



Team + Vision = Solution²

DDSCOMPANIES.COM

Heavy Civil Construction » Underground Utility Construction » Site/Civil/Utility Design » Energy Services

**Drainage Report
&
Stormwater Pollution Prevention Plan
for**

Waterchase Residential Subdivision

***Canandaigua, NY
June 23, 2025***

PROJECT: Waterchase Residential Subdivision
North Road, Stewart Place & Kennedy Street
Canandaigua, New York 14424

DEVELOPER: Canandaigua Homes LLC
83 South Main St
Canandaigua, NY 14424

PREPARED BY: The DDS Companies
45 Hendrix Road
West Henrietta, NY 14586

SECTION 1: PROJECT INFORMATION

- 1.1. Pre-Application Meeting Notes
- 1.2. Owner-Operator-SWPPP Contact-SWPPP Preparer Contact Information
- 1.3. Site Address and Location Map; Project Type, Size, and Scope

SECTION 2: STORMWATER SITE PLANNING, PRACTICE SELECTION, AND DETAILS

- 2.1. Overall Narrative
- 2.2. Site Planning
- 2.3. Determine Water Quality Treatment Volume (WQv)
- 2.4. Runoff Reduction by Applying Green Infrastructure Techniques and Standard Stormwater Management Practices with RRV Capacity
- 2.5. Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume
- 2.6. Apply Volume Peak Rate Control Practices if Needed to Meet Requirements
- 2.7. Reference Map/Construction Drawing for Descriptions, Dimensions, Material Specifications and Installation Details for each Post-Construction Stormwater Control Practice
- 2.8. Long Term Operation and Maintenance of Post-Construction Stormwater Management Practices.

SECTION 3: CONSTRUCTION EROSION AND SEDIMENT CONTROL PLANS, VEGETATIVE MEASURES & CONTROL OF NON-STORMWATER DISCHARGES

- 3.1. Description of Temporary and Permanent Structural and Vegetative Measures.
- 3.2. Reference Map/Construction Drawing for Material Specifications, Dimensions and Installation Details for All Erosion and Sediment Control Practices
- 3.3. Identification of Design Elements not in Conformance with the New York State Standards and Specifications for Erosion and Sediment Control
- 3.4. Inspection Schedule and Operation and Maintenance Schedule of all Erosion and Sediment Control Practices.
- 3.5. Description of the Structural Practices to Divert Flows
- 3.6. Construction Phasing and Sequencing Plans
- 3.7. Description of Pollution Prevention Measures to Control Construction Litter, Construction Chemicals and Debris
- 3.8. Description and Location of any Stormwater Discharges Associated with Industrial Activity other than Construction at the Site

SECTION 4: EXISTING AND PROPOSED MAPPING AND PLANS

- 4.1. Vicinity Map and Project Boundary
- 4.2. Existing and Proposed Topography
- 4.3. Location of Perennial and Intermittent Streams
- 4.4. Map and Description of Soils from USDA Soil Survey
- 4.5. Boundaries of Existing Vegetation and Proposed Limits of Clearing
- 4.6. Location and Boundaries of Resource Protection Areas such as Wetlands, Lakes, Ponds, etc
- 4.7. Boundary and Acreage of Upstream Watershed.
- 4.8. Name and Locations of Receiving Waters
- 4.9. Location of Existing and Proposed Roads, Lot Boundaries, Buildings and other structures
- 4.10. Location and Size of Staging Areas, Equipment Storage Areas, Waste Areas, and Concrete Washout Areas
- 4.11. Existing and Proposed Utilities (Sewer, Water, Gas etc) and Easements
- 4.12. Location and Flow Paths of Existing and Proposed Conveyance Systems
- 4.13. Location of Floodplain/Floodway Limits
- 4.14. Location and Dimensions of Proposed Channel Modifications, such as Bridge or Culvert Crossings
- 4.15. Limits of Disturbance of Proposed Permanent Stormwater Management and Erosion/Sediment Control Practices
- 4.16. Existing and Proposed Structural Elevations.
- 4.17. Construction Drawings of Post Construction Stormwater Control Practices
- 4.18. Final Landscaping Plans

SECTION 5: RECORD KEEPING.

- 5.1. Copy of NOI Signed by SWPPP Preparer & NOI Acknowledgement Letter
- 5.2. Contractor/Subcontractors; Name, Responsibilities, and Certification\ Statements
- 5.3. Contractor/Subcontractors; Stormwater Training Cards and Numbers (if applicable)
- 5.4. Documentation from NYS-Historic Preservation Office
- 5.5. MS4 SWPPP Acceptance Form (if Applicable)
- 5.6. Most Current Version of the NYS-DEC SPDES General Permit for Stormwater Discharges from Construction Activity

SWPPP Appendices

- Appendix A – Site Plans
- Appendix B – Water Quality Volume and Runoff Reduction Volume Calculations
- Appendix C – Soil Survey and Floodplain Maps
- Appendix D – Wetland Delineation Report and USACE Jurisdictional Determination
- Appendix E – Pre and Post Conditions Drainage Maps
- Appendix F – Pre and Post HydroCAD Model Report
- Appendix G – CPv, Q10, and Qf Calculations (Control Volume Summary)
- Appendix H – NYSDEC SPDES – General Permit for Stormwater Discharge (GP-0-25-001)
- Appendix I – N.O.I./N.O.T. and MS4 Acceptance Forms
- Appendix J – Stormwater Maintenance and Inspection Forms
- Appendix K – SWPPP Certification Form
- Appendix L – Soil Restoration Requirements
- Appendix M – Winter Stabilization Requirements

SECTION 1: PROJECT INFORMATION**1.1. Pre-Application Meeting Notes**

Preliminary City Staff and City Council meetings were held regarding this project. During those meetings best management practices were discussed and have been employed below to ensure good planning and development.

1.2. Owner or Operator, SWPPP Contact, and SWPPP Preparer Information**Owner/Operator**

Robert Brenner
Canandaigua Homes LLC
83 South Main St,
Canandaigua, NY 14424

SWPPP Preparer & Qualified Inspector:

Edmund Martin, P.E.
DDS Engineering and Surveying, LLP
45 Hendrix Road,
West Henrietta, NY 14586

1.3. Site Address and Location Map; Project Type, Size, and Scope

See Appendix A for Site Plans, Site Location Map, and details of proposed development. Below is an aerial image of the project area:



PROJECT SITE

The 27.4-acre subject parcel is located Southwest of the North Road & East Street intersection, on the east end of the existing Stewart Place in the City of Canandaigua R-1B Single Family Residential District. The applicant intends to construct a 79-lot residential subdivision on this lot. Development will be completed including ~3,800 LF of 24' wide public roadways, public watermain extension, sanitary sewer extension, street lighting, street landscaping, and

stormwater collection and management facilities. The 3,800 lf of public rights-of-way (50' wide) are made up of three roads that intersect to make a looped community. The road names for reference are Maple Lane, Boyce St, and Kennedy St. The proposed stormwater management facilities, treatment, and collection analysis are described herein.

The proposal requires approximately 23 acres of disturbance to complete construction. Therefore, a NYSDEC General Permit-0-25-001 Stormwater Discharge Permit will be required.

This report will provide information, calculations, and figures supporting the stormwater management design for the full build out of the proposed development. Stormwater treatment will meet the requirements of the City of Canandaigua and the NYSDEC SPDES General Permit for stormwater discharges, GP-0-25-001.

The treatment requirements for the area of disturbance and new 10.3 acres of impervious surfaces will be met by utilizing green infrastructure practices as well as stormwater wet ponds to reduce runoff volume, treat the required water quality volumes, and control peak flow discharge rates from the site per the NYSDEC Stormwater Design Manual, latest edition referred to here after as the "technical standard". Should changes to the SWPPP be proposed either during construction or at some other point, the City of Canandaigua will need to review prior to acceptance of the modification.

SECTION 2: STORMWATER SITE PLANNING, PRACTICE SELECTION, AND DETAILS

2.1. Overall Narrative

The proposed full build out development requires mass earthwork to WQ_v accommodate the proposed development and create an aesthetically pleasing and functional residential subdivision community. The site runoff from new impervious surfaces, lawn areas, and landscaped areas will flow overland into a public stormwater collection system which conveys stormwater to one of the six stormwater management areas on site. The stormwater management areas (described in the Post Construction Drainage Areas below) are sized to meet Runoff reduction requirements (RR_v), Water Quality Volume (WQ_v), and peak runoff requirements. Each of the stormwater management discharges into a separate section of the pre-existing drainage channel which bisects the property traveling south to the northern most property line. Stormwater management facilities are made up of a combination of sedimentation basins, bio-retention areas, and wet ponds.

The minimum runoff reduction volume will be treated within (3) bio-retention areas and (2) sedimentation basins. Stormwater will then be directed to one of (3) new wet ponds which will treat any remaining water quality volume and control peak discharge rates per the NYSDEC Design Manual. The sediment basin, bio-retention area, and stormwater ponds are sized to treat the entire water quality volume, as well as provide storage for the 1-yr, 10-yr, and 100-yr storm events.

2.2. Site Planning

The existing site is made up of +/- 27 acres of open meadow and wooded land. The entire site drains to a primary drainage channel that flows Northwest and discharges offsite into public stormwater conveyance system. The site soils on the property are predominantly HSG "D" class soils (Appendix C) in their natural state.

There are three existing manmade drainage channels on site which intersect at the center of the property and direct stormwater offsite through the primary drainage channel. The southern channel conveys stormwater from Chapel St into the site. The eastern channel conveys stormwater from properties to the east. The western channel conveys stormwater from the west subdivision into the property. Finally, the northern channel collects all the runoff and flows and discharges offsite into public stormwater conveyance system.

The flows from these offsite drainage channels will not change from the development of the proposed subdivision and have therefore been excluded from pre and post development modelling.

See appendix E for the Pre-Conditions drainage Map which illustrates each sub-catchment, this soils on site and the respective time of concentrations for each point of analysis.

Pre-Conditions Drainage Areas

Existing Subcatchment #1 (EX-1) consists of 9.8 Acres and drains from the northeastern corner of the property to the eastern channel. Stormwater is directed to this point via overland sheet flow through the brush to the channel. This area consists of heavy vegetation and wooded areas.

Existing Subcatchment #2 (EX-2) consists of 13.3 Acres and drains from the north and west property boundaries directly into the northern channel. Stormwater is directed to this point via overland sheet flow through the brush and woods to the channel. This area consists of heavy vegetation and wooded areas. Approximately 4 acres of offsite area is included in this subcatchment from the properties on the south side of North Road. Stormwater in this area is conveyed via rear yard drainage swale to a culvert on the owner's property.

Existing Subcatchment #3 (EX-3) consists of 4.8 acres and drains from the southern property boundary directly into the southern channel. Stormwater is directed to this point via overland sheet flow through a heavy wooded area to the southern drainage channel.

Existing Subcatchment #4 (EX-4) consists of 2.5 acres and drains stormwater flows from the dead end of Stewart place through a heavy brush area and into the eastern drainage channel. This area consists of heavy brush vegetation.

Post Construction Designed Drainage Areas

As described in this report, the site's stormwater management facilities are split into six (6) sections. The six facilities are described below

1. The northern portion of the site will be treated with a sedimentation basin and wet pond stormwater management facility which discharges into the northern channel.
2. The center of the site will be treated with a bioretention and wet pond stormwater management facility which will discharge into the eastern channel.
3. The eastern portion of the site will be treated with a sedimentation basin and wet pond stormwater management facility which will discharge into the eastern channel. Offsite flows from the east will be by passed via proposed drainage swale around the stormwater management facility for this area.
4. Maple Lane drainage (STA 0+00 – 8+50) will be treated with an oversized bioretention facility which will discharge into the southern channel.
5. Kennedy St drainage south of the intersection with Maple Ln. will be treated with an oversized bioretention facility which will discharge into the southern channel.

6. The Kennedy St cul-de-sac will be treated with two bioretention areas connected by an equalizer pipe. This facility will discharge into the eastern channel.

These proposed catchments and stormwater management facilities have been laid out in such a way as to maintain the existing drainage patterns seen in the pre-existing conditions. See appendix E for the Post-Conditions Drainage Map which illustrates each proposed catchment area, soil make ups, and respective time of concentrations for each Point of Analysis.

Proposed Subcatchment #1 (PR-1) consists of 10.7 acres and drains into stormwater facility No. 1 (Sedimentation basin and Wet Pond). This catchment consists of new impervious surfaces from the development of Boyce St (STA. 0+00 – 7+00) and Maple Lane (STA. 16+00 - 21+55). This includes all associated houses, driveways, and sidewalks through these sections of public roadways. Approximately 4 acres of offsite area is included in this subcatchment from properties to the north. A wide drainage swale is proposed along the northern property line to collect this flow and direct it into the proposed stormwater management facility. Stormwater is conveyed from the surrounding lawn areas to the proposed stormwater collection infrastructure in Maple Ln. and Boyce St. Stormwater is then conveyed from the collection to the proposed sedimentation basin and wet pond (SWMF #1). The wet pond treats a portion of the site's total WQv, attenuates peak flows, and then discharges through an overflow structure to the northern channel.

Proposed Subcatchment #2 (PR-2) consists of 2.7 acres and drains into stormwater facility No. 3 (Sedimentation basin and Wet Pond). This catchment consists of new impervious surfaces from Maple Ln. (STA. 16+00 – STA. 13+00). This includes all associated houses, driveways, and sidewalks through these sections of public roadways. Stormwater is conveyed from the surrounding lawn areas to proposed stormwater collection infrastructure in Maple Ln. Stormwater is then conveyed from the collection to the proposed sedimentation basin and wet pond (SWMF #3). The wet pond treats a portion of the site's total WQv, attenuates peak flows, and then discharges through an overflow structure to the eastern channel. Offsite flows from the existing properties to the east will bypass the stormwater management facilities and drain directly into the eastern channel and therefore are excluded from analysis.

Proposed Subcatchment #3 (PR-3) consists of 5.3 acres and drains into stormwater facility No. 2 (Bioretention area and Wet Pond). This catchment consists of new impervious surfaces from Boyce St (STA. 7+00 – STA. 10+00) and Maple Ln. (STA 13+00 – STA. 8+50). This includes all associated houses, driveways, and sidewalks through these sections of public roadways, as well as a large portion of the center lawn area between the houses of the subdivision. Stormwater is conveyed from the surrounding lawn areas

via sheet flow to stormwater collection in Boyce St. and Maple Ln. Stormwater is then conveyed from the collection to the proposed bioretention area and wet pond (SWMF #2). The Bioretention area treats a portion of the site's RRv. The wet pond treats a portion of the sites WQv, attenuates peak flows, and then discharges through an overflow structure to the eastern channel.

Proposed Subcatchment #4 (PR-4) consists of 4.4 acres and drains into a large bioretention area (SWMF #4). This catchment consists of new impervious surfaces from Maple Ln. (STA. 0+00 – STA 8+50). This includes all associated houses, driveways, and sidewalk through this section of public roadway. Stormwater is conveyed from the surrounding lawns areas to proposed stormwater collection infrastructure in Maple Ln. Stormwater is then conveyed from the collection to the proposed bioretention area. The Bioretention area treats a portion of the sites RRv, WQv, attenuates peak flows, and then discharges through an overflow structure to the eastern channel.

Proposed Subcatchment #5 (PR-5) consists of 2.1 acres and drains into one of two proposed bioretention areas connected by an equalization pipe (SWMF #6). This catchment consists of new impervious surfaces from Kennedy St. from the intersection of Maple Ln to the end of the Kennedy St Cul-de-sac. This includes all associated houses, driveways, and sidewalk through this section of public roadway. Stormwater is conveyed from the surrounding lawn areas via sheet flow to the bioretention areas. The bioretention areas treat a portion of the sites RRv, WQv, attenuates peak flows, and then discharges through an overflow structure to the western channel.

Proposed Subcatchment #6 (PR-6) consists of 0.9 acres and drains into a bioretention area (SWMF #5). This catchment consists of new impervious surfaces from Kennedy St. from the Maple Ln. intersection to the south property line. This includes all associated houses, driveways, and sidewalk through this section of public roadway. Stormwater is conveyed from the surrounding lawn areas via sheet flow to the collection in Kennedy St where it is conveyed directly to the bioretention area. This bioretention area treats a portion of the sites RRv, WQv, attenuates peak flows, and then discharges through an overflow structure to the southern channel.

Proposed Subcatchment #7 (PR-7) consists of 3.2 acres and drains directly into the northern drainage channel. This area will remain undeveloped from the pre to post condition. Stormwater flows via sheet flow through the existing wooded area from the western property boundary into the existing northern drainage channel.

Proposed Subcatchment #8, #9, & #10 (PR-8, PR-9, & PR-10) consist of a total 1.1 acres. These areas are contained over the existing east, west, and south channels, which will remain undeveloped in the pre and post condition. All areas will drain via sheet flow over lawn directly into the accompanying drainage channel.

All proposed drainage and treatment areas are shown on the Appendix D Post Construction Drainage Map and analyzed in the Hydraulic calculations below.

Wetlands

A search of both the U.S. Fish and Wildlife Service National Wetlands Inventory Mapper and the New York State Department of Environmental Conservation Resource mapper showed the presence of a Federal Wetland encroaching the southern property of the site. A wetland delineation was prepared for the site in October of 2020 which indicated that there are no federal wetlands on site. This report was corroborated by the United States Army Corps of Engineers (USACE) who issued a Jurisdictional Determination for the site on 7/12/2021 indicating that the aquatic resources on the property (manmade channels through the property) are not waters of the US and are not regulated under Section 404 of the Clean Water Act. Copies of the wetland delineation and Jurisdictional Determination are included in this report As Appendix D.

Floodway

According to Flood Insurance Rate Map of the Area (Community Panel Number 360597), dated September 24, 1982, the site is located within Flood Zone C (area of minimal flooding) and will not impact any floodplain.

(See the Flood FIRM Map, located in Appendix C of this report)

Archaeological

The subject property was determined to be outside of an archeologically sensitive area per the CRIS website. Through consultation with the Office of Parks, Recreation, and Historic Preservation (OPRHP), it was determined that there would be no impact on archaeological and/or historic resources.

Runoff Reduction Techniques

Runoff reduction techniques per chapter 3 of the technical standard (Stormwater Planning) were taken into careful consideration when developing the site design. The three primary components per the manual were considered and applied as appropriate (see breakdown below).

- Avoiding Impacts
 - The entirety of the existing site consisted of drainage channels that serviced surrounding development. These channels lead offsite to Canandaigua Outlet. These channels were identified as areas which shall remain undisturbed from the project. In the locations where proposed streets had to cross the channels, culverts are proposed to maintain existing flow patterns.
- Reducing impacts
 - Minimizing impervious covers was applied to the design to the greatest extent practical. Buildings and roads were laid out in such a way to maximize green space between buildings, roads, sidewalks, etc. Open space and landscaping add to the aesthetic as well as reduce the amount of runoff produced.
- Managing impacts
 - The Runoff Reduction Volume will be provided in the bio-retention facilities and wet ponds. All 1-year stormwater flows are diverted from the sedimentation basin into the Bio-Areas and wet ponds (See Section 2.4)

After site reduction techniques were applied, WQv, RRv, and Peak Rates were analyzed to size the stormwater facilities.

2.3. Determine Water Quality Treatment Volume (WQv)

The required water quality volume is determined using sizing criteria in the technical standard, Chapter 4, and is determined to be 39,233 cf (0.9 acre-ft). WQv calculations are provided within Appendix B. WQv is provided within the proposed wet ponds of the stormwater management facilities.

2.4. Runoff Reduction by Applying Green Infrastructure Techniques and Standard Stormwater Management Practices with RRV Capacity

Runoff Reduction will be achieved within the Bio-Retention areas which are standard stormwater management practices (SMP) with runoff reduction volume (RRv) capacity. GI worksheets are used to determine that the minimum RRV for the development portion of the site is 7,118 cf (0.16 acre-ft).

The proposed bio-retention facilities provide a sum of 9,299 cf (0.21 acre-ft) of Runoff Reduction. The analysis is based on the storage volume provided using a 6" ponding depth over the 2.5' of bioretention media as well as the available storage within the media. NYSDEC GI worksheets are used for the calculations (See Appendix B). A breakdown of each bio-retention areas RRV is listed below.

- Bioretention Area 1 (SWMF #2) = 2,554 cf
- Bioretention Area 2 (SWMF #4) = 2,729 cf
- Bioretention Area 3 (SWMF #5) = 1,533 cf
- Bioretention Area 4 (SWMF #6) = 953 cf

2.5. Apply Standard Stormwater Management Practices (SMP) to Address Remaining Water Quality Volume

The proposed standard SMP is multiple Wet Pond's with a Sediment Forebay. The permanent pool of the proposed pond is designed to provide a minimum volume equal to the remaining WQv. The proposed design volume sum of all the wet ponds (below the daily water level) is 42,025 cf (0.97 acre-ft). A break down of each Wet Pond is listed below.

- Wet Pond #1 (SWMF #1) – 15,361 cf (Daily Water Elev. – 792.0')
- Wet Pond #2 (SWMF #2) – 21,834 cf (Daily Water Elev. – 794.0')
- Wet Pond #3 (SWMF #3) – 4,830 cf (Daily Water Elev. – 795.0')

The pre-treatment for the proposed ponds is designed as a temporary sedimentation basin which will be utilized as a pre-treatment forebay in post construction. The required pre-treatment is 10% of the required WQv. A break down of the two sedimentation basins is listed below. See Section 3 for description and sizing of the temporary sedimentation basin for construction.

- Sed Basin #1 (SWMF #1) – 12,179 cf
- Sed Basin #2 (SWMF #3) – 4,264 cf

2.6. Apply Volume Peak Rate Control Practices if needed to Meet Requirements

Stream Channel Protection (Cpv):

To satisfy the requirements for the Channel Protection Volume (Cpv) criteria, it is necessary to provide 24 hour extended detention of the 1-year storm. Volume is calculated using methods outlined in TR-55 (NRCS, 1986) and uses unit peak discharge to determine this volume. Using the calculations laid out in Appendix G the unit peak discharge was calculated to be 525 csm/in. From figure B.1 of the New York State Stormwater Management Design Manual, this unit peak discharge relates to an outflow ratio of approximately 0.04. Using this the required storage volume was then computed as 1.22 acre-ft (53,143 cf). The runoff volume and runoff depth in this calculation were taken directly from the HydroCAD model (See Appendix F).

Based on the Post Development HydroCAD model, the proposed facilities utilize 23,900 cf of storage in the Wet Ponds, 15,272 cf of storage in the Sedimentation Basins, and 15,941 cf of storage in the bioretention facilities during the 1year-24hr storm event for a total of 55,113 cf or 1.27 acre-ft. This satisfies the CPv requirements.

Overbank Flood Control (Qp):

Based on the HydroCAD model (Appendix F), runoff generated from the 10-year storm in the predeveloped condition is 22.57 cfs and post development flow without stormwater controls is 44.81 cfs. The rate of flow leaving the site in a 10-year storm is 12.24 cfs and therefore satisfies the requirements for overbank flood control.

Extreme Flood Control (Qf):

Based on the HydroCAD model (Appendix F), runoff generated from the 100-year storm for this project site in the pre-developed condition is 58.56 cfs. Under full build out conditions without stormwater controls, the rate is 92.71 cfs. The flow rate leaving the site in the 100-year storm is 55.06 cfs and therefore satisfies the requirements for overbank flood control.

Peak Flow Rate Summary

The proposed stormwater management facilities will provide the required storage volume to mitigate increased rates of runoff caused by the proposed development. The resulting discharges for various storm events are as follows:

Design Storm	1-Yr	10-Yr	50-Yr	100-Yr
Total Existing Conditions	6.15	22.57	45.07	58.56
Total Proposed Conditions	3.80	12.24	33.86	54.21
	38%	46%	25%	7.4%

As indicated above and reflecting in Appendix F, proposed discharge rates are less than those occurring under existing/pre-development conditions.

2.7. Reference Map/Construction Drawing for the Descriptions, Dimensions, Material Specifications, and Installation Details for East Post-Construction Stormwater Control Practice

Appendix A contains a full set of plans that contains construction specifications. A full sized (24"x36") copy of the drawing set may be obtained from the City Building Department or DDS. Specific Stormwater Construction Items can be found on the following sheets within this set.

- C1 - Construction Sequence and Erosion and Sediment Control Notes
- C9 – C12 Stormwater Collection and Conveyance (Plan View)
- C13 – C14 Stormwater Collection and Conveyance (Profile Views)
- C15 – C18 Grading Plans
- C19 – Erosion and Sedimentation Control Plan
- C24 – C26 Utility, Stormwater and E&S Details

2.8. Long Term Operation and Maintenance of Post Construction Stormwater Management Practices

Long Term operation and maintenance of the Stormwater Management System are based on the Maintenance and Inspection Checklists provided in Appendix J of the NYS Stormwater Design Manual. Items listed should be investigated, noted on the check list, and addressed appropriately.

Pond and Sedimentation Basin

- Undesirable Vegetative Growth in Pond/Basin (monthly)
- Floating debris (monthly)
- Visible Pollution (monthly)
- Sedimentation builds up in Forebay Noted (monthly)
- Sediment cleanout when depth prior to sediment obstructing outlets (Monthly)

- Concrete Weir should be inspected for cracks, settlement, mis alignment, etc (annually and after major storm events)
- Low flow orifice should not be obstructed (Monthly)
- Concrete overflow structures in forebay should be free of cracks, major/minor spalling, joint failures, water tightness, etc. (annually)
- Trash rack over overflow should be free of debris (Monthly)
- Excessive sediment accumulation inside structures (annually)

Bioretention

- Areas are free of debris (monthly)
- No yard wastes occupy the practice area (monthly)
- Vegetation is fertilized per specifications (on landscaping plans)
- Plant composition and fertilization is according to the plans (monthly)
- No evidence of erosion (monthly)
- Overflow is in good condition (quarterly)
- All drains in the bio-retention are in good condition and function properly (monthly)

SECTION 3: CONSTRUCTION EROSION AND SEDIMENT CONTROL PLANS, VEGETATIVE MEASURES AND CONTROL OF NON-STORMWATER DISCHARGES

3.1. Description of Temporary and Permanent Structural and Vegetative Measures

The proposed project will disturb more than NYSDEC limit of 5 acres in total. While 5 or more acres are disturbed, a qualified inspector will perform twice weekly inspections to ensure permit compliance. When disturbance is under 5 acres, once a week inspection is required. All erosion and sediment control practices shall meet the requirements of the latest version of the NYS Standards and Specification for Erosion and Sediment Control.

Temporary Erosion Control Measures

- Silt control fencing will be installed at the down-gradient limits of proposed disturbance within the development area.
- Vegetative measures such as seeding and mulching shall be utilized to help prevent eroding of the soil.
- Temporary inlet fabric protection will be installed around all catch basins and Bio-retention inlets.
- Temporary seeding of soil stockpiles will be required when stockpiles are not to be disturbed within 7 days. All soil stockpiles shall be surrounded with two rows of silt fence.
- Temporary concrete washout areas will be utilized when performing concrete work.
- Temporary construction entrances will be installed at the locations of the new road connection(s) to North Road. No construction access is permitted from Stewart Place or Kennedy St.
- Permanent rock outlet protection will be installed at all stormwater management discharge points.
- Basins will be cleaned out when the storage sediment zone volume is reduced by 50% and in no case will the sediment basin be permitted to build up higher than one foot below the bottom of the dewatering zone. The basins are made up of three storage areas, one at the northeast bioretention area, the second storage area at the bioretention area parallel with the parking lot, and third at the southern end of the site. Sediment accumulated from the temporary sedimentation basins shall be removed prior to placement of bio-media and final stabilization.
- As necessary, the paved streets adjacent to the site entrance will be swept to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material from the construction site, which is prone to blowing from the wind, will be covered with a tarpaulin.
- During construction, the contractor will be responsible for replacing any erosion control devices which become inoperable or damaged. The contractor shall inspect all erosion control devices after each rain event to ensure they are working properly.

Repairs to all erosion control devices shall be made in accordance with NYSDEC regulations and design criteria. Any silt accumulation on roadways, in ditches or swales, in existing stormwater management areas, or in existing sewers shall be removed immediately. No offsite tracking of silt mud, or other debris will be permitted.

Permanent seeding of all disturbed pervious areas as follows:

- Common White Clover @ 8lbs/acre, plus tall fescue @ 20lbs/acre, plus Ryegrass (perennial) @ 5lbs/acre.
- Steep slopes (1V:3H or greater) and untraveled lawn areas will be seeded with 50% flat pea, 25% tall fescue, and 25% trefoil.
- Fertilizer shall be 5:10:10 at 20lbs per 1,000 sf.
- All seeded areas must be watered, fertilized, re-seeded as necessary, and mulched according to manufacturer's specifications to maintain a vigorous, dense vegetative cover.
- If temporary vegetative cover is to be used, a mix of annual ryegrass (50%) and perennial ryegrass (50%) must be applied at a rate of 75 lbs/acre with paper mulch at 2000 lbs/acre and a tackifier at 60 lbs/acre.
- All areas where the slope exceeds 3:1 will receive jute mesh erosion control blankets.

3.2. Reference the Map/Construction Drawing for the Material Specifications, Dimensions and Installation Details for All Erosion and Sediment Control Practices.

See Appendix A for a full-size copy of the Stormwater Maintenance facility drawings, details, and Erosion and Sedimentation Control Plans.

3.3. Identification of Design Elements not in Conformance with the New York State Standard Specifications for Erosion and Sediment Control.

All design elements are in conformance with the New York State Standards and Specifications for Erosion and Sediment Control.

3.4. Inspection Schedule and Operation and Maintenance Schedule of all Erosion and Sediment Control Practices.

Disturbances are expected to exceed 5 acres. All erosion and sediment control practices must be inspected twice every 7 calendar days by a qualified inspector while the disturbance exceeds 5-acres.

3.5. Description of the Structural Practices to Divert Flows

The site and grading have been designed to divert flow to onsite stormwater conveyance system. Road curbs, building locations, and road grading will drain all oncoming flows into collection made up of catch basins, manholes, and smooth interior corrugated polyethylene pipe. The stormwater follows the stormwater system which will discharge into proposed stormwater management facilities. In Catchments PR-7, PR-8, PR-9, & PR-10 stormwater follows the existing path to the same analysis points as the pre-existing conditions.

3.6. Construction Phasing and Sequencing of Plans

The project will be split into three phases, but the permit will remain open throughout the duration of all phases. A phasing plan is included in the site plans (appendix A).

Phase 1 will consist of 11.4 acres and the development of the first 29 lots construction of Boyce St. with North Rd. connection, construction of Maple Ln. from Stewart Pl. to Boyce St., and Kennedy St up to the intersection with Maple Ln. Water and Sewer utilities will be installed to the phasing lines for future build out. Finally, Stormwater management facilities #1, #2, #4, & #5 will all be developed along with all required stormwater collection.

Phase 2 will consist of 12.1 acres and the development of the 44 lots all along Maple Ln. This phase will involve full installation of Maple Ln with associate watermain extensions, sewer extensions, and associated stormwater collection. Stormwater management facility #3 will be developed in this phase.

Phase 3 will consist of 4 acres and the development of the final 6 lots within the Kennedy St Cul-de-sac. Phase 3 will include watermain and sewer extensions as well as the development of stormwater management facility #6.

To develop the site properly, the contractor(s) will begin by developing construction access to the site, installing erosion and sediment controls and then beginning mass earthwork to develop the stormwater ponds and sedimentation basins. Once the stormwater sedimentation basin is constructed, the pond is excavated and mass grading is complete, the contractor will move to mass grading and installing utilities throughout the site. Only when all the mass grading is complete and roadways are laid out will the contractor begin home construction. Once the site is developed the landscaping and seeding will be completed to obtain full stabilization prior to moving on to phase 2.

It is anticipated that phases will extend into the winter. Should a winter shutdown be necessary at any time, the contractor will be responsible for winter stabilization in accordance with Appendix M.

3.7. Description of Pollution Prevention Measures to Control Construction Litter, Construction Chemicals and Debris

Other potential sources of pollution exist that are unrelated to erosion and sediment, particularly those related to construction activities. The following passage identifies those potential sources and provides methods that reduce the risks of spills or other accidental exposure of materials/substances to stormwater run-off. All applicable state and local standards shall be followed at all times. Manufacturer's recommendations shall be followed with regard to the handling of particular products.

Off-site Vehicle Tracking

Roads shall be swept daily and as needed. The roads adjacent to the project site shall be kept clean and free of debris.

Waste Materials

All construction waste material shall be deposited into metal dumpsters that will be emptied on a regular basis by a licensed waste management company. Any spillage of chemicals such as petroleum products or related construction chemicals shall be cleaned up immediately using absorbent material and deposited into a separate metal dumpster and emptied by a properly licensed waste management company on a regular basis. Arrangements shall be made with the waste management company for the disposal of various construction materials.

Sanitary Waste

The contractor is responsible for providing porta-johns for sanitary waste throughout the duration of construction. Porta-johns shall be emptied on a regular basis by a licensed waste management company.

Potential Pollution Sources

The following materials are expected to be present during construction:

Hazardous Materials

- Paints
- Acids for cleaning masonry
- Cleaning solvents
- Concrete curing compounds
- Construction chemicals

Other products

- Petroleum based products

- Concrete
- Detergents
- Masonry
- Asphalt
- Tar
- Fertilizer
- Wood

Spill Prevention

A separate staging area shall be provided for the purpose of refueling and vehicle maintenance. Absorbent materials shall be available at this staging area to clean up spills and prevent chemicals from entering stormwater. Material Safety Data Sheets (MSDS) should be consulted for proper procedures regarding handling of hazardous products.

Housekeeping Practices

The following practices shall be followed on-site during the construction of this project:

- An effort should be made to store on-site only enough products necessary to complete the job.
- All materials stored on-site shall be in a neat, orderly manner and in their original containers, with the original manufacturer's label. Whenever possible, stored materials shall be covered or under a roof or other enclosure.
- Substances shall not be mixed with one another unless recommended by the manufacturers.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturer's recommendations shall be followed for use and disposal of products.
- The site superintendent will inspect daily to ensure proper use and disposal of materials on-site.
- Detergents will be discharged only into the sanitary sewer system.

Hazardous Products

The following procedures shall be followed to reduce the risks associated with hazardous products:

- Products shall be stored in their original containers with original labels attached and in a readable form.
- Products shall be used only for their intended purpose, handled, and disposed of as per the manufacturer's recommendations, local, state, or federal agencies.

Petroleum Products

- All on-site vehicles shall be monitored for leaks and receive regular maintenance to reduce the chance of leaks.
- All on-site construction vehicles will be parked or staged at least 200 ft. from any waterway, pond, or creek.
- Construction vehicles found with leaks shall be taken out of service until the leak is repaired. Collection pans shall be placed under leaks until repaired.
- Petroleum products shall be stored in clearly labeled, sealed containers in an enclosed area whenever possible.
- A licensed waste management company will dispose of lubricant material containers in a proper manner.
- All spills shall be contained and cleaned up immediately.
- Equipment and materials necessary to contain and clean up spills shall be stored on-site in or near petroleum storage areas.
- Fuel storage tanks kept on-site shall be placed on concrete pads and in accordance with all state, local, and federal agencies.

Fertilizers

- Fertilizers will only be applied in the minimum amounts as recommended by the manufacturer.
- Storage of fertilizers shall be in an enclosed or covered area.

Paints

- All containers will be tightly sealed and stored when not in use. Excess paint shall not be disposed of into the storm sewer system. Disposal shall be recommended by the manufacturer and in accordance with all local, state, and federal agencies.

Concrete Trucks

- Concrete trucks may wash out or discharge surplus concrete or drum wash water on-site, only in the designated area.

Spill Control Practices

- Manufacturers' recommendations for cleanup shall be clearly posted and all site personnel will be made aware of these procedures as well as the location of the information and clean-up supplies.
- Materials and equipment necessary for spill cleanup shall be kept on site. Equipment and materials shall include, but not be limited to brooms, mops, dustpans, gloves, goggles, and absorbent materials such as cat litter, sand, and sawdust, plastic and metal containers.
- All spills shall be contained and cleaned up immediately upon discovery.

- The spill area shall be kept well-ventilated and all personnel in the area shall wear appropriate clothing necessary to prevent contact with hazardous materials.
- Toxic or hazardous spills will be reported to the appropriate state, local, or federal agency regardless of size. The National Response Center (1-800-424-8802) shall be notified immediately in the event of a spill of “reportable quantity”. A written description of the release will be submitted to the EPA Regional Office and NYSDEC within 14 days of the event. The report shall include the date and circumstances, as well as the steps taken to prevent a similar release. The SWPPP and spill prevention plan shall be modified to include this information. The “reportable quantity” for oil is that which produces sheen on any water of the United States.
- The site superintendent in charge of day-to-day site operations will be the spill prevention and clean-up coordinator. He will designate at least two other on-site personnel who will receive spill prevention and spill clean-up training. These individuals will become responsible for a particular phase of prevention and clean-up. The names of personnel responsible shall be clearly posted within clean-up material storage area as well as in the on-site construction office.

SECTION 4: EXISTING AND PROPOSED MAPPING AND PLANS

4.1. Vicinity Map and Project Boundary

The enclosed plan set includes a vicinity map showing the project boundary (See Appendix A).

4.2. Existing and Proposed Topography

The Grading plan provides the existing and proposed topography (See Appendix A).

4.3. Location of Perennial and Intermittent Streams

There are three existing drainage channels on site which intersect at the center of the property and direct stormwater offsite through primary drainage channel. The southern channel conveys stormwater from Chapel St into the site. The eastern channel conveys stormwater from properties to the east. The western channel conveys stormwater from the west subdivision into the property. Finally, the northern channel collects all the runoff and flows offsite to an existing downstream storm sewer system. Culvert crossings are being provided where the proposed roadway crosses the existing stream.

4.4. Map and Description of Soils from USDA Soil Survey

See Appendix C for Soil Survey Map and Description.

4.5. Boundaries of Existing Vegetation and Proposed Limits of Clearing

All existing trees and brush within the limits of disturbance will be cleared to make way for the new residential subdivision. All areas which have been called out to remain undisturbed will remain as such. All areas which have been called out to remain pervious will be seeded as indicated above.

4.6. Location and Boundaries of Resource Protection Areas such as Wetlands, Lakes, Ponds, etc.

There are no known resource protection boundaries on the site which require special consideration. The wetland delineation described above indicates no federal wetlands on site. See appendix D for wetland delineation and USACE Jurisdictional Determination.

4.7. Name and Locations of Receiving Waters

All flow from the stormwater management facilities will be directed to the channel and culvert in the northwest corner of the site. This culvert eventually discharges into the downstream storm sewer.

4.9. Location of Existing and Proposed Roads, Lot Boundaries, Buildings, and other structures

See drawing set for proposed subdivision, roadways, lot boundaries, buildings, and other structures.

4.10. Location and Size of Staging Areas, Equipment Storage Areas, Borrow Pits, Waste Areas, and Concrete Washout Areas

Staging, concrete washout areas, and soil stockpile areas are provided in strategic areas around the site. See Grading and Erosion and Sediment Control Plans (Appendix A).

4.11. Existing and Proposed utilities (Sewer, Water, Gas, Etc.) and Easements

See Utility Drawings for existing and proposed utilities for this project. Appendix A.

4.12. Location and Flow Paths of Existing and Proposed Conveyance Systems, such as Channels, Swales, Culverts, and Storm Drains

See Utility and Grading Plans for existing and proposed conveyance systems.

4.13. Location of Floodplain/Floodway Limits

According to Flood Insurance Rate Map of the Area (Community Panel Number 360597), dated September 24, 1982, the site is located within Zone C (area of minimal flooding) and will not impact any floodplain (See the Flood FIRM Map, located in Appendix C of this report).

4.14. Location and Dimensions of Proposed Channel Modifications, such as Bridge or Culvert Crossings

No channel modifications are proposed as part of this development. Culvert crossings are provided where the roadways cross the man-made channels. See the Site Plans (Appendix A) for the sizes, locations, and dimensions of the proposed culvert crossings.

4.15. Location, Size, Maintenance access and Limits of Disturbance of Proposed Temporary and Permanent Stormwater Management and Erosion and Sediment Control Practices, including timing and Duration of Temporary Practices.

See Appendix A for site plans. Temporary sediment basin and other erosion control practices such as diversion swales, check dams, silt fence, staging area, construction entrances, etc. should be developed before starting any building, utility, or other infrastructures proposed in the project.

4.16. Construction Drawings Identifying the Specific Locations and Sizes of each Post Construction Stormwater Practice

See Appendix A for site plans.

4.17 Final Landscaping Plans

The Plan Set in Appendix A includes landscaping plans and details including locations of plantings, seeding instructions, and bio-retention area landscaping.

SECTION 5: RECORD KEEPING

5.1. **Copy of NOI Signed by SWPPP Preparer and NOI Acknowledgement Letter (Appendix I)**

A Copy of the NOI signed by the SWPPP Preparer and NOI Acknowledgement Letter are included as Appendix I. These shall be kept on site along with the remaining contents of the SWPPP at all times.

5.2. **Contractor/Subcontractors; Name, Responsibilities, and Certification Statements**

Contractor, Operator, and Subcontractors shall sign the certification statement listed in Appendix K. The certification statement states that all parties involved are aware of and will uphold all aspects of the SWPPP and SPDES General permit. This document will contain all the names and responsibilities of all personnel involved with said project.

5.3. **Contractor/Subcontractors; Stormwater Training Cards and Numbers**

All stormwater training cards for all personnel who will be involved in construction and SWPPP implementation shall be photocopied and retained with this SWPPP document on site throughout the duration of the project. Should any personnel involved with the SWPPP on site not have their four-hour erosion and sedimentation control course completed, then they shall do so before working on the project.

5.4. **Documentation from NYS-Historic Preservation Office**

The proposed action has been declared to have no impact on any archaeological resources in the area.

5.5. **MS4 SWPPP Acceptance Form (Appendix I)**

The signed SWPPP Acceptance form from the MS4 for the City of Canandaigua is included in this report as Appendix I.

5.6. **Most Current Version of the NYS DEC SPDES General Permit for Stormwater Discharges from Construction Activity (Appendix H)**

New York State Department of Environmental Conservation General Permit-0-25-001 Stormwater Discharge Permit is included in this report as Appendix H.

5.7. **Corrective Action Log**

The contractor and SWPPP inspector shall keep a corrective action log on site which records all of the identified deficiencies through the project, and all of the corrective

actions required (and implemented) to fix said deficiency. Corrective actions will be based upon direction given by the qualified inspector during the project.

5.8. Plans Stamped by a Qualified Professional

Final Town approved site plans are included in this report as appendix A. Plans are stamped and signed by a Licensed Professional Engineer.

5.9. Dedication/As-Builts for all Post-Construction Stormwater Management Facilities

As-built documentation shall be collected and maintained on site throughout the duration of construction. Any significant deviations from the plan must first be approved by the Design Engineer and the Municipality. A final as built will be required for record keeping purposes after completion of construction.

5.10. Notice of Termination (Appendix I)

Once the project is completed. A Notice of Termination for the permit will need to be filed with NYSDEC to officially close the SPDES permit. A blank permit has been included in this report as Appendix I.

5.11. Stormwater Maintenance and Inspection Forms (Appendix J)

Forms to be utilized for bi-weekly inspection and stormwater maintenance. These are included in this report as Appendix J.

5.12. Soil Restoration Requirements and Winter Stabilization (Appendix L and M)

Information from the DEC in Appendix L and M shall be referenced when restoring soil or preparing for winter shut down.

APPENDIX A – SITE PLANS

APPENDIX B – WATER QUALITY VOLUME AND RUNNOFF
REDUCTION VOLUME CALCULATIONS

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....

Design Point:

P=

1.00

inch

Breakdown of Subcatchments

Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Description
1	10.70	3.40	32%	0.34	13,050	
2	2.70	0.71	26%	0.29	2,810	
3	5.30	2.10	40%	0.41	7,823	
4	4.40	2.63	60%	0.59	9,391	
5	2.10	1.13	54%	0.53	4,073	
6	0.90	0.35	39%	0.40	1,307	
7	3.20	0.00	0%	0.05	581	
8	1.10	0.00	0%	0.05	200	
9						
10						
Subtotal (1-30)	30.40	10.32	34%	0.36	39,233	Subtotal 1
Total	30.40	10.32	34%	0.36	39,233	Initial WQv

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area	Contributing Impervious Area	Notes
	(Acre)	(Acre)	
Conservation of Natural Areas	0.00	0.00	minimum 10,000 sf
Riparian Buffers	0.00	0.00	maximum contributing length 75 feet to 150 feet
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	Up to 100 sf directly connected impervious area may be subtracted per tree
Total	0.00	0.00	

Recalculate WQv after application of Area Reduction Techniques

	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Runoff Coefficient Rv	WQv (ft ³)
"<<Initial WQv"	30.40	10.32	34%	0.36	39,233
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	30.40	10.32	34%	0.36	39,233
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	30.40	10.32	34%	0.36	39,233
WQv reduced by Area Reduction techniques					0

Minimum RRv

Enter the Soils Data for the site

Soil Group	Acres	S
A		55%
B		40%
C		30%
D	30.40	20%
Total Area	30.4	

Calculate the Minimum RRv

S =	0.20	
Impervious =	10.32	acre
Precipitation	1	in
Rv	0.95	
Minimum RRv	7,118	ft3
	0.16	af

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

$$A_f = WQv \cdot (df) / [k \cdot (hf + df)(tf)]$$

A_f Required Surface Area (ft²)

WQv Water Quality Volume (ft³)

df Depth of the Soil Medium (feet)

hf Average height of water above the planter bed

tf Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: **Sand** - 3.5 ft/day (City of Austin 1988); **Peat** - 2.0 ft/day (Galli 1990); **Leaf Compost** - 8.7 ft/day (Claytor and Schueler, 1996); **Bioretention Soil** (0.5 ft/day (Claytor &

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
3	5.30	2.10	0.40	0.41	7822.65	1.00	
Enter Impervious Area Reduced by Disconnection of Rooftops			40%	0.41	7,823	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Soil Information							
Soil Group		D					
Soil Infiltration Rate		0.10	in/hour	Okay			
Using Underdrains?		Yes	Okay				
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				7,823	ft ³		
Enter Depth of Soil Media			df	2.5	ft	2.5-4 ft	
Enter Hydraulic Conductivity			k	0.5	ft/day		
Enter Average Height of Ponding			hf	0.5	ft	6 inches max.	
Enter Filter Time			tf	2	days		
Required Filter Area			A_f	6519	ft²		
Determine Actual Bio-Retention Area							
Filter Width		8	ft				
Filter Length		665	ft				
Filter Area		5320	ft ²				
Actual Volume Provided		6384	ft ³				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			Yes	Select Practice	Other/Standard SMP		
RRv		2,554					
RRv applied		2,554	ft³	This is 40% of the storage provided or WQv whichever is less.			
Volume Treated		0	ft ³	This is the portion of the WQv that is not reduced in the practice.			
Volume Directed		5,269	ft ³	This volume is directed another practice			
Sizing V		Error	Check to be sure Area provided $\geq A_f$				

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

$$A_f = WQ_v * (d_f) / [k * (h_f + d_f)(t_f)]$$

A_f Required Surface Area (ft²)

WQ_v Water Quality Volume (ft³)

d_f Depth of the Soil Medium (feet)

h_f Average height of water above the planter bed

t_f Volume Through the Filter Media (days)

k

The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: **Sand** - 3.5 ft/day (City of Austin 1988); **Peat** - 2.0 ft/day (Galli 1990); **Leaf Compost** - 8.7 ft/day (Claytor and Schueler, 1996); **Bioretention Soil** (0.5 ft/day (Claytor & Schueler, 1996)

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
4	4.40	2.63	0.60	0.59	9390.81	1.00	
Enter Impervious Area Reduced by Disconnection of Rooftops			60%	0.59	9,391	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Soil Information							
Soil Group		D					
Soil Infiltration Rate		0.10	in/hour	Okay			
Using Underdrains?		Yes	Okay				
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				9,391	ft ³		
Enter Depth of Soil Media				d_f	2.5	ft	2.5-4 ft
Enter Hydraulic Conductivity				k	0.5	ft/day	
Enter Average Height of Ponding				h_f	0.5	ft	6 inches max.
Enter Filter Time				t_f	2	days	
Required Filter Area				A_f	7826	ft²	
Determine Actual Bio-Retention Area							
Filter Width		30	ft				
Filter Length		189.5	ft				
Filter Area		5685	ft ²				
Actual Volume Provided		6822	ft ³				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice	N/A		
RRv		2,729					
RRv applied		2,729	ft³	This is 40% of the storage provided or WQv whichever is less.			
Volume Treated		6,662	ft ³	This is the portion of the WQv that is not reduced in the practice.			
Volume Directed		0	ft ³	This volume is directed another practice			

Bioretention Worksheet

Sizing v	Error	Check to be sure Area provided $\geq A_f$

(For use on HSG C or D Soils with underdrains)

$$A_f = WQv * (df) / [k * (hf + df)(tf)]$$

A_f	Required Surface Area (ft ²)	The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: Sand - 3.5 ft/day (City of Austin 1988); Peat - 2.0 ft/day (Galli 1990); Leaf Compost - 8.7 ft/day (Claytor and Schueler, 1996); Bioretention Soil (0.5 ft/day (Claytor &
WQv	Water Quality Volume (ft ³)	
df	Depth of the Soil Medium (feet)	
hf	Average height of water above the planter bed	
tf	Volume Through the Filter Media (days)	

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
5	2.10	1.13	0.54	0.53	4072.86	1.00	
Enter Impervious Area Reduced by Disconnection of Rooftops			54%	0.53	4,073	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Soil Information							
Soil Group		D					
Soil Infiltration Rate		0.10		in/hour	Okay		
Using Underdrains?		Yes		Okay			
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				4,073	ft ³		
Enter Depth of Soil Media				df	2.5	ft	2.5-4 ft
Enter Hydraulic Conductivity				k	0.5	ft/day	
Enter Average Height of Ponding				hf	0.5	ft	6 inches max.
Enter Filter Time				tf	2	days	
Required Filter Area				Af	3394	ft ²	
Determine Actual Bio-Retention Area							
Filter Width		31	ft				
Filter Length		103	ft				
Filter Area		3193	ft ²				
Actual Volume Provided		3832	ft ³				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice	N/A		
RRv		1,533					
RRv applied		1,533	ft ³	This is 40% of the storage provided or WQv whichever is less.			
Volume Treated		2,540	ft ³	This is the portion of the WQv that is not reduced in the practice.			
Volume Directed		0	ft ³	This volume is directed another practice			

Bioretention Worksheet

Sizing v	Error	Check to be sure Area provided $\geq A_f$

(For use on HSG C or D Soils with underdrains)

$$A_f = WQv * (df) / [k * (hf + df)(tf)]$$

A_f	Required Surface Area (ft ²)	The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: Sand - 3.5 ft/day (City of Austin 1988); Peat - 2.0 ft/day (Galli 1990); Leaf Compost - 8.7 ft/day (Claytor and Schueler, 1996); Bioretention Soil (0.5 ft/day (Claytor &
WQv	Water Quality Volume (ft ³)	
df	Depth of the Soil Medium (feet)	
hf	Average height of water above the planter bed	
tf	Volume Through the Filter Media (days)	

Design Point:							
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
6	0.90	0.35	0.39	0.40	1306.80	1.00	
Enter Impervious Area Reduced by Disconnection of Rooftops			39%	0.40	1,307	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Soil Information							
Soil Group		D					
Soil Infiltration Rate		0.10		in/hour	Okay		
Using Underdrains?		Yes		Okay			
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				1,307	ft ³		
Enter Depth of Soil Media				df	2.5	ft	2.5-4 ft
Enter Hydraulic Conductivity				k	0.5	ft/day	
Enter Average Height of Ponding				hf	0.5	ft	6 inches max.
Enter Filter Time				tf	2	days	
Required Filter Area				Af	1089	ft ²	
Determine Actual Bio-Retention Area							
Filter Width		10	ft				
Filter Length		198.5	ft				
Filter Area		1985	ft ²				
Actual Volume Provided		2382	ft ³				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice	N/A		
RRv		953					
RRv applied		953	ft ³	This is 40% of the storage provided or WQv whichever is less.			
Volume Treated		354	ft ³	This is the portion of the WQv that is not reduced in the practice.			
Volume Directed		0	ft ³	This volume is directed another practice			

Bioretention Worksheet

Sizing v	OK		Check to be sure Area provided $\geq$ Af
Total RRv Applied	7,767.84		
Total Area	12.70		
Total Impervious Area	6.21		
Total Volume Treated	9,556.23		
Rooftop Disconnect Impervious Area Total	0.00		

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techniques/Standard SMPs		Total Contributing Area	Total Contributing Impervious Area	WQv Reduced (RRv)	WQv Treated
			(acres)	(acres)	cf	cf
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4				
	Bioretention & Infiltration Bioretention	F-5	12.70	6.21	9299	9556
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2	17.7	4.11		42,025.00
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4)	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2)	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			0.00	0.00	0	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			12.70	6.21	9299	9556
Totals by Standard SMP →			17.70	4.11		42025
Totals (Area + Volume + all SMPs) →			30.40	10.32	9,299	51,581
	Impervious Cover v	okay				

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	39233	0.901
30	Total RRV Provided	9299	0.213
31	Is RRV Provided $\geq$ WQv Required?	No	
32	Minimum RRV	7118	0.163
32a	Is RRV Provided $\geq$ Minimum RRV Required?	Yes	
33a	Total WQv Treated	51581	1.184
34	Sum of Volume Reduced & Treated	60880	1.398
34	Sum of Volume Reduced and Treated	60880	1.398
35	Is Sum RRV Provided and WQv Provided $\geq$ WQv Required?	Yes	

Apply Peak Flow Attenuation			
36	Channel Protection	C_{pv}	
37	Overbank	Q_p	
37	Extreme Flood Control	Q_f	
	Are Quantity Control requirements met?	Yes	Plan Completed

APPENDIX C – SOIL SURVEY AND FLOODPLAIN MAPS



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Ontario County, New York**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Ontario County, New York.....	13
34A—Lakemont silty clay loam, 0 to 3 percent slopes.....	13
35A—Odessa silt loam, 0 to 3 percent slopes.....	14
260B—Cayuga silt loam, 3 to 8 percent slopes.....	16
References	18

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

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 1:12,000.

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: Ontario County, New York
Survey Area Data: Version 24, Aug 30, 2024

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

Date(s) aerial images were photographed: Aug 3, 2021—Nov 7, 2021

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
34A	Lakemont silty clay loam, 0 to 3 percent slopes	25.6	74.8%
35A	Odessa silt loam, 0 to 3 percent slopes	6.0	17.6%
260B	Cayuga silt loam, 3 to 8 percent slopes	2.6	7.6%
Totals for Area of Interest		34.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Ontario County, New York

34A—Lakemont silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2spjw

Elevation: 260 to 1,800 feet

Mean annual precipitation: 31 to 57 inches

Mean annual air temperature: 41 to 50 degrees F

Frost-free period: 100 to 190 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Lakemont and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lakemont

Setting

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Red clayey glaciolacustrine deposits derived from calcareous shale

Typical profile

Ap - 0 to 6 inches: silty clay loam

Eg - 6 to 10 inches: silty clay loam

Btg1 - 10 to 15 inches: silty clay

Btg2 - 15 to 31 inches: silty clay

C - 31 to 79 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 25 percent

Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D

Ecological site: F101XY010NY - Wet Lake Plain Depression

Hydric soil rating: Yes

Minor Components

Odessa

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F101XY009NY - Moist Lake Plain
Hydric soil rating: No

Canandaigua

Percent of map unit: 4 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Fonda

Percent of map unit: 4 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Barre

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

35A—Odessa silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2wrd8
Elevation: 260 to 1,540 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Odessa and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Odessa

Setting

Landform: Lake terraces

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Red clayey glaciolacustrine deposits derived from calcareous shale

Typical profile

Ap - 0 to 8 inches: silt loam

Bt/E - 8 to 10 inches: silty clay loam

Bt1 - 10 to 15 inches: silty clay

Bt2 - 15 to 25 inches: silty clay

C - 25 to 79 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 25 percent

Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F101XY009NY - Moist Lake Plain

Hydric soil rating: No

Minor Components

Lakemont

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Schoharie

Percent of map unit: 5 percent

Custom Soil Resource Report

Landform: Lake terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Churchville

Percent of map unit: 3 percent
Landform: Drumlinoid ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Rhinebeck

Percent of map unit: 2 percent
Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

260B—Cayuga silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2mxwb
Elevation: 400 to 1,400 feet
Mean annual precipitation: 31 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 107 to 171 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cayuga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cayuga

Setting

Landform: Till plains, lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey glaciolacustrine deposits over loamy till derived from limestone, dolomite, sandstone, or shale

Custom Soil Resource Report

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 30 inches: silty clay
H3 - 30 to 39 inches: channery silty clay loam
H4 - 39 to 60 inches: channery clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F101XY009NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Schoharie

Percent of map unit: 10 percent
Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Odessa

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

ELEVATION REFERENCE MARKS		
REFERENCE MARK	ELEVATION IN FT. (NGVD) 1	DESCRIPTION OF LOCATION
RM 1	767.341	Standard Inert stamped 766 03WEGG 1899 in foundation wall at southeast corner of courthouse at Court and Ontario Streets.

¹ National Geodetic Vertical Datum of 1929



100-Year Flood Boundary
Zone Designations* With Date of Identification
p.s. 12/2/74
100-Year Flood Boundary
500-Year Flood Boundary
Base Flood Elevation Line With Elevation in Feet**
Base Flood Elevation in Feet Where Uniform Within Zone**
Elevation Reference Mark
River Mile
**Referenced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A2	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths or inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed index to Map Panels.

INITIAL IDENTIFICATION DATE
NOVEMBER 26, 1976
FLOOD HAZARD BOX MAP REVISIONS:
NONE
FLOOD INSURANCE RATE MAP EFFECTIVE:
APRIL 1, 1981
FLOOD INSURANCE RATE MAP REVISIONS:
9/24/82 DECREASE ZONE A BOUNDARY DECREASE ZONE B BOUNDARY ADD ROAD ADD ROAD NAMES REVISE ROAD NAMES

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6630.

APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CITY OF CANANDAIGUA,
NEW YORK
ONTARIO COUNTY

(SEE MAP INDEX FOR PANELS NOT PRINTED)
PANEL 1 OF 2

COMMUNITY-PANEL NUMBER
360597 0001 C
MAP REVISED:
SEPTEMBER 24, 1982

**APPENDIX D – WETLAND DELINEATION REPORT AND
USACE JURISDICTIONAL DETERMINATION**



DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

July 12, 2021

Regulatory Branch

SUBJECT: Approved Jurisdictional Determination for Department of the Army Processing No. LRB-2021-00068

The DDS Companies
45 Hendrix Road
West Henrietta, New York 14586
Attn: Cade Krueger

Dear Mr. Krueger:

I have reviewed the request for an approved jurisdictional determination (JD), made on your behalf by BME Associates, for the approximately 27- acre subject parcel located adjacent to North Road, City of Canandaigua, Ontario County, New York.

Enclosed is an approved JD which verifies the limits of waters of the U.S. within the subject parcel as depicted on Sheet 3 of 3. This approved JD will remain valid for a period of five (5) years from the date of this correspondence unless new information warrants revision of the approved JD before the expiration date. At the end of this period, a new aquatic resource delineation and JD will be required.

I have determined that the following aquatic resources **are not** waters of the U.S. as noted on the attached Interim Approved Jurisdictional Determination Form: Ditches 1, 2, 3, and 4. Therefore, these aquatic resources **are not** regulated under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899. Department of the Army authorization **is not** required if you propose work or propose a discharge of dredged or fill material in these aquatic resources.

Further, this delineation/determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in your request. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are United States Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resource Conservation Service prior to starting work.

If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal the above JD, you must submit a completed RFA form within 60 days of the date on this letter to the Great Lakes/Ohio River Division Office at the following address:

Regulatory Branch

SUBJECT: Approved Jurisdictional Determination for Department of the Army Processing No. LRB-2021-00068

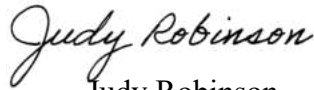
Suzanne Chubb
Regulatory Appeals Review Officer
US Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10-714
Cincinnati, Ohio 45202-3222
Phone: 513-684-7261 Fax: 513-684-2460

In order for an RFA to be accepted, the Corps must determine that it is complete; that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by September 9, 2021.

It is not necessary to submit an RFA to the Division office if you do not object to the determination in this letter.

Questions pertaining to this matter should be directed to me at (716) 879-6330, by writing to Judy Robinson, U.S. Army Corps of Engineers, 7413 County House Road, Auburn, New York 13021; or by e-mail at: Judy.A.Robinson@usace.army.mil.

Sincerely,

A handwritten signature in cursive script that reads "Judy Robinson".

Judy Robinson
Biologist

Enclosures

cc: Jenna Lynch, BME Associates
Martin Janda, BME Associates

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: The DDS Companies (North Road Property)		File Number: LRB-2021-00068	Date: July 12, 2021
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
X	APPROVED JURISDICTIONAL DETERMINATION	D	
	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/CECW/Pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

● **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

● **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

● **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

● **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

● **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

● **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Project Manager
U.S. Army Corps of Engineers
7413 County House Road
Auburn, New York 13021
716-879-6330
Judy.a.robinson@usace.army.mil

If you only have questions regarding the appeal process you may also contact:

Suzanne Chubb
Regulatory Appeals Review Officer
US Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10-714
Cincinnati, Ohio 45202-3222
Phone: 513-684-7261 Fax: 513-684-2460

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:

Federal Wetland Delineation Report

for

North Road Property

City of Canandaigua Ontario County New York

Prepared for:

The DDS Companies
45 Hendrix Road
West Henrietta, NY, 14586

Prepared by:



10 Lift Bridge Lane East
Fairport, NY 14450
(585) 377-7360

BME Project No.

October 2020

TABLE OF CONTENTS

Narrative

Introduction.....	1
Agency Resource Information	1
Methodology	2
Site Ecology	3
Water Resource Descriptions.....	4
Conclusions.....	6
References.....	7

Appendices

Appendix A	<u>Exhibits</u>
	Exhibit 1 – Aerial Site Location Map
	Exhibit 2 – USGS Quadrangle
	Exhibit 3 – USFWS National Wetlands Inventory
	Exhibit 4 – NYSDEC Environmental Resource Mapper
	Exhibit 5 – NRCS Soil Survey
	Exhibit 6 – Aerial Wetland Delineation Map
	Exhibit 7 – Photo Location Map
Appendix B	Site Photographs
Appendix C	Data Forms

INTRODUCTION

The DDS Companies contracted BME Associates (BME) to examine and delineate wetlands on a $\pm$ 27.3 acre site located on North Road in Canandaigua, Ontario County, New York (Appendix A, Exhibit 1). **An Approved Jurisdictional Determination is requested.**

The review area consists of forested upland, successional shrubland, and open field. There are three tributaries on site, which are man-made, maintained drainage ditches. The site is surrounded by residential land use.

The presence and location of wetlands and streams was determined using methods established in the 1987 *Corps of Engineers Wetland Delineation Manual*, 2012 *Northeast Regional Supplement*, 2018 *Field Indicators of Hydric Soils in the United States*, and other appropriate guidelines. The results of the delineation study are contained in this report.

AGENCY RESOURCE INFORMATION

Prior to initiating the field wetland delineation study, BME reviewed the following background information:

- GIS Aerial Photo of the Site (Exhibit 1) – The site consists of forested upland, shrubland hayfield and disturbed area near two road stubs at the southern corner of the property. The surrounding areas are residential. The site has access to North road to the north as well as Stewart Place and Cayuga Road to the west.
- U.S. Geological Survey (USGS) 7.5 minute topographic series to determine drainage patterns and the presence of streams and other water bodies (see Exhibit 2). The USGS topographic map shows a straight line man-made tributary running through the property in the south to north direction. The site is generally flat. Wetlands are shown southeast of the property.
- U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) map to locate any mapped Federal wetlands on the site. The NWI map shows Tributary “A” and a wetland along the southern property line, classified as PFO1E and PEM1E (see Exhibit 3).

- New York State Department of Environmental Conservation (NYSDEC) Environmental Resource Mapper to determine the presence of any mapped NYSDEC wetlands on the project site (see Exhibit 4). The resource mapper shows a class C tributary on the property (Tributary “A”). There are no mapped state wetlands shown within the site boundary. There is a state wetland located south of the site much further away than what the federal (NWI) map shows.
- The Natural Resource Conservation Service Soil Survey was used to locate any hydric soils, or soils with potential hydric inclusions (see Exhibit 5). The soils map indicates the presence of the following soils within the site (Area of Interest):

Summary by Map Unit — Ontario County, New York (NY069)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
34A	Lakemont silty clay loam, 0 to 3 percent slopes	95	20.7	76.0%
35A	Odessa silt loam, 0 to 3 percent slopes	5	4.3	15.7%
260B	Cayuga silt loam, 3 to 8 percent slopes	0	2.3	8.4%
Totals for Area of Interest			27.3	100.0%

- FEMA Floodplain Map was utilized to locate floodplains that might occur on the site. Based on the FEMA mapping, the site is not located in a flood zone.

METHODOLOGY

BME conducted the federal wetland delineation for the site according to methods described in the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual*, and the 2012 *North Central and Northeast Region Supplement*. The 2018 *U.S. Army Corps of Engineers, National Wetland Plant List* was utilized for wetland indicator status while the *USDA, NRCS Field Indicators of Hydric Soils in the United States* was utilized for hydric soil identification. A general survey of the site was conducted to determine the presence of waters of the U.S. and potential wetland areas. Site hydrology was evaluated by looking for and noting wetland hydrology indicators.

At each data sampling location, a list of dominant plants was documented and the percent cover for each species was estimated. Generally, a 5-foot radius from the sampling point was used to define herbaceous plants within the plant community, a 30-foot radius was used to define trees and woody vines, and a 15-foot radius to define shrubs and saplings. The “dominance measure methods” outlined in the *1987 Federal Delineation Manual* (Federal Interagency Committee for Wetland Delineation 1987) and the *2012 Northcentral and Northeast Region Supplement* were used to determine the presence of wetland vegetation while the *2018 U.S. Army Corps of Engineers National Wetland Plant List* was utilized for plant identification and determination of wetland plant indicator status. Site photograph locations are shown on Exhibit 8 in Appendix A. Site photographs can be found in Appendix B.

Atypical situation methodology was not utilized. Historic aerial imagery, soils maps, on-site assessments, and known history from the landowner were evaluated.

SITE ECOLOGY

General plant communities on the site include forested upland and shrubland.

Forested Upland and shrubland

Much of the upland portion of the site is forested, with an abundance of understory shrubs. Common species within the upland portion of this property include common buckthorn monoculture (*Rhamnus cathartica*), eastern cottonwood (*Populus deltoides*), Canadian goldenrod (*Solidago canadensis*) and virginia creeper (*Parthenocissus quinquefolia*). All upland areas are well drained to the existing man-made ditches on site which are approximately 4’ to 10’ below the upland grades.

Disturbed Areas

A portion of the site was disturbed during construction of the residential development in the southwest property corner where two existing road stubs are located.

Hayfield

A grass hayfield is in the northeast corner of the site and covers about 30% of the area. Common species include Timothy grass (*Phleum pratense*), dandelion (*Taraxacum officinale*), and Kentucky blue grass (*Poa pratensis*). The area is flat and well drained.

WATER RESOURCE DESCRIPTIONS

After conducting field work, it was concluded that there are no wetlands present on site. There are three tributaries which run through the property. There is a wetland further southeast of the property.

Tributary “A” (Length = $\pm 1,210$ LF), Tributary “B” (Length = ± 420 LF) and Tributary “C” (± 480 LF).

Table 1. Water Resource Summary

Name	Identification	Quantification (within site)	OHWM Dimensions	Flow Regime	Lat. and Long.
Tributary “A”	-	$\pm 1,210$ LF	± 3 -6 FT wide ± 4 -10 FT deep (from top of bank)	Intermittent	42.9084, -77.2855 to 42.9059, -77.2813
Tributary “B”	-	± 420 LF	± 2 -3 FT wide ± 4 -8 FT deep (from top of bank)	Ephemeral	42.9079, -77.2796 to 42.9069, -77.2821
Tributary “C”	-	± 480 LF	± 2 -3 FT wide ± 4 -6 FT deep (from top of bank)	Ephemeral	42.9063, -77.2835 to 42.9067, -77.2821

SITE WETLANDS:

Due to the lack of hydrology and hydric soils on site, BME has concluded that there are no wetlands on site.

SITE TRIBUTARIES:

Tributary “A” (Length = $\pm 1,210$ LF) Intermittent flow regime

Tributary “A” is a man-made drainage channel which runs north through the property. Its banks are 4-10 feet high. This tributary has an intermittent flow regime and collects water seasonally mostly from surrounding residential areas.

Tributary “B” (Length = ± 420 LF) Ephemeral flow regime

Tributary “B” is a straight, man-made drainage channel which drains from east to west through the property. It’s banks are 4-8 feet high. The channel flows into Tributary “A.” This tributary has an ephemeral flow regime and collects water from surrounding residential areas after rainfall events.

Tributary “C” (Length = ± 480 LF) Ephemeral flow regime

Tributary “C” is a man-made drainage channel with a concrete bottom invert which drains from west to east. It’s banks are 4-6 feet high. The channel flows into Tributary “A.” This tributary has an ephemeral flow regime and was installed to drain water from the adjacent single family residential subdivision.

CONCLUSIONS

Based on the lack of presence of all three parameters for federal jurisdictional wetlands, BME has concluded that there are no wetlands on site. Three (3) maintained man-made tributaries (Tributary “A” $\pm$ 1,210 LF, Tributary “B” $\pm$ 420 LF, and Tributary “C” $\pm$ 480 LF) were located and their flow regimes evaluated. Tributary “A” has an intermittent flow regime while Tributaries “B” and “C” are ephemeral. On behalf of The DDS Companies, we request an Approved Jurisdictional Determination for the subject site.

REFERENCES

- Department of the Army. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. Corps of Engineers, Waterways Experiment Station. Vicksburg, Mississippi.
- Federal Interagency Committee for Wetland Delineation. 1989. Identifying and Delineating Jurisdictional Wetlands. U. S. Army Corps of Engineers, U.S. Environmental Protection Agency, U. S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, DC. Cooperative Technical Publication.
- Munsell Color. (Revised) 2009. Munsell Soil Color Charts. X-Rite Incorporated. Grand Rapids, Michigan USA.
- National Wetland Inventory Maps, U.S. Department of the Interior, Fish and Wildlife Service, National Wetland Inventory, St. Petersburg, FL.
- Newcomb, L. 1977. Newcomb's Wildflower Guide. Hachette Book Group, Inc. New York, NY.
- New York State Department of Environmental Conservation Freshwater Wetlands Maps, NYSDEC, New York.
- Ogden, E.C. 1981. Field Guide to Northeastern Ferns. Contributions to a Flora of New York State III, R.S. Mitchell (Ed.), Bull. 444, New York State Museum, Albany, NY 122 pp.
- Reed, P.B., Jr. 1995. National List of Plant Species That Occur in Wetlands: Northeast (Region 1). U.S. Fish and Wildlife Service Biological Report 88(26.1). St. Petersburg, FL.
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, January 2012, Volume 2.0.
- U.S.D.A. Soil Conservation Service. 1986. Soil Survey of Monroe County, New York. USDA SCS. Washington, DC.
- U.S.D.A. Soil Conservation Service. 1991. Hydric Soils of the United States. Miscellaneous Publication No. 1491. Washington, DC.
- U.S.D.A. Soil Conservation Service. 2017, V. 8.1. National Hydric Soils List. Lincoln, NE.
- Williams, A.E. 1992. Clarification and Interpretation of the 1987 Manual. U.S. Army Corps of Engineers March 6, 1992 Memorandum. USACE. Washington, DC.
- U.S Army Corps of Engineers 2018. National Wetland Plant List, Version 3.4

BME Wetland Field Delineators

Martin Janda, Jenna Lynch

APPENDIX A

Exhibits 1 – 7

Exhibit 1 – Aerial Site Location Map

Exhibit 2 – USGS Quadrangle

Exhibit 3 – USFWS National Wetlands Inventory

Exhibit 4 – NYSDEC Environmental Resource Mapper

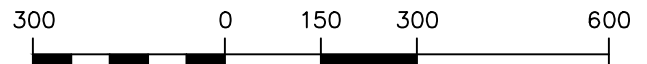
Exhibit 5 – NRCS Soil Survey

Exhibit 6 – Aerial Wetland Delineation Map

Exhibit 7 – Photo Location Map




Site Boundary


Graphic Scale

Date: 10/22/2020

Project #: 2089-89



North Road Property

Aerial Site Location Map

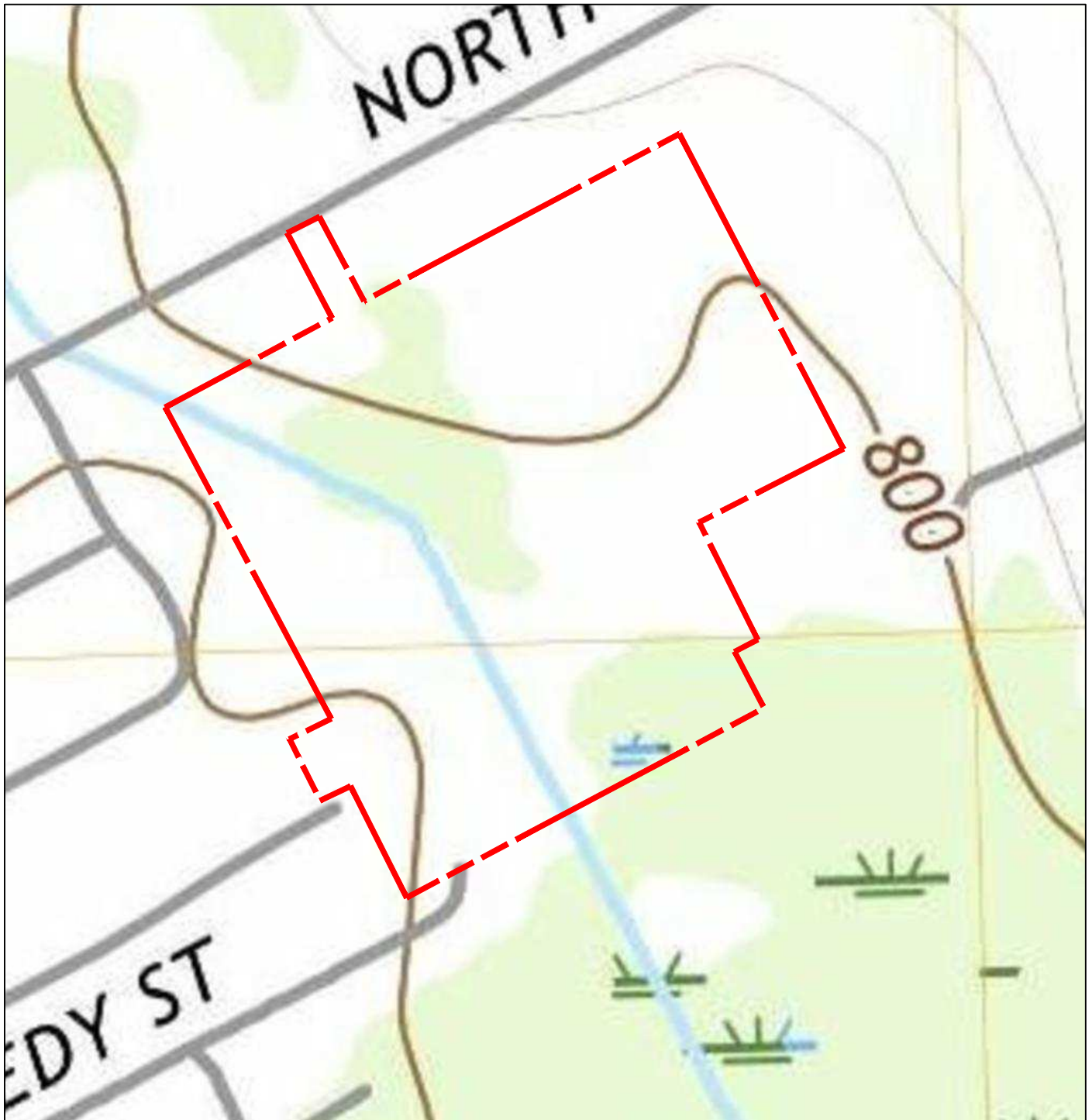
City of Canandaigua, Ontario County, New York

P:\2089-89\Drawings\Final\2089-89 Wetland Base.dwg

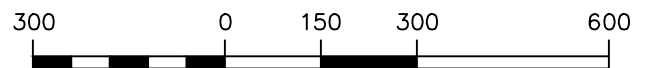


Scale:
1"=300'

EXHIBIT 1



Site Boundary



Graphic Scale

Date: 10/22/2020

Project #: 2089-89



North Road Property

USGS Map

City of Canandaigua, Ontario County, New York

P:\2089-89\Drawings\Final\2089-89 Wetland Base.dwg

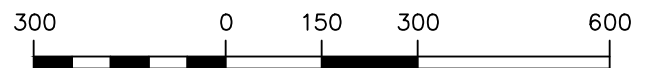


Scale:
1"=300'

EXHIBIT
2



Site Boundary



Graphic Scale

Date: 10/22/2020

Project # : 2089-86



North Road Property

USFWS National Wetland Inventory

City of Canandaigua, Ontario County, New York

P: \2089-89\Drawings\Final\2089-89 Wetland Base.dwg

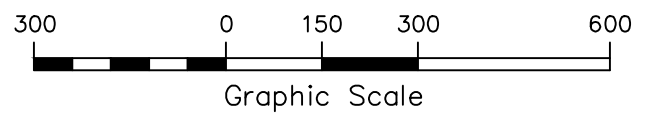


Scale:
1"=300'

EXHIBIT
3



 Site Boundary



Date: 10/22/2020

Project #: 2089-89

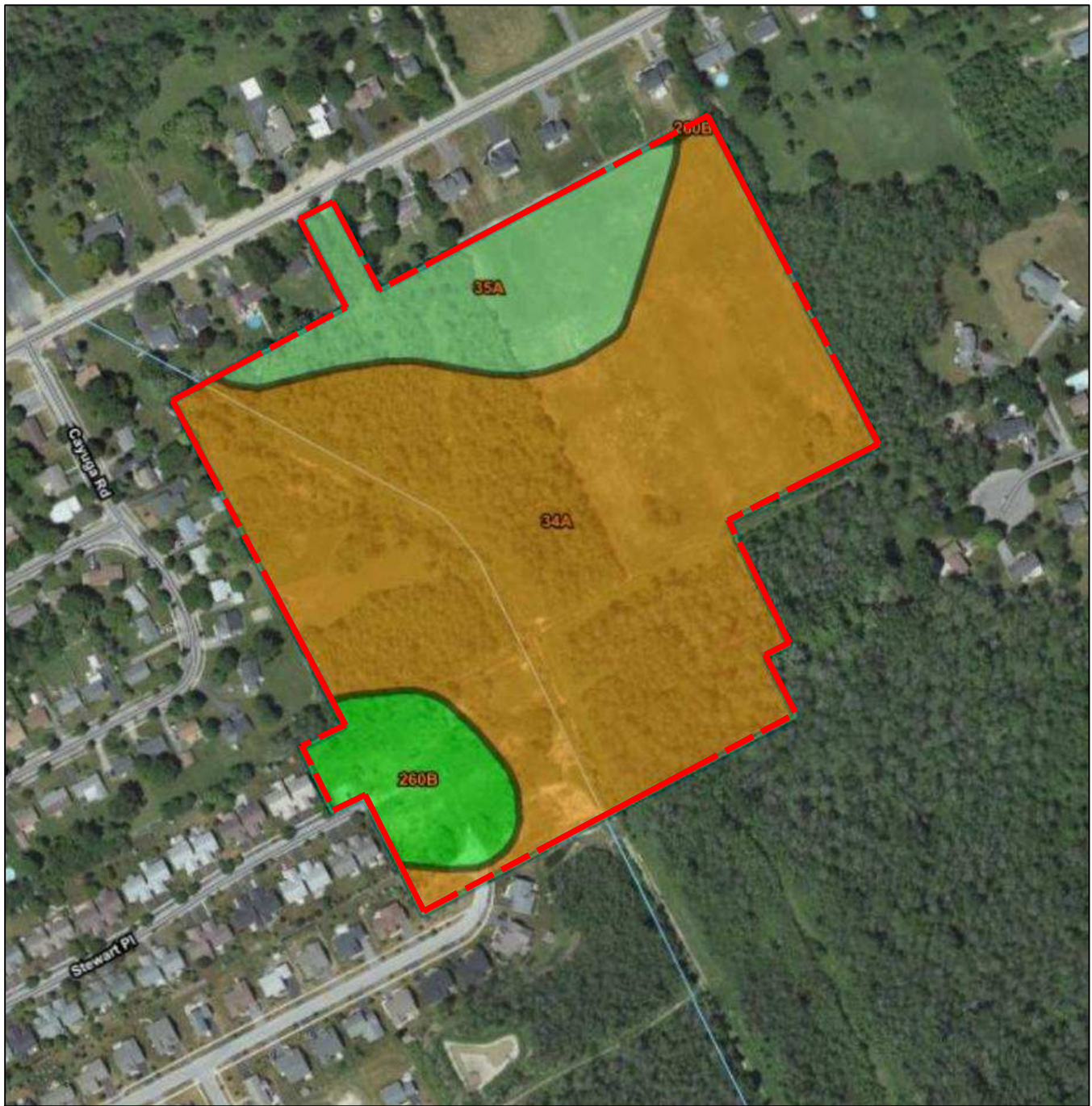


North Road Property

NYSDEC Environmental Resource Mapper
 City of Canandaigua, Ontario County, New York
 P:\2089-89\Drawings\Final\2089-89 Wetland Base.dwg

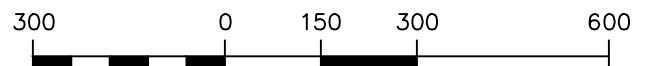


Scale:
 1"=300'
 EXHIBIT
 4





 Site Boundary



 Graphic Scale

Date: 10/22/2020

Project #: 2089-89



North Road Property

NRCS Soil Survey

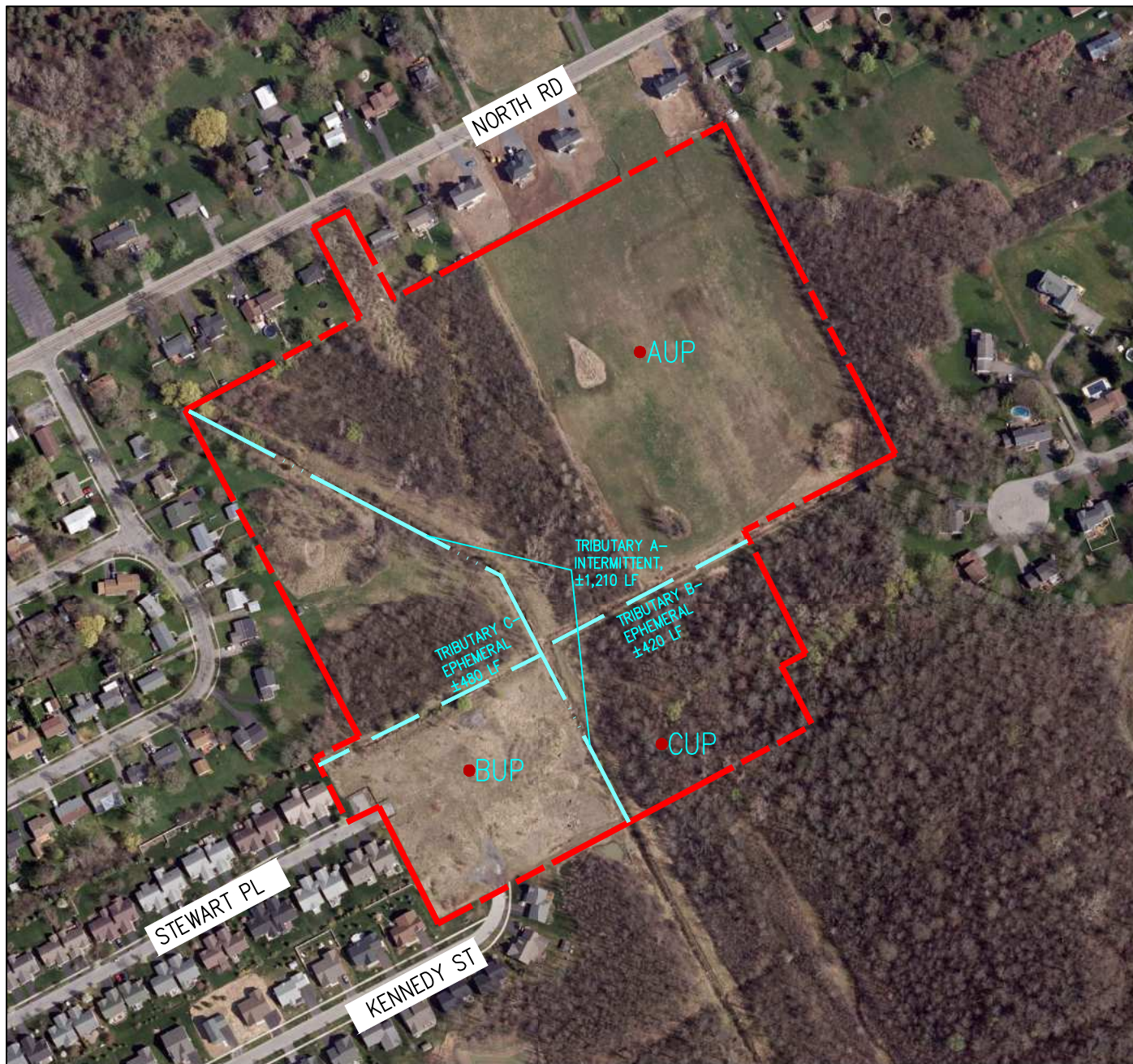
City of Canandaigua, Ontario County, New York

P:\2089-89\Drawings\Final\2089-89 Wetland Base.dwg



Scale:
1"=300'

EXHIBIT
5



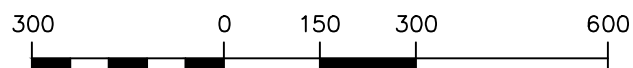
Site Boundary

Intermittent Tributary

Ephemeral Tributary

• AUP

Data Sampling Point



Graphic Scale

Date: 10/26/2020

Project #: 2089-89



North Road Property

Aerial Wetland Delineation Map

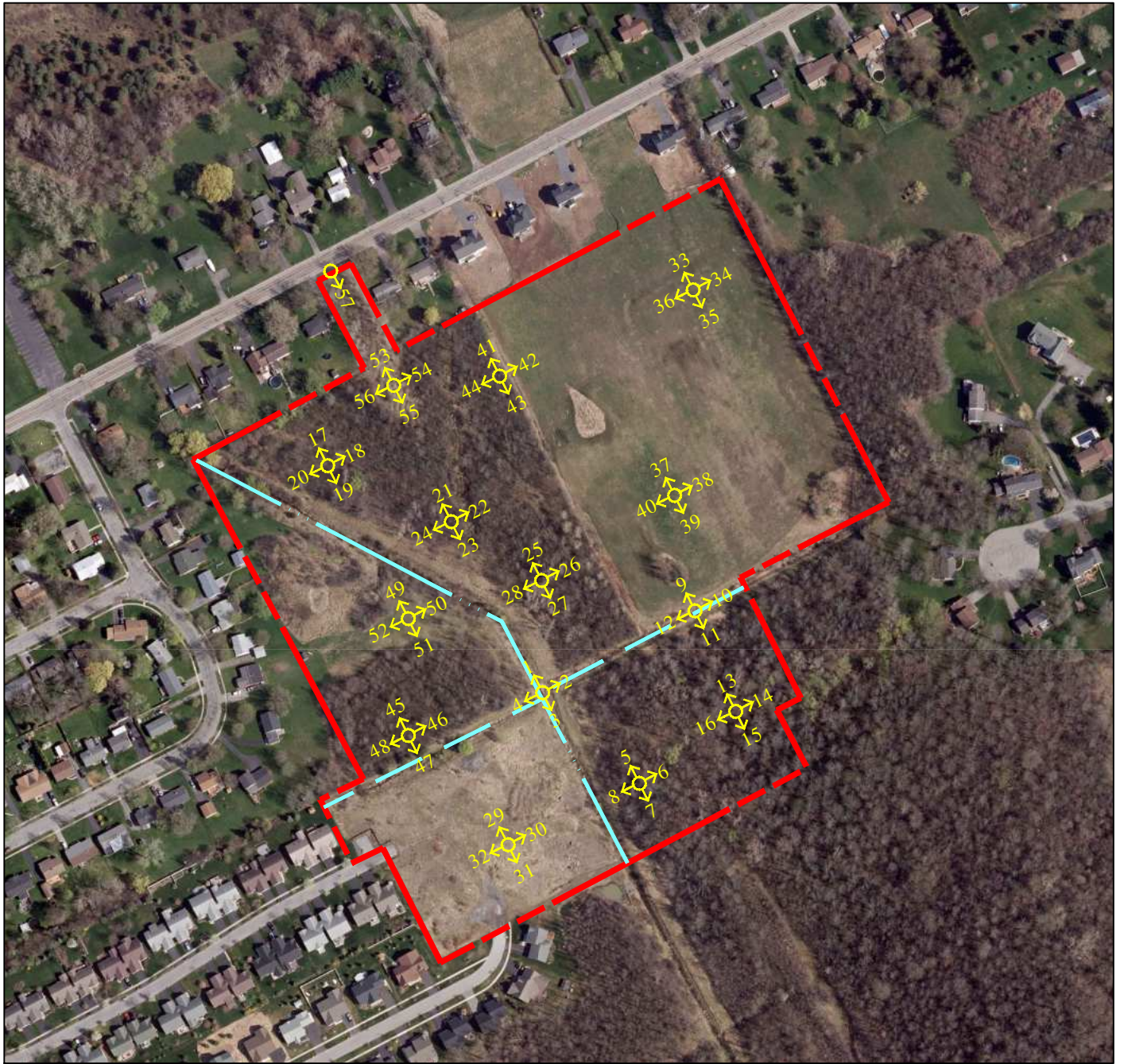
City of Canandaigua, Ontario County, New York

P:\2089-89\Drawings\Final\2089-89 Wetland Base.dwg



Scale:
1"=300'

EXHIBIT
6



Site Boundary



Intermittent Tributary



Ephemeral Tributary

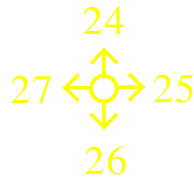
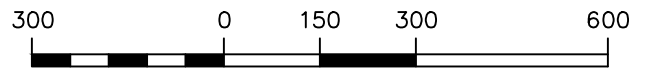


Photo Locations



Graphic Scale

Date: 10/26/2020

Project #: 2089-89



NORTH ROAD PROPERTY

Photo Location Map

City of Canandaigua, Ontario County, New York

P:\2089-89\Drawings\Final\2089-89 Wetland Base.dwg



Scale:
1"=300'

EXHIBIT
7

APPENDIX B

Site Photographs



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4



PHOTO 5



PHOTO 6



PHOTO 7



PHOTO 8



PHOTO 9



PHOTO 10



PHOTO 11



PHOTO 12



PHOTO 13



PHOTO 14



PHOTO 15



PHOTO 16



PHOTO 17



PHOTO 18



PHOTO 19



PHOTO 20



PHOTO 21



PHOTO 22



PHOTO 23



PHOTO 24



PHOTO 25



PHOTO 26



PHOTO 27



PHOTO 28



PHOTO 29



PHOTO 30



PHOTO 31



PHOTO 32



PHOTO 33



PHOTO 34



PHOTO 35



PHOTO 36



PHOTO 37



PHOTO 38



PHOTO 39



PHOTO 40



PHOTO 41



PHOTO 42



PHOTO 43



PHOTO 44



PHOTO 45



PHOTO 46



PHOTO 47



PHOTO 48



PHOTO 49



PHOTO 50



PHOTO 51



PHOTO 52



PHOTO 53



PHOTO 54



PHOTO 55



PHOTO 56



PHOTO 57

APPENDIX C

Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: North Road Property City/County: Ontario County Sampling Date: 10/06/2020
 Applicant/Owner: The DDS Companies State: NY Sampling Point: AUP
 Investigator(s): Martin Janda, Jenna Lynch (BME Associates) Section, Township, Range: City of Canandaigua
 Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none
 Slope (%): 0 Lat: 42.9088 Long: -77.2817 Datum: NAD83
 Soil Map Unit Name: Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present? Yes ☐ No ☒	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present? Yes ☐ No ☒	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: <u>None</u>		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ Water-Stained Leaves (B9)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ Aquatic Fauna (B13)	☐ Drainage Patterns (B10)	
☐ Saturation (A3)	☐ Marl Deposits (B15)	☐ Moss Trim Lines (B16)	
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Dry-Season Water Table (C2)	
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Crayfish Burrows (C8)	
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Stunted or Stressed Plants (D1)	
☐ Iron Deposits (B5)	☐ Thin Muck Surface (C7)	☐ Geomorphic Position (D2)	
☐ Inundation Visible on Aerial Imagery (B7)	☐ Other (Explain in Remarks)	☐ Shallow Aquitard (D3)	
☐ Sparsely Vegetated Concave Surface (B8)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present? Yes ☐ No ☒	Depth (inches): _____	Wetland Hydrology Present? Yes ☐ No ☒	
Water Table Present? Yes ☐ No ☒	Depth (inches): _____		
Saturation Present? Yes ☐ No ☒	Depth (inches): _____		
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

VEGETATION – Use scientific names of plants.

 Sampling Point: AUP

Tree Stratum (Plot size: <u>R=30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
			_____ = Total Cover	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>40</u></td> <td>x 2 = <u>80</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>55</u></td> <td>x 4 = <u>220</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>95</u> (A)</td> <td><u>300</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.16</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>40</u>	x 2 = <u>80</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>55</u>	x 4 = <u>220</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>95</u> (A)	<u>300</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>40</u>	x 2 = <u>80</u>																	
FAC species <u>0</u>	x 3 = <u>0</u>																	
FACU species <u>55</u>	x 4 = <u>220</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>95</u> (A)	<u>300</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>R=15'</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
			_____ = Total Cover															
Herb Stratum (Plot size: <u>R=5'</u>)																		
1. <u>Phalaris arundinacea</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: ☐ Rapid Test for Hydrophytic Vegetation ☐ Dominance Test is >50% ☐ Prevalence Index is ≤3.0 ¹ ☐ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Phleum pratense</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>															
3. <u>Centaurea jacea</u>	<u>10</u>	<u>no</u>	<u>FACU</u>															
4. <u>Poa pratensis</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>															
5. <u>Trifolium repens</u>	<u>5</u>	<u>no</u>	<u>FACU</u>															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
			<u>95</u> = Total Cover															
Woody Vine Stratum (Plot size: <u>R=30'</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
			_____ = Total Cover															
Remarks: (Include photo numbers here or on a separate sheet.) 																		

Sampling Point: AUP

[illegible]

Indicators for Problematic Hydric Soils³:

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Hydric Soil Present? Yes No ☒

Northcentral and Northeast Region – Interim Version

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: North Road Property City/County: Ontario County Sampling Date: 10/06/2020
 Applicant/Owner: The DDS Companies State: NY Sampling Point: BUP
 Investigator(s): Martin Janda, Jenna Lynch (BME Associates) Section, Township, Range: City of Canandaigua
 Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none
 Slope (%): 0 Lat: 42.9061 Long: -77.2823 Datum: NAD83
 Soil Map Unit Name: Cayuga silt loam, 3 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present? Yes ☐ No ☒	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present? Yes ☐ No ☒	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: <u>None</u>		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)		☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ Microtopographic Relief (D4) ☐ FAC-Neutral Test (D5)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ Marl Deposits (B15) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Other (Explain in Remarks)		
Field Observations:		Wetland Hydrology Present? Yes ☐ No ☒	
Surface Water Present? Yes ☐ No ☒	Depth (inches): _____		
Water Table Present? Yes ☐ No ☒	Depth (inches): _____		
Saturation Present? Yes ☐ No ☒	Depth (inches): _____		
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

VEGETATION – Use scientific names of plants.

Sampling Point: BUP

Tree Stratum (Plot size: <u>R=30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="text-align: left;">Total % Cover of:</th> <th style="text-align: left;">Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>30</u></td> <td>x 2 = <u>60</u></td> </tr> <tr> <td>FAC species <u>15</u></td> <td>x 3 = <u>45</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>17</u></td> <td>x 5 = <u>85</u></td> </tr> <tr> <td>Column Totals: <u>102</u> (A)</td> <td><u>350</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.43</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>30</u>	x 2 = <u>60</u>	FAC species <u>15</u>	x 3 = <u>45</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>17</u>	x 5 = <u>85</u>	Column Totals: <u>102</u> (A)	<u>350</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>30</u>	x 2 = <u>60</u>																	
FAC species <u>15</u>	x 3 = <u>45</u>																	
FACU species <u>40</u>	x 4 = <u>160</u>																	
UPL species <u>17</u>	x 5 = <u>85</u>																	
Column Totals: <u>102</u> (A)	<u>350</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>R=15'</u>)																		
1. <u>Populus deltoides</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover																		
Herb Stratum (Plot size: <u>R=5'</u>)																		
1. <u>Phalaris arundinacea</u>	<u>30</u>	<u>yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: ☐ Rapid Test for Hydrophytic Vegetation ☐ Dominance Test is >50% ☐ Prevalence Index is ≤3.0 ¹ ☐ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Solidago canadensis</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>															
3. <u>Daucus carota</u>	<u>12</u>	<u>no</u>	<u>UPL</u>															
4. <u>Cirsium discolor</u>	<u>5</u>	<u>no</u>	<u>UPL</u>															
5. <u>Centaurea jacea</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
_____ = Total Cover																		
Woody Vine Stratum (Plot size: <u>R=30'</u>)																		
1. _____	_____	_____	_____	Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
_____ = Total Cover																		
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes _____ No <u>X</u>														

Sampling Point: BUP

[illegible]

Hydric Soil Indicators: NONE

___ Histosol (A1)	___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)	___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
___ Histic Epipedon (A2)	___	___ Coast Prairie Redox (A16) (LRR K, L, R)
___ Black Histic (A3)	___ Thin Dark Surface (S9) (LRR R, MLRA 149B)	___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
___ Hydrogen Sulfide (A4)	___ Loamy Mucky Mineral (F1) (LRR K, L)	___ Dark Surface (S7) (LRR K, L)
___ Stratified Layers (A5)	___ Loamy Gleyed Matrix (F2)	___ Polyvalue Below Surface (S8) (LRR K, L)
___ Depleted Below Dark Surface (A11)	___ Depleted Matrix (F3)	___ Thin Dark Surface (S9) (LRR K, L)
___ Thick Dark Surface (A12)	___ Redox Dark Surface (F6)	___ Iron-Manganese Masses (F12) (LRR K, L, R)
___ Sandy Mucky Mineral (S1)	___ Depleted Dark Surface (F7)	___ Piedmont Floodplain Soils (F19) (MLRA 149B)
___ Sandy Gleyed Matrix (S4)	___ Redox Depressions (F8)	___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
___ Sandy Redox (S5)		___ Red Parent Material (TF2)
___ Stripped Matrix (S6)		___ Very Shallow Dark Surface (TF12)
___ Dark Surface (S7) (LRR R, MLRA 149B)		___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches): _____

Hydric Soil Present? Yes No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: North Road Property City/County: Ontario County Sampling Date: 10/06/2020
 Applicant/Owner: The DDS Companies State: NY Sampling Point: CUP
 Investigator(s): Martin Janda, Jenna Lynch (BME Associates) Section, Township, Range: City of Canandaigua
 Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none
 Slope (%): 0 Lat: 42.9064 Long: -77.2805 Datum: NAD83
 Soil Map Unit Name: Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present? Yes ☐ No ☒	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present? Yes ☐ No ☒	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: <u>None</u>		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
☐ Surface Water (A1)	☐ Water-Stained Leaves (B9)	☐ Surface Soil Cracks (B6)
☐ High Water Table (A2)	☐ Aquatic Fauna (B13)	☐ Drainage Patterns (B10)
☐ Saturation (A3)	☐ Marl Deposits (B15)	☐ Moss Trim Lines (B16)
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Dry-Season Water Table (C2)
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Crayfish Burrows (C8)
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Stunted or Stressed Plants (D1)
☐ Iron Deposits (B5)	☐ Thin Muck Surface (C7)	☐ Geomorphic Position (D2)
☐ Inundation Visible on Aerial Imagery (B7)	☐ Other (Explain in Remarks)	☐ Shallow Aquitard (D3)
☐ Sparsely Vegetated Concave Surface (B8)		☐ Microtopographic Relief (D4)
		☐ FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes ☐ No ☒ Depth (inches): _____		
Water Table Present? Yes ☐ No ☒ Depth (inches): _____		
Saturation Present? Yes ☐ No ☒ Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes ☐ No ☒	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION – Use scientific names of plants.

Sampling Point: CUP

Tree Stratum (Plot size: <u>R=30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Acer rubrum</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)														
2. <u>Fraxinus pensylvanica</u>	<u>10</u>	<u>no</u>	<u>FACW</u>															
3. <u>Populus deltoides</u>	<u>30</u>	<u>yes</u>	<u>FAC</u>															
4. <u>Acer saccharum</u>	<u>10</u>	<u>no</u>	<u>FACU</u>															
5. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>10</u></td> <td>x 2 = <u>20</u></td> </tr> <tr> <td>FAC species <u>115</u></td> <td>x 3 = <u>345</u></td> </tr> <tr> <td>FACU species <u>35</u></td> <td>x 4 = <u>140</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>160</u></td> <td>(A) <u>505</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.16</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>10</u>	x 2 = <u>20</u>	FAC species <u>115</u>	x 3 = <u>345</u>	FACU species <u>35</u>	x 4 = <u>140</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>160</u>	(A) <u>505</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>10</u>	x 2 = <u>20</u>																	
FAC species <u>115</u>	x 3 = <u>345</u>																	
FACU species <u>35</u>	x 4 = <u>140</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>160</u>	(A) <u>505</u> (B)																	
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
	<u>60</u>	<u>= Total Cover</u>																
Sapling/Shrub Stratum (Plot size: <u>R=15'</u>)				Hydrophytic Vegetation Indicators: ☐ Rapid Test for Hydrophytic Vegetation ☐ Dominance Test is >50% ☐ Prevalence Index is ≤3.0 ¹ ☐ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain)														
1. <u>Rhamnus cathartica</u>	<u>65</u>	<u>yes</u>	<u>FAC</u>															
2. <u>Populus deltoides</u>	<u>10</u>	<u>no</u>	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
	<u>75</u>	<u>= Total Cover</u>		Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.														
Herb Stratum (Plot size: <u>R=5'</u>)																		
1. <u>Allaria petiolata</u>	<u>15</u>	<u>yes</u>	<u>FACU</u>															
2. <u>Symphytotrichum ericoides</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>															
3. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes _____ No <u>X</u>														
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>R=30'</u>)														
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>R=30'</u>)														
12. _____	_____	_____	_____															
	<u>25</u>	<u>= Total Cover</u>																
1. _____	_____	_____	_____															
2. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>R=30'</u>)														
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
	_____	<u>= Total Cover</u>																

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: CUP

[illegible]

Hydric Soil Indicators: NONE

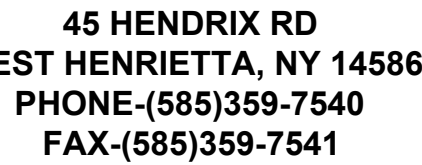
3 cm Muck (A10) (LBRK) MLRA 14

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

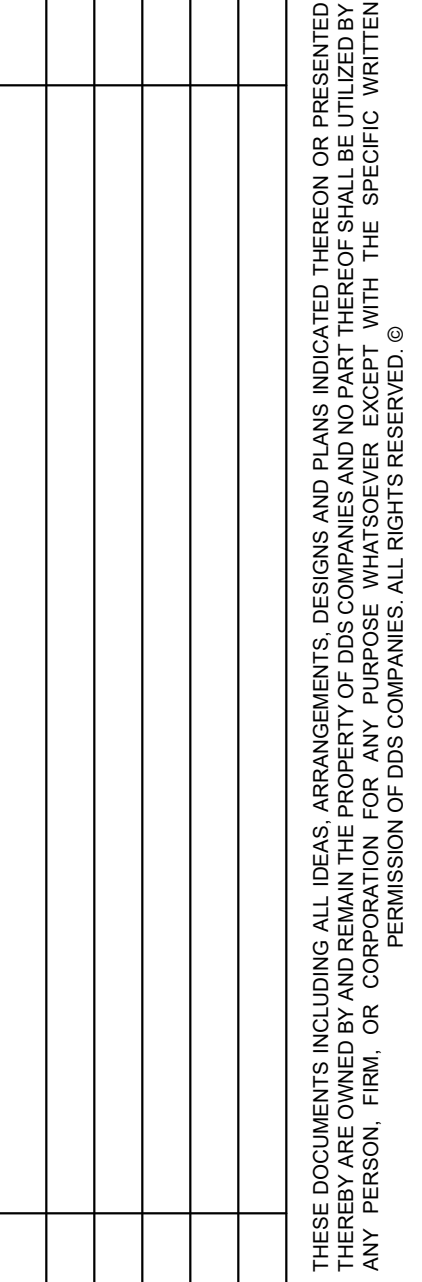
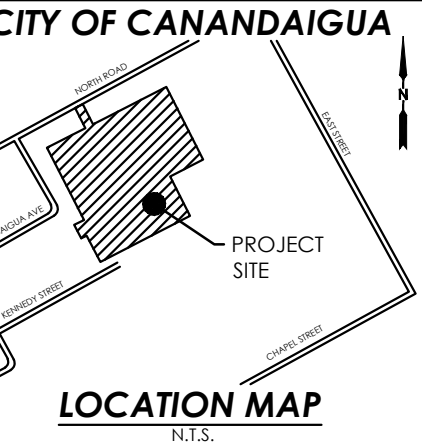
Hydric Soil Present? Yes _____ No X

Northcentral and Northeast Region – Interim Version

APPENDIX E – PRE AND POST CONDITIONS DRAINAGE MAPS



ANANDAIGUA HOMES LLC
33 SOUTH MAIN STREET
ANANDAIGUA, NY 14424
PHONE-(585-598-1251)



WATERCHASE RESIDENTIAL SUBDIVISION

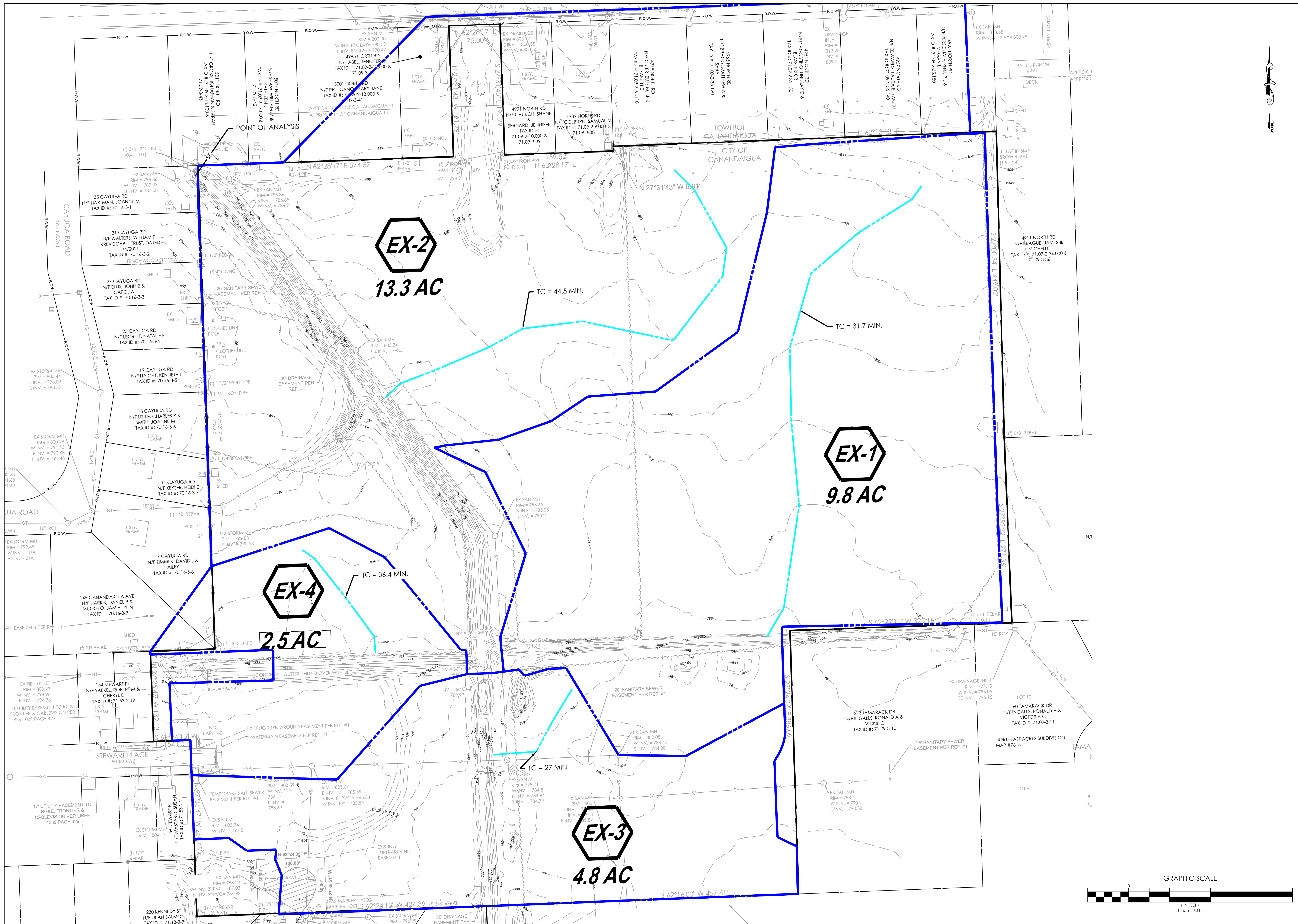
BEING A PART OF CITY OF CANADAGUIA, ONTARIO COUNTY, NEW YORK

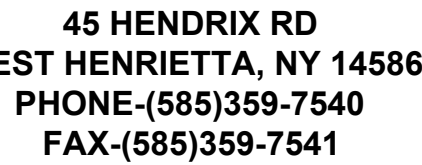
DRAWING TITLE:

PRE-CONDITIONS DRAINAGE MAP

OWN BY:	SIC	ESM	PROJ. NO.	7224
CHECKED BY:	ESM	DATE:	12/6/2024	PAGE SIZE:
				ARC

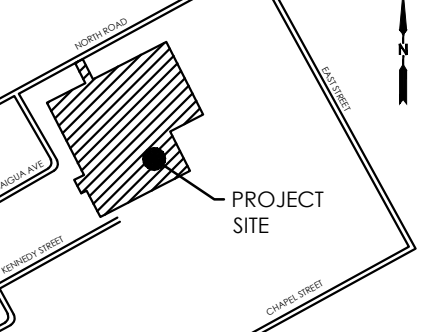
V: 00	DRAWING NO: PRE





ANANDAIGUA HOMES LLC
33 SOUTH MAIN STREET
ANANDAIGUA, NY 14424
PHONE-(585-598-1251)

CITY OF CANANDAIGUA



LOCATION MAP



REV	DESCRIPTION	DATE

THESE DOCUMENTS INCLUDING ALL IDEAS, ARRANGEMENTS, DESIGNS AND PLANS INDICATED THEREON OR PRESENTED THEREON ARE THE PROPERTY OF DDC COMPANIES. NO PART OF THESE DOCUMENTS ARE TO BE REPRODUCED BY ANY PERSON, FIRM, OR CORPORATION FOR ANY PURPOSE WHATSOEVER EXCEPT WITH THE SPECIFIC WRITTEN PERMISSION OF DDC COMPANIES. ALL RIGHTS RESERVED. ©

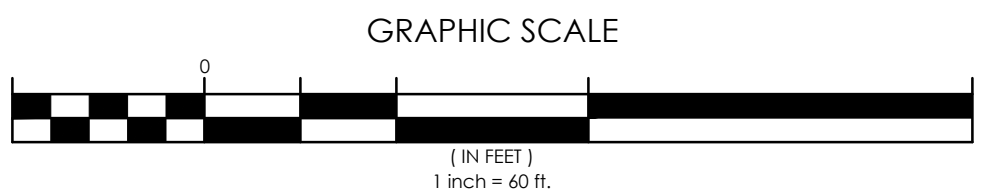
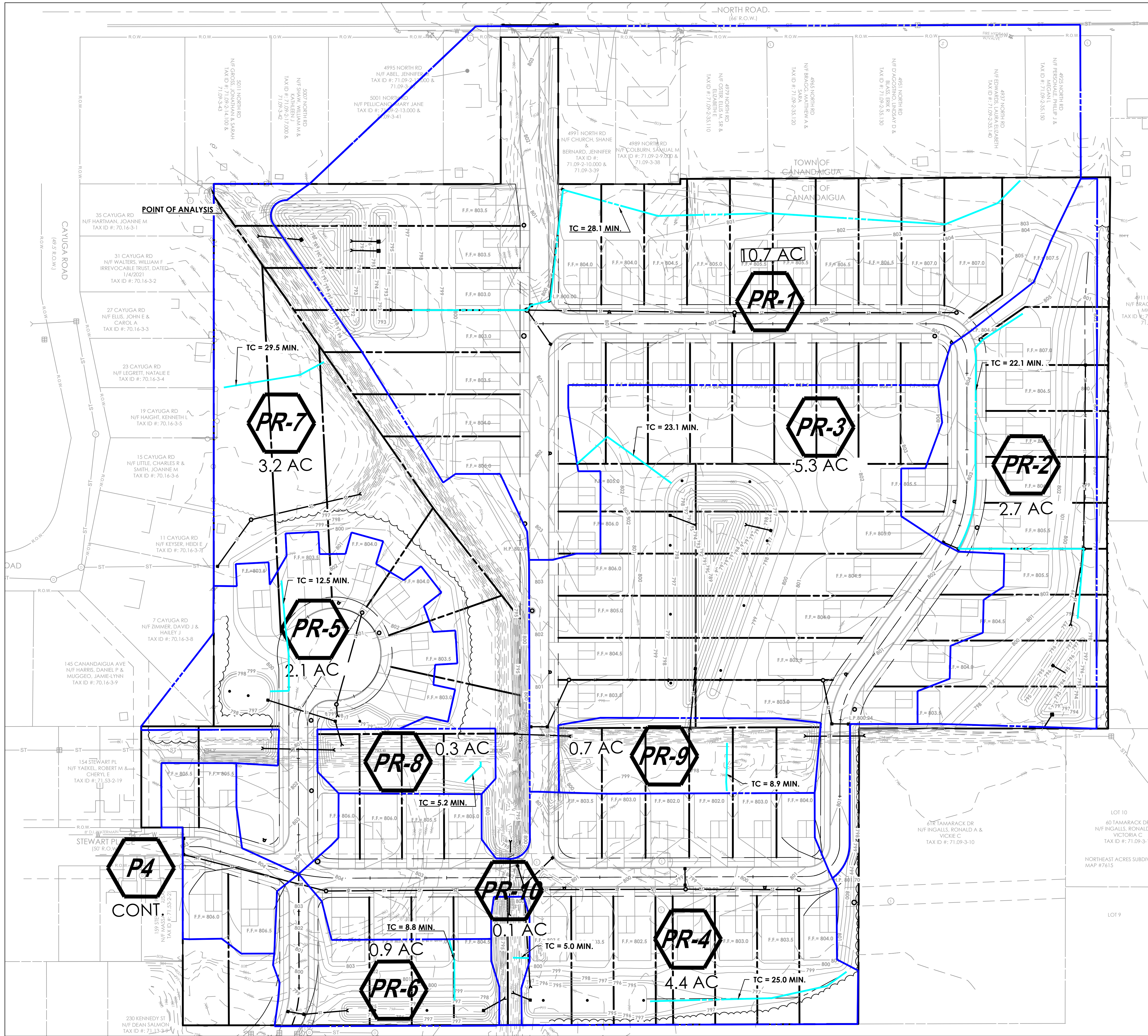
**WATERCHASE RESIDENTIAL
SUBDIVISION**

DRAWING TITLE:

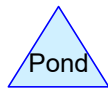
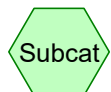
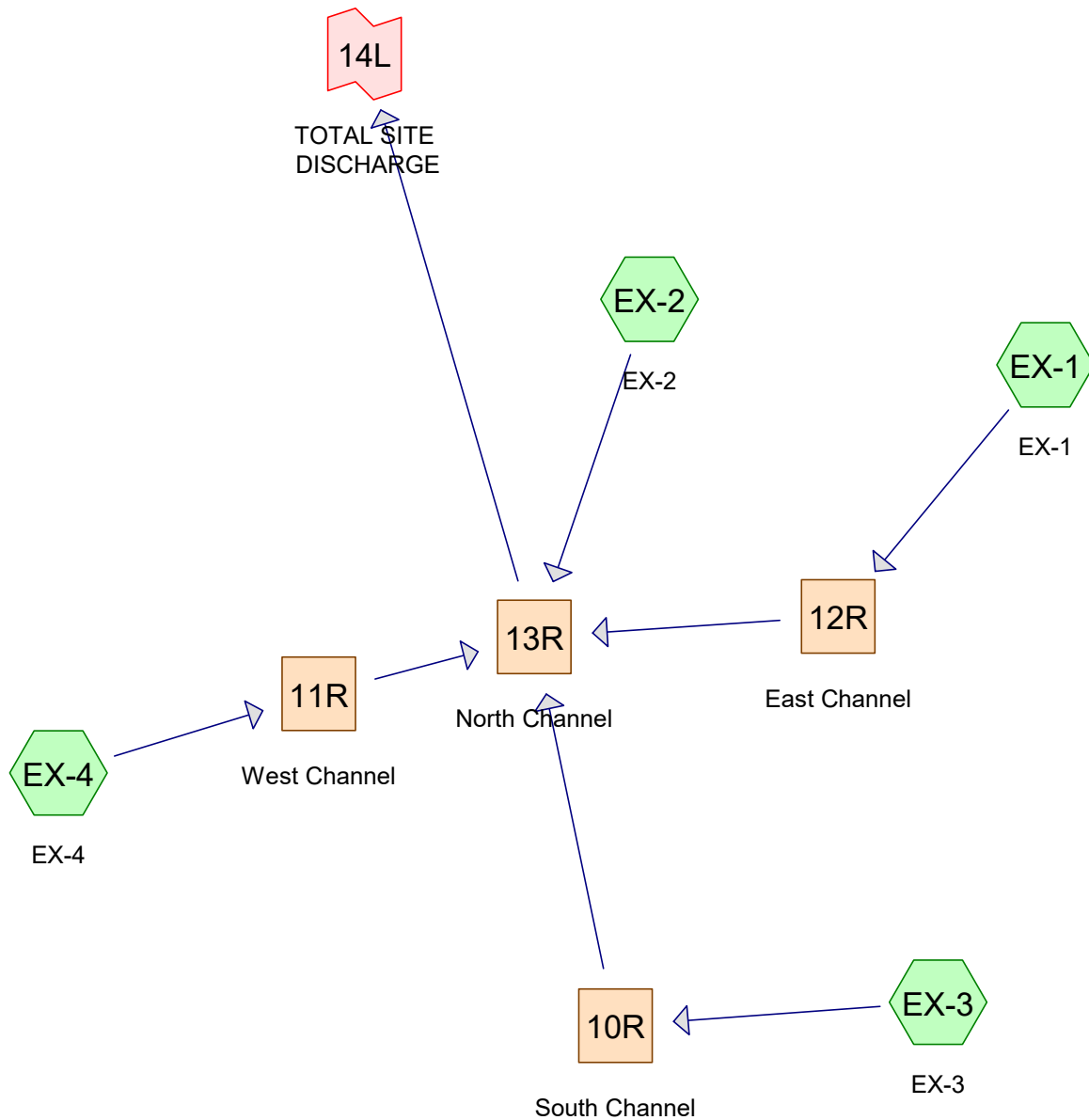
POST-CONDITIONS DRAINAGE MAP

REV:
00

DRAWING NO:
POST



APPENDIX F – PRE AND POST HYDROCAD MODELS



Routing Diagram for Waterchase Sub Pre with offsite
Prepared by DDS Engineering & Surveying LLP, Printed 6/24/2025
HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 2

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 7081 NY Ontario

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 3

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	NRCC 24-hr	A	Default	24.00	1	1.89	2
2	10-Year	NRCC 24-hr	A	Default	24.00	1	3.14	2
3	50-Year	NRCC 24-hr	A	Default	24.00	1	4.52	2
4	100-Year	NRCC 24-hr	A	Default	24.00	1	5.29	2

Waterchase Sub Pre with offisite

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 4

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.600	80	>75% Grass cover, Good, HSG D (EX-1, EX-2)
10.640	73	Brush, Good, HSG D (EX-1, EX-2, EX-3, EX-4)
0.660	98	Paved parking, HSG D (EX-2, EX-3, EX-4)
14.500	79	Woods/grass comb., Good, HSG D (EX-1, EX-2, EX-3, EX-4)
30.400	77	TOTAL AREA

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 5

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
30.400	HSG D	EX-1, EX-2, EX-3, EX-4
0.000	Other	
30.400		TOTAL AREA

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 6

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	4.600	0.000	4.600	>75% Grass cover, Good	EX-1, EX-2
0.000	0.000	0.000	10.640	0.000	10.640	Brush, Good	EX-1, EX-2, EX-3, EX-4
0.000	0.000	0.000	0.660	0.000	0.660	Paved parking	EX-2, EX-3, EX-4
0.000	0.000	0.000	14.500	0.000	14.500	Woods/grass comb., Good	EX-1, EX-2, EX-3, EX-4
0.000	0.000	0.000	30.400	0.000	30.400	TOTAL AREA	

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 7

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX-1: EX-1

Runoff Area=9.800 ac 0.00% Impervious Runoff Depth=0.33"
Flow Length=753' Tc=31.7 min CN=75 Runoff=1.92 cfs 0.268 af

Subcatchment EX-2: EX-2

Runoff Area=13.300 ac 4.29% Impervious Runoff Depth=0.46"
Flow Length=750' Slope=0.0100 ' ' Tc=44.5 min CN=79 Runoff=3.41 cfs 0.509 af

Subcatchment EX-3: EX-3

Runoff Area=4.800 ac 0.83% Impervious Runoff Depth=0.42"
Flow Length=169' Tc=27.1 min CN=78 Runoff=1.47 cfs 0.170 af

Subcatchment EX-4: EX-4

Runoff Area=2.500 ac 2.00% Impervious Runoff Depth=0.42"
Flow Length=189' Tc=36.4 min CN=78 Runoff=0.65 cfs 0.088 af

Reach 10R: South Channel

Avg. Flow Depth=0.17' Max Vel=0.66 fps Inflow=1.47 cfs 0.170 af
n=0.030 L=1,343.0' S=0.0020 ' ' Capacity=252.34 cfs Outflow=0.84 cfs 0.170 af

Reach 11R: West Channel

Avg. Flow Depth=0.12' Max Vel=1.18 fps Inflow=0.65 cfs 0.088 af
n=0.017 L=387.6' S=0.0033 ' ' Capacity=677.24 cfs Outflow=0.63 cfs 0.088 af

Reach 12R: East Channel

Avg. Flow Depth=0.34' Max Vel=1.38 fps Inflow=1.92 cfs 0.268 af
n=0.030 L=671.0' S=0.0043 ' ' Capacity=223.88 cfs Outflow=1.79 cfs 0.268 af

Reach 13R: North Channel

Avg. Flow Depth=0.58' Max Vel=1.31 fps Inflow=6.60 cfs 1.035 af
n=0.030 L=804.0' S=0.0018 ' ' Capacity=1,274.88 cfs Outflow=6.15 cfs 1.035 af

Link 14L: TOTAL SITE DISCHARGE

Inflow=6.15 cfs 1.035 af
Primary=6.15 cfs 1.035 af

Total Runoff Area = 30.400 ac Runoff Volume = 1.035 af Average Runoff Depth = 0.41"
97.83% Pervious = 29.740 ac 2.17% Impervious = 0.660 ac

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 8

Summary for Subcatchment EX-1: EX-1

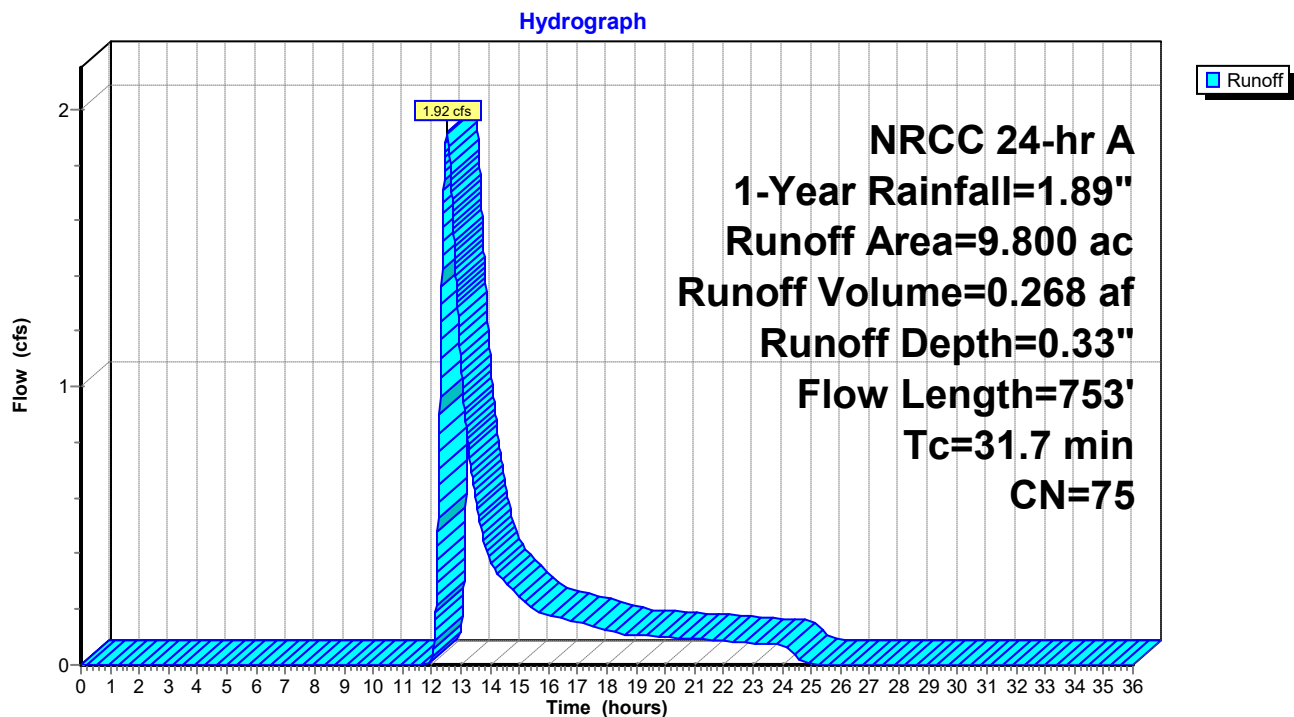
Runoff = 1.92 cfs @ 12.54 hrs, Volume= 0.268 af, Depth= 0.33"
Routed to Reach 12R : East Channel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
7.270	73	Brush, Good, HSG D
2.370	79	Woods/grass comb., Good, HSG D
0.160	80	>75% Grass cover, Good, HSG D
9.800	75	Weighted Average
9.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0235	0.10		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
15.5	653	0.0100	0.70		Shallow Concentrated Flow, Shallow Concentrated Flow
					Short Grass Pasture Kv= 7.0 fps
31.7	753	Total			

Subcatchment EX-1: EX-1



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 9

Summary for Subcatchment EX-2: EX-2

Runoff = 3.41 cfs @ 12.71 hrs, Volume= 0.509 af, Depth= 0.46"
Routed to Reach 13R : North Channel

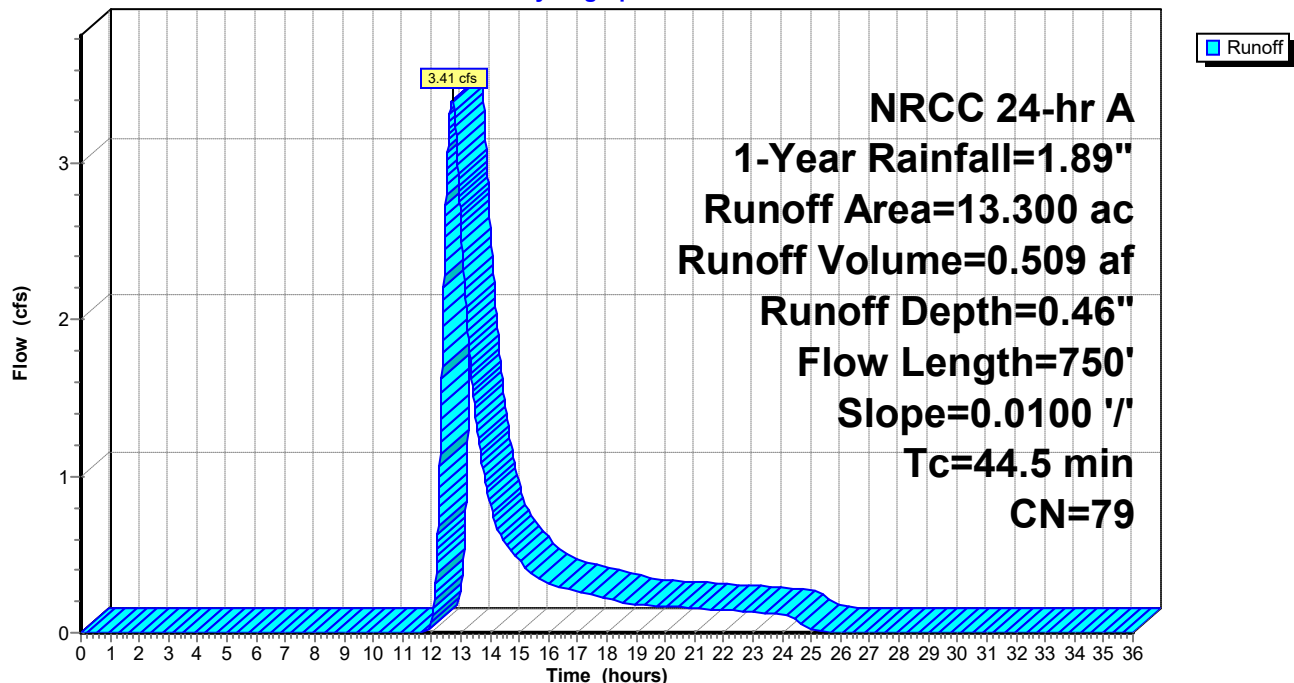
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
1.520	73	Brush, Good, HSG D
6.770	79	Woods/grass comb., Good, HSG D
4.440	80	>75% Grass cover, Good, HSG D
0.570	98	Paved parking, HSG D
13.300	79	Weighted Average
12.730		95.71% Pervious Area
0.570		4.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
21.7	650	0.0100	0.50		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
44.5	750	Total			

Subcatchment EX-2: EX-2

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 10

Summary for Subcatchment EX-3: EX-3

Runoff = 1.47 cfs @ 12.44 hrs, Volume= 0.170 af, Depth= 0.42"
Routed to Reach 10R : South Channel

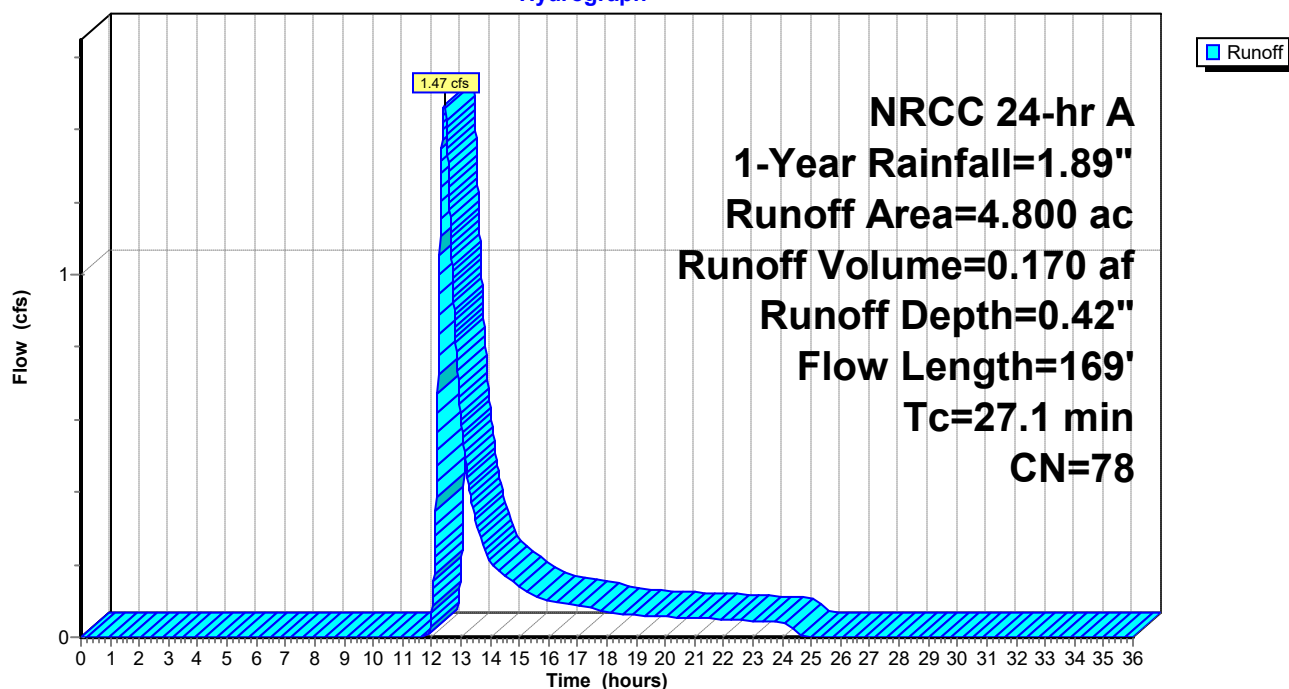
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
3.660	79	Woods/grass comb., Good, HSG D
1.100	73	Brush, Good, HSG D
0.040	98	Paved parking, HSG D
4.800	78	Weighted Average
4.760		99.17% Pervious Area
0.040		0.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0200	0.06		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
1.1	69	0.0430	1.04		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
27.1	169	Total			

Subcatchment EX-3: EX-3

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 11

Summary for Subcatchment EX-4: EX-4

Runoff = 0.65 cfs @ 12.58 hrs, Volume= 0.088 af, Depth= 0.42"
Routed to Reach 11R : West Channel

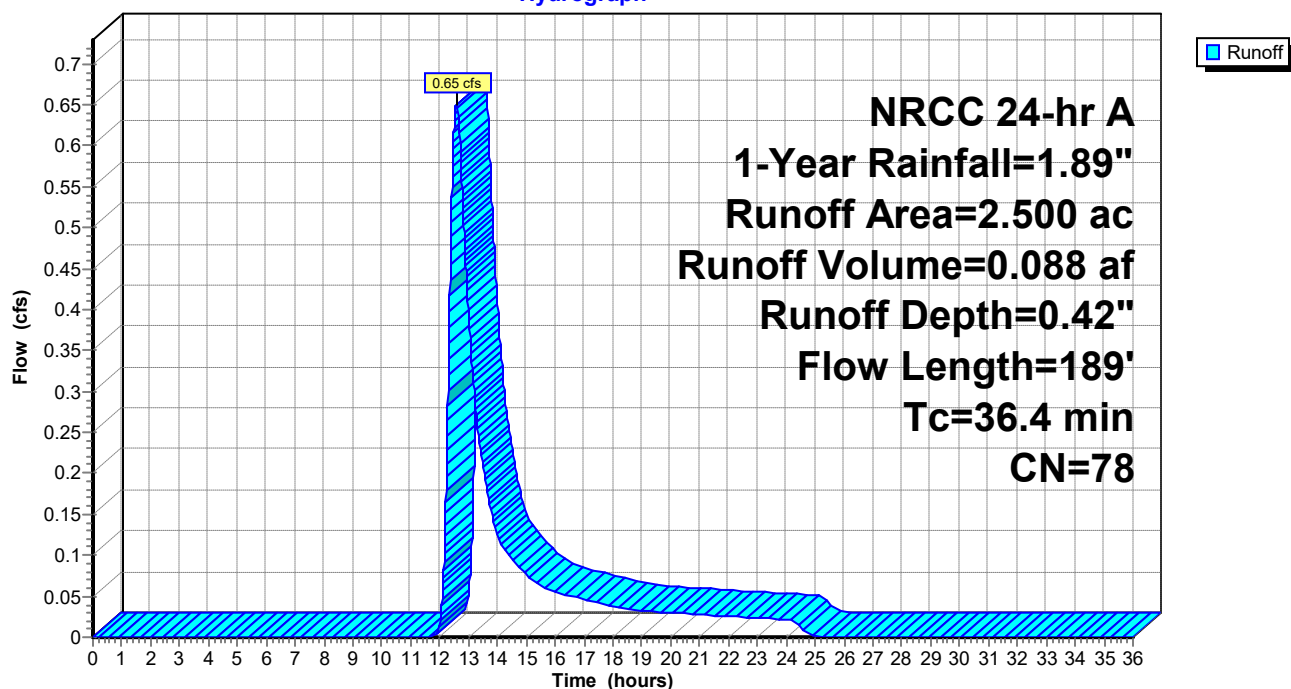
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.750	73	Brush, Good, HSG D
1.700	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
2.500	78	Weighted Average
2.450		98.00% Pervious Area
0.050		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.3	100	0.0100	0.05		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
2.1	89	0.0200	0.71		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
36.4	189	Total			

Subcatchment EX-4: EX-4

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 12

Summary for Reach 10R: South Channel

Inflow Area = 4.800 ac, 0.83% Impervious, Inflow Depth = 0.42" for 1-Year event
Inflow = 1.47 cfs @ 12.44 hrs, Volume= 0.170 af
Outflow = 0.84 cfs @ 12.81 hrs, Volume= 0.170 af, Atten= 43%, Lag= 22.5 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.66 fps, Min. Travel Time= 33.8 min

Avg. Velocity= 0.30 fps, Avg. Travel Time= 75.3 min

Peak Storage= 1,694 cf @ 12.81 hrs

Average Depth at Peak Storage= 0.17' , Surface Width= 7.85'

Bank-Full Depth= 4.00' Flow Area= 66.0 sf, Capacity= 252.34 cfs

Custom cross-section, Length= 1,343.0' Slope= 0.0020 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-13.50	796.00	0.00
-11.50	795.00	1.00
-9.00	794.00	2.00
-7.00	793.00	3.00
-4.00	792.00	4.00
3.00	792.00	4.00
5.00	793.00	3.00
7.00	794.00	2.00
9.00	795.00	1.00
14.50	796.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.5	12.4	12.0	12,759	17.83
2.00	23.5	16.9	16.0	31,561	65.70
3.00	41.8	21.8	20.5	56,070	144.32
4.00	66.0	29.6	28.0	88,638	252.34

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

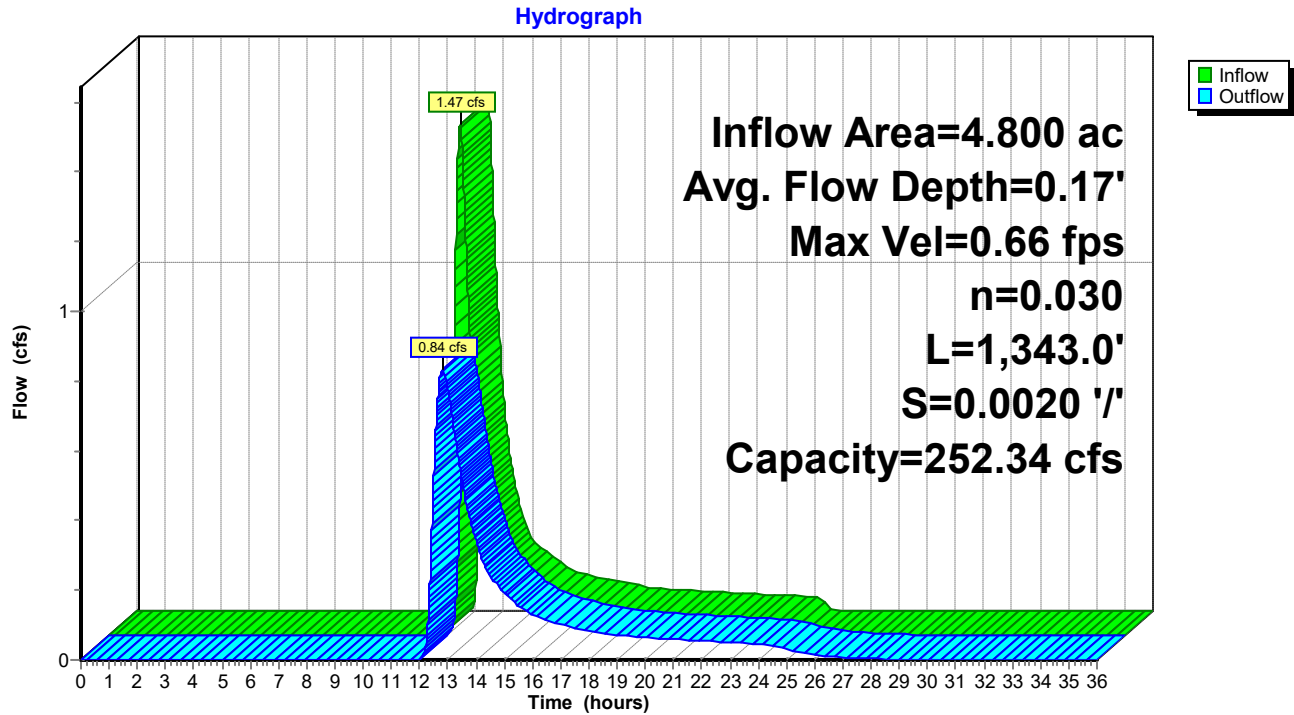
Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 13

Reach 10R: South Channel



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 14

Summary for Reach 11R: West Channel

Inflow Area = 2.500 ac, 2.00% Impervious, Inflow Depth = 0.42" for 1-Year event
Inflow = 0.65 cfs @ 12.58 hrs, Volume= 0.088 af
Outflow = 0.63 cfs @ 12.65 hrs, Volume= 0.088 af, Atten= 3%, Lag= 4.4 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.18 fps, Min. Travel Time= 5.5 min

Avg. Velocity= 0.65 fps, Avg. Travel Time= 9.9 min

Peak Storage= 208 cf @ 12.65 hrs

Average Depth at Peak Storage= 0.12' , Surface Width= 4.74'

Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

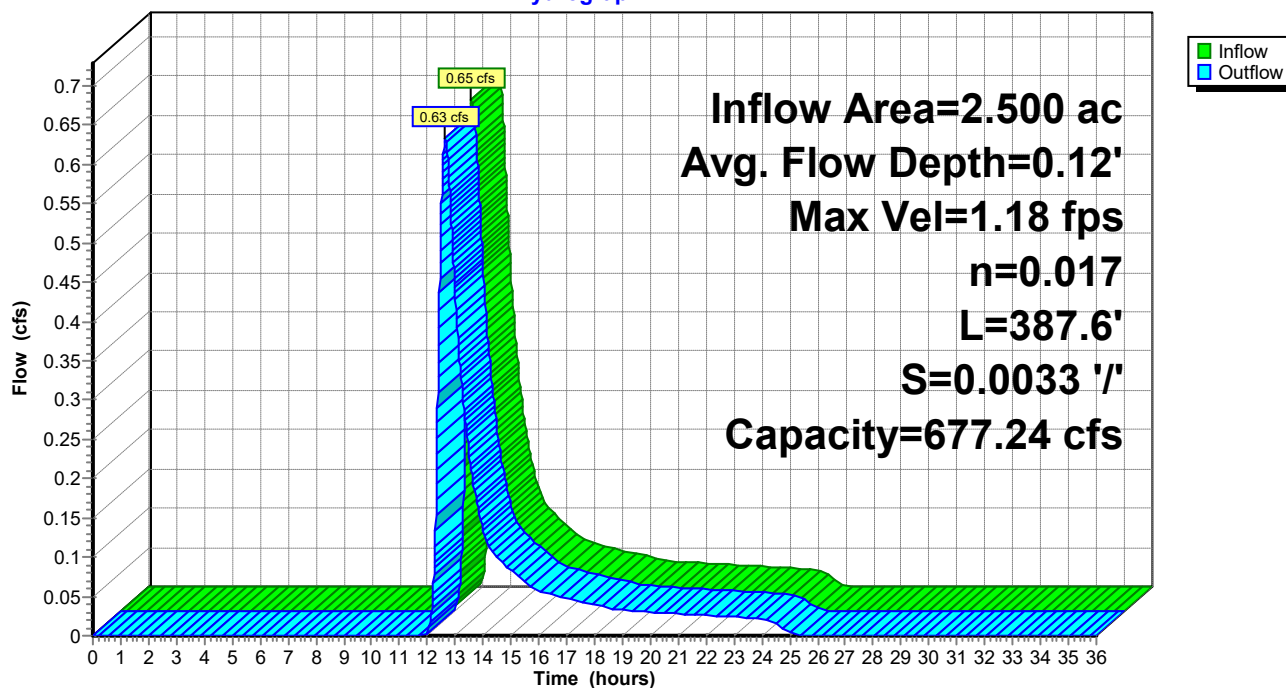
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 15

Summary for Reach 12R: East Channel

Inflow Area = 9.800 ac, 0.00% Impervious, Inflow Depth = 0.33" for 1-Year event
Inflow = 1.92 cfs @ 12.54 hrs, Volume= 0.268 af
Outflow = 1.79 cfs @ 12.65 hrs, Volume= 0.268 af, Atten= 7%, Lag= 6.7 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.38 fps, Min. Travel Time= 8.1 min

Avg. Velocity= 0.57 fps, Avg. Travel Time= 19.5 min

Peak Storage= 869 cf @ 12.65 hrs

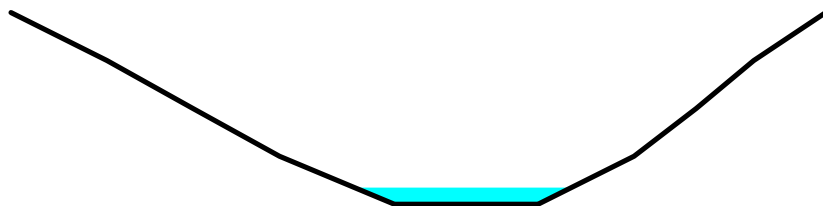
Average Depth at Peak Storage= 0.34' , Surface Width= 4.52'

Bank-Full Depth= 4.00' Flow Area= 41.4 sf, Capacity= 223.88 cfs

Custom cross-section, Length= 671.0' Slope= 0.0043 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.00	797.00	0.00
-7.00	796.00	1.00
-5.20	795.00	2.00
-3.40	794.00	3.00
-1.00	793.00	4.00
2.00	793.00	4.00
4.00	794.00	3.00
5.30	795.00	2.00
6.50	796.00	1.00
8.00	797.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	3.0	0.0	0	0.00
1.00	5.2	7.8	7.4	3,489	12.82
2.00	14.2	11.5	10.5	9,495	52.53
3.00	26.2	15.2	13.5	17,547	121.86
4.00	41.4	19.2	17.0	27,779	223.88

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

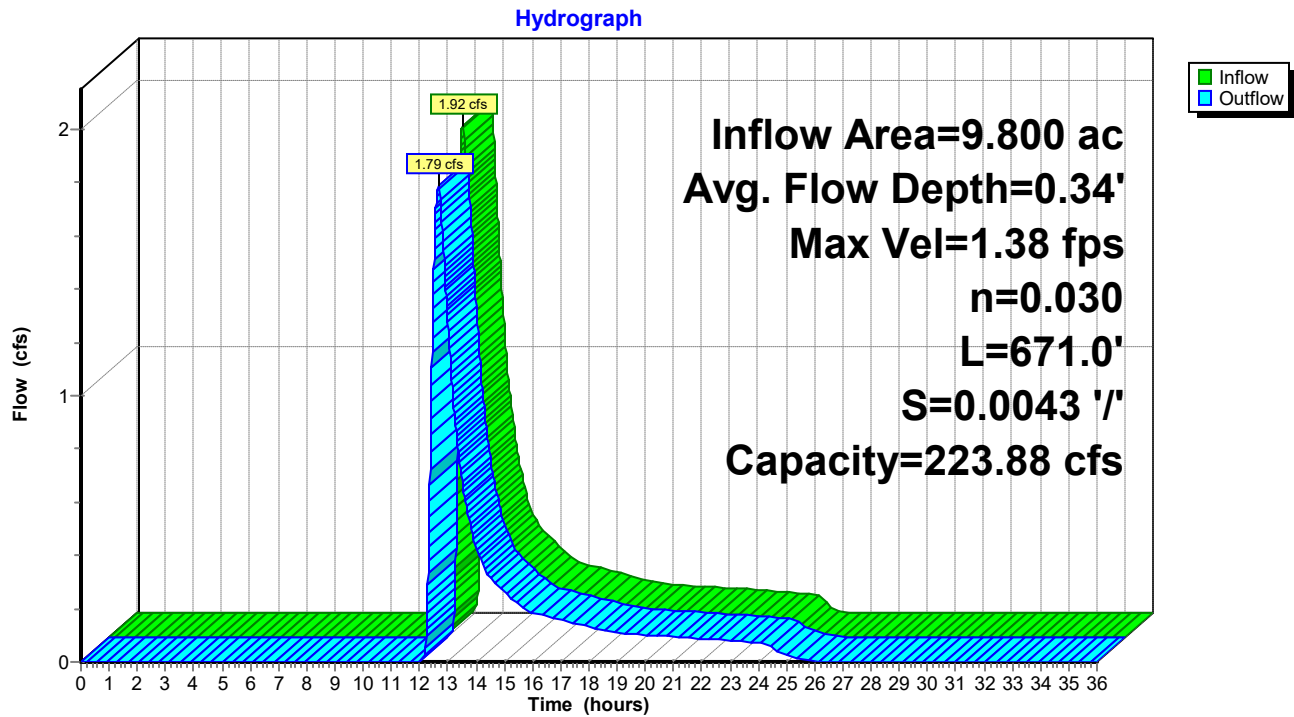
Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 16

Reach 12R: East Channel



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 17

Summary for Reach 13R: North Channel

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 0.41" for 1-Year event
Inflow = 6.60 cfs @ 12.70 hrs, Volume= 1.035 af
Outflow = 6.15 cfs @ 12.83 hrs, Volume= 1.035 af, Atten= 7%, Lag= 8.0 min
Routed to Link 14L : TOTAL SITE DISCHARGE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.31 fps, Min. Travel Time= 10.2 min

Avg. Velocity= 0.52 fps, Avg. Travel Time= 25.9 min

Peak Storage= 3,771 cf @ 12.83 hrs

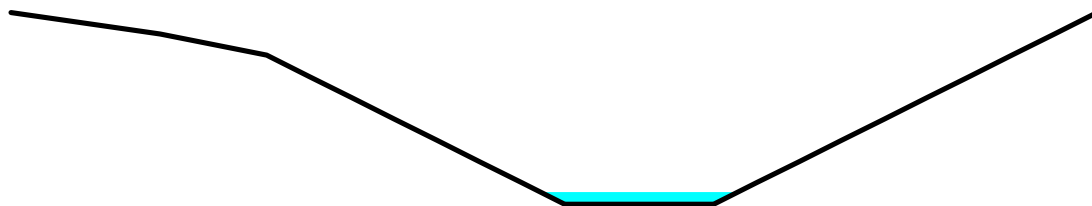
Average Depth at Peak Storage= 0.58', Surface Width= 9.30'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,274.88 cfs

Custom cross-section, Length= 804.0' Slope= 0.0018 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

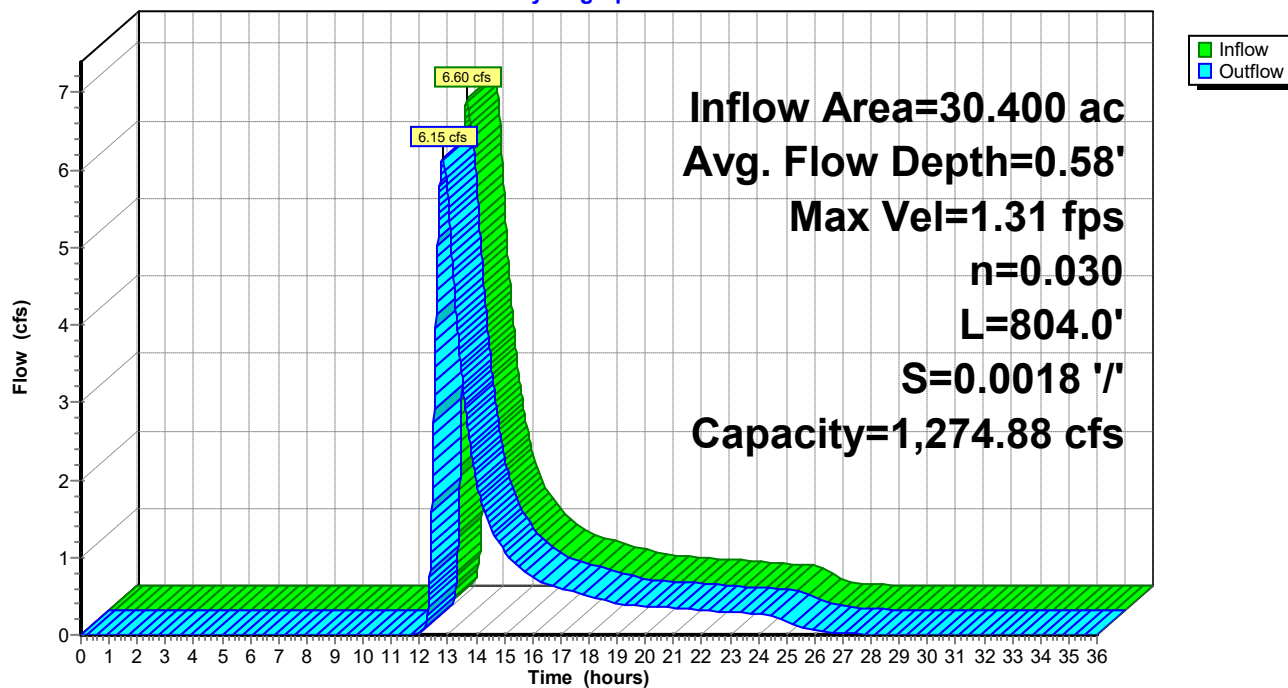
Printed 6/24/2025

Page 18

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	7,236	16.10
2.00	22.0	15.9	15.0	17,688	57.36
3.00	39.0	20.4	19.0	31,356	126.30
4.00	60.0	24.9	23.0	48,240	226.92
5.00	85.0	29.4	27.0	68,340	363.20
6.00	114.0	33.8	31.0	91,656	538.98
7.00	147.0	38.3	35.0	118,188	757.96
8.00	185.5	45.6	42.0	149,142	993.79
9.00	232.0	54.9	51.0	186,528	1,274.88

Reach 13R: North Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

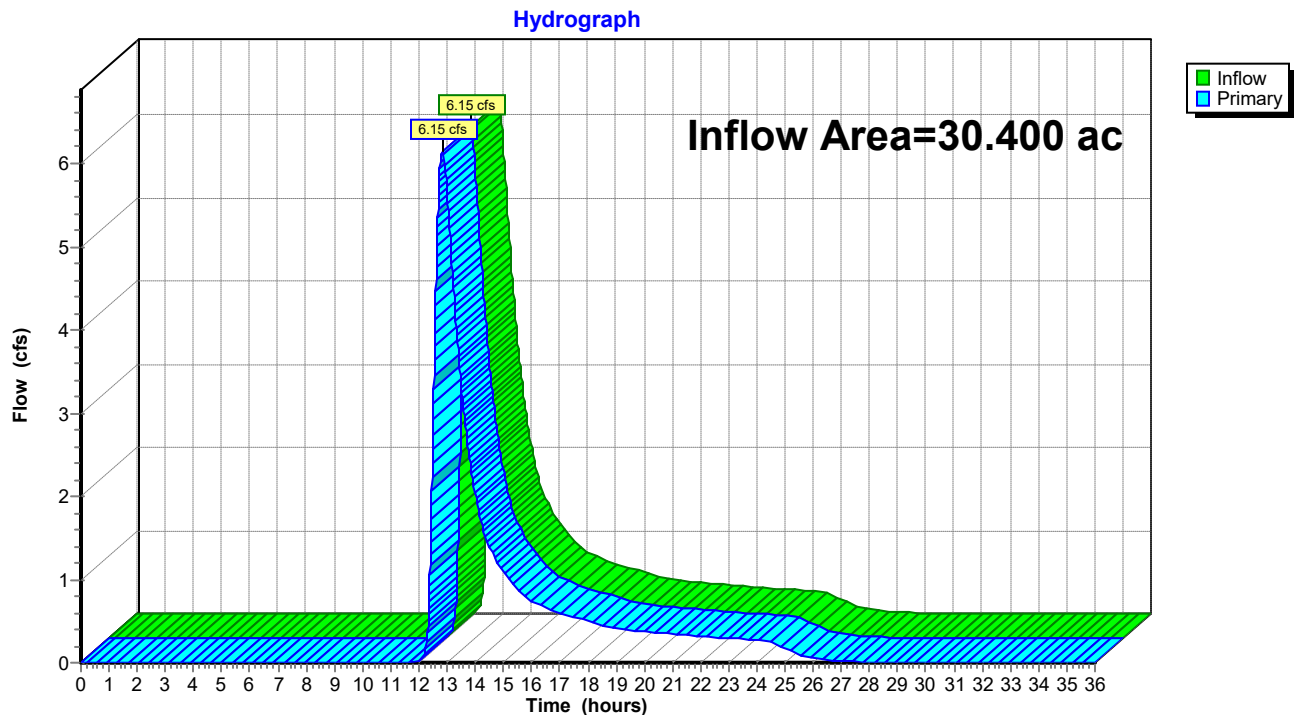
Page 19

Summary for Link 14L: TOTAL SITE DISCHARGE

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 0.41" for 1-Year event
Inflow = 6.15 cfs @ 12.83 hrs, Volume= 1.035 af
Primary = 6.15 cfs @ 12.83 hrs, Volume= 1.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 14L: TOTAL SITE DISCHARGE



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 20

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX-1: EX-1

Runoff Area=9.800 ac 0.00% Impervious Runoff Depth=1.05"
Flow Length=753' Tc=31.7 min CN=75 Runoff=7.58 cfs 0.860 af

Subcatchment EX-2: EX-2

Runoff Area=13.300 ac 4.29% Impervious Runoff Depth=1.29"
Flow Length=750' Slope=0.0100 '/' Tc=44.5 min CN=79 Runoff=10.65 cfs 1.432 af

Subcatchment EX-3: EX-3

Runoff Area=4.800 ac 0.83% Impervious Runoff Depth=1.23"
Flow Length=169' Tc=27.1 min CN=78 Runoff=4.84 cfs 0.492 af

Subcatchment EX-4: EX-4

Runoff Area=2.500 ac 2.00% Impervious Runoff Depth=1.23"
Flow Length=189' Tc=36.4 min CN=78 Runoff=2.14 cfs 0.256 af

Reach 10R: South Channel

Avg. Flow Depth=0.40' Max Vel=1.11 fps Inflow=4.84 cfs 0.492 af
n=0.030 L=1,343.0' S=0.0020 '/' Capacity=252.34 cfs Outflow=3.53 cfs 0.492 af

Reach 11R: West Channel

Avg. Flow Depth=0.25' Max Vel=1.79 fps Inflow=2.14 cfs 0.256 af
n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=2.12 cfs 0.256 af

Reach 12R: East Channel

Avg. Flow Depth=0.75' Max Vel=2.11 fps Inflow=7.58 cfs 0.860 af
n=0.030 L=671.0' S=0.0043 '/' Capacity=223.88 cfs Outflow=7.33 cfs 0.860 af

Reach 13R: North Channel

Avg. Flow Depth=1.21' Max Vel=1.99 fps Inflow=23.43 cfs 3.040 af
n=0.030 L=804.0' S=0.0018 '/' Capacity=1,274.88 cfs Outflow=22.57 cfs 3.040 af

Link 14L: TOTAL SITE DISCHARGE

Inflow=22.57 cfs 3.040 af
Primary=22.57 cfs 3.040 af

Total Runoff Area = 30.400 ac Runoff Volume = 3.040 af Average Runoff Depth = 1.20"
97.83% Pervious = 29.740 ac 2.17% Impervious = 0.660 ac

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 21

Summary for Subcatchment EX-1: EX-1

Runoff = 7.58 cfs @ 12.47 hrs, Volume= 0.860 af, Depth= 1.05"
Routed to Reach 12R : East Channel

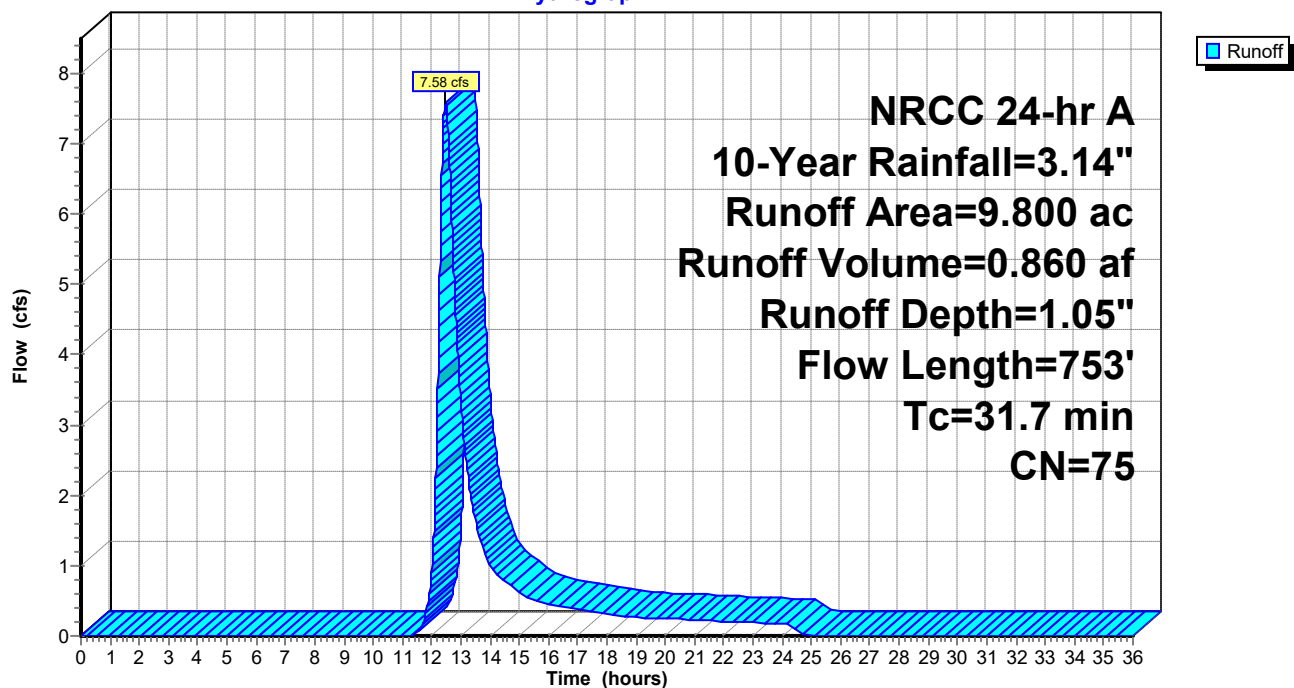
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
7.270	73	Brush, Good, HSG D
2.370	79	Woods/grass comb., Good, HSG D
0.160	80	>75% Grass cover, Good, HSG D
9.800	75	Weighted Average
9.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0235	0.10		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
15.5	653	0.0100	0.70		Shallow Concentrated Flow, Shallow Concentrated Flow
					Short Grass Pasture Kv= 7.0 fps
31.7	753	Total			

Subcatchment EX-1: EX-1

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 22

Summary for Subcatchment EX-2: EX-2

Runoff = 10.65 cfs @ 12.65 hrs, Volume= 1.432 af, Depth= 1.29"
Routed to Reach 13R : North Channel

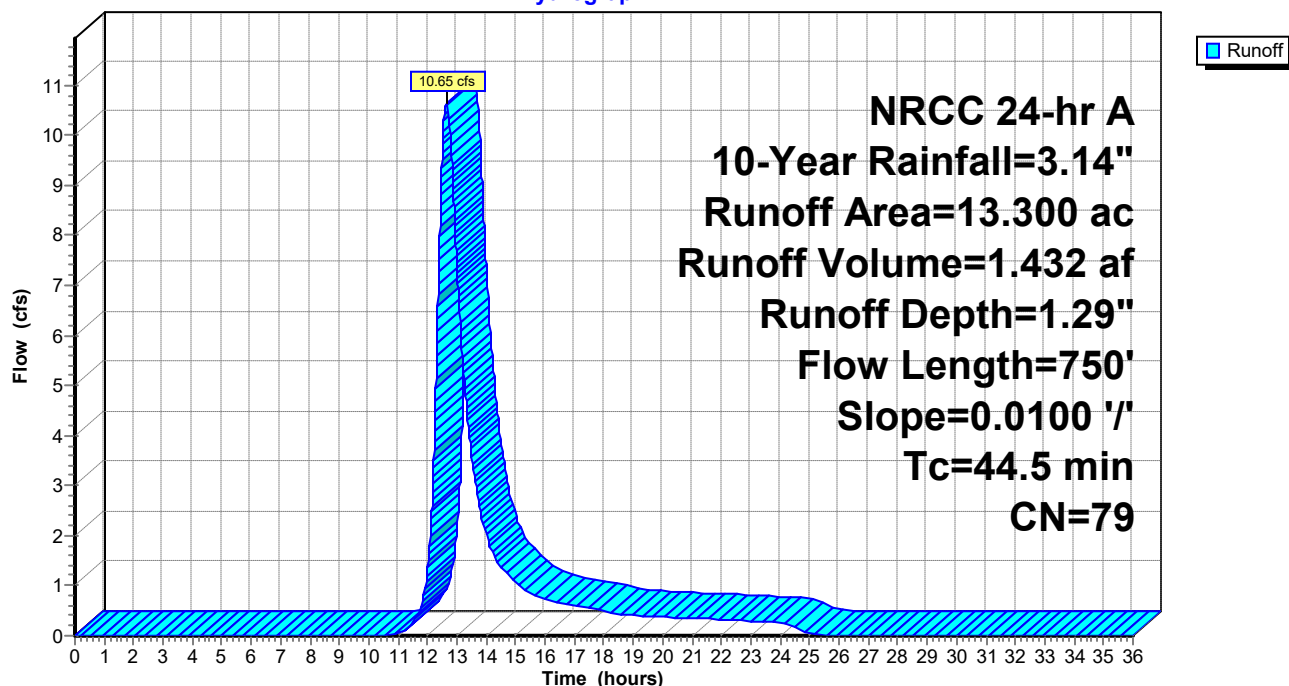
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
1.520	73	Brush, Good, HSG D
6.770	79	Woods/grass comb., Good, HSG D
4.440	80	>75% Grass cover, Good, HSG D
0.570	98	Paved parking, HSG D
13.300	79	Weighted Average
12.730		95.71% Pervious Area
0.570		4.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
21.7	650	0.0100	0.50		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
44.5	750	Total			

Subcatchment EX-2: EX-2

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 23

Summary for Subcatchment EX-3: EX-3

Runoff = 4.84 cfs @ 12.40 hrs, Volume= 0.492 af, Depth= 1.23"
Routed to Reach 10R : South Channel

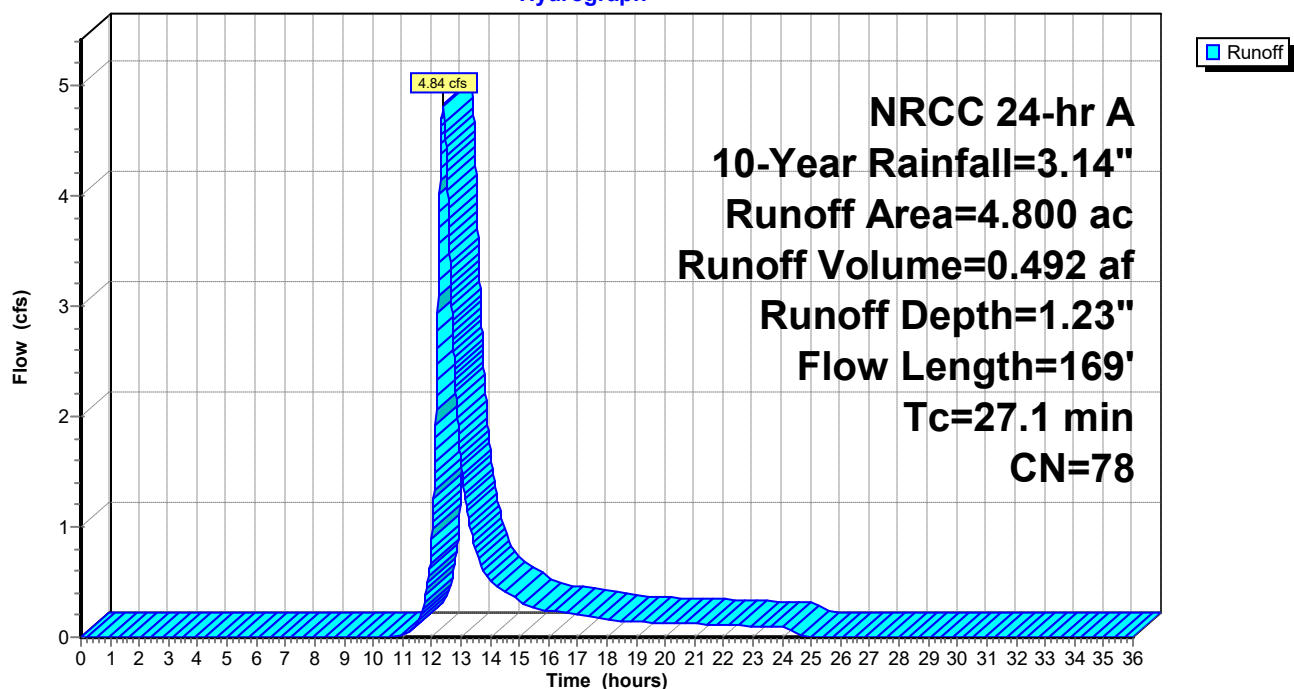
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
3.660	79	Woods/grass comb., Good, HSG D
1.100	73	Brush, Good, HSG D
0.040	98	Paved parking, HSG D
4.800	78	Weighted Average
4.760		99.17% Pervious Area
0.040		0.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0200	0.06		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
1.1	69	0.0430	1.04		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
27.1	169	Total			

Subcatchment EX-3: EX-3

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 24

Summary for Subcatchment EX-4: EX-4

Runoff = 2.14 cfs @ 12.54 hrs, Volume= 0.256 af, Depth= 1.23"
Routed to Reach 11R : West Channel

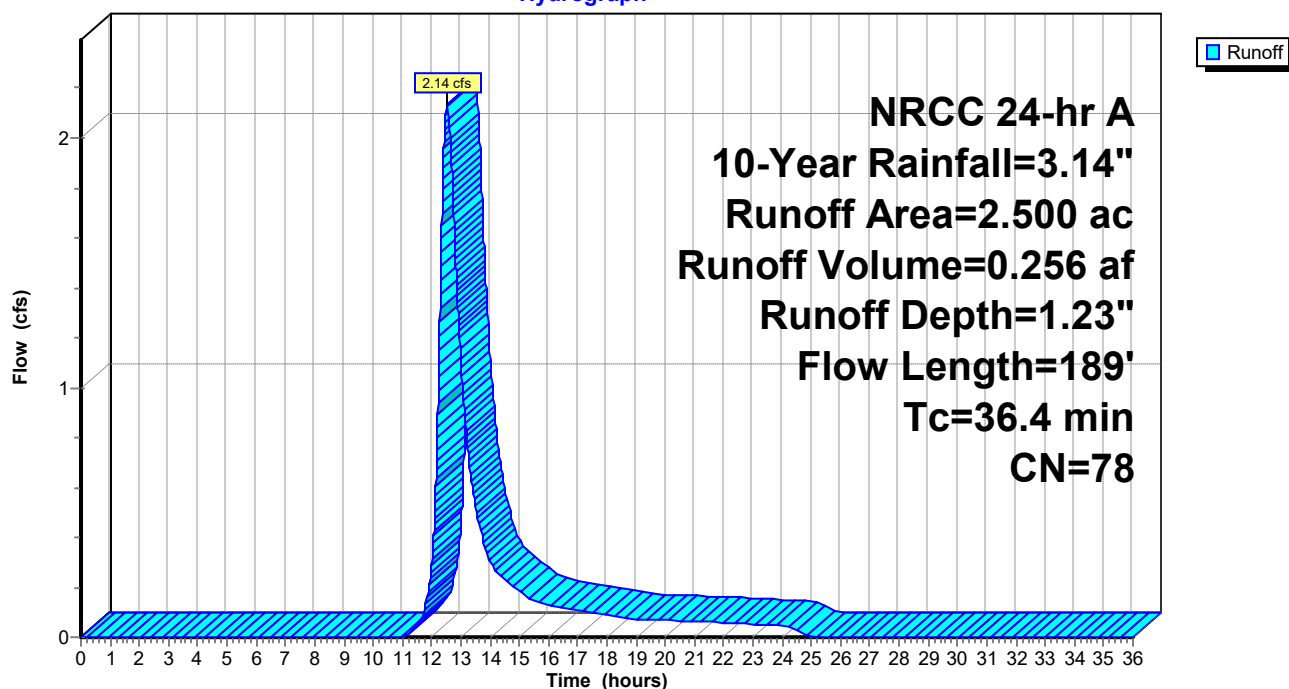
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.750	73	Brush, Good, HSG D
1.700	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
2.500	78	Weighted Average
2.450		98.00% Pervious Area
0.050		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.3	100	0.0100	0.05		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
2.1	89	0.0200	0.71		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
36.4	189	Total			

Subcatchment EX-4: EX-4

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 25

Summary for Reach 10R: South Channel

Inflow Area = 4.800 ac, 0.83% Impervious, Inflow Depth = 1.23" for 10-Year event
Inflow = 4.84 cfs @ 12.40 hrs, Volume= 0.492 af
Outflow = 3.53 cfs @ 12.61 hrs, Volume= 0.492 af, Atten= 27%, Lag= 12.7 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.11 fps, Min. Travel Time= 20.2 min

Avg. Velocity= 0.36 fps, Avg. Travel Time= 62.8 min

Peak Storage= 4,275 cf @ 12.61 hrs

Average Depth at Peak Storage= 0.40' , Surface Width= 8.99'

Bank-Full Depth= 4.00' Flow Area= 66.0 sf, Capacity= 252.34 cfs

Custom cross-section, Length= 1,343.0' Slope= 0.0020 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-13.50	796.00	0.00
-11.50	795.00	1.00
-9.00	794.00	2.00
-7.00	793.00	3.00
-4.00	792.00	4.00
3.00	792.00	4.00
5.00	793.00	3.00
7.00	794.00	2.00
9.00	795.00	1.00
14.50	796.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.5	12.4	12.0	12,759	17.83
2.00	23.5	16.9	16.0	31,561	65.70
3.00	41.8	21.8	20.5	56,070	144.32
4.00	66.0	29.6	28.0	88,638	252.34

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

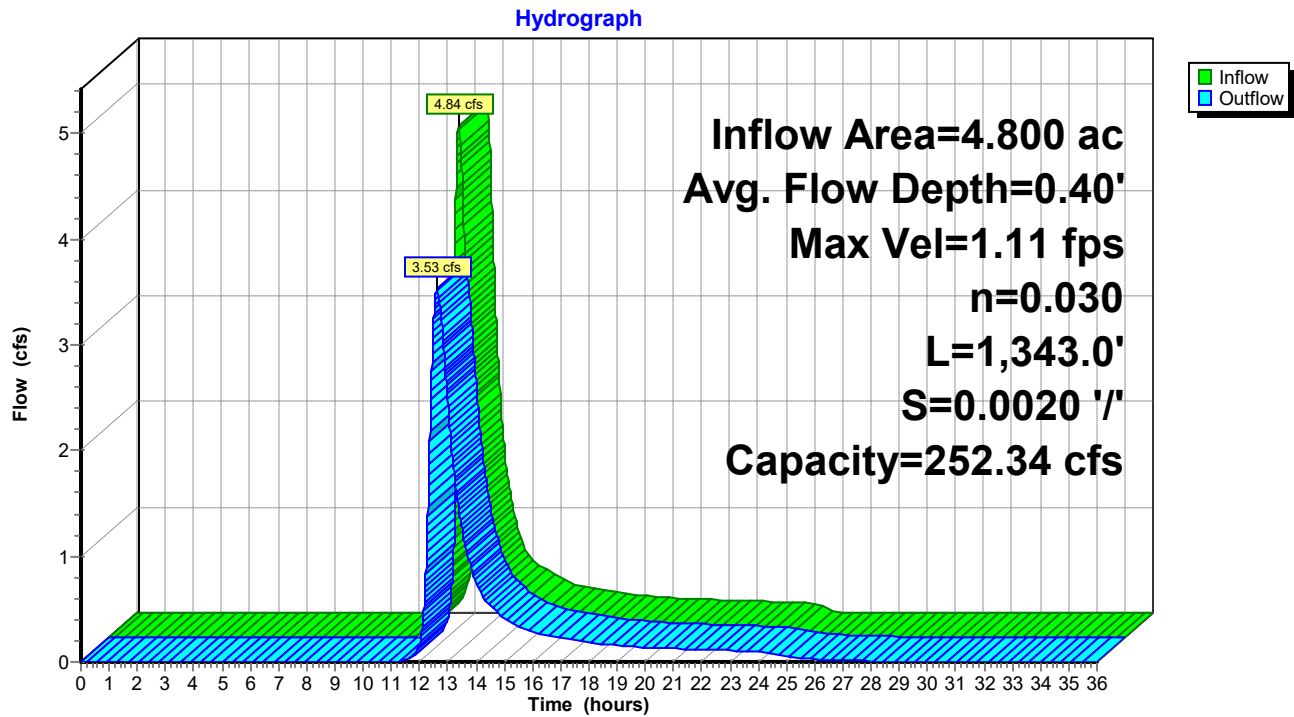
Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 26

Reach 10R: South Channel



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 27

Summary for Reach 11R: West Channel

Inflow Area = 2.500 ac, 2.00% Impervious, Inflow Depth = 1.23" for 10-Year event
Inflow = 2.14 cfs @ 12.54 hrs, Volume= 0.256 af
Outflow = 2.12 cfs @ 12.58 hrs, Volume= 0.256 af, Atten= 1%, Lag= 2.6 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.79 fps, Min. Travel Time= 3.6 min

Avg. Velocity= 0.73 fps, Avg. Travel Time= 8.9 min

Peak Storage= 458 cf @ 12.58 hrs

Average Depth at Peak Storage= 0.25' , Surface Width= 5.49'

Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

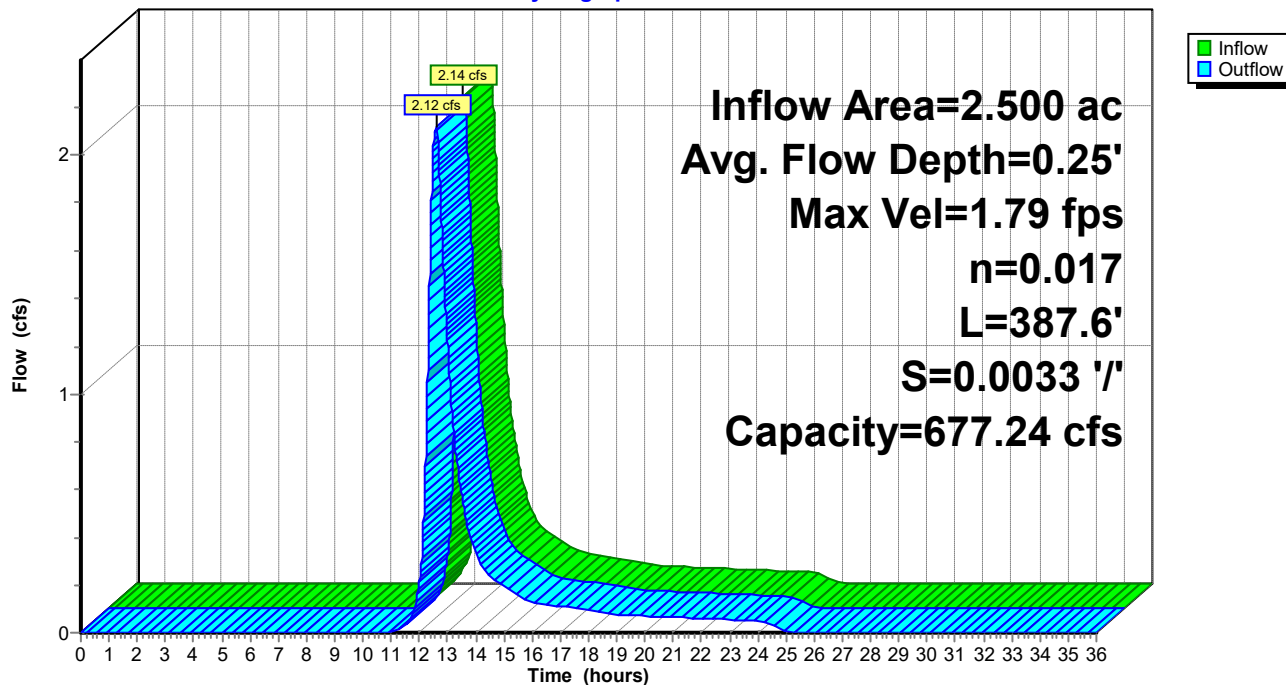
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 28

Summary for Reach 12R: East Channel

Inflow Area = 9.800 ac, 0.00% Impervious, Inflow Depth = 1.05" for 10-Year event
Inflow = 7.58 cfs @ 12.47 hrs, Volume= 0.860 af
Outflow = 7.33 cfs @ 12.55 hrs, Volume= 0.860 af, Atten= 3%, Lag= 4.3 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.11 fps, Min. Travel Time= 5.3 min

Avg. Velocity= 0.76 fps, Avg. Travel Time= 14.7 min

Peak Storage= 2,333 cf @ 12.55 hrs

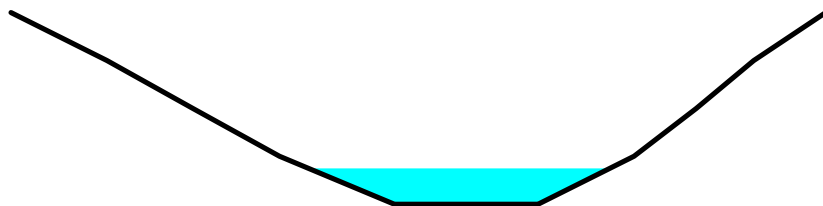
Average Depth at Peak Storage= 0.75' , Surface Width= 6.29'

Bank-Full Depth= 4.00' Flow Area= 41.4 sf, Capacity= 223.88 cfs

Custom cross-section, Length= 671.0' Slope= 0.0043 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.00	797.00	0.00
-7.00	796.00	1.00
-5.20	795.00	2.00
-3.40	794.00	3.00
-1.00	793.00	4.00
2.00	793.00	4.00
4.00	794.00	3.00
5.30	795.00	2.00
6.50	796.00	1.00
8.00	797.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	3.0	0.0	0	0.00
1.00	5.2	7.8	7.4	3,489	12.82
2.00	14.2	11.5	10.5	9,495	52.53
3.00	26.2	15.2	13.5	17,547	121.86
4.00	41.4	19.2	17.0	27,779	223.88

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

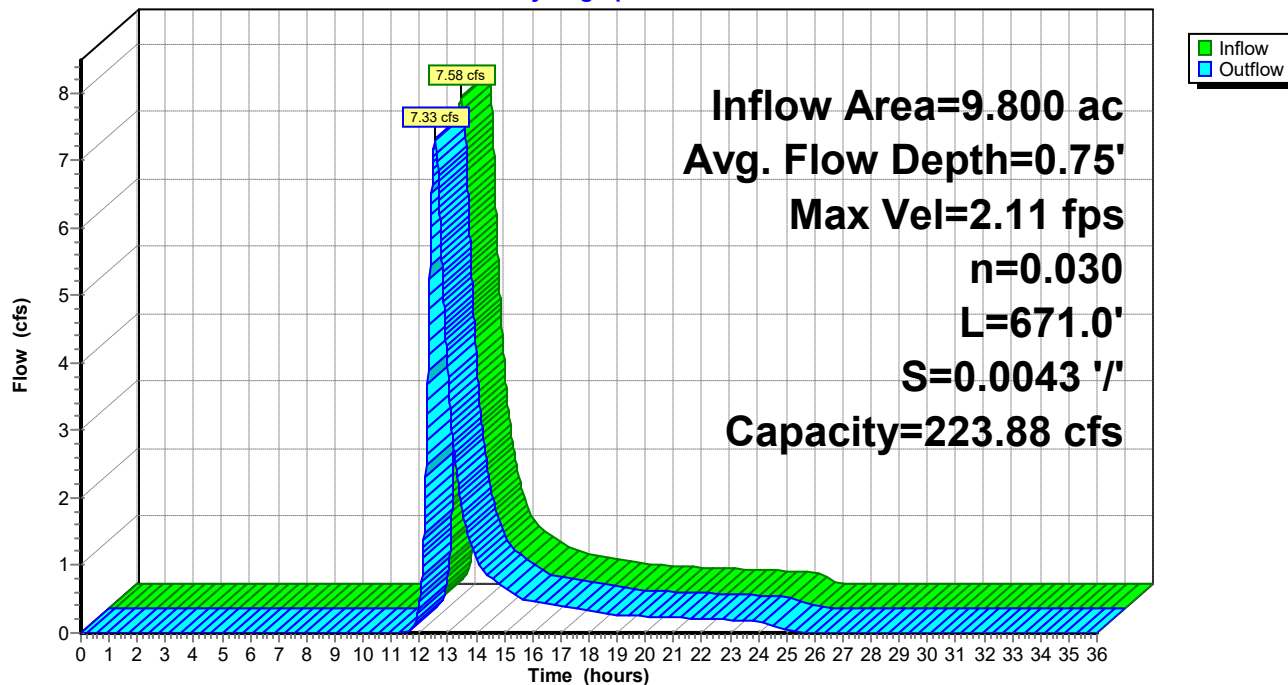
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 29

Reach 12R: East Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 30

Summary for Reach 13R: North Channel

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 1.20" for 10-Year event
Inflow = 23.43 cfs @ 12.60 hrs, Volume= 3.040 af
Outflow = 22.57 cfs @ 12.69 hrs, Volume= 3.040 af, Atten= 4%, Lag= 5.0 min
Routed to Link 14L : TOTAL SITE DISCHARGE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.99 fps, Min. Travel Time= 6.7 min

Avg. Velocity= 0.63 fps, Avg. Travel Time= 21.2 min

Peak Storage= 9,137 cf @ 12.69 hrs

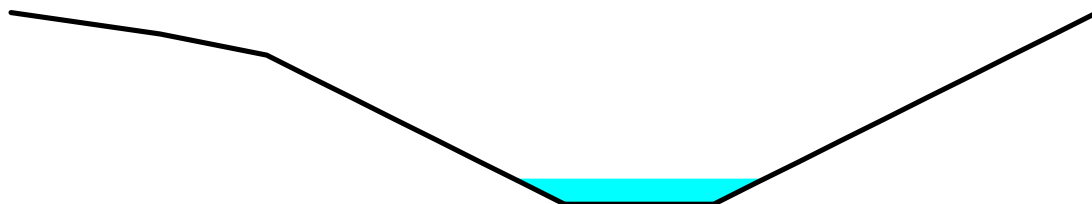
Average Depth at Peak Storage= 1.21', Surface Width= 11.83'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,274.88 cfs

Custom cross-section, Length= 804.0' Slope= 0.0018 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

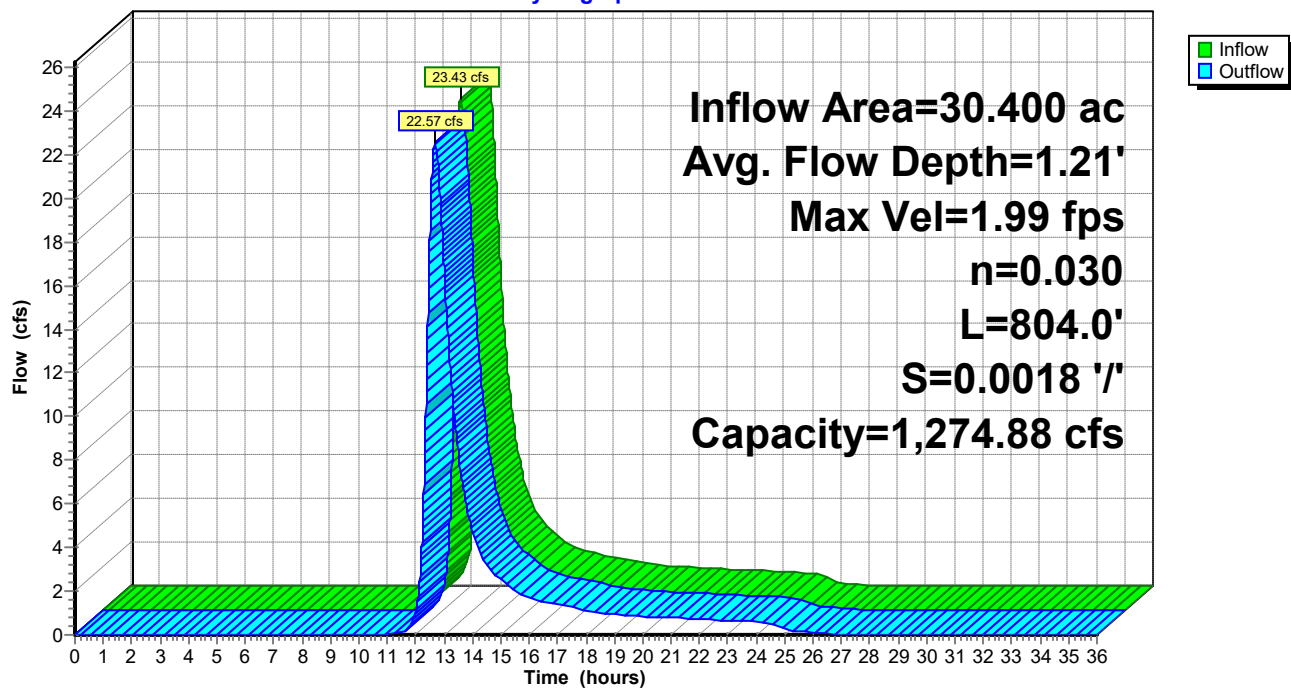
Printed 6/24/2025

Page 31

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	7,236	16.10
2.00	22.0	15.9	15.0	17,688	57.36
3.00	39.0	20.4	19.0	31,356	126.30
4.00	60.0	24.9	23.0	48,240	226.92
5.00	85.0	29.4	27.0	68,340	363.20
6.00	114.0	33.8	31.0	91,656	538.98
7.00	147.0	38.3	35.0	118,188	757.96
8.00	185.5	45.6	42.0	149,142	993.79
9.00	232.0	54.9	51.0	186,528	1,274.88

Reach 13R: North Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

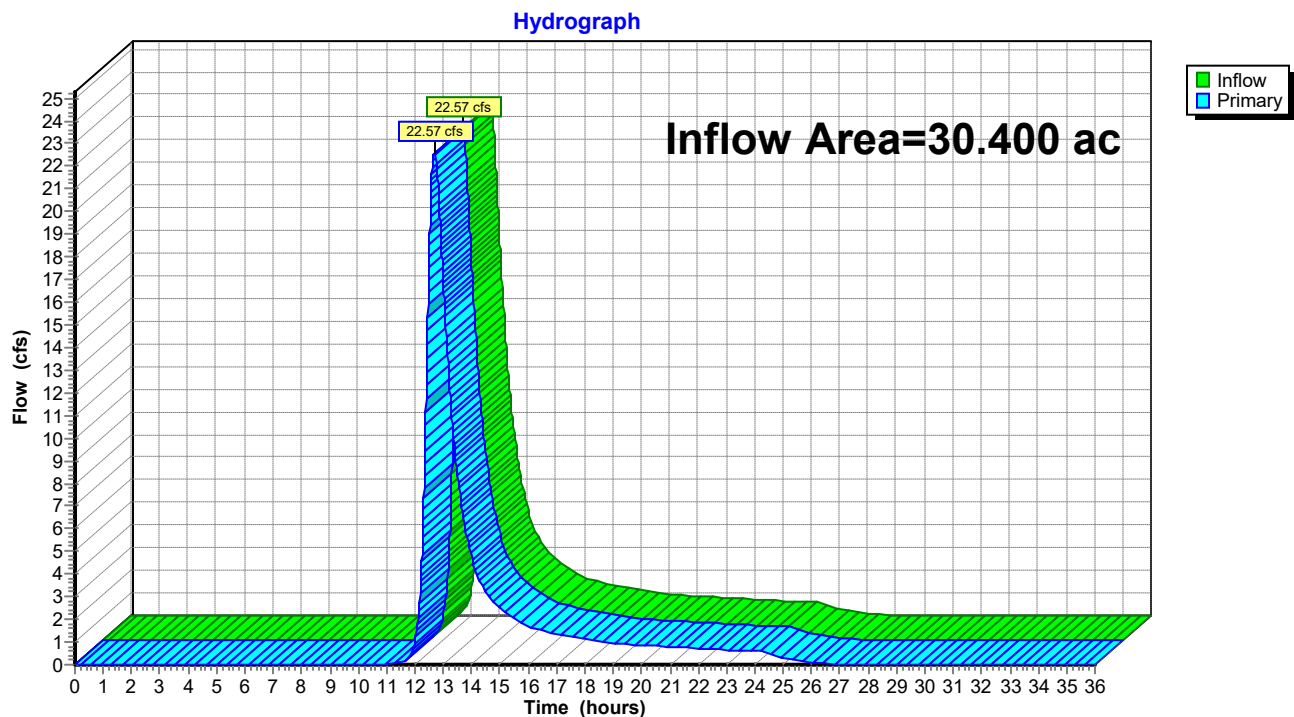
Page 32

Summary for Link 14L: TOTAL SITE DISCHARGE

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 1.20" for 10-Year event
Inflow = 22.57 cfs @ 12.69 hrs, Volume= 3.040 af
Primary = 22.57 cfs @ 12.69 hrs, Volume= 3.040 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 14L: TOTAL SITE DISCHARGE



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 33

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX-1: EX-1

Runoff Area=9.800 ac 0.00% Impervious Runoff Depth=2.07"
Flow Length=753' Tc=31.7 min CN=75 Runoff=15.48 cfs 1.687 af

Subcatchment EX-2: EX-2

Runoff Area=13.300 ac 4.29% Impervious Runoff Depth=2.39"
Flow Length=750' Slope=0.0100 '/' Tc=44.5 min CN=79 Runoff=20.21 cfs 2.653 af

Subcatchment EX-3: EX-3

Runoff Area=4.800 ac 0.83% Impervious Runoff Depth=2.31"
Flow Length=169' Tc=27.1 min CN=78 Runoff=9.32 cfs 0.924 af

Subcatchment EX-4: EX-4

Runoff Area=2.500 ac 2.00% Impervious Runoff Depth=2.31"
Flow Length=189' Tc=36.4 min CN=78 Runoff=4.12 cfs 0.481 af

Reach 10R: South Channel

Avg. Flow Depth=0.61' Max Vel=1.43 fps Inflow=9.32 cfs 0.924 af
n=0.030 L=1,343.0' S=0.0020 '/' Capacity=252.34 cfs Outflow=7.46 cfs 0.924 af

Reach 11R: West Channel

Avg. Flow Depth=0.36' Max Vel=2.22 fps Inflow=4.12 cfs 0.481 af
n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=4.09 cfs 0.481 af

Reach 12R: East Channel

Avg. Flow Depth=1.09' Max Vel=2.59 fps Inflow=15.48 cfs 1.687 af
n=0.030 L=671.0' S=0.0043 '/' Capacity=223.88 cfs Outflow=15.17 cfs 1.687 af

Reach 13R: North Channel

Avg. Flow Depth=1.76' Max Vel=2.43 fps Inflow=46.26 cfs 5.745 af
n=0.030 L=804.0' S=0.0018 '/' Capacity=1,274.88 cfs Outflow=45.07 cfs 5.745 af

Link 14L: TOTAL SITE DISCHARGE

Inflow=45.07 cfs 5.745 af
Primary=45.07 cfs 5.745 af

Total Runoff Area = 30.400 ac Runoff Volume = 5.745 af Average Runoff Depth = 2.27"
97.83% Pervious = 29.740 ac 2.17% Impervious = 0.660 ac

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 34

Summary for Subcatchment EX-1: EX-1

Runoff = 15.48 cfs @ 12.46 hrs, Volume= 1.687 af, Depth= 2.07"
Routed to Reach 12R : East Channel

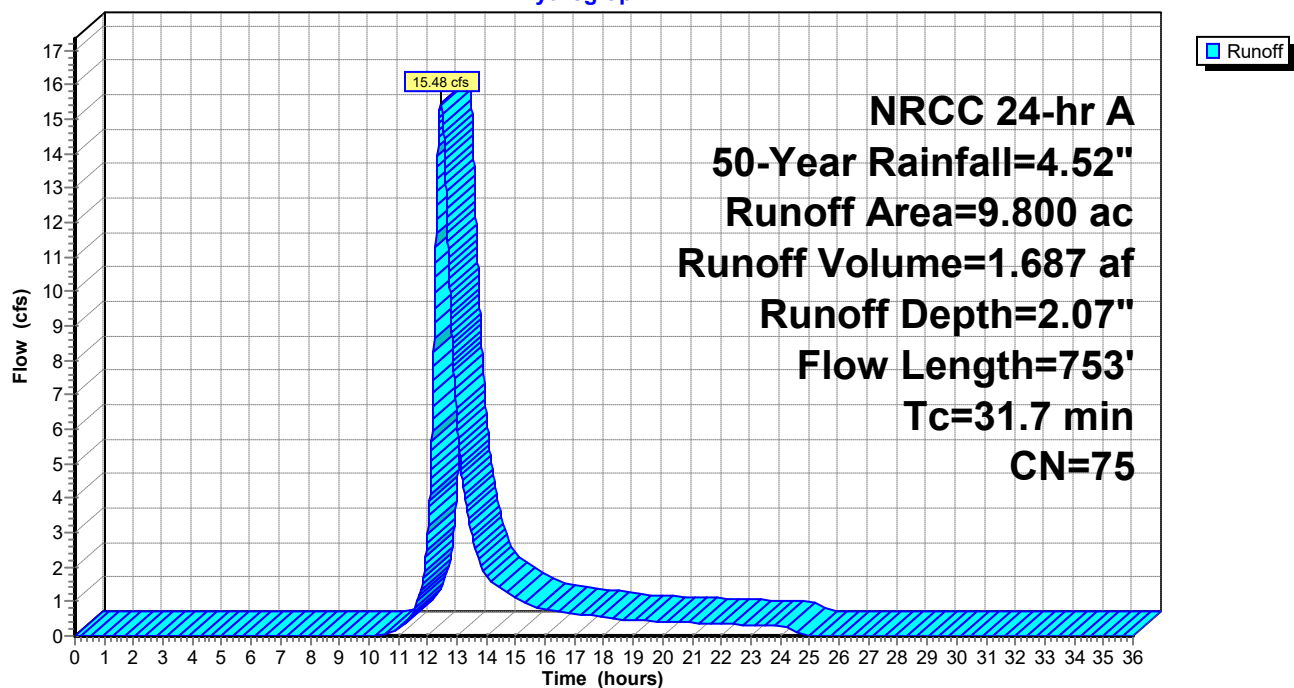
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
7.270	73	Brush, Good, HSG D
2.370	79	Woods/grass comb., Good, HSG D
0.160	80	>75% Grass cover, Good, HSG D
9.800	75	Weighted Average
9.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0235	0.10		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
15.5	653	0.0100	0.70		Shallow Concentrated Flow, Shallow Concentrated Flow
					Short Grass Pasture Kv= 7.0 fps
31.7	753	Total			

Subcatchment EX-1: EX-1

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 35

Summary for Subcatchment EX-2: EX-2

Runoff = 20.21 cfs @ 12.61 hrs, Volume= 2.653 af, Depth= 2.39"
Routed to Reach 13R : North Channel

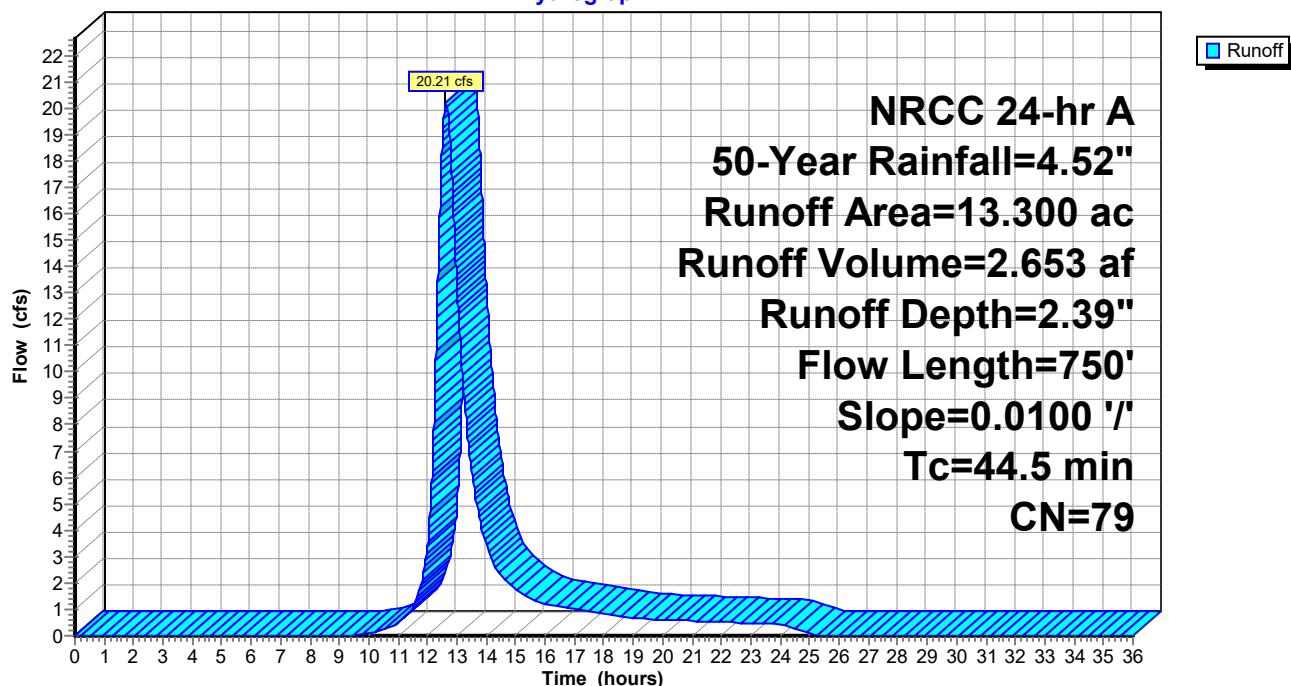
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
1.520	73	Brush, Good, HSG D
6.770	79	Woods/grass comb., Good, HSG D
4.440	80	>75% Grass cover, Good, HSG D
0.570	98	Paved parking, HSG D
13.300	79	Weighted Average
12.730		95.71% Pervious Area
0.570		4.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
21.7	650	0.0100	0.50		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
44.5	750	Total			

Subcatchment EX-2: EX-2

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 36

Summary for Subcatchment EX-3: EX-3

Runoff = 9.32 cfs @ 12.38 hrs, Volume= 0.924 af, Depth= 2.31"
Routed to Reach 10R : South Channel

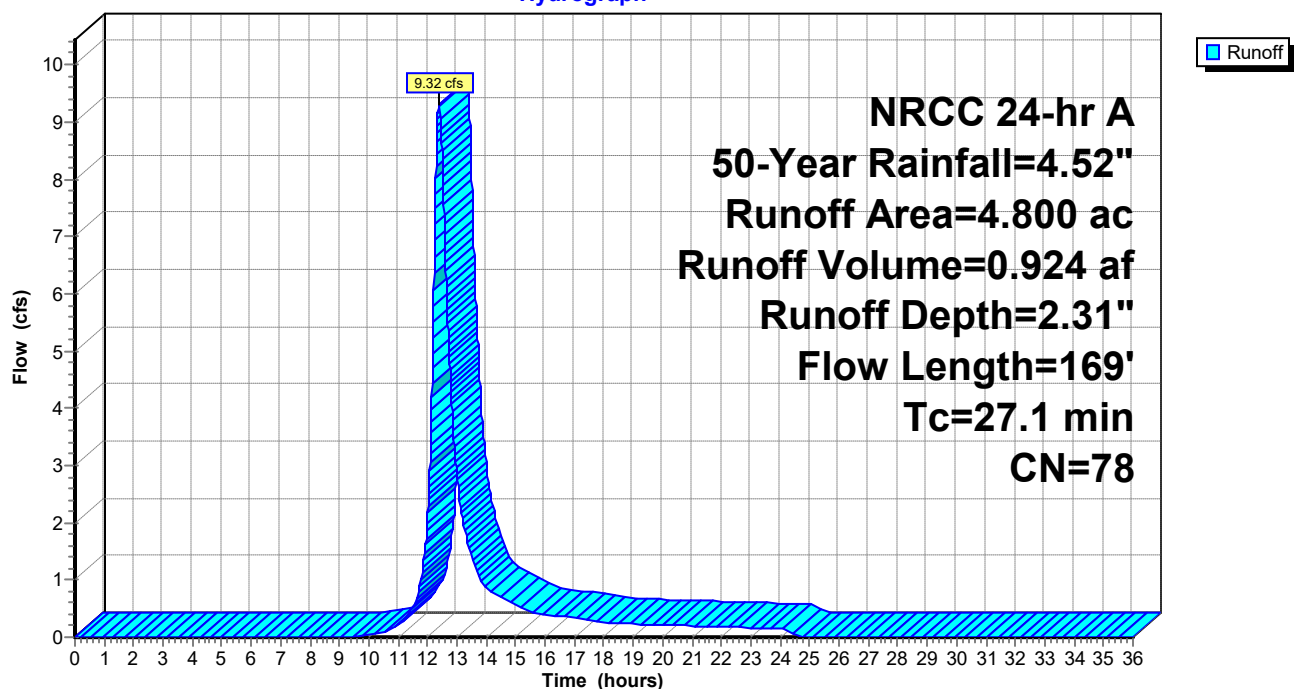
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
3.660	79	Woods/grass comb., Good, HSG D
1.100	73	Brush, Good, HSG D
0.040	98	Paved parking, HSG D
4.800	78	Weighted Average
4.760		99.17% Pervious Area
0.040		0.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0200	0.06		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
1.1	69	0.0430	1.04		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
27.1	169	Total			

Subcatchment EX-3: EX-3

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 37

Summary for Subcatchment EX-4: EX-4

Runoff = 4.12 cfs @ 12.50 hrs, Volume= 0.481 af, Depth= 2.31"
Routed to Reach 11R : West Channel

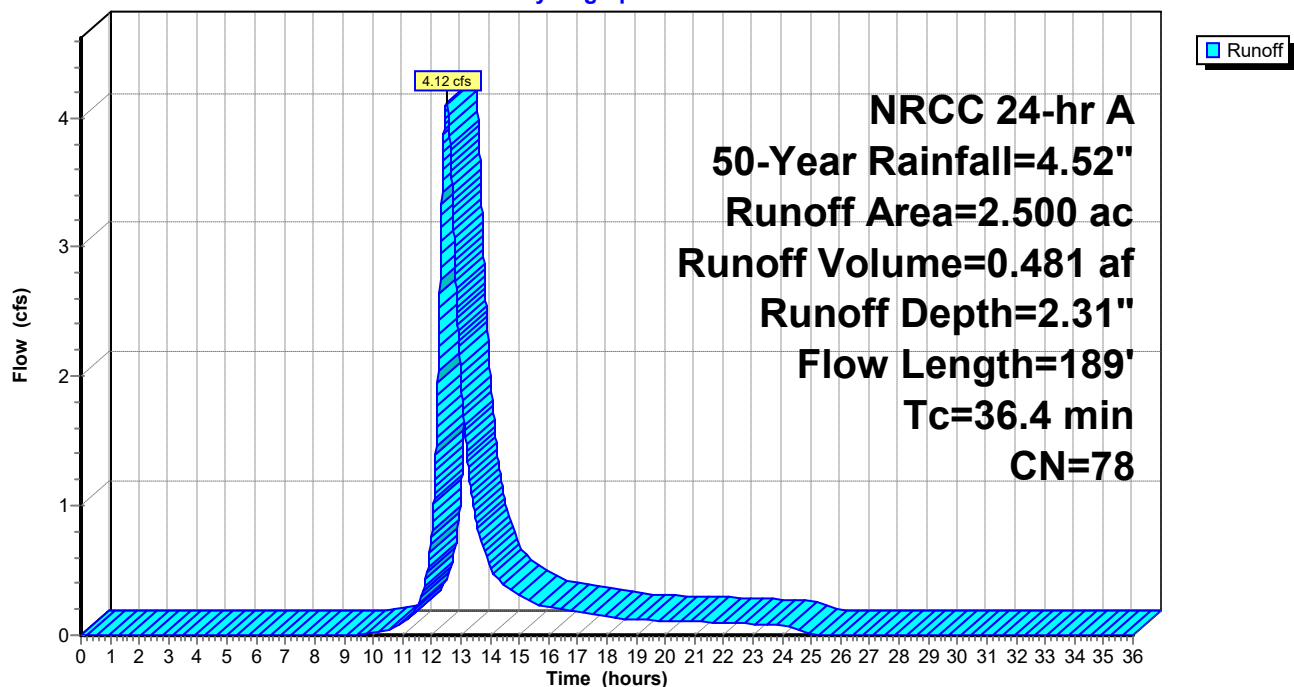
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.750	73	Brush, Good, HSG D
1.700	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
2.500	78	Weighted Average
2.450		98.00% Pervious Area
0.050		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.3	100	0.0100	0.05		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
2.1	89	0.0200	0.71		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
36.4	189	Total			

Subcatchment EX-4: EX-4

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 38

Summary for Reach 10R: South Channel

Inflow Area = 4.800 ac, 0.83% Impervious, Inflow Depth = 2.31" for 50-Year event
Inflow = 9.32 cfs @ 12.38 hrs, Volume= 0.924 af
Outflow = 7.46 cfs @ 12.56 hrs, Volume= 0.924 af, Atten= 20%, Lag= 10.4 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.43 fps, Min. Travel Time= 15.7 min

Avg. Velocity= 0.40 fps, Avg. Travel Time= 55.4 min

Peak Storage= 7,021 cf @ 12.56 hrs

Average Depth at Peak Storage= 0.61', Surface Width= 10.06'

Bank-Full Depth= 4.00' Flow Area= 66.0 sf, Capacity= 252.34 cfs

Custom cross-section, Length= 1,343.0' Slope= 0.0020 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-13.50	796.00	0.00
-11.50	795.00	1.00
-9.00	794.00	2.00
-7.00	793.00	3.00
-4.00	792.00	4.00
3.00	792.00	4.00
5.00	793.00	3.00
7.00	794.00	2.00
9.00	795.00	1.00
14.50	796.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.5	12.4	12.0	12,759	17.83
2.00	23.5	16.9	16.0	31,561	65.70
3.00	41.8	21.8	20.5	56,070	144.32
4.00	66.0	29.6	28.0	88,638	252.34

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

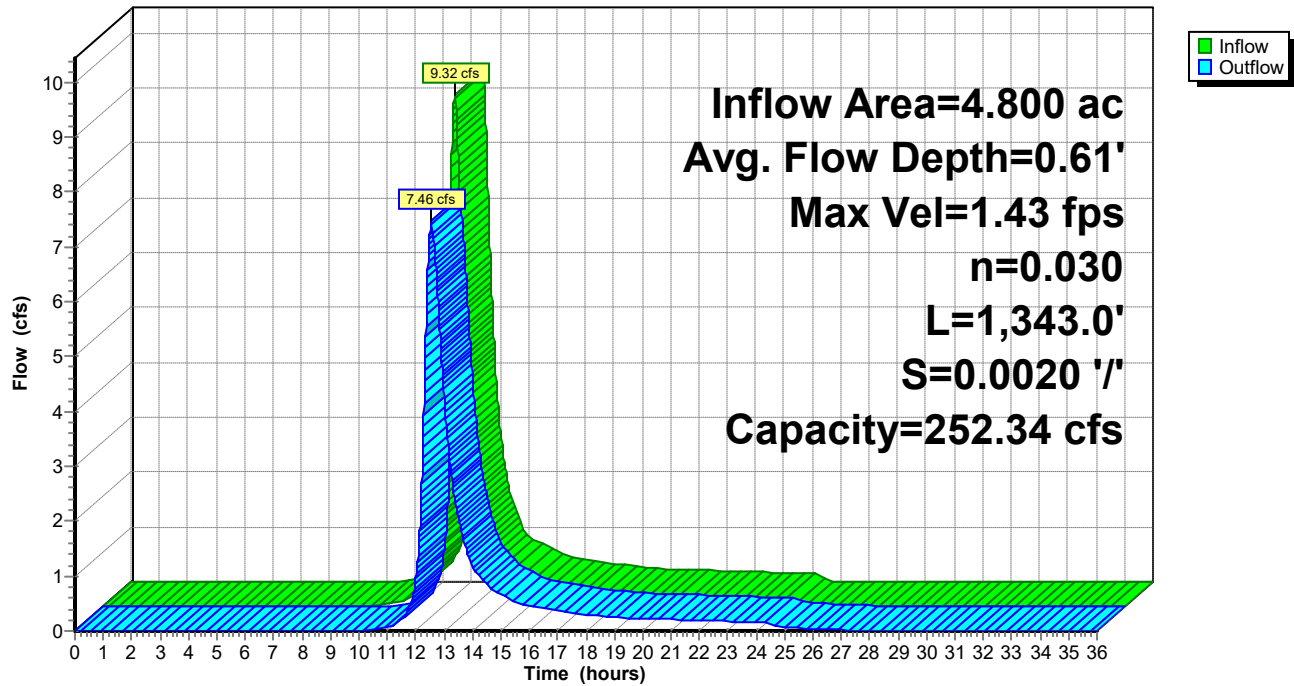
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 39

Reach 10R: South Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 40

Summary for Reach 11R: West Channel

Inflow Area = 2.500 ac, 2.00% Impervious, Inflow Depth = 2.31" for 50-Year event
Inflow = 4.12 cfs @ 12.50 hrs, Volume= 0.481 af
Outflow = 4.09 cfs @ 12.55 hrs, Volume= 0.481 af, Atten= 1%, Lag= 2.8 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.22 fps, Min. Travel Time= 2.9 min

Avg. Velocity= 0.81 fps, Avg. Travel Time= 8.0 min

Peak Storage= 714 cf @ 12.55 hrs

Average Depth at Peak Storage= 0.36' , Surface Width= 6.17'

Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

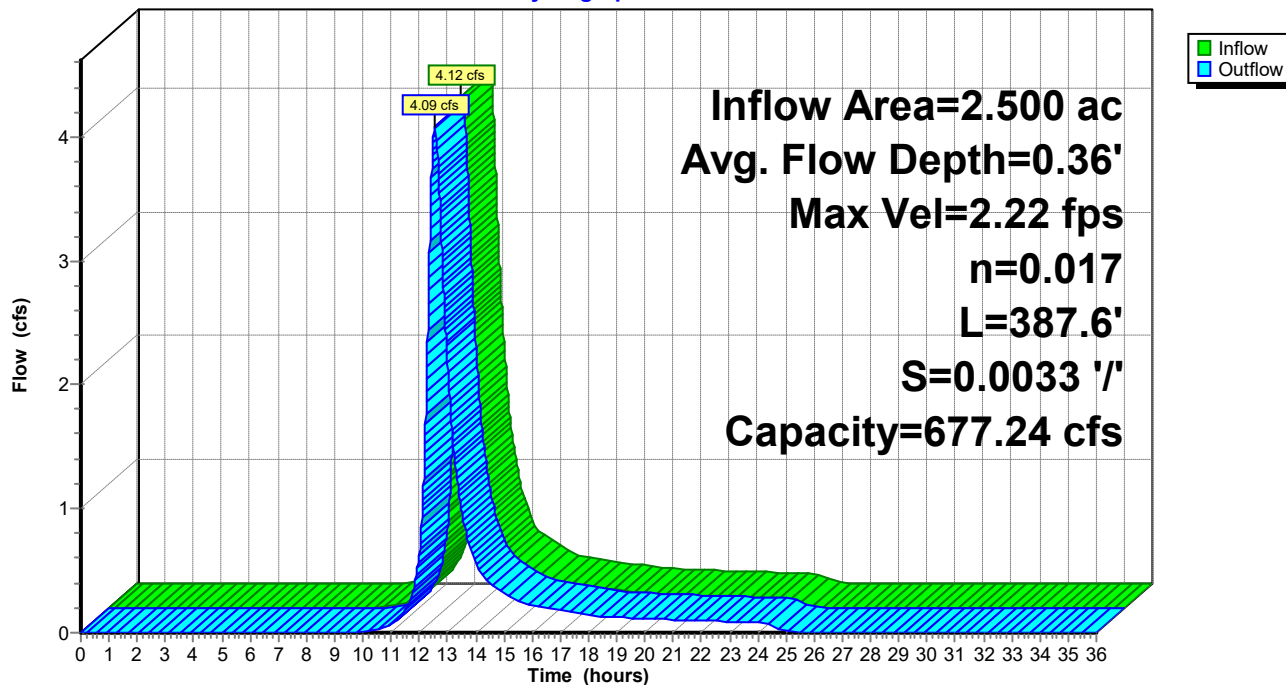
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 41

Summary for Reach 12R: East Channel

Inflow Area = 9.800 ac, 0.00% Impervious, Inflow Depth = 2.07" for 50-Year event
Inflow = 15.48 cfs @ 12.46 hrs, Volume= 1.687 af
Outflow = 15.17 cfs @ 12.51 hrs, Volume= 1.687 af, Atten= 2%, Lag= 3.2 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.59 fps, Min. Travel Time= 4.3 min

Avg. Velocity= 0.89 fps, Avg. Travel Time= 12.6 min

Peak Storage= 3,922 cf @ 12.51 hrs

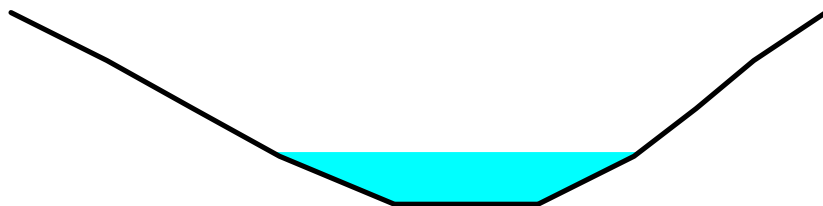
Average Depth at Peak Storage= 1.09' , Surface Width= 7.67'

Bank-Full Depth= 4.00' Flow Area= 41.4 sf, Capacity= 223.88 cfs

Custom cross-section, Length= 671.0' Slope= 0.0043 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.00	797.00	0.00
-7.00	796.00	1.00
-5.20	795.00	2.00
-3.40	794.00	3.00
-1.00	793.00	4.00
2.00	793.00	4.00
4.00	794.00	3.00
5.30	795.00	2.00
6.50	796.00	1.00
8.00	797.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	3.0	0.0	0	0.00
1.00	5.2	7.8	7.4	3,489	12.82
2.00	14.2	11.5	10.5	9,495	52.53
3.00	26.2	15.2	13.5	17,547	121.86
4.00	41.4	19.2	17.0	27,779	223.88

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

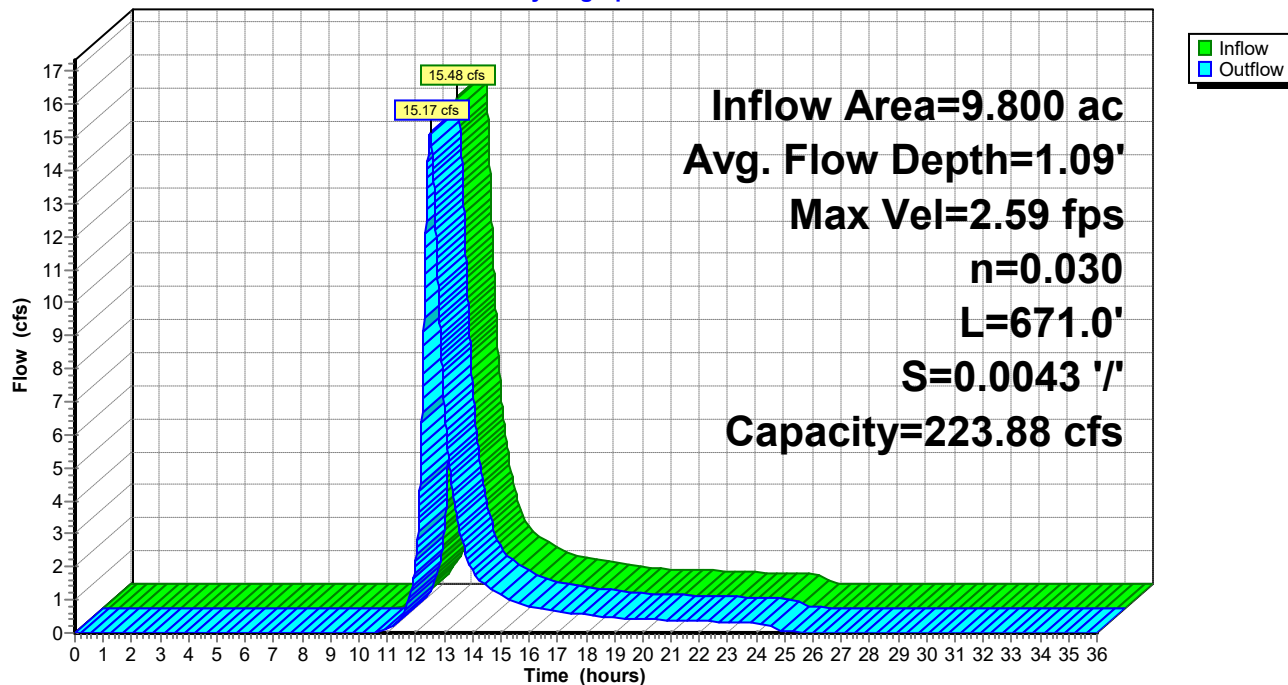
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 42

Reach 12R: East Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 43

Summary for Reach 13R: North Channel

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 2.27" for 50-Year event
Inflow = 46.26 cfs @ 12.56 hrs, Volume= 5.745 af
Outflow = 45.07 cfs @ 12.63 hrs, Volume= 5.745 af, Atten= 3%, Lag= 4.4 min
Routed to Link 14L : TOTAL SITE DISCHARGE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.43 fps, Min. Travel Time= 5.5 min

Avg. Velocity= 0.72 fps, Avg. Travel Time= 18.6 min

Peak Storage= 14,882 cf @ 12.63 hrs

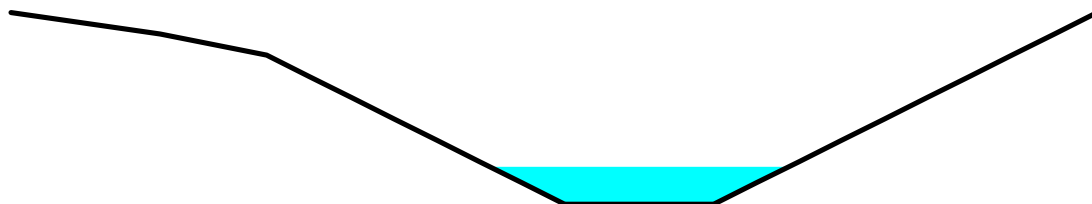
Average Depth at Peak Storage= 1.76' , Surface Width= 14.04'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,274.88 cfs

Custom cross-section, Length= 804.0' Slope= 0.0018 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

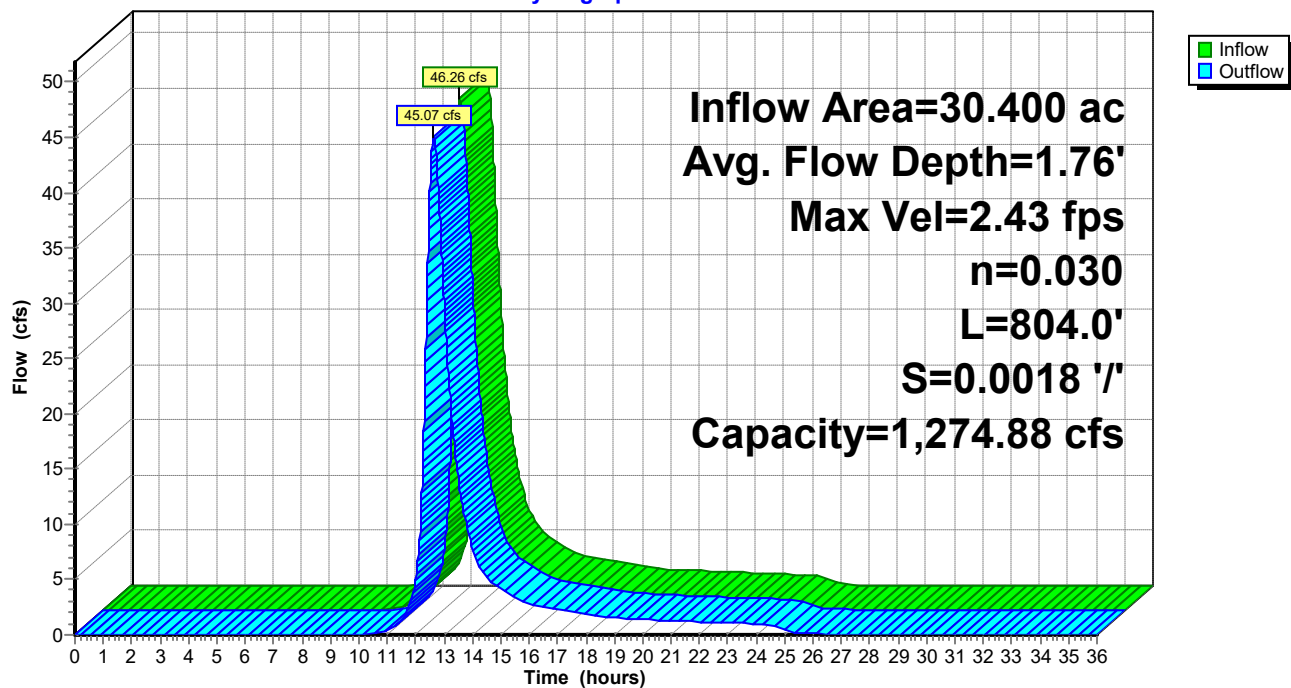
Printed 6/24/2025

Page 44

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	7,236	16.10
2.00	22.0	15.9	15.0	17,688	57.36
3.00	39.0	20.4	19.0	31,356	126.30
4.00	60.0	24.9	23.0	48,240	226.92
5.00	85.0	29.4	27.0	68,340	363.20
6.00	114.0	33.8	31.0	91,656	538.98
7.00	147.0	38.3	35.0	118,188	757.96
8.00	185.5	45.6	42.0	149,142	993.79
9.00	232.0	54.9	51.0	186,528	1,274.88

Reach 13R: North Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

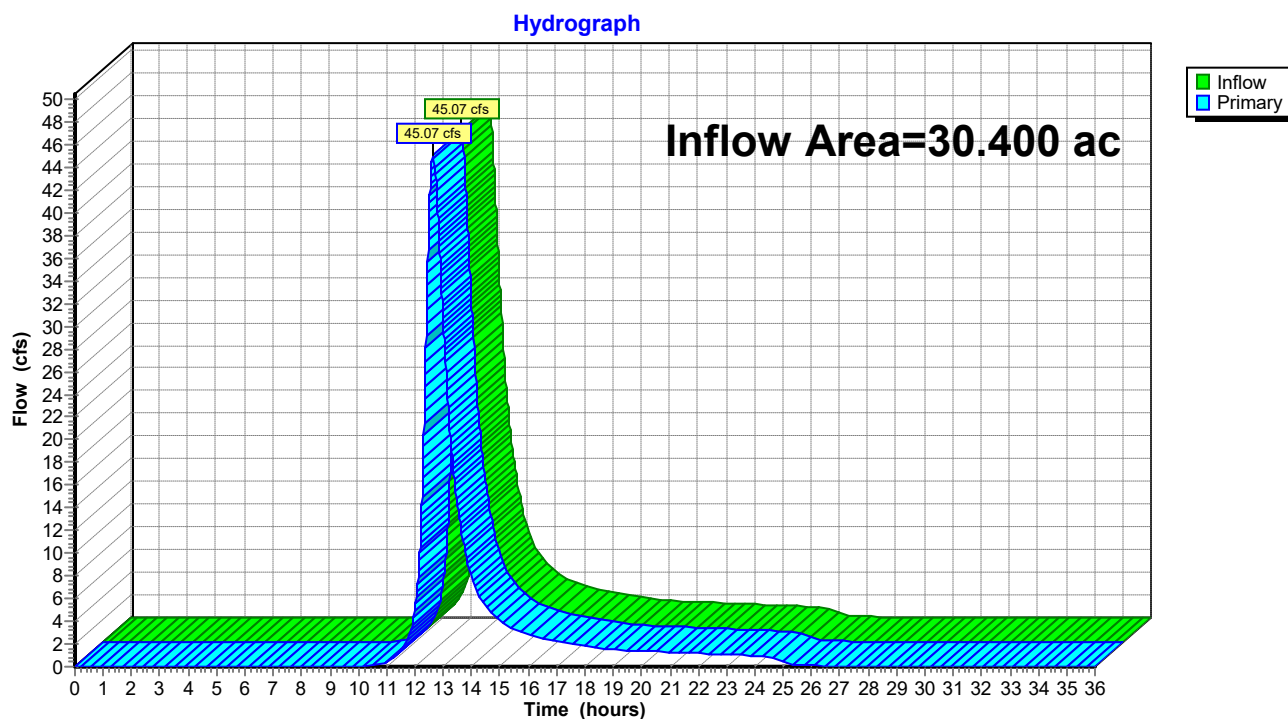
Page 45

Summary for Link 14L: TOTAL SITE DISCHARGE

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 2.27" for 50-Year event
Inflow = 45.07 cfs @ 12.63 hrs, Volume= 5.745 af
Primary = 45.07 cfs @ 12.63 hrs, Volume= 5.745 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 14L: TOTAL SITE DISCHARGE



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 46

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX-1: EX-1

Runoff Area=9.800 ac 0.00% Impervious Runoff Depth=2.69"
Flow Length=753' Tc=31.7 min CN=75 Runoff=20.29 cfs 2.194 af

Subcatchment EX-2: EX-2

Runoff Area=13.300 ac 4.29% Impervious Runoff Depth=3.05"
Flow Length=750' Slope=0.0100 '/' Tc=44.5 min CN=79 Runoff=25.84 cfs 3.384 af

Subcatchment EX-3: EX-3

Runoff Area=4.800 ac 0.83% Impervious Runoff Depth=2.96"
Flow Length=169' Tc=27.1 min CN=78 Runoff=11.97 cfs 1.184 af

Subcatchment EX-4: EX-4

Runoff Area=2.500 ac 2.00% Impervious Runoff Depth=2.96"
Flow Length=189' Tc=36.4 min CN=78 Runoff=5.30 cfs 0.617 af

Reach 10R: South Channel

Avg. Flow Depth=0.72' Max Vel=1.56 fps Inflow=11.97 cfs 1.184 af
n=0.030 L=1,343.0' S=0.0020 '/' Capacity=252.34 cfs Outflow=9.82 cfs 1.184 af

Reach 11R: West Channel

Avg. Flow Depth=0.42' Max Vel=2.40 fps Inflow=5.30 cfs 0.617 af
n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=5.26 cfs 0.617 af

Reach 12R: East Channel

Avg. Flow Depth=1.24' Max Vel=2.82 fps Inflow=20.29 cfs 2.194 af
n=0.030 L=671.0' S=0.0043 '/' Capacity=223.88 cfs Outflow=19.91 cfs 2.194 af

Reach 13R: North Channel

Avg. Flow Depth=2.02' Max Vel=2.62 fps Inflow=59.90 cfs 7.378 af
n=0.030 L=804.0' S=0.0018 '/' Capacity=1,274.88 cfs Outflow=58.56 cfs 7.378 af

Link 14L: TOTAL SITE DISCHARGE

Inflow=58.56 cfs 7.378 af
Primary=58.56 cfs 7.378 af

Total Runoff Area = 30.400 ac Runoff Volume = 7.378 af Average Runoff Depth = 2.91"
97.83% Pervious = 29.740 ac 2.17% Impervious = 0.660 ac

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 47

Summary for Subcatchment EX-1: EX-1

Runoff = 20.29 cfs @ 12.44 hrs, Volume= 2.194 af, Depth= 2.69"
Routed to Reach 12R : East Channel

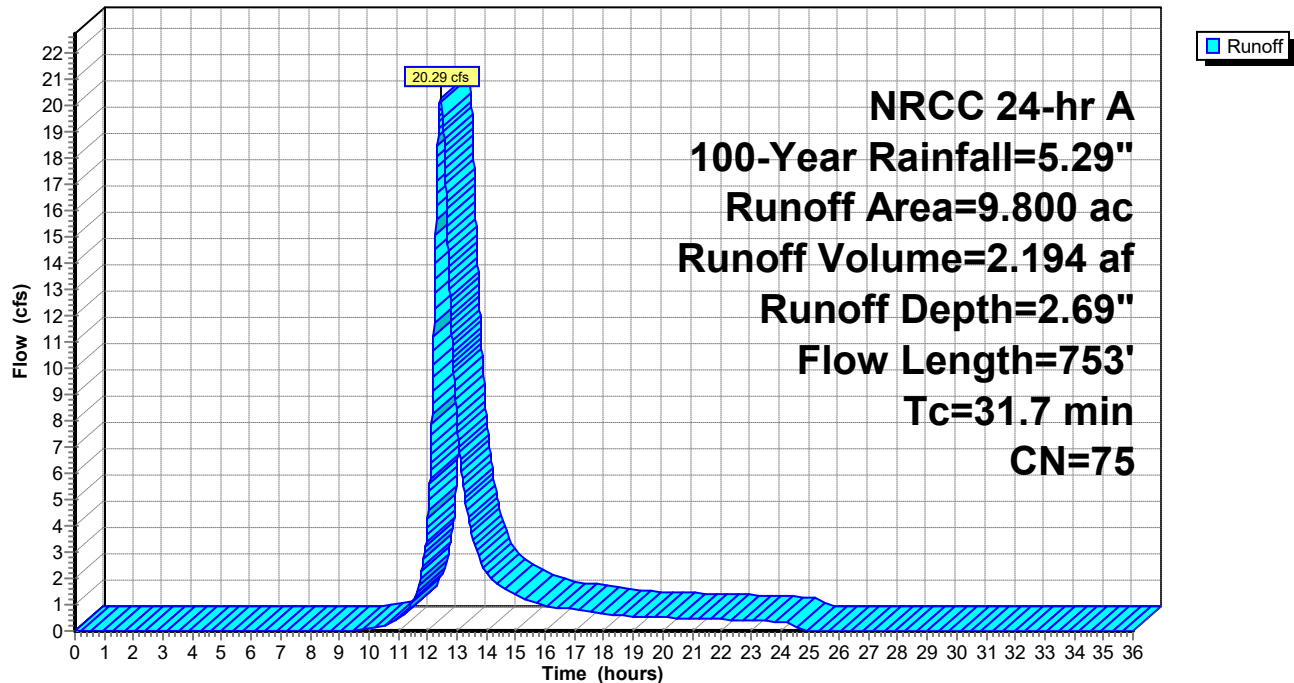
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
7.270	73	Brush, Good, HSG D
2.370	79	Woods/grass comb., Good, HSG D
0.160	80	>75% Grass cover, Good, HSG D
9.800	75	Weighted Average
9.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.2	100	0.0235	0.10		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
15.5	653	0.0100	0.70		Shallow Concentrated Flow, Shallow Concentrated Flow
					Short Grass Pasture Kv= 7.0 fps
31.7	753	Total			

Subcatchment EX-1: EX-1

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 48

Summary for Subcatchment EX-2: EX-2

Runoff = 25.84 cfs @ 12.61 hrs, Volume= 3.384 af, Depth= 3.05"
Routed to Reach 13R : North Channel

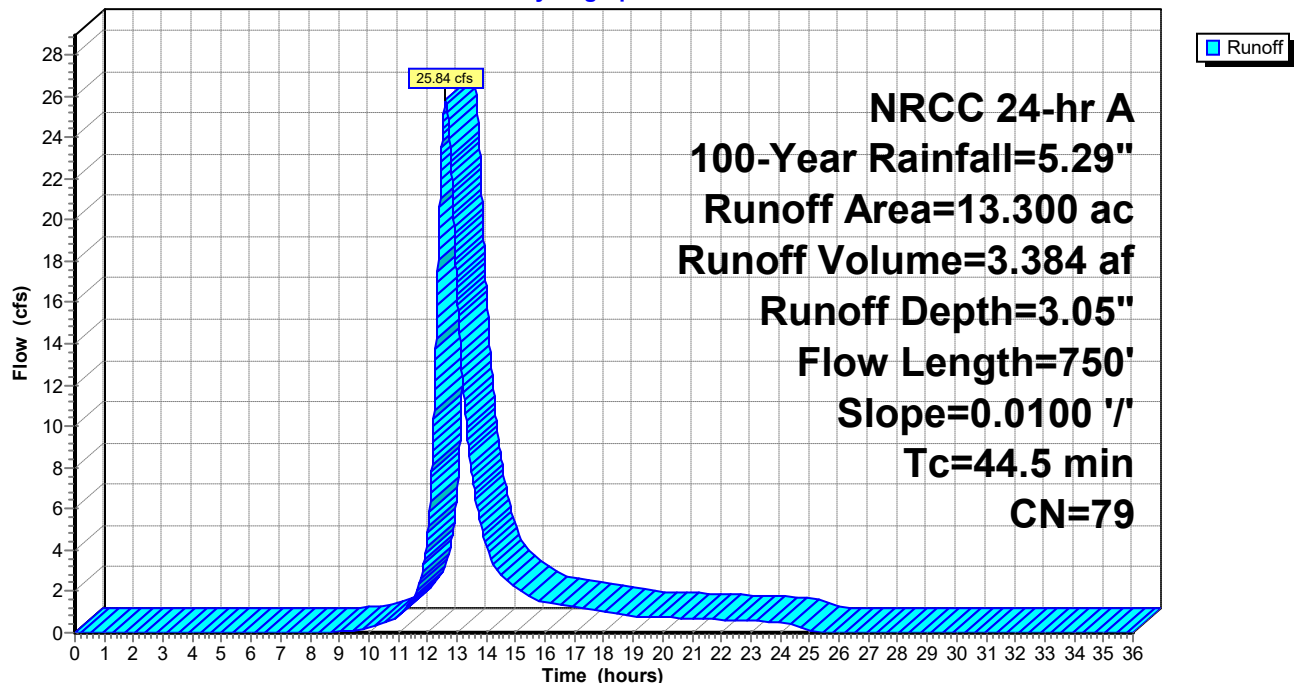
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
1.520	73	Brush, Good, HSG D
6.770	79	Woods/grass comb., Good, HSG D
4.440	80	>75% Grass cover, Good, HSG D
0.570	98	Paved parking, HSG D
13.300	79	Weighted Average
12.730		95.71% Pervious Area
0.570		4.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100'
					Grass: Dense n= 0.240 P2= 2.19"
21.7	650	0.0100	0.50		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
44.5	750	Total			

Subcatchment EX-2: EX-2

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 49

Summary for Subcatchment EX-3: EX-3

Runoff = 11.97 cfs @ 12.38 hrs, Volume= 1.184 af, Depth= 2.96"
Routed to Reach 10R : South Channel

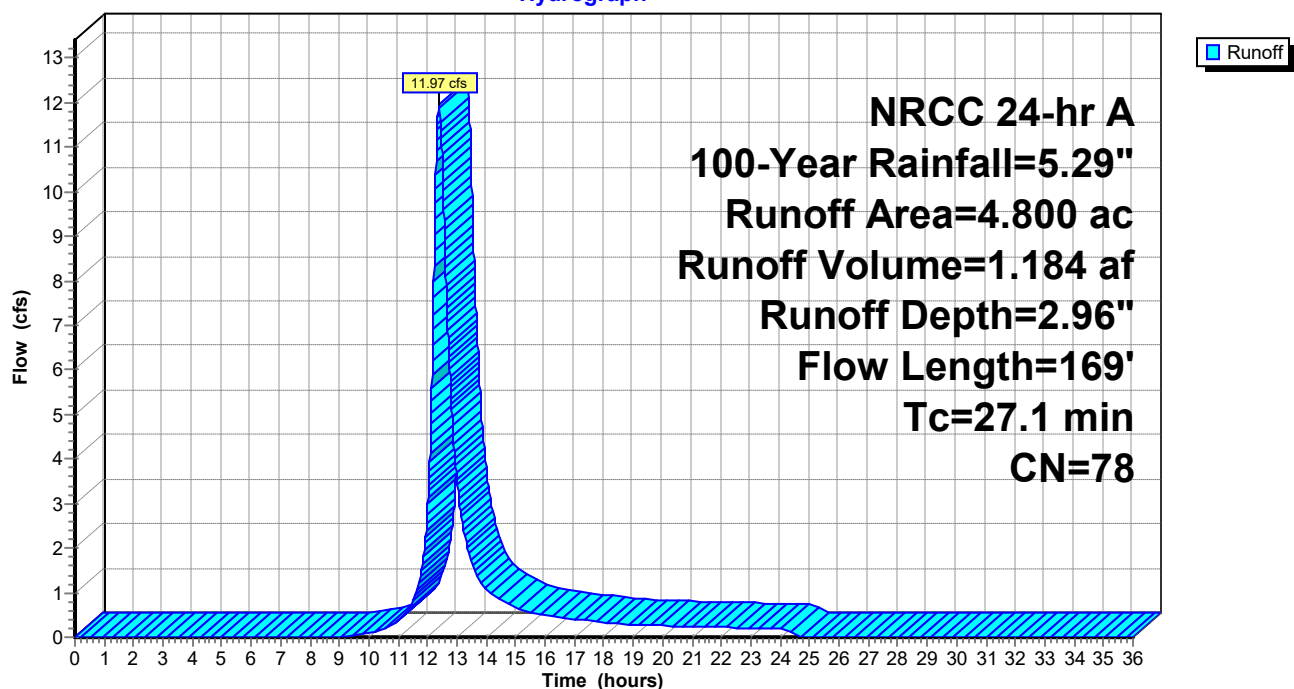
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
3.660	79	Woods/grass comb., Good, HSG D
1.100	73	Brush, Good, HSG D
0.040	98	Paved parking, HSG D
4.800	78	Weighted Average
4.760		99.17% Pervious Area
0.040		0.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0200	0.06		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
1.1	69	0.0430	1.04		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
27.1	169	Total			

Subcatchment EX-3: EX-3

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 50

Summary for Subcatchment EX-4: EX-4

Runoff = 5.30 cfs @ 12.50 hrs, Volume= 0.617 af, Depth= 2.96"
Routed to Reach 11R : West Channel

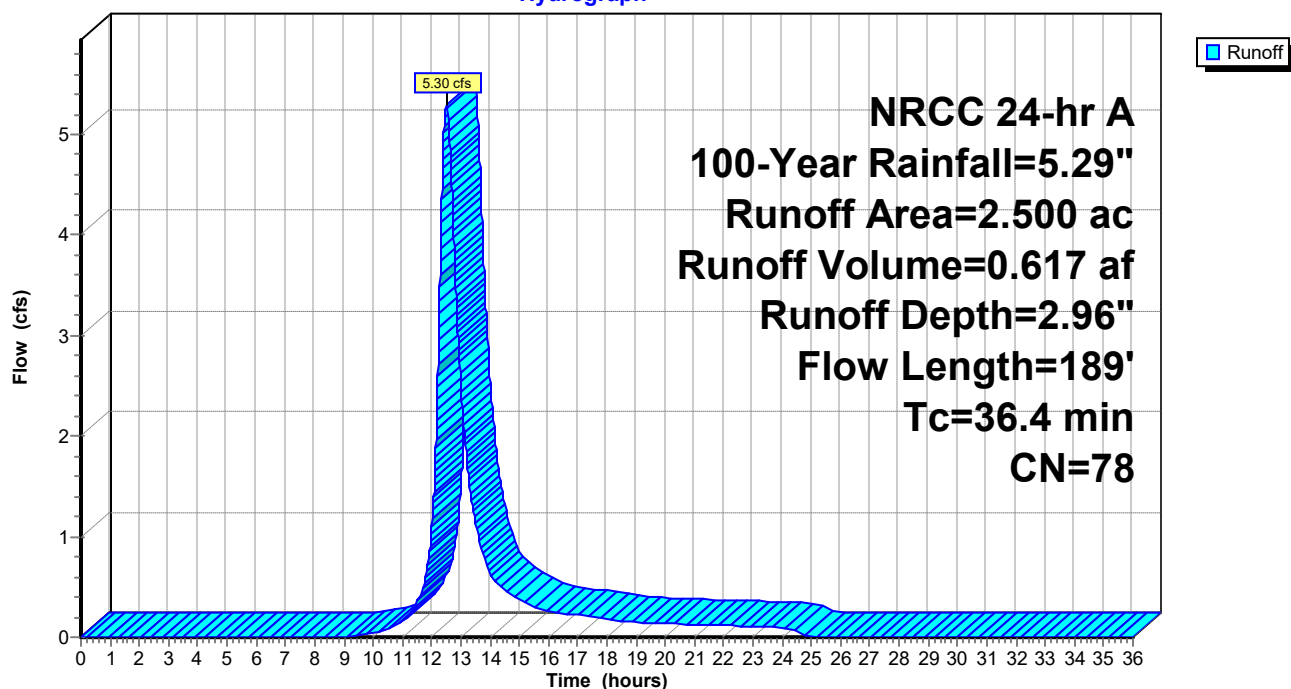
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.750	73	Brush, Good, HSG D
1.700	79	Woods/grass comb., Good, HSG D
0.050	98	Paved parking, HSG D
2.500	78	Weighted Average
2.450		98.00% Pervious Area
0.050		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.3	100	0.0100	0.05		Sheet Flow, First 100'
					Woods: Light underbrush n= 0.400 P2= 2.19"
2.1	89	0.0200	0.71		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
36.4	189	Total			

Subcatchment EX-4: EX-4

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 51

Summary for Reach 10R: South Channel

Inflow Area = 4.800 ac, 0.83% Impervious, Inflow Depth = 2.96" for 100-Year event
Inflow = 11.97 cfs @ 12.38 hrs, Volume= 1.184 af
Outflow = 9.82 cfs @ 12.54 hrs, Volume= 1.184 af, Atten= 18%, Lag= 9.5 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.56 fps, Min. Travel Time= 14.4 min

Avg. Velocity= 0.42 fps, Avg. Travel Time= 52.7 min

Peak Storage= 8,465 cf @ 12.54 hrs

Average Depth at Peak Storage= 0.72' , Surface Width= 10.58'

Bank-Full Depth= 4.00' Flow Area= 66.0 sf, Capacity= 252.34 cfs

Custom cross-section, Length= 1,343.0' Slope= 0.0020 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-13.50	796.00	0.00
-11.50	795.00	1.00
-9.00	794.00	2.00
-7.00	793.00	3.00
-4.00	792.00	4.00
3.00	792.00	4.00
5.00	793.00	3.00
7.00	794.00	2.00
9.00	795.00	1.00
14.50	796.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.5	12.4	12.0	12,759	17.83
2.00	23.5	16.9	16.0	31,561	65.70
3.00	41.8	21.8	20.5	56,070	144.32
4.00	66.0	29.6	28.0	88,638	252.34

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

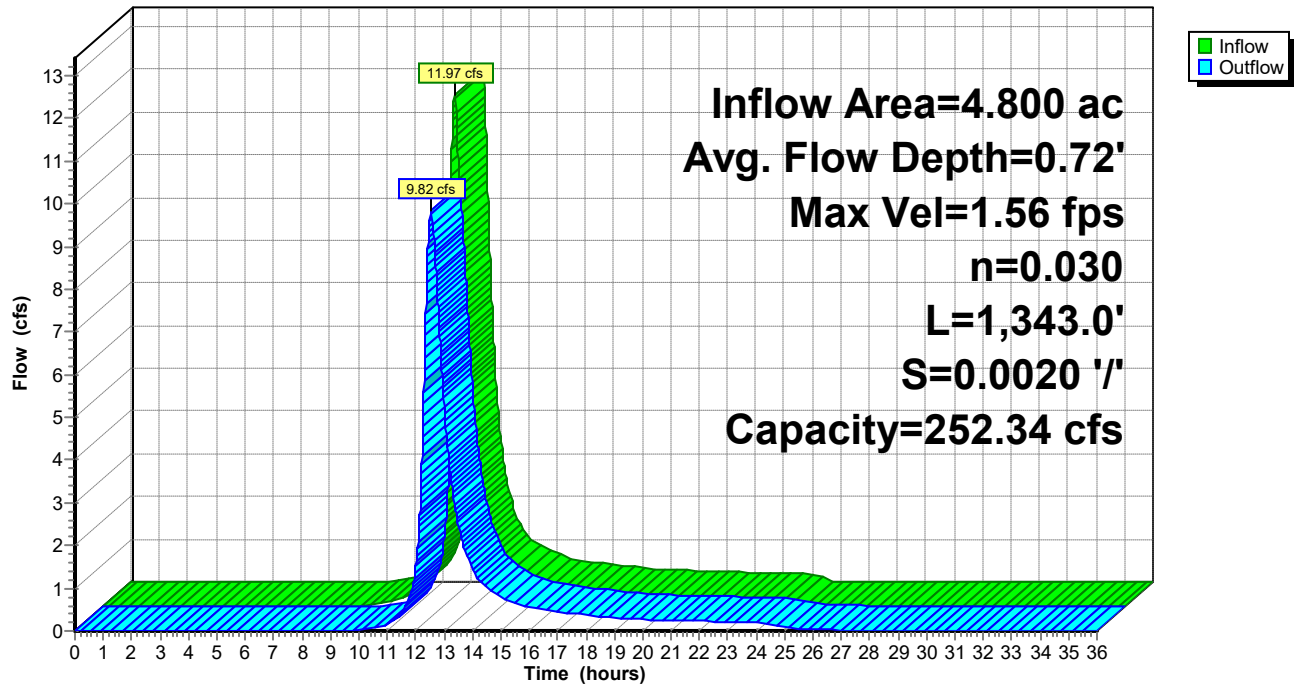
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 52

Reach 10R: South Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 53

Summary for Reach 11R: West Channel

Inflow Area = 2.500 ac, 2.00% Impervious, Inflow Depth = 2.96" for 100-Year event
Inflow = 5.30 cfs @ 12.50 hrs, Volume= 0.617 af
Outflow = 5.26 cfs @ 12.54 hrs, Volume= 0.617 af, Atten= 1%, Lag= 2.4 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.40 fps, Min. Travel Time= 2.7 min

Avg. Velocity= 0.85 fps, Avg. Travel Time= 7.6 min

Peak Storage= 849 cf @ 12.54 hrs

Average Depth at Peak Storage= 0.42', Surface Width= 6.50'

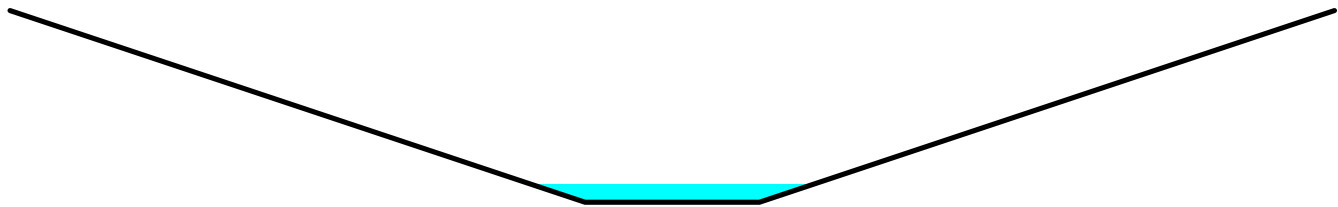
Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

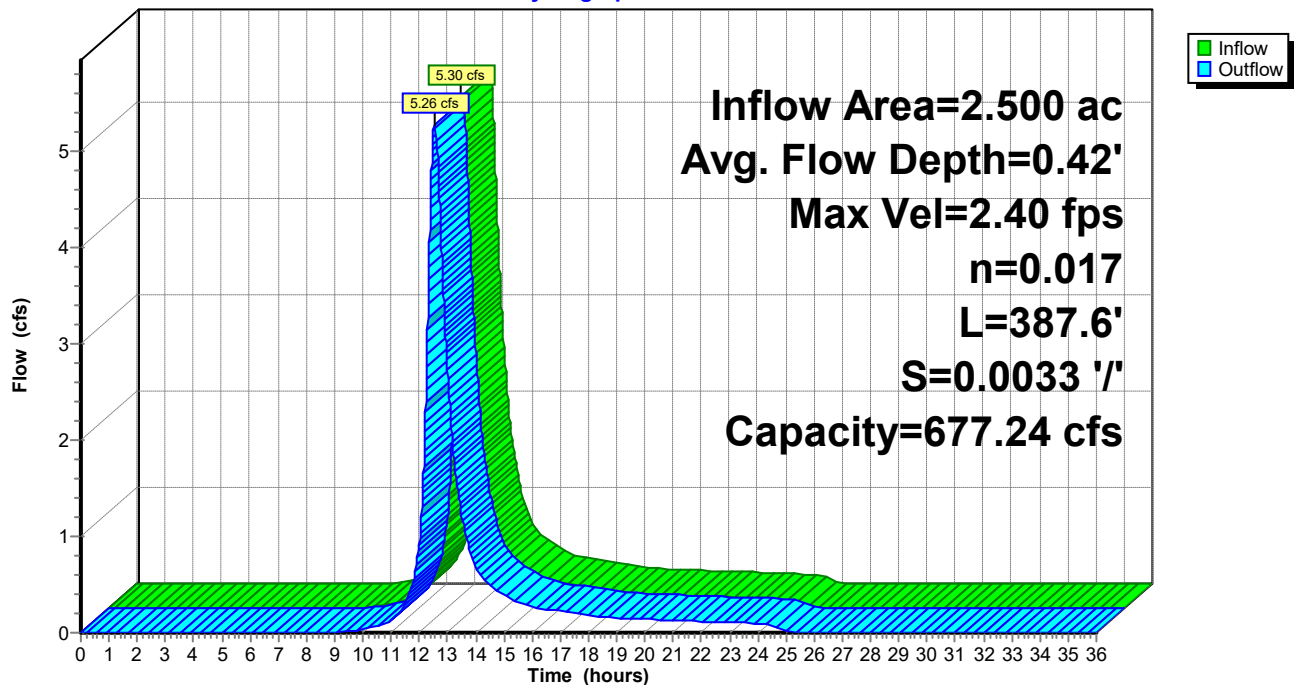
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 54

Summary for Reach 12R: East Channel

Inflow Area = 9.800 ac, 0.00% Impervious, Inflow Depth = 2.69" for 100-Year event
Inflow = 20.29 cfs @ 12.44 hrs, Volume= 2.194 af
Outflow = 19.91 cfs @ 12.50 hrs, Volume= 2.194 af, Atten= 2%, Lag= 3.8 min
Routed to Reach 13R : North Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.82 fps, Min. Travel Time= 4.0 min

Avg. Velocity= 0.94 fps, Avg. Travel Time= 11.8 min

Peak Storage= 4,745 cf @ 12.50 hrs

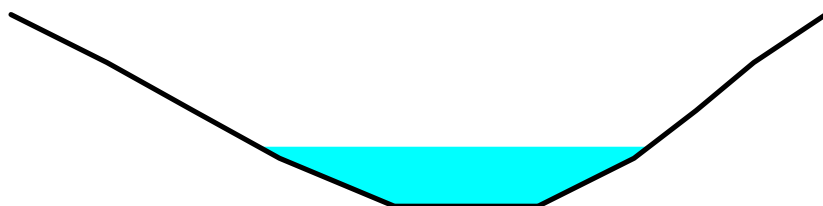
Average Depth at Peak Storage= 1.24' , Surface Width= 8.15'

Bank-Full Depth= 4.00' Flow Area= 41.4 sf, Capacity= 223.88 cfs

Custom cross-section, Length= 671.0' Slope= 0.0043 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 794.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-9.00	797.00	0.00
-7.00	796.00	1.00
-5.20	795.00	2.00
-3.40	794.00	3.00
-1.00	793.00	4.00
2.00	793.00	4.00
4.00	794.00	3.00
5.30	795.00	2.00
6.50	796.00	1.00
8.00	797.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	3.0	0.0	0	0.00
1.00	5.2	7.8	7.4	3,489	12.82
2.00	14.2	11.5	10.5	9,495	52.53
3.00	26.2	15.2	13.5	17,547	121.86
4.00	41.4	19.2	17.0	27,779	223.88

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

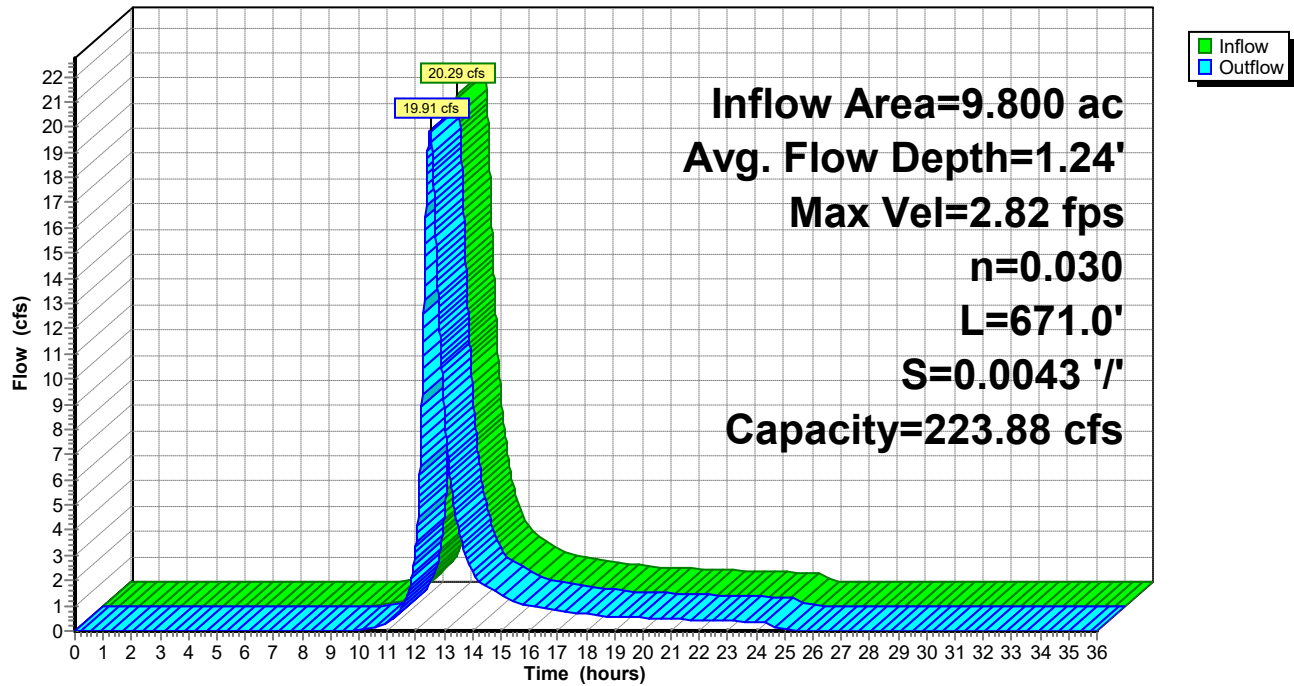
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 55

Reach 12R: East Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 56

Summary for Reach 13R: North Channel

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 2.91" for 100-Year event
Inflow = 59.90 cfs @ 12.55 hrs, Volume= 7.378 af
Outflow = 58.56 cfs @ 12.62 hrs, Volume= 7.378 af, Atten= 2%, Lag= 3.9 min
Routed to Link 14L : TOTAL SITE DISCHARGE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.62 fps, Min. Travel Time= 5.1 min

Avg. Velocity= 0.76 fps, Avg. Travel Time= 17.7 min

Peak Storage= 17,952 cf @ 12.62 hrs

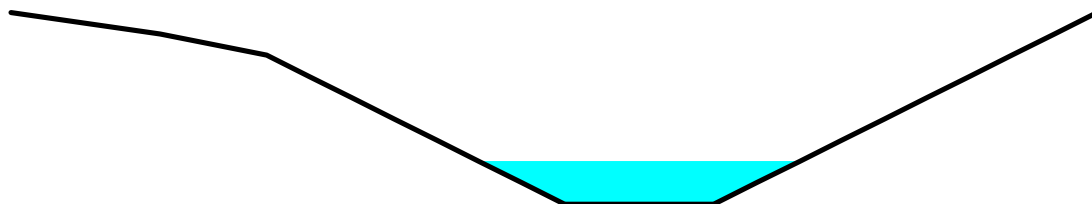
Average Depth at Peak Storage= 2.02', Surface Width= 15.09'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,274.88 cfs

Custom cross-section, Length= 804.0' Slope= 0.0018 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

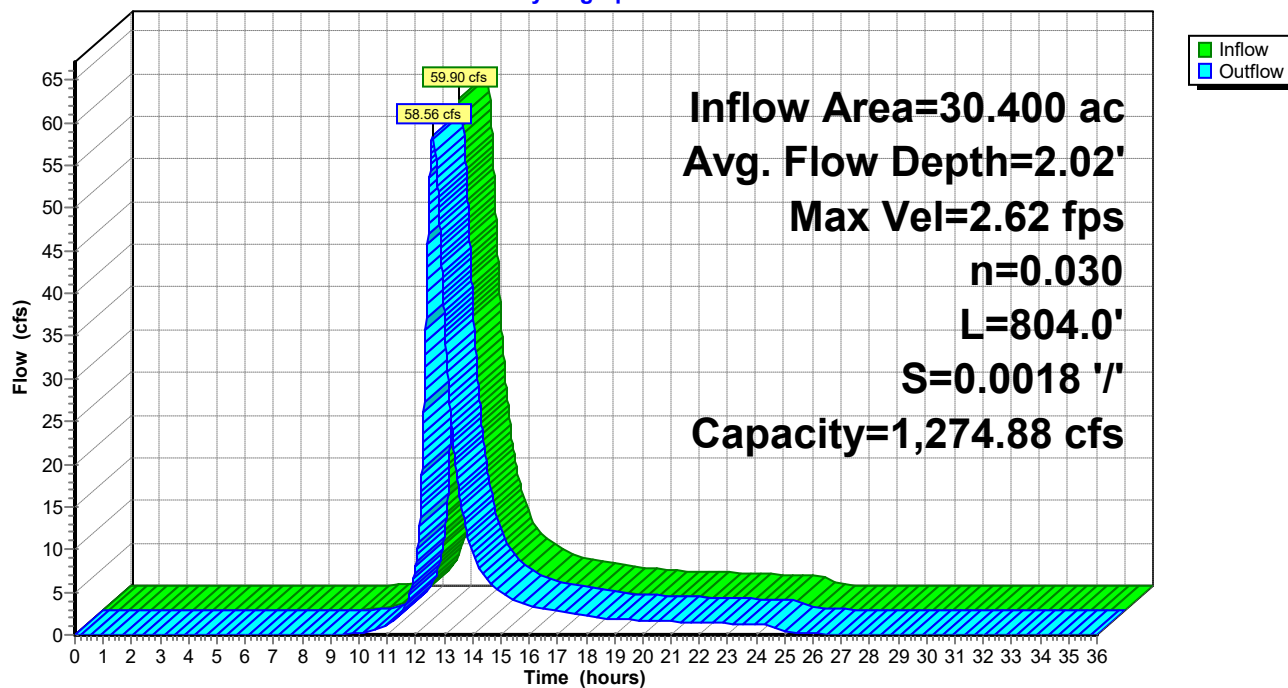
Printed 6/24/2025

Page 57

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	7,236	16.10
2.00	22.0	15.9	15.0	17,688	57.36
3.00	39.0	20.4	19.0	31,356	126.30
4.00	60.0	24.9	23.0	48,240	226.92
5.00	85.0	29.4	27.0	68,340	363.20
6.00	114.0	33.8	31.0	91,656	538.98
7.00	147.0	38.3	35.0	118,188	757.96
8.00	185.5	45.6	42.0	149,142	993.79
9.00	232.0	54.9	51.0	186,528	1,274.88

Reach 13R: North Channel

Hydrograph



Waterchase Sub Pre with offsite

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Pre Condition HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

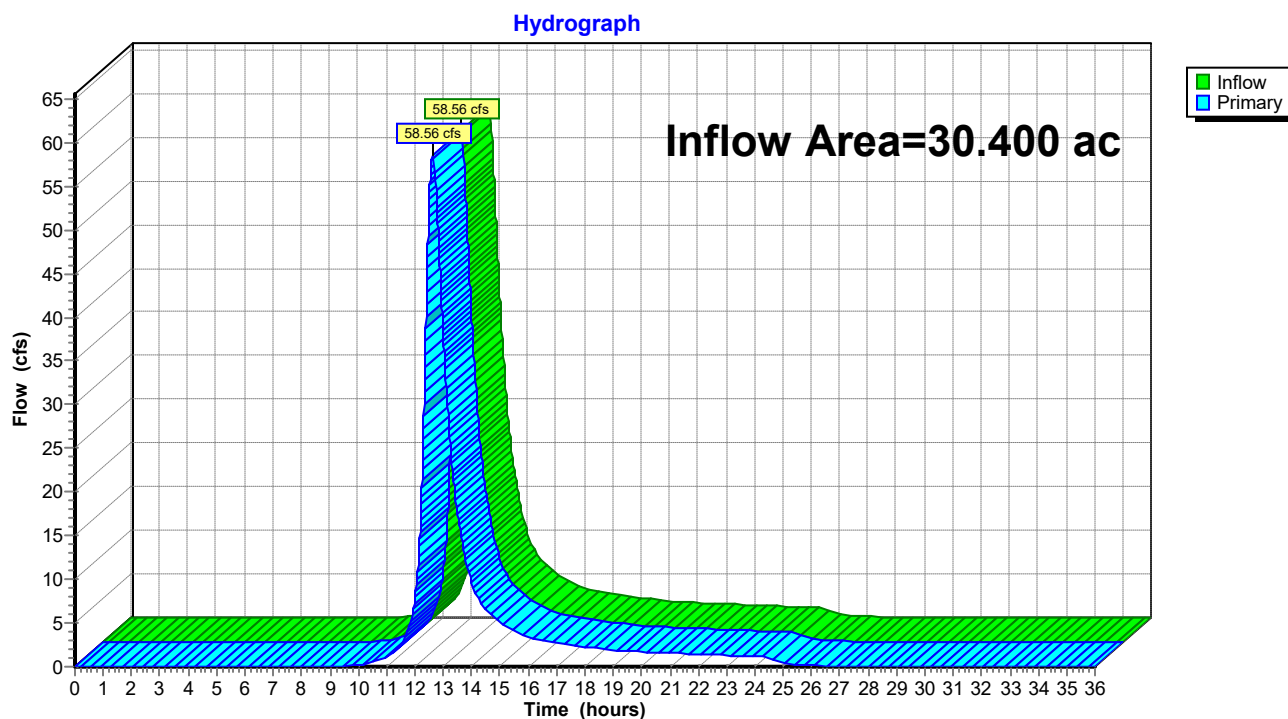
Page 58

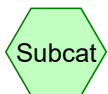
Summary for Link 14L: TOTAL SITE DISCHARGE

Inflow Area = 30.400 ac, 2.17% Impervious, Inflow Depth = 2.91" for 100-Year event
Inflow = 58.56 cfs @ 12.62 hrs, Volume= 7.378 af
Primary = 58.56 cfs @ 12.62 hrs, Volume= 7.378 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 14L: TOTAL SITE DISCHARGE





Link

Prepared by DDS Engineering & Surveying LLP, Printed 6/24/2025
HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 2

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 7081 NY Ontario

Rainfall events imported from "NRCS-Rain.txt" for 7081 NY Ontario

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 3

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	NRCC 24-hr	A	Default	24.00	1	1.89	2
2	10-Year	NRCC 24-hr	A	Default	24.00	1	3.14	2
3	50-Year	NRCC 24-hr	A	Default	24.00	1	4.52	2
4	100-Year	NRCC 24-hr	A	Default	24.00	1	5.29	2

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 4

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.390	80	>75% Grass cover, Good, HSG D (PR-1, PR-10, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9)
0.140	98	POND (PR-1)
10.320	98	Paved parking, HSG D (PR-1, PR-2, PR-3, PR-4, PR-5, PR-6)
0.250	98	Wet Pond (PR-2, PR-3)
1.300	79	Woods/grass comb., Good, HSG D (PR-7)
30.400	86	TOTAL AREA

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 5

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
30.010	HSG D	PR-1, PR-10, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
0.390	Other	PR-1, PR-2, PR-3
30.400		TOTAL AREA

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 6

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	18.390	0.000	18.390	>75% Grass cover, Good	PR-1, PR-10, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
0.000	0.000	0.000	0.000	0.140	0.140	POND	PR-1
0.000	0.000	0.000	10.320	0.000	10.320	Paved parking	PR-1, PR-2, PR-3, PR-4, PR-5, PR-6
0.000	0.000	0.000	0.000	0.250	0.250	Wet Pond	PR-2, PR-3
0.000	0.000	0.000	1.300	0.000	1.300	Woods/grass comb., Good	PR-7
0.000	0.000	0.000	30.010	0.390	30.400	TOTAL AREA	

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

Printed 6/24/2025

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Page 7

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	PR-1	0.00	0.00	147.0	0.0060	0.013	0.0	15.0	0.0
2	PR-1	0.00	0.00	25.0	0.0060	0.013	0.0	15.0	0.0
3	PR-1	0.00	0.00	180.0	0.0060	0.013	0.0	18.0	0.0
4	PR-2	0.00	0.00	164.0	0.0007	0.013	0.0	12.0	0.0
5	PR-2	0.00	0.00	91.0	0.0004	0.013	0.0	12.0	0.0
6	B1	794.00	794.00	32.0	0.0000	0.013	0.0	15.0	0.0
7	B2	792.00	792.00	23.0	0.0000	0.013	0.0	15.0	0.0
8	B3	792.00	792.00	28.0	0.0000	0.013	0.0	15.0	0.0
9	B4	794.00	794.00	29.0	0.0000	0.013	0.0	10.0	0.0
10	P1	792.00	792.00	40.0	0.0000	0.013	0.0	24.0	0.0
11	P2	794.00	794.00	10.0	0.0000	0.013	0.0	12.0	0.0
12	P3	795.00	794.50	17.0	0.0294	0.013	0.0	15.0	0.0
13	SB1	793.00	793.00	15.0	0.0000	0.013	0.0	18.0	0.0
14	SB2	795.00	795.00	10.0	0.0000	0.013	0.0	24.0	0.0

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 8

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR-1: PR-1	Runoff Area=10.700 ac 33.08% Impervious Runoff Depth=0.77" Flow Length=1,030' Tc=28.1 min CN=86 Runoff=6.63 cfs 0.684 af
Subcatchment PR-10: PR-10	Runoff Area=0.100 ac 0.00% Impervious Runoff Depth=0.50" Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=0.08 cfs 0.004 af
Subcatchment PR-2: PR-2	Runoff Area=2.700 ac 28.52% Impervious Runoff Depth=0.72" Flow Length=648' Tc=22.1 min CN=85 Runoff=1.75 cfs 0.161 af
Subcatchment PR-3: PR-3	Runoff Area=5.300 ac 43.21% Impervious Runoff Depth=0.88" Flow Length=156' Tc=23.1 min CN=88 Runoff=4.23 cfs 0.388 af
Subcatchment PR-4: PR-4	Runoff Area=4.400 ac 59.77% Impervious Runoff Depth=1.07" Flow Length=263' Tc=25.0 min CN=91 Runoff=4.14 cfs 0.392 af
Subcatchment PR-5: PR-5	Runoff Area=2.100 ac 53.81% Impervious Runoff Depth=1.00" Flow Length=168' Tc=12.5 min CN=90 Runoff=2.56 cfs 0.175 af
Subcatchment PR-6: PR-6	Runoff Area=0.900 ac 38.89% Impervious Runoff Depth=0.82" Flow Length=80' Slope=0.0680 '/' Tc=8.8 min CN=87 Runoff=1.03 cfs 0.062 af
Subcatchment PR-7: PR-7	Runoff Area=3.200 ac 0.00% Impervious Runoff Depth=0.50" Flow Length=136' Tc=29.5 min CN=80 Runoff=1.15 cfs 0.132 af
Subcatchment PR-8: PR-8	Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=0.50" Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=0.23 cfs 0.012 af
Subcatchment PR-9: PR-9	Runoff Area=0.700 ac 0.00% Impervious Runoff Depth=0.50" Flow Length=66' Slope=0.0450 '/' Tc=8.9 min CN=80 Runoff=0.45 cfs 0.029 af
Reach 11R: West Channel	Avg. Flow Depth=0.17' Max Vel=1.42 fps Inflow=1.09 cfs 0.188 af n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=1.07 cfs 0.188 af
Reach 12R: East Channel	Avg. Flow Depth=0.12' Max Vel=0.65 fps Inflow=0.49 cfs 0.188 af n=0.030 L=479.0' S=0.0031 '/' Capacity=207.35 cfs Outflow=0.37 cfs 0.188 af
Reach 13R: North Channel Section 1	Avg. Flow Depth=0.37' Max Vel=1.04 fps Inflow=3.04 cfs 1.185 af n=0.030 L=400.0' S=0.0019 '/' Capacity=1,299.91 cfs Outflow=3.01 cfs 1.183 af
Reach 15R: East Channel 2	Avg. Flow Depth=0.11' Max Vel=1.07 fps Inflow=0.69 cfs 0.541 af n=0.030 L=212.0' S=0.0088 '/' Capacity=599.19 cfs Outflow=0.69 cfs 0.541 af
Reach 16R: South Channel 2	Avg. Flow Depth=0.64' Max Vel=1.51 fps Inflow=1.56 cfs 0.457 af n=0.030 L=162.0' S=0.0046 '/' Capacity=1,557.04 cfs Outflow=1.56 cfs 0.457 af
Reach 18R: North Channel Section 2	Avg. Flow Depth=0.56' Max Vel=1.09 fps Inflow=3.85 cfs 1.828 af n=0.030 L=430.0' S=0.0016 '/' Capacity=1,217.16 cfs Outflow=3.80 cfs 1.821 af

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 9

Pond B1: BIO 1

Peak Elev=797.69' Storage=4,920 cf Inflow=4.23 cfs 0.388 af
Primary=2.95 cfs 0.388 af Secondary=0.00 cfs 0.000 af Outflow=2.95 cfs 0.388 af

Pond B2: BIO 2

Peak Elev=795.97' Storage=6,974 cf Inflow=4.14 cfs 0.392 af
Primary=1.39 cfs 0.392 af Secondary=0.00 cfs 0.000 af Outflow=1.39 cfs 0.392 af

Pond B3: BIO 3

Peak Elev=795.55' Storage=1,279 cf Inflow=1.03 cfs 0.062 af
Outflow=0.16 cfs 0.062 af

Pond B4: BIO 4

Peak Elev=797.77' Storage=2,768 cf Inflow=2.56 cfs 0.175 af
Primary=1.03 cfs 0.175 af Secondary=0.00 cfs 0.000 af Outflow=1.03 cfs 0.175 af

Pond P1: POND 1

Peak Elev=793.92' Storage=14,455 cf Inflow=1.33 cfs 0.621 af
Outflow=0.32 cfs 0.513 af

Pond P2: POND 2

Peak Elev=794.78' Storage=6,962 cf Inflow=2.95 cfs 0.388 af
Outflow=0.33 cfs 0.353 af

Pond P3: POND 3

Peak Elev=795.79' Storage=2,479 cf Inflow=0.88 cfs 0.161 af
Primary=0.33 cfs 0.159 af Secondary=0.00 cfs 0.000 af Outflow=0.33 cfs 0.159 af

Pond SB1: SED 1

Peak Elev=795.23' Storage=13,860 cf Inflow=6.63 cfs 0.684 af
Primary=1.33 cfs 0.621 af Secondary=0.00 cfs 0.000 af Outflow=1.33 cfs 0.621 af

Pond SB2: SED 2

Peak Elev=796.32' Storage=1,419 cf Inflow=1.75 cfs 0.161 af
Primary=0.88 cfs 0.161 af Secondary=0.00 cfs 0.000 af Outflow=0.88 cfs 0.161 af

Link 9L: TOTAL SITE RUNNOFF

Inflow=3.80 cfs 1.821 af
Primary=3.80 cfs 1.821 af

Total Runoff Area = 30.400 ac Runoff Volume = 2.038 af Average Runoff Depth = 0.80"
64.77% Pervious = 19.690 ac 35.23% Impervious = 10.710 ac

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 10

Summary for Subcatchment PR-1: PR-1

Runoff = 6.63 cfs @ 12.40 hrs, Volume= 0.684 af, Depth= 0.77"
Routed to Pond SB1 : SED 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
3.400	98	Paved parking, HSG D
7.160	80	>75% Grass cover, Good, HSG D
* 0.140	98	POND
10.700	86	Weighted Average
7.160		66.92% Pervious Area
3.540		33.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	100	0.0175	0.09		Sheet Flow, First 100 Grass: Dense n= 0.240 P2= 2.19"
8.5	578	0.0050	1.14		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
0.6	147	0.0060	4.08	5.00	Pipe Channel, PIPE 1 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.1	25	0.0060	4.08	5.00	Pipe Channel, PIPE 2 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.7	180	0.0060	4.60	8.14	Pipe Channel, PIPE 3 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
28.1	1,030	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

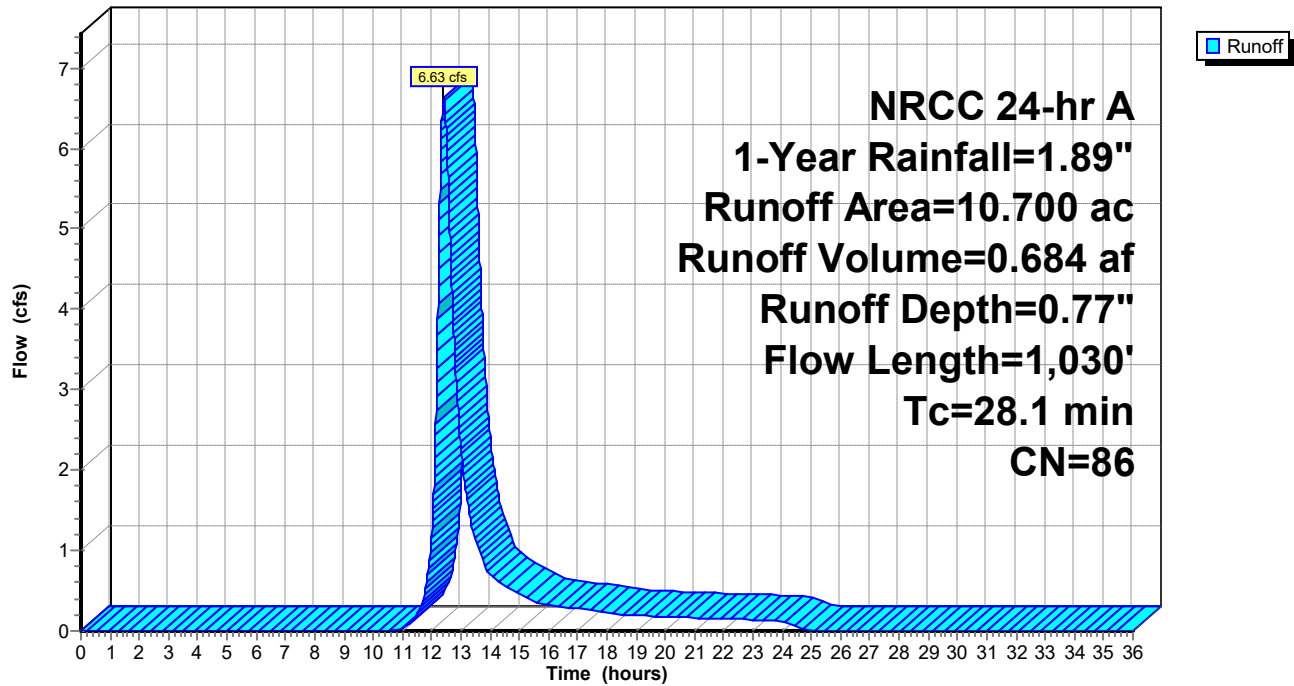
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 11

Subcatchment PR-1: PR-1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 12

Summary for Subcatchment PR-10: PR-10

Runoff = 0.08 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 0.50"
Routed to Reach 16R : South Channel 2

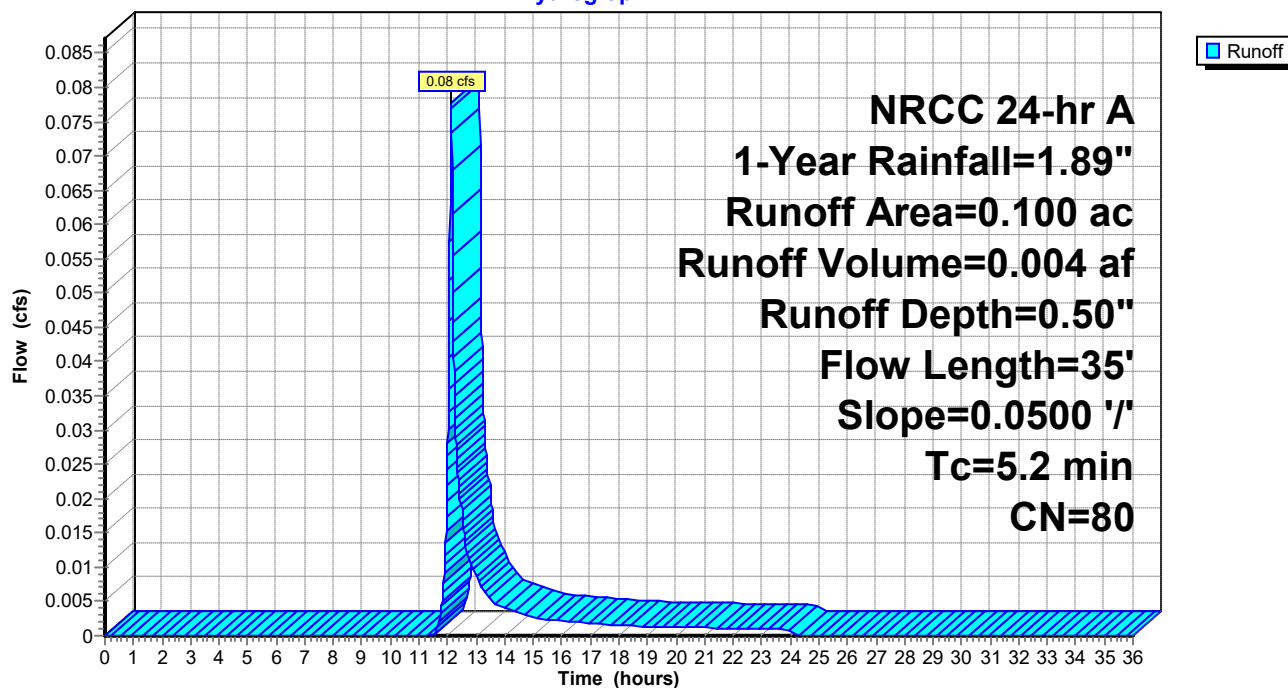
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-10: PR-10

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 13

Summary for Subcatchment PR-2: PR-2

Runoff = 1.75 cfs @ 12.35 hrs, Volume= 0.161 af, Depth= 0.72"
Routed to Pond SB2 : SED 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
1.930	80	>75% Grass cover, Good, HSG D
* 0.060	98	Wet Pond
2.700	85	Weighted Average
1.930		71.48% Pervious Area
0.770		28.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		Sheet Flow, FIRST 100' Grass: Short n= 0.150 P2= 2.19"
2.5	293	0.0090	1.93		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
2.3	164	0.0007	1.20	0.94	Pipe Channel, PIPE 1 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.7	91	0.0004	0.91	0.71	Pipe Channel, PIPE 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
22.1	648	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

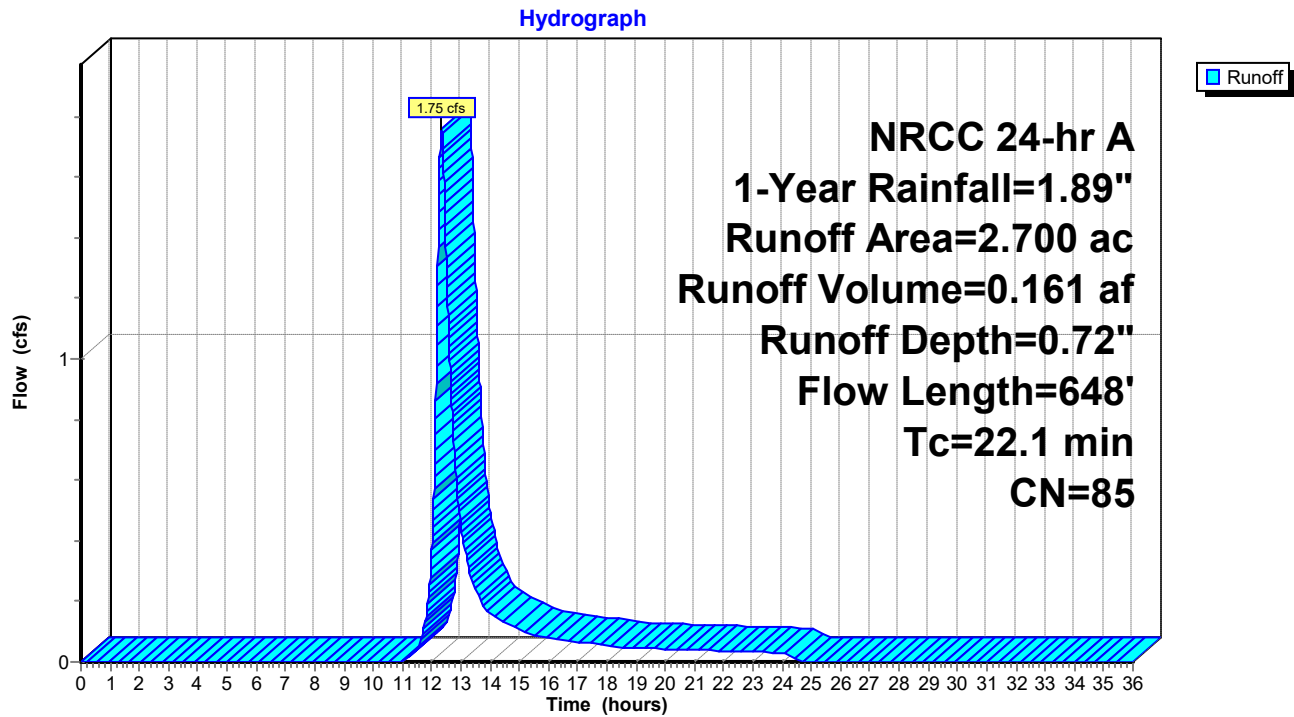
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 14

Subcatchment PR-2: PR-2



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 15

Summary for Subcatchment PR-3: PR-3

Runoff = 4.23 cfs @ 12.34 hrs, Volume= 0.388 af, Depth= 0.88"
Routed to Pond B1 : BIO 1

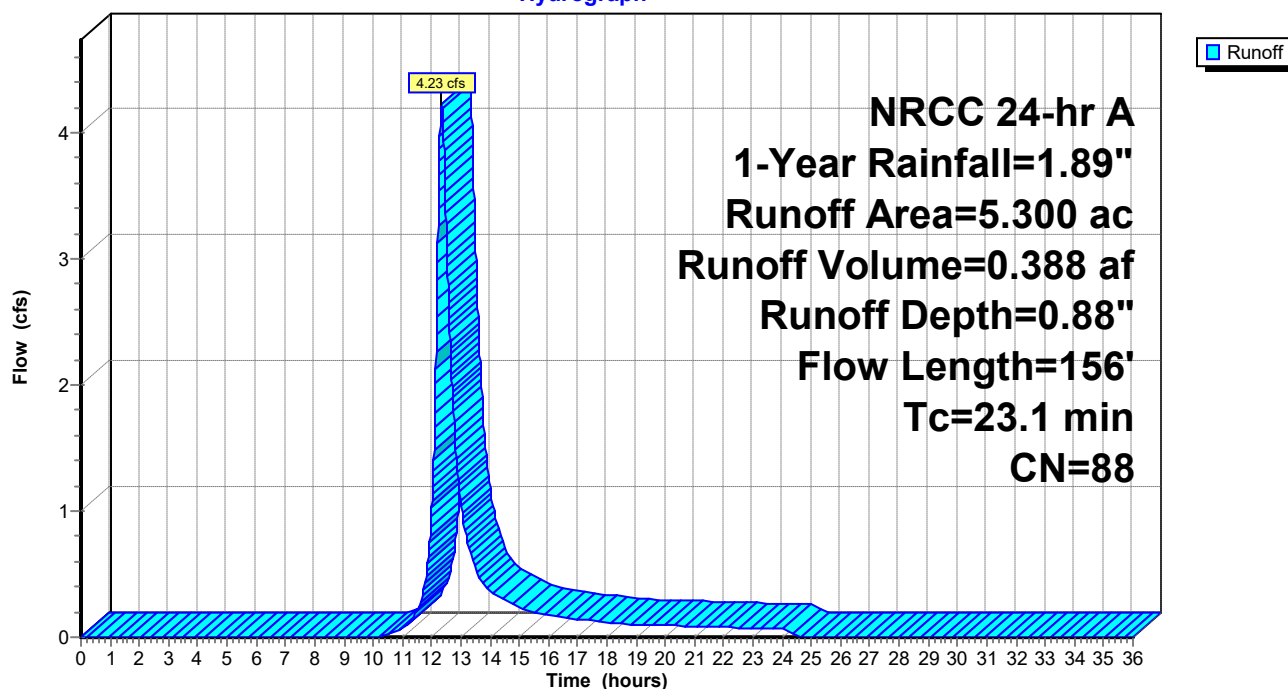
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
2.100	98	Paved parking, HSG D
3.010	80	>75% Grass cover, Good, HSG D
* 0.190	98	Wet Pond
5.300	88	Weighted Average
3.010		56.79% Pervious Area
2.290		43.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
0.3	56	0.0530	3.71		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
23.1	156	Total			

Subcatchment PR-3: PR-3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 16

Summary for Subcatchment PR-4: PR-4

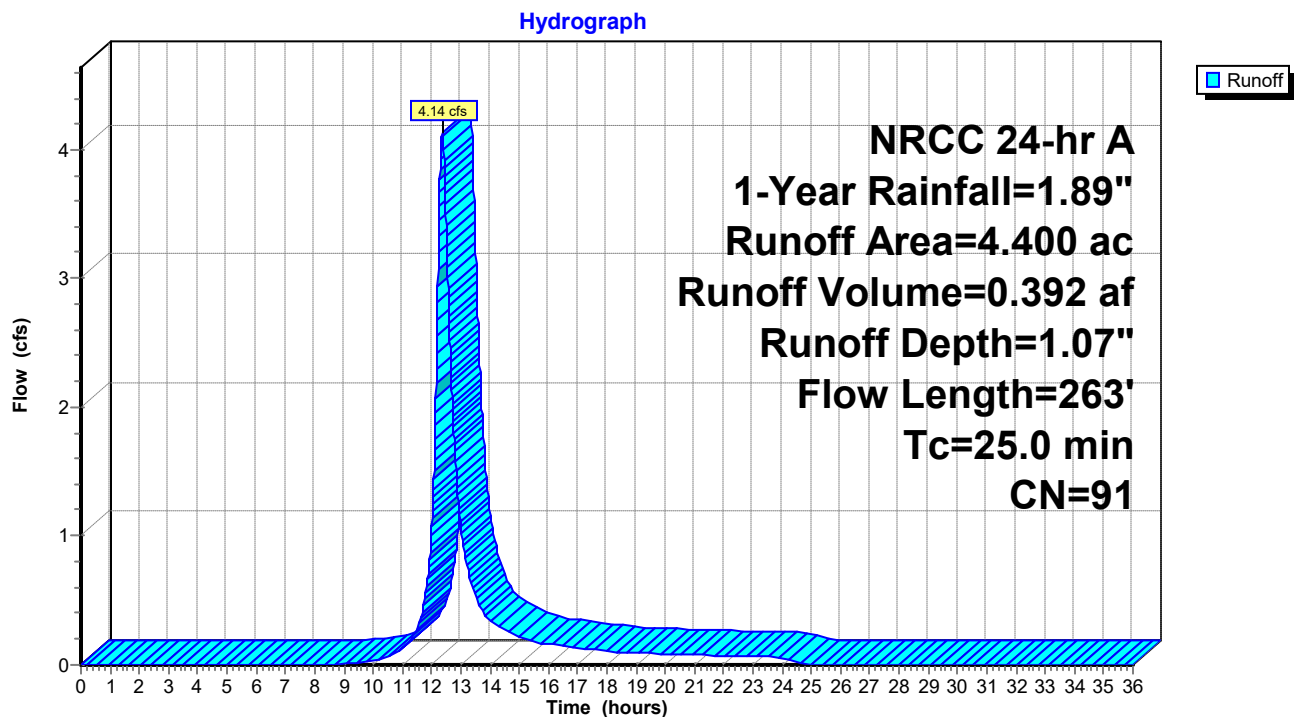
Runoff = 4.14 cfs @ 12.36 hrs, Volume= 0.392 af, Depth= 1.07"
Routed to Pond B2 : BIO 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
2.630	98	Paved parking, HSG D
1.770	80	>75% Grass cover, Good, HSG D
4.400	91	Weighted Average
1.770		40.23% Pervious Area
2.630		59.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
2.2	163	0.0060	1.25		Shallow Concentrated Flow, SCF Grass
					Unpaved Kv= 16.1 fps
25.0	263	Total			

Subcatchment PR-4: PR-4



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 17

Summary for Subcatchment PR-5: PR-5

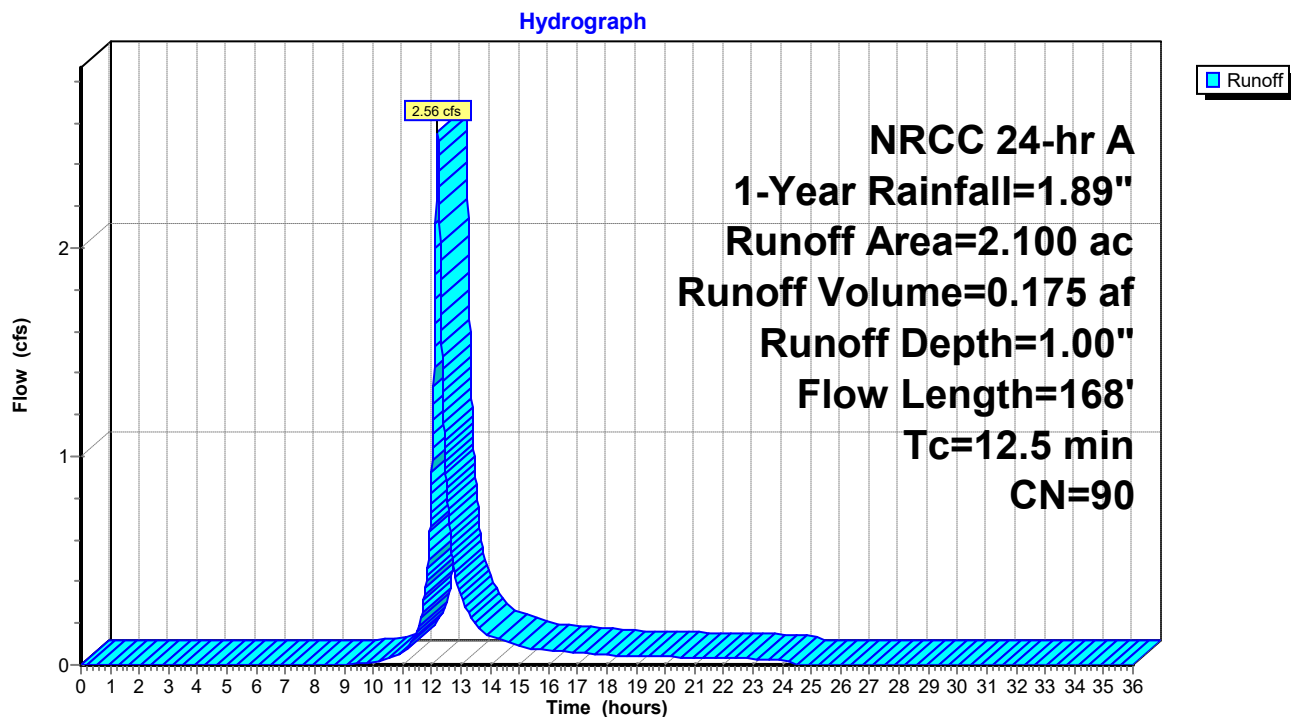
Runoff = 2.56 cfs @ 12.21 hrs, Volume= 0.175 af, Depth= 1.00"
Routed to Pond B4 : BIO 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
1.130	98	Paved parking, HSG D
0.970	80	>75% Grass cover, Good, HSG D
2.100	90	Weighted Average
0.970		46.19% Pervious Area
1.130		53.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	58	0.0170	0.08		Sheet Flow, First 58
					Grass: Dense n= 0.240 P2= 2.19"
0.6	110	0.0230	3.08		Shallow Concentrated Flow, Pave Surf
					Paved Kv= 20.3 fps
12.5	168	Total			

Subcatchment PR-5: PR-5



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 18

Summary for Subcatchment PR-6: PR-6

Runoff = 1.03 cfs @ 12.17 hrs, Volume= 0.062 af, Depth= 0.82"
Routed to Pond B3 : BIO 3

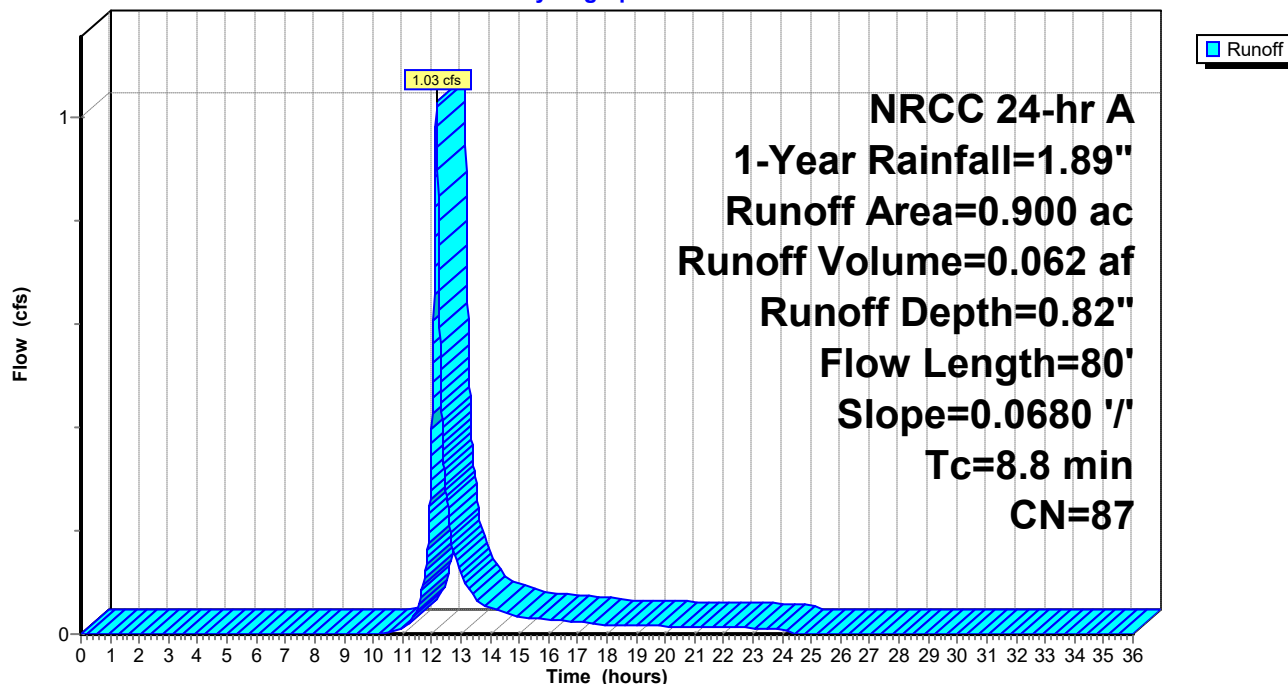
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.350	98	Paved parking, HSG D
0.550	80	>75% Grass cover, Good, HSG D
0.900	87	Weighted Average
0.550		61.11% Pervious Area
0.350		38.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	80	0.0680	0.15		Sheet Flow, SF 80'
Grass: Dense n= 0.240 P2= 2.19"					

Subcatchment PR-6: PR-6

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 19

Summary for Subcatchment PR-7: PR-7

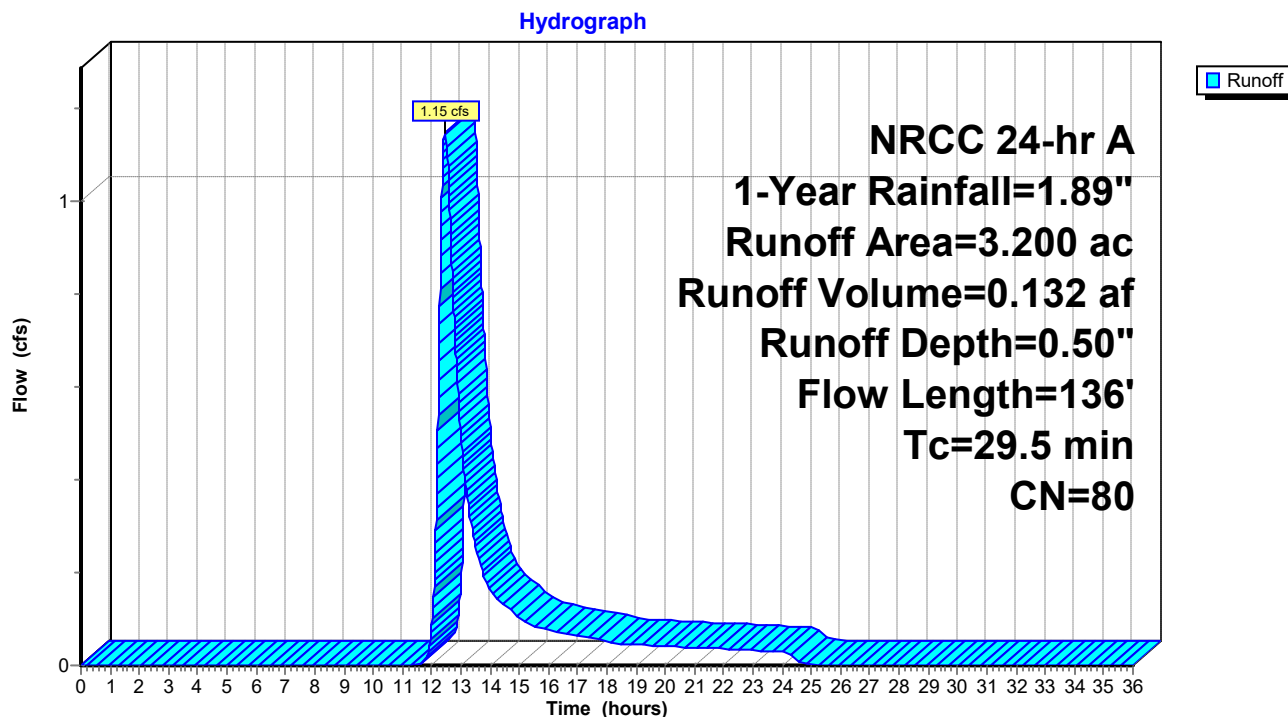
Runoff = 1.15 cfs @ 12.46 hrs, Volume= 0.132 af, Depth= 0.50"
Routed to Reach 18R : North Channel Section 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
1.300	79	Woods/grass comb., Good, HSG D
1.900	80	>75% Grass cover, Good, HSG D
3.200	80	Weighted Average
3.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	100	0.0150	0.06		Sheet Flow, First 100
					Woods: Light underbrush n= 0.400 P2= 2.19"
0.4	36	0.0800	1.41		Shallow Concentrated Flow, SCF
					Woodland Kv= 5.0 fps
29.5	136	Total			

Subcatchment PR-7: PR-7



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 20

Summary for Subcatchment PR-8: PR-8

Runoff = 0.23 cfs @ 12.13 hrs, Volume= 0.012 af, Depth= 0.50"
Routed to Reach 11R : West Channel

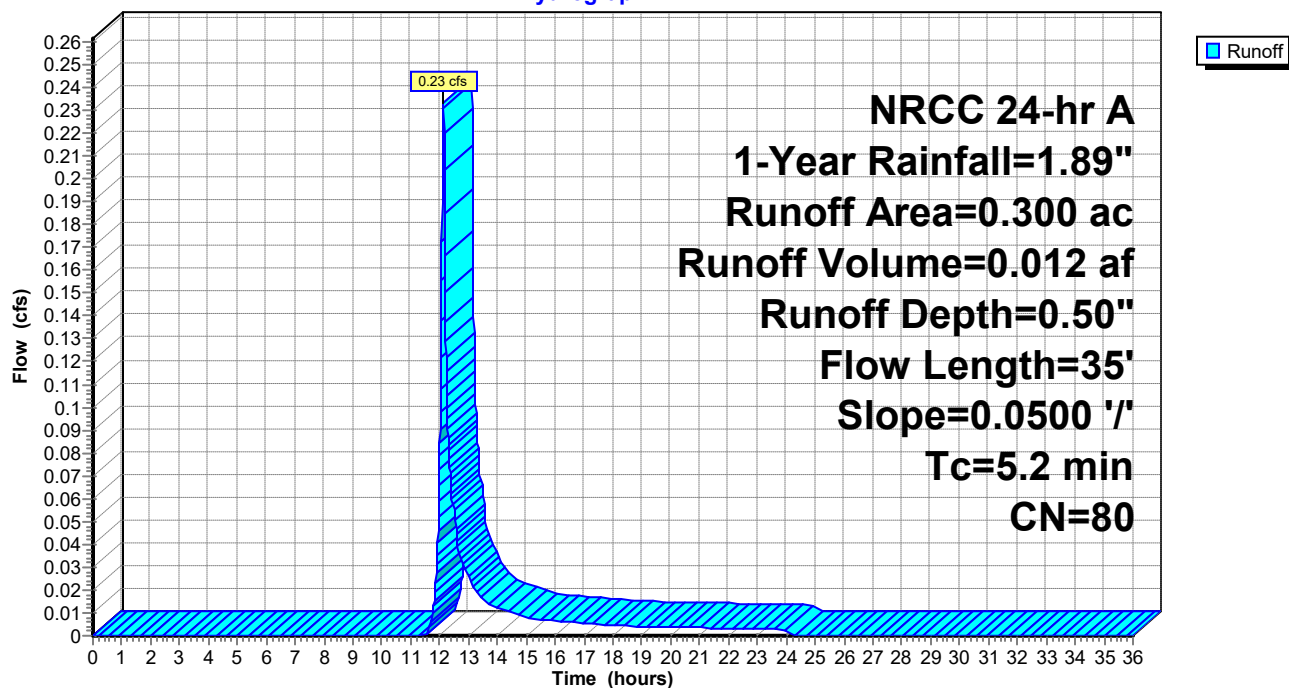
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.300	80	>75% Grass cover, Good, HSG D
0.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35
Grass: Dense n= 0.240 P2= 2.19"					

Subcatchment PR-8: PR-8

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 21

Summary for Subcatchment PR-9: PR-9

Runoff = 0.45 cfs @ 12.17 hrs, Volume= 0.029 af, Depth= 0.50"
Routed to Reach 12R : East Channel

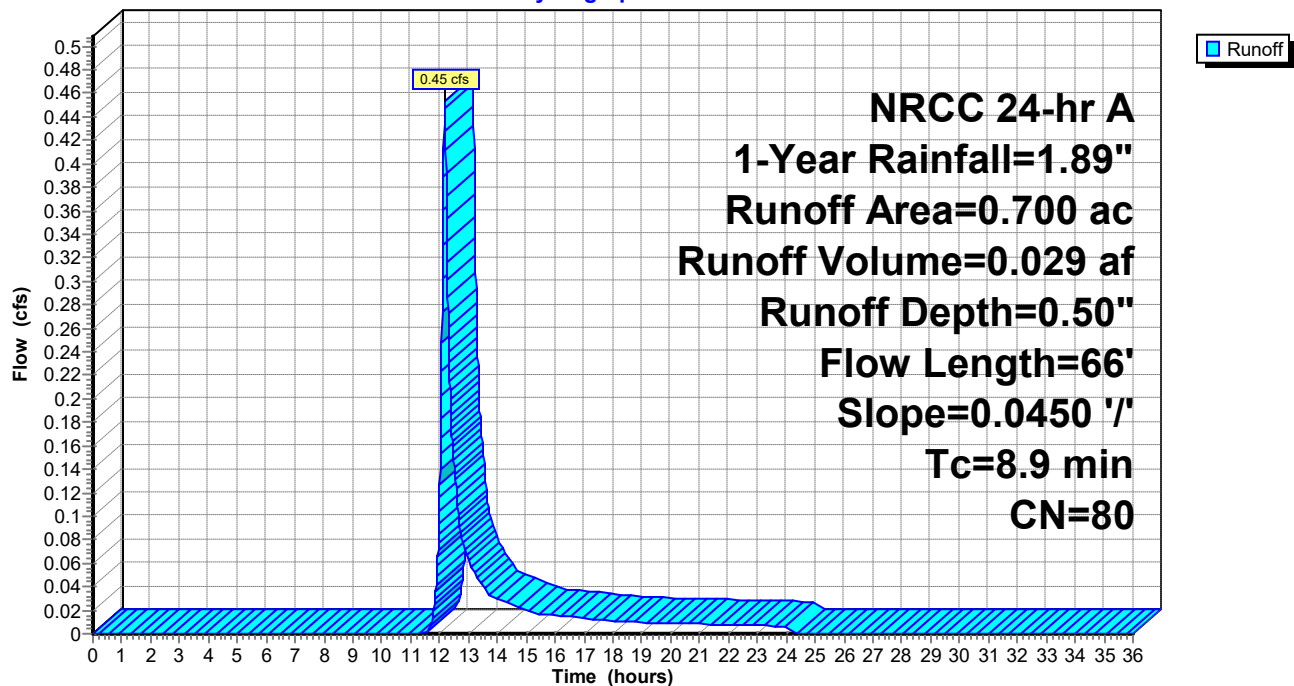
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-Year Rainfall=1.89"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	66	0.0450	0.12		Sheet Flow, First 66 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-9: PR-9

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 22

Summary for Reach 11R: West Channel

Inflow Area = 2.400 ac, 47.08% Impervious, Inflow Depth = 0.94" for 1-Year event
Inflow = 1.09 cfs @ 12.44 hrs, Volume= 0.188 af
Outflow = 1.07 cfs @ 12.52 hrs, Volume= 0.188 af, Atten= 1%, Lag= 4.5 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.42 fps, Min. Travel Time= 4.5 min

Avg. Velocity= 0.65 fps, Avg. Travel Time= 10.0 min

Peak Storage= 293 cf @ 12.52 hrs

Average Depth at Peak Storage= 0.17' , Surface Width= 5.01'

Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

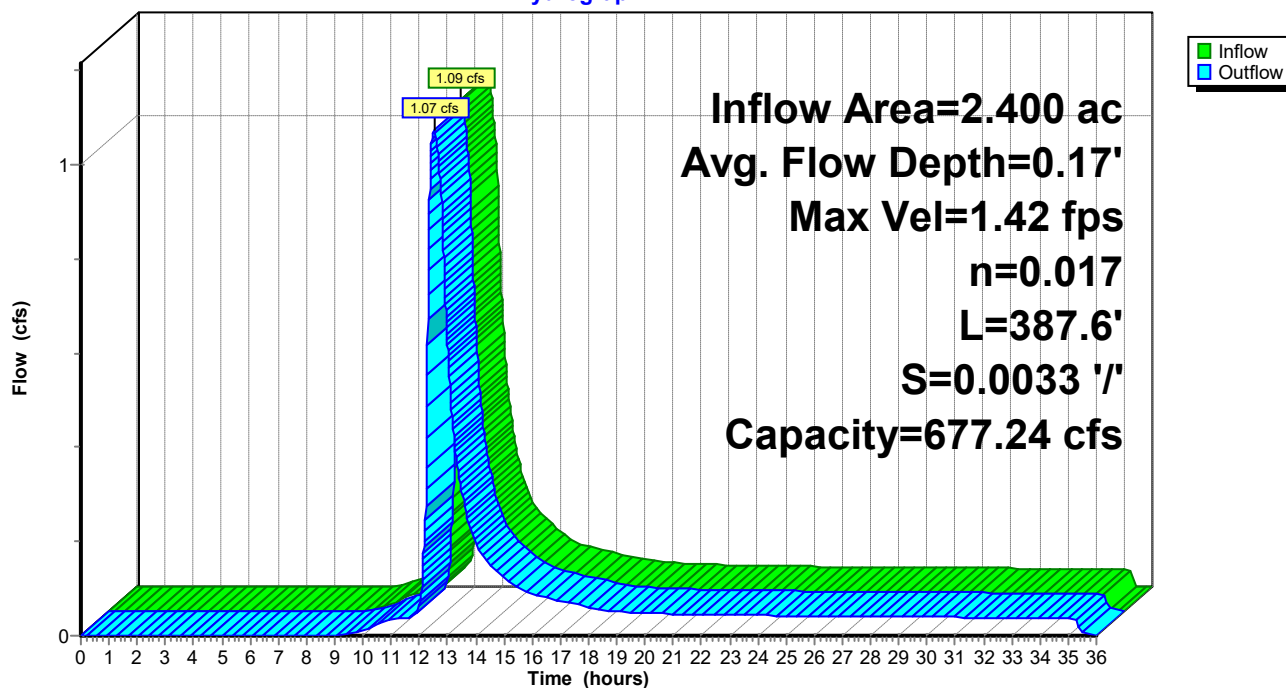
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 23

Summary for Reach 12R: East Channel

Inflow Area = 3.400 ac, 22.65% Impervious, Inflow Depth > 0.66" for 1-Year event
Inflow = 0.49 cfs @ 12.18 hrs, Volume= 0.188 af
Outflow = 0.37 cfs @ 13.49 hrs, Volume= 0.188 af, Atten= 24%, Lag= 78.9 min
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.65 fps, Min. Travel Time= 12.3 min

Avg. Velocity= 0.39 fps, Avg. Travel Time= 20.3 min

Peak Storage= 275 cf @ 13.49 hrs

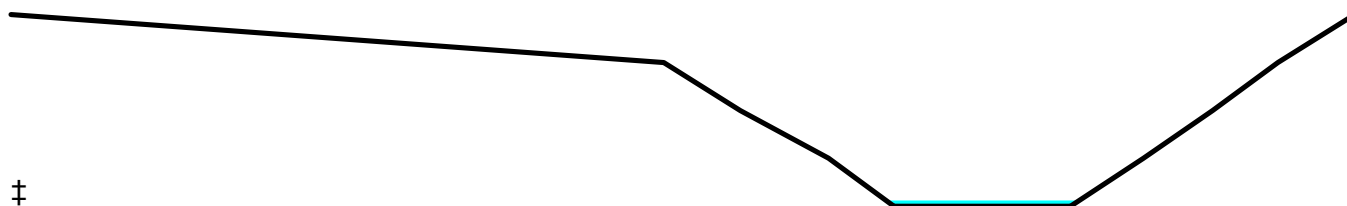
Average Depth at Peak Storage= 0.12' , Surface Width= 5.03'

Bank-Full Depth= 4.00' Flow Area= 56.3 sf, Capacity= 207.35 cfs

Custom cross-section, Length= 479.0' Slope= 0.0031 '/'

Constant n= 0.030

Inlet Invert= 794.50', Outlet Invert= 793.00'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-25.00	798.00	0.00
-8.00	797.00	1.00
-6.00	796.00	2.00
-3.70	795.00	3.00
-2.00	794.00	4.00
2.60	794.00	4.00
4.50	795.00	3.00
6.30	796.00	2.00
8.00	797.00	1.00
10.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	4.6	0.0	0	0.00
1.00	6.4	8.7	8.2	3,066	14.44
2.00	16.6	13.3	12.3	7,975	53.64
3.00	30.8	17.5	16.0	14,753	124.48
4.00	56.3	36.8	35.0	26,968	207.35

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

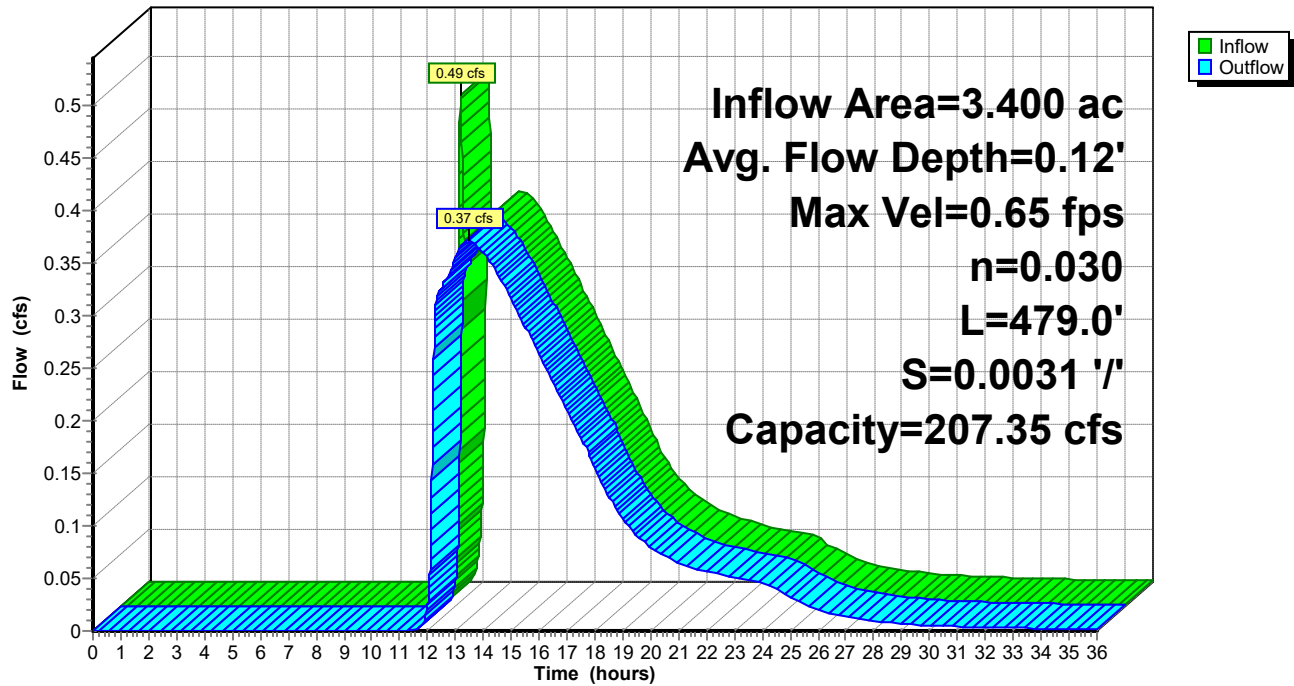
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 24

Reach 12R: East Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 25

Summary for Reach 13R: North Channel Section 1

Inflow Area = 16.500 ac, 43.45% Impervious, Inflow Depth > 0.86" for 1-Year event
Inflow = 3.04 cfs @ 12.75 hrs, Volume= 1.185 af
Outflow = 3.01 cfs @ 12.82 hrs, Volume= 1.183 af, Atten= 1%, Lag= 4.2 min
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.04 fps, Min. Travel Time= 6.4 min

Avg. Velocity= 0.53 fps, Avg. Travel Time= 12.7 min

Peak Storage= 1,162 cf @ 12.82 hrs

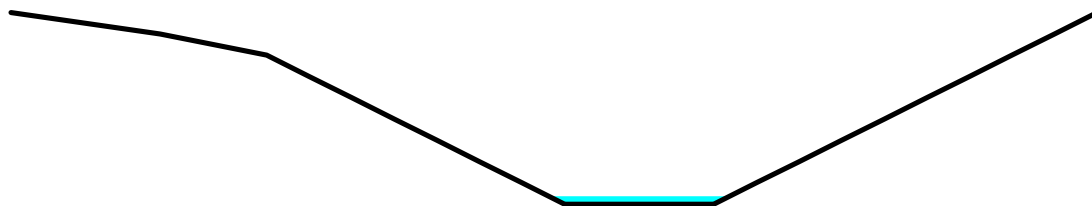
Average Depth at Peak Storage= 0.37' , Surface Width= 8.50'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,299.91 cfs

Custom cross-section, Length= 400.0' Slope= 0.0019 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 790.50'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

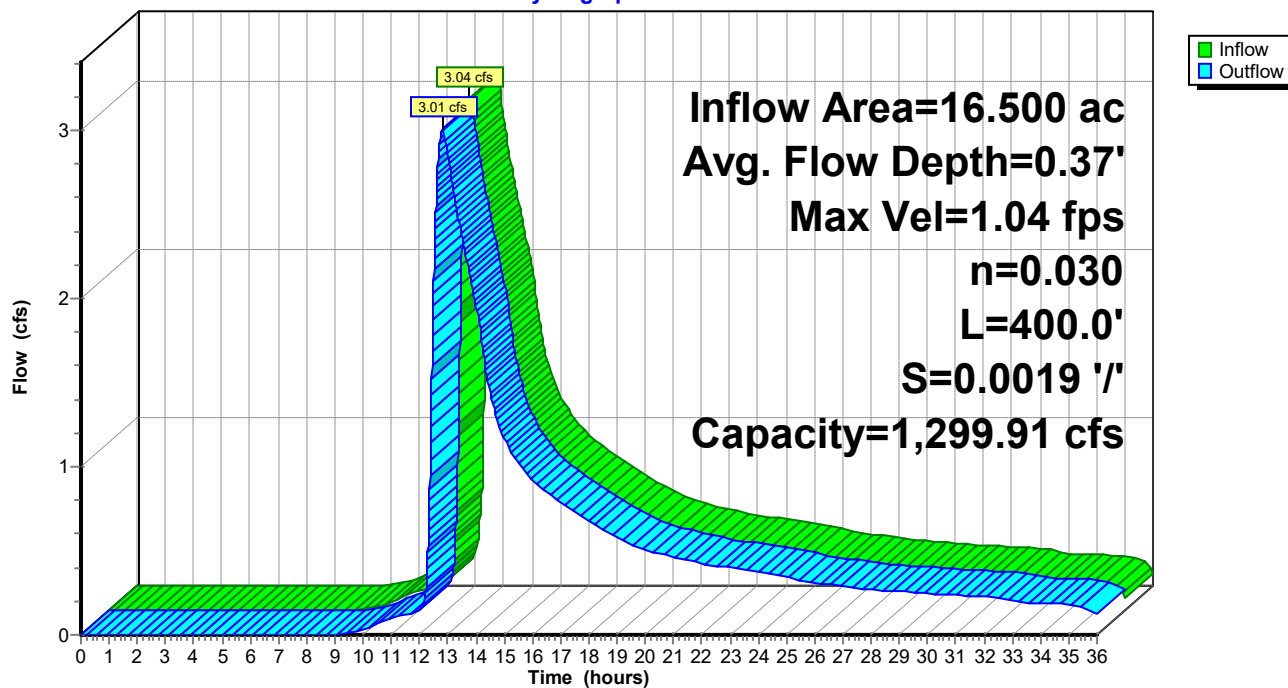
Printed 6/24/2025

Page 26

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	3,600	16.42
2.00	22.0	15.9	15.0	8,800	58.48
3.00	39.0	20.4	19.0	15,600	128.78
4.00	60.0	24.9	23.0	24,000	231.38
5.00	85.0	29.4	27.0	34,000	370.33
6.00	114.0	33.8	31.0	45,600	549.56
7.00	147.0	38.3	35.0	58,800	772.84
8.00	185.5	45.6	42.0	74,200	1,013.31
9.00	232.0	54.9	51.0	92,800	1,299.91

Reach 13R: North Channel Section 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 27

Summary for Reach 15R: East Channel 2

Inflow Area = 8.700 ac, 35.17% Impervious, Inflow Depth > 0.75" for 1-Year event
Inflow = 0.69 cfs @ 13.69 hrs, Volume= 0.541 af
Outflow = 0.69 cfs @ 13.73 hrs, Volume= 0.541 af, Atten= 0%, Lag= 2.4 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.07 fps, Min. Travel Time= 3.3 min

Avg. Velocity= 0.75 fps, Avg. Travel Time= 4.7 min

Peak Storage= 137 cf @ 13.73 hrs

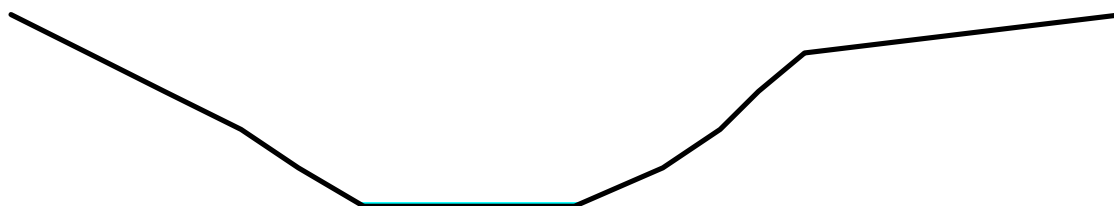
Average Depth at Peak Storage= 0.11', Surface Width= 5.95'

Bank-Full Depth= 5.00' Flow Area= 73.5 sf, Capacity= 599.19 cfs

Custom cross-section, Length= 212.0' Slope= 0.0088 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 793.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-12.00	798.00	0.00
-10.00	797.00	1.00
-8.00	796.00	2.00
-6.00	795.00	3.00
-4.50	794.00	4.00
-2.80	793.00	5.00
2.70	793.00	5.00
5.00	794.00	4.00
6.50	795.00	3.00
7.50	796.00	2.00
8.70	797.00	1.00
17.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.5	0.0	0	0.00
1.00	7.5	10.0	9.5	1,590	28.84
2.00	18.5	13.6	12.5	3,922	105.73
3.00	32.5	17.2	15.5	6,890	230.76
4.00	49.6	21.0	18.7	10,515	408.79
5.00	73.5	31.6	29.0	15,571	599.19

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

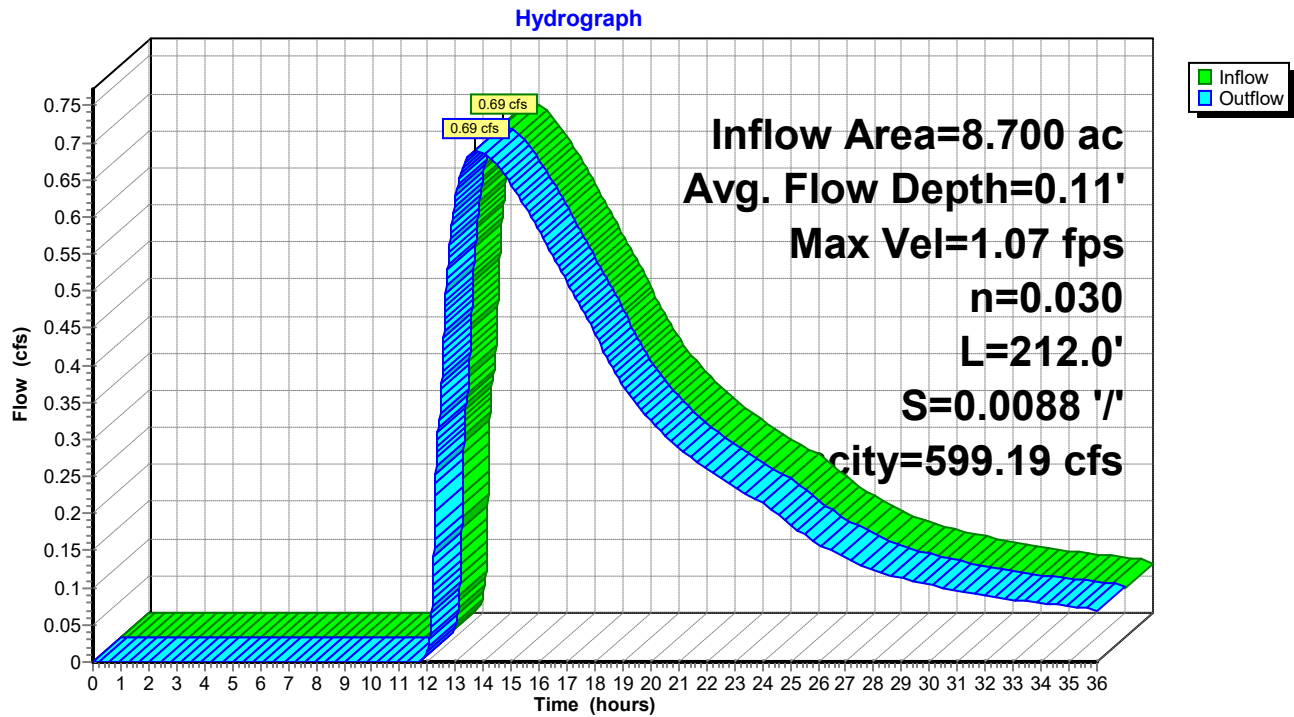
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 28

Reach 15R: East Channel 2



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 29

Summary for Reach 16R: South Channel 2

Inflow Area = 5.400 ac, 55.19% Impervious, Inflow Depth = 1.02" for 1-Year event
Inflow = 1.56 cfs @ 12.83 hrs, Volume= 0.457 af
Outflow = 1.56 cfs @ 12.86 hrs, Volume= 0.457 af, Atten= 0%, Lag= 1.3 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.51 fps, Min. Travel Time= 1.8 min

Avg. Velocity= 0.83 fps, Avg. Travel Time= 3.3 min

Peak Storage= 167 cf @ 12.86 hrs

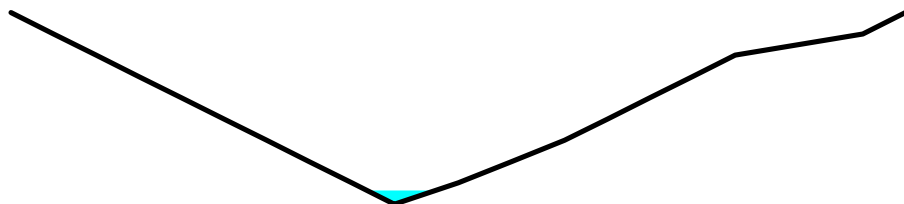
Average Depth at Peak Storage= 0.64' , Surface Width= 3.21'

Bank-Full Depth= 9.00' Flow Area= 183.5 sf, Capacity= 1,557.04 cfs

Custom cross-section, Length= 162.0' Slope= 0.0046 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 792.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-18.00	800.00	0.00
-16.00	799.00	1.00
-14.00	798.00	2.00
-12.00	797.00	3.00
-10.00	796.00	4.00
-8.00	795.00	5.00
-6.00	794.00	6.00
-4.00	793.00	7.00
-2.00	792.00	8.00
0.00	791.00	9.00
3.00	792.00	8.00
5.50	793.00	7.00
8.00	794.00	6.00
10.00	795.00	5.00
12.00	796.00	4.00
14.00	797.00	3.00
16.00	798.00	2.00
22.00	799.00	1.00
24.00	800.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

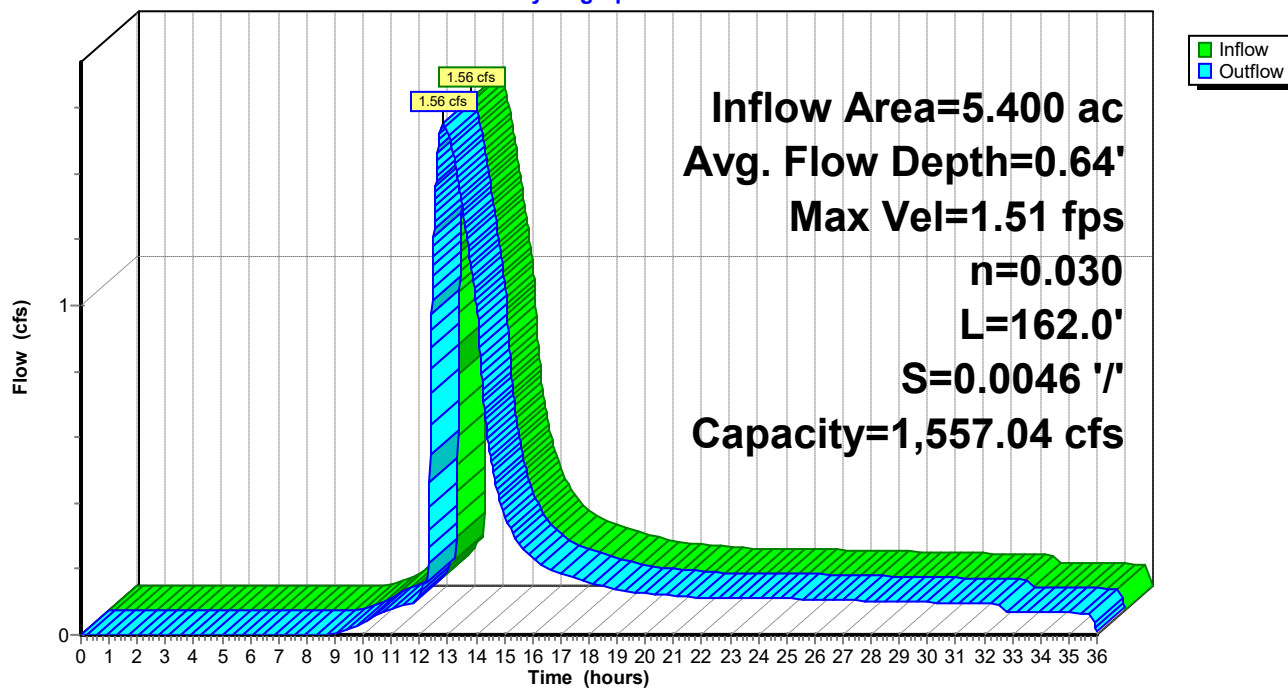
Printed 6/24/2025

Page 30

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
1.00	2.5	5.4	5.0	405	5.04
2.00	9.8	10.3	9.5	1,580	31.62
3.00	21.5	15.3	14.0	3,483	91.09
4.00	37.5	19.7	18.0	6,075	193.94
5.00	57.5	24.2	22.0	9,315	345.07
6.00	81.5	28.7	26.0	13,203	551.18
7.00	109.5	33.1	30.0	17,739	818.63
8.00	143.5	41.5	38.0	23,247	1,106.58
9.00	183.5	45.9	42.0	29,727	1,557.04

Reach 16R: South Channel 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 31

Summary for Reach 18R: North Channel Section 2

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 0.72" for 1-Year event
Inflow = 3.85 cfs @ 12.73 hrs, Volume= 1.828 af
Outflow = 3.80 cfs @ 12.82 hrs, Volume= 1.821 af, Atten= 1%, Lag= 5.4 min
Routed to Link 9L : TOTAL SITE RUNNOFF

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.09 fps, Min. Travel Time= 6.6 min

Avg. Velocity= 0.59 fps, Avg. Travel Time= 12.2 min

Peak Storage= 1,494 cf @ 12.82 hrs

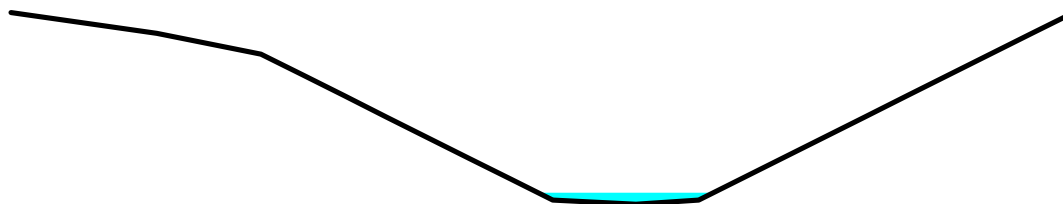
Average Depth at Peak Storage= 0.56' , Surface Width= 8.44'

Bank-Full Depth= 9.20' Flow Area= 232.7 sf, Capacity= 1,217.16 cfs

Custom cross-section, Length= 430.0' Slope= 0.0016 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 790.50', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
0.00	789.80	9.20
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

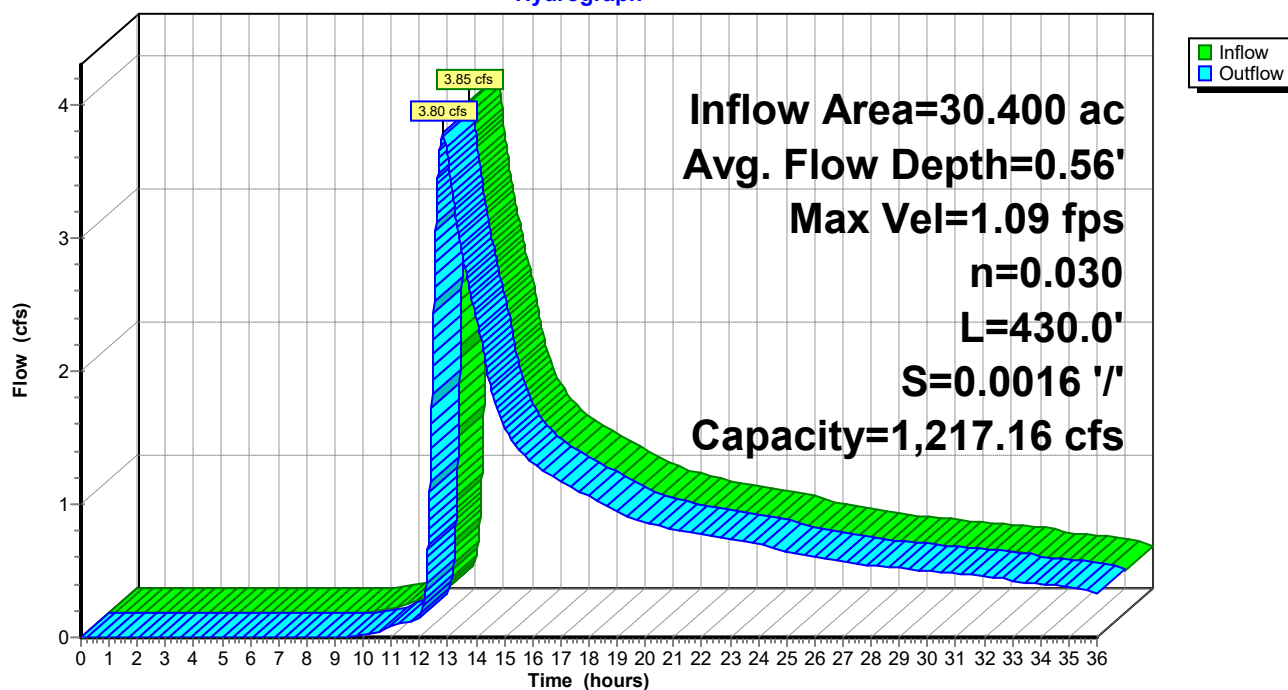
Printed 6/24/2025

Page 32

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
0.20	0.7	7.0	7.0	301	0.30
1.20	9.7	11.5	11.0	4,171	17.33
2.20	22.7	16.0	15.0	9,761	57.39
3.20	39.7	20.4	19.0	17,071	123.56
4.20	60.7	24.9	23.0	26,101	219.73
5.20	85.7	29.4	27.0	36,851	349.72
6.20	114.7	33.8	31.0	49,321	517.20
7.20	147.7	38.3	35.0	63,511	725.70
8.20	186.2	45.7	42.0	80,066	949.96
9.20	232.7	55.0	51.0	100,061	1,217.16

Reach 18R: North Channel Section 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 33

Summary for Pond B1: BIO 1

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth = 0.88" for 1-Year event
Inflow = 4.23 cfs @ 12.34 hrs, Volume= 0.388 af
Outflow = 2.95 cfs @ 12.54 hrs, Volume= 0.388 af, Atten= 30%, Lag= 11.6 min
Primary = 2.95 cfs @ 12.54 hrs, Volume= 0.388 af
Routed to Pond P2 : POND 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P2 : POND 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.69' @ 12.54 hrs Surf.Area= 9,035 sf Storage= 4,920 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 211.7 min (1,053.7 - 842.0)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	14,087 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
797.00	5,319	0	0
798.00	10,740	8,030	8,030
798.50	13,488	6,057	14,087

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	15.0" Round Culvert X 2.00 L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 7.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	797.90'	24.0" x 24.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#6	Secondary	798.00'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir X 4.00 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) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 34

Primary OutFlow Max=2.95 cfs @ 12.54 hrs HW=797.69' TW=794.24' (Dynamic Tailwater)

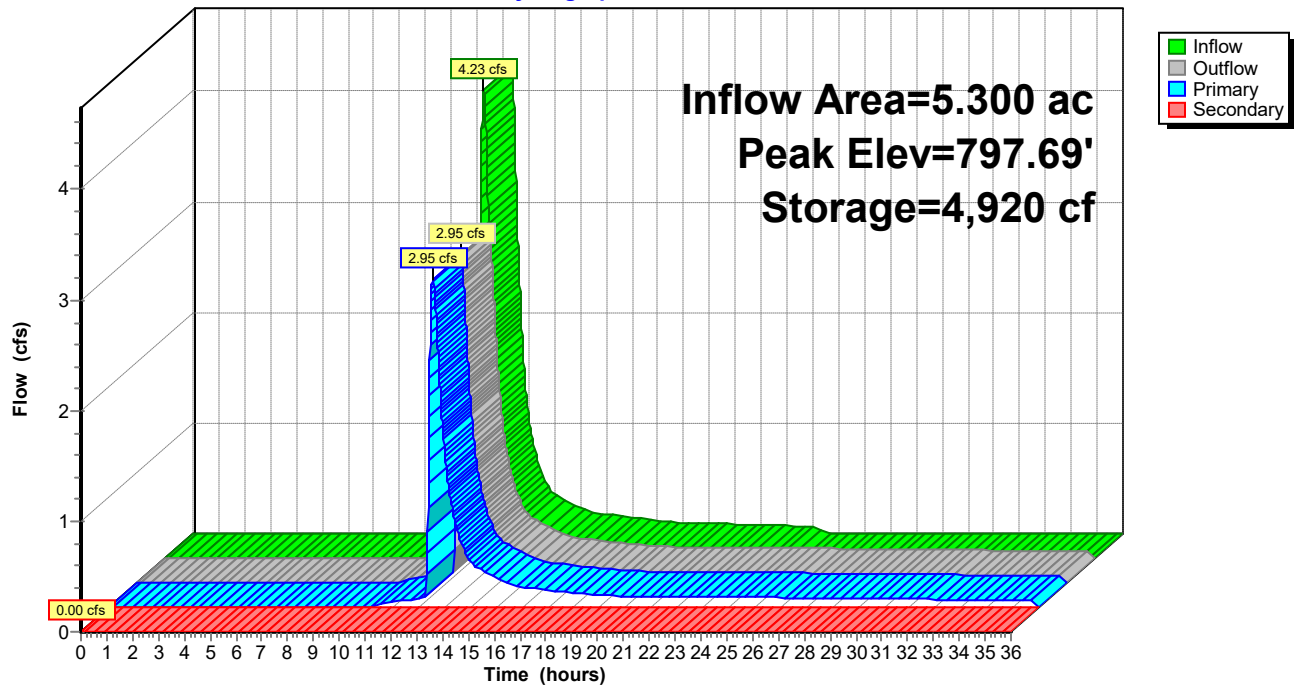
- 1=Culvert (Passes 2.95 cfs of 20.51 cfs potential flow)
- 2=Orifice/Grate (Passes 2.95 cfs of 3.50 cfs potential flow)
- 3=Exfiltration (Exfiltration Controls 0.10 cfs)
- 4=Orifice/Grate (Orifice Controls 2.85 cfs @ 2.07 fps)
- 5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=797.00' TW=794.00' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B1: BIO 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 35

Summary for Pond B2: BIO 2

Inflow Area = 4.400 ac, 59.77% Impervious, Inflow Depth = 1.07" for 1-Year event
Inflow = 4.14 cfs @ 12.36 hrs, Volume= 0.392 af
Outflow = 1.39 cfs @ 12.87 hrs, Volume= 0.392 af, Atten= 66%, Lag= 30.6 min
Primary = 1.39 cfs @ 12.87 hrs, Volume= 0.392 af
Routed to Reach 16R : South Channel 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.97' @ 12.87 hrs Surf.Area= 8,732 sf Storage= 6,974 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 224.7 min (1,055.9 - 831.2)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	24,112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	5,689	0	0
796.00	8,835	7,262	7,262
797.00	12,011	10,423	17,685
797.50	13,697	6,427	24,112

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	797.00'	8.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 36

Primary OutFlow Max=1.39 cfs @ 12.87 hrs HW=795.97' TW=792.64' (Dynamic Tailwater)

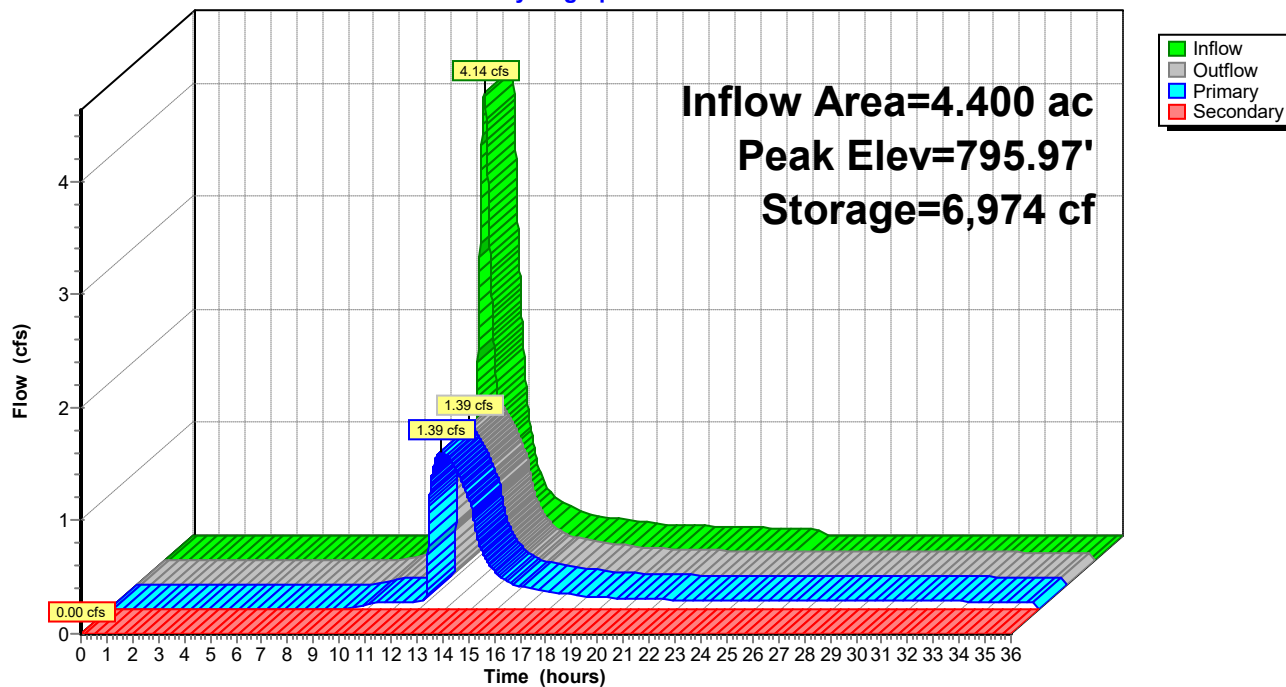
- 1=Culvert (Passes 1.39 cfs of 10.77 cfs potential flow)
- 2=Orifice/Grate (Passes 1.39 cfs of 1.72 cfs potential flow)
- 3=Exfiltration (Exfiltration Controls 0.10 cfs)
- 4=Orifice/Grate (Orifice Controls 1.29 cfs @ 3.29 fps)
- 5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=792.00' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B2: BIO 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 37

Summary for Pond B3: BIO 3

Inflow Area = 0.900 ac, 38.89% Impervious, Inflow Depth = 0.82" for 1-Year event
Inflow = 1.03 cfs @ 12.17 hrs, Volume= 0.062 af
Outflow = 0.16 cfs @ 12.74 hrs, Volume= 0.062 af, Atten= 85%, Lag= 34.4 min
Primary = 0.16 cfs @ 12.74 hrs, Volume= 0.062 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.55' @ 12.74 hrs Surf.Area= 2,635 sf Storage= 1,279 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 354.1 min (1,186.7 - 832.6)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	8,693 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	1,987	0	0
796.00	3,157	2,572	2,572
797.00	4,384	3,771	6,343
797.50	5,018	2,351	8,693

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 12.74 hrs HW=795.55' TW=792.64' (Dynamic Tailwater)

1=Culvert (Passes 0.16 cfs of 10.09 cfs potential flow)
2=Orifice/Grate (Passes 0.16 cfs of 1.61 cfs potential flow)
3=Exfiltration (Exfiltration Controls 0.03 cfs)
4=Orifice/Grate (Weir Controls 0.13 cfs @ 0.76 fps)
5=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

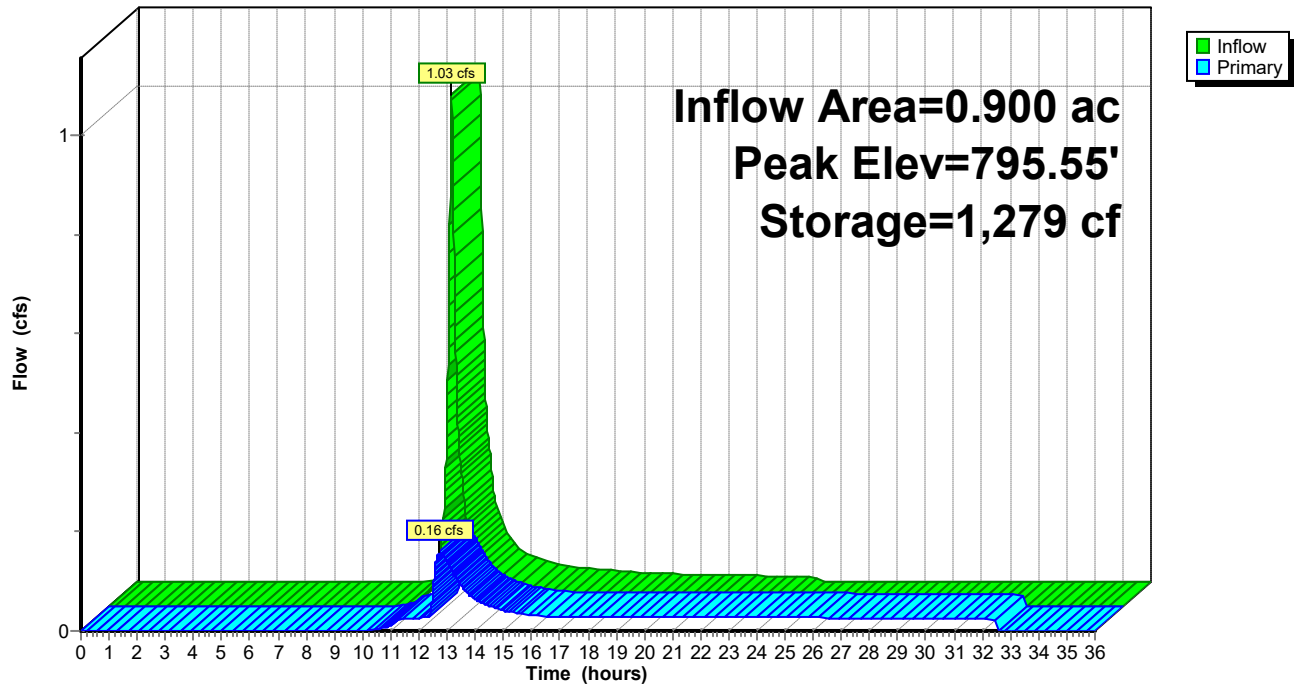
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 38

Pond B3: BIO 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 39

Summary for Pond B4: BIO 4

Inflow Area = 2.100 ac, 53.81% Impervious, Inflow Depth = 1.00" for 1-Year event
Inflow = 2.56 cfs @ 12.21 hrs, Volume= 0.175 af
Outflow = 1.03 cfs @ 12.45 hrs, Volume= 0.175 af, Atten= 60%, Lag= 14.8 min
Primary = 1.03 cfs @ 12.45 hrs, Volume= 0.175 af
Routed to Reach 11R : West Channel
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 11R : West Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.77' @ 12.45 hrs Surf.Area= 4,003 sf Storage= 2,768 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 242.2 min (1,066.1 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	11,425 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
797.00	3,198	336.0	0	0	3,198
798.00	4,260	373.0	3,716	3,716	5,315
799.00	5,435	410.0	4,836	8,552	7,654
799.50	6,065	430.0	2,874	11,425	9,007

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	10.0" Round Culvert L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	798.55'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	799.00'	10.0' long x 7.0' 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 40

Primary OutFlow Max=1.03 cfs @ 12.45 hrs HW=797.77' TW=794.45' (Dynamic Tailwater)

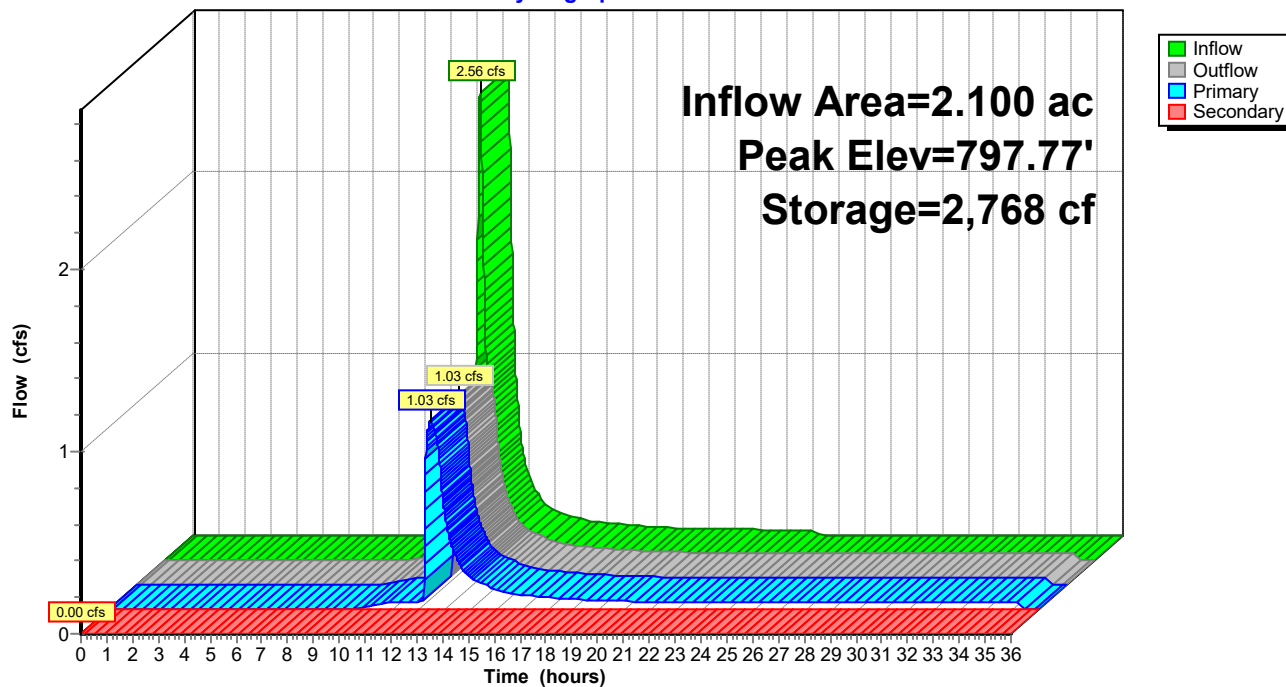
- 1=Culvert (Passes 1.03 cfs of 4.60 cfs potential flow)
- 2=Orifice/Grate (Passes 1.03 cfs of 1.72 cfs potential flow)
- 3=Exfiltration (Exfiltration Controls 0.05 cfs)
- 4=Orifice/Grate (Orifice Controls 0.98 cfs @ 2.50 fps)
- 5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=797.00' TW=794.28' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B4: BIO 4

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 41

Summary for Pond P1: POND 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth > 0.70" for 1-Year event
Inflow = 1.33 cfs @ 13.37 hrs, Volume= 0.621 af
Outflow = 0.32 cfs @ 18.27 hrs, Volume= 0.513 af, Atten= 76%, Lag= 294.3 min
Primary = 0.32 cfs @ 18.27 hrs, Volume= 0.513 af
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 793.92' @ 18.27 hrs Surf.Area= 9,149 sf Storage= 14,455 cf

Plug-Flow detention time= 516.1 min calculated for 0.513 af (83% of inflow)
Center-of-Mass det. time= 406.7 min (1,433.7 - 1,027.0)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	50,944 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	5,934	0	0
793.00	7,561	6,748	6,748
794.00	9,282	8,422	15,169
795.00	11,104	10,193	25,362
796.00	13,026	12,065	37,427
797.00	14,008	13,517	50,944

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	24.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	792.00'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	794.00'	20.0" W x 10.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	795.75'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.32 cfs @ 18.27 hrs HW=793.92' TW=790.81' (Dynamic Tailwater)

1=Culvert (Passes 0.32 cfs of 9.81 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.32 cfs @ 6.46 fps)
3=Orifice/Grate (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

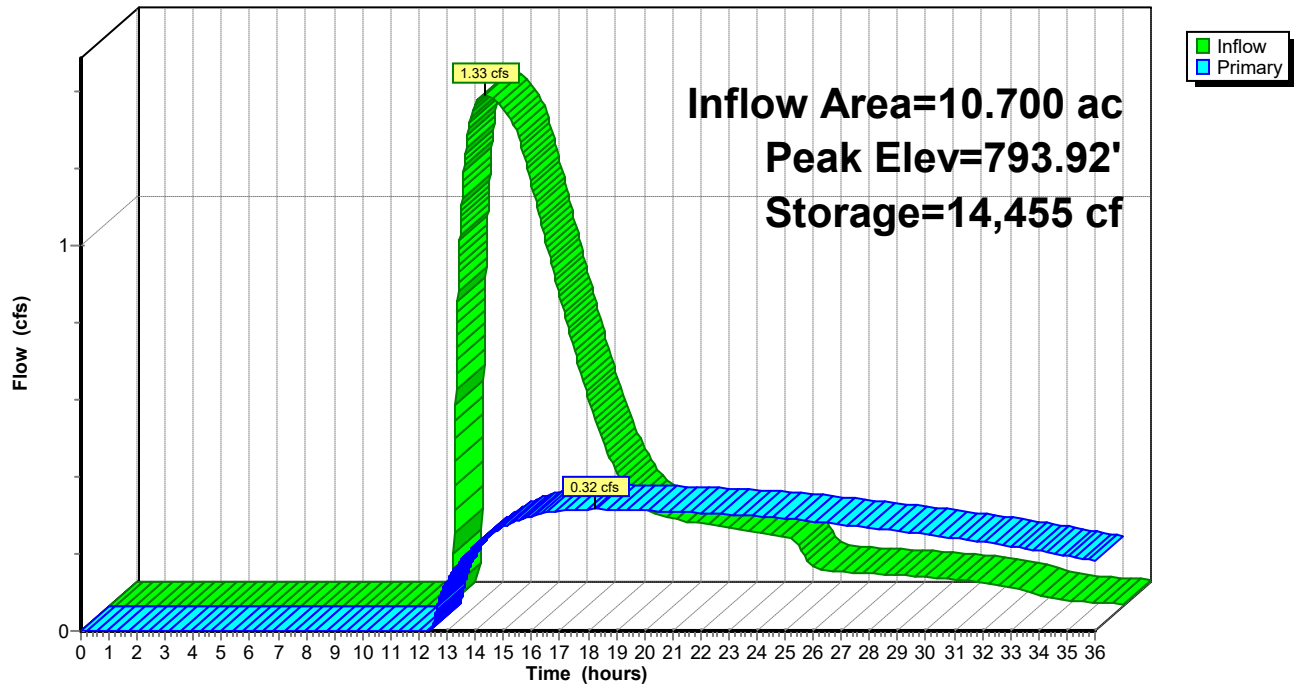
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 42

Pond P1: POND 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 43

Summary for Pond P2: POND 2

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth = 0.88" for 1-Year event
Inflow = 2.95 cfs @ 12.54 hrs, Volume= 0.388 af
Outflow = 0.33 cfs @ 14.46 hrs, Volume= 0.353 af, Atten= 89%, Lag= 115.4 min
Primary = 0.33 cfs @ 14.46 hrs, Volume= 0.353 af
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 794.78' @ 14.46 hrs Surf.Area= 9,808 sf Storage= 6,962 cf

Plug-Flow detention time= 298.3 min calculated for 0.353 af (91% of inflow)
Center-of-Mass det. time= 210.0 min (1,263.7 - 1,053.7)

Volume	Invert	Avail.Storage	Storage Description
#1	794.00'	60,439 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
794.00	8,143	0	0
795.00	10,289	9,216	9,216
796.00	12,675	11,482	20,698
797.00	15,212	13,944	34,642
798.00	17,852	16,532	51,174
798.50	19,211	9,266	60,439

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	794.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.50'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	796.60'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 14.46 hrs HW=794.78' TW=793.61' (Dynamic Tailwater)

1=Culvert (Passes 0.33 cfs of 1.26 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.33 cfs @ 3.76 fps)
3=Orifice/Grate (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

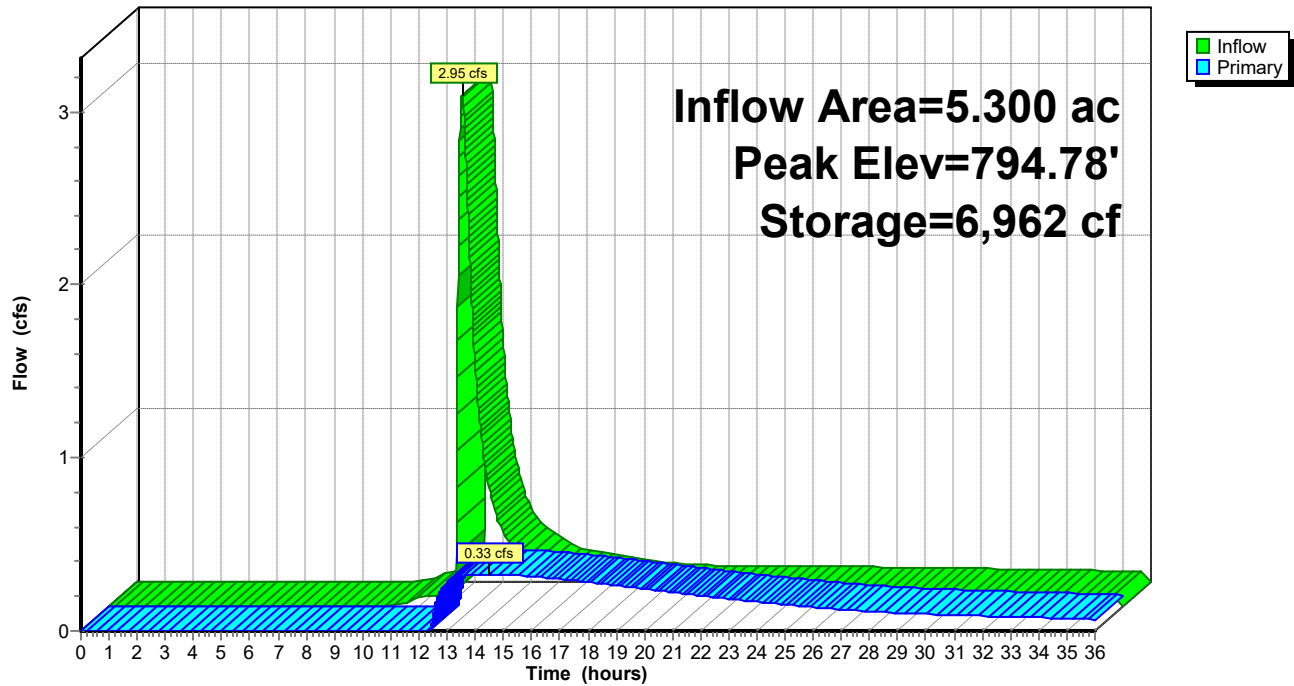
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 44

Pond P2: POND 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 45

Summary for Pond P3: POND 3

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth > 0.71" for 1-Year event
Inflow = 0.88 cfs @ 12.52 hrs, Volume= 0.161 af
Outflow = 0.33 cfs @ 13.62 hrs, Volume= 0.159 af, Atten= 62%, Lag= 65.8 min
Primary = 0.33 cfs @ 13.62 hrs, Volume= 0.159 af
Routed to Reach 12R : East Channel
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 12R : East Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.79' @ 13.62 hrs Surf.Area= 3,557 sf Storage= 2,479 cf

Plug-Flow detention time= 116.8 min calculated for 0.159 af (99% of inflow)
Center-of-Mass det. time= 109.9 min (997.4 - 887.6)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	10,321 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	2,710	0	0
796.00	3,780	3,245	3,245
797.00	5,016	4,398	7,643
797.50	5,697	2,678	10,321

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	15.0" Round Culvert L= 17.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 794.50' S= 0.0294 ' S= 0.0294 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	795.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.50'	36.0" W x 36.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long 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

Primary OutFlow Max=0.33 cfs @ 13.62 hrs HW=795.79' TW=794.62' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.33 cfs of 2.48 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 3.81 fps)
↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=794.50' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

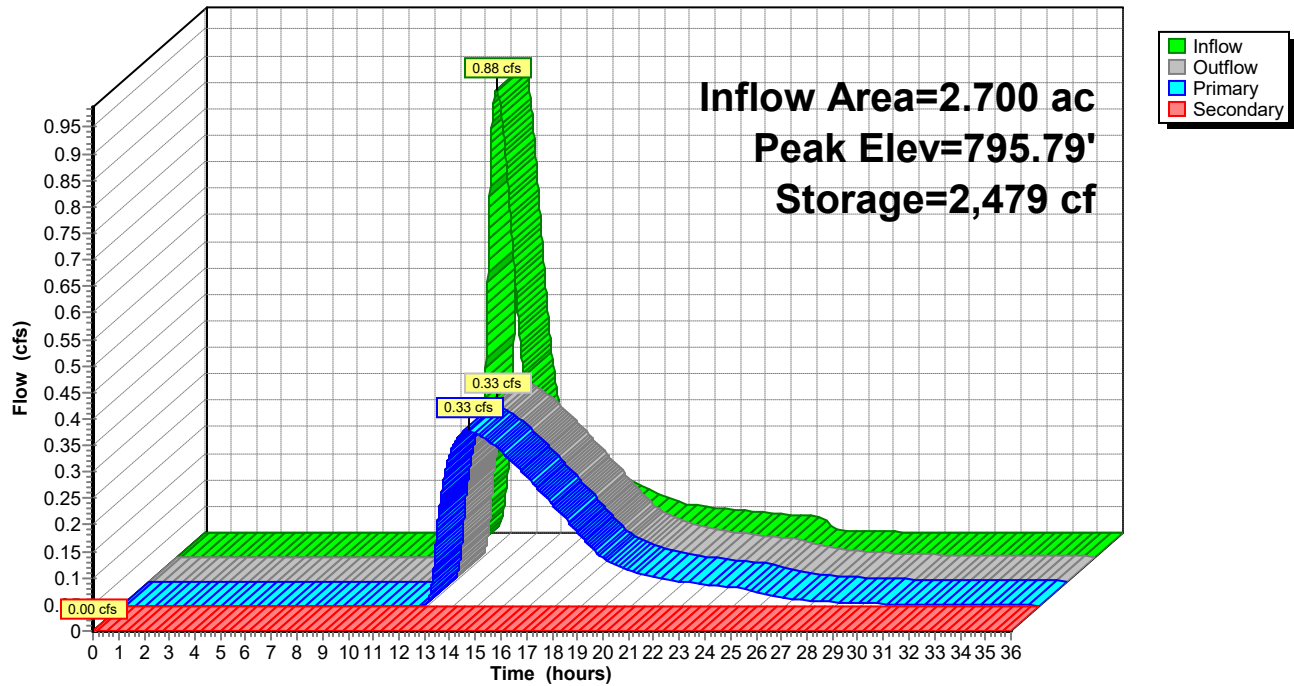
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 46

Pond P3: POND 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 47

Summary for Pond SB1: SED 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth = 0.77" for 1-Year event
Inflow = 6.63 cfs @ 12.40 hrs, Volume= 0.684 af
Outflow = 1.33 cfs @ 13.37 hrs, Volume= 0.621 af, Atten= 80%, Lag= 57.9 min
Primary = 1.33 cfs @ 13.37 hrs, Volume= 0.621 af
Routed to Pond P1 : POND 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P1 : POND 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.23' @ 13.37 hrs Surf.Area= 7,394 sf Storage= 13,860 cf

Plug-Flow detention time= 217.9 min calculated for 0.621 af (91% of inflow)
Center-of-Mass det. time= 172.6 min (1,027.0 - 854.4)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	23,675 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,977	0	0
793.00	3,138	2,558	2,558
794.00	4,415	3,777	6,334
795.00	7,275	5,845	12,179
796.50	8,053	11,496	23,675

Device	Routing	Invert	Outlet Devices
#1	Primary	793.00'	18.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 793.00' / 793.00' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	793.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.40'	36.0" x 36.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#4	Secondary	795.80'	15.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 2.00 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

Primary OutFlow Max=1.33 cfs @ 13.37 hrs HW=795.23' TW=792.65' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 1.33 cfs of 18.18 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 1.33 cfs @ 6.77 fps)
↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=792.00' TW=792.00' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

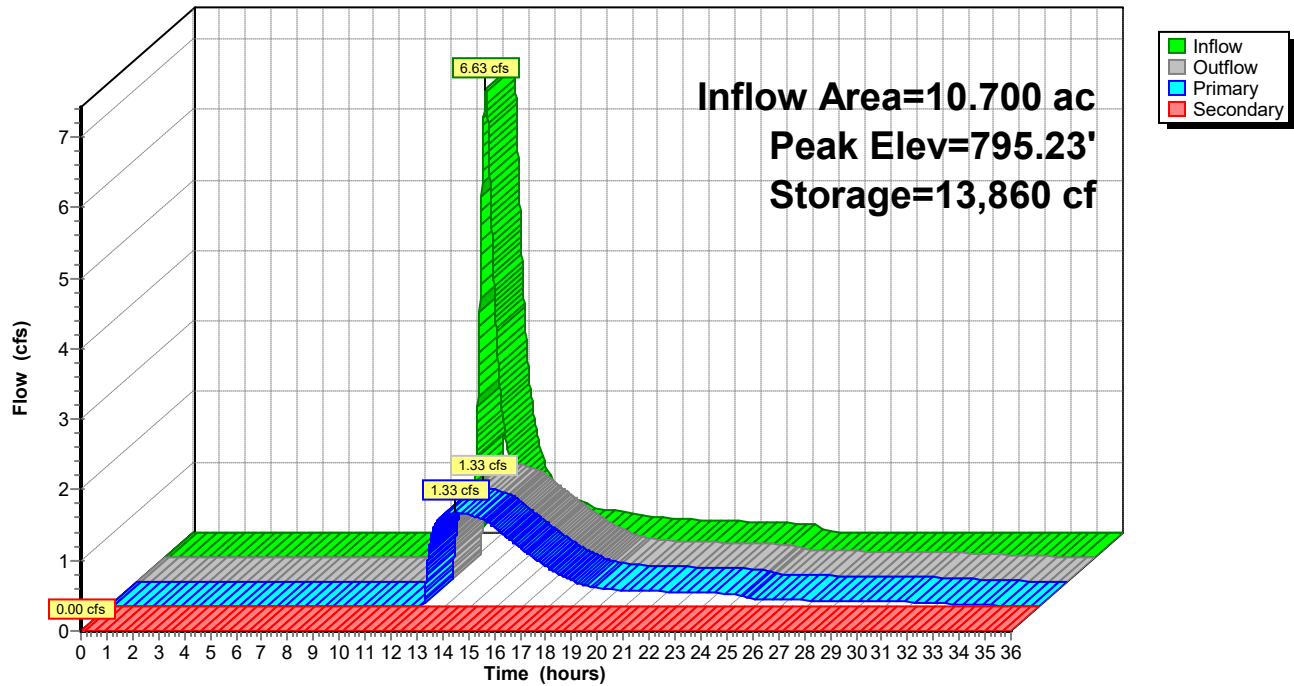
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 48

Pond SB1: SED 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 49

Summary for Pond SB2: SED 2

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 0.72" for 1-Year event
Inflow = 1.75 cfs @ 12.35 hrs, Volume= 0.161 af
Outflow = 0.88 cfs @ 12.52 hrs, Volume= 0.161 af, Atten= 50%, Lag= 10.7 min
Primary = 0.88 cfs @ 12.52 hrs, Volume= 0.161 af
Routed to Pond P3 : POND 3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P3 : POND 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.32' @ 12.69 hrs Surf.Area= 1,753 sf Storage= 1,419 cf

Plug-Flow detention time= 35.9 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 34.9 min (887.6 - 852.6)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	4,264 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	428	0	0
796.00	1,411	920	920
797.00	2,494	1,953	2,872
797.50	3,074	1,392	4,264

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	24.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 795.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	795.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.65'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.88 cfs @ 12.52 hrs HW=796.26' TW=795.39' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.88 cfs of 5.15 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.88 cfs @ 4.49 fps)
↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=795.00' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

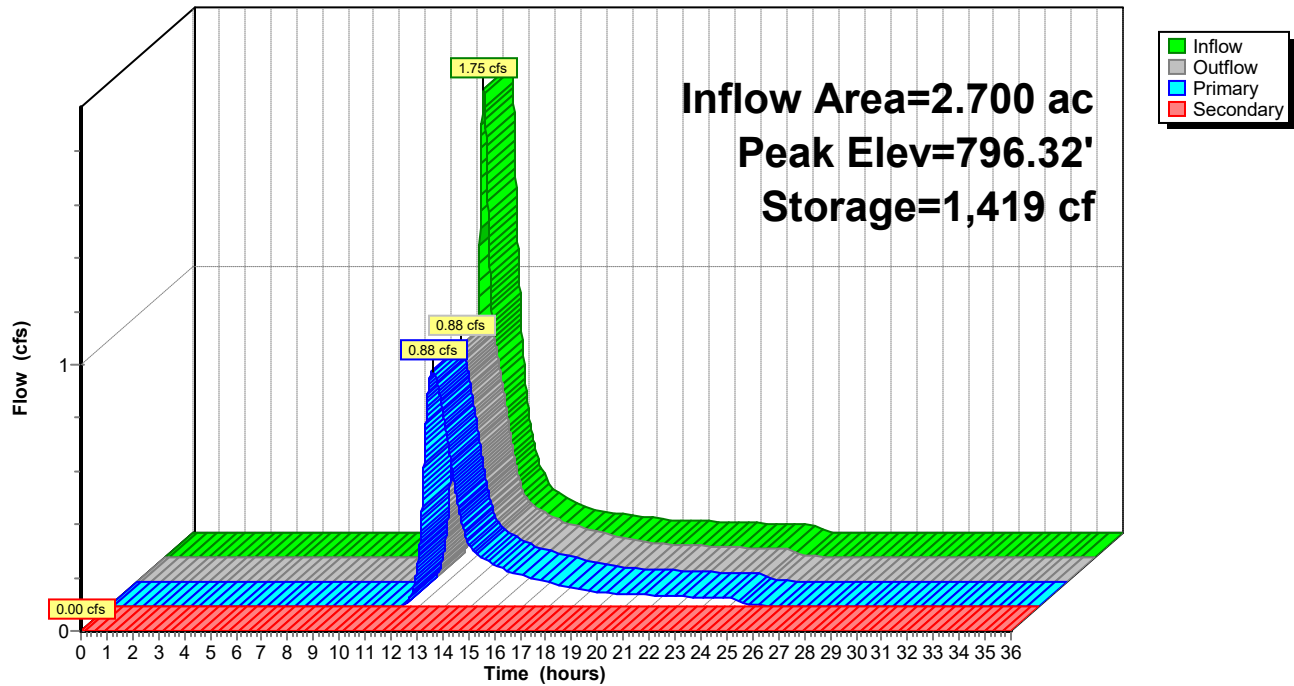
NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

Page 50

Pond SB2: SED 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 1-Year Rainfall=1.89"

Printed 6/24/2025

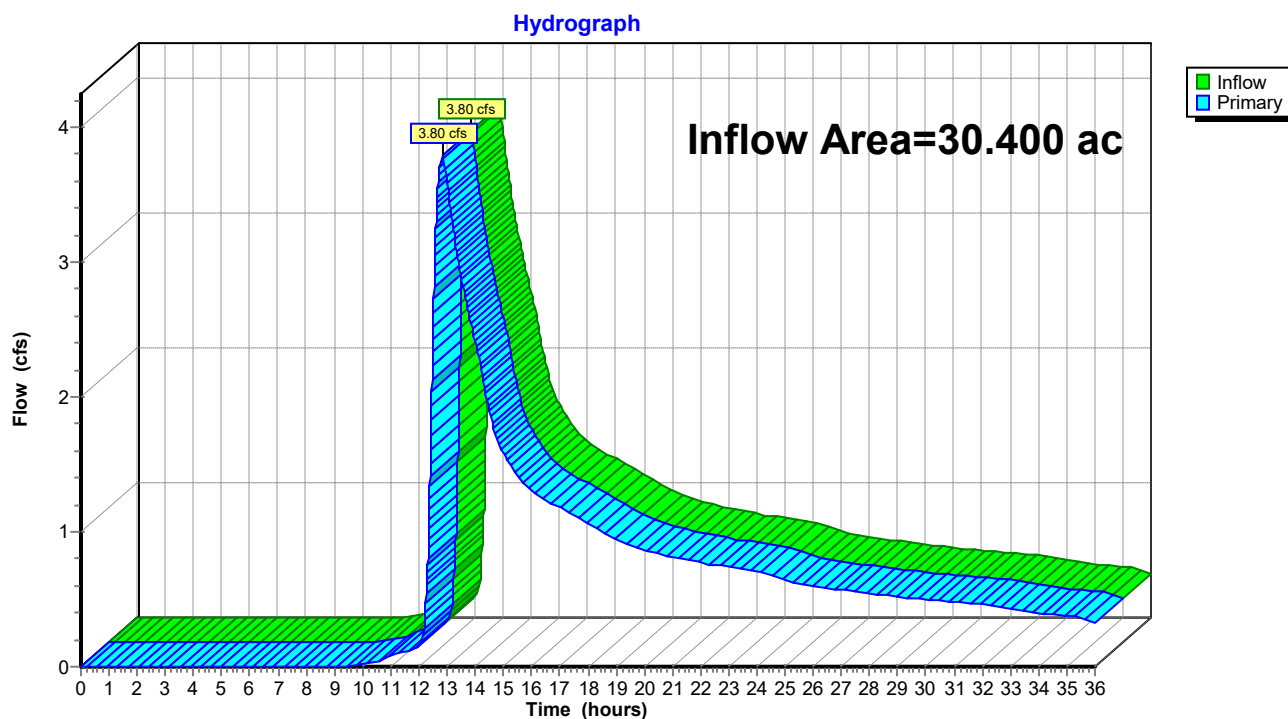
Page 51

Summary for Link 9L: TOTAL SITE RUNNOFF

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 0.72" for 1-Year event
Inflow = 3.80 cfs @ 12.82 hrs, Volume= 1.821 af
Primary = 3.80 cfs @ 12.82 hrs, Volume= 1.821 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 9L: TOTAL SITE RUNNOFF



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 52

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR-1: PR-1 Runoff Area=10.700 ac 33.08% Impervious Runoff Depth=1.78"
Flow Length=1,030' Tc=28.1 min CN=86 Runoff=15.77 cfs 1.590 af

Subcatchment PR-10: PR-10 Runoff Area=0.100 ac 0.00% Impervious Runoff Depth=1.36"
Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=0.22 cfs 0.011 af

Subcatchment PR-2: PR-2 Runoff Area=2.700 ac 28.52% Impervious Runoff Depth=1.71"
Flow Length=648' Tc=22.1 min CN=85 Runoff=4.29 cfs 0.384 af

Subcatchment PR-3: PR-3 Runoff Area=5.300 ac 43.21% Impervious Runoff Depth=1.94"
Flow Length=156' Tc=23.1 min CN=88 Runoff=9.39 cfs 0.858 af

Subcatchment PR-4: PR-4 Runoff Area=4.400 ac 59.77% Impervious Runoff Depth=2.20"
Flow Length=263' Tc=25.0 min CN=91 Runoff=8.42 cfs 0.807 af

Subcatchment PR-5: PR-5 Runoff Area=2.100 ac 53.81% Impervious Runoff Depth=2.11"
Flow Length=168' Tc=12.5 min CN=90 Runoff=5.32 cfs 0.370 af

Subcatchment PR-6: PR-6 Runoff Area=0.900 ac 38.89% Impervious Runoff Depth=1.86"
Flow Length=80' Slope=0.0680 '/' Tc=8.8 min CN=87 Runoff=2.33 cfs 0.140 af

Subcatchment PR-7: PR-7 Runoff Area=3.200 ac 0.00% Impervious Runoff Depth=1.36"
Flow Length=136' Tc=29.5 min CN=80 Runoff=3.44 cfs 0.362 af

Subcatchment PR-8: PR-8 Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=1.36"
Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=0.67 cfs 0.034 af

Subcatchment PR-9: PR-9 Runoff Area=0.700 ac 0.00% Impervious Runoff Depth=1.36"
Flow Length=66' Slope=0.0450 '/' Tc=8.9 min CN=80 Runoff=1.32 cfs 0.079 af

Reach 11R: West Channel Avg. Flow Depth=0.24' Max Vel=1.77 fps Inflow=2.05 cfs 0.402 af
n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=2.03 cfs 0.402 af

Reach 12R: East Channel Avg. Flow Depth=0.25' Max Vel=1.02 fps Inflow=1.53 cfs 0.461 af
n=0.030 L=479.0' S=0.0031 '/' Capacity=207.35 cfs Outflow=1.27 cfs 0.461 af

Reach 13R: North Channel Section 1 Avg. Flow Depth=0.68' Max Vel=1.47 fps Inflow=8.47 cfs 2.623 af
n=0.030 L=400.0' S=0.0019 '/' Capacity=1,299.91 cfs Outflow=8.32 cfs 2.618 af

Reach 15R: East Channel 2 Avg. Flow Depth=0.21' Max Vel=1.57 fps Inflow=1.98 cfs 1.269 af
n=0.030 L=212.0' S=0.0088 '/' Capacity=599.19 cfs Outflow=1.98 cfs 1.268 af

Reach 16R: South Channel 2 Avg. Flow Depth=1.02' Max Vel=2.04 fps Inflow=5.31 cfs 0.954 af
n=0.030 L=162.0' S=0.0046 '/' Capacity=1,557.04 cfs Outflow=5.29 cfs 0.953 af

Reach 18R: North Channel Section 2 Avg. Flow Depth=1.00' Max Vel=1.60 fps Inflow=12.30 cfs 4.325 af
n=0.030 L=430.0' S=0.0016 '/' Capacity=1,217.16 cfs Outflow=12.24 cfs 4.316 af

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 53

Pond B1: BIO 1

Peak Elev=798.06' Storage=8,651 cf Inflow=9.39 cfs 0.858 af
Primary=6.71 cfs 0.835 af Secondary=1.33 cfs 0.021 af Outflow=8.03 cfs 0.855 af

Pond B2: BIO 2

Peak Elev=796.62' Storage=13,340 cf Inflow=8.42 cfs 0.807 af
Primary=4.48 cfs 0.803 af Secondary=0.00 cfs 0.000 af Outflow=4.48 cfs 0.803 af

Pond B3: BIO 3

Peak Elev=795.82' Storage=2,029 cf Inflow=2.33 cfs 0.140 af
Outflow=1.11 cfs 0.140 af

Pond B4: BIO 4

Peak Elev=798.47' Storage=5,829 cf Inflow=5.32 cfs 0.370 af
Primary=1.88 cfs 0.369 af Secondary=0.00 cfs 0.000 af Outflow=1.88 cfs 0.369 af

Pond P1: POND 1

Peak Elev=794.77' Storage=22,823 cf Inflow=14.97 cfs 1.519 af
Outflow=3.98 cfs 1.345 af

Pond P2: POND 2

Peak Elev=795.93' Storage=19,814 cf Inflow=8.03 cfs 0.855 af
Outflow=1.19 cfs 0.808 af

Pond P3: POND 3

Peak Elev=796.66' Storage=6,020 cf Inflow=4.12 cfs 0.384 af
Primary=1.14 cfs 0.382 af Secondary=0.00 cfs 0.000 af Outflow=1.14 cfs 0.382 af

Pond SB1: SED 1

Peak Elev=795.71' Storage=17,469 cf Inflow=15.77 cfs 1.590 af
Primary=14.97 cfs 1.519 af Secondary=0.00 cfs 0.000 af Outflow=14.97 cfs 1.519 af

Pond SB2: SED 2

Peak Elev=796.84' Storage=2,479 cf Inflow=4.29 cfs 0.384 af
Primary=4.12 cfs 0.384 af Secondary=0.00 cfs 0.000 af Outflow=4.12 cfs 0.384 af

Link 9L: TOTAL SITE RUNNOFF

Inflow=12.24 cfs 4.316 af
Primary=12.24 cfs 4.316 af

Total Runoff Area = 30.400 ac Runoff Volume = 4.635 af Average Runoff Depth = 1.83"
64.77% Pervious = 19.690 ac 35.23% Impervious = 10.710 ac

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 54

Summary for Subcatchment PR-1: PR-1

Runoff = 15.77 cfs @ 12.40 hrs, Volume= 1.590 af, Depth= 1.78"
Routed to Pond SB1 : SED 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
3.400	98	Paved parking, HSG D
7.160	80	>75% Grass cover, Good, HSG D
* 0.140	98	POND
10.700	86	Weighted Average
7.160		66.92% Pervious Area
3.540		33.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	100	0.0175	0.09		Sheet Flow, First 100 Grass: Dense n= 0.240 P2= 2.19"
8.5	578	0.0050	1.14		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
0.6	147	0.0060	4.08	5.00	Pipe Channel, PIPE 1 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.1	25	0.0060	4.08	5.00	Pipe Channel, PIPE 2 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.7	180	0.0060	4.60	8.14	Pipe Channel, PIPE 3 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
28.1	1,030	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

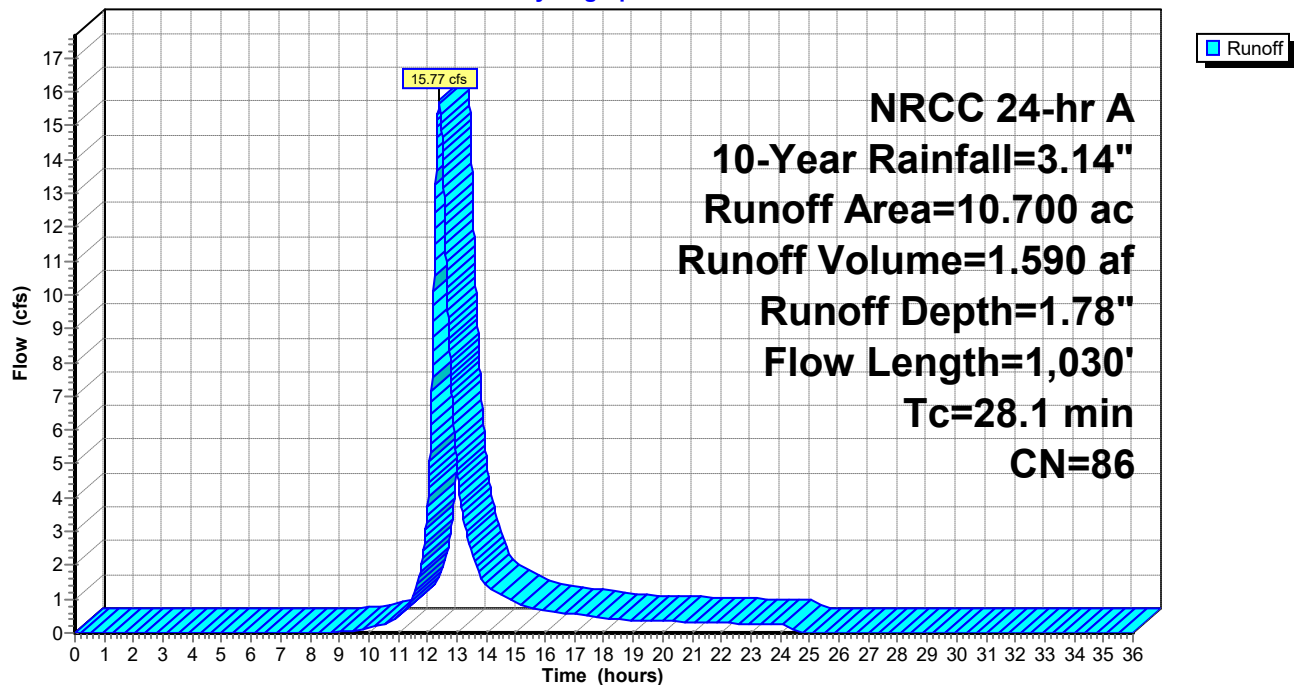
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 55

Subcatchment PR-1: PR-1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 56

Summary for Subcatchment PR-10: PR-10

Runoff = 0.22 cfs @ 12.13 hrs, Volume= 0.011 af, Depth= 1.36"
Routed to Reach 16R : South Channel 2

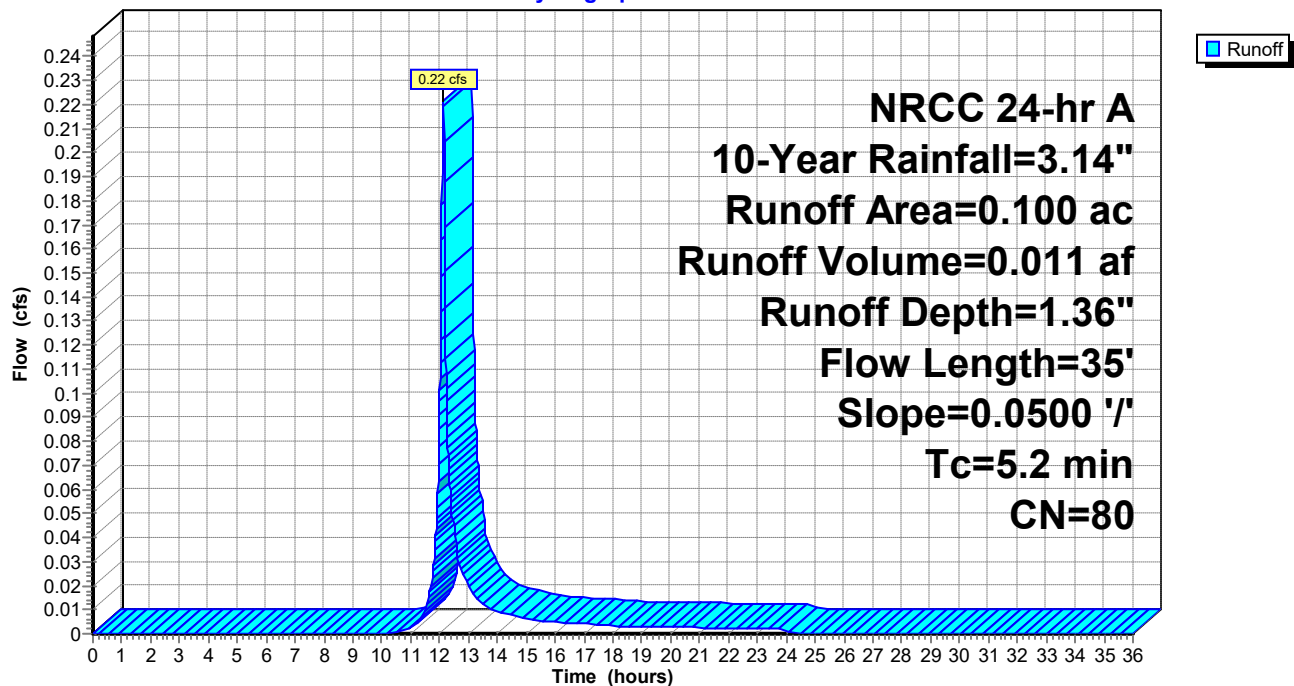
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-10: PR-10

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 57

Summary for Subcatchment PR-2: PR-2

Runoff = 4.29 cfs @ 12.33 hrs, Volume= 0.384 af, Depth= 1.71"
Routed to Pond SB2 : SED 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
1.930	80	>75% Grass cover, Good, HSG D
* 0.060	98	Wet Pond
2.700	85	Weighted Average
1.930		71.48% Pervious Area
0.770		28.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		Sheet Flow, FIRST 100' Grass: Short n= 0.150 P2= 2.19"
2.5	293	0.0090	1.93		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
2.3	164	0.0007	1.20	0.94	Pipe Channel, PIPE 1 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.7	91	0.0004	0.91	0.71	Pipe Channel, PIPE 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
22.1	648	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

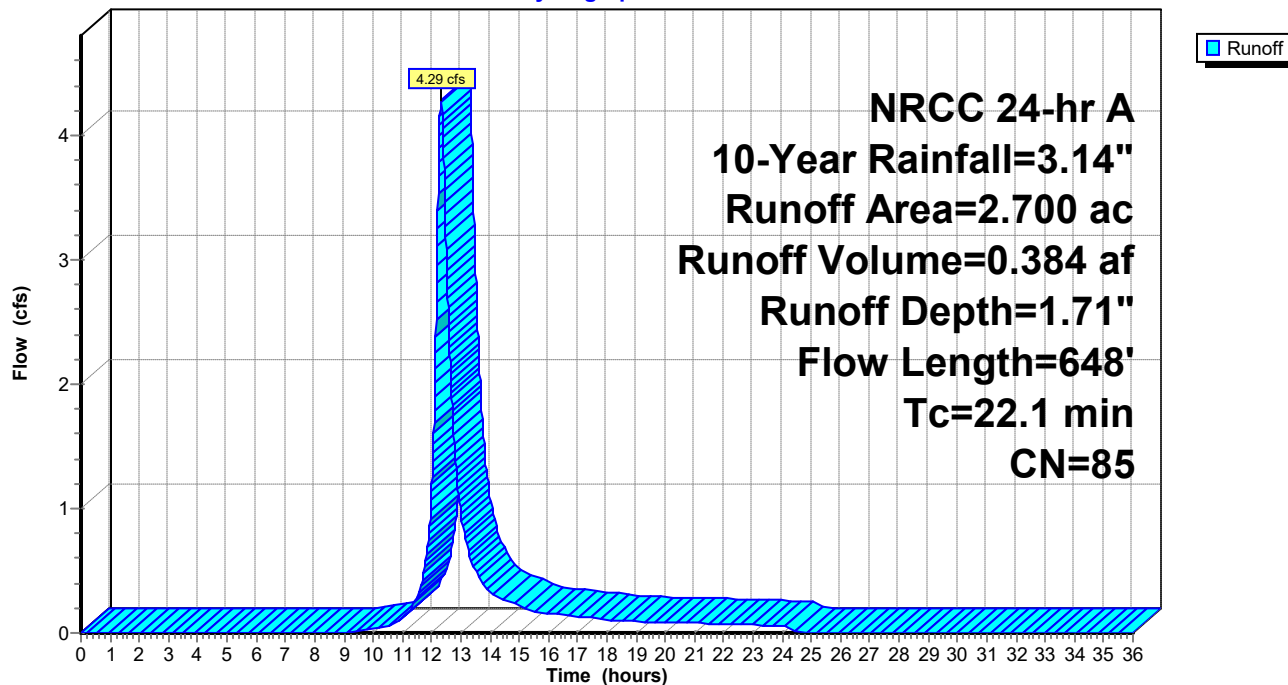
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 58

Subcatchment PR-2: PR-2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 59

Summary for Subcatchment PR-3: PR-3

Runoff = 9.39 cfs @ 12.34 hrs, Volume= 0.858 af, Depth= 1.94"
Routed to Pond B1 : BIO 1

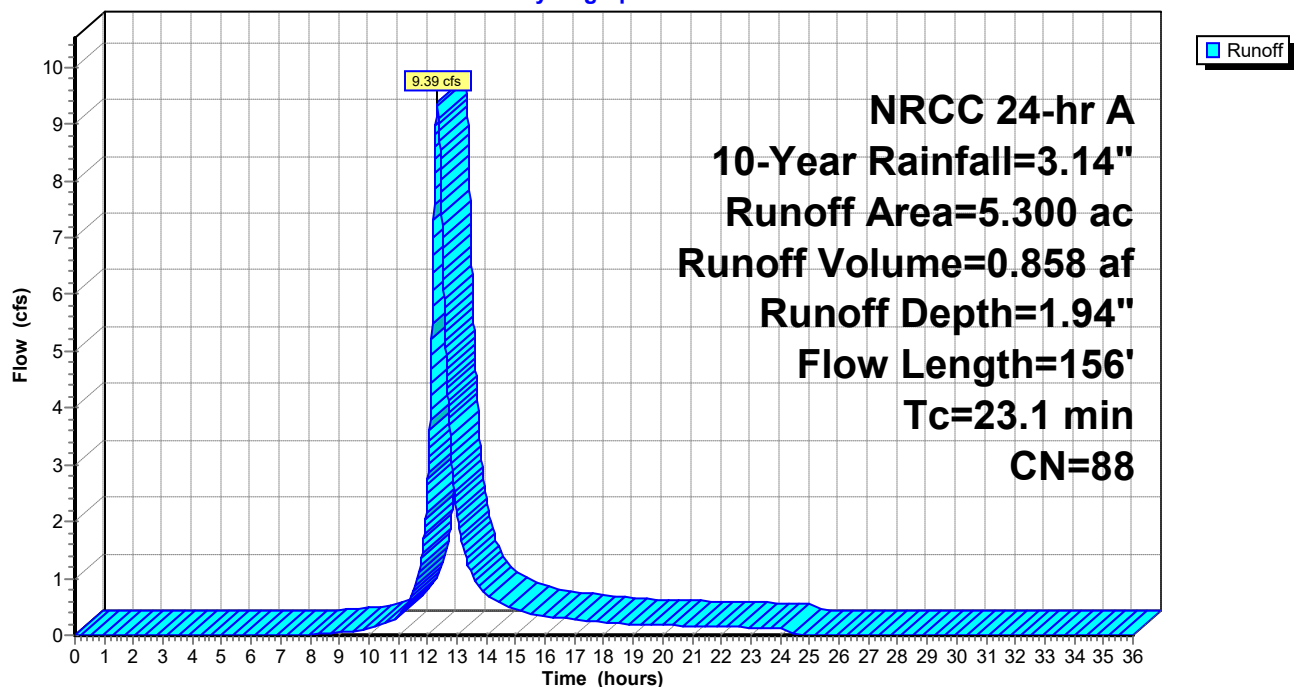
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
2.100	98	Paved parking, HSG D
3.010	80	>75% Grass cover, Good, HSG D
* 0.190	98	Wet Pond
5.300	88	Weighted Average
3.010		56.79% Pervious Area
2.290		43.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
0.3	56	0.0530	3.71		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
23.1	156	Total			

Subcatchment PR-3: PR-3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 60

Summary for Subcatchment PR-4: PR-4

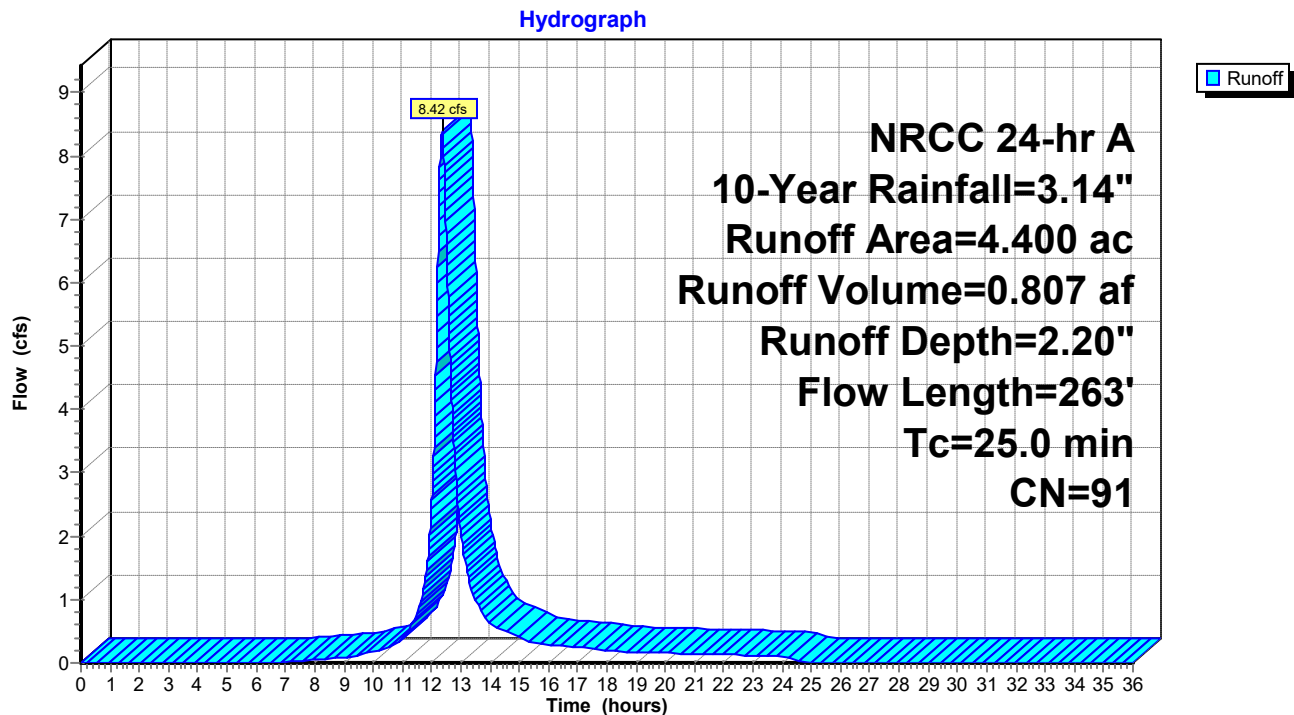
Runoff = 8.42 cfs @ 12.36 hrs, Volume= 0.807 af, Depth= 2.20"
Routed to Pond B2 : BIO 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
2.630	98	Paved parking, HSG D
1.770	80	>75% Grass cover, Good, HSG D
4.400	91	Weighted Average
1.770		40.23% Pervious Area
2.630		59.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
2.2	163	0.0060	1.25		Shallow Concentrated Flow, SCF Grass
					Unpaved Kv= 16.1 fps
25.0	263	Total			

Subcatchment PR-4: PR-4



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 61

Summary for Subcatchment PR-5: PR-5

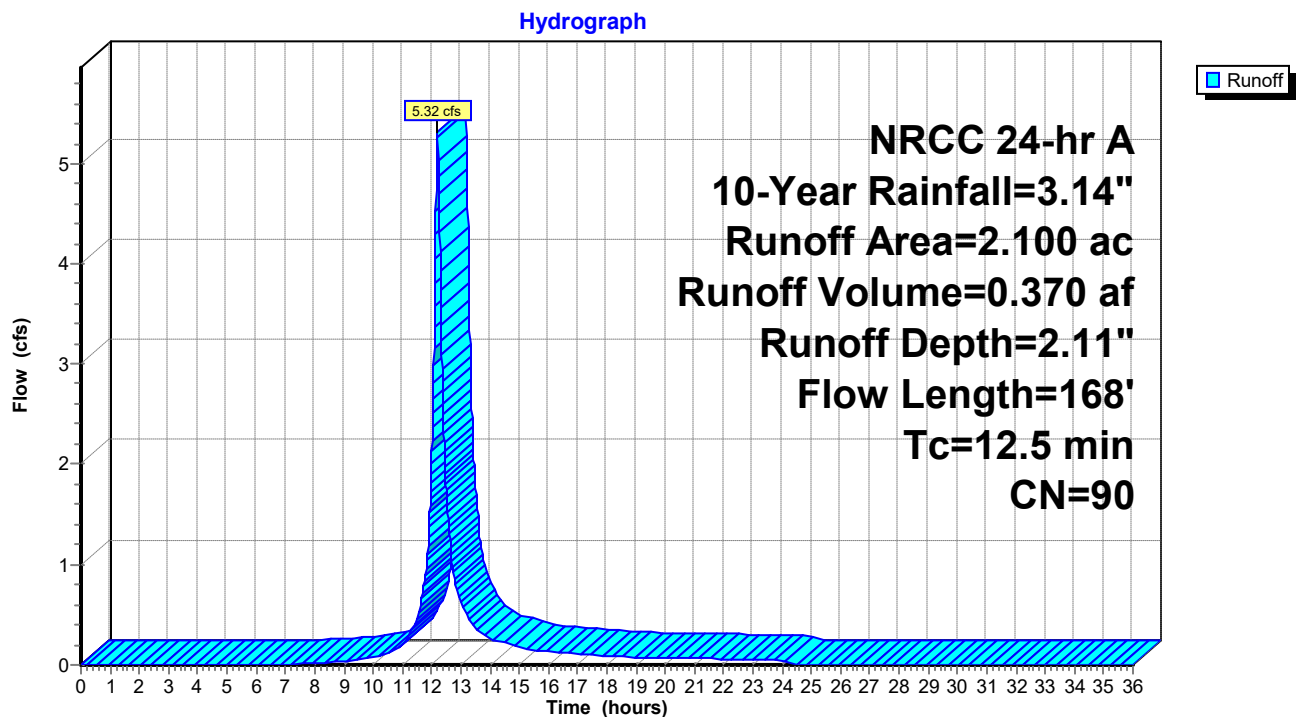
Runoff = 5.32 cfs @ 12.20 hrs, Volume= 0.370 af, Depth= 2.11"
Routed to Pond B4 : BIO 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
1.130	98	Paved parking, HSG D
0.970	80	>75% Grass cover, Good, HSG D
2.100	90	Weighted Average
0.970		46.19% Pervious Area
1.130		53.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	58	0.0170	0.08		Sheet Flow, First 58
					Grass: Dense n= 0.240 P2= 2.19"
0.6	110	0.0230	3.08		Shallow Concentrated Flow, Pave Surf
					Paved Kv= 20.3 fps
12.5	168	Total			

Subcatchment PR-5: PR-5



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 62

Summary for Subcatchment PR-6: PR-6

Runoff = 2.33 cfs @ 12.16 hrs, Volume= 0.140 af, Depth= 1.86"
Routed to Pond B3 : BIO 3

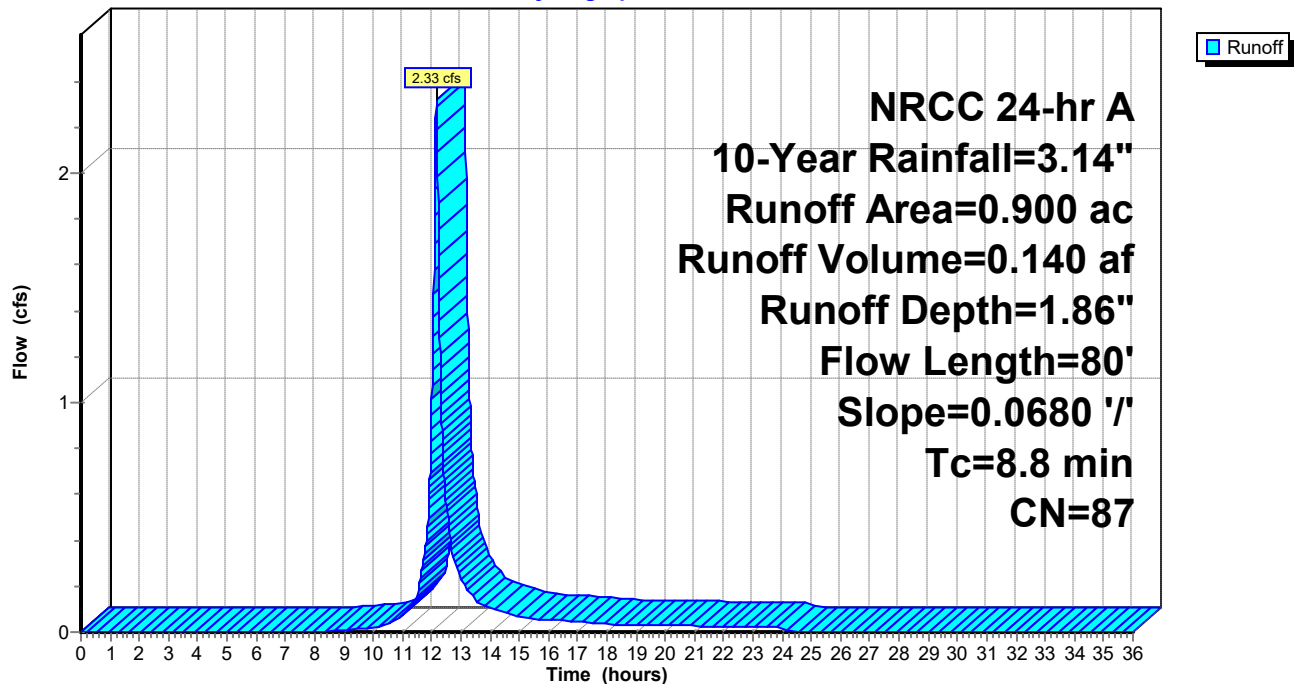
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.350	98	Paved parking, HSG D
0.550	80	>75% Grass cover, Good, HSG D
0.900	87	Weighted Average
0.550		61.11% Pervious Area
0.350		38.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	80	0.0680	0.15		Sheet Flow, SF 80'
Grass: Dense n= 0.240 P2= 2.19"					

Subcatchment PR-6: PR-6

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 63

Summary for Subcatchment PR-7: PR-7

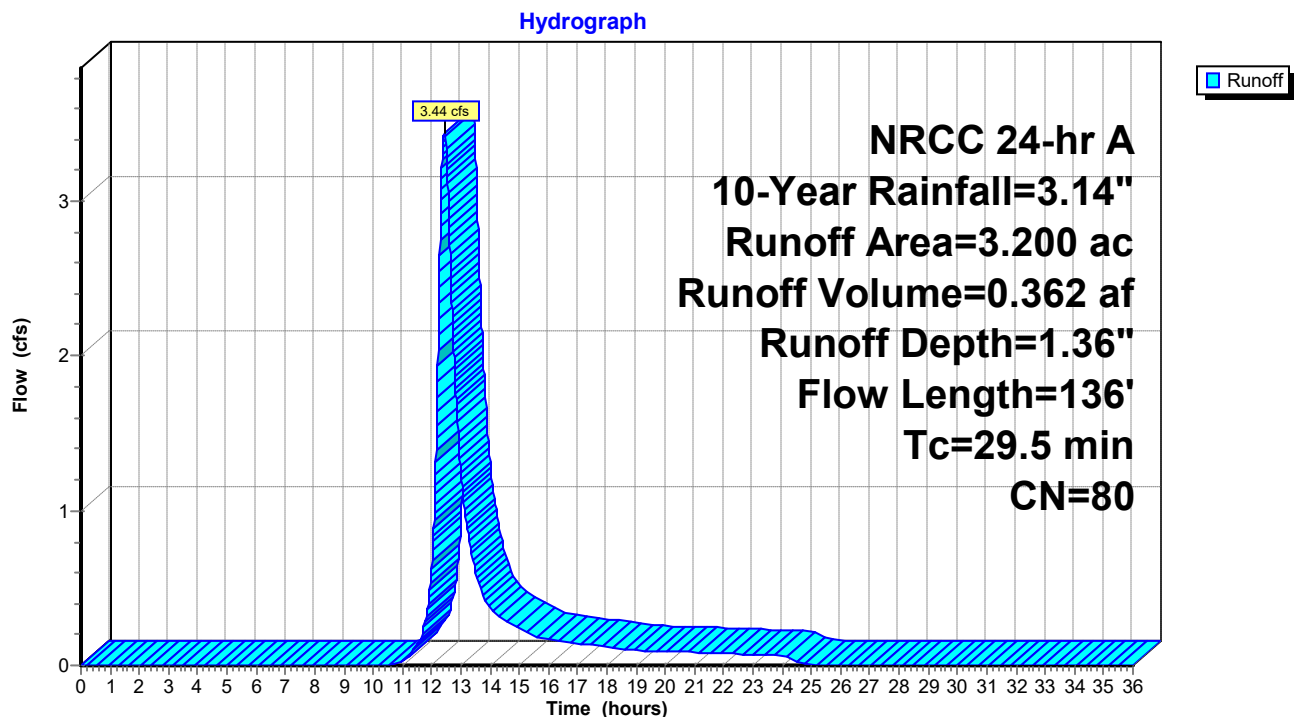
Runoff = 3.44 cfs @ 12.43 hrs, Volume= 0.362 af, Depth= 1.36"
Routed to Reach 18R : North Channel Section 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
1.300	79	Woods/grass comb., Good, HSG D
1.900	80	>75% Grass cover, Good, HSG D
3.200	80	Weighted Average
3.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	100	0.0150	0.06		Sheet Flow, First 100
					Woods: Light underbrush n= 0.400 P2= 2.19"
0.4	36	0.0800	1.41		Shallow Concentrated Flow, SCF
					Woodland Kv= 5.0 fps
29.5	136	Total			

Subcatchment PR-7: PR-7



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 64

Summary for Subcatchment PR-8: PR-8

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.034 af, Depth= 1.36"
Routed to Reach 11R : West Channel

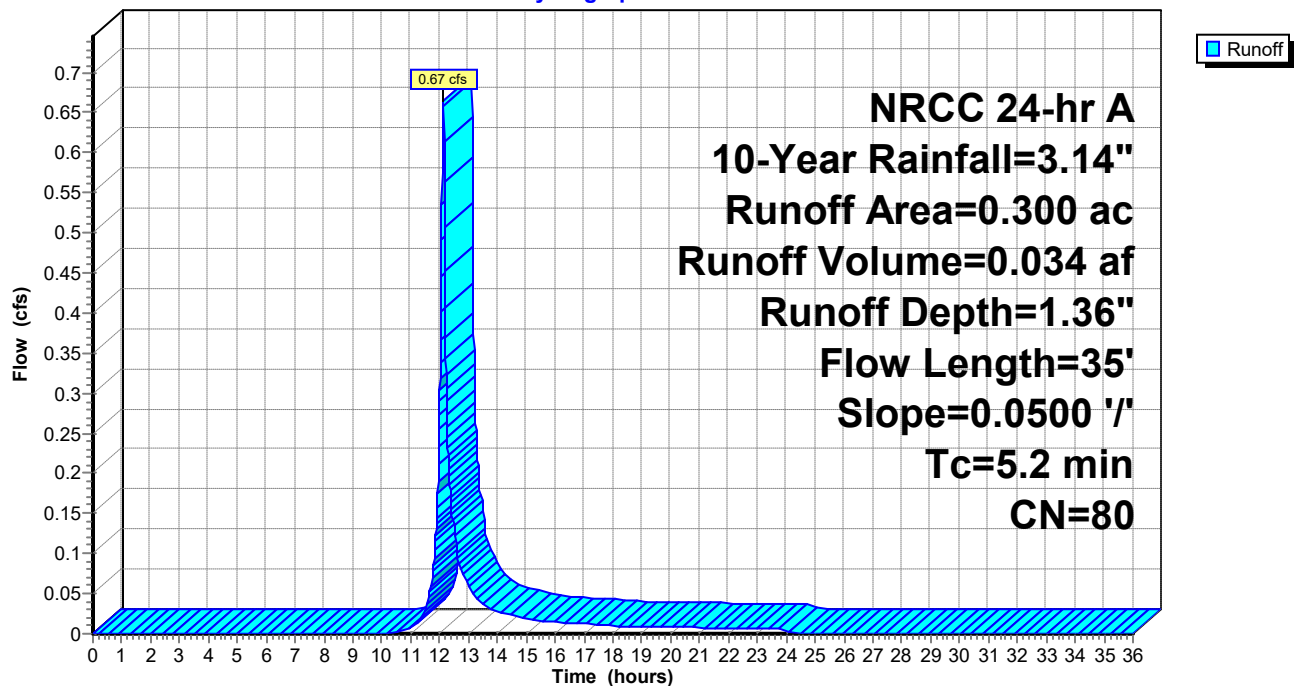
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.300	80	>75% Grass cover, Good, HSG D
0.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-8: PR-8

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 65

Summary for Subcatchment PR-9: PR-9

Runoff = 1.32 cfs @ 12.17 hrs, Volume= 0.079 af, Depth= 1.36"
Routed to Reach 12R : East Channel

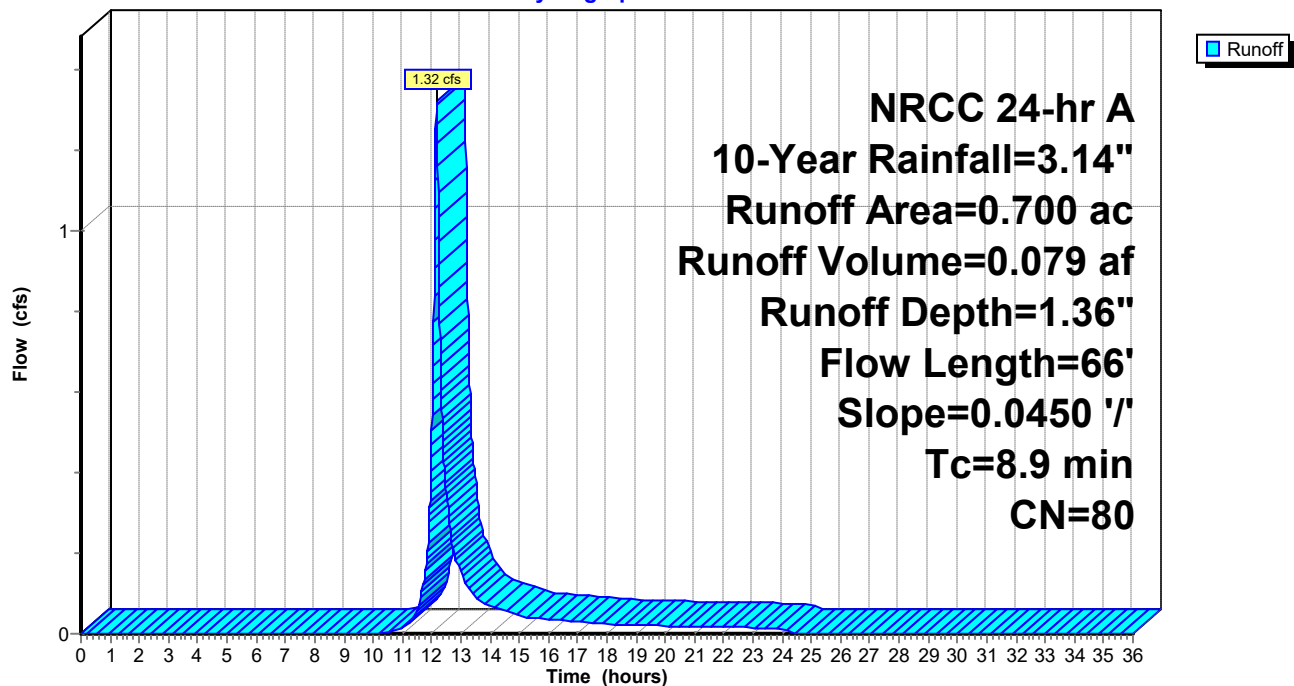
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	66	0.0450	0.12		Sheet Flow, First 66
Grass: Dense n= 0.240 P2= 2.19"					

Subcatchment PR-9: PR-9

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 66

Summary for Reach 11R: West Channel

Inflow Area = 2.400 ac, 47.08% Impervious, Inflow Depth > 2.01" for 10-Year event
Inflow = 2.05 cfs @ 12.35 hrs, Volume= 0.402 af
Outflow = 2.03 cfs @ 12.39 hrs, Volume= 0.402 af, Atten= 1%, Lag= 2.4 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.77 fps, Min. Travel Time= 3.7 min

Avg. Velocity= 0.70 fps, Avg. Travel Time= 9.3 min

Peak Storage= 445 cf @ 12.39 hrs

Average Depth at Peak Storage= 0.24' , Surface Width= 5.46'

Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

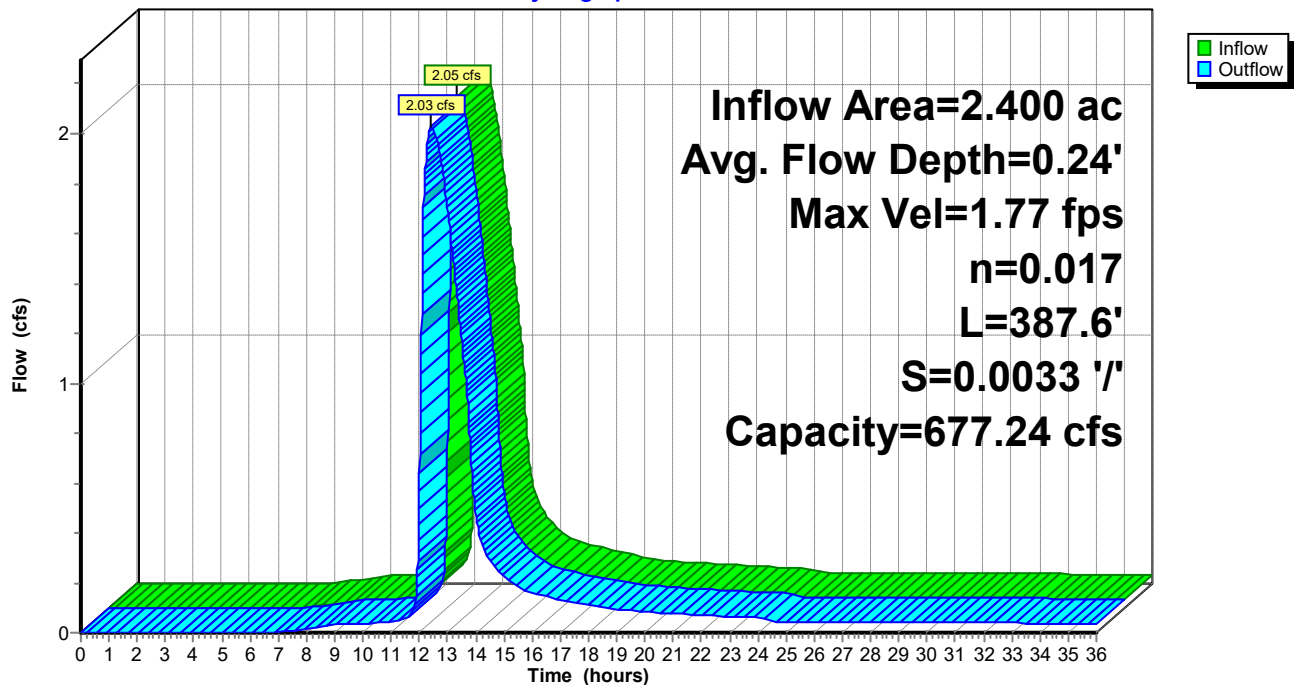
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 67

Summary for Reach 12R: East Channel

Inflow Area = 3.400 ac, 22.65% Impervious, Inflow Depth > 1.63" for 10-Year event
Inflow = 1.53 cfs @ 12.17 hrs, Volume= 0.461 af
Outflow = 1.27 cfs @ 13.02 hrs, Volume= 0.461 af, Atten= 17%, Lag= 51.1 min
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.02 fps, Min. Travel Time= 7.9 min

Avg. Velocity= 0.48 fps, Avg. Travel Time= 16.5 min

Peak Storage= 596 cf @ 13.02 hrs

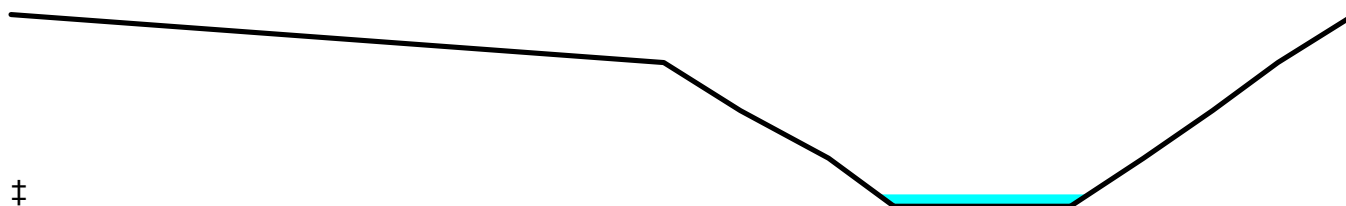
Average Depth at Peak Storage= 0.25' , Surface Width= 5.49'

Bank-Full Depth= 4.00' Flow Area= 56.3 sf, Capacity= 207.35 cfs

Custom cross-section, Length= 479.0' Slope= 0.0031 '/'

Constant n= 0.030

Inlet Invert= 794.50', Outlet Invert= 793.00'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-25.00	798.00	0.00
-8.00	797.00	1.00
-6.00	796.00	2.00
-3.70	795.00	3.00
-2.00	794.00	4.00
2.60	794.00	4.00
4.50	795.00	3.00
6.30	796.00	2.00
8.00	797.00	1.00
10.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	4.6	0.0	0	0.00
1.00	6.4	8.7	8.2	3,066	14.44
2.00	16.6	13.3	12.3	7,975	53.64
3.00	30.8	17.5	16.0	14,753	124.48
4.00	56.3	36.8	35.0	26,968	207.35

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

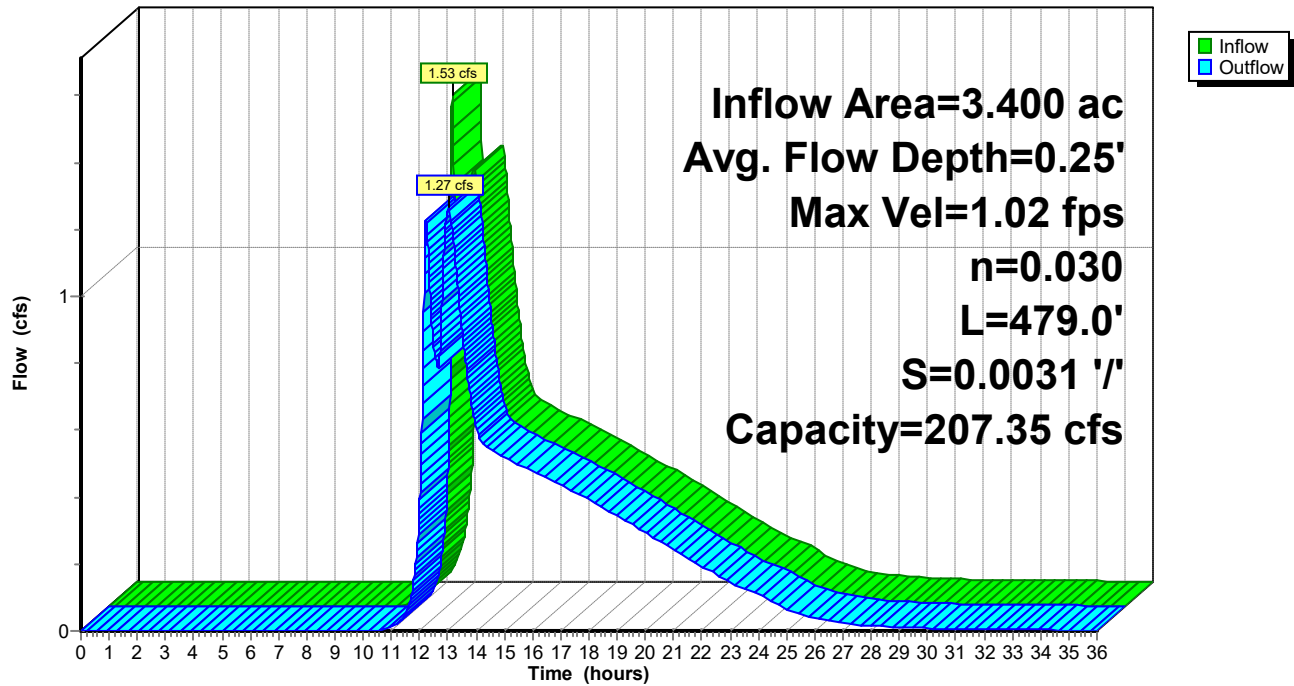
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 68

Reach 12R: East Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 69

Summary for Reach 13R: North Channel Section 1

Inflow Area = 16.500 ac, 43.45% Impervious, Inflow Depth > 1.91" for 10-Year event
Inflow = 8.47 cfs @ 12.64 hrs, Volume= 2.623 af
Outflow = 8.32 cfs @ 12.70 hrs, Volume= 2.618 af, Atten= 2%, Lag= 3.5 min
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.47 fps, Min. Travel Time= 4.5 min

Avg. Velocity= 0.63 fps, Avg. Travel Time= 10.5 min

Peak Storage= 2,266 cf @ 12.70 hrs

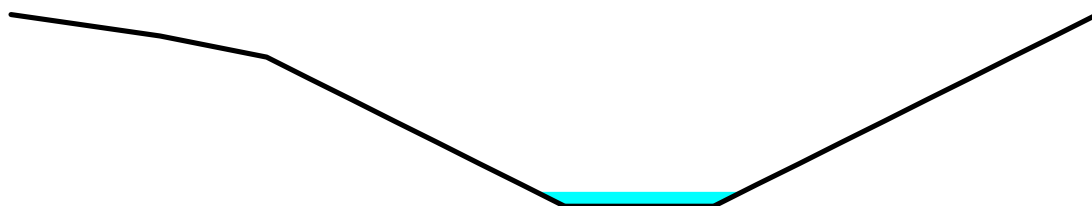
Average Depth at Peak Storage= 0.68' , Surface Width= 9.71'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,299.91 cfs

Custom cross-section, Length= 400.0' Slope= 0.0019 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 790.50'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

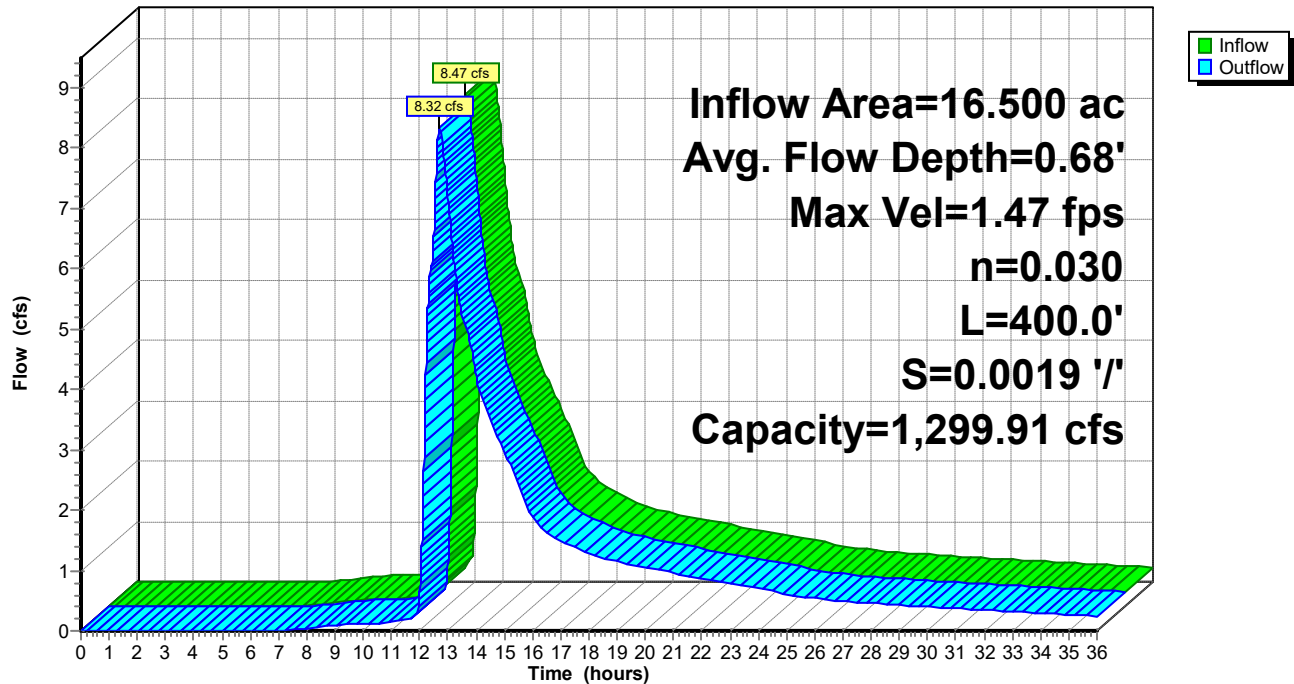
Printed 6/24/2025

Page 70

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	3,600	16.42
2.00	22.0	15.9	15.0	8,800	58.48
3.00	39.0	20.4	19.0	15,600	128.78
4.00	60.0	24.9	23.0	24,000	231.38
5.00	85.0	29.4	27.0	34,000	370.33
6.00	114.0	33.8	31.0	45,600	549.56
7.00	147.0	38.3	35.0	58,800	772.84
8.00	185.5	45.6	42.0	74,200	1,013.31
9.00	232.0	54.9	51.0	92,800	1,299.91

Reach 13R: North Channel Section 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 71

Summary for Reach 15R: East Channel 2

Inflow Area = 8.700 ac, 35.17% Impervious, Inflow Depth > 1.75" for 10-Year event
Inflow = 1.98 cfs @ 13.58 hrs, Volume= 1.269 af
Outflow = 1.98 cfs @ 13.60 hrs, Volume= 1.268 af, Atten= 0%, Lag= 1.4 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.57 fps, Min. Travel Time= 2.2 min

Avg. Velocity= 0.94 fps, Avg. Travel Time= 3.8 min

Peak Storage= 267 cf @ 13.60 hrs

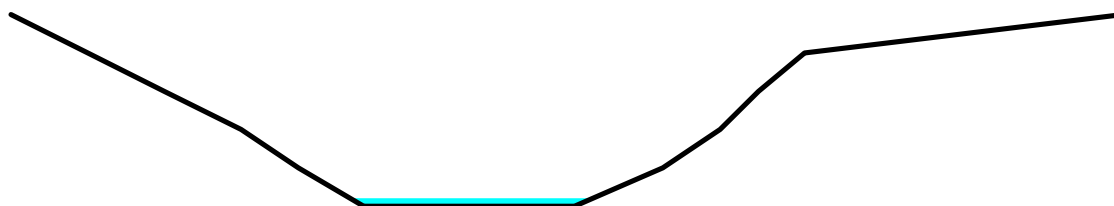
Average Depth at Peak Storage= 0.21' , Surface Width= 6.35'

Bank-Full Depth= 5.00' Flow Area= 73.5 sf, Capacity= 599.19 cfs

Custom cross-section, Length= 212.0' Slope= 0.0088 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 793.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-12.00	798.00	0.00
-10.00	797.00	1.00
-8.00	796.00	2.00
-6.00	795.00	3.00
-4.50	794.00	4.00
-2.80	793.00	5.00
2.70	793.00	5.00
5.00	794.00	4.00
6.50	795.00	3.00
7.50	796.00	2.00
8.70	797.00	1.00
17.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.5	0.0	0	0.00
1.00	7.5	10.0	9.5	1,590	28.84
2.00	18.5	13.6	12.5	3,922	105.73
3.00	32.5	17.2	15.5	6,890	230.76
4.00	49.6	21.0	18.7	10,515	408.79
5.00	73.5	31.6	29.0	15,571	599.19

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

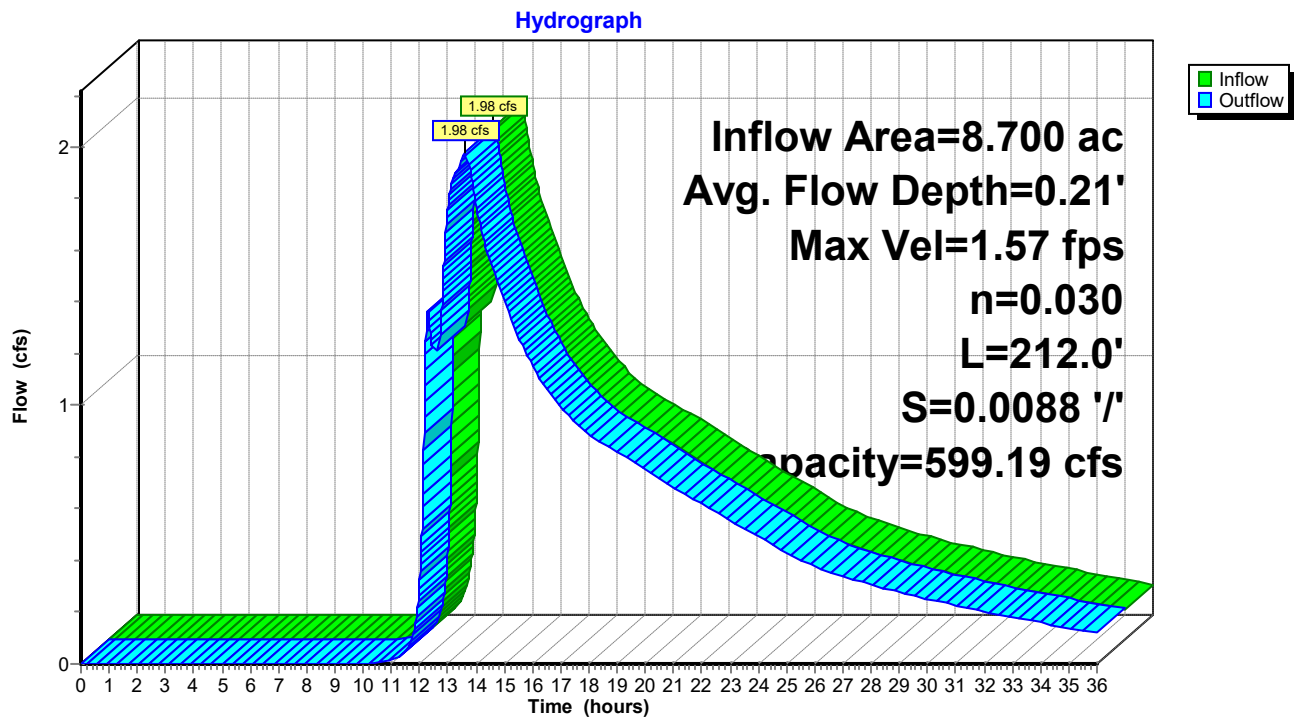
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 72

Reach 15R: East Channel 2



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 73

Summary for Reach 16R: South Channel 2

Inflow Area = 5.400 ac, 55.19% Impervious, Inflow Depth > 2.12" for 10-Year event
Inflow = 5.31 cfs @ 12.63 hrs, Volume= 0.954 af
Outflow = 5.29 cfs @ 12.64 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.9 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.04 fps, Min. Travel Time= 1.3 min

Avg. Velocity= 0.90 fps, Avg. Travel Time= 3.0 min

Peak Storage= 419 cf @ 12.64 hrs

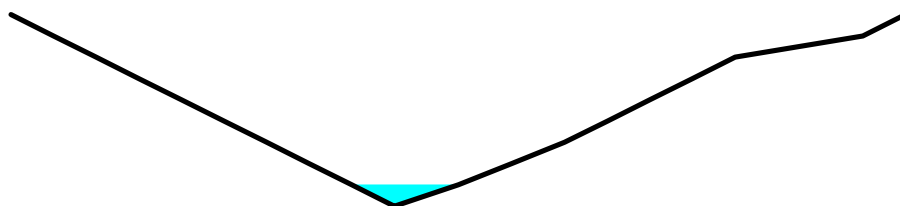
Average Depth at Peak Storage= 1.02' , Surface Width= 5.08'

Bank-Full Depth= 9.00' Flow Area= 183.5 sf, Capacity= 1,557.04 cfs

Custom cross-section, Length= 162.0' Slope= 0.0046 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 792.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-18.00	800.00	0.00
-16.00	799.00	1.00
-14.00	798.00	2.00
-12.00	797.00	3.00
-10.00	796.00	4.00
-8.00	795.00	5.00
-6.00	794.00	6.00
-4.00	793.00	7.00
-2.00	792.00	8.00
0.00	791.00	9.00
3.00	792.00	8.00
5.50	793.00	7.00
8.00	794.00	6.00
10.00	795.00	5.00
12.00	796.00	4.00
14.00	797.00	3.00
16.00	798.00	2.00
22.00	799.00	1.00
24.00	800.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

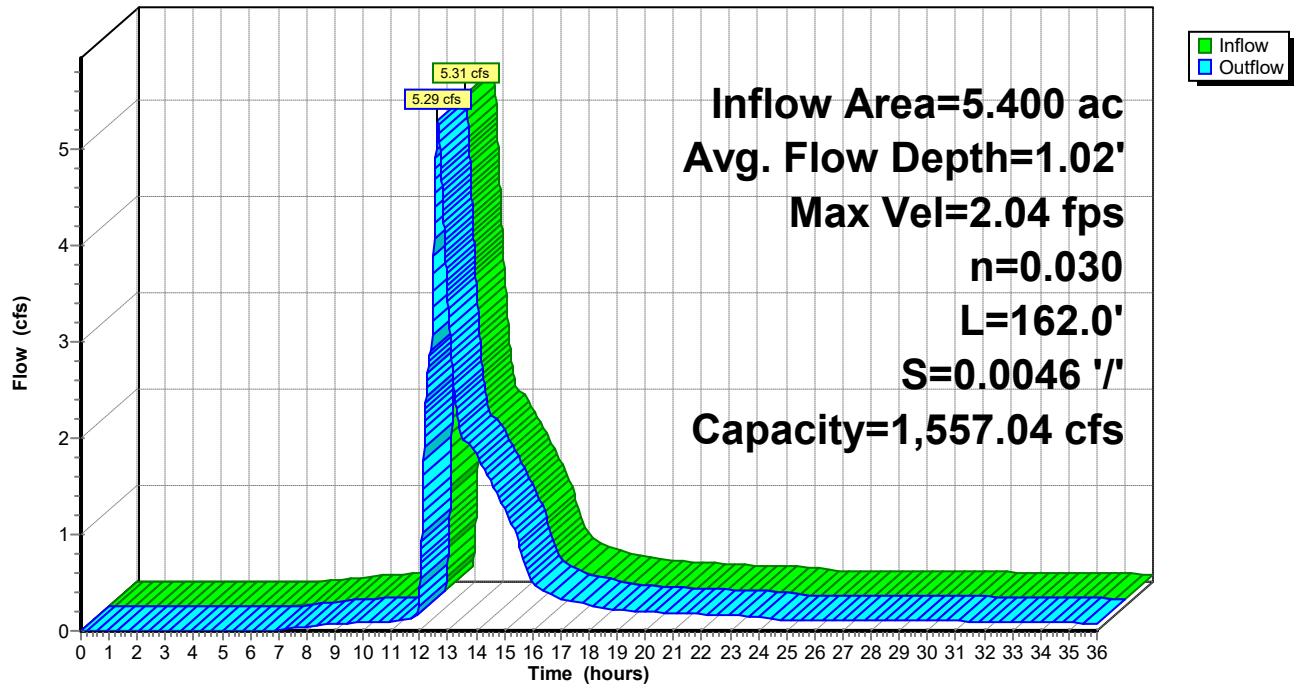
Printed 6/24/2025

Page 74

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
1.00	2.5	5.4	5.0	405	5.04
2.00	9.8	10.3	9.5	1,580	31.62
3.00	21.5	15.3	14.0	3,483	91.09
4.00	37.5	19.7	18.0	6,075	193.94
5.00	57.5	24.2	22.0	9,315	345.07
6.00	81.5	28.7	26.0	13,203	551.18
7.00	109.5	33.1	30.0	17,739	818.63
8.00	143.5	41.5	38.0	23,247	1,106.58
9.00	183.5	45.9	42.0	29,727	1,557.04

Reach 16R: South Channel 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 75

Summary for Reach 18R: North Channel Section 2

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 1.71" for 10-Year event
Inflow = 12.30 cfs @ 12.89 hrs, Volume= 4.325 af
Outflow = 12.24 cfs @ 12.95 hrs, Volume= 4.316 af, Atten= 0%, Lag= 3.3 min
Routed to Link 9L : TOTAL SITE RUNNOFF

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.60 fps, Min. Travel Time= 4.5 min

Avg. Velocity= 0.71 fps, Avg. Travel Time= 10.1 min

Peak Storage= 3,280 cf @ 12.95 hrs

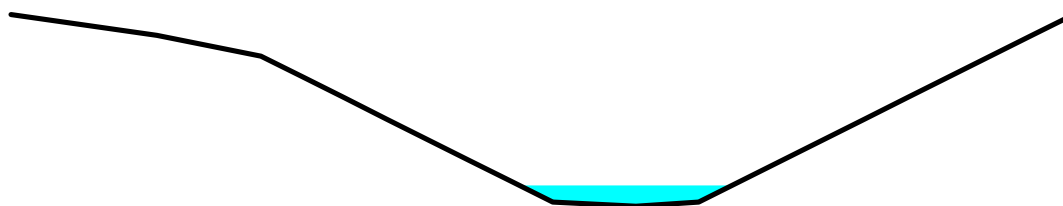
Average Depth at Peak Storage= 1.00' , Surface Width= 10.22'

Bank-Full Depth= 9.20' Flow Area= 232.7 sf, Capacity= 1,217.16 cfs

Custom cross-section, Length= 430.0' Slope= 0.0016 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 790.50', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
0.00	789.80	9.20
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

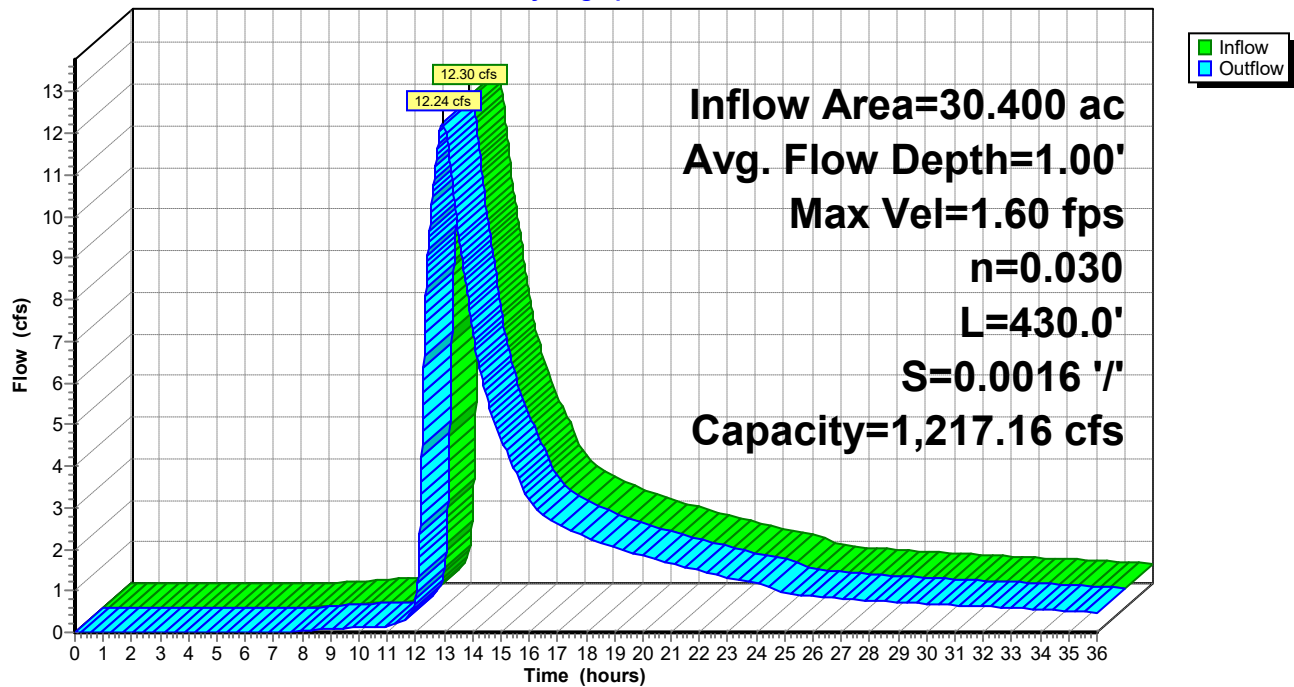
Printed 6/24/2025

Page 76

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
0.20	0.7	7.0	7.0	301	0.30
1.20	9.7	11.5	11.0	4,171	17.33
2.20	22.7	16.0	15.0	9,761	57.39
3.20	39.7	20.4	19.0	17,071	123.56
4.20	60.7	24.9	23.0	26,101	219.73
5.20	85.7	29.4	27.0	36,851	349.72
6.20	114.7	33.8	31.0	49,321	517.20
7.20	147.7	38.3	35.0	63,511	725.70
8.20	186.2	45.7	42.0	80,066	949.96
9.20	232.7	55.0	51.0	100,061	1,217.16

Reach 18R: North Channel Section 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 77

Summary for Pond B1: BIO 1

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth = 1.94" for 10-Year event
Inflow = 9.39 cfs @ 12.34 hrs, Volume= 0.858 af
Outflow = 8.03 cfs @ 12.45 hrs, Volume= 0.855 af, Atten= 14%, Lag= 6.5 min
Primary = 6.71 cfs @ 12.44 hrs, Volume= 0.835 af
Routed to Pond P2 : POND 2
Secondary = 1.33 cfs @ 12.45 hrs, Volume= 0.021 af
Routed to Pond P2 : POND 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 798.06' @ 12.45 hrs Surf.Area= 11,054 sf Storage= 8,651 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 108.6 min (931.4 - 822.8)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	14,087 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
797.00	5,319	0	0
798.00	10,740	8,030	8,030
798.50	13,488	6,057	14,087

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	15.0" Round Culvert X 2.00 L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 7.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	797.90'	24.0" x 24.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#6	Secondary	798.00'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir X 4.00 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) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 78

Primary OutFlow Max=6.70 cfs @ 12.44 hrs HW=798.06' TW=794.72' (Dynamic Tailwater)

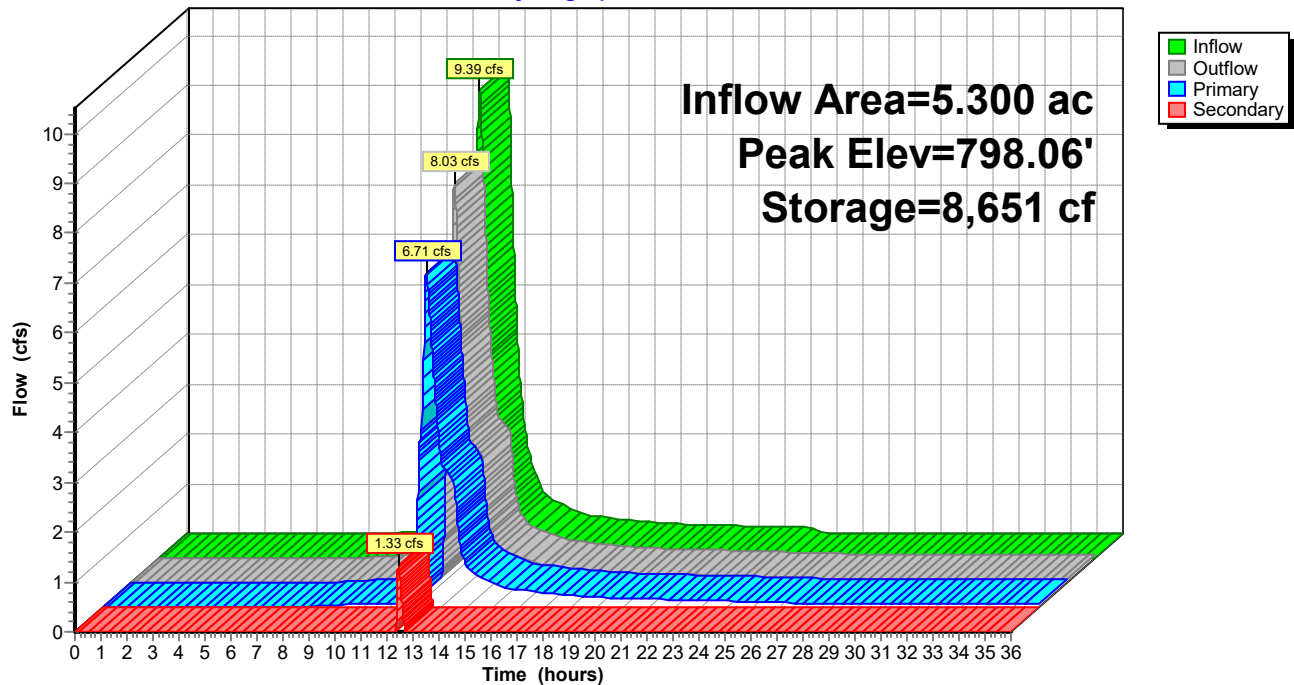
- 1=Culvert (Passes 6.70 cfs of 21.59 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 3.45 cfs @ 8.80 fps)
- 3=Exfiltration (Passes < 0.13 cfs potential flow)
- 4=Orifice/Grate (Passes < 4.94 cfs potential flow)
- 5=Orifice/Grate (Weir Controls 3.25 cfs @ 1.30 fps)

Secondary OutFlow Max=1.32 cfs @ 12.45 hrs HW=798.06' TW=794.74' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Weir Controls 1.32 cfs @ 0.58 fps)

Pond B1: BIO 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 79

Summary for Pond B2: BIO 2

Inflow Area = 4.400 ac, 59.77% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 8.42 cfs @ 12.36 hrs, Volume= 0.807 af
Outflow = 4.48 cfs @ 12.66 hrs, Volume= 0.803 af, Atten= 47%, Lag= 18.1 min
Primary = 4.48 cfs @ 12.66 hrs, Volume= 0.803 af
Routed to Reach 16R : South Channel 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.62' @ 12.66 hrs Surf.Area= 10,801 sf Storage= 13,340 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 139.3 min (953.1 - 813.9)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	24,112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	5,689	0	0
796.00	8,835	7,262	7,262
797.00	12,011	10,423	17,685
797.50	13,697	6,427	24,112

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	797.00'	8.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 80

Primary OutFlow Max=4.48 cfs @ 12.66 hrs HW=796.62' TW=793.02' (Dynamic Tailwater)

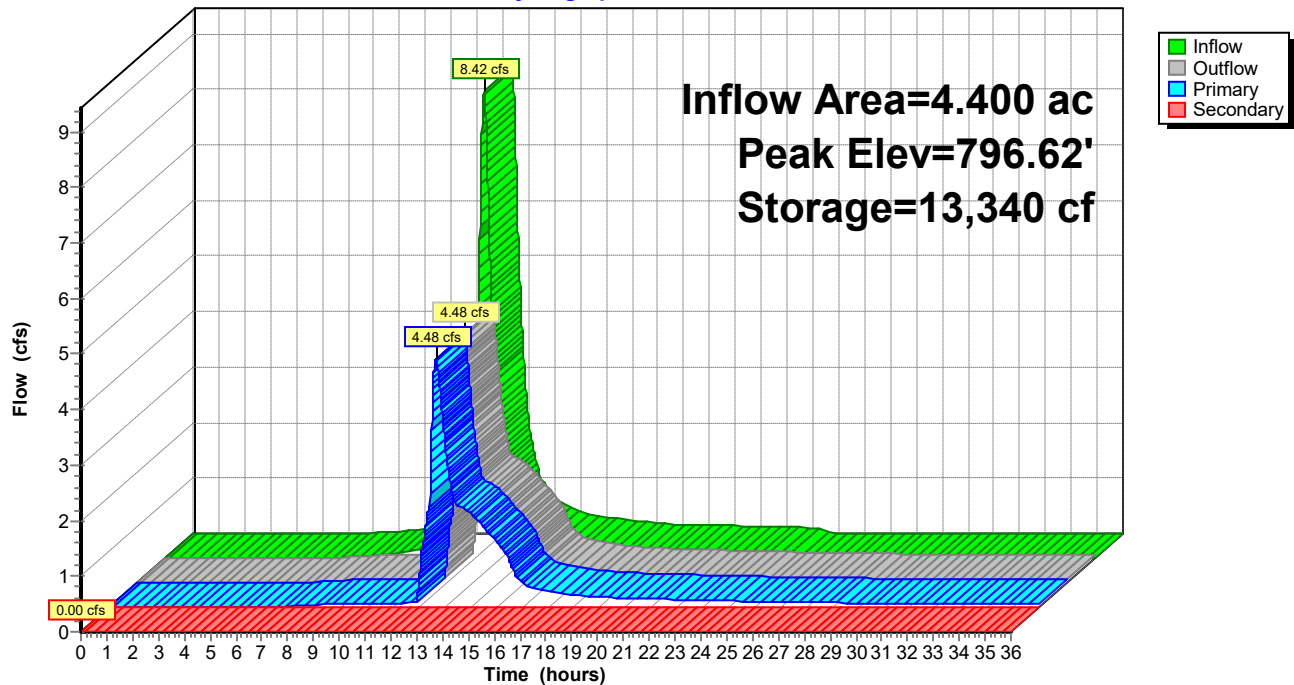
- 1=Culvert (Passes 4.48 cfs of 11.22 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.79 cfs @ 9.14 fps)
- 3=Exfiltration (Passes < 0.13 cfs potential flow)
- 4=Orifice/Grate (Passes < 2.00 cfs potential flow)
- 5=Orifice/Grate (Weir Controls 2.68 cfs @ 1.53 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=792.00' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B2: BIO 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 81

Summary for Pond B3: BIO 3

Inflow Area = 0.900 ac, 38.89% Impervious, Inflow Depth = 1.86" for 10-Year event
Inflow = 2.33 cfs @ 12.16 hrs, Volume= 0.140 af
Outflow = 1.11 cfs @ 12.31 hrs, Volume= 0.140 af, Atten= 52%, Lag= 8.7 min
Primary = 1.11 cfs @ 12.31 hrs, Volume= 0.140 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.82' @ 12.31 hrs Surf.Area= 2,949 sf Storage= 2,029 cf

Plug-Flow detention time= 204.3 min calculated for 0.140 af (100% of inflow)
Center-of-Mass det. time= 204.4 min (1,017.1 - 812.7)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	8,693 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	1,987	0	0
796.00	3,157	2,572	2,572
797.00	4,384	3,771	6,343
797.50	5,018	2,351	8,693

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.11 cfs @ 12.31 hrs HW=795.82' TW=792.79' (Dynamic Tailwater)

1=Culvert (Passes 1.11 cfs of 10.29 cfs potential flow)
2=Orifice/Grate (Passes 1.11 cfs of 1.65 cfs potential flow)
3=Exfiltration (Exfiltration Controls 0.03 cfs)
4=Orifice/Grate (Orifice Controls 1.07 cfs @ 2.73 fps)
5=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

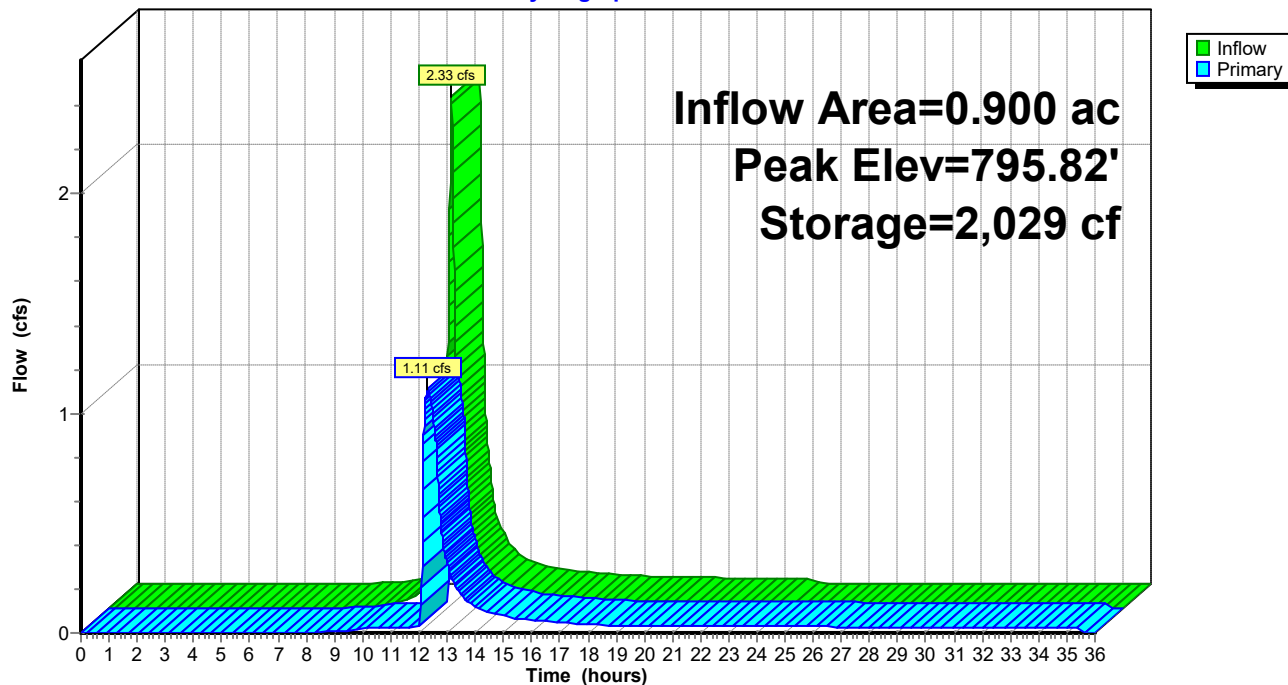
Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 82

Pond B3: BIO 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 83

Summary for Pond B4: BIO 4

Inflow Area = 2.100 ac, 53.81% Impervious, Inflow Depth = 2.11" for 10-Year event
Inflow = 5.32 cfs @ 12.20 hrs, Volume= 0.370 af
Outflow = 1.88 cfs @ 12.48 hrs, Volume= 0.369 af, Atten= 65%, Lag= 16.4 min
Primary = 1.88 cfs @ 12.48 hrs, Volume= 0.369 af
Routed to Reach 11R : West Channel
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 11R : West Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 798.47' @ 12.48 hrs Surf.Area= 4,791 sf Storage= 5,829 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 138.8 min (944.8 - 806.0)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	11,425 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
797.00	3,198	336.0	0	0	3,198
798.00	4,260	373.0	3,716	3,716	5,315
799.00	5,435	410.0	4,836	8,552	7,654
799.50	6,065	430.0	2,874	11,425	9,007

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	10.0" Round Culvert L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	798.55'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	799.00'	10.0' long x 7.0' 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 84

Primary OutFlow Max=1.88 cfs @ 12.48 hrs HW=798.47' TW=794.52' (Dynamic Tailwater)

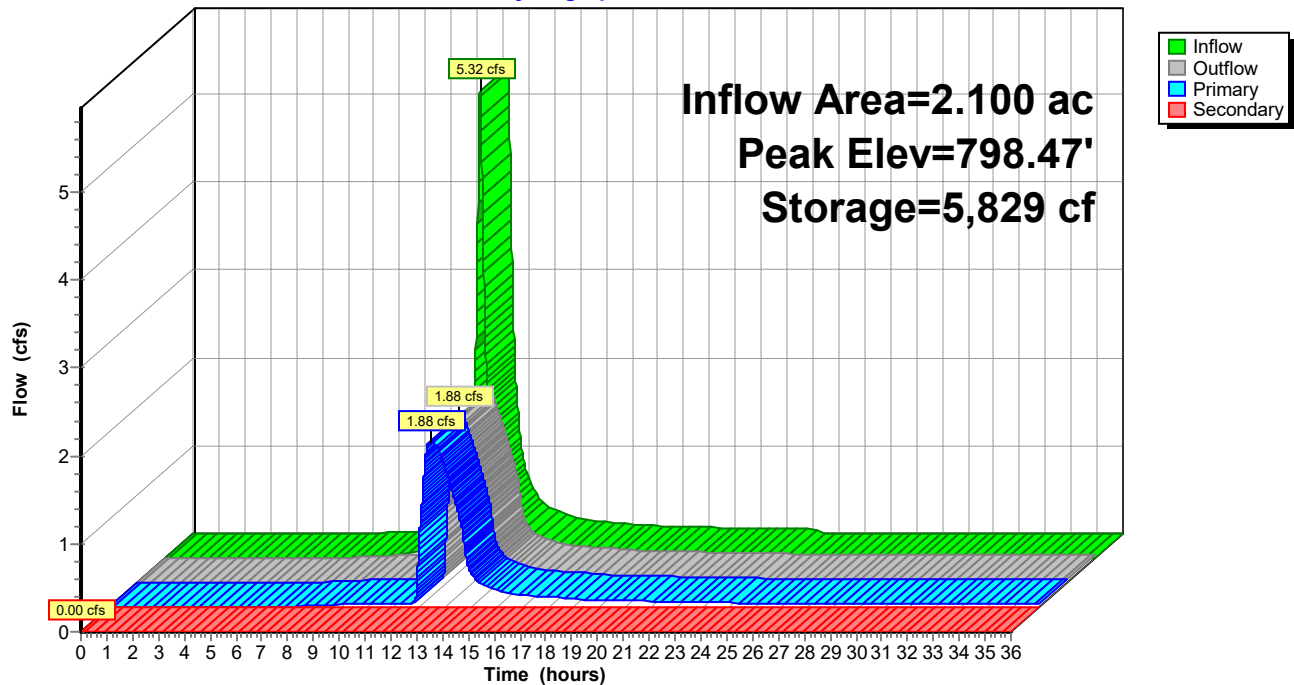
- 1=Culvert (Passes 1.88 cfs of 5.11 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.88 cfs @ 9.56 fps)
- 3=Exfiltration (Passes < 0.06 cfs potential flow)
- 4=Orifice/Grate (Passes < 1.86 cfs potential flow)
- 5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=797.00' TW=794.28' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B4: BIO 4

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 85

Summary for Pond P1: POND 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth > 1.70" for 10-Year event
Inflow = 14.97 cfs @ 12.48 hrs, Volume= 1.519 af
Outflow = 3.98 cfs @ 13.17 hrs, Volume= 1.345 af, Atten= 73%, Lag= 41.7 min
Primary = 3.98 cfs @ 13.17 hrs, Volume= 1.345 af
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 794.77' @ 13.17 hrs Surf.Area= 10,679 sf Storage= 22,823 cf

Plug-Flow detention time= 275.2 min calculated for 1.345 af (89% of inflow)
Center-of-Mass det. time= 194.4 min (1,149.1 - 954.7)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	50,944 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	5,934	0	0
793.00	7,561	6,748	6,748
794.00	9,282	8,422	15,169
795.00	11,104	10,193	25,362
796.00	13,026	12,065	37,427
797.00	14,008	13,517	50,944

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	24.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	792.00'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	794.00'	20.0" W x 10.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	795.75'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.98 cfs @ 13.17 hrs HW=794.77' TW=791.47' (Dynamic Tailwater)

1=Culvert (Passes 3.98 cfs of 15.62 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.38 cfs @ 7.83 fps)
3=Orifice/Grate (Orifice Controls 3.59 cfs @ 2.81 fps)
4=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

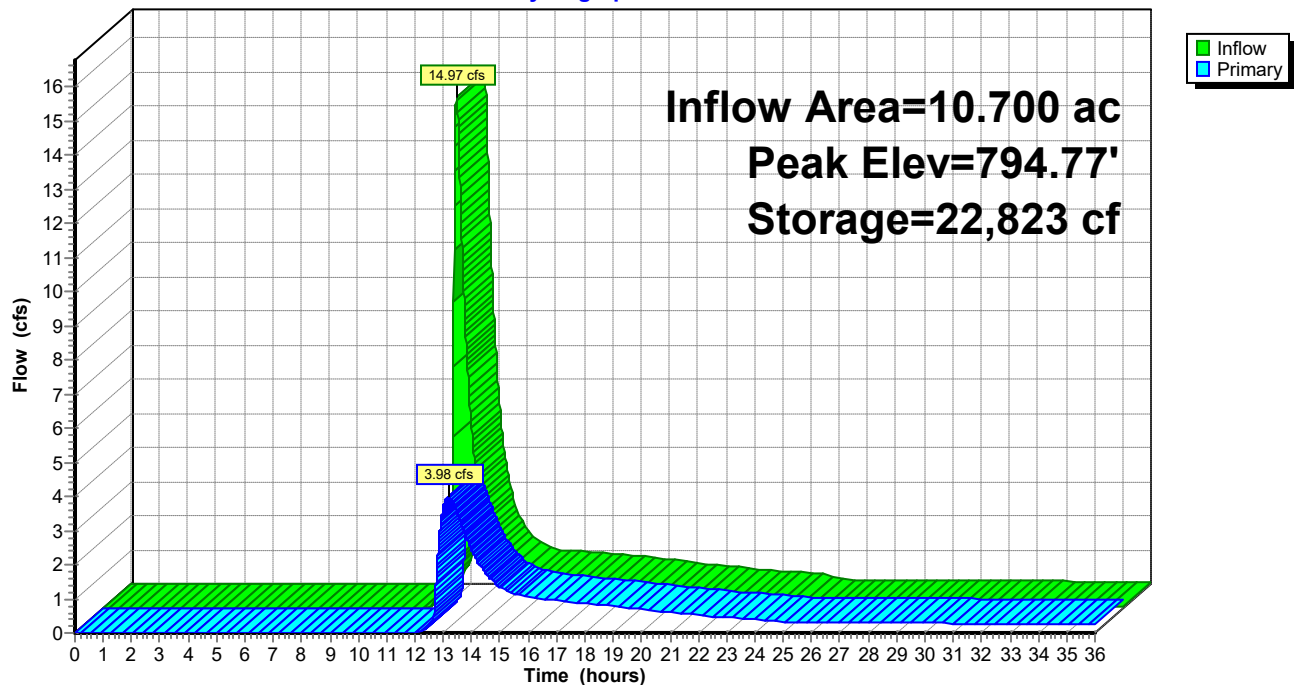
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 86

Pond P1: POND 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 87

Summary for Pond P2: POND 2

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth > 1.94" for 10-Year event
Inflow = 8.03 cfs @ 12.45 hrs, Volume= 0.855 af
Outflow = 1.19 cfs @ 13.76 hrs, Volume= 0.808 af, Atten= 85%, Lag= 78.9 min
Primary = 1.19 cfs @ 13.76 hrs, Volume= 0.808 af
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.93' @ 13.76 hrs Surf.Area= 12,508 sf Storage= 19,814 cf

Plug-Flow detention time= 371.3 min calculated for 0.808 af (94% of inflow)
Center-of-Mass det. time= 313.8 min (1,245.2 - 931.4)

Volume	Invert	Avail.Storage	Storage Description
#1	794.00'	60,439 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
794.00	8,143	0	0
795.00	10,289	9,216	9,216
796.00	12,675	11,482	20,698
797.00	15,212	13,944	34,642
798.00	17,852	16,532	51,174
798.50	19,211	9,266	60,439

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	794.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.50'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	796.60'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 13.76 hrs HW=795.93' TW=793.71' (Dynamic Tailwater)

1=Culvert (Passes 1.19 cfs of 4.51 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.56 cfs @ 6.39 fps)
3=Orifice/Grate (Orifice Controls 0.63 cfs @ 2.23 fps)
4=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

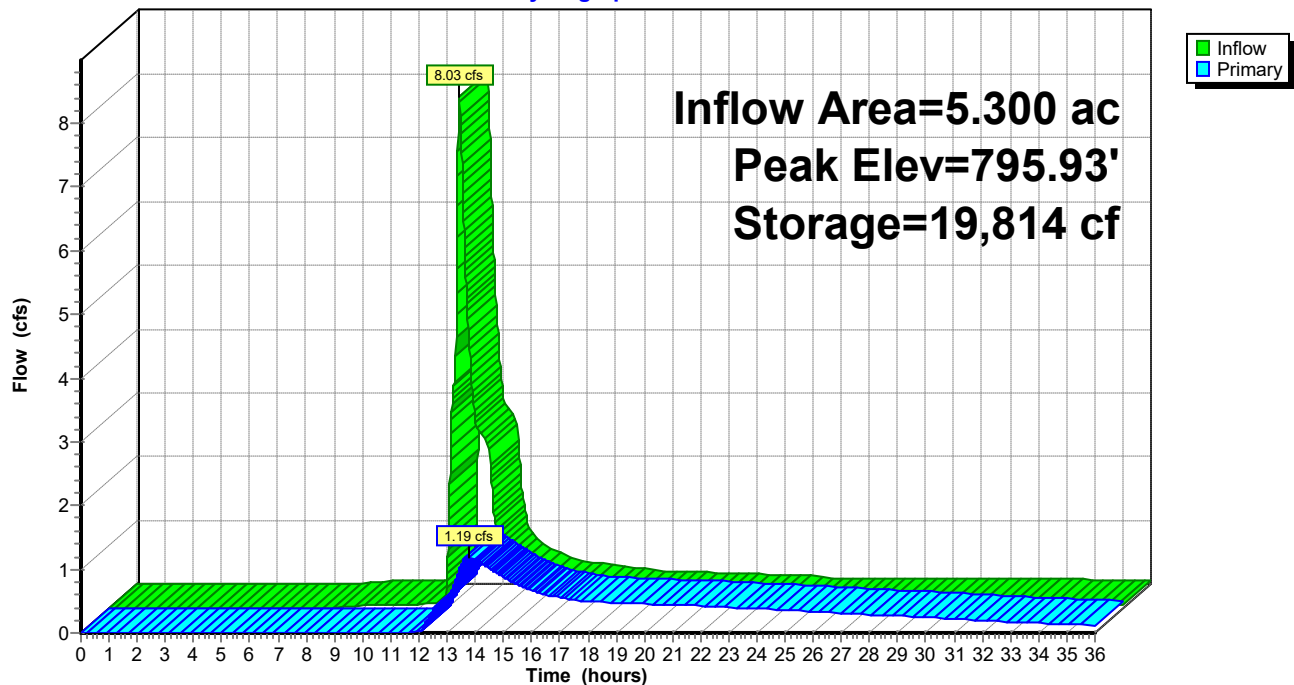
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 88

Pond P2: POND 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 89

Summary for Pond P3: POND 3

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 1.71" for 10-Year event
Inflow = 4.12 cfs @ 12.37 hrs, Volume= 0.384 af
Outflow = 1.14 cfs @ 12.93 hrs, Volume= 0.382 af, Atten= 72%, Lag= 33.7 min
Primary = 1.14 cfs @ 12.93 hrs, Volume= 0.382 af
Routed to Reach 12R : East Channel
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 12R : East Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.66' @ 12.93 hrs Surf.Area= 4,599 sf Storage= 6,020 cf

Plug-Flow detention time= 133.8 min calculated for 0.382 af (100% of inflow)
Center-of-Mass det. time= 130.4 min (1,006.6 - 876.2)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	10,321 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	2,710	0	0
796.00	3,780	3,245	3,245
797.00	5,016	4,398	7,643
797.50	5,697	2,678	10,321

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	15.0" Round Culvert L= 17.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 794.50' S= 0.0294 ' S= 0.0294 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	795.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.50'	36.0" W x 36.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long 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

Primary OutFlow Max=1.14 cfs @ 12.93 hrs HW=796.66' TW=794.74' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 1.14 cfs of 6.02 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.89 fps)
↑ **3=Orifice/Grate** (Orifice Controls 0.63 cfs @ 1.29 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=794.50' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

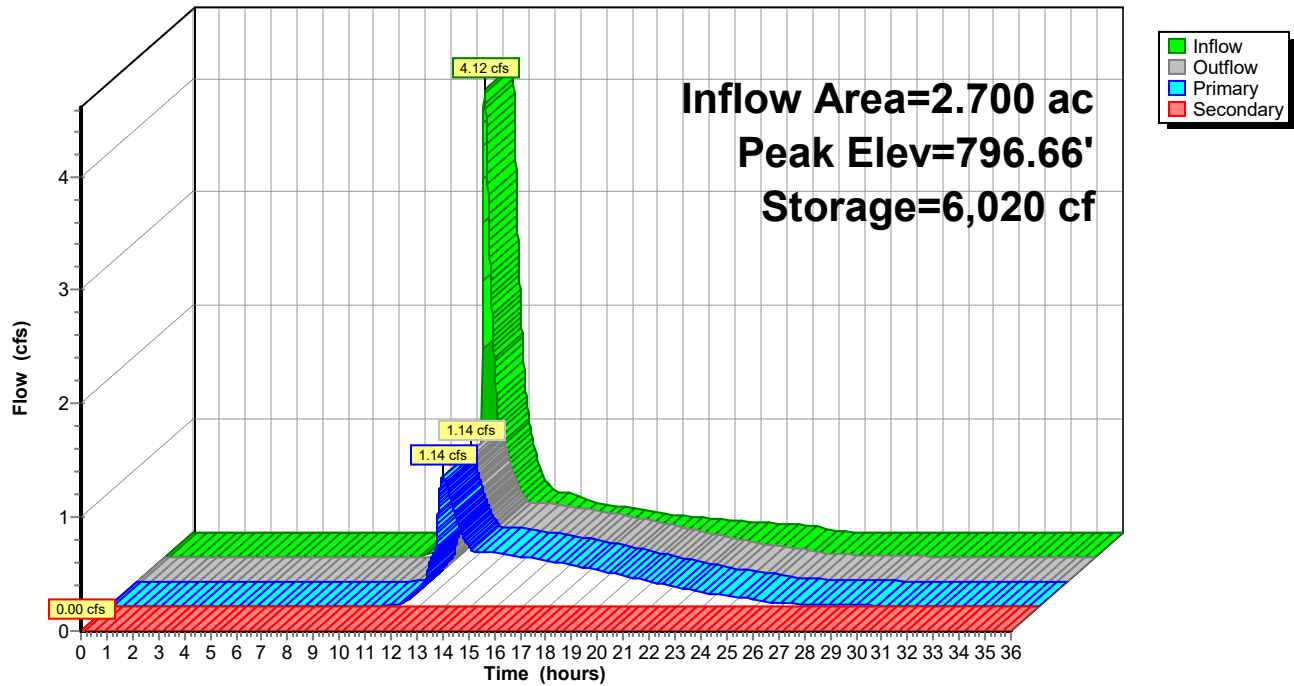
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 90

Pond P3: POND 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 91

Summary for Pond SB1: SED 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth = 1.78" for 10-Year event
Inflow = 15.77 cfs @ 12.40 hrs, Volume= 1.590 af
Outflow = 14.97 cfs @ 12.48 hrs, Volume= 1.519 af, Atten= 5%, Lag= 4.7 min
Primary = 14.97 cfs @ 12.48 hrs, Volume= 1.519 af
Routed to Pond P1 : POND 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P1 : POND 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.71' @ 12.48 hrs Surf.Area= 7,643 sf Storage= 17,469 cf

Plug-Flow detention time= 145.8 min calculated for 1.519 af (96% of inflow)
Center-of-Mass det. time= 121.0 min (954.7 - 833.7)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	23,675 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,977	0	0
793.00	3,138	2,558	2,558
794.00	4,415	3,777	6,334
795.00	7,275	5,845	12,179
796.50	8,053	11,496	23,675

Device	Routing	Invert	Outlet Devices
#1	Primary	793.00'	18.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 793.00' / 793.00' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	793.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.40'	36.0" x 36.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#4	Secondary	795.80'	15.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 2.00 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

Primary OutFlow Max=14.97 cfs @ 12.48 hrs HW=795.71' TW=793.03' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 14.97 cfs of 23.41 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 1.48 cfs @ 7.55 fps)
↑ **3=Orifice/Grate** (Weir Controls 13.48 cfs @ 1.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=792.00' TW=792.00' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

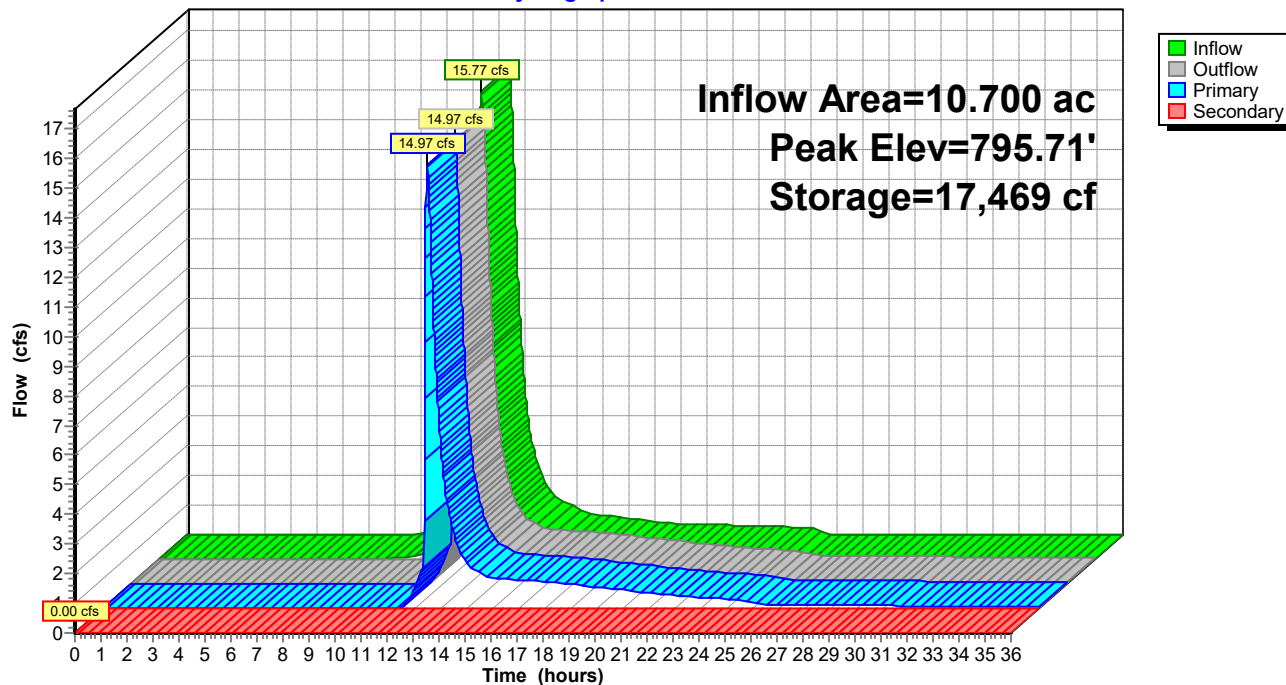
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 92

Pond SB1: SED 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 93

Summary for Pond SB2: SED 2

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 1.71" for 10-Year event
Inflow = 4.29 cfs @ 12.33 hrs, Volume= 0.384 af
Outflow = 4.12 cfs @ 12.37 hrs, Volume= 0.384 af, Atten= 4%, Lag= 2.8 min
Primary = 4.12 cfs @ 12.37 hrs, Volume= 0.384 af
Routed to Pond P3 : POND 3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond P3 : POND 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.84' @ 12.38 hrs Surf.Area= 2,317 sf Storage= 2,479 cf

Plug-Flow detention time= 45.5 min calculated for 0.384 af (100% of inflow)
Center-of-Mass det. time= 45.1 min (876.2 - 831.1)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	4,264 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	428	0	0
796.00	1,411	920	920
797.00	2,494	1,953	2,872
797.50	3,074	1,392	4,264

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	24.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 795.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	795.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.65'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=4.11 cfs @ 12.37 hrs HW=796.84' TW=795.82' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 4.11 cfs of 9.92 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.95 cfs @ 4.86 fps)
↑ **3=Orifice/Grate** (Weir Controls 3.16 cfs @ 1.41 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=795.00' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

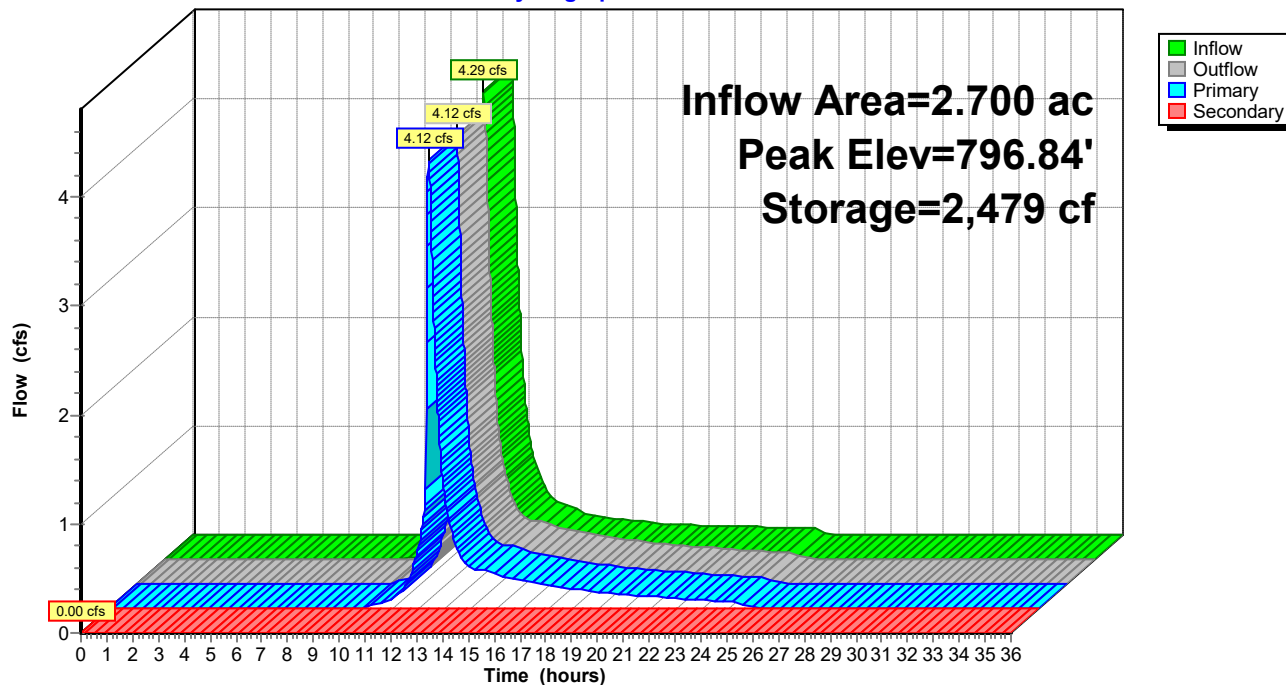
Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

Page 94

Pond SB2: SED 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 10-Year Rainfall=3.14"

Printed 6/24/2025

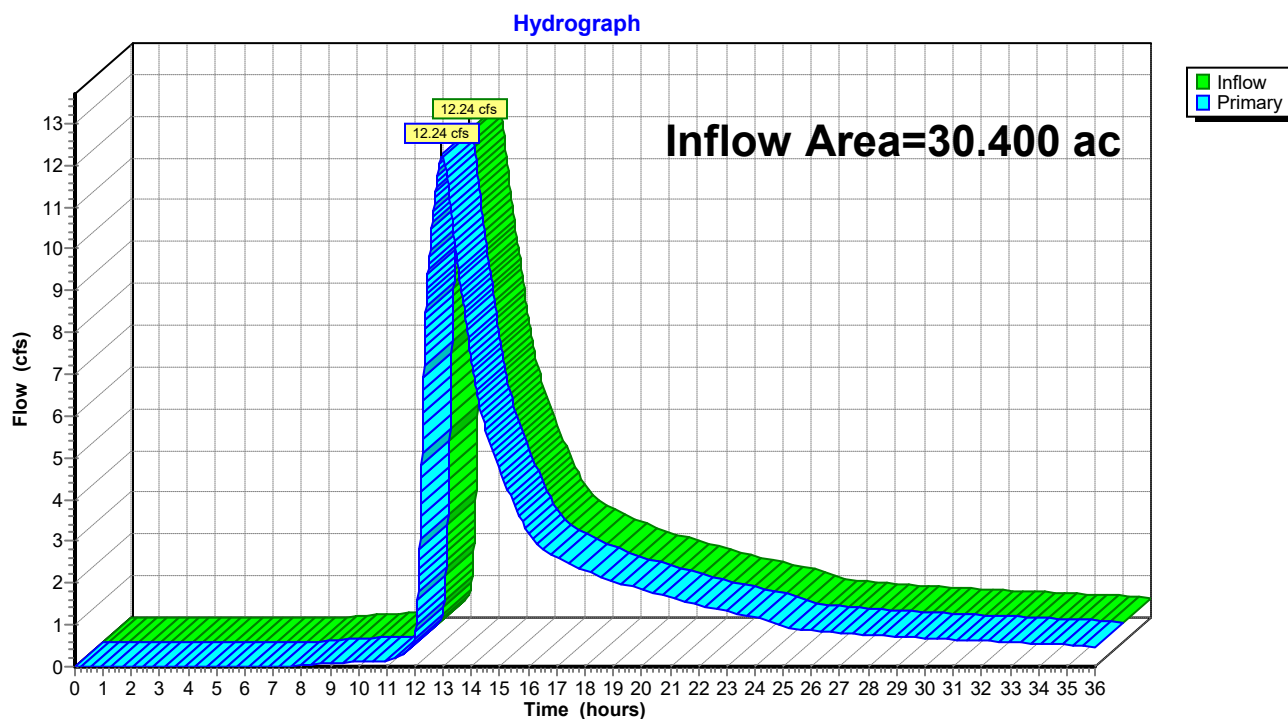
Page 95

Summary for Link 9L: TOTAL SITE RUNNOFF

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 1.70" for 10-Year event
Inflow = 12.24 cfs @ 12.95 hrs, Volume= 4.316 af
Primary = 12.24 cfs @ 12.95 hrs, Volume= 4.316 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 9L: TOTAL SITE RUNNOFF



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 96

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR-1: PR-1	Runoff Area=10.700 ac 33.08% Impervious Runoff Depth=3.02" Flow Length=1,030' Tc=28.1 min CN=86 Runoff=26.54 cfs 2.694 af
Subcatchment PR-10: PR-10	Runoff Area=0.100 ac 0.00% Impervious Runoff Depth=2.48" Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=0.40 cfs 0.021 af
Subcatchment PR-2: PR-2	Runoff Area=2.700 ac 28.52% Impervious Runoff Depth=2.93" Flow Length=648' Tc=22.1 min CN=85 Runoff=7.32 cfs 0.659 af
Subcatchment PR-3: PR-3	Runoff Area=5.300 ac 43.21% Impervious Runoff Depth=3.22" Flow Length=156' Tc=23.1 min CN=88 Runoff=15.31 cfs 1.420 af
Subcatchment PR-4: PR-4	Runoff Area=4.400 ac 59.77% Impervious Runoff Depth=3.52" Flow Length=263' Tc=25.0 min CN=91 Runoff=13.18 cfs 1.290 af
Subcatchment PR-5: PR-5	Runoff Area=2.100 ac 53.81% Impervious Runoff Depth=3.41" Flow Length=168' Tc=12.5 min CN=90 Runoff=8.40 cfs 0.598 af
Subcatchment PR-6: PR-6	Runoff Area=0.900 ac 38.89% Impervious Runoff Depth=3.12" Flow Length=80' Slope=0.0680 '/' Tc=8.8 min CN=87 Runoff=3.82 cfs 0.234 af
Subcatchment PR-7: PR-7	Runoff Area=3.200 ac 0.00% Impervious Runoff Depth=2.48" Flow Length=136' Tc=29.5 min CN=80 Runoff=6.39 cfs 0.661 af
Subcatchment PR-8: PR-8	Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=2.48" Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=1.21 cfs 0.062 af
Subcatchment PR-9: PR-9	Runoff Area=0.700 ac 0.00% Impervious Runoff Depth=2.48" Flow Length=66' Slope=0.0450 '/' Tc=8.9 min CN=80 Runoff=2.41 cfs 0.145 af
Reach 11R: West Channel	Avg. Flow Depth=0.43' Max Vel=2.45 fps Inflow=5.79 cfs 0.658 af n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=5.62 cfs 0.657 af
Reach 12R: East Channel	Avg. Flow Depth=0.53' Max Vel=1.58 fps Inflow=4.81 cfs 0.801 af n=0.030 L=479.0' S=0.0031 '/' Capacity=207.35 cfs Outflow=4.63 cfs 0.801 af
Reach 13R: North Channel Section 1	Avg. Flow Depth=1.15' Max Vel=1.97 fps Inflow=21.22 cfs 4.352 af n=0.030 L=400.0' S=0.0019 '/' Capacity=1,299.91 cfs Outflow=21.02 cfs 4.346 af
Reach 15R: East Channel 2	Avg. Flow Depth=0.44' Max Vel=2.43 fps Inflow=6.82 cfs 2.159 af n=0.030 L=212.0' S=0.0088 '/' Capacity=599.19 cfs Outflow=6.81 cfs 2.157 af
Reach 16R: South Channel 2	Avg. Flow Depth=1.38' Max Vel=2.53 fps Inflow=11.98 cfs 1.537 af n=0.030 L=162.0' S=0.0046 '/' Capacity=1,557.04 cfs Outflow=11.96 cfs 1.537 af
Reach 18R: North Channel Section 2	Avg. Flow Depth=1.68' Max Vel=2.17 fps Inflow=33.65 cfs 7.432 af n=0.030 L=430.0' S=0.0016 '/' Capacity=1,217.16 cfs Outflow=33.36 cfs 7.422 af

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 97

Pond B1: BIO 1

Peak Elev=798.15' Storage=9,651 cf Inflow=15.31 cfs 1.420 af
Primary=9.51 cfs 1.258 af Secondary=5.40 cfs 0.158 af Outflow=14.89 cfs 1.416 af

Pond B2: BIO 2

Peak Elev=796.88' Storage=16,224 cf Inflow=13.18 cfs 1.290 af
Primary=10.37 cfs 1.283 af Secondary=0.00 cfs 0.000 af Outflow=10.37 cfs 1.283 af

Pond B3: BIO 3

Peak Elev=796.21' Storage=3,259 cf Inflow=3.82 cfs 0.234 af
Outflow=1.63 cfs 0.233 af

Pond B4: BIO 4

Peak Elev=798.84' Storage=7,704 cf Inflow=8.40 cfs 0.598 af
Primary=5.34 cfs 0.596 af Secondary=0.00 cfs 0.000 af Outflow=5.34 cfs 0.596 af

Pond P1: POND 1

Peak Elev=795.92' Storage=36,386 cf Inflow=24.07 cfs 2.618 af
Outflow=11.37 cfs 2.425 af

Pond P2: POND 2

Peak Elev=796.59' Storage=28,557 cf Inflow=14.89 cfs 1.416 af
Outflow=2.80 cfs 1.358 af

Pond P3: POND 3

Peak Elev=797.02' Storage=7,752 cf Inflow=7.20 cfs 0.658 af
Primary=4.20 cfs 0.656 af Secondary=0.08 cfs 0.001 af Outflow=4.28 cfs 0.656 af

Pond SB1: SED 1

Peak Elev=796.03' Storage=19,942 cf Inflow=26.54 cfs 2.694 af
Primary=23.64 cfs 2.246 af Secondary=7.74 cfs 0.371 af Outflow=24.07 cfs 2.618 af

Pond SB2: SED 2

Peak Elev=797.09' Storage=3,093 cf Inflow=7.32 cfs 0.659 af
Primary=7.20 cfs 0.648 af Secondary=0.59 cfs 0.010 af Outflow=7.20 cfs 0.658 af

Link 9L: TOTAL SITE RUNNOFF

Inflow=33.36 cfs 7.422 af
Primary=33.36 cfs 7.422 af

Total Runoff Area = 30.400 ac Runoff Volume = 7.782 af Average Runoff Depth = 3.07"
64.77% Pervious = 19.690 ac 35.23% Impervious = 10.710 ac

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 98

Summary for Subcatchment PR-1: PR-1

Runoff = 26.54 cfs @ 12.39 hrs, Volume= 2.694 af, Depth= 3.02"
Routed to Pond SB1 : SED 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
3.400	98	Paved parking, HSG D
7.160	80	>75% Grass cover, Good, HSG D
* 0.140	98	POND
10.700	86	Weighted Average
7.160		66.92% Pervious Area
3.540		33.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	100	0.0175	0.09		Sheet Flow, First 100 Grass: Dense n= 0.240 P2= 2.19"
8.5	578	0.0050	1.14		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
0.6	147	0.0060	4.08	5.00	Pipe Channel, PIPE 1 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.1	25	0.0060	4.08	5.00	Pipe Channel, PIPE 2 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.7	180	0.0060	4.60	8.14	Pipe Channel, PIPE 3 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
28.1	1,030	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

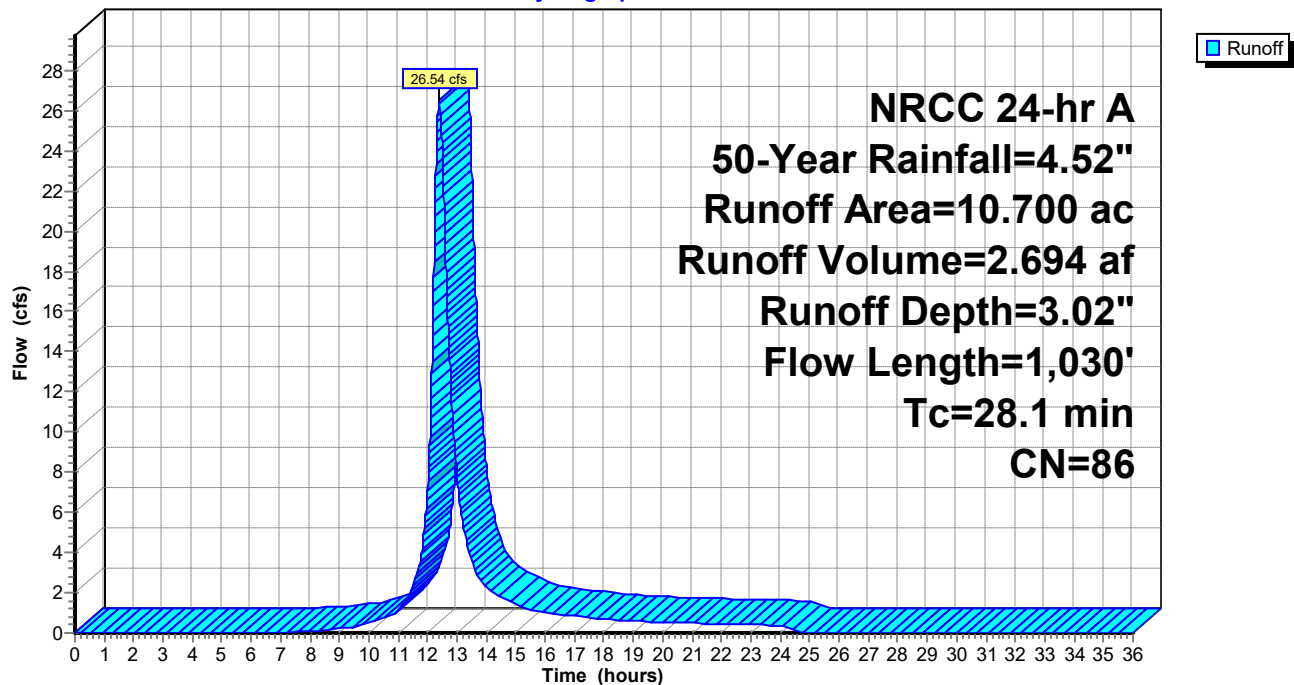
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 99

Subcatchment PR-1: PR-1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 100

Summary for Subcatchment PR-10: PR-10

Runoff = 0.40 cfs @ 12.13 hrs, Volume= 0.021 af, Depth= 2.48"
Routed to Reach 16R : South Channel 2

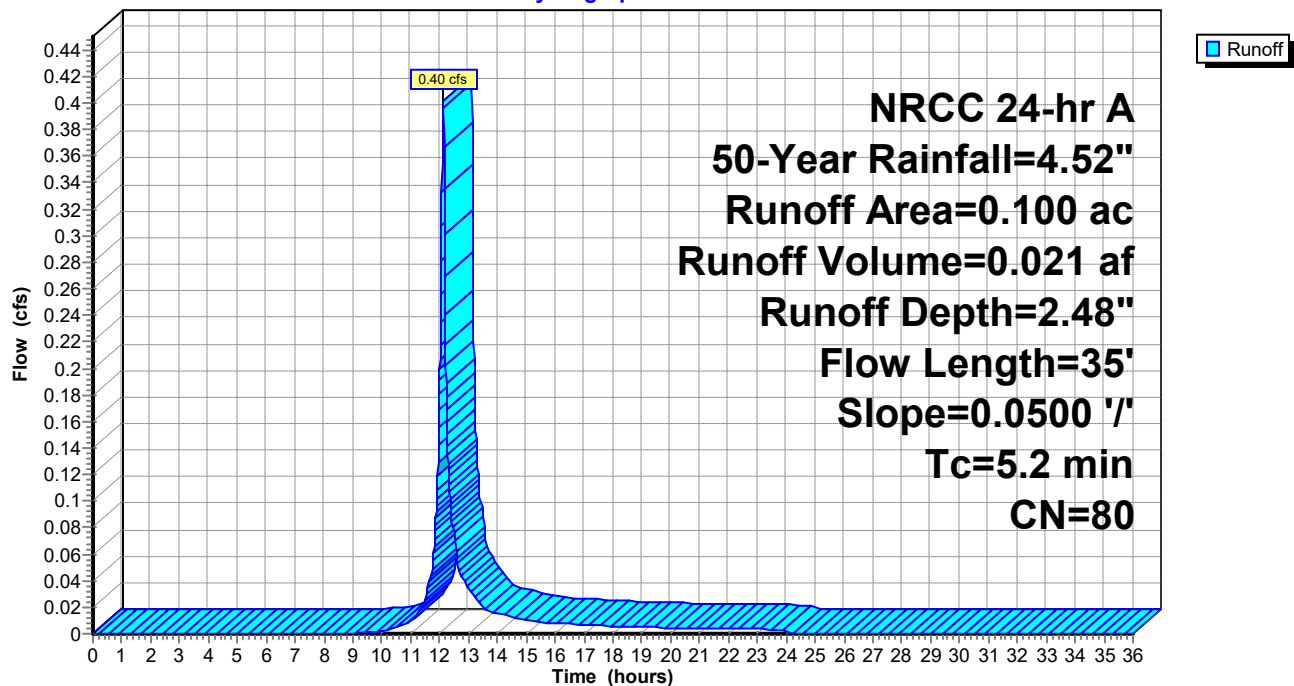
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-10: PR-10

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 101

Summary for Subcatchment PR-2: PR-2

Runoff = 7.32 cfs @ 12.31 hrs, Volume= 0.659 af, Depth= 2.93"
Routed to Pond SB2 : SED 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
1.930	80	>75% Grass cover, Good, HSG D
* 0.060	98	Wet Pond
2.700	85	Weighted Average
1.930		71.48% Pervious Area
0.770		28.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		Sheet Flow, FIRST 100' Grass: Short n= 0.150 P2= 2.19"
2.5	293	0.0090	1.93		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
2.3	164	0.0007	1.20	0.94	Pipe Channel, PIPE 1 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.7	91	0.0004	0.91	0.71	Pipe Channel, PIPE 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
22.1	648	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

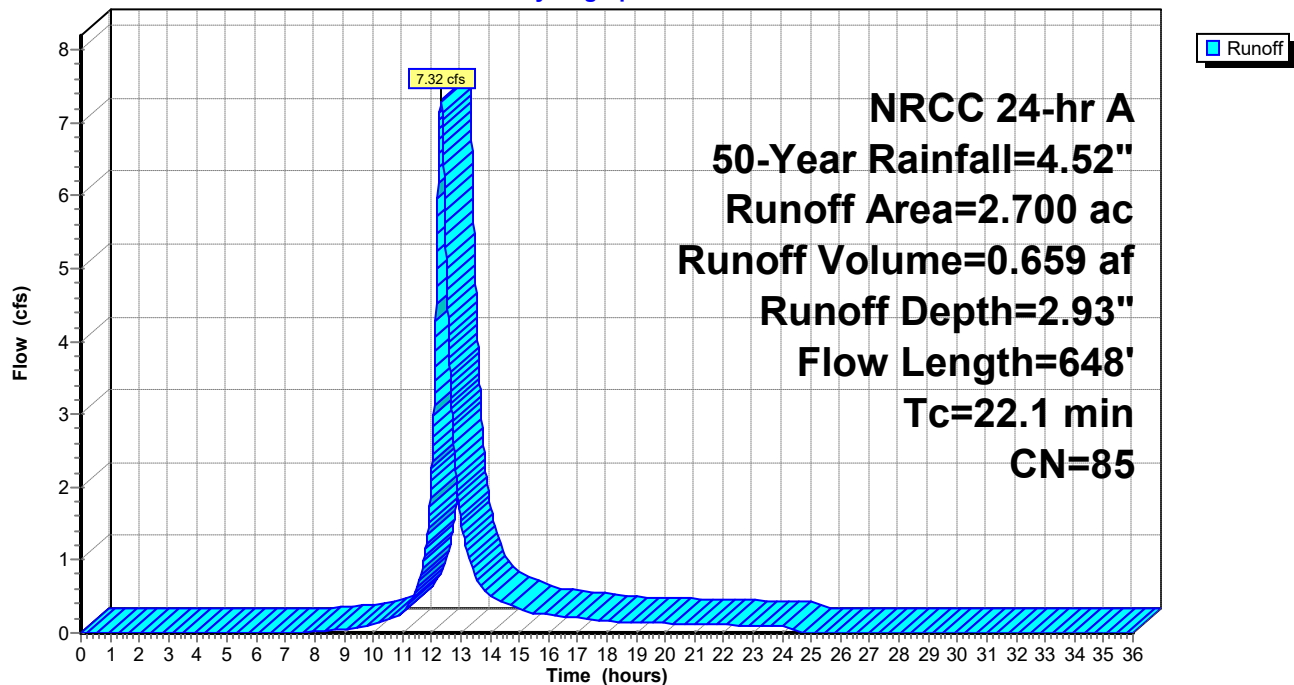
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 102

Subcatchment PR-2: PR-2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 103

Summary for Subcatchment PR-3: PR-3

Runoff = 15.31 cfs @ 12.33 hrs, Volume= 1.420 af, Depth= 3.22"
Routed to Pond B1 : BIO 1

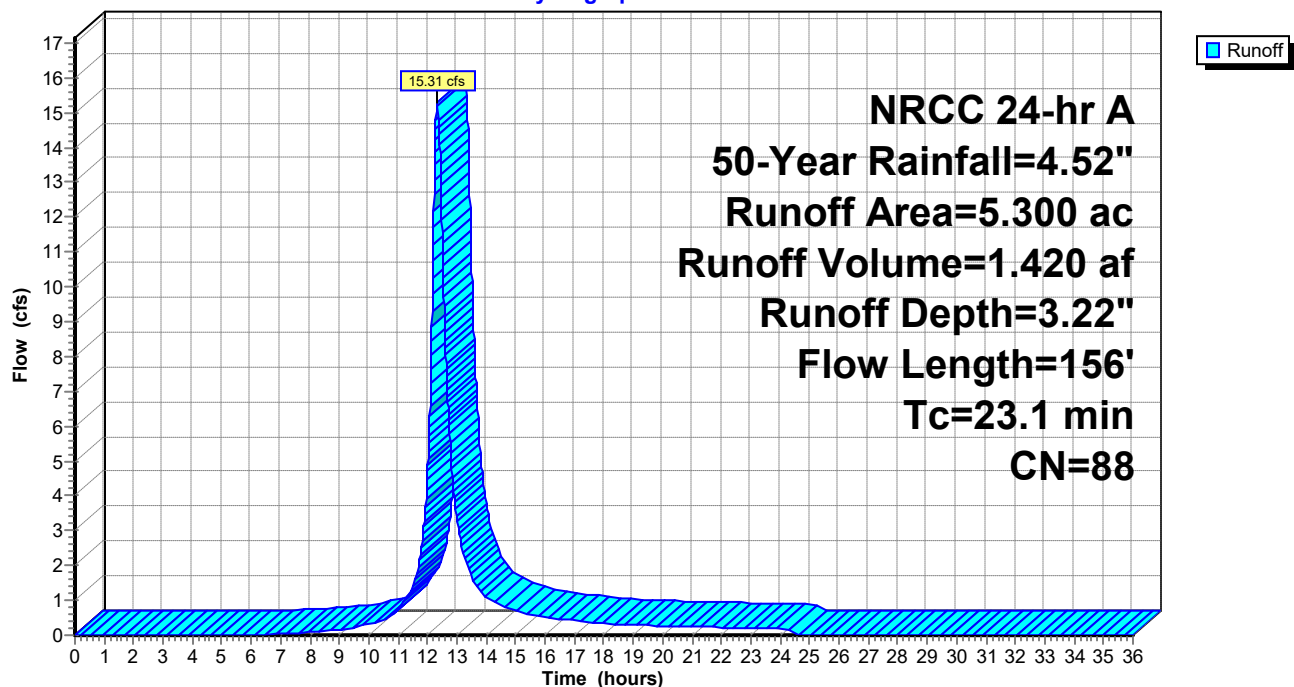
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
2.100	98	Paved parking, HSG D
3.010	80	>75% Grass cover, Good, HSG D
* 0.190	98	Wet Pond
5.300	88	Weighted Average
3.010		56.79% Pervious Area
2.290		43.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
0.3	56	0.0530	3.71		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
23.1	156	Total			

Subcatchment PR-3: PR-3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 104

Summary for Subcatchment PR-4: PR-4

Runoff = 13.18 cfs @ 12.36 hrs, Volume= 1.290 af, Depth= 3.52"
Routed to Pond B2 : BIO 2

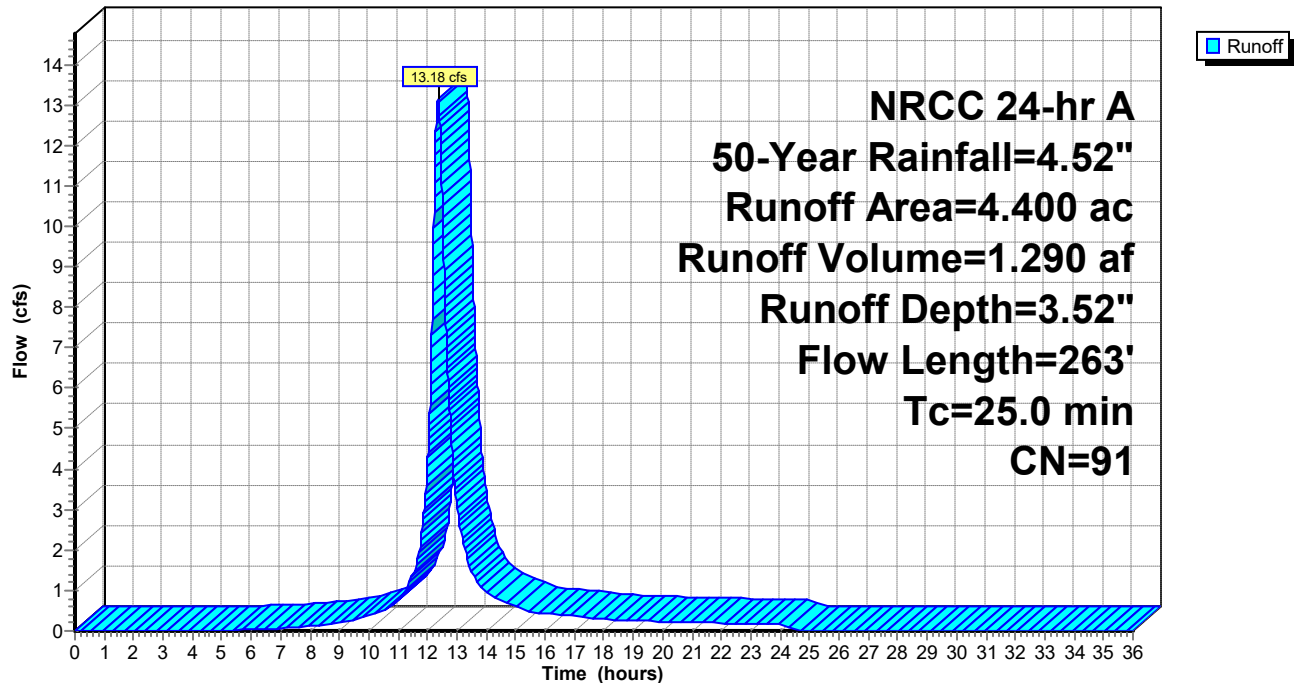
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
2.630	98	Paved parking, HSG D
1.770	80	>75% Grass cover, Good, HSG D
4.400	91	Weighted Average
1.770		40.23% Pervious Area
2.630		59.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
2.2	163	0.0060	1.25		Shallow Concentrated Flow, SCF Grass
					Unpaved Kv= 16.1 fps
25.0	263	Total			

Subcatchment PR-4: PR-4

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 105

Summary for Subcatchment PR-5: PR-5

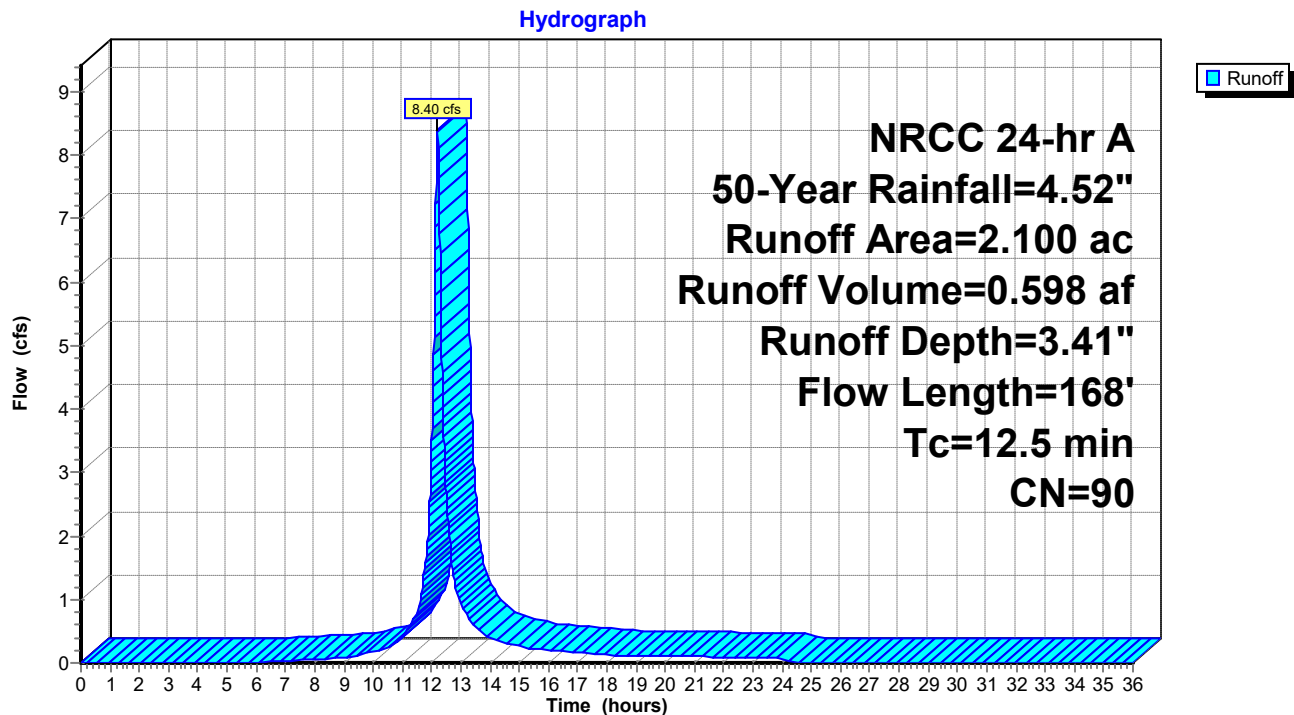
Runoff = 8.40 cfs @ 12.20 hrs, Volume= 0.598 af, Depth= 3.41"
Routed to Pond B4 : BIO 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
1.130	98	Paved parking, HSG D
0.970	80	>75% Grass cover, Good, HSG D
2.100	90	Weighted Average
0.970		46.19% Pervious Area
1.130		53.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	58	0.0170	0.08		Sheet Flow, First 58
					Grass: Dense n= 0.240 P2= 2.19"
0.6	110	0.0230	3.08		Shallow Concentrated Flow, Pave Surf
					Paved Kv= 20.3 fps
12.5	168	Total			

Subcatchment PR-5: PR-5



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 106

Summary for Subcatchment PR-6: PR-6

Runoff = 3.82 cfs @ 12.16 hrs, Volume= 0.234 af, Depth= 3.12"
Routed to Pond B3 : BIO 3

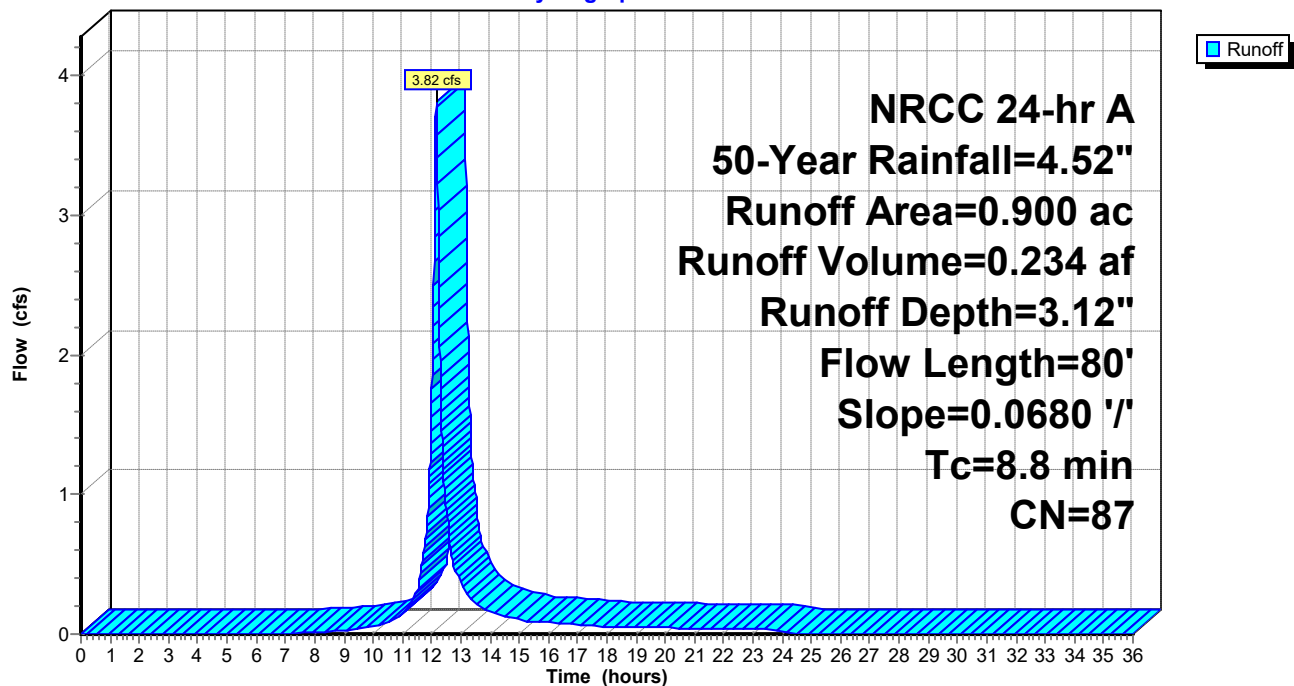
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.350	98	Paved parking, HSG D
0.550	80	>75% Grass cover, Good, HSG D
0.900	87	Weighted Average
0.550		61.11% Pervious Area
0.350		38.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	80	0.0680	0.15		Sheet Flow, SF 80'
Grass: Dense n= 0.240 P2= 2.19"					

Subcatchment PR-6: PR-6

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 107

Summary for Subcatchment PR-7: PR-7

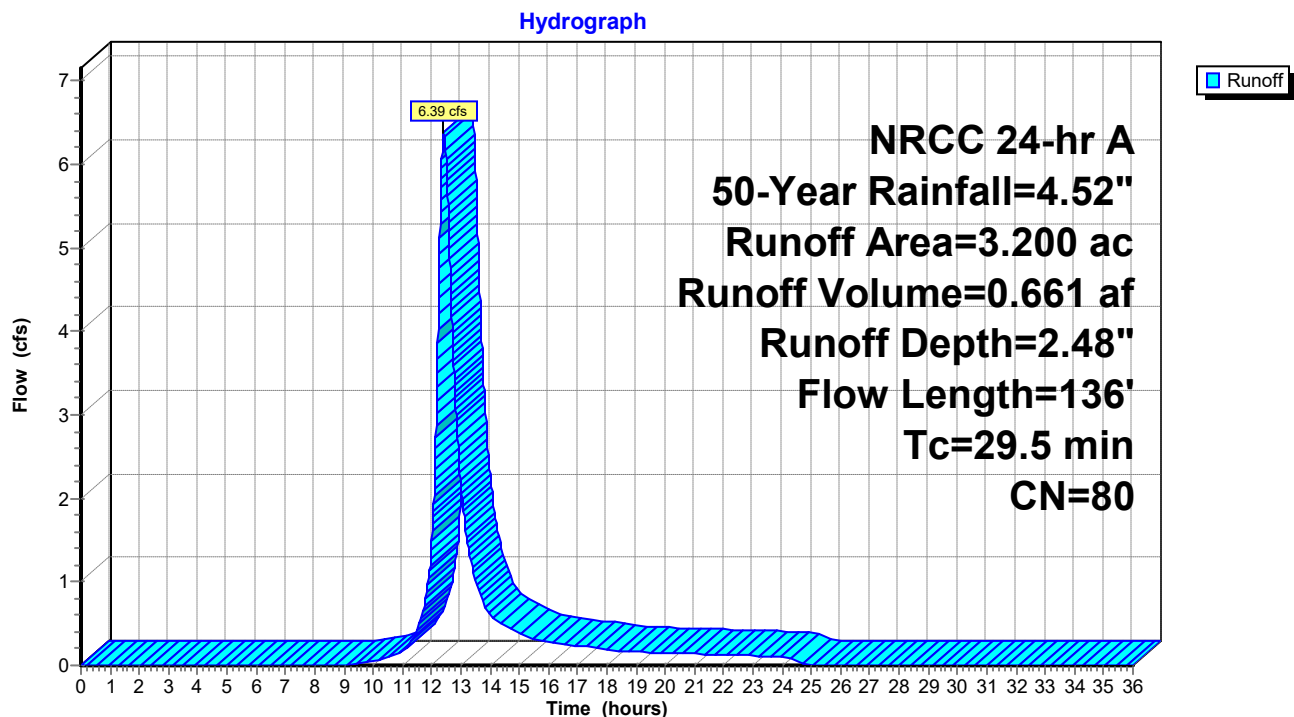
Runoff = 6.39 cfs @ 12.42 hrs, Volume= 0.661 af, Depth= 2.48"
Routed to Reach 18R : North Channel Section 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
1.300	79	Woods/grass comb., Good, HSG D
1.900	80	>75% Grass cover, Good, HSG D
3.200	80	Weighted Average
3.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	100	0.0150	0.06		Sheet Flow, First 100
					Woods: Light underbrush n= 0.400 P2= 2.19"
0.4	36	0.0800	1.41		Shallow Concentrated Flow, SCF
					Woodland Kv= 5.0 fps
29.5	136	Total			

Subcatchment PR-7: PR-7



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 108

Summary for Subcatchment PR-8: PR-8

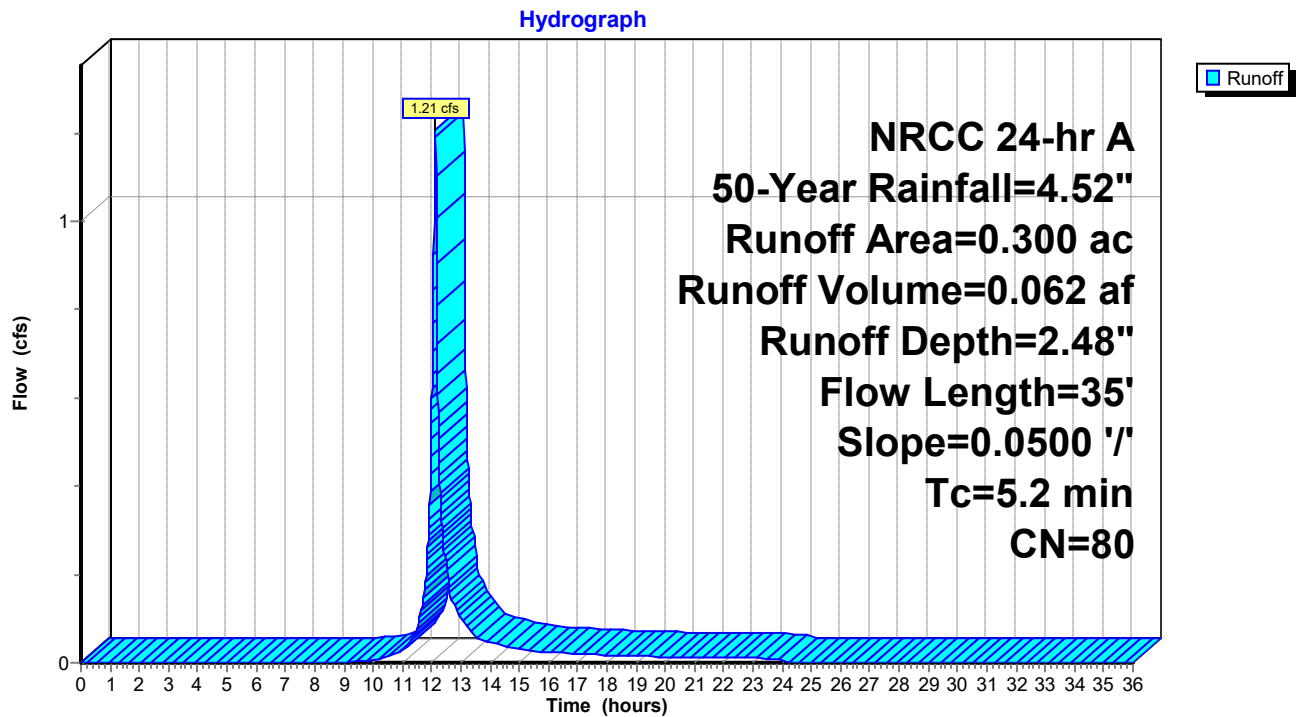
Runoff = 1.21 cfs @ 12.13 hrs, Volume= 0.062 af, Depth= 2.48"
Routed to Reach 11R : West Channel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.300	80	>75% Grass cover, Good, HSG D
0.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-8: PR-8



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 109

Summary for Subcatchment PR-9: PR-9

Runoff = 2.41 cfs @ 12.16 hrs, Volume= 0.145 af, Depth= 2.48"
Routed to Reach 12R : East Channel

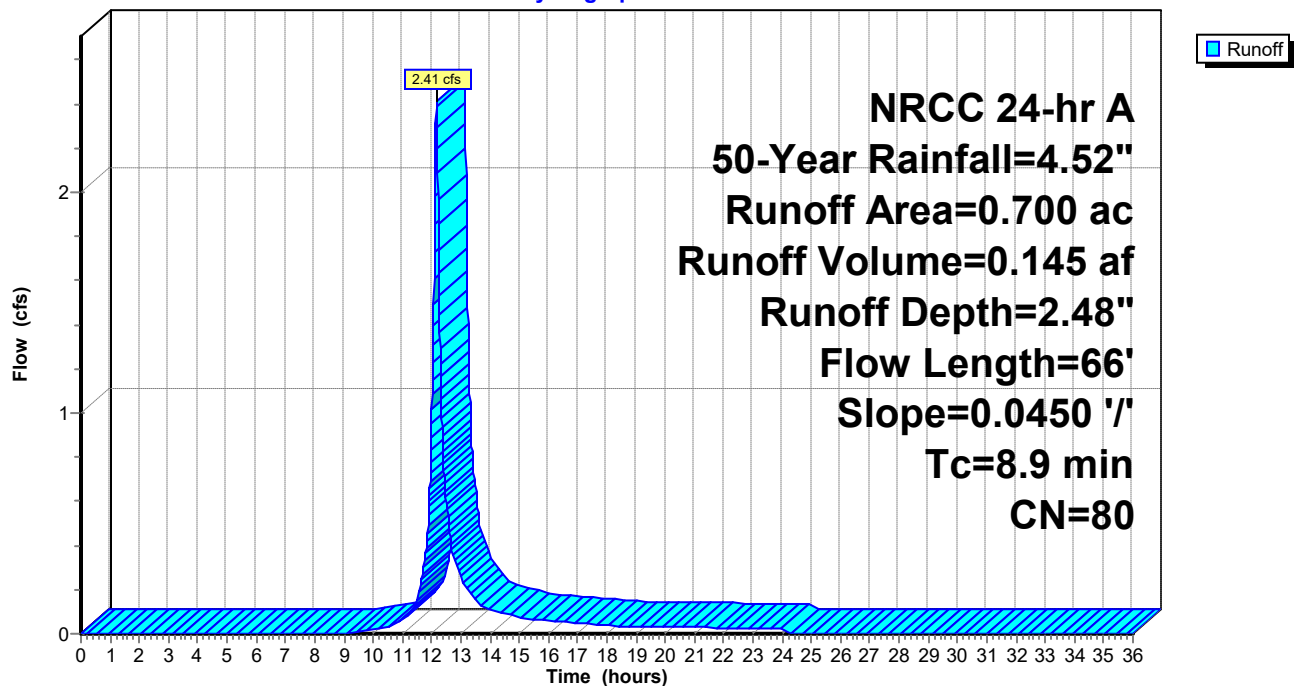
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-Year Rainfall=4.52"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	66	0.0450	0.12		Sheet Flow, First 66 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-9: PR-9

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 110

Summary for Reach 11R: West Channel

Inflow Area = 2.400 ac, 47.08% Impervious, Inflow Depth > 3.29" for 50-Year event
Inflow = 5.79 cfs @ 12.27 hrs, Volume= 0.658 af
Outflow = 5.62 cfs @ 12.37 hrs, Volume= 0.657 af, Atten= 3%, Lag= 5.7 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.45 fps, Min. Travel Time= 2.6 min

Avg. Velocity= 0.74 fps, Avg. Travel Time= 8.7 min

Peak Storage= 889 cf @ 12.37 hrs

Average Depth at Peak Storage= 0.43' , Surface Width= 6.60'

Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

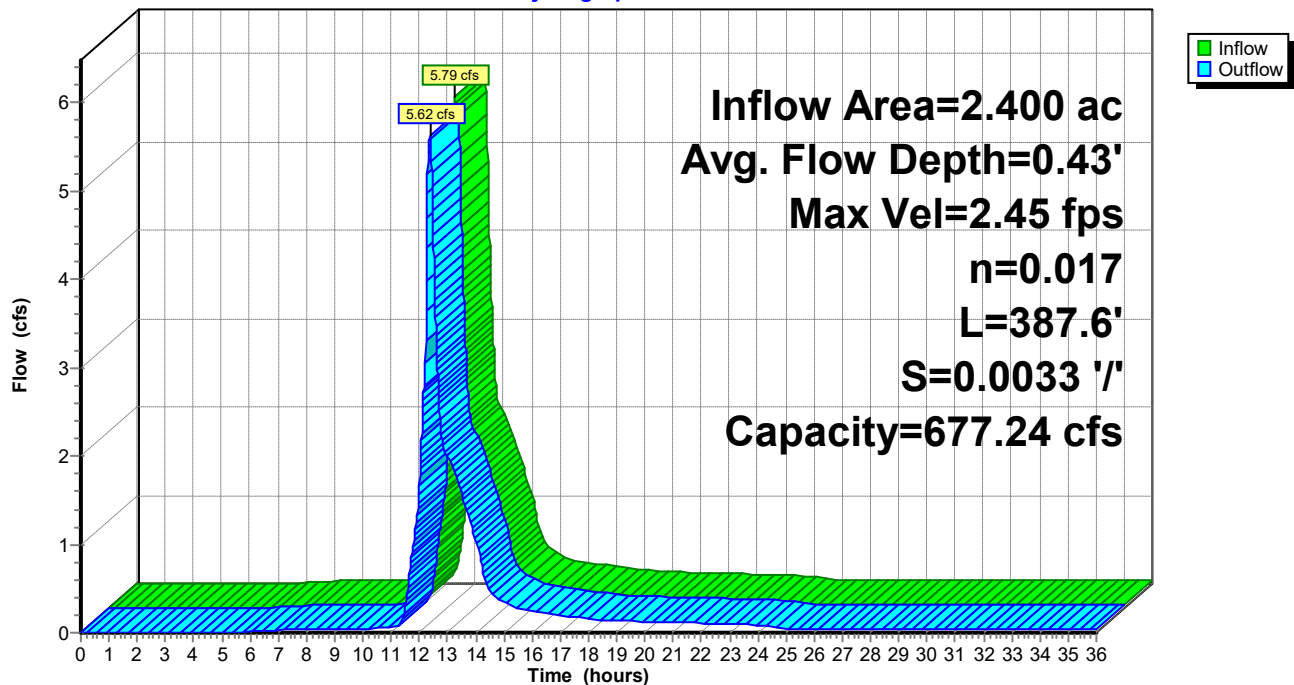
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 111

Summary for Reach 12R: East Channel

Inflow Area = 3.400 ac, 22.65% Impervious, Inflow Depth > 2.83" for 50-Year event
Inflow = 4.81 cfs @ 12.56 hrs, Volume= 0.801 af
Outflow = 4.63 cfs @ 12.63 hrs, Volume= 0.801 af, Atten= 4%, Lag= 3.7 min
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.58 fps, Min. Travel Time= 5.0 min

Avg. Velocity= 0.53 fps, Avg. Travel Time= 15.0 min

Peak Storage= 1,401 cf @ 12.63 hrs

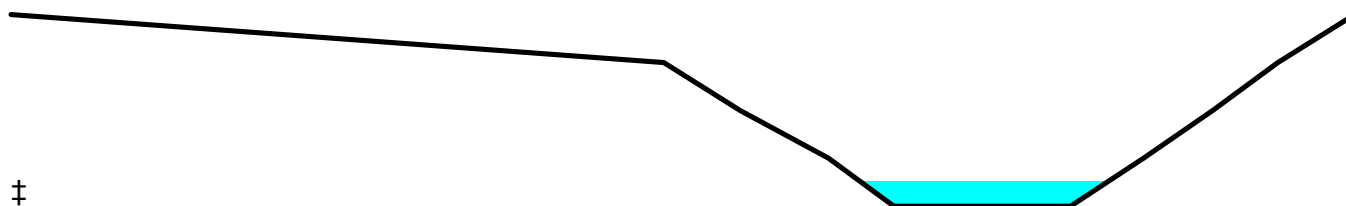
Average Depth at Peak Storage= 0.53' , Surface Width= 6.50'

Bank-Full Depth= 4.00' Flow Area= 56.3 sf, Capacity= 207.35 cfs

Custom cross-section, Length= 479.0' Slope= 0.0031 '/'

Constant n= 0.030

Inlet Invert= 794.50', Outlet Invert= 793.00'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-25.00	798.00	0.00
-8.00	797.00	1.00
-6.00	796.00	2.00
-3.70	795.00	3.00
-2.00	794.00	4.00
2.60	794.00	4.00
4.50	795.00	3.00
6.30	796.00	2.00
8.00	797.00	1.00
10.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	4.6	0.0	0	0.00
1.00	6.4	8.7	8.2	3,066	14.44
2.00	16.6	13.3	12.3	7,975	53.64
3.00	30.8	17.5	16.0	14,753	124.48
4.00	56.3	36.8	35.0	26,968	207.35

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

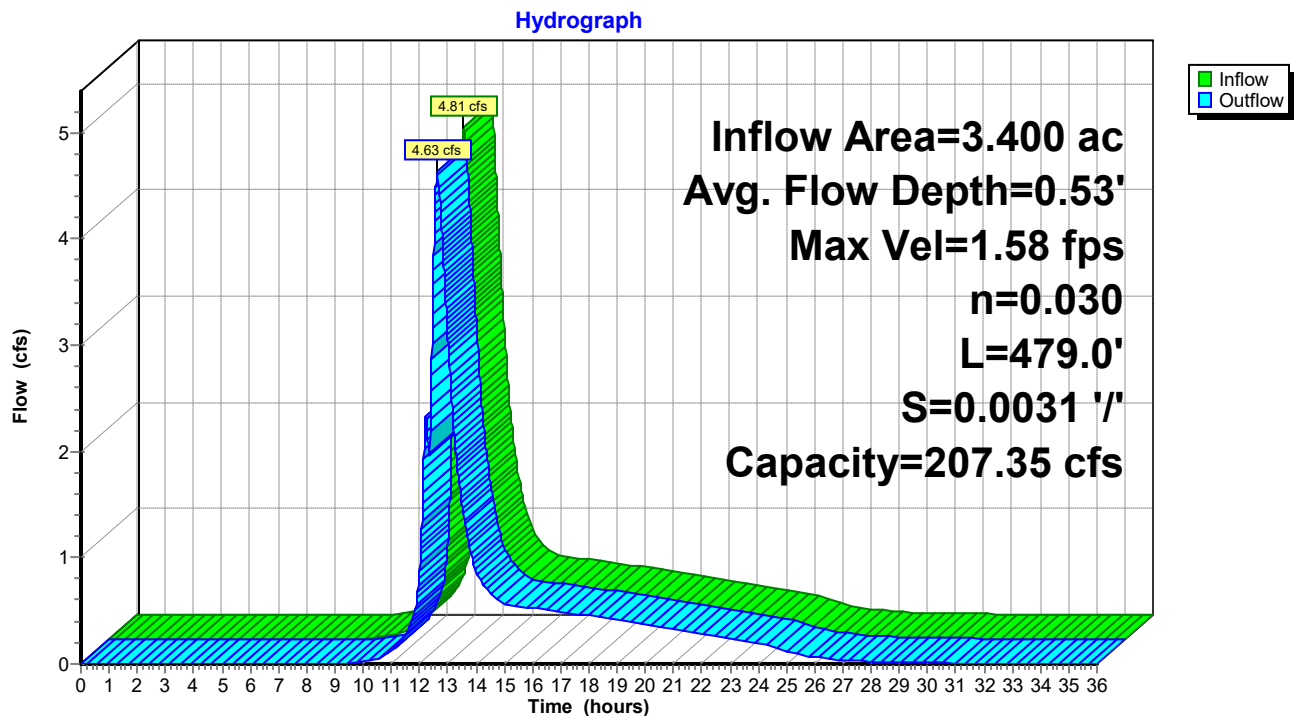
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 112

Reach 12R: East Channel



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 113

Summary for Reach 13R: North Channel Section 1

Inflow Area = 16.500 ac, 43.45% Impervious, Inflow Depth > 3.16" for 50-Year event
Inflow = 21.22 cfs @ 12.55 hrs, Volume= 4.352 af
Outflow = 21.02 cfs @ 12.59 hrs, Volume= 4.346 af, Atten= 1%, Lag= 2.5 min
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.97 fps, Min. Travel Time= 3.4 min

Avg. Velocity= 0.70 fps, Avg. Travel Time= 9.6 min

Peak Storage= 4,269 cf @ 12.59 hrs

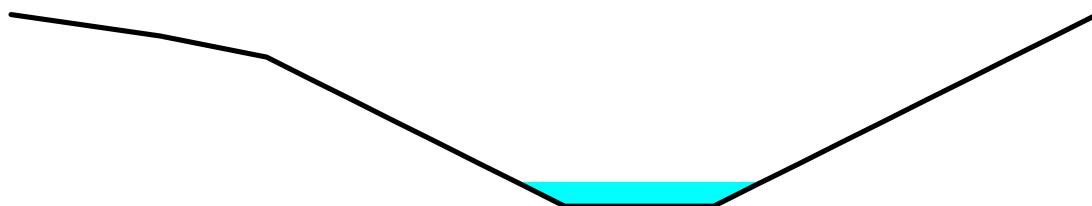
Average Depth at Peak Storage= 1.15', Surface Width= 11.59'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,299.91 cfs

Custom cross-section, Length= 400.0' Slope= 0.0019 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 790.50'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

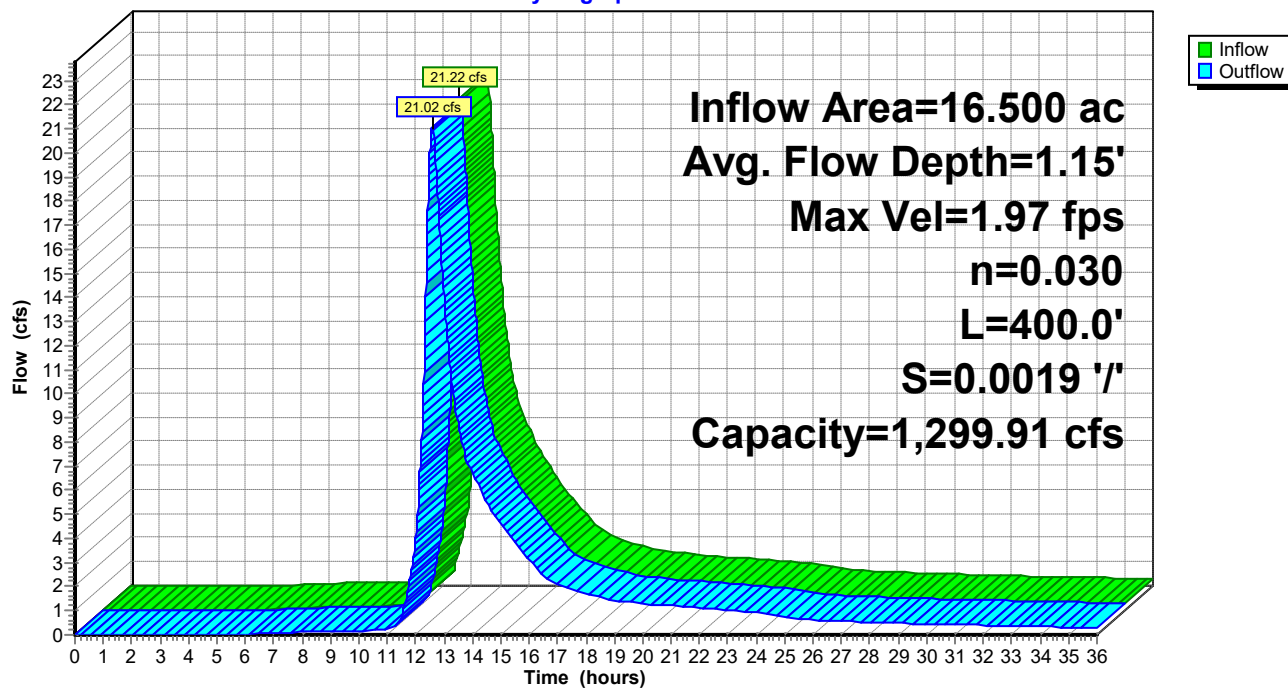
Printed 6/24/2025

Page 114

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	3,600	16.42
2.00	22.0	15.9	15.0	8,800	58.48
3.00	39.0	20.4	19.0	15,600	128.78
4.00	60.0	24.9	23.0	24,000	231.38
5.00	85.0	29.4	27.0	34,000	370.33
6.00	114.0	33.8	31.0	45,600	549.56
7.00	147.0	38.3	35.0	58,800	772.84
8.00	185.5	45.6	42.0	74,200	1,013.31
9.00	232.0	54.9	51.0	92,800	1,299.91

Reach 13R: North Channel Section 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 115

Summary for Reach 15R: East Channel 2

Inflow Area = 8.700 ac, 35.17% Impervious, Inflow Depth > 2.98" for 50-Year event
Inflow = 6.82 cfs @ 12.67 hrs, Volume= 2.159 af
Outflow = 6.81 cfs @ 12.69 hrs, Volume= 2.157 af, Atten= 0%, Lag= 1.2 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.43 fps, Min. Travel Time= 1.5 min

Avg. Velocity= 1.04 fps, Avg. Travel Time= 3.4 min

Peak Storage= 595 cf @ 12.69 hrs

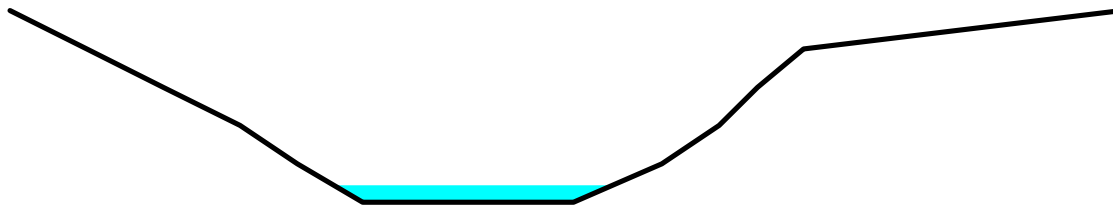
Average Depth at Peak Storage= 0.44' , Surface Width= 7.26'

Bank-Full Depth= 5.00' Flow Area= 73.5 sf, Capacity= 599.19 cfs

Custom cross-section, Length= 212.0' Slope= 0.0088 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 793.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-12.00	798.00	0.00
-10.00	797.00	1.00
-8.00	796.00	2.00
-6.00	795.00	3.00
-4.50	794.00	4.00
-2.80	793.00	5.00
2.70	793.00	5.00
5.00	794.00	4.00
6.50	795.00	3.00
7.50	796.00	2.00
8.70	797.00	1.00
17.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.5	0.0	0	0.00
1.00	7.5	10.0	9.5	1,590	28.84
2.00	18.5	13.6	12.5	3,922	105.73
3.00	32.5	17.2	15.5	6,890	230.76
4.00	49.6	21.0	18.7	10,515	408.79
5.00	73.5	31.6	29.0	15,571	599.19

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

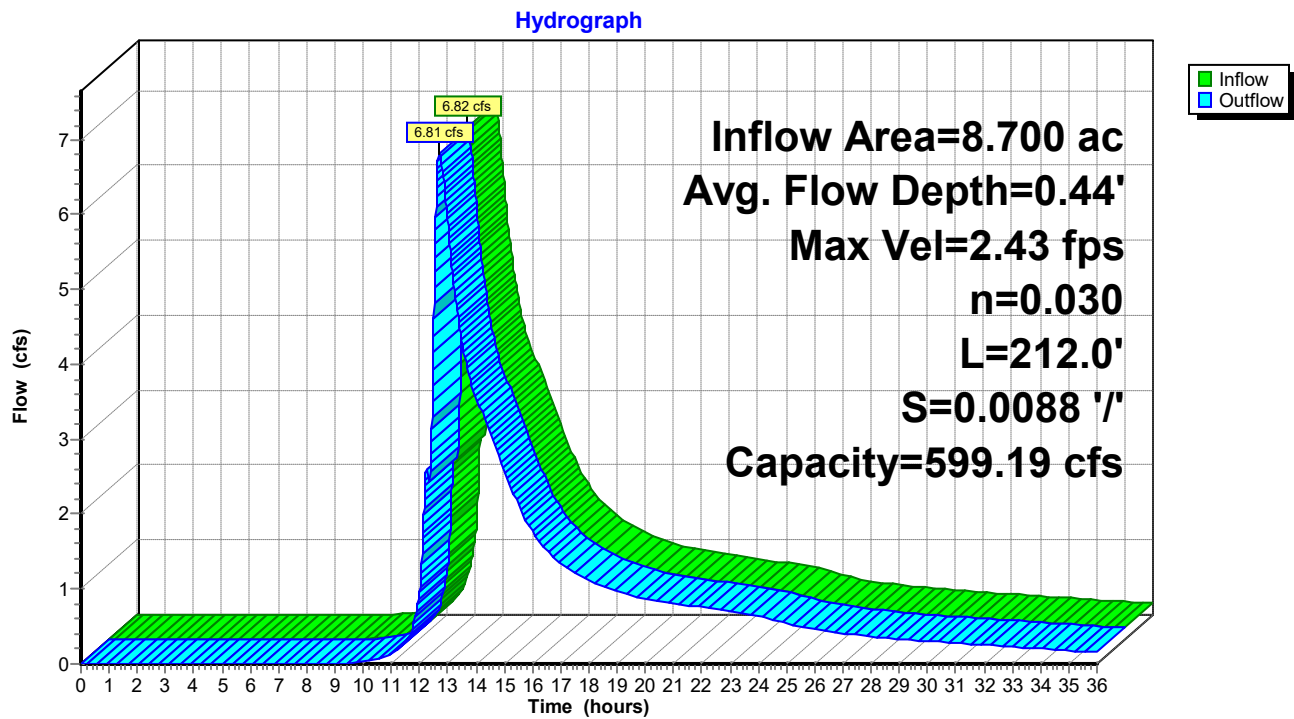
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 116

Reach 15R: East Channel 2



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 117

Summary for Reach 16R: South Channel 2

Inflow Area = 5.400 ac, 55.19% Impervious, Inflow Depth > 3.42" for 50-Year event
Inflow = 11.98 cfs @ 12.50 hrs, Volume= 1.537 af
Outflow = 11.96 cfs @ 12.51 hrs, Volume= 1.537 af, Atten= 0%, Lag= 0.8 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.53 fps, Min. Travel Time= 1.1 min

Avg. Velocity= 0.96 fps, Avg. Travel Time= 2.8 min

Peak Storage= 766 cf @ 12.51 hrs

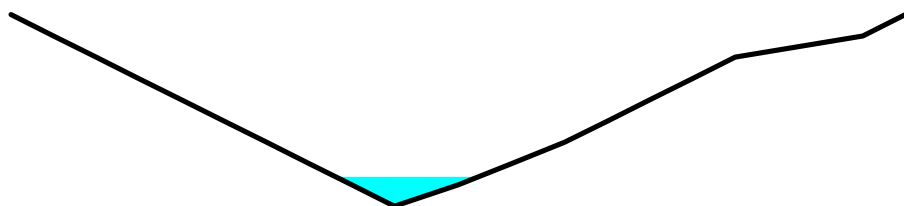
Average Depth at Peak Storage= 1.38' , Surface Width= 6.71'

Bank-Full Depth= 9.00' Flow Area= 183.5 sf, Capacity= 1,557.04 cfs

Custom cross-section, Length= 162.0' Slope= 0.0046 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 792.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-18.00	800.00	0.00
-16.00	799.00	1.00
-14.00	798.00	2.00
-12.00	797.00	3.00
-10.00	796.00	4.00
-8.00	795.00	5.00
-6.00	794.00	6.00
-4.00	793.00	7.00
-2.00	792.00	8.00
0.00	791.00	9.00
3.00	792.00	8.00
5.50	793.00	7.00
8.00	794.00	6.00
10.00	795.00	5.00
12.00	796.00	4.00
14.00	797.00	3.00
16.00	798.00	2.00
22.00	799.00	1.00
24.00	800.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

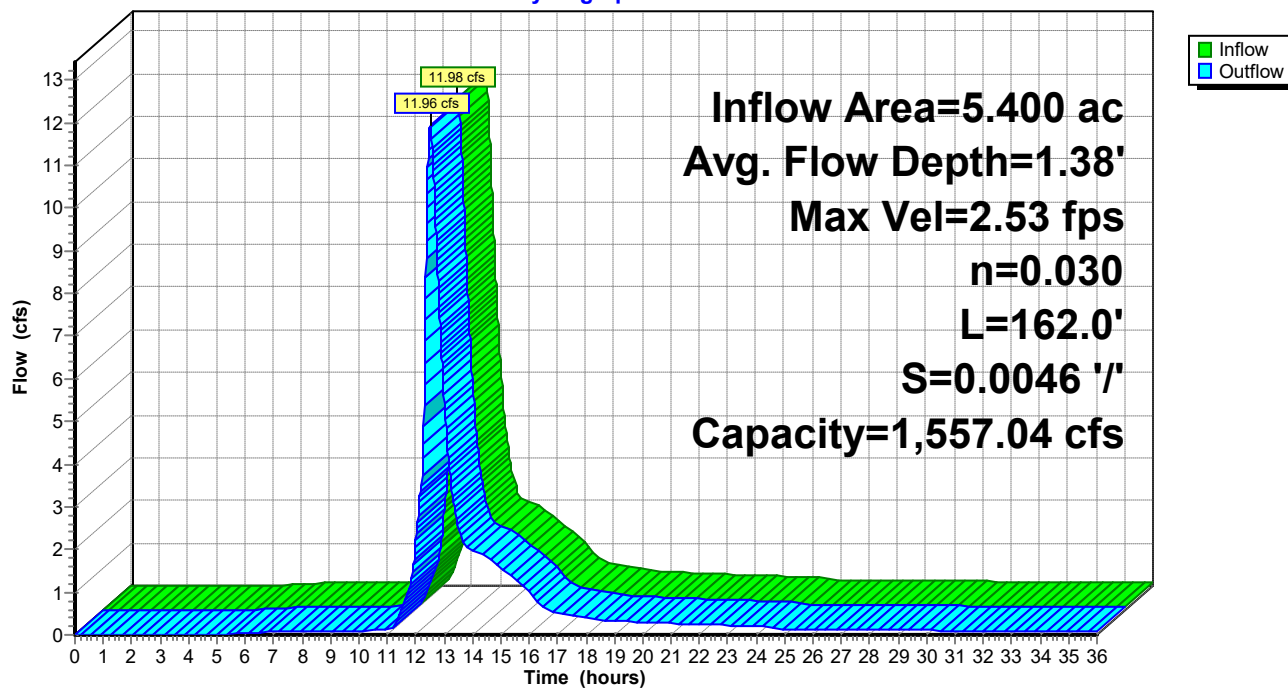
Printed 6/24/2025

Page 118

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
1.00	2.5	5.4	5.0	405	5.04
2.00	9.8	10.3	9.5	1,580	31.62
3.00	21.5	15.3	14.0	3,483	91.09
4.00	37.5	19.7	18.0	6,075	193.94
5.00	57.5	24.2	22.0	9,315	345.07
6.00	81.5	28.7	26.0	13,203	551.18
7.00	109.5	33.1	30.0	17,739	818.63
8.00	143.5	41.5	38.0	23,247	1,106.58
9.00	183.5	45.9	42.0	29,727	1,557.04

Reach 16R: South Channel 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 119

Summary for Reach 18R: North Channel Section 2

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 2.93" for 50-Year event
Inflow = 33.65 cfs @ 12.60 hrs, Volume= 7.432 af
Outflow = 33.36 cfs @ 12.64 hrs, Volume= 7.422 af, Atten= 1%, Lag= 2.7 min
Routed to Link 9L : TOTAL SITE RUNNOFF

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.17 fps, Min. Travel Time= 3.3 min

Avg. Velocity= 0.78 fps, Avg. Travel Time= 9.2 min

Peak Storage= 6,614 cf @ 12.64 hrs

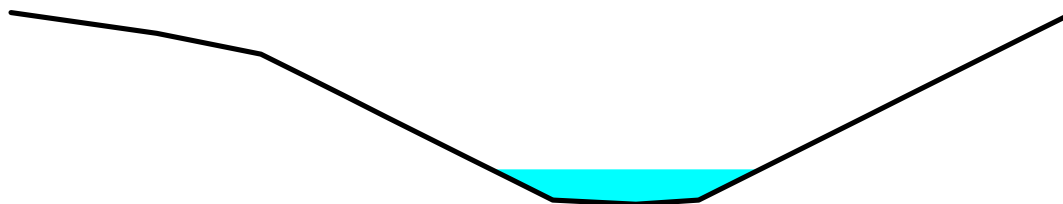
Average Depth at Peak Storage= 1.68' , Surface Width= 12.90'

Bank-Full Depth= 9.20' Flow Area= 232.7 sf, Capacity= 1,217.16 cfs

Custom cross-section, Length= 430.0' Slope= 0.0016 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 790.50', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
0.00	789.80	9.20
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

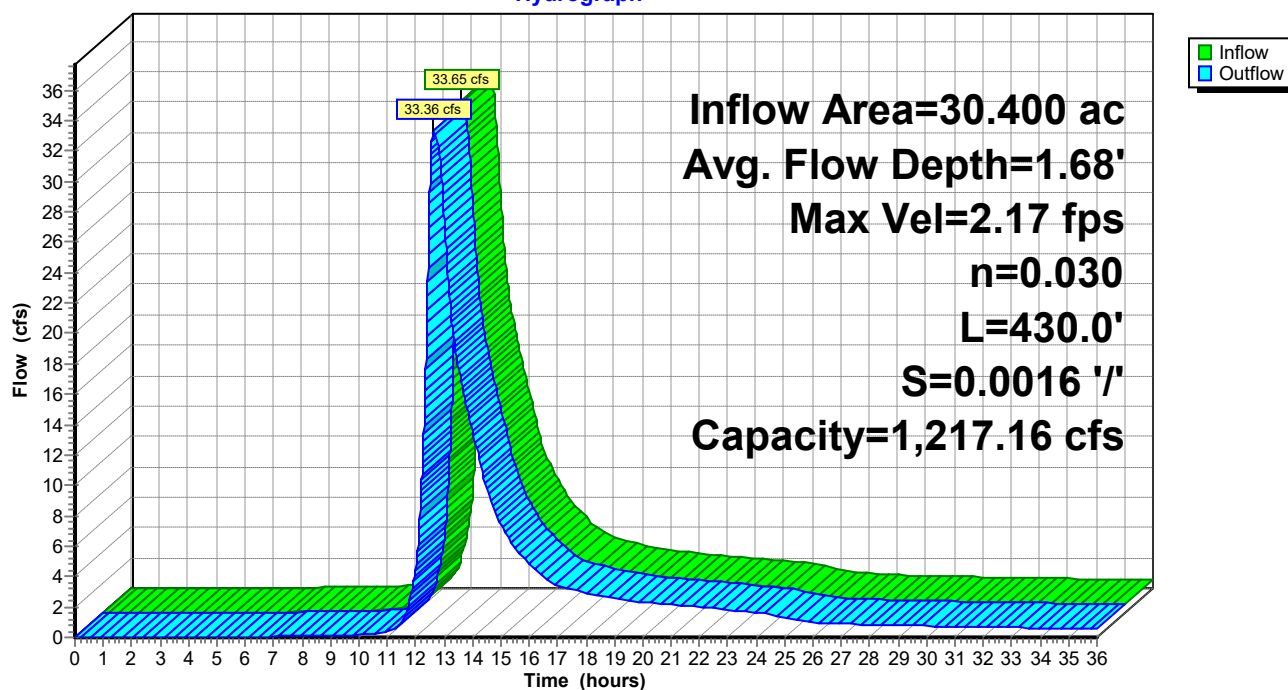
Printed 6/24/2025

Page 120

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
0.20	0.7	7.0	7.0	301	0.30
1.20	9.7	11.5	11.0	4,171	17.33
2.20	22.7	16.0	15.0	9,761	57.39
3.20	39.7	20.4	19.0	17,071	123.56
4.20	60.7	24.9	23.0	26,101	219.73
5.20	85.7	29.4	27.0	36,851	349.72
6.20	114.7	33.8	31.0	49,321	517.20
7.20	147.7	38.3	35.0	63,511	725.70
8.20	186.2	45.7	42.0	80,066	949.96
9.20	232.7	55.0	51.0	100,061	1,217.16

Reach 18R: North Channel Section 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 121

Summary for Pond B1: BIO 1

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth = 3.22" for 50-Year event
Inflow = 15.31 cfs @ 12.33 hrs, Volume= 1.420 af
Outflow = 14.89 cfs @ 12.37 hrs, Volume= 1.416 af, Atten= 3%, Lag= 2.3 min
Primary = 9.51 cfs @ 12.36 hrs, Volume= 1.258 af
Routed to Pond P2 : POND 2
Secondary = 5.40 cfs @ 12.37 hrs, Volume= 0.158 af
Routed to Pond P2 : POND 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 798.15' @ 12.37 hrs Surf.Area= 11,540 sf Storage= 9,651 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 73.3 min (884.0 - 810.7)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	14,087 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
797.00	5,319	0	0
798.00	10,740	8,030	8,030
798.50	13,488	6,057	14,087

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	15.0" Round Culvert X 2.00 L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 7.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	797.90'	24.0" x 24.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#6	Secondary	798.00'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir X 4.00 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) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 122

Primary OutFlow Max=9.51 cfs @ 12.36 hrs HW=798.15' TW=795.36' (Dynamic Tailwater)

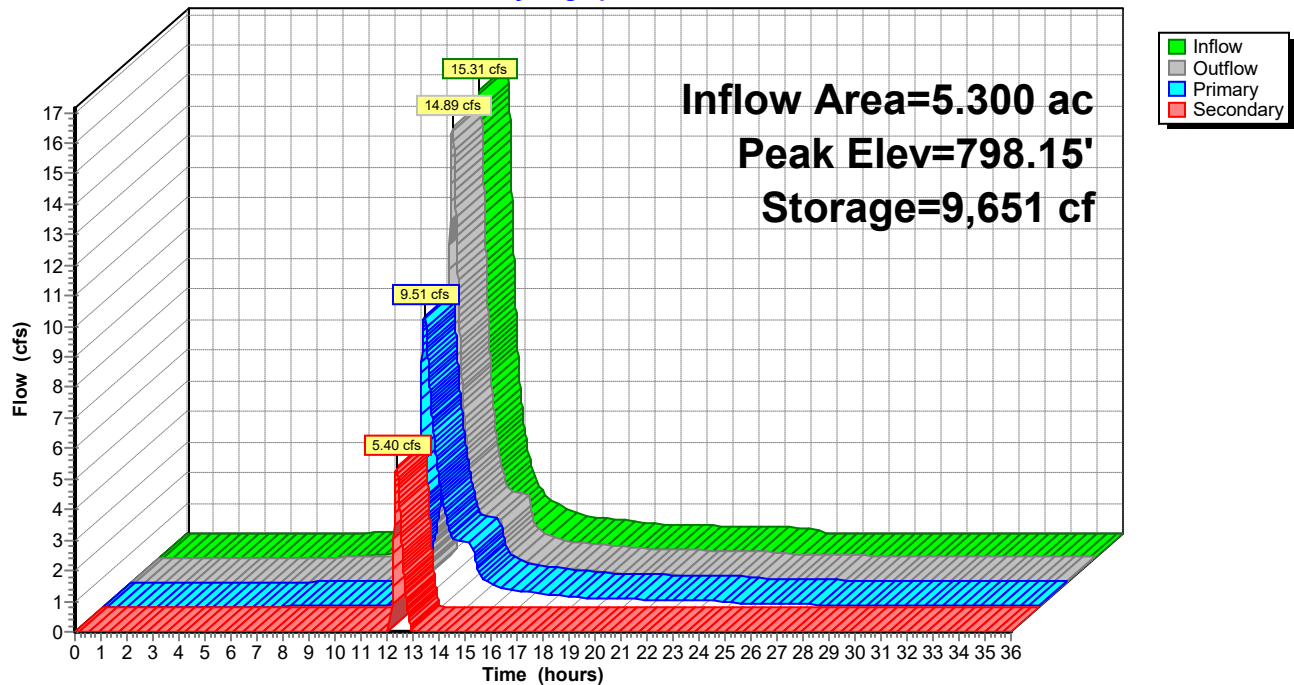
- 1=Culvert (Passes 9.51 cfs of 19.73 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 3.16 cfs @ 8.04 fps)
- 3=Exfiltration (Passes < 0.13 cfs potential flow)
- 4=Orifice/Grate (Passes < 5.32 cfs potential flow)
- 5=Orifice/Grate (Weir Controls 6.35 cfs @ 1.62 fps)

Secondary OutFlow Max=5.39 cfs @ 12.37 hrs HW=798.15' TW=795.42' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Weir Controls 5.39 cfs @ 0.93 fps)

Pond B1: BIO 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 123

Summary for Pond B2: BIO 2

Inflow Area = 4.400 ac, 59.77% Impervious, Inflow Depth = 3.52" for 50-Year event
Inflow = 13.18 cfs @ 12.36 hrs, Volume= 1.290 af
Outflow = 10.37 cfs @ 12.50 hrs, Volume= 1.283 af, Atten= 21%, Lag= 8.9 min
Primary = 10.37 cfs @ 12.50 hrs, Volume= 1.283 af
Routed to Reach 16R : South Channel 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.88' @ 12.51 hrs Surf.Area= 11,618 sf Storage= 16,224 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 100.0 min (902.8 - 802.8)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	24,112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	5,689	0	0
796.00	8,835	7,262	7,262
797.00	12,011	10,423	17,685
797.50	13,697	6,427	24,112

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	797.00'	8.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 124

Primary OutFlow Max=10.37 cfs @ 12.50 hrs HW=796.88' TW=793.38' (Dynamic Tailwater)

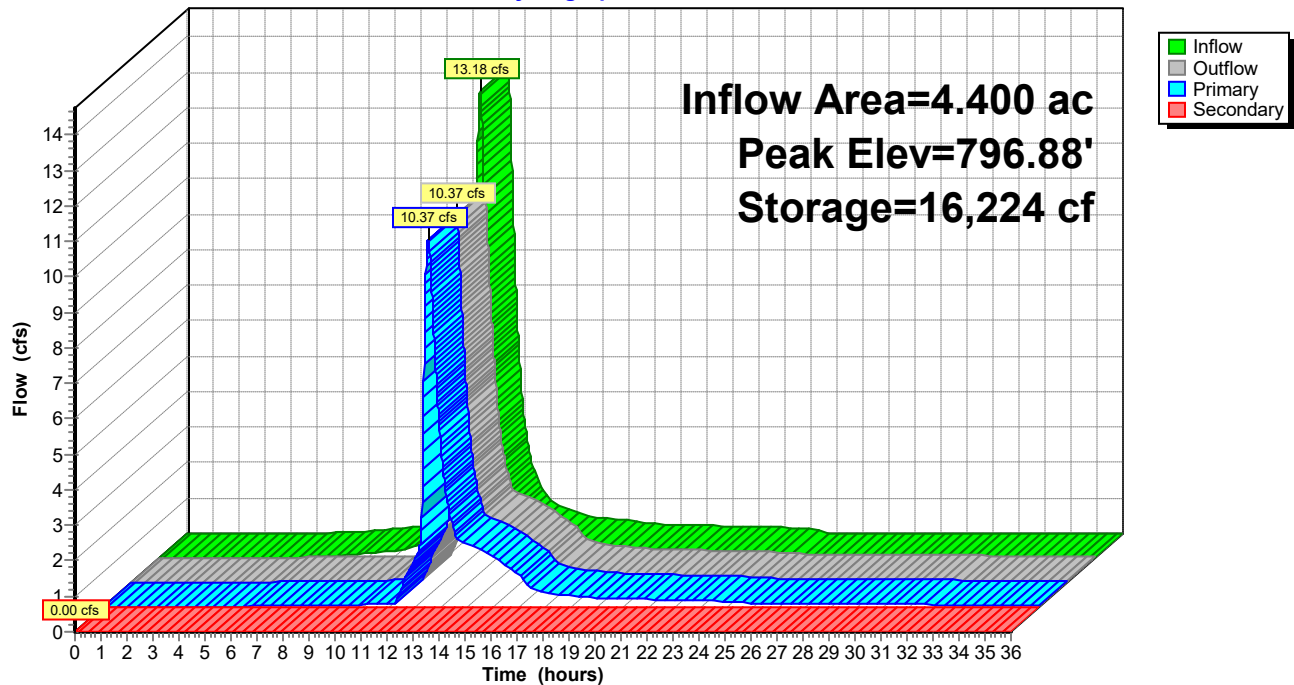
- 1=Culvert (Passes 10.37 cfs of 11.05 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.77 cfs @ 9.00 fps)
- 3=Exfiltration (Passes < 0.13 cfs potential flow)
- 4=Orifice/Grate (Passes < 2.22 cfs potential flow)
- 5=Orifice/Grate (Weir Controls 8.60 cfs @ 2.26 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=795.00' TW=792.00' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B2: BIO 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 125

Summary for Pond B3: BIO 3

Inflow Area = 0.900 ac, 38.89% Impervious, Inflow Depth = 3.12" for 50-Year event
Inflow = 3.82 cfs @ 12.16 hrs, Volume= 0.234 af
Outflow = 1.63 cfs @ 12.32 hrs, Volume= 0.233 af, Atten= 57%, Lag= 9.9 min
Primary = 1.63 cfs @ 12.32 hrs, Volume= 0.233 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.21' @ 12.32 hrs Surf.Area= 3,414 sf Storage= 3,259 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 136.8 min (937.2 - 800.4)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	8,693 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	1,987	0	0
796.00	3,157	2,572	2,572
797.00	4,384	3,771	6,343
797.50	5,018	2,351	8,693

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.63 cfs @ 12.32 hrs HW=796.21' TW=793.10' (Dynamic Tailwater)

1=Culvert (Passes 1.63 cfs of 10.41 cfs potential flow)
2=Orifice/Grate (Passes 1.63 cfs of 1.67 cfs potential flow)
3=Exfiltration (Exfiltration Controls 0.04 cfs)
4=Orifice/Grate (Orifice Controls 1.59 cfs @ 4.05 fps)
5=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

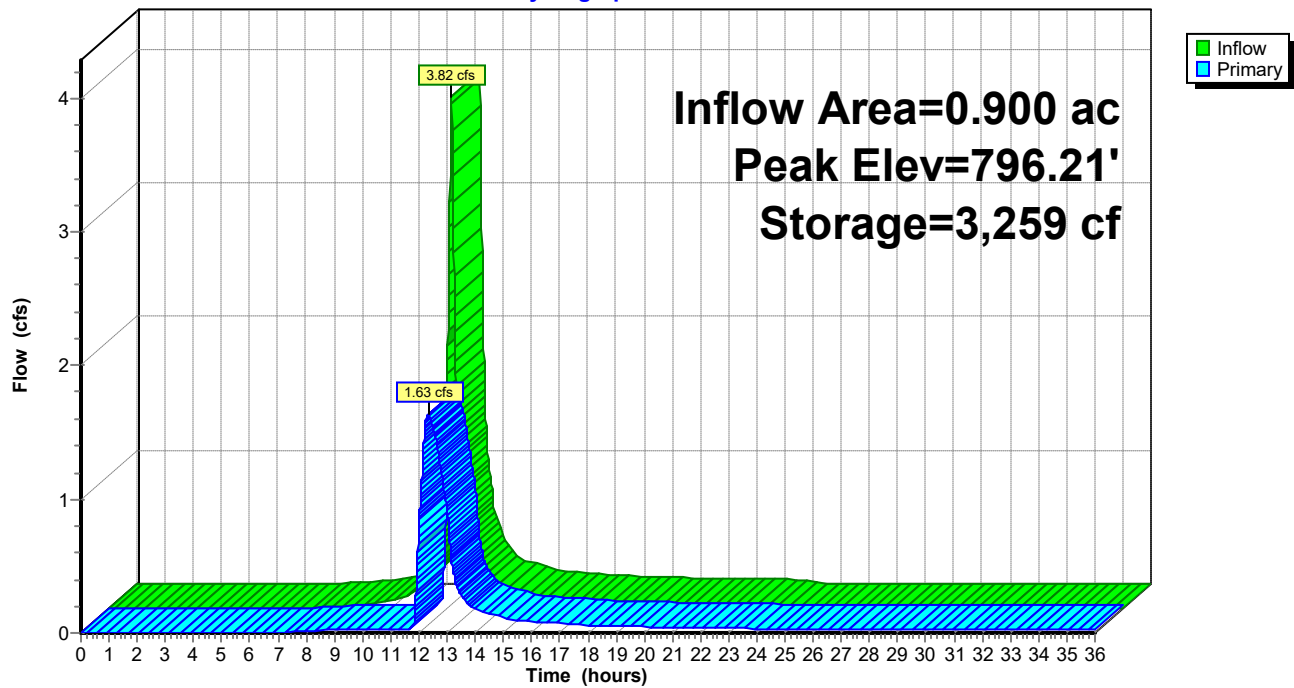
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 126

Pond B3: BIO 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 127

Summary for Pond B4: BIO 4

Inflow Area = 2.100 ac, 53.81% Impervious, Inflow Depth = 3.41" for 50-Year event
Inflow = 8.40 cfs @ 12.20 hrs, Volume= 0.598 af
Outflow = 5.34 cfs @ 12.28 hrs, Volume= 0.596 af, Atten= 36%, Lag= 4.7 min
Primary = 5.34 cfs @ 12.28 hrs, Volume= 0.596 af
Routed to Reach 11R : West Channel
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 11R : West Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 798.84' @ 12.33 hrs Surf.Area= 5,239 sf Storage= 7,704 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 97.4 min (892.0 - 794.6)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	11,425 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
797.00	3,198	336.0	0	0	3,198
798.00	4,260	373.0	3,716	3,716	5,315
799.00	5,435	410.0	4,836	8,552	7,654
799.50	6,065	430.0	2,874	11,425	9,007

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	10.0" Round Culvert L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	798.55'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	799.00'	10.0' long x 7.0' 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 128

Primary OutFlow Max=5.34 cfs @ 12.28 hrs HW=798.82' TW=794.68' (Dynamic Tailwater)

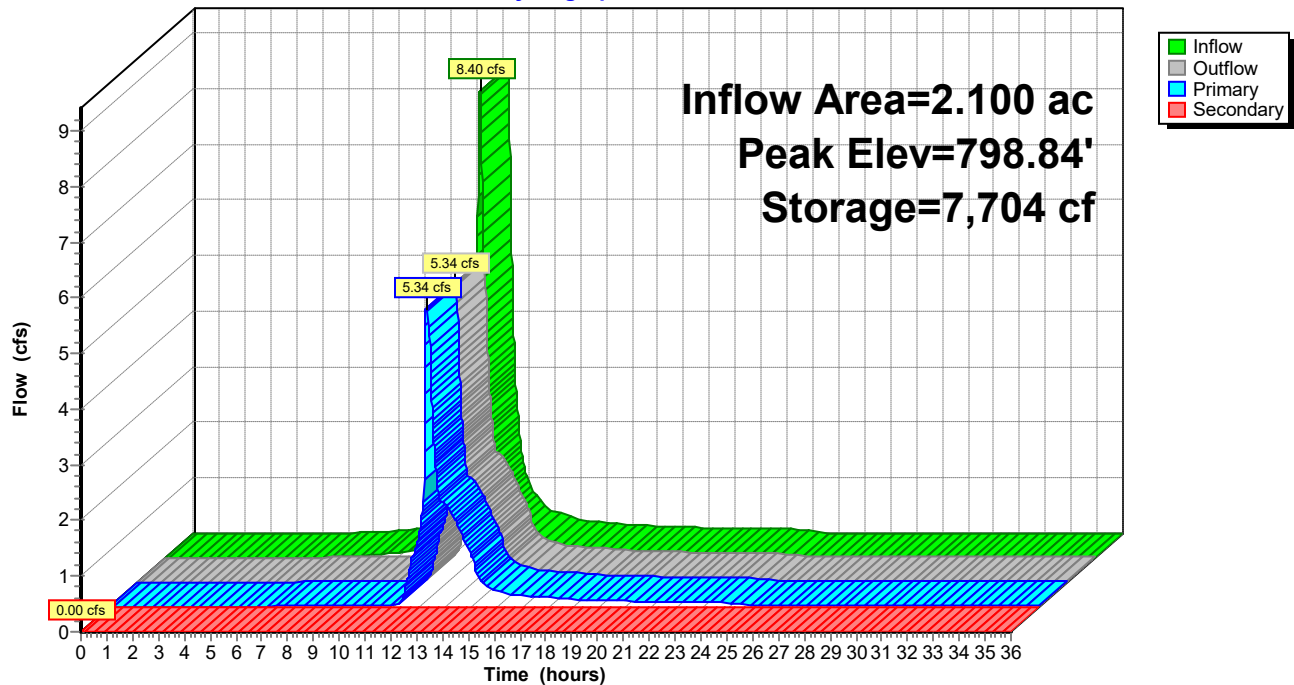
- 1=Culvert (Inlet Controls 5.34 cfs @ 9.79 fps)
- 2=Orifice/Grate (Passes < 1.92 cfs potential flow)
- 3=Exfiltration (Passes < 0.06 cfs potential flow)
- 4=Orifice/Grate (Passes < 2.17 cfs potential flow)
- 5=Orifice/Grate (Passes < 3.63 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=797.00' TW=794.28' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B4: BIO 4

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 129

Summary for Pond P1: POND 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth > 2.94" for 50-Year event
Inflow = 24.07 cfs @ 12.33 hrs, Volume= 2.618 af
Outflow = 11.37 cfs @ 12.85 hrs, Volume= 2.425 af, Atten= 53%, Lag= 30.8 min
Primary = 11.37 cfs @ 12.85 hrs, Volume= 2.425 af
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 795.92' @ 12.85 hrs Surf.Area= 12,871 sf Storage= 36,386 cf

Plug-Flow detention time= 174.3 min calculated for 2.425 af (93% of inflow)
Center-of-Mass det. time= 119.5 min (1,026.6 - 907.1)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	50,944 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	5,934	0	0
793.00	7,561	6,748	6,748
794.00	9,282	8,422	15,169
795.00	11,104	10,193	25,362
796.00	13,026	12,065	37,427
797.00	14,008	13,517	50,944

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	24.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	792.00'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	794.00'	20.0" W x 10.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	795.75'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=11.37 cfs @ 12.85 hrs HW=795.92' TW=792.14' (Dynamic Tailwater)

1=Culvert (Passes 11.37 cfs of 24.71 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.46 cfs @ 9.36 fps)
3=Orifice/Grate (Orifice Controls 8.17 cfs @ 5.88 fps)
4=Orifice/Grate (Weir Controls 2.74 cfs @ 1.35 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

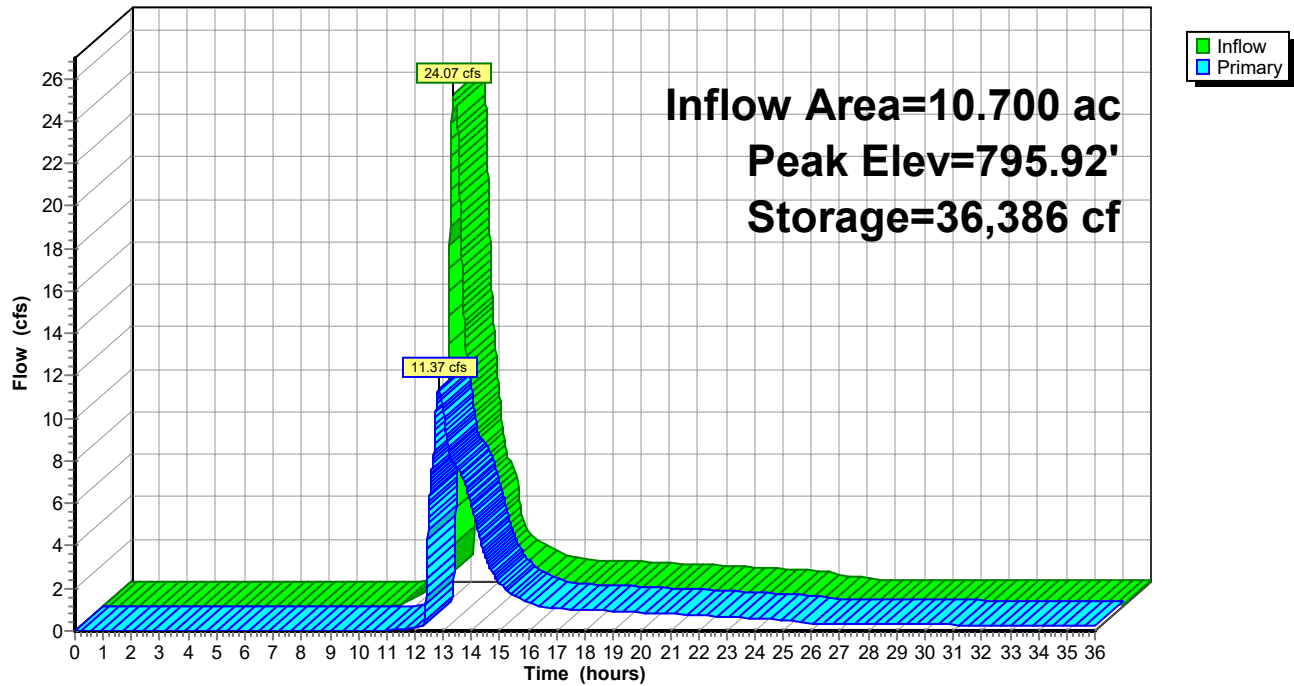
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 130

Pond P1: POND 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 131

Summary for Pond P2: POND 2

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth > 3.21" for 50-Year event
Inflow = 14.89 cfs @ 12.37 hrs, Volume= 1.416 af
Outflow = 2.80 cfs @ 13.25 hrs, Volume= 1.358 af, Atten= 81%, Lag= 52.7 min
Primary = 2.80 cfs @ 13.25 hrs, Volume= 1.358 af
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.59' @ 13.25 hrs Surf.Area= 14,161 sf Storage= 28,557 cf

Plug-Flow detention time= 284.8 min calculated for 1.357 af (96% of inflow)
Center-of-Mass det. time= 242.7 min (1,126.7 - 884.0)

Volume	Invert	Avail.Storage	Storage Description
#1	794.00'	60,439 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
794.00	8,143	0	0
795.00	10,289	9,216	9,216
796.00	12,675	11,482	20,698
797.00	15,212	13,944	34,642
798.00	17,852	16,532	51,174
798.50	19,211	9,266	60,439

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	794.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.50'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	796.60'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.80 cfs @ 13.25 hrs HW=796.59' TW=793.87' (Dynamic Tailwater)

1=Culvert (Passes 2.80 cfs of 5.46 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.65 cfs @ 7.49 fps)
3=Orifice/Grate (Orifice Controls 2.15 cfs @ 3.94 fps)
4=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

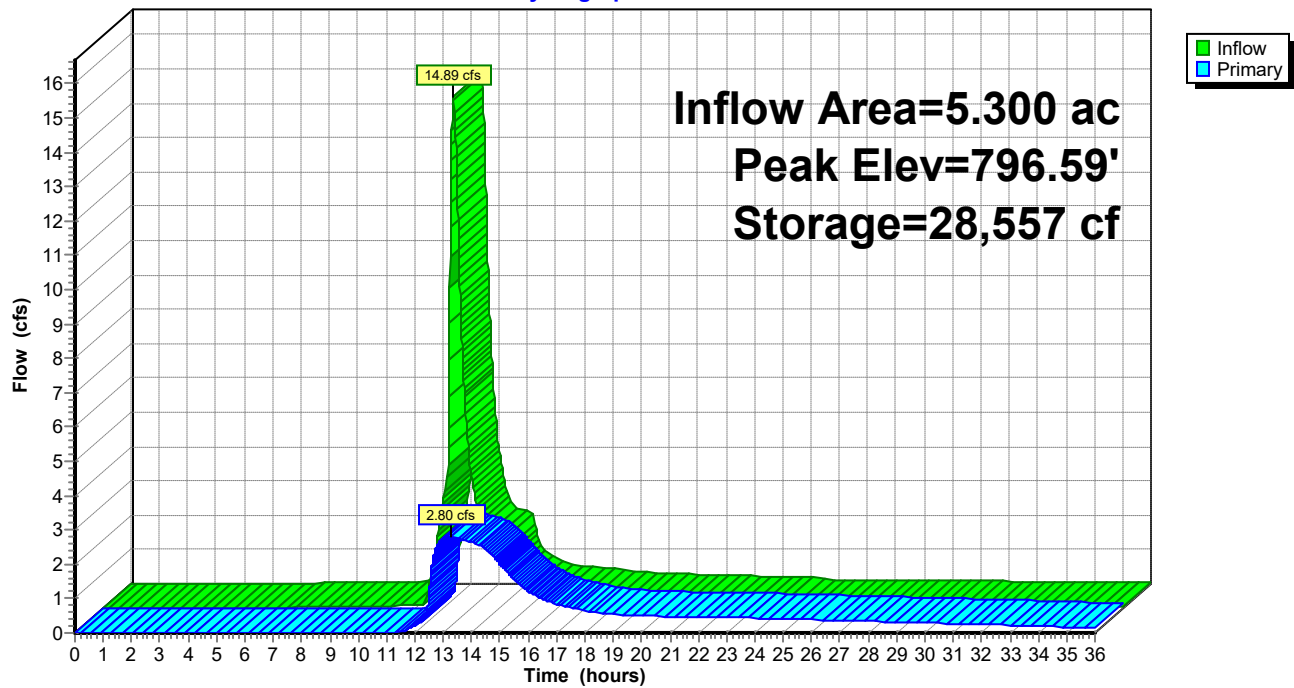
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 132

Pond P2: POND 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 133

Summary for Pond P3: POND 3

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 2.93" for 50-Year event
Inflow = 7.20 cfs @ 12.34 hrs, Volume= 0.658 af
Outflow = 4.28 cfs @ 12.58 hrs, Volume= 0.656 af, Atten= 41%, Lag= 14.5 min
Primary = 4.20 cfs @ 12.58 hrs, Volume= 0.656 af
Routed to Reach 12R : East Channel
Secondary = 0.08 cfs @ 12.58 hrs, Volume= 0.001 af
Routed to Reach 12R : East Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.02' @ 12.58 hrs Surf.Area= 5,046 sf Storage= 7,752 cf

Plug-Flow detention time= 100.5 min calculated for 0.656 af (100% of inflow)
Center-of-Mass det. time= 98.4 min (951.2 - 852.9)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	10,321 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	2,710	0	0
796.00	3,780	3,245	3,245
797.00	5,016	4,398	7,643
797.50	5,697	2,678	10,321

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	15.0" Round Culvert L= 17.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 794.50' S= 0.0294 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	795.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.50'	36.0" W x 36.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long 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

Primary OutFlow Max=4.20 cfs @ 12.58 hrs HW=797.02' TW=795.02' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 4.20 cfs of 6.98 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.57 cfs @ 6.56 fps)
↑ **3=Orifice/Grate** (Orifice Controls 3.63 cfs @ 2.32 fps)

Secondary OutFlow Max=0.07 cfs @ 12.58 hrs HW=797.02' TW=795.02' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.34 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

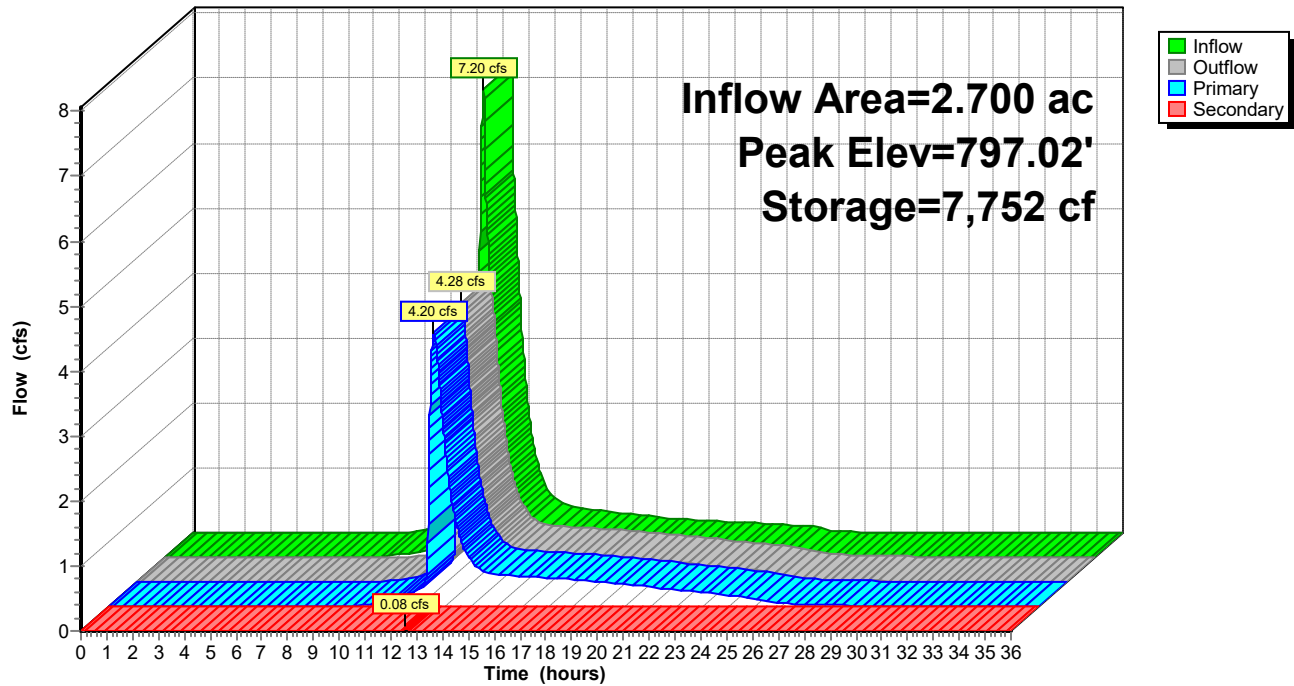
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 134

Pond P3: POND 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 135

Summary for Pond SB1: SED 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth = 3.02" for 50-Year event
Inflow = 26.54 cfs @ 12.39 hrs, Volume= 2.694 af
Outflow = 24.07 cfs @ 12.33 hrs, Volume= 2.618 af, Atten= 9%, Lag= 0.0 min
Primary = 23.64 cfs @ 12.33 hrs, Volume= 2.246 af
Routed to Pond P1 : POND 1
Secondary = 7.74 cfs @ 12.59 hrs, Volume= 0.371 af
Routed to Pond P1 : POND 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.03' @ 12.77 hrs Surf.Area= 7,809 sf Storage= 19,942 cf

Plug-Flow detention time= 102.6 min calculated for 2.617 af (97% of inflow)
Center-of-Mass det. time= 86.1 min (907.1 - 821.1)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	23,675 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,977	0	0
793.00	3,138	2,558	2,558
794.00	4,415	3,777	6,334
795.00	7,275	5,845	12,179
796.50	8,053	11,496	23,675

Device	Routing	Invert	Outlet Devices
#1	Primary	793.00'	18.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 793.00' / 793.00' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	793.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.40'	36.0" x 36.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#4	Secondary	795.80'	15.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 2.00 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

Primary OutFlow Max=23.70 cfs @ 12.33 hrs HW=795.83' TW=793.88' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 23.70 cfs of 23.78 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 1.32 cfs @ 6.73 fps)
↑ **3=Orifice/Grate** (Weir Controls 22.37 cfs @ 2.15 fps)

Secondary OutFlow Max=7.74 cfs @ 12.59 hrs HW=796.03' TW=795.53' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 7.74 cfs @ 1.13 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

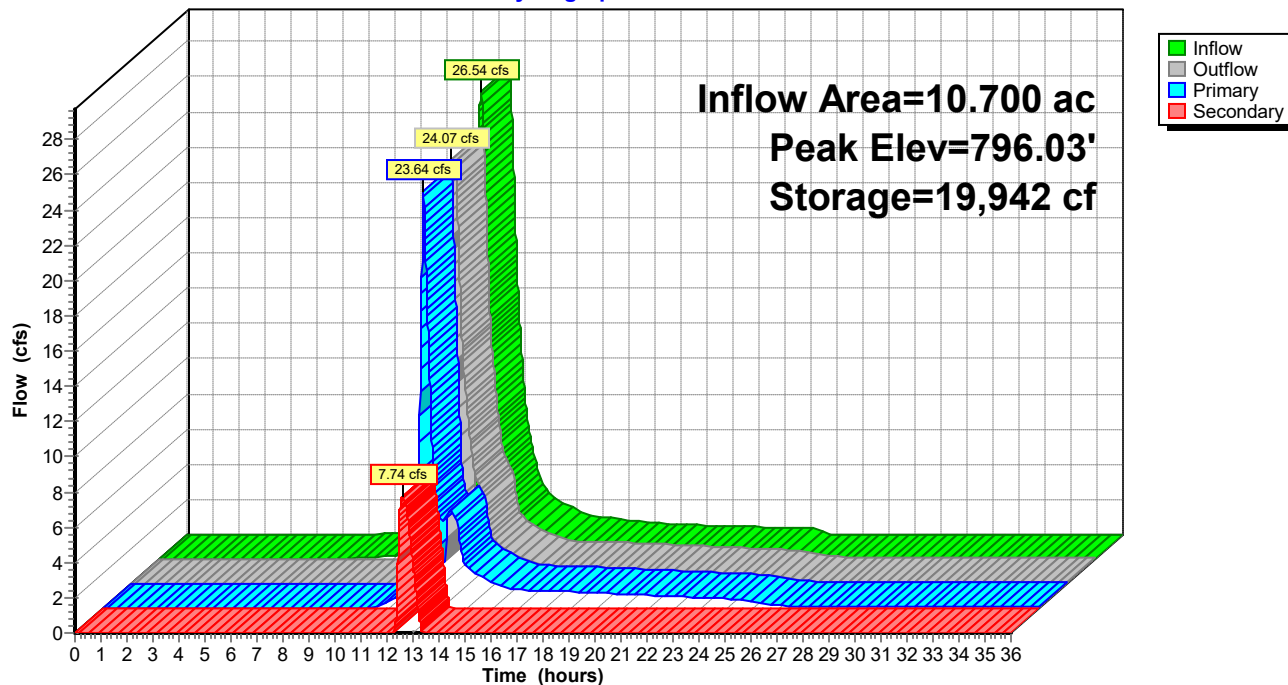
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 136

Pond SB1: SED 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 137

Summary for Pond SB2: SED 2

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 2.93" for 50-Year event
Inflow = 7.32 cfs @ 12.31 hrs, Volume= 0.659 af
Outflow = 7.20 cfs @ 12.34 hrs, Volume= 0.658 af, Atten= 2%, Lag= 1.3 min
Primary = 7.20 cfs @ 12.34 hrs, Volume= 0.648 af
Routed to Pond P3 : POND 3
Secondary = 0.59 cfs @ 12.53 hrs, Volume= 0.010 af
Routed to Pond P3 : POND 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.09' @ 12.54 hrs Surf.Area= 2,595 sf Storage= 3,093 cf

Plug-Flow detention time= 34.9 min calculated for 0.658 af (100% of inflow)
Center-of-Mass det. time= 34.7 min (852.9 - 818.2)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	4,264 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	428	0	0
796.00	1,411	920	920
797.00	2,494	1,953	2,872
797.50	3,074	1,392	4,264

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	24.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 795.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	795.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.65'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=7.19 cfs @ 12.34 hrs HW=796.96' TW=796.61' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 7.19 cfs of 8.80 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.82 fps)
↑ **3=Orifice/Grate** (Weir Controls 6.64 cfs @ 1.81 fps)

Secondary OutFlow Max=0.59 cfs @ 12.53 hrs HW=797.09' TW=797.01' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 0.59 cfs @ 0.68 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

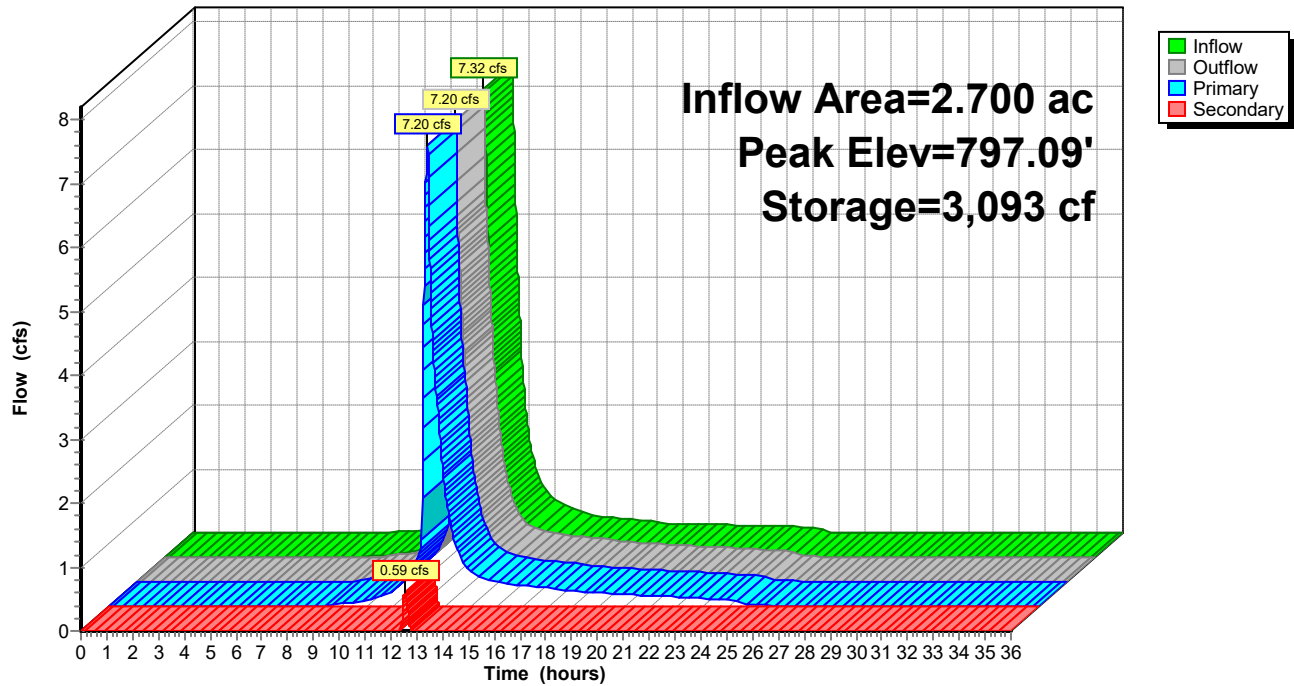
NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

Page 138

Pond SB2: SED 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 50-Year Rainfall=4.52"

Printed 6/24/2025

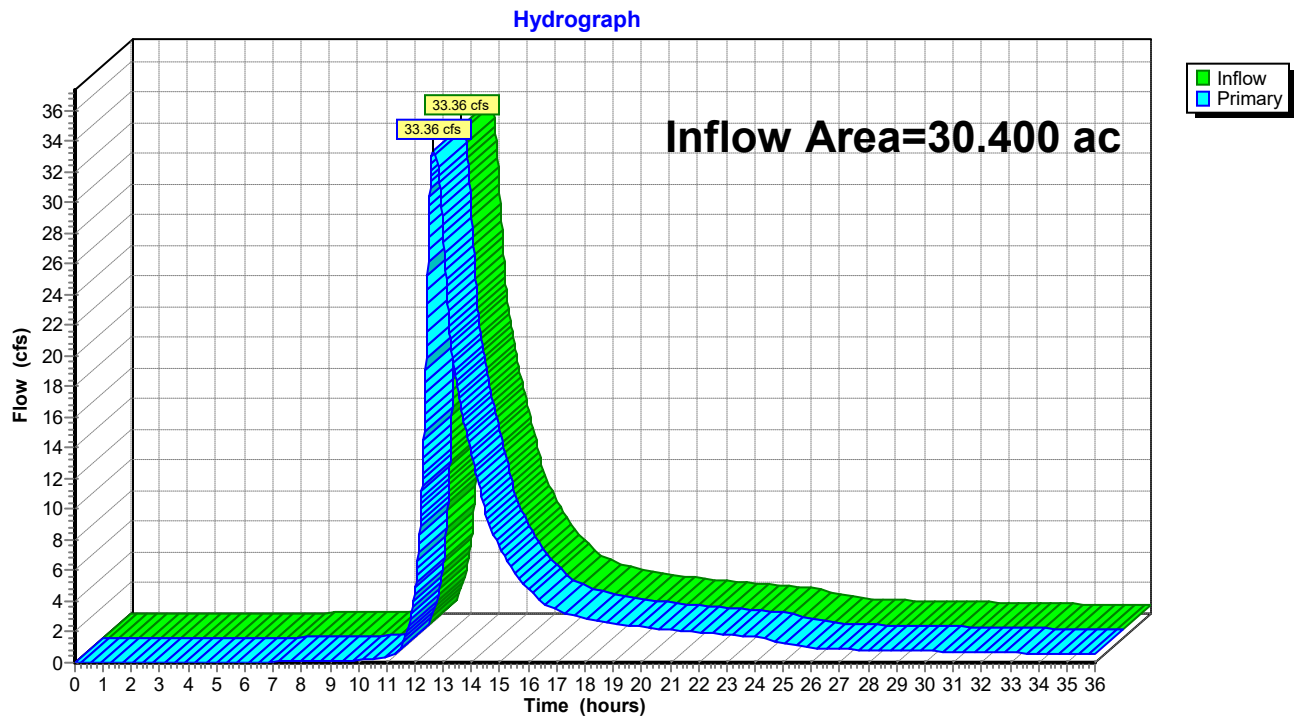
Page 139

Summary for Link 9L: TOTAL SITE RUNNOFF

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 2.93" for 50-Year event
Inflow = 33.36 cfs @ 12.64 hrs, Volume= 7.422 af
Primary = 33.36 cfs @ 12.64 hrs, Volume= 7.422 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 9L: TOTAL SITE RUNNOFF



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 140

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PR-1: PR-1	Runoff Area=10.700 ac 33.08% Impervious Runoff Depth=3.74" Flow Length=1,030' Tc=28.1 min CN=86 Runoff=32.63 cfs 3.334 af
Subcatchment PR-10: PR-10	Runoff Area=0.100 ac 0.00% Impervious Runoff Depth=3.15" Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=0.51 cfs 0.026 af
Subcatchment PR-2: PR-2	Runoff Area=2.700 ac 28.52% Impervious Runoff Depth=3.64" Flow Length=648' Tc=22.1 min CN=85 Runoff=9.04 cfs 0.818 af
Subcatchment PR-3: PR-3	Runoff Area=5.300 ac 43.21% Impervious Runoff Depth=3.95" Flow Length=156' Tc=23.1 min CN=88 Runoff=18.64 cfs 1.742 af
Subcatchment PR-4: PR-4	Runoff Area=4.400 ac 59.77% Impervious Runoff Depth=4.26" Flow Length=263' Tc=25.0 min CN=91 Runoff=15.82 cfs 1.563 af
Subcatchment PR-5: PR-5	Runoff Area=2.100 ac 53.81% Impervious Runoff Depth=4.16" Flow Length=168' Tc=12.5 min CN=90 Runoff=10.12 cfs 0.727 af
Subcatchment PR-6: PR-6	Runoff Area=0.900 ac 38.89% Impervious Runoff Depth=3.84" Flow Length=80' Slope=0.0680 '/' Tc=8.8 min CN=87 Runoff=4.66 cfs 0.288 af
Subcatchment PR-7: PR-7	Runoff Area=3.200 ac 0.00% Impervious Runoff Depth=3.15" Flow Length=136' Tc=29.5 min CN=80 Runoff=8.11 cfs 0.839 af
Subcatchment PR-8: PR-8	Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=3.15" Flow Length=35' Slope=0.0500 '/' Tc=5.2 min CN=80 Runoff=1.52 cfs 0.079 af
Subcatchment PR-9: PR-9	Runoff Area=0.700 ac 0.00% Impervious Runoff Depth=3.15" Flow Length=66' Slope=0.0450 '/' Tc=8.9 min CN=80 Runoff=3.05 cfs 0.184 af
Reach 11R: West Channel	Avg. Flow Depth=0.46' Max Vel=2.54 fps Inflow=6.39 cfs 0.804 af n=0.017 L=387.6' S=0.0033 '/' Capacity=677.24 cfs Outflow=6.32 cfs 0.803 af
Reach 12R: East Channel	Avg. Flow Depth=0.68' Max Vel=1.83 fps Inflow=7.55 cfs 1.000 af n=0.030 L=479.0' S=0.0031 '/' Capacity=207.35 cfs Outflow=7.23 cfs 1.000 af
Reach 13R: North Channel Section 1	Avg. Flow Depth=1.36' Max Vel=2.16 fps Inflow=28.80 cfs 5.346 af n=0.030 L=400.0' S=0.0019 '/' Capacity=1,299.91 cfs Outflow=28.73 cfs 5.339 af
Reach 15R: East Channel 2	Avg. Flow Depth=0.61' Max Vel=2.91 fps Inflow=11.93 cfs 2.674 af n=0.030 L=212.0' S=0.0088 '/' Capacity=599.19 cfs Outflow=11.84 cfs 2.672 af
Reach 16R: South Channel 2	Avg. Flow Depth=1.43' Max Vel=2.59 fps Inflow=13.15 cfs 1.870 af n=0.030 L=162.0' S=0.0046 '/' Capacity=1,557.04 cfs Outflow=13.15 cfs 1.870 af
Reach 18R: North Channel Section 2	Avg. Flow Depth=2.14' Max Vel=2.49 fps Inflow=54.64 cfs 9.232 af n=0.030 L=430.0' S=0.0016 '/' Capacity=1,217.16 cfs Outflow=54.21 cfs 9.222 af

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 141

Pond B1: BIO 1

Peak Elev=798.18' Storage=10,074 cf Inflow=18.64 cfs 1.742 af
Primary=10.74 cfs 1.482 af Secondary=7.54 cfs 0.257 af Outflow=18.26 cfs 1.738 af

Pond B2: BIO 2

Peak Elev=797.05' Storage=18,270 cf Inflow=15.82 cfs 1.563 af
Primary=11.24 cfs 1.555 af Secondary=0.20 cfs 0.002 af Outflow=11.44 cfs 1.557 af

Pond B3: BIO 3

Peak Elev=796.43' Storage=4,032 cf Inflow=4.66 cfs 0.288 af
Outflow=1.73 cfs 0.287 af

Pond B4: BIO 4

Peak Elev=799.08' Storage=8,973 cf Inflow=10.12 cfs 0.727 af
Primary=5.47 cfs 0.721 af Secondary=0.51 cfs 0.005 af Outflow=5.98 cfs 0.725 af

Pond P1: POND 1

Peak Elev=796.18' Storage=39,767 cf Inflow=30.30 cfs 3.254 af
Outflow=20.30 cfs 3.054 af

Pond P2: POND 2

Peak Elev=796.85' Storage=32,357 cf Inflow=18.26 cfs 1.738 af
Outflow=5.79 cfs 1.674 af

Pond P3: POND 3

Peak Elev=797.14' Storage=8,366 cf Inflow=8.19 cfs 0.818 af
Primary=5.54 cfs 0.792 af Secondary=1.25 cfs 0.024 af Outflow=6.78 cfs 0.816 af

Pond SB1: SED 1

Peak Elev=796.27' Storage=21,875 cf Inflow=32.63 cfs 3.334 af
Primary=22.73 cfs 2.398 af Secondary=18.47 cfs 0.856 af Outflow=30.30 cfs 3.254 af

Pond SB2: SED 2

Peak Elev=797.24' Storage=3,506 cf Inflow=9.04 cfs 0.818 af
Primary=8.19 cfs 0.762 af Secondary=2.31 cfs 0.056 af Outflow=8.19 cfs 0.818 af

Link 9L: TOTAL SITE RUNNOFF

Inflow=54.21 cfs 9.222 af
Primary=54.21 cfs 9.222 af

Total Runoff Area = 30.400 ac Runoff Volume = 9.601 af Average Runoff Depth = 3.79"
64.77% Pervious = 19.690 ac 35.23% Impervious = 10.710 ac

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 142

Summary for Subcatchment PR-1: PR-1

Runoff = 32.63 cfs @ 12.39 hrs, Volume= 3.334 af, Depth= 3.74"
Routed to Pond SB1 : SED 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
3.400	98	Paved parking, HSG D
7.160	80	>75% Grass cover, Good, HSG D
* 0.140	98	POND
10.700	86	Weighted Average
7.160		66.92% Pervious Area
3.540		33.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	100	0.0175	0.09		Sheet Flow, First 100 Grass: Dense n= 0.240 P2= 2.19"
8.5	578	0.0050	1.14		Shallow Concentrated Flow, SCF Unpaved Kv= 16.1 fps
0.6	147	0.0060	4.08	5.00	Pipe Channel, PIPE 1 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.1	25	0.0060	4.08	5.00	Pipe Channel, PIPE 2 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.7	180	0.0060	4.60	8.14	Pipe Channel, PIPE 3 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
28.1	1,030	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

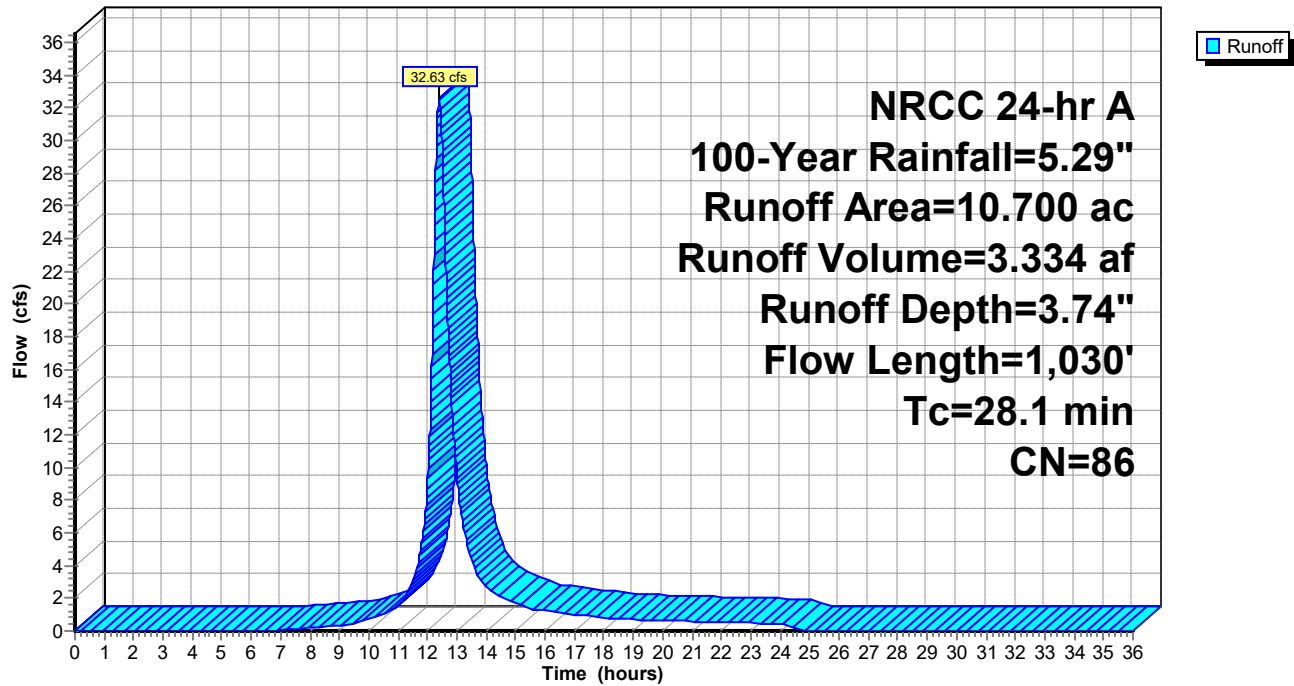
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 143

Subcatchment PR-1: PR-1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 144

Summary for Subcatchment PR-10: PR-10

Runoff = 0.51 cfs @ 12.13 hrs, Volume= 0.026 af, Depth= 3.15"
Routed to Reach 16R : South Channel 2

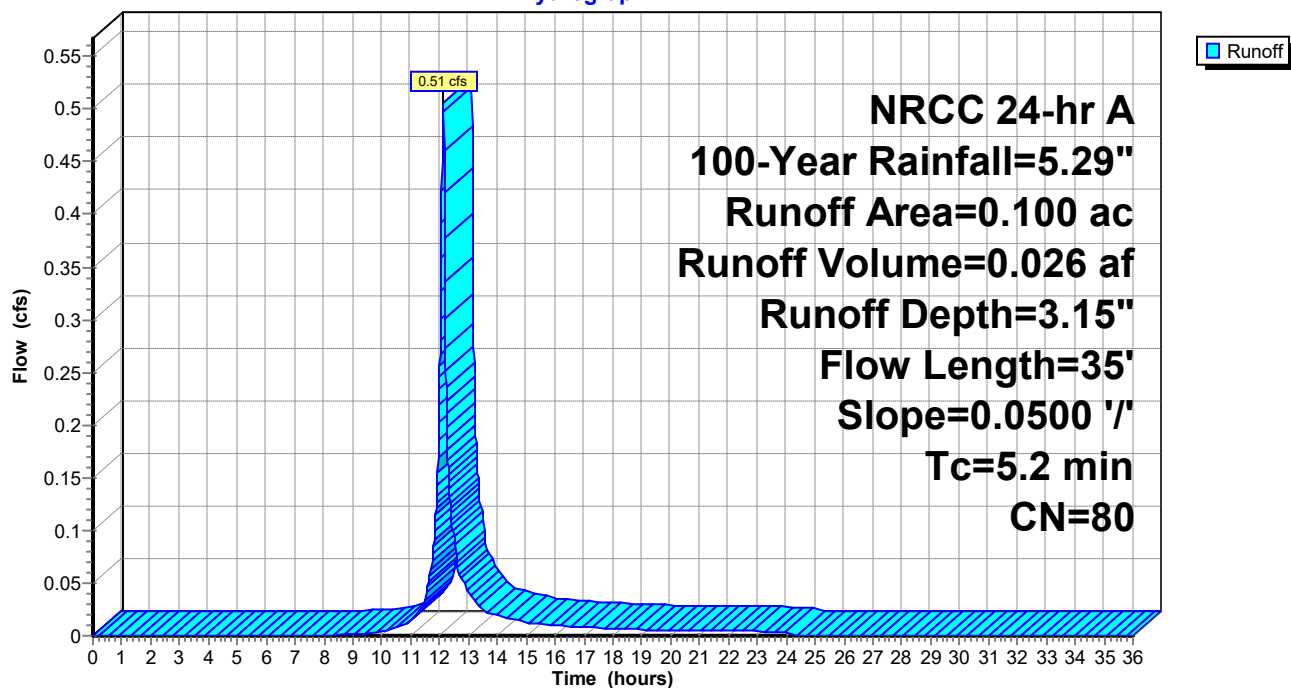
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.100	80	>75% Grass cover, Good, HSG D
0.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-10: PR-10

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 145

Summary for Subcatchment PR-2: PR-2

Runoff = 9.04 cfs @ 12.31 hrs, Volume= 0.818 af, Depth= 3.64"
Routed to Pond SB2 : SED 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.710	98	Paved parking, HSG D
1.930	80	>75% Grass cover, Good, HSG D
* 0.060	98	Wet Pond
2.700	85	Weighted Average
1.930		71.48% Pervious Area
0.770		28.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0100	0.11		Sheet Flow, FIRST 100' Grass: Short n= 0.150 P2= 2.19"
2.5	293	0.0090	1.93		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
2.3	164	0.0007	1.20	0.94	Pipe Channel, PIPE 1 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.7	91	0.0004	0.91	0.71	Pipe Channel, PIPE 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
22.1	648	Total			

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

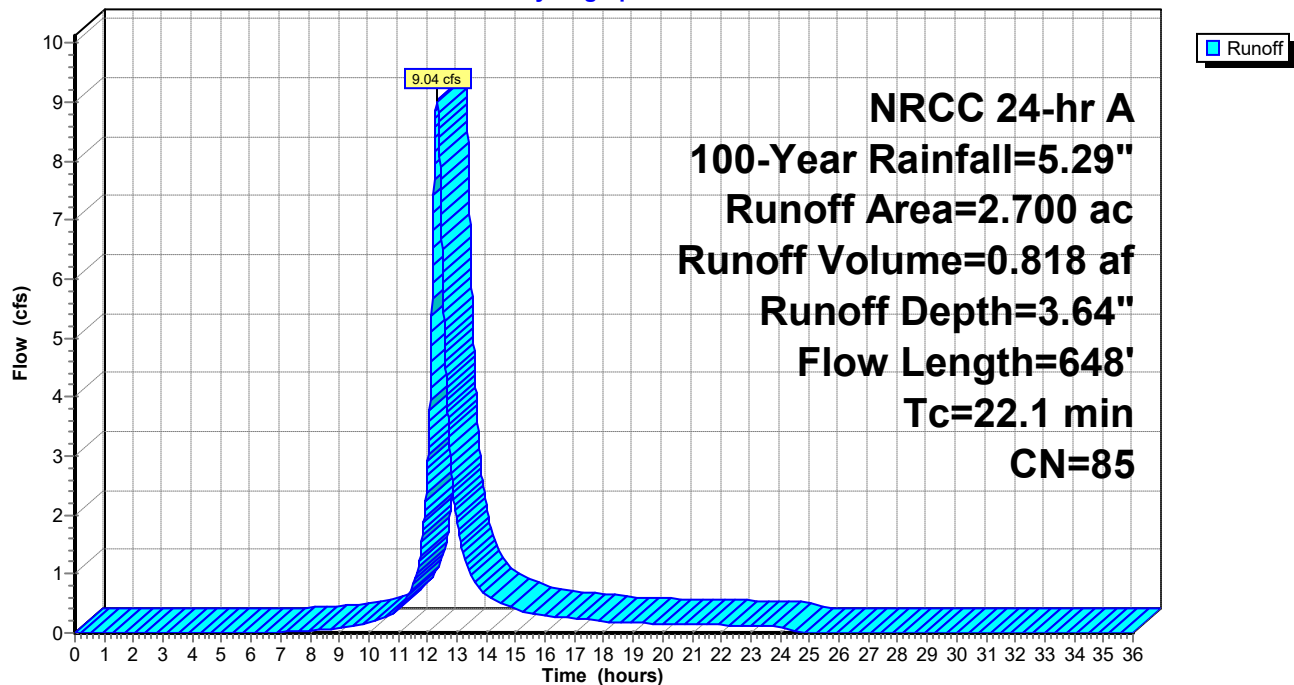
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 146

Subcatchment PR-2: PR-2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 147

Summary for Subcatchment PR-3: PR-3

Runoff = 18.64 cfs @ 12.32 hrs, Volume= 1.742 af, Depth= 3.95"
Routed to Pond B1 : BIO 1

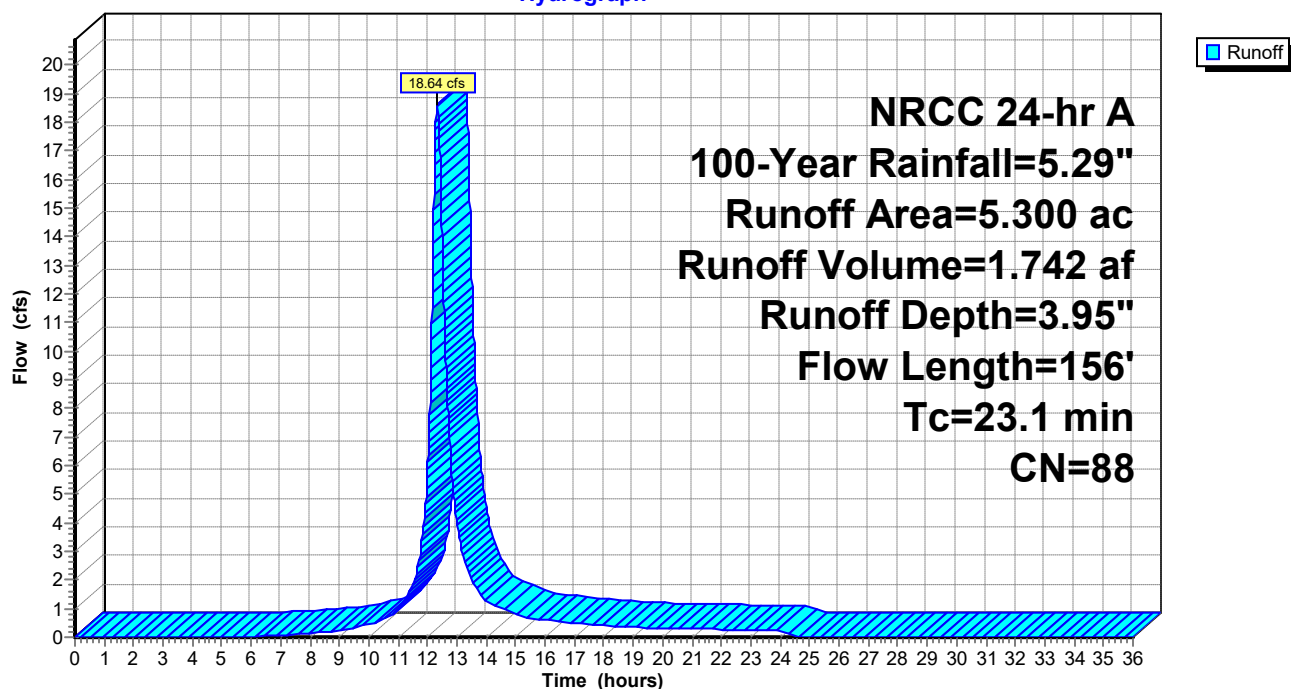
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
2.100	98	Paved parking, HSG D
3.010	80	>75% Grass cover, Good, HSG D
* 0.190	98	Wet Pond
5.300	88	Weighted Average
3.010		56.79% Pervious Area
2.290		43.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
0.3	56	0.0530	3.71		Shallow Concentrated Flow, SCF
					Unpaved Kv= 16.1 fps
23.1	156	Total			

Subcatchment PR-3: PR-3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 148

Summary for Subcatchment PR-4: PR-4

Runoff = 15.82 cfs @ 12.36 hrs, Volume= 1.563 af, Depth= 4.26"
Routed to Pond B2 : BIO 2

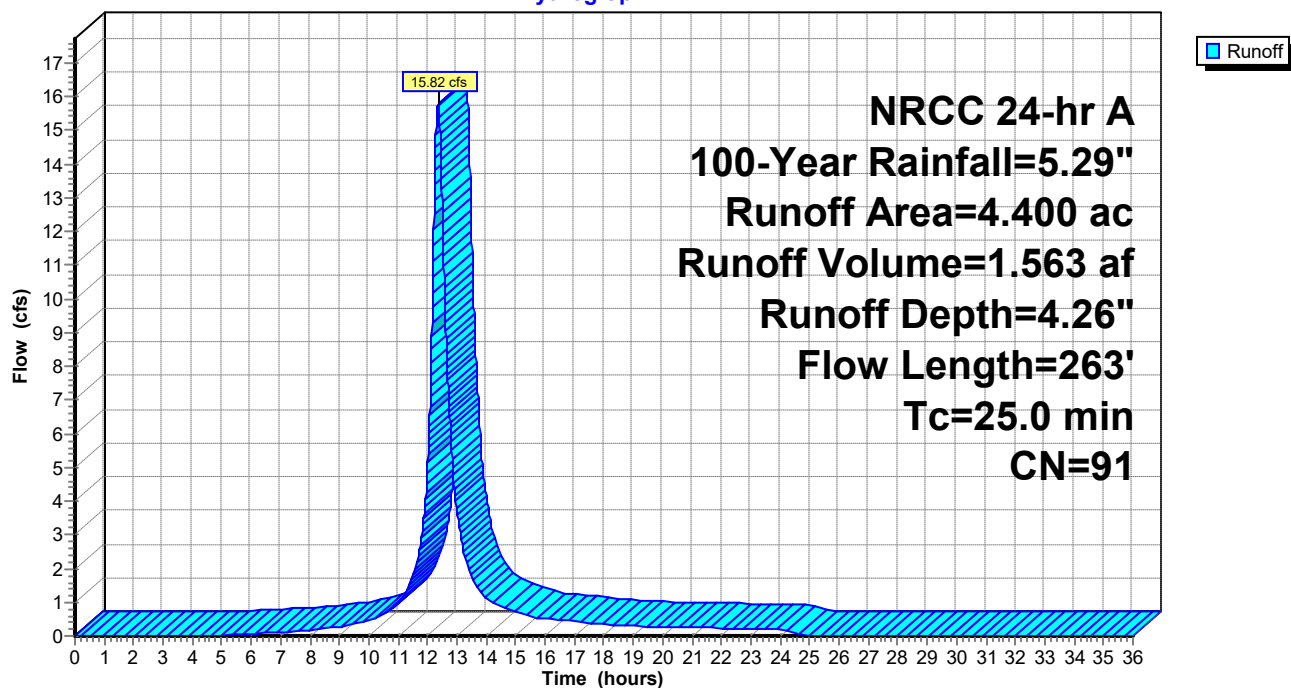
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
2.630	98	Paved parking, HSG D
1.770	80	>75% Grass cover, Good, HSG D
4.400	91	Weighted Average
1.770		40.23% Pervious Area
2.630		59.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8	100	0.0100	0.07		Sheet Flow, First 100
					Grass: Dense n= 0.240 P2= 2.19"
2.2	163	0.0060	1.25		Shallow Concentrated Flow, SCF Grass
					Unpaved Kv= 16.1 fps
25.0	263	Total			

Subcatchment PR-4: PR-4

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 149

Summary for Subcatchment PR-5: PR-5

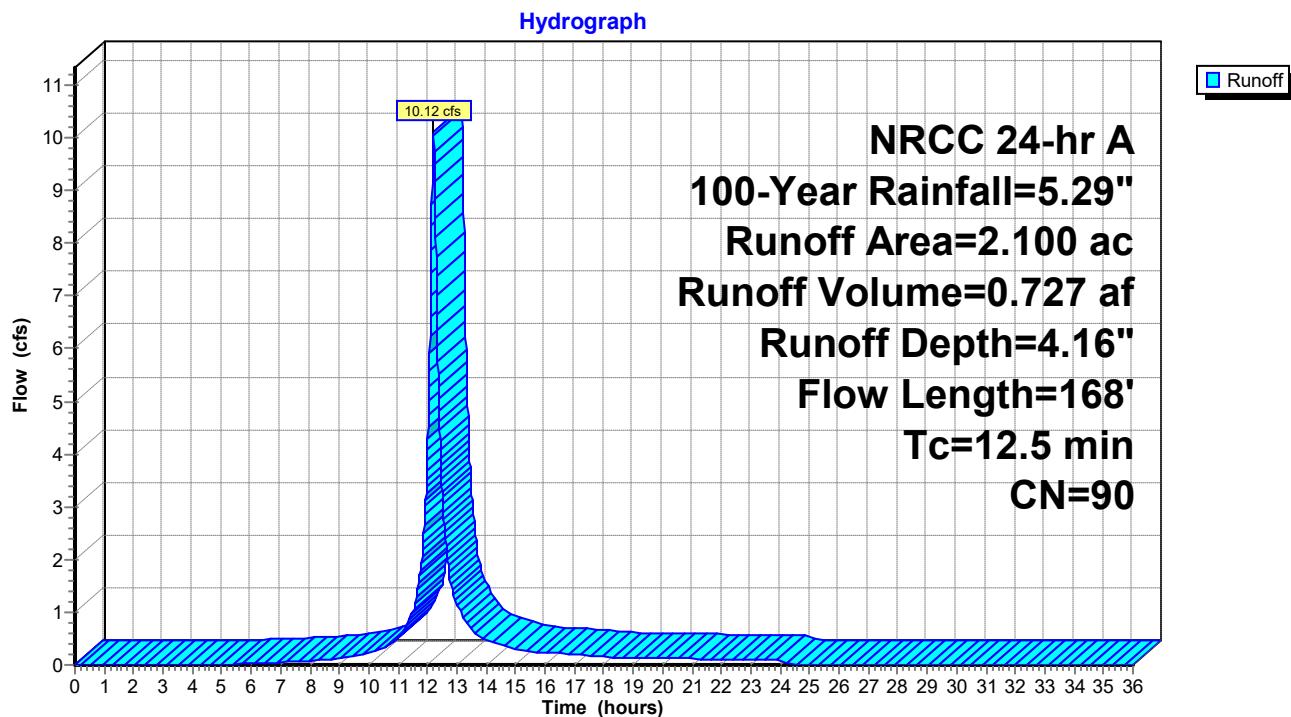
Runoff = 10.12 cfs @ 12.20 hrs, Volume= 0.727 af, Depth= 4.16"
Routed to Pond B4 : BIO 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
1.130	98	Paved parking, HSG D
0.970	80	>75% Grass cover, Good, HSG D
2.100	90	Weighted Average
0.970		46.19% Pervious Area
1.130		53.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	58	0.0170	0.08		Sheet Flow, First 58
					Grass: Dense n= 0.240 P2= 2.19"
0.6	110	0.0230	3.08		Shallow Concentrated Flow, Pave Surf
					Paved Kv= 20.3 fps
12.5	168	Total			

Subcatchment PR-5: PR-5



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 150

Summary for Subcatchment PR-6: PR-6

Runoff = 4.66 cfs @ 12.16 hrs, Volume= 0.288 af, Depth= 3.84"
Routed to Pond B3 : BIO 3

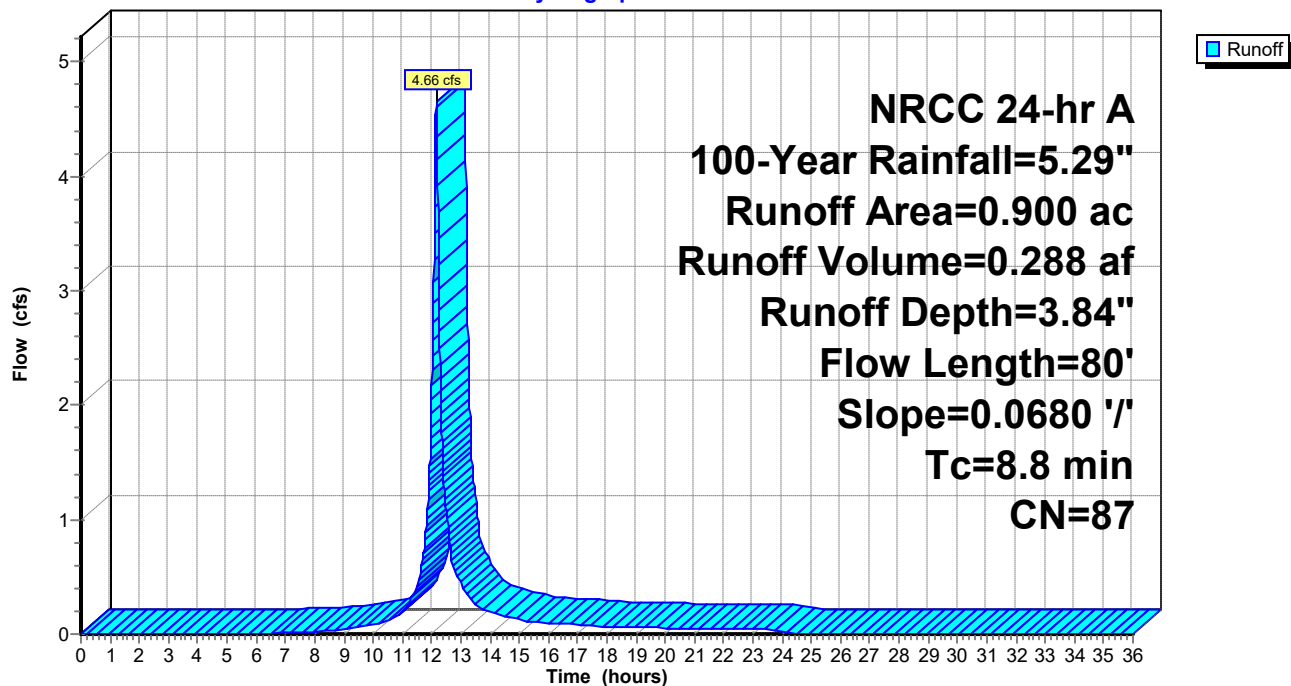
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.350	98	Paved parking, HSG D
0.550	80	>75% Grass cover, Good, HSG D
0.900	87	Weighted Average
0.550		61.11% Pervious Area
0.350		38.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	80	0.0680	0.15		Sheet Flow, SF 80'
Grass: Dense n= 0.240 P2= 2.19"					

Subcatchment PR-6: PR-6

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 151

Summary for Subcatchment PR-7: PR-7

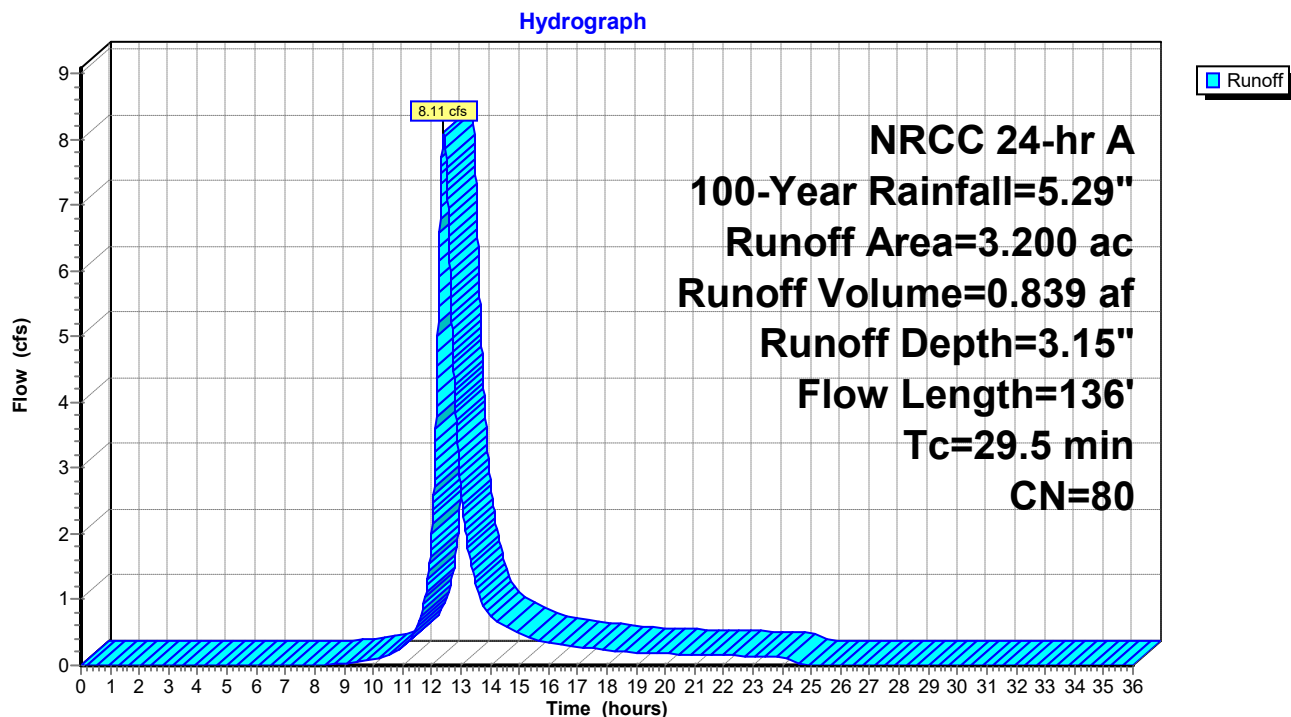
Runoff = 8.11 cfs @ 12.42 hrs, Volume= 0.839 af, Depth= 3.15"
Routed to Reach 18R : North Channel Section 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
1.300	79	Woods/grass comb., Good, HSG D
1.900	80	>75% Grass cover, Good, HSG D
3.200	80	Weighted Average
3.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	100	0.0150	0.06		Sheet Flow, First 100
					Woods: Light underbrush n= 0.400 P2= 2.19"
0.4	36	0.0800	1.41		Shallow Concentrated Flow, SCF
					Woodland Kv= 5.0 fps
29.5	136	Total			

Subcatchment PR-7: PR-7



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 152

Summary for Subcatchment PR-8: PR-8

Runoff = 1.52 cfs @ 12.13 hrs, Volume= 0.079 af, Depth= 3.15"
Routed to Reach 11R : West Channel

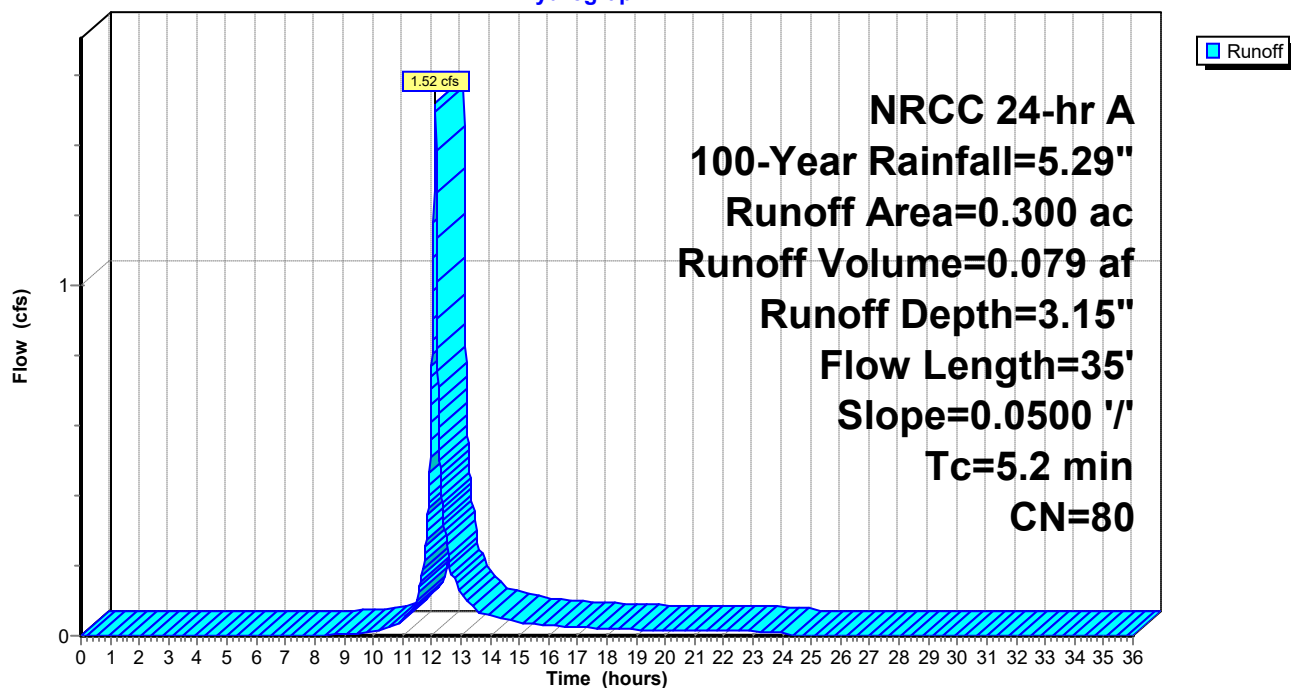
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.300	80	>75% Grass cover, Good, HSG D
0.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	35	0.0500	0.11		Sheet Flow, First 35 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-8: PR-8

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 153

Summary for Subcatchment PR-9: PR-9

Runoff = 3.05 cfs @ 12.16 hrs, Volume= 0.184 af, Depth= 3.15"
Routed to Reach 12R : East Channel

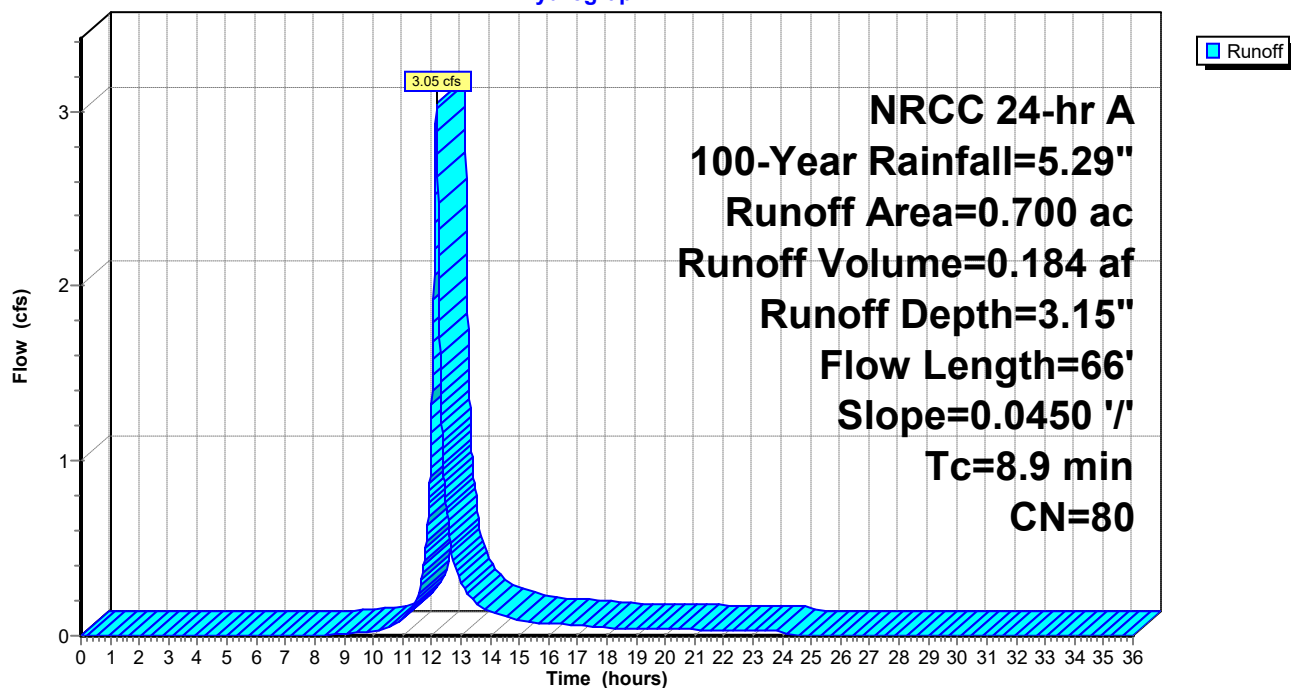
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-Year Rainfall=5.29"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	66	0.0450	0.12		Sheet Flow, First 66 Grass: Dense n= 0.240 P2= 2.19"

Subcatchment PR-9: PR-9

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 154

Summary for Reach 11R: West Channel

Inflow Area = 2.400 ac, 47.08% Impervious, Inflow Depth > 4.02" for 100-Year event
Inflow = 6.39 cfs @ 12.34 hrs, Volume= 0.804 af
Outflow = 6.32 cfs @ 12.36 hrs, Volume= 0.803 af, Atten= 1%, Lag= 1.6 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.54 fps, Min. Travel Time= 2.5 min

Avg. Velocity= 0.77 fps, Avg. Travel Time= 8.4 min

Peak Storage= 964 cf @ 12.36 hrs

Average Depth at Peak Storage= 0.46' , Surface Width= 6.77'

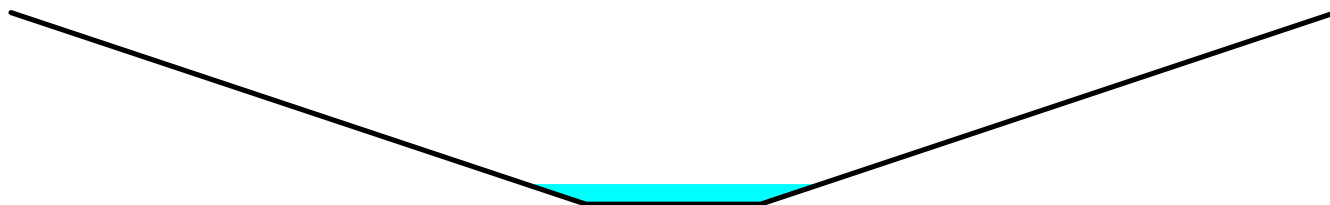
Bank-Full Depth= 4.40' Flow Area= 75.7 sf, Capacity= 677.24 cfs

4.00' x 4.40' deep channel, n= 0.017 Concrete, unfinished

Side Slope Z-value= 3.0 '/' Top Width= 30.40'

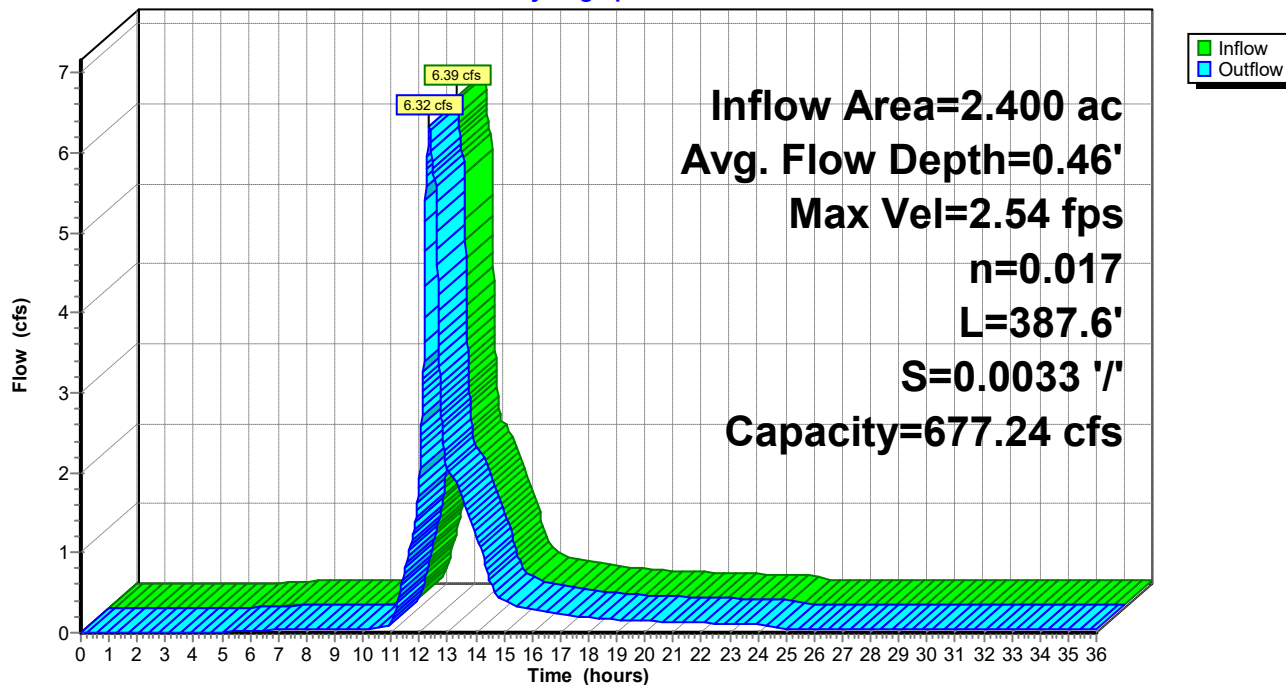
Length= 387.6' Slope= 0.0033 '/'

Inlet Invert= 794.28', Outlet Invert= 793.00'



Reach 11R: West Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 155

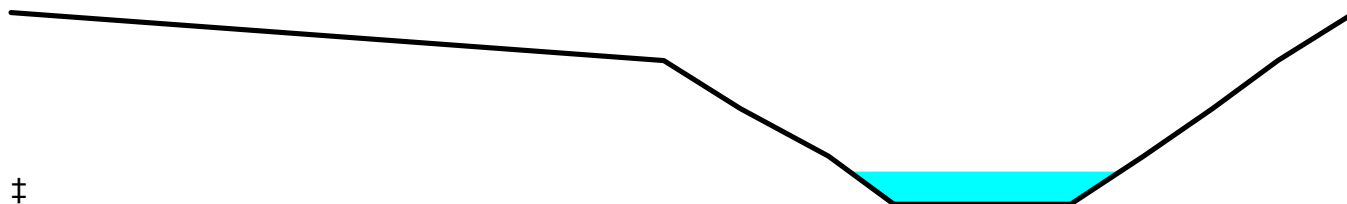
Summary for Reach 12R: East Channel

Inflow Area = 3.400 ac, 22.65% Impervious, Inflow Depth > 3.53" for 100-Year event
Inflow = 7.55 cfs @ 12.48 hrs, Volume= 1.000 af
Outflow = 7.23 cfs @ 12.54 hrs, Volume= 1.000 af, Atten= 4%, Lag= 3.5 min
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.83 fps, Min. Travel Time= 4.4 min
Avg. Velocity= 0.55 fps, Avg. Travel Time= 14.4 min

Peak Storage= 1,896 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.68' , Surface Width= 7.05'
Bank-Full Depth= 4.00' Flow Area= 56.3 sf, Capacity= 207.35 cfs

Custom cross-section, Length= 479.0' Slope= 0.0031 '/'
Constant n= 0.030
Inlet Invert= 794.50', Outlet Invert= 793.00'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-25.00	798.00	0.00
-8.00	797.00	1.00
-6.00	796.00	2.00
-3.70	795.00	3.00
-2.00	794.00	4.00
2.60	794.00	4.00
4.50	795.00	3.00
6.30	796.00	2.00
8.00	797.00	1.00
10.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	4.6	0.0	0	0.00
1.00	6.4	8.7	8.2	3,066	14.44
2.00	16.6	13.3	12.3	7,975	53.64
3.00	30.8	17.5	16.0	14,753	124.48
4.00	56.3	36.8	35.0	26,968	207.35

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

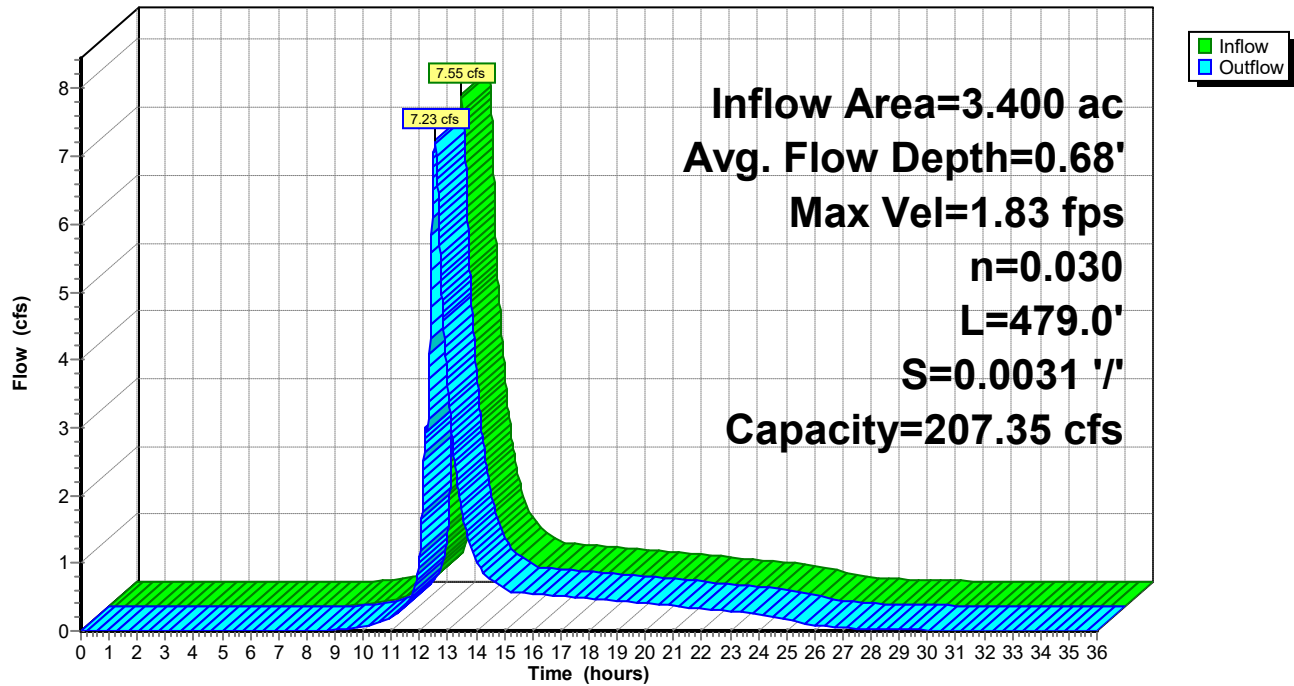
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 156

Reach 12R: East Channel

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 157

Summary for Reach 13R: North Channel Section 1

Inflow Area = 16.500 ac, 43.45% Impervious, Inflow Depth > 3.89" for 100-Year event
Inflow = 28.80 cfs @ 12.60 hrs, Volume= 5.346 af
Outflow = 28.73 cfs @ 12.65 hrs, Volume= 5.339 af, Atten= 0%, Lag= 2.9 min
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.16 fps, Min. Travel Time= 3.1 min

Avg. Velocity= 0.72 fps, Avg. Travel Time= 9.2 min

Peak Storage= 5,310 cf @ 12.65 hrs

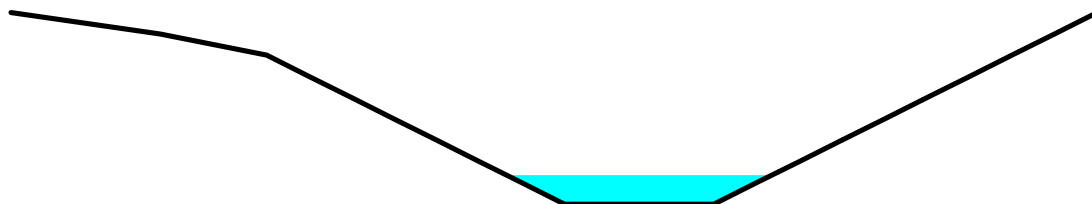
Average Depth at Peak Storage= 1.36' , Surface Width= 12.46'

Bank-Full Depth= 9.00' Flow Area= 232.0 sf, Capacity= 1,299.91 cfs

Custom cross-section, Length= 400.0' Slope= 0.0019 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 791.25', Outlet Invert= 790.50'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

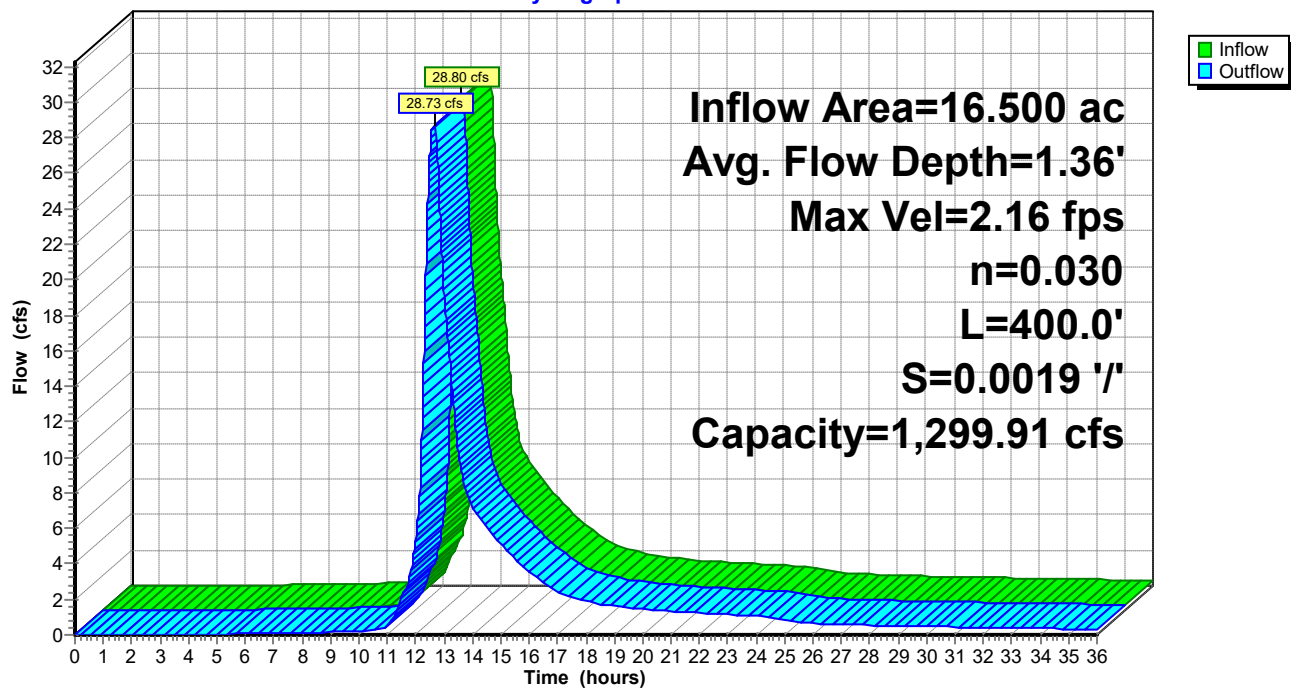
Printed 6/24/2025

Page 158

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	7.0	0.0	0	0.00
1.00	9.0	11.5	11.0	3,600	16.42
2.00	22.0	15.9	15.0	8,800	58.48
3.00	39.0	20.4	19.0	15,600	128.78
4.00	60.0	24.9	23.0	24,000	231.38
5.00	85.0	29.4	27.0	34,000	370.33
6.00	114.0	33.8	31.0	45,600	549.56
7.00	147.0	38.3	35.0	58,800	772.84
8.00	185.5	45.6	42.0	74,200	1,013.31
9.00	232.0	54.9	51.0	92,800	1,299.91

Reach 13R: North Channel Section 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 159

Summary for Reach 15R: East Channel 2

Inflow Area = 8.700 ac, 35.17% Impervious, Inflow Depth > 3.69" for 100-Year event
Inflow = 11.93 cfs @ 12.67 hrs, Volume= 2.674 af
Outflow = 11.84 cfs @ 12.68 hrs, Volume= 2.672 af, Atten= 1%, Lag= 0.8 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.91 fps, Min. Travel Time= 1.2 min

Avg. Velocity= 1.08 fps, Avg. Travel Time= 3.3 min

Peak Storage= 862 cf @ 12.68 hrs

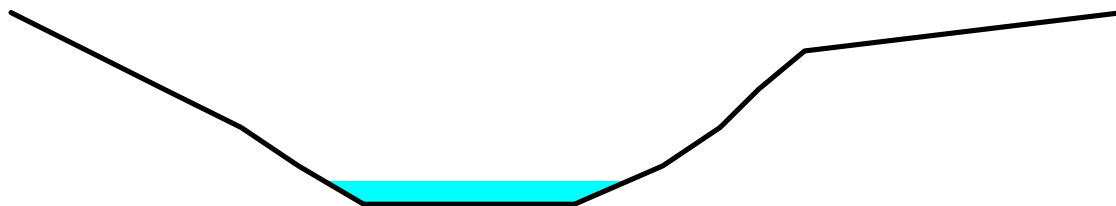
Average Depth at Peak Storage= 0.61' , Surface Width= 7.92'

Bank-Full Depth= 5.00' Flow Area= 73.5 sf, Capacity= 599.19 cfs

Custom cross-section, Length= 212.0' Slope= 0.0088 '/'

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 793.50', Outlet Invert= 791.63'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-12.00	798.00	0.00
-10.00	797.00	1.00
-8.00	796.00	2.00
-6.00	795.00	3.00
-4.50	794.00	4.00
-2.80	793.00	5.00
2.70	793.00	5.00
5.00	794.00	4.00
6.50	795.00	3.00
7.50	796.00	2.00
8.70	797.00	1.00
17.00	798.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.5	0.0	0	0.00
1.00	7.5	10.0	9.5	1,590	28.84
2.00	18.5	13.6	12.5	3,922	105.73
3.00	32.5	17.2	15.5	6,890	230.76
4.00	49.6	21.0	18.7	10,515	408.79
5.00	73.5	31.6	29.0	15,571	599.19

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

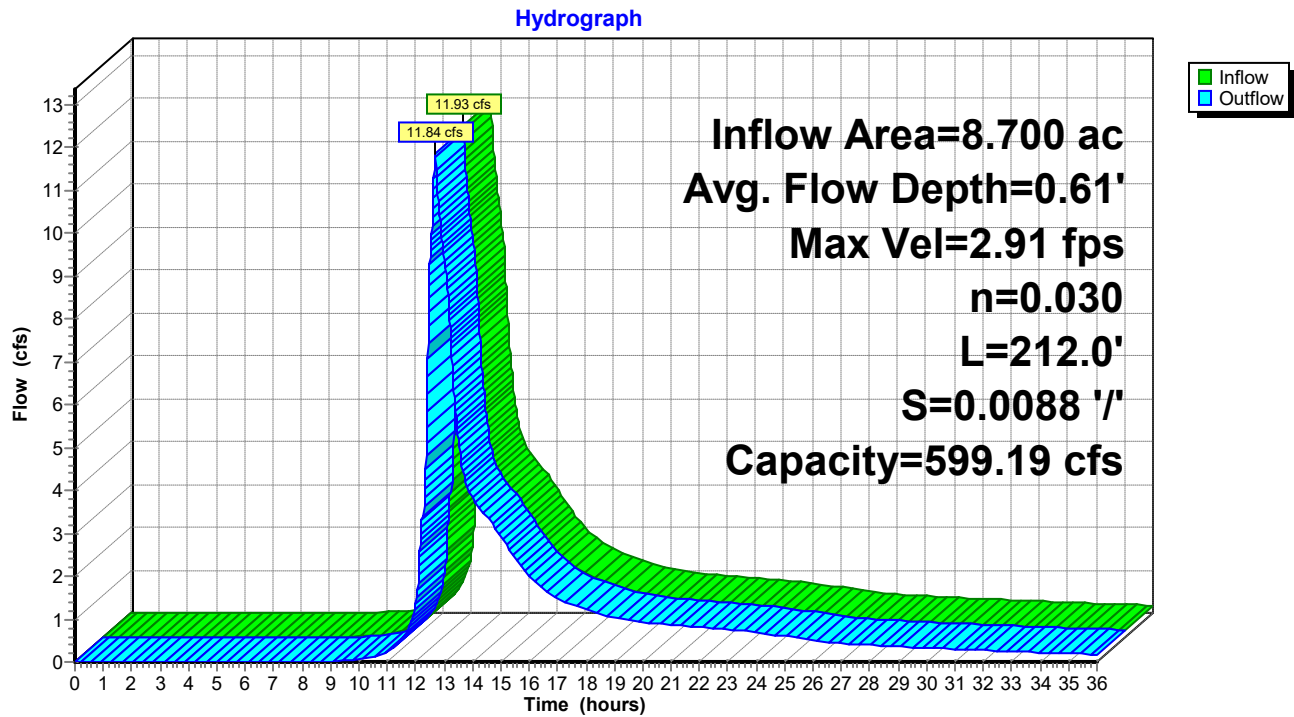
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 160

Reach 15R: East Channel 2



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 161

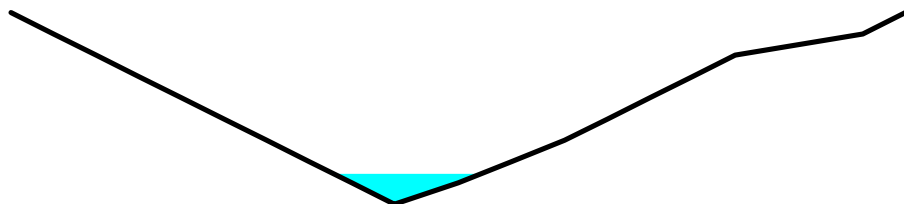
Summary for Reach 16R: South Channel 2

Inflow Area = 5.400 ac, 55.19% Impervious, Inflow Depth > 4.16" for 100-Year event
Inflow = 13.15 cfs @ 12.53 hrs, Volume= 1.870 af
Outflow = 13.15 cfs @ 12.54 hrs, Volume= 1.870 af, Atten= 0%, Lag= 0.8 min
Routed to Reach 13R : North Channel Section 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.59 fps, Min. Travel Time= 1.0 min
Avg. Velocity= 0.99 fps, Avg. Travel Time= 2.7 min

Peak Storage= 822 cf @ 12.54 hrs
Average Depth at Peak Storage= 1.43' , Surface Width= 6.94'
Bank-Full Depth= 9.00' Flow Area= 183.5 sf, Capacity= 1,557.04 cfs

Custom cross-section, Length= 162.0' Slope= 0.0046 '/' (108 Elevation Intervals)
Constant n= 0.030 Earth, grassed & winding
Inlet Invert= 792.00', Outlet Invert= 791.25'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-18.00	800.00	0.00
-16.00	799.00	1.00
-14.00	798.00	2.00
-12.00	797.00	3.00
-10.00	796.00	4.00
-8.00	795.00	5.00
-6.00	794.00	6.00
-4.00	793.00	7.00
-2.00	792.00	8.00
0.00	791.00	9.00
3.00	792.00	8.00
5.50	793.00	7.00
8.00	794.00	6.00
10.00	795.00	5.00
12.00	796.00	4.00
14.00	797.00	3.00
16.00	798.00	2.00
22.00	799.00	1.00
24.00	800.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

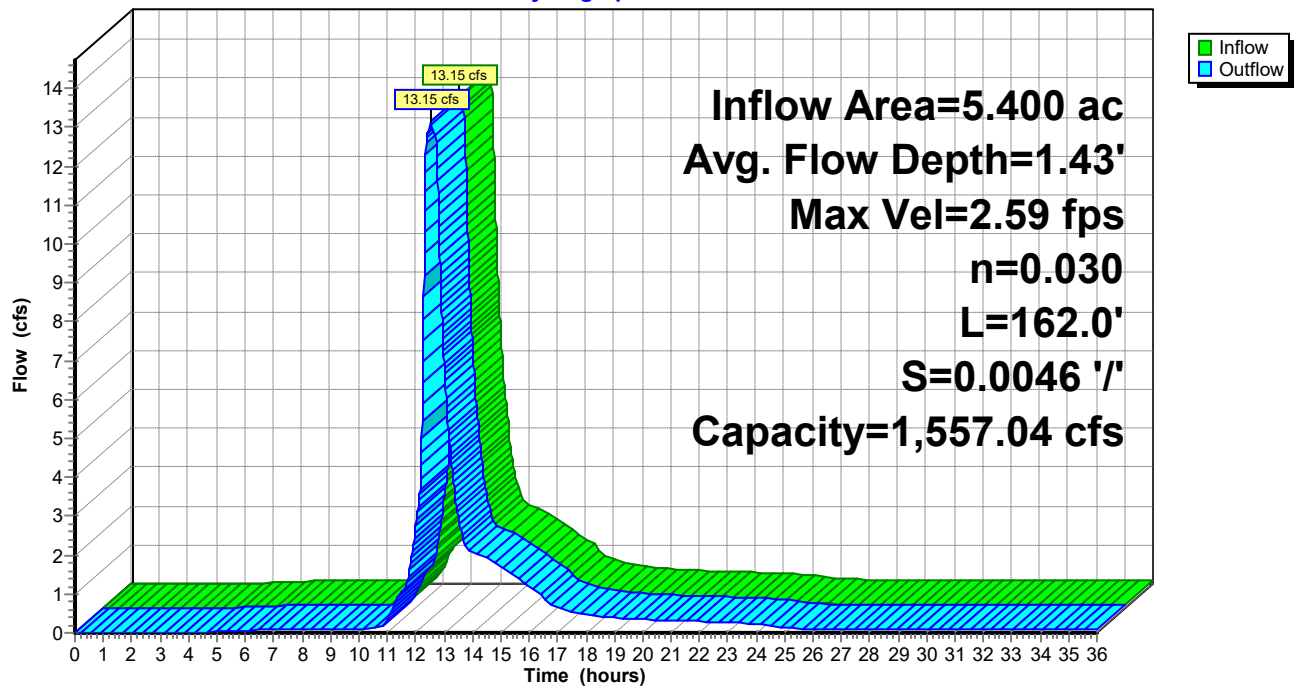
Printed 6/24/2025

Page 162

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
1.00	2.5	5.4	5.0	405	5.04
2.00	9.8	10.3	9.5	1,580	31.62
3.00	21.5	15.3	14.0	3,483	91.09
4.00	37.5	19.7	18.0	6,075	193.94
5.00	57.5	24.2	22.0	9,315	345.07
6.00	81.5	28.7	26.0	13,203	551.18
7.00	109.5	33.1	30.0	17,739	818.63
8.00	143.5	41.5	38.0	23,247	1,106.58
9.00	183.5	45.9	42.0	29,727	1,557.04

Reach 16R: South Channel 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 163

Summary for Reach 18R: North Channel Section 2

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 3.64" for 100-Year event
Inflow = 54.64 cfs @ 12.64 hrs, Volume= 9.232 af
Outflow = 54.21 cfs @ 12.68 hrs, Volume= 9.222 af, Atten= 1%, Lag= 2.4 min
Routed to Link 9L : TOTAL SITE RUNNOFF

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 2.49 fps, Min. Travel Time= 2.9 min

Avg. Velocity= 0.81 fps, Avg. Travel Time= 8.8 min

Peak Storage= 9,367 cf @ 12.68 hrs

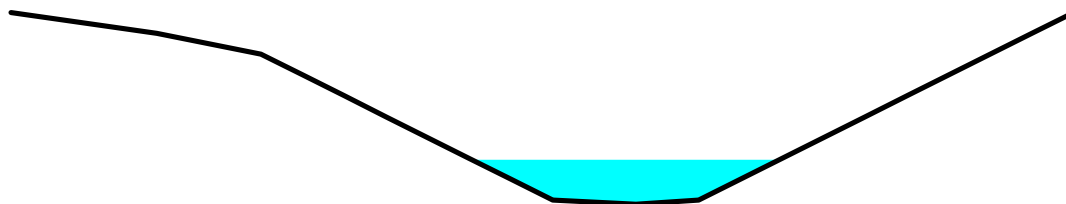
Average Depth at Peak Storage= 2.14' , Surface Width= 14.75'

Bank-Full Depth= 9.20' Flow Area= 232.7 sf, Capacity= 1,217.16 cfs

Custom cross-section, Length= 430.0' Slope= 0.0016 '/' (108 Elevation Intervals)

Constant n= 0.030 Earth, grassed & winding

Inlet Invert= 790.50', Outlet Invert= 789.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
-30.00	799.00	0.00
-23.00	798.00	1.00
-18.00	797.00	2.00
-16.00	796.00	3.00
-14.00	795.00	4.00
-12.00	794.00	5.00
-10.00	793.00	6.00
-8.00	792.00	7.00
-6.00	791.00	8.00
-4.00	790.00	9.00
0.00	789.80	9.20
3.00	790.00	9.00
5.00	791.00	8.00
7.00	792.00	7.00
9.00	793.00	6.00
11.00	794.00	5.00
13.00	795.00	4.00
15.00	796.00	3.00
17.00	797.00	2.00
19.00	798.00	1.00
21.00	799.00	0.00

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

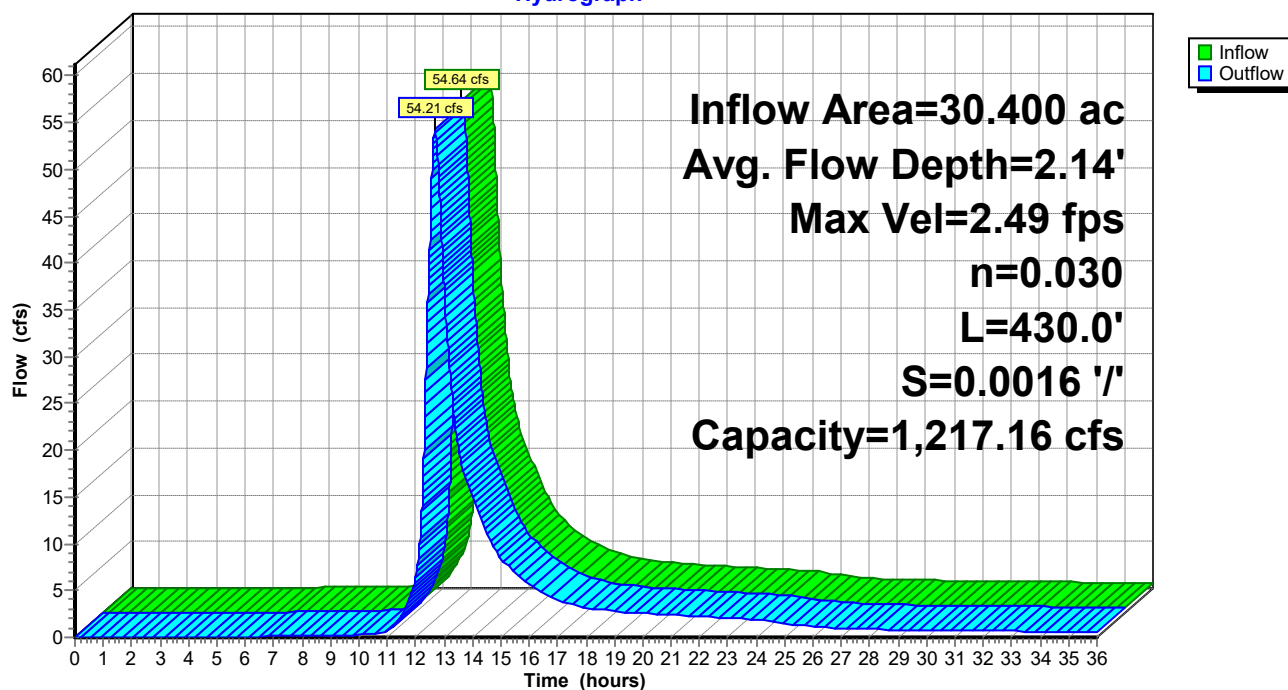
Printed 6/24/2025

Page 164

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	0.0	0.0	0	0.00
0.20	0.7	7.0	7.0	301	0.30
1.20	9.7	11.5	11.0	4,171	17.33
2.20	22.7	16.0	15.0	9,761	57.39
3.20	39.7	20.4	19.0	17,071	123.56
4.20	60.7	24.9	23.0	26,101	219.73
5.20	85.7	29.4	27.0	36,851	349.72
6.20	114.7	33.8	31.0	49,321	517.20
7.20	147.7	38.3	35.0	63,511	725.70
8.20	186.2	45.7	42.0	80,066	949.96
9.20	232.7	55.0	51.0	100,061	1,217.16

Reach 18R: North Channel Section 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 165

Summary for Pond B1: BIO 1

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth = 3.95" for 100-Year event
Inflow = 18.64 cfs @ 12.32 hrs, Volume= 1.742 af
Outflow = 18.26 cfs @ 12.36 hrs, Volume= 1.738 af, Atten= 2%, Lag= 2.1 min
Primary = 10.74 cfs @ 12.35 hrs, Volume= 1.482 af
Routed to Pond P2 : POND 2
Secondary = 7.54 cfs @ 12.37 hrs, Volume= 0.257 af
Routed to Pond P2 : POND 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 798.18' @ 12.37 hrs Surf.Area= 11,740 sf Storage= 10,074 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.9 min (868.8 - 805.9)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	14,087 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
797.00	5,319	0	0
798.00	10,740	8,030	8,030
798.50	13,488	6,057	14,087

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	15.0" Round Culvert X 2.00 L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 7.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	797.90'	24.0" x 24.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#6	Secondary	798.00'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir X 4.00 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) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 166

Primary OutFlow Max=10.74 cfs @ 12.35 hrs HW=798.18' TW=795.78' (Dynamic Tailwater)

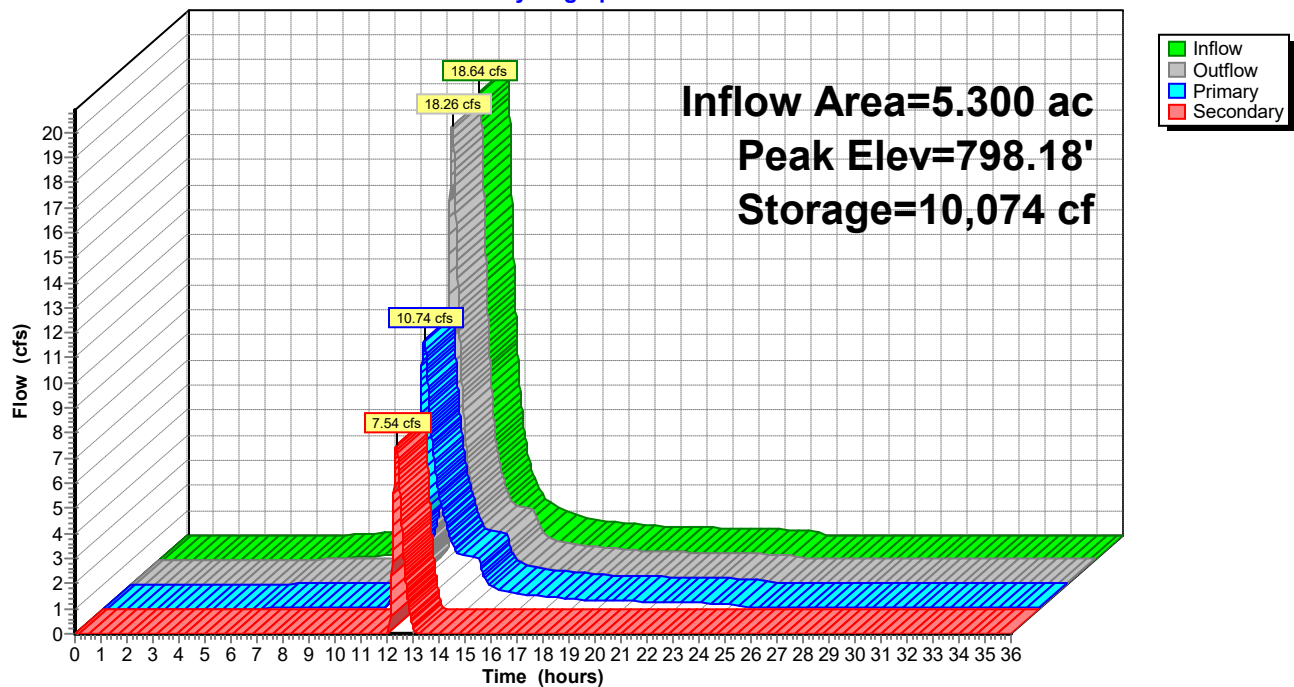
- 1=Culvert (Passes 10.74 cfs of 18.30 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 2.93 cfs @ 7.45 fps)
- 3=Exfiltration (Passes < 0.14 cfs potential flow)
- 4=Orifice/Grate (Passes < 5.46 cfs potential flow)
- 5=Orifice/Grate (Weir Controls 7.81 cfs @ 1.73 fps)

Secondary OutFlow Max=7.53 cfs @ 12.37 hrs HW=798.18' TW=795.85' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Weir Controls 7.53 cfs @ 1.04 fps)

Pond B1: BIO 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 167

Summary for Pond B2: BIO 2

Inflow Area = 4.400 ac, 59.77% Impervious, Inflow Depth = 4.26" for 100-Year event
Inflow = 15.82 cfs @ 12.36 hrs, Volume= 1.563 af
Outflow = 11.44 cfs @ 12.53 hrs, Volume= 1.557 af, Atten= 28%, Lag= 10.7 min
Primary = 11.24 cfs @ 12.53 hrs, Volume= 1.555 af
Routed to Reach 16R : South Channel 2
Secondary = 0.20 cfs @ 12.53 hrs, Volume= 0.002 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.05' @ 12.53 hrs Surf.Area= 12,174 sf Storage= 18,270 cf

Plug-Flow detention time= 91.3 min calculated for 1.556 af (100% of inflow)
Center-of-Mass det. time= 88.6 min (886.9 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	24,112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	5,689	0	0
796.00	8,835	7,262	7,262
797.00	12,011	10,423	17,685
797.50	13,697	6,427	24,112

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	797.00'	8.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 168

Primary OutFlow Max=11.24 cfs @ 12.53 hrs HW=797.05' TW=793.43' (Dynamic Tailwater)

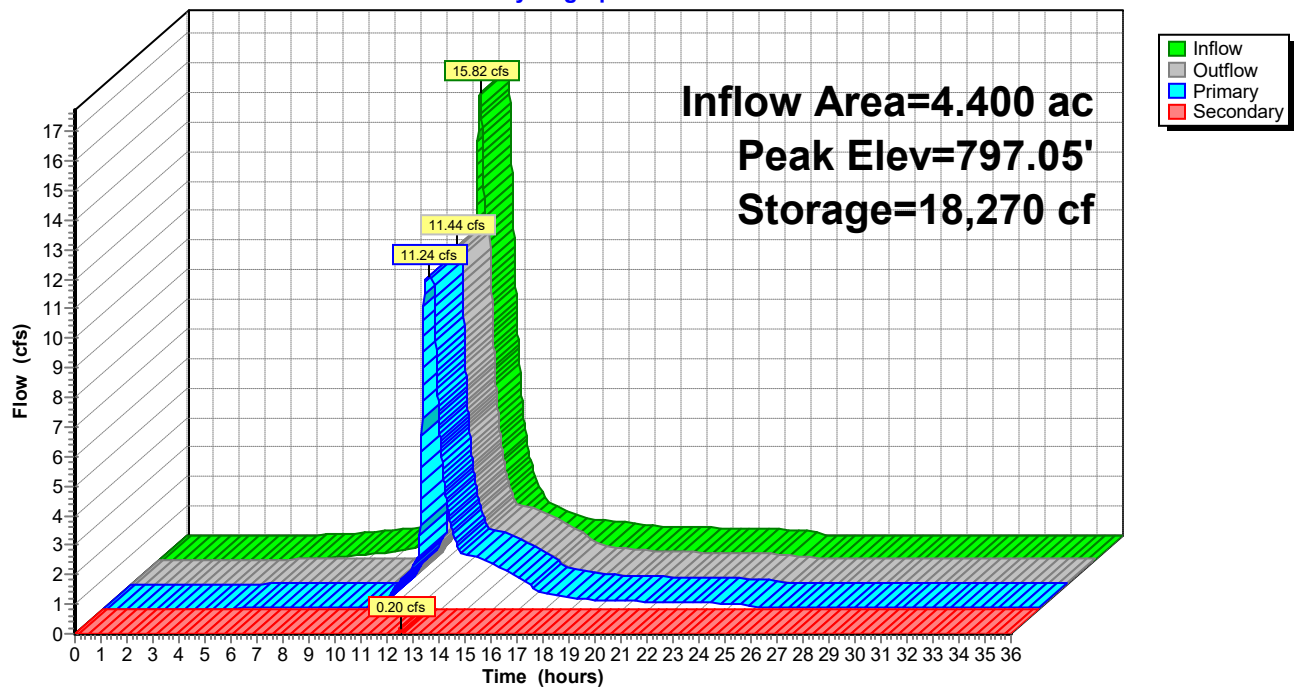
- 1=Culvert (Inlet Controls 11.24 cfs @ 9.16 fps)
- 2=Orifice/Grate (Passes < 1.80 cfs potential flow)
- 3=Exfiltration (Passes < 0.14 cfs potential flow)
- 4=Orifice/Grate (Passes < 2.35 cfs potential flow)
- 5=Orifice/Grate (Passes < 13.66 cfs potential flow)

Secondary OutFlow Max=0.20 cfs @ 12.53 hrs HW=797.05' TW=793.43' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Weir Controls 0.20 cfs @ 0.52 fps)

Pond B2: BIO 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 169

Summary for Pond B3: BIO 3

Inflow Area = 0.900 ac, 38.89% Impervious, Inflow Depth = 3.84" for 100-Year event
Inflow = 4.66 cfs @ 12.16 hrs, Volume= 0.288 af
Outflow = 1.73 cfs @ 12.21 hrs, Volume= 0.287 af, Atten= 63%, Lag= 3.2 min
Primary = 1.73 cfs @ 12.21 hrs, Volume= 0.287 af
Routed to Reach 16R : South Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.43' @ 12.37 hrs Surf.Area= 3,681 sf Storage= 4,032 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 117.8 min (913.2 - 795.4)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	8,693 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	1,987	0	0
796.00	3,157	2,572	2,572
797.00	4,384	3,771	6,343
797.50	5,018	2,351	8,693

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	15.0" Round Culvert L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	792.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	795.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	795.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	796.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.72 cfs @ 12.21 hrs HW=796.30' TW=792.98' (Dynamic Tailwater)

1=Culvert (Passes 1.72 cfs of 10.77 cfs potential flow)
2=Orifice/Grate (Orifice Controls 1.72 cfs @ 8.78 fps)
3=Exfiltration (Passes < 0.04 cfs potential flow)
4=Orifice/Grate (Passes < 1.70 cfs potential flow)
5=Orifice/Grate (Controls 0.00 cfs)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

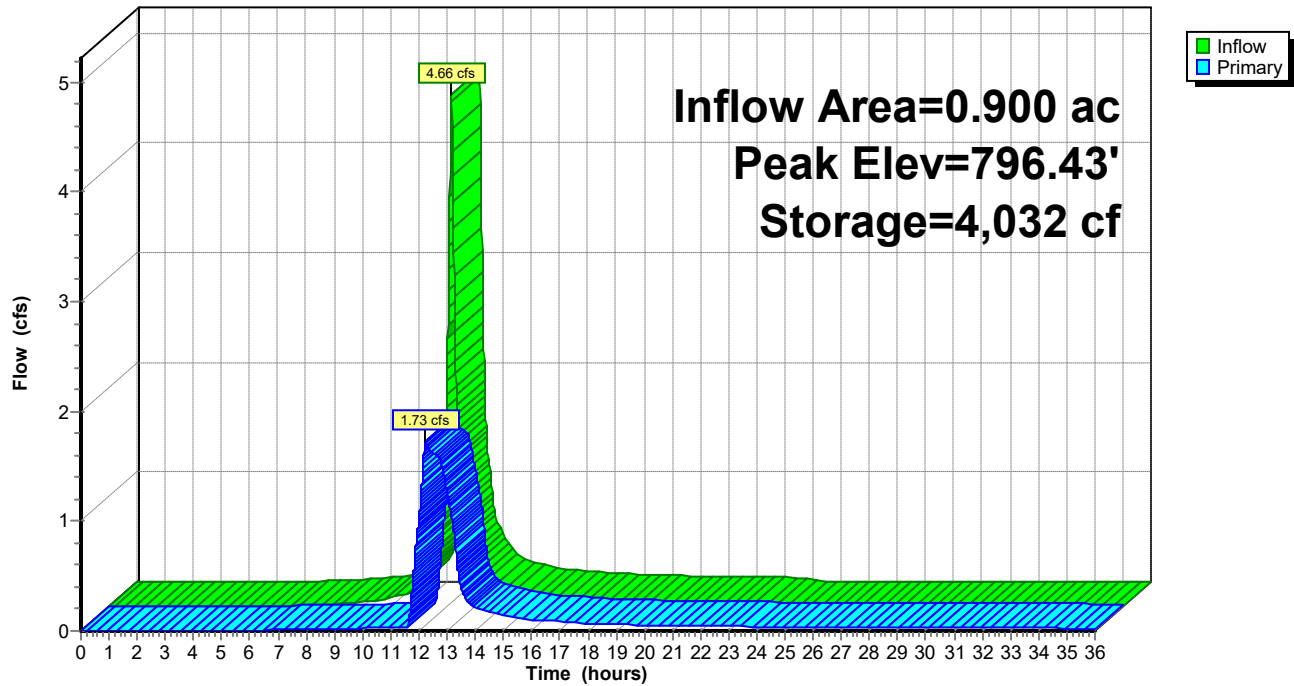
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 170

Pond B3: BIO 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 171

Summary for Pond B4: BIO 4

Inflow Area = 2.100 ac, 53.81% Impervious, Inflow Depth = 4.16" for 100-Year event
Inflow = 10.12 cfs @ 12.20 hrs, Volume= 0.727 af
Outflow = 5.98 cfs @ 12.34 hrs, Volume= 0.725 af, Atten= 41%, Lag= 8.5 min
Primary = 5.47 cfs @ 12.33 hrs, Volume= 0.721 af
Routed to Reach 11R : West Channel
Secondary = 0.51 cfs @ 12.34 hrs, Volume= 0.005 af
Routed to Reach 11R : West Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 799.08' @ 12.34 hrs Surf.Area= 5,529 sf Storage= 8,973 cf

Plug-Flow detention time= 87.0 min calculated for 0.725 af (100% of inflow)
Center-of-Mass det. time= 85.2 min (875.2 - 790.0)

Volume	Invert	Avail.Storage	Storage Description
#1	797.00'	11,425 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
797.00	3,198	336.0	0	0	3,198
798.00	4,260	373.0	3,716	3,716	5,315
799.00	5,435	410.0	4,836	8,552	7,654
799.50	6,065	430.0	2,874	11,425	9,007

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	10.0" Round Culvert L= 29.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Device 1	794.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 2	797.00'	0.500 in/hr Exfiltration over Surface area
#4	Device 2	797.50'	6.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	798.55'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	799.00'	10.0' long x 7.0' 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 172

Primary OutFlow Max=5.47 cfs @ 12.33 hrs HW=799.08' TW=794.74' (Dynamic Tailwater)

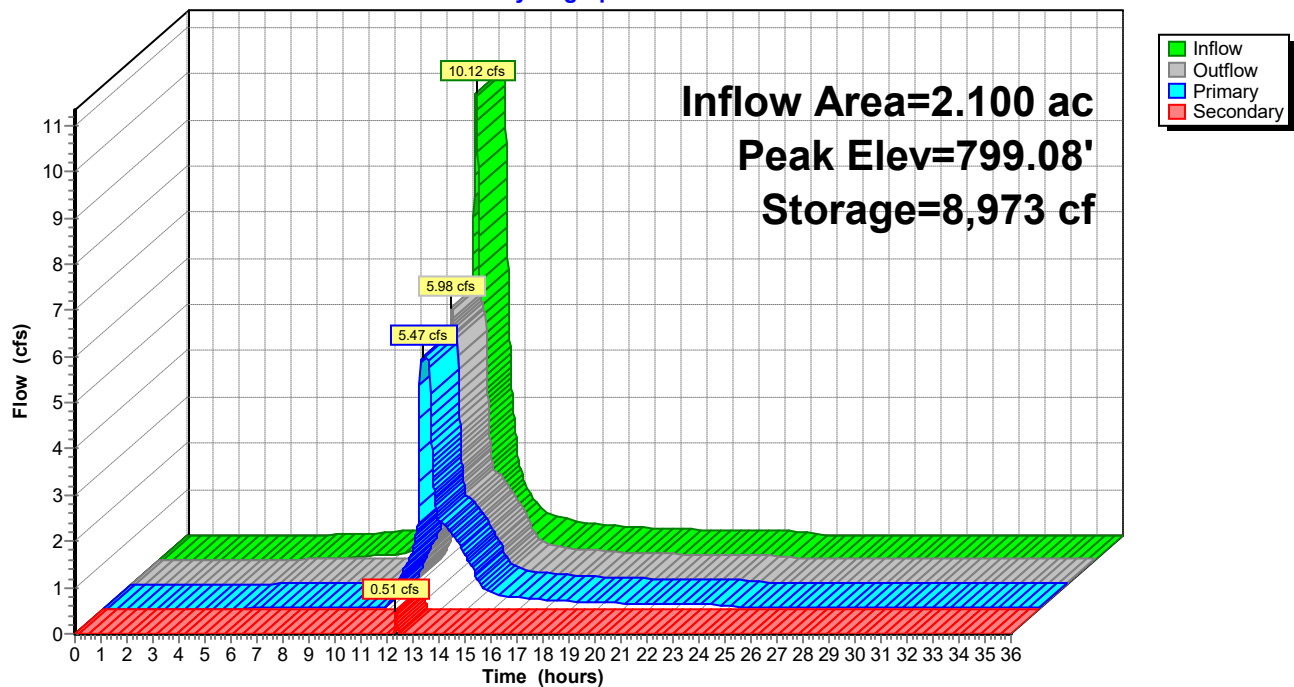
- 1=Culvert (Inlet Controls 5.47 cfs @ 10.03 fps)
- 2=Orifice/Grate (Passes < 1.97 cfs potential flow)
- 3=Exfiltration (Passes < 0.06 cfs potential flow)
- 4=Orifice/Grate (Passes < 2.37 cfs potential flow)
- 5=Orifice/Grate (Passes < 9.97 cfs potential flow)

Secondary OutFlow Max=0.51 cfs @ 12.34 hrs HW=799.08' TW=794.74' (Dynamic Tailwater)

- 6=Broad-Crested Rectangular Weir (Weir Controls 0.51 cfs @ 0.66 fps)

Pond B4: BIO 4

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 173

Summary for Pond P1: POND 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth > 3.65" for 100-Year event
Inflow = 30.30 cfs @ 12.42 hrs, Volume= 3.254 af
Outflow = 20.30 cfs @ 12.67 hrs, Volume= 3.054 af, Atten= 33%, Lag= 14.9 min
Primary = 20.30 cfs @ 12.67 hrs, Volume= 3.054 af
Routed to Reach 18R : North Channel Section 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.18' @ 12.67 hrs Surf.Area= 13,201 sf Storage= 39,767 cf

Plug-Flow detention time= 145.4 min calculated for 3.054 af (94% of inflow)
Center-of-Mass det. time= 98.2 min (989.6 - 891.5)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	50,944 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	5,934	0	0
793.00	7,561	6,748	6,748
794.00	9,282	8,422	15,169
795.00	11,104	10,193	25,362
796.00	13,026	12,065	37,427
797.00	14,008	13,517	50,944

Device	Routing	Invert	Outlet Devices
#1	Primary	792.00'	24.0" Round Culvert L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 792.00' / 792.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	792.00'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	794.00'	20.0" W x 10.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	795.75'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=20.30 cfs @ 12.67 hrs HW=796.18' TW=792.64' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 20.30 cfs of 26.32 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.44 cfs @ 9.06 fps)
↑ **3=Orifice/Grate** (Orifice Controls 8.86 cfs @ 6.38 fps)
↑ **4=Orifice/Grate** (Weir Controls 11.00 cfs @ 2.14 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

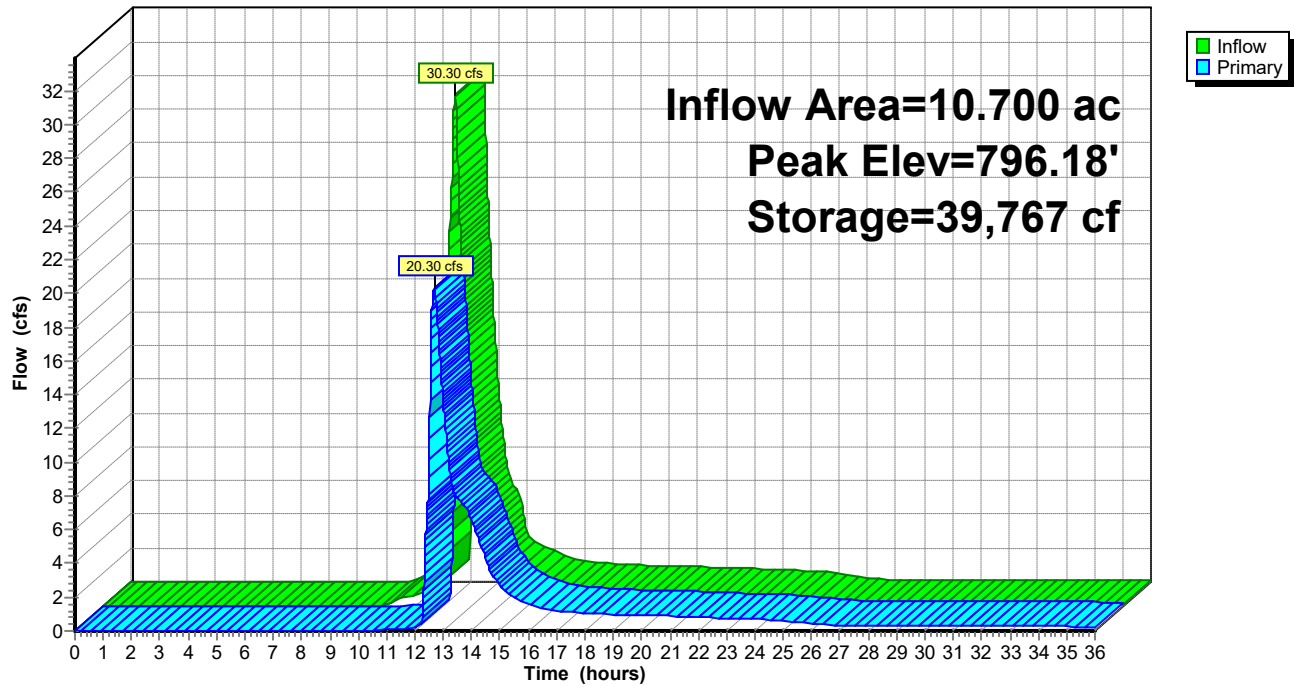
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 174

Pond P1: POND 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 175

Summary for Pond P2: POND 2

Inflow Area = 5.300 ac, 43.21% Impervious, Inflow Depth > 3.94" for 100-Year event
Inflow = 18.26 cfs @ 12.36 hrs, Volume= 1.738 af
Outflow = 5.79 cfs @ 12.87 hrs, Volume= 1.674 af, Atten= 68%, Lag= 30.6 min
Primary = 5.79 cfs @ 12.87 hrs, Volume= 1.674 af
Routed to Reach 15R : East Channel 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.85' @ 12.87 hrs Surf.Area= 14,826 sf Storage= 32,357 cf

Plug-Flow detention time= 248.8 min calculated for 1.674 af (96% of inflow)
Center-of-Mass det. time= 211.7 min (1,080.5 - 868.8)

Volume	Invert	Avail.Storage	Storage Description
#1	794.00'	60,439 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
794.00	8,143	0	0
795.00	10,289	9,216	9,216
796.00	12,675	11,482	20,698
797.00	15,212	13,944	34,642
798.00	17,852	16,532	51,174
798.50	19,211	9,266	60,439

Device	Routing	Invert	Outlet Devices
#1	Primary	794.00'	12.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 794.00' / 794.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	794.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.50'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	796.60'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.79 cfs @ 12.87 hrs HW=796.85' TW=794.06' (Dynamic Tailwater)

1=Culvert (Inlet Controls 5.79 cfs @ 7.38 fps)
2=Orifice/Grate (Passes < 0.69 cfs potential flow)
3=Orifice/Grate (Passes < 2.53 cfs potential flow)
4=Orifice/Grate (Passes < 4.84 cfs potential flow)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

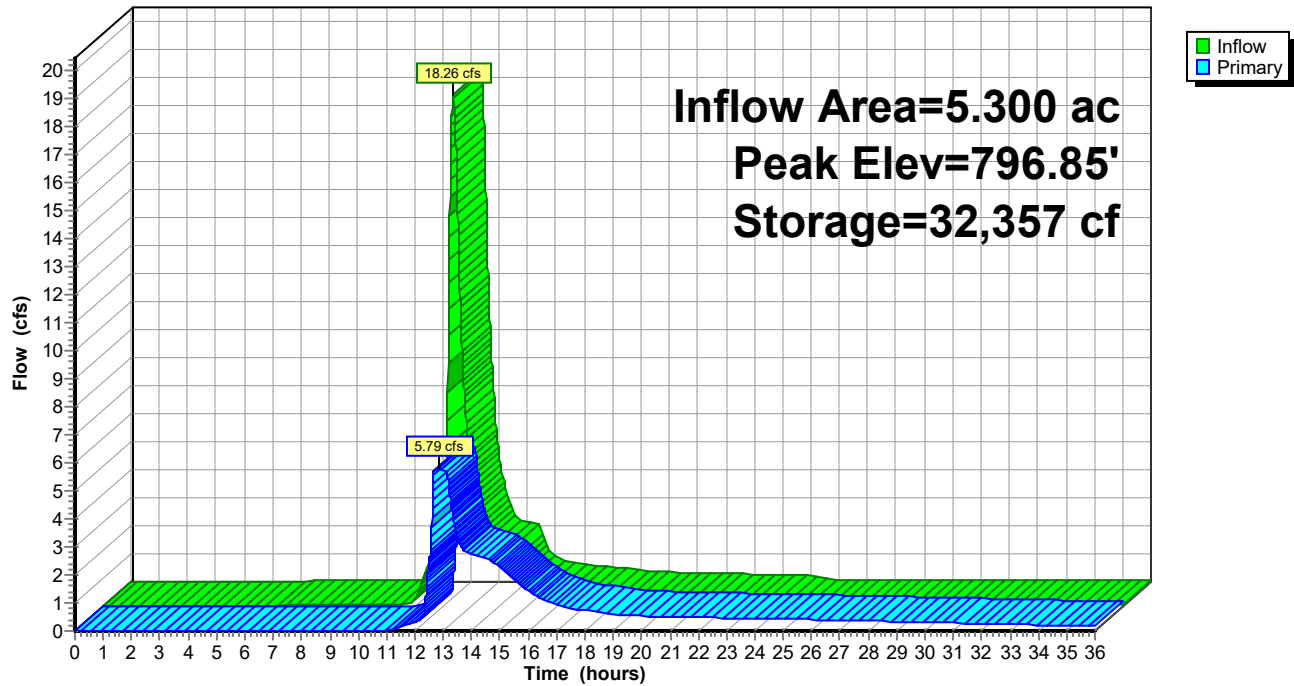
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 176

Pond P2: POND 2

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 177

Summary for Pond P3: POND 3

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 3.64" for 100-Year event
Inflow = 8.19 cfs @ 12.27 hrs, Volume= 0.818 af
Outflow = 6.78 cfs @ 12.49 hrs, Volume= 0.816 af, Atten= 17%, Lag= 13.2 min
Primary = 5.54 cfs @ 12.49 hrs, Volume= 0.792 af
Routed to Reach 12R : East Channel
Secondary = 1.25 cfs @ 12.49 hrs, Volume= 0.024 af
Routed to Reach 12R : East Channel

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.14' @ 12.49 hrs Surf.Area= 5,209 sf Storage= 8,366 cf

Plug-Flow detention time= 90.0 min calculated for 0.816 af (100% of inflow)
Center-of-Mass det. time= 88.1 min (932.7 - 844.6)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	10,321 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	2,710	0	0
796.00	3,780	3,245	3,245
797.00	5,016	4,398	7,643
797.50	5,697	2,678	10,321

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	15.0" Round Culvert L= 17.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 794.50' S= 0.0294 ' S= 0.0294 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	795.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.50'	36.0" W x 36.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long 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

Primary OutFlow Max=5.54 cfs @ 12.49 hrs HW=797.14' TW=795.16' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 5.54 cfs of 7.28 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.59 cfs @ 6.77 fps)
↑ **3=Orifice/Grate** (Orifice Controls 4.95 cfs @ 2.57 fps)

Secondary OutFlow Max=1.24 cfs @ 12.49 hrs HW=797.14' TW=795.16' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 1.24 cfs @ 0.88 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

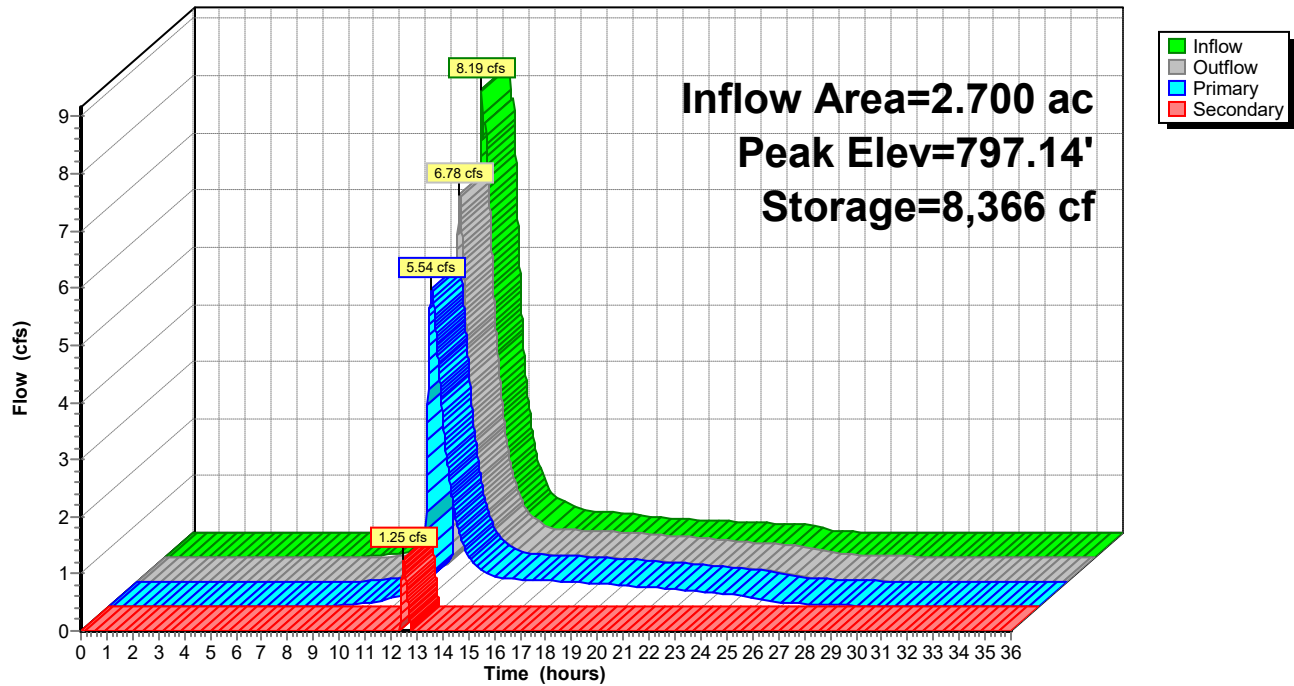
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 178

Pond P3: POND 3

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 179

Summary for Pond SB1: SED 1

Inflow Area = 10.700 ac, 33.08% Impervious, Inflow Depth = 3.74" for 100-Year event
Inflow = 32.63 cfs @ 12.39 hrs, Volume= 3.334 af
Outflow = 30.30 cfs @ 12.42 hrs, Volume= 3.254 af, Atten= 7%, Lag= 1.9 min
Primary = 22.73 cfs @ 12.25 hrs, Volume= 2.398 af
Routed to Pond P1 : POND 1
Secondary = 18.47 cfs @ 12.49 hrs, Volume= 0.856 af
Routed to Pond P1 : POND 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 796.27' @ 12.64 hrs Surf.Area= 7,936 sf Storage= 21,875 cf

Plug-Flow detention time= 89.8 min calculated for 3.254 af (98% of inflow)
Center-of-Mass det. time= 75.5 min (891.5 - 816.0)

Volume	Invert	Avail.Storage	Storage Description
#1	792.00'	23,675 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
792.00	1,977	0	0
793.00	3,138	2,558	2,558
794.00	4,415	3,777	6,334
795.00	7,275	5,845	12,179
796.50	8,053	11,496	23,675

Device	Routing	Invert	Outlet Devices
#1	Primary	793.00'	18.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 793.00' / 793.00' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	793.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	795.40'	36.0" x 36.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#4	Secondary	795.80'	15.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 2.00 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

Primary OutFlow Max=22.69 cfs @ 12.25 hrs HW=795.83' TW=794.05' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 22.69 cfs @ 6.42 fps)
↑ **2=Orifice/Grate** (Passes < 1.26 cfs potential flow)
↑ **3=Orifice/Grate** (Passes < 21.86 cfs potential flow)

Secondary OutFlow Max=18.46 cfs @ 12.49 hrs HW=796.20' TW=795.83' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 18.46 cfs @ 1.56 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD

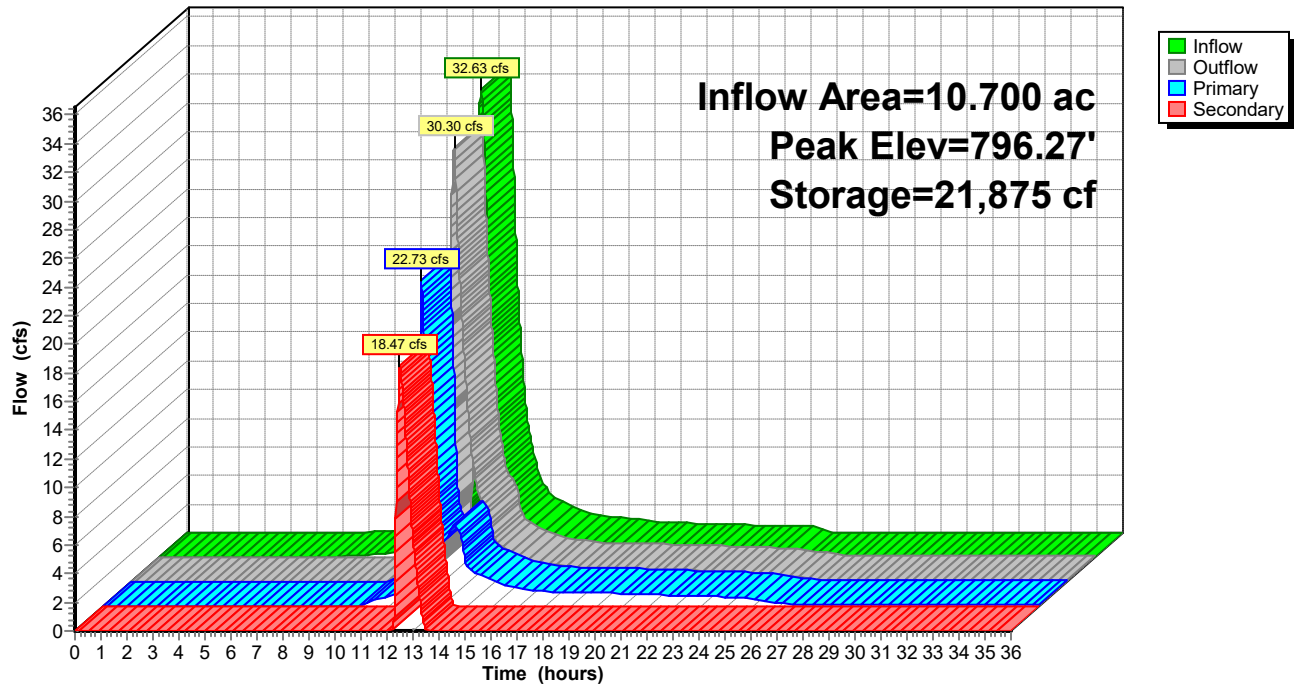
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 180

Pond SB1: SED 1

Hydrograph



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 181

Summary for Pond SB2: SED 2

Inflow Area = 2.700 ac, 28.52% Impervious, Inflow Depth = 3.64" for 100-Year event
Inflow = 9.04 cfs @ 12.31 hrs, Volume= 0.818 af
Outflow = 8.19 cfs @ 12.27 hrs, Volume= 0.818 af, Atten= 9%, Lag= 0.0 min
Primary = 8.19 cfs @ 12.27 hrs, Volume= 0.762 af
Routed to Pond P3 : POND 3
Secondary = 2.31 cfs @ 12.44 hrs, Volume= 0.056 af
Routed to Pond P3 : POND 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 797.24' @ 12.46 hrs Surf.Area= 2,773 sf Storage= 3,506 cf

Plug-Flow detention time= 31.7 min calculated for 0.818 af (100% of inflow)
Center-of-Mass det. time= 31.6 min (844.6 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	795.00'	4,264 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
795.00	428	0	0
796.00	1,411	920	920
797.00	2,494	1,953	2,872
797.50	3,074	1,392	4,264

Device	Routing	Invert	Outlet Devices
#1	Primary	795.00'	24.0" Round Culvert L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 795.00' / 795.00' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	795.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	796.65'	36.0" x 36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Secondary	797.00'	10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=8.16 cfs @ 12.27 hrs HW=796.99' TW=796.67' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 8.16 cfs of 8.47 cfs potential flow)
↑ **2=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.70 fps)
↑ **3=Orifice/Grate** (Weir Controls 7.63 cfs @ 1.89 fps)

Secondary OutFlow Max=2.31 cfs @ 12.44 hrs HW=797.24' TW=797.13' (Dynamic Tailwater)

↑ **4=Broad-Crested Rectangular Weir** (Weir Controls 2.31 cfs @ 0.97 fps)

Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

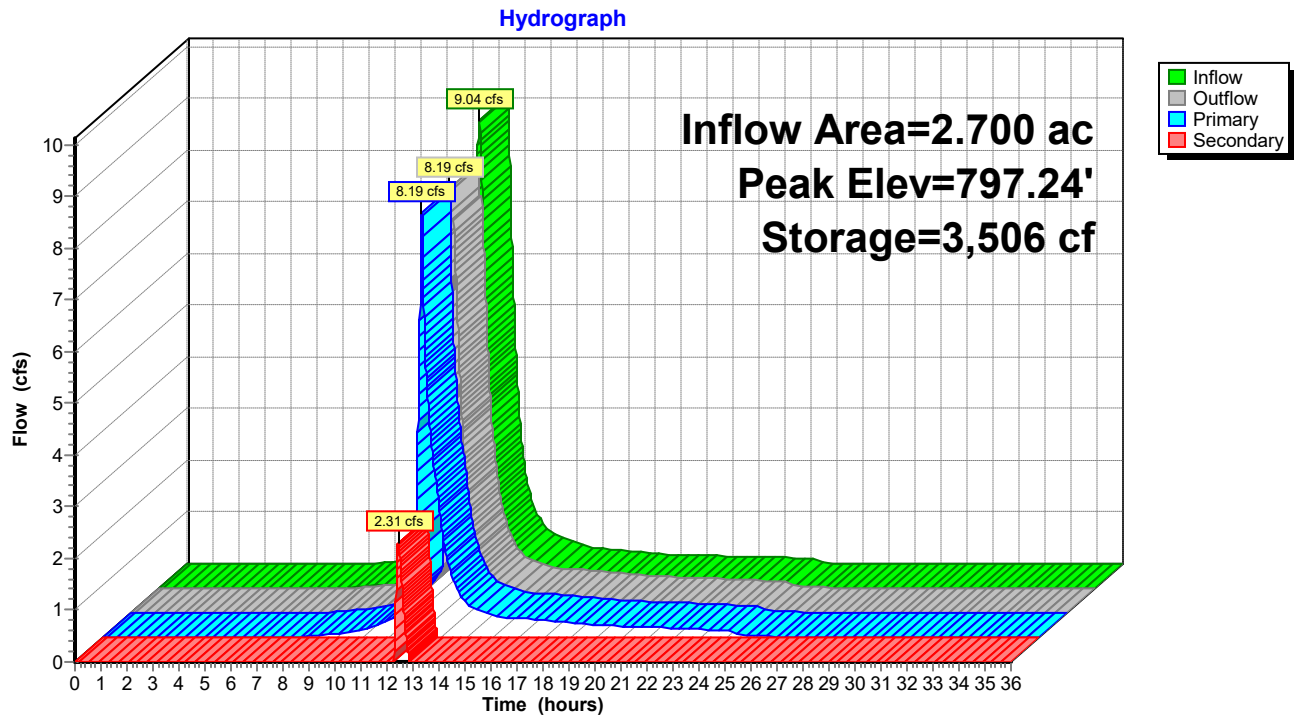
Waterchase Sub. Post Cond. HydroCAD

NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

Page 182

Pond SB2: SED 2



Waterchase Sub Proposed

Prepared by DDS Engineering & Surveying LLP

HydroCAD® 10.20-2h s/n 02431 © 2024 HydroCAD Software Solutions LLC

Waterchase Sub. Post Cond. HydroCAD
NRCC 24-hr A 100-Year Rainfall=5.29"

Printed 6/24/2025

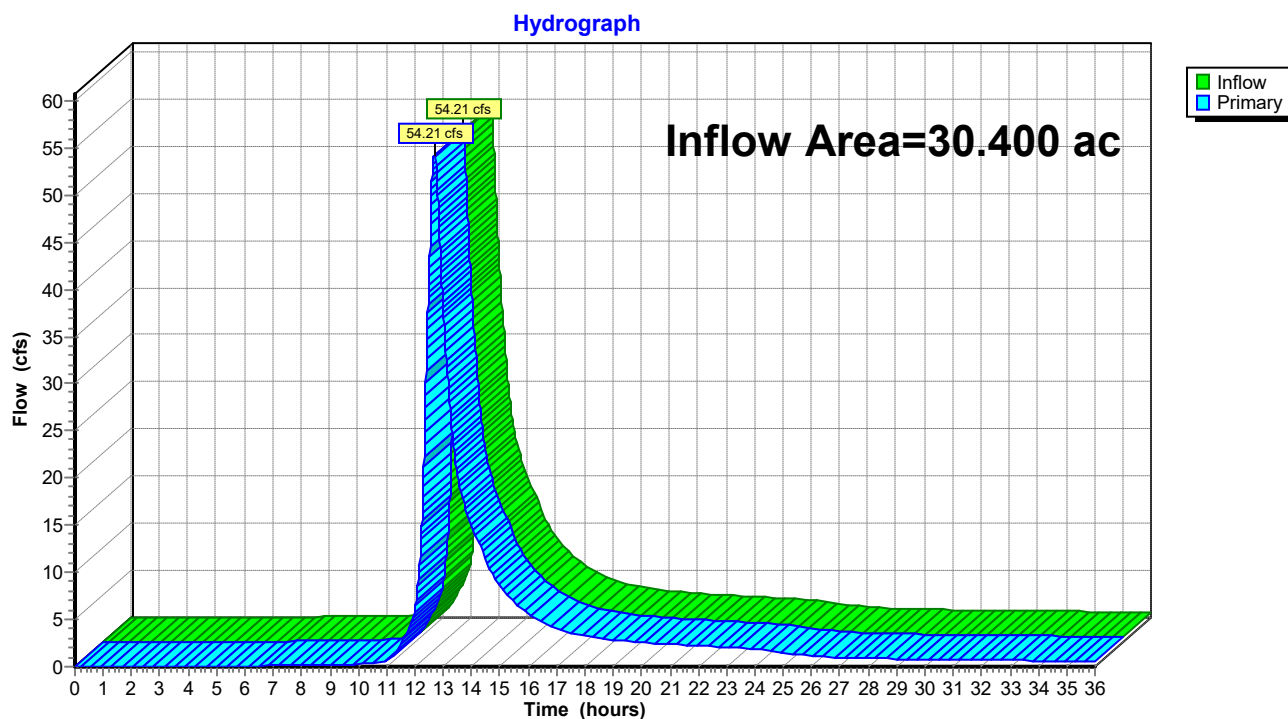
Page 183

Summary for Link 9L: TOTAL SITE RUNNOFF

Inflow Area = 30.400 ac, 35.23% Impervious, Inflow Depth > 3.64" for 100-Year event
Inflow = 54.21 cfs @ 12.68 hrs, Volume= 9.222 af
Primary = 54.21 cfs @ 12.68 hrs, Volume= 9.222 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 9L: TOTAL SITE RUNNOFF



APPENDIX G – CPV, Q10, AND QF CALCULATIONS

STORMWATER SUMMARY

Project Name:	Waterchase Subdivision	Values taken from HydroCAD™ model.
Project Location:	North Road Canandaigua	
Project Area:	30.40 acres	
Total Drainage Area:	30.40 acres	
Impervious Area (I) %:	34.00%	
	10.32	Impervious Area to Treat (AC)

1 Year Channel Protection Volume

$$Cp_v = V_r(V_s/V_r)$$

Contributing A= 30.40

$V_r = 1.89$ Runoff Volume (VR was taken from HydroCAD™ Model of runoff from post-construction, no controls)

$qu = 515$ Unit Peak Discharge Equation

$q_o/q_i = 0.040$ Figure B.1 of NYS Stormwater Management Design Manual

$Q_d = 0.77$ Runoff inches (no controls)

$V_s/V_r = 0.63$ Storage Ratio :

$$\frac{V_s}{V_r} = 0.682 - 1.43 \left(\frac{q_o}{q_i} \right) + 1.64 \left(\frac{q_o}{q_i} \right)^2 - 0.804 \left(\frac{q_o}{q_i} \right)^3 =$$

$$Cp_v = \frac{\left(\frac{V_s}{V_r} \right) * Q_d * A}{12} :$$

$Cp_v = 1.224$ ac-ft

Stormwater Detention - 10 Year Storm - Overbank Flood Control

$$Q_{p10} = V_r(V_s/V_r)$$

$$\frac{q_o}{q_i} = \frac{\text{pre-developed runoff}}{\text{post-developed runoff}}$$

10 yr $Q_{PRE} = 22.57$

10 yr $Q_{DEV} = 44.81$ (No Controls)

$q_o/q_i = 0.50$ (Pre-Developed CFS/Post Dev CFS)

$V_r = 4.517$ Runoff Volume (VR was taken from HydroCAD™ Model of runoff from post-construction conditions, no controls)

$V_s/V_r = 0.28$ (From NYSDEC Manual, Figure 8.6) Use equation as q_o/q_i approaches limits of graph.

$$\frac{V_s}{V_r} = 0.682 - 1.43 \left(\frac{q_o}{q_i} \right) + 1.64 \left(\frac{q_o}{q_i} \right)^2 - 0.804 \left(\frac{q_o}{q_i} \right)^3 =$$

$$Vs = \left(\frac{Vs}{Vr} \right) \times (Vr) :$$

$Q_{p10} = 1.242$ ac-ft

Stormwater Detention - 100 Year Storm - Extreme Flood Control

$$Q_{p100} = V_r(V_s/V_r)$$

$$\frac{q_o}{q_i} = \frac{\text{pre-developed runoff}}{\text{post-developed runoff}}$$

100 yr $Q_{PRE} = 58.56$

100 yr $Q_{DEV} = 92.71$ (No Controls)

$q_o/q_i = 0.63$ (Pre-Developed CFS/Post Dev CFS)

$V_r = 9.47$ Runoff Volume (VR was taken from HydroCAD Model of runoff from post-construction conditions)

$V_s/V_r = 0.23$ (From NYSDEC Manual, Figure 8.6) Use equation as q_o/q_i exceeds limits of graph.

$$\frac{V_s}{V_r} = 0.682 - 1.43 \left(\frac{q_o}{q_i} \right) + 1.64 \left(\frac{q_o}{q_i} \right)^2 - 0.804 \left(\frac{q_o}{q_i} \right)^3 =$$

$$Vs = \left(\frac{Vs}{Vr} \right) \times (Vr) :$$

$Q_{p100} = 2.182$ ac-ft

**APPENDIX H – NYSDEC GENERAL PERMIT FOR
STORMWATER DISCHARGES (GP-0-25-001)**



Department of
Environmental
Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL
CONSERVATION (NYSDEC)

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-25-001

Construction General Permit (CGP)

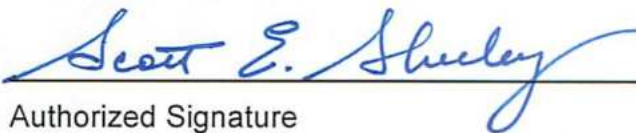
Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2025

Expiration Date: January 28, 2030

Scott E. Sheeley

Chief Permit Administrator

A handwritten signature in blue ink, reading "Scott E. Sheeley". The signature is written over a horizontal line.

Authorized Signature

JAN. 29, 2025

Date

Address: NYSDEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act (CWA), and 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), *stormwater discharges* from certain *construction activities* are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York State administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7 and 8, and Article 70, as well as 6 NYCRR Parts 621 and 750.

Construction activities constitute construction of a *point source* and, therefore, pursuant to ECL sections 17-0505, 17-0701, and 17-0803, the *owner or operator* must have coverage under a SPDES permit prior to *commencement of construction activities*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES CONSTRUCTION GENERAL PERMIT (CGP) GP-0-25-001
FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES**

Table of Contents

Part I. How to Obtain Coverage and General Requirements	5
A. Eligibility Requirements	5
B. Types of <i>Discharges</i> Authorized	9
C. Prohibited <i>Discharges</i>	10
D. Electronic Notice of Intent (eNOI) Submittal.....	10
E. General Requirements for <i>Owners or Operators</i> with Permit Coverage	14
F. Permit Coverage for <i>Discharges</i> Authorized Under GP-0-20-001	18
G. Change of <i>Owner or Operator</i>	19
Part II. Water Quality-Based Effluent Limitations	20
A. Maintaining Water Quality	20
B. Effluent Limitations Applicable to <i>Discharges</i> from <i>Construction Activities</i>	20
C. Post-Construction Stormwater Management Practice (SMP) Requirements ...	23
Part III. Stormwater Pollution Prevention Plan (SWPPP)	28
A. General SWPPP Requirements	28
B. Required SWPPP Contents	32
C. Required SWPPP Components by Project Type.....	37
Part IV. Inspection and Maintenance Requirements	37
A. General Construction Site Inspection and Maintenance Requirements	37
B. Contractor Maintenance Inspection Requirements	37
C. <i>Qualified Inspector</i> Inspection Requirements.....	38
Part V. How to Terminate CGP Coverage.....	43
A. Electronic Notice of Termination (eNOT) Submittal.....	43
Part VI. Record Retention and Reporting.....	45
A. Record Retention	46
B. Reporting	46
Part VII. Standard Permit Requirements	46
A. Duty to Comply.....	46
B. Need to Halt or Reduce Activity Not a Defense.....	46
C. Penalties	46
D. False Statements	47
E. Re-Opener Clause	47
F. Duty to Mitigate	47
G. Requiring Another General Permit or Individual SPDES Permit.....	47
H. Duty to Provide Information.....	49
I. Extension	49
J. Signatories and Certification	50
K. Inspection and Entry	52
L. Confidentiality of Information.....	53
M. Other Permits May Be Required	53

N.	NYSDEC Orders or Civil Decrees/Judgments.....	53
O.	Property Rights	53
P.	Compliance with Interstate Standards.....	53
Q.	Oil and Hazardous Substance Liability.....	54
R.	Severability.....	54
S.	NYSDEC Approved Forms.....	54
APPENDIX A – Abbreviations and Definitions.....		55
	Abbreviations.....	55
	Definitions.....	56
APPENDIX B – Required SWPPP Components by Project Type.....		64
	Table 1.....	64
	Table 2.....	66
APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal.....		68
APPENDIX D – Impaired Waterbodies (by Construction Related Pollutants)		74
APPENDIX E – List of NYSDEC Regional Offices.....		80
APPENDIX F – SWPPP Preparer Certification Form		81
APPENDIX G – MS4 SWPPP Acceptance Form.....		83
APPENDIX H – NYCDEP SWPPP Acceptance/Approval Form		86
APPENDIX I – MS4 No Jurisdiction Form.....		89
APPENDIX J – Owner/Operator Certification Form		91

Part I. How to Obtain Coverage and General Requirements

To be covered under this permit, the *owner or operator* must meet all eligibility requirements in Part I.A. and follow the requirements for obtaining permit coverage in Part I.D., F., or G.

A. Eligibility Requirements

For a *common plan of development or sale*, the *phase(s)* that meet the eligibility requirements in Part I.A. may obtain coverage under this permit even if other *phase(s)* of the same *common plan of development or sale* do not meet the eligibility requirements and require an individual SPDES permit.

1. The *owner's or operator's construction activities* involve soil disturbances of:
 - a. one or more acres; or
 - b. less than one acre which are part of a *common plan of development or sale* that will ultimately disturb one or more acres; or
 - c. less than one acre where NYSDEC has determined that a SPDES permit is required for *stormwater discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of pollutants to *surface waters of the State*.
 - i. 5,000 square feet or more, but less than one acre, and are in the New York City Watershed located east of the Hudson River, Appendix C Figure 1; or
 - ii. 20,000 square feet or more, but less than one acre, within the municipal boundaries of the City of New York (NYC); or
 - iii. less than 20,000 square feet which are part of a *common plan of development or sale* that will ultimately disturb 20,000 square feet or more, but less than one acre, within the municipal boundaries of NYC; or
 - iv. that creates 5,000 square feet or more of *impervious area* within the municipal boundaries of NYC.

2. *Discharges from the owner's or operator's construction activities* are/were not:

- a. already covered by a different SPDES permit; or
- b. covered under a different SPDES permit that was denied, terminated, or revoked; or
- c. identified in an expired individual SPDES permit that was not renewed; or
- d. required to obtain an individual SPDES permit or another general SPDES permit in accordance with Part VII.K.

3. If *construction activities* may adversely affect a species that is endangered or threatened, the *owner or operator* must obtain a:

- a. permit issued pursuant to 6 NYCRR Part 182 for the project; or
- b. letter issued by NYSDEC of non-jurisdiction pursuant to 6 NYCRR Part 182 for the project.

4. If *construction activities* have the potential to affect an *historic property*, the *owner or operator* must obtain one of the following:

- a. documentation that the *construction activity* is not within an archeological buffer area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:
 - i. 1-5 acres of disturbance - 20 feet; or
 - ii. 5-20 acres of disturbance - 50 feet; or

- iii. 20+ acres of disturbance - 100 feet.
- b. NYSDEC consultation form sent to OPRHP,¹ and copied to NYSDEC's Agency Historic Preservation Officer (APO), and
 - i. the State Environmental Quality Review Act (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
 - ii. documentation from OPRHP that the *construction activity* will result in No Impact; or
 - iii. documentation from OPRHP providing a determination of No Adverse Impact; or
 - iv. a Letter of Resolution signed by the *owner or operator*, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA).
- c. documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
 - i. No Affect; or
 - ii. No Adverse Affect; or
 - iii. Executed Memorandum of Agreement.
- d. documentation that SHPA Section 14.09 has been completed by NYSDEC or another state agency.
- 5. If *construction activities* are subject to SEQR, the *owner or operator* must obtain documentation that SEQR has been satisfied.
- 6. If *construction activities* are not subject to SEQR, but subject to the equivalent environmental review from another New York State or federal agency, the

¹ The consultation form can be submitted, along with other project information, through OPRHP's Cultural Resource Information System (CRIS) portal. If submitted through CRIS, paper copies of the consultation form need not be mailed.

Part I.A.6.

owner or operator must obtain documentation that project review, pursuant to a process equivalent to SEQR from another New York State or federal agency, has been satisfied.

7. If *construction activities* require Uniform Procedures Act (UPA) Permits (see 6 NYCRR Part 621) from NYSDEC, or the equivalent from another New York State or federal agency, the *owner or operator* must:

- a. obtain all such necessary permits; or
- b. receive notification from NYSDEC pursuant to 6 NYCRR 621.3(a)(4) excepting Part I.A.7.a.

8. *Construction activities* are not eligible if they meet the following criteria in Part I.A.8.a. or b.:

- a. For linear transportation and linear utility project types, the *construction activities*:
 - i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and
 - ii. are undertaken on land with no existing *impervious cover*; and
 - iii. disturb two or more acres of *steep slope*.
- b. For all other project types, the *construction activities*:
 - i. are within the watershed of *surface waters of the State* classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website; and
 - ii. are undertaken on land with no existing *impervious cover*; and
 - iii. disturb one or more acres of *steep slope*.

B. Types of *Discharges* Authorized

1. The following *stormwater discharges* are authorized under this permit:
 - a. *Stormwater discharges*, including *stormwater* runoff, snowmelt runoff, and surface runoff and drainage, associated with *construction activity*, are authorized under this permit provided that appropriate *stormwater* controls are designed, installed, and maintained in accordance with Part II. and Part III.
 - b. *Stormwater discharges* from construction support activities at the *construction site* (including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) if the following requirements are met:
 - i. The support activity is directly related to the *construction site* required to have permit coverage for *stormwater discharges*; and
 - ii. The support activity is not a commercial operation, nor does it serve multiple unrelated *construction sites*; and
 - iii. The support activity does not continue to operate beyond the completion of the *construction activity* at the site it supports; and
 - iv. *Stormwater* controls are implemented in accordance with Part II. and Part III. for *discharges* from the support activity areas.
2. The following non-*stormwater discharges* associated with *construction activity* are authorized under this permit:
 - a. Non-*stormwater discharges* listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: “*Discharges* from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned”; and
 - b. Non-*stormwater discharges* of waters to which other components have not been added that are used in accordance with the *SWPPP* to control dust or irrigate vegetation in stabilized areas; and
 - c. Uncontaminated *discharges* from *dewatering* operations

3. Authorized *discharges of stormwater* or authorized *discharges* of non-*stormwater*, commingled with a *discharge* authorized by a different SPDES permit and/or a *discharge* that does not require SPDES permit authorization, are also authorized under this permit.

C. Prohibited *Discharges*

1. Non-*stormwater discharges* prohibited under this permit include but are not limited to:
 - a. Wastewater from washout of concrete; and
 - b. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and
 - c. Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance; and
 - d. Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and
 - e. Toxic or hazardous substances from a spill or other release.

D. Electronic Notice of Intent (eNOI) Submittal

To receive authorization in accordance with Part I.D.3.b., the *owner or operator* must submit a complete eNOI in accordance with the requirements in Part I.D. The eNOI contains questions to: ensure eligibility requirements in Part I.A. have been met; obtain *owner or operator* contact information; obtain the total area to be disturbed and the existing/future *impervious areas* (rounded to the nearest tenth of an acre); confirm *Traditional Land Use Control MS4 Operator* jurisdiction over construction projects; satisfy the EPA eRule requirements; confirm that the Water Quality-Based Effluent Limitations in Part II. have been met; demonstrate consideration of the future risks due to climate change in accordance with Part III.A.2.; and confirm that the other *Stormwater Pollution Prevention Plan (SWPPP)* requirements in Part III. have been met.

1. An eNOI may be submitted for:
 - a. *construction activities* that are not part of a *common plan of development or sale*; or

- b. an entire *common plan of development or sale*; or
 - c. separate *phase(s)* of a *common plan of development or sale* if the following requirements are met:
 - i. the *common plan of development or sale* meets the eligibility requirements of Part I.A.5. or 6.; and
 - ii. the *phase(s)* meet(s) all other eligibility requirements of Part I.A.; and
 - iii. Part III.C. Required *SWPPP* Components by Project Type is based on the *common plan of development or sale*, not the *phase(s)*; or
 - d. *tree clearing* that is associated with, or will support, a *renewable energy* generation, transmission, or storage project that meets Part I.A.5. and 6., if the *tree clearing*:
 - i. meets all other eligibility requirements of Part I.A.; and
 - ii. will occur in NYSDEC's Regions 3-9; and
 - iii. is not within ¼ mile of a bat hibernaculum protected pursuant to 6 NYCRR Part 182; and
 - iv. will occur between November 1st and March 31st.
2. As prerequisites for submitting an eNOI, the *owner or operator* must:
- a. prepare a *SWPPP* for Part I.D.1.a., b., c., or d. in accordance with Part III.; and
 - b. based on the following criteria, upload the following signature forms signed in accordance with Part VII.J. to the eNOI prior to submission:
 - i. for all eNOIs:
 - 1. the *SWPPP* Preparer Certification Form, Appendix F, signed by the *SWPPP* preparer; and

2. the Owner/Operator Certification Form, Appendix J, signed by the *owner or operator*; and
- ii. if an eNOI includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that will *discharge* to the *MS4(s)*:
 1. determine if the *Traditional Land Use Control MS4 Operator(s)* have review authority. A *Traditional Land Use Control MS4 Operator* does not have review authority where:
 - a. the *owner or operator* of the *construction activities* in Part I.D.2.b.ii. is the same entity as the *Traditional Land Use Control MS4 Operator* identified in Part I.D.2.b.ii.; or
 - b. there is a statute exempting the *owner or operator* from zoning review by the *Traditional Land Use Control MS4 Operator*; or
 - c. there is no such statute per Part I.D.2.b.ii.1.b., the *Traditional Land Use Control MS4 Operator* concludes, after public hearing, that it does not have zoning review authority in accordance with Legal Memorandum LU14 Updated January 2020 “Governmental Immunity from Zoning and Other Legislation”; and
 2. if the *Traditional Land Use Control MS4 Operator(s)* have review authority, submit the *SWPPP* to the *Traditional Land Use Control MS4 Operator(s)* for review and have:
 - a. if outside the municipal boundaries of NYC: the *MS4 SWPPP Acceptance Form*, Appendix G, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator*, or by a duly authorized representative of that person in accordance with Part VII.J.2.; or

- b. if within the municipal boundaries of NYC: The City of New York Department of Environmental Protection (NYCDEP) SWPPP Acceptance/Approval Form, Appendix H, signed by the principal executive officer or ranking elected official from the Traditional Land Use Control MS4 Operator, or by a duly authorized representative of that person in accordance with Part VII.J.2.; and
 - 3. if the *Traditional Land Use Control MS4 Operator* does not have review authority, have the MS4 No Jurisdiction Form, Appendix I, signed by the principal executive officer or ranking elected official from the *Traditional Land Use Control MS4 Operator*, or by a duly authorized representative of that person in accordance with Part VII.J.2.
3. Submitting an eNOI:
- a. The *owner or operator* must submit a complete Notice of Intent electronically using a NYSDEC approved form.²
 - b. The *owner or operator* is authorized to *commence construction activity* as of the authorization date indicated in the Letter of Authorization (LOA), which is sent by NYSDEC after a complete eNOI is submitted.
 - i. If an eNOI is received for a *SWPPP* that deviates from one of the technical standards but demonstrates *equivalence* in accordance with Part III.B.1.a.ii. or Part III.B.2.b.ii., if the *SWPPP* includes *construction activities* that are not within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)*, and/or if the *SWPPP* includes *construction activities* within the municipal boundary(ies) of *Traditional Land Use Control MS4 Operator(s)* that do not have review authority in accordance with Part I.D.2.b.ii.1., the authorization date indicated in the LOA will be 60 business days after the eNOI submission date.

² Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

- c. If *Traditional Land Use Control MS4 Operator(s)* have review authority in accordance with Part I.D.2.b.ii.2., the *owner or operator* must, within five business days of receipt of the LOA, send an electronic copy of the LOA to the *Traditional Land Use Control MS4 Operator(s)* with review authority.

E. General Requirements for Owners or Operators with Permit Coverage

1. As of the date the LOA is received, the *owner or operator* must make the eNOI, *SWPPP*, and LOA available for review and copying in accordance with the requirements in Part VII.H. When applicable, as of the date an updated LOA is received, the *owner or operator* must make the updated LOA available for review and copying in accordance with the requirements in Part VII.H.
2. The *owner or operator* must ensure compliance with all requirements of this permit and that the provisions of the *SWPPP*, including any changes made to the *SWPPP* in accordance with Part III.A.5., are properly implemented and maintained from the *commencement of construction activity* until:
 - a. all areas of disturbance have achieved *final stabilization*; and
 - b. the owner's or operator's coverage under this permit is terminated in accordance with Part V.A.5.a.
3. As of the date of the *commencement of construction activities* until Part I.E.2.a. and b. have been met, the *owner or operator* must maintain at the *construction site*, a copy of:
 - a. all documentation necessary to demonstrate eligibility with this permit; and
 - b. this permit; and
 - c. the *SWPPP*; and
 - d. the signed *SWPPP Preparer Certification Form*; and
 - e. the signed *MS4 SWPPP Acceptance Form* or signed *NYCDEP SWPPP Acceptance/Approval Form* or signed *MS4 No Jurisdiction Form* (when applicable); and
 - f. the signed *Owner/Operator Certification Form*; and

- g. the eNOI; and
 - h. the LOA; and
 - i. the LOA transmittal to the Traditional Land Use Control MS4 Operator in accordance with Part I.D.3.c. (when applicable).
4. The *owner or operator* must maintain at the *construction site*, until Part I.E.2.a. and b. have been met, as of the date the documents become final or are received, a copy of the:
- a. responsible contractor's or subcontractor's certification statement(s) in accordance with Part III.A.7.; and
 - b. inspection reports in accordance with Part IV.C.4. and 6.; and
 - c. Request to Disturb Greater Than Five Acres and the Authorization Letter to Disturb Greater Than Five Acres in accordance with Part I.E.6. (when applicable); and
 - d. Request to Continue Coverage and the Letter of Continued Coverage (LOCC) in accordance with Part I.F.2. and 4. (when applicable); and
 - e. The updated LOA(s) in accordance with Part I.E.9. (when applicable).
5. The *owner or operator* must maintain the documents in Part I.E.3. and 4. in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection. The documents must be paper documents unless electronic documents are accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be. If electronic documents are kept on site, the *owner or operator* must maintain functional equipment on site available to an inspector during normal hours of operation such that an inspector may view the electronic documents in a format that can be read in a similar manner as a paper record and in a legally dependable format with no less evidentiary value than their paper equivalent.
6. The *owner or operator* must meet the following requirements prior to disturbing greater than five acres of soil at any one time:
- a. The *owner or operator* must submit a written Request to Disturb Greater Than Five Acres to:

Part I.E.6.a.i.

- i. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, if a *Traditional Land Use Control MS4 Operator* does not have review authority in accordance with Part I.D.2.b.ii.1.; or
 - ii. the *Traditional Land Use Control MS4 Operator*, if a *Traditional Land Use Control MS4 Operator* has review authority in accordance with Part I.D.2.b.ii.1.; or
 - iii. NYSDEC's Regional Office Division of Water staff based on the project location, Appendix E, and each involved *Traditional Land Use Control MS4 Operator*, if the project spans multiple municipalities with more than one *Traditional Land Use Control MS4 Operator* involved with review authority in accordance with Part I.D.2.b.ii.1.
- b. The written Request to Disturb Greater Than Five Acres must include:
- i. The SPDES permit identification number (Permit ID); and
 - ii. Full technical justification demonstrating why alternative methods of construction that would result in five acres of soil disturbance or less at any one time are not feasible; and
 - iii. The phasing plan for the project and sequencing plans for all *phases* from the *SWPPP* in accordance with Part III.B.1.d.; and
 - iv. Plans with locations and details of erosion and sediment control practices such that the heightened concern for erosion when disturbing greater than five acres at one time has been addressed; and
 - v. Acknowledgment that "the *owner or operator* will comply with the requirements in Part IV.C.2.b."; and
 - vi. Acknowledgment that "the *owner or operator* will comply with the requirements in Part II.B.1.b."
- c. The *owner or operator* must be in receipt of an Authorization Letter to Disturb Greater Than Five Acres, which will include when the

authorization begins and ends and indicate a maximum area (acres) of soil disturbance allowed at any one time, from:

- i. NYSDEC, if Part I.E.6.a.i. or iii. apply; or
 - ii. the *Traditional Land Use Control MS4 Operator*, if Part I.E.6.a.ii. applies.
7. Upon a finding of significant non-compliance with the practices described in the *SWPPP* or violation of this permit, NYSDEC may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order must be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.
8. If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE).³ *Construction activity* shall not resume until written permission to do so has been received from the RWE.
9. To be authorized to implement modifications to the information previously submitted in the eNOI, the *owner or operator* must:
 - a. notify NYSDEC via email at Stormwater_info@dec.ny.gov requesting access to update the eNOI; and
 - b. update the eNOI to reflect the modifications and resubmit the eNOI in accordance with Part I.D.; and
 - c. receive an updated LOA.
10. The eNOI, *SWPPP*, LOA, updated LOAs (when applicable), and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

³ The Regional Water Manager where a DEC Region does not have a RWE.

F. Permit Coverage for *Discharges* Authorized Under GP-0-20-001

When applicable:

1. Upon the effective date of this permit, an *owner or operator* of a *construction activity*, with coverage under GP-0-20-001, will have interim coverage under GP-0-25-001 for 45 calendar days starting on the effective date of GP-0-25-001 so long as the *owner or operator* maintains compliance with all applicable requirements of this permit.
2. Within 30 calendar days of the effective date of this permit, the *owner or operator*, with coverage under GP-0-20-001, must submit a complete Request to Continue Coverage electronically using a NYSDEC approved form,⁴ which contains the information identified in Part I.F.3. below, if:
 - a. the *owner or operator* continues to implement the SMP component in conformance with the technical standards in place at the time of initial project authorization; and
 - b. the *owner or operator* will comply with all non-design requirements of GP-0-25-001.
3. The Request to Continue Coverage form contains questions to: ensure eligibility requirements in Part I.A. have been met; verify *owner or operator* contact information; verify the permit identification number; verify the original eNOI submission ID, if applicable; verify Part I.F.2.a. and b.; verify the version of the Design Manual that the technical/design components conform to; and receive an updated Owner/Operator Certification Form, Appendix I.
4. The *owner or operator* has obtained continued coverage under GP-0-25-001 as of the date indicated in the LOCC, which is sent by NYSDEC after a complete Request to Continue Coverage form is submitted.
5. If the owner or operator does not submit the Request to Continue Coverage form in accordance with Part I.F.2. and 3., coverage under this permit is automatically terminated after interim coverage expires.

⁴ Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

G. Change of *Owner or Operator*

When applicable:

1. When property ownership changes, or when there is a change in operational control over the construction plans and specifications, the following process applies:
 - a. The new *owner or operator* must meet the applicable prerequisites for submitting an eNOI in accordance with Part I.D.2.; and
 - b. The new *owner or operator* must submit an eNOI in accordance with Part I.D.3.; and
 - c. Permit coverage for the new *owner or operator* will be effective upon receipt of the LOA in accordance with Part I.D.3.b.; and
 - d. The new *owner or operator*, upon receipt of their LOA, must provide their Permit ID to the original *owner or operator*; and
 - e. If the original *owner or operator* will no longer be the *owner or operator* of the *construction activity* identified in the original *owner's or operator's* eNOI, the original *owner or operator*, upon receipt of the new *owner's or operator's* Permit ID in accordance with Part I.G.1.d., must submit to NYSDEC a completed eNOT in accordance with Part V. that includes the name and Permit ID of the new *owner or operator*; or
 - f. If the original *owner or operator* maintains ownership of a portion of the *construction activity*, the original *owner or operator* must maintain their coverage under the permit by modifying their eNOI; modifications to the eNOI must include:
 - i. the revised area of disturbance and/or *impervious area(s)*; and
 - ii. the revised SMP information, if applicable; and
 - iii. a narrative description of what has changed; and
 - iv. the new *owner's or operator's* Permit ID for the portion of the project removed from the eNOI.

Owners or operators must follow Part I.E.9. to modify the eNOI.

Part II. Water Quality-Based Effluent Limitations

A. Maintaining Water Quality

NYSDEC expects that compliance with the requirements of this permit will control *discharges* necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any *discharge* to either cause or contribute to a violation of the following *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York:

1. There must be no increase in turbidity that will cause a substantial visible contrast to natural conditions; and
2. There must be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and
3. There must be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the *stormwater discharges* authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standard*, the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this permit and document in accordance with Part IV.C.4. of this permit. To address the *water quality standard* violation the *owner or operator* must include and implement appropriate controls in the *SWPPP* to correct the problem or obtain an individual SPDES permit.

If, despite compliance with the requirements of this permit, it is demonstrated that the *stormwater discharges* authorized by this permit are causing or contributing to a violation of *water quality standards*, or if NYSDEC determines that a modification of this permit is necessary to prevent a violation of *water quality standards*, the authorized *discharges* will no longer be eligible for coverage under this permit, and the *owner or operator* must obtain an individual SPDES permit prior to further *discharges* from the *construction site*.

B. Effluent Limitations Applicable to *Discharges* from *Construction Activities*

Discharges authorized by this permit must achieve, at a minimum, the effluent limitations in Part II.B.1.a., b., c., d., and e. These limitations represent the

degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement, and maintain control measures to *minimize* the *discharge of pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part II.B.1.a., b., c., d., and e. and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (BB), dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in *SWPPP* the reason(s) for the deviation, or alternative design, and provide information in the *SWPPP* demonstrating that the deviation or alternative design is *equivalent* to the technical standard.

- a. **Erosion and Sediment Controls.** At a minimum, erosion and sediment controls must be selected, designed, installed, implemented, and maintained to:
 - i. *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*; and
 - ii. Control *stormwater discharges*, including both peak flow rates and total *stormwater* volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points; and
 - iii. *Minimize* the amount of soil exposed during *construction activity*; and
 - iv. *Minimize* the disturbance of *steep slope*; and
 - v. *Minimize* sediment *discharges* from the site; and
 - vi. Provide and maintain *natural buffers* around surface waters, direct *stormwater* to vegetated areas and maximize *stormwater* infiltration to reduce *pollutant discharges*, unless *infeasible*; and
 - vii. *Minimize* soil compaction. *Minimizing* soil compaction is not required

where the intended function of a specific area of the site dictates that it be compacted; and

- viii. Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and
 - ix. *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of *pollutants* that could be discharged from the site.
- b. **Soil Stabilization.** In areas where soil disturbance activity has ceased, whether permanently or *temporarily ceased*, the application of soil stabilization measures must be initiated by the end of the next business day and completed within 14 calendar days from the date the current soil disturbance activity ceased. For *construction sites* that *directly discharge* to one of the 303(d) segments listed in Appendix D, or are located in one of the watersheds listed in Appendix C, or are authorized to disturb greater than five acres in accordance with Part I.E.5.a.viii., the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven calendar days from the date the soil disturbance activity ceased.
- c. **Dewatering.** *Discharges* from *dewatering* activities, including *discharges* from *dewatering* of trenches and excavations, must be managed by appropriate control measures.
- d. **Pollution Prevention Measures.** Select, design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge of pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be selected, designed, installed, implemented, and maintained to:
- i. *Minimize* the *discharge of pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. Soaps, detergents and solvents cannot be used; and
 - ii. *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation

and to *stormwater*. *Minimization* of exposure is not required in cases where the exposure to precipitation and to *stormwater* will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of *stormwater* contamination (such as final products and materials intended for outdoor use); and

- iii. Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.
- e. **Surface Outlets.** When discharging from basins and impoundments, the surface outlets must be designed, constructed, and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-Construction Stormwater Management Practice (SMP) Requirements

- 1. The *owner or operator* of a *construction activity* that requires post-construction SMPs, in accordance with Part III.C., must select, design, install, implement, and maintain the SMPs to meet the *performance criteria* in the New York State Stormwater Management Design Manual, dated July 31, 2024 (DM), using sound engineering judgment. Where SMPs are not designed in conformance with the *performance criteria* in the DM, the *owner or operator* must include in the *SWPPP* the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.
- 2. The *owner or operator* of a *construction activity*, that requires SMPs in accordance with Part III.C., must design the practices to meet the applicable *sizing criteria* in Part II.C.2.a., b., c., or d.

a. Sizing Criteria for New Development

- i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):
 - 1. Reduce the total WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv must be calculated in accordance with the criteria in Section 4.2 of the DM; or

2. Minimum RRV and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the requirements in Part II.C.2.a.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRV capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRV capacity, the *SWPPP* must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRV as calculated using the criteria in Section 4.4 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

- ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:
 1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or
 2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs without detention or velocity controls; or
 3. The site *directly discharges* into a fifth order or larger water body (stream, river, or lake), or tidal waters, where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.

- iii. **Overbank Flood Control Criteria (Qp):** Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
 - 1. the site *directly discharges* to tidal waters or fifth order or larger streams, or
 - 2. A downstream analysis reveals that *overbank* control is not required.
- iv. **Extreme Flood Control Criteria (Qf):** Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
 - 1. the site *directly discharges* to tidal waters or fifth order or larger streams, or
 - 2. A downstream analysis reveals that *overbank* control is not required.

b. Sizing Criteria for New Development in Enhanced Phosphorus Removal Watersheds

- i. Runoff Reduction Volume (RRv) and Water Quality Volume (WQv):
 - 1. Reduce the WQv by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24-hour design storm over the post-developed watershed and must be calculated in accordance with the criteria in Section 4.3 of the DM; or
 - 2. Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part II.C.2.b.i.1. due to *site limitations* must direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv must be documented in the *SWPPP*. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the *SWPPP* must include

documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.5 of the DM. The remaining portion of the total WQv that cannot be reduced must be treated by application of standard SMPs.

- ii. Channel Protection Volume (CPv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event, remaining after runoff reduction. Where a CPv control orifice is provided, the minimum orifice size must be 3 inches, with acceptable external trash rack or orifice protection. The CPv requirement does not apply when:
 - 1. Reduction of the entire CPv is achieved by application of runoff reduction techniques or infiltration systems; or
 - 2. The 1-year post-development peak *discharge* is less than or equal to 2.0 cfs; or
 - 3. The site *directly discharges* to tidal waters, or a fifth order or larger water body (stream, river, or lake) where the increase in smaller flows will not impact the stream bank or channel integrity. However, the point of *discharge* must be adequately protected against scour and erosion by the increased peak *discharge*.
- iii. *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
 - 1. the site *directly discharges* to tidal waters or fifth order or larger streams; or
 - 2. A downstream analysis reveals that *overbank* control is not required.

- iv. Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
 - 1. the site *directly discharges* to tidal waters or fifth order or larger streams; or
 - 2. A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

- i. Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* must be addressed by one of the following options, as outlined in Section 9.2.1. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C) must calculate the WQv in accordance with Section 4.3 of the DM. All other *redevelopment activities* must calculate the WQv in accordance with Section 4.2 of the DM.
 - 1. Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the DM must be applied to all newly created pervious areas; or
 - 2. Capture and treat 100% of the required WQv, for a minimum of 25% of the disturbed redevelopment *impervious area*, by implementation of standard SMPs or reduced by application of runoff reduction techniques; or
 - 3. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a volume-based alternative SMP, as defined in Section 9.4 of the DM; or
 - 4. Capture and treat 100% of the required WQv, for a minimum of 75% of the disturbed redevelopment *impervious area*, by implementation of a flow-through alternative SMP sized to treat the peak rate of runoff from the WQv design storm; or

5. Application of a combination of 1 through 4 above that provide a weighted average of at least two of the above methods. Application of this method must be in accordance with the criteria in Section 9.2.1(A)(V) of the DM; or
 6. If there is an existing SMP located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 through 5 above.
- ii. Channel Protection Volume (CPv) is not required if there is 0% change to hydrology that increases the *discharge* rate and volume from the project site.
 - iii. *Overbank* Flood Control (Qp) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.
 - iv. Extreme Flood Control (Qf) is not required if there is 0% change to hydrology that increases the *discharge* rate from the project site.

d. *Sizing Criteria for Combination of Redevelopment Activity and New Development*

Construction projects, that include both *new development* and *redevelopment activity*, must use SMPs that meet the *sizing criteria* calculated as an aggregate of the *sizing criteria* in Part II.C.2.a. or b. for the *new development* portion of the project and Part II.C.2.c. for the *redevelopment activity* portion of the project.

Part III. Stormwater Pollution Prevention Plan (SWPPP)

A. General SWPPP Requirements

1. A SWPPP must be prepared and implemented by the *owner or operator* of all *construction activity* covered by this permit. All authorized *discharges* must be identified in the SWPPP. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and

practices that will be used to meet the effluent limitations in Part II.B. and, where applicable, the SMP requirements in Part II.C.

2. The *SWPPP* must demonstrate consideration in narrative format of the future physical risks due to climate change pursuant to the Community Risk and Resiliency Act (CRRA), 6 NYCRR Part 490, and associated guidance.

- a. The owner or operator must consider:

- i. the following physical risks due to climate change:

- (i) increasing temperature; and
 - (ii) increasing precipitation; and
 - (iii) increasing variability in precipitation, including chance of drought; and
 - (iv) increasing frequency and severity of flooding; and
 - (v) rising sea level; and
 - (vi) increasing storm surge; and
 - (vii) shifting ecology.

- ii. for each of the following:

- (i) overall site planning; and
 - (ii) location, elevation, and sizing of:
 - a. control measures and practices; and
 - b. conveyance system(s); and
 - c. detention system(s).

3. The *SWPPP* must describe the erosion and sediment control practices and where required, SMPs that will be used and/or constructed to reduce the *pollutants* in *stormwater discharges* and to assure compliance with the

requirements of this permit. In addition, the *SWPPP* must identify potential sources of pollution which may reasonably be expected to affect the quality of *stormwater discharges*.

4. All *SWPPPs*, that require the SMP component in accordance with Part III.B.2., must be prepared by a *qualified professional*.
5. The *owner or operator* must keep the *SWPPP* current so that, at all times, it accurately documents the erosion and sediment control practices that are being used or will be used during construction, and all SMPs that will be constructed on the site. At a minimum, the *owner or operator* must modify the *SWPPP*, including construction drawings:
 - a. whenever the current provisions prove to be ineffective in *minimizing pollutants* in *stormwater discharges* from the site; and
 - b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge of pollutants*; and
 - c. to address issues or deficiencies identified during an inspection by the *qualified inspector*, NYSDEC, or other regulatory authority; and
 - d. to document the final construction conditions in an as-built drawing.
6. NYSDEC may notify the *owner or operator* at any time that the *SWPPP* does not meet one or more of the minimum requirements of this permit. The notification must be in writing and identify the provisions of the *SWPPP* that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by NYSDEC, the *owner or operator* must make the required changes to the *SWPPP* and submit written notification to NYSDEC that the changes have been made. If the *owner or operator* does not respond to NYSDEC's comments in the specified time frame, NYSDEC may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4.
7. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices included in the *SWPPP* and the

contractor(s) and subcontractor(s) that will be responsible for constructing the SMPs included in the *SWPPP*. The *owner or operator* must have each of the contractors and subcontractors identify at least one person from their company to be *trained contractor* that will be responsible for implementation of the *SWPPP*. The *owner or operator* must ensure that at least one *trained contractor* is on site daily when soil disturbance activities are being performed.

The *owner or operator* must have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before the *commencement of construction activities*:

"I hereby certify under penalty of law that I understand and agree to comply with the requirements of the *SWPPP* and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the requirements of the most current version of the New York State Pollutant Discharge Elimination System (SPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the *SWPPP* that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for *SWPPP* implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* must attach the certification statement(s) to the copy of the *SWPPP* that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the *SWPPP* after the *commencement of construction activities*, they must also sign the certification statement and provide the information listed above prior to performing *construction activities*.

B. Required *SWPPP* Contents

1. Erosion and sediment control component - The *owner or operator* must prepare a *SWPPP* that includes erosion and sediment control practices.
 - a. Erosion and sediment control practices must be designed:
 - i. in conformance with the BB; or
 - ii. *equivalent* to the BB if deviating from Part III.B.1.a.i.
 - b. If the erosion and sediment control practices are designed in conformance with Part III.B.1.a.ii., the *SWPPP* must include a demonstration of *equivalence* to the BB.
 - c. At a minimum, the erosion and sediment control component of the *SWPPP* must include the following:
 - i. Background information about the scope of the project, including the location, type and size of project; and
 - ii. A site map/construction drawing(s) with north arrows for the project, including a general location map. At a minimum, the site map must show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the *stormwater discharge(s)* and receiving surface water(s); and
 - iii. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG); and
 - iv. A phasing plan for the project and sequencing plans for all *phases*, both of which must address clearing and grubbing, excavation and grading, utility and infrastructure installation, *final stabilization*,

and any other *construction activity* at the site that will result in soil disturbance.

1. The phasing plan must include:
 - a. a map delineating and labeling the limits of soil disturbance for all *phases* of a project; and
 - b. a table identifying the order and intended schedule of when each *phase* will begin and end its sequencing plan. The table must identify the total disturbed area for each *phase* at any one time and the total disturbed area for the overall project at any one time all on one timeline showing all overlapping quantities of disturbed area at any one time; and
2. A sequencing plan for a specific *phase* must include:
 - a. a table indicating the order and intended schedule of *construction activities* within a *phase*, and corresponding construction drawings with a description of the work to be performed; and
 - b. all permanent and *temporary stabilization* measures; and
- v. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented; and
- vi. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice; and
- vii. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any

temporary sediment basins and structural practices that will be used to divert flows from exposed soils; and

- viii. A maintenance inspection schedule for the contractor(s) and subcontractor(s) identified in Part III.A.7. to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule must be in accordance with the requirements in the BB technical standard; and
- ix. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the *stormwater discharges*; and
- x. A description and location of any *stormwater discharges* associated with industrial activity other than construction at the site, including, but not limited to, *stormwater discharges* from asphalt plants and concrete plants located on the *construction site*; and
- xi. Identification of any elements of the design that are not in conformance with the design criteria in the BB technical standard. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. SMP component – The *owner or operator* of *construction activity* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs.

- a. SMPs must be designed in conformance with the applicable *sizing criteria* in Part II.C.2.a., c., or d.; and
- b. SMPs must be designed in conformance with the *performance criteria*:
 - i. in the DM; or
 - ii. *equivalent* to the DM if deviating from Part III.B.2.b.i.; or
 - iii. in the New York State Stormwater Management Design Manual, dated January 2015 (2015 Design Manual), or *equivalent* to it, if the following criteria are met:

1. The eNOI is submitted in accordance with Part I.D. before January 29, 2027 for *construction activities* that are either:
 - a. subject to governmental review and approval:
 - i. where the *owner or operator* made any application to that governmental entity prior to the effective date of this permit; and
 - ii. such application included a *SWPPP* developed using the 2015 Design Manual or *equivalent* to it; or
 - b. not subject to governmental review and approval:
 - i. where a fiscal allocation for the *construction activities* has been developed and approved by a governmental entity; and
 - ii. the *SWPPP* was developed using the 2015 Design Manual or *equivalent* to it; and
 - c. If SMPs are designed in conformance with Part III.B.2.b.ii., the *SWPPP* must include the reason(s) for the deviation or alternative design and a demonstration of *equivalence* to the DM; and
 - d. If SMPs are designed in conformance with Part III.B.2.b.iii., the *SWPPP* must include supporting information or documentation demonstrating that Part III.B.2.b.iii.1.a. or b. apply; and
 - e. The SMP component of the *SWPPP* must include the following:
 - i. Identification of all SMPs to be constructed as part of the project, including which option the SMP designs conform to, either Part III.B.2.b.i., ii., or iii. Include the dimensions, material specifications and installation details for each SMP; and
 - ii. A site map/construction drawing(s) showing the specific location and size of each SMP; and

- iii. A Stormwater Modeling and Analysis Report that includes:
 - (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points; and
 - (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and SMPs; and
 - (iii) Results of *stormwater* modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre- and post-development runoff rates and volumes for the different storm events; and
 - (iv) Summary table, with supporting calculations, which demonstrates that each SMP has been designed in conformance with the *sizing criteria* included in the DM; and
 - (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part II.C.; and
 - (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the DM. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the DM.
- iv. Soil testing results and locations (test pits, borings); and
- v. Infiltration test results, when required in accordance with Part III.B.2.a.; and
- vi. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each SMP. The plan must identify the entity

that will be responsible for the long-term operation and maintenance of each practice; and

3. Enhanced Phosphorus Removal Standards - The *owner or operator* of *construction activity* identified in Table 2 of Appendix B that is located in a watershed identified in Appendix C must prepare a *SWPPP* that includes SMPs designed in conformance with the applicable *sizing criteria* in Part II.C.2.b., c., or d. and the *performance criteria* Enhanced Phosphorus Removal Standards included in the DM. At a minimum, the SMP component of the *SWPPP* must meet the requirements of Part III.B.2.

C. Required *SWPPP* Components by Project Type

Owners or operators of *construction activities*, identified in Table 1 of Appendix B, are required to prepare a *SWPPP* that only includes erosion and sediment control practices designed in accordance with Part III.B.1. *Owners or operators* of the *construction activities*, identified in Table 2 of Appendix B, must prepare a *SWPPP* that also includes SMPs designed in accordance with Part III.B.2 or 3.

For the entire area of disturbance, including the entire *common plan of development or sale* if applicable, the owner or operator must evaluate every bullet from Appendix B Table 1 and Table 2 separately. If bullets from both Table 1 and Table 2 apply, the *SWPPP* must include erosion and sediment control practices for all *construction activities* but SMPs for only those portions of the *construction activities* that fall under Table 2 bullet(s).

Part IV. Inspection and Maintenance Requirements

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures), and all SMPs identified in the *SWPPP*, are inspected and maintained in accordance with Part IV.B. and C.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity*, identified in Tables 1 and 2 of Appendix B, must have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being

implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor must:

- a. if the corrective action does not require engineering design:
 - i. begin implementing corrective actions within one business day; and
 - ii. complete the corrective actions within five business days; or
 - b. if the corrective action requires engineering design:
 - i. begin the engineering design process within five business days; and
 - ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.
2. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. The *trained contractor* must begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.
 3. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections in accordance with Part IV.B.1. if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational.

C. Qualified Inspector Inspection Requirements

1. With the exception of the following *construction activities* identified in Tables 1 and 2 of Appendix B, a *qualified inspector* must conduct site inspections for all other *construction activities* identified in Tables 1 and 2 of Appendix B:
 - a. the construction of a single-family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than or equal to five (5) acres and is

not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix D; and

- b. the construction of a single-family home that involves soil disturbances of one (1) or more acres but less than or equal to five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix D; and
 - c. construction on *agricultural property* that involves soil disturbances of one (1) or more acres but less than five (5) acres; and
 - d. *construction activities* located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances of 5,000 square feet or more, but less than one acre.
2. The *qualified inspector* must conduct site inspections in accordance with the following timetable:
- a. For *construction sites* where soil disturbance activities are on-going, the *qualified inspector* must conduct a site inspection at least once every seven (7) calendar days; or
 - b. For *construction sites* where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part I.E.6. to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days; or
 - c. For *construction sites* where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* must conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas under the jurisdiction of a *Traditional Land Use Control MS4 Operator*, the *Traditional Land Use Control MS4 Operator* (provided the *Traditional Land Use Control MS4 Operator* is not the *owner or operator* of the *construction activity*) by hard copy or email prior to reducing the inspections to this frequency and again by hard copy or email prior to re-commencing construction; or

- d. For *construction sites* where soil disturbance activities have been shut down with partial project completion, the requirement to have the *qualified inspector* conduct inspections ceases if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational. The *owner or operator* must notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix E) or, in areas subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1., the *Traditional Land Use Control MS4 Operator(s)* (provided the *Traditional Land Use Control MS4 Operator(s)* are not the *owners or operators* of the *construction activity*) in writing prior to the shutdown and again in writing prior to resuming *construction activity*. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* must terminate coverage by meeting the requirements of Part V; or
 - e. For *construction sites* involving soil disturbance of one (1) or more acres that *directly discharge* to one of the 303(d) segments listed in Appendix D or is located in one of the watersheds listed in Appendix C, the *qualified inspector* must conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections must be separated by a minimum of two (2) full calendar days.
3. At a minimum, the *qualified inspector* must inspect:
- a. all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness; and
 - b. all SMPs under construction to ensure that they are constructed in conformance with the *SWPPP*; and
 - c. all areas of disturbance that have not achieved *final stabilization*; and
 - d. all points of *discharge to surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site*; and
 - e. all points of *discharge* from the *construction site*.

4. The *qualified inspector* must prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report must include and/or address all of the following, for all *construction activities* except those listed in Part IV.C.1.:
 - a. Permit identification number; and
 - b. Date and time of inspection; and
 - c. Name and title of person(s) performing inspection; and
 - d. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection, including the temperature at the time of the inspection; and
 - e. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This must include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow; and
 - f. A description of the condition of all *surface waters of the State* located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This must include identification of any *discharges* of sediment to the *surface waters of the State*; and
 - g. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance; and
 - h. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced; and
 - i. Description and sketch (map) of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection; and
 - j. Estimates, in square feet or acres, of the following areas:

- i. Total area with active soil disturbance (not requiring either *temporary stabilization* or *final stabilization*); and
 - ii. Total area with inactive soil disturbance (requiring either *temporary stabilization* or *final stabilization*); and
 - iii. Total area that has achieved *temporary stabilization*; and
 - iv. Total area that has achieved *final stabilization*; and
- k. Current stage of construction of all SMPs and identification of all *construction activity* on site that is not in conformance with the *SWPPP* and technical standards; and
- l. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the SMP(s); and
- m. Identification and status of all corrective actions that were required by previous inspection; and
- n. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* must attach color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* must also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* must attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.
5. Within one business day of the completion of an inspection, the *qualified inspector* must notify the *owner or operator*, and appropriate contractor or subcontractor identified in Part III.A.7., of any corrective actions that need to be taken. The contractor or subcontractor must:
- a. if the corrective action does not require engineering design:

- i. begin implementing corrective actions within one business day; and
 - ii. complete the corrective actions within five business days; or
 - b. if the corrective action requires engineering design:
 - i. begin the engineering design process within five business days; and
 - ii. complete the corrective action in a reasonable time frame but no later than within 60 calendar days.
6. All inspection reports must be signed by the *qualified inspector*. In accordance with Part I.E.3., the inspection reports must be maintained on site with the *SWPPP*.

Part V. How to Terminate CGP Coverage

A. Electronic Notice of Termination (eNOT) Submittal

The eNOT contains questions to ensure requirements in Part V.A. have been met.

1. An *owner or operator* must terminate coverage when one or more of the following requirements have been met:
 - a. Total project completion:
 - i. all *construction activity* identified in the *SWPPP* has been completed; and
 - ii. all areas of disturbance have achieved *final stabilization*; and
 - iii. all temporary, structural erosion and sediment control measures have been removed; and
 - iv. all SMPs have been constructed in conformance with the *SWPPP* and are operational; and
 - v. an as-built drawing has been prepared; or

- b. Planned shutdown with partial project completion:
 - i. all soil disturbance activities have ceased; and
 - ii. all areas disturbed as of the project shutdown date have achieved *final stabilization*; and
 - iii. all temporary, structural erosion and sediment control measures have been removed; and
 - iv. all SMPs required for the completed portion of the project have been constructed in conformance with the *SWPPP* and are operational; and
 - v. an as-built drawing has been prepared; or
 - c. In accordance with Part I.G. Change of Owner or Operator; or
 - d. The *owner or operator* has obtained coverage under an alternative general SPDES permit or an individual SPDES permit.
2. For *construction activities* that require *qualified inspector* inspections in accordance with Part IV.C.1. and have met Part V.A.1.a. or b., the *owner or operator* must have the *qualified inspector* perform a final site inspection prior to submitting the eNOT. The *qualified inspector* must, by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice(s)” certification statements on the eNOT, certify that all the requirements in Part V.A.1.a. or b. have been achieved.
3. For *construction activities* that are subject to the review authority of *Traditional Land Use Control MS4 Operator(s)* in accordance with Part I.D.2.b.ii.1. and meet Part V.A.1.a. or b., the *owner or operator* must have the *Traditional Land Use Control MS4 Operator(s)* sign the “MS4 Acceptance” statement on the eNOT in accordance with the requirements in Part VII.J. A *Traditional Land Use Control MS4 Operator* official, by signing this statement, determined that it is acceptable for the *owner or operator* to submit the eNOT in accordance with the requirements of this Part. A *Traditional Land Use Control MS4 Operator* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector’s* final site inspection certification(s) when required in Part V.A.2.

Part V.A.4.

4. For *construction activities* that require SMPs and meet Part V.A.1.a. or b., the *owner or operator* must, prior to submitting the eNOT, ensure one of the following:
 - a. for SMP(s) that were constructed by a private entity, but will be owned, operated, and maintained by a public entity, the SMP(s) and any right-of-way(s) needed to operate and maintain such practice(s) have been deeded to the municipality in which the practice(s) is located; or
 - b. for SMP(s) that are privately owned, but will be operated and maintained by a public entity, an executed operation and maintenance agreement is in place with the municipality that will operate and maintain the SMP(s); or
 - c. for SMP(s) that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record; or
 - d. for SMP(s) that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility, the *owner or operator* has policies and procedures in place that ensure operation and maintenance of the practices in accordance with the operation and maintenance plan.
5. An *owner or operator* that has met the requirements of Part V.A.1., 2., 3., and 4. must request termination of coverage under this permit by submitting a complete Notice of Termination form electronically using a NYSDEC approved form.⁵
 - a. The owner's or operator's coverage is terminated as of the termination date indicated in the Letter of Termination (LOT), which is sent by NYSDEC after a complete eNOT is submitted.

⁵ Unless NYSDEC grants a waiver in accordance with 40 CFR 127.15(c) or (d). All waiver requests must be submitted to Stormwater_info@dec.ny.gov or NYSDEC, Bureau of Water Permits, 625 Broadway, 4th Floor, Albany, New York 12233-3505.

Part VI. Record Retention and Reporting

A. Record Retention

The *owner or operator* must retain a copy of the documents listed in Part I.E.3. and a copy of the LOT for a period of at least five years from the date that NYSDEC accepts a complete NOT submitted in accordance with Part V.

B. Reporting

Except for the eNOI, the signature forms associated with the eNOI, and the eNOT, all other written correspondence requested by NYSDEC, including individual permit applications, must be sent to the address of the appropriate DOW (SPDES) Program contact at the Regional Office listed in Appendix E.

Part VII. Standard Permit Requirements

For the purposes of this permit, examples of contractors and subcontractors include: third-party maintenance and construction contractors.

A. Duty to Comply

The *owner or operator*, and all contractors or subcontractors, must comply with all requirements of this permit. Any non-compliance with the requirements of this permit constitutes a violation of the New York State Environmental Conservation Law (ECL), and its implementing regulations, and is grounds for enforcement action. Filing of a request for termination of coverage under this permit, or a notification of planned changes or anticipated non-compliance, does not limit, diminish or stay compliance with any requirements of this permit.

B. Need to Halt or Reduce Activity Not a Defense

The necessity to halt or reduce the *construction activity* regulated by this permit, in order to maintain compliance with the requirements of this permit, must not be a defense in an enforcement action.

C. Penalties

There are substantial criminal, civil, and administrative penalties associated with violating the requirements of this permit. Fines of up to \$37,500 per day for each

violation and imprisonment for up to 15 years may be assessed depending upon the nature and degree of the offense.

D. False Statements

Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance must, upon conviction, be punished in accordance with ECL §71-1933 and or New York State Penal Law Articles 175 and 210.

E. Re-Opener Clause

Upon issuance of this permit, a determination has been made on the basis of a submitted Notice of Intent, plans, or other available information, that compliance with the specified permit requirements will reasonably protect classified water use and assure compliance with applicable *water quality standards*. Satisfaction of the requirements of this permit notwithstanding, if operation pursuant to this permit causes or contributes to a condition in contravention of State *water quality standards* or guidance values, or if NYSDEC determines that a modification is necessary to prevent impairment of the best use of the waters or to assure maintenance of *water quality standards* or compliance with other provisions of ECL Article 17 or the Clean Water Act (CWA), or any regulations adopted pursuant thereto, NYSDEC may require such modification and the Commissioner may require abatement action to be taken by the *owner or operator* and may also prohibit such operation until the modification has been implemented.

F. Duty to Mitigate

The *owner or operator*, and its contractors and subcontractors, must take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G. Requiring Another General Permit or Individual SPDES Permit

NYSDEC may require any *owner or operator* authorized to *discharge* in accordance with this permit to apply for and obtain an individual SPDES permit or apply for authorization to *discharge* in accordance with another general SPDES permit.

1. Cases where an individual SPDES permit or authorization to discharge in accordance with another general SPDES permit may be required include, but is not limited to the following:

Part VII.G.1.a.

- a. the *owner or operator* is not in compliance with the conditions of this permit or does not meet the requirements for coverage under this permit; and
 - b. a change has occurred in the availability of demonstrated technology or practices for the control or abatement of *pollutants* applicable to the *point source*; and
 - c. new effluent limitation guidelines or new source performance standards are promulgated that are applicable to *point sources* authorized to *discharge* in accordance with this permit; and
 - d. existing effluent limitation guidelines or new source performance standards that are applicable to *point sources* authorized to *discharge* in accordance with this permit are modified; and
 - e. a water quality management plan containing requirements applicable to such *point sources* is approved by NYSDEC; and
 - f. circumstances have changed since the time of the request to be covered so that the *owner or operator* is no longer appropriately controlled under this permit, or either a temporary or permanent reduction or elimination of the authorized *discharge* is necessary; and
 - g. the *discharge* is in violation of section 17-0501 of the ECL; and
 - h. the *discharge(s)* is a significant contributor of *pollutants*. In making this determination, NYSDEC may consider the following factors:
 - i. the location of the *discharge(s)* with respect to *surface waters of the State*; and
 - ii. the size of the *discharge(s)*; and
 - iii. the quantity and nature of the *pollutants discharged* to *surface waters of the State*; and
 - iv. other relevant factors including compliance with other provisions of ECL Article 17, or the CWA.
2. When NYSDEC requires any *owner or operator* authorized by this permit to apply for an individual SPDES permit as provided for in this subdivision, it must notify the *owner or operator* in writing that a permit application is required. This notice must include a brief statement of the reasons for this decision, an application

form, a statement setting a time for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from the *owner's or operator's* receipt of the notification letter, whereby the authorization to *discharge* under this permit must be terminated. NYSDEC may grant additional time upon demonstration, to the satisfaction of the RWE,⁶ that additional time to apply for an alternative authorization is necessary or where NYSDEC has not provided a permit determination in accordance with 6 NYCRR Part 621.

3. When an individual SPDES permit is issued to an *owner or operator* authorized to *discharge* under this permit for the same *discharge(s)*, this permit authorization for *construction activities* authorized under the individual SPDES permit is automatically terminated on the effective date of the individual SPDES permit unless termination is earlier in accordance with 6 NYCRR Part 750.

H. Duty to Provide Information

The *owner or operator* must furnish to NYSDEC, within five business days, unless otherwise set forth by NYSDEC, any information that NYSDEC may request to determine whether cause exists to determine compliance with this permit or to determine whether cause exists for requiring an individual SPDES permit in accordance with 6 NYCRR 750-1.21(e) (see Part VII.G. Requiring Another General Permit or Individual Permit).

The *owner or operator* must make available to NYSDEC, for inspection and copying, or furnish to NYSDEC within 25 business days of receipt of a NYSDEC request for such information, any information retained in accordance with this permit.

Except for Part I.D.4. and 5. and Part I.G., the following applies: where the *owner or operator* becomes aware that it failed to submit any relevant facts on the Notice of Intent, or submitted incorrect information in a Notice of Intent or in any report to NYSDEC, the *owner or operator* must submit such facts or corrected information to NYSDEC within five business days.

I. Extension

In the event a new permit is not issued and effective prior to the expiration of this permit, and this permit is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, then the *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the requirements of this permit until a new permit is issued and effective.

⁶ The Regional Water Manager where a DEC Region does not have a RWE.

J. Signatories and Certification

The Notice of Intent, Notice of Termination, and reports required by this permit must be signed as provided in 40 CFR §122.22.

1. All Notices of Intent and Notices of Termination must be signed as follows:

- a. For a corporation. By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation; or
 - (ii) the manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for Notice of Intent or Notice of Termination requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

Note: NYSDEC does not require specific assignments or delegations of authority to responsible corporate officers identified in 40 CFR §122.22(a)(1)(i). NYSDEC will presume that these responsible corporate officers have the requisite authority to sign the Notice of Intent or Notice of Termination unless the corporation has notified NYSDEC to the contrary. Corporate procedures governing authority to sign a Notice of Intent or Notice of Termination may provide for assignment or delegation to applicable corporate positions under 40 CFR §122.22(a)(1)(ii) rather than to specific individuals.

- b. For a partnership or sole proprietorship. By a general partner or the proprietor, respectively.

Part VII.J.1.c.

- c. For a municipality, State, Federal, or other public agency. By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 1. the chief executive officer of the agency; or
 2. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
2. All reports required by this permit, and other information requested by NYSDEC, must be signed by a person described in Part VII.J.1., or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described in Part VII.J.1. or using the Duly Authorized Form, found on the DEC website; and
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - c. The written authorization is submitted to NYSDEC.
3. Changes to authorization. If an authorization under Part VII.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the *construction activity*, a new authorization satisfying the requirements of Part VII.J.2. must be submitted to NYSDEC prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under Part VII.J.1. or 2. must make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who

manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

5. Electronic reporting. If documents described in Part VII.J.1. or 2. are submitted electronically by or on behalf of the *construction activity* with coverage under this permit, any person providing the electronic signature for such documents must meet all relevant requirements of this section, and must ensure that all of the relevant requirements of 40 CFR Part 3 (including, in all cases, subpart D to Part 3) (Cross-Media Electronic Reporting) and 40 CFR Part 127 (NPDES Electronic Reporting Requirements) are met for that submission.

K. Inspection and Entry

The *owner or operator* must allow NYSDEC, the USEPA Regional Administrator, the applicable county health department, or any authorized representatives of those entities, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the *discharge*, upon the presentation of credentials and other documents as may be required by law, to:

1. enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the requirements of this permit; and
2. have access to and copy at reasonable times, any records that must be kept under the requirements of this permit, including records required to be maintained for purposes of operation and maintenance; and
3. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and
4. sample or monitor at reasonable times, for the purposes of assuring general SPDES permit compliance or as otherwise authorized by the CWA or ECL, any substances or parameters at any location; and
5. enter upon the property of any contributor to the regulated facility or activity under authority of the *owner or operator*.

L. Confidentiality of Information

The following must not be held confidential: this permit, the fact sheet for this permit, the name and address of any *owner or operator*, effluent data, the Notice of Intent, and information regarding the need to obtain an individual permit or an alternative general SPDES permit. This includes information submitted on forms themselves and any attachments used to supply information required by the forms (except information submitted on usage of substances). Upon the request of the *owner or operator*, NYSDEC must make determinations of confidentiality in accordance with 6 NYCRR Part 616, except as set forth in the previous sentence. Any information accorded confidential status must be disclosed to the Regional Administrator upon his or her written request. Prior to disclosing such information to the Regional Administrator, NYSDEC will notify the Regional Administrator of the confidential status of such information.

M. Other Permits May Be Required

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

N. NYSDEC Orders or Civil Decrees/Judgments

The issuance of this permit by the NYSDEC, and the coverage under this permit by the *owner or operator*, does not supersede, revoke, or rescind any existing order on consent or civil Decree/Judgment, or modification to any such documents or to any order issued by the Commissioner, or any of the terms, conditions, or requirements contained in such order or modification therefore, unless expressly noted.

O. Property Rights

Coverage under this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the *discharge* authorized.

P. Compliance with Interstate Standards

If the *construction activity* covered by this permit originates within the jurisdiction of an interstate water pollution control agency, then the *construction activity* must also comply with any applicable effluent standards or *water quality standards* promulgated by that interstate agency and as set forth in this permit for such *construction activities*.

Q. Oil and Hazardous Substance Liability

Coverage under this permit does not affect the imposition of responsibilities upon, or the institution of any legal action against, the *owner or operator* under section 311 of the CWA, which must be in conformance with regulations promulgated pursuant to section 311 governing the applicability of section 311 of the CWA to *discharges* from facilities with *NPDES* permits, nor must such issuance preclude the institution of any legal action or relieve the *owner or operator* from any responsibilities, liabilities, or penalties to which the *owner or operator* is or may be subject pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. section 9601 et seq. (CERCLA).

R. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, must not be affected thereby.

S. NYSDEC Approved Forms

The *owner or operator* must provide all relevant information that is requested by NYSDEC, and required by this permit, on all NYSDEC approved forms.

APPENDIX A – Abbreviations and Definitions

Abbreviations

APO – Agency Preservation Officer
BB – New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), dated November 2016
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
CPv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DM – New York State Stormwater Management Design Manual (Design Manual), dated July 31, 2024
DOW – Division of Water
EAF – Environmental Assessment Form
ECL – chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law
EPA – U.S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
NYC – The City of New York
NYCDEP – The City of New York Department of Environmental Protection
NYSDEC – The New York State Department of Environmental Conservation
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RR – Runoff Reduction
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SMP – Post-Construction Stormwater Management Practice
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit. If a word is not italicized in the permit, use its common definition.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property – the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023).

Alter Hydrology from Pre- to Post-Development Conditions – the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer System – a sewer system which conveys sewage and *stormwater* through a single pipe system to a publicly owned treatment works.

Commence (Commencement of) Construction Activities – the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the *SWPPP*. See definition for “*Construction Activity(ies)*” also.

Common Plan of Development or Sale – a contiguous area where multiple separate and distinct *construction activities* are occurring, or may occur, under one plan. The “common plan” of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQR) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating *construction activities* may occur on a specific plot. A *common plan of development or sale* is comprised of two or more *phases*.

Common plan of development or sale does not include separate and distinct *construction activities* that are occurring, or may occur, under one plan that are at least 1/4 mile apart provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Construction Activity(ies) – identified within 40 CFR 122.26(b)(14)(x), 122.26(b)(15)(i), and 122.26(b)(15)(ii), any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, mechanized logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal.

Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, which is excluded from the calculation of the soil disturbance for a project. Routine maintenance includes, but is not limited to:

- Re-grading of gravel roads or parking lots; and
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of the ditch; and
- Replacement of existing culverts that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity of a ditch; and
- Replacement of existing bridges that maintains the approximate original line and grade, and maintains or improves the hydraulic capacity beneath the bridges; and
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch); and
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*; and
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material; and
- Long-term use of equipment storage areas at or near highway maintenance facilities; and
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*; and
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts; and
- Maintenance of ski trails including brush hog use and mowing; and
- Above ground snowmaking pipe replacement; and
- Replacement of existing utility poles; etc.

Construction Site – the land area where *construction activity(ies)* will occur. See also the definitions for “*Commence (Commencement of) Construction Activities*” and “*Common Plan of Development or Sale.*”

Dewatering – the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Directly Discharge(s)(ing) (to a specific surface waterbody) – runoff flows from a *construction site* by overland flow and the first point of *discharge* is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of *discharge* from the separate storm sewer system is the specific surface waterbody.

Discharge(s)(d) – any addition of any *pollutant* to waters of the State through an outlet or *point source*.

Embankment – an earthen or rock slope that supports a road/highway.

Equivalent (Equivalence) – the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization – all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other *equivalent* stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

Historic Property – any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) – all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and compacted gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – not technologically possible, or not economically practicable and achievable considering best industry practices.

Minimize(ing)(ation) – reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer System (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

1. owned or operated by a State, city, town, village, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, *stormwater*, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA, that *discharges to surface waters of the State*; and
2. designed or used for collecting or conveying *stormwater*; and
3. which is not a *combined sewer system*; and
4. which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Natural Buffer(s) – an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – any land disturbance that does not meet the definition of *Redevelopment Activity* included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

Nonpoint Source(s) – any source of water pollution or *pollutants* which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank – flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator – the person, persons, or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit requirements.

Performance Criteria – the six performance criteria for each group of SMPs in Chapters 5 and 6 of the technical standard, New York State Stormwater Management Design Manual (DM), dated July 31, 2024. These include feasibility, conveyance, pretreatment, treatment, landscaping, and maintenance. It does not include the *Sizing Criteria* (i.e. WQv, RRV, CPv, Qp and Qf) in Part I.C.2. of the permit.

Phase – a defined area in which *construction activities* are occurring or will occur separate from other defined area(s).

Point Source – any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be *discharged*.

Pollutant(s) – dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast *discharged* into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq.

Qualified Inspector – a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder or other NYSDEC endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any SMPs that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional – a person that is knowledgeable in the principles and practices of *stormwater* management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other NYSDEC endorsed individual(s). Individuals preparing *SWPPPs* that require the SMP component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the *SWPPP* that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – the disturbance and reconstruction of existing *impervious area*, including *impervious areas* that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Renewable Energy – electricity or thermal energy generated by renewable energy systems through use of the following technologies: solar thermal, photovoltaics, on land and offshore wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells which do not utilize a fossil fuel resource in the process of generating electricity.

Site Limitations – site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical *site limitations* include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of *site limitations* shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – the criteria included in Part I.C.2 of the permit that are used to size SMPs. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank Flood* (Qp), and Extreme Flood (Qf).

Steep Slope – land area designated on the current United States Department of Agriculture (USDA) Soil Survey as Soil Slope Phase D, (provided the map unit name or description is inclusive of slopes greater than 25%), or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Stormwater – that portion of precipitation that, once having fallen to the ground, is in excess of the evaporative or infiltrative capacity of soils, or the retentive capacity of surface features, which flows or will flow off the land by surface runoff to waters of the State.

Streambank – the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – a project specific report, including construction drawings, that among other things: describes the *construction activity(ies)*, identifies the potential sources of pollution at the *construction site*; describes and shows the *stormwater* controls that will be used to control the *pollutants* (i.e. erosion and sediment controls; for many projects, includes SMPs); and identifies procedures the *owner or operator* will implement to comply with the requirements of the permit. See Part III of the permit for a complete description of the information that must be included in the *SWPPP*.

Surface Waters of the State – shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization – exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Load (TMDL) – the sum of the allowable loads of a single *pollutant* from all contributing point and *nonpoint sources*. It is a calculation of the maximum amount of a *pollutant* that a waterbody can receive and still meet *water quality standards*, and an allocation of that amount to the *pollutant's* sources. A TMDL stipulates Waste Load Allocations (WLA) for *point source discharges*, Load Allocations (LA) for *nonpoint sources*, and a margin of safety (MOS).

Traditional Land Use Control MS4 Operator – a city, town, or village with land use control authority that is authorized to *discharge* under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Trained Contractor – an employee from the contracting (construction) company, identified in Part III.A.7., that has received four (4) hours of NYSDEC endorsed training

in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.7., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, *New York State Erosion and Sediment Control Certificate Program* holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of NYSDEC endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC endorsed entity).

The *trained contractor* is responsible for the day-to-day implementation of the *SWPPP*.

Tree Clearing – *construction activities* limited to felling and removal of trees.

Tree clearing does not include hand felling and leaving the trees in place with no support from mechanized equipment, which is not considered *construction activity* requiring coverage under this permit.

Water Quality Standard – such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities* that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single-family home not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions with 25% or less *impervious cover* at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix D
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.
- Structural agricultural conservation practices as identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023) that include construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.

The following *construction activities* that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

- All construction activities located in the New York City Watershed located east of the Hudson River, see Appendix C Figure 1, that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Within the municipal boundaries of NYC:

- Stand-alone road reconstruction, where the total soil disturbance from only that road construction, is less than one (1) acre of land.

The following *construction activities*:

- Installation of underground linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation, *stormwater* retrofits, stream restoration, and resiliency projects that reconstruct shoreline areas to address sea level rise
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an *impervious cover*
- Cross-country ski trails, walking/hiking trails, and mountain biking trails, including a de minimis parking lot (maximum 10 spaces total, sized for passenger cars) with 35 feet minimum preservation of undisturbed area downgradient from the parking lot
- Dam rehabilitation (the structure of the dam itself)
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are not part of residential, commercial, or institutional development;
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path, or walking path.

Table 1 (Continued)
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP
THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following *construction activities*:

- Slope stabilization
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Vegetated open space (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) that do not *alter hydrology from pre- to post-development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions
- Demolition where vegetation will be established, and no *redevelopment activity* is planned¹
- Installation or replacement of either an overhead electric transmission line or a ski lift tower that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*.
- Solar array field areas that have tables elevated off the ground, spaced one table width apart, do not *alter hydrology from pre- to post-development conditions*, and address water quality volume and runoff reduction volume by maintaining sheet flow on slopes less than 8%.
- Structural agricultural conservation practices as identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023) that do not include construction or reconstruction of *impervious area* and do not *alter hydrology from pre- to post-development* conditions.
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary *impervious areas* that will be restored to pre-construction conditions once the *construction activity* is complete (in this context, “temporary” means the *impervious area* will be in place for two years or less)
- Other *construction activities* that do not include the construction or reconstruction of *impervious area*, and do not *alter hydrology from pre- to post-development* conditions, and are not listed in Table 2.

1. If the site is redeveloped in the future, a new eNOI must be submitted.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPs)

The following *construction activities*:

- Single-family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family home that disturbs five (5) or more acres of land
- Single-family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix D
- Single-family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of between 20,000 square feet and one (1) acre of land within the municipal boundaries of NYC with greater than 25% *impervious cover* at total site build-out
- Single-family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single-family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a *common plan of development or sale* that will ultimately disturb five (5) or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Creation of 5,000 square feet or more of *impervious area* in the municipal boundaries of NYC
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) that involves soil disturbance greater than five acres.
- Structural agricultural conservation practices as identified in Table II in the “Agricultural Best Management Practice Systems Catalogue” (dated June 2023) that involves soil disturbance greater than five acres and include the construction or reconstruction of *impervious area* or *alter hydrology from pre- to post-development* conditions.
- Facility buildings, including ski lodges, restroom buildings, pumphouses, ski lift terminals, and maintenance and groomer garages
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills; including creation of landfills or capping landfills.
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTWs, water treatment plants, and water storage tanks
- Golf courses
- Office complexes

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A *SWPPP* THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES (SMPs)

The following *construction activities*:

- Permanent laydown yards and equipment storage lots
- Playgrounds that include the construction or reconstruction of *impervious area*
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surfaces
- Road construction or reconstruction, outside the municipal boundaries of NYC
- Road construction within the municipal boundaries of NYC
- Stand-alone road reconstruction, within the municipal boundaries of NYC where the total soil disturbance from that road reconstruction involves soil disturbance of one (1) acre or more of land
- Parking lot construction or reconstruction (as with all Table 2 bullets, this includes parking lots constructed as part of the *construction activities* listed in Table 1, unless a Table 1 bullet specifies otherwise)
- Athletic fields (natural grass) that include the construction or reconstruction of *impervious area* (>5% of disturbed area) or *alter the hydrology from pre- to post-development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations, and well drilling pads, surfaced with *impervious cover*, and constructed as part of an overhead electric transmission line, wind-power, cell tower, oil or gas well drilling, sewer or water main, ski lift, or other linear utility project
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of a residential, commercial or institutional development
- Sidewalks, bike paths, or walking paths, surfaced with an *impervious cover*, that are part of highway construction or reconstruction
- Solar array field areas on slopes greater than 8% that cannot maintain sheet flow using management practices identified in the BB or the DM
- Solar array field areas on slopes less than 8% that will *alter the hydrology from pre- to post-development* conditions
- Solar array field areas with tables that are not elevated high enough to achieve *final stabilization* beneath the tables
- Traditional *impervious areas* associated with solar development (e.g. roads, buildings, transformers)
- Utility pads surfaced with *impervious cover*, including electric vehicle charging stations
- All other *construction activities* that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre- to post-development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators of construction activities* identified in Table 2 of Appendix B must prepare a *SWPPP* that includes SMPs designed in conformance with the Enhanced Phosphorus Removal Standards included in the DM technical standard.

- Entire New York City Watershed located east of the Hudson River – Figure 1
- Onondaga Lake Watershed – Figure 2
- Greenwood Lake Watershed – Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

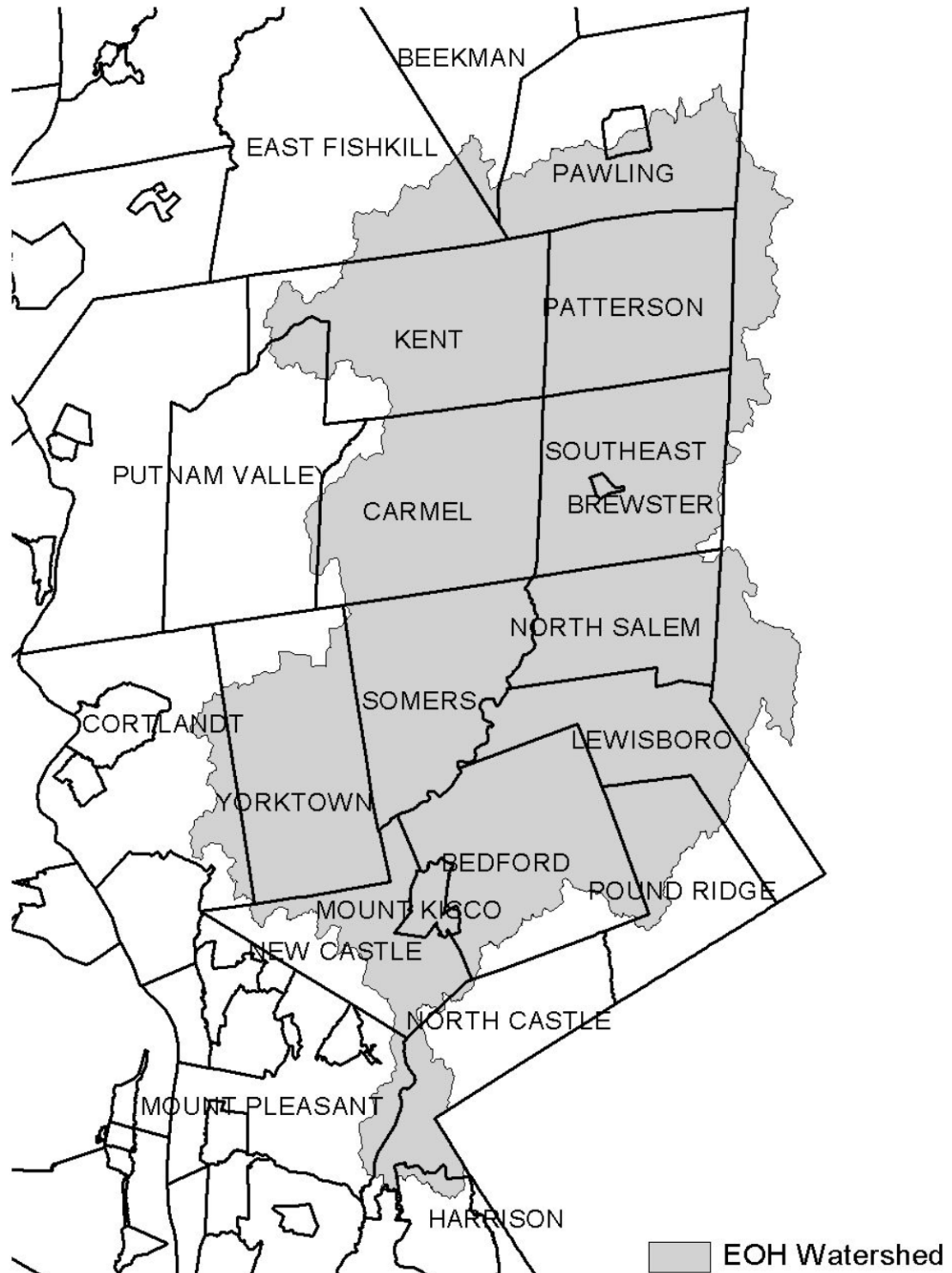


Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

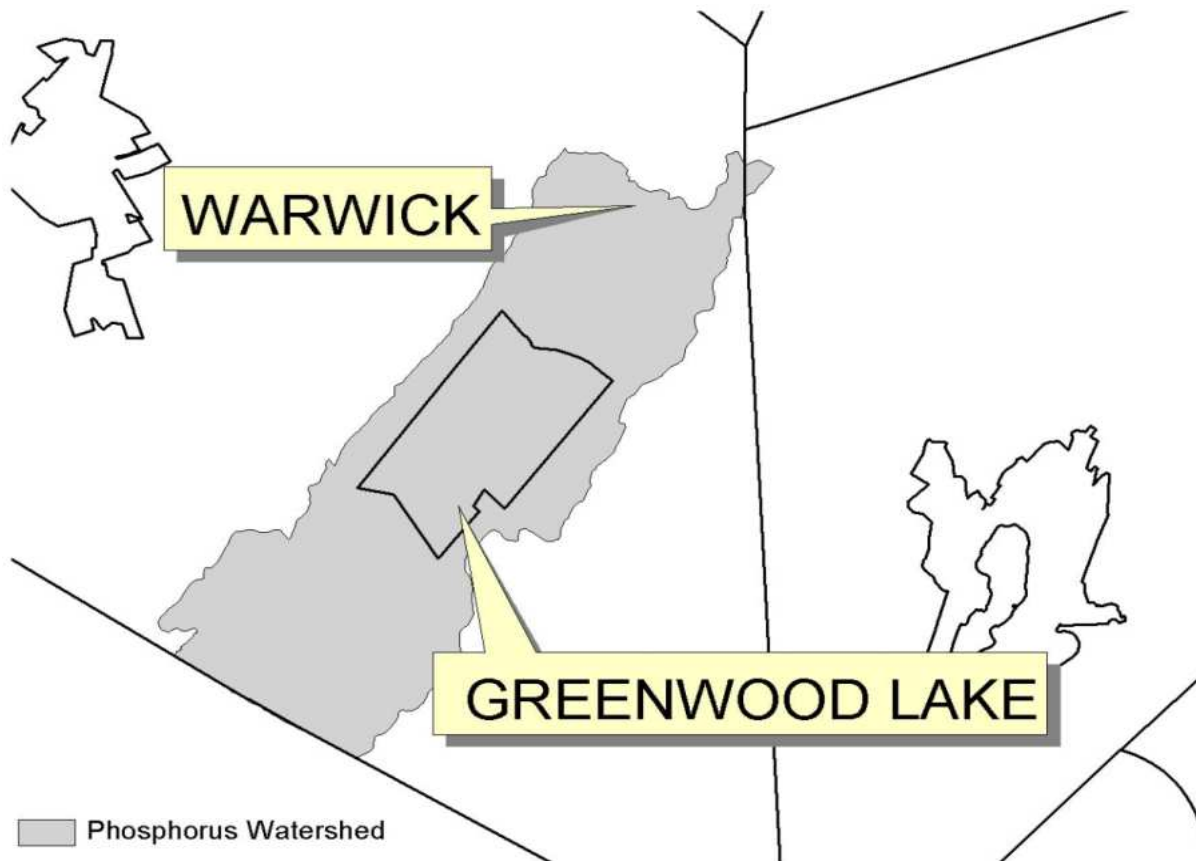


Figure 4 - Oscawana Lake Watershed

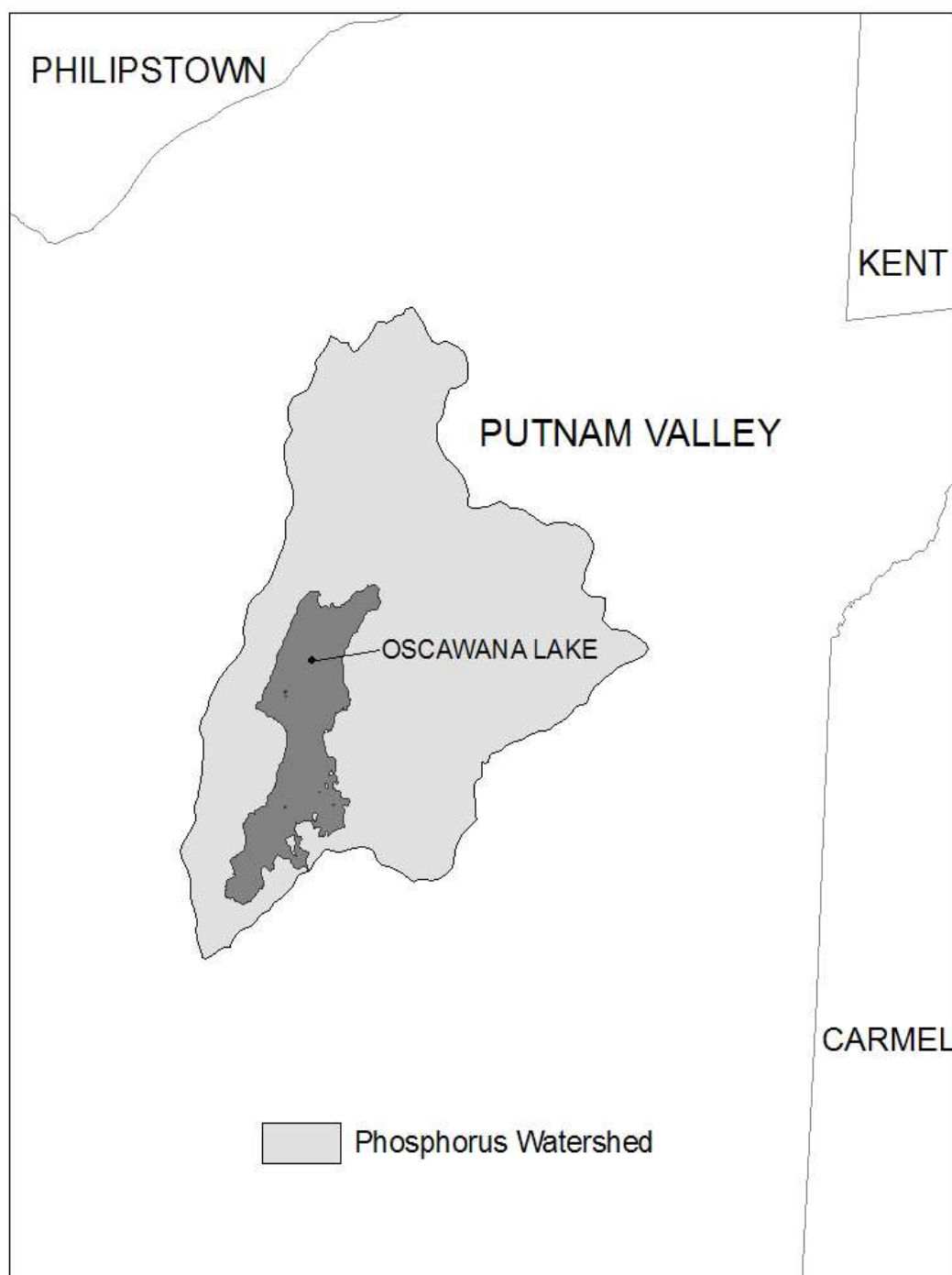
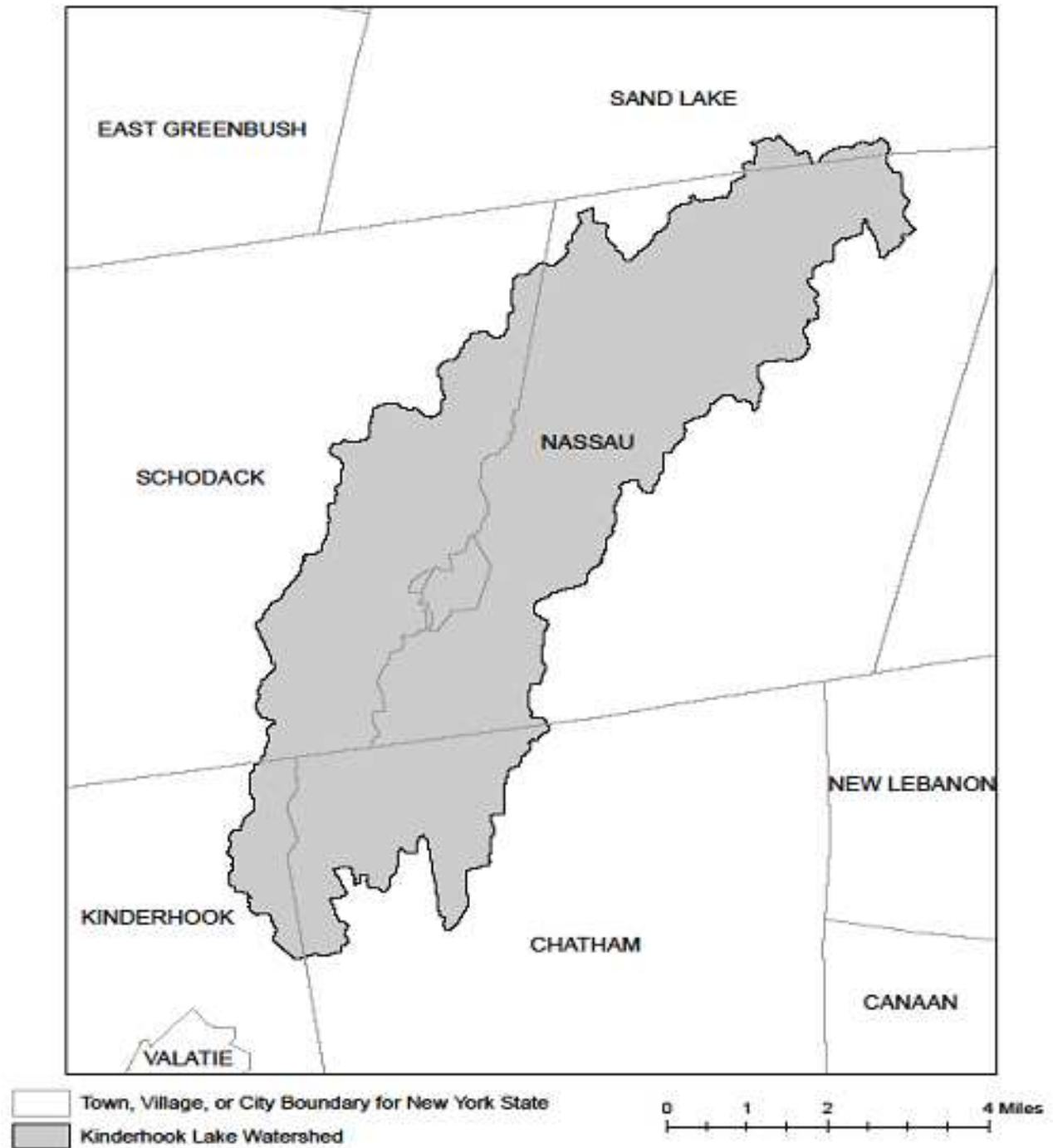


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Impaired Waterbodies (by Construction Related Pollutants)

List of waterbodies impaired by *pollutants* related to *construction activity*, including turbidity, silt/sediment, and nutrients (e.g. nitrogen, phosphorus). This list is a subset of “The Final New York State 2018 Section 303(d) List of Impaired Waters Requiring a TMDL” dated June 2020.

County	Waterbody	Pollutant
Albany	Ann Lee (Shakers) Pond, Stump Pond (1201-0096)	Phosphorus
Albany	Lawsons Lake (1301-0235)	Phosphorus
Allegany	Amity Lake, Saunders Pond (0403-0054)	Phosphorus
Allegany	Andover Pond (0403-0056)	Phosphorus
Bronx	Reservoir No.1/Lake Isle (1702-0075)	Phosphorus
Bronx	Van Cortlandt Lake (1702-0008)	Phosphorus
Broome	Blueberry, Laurel Lakes (1404-0033)	Phosphorus
Broome	Fly Pond, Deer Lake (1404-0038)	Phosphorus
Broome	Minor Tribs to Lower Susquehanna (0603-0044)	Phosphorus
Broome	Whitney Point Lake/Reservoir (0602-0004)	Phosphorus
Cattaraugus	Allegheny River/Reservoir (0201-0023)	Phosphorus
Cattaraugus	Beaver Lake/Alma Pond (0201-0073)	Phosphorus
Cattaraugus	Case Lake (0201-0020)	Phosphorus
Cattaraugus	Linlyco/Club Pond (0201-0035)	Phosphorus
Cayuga	Duck Lake (0704-0025)	Phosphorus
Cayuga	Owasco Inlet, Upper, and tribs (0706-0014)	Nutrients
Chautauqua	Chadakoin River and tribs (0202-0018)	Phosphorus
Chautauqua	Hulburt/Clymer Pond (0202-0079)	Phosphorus
Chautauqua	Middle Cassadaga Lake (0202-0002)	Phosphorus
Clinton	Great Chazy River, Lower, Main Stem (1002-0001)	Silt/Sediment
Columbia	Robinson Pond (1308-0003)	Phosphorus
Cortland	Dean Pond (0602-0077)	Phosphorus
Dutchess	Fallkill Creek (1301-0087)	Phosphorus
Dutchess	Hillside Lake (1304-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Phosphorus
Dutchess	Wappingers Lake (1305-0001)	Silt/Sediment
Erie	Beeman Creek and tribs (0102-0030)	Phosphorus
Erie	Delaware Park Pond (0101-0026)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Phosphorus
Erie	Ellicott Creek, Lower, and tribs (0102-0018)	Silt/Sediment
Erie	Green Lake (0101-0038)	Phosphorus
Erie	Little Sister Creek, Lower, and tribs (0104-0045)	Phosphorus
Erie	Murder Creek, Lower, and tribs (0102-0031)	Phosphorus

Erie	Rush Creek and tribs (0104-0018)	Phosphorus
Erie	Scajaquada Creek, Lower, and tribs (0101-0023)	Phosphorus
Erie	Scajaquada Creek, Middle, and tribs (0101-0033)	Phosphorus
Erie	Scajaquada Creek, Upper, and tribs (0101-0034)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Phosphorus
Erie	South Branch Smoke Cr, Lower, and tribs (0101-0036)	Silt/Sediment
Genesee	Bigelow Creek and tribs (0402-0016)	Phosphorus
Genesee	Black Creek, Middle, and minor tribs (0402-0028)	Phosphorus
Genesee	Black Creek, Upper, and minor tribs (0402-0048)	Phosphorus
Genesee	Bowen Brook and tribs (0102-0036)	Phosphorus
Genesee	LeRoy Reservoir (0402-0003)	Phosphorus
Genesee	Mill Pond (0402-0050)	Phosphorus
Genesee	Oak Orchard Cr, Upper, and tribs (0301-0014)	Phosphorus
Genesee	Oatka Creek, Middle, and minor tribs (0402-0031)	Phosphorus
Genesee	Tonawanda Cr, Middle, Main Stem (0102-0002)	Phosphorus
Greene	Schoharie Reservoir (1202-0012)	Silt/Sediment
Greene	Sleepy Hollow Lake (1301-0059)	Silt/Sediment
Herkimer	Steele Creek tribs (1201-0197)	Phosphorus
Herkimer	Steele Creek tribs (1201-0197)	Silt/Sediment
Kings	Hendrix Creek (1701-0006) 18	Nitrogen
Kings	Prospect Park Lake (1701-0196)	Phosphorus
Lewis	Mill Creek/South Branch, and tribs (0801-0200)	Nutrients
Livingston	Christie Creek and tribs (0402-0060)	Phosphorus
Livingston	Conesus Lake (0402-0004)	Phosphorus
Livingston	Mill Creek and minor tribs (0404-0011)	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs (0402-0033)	Phosphorus
Monroe	Buck Pond (0301-0017)	Phosphorus
Monroe	Cranberry Pond (0301-0016)	Phosphorus
Monroe	Durand, Eastman Lakes (0302-0037)	Phosphorus
Monroe	Lake Ontario Shoreline, Western (0301-0069) 9	Phosphorus
Monroe	Long Pond (0301-0015)	Phosphorus
Monroe	Mill Creek and tribs (0302-0025)	Phosphorus 2
Monroe	Mill Creek/Blue Pond Outlet and tribs (0402-0049)	Phosphorus
Monroe	Minor Tribs to Irondequoit Bay (0302-0038)	Phosphorus
Monroe	Rochester Embayment - East (0302-0002) [9]	Phosphorus
Monroe	Rochester Embayment - West (0301-0068) 9	Phosphorus
Monroe	Shipbuilders Creek and tribs (0302-0026)	Phosphorus 2
Monroe	Thomas Creek/White Brook and tribs (0302-0023)	Phosphorus

Nassau	Bannister Creek/Bay (1701-0380)	Nitrogen
Nassau	Beaver Lake (1702-0152)	Phosphorus
Nassau	Browswere Bay (1701-0383)	Nitrogen
Nassau	Camaans Pond (1701-0052)	Phosphorus
Nassau	East Meadow Brook, Upper, and tribs (1701-0211)	Silt/Sediment
Nassau	East Rockaway Channel (1701-0381)	Nitrogen
Nassau	Glen Cove Creek, Lower, and tribs (1702-0146)	Silt/Sediment
Nassau	Grant Park Pond (1701-0054)	Phosphorus
Nassau	Hempstead Bay, Broad Channel (1701-0032)	Nitrogen
Nassau	Hempstead Lake (1701-0015)	Phosphorus
Nassau	Hewlett Bay (1701-0382)	Nitrogen
Nassau	Hog Island Channel (1701-0220)	Nitrogen
Nassau	Massapequa Creek, Upper, and tribs (1701-0174)	Phosphorus
Nassau	Milburn/Parsonage Creeks, Upp, and tribs (1701-0212)	Phosphorus
Nassau	Reynolds Channel, East (1701-0215) [12]	Nitrogen
Nassau	Reynolds Channel, West (1701-0216) 12	Nitrogen
Nassau	Tidal Tribs to Hempstead Bay (1701-0218)	Nitrogen
Nassau	Tribs (fresh) to East Bay (1701-0204)	Silt/Sediment
Nassau	Tribs (fresh) to East Bay (1701-0204)	Phosphorus
Nassau	Tribs to Smith Pond/Halls Pond (1701-0221)	Phosphorus
Nassau	Woodmere Channel (1701-0219)	Nitrogen
New York	Harlem Meer (1702-0103)	Phosphorus
New York	The Lake in Central Park (1702-0105)	Phosphorus
Niagara	Bergholtz Creek and tribs (0101-0004)	Phosphorus
Niagara	Hyde Park Lake (0101-0030)	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0053) 9	Phosphorus
Niagara	Lake Ontario Shoreline, Western (0301-0072) 9	Phosphorus
Oneida	Ballou, Nail Creeks (1201-0203)	Phosphorus
Onondaga	Ley Creek and tribs (0702-0001) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nutrients (phosphorus)
Onondaga	Minor Tribs to Onondaga Lake (0702-0022) 10	Nitrogen (NH3, NO2)
Onondaga	Onondaga Creek, Lower (0702-0023) 10	Nutrients (phosphorus)
Onondaga	Onondaga Creek, Lower, and tribs (0702-0023)	Turbidity
Onondaga	Onondaga Creek, Middle, and tribs (0702-0004)	Turbidity
Onondaga	Onondaga Creek, Upper, and tribs (0702-0024)	Turbidity
Ontario	Great Brook and minor tribs (0704-0034)	Phosphorus 2
Ontario	Great Brook and minor tribs (0704-0034)	Silt/Sediment

Ontario	Hemlock Lake Outlet and minor tribs (0402-0013)	Phosphorus
Ontario	Honeoye Lake (0402-0032)	Phosphorus
Orange	Brown Pond Reservoir (1303-0013)	Phosphorus
Orange	Lake Washington (1303-0012)	Phosphorus
Orange	Minor Tribs to Middle Wallkill (1306-0061)	Phosphorus
Orange	Monhagen Brook and tribs (1306-0074)	Phosphorus
Orange	Orange Lake (1301-0008) [16]	Phosphorus
Orange	Quaker Creek and tribs (1306-0025)	Phosphorus
Orange	Wallkill River, Middle, Main Stem (1306-0038)	Phosphorus
Orange	Wallkill River, Upper, and Minor tribs (1306-0017)	Phosphorus
Orleans	Glenwood Lake (0301-0041)	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0070) 9	Phosphorus
Orleans	Lake Ontario Shoreline, Western (0301-0071) 9	Phosphorus
Oswego	Lake Neatahwanta (0701-0018)	Nutrients (phosphorus)
Oswego	Pleasant Lake (0703-0047)	Phosphorus
Putnam	Lost Lake, Putnam Lake (1302-0053)	Phosphorus
Putnam	Minor Tribs to Croton Falls Reservoir (1302-0001)	Phosphorus
Queens	Bergen Basin (1701-0009) 18	Nitrogen
Queens	Jamaica Bay, Eastern, and tribs, Queens (1701-0005) 18	Nitrogen
Queens	Kissena Lake (1702-0258)	Phosphorus
Queens	Meadow Lake (1702-0030)	Phosphorus
Queens	Shellbank Basin (1701-0001) 18	Nitrogen
Queens	Willow Lake (1702-0031)	Phosphorus
Rensselaer	Nassau Lake (1310-0001)	Phosphorus
Rensselaer	Snyders Lake (1301-0043)	Phosphorus
Richmond	Grassmere Lake/Bradys Pond (1701-0357)	Phosphorus
Rockland	Congers Lake, Swartout Lake (1501-0019)	Phosphorus
Rockland	Rockland Lake (1501-0021)	Phosphorus
Saratoga	Ballston Lake (1101-0036)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Phosphorus
Saratoga	Dwaas Kill and tribs (1101-0007)	Silt/Sediment
Saratoga	Lake Lonely (1101-0034)	Phosphorus
Saratoga	Round Lake (1101-0060)	Phosphorus
Saratoga	Tribs to Lake Lonely (1101-0001)	Phosphorus
Schenectady	Collins Lake (1201-0077)	Phosphorus
Schenectady	Duane Lake (1311-0006)	Phosphorus
Schenectady Lake	Mariaville Lake (1201-0113)	Phosphorus
Schuyler	Cayuta Lake (0603-0005)	Phosphorus

Seneca	Reeder Creek and tribs (0705-0074)	Phosphorus
St.Lawrence	Black Lake Outlet, Black Lake (0906-0001)	Phosphorus
St.Lawrence	Fish Creek and minor tribs (0906-0026)	Phosphorus
Steuben	Smith Pond (0502-0012)	Phosphorus
Suffolk	Agawam Lake (1701-0117)	Phosphorus
Suffolk	Big/Little Fresh Ponds (1701-0125)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Phosphorus
Suffolk	Canaan Lake (1701-0018)	Silt/Sediment
Suffolk	Fresh Pond (1701-0241)	Phosphorus
Suffolk	Great South Bay, East (1701-0039)	Nitrogen
Suffolk	Great South Bay, Middle (1701-0040)	Nitrogen
Suffolk	Great South Bay, West (1701-0173)	Nitrogen
Suffolk	Lake Ronkonkoma (1701-0020)	Phosphorus
Suffolk	Mattituck/Marratooka Pond (1701-0129)	Phosphorus
Suffolk	Mill and Seven Ponds (1701-0113)	Phosphorus
Suffolk	Millers Pond (1702-0013)	Phosphorus
Suffolk	Moriches Bay, East (1701-0305)	Nitrogen
Suffolk	Moriches Bay, West (1701-0038)	Nitrogen
Suffolk	Quantuck Bay (1701-0042)	Nitrogen
Suffolk	Shinnecock Bay and Inlet (1701-0033)	Nitrogen
Suffolk	Tidal Tribs to West Moriches Bay (1701-0312)	Nitrogen
Sullivan	Bodine, Montgomery Lakes (1401-0091)	Phosphorus
Sullivan	Davies Lake (1402-0047)	Phosphorus
Sullivan	Evens Lake (1402-0004)	Phosphorus
Sullivan	Pleasure Lake (1402-0055)	Phosphorus
Sullivan	Swan Lake (1401-0063)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Phosphorus
Tompkins	Cayuga Lake, Southern End (0705-0040)	Silt/Sediment
Ulster	Ashokan Reservoir (1307-0004)	Silt/Sediment
Ulster	Esopus Creek, Lower, Main Stem (1307-0010) [17]	Turbidity
Ulster	Esopus Creek, Middle, Main Stem (1307-0003) 17	Turbidity
Ulster	Esopus Creek, Upper, and minor tribs (1307-0007)[3]	Silt/Sediment
Ulster	Wallkill River, Lower, Main Stem (1306-0027)	Phosphorus
Warren	Hague Brook and tribs (1006-0006)	Silt/Sediment
Warren	Huddle/Finkle Brooks and tribs (1006-0003)	Silt/Sediment
Warren	Indian Brook and tribs (1006-0002)	Silt/Sediment
Warren	Lake George (1006-0016) and tribs	Silt/Sediment
Warren	Tribs to Lake George, East Shore (1006-0020)	Silt/Sediment
Warren	Tribs to Lake George, Lk.George Village (1006-0008)	Silt/Sediment

Washington	Wood Cr/Champlain Canal and tribs (1005-0036)	Phosphorus
Westchester	Lake Katonah (1302-0136)	Phosphorus
Westchester	Lake Lincolndale (1302-0089)	Phosphorus
Westchester	Lake Meahagh (1301-0053)	Phosphorus
Westchester	Lake Mohegan (1301-0149)	Phosphorus
Westchester	Lake Shenorock (1302-0083)	Phosphorus
Westchester	Mamaroneck River, Lower (1702-0071)	Silt/Sediment
Westchester	Mamaroneck River, Upp, & minor tribs (1702-0123)	Silt/Sediment
Westchester	Saw Mill River (1301-0007)	Phosphorus
Westchester	Saw Mill River, Middle, and tribs (1301-0100)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Phosphorus
Westchester	Sheldrake River (1702-0069)	Silt/Sediment
Westchester	Silver Lake (1702-0040)	Phosphorus
Westchester	Teatown Lake (1302-0150)	Phosphorus
Westchester	Truesdale Lake (1302-0054)	Phosphorus
Westchester	Wallace Pond (1301-0140)	Phosphorus

APPENDIX E – List of NYSDEC Regional Offices

<u>Region</u>	<u>COVERING THE FOLLOWING COUNTIES:</u>	<u>DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS</u>	<u>DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM</u>
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	220 WHITE PLAINS ROAD, SUITE 110 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, Po Box 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7438	5786 WIDEWATERS PARKWAY SYRACUSE, NY 13214-1867 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7165	700 DELAWARE AVENUE BUFFALO, NY 14209-2999 TEL. (716) 851-7070

APPENDIX F – SWPPP Preparer Certification Form

The SWPPP Preparer Certification Form required by this permit begins on the following page.

APPENDIX I – N.O.I/N.O.T. AND MS4 ACCEPTANCE FORMS

Construction General Permit (CGP) Electronic Notice of Intent (eNOI) GP-0-25-001

version 1.11

(Submission #: HQD-KW12-M24BF, version 1)

Details

Originally Started By Adam Colton

Alternate Identifier Waterchase Residential Subdivision ♦ Region 8

Submission ID HQD-KW12-M24BF

Status Draft

Active Steps Form Submitted

Form Input

Eligibility

Disturbance Threshold

1. Will the construction activity involve soil disturbances listed in Part I.A.1 of GP-0-25-001?

Yes

1.a. Will any runoff from the site enter a sewer system classified as a combined sewer?

No

1.b. Is this a remediation project being done under a Department approved work plan (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) with a SWPPP which meets the substantive requirements of GP-0-25-001?

No

1.c. Is the construction activity related to a stormwater discharge that does not require a permit as described in 40 CFR 122.3(e), e.g. non-point source agriculture or silviculture activities?

No

Other SPDES Permits

2. Will the discharge from the construction activity meet all conditions listed in Part I.A.2 of GP-0-25-001?

Yes

Threatened and Endangered Species

3. Will the construction activity potentially adversely affect a species that is endangered or threatened per Part I.A.3.?

No

State Historic Preservation Act (SHPA)

4. Is the construction activity designated by the Commissioner of the Office of Parks, Recreation and Historic Preservation (OPRHP), pursuant to 9 NYCRR ♦♦428.12 or 428.13 as exempt from the SHPA review (see Attachment 2 of the Letter of Resolution between NYSDEC and OPRHP, dated January 9, 2015)?

No

4.a. Will the construction activity:

- a) occur within an archeologically sensitive area indicated on the sensitivity map, or
- b) have the potential to affect a property that is listed or determined to be eligible for listing on the National or State Registers of Historic Pl or
- c) include a new permanent building on the construction site within the following distances from a building, structure, or object that is more th 50 years old and OPRHP, a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional ha determined is a historically/archeologically significant building, structure, or object:

- 1-5 acres of disturbance—20 feet
- 5-20 acres of disturbance—50 feet
- 20+ acres of disturbance—100 feet?

No

4.b. Is there documentation at the construction site demonstrating:

- a) that the construction activity is not within an archeologically sensitive area indicated on the sensitivity map, and that the construction activity is not immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and
- b) that there is no new permanent building to be built on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that OPRHP, a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant:
 - 1-5 acres of disturbance – 20 feet
 - 5-20 acres of disturbance – 50 feet
 - 20+ acres of disturbance – 100 feet?

Yes

State Environmental Quality Review (SEQR)

5. Is the construction activity subject to SEQR (Part I.A.5.), or the equivalent environmental review from another NYS or federal agency (Part I.A.6.)?

Yes

5.a. Has the owner/operator obtained documentation that the project review pursuant to SEQR, or the equivalent, has been satisfied per Part I.A.5. or I.A.6. of GP-0-25-001?

Yes

Uniform Procedures Act (UPA) Permits

6. Has the owner/operator obtained all necessary UPA permits from NYSDEC, or the equivalent from another NYS or federal agency per Part I.A.7.a. of GP-0-25-001?

Yes

Steep Slope

7. Is the construction activity within the watershed of surface waters of the State classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website?

No

Owner/Operator Information

8. Owner/Operator Name

Canandaigua Homes LLC

9. Owner/Operator Contact Person Information

First and Last Name	Phone	E-mail
Robert Brenner	585-598-1251	rbrenner@mahoneybrenner.com

10. Owner/Operator Mailing Address

83 S MAIN ST
CANANDAIGUA, NY 14424-1906
USA

11. Is the billing contact different from the Owner/Operator Contact?

No

12. What type of organization is the owner/operator?

Corporation

12.b. Is the owner/operator registered with the Department of State to do business in New York State?

Yes

12.b.i. Department of State ID #

7469780

The Department of State ID can be found using the following link:

[Department of State | Division of Corporations](#)

Site Information**13. Project/Site Name**

Waterchase Residential Subdivision

14. Site Address

156 Stewart Place
Canandaigua, NY 14424
Ontario

DEC Region

8

15. Site Latitude & Longitude

42.90817630520098,-77.28154212557777

Project Details**16. This eNOI submission is for:**

An entire common plan of development or sale in accordance with Part I.D.1.b.

17. Does the project type fall under Table 1 or Table 2 of Appendix B of GP-0-25-001? If any portion of the construction activity falls under Table 2, regardless of the size of the disturbance, select "Table 2".

Table 2

18. Consistent with Part III.B.1.c.i. of GP-0-25-001, provide a concise overview of the project. Describe existing and proposed conditions, and include any other relevant information.

The 27.4-acre subject parcel is located Southwest of the North Road & East Street intersection, on the east end of the existing Stewart Place in the City of Canandaigua R-1B Single Family Residential District. The applicant intends to construct a 79-lot residential subdivision on this lot. Development will be completed including ~3,800 LF of 24" wide public roadways, public watermain extension, sanitary sewer extension, street lighting, street landscaping, and stormwater management facilities (including stormwater collection). The 3,800 lf of public roads is made up of three roads that intersect to make a looped community.

Enter the total project site acreage, the acreage to be disturbed, and the future impervious area (acreage) within the disturbed area, rounded to the nearest tenth of an acre.

19. Total Site Area (acres)

27.4

20. Total Area to be Disturbed (acres)

22.5

21. Existing Impervious Area to be Disturbed (acres)

0.0

22. Future Impervious Area Within Disturbed Area (acres)

10.3

Nature of the project:

New Construction

23. Do you plan to disturb more than 5 acres of soil at any one time?

Yes

The owner/operator must meet the requirements in Part I.E.6. before disturbing greater than five acres at any one time.

24. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%)

0

B (%)

0

C (%)

0

D (%)

100

25. Enter the planned start and end dates of the disturbance activities.

Start Date

10/01/2025

End Date

10/01/2026

26. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Tributary to Canandaigua Outlet

27. Type of waterbody identified in question 26?

Stream/Creek Off Site

28. Has the surface waterbody in question 26 been identified as a 303(d) segment in Appendix D of GP-0-25-001?

No

29. Is this project located in one of the Watersheds identified in Appendix C of GP-0-25-001?

No

30. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?

No

31. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?

Yes

31.a. What is the name of the municipality/entity that owns the separate storm sewer system? If the separate sewer system is owned by an MS4 Operator, enter the MS4 Operator name.

Canandaigua

32. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?

No

33. Is this property owned by a state authority, state agency, federal government or local government?

No

Required SWPPP Components

General SWPPP Requirements

34. Has a SWPPP been developed in conformance with the requirements in Part III. of GP-0-25-001?

Yes

35. Does the SWPPP demonstrate consideration of the future physical risks due to climate change pursuant to the CRRRA, 6 NYCRR Part 490, and associated guidance per Part III.A.2. of GP-0-25-001?

Yes

36. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?

Yes

37. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the NYS Stormwater Management Design Manual?

Yes

37.a. Which version of the NYS Stormwater Management Design Manual was used to develop the SWPPP?

2024

SWPPP Preparer

39. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

40. Name of the person who prepared the SWPPP
Edmund Martin

41. SWPPP Preparer Organization Name
DDS Engineering and Survey, LLP

42. SWPPP Preparer Contact Information

First and Last Name	Phone	E-mail
Edmund Martin	585-359-7540	emartin@ddscompanies.com

43. SWPPP Preparer Address

45 HENDRIX RD
W HENRIETTA, NY 14586-9205

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form:

- 1) Click on the link below to download a blank certification form
- 2) The certified SWPPP preparer should sign this form
- 3) Upload the completed form

[Download SWPPP Preparer Certification Form](#)

44. Please upload the SWPPP Preparer Certification

[Appendix I - SWPPP Prep Cert Form.pdf](#) - 06/25/2025 11:42 AM

Comment
NONE PROVIDED

44.a. Has the SWPPP Preparer Certification Form been signed by the SWPPP preparer in accordance with Part VII.J of GP-0-25-001?

Yes

Erosion & Sediment Control Criteria

45. Has a construction sequence schedule for the planned management practices been prepared?

Yes

Post-Construction Criteria

Site Planning and Soil Restoration

46. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

Preservation of Undisturbed Area
Roadway Reduction

47. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6 ("Soil Restoration") of the Design Manual.

All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

Water Quality Criteria

49. Water Quality Sizing Criteria

Total WQv required (acre-feet)	Total RRv provided (acre-feet)	Minimum RRv (acre-feet)	Total WQv provided (acre-feet)	Sum of RRv and WQv provided
0.9	0.21	0.16	0.97	1.18

49.a. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required.

RRv and WQv provided are both greater than the required amounts.

Water Quantity Criteria

51. Does one of the waiver conditions apply to the channel protection for this construction activity?

No

51.b.i. CPv Required (acre-feet)

1.22

51.b.ii. CPv Provided (acre-feet)

1.27

52. Does one of the waiver conditions apply to the Qp and Qf for this construction activity?

No

Overbank Flood Control Criteria (Qp)

52.b.i. Pre-Development (CFS)

22.57

52.b.ii. Post-Development (CFS)

12.24

Total Extreme Flood Control Criteria (Qf)

52.b.iii. Pre-Development (CFS)

58.56

52.b.iv. Post-Development (CFS)

55.06

Operation and Maintenance

53. Has a long-term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?

Yes

53.a. Identify the entity responsible for the long-term Operation and Maintenance.

Owner/operator

Post-Construction SMP Identification

54. Post-Construction RR Techniques and Standard SMPs

RR Techniques and SMPs	Contributing Impervious Area (acres)	Total Contributing Area (acres)
Wet Pond (P-2)	4.110	
Filtration Bioretention (F-5)	6.210	

55. Alternative SMPs

Type of Alternative SMP	Manufacturer of the Alternative SMP	Name of the Alternative SMP	Contributing Impervious Area (acres)
NONE PROVIDED	NONE PROVIDED	NONE PROVIDED	NONE PROVIDED

Other Permits

56. Identify other permits, existing and new, that are required for this project/facility.

None

57. Is this NOI for a change in owner/operator per Part I.G.?

No

MS4 SWPPP Acceptance

59. Will the construction activities be within the municipal boundary(ies) of Traditional Land Use Control MS4 Operator(s) and discharge to the MS4(s)?

Yes

59.a. Which form is required per Part I.D.2.b.ii.?

MS4 SWPPP Acceptance Form

MS4 SWPPP Acceptance Form Download

Download the MS4 SWPPP Acceptance Form from the link below.
[MS4 SWPPP Acceptance Form](#)

60. MS4 Acceptance or No Jurisdiction Form Upload

NONE PROVIDED

Comment

NONE PROVIDED

60.a. Has the form been signed by the principal executive officer or ranking elected official or duly authorized representative of that person in accordance with Part VII.J. and submitted along with this NOI?
Yes

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the Owner/Operator Certification Form by clicking the link below.
[Owner/Operator Certification Form](#)

61. Upload Owner/Operator Certification Form

NONE PROVIDED

Comment

NONE PROVIDED

61.a. Has the Owner/Operator Certification Form from Appendix J been signed by the owner/operator, or a representative of the owner/operator in accordance with Part VII.J of GP-0-25-001 and uploaded to the eNOI?
Yes

Additional Project Information

62. Enter any additional pertinent project information in the text box below.
NONE PROVIDED

Attachments

Date	Attachment Name	Context	User
6/25/2025 11:42 AM	Appendix I - SWPPP Prep Cert Form.pdf	Attachment	Adam Colton

Status History

	User	Processing Status
6/25/2025 8:03:18 AM	Adam Colton	Draft

Processing Steps

Step Name	Assigned To/Completed By	Date Completed
Form Submitted		
Issue SPDES Permit ID	Daniel von Schilgen	



Department of
Environmental
Conservation

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information

1. Owner/Operator Name:	Canandaigua Homes LLC
2. Contact Person:	Robert Brenner
3. Street Address:	83 South Main St
4. City/State/Zip:	Canandaigua, NY 14424

II. Project Site Information

5. Project/Site Name:	Waterchase Residential Subdivision
6. Street Address:	Stewart Place
7. City/State/Zip:	Canandaigua

III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information

- | |
|---|
| 8. SWPPP Reviewed by: |
| 9. Title/Position: |
| 10. Date Final SWPPP Reviewed and Accepted: |

IV. Regulated MS4 Information

11. Name of MS4:	City of Canandaigua
12. MS4 SPDES Permit Identification Number:	NYR20A
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

**New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505**

(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized
under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ____ _

I. Owner or Operator Information

1. Owner/Operator Name: Canandaigua Homes LLC

2. Street Address: 83 South Main St.

3. City/State/Zip: Canandaigua, NY 14424

4. Contact Person: Robert Brenner

4a. Telephone: 585-598-1251

4b. Contact Person E-Mail: rbrenner@mahoneybrenner.com

II. Project Site Information

5. Project/Site Name: Waterchase Residential Subdivision

6. Street Address: Stewart Place

7. City/Zip: Canandaigua, NY 14424

8. County: Ontario

III. Reason for Termination

9a. ☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. *Date final stabilization completed (month/year): _____

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ____ _

(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? ☐ yes ☐ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? ☐ yes ☐ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

**NOTICE OF TERMINATION for Storm Water Discharges Authorized under the
SPDES General Permit for Construction Activity - continued**

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? ☐ yes ☐ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? 10.3
(acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes
☐ no
(If Yes, complete section VI - "MS4 Acceptance" statement)

V. Additional Information/Explanation:
(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:

Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the
SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:

Title/Position:

Signature:

Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:

Title/Position:

Signature:

Date:

IX. Owner or Operator Certification

I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:

Title/Position:

Signature:

Date:

(NYS DEC Notice of Termination - January 2015)



SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

Project/Site Name:

Waterchase Residential Subdivision

eNOI Submission ID:

HQD-KW12-M24BF

Owner/Operator Name:

Canandaigua Homes LLC

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Edmund

S

Martin

SWPPP Preparer First Name

MI

SWPPP Preparer Last Name

Signature

6/25/2025

Date

APPENDIX J – STORMWATER MAINTENANCE AND INSPECTION FORMS

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name _____
Permit No. _____ **Date of Authorization** _____
Name of Operator _____
Prime Contractor _____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector¹ conduct an assessment of the site prior to the commencement of construction² and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization³ using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Pre-construction Site Assessment Checklist

(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

- ☐ ☐ ☐ Has a Notice of Intent been filed with the NYS Department of Conservation?
- ☐ ☐ ☐ Is the SWPPP on-site? Where? _____
- ☐ ☐ ☐ Is the Plan current? What is the latest revision date? _____
- ☐ ☐ ☐ Is a copy of the NOI (with brief description) onsite? Where? _____
- ☐ ☐ ☐ Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

- ☐ ☐ ☐ Are construction limits clearly flagged or fenced?
- ☐ ☐ ☐ Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
- ☐ ☐ ☐ Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

- ☐ ☐ ☐ Clean stormwater runoff has been diverted from areas to be disturbed.
- ☐ ☐ ☐ Bodies of water located either on site or in the vicinity of the site have been identified and protected.
- ☐ ☐ ☐ Appropriate practices to protect on-site or downstream surface water are installed.
- ☐ ☐ ☐ Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA

- ☐ ☐ ☐ A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
- ☐ ☐ ☐ Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
- ☐ ☐ ☐ Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA

- ☐ ☐ ☐ Silt fence material and installation comply with the standard drawing and specifications.
- ☐ ☐ ☐ Silt fences are installed at appropriate spacing intervals
- ☐ ☐ ☐ Sediment/detention basin was installed as first land disturbing activity.
- ☐ ☐ ☐ Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

- ☐ ☐ ☐ The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
- ☐ ☐ ☐ The plan is contained in the SWPPP on page _____
- ☐ ☐ ☐ Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

- 1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
- 2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
- 3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;
- 4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);
- 5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and
- 6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)

Date of Inspection

Qualified Inspector (print name)

Qualified Inspector Signature

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality**Yes No NA**

- ☐ ☐ ☐ Is there an increase in turbidity causing a substantial visible contrast to natural conditions at the outfalls?
- ☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
- ☐ ☐ ☐ All disturbance is within the limits of the approved plans.
- ☐ ☐ ☐ Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

- ☐ ☐ ☐ Is construction site litter, debris and spoils appropriately managed?
- ☐ ☐ ☐ Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
- ☐ ☐ ☐ Is construction impacting the adjacent property?
- ☐ ☐ ☐ Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

- ☐ ☐ ☐ Maximum diameter pipes necessary to span creek without dredging are installed.
- ☐ ☐ ☐ Installed non-woven geotextile fabric beneath approaches.
- ☐ ☐ ☐ Is fill composed of aggregate (no earth or soil)?
- ☐ ☐ ☐ Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

3. Stabilized Construction Access

Yes No NA

- ☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.
- ☐ ☐ ☐ Installed per standards and specifications?
- ☐ ☐ ☐ Does all traffic use the stabilized entrance to enter and leave site?
- ☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

- ☐ ☐ ☐ Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
- ☐ ☐ ☐ Clean water from upstream pool is being pumped to the downstream pool.
- ☐ ☐ ☐ Sediment laden water from work area is being discharged to a silt-trapping device.
- ☐ ☐ ☐ Constructed upstream berm with one-foot minimum freeboard.

Runoff Control Practices (continued)

2. Flow Spreader

Yes No NA

- ☐ ☐ ☐ Installed per plan.
☐ ☐ ☐ Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
☐ ☐ ☐ Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

- ☐ ☐ ☐ Installed per plan with minimum side slopes 2H:1V or flatter.
☐ ☐ ☐ Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
☐ ☐ ☐ Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam

Yes No NA

- ☐ ☐ ☐ Is channel stable? (flow is not eroding soil underneath or around the structure).
☐ ☐ ☐ Check is in good condition (rocks in place and no permanent pools behind the structure).
☐ ☐ ☐ Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

- ☐ ☐ ☐ Installed per plan.
☐ ☐ ☐ Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

- ☐ ☐ ☐ Stockpiles are stabilized with vegetation and/or mulch.
☐ ☐ ☐ Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

- ☐ ☐ ☐ Temporary seedings and mulch have been applied to idle areas.
☐ ☐ ☐ 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Silt Fence and Linear Barriers

Yes No NA

- ☐ ☐ ☐ Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
☐ ☐ ☐ Joints constructed by wrapping the two ends together for continuous support.
☐ ☐ ☐ Fabric buried 6 inches minimum.
☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ____% of design capacity.

Sediment Control Practices (continued)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured practices)

Yes No NA

- ☐ ☐ ☐ Installed concrete blocks lengthwise so open ends face outward, not upward.
☐ ☐ ☐ Placed wire screen between No. 3 crushed stone and concrete blocks.
☐ ☐ ☐ Drainage area is 1 acre or less.
☐ ☐ ☐ Excavated area is 900 cubic feet.
☐ ☐ ☐ Excavated side slopes should be 2:1.
☐ ☐ ☐ 2" x 4" frame is constructed and structurally sound.
☐ ☐ ☐ Posts 3-foot maximum spacing between posts.
☐ ☐ ☐ Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.
☐ ☐ ☐ Manufactured insert fabric is free of tears and punctures.
☐ ☐ ☐ Filter Sock is not torn or flattened and fill material is contained within the mesh sock.

Sediment accumulation ____% of design capacity.

3. Temporary Sediment Trap

Yes No NA

- ☐ ☐ ☐ Outlet structure is constructed per the approved plan or drawing.
☐ ☐ ☐ Geotextile fabric has been placed beneath rock fill.
☐ ☐ ☐ Sediment trap slopes and disturbed areas are stabilized.

Sediment accumulation is ____% of design capacity.

4. Temporary Sediment Basin

Yes No NA

- ☐ ☐ ☐ Basin and outlet structure constructed per the approved plan.
☐ ☐ ☐ Basin side slopes are stabilized with seed/mulch.
☐ ☐ ☐ Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
☐ ☐ ☐ Sediment basin dewatering pool is dewatering at appropriate rate.

Sediment accumulation is ____% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
 - a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
 - b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:[illegible]

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
 Location: _____
 Site Status: _____

 Date: _____
 Time: _____

 Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6. Pond, toe & chimney drains clear and functioning		
7. Seeps/leaks on downstream face		
8. Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____		
1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1. Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4. Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3. Aesthetics		
a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaterers between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

APPENDIX K – SWPPP CERTIFICATION LETTER



SWPPP CERTIFICATIONS

Waterchase Subdivision, Canandaigua NY

7.1 Operator's Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signed:

DATE

7.2 Contractor's Certification

Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor*. The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed. The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the certification statement below before they commence any *construction activity*.

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the (Part III.A.6) *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of

The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

[illegible]

APPENDIX L – SOIL RESTORATION REQUIREMENTS

STANDARD AND SPECIFICATIONS FOR SOIL RESTORATION



Definition & Scope

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Conditions Where Practice Applies

Soil restoration is to be applied to areas whose heavy construction traffic is done and final stabilization is to begin. This is generally applied in the cleanup, site restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate ground cover to maintain the soil structure. Soil restoration measures should be applied over and adjacent to any runoff reduction practices to achieve design performance.



Design Criteria

1. Soil restoration areas will be designated on the plan views of areas to be disturbed.

2. Soil restoration will be completed in accordance with Table 4.6 on page 4.53.

Specification for Full Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil. The compost shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table, except for "Particle Size" 100% will pass the 1/2" sieve. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content.**



2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6 inches.
5. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.
6. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. This should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Maintenance

Keep the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Table 4.6
Soil Restoration Requirements

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only - no change in grade	HSG A&B	HSG C&D	Protect area from any ongoing construction activities.
	Apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A&B	HSG C&D	
	Aerate* and apply 6 inches of topsoil	Apply full Soil Restoration**	
Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (decompaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		
* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.			
** Per “Deep Ripping and De-compaction, DEC 2008”.			

STANDARD AND SPECIFICATIONS FOR STABILIZATION WITH SOD



Definition & Scope

Stabilizing restored, exposed soil surfaces by establishing long term stands of grass with sod to reduce damage from sediment and runoff to downstream areas and enhance natural beauty.

Conditions Where Practice Applies

On exposed soils that have a potential for causing off site environmental damage where a quick vegetative cover is desired. Moisture, either applied or natural, is essential to success.

Design Criteria

1. Sod shall be bluegrass or a bluegrass/red fescue mixture or a perennial ryegrass for average sites. (CAUTION: Perennial ryegrass has limited cold tolerance and may winter kill.) Use turf type cultivars of tall fescue for shady, droughty, or otherwise more critical areas. For variety selection, contact Cornell Cooperative Extension Turf Specialist.
2. Sod shall be machine cut at a uniform soil thickness of 3/4 inch, plus or minus 1/4 inch. Measurement for thickness shall exclude top growth and thatch.
3. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.
4. Sod shall be free of weeds and undesirable coarse weedy grasses. Wild native or pasture grass sod shall not be used unless specified.
5. Sod shall not be harvested or transplanted when

moisture content (excessively dry or wet) may adversely affect its survival.

6. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved by the contracting officer or his designated representative prior to its installation.

Site Preparation

Fertilizer and lime application rates shall be determined by soil tests. Under unusual circumstances where there is insufficient time for a complete soil test and the contracting officer agrees, fertilizer and lime materials may be applied in amounts shown in subsection 2 below. Slope land such as to provide good surface water drainage. Avoid depressions or pockets.

1. Prior to sodding, the surface shall be smoothed and cleared of all trash, debris, and of all roots, brush, wire, grade stakes and other objects that would interfere with planting, fertilizing or maintenance operations.
2. **The soil should be tested to determine the amounts of amendments needed.** Where the soil is acid or composed of heavy clays, ground limestone shall be spread to raise the pH to 6.5. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 20 lbs. of 5-5-10 (or equivalent) and mix into the top 3 inches of soil with the required lime for every 1,000 square feet. Soil should be moist prior to sodding. Arrange for temporary storage of sod to keep it shaded and cool.

Sod Installation

1. For the operation of laying, tamping, and irrigating for any areas, sod shall be completed within eight hours. During periods of excessively high temperature, the soil shall be lightly moistened immediately prior to laying the sod.
2. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to, and tightly wedged against, each other. Lateral joints shall be staggered to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots. On sloping areas where erosion may be a problem, sod shall be laid with the long edges parallel to the contour and with

staggered joints.

3. Secure the sod by tamping and pegging, or other approved methods. As sodding is completed in any one section, the entire area shall be rolled or tamped to ensure solid contact of roots with the soil surface.
4. Sod shall be watered immediately after rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Keep sod moist for at least two weeks.

Sod Maintenance

1. In the absence of adequate rainfall, watering shall be performed daily, or as often as deemed necessary by the inspector, during the first week and in sufficient quantities to maintain moist soil to a depth of 4 inches. Watering should be done in the morning. Avoid excessive watering during applications.
2. After the first week, sod shall be watered as necessary to maintain adequate moisture and ensure establishment.
3. The first mowing should not be attempted until sod is firmly rooted. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings. Grass height shall be maintained between 2 and 3 inches unless otherwise specified. Avoid heavy mowing equipment for several weeks to prevent rutting.
4. If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply fertilizer three to four weeks after sodding, at a rate of 1 pound nitrogen/1,000 sq.ft. Use a complete fertilizer with a 2-1-1 ratio.
5. Weed Control: Target herbicides for weeds present. Consult current Cornell Pest Control Recommendations for Commercial Turfgrass Management or consult the local office of Cornell Cooperative Extension.
6. Disease Control: Consult the local office of the Cornell Cooperative Extension.

Additional References

1. Home Lawns, Establishment and Maintenance, CCE Information Bulletin 185, Revised November 1994. Cornell University, Ithaca, NY.
2. Installing a Sod Lawn. CCE Suffolk County, NY. Thomas Kowalsick February 1994, Revised January 1999. www.cce.cornell.edu/counties/suffolk/grownet

APPENDIX M – WINTER STABILIZATION REQUIREMENTS

STANDARD AND SPECIFICATIONS FOR WINTER STABILIZATION



Definition & Scope

A temporary site specific, enhanced erosion and sediment control plan to manage runoff and sediment at the site during construction activities in the winter months to protect off-site water resources.

Conditions Where Practice Applies

This standard applies to all construction activities involved with ongoing land disturbance and exposure between November 15th to the following April 1st.

Design Criteria

1. Prepare a snow management plan with adequate storage for snow and control of melt water, requiring cleared snow to be stored in a manner not affecting ongoing construction activities.
2. Enlarge and stabilize access points to provide for snow management and stockpiling. Snow management activities must not destroy or degrade installed erosion and sediment control practices.
3. A minimum 25 foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes that are visible above the snow pack.
4. Edges of disturbed areas that drain to a waterbody within 100 feet will have 2 rows of silt fence, 5 feet apart, installed on the contour.
5. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and meltwater, shall be removed.
6. Sediment barriers must be installed at all appropriate

perimeter and sensitive locations. Silt fence and other practices requiring earth disturbance must be installed before the ground freezes.

7. Soil stockpiles must be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. A barrier must be installed at least 15 feet from the toe of the stockpile to prevent soil migration and to capture loose soil.
8. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures should be initiated by the end of the next business day and completed within three (3) days. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper.
9. If straw mulch alone is used for temporary stabilization, it shall be applied at double the standard rate of 2 tons per acre, making the application rate 4 tons per acre. Other manufactured mulches should be applied at double the manufacturer's recommended rate.
10. To ensure adequate stabilization of disturbed soil in advance of a melt event, areas of disturbed soil should be stabilized at the end of each work day unless:
 - a. work will resume within 24 hours in the same area and no precipitation is forecast or;
 - b. the work is in disturbed areas that collect and retain runoff, such as open utility trenches, foundation excavations, or water management areas.
11. Use stone paths to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. Stone paths should be a minimum 10 feet in width but wider as necessary to accommodate equipment.

Maintenance

The site shall be inspected frequently to ensure that the erosion and sediment control plan is performing its winter stabilization function. If the site will not have earth disturbing activities ongoing during the "winter season", all bare exposed soil must be stabilized by established vegetation, straw or other acceptable mulch, matting, rock, or other approved material such as rolled erosion control products. Seeding of areas with mulch cover is preferred but seeding alone is not acceptable for proper stabilization.

Compliance inspections must be performed and reports filed properly in accordance with the SWPPP for all sites under a winter shutdown.

References

1. Northeastern Illinois Soil and Sedimentation Control Steering Committee. October 1981. Procedures and Standards for Urban Soil Erosion and Sediment Control in Illinois.
2. J.F. Rushing, V.M. Moore, J.S. Tingle, Q. Mason, and T. McCaffery, 2005. Dust Abatement Methods for Lines of Communication and Base Camps in Temperate Climates. ERDC/GSL TR-05-23, October 2005.