
Gray Road & North Towne Road Sewer Service Area Amendment

Exhibit 2

Madison Metropolitan Sewerage District (MMSD) Statement of Capacity

Madison Metropolitan Sewerage District

Memorandum

To: *Capital Area Regional Planning Commission, c/o Nick Bower, Senior Environmental Engineer & Water Quality Program Director*

Village of Windsor, c/o Jamie Rybarczyk, Community Development Director | Deputy Administrator

From: *Curt Sauser, Engineering Technician*

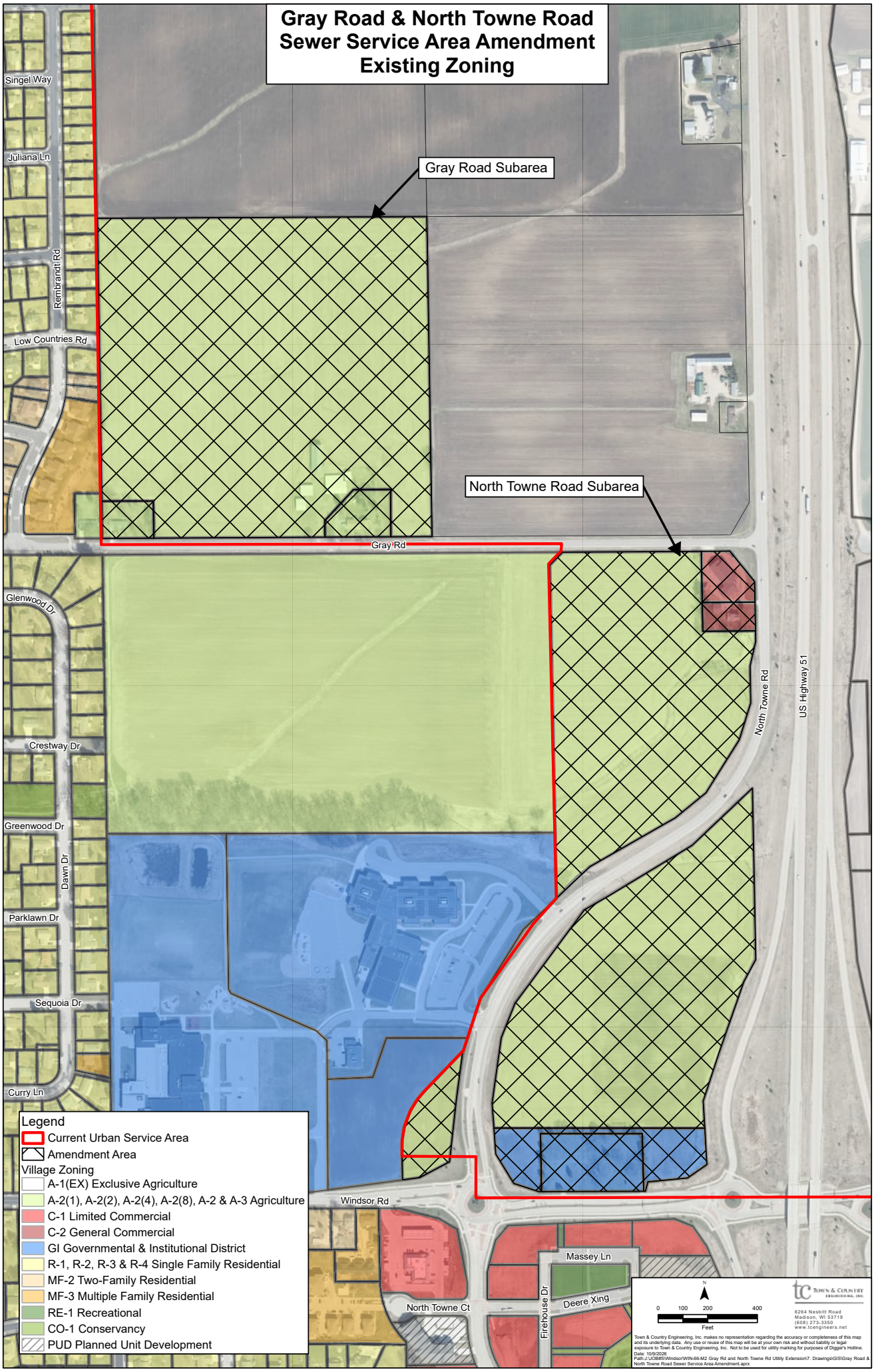
Date: *October 28, 2026*

Subject: *Gray Road & North Towne Road Sewer Service Area Amendment*

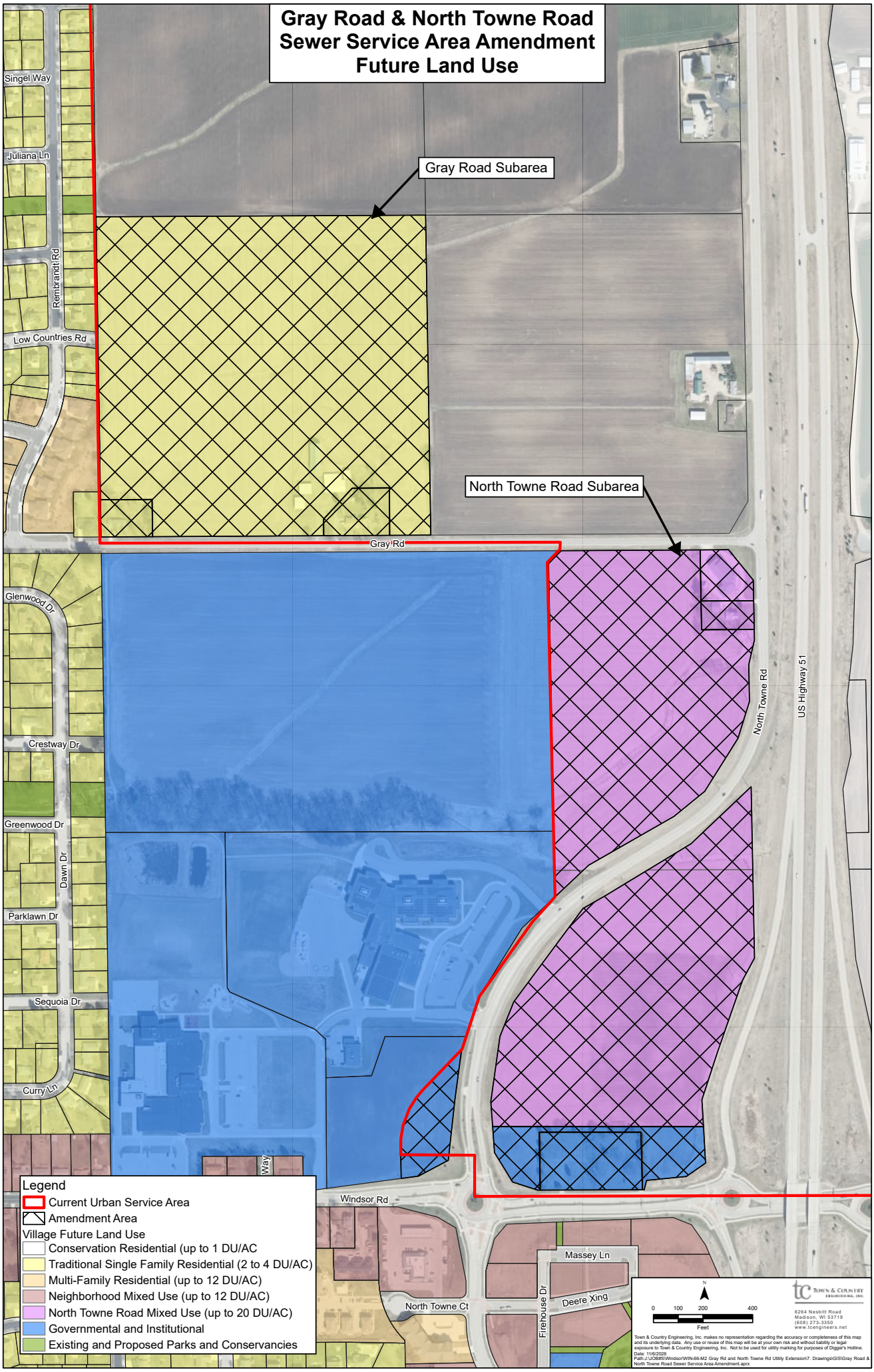
Staff in the District's Planning Department have reviewed the preliminary application for the above-referenced sewer service area amendment. Based on this review, District staff have determined that adequate capacity exists in the District's collection system and at its treatment facility to provide sanitary sewer service for anticipated development in the proposed amendment area.

Map 1

Existing Land Use


Gray Road & North Towne Road
Sewer Service Area Amendment
Existing Zoning
Gray Road Subarea
North Towne Road Subarea
Singel Way
Juliana Ln
Rembrandt Rd
Low Countries Rd
Gray Rd
Glenwood Dr
Crestway Dr
Greenwood Dr
Dawn Dr
Parklawn Dr
Sequoia Dr
Curry Ln
North Towne Rd
US Highway 51
Windsor Rd
Massey Ln
Deere Xing
Firehouse Dr
North Towne Ct
Legend
Current Urban Service Area
Amendment Area
Village Zoning
A-1(EX) Exclusive Agriculture
A-2(1), A-2(2), A-2(4), A-2(8), A-2 & A-3 Agriculture
C-1 Limited Commercial
C-2 General Commercial
GI Governmental & Institutional District
R-1, R-2, R-3 & R-4 Single Family Residential
MF-2 Two-Family Residential
MF-3 Multiple Family Residential
RE-1 Recreational
CO-1 Conservancy
PUD Planned Unit Development
N
0 100 200 400
Feet
6264 Nesbitt Road
Madison, WI 53719
(608) 273-3350
www.tcengineers.net
Town & Country Engineering, Inc. makes no representation regarding the accuracy or completeness of this map and its underlying data. Any use or reuse of this map will be at your own risk and without liability or legal exposure to Town & Country Engineering, Inc. Not to be used for utility marking for purposes of Digger's Hotline.
Date: 10/9/2026
Path:J:\JOBS\Windsor\WIN-66-M2 Gray Rd and North Towne Rd Utility Extension\7. Drawings\GIS\Gray Road & North Towne Road Sewer Service Area Amendment.aprx

Map 2
Future Land Use


Gray Road & North Towne Road
Sewer Service Area Amendment
Future Land Use
Gray Road Subarea
North Towne Road Subarea
Singel Way
Juliana Ln
Rembrandt Rd
Low Countries Rd
Gray Rd
Glenwood Dr
Crestway Dr
Greenwood Dr
Dawn Dr
Parklawn Dr
Sequoia Dr
Curry Ln
North Towne Rd
US Highway 51
Windsor Rd
Massey Ln
Deere Xing
Firehouse Dr
North Towne Ct
Legend
Current Urban Service Area
Amendment Area
Village Future Land Use
Conservation Residential (up to 1 DU/AC
Traditional Single Family Residential (2 to 4 DU/AC)
Multi-Family Residential (up to 12 DU/AC)
Neighborhood Mixed Use (up to 12 DU/AC)
North Towne Road Mixed Use (up to 20 DU/AC)
Governmental and Institutional
Existing and Proposed Parks and Conservancies
N
0 100 200 400
Feet
6264 Nesbitt Road
Madison, WI 53719
(608) 273-3350
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Town & Country Engineering, Inc. makes no representation regarding the accuracy or completeness of this map and its underlying data. Any use or reuse of this map will be at your own risk and without liability or legal exposure to Town & Country Engineering, Inc. Not to be used for utility marking for purposes of Digger's Hotline.
Date: 11/6/2026
Path:J:\JOBS\Windsor\WIN-66-M2 Gray Rd and North Towne Rd Utility Extension\7. Drawings\GIS\Gray Road & North Towne Road Sewer Service Area Amendment.aprx

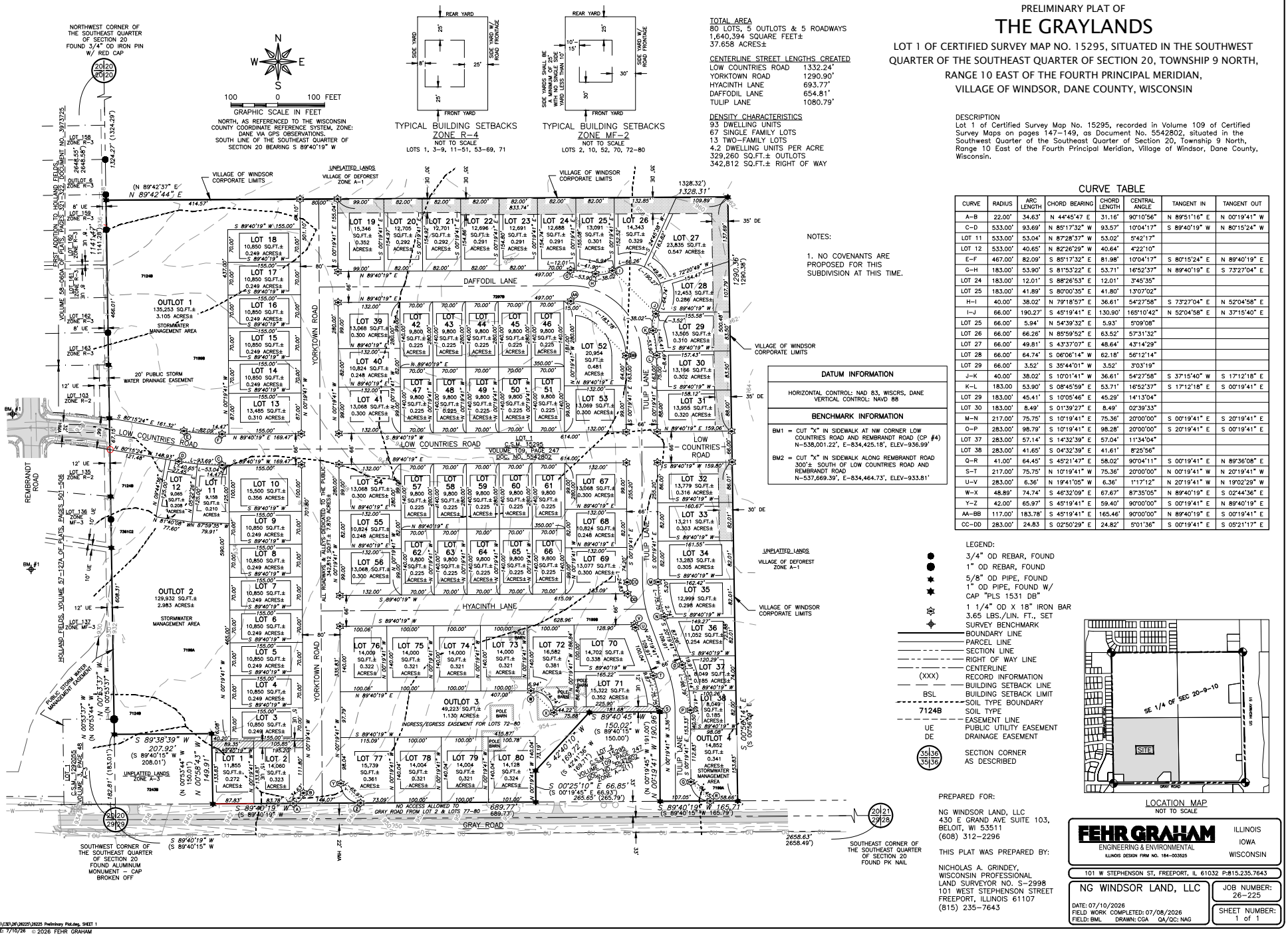
Map 3

The Graylands Preliminary Plat

PRELIMINARY PLAT OF

THE GRAYLANDS

LOT 1 OF CERTIFIED SURVEY MAP NO. 15295, SITUATED IN THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 20, TOWNSHIP 9 NORTH, RANGE 10 EAST OF THE FOURTH PRINCIPAL MERIDIAN, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN



TOTAL AREA
80 LOTS, 5 OUTLOTS & 5 ROADWAYS
1,640,394 SQUARE FEET±
37.658 ACRES±

CENTERLINE STREET LENGTHS CREATED

LOW COUNTRIES ROAD	1332.24'
YORKTOWN ROAD	1290.90'
HYACINTH LANE	693.77'
DAFFODIL LANE	654.81'
TULIP LANE	1080.79'

DENSITY CHARACTERISTICS
93 DWELLING UNITS
67 SINGLE FAMILY LOTS
13 TWO-FAMILY LOTS
4.2 DWELLING UNITS PER ACRE
329,260 SQ.FT.± OUTLOTS
342,812 SQ.FT.± RIGHT OF WAY

DESCRIPTION
Lot 1 of Certified Survey Map No. 15295, recorded in Volume 109 of Certified Survey Maps on pages 147-149, as Document No. 5542802, situated in the Southwest Quarter of the Southeast Quarter of Section 20, Township 9 North, Range 10 East of the Fourth Principal Meridian, Village of Windsor, Dane County, Wisconsin.

NOTES:

1. NO COVENANTS ARE PROPOSED FOR THIS SUBDIVISION AT THIS TIME.

DATUM INFORMATION
HORIZONTAL CONTROL: NAD 83, WISCRS, DANE VERTICAL CONTROL: NAVD 88
BENCHMARK INFORMATION
BM1 = CUT "X" IN SIDEWALK AT NW CORNER LOW COUNTRIES ROAD AND REMBRANDT ROAD (CP #4) N=538,001.22', E=834,425.18', ELEV=936.99'
BM2 = CUT "X" IN SIDEWALK ALONG REMBRANDT ROAD 300'± SOUTH OF LOW COUNTRIES ROAD AND REMBRANDT ROAD N=537,669.39', E=834,464.73', ELEV=933.81'

CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH	CENTRAL ANGLE	TANGENT IN	TANGENT OUT
A-B	22.00'	34.63'	N 44°45'47" E	31.16'	90°10'56"	N 89°51'16" E	N 00°19'41" W
C-D	533.00'	93.69'	N 85°17'32" W	93.57'	10°04'17"	S 89°40'19" W	N 80°15'24" W
LOT 11	533.00'	53.04'	N 87°28'37" W	53.02'	5°42'17"		
LOT 12	533.00'	40.65'	N 82°26'29" W	40.64'	4°22'10"		
E-F	467.00'	82.09'	S 85°17'32" E	81.98'	10°04'17"	N 80°15'24" E	N 89°40'19" E
G-H	183.00'	53.90'	S 81°53'22" E	53.71'	16°52'37"	N 89°40'19" E	S 73°27'04" E
LOT 24	183.00'	12.01'	S 88°26'53" E	12.01'	3°45'35"		
LOT 25	183.00'	41.89'	S 80°00'35" E	41.80'	13°07'02"		
H-I	40.00'	38.02'	N 79°18'57" E	36.61'	54°27'58"	S 73°27'04" E	N 52°04'58" E
I-J	66.00'	190.27'	S 45°19'41" E	130.90'	165°10'42"	N 52°04'58" E	N 37°15'40" E
LOT 25	66.00'	5.94'	N 54°39'32" E	5.93'	5°09'08"		
LOT 26	66.00'	66.26'	N 85°59'52" E	63.52'	57°31'32"		
LOT 27	66.00'	49.81'	S 43°37'07" E	48.64'	43°14'29"		
LOT 28	66.00'	64.74'	S 06°06'14" W	62.18'	56°12'14"		
LOT 29	66.00'	3.52'	S 35°44'01" W	3.52'	3°03'19"		
J-K	40.00'	38.02'	S 10°01'41" W	36.61'	54°27'58"	S 37°15'40" W	S 17°12'18" E
K-L	183.00	53.90'	S 08°45'59" E	53.71'	16°52'37"	S 17°12'18" E	S 00°19'41" E
LOT 29	183.00'	45.41'	S 10°05'46" E	45.29'	14°13'04"		
LOT 30	183.00'	8.49'	S 01°39'27" E	8.49'	02°39'33"		
M-N	217.00'	75.75'	S 10°19'41" E	75.36'	20°00'00"	S 00°19'41" E	S 20°19'41" E
O-P	283.00'	98.79'	S 10°19'41" E	98.28'	20°00'00"	S 20°19'41" E	S 00°19'41" E
LOT 37	283.00'	57.14'	S 14°32'39" E	57.04'	11°34'04"		
LOT 38	283.00'	41.65'	S 04°32'39" E	41.61'	8°25'56"		
Q-R	41.00'	64.45'	S 45°21'47" E	58.02'	90°04'11"	S 00°19'41" E	N 89°36'08" E
S-T	217.00'	75.75'	N 10°19'41" W	75.36'	20°00'00"	N 00°19'41" W	N 20°19'41" W
U-V	283.00'	6.36'	N 19°41'05" W	6.36'	1°17'12"	N 20°19'41" W	N 19°02'29" W
W-X	48.89'	74.74'	S 46°32'09" E	67.67'	87°35'05"	N 89°40'19" E	S 02°44'36" E
Y-Z	42.00'	65.97'	S 45°19'41" E	59.40'	90°00'00"	S 00°19'41" E	N 89°40'19" E
AA-BB	117.00'	183.78'	S 45°19'41" E	165.46'	90°00'00"	N 89°40'19" E	S 00°19'41" E
CC-DD	283.00'	24.83	S 02°50'29" E	24.82'	5°01'36"	S 00°19'41" E	S 05°21'17" E

LEGEND:
- 3/4" OD REBAR, FOUND
- 1" OD REBAR, FOUND
- 5/8" OD PIPE, FOUND
- 1" OD PIPE, FOUND W/ CAP "PLS 1531 DB"
- 1 1/4" OD X 18" IRON BAR
- 3.65 LBS./LIN. FT., SET
- SURVEY BENCHMARK
- BOUNDARY LINE
- PARCEL LINE
- SECTION LINE
- RIGHT OF WAY LINE
- CENTERLINE
- (XXX) RECORD INFORMATION
- BUILDING SETBACK LINE
- BSL BUILDING SETBACK LIMIT
- SOIL TYPE BOUNDARY
- 7124B SOIL TYPE
- EASEMENT LINE
- UE PUBLIC UTILITY EASEMENT
- DE DRAINAGE EASEMENT
- 35|36 / 35|36 SECTION CORNER AS DESCRIBED

LOCATION MAP
NOT TO SCALE

PREPARED FOR:

NG WINDSOR LAND, LLC
430 E GRAND AVE SUITE 103,
BELOIT, WI 53511
(608) 312-2296

THIS PLAT WAS PREPARED BY:

NICHOLAS A. GRINDEY,
WISCONSIN PROFESSIONAL
LAND SURVEYOR NO. S-2998
101 WEST STEPHENSON STREET
FREEPORT, ILLINOIS 61107
(815) 235-7643

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525
ILLINOIS IOWA WISCONSIN
101 W STEPHENSON ST, FREEPORT, IL 61032 P:815.235.7643

NG WINDSOR LAND, LLC

JOB NUMBER: 26-225

DATE: 07/10/2026
FIELD WORK COMPLETED: 07/08/2026
FIELD: BML DRAWN: CGA QA/QC: NAG

SHEET NUMBER: 1 of 1

M:\Drawings\CSD\26\26225\26225 Preliminary Plat.dwg, SHEET 1
PLOT DATE: 7/10/26 © 2026 FEHR GRAHAM

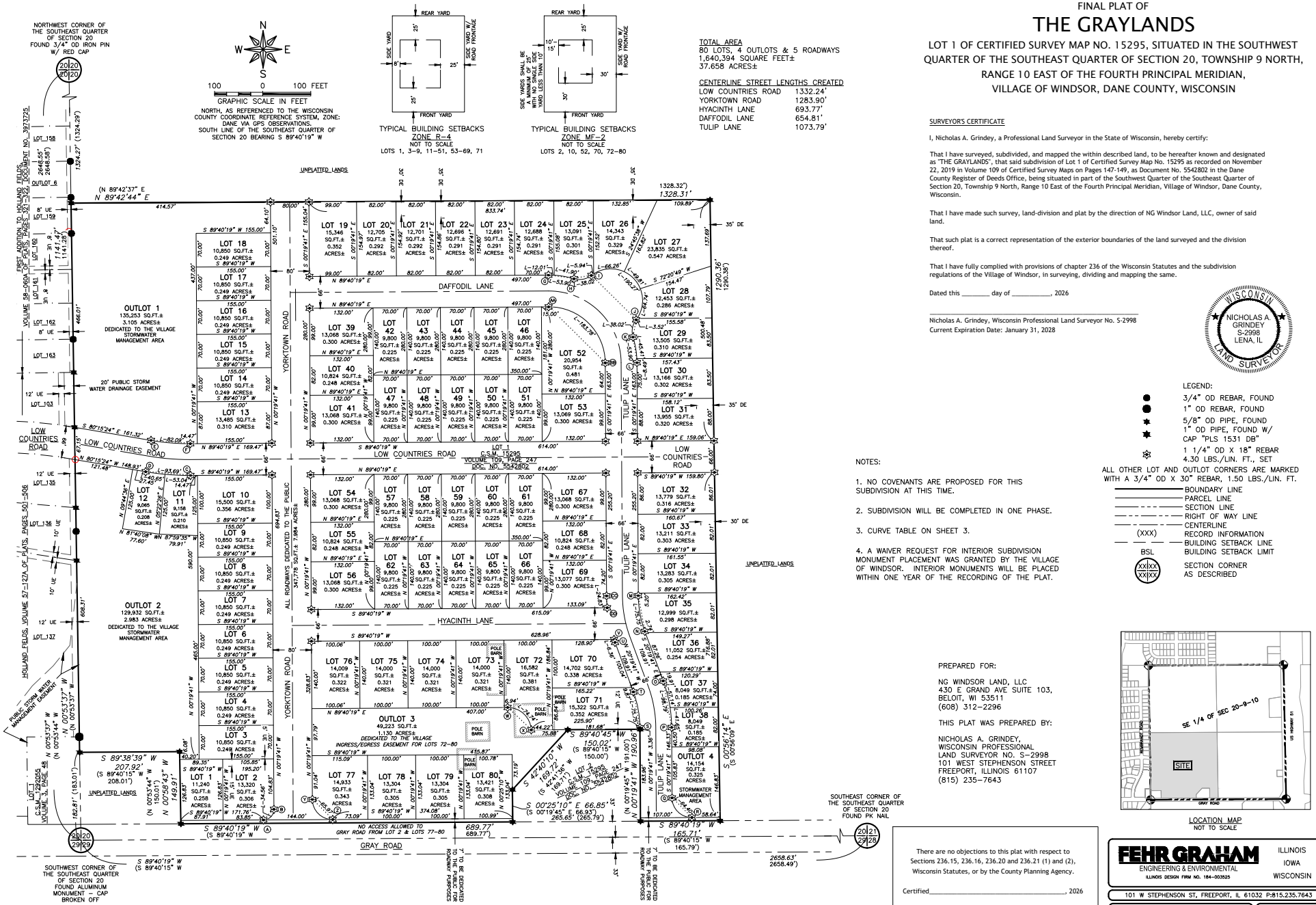
Map 4

The Graylands Final Plat

FINAL PLAT OF

THE GRAYLANDS

LOT 1 OF CERTIFIED SURVEY MAP NO. 15295, SITUATED IN THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 20, TOWNSHIP 9 NORTH, RANGE 10 EAST OF THE FOURTH PRINCIPAL MERIDIAN, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN



TOTAL AREA
80 LOTS, 4 OUTLOTS & 5 ROADWAYS
1,640,394 SQUARE FEET±
37.658 ACRES±

CENTERLINE STREET LENGTHS CREATED

LOW COUNTRIES ROAD	1332.24'
YORKTOWN ROAD	1283.90'
HYACINTH LANE	693.77'
DAFFODIL LANE	654.81'
TULIP LANE	1073.79'

SURVEYOR'S CERTIFICATE

I, Nicholas A. Grindey, a Professional Land Surveyor in the State of Wisconsin, hereby certify:

That I have surveyed, subdivided, and mapped the within described land, to be hereafter known and designated as "THE GRAYLANDS", that said subdivision of Lot 1 of Certified Survey Map No. 15295 as recorded on November 22, 2019 in Volume 109 of Certified Survey Maps on Pages 147-149, as Document No. 5542802 in the Dane County Register of Deeds Office, being situated in part of the Southwest Quarter of the Southeast Quarter of Section 20, Township 9 North, Range 10 East of the Fourth Principal Meridian, Village of Windsor, Dane County, Wisconsin.

That I have made such survey, land-division and plat by the direction of NG Windsor Land, LLC, owner of said land.

That such plat is a correct representation of the exterior boundaries of the land surveyed and the division thereof.

That I have fully complied with provisions of chapter 236 of the Wisconsin Statutes and the subdivision regulations of the Village of Windsor, in surveying, dividing and mapping the same.

Dated this _____ day of _____, 2026

_____
Nicholas A. Grindey, Wisconsin Professional Land Surveyor No. S-2998
Current Expiration Date: January 31, 2028

WISCONSIN NICHOLAS A. GRINDEY S-2998 LENA, IL LAND SURVEYOR

NOTES:

1. NO COVENANTS ARE PROPOSED FOR THIS SUBDIVISION AT THIS TIME.

2. SUBDIVISION WILL BE COMPLETED IN ONE PHASE.

3. CURVE TABLE ON SHEET 3.

4. A WAIVER REQUEST FOR INTERIOR SUBDIVISION MONUMENT PLACEMENT WAS GRANTED BY THE VILLAGE OF WINDSOR. INTERIOR MONUMENTS WILL BE PLACED WITHIN ONE YEAR OF THE RECORDING OF THE PLAT.

LEGEND:

- 3/4" OD REBAR, FOUND
- 1" OD REBAR, FOUND
- 5/8" OD PIPE, FOUND
- 1" OD PIPE, FOUND W/ CAP "PLS 1531 DB"
- 1 1/4" OD X 18" REBAR 4.30 LBS./LIN. FT., SET

ALL OTHER LOT AND OUTLOT CORNERS ARE MARKED WITH A 3/4" OD X 30" REBAR, 1.50 LBS./LIN. FT.

- BOUNDARY LINE
- PARCEL LINE
- SECTION LINE
- RIGHT OF WAY LINE
- CENTERLINE
- (XXX) RECORD INFORMATION
- BSL BUILDING SETBACK LINE / BUILDING SETBACK LIMIT
- XXXX XXXX SECTION CORNER AS DESCRIBED

PREPARED FOR:

NG WINDSOR LAND, LLC
430 E GRAND AVE SUITE 103,
BELOIT, WI 53511
(608) 312-2296

THIS PLAT WAS PREPARED BY:

NICHOLAS A. GRINDEY,
WISCONSIN PROFESSIONAL
LAND SURVEYOR NO. S-2998
101 WEST STEPHENSON STREET
FREEPORT, ILLINOIS 61107
(815) 235-7643

LOCATION MAP
NOT TO SCALE

There are no objections to this plat with respect to Sections 236.15, 236.16, 236.20 and 236.21 (1) and (2), Wisconsin Statutes, or by the County Planning Agency.

Certified_____, 2026

Department of Administration

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525
ILLINOIS IOWA WISCONSIN
101 W STEPHENSON ST, FREEPORT, IL 61032 P:815.235.7643

NG WINDSOR LAND, LLC

DATE: 10/01/2026
FIELD WORK COMPLETED: 07/08/2026
FIELD: BML DRAWN: CGA QA/QC: NAG

JOB NUMBER: 26-225

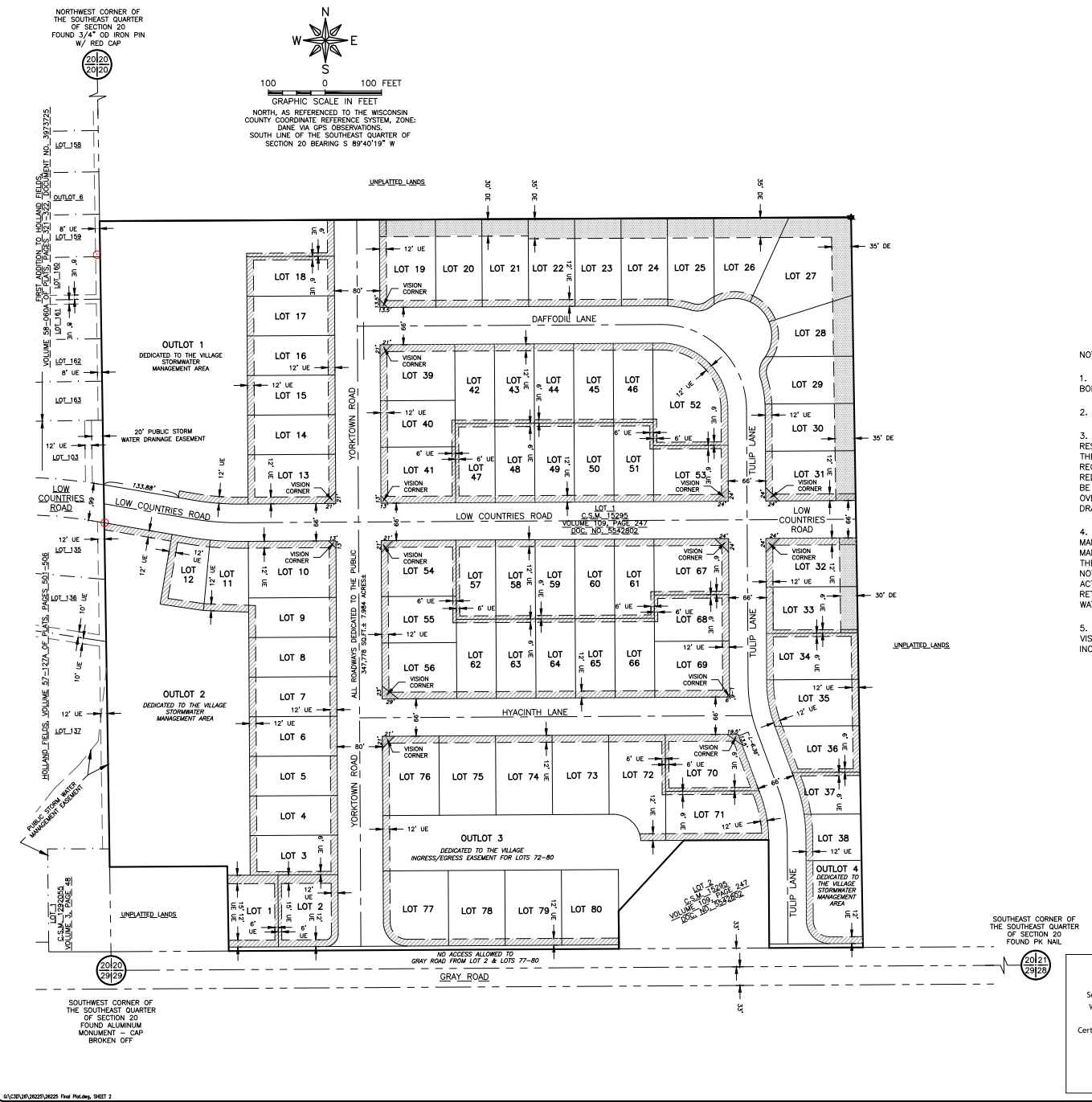
SHEET NUMBER: 1 of 3

G:\JOB\26\26225\Final Plat.dwg, SHEET 1
PLOT DATE: 10/1/26 © 2026 FEHR GRAHAM

FINAL PLAT OF

THE GRAYLANDS

LOT 1 OF CERTIFIED SURVEY MAP NO. 15295, SITUATED IN THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 20, TOWNSHIP 9 NORTH, RANGE 10 EAST OF THE FOURTH PRINCIPAL MERIDIAN, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN



NOTES:

1. PUBLIC UTILITY EASEMENTS AS SET FORTH ARE FOR THE USE OF PUBLIC BODIES AND PUBLIC UTILITIES HAVING RIGHTS TO SERVE THE PLATTED AREA.

2. A 6 FOOT DRAINAGE EASEMENT SHALL RUN ALONG EACH SIDE YARD.

3. MAINTENANCE OF THE DRAINAGE EASEMENTS SHALL BE THE SOLE RESPONSIBILITY OF THE INDIVIDUAL PROPERTY OWNER. THE FINISHED GRADE OF THE EASEMENTS SHALL NOT BE ALTERED OR ENCROACHED UPON BY FILLING, REGRADING OR CONSTRUCTION OF SURFACE IMPROVEMENTS THAT OBSTRUCT OR REDIRECT THE FLOW OF WATER NOR SHALL ANY BUILDINGS OR STRUCTURES BE ERECTED WITHIN THE EASEMENTS. PUBLIC UTILITY EASEMENTS THAT OVERLAP THE DRAINAGE EASEMENTS SHALL NOT INTERFERE WITH THE INTENDED DRAINAGE FUNCTION.

4. OUTLOTS 1, 2, AND 3 ARE TO BE DEVELOPED WITH SURFACE WATER MANAGEMENT FACILITIES AND SHALL BE PRIVATELY CONSTRUCTED AND MAINTAINED BY THE VILLAGE OF WINDSOR. CURRENT AND FUTURE OWNERS OF THE PROPERTY IN THE AREA SURROUNDING SAID FACILITY ARE HEREBY NOTIFIED THAT CERTAIN ENVIRONMENTAL CONDITIONS INHERENT IN SUCH ACTIVITIES MAY EVOLVE IN THE AREA AS A RESULT OF SURFACE WATER RETENTION OR DETENTION INCLUDING, BUT NOT LIMITED TO, PRESENCE OF WATER DEPENDENT PLANTS, ANIMALS AND INSECTS.

5. NO STRUCTURE OR IMPROVEMENT OF ANY KIND IS PERMITTED WITHIN THE VISION CORNER. NO VEGETATION WITHIN THE VISION CORNER MAY EXCEED 30 INCHES IN HEIGHT.

LEGEND:

- - - - - - - -	EASEMENT LINE
UE	PUBLIC UTILITY EASEMENT
DE	DRAINAGE EASEMENT

There are no objections to this plat with respect to Sections 236.15, 236.16, 236.20 and 236.21 (1) and (2), Wisconsin Statutes, or by the County Planning Agency.

Certified_____, 2026

Department of Administration

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525
ILLINOIS IOWA WISCONSIN
101 W STEPHENSON ST, FREEPORT, IL 61032 P:815.235.7643

NG WINDSOR LAND, LLC

JOB NUMBER: 26-225

DATE: 10/01/2026
FIELD WORK COMPLETED: 07/08/2026
FIELD: BML DRAWN: CGA QA/QC: NAG

SHEET NUMBER: 2 of 3

G:\C3D\26\26225\26225 Final Plat.dwg, SHEET 2
PLOT DATE: 10/7/26 © 2026 FEHR GRAHAM

FINAL PLAT OF

THE GRAYLANDS

LOT 1 OF CERTIFIED SURVEY MAP NO. 15295, SITUATED IN THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 20, TOWNSHIP 9 NORTH, RANGE 10 EAST OF THE FOURTH PRINCIPAL MERIDIAN, VILLAGE OF WINDSOR, DANE COUNTY, WISCONSIN

CORPORATE OWNERS CERTIFICATE

NG Windsor Land, LLC, a corporation duly organized and existing under and by virtue of the laws of the State of Wisconsin, as Owner of the land described in the foregoing description, does hereby certify that said corporation caused the land described on this map to be surveyed, divided, mapped and dedicated as represented on the map.

NG Windsor Land, LLC does further certify that this map is required by Sections 236.10 and 236.12 of the Wisconsin Statues to be submitted to the following for approval or objection: Village of Windsor, Department of Administration.

IN WITNESS WHEREOF, NG Windsor Land, LLC has caused these presents to be signed by Zach Knutson, its

Member, this _____ day of _____, 2026.

_____
Zach Knutson, Member

Personally came before me, this _____ day of _____, 2026,

Zach Knutson and of the above-named corporation, to me known to be the person(s) who executed the foregoing certificate, and to me know to be such Member of said limited liability company and acknowledged that they executed the foregoing certificate as such officers as the deed of such corporation, by its authority.

_____

Notary Public,_____ County, Wisconsin

My Commission Expires _____

VILLAGE BOARD RESOLUTION VILLAGE OF WINDSOR

I, John Moe, do hereby certify that I am the duly appointed, qualified and acting Village Clerk of the Village of Windsor, and that this plat was approved by the Village Board of the Village fo Windsor, Dane County, Wisconsin and furthermore certify that the conditions of said approval were fulfilled on the _____ day of _____ _____, 2026, affecting the lands in the plat of THE GRAYLANDS.

_____
John Moe
Village Clerk
Village of Windsor

VILLAGE TREASURER'S CERTIFICATE

I, Sindy Schween, being the duly elected, qualified and acting Treasurer of the Village of Windsor, do hereby certify that the records in my office show no unredeemed tax sales and no unpaid taxes or special assessments as of this _____ day of _____, 2026, affecting the lands in the plat of THE GRAYLANDS.

_____
Sindy Schween
Village Treasurer
Village of Windsor

VILLAGE PLAN COMMISSION CERTIFICATE

I, being the duly elected, qualified and acting Clerk of the Village of Windsor, do hereby certify that the records in my office show no unredeemed tax sales and no unpaid taxes or special assessments as of the of this _____ day of _____, 2026, affecting the lands in the plat of THE GRAYLANDS.

_____
Jamie Rybarczyk
Community Development Director
Village of Windsor

DANE COUNTY TREASURER'S CERTIFICATE

I, Adam Gallagher, being the duly appointed, qualified and acting Treasurer of the County of Dane, do hereby certify that the records in my office show no unredeemed tax sales and no unpaid taxes or special assessments as of this _____ day of _____, 2026, affecting the lands in the plat of THE GRAYLANDS.

_____
Adam Gallagher, Dane County Treasurer

RECORDING DATA

RECEIVED FOR RECORD THIS _____ DAY OF _____ A.D. 2026 AT _____ O'CLOCK __.M. AND RECORDED IN VOLUME _____OF PLATS ON PAGES _____ , DOCUMENT NO. _____.

_____
REGISTER OF DEEDS

CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH	CENTRAL ANGLE	TANGENT IN	TANGENT OUT
A–B	22.00'	34.56'	N 44°40'19 E	31.11'	90°00'00"	N 89°40'19" E	N 00°19'41" W
C–D	533.00'	93.69'	N 85°17'32" W	93.57'	10°04'17"	S 89°40'19" W	N 80°15'24" W
LOT 11	533.00'	53.04'	N 87°28'37" W	53.02'	5°42'17"		
LOT 12	533.00'	40.65'	N 82°26'29" W	40.64'	4°22'10"		
E–F	467.00'	82.09'	S 85°17'32" E	81.98'	10°04'17"	S 80°15'24" E	N 89°40'19" E
G–H	183.00'	53.90'	S 81°53'22" E	53.71'	16°52'37"	N 89°40'19" E	S 73°27'04" E
LOT 24	183.00'	12.01'	S 88°26'53" E	12.01'	3°45'35"		
LOT 25	183.00'	41.89'	S 80°00'35" E	41.80'	13°07'02"		
H–I	40.00'	38.02'	N 79°18'57" E	36.61'	54°27'58"	S 73°27'04" E	N 52°04'58" E
I–J	66.00'	190.27'	S 45°19'41" E	130.90'	165°10'42"	N 52°04'58" E	N 37°15'40" E
LOT 25	66.00'	5.94'	N 54°39'32" E	5.93'	5°09'08"		
LOT 26	66.00'	66.26'	N 85°59'52" E	63.52'	57°31'32"		
LOT 27	66.00'	49.81'	S 43°37'07" E	48.64'	43°14'29"		
LOT 28	66.00'	64.74'	S 06°06'14" W	62.18'	56°12'14"		
LOT 29	66.00'	3.52'	S 35°44'01" W	3.52'	3°03'19"		
J–K	40.00'	38.02'	S 10°01'41" W	36.61'	54°27'58"	S 37°15'40" W	S 17°12'18" E
K–L	183.00	53.90'	S 08°45'59" E	53.71'	16°52'37"	S 17°12'18" E	S 00°19'41" E
LOT 29	183.00'	45.41'	S 10°05'46" E	45.29'	14°13'04"		
LOT 30	183.00'	8.49'	S 01°39'27" E	8.49'	02°39'33"		
M–N	217.00'	75.75'	S 10°19'41" E	75.36'	20°00'00"	S 00°19'41" E	S 20°19'41" E
O–P	283.00'	98.79'	S 10°19'41" E	98.28'	20°00'00"	S 20°19'41" E	S 00°19'41" E
LOT 37	283.00'	57.14'	S 14°32'39" E	57.04'	11°34'04"		
LOT 38	283.00'	41.65'	S 04°32'39" E	41.61'	8°25'56"		
Q–R	41.00'	64.40'	S 45°19'41" E	57.98'	90°00'00"	S 00°19'41" E	N 89°40'19" E
S–T	217.00'	75.75'	N 10°19'41" W	75.36'	20°00'00"	N 00°19'41" W	N 20°19'41" W
U–V	283.00'	6.36'	N 19°41'05" W	6.36'	1°17'12"	N 20°19'41" W	N 19°02'29" W
W–X	48.89'	74.74'	S 46°32'09" E	67.67'	87°35'05"	N 89°40'19" E	S 02°44'36" E
Y–Z	42.00'	65.97'	S 45°19'41" E	59.40'	90°00'00"	S 00°19'41" E	N 89°40'19" E
AA–BB	117.00'	183.78'	S 45°19'41" E	165.46'	90°00'00"	N 89°40'19" E	S 00°19'41" E
CC–DD	283.00'	24.83	S 02°50'29" E	24.82'	5°01'36"	S 00°19'41" E	S 05°21'17" E

There are no objections to this plat with respect to Sections 236.15, 236.16, 236.20 and 236.21 (1) and (2), Wisconsin Statutes, or by the County Planning Agency.

Certified_____, 2026

Department of Administration

WISCONSIN
NICHOLAS A. GRINDEY
S-2998
LENA, IL
LAND SURVEYOR

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525
ILLINOIS
IOWA
WISCONSIN
101 W STEPHENSON ST, FREEPORT, IL 61032 P:815.235.7643

NG WINDSOR LAND, LLC

DATE: 10/01/2026
FIELD WORK COMPLETED: 07/08/2026
FIELD: BML DRAWN: CGA QA/QC: NAG

JOB NUMBER: 26-225

SHEET NUMBER: 3 of 3

G:\C3D\26\26225\26225 Final Plat.dwg, SHEET 3
PLOT DATE: 10/7/26 © 2026 FEHR GRAHAM

Exhibit 3

CARPC Memorandum Environmental Conditions Review

CAPITAL AREA RPC
100 State St, Ste 400, Madison, WI 53703-2573

ph: 608.474.6017
info@capitalarearpc.org

Memorandum

DATE: January 20, 2026

TO: Jamie Rybarczyk, Community Development Director/Deputy Administrator
Village of Windsor

FROM: Melissa Michaud, Environmental Resources Planner
Nick Bower, Sr Environmental Engineer

SUBJECT: Village of Windsor – Karow Property & Quest Building Corp
Environmental Conditions Review

Background

The Village has requested a preliminary review of Environmental Corridors (EC) for two subareas which the Village is considering as future growth areas which would necessitate an amendment to the Northern Urban Service Area (USA). The Karow Property (northern subarea) is approximately 38 acres and located north of Gray Road, and the Quest Building Corp (southern subarea) is approximately 40 acres and located south of Gray road. This technical memo includes the results of a site analysis for elements required or recommended for inclusion in the environmental corridor for this analysis area, if brought into the USA.

Preliminary mapping of these future environmental corridors (referred to as Estimated Environmental Corridors for those areas *generally required* for inclusion in EC if brought into the USA, and Voluntary Environmental Corridors for those areas *recommended* for inclusion) is available on the CARPC Open Data Portal (see mapping here). Additional information on all elements and benefits is discussed in more detail within the Environmental Corridors Report (last updated 2025).

Environmental Corridor Elements

The following elements have been identified in the project area and are described below. **Figure 1** shows mapping of these areas based on best available data at this time.

Estimated Environmental Corridor

These are preliminary estimates of lands that would be required to be designated as Environmental Corridor if brought into an urban service area. Future evaluation through aerial

review, field visits by subject matter experts, survey data, permitting, or updated mapping could impact environmental corridor mapping in the analysis area.

Streams

An unnamed intermittent tributary to the Yahara River is mapped within the southern subarea. Buffer requirements differ depending on whether a waterbody is navigable based on WDNR determination and if it has recreational access. Along navigable streams, a buffer strip with a minimum width of 75 feet, ideally comprised of native vegetation suitable to the conditions, must be provided to the landward side of the ordinary high water mark (OHWM). For non-navigable waterways, a 25-foot shoreland buffer on each side of the waterway from the top of bank or OHWM, for a 75-foot minimum total width, is required as environmental corridor. Only the DNR can make an official navigability determination (see handout for more details); however, based on a review of aerial imagery from the past 20 years (Dane County GIS imagery, DCiMap), it is our opinion that this watercourse is likely non-navigable.

Note: The EC mapping to the east of the southern subarea (outside of the current and proposed USA) has a total corridor width of 100 feet, centered on the intermittent stream. This is standard protocol for such 'future' environmental corridor areas as the accuracy of underlying data for these areas is generally less certain. Refer to the Environmental Corridors Report for additional detail.

Note: The existing Environmental Corridor mapping to the west was established in 2020 based on the intermittent stream with a 75-foot buffer and planned stormwater pond. It was last updated in 2023 to reflect a wetland delineation (see below).

Wetlands

Two Wisconsin Wetland Inventory (WWI) wetlands are mapped within the southern subarea, corresponding with two recent wetland delineations conducted by Taylor Conservation, LLC (an assured wetland delineator). In 2022, a wetland delineation (link to report) was conducted east/south of North Towne Road. This site investigation and field delineation determined that there were two fresh (wet) meadow wetlands. In 2023, a wetland delineation (link to report) was conducted along the unnamed intermittent stream. The site investigation and field delineation determined that there was one fresh (wet) meadow wetland present. Wetlands under WDNR jurisdiction and a minimum 75-foot vegetated buffer are required as environmental corridor. Wetland delineations are considered 'current' if within five (5) years; beyond this time, new delineations would be required to confirm extents. There are no apparent wetlands within the northern subarea.

Riparian Steep Slopes

Steep slopes are those having a 12% or greater gradient in the glaciated portions of the county; or having a 20% or greater gradient in the driftless portion of the county. Riparian slopes are those along a water body or wetland which commences within 75 feet of the water

body or wetland, extending outward until the point at which the slope naturally terminates or which the natural flow of runoff no longer contributes directly to the water body or wetland. Based on Dane County LiDAR contour information, riparian steep slopes exist along the unnamed intermittent stream in the analysis area and are required as environmental corridor. The extents of this mapping may be adjusted based on future topographical surveys completed within the project area.

Voluntary Environmental Corridor

These are lands that provide important benefits to the region but do not have legal protection from development or disturbance, such as old-growth woodlands, and are recommended for voluntary inclusion in Environmental Corridors. These resources support wildlife habitat, groundwater recharge, and slope stability. They also contribute to climate change mitigation, reduce flood risks, reduce rainwater runoff, filter pollutants, enhance scenic beauty, and shape urban form. Within the analysis area, the following resource types exist and are recommended for inclusion in Environmental Corridor.

Potentially Restorable Wetlands

Potentially restorable wetlands (PRW) are areas that are not currently mapped as wetland, but where soil and water pooling data indicate wetland restoration may be possible. Restored wetlands have the potential to provide a myriad of benefits for habitat, water quality, groundwater recharge, and climate change mitigation. The areas of PRW within the analysis area generally correspond to natural drainage patterns.

Conclusions

The mapping being provided is based on best available information at this time. The final areas of mapped Environmental Corridor will be evaluated at the time of USA amendment application or as new information becomes available in the future, in accordance with the adopted Policies and Criteria for Environmental Corridors. Please contact the following CARPC staff to discuss questions or opportunities for enhanced protection of these valuable resources.

Melissa Michaud, Env Resource Planner
608-474-6020
melissam@capitalarearpc.org

Nick Bower, Sr Env Engineer
608-474-6019
nickb@capitalarearpc.org

Attachments:

1) Figure 1. CARPC Environmental Conditions Review
2) Figure 2. Wetland Delineation Map (6763 Hwy 51, 2022)
3) Figure 3. Wetland Delineation Map (Gray Road, 2023)

Figure 1. CARPC Environmental Conditions Review

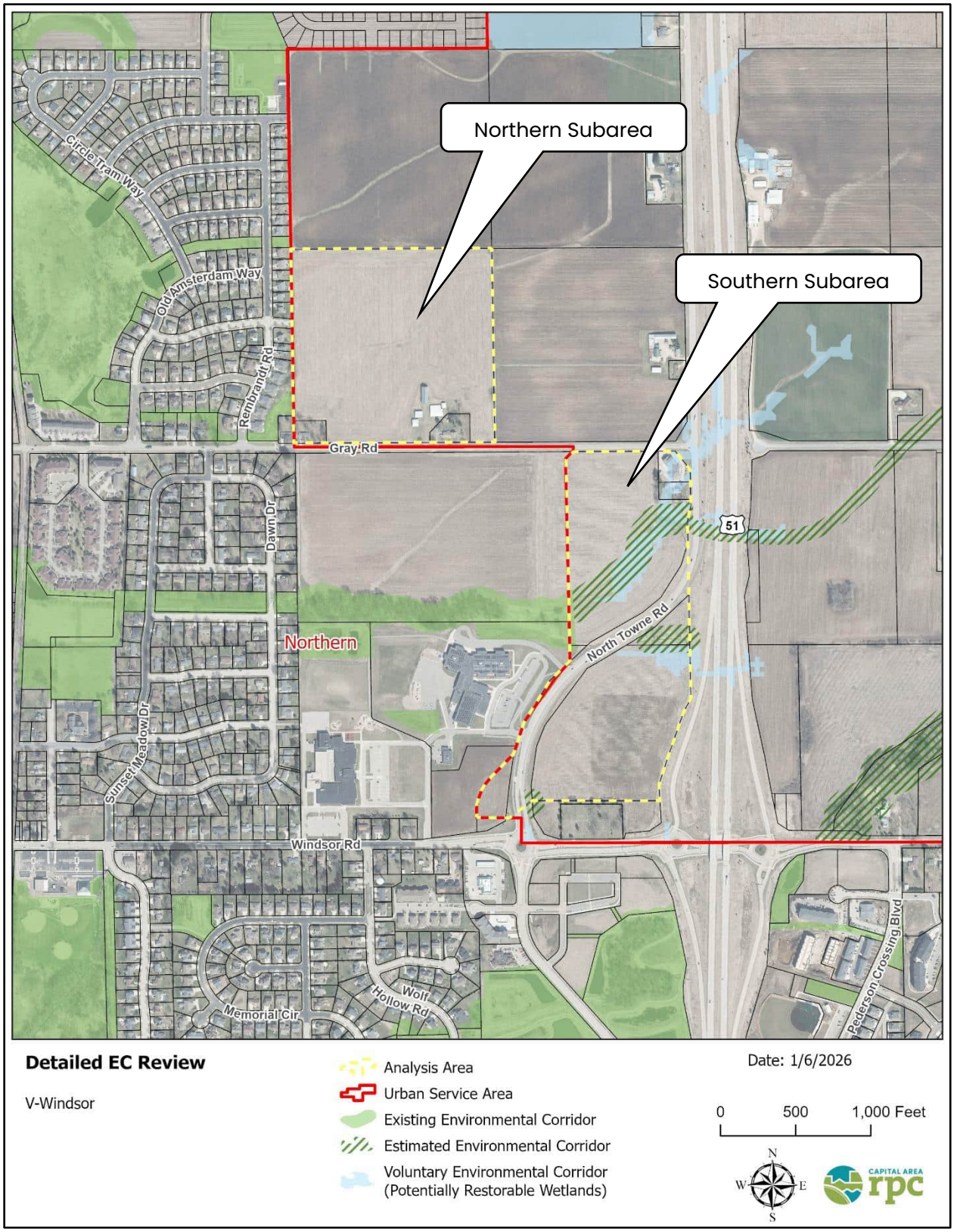
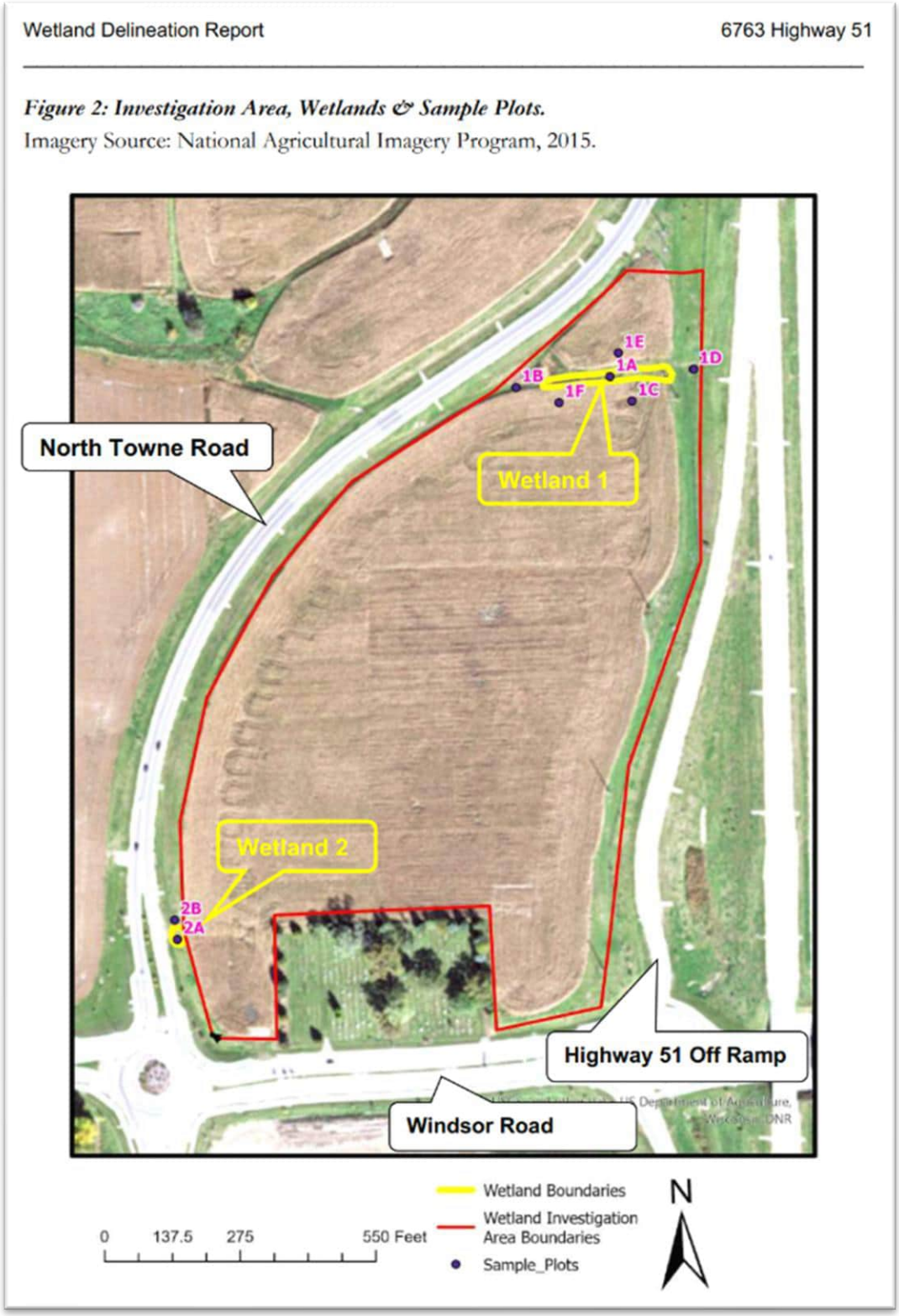


Figure 2. Wetland Delineation Map (6763 Hwy 51, 2022)



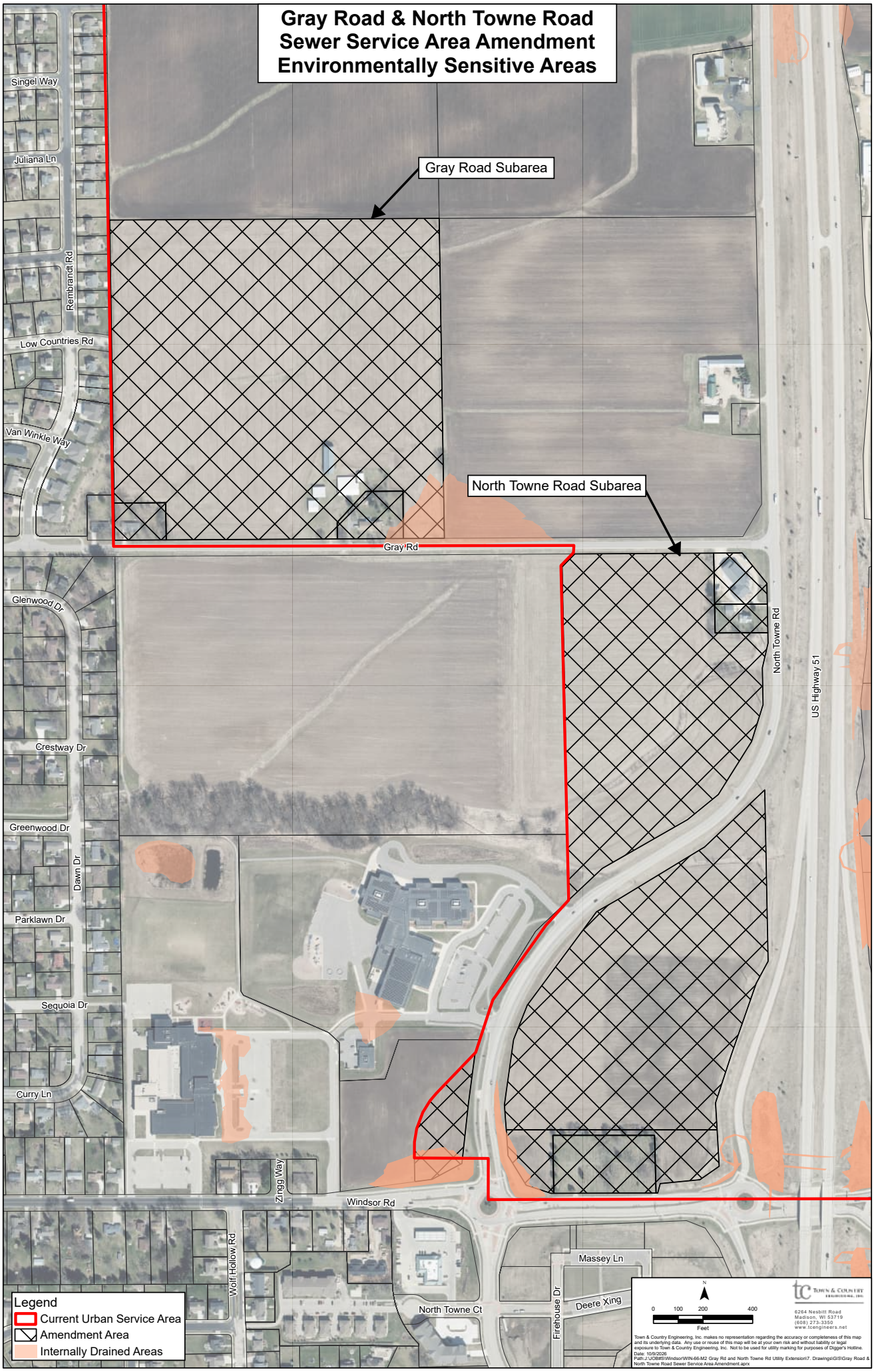
Source: Taylor Conservancy LLC

Figure 3. Wetland Delineation Map (Gray Road, 2023)



Source: Taylor Conservancy LLC

Map 5
Environmentally Sensitive Areas


Gray Road & North Towne Road
Sewer Service Area Amendment
Environmentally Sensitive Areas
Gray Road Subarea
North Towne Road Subarea
Singel Way
Juliana Ln
Rembrandt Rd
Low Countries Rd
Van Winkle Way
Gray Rd
Glenwood Dr
Crestway Dr
Greenwood Dr
Dawn Dr
Parklawn Dr
Sequoia Dr
Curry Ln
North Towne Rd
US Highway 51
Zingg Way
Windsor Rd
Wolf Hollow Rd
Massey Ln
Deere Xing
Firehouse Dr
North Towne Ct
Legend
Current Urban Service Area
Amendment Area
Internally Drained Areas
N
0 100 200 400
Feet
Town & Country Engineering, Inc.
6264 Nesbitt Road
Madison, WI 53719
(608) 273-3350
www.tcengineers.net
Town & Country Engineering, Inc. makes no representation regarding the accuracy or completeness of this map and its underlying data. Any use or reuse of this map will be at your own risk and without liability or legal exposure to Town & Country Engineering, Inc. Not to be used for utility marking for purposes of Digger's Hotline.
Date: 10/9/2026
Path:J:\JOBS\Windsor\WIN-66-M2 Gray Rd and North Towne Rd Utility Extension\7. Drawings\GIS\Gray Road & North Towne Road Sewer Service Area Amendment.aprx

Map 6
Proposed Environmental Corridors

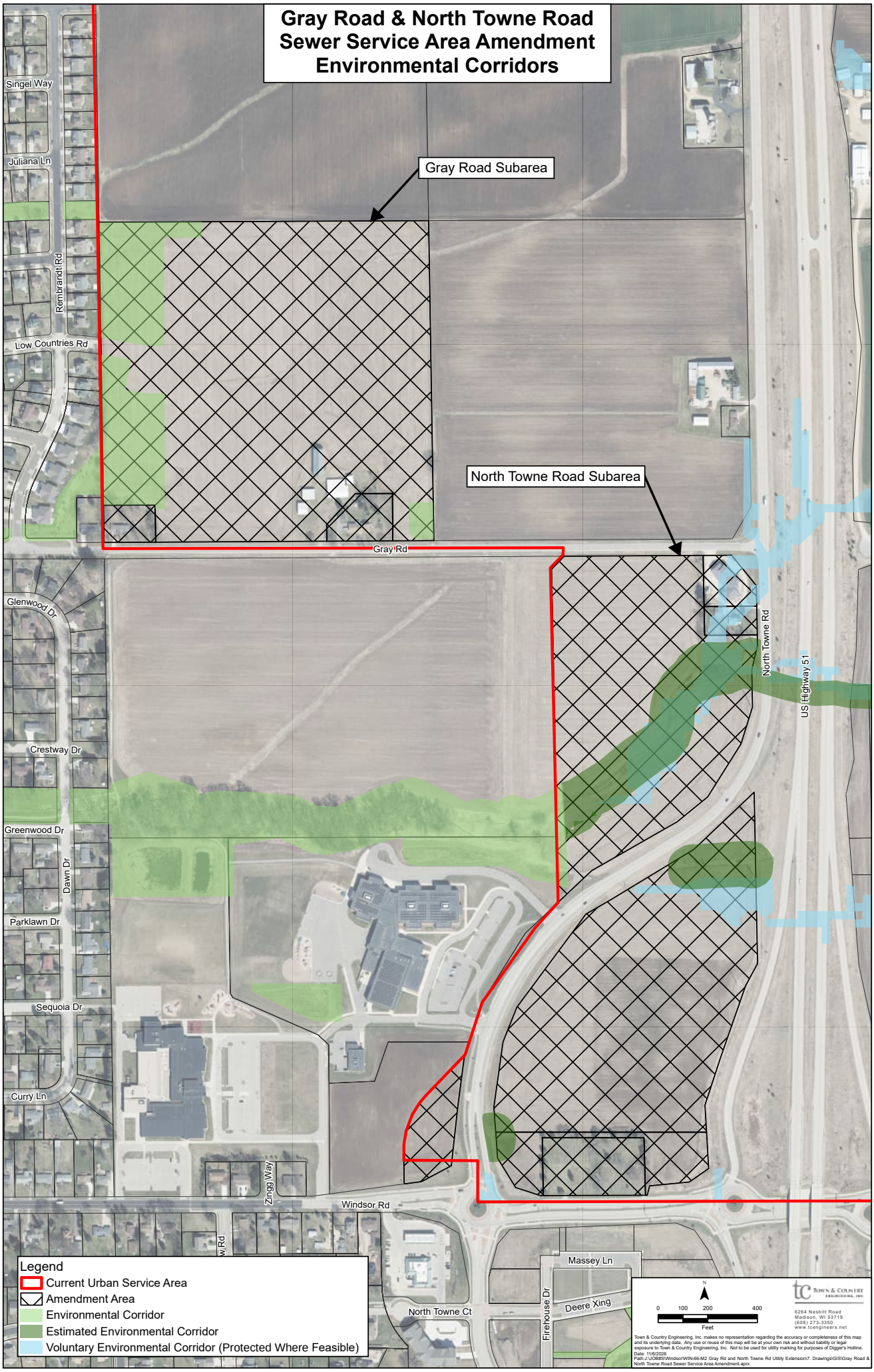

Gray Road & North Towne Road
Sewer Service Area Amendment
Environmental Corridors
Gray Road Subarea
North Towne Road Subarea
Singel Way
Juliana Ln
Rembrandt Rd
Low Countries Rd
Gray Rd
Glenwood Dr
Crestway Dr
Greenwood Dr
Dawn Dr
Parklawn Dr
Sequoia Dr
Curry Ln
North Towne Rd
US Highway 51
Zingg Way
Windsor Rd
Massey Ln
Deere Xing
Firehouse Dr
North Towne Ct
Legend
Current Urban Service Area
Amendment Area
Environmental Corridor
Estimated Environmental Corridor
Voluntary Environmental Corridor (Protected Where Feasible)
N
0 100 200 400
Feet
6264 Nesbitt Road
Madison, WI 53719
(608) 273-3350
www.tcengineers.net
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Date: 11/6/2026
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Exhibit 4

Town & Country Engineering, Inc Municipal Service Evaluation Analysis

MUNICIPAL SERVICE EVALUATION

GRAY ROAD AREA

VILLAGE OF WINDSOR

October 2026

1 Introduction

The purpose of this evaluation is to determine the ability of the Village of Windsor's to provide municipal water and sewer service to potential areas of new development. The areas under consideration for this study are shown on Map 1. These areas are a mix of future expected land uses and those land uses. Many of these areas are under consideration for near-term development. If development is to be pursued on these parcels, a formal amendment to the Village's urban service area will be required.

2 Sanitary Sewer Service

The Windsor Sewer Utility provides municipal sanitary sewer service for the Village of Windsor. The Village sends sewage to the Madison Metropolitan Sewerage District (MMSD) for treatment. For billing purposes, MMSD monitors wastewater flows at various points throughout the Village system on a quarterly basis. These monitoring points are strategic and the flow to these points can divide the Village system into tributary basins. These existing basins and monitoring points are shown on Map 1.

An analysis of the ability of the existing system to provide the areas under consideration with gravity flow sanitary sewer service has been conducted. Existing sewer elevations have been compared to future minimum pipe slopes and existing ground elevation data. The result is preliminary sewer alignments through the new development areas, which are shown on the map. These alignments are shown at locations that fit with the existing ground surface elevation data. They may be significantly altered as development plans become finalized.

MMSD has produced a planning document entitled the "2018 Collection System Evaluation" which projects future flows and sanitary basins for sewerage flowing to the District. The preliminary sewer alignments through these new development parcels is consistent with the District's planning documents. Additionally, the future wastewater flows from these basins have been estimated using peaking factor and water usage data from that planning report.

Table 1 summarizes the existing and projected sanitary flows. The peak flow rates within all of the areas under consideration can be accommodated by the Village's existing gravity sewer system. The approximate maximum flow that can be accommodated in an 8-inch PVC sanitary sewer installed at minimum grade (0.4%) is 0.90cfs or 581,000 gpd. The approximate maximum flow that can be accommodated in a 10-inch PVC sanitary sewer installed at minimum grade (0.28%) is 1.37cfs or 885,000 gpd. The projected peak flow rates from Q-142 and Q-122 fall below these limits.

The flow rates projected if all of Q-097 is developed are above this 0.90cfs limit for 8-inch sewer. If the DeForest Area School District does not develop or sell their farm field to a developer, the flow rates would be less than the 0.90cfs and an easement would be required to develop the parcel east of theirs which there is no guaranty the District will allow. If development were to occur within all of the basin, it would be recommended to monitor flows at strategic downstream locations as development occurs and to evaluate the existing size and grades of the receiving sewers to properly assess actual capacity limits.

Table 1: Estimated Wastewater Flows

Future/Existing Service Area	Total Area (ac)	Number of Units	Population	Average Daily Flow Rate (gpd)	Peak Flow Rate (gpd)	Peak Flow Rate (mgd)	Peak Flow Rate (gpm)
Environmental Corridor/Parks	10	-	-	-	-	-	-
Mixed or Flexed Commercial/Residential[7]	4.0	48	125	7,016	26,660	0.027	19
Moderate Density Residential[7]	18.4	221	578	32,342	122,901	0.123	85
Low Density Residential[7]	84.7	21	55	39,484	150,039	0.150	104
Sub-Totals From Deforest=				78,842	299,599	0.300	208
Traditional Single-Family Residential	40.0	160	418	23,386	88,865	0.089	62
Existing Flow to Q-142	-	-	-	39,484	150,039	0.150	104
Sub-Totals From Windsor=				62,870	238,904	0.239	166
Total Flow to Q-142=	**40.0**	**160**	**418**	**141,712**	**538,504**	**0.539**	**374**
Traditional Single-Family Residential	46.8	187	489	27,361	103,972	0.104	72
Neighborhood Mixed Use	16.3	325	848	47,502	180,508	0.181	125
Existing Flow to Q-097	-	-	-	103,311	392,583	0.393	273
Total Flow to Q-097=	**63.1**	**512**	**1,337**	**178,174**	**677,063**	**0.677**	**470**
Traditional Single-Family Residential	-	-	-	-	-	-	-
Neighborhood Mixed Use	23.0	459	1199	67,117	255,043	0.255	177
Existing Flow to Q-122	-	-	-	181,381	689,248	0.689	479
Total Flow to Q-122=	**23.0**	**459**	**1,199**	**248,498**	**944,291**	**0.944**	**656**

Assumptions:

Occupancy Density[1]	2.61	persons/housing unit
Individual Residential Usage[2]	56	gpd/person
Wastewater Peaking Factor[3]	3.8	

Notes:

1. Average household size according to 2020 census.

2. This value matches the per capita water use value for Village of Windsor from the 2018 MMSD Collection System Evaluation. Actual PSC data from 2017 to 2022 indicates an average per capita water usage of 44 gpd/person.

3. Peaking Factor used in 2018 MMSD Collection System Evaluation for the receiving MMSD interceptor segments.

4. According to Comprehensive Plan, average density in Traditional Single Family residential should be 2-4 units per acre. Average density for these calculations is assumed to be 4 units per acre.

5. According to Comprehensive Plan, maximum allowable density on any parcel within North Towne Road Mixed Use zoning is 20 units per acre. For these calculations, average density has been assumed to be 20 units per acre.

6. Existing flow data has been calculated using MMSD monitoring data from 2023.

7. Population densities in these zoning areas have been estimated using the maximum allowable densities in the Village of Deforest 2020 Comprehensive Plan.

3 Municipal Water Service

The ability to provide these areas with municipal water service has been evaluated in the 2016 Water Needs Assessment Study and then again in the more recent engineering report to the PSC that was completed in 2022 in order to plan for the construction of a new elevated storage tank. That elevated storage tank has now been placed into use. Both of these reports contemplate land use and future projected demands that are consistent with current projections. In those reports, this area is referred to as to as development "East of Hwy 51". The new well and tower that have been constructed between 2016 and 2023 provide sufficient supply for this area.

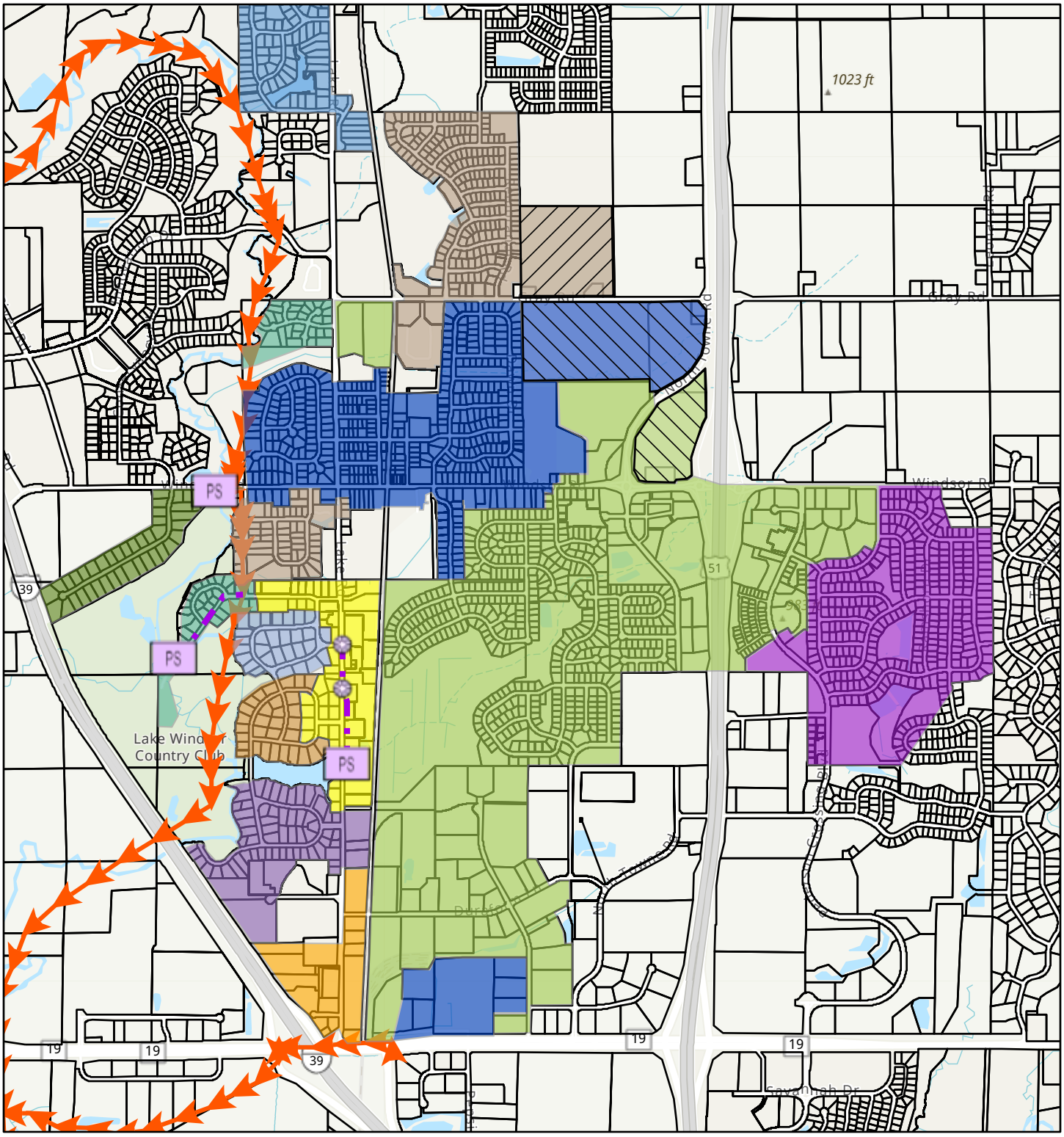
The Village has an existing pressure boosted zone on the west side of Highway 51. The ground elevations in that area range from 920' to over 1000' msl. Similarly, this area east of Highway 51 has ground surface elevations in the range of 920' to over 1000'. In order to meet the required minimum and maximum water pressures within this area, it will be required to be a pressure boosted zone.

A map of the Village's existing water system is shown on Map 3. The evaluation area could be served by the existing booster station utilizing a water main extension from the booster station, a temporary booster station adjacent to Holland Fields Development could be installed until a water main extension could be completed, or a new permanent booster station for this separate area could be constructed adjacent to Holland Fields Development.

A potential route for a booster main extension is shown on Map 3. Construction of a water main connection along this route would be at a cost of approximately $200,000. Additional mains would need to be extended to the north to serve the northern areas of development.

The construction of a temporary (less than 15 year lifespan) booster station to serve the new development areas station would be at a cost of approximately $1 million. The construction of a permanent booster station within the new development area would be at a cost of approximately $2.5 million.

MAP 1
SANITARY MONITORING BASINS



4/19/2024, 1:49:59 PM

1:32,927

0 0.2 0.4 0.8 mi

0 0.33 0.65 1.3 km

PS Sanitary - Lift Station

Sanitary - Forcemain Manhole

Sanitary - Forcemain

Sanitary Sub Basin

4400 HWY 19 Windsor

4459 Gray Road

Bull Run-Windsor Corners

Golf-Fairway

Highland

LW Chestnut

LW Oak Lane-Maple Lane

Q-004

Q-007

Q-079

Q-095

Q-097

Q-122

Q-142

Q-152

Res- Windsor Hid Spr

MMSDS_Utilities - Main

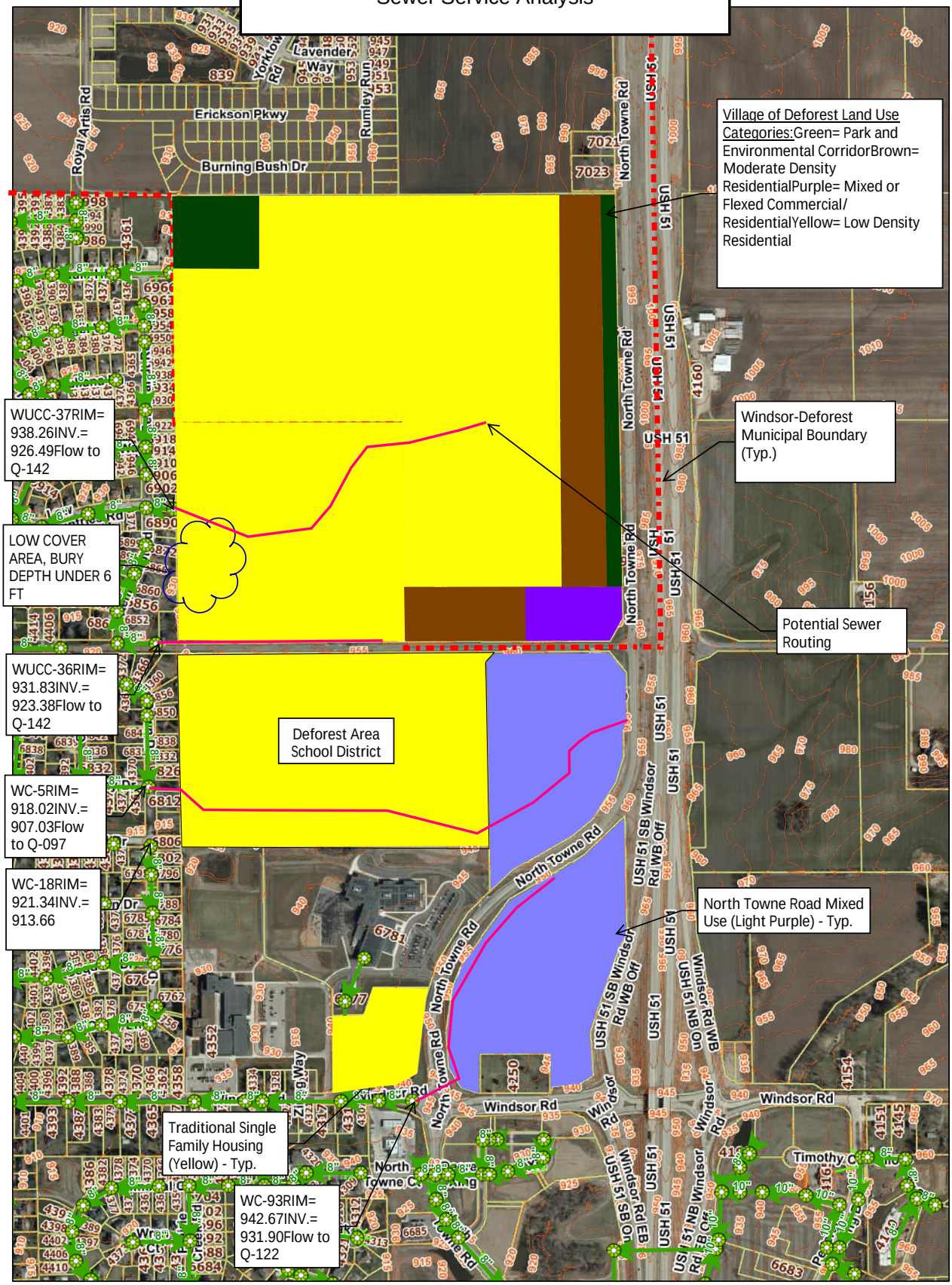
Tax Parcels (April 2024)

Areas Under Consideration

County of Dane, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

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MAP 2Village of WindsorGray Road Area Gravity Sewer Service Analysis



3/24/2024, 3:42:24 PM

- Sanitary - Manhole
- Sanitary - Gravity Main
- Sanitary - Lateral

2022 County Aerial

- Red: Red
- Green: Green
- Blue: Blue

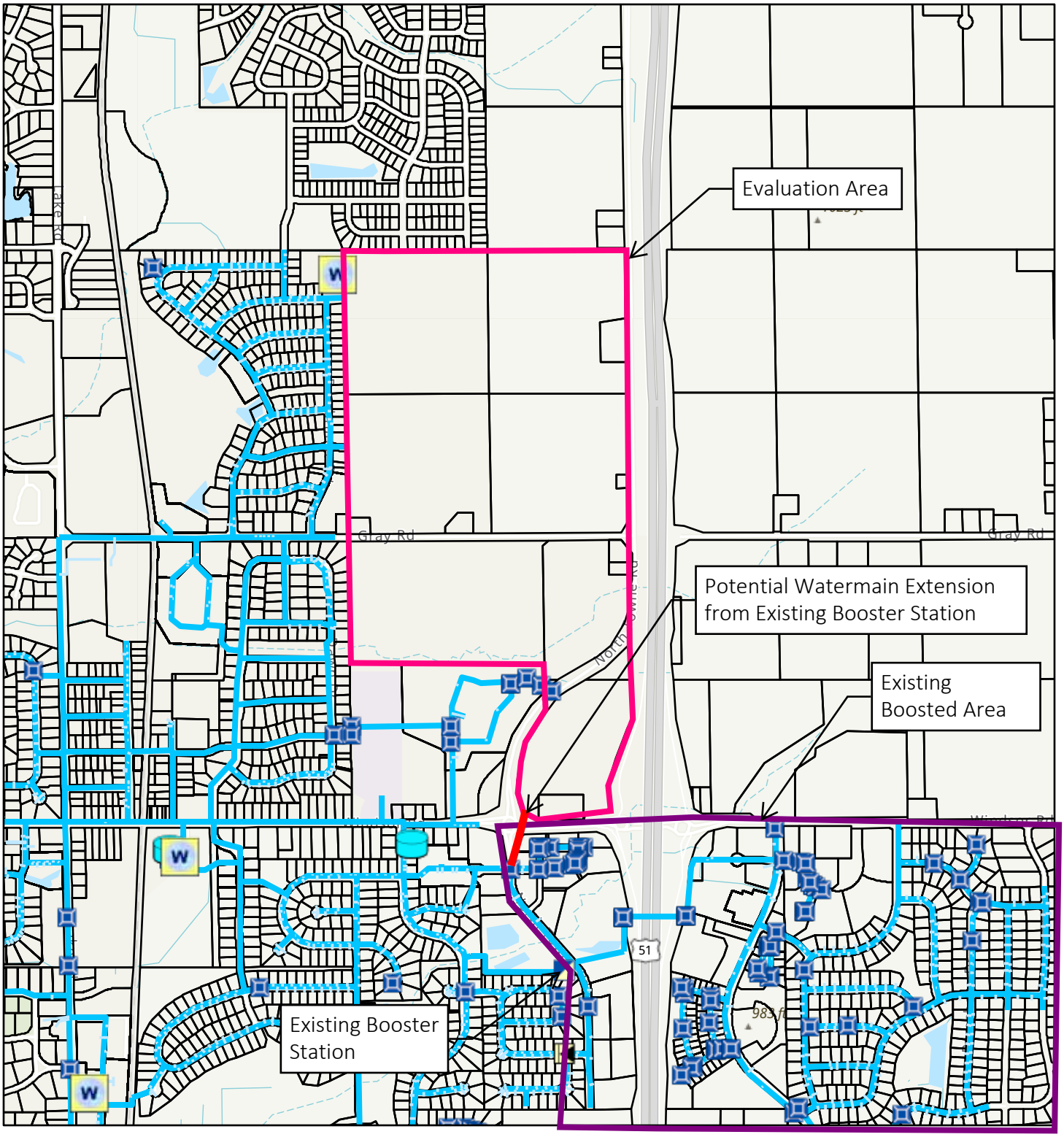
1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

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MAP 3
Village of Windsor Water System



4/19/2024, 1:43:34 PM

1:21,341

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Water - Well

Water - Storage Structures

Water - Booster Station

Water - Pressure Reducing Valve

Water - Fittings

Water - Service Line

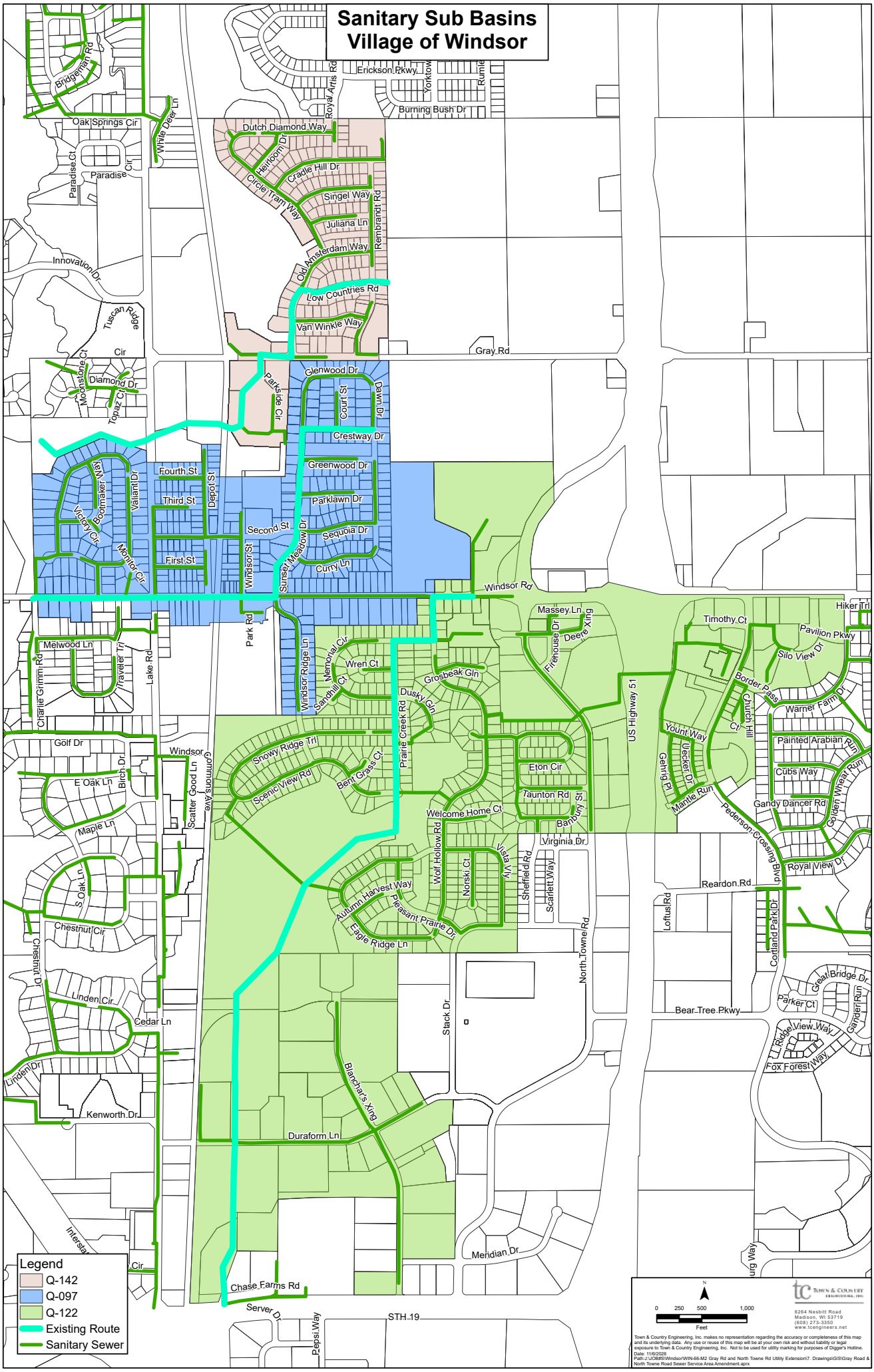
Water - Main

Village of Windsor

Tax Parcels (April 2024)

County of Dane, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

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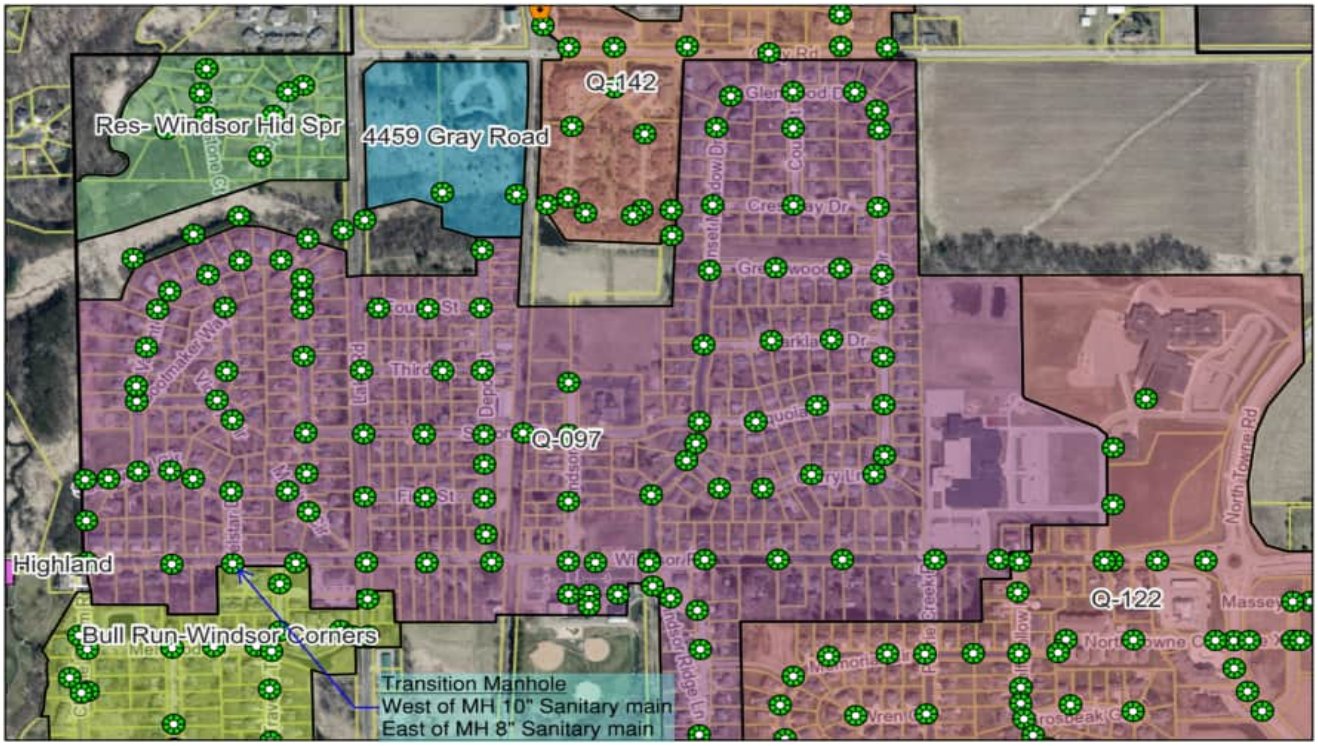

Sanitary Sub Basins
Village of Windsor
Bridgeman Rd
Oak Springs Cir
White Deer Ln
Paradise Ct
Paradise Cir
Innovation Dr
Tuscan Ridge Cir
Moonstone Ct
Diamond Dr
Topaz Ct
Erickson Pkwy
Royal Arms Rd
Yorktown
Rumle
Burning Bush Dr
Dutch Diamond Way
Heirloom Dr
Cradle Hill Dr
Circle Tram Way
Singel Way
Juliana Ln
Rembrandt Rd
Old Amsterdam Way
Low Countries Rd
Van Winkle Way
Gray Rd
Glenwood Dr
Parkside Cir
Court St
Dawn Dr
Crestway Dr
Greenwood Dr
Parklawn Dr
Sequoia Dr
Curry Ln
Fourth St
Third St
First St
Depot St
Windsor St
Sunset Meadow Dr
Valiant Dr
Bootmaker Way
Victory Cir
Monitor Cir
Windsor Rd
Park Rd
Melwood Ln
Charlie Grimm Rd
Traveler Trl
Lake Rd
Windsor Ridge Ln
Memorial Cir
Wren Ct
Sandhill Ct
Grosbeak Gln
Dusky Gln
Prairie Creek Rd
Massey Ln
Deere Xing
Firehouse Dr
US Highway 51
Timothy Ct
Pavilion Pkwy
Hiker Trl
Silo View Dr
Border Pass
Church Hill Ct
Warner Farm Dr
Painted Arabian Run
Cubs Way
Golden Wheat Run
Gandy Dancer Rd
Pederson Crossing Blvd
Royal View Dr
Yount Way
Uecker Dr
Genrig Pl
Mantle Run
Golf Dr
Windsor Commons Ave
Birch Dr
E Oak Ln
Scatter Good Ln
Maple Ln
S Oak Ln
Chestnut Cir
Chestnut Dr
Linden Cir
Cedar Ln
Linden Dr
Kenworth Dr
Snowy Ridge Trl
Scenic View Rd
Bent Grass Ct
Eton Cir
Taunton Rd
Barnbury St
Welcome Home Ct
Wolf Hollow Rd
Norski Ct
Vista View
Sheffield Rd
Scarlett Way
Virginia Dr
Autumn Harvest Way
Pleasant Prairie Dr
Eagle Ridge Ln
North Towne Rd
Reardon Rd
Loftus Rd
Cortland Park Dr
Great Bridge Dr
Parker Ct
Gander Run
Bear Tree Pkwy
Ridge View Way
Fox Forest Way
Stack Dr
Blanchard's Xing
Duraform Ln
Meridian Dr
Chase Farms Rd
Server Dr
Pepsi Way
STH 19
Legend
Q-142
Q-097
Q-122
Existing Route
Sanitary Sewer
N
0 250 500 1,000
Feet
Town & Country Engineering, Inc.
6264 Nesbitt Road
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Path: J:\JOBS\Windsor\WIN-66-M2 Gray Rd and North Towne Rd Utility Extension\7. Drawings\GIS\Gray Road & North Towne Road Sewer Service Area Amendment.aprx

Q-097 Existing Service Area past transition manhole (MMSD MH to 8" sanitary main)	Number of Lots	Number of Units	Population	Average Daily Flow Rate (gpd)	Peak Flow Rate (gpd)	Peak Flow Rate (mgd)	Peak Flow Rate (gpm)
Single-Family Lots	85.0	85.0	222	12,424	47,210	0.047	33
Duplex Lots	8.0	16.0	42	2,339	8,887	0.009	6
Total Flow to Q-097=	**93.0**	**101.0**	**264**	**14,762**	**56,096**	**0.056**	**39**

Total (652k gpd new/existing - 56k gpd existing) **596,196** (greater than 580K)

Total [603k gpd new/ex. (excluding environmental corridor) - 56k gpd ex.] **546,904** (less than 580k)

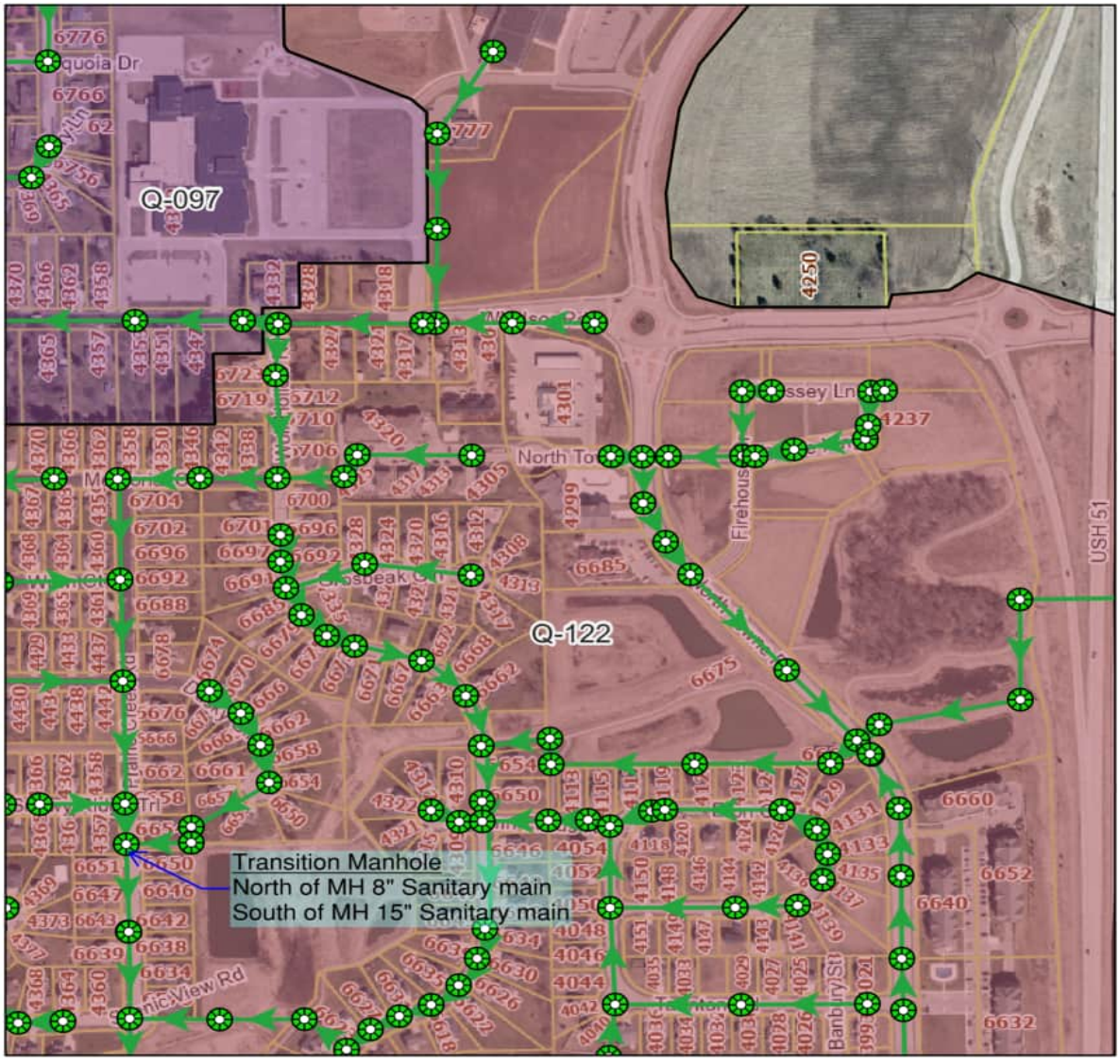
1. Approximate maximum flow for an 8-inch PVC sanitary sewer installed at minimum grade (0.4%) is 0.90cfs or 581,000 gpd
2. Approximate maximum flow for an 10-inch PVC sanitary sewer installed at minimum grade (0.28%) is 1.37 cfs or 885,000 gpd
3. Assumed 4.4 acres environmental corridor excluding for neighborhood zoning



Q-122 Existing Service Area to transition manhole (8" sanitary main to 15" sanitary main)	Number of Lots	Number of Units	Population	Average Daily Flow Rate (gpd)	Peak Flow Rate (gpd)	Peak Flow Rate (mgd)	Peak Flow Rate (gpm)
Single-Family Lots	74.0	74.0	193	10,816	41,100	0.041	29
Duplex Lots	12.0	24.0	63	3,508	13,330	0.013	9
Small Multi-Family Lot	1.0	17.0	44	2,485	9,442	0.009	7
Big Multi-Family Lot	1.0	82.0	214	11,985	45,543	0.046	32
Commerical Lot	1.0	1.0	1	2,200	8,360	0.008	6
Governmental or Institutional	1.0	1.0	1	22,000	83,600	0.084	58
Total Flow to Q-097=	**90.0**	**199.0**	**516**	**52,994**	**201,375**	**0.201**	**140**

Total (255k gpd new + 191k gpd existing) **429,093** (less than 580k)

1. Commerical lot is an existing gas station. Assumed 2200 gpd
2. Governmental is the existing Harvest Intermediate School. Assumed 22000 gpd
3. Approximate maximum flow for an 8-inch PVC sanitary sewer installed at minimum grade (0.4%) is 0.90cfs or 581,000 gpd
4. Approximate maximum flow for an 15-inch PVC sanitary sewer installed at minimum grade (0.15%) is 2.95 cfs or 1,906,000 gpd



Future/Existing Service Area	Total Area (ac)	Number of Units	Population	Average Daily Flow Rate (gpd)	Peak Flow Rate (gpd)	Peak Flow Rate (mgd)	Peak Flow Rate (gpm)
Environmental Corridor/Parks	10	-	-	-	-	-	-
Mixed or Flexed Commercial/Residential[7]	4.0	48	125	7,016	26,660	0.027	19
Moderate Density Residential[7]	18.4	221	578	32,342	122,901	0.123	85
Low Density Residential[7]	84.7	21	55	39,484	150,039	0.150	104
Sub-Totals From Deforest=				78,842	299,599	0.300	208
Traditional Single-Family Residential	37.7	151	394	22,041	83,756	0.084	58
Existing Flow to Q-142	-	-	-	39,484	150,039	0.150	104
Sub-Totals From Windsor=				61,525	233,795	0.234	162
Total Flow to Q-142=	**37.7**	**151**	**394**	**140,367**	**533,394**	**0.533**	**370**
Traditional Single-Family Residential	46.8	94	244	13,681	51,986	0.052	36
North Towne Road Mixed Use	18.7	374	976	54,664	207,723	0.208	144
Existing Flow to Q-097	-	-	-	103,311	392,583	0.393	273
Total Flow to Q-097=	**65.5**	**468**	**1,220**	**171,656**	**652,292**	**0.652**	**453**
Traditional Single-Family Residential	-	-	-	-	-	-	-
Northe Towne Road Mixed Use	20.5	410	1070	59,926	227,717	0.228	158
Existing Flow to Q-122	-	-	-	181,381	689,248	0.689	479
Total Flow to Q-122=	**20.5**	**410**	**1,070**	**241,307**	**916,965**	**0.917**	**637**

Assumptions:

Occupancy Density[1]	2.61	persons/housing unit
Individual Residential Usage[2]	56	gpd/person
Wastewater Peaking Factor[3]	3.8	

Notes:

1. Average household size according to 2020 census.

2. This value matches the per capita water use value for Village of Windsor from the 2018 MMSD Collection System Evaluation. Actual PSC data from 2017 to 2022 indicates an average per capita water usage of 44 gpd/person.

3. Peaking Factor used in 2018 MMSD Collection System Evaluation for the receiving MMSD interceptor segments.

4. According to Comprehensive Plan, average density in Traditional Single Family residential should be 2-4 units per acre. Average density for these calculations is assumed to be 4 units per acre.

5. According to Comprehensive Plan, maximum allowable density on any parcel within North Towne Road Mixed Use zoning is 20 units per acre. For these calculations, average density has been assumed to be 20 units per acre.

6. Existing flow data has been calculated using MMSD monitoring data from 2023.

7. Population densities in these zoning areas have been estimated using the maximum allowable densities in the Village of Deforest 2020 Comprehensive Plan.

Table 2-1 Historical Water Data

Year	2017	2018	2019	2020	2021	2022	Average	Maximum
January 1 Estimated (Census) Population	7,229	7,737	8,246	8,754	8,942	9,134		
Residential (Single Family)								
PSC - Number Customers	1,474	1,567	1,604	1,669	1,839	1,684		
Water Sales (gallons x 1,000)	67,606	67,904	69,575	81,655	86,653	81,081	*75,746*	*86,653*
Average Usage per Customer (gpd)	126	119	119	134	129	132	*127*	*134*
Average Usage per Capita (gpcd)	25.6	24.0	23.1	25.6	26.5	24.3	*24.8*	*26.5*
Residential (Multifamily)								
PSC - Number Customers	44	44	45	45	45	47		
Water Sales (gallons x 1,000)	11,766	12,228	13,047	14,630	15,602	16,020	*13,882*	*16,020*
Average Usage per Customer (gpd)	733	761	794	891	950	934	*844*	*950*
Average Usage per Capita (gpcd)	1258.0	1393.3	1546.2	1568.4	1610.1	1804.8	*1530.1*	*1804.8*
Commercial								
PSC - Number Customers	77	81	82	82	79	79		
Water Sales (gallons x 1,000)	14,032	14,246	16,399	16,161	17,830	24,157	*17,138*	*24,157*
Average Usage per Customer (gpd)	499	481	548	540	618	835	*587*	*835*
Average Usage per Capita (gpcd)	1.9	1.8	2.0	1.8	2.0	2.6	*2.0*	*2.6*
Industrial								
PSC - Number Customers	8	9	9	9	8	8		
Water Sales (gallons x 1,000)	7,224	17,955	25,631	27,395	27,714	26,802	*22,120*	*27,714*
Average Usage per Customer (gpd)	2474	5451	7802	8339	9491	9154	*7,119*	*9,491*
Average Usage per Capita (gpcd)	1.0	2.3	3.1	3.1	3.1	2.9	*2.6*	*3.1*
Public & Interdeparmental Customers								
PSC - Number Customers	13	11	13	13	14	14		
Water Sales (gallons x 1,000)	4,411	5,016	5,128	6,908	8,355	8,331	*6,358*	*8,355*
Average Usage per Customer (gpd)	930	1,246	1,081	1,456	1,635	1,626	*1,329*	*1,635*
Average Usage per Capita (gpcd)	1.8	2.0	2.1	2.8	3.4	3.4	*2.6*	*3.4*
Total Water Sales (gallons x 1,000)	105,039	117,349	129,780	146,749	156,154	156,391	*135,244*	*156,391*
Average Daily Usage (mgd)	0.288	0.321	0.356	0.402	0.428	0.427	*0.370*	*0.428*
Average Daily Usage per Capita (gpd)	39.8	41.4	43.1	45.9	47.8	46.8	*44.2*	*47.8*
Total Annual Pumpage (gallons x 1,000)	117,514	131,328	145,476	167,616	178,985	166,247	*151,194*	*178,985*
Average Daily Pumpage (mgd)	0.291	0.323	0.358	0.405	0.430	0.432	*0.373*	*0.432*
Average Daily Pumpage per Capita (gpd)	40.3	41.7	43.4	46.2	48.1	47.3	*44.5*	*48.1*
Maximum Daily Pumpage (mgd)	0.985	0.811	0.704	0.908	1.082	0.864	*0.892*	*1.082*
Maximum Day/Average Day (%)	338%	251%	197%	224%	251%	200%	244%	338%
Volume Not Sold but Accounted for	11,294	13,517	14,940	19,911	21,853	8,547	*15,010*	*21,853*
Unaccounted Pumped Volume	1,181	462	756	956	978	1,309	*940*	*1,309*
Percent Water Unaccounted	1.0%	0.4%	0.5%	0.6%	0.5%	0.8%	*0.6%*	*1.0%*

Estimated Water Demand

Future Land Use	Acres	Number of Units	Average Daily Water Demand (gpd)	Maximum Daily Water Demand (gpm)	Peak Hour Water Demand (gpm)
Neighborhood Mixed Use	23.0	459	53267.2	85	170
Q-122 Totals=	**23.0**	**459**	**53267**	**85**	**170**
Traditional Single-Family Residential	46.8	187	21715.2	35	69
Neighborhood Mixed Use	16.3	325	37700	60	120
Q-097 Totals=	**63.1**	**512**	**59415**	**95**	**190**
Traditional Single-Family Residential	40.0	160	18560	30	59
Q-142 Totals=	**40.0**	**160**	**18560**	**30**	**59**
Totals=	**126.0**	**1131.4**	**131242.4**	**209.6**	**419.2**

Assumptions:

Per Residential Customer Water Demand[1]	116	gals/day per customer
Max. Day to Average Day Ratio[2]	2.3	
Peak Hour/Max. Day Factor[3]	2	

Notes:

1. Average based on PSC water use data 2017-2022
2. Average ratio based on PSC water use data 2017-2022
3. Ram S. Gupta, "Hydrology & Hydraulic Systems", 1989
4. According to Comprehensive Plan, average density in Traditional Single Family residential should be 2-4 units per acre. Average density for these calculations is assumed to be 4 units per acre.
5. According to Comprehensive Plan, maximum allowable density within North Towne Road Mixed Use zoning is 20 units per acre. For these calculations, average density has been assumed to be 20 units per acre.

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January 13, 2022

Public Service Commission of Wisconsin
4822 Madison Yards Way
P.O. Box 7854
Madison, WI 53705-9100

Subject: Windsor Water Utility (South System) – 400,000 Gallon Elevated Tank

Request Certificate of Authority to Construct

Dear Public Service Commission:

On behalf of the Windsor Water Utility, we are writing to request authority to construct a new 400,000-gallon elevated tank on the east side of the Village of Windsor. The proposed 400,000-gallon elevated tank will be located within the Bear Tree Farms subdivision, on the far east side of Windsor Water Utility's (South System) in the system's East High-Pressure Zone. (See distribution map on Exhibit 1 in Appendix A.) The East-High Pressure Zone is currently served by a booster station to provide adequate pressures for areas of high ground elevation, primarily east of USH 51. While this booster station was designed to provide adequate supply and fire protection for the first few residential phases of the development, the area is continuing to grow, and larger commercial buildings and apartments are being constructed which continues to drive the need for storage to meet normal domestic water supply and firefighting demands in the East-High Pressure Zone.

A new elevated tank in Windsor has been considered for over a decade and its future need was presented to this Commission in June of 2019 as part of the Well No. 3 Well and Wellhouse project (6572-CW-101). The timing for the elevated tank has been purposefully deferred for a few years, waiting for develop to occur within the East-High Pressure Zone. As the Bear Tree Farm subdivision is now rapidly expanding the need to move forward and construct the elevated tank has arrived.

The proposed 400,000-gallon elevated tank will provide sufficient storage capacity to meet expected domestic and firefighting demands in the Village due to new users. Construction for the new tower is currently scheduled to start in summer or fall of 2022 and be completed in late spring of 2024.

This request is submitted in accordance with the requirements of PSC 184.04 using a PSC Type 3 Water Application Filing Format. In support of this request, we have enclosed the following information:

1. Engineering Report meeting PSC Type 3 Water Application Filing Format.
2. Maps, drawings and exhibits including the following:
   - ☐ Distribution Map of Windsor South Water System
   - ☐ Various Maps showing Tank Location and Its Relationship to Other Features
   - ☐ Preliminary Site Plan for the Elevated Tank

1.0 Project Overview

Growth in the Village of Windsor (primarily south of Windsor Road and east of USH 51) has created to the need to construct additional well and storage capacity to meet growing water demands within the Water Utility's South System. Windsor's South System was formerly referred to as Windsor Sanitary District No. 1, before the Town of Windsor became the Village of Windsor in 2016.

Due to growth in Windsor's South Water System, the PSC authorized the construction of Well No. 3 with an ultimate capacity of 650 gpm to ensure sufficient firm water supply capacity in 2019 (6572-CW-101). The 2019 application discussed the need for a future elevated tank that was expected to be needed around year 2025. Per the last US Census, the Village of Windsor was the fastest growing community in Dane County, hence the need for constructing the elevated tank has only accelerated since 2019. As a result, this application is being submitted to increase planned system storage at this time.

The need for additional storage capacity was initially formalized in a Water Needs Assessment Study (WNAS) performed by Baxter & Woodman, Inc. in September of 2016 and updated in June of 2019 as part of the Well No. 3 Well and Wellhouse project (6572-CW-101). A copy of the 2016 WNAS report is included in Appendix B. This report updates the 2016 WNAS report and 2019 PSC Construction Authorization with water demand data through year 2021, including reported maximum day demands due to hot/dry weather.

As noted, the Windsor South System provides drinking water to a growing residential, commercial and industrial customer base within the southern portion of the Village of Windsor and a portion of the Village of DeForest. Current developments recently submitted to both Village (and in various approval stages) include the following named developments along with their type and size.

Table 1: Recently Announced Developments in 2021

Development Name	Type of Development	Size of Development
Bear Tree Farm Phase 6	Single Family Homes	76 Lots
Covered Bridge Residences	Apartments	5 buildings each with 75 units
Diamond Village	Single Family Homes	45 Lots
Church Hill Condominiums	Duplex Condominiums	9 buildings each with 2 units
Bear Tree Farms -West	Apartments	1 building with 100 units
Bear Tree Farms -West	Apartments	2 buildings each with 12 units
Bear Tree Farms -West	Commercial	4.06 acres

In total, the above noted developments in DeForest and Windsor will add nearly 500 equivalent residential units of demand to Windsor's South System and all of it on the east side of USH 51, within the East-High Pressure Zone.

1.1 Project Location

The proposed elevated tank site is located within the Village of Windsor's Tower Hill Park within the Bear Tree Farms Subdivision. Two lots were dedicated for the location of the future elevated tank as part of the Bear Tree Farms development and declared a park called Tower Hill Park. All construction activities for the tank project will occur within the Tower Hill Park site.

The general location for Tower Hill Park and the center of the elevated tank is shown in Figure 1 (below). The proposed tank will be within the northern portion of Outlot 7 of the Bear Tree Farms subdivision, with an address of 4058 Eagle Mound Pass. Outlot 7 is the evergreen tree shaped lot with a connection to Eagle Mound Pass on the south side. Outlot 6 is the first lot east of Outlot 7 on the north side of Eagle Mound Pass. The park currently consists of vacant land adjacent to the proposed tank site with existing residential homes to the east. Planned streets for the Sixth Phase of the Bear Tree Farms subdivision are shown on Figure 1, on the land that was formerly agricultural. Eagle Mound Pass along with 12-inch water main was recently extended to Outlot 7 in late 2021. The project location is also shown on USGS map (Exhibit 2 located in the Appendix A) with a U.S. Public Lands location description as being in the NW ¼ of the SE ¼ of Section 28, T9N and R10E.



Figure 1: Proposed 400,000-gallon Elevated Tank Location

1.2 Project Component Description

The project will consist of a 400,000-gallon painted steel elevated tank of the water-spheroid style. The base of the elevated tank will house necessary electrical and control equipment, sample taps and shut off valves.

Major Project Components of the Elevated Tank will include the following:

- Concrete foundation and floor
- Steel structure consisting of base cone, access tube and water containment tank
- One steel single doorway
- Single riser pipe with insulation
- An active tank mixer
- Overflow with splash pad
- Electrical gear and lighting including aviation obstruction lights
- Controls including radio-based communication, pressure transducer and temperature probe
- Foundation penetrations and attachments for future cellular equipment
- Paint scheme to match existing 300,000-gallon elevated tank
- Asphaltic access road with turnaround
- 12-inch water main extension from Eagle Mound Pass with fire hydrant for tank draining

1.3 New Construction

The elevated tank project will include components that currently do not exist except for the existing SCADA control system that the new tank will be integrated into and the Village streets and watermains that have been or will be completed as part of the Bear Tree Farms and Covered Bridge Residence subdivisions. These new watermains and the sizing of these mains were increased in anticipation of the proposed elevated tank.

1.4 Project Schedule

The elevated tank "design phase" is planned to be completed in the spring of 2022, with formal bidding to follow. After receipt of PSC, FAA and WDNR approvals, construction of the elevated tank is anticipated to start in early fall of 2022, with final painting to be completed in late spring or early summer of 2024. A detailed schedule is attached in Appendix C.

1.5 Project Contacts

Village Administrator of Windsor
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tina@windsorwi.gov

Design Consultant
Gerald D. Groth, PE
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2005 W. Beltline Hwy, Suite 201
Madison, WI 53713
608-347-1542
ggroth@baxterwoodman.com

1.6 Other Agency Correspondence/Permits/Approvals

1.6.1 Except for Baxter and Woodman's approved design contract for the elevated tank project and the 2019 Well No. 3 Well and Wellhouse project approval by the PSC Commission (6572-CW-101), we have no current agency correspondence, permits, or approvals on the project.

1.6.2 The following approvals will be required and obtained for this project:

- ☐ Wisconsin Department of Natural Resources (Elevated Storage Tank and Watermain Submittals) - applications pending
- ☐ Public Service Commission Authority to Construct – this application
- ☐ Village of Windsor Building and Erosion Control – application pending
- ☐ Federal Aviation Administration and Wisconsin Bureau of Aeronautics – applications pending

1.7 Project Maps and Environmental Data

The elevated tank project location is shown in the attached documents as follows in Appendix A:

- ☐ USGS Base Map with Proposed Project Location
- ☐ Various Maps showing Tank Location and Its Relationship to Other Environmental Features
- ☐ Windsor South System Water Distribution Map
- ☐ Proposed Elevated Tank Site Plan

Environmental Data Review:
We have included several Environmental maps in Appendix A to show the geographical location of the proposed elevated tank and potential areas of environmental and other concerns.

Exhibit 3; FEMA Flood Hazard Map
To reduce the height of the water tower we have placed the proposed elevated tank on a hilltop, that is naturally away from areas subject to flooding, waterways and wetlands. Exhibit 3 in Appendix A shows the location of the proposed elevated tank in an area of minimal flood hazard.

Exhibit 4; Wisconsin Surface Water Data and Wetlands
Exhibit 4 shows the location of the proposed elevated tank away from any waterway, river, lake or wetland. The nearest waterway is the Yahara River Windsor Channel located approximately 2,000

feet to the NE. The nearest wetland is approximately 3,500 feet due west of the site and west of USH 51, in the Windsor Crossing development. The nearest NCRS "Wet Spot" is noted approximately 1,000 feet to the SE within the existing Terrace Park subdivision.

IPaC (Information Planning and Consultation) Environmental USFWS Resource List
Exhibit 5 in Appendix A contains listing of fish and wildlife resources that may be in the area. As expected for a formerly cultivated land adjacent to homes the area has no fish concerns and limited concerns for other animals including migratory birds.

Wisconsin DNR NHI (National Heritage Inventory) Portal:
Exhibit 6 in Appendix A contains information from the Wisconsin DNR NHI (National Heritage Inventory) Portal search. The entire area is considered a high potential zone for the Rusty Patched Bumblebee, however based on 100% of our specific site having un-suitable habitat, the concerns to disrupt the Rusty Patch Bumblebee or its habitat are negligible.

Wisconsin Historic Preservation Database (WHPD):
Exhibit 7 in Appendix A shows the Wisconsin Historical Society inventories of past archaeologic sites, burial sites, and cemeteries along with historical buildings, structures and other places. We reviewed the WHPD's database and found no past archaeologic nor historic features on or near the project location.

Conclusions:

- ✓ There are no floodplains or flood prone areas within the project boundary
- ✓ There are no rivers lakes or other waterways within the project boundaries
- ✓ There are no trout streams or wild or scenic waterways within the project boundaries
- ✓ There are no wetlands within the project boundaries
- ✓ There are no known archaeological sites within the project boundaries
- ✓ There are no historic buildings, structures or features on or near our project site

2.0 Project Development and Alternatives

2.1. Project Purpose and Necessity

Past Studies
As previously noted, concerns regarding inadequate amounts of well supply capacity and water storage within the Windsor (South) water system have been discussed for over a decade. A comprehensive water study was completed for Windsor Sanitary District No. 1 (WSD No. 1) in 1997. The 1997 Comprehensive Study analyzed existing and future water system needs and made recommendations for major system improvements including construction of a future third well and a 400,000-gallon elevated tank to meet anticipated future demands and fire protection needs.

Water demands did not change substantially after the 1997 study, partially due to the "slow down" in the residential housing and commercial markets, which delayed the need to add a new (third) water supply well to the system.

Between 1997 and 2007, WSD No. 1 continued to look at options and alternatives for adding a new well and supplementary storage within the system. FAA restrictions (due to building height restrictions due to the location of nearby Dane County Regional MSN airport) eliminated most sites for a new elevated tank within the existing Windsor South System service area north of Highway 19 and west of Highway 51 (See Exhibit 8 in Appendix A for Dane County Regional Airport Building Height Limitation). The concern with adding a second elevated tank due to these height restrictions, led to plans which called for locating a future well and a ground level reservoir in Cradle Hill Park on the north side of Windsor's South System.

Developer driven pressure for additional fire protection capabilities (of at least 3,500 gpm for a three-hour duration) continued from the late 1990's to approximately 2007. In 2007 WSD No. 1 began construction of a 600,000-gallon ground level reservoir and booster station at Well No. 1 to supplement firefighting and provide emergency storage needs. This storage project was completed in 2009 and provides the system with significant additional fire-fighting capabilities and emergency storage reserves.

Plans for a large primarily residential development east of Highway 51 began to emerge in 2010, called Bear Tree Windsor and Bear Tree DeForest developments. With the increased water demands and high topography associated with the Bear Tree Windsor and Bear Tree DeForest developments, a Joint Water Study between DeForest and Windsor was undertaken to increase water pressures and cooperatively address water supply issues between the two communities in 2011. The 2011 Joint Water Study recommended constructing a new elevated tank (and potential third well) for Windsor on the east side of USH 51 and proposed an interconnection between the Windsor and the DeForest South System, near the intersection of Pederson Crossing and Reardon Road. The 2011 Joint Water Study also endorsed development of a high-level pressure zone on the east side of USH 51 with a capacity of at least 1,433 gpm and a 400,000-gallon elevated tank to serve the new developments.

2016 Needs Assessment

In 2016, Baxter & Woodman completed a Water Needs Assessment Study (WNAS) for the Village of Windsor's South Water System (located in Appendix B). The 2016 WNAS report followed the requirements for a Water Needs Assessment Study as noted in Wisconsin Statutes 66.0617; Impact Fees, as included the following:

- EXISTING WATER SYSTEM INVENTORY – Prepare an inventory of the major existing water system components and identify any existing deficiencies in quantity or quality.

- IDENTIFY NEW OR EXPANDED WATER SYSTEM FACILITY REQUIREMENTS – Identify new public water system facilities, improvements, or expansions of existing public facilities, that will be required because of land development impacts on the water system, based on service areas and service standards.
- CAPITAL COST DEVELOPMENT – Prepare a detailed opinion of the probable capital costs of providing the new public facilities, improvements or expansions of the existing public facilities. Include an estimate of the cumulative effect of all proposed and existing impact fees on the availability of affordable housing within the municipality.

The 2016 WNAS report evaluated past water use data, published population projections, and known housing developments to estimate future water demand. The known housing development areas included Wolf Hollow, Prairie Creek, Acker/Pleasant Hill, and Windsor Crossings on the west side of USH 51 and the new Bear Tree development on the eastside of USH 51. Total additional residential housing units on the west side of USH 51 totaled 650 additional homes or residential equivalent units, with several apartments. Total additional residential housing units on the east side of USH 51 totaled 597 additional homes plus 54.4 acres of land that was slated for commercial use.

The 2016 WNAS report estimated when Windsor's future maximum day demands might exceed current firm well capacity by looking at the number of new water customers added in the prior five-year span and estimating a probable future maximum day. The future maximum day demand was estimated by multiplying the current rate of customer growth by average customer water use on a maximum day and adding it to the highest maximum day demand seen in the prior 5 years. The estimate determined that there needed to be a new well by the summer of 2019 and an elevated tank by year 2025.

Updated Water Use Data

Since the 2016 WNAS report, more than four years have elapsed, which provides additional data to compare to the previously made demand projections. Water use for the Windsor Water Utility's South System is noted in Table 2 on the following page, for the years 2011 to 2021. These water demands were obtained from Utility pumpage data as obtained from Public Service Commission annual water reports and the utility's recorded pumpage data for the South System. Maximum day pumpage demands noted in the table reflect only those days of high demand associated with hot dry weather conditions. Days of higher demand may have occurred due to system flushing or water main breaks but are not considered when designing a system's supply requirements, as these are either controllable events or catastrophic events that are not considered to be normal design conditions. Table 1 includes listed water pumpage records for average day, maximum day pumpage during hot/dry weather, and the ratio of the maximum day/average day demands.

Table 2: Water Pumping Data

Year	Average Day Water Demand (MGD)	Maximum Day Water Demand (MGD)	Maximum Day Demand (GPM)	Maximum Day/Average Day Ratio
2011	0.266	0.493	342	1.85
2012	0.282	0.691	480	2.45
2013	0.272	0.570	396	2.10
2014	0.276	0.452	314	1.64
2015	0.281	0.539	374	1.92
2016	0.302	0.647	449	2.14
2017	0.301	0.681	473	2.26
2018	0.339	0.635	441	1.87
2019	0.377	0.679	472	1.80
2020	0.432	0.869	603	2.01
2021	0.464	1.035	719	2.23

As noted in Table 2, average day demands have been steadily increasing for the Village's South Water System since 2017. Maximum day demands are more variable than average day demands due to variances in the weather from year-to-year, but there has been a dramatic increase in the past 3 years, all of which is attributable to growth in the system. Water use data from 2012 was the previous record for maximum day pumping during hot/dry weather. Maximum day demands in 2020 and 2021 beat this previous maximum day by a significant margin.

The ratio of the maximum day to average day is an important water supply design factor, but has remained near or just above 2.0 for the last decade. The maximum day to average day ratio reflects water usage from typical "residential" users that water their lawns and consume on average about twice as much water on a hot/dry summer day versus all other times of the year.

Proposed Future Average Day and Maximum Day Estimates From 2016 WNAS Study

The 2016 WNAS provided estimates on the number of new homes proposed on the west and east sides of USH 51. The west side developments included an estimated 650 total residential units which would result in an estimated average day demand increase of 162,500 gallons per day. The east side had an estimated 596 residential homes and 54.4 acres of commercial land. Using 1,000 gallons per acre to estimate average day demand for the commercial area results in total average day demand increases on the west side of USH 51 at 203,400 gallons (149,000 + 54,400 = 203,400).

Table 3 summarizes the known water supply needs for both the west-side and east-side USH 51 developments in 2016 utilizing the number of known residential equivalent units being developed at 250 gallons per day per unit for platted developments and 1,000 gallons (or 4 equivalent residential units) per gross acre of future areas as identified in 2016 WNAS Study.

Table 3: Known Future Water Demand Increases Identified in 2016 WNAS Study

Development	Average Day Demand Increase (gpd)	Maximum Day Demand Increase (gpd)	Maximum Day Demand Increase (gpm)
West Side USH 51	162,500	325,000	226
East Side USH 51	203,400	406,800	282
Total	365,900	731,800	508

To account for these other unknown in-fill developments and to satisfy a recent shift towards construction of large apartment buildings and large water users, the 2016 WNAS report added an additional 25 percent to the known future totals above to arrive at a future "design" demand for planning purposes. Twenty five percent of 508 gpm of demand resulted in 127 gpm of additional demand. This results in a design future maximum day demand increase of 635 (508 + 127 = 635) gpm. Note that this is above the existing maximum day demand in 2016 which was nearly 450 gpm.

Additional Developments since 2016 WNAS Study

In 2019, two additional developments were noted that would account for a large portion of the 25% assumption for unknown or additional growth. These two "additional" developments include expansion of a large industrial user within the Windsor industrial area north of Highway 19 and a 1,170 student Intermediate school north of Windsor Road, west of Highway 51. These "other additional" developments were reviewed in detail as part of the 2019 Well No. 3 PSC Authority to Construct report and were found to account for 55% of the 25% additional allowance for unknown or other users.

In addition to the Intermediate School and the large industrial user, the Village of Windsor that were constructed has also constructed two community splash pads, that both use a considerable amount of water during hot/dry summer days. One of these splash pads is located within the East-High Pressure Zone, with the other splash pad in the existing Low Pressure Zone.

New developments announced in DeForest and Windsor in 2021 and identified earlier in Table 1, would add nearly 500 equivalent residential units of demand to Windsor's South System and all of it on the east side of USH 51 in the East-High Pressure Zone. While a majority of these announced developments were anticipated with the Bear Tree Farms DeForest and Bear Tree Farms Windsor planning in 2016, the speed to which this growth is occurring is occurring at a faster rate than expected. Additionally, the construction of several large apartment buildings of 75 and 100 units east of USH 51 is dramatically increasing the need for additional fire protection and the need for a backup supply of water within Windsor's East-High Pressure Zone.

Construction of an elevated tank east of USH 51, would provide increased fire protection and a backup water supply for the East-High Pressure Zone in the event of a water main break to the single water line serving the east side of USH 51 or a failure to the East-High Booster Station. It should also be noted that water in the new 400,000-gallon elevated tank could still be transferred into the existing Low Pressure Zone of Windsor's South system by gravity through the existing booster station, hence all new users in Windsor's South system will benefit from the new storage tank located east of USH 51.

Future Maximum Day Demands

Estimates for future maximum day demands were developed in 2016 and updated in the 2019 Well No. 3 PSC Authority to Construct Report. In that report an ultimate future demand of 1,088 gpm or 1.567 mgd was used as a future maximum day at build-out. This resulted in the recommendation to construct Well No. 3 with a capacity of 650 gpm. Adding Well No. 3 results in a total future firm supply of 1,170 gpm or 1.684 mgd.

For purposes of designing the new elevated tank at this time, this report could utilize either the forecast demand of 1.567 mgd, or the available 1.684 mgd of total firm supply, or something in between. Since the output of the supply wells will decline somewhat over time (due to declines in water levels and natural calcification and clogging of the well borehole) designing for a future output of 1,170 gpm or 1.684 mgd may be over-estimating future conditions. Since there is not a major difference between 1.567 and 1.684 mgd anyway, this report will utilize a future maximum day demand design of 1.6 mgd to estimate future storage needs.

Numeric Justification for Increased Elevated Storage Capacity

There are several rules of thumb and engineering design criteria supported by Wisconsin DNR and PSC to help arrive at recommended design volumes for "Storage" in a system. Elevated storage is desired in community water systems to meet both domestic requirements and for fire protection needs. Wisconsin DNR (and Ten States Standards Reference) recommends that the amount of storage be determined from an engineering study with the following considerations:

a. Fire flow requirements established by the appropriate state Insurance Office should be satisfied where fire protection is provided.
b. The minimum storage capacity (or equivalent capacity) for systems not providing fire protection should be equal to the average daily consumption. This requirement may be reduced when the source water and treatment facilities have sufficient capacity with standby power to supplement peak demands in the system.
c. Excessive storage capacity should be provided to prevent potential water quality deterioration problems.

Nearly all community water systems in the mid-west provide fire protection, hence fire demand requirements must normally be evaluated in every community system storage analysis. Freezing conditions are a definite problem during cold winter days in northern climates, hence too much storage needs to be evaluated.

Storage Definitions

This memo will utilize the following definitions to help calculate storage requirements, that also corresponds to the PSC's Supplemental Checklist identified in more detail below.

Total Recommended Storage Requirements: Total Storage (TS) required for a system is equal to the combined volume needed to meet domestic, fire, operations, and storage reserve requirements, or TS = D + F + O + R. It should be noted that TS requirements can also be reduced by excess or spare well capacity if it is available to the system.

Domestic (Equalization) Storage: Domestic Storage (D) is the amount of storage needed to ensure that there is an adequate amount of water available to equalize the normal diurnal peak hour water usage during the day when demands exceed the average supply amount. The amount of domestic or equalization storage is normally around 10 to 25% of the Maximum Daily Demand (MDD) when the supply input for a 24-hour period just equals the total MDD. For Windsor we will assume 15% of the MDD for Domestic Storage.

Fire Storage: Fire storage (F) is the amount of storage needed to fight the community's basic fire flow requirements for a set duration. Basic fire flow requirements are normally determined from the Insurance Service Office or ISO. Windsor's basic ISO fire flow requirement has been established at 3,500 gpm for a 3 hour duration, which equals 630,000 gallons of storage.

Operational Storage: Operational Storage (O) is the amount of storage needed to allow the existing control system to turn on necessary pumps and use up or turnover a portion of water in storage being fill and refill cycles. The amount of operational storage should also consider the amount of dead storage available in a system such as the bottom few feet in a tank or reservoir that cannot be removed by gravity or pumps. While the actual volume associated with operational storage is dependent on a number of factors, operational storage amounts could also be considered along with storage reserves, which are discussed in more detail below.

Reserve Storage: Reserve storage (R) is an amount of storage desired for other unknown emergencies. Lake Water communities in the Chicago area are required (by contract) to have storage amounts of 2 times the ADD in the event of a disruption in supply. By definition, this would be reserve storage, which would equate to an amount equal to 200% of the ADD. Similar to Operational Storage, Reserve Storage amounts should be based on water supply reliability issues and Utility staff input.

Combined Operational and Reserve Storage: Since the amount of operational and reserve storage cannot always be quantified in a precise manner, assumed or typical values are normally assigned. It is also reasonable to assign a combined value to both the operational and reserve storage amounts rather than complicate the issue with two guesstimates. A combined amount of 20% to 35% for both operational and reserve storage is suggested as a guide.

Based on Windsor's 600,000-gallon reservoir with higher required operational/dead storage we will utilize a combined 30% operational and reserve storage requirement for this calculation.

PSC Supplemental Checklist

The PSC has requested that any new well or storage facility include a numeric justification based on several equations developed in an article published in 2013 Wisconsin Water Association newsletter article, authored by Andy Jacque entitled "How Much Water Supply Capacity Should a Public Water System Have?" The numeric justification provided by Andy Jacque, included all of the parameters noted above for estimating required storage, except the Domestic (Equalization) Storage component. Additionally, the numeric justification noted by Andy Jacque in the 2013 newsletter emphasized that spare well capacity or spare storage should be used to offset deficiencies in storage or supply.

In 2019, Andy Jacque and Gerald Groth presented a paper at the Annual Conference of the Wisconsin Section of AWWA in Madison, entitled a "Second Look at "How Much Water Supply Capacity Should a Public Water System Have?". That paper discussed Storage concepts presented above and affirmed the need for Domestic (Equalization) Storage along with the need to have firm well capacity equal or greater than the design maximum day demand.

Required New Storage Capacity:

Since the engineering behind Andy Jacque's formulas and Wisconsin DNR recommendations are identical concepts, we will utilize the following formula and assumptions to calculate future total storage needs, TS = D + F + O + R, where;

TS = Total Storage
D = Domestic Equalization Storage, or 15% of the MDD.
F = Fire Storage, or 3,500 for 3 hours = 630,000 gallons
0 + R = Operational Storage + Reserve Storage, or 30% of TS
MDD = 1.6 mgd or 1.6 MG for a 24 hour period

Additionally, it should be noted that for purposes of this calculation there will be no "spare well capacity" since the future maximum day demand (MDD) of 1.6 mgd will be equal to the total available Firm Well Capacity of the system with new Well No. 3 in service. Hence on given 24 hour period on a maximum day, the total storage needs would be as follows:

TS = (D + F) + (O + R)
TS = (D + F) + 0.3 TS
0.7 TS = (D + F)
TS = (D + F) / 0.7
TS = (0.15 MDD + 3,500 gpm x 3 hours) / 0.7
TS = [(0.15 x 1.6 MG) + (3,500 gpm x 3 hours)] / 0.7
TS = (0.24 MG + 0.63 MG) x 1.429 => 1.243 MG

With existing storage at 0.9 MG (900,000-gallons) the amount of new storage required would be 0.343 MG or 343,000 gallons (1.243 – 0.90 = 0.343 MG). A 350,000-gallon tank is not a standard tank size, hence a 400,000 gallon tank would be required.

It should be noted that depending on changes to either the percentage of Domestic Equalization Storage and/or Operational + Reserve Storage estimates the calculations could suggest construction of either an additional 300,000 or 500,000-gallon tank. A review of other DNR Design Criteria and Ten State Standard Recommendations follow to help determine a final recommended tank size.

Other DNR Design Criteria

Wisconsin DNR NR 811.62(1) discusses storage volume requirements and generally stipulates the following;

- A sufficient quantity of water shall be maintained in elevated storage.
- When only one pumping unit is available the amount shall be at least equal to one average day supply.
- When more than one pumping unit is available, the amount shall be as determined by standard engineering practice considering water demands, type of service and population served, average day demands, maximum day demands, peak hour demands, fire demands, water source (quality, availability, and treatment), pump capacities, auxiliary power, other storage capacity, water distribution and costs.

In looking at average day demand requirements, the system in total should have a minimum of 800,000 gallons of storage. With a new 400,000-gallon elevated tank the system would have 700,000 gallons of elevated storage and 1,300,000 in total storage. On a percentage of a 0.8 mgd average day, this would be 88% of an average day in elevated storage and 162% of an average day in total storage. The percentages are considered to be within acceptable ranges compared to other systems.

When looking at strictly the East-High Pressure Zone, it would appear that the average day demand at build out will be around 250,000 to 300,000 gallons per day. This would suggest that a 400,000-gallon tank on the east side of USH 51 may be a bit too large. However, when you consider that this

tank will be relied on as a back-up water source in the event of a watermain break in the single water main under STH 51 or a failure in the booster station supply water to the East-High Pressure Zone, the need for increase Storage Reserve for the area east of USH 51 should also be factored in. As a result 400,000 gallons could be a more advisable amount.

Wisconsin DNR and Ten States Standards Storage when Fire Protection is Provided

Reference to Wisconsin DNR and Ten States Standards Recommendations were provided at the beginning of the "Numeric Justification for Increased Elevated Storage Capacity" discussion. While there is not a definitive recommendation for systems that provide both domestic and fire protection, it is clear that the minimum amount of storage for systems not providing fire protection, should be equal to the average daily consumption. Hence for systems providing both domestic and fire protection it would also be clear that the amount of storage should be more than just the average day. With an average design day of 0.8 MG and fire storage requirements at 0.63 MG, one could argue that perhaps 1.43 MG of storage should or could be considered for Windsor's South Water system. With a new 400,000-gallon tank Windsor would have 1.30 MG of storage. This would suggest that even a larger elevated tank or two elevated tanks could be constructed to meet the 1.43 MG of storage.

New Storage Size Conclusions and Recommendations

While there is no definitive equation to precisely quantify how much storage a water system needs, the use of commonly accepted storage needs for domestic, fire, operational and reserve requirements considering PSC Checklist, Ten States Standards, and Wisconsin DRN requirement and recommendations, suggests that a tank size of around 400,000 would generally meet all specified requirements for both the East-High Pressure Zone and Windsor's entire South Water System.

Constructing a slightly smaller 300,000-gallon tank would likely be too small to serve as a more reliable and longer back-up reserve supply to the East-High Pressure Zone in the event of disruption to supply from either a watermain break or failure in the East-High Pressure Zone booster station.

Constructing a slightly larger 500,000-gallon elevated tank would provide nearly two-times the East-Pressure Zones average amount of water use, which would add to operational concerns with potential freezing in the winter. Building two tanks with a total size of 500,000 is definitely not cost effective, hence only one new tank should be built.

In summary, since the new tank located within the East-High Pressure Zone will provide for a more reliable and longer back-up supply to the East-High Pressure Zone, we recommend building a single 400,000-gallon elevated tank. Potential issues with water turnover can be minimized by keeping water levels below overflow during the first few years until the area is more fully

developed and by allowing water to flow back into the lower pressure zone through the pressure reducing valve (PRV) within the East-High Pressure Booster Station. Allowing water to flow from the East-High Pressure Zone into the Low-Pressure Zone will assist with water turnover in the new tank and would be a benefit to the low pressure zone during an emergency or fire on the westside of USH 51.

2.1 Project Relationship to Future Projects

The proposed elevated tank is the final step in a line of projects that has allowed the Windsor South Water System to expand east of USH 51. The first step was construction of water main under USH 51 as it was expanded from a two-lane highway to a four-lane divided expressway. The second step was construction of the East-High booster station to provide necessary pressure and boosted supply for the initial phases of the Bear Tree Subdivision. The third step was construction of Well No. 3 Well Borehole and Well House to provide for adequate water supply to meet expanding water demands in the system. Now we are at the fourth and final step, which is construction of an elevated tank to meet increasing water demands and fire protection in the East-High Pressure Zone.

Windsor has implemented and will fund this project using Water Impact Fees; hence this project falls outside of normal budget planning. Estimated Project Costs and funding for the elevated tank project is described in more detail in Section 5 of this report.

2.2 Alternatives to an Elevated Tank

This section will look at the various alternatives to providing an elevated tank within the East-High Pressure Zone. Four things that must be provided by any alternative to an elevated tank includes the following:

- Increasing fire protection to at least 3,500 gpm for 3 hours on the east-side of USH 51.
- Providing for peak diurnal demand fluctuations during the day, and
- Providing a second source of water supply during temporary loss of supply from the Low Pressure Zone.
- Economically better or comparable to the total project cost of the new elevated tank which is expected to be $2.34M as discussed in detail in Section 5.

Five alternatives to an elevated tank will include the following:

1. Drilling another well east of USH 51
2. Connecting with Village of DeForest with an automated connection on the eastside of USH 51
3. Connecting to either the City of Madison, Sun Prairie or Windsor North Water System
4. Expanding the existing East-High booster station capacity and providing a second watermain connection under USH 51
5. Constructing a ground level reservoir and booster station on east-side of USH 51

These alternatives will be considered in more detail below:

2.2.1 Drilling another well east of USH 51

When looking for a third well site for Windsor we looked at the potential to drill a well on the east-side of USH 51 within the Bear Tree subdivision. Wisconsin DNR expressed concerns with drilling a well in this location as nearly the entire Bear Tree subdivision comprises the recharge area for both the Culver and Token Creek springs (See Exhibit 9 in Appendix A). As it would be difficult to demonstrate that a new well would not impact the springs, we abandoned the thought of drilling a new well east of USH 51 and ended up drilling Well No. 3 west of USH 51 in Cradle Hill Park.

If a suitable well site could be found on the east side of 51, the new well would need to be at least 2,400 gpm in size to provide the basic fire flow of 3,500 gpm plus a maximum day demand of around 400 gpm for the East-High Pressure Zone and assuming the existing booster station would provide 1,500 gpm. Revised costs for Well No. 3 well and wellhouse (capacity of 650 gpm) currently totals over $2,000,000, which is only slightly less than estimated project cost for a new elevated tank. The well would also need to be piped to the Bear Tree Farms subdivision with at least a 16" main. If able to be located even 1/2 mile away construction costs for this main are estimated at around $250/foot for the pipe and restoration that would add $700,000 in cost. Adding in additional costs for land, expansion of well and well house to 2,400 gpm, plus the watermain would total significantly more than the elevated tank, and still not provide as much fire protection as the elevated tank.

There would also be substantial operational issues associated with operating a large well during fire events and subject the distribution system to significant water hammer and pressure swings. There would also be concerns with maintaining bacteriological safe samples from a large well, if the well were not used on a regular basis.

Due to difficulty in finding a suitable well site, significantly higher costs, plus long-term maintenance/control concerns; adding a new well east of USH 51 is not a likely option versus construction of an elevated tank for the Windsor South System.

2.2.2 Connecting with Village of DeForest with an Automated Connection

DeForest and Windsor completed a Joint Water Study in 2011, with the results indicating that each system should be maintained as independent water systems, but with provisions to provide backup water during emergencies. Plans were developed and bids received to provide an automated emergency interconnect on the east side of USH 51, but this automated interconnect was never authorized by the Village of DeForest due to budgetary concerns and the planned automated connection has now been abandoned.

Currently a hard-piped emergency interconnect exists at the corner of Pederson Crossing and Reardon Road that can manually be operated during emergencies. While this connection could provide water during a long-term supply outage for the East-High Pressure Zone, due to a water main break or booster pumping station failure, the interconnect is manual. Hence depending on the severity or abruptness of the emergency, the system would likely lose pressure before it was manually able to be opened up, hence a "boil-order" would need to be issued due to the loss of system pressure. Even if an automated interconnect were implemented, system pressures within the East-High Pressure Zone would be less than DNR requires as the overflow elevation of DeForest's South Water System elevated tank is only at 1,060 feet (msl). Even with a full elevated tank, the DeForest South Water System would provide only 26 psi of pressure at high ground elevation of 1,000 feet (msl) at the north end of the Bear Tree Farms development. While this would meet DNR emergency pressure requirements of 20 psi, it is less than DNR minimum system pressure requirements of 35 psi that is required for long term normal system pressures and less than what currently is provided by the East-High booster station with a target hydraulic grade line (or HGL) of 1,120 feet. In comparison, the target HGL from the East-High booster station provides 52 psi of pressure at elevation 1,000 feet (msl). This would require DeForest or Windsor to install a booster station at the interconnection point to boost pressures into Windsor's East-High Pressure Zone.

To provide 3,500 gpm for fire plus an estimated maximum day demand of 400 gpm within the East-High Pressure Zone, the emergency connection and booster station with DeForest would need to provide around 2,400 gpm of the total required 3,900 gpm of supply, assuming that the existing booster station could provide 1,500 gpm. This is not an impossibly high flow amount, but it must also occur on a routine daily basis to meet domestic peak demands. Hence DeForest's well supply, storage and distribution systems would need to provide this without adversely impacting their system and at 35 psi not the emergency 20 psi needed only for fire demands. On a supply basis alone, the Village of DeForest does not have surplus water supply to be able to provide Windsor with significant additional water supply as they recently had to abandon their Well No. 5 (located just west of USH 51 and west of the DeForest portion of Bear Tree Farms), due to high radionuclide levels and well borehole issues.

Construction costs for the East-High Pressure Booster Station with a capacity of 1,500 gpm cost $800,000 in 2018. Adding in additional costs for the slightly higher capacity, engineering, and 4 years of inflation would likely add about 50% to the $800,000 construction cost. To arrive at a new booster station project cost in 2022 with 20% additional cost due to upsized booster station, 15% engineering and 15% inflation, would put the estimated booster station project cost at $1,200,000.

We have not analyzed what improvements would be needed for the DeForest system, but there would be some interconnecting piping and land costs required to build a booster station and added piping connections to transmit 2,400 gpm or more water to the Windsor side of the Bear Tree Farms subdivision. Adding in a $200,000 would bring final costs for a booster station and interconnect

from DeForest at around $1,400,000 (neglecting costs for improvements in supply and delivery within the DeForest system). This cost would be less than an elevated tank, if DeForest had available water supply and the system infrastructure to provide 2,400 gpm of water on a routine basis.

Per the 2011 Joint Water Study, a single elevated tank east of USH 51 was envisioned to provide both Windsor and DeForest with added fire protection. Without system infrastructure improvements on the DeForest side, construction of a booster station to provide water to Windsor from DeForest would be an added demand that would in fact decrease DeForest's water supply and firefighting potential.

As part of the 2019 PSC Application for Windsor's Well No. 3, we considered connections to DeForest and concluded that there was not enough well capacity within the DeForest system to provide an additional 500 to 650 gpm of water on a long-term basis. If a booster station were installed, DeForest would need to provide at least 2,400 gpm of water for infrequent fire demands and routinely to meet diurnal peak demands. For purpose of this report, we can assume that the diurnal peak demands would be able to be met with the 3,500 gpm fire demand, hence total capacity for the new booster station would still only be 2,400 gpm. Providing 2,400 gpm on a normal routine basis is a significant water demand that would likely be difficult for DeForest to provide without major improvements including a new well, storage and water piping infrastructure.

Given the current lack of excess well supply in DeForest we would reasonably expect that additional improvements would be required in the DeForest system to make a 2,400 gpm inter-connection viable, that at best would be similar to the cost of an elevated tank. Adding in past decisions by DeForest to not permit an automated interconnection, and cost of water from DeForest on a long term basis, we do not consider connecting with the Village of DeForest a readily available option for the Windsor South System.

2.2.3 Connecting to Other Neighboring Water Systems

Besides making a connection to DeForest, we considered connections to other neighboring communities, including Madison, Sun Prairie, and the Windsor North Water System, as part of the 2019 PSC Application for new Well No. 3. These options will be revisited below.

Madison

Madison is the next closest water system to Windsor. While Madison may have some excess well capacity, with their water conservation efforts and recent loss of major water users like Oscar Mayer and Bimbo Bakery, Madison does have PFAS pollution concerns in several of their wells, including the one closest to the airport (and Windsor). Hence there may be long term water supply issues with connecting to Madison that would require additional investigation.

Assuming that long term water supply issues could be solved, new water main would need to be connected from Madison to Windsor. As noted with the DeForest connection option, a supply of 2,400 gpm would be required. The closest connection to Madison would be near the airport at about 10,000 feet away. If water main could be installed at $250 per foot, costs for added transmission main would be $2,500,000, which exceeds the estimated cost of the new elevated tank. The $2,500,000 cost also does not consider additional costs required for boring under the interstate, USH 19, or wetlands, nor does it include metering and connection facilities, nor a possible booster station to lift water from the Madison system into the Windsor system. These additional items would increase construction costs to at least to $4,000,000 and project costs to over $5,000,000. Additionally, Windsor would need to purchase water from Madison, that would add annual cost for the Village of Windsor's users.

Due to costs alone Madison is not a reliable long term well supply option for Windsor South System.

Sun Prairie

Sun Prairie is the next major water system in the area, but is even further away than Madison, with distances of 18,000 feet. Additional costs would also be required to bore under USH 51 and possibly USH 19. As with the Madison alternative there would also be costs for metering, potential booster station and purchase cost of water. Assuming water is available, construction costs for transmission main alone would likely approach $4,500,000, not including a booster station.

Similar to the Madison alternative, Sun Prairie is not a reliable long term well supply option for the Windsor South System.

Windsor North System

The Windsor North System is controlled and operated by the Village of Windsor and has some excess well capacity that could provide enough firm well capacity to meet the Windsor South System's added fire demands but not for fire protection. The distance between the Windsor North and South Systems is over 18,000 feet as the crow flies. Similar to Sun Prairie costs, anticipated transmission main and construction costs would approach $4,500,000 alone. Additional storage would likely need to be considered as a required improvement within the Windsor North System. This would benefit the North System if storage were added to the North System, but that would add more cost to the project.

Due to transmission costs alone connecting to the Windsor North System is not a reliable long term well supply option for Windsor South System.

2.2.4 Expanding the Booster Station and Providing a Second Connection Under USH 51

The East-High Pressure Zone area, east of USH 51, is currently served by a single 12-inch watermain

connection that was installed under USH 51 when it was expanded to a four-lane divided freeway. Providing a second connection across USH 51 would require boring a second main under USH 51 and either expanding the existing booster station or building a new one. As noted in the alternatives above, an expanded booster station of at least 3,900 gpm would be required to meet the 3,500 gpm fire flow and 400 gpm expected maximum day demand.

Expanding the current 1,500 gpm booster station to 3,900 gpm would be very difficult. A simpler and likely less expensive alternative would be to simply add a new 2,400 gpm station instead. If a second booster station were built near the existing booster station facility, a second water main could then be bored under USH 51 and connected into the existing 12-inch main on Pederson Crossing.

Assuming a new 2,400 gpm booster station would be installed south of the existing booster station and connected into the existing suction piping network, total length required for new 16-inch discharge pipe would be approximately 2,000 feet in length, with over 300' of that length associated with the boring under USH 51. Construction costs for the boring under USH 51 are estimated at $1,000/foot, which would bring total watermain construction costs for 1,700 feet of open cut 16-inch main and 300 feet of bored 16-inch main under USH 51 to around $725,000. Engineering would add another $100,000 or so, bring the total watermain and boring project cost to $825,000. As noted with the DeForest option, project costs for a 2,400 gpm booster station would add another $1,400,000, bring the total to over $2,225,000.

Adding 3,900 gpm in total demand to Windsor's Low Pressure Zone system would be a significant demand that would be difficult to provide without added watermain reinforcement to the booster station locations.

Additionally, we would still need to add storage somewhere in the system to accommodate growth hence 400,000 gallons of additional storage that is still needed to be provided somewhere.

Due to costs alone providing a second connection across USH 51, expanding the existing booster station (or providing a new station), and constructing 400,000 gallons of storage elsewhere is not practical on a cost basis.

2.2.5 Constructing a Ground Level Reservoir and Booster Station on East-Side of USH 51

In lieu of constructing elevated storage on the eastside of USH 51, it would be possible to construct a ground level reservoir and booster station on the eastside of USH 51. This would provide a secondary source of supply and avoid installation of significant transmission mains, and/or boring under USH 51 as required for some of the alternatives noted above. Construction of a ground level reservoir with booster station would also avoid significant improvements to the existing distribution systems for Windsor or DeForest in terms of additional watermain infrastructure as noted for some of the other alternatives. If built at the site of the proposed elevated tank the

amount of watermain improvements required for the ground level reservoir option would be same as the elevated tank, which is proposed to connect to the 12-inch main in Eagle Mound Pass that will provide for the transfer of water in multiple directions throughout the distribution network.

Since the existing East-High Booster Station was designed to provide the maximum day demands for the entire East-High Pressure Zone, the ground level reservoir and associated booster station would be designed to provide the daily peak diurnal demands and fire protection.

As noted, the new ground level reservoir could be built in Water Tower Park north of Eagle Mound Pass or could be built elsewhere in the system. The new reservoir would also need to be built somewhat larger than 400,000-gallon elevated tank to accommodate the need for more turnover and some unusable portions of the reservoir that Andy Jacque refers to as "dead space". For ground level reservoirs, there is often a certain amount of "dead space" associated with the bottom few feet of the ground level reservoir to provide for adequate submergence depth for the booster pumps and to avoid potential disturbance of sediments. Hence a larger factor for Operational Storage and Effective Storage would be desired. The amount of dead space could be reduced somewhat during design phase, but not entirely eliminated.

Windsor built a 600,000-gallon ground level reinforced concrete reservoir with 3,500 gpm booster station in 2009 at a construction cost of $2,000,000. Assuming a total cost increase of 35% (15% engineering and 20% inflation) would put the total project cost of a new reservoir and booster station at $2,700,000 in 2022. Some savings could be provided if the tank were constructed of steel, but then there would also be long term maintenance costs associated with a steel tank.

The new booster station associated with the reservoir would need to be equipped with a series of variably sized booster pumps to handle varying demands in the system, hence the ultimate cost of this option could exceed $2,700,000. The existing East-High Booster Station has 5 booster pumps. Assuming the new booster facility would have 5 additional pumps, this would then require coordination of 10 pumps to be controlled for this relatively small pressure zone during the peak hour use. Additionally, there will need to be added control coordination to ensure proper turn over in the ground level reservoir as the reservoir would likely be filled during the nighttime and pumped out during daytime. It will also become more difficult (control wise) to deliver water from the East-High pressure zone into the Low Pressure Zone as the new pumping station associated with the reservoir would need to be operated to allow water to flow out of the East-High Pressure Zone and into the Low Pressure Zone through the pressure reducing valve at the East-High Booster Station. As a result of the above, controls and control logic will need to be more complicated.

There would be higher energy costs to repump water from the ground level reservoir than the elevated tank option as water would first be boosted from the East-High Pressure Zone booster station, then released into the new ground level reservoir (to atmospheric pressure) and then

ultimately boosted out again into the East-High Pressure Zone. Assuming half of the water demand in the zone would need to be re-boosted the additional energy cost would be add approximately $6,000/year in electricity cost from the facility due to loss of energy.

With a reduction in flow in and out of the reservoir, there would also be a greater concern with the degradation of water quality, including loss of adequate chlorine levels. As a result, it would be recommended that chlorine be added to the water leaving the reservoir and new booster station if needed. This will require the construction and operation of chemical feed equipment for this alternative.

As with all of the other alternative options note above, installing a ground level reservoir would cost as much or more than an elevated tank and result in higher annual and long-term maintenance costs and control concerns versus adding a new elevated tank for the Windsor South System. As a result, building a ground level reservoir and new booster station in the East-High Pressure Zone is not considered as good an alternative as an elevated tank.

2.3 Wisconsin DNR Consultation

We have not had any consultation with Wisconsin DNR about the elevated tank, however Wisconsin DNR has recommended that the Village of Windsor address the single source of supply issues east of USH 51 in their last two Sanitary Surveys. The latest sanitary survey dated December 14, 2021 (See Appendix D) states the following:

- The area on the east side of Highway 51 is currently served by one water main. The Department recommends that additional storage be constructed in the zone or that a looping water main be installed. A looped water main will help maintain water quality and improve fire flows in the area.

While we generally concur that looped water mains can help maintain water quality the looped service to the East-Side Pressure Zone will not materially affect water quality in the East-Pressure Zone as the new loop will simply become a looped dead-end. Similarly fire protection won't necessarily increase in the looped system as the physical limitation is the booster pumping capacity. Some minor increases in fire capacity would occur, but substantial improvement will only occur with added booster pumping capacity with a second booster pumping station or an elevated tank. As noted above in Section 2.2, an elevated tank is overall the most cost effective and beneficial alternative.

3.0 Site Information

3.1 General Site Description

The location for the proposed elevated tank site is in Tower Hill Park within the Bear Tree Farm Subdivision (Outlot 6 and 7) with an address of 4058 Eagle Mound Pass. The park currently consists of vacant land developed as part of the last two phases of the Bear Tree Farms subdivision that was formerly agricultural land. A new roadway (Eagle Mound Pass) and 12-inch water main was extended to the site in late 2021. Plans for additional watermain reinforcement will occur in the next few years as the remaining phases of the Bear Tree Farms and Covered Bridge Residence subdivision occurs that will provide for numerous flow water flow paths throughout the East-High Pressure Zone. The location of the elevated tank is also shown on the various maps located in the Appendix A. The U.S. Public Lands location description for the project is the NW ¼ of the SE ¼ of Section 28, T9N and R10E.

3.2 Specific Watermain and Sanitary Sewer Route Information

Water main for the new elevated tank will be connected to the system via existing 12-inch water main approximately 300 feet south of the proposed tank centerline on Eagle Mound Pass. This existing 12-inch water main when combined with the rest of the proposed Bear Tree Park subdivision, proposed Covered Bridge Residences, and Border Pass connection will provide substantial capacity to link the new elevated tank with the remainder of the East-Pressure Zone's Windsor South distribution system as shown in Exhibit 10 in Appendix A.

Exhibit 11 in Appendix A shows proposed site plan for the proposed elevated tank north of Eagle Mound Pass. The length of water main anticipated to be constructed is just over 200 linear feet in length and can be constructed through the vacant lot using open trench methods. The watermain was already extended out of the street with construction of the last phase of the Bear Tree Farms subdivision. A fire hydrant will be added just north of the street between two isolation valves to allow the elevated tank to be drained when needed or used for flushing purposes.

Connection to the sanitary sewer collection system will also be made at Eagle Mound Pass, south of the elevated tank with a sewer lateral extended with the last phase of the Bear Tree Farms subdivision phase. Sewer service will ultimately end up at Madison Metropolitan Sewerage District through the sanitary sewer collection system already in place.

3.3 Associated Facilities Information

3.3.1 The elevated tank will be constructed as a steel waterspheroid water tower with an overflow height of 1,120' msl. This will make the tower approximately 140' to overflow. A standard 400,000-gallon elevated tank has a tank diameter (above ground) of approximately 50.7 feet with a water

depth of 37.5 feet. At ground level, the elevated tank consists of a "tee-pee" shaped steel base cone with a diameter (at ground level) of approximately 22 feet.

3.3.2 No land is required to be purchased for the elevated tank facility as the tank, roadway watermain and sanitary lateral can all be installed in Outlot 6 and 7, that were dedicated to the project as Tower Hill Park.

3.3.3 Location of all mains entering and leaving facility and connecting to the larger system are shown in the site plan and in Exhibit 10 in Appendix A. Besides the new elevated tank there are no other structures that will impact adjacent landowners. Visually the tank will be set back from all adjacent homes and placed such that the tank is located adjacent to the rear yards of all the existing homes and new lots. While it will be impossible to visually hide the elevated tank, there will be no noise generated from the tank or water noises as water enters or leaves the tank.

3.3.4 The elevated tank will be located near the top of a hill, hence that are no waterways or wetlands within Tower Hill Park as shown in the DNR Wetlands, Surface Water, and Local Topography as shown on the various maps in Appendix A.

3.3.5 For access to the elevated tank, a 12-foot wide asphaltic driveway with turnaround will be constructed.

3.3.6 Disturbed grass will be restored after construction.

3.4 Staging Areas and Additional Temporary Workspace Requirements

The construction laydown/staging area for the proposed elevated tank will be located in adjacent Outlot 6 north of Eagle Mound Pass. The site plan as attached in Appendix A illustrates the location and site features.

The elevated tank site will require construction of a reinforced concrete foundation and extending approximately 8 to 10 feet below grade. The tank site (including foundation excavation and laydown areas) will fenced from public.

3.5 There are no lands or route segments for watermains that will be installed within a WisDOT ROW.

3.6 There are no route segments of the elevated tank project and watermain connections that will be within County road ROW. All work will be within the Village of Windsor and the municipality is fully aware of the proposed facilities. There will also be no construction within Eagle Mound Pass either as we have planned for the future tank water main and sanitary sewer lateral with the Bear Tree Farm Phase Five subdivision work.

3.7 Construction Impacts

3.7.1 The proposed construction sequence for the construction of the elevated tank and water main connection is noted below:

1. Pre-construction Activities – A work boundary fence will be installed along with necessary erosion control measures consisting of a silt fence and aggregate construction site entrance.
2. The tank manufacturer will prepare detailed tank erection drawings in preparation for steel fabrication.
3. The reinforced concrete tank foundation will be installed by digging down to bearing grade, setting reinforcing steel, and pouring concrete, including foundation walls to finished grade.
4. The tank steel will be fabricated, primed with initial zinc paint coating, and delivered to site.
5. The tank erection crew will weld together the fabricated steel together for new elevated tank and install necessary tank appurtenances, including riser pipe, overflow and hatches.
6. The tank painting crew will repaint and repair all weld seams and then paint the entire elevated tank. Installation of a painting shroud may likely be utilized for a portion of the work efforts due to the location of nearby homes and property lines.
7. Electrical work will be performed including bringing 120-volt power to the site, tank interior and exterior lighting, power for tank mixer, obstruction lights, and SCADA Controls, including modifications to booster pumping station.
8. The site work will be completed, including connection to existing water connections and sanitary lateral installation, plus asphalt driveway installation.
9. Final site restoration will be performed including installation of splash pad, riprap, topsoil and seeding.
10. The tank will be cleaned, disinfected, tested for water quality prior to puting into service.

3.7.2 The project construction methods will follow normal work tasks to complete the work items noted above. The construction zone disturbance for the tank itself will be approximately 60-foot diameter, with an additional 30 foot by 30 foot area for topsoil and excavated earth stockpiles. The trench for water main and sanitary sewer will be approximately 200 feet long and 8 to 10 foot wide each. A construction laydown area will also be set up in Outlot 6, south of the tank site that is estimated to be 50 foot by 100 foot in total size.

3.7.3 The construction disturbance zone will be contained within the designated property boundary. Any water discharged to waste due to pressure testing of water main will be discharged to the existing storm water system to the existing storm water detention basins.

3.7.4 The construction boundary limits will be contained within the limits of Outlot 6 and 7. Erosion control measures will be used to mitigate the construction impacts on the nearby roadways and lands within and adjacent to the subdivision.

3.7.5 Construction methods utilized for water main, sanitary sewer laterals and electrical utility will all be open trench.

4. 0 Natural Resource Impacts

4.1 Flood-Sensitive Facilities

The project site is not located within any known floodway or flood plain. See attached FEMA Floodplain map in Exhibit 3 of Appendix A.

4.2 Wetlands

4.2.1 No wetlands impacts are anticipated from the construction of the elevated tank. The project is located within the Bear Tree Farm subdivision and has developed storm water detention basins south of the elevated tank.

4.2.2 The nearest wetland is 3,500 feet from the proposed elevated tank as shown in Exhibit 4 of Appendix A.

4.2.3 There will be only minor discharge of water during initial flushing and testing of the water main connection for the tank. This discharge will be flushed out onto Eagle Mound Pass and directed to the stormwater collection system and infiltration/detention basins. Any necessary control measures to prevent any local scouring during water discharge will be implemented.

4.3 Waterbodies/Waterways

4.3.1 No waterbodies or waterways exist on the property or rights of way impacted by this project. See attached DNR Wetlands, Surface Water, and Local Topography in Appendix A.

4.3.2 There are no construction activities that would occur in flood plain or flood ways. See attached FEMA Floodplain map in Appendix A.

4.3.3 There are no waterbody and waterway crossings. See attached Water Surface map in Exhibit 4 of Appendix A.

4.3.4 Erosion control measures such as silt fences and stabilized construction entrances will be used to mitigate potential impacts to local streets and adjacent properties.

4.4 Rare Species and Natural Communities

4.4.1 We have performed an Information, Planning and Consultation (IPaC) Environmental review and Natural Heritage Inventory (NHI) review of the site and include this in Appendix A.

4.4.2 Information on the IPaC review is located in Exhibit 5 of Appendix A. The IPaC review contains listing of fish and wildlife resources that may be in the area. As expected for a formerly cultivated land adjacent to homes the area has no fish concerns and limited concerns for other animals including migratory birds.

4.4.3 Information from the Wisconsin DNR NHI (National Heritage Inventory) Portal search I shown on Exhibit 6 in Appendix A. The project is covered by the Broad Incidental Take Permit for no or low impact actives. The entire area is considered a high potential zone for the Rusty Patched Bumblebee, however based on 100% of our specific site having un-suitable habitat, the concerns to disrupt the Rusty Patch Bumblebee or its habitat are negligible.

4.4.4 There are no DNR identified follow-up actions required or recommended.

4.5 Historical Resources

4.5.1 The location for the elevated tank site was previously noted as being in Tower Hill Park within the Bear Tree Farm Subdivision (Outlot 6 and 7) with an address of 4058 Eagle Mound Pass. The park currently consists of vacant land developed as part of the last two phases of the Bear Tree Farms subdivision that was formerly agricultural land.

4.5.2 Exhibit 7 in Appendix A shows the Wisconsin Historical Society inventories of past archaeologic sites, burial sites, and cemeteries along with historical buildings, structures and other places. We reviewed the Wisconsin Historic Preservation Database (WHPD) found no past archaeologic nor historic features on or near the project location.

5.0 Estimated Project Costs

5.1 Estimated Project Capital Costs

The estimated project capital costs for the elevated tank are noted in Table 4, following the PSC standard accounts numbers and descriptions. A 10 percent contingency has been added along with Engineering, Soil Boring and Legal fees. The total estimated Project Cost is $2,340,000.

Table 4: PSC Standard Account Total Project Cost Estimates

Account #	Transmission and Distribution Plant	Estimated Cost
342	Distribution Reservoirs and Standpipes	$1.860,000
343	Transmission and Distribution Mains	$34,000
348	Hydrants	$ 6,000
	Subtotal	$1.900.000
Account #	General Plant	Estimated Cost
397.1	SCADA Equipment	$50,000
	Subtotal General Plant	$50.000
	SUBTOTAL CONSTRUCTION	$1,950,000
	Allowed Contingency (10%)	$195.000
	TOTAL CONSTRUCTION	$2,145,000
	Engineering, Soil Borings, Legal Fees (10%)	$195,000
	TOTAL ESTIMATED PROJECT COST	$2,340,000

A more detailed breakdown of the for the combined accounts may be found in Table 5 below.

Table 5: Breakdown of PSC Accounts 342, 343 348 and 397.1

Item	Qty	Unit	Unit Price	Ext Price
CBI Basic Tank Estimate	1	ea	$ 1,650,000	$ 1,650,000
Tank Enhancements	1	ea	$ 150,000	$ 150,000
Tank Subtotal				$ 1,800,000
Erosion Control and Seeding	1	ea	$ 20,000	$ 20,000
Water Main				
- Main	200	lf	$ 125	$ 25,000
- Connection	1	ea	$ 1,000	$ 1,000
- Hydrant	1	ea	$ 6,000	$ 6,000
- Valves	2	ea	$ 4,000	$ 8,000
Subtotal				$ 40,000
Sanitary Lateral				
- Lateral	200	lf	$ 60	$ 12,000
- Connection	1	ea	$ 500	$ 500
Sanitary Lateral Subtotal				$ 12,500
Asphalt Roadway and Turnaround	1	ea	$ 20,000	$ 20,000
Electrical Allowance	1	ea	$ 7,500	$ 7,500
SCADA Allowance	1	ea	$ 50,000	$ 50,000
SUBTOTAL CONSTRUCTION				$ 1,950,000

Adding in a 10% contingency ($195,000) and 10% Engineering, Soil Boring and Legal Fees ($195,000) brings the total Project cost to $2,340,000 as shown in Table 4.

5.2 Estimated Annual Operating and Maintenance Costs

Anticipated operating costs for the elevated tank using major expense accounts are noted below in Table 6. We have included $20,000 in additional annual expenses for ultimate tank repainting needs, that will be needed every 15 years or so.

Table 6: Additional Annual Operation and Maintenance Expenses for Elevated Tank After Year 2025

Category	Additional Annual Expense
Operational Labor (660)	$3,000
Storage Facilities Expenses (661)	$500
Transmission and Distribution Line Expenses (662)	$1,000
Maintenance of Distribution Reservoirs and Standpipes (672)	$20,000
Total Operation and Maintenance Expenses	$24,500

5.3 Property Costs

No property is being replaced or retired as a result of this project.

5.4 Project Funding

The project will be financed by Village of Windsor's water impact fees paid by the development of new properties. Growth in the area has prompted the Village to charge a water system connection fee of $3,000 for new water connections to reimburse the Village for cost of new supply wells and storage facilities. The impact fees will cover the costs to construct new infrastructure with little to no impact on water rates. The $3,000 impact fee pays for the Village's Well No. 1 Reservoir and Booster Station, the Well No. 3 project and the new 400,000-gallon elevated tank. The Village will also collect Payment in Lieu of Taxes (PILOT) fees from the Water Utility, and so it would be able to make up any periodic shortfalls if necessary.

5.5 Effect of the Project on the Cost of Operation, Quality of Service and Reliability of Service

Construction of the new 400,000-gallon elevated tank will substantially increase fire flows and system reliability for the East-High Pressure Zone and allow for increased storage in the Low-Pressure Zone as water from the new elevated tank can be bled back into the Low Pressure Zone through the existing East-High Zone Booster Station. The new elevated tank will also allow the booster station to be changed from a continuously running booster station (with pump operation on VFDs) to a more economical form of operation with pumps running at full speed to fill the new elevated tank. This will keep water pressures in the East-High Zone more stable and fewer high-pressure peaks and low pressure valleys associated with the booster station's current "pressure" control. This will reduce energy consumption and help reduce water main break potential.

Additionally, an elevated tank will provide for emergency flow of water that does not rely on mechanical pumps, electricity, or controls for it to be delivered into the system that a ground level tank or booster station requires, once it enters the tank. Hence an elevated tank is the recommended option for systems with one source of supply per Ten States Standards and Wisconsin DNR.

This request was prepared in accordance with PSC Type 3 Water Application Filing Requirements. It is believed that the information provided will meet your needs and we look forward to a rapid and positive review of our request to allow us to move forward with the 400,000-gallon Elevated Tank project.

Please call if you have any questions.

Sincerely,

BAXTER & WOODMAN, INC.
CONSULTING ENGINEERS

Gerald Groth, P.E.

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BAXTER & WOODMAN Consulting Engineers

APPENDIX MATERIAL

PSC Request Certificate of Authority to Construct
Windsor Water Utility (South System) – 400,000 Gallon Elevated Tank

Appendix A:

- Exhibit 1: Windsor South Water System Distribution Map
- Exhibit 2: Location of Proposed Elevated Tank on USGS Maps
- Exhibit 3: FEMA Flood Hazard Map
- Exhibit 4: Wisconsin DNR Water Surface and Wetland Location Map
- Exhibit 5: Information, Planning and Consultation (IPaC) Environmental Resources List
- Exhibit 6: National Heritage Inventory (NHI) Portal Information
- Exhibit 7: Wisconsin Historic Preservation Database (WHPD) Information
- Exhibit 8: Dane County Regional Airport Building Height Limitation Map
- Exhibit 9: Culver and Token Creek Springs Recharge Area Map
- Exhibit 10: East-High Pressure Zone Watermain Upsize Plan
- Exhibit 11: Elevated Tank Site Plan

Appendix B: 2016 Water Needs Assessment Study

Appendix C: Proposed Tank Schedule

Appendix D: 2021 Wisconsin DNR Sanitary Survey Report for Windsor South System

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September 8, 2016

Mr. Robert E. Wipperfurth
Village President
Village of Windsor
4084 Mueller Road
DeForest, WI 53532

Subject: Water Needs Assessment Study

Dear Mr. Wipperfurth,

The Village of Windsor has requested that a Water System Needs Assessment Study be performed to help establish impact fees for a new storage tank and well facility meant for the Village's southernmost portion of its water service area, formerly referred to as Windsor Sanitary District No. 1 (WSD No. 1).

The need for a new storage tank and well was previously outlined in a June 1, 2016 Comprehensive Water System Review study, performed in response to a request made by the Wisconsin DNR as part of their 2016 Sanitary Survey. The format for this Water Needs Assessment Study adds to the previous completed report, and follows the requirements for a Water Needs Assessment Study as noted in Wisconsin Statutes 66.0617; Impact Fees, as noted below.

- **EXISTING WATER SYSTEM INVENTORY** – Prepare an inventory of the major existing water system components and identify any existing deficiencies in quantity or quality.
- **IDENTIFY NEW OR EXPANDED WATER SYSTEM FACILITY REQUIREMENTS** – Identify new public water system facilities, improvements, or expansions of existing public facilities, that will be required because of land development impacts on the water system, based on service areas and service standards.
- **CAPITAL COST DEVELOPMENT** – Prepare a detailed opinion of the probable capital costs of providing the new public facilities, improvements or expansions of the existing public facilities. Include an estimate of the cumulative effect of all proposed and existing impact fees on the availability of affordable housing within the municipality.

EXISTING WATER SYSTEM INVENTORY

Existing Water Facilities

The southernmost portion of the Windsor Water Utility provides drinking water to a growing residential, commercial and industrial client base within the Village of Windsor and portions of the Village of Deforest. Currently the southernmost portion of Windsor Water Utility consists of the following major facilities:

- Two wells (Well No. 1 and Well No. 2)
- One 300,000 gallon elevated tank
- One 600,000 gallon ground level reservoir and attached booster pumping station
- Approximately 19.5 miles of water main ranging in size from 6 to 16-inches in diameter

Well No. 1

Well No. 1 is located at 6715 Park Street and housed in a small masonry building. The well pumps to a 600,000 gallon ground level reservoir located directly to the west of the well house. The well was constructed in 1961 to a depth of 400 feet below ground surface (bgs) and is cased with a 12-inch inner casing to a depth of 107' bgs. Water is withdrawn from the upper and lower sandstone aquifers with a vertical line shaft pump.

The current output of Well No. 1 is 650 gallons per minute (gpm). Standby power for the well house is provided by a fixed natural gas generator located within the booster pumping station adjacent to the 600,000 ground level reservoir.

Water quality from Well No. 1 is good with no primary (health related) contaminant exceedances such as radium, nitrate, or man-made chemical contamination. The well has no secondary (aesthetic) contaminant exceedances, with the possible exception of high natural hardness, which can result in higher soap consumption and scaling in water heaters and boilers. Water treatment includes the addition of sodium hypochlorite for disinfection and fluoride for the prevention of dental cavities.

Well No. 2

Well No. 2 is located at 6604 Lake Road (CTH CV) and is housed in a small masonry building. Well No. 2 is located approximately 2,350 feet southwest of Well No. 1 and pumps directly into the distribution system. The well was constructed in 1973 to a depth of 555 feet bgs and is cased with a 12-inch inner casing to a depth of 108' bgs. Water is withdrawn from the upper and lower sandstone aquifers with a vertical turbine line shaft pump.

The current output of Well No. 1 is 520 gpm. Standby power for the well facility is located just outside the well house with a fixed natural gas generator.

Water quality from Well No. 2 is similar to Well No. 1, with no primary (health related) contaminant exceedances nor any secondary (aesthetic) contaminant exceedances, with the possible exception of high natural hardness. Water treatment includes the addition of sodium hypochlorite and fluoride.

Total Existing Well Capacity

Current well capacity for Windsor's southernmost water system totals 1,170 gpm. Consistent with "good engineering" practice, it is recommended that the system have adequate well capacity to meet

expected maximum day demands with the largest well out of service, which is referred to as "firm" well capacity. For Windsor, this means that their "firm well" capacity (assuming Well No. 1 is "out of service") is 520 gpm, or 748,800 gallons per day (gpd).

300,000 Gallon Elevated Tank

An elevated tank with a capacity of 300,000 gallons is located east of Wolf Hollow Road and south of Windsor Road. The steel tank was built in 1987, is 112' above ground, and has an overflow elevation of 1047' above mean sea level. The tank was last inspected in 2012 and will be inspected again late this year in advance of its scheduled repainting (both inside and outside) in year 2017.

600,000 Gallon Reservoir and Booster Station

A 600,000 gallon reinforced concrete ground level reservoir was constructed in 2009 to provide additional fire-fighting capacity and emergency storage reserves for the system. A booster pumping station is attached to the reservoir and consists of the following major items:

- Three booster pumps, each with a capacity of 1,000 gpm and each operable with variable frequency drives (VFDs).
- A separate chemical room, which houses sodium hypochlorite and fluoride addition.
- Bathroom
- Meter testing equipment
- Fixed natural gas generator

Prior Planning Efforts

Concerns regarding inadequate amounts of well supply and water storage within the southernmost water system in Windsor have been discussed for many years, dating back to at least 1997. At that time, a comprehensive water study was completed for WSD No. 1. The 1997 comprehensive study analyzed existing and future water system needs and made recommendations for major system improvements including construction of a future third well (of 500 gpm) and a 400,000 gallon elevated tank to meet anticipated future demands and fire protection needs.

Water demands did not change substantially after the 1997 study was completed, partially due to the "slow down" in the residential housing and commercial markets, which significantly delayed the need to add a third well.

Between 1997 and 2007, WSD No. 1 continued to passively look at options and alternatives for adding a new well and supplementary storage within the system. FAA restrictions regarding where a new elevated tank could be located within WSD No. 1's existing service area (due to height restrictions with the Madison airport) eliminated most sites within the existing service area and led to plans which called for locating a future well and a ground level reservoir within Cradle Hill Park in the Holland Field's subdivision.

Developer driven pressure for additional fire protection capabilities (of at least 3,500 gpm for a three hour duration) continued from the late 1990's to approximately year 2007. In response to developer pressures, WSD No. 1 began construction of a 600,000 gallon ground level reservoir and booster pumping station adjacent to Well No. 1 to supplement fire-fighting and provide emergency storage needs. This storage project was completed in 2009.

Planning efforts for the Bear Tree Windsor and Bear Tree Deforest developments in 2010 resulted in completion of a Joint Water Study between Deforest and Windsor on 2011, which cooperatively recommended desired water supply facilities to serve the expanding area for the benefit of both communities, without duplication of major facilities.

For the Windsor system, the Joint Water Study proposed constructing a new elevated tank (and potential third well) for Windsor on the east side of Highway 51 (on the north end of the Bear Tree Windsor development) and proposed an interconnect between Windsor and the Deforest South system, near the intersection of Pederson Crossing and Reardon Road. The 2011 Joint Water Study affirmed the need for development of a high pressure zone on the east side of Highway 51 for both Windsor and Deforest and recommended a booster pumping capacity of at least 1,433 gpm, to serve the Bear Tree Windsor Development and noted water service area, which also included approximately 54 acres within the Village of Deforest.

Existing Water Demands

Water demands within the southernmost Windsor Water service for the years 2011 through 2015 area are noted in Table No. 1. These water demands were obtained from Utility pumpage data as obtained from Public Service Commission annual water reports. The table includes listed water pumpage demands for average day, maximum day, and the resulting ratio of the maximum day/average day demands. For easier comparison to well pump flow rates, we express maximum day demands in both millions of gallon per day (mgd) and its equivalent gallons per minute (gpm) flow rate.

Table 1: Past Water Pumping Data

Year	Average Day (MGD)	Maximum Day (MGD)	Maximum Day (GPM)	Max/Avg Ratio
2011	0.266	0.493	342	1.86
2012	0.282	0.629	437	2.23
2013	0.272	0.570	396	2.09
2014	0.276	0.452	314	1.64
2015	0.280	0.539	374	1.93
AVG	**0.275**	**0.537**	**373**	**1.95**

As noted in Table 1, average day demands for the southernmost water service area in Windsor have not changed dramatically. Maximum day demands are more variable than average day demands due to extremes in rainfall and temperature, which affect water use. The highest maximum day in the past five years was at 437 gpm in 2012, which was an extremely hot and dry year. Based on Windsor's firm well capacity of 520 gpm, some additional "well" capacity exists to meet growing demands. The maximum day/average day ratio represents proportionally how much higher maximum day demands are versus average day demands. The maximum day to average day ratio has averaged 1.95 over the past 5 years and is similar to other largely residential communities in the mid-west with lawn watering in the summer months.

Water Pressures

The existing low pressure zone is served by an elevated tank with an overflow of 1047 feet, above mean sea level (msl). Ground elevations within the low pressure zone range from 880' along Highway 19 and Lake Road, to as high as 940' near Windsor Road and the south end of North Towne Road. With the existing elevated tank at filled to its overflow elevation, static water pressures would range from 46 at high ground elevation of 940' and 73 psi at lower elevations. These pressures are between Wisconsin DNR's acceptable pressure range of 35 to 100 psi. Operationally the existing elevated tank is allowed to fall by approximately 10 to 20 feet between filling cycles, which would result in a decrease in water pressures of 4 to 8.5 psi. Subtracting even 10 psi off the lowest system pressure of 46 psi would still result in acceptable pressures.

Typical "design criteria" for evaluating elevated tank overflow and service area elevations, limit the area to be served to approximately 100' below the overflow elevation to allow for combined operational levels and distribution losses to fall by 20 feet and still meet the minimum code requirement of 35 psi. Hence the existing low pressure zone can practically serve to an elevation of approximately 947 feet.

System Flow Requirements

The Windsor water system is designed to distribute needed water supply to all locations within its distribution system from its two well facilities and elevated tank over a variety of flow conditions, which includes peak water use demands, including those required for fighting fires. The distribution system must be designed to handle a variety of flow conditions and consists of a network of adequately sized water mains to provide for both domestic and emergency fire flow requirements. A well designed distribution system must also be looped to provide for redundancy of service, in the event of a water main break.

Table 2 shows recommended levels for fire protection based on land use classification. The southernmost portion of the Windsor Water Utility generally provides these recommend fire flows along with normal system demands.

Table 2: Recommended Fire Flow Rates per Land Use Classification

Land Use	Minimum Fire Flow (gpm)
Single-Family Residential	1,500
Multi-Family Residential	2,000
Commercial – General	2,500
Office/Research	2,500
Major Commercial	3,500
Institutional	3,500
General Manufacturing	3,500

It should be noted that the actual required fire flow for all building classifications is a function of several attributes including bulding size, materials of construction, and proximity to other structures. The above fire flow rate guidelines for land use classifications are however a good guideline. Use of on-site fire protection measures such as individual building sprinklers can also be utilized to reduce overall fire protection needs.

Storage

Storage is desired in community water systems to meet both domestic requirements and for fire protection needs. Wisconsin DNR recommends that the amount of storage be determined from an engineering study with the following considerations:

a. Fire flow requirements established by the appropriate state Insurance Office should be satisfied where fire protection is provided.
b. The minimum storage capacity (or equivalent capacity) for systems not providing fire protection should be equal to the average daily consumption.
c. Excessive storage capacity should be avoided to prevent potential water quality deterioration problems.

Fundamentally storage is required to meet normal peak demands in a system on a daily basis. Storage to meet these peak flow conditions is commonly referred to as “domestic” or “equalization” storage. Additionally, storage is desired for normal operational fluctuations of water levels in the tanks and for emergencies, such as water main breaks, extended power outages, or any other unusual conditions that would interrupt normal water flow.

Total storage requirements are therefore equal to the amount of storage required for fire demands, peak flow equalization, normal operations and emergency reserves. For Windsor the following design criteria/assumptions are made to provide needed storage amounts:

- Fire Protection; 3,500 gpm for 3 hours, or 630,000 gallons (3,500 gpm x 3 hours x 60 min/hour = 630,000 gallons)
- Equalization Storage; 20% of Maximum Day Demand, or 112,000 gallons to meet current maximum day demands.
- Emergency and Operational Storage; 25% of the Maximum Day Demand or 140,000 gallons to meet current maximum day demands.
- Total storage requirements are therefore 882,000 gallons (630,000 + 112,000 + 140,000 = 882,000) to meet current demands.

Windsor currently has a total of 900,000 gallons of water in storage with 300,000 gallons in an elevated tank and 600,000 gallons in a ground level reservoir. A booster pumping station associated with the 600,000-gallon reservoir is equipped with an emergency generator and capable of delivering up to 3,000 gpm of water from the reservoir during fires or other emergencies. Based on the above, existing storage is adequate to satisfy existing demands, but is close to the recommended storage needs.

Existing Water System Deficiency Summary

Windsor's existing southernmost water system has no deficiencies in its water supply, storage or distribution system, with the exception of repainting of the elevated tank (which is considered normal system maintenance) and increasing pressures within the new Bear Tree and Windsor Crossing developments with the proposed East High Pressure Zone Booster Station (with the booster station being paid for through existing Developer Agreements currently in place).

IDENTIFY NEW OR EXPANDED WATER SYSTEM FACILITY REQUIREMENTS

Current Housing Developments

The Village of Windsor currently has several active residential housing develops. These major developments include Wolf Hollow, Prairie Creek, Acker/Pleasant Hill, and Windsor Crossings on the west-side of Highway 51 and the new Bear Tree development on the east-side of Highway 51. The Bear Tree development also includes approximately 54.4 acres within the Village of Deforest, which will be served with water from Windsor's southernmost Water Utility.

Typical water system evaluations utilize past water use data and published population projections for the community to help estimate future demands. Population data for the area served by the southernmost Windsor Water Utility is not readily available, as it covers only portions of two communities. To help estimate the population being served by the southernmost Water Utility service area in Windsor, we have been tracking the number of connections added to the system as shown in Table 3 and multiplying by 2.7 people per connection for several years.

Table 3: Added Active Service Connections per Year Since 2011

Year	Year End In-Use Connections	Estimated Population Served	Active Connection Demands (GPD)	Year End Service Connection Increases
2011	1002	2,705	265.1	0
2012	1013	2,735	279.1	11
2013	1075	2,903	253.5	62
2014	1132	3,056	243.9	57
2015	1209	3,264	231.5	77
AVG	**1086.2**	**2,933**	**254.6**	**41**

As noted in Table 3, the average number of active connections has been dramatically increasing over the past three years, due to increase in new housing developments. Actual water use per connection however has been decreasing, likely due to water saving plumbing fixtures and a more conscientious water conservation effort by individual homeowners and businesses. To help estimate future water demands we will utilize a per connection demand of 250 gpd.

Estimates for determining future demands can be approximated using the per connection water demands of 250 gpd as noted in Table 3, since we have a good estimate on the number of new homes that are being proposed for both the known existing and future developments.

Table 4 summarizes these known additional water supply needs for both the west-side and east-side Highway 51 developments utilizing the number of known residential equivalent units being developed at 250 gallons per day per unit for platted developments and 1,000 gallons (or 4 equivalent residential units) per gross acres un-platted future areas.

Table 4: Additional Known Future Water Demands

Developments	Average Day (MGD)	Maximum Day (MGD	Maximum Day (GPM)	Comments
West of Highway 51	0.18	0.36	249	650 total Units
East of Highway 51	0.16	0.32	226	596 Units + 54.4 Acres
Subtotal	**0.34**	**0.68**	**475**	~ 1,463

While the above demand assumptions are based on best available data, the demands are still approximate. To allow for other unknown in-fill developments and to satisfy a recent shift towards construction of larger apartment buildings with corresponding larger population and water needs, we will add an additional 25% to the known future totals above to arrive at a future "design" demand for planning purposes. Assuming existing average day and maximum day demands of 0.28 MGD and 0.56 MGD (0.56 MGD = 2 x 0.26 MGD), respectively, the following demands in Table 5 will serve as a more conservative planning value for future water requirements.

Table 5: Design Future Water Demands

Demands	Average Day (MGD)	Maximum Day (MGD)	Maximum Day (GPM)	Comments
Existing	0.28	0.56	389	Okay; < Existing Firm Well Supply
Future Added Demands at (+25%)	0.43	0.86	594	Will Exceed Existing Firm Well Supply
Total Future Demands	**0.71**	**1.42**	**983**	**Requires one new well**

As noted above, total additional future design demands of 594 gpm would be required to satisfy the known future developments, which would bring the total future maximum day water demands to 983 gpm. Hence a new well of at least 463 gpm of additional well supply would be required to meet the total future demands of 983 gpm. [983 gpm (total maximum day demand) minus 520 gpm (existing firm well supply) = 463 gpm of required additional minimum well supply.]

For design purposes we would recommend that the new well be designed to accommodate an ultimate supply of 650 gpm to match Well No. 1 and provide for additional unknown future demands. A smaller well pump (350 to 500 gpm) could be installed in the well borehole for the foreseeable future however.

To estimate how fast these developments are occurring, Table 3 showed how many new active service connections have been added to the system over the past 5 years. These estimates of past growth along with estimates of "per connection" demands will provide some indication of when the next well will need to be on line to satisfy "firm well" supply requirements.

While the average growth in year-end service connections over the past 5 years has been 41 connections per year, the past 3 years has been much higher at approximately 65 new connections per year. Assuming that 75 connections are added (a conservatively higher than average rate) and a "per connection" demand of 250 gpd, the added average day demand is estimated to be 13 gpm with twice that, or 26 gpm added on maximum days.

Using the highest maximum day demand of 437 gpm experienced in 2012, the southernmost area of Windsor would need to satisfy expected maximum day demand increases of 26 gpm each year, which would bring the total to 515 gpm in year 2018. The system would not however have adequate firm well capacity to meet expected demands in summer of 2019. Hence a new well would likely need to be operational prior to the end of 2018. Possible locations for a third well are noted in the following section.

Future Third Well Location

As noted earlier, future wells have previously been planned for in Cradle Hill Park (within the existing low pressure zone) and as an alternative location in Tower Hill Park (within the proposed East High Pressure Zone for the new Bear Tree Windsor development.

Each well location has its advantages and disadvantages. An advantage for the Cradle Hill Park location is that the new well would be able to deliver water into the low pressure zone at a lower pressure than a new well within the high pressure zone (which translates to energy savings if water is then required to be transferred to the low pressure zone). Disadvantages of a well in Cradle Hill Park are that construction would occur just northeast of the newly constructed Splash Park and the separation distance between a new well at Cradle Hill Park and the Village of Deforest's Well No. 4 (515 Yorktown Road) is only 4,050 feet. This distance is slightly less than the desired spacing of approximately one mile (5,280 feet) between sandstone wells, which is desired to eliminate or greatly reduce any potential well drawdown interferences between these two wells.

A significant advantage with a new well in Tower Park, is that the well would provide for a redundant source of supply within the new high pressure zone. Other advantages are that a new well in this location will be more than 1 mile from Deforest's new Well No. 5 (located just west of Highway 51 and south of Bear Tree Parkway) and over 8,000 feet from Token Creek and the Token Creek Springs. Another advantage is that the third well would be constructed within a new park, hence it would not disrupt any existing park improvements or visitors. A disadvantages of constructing a new well in Tower Park is that the well will likely need to be equipped with a VFD to allow it to successfully be pumped into the system for many years at a lower flow rate, due to low system demands east of Highway 51. Even with a VFD a portion of the flow will need to be bled back into the low zone system at the proposed High Zone Booster Pumping Station off of North Towne Road within new Windsor Crossing subdivision, which will slightly increase pumping costs until Bear Tree demands east of Highway 51 increase, with new home construction.

Preliminary planning efforts required for siting a new well, including both a hydrogeologic investigation and a well setback study, may help define which well site is more suitable than the other, although the site at Tower Hill Park appears to be the favorable option at this time.

Storage

As noted above, Windsor currently has 900,000 gallons of water in storage with 300,000 gallons in an elevated tank and 600,000 gallons in a ground level reservoir. While Windsor just has enough storage to meet existing demands, additional storage will be required to meet future fire demands, peak flow equalization, normal operations and emergency reserves. The following design criteria/assumptions are made to provide needed future storage amounts:

- Fire Protection; 3,500 gpm for 3 hours, or 630,000 gallons (3,500 gpm x 3 hours x 60 min/hour = 630,000 gallons).
- Equalization Storage; 20% of Maximum Day Demand, or 283,000 gallons.
- Emergency and Operational Storage; 25% of the Maximum Day Demand or, 353,750 gallons.
- Total storage requirements are therefore 1,266,700 (630,000 + 283,000 + 353,700 = 1,266,700) to meet future demands, which is 366,700 gallons short of available storage volume of 900,000 gallons.

Based on the above, future storage requirements will be approximately 366,700 gallons, which would indicate that a 400,000-gallon tank would be necessary to meet future needs. We would expect that the new elevated tank would not be built until more development occurs within the Bear Tree area and average day demands exceed approximately 400,000 gallons per day, which would put no more than 2 days of average day demand in elevated storage, to reduce concerns with freezing water in the winter and stagnant water during the summer. Based on estimates of current growth rate an average day demand of 400,000 will be achieved in year 2022 to 2023. If a new well is installed in year 2018, the new well pump could delay construction of the new tower for several years as the excess supply can be used to reduce domestic/equalization storage needs, as well as, the need for emergency reserve storage amounts, as you essentially have an infinite supply of water available to pump into the system at whatever the capacity of the installed well pump. Based on the above assumptions we estimate that the tank should be on line by approximately the year 2025.

The location of a new elevated tank in the system has previously been determined to be at Tower Hill Park. As previously noted this tank would be built with an overflow elevation of approximately 1,120 feet above mean sea level.

Future Water System Pressures

The existing low pressure zone area will continue to be served by the existing elevated tank with an overflow of 1047 feet, above mean sea level (msl). The new Bear Tree development and portions of the new Windsor Crossing development exceed 947 feet in elevation. Elevations within the proposed Bear Tree and portions of the new Windsor Crossing developments range from 920' to 1000' msl.

Previous studies (including the Joint Water System in 2011) looked a developing a new high pressure zone with a future elevated tank overflow at 1,150 feet above msl. The intent of this elevation was to serve an area as far north as possible. An overflow of 1,150 feet would result in pressures at the low ends of the Bear Tree and/or Windsor Crossing which would approach the 100 psi upper limit and would likely exceed it at the High Zone Booster Pumping Station, when delivering higher amounts of water into the high pressure zone.

As a result of the above high pressue concerns, a lower proposed future overflow elevation of 1,120' above msl was discussed in the past with WSD No. 1 Commissioners and recommended for the new

high pressure zone. This lower proposed overflow elevation for the high pressure zone would result in water pressures that would range from 52 and 86 psi at the high and low ground elevations with a design overflow elevation of 1,120' msl within the proposed high pressure zone. These pressures are also comfortably within the recommended code minimum and maximum pressures, including subtracting another 10 psi for overall water level fluctuations and system losses.

Discussions with Village of Deforest Village Engineer, looked at the potential to have the East High Pressure Zone connected with the Village of Deforest's North water system. The Joint Water Study lists high water levels in the Deforest North Water System at 1,096' msl. At 1,096' expected water pressures at overflow would be approximately 10 psi less than those noted above. Using the previously noted maximum service area elevation criteria of 100' below overflow, would result in a maximum desired service elevation of 996' msl. This is close to, but just under the 1,000' maximum elevation noted as existing in the Bear Tree Windsor.

Based on the above the proposed service elevation for the East High Pressure Zone will initially be established 1,120' msl. Operating at a future lower service gradient of 1,096' would be possible with the proposed VFDs.

System Flow Requirements

Until a new well or elevated tank is constructed east of Highway 51, the new Bear Tree development will be served by a single booster station and in some places a non-looped watermain. To keep the water system, east of Highway 51 in service during a major disruption, a manual interconnect with the Village of Deforest's South pressure system (served by an elevated tank with an overflow of 1,060') would keep system pressures within Windsor's new high zone at between 26 to 60 psi. While 26 psi is less than 35 psi for normal system pressures it is above the minimum emergency pressure requirements of 20 psi for these abnormal conditions. Hence the interconnect will provide Windsor with redundant supply until a future well or elevated tank is constructed.

The Windsor water system will be designed to distribute needed water supply to all locations within its distribution system from its new well, booster pumping facilities and elevated tank. The distribution system consists of a network of adequately sized water mains to provide for both domestic and emergency fire flow requirements. The distribution system will also be looped which provides for redundancy of flows in the event of a water main break.

Future Conclusions and Recommendations

Looking at future development it is evident that the southernmost portion of Windsor's Water Utility will need a third well in the next few years. Two locations have been identified in previous studies for locating a new well, including Cradle Hill Park on the north side of the Village and proposed Tower Park in new Bear Tree development, east of Highway 51. Advantages and disadvantages exist for both sites.

As demands grow, additional storage of at least 400,000 gallons is recommended. A new well would delay construction of a future elevated tank for many years. The location for the next storage tank has been previously identified as proposed Tower Park in new Bear Tree development, east of Highway 51. This tower is expected to be on line by year 2025.

Based on the above we offer the following conclusions and recommendations:

1. Complete the proposed East High Zone Booster Pumping Station for Bear Tree development, along with formalizing use of the manual interconnect with Deforest (Note that payment for the East High Booster Pumping Station will ultimately be paid for by Bear Tree developer as lots are sold, and is not part of any new special assessments.)
2. Begin a formalized Well Head Survey and Preliminary Design efforts to determine the preferred location for the proposed third well.
3. Construct a new well with a design capacity of 650 gpm by the end of 2018.
4. Future storage of approximately 400,000 gallons should be constructed east of Highway 51 by approximately year 2025. Initial thoughts are to build this tank to either 1,120' msl (or if the potential to merge with the Deforest North system at 1,096' msl).

CAPITAL COST DEVELOPMENT

This section will present a detailed opinion of the probable capital costs of providing the new public facilities, improvements or expansions of the existing public facilities. An estimate of the cumulative effect of all proposed and existing impact fees on the availability of affordable housing within the municipality is also noted.

Estimated New Well Construction and Project Costs

Estimated project costs (in year 2016 dollars) for a new well are estimated in Table 6, which includes a 20% factor for contingencies and 15% factor for engineering and legal fees.

Table 6: Estimated New Well Probable Construction and Project Costs (Year 2016 Dollars)

Item	Estimated Cost
Well Borehole	$200,000
Well Pump	$50,000
Well House (w/ Separate Chemical Feed Rooms)	$600,000
Generator	$100,000
Subtotal	**$950,000**
Contingencies @ 20%	$190,000
Engineering and Legal Fees @ 15%	$145,000
Total	**$1,285,000**

Estimated Storage Tank Construction and Project Costs

Estimated project costs (in year 2016 dollars) for a new 400,000-gallon tank are estimated in Table 7, which includes a 20% factor for contingencies and a 10% factor for engineering and legal fees. Note that the fee for elevated storage tank design is lower for an elevated tank then the 15% factor utilized for the proposed well and well house.

Table 7: Estimated Storage Tank Probable Construction and Project Costs (Year 2016 Dollars)

Item	Estimated Cost
Tank Foundation	$185,000
Tank Steel and Fabrication	$300,000
Tank Erection	$300,000
Tank Painting	$200,000
Site Work	$125,000
Electrical (including Cathodic Protection)	$75,000
Testing	$5,000
Subtotal	**$1,190,000**
Contingencies @ 20%	$240,000
Engineering and Legal Fees @ 10%	$120,000
Total	**$1,550,000**

Proposed and Existing Impact Fees and Affordable Housing

Existing impact fees are being collected by the Village of Windsor for the ground level reservoir and booster pumping station project that was constructed in 2009. The amount of this existing impact fee is $1,000.

Present worth costs for the well and elevated tank are expected to be $2,835,000 ($1,285,000 + $1,550,000 = $2,835,000). If this cost were spread out among the non-inflated new "equivalent" service connections on both the east and west sides of Highway 51, we would divide by a total of 1,463.6 users [650 + 596 + (54.4 x 4) = 1.463/6]. Using 1,460 as the number of equivalent service connections, would result in a present worth cost per connection of $1,941.78 per connection or approximately $2,000. This cost should be adjusted to appropriately provide for increased revenue to offset added costs for borrowing and inflation.

The term "affordable housing" refers to a household's ability to find housing within their financial means. Households that spend more than 30% of their income on housing are considered to experience cost burden. This term applies to all income levels. However what people typically mean

when using the term is to indicate low-income or subsidized housing. Such housing is usually restricted to occupancy by households that earn less than 80% the area median income (80%AMI).

Latest information (as published by Wisconsin DNR) indicates an AMI of $85,181 for the former Town of Windsor, which would result in an 80%AMI amount of $68,14 year. The monthly 30% spending level for the 80%AMI household amount would therefore be $1,703.63.

The added monthly principal and interest payment for both the proposed and existing impact fees of $3,000 are estimated at $14.46 based on a 30-year loan at 4% interest. The $14.46 amount is less than 1% of the total monthly payment. While an added cost, this amount is not considered a major obstacle to new home ownership.

Thank you again for this opportunity to assist you in this important issue. If during your review you would like additional information, please feel free to contact us.

Sincerely,

BAXTER & WOODMAN, INC.
CONSULTING ENGINEERS

Gerald D. Groth, P.E.
Windsor Utility Engineer

BAXTER & WOODMAN Consulting Engineers

Addendum to Water Needs Assessment Study

DATE: October 24, 2016

TO: Village of Windsor

FROM: Jerry Groth, P.E.

SUBJECT: Commercial and Multifamily Impact Fee Recovery

The purpose of this addendum to the Water Needs Assessment Study is to define the methodology for assessing commercial and multifamily properties for impact fees that utilize an Equivalent Residential User (ERU) or Single Family Unit (SFU) basis.

Background

A Water System Needs Assessment Study dated September 8, 2016 was completed for the Village of Windsor to help establish impact fees for a new storage tank and well facility meant for the Village's southernmost portion of its water service area, formerly referred to as Windsor Sanitary District No. 1 (WSD No. 1). This study developed an impact fee for new Equivalent Residential Users after a review of new water facility requirements to meet expected growth and outlining probable capital costs for providing the new facilities, which included a new well and elevated tank.

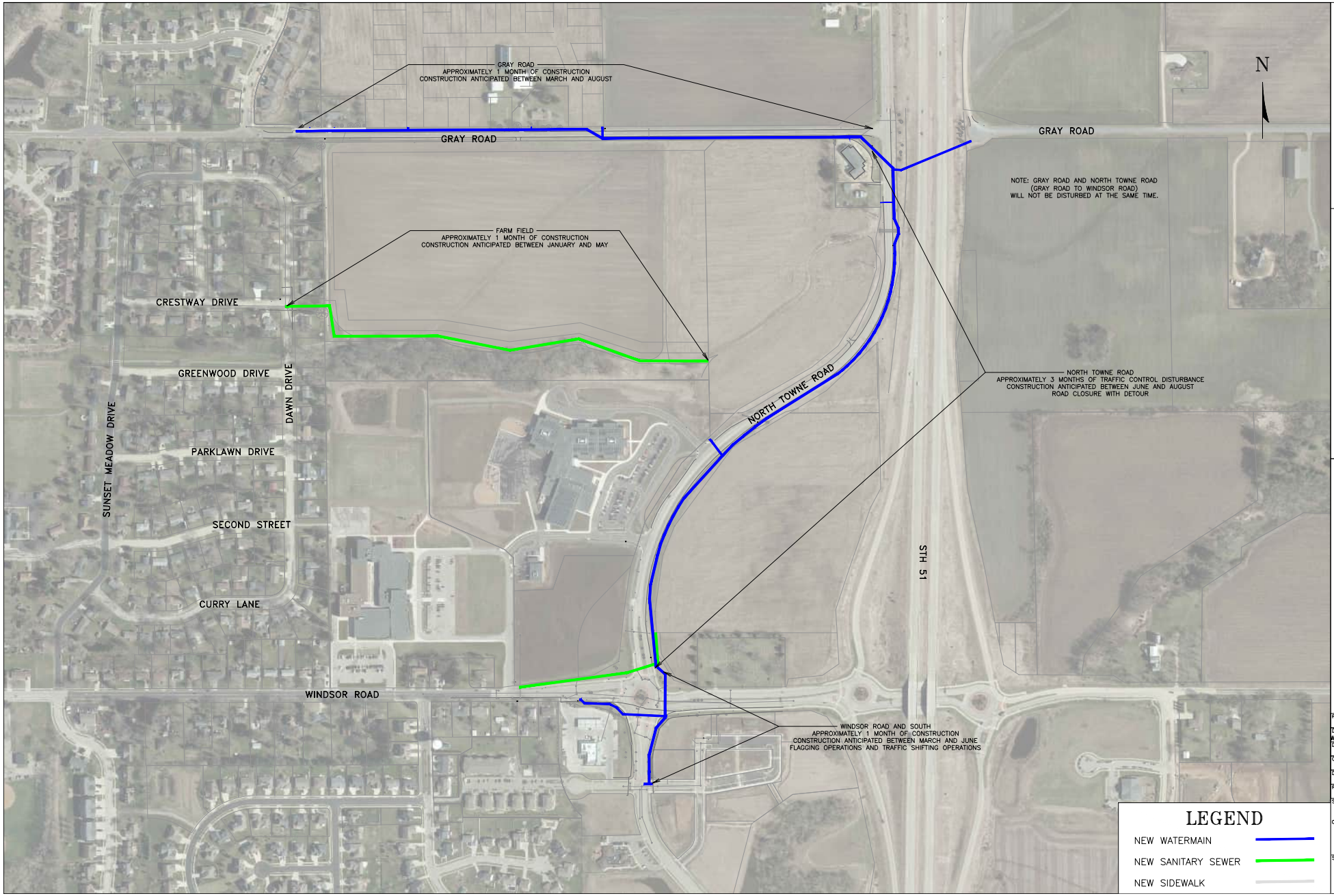
Methodology

Recent assessments for recovery of required infrastructure costs in Windsor been based on an "Equivalent Residential User" or ERU basis, with one (1.0) ERU for each single family lot and two (2.0) ERUs for duplexes.

Commercial property "ERU equivalents" shall be based on lot size for commercial/retail lots, based on "three (3.0) ERU equivalents per acre", based on average single family lot sizes of approximately 14,520 square feet each or 1/3 of an acre (43,560 square feet per acre).

Multifamily (including apartments, condominiums, and senior housing, but not duplexes) shall be established on a value of 2/3's of the total number of living units, which is based on DNR code NR 811.29 for estimating pumping capacity requirements.

Map 7
Municipal Utility Extension

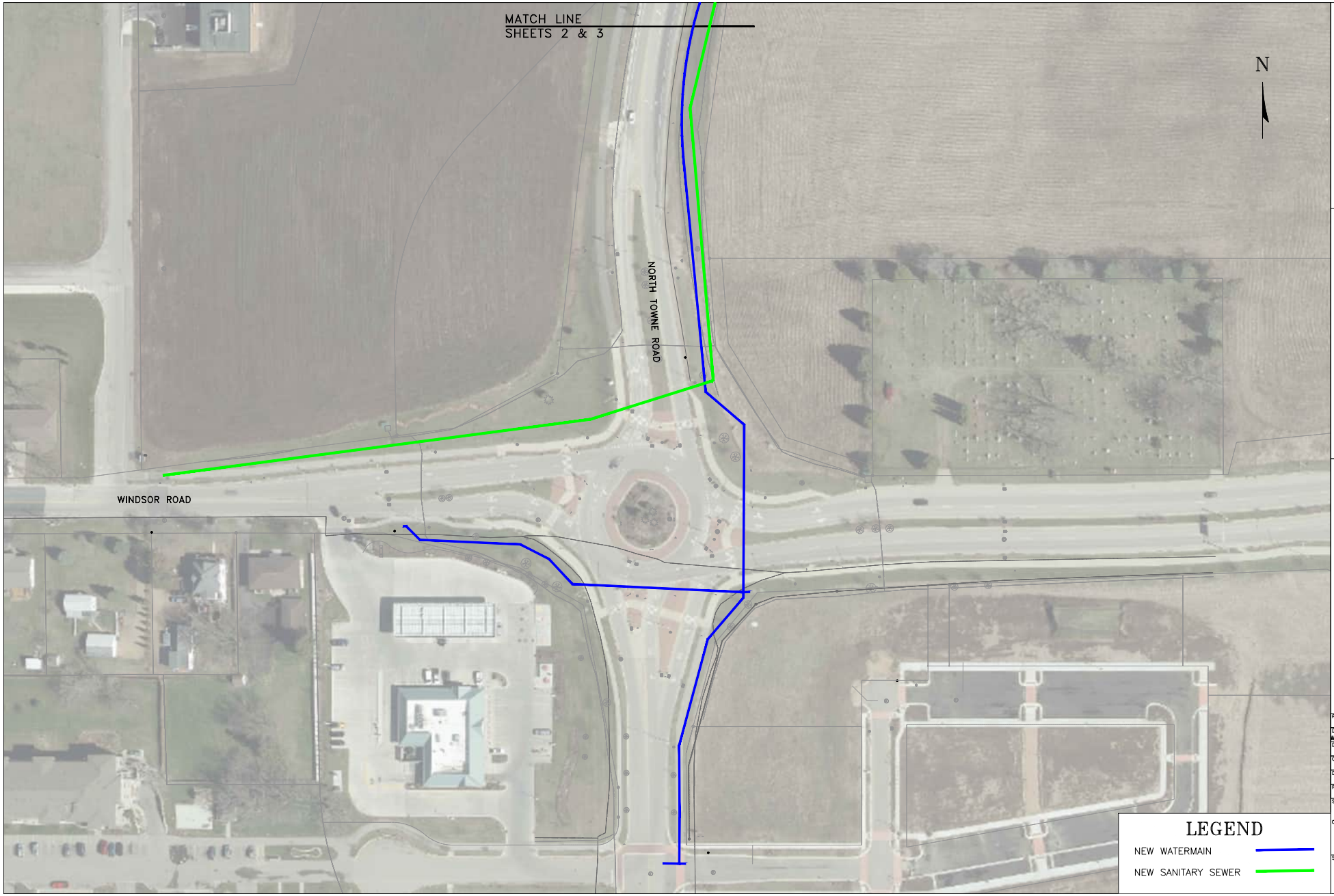


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SANITARY SEWER / WATER MAIN EXTENSION
GRAY / NORTH TOWNE ROAD

2027 UTILITY IMPROVEMENTS
GRAY ROAD, WINDSOR ROAD, AND
NORTH TOWNE ROAD
Village of Windsor, Wisconsin

PROJECT NO.:	WIN 66
DRAWING FILE:	WIN 66 SHEETS.DWG
DRAWN BY:	J.T.G.
CHECKED BY:	N.R.B.
DATE:	10-19-26
REVISIONS:	
SCALE:	0 50 100 200
SHEET:	1



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SANITARY SEWER / WATER MAIN EXTENSION
GRAY / NORTH TOWNE ROAD

2026 UTILITY IMPROVEMENTS
GRAY ROAD, WINDSOR ROAD, AND
NORTH TOWNE ROAD
Village of Windsor, Wisconsin

PROJECT NO.:	WIN 66
DRAWING FILE:	WIN 66 SHEETS.DWG
DRAWN BY:	J.T.G.
CHECKED BY:	N.R.B.
DATE:	9-22-26
REVISIONS:	
SCALE:	0 25 50
SHEET:	2

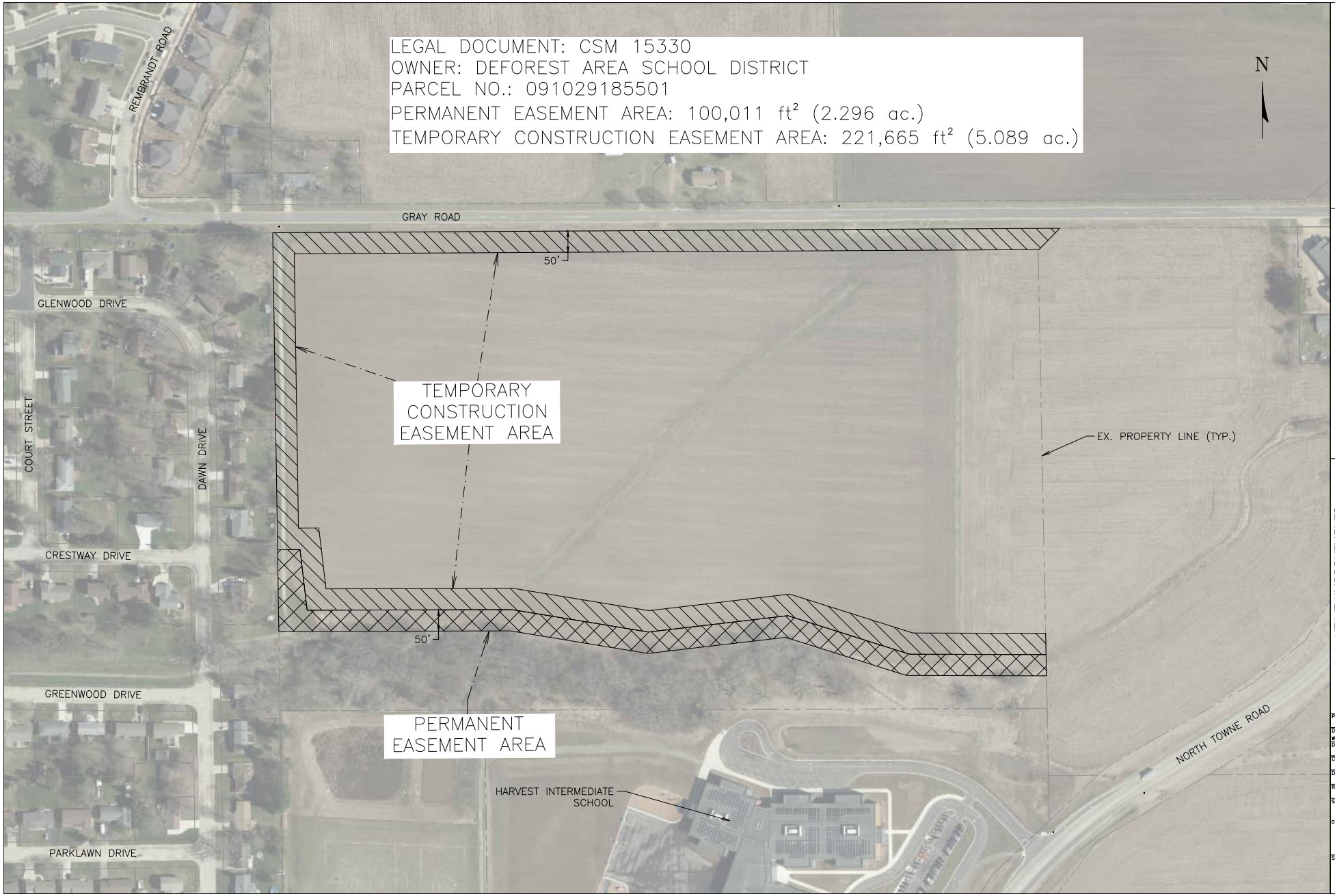


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SCALE:	0 25 50 100
SHEET:	3



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EASEMENT EXHIBIT
CSM 15330

2027 UTILITY IMPROVEMENTS
GRAY ROAD, WINDSOR ROAD, AND
NORTH TOWNE ROAD
Village of Windsor, Wisconsin

PROJECT NO.: WIN 66
DRAWING FILE: WIN 66 EASEMENTS.DWG
DRAWN BY: S.L.D.
CHECKED BY: N.R.B.
DATE: 9-21-26
REVISIONS:
SCALE: 0 25 50 100
SHEET: 1

Exhibit 5

The Graylands Stormwater Drainage Report

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL

Stormwater Drainage Report

The Graylands Residential Subdivision
Windsor, Wisconsin

Project Number: 26-225

October 9, 2026

Fehr Graham
200 Prairie Street
Suite 208
Rockford, Illinois 61107

Next Generation, Windsor Land, LLC
430 East Grand Avenue Ste 103
Beloit, Wisconsin 53511

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL

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Exhibits

Exhibit 1 Existing Site Watershed Map
Exhibit 2 Proposed Site Watershed Map
Exhibit 3 Hydrologic Soil Group Map
Exhibit 4 FIRMette Map
Exhibit 5 1-Year HydroCAD Results
Exhibit 6 2-Year HydroCAD Results
Exhibit 7 10-Year HydroCAD Results
Exhibit 8 100-Year HydroCAD Results
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Exhibit 10 WinSLAMM TSS Results
Exhibit 11 Soil Evaluation Report
Exhibit 12 WinSLAMM Infiltration Results
Exhibit 13 Storm Sewer Sizing

I. INTRODUCTION

This report summarizes the stormwater management design for a new single-family and two-family residential subdivision located north of Gray Road and east of Rembrandt Road in Windsor, Wisconsin. The proposed project includes subdividing the existing parcel to allow for residential home construction and the construction of new roads and utility extensions. The site is located on Parcel 491101 in the Village of Windsor.

II. PURPOSE OF ANALYSIS

The purpose of this analysis is to identify the impacts of the proposed development relative to stormwater runoff on site and show compliance, to the best extent practical with the Dane County Ordinance Chapter 14 and State of Wisconsin Administrative Code Chapter NR 151 requirements. The analysis will address the following:

- Maintain or reduce post-development runoff peak flow rates to that of pre-development runoff peak flow rates for the 1, 2, 10, 100 & 200-year MSE4 design rainfall events.
- Reduce the total suspended solids (TSS) load by 80%, based on the average annual rainfall.
- Infiltrate 90% of the pre-development infiltration volume, based on average annual rainfall.
- Meet or exceed the estimated average annual groundwater recharge rate.
- Provide thermal control to reduce the temperature of runoff to receiving waters.
- Provide sediment control during construction, limiting construction sediment loss to 5 tons per acre per year.

III. SITE CHARACTERISTICS AND LAND USE

The existing site is 37.7 acres of agricultural fields. Currently, approximately 95% of the site drains west through an existing drainage easement adjacent to the neighboring residential subdivision. Approximately 2.5% of the site discharges offsite in the northwest. Approximately 2.5% of the site drains to an existing depression in the southeast corner of the subject site. When this depression fills up, it discharges back into the site through a ditch along the north side of Gray Road. The remaining areas are located along the perimeter of the site and discharge offsite at various locations.

There are 49.1 acres of offsite area tributary to the site. An existing site watershed map is included in Exhibit 1. The proposed watershed map is included in Exhibit 2.

The hydrologic soil group of soils on site is mainly type B with some type C soils. See Exhibit 3 for more information on the existing site soil.

The site can be found on the FEMA Flood Insurance Rate Map (FIRM) Panel 55025C0252H dated 9/17/2014 for Windsor, Wisconsin. The FIRM map indicates that the existing site is not in the Special Flood Hazard Areas (SFHAs) subject to inundation by the 1% annual chance flood. See Exhibit 4 for the FIRMette Map.

The proposed development will continue to drain to the west discharge point. The majority of runoff will first be directed into a proposed wet pond for TSS reduction. The wet pond will drain into an infiltration basin before being discharged offsite.

A portion of the runoff will drain to the proposed depression in the southeast corner and continue to drain to the wet pond through storm sewer.

The majority of the offsite runoff will be bypassed along the site perimeter on the north and west sides of the site with a swale and will discharge offsite at the same location as the infiltration basin.

IV. STORMWATER RUNOFF

HydroCAD version 10.20-9a was used to model the pre- and post-development stormwater conditions. The results of the model are included in Exhibits 5, 6, 7, 8, and 9. Pond designs are described further in the following paragraphs. Pond locations are shown in Exhibit 2.

Runoff will be directed to a proposed wet pond that will settle out suspended solids prior to infiltration. The wet pond will discharge into infiltration basin to the south. The infiltration basin will meet infiltration requirements, increase storage volume, and control the peak discharge. The maximum ponding depth will not exceed 2 feet up to the 200-year storm event. The infiltration basin will discharge to the existing drainageway to the west of the site. The bypass swale will also discharge at this location.

The Dane County Ordinance requires sites to maintain or reduce the peak runoff discharge rates, to the maximum extent practicable, as compared to predevelopment conditionally the 1-year, 2-year, 10-year, 100, year and 200-year, 24-hour design storm applicable to the post-construction site.

The existing and proposed peak discharges from the site and basin peak elevations from the modeling results are shown in the following tables. See Exhibits 5, 6, 7, 8, and 9 for the HydroCAD modeling.

Table 1: Pre-Development Peak Flows

Storm Event (Yr.)	Total Peak Flow (cfs)
1	11.86
2	18.76
10	51.28
100	137.49
200	169.65

Table 2: Post-Development Peak Flows

Storm Event (Yr.)	Total Peak Flow (cfs)	Total Peak Flow with No Controls (cfs)
1	7.18	49.54
2	11.46	67.62
10	31.14	144.11
100	109.27	326.91
200	139.57	392.37

Table 3: Post-Development Basin Elevations

Storm Event (Yr.)	Wet Pond Peak Water Surface Elevation (ft.)	Infiltration Basin Peak Water Surface Elevation (ft.)	SE Depression Peak Water Surface Elevation (ft.)
1	932.34	931.58	955.04
2	932.56	931.63	955.17
10	933.40	931.86	955.62
100	935.55	932.27	956.23
200	936.39	932.37	956.38

Based on the calculations as shown, the proposed stormwater measures result in a reduction of the peak discharge in the proposed condition compared to the existing condition; therefore, the peak flow reduction requirements are met.

V. TOTAL SUSPENDED SOLIDS REMOVAL

The Dane County Ordinance requires 80% TSS removal in the average annual rainfall event. The State of Wisconsin Administrative Code requires 60% TSS reduction prior to infiltration. WinSLAMM version 10.5.2 was used to model the TSS reduction in the average annual rain event.

A standard land use of Medium Density Residential No Alleys (MDNR) was used for the project area in the post-development WinSLAMM models. A small portion of the proposed site will include alleys; the paved area from this portion of the site was calculated separately and added to the total paved parking value.

The proposed wet pond is designed to meet Dane County and State standards and settle out suspended solids. The bottom of the wet pond is set 6’ feet lower than the outfall into the infiltration basin to allow for settling of solids. In the average annual rainfall, the wet pond will remove 82.03% of the total suspended solids prior to infiltration, meeting the State requirement. During the average annual rainfall in the proposed design, the overall TSS reduction for the site is 95.14%, meeting the County requirement when including TSS removal within the infiltration basin as well as the wet pond. The overall drainage area WinSLAMM results are included in Exhibit 10.

VI. INFILTRATION

The Dane County ordinance requires the site to infiltrate 90% of the pre-development infiltration volume during the average annual rainfall. The WinSLAMM infiltration modeling includes all onsite areas and removes all offsite drainage areas to show that the site is meeting the infiltration requirements without relying on offsite runoff. A free discharge from the site was assumed. The modeling results indicate that the post-development site infiltration volume provided will meet the infiltration requirement. Exhibit 11 contains the WinSLAMM infiltration modeling results and calculations.

Table 4: Total Infiltration

Development Condition	Runoff Volume (cu. ft.)	Percent Infiltrated (Stay-On)
Pre-Development	250,375	
Post-Development	196,922	101.4%

The soil and site evaluation determined that the soil at the ground surface of the existing site is silt loam. The soil at the depth of the proposed infiltration basin varies. The most restrictive infiltration rate was used. The Soil Evaluation Report is included in Exhibit 11.

VII. GROUNDWATER RECHARGE

The post-development site will utilize the infiltration basin to meet or exceed the average annual groundwater recharge rate. For informational purposes, the groundwater recharge was quantified using WinSLAMM modeling, and the results are shown in the table below. A conservatively high recharge rate of 10.0 inches per year was assumed to determine the pre-development recharge based on Figure 5 of the Wisconsin Geological and Natural History Survey's 2009 report, Groundwater Recharge in Dane County, Estimated by a GIS-Based Water-Balanced Model. WinSLAMM was used to determine the groundwater recharge, using the same model that was used for meeting infiltration requirements. Exhibit 12 contains the WinSLAMM recharge modeling results and calculations.

Table 5: Total Groundwater Recharge

Development Condition	Average Annual Recharge Volume (ac*ft/year)	Percent Recharged
Pre-Development	26.99	
Post-Development	40.41	128.8

VIII. THERMAL CONTROL

By meeting the infiltration requirements, thermal control requirements are also met.

IX. STORM SEWER CALCULATIONS

The capacity of each storm sewer pipe was sized to meet or exceed the 10-year flow rate. Overland flow routes have been provided for larger storm events. See Exhibit 13 for storm sewer sizing calculations. The culverts located in the bypass swale were sized for the 200-year storm event in HydroCAD. See Exhibit 9 for the bypass culvert sizing.

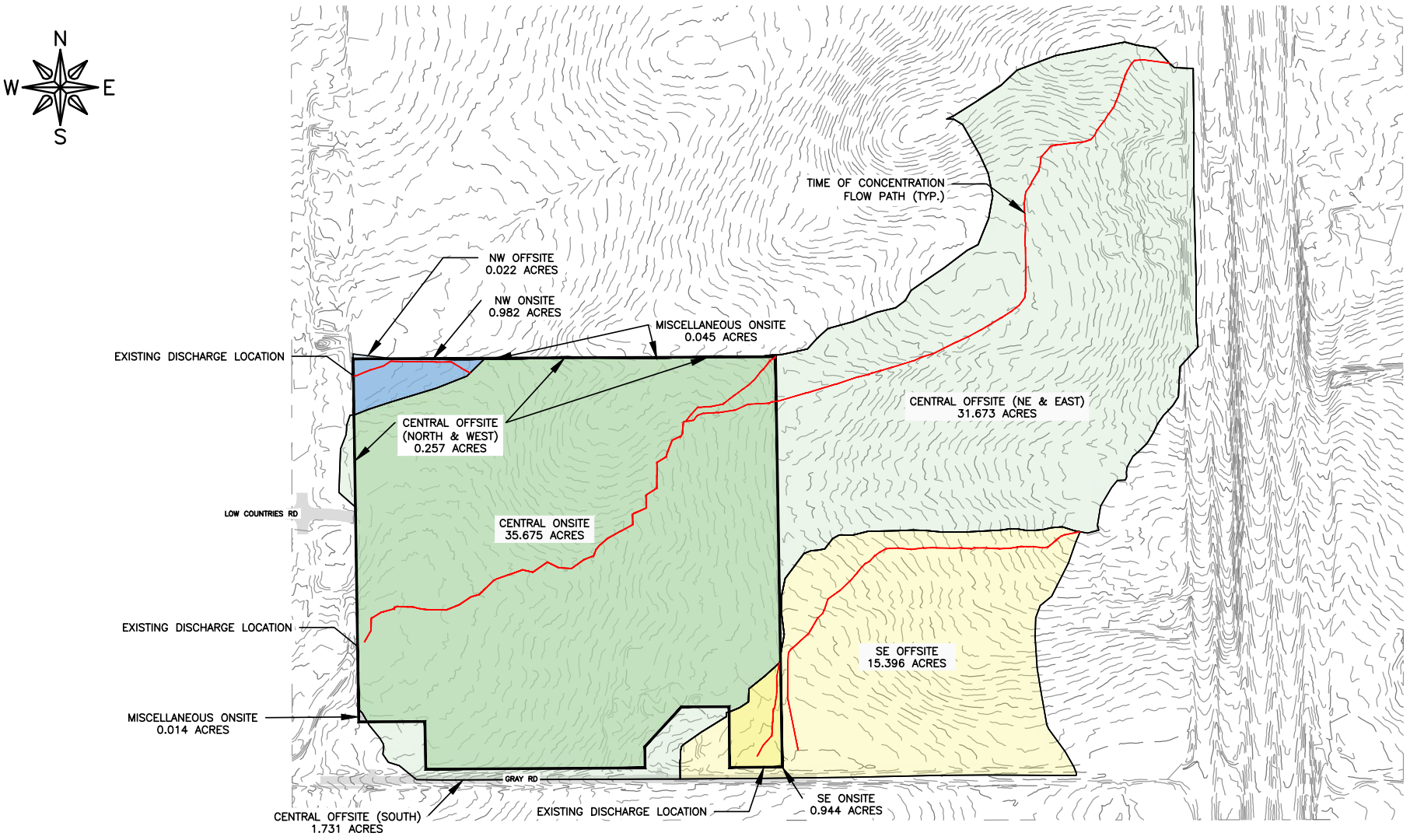
X. CONCLUSION

Overall, the proposed development meets the release rate, total suspended solids reduction, infiltration, groundwater recharge, thermal control, and sediment control requirements as required by the Dane County Ordinance and State of Wisconsin Administrative Code Chapter NR 151 to the greatest extent practical.

Exhibits

Exhibit 1

Existing Site Watershed Map



EXISTING DRAINAGE AREAS

10/2/2026

300 0 300 FEET
GRAPHIC SCALE IN FEET

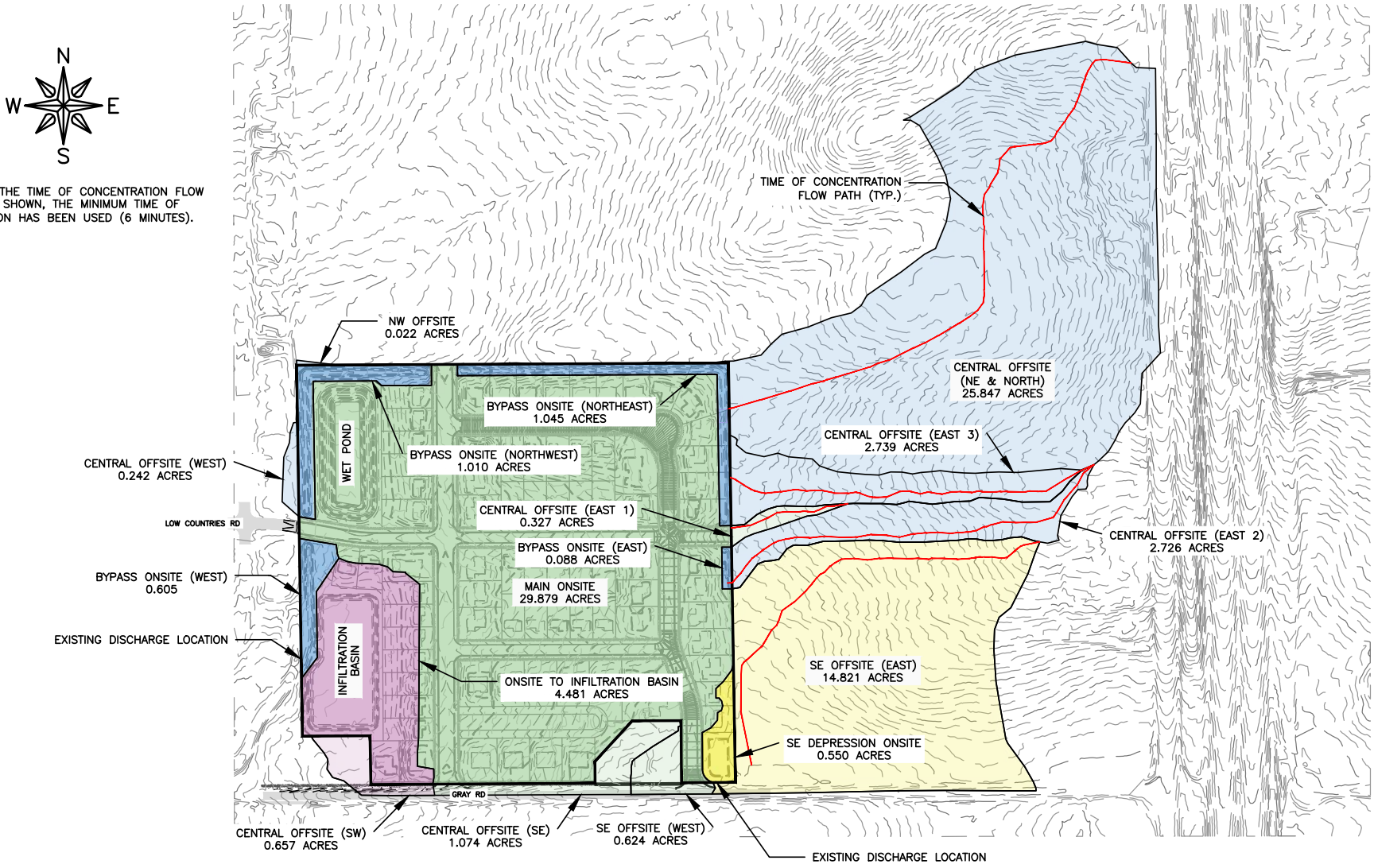
FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525
ILLINOIS
IOWA
WISCONSIN

G:\C3D\26\26225\Engineering\26-225 Stormwater.dwg, Ex Drainage Areas
PLOT DATE: 10/2/26

© 2026 FEHR GRAHAM

Exhibit 2

Proposed Site Watershed Map



PROPOSED DRAINAGE AREAS

300 0 300 FEET
GRAPHIC SCALE IN FEET

10/8/2026

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ILLINOIS
IOWA
WISCONSIN

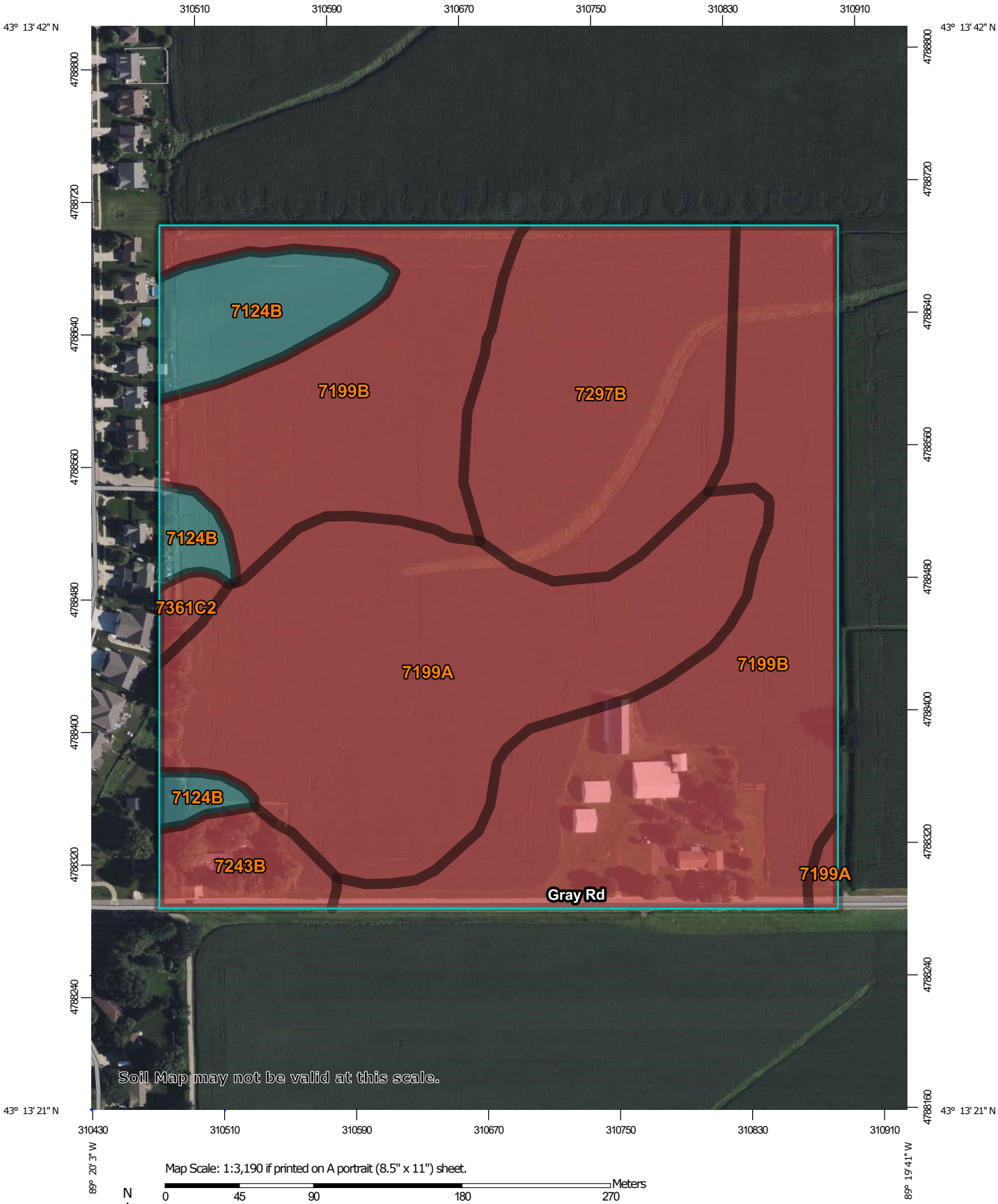
G:\C3D\26\26225\Engineering\26-225 Stormwater.dwg, Pro Drainage Areas
PLOT DATE: 10/8/26

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Exhibit 3

Hydrologic Soil Group Map

Hydrologic Soil Group—Dane County, Wisconsin
(26-225 Windsor Residential Development)



Map Scale: 1:3,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dane County, Wisconsin
Survey Area Data: Version 24, Sep 10, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 4, 2022—Sep 13, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
7124B	Dodge silt loam, 2 to 6 percent slopes	C	2.9	6.9%
7199A	Plano silt loam, till substratum, 0 to 2 percent slopes	B	12.2	28.9%
7199B	Plano silt loam, till substratum, 2 to 6 percent slopes	B	18.1	43.0%
7243B	St. Charles silt loam, 2 to 6 percent slopes	B	1.3	3.1%
7297B	Ringwood silt loam, 2 to 6 percent slopes	B	7.3	17.3%
7361C2	Kidder loam, 6 to 12 percent slopes, eroded	B	0.3	0.8%
Totals for Area of Interest			**42.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

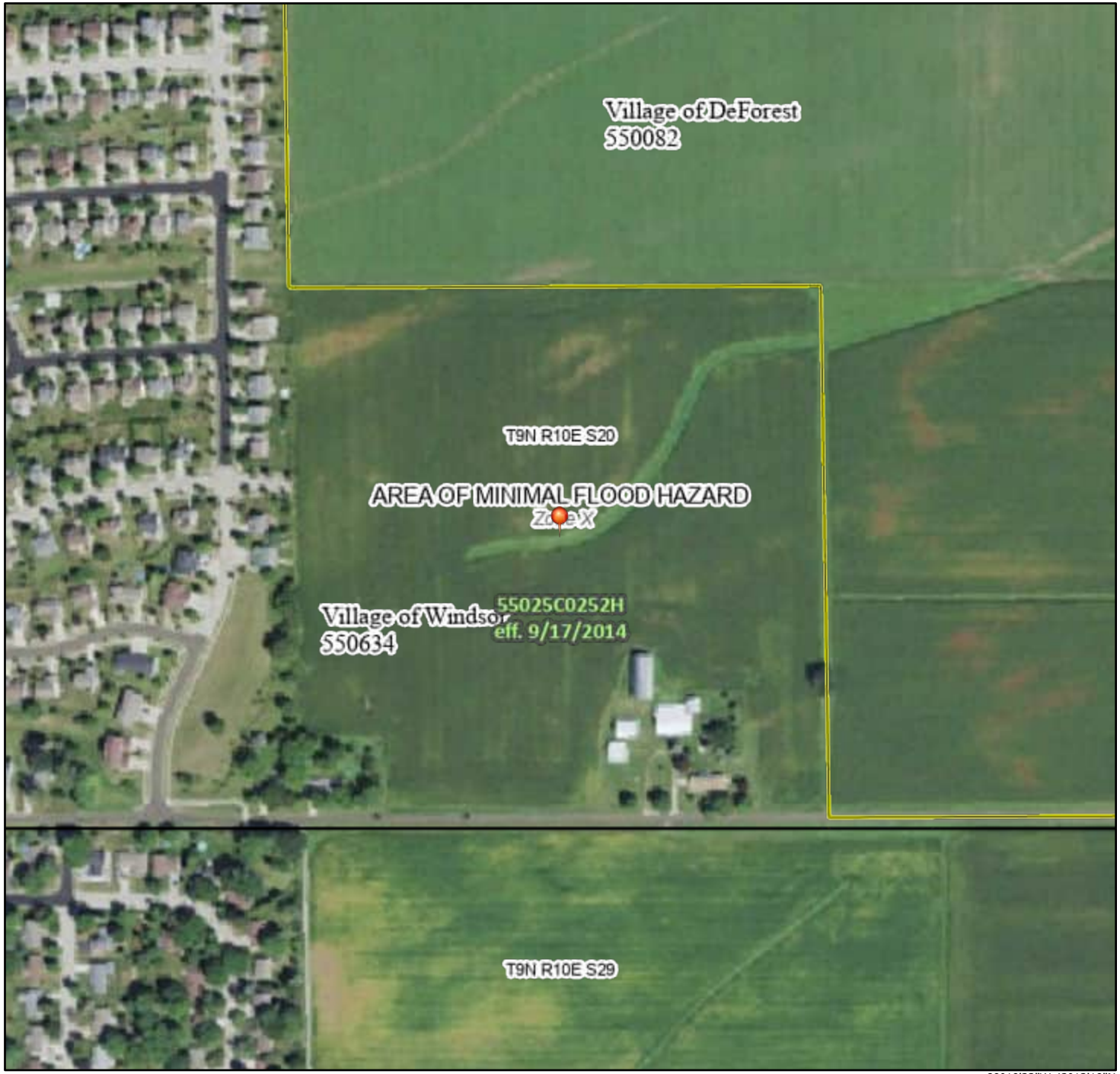
Tie-break Rule: Higher

Exhibit 4

FIRMette Map

National Flood Hazard Layer FIRMette

89°20'11"W 43°13'45"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

89°19'33"W 43°13'19"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

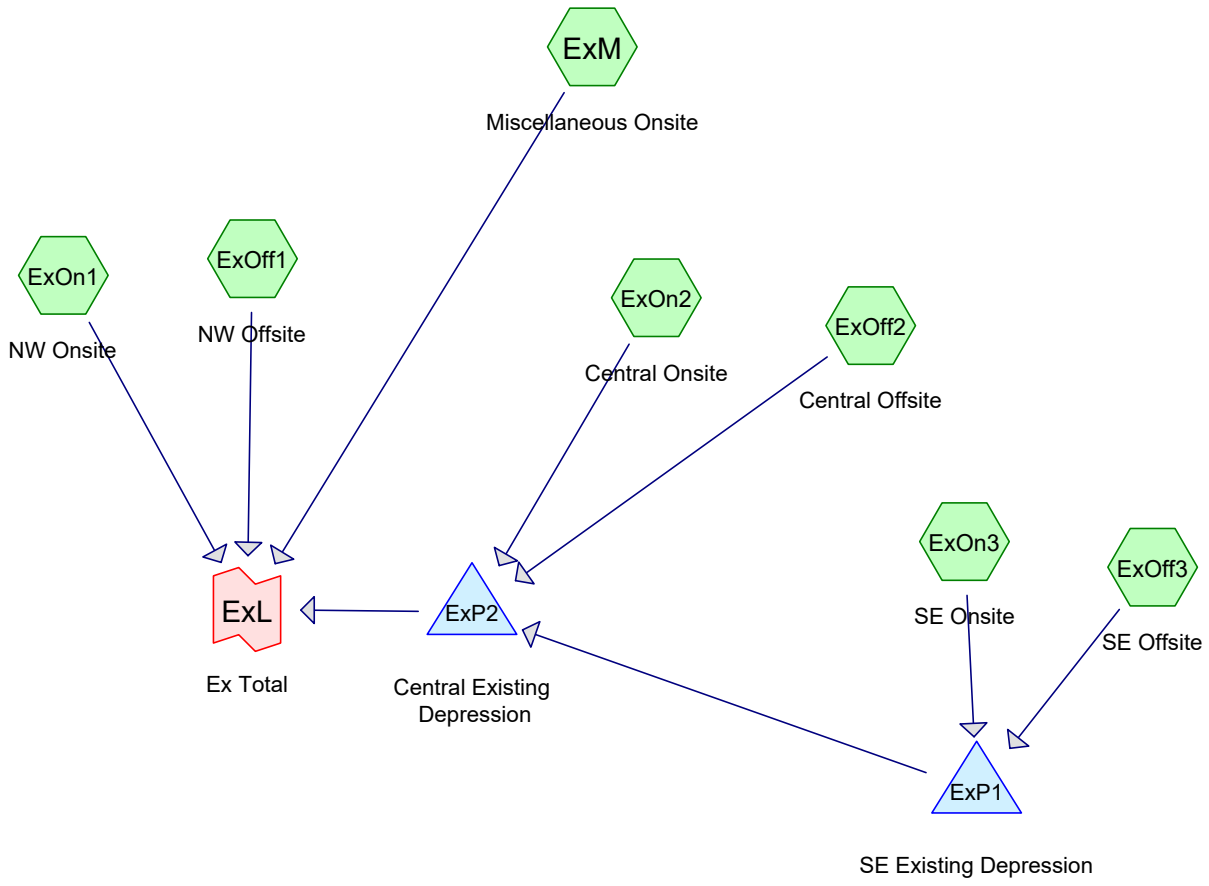
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/26/2026 at 8:03 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Exhibit 5

1-Year HydroCAD Results

Existing



Subcat Reach Pond Link

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentExM: MiscellaneousOnsite Runoff Area=2,540 sf 0.00% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=68 Runoff=0.03 cfs 0.002 af

SubcatchmentExOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=68 Runoff=0.01 cfs 0.001 af

SubcatchmentExOff2: Central Offsite Runoff Area=1,466,288 sf 2.41% Impervious Runoff Depth=0.38"
Flow Length=3,502' Tc=51.7 min CN=68 Runoff=5.51 cfs 1.076 af

SubcatchmentExOff3: SE Offsite Runoff Area=670,631 sf 2.40% Impervious Runoff Depth=0.42"
Flow Length=1,396' Tc=20.1 min CN=69 Runoff=4.84 cfs 0.534 af

SubcatchmentExOn1: NW Onsite Runoff Area=42,806 sf 0.00% Impervious Runoff Depth=0.56"
Flow Length=386' Tc=8.2 min CN=73 Runoff=0.74 cfs 0.046 af

SubcatchmentExOn2: Central Onsite Runoff Area=1,554,006 sf 0.53% Impervious Runoff Depth=0.38"
Flow Length=1,792' Slope=0.0168 '/' Tc=25.6 min CN=68 Runoff=8.70 cfs 1.140 af

SubcatchmentExOn3: SE Onsite Runoff Area=41,039 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=311' Tc=13.4 min CN=68 Runoff=0.32 cfs 0.030 af

Pond ExP1: SE Existing Depression Peak Elev=955.36' Storage=18,786 cf Inflow=5.10 cfs 0.564 af
Discarded=0.15 cfs 0.518 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.518 af

Pond ExP2: Central Existing Depression Peak Elev=931.52' Storage=21 cf Inflow=11.67 cfs 2.216 af
Discarded=0.00 cfs 0.000 af Primary=11.66 cfs 2.216 af Outflow=11.66 cfs 2.216 af

Link ExL: Ex Total Inflow=11.86 cfs 2.264 af
Primary=11.86 cfs 2.264 af

Total Runoff Area = 86.737 ac Runoff Volume = 2.829 af Average Runoff Depth = 0.39"
98.42% Pervious = 85.367 ac 1.58% Impervious = 1.370 ac

Summary for Subcatchment ExM: Miscellaneous Onsite

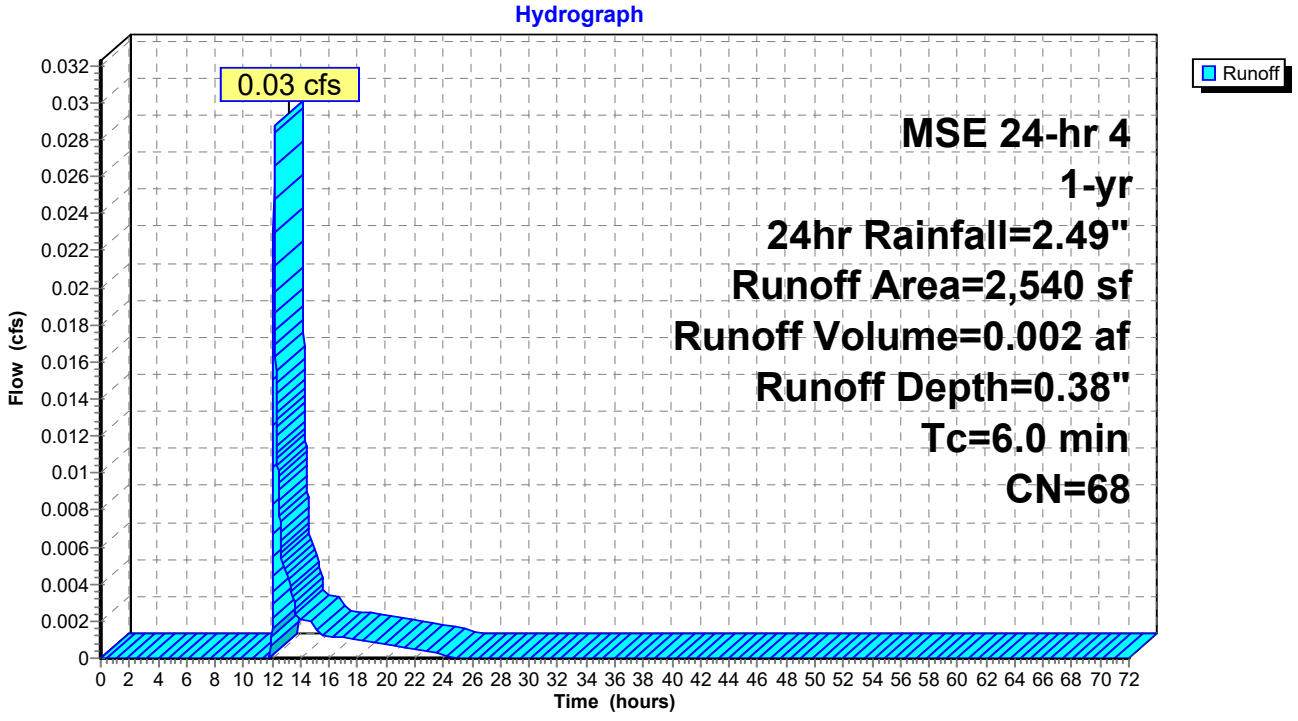
Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 0.38"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	1,288	68	Cropland, HSG B Onsite
*	638	68	Cropland, HSG B Onsite
*	614	68	Cropland, HSG B Onsite
	2,540	68	Weighted Average
	2,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExM: Miscellaneous Onsite



Summary for Subcatchment ExOff1: NW Offsite

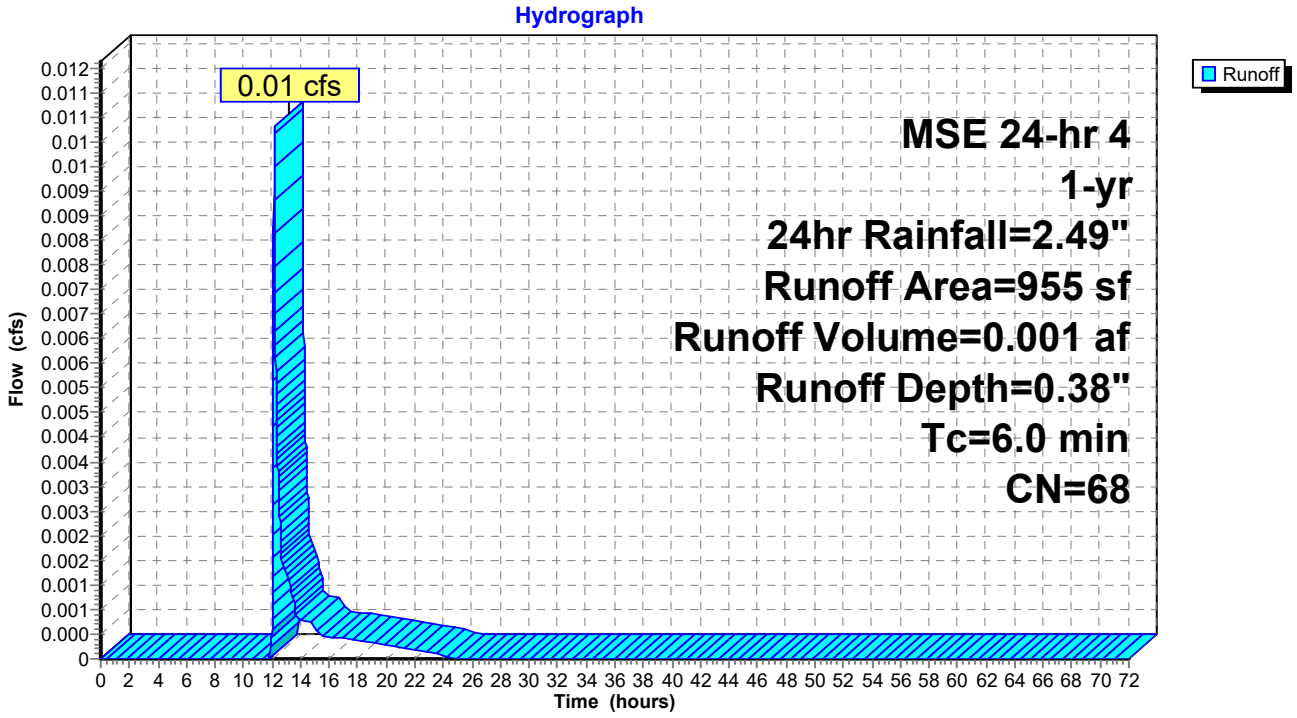
Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 0.38"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExOff1: NW Offsite



Summary for Subcatchment ExOff2: Central Offsite

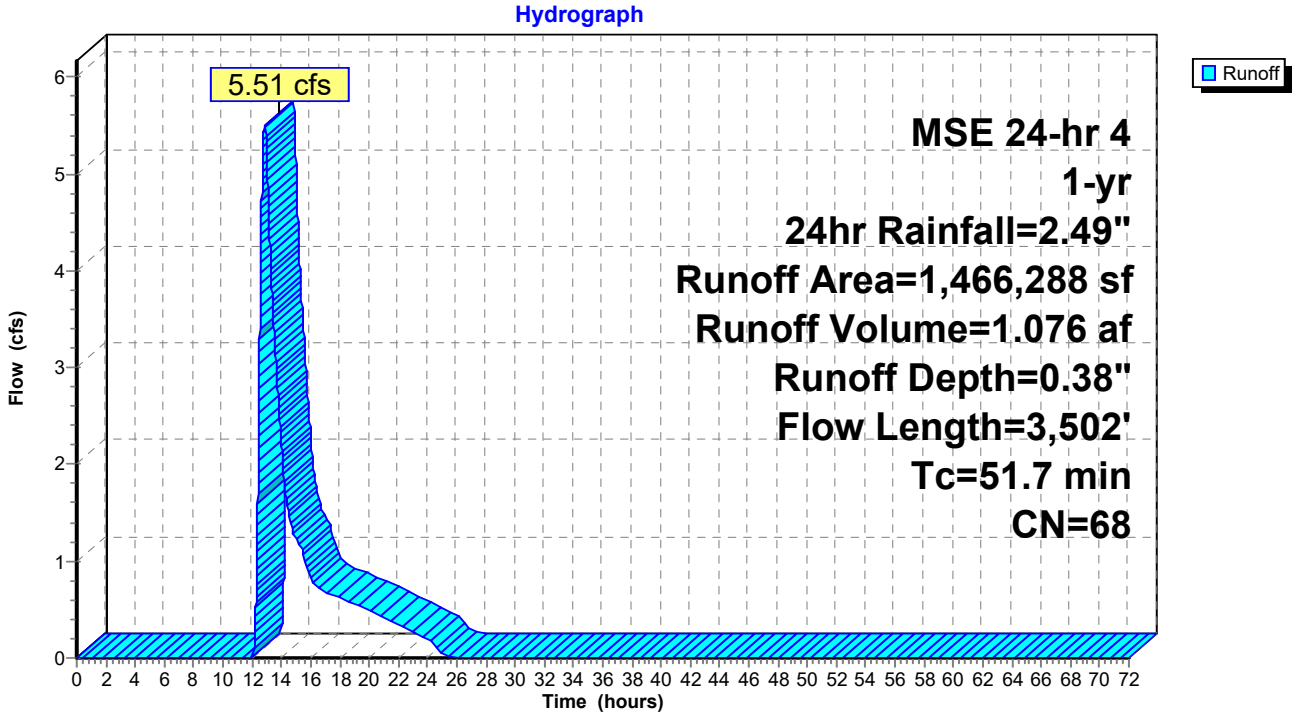
Runoff = 5.51 cfs @ 12.87 hrs, Volume= 1.076 af, Depth= 0.38"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	1,353,095	68	Cropland, HSG B Offsite
*	93,231	70	1/2 acre lots, 25% imp, HSG B Offsite
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
*	9,410	98	Pavement Offsite
	1,466,288	68	Weighted Average
	1,430,932		97.59% Pervious Area
	35,356		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
46.7	3,392	0.0181	1.21		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
51.7	3,502	Total			

Subcatchment ExOff2: Central Offsite



Summary for Subcatchment ExOff3: SE Offsite

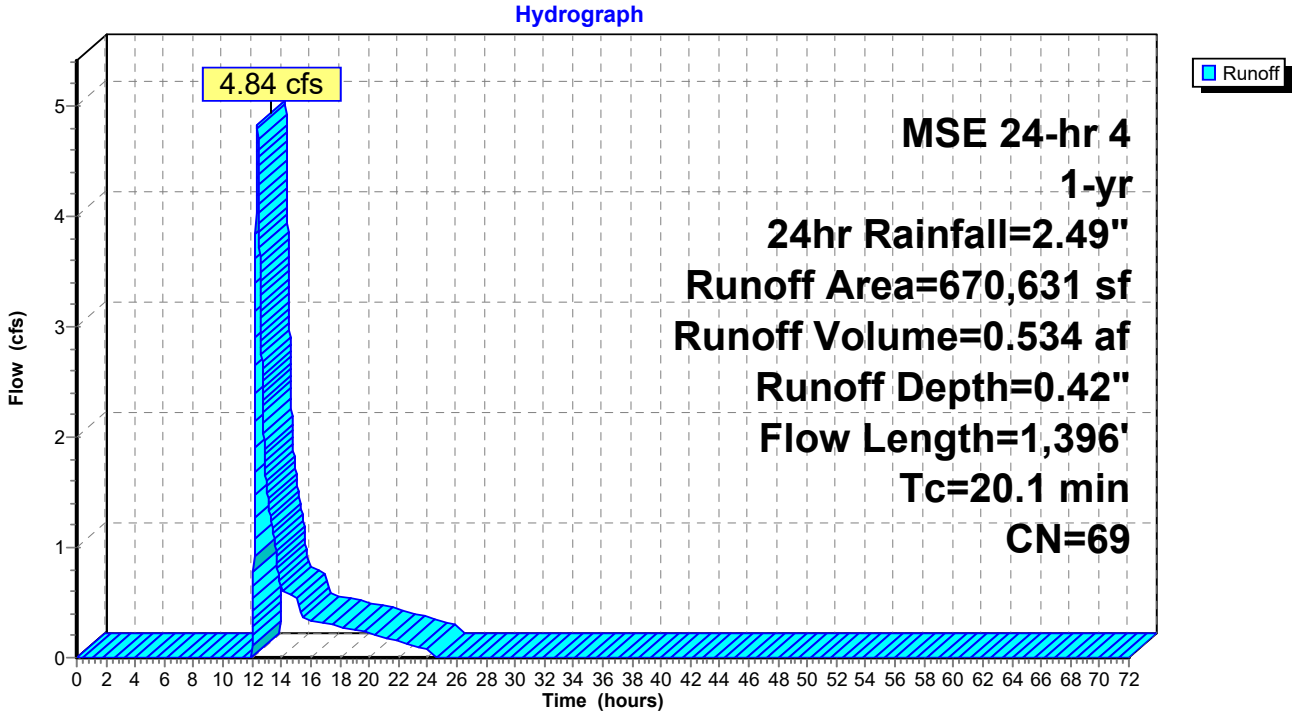
Runoff = 4.84 cfs @ 12.35 hrs, Volume= 0.534 af, Depth= 0.42"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	640,930	68	Cropland, HSG B Offsite
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	11,569	98	Pavement Offsite
	670,631	69	Weighted Average
	654,529		97.60% Pervious Area
	16,102		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment ExOff3: SE Offsite



Summary for Subcatchment ExOn1: NW Onsite

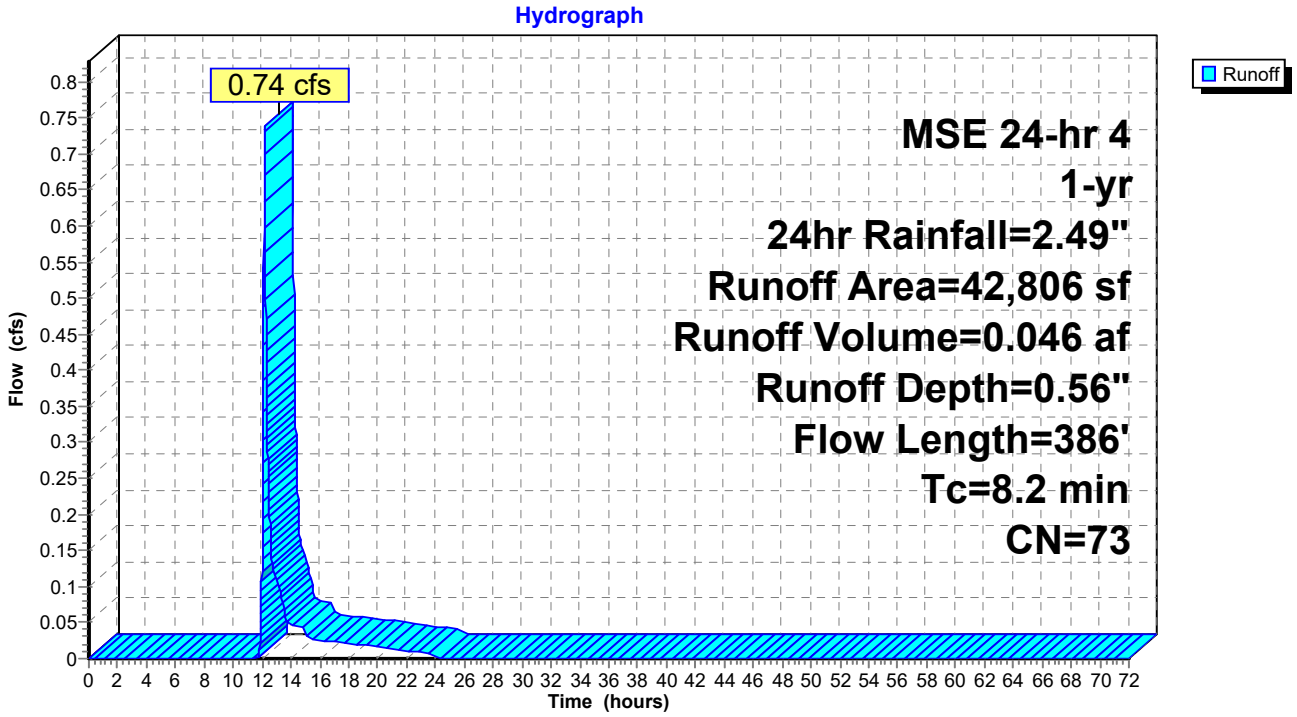
Runoff = 0.74 cfs @ 12.17 hrs, Volume= 0.046 af, Depth= 0.56"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	21,403	68	Cropland, HSG B Onsite
*	21,403	78	Cropland, HSG C Onsite
	42,806	73	Weighted Average
	42,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	67	0.0217	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
4.7	319	0.0156	1.12		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
8.2	386	Total			

Subcatchment ExOn1: NW Onsite



Summary for Subcatchment ExOn2: Central Onsite

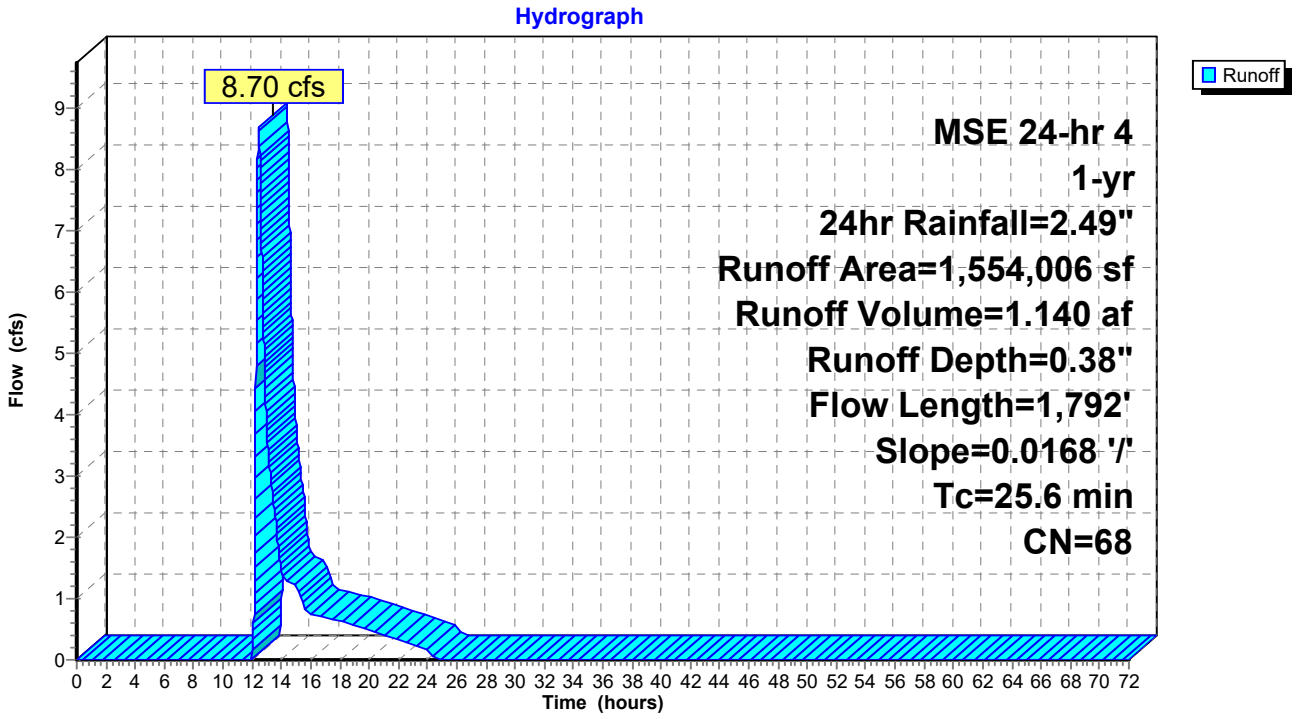
Runoff = 8.70 cfs @ 12.46 hrs, Volume= 1.140 af, Depth= 0.38"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	1,516,018	68	Cropland, HSB Onsite
*	5,189	78	Cropland, HSG C Onsite
*	32,799	70	1/2 acre lots, 25% imp, HSG B Onsite
	1,554,006	68	Weighted Average
	1,545,806		99.47% Pervious Area
	8,200		0.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,792	0.0168	1.17		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment ExOn2: Central Onsite



Summary for Subcatchment ExOn3: SE Onsite

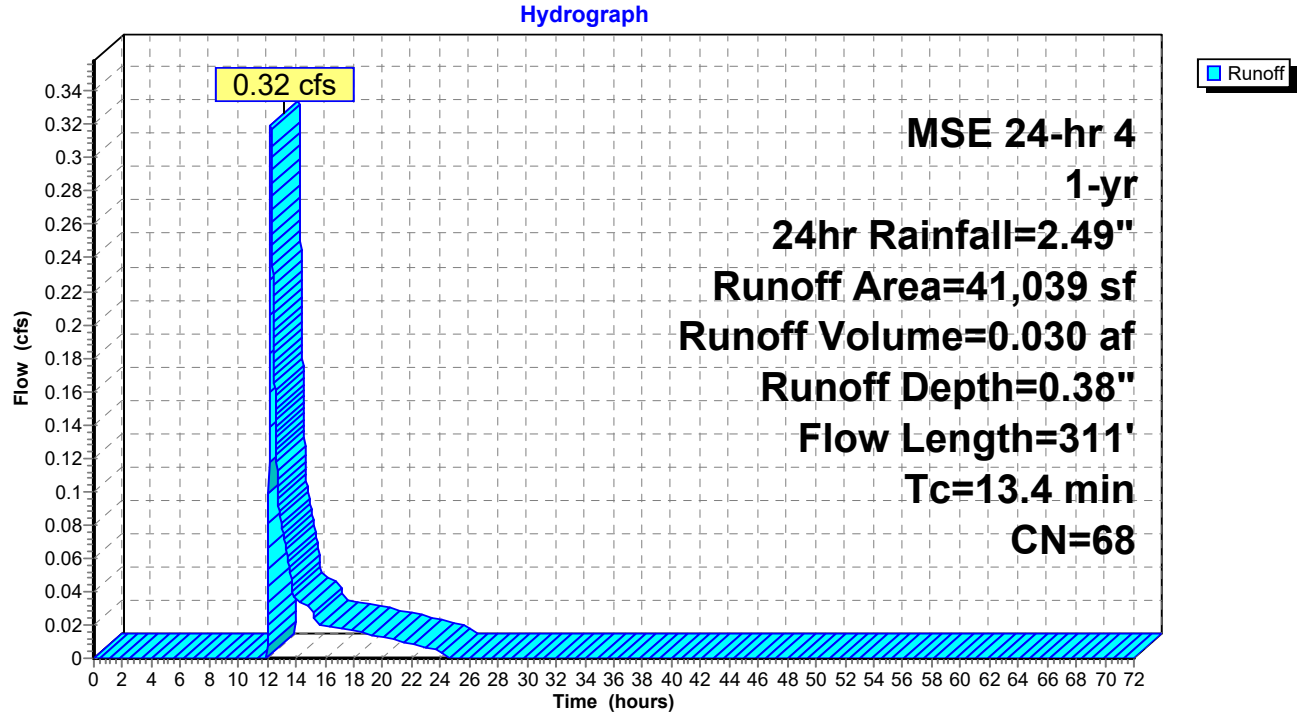
Runoff = 0.32 cfs @ 12.25 hrs, Volume= 0.030 af, Depth= 0.38"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	41,039	68	Cropland, HSB Onsite
	41,039		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	155	0.0086	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84" Using McCuen-Spiess flow length
3.5	156	0.0070	0.75		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
13.4	311	Total			

Subcatchment ExOn3: SE Onsite



Summary for Pond ExP1: SE Existing Depression

Inflow Area = 16.338 ac, 2.26% Impervious, Inflow Depth = 0.41" for 1-yr, 24hr event
Inflow = 5.10 cfs @ 12.35 hrs, Volume= 0.564 af
Outflow = 0.15 cfs @ 22.24 hrs, Volume= 0.518 af, Atten= 97%, Lag= 593.2 min
Discarded = 0.15 cfs @ 22.24 hrs, Volume= 0.518 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond ExP2 : Central Existing Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 955.36' @ 22.24 hrs Surf.Area= 49,761 sf Storage= 18,786 cf

Plug-Flow detention time= 1,367.0 min calculated for 0.518 af (92% of inflow)
Center-of-Mass det. time= 1,328.2 min (2,219.3 - 891.1)

Volume	Invert	Avail.Storage	Storage Description
#1	954.57'	150,632 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

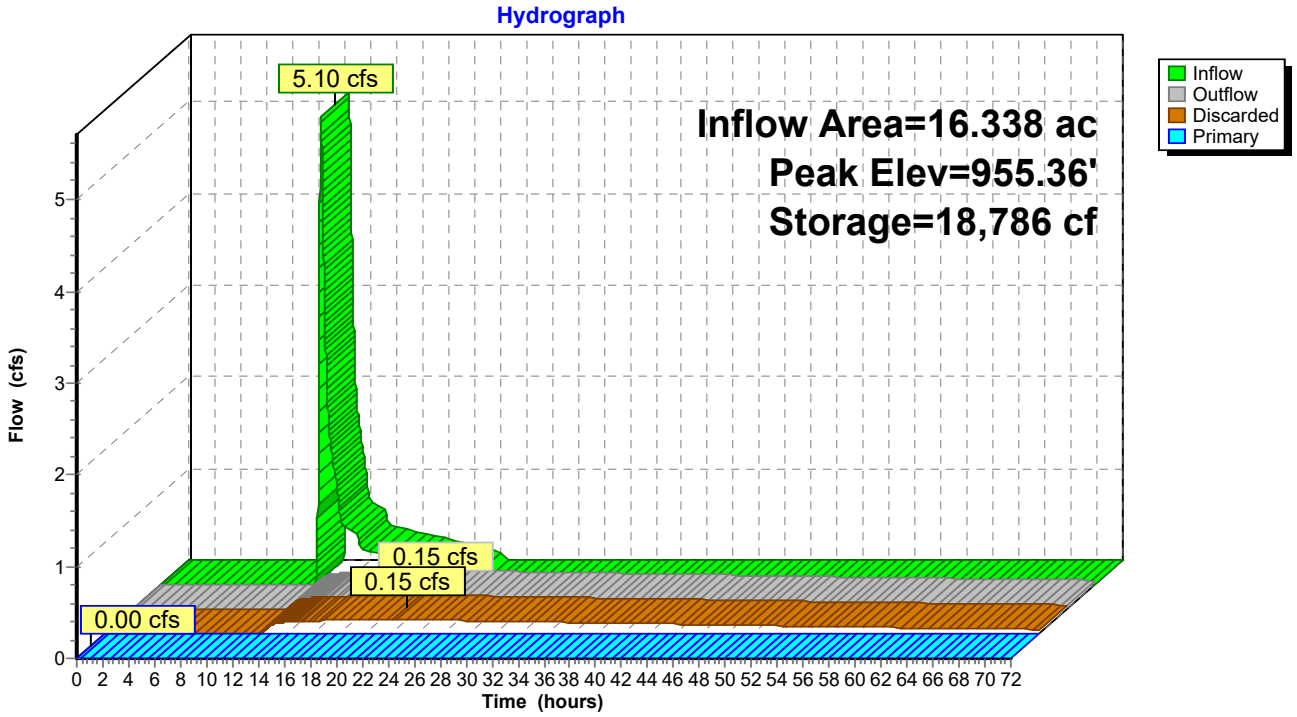
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.57	0	0	0
955.00	24,649	5,300	5,300
956.00	93,926	59,288	64,587
956.50	121,903	53,957	118,544
956.75	134,797	32,088	150,632

Device	Routing	Invert	Outlet Devices
#1	Primary	956.34'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 956.34 956.50 956.75 957.00 Width (feet) 7.00 104.00 184.00 249.00
#2	Discarded	954.57'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.15 cfs @ 22.24 hrs HW=955.36' (Free Discharge)
↑**2=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.57' TW=931.18' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond ExP1: SE Existing Depression



Summary for Pond ExP2: Central Existing Depression

Inflow Area = 85.674 ac, 1.60% Impervious, Inflow Depth = 0.31" for 1-yr, 24hr event
Inflow = 11.67 cfs @ 12.54 hrs, Volume= 2.216 af
Outflow = 11.66 cfs @ 12.55 hrs, Volume= 2.216 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.55 hrs, Volume= 0.000 af
Primary = 11.66 cfs @ 12.55 hrs, Volume= 2.216 af
Routed to Link ExL : Ex Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.52' @ 12.55 hrs Surf.Area= 127 sf Storage= 21 cf

Plug-Flow detention time= 0.0 min calculated for 2.216 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (912.7 - 912.7)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	681,595 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

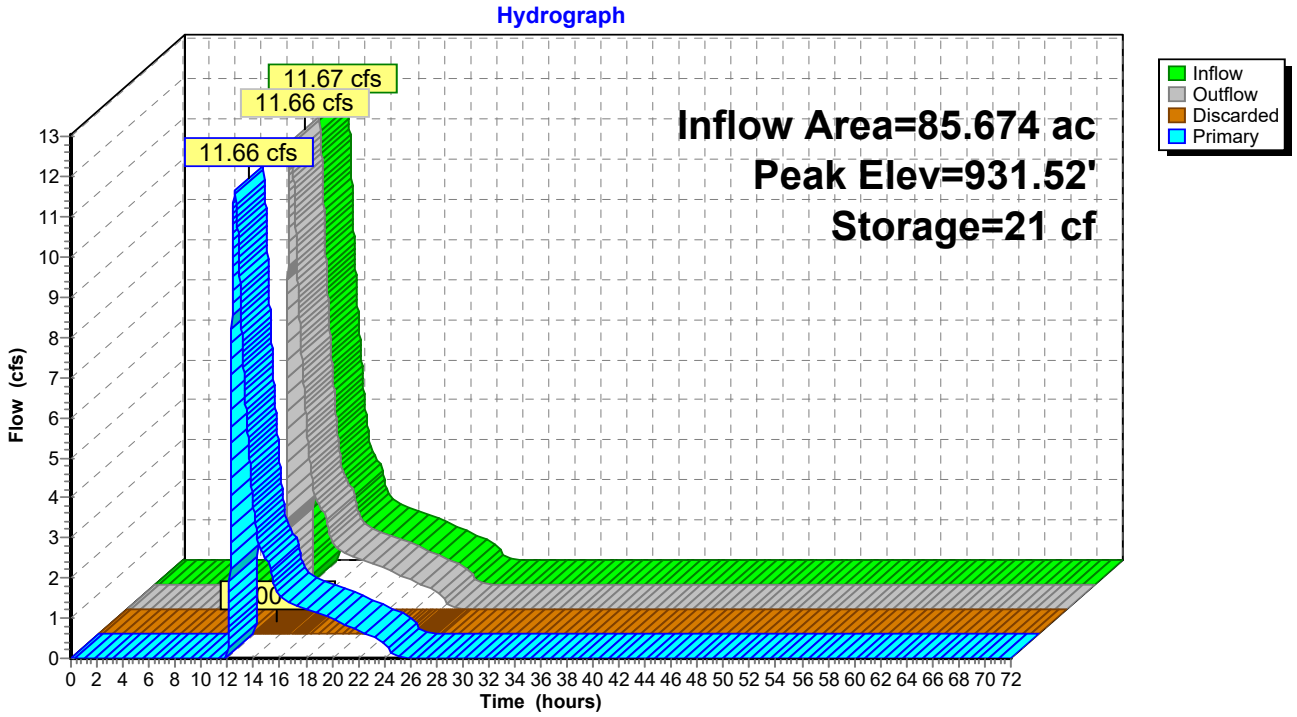
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	308	126	126
933.00	33,728	17,018	17,144
934.00	96,309	65,019	82,163
935.00	168,612	132,461	214,623
936.00	234,956	201,784	416,407
937.00	295,420	265,188	681,595

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 936.00 937.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00 622.00 735.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.55 hrs HW=931.52' (Free Discharge)
↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=11.66 cfs @ 12.55 hrs HW=931.52' TW=0.00' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 11.66 cfs @ 1.52 fps)

Pond ExP2: Central Existing Depression

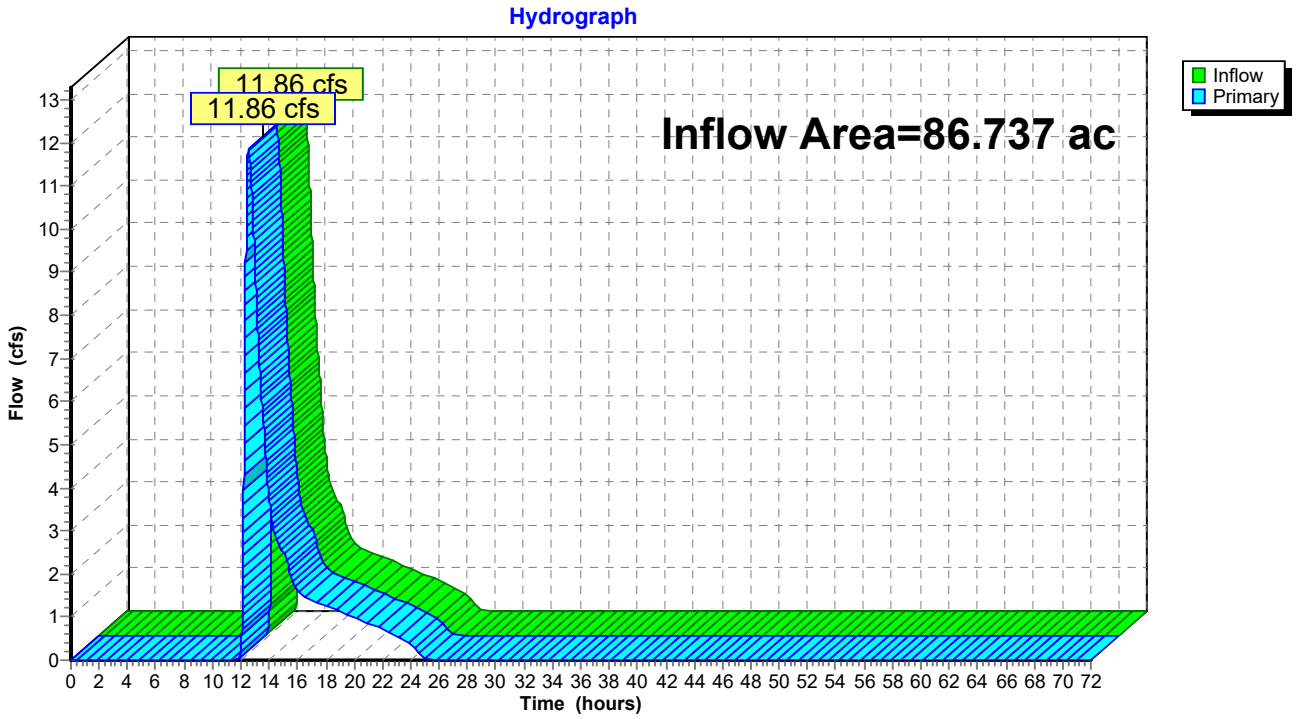


Summary for Link ExL: Ex Total

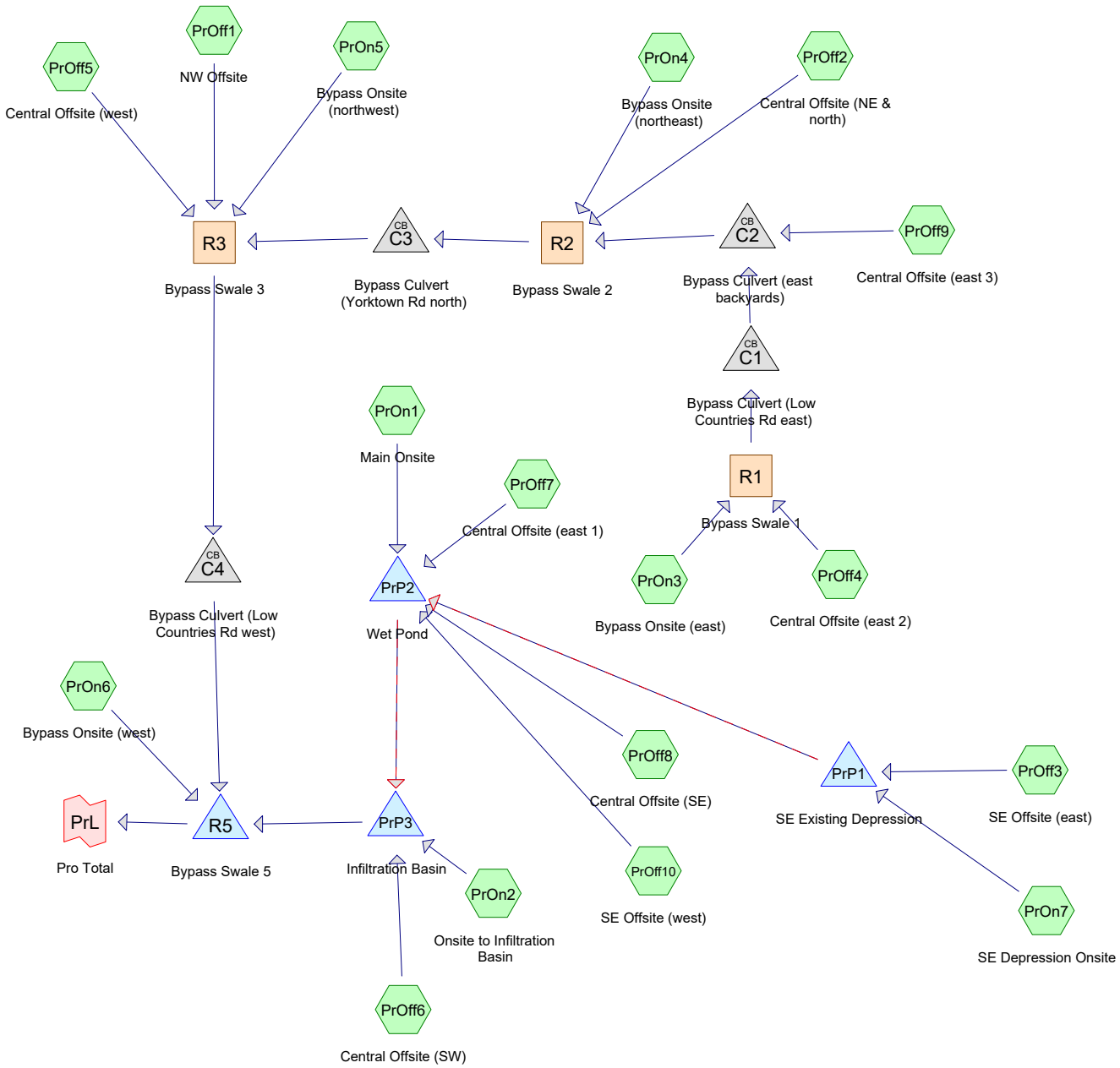
Inflow Area = 86.737 ac, 1.58% Impervious, Inflow Depth = 0.31" for 1-yr, 24hr event
Inflow = 11.86 cfs @ 12.54 hrs, Volume= 2.264 af
Primary = 11.86 cfs @ 12.54 hrs, Volume= 2.264 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link ExL: Ex Total



Proposed



Subcat Reach Pond Link

Routing Diagram for 26-225 HydroCAD
Prepared by Fehr Graham & Associates, Printed 10/8/2026
HydroCAD® 10.20-9a s/n 00943 © 2026 HydroCAD Software Solutions LLC

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPrOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=68 Runoff=0.01 cfs 0.001 af

SubcatchmentPrOff10: SE Offsite (west) Runoff Area=27,179 sf 40.65% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=76 Runoff=0.67 cfs 0.036 af

SubcatchmentPrOff2: Central Offsite Runoff Area=1,125,874 sf 1.51% Impervious Runoff Depth=0.38"
Flow Length=1,885' Tc=28.1 min CN=68 Runoff=6.00 cfs 0.826 af

SubcatchmentPrOff3: SE Offsite (east) Runoff Area=645,599 sf 0.03% Impervious Runoff Depth=0.38"
Flow Length=1,396' Tc=20.1 min CN=68 Runoff=4.09 cfs 0.474 af

SubcatchmentPrOff4: Central Offsite (east Runoff Area=118,736 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=1,270' Slope=0.0225 '/' Tc=15.7 min CN=68 Runoff=0.85 cfs 0.087 af

SubcatchmentPrOff5: Central Offsite Runoff Area=10,552 sf 25.00% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=80 Runoff=0.34 cfs 0.018 af

SubcatchmentPrOff6: Central Offsite (SW) Runoff Area=28,651 sf 14.99% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=72 Runoff=0.51 cfs 0.029 af

SubcatchmentPrOff7: Central Offsite (east Runoff Area=14,256 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=373' Tc=6.2 min CN=68 Runoff=0.16 cfs 0.010 af

SubcatchmentPrOff8: Central Offsite (SE) Runoff Area=46,766 sf 39.64% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=76 Runoff=1.16 cfs 0.062 af

SubcatchmentPrOff9: Central Offsite (east Runoff Area=119,306 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=1,164' Slope=0.0229 '/' Tc=14.2 min CN=68 Runoff=0.90 cfs 0.088 af

SubcatchmentPrOn1: Main Onsite Runoff Area=1,301,517 sf 39.68% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=76 Runoff=32.18 cfs 1.714 af

SubcatchmentPrOn2: Onsite to Runoff Area=195,173 sf 70.40% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=88 Runoff=9.95 cfs 0.513 af

SubcatchmentPrOn3: Bypass Onsite (east) Runoff Area=3,848 sf 0.00% Impervious Runoff Depth=0.19"
Tc=6.0 min CN=61 Runoff=0.01 cfs 0.001 af

SubcatchmentPrOn4: Bypass Onsite Runoff Area=45,511 sf 0.00% Impervious Runoff Depth=0.19"
Tc=6.0 min CN=61 Runoff=0.12 cfs 0.017 af

SubcatchmentPrOn5: Bypass Onsite Runoff Area=44,014 sf 0.00% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=66 Runoff=0.37 cfs 0.027 af

SubcatchmentPrOn6: Bypass Onsite (west) Runoff Area=26,361 sf 0.00% Impervious Runoff Depth=0.60"
Tc=6.0 min CN=74 Runoff=0.56 cfs 0.030 af

SubcatchmentPrOn7: SE Depression Runoff Area=23,967 sf 76.88% Impervious Runoff Depth=1.60"
Tc=6.0 min CN=91 Runoff=1.40 cfs 0.073 af

Reach R1: Bypass Swale 1 Avg. Flow Depth=0.11' Max Vel=1.46 fps Inflow=0.86 cfs 0.089 af
n=0.022 L=108.0' S=0.0099 '/' Capacity=198.46 cfs Outflow=0.86 cfs 0.089 af

Reach R2: Bypass Swale 2 Avg. Flow Depth=0.32' Max Vel=3.57 fps Inflow=7.26 cfs 1.019 af
n=0.022 L=913.0' S=0.0167 '/' Capacity=422.06 cfs Outflow=7.10 cfs 1.019 af

Reach R3: Bypass Swale 3 Avg. Flow Depth=0.39' Max Vel=2.77 fps Inflow=7.28 cfs 1.065 af
n=0.022 L=791.0' S=0.0080 '/' Capacity=440.47 cfs Outflow=7.08 cfs 1.065 af

Pond C1: Bypass Culvert (Low Countries Rd east) Peak Elev=959.05' Inflow=0.86 cfs 0.089 af
24.0" Round Culvert n=0.011 L=100.0' S=0.0047 '/' Outflow=0.86 cfs 0.089 af

Pond C2: Bypass Culvert (east backyards) Peak Elev=958.67' Inflow=1.74 cfs 0.176 af
27.0" Round Culvert n=0.011 L=323.0' S=0.0048 '/' Outflow=1.74 cfs 0.176 af

Pond C3: Bypass Culvert (Yorktown Rd north) Peak Elev=941.72' Inflow=7.10 cfs 1.019 af
30.0" Round Culvert x 2.00 n=0.011 L=119.0' S=0.0067 '/' Outflow=7.10 cfs 1.019 af

Pond C4: Bypass Culvert (Low Countries Rd west) Peak Elev=934.48' Inflow=7.08 cfs 1.065 af
27.0" Round Culvert x 3.00 n=0.011 L=109.0' S=0.0083 '/' Outflow=7.08 cfs 1.065 af

Pond PrP1: SE Existing Depression Peak Elev=955.04' Storage=7,073 cf Inflow=4.47 cfs 0.547 af
Discarded=0.07 cfs 0.058 af Primary=1.35 cfs 0.489 af Secondary=0.00 cfs 0.000 af Outflow=1.42 cfs 0.547 af

Pond PrP2: Wet Pond Peak Elev=932.34' Storage=230,033 cf Inflow=34.28 cfs 2.311 af
Primary=3.95 cfs 2.224 af Secondary=0.00 cfs 0.000 af Outflow=3.95 cfs 2.224 af

Pond PrP3: Infiltration Basin Peak Elev=931.58' Storage=67,654 cf Inflow=11.03 cfs 2.765 af
Discarded=0.19 cfs 0.940 af Primary=1.40 cfs 0.810 af Outflow=1.59 cfs 1.750 af

Pond R5: Bypass Swale 5 Peak Elev=931.46' Storage=46 cf Inflow=7.18 cfs 1.905 af
Discarded=0.00 cfs 0.001 af Primary=7.18 cfs 1.904 af Outflow=7.18 cfs 1.905 af

Link PrL: Pro Total Inflow=7.18 cfs 1.904 af
Primary=7.18 cfs 1.904 af

Total Runoff Area = 86.737 ac Runoff Volume = 4.006 af Average Runoff Depth = 0.55"
80.79% Pervious = 70.071 ac 19.21% Impervious = 16.666 ac

Summary for Subcatchment PrOff1: NW Offsite

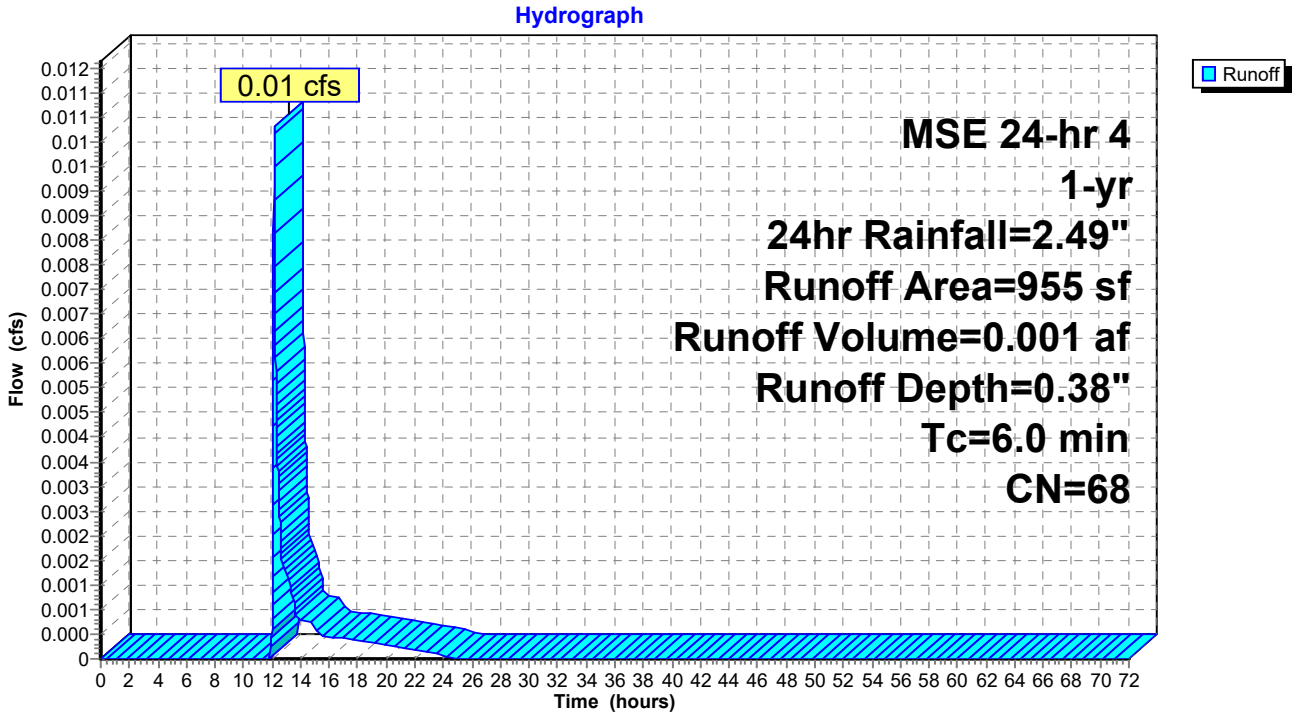
Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 0.38"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff1: NW Offsite



Summary for Subcatchment PrOff10: SE Offsite (west)

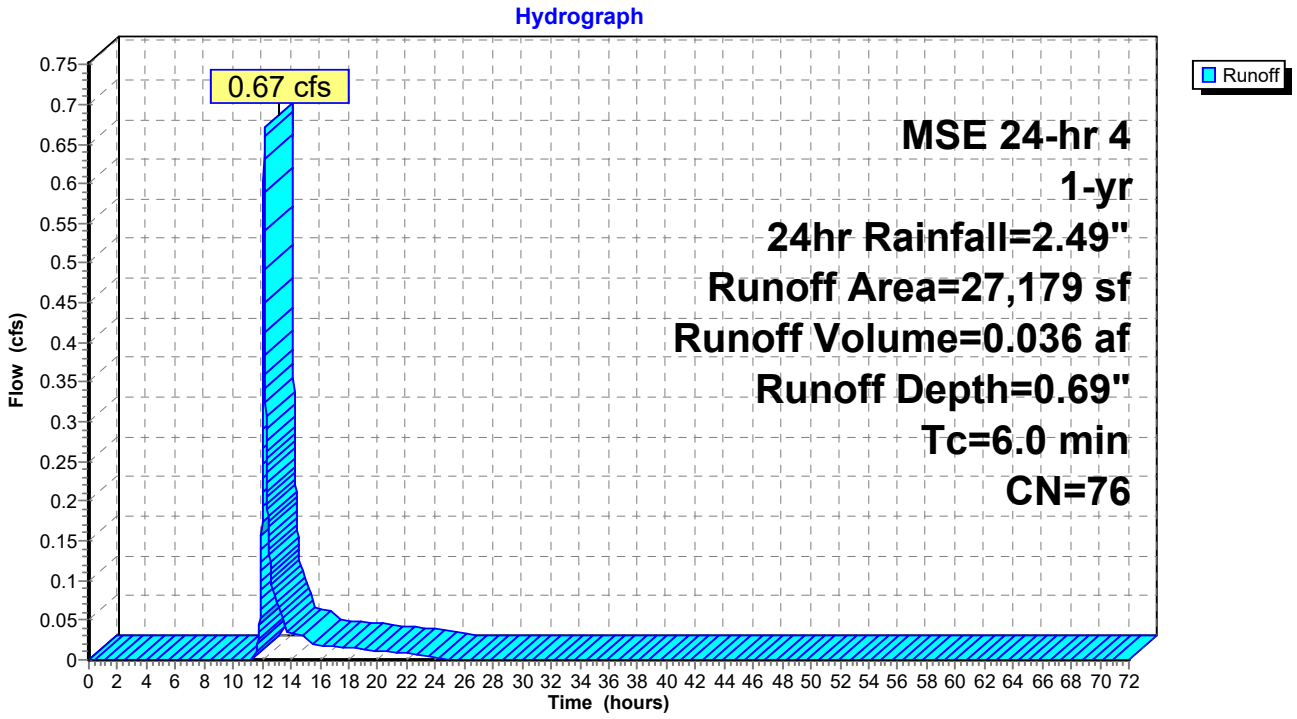
Runoff = 0.67 cfs @ 12.14 hrs, Volume= 0.036 af, Depth= 0.69"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	2,533	61	>75% Grass cover, Good, HSG B Offsite
*	3,161	98	Pavement Offsite
*	3,353	98	Pro Pave in ROW Offiste
	27,179	76	Weighted Average
	16,132		59.35% Pervious Area
	11,047		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff10: SE Offsite (west)



Summary for Subcatchment PrOff2: Central Offsite (NE & north)

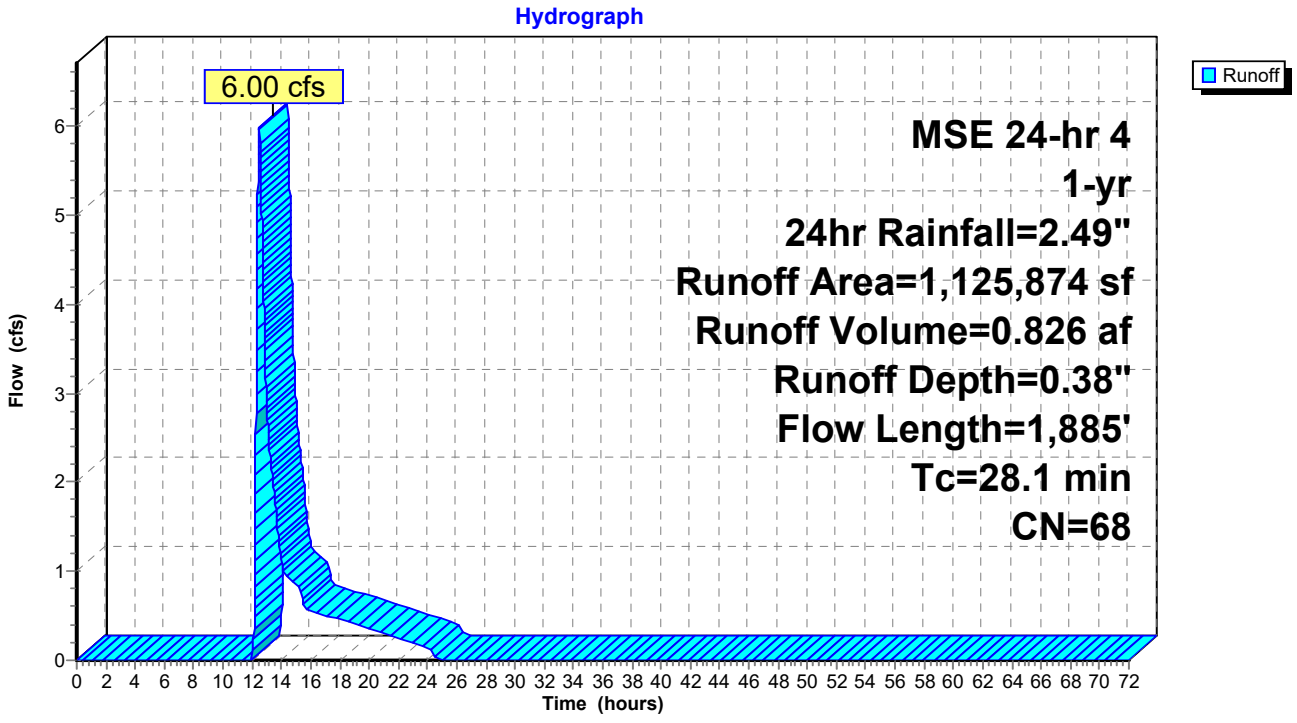
Runoff = 6.00 cfs @ 12.49 hrs, Volume= 0.826 af, Depth= 0.38"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	1,058,084	68	Cropland, HSG B Offsite
*	67,790	70	1/2 acre lots, 25% imp, HSG B Offsite
	1,125,874	68	Weighted Average
	1,108,927		98.49% Pervious Area
	16,948		1.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
23.1	1,775	0.0202	1.28		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
28.1	1,885	Total			

Subcatchment PrOff2: Central Offsite (NE & north)



Summary for Subcatchment PrOff3: SE Offsite (east)

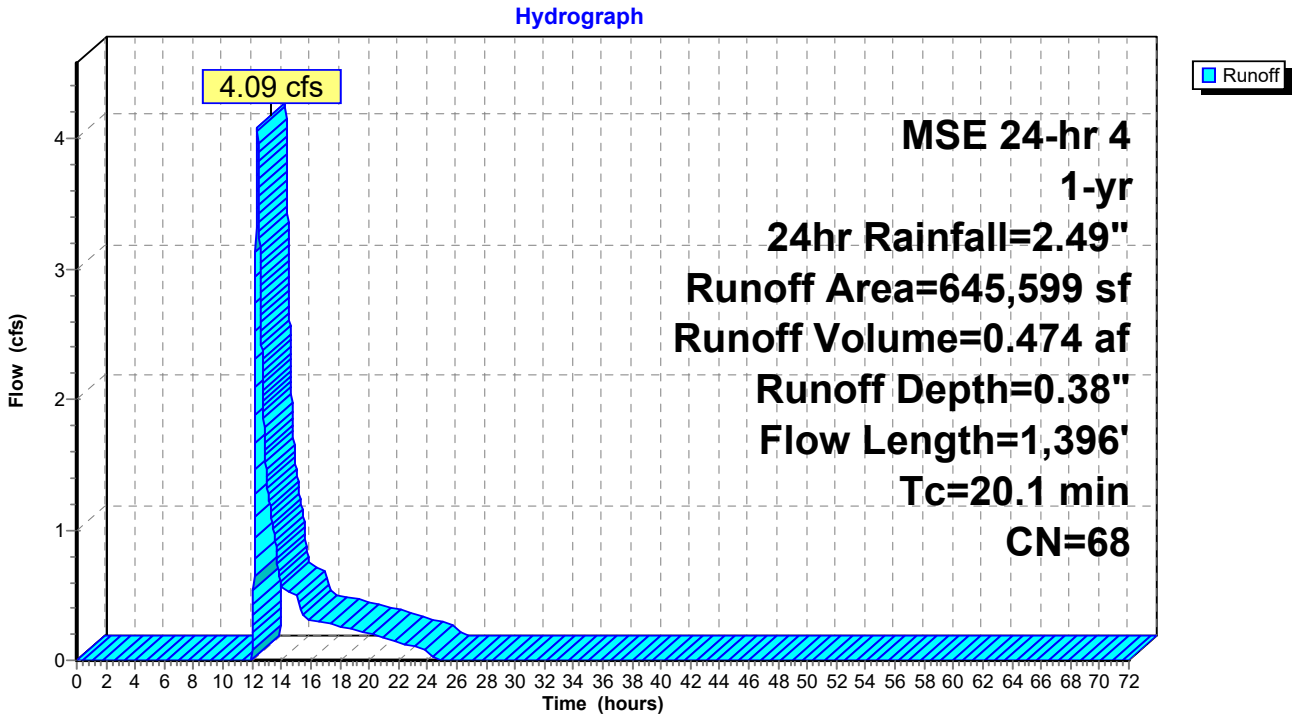
Runoff = 4.09 cfs @ 12.35 hrs, Volume= 0.474 af, Depth= 0.38"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	645,405	68	Cropland, HSG B Offsite
*	194	98	Pavement Offsite
	645,599	68	Weighted Average
	645,405		99.97% Pervious Area
	194		0.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment PrOff3: SE Offsite (east)



Summary for Subcatchment PrOff4: Central Offsite (east 2)

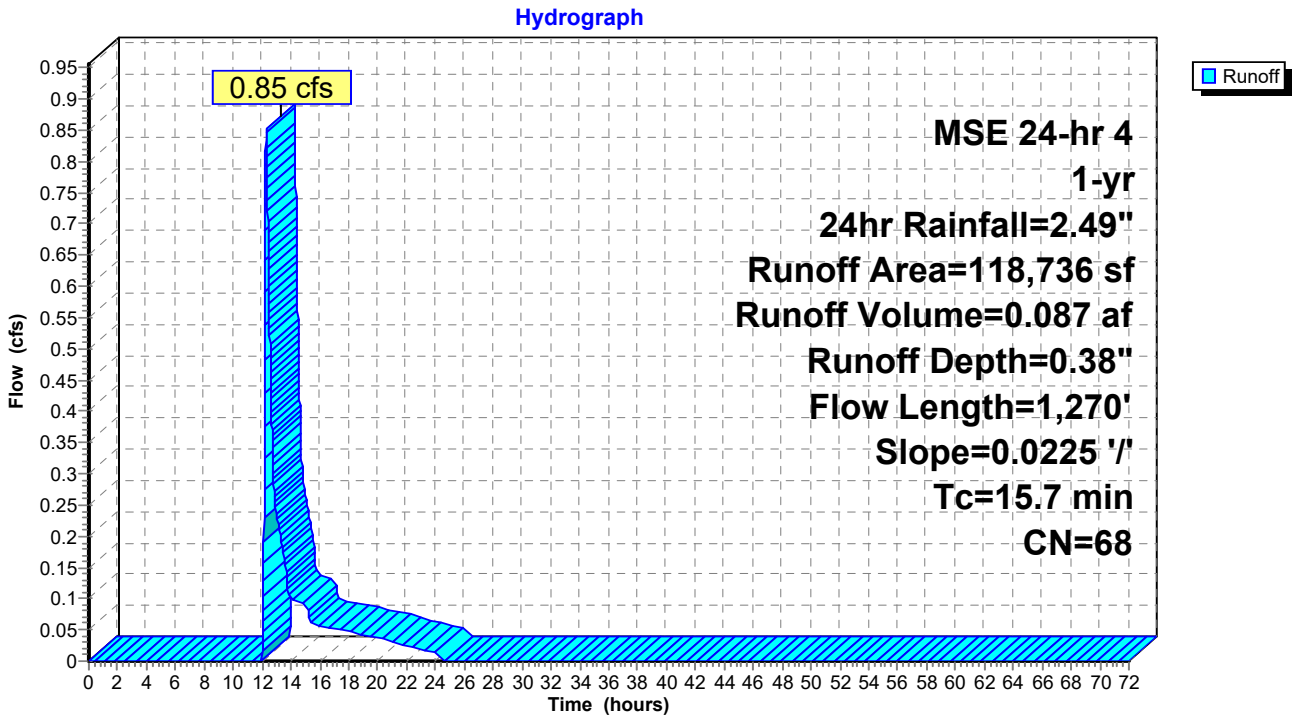
Runoff = 0.85 cfs @ 12.29 hrs, Volume= 0.087 af, Depth= 0.38"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	118,736	68	Cropland, HSG B Offsite
	118,736		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	1,270	0.0225	1.35		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff4: Central Offsite (east 2)



Summary for Subcatchment PrOff5: Central Offsite (west)

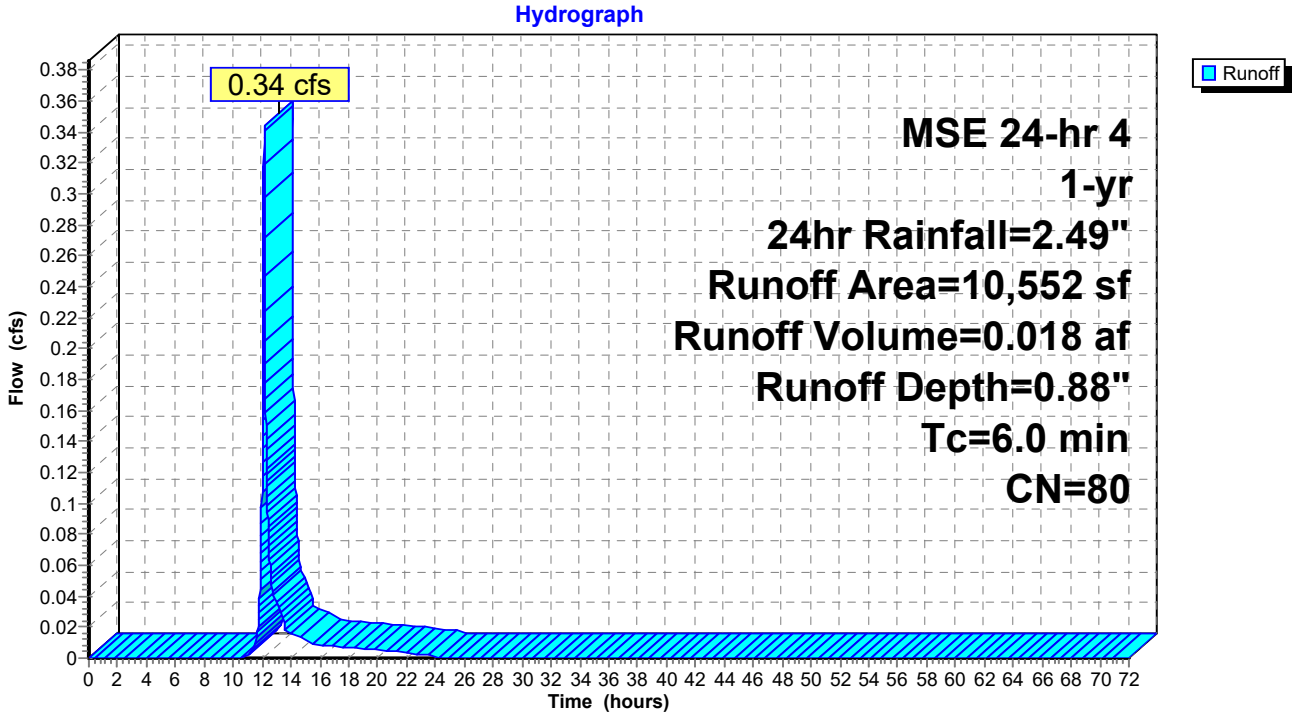
Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.018 af, Depth= 0.88"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
	7,914		75.00% Pervious Area
	2,638		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff5: Central Offsite (west)



Summary for Subcatchment PrOff6: Central Offsite (SW)

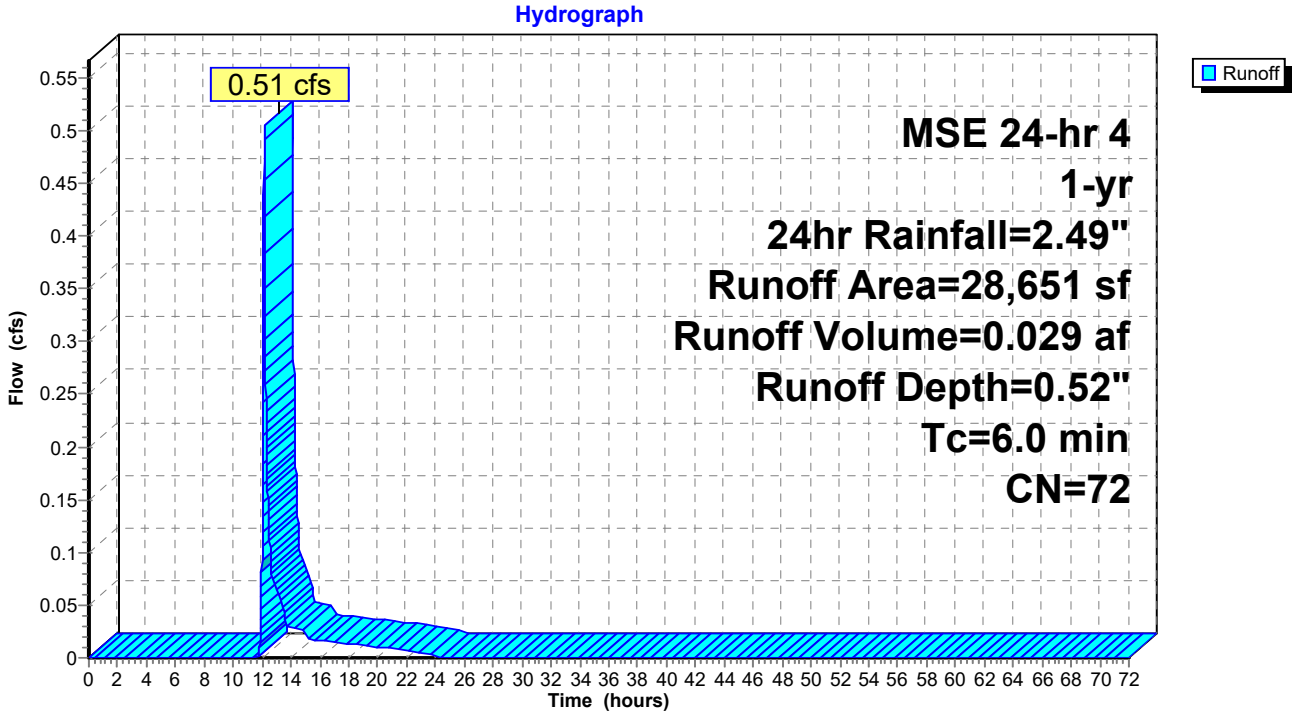
Runoff = 0.51 cfs @ 12.14 hrs, Volume= 0.029 af, Depth= 0.52"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	20,337	68	Cropland, HSG B Offsite
*	4,018	61	>75% Grass cover, Good, HSG B Offsite
*	2,590	98	Pavement Offsite
*	1,706	98	Pro Pave in ROW Offiste
	28,651	72	Weighted Average
	24,355		85.01% Pervious Area
	4,296		14.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff6: Central Offsite (SW)



Summary for Subcatchment PrOff7: Central Offsite (east 1)

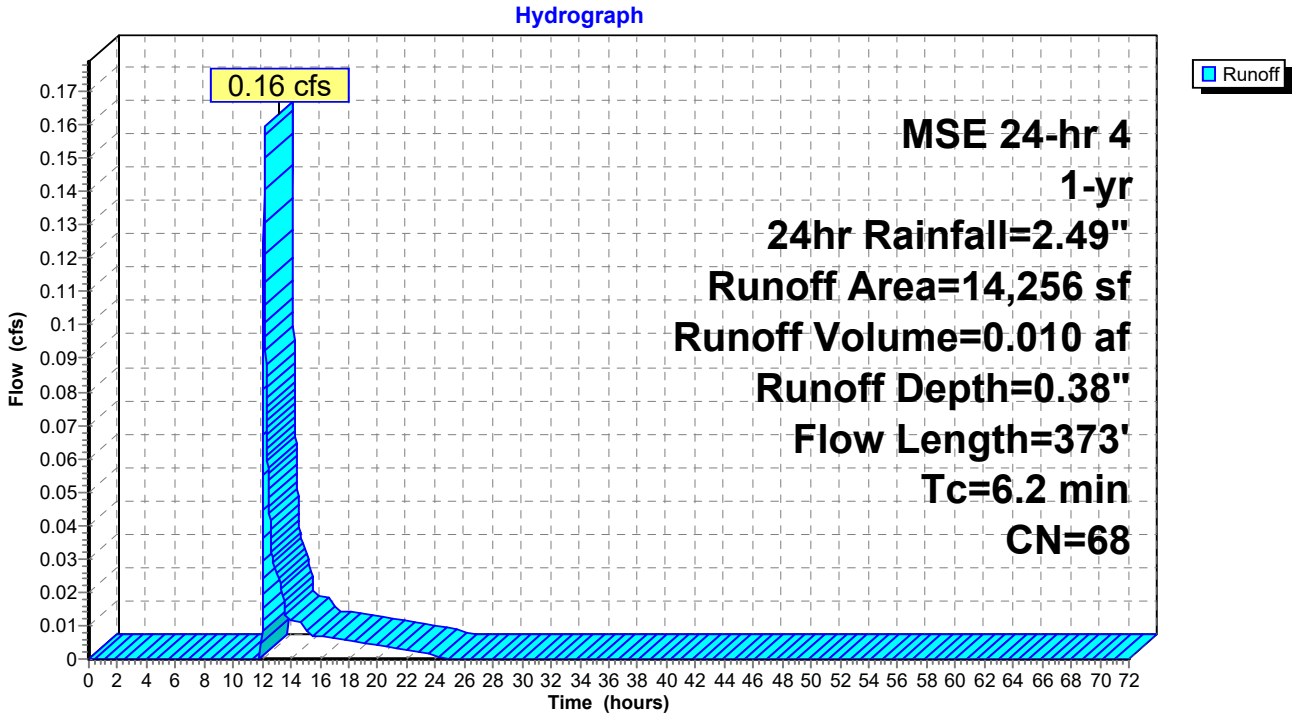
Runoff = 0.16 cfs @ 12.15 hrs, Volume= 0.010 af, Depth= 0.38"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	14,256	68	Cropland, HSG B Offsite
	14,256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	47	0.0266	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
3.8	326	0.0252	1.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.2	373	Total			

Subcatchment PrOff7: Central Offsite (east 1)



Summary for Subcatchment PrOff8: Central Offsite (SE)

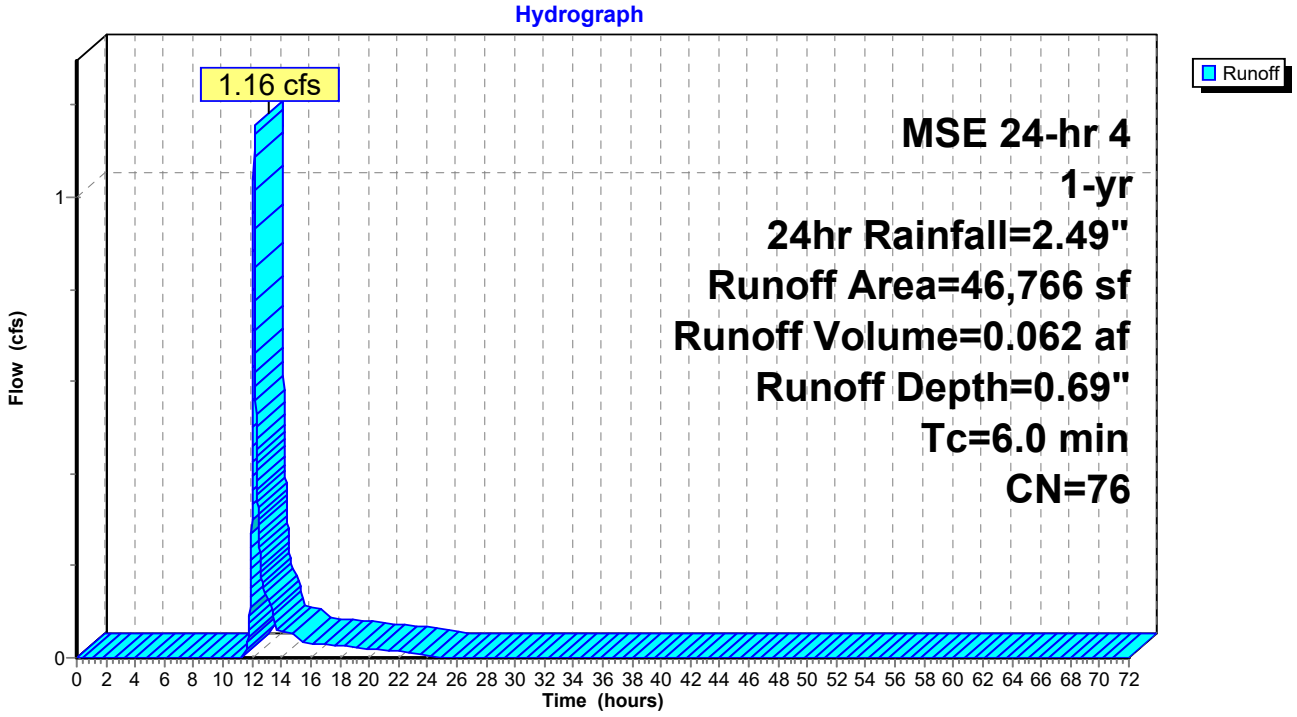
Runoff = 1.16 cfs @ 12.14 hrs, Volume= 0.062 af, Depth= 0.69"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	9,149	61	>75% Grass cover, Good, HSG B Offsite
*	25,441	70	1/2 acre lots, 25% imp, HSG B Offsite
*	6,820	98	Pavement Offsite
*	5,356	98	Pro Pave in ROW Offiste
	46,766	76	Weighted Average
	28,230		60.36% Pervious Area
	18,536		39.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff8: Central Offsite (SE)



Summary for Subcatchment PrOff9: Central Offsite (east 3)

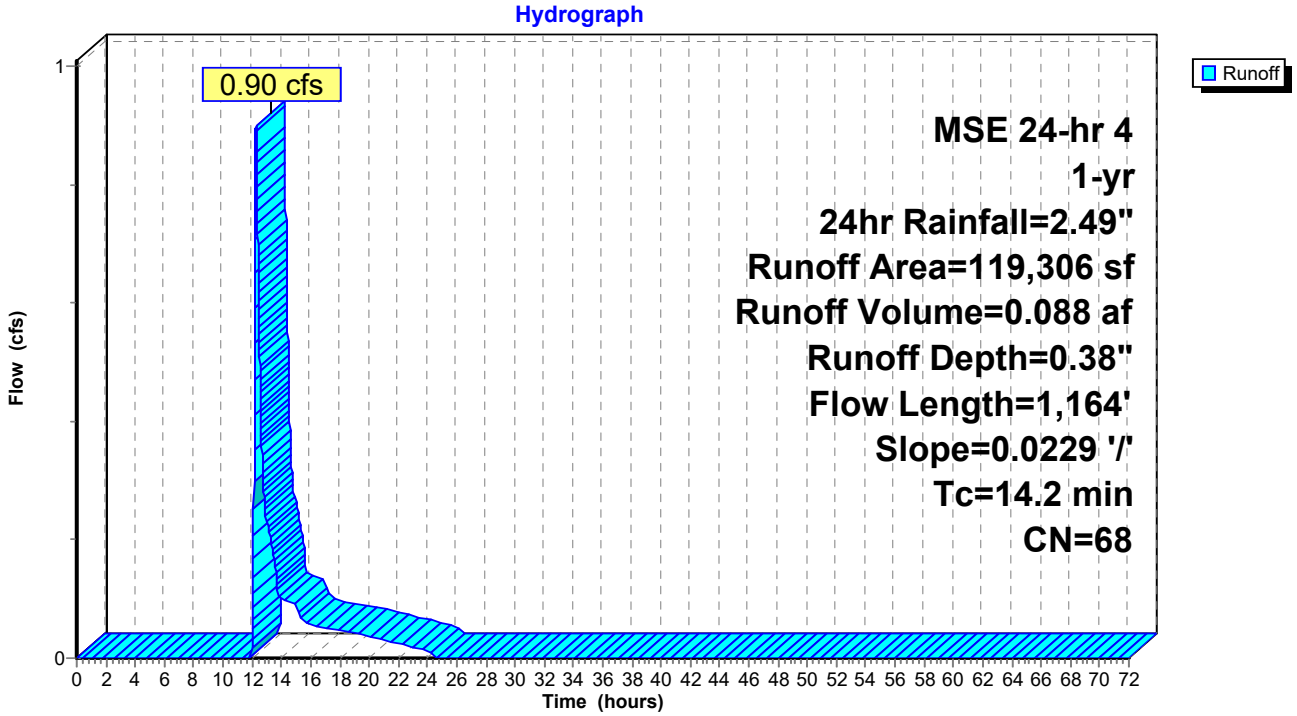
Runoff = 0.90 cfs @ 12.26 hrs, Volume= 0.088 af, Depth= 0.38"
Routed to Pond C2 : Bypass Culvert (east backyards)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	119,306	68	Cropland, HSG B Offsite
	119,306		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	1,164	0.0229	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff9: Central Offsite (east 3)



Summary for Subcatchment PrOn1: Main Onsite

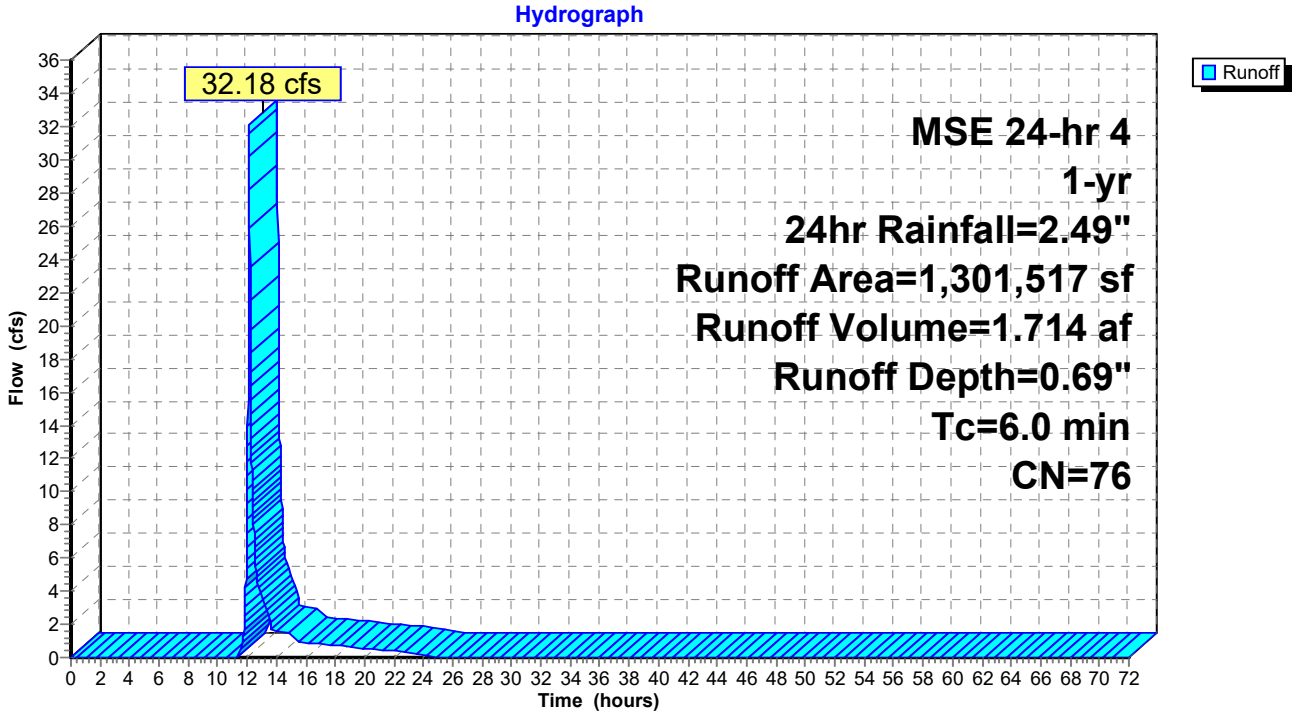
Runoff = 32.18 cfs @ 12.14 hrs, Volume= 1.714 af, Depth= 0.69"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
	623,728	72	1/3 acre lots, 30% imp, HSG B
	555,477	75	1/4 acre lots, 38% imp, HSG B
	6,494	83	1/4 acre lots, 38% imp, HSG C
*	91,094	100	Wet Pond
*	24,724	98	Alley
	1,301,517	76	Weighted Average
	785,032		60.32% Pervious Area
	516,485		39.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn1: Main Onsite



Summary for Subcatchment PrOn2: Onsite to Infiltration Basin

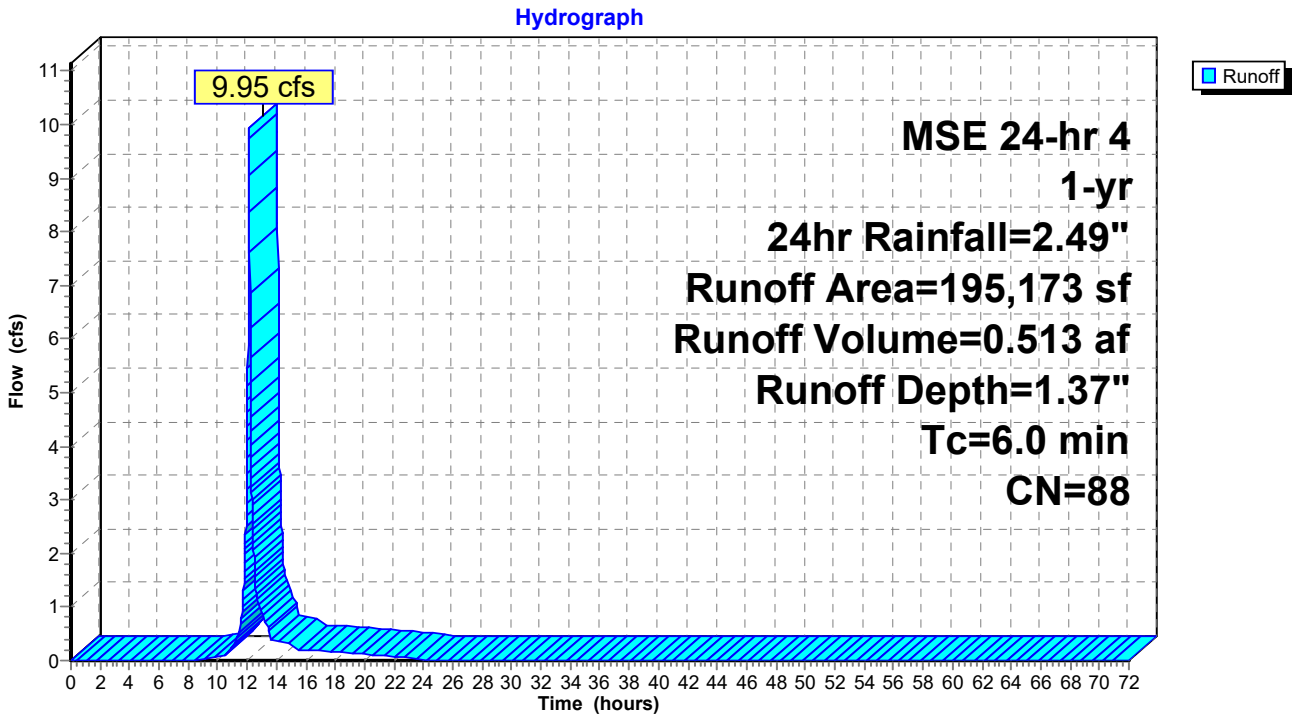
Runoff = 9.95 cfs @ 12.13 hrs, Volume= 0.513 af, Depth= 1.37"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
	13,000	72	1/3 acre lots, 30% imp, HSG B
	78,516	75	1/4 acre lots, 38% imp, HSG B
*	103,657	100	Pond
	195,173	88	Weighted Average
	57,780		29.60% Pervious Area
	137,393		70.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn2: Onsite to Infiltration Basin



Summary for Subcatchment PrOn3: Bypass Onsite (east)

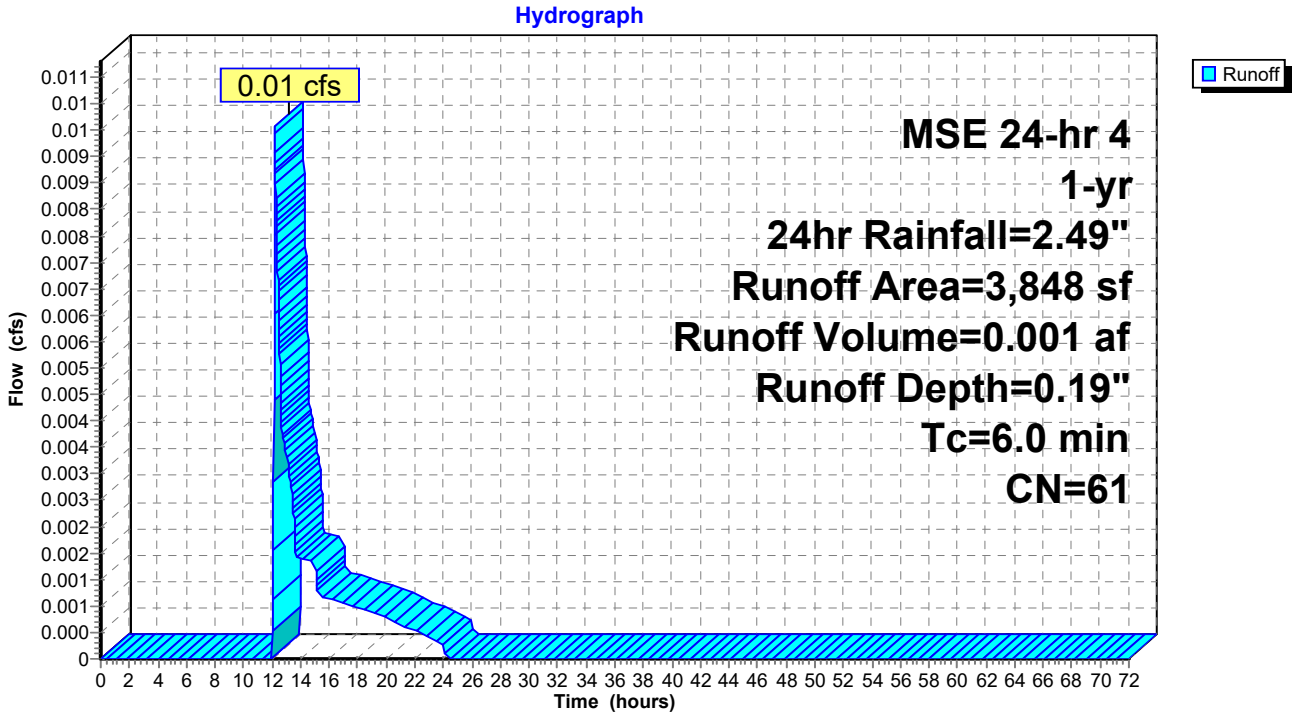
Runoff = 0.01 cfs @ 12.17 hrs, Volume= 0.001 af, Depth= 0.19"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

Area (sf)	CN	Description
3,848	61	>75% Grass cover, Good, HSG B
3,848		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn3: Bypass Onsite (east)



Summary for Subcatchment PrOn4: Bypass Onsite (northeast)

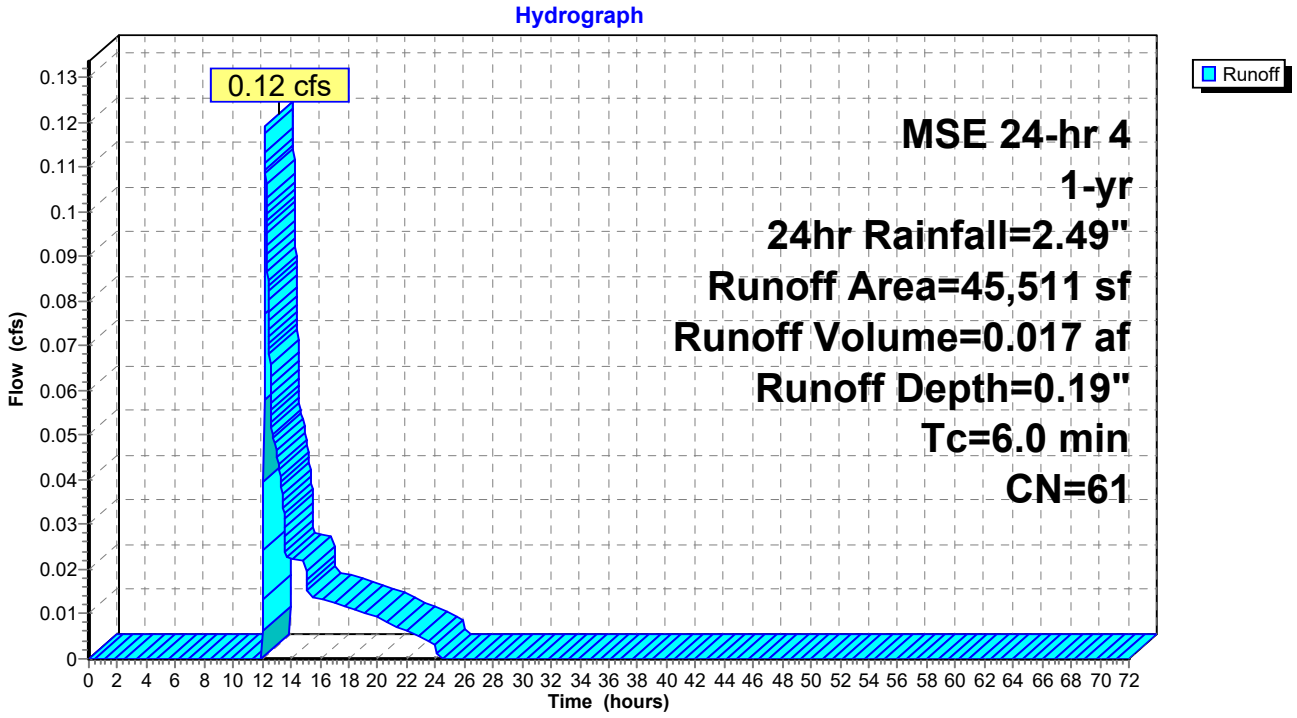
Runoff = 0.12 cfs @ 12.17 hrs, Volume= 0.017 af, Depth= 0.19"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

Area (sf)	CN	Description
45,511	61	>75% Grass cover, Good, HSG B
45,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn4: Bypass Onsite (northeast)



Summary for Subcatchment PrOn5: Bypass Onsite (northwest)

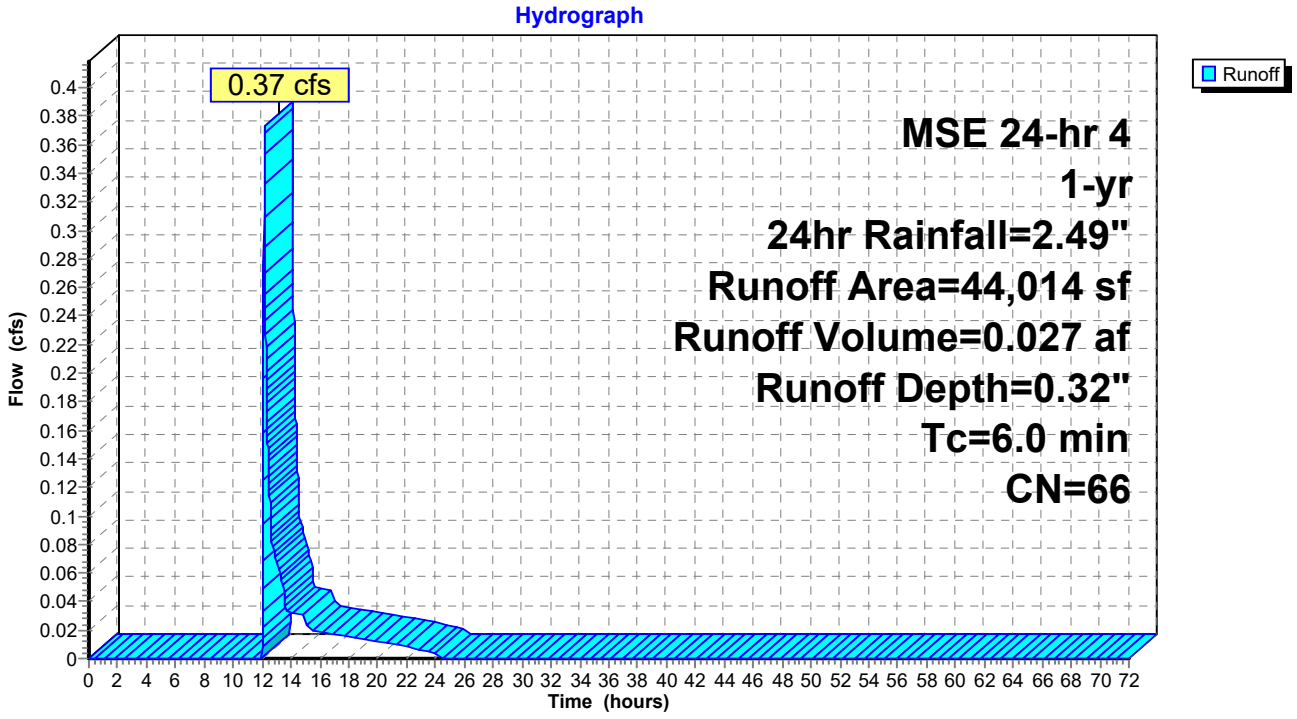
Runoff = 0.37 cfs @ 12.15 hrs, Volume= 0.027 af, Depth= 0.32"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

Area (sf)	CN	Description
26,408	61	>75% Grass cover, Good, HSG B
17,606	74	>75% Grass cover, Good, HSG C
44,014	66	Weighted Average
44,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn5: Bypass Onsite (northwest)



Summary for Subcatchment PrOn6: Bypass Onsite (west)

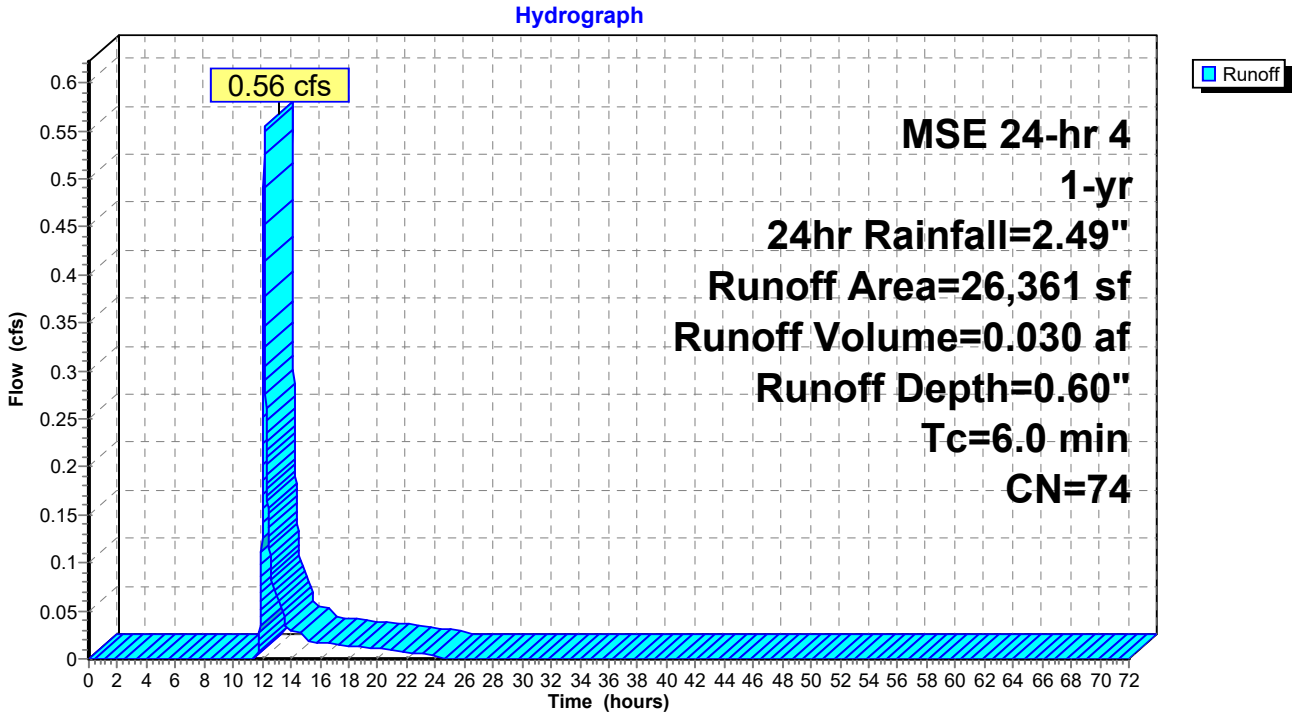
Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 0.60"
Routed to Pond R5 : Bypass Swale 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

Area (sf)	CN	Description
26,361	74	>75% Grass cover, Good, HSG C
26,361		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn6: Bypass Onsite (west)



Summary for Subcatchment PrOn7: SE Depression Onsite

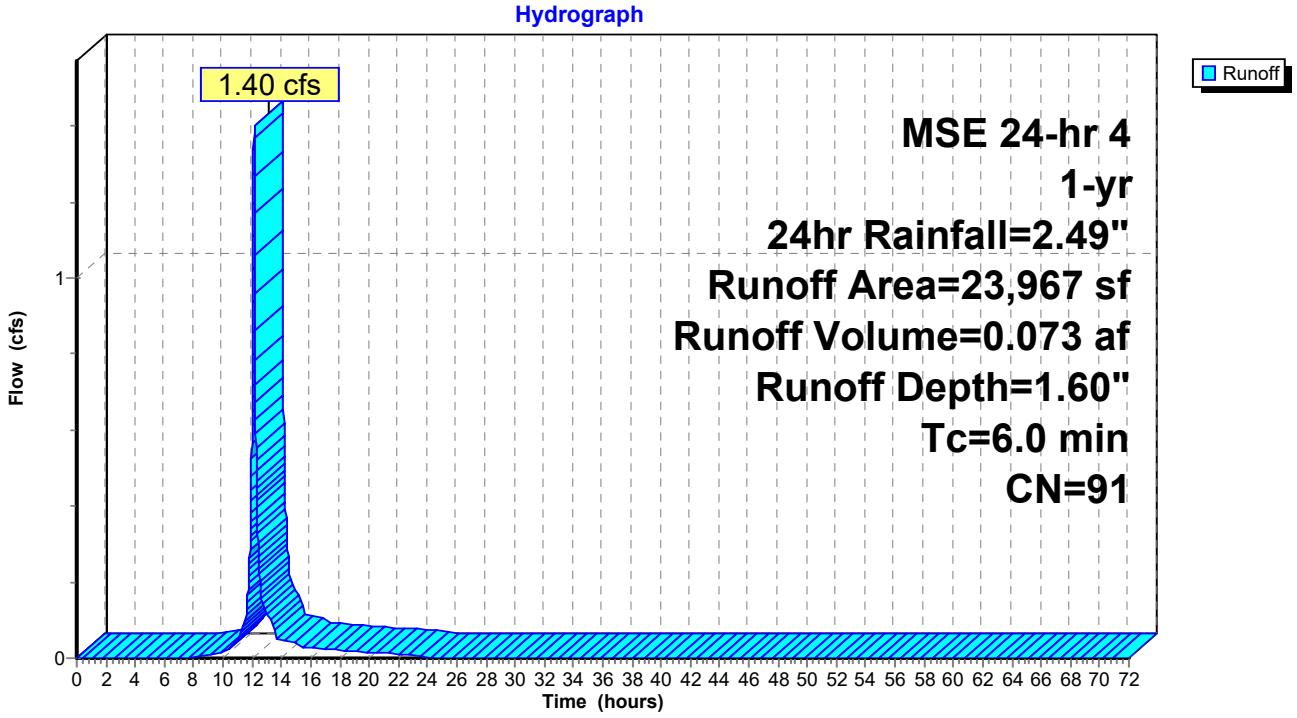
Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.073 af, Depth= 1.60"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1-yr, 24hr Rainfall=2.49"

	Area (sf)	CN	Description
*	15,029	100	SE Depression
	8,938	75	1/4 acre lots, 38% imp, HSG B
	23,967	91	Weighted Average
	5,542		23.12% Pervious Area
	18,425		76.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn7: SE Depression Onsite



Summary for Reach R1: Bypass Swale 1

Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 0.86 cfs @ 12.29 hrs, Volume= 0.089 af
Outflow = 0.86 cfs @ 12.30 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.7 min
Routed to Pond C1 : Bypass Culvert (Low Countries Rd east)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.46 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 3.1 min

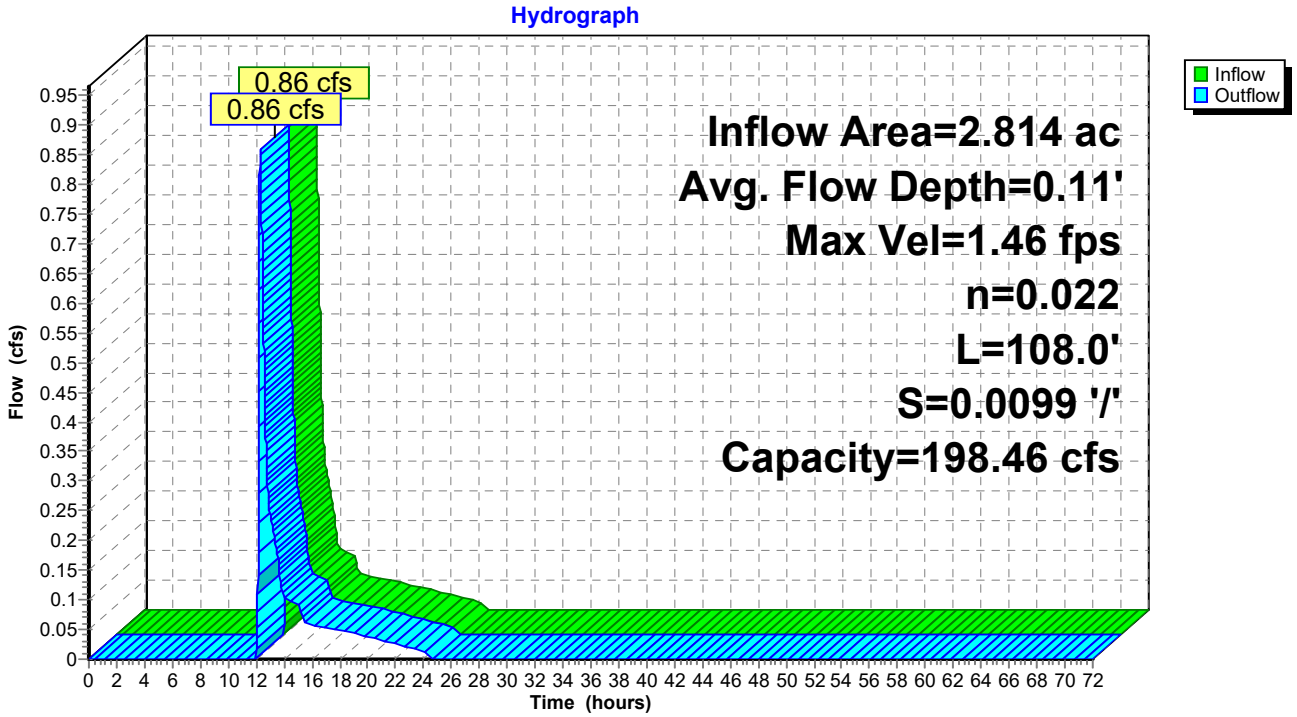
Peak Storage= 64 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 5.87'
Bank-Full Depth= 2.00' Flow Area= 26.0 sf, Capacity= 198.46 cfs

5.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 21.00'
Length= 108.0' Slope= 0.0099 '/'
Inlet Invert= 960.32', Outlet Invert= 959.25'



‡

Reach R1: Bypass Swale 1



Summary for Reach R2: Bypass Swale 2

Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 7.26 cfs @ 12.46 hrs, Volume= 1.019 af
Outflow = 7.10 cfs @ 12.52 hrs, Volume= 1.019 af, Atten= 2%, Lag= 3.5 min
Routed to Pond C3 : Bypass Culvert (Yorktown Rd north)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.57 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 10.5 min

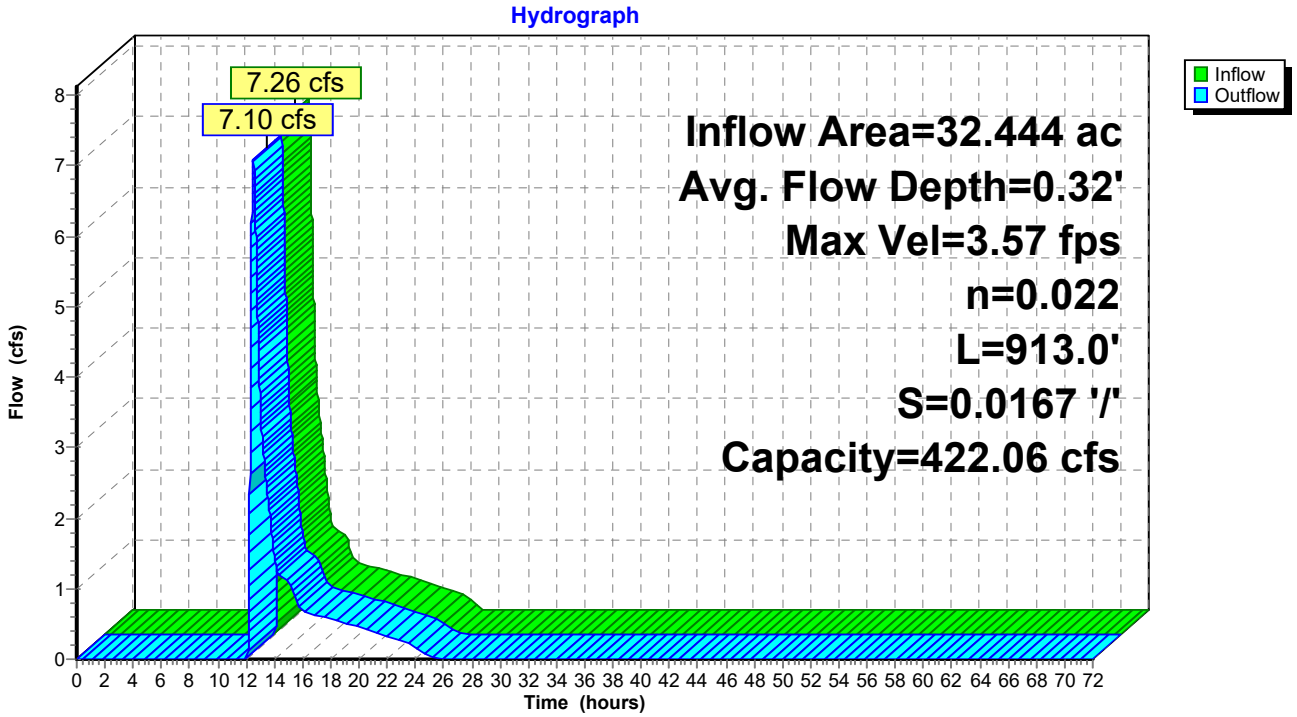
Peak Storage= 1,816 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 7.54'
Bank-Full Depth= 2.50' Flow Area= 37.5 sf, Capacity= 422.06 cfs

5.00' x 2.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 25.00'
Length= 913.0' Slope= 0.0167 '/'
Inlet Invert= 956.53', Outlet Invert= 941.28'



‡

Reach R2: Bypass Swale 2



Summary for Reach R3: Bypass Swale 3

Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 7.28 cfs @ 12.52 hrs, Volume= 1.065 af
Outflow = 7.08 cfs @ 12.58 hrs, Volume= 1.065 af, Atten= 3%, Lag= 3.6 min
Routed to Pond C4 : Bypass Culvert (Low Countries Rd west)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 12.1 min

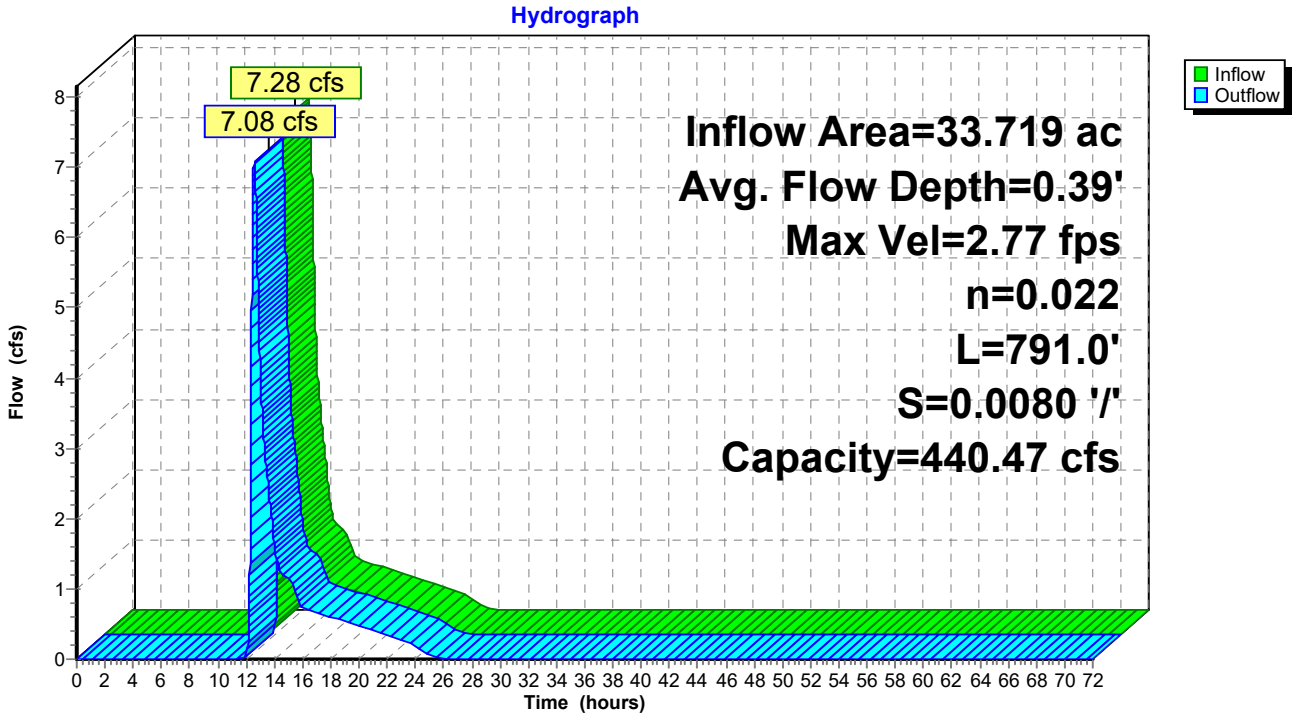
Peak Storage= 2,023 cf @ 12.58 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 8.12'
Bank-Full Depth= 3.00' Flow Area= 51.0 sf, Capacity= 440.47 cfs

5.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 29.00'
Length= 791.0' Slope= 0.0080 '/'
Inlet Invert= 940.20', Outlet Invert= 933.90'



‡

Reach R3: Bypass Swale 3



Summary for Pond C1: Bypass Culvert (Low Countries Rd east)

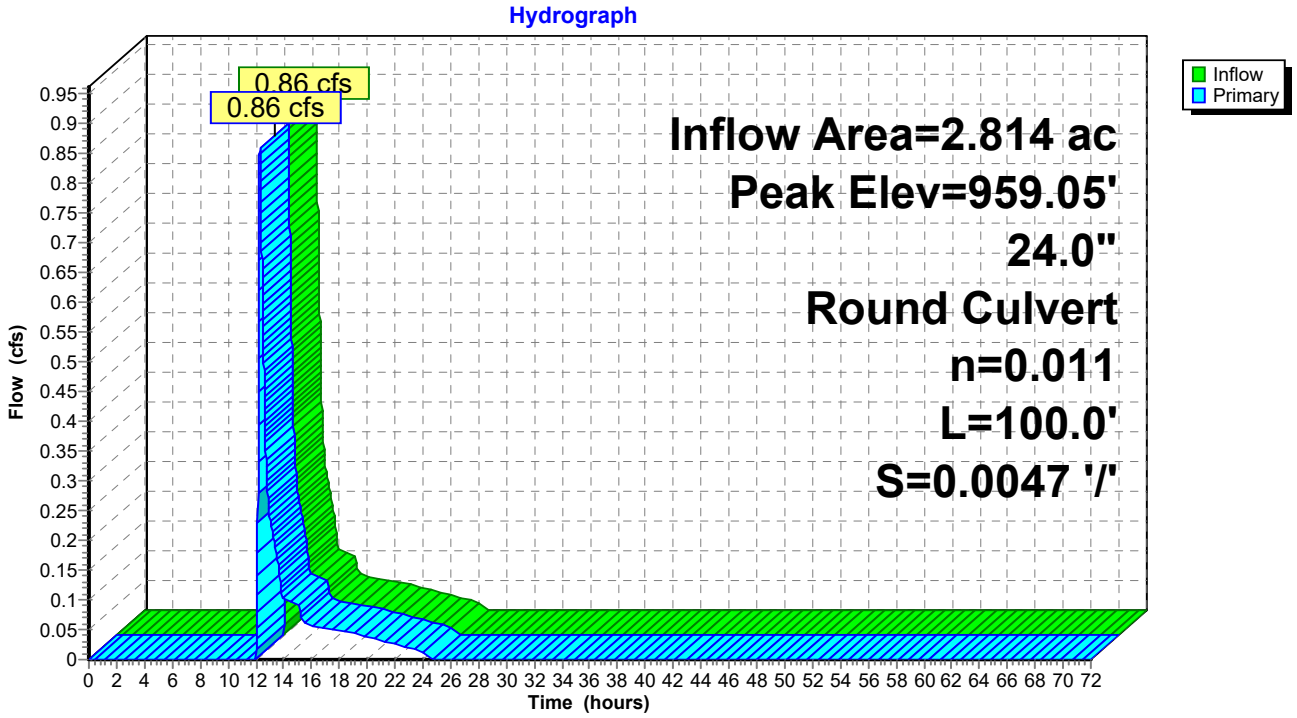
Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 0.86 cfs @ 12.30 hrs, Volume= 0.089 af
Outflow = 0.86 cfs @ 12.30 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.30 hrs, Volume= 0.089 af
Routed to Pond C2 : Bypass Culvert (east backyards)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 959.05' @ 12.30 hrs
Flood Elev= 962.57'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.60'	**24.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.60' / 958.13' S= 0.0047 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.86 cfs @ 12.30 hrs HW=959.05' TW=958.67' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.86 cfs @ 2.45 fps)

Pond C1: Bypass Culvert (Low Countries Rd east)



Summary for Pond C2: Bypass Culvert (east backyards)

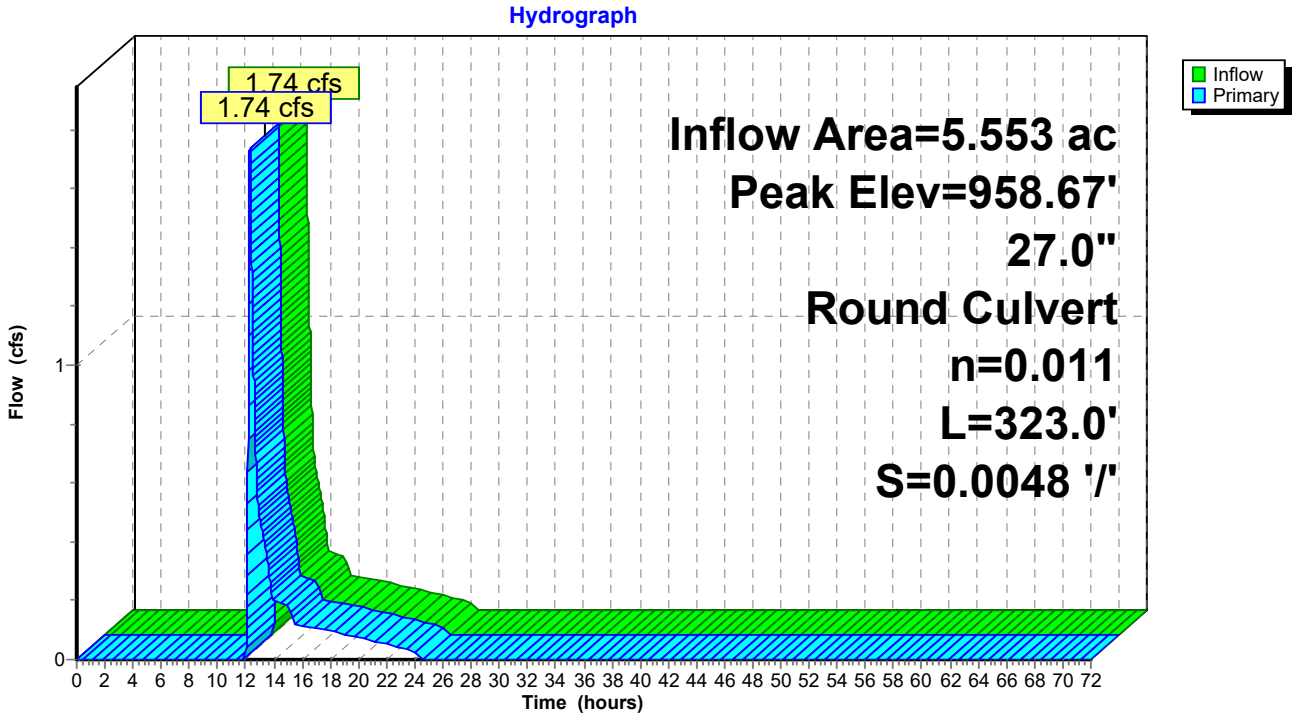
Inflow Area = 5.553 ac, 0.00% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 1.74 cfs @ 12.29 hrs, Volume= 0.176 af
Outflow = 1.74 cfs @ 12.29 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min
Primary = 1.74 cfs @ 12.29 hrs, Volume= 0.176 af
Routed to Reach R2 : Bypass Swale 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 958.67' @ 12.29 hrs
Flood Elev= 963.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.13'	**27.0" Round Culvert** L= 323.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.13' / 956.59' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=1.74 cfs @ 12.29 hrs HW=958.67' TW=956.74' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.74 cfs @ 3.55 fps)

Pond C2: Bypass Culvert (east backyards)



Summary for Pond C3: Bypass Culvert (Yorktown Rd north)

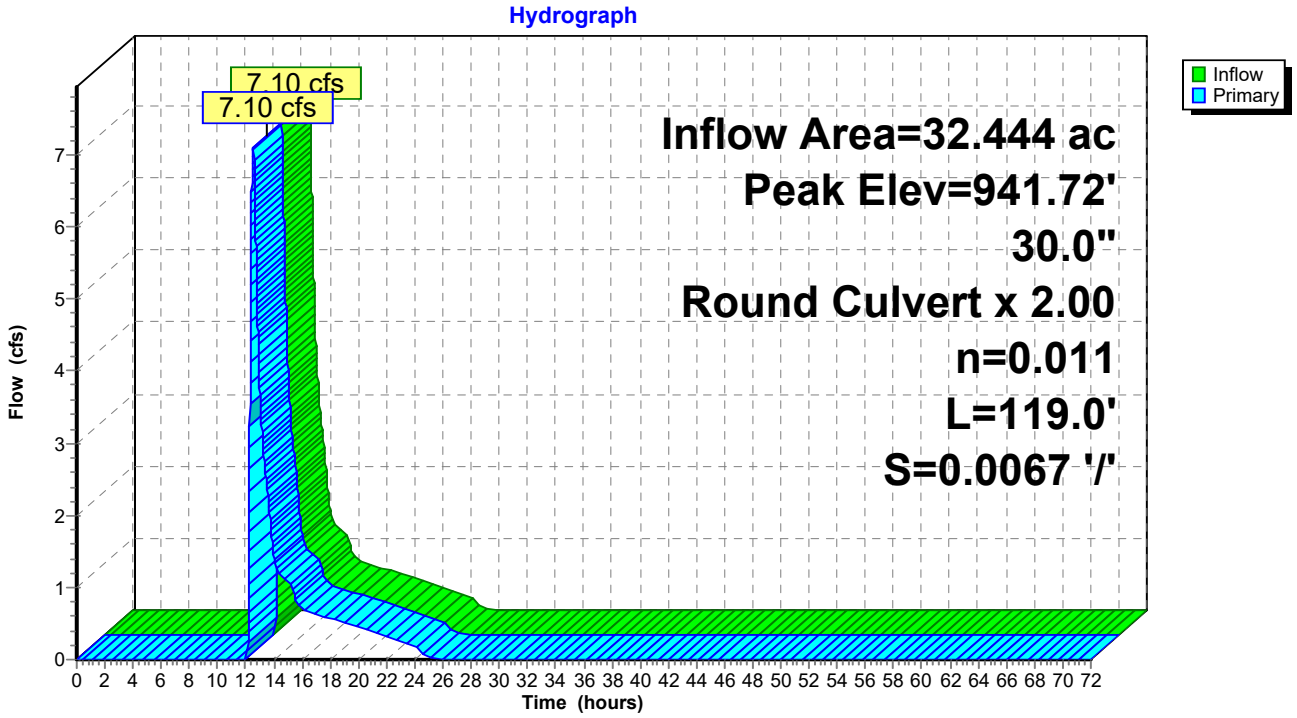
Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 7.10 cfs @ 12.52 hrs, Volume= 1.019 af
Outflow = 7.10 cfs @ 12.52 hrs, Volume= 1.019 af, Atten= 0%, Lag= 0.0 min
Primary = 7.10 cfs @ 12.52 hrs, Volume= 1.019 af
Routed to Reach R3 : Bypass Swale 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 941.72' @ 12.52 hrs
Flood Elev= 946.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	941.00'	**30.0" Round Culvert X 2.00** L= 119.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 941.00' / 940.20' S= 0.0067 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=7.10 cfs @ 12.52 hrs HW=941.72' TW=940.58' (Dynamic Tailwater)
1=Culvert (Barrel Controls 7.10 cfs @ 4.52 fps)

Pond C3: Bypass Culvert (Yorktown Rd north)



Summary for Pond C4: Bypass Culvert (Low Countries Rd west)

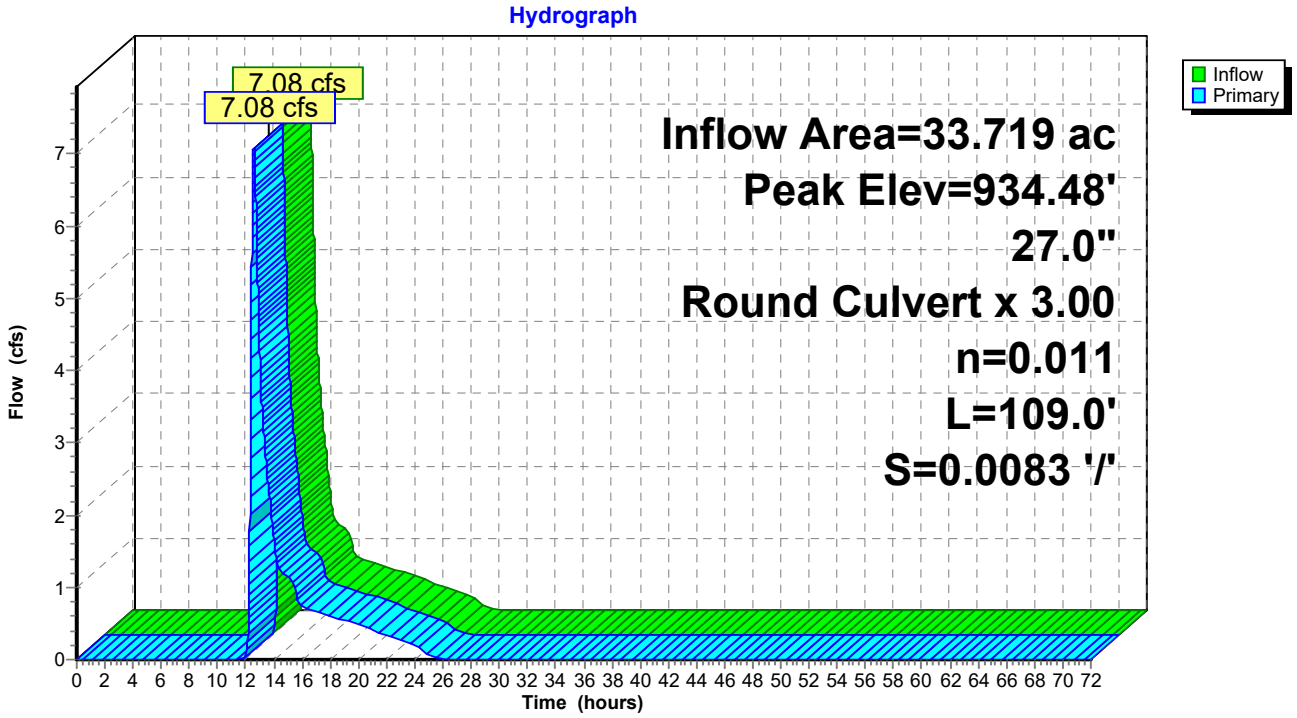
Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 0.38" for 1-yr, 24hr event
Inflow = 7.08 cfs @ 12.58 hrs, Volume= 1.065 af
Outflow = 7.08 cfs @ 12.58 hrs, Volume= 1.065 af, Atten= 0%, Lag= 0.0 min
Primary = 7.08 cfs @ 12.58 hrs, Volume= 1.065 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 934.48' @ 12.58 hrs
Flood Elev= 937.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	933.90'	**27.0" Round Culvert X 3.00** L= 109.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 933.90' / 933.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=7.08 cfs @ 12.58 hrs HW=934.48' TW=931.46' (Dynamic Tailwater)
1=Culvert (Barrel Controls 7.08 cfs @ 4.39 fps)

Pond C4: Bypass Culvert (Low Countries Rd west)



Summary for Pond PrP1: SE Existing Depression

Inflow Area = 15.371 ac, 2.78% Impervious, Inflow Depth = 0.43" for 1-yr, 24hr event
Inflow = 4.47 cfs @ 12.35 hrs, Volume= 0.547 af
Outflow = 1.42 cfs @ 13.07 hrs, Volume= 0.547 af, Atten= 68%, Lag= 43.4 min
Discarded = 0.07 cfs @ 13.07 hrs, Volume= 0.058 af
Primary = 1.35 cfs @ 13.07 hrs, Volume= 0.489 af
Routed to Pond PrP2 : Wet Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP2 : Wet Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 955.04' @ 13.07 hrs Surf.Area= 21,512 sf Storage= 7,073 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 96.3 min (979.5 - 883.2)

Volume	Invert	Avail.Storage	Storage Description
#1	954.50'	122,348 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.50	5,787	0	0
955.00	19,221	6,252	6,252
956.00	76,066	47,644	53,896
956.50	95,900	42,992	96,887
956.75	107,787	25,461	122,348

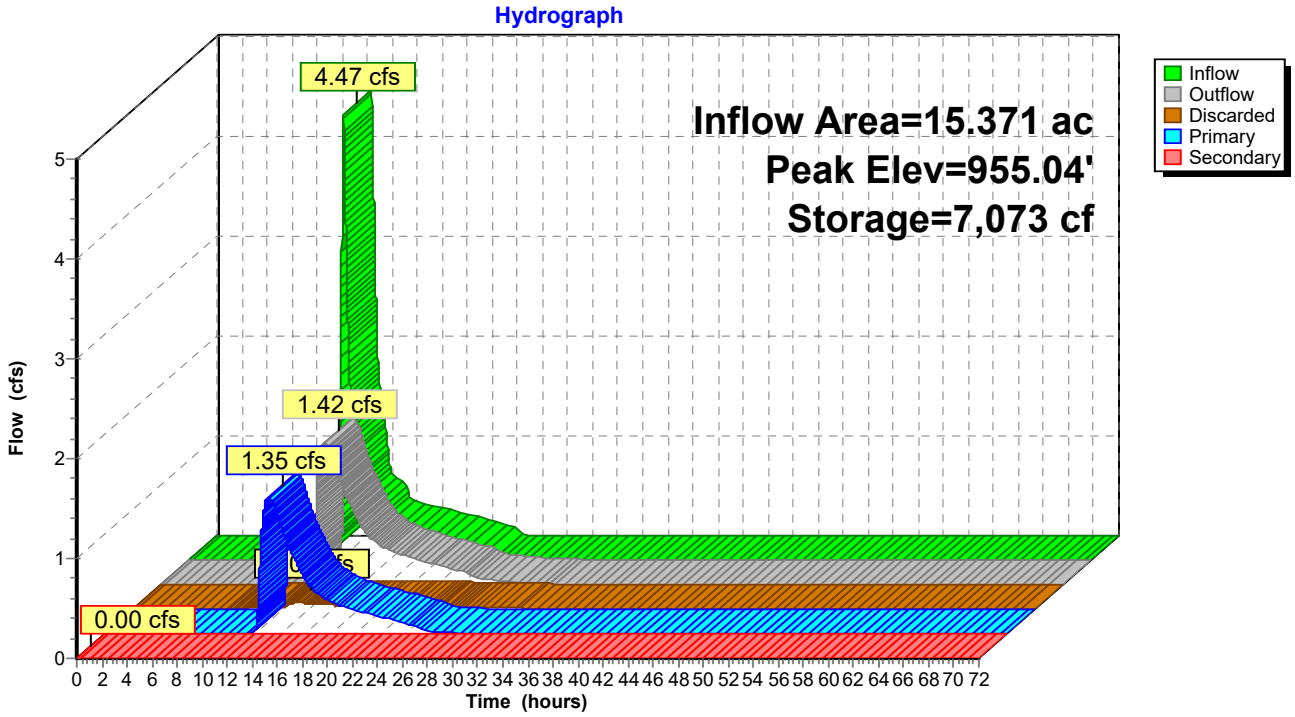
Device	Routing	Invert	Outlet Devices
#1	Discarded	954.50'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 900.00'
#2	Secondary	955.75'	**10.0' long + 4.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Primary	954.50'	**12.0" Round Culvert** L= 1,700.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 954.50' / 931.50' S= 0.0135 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.07 cfs @ 13.07 hrs HW=955.04' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.35 cfs @ 13.07 hrs HW=955.04' TW=932.32' (Dynamic Tailwater)
↑—**3=Culvert** (Inlet Controls 1.35 cfs @ 3.13 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.50' TW=931.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PrP1: SE Existing Depression



Summary for Pond PrP2: Wet Pond

Inflow Area = 47.275 ac, 27.42% Impervious, Inflow Depth = 0.59" for 1-yr, 24hr event
Inflow = 34.28 cfs @ 12.14 hrs, Volume= 2.311 af
Outflow = 3.95 cfs @ 13.49 hrs, Volume= 2.224 af, Atten= 88%, Lag= 81.3 min
Primary = 3.95 cfs @ 13.49 hrs, Volume= 2.224 af
Routed to Pond PrP3 : Infiltration Basin
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Automatic Starting Elev= 931.50' Surf.Area= 45,103 sf Storage= 190,807 cf
Peak Elev= 932.34' @ 13.49 hrs Surf.Area= 48,257 sf Storage= 230,033 cf (39,226 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 313.2 min (1,187.9 - 874.6)

Volume	Invert	Avail.Storage	Storage Description
#1	925.50'	545,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

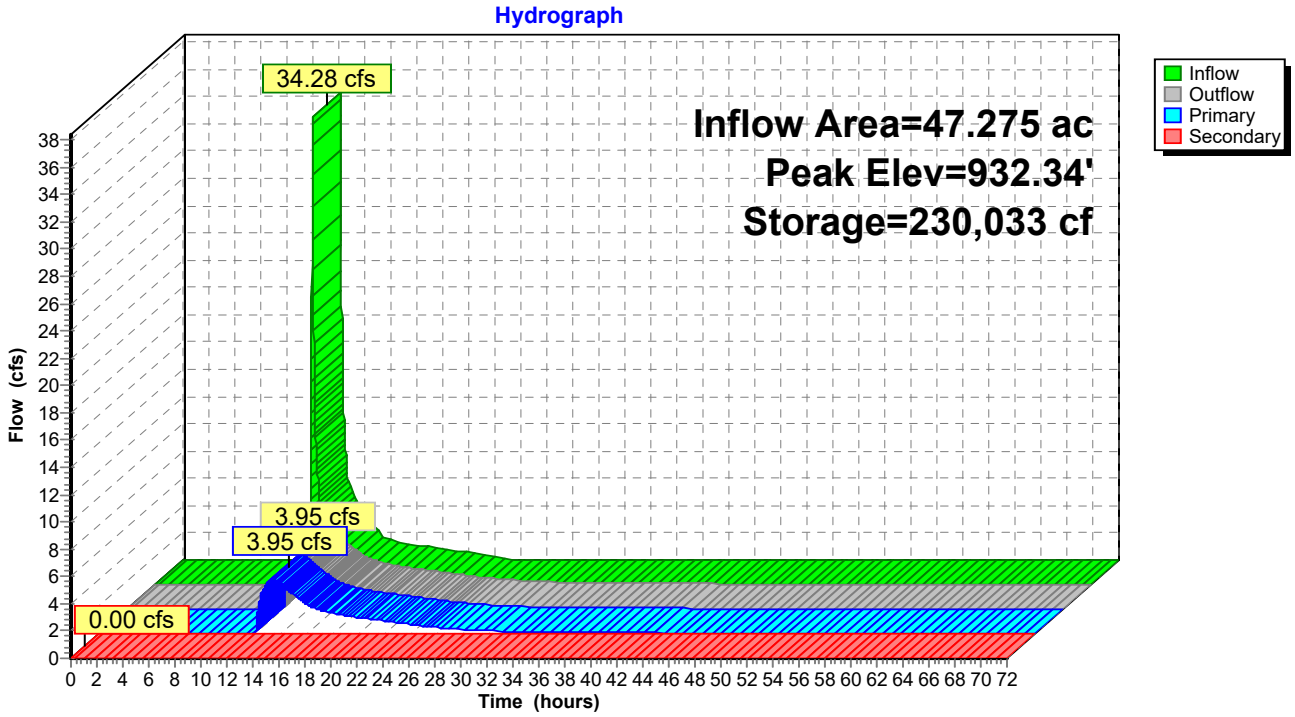
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
925.50	23,915	0	0
930.50	36,156	150,178	150,178
931.50	45,103	40,630	190,807
932.50	48,857	46,980	237,787
933.50	52,712	50,785	288,572
934.50	56,667	54,690	343,261
935.50	60,723	58,695	401,956
936.50	64,880	62,802	464,758
937.50	69,137	67,009	531,766
937.70	70,001	13,914	545,680

Device	Routing	Invert	Outlet Devices
#1	Primary	931.50'	**30.0" Round Culvert** L= 263.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 931.50' / 930.50' S= 0.0038 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	936.70'	**10.0' long + 4.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=3.95 cfs @ 13.49 hrs HW=932.34' TW=930.99' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.95 cfs @ 4.06 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=931.50' TW=930.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PrP2: Wet Pond



Summary for Pond PrP3: Infiltration Basin

Inflow Area = 52.413 ac, 30.94% Impervious, Inflow Depth > 0.63" for 1-yr, 24hr event
Inflow = 11.03 cfs @ 12.14 hrs, Volume= 2.765 af
Outflow = 1.59 cfs @ 18.40 hrs, Volume= 1.750 af, Atten= 86%, Lag= 375.8 min
Discarded = 0.19 cfs @ 18.40 hrs, Volume= 0.940 af
Primary = 1.40 cfs @ 18.40 hrs, Volume= 0.810 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.58' @ 18.40 hrs Surf.Area= 65,202 sf Storage= 67,654 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 800.2 min (1,915.2 - 1,115.0)

Volume	Invert	Avail.Storage	Storage Description
#1	930.50'	400,616 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

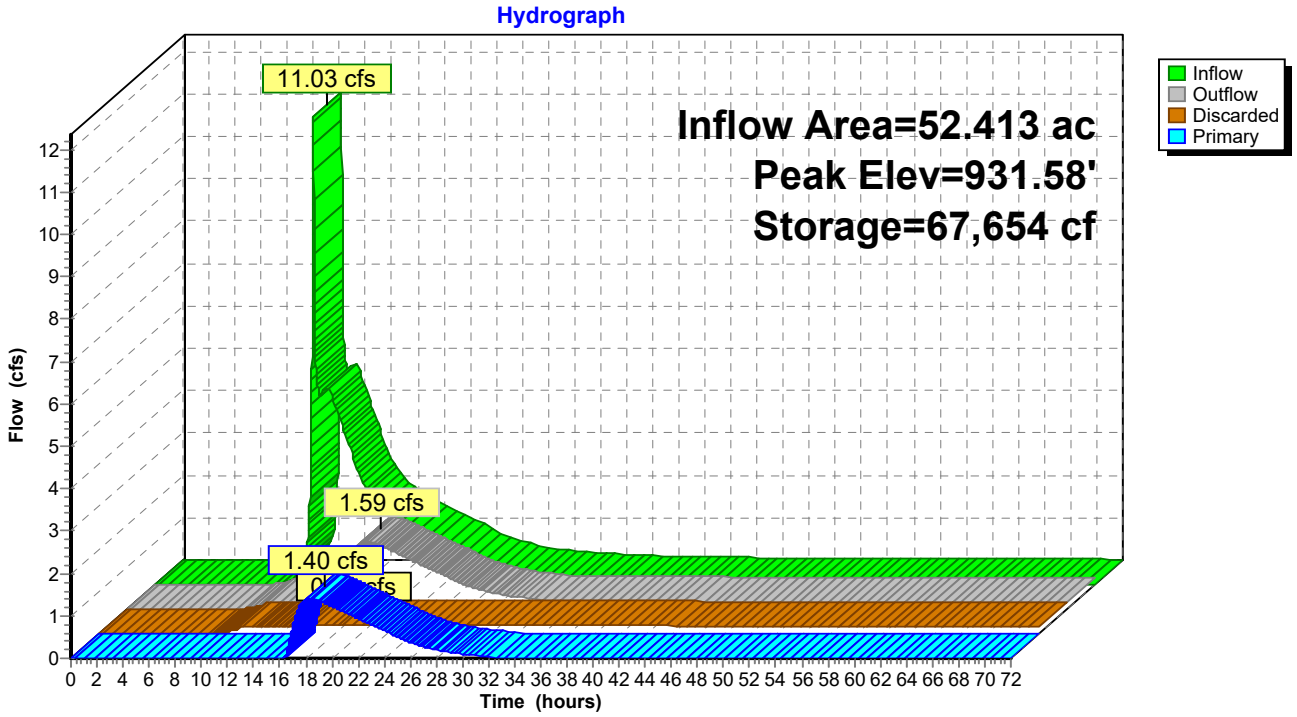
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
930.50	60,505	0	0
931.00	62,666	30,793	30,793
932.00	67,065	64,866	95,658
933.00	71,564	69,315	164,973
934.00	76,164	73,864	238,837
935.00	80,865	78,515	317,351
936.00	85,665	83,265	400,616

Device	Routing	Invert	Outlet Devices
#1	Discarded	930.50'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'
#2	Primary	931.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.50 932.00 933.00 934.00 935.00 936.00 Width (feet) 20.00 24.00 32.00 40.00 48.00 56.00

Discarded OutFlow Max=0.19 cfs @ 18.40 hrs HW=931.58' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=1.40 cfs @ 18.40 hrs HW=931.58' TW=931.35' (Dynamic Tailwater)
↑—**2=Custom Weir/Orifice** (Weir Controls 1.40 cfs @ 0.90 fps)

Pond PrP3: Infiltration Basin



Summary for Pond R5: Bypass Swale 5

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 0.26" for 1-yr, 24hr event
Inflow = 7.18 cfs @ 12.57 hrs, Volume= 1.905 af
Outflow = 7.18 cfs @ 12.58 hrs, Volume= 1.905 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.58 hrs, Volume= 0.001 af
Primary = 7.18 cfs @ 12.58 hrs, Volume= 1.904 af
Routed to Link PrL : Pro Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.46' @ 12.58 hrs Surf.Area= 330 sf Storage= 46 cf

Plug-Flow detention time= 0.1 min calculated for 1.904 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (1,070.9 - 1,070.8)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	21,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

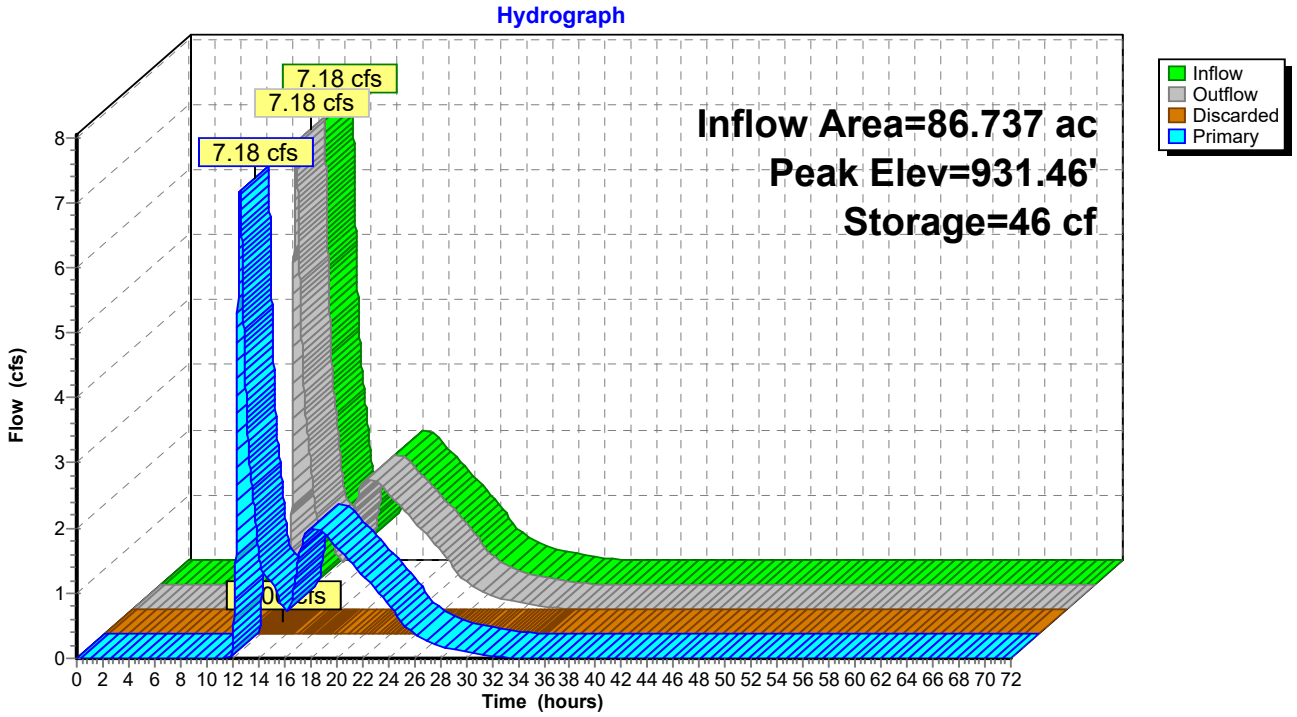
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	973	399	399
933.00	4,970	2,972	3,370
934.00	8,803	6,887	10,257
935.00	13,565	11,184	21,441

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.58 hrs HW=931.46' (Free Discharge)
↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=7.18 cfs @ 12.58 hrs HW=931.46' TW=0.00' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 7.18 cfs @ 1.38 fps)

Pond R5: Bypass Swale 5



Summary for Link PrL: Pro Total

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 0.26" for 1-yr, 24hr event
Inflow = 7.18 cfs @ 12.58 hrs, Volume= 1.904 af
Primary = 7.18 cfs @ 12.58 hrs, Volume= 1.904 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PrL: Pro Total

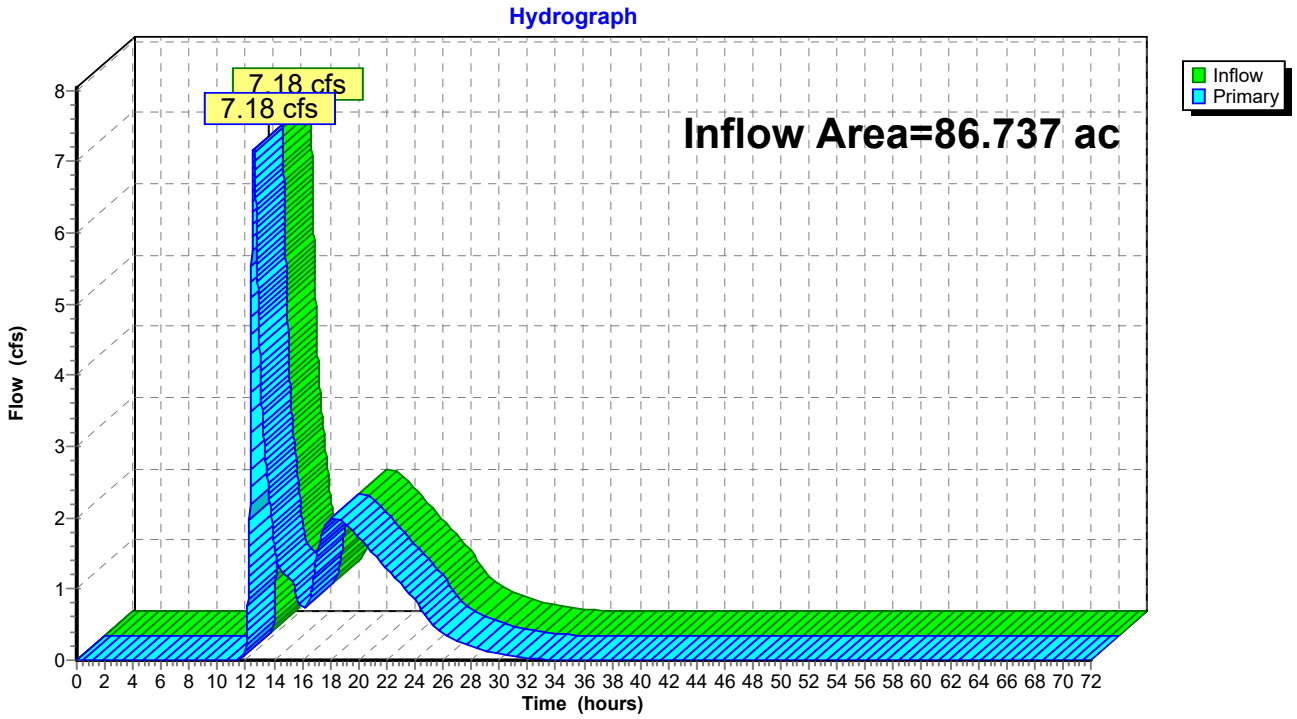
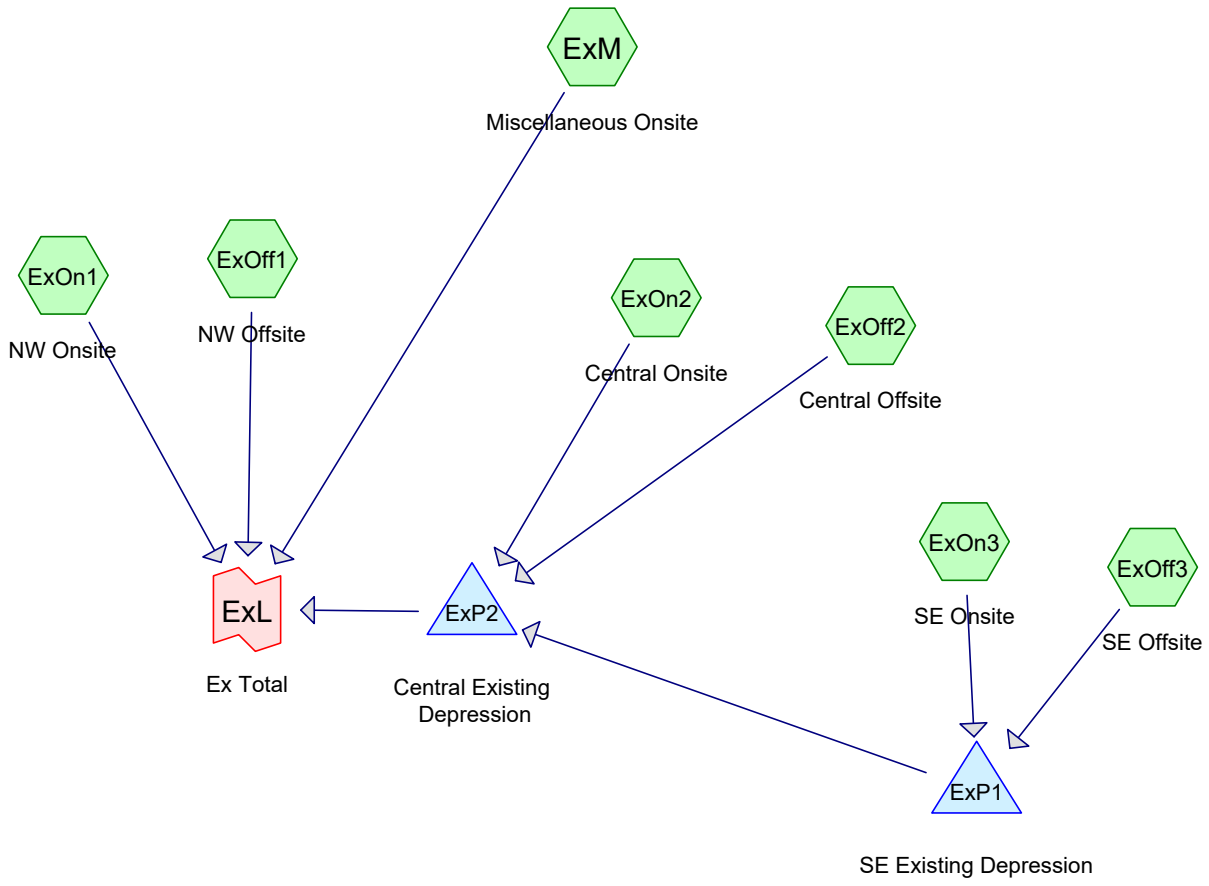


Exhibit 6

2-Year HydroCAD Results

Existing



Subcat Reach Pond Link

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentExM: MiscellaneousOnsite Runoff Area=2,540 sf 0.00% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=68 Runoff=0.05 cfs 0.003 af

SubcatchmentExOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=68 Runoff=0.02 cfs 0.001 af

SubcatchmentExOff2: Central Offsite Runoff Area=1,466,288 sf 2.41% Impervious Runoff Depth=0.55"
Flow Length=3,502' Tc=51.7 min CN=68 Runoff=8.62 cfs 1.531 af

SubcatchmentExOff3: SE Offsite Runoff Area=670,631 sf 2.40% Impervious Runoff Depth=0.59"
Flow Length=1,396' Tc=20.1 min CN=69 Runoff=7.50 cfs 0.752 af

SubcatchmentExOn1: NW Onsite Runoff Area=42,806 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=386' Tc=8.2 min CN=73 Runoff=1.05 cfs 0.062 af

SubcatchmentExOn2: Central Onsite Runoff Area=1,554,006 sf 0.53% Impervious Runoff Depth=0.55"
Flow Length=1,792' Slope=0.0168 '/' Tc=25.6 min CN=68 Runoff=13.84 cfs 1.623 af

SubcatchmentExOn3: SE Onsite Runoff Area=41,039 sf 0.00% Impervious Runoff Depth=0.55"
Flow Length=311' Tc=13.4 min CN=68 Runoff=0.51 cfs 0.043 af

Pond ExP1: SE Existing Depression Peak Elev=955.52' Storage=27,432 cf Inflow=7.91 cfs 0.794 af
Discarded=0.18 cfs 0.677 af Primary=0.00 cfs 0.000 af Outflow=0.18 cfs 0.677 af

Pond ExP2: Central Existing Depression Peak Elev=931.59' Storage=31 cf Inflow=18.48 cfs 3.154 af
Discarded=0.00 cfs 0.000 af Primary=18.48 cfs 3.154 af Outflow=18.48 cfs 3.154 af

Link ExL: Ex Total Inflow=18.76 cfs 3.220 af
Primary=18.76 cfs 3.220 af

Total Runoff Area = 86.737 ac Runoff Volume = 4.015 af Average Runoff Depth = 0.56"
98.42% Pervious = 85.367 ac 1.58% Impervious = 1.370 ac

Summary for Subcatchment ExM: Miscellaneous Onsite

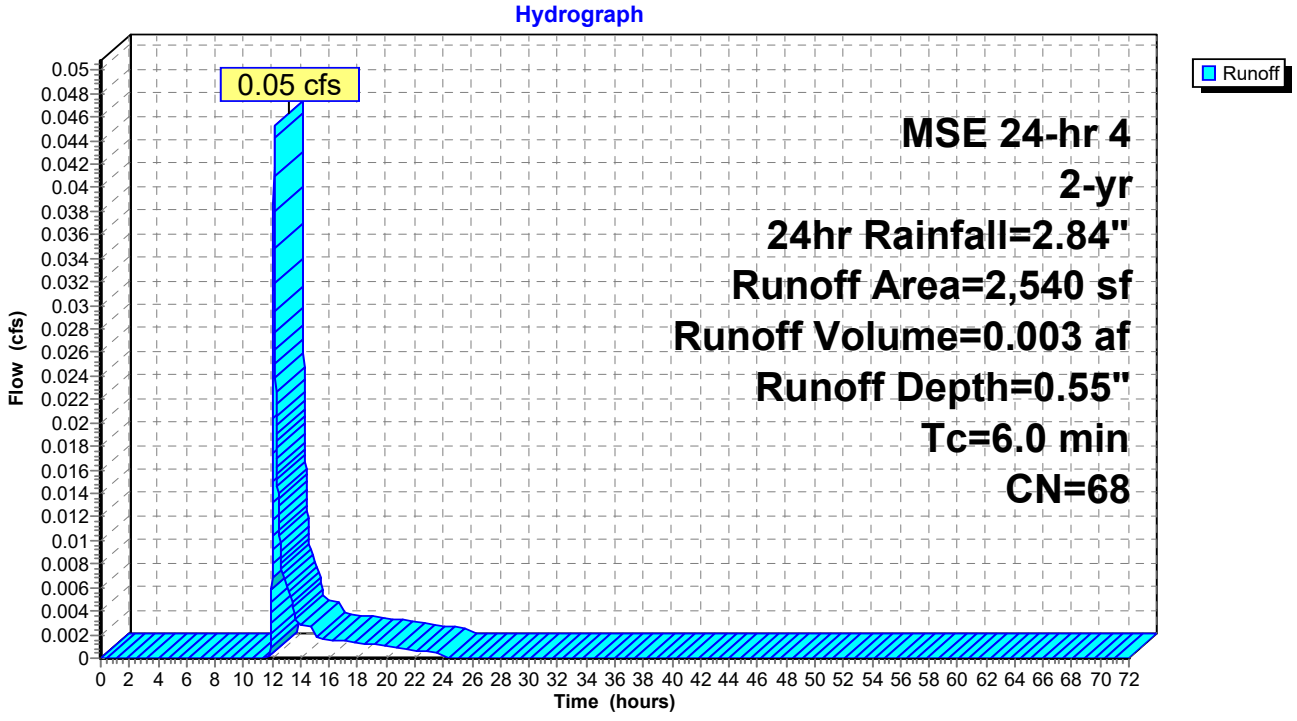
Runoff = 0.05 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 0.55"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	1,288	68	Cropland, HSG B Onsite
*	638	68	Cropland, HSG B Onsite
*	614	68	Cropland, HSG B Onsite
	2,540	68	Weighted Average
	2,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExM: Miscellaneous Onsite



Summary for Subcatchment ExOff1: NW Offsite

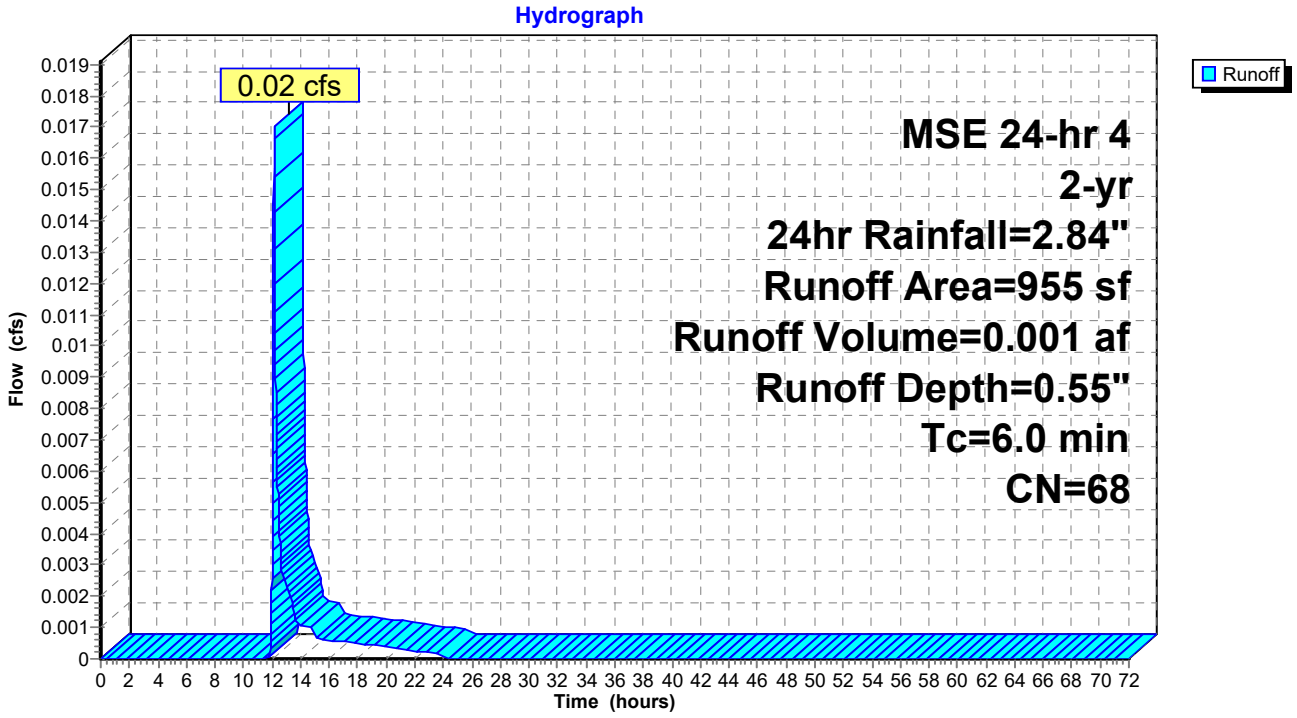
Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.001 af, Depth= 0.55"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExOff1: NW Offsite



Summary for Subcatchment ExOff2: Central Offsite

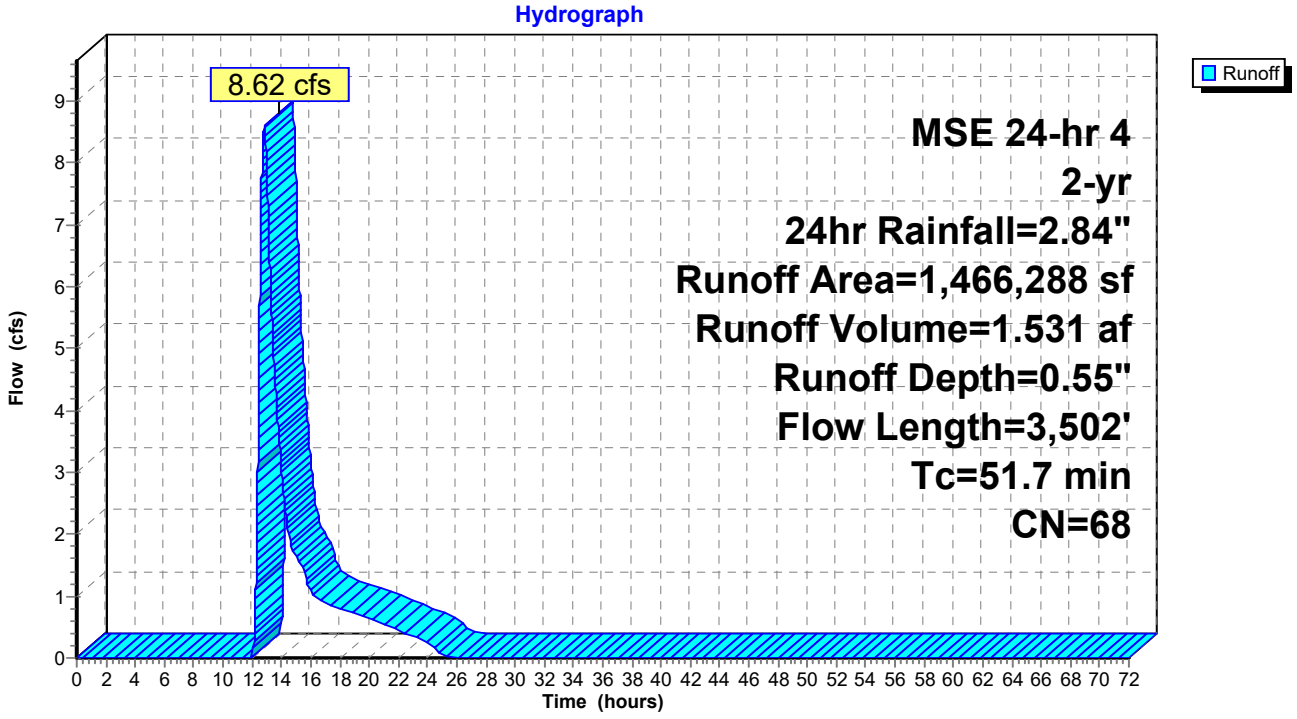
Runoff = 8.62 cfs @ 12.81 hrs, Volume= 1.531 af, Depth= 0.55"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	1,353,095	68	Cropland, HSG B Offsite
*	93,231	70	1/2 acre lots, 25% imp, HSG B Offsite
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
*	9,410	98	Pavement Offsite
	1,466,288	68	Weighted Average
	1,430,932		97.59% Pervious Area
	35,356		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
46.7	3,392	0.0181	1.21		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
51.7	3,502	Total			

Subcatchment ExOff2: Central Offsite



Summary for Subcatchment ExOff3: SE Offsite

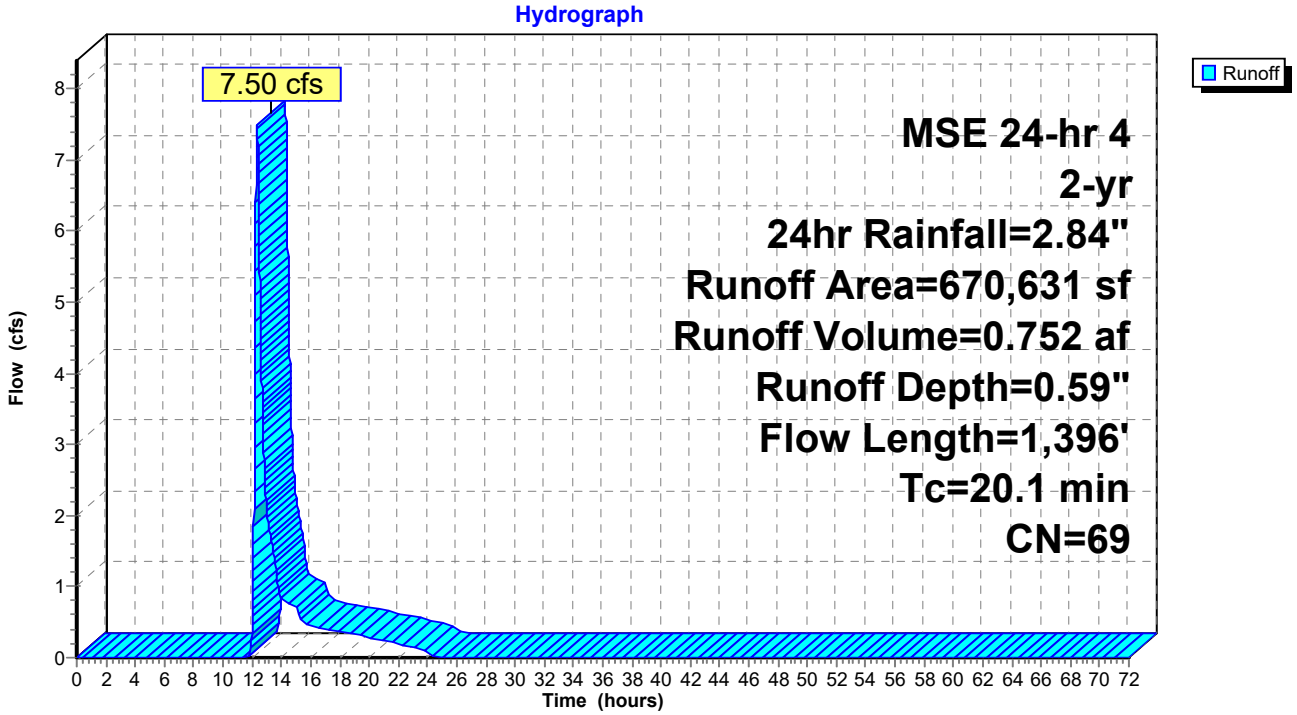
Runoff = 7.50 cfs @ 12.34 hrs, Volume= 0.752 af, Depth= 0.59"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	640,930	68	Cropland, HSG B Offsite
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	11,569	98	Pavement Offsite
	670,631	69	Weighted Average
	654,529		97.60% Pervious Area
	16,102		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment ExOff3: SE Offsite



Summary for Subcatchment ExOn1: NW Onsite

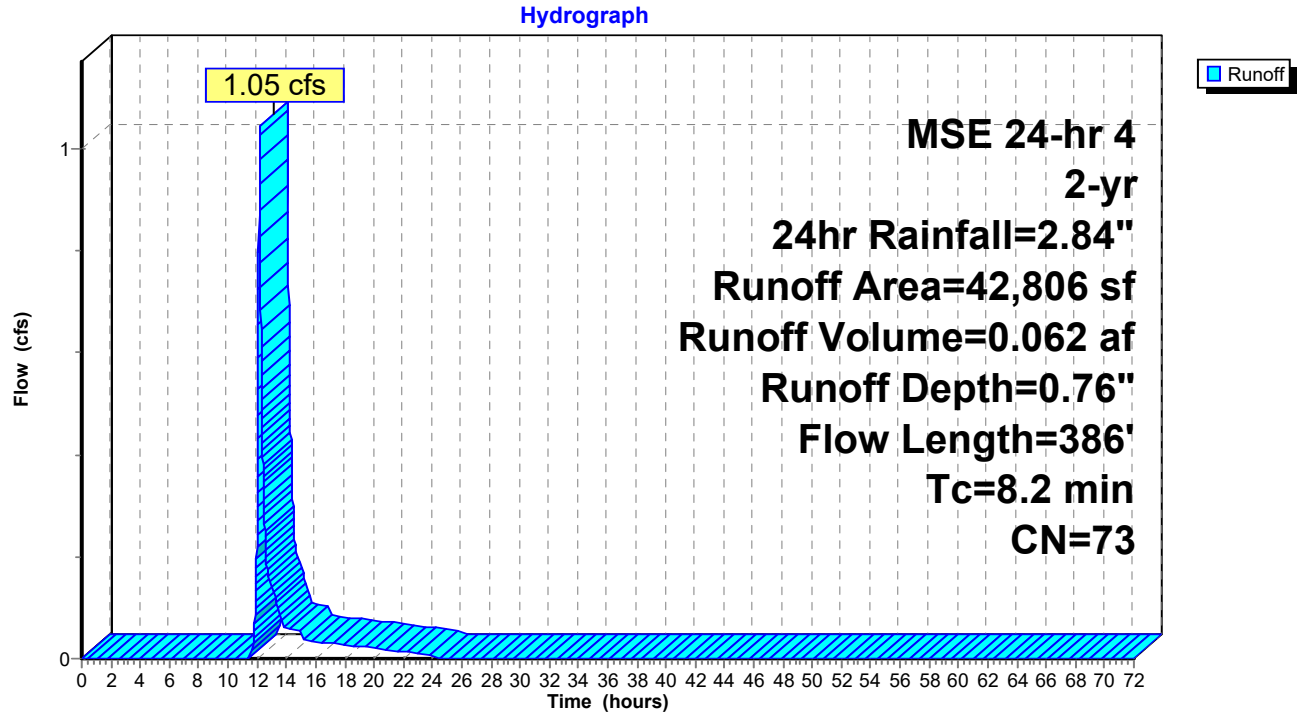
Runoff = 1.05 cfs @ 12.16 hrs, Volume= 0.062 af, Depth= 0.76"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	21,403	68	Cropland, HSG B Onsite
*	21,403	78	Cropland, HSG C Onsite
	42,806	73	Weighted Average
	42,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	67	0.0217	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
4.7	319	0.0156	1.12		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
8.2	386	Total			

Subcatchment ExOn1: NW Onsite



Summary for Subcatchment ExOn2: Central Onsite

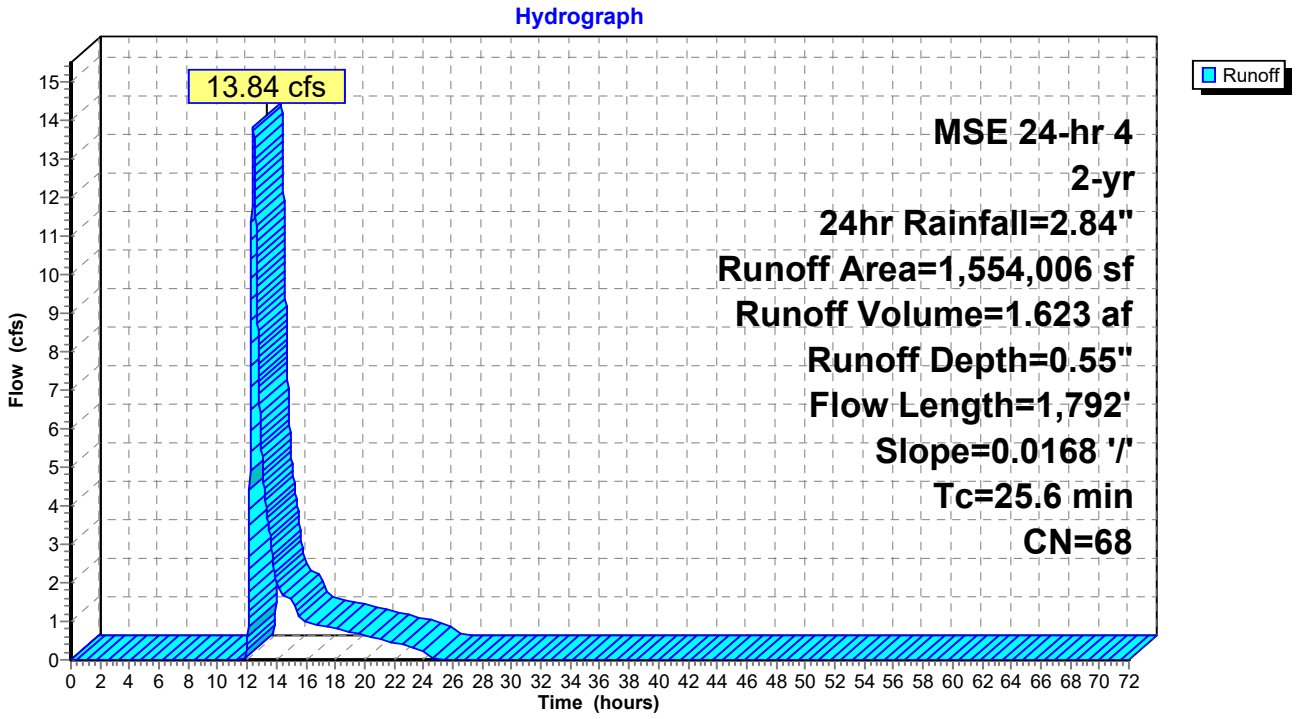
Runoff = 13.84 cfs @ 12.43 hrs, Volume= 1.623 af, Depth= 0.55"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	1,516,018	68	Cropland, HSB Onsite
*	5,189	78	Cropland, HSG C Onsite
*	32,799	70	1/2 acre lots, 25% imp, HSG B Onsite
	1,554,006	68	Weighted Average
	1,545,806		99.47% Pervious Area
	8,200		0.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,792	0.0168	1.17		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment ExOn2: Central Onsite



Summary for Subcatchment ExOn3: SE Onsite

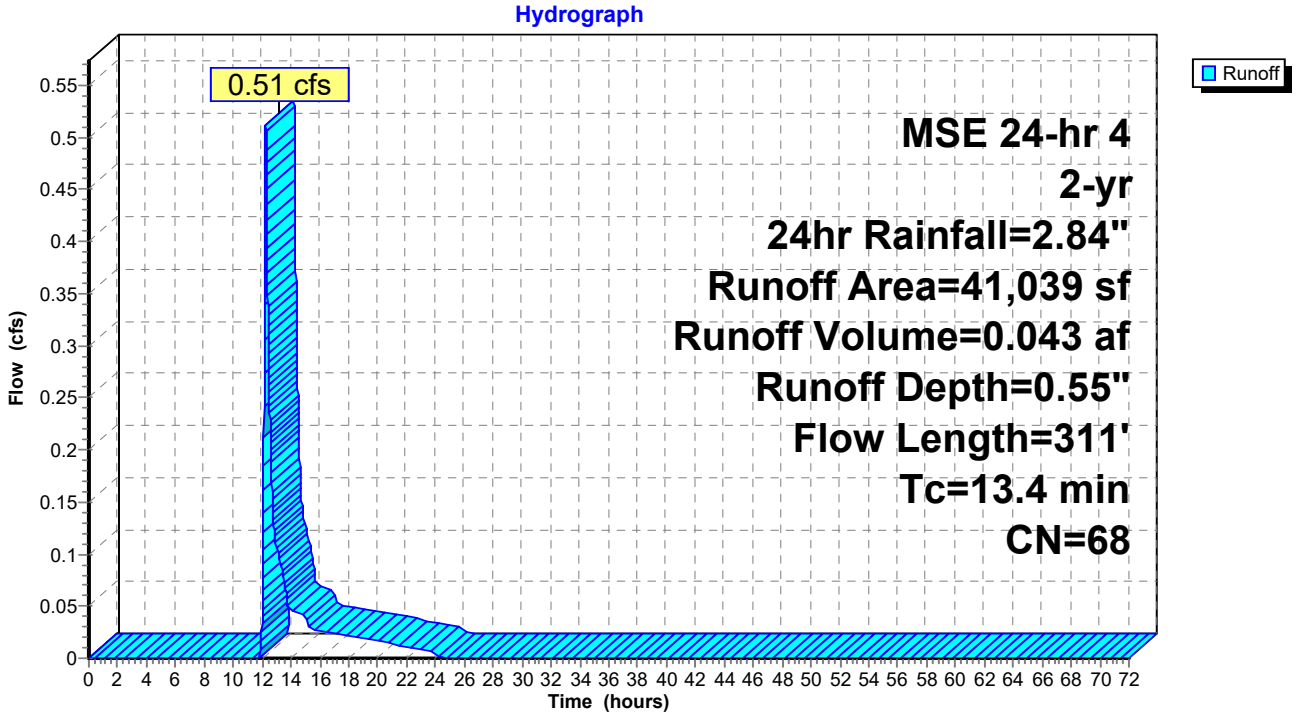
Runoff = 0.51 cfs @ 12.24 hrs, Volume= 0.043 af, Depth= 0.55"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	41,039	68	Cropland, HSB Onsite
	41,039		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	155	0.0086	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84" Using McCuen-Spiess flow length
3.5	156	0.0070	0.75		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
13.4	311	Total			

Subcatchment ExOn3: SE Onsite



Summary for Pond ExP1: SE Existing Depression

Inflow Area = 16.338 ac, 2.26% Impervious, Inflow Depth = 0.58" for 2-yr, 24hr event
Inflow = 7.91 cfs @ 12.33 hrs, Volume= 0.794 af
Outflow = 0.18 cfs @ 22.45 hrs, Volume= 0.677 af, Atten= 98%, Lag= 607.3 min
Discarded = 0.18 cfs @ 22.45 hrs, Volume= 0.677 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond ExP2 : Central Existing Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 955.52' @ 22.45 hrs Surf.Area= 60,615 sf Storage= 27,432 cf

Plug-Flow detention time= 1,468.5 min calculated for 0.677 af (85% of inflow)
Center-of-Mass det. time= 1,405.7 min (2,285.3 - 879.6)

Volume	Invert	Avail.Storage	Storage Description
#1	954.57'	150,632 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

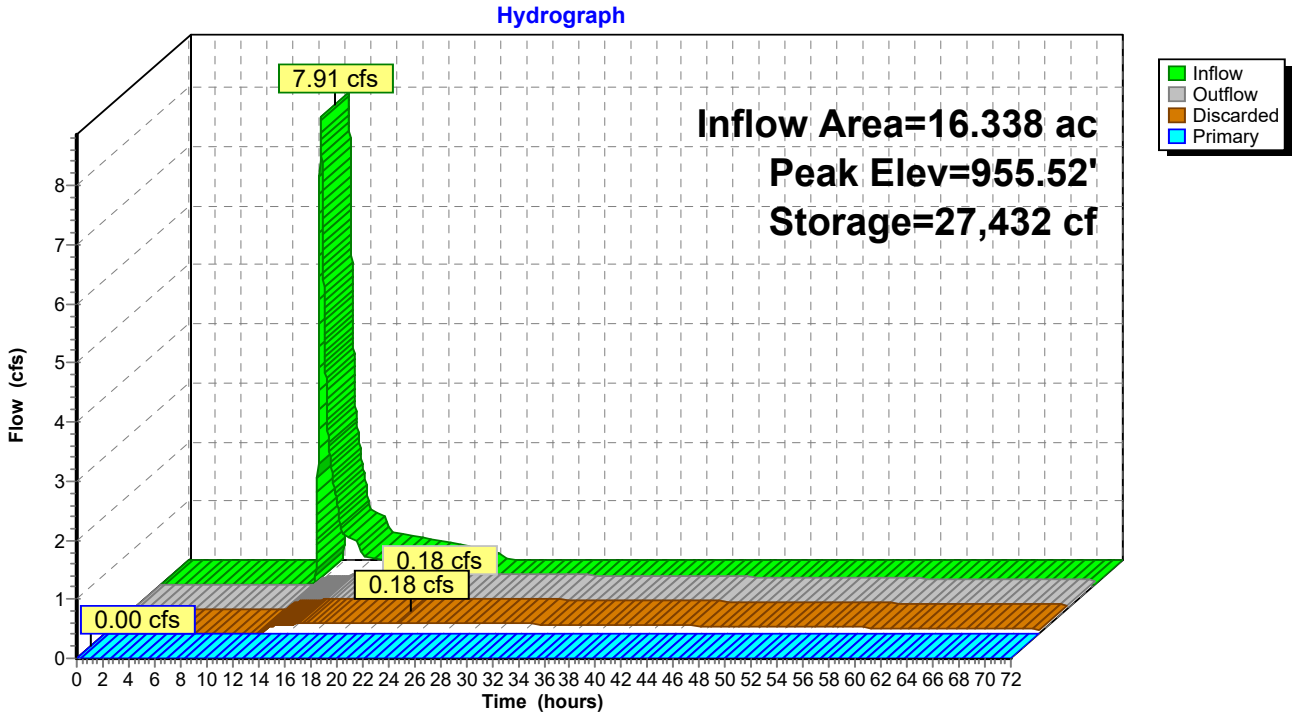
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.57	0	0	0
955.00	24,649	5,300	5,300
956.00	93,926	59,288	64,587
956.50	121,903	53,957	118,544
956.75	134,797	32,088	150,632

Device	Routing	Invert	Outlet Devices
#1	Primary	956.34'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 956.34 956.50 956.75 957.00 Width (feet) 7.00 104.00 184.00 249.00
#2	Discarded	954.57'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.18 cfs @ 22.45 hrs HW=955.52' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.57' TW=931.18' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond ExP1: SE Existing Depression



Summary for Pond ExP2: Central Existing Depression

Inflow Area = 85.674 ac, 1.60% Impervious, Inflow Depth = 0.44" for 2-yr, 24hr event
Inflow = 18.48 cfs @ 12.52 hrs, Volume= 3.154 af
Outflow = 18.48 cfs @ 12.52 hrs, Volume= 3.154 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.52 hrs, Volume= 0.000 af
Primary = 18.48 cfs @ 12.52 hrs, Volume= 3.154 af
Routed to Link ExL : Ex Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.59' @ 12.52 hrs Surf.Area= 153 sf Storage= 31 cf

Plug-Flow detention time= 0.0 min calculated for 3.154 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (900.4 - 900.4)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	681,595 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

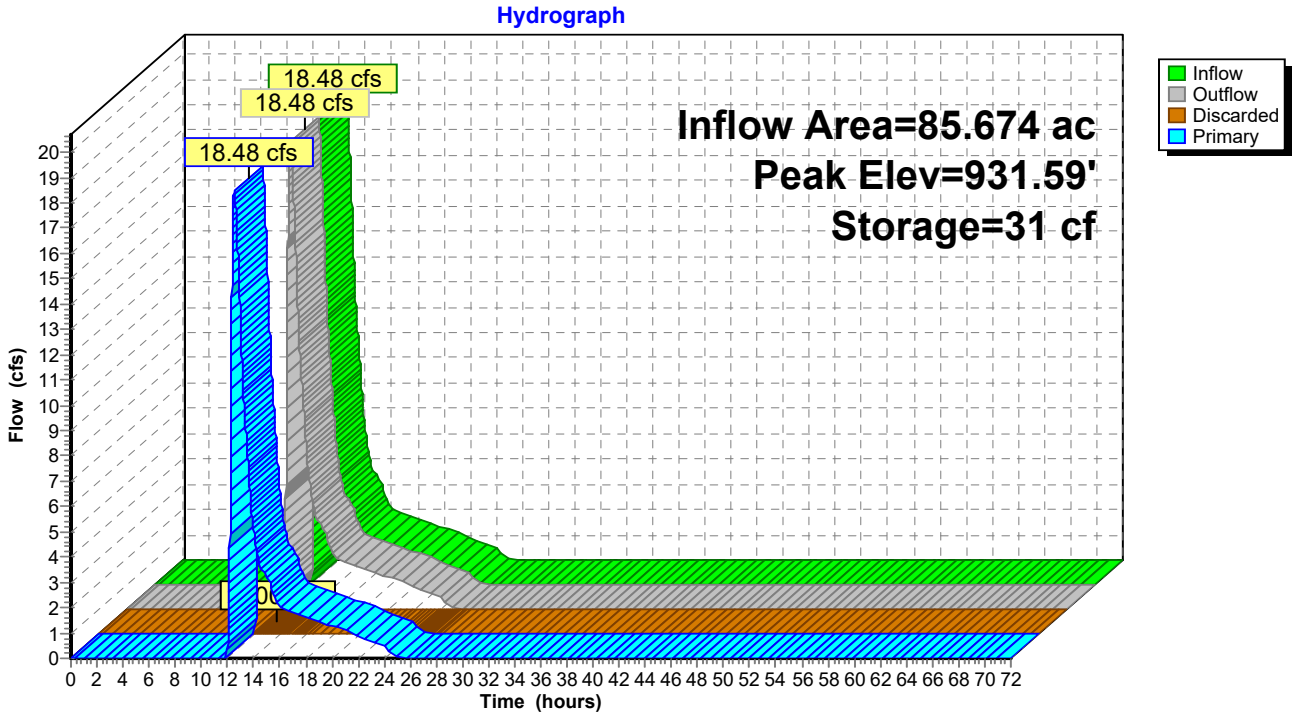
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	308	126	126
933.00	33,728	17,018	17,144
934.00	96,309	65,019	82,163
935.00	168,612	132,461	214,623
936.00	234,956	201,784	416,407
937.00	295,420	265,188	681,595

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 936.00 937.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00 622.00 735.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.52 hrs HW=931.59' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=18.48 cfs @ 12.52 hrs HW=931.59' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 18.48 cfs @ 1.68 fps)

Pond ExP2: Central Existing Depression

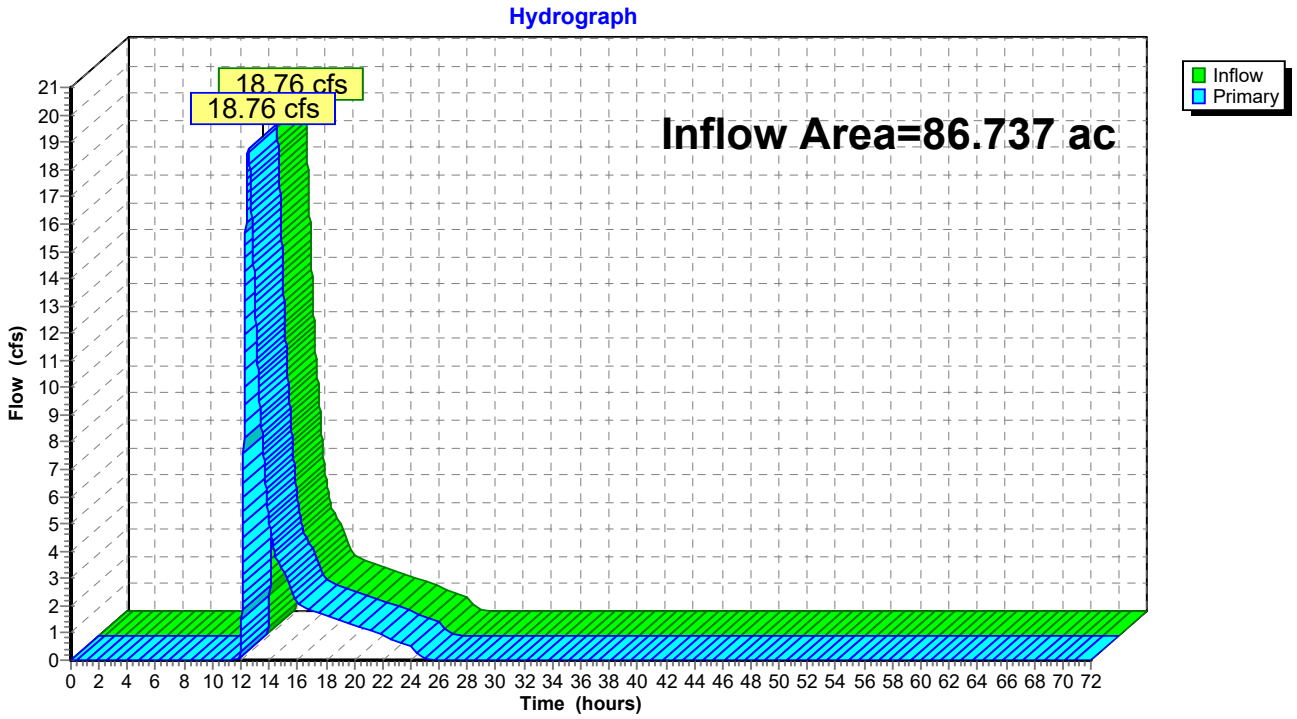


Summary for Link ExL: Ex Total

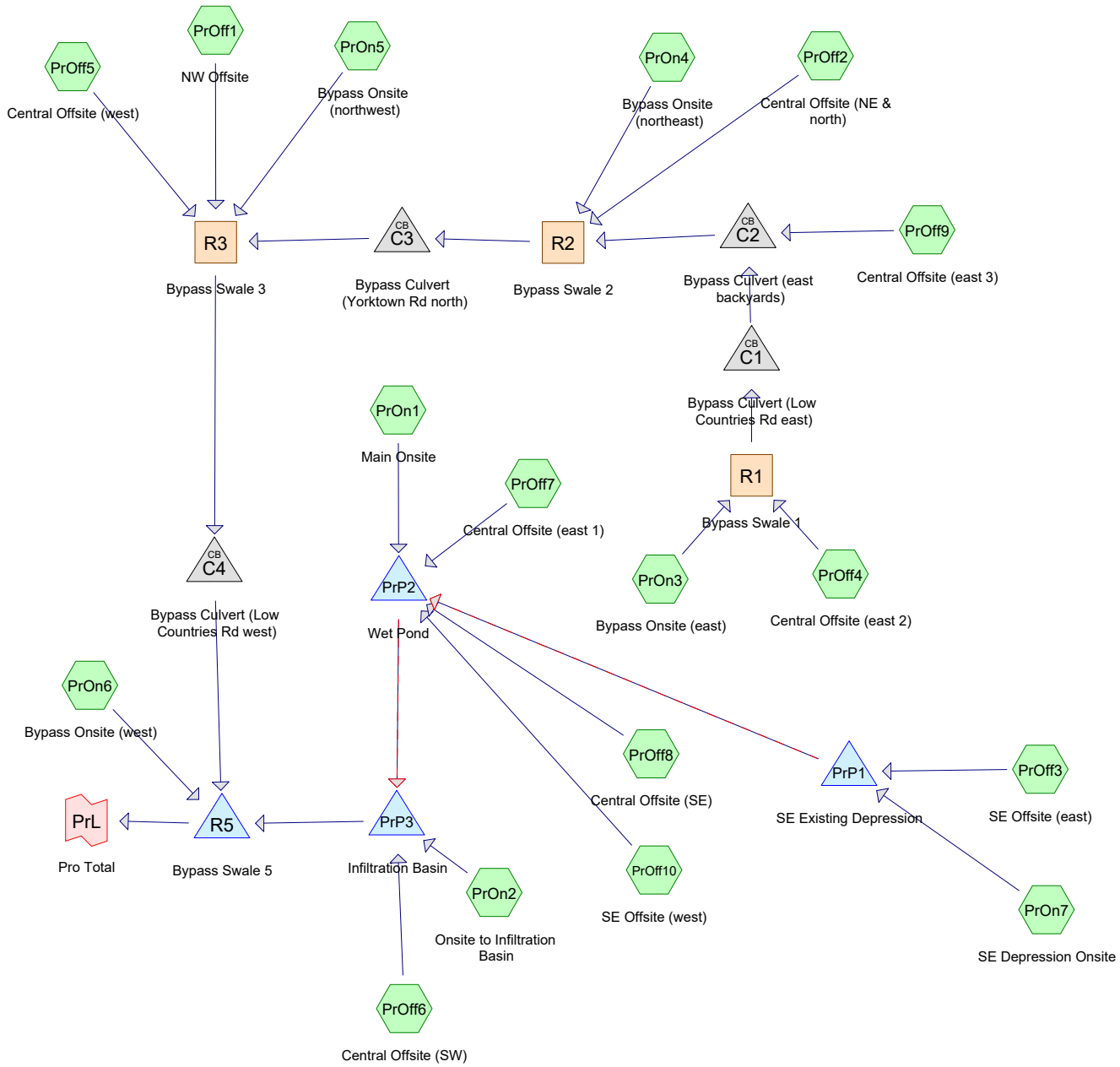
Inflow Area = 86.737 ac, 1.58% Impervious, Inflow Depth = 0.45" for 2-yr, 24hr event
Inflow = 18.76 cfs @ 12.51 hrs, Volume= 3.220 af
Primary = 18.76 cfs @ 12.51 hrs, Volume= 3.220 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link ExL: Ex Total



Proposed



Subcat Reach Pond Link

Routing Diagram for 26-225 HydroCAD
Prepared by Fehr Graham & Associates, Printed 10/8/2026
HydroCAD® 10.20-9a s/n 00943 © 2026 HydroCAD Software Solutions LLC

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPrOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=68 Runoff=0.02 cfs 0.001 af

SubcatchmentPrOff10: SE Offsite (west) Runoff Area=27,179 sf 40.65% Impervious Runoff Depth=0.91"
Tc=6.0 min CN=76 Runoff=0.91 cfs 0.047 af

SubcatchmentPrOff2: Central Offsite Runoff Area=1,125,874 sf 1.51% Impervious Runoff Depth=0.55"
Flow Length=1,885' Tc=28.1 min CN=68 Runoff=9.52 cfs 1.176 af

SubcatchmentPrOff3: SE Offsite (east) Runoff Area=645,599 sf 0.03% Impervious Runoff Depth=0.55"
Flow Length=1,396' Tc=20.1 min CN=68 Runoff=6.54 cfs 0.674 af

SubcatchmentPrOff4: Central Offsite (east Runoff Area=118,736 sf 0.00% Impervious Runoff Depth=0.55"
Flow Length=1,270' Slope=0.0225 '/' Tc=15.7 min CN=68 Runoff=1.37 cfs 0.124 af

SubcatchmentPrOff5: Central Offsite Runoff Area=10,552 sf 25.00% Impervious Runoff Depth=1.13"
Tc=6.0 min CN=80 Runoff=0.45 cfs 0.023 af

SubcatchmentPrOff6: Central Offsite (SW) Runoff Area=28,651 sf 14.99% Impervious Runoff Depth=0.71"
Tc=6.0 min CN=72 Runoff=0.72 cfs 0.039 af

SubcatchmentPrOff7: Central Offsite (east Runoff Area=14,256 sf 0.00% Impervious Runoff Depth=0.55"
Flow Length=373' Tc=6.2 min CN=68 Runoff=0.25 cfs 0.015 af

SubcatchmentPrOff8: Central Offsite (SE) Runoff Area=46,766 sf 39.64% Impervious Runoff Depth=0.91"
Tc=6.0 min CN=76 Runoff=1.56 cfs 0.081 af

SubcatchmentPrOff9: Central Offsite (east Runoff Area=119,306 sf 0.00% Impervious Runoff Depth=0.55"
Flow Length=1,164' Slope=0.0229 '/' Tc=14.2 min CN=68 Runoff=1.45 cfs 0.125 af

SubcatchmentPrOn1: Main Onsite Runoff Area=1,301,517 sf 39.68% Impervious Runoff Depth=0.91"
Tc=6.0 min CN=76 Runoff=43.36 cfs 2.263 af

SubcatchmentPrOn2: Onsite to Runoff Area=195,173 sf 70.40% Impervious Runoff Depth=1.68"
Tc=6.0 min CN=88 Runoff=12.08 cfs 0.626 af

SubcatchmentPrOn3: Bypass Onsite (east) Runoff Area=3,848 sf 0.00% Impervious Runoff Depth=0.31"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

SubcatchmentPrOn4: Bypass Onsite Runoff Area=45,511 sf 0.00% Impervious Runoff Depth=0.31"
Tc=6.0 min CN=61 Runoff=0.31 cfs 0.027 af

SubcatchmentPrOn5: Bypass Onsite Runoff Area=44,014 sf 0.00% Impervious Runoff Depth=0.47"
Tc=6.0 min CN=66 Runoff=0.64 cfs 0.040 af

SubcatchmentPrOn6: Bypass Onsite (west) Runoff Area=26,361 sf 0.00% Impervious Runoff Depth=0.81"
Tc=6.0 min CN=74 Runoff=0.77 cfs 0.041 af

SubcatchmentPrOn7: SE Depression Runoff Area=23,967 sf 76.88% Impervious Runoff Depth=1.92"
Tc=6.0 min CN=91 Runoff=1.67 cfs 0.088 af

Reach R1: Bypass Swale 1 Avg. Flow Depth=0.14' Max Vel=1.72 fps Inflow=1.38 cfs 0.126 af
n=0.022 L=108.0' S=0.0099 '/' Capacity=198.46 cfs Outflow=1.38 cfs 0.126 af

Reach R2: Bypass Swale 2 Avg. Flow Depth=0.41' Max Vel=4.13 fps Inflow=11.46 cfs 1.453 af
n=0.022 L=913.0' S=0.0167 '/' Capacity=422.06 cfs Outflow=11.29 cfs 1.453 af

Reach R3: Bypass Swale 3 Avg. Flow Depth=0.50' Max Vel=3.20 fps Inflow=11.56 cfs 1.517 af
n=0.022 L=791.0' S=0.0080 '/' Capacity=440.47 cfs Outflow=11.31 cfs 1.517 af

Pond C1: Bypass Culvert (Low Countries Rd east) Peak Elev=959.19' Inflow=1.38 cfs 0.126 af
24.0" Round Culvert n=0.011 L=100.0' S=0.0047 '/' Outflow=1.38 cfs 0.126 af

Pond C2: Bypass Culvert (east backyards) Peak Elev=958.82' Inflow=2.80 cfs 0.251 af
27.0" Round Culvert n=0.011 L=323.0' S=0.0048 '/' Outflow=2.80 cfs 0.251 af

Pond C3: Bypass Culvert (Yorktown Rd north) Peak Elev=941.93' Inflow=11.29 cfs 1.453 af
30.0" Round Culvert x 2.00 n=0.011 L=119.0' S=0.0067 '/' Outflow=11.29 cfs 1.453 af

Pond C4: Bypass Culvert (Low Countries Rd west) Peak Elev=934.64' Inflow=11.31 cfs 1.517 af
27.0" Round Culvert x 3.00 n=0.011 L=109.0' S=0.0083 '/' Outflow=11.31 cfs 1.517 af

Pond PrP1: SE Existing Depression Peak Elev=955.17' Storage=10,486 cf Inflow=6.98 cfs 0.762 af
Discarded=0.09 cfs 0.066 af Primary=1.97 cfs 0.696 af Secondary=0.00 cfs 0.000 af Outflow=2.06 cfs 0.762 af

Pond PrP2: Wet Pond Peak Elev=932.56' Storage=240,534 cf Inflow=46.28 cfs 3.103 af
Primary=6.08 cfs 3.014 af Secondary=0.00 cfs 0.000 af Outflow=6.08 cfs 3.014 af

Pond PrP3: Infiltration Basin Peak Elev=931.63' Storage=71,338 cf Inflow=14.15 cfs 3.679 af
Discarded=0.19 cfs 0.950 af Primary=3.24 cfs 1.705 af Outflow=3.44 cfs 2.654 af

Pond R5: Bypass Swale 5 Peak Elev=931.52' Storage=67 cf Inflow=11.46 cfs 3.262 af
Discarded=0.00 cfs 0.001 af Primary=11.46 cfs 3.262 af Outflow=11.46 cfs 3.262 af

Link PrL: Pro Total Inflow=11.46 cfs 3.262 af
Primary=11.46 cfs 3.262 af

Total Runoff Area = 86.737 ac Runoff Volume = 5.392 af Average Runoff Depth = 0.75"
80.79% Pervious = 70.071 ac 19.21% Impervious = 16.666 ac

Summary for Subcatchment PrOff1: NW Offsite

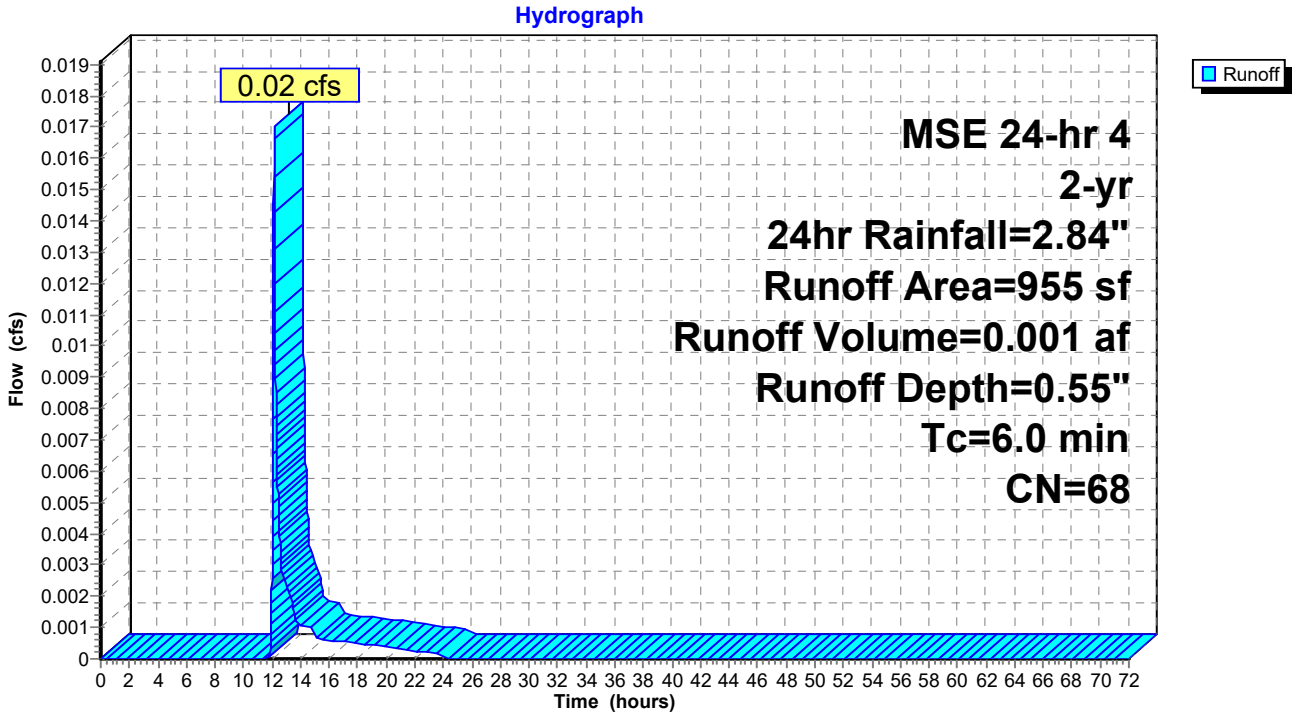
Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.001 af, Depth= 0.55"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff1: NW Offsite



Summary for Subcatchment PrOff10: SE Offsite (west)

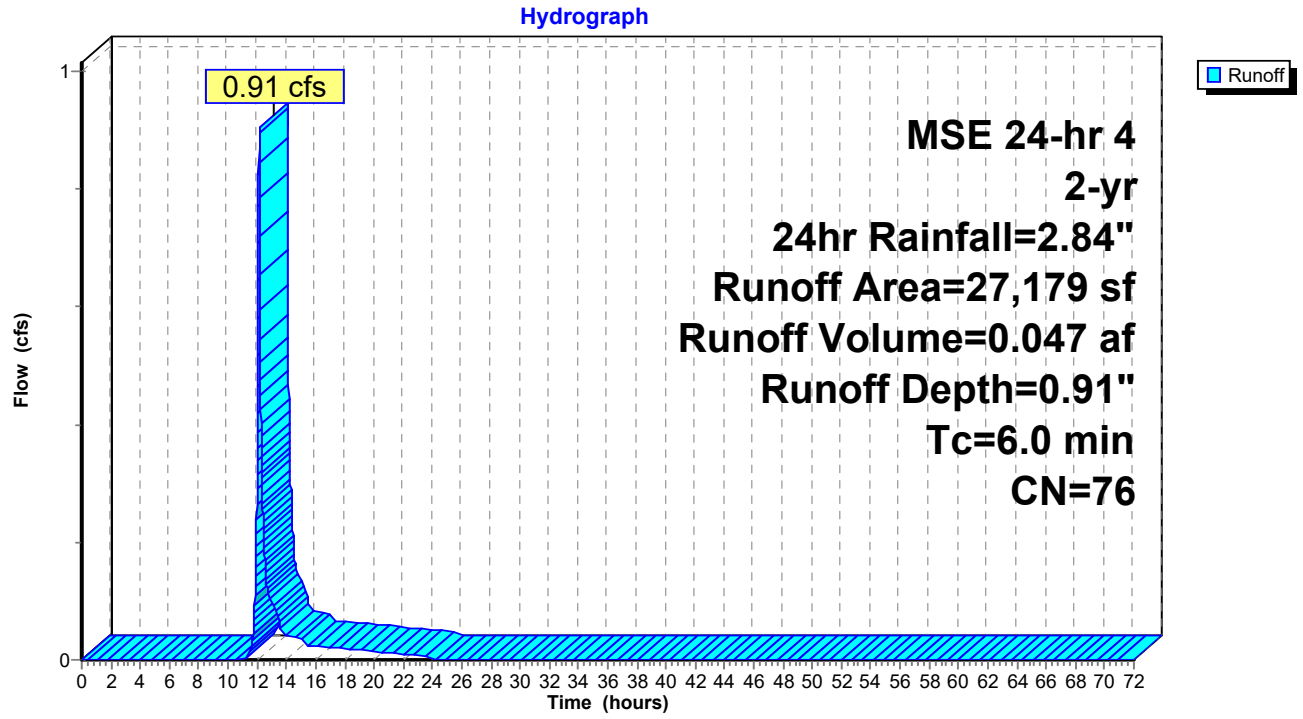
Runoff = 0.91 cfs @ 12.14 hrs, Volume= 0.047 af, Depth= 0.91"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	2,533	61	>75% Grass cover, Good, HSG B Offsite
*	3,161	98	Pavement Offsite
*	3,353	98	Pro Pave in ROW Offiste
	27,179	76	Weighted Average
	16,132		59.35% Pervious Area
	11,047		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff10: SE Offsite (west)



Summary for Subcatchment PrOff2: Central Offsite (NE & north)

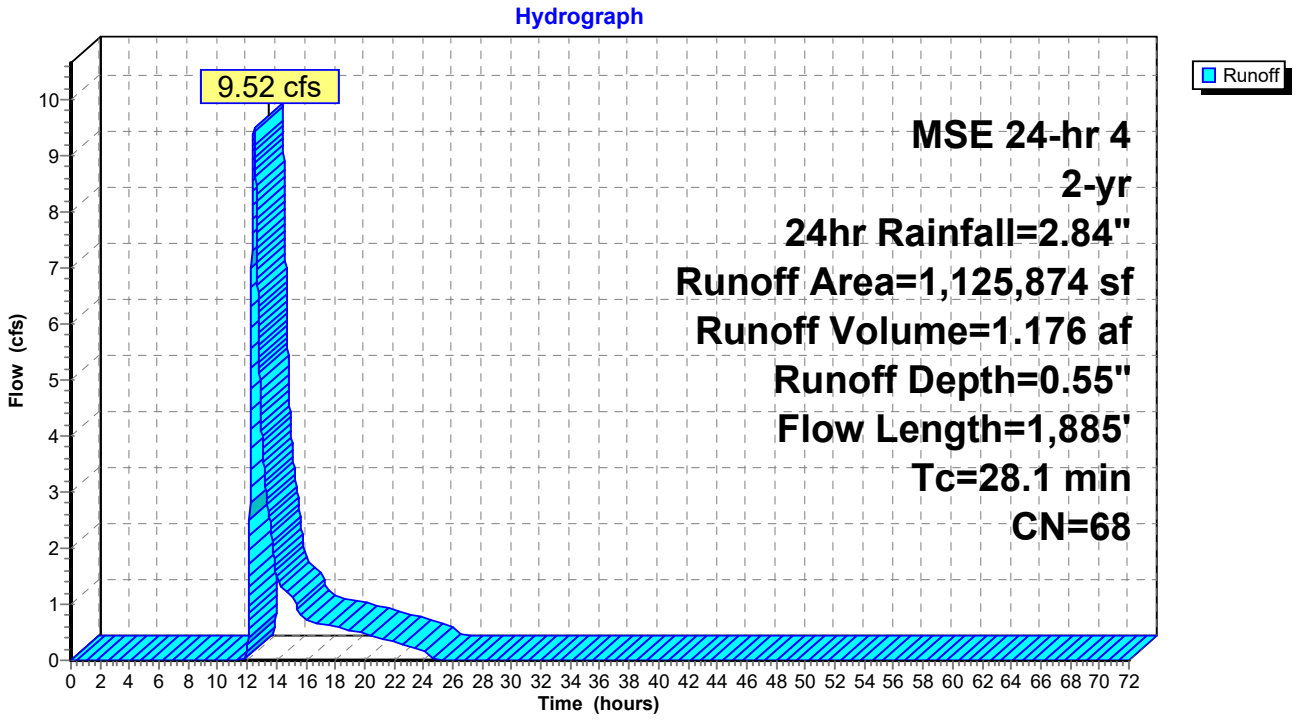
Runoff = 9.52 cfs @ 12.46 hrs, Volume= 1.176 af, Depth= 0.55"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	1,058,084	68	Cropland, HSG B Offsite
*	67,790	70	1/2 acre lots, 25% imp, HSG B Offsite
	1,125,874	68	Weighted Average
	1,108,927		98.49% Pervious Area
	16,948		1.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
23.1	1,775	0.0202	1.28		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
28.1	1,885	Total			

Subcatchment PrOff2: Central Offsite (NE & north)



Summary for Subcatchment PrOff3: SE Offsite (east)

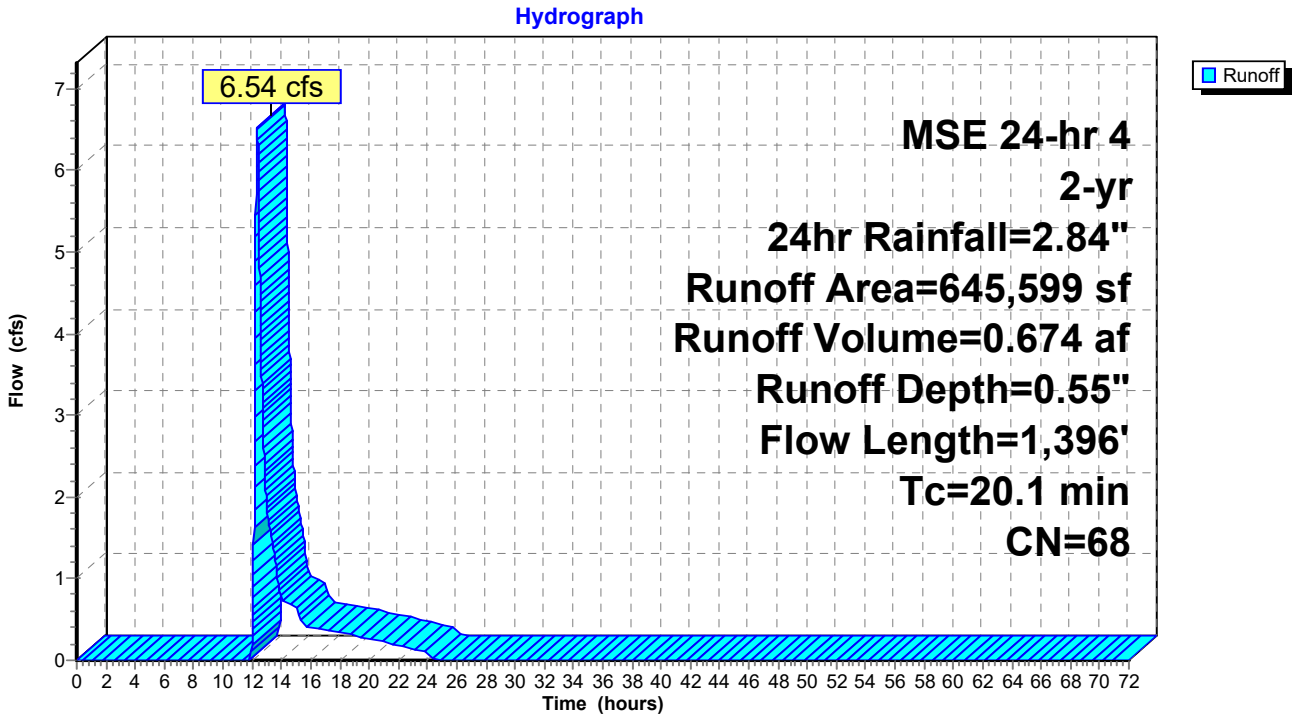
Runoff = 6.54 cfs @ 12.35 hrs, Volume= 0.674 af, Depth= 0.55"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	645,405	68	Cropland, HSG B Offsite
*	194	98	Pavement Offsite
	645,599	68	Weighted Average
	645,405		99.97% Pervious Area
	194		0.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment PrOff3: SE Offsite (east)



Summary for Subcatchment PrOff4: Central Offsite (east 2)

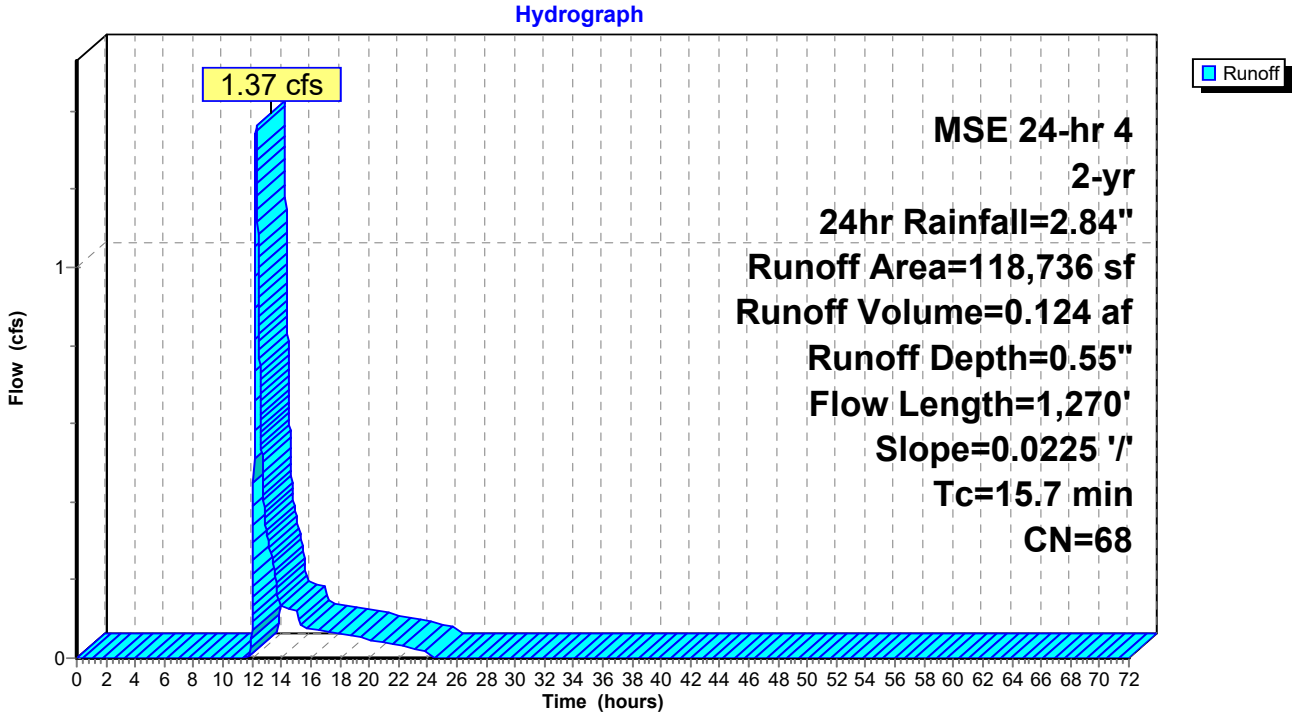
Runoff = 1.37 cfs @ 12.27 hrs, Volume= 0.124 af, Depth= 0.55"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	118,736	68	Cropland, HSG B Offsite
	118,736		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	1,270	0.0225	1.35		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff4: Central Offsite (east 2)



Summary for Subcatchment PrOff5: Central Offsite (west)

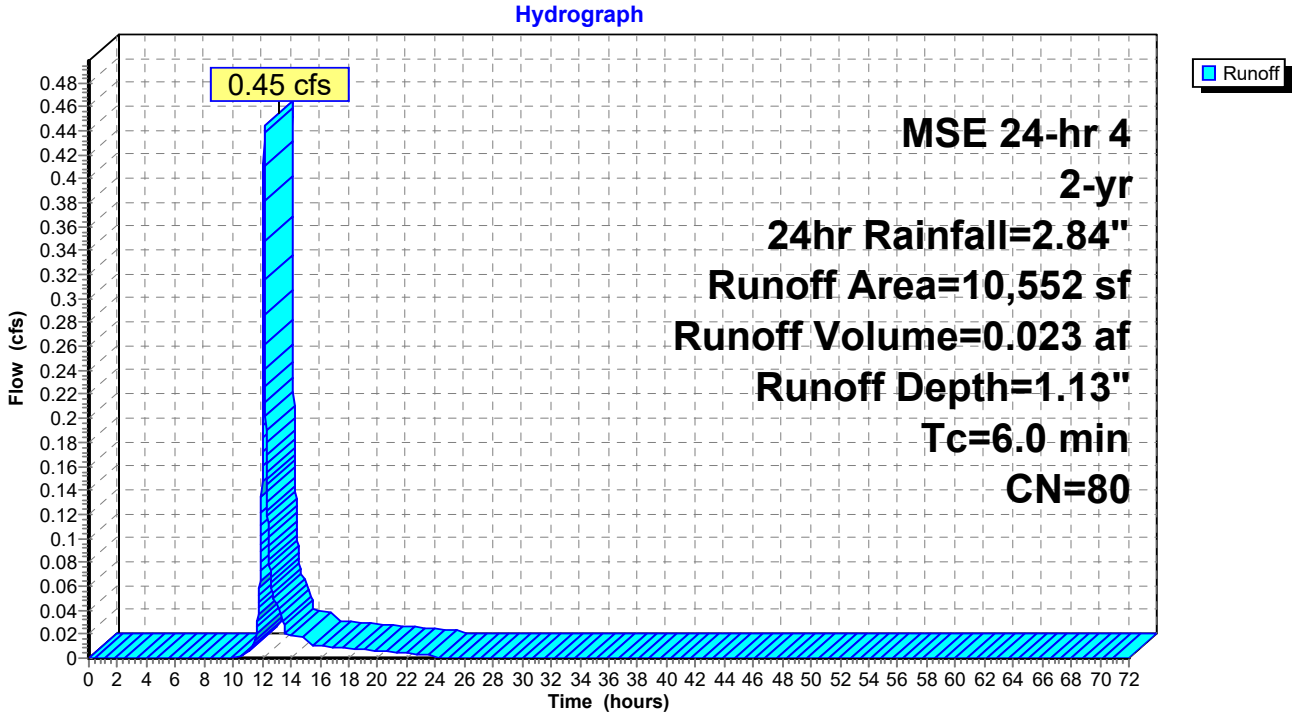
Runoff = 0.45 cfs @ 12.14 hrs, Volume= 0.023 af, Depth= 1.13"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
	7,914		75.00% Pervious Area
	2,638		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff5: Central Offsite (west)



Summary for Subcatchment PrOff6: Central Offsite (SW)

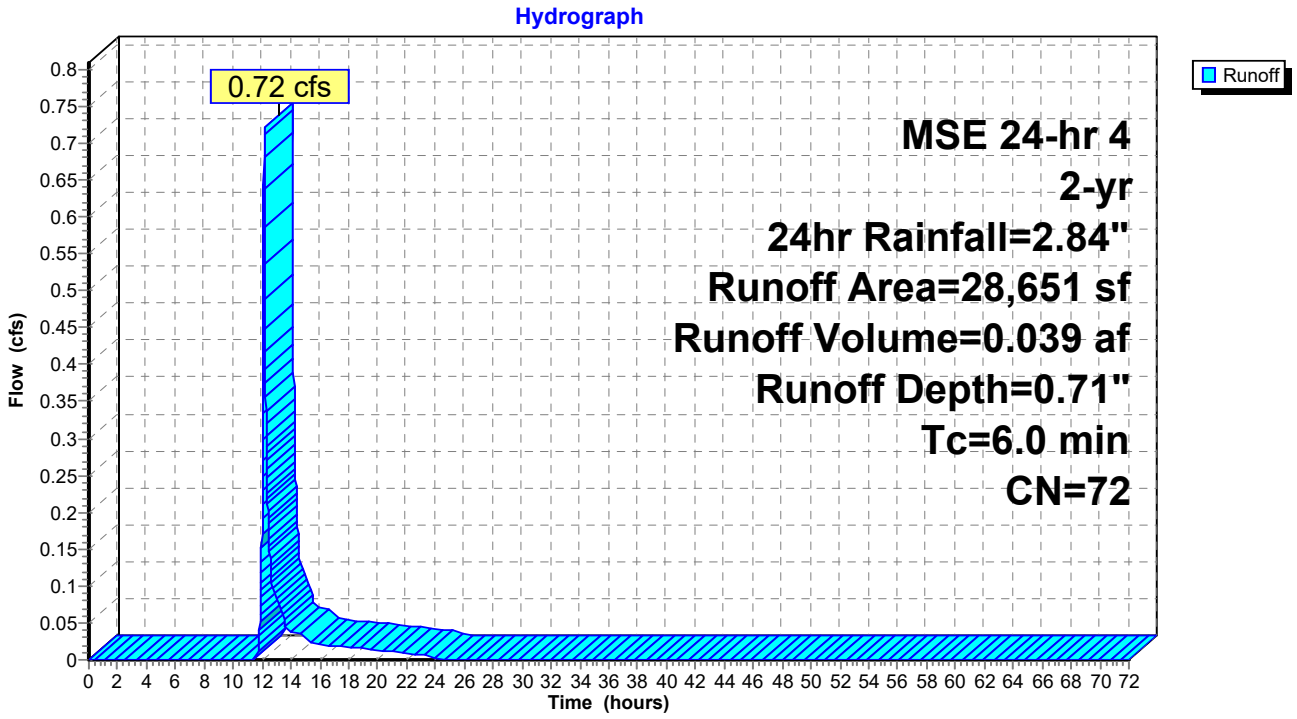
Runoff = 0.72 cfs @ 12.14 hrs, Volume= 0.039 af, Depth= 0.71"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	20,337	68	Cropland, HSG B Offsite
*	4,018	61	>75% Grass cover, Good, HSG B Offsite
*	2,590	98	Pavement Offsite
*	1,706	98	Pro Pave in ROW Offiste
	28,651	72	Weighted Average
	24,355		85.01% Pervious Area
	4,296		14.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff6: Central Offsite (SW)



Summary for Subcatchment PrOff7: Central Offsite (east 1)

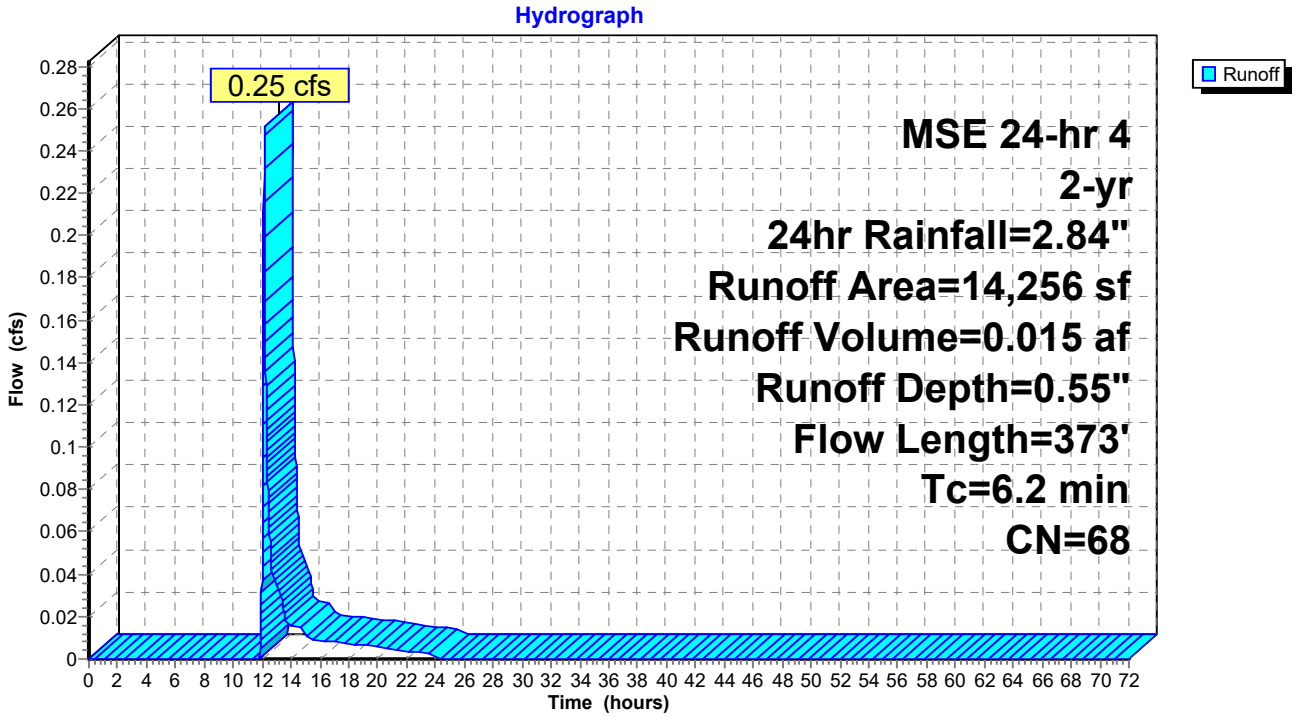
Runoff = 0.25 cfs @ 12.15 hrs, Volume= 0.015 af, Depth= 0.55"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	14,256	68	Cropland, HSG B Offsite
	14,256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	47	0.0266	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
3.8	326	0.0252	1.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.2	373	Total			

Subcatchment PrOff7: Central Offsite (east 1)



Summary for Subcatchment PrOff8: Central Offsite (SE)

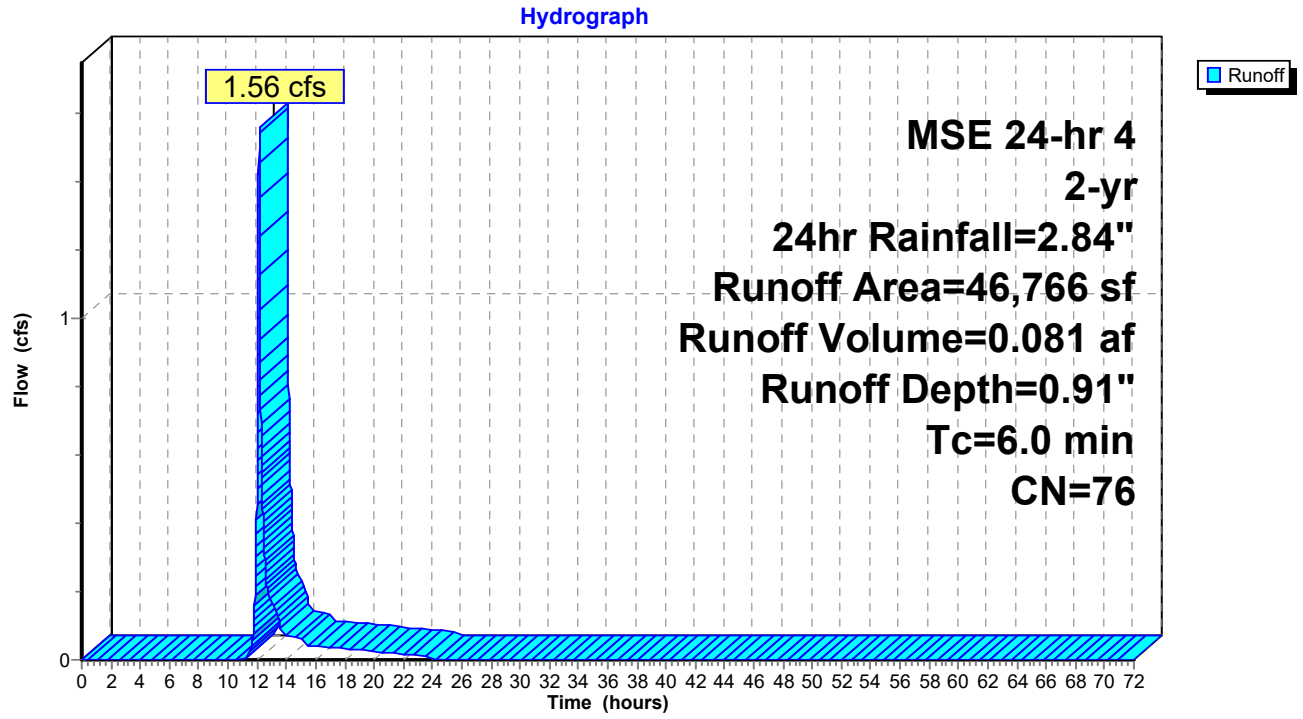
Runoff = 1.56 cfs @ 12.14 hrs, Volume= 0.081 af, Depth= 0.91"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	9,149	61	>75% Grass cover, Good, HSG B Offsite
*	25,441	70	1/2 acre lots, 25% imp, HSG B Offsite
*	6,820	98	Pavement Offsite
*	5,356	98	Pro Pave in ROW Offiste
	46,766	76	Weighted Average
	28,230		60.36% Pervious Area
	18,536		39.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff8: Central Offsite (SE)



Summary for Subcatchment PrOff9: Central Offsite (east 3)

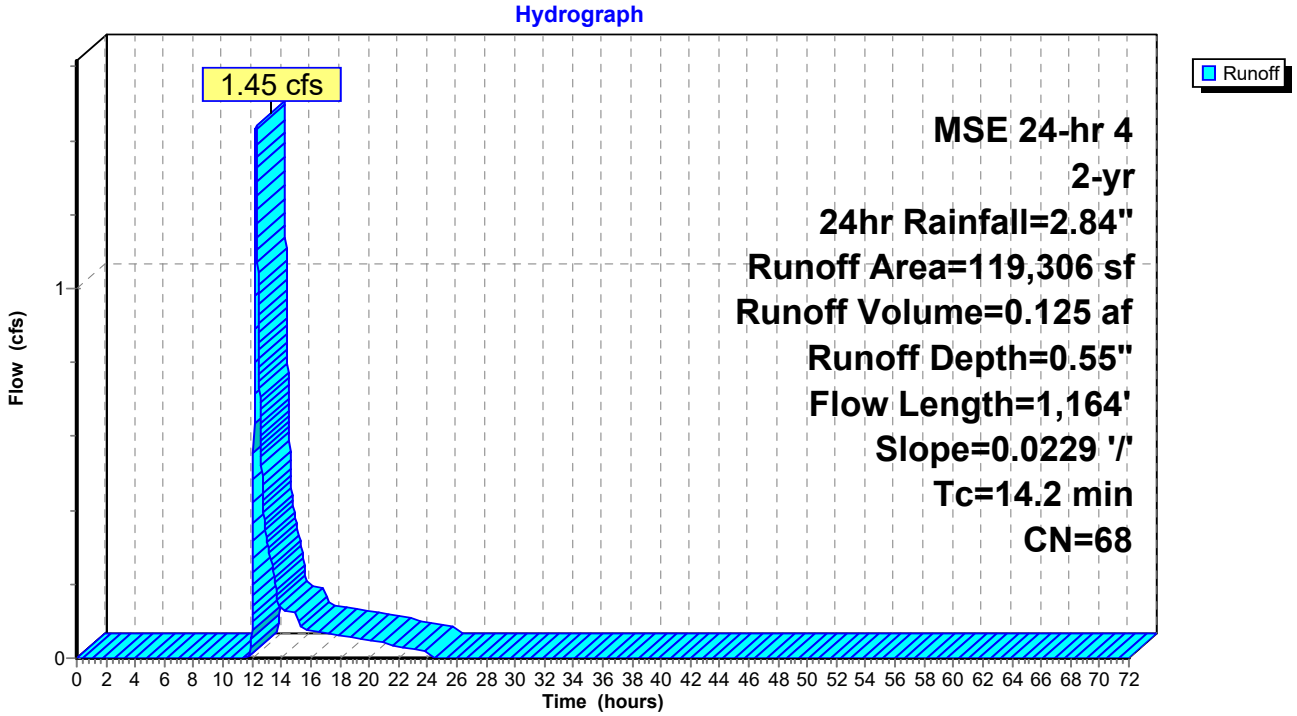
Runoff = 1.45 cfs @ 12.26 hrs, Volume= 0.125 af, Depth= 0.55"
Routed to Pond C2 : Bypass Culvert (east backyards)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	119,306	68	Cropland, HSG B Offsite
	119,306		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	1,164	0.0229	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff9: Central Offsite (east 3)



Summary for Subcatchment PrOn1: Main Onsite

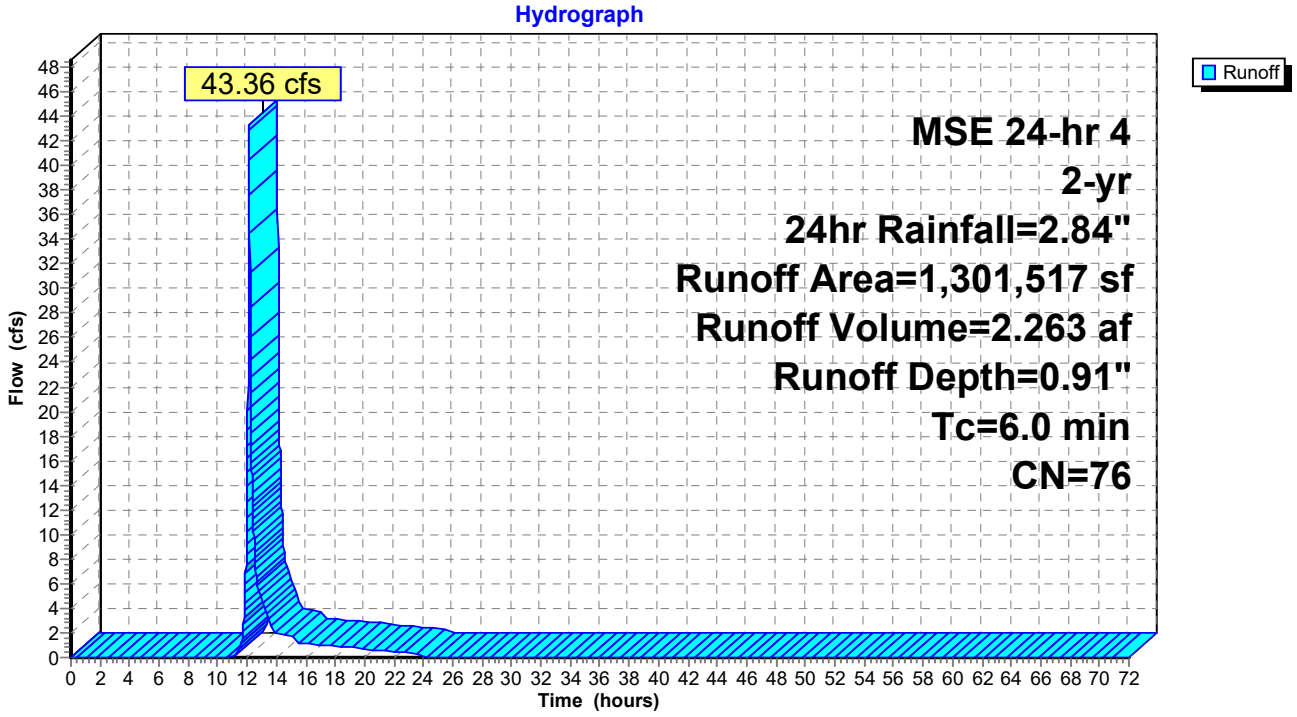
Runoff = 43.36 cfs @ 12.14 hrs, Volume= 2.263 af, Depth= 0.91"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
	623,728	72	1/3 acre lots, 30% imp, HSG B
	555,477	75	1/4 acre lots, 38% imp, HSG B
	6,494	83	1/4 acre lots, 38% imp, HSG C
*	91,094	100	Wet Pond
*	24,724	98	Alley
	1,301,517	76	Weighted Average
	785,032		60.32% Pervious Area
	516,485		39.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn1: Main Onsite



Summary for Subcatchment PrOn2: Onsite to Infiltration Basin

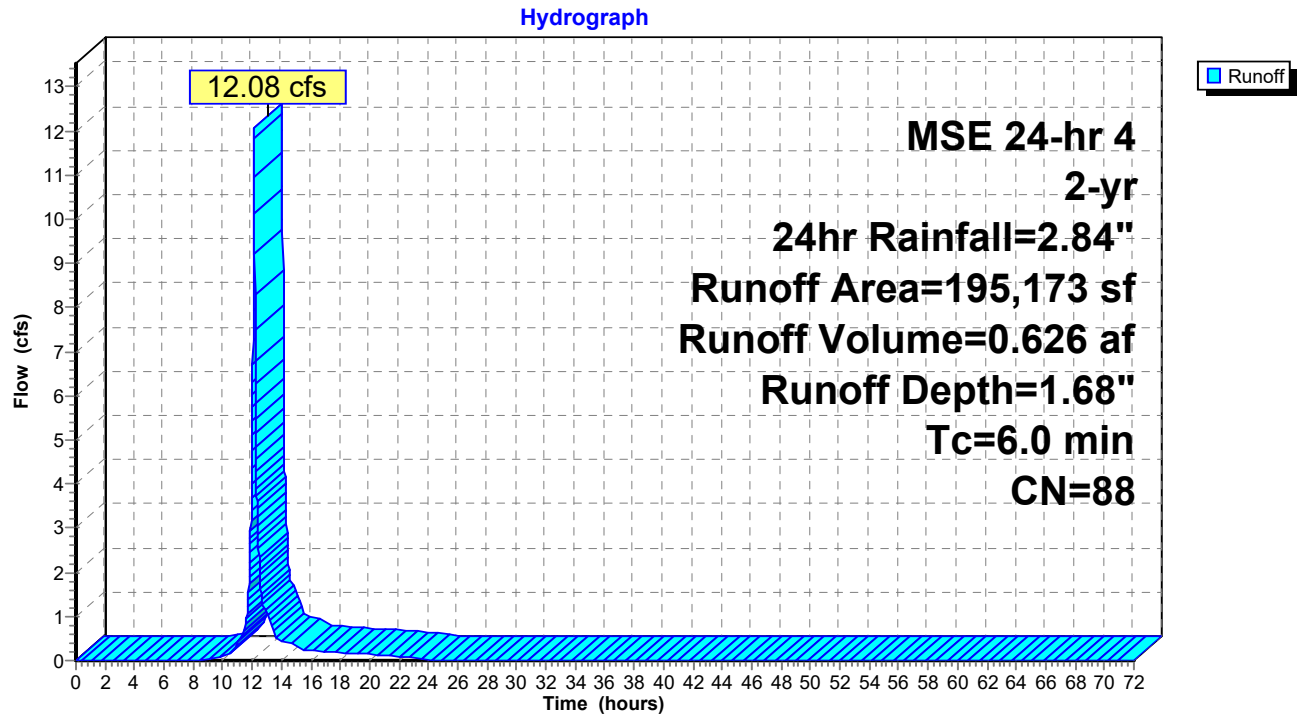
Runoff = 12.08 cfs @ 12.13 hrs, Volume= 0.626 af, Depth= 1.68"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
	13,000	72	1/3 acre lots, 30% imp, HSG B
	78,516	75	1/4 acre lots, 38% imp, HSG B
*	103,657	100	Pond
	195,173	88	Weighted Average
	57,780		29.60% Pervious Area
	137,393		70.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn2: Onsite to Infiltration Basin



Summary for Subcatchment PrOn3: Bypass Onsite (east)

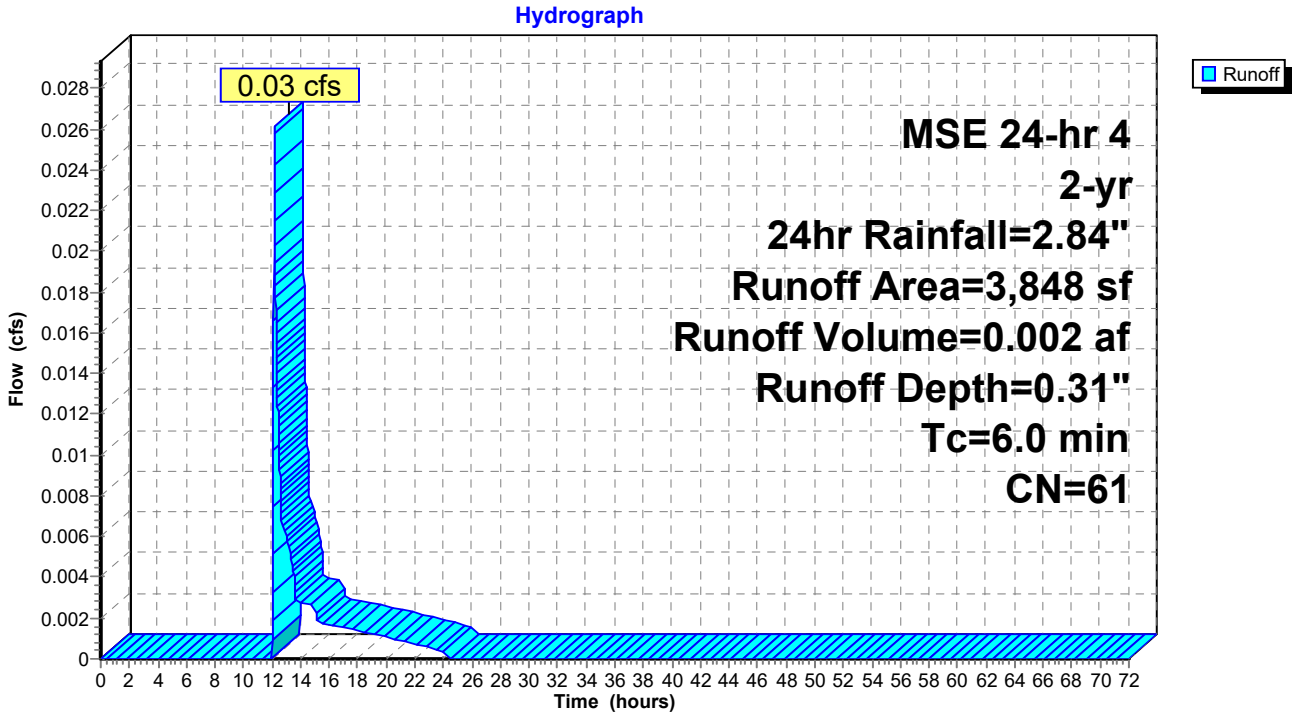
Runoff = 0.03 cfs @ 12.16 hrs, Volume= 0.002 af, Depth= 0.31"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

Area (sf)	CN	Description
3,848	61	>75% Grass cover, Good, HSG B
3,848		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn3: Bypass Onsite (east)



Summary for Subcatchment PrOn4: Bypass Onsite (northeast)

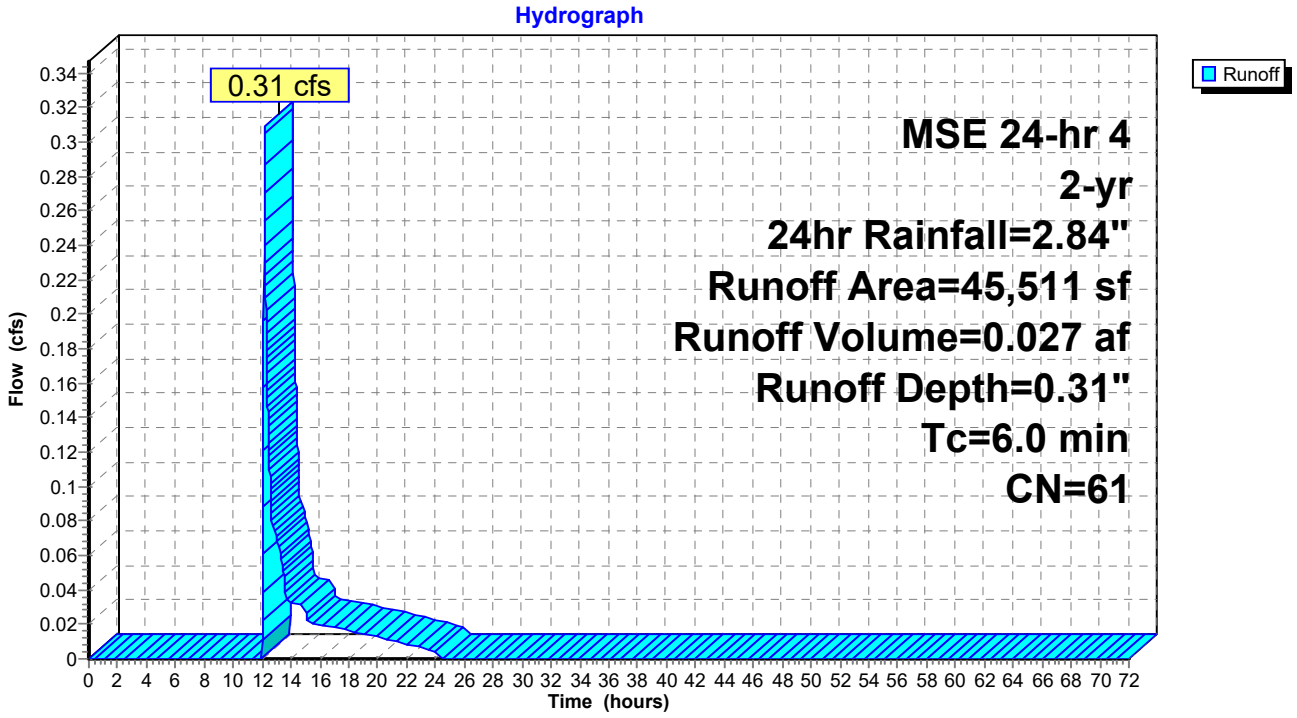
Runoff = 0.31 cfs @ 12.16 hrs, Volume= 0.027 af, Depth= 0.31"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

Area (sf)	CN	Description
45,511	61	>75% Grass cover, Good, HSG B
45,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn4: Bypass Onsite (northeast)



Summary for Subcatchment PrOn5: Bypass Onsite (northwest)

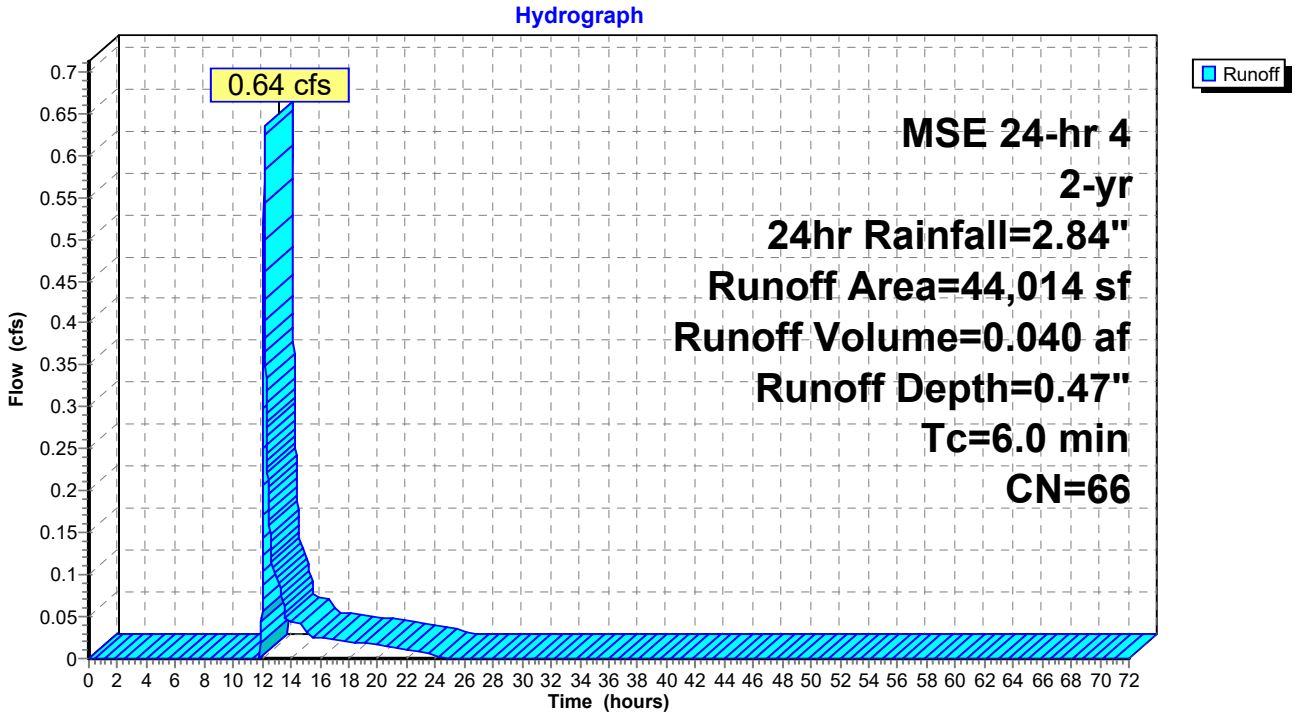
Runoff = 0.64 cfs @ 12.15 hrs, Volume= 0.040 af, Depth= 0.47"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

Area (sf)	CN	Description
26,408	61	>75% Grass cover, Good, HSG B
17,606	74	>75% Grass cover, Good, HSG C
44,014	66	Weighted Average
44,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn5: Bypass Onsite (northwest)



Summary for Subcatchment PrOn6: Bypass Onsite (west)

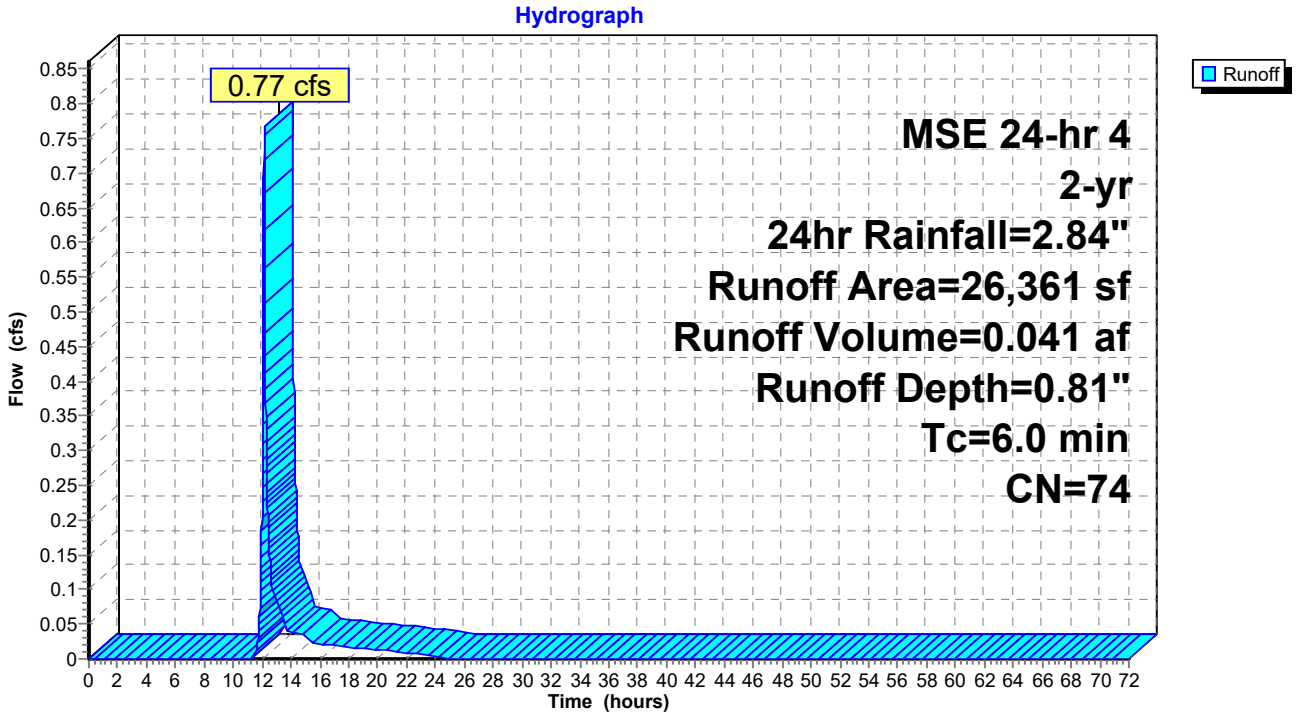
Runoff = 0.77 cfs @ 12.14 hrs, Volume= 0.041 af, Depth= 0.81"
Routed to Pond R5 : Bypass Swale 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

Area (sf)	CN	Description
26,361	74	>75% Grass cover, Good, HSG C
26,361		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn6: Bypass Onsite (west)



Summary for Subcatchment PrOn7: SE Depression Onsite

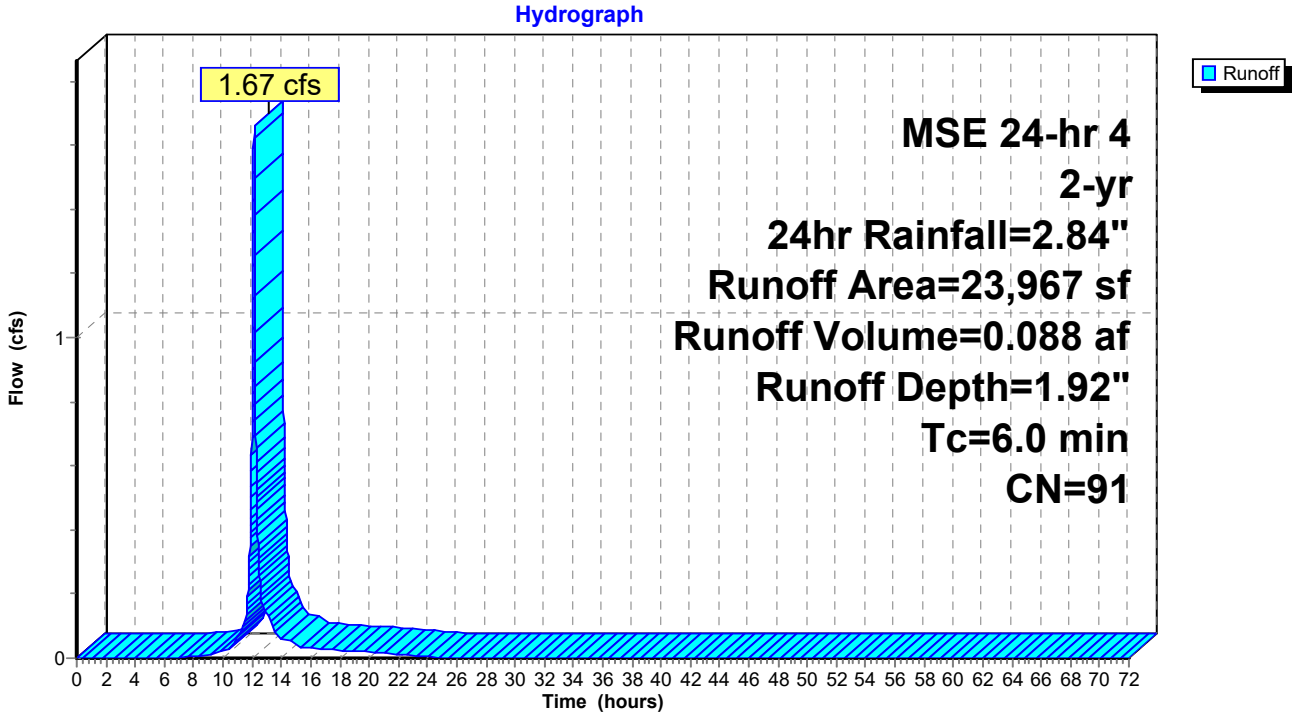
Runoff = 1.67 cfs @ 12.13 hrs, Volume= 0.088 af, Depth= 1.92"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-yr, 24hr Rainfall=2.84"

	Area (sf)	CN	Description
*	15,029	100	SE Depression
	8,938	75	1/4 acre lots, 38% imp, HSG B
	23,967	91	Weighted Average
	5,542		23.12% Pervious Area
	18,425		76.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn7: SE Depression Onsite



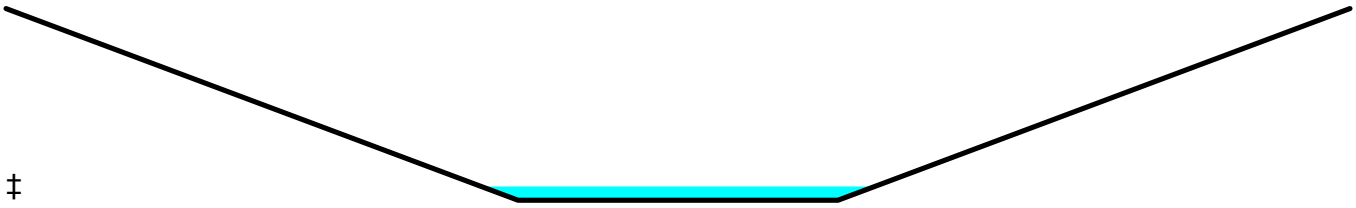
Summary for Reach R1: Bypass Swale 1

Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 1.38 cfs @ 12.27 hrs, Volume= 0.126 af
Outflow = 1.38 cfs @ 12.29 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.8 min
Routed to Pond C1 : Bypass Culvert (Low Countries Rd east)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.72 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 2.9 min

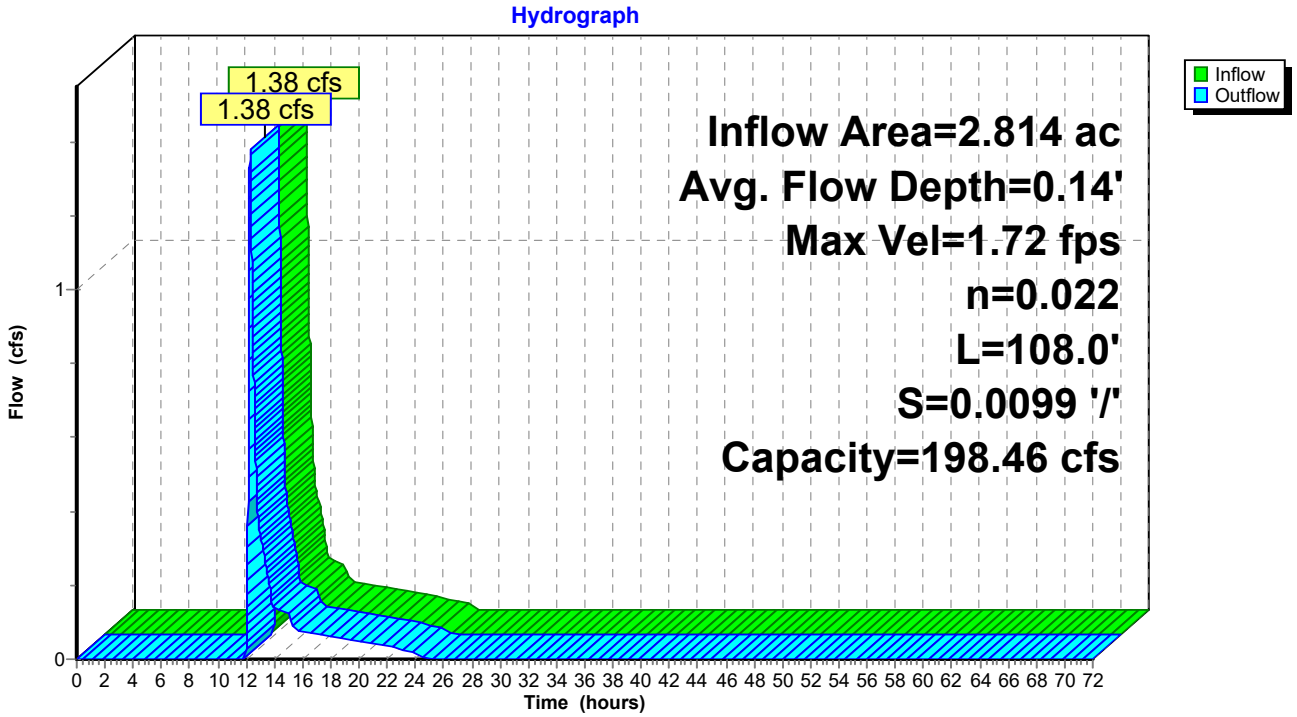
Peak Storage= 86 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 6.15'
Bank-Full Depth= 2.00' Flow Area= 26.0 sf, Capacity= 198.46 cfs

5.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 21.00'
Length= 108.0' Slope= 0.0099 '/'
Inlet Invert= 960.32', Outlet Invert= 959.25'



‡

Reach R1: Bypass Swale 1



Summary for Reach R2: Bypass Swale 2

Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 11.46 cfs @ 12.45 hrs, Volume= 1.453 af
Outflow = 11.29 cfs @ 12.48 hrs, Volume= 1.453 af, Atten= 2%, Lag= 2.2 min
Routed to Pond C3 : Bypass Culvert (Yorktown Rd north)

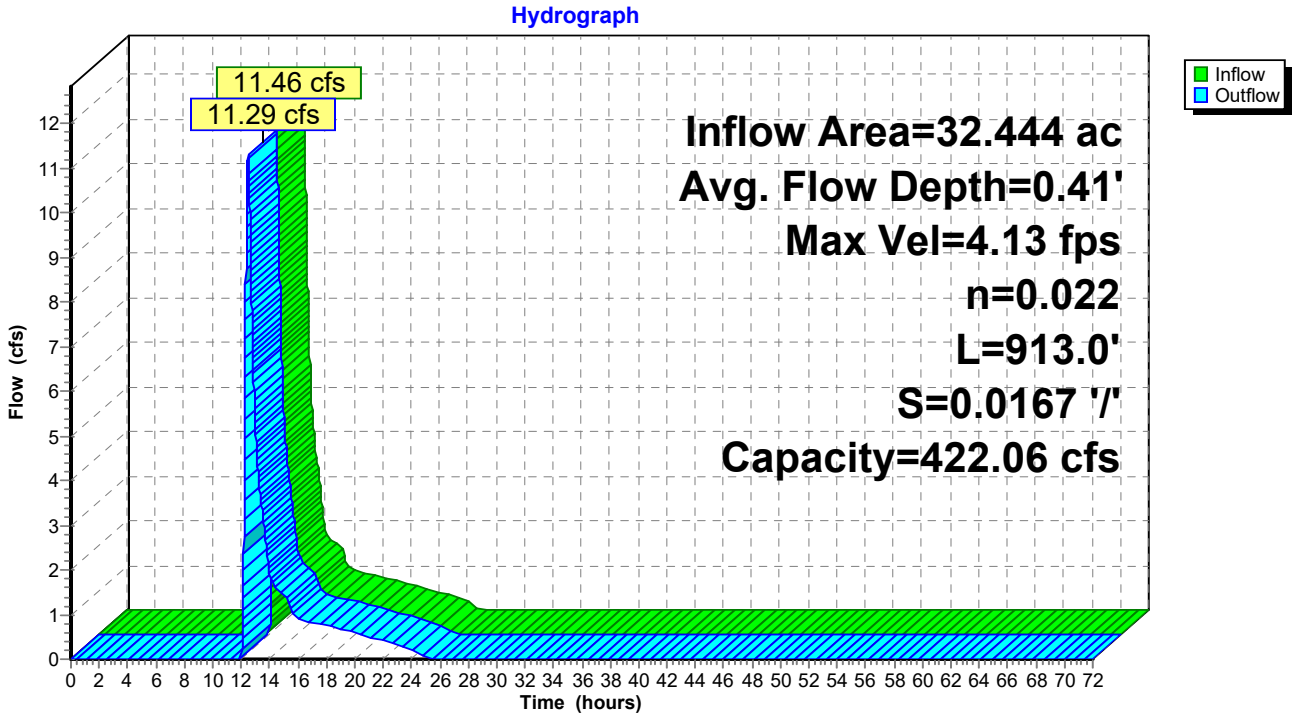
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.13 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 9.6 min

Peak Storage= 2,493 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 8.29'
Bank-Full Depth= 2.50' Flow Area= 37.5 sf, Capacity= 422.06 cfs

5.00' x 2.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 25.00'
Length= 913.0' Slope= 0.0167 '/'
Inlet Invert= 956.53', Outlet Invert= 941.28'



‡



Summary for Reach R3: Bypass Swale 3

Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 11.56 cfs @ 12.48 hrs, Volume= 1.517 af
Outflow = 11.31 cfs @ 12.53 hrs, Volume= 1.517 af, Atten= 2%, Lag= 3.3 min
Routed to Pond C4 : Bypass Culvert (Low Countries Rd west)

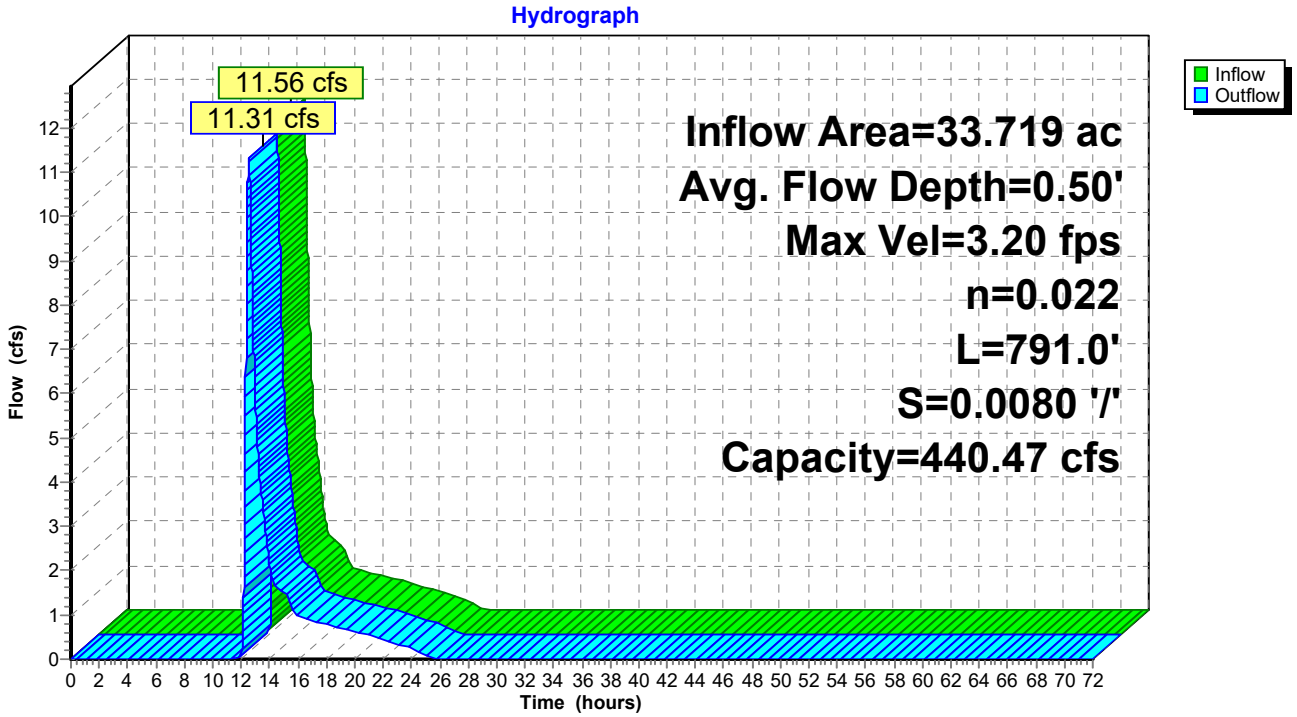
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.20 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 11.1 min

Peak Storage= 2,798 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 9.03'
Bank-Full Depth= 3.00' Flow Area= 51.0 sf, Capacity= 440.47 cfs

5.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 29.00'
Length= 791.0' Slope= 0.0080 '/'
Inlet Invert= 940.20', Outlet Invert= 933.90'



‡



Summary for Pond C1: Bypass Culvert (Low Countries Rd east)

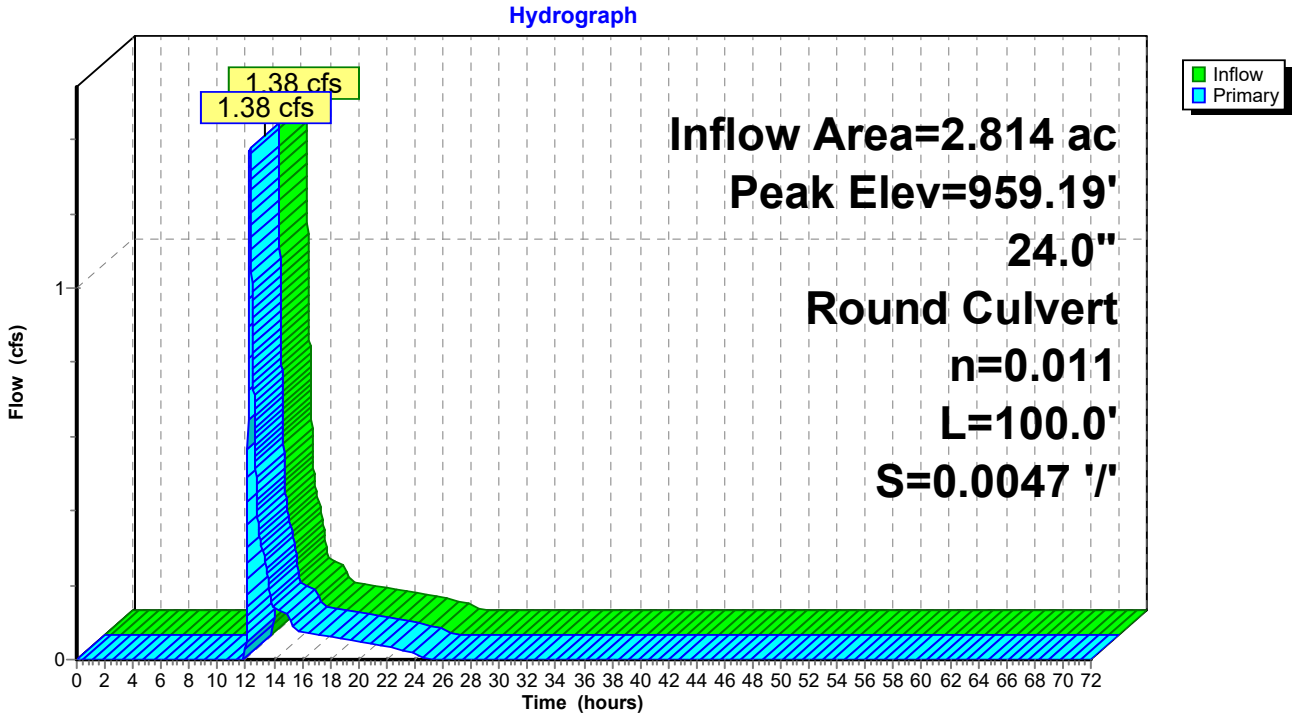
Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 1.38 cfs @ 12.29 hrs, Volume= 0.126 af
Outflow = 1.38 cfs @ 12.29 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.29 hrs, Volume= 0.126 af
Routed to Pond C2 : Bypass Culvert (east backyards)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 959.19' @ 12.28 hrs
Flood Elev= 962.57'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.60'	**24.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.60' / 958.13' S= 0.0047 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.38 cfs @ 12.29 hrs HW=959.19' TW=958.82' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.38 cfs @ 2.69 fps)

Pond C1: Bypass Culvert (Low Countries Rd east)



Summary for Pond C2: Bypass Culvert (east backyards)

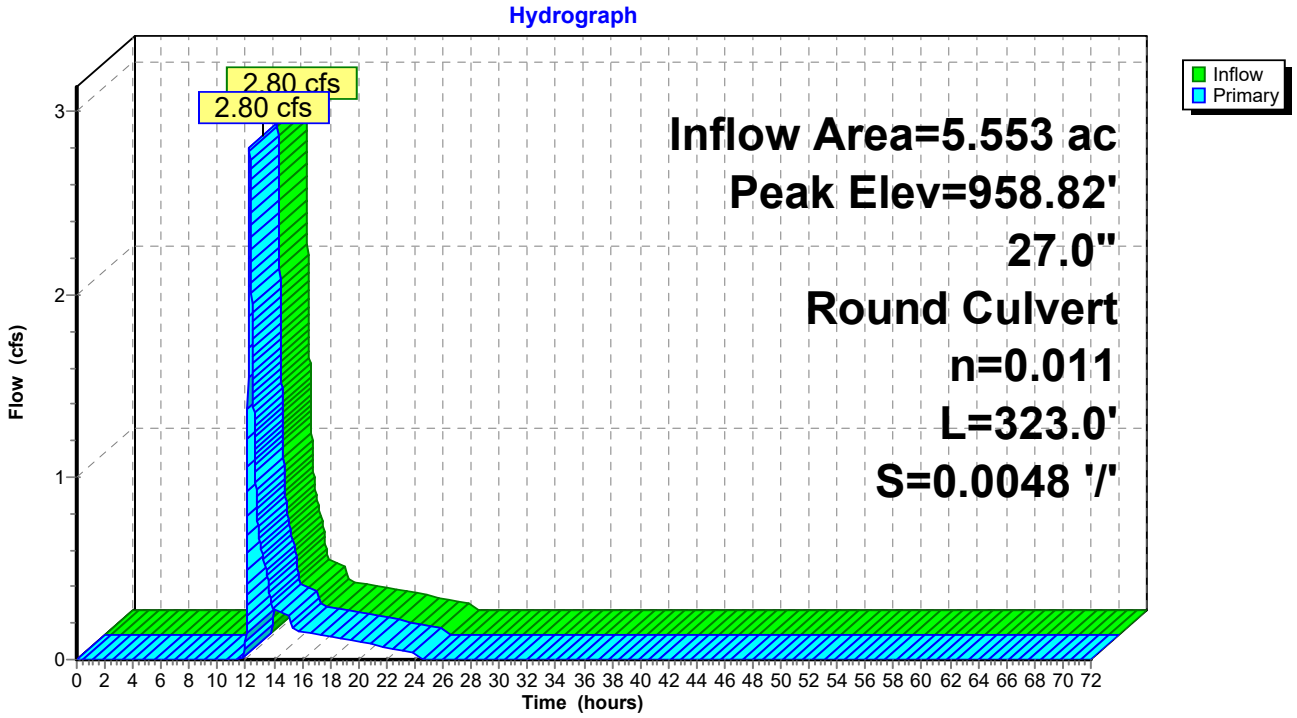
Inflow Area = 5.553 ac, 0.00% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 2.80 cfs @ 12.27 hrs, Volume= 0.251 af
Outflow = 2.80 cfs @ 12.27 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min
Primary = 2.80 cfs @ 12.27 hrs, Volume= 0.251 af
Routed to Reach R2 : Bypass Swale 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 958.82' @ 12.27 hrs
Flood Elev= 963.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.13'	**27.0" Round Culvert** L= 323.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.13' / 956.59' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=2.80 cfs @ 12.27 hrs HW=958.82' TW=956.82' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.80 cfs @ 4.05 fps)

Pond C2: Bypass Culvert (east backyards)



Summary for Pond C3: Bypass Culvert (Yorktown Rd north)

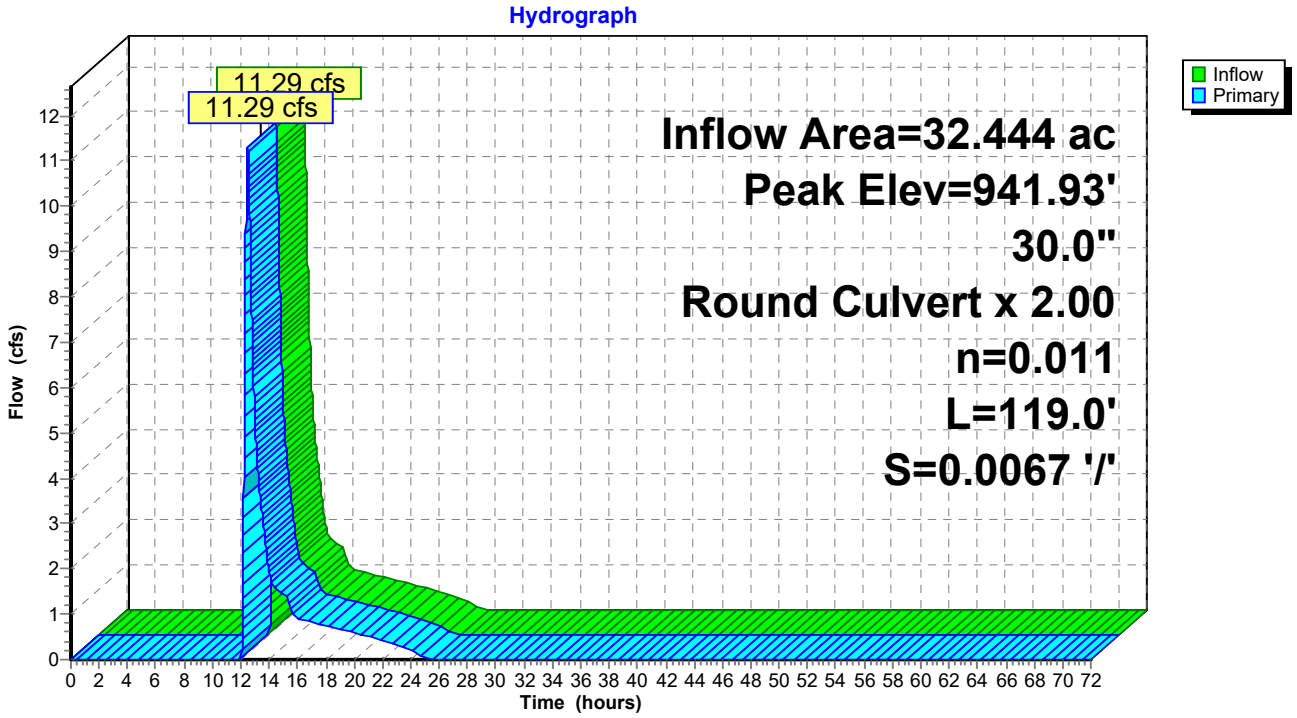
Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 11.29 cfs @ 12.48 hrs, Volume= 1.453 af
Outflow = 11.29 cfs @ 12.48 hrs, Volume= 1.453 af, Atten= 0%, Lag= 0.0 min
Primary = 11.29 cfs @ 12.48 hrs, Volume= 1.453 af
Routed to Reach R3 : Bypass Swale 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 941.93' @ 12.48 hrs
Flood Elev= 946.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	941.00'	**30.0" Round Culvert X 2.00** L= 119.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 941.00' / 940.20' S= 0.0067 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=11.28 cfs @ 12.48 hrs HW=941.93' TW=940.70' (Dynamic Tailwater)
1=Culvert (Barrel Controls 11.28 cfs @ 5.04 fps)

Pond C3: Bypass Culvert (Yorktown Rd north)



Summary for Pond C4: Bypass Culvert (Low Countries Rd west)

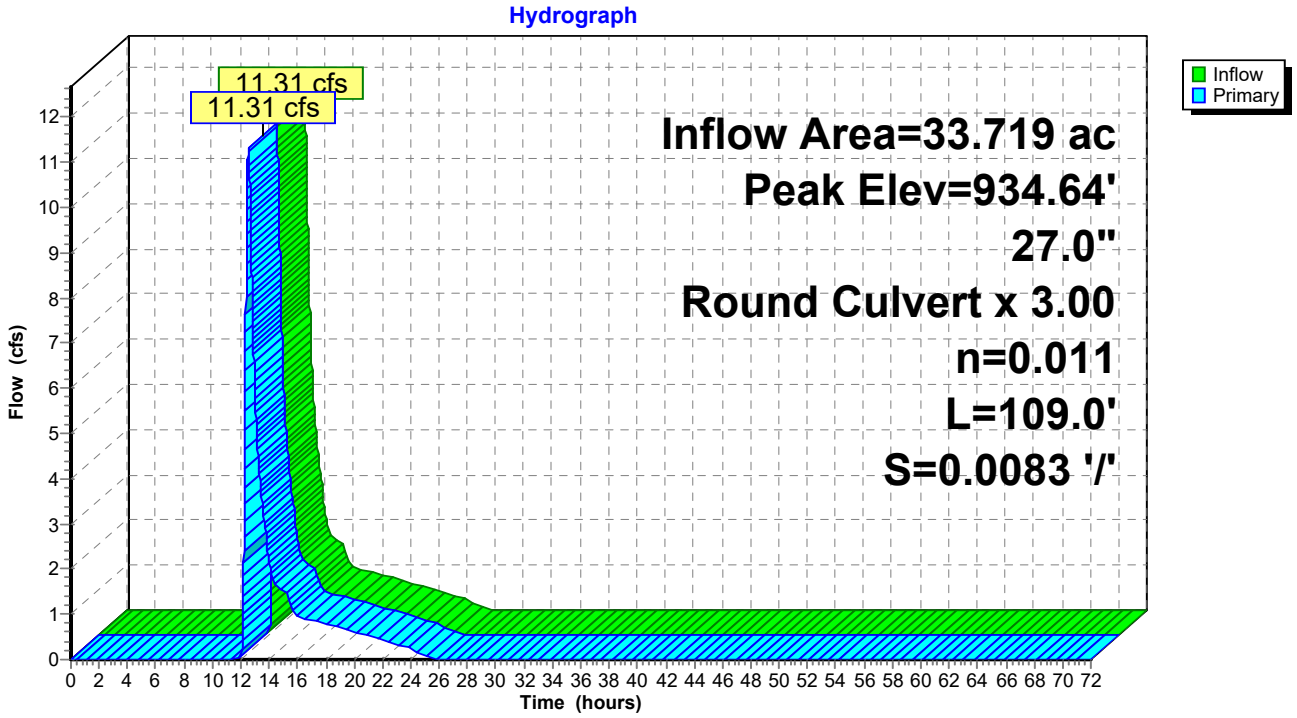
Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 0.54" for 2-yr, 24hr event
Inflow = 11.31 cfs @ 12.53 hrs, Volume= 1.517 af
Outflow = 11.31 cfs @ 12.53 hrs, Volume= 1.517 af, Atten= 0%, Lag= 0.0 min
Primary = 11.31 cfs @ 12.53 hrs, Volume= 1.517 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 934.64' @ 12.53 hrs
Flood Elev= 937.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	933.90'	**27.0" Round Culvert X 3.00** L= 109.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 933.90' / 933.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=11.31 cfs @ 12.53 hrs HW=934.64' TW=931.52' (Dynamic Tailwater)
1=Culvert (Barrel Controls 11.31 cfs @ 4.90 fps)

Pond C4: Bypass Culvert (Low Countries Rd west)



Summary for Pond PrP1: SE Existing Depression

Inflow Area = 15.371 ac, 2.78% Impervious, Inflow Depth = 0.60" for 2-yr, 24hr event
Inflow = 6.98 cfs @ 12.34 hrs, Volume= 0.762 af
Outflow = 2.06 cfs @ 12.99 hrs, Volume= 0.762 af, Atten= 70%, Lag= 39.4 min
Discarded = 0.09 cfs @ 12.99 hrs, Volume= 0.066 af
Primary = 1.97 cfs @ 12.99 hrs, Volume= 0.696 af
Routed to Pond PrP2 : Wet Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP2 : Wet Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 955.17' @ 12.99 hrs Surf.Area= 29,168 sf Storage= 10,486 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 92.4 min (965.9 - 873.6)

Volume	Invert	Avail.Storage	Storage Description
#1	954.50'	122,348 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.50	5,787	0	0
955.00	19,221	6,252	6,252
956.00	76,066	47,644	53,896
956.50	95,900	42,992	96,887
956.75	107,787	25,461	122,348

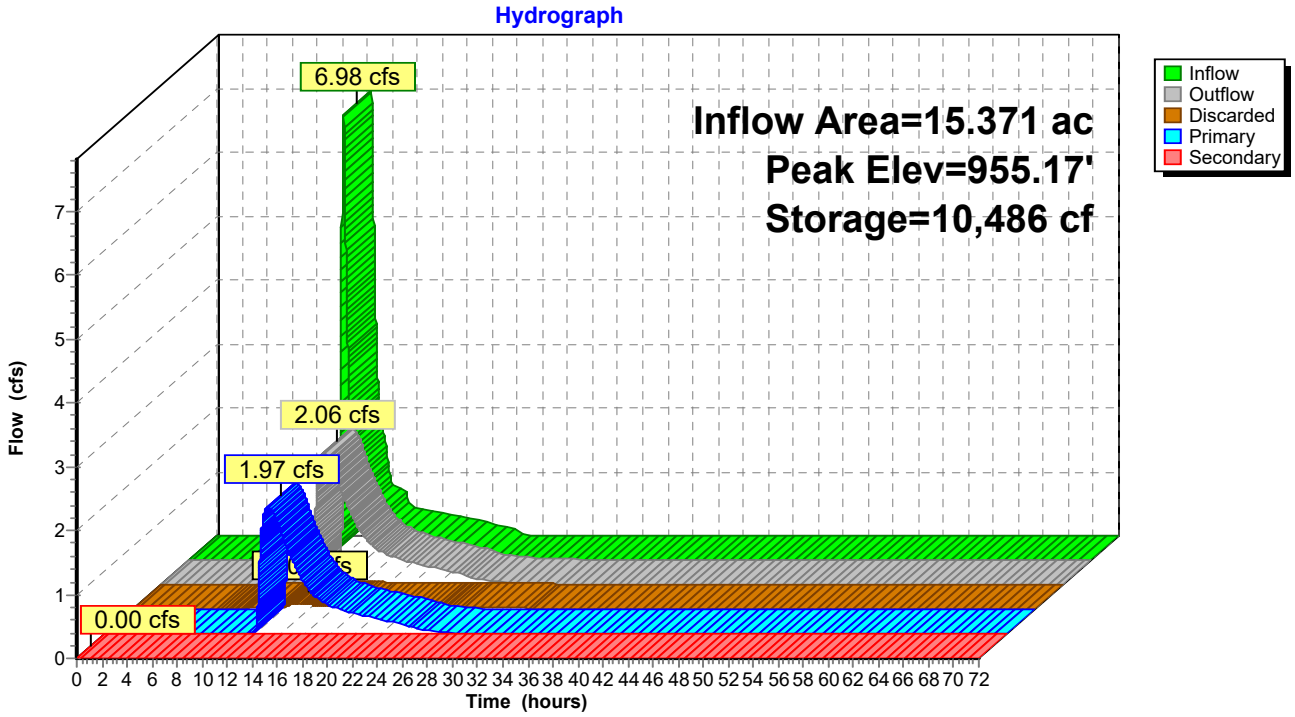
Device	Routing	Invert	Outlet Devices
#1	Discarded	954.50'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 900.00'
#2	Secondary	955.75'	**10.0' long + 4.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Primary	954.50'	**12.0" Round Culvert** L= 1,700.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 954.50' / 931.50' S= 0.0135 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.09 cfs @ 12.99 hrs HW=955.17' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=1.97 cfs @ 12.99 hrs HW=955.17' TW=932.55' (Dynamic Tailwater)
↑—**3=Culvert** (Inlet Controls 1.97 cfs @ 3.50 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.50' TW=931.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PrP1: SE Existing Depression



Summary for Pond PrP2: Wet Pond

Inflow Area = 47.275 ac, 27.42% Impervious, Inflow Depth = 0.79" for 2-yr, 24hr event
Inflow = 46.28 cfs @ 12.14 hrs, Volume= 3.103 af
Outflow = 6.08 cfs @ 13.27 hrs, Volume= 3.014 af, Atten= 87%, Lag= 67.7 min
Primary = 6.08 cfs @ 13.27 hrs, Volume= 3.014 af
Routed to Pond PrP3 : Infiltration Basin
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Automatic Starting Elev= 931.50' Surf.Area= 45,103 sf Storage= 190,807 cf
Peak Elev= 932.56' @ 13.27 hrs Surf.Area= 49,073 sf Storage= 240,534 cf (49,727 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 264.9 min (1,133.0 - 868.0)

Volume	Invert	Avail.Storage	Storage Description
#1	925.50'	545,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

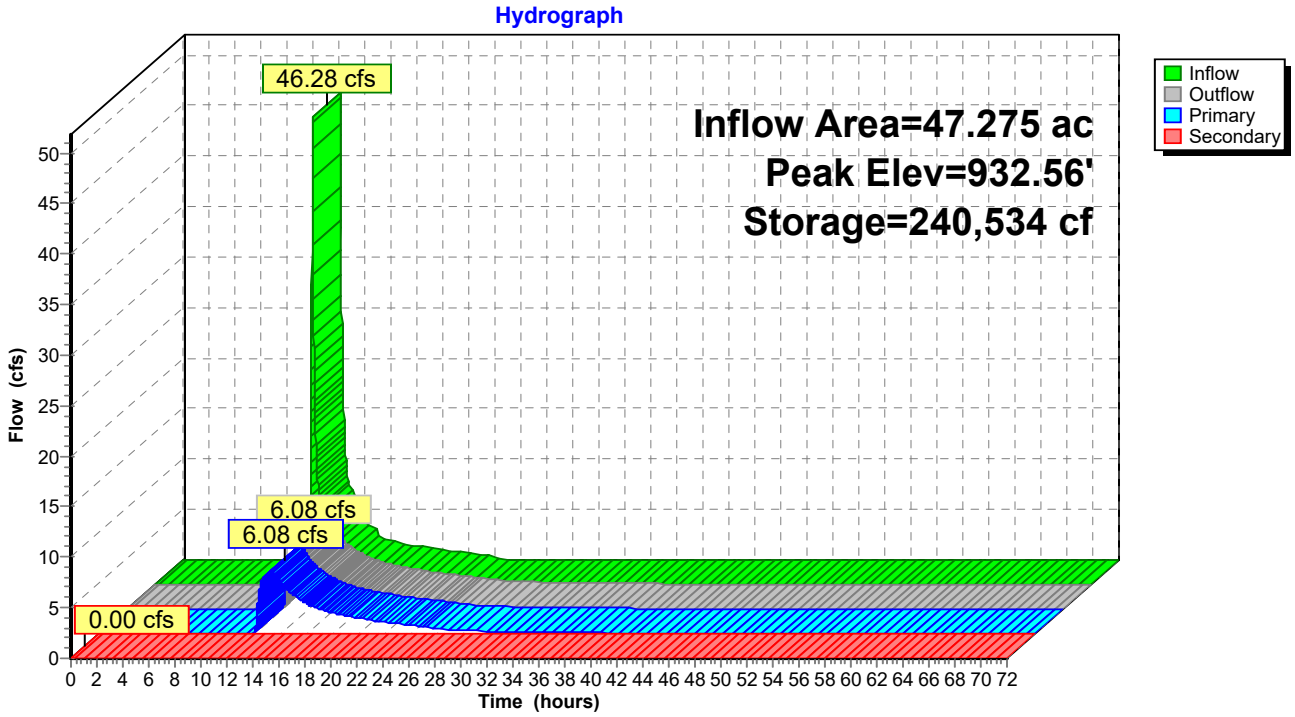
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
925.50	23,915	0	0
930.50	36,156	150,178	150,178
931.50	45,103	40,630	190,807
932.50	48,857	46,980	237,787
933.50	52,712	50,785	288,572
934.50	56,667	54,690	343,261
935.50	60,723	58,695	401,956
936.50	64,880	62,802	464,758
937.50	69,137	67,009	531,766
937.70	70,001	13,914	545,680

Device	Routing	Invert	Outlet Devices
#1	Primary	931.50'	**30.0" Round Culvert** L= 263.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 931.50' / 930.50' S= 0.0038 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	936.70'	**10.0' long + 4.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=6.08 cfs @ 13.27 hrs HW=932.56' TW=931.14' (Dynamic Tailwater)
1=Culvert (Barrel Controls 6.08 cfs @ 4.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=931.50' TW=930.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PrP2: Wet Pond



Summary for Pond PrP3: Infiltration Basin

Inflow Area = 52.413 ac, 30.94% Impervious, Inflow Depth > 0.84" for 2-yr, 24hr event
Inflow = 14.15 cfs @ 12.14 hrs, Volume= 3.679 af
Outflow = 3.44 cfs @ 15.74 hrs, Volume= 2.654 af, Atten= 76%, Lag= 216.0 min
Discarded = 0.19 cfs @ 15.74 hrs, Volume= 0.950 af
Primary = 3.24 cfs @ 15.74 hrs, Volume= 1.705 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.63' @ 15.74 hrs Surf.Area= 65,450 sf Storage= 71,338 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 546.2 min (1,621.0 - 1,074.7)

Volume	Invert	Avail.Storage	Storage Description
#1	930.50'	400,616 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

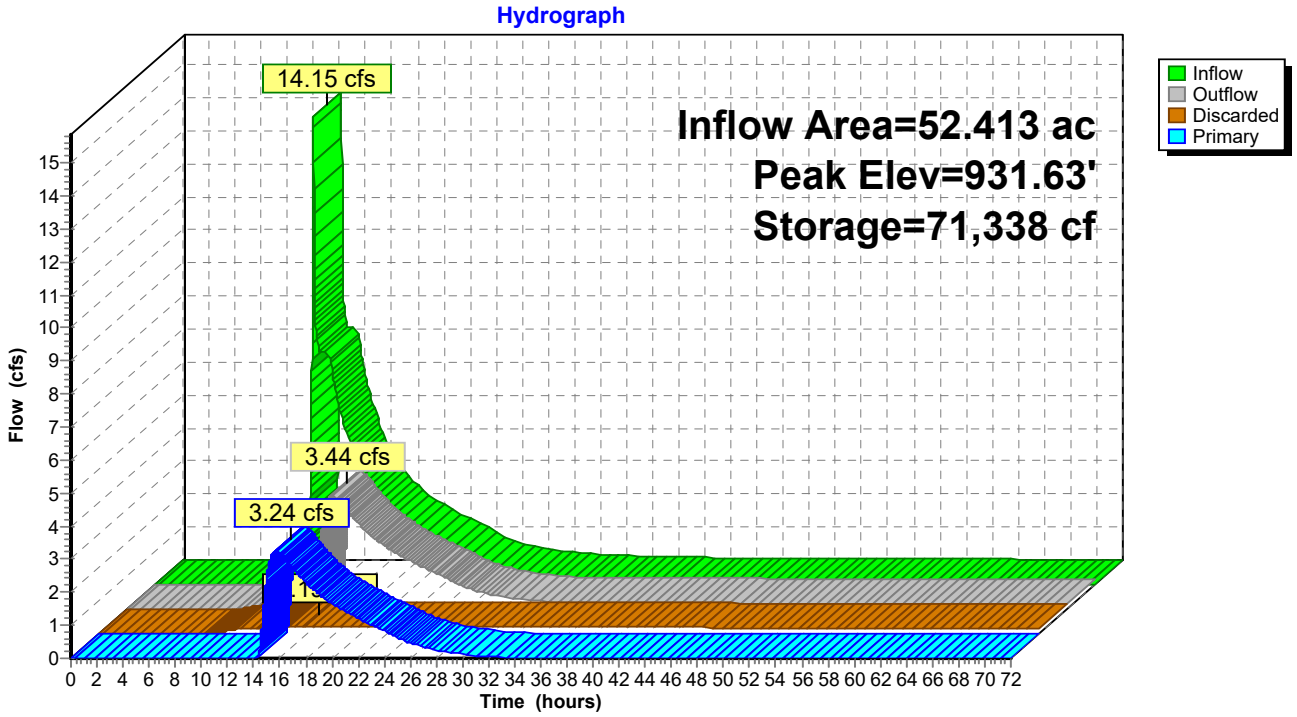
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
930.50	60,505	0	0
931.00	62,666	30,793	30,793
932.00	67,065	64,866	95,658
933.00	71,564	69,315	164,973
934.00	76,164	73,864	238,837
935.00	80,865	78,515	317,351
936.00	85,665	83,265	400,616

Device	Routing	Invert	Outlet Devices
#1	Discarded	930.50'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'
#2	Primary	931.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.50 932.00 933.00 934.00 935.00 936.00 Width (feet) 20.00 24.00 32.00 40.00 48.00 56.00

Discarded OutFlow Max=0.19 cfs @ 15.74 hrs HW=931.63' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=3.24 cfs @ 15.74 hrs HW=931.63' TW=931.41' (Dynamic Tailwater)
↑—**2=Custom Weir/Orifice** (Weir Controls 3.24 cfs @ 1.19 fps)

Pond PrP3: Infiltration Basin



Summary for Pond R5: Bypass Swale 5

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 0.45" for 2-yr, 24hr event
Inflow = 11.46 cfs @ 12.53 hrs, Volume= 3.262 af
Outflow = 11.46 cfs @ 12.53 hrs, Volume= 3.262 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.53 hrs, Volume= 0.001 af
Primary = 11.46 cfs @ 12.53 hrs, Volume= 3.262 af
Routed to Link PrL : Pro Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.52' @ 12.53 hrs Surf.Area= 398 sf Storage= 67 cf

Plug-Flow detention time= 0.1 min calculated for 3.262 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (1,037.5 - 1,037.3)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	21,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

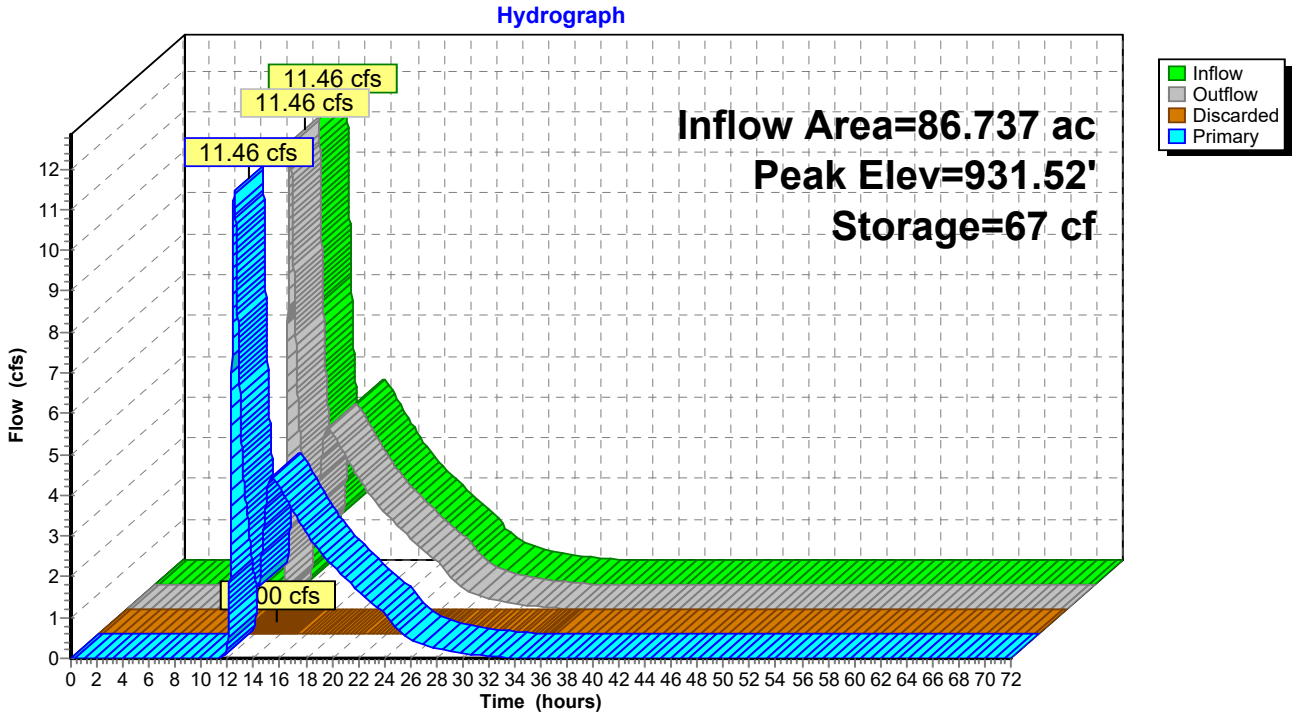
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	973	399	399
933.00	4,970	2,972	3,370
934.00	8,803	6,887	10,257
935.00	13,565	11,184	21,441

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.53 hrs HW=931.52' (Free Discharge)
2=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=11.46 cfs @ 12.53 hrs HW=931.52' TW=0.00' (Dynamic Tailwater)
1=Custom Weir/Orifice (Weir Controls 11.46 cfs @ 1.52 fps)

Pond R5: Bypass Swale 5



Summary for Link PrL: Pro Total

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 0.45" for 2-yr, 24hr event
Inflow = 11.46 cfs @ 12.53 hrs, Volume= 3.262 af
Primary = 11.46 cfs @ 12.53 hrs, Volume= 3.262 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PrL: Pro Total

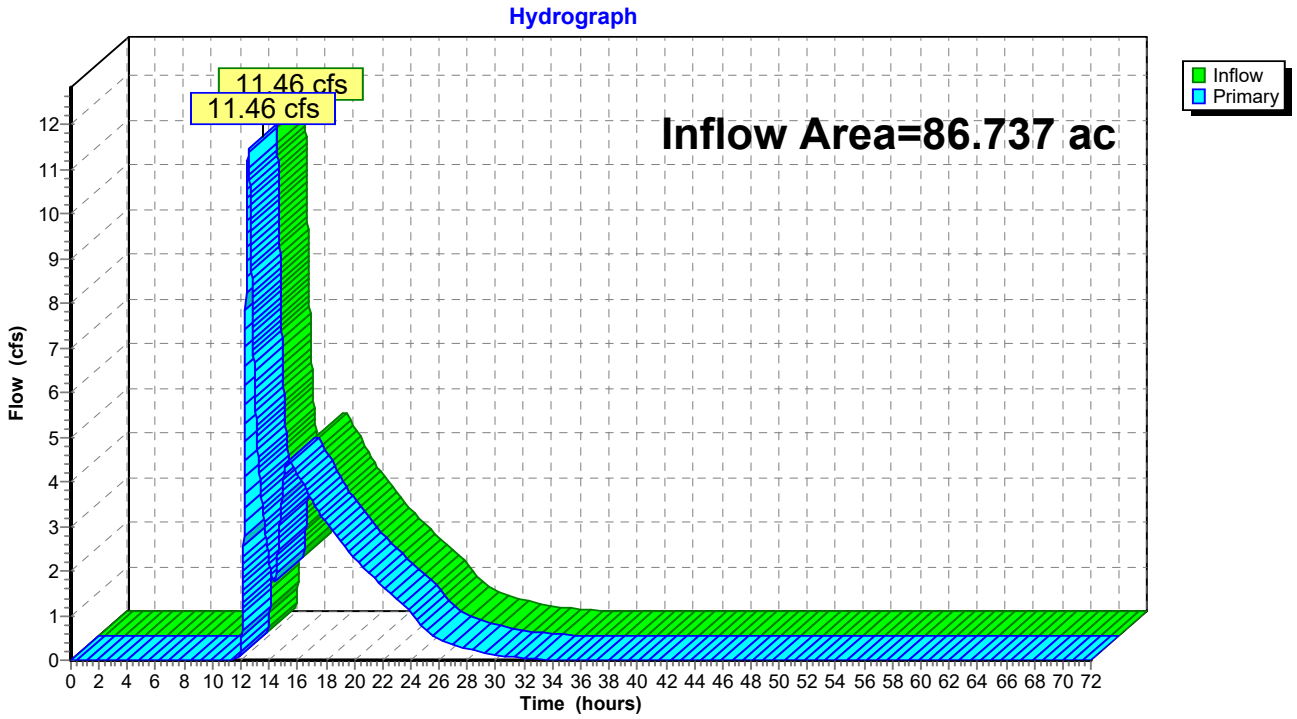
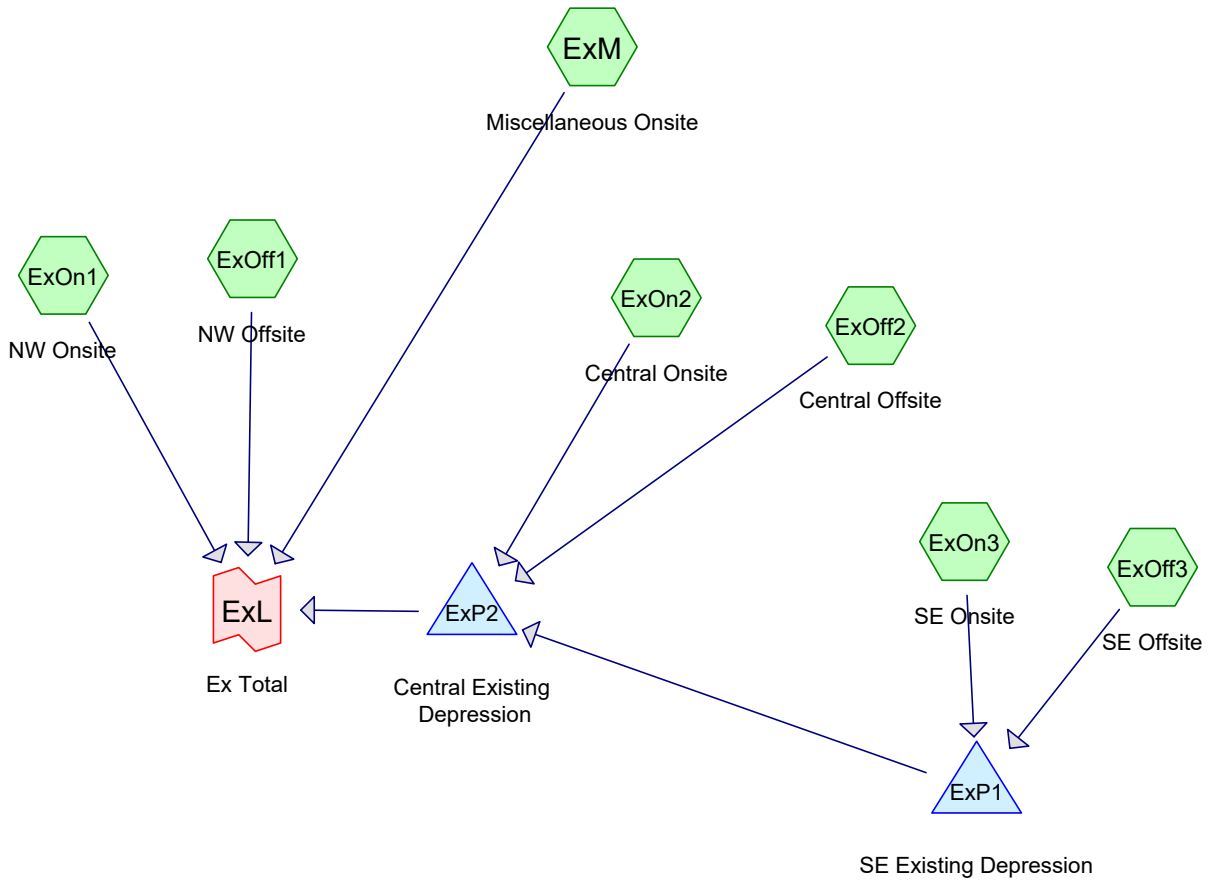


Exhibit 7

10-Year HydroCAD Results

Existing



Subcat Reach Pond Link

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentExM: MiscellaneousOnsite Runoff Area=2,540 sf 0.00% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=68 Runoff=0.12 cfs 0.006 af

SubcatchmentExOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=68 Runoff=0.04 cfs 0.002 af

SubcatchmentExOff2: Central Offsite Runoff Area=1,466,288 sf 2.41% Impervious Runoff Depth=1.26"
Flow Length=3,502' Tc=51.7 min CN=68 Runoff=22.92 cfs 3.541 af

SubcatchmentExOff3: SE Offsite Runoff Area=670,631 sf 2.40% Impervious Runoff Depth=1.33"
Flow Length=1,396' Tc=20.1 min CN=69 Runoff=19.36 cfs 1.701 af

SubcatchmentExOn1: NW Onsite Runoff Area=42,806 sf 0.00% Impervious Runoff Depth=1.59"
Flow Length=386' Tc=8.2 min CN=73 Runoff=2.30 cfs 0.130 af

SubcatchmentExOn2: Central Onsite Runoff Area=1,554,006 sf 0.53% Impervious Runoff Depth=1.26"
Flow Length=1,792' Slope=0.0168 '/' Tc=25.6 min CN=68 Runoff=37.06 cfs 3.753 af

SubcatchmentExOn3: SE Onsite Runoff Area=41,039 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=311' Tc=13.4 min CN=68 Runoff=1.37 cfs 0.099 af

Pond ExP1: SE Existing Depression Peak Elev=956.02' Storage=66,634 cf Inflow=20.49 cfs 1.800 af
Discarded=0.29 cfs 1.206 af Primary=0.00 cfs 0.000 af Outflow=0.29 cfs 1.206 af

Pond ExP2: Central Existing Depression Peak Elev=931.80' Storage=72 cf Inflow=50.64 cfs 7.294 af
Discarded=0.00 cfs 0.000 af Primary=50.64 cfs 7.293 af Outflow=50.64 cfs 7.294 af

Link ExL: Ex Total Inflow=51.28 cfs 7.432 af
Primary=51.28 cfs 7.432 af

Total Runoff Area = 86.737 ac Runoff Volume = 9.232 af Average Runoff Depth = 1.28"
98.42% Pervious = 85.367 ac 1.58% Impervious = 1.370 ac

Summary for Subcatchment ExM: Miscellaneous Onsite

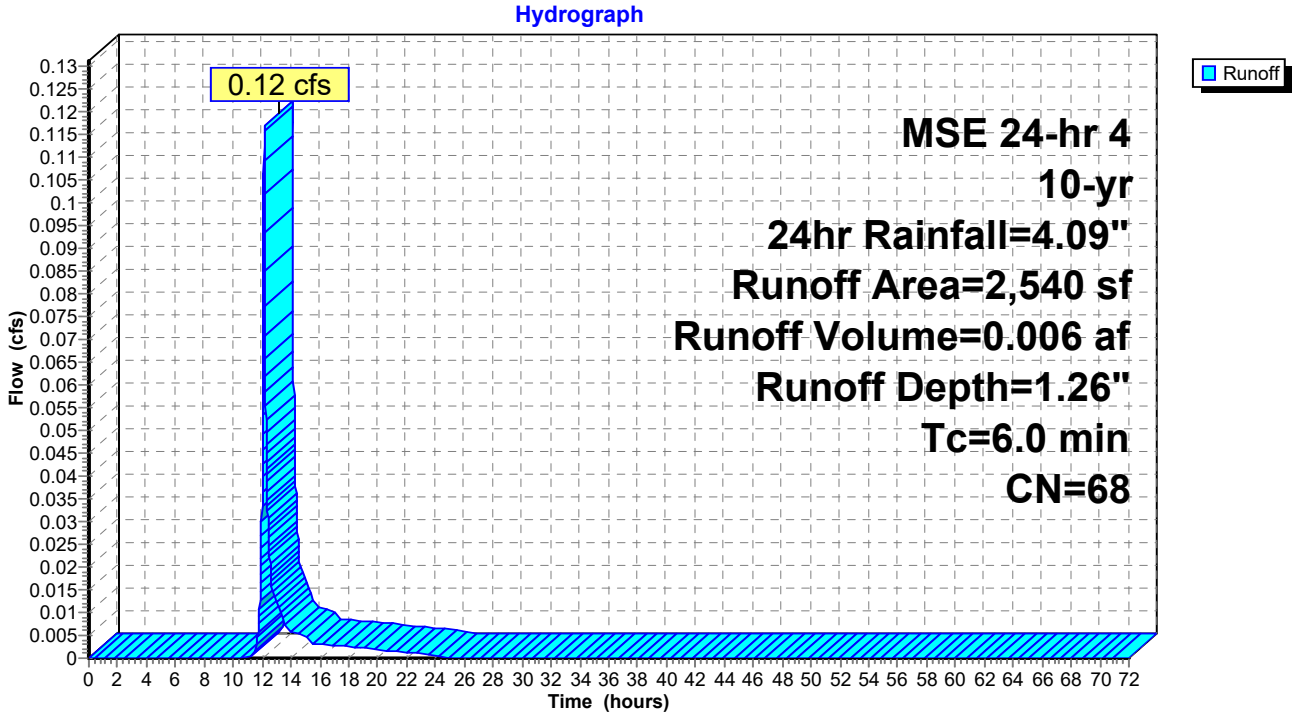
Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.006 af, Depth= 1.26"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	1,288	68	Cropland, HSG B Onsite
*	638	68	Cropland, HSG B Onsite
*	614	68	Cropland, HSG B Onsite
	2,540	68	Weighted Average
	2,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExM: Miscellaneous Onsite



Summary for Subcatchment ExOff1: NW Offsite

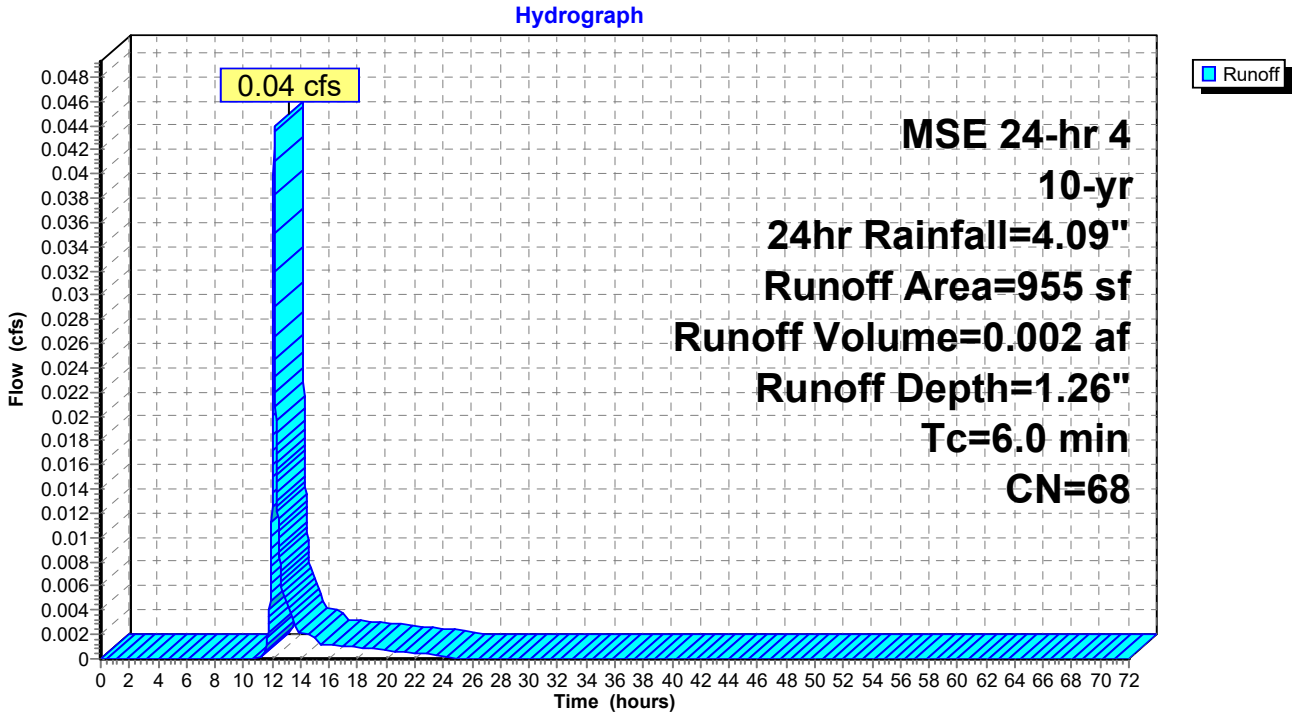
Runoff = 0.04 cfs @ 12.14 hrs, Volume= 0.002 af, Depth= 1.26"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExOff1: NW Offsite



Summary for Subcatchment ExOff2: Central Offsite

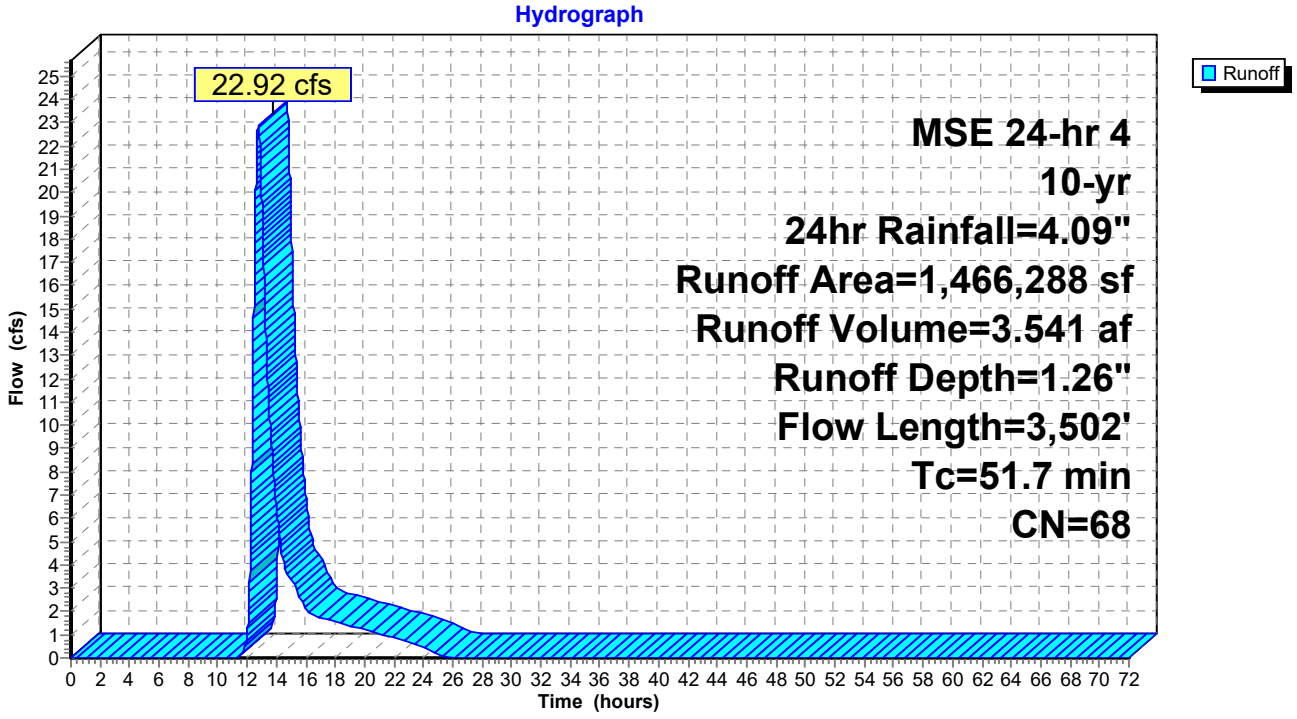
Runoff = 22.92 cfs @ 12.76 hrs, Volume= 3.541 af, Depth= 1.26"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	1,353,095	68	Cropland, HSG B Offsite
*	93,231	70	1/2 acre lots, 25% imp, HSG B Offsite
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
*	9,410	98	Pavement Offsite
	1,466,288	68	Weighted Average
	1,430,932		97.59% Pervious Area
	35,356		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
46.7	3,392	0.0181	1.21		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
51.7	3,502	Total			

Subcatchment ExOff2: Central Offsite



Summary for Subcatchment ExOff3: SE Offsite

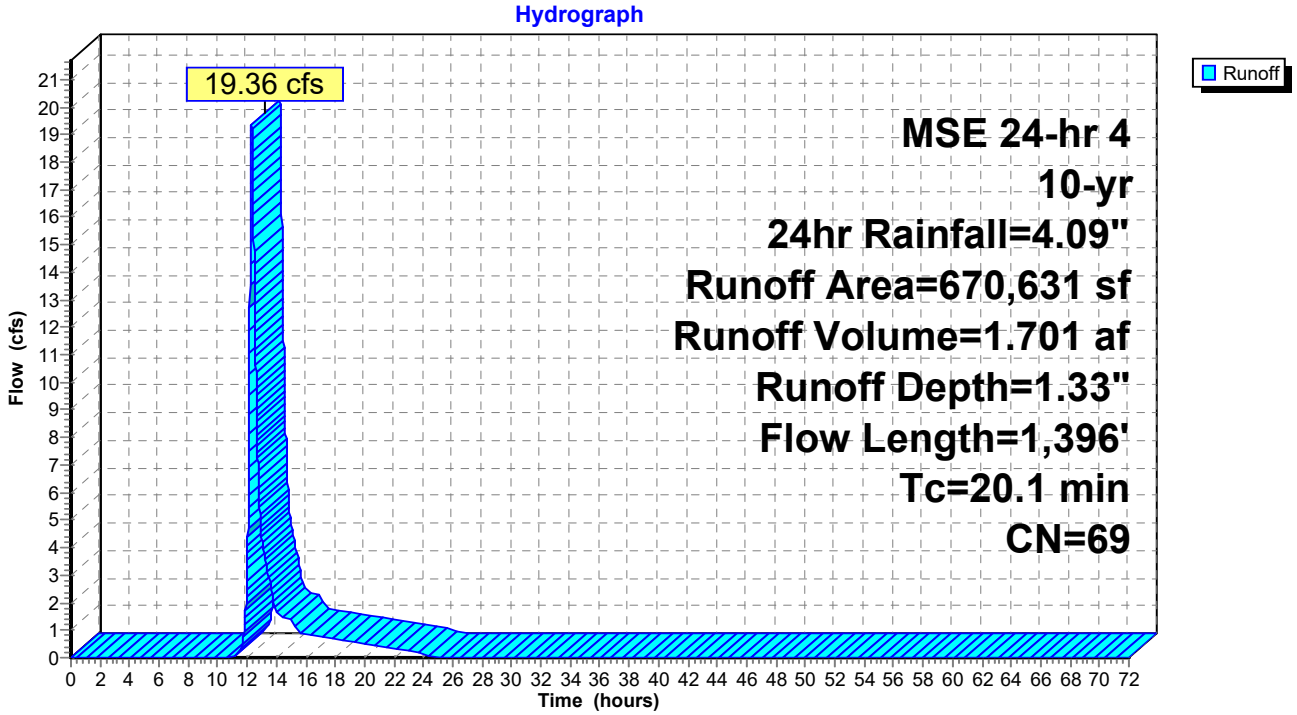
Runoff = 19.36 cfs @ 12.31 hrs, Volume= 1.701 af, Depth= 1.33"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	640,930	68	Cropland, HSG B Offsite
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	11,569	98	Pavement Offsite
	670,631	69	Weighted Average
	654,529		97.60% Pervious Area
	16,102		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment ExOff3: SE Offsite



Summary for Subcatchment ExOn1: NW Onsite

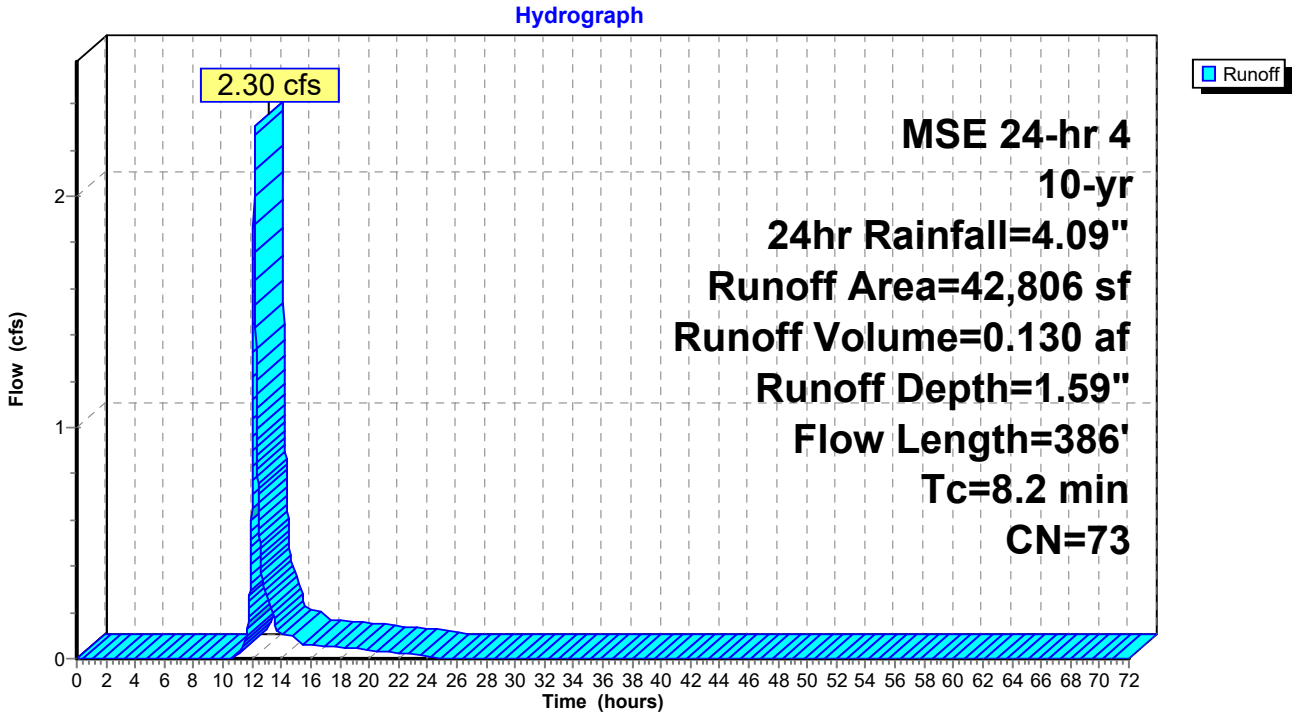
Runoff = 2.30 cfs @ 12.16 hrs, Volume= 0.130 af, Depth= 1.59"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	21,403	68	Cropland, HSG B Onsite
*	21,403	78	Cropland, HSG C Onsite
	42,806	73	Weighted Average
	42,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	67	0.0217	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
4.7	319	0.0156	1.12		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
8.2	386	Total			

Subcatchment ExOn1: NW Onsite



Summary for Subcatchment ExOn2: Central Onsite

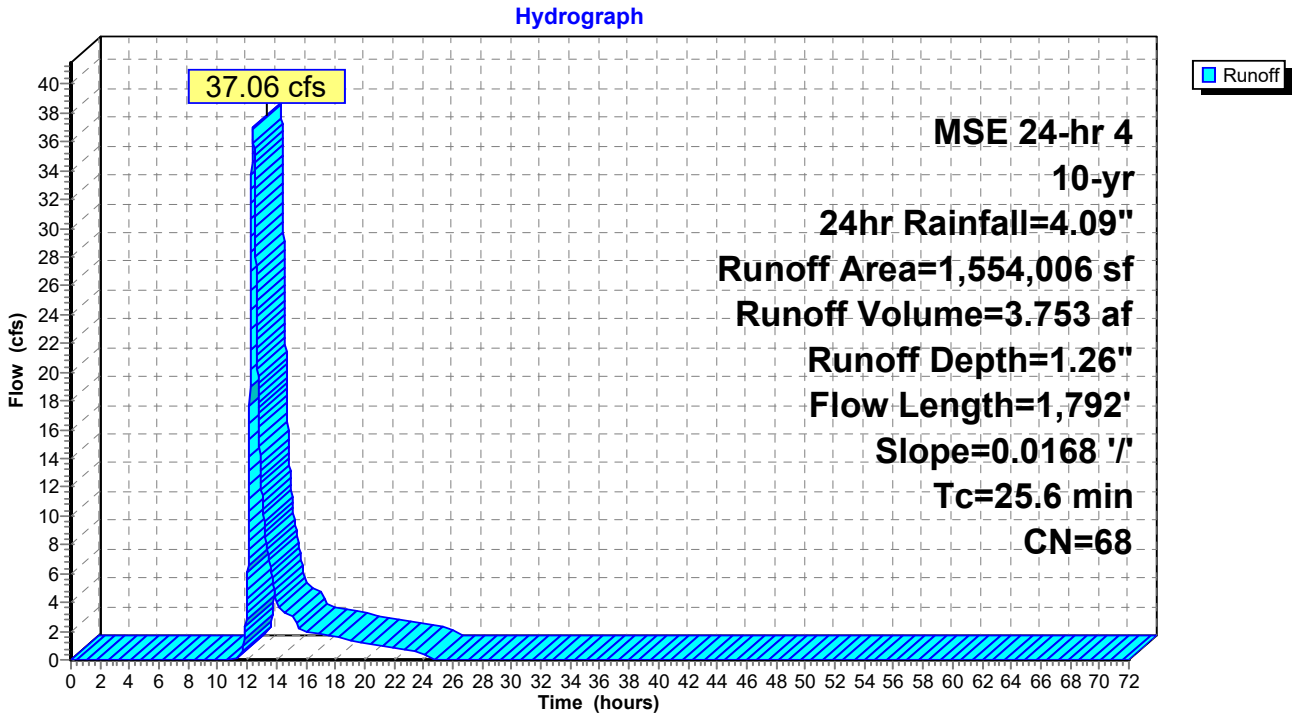
Runoff = 37.06 cfs @ 12.39 hrs, Volume= 3.753 af, Depth= 1.26"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	1,516,018	68	Cropland, HSB Onsite
*	5,189	78	Cropland, HSG C Onsite
*	32,799	70	1/2 acre lots, 25% imp, HSG B Onsite
	1,554,006	68	Weighted Average
	1,545,806		99.47% Pervious Area
	8,200		0.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,792	0.0168	1.17		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment ExOn2: Central Onsite



Summary for Subcatchment ExOn3: SE Onsite

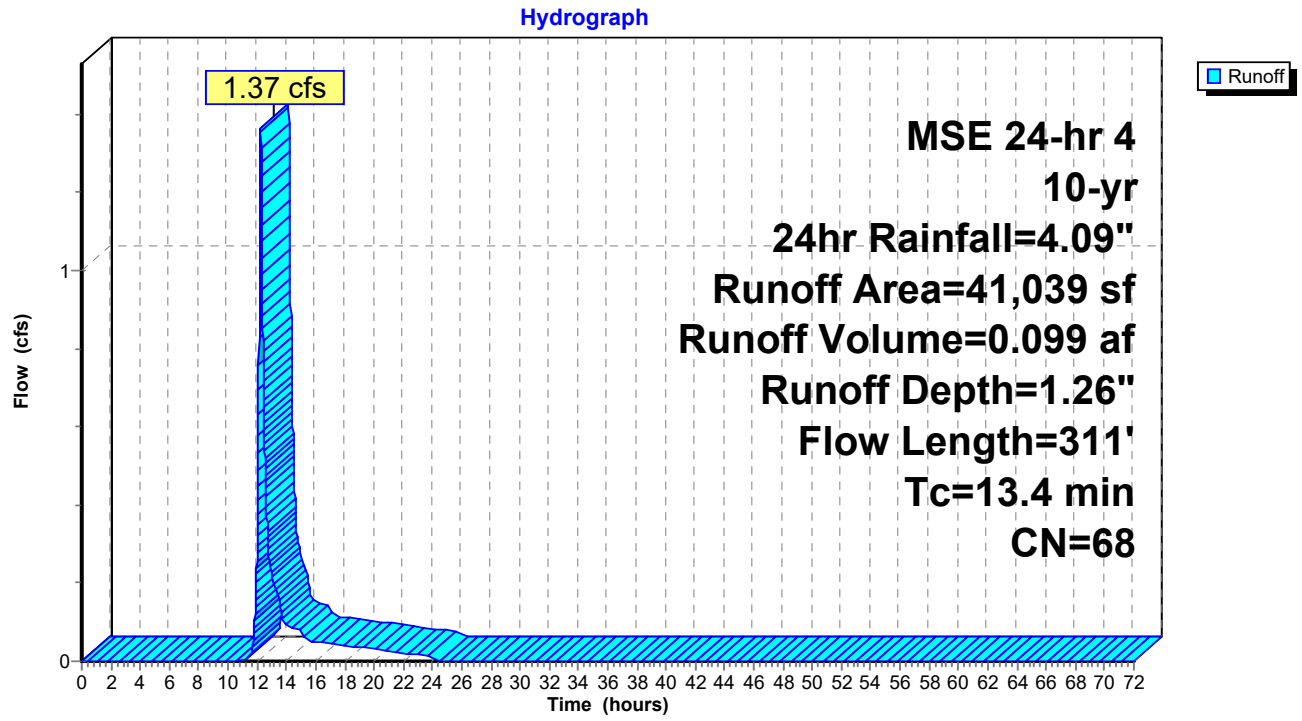
Runoff = 1.37 cfs @ 12.23 hrs, Volume= 0.099 af, Depth= 1.26"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	41,039	68	Cropland, HSB Onsite
	41,039		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	155	0.0086	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84" Using McCuen-Spiess flow length
3.5	156	0.0070	0.75		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
13.4	311	Total			

Subcatchment ExOn3: SE Onsite



Summary for Pond ExP1: SE Existing Depression

Inflow Area = 16.338 ac, 2.26% Impervious, Inflow Depth = 1.32" for 10-yr, 24hr event
Inflow = 20.49 cfs @ 12.31 hrs, Volume= 1.800 af
Outflow = 0.29 cfs @ 23.00 hrs, Volume= 1.206 af, Atten= 99%, Lag= 641.3 min
Discarded = 0.29 cfs @ 23.00 hrs, Volume= 1.206 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond ExP2 : Central Existing Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 956.02' @ 23.00 hrs Surf.Area= 95,138 sf Storage= 66,634 cf

Plug-Flow detention time= 1,635.7 min calculated for 1.206 af (67% of inflow)
Center-of-Mass det. time= 1,536.8 min (2,392.7 - 855.9)

Volume	Invert	Avail.Storage	Storage Description
#1	954.57'	150,632 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

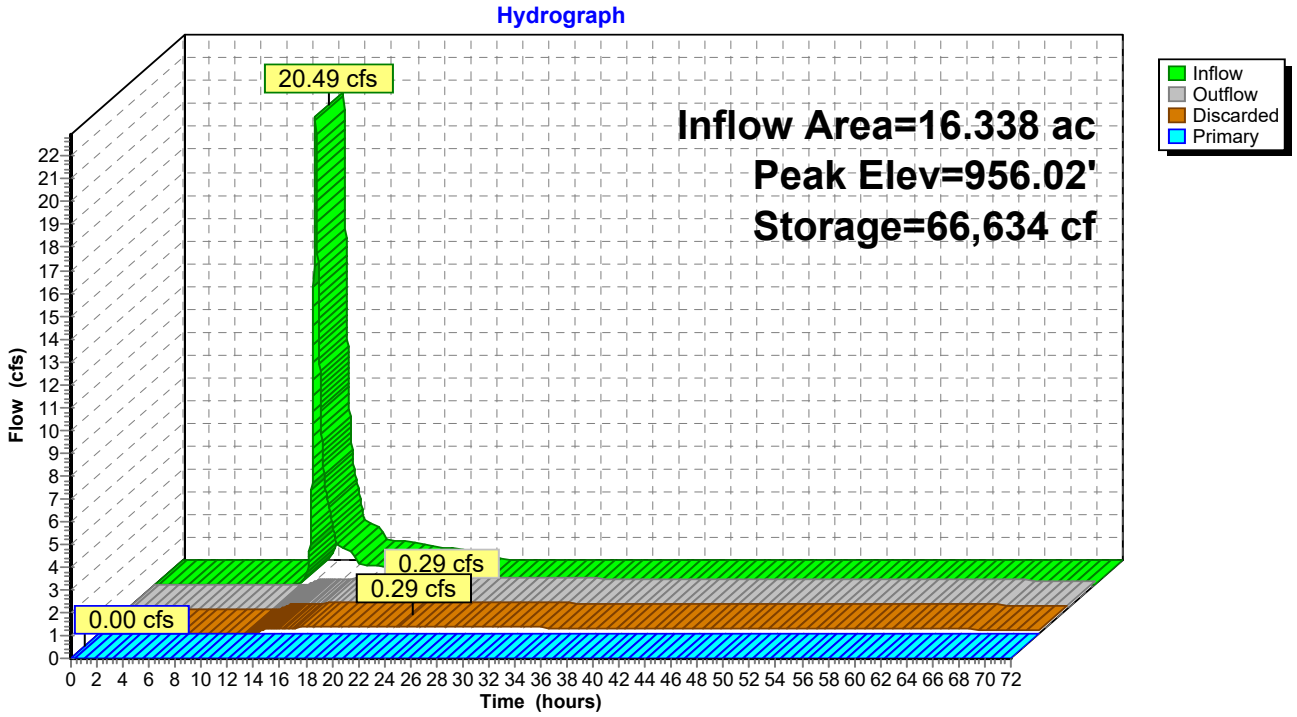
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.57	0	0	0
955.00	24,649	5,300	5,300
956.00	93,926	59,288	64,587
956.50	121,903	53,957	118,544
956.75	134,797	32,088	150,632

Device	Routing	Invert	Outlet Devices
#1	Primary	956.34'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 956.34 956.50 956.75 957.00 Width (feet) 7.00 104.00 184.00 249.00
#2	Discarded	954.57'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.29 cfs @ 23.00 hrs HW=956.02' (Free Discharge)
↑**2=Exfiltration** (Controls 0.29 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.57' TW=931.18' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond ExP1: SE Existing Depression



Summary for Pond ExP2: Central Existing Depression

Inflow Area = 85.674 ac, 1.60% Impervious, Inflow Depth = 1.02" for 10-yr, 24hr event
Inflow = 50.64 cfs @ 12.46 hrs, Volume= 7.294 af
Outflow = 50.64 cfs @ 12.46 hrs, Volume= 7.294 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.46 hrs, Volume= 0.000 af
Primary = 50.64 cfs @ 12.46 hrs, Volume= 7.293 af
Routed to Link ExL : Ex Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.80' @ 12.46 hrs Surf.Area= 233 sf Storage= 72 cf

Plug-Flow detention time= 0.0 min calculated for 7.293 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (875.6 - 875.5)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	681,595 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

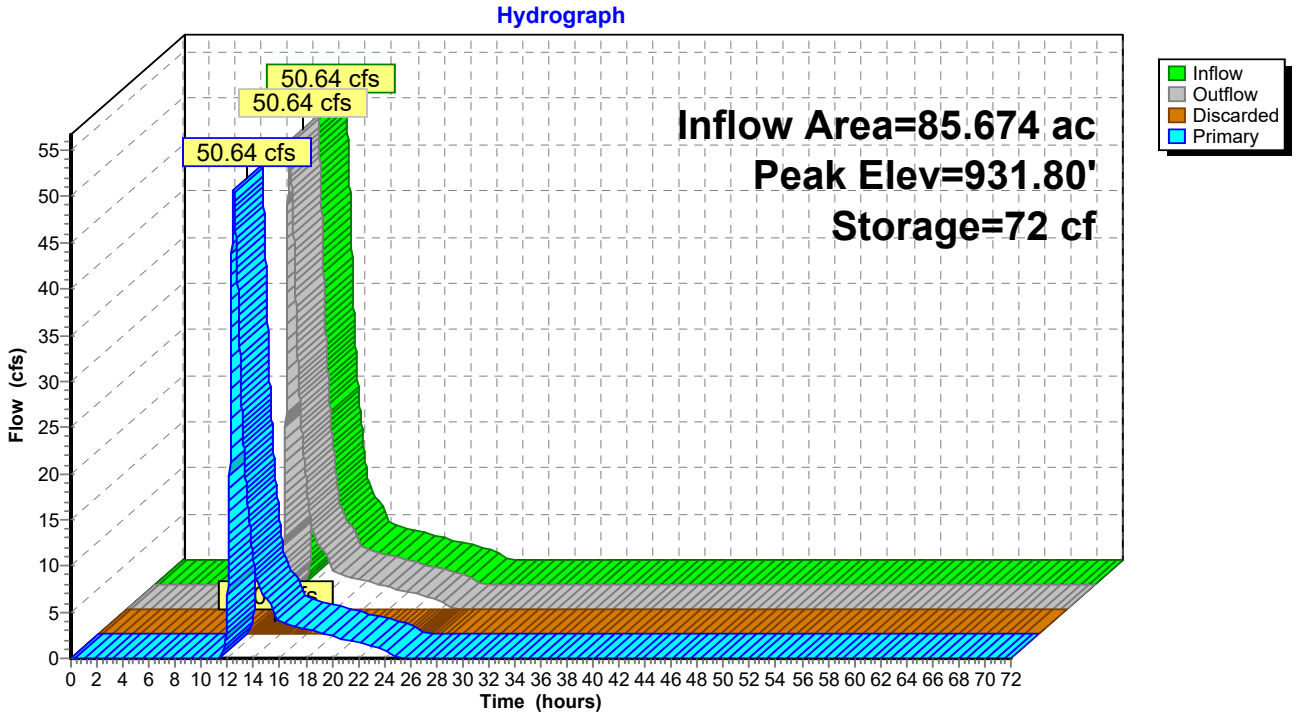
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	308	126	126
933.00	33,728	17,018	17,144
934.00	96,309	65,019	82,163
935.00	168,612	132,461	214,623
936.00	234,956	201,784	416,407
937.00	295,420	265,188	681,595

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 936.00 937.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00 622.00 735.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.46 hrs HW=931.80' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=50.63 cfs @ 12.46 hrs HW=931.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 50.63 cfs @ 2.11 fps)

Pond ExP2: Central Existing Depression

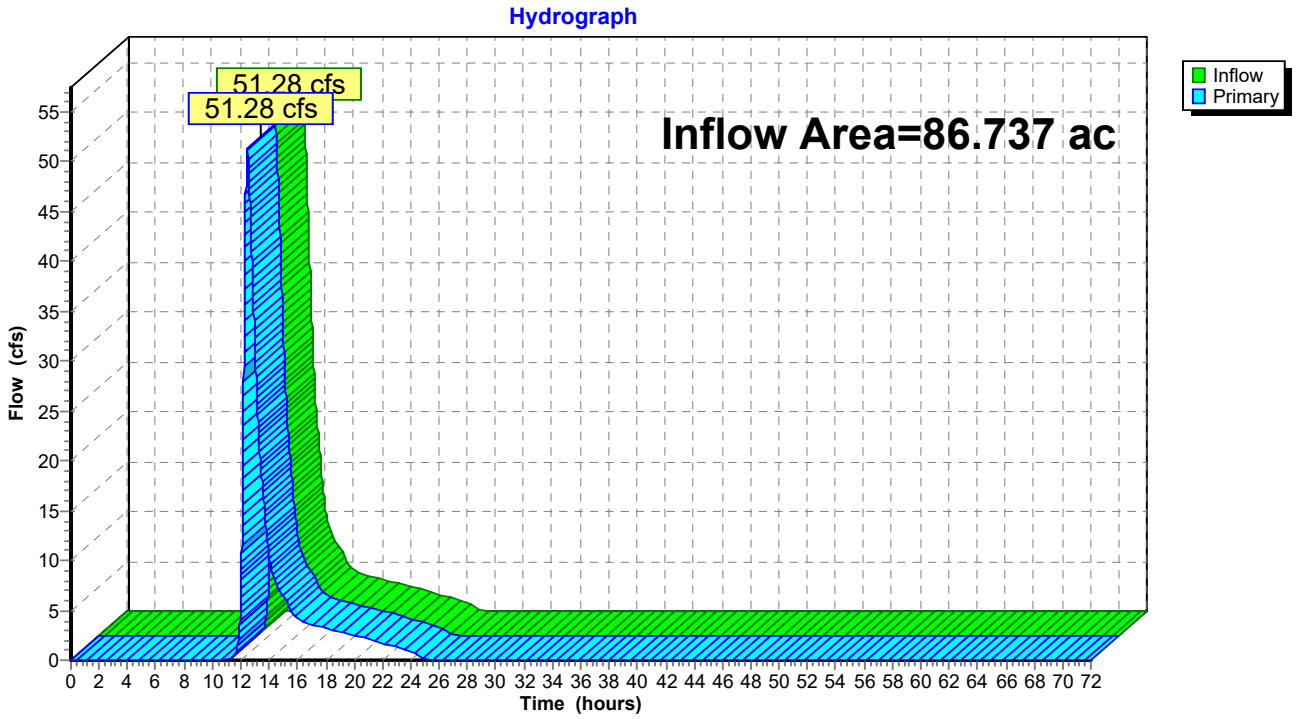


Summary for Link ExL: Ex Total

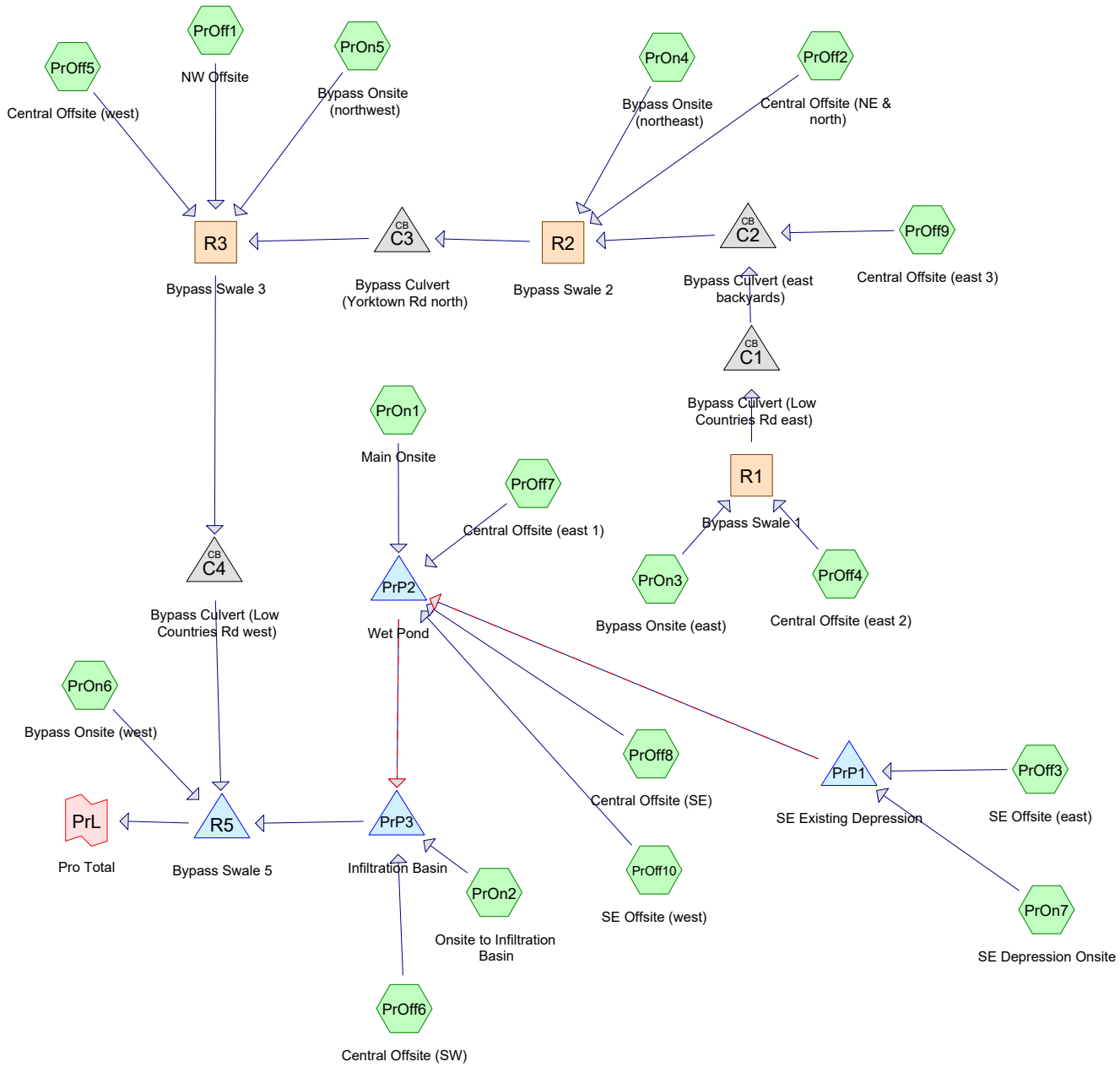
Inflow Area = 86.737 ac, 1.58% Impervious, Inflow Depth = 1.03" for 10-yr, 24hr event
Inflow = 51.28 cfs @ 12.46 hrs, Volume= 7.432 af
Primary = 51.28 cfs @ 12.46 hrs, Volume= 7.432 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link ExL: Ex Total



Proposed



Subcat Reach Pond Link

Routing Diagram for 26-225 HydroCAD
Prepared by Fehr Graham & Associates, Printed 10/8/2026
HydroCAD® 10.20-9a s/n 00943 © 2026 HydroCAD Software Solutions LLC

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPrOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=68 Runoff=0.04 cfs 0.002 af

SubcatchmentPrOff10: SE Offsite (west) Runoff Area=27,179 sf 40.65% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=76 Runoff=1.84 cfs 0.094 af

SubcatchmentPrOff2: Central Offsite Runoff Area=1,125,874 sf 1.51% Impervious Runoff Depth=1.26"
Flow Length=1,885' Tc=28.1 min CN=68 Runoff=25.49 cfs 2.719 af

SubcatchmentPrOff3: SE Offsite (east) Runoff Area=645,599 sf 0.03% Impervious Runoff Depth=1.26"
Flow Length=1,396' Tc=20.1 min CN=68 Runoff=17.58 cfs 1.559 af

SubcatchmentPrOff4: Central Offsite (east Runoff Area=118,736 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=1,270' Slope=0.0225 '/' Tc=15.7 min CN=68 Runoff=3.67 cfs 0.287 af

SubcatchmentPrOff5: Central Offsite Runoff Area=10,552 sf 25.00% Impervious Runoff Depth=2.12"
Tc=6.0 min CN=80 Runoff=0.83 cfs 0.043 af

SubcatchmentPrOff6: Central Offsite (SW) Runoff Area=28,651 sf 14.99% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=72 Runoff=1.62 cfs 0.084 af

SubcatchmentPrOff7: Central Offsite (east Runoff Area=14,256 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=373' Tc=6.2 min CN=68 Runoff=0.65 cfs 0.034 af

SubcatchmentPrOff8: Central Offsite (SE) Runoff Area=46,766 sf 39.64% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=76 Runoff=3.16 cfs 0.162 af

SubcatchmentPrOff9: Central Offsite (east Runoff Area=119,306 sf 0.00% Impervious Runoff Depth=1.26"
Flow Length=1,164' Slope=0.0229 '/' Tc=14.2 min CN=68 Runoff=3.86 cfs 0.288 af

SubcatchmentPrOn1: Main Onsite Runoff Area=1,301,517 sf 39.68% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=76 Runoff=87.95 cfs 4.501 af

SubcatchmentPrOn2: Onsite to Runoff Area=195,173 sf 70.40% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=88 Runoff=19.81 cfs 1.050 af

SubcatchmentPrOn3: Bypass Onsite (east) Runoff Area=3,848 sf 0.00% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=61 Runoff=0.11 cfs 0.006 af

SubcatchmentPrOn4: Bypass Onsite Runoff Area=45,511 sf 0.00% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=61 Runoff=1.32 cfs 0.075 af

SubcatchmentPrOn5: Bypass Onsite Runoff Area=44,014 sf 0.00% Impervious Runoff Depth=1.14"
Tc=6.0 min CN=66 Runoff=1.80 cfs 0.096 af

SubcatchmentPrOn6: Bypass Onsite (west) Runoff Area=26,361 sf 0.00% Impervious Runoff Depth=1.66"
Tc=6.0 min CN=74 Runoff=1.64 cfs 0.084 af

SubcatchmentPrOn7: SE Depression Runoff Area=23,967 sf 76.88% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=91 Runoff=2.62 cfs 0.142 af

Reach R1: Bypass Swale 1 Avg. Flow Depth=0.25' Max Vel=2.42 fps Inflow=3.73 cfs 0.293 af
n=0.022 L=108.0' S=0.0099 '/' Capacity=198.46 cfs Outflow=3.72 cfs 0.293 af

Reach R2: Bypass Swale 2 Avg. Flow Depth=0.70' Max Vel=5.56 fps Inflow=30.83 cfs 3.375 af
n=0.022 L=913.0' S=0.0167 '/' Capacity=422.06 cfs Outflow=30.50 cfs 3.375 af

Reach R3: Bypass Swale 3 Avg. Flow Depth=0.86' Max Vel=4.28 fps Inflow=31.16 cfs 3.516 af
n=0.022 L=791.0' S=0.0080 '/' Capacity=440.47 cfs Outflow=30.80 cfs 3.516 af

Pond C1: Bypass Culvert (Low Countries Rd east) Peak Elev=959.66' Inflow=3.72 cfs 0.293 af
24.0" Round Culvert n=0.011 L=100.0' S=0.0047 '/' Outflow=3.72 cfs 0.293 af

Pond C2: Bypass Culvert (east backyards) Peak Elev=959.30' Inflow=7.54 cfs 0.581 af
27.0" Round Culvert n=0.011 L=323.0' S=0.0048 '/' Outflow=7.54 cfs 0.581 af

Pond C3: Bypass Culvert (Yorktown Rd north) Peak Elev=942.66' Inflow=30.50 cfs 3.375 af
30.0" Round Culvert x 2.00 n=0.011 L=119.0' S=0.0067 '/' Outflow=30.50 cfs 3.375 af

Pond C4: Bypass Culvert (Low Countries Rd west) Peak Elev=935.22' Inflow=30.80 cfs 3.516 af
27.0" Round Culvert x 3.00 n=0.011 L=109.0' S=0.0083 '/' Outflow=30.80 cfs 3.516 af

Pond PrP1: SE Existing Depression Peak Elev=955.62' Storage=28,981 cf Inflow=18.35 cfs 1.701 af
Discarded=0.17 cfs 0.103 af Primary=3.72 cfs 1.599 af Secondary=0.00 cfs 0.000 af Outflow=3.88 cfs 1.701 af

Pond PrP2: Wet Pond Peak Elev=933.40' Storage=283,555 cf Inflow=94.65 cfs 6.390 af
Primary=16.99 cfs 6.299 af Secondary=0.00 cfs 0.000 af Outflow=16.99 cfs 6.299 af

Pond PrP3: Infiltration Basin Peak Elev=931.86' Storage=86,402 cf Inflow=29.39 cfs 7.432 af
Discarded=0.20 cfs 0.974 af Primary=14.46 cfs 5.415 af Outflow=14.66 cfs 6.389 af

Pond R5: Bypass Swale 5 Peak Elev=931.68' Storage=151 cf Inflow=31.14 cfs 9.015 af
Discarded=0.00 cfs 0.001 af Primary=31.14 cfs 9.014 af Outflow=31.14 cfs 9.015 af

Link PrL: Pro Total Inflow=31.14 cfs 9.014 af
Primary=31.14 cfs 9.014 af

Total Runoff Area = 86.737 ac Runoff Volume = 11.226 af Average Runoff Depth = 1.55"
80.79% Pervious = 70.071 ac 19.21% Impervious = 16.666 ac

Summary for Subcatchment PrOff1: NW Offsite

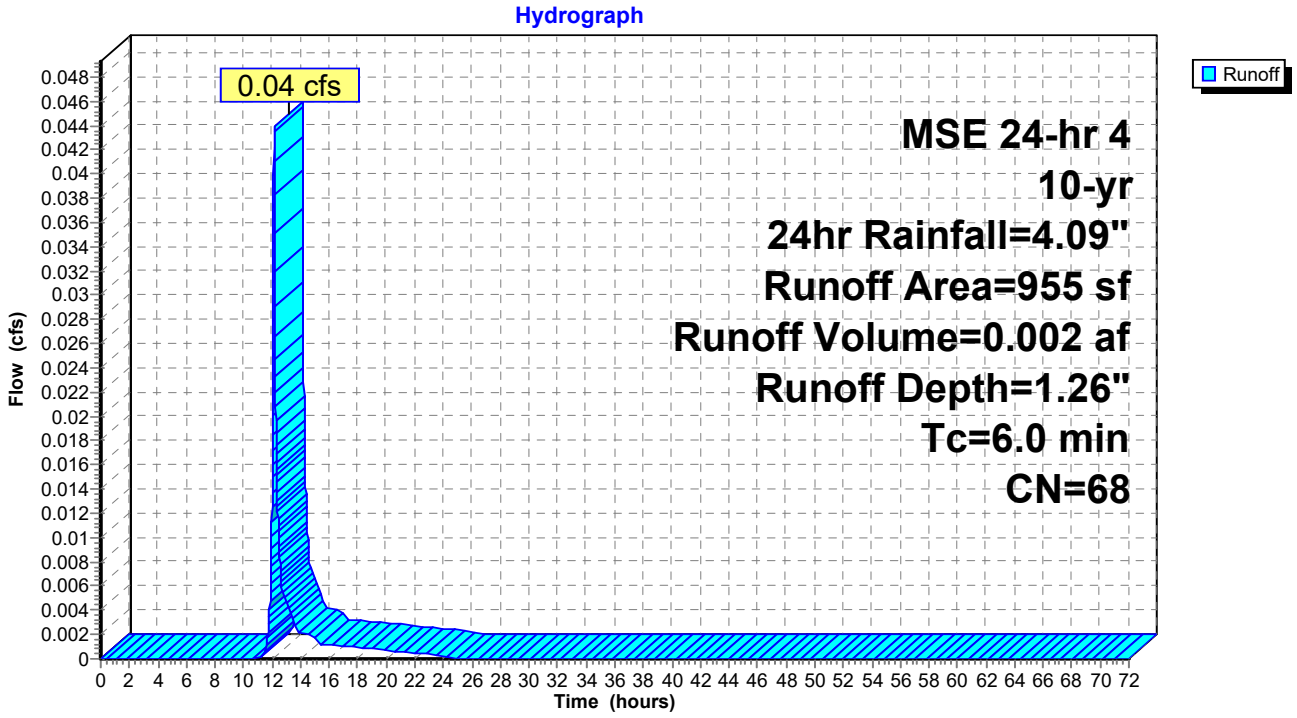
Runoff = 0.04 cfs @ 12.14 hrs, Volume= 0.002 af, Depth= 1.26"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff1: NW Offsite



Summary for Subcatchment PrOff10: SE Offsite (west)

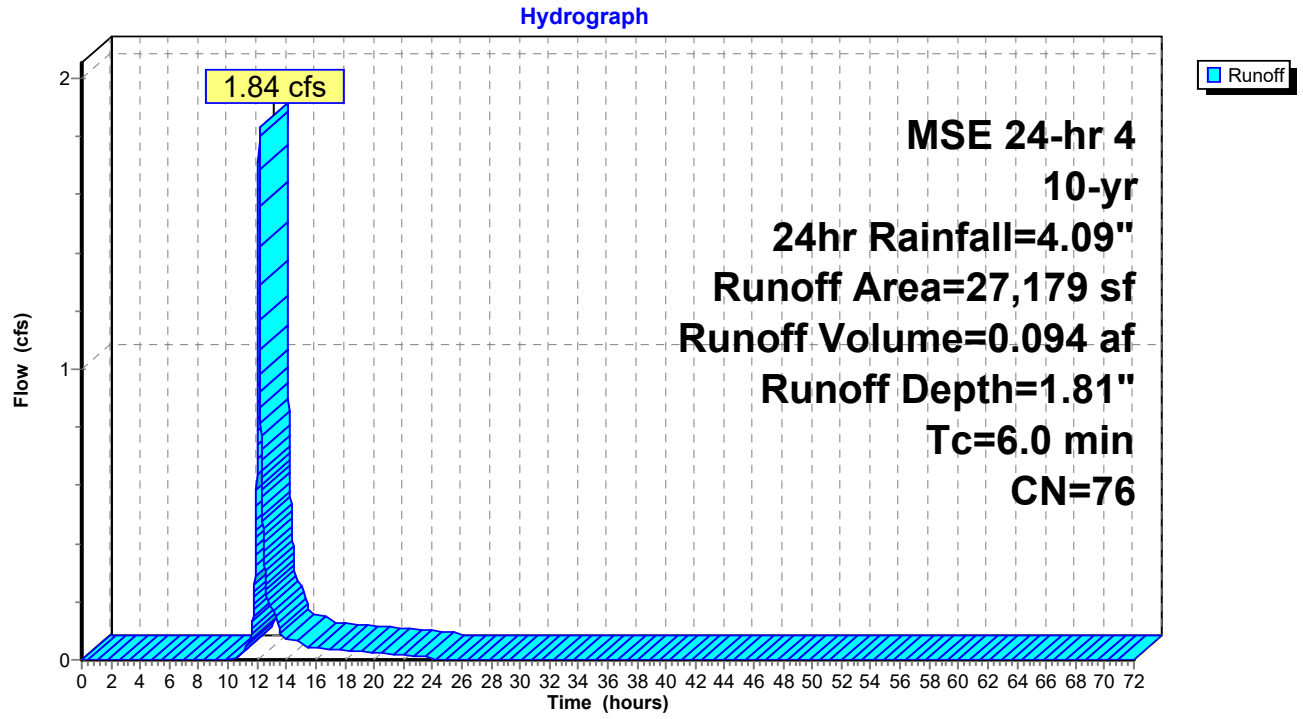
Runoff = 1.84 cfs @ 12.14 hrs, Volume= 0.094 af, Depth= 1.81"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	2,533	61	>75% Grass cover, Good, HSG B Offsite
*	3,161	98	Pavement Offsite
*	3,353	98	Pro Pave in ROW Offiste
	27,179	76	Weighted Average
	16,132		59.35% Pervious Area
	11,047		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff10: SE Offsite (west)



Summary for Subcatchment PrOff2: Central Offsite (NE & north)

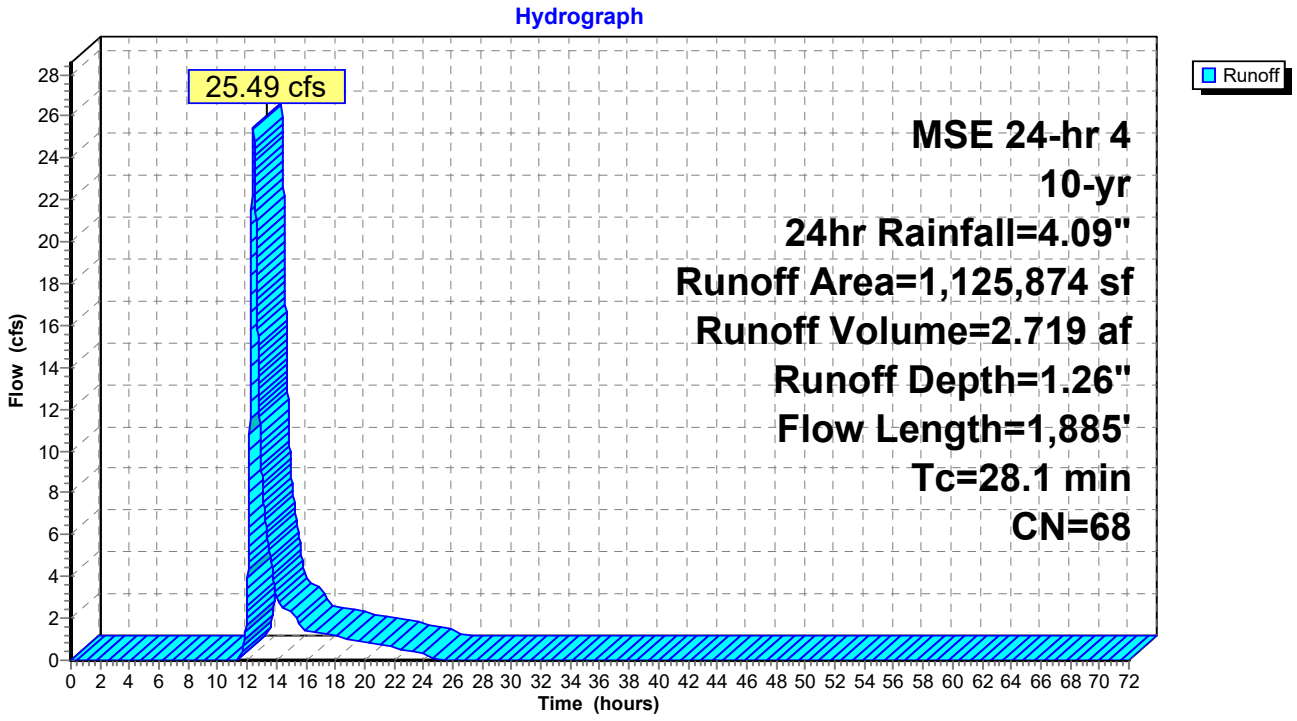
Runoff = 25.49 cfs @ 12.43 hrs, Volume= 2.719 af, Depth= 1.26"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	1,058,084	68	Cropland, HSG B Offsite
*	67,790	70	1/2 acre lots, 25% imp, HSG B Offsite
	1,125,874	68	Weighted Average
	1,108,927		98.49% Pervious Area
	16,948		1.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
23.1	1,775	0.0202	1.28		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
28.1	1,885	Total			

Subcatchment PrOff2: Central Offsite (NE & north)



Summary for Subcatchment PrOff3: SE Offsite (east)

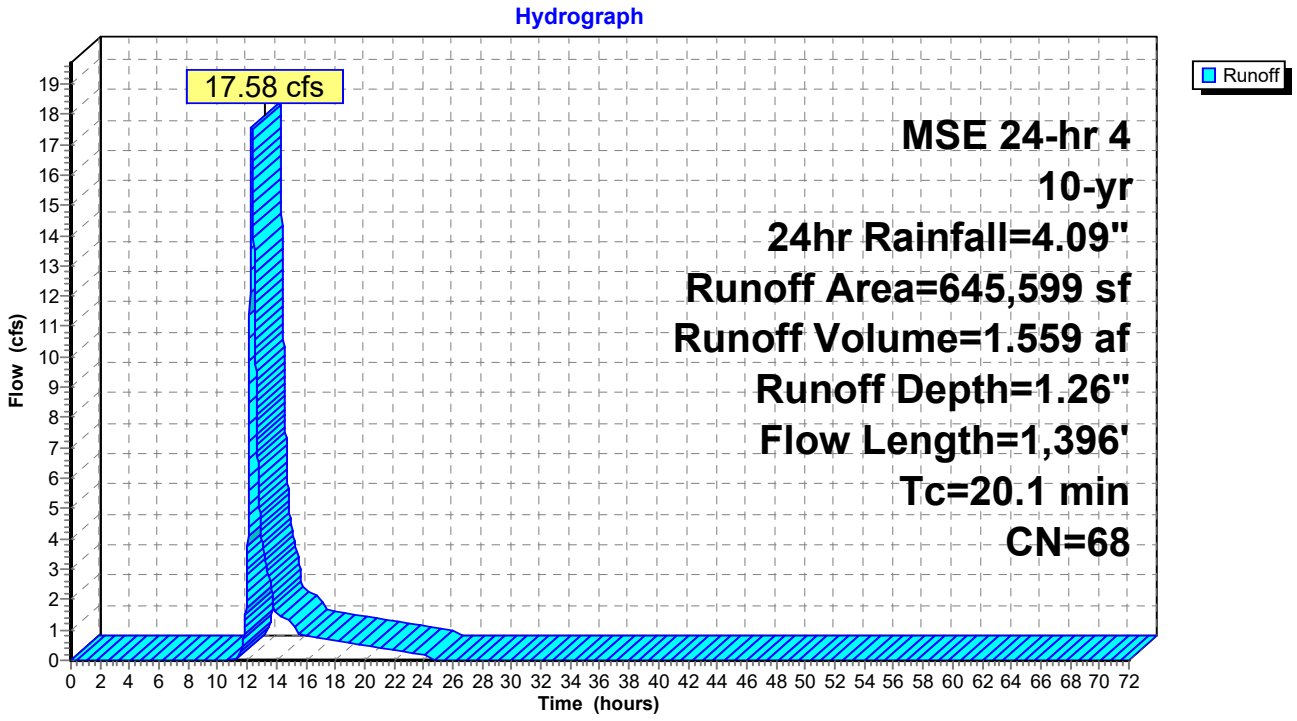
Runoff = 17.58 cfs @ 12.31 hrs, Volume= 1.559 af, Depth= 1.26"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	645,405	68	Cropland, HSG B Offsite
*	194	98	Pavement Offsite
	645,599	68	Weighted Average
	645,405		99.97% Pervious Area
	194		0.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment PrOff3: SE Offsite (east)



Summary for Subcatchment PrOff4: Central Offsite (east 2)

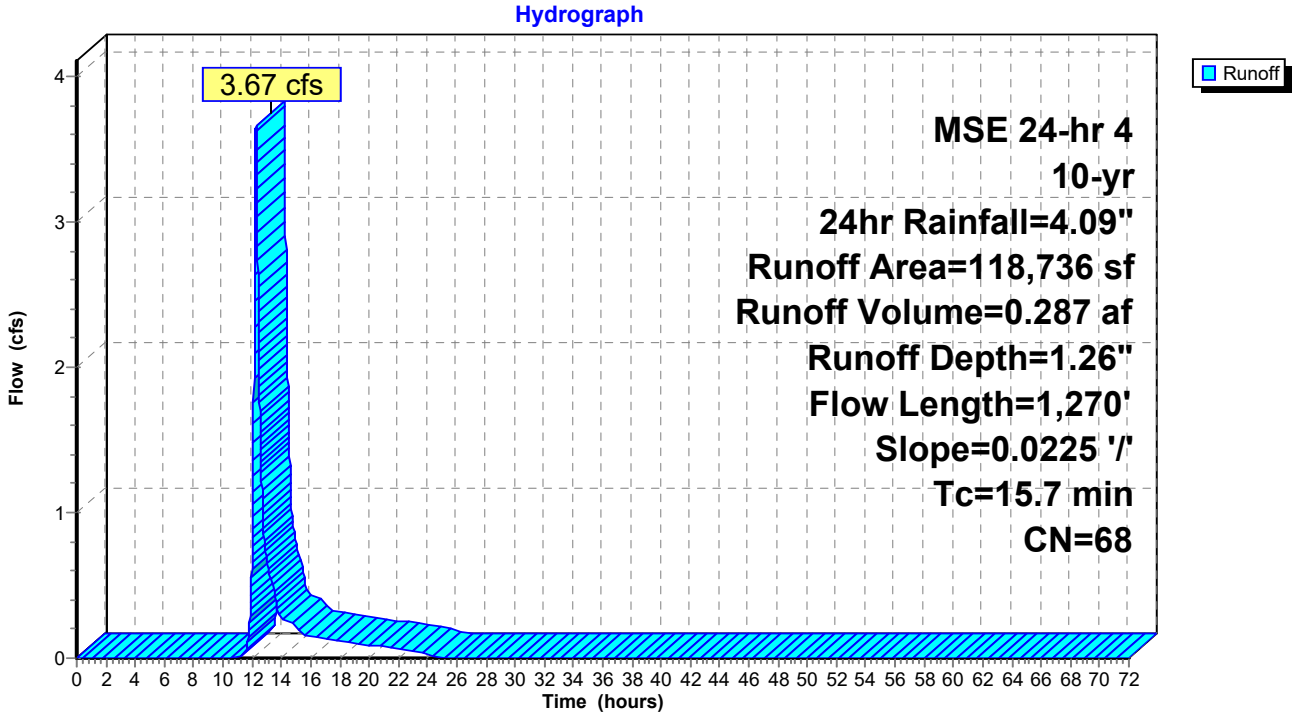
Runoff = 3.67 cfs @ 12.26 hrs, Volume= 0.287 af, Depth= 1.26"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	118,736	68	Cropland, HSG B Offsite
	118,736		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	1,270	0.0225	1.35		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff4: Central Offsite (east 2)



Summary for Subcatchment PrOff5: Central Offsite (west)

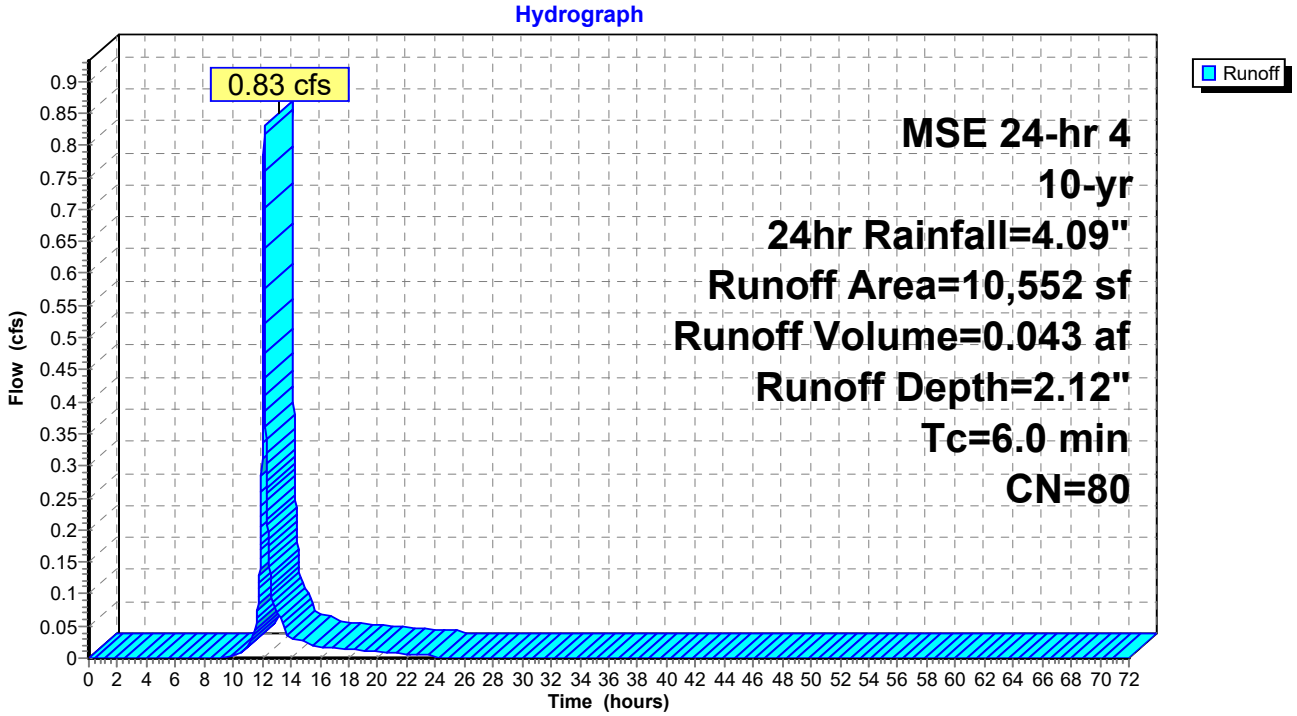
Runoff = 0.83 cfs @ 12.13 hrs, Volume= 0.043 af, Depth= 2.12"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
	7,914		75.00% Pervious Area
	2,638		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff5: Central Offsite (west)



Summary for Subcatchment PrOff6: Central Offsite (SW)

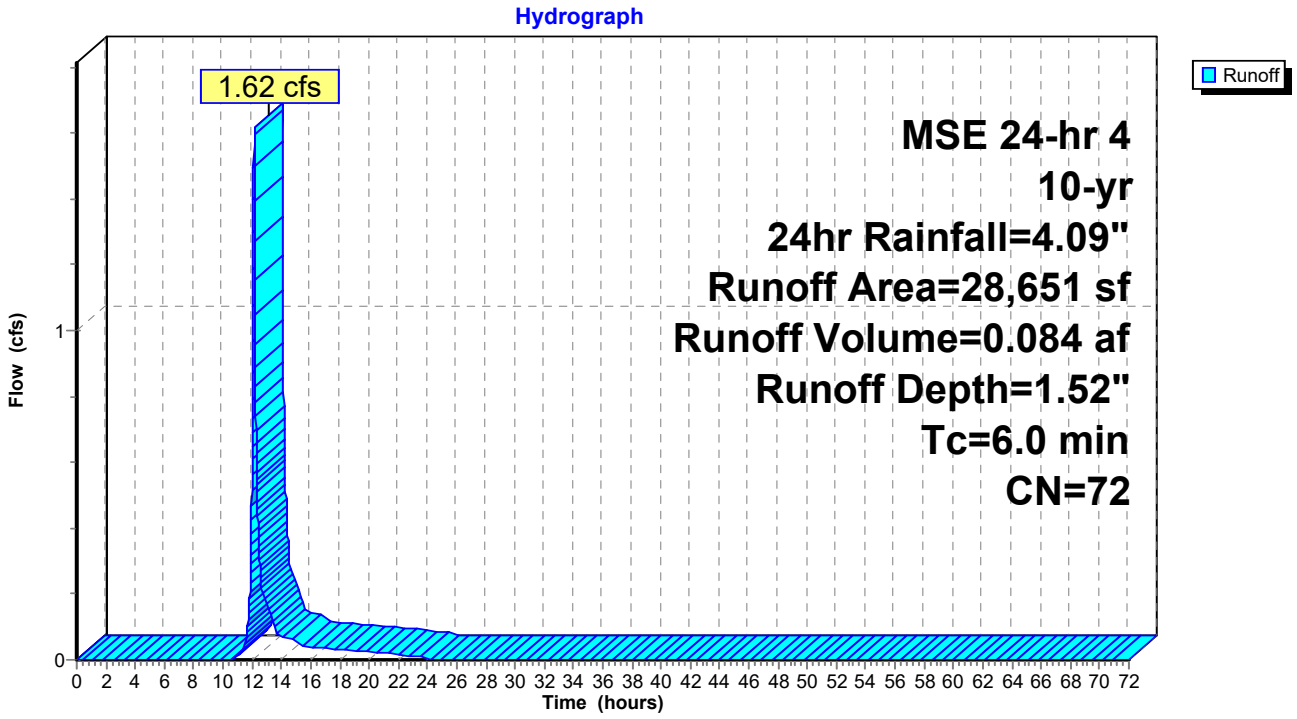
Runoff = 1.62 cfs @ 12.14 hrs, Volume= 0.084 af, Depth= 1.52"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	20,337	68	Cropland, HSG B Offsite
*	4,018	61	>75% Grass cover, Good, HSG B Offsite
*	2,590	98	Pavement Offsite
*	1,706	98	Pro Pave in ROW Offiste
	28,651	72	Weighted Average
	24,355		85.01% Pervious Area
	4,296		14.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff6: Central Offsite (SW)



Summary for Subcatchment PrOff7: Central Offsite (east 1)

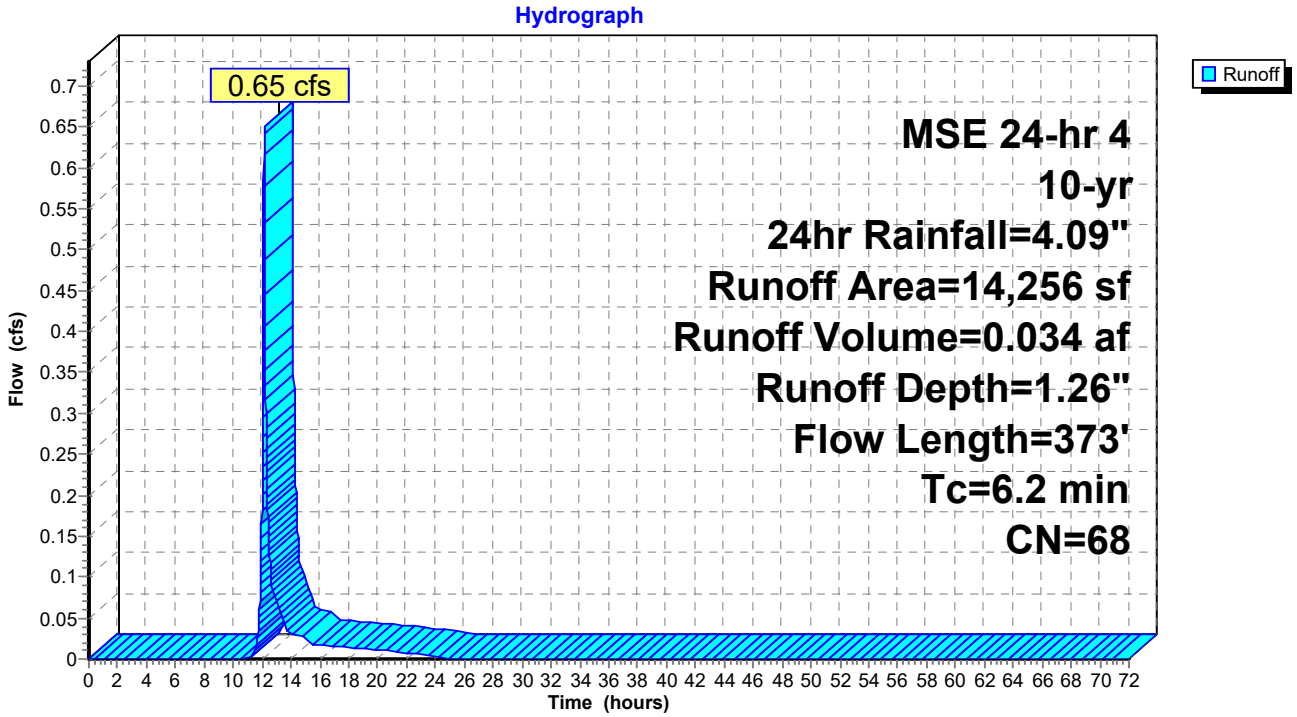
Runoff = 0.65 cfs @ 12.14 hrs, Volume= 0.034 af, Depth= 1.26"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	14,256	68	Cropland, HSG B Offsite
	14,256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	47	0.0266	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
3.8	326	0.0252	1.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.2	373	Total			

Subcatchment PrOff7: Central Offsite (east 1)



Summary for Subcatchment PrOff8: Central Offsite (SE)

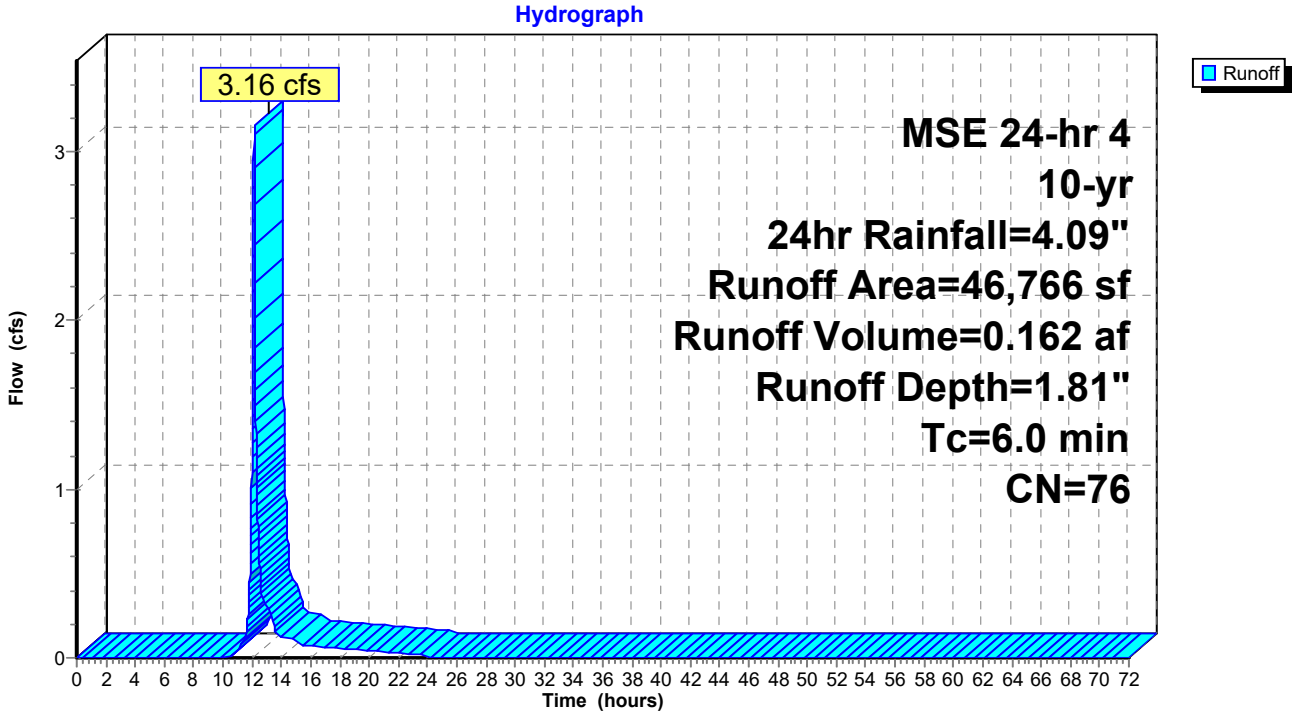
Runoff = 3.16 cfs @ 12.14 hrs, Volume= 0.162 af, Depth= 1.81"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	9,149	61	>75% Grass cover, Good, HSG B Offsite
*	25,441	70	1/2 acre lots, 25% imp, HSG B Offsite
*	6,820	98	Pavement Offsite
*	5,356	98	Pro Pave in ROW Offiste
	46,766	76	Weighted Average
	28,230		60.36% Pervious Area
	18,536		39.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff8: Central Offsite (SE)



Summary for Subcatchment PrOff9: Central Offsite (east 3)

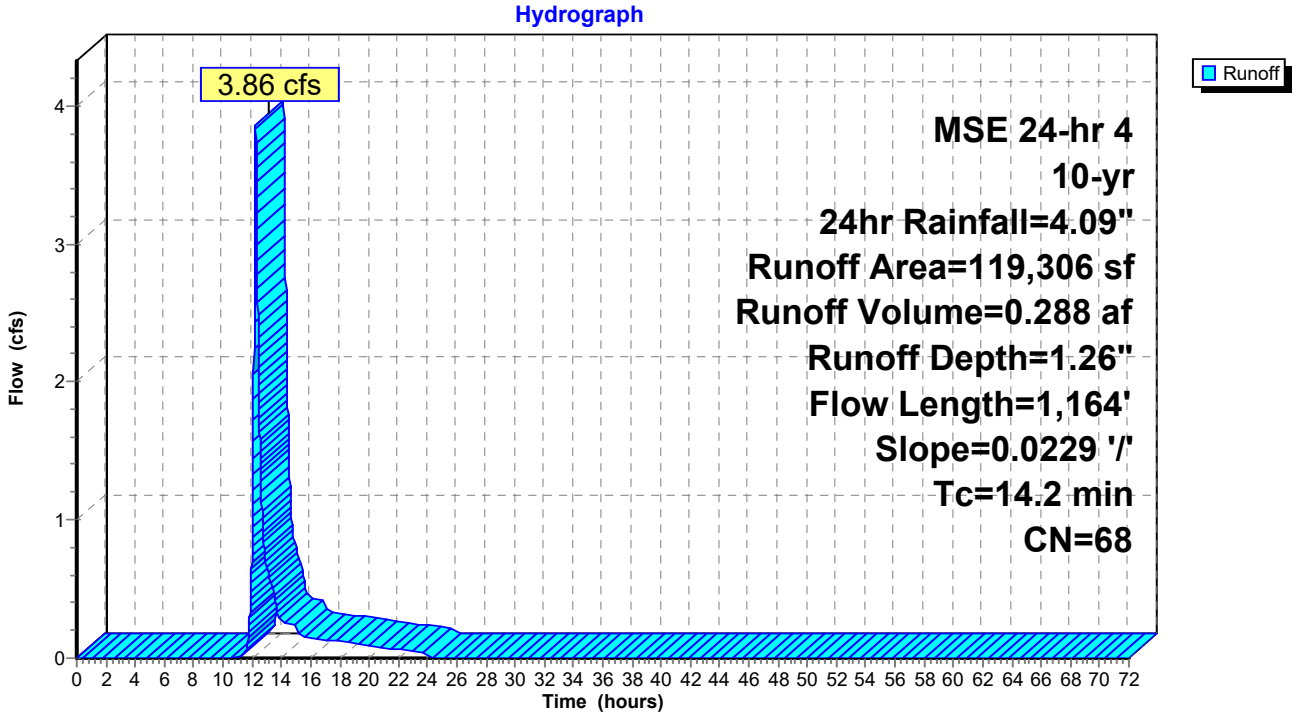
Runoff = 3.86 cfs @ 12.23 hrs, Volume= 0.288 af, Depth= 1.26"
Routed to Pond C2 : Bypass Culvert (east backyards)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	119,306	68	Cropland, HSG B Offsite
	119,306		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	1,164	0.0229	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff9: Central Offsite (east 3)



Summary for Subcatchment PrOn1: Main Onsite

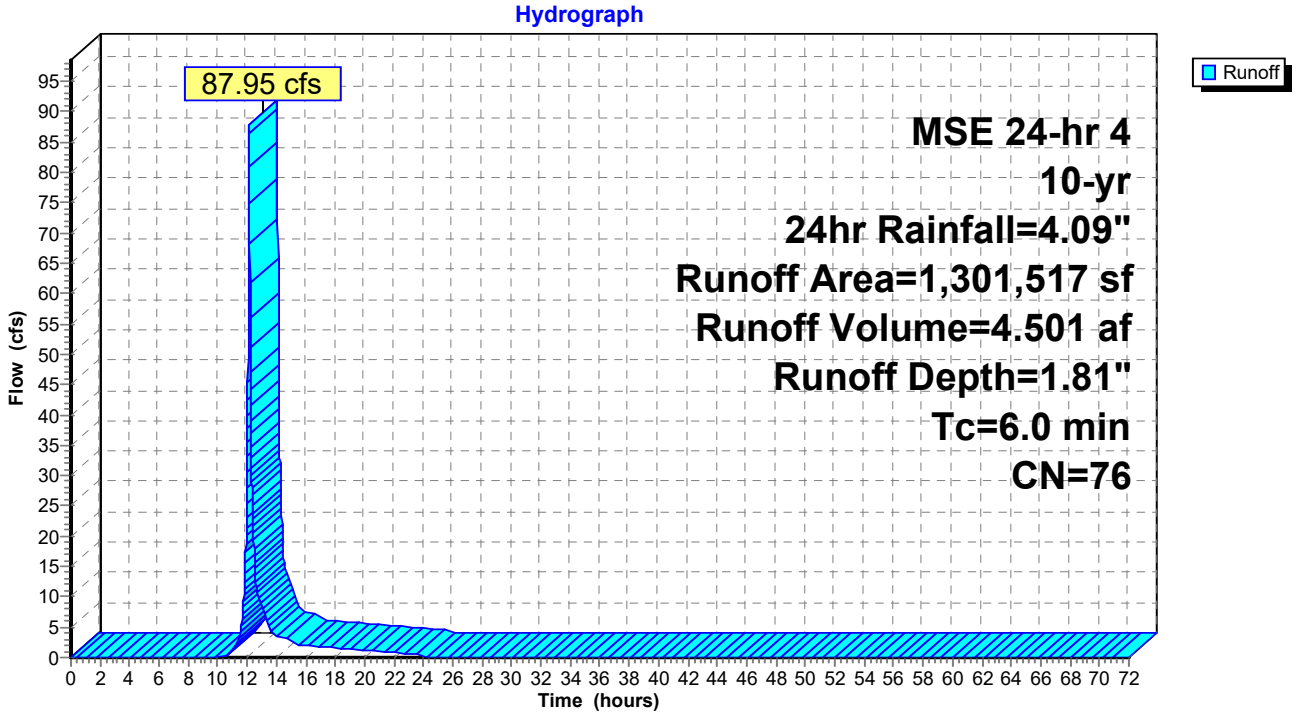
Runoff = 87.95 cfs @ 12.14 hrs, Volume= 4.501 af, Depth= 1.81"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
	623,728	72	1/3 acre lots, 30% imp, HSG B
	555,477	75	1/4 acre lots, 38% imp, HSG B
	6,494	83	1/4 acre lots, 38% imp, HSG C
*	91,094	100	Wet Pond
*	24,724	98	Alley
	1,301,517	76	Weighted Average
	785,032		60.32% Pervious Area
	516,485		39.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn1: Main Onsite



Summary for Subcatchment PrOn2: Onsite to Infiltration Basin

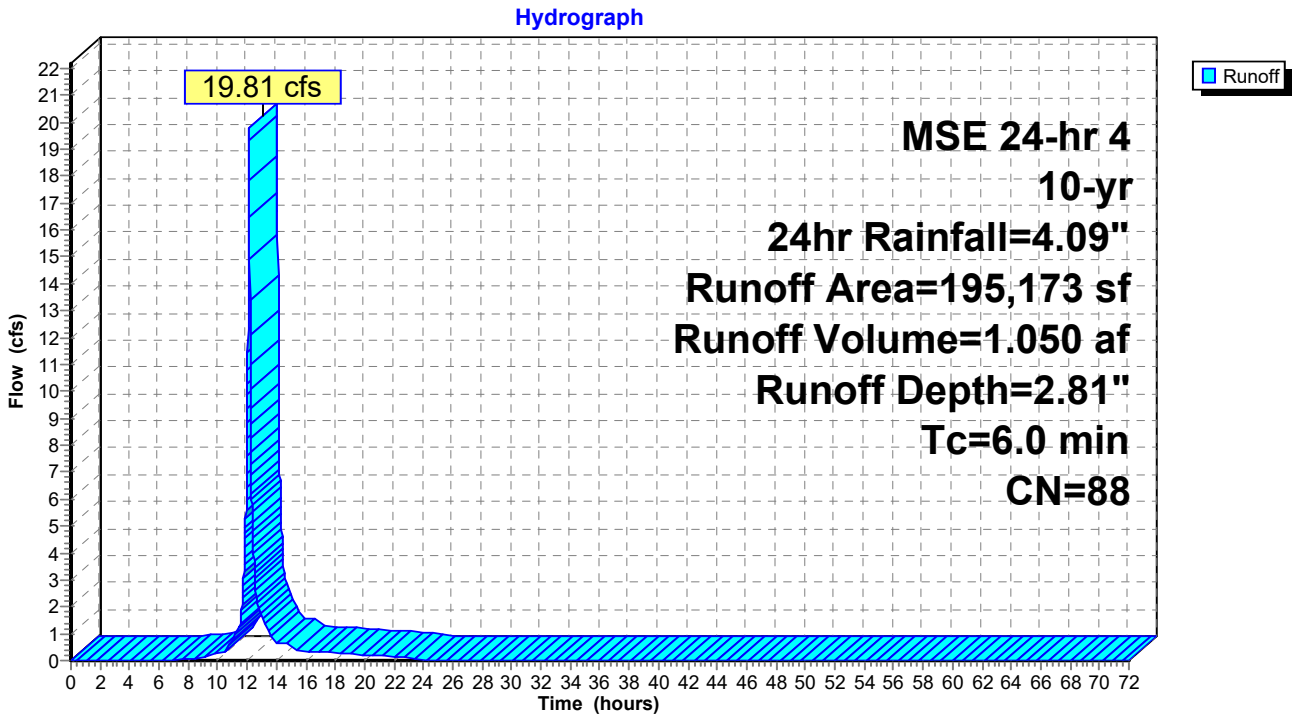
Runoff = 19.81 cfs @ 12.13 hrs, Volume= 1.050 af, Depth= 2.81"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
	13,000	72	1/3 acre lots, 30% imp, HSG B
	78,516	75	1/4 acre lots, 38% imp, HSG B
*	103,657	100	Pond
	195,173	88	Weighted Average
	57,780		29.60% Pervious Area
	137,393		70.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn2: Onsite to Infiltration Basin



Summary for Subcatchment PrOn3: Bypass Onsite (east)

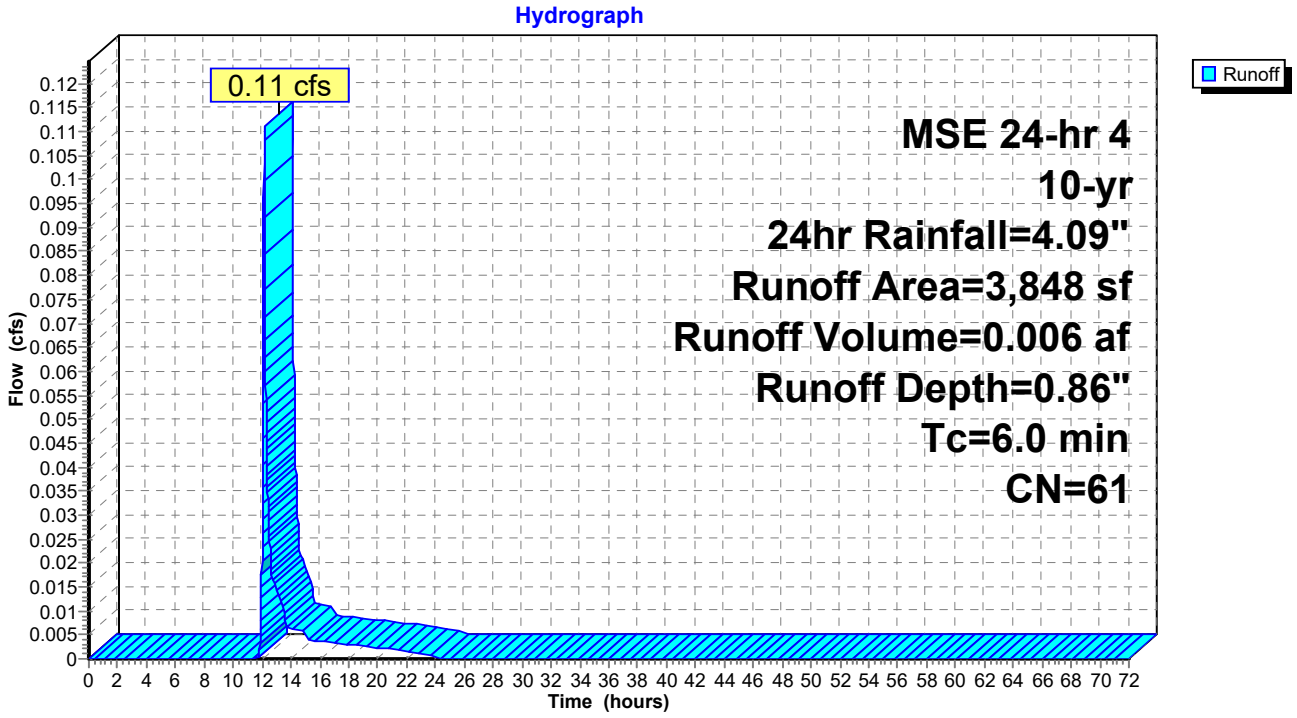
Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.006 af, Depth= 0.86"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

Area (sf)	CN	Description
3,848	61	>75% Grass cover, Good, HSG B
3,848		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn3: Bypass Onsite (east)



Summary for Subcatchment PrOn4: Bypass Onsite (northeast)

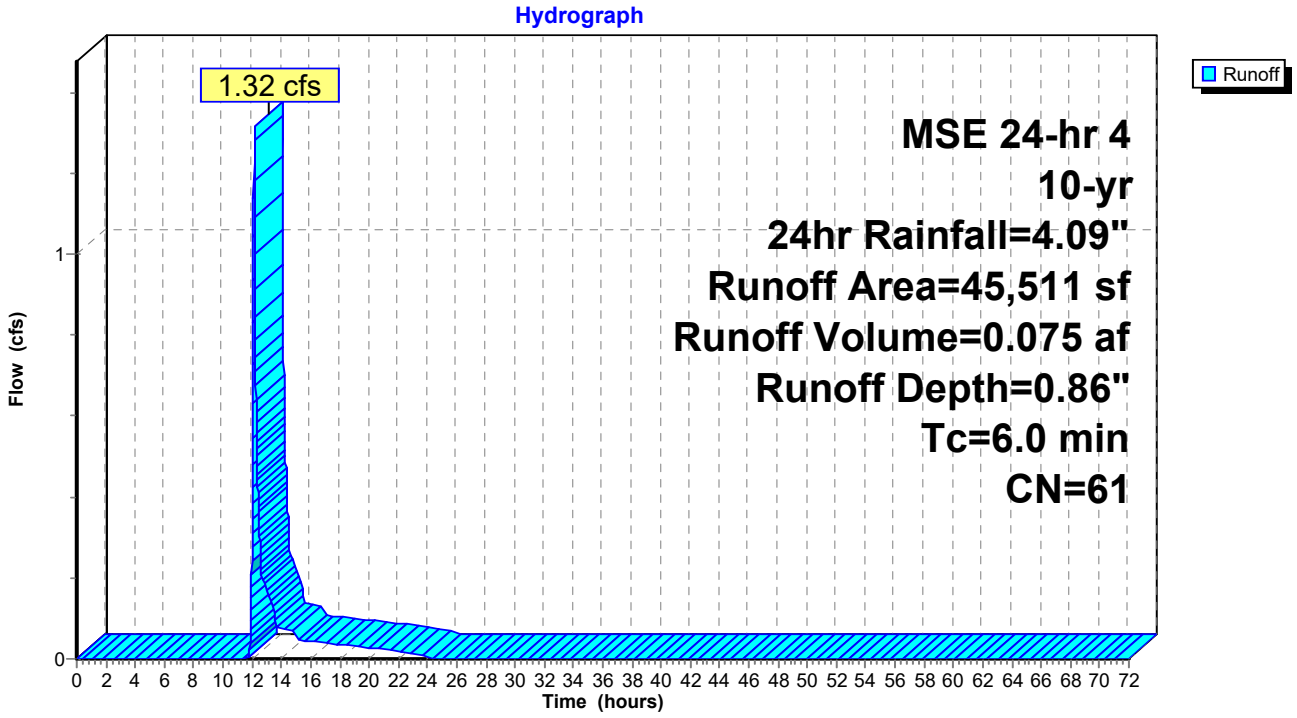
Runoff = 1.32 cfs @ 12.14 hrs, Volume= 0.075 af, Depth= 0.86"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

Area (sf)	CN	Description
45,511	61	>75% Grass cover, Good, HSG B
45,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn4: Bypass Onsite (northeast)



Summary for Subcatchment PrOn5: Bypass Onsite (northwest)

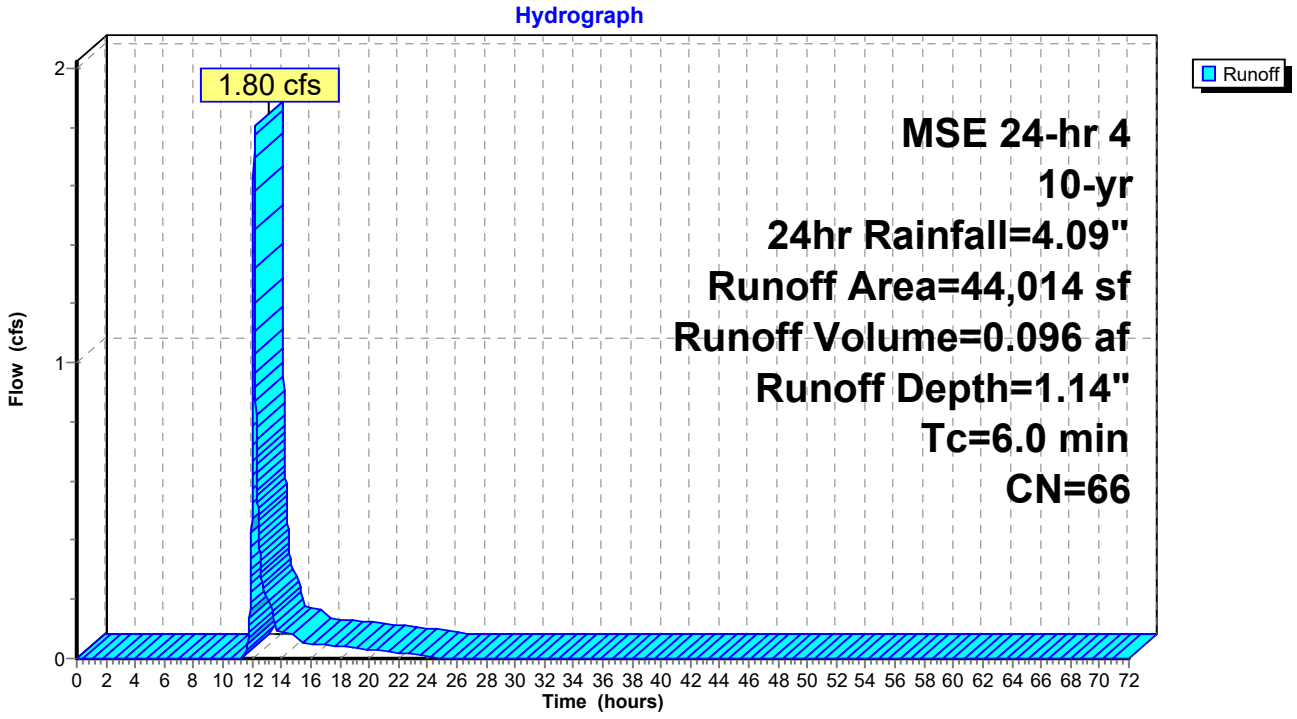
Runoff = 1.80 cfs @ 12.14 hrs, Volume= 0.096 af, Depth= 1.14"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

Area (sf)	CN	Description
26,408	61	>75% Grass cover, Good, HSG B
17,606	74	>75% Grass cover, Good, HSG C
44,014	66	Weighted Average
44,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn5: Bypass Onsite (northwest)



Summary for Subcatchment PrOn6: Bypass Onsite (west)

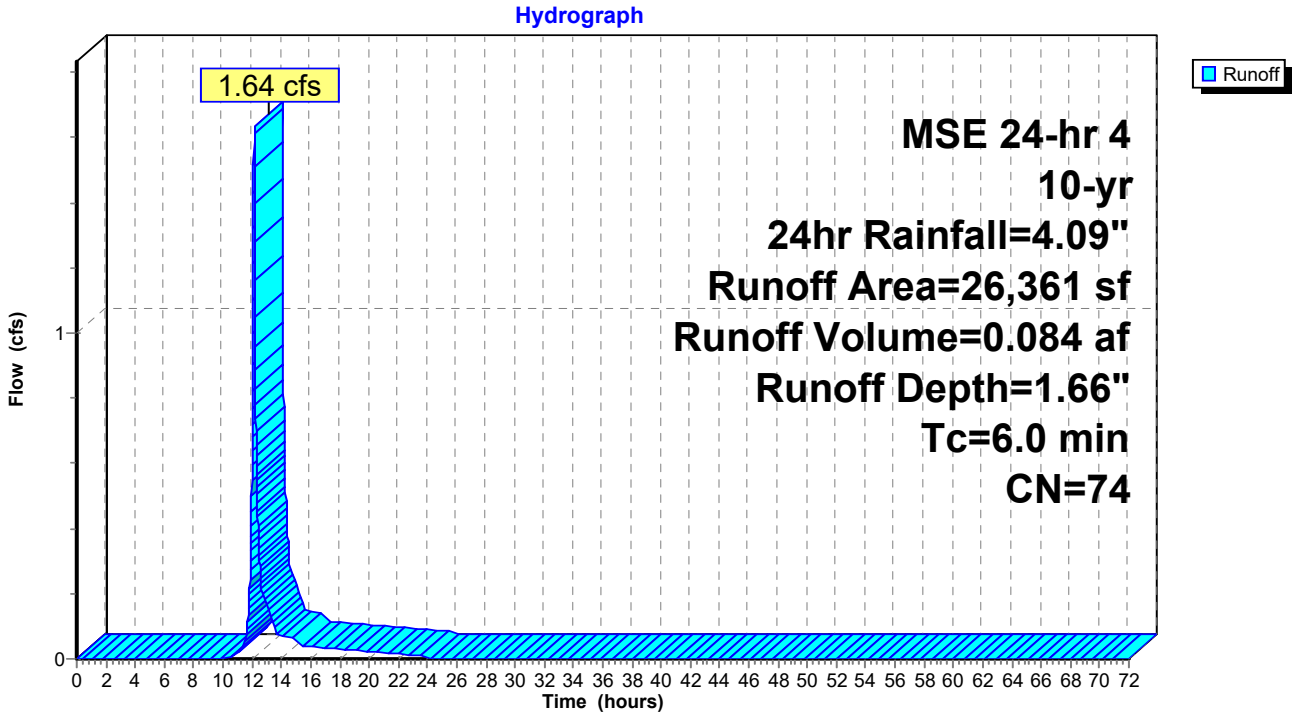
Runoff = 1.64 cfs @ 12.14 hrs, Volume= 0.084 af, Depth= 1.66"
Routed to Pond R5 : Bypass Swale 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

Area (sf)	CN	Description
26,361	74	>75% Grass cover, Good, HSG C
26,361		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn6: Bypass Onsite (west)



Summary for Subcatchment PrOn7: SE Depression Onsite

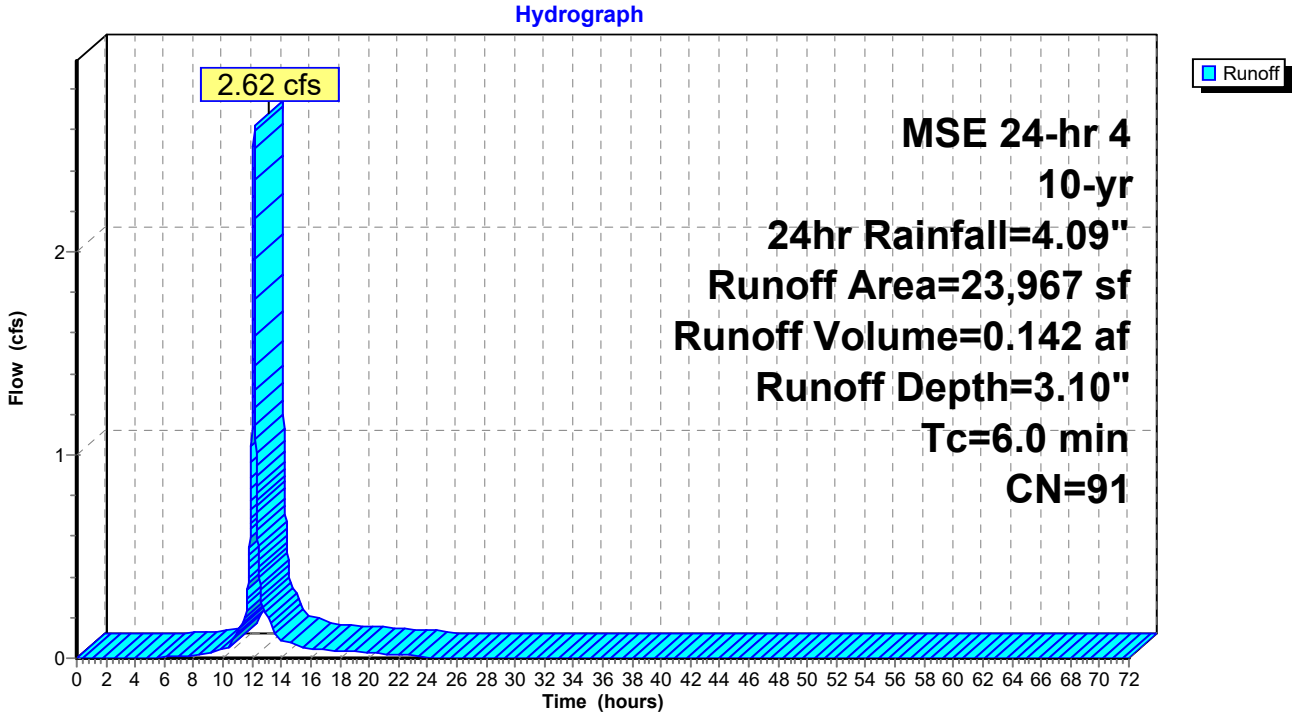
Runoff = 2.62 cfs @ 12.13 hrs, Volume= 0.142 af, Depth= 3.10"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-yr, 24hr Rainfall=4.09"

	Area (sf)	CN	Description
*	15,029	100	SE Depression
	8,938	75	1/4 acre lots, 38% imp, HSG B
	23,967	91	Weighted Average
	5,542		23.12% Pervious Area
	18,425		76.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn7: SE Depression Onsite



Summary for Reach R1: Bypass Swale 1

Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 3.73 cfs @ 12.26 hrs, Volume= 0.293 af
Outflow = 3.72 cfs @ 12.26 hrs, Volume= 0.293 af, Atten= 0%, Lag= 0.4 min
Routed to Pond C1 : Bypass Culvert (Low Countries Rd east)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.42 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 2.3 min

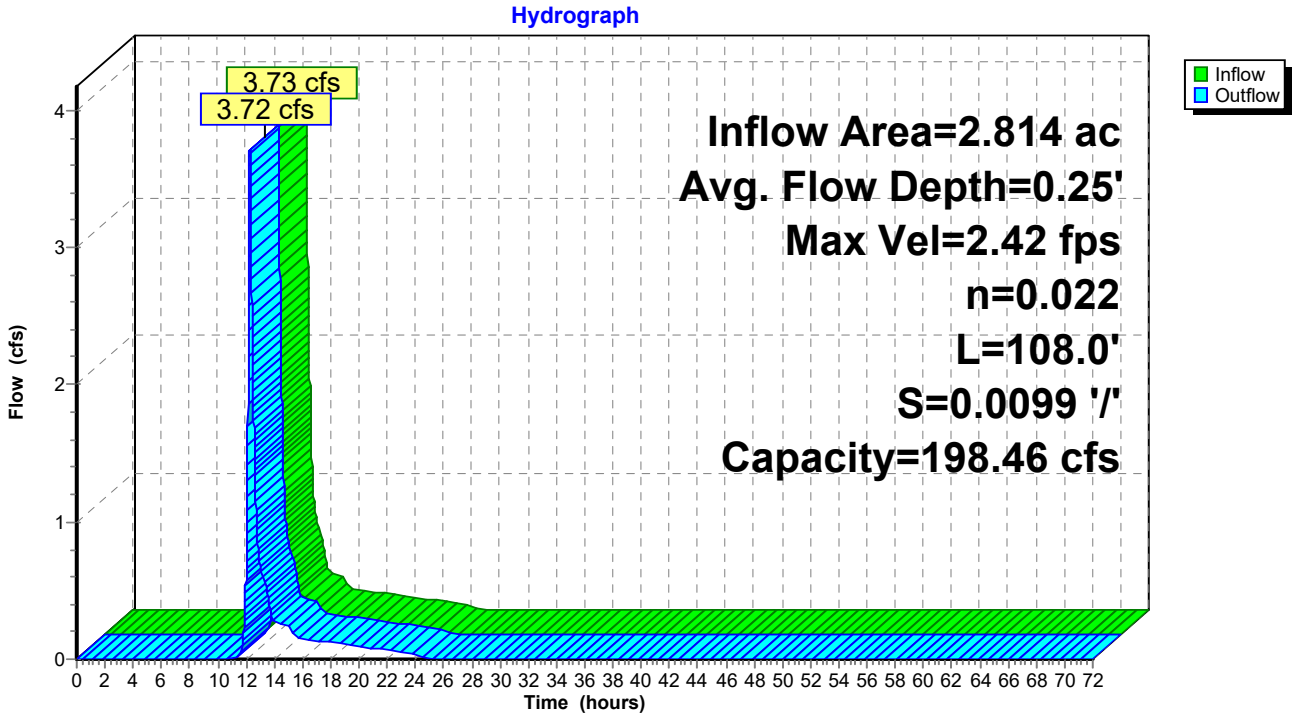
Peak Storage= 166 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 7.04'
Bank-Full Depth= 2.00' Flow Area= 26.0 sf, Capacity= 198.46 cfs

5.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 21.00'
Length= 108.0' Slope= 0.0099 '/'
Inlet Invert= 960.32', Outlet Invert= 959.25'



‡

Reach R1: Bypass Swale 1



Summary for Reach R2: Bypass Swale 2

Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 30.83 cfs @ 12.39 hrs, Volume= 3.375 af
Outflow = 30.50 cfs @ 12.43 hrs, Volume= 3.375 af, Atten= 1%, Lag= 2.0 min
Routed to Pond C3 : Bypass Culvert (Yorktown Rd north)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.56 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 7.7 min

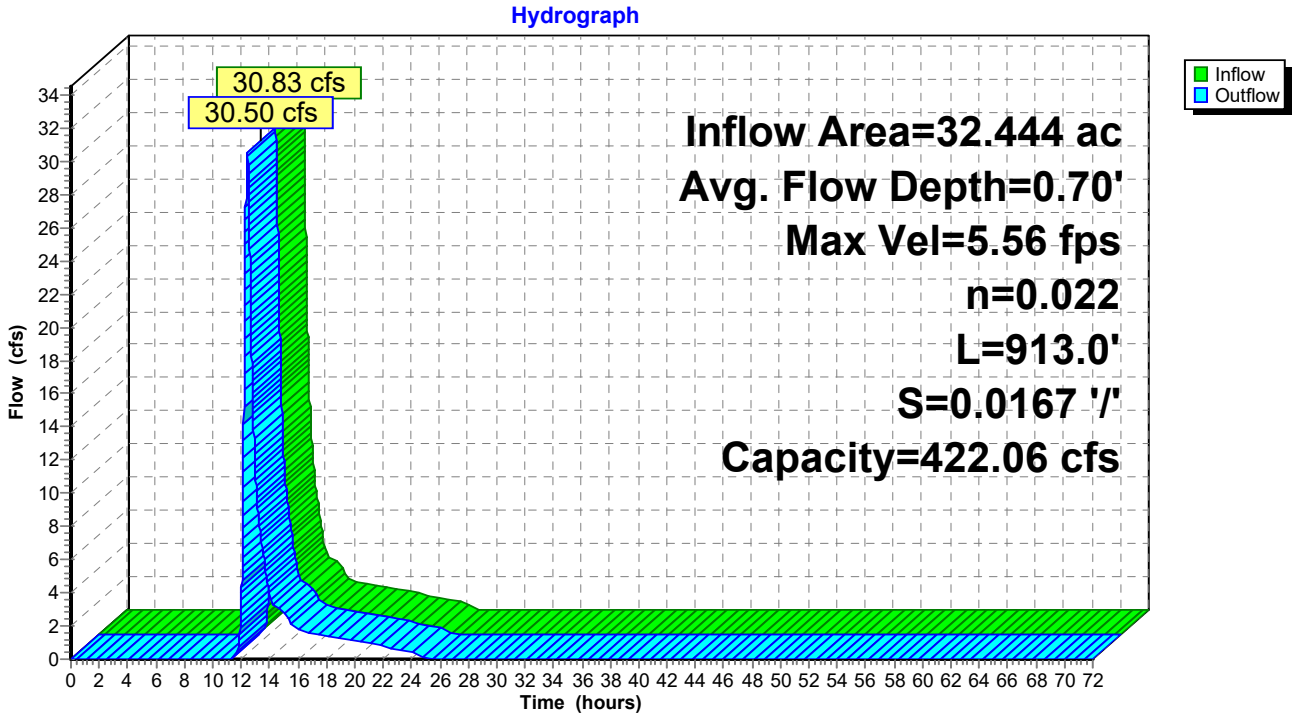
Peak Storage= 5,008 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.70' , Surface Width= 10.62'
Bank-Full Depth= 2.50' Flow Area= 37.5 sf, Capacity= 422.06 cfs

5.00' x 2.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 25.00'
Length= 913.0' Slope= 0.0167 '/'
Inlet Invert= 956.53', Outlet Invert= 941.28'



‡

Reach R2: Bypass Swale 2



Summary for Reach R3: Bypass Swale 3

Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 31.16 cfs @ 12.42 hrs, Volume= 3.516 af
Outflow = 30.80 cfs @ 12.47 hrs, Volume= 3.516 af, Atten= 1%, Lag= 2.5 min
Routed to Pond C4 : Bypass Culvert (Low Countries Rd west)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.28 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 9.3 min

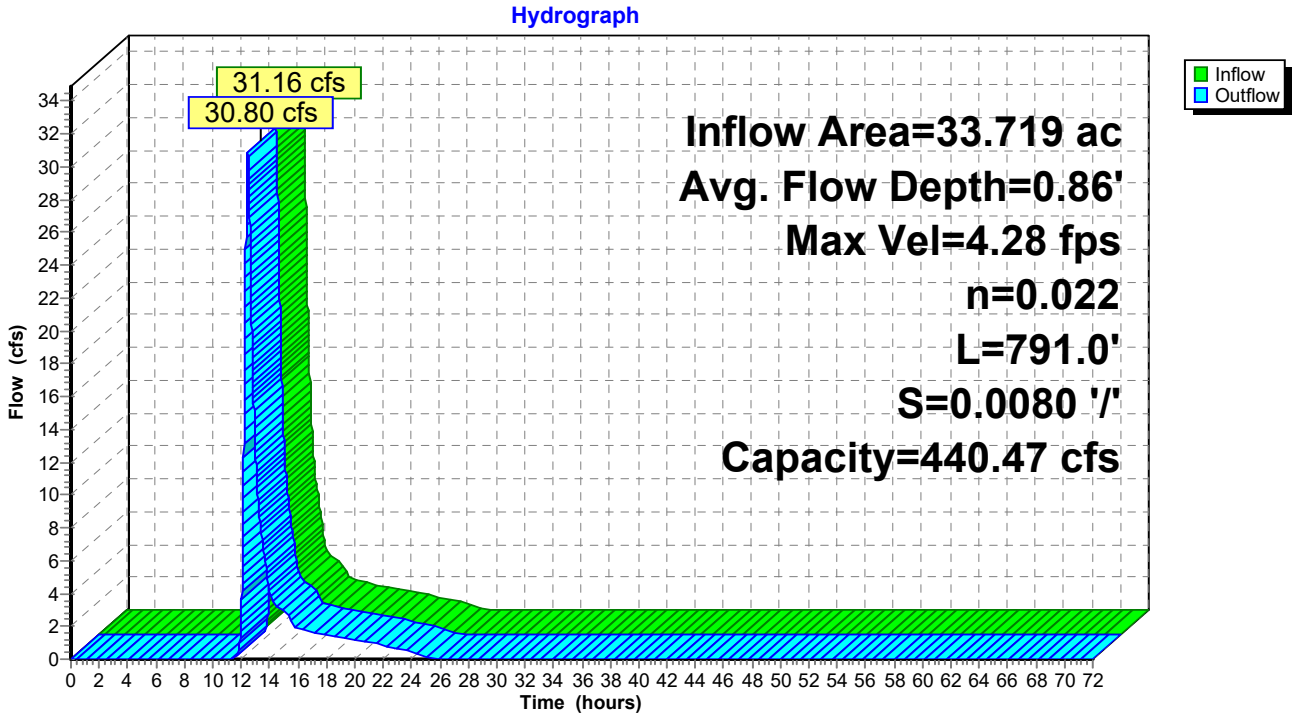
Peak Storage= 5,696 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.86' , Surface Width= 11.84'
Bank-Full Depth= 3.00' Flow Area= 51.0 sf, Capacity= 440.47 cfs

5.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 29.00'
Length= 791.0' Slope= 0.0080 '/'
Inlet Invert= 940.20', Outlet Invert= 933.90'



‡

Reach R3: Bypass Swale 3



Summary for Pond C1: Bypass Culvert (Low Countries Rd east)

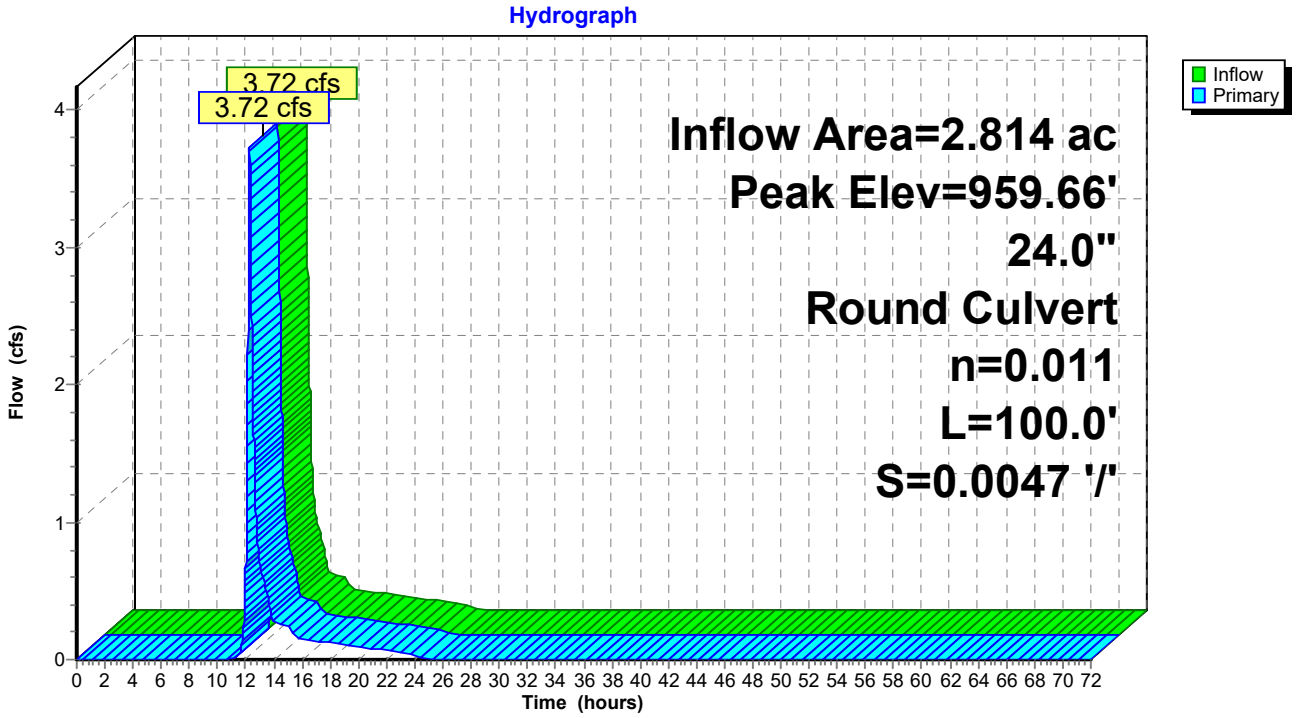
Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 3.72 cfs @ 12.26 hrs, Volume= 0.293 af
Outflow = 3.72 cfs @ 12.26 hrs, Volume= 0.293 af, Atten= 0%, Lag= 0.0 min
Primary = 3.72 cfs @ 12.26 hrs, Volume= 0.293 af
Routed to Pond C2 : Bypass Culvert (east backyards)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 959.66' @ 12.26 hrs
Flood Elev= 962.57'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.60'	**24.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.60' / 958.13' S= 0.0047 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=3.73 cfs @ 12.26 hrs HW=959.66' TW=959.30' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.73 cfs @ 3.20 fps)

Pond C1: Bypass Culvert (Low Countries Rd east)



Summary for Pond C2: Bypass Culvert (east backyards)

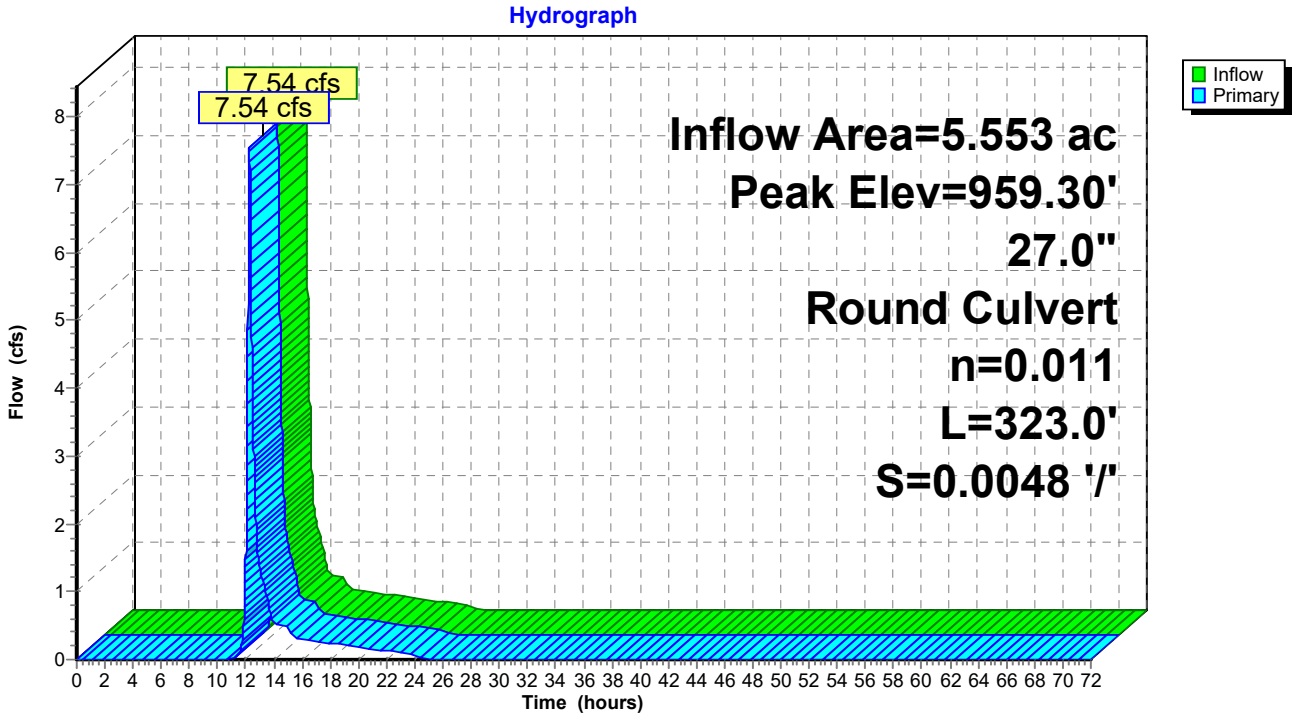
Inflow Area = 5.553 ac, 0.00% Impervious, Inflow Depth = 1.26" for 10-yr, 24hr event
Inflow = 7.54 cfs @ 12.25 hrs, Volume= 0.581 af
Outflow = 7.54 cfs @ 12.25 hrs, Volume= 0.581 af, Atten= 0%, Lag= 0.0 min
Primary = 7.54 cfs @ 12.25 hrs, Volume= 0.581 af
Routed to Reach R2 : Bypass Swale 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 959.30' @ 12.25 hrs
Flood Elev= 963.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.13'	**27.0" Round Culvert** L= 323.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.13' / 956.59' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=7.54 cfs @ 12.25 hrs HW=959.30' TW=957.11' (Dynamic Tailwater)
1=Culvert (Barrel Controls 7.54 cfs @ 5.24 fps)

Pond C2: Bypass Culvert (east backyards)



Summary for Pond C3: Bypass Culvert (Yorktown Rd north)

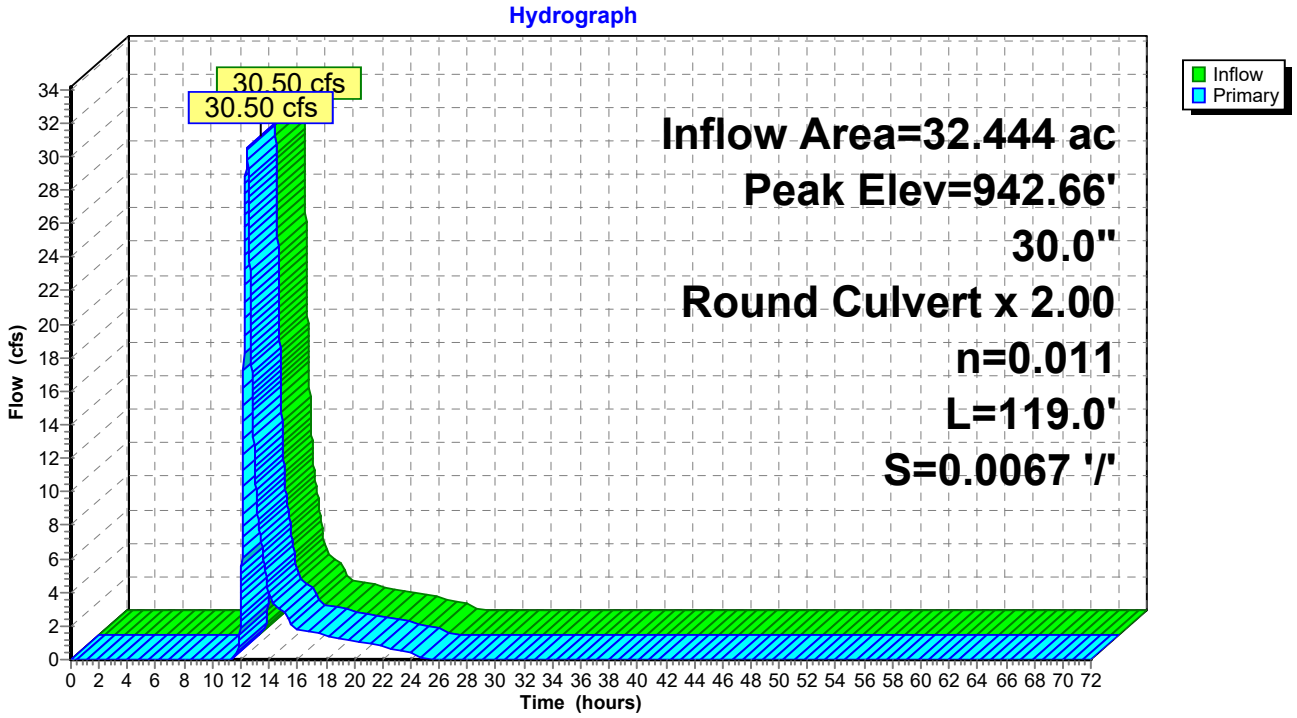
Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 30.50 cfs @ 12.43 hrs, Volume= 3.375 af
Outflow = 30.50 cfs @ 12.43 hrs, Volume= 3.375 af, Atten= 0%, Lag= 0.0 min
Primary = 30.50 cfs @ 12.43 hrs, Volume= 3.375 af
Routed to Reach R3 : Bypass Swale 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 942.66' @ 12.43 hrs
Flood Elev= 946.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	941.00'	**30.0" Round Culvert X 2.00** L= 119.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 941.00' / 940.20' S= 0.0067 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=30.49 cfs @ 12.43 hrs HW=942.66' TW=941.05' (Dynamic Tailwater)
1=Culvert (Barrel Controls 30.49 cfs @ 6.26 fps)

Pond C3: Bypass Culvert (Yorktown Rd north)



Summary for Pond C4: Bypass Culvert (Low Countries Rd west)

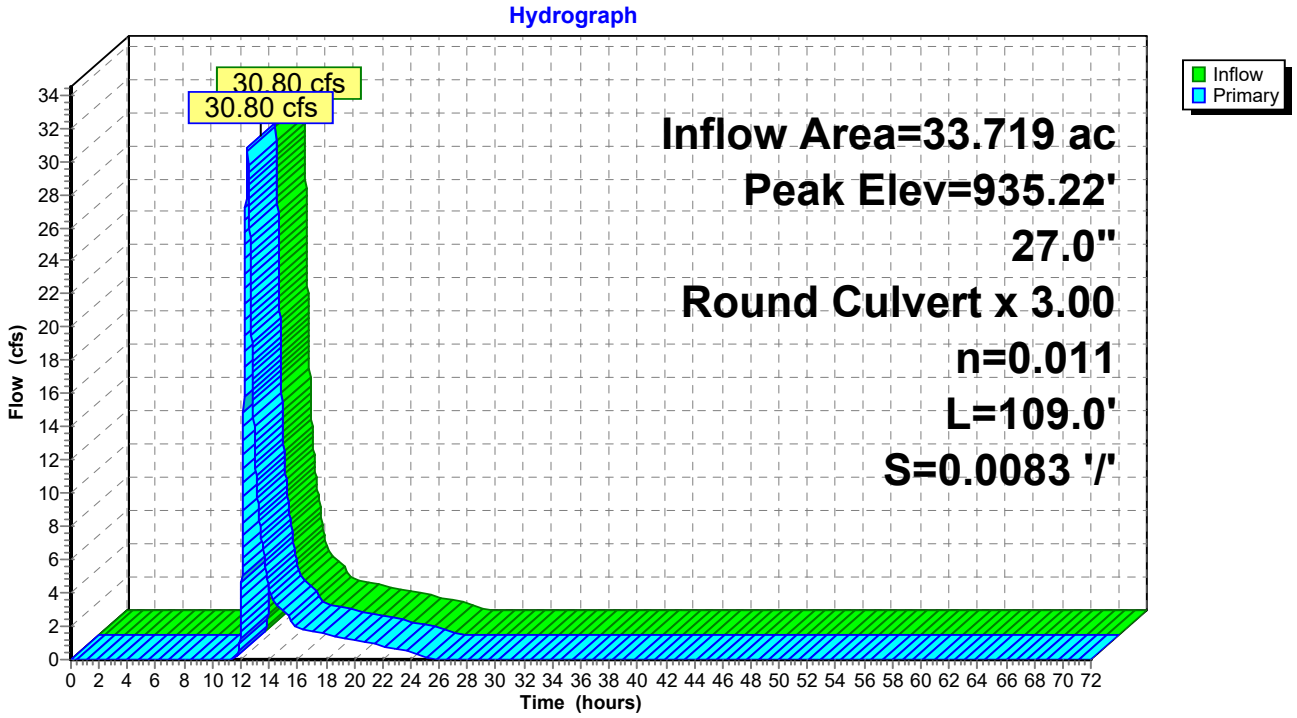
Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 30.80 cfs @ 12.47 hrs, Volume= 3.516 af
Outflow = 30.80 cfs @ 12.47 hrs, Volume= 3.516 af, Atten= 0%, Lag= 0.0 min
Primary = 30.80 cfs @ 12.47 hrs, Volume= 3.516 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 935.22' @ 12.47 hrs
Flood Elev= 937.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	933.90'	**27.0" Round Culvert X 3.00** L= 109.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 933.90' / 933.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=30.79 cfs @ 12.47 hrs HW=935.22' TW=931.68' (Dynamic Tailwater)
1=Culvert (Barrel Controls 30.79 cfs @ 6.09 fps)

Pond C4: Bypass Culvert (Low Countries Rd west)



Summary for Pond PrP1: SE Existing Depression

Inflow Area = 15.371 ac, 2.78% Impervious, Inflow Depth = 1.33" for 10-yr, 24hr event
Inflow = 18.35 cfs @ 12.31 hrs, Volume= 1.701 af
Outflow = 3.88 cfs @ 13.09 hrs, Volume= 1.701 af, Atten= 79%, Lag= 46.9 min
Discarded = 0.17 cfs @ 13.09 hrs, Volume= 0.103 af
Primary = 3.72 cfs @ 13.09 hrs, Volume= 1.599 af
Routed to Pond PrP2 : Wet Pond
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP2 : Wet Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 955.62' @ 13.09 hrs Surf.Area= 54,347 sf Storage= 28,981 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 102.5 min (955.1 - 852.6)

Volume	Invert	Avail.Storage	Storage Description
#1	954.50'	122,348 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.50	5,787	0	0
955.00	19,221	6,252	6,252
956.00	76,066	47,644	53,896
956.50	95,900	42,992	96,887
956.75	107,787	25,461	122,348

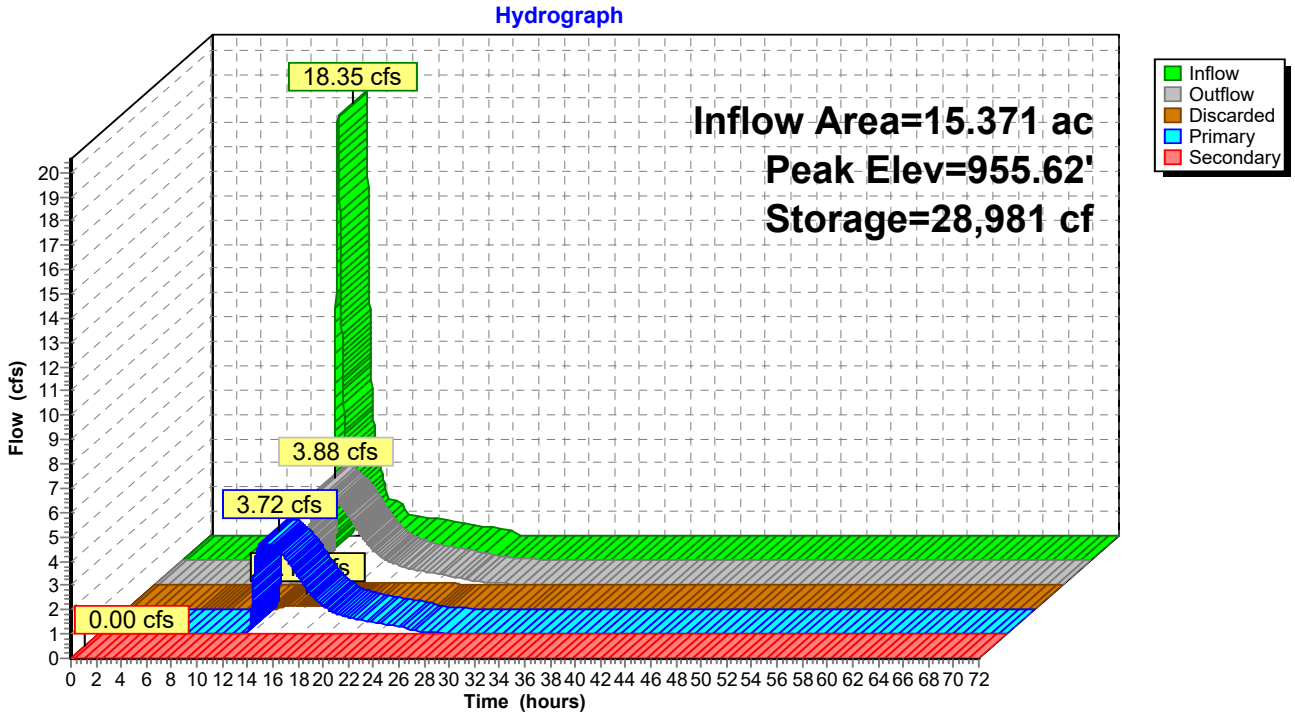
Device	Routing	Invert	Outlet Devices
#1	Discarded	954.50'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 900.00'
#2	Secondary	955.75'	**10.0' long + 4.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Primary	954.50'	**12.0" Round Culvert** L= 1,700.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 954.50' / 931.50' S= 0.0135 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.17 cfs @ 13.09 hrs HW=955.62' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=3.72 cfs @ 13.09 hrs HW=955.62' TW=933.31' (Dynamic Tailwater)
↑—**3=Culvert** (Inlet Controls 3.72 cfs @ 4.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=954.50' TW=931.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PrP1: SE Existing Depression



Summary for Pond PrP2: Wet Pond

Inflow Area = 47.275 ac, 27.42% Impervious, Inflow Depth = 1.62" for 10-yr, 24hr event
Inflow = 94.65 cfs @ 12.14 hrs, Volume= 6.390 af
Outflow = 16.99 cfs @ 12.58 hrs, Volume= 6.299 af, Atten= 82%, Lag= 26.8 min
Primary = 16.99 cfs @ 12.58 hrs, Volume= 6.299 af
Routed to Pond PrP3 : Infiltration Basin
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Automatic Starting Elev= 931.50' Surf.Area= 45,103 sf Storage= 190,807 cf
Peak Elev= 933.40' @ 12.58 hrs Surf.Area= 52,344 sf Storage= 283,555 cf (92,748 cf above start)

Plug-Flow detention time= 727.4 min calculated for 1.918 af (30% of inflow)
Center-of-Mass det. time= 174.8 min (1,031.9 - 857.0)

Volume	Invert	Avail.Storage	Storage Description
#1	925.50'	545,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

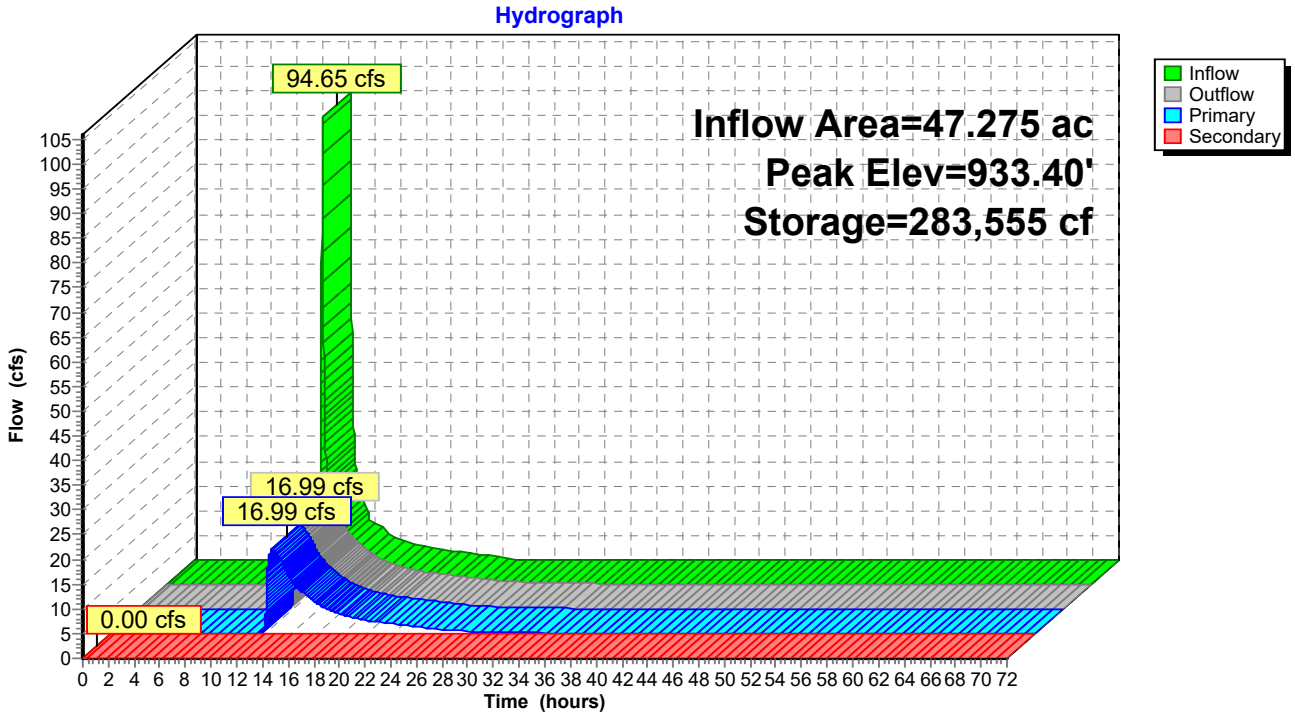
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
925.50	23,915	0	0
930.50	36,156	150,178	150,178
931.50	45,103	40,630	190,807
932.50	48,857	46,980	237,787
933.50	52,712	50,785	288,572
934.50	56,667	54,690	343,261
935.50	60,723	58,695	401,956
936.50	64,880	62,802	464,758
937.50	69,137	67,009	531,766
937.70	70,001	13,914	545,680

Device	Routing	Invert	Outlet Devices
#1	Primary	931.50'	**30.0" Round Culvert** L= 263.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 931.50' / 930.50' S= 0.0038 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	936.70'	**10.0' long + 4.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=16.99 cfs @ 12.58 hrs HW=933.40' TW=931.39' (Dynamic Tailwater)
1=Culvert (Barrel Controls 16.99 cfs @ 5.86 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=931.50' TW=930.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PrP2: Wet Pond



Summary for Pond PrP3: Infiltration Basin

Inflow Area = 52.413 ac, 30.94% Impervious, Inflow Depth > 1.70" for 10-yr, 24hr event
Inflow = 29.39 cfs @ 12.15 hrs, Volume= 7.432 af
Outflow = 14.66 cfs @ 13.56 hrs, Volume= 6.389 af, Atten= 50%, Lag= 84.6 min
Discarded = 0.20 cfs @ 13.54 hrs, Volume= 0.974 af
Primary = 14.46 cfs @ 13.56 hrs, Volume= 5.415 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.86' @ 13.54 hrs Surf.Area= 66,455 sf Storage= 86,402 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 237.9 min (1,234.3 - 996.3)

Volume	Invert	Avail.Storage	Storage Description
#1	930.50'	400,616 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

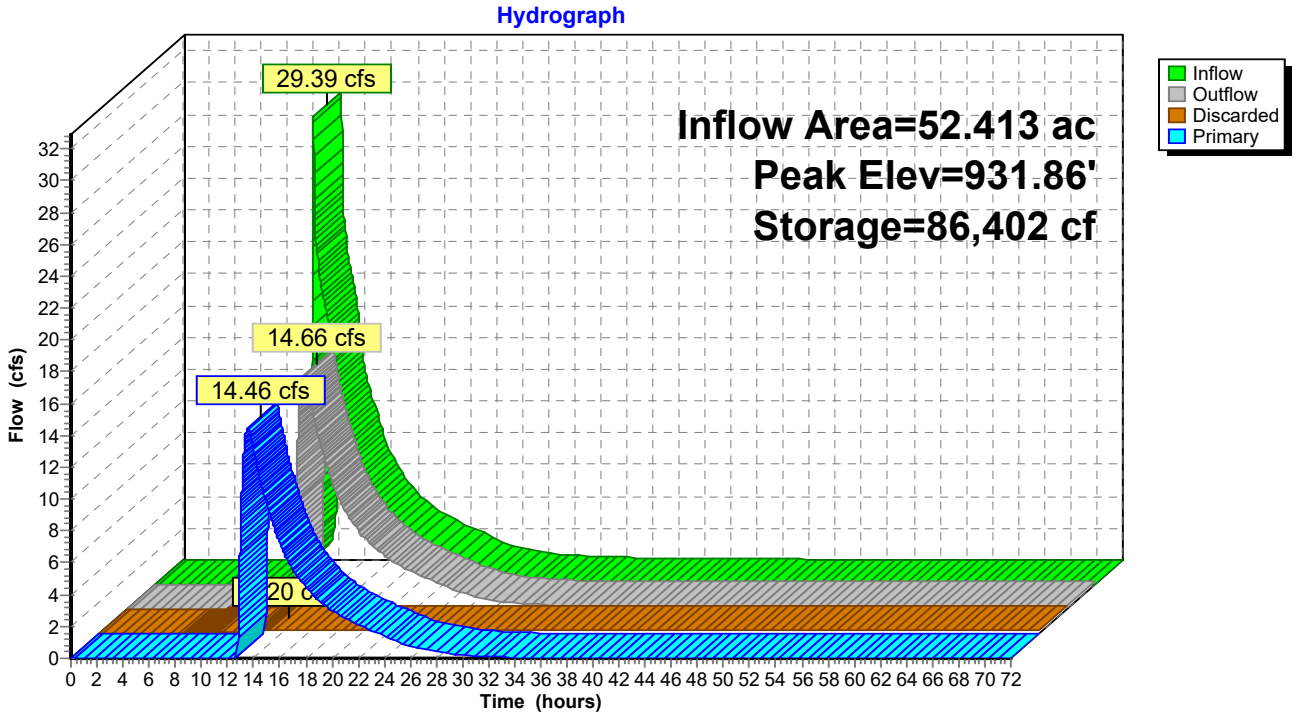
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
930.50	60,505	0	0
931.00	62,666	30,793	30,793
932.00	67,065	64,866	95,658
933.00	71,564	69,315	164,973
934.00	76,164	73,864	238,837
935.00	80,865	78,515	317,351
936.00	85,665	83,265	400,616

Device	Routing	Invert	Outlet Devices
#1	Discarded	930.50'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'
#2	Primary	931.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.50 932.00 933.00 934.00 935.00 936.00 Width (feet) 20.00 24.00 32.00 40.00 48.00 56.00

Discarded OutFlow Max=0.20 cfs @ 13.54 hrs HW=931.86' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.20 cfs)

Primary OutFlow Max=14.46 cfs @ 13.56 hrs HW=931.86' TW=931.61' (Dynamic Tailwater)
↑—**2=Custom Weir/Orifice** (Weir Controls 14.46 cfs @ 1.87 fps)

Pond PrP3: Infiltration Basin



Summary for Pond R5: Bypass Swale 5

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 31.14 cfs @ 12.46 hrs, Volume= 9.015 af
Outflow = 31.14 cfs @ 12.46 hrs, Volume= 9.015 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.46 hrs, Volume= 0.001 af
Primary = 31.14 cfs @ 12.46 hrs, Volume= 9.014 af
Routed to Link PrL : Pro Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 931.68' @ 12.46 hrs Surf.Area= 599 sf Storage= 151 cf

Plug-Flow detention time= 0.1 min calculated for 9.014 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (963.7 - 963.6)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	21,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

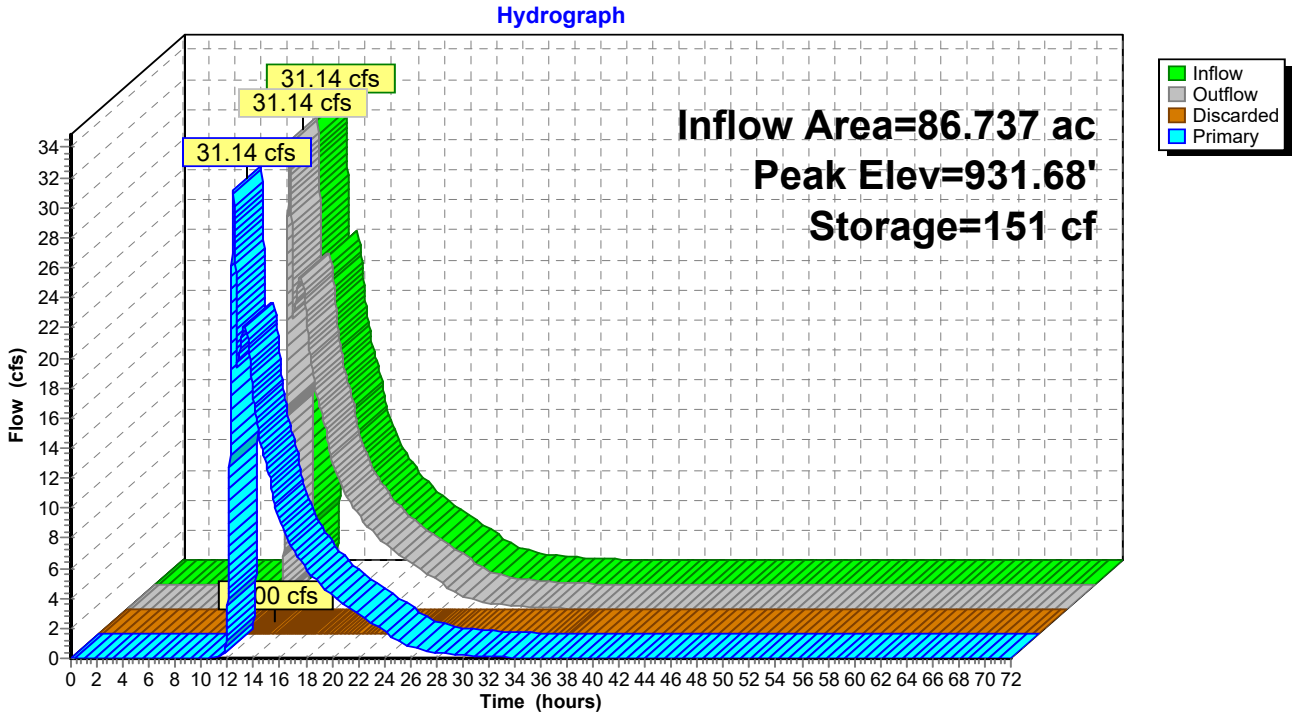
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	973	399	399
933.00	4,970	2,972	3,370
934.00	8,803	6,887	10,257
935.00	13,565	11,184	21,441

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.46 hrs HW=931.68' (Free Discharge)
↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=31.13 cfs @ 12.46 hrs HW=931.68' TW=0.00' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 31.13 cfs @ 1.89 fps)

Pond R5: Bypass Swale 5



Summary for Link PrL: Pro Total

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 1.25" for 10-yr, 24hr event
Inflow = 31.14 cfs @ 12.46 hrs, Volume= 9.014 af
Primary = 31.14 cfs @ 12.46 hrs, Volume= 9.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PrL: Pro Total

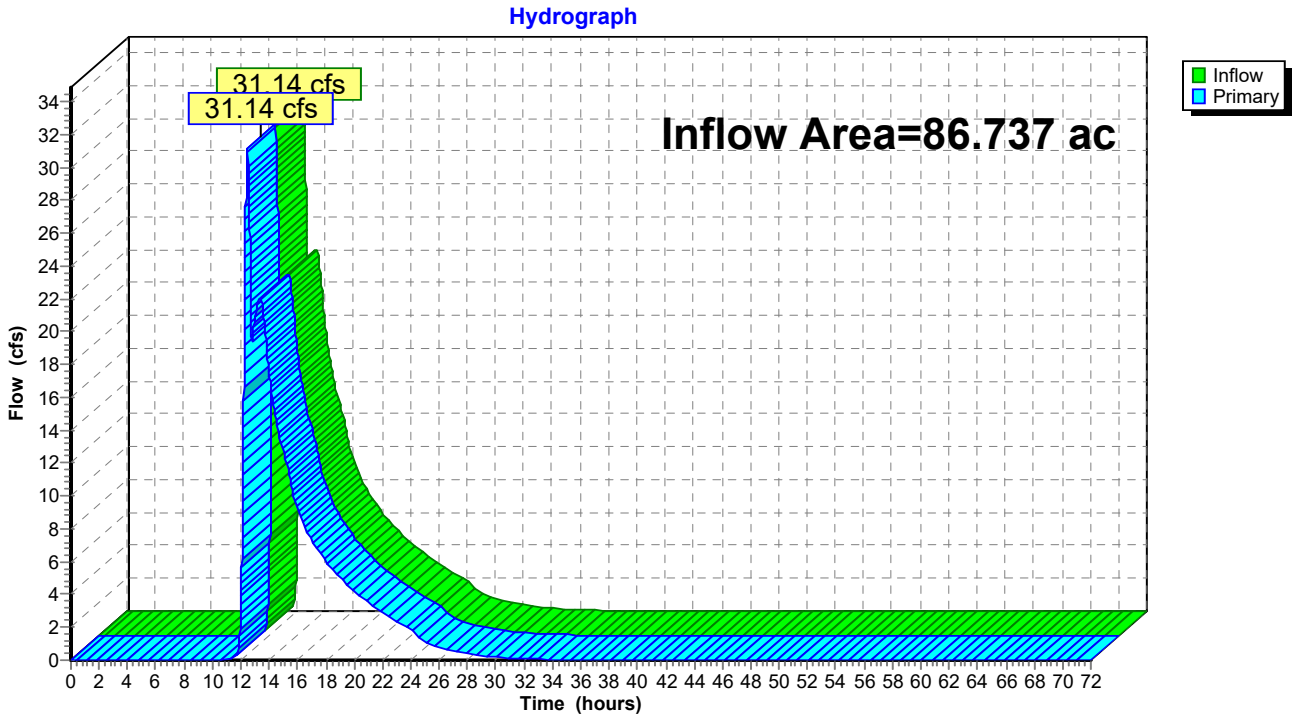
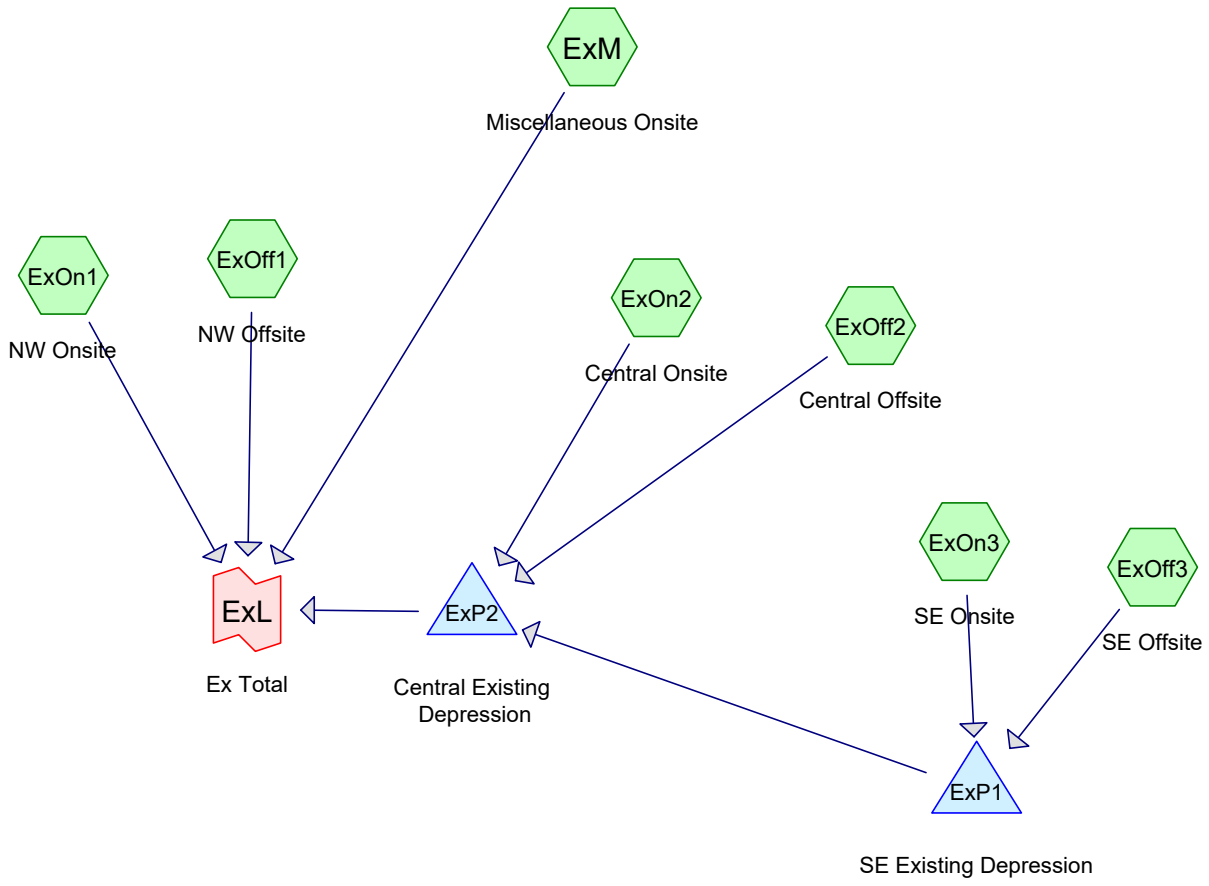


Exhibit 8

100-Year HydroCAD Results

Existing



Subcat Reach Pond Link

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentExM: MiscellaneousOnsite Runoff Area=2,540 sf 0.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=68 Runoff=0.30 cfs 0.015 af

SubcatchmentExOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=68 Runoff=0.11 cfs 0.006 af

SubcatchmentExOff2: Central Offsite Runoff Area=1,466,288 sf 2.41% Impervious Runoff Depth=3.14"
Flow Length=3,502' Tc=51.7 min CN=68 Runoff=60.83 cfs 8.800 af

SubcatchmentExOff3: SE Offsite Runoff Area=670,631 sf 2.40% Impervious Runoff Depth=3.24"
Flow Length=1,396' Tc=20.1 min CN=69 Runoff=49.54 cfs 4.153 af

SubcatchmentExOn1: NW Onsite Runoff Area=42,806 sf 0.00% Impervious Runoff Depth=3.64"
Flow Length=386' Tc=8.2 min CN=73 Runoff=5.30 cfs 0.298 af

SubcatchmentExOn2: Central Onsite Runoff Area=1,554,006 sf 0.53% Impervious Runoff Depth=3.14"
Flow Length=1,792' Slope=0.0168 '/' Tc=25.6 min CN=68 Runoff=97.86 cfs 9.327 af

SubcatchmentExOn3: SE Onsite Runoff Area=41,039 sf 0.00% Impervious Runoff Depth=3.14"
Flow Length=311' Tc=13.4 min CN=68 Runoff=3.56 cfs 0.246 af

Pond ExP1: SE Existing Depression Peak Elev=956.48' Storage=115,597 cf Inflow=52.46 cfs 4.399 af
Discarded=0.37 cfs 1.575 af Primary=6.53 cfs 1.673 af Outflow=6.91 cfs 3.248 af

Pond ExP2: Central Existing Depression Peak Elev=932.12' Storage=407 cf Inflow=136.10 cfs 19.800 af
Discarded=0.01 cfs 0.001 af Primary=136.05 cfs 19.799 af Outflow=136.06 cfs 19.800 af

Link ExL: Ex Total Inflow=137.49 cfs 20.118 af
Primary=137.49 cfs 20.118 af

Total Runoff Area = 86.737 ac Runoff Volume = 22.846 af Average Runoff Depth = 3.16"
98.42% Pervious = 85.367 ac 1.58% Impervious = 1.370 ac

Summary for Subcatchment ExM: Miscellaneous Onsite

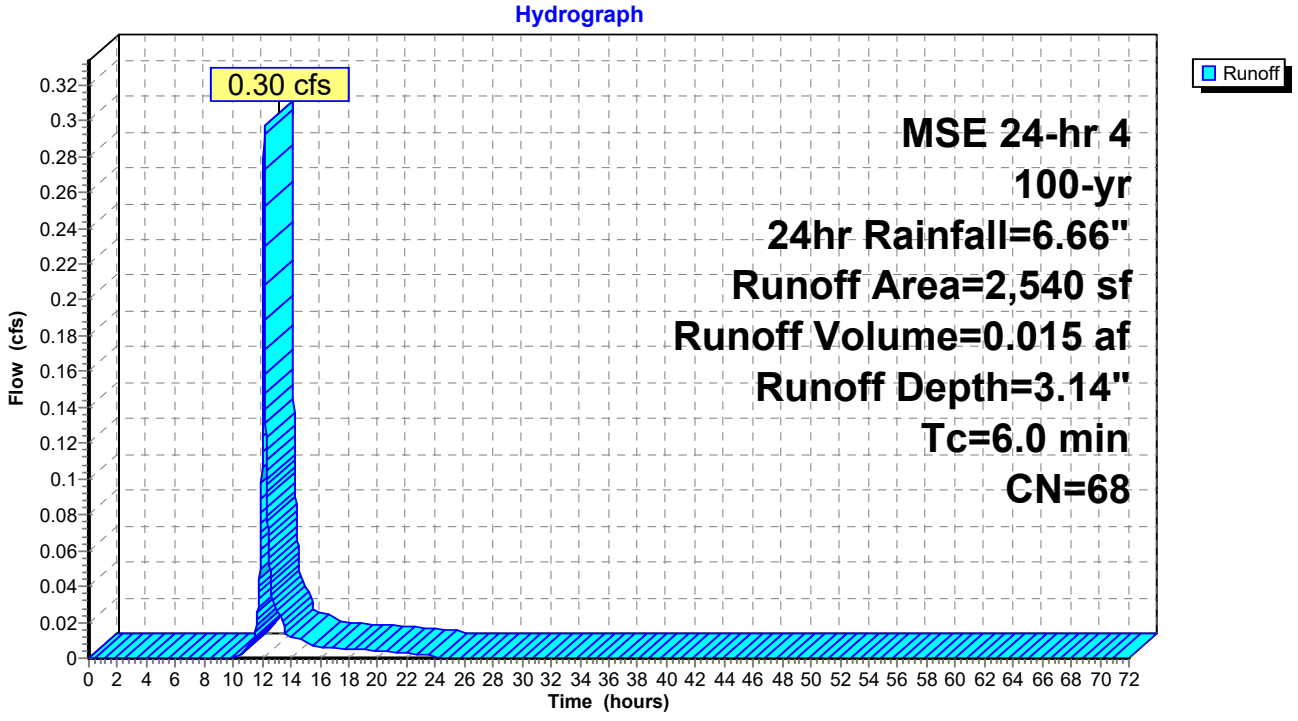
Runoff = 0.30 cfs @ 12.13 hrs, Volume= 0.015 af, Depth= 3.14"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	1,288	68	Cropland, HSG B Onsite
*	638	68	Cropland, HSG B Onsite
*	614	68	Cropland, HSG B Onsite
	2,540	68	Weighted Average
	2,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExM: Miscellaneous Onsite



Summary for Subcatchment ExOff1: NW Offsite

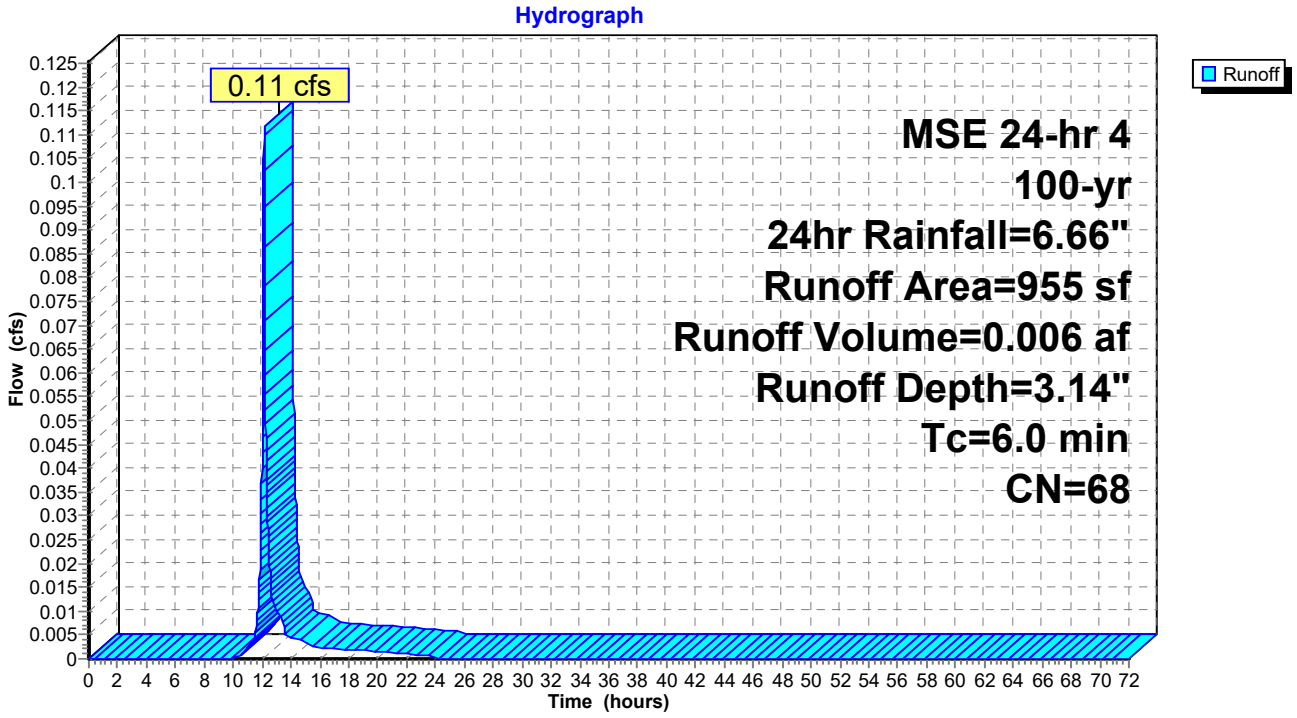
Runoff = 0.11 cfs @ 12.13 hrs, Volume= 0.006 af, Depth= 3.14"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExOff1: NW Offsite



Summary for Subcatchment ExOff2: Central Offsite

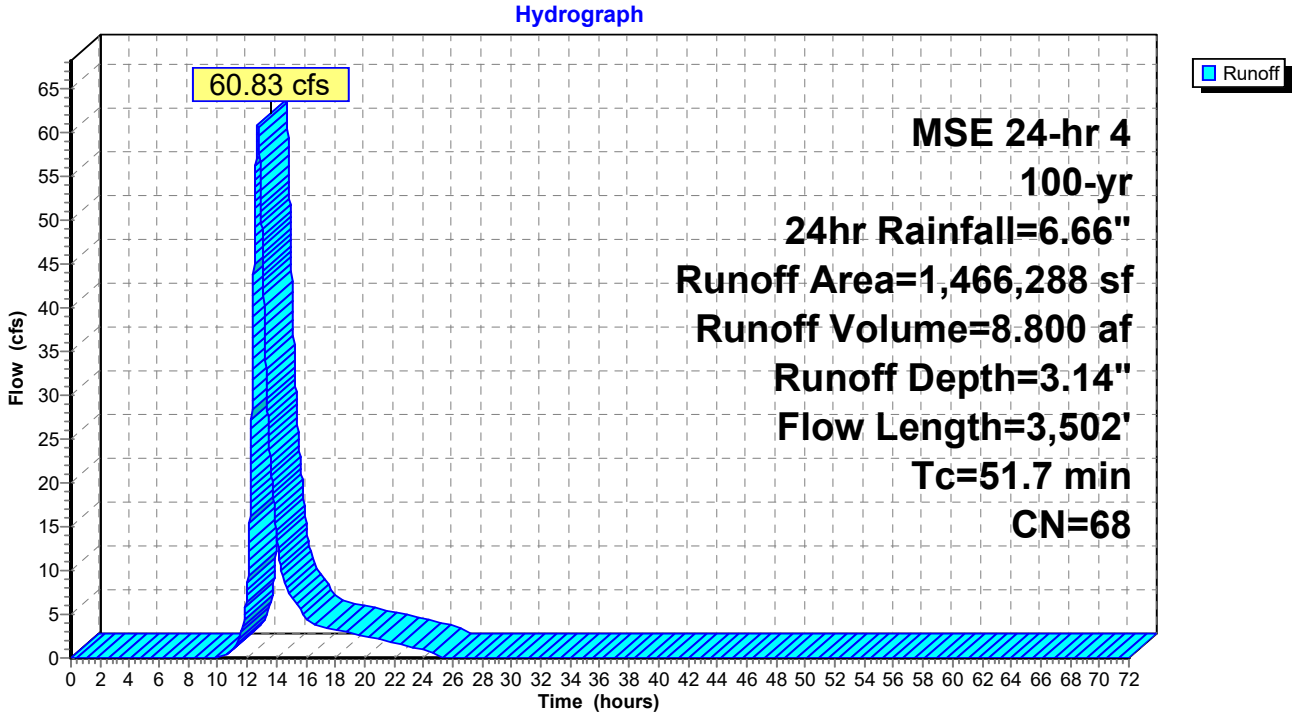
Runoff = 60.83 cfs @ 12.70 hrs, Volume= 8.800 af, Depth= 3.14"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	1,353,095	68	Cropland, HSG B Offsite
*	93,231	70	1/2 acre lots, 25% imp, HSG B Offsite
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
*	9,410	98	Pavement Offsite
	1,466,288	68	Weighted Average
	1,430,932		97.59% Pervious Area
	35,356		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
46.7	3,392	0.0181	1.21		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
51.7	3,502	Total			

Subcatchment ExOff2: Central Offsite



Summary for Subcatchment ExOff3: SE Offsite

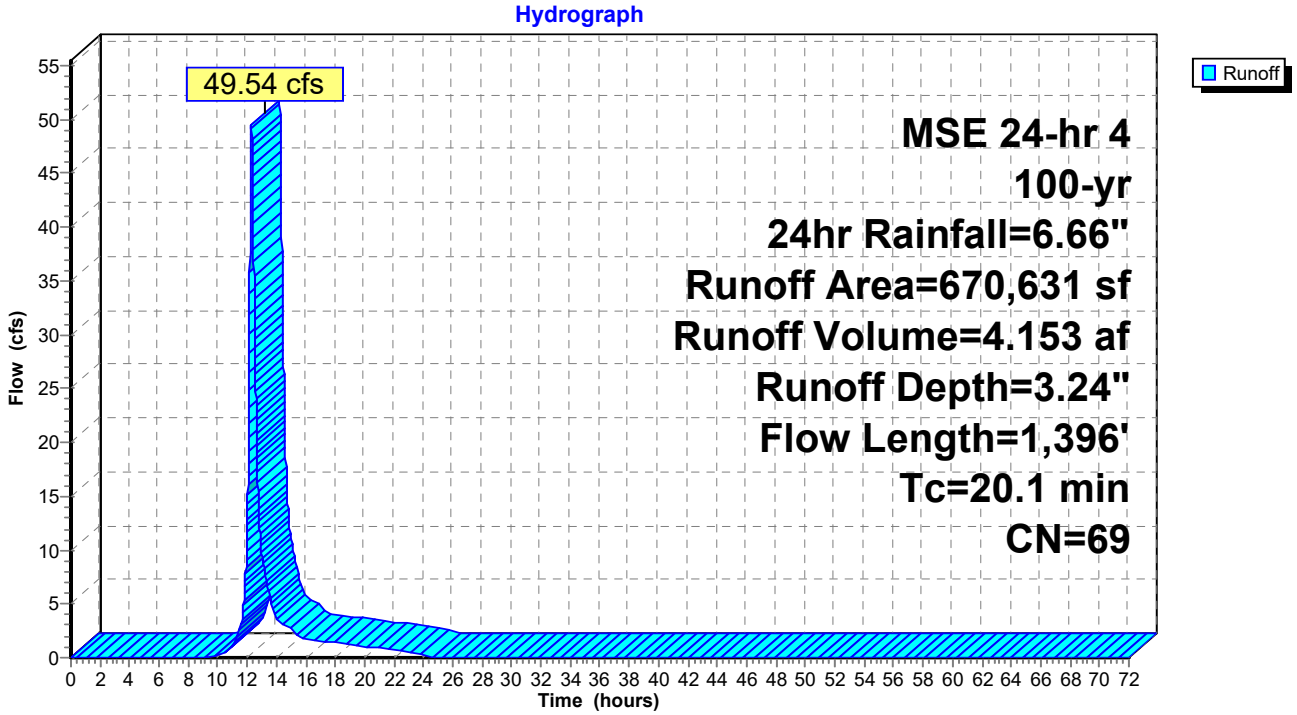
Runoff = 49.54 cfs @ 12.30 hrs, Volume= 4.153 af, Depth= 3.24"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	640,930	68	Cropland, HSG B Offsite
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	11,569	98	Pavement Offsite
	670,631	69	Weighted Average
	654,529		97.60% Pervious Area
	16,102		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment ExOff3: SE Offsite



Summary for Subcatchment ExOn1: NW Onsite

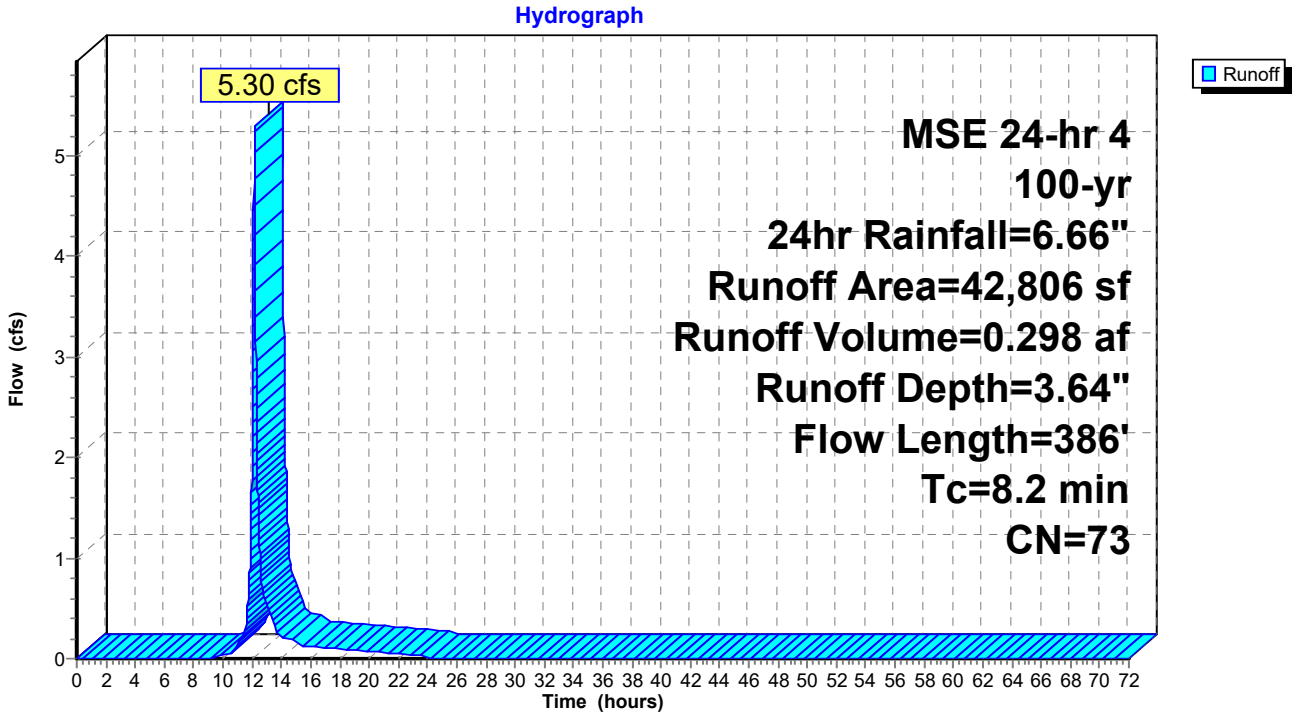
Runoff = 5.30 cfs @ 12.16 hrs, Volume= 0.298 af, Depth= 3.64"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	21,403	68	Cropland, HSG B Onsite
*	21,403	78	Cropland, HSG C Onsite
	42,806	73	Weighted Average
	42,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	67	0.0217	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
4.7	319	0.0156	1.12		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
8.2	386	Total			

Subcatchment ExOn1: NW Onsite



Summary for Subcatchment ExOn2: Central Onsite

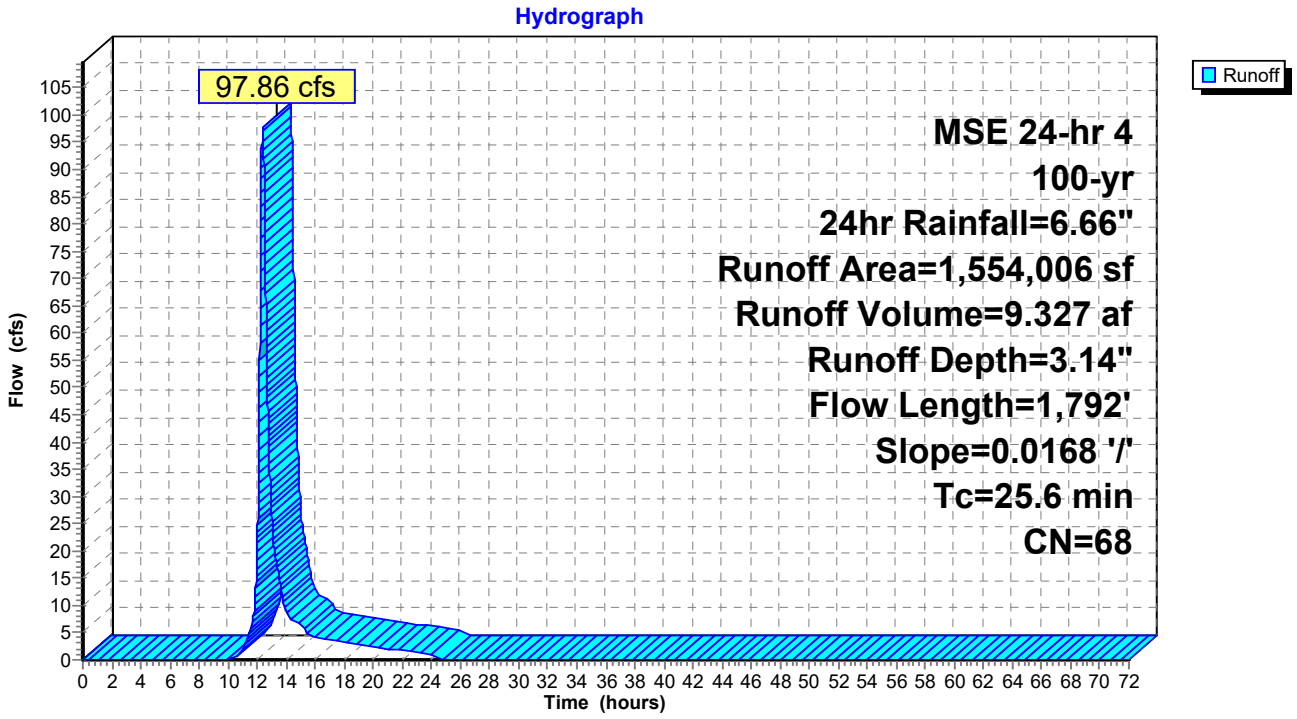
Runoff = 97.86 cfs @ 12.37 hrs, Volume= 9.327 af, Depth= 3.14"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	1,516,018	68	Cropland, HSB Onsite
*	5,189	78	Cropland, HSG C Onsite
*	32,799	70	1/2 acre lots, 25% imp, HSG B Onsite
	1,554,006	68	Weighted Average
	1,545,806		99.47% Pervious Area
	8,200		0.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,792	0.0168	1.17		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment ExOn2: Central Onsite



Summary for Subcatchment ExOn3: SE Onsite

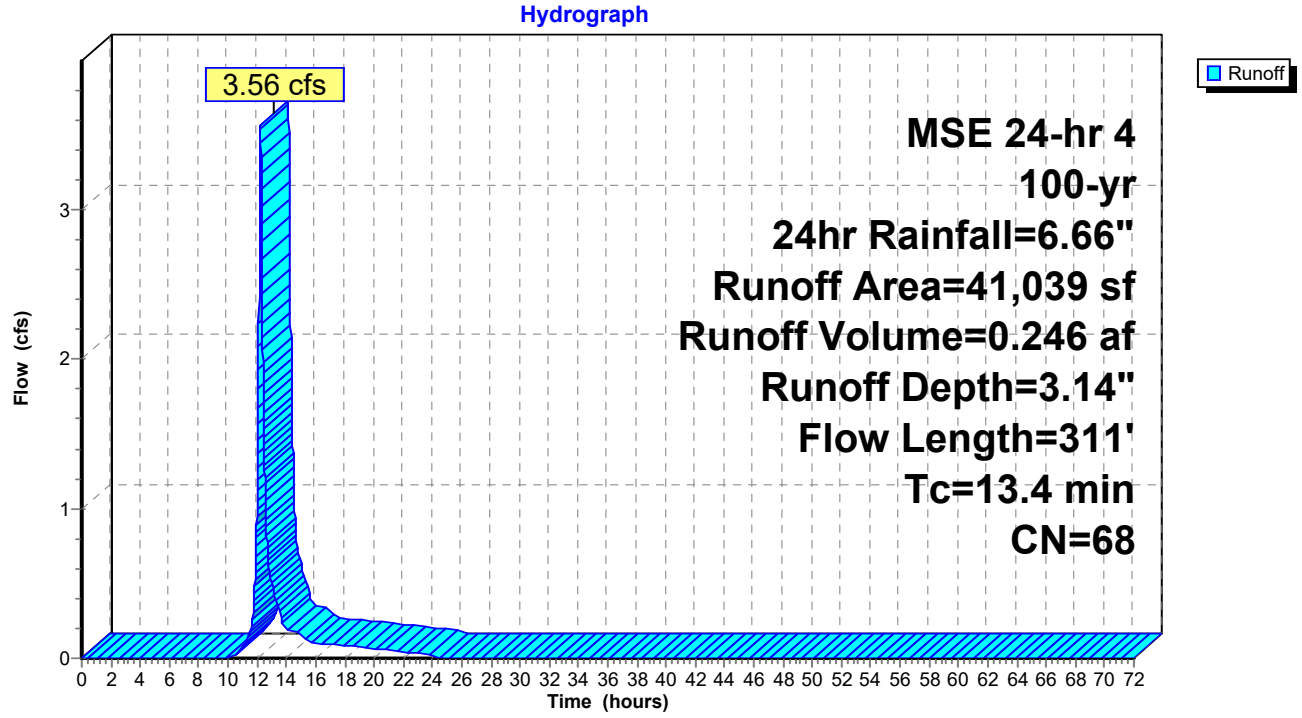
Runoff = 3.56 cfs @ 12.22 hrs, Volume= 0.246 af, Depth= 3.14"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	41,039	68	Cropland, HSB Onsite
	41,039		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	155	0.0086	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84" Using McCuen-Spiess flow length
3.5	156	0.0070	0.75		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
13.4	311	Total			

Subcatchment ExOn3: SE Onsite



Summary for Pond ExP1: SE Existing Depression

Inflow Area = 16.338 ac, 2.26% Impervious, Inflow Depth = 3.23" for 100-yr, 24hr event
Inflow = 52.46 cfs @ 12.30 hrs, Volume= 4.399 af
Outflow = 6.91 cfs @ 13.42 hrs, Volume= 3.248 af, Atten= 87%, Lag= 67.3 min
Discarded = 0.37 cfs @ 13.42 hrs, Volume= 1.575 af
Primary = 6.53 cfs @ 13.42 hrs, Volume= 1.673 af
Routed to Pond ExP2 : Central Existing Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 956.48' @ 13.42 hrs Surf.Area= 120,543 sf Storage= 115,597 cf

Plug-Flow detention time= 913.8 min calculated for 3.248 af (74% of inflow)
Center-of-Mass det. time= 831.1 min (1,664.7 - 833.6)

Volume	Invert	Avail.Storage	Storage Description
#1	954.57'	150,632 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

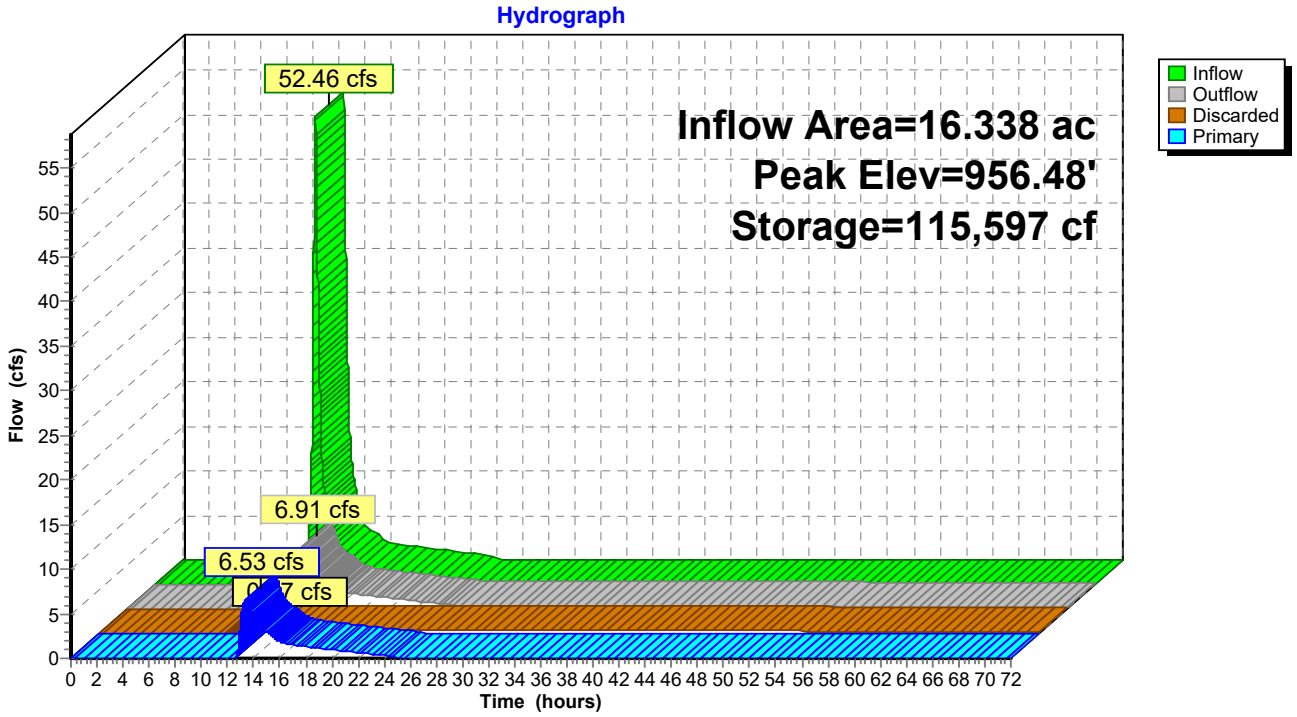
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.57	0	0	0
955.00	24,649	5,300	5,300
956.00	93,926	59,288	64,587
956.50	121,903	53,957	118,544
956.75	134,797	32,088	150,632

Device	Routing	Invert	Outlet Devices
#1	Primary	956.34'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 956.34 956.50 956.75 957.00 Width (feet) 7.00 104.00 184.00 249.00
#2	Discarded	954.57'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.37 cfs @ 13.42 hrs HW=956.48' (Free Discharge)
↑**2=Exfiltration** (Controls 0.37 cfs)

Primary OutFlow Max=6.53 cfs @ 13.42 hrs HW=956.48' TW=931.80' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 6.53 cfs @ 1.00 fps)

Pond ExP1: SE Existing Depression



Summary for Pond ExP2: Central Existing Depression

Inflow Area = 85.674 ac, 1.60% Impervious, Inflow Depth = 2.77" for 100-yr, 24hr event
Inflow = 136.10 cfs @ 12.43 hrs, Volume= 19.800 af
Outflow = 136.06 cfs @ 12.44 hrs, Volume= 19.800 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.01 cfs @ 12.44 hrs, Volume= 0.001 af
Primary = 136.05 cfs @ 12.44 hrs, Volume= 19.799 af
Routed to Link ExL : Ex Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 932.12' @ 12.44 hrs Surf.Area= 4,341 sf Storage= 407 cf

Plug-Flow detention time= 0.0 min calculated for 19.797 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (862.3 - 862.2)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	681,595 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

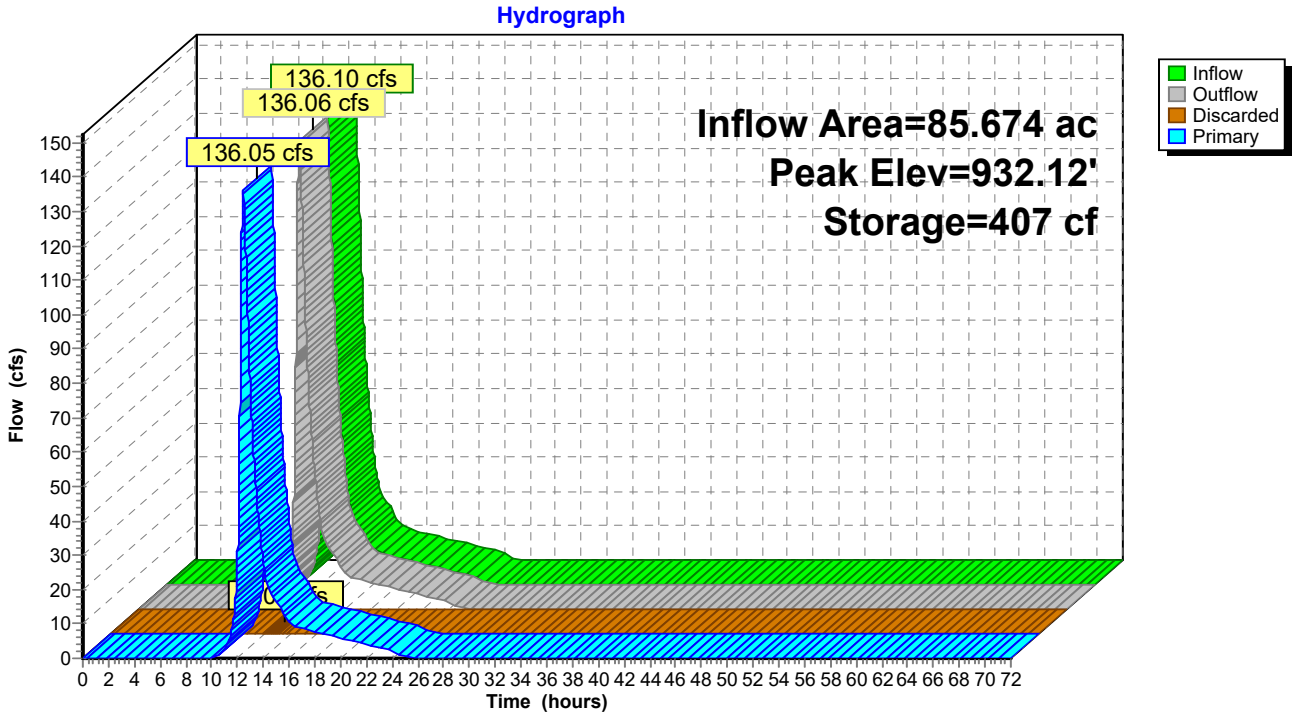
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	308	126	126
933.00	33,728	17,018	17,144
934.00	96,309	65,019	82,163
935.00	168,612	132,461	214,623
936.00	234,956	201,784	416,407
937.00	295,420	265,188	681,595

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 936.00 937.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00 622.00 735.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.01 cfs @ 12.44 hrs HW=932.12' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=136.04 cfs @ 12.44 hrs HW=932.12' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 136.04 cfs @ 2.60 fps)

Pond ExP2: Central Existing Depression

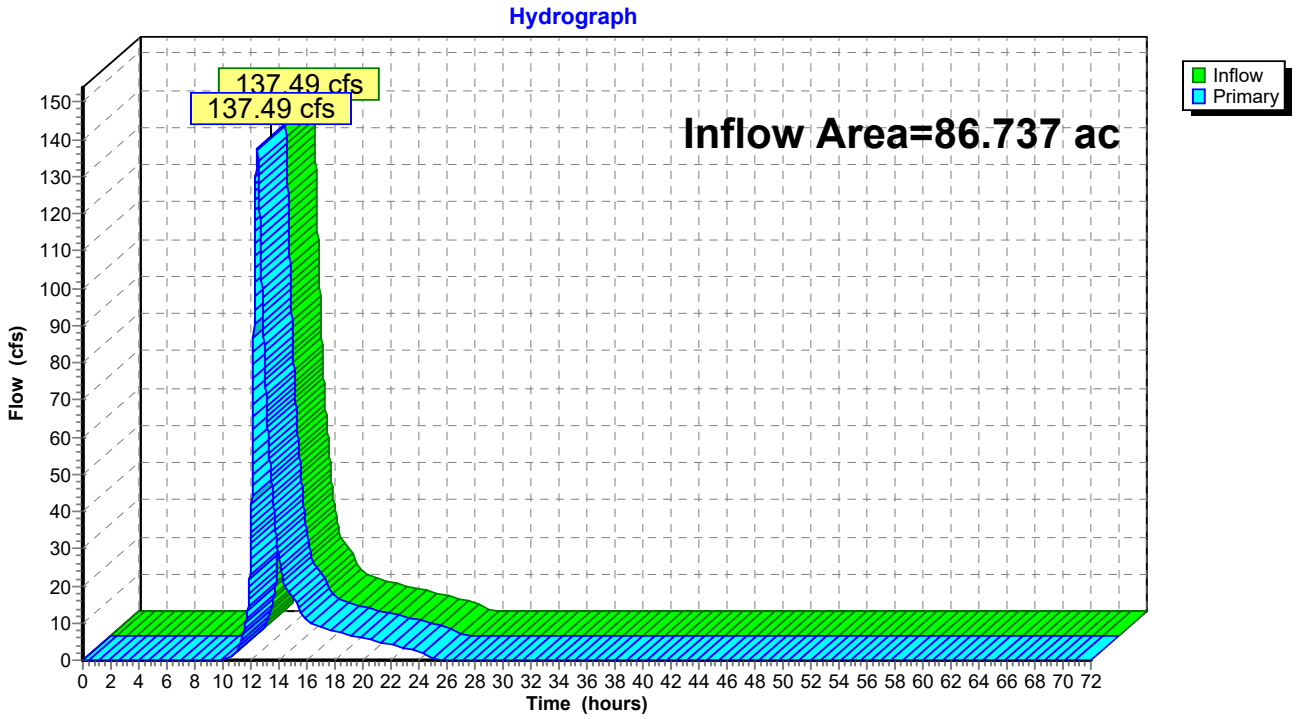


Summary for Link ExL: Ex Total

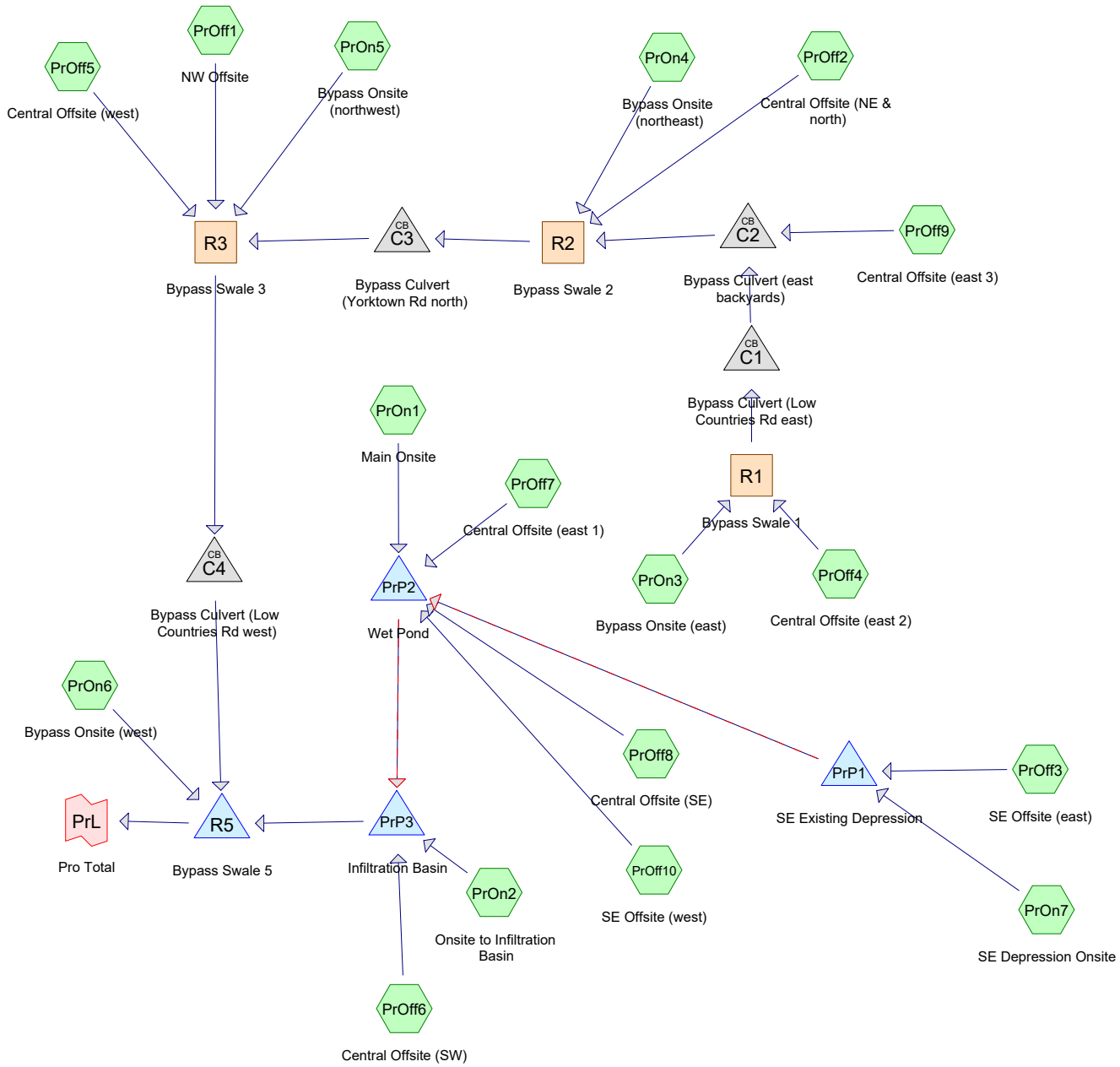
Inflow Area = 86.737 ac, 1.58% Impervious, Inflow Depth = 2.78" for 100-yr, 24hr event
Inflow = 137.49 cfs @ 12.44 hrs, Volume= 20.118 af
Primary = 137.49 cfs @ 12.44 hrs, Volume= 20.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link ExL: Ex Total



Proposed



Subcat Reach Pond Link

Routing Diagram for 26-225 HydroCAD
Prepared by Fehr Graham & Associates, Printed 10/8/2026
HydroCAD® 10.20-9a s/n 00943 © 2026 HydroCAD Software Solutions LLC

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPrOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=68 Runoff=0.11 cfs 0.006 af

SubcatchmentPrOff10: SE Offsite (west) Runoff Area=27,179 sf 40.65% Impervious Runoff Depth=3.96"
Tc=6.0 min CN=76 Runoff=3.97 cfs 0.206 af

SubcatchmentPrOff2: Central Offsite Runoff Area=1,125,874 sf 1.51% Impervious Runoff Depth=3.14"
Flow Length=1,885' Tc=28.1 min CN=68 Runoff=67.29 cfs 6.757 af

SubcatchmentPrOff3: SE Offsite (east) Runoff Area=645,599 sf 0.03% Impervious Runoff Depth=3.14"
Flow Length=1,396' Tc=20.1 min CN=68 Runoff=46.15 cfs 3.875 af

SubcatchmentPrOff4: Central Offsite (east Runoff Area=118,736 sf 0.00% Impervious Runoff Depth=3.14"
Flow Length=1,270' Slope=0.0225 '/' Tc=15.7 min CN=68 Runoff=9.59 cfs 0.713 af

SubcatchmentPrOff5: Central Offsite Runoff Area=10,552 sf 25.00% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=80 Runoff=1.68 cfs 0.088 af

SubcatchmentPrOff6: Central Offsite (SW) Runoff Area=28,651 sf 14.99% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=72 Runoff=3.78 cfs 0.194 af

SubcatchmentPrOff7: Central Offsite (east Runoff Area=14,256 sf 0.00% Impervious Runoff Depth=3.14"
Flow Length=373' Tc=6.2 min CN=68 Runoff=1.66 cfs 0.086 af

SubcatchmentPrOff8: Central Offsite (SE) Runoff Area=46,766 sf 39.64% Impervious Runoff Depth=3.96"
Tc=6.0 min CN=76 Runoff=6.83 cfs 0.354 af

SubcatchmentPrOff9: Central Offsite (east Runoff Area=119,306 sf 0.00% Impervious Runoff Depth=3.14"
Flow Length=1,164' Slope=0.0229 '/' Tc=14.2 min CN=68 Runoff=10.08 cfs 0.716 af

SubcatchmentPrOn1: Main Onsite Runoff Area=1,301,517 sf 39.68% Impervious Runoff Depth=3.96"
Tc=6.0 min CN=76 Runoff=189.95 cfs 9.850 af

SubcatchmentPrOn2: Onsite to Runoff Area=195,173 sf 70.40% Impervious Runoff Depth=5.26"
Tc=6.0 min CN=88 Runoff=35.71 cfs 1.965 af

SubcatchmentPrOn3: Bypass Onsite (east) Runoff Area=3,848 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=61 Runoff=0.35 cfs 0.018 af

SubcatchmentPrOn4: Bypass Onsite Runoff Area=45,511 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=61 Runoff=4.16 cfs 0.214 af

SubcatchmentPrOn5: Bypass Onsite Runoff Area=44,014 sf 0.00% Impervious Runoff Depth=2.94"
Tc=6.0 min CN=66 Runoff=4.84 cfs 0.248 af

SubcatchmentPrOn6: Bypass Onsite (west) Runoff Area=26,361 sf 0.00% Impervious Runoff Depth=3.75"
Tc=6.0 min CN=74 Runoff=3.66 cfs 0.189 af

SubcatchmentPrOn7: SE Depression Runoff Area=23,967 sf 76.88% Impervious Runoff Depth=5.60"
Tc=6.0 min CN=91 Runoff=4.55 cfs 0.257 af

Reach R1: Bypass Swale 1 Avg. Flow Depth=0.44' Max Vel=3.30 fps Inflow=9.75 cfs 0.731 af
n=0.022 L=108.0' S=0.0099 '/' Capacity=198.46 cfs Outflow=9.74 cfs 0.731 af

Reach R2: Bypass Swale 2 Avg. Flow Depth=1.15' Max Vel=7.29 fps Inflow=81.19 cfs 8.418 af
n=0.022 L=913.0' S=0.0167 '/' Capacity=422.06 cfs Outflow=80.76 cfs 8.418 af

Reach R3: Bypass Swale 3 Avg. Flow Depth=1.39' Max Vel=5.58 fps Inflow=82.35 cfs 8.760 af
n=0.022 L=791.0' S=0.0080 '/' Capacity=440.47 cfs Outflow=81.77 cfs 8.760 af

Pond C1: Bypass Culvert (Low Countries Rd east) Peak Elev=960.67' Inflow=9.74 cfs 0.731 af
24.0" Round Culvert n=0.011 L=100.0' S=0.0047 '/' Outflow=9.74 cfs 0.731 af

Pond C2: Bypass Culvert (east backyards) Peak Elev=960.27' Inflow=19.74 cfs 1.447 af
27.0" Round Culvert n=0.011 L=323.0' S=0.0048 '/' Outflow=19.74 cfs 1.447 af

Pond C3: Bypass Culvert (Yorktown Rd north) Peak Elev=944.79' Inflow=80.76 cfs 8.418 af
30.0" Round Culvert x 2.00 n=0.011 L=119.0' S=0.0067 '/' Outflow=80.76 cfs 8.418 af

Pond C4: Bypass Culvert (Low Countries Rd west) Peak Elev=936.53' Inflow=81.77 cfs 8.760 af
27.0" Round Culvert x 3.00 n=0.011 L=109.0' S=0.0083 '/' Outflow=81.77 cfs 8.760 af

Pond PrP1: SE Existing Depression Peak Elev=956.23' Storage=72,215 cf Inflow=47.52 cfs 4.132 af
Discarded=0.26 cfs 0.167 af Primary=4.64 cfs 2.911 af Secondary=9.80 cfs 1.053 af Outflow=14.62 cfs 4.132 af

Pond PrP2: Wet Pond Peak Elev=935.55' Storage=405,247 cf Inflow=205.59 cfs 14.460 af
Primary=36.70 cfs 14.367 af Secondary=0.00 cfs 0.000 af Outflow=36.70 cfs 14.367 af

Pond PrP3: Infiltration Basin Peak Elev=932.27' Storage=113,738 cf Inflow=68.87 cfs 16.526 af
Discarded=0.21 cfs 1.011 af Primary=41.60 cfs 14.454 af Outflow=41.81 cfs 15.465 af

Pond R5: Bypass Swale 5 Peak Elev=932.04' Storage=438 cf Inflow=109.27 cfs 23.403 af
Discarded=0.00 cfs 0.002 af Primary=109.27 cfs 23.401 af Outflow=109.27 cfs 23.403 af

Link PrL: Pro Total Inflow=109.27 cfs 23.401 af
Primary=109.27 cfs 23.401 af

Total Runoff Area = 86.737 ac Runoff Volume = 25.735 af Average Runoff Depth = 3.56"
80.79% Pervious = 70.071 ac 19.21% Impervious = 16.666 ac

Summary for Subcatchment PrOff1: NW Offsite

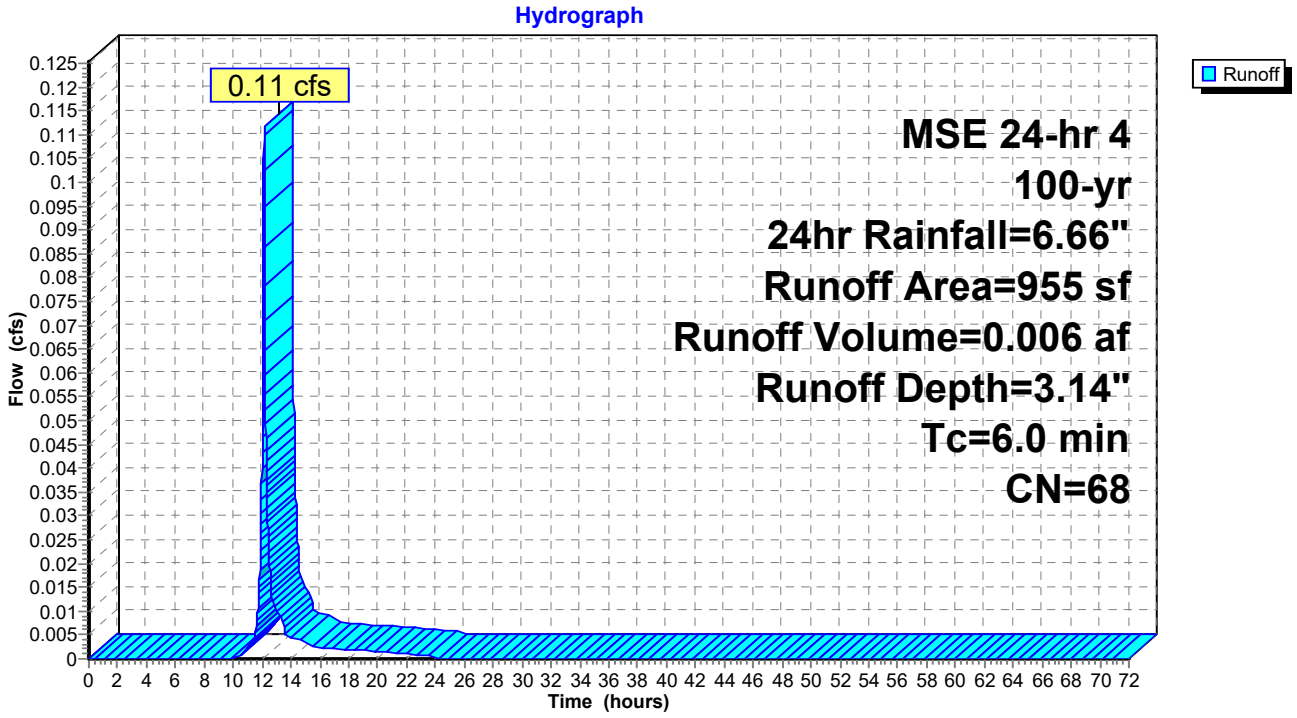
Runoff = 0.11 cfs @ 12.13 hrs, Volume= 0.006 af, Depth= 3.14"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff1: NW Offsite



Summary for Subcatchment PrOff10: SE Offsite (west)

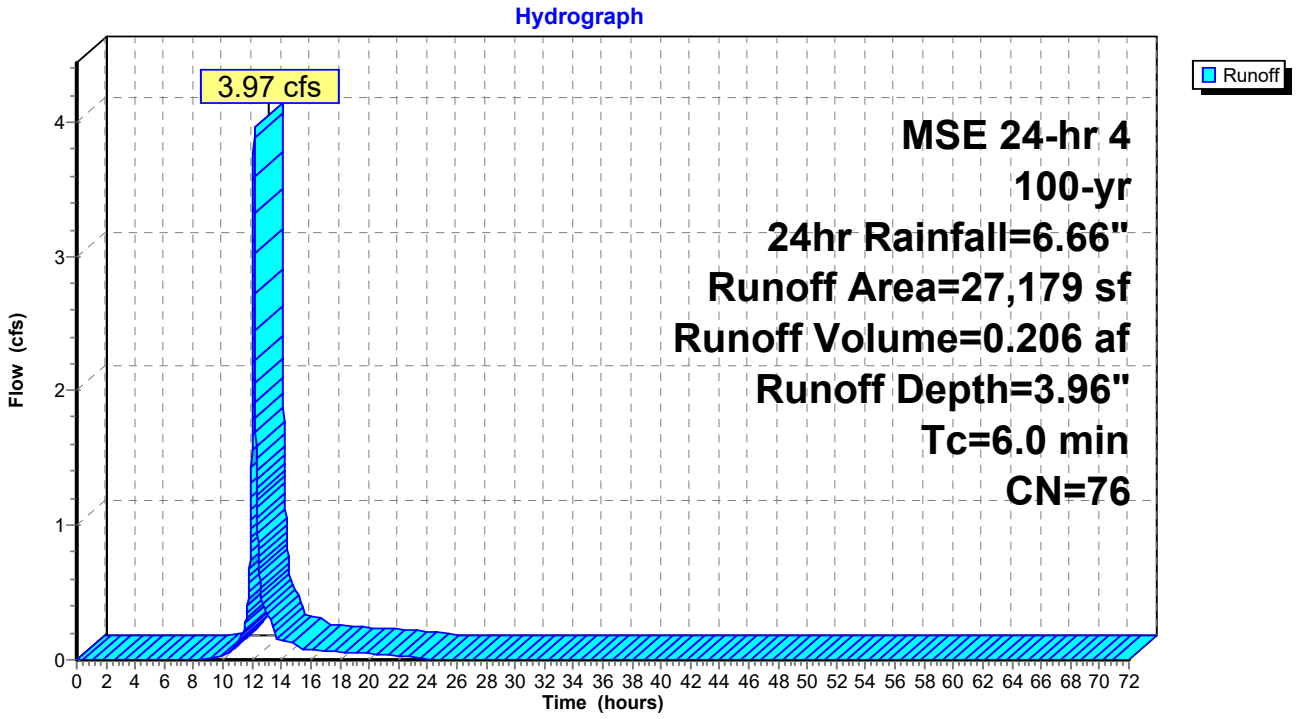
Runoff = 3.97 cfs @ 12.13 hrs, Volume= 0.206 af, Depth= 3.96"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	2,533	61	>75% Grass cover, Good, HSG B Offsite
*	3,161	98	Pavement Offsite
*	3,353	98	Pro Pave in ROW Offiste
	27,179	76	Weighted Average
	16,132		59.35% Pervious Area
	11,047		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff10: SE Offsite (west)



Summary for Subcatchment PrOff2: Central Offsite (NE & north)

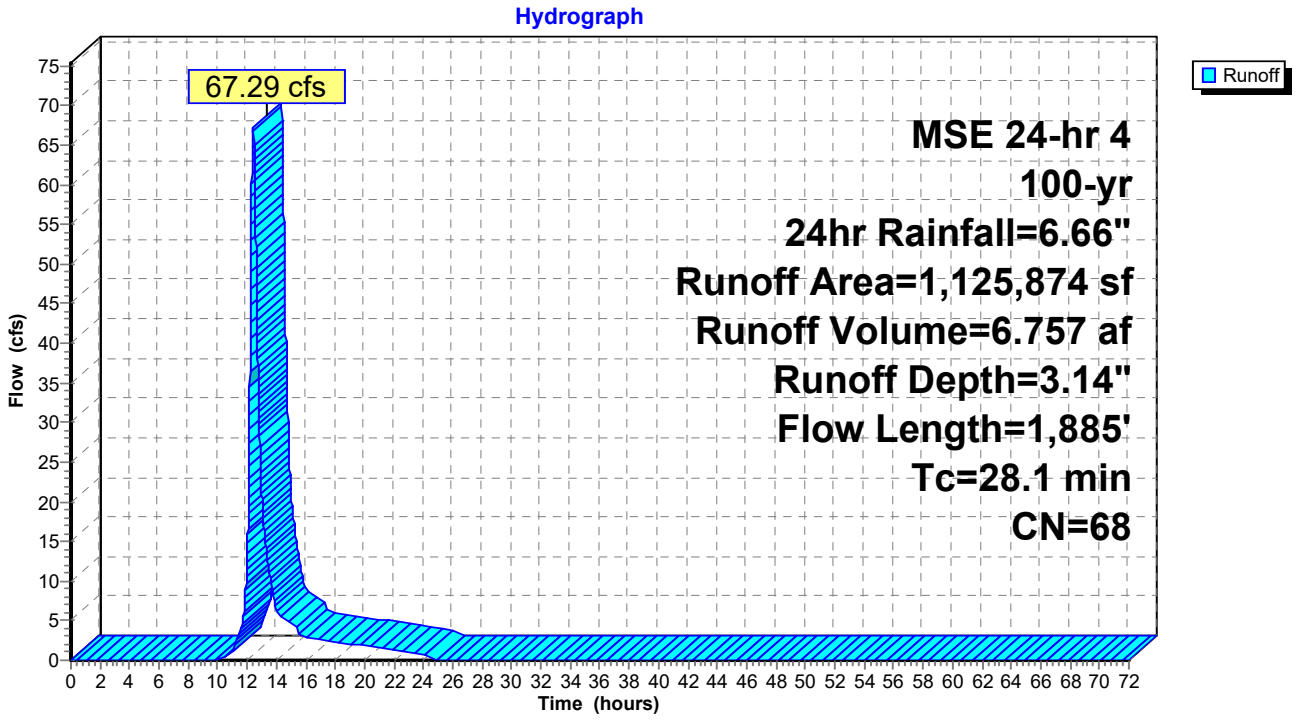
Runoff = 67.29 cfs @ 12.40 hrs, Volume= 6.757 af, Depth= 3.14"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	1,058,084	68	Cropland, HSG B Offsite
*	67,790	70	1/2 acre lots, 25% imp, HSG B Offsite
	1,125,874	68	Weighted Average
	1,108,927		98.49% Pervious Area
	16,948		1.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
23.1	1,775	0.0202	1.28		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
28.1	1,885	Total			

Subcatchment PrOff2: Central Offsite (NE & north)



Summary for Subcatchment PrOff3: SE Offsite (east)

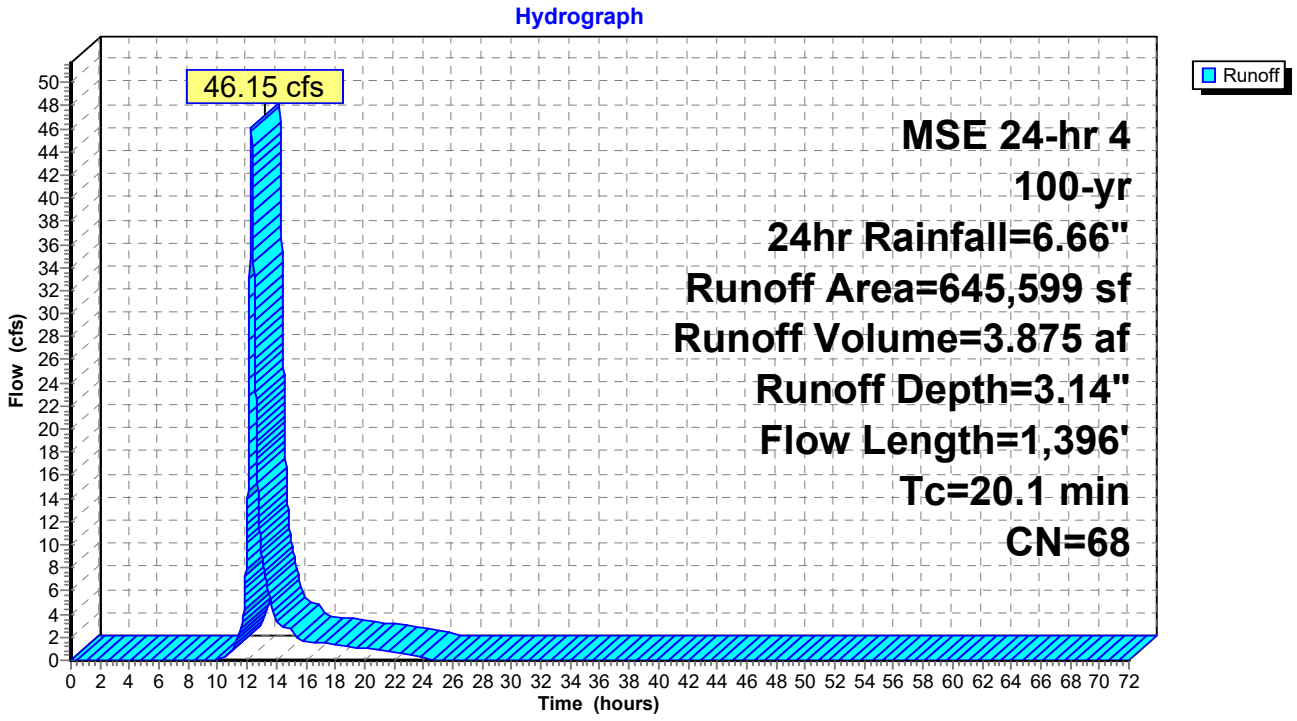
Runoff = 46.15 cfs @ 12.30 hrs, Volume= 3.875 af, Depth= 3.14"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	645,405	68	Cropland, HSG B Offsite
*	194	98	Pavement Offsite
	645,599	68	Weighted Average
	645,405		99.97% Pervious Area
	194		0.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment PrOff3: SE Offsite (east)



Summary for Subcatchment PrOff4: Central Offsite (east 2)

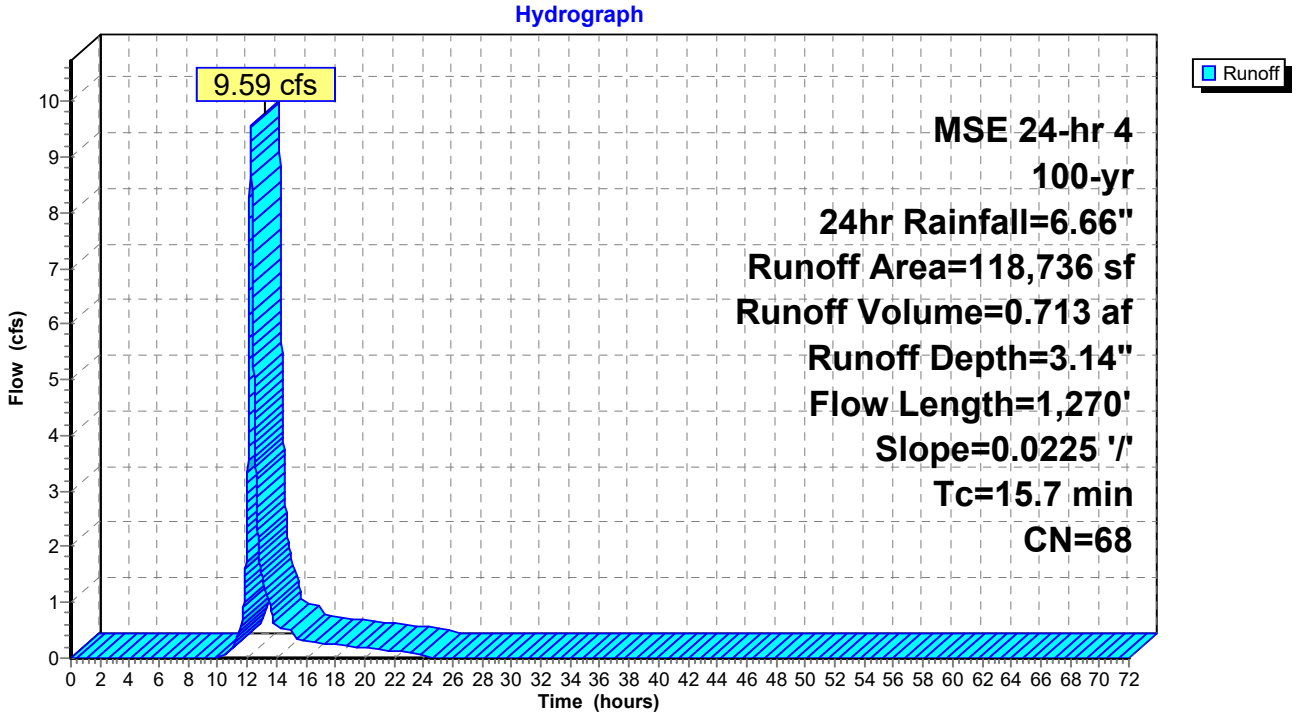
Runoff = 9.59 cfs @ 12.25 hrs, Volume= 0.713 af, Depth= 3.14"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	118,736	68	Cropland, HSG B Offsite
	118,736		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	1,270	0.0225	1.35		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff4: Central Offsite (east 2)



Summary for Subcatchment PrOff5: Central Offsite (west)

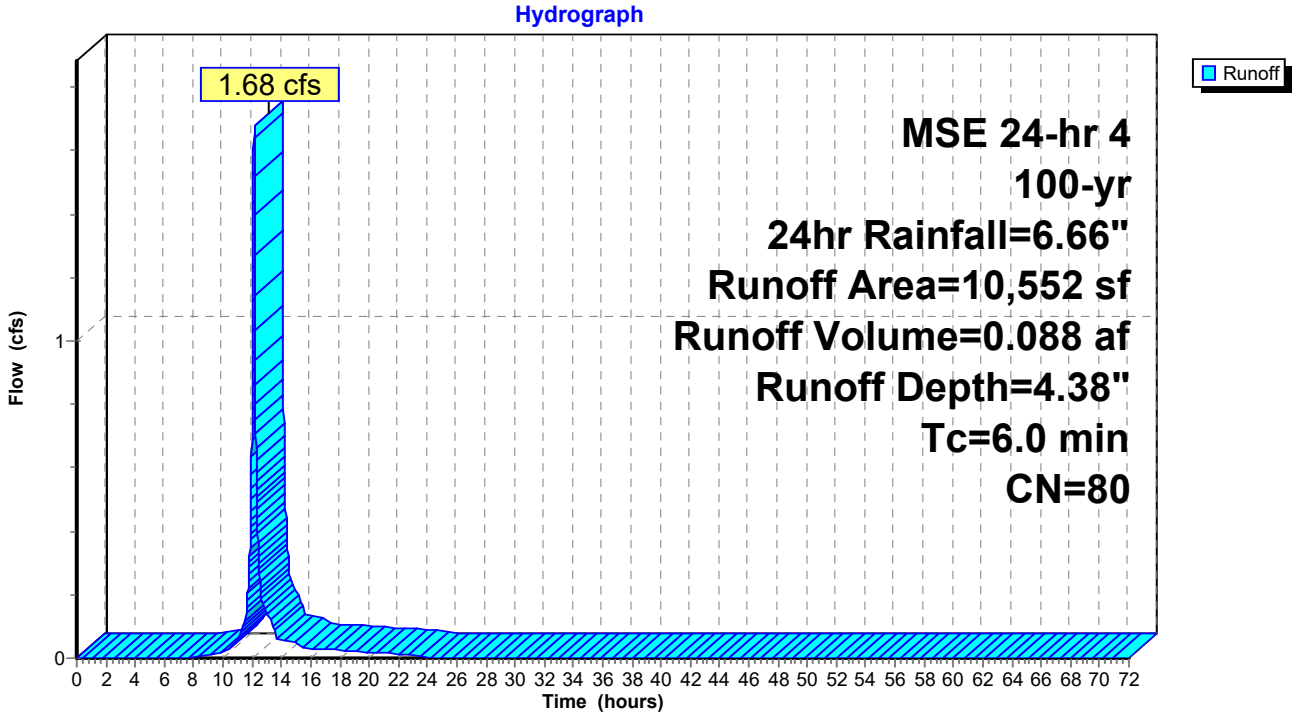
Runoff = 1.68 cfs @ 12.13 hrs, Volume= 0.088 af, Depth= 4.38"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
	7,914		75.00% Pervious Area
	2,638		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff5: Central Offsite (west)



Summary for Subcatchment PrOff6: Central Offsite (SW)

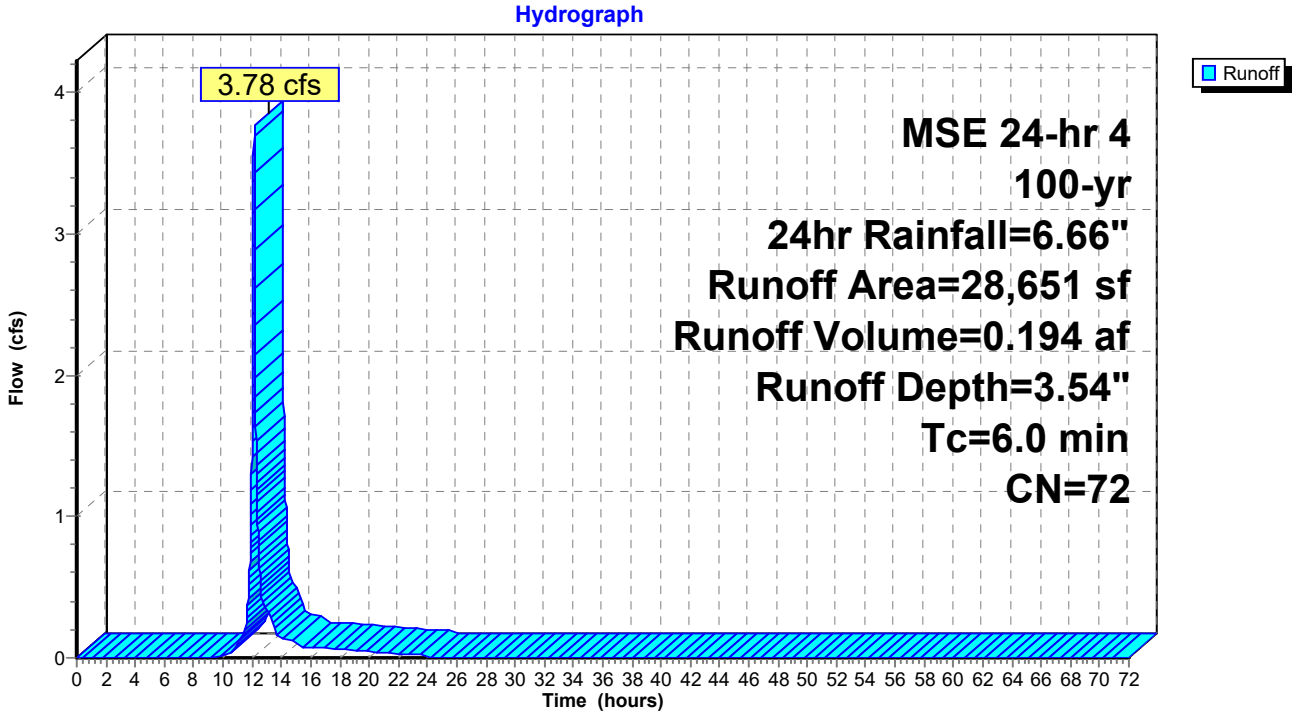
Runoff = 3.78 cfs @ 12.13 hrs, Volume= 0.194 af, Depth= 3.54"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	20,337	68	Cropland, HSG B Offsite
*	4,018	61	>75% Grass cover, Good, HSG B Offsite
*	2,590	98	Pavement Offsite
*	1,706	98	Pro Pave in ROW Offiste
	28,651	72	Weighted Average
	24,355		85.01% Pervious Area
	4,296		14.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff6: Central Offsite (SW)



Summary for Subcatchment PrOff7: Central Offsite (east 1)

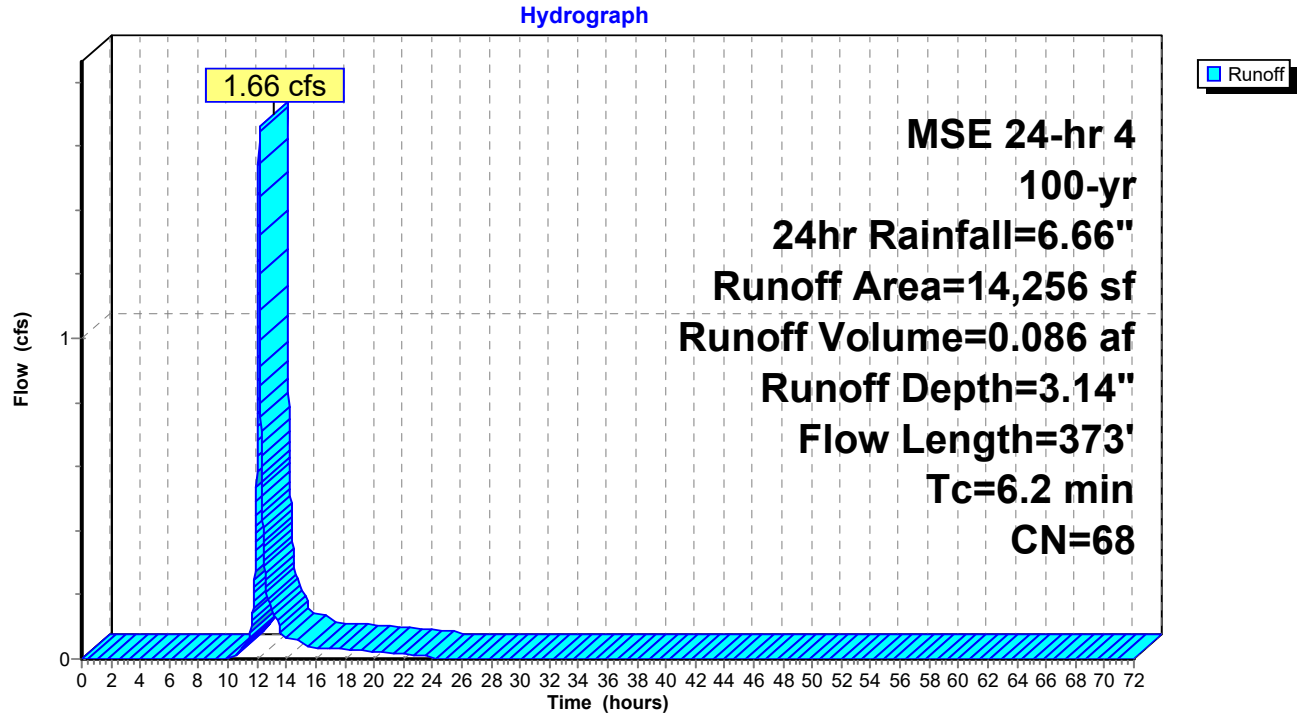
Runoff = 1.66 cfs @ 12.14 hrs, Volume= 0.086 af, Depth= 3.14"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	14,256	68	Cropland, HSG B Offsite
	14,256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	47	0.0266	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
3.8	326	0.0252	1.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.2	373	Total			

Subcatchment PrOff7: Central Offsite (east 1)



Summary for Subcatchment PrOff8: Central Offsite (SE)

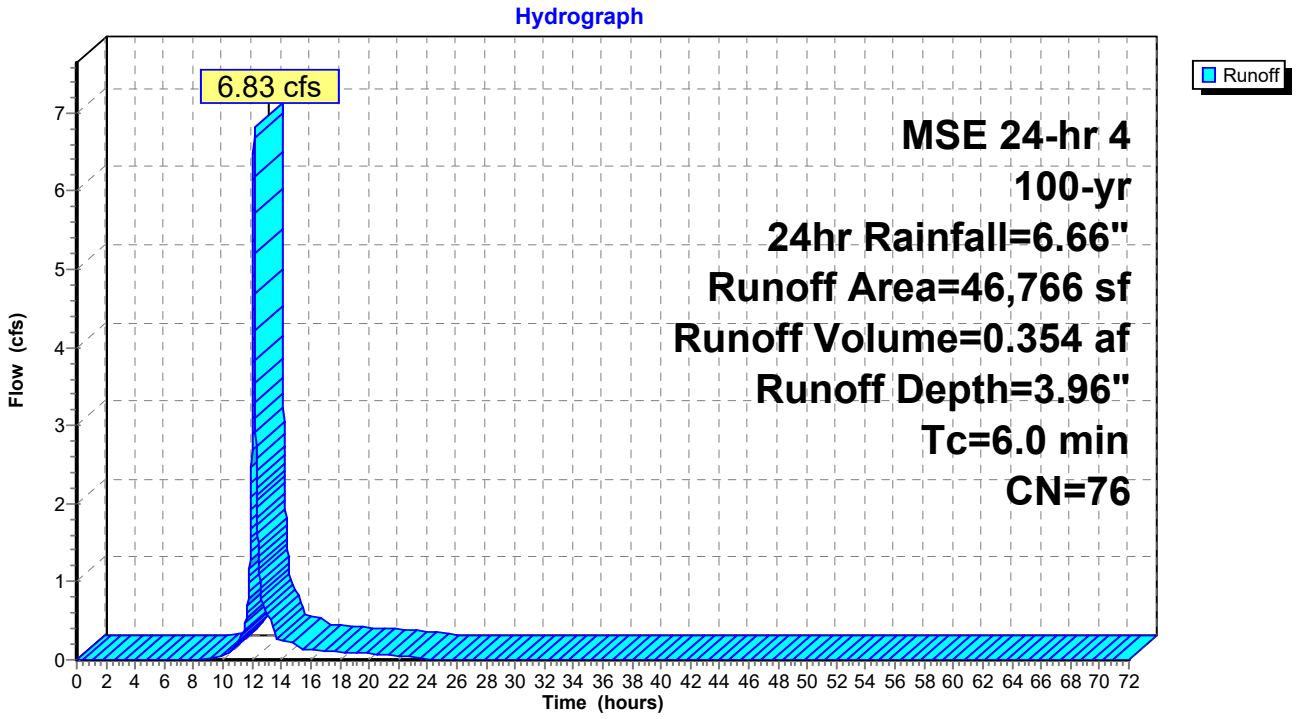
Runoff = 6.83 cfs @ 12.13 hrs, Volume= 0.354 af, Depth= 3.96"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	9,149	61	>75% Grass cover, Good, HSG B Offsite
*	25,441	70	1/2 acre lots, 25% imp, HSG B Offsite
*	6,820	98	Pavement Offsite
*	5,356	98	Pro Pave in ROW Offiste
	46,766	76	Weighted Average
	28,230		60.36% Pervious Area
	18,536		39.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff8: Central Offsite (SE)



Summary for Subcatchment PrOff9: Central Offsite (east 3)

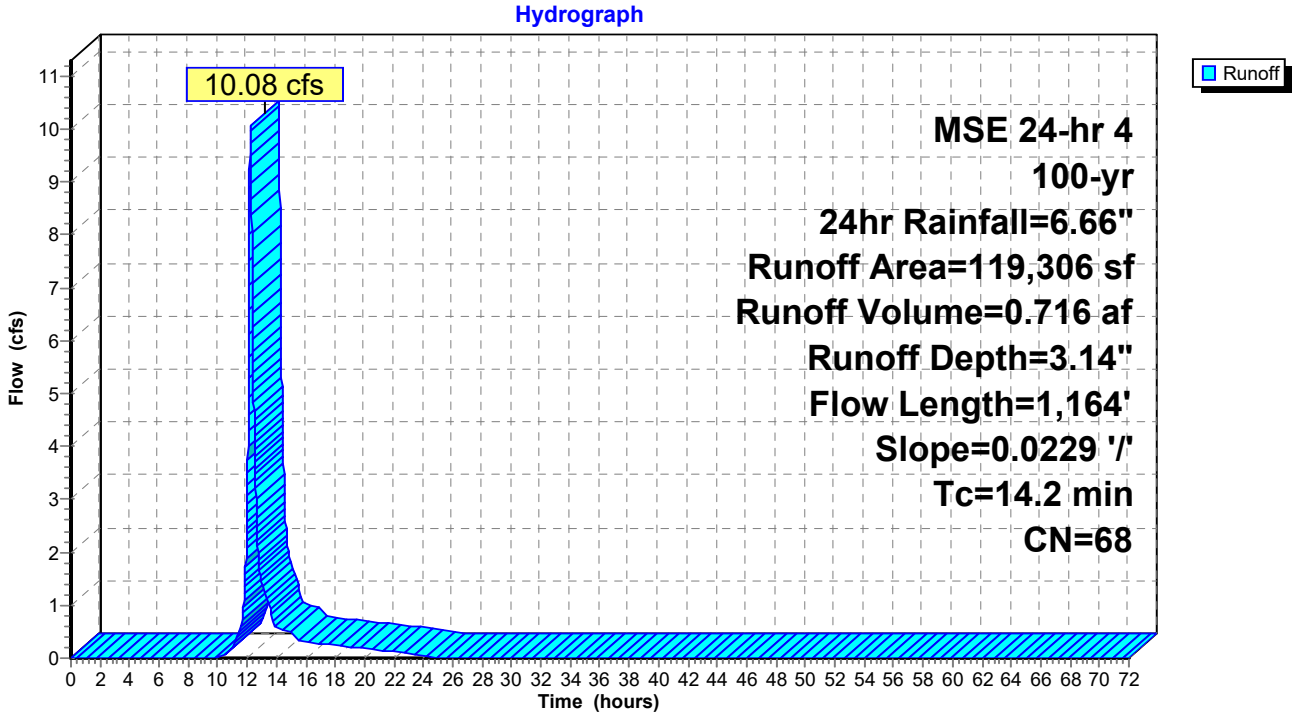
Runoff = 10.08 cfs @ 12.23 hrs, Volume= 0.716 af, Depth= 3.14"
Routed to Pond C2 : Bypass Culvert (east backyards)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	119,306	68	Cropland, HSG B Offsite
	119,306		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	1,164	0.0229	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff9: Central Offsite (east 3)



Summary for Subcatchment PrOn1: Main Onsite

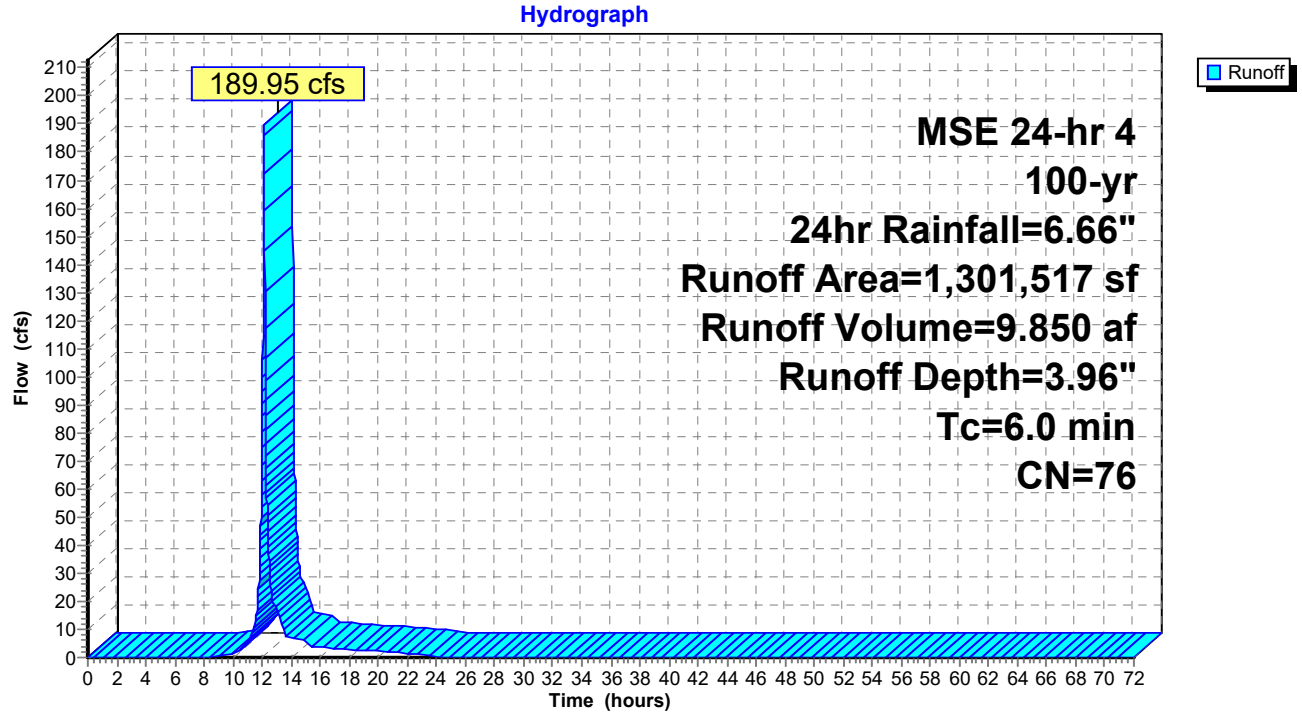
Runoff = 189.95 cfs @ 12.13 hrs, Volume= 9.850 af, Depth= 3.96"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
	623,728	72	1/3 acre lots, 30% imp, HSG B
	555,477	75	1/4 acre lots, 38% imp, HSG B
	6,494	83	1/4 acre lots, 38% imp, HSG C
*	91,094	100	Wet Pond
*	24,724	98	Alley
	1,301,517	76	Weighted Average
	785,032		60.32% Pervious Area
	516,485		39.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn1: Main Onsite



Summary for Subcatchment PrOn2: Onsite to Infiltration Basin

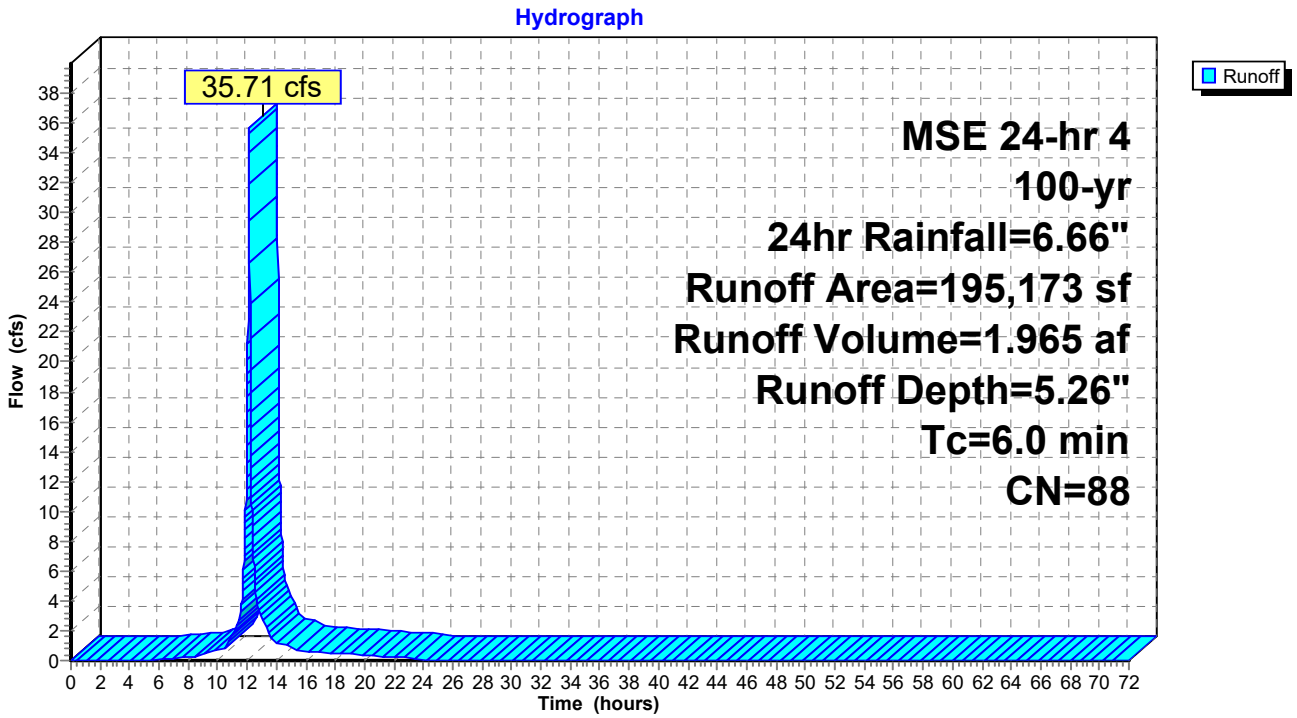
Runoff = 35.71 cfs @ 12.13 hrs, Volume= 1.965 af, Depth= 5.26"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
	13,000	72	1/3 acre lots, 30% imp, HSG B
	78,516	75	1/4 acre lots, 38% imp, HSG B
*	103,657	100	Pond
	195,173	88	Weighted Average
	57,780		29.60% Pervious Area
	137,393		70.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn2: Onsite to Infiltration Basin



Summary for Subcatchment PrOn3: Bypass Onsite (east)

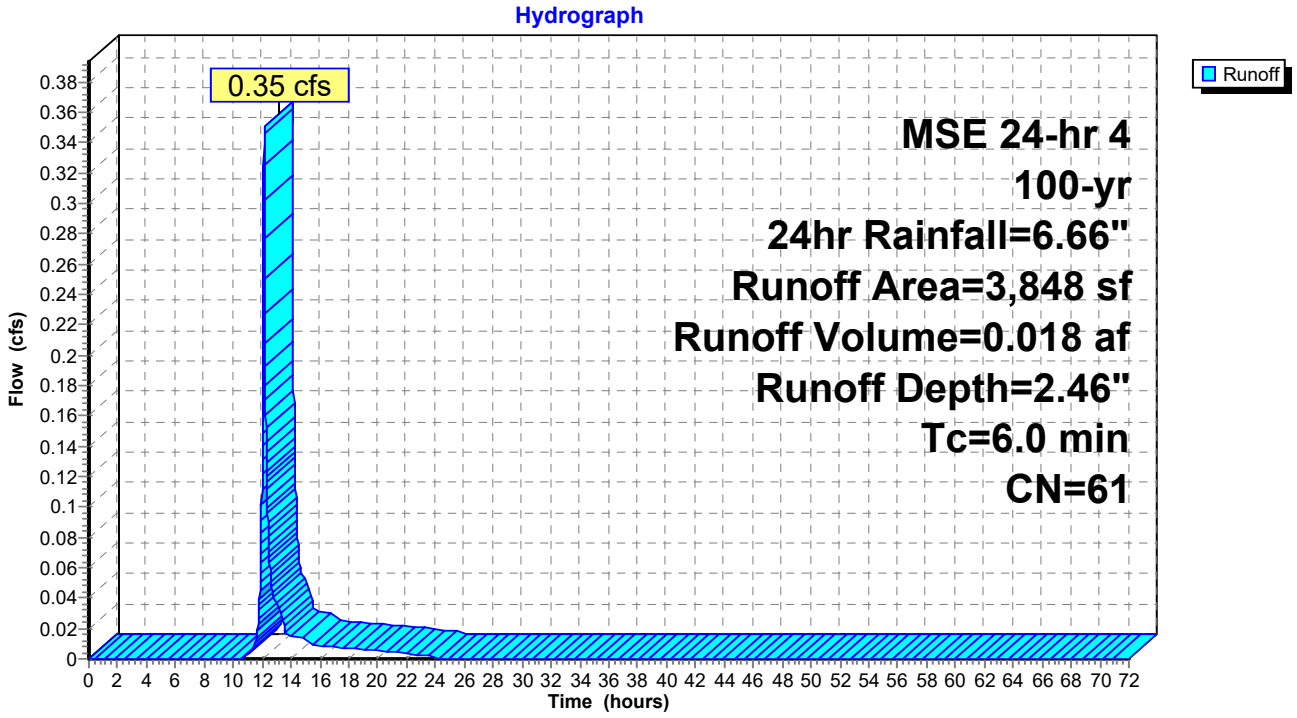
Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.018 af, Depth= 2.46"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

Area (sf)	CN	Description
3,848	61	>75% Grass cover, Good, HSG B
3,848		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn3: Bypass Onsite (east)



Summary for Subcatchment PrOn4: Bypass Onsite (northeast)

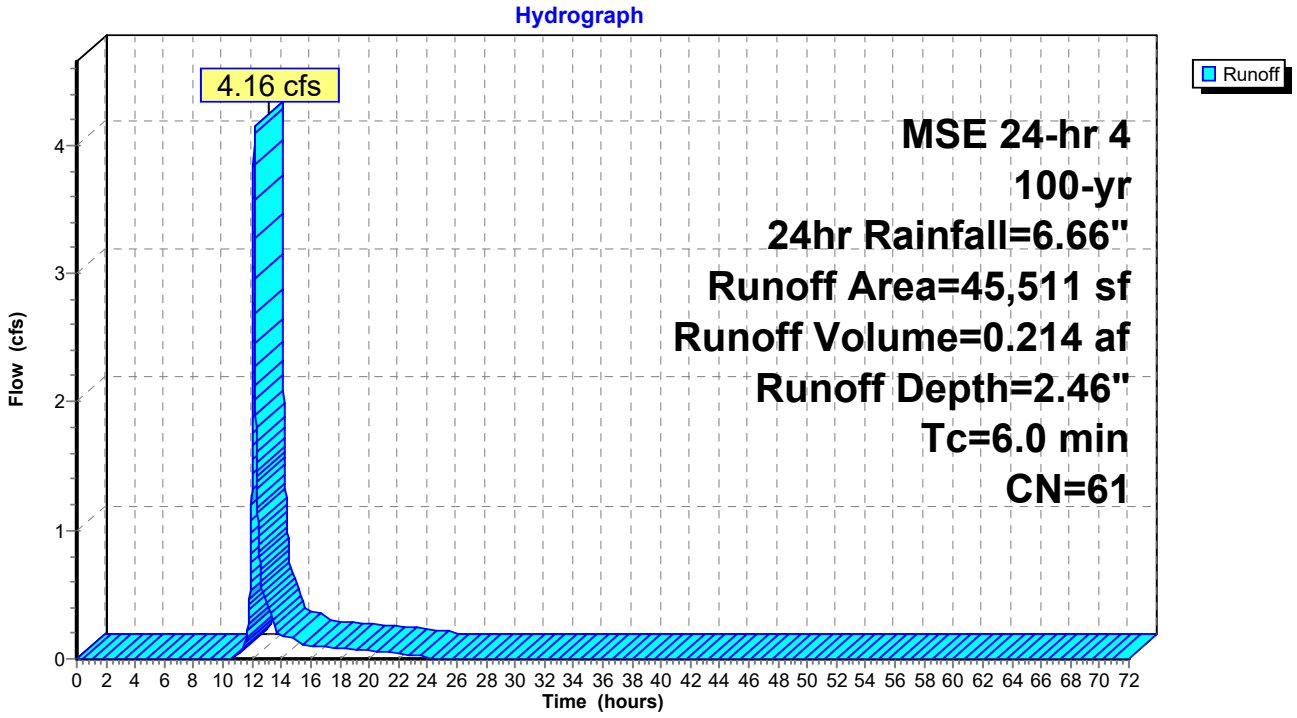
Runoff = 4.16 cfs @ 12.14 hrs, Volume= 0.214 af, Depth= 2.46"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

Area (sf)	CN	Description
45,511	61	>75% Grass cover, Good, HSG B
45,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn4: Bypass Onsite (northeast)



Summary for Subcatchment PrOn5: Bypass Onsite (northwest)

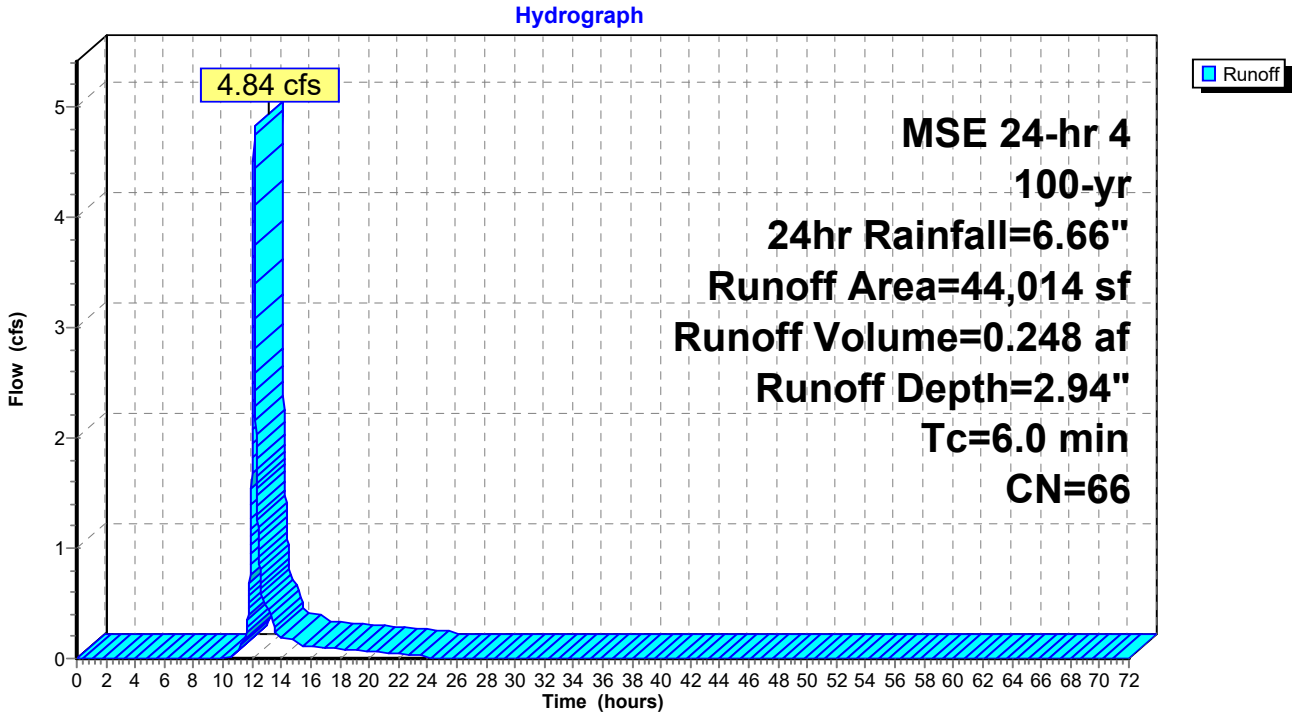
Runoff = 4.84 cfs @ 12.14 hrs, Volume= 0.248 af, Depth= 2.94"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

Area (sf)	CN	Description
26,408	61	>75% Grass cover, Good, HSG B
17,606	74	>75% Grass cover, Good, HSG C
44,014	66	Weighted Average
44,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn5: Bypass Onsite (northwest)



Summary for Subcatchment PrOn6: Bypass Onsite (west)

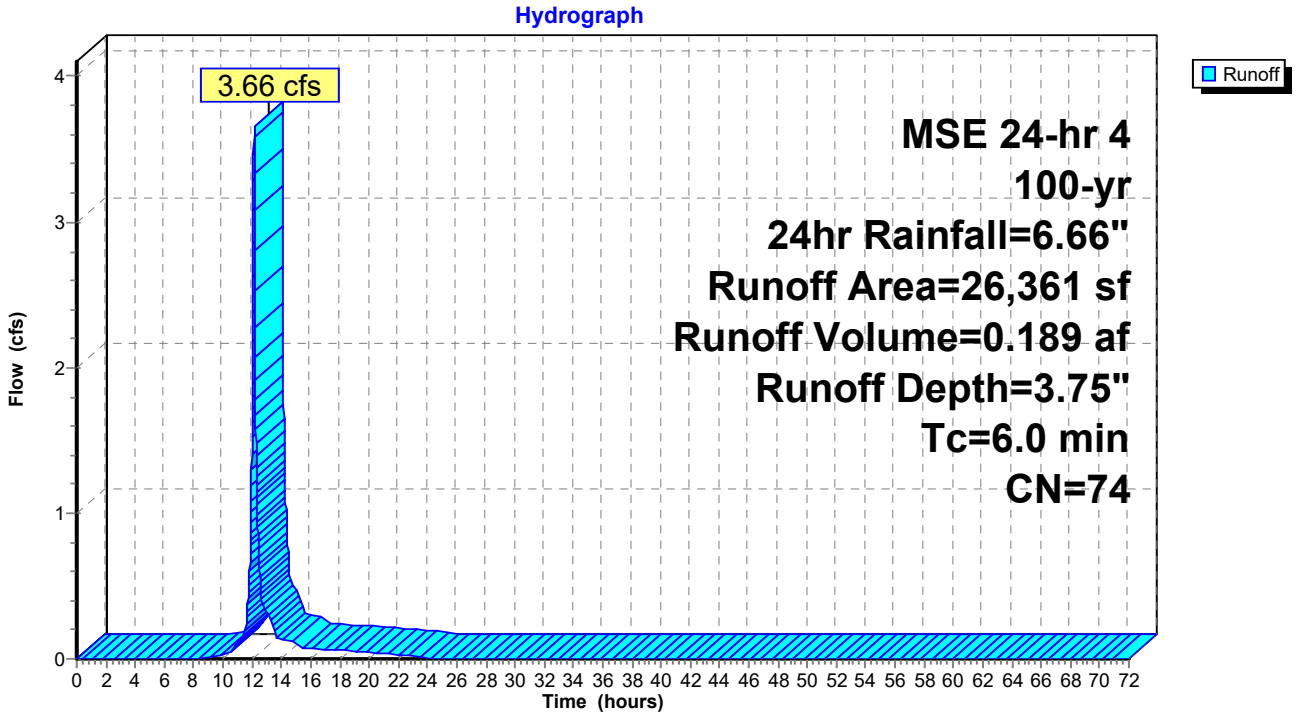
Runoff = 3.66 cfs @ 12.13 hrs, Volume= 0.189 af, Depth= 3.75"
Routed to Pond R5 : Bypass Swale 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

Area (sf)	CN	Description
26,361	74	>75% Grass cover, Good, HSG C
26,361		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn6: Bypass Onsite (west)



Summary for Subcatchment PrOn7: SE Depression Onsite

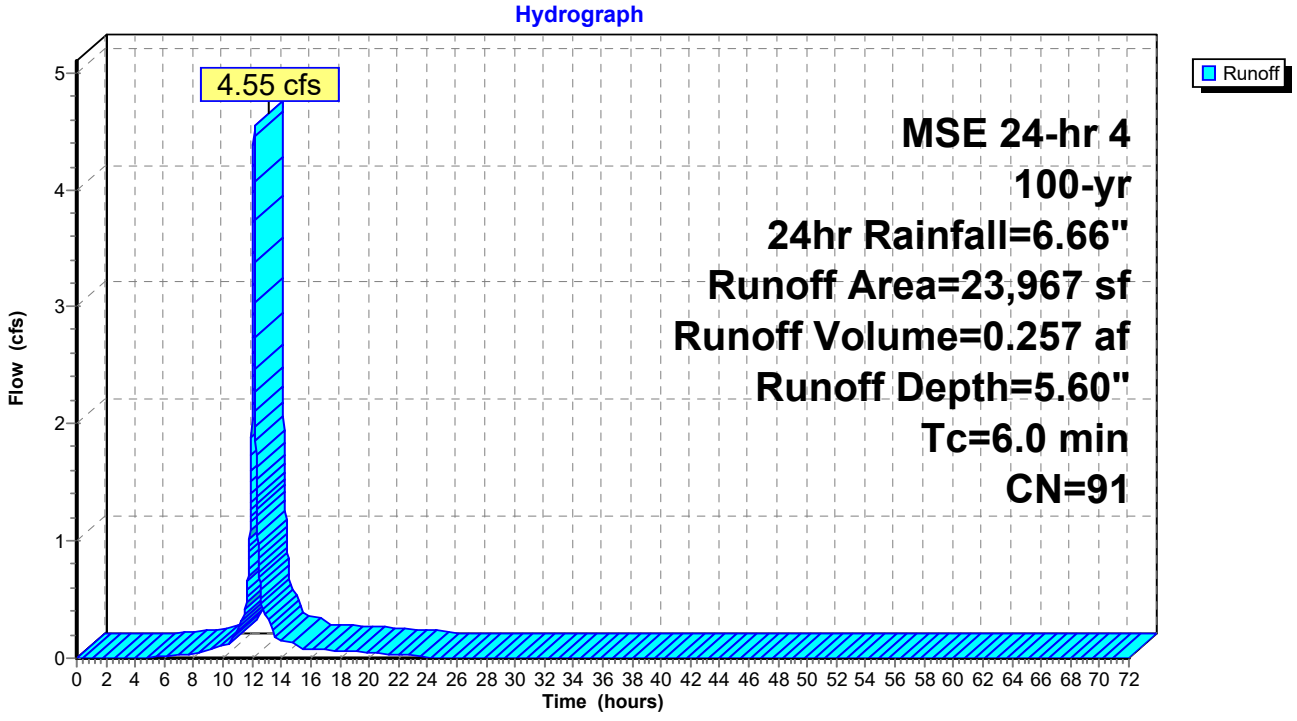
Runoff = 4.55 cfs @ 12.13 hrs, Volume= 0.257 af, Depth= 5.60"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-yr, 24hr Rainfall=6.66"

	Area (sf)	CN	Description
*	15,029	100	SE Depression
	8,938	75	1/4 acre lots, 38% imp, HSG B
	23,967	91	Weighted Average
	5,542		23.12% Pervious Area
	18,425		76.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn7: SE Depression Onsite



Summary for Reach R1: Bypass Swale 1

Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 3.12" for 100-yr, 24hr event
Inflow = 9.75 cfs @ 12.24 hrs, Volume= 0.731 af
Outflow = 9.74 cfs @ 12.25 hrs, Volume= 0.731 af, Atten= 0%, Lag= 0.4 min
Routed to Pond C1 : Bypass Culvert (Low Countries Rd east)

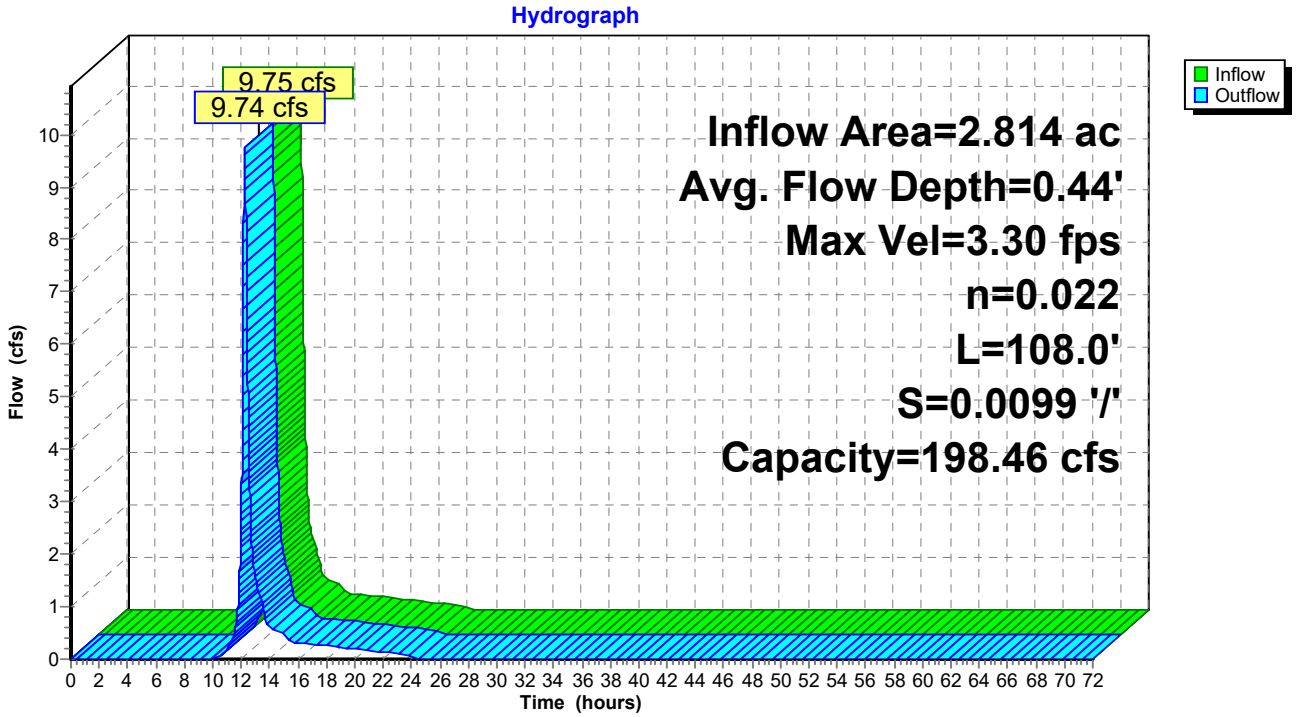
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.30 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 1.8 min

Peak Storage= 319 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.44' , Surface Width= 8.50'
Bank-Full Depth= 2.00' Flow Area= 26.0 sf, Capacity= 198.46 cfs

5.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 21.00'
Length= 108.0' Slope= 0.0099 '/'
Inlet Invert= 960.32', Outlet Invert= 959.25'



‡



Summary for Reach R2: Bypass Swale 2

Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 3.11" for 100-yr, 24hr event
Inflow = 81.19 cfs @ 12.37 hrs, Volume= 8.418 af
Outflow = 80.76 cfs @ 12.40 hrs, Volume= 8.418 af, Atten= 1%, Lag= 1.8 min
Routed to Pond C3 : Bypass Culvert (Yorktown Rd north)

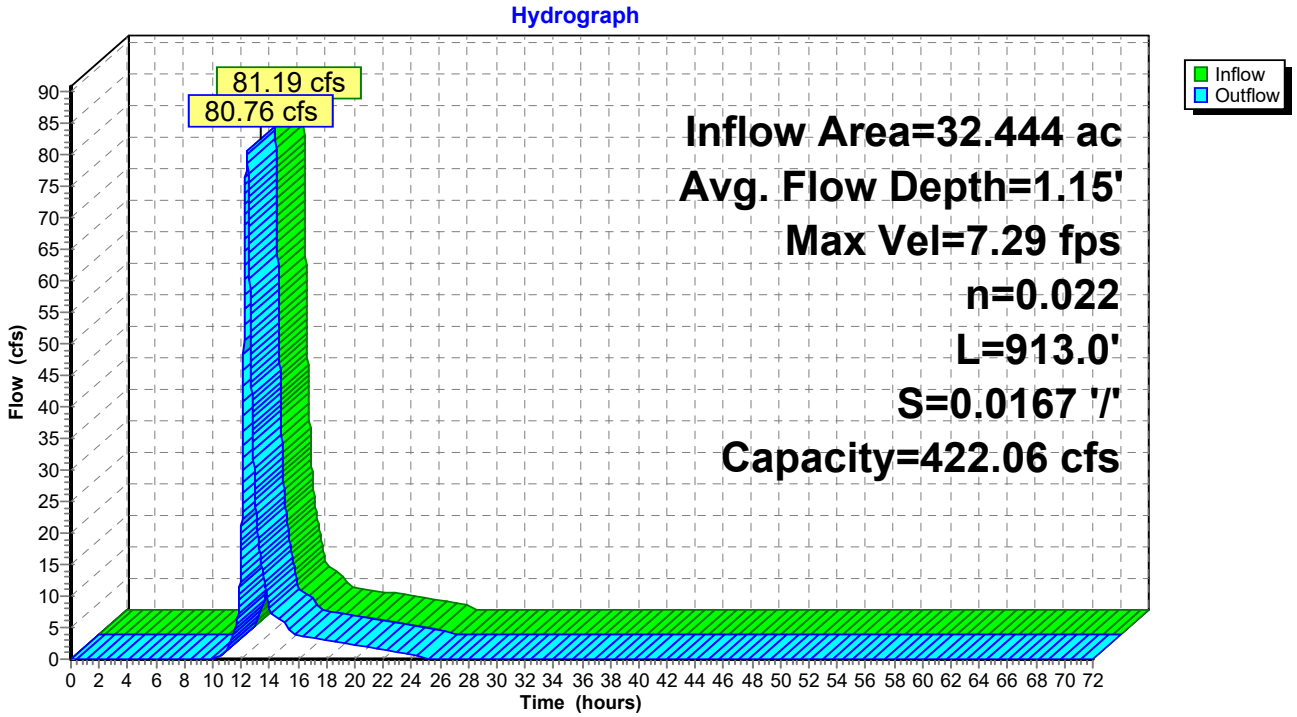
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.29 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 2.49 fps, Avg. Travel Time= 6.1 min

Peak Storage= 10,111 cf @ 12.40 hrs
Average Depth at Peak Storage= 1.15' , Surface Width= 14.22'
Bank-Full Depth= 2.50' Flow Area= 37.5 sf, Capacity= 422.06 cfs

5.00' x 2.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 25.00'
Length= 913.0' Slope= 0.0167 '/'
Inlet Invert= 956.53', Outlet Invert= 941.28'



‡



Summary for Reach R3: Bypass Swale 3

Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 3.12" for 100-yr, 24hr event
Inflow = 82.35 cfs @ 12.39 hrs, Volume= 8.760 af
Outflow = 81.77 cfs @ 12.42 hrs, Volume= 8.760 af, Atten= 1%, Lag= 1.7 min
Routed to Pond C4 : Bypass Culvert (Low Countries Rd west)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.58 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.72 fps, Avg. Travel Time= 7.7 min

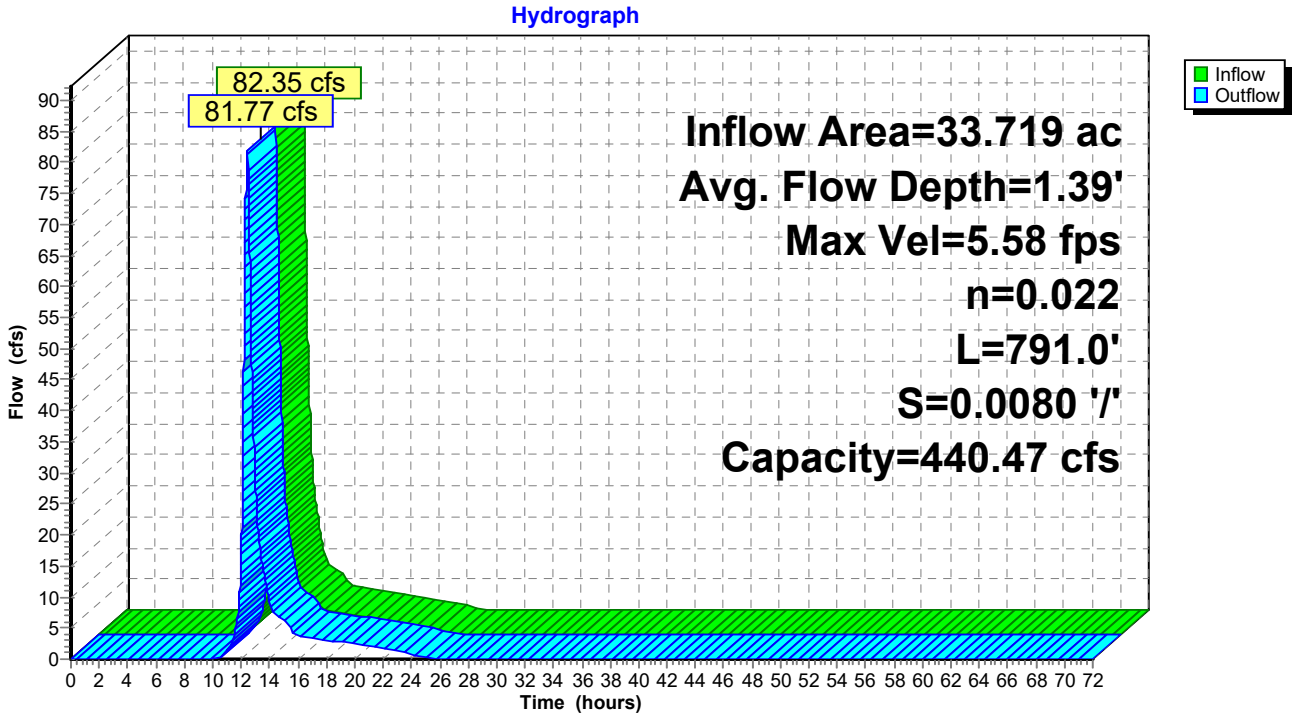
Peak Storage= 11,590 cf @ 12.42 hrs
Average Depth at Peak Storage= 1.39' , Surface Width= 16.11'
Bank-Full Depth= 3.00' Flow Area= 51.0 sf, Capacity= 440.47 cfs

5.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 29.00'
Length= 791.0' Slope= 0.0080 '/'
Inlet Invert= 940.20', Outlet Invert= 933.90'



‡

Reach R3: Bypass Swale 3



Summary for Pond C1: Bypass Culvert (Low Countries Rd east)

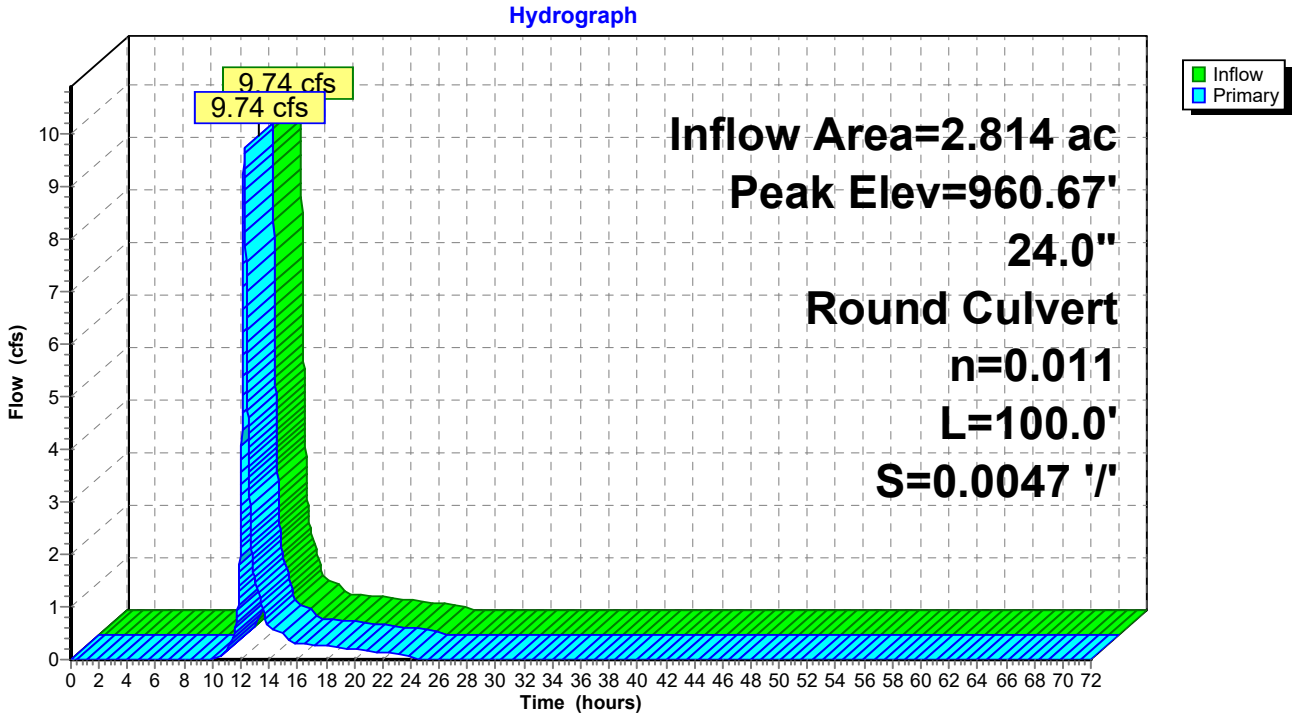
Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 3.12" for 100-yr, 24hr event
Inflow = 9.74 cfs @ 12.25 hrs, Volume= 0.731 af
Outflow = 9.74 cfs @ 12.25 hrs, Volume= 0.731 af, Atten= 0%, Lag= 0.0 min
Primary = 9.74 cfs @ 12.25 hrs, Volume= 0.731 af
Routed to Pond C2 : Bypass Culvert (east backyards)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 960.67' @ 12.25 hrs
Flood Elev= 962.57'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.60'	**24.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.60' / 958.13' S= 0.0047 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=9.83 cfs @ 12.25 hrs HW=960.67' TW=960.26' (Dynamic Tailwater)
1=Culvert (Outlet Controls 9.83 cfs @ 3.75 fps)

Pond C1: Bypass Culvert (Low Countries Rd east)



Summary for Pond C2: Bypass Culvert (east backyards)

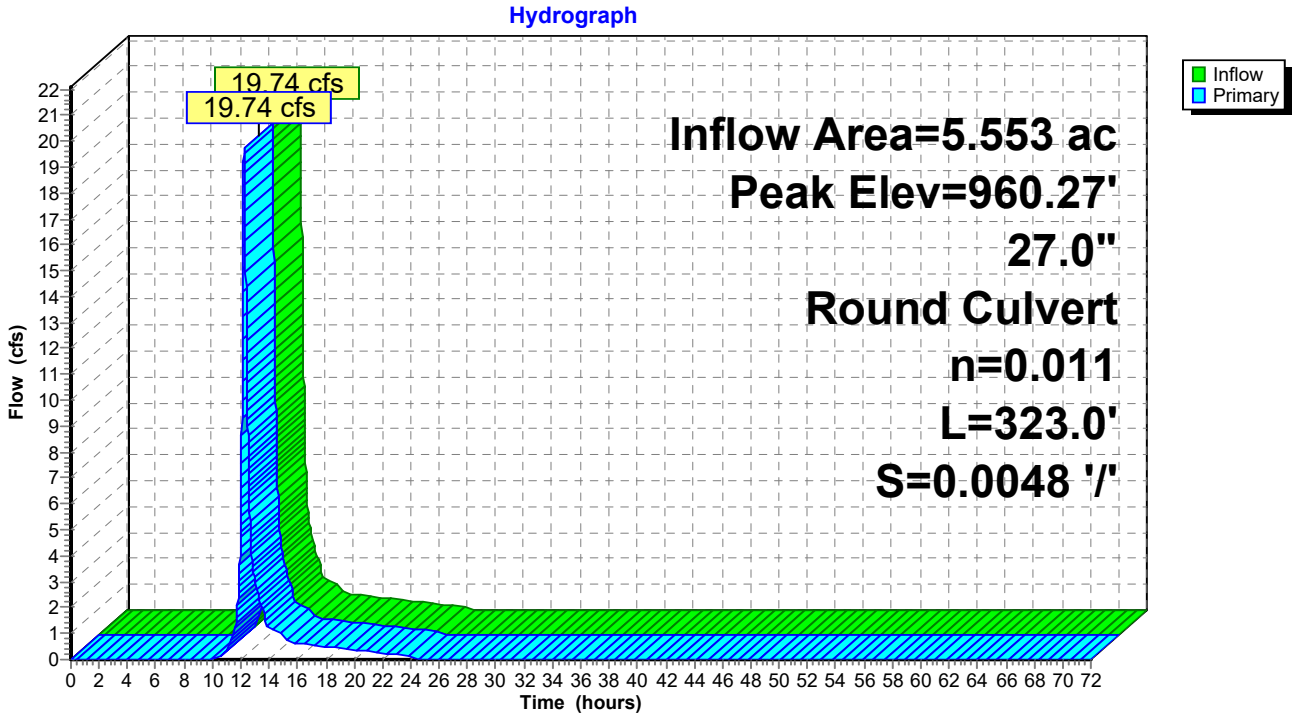
Inflow Area = 5.553 ac, 0.00% Impervious, Inflow Depth = 3.13" for 100-yr, 24hr event
Inflow = 19.74 cfs @ 12.24 hrs, Volume= 1.447 af
Outflow = 19.74 cfs @ 12.24 hrs, Volume= 1.447 af, Atten= 0%, Lag= 0.0 min
Primary = 19.74 cfs @ 12.24 hrs, Volume= 1.447 af
Routed to Reach R2 : Bypass Swale 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 960.27' @ 12.24 hrs
Flood Elev= 963.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.13'	**27.0" Round Culvert** L= 323.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.13' / 956.59' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=19.73 cfs @ 12.24 hrs HW=960.27' TW=957.54' (Dynamic Tailwater)
1=Culvert (Barrel Controls 19.73 cfs @ 6.51 fps)

Pond C2: Bypass Culvert (east backyards)



Summary for Pond C3: Bypass Culvert (Yorktown Rd north)

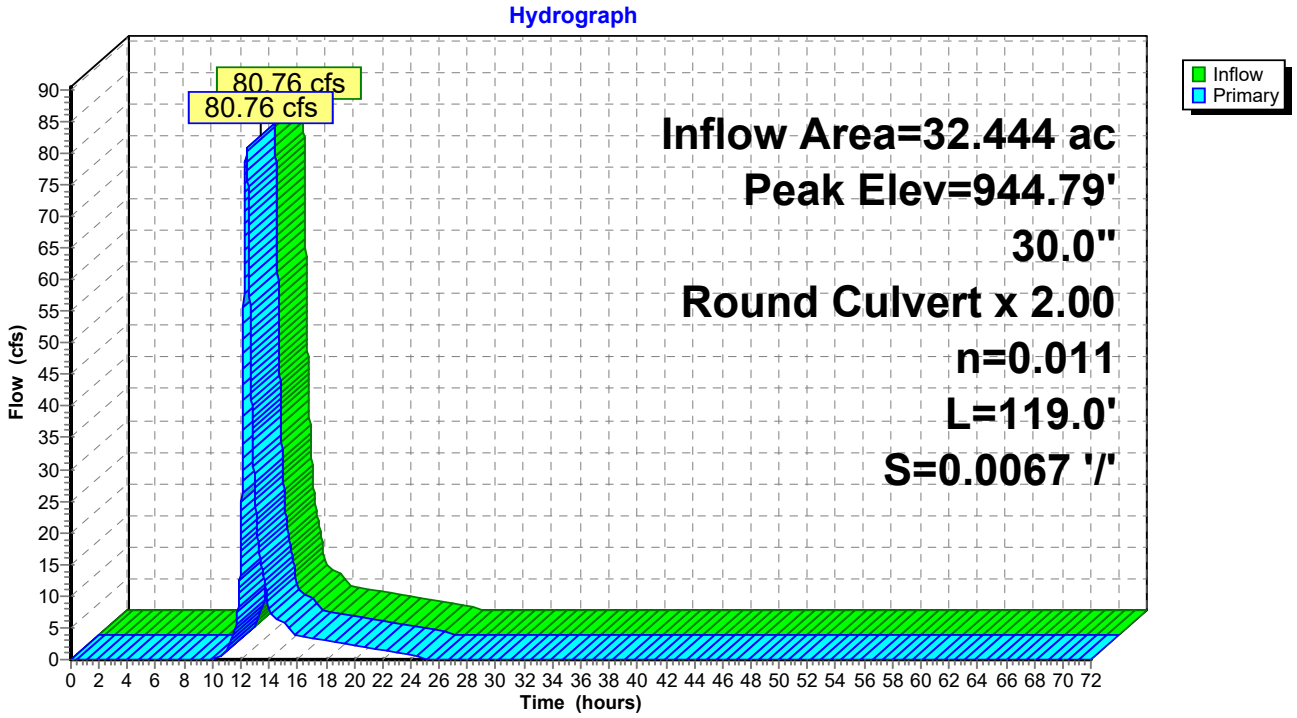
Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 3.11" for 100-yr, 24hr event
Inflow = 80.76 cfs @ 12.40 hrs, Volume= 8.418 af
Outflow = 80.76 cfs @ 12.40 hrs, Volume= 8.418 af, Atten= 0%, Lag= 0.0 min
Primary = 80.76 cfs @ 12.40 hrs, Volume= 8.418 af
Routed to Reach R3 : Bypass Swale 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 944.79' @ 12.40 hrs
Flood Elev= 946.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	941.00'	**30.0" Round Culvert X 2.00** L= 119.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 941.00' / 940.20' S= 0.0067 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=80.75 cfs @ 12.40 hrs HW=944.79' TW=941.58' (Dynamic Tailwater)
1=Culvert (Barrel Controls 80.75 cfs @ 8.22 fps)

Pond C3: Bypass Culvert (Yorktown Rd north)



Summary for Pond C4: Bypass Culvert (Low Countries Rd west)

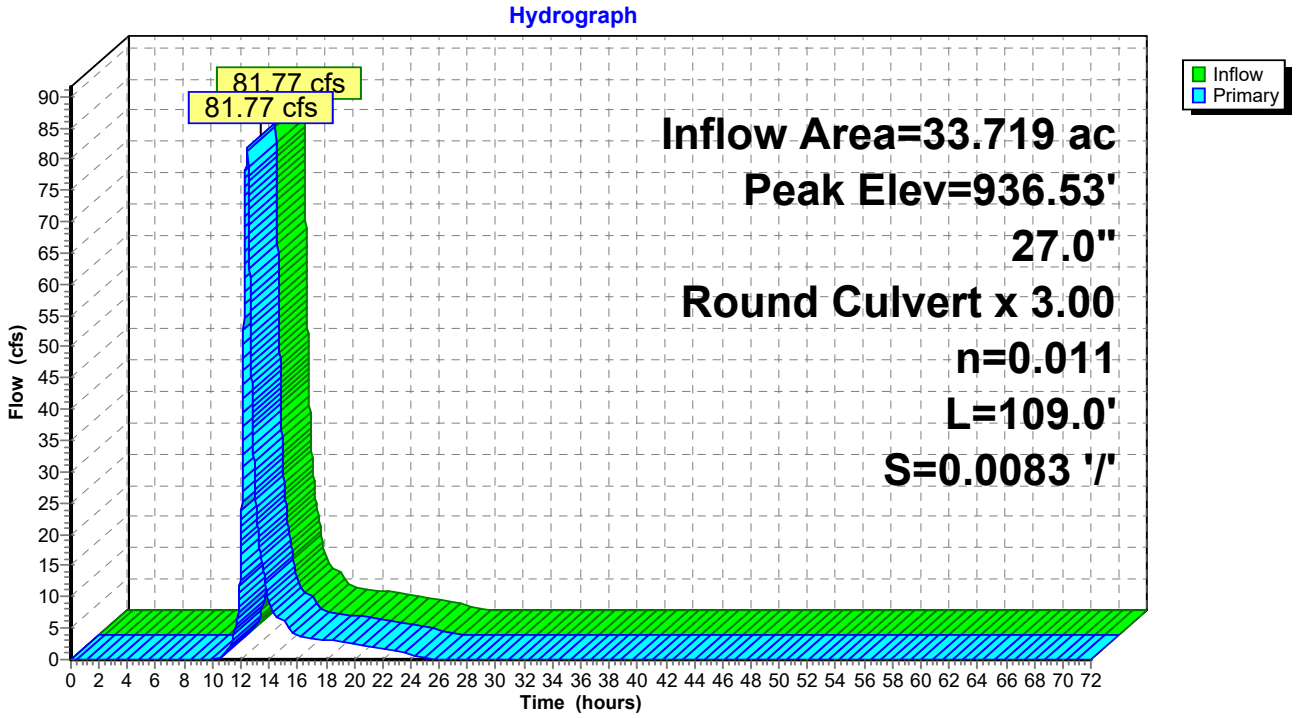
Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 3.12" for 100-yr, 24hr event
Inflow = 81.77 cfs @ 12.42 hrs, Volume= 8.760 af
Outflow = 81.77 cfs @ 12.42 hrs, Volume= 8.760 af, Atten= 0%, Lag= 0.0 min
Primary = 81.77 cfs @ 12.42 hrs, Volume= 8.760 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 936.53' @ 12.42 hrs
Flood Elev= 937.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	933.90'	**27.0" Round Culvert X 3.00** L= 109.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 933.90' / 933.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=81.76 cfs @ 12.42 hrs HW=936.53' TW=932.03' (Dynamic Tailwater)
1=Culvert (Barrel Controls 81.76 cfs @ 7.37 fps)

Pond C4: Bypass Culvert (Low Countries Rd west)



Summary for Pond PrP1: SE Existing Depression

Inflow Area = 15.371 ac, 2.78% Impervious, Inflow Depth = 3.23" for 100-yr, 24hr event
Inflow = 47.52 cfs @ 12.30 hrs, Volume= 4.132 af
Outflow = 14.62 cfs @ 12.75 hrs, Volume= 4.132 af, Atten= 69%, Lag= 27.2 min
Discarded = 0.26 cfs @ 12.75 hrs, Volume= 0.167 af
Primary = 4.64 cfs @ 14.13 hrs, Volume= 2.911 af
Routed to Pond PrP2 : Wet Pond
Secondary = 9.80 cfs @ 12.75 hrs, Volume= 1.053 af
Routed to Pond PrP2 : Wet Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 956.23' @ 12.75 hrs Surf.Area= 85,085 sf Storage= 72,215 cf

Plug-Flow detention time= 104.6 min calculated for 4.131 af (100% of inflow)
Center-of-Mass det. time= 104.7 min (936.5 - 831.8)

Volume	Invert	Avail.Storage	Storage Description
#1	954.50'	122,348 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.50	5,787	0	0
955.00	19,221	6,252	6,252
956.00	76,066	47,644	53,896
956.50	95,900	42,992	96,887
956.75	107,787	25,461	122,348

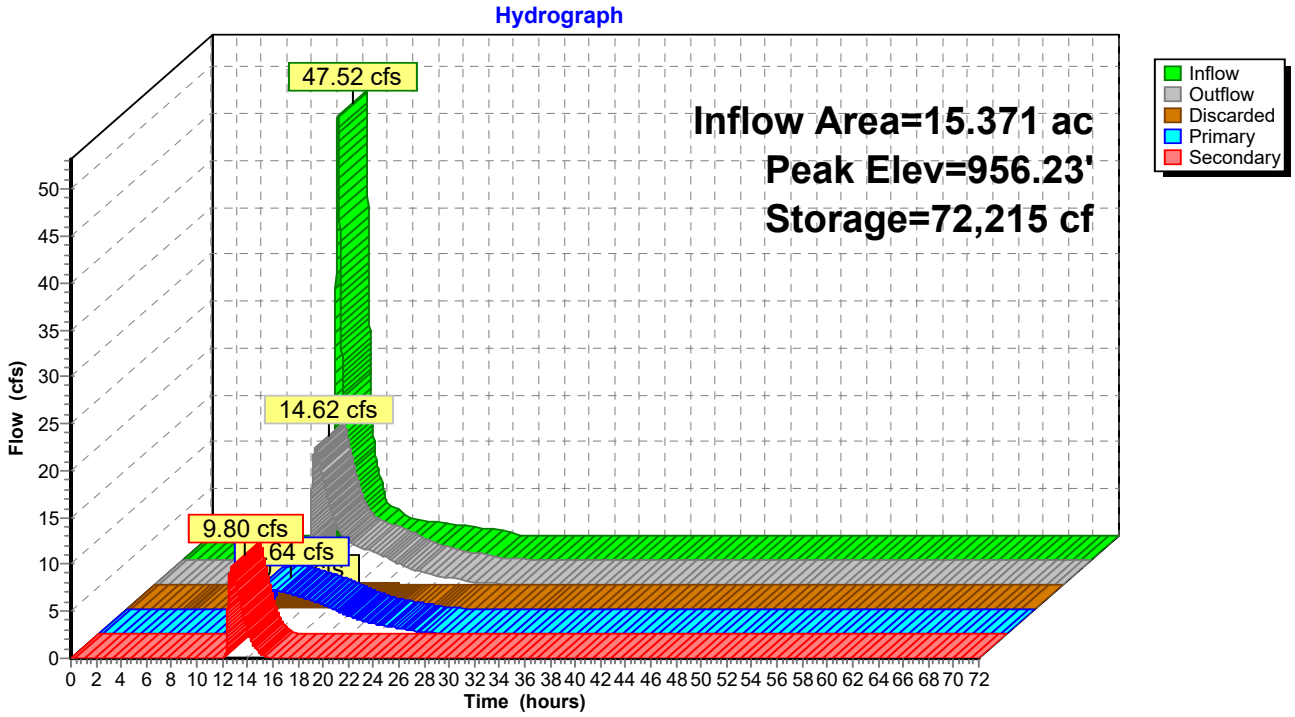
Device	Routing	Invert	Outlet Devices
#1	Discarded	954.50'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 900.00'
#2	Secondary	955.75'	**10.0' long + 4.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Primary	954.50'	**12.0" Round Culvert** L= 1,700.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 954.50' / 931.50' S= 0.0135 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.26 cfs @ 12.75 hrs HW=956.23' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.26 cfs)

Primary OutFlow Max=4.64 cfs @ 14.13 hrs HW=955.96' TW=934.61' (Dynamic Tailwater)
↑—**3=Culvert** (Outlet Controls 4.64 cfs @ 5.91 fps)

Secondary OutFlow Max=9.80 cfs @ 12.75 hrs HW=956.23' TW=935.55' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 9.80 cfs @ 1.72 fps)

Pond PrP1: SE Existing Depression



Summary for Pond PrP2: Wet Pond

Inflow Area = 47.275 ac, 27.42% Impervious, Inflow Depth = 3.67" for 100-yr, 24hr event
Inflow = 205.59 cfs @ 12.13 hrs, Volume= 14.460 af
Outflow = 36.70 cfs @ 12.65 hrs, Volume= 14.367 af, Atten= 82%, Lag= 30.8 min
Primary = 36.70 cfs @ 12.65 hrs, Volume= 14.367 af
Routed to Pond PrP3 : Infiltration Basin
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Automatic Starting Elev= 931.50' Surf.Area= 45,103 sf Storage= 190,807 cf
Peak Elev= 935.55' @ 12.65 hrs Surf.Area= 60,948 sf Storage= 405,247 cf (214,440 cf above start)

Plug-Flow detention time= 315.3 min calculated for 9.985 af (69% of inflow)
Center-of-Mass det. time= 125.6 min (967.6 - 842.0)

Volume	Invert	Avail.Storage	Storage Description
#1	925.50'	545,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

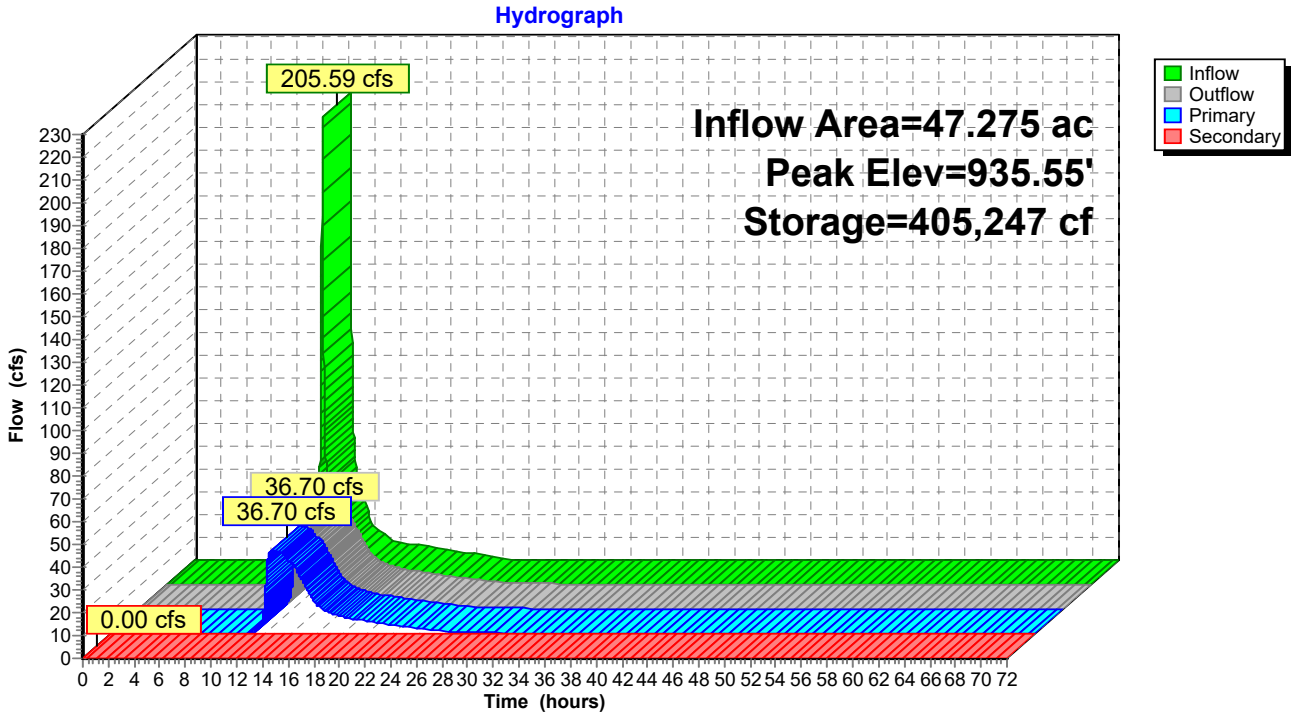
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
925.50	23,915	0	0
930.50	36,156	150,178	150,178
931.50	45,103	40,630	190,807
932.50	48,857	46,980	237,787
933.50	52,712	50,785	288,572
934.50	56,667	54,690	343,261
935.50	60,723	58,695	401,956
936.50	64,880	62,802	464,758
937.50	69,137	67,009	531,766
937.70	70,001	13,914	545,680

Device	Routing	Invert	Outlet Devices
#1	Primary	931.50'	**30.0" Round Culvert** L= 263.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 931.50' / 930.50' S= 0.0038 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	936.70'	**10.0' long + 4.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=36.70 cfs @ 12.65 hrs HW=935.55' TW=932.26' (Dynamic Tailwater)
1=Culvert (Barrel Controls 36.70 cfs @ 7.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=931.50' TW=930.50' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PrP2: Wet Pond



Summary for Pond PrP3: Infiltration Basin

Inflow Area = 52.413 ac, 30.94% Impervious, Inflow Depth > 3.78" for 100-yr, 24hr event
Inflow = 68.87 cfs @ 12.14 hrs, Volume= 16.526 af
Outflow = 41.81 cfs @ 12.90 hrs, Volume= 15.465 af, Atten= 39%, Lag= 45.8 min
Discarded = 0.21 cfs @ 12.72 hrs, Volume= 1.011 af
Primary = 41.60 cfs @ 12.90 hrs, Volume= 14.454 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 932.27' @ 12.72 hrs Surf.Area= 68,267 sf Storage= 113,738 cf

Plug-Flow detention time= 165.0 min calculated for 15.463 af (94% of inflow)
Center-of-Mass det. time= 108.2 min (1,051.8 - 943.6)

Volume	Invert	Avail.Storage	Storage Description
#1	930.50'	400,616 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

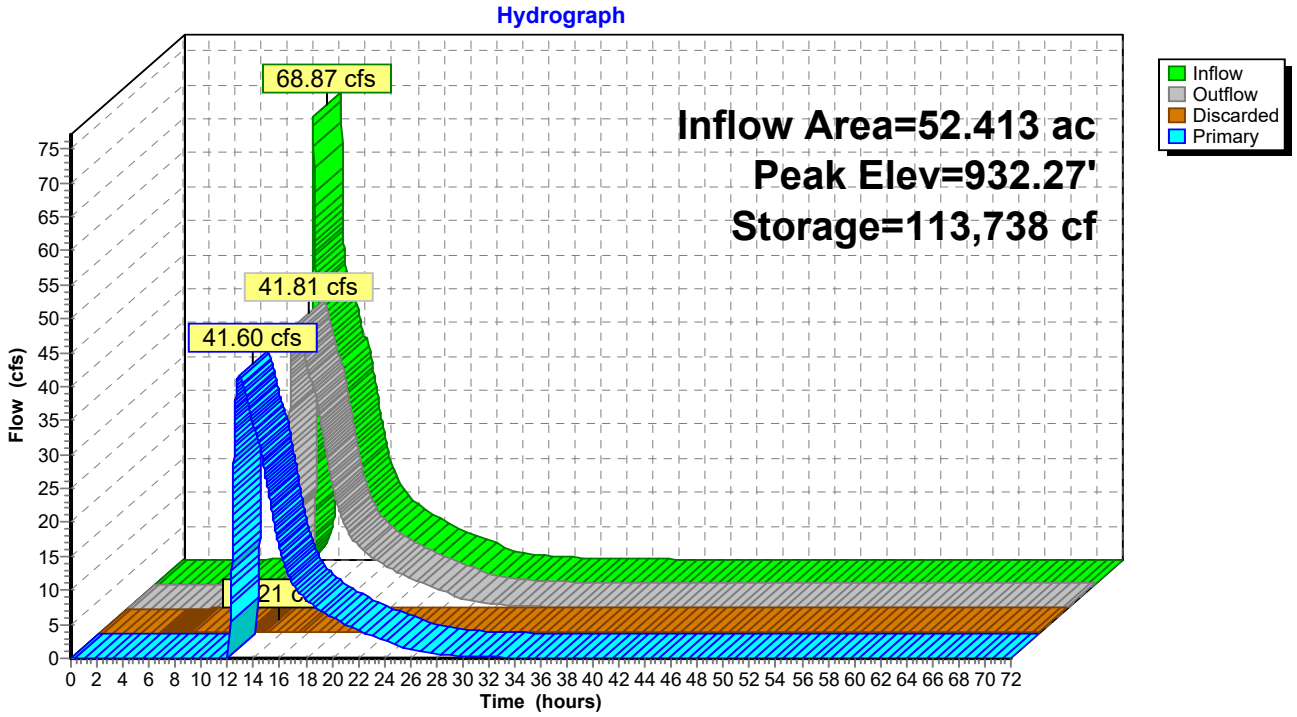
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
930.50	60,505	0	0
931.00	62,666	30,793	30,793
932.00	67,065	64,866	95,658
933.00	71,564	69,315	164,973
934.00	76,164	73,864	238,837
935.00	80,865	78,515	317,351
936.00	85,665	83,265	400,616

Device	Routing	Invert	Outlet Devices
#1	Discarded	930.50'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'
#2	Primary	931.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.50 932.00 933.00 934.00 935.00 936.00 Width (feet) 20.00 24.00 32.00 40.00 48.00 56.00

Discarded OutFlow Max=0.21 cfs @ 12.72 hrs HW=932.27' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.21 cfs)

Primary OutFlow Max=41.71 cfs @ 12.90 hrs HW=932.26' TW=931.91' (Dynamic Tailwater)
↑—**2=Custom Weir/Orifice** (Weir Controls 41.71 cfs @ 2.40 fps)

Pond PrP3: Infiltration Basin



Summary for Pond R5: Bypass Swale 5

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 3.24" for 100-yr, 24hr event
Inflow = 109.27 cfs @ 12.49 hrs, Volume= 23.403 af
Outflow = 109.27 cfs @ 12.49 hrs, Volume= 23.403 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.49 hrs, Volume= 0.002 af
Primary = 109.27 cfs @ 12.49 hrs, Volume= 23.401 af
Routed to Link PrL : Pro Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 932.04' @ 12.49 hrs Surf.Area= 1,123 sf Storage= 438 cf

Plug-Flow detention time= 0.1 min calculated for 23.399 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (918.0 - 918.0)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	21,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

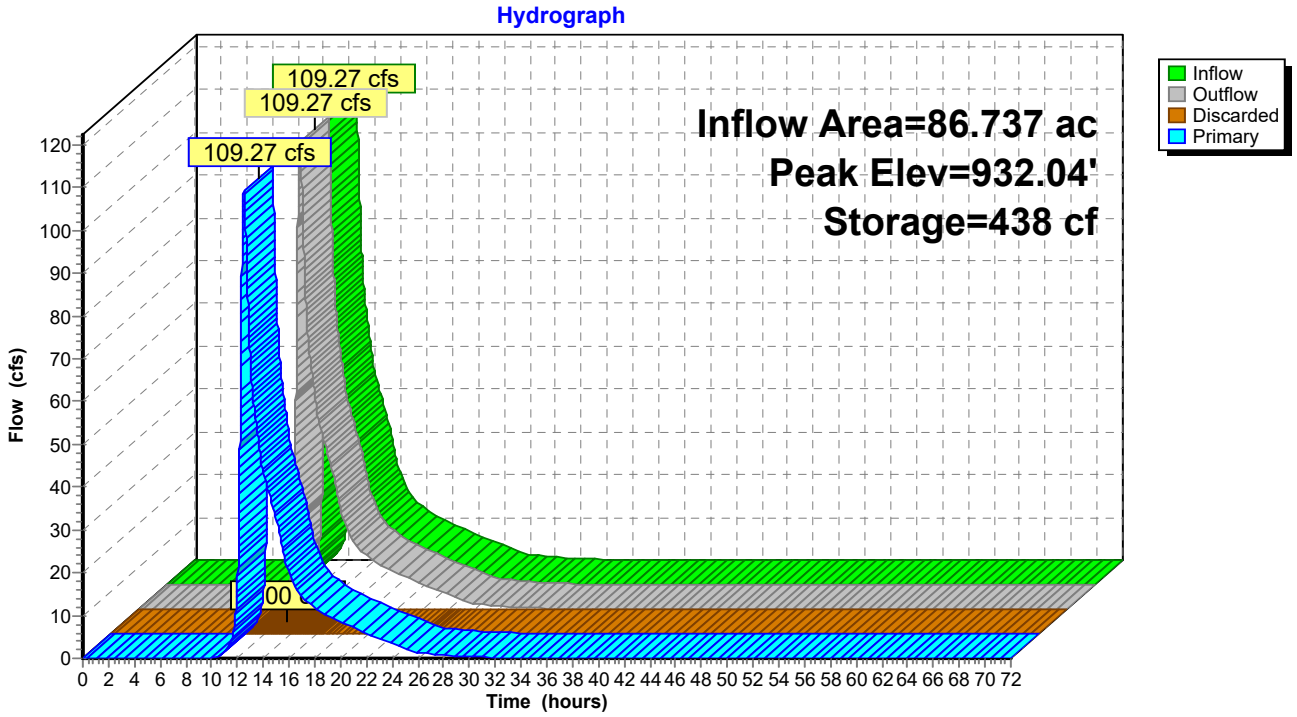
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	973	399	399
933.00	4,970	2,972	3,370
934.00	8,803	6,887	10,257
935.00	13,565	11,184	21,441

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.49 hrs HW=932.04' (Free Discharge)
↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=109.25 cfs @ 12.49 hrs HW=932.04' TW=0.00' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 109.25 cfs @ 2.49 fps)

Pond R5: Bypass Swale 5



Summary for Link PrL: Pro Total

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 3.24" for 100-yr, 24hr event
Inflow = 109.27 cfs @ 12.49 hrs, Volume= 23.401 af
Primary = 109.27 cfs @ 12.49 hrs, Volume= 23.401 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PrL: Pro Total

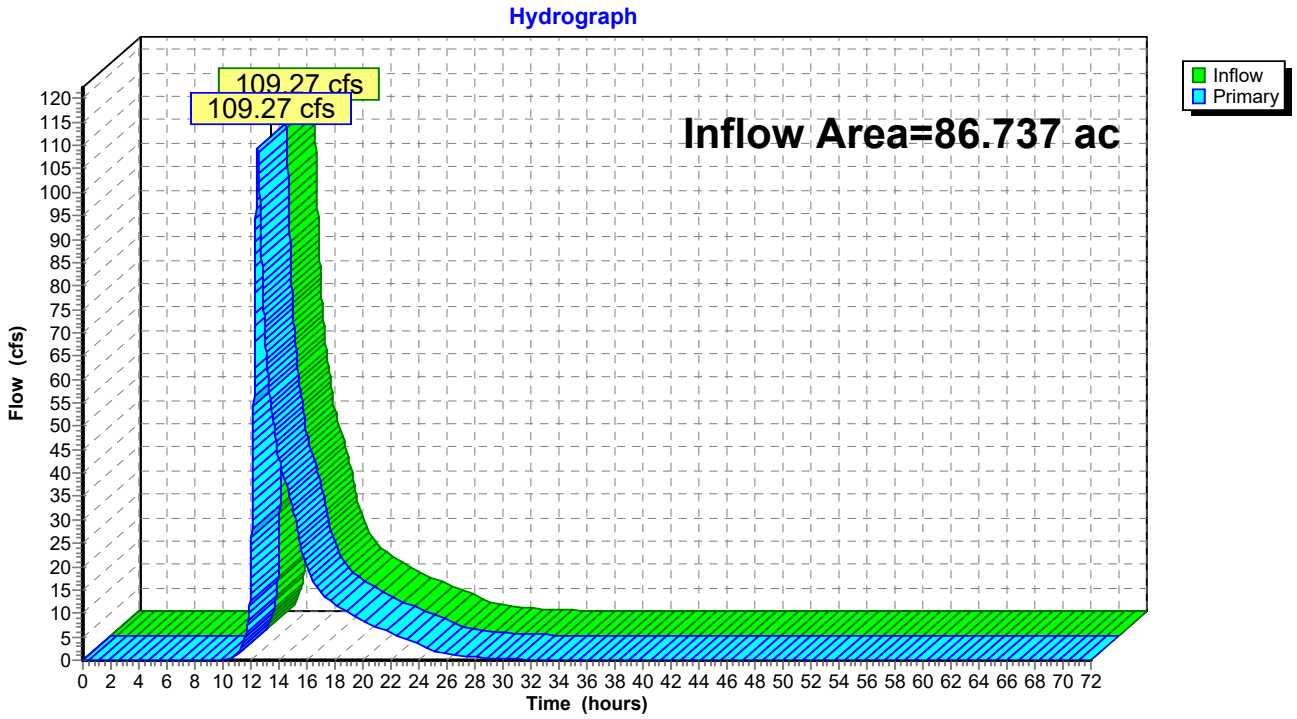
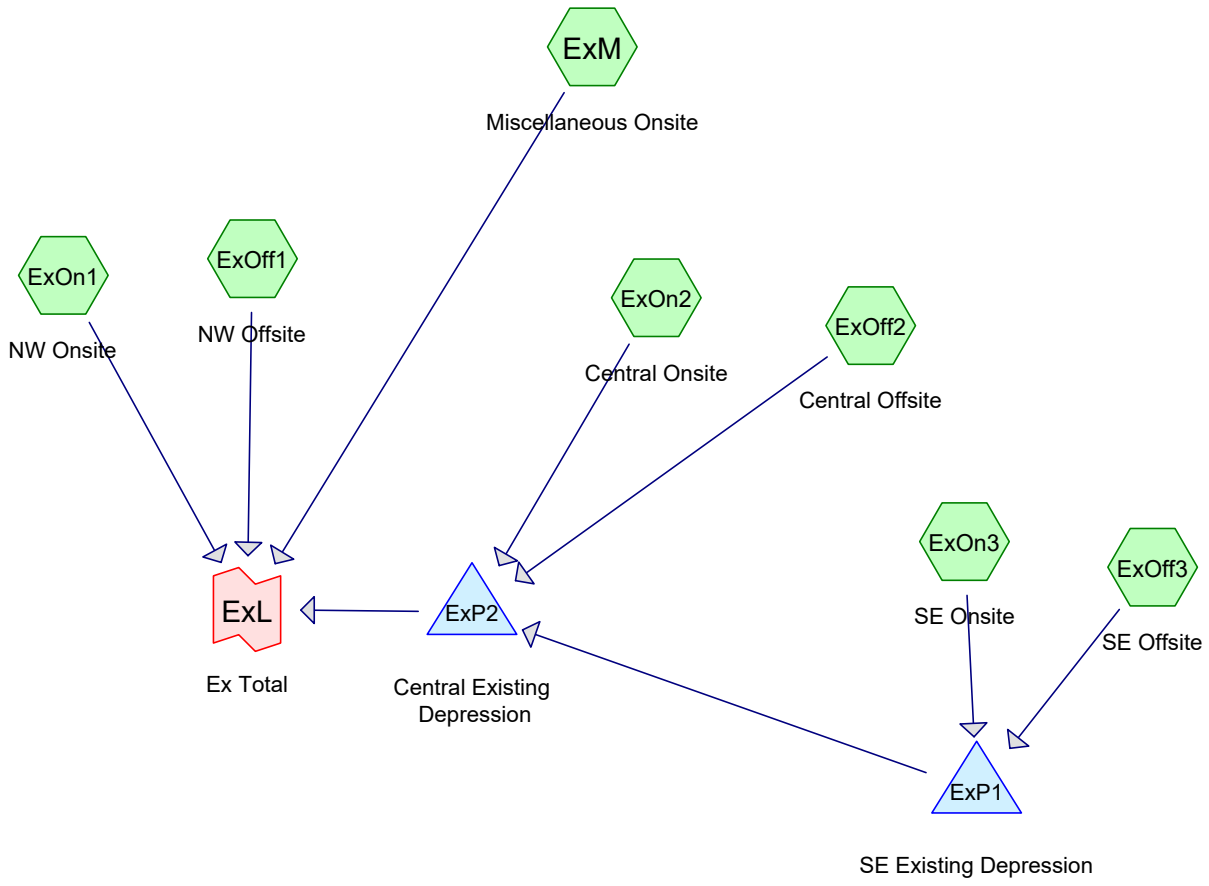


Exhibit 9

200-Year HydroCAD Results

Existing



Subcat Reach Pond Link

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentExM: MiscellaneousOnsite Runoff Area=2,540 sf 0.00% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=68 Runoff=0.36 cfs 0.019 af

SubcatchmentExOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=68 Runoff=0.14 cfs 0.007 af

SubcatchmentExOff2: Central Offsite Runoff Area=1,466,288 sf 2.41% Impervious Runoff Depth=3.84"
Flow Length=3,502' Tc=51.7 min CN=68 Runoff=75.02 cfs 10.782 af

SubcatchmentExOff3: SE Offsite Runoff Area=670,631 sf 2.40% Impervious Runoff Depth=3.95"
Flow Length=1,396' Tc=20.1 min CN=69 Runoff=60.65 cfs 5.072 af

SubcatchmentExOn1: NW Onsite Runoff Area=42,806 sf 0.00% Impervious Runoff Depth=4.40"
Flow Length=386' Tc=8.2 min CN=73 Runoff=6.37 cfs 0.360 af

SubcatchmentExOn2: Central Onsite Runoff Area=1,554,006 sf 0.53% Impervious Runoff Depth=3.84"
Flow Length=1,792' Slope=0.0168 '/' Tc=25.6 min CN=68 Runoff=120.38 cfs 11.427 af

SubcatchmentExOn3: SE Onsite Runoff Area=41,039 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=311' Tc=13.4 min CN=68 Runoff=4.37 cfs 0.302 af

Pond ExP1: SE Existing Depression Peak Elev=956.54' Storage=122,901 cf Inflow=64.21 cfs 5.374 af
Discarded=0.38 cfs 1.585 af Primary=15.31 cfs 2.633 af Outflow=15.69 cfs 4.218 af

Pond ExP2: Central Existing Depression Peak Elev=932.21' Storage=906 cf Inflow=168.04 cfs 24.842 af
Discarded=0.02 cfs 0.001 af Primary=167.93 cfs 24.841 af Outflow=167.96 cfs 24.842 af

Link ExL: Ex Total Inflow=169.65 cfs 25.226 af
Primary=169.65 cfs 25.226 af

Total Runoff Area = 86.737 ac Runoff Volume = 27.968 af Average Runoff Depth = 3.87"
98.42% Pervious = 85.367 ac 1.58% Impervious = 1.370 ac

Summary for Subcatchment ExM: Miscellaneous Onsite

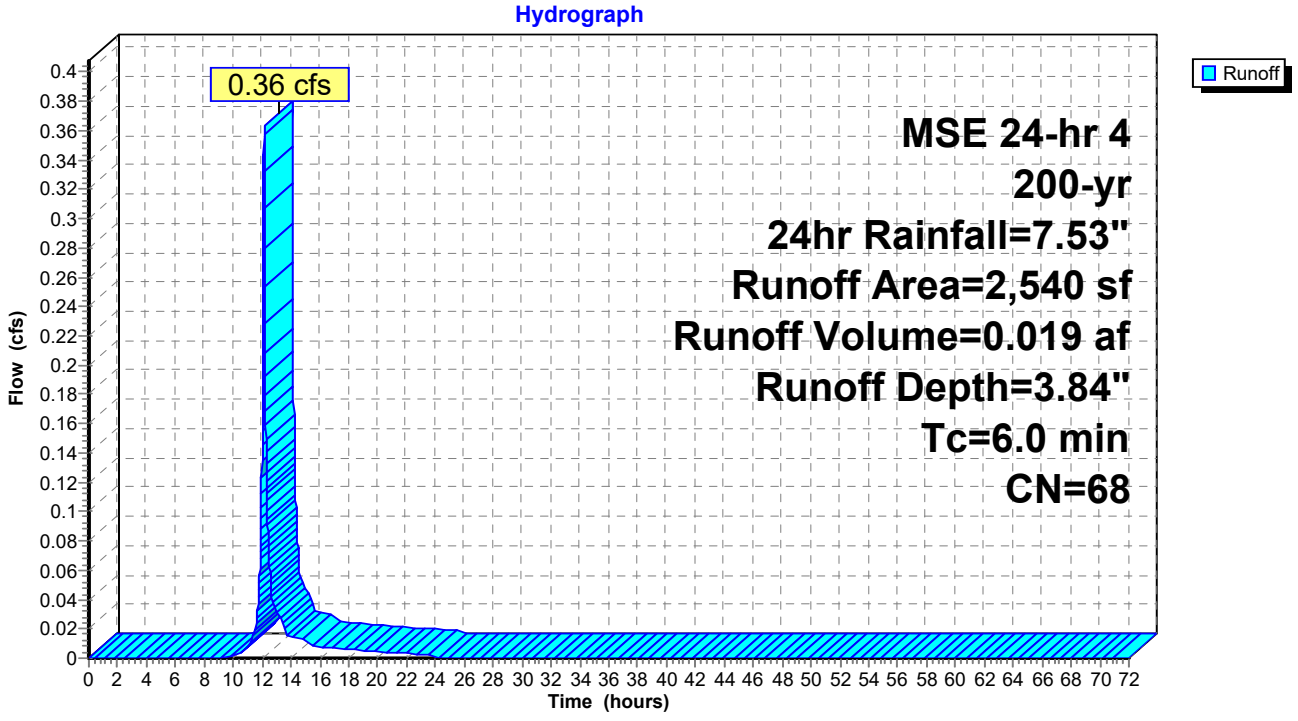
Runoff = 0.36 cfs @ 12.13 hrs, Volume= 0.019 af, Depth= 3.84"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	1,288	68	Cropland, HSG B Onsite
*	638	68	Cropland, HSG B Onsite
*	614	68	Cropland, HSG B Onsite
	2,540	68	Weighted Average
	2,540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExM: Miscellaneous Onsite



Summary for Subcatchment ExOff1: NW Offsite

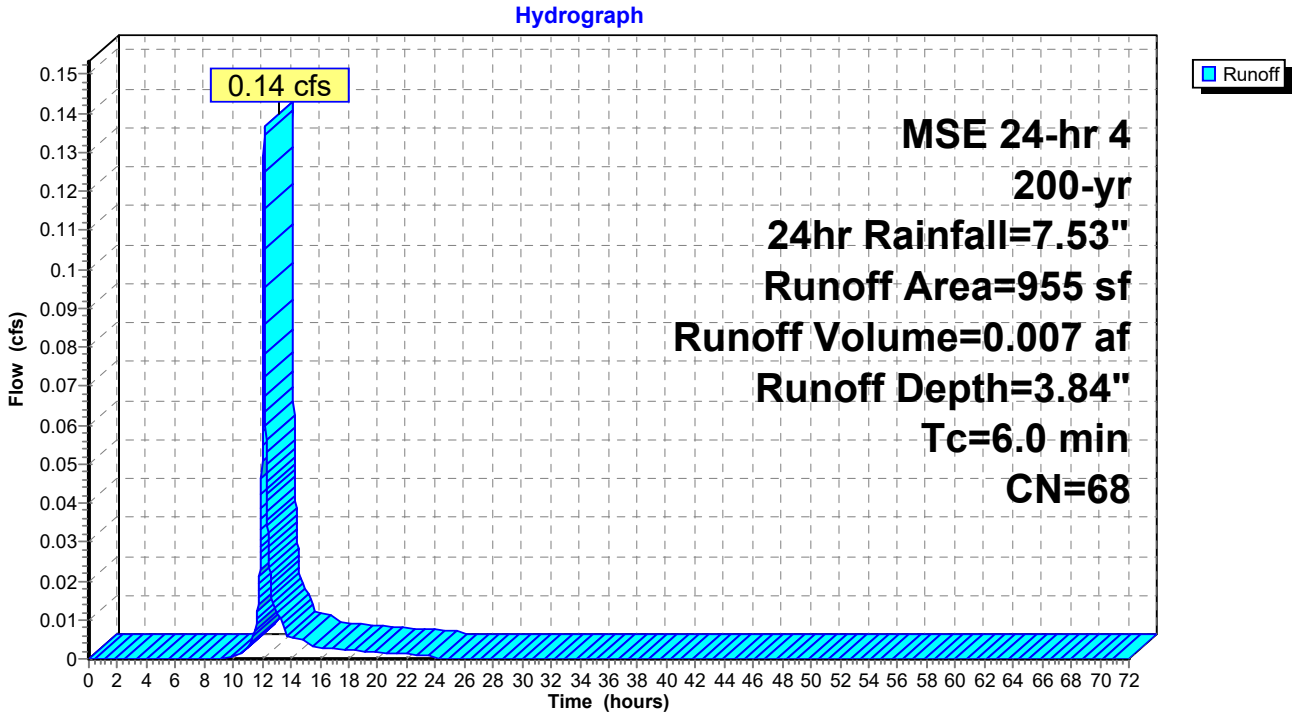
Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.007 af, Depth= 3.84"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment ExOff1: NW Offsite



Summary for Subcatchment ExOff2: Central Offsite

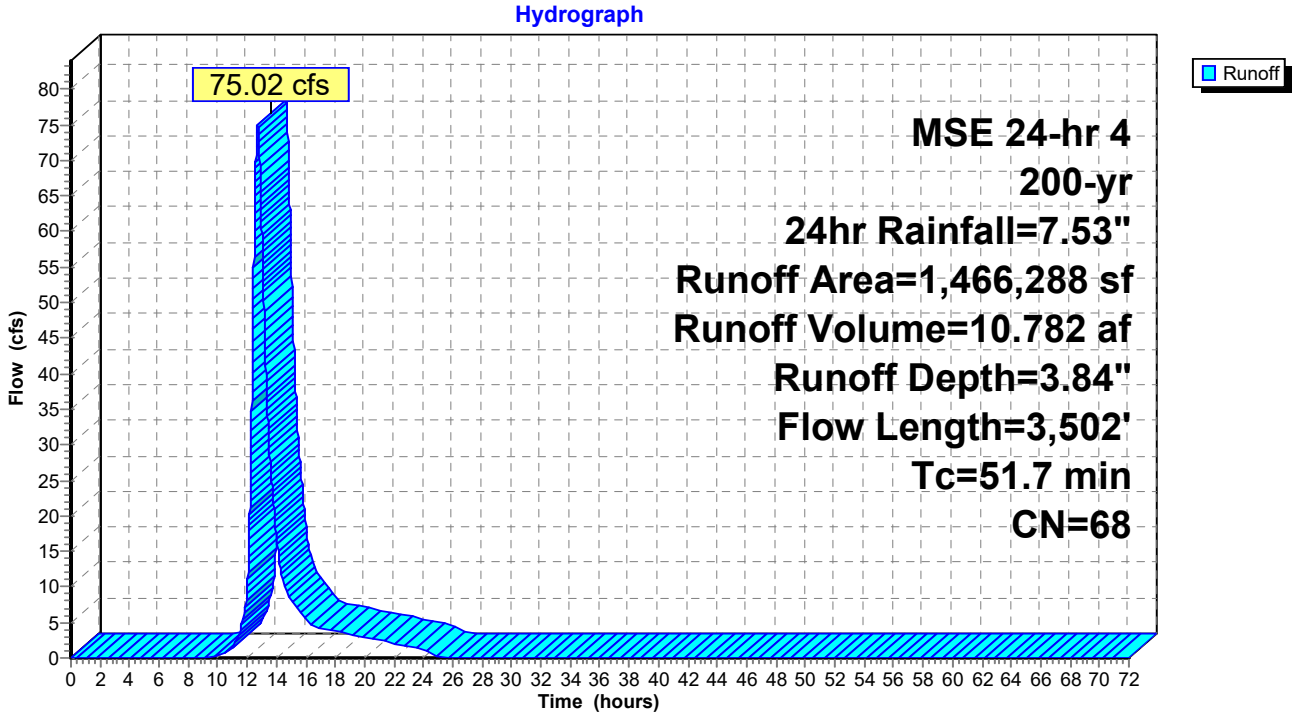
Runoff = 75.02 cfs @ 12.70 hrs, Volume= 10.782 af, Depth= 3.84"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	1,353,095	68	Cropland, HSG B Offsite
*	93,231	70	1/2 acre lots, 25% imp, HSG B Offsite
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
*	9,410	98	Pavement Offsite
	1,466,288	68	Weighted Average
	1,430,932		97.59% Pervious Area
	35,356		2.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
46.7	3,392	0.0181	1.21		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
51.7	3,502	Total			

Subcatchment ExOff2: Central Offsite



Summary for Subcatchment ExOff3: SE Offsite

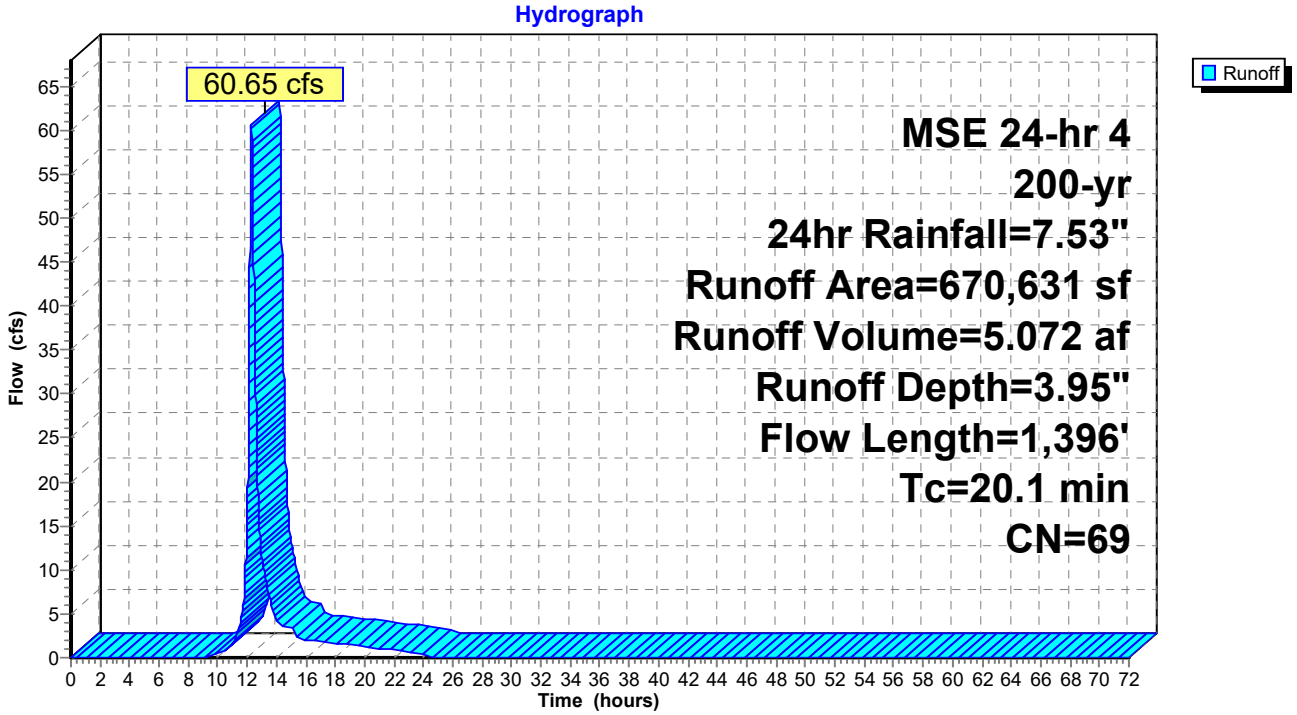
Runoff = 60.65 cfs @ 12.30 hrs, Volume= 5.072 af, Depth= 3.95"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	640,930	68	Cropland, HSG B Offsite
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	11,569	98	Pavement Offsite
	670,631	69	Weighted Average
	654,529		97.60% Pervious Area
	16,102		2.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment ExOff3: SE Offsite



Summary for Subcatchment ExOn1: NW Onsite

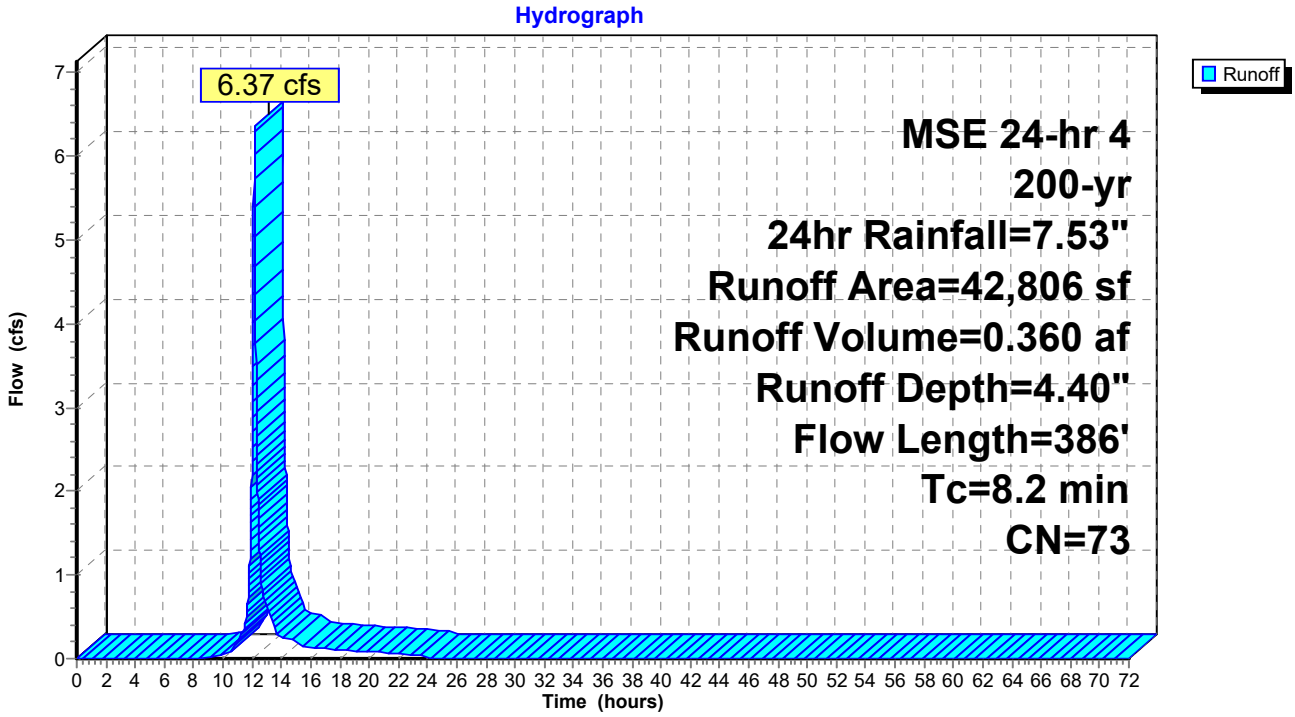
Runoff = 6.37 cfs @ 12.16 hrs, Volume= 0.360 af, Depth= 4.40"
Routed to Link ExL : Ex Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	21,403	68	Cropland, HSG B Onsite
*	21,403	78	Cropland, HSG C Onsite
	42,806	73	Weighted Average
	42,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	67	0.0217	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
4.7	319	0.0156	1.12		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
8.2	386	Total			

Subcatchment ExOn1: NW Onsite



Summary for Subcatchment ExOn2: Central Onsite

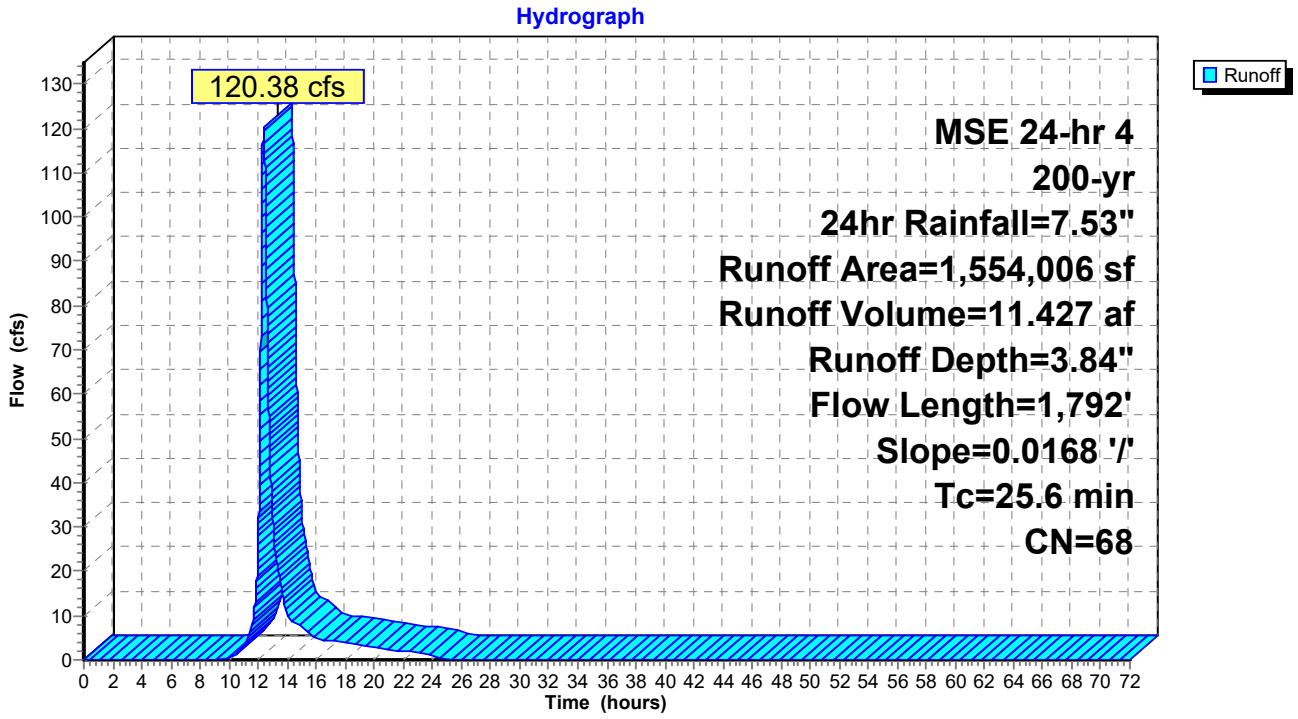
Runoff = 120.38 cfs @ 12.37 hrs, Volume= 11.427 af, Depth= 3.84"
Routed to Pond ExP2 : Central Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	1,516,018	68	Cropland, HSB Onsite
*	5,189	78	Cropland, HSG C Onsite
*	32,799	70	1/2 acre lots, 25% imp, HSG B Onsite
	1,554,006	68	Weighted Average
	1,545,806		99.47% Pervious Area
	8,200		0.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,792	0.0168	1.17		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment ExOn2: Central Onsite



Summary for Subcatchment ExOn3: SE Onsite

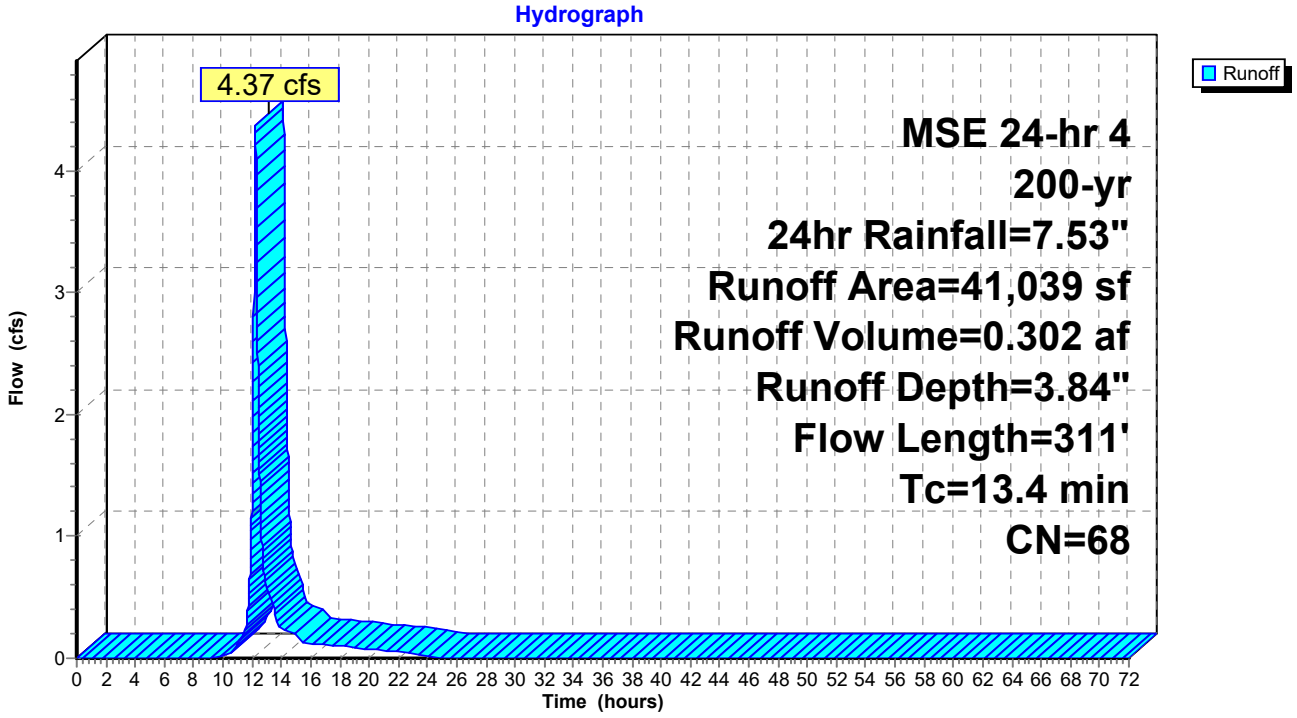
Runoff = 4.37 cfs @ 12.22 hrs, Volume= 0.302 af, Depth= 3.84"
Routed to Pond ExP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	41,039	68	Cropland, HSB Onsite
	41,039		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	155	0.0086	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84" Using McCuen-Spiess flow length
3.5	156	0.0070	0.75		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
13.4	311	Total			

Subcatchment ExOn3: SE Onsite



Summary for Pond ExP1: SE Existing Depression

Inflow Area = 16.338 ac, 2.26% Impervious, Inflow Depth = 3.95" for 200-yr, 24hr event
Inflow = 64.21 cfs @ 12.29 hrs, Volume= 5.374 af
Outflow = 15.69 cfs @ 12.83 hrs, Volume= 4.218 af, Atten= 76%, Lag= 32.0 min
Discarded = 0.38 cfs @ 12.83 hrs, Volume= 1.585 af
Primary = 15.31 cfs @ 12.83 hrs, Volume= 2.633 af
Routed to Pond ExP2 : Central Existing Depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 956.54' @ 12.83 hrs Surf.Area= 123,733 sf Storage= 122,901 cf

Plug-Flow detention time= 722.6 min calculated for 4.217 af (78% of inflow)
Center-of-Mass det. time= 648.8 min (1,477.5 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1	954.57'	150,632 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

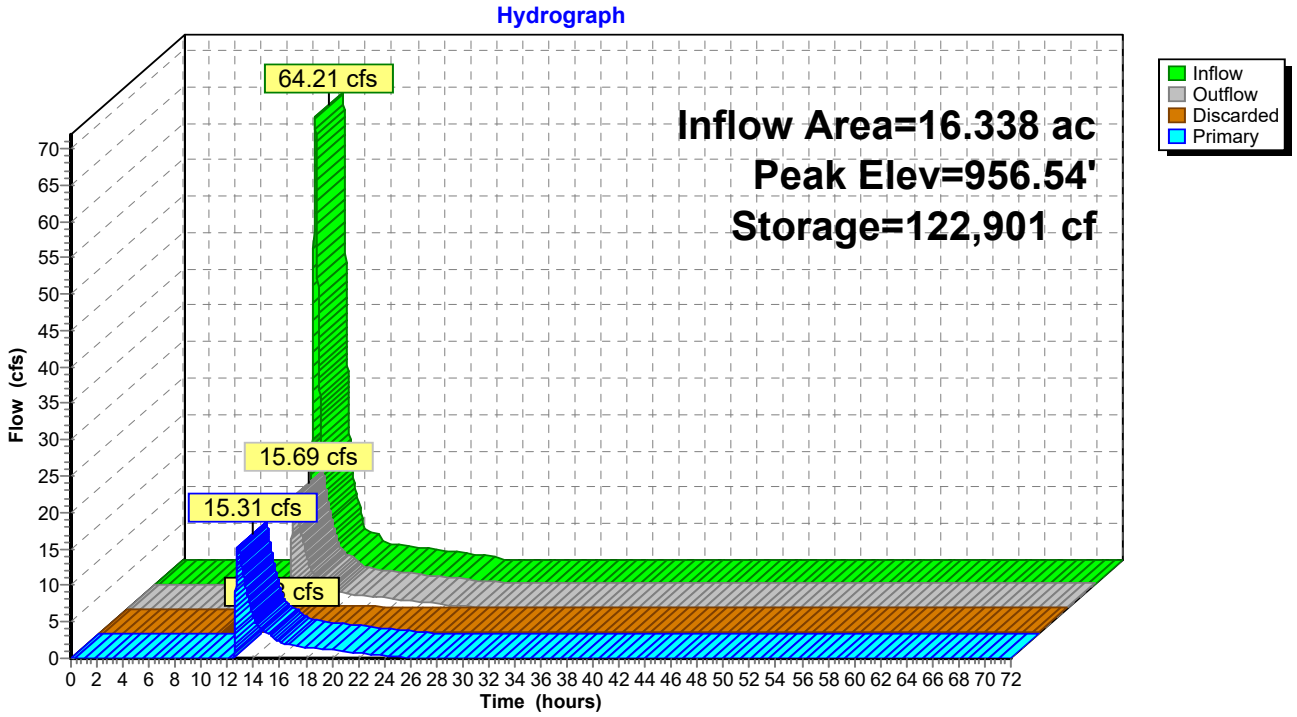
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.57	0	0	0
955.00	24,649	5,300	5,300
956.00	93,926	59,288	64,587
956.50	121,903	53,957	118,544
956.75	134,797	32,088	150,632

Device	Routing	Invert	Outlet Devices
#1	Primary	956.34'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 956.34 956.50 956.75 957.00 Width (feet) 7.00 104.00 184.00 249.00
#2	Discarded	954.57'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.38 cfs @ 12.83 hrs HW=956.54' (Free Discharge)
↑**2=Exfiltration** (Controls 0.38 cfs)

Primary OutFlow Max=15.31 cfs @ 12.83 hrs HW=956.54' TW=932.11' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 15.31 cfs @ 1.20 fps)

Pond ExP1: SE Existing Depression



Summary for Pond ExP2: Central Existing Depression

Inflow Area = 85.674 ac, 1.60% Impervious, Inflow Depth = 3.48" for 200-yr, 24hr event
Inflow = 168.04 cfs @ 12.43 hrs, Volume= 24.842 af
Outflow = 167.96 cfs @ 12.44 hrs, Volume= 24.842 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.44 hrs, Volume= 0.001 af
Primary = 167.93 cfs @ 12.44 hrs, Volume= 24.841 af
Routed to Link ExL : Ex Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 932.21' @ 12.44 hrs Surf.Area= 7,227 sf Storage= 906 cf

Plug-Flow detention time= 0.0 min calculated for 24.839 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (855.8 - 855.7)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	681,595 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

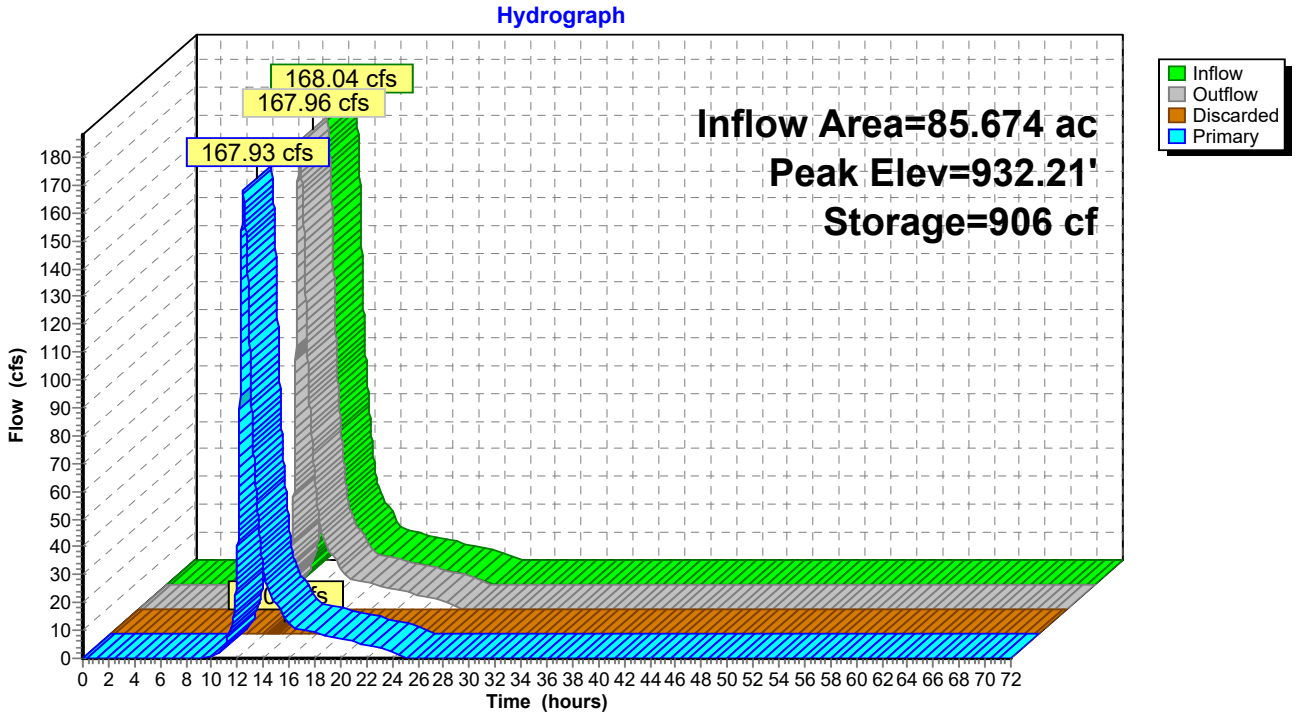
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	308	126	126
933.00	33,728	17,018	17,144
934.00	96,309	65,019	82,163
935.00	168,612	132,461	214,623
936.00	234,956	201,784	416,407
937.00	295,420	265,188	681,595

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 936.00 937.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00 622.00 735.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.02 cfs @ 12.44 hrs HW=932.21' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=167.91 cfs @ 12.44 hrs HW=932.21' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 167.91 cfs @ 2.71 fps)

Pond ExP2: Central Existing Depression

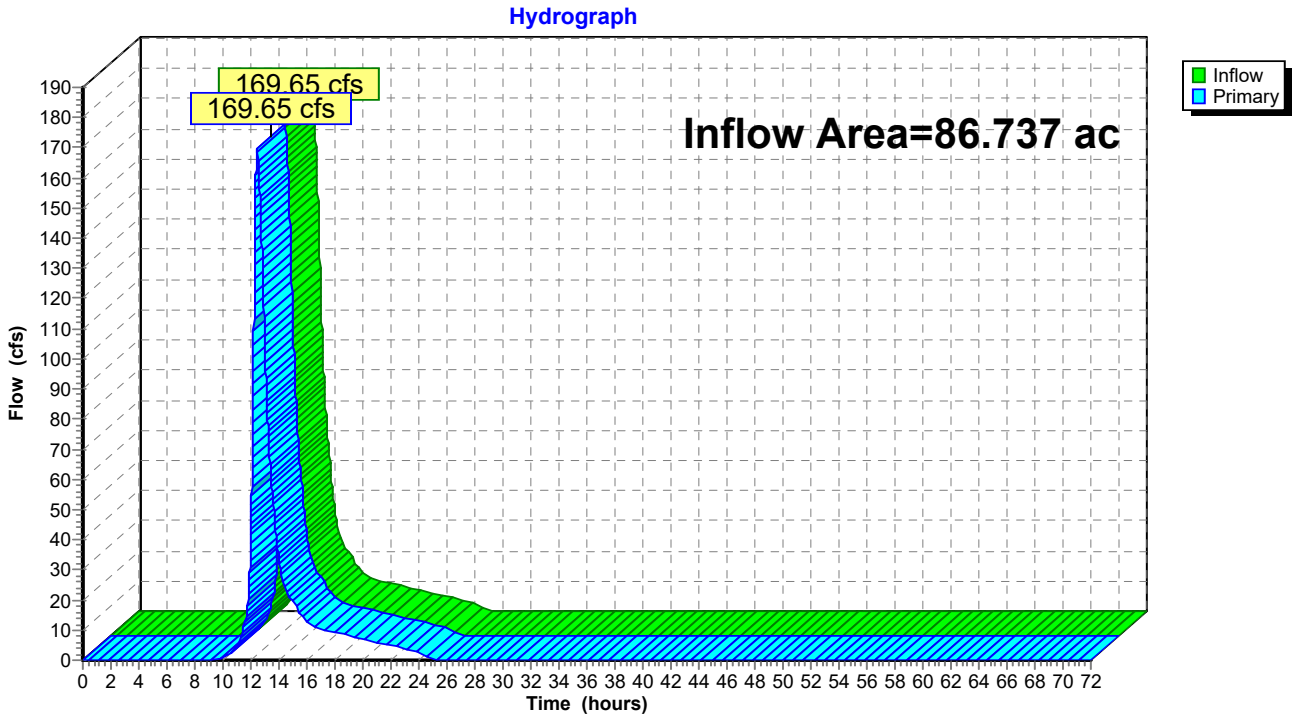


Summary for Link ExL: Ex Total

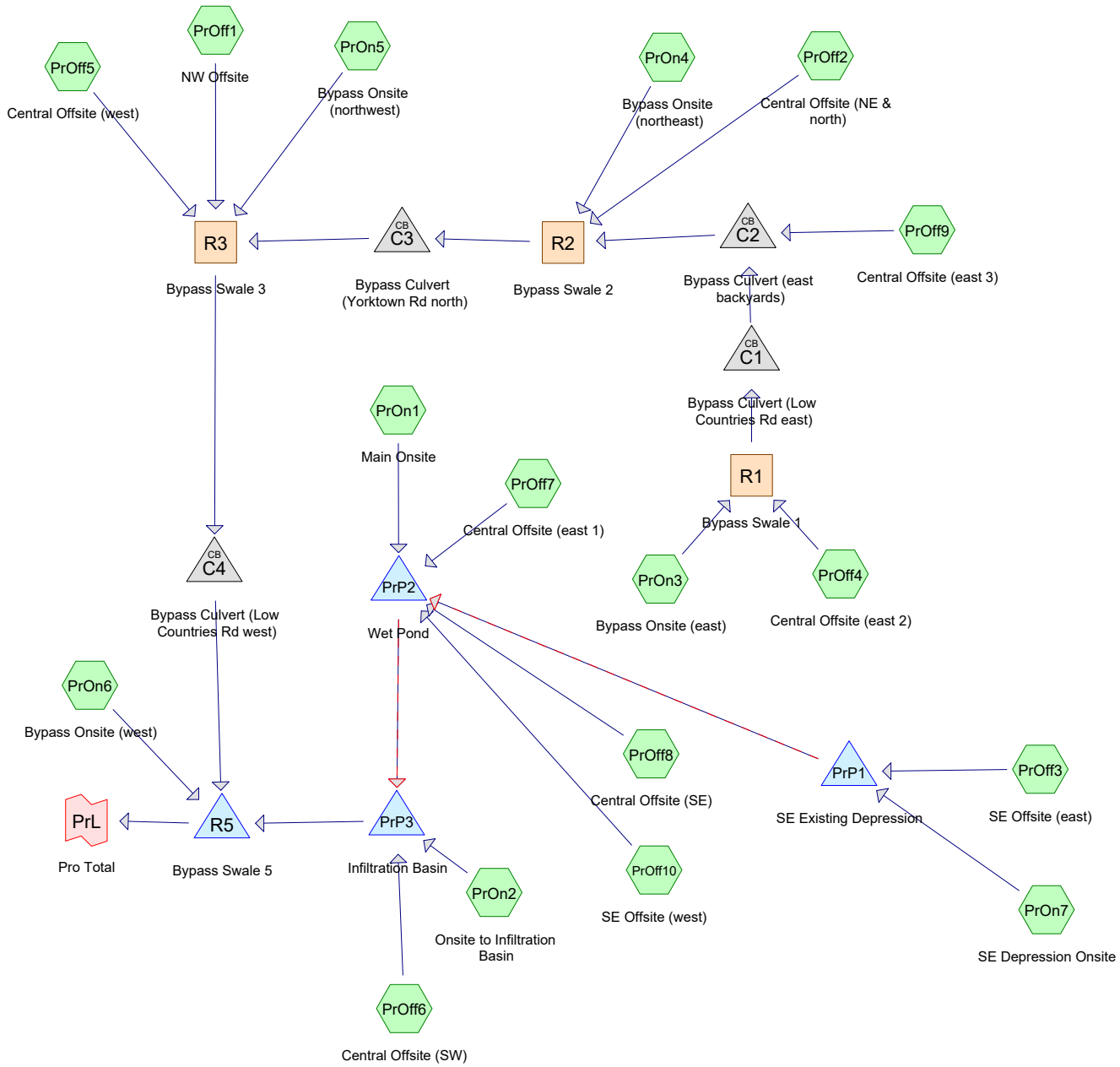
Inflow Area = 86.737 ac, 1.58% Impervious, Inflow Depth = 3.49" for 200-yr, 24hr event
Inflow = 169.65 cfs @ 12.44 hrs, Volume= 25.226 af
Primary = 169.65 cfs @ 12.44 hrs, Volume= 25.226 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link ExL: Ex Total



Proposed



Subcat Reach Pond Link

Routing Diagram for 26-225 HydroCAD
Prepared by Fehr Graham & Associates, Printed 10/8/2026
HydroCAD® 10.20-9a s/n 00943 © 2026 HydroCAD Software Solutions LLC

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPrOff1: NW Offsite Runoff Area=955 sf 0.00% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=68 Runoff=0.14 cfs 0.007 af

SubcatchmentPrOff10: SE Offsite (west) Runoff Area=27,179 sf 40.65% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=76 Runoff=4.71 cfs 0.246 af

SubcatchmentPrOff2: Central Offsite Runoff Area=1,125,874 sf 1.51% Impervious Runoff Depth=3.84"
Flow Length=1,885' Tc=28.1 min CN=68 Runoff=82.83 cfs 8.279 af

SubcatchmentPrOff3: SE Offsite (east) Runoff Area=645,599 sf 0.03% Impervious Runoff Depth=3.84"
Flow Length=1,396' Tc=20.1 min CN=68 Runoff=56.73 cfs 4.747 af

SubcatchmentPrOff4: Central Offsite (east Runoff Area=118,736 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=1,270' Slope=0.0225 '/' Tc=15.7 min CN=68 Runoff=11.77 cfs 0.873 af

SubcatchmentPrOff5: Central Offsite Runoff Area=10,552 sf 25.00% Impervious Runoff Depth=5.19"
Tc=6.0 min CN=80 Runoff=1.97 cfs 0.105 af

SubcatchmentPrOff6: Central Offsite (SW) Runoff Area=28,651 sf 14.99% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=72 Runoff=4.55 cfs 0.235 af

SubcatchmentPrOff7: Central Offsite (east Runoff Area=14,256 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=373' Tc=6.2 min CN=68 Runoff=2.03 cfs 0.105 af

SubcatchmentPrOff8: Central Offsite (SE) Runoff Area=46,766 sf 39.64% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=76 Runoff=8.11 cfs 0.423 af

SubcatchmentPrOff9: Central Offsite (east Runoff Area=119,306 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=1,164' Slope=0.0229 '/' Tc=14.2 min CN=68 Runoff=12.37 cfs 0.877 af

SubcatchmentPrOn1: Main Onsite Runoff Area=1,301,517 sf 39.68% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=76 Runoff=225.67 cfs 11.783 af

SubcatchmentPrOn2: Onsite to Runoff Area=195,173 sf 70.40% Impervious Runoff Depth=6.11"
Tc=6.0 min CN=88 Runoff=41.05 cfs 2.281 af

SubcatchmentPrOn3: Bypass Onsite (east) Runoff Area=3,848 sf 0.00% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=61 Runoff=0.44 cfs 0.023 af

SubcatchmentPrOn4: Bypass Onsite Runoff Area=45,511 sf 0.00% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=61 Runoff=5.25 cfs 0.269 af

SubcatchmentPrOn5: Bypass Onsite Runoff Area=44,014 sf 0.00% Impervious Runoff Depth=3.63"
Tc=6.0 min CN=66 Runoff=5.96 cfs 0.305 af

SubcatchmentPrOn6: Bypass Onsite (west) Runoff Area=26,361 sf 0.00% Impervious Runoff Depth=4.51"
Tc=6.0 min CN=74 Runoff=4.38 cfs 0.227 af

SubcatchmentPrOn7: SE Depression Runoff Area=23,967 sf 76.88% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=91 Runoff=5.20 cfs 0.296 af

Reach R1: Bypass Swale 1 Avg. Flow Depth=0.49' Max Vel=3.51 fps Inflow=11.98 cfs 0.896 af
n=0.022 L=108.0' S=0.0099 '/' Capacity=198.46 cfs Outflow=11.98 cfs 0.896 af

Reach R2: Bypass Swale 2 Avg. Flow Depth=1.28' Max Vel=7.71 fps Inflow=99.95 cfs 10.321 af
n=0.022 L=913.0' S=0.0167 '/' Capacity=422.06 cfs Outflow=99.44 cfs 10.321 af

Reach R3: Bypass Swale 3 Avg. Flow Depth=1.53' Max Vel=5.90 fps Inflow=101.38 cfs 10.738 af
n=0.022 L=791.0' S=0.0080 '/' Capacity=440.47 cfs Outflow=100.75 cfs 10.738 af

Pond C1: Bypass Culvert (Low Countries Rd east) Peak Elev=961.14' Inflow=11.98 cfs 0.896 af
24.0" Round Culvert n=0.011 L=100.0' S=0.0047 '/' Outflow=11.98 cfs 0.896 af

Pond C2: Bypass Culvert (east backyards) Peak Elev=960.69' Inflow=24.27 cfs 1.773 af
27.0" Round Culvert n=0.011 L=323.0' S=0.0048 '/' Outflow=24.27 cfs 1.773 af

Pond C3: Bypass Culvert (Yorktown Rd north) Peak Elev=945.87' Inflow=99.44 cfs 10.321 af
30.0" Round Culvert x 2.00 n=0.011 L=119.0' S=0.0067 '/' Outflow=99.44 cfs 10.321 af

Pond C4: Bypass Culvert (Low Countries Rd west) Peak Elev=937.50' Inflow=100.75 cfs 10.738 af
27.0" Round Culvert x 3.00 n=0.011 L=109.0' S=0.0083 '/' Outflow=100.75 cfs 10.738 af

Pond PrP1: SE Existing Depression Peak Elev=956.38' Storage=85,211 cf Inflow=58.31 cfs 5.043 af
Discarded=0.28 cfs 0.181 af Primary=4.60 cfs 3.159 af Secondary=16.00 cfs 1.703 af Outflow=20.76 cfs 5.043 af

Pond PrP2: Wet Pond Peak Elev=936.39' Storage=457,884 cf Inflow=244.12 cfs 17.419 af
Primary=42.30 cfs 17.325 af Secondary=0.00 cfs 0.000 af Outflow=42.30 cfs 17.325 af

Pond PrP3: Infiltration Basin Peak Elev=932.37' Storage=120,958 cf Inflow=77.28 cfs 19.841 af
Discarded=0.22 cfs 1.020 af Primary=49.06 cfs 17.756 af Outflow=49.28 cfs 18.777 af

Pond R5: Bypass Swale 5 Peak Elev=932.13' Storage=560 cf Inflow=139.58 cfs 28.722 af
Discarded=0.00 cfs 0.002 af Primary=139.57 cfs 28.719 af Outflow=139.58 cfs 28.722 af

Link PrL: Pro Total Inflow=139.57 cfs 28.719 af
Primary=139.57 cfs 28.719 af

Total Runoff Area = 86.737 ac Runoff Volume = 31.081 af Average Runoff Depth = 4.30"
80.79% Pervious = 70.071 ac 19.21% Impervious = 16.666 ac

Summary for Subcatchment PrOff1: NW Offsite

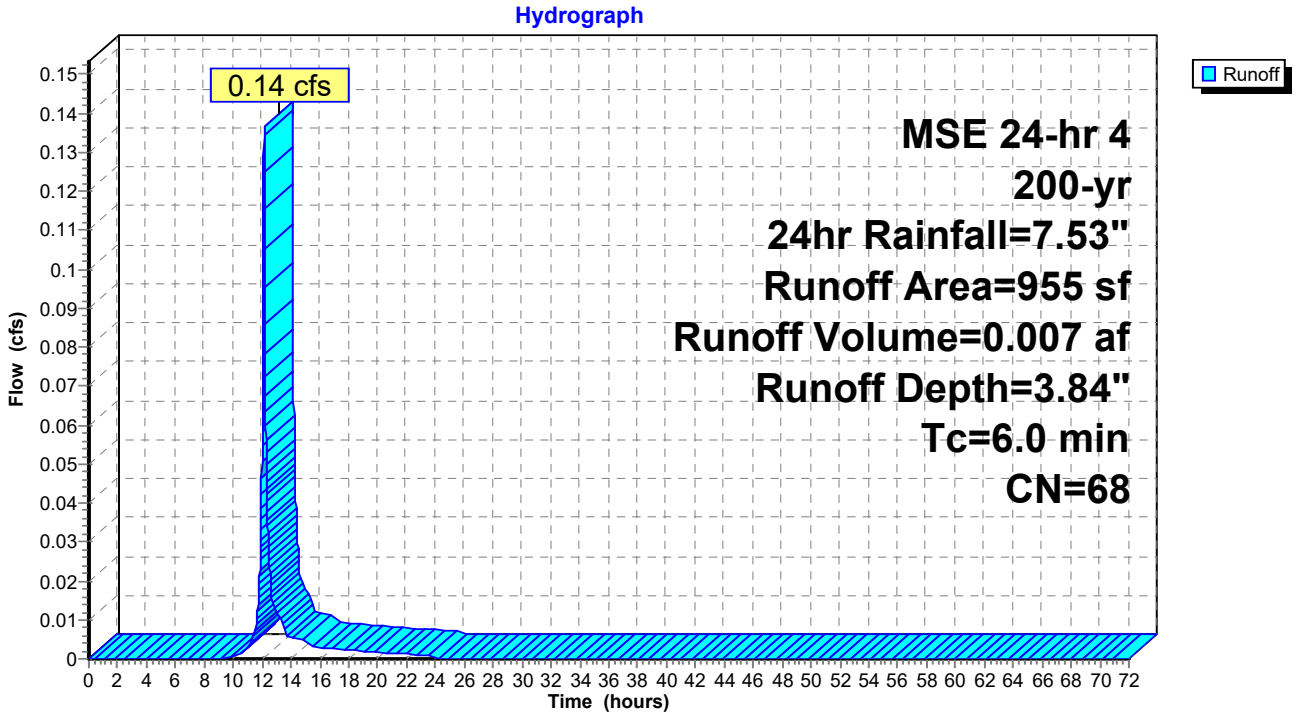
Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.007 af, Depth= 3.84"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	955	68	Cropland, HSG B Offsite
	955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff1: NW Offsite



Summary for Subcatchment PrOff10: SE Offsite (west)

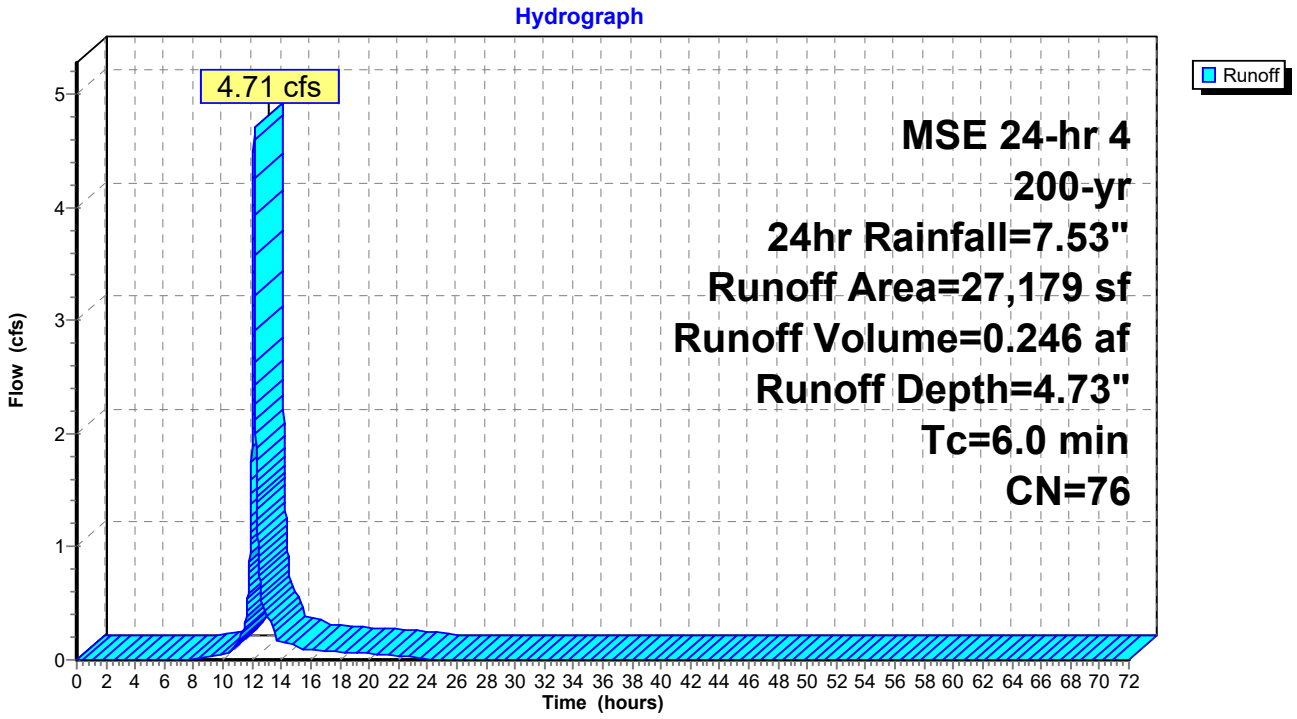
Runoff = 4.71 cfs @ 12.13 hrs, Volume= 0.246 af, Depth= 4.73"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	18,132	70	1/2 acre lots, 25% imp, HSG B Offsite
*	2,533	61	>75% Grass cover, Good, HSG B Offsite
*	3,161	98	Pavement Offsite
*	3,353	98	Pro Pave in ROW Offiste
	27,179	76	Weighted Average
	16,132		59.35% Pervious Area
	11,047		40.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff10: SE Offsite (west)



Summary for Subcatchment PrOff2: Central Offsite (NE & north)

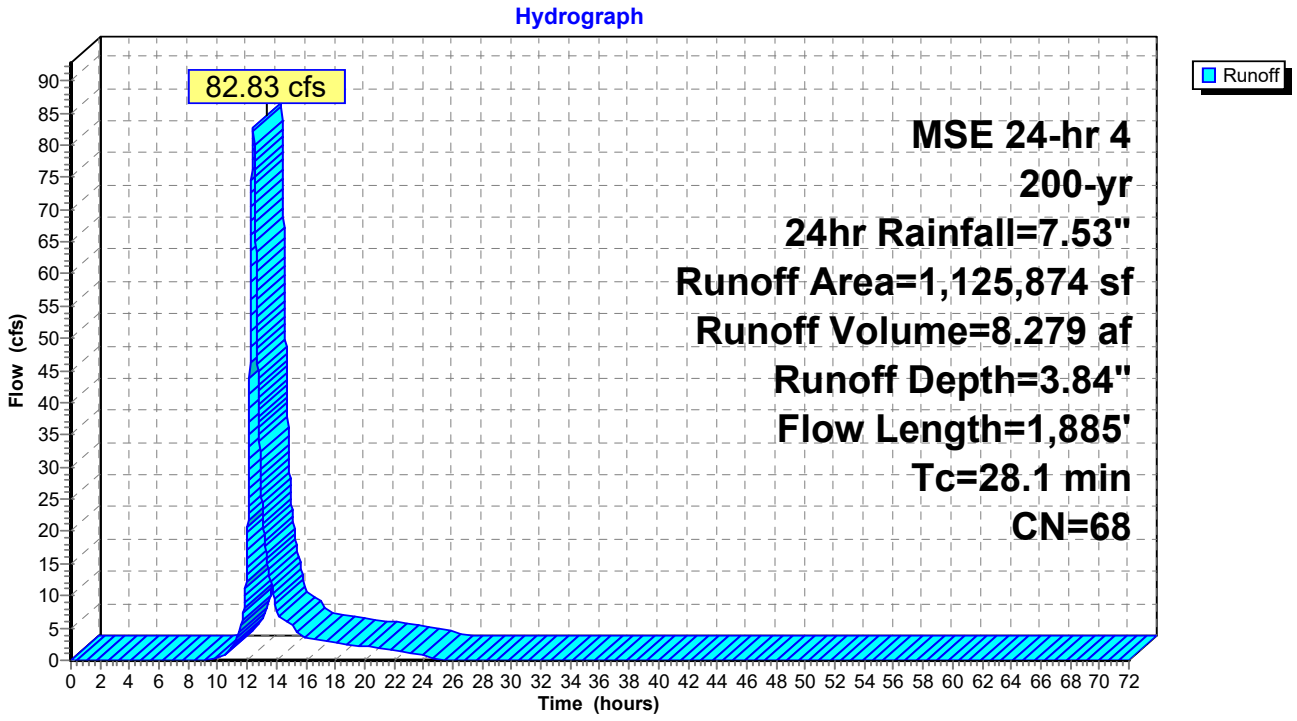
Runoff = 82.83 cfs @ 12.40 hrs, Volume= 8.279 af, Depth= 3.84"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	1,058,084	68	Cropland, HSG B Offsite
*	67,790	70	1/2 acre lots, 25% imp, HSG B Offsite
	1,125,874	68	Weighted Average
	1,108,927		98.49% Pervious Area
	16,948		1.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	110	0.0236	0.36		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
23.1	1,775	0.0202	1.28		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
28.1	1,885	Total			

Subcatchment PrOff2: Central Offsite (NE & north)



Summary for Subcatchment PrOff3: SE Offsite (east)

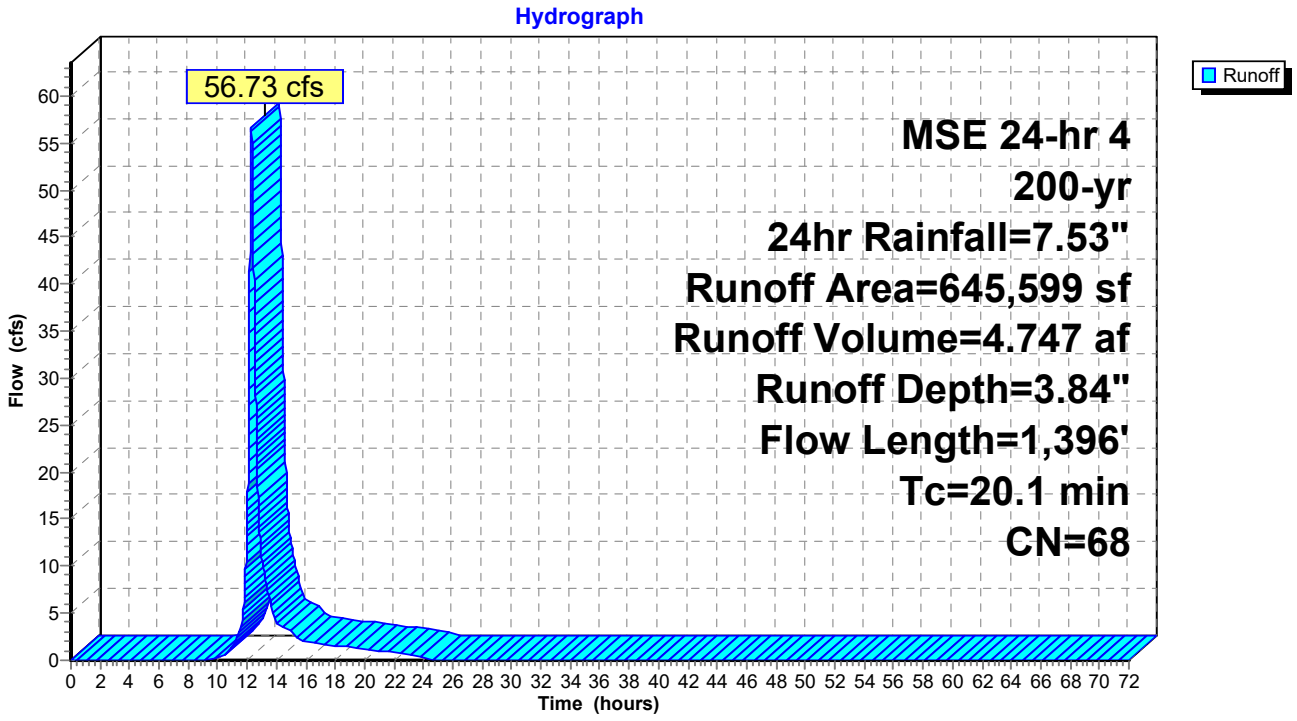
Runoff = 56.73 cfs @ 12.30 hrs, Volume= 4.747 af, Depth= 3.84"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	645,405	68	Cropland, HSG B Offsite
*	194	98	Pavement Offsite
	645,599	68	Weighted Average
	645,405		99.97% Pervious Area
	194		0.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	82	0.0229	0.34		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
16.1	1,314	0.0228	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	1,396	Total			

Subcatchment PrOff3: SE Offsite (east)



Summary for Subcatchment PrOff4: Central Offsite (east 2)

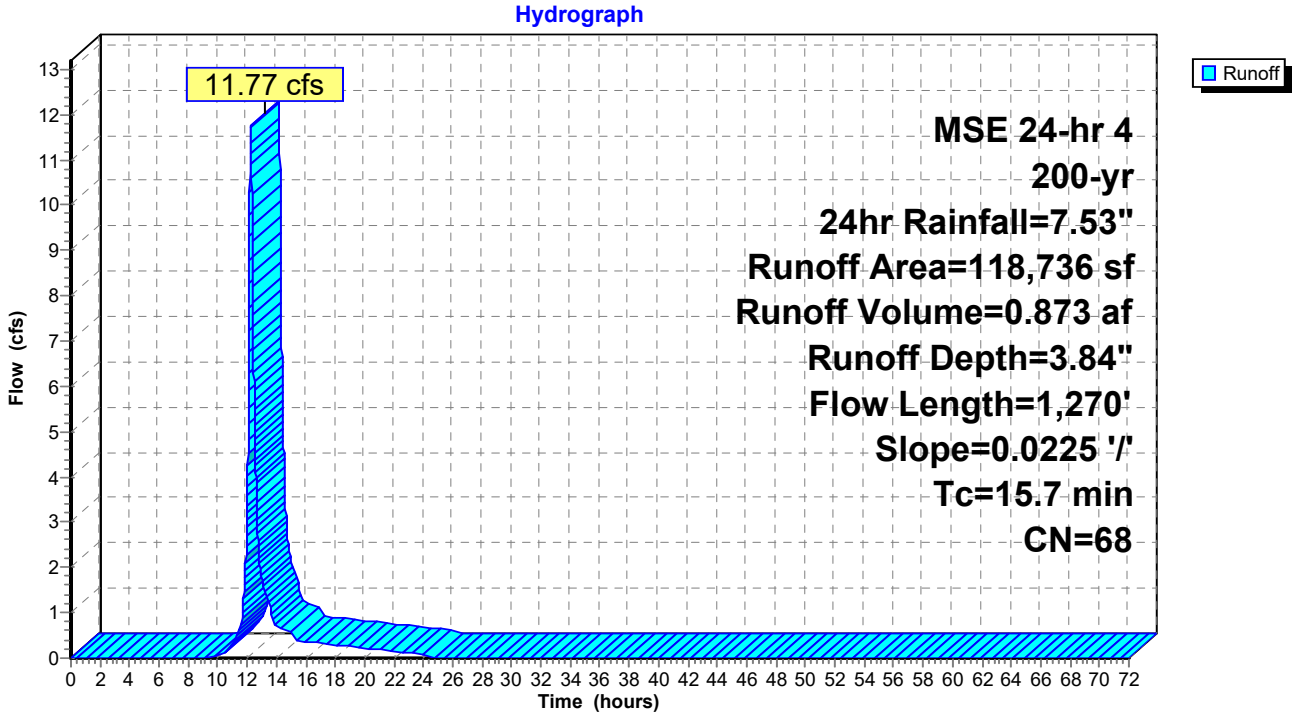
Runoff = 11.77 cfs @ 12.24 hrs, Volume= 0.873 af, Depth= 3.84"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	118,736	68	Cropland, HSG B Offsite
	118,736		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	1,270	0.0225	1.35		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff4: Central Offsite (east 2)



Summary for Subcatchment PrOff5: Central Offsite (west)

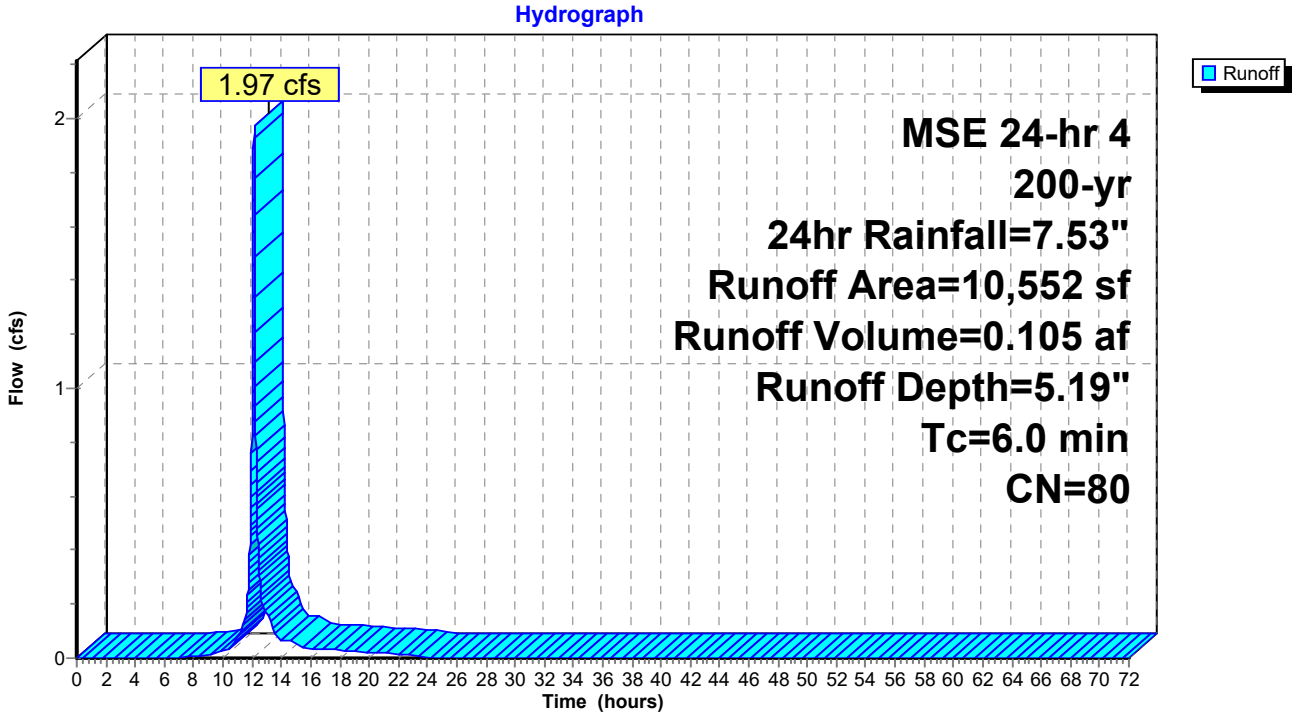
Runoff = 1.97 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 5.19"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	10,552	80	1/2 acre lots, 25% imp, HSG C Offsite
	7,914		75.00% Pervious Area
	2,638		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff5: Central Offsite (west)



Summary for Subcatchment PrOff6: Central Offsite (SW)

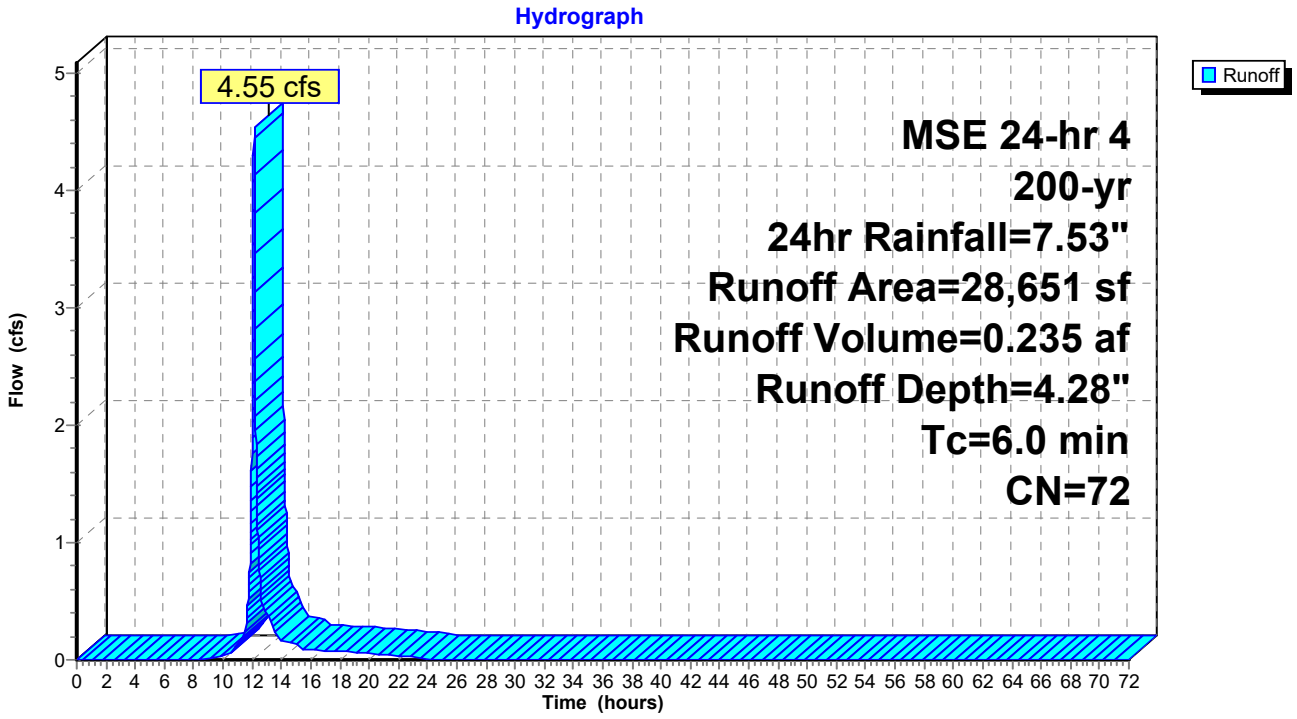
Runoff = 4.55 cfs @ 12.13 hrs, Volume= 0.235 af, Depth= 4.28"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	20,337	68	Cropland, HSG B Offsite
*	4,018	61	>75% Grass cover, Good, HSG B Offsite
*	2,590	98	Pavement Offsite
*	1,706	98	Pro Pave in ROW Offiste
	28,651	72	Weighted Average
	24,355		85.01% Pervious Area
	4,296		14.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff6: Central Offsite (SW)



Summary for Subcatchment PrOff7: Central Offsite (east 1)

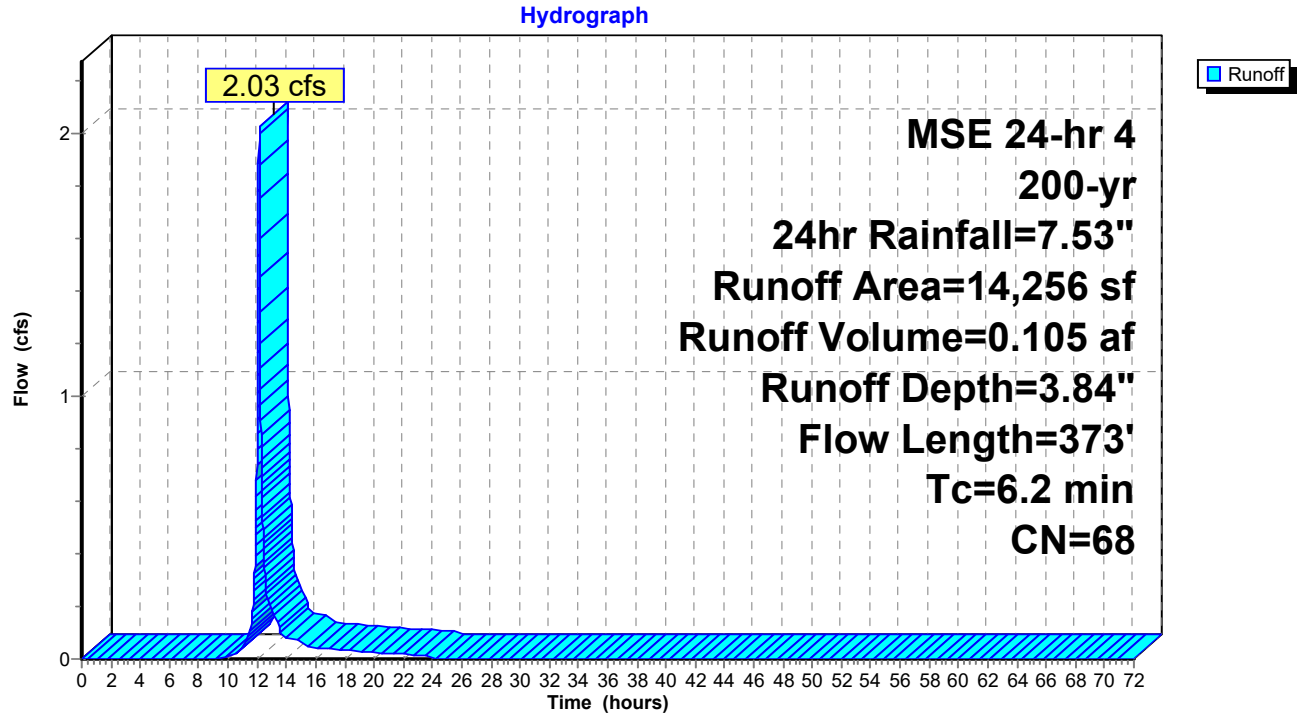
Runoff = 2.03 cfs @ 12.14 hrs, Volume= 0.105 af, Depth= 3.84"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	14,256	68	Cropland, HSG B Offsite
	14,256		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	47	0.0266	0.32		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.84"
3.8	326	0.0252	1.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
6.2	373	Total			

Subcatchment PrOff7: Central Offsite (east 1)



Summary for Subcatchment PrOff8: Central Offsite (SE)

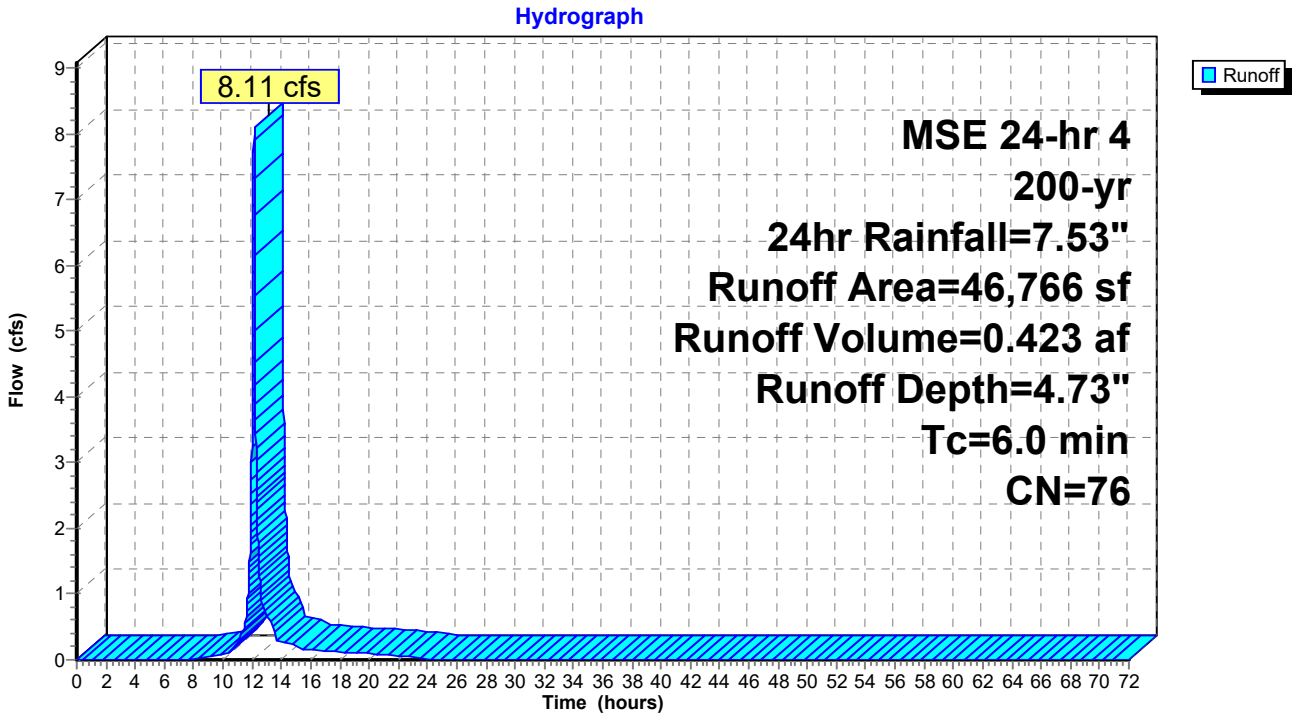
Runoff = 8.11 cfs @ 12.13 hrs, Volume= 0.423 af, Depth= 4.73"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	9,149	61	>75% Grass cover, Good, HSG B Offsite
*	25,441	70	1/2 acre lots, 25% imp, HSG B Offsite
*	6,820	98	Pavement Offsite
*	5,356	98	Pro Pave in ROW Offiste
	46,766	76	Weighted Average
	28,230		60.36% Pervious Area
	18,536		39.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOff8: Central Offsite (SE)



Summary for Subcatchment PrOff9: Central Offsite (east 3)

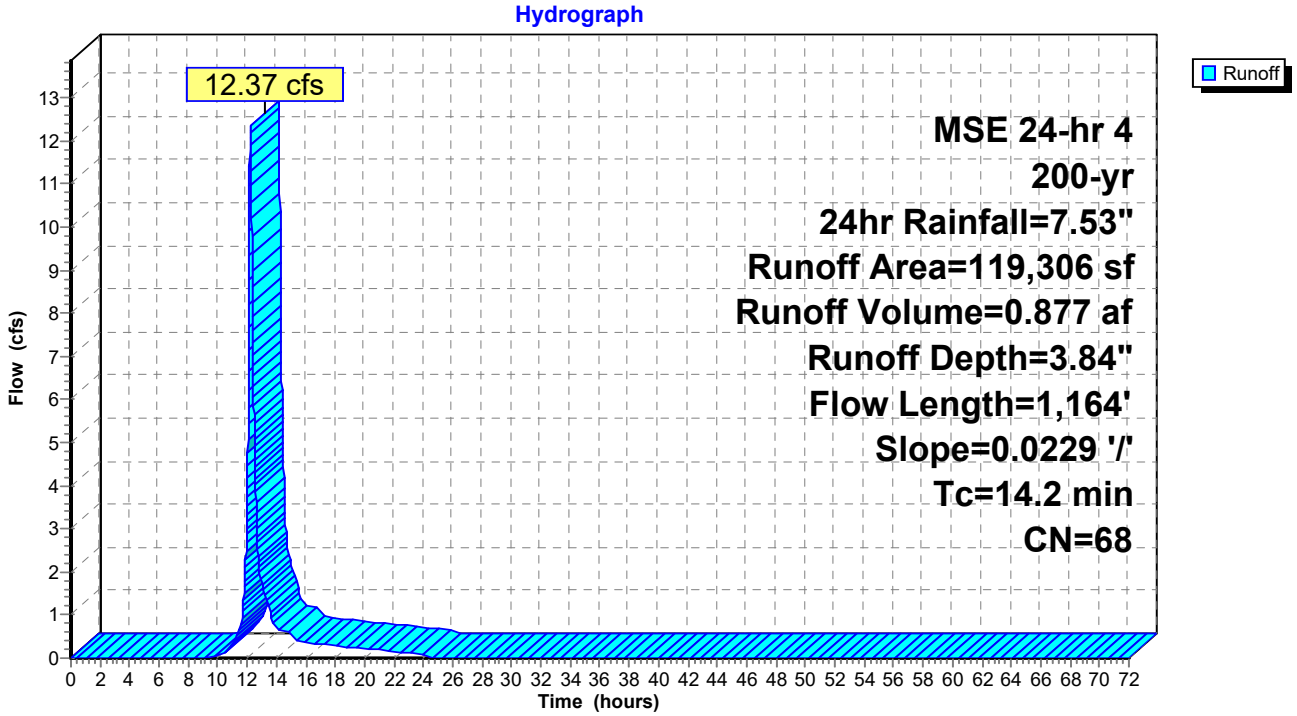
Runoff = 12.37 cfs @ 12.23 hrs, Volume= 0.877 af, Depth= 3.84"
Routed to Pond C2 : Bypass Culvert (east backyards)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	119,306	68	Cropland, HSG B Offsite
	119,306		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	1,164	0.0229	1.36		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps

Subcatchment PrOff9: Central Offsite (east 3)



Summary for Subcatchment PrOn1: Main Onsite

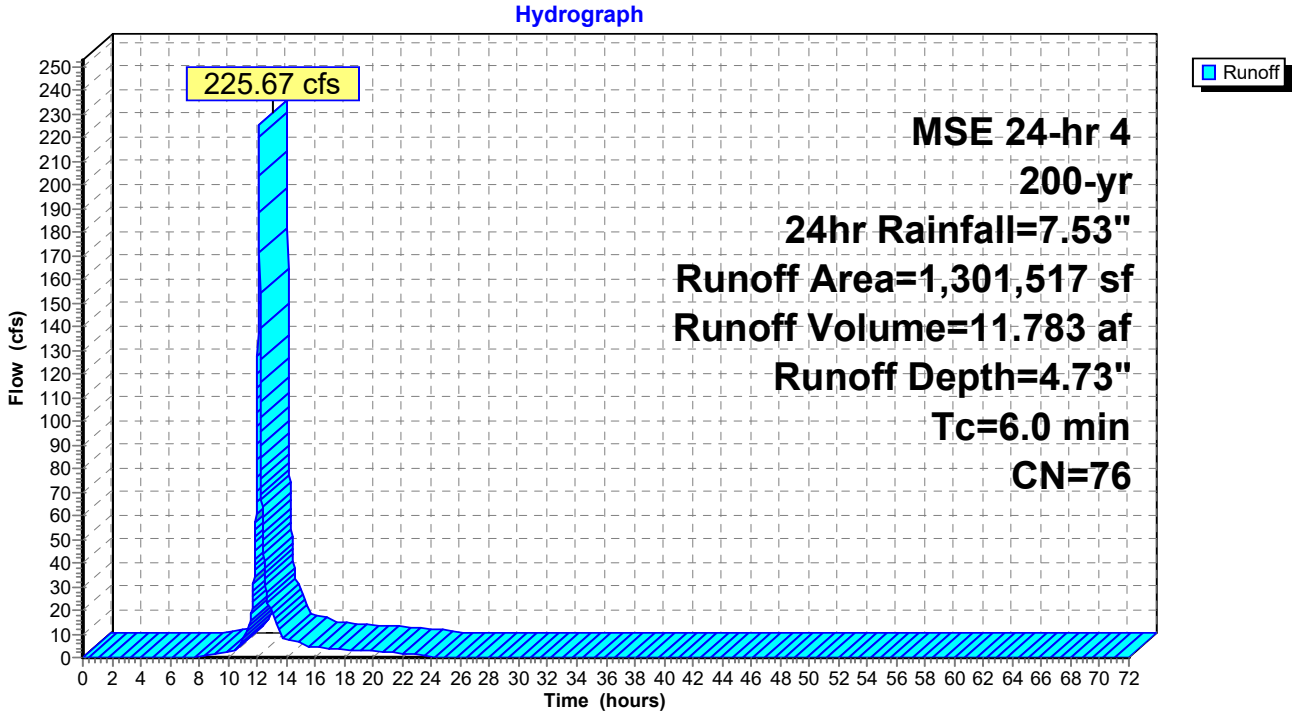
Runoff = 225.67 cfs @ 12.13 hrs, Volume= 11.783 af, Depth= 4.73"
Routed to Pond PrP2 : Wet Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
	623,728	72	1/3 acre lots, 30% imp, HSG B
	555,477	75	1/4 acre lots, 38% imp, HSG B
	6,494	83	1/4 acre lots, 38% imp, HSG C
*	91,094	100	Wet Pond
*	24,724	98	Alley
	1,301,517	76	Weighted Average
	785,032		60.32% Pervious Area
	516,485		39.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn1: Main Onsite



Summary for Subcatchment PrOn2: Onsite to Infiltration Basin

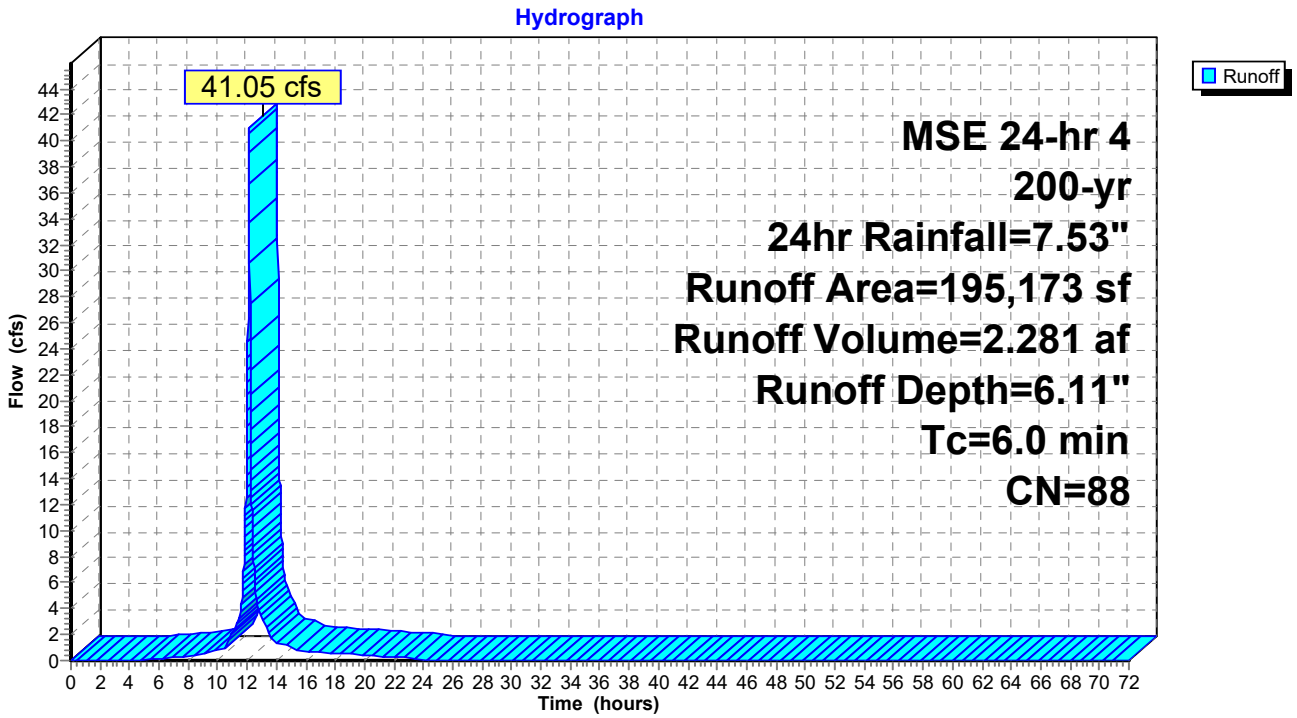
Runoff = 41.05 cfs @ 12.13 hrs, Volume= 2.281 af, Depth= 6.11"
Routed to Pond PrP3 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
	13,000	72	1/3 acre lots, 30% imp, HSG B
	78,516	75	1/4 acre lots, 38% imp, HSG B
*	103,657	100	Pond
	195,173	88	Weighted Average
	57,780		29.60% Pervious Area
	137,393		70.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn2: Onsite to Infiltration Basin



Summary for Subcatchment PrOn3: Bypass Onsite (east)

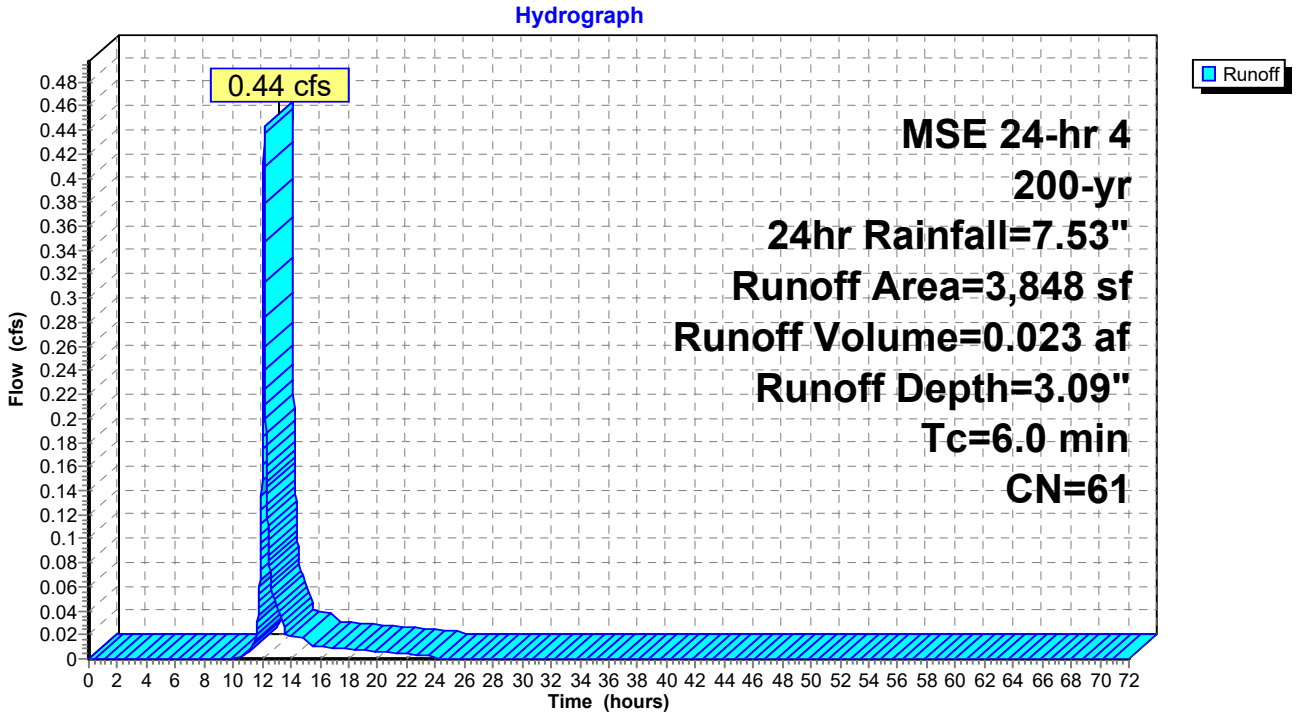
Runoff = 0.44 cfs @ 12.14 hrs, Volume= 0.023 af, Depth= 3.09"
Routed to Reach R1 : Bypass Swale 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

Area (sf)	CN	Description
3,848	61	>75% Grass cover, Good, HSG B
3,848		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn3: Bypass Onsite (east)



Summary for Subcatchment PrOn4: Bypass Onsite (northeast)

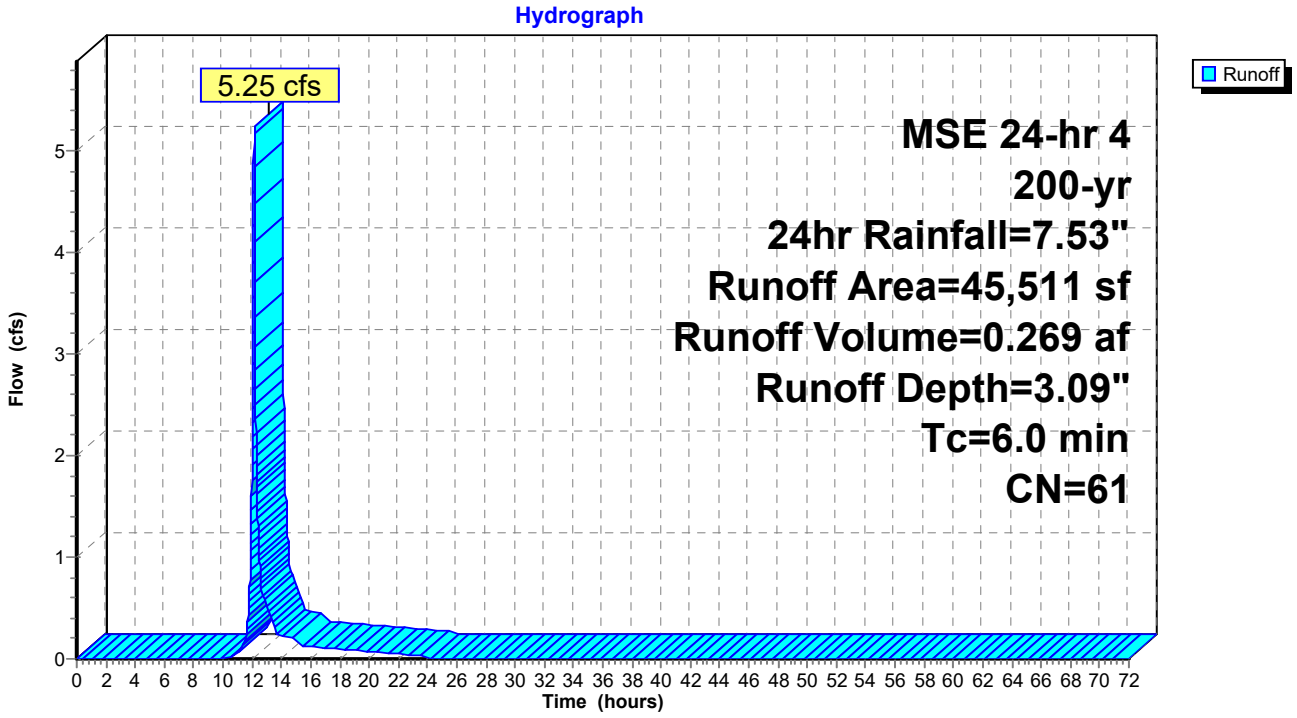
Runoff = 5.25 cfs @ 12.14 hrs, Volume= 0.269 af, Depth= 3.09"
Routed to Reach R2 : Bypass Swale 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

Area (sf)	CN	Description
45,511	61	>75% Grass cover, Good, HSG B
45,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn4: Bypass Onsite (northeast)



Summary for Subcatchment PrOn5: Bypass Onsite (northwest)

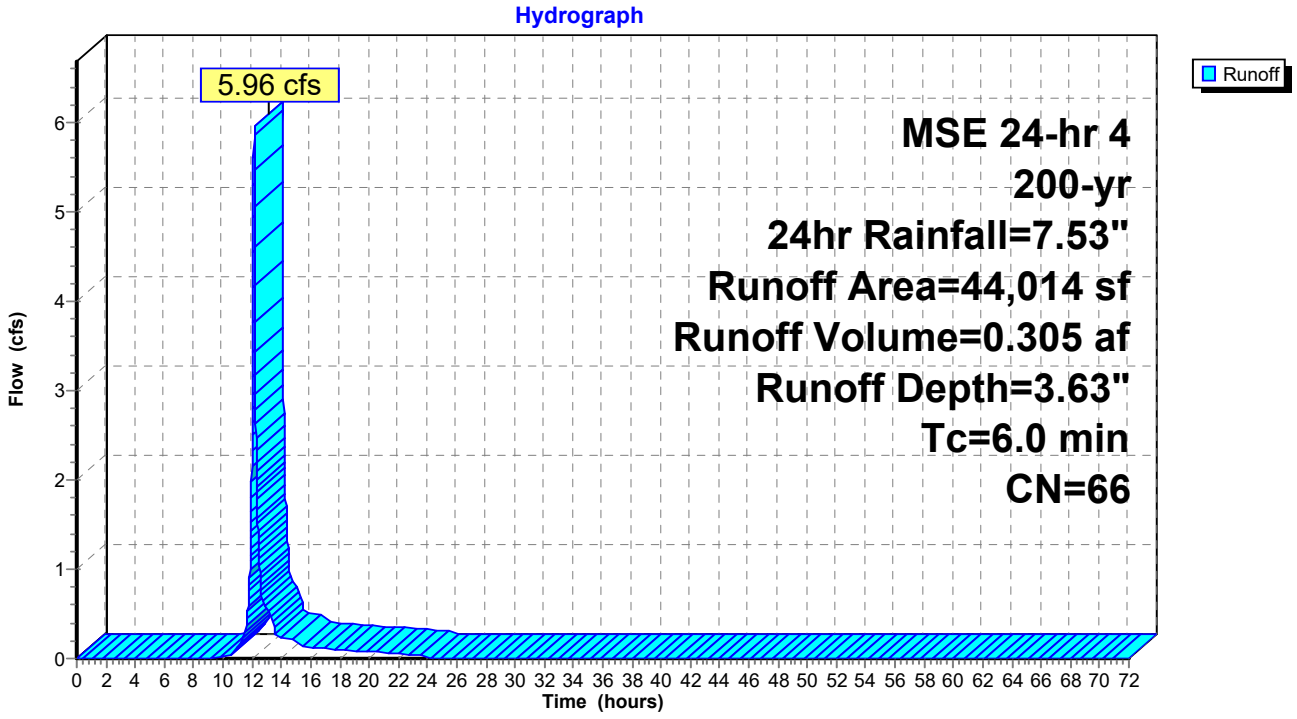
Runoff = 5.96 cfs @ 12.13 hrs, Volume= 0.305 af, Depth= 3.63"
Routed to Reach R3 : Bypass Swale 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

Area (sf)	CN	Description
26,408	61	>75% Grass cover, Good, HSG B
17,606	74	>75% Grass cover, Good, HSG C
44,014	66	Weighted Average
44,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn5: Bypass Onsite (northwest)



Summary for Subcatchment PrOn6: Bypass Onsite (west)

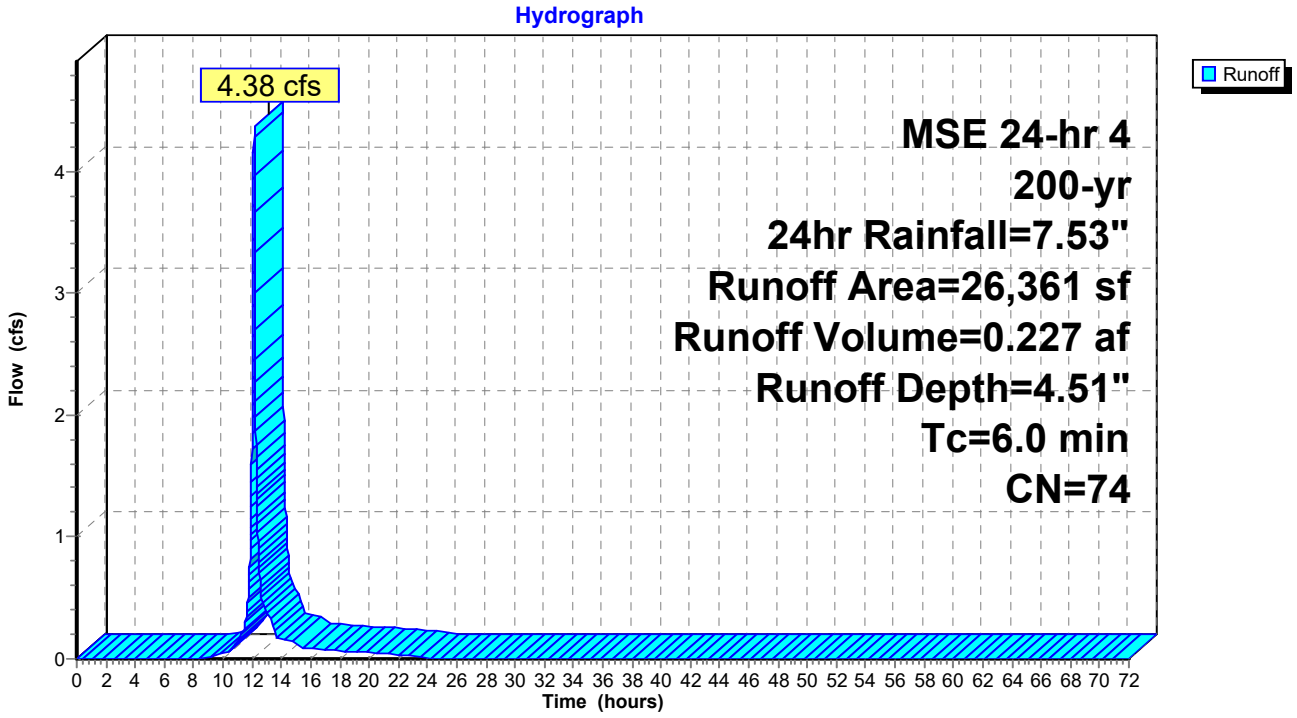
Runoff = 4.38 cfs @ 12.13 hrs, Volume= 0.227 af, Depth= 4.51"
Routed to Pond R5 : Bypass Swale 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

Area (sf)	CN	Description
26,361	74	>75% Grass cover, Good, HSG C
26,361		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn6: Bypass Onsite (west)



Summary for Subcatchment PrOn7: SE Depression Onsite

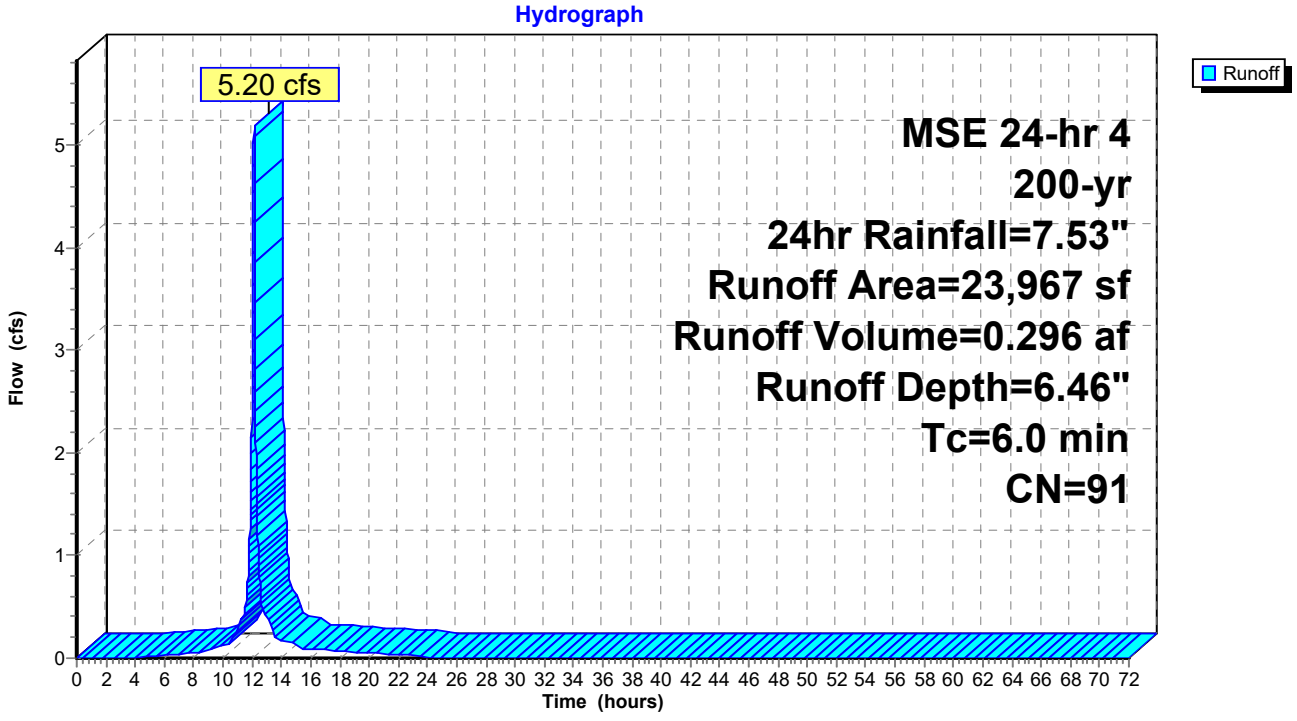
Runoff = 5.20 cfs @ 12.13 hrs, Volume= 0.296 af, Depth= 6.46"
Routed to Pond PrP1 : SE Existing Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 200-yr, 24hr Rainfall=7.53"

	Area (sf)	CN	Description
*	15,029	100	SE Depression
	8,938	75	1/4 acre lots, 38% imp, HSG B
	23,967	91	Weighted Average
	5,542		23.12% Pervious Area
	18,425		76.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PrOn7: SE Depression Onsite



Summary for Reach R1: Bypass Swale 1

Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 3.82" for 200-yr, 24hr event
Inflow = 11.98 cfs @ 12.24 hrs, Volume= 0.896 af
Outflow = 11.98 cfs @ 12.25 hrs, Volume= 0.896 af, Atten= 0%, Lag= 0.4 min
Routed to Pond C1 : Bypass Culvert (Low Countries Rd east)

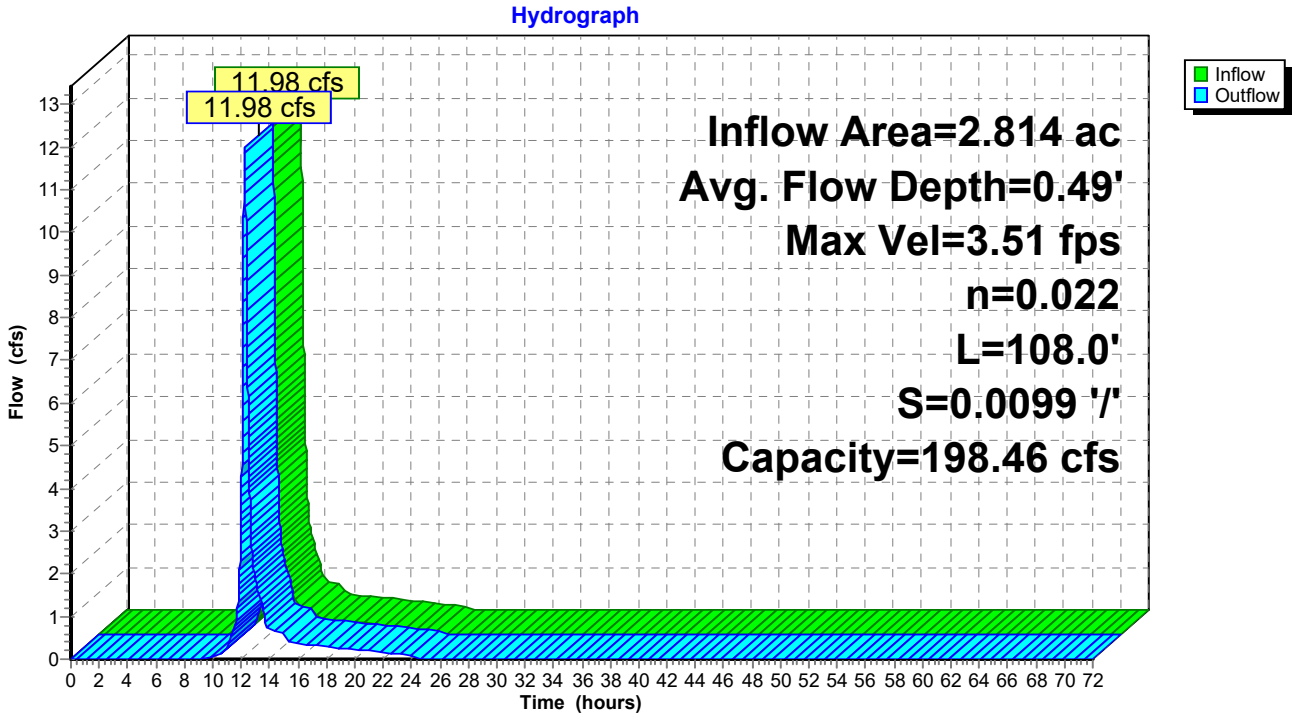
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.51 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 1.7 min

Peak Storage= 368 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 8.92'
Bank-Full Depth= 2.00' Flow Area= 26.0 sf, Capacity= 198.46 cfs

5.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 21.00'
Length= 108.0' Slope= 0.0099 '/'
Inlet Invert= 960.32', Outlet Invert= 959.25'



‡



Summary for Reach R2: Bypass Swale 2

Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 3.82" for 200-yr, 24hr event
Inflow = 99.95 cfs @ 12.36 hrs, Volume= 10.321 af
Outflow = 99.44 cfs @ 12.39 hrs, Volume= 10.321 af, Atten= 1%, Lag= 1.7 min
Routed to Pond C3 : Bypass Culvert (Yorktown Rd north)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.71 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 5.8 min

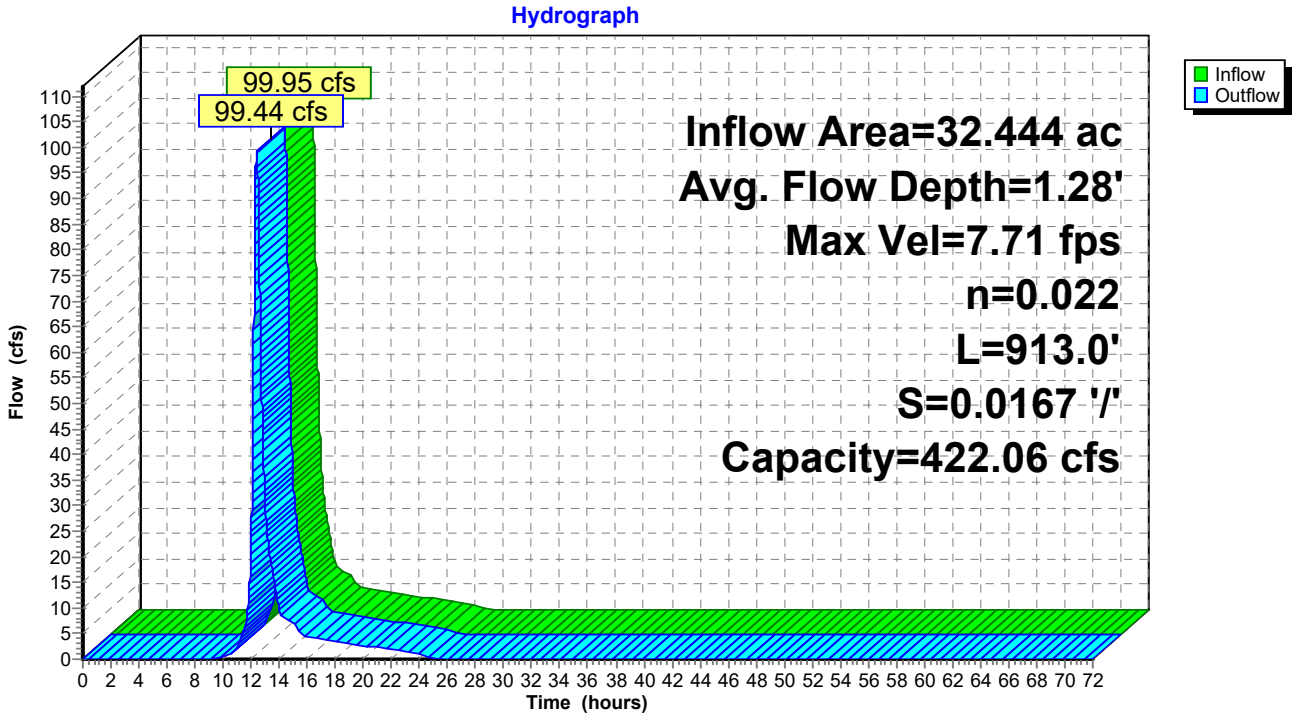
Peak Storage= 11,770 cf @ 12.39 hrs
Average Depth at Peak Storage= 1.28' , Surface Width= 15.21'
Bank-Full Depth= 2.50' Flow Area= 37.5 sf, Capacity= 422.06 cfs

5.00' x 2.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 25.00'
Length= 913.0' Slope= 0.0167 '/'
Inlet Invert= 956.53', Outlet Invert= 941.28'



‡

Reach R2: Bypass Swale 2



Summary for Reach R3: Bypass Swale 3

Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 3.82" for 200-yr, 24hr event
Inflow = 101.38 cfs @ 12.39 hrs, Volume= 10.738 af
Outflow = 100.75 cfs @ 12.41 hrs, Volume= 10.738 af, Atten= 1%, Lag= 1.7 min
Routed to Pond C4 : Bypass Culvert (Low Countries Rd west)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.90 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 7.3 min

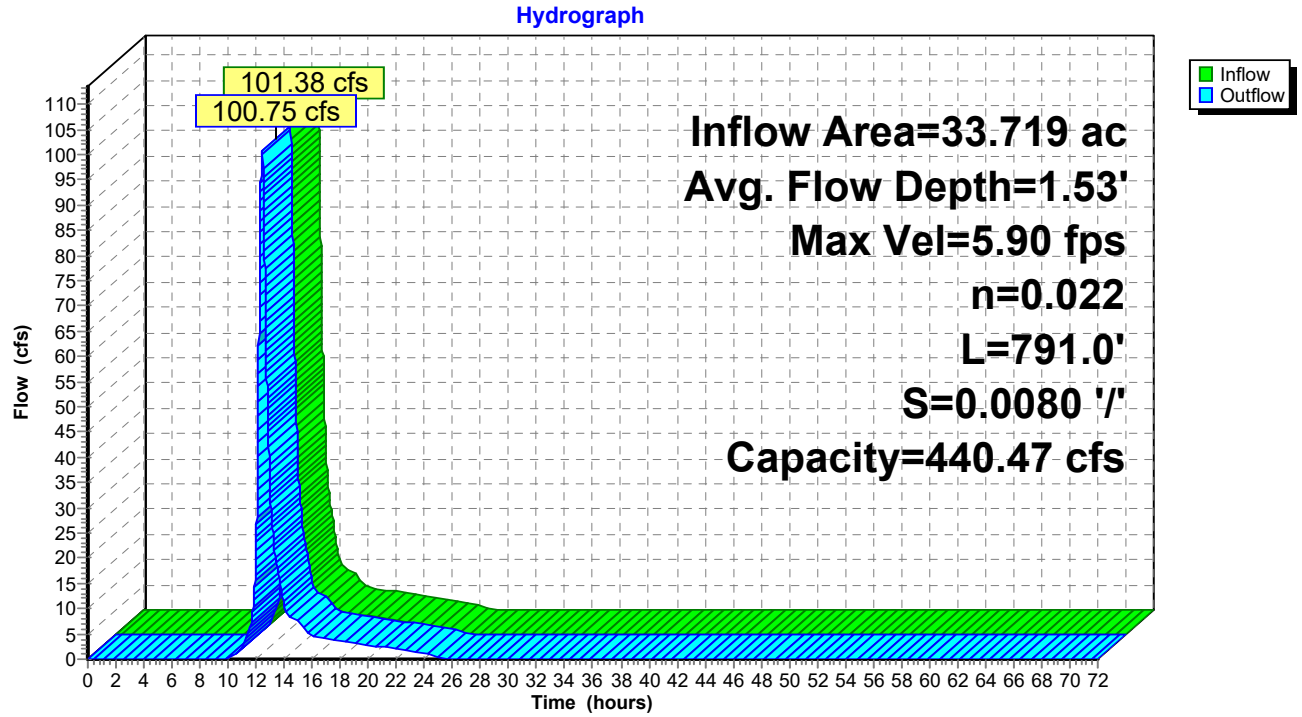
Peak Storage= 13,512 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.53' , Surface Width= 17.27'
Bank-Full Depth= 3.00' Flow Area= 51.0 sf, Capacity= 440.47 cfs

5.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 29.00'
Length= 791.0' Slope= 0.0080 '/'
Inlet Invert= 940.20', Outlet Invert= 933.90'



‡

Reach R3: Bypass Swale 3



Summary for Pond C1: Bypass Culvert (Low Countries Rd east)

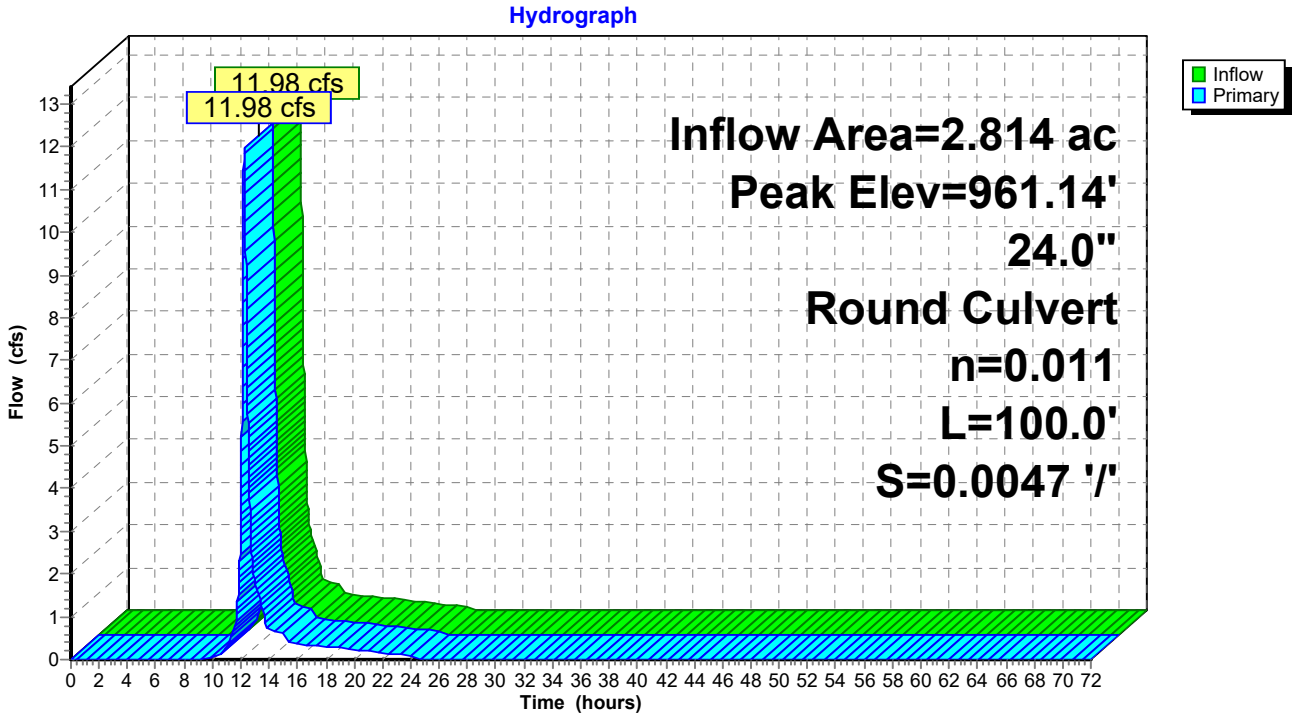
Inflow Area = 2.814 ac, 0.00% Impervious, Inflow Depth = 3.82" for 200-yr, 24hr event
Inflow = 11.98 cfs @ 12.25 hrs, Volume= 0.896 af
Outflow = 11.98 cfs @ 12.25 hrs, Volume= 0.896 af, Atten= 0%, Lag= 0.0 min
Primary = 11.98 cfs @ 12.25 hrs, Volume= 0.896 af
Routed to Pond C2 : Bypass Culvert (east backyards)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 961.14' @ 12.25 hrs
Flood Elev= 962.57'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.60'	**24.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.60' / 958.13' S= 0.0047 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=12.11 cfs @ 12.25 hrs HW=961.14' TW=960.67' (Dynamic Tailwater)
1=Culvert (Outlet Controls 12.11 cfs @ 3.92 fps)

Pond C1: Bypass Culvert (Low Countries Rd east)



Summary for Pond C2: Bypass Culvert (east backyards)

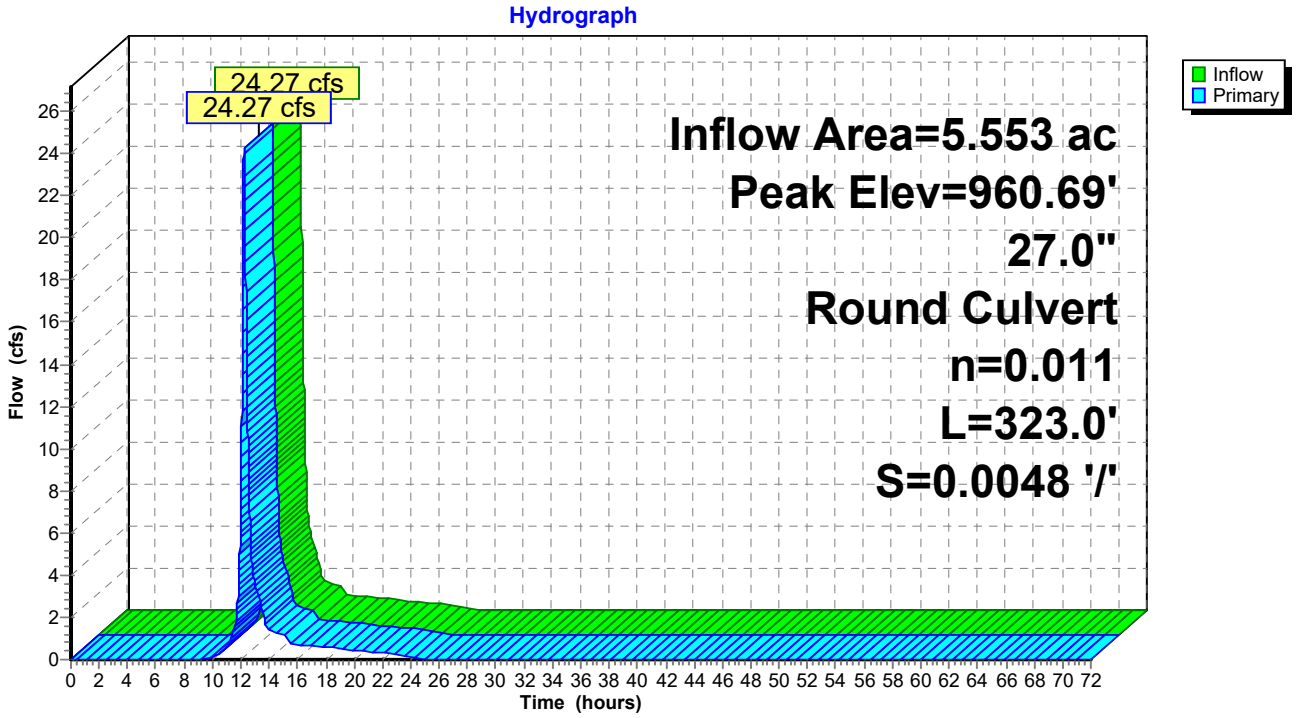
Inflow Area = 5.553 ac, 0.00% Impervious, Inflow Depth = 3.83" for 200-yr, 24hr event
Inflow = 24.27 cfs @ 12.23 hrs, Volume= 1.773 af
Outflow = 24.27 cfs @ 12.23 hrs, Volume= 1.773 af, Atten= 0%, Lag= 0.0 min
Primary = 24.27 cfs @ 12.23 hrs, Volume= 1.773 af
Routed to Reach R2 : Bypass Swale 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 960.69' @ 12.23 hrs
Flood Elev= 963.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	958.13'	**27.0" Round Culvert** L= 323.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 958.13' / 956.59' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=24.24 cfs @ 12.23 hrs HW=960.68' TW=957.66' (Dynamic Tailwater)
1=Culvert (Barrel Controls 24.24 cfs @ 6.72 fps)

Pond C2: Bypass Culvert (east backyards)



Summary for Pond C3: Bypass Culvert (Yorktown Rd north)

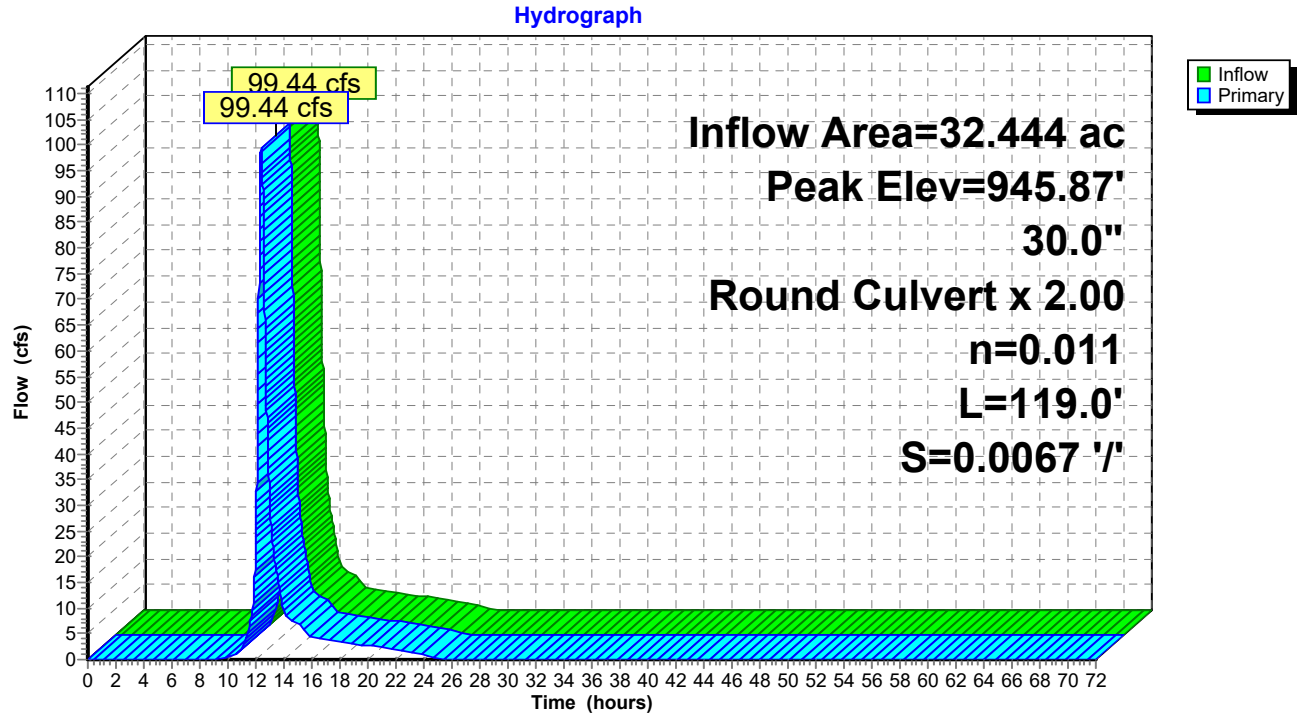
Inflow Area = 32.444 ac, 1.20% Impervious, Inflow Depth = 3.82" for 200-yr, 24hr event
Inflow = 99.44 cfs @ 12.39 hrs, Volume= 10.321 af
Outflow = 99.44 cfs @ 12.39 hrs, Volume= 10.321 af, Atten= 0%, Lag= 0.0 min
Primary = 99.44 cfs @ 12.39 hrs, Volume= 10.321 af
Routed to Reach R3 : Bypass Swale 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 945.87' @ 12.39 hrs
Flood Elev= 946.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	941.00'	**30.0" Round Culvert X 2.00** L= 119.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 941.00' / 940.20' S= 0.0067 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=99.43 cfs @ 12.39 hrs HW=945.87' TW=941.73' (Dynamic Tailwater)
1=Culvert (Barrel Controls 99.43 cfs @ 10.13 fps)

Pond C3: Bypass Culvert (Yorktown Rd north)



Summary for Pond C4: Bypass Culvert (Low Countries Rd west)

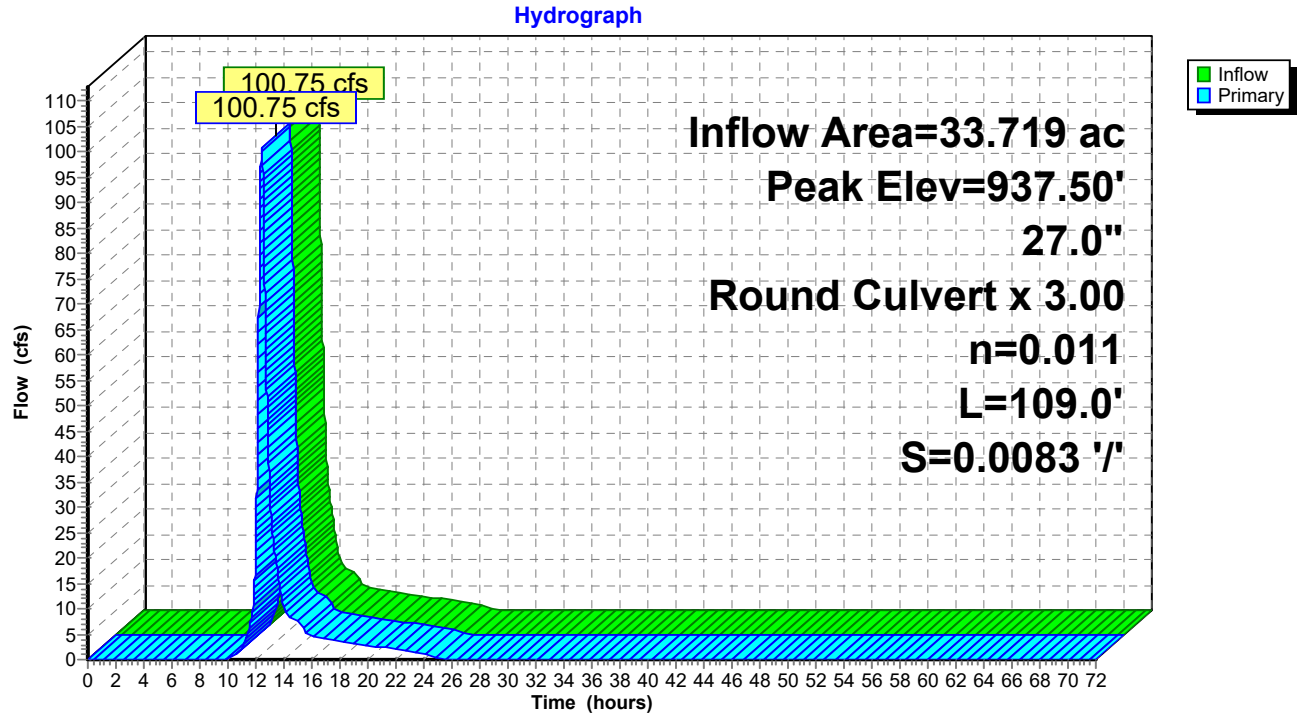
Inflow Area = 33.719 ac, 1.33% Impervious, Inflow Depth = 3.82" for 200-yr, 24hr event
Inflow = 100.75 cfs @ 12.41 hrs, Volume= 10.738 af
Outflow = 100.75 cfs @ 12.41 hrs, Volume= 10.738 af, Atten= 0%, Lag= 0.0 min
Primary = 100.75 cfs @ 12.41 hrs, Volume= 10.738 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 937.50' @ 12.41 hrs
Flood Elev= 937.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	933.90'	**27.0" Round Culvert X 3.00** L= 109.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 933.90' / 933.00' S= 0.0083 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.98 sf

Primary OutFlow Max=100.73 cfs @ 12.41 hrs HW=937.50' TW=932.13' (Dynamic Tailwater)
1=Culvert (Barrel Controls 100.73 cfs @ 8.44 fps)

Pond C4: Bypass Culvert (Low Countries Rd west)



Summary for Pond PrP1: SE Existing Depression

Inflow Area = 15.371 ac, 2.78% Impervious, Inflow Depth = 3.94" for 200-yr, 24hr event
Inflow = 58.31 cfs @ 12.30 hrs, Volume= 5.043 af
Outflow = 20.76 cfs @ 12.69 hrs, Volume= 5.043 af, Atten= 64%, Lag= 23.6 min
Discarded = 0.28 cfs @ 12.69 hrs, Volume= 0.181 af
Primary = 4.60 cfs @ 14.53 hrs, Volume= 3.159 af
Routed to Pond PrP2 : Wet Pond
Secondary = 16.00 cfs @ 12.69 hrs, Volume= 1.703 af
Routed to Pond PrP2 : Wet Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 956.38' @ 12.69 hrs Surf.Area= 90,942 sf Storage= 85,211 cf

Plug-Flow detention time= 98.5 min calculated for 5.043 af (100% of inflow)
Center-of-Mass det. time= 98.5 min (925.7 - 827.2)

Volume	Invert	Avail.Storage	Storage Description
#1	954.50'	122,348 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
954.50	5,787	0	0
955.00	19,221	6,252	6,252
956.00	76,066	47,644	53,896
956.50	95,900	42,992	96,887
956.75	107,787	25,461	122,348

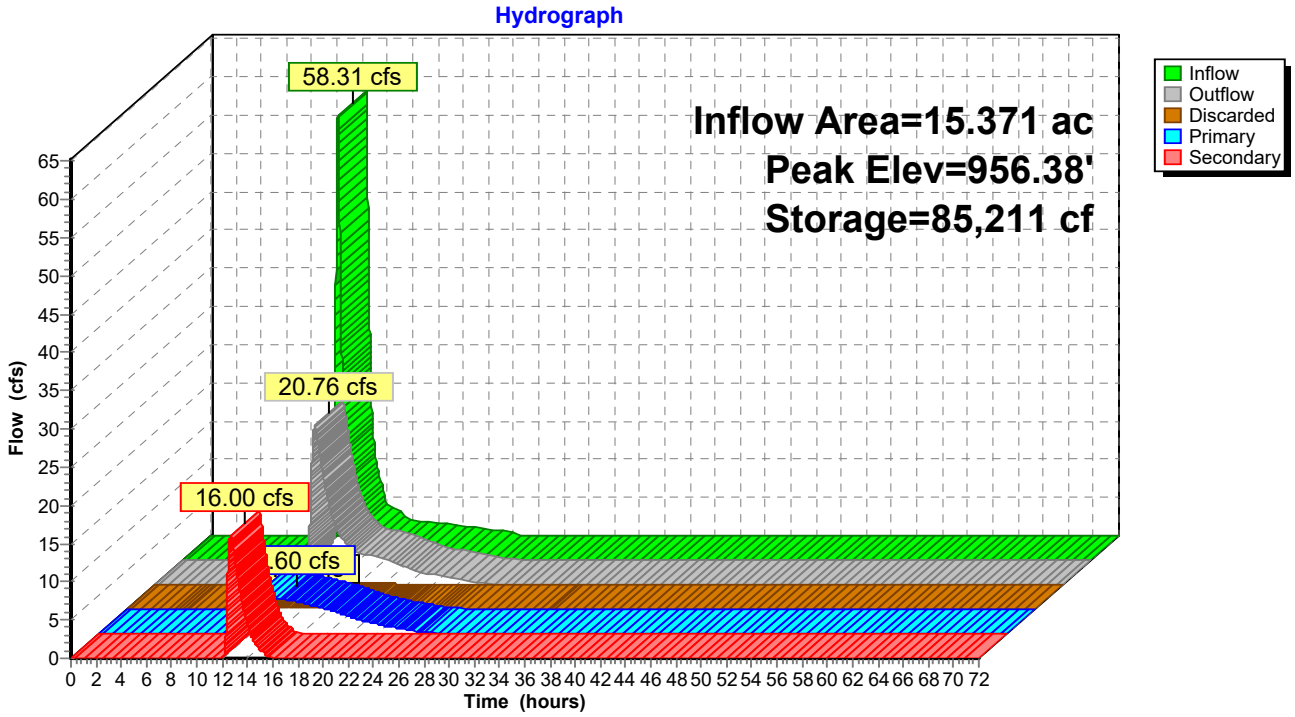
Device	Routing	Invert	Outlet Devices
#1	Discarded	954.50'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 900.00'
#2	Secondary	955.75'	**10.0' long + 4.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Primary	954.50'	**12.0" Round Culvert** L= 1,700.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 954.50' / 931.50' S= 0.0135 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Discarded OutFlow Max=0.28 cfs @ 12.69 hrs HW=956.38' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.28 cfs)

Primary OutFlow Max=4.60 cfs @ 14.53 hrs HW=955.95' TW=934.98' (Dynamic Tailwater)
↑—**3=Culvert** (Outlet Controls 4.60 cfs @ 5.85 fps)

Secondary OutFlow Max=15.99 cfs @ 12.69 hrs HW=956.38' TW=936.38' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 15.99 cfs @ 2.05 fps)

Pond PrP1: SE Existing Depression



Summary for Pond PrP2: Wet Pond

Inflow Area = 47.275 ac, 27.42% Impervious, Inflow Depth = 4.42" for 200-yr, 24hr event
Inflow = 244.12 cfs @ 12.13 hrs, Volume= 17.419 af
Outflow = 42.30 cfs @ 12.85 hrs, Volume= 17.325 af, Atten= 83%, Lag= 43.1 min
Primary = 42.30 cfs @ 12.85 hrs, Volume= 17.325 af
Routed to Pond PrP3 : Infiltration Basin
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond PrP3 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Automatic Starting Elev= 931.50' Surf.Area= 45,103 sf Storage= 190,807 cf
Peak Elev= 936.39' @ 12.85 hrs Surf.Area= 64,438 sf Storage= 457,884 cf (267,077 cf above start)

Plug-Flow detention time= 282.5 min calculated for 12.945 af (74% of inflow)
Center-of-Mass det. time= 122.6 min (959.2 - 836.6)

Volume	Invert	Avail.Storage	Storage Description
#1	925.50'	545,680 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

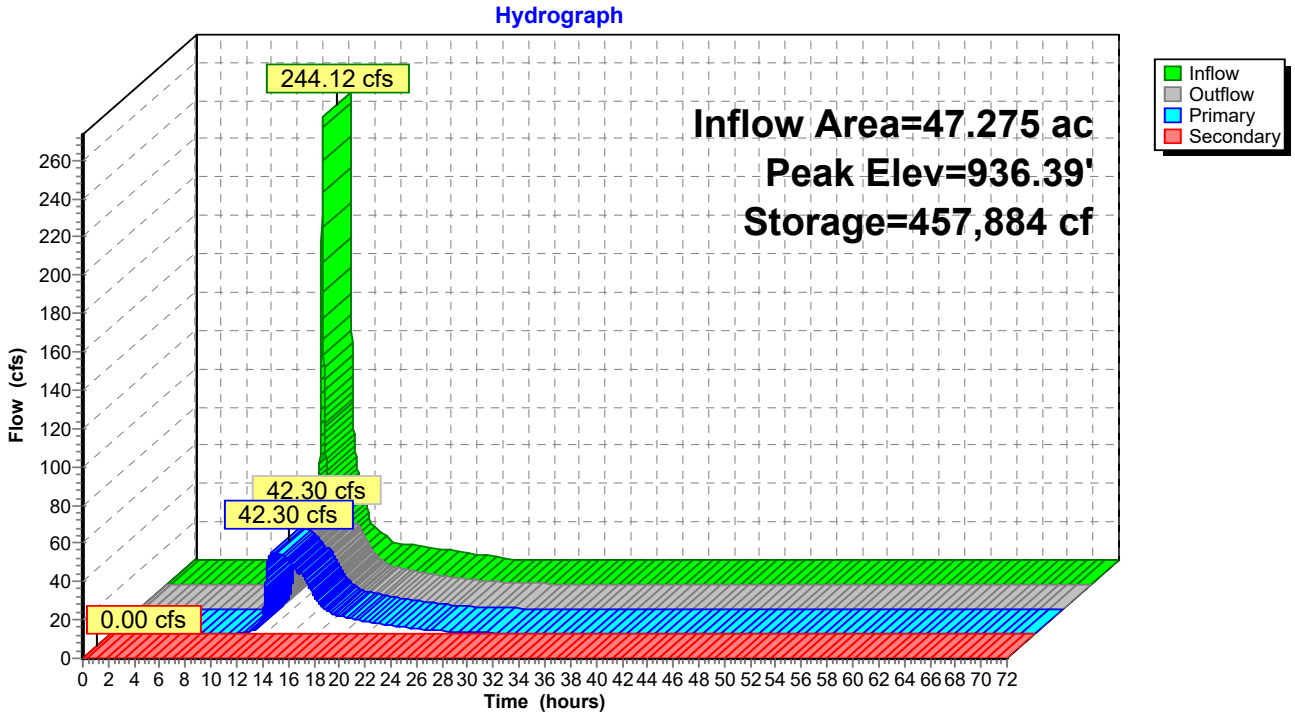
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
925.50	23,915	0	0
930.50	36,156	150,178	150,178
931.50	45,103	40,630	190,807
932.50	48,857	46,980	237,787
933.50	52,712	50,785	288,572
934.50	56,667	54,690	343,261
935.50	60,723	58,695	401,956
936.50	64,880	62,802	464,758
937.50	69,137	67,009	531,766
937.70	70,001	13,914	545,680

Device	Routing	Invert	Outlet Devices
#1	Primary	931.50'	**30.0" Round Culvert** L= 263.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 931.50' / 930.50' S= 0.0038 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	936.70'	**10.0' long + 4.0 '/' SideZ x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=42.30 cfs @ 12.85 hrs HW=936.39' TW=932.35' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 42.30 cfs @ 8.62 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=931.50' TW=930.50' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PrP2: Wet Pond



Summary for Pond PrP3: Infiltration Basin

Inflow Area = 52.413 ac, 30.94% Impervious, Inflow Depth > 4.54" for 200-yr, 24hr event
Inflow = 77.28 cfs @ 12.13 hrs, Volume= 19.841 af
Outflow = 49.28 cfs @ 12.82 hrs, Volume= 18.777 af, Atten= 36%, Lag= 41.5 min
Discarded = 0.22 cfs @ 12.62 hrs, Volume= 1.020 af
Primary = 49.06 cfs @ 12.82 hrs, Volume= 17.756 af
Routed to Pond R5 : Bypass Swale 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 932.37' @ 12.62 hrs Surf.Area= 68,741 sf Storage= 120,958 cf

Plug-Flow detention time= 140.5 min calculated for 18.774 af (95% of inflow)
Center-of-Mass det. time= 92.4 min (1,028.9 - 936.6)

Volume	Invert	Avail.Storage	Storage Description
#1	930.50'	400,616 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

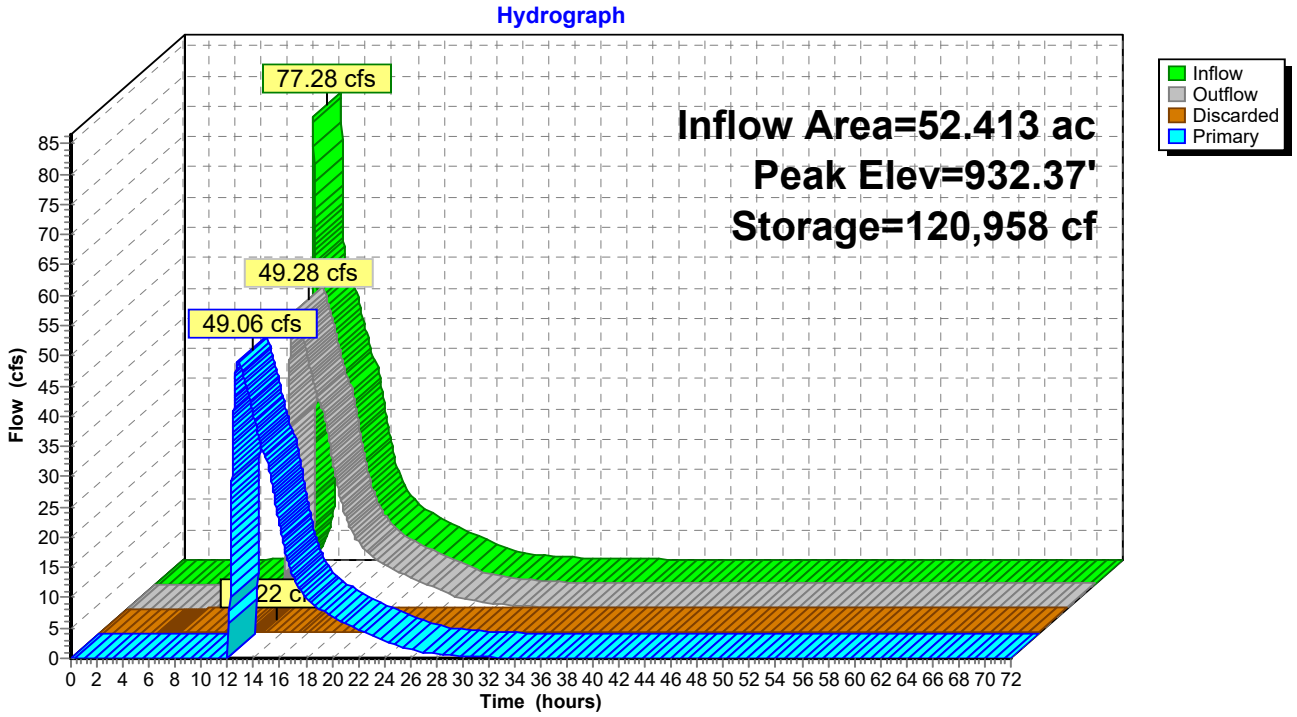
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
930.50	60,505	0	0
931.00	62,666	30,793	30,793
932.00	67,065	64,866	95,658
933.00	71,564	69,315	164,973
934.00	76,164	73,864	238,837
935.00	80,865	78,515	317,351
936.00	85,665	83,265	400,616

Device	Routing	Invert	Outlet Devices
#1	Discarded	930.50'	**0.110 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'
#2	Primary	931.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.50 932.00 933.00 934.00 935.00 936.00 Width (feet) 20.00 24.00 32.00 40.00 48.00 56.00

Discarded OutFlow Max=0.22 cfs @ 12.62 hrs HW=932.37' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.22 cfs)

Primary OutFlow Max=49.24 cfs @ 12.82 hrs HW=932.35' TW=932.00' (Dynamic Tailwater)
↑—**2=Custom Weir/Orifice** (Weir Controls 49.24 cfs @ 2.47 fps)

Pond PrP3: Infiltration Basin



Summary for Pond R5: Bypass Swale 5

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 3.97" for 200-yr, 24hr event
Inflow = 139.58 cfs @ 12.46 hrs, Volume= 28.722 af
Outflow = 139.58 cfs @ 12.46 hrs, Volume= 28.722 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 12.46 hrs, Volume= 0.002 af
Primary = 139.57 cfs @ 12.46 hrs, Volume= 28.719 af
Routed to Link PrL : Pro Total

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 932.13' @ 12.46 hrs Surf.Area= 1,496 sf Storage= 560 cf

Plug-Flow detention time= 0.1 min calculated for 28.718 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (911.6 - 911.5)

Volume	Invert	Avail.Storage	Storage Description
#1	931.18'	21,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

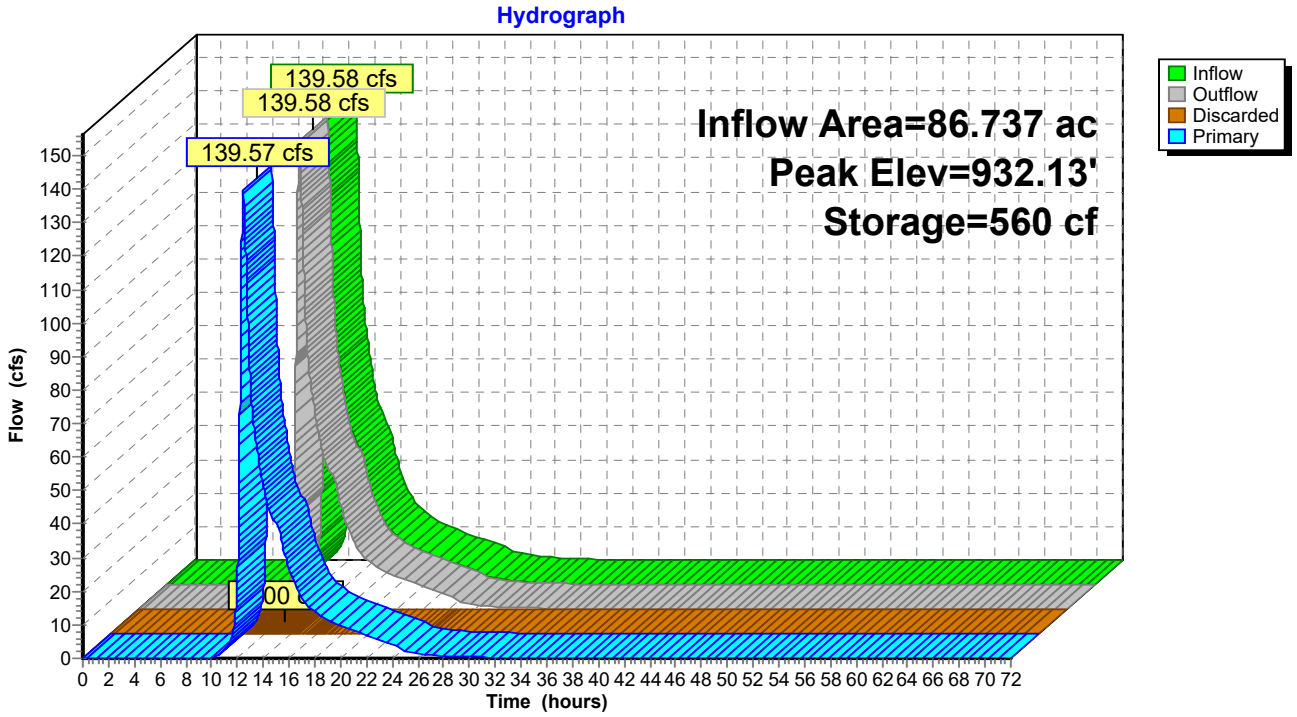
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
931.18	0	0	0
932.00	973	399	399
933.00	4,970	2,972	3,370
934.00	8,803	6,887	10,257
935.00	13,565	11,184	21,441

Device	Routing	Invert	Outlet Devices
#1	Primary	931.18'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 931.18 931.50 932.00 933.00 934.00 935.00 Width (feet) 0.00 43.00 91.00 222.00 278.00 427.00
#2	Discarded	931.18'	**0.130 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 923.50'

Discarded OutFlow Max=0.00 cfs @ 12.46 hrs HW=932.13' (Free Discharge)
↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=139.57 cfs @ 12.46 hrs HW=932.13' TW=0.00' (Dynamic Tailwater)
↑**1=Custom Weir/Orifice** (Weir Controls 139.57 cfs @ 2.61 fps)

Pond R5: Bypass Swale 5



Summary for Link PrL: Pro Total

Inflow Area = 86.737 ac, 19.21% Impervious, Inflow Depth = 3.97" for 200-yr, 24hr event
Inflow = 139.57 cfs @ 12.46 hrs, Volume= 28.719 af
Primary = 139.57 cfs @ 12.46 hrs, Volume= 28.719 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link PrL: Pro Total

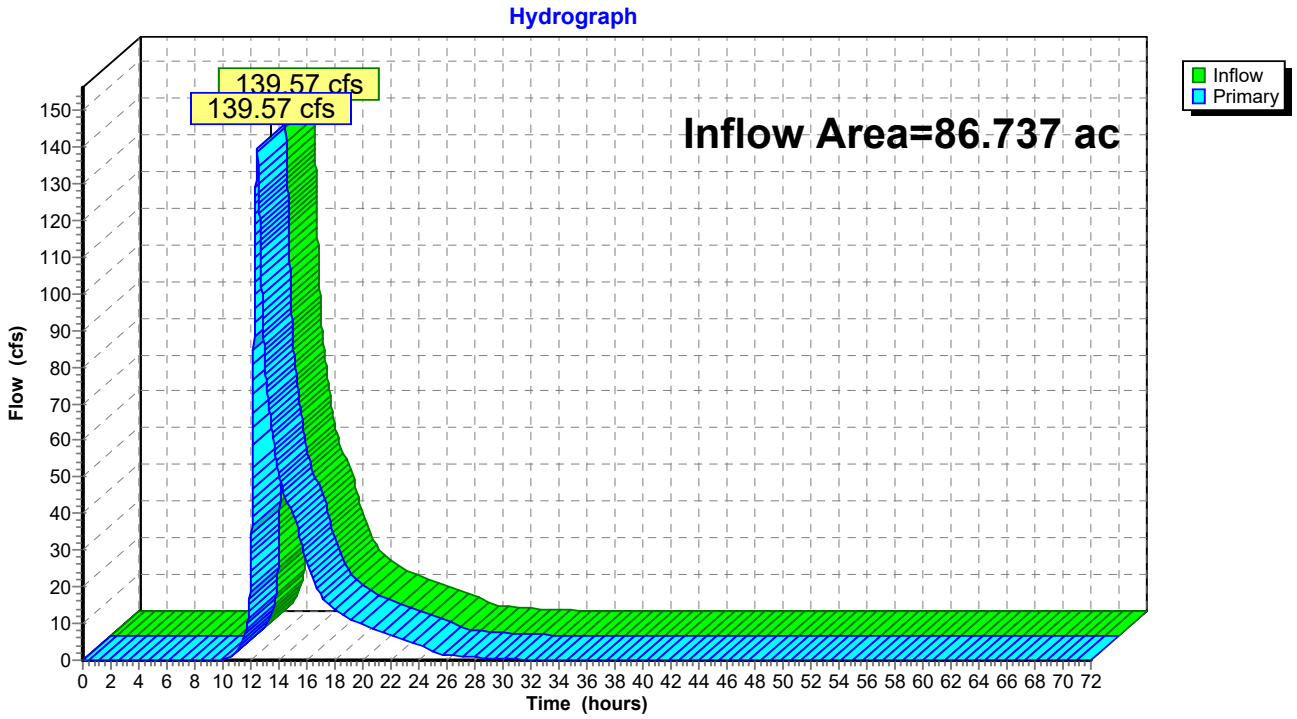
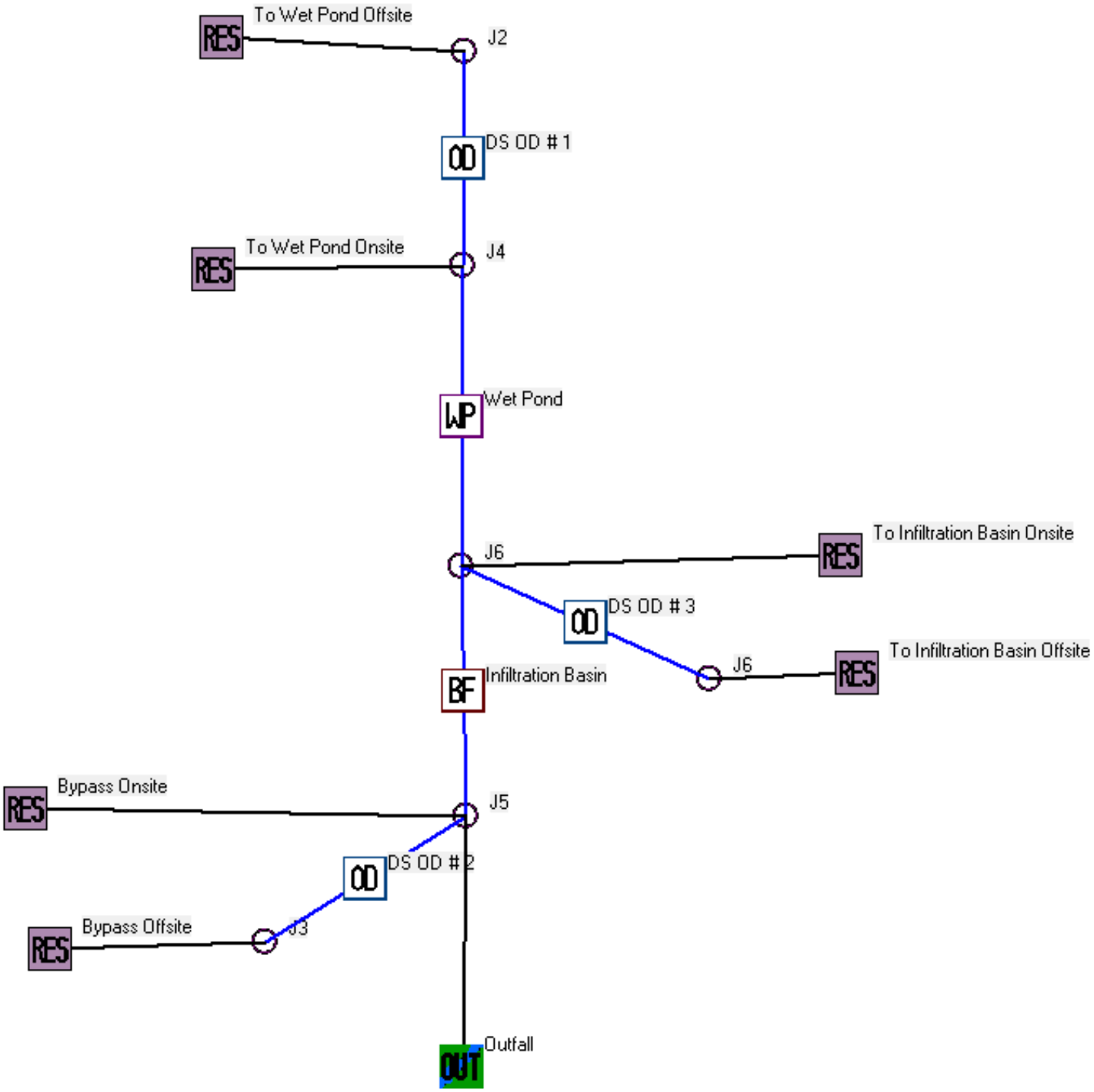


Exhibit 10

WinSLAMM TSS Results

Post-Development - Entire Drainage Area



Data file name: F:\ProjectsAdmin\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Post Developmer
WinSLAMM Version 10.5.2
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 09-25-2026 Time: 08:57:23
Site information:

LU# 1 - Residential: Bypass Onsite Total area (ac): 2.749
45 - Large Landscaped Areas 1 (Crops): 2.749 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Residential: Bypass Offsite Total area (ac): 31.575
1 - Roofs 1: 0.081 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.189 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.004 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.101 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.029 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.020 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.020 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
38 - Streets 2: 0.218 ac. Smooth Street Length = 0.0545 mi Street Width = 33 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 29.778 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.052 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.007 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.004 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 0.072 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Residential: To Wet Pond Offsite Total area (ac): 16.846
1 - Roofs 1: 0.045 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.105 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.002 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.056 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.016 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.011 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.011 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
38 - Streets 2: 0.555 ac. Smooth Street Length = 0.1388 mi Street Width = 32.98811 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 15.414 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.585 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.004 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.002 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 0.040 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Residential: To Wet Pond Onsite Total area (ac): 30.429
1 - Roofs 1: 1.234 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 2.880 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.622 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 1.536 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.439 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.302 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.302 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 2.091 ac. Smooth Street Length = 0.5228 mi Street Width = 32.99685 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
38 - Streets 2: 1.228 ac. Smooth Street Length = 0.2068 mi Street Width = 48.98936 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.055 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 16.042 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.110 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.055 ac. Source Area PSD File:
70 - Water Body Areas: 2.436 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 1.097 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 5 - Residential: To Infiltration Basin Offsite Total area (ac): 0.658
25 - Driveways 1: 0.059 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.020 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.020 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.559 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 6 - Residential: To Infiltration Basin Onsite Total area (ac): 4.481
1 - Roofs 1: 0.095 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

2 - Roofs 2: 0.221 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.004 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.118 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.034 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.023 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.023 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.254 ac. Smooth Street Length = 0.0635 mi Street Width = 33 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.004 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.229 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.008 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.004 ac. Source Area PSD File:
70 - Water Body Areas: 2.380 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 0.084 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Other Device CP# 1 (DS) - DS OD # 1
Fraction of drainage area served by device (ac) = 1.00
Particulate Concentration reduction fraction = 1.00
Filterable Concentration reduction fraction = 1.00
Runoff volume reduction fraction = 0

Control Practice 2: Other Device CP# 2 (DS) - DS OD # 2
Fraction of drainage area served by device (ac) = 1.00
Particulate Concentration reduction fraction = 1.00
Filterable Concentration reduction fraction = 1.00
Runoff volume reduction fraction = 0

Control Practice 3: Wet Detention Pond CP# 1 (DS) - Wet Pond
Initial stage elevation (ft): 6
Maximum flow allowed into pond (cfs): No maximum value entered
Outlet Characteristics:
Outlet type: Orifice 1
1. Orifice diameter (ft): 2.5
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 11.2
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.5490	0.00	0.00
2	5.00	0.8300	0.00	0.00
3	6.00	1.0354	0.00	0.00
4	7.00	1.1216	0.00	0.00
5	8.00	1.2101	0.00	0.00
6	9.00	1.3009	0.00	0.00
7	10.00	1.3940	0.00	0.00
8	11.00	1.4894	0.00	0.00
9	12.00	1.5872	0.00	0.00
10	12.20	1.6070	0.00	0.00

Control Practice 4: Biofilter CP# 1 (DS) - Infiltration Basin

1. Top area (square feet) = 85665
2. Bottom area (square feet) = 60505
3. Depth (ft): 7.5
4. Biofilter width (ft) - for Cost Purposes Only: 100
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Treatment media infiltration rate: 0.5
12. Treatment media depth (ft) = 2
13. Treatment media porosity = 0.27
14. Percent solids reduction due to flow through treatment media = 0
16. Number of biofiltration control devices = 1
18. Initial water surface elevation (ft): 0

Estimated Surface Drain Time = 109.09 hrs.
Estimated Subsurface Drain Time = 122.05 hrs.
Soil Data Soil Type Fraction in Eng. Soil
Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 20
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 3

Outlet type: Evapotranspiration

Month Number	Month	Evapotranspiration (in/day)	Evaporation (in/day)
1	January	.	.
2	February	.	.
3	March	.	.
4	April	.1	.
5	May	.14	.
6	June	.15	.
7	July	.15	.
8	August	.12	.
9	September	.09	.
10	October	.07	.
11	November	.03	.
12	December	.	.

1. Saturated Soil Moisture Content: 0.27
2. Soil Field Moisture Capacity (% of Soil Dry Weight): 0.195
3. Permanent Wilting Point (% of Soil Dry Weight): 0.065
4. Supplemental Irrigation Used= False

4a. Fraction of available capacity when irrigation starts = 0
4b. Fraction of available capacity when irrigation stops = 0
5a. First area of biofilter that is vegetated (fraction): 1
5b. Second area of biofilter that is vegetated (fraction): 0
5c. Third area of biofilter that is vegetated (fraction): 0
5d. Fourth area of biofilter that is vegetated (fraction): 0
6a. First plant type: 7
6b. Second plant type: 0
6c. Third plant type: 0
6d. Fourth plant type: 0
7a. First root depth (ft): 6
7b. Second root depth (ft): 0
7c. Third root depth (ft): 0
7d. Fourth root depth (ft): 0
8a. First ET adjustment factor for actual crop (decimal): 0.8
8b. Second ET adjustment factor for actual crop (decimal): 0
8c. Third ET adjustment factor for actual crop (decimal): 0
8e. Fourth ET adjustment factor for actual crop (decimal): 0

Control Practice 5: Other Device CP# 3 (DS) - DS OD # 3
Fraction of drainage area served by device (ac) = 1.00
Particulate Concentration reduction fraction = 1.00
Filterable Concentration reduction fraction = 1.00
Runoff volume reduction fraction = 0

SLAMM for Windows Version 10.5.2
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Data file name: F:\ProjectsAdmin\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Post Developmer
WinSLAMM Version 10.5.2
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 09-25-2026 Time of run: 08:56:36
Total Area Modeled (acres): 86.738
Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	1.411E+06	-	90.51	7975	-
Outfall Total with Controls:	134497	90.47%	46.12	387.2	95.14%
Annualized Total After Outfall Controls:	134866			388.3	

Biofilter # 1: Never. Percent Solids Reduction due to Treatment Media Not Used

Data File: F:\ProjectsAdmin\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Post Development - Main\SE Depression Not Separate\26-2

Rain File: WisReg - Madison WI 1981.RAN

Date: 09-25-26 Time: 8:54:56 AM

Site Description:

Col. #:	2	3	4	5	6	7	8	9	10	11	12	13
Control Practice No.	Control Practice Type	Control Practice Name or Location	Total Inflow Volume (cf)	Total Outflow Volume (cf)	Percent Volume Reduction	Total Influent Load (lbs)	Total Effluent Load (lbs)	Percent Load Reduction	Flow Weighted Influent Conc (mg/L)	Flow Weighted Effluent Conc (mg/L)	Percent Conc. Reduction	Influent Median Part. Size (microns)
1	Other Device	DS OD # 1	62601	62601	0	625.4	0	100.0	160.0	0	100.000	7.80
2	Other Device	DS OD # 2	44807	44807	0	407.0	0	100.0	145.5	0	100.000	7.80
3	Wet Detention Pond	Wet Pond	1.042E+06	1.043E+06	-0.0960	6173	1109	82.03	94.89	17.02	82.060	7.80
4	Biofilter	Infiltration Basin	1.350E+06	72434	94.63	1583	142.7	90.99	18.78	31.55	-68.038	2.68
5	Other Device	DS OD # 3	6122	6122	0	50.75	0	100.0	132.8	0	100.000	7.80

Data File: F:\ProjectsAdmin\Nex225 Post-Development Main.mdb

Rain File: WisReg - Madison WI

Date: 09-25-26 Time: 8:54:56 A

Site Description:

Col. #:	2	14	15	16	17	18	19	20	23	27	28	29	30
Control Practice No.	Control Practice Type	Effluent Median Part. Size (microns)	Notes	Maximum Flushing Ratio	Maximum Peak Reduction Factor	Maximum Stage (ft)	Hydraulic Volume Out (cf)	Minimum Volume (cf)	Treated Volume (cf)	Maximum Surface Ponding Time (hrs)	Maximum Subsurface Ponding Time (hrs)	Volume Infiltrated (cf)	Underdrain Discharge Vol. (cf)
1	Other Device	7.80											
2	Other Device	7.80											
3	Wet Detention Pond	1.74	No Pond Overflows	0.7	1.00	7.19	1043217	190846				0	
4	Biofilter	2.46	No Biofilter Overflows			3.17	89052		1199404	130.4	176.11	1213325.00	0
5	Other Device	7.80											

Data File: F:\ProjectsAdmin\Nex

Rain File: WisReg - Madison WI

Date: 09-25-26 Time: 8:54:56 A

Site Description:

Col. #:	2	31	32	33	34	35	36	39	54	57	58	61	62	63
Control Practice No.	Control Practice Type	Evapo-Transpir. Vol. (cf)	Minimum Soil Moist. (frac)	Surface Discharge Bypass Vol. (cf)	Evap. Vol. (cf)	Volume Supplemtl. Irrig.(cf)	Final Surface Infiltration Rate (in/hr)	Surface Ponding Events >72 hrs (Count)	Residence Time in Media (hrs)	Volume to WWTP (cf)	Water Withdrawl Volume (cf)	Ttl. Mass Trapped in Media (lbs)	Ttl. Mass Infiltrated (lbs)	Annual Allowable Clog Rate (lbs/sf/yr)
1	Other Device													
2	Other Device													
3	Wet Detention Pond									0	0			
4	Biofilter	78640.66	-0.72	72433.73			0.488	4	58.91			1438.03	17.66	0.102
5	Other Device													

Data File: F:\ProjectsAdmin\Nex				
Rain File: WisReg - Madison WI				
Date: 09-25-26 Time: 8:54:56 A				
Site Description:				
Col. #:	2	64	65	91
Control Practice No.	Control Practice Type	First Year Cum. Load (lbs/sf)	Time Until Clogging Failure (yrs)	Runoff Producing Events/ Ttl. Rains
1	Other Device			90/90
2	Other Device			90/90
3	Wet Detention Pond			90/90
4	Biofilter	0.024	Never	4/90
5	Other Device			90/90

Exhibit 11

Soil Evaluation Report

Wis. Depart. of Safety and Professional Services

Division of Industry Services

SOIL EVALUATION - STORM

in accordance with SPS 382,365 and 385, Wis.Adm.Code

Attach complete site plan on paper not less than 8 1/2 x 11" in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and % slope,scale or dimensions,north arrow,location &distance to nearest road.

Please print all information

Personal information you provide may be used for secondary purposes (Privacy Law,s.15.04(1)(m)).

County	DANE
Parcel I.D.	196/0910-204-9110-1
Reviewed by	Date

Property Owner	Property Location
KAROWS PONDEROSA LLC	SW 1/4, SE 1/4, S 20 , T 9 N, R 10 E
Property Owner's Mailing Address	**Lot #** / **Subd.Name or CSM#**
W5467 COUNTY HIGHWAY CS	1 / 15295
City / State / Zip Code / Phone Number	☐ City ☒ Village / **Nearest Road**
POYNETTE WI 53955	WINDSOR / GRAY RD

Drainage area: TBD ☐ sq.ft. ☐ acres

Optional:

Test Site Suitable for (check all that apply)

☐ Irrigation ☐ Bioretention trench ☐ Trenches
☐ Rain garden ☐ Grassed swale ☐ Reuse
☐ Infiltration trench ☐ SDS (>15'wide) ☐ Other_____

Hydraulic Application Test Method:

☒ Morphological Evaluation
☐ Double-Ring Infiltrometer
☐ Other (specify) _____

Site Considerations:

Obser. ☐ Boring

1 # ☒ Pit Ground surface elev. 933.84 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-14	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	14-34	10YR4/4		sicl	2fsbk	fi	gs	1	0.04
Bt2	34-57	10YR4/4		sicl	1fsbk	fi	cs	2	0.04
C1	57-70	10YR4/6		scl	0mass	fi	cs	8	0.11
C2	70-130	10YR5/4		gr fsl	1msbk	vfr		20	0.5

Obser. ☐ Boring

2 # ☒ Pit Ground surface elev. 934.98 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-15	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	15-30	10YR4/4		sicl	2fsbk	fi	gs	1	0.04
Bt2	30-39	10YR4/4		sicl	1fsbk	fi	cw	5	0.04
Bt3	39-41	10YR4/6		gr scl	1msbk	fi	cw	25	0.11
C	41-138	10YR5/4		gr fsl	1msbk	vfr		22	0.5

CST Name	CLAY VANDERLEEST	Signature:	CST Number 1190689
Address	N7803 TOPPE RD WATERLOO, WI 53594	Date Evaluation Conducted:4/20/2026	SP-121100003 Telephone No.(608) 509-2855

Obser. ☐ Boring

3 # ☒ Pit Ground surface elev. 934.04 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-15	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	15-33	10YR4/4		sicl	2fsbk	fi	gs	1	0.04
Bt2	33-44	10YR4/4		sicl	1fsbk	fi	cw	3	0.04
Bt3	44-54	10YR4/6		gr scl	1msbk	fi	cw	19	0.11
C	54-133	10YR5/4		gr fsl	1msbk	vfr		17	0.5

Obser. ☐ Boring

4 # ☒ Pit Ground surface elev. 932.22 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-13	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	13-30	10YR4/4		sicl	2fsbk	fi	gs	1	0.04
Bt2	30-44	10YR4/4		sicl	1fsbk	fi	cw	6	0.04
Bt3	44-53	10YR4/6		gr scl	1msbk	fi	cw	20	0.11
C	53-130	10YR5/4		gr fsl	1msbk	vfr		20	0.5

Obser. ☐ Boring

5 # ☒ Pit Ground surface elev. 932.15 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap1	0-20	10YR3/2		sil	2fpl	fr	cs	0	0.13
Ap2	20-52	10YR4/4		sil	1msbk	fr	as	0	0.13
Bt1	52-66	10YR4/4		sicl	1fsbk	fi	cs	2	0.04
Bt2	66-81	10YR4/6		gr scl	1msbk	fi	cw	17	0.11
C	81-136	10YR5/4		gr fsl	1msbk	vfr		22	0.5

The Dept. of Safety and Professional Services is an equal opportunity service provider and employer. If you need assistance to access services or need material in an alternate format, contact the department at 608-266-3151 or TTY through Relay.

Obser. ☐ Boring

6 # ☒ Pit Ground surface elev. 933.13 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-20	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	20-38	10YR4/4		sicl	2fsbk	fi	cw	0	0.04
Bt2	38-64	10YR4/4	c2d10YR6/6 6/2	sicl	1fsbk	fi	cs	0	0.04
C1	64-72	10YR4/6		scl	0mass	fi	cw	5	0.11
C2	72-131	10YR5/4		gr fsl	1msbk	vfr		18	0.5

Obser. ☐ Boring

7 # ☒ Pit Ground surface elev. 933.29 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-28	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	28-46	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	46-72	10YR4/4	c2d10YR6/6 6/2	sicl	1fsbk	fi	cw	0	0.04
C1	72-85	10YR4/6		scl	0mass	fi	cw	7	0.11
C2	85-109	10YR5/4 6/4		gr fsl/ vfs	1msbk	vfr	gw	16	0.5
C3	109-132	10YR5/4		gr sl	1msbk	vfr		18	0.5

Obser. ☐ Boring

8 # ☒ Pit Ground surface elev. 932.37 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-20	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	20-31	10YR4/4		sicl	2fsbk	fi	cw	0	0.04
Bt2	31-54	10YR4/4	c2d10YR6/6 6/2	sicl	1fsbk	fi	cs	0	0.04
C1	54-65	10YR4/6		gr scl	0mass	fi	cw	15	0.11
C2	65-137	10YR5/4		gr fsl	1msbk	vfr		20	0.5

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Obser. ☐ Boring

9 # ☒ Pit Ground surface elev. 934.46 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-9	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	9-29	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	29-48	10YR4/4		sicl	1fsbk	fi	cw	1	0.04
C1	48-58	10YR4/6		scl	0mass	fi	cw	5	0.11
C2	58-144	10YR5/4		gr fsl	1msbk	vfr		17	0.5

Obser. ☐ Boring

10 # ☒ Pit Ground surface elev. 933.27 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap1	0-18	10YR3/2		sil	2fpl	fr	cs	0	0.13
Ap2	18-35	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt	35-64	10YR4/4		sicl	1fsbk	fi	cw	3	0.04
C1	64-112	10YR4/6	c2f10YR6/6 6/2	scl	0mass	fi	gw	8	0.11
C2	112-136	10YR5/4		gr fsl	1msbk	vfr		15	0.5

Obser. ☐ Boring

11 # ☒ Pit Ground surface elev. 934.06 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-17	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt	17-32	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
C1	32-66	10YR4/4	c3d10YR5/8 6/3	sicl	0mass	fi	cw	0	0.04
C2	66-87	10YR4/6		scl	0mass	fi	cw	7	0.11
C3	87-138	10YR5/4		gr fsl	1msbk	vfr		16	0.5

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Obser. ☐ Boring

12 # ☒ Pit Ground surface elev. 936.36 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-14	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	14-29	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	29-50	10YR4/4		sicl	1fsbk	fi	gw	1	0.04
Bt3	50-58	10YR4/6		scl	1msbk	fi	cw	6	0.11
C	58-154	10YR5/4		gr fsl	1msbk	vfr		18	0.5

Obser. ☐ Boring

13 # ☒ Pit Ground surface elev. 937.43 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-10	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	10-28	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	28-46	10YR4/4		sicl	1fsbk	fi	cw	2	0.04
Bt3	46-61	10YR4/6		scl	1msbk	fi	cw	10	0.11
C1	61-110	10YR5/4		gr fsl	1msbk	vfr	gw	19	0.5
C2	110-170	10YR5/4		gr sl	1msbk	vfr		23	0.5

Obser. ☐ Boring

14 # ☒ Pit Ground surface elev. 936.78 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-12	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	12-26	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	26-30	10YR4/4		sicl	1fsbk	fi	cs	1	0.04
Bt3	30-46	10YR4/6		scl	1msbk	fi	cw	5	0.11
C1	46-76	10YR5/4		gr fsl	1msbk	vfr	gw	23	0.5
C2	76-165	10YR5/4		gr sl	1msbk	vfr		20	0.5

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Obser. ☐ Boring

15 # ☒ Pit Ground surface elev. 938.71 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-13	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	13-34	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	34-46	10YR4/4		sicl	1fsbk	fi	cs	1	0.04
Bt3	46-56	10YR4/6		scl	1msbk	fi	cw	5	0.11
C	56-182	10YR5/4		gr fsl	1msbk	vfr		16	0.5

Obser. ☐ Boring

16 # ☒ Pit Ground surface elev. 937.3 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-16	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt	16-35	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
C1	35-70	10YR4/4	c1d10YR6/6 6/2	sicl	1fsbk	fi	cw	3	0.04
C2	70-82	10YR4/6	c2f10YR5/8	scl	1msbk	fi	cw	8	0.11
C3	82-106	10YR5/4		gr fsl	1msbk	vfr	gw	17	0.5
C4	106-172	10YR5/4		gr sl	1msbk	vfr		22	0.5

Obser. ☐ Boring

17 # ☒ Pit Ground surface elev. 939.11 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-10	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	10-29	10YR4/4		sicl	2fsbk	fi	cs	0	0.04
Bt2	29-48	10YR4/4		sicl	1fsbk	fi	cs	2	0.04
Bt3	48-57	10YR4/6		scl	1msbk	fi	cw	10	0.11
C1	57-99	10YR5/4		gr fsl	1msbk	vfr	gw	19	0.5
C2	99-187	10YR5/4		gr sl	1msbk	vfr		21	0.5

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Obser. ☐ Boring

18 # ☒ Pit Ground surface elev. 939.46 Depth to limiting factor N/A

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.
Ap	0-12	10YR3/2		sil	1msbk	fr	as	0	0.13
Bt1	12-35	10YR4/4		sicl	2fsbk	fi	gs	0	0.04
Bt2	35-66	10YR4/4		sicl	1fsbk	fi	cs	2	0.04
C1	66-111	10YR5/4		gr fsl	1msbk	vfr	gw	15	0.5
C2	111-191	10YR5/4		gr sl	1msbk	vfr		21	0.5

Obser. ☐ Boring

☒ Pit Ground surface elev. Depth to limiting factor

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.

Obser. ☐ Boring

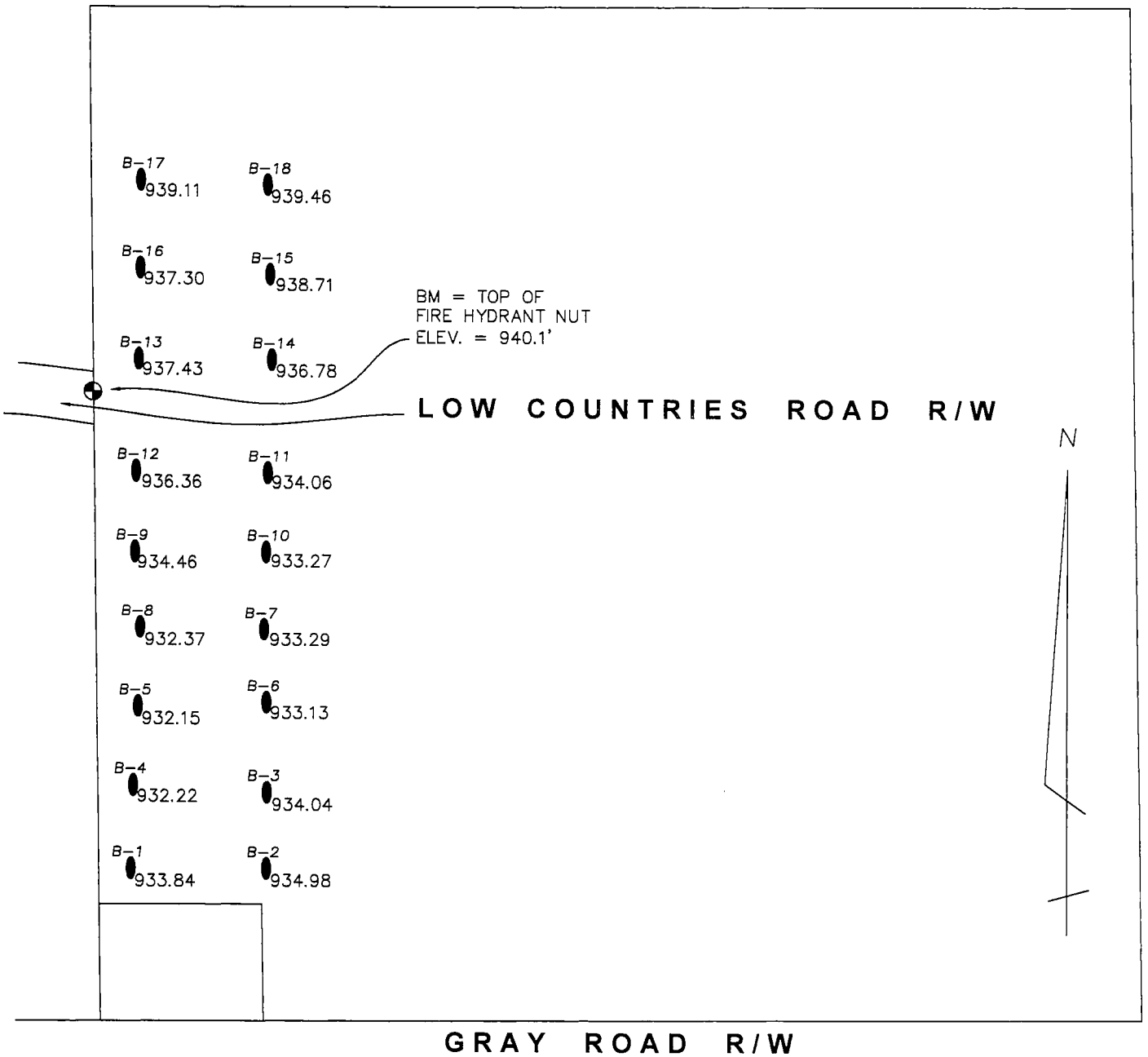
☒ Pit Ground surface elev. Depth to limiting factor

Horizon	Depth inches	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr.Sz.Sh.	Consistence (Moist)	Boundary	% Rock Fragmts	Hydraulic App. Rate Inches/Hr.

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KAROWS PONDEROSA LLC

LOT 1,
CSM 15295
37.66 ACRES



* Elevations are for Soil Test Use Only
* This is Not a Survey
* Property Lines Per Owner or County GIS Website
* Property Lines Need to be Identified Prior to Installation

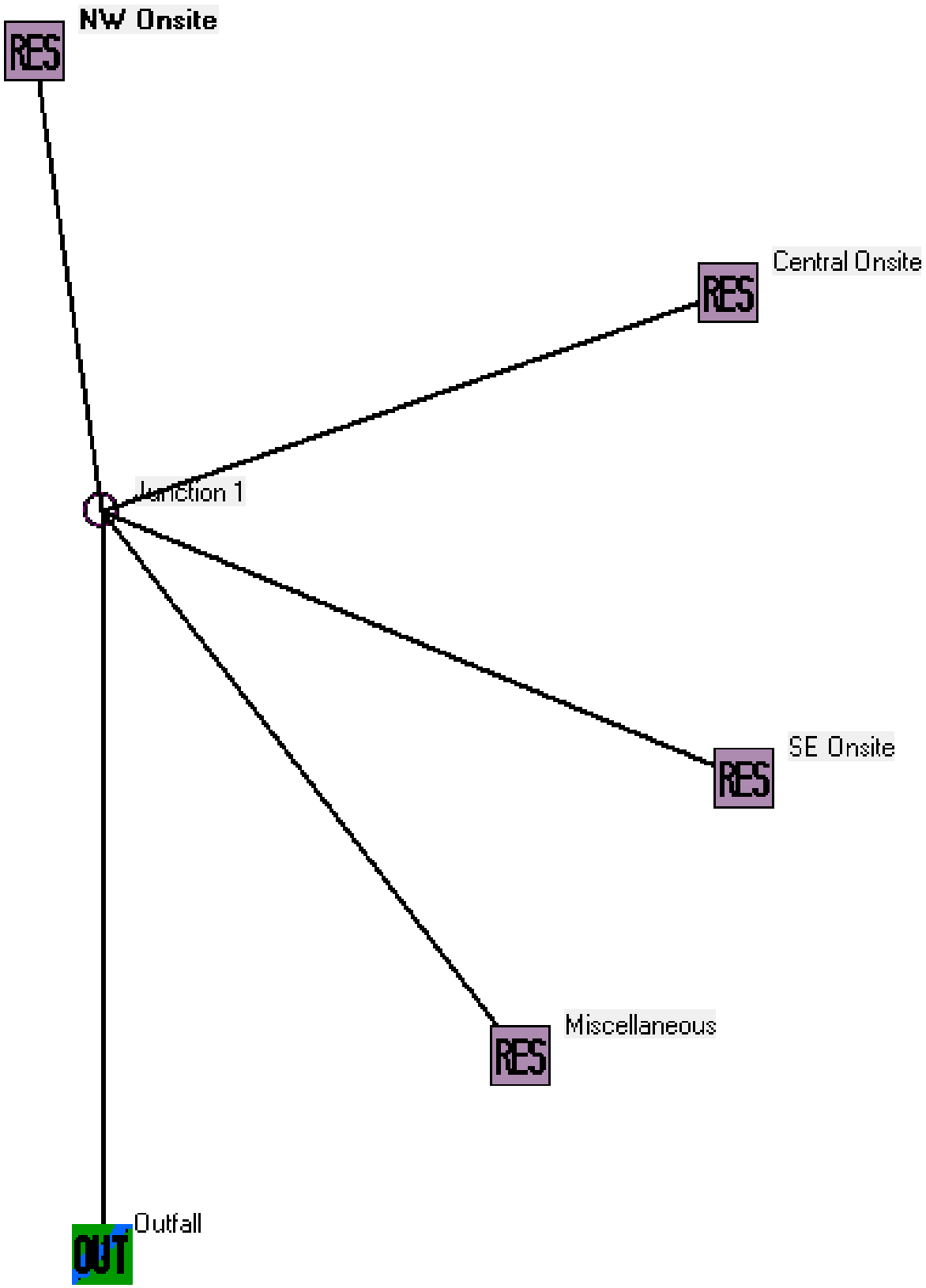
Scale: 1"=200'

400 Feet

Exhibit 12

WinSLAMM Infiltration Results

Pre-development



Data file name: O:\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Pre Development\26-225 Pre De
WinSLAMM Version 10.5.1
Rain file name: O:\Next Generation Construction, LLC\23-935 - Inman Residential Development - Beloit, WI\PH05 - Stormwater Report\WinSLAMM\WisReg - Madison
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: O:\Next Generation Construction, LLC\23-935 - Inman Residential Development - Beloit, WI\PH05 - Stormwater Report\WinSLAM
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 06-25-2026 Time: 15:42:42
Site information:

LU# 1 - Residential: NW Onsite Total area (ac): 0.983
45 - Large Landscaped Areas 1: 0.983 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Residential: Central Onsite Total area (ac): 35.675
1 - Roofs 1: 0.034 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.079 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.002 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.042 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.012 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.008 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.008 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
38 - Streets 2: 0.091 ac. Smooth Street Length = 0.0289 mi Street Width = 25.97751 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1 (Crops): 34.922 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.440 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.003 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.002 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 0.032 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Residential: SE Onsite Total area (ac): 0.942
45 - Large Landscaped Areas 1 (Crops): 0.942 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

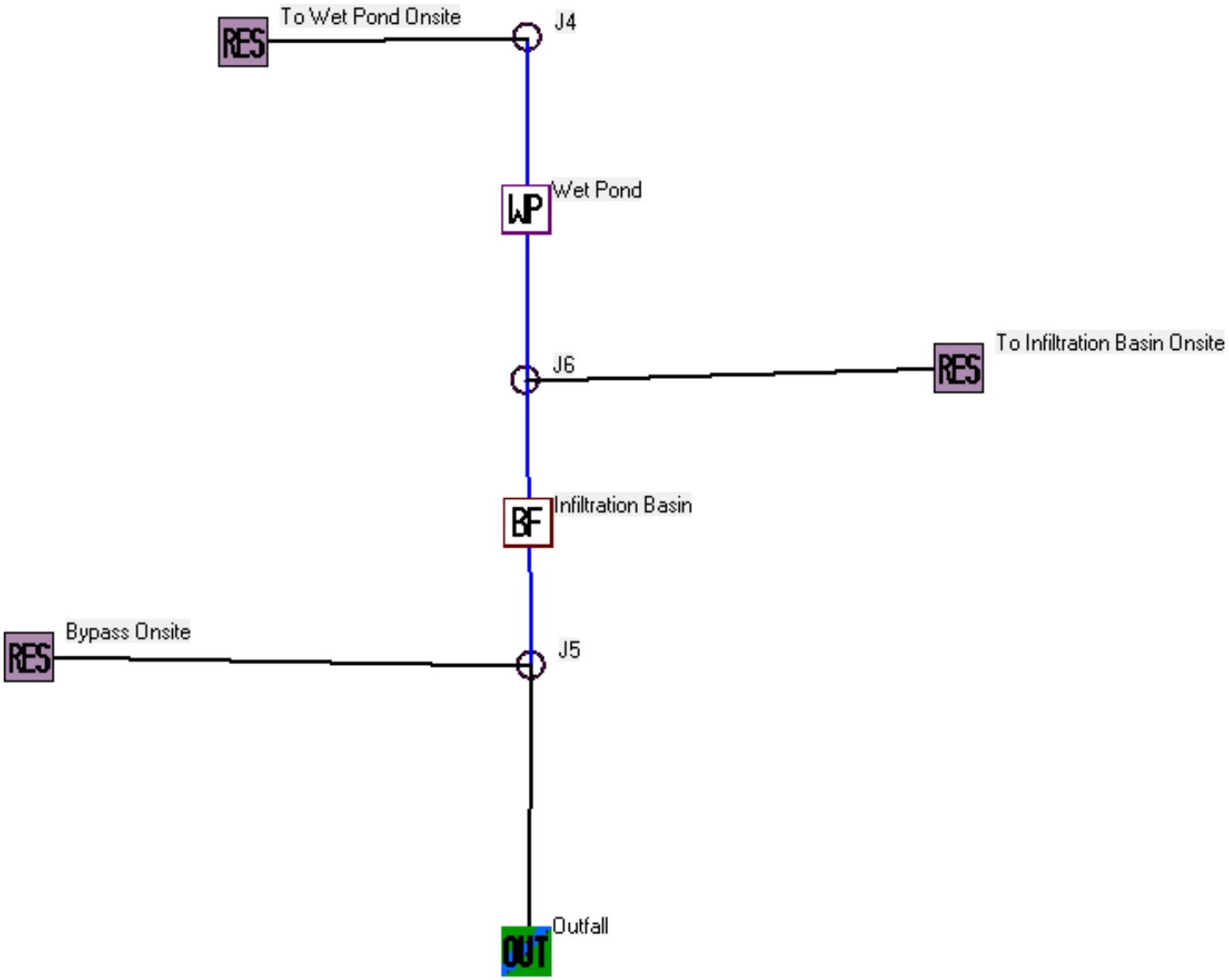
LU# 4 - Residential: Miscellaneous Total area (ac): 0.058
45 - Large Landscaped Areas 1 (Crops): 0.058 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

SLAMM for Windows Version 10.5.1
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Data file name: O:\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Pre Development\26-225 Pre De
WinSLAMM Version 10.5.1
Rain file name: O:\Next Generation Construction, LLC\23-935 - Inman Residential Development - Beloit, WI\PH05 - Stormwater Report\WinSLAMM\WisReg - Madison
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: O:\Next Generation Construction, LLC\23-935 - Inman Residential Development - Beloit, WI\PH05 - Stormwater Report\WinSLAM
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 06-25-2026 Time of run: 15:44:01
Total Area Modeled (acres): 37.658
Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	250378	-	222.4	3476	-
Outfall Total with Controls:	250375	0.00%	222.4	3476	0.00%
Annualized Total After Outfall Controls:	251063			3485	

Post-Development - Site Only



Data file name: F:\ProjectsAdmin\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Post Developmer
WinSLAMM Version 10.5.2
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 09-25-2026 Time: 09:06:36
Site information:

LU# 1 - Residential: Bypass Onsite Total area (ac): 2.749
45 - Large Landscaped Areas 1 (Crops): 2.749 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Residential: To Wet Pond Onsite Total area (ac): 30.429
1 - Roofs 1: 1.234 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 2.880 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.622 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 1.536 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.439 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.302 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.302 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 2.091 ac. Smooth Street Length = 0.5228 mi Street Width = 32.99685 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
38 - Streets 2: 1.228 ac. Smooth Street Length = 0.2068 mi Street Width = 48.98936 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.055 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 16.042 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.110 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.055 ac. Source Area PSD File:
70 - Water Body Areas: 2.436 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 1.097 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Residential: To Infiltration Basin Onsite Total area (ac): 4.481
1 - Roofs 1: 0.095 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
2 - Roofs 2: 0.221 ac. Pitched Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.004 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.118 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
26 - Driveways 2: 0.034 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.023 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
32 - Sidewalks 2: 0.023 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.254 ac. Smooth Street Length = 0.0635 mi Street Width = 33 ft Street Edges = 2
Default St. Dirt Accum. Annual Winter Load = 2500 lbs Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.004 ac. Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 1.229 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.008 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
69 - Isolated Areas: 0.004 ac. Source Area PSD File:
70 - Water Body Areas: 2.380 ac. Source Area PSD File:
71 - Other Pervious Areas 1: 0.084 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Wet Detention Pond CP# 1 (DS) - Wet Pond

Initial stage elevation (ft): 6

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

1. Orifice diameter (ft): 2.5
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 11.2

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.5490	0.00	0.00
2	5.00	0.8300	0.00	0.00
3	6.00	1.0354	0.00	0.00
4	7.00	1.1216	0.00	0.00
5	8.00	1.2101	0.00	0.00
6	9.00	1.3009	0.00	0.00
7	10.00	1.3940	0.00	0.00
8	11.00	1.4894	0.00	0.00
9	12.00	1.5872	0.00	0.00
10	12.20	1.6070	0.00	0.00

Control Practice 2: Biofilter CP# 1 (DS) - Infiltration Basin

1. Top area (square feet) = 85665
2. Bottom area (square feet) = 60505
3. Depth (ft): 5.5
4. Biofilter width (ft) - for Cost Purposes Only: 100
5. Infiltration rate (in/hr) = 0.11
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Treatment media infiltration rate: 0
12. Treatment media depth (ft) = 0
13. Treatment media porosity = 0.27
14. Percent solids reduction due to flow through treatment media = 0
16. Number of biofiltration control devices = 1
18. Initial water surface elevation (ft): 0

Estimated Surface Drain Time = 109.09 hrs.

Soil Data Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 20
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 1

SLAMM for Windows Version 10.5.2
(c) Copyright Robert Pitt and John Voorhees 2019, All Rights Reserved

Data file name: F:\ProjectsAdmin\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Post Developmer
WinSLAMM Version 10.5.2
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
Date of run: 09-25-2026 Time of run: 09:05:12
Total Area Modeled (acres): 37.659
Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	1.298E+06	-	85.06	6892	-
Outfall Total with Controls:	196922	84.83%	44.77	550.4	92.01%
Annualized Total After Outfall Controls:	197463			551.9	

Biofilter # 1: Never. Percent Solids Reduction due to Treatment Media Not Used

Data File: F:\ProjectsAdmin\Next Generation Construction, LLC\26-225 Windsor Residential Subdivision\Design\Stormwater\WinSLAMM\26-225 Post Development - On Site Only\26-225 Post-Developmen
Rain File: WisReg - Madison WI 1981.RAN
Date: 09-25-26 Time: 9:04:42 AM
Site Description:

Col. #:	2	3	4	5	6	7	8	9	10	11	12	13
Control Practice No.	Control Practice Type	Control Practice Name or Location	Total Inflow Volume (cf)	Total Outflow Volume (cf)	Percent Volume Reduction	Total Influent Load (lbs)	Total Effluent Load (lbs)	Percent Load Reduction	Flow Weighted Influent Conc (mg/L)	Flow Weighted Effluent Conc (mg/L)	Percent Conc. Reduction	Influent Median Part. Size (microns)
1	Wet Detention Pond	Wet Pond	979454	980462	-0.103	6173	1061	82.81	101.0	17.34	82.823	7.80
2	Biofilter	Infiltration Basin	1.282E+06	179667	85.99	1536	305.8	80.09	19.20	27.26	-42.035	0.00

Data File: F:\ProjectsAdmin\Next - On Site Only.mdb

Rain File: WisReg - Madison WI

Date: 09-25-26 Time: 9:04:42 A

Site Description:

Col. #:	2	14	15	16	17	18	19	20	23	27	28	29	30
Control Practice No.	Control Practice Type	Effluent Median Part. Size (microns)	Notes	Maximum Flushing Ratio	Maximum Peak Reduction Factor	Maximum Stage (ft)	Hydraulic Volume Out (cf)	Minimum Volume (cf)	Treated Volume (cf)	Maximum Surface Ponding Time (hrs)	Maximum Subsurface Ponding Time (hrs)	Volume Infiltrated (cf)	Underdrain Discharge Vol. (cf)
1	Wet Detention Pond	1.72	No Pond Overflows	0.6	1.00	7.15	980462	190846				0	
2	Biofilter	0.00	No Biofilter Overflows			1.19	179667		1102441	145.8	0.00	1102441.00	0

Data File: F:\ProjectsAdmin\Nex														
Rain File: WisReg - Madison WI														
Date: 09-25-26 Time: 9:04:42 A														
Site Description:														
Col. #:	2	31	32	33	34	35	36	39	54	57	58	61	62	63
Control Practice No.	Control Practice Type	Evapo-Transpir. Vol. (cf)	Minimum Soil Moist. (frac)	Surface Discharge Bypass Vol. (cf)	Evap. Vol. (cf)	Volume Supplemtl. Irrig.(cf)	Final Surface Infiltration Rate (in/hr)	Surface Ponding Events >72 hrs (Count)	Residence Time in Media (hrs)	Volume to WWTP (cf)	Water Withdrawl Volume (cf)	Ttl. Mass Trapped in Media (lbs)	Ttl. Mass Infiltrated (lbs)	Annual Allowable Clog Rate (lbs/sf/yr)
1	Wet Detention Pond									0	0			
2	Biofilter		-0.72	179667.40			0.107	5	0.00			0.00	1760.94	0.102

Data File: F:\ProjectsAdmin\Nex				
Rain File: WisReg - Madison WI				
Date: 09-25-26 Time: 9:04:42 A				
Site Description:				
Col. #:	2	64	65	91
Control Practice No.	Control Practice Type	First Year Cum. Load (lbs/sf)	Time Until Clogging Failure (yrs)	Runoff Producing Events/ Ttl. Rains
1	Wet Detention Pond			90/90
2	Biofilter	0.029	Never	7/90

Infiltration Calculations

Average Annual Rainfall = 28.81 inches

Notes:

1.) Infiltration calculations are based on runoff volume outputs from WinSLAMM v10.2.1

2.) = Cells That Require Data Input.

Pre-Development Infiltration Calculations:

1.) Pre-development Project Site Area = 37.658 acres

37.6582 acres * (43,560 sq. ft./1 acre) = 1,640,391 sq. ft.

2.) Pre-development runoff volume = 250,375 cu. ft.

3.) Pre-development runoff depth = (250,375 cu. ft. / 1,640,391 sq. ft.)

= 0.15 ft.

= 1.83 in.

4.) Pre-development stay-on depth = (28.81 in. - 1.83 in.)

= 26.98 in

Target Post-Development Stay-On Depth = 90% of Pre-Development Stay-On Depth

5.) Target Post-development stay-on = (26.98 in. * 0.9)

= 24.28 in.

Post-Development Infiltration Calculations:

1.) Post-development Project Site Area = 37.658 acres

37.6582 acres * (43,560 sq. ft./1 acre) = 1,640,391 sq. ft.

2.) Post-development runoff volume = 196,922 cu. ft.

3.) Post-development runoff depth = (196,922 cu. ft. / 1,640,391 sq. ft.)

= 0.12 ft.

= 1.44 in.

Infiltration Calculations

Post-Development Infiltration Calculations (Continued):

4.) Post-development stay-on depth = (28.81 in. - 1.44 in.)

= 27.37 in

5.) Post-development stay-on percentage as compared to pre-development stay-on:

= (27.37 in. / 26.98 in.)
= **101.4%**

The post-development project site infiltrates approximately **101.4%** of the pre-development infiltration volume.

Recharge Calculations

Average Annual Rainfall = 28.81 inches

Notes:

1.) Recharge calculations are based on Column #29 "Volume Infiltrated" outputs from WinSLAMM v10.2.1 and pervious areas for project site.
2.) In order for WinSLAMM to calculate recharge within the individual stormwater facilities, an engineered soil layer must be added to the model. In the case of infiltration basins where the bottom is native soil, the "engineered soil" in the model represents the properties of the anticipated native soil or backfilled soils, not a true engineered soil such as a sand and compost mix. By adding the engineered soil, an evapotranspiration input can then be added to the model allowing for the model to calculate recharge with outputs in Column 29 for use in recharge calculations below.

Pre-Development/Existing Conditions Recharge Calculations:

1.) Pre-development Project Site Area = 37.658 acres

37.6582 acres * (43,560 sq. ft./1 acre) = 1,640,391 sq. ft.

2.) Pre-development Average Annual Rechage Rate = 10.00 in./yr.

3.) Pre-development Recharge Volume = 37.658 acres * (10. in./yr. * (1 ft. / 12 in.))

= 31.38 acre*ft./yr.

4.) Required Percent Of Pre-development Recharge Volume To Be Recharged Post-Development:

= 100%

4.) Required Post-Development Recharge Volume:

= 31.38 acre*ft./yr.

Recharge Calculations

Post-Development Recharge Calculations:

1.) Post-development Project Site Area = 37.658 acres

2.) Post-development Basin Recharge Volume (WinSLAMM Control Practices, Column #29):

*Note: Column #29 "Volume Infiltrated" results should only be summed for infiltration basins and bioretention basins. Infiltration basins and bioretention basins need to incorporate appropriate evapotranspiration input values in the facility prior to running the model. All other facilities should have a typical evapotranspiration value of best engineering judgement applied (19 in./yr. is common for Madison, WI area) to the value in Column #29.

= 1,102,441 cu. ft./yr.
= 25.31 acre*ft./yr.

Post-Development Recharge Calculations (Continued):

3.) Post-development Project Site Pervious Area = 18.13 acres

4.) Post-development Project Site Percent Pervious Area = (18.13 acres / 37.658 acres) * 100

= 48.1%

5.) Post-development Pervious Area Recharge = 18.13 acres * (10. in./yr. * (1 ft. / 12 in.))

= 15.11 acre*ft./yr.

6.) Post-development Total Recharge Provided = Basin Recharge + Pervious Area Recharge

= 25.31 acre*ft./yr. + 15.11 acre*ft./yr.
= 40.41 acre*ft./yr.

The post-development project site recharges approximately **128.8%** of the pre-development recharge volume.

Exhibit 13

Storm Sewer Sizing

STORM SEWER PIPE SIZING

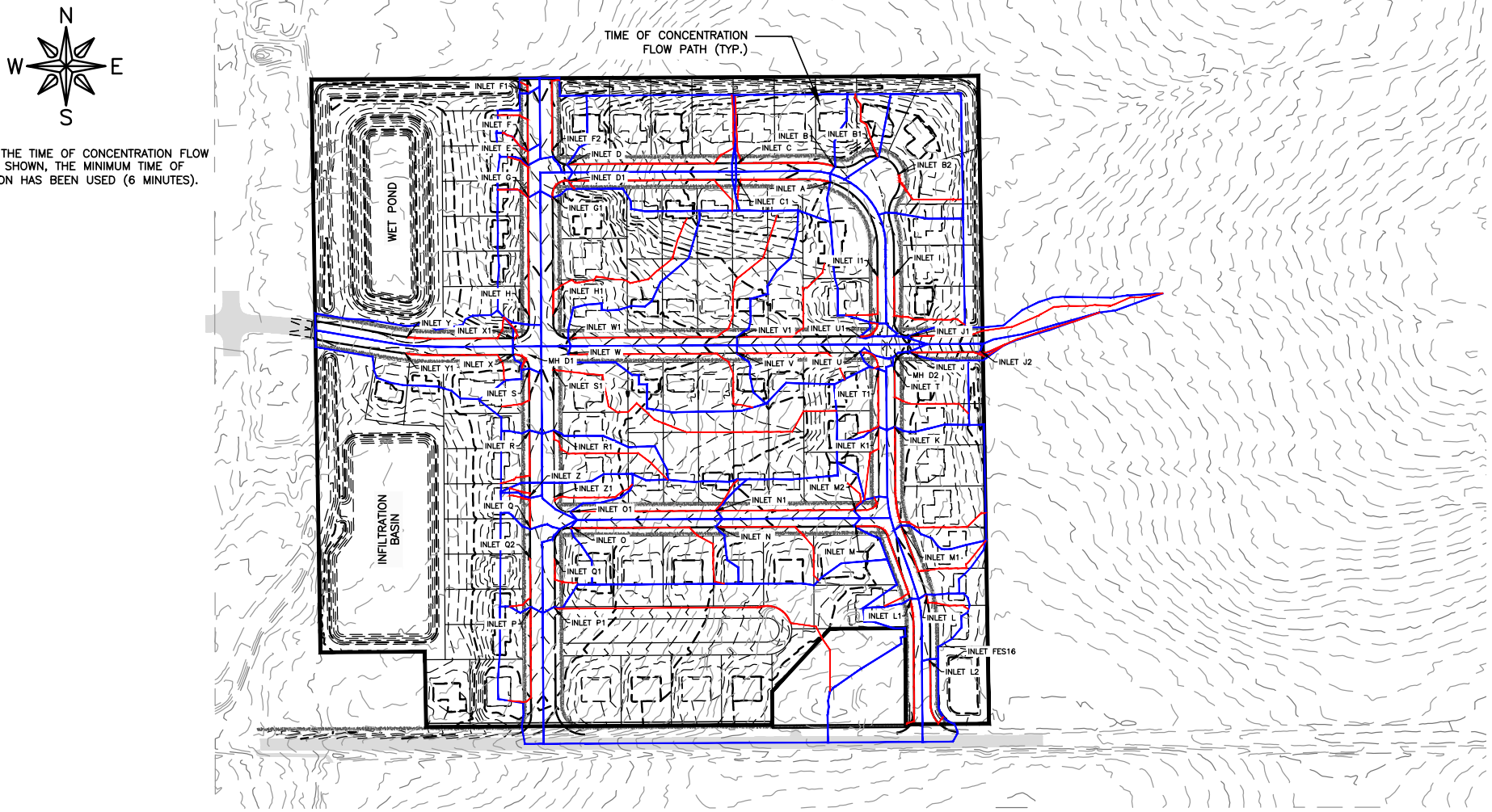
10 Year Design

Manning's Roughness Coefficient
n = 0.012

Output w/ Equations

Upstream Structure	Downstream Structure	Runoff Coef.	Area (acres)	CA	∑CA	Pipe Length (ft)	Inlet Time (min)	Upstr. Sewer Flow Time (min)	Time of concen. (min)[1]	Rainfall Intensity 10 yr. (in/hr)	Flow Rate (cfs)	Pipe Slope (ft/ft)	Pipe Size (in)	Pipe Capacity (cfs)	Pipe Velocity (fps)
A	B	0.40	0.35	0.14	0.14	29	6.0	0.0	6.0	6.60	0.91	1.03%	12	3.93	1.16
B2	B1	0.40	0.98	0.39	0.39	53	1.0	0.0	5.0	6.97	2.72	1.04%	12	3.94	3.46
B1	B	0.40	0.30	0.12	0.51	87	6.0	5.3	6.0	6.60	3.37	1.03%	12	3.93	4.29
B	C	0.40	0.74	0.30	0.94	194	10.7	6.5	10.7	5.10	4.82	0.93%	15	6.76	3.92
C1	C	0.40	0.00	0.00	0.00	29	0.0	0.0	5.0	6.97	0.01	0.69%	12	3.21	0.02
C	D	0.40	0.01	0.00	0.95	335	0.0	33.2	33.2	2.95	2.80	1.73%	15	9.23	2.28
D1	D	0.40	0.47	0.19	0.19	29	10.0	0.0	10.0	5.10	0.95	0.62%	12	3.05	1.21
D	E	0.40	1.06	0.42	1.56	80	3.2	35.7	35.7	2.95	4.60	2.24%	15	10.49	3.75
F2	F	0.40	0.30	0.12	0.12	49	2.8	0.0	5.0	6.97	0.84	1.00%	12	3.87	1.07
F1	F	0.40	0.02	0.01	0.01	115	2.5	0.0	5.0	6.97	0.07	1.00%	12	3.87	0.09
F	E	0.40	0.16	0.06	0.19	28	4.8	5.8	5.8	6.97	1.34	2.79%	12	6.46	1.71
E	G	0.40	0.07	0.03	1.78	65	5.8	36.0	36.0	2.75	4.89	1.02%	18	11.49	2.77
G1	G	0.40	0.06	0.02	0.02	49	2.3	0.0	5.0	6.97	0.16	2.55%	12	6.18	0.21
G	H	0.40	0.15	0.06	1.86	236	4.5	36.4	36.4	2.75	5.12	1.19%	18	12.42	2.90
H1	H	0.40	1.23	0.49	0.49	49	7.4	0.0	7.4	6.22	3.07	2.35%	12	5.93	3.91
H	D1 MH	0.40	0.51	0.20	2.56	78	1.8	37.8	37.8	2.75	7.04	2.18%	18	16.84	3.98
I1	I	0.40	0.61	0.24	0.24	29	1.6	0.0	5.0	6.97	1.70	0.52%	12	2.78	2.16
I	D2 MH	0.40	0.82	0.33	0.57	149	9.5	5.2	9.5	5.47	3.12	0.72%	12	3.28	3.97
J1	J	0.40	0.37	0.15	0.15	29	11.6	0.0	11.6	4.91	0.73	0.69%	12	3.21	0.93
J2	J	0.40	0.05	0.02	0.02	139	9.4	0.0	9.4	5.47	0.10	4.93%	12	8.59	0.13
J	D2 MH	0.40	0.10	0.04	0.21	67	6.8	12.1	12.1	4.72	0.98	4.36%	12	8.08	1.25
K1	K	0.40	0.22	0.09	0.09	29	21.1	0.0	21.1	3.67	0.33	1.90%	12	5.33	0.42
K	T	0.40	0.98	0.39	0.48	115	11.3	22.2	22.2	3.59	1.73	1.70%	12	5.04	2.21
T1	T	0.40	0.29	0.11	0.11	29	4.3	0.0	5.0	6.97	0.80	1.90%	12	5.33	1.01
T	D2 MH	0.40	0.52	0.21	0.80	34	6.9	23.1	23.1	3.51	2.82	1.68%	12	5.01	3.60
D2 MH	U	0.40	0.00	0.00	1.58	67	0.0	23.3	23.3	3.51	5.56	1.76%	15	9.31	4.53
U1	U	0.40	0.03	0.01	0.01	29	3.7	0.0	5.0	6.97	0.09	1.55%	12	4.82	0.11
U	V	0.40	0.03	0.01	1.61	246	2.8	23.5	23.5	3.51	5.65	2.11%	15	10.20	4.60
V1	V	0.40	0.72	0.29	0.29	29	8.7	0.0	8.7	5.85	1.69	2.24%	12	5.79	2.15
V	W	0.40	0.48	0.19	2.09	336	8.3	24.4	24.4	3.43	7.17	1.25%	15	7.84	5.84
W1	W	0.40	1.52	0.61	0.61	29	10.5	0.0	10.5	5.10	3.10	1.72%	12	5.08	3.95
W	D1 MH	0.40	0.77	0.31	3.01	80	11.6	25.4	25.4	3.35	10.07	4.19%	15	14.35	8.21

Directly drained catchment or contributing upstream sewer	Direct downstream connection	Runoff Coef.	Area (acres)	CA	∑CA	Pipe Length (ft)	Inlet Time (min)	Upstr. Sewer Flow Time (min)	Time of concen. (min)[1]	Rainfall Intensity 10 yr. (in/hr)	Flow Rate (cfs)	Pipe Slope (ft/ft)	Pipe Size (in)	Pipe Capacity (cfs)	Pipe Velocity (fps)
FES16[2]	L2					42					3.72	2.53%	12	6.15	4.74
L2	L	0.40	0.16	0.06	0.06	129	3.4	0.5	5.0	6.97	0.44	0.50%	12	2.75	0.55
L1	L	0.40	0.83	0.33	0.33	29	4.5	0.0	5.0	6.97	2.31	0.86%	12	3.59	2.94
L	M1	0.40	0.21	0.08	0.48	146	8.5	8.9	8.9	5.85	2.78	0.96%	12	3.79	3.55
M1	M	0.40	0.32	0.13	0.60	93	15.6	9.6	15.6	4.15	2.51	1.18%	12	4.21	3.19
M2	M	0.40	0.06	0.02	0.02	29	2.0	0.0	5.0	6.97	0.15	0.69%	12	3.21	0.20
M	N	0.40	0.23	0.09	0.72	275	6.2	16.1	16.1	4.07	2.92	1.91%	12	5.34	3.72
N1	N	0.40	0.50	0.20	0.20	29	10.5	0.0	10.5	5.10	1.02	0.69%	12	3.21	1.30
N	O	0.40	0.77	0.31	1.23	289	10.7	17.3	17.3	3.99	4.89	2.34%	12	5.91	6.23
O1	O	0.40	0.44	0.18	0.18	29	4.3	0.0	5.0	6.97	1.23	2.41%	12	6.01	1.57
O	Q	0.40	0.85	0.34	1.74	83	9.7	18.1	18.1	3.91	6.82	2.77%	15	11.68	5.56
P1	P	0.40	4.65	1.86	1.86	49	22.4	0.0	22.4	3.59	6.68	1.12%	15	7.43	5.45
P	Q2	0.40	0.45	0.18	2.04	97	3.1	22.6	22.6	3.59	7.32	2.27%	15	10.56	5.97
Q1	Q2	0.40	0.27	0.11	0.11	49	3.7	0.0	5.0	6.97	0.75	0.61%	12	3.03	0.95
Q2	Q	0.40	0.35	0.14	2.29	58	5.2	22.9	22.9	3.59	8.21	2.76%	15	11.65	6.69
Q	Z	0.40	0.15	0.06	4.09	63	5.5	23.0	23.0	3.51	14.36	1.75%	18	15.07	8.13
Z1	Z	0.40	0.20	0.08	0.08	49	10.9	0.0	10.9	5.10	0.41	4.80%	12	8.47	0.52
Z	R	0.40	0.04	0.01	4.19	131	5.2	23.1	23.1	3.51	14.70	0.50%	24	17.31	4.68
R1	R	0.40	0.44	0.17	0.17	49	9.9	0.0	9.9	5.47	0.96	5.00%	12	8.65	1.22
R	S	0.40	0.20	0.08	4.44	122	11.6	23.6	23.6	3.51	15.59	0.53%	24	17.93	4.96
S1	S	0.40	2.03	0.81	0.81	49	15.6	0.0	15.6	4.15	3.38	5.00%	12	8.65	4.30
S	D1 MH	0.40	0.24	0.10	5.35	29	7.6	24.0	24.0	3.43	18.36	1.03%	24	24.99	5.84
D1 MH	X	0.40	0.00	0.00	10.92	29	0.0	24.1	24.1	3.43	37.44	0.86%	30	41.36	7.63
X1	X	0.40	0.06	0.02	0.02	29	2.5	0.0	5.0	6.97	0.16	5.69%	12	9.23	0.21
X	Y1	0.40	0.05	0.02	10.96	215	2.1	24.2	24.2	3.43	37.60	0.51%	36	51.82	5.32
Y1	Y	0.40	0.64	0.26	11.22	29	6.0	24.8	24.8	3.43	38.48	0.59%	36	55.47	5.44
Y	FES	0.40	0.39	0.16	11.38	55	5.0	24.9	24.9	3.43	39.02	0.51%	36	51.69	5.52



STORM SEWER DRAINAGE AREAS

200 0 200 FEET
GRAPHIC SCALE IN FEET

10/8/2026

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525
ILLINOIS
IOWA
WISCONSIN

G:\C3D\26\26225\Engineering\26-225 Stormwater.dwg, Storm Sewer Drainage Areas
PLOT DATE: 10/8/26

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fehrgraham.com

Exhibit 6

Declaration of Restrictions and Maintenance Requirements for Stormwater Management Measures and Waiver of Right to Contest Special Assessments and Charges

PLAT OF Development Name,
VILLAGE OF WINDSOR,
DANE COUNTY, WISCONSIN:

DECLARATION OF RESTRICTIONS
AND MAINTENANCE REQUIREMENTS FOR
STORMWATER MANAGEMENT MEASURES
AND
WAIVER OF RIGHT TO CONTEST SPECIAL
ASSESSMENTS AND CHARGES

Return To:
Dane County Land and Water Resources
Water Resources Engineering Division
5201 Fen Oak Drive, Room 208
Madison, WI 53718

Parcel Numbers: See Exhibit A

RECITALS:

A. Business Entity Name, is*(are)* the owner*(s)* of property in the Village of Windsor, County of Dane, State of Wisconsin, more particularly described on Exhibit A attached hereto ("Property").

B. The Village of Windsor (Windsor) and Dane County (County) require Owner to record this Agreement regarding maintenance of stormwater management measures to be located on the Property. Owner agrees to maintain the stormwater management measures and to grant to Windsor or County the rights set forth below.

NOW, THEREFORE, in consideration of the agreement herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the owner agrees as follows:

1. Maintenance. Owner and its successors and assigns shall be responsible to repair and maintain the stormwater management measures located on the Property in good condition and in working order and such that the measures comply with approved plans on file with the Village of Windsor and Dane County. Said maintenance shall be at the Owner's sole cost and expense. Owner will conduct such maintenance or repair work in accordance with all applicable laws, codes, regulations, and similar requirements. Specific maintenance tasks are more particularly described on Exhibit B.

2. Easement to the Village and County. If Owner fails to maintain the stormwater management measures as required in Section 1, then the Village or the County shall have the right, after providing the Owner with written notice of the maintenance issue ("Maintenance Notice") and thirty (30) days to comply with the Village or County's maintenance request, to enter the Property in order to conduct the maintenance specified in the Maintenance Notice. Village or County will conduct such maintenance work in accordance with all applicable laws, codes, regulations, and similar requirements and will not unreasonably interfere with Owner's use of the Property. All costs and

expenses incurred by the Village or County in conducting such maintenance may be charged to the owner of the Property by placing the amount on the tax roll for the Property as a special assessment in accordance with Section 66.0703, Wis. Stats. and applicable portions of the Dane County Ordinances.

3. Term/Termination. The term of this Agreement shall commence on the date that this Agreement is recorded with the Register of Deeds Office for Dane County, Wisconsin, and except as otherwise herein specifically provided, shall continue in perpetuity. Notwithstanding the foregoing, this Agreement may be terminated by recording with the Register of Deeds Office for Dane County, Wisconsin, a written instrument of termination signed by the Village, the County and all of the then-owners of the Property.

4. Miscellaneous.

(a) Notices. Any notice, request or demand required or permitted under this Agreement shall be in writing and shall be deemed given when personally served or three (3) days after the same has been deposited with the United States Post Office, registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

If to Owner: Contact Information

If to Village: Village of Windsor
Village Clerk
4084 Mueller Road
DeForest, WI 53532

If to County: Dane County Land & Water Resources Department
Water Resource Engineering Division
5201 Fen Oak Drive, Room 208
Madison, WI 53718

Any party may change its address for the receipt of notice by written notice to the others.

(b) Governing Law. This Agreement shall be governed and construed in accordance with the laws of the State of Wisconsin.

(c) Amendments or Further Agreements to be in Writing. This Agreement may not be modified in whole or in part unless such agreement is in writing and signed by all parties bound hereby.

(d) Covenants Running with the Land. All of the easements, restrictions, covenants and agreements set forth in this Agreement are intended to be and shall be construed as covenants running with the land, binding upon, inuring to the benefit of, and enforceable by the parties hereto and their respective successors and assigns.

(e) Partial Invalidity. If any provisions, or portions thereof, of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Agreement, or the application of such provision, or portion thereof, to any other persons or circumstances shall not be affected thereby and each provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

SIGNATURES OF OWNER, VILLAGE AND COUNTY ARE ON THE PAGES THAT FOLLOW:

IN WITNESS WHEREOF, Business Entity Name, as Owner, has caused this Agreement to be signed its authorized representative, as of this _____ day of _____, 2026.

OWNER
Business Entity Name

By: _____

Owner Name, Owner Title

ACKNOWLEDGMENT

STATE OF WISCONSIN)
)ss.
COUNTY OF DANE)

Personally came before me this _____ day of _____, 2026, the above-named Owner Name, to me known to be the person who executed the foregoing instrument and acknowledged the same on behalf of Business Entity Name.

_____

Notary Public

_____

Print or type name

My Commission expires: _____

IN WITNESS WHEREOF, Village of Windsor, as Village, has caused this Agreement to be signed its authorized representative, as of this _____ day of _____, 2026.

VILLAGE
Village of Windsor

By: _____

Robert E. Wipperfurth, President

Attest: _____

Christine Capstran, Clerk

ACKNOWLEDGMENT

STATE OF WISCONSIN)
)ss.
COUNTY OF DANE)

Personally came before me this _____ day of _____, 2026, the above-named Robert E. Wipperfurth and Christine Capstran, to me known as the Village President and Village Clerk, and who executed the foregoing instrument and acknowledged the same on behalf of the Village of Windsor.

_____

Notary Public

_____

Print or type name

My Commission expires: _____

IN WITNESS WHEREOF, Dane County, as County, has caused this Agreement to be signed its authorized representative, as of this _____ day of _____, 2026.

COUNTY
Dane County Land & Water Resources Department

By: _____

Engineering Division Staff Signature

_____

Print Engineering Division Staff Name

_____

Print Engineering Division Staff Title

ACKNOWLEDGMENT

STATE OF WISCONSIN)
)ss.
COUNTY OF DANE)

Personally came before me this _____ day of _____, 2026, the above-named _____, to me known as the authorized representative of the Dane County Land & Water Resources Department, and who executed the foregoing instrument and acknowledged the same on behalf of Dane County.

_____

Notary Public

_____

Print or type name

My Commission expires: _____

Exhibits Incorporated by Reference:
Exhibit A: Parcel Number & Legal Description
Exhibit B: Inspection and Maintenance Requirements

This Instrument Drafted By:
Jamie Rybarczyk
Village of Windsor
4084 Mueller Road
DeForest, WI 53532

EXHIBIT A
PARCEL NUMBER & LEGAL DESCRIPTION

Parcel Number	Legal Description
Parcel Number	Legal Description

EXHIBIT B
INSPECTION AND MAINTENANCE REQUIREMENTS

Components of the Stormwater Management System:
The Stormwater Management System consist(s) of the following components:

1. Swales
2. Culverts and Storm Sewers
3. Wet Detention Basins
4. Infiltration Basins
5. Biorentention Basins
6. Vegetative Buffers
7. Oil Control Filters
8. Other

Inspection and Maintenance Requirements:
All components of the Stormwater Management System shall be inspected at least semi- annually in early Spring and early Autumn. Repairs will be made whenever the performance of a stormwater control device is compromised as described below. The Owner shall maintain records of all inspection and maintenance activities, which shall be made available to Village and County within ten (10) days of request.

1. Swales. The Owner shall:
    a. Inspect swales after rainfall events of 1.5 inches or greater, for two (2) years following installation.
    b. Repair any areas that do not have good vegetative cover or that show signs of erosion.
    c. Repairs must restore the swale(s) to the specifications of the approved Plan.
    d. Mowing height shall be 6 inches in height or higher to promote filtration.
    e. Mowing shall occur infrequently (ideally twice annually) in order to retain taller vegetation.

2. Culverts and Storm Sewers. The Owner shall:
    a. Perform visual inspections of components and remove debris from inlets and storm sewer manholes.
    b. Repair inlet/outlet areas that are damaged or show signs of erosion.
    c. Replace rip-rap as necessary to maintain compliance with the approved Plan.
    d. Repair and restore all components to the specifications of the approved Plan.

3. Wet Detention Basins. The Owner shall:
    a. Perform visual inspection of the basin outlet structure(s) and perimeter semi-annually. All undesirable vegetation and volunteer tree growth shall be removed, including that which is in close proximity to the outlet structure(s).
    b. Check the outlet structure(s) for deterioration or damage, obstructions, sediment, and general operation (including emergency drawdown & overflow devices if present).
    c. Check the condition at the receiving area/channels at the outlet and downstream from the release structures for stability and signs of erosion damage or sparse vegetation.
    d. Conduct a topographic survey of the pond bottom and sediment depth shall be conducted every 5-years or at the request of the municipality. The survey shall be of sufficient detail so as to evaluate volume of accumulated sediment. Survey data shall be sealed by a registered land surveyor or engineer.
    e. Inspect accumulated sediment in the permanent pool area, as identified by the topographic survey, and dredge and dispose of offsite as required by Wisconsin Department of Natural Resources Technical Standard 1001 - Wet Detention Pond, as may be amended.
    f. Maintain access to the basin for the Village and County to perform inspection and maintenance

activities.

g. Prohibit and eliminate plantings or structures of any kind within the detention pond area except where prior written approval is obtained from the Village and County Engineer.

4. Infiltration Basins. The Owner shall:
    a. Protect infiltration surface from construction sediment with staging or through the use of erosion control measures. Basin shall be inspected upon completion to confirm that clogging due to construction sediment has not occurred, and satisfactory assurance of said results provided to Village and County.
    b. In the first Spring and Summer after construction, water the area once per week during the first 8 weeks if rainfall has not occurred within the previous 7 days. At least 1 inch of water is necessary per week.
    c. Remove emergency drawdown plug (if present) for first growing season in basin. This will allow plugs to establish and minimized the risk of plant failure.
    d. Inspect the area at the beginning and end of each growing season or after every rainstorm greater than 2.5 inches. If the system fails visibly due to sustained sediment loading, the upper soil layer should be replaced and re-vegetated. Growing, native vegetation may be salvaged prior to replacing the upper soil layer. Visible failure is when standing water remains in the infiltration area longer than 72 hours after the termination of previous rainfall event.
    e. If compromised, basin shall be restored per specifications of originally approved Plan or modified as approved by Village and County Engineer.
    f. All vehicular or equipment is prohibited from driving onto or across basin.
    g. Pedestrian traffic is prohibited from crossing basin.
    h. Snow shall not be dumped directly onto the infiltration surface.

5. Bioretention Basins. The Owner shall:
    a. Install bioretention basin in accordance with the plans approved by the Village and County. Bioretention for infiltration shall also be installed in accordance with WDNR Conservation Practice Standard #1004.
    b. Protect infiltration surface from construction sediment with staging or through the use of erosion control measures. Basin shall be inspected upon completion to confirm that clogging due to construction sediment has not occurred, and satisfactory assurance of said results provided to Village and County.
    c. In the first Spring and Summer after construction, water the area once per week during the first 8 weeks if rainfall has not occurred within the previous 7 days. At least 1 inch of water is recommended per week.
    d. Remove emergency drawdown plug (if present) for first growing season in basin. This will allow plugs to establish and minimized the risk of plant failure.
    e. If basin receives runoff from areas to be salted in winter, it is recommended that the emergency drawdown (if present) is open during winter months to promote bypass snowmelt with high sodium content. Emergency drawdown cap or plug must be reinstalled in the spring.
    f. Visual inspection of the bioretention basin shall be performed, at a minimum, annually. Maintenance shall be required when system shows standing water beyond 72 hours of a rain event. Cleaning shall consist of removal of sediment, two (2) foot undercut, undercut replacement with material consisting of 30% compost and 70% sand and restoration in kind. Restoration of plant material shall be by plugging, not seeding alone.
    g. If compromised, basin shall be restored per specifications of originally approved Plan or modified as approved by Village and County Engineer.
    h. All vehicular or equipment is prohibited from driving onto or across basin.
    i. Pedestrian traffic is prohibited from crossing basin.
    j. Snow shall not be dumped directly onto the infiltration surface.

6. Vegetative Buffers. The Owner shall:
    a. Cut and remove grassed vegetation at least once per year.
    b. Mowing should only be performed during dry periods using lightweight equipment to prevent soil compaction and damage to vegetation.
    c. Buffer strips should be inspected after major storm events to ensure they are operating properly and to check for any potential problems, such as the formation of rills and gullies, bare spots, and sedimentation accumulation.

7. Oil Control Filters. The Owner shall:
    a. Install and maintain Flo-Gard "Plus" (High Capacity) Catch Basin Insert as distributed by Kristar of Catch-All inlet filters by Mar-Mac Manufacturing Co. or equal. Said insert is installed for mitigation and control of sediment and/or oil and grease in the stormwater runoff.
    b. Install 14 inserts at structures noted on utility plan, located along drives and parking areas, which drain to wet ponds.
    c. Install and maintain oil control filters in accordance with the manufacturer's guidelines.
    d. At a minimum, inspect the oil control filters two (2) times per year, clean two (2) times per year, and replace one (1) time per year. More specifically, debris shall be removed and filter medium is to be replaced any time the filter medium appears to be 50% coated with oil or grease.

8. Other. The Owner shall:
    a. Inspection and maintenance requirement.

Prohibitions:

Mowing in ditches will be minimized in order to maximize filtration of runoff. If occasional mowing is necessary, the mowing height will be no shorter than six inches.