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UNIVERSITY BLVD PHASE 2/ SHIER-RINGS ROAD & AVERY ROAD INTERSECTION

Stormwater Pollution Prevention Plan (SWPPP)

Prepared For: City of Dublin

December 11, 2020

Engineers, Surveyors, Planners, Scientists

MEMO

Date: December 11, 2020

To: Michael Sweder, City of Dublin

From: James Akins (614) 775-4389

Subject: University Blvd Phase 2/Shier Rings Road & Avery Road Intersection SWPPP Manual

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The following items are required in order to complete the SWPPP Manual:

1. Please sign the SWPPP certification sheet located within the front of the manual.
2. Upon receiving a copy in the mail from the Ohio EPA, insert a copy of the Ohio EPA Notice of Intent (NOI) approval letter within Appendix A. The assigned NPDES facility number is indicated on this letter.
3. Have the appropriate Contractors complete and submit the Ohio EPA Notice of Intent (NOI) Co-permittee application. The Co-permittee application can be found on the Ohio EPA's EBusiness Center website.
4. All Contractors associated with the implementation of the SWPPP are required to review the SWPPP and sign the acknowledgment form within Appendix B.
5. The Contractor is required to keep an up-to-date disturbance and stabilization activities log. An example is provided within Appendix F. This is an EPA requirement to assist with determining if the disturbed areas associated with the construction activities are being properly stabilized by either temporary or permanent means. Soil stabilization requirements are outlined within the SWPPP Section 3.1.
6. Ensure that the required erosion control site inspections are being provided and create reports. An example of an inspection report is provided within Appendix H. Site inspection requirements are indicated within the SWPPP Section 3.7.
7. The Contractor is required to update the SWPPP if modifications are necessary during construction activities. Indicate the SWPPP modifications on the log provided within Appendix I.
8. Ensure that a copy of the SWPPP manual and copies of the required inspections reports are kept on-site and available for the Ohio EPA to review during working hours.
9. Upon completion of the project, submit the Notice of Termination (NOT) form provided on the Ohio EPA's EBusiness Center website. This will terminate the NPDES permit coverage that was issued to cover the construction site stormwater discharges. Instructions are provided within the SWPPP Section 1.7.

Please let me know if you have any questions.

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SWPPP CERTIFICATION

"I certify under the 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Project Estimated Start Date:	March 2021
Project Estimated Completion Date:	December 2022
Project Owner:	City of Dublin
Signature:	_____
Printed Name:	Michael Sweder, PE
Phone Number:	614-410-4621
Date:	_____
SWPPP Prepared By:	EMH&T Inc.
Signature:	
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Date:	December 11, 2020
Site Contact:	Michael Sweder, PE The City of Dublin 6555 Shier-Rings Road Dublin, Ohio 43016 Phone: 614-410-4621 Email: msweder@dublin.oh.us

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1.0 OVERVIEW

1.1 SWPPP Overview

This plan has been prepared for the University Blvd Phase 2/Shier Rings Road & Avery Road Intersection project located within the City of Dublin, Franklin County. The SWPPP addresses the storm water management requirements within the Ohio Environmental Protection Agency General Permit No. OHC000005 which authorizes storm water discharges associated with construction activity under the National Pollutant Discharge Elimination System (NPDES) and the City of Dublin Erosion and Sediment Pollution Control Regulations.

City of Dublin is the operator associated with the project. Copies of the Ohio EPA NOI approval letter and Ohio EPA General Permit are provided in Appendix A.

The SWPPP identifies potential pollutant sources associated with construction site runoff and indicates the utilization of Best Management Practices (BMP's). BMP's consist of planned activities, structural and non-structural practices, maintenance procedures and management practices utilized to prevent or reduce the pollution of surface waters of the state. Construction activities covered under the permit include any clearing, grubbing, grading, excavating, filling procedures and dewatering activities that disturb the project area indicated on the Notice of Intent (NOI) application.

The permit also authorizes storm water runoff discharges from support activities associated with the project. Support activities include: concrete or asphalt batch plants; equipment staging yards; material storage areas; excavated material disposal and borrow areas. Non-storm water discharges covered by the permit include: discharges from firefighting activities; fire hydrant flushing; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred; air conditioning condensate; springs; uncontaminated ground water from trench or well point dewatering and foundation or footer drains where flows are not contaminated with the process materials such as solvents.

1.2 EPA NOI Co-permittee Application

Contractors associated with the project that meets the definition of a "site operator" per the Ohio EPA General Permit, shall complete the NOI co-permittee application and submit the application to the Ohio EPA. The Contractor shall be covered under the same Ohio EPA facility permit number assigned to the project that is indicated on the Ohio EPA NOI approval letter. The Contractor will be responsible for complying with the requirements within the EPA General Permit. The Ohio EPA NOI Co-permittee application is required to be filed electronically via the Ohio EPA's e-Business Center website which can be found by following the link below.

Ohio EPA EBusiness Center: https://ebiz.epa.ohio.gov/login.html

Steps to file a Co-permittee application are provided below.

1. Create an account/password and PIN on the Ohio EPA's e-Business Center.
2. Log on and click "Division of Surface Water NPDES Permit Applications (STREAMS).
3. At the top of the page under permit list click "Add Permit" and search for the project using the Ohio EPA NPDES Facility Permit Number. This was assigned to the project when the NOI was approved.
4. You will see your project added to the permit list. Click "Actions" and "Create Copermittee Permit Application"
5. Fill in the required information and submit the application form using your PIN.

Site Operator per the Ohio EPA General Permit: The party that has day-to-day operational control over those activities at a project which are necessary to ensure compliance with the SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

1.3 Potential Construction Site Storm Water Pollutants

The SWPPP identifies potential sources of pollutants which may reasonably be expected to affect the quality of storm water discharges associated with construction activities of the project. Descriptions of the BMP's are provided that shall be utilized to reduce the potential pollutants.

Potential Construction Site Storm Water Pollutants

Potential Pollutant	Best Management Practice
Sediment within construction site runoff	Sediment basin, sediment fence, storm sewer inlet protection, temporary and permanent seeding and mulching
Sediment associated with dewatering activities	Placement of intake hose shall be positioned at the top of the water level. Discharge hose shall be directed into a filter bag with a sufficient existing vegetative buffer prior to the stormwater outfall
Dust	Water trucks or other acceptable means of managing dust from construction traffic approved by the local governing authority
Fuels	Fuel tanks shall be stored away from surface waters and storm sewer inlets within a diked area. Spills shall be contained as soon as possible upon notification and material removed from the site. Fuel containers shall be closed when not in use so not to expose to stormwater.
Grease & Oil	Spills shall be contained as soon as possible upon notice and material removed from the site. Containers shall be closed when not in use so not to expose to stormwater. Empty containers shall be removed from the site and properly disposed of.
Fertilizers/Pesticides	Applied at the required rates and not on impervious areas.
Alkalinity	Concrete trucks shall utilize areas to washout trucks. Accumulated concrete shall be removed from the site and disposed of properly. Alternatively, contractors shall use a roll off box with a liner.

Ohio EPA Emergency Spill Hotline

Hazardous or potential hazardous material that is utilized on the site shall be handled, stored and disposed of properly to reduce the potential of polluting storm water runoff. Spills or other unintended releases in excess of reportable quantities that discharge hazardous substances into surface waters of the state shall be contained and reported as required within section 40 of the Code of Federal Regulations Part 117 and Part 302. Spills are to be immediately reported to the Ohio EPA Emergency Spill Hotline (1-800-282-9378).

Petroleum product spills of 25 gallons or more shall be immediately reported to the Ohio EPA and the local fire department. All releases of hazardous substances to the environment must be handled pursuant to applicable laws. All spills that result in the contact with waters of the state must be reported to the Ohio EPA. Smaller spills on impervious areas such as pavement shall be contained and absorbed with sawdust, kitty litter or other absorbent material and disposed of at a licensed sanitary facility.

1.4 SWPPP Availability

On-site:

The SWPPP shall be available immediately upon request of the City of Dublin and the Ohio EPA Director or an authorized representative during working hours. Additionally, a copy of the Notice of Intent (NOI) application and the EPA letter granting permit coverage under the Ohio EPA General Permit Number OHC000005 shall be made available.

Written request:

The SWPPP shall be provided within 10 days upon written request from the EPA Director or the Director's authorized representative.

To the public:

All NOI applications, Ohio EPA general permit approval for coverage letters, and SWPPP's are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee may claim to the Ohio EPA any portion of an SWPPP as confidential in accordance with Ohio law.

1.5 SWPPP Revision Requirement

The SWPPP shall be revised to address any changes required by the Ohio EPA Director or authorized representative within 10 days of the notification. The SWPPP shall be submitted to the EPA or a written certification that the revision requests have been addressed.

City of Dublin shall amend the SWPPP whenever there is a change in the design, construction, operation or maintenance, which has a significant effect on the potential for the discharges of pollutants to surface waters of the state or if the SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with construction

activities. The changes made to the SWPPP are required to be indicated on the SWPPP Amendment Log located within Appendix I.

1.6 Contractor and Subcontractor SWPPP Acknowledgement

City of Dublin shall inform all Contractors and subcontractors of the terms and conditions of the Ohio EPA general permit who will be involved with the implementation of the SWPPP prior to commencement of land disturbing activities on the site. City of Dublin shall maintain a written document containing the signatures of the Contractors and subcontractors involved with the implementation of the SWPPP. The Contractors and subcontractors roles associated with the SWPPP implementation shall be indicated on the signature sheet located within Appendix B.

1.7 Ohio EPA Notice of Termination

Erosion and sediment controls associated with the various construction activities shall be installed according to the erosion and sediment control plans located within Appendix C. The controls shall be inspected and maintained until the site is permanently stabilized and the Ohio EPA Notice of Termination (NOT) has been submitted which terminates the General Permit coverage. The NOT form shall be submitted to the Ohio EPA upon the permanent stabilization of the site and the removal of the temporary sediment controls. The Ohio EPA Notice of Termination (NOT) Application is required to be filed electronically using the Ohio EPA's e-Business Center.

Steps to file a Notice of Termination application are provided below.

1. Create an account/password and PIN on the Ohio EPA's e-Business Center.
2. Log on and click "Division of Surface Water NPDES Permit Applications (STREAMS).
3. At the top of the page under permit list click "Add Permit" and search for the project using the Ohio EPA NPDES Facility Permit Number. This was assigned to the project when the NOI was approved.
4. You will see your project added to the permit list. Click "Actions" and "Terminate Permit"
5. Fill in the required information and submit the application form using your PIN.

2.0 SITE DESCRIPTION

2.1 Construction Activity

The overall project consists of the construction of a four lane roadway on new alignment with sidewalks, shared use paths, lighting, storm sewer, water mains, sanitary sewer and roundabouts.

Construction activities associated with the project include:

- installation of temporary sediment controls;
- clearing and grading;
- installation of the proposed site infrastructure;
- construction of the proposed roadway;
- and permanent stabilization of the disturbed areas.

An estimated 36.24 acres shall be disturbed associated with construction activities.

LOCATION MAP
No Scale

2.2 Site Area Information

Total Site Disturbance as indicated on the EPA NOI =	36.24 Acres
Latitude:	40.096669°
Longitude:	-83.169488°
Pre-construction Impervious Area =	6.80 Acres
Post-construction Impervious Area =	14.77 Acres
Pre-construction Volumetric Runoff Coefficient =	0.58
Post-construction Volumetric Runoff Coefficient =	0.67

2.3 Soil Data

According to the USDA Soil Survey, the predominant soils on-site consist of:

- CrA – Crosby silt loam, 0-2% slopes — Type "C/D" Hydrologic Soil Group
- Ko – Kokomo silty clay loam, 0-2% slopes — Type "C/D" Hydrologic Soil Group
- LeB – Lewisburg-Crosby complex, 2-6% slopes — Type "C/D" Hydrologic Soil Group
- Ut – Udorthents-Urban land complex — Type "C/D" Hydrologic Soil Group

Soil erosion rates increase as the existing cover is removed resulting from construction activities. Sediment controls are to be installed and properly maintained as indicated within this plan to minimize sediment laden runoff from flowing offsite. Disturbed areas are to be stabilized per the temporary and permanent stabilization requirements as indicated within Section 3.1.

Muddy water encountered within excavated areas will require to be pumped into a filter bag.

Soil Map

2.4 Existing Land Use & Adjacent Areas

The existing land-use associated with the site consists of open field. The site is bordered by open field and US 33 to the north, warehouses to the east, the existing Shier Rings Road to the south, and Eiterman Road to the west.

Limits of Disturbance Map

2.5 Receiving Stream

Stormwater runoff associated with the project is tributary to Cosgray Ditch.

2.6 Construction Sequence – Best Management Practice Installation

Note: Ensure that a copy of the NOI, Ohio EPA approval letter, and the SWPPP are available on-site during working hours.

Phase 1

1. Where indicated on the plans, install storm drain inlet protection on existing inlets and establish concrete washout area.
2. Ensure a stabilized construction entrance and staging area are installed and utilized throughout construction activities.
3. Install perimeter controls where shown on the plans.
4. Place the check dams in the existing ditches.

Phase 2

1. Begin excavating the sediment basins, installing the outlet structures, temporary pipe, and skimmers.
2. Ensure basin slopes above normal pool is stabilized with erosion control matting or jute matting.
3. Commence with clearing, grading, and fill activities.
4. Ensure disturbed areas that are to remain idle for more than 14 days are temporarily stabilized.
5. Install the proposed utilities. Utilize a dewatering filter bag for any muddy water encountered.
6. Install storm drain inlet protection on the newly construction storm inlets.
7. Install the proposed culvert where Cosgray Ditch passes through the roadway corridor. Utilize the stream pump around detail.
8. Ensure the perimeter controls are installed per the phase 2 portion of the plans.
9. Construct the existing basin improvements. Ensure all disturbed areas are permanently stabilized.
10. Begin installing roadway curb and pavement, ensure concrete washout area is utilized for concrete wash.
11. Permanently seed and stabilize the disturbed areas that are at final grade.
12. Remove the ditch check dams, storm drain protection and perimeter controls. Permanently stabilize areas if disturbed during BMP removal.
13. Once permanent vegetation is established, remove the temporary pipe and skimmer from the basin outlet structures. Install the post-construction water quality orifices.

3.0 CONTROLS

Erosion controls, sediment controls and storm water management practices utilized shall be installed per the details indicated on the erosion and sediment control plan located within Appendix C.

Alternative controls installed by the contractor shall be documented within the SWPPP Amendment Log located within Appendix I and the installation of the controls shall meet the standards and specifications in the current edition of Ohio's Rainwater and Land Development manual or other standards acceptable to the Ohio EPA.

3.1 Erosion Control Practices

Temporary seeding and mulching applications shall be utilized to stabilize disturbed areas throughout the construction process.

Throughout construction activities, the site Contractor is required to maintain a log documenting land disturbing and temporary/permanent stabilization activities associated with the site. A log is provided within Appendix F. Disturbed areas are to be temporarily and permanently stabilized per the requirements outlined below.

Temporary Stabilization

Project Area	Time Frame for Application
Disturbed areas within 50' of a surface water of the state and not at final grade	Within 2 days of the most recent disturbance
Disturbed areas that will be dormant for more than 14 days but less than 1 year, and not within 50' of a surface water of the state	Within 7 days of the most recent disturbance within the area. Residential lots are to be stabilized at least 7 days prior to transfer of the permit coverage
Disturbed areas that will be idle over the winter	Prior to the onset of winter weather

Note: The temporary seeding mix/application rates are provided on the ESC Plans.

Permanent Stabilization

Project Area	Time Frame for Application
Area to lie dormant for more than 1 year	Within 7 days of the most recent disturbance
Area within 50' of a stream and at final grade	Within 2 days of reaching final grade
Other areas at final grade	Within 7 days of reaching final grade

Note: The permanent seeding mix/application rates are provided on the ESC Plans.

3.2 Sediment Control Practices

Sediment control devices shall be implemented for all areas remaining disturbed for over 14 days. Additionally, the sediment controls shall be installed within 7 days of grubbing activities.

The Ohio EPA requires that during construction a site must provide a means by which to control the sediment laden runoff from the construction site. For each acre of drainage area that is tributary to the sediment basin, a drawdown volume of 67 yd^3 is provided above the normal pool elevation. The basin will additionally provide more than the required 37 yd^3 of settling volume below the normal pool elevation for each acre of disturbed area tributary to the basin.

Wet Basins A, B, and C will be used as a sediment basin during construction.

Sediment Basin Calculations

Basin Identifier	Tributary area (acres)	Disturbed area (acres)	Required Dewatering Volume (ac-ft)	Provided Dewatering Volume (ac-ft)	Dewatering Elevation	Required Sediment Storage Volume (ac-ft)	Provided Sediment Storage Volume (ac-ft)	Marlee Float Skimmer Orifice Size (inches)
Wet Basin A	8.70	5.82	0.36	0.431	931.28	0.13	0.700	2.5
Wet Basin B	9.41	8.49	0.39	0.519	924.17	0.19	0.910	3.0
Wet Basin C	15.08	6.19	0.63	0.724	921.62	0.14	2.332	4.0

Sedimentation Calculations and a drawdown graphs are included in Appendix D. The Stormwater Tributary Map is included in Appendix E.

The site will additionally utilize sediment controls such as sediment fence and inlet protection to manage runoff during construction. Details associated with the various sediment controls are indicated on the erosion and sediment control plan within Appendix C.

3.3 Post-Construction Storm Water Quality

The Ohio EPA requires that a redevelopment site have a 20 percent net reduction of the site's volumetric runoff coefficient through impervious area reduction, or treat 20 percent of the water quality volume for the previously developed area and 100 percent of the new impervious area. The University Boulevard Phase 2 and Shier Rings Road & Avery Road Intersection project is required to treat a water quality volume of 0.702 acre-feet. Within the right of way, the individual basins provide a total 0.705 acre-feet of treatment, which meets and exceeds the water quality requirement. The water quality treatment per basin is detailed below.

Water Quality Treatment Provided within Right of Way

Basin Identifier	Water Quality Volume (ac-ft)
Wet Basin A	0.167
Wet Basin B	0.274
Wet Basin C	0.264
Total	**0.705**

The City of Dublin Stormwater Design Manual states that for roadway resurfacing, post-construction quality controls are not required, so areas that were limited to just roadway resurfacing were not included in water quality calculations.

The Ohio EPA requires that the water quality volume for wet basins be detained for a period of 24 hours while not discharging more than the first half of the water quality volume in less than 8 hours. Water quality drawdown for the Basins A, B, and C will be provided by the basin's 1st stage outlet. Redevelopment and Water Quality Calculations are described in the tables below.

Redevelopment Water Quality Calculations

Total Site Area (acres)	Existing Impervious Area (acres)	Existing % Impervious	Existing Rv	Proposed Impervious Area (acres)	Proposed % Impervious	Proposed Rv	Required WQv Treatment (ac-ft)
29.02	4.35	15%	0.19	13.56	47%	0.47	**0.702**

Water Quality Calculations

Basin Identifier	Tributary area (acres)	Percent Impervious (%)	Water Quality Volume (ac-ft)	Water Quality Elevation (feet)
Wet Basin A	8.7	29	0.203	930.76
Wet Basin B	9.41	40	0.292	923.90
Wet Basin C	15.08	61	0.680	921.69
Total	**33.19**	**47**	**1.175**	**-**

The addition of the roadway to provide a left turn parking lot exit for the Dublin City School Transportation results in an impact to the existing Dublin Service Center basin. The impacts to the basin will be compensated for with additional volume provided by re-grading the basin above normal pool. The basin was originally constructed in 2002 and the water quality calculations were performed using the EPA requirements from that time period, but using the present day impervious/pervious areas, as additional impervious area was added to the tributary area to the basin between 2002 and present day.

Service Center Basin Water Quality Calculations

Basin Identifier	Tributary area (acres)	Percent Impervious (%)	Water Quality Volume (ac-ft)	Water Quality Elevation (feet)
Service Center Basin	15.606	59%	0.569	923.08

Water quality calculations and drawdown graphs are included in Appendix D.

3.4 Dewatering Activities

The direct discharge of muddy water to surface waters of the state is a direct violation of the Ohio EPA General Permit. Muddy water encountered during excavation activities shall be directed into a dewatering filter bag. Additional Best Management Practices such as perimeter sediment fence and gravel dikes around the bag are necessary if bags are utilized. Additionally, a dense vegetated buffer strip is required between the bag and the stormwater outfall location. A 50 foot minimum strip of vegetation is recommended.

3.5 Surface Water Impacts

The construction of the University Boulevard Phase 2/Shier-Rings Road and Avery Road Intersection project is a part of an overall 102 acre development. The University Boulevard Phase 2/Shier-Rings Road and Avery Road Intersection project will not require any surface water impact permits. However, an Ohio EPA Section 401 Water Quality Certification and Section 404 authorization from the United State Army Corps of Engineers (USACE) will be obtained for the impacts to the surface water features that will be impacted by a separate plan, which facilitates the construction of this project. The permit study area includes five (5) parcels owned by the City of Dublin, totaling approximately 102 acres. The overall 140-acre project area contains 3,776 linear feet of intermittent stream and 1.05 acres of jurisdictional wetlands. The proposed impacts include 3,007 linear feet of intermittent stream, and 0.22 acre of Category 1 jurisdictional wetlands. Mitigation for these impacts will include onsite mitigation via stream relocation and restoration. The onsite mitigation will include restoration of approximately 3,000 linear feet of intermittent stream. The required wetland mitigation will occur offsite via purchase of 0.4 acre of credit from the Big-Darby Hellbranch Mitigation Bank.

3.6 Non-sediment Pollutant Controls

Waste Disposal

Containers shall be provided for the proper collection of all waste material. Construction and demolition debris (CD&D) must be disposed of in accordance with Ohio Revised Code 3714 at an approved Ohio EPA CD&D landfill. Temporary sanitary water facilities additionally must be provided and maintained. Dumpsters shall be closed or covered when not in use (non-operating hours) to limit the temporarily stored waste to storm water exposure and ensuring that no liquid wastes or wastes saturated with significant materials are allowed to be accumulated in trash dumpsters.

Construction Chemicals
The storage and mixing of chemicals shall be performed in a designated area away from watercourses and storm sewer inlets. Chemical containers shall be properly stored on-site to ensure that they are not exposed to rain events. Empty containers shall be properly disposed of off-site at an approved facility. Equipment maintenance and refueling areas are to be located away from storm water conveyance channels and surface waters. A Spill Prevention Control and Countermeasure Plan (SPCC) must be provided by the Contractor if on-site temporary fuel tanks exceed 660 gallons or if the combined storage is above 1320 gallons.

Concrete Washout Areas
Concrete trucks shall have a designated wash-pit or sump with no potential for discharge to ensure that the concrete wash shall not enter storm drains and waters of the state.

Contaminated Soils
Hazardous substances spilled or released into the soil shall be dug up and disposed of at a licensed sanitary landfill.

Dust Control
Manufactured dust suppressants shall be applied at the manufacturers specifications. Water trucks can additionally be used. Manufactured products shall be applied in a manner to not result in discharges to waters of the state. The suppressants shall not be applied if precipitation is noted in the short term forecast.

Off-site traffic
Temporary construction drives or the existing paved drives shall be utilized to assist with the prevention of off-site tracking of mud. Accumulated mud tracked beyond the limits of the project shall be removed on an as needed basis by the contractor. Collected mud shall be incorporated into the disturbance activities associated with the site and appropriately stabilized.

3.7 Inspections

Inspection of the temporary and permanent controls shall be conducted, at a minimum, once every seven days and within 24 hours of a 0.5" rain event or greater. The inspector shall have the proper knowledge and experience in the installation and maintenance of the controls and the permit requirements.

A report shall be completed for each inspection indicating the controls that have been installed, controls needing to be installed, maintenance required and indicate maintenance that has occurred. All preventative and remedial maintenance work, including clean out, repair, replacement, re-grading, reseeding, re-mulching and re-netting must be performed within three days of the inspection. Required maintenance work associated with sediment basins shall be conducted within ten days of the inspection. If erosion and sediment control BMPs fail to perform as expected, replacement BMPs, or modifications of those installed will be required. The permittee shall maintain the reports for a period of three years after the Notice of Termination form has been submitted. Inspection reports are located in Appendix H.

3.8 Erosion and Sediment Control BMP Maintenance

The temporary controls shall be maintained and repaired as indicated within the inspection reports to ensure proper functionality of the controls. The controls shall be maintained as indicated on the BMP details located on the erosion and sediment control plan within Appendix C. Maintenance shall be conducted until the upslope areas of the controls are permanently stabilized with permanent vegetation. Accumulated sediment shall be removed from the controls and utilized as fill material in non-structural areas. Maintenance conducted shall be recorded and filed within the SWPPP. If a control practice is in need of repair or maintenance, as indicated by inspection, it must be repaired or maintained within three days of inspection.

Temporary controls are to be removed upon permanent stabilization of the site. Permanent stabilizations consists of the establishment of permanent vegetation, decorative landscape mulch, matting, sod rip-rap and other landscaping techniques that provides permanent erosion control on areas where land disturbing activities are completed. Permanent stabilization by means of grass vegetation is established when a uniform perennial vegetative cover with a density of at least 70% is achieved.

Sediment Basin: Inspect the outlet structure to ensure that the basin is draining properly. Remove any accumulated debris which may impede the basin dewatering. Remove the accumulated sediment within the basin to ensure that the volume provided below the normal pool elevation is provided. Accumulated sediment within the basin shall be removed once the storage volume has been reduced by half. The removed sediment shall be stabilized on-site. Maintenance work must be performed within ten days of the inspection.

Storm Sewer Inlet Protection: Accumulated sediment must be removed from the filter fabric to ensure that the protections drain properly. Damaged protections must be repaired or replaced. Maintenance work must be performed within three days of the inspection.

Construction Entrance: The minimum rock thickness of 6" shall be maintained throughout the utilization of the temporary entrance. Sediment deposited onto the paved roads shall be removed daily. Maintenance work must be performed within three days of the inspection.

Rock Check Dam: Rock check dams shall be placed where standing water or excessive siltation will be minimized or where damage to vegetative lining will be insignificant. Sediment shall be removed from behind check dam once it accumulates to one-half the original height of the check dam.

Sediment Fence: Accumulated sediment must be removed from the fence when the sediment reaches ½ the above ground height of the fence. Undermined or overtopped fence must be repaired or replaced with a rock check dam. Maintenance work must be performed within three days of the inspection.

Dewatering Filter Bag: Filter bags and the associated perimeter controls are to be maintained throughout the duration of pumping activities. Bags shall be replaced once they have filled with sediment. Accumulated sediment within the bag shall be removed and placed on-site to dry. Spread soil and stabilize. The Contractor shall monitor the outflow from the bags and through the perimeter controls and existing vegetated areas. If the quality of the water is "muddy" in appearance, then

additional controls are required to be installed. Maintenance work must be performed immediately upon the inspection.

Temporary & Permanent Seeding: Seeded areas shall be inspected upon rain events to ensure areas are not washing out. Washed out areas shall be repaired and reseeded. Temporary sediment controls and/or erosion control matting may need to be utilized if washout problems routinely occur. Maintenance work must be performed within three days of the inspection.

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APPENDIX A: Ohio EPA Approval Letter & General Permit

Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

Dec 18, 2020

City of Dublin
Paul Hammersmith
6555 Shier Rings Road
Dublin, OH 43016

Re: Approval Under Ohio EPA National Pollutant Discharge Elimination System (NPDES) - Construction Site Stormwater General Permit - OHC000005

Dear Applicant,

Your NPDES Notice of Intent (NOI) application is approved for the following facility/site. Please use your Ohio EPA Facility Permit Number in all future correspondence.

Facility Name:	University Blvd Phase 2
Facility Location:	E of Eiteman Road &Shier Rings Road
City:	Dublin
County:	Franklin
Township:	
Ohio EPA Facility Permit Number:	4GC07621*AG
Permit Effective Date:	Dec 18, 2020

Please read and review the permit carefully. The permit contains requirements and prohibitions with which you must comply. Coverage under this permit will remain in effect until a renewal of the permit is issued by the Ohio EPA.

If more than one operator (defined in the permit) will be engaged at the site, each operator shall seek coverage under the general permit. Additional operator(s) shall submit a Co-Permittee NOI to be covered under this permit. There is no fee associated with the Co-Permittee NOI form.

Please be aware that this letter only authorizes discharges in accordance with the above referenced NPDES CGP. The placement to fill into regulated waters of the state may require a 401 Water Quality Certification and/or Isolated Wetlands Permit from Ohio EPA. Also, a Permit-To-Install (PTI) is required for the construction of sanitary or industrial wastewater collection, conveyance, storage, treatment, or disposal facility; unless a specific exemption by rule exists. Failure to obtain the required permits in advance is a violation of Ohio Revised Code 6111 and potentially subjects you to enforcement and civil penalties.

To view your electronic submissions and permits please Logon in to the Ohio EPA's eBusiness Center at http://ebiz.epa.ohio.gov.

If you need assistance or have questions please call (614) 644-2001 and ask for Construction Site Stormwater General Permit support or visit our website at http://www.epa.ohio.gov.

Sincerely,

Laurie A. Stevenson
Director

Issuance Date: April 23, 2018
Effective Date: April 23, 2018
Expiration Date: April 22, 2023

Ohio EPA APR 23 '18
Entered Directors Journal

OHIO ENVIRONMENTAL PROTECTION AGENCY

GENERAL PERMIT AUTHORIZATION FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et. seq. hereafter referred to as "the Act") and the Ohio Water Pollution Control Act [Ohio Revised Code ("ORC") Chapter 6111], dischargers of storm water from sites where construction activity is being conducted, as defined in Part I.B of this permit, are authorized by the Ohio Environmental Protection Agency, hereafter referred to as "Ohio EPA," to discharge from the outfalls at the sites and to the receiving surface waters of the state identified in their Notice of Intent ("NOI") application form on file with Ohio EPA in accordance with the conditions specified in Parts I through VII of this permit.

It has been determined that a lowering of water quality of various waters of the state associated with granting coverage under this permit is necessary to accommodate important social and economic development in the state of Ohio. In accordance with OAC 3745-1-05, this decision was reached only after examining a series of technical alternatives, reviewing social and economic issues related to the degradation, and considering all public and intergovernmental comments received concerning the proposal.

This permit is conditioned upon payment of applicable fees, submittal of a complete NOI application form, development (and submittal, if applicable) of a complete Storm Water Pollution Prevention Plan (SWP3) and written approval of coverage from the director of Ohio EPA in accordance with Ohio Administrative Code ("OAC") Rule 3745-38-02.

Craig W. Butler
Director

Total Pages: 60

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: [signature] Date: 4-23-18

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PART I. COVERAGE UNDER THIS PERMIT

A. Permit Area.

This permit covers the entire State of Ohio. Appendices A and B of this permit contain additional watershed specific requirements for construction activities located partially or fully within the Big Darby Creek Watershed and portions of the Olentangy River Watershed. Projects within portions of the Olentangy River watershed shall seek coverage under this permit following the expiration of OHCO00002 (May 31, 2019).

B. Eligibility.

1. Construction activities covered. Except for storm water discharges identified under Part I.B.2, this permit may cover all new and existing discharges composed entirely of storm water discharges associated with construction activity that enter surface waters of the state or a storm drain leading to surface waters of the state.

   For the purposes of this permit, construction activities include any clearing, grading, excavating, grubbing and/or filling activities that disturb one or more acres. Discharges from trench dewatering are also covered by this permit as long as the dewatering activity is carried out in accordance with the practices outlined in Part III.G.2.g.iv of this permit.

   Construction activities disturbing one or more acres of total land, or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land are eligible for coverage under this permit. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale.

   This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

   a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;

   b. The support activity is not a commercial operation serving multiple unrelated construction projects and does not operate beyond the completion of the construction activity at the site it supports;

   c. Appropriate controls and measures are identified in a storm water pollution prevention plan (SWP3) covering the discharges from the support activity; and

   d. The support activity is on or contiguous with the property defined in the NOI (offsite borrow pits and soil disposal areas, which serve only one project, do not have to be contiguous with the construction site).

2. Limitations on coverage. The following storm water discharges associated with construction activity are not covered by this permit:

a. Storm water discharges that originate from the site after construction activities have ceased, including any temporary support activity, and the site has achieved final stabilization. Industrial post-construction storm water discharges may need to be covered by an NPDES permit;

b. Storm water discharges associated with construction activity that the director has shown to be or may reasonably expect to be contributing to a violation of a water quality standard; and

c. Storm water discharges authorized by an individual NPDES permit or another NPDES general permit;

3. Waivers. After March 10, 2003, sites whose larger common plan of development or sale have at least one, but less than five acres of land disturbance, which would otherwise require permit coverage for storm water discharges associated with construction activities, may request that the director waive their permit requirement. Entities wishing to request such a waiver must certify in writing that the construction activity meets one of the two waiver conditions:

a. Rainfall Erosivity Waiver. For a construction site to qualify for the rainfall erosivity waiver, the cumulative rainfall erosivity over the project duration must be five or less and the site must be stabilized with a least a 70 percent vegetative cover or other permanent, non-erosive cover. The rainfall erosivity must be calculated according to the method in U.S. EPA Fact Sheet 3.1 Construction Rainfall Erosivity Waiver dated January 2001 and be found at: http://epa.ohio.gov/portals/35/permits/USEPAfact3-1_s.pdf. If it is determined that a construction activity will take place during a time period where the rainfall erosivity factor is less than five, a written waiver certification must be submitted to Ohio EPA at least 21 days before construction activity is scheduled to begin. If the construction activity will extend beyond the dates specified in the waiver certification, the operator must either: (a) recalculate the waiver using the original start date with the new ending date (if the R factor is still less than five, a new waiver certification must be submitted) or (b) submit an NOI application form and fee for coverage under this general permit at least seven days prior to the end of the waiver period; or

b. TMDL (Total Maximum Daily Load) Waiver. Storm water controls are not needed based on a TMDL approved or established by U.S. EPA that addresses the pollutant(s) of concern or, for non-impaired waters that do not require TMDLs, and equivalent analysis that determines allocations for small construction sites for the pollutant(s) of concern or that determines that such allocations are not needed to protect water quality based on consideration of existing in-stream concentrations, expected growth in pollutant contributions from all sources, and a margin of safety. The pollutant(s) of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. The operator must certify to the director of Ohio EPA that the construction activity will take place, and storm water discharges will occur, within the drainage area addressed by the TMDL or equivalent analysis. A written waiver certification must be submitted to Ohio EPA at least 21 days before the construction activity is scheduled to begin.

4. Prohibition on non-storm water discharges. All discharges covered by this permit must be composed entirely of storm water with the exception of the following: discharges from firefighting activities; fire hydrant flushings; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water from trench or well point dewatering and foundation or footing drains where flows are not contaminated with process materials such as solvents. Dewatering activities must be done in compliance with Part II.C and Part III.G.2.g.iv of this permit. Discharges of material other than storm water or the authorized non-storm water discharges listed above must comply with an individual NPDES permit or an alternative NPDES general permit issued for the discharge.

   Except for flows from firefighting activities, sources of non-storm water listed above that are combined with storm water discharges associated with construction activity must be identified in the SWP3. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

5. Spills and unintended releases (Releases in excess of Reportable Quantities). This permit does not relieve the permittee of the reporting requirements of Title 40 of the Code of Federal Regulations ("CFR") Part 117 and 40 CFR Part 302. In the event of a spill or other unintended release, the discharge of hazardous substances in the storm water discharge(s) from a construction site must be minimized in accordance with the applicable storm water pollution prevention plan for the construction activity and in no case, during any 24-hour period, may the discharge(s) contain a hazardous substance equal to or in excess of reportable quantities.

   40 CFR Part 117 sets forth a determination of the reportable quantity for each substance designated as hazardous in 40 CFR Part 116. The regulation applies to quantities of designated substances equal to or greater than the reportable quantities, when discharged to surface waters of the state. 40 CFR Part 302 designates under section 102(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, those substances in the statutes referred to in section 101(14), identifies reportable quantities for these substances and sets forth the notification requirements for releases of these substances. This regulation also sets forth reportable quantities for hazardous substances designated under section 311(b)(2)(A) of the Clean Water Act (CWA).

C. Requiring an individual NPDES permit or an alternative NPDES general permit.

1. The director may require an alternative permit. The director may require any operator eligible for this permit to apply for and obtain either an individual NPDES permit or coverage under an alternative NPDES general permit in accordance with OAC Rule 3745-38-02. Any interested person may petition the director to take action under this paragraph.

The director will send written notification that an alternative NPDES permit is required. This notice shall include a brief statement of the reasons for this decision, an application form and a statement setting a deadline for the operator to file the application. If an operator fails to submit an application in a timely manner as required by the director under this paragraph, then coverage, if in effect, under this permit is automatically terminated at the end of the day specified for application submittal.

2. Operators may request an individual NPDES permit. Any owner or operator eligible for this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application with reasons supporting the request to the director in accordance with the requirements of 40 CFR 122.26. If the reasons adequately support the request, the director shall grant it by issuing an individual NPDES permit.

3. When an individual NPDES permit is issued to an owner or operator otherwise subject to this permit or the owner or operator is approved for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the alternative general permit, whichever the case may be.

D. Permit requirements when portions of a site are sold

If an operator obtains a permit for a development, and then the operator (permittee) sells off lots or parcels within that development, permit coverage must be continued on those lots until a Notice of Termination (NOT) in accordance with Part IV.B is submitted. For developments which require the use of centralized sediment and erosion controls (i.e., controls that address storm water runoff from one or more lots) for which the current permittee intends to terminate responsibilities under this permit for a lot after sale of the lot to a new owner and such termination will either prevent or impair the implementation of the controls and therefore jeopardize compliance with the terms and conditions of this permit, the permittee will be required to maintain responsibility for the implementation of those controls. For developments where this is not the case, it is the permittee's responsibility to temporarily stabilize all lots sold to individual lot owners unless an exception is approved in accordance with Part III.G.4. In cases where permit responsibilities for individual lot(s) will be terminated after sale of the lot, the permittee shall inform the individual lot owner of the obligations under this permit and ensure that the Individual Lot NOI application is submitted to Ohio EPA.

E. Authorization

1. Obtaining authorization to discharge. Operators that discharge storm water associated with construction activity must submit an NOI application form and Storm Water Pollution Prevention Plan (SWP3) if located within the Big Darby Creek watershed or portions of the Olentangy watershed in accordance with the requirements of Part I.F of this permit to obtain authorization to discharge under this general permit. As required under OAC Rule 3745-38-06(E), the director, in response to the NOI submission, will notify the applicant in writing that he/she has or has not been granted general permit coverage to discharge storm water associated with construction activity under the terms and conditions of this permit or that the applicant must apply for an individual NPDES permit or coverage under an alternate general NPDES permit as described in Part I.C.1.

2. No release from other requirements. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations. Other permit requirements commonly associated with construction activities include, but are not limited to, section 401 water quality certifications, isolated wetland permits, permits to install sanitary sewers or other devices that discharge or convey polluted water, permits to install drinking water lines, single lot sanitary system permits and disturbance of land which was used to operate a solid or hazardous waste facility (i.e., coverage under this NPDES general permit does not satisfy the requirements of OAC Rule 3745-27-13 or ORC Section 3734.02(H)). The issuance of this permit is subject to resolution of an antidegradation review. This permit does not relieve the permittee of other responsibilities associated with construction activities such as contacting the Ohio Department of Natural Resources, Division of Water, to ensure proper well installation and abandonment of wells.

F. Notice of Intent Requirements

1. Deadlines for notification.

   a. Initial coverage: Operators who intend to obtain initial coverage for a storm water discharge associated with construction activity under this general permit must submit a complete and accurate NOI application form, a completed Storm Water Pollution Prevention Plan (SWP3) for projects within the Big Darby Creek and portions of the Olentangy river watersheds and appropriate fee at least 21 days (or 45 days in the Big Darby Creek watershed and portions of the Olentangy watershed) prior to the commencement of construction activity. If more than one operator, as defined in Part VII of this general permit, will be engaged at a site, each operator shall seek coverage under this general permit prior to engaging in construction activities. Coverage under this permit is not effective until an approval letter granting coverage from the director of Ohio EPA is received by the applicant. Where one operator has already submitted an NOI prior to other operator(s) being identified, the additional operator shall request modification of coverage to become a co-permittee. In such instances, the co-permittees shall be covered under the same facility permit number. No additional permit fee is required.

   b. Individual lot transfer of coverage: Operators must each submit an individual lot notice of intent (Individual Lot NOI) application form (no fee required) to Ohio EPA at least seven days prior to the date that they intend to accept responsibility for permit requirements for their portion of the original permitted development from the previous permittee. Transfer of permit coverage is not granted until an approval letter from the director of Ohio EPA is received by the applicant.

2. Failure to notify. Operators who fail to notify the director of their intent to be covered and who discharge pollutants to surface waters of the state without an NPDES permit are in violation of ORC Chapter 6111. In such instances, Ohio EPA may bring an enforcement action for any discharges of storm water associated with construction activity.

3. How to submit an NOI. Operators seeking coverage under this permit must submit a complete and accurate Notice of Intent (NOI) application using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: **https://ebiz.epa.ohio.gov/**. Submission through the Ohio EPA eBusiness Center will

require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOI. Existing eBusiness Center account holders can access the NOI form through their existing account and submit using their existing PIN. Please see the following link for guidance: **http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance**. Alternatively, if you are unable to access the NOI form through the agency eBusiness Center due to a demonstrated hardship, the NOI may be submitted on a paper NOI form provided by Ohio EPA. NOI information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOI form.

4. Additional notification. NOIs and SWP3s are considered public documents and shall be made available to the public in accordance with Part III.C.2. The permittee shall make NOIs and SWP3s available upon request of the director of Ohio EPA, local agencies approving sediment and erosion control plans, grading plans or storm water management plans, local governmental officials, or operators of municipal separate storm sewer systems (MS4s) receiving drainage from the permitted site. Each operator that discharges to an NPDES permitted MS4 shall provide a copy of its Ohio EPA NOI submission to the MS4 in accordance with the MS4's requirements, if applicable.

5. Re-notification. Existing permittees having coverage under the previous generations of this general permit shall have continuing coverage under OHC000005 with the submittal of a timely renewal application. Within 180 days from the effective date of this permit, existing permittees shall submit the completed renewal application expressing their intent for continued coverage. In accordance with Ohio Administrative Code (OAC) 3745-38-02(E)(2)(a)(i), a renewal application fee will only apply to existing permittees having general permit coverage for 5 or more years as of the effective date of this general permit. Permit coverage will be terminated if Ohio EPA does not receive the renewal application within this 180-day period.

Part II. NON-NUMERIC EFFLUENT LIMITATIONS

You shall comply with the following non-numeric effluent limitations for discharges from your site and/or from construction support activities. Part III of this permit contains the specific design criteria to meet the objectives of the following non-numeric effluent limitations. You shall develop and implement the SWP3 in accordance with Part III of this permit to satisfy these non-numeric effluent limitations.

A. Erosion and Sediment Controls. You shall design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls shall be designed, installed and maintained to:

1. Control storm water volume and velocity within the site to minimize soil and stream erosion;

2. Control storm water discharges, including both peak flowrates and total storm water volume, to minimize erosion at outlets and to minimize downstream channel and streambank erosion;

3. Minimize the amount of soil exposed during construction activity;

4. Minimize the disturbance of steep slopes;

5. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls shall address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;

6. If feasible, provide and maintain a 50-foot undisturbed natural buffer around surface waters of the state, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration. If it is infeasible to provide and maintain an undisturbed 50-foot natural buffer, you shall comply with the stabilization requirements found in Part II.B for areas within 50 feet of a surface water; and

7. Minimize soil compaction and, unless infeasible, preserve topsoil.

B. Soil Stabilization. Stabilization of disturbed areas shall, at a minimum, be initiated in accordance with the time frames specified in the following tables.

Table 1: Permanent Stabilization

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the state and at final grade	Within two days of reaching final grade
Other areas at final grade	Within seven days of reaching final grade within that area

Table 2: Temporary Stabilization

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the state and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 14 days
Any disturbed areas that will be dormant for more than 14 days but less than one year, and not within 50 feet of a surface water of the state	Within seven days of the most recent disturbance within the area For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed. Permanent and temporary stabilization are defined in Part VII.

C. **Dewatering.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.

D. **Pollution Prevention Measures.** Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:

1. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters shall be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;

2. Minimize the exposure of construction materials, products, and wastes; landscape materials, fertilizers, pesticides, and herbicides; detergents, sanitary waste and other materials present on the site to precipitation and to storm water; and

3. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

E. **Prohibited Discharges.** The following discharges are prohibited:

1. Wastewater from washout of concrete, unless managed by an appropriate control;

2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and

4. Soaps or solvents used in vehicle and equipment washing or all other waste water streams which could be subject to an individual NPDES permit (Part III.G.2.g).

F. **Surface Outlets**. When discharging from sediment basins utilize outlet structures that withdraw water from the surface, unless infeasible. (Note: Ohio EPA believes that the circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include time periods with extended cold weather during winter months. If you have determined that it is infeasible to meet this requirement, you shall provide documentation in your SWP3 to support your determination.)

G. **Post-Construction Storm Water Management Controls**. So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity.

PART III. STORM WATER POLLUTION PREVENTION PLAN (SWP3)

A. Storm Water Pollution Prevention Plans.

A SWP3 shall be developed for each site covered by this permit. For a multi-phase construction project, a separate NOI shall be submitted when a separate SWP3 will be prepared for

subsequent phases. SWP3s shall be prepared in accordance with sound engineering and/or conservation practices by a professional experienced in the design and implementation of standard erosion and sediment controls and storm water management practices addressing all phases of construction. The SWP3 shall clearly identify all activities which are required to be authorized under Section 401 and subject to an antidegradation review. The SWP3 shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction activities. The SWP3 shall be a comprehensive, stand-alone document, which is not complete unless it contains the information required by Part III.G of this permit. In addition, the SWP3 shall describe and ensure the implementation of best management practices (BMPs) that reduce the pollutants and impact of storm water discharges during construction and pollutants associated with the post-construction land use to ensure compliance with ORC Section 6111.04, OAC Chapter 3745-1 and the terms and conditions of this permit.

B. Timing

An acceptable SWP3 shall be completed and submitted to the applicable regulated MS4 entity (for projects constructed entirely within a regulated MS4 area) prior to the timely submittal of an NOI. Projects within the Big Darby Creek and portions of the Olentangy watersheds must submit a SWP3 with the NOI. The SWP3 shall be updated in accordance with Part III.D. Submission of a SWP3 does not constitute review and approval on the part of Ohio EPA. Upon request and good cause shown, the director may waive the requirement to have a SWP3 completed at the time of NOI submission. If a waiver has been granted, the SWP3 must be completed prior to the initiation of construction activities. The SWP3 must be implemented upon initiation of construction activities.

In order to continue coverage from the previous generations of this permit, the permittee shall review and update the SWP3 to ensure that this permit's requirements are addressed within 180 days after the effective date of this permit. If it is infeasible for you to comply with a specific requirement in this permit because (1) the provision was not part of the permit you were previously covered under, and (2) because you are prevented from compliance due to the nature or location of earth disturbances that commenced prior to the effective date of this permit, you shall include documentation within your SWP3 of the reasons why it is infeasible for you to meet the specific requirement.

Examples of OHC000005 permit conditions that would be infeasible for permittees renewing coverage to comply with include:

- OHC000005 post-construction requirements, for projects that obtained NPDES construction storm water coverage and started construction activities prior to the effective date of this permit;

- OHC000005 post-construction requirements, for multi-phase development projects with an existing regional post-construction BMP issued under previous NPDES post-construction requirements. This only applies to construction sites authorized under Ohio EPA's Construction Storm Water Permits issued after April 20, 2003;

- OHC000005 post-construction requirements, for renewing or initial coverage and you have a SWP3 approved locally and you will start construction within 180 days of the effective date of this permit;

- Sediment settling pond design requirements, if the general permit coverage was obtained prior to April 21, 2013 and the sediment settling pond has been installed; or

- Case-by-case situations approved by the Director.

C. SWP3 Signature and Review.

1. Plan Signature and Retention On-Site. The SWP3 shall include the certification in Part V.H, be signed in accordance with Part V.G., and be retained on site during working hours.

2. Plan Availability

   a. On-site: The plan shall be made available immediately upon request of the director or his authorized representative and MS4 operators or their authorized representative during working hours. A copy of the NOI and letter granting permit coverage under this general permit also shall be made available at the site.

   b. By written request: The permittee must provide the most recent copy of the SWP3 within 7 days upon written request by any of the following:

      i. The director or the director's authorized representative;

      ii. A local agency approving sediment and erosion plans, grading plans or storm water management plans; or

      iii. In the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the operator of the system.

   c. To the public: All NOIs, general permit approval for coverage letters, and SWP3s are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee shall make documents available to the public upon request or provide a copy at public expense, at cost, in a timely manner. However, the permittee may claim to Ohio EPA any portion of an SWP3 as confidential in accordance with Ohio law.

3. Plan Revision. The director or authorized representative may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this part. Within 10 days after such notification from the director or authorized representative (or as otherwise provided in the notification), the permittee shall make the required changes to the SWP3 and shall submit to Ohio EPA the revised SWP3 or a written certification that the requested changes have been made.

D. Amendments

The permittee shall amend the SWP3 whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the state or if the SWP3 proves to be ineffective in achieving the

general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the SWP3 may be reviewed by Ohio EPA in the same manner as Part III.C.

E. Duty to inform contractors and subcontractors

The permittee shall inform all contractors and subcontractors not otherwise defined as "operators" in Part VII of this general permit who will be involved in the implementation of the SWP3 of the terms and conditions of this general permit. The permittee shall maintain a written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3. The written document shall be created, and signatures shall be obtained prior to commencement of earth disturbing activity on the construction site.

F. Total Maximum Daily Load (TMDL) allocations

If a TMDL is approved for any waterbody into which the permittee's site discharges and requires specific BMPs for construction sites, the director may require the permittee to revise his/her SWP3. Specific conditions have been provided in Appendix A (for the Big Darby Creek Watershed) and Appendix B (for portions of the Olentangy river watershed).

G. SWP3 Requirements

Operations that discharge storm water from construction activities are subject to the following requirements and the SWP3 shall include the following items:

1. Site description. Each SWP3 shall provide:

    a. A description of the nature and type of the construction activity (e.g., low density residential, shopping mall, highway, etc.);

    b. Total area of the site and the area of the site that is expected to be disturbed (i.e., grubbing, clearing, excavation, filling or grading, including off-site borrow areas);

    c. A measure of the impervious area and percent imperviousness created by the construction activity (existing, new and total impervious area after construction);

    d. Storm water calculations, including the volumetric runoff coefficients for both the pre-construction and post- construction site conditions, and resulting water quality volume; design details for post-construction storm water facilities and pretreatment practices such as contributing drainage areas, capacities, elevations, outlet details and drain times shall be included in the SWP3; and if applicable, explanation of the use of existing post-construction facilities. Ohio EPA recommends the use of data sheets (see Ohio's Rainwater and Land Development manual and Ohio EPA resources for examples);

    e. Existing data describing the soil and, if available, the quality of any discharge from the site;

f. A description of prior land uses at the site;

g. A description of the condition of any on-site streams (e.g. prior channelization, bed instability or headcuts, channels on public maintenance, or natural channels);

h. An implementation schedule which describes the sequence of major construction operations (i.e., designation of vegetative preservation areas, grubbing, excavating, grading, utilities, infrastructure installation and others) and the implementation of erosion, sediment and storm water management practices or facilities to be employed during each operation of the sequence;

i. The name and/or location of the immediate receiving stream or surface water(s) and the first subsequent named receiving water(s) and the areal extent and description of wetlands or other special aquatic sites at or near the site which will be disturbed, or which will receive discharges from disturbed areas of the project. For discharges to an MS4, the point of discharge to the MS4 and the location where the MS4 ultimately discharges to a stream or surface water of the state shall be indicated;

j. For subdivided developments, a detail drawing of individual parcels with their erosion, sediment or storm water control practices and/or a typical individual lot showing standard individual lot erosion and sediment control practices.

   A typical individual lot drawing does not remove the responsibility to designate specific erosion and sediment control practices in the SWP3 for critical areas such as steep slopes, stream banks, drainage ways and riparian zones;

k. Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants covered by this permit and the best management practices to address pollutants in these storm water discharges;

l. A cover page or title identifying the name and location of the site, the name and contact information of all construction site operators, the name and contact information for the person responsible for authorizing and amending the SWP3, preparation date, and the estimated dates that construction will start and be complete;

m. A log documenting grading and stabilization activities as well as amendments to the SWP3, which occur after construction activities commence; and

n. Site map showing:

   i. Limits of earth-disturbing activity of the site including associated off-site borrow or spoil areas that are not addressed by a separate NOI and associated SWP3;

   ii. Soils types for all areas of the site, including locations of unstable or highly erodible and/or known contaminated soils;

iii. Existing and proposed contours. A delineation of drainage watersheds expected during and after major grading activities as well as the size of each drainage watershed, in acres;

iv. The location of any delineated boundary for required riparian setbacks;

v. Conservation easements or areas designated as open space, preserved vegetation or otherwise protected from earth disturbing activities. A description of any associated temporary or permanent fencing or signage;

vi. Surface water locations including springs, wetlands, streams, lakes, water wells, etc., on or within 200 feet of the site, including the boundaries of wetlands or stream channels and first subsequent named receiving water(s) the permittee intends to fill or relocate for which the permittee is seeking approval from the Army Corps of Engineers and/or Ohio EPA;

vii. Existing and planned locations of buildings, roads, parking facilities and utilities;

viii. The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during site development;

ix. Sediment traps and basins noting their sediment storage and dewatering (detention) volume and contributing drainage area. Ohio EPA recommends the use of data sheets (see Ohio EPA's Rainwater and Land Development manual and website for examples) to provide data for all sediment traps and basins noting important inputs to design and resulting parameters such as their contributing drainage area, disturbed area, detention volume, sedimentation volume, practice surface area, dewatering time, outlet type and dimensions;

x. The location of permanent storm water management practices (new and existing) including pretreatment practices to be used to control pollutants in storm water after construction operations have been completed along with the location of existing and planned drainage features including catch basins, culverts, ditches, swales, surface inlets and outlet structures;

xi. Areas designated for the storage or disposal of solid, sanitary and toxic wastes, including dumpster areas, areas designated for cement truck washout, and vehicle fueling;

xii. The location of designated construction entrances where the vehicles will access the construction site; and

xiii. The location of any areas of proposed floodplain fill, floodplain excavation, stream restoration or known temporary or permanent stream crossings.

2. Controls. In accordance with Part II.A, the SWP3 shall contain a description of the controls appropriate for each construction operation covered by this permit and the operator(s) shall implement such controls. The SWP3 shall clearly describe for each major construction activity identified in Part III.G.1.h: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which contractor is responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization). The SWP3 shall identify the subcontractors engaged in activities that could impact storm water runoff. The SWP3 shall contain signatures from all of the identified subcontractors indicating that they have been informed and understand their roles and responsibilities in complying with the SWP3. Ohio EPA recommends that the primary site operator review the SWP3 with the primary contractor prior to commencement of construction activities and keep a SWP3 training log to demonstrate that this review has occurred.

   Ohio EPA recommends that the erosion, sediment, and storm water management practices used to satisfy the conditions of this permit should meet the standards and specifications in the most current edition of Ohio's Rainwater and Land Development (see definitions) manual or other standards acceptable to Ohio EPA. The controls shall include the following minimum components:

   a. Preservation Methods. The SWP3 shall make use of practices which preserve the existing natural condition as much as feasible. Such practices may include: preserving existing vegetation, vegetative buffer strips, and existing soil profile and topsoil; phasing of construction operations to minimize the amount of disturbed land at any one time; and designation of tree preservation areas or other protective clearing or grubbing practices. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water.

   b. Erosion Control Practices. The SWP3 shall make use of erosion controls that provide cover over disturbed soils unless an exception is approved in accordance with Part III.G.4. A description of control practices designed to re-establish vegetation or suitable cover on disturbed areas after grading shall be included in the SWP3. The SWP3 shall provide specifications for stabilization of all disturbed areas of the site and provide guidance as to which method of stabilization will be employed for any time of the year. Such practices may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, use of construction entrances and the use of alternative ground cover.

      i. **Stabilization.** Disturbed areas shall be stabilized in accordance with Table 1 (Permanent Stabilization) and Table 2 (Temporary Stabilization) in Part II.B of this permit.

      ii. **Permanent stabilization of conveyance channels**. Operators shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding (as defined in the most current edition of the Rainwater and Land

Development manual), mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques or rock check dams.

c. Runoff Control Practices. The SWP3 shall incorporate measures which control the flow of runoff from disturbed areas so as to prevent erosion from occurring. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices shall divert runoff away from disturbed areas and steep slopes where practicable. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected.

d. Sediment Control Practices. The plan shall include a description of structural practices that shall store runoff allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Structural practices shall be used to control erosion and trap sediment from a site remaining disturbed for more than 14 days. Such practices may include, among others: sediment settling ponds, sediment barriers, earth diversion dikes or channels which direct runoff to a sediment settling pond and storm drain inlet protection. All sediment control practices must be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a sediment control practice unless those are used in conjunction with a sediment settling pond.

The SWP3 shall contain detail drawings for all structural practices.

i. **Timing.** Sediment control structures shall be functional throughout the course of earth disturbing activity. Sediment basins and perimeter sediment barriers shall be implemented prior to grading and within seven days from the start of grubbing. They shall continue to function until the upslope development area is stabilized with permanent cover. As construction progresses and the topography is altered, appropriate controls shall be constructed, or existing controls altered to address the changing drainage patterns.

ii. **Sediment settling ponds.** A sediment settling pond is required for any one of the following conditions:

- Concentrated or collected storm water runoff (e.g., storm sewer or ditch);
- Runoff from drainage areas, which exceed the design capacity of silt fence or other sediment barriers; or
- Runoff from drainage areas that exceed the design capacity of inlet protection;

The permittee may request approval from Ohio EPA to use alternative controls if the permittee can demonstrate the alternative controls are equivalent in effectiveness to a sediment settling pond.

In accordance with Part II.F, if feasible, sediment settling ponds shall be dewatered at the pond surface using a skimmer or equivalent device. The sediment settling pond volume consists of both a dewatering zone and a sediment storage zone. The volume of the dewatering zone shall be a minimum of 1800 cubic feet (ft^3) per acre of drainage (67 yd^3/acre) with a minimum 48-hour drain time. The volume of the sediment storage zone shall be calculated by one of the following methods:

Method 1: The volume of the sediment storage zone shall be 1000 ft^3 per disturbed acre within the watershed of the basin. OR

Method 2: The volume of the sediment storage zone shall be the volume necessary to store the sediment as calculated with RUSLE or a similar generally accepted erosion prediction model.

Accumulated sediment shall be removed from the sediment storage zone once it exceeds 50 percent of the minimum required sediment storage design capacity and prior to the conversion to the post-construction practice unless suitable storage is demonstrated based upon over-design. When determining the total contributing drainage area, off-site areas and areas which remain undisturbed by construction activity shall be included unless runoff from these areas is diverted away from the sediment settling pond and is not co-mingled with sediment-laden runoff. The depth of the dewatering zone shall be less than or equal to five feet. The configuration between inlets and the outlet of the basin shall provide at least two units of length for each one unit of width (≥ 2:1 length:width ratio); however, a length to width ratio of 4:1 is recommended. When designing sediment settling ponds, the permittee shall consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. Combining multiple sediment and erosion control measures in order to maximize pollutant removal is encouraged.

iii. **Sediment Barriers and Diversions.** Sheet flow runoff from denuded areas shall be intercepted by sediment barriers or diversions to protect adjacent properties and water resources from sediment transported via sheet flow. Where intended to provide sediment control, silt fence shall be placed on a level contour downslope of the disturbed area. For most applications, standard silt fence may be substituted with a 12-inch diameter sediment barrier. The relationship between the maximum drainage area to sediment barrier for a particular slope range is shown in the following table:

Table 3 Sediment Barrier Maximum Drainage Area Based on Slope

Maximum drainage area (in acres) to 100 linear feet of sediment barrier	Range of slope for a particular drainage area (in percent)
0.5	< 2%
0.25	≥ 2% but < 20%
0.125	≥ 20% but < 50%

Placing sediment barriers in a parallel series does not extend the size of the drainage area. Storm water diversion practices shall be used to keep runoff away from disturbed areas and steep slopes where practicable. Diversion practices, which include swales, dikes or berms, may receive storm water runoff from areas up to 10 acres.

iv. **Inlet Protection.** Other erosion and sediment control practices shall minimize sediment laden water entering active storm drain systems. All inlets receiving runoff from drainage areas of one or more acres will require a sediment settling pond.

v. **Surface Waters of the State Protection.** If construction activities disturb areas adjacent to surface waters of the state, structural practices shall be designed and implemented on site to protect all adjacent surface waters of the state from the impacts of sediment runoff. No structural sediment controls (e.g., the installation of silt fence or a sediment settling pond) shall be used in a surface water of the state. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water. Where impacts within this buffer area are unavoidable, due to the nature of the construction (e.g., stream crossings for roads or utilities), the project shall be designed such that the number of stream crossings and the width of the disturbance within the buffer area are minimized.

vi. **Modifying Controls**. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the permittee shall replace or modify the control for site conditions.

e. Post-Construction Storm Water Management Requirements. So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity. To meet the post-construction requirements of this permit, the SWP3 shall contain a description of the post-construction BMPs that will be installed during construction for the site and the rationale for their selection. The rationale shall address the anticipated impacts on the channel and floodplain morphology, hydrology, and water quality. Post-construction BMPs cannot be installed within a surface water of the state (e.g., wetland or stream) unless it is authorized by a CWA 401 water quality certification, CWA 404 permit, or Ohio EPA non-jurisdictional wetland/stream program approval. Note: local jurisdictions may have more stringent post-construction requirements.

Detail drawings and maintenance plans shall be provided for all post-construction BMPs in the SWP3. Maintenance plans shall be provided by the permittee to the post-construction operator of the site (including homeowner associations) upon completion of construction activities (prior to termination of permit coverage). Maintenance plans shall ensure that pollutants collected within structural post-construction practices are disposed of in accordance with local, state, and federal regulations. To ensure that storm water management systems function as

designed and constructed, the post-construction operation and maintenance plan shall be a stand-alone document which contains: (1) a designated entity for storm water inspection and maintenance responsibilities; (2) the routine and non-routine maintenance tasks to be undertaken; (3) a schedule for inspection and maintenance; (4) any necessary legally binding maintenance easements and agreements; (5) construction drawings or excerpts showing the plan view, profile and details of the outlet(s); and (6) a map showing all access and maintenance easements (7) for table 4a practices, provide relevant elevations and associated volumes that dictate when removal of accumulated sediments must occur. Permittees are responsible for assuring all post-construction practices meet plan specifications and intended post-construction conditions have been met (e.g., sediment removed from, and sediment storage restored to, permanent pools, sediment control outlets removed and replaced with permanent post-construction discharge structures, and all slopes and drainageways permanently stabilized), but are not responsible under this permit for operation and maintenance of post-construction practices once coverage under this permit is terminated.

Post-construction storm water BMPs that discharge pollutants from point sources once construction is completed, may in themselves, need authorization under a separate NPDES permit (one example is storm water discharges from regulated industrial sites).

Construction activities that do not include the installation of any impervious surface (e.g., park lands), abandoned mine land reclamation activities regulated by the Ohio Department of Natural Resources, stream and wetland restoration activities, and wetland mitigation activities are not required to comply with the conditions of Part III.G.2.e of this permit. Linear construction projects, (e.g., pipeline or utility line installation), which do not result in the installation of additional impervious surface, are not required to comply with the conditions of Part III.G.2.e of this permit. However, linear construction projects shall be designed to minimize the number of stream crossings and the width of disturbance and achieve final stabilization of the disturbed area as defined in Part VII.M.1.

For all construction activities that will disturb two or more acres of land, or will disturb less than two acres, that are a part of a larger common plan of development or sale which will disturb two or more acres of land, the post construction BMP(s) chosen shall be able to manage storm water runoff for protection of stream channels, stream stability, and water quality. The BMP(s) chosen must be compatible with site and soil conditions. Structural post-construction storm water treatment practices shall be incorporated into the permanent drainage system for the site. The BMP(s) chosen must be sized to treat the water quality volume (WQ_v) and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1. The WQ_v shall be equivalent to the volume of runoff from a 0.90-inch rainfall and shall be determined using the following equations:

$$WQ_v = Rv * P * A / 12 \quad \text{(Equation 1)}$$

where:
WQ_v = water quality volume in acre-feet
Rv = the volumetric runoff coefficient calculated using equation 2
P = 0.90 inch precipitation depth
A = area draining into the BMP in acres

$$Rv = 0.05 + 0.9i \quad \text{(Equation 2)}$$

where i = fraction of post-construction impervious surface)

An additional volume equal to 20 percent of the WQ_v shall be incorporated into the BMP for sediment storage. Ohio EPA recommends BMPs be designed according to the methodology described in the most current edition of the Rainwater and Land Development manual or in another design manual acceptable for use by Ohio EPA.

The BMPs listed in Tables 4a and 4b below are considered standard BMPs approved for general use. However, communities with a regulated MS4 may limit the use of some of these BMPs. BMPs shall be designed such that the drain time is long enough to provide treatment, but short enough to provide storage for successive rainfall events and avoid the creation of nuisance conditions. The outlet structure for the post-construction BMP shall not discharge more than the first half of the WQv in less than one-third of the drain time. The WQv is the volume of storm water runoff that must be detained by a post-construction practice as specified by the most recent edition of the Rainwater and Land Development manual.

Post-construction practices shall be sized to treat 100% of the WQv associated with their contributing drainage area. If there is an existing post-construction BMP that treats runoff from the disturbed area, and the BMP meets the post-construction requirements of this permit, no additional post-construction BMP will be required. A regional storm water BMP may be used to meet the post-construction requirement if 1) the BMP meets the design requirements for treating the WQv, and 2) a legal agreement is established through which the regional BMP owner or operator agrees to provide this service in the long term. Design information for such facilities such as contributing drainage areas, capacities, elevations, outlet details and drain times shall be included in the SWP3.

Table 4a Extended Detention Post-Construction Practices with Minimum Drain Times

Extended Detention Practices	**Minimum Drain Time of WQv**
Wet Extended Detention Basin[1,2]	24 hours
Constructed Extended Detention Wetland[1,2]	24 hours
Dry Extended Detention Basin[1,3]	48 hours
Permeable Pavement – Extended Detention[1]	24 hours
Underground Storage – Extended Detention[1,4]	24 hours
Sand & Other Media Filtration - Extended Detention[1, 5]	24 hours

Notes:
1. The outlet structure shall not discharge more than the first half of the WQv in less than one-third of the drain time.
2. Provide a permanent pool with a minimum volume equal to the WQv and an extended detention volume above the permanent pool equal to 1.0 x WQv.
3. Dry basins must include a forebay and a micropool each sized at a minimum of 0.1 x WQv and a protected outlet, or include acceptable pretreatment and a protected outlet.
4. Underground storage must have pretreatment for removal of suspended sediments included in the design and documented in the SWP3. This pretreatment shall concentrate sediment in a location where it can be readily removed. For non-infiltrating, underground extended detention systems, pretreatment shall be 50% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction BMP Testing Protocol.
5. The WQv ponding area shall completely empty between 24 and 72 hours.

Table 4b Infiltration Post-Construction Practices with Maximum Drain Times

Infiltration Practices	**Maximum Drain Time of WQv**
Bioretention Area/Cell[1,2]	24 hours
Infiltration Basin	24 hours
Infiltration Trench[2]	48 hours
Permeable Pavement – Infiltration[3]	48 hours
Underground Storage – Infiltration[3,4]	48 hours

Notes:
1. Bioretention soil media shall have a permeability of approximately 1 – 4 in/hr. Meeting the soil media specifications in the Rainwater and Land Development manual is considered compliant with this requirement. Bioretention cells must have underdrains unless in-situ conditions allow for the WQv (surface ponding) plus the bioretention soil (to a depth of 24 inches) to drain completely within 48 hours.
2. Infiltrating practices with the WQv stored aboveground (bioretention, infiltration basin) shall fully drain the WQv within 24 hours to minimize nuisance effects of standing water and to promote vigorous communities of appropriate vegetation.
3. Subsurface practices designed to fully infiltrate the WQv (infiltration trench, permeable pavement with infiltration, underground storage with infiltration) shall empty within 48 hours to recover storage for subsequent storm events.
4. Underground storage systems with infiltration must have adequate pretreatment of suspended sediments included in the design and documented in the SWP3 in order to minimize clogging of the infiltrating surface. Pretreatment shall concentrate sediment in a location where it can be readily removed. Examples include media filters situated upstream of the storage or other suitable alternative approved by Ohio EPA. For infiltrating underground systems, pretreatment shall be 80% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction BMP Testing Protocol.

Small Construction Activities. For all construction activities authorized under this permit which result in a disturbance less than 2 acres, a post-construction practice shall be used to treat storm water runoff for pollutants and to reduce adverse impacts on receiving waters. The applicant must provide a justification in the SWP3 why the use of table 4a and 4b practices are not feasible. The justification must address limiting factors which would prohibit the project going forward should table 4a and 4b practices be required. Please note that additional practices selected will require approval from the regulated MS4. The use of green infrastructure BMPs such as runoff reducing practices is also encouraged.

Transportation Projects. The construction of new roads and roadway improvement projects by public entities (i.e., the state, counties, townships, cities, or villages) may implement post-construction BMPs in compliance with the current version (as of the effective date of this permit) of the Ohio Department of Transportation's "Location and Design Manual, Volume Two Drainage Design" that has been accepted by Ohio EPA as an alternative to the conditions of this permit.

Offsite Mitigation of Post-Construction. Ohio EPA may authorize the offsite mitigation of the post-construction requirements of Part III.G.2.e of this permit on a case by case basis provided the permittee clearly demonstrates the BMPs listed in Tables 4a and 4b are not feasible and the following criteria are met: (1) a maintenance agreement or policy is established to ensure operations and treatment long-term; (2) the offsite location discharges to the same HUC-12 watershed unit; and (3) the mitigation ratio of the WQv is 1.5 to 1 or the WQv at the point of retrofit, whichever is greater. Requests for offsite mitigation must be received prior to receipt of the NOI application.

Previously Developed Areas - Ohio EPA encourages the redevelopment of previously graded, paved or built upon sites through a reduction of the WQv treatment requirement. For a previously developed area, one or a combination of the following two conditions shall be met:

- A 20 percent net reduction of the site's volumetric runoff coefficient through impervious area reduction with soil restoration or replacing impervious roof area with green roof area (for these purposes green roofs shall be considered pervious surface) or
- Treatment of 20 percent of the WQv for the previously developed area using a practice meeting Table 4a/5b criteria.

Where there is a combination of redeveloped areas and new development, a weighted approached shall be used with the following equation:

$$WQv = P * A * [(Rv*0.2) + (Rv2 - Rv1)] / 12 \qquad \text{(Equation 3)}$$

Where

P = 0.90 inches
A = Area draining into the BMP in acres
Rv1 = volumetric runoff coefficient for existing conditions (current site impervious area)
Rv2 = volumetric runoff coefficient for proposed conditions (post-construction site impervious area)

Post-construction practices shall be located to treat impervious areas most likely to generate the highest pollutant load, such as parking lots or roadways, rather than areas predicted to be cleaner such as rooftops.

Runoff Reduction Practices. The size of structural post-construction practices used to capture and treat the WQv can be reduced by incorporating runoff

reducing practices into the design of the site's drainage system. The approach to calculate and document runoff reduction is detailed in the Rainwater and Land Development Manual. BMP-specific runoff reduction volumes are set by specifications in the Rainwater and Land Development Manual for the following practices:

- Impervious surface disconnection
- Rainwater harvesting
- Bioretention
- Infiltration basin
- Infiltration trench
- Permeable pavement with infiltration
- Underground storage with infiltration
- Grass swale
- Sheet flow to filter strip
- Sheet flow to conservation area

A runoff reduction approach may be used to meet the groundwater recharge requirements in the Big Darby Creek Watershed; the runoff reduction practices used for groundwater recharge may be used to reduce the WQv requirement, see appendix A for details on groundwater recharge requirements.

In order to promote the implementation of green infrastructure, the Director may consider the use of runoff reducing practices to demonstrate compliance with Part III.G.2.e of this permit for areas of the site not draining into a common drainage system of the site, e.g., sheet flow from perimeter areas such as the rear yards of residential lots, low density development scenarios, or where the permittee can demonstrate that the intent of pollutant removal and stream protection, as required in Part III.G.2.e of this permit is being addressed through non-structural post-construction BMPs based upon review and approval by Ohio EPA.

Use of Alternative Post-Construction BMPs. This permit does not preclude the use of innovative or experimental post-construction storm water management technologies. Alternative post-construction BMPs shall previously have been tested to confirm storm water treatment efficacy equivalent to those BMPs listed in Tables 4a and 4b using the protocol described in this section. BMP testing may include laboratory testing, field testing, or both.

Permittees shall request approval from Ohio EPA to use alternative post-construction BMPs on a case-by-case basis. To use an alternative post-construction BMP, the permittee must demonstrate that a BMP listed in Tables 4a and 4b is not feasible and the proposed alternative post-construction BMP meets the minimum treatment criteria as described in this section. The permittee shall submit an application to Ohio EPA for any proposed alternative post-construction BMP. Where the development project is located within a regulated municipal separate storm sewer system (MS4) community, the use of an alternative practice requires pre-approval by the MS4 before submittal of the Ohio EPA permit application. Ohio EPA requires that approvals for alternative

post-construction BMPs are finalized before permittees submit an NOI for permit coverage.

In addition to meeting sediment removal criteria, the discharge rate from the proposed alternative practice shall be reduced to prevent stream bed erosion and protect the physical and biological stream integrity unless there will be negligible hydrological impact to the receiving surface water of the state. Discharge rate is considered to have a negligible impact if the permittee can demonstrate that one of the following three conditions exist:

i. The entire WQv is recharged to groundwater;
ii. The larger common plan of development or sale will create less than one acre of impervious surface;
iii. The storm water drainage system of the development discharges directly into a large river with drainage area equal to 100 square miles or larger upstream of the development site or to a lake where the development area is less than 5 percent of the watershed area, unless a TMDL has identified water quality problems into the receiving surface waters of the state.

If the conditions above that minimize the potential for hydrological impact to the receiving surface water of the state do not exist, then the alternative post-construction BMP must prevent stream erosion by reducing the flow rate from the WQ_V. In such cases, discharge of the WQ_V must be controlled. A second storm water BMP that provides extended detention of the WQv may be needed to meet the post-construction criteria.

Alternative Post-Construction BMP Testing Protocol. For laboratory testing, the alternative BMP shall be tested using sediment with a specific gravity of 2.65, a particle size distribution closely matching the distribution shown in Table 5, and total suspended sediment (TSS) concentrations within 10% of 200 mg/L (180 mg/L – 220 mg/L TSS). For an alternative BMP to be acceptable, the test results must demonstrate that the minimum treatment rate is 80% TSS removal at the design flow rate for the tested BMP.

Table 5 Particle Size Distribution for Testing Alternative Post-Construction BMPs

Particle Size (microns)	Percent Finer (%)
1,000	100
500	95
250	90
150	75
100	60
75	50
50	45
20	35
8	20
5	10
2	5

- For field testing, the alternative BMP shall be tested using storm water runoff from the field, not altered by adding aggregate, or subjecting to unusually high

sediment loads such as those from unstabilized construction disturbance. The storm water runoff used for field testing shall be representative of runoff from the proposed installation site for the alternative BMP after all construction activities have ceased and the ground has been stabilized. The influent and effluent TSS concentrations of storm water runoff must be collected in the field. For an alternative BMP to be acceptable, the test results must demonstrate the minimum treatment rate is 80% TSS removal for influent concentrations equal to or greater than 100 mg/L TSS. If the influent concentration to the proposed alternative BMP is less than 100 mg/L TSS in the field, then the BMP must achieve an average effluent concentration less than or equal to 20 mg/L TSS.

- Testing of alternative post-construction BMPs shall be performed or overseen by a qualified independent, third-party testing organization.

- Testing shall demonstrate the maximum flow rate at which the alternative post-construction BMP can achieve the necessary treatment efficacy, including consideration for the potential of sediment resuspension.

- Testing shall demonstrate the maximum volume of sediment and floatables that can be collected in the alternative post-construction BMP before pollutants must be removed to maintain 80% treatment efficacy.

- Testing shall indicate the recommended maintenance frequency and maintenance protocol to ensure ongoing performance of the alternative post-construction BMP.

The alternative post-construction BMP testing protocol described in this section is similar to testing requirements specified by the New Jersey Department of Environmental Protection (NJDEP) for storm water Manufactured Treatment Devices (MTD) and therefore testing results certified by NJDEP shall be accepted by Ohio EPA. For examples of BMPs that have been tested using New Jersey Department of Environmental Protection's procedures, see the website: www.njstormwater.org.

Another nationally recognized storm water product testing procedure is the Technology Assessment Protocol – Ecology (TAPE) administered by the State of Washington, Department of Ecology. The TAPE testing procedure describes testing to achieve 80% TSS removal using a sediment mix with a particle size distribution with approximately 75% of the mass of the aggregate with particle diameters less than 45 microns. Overall, this particle size distribution is finer than the distribution in Table 6. Therefore, if TAPE testing results are available for a proposed alternative post-construction BMP, those results shall be accepted by Ohio EPA. The State of Washington, Department of Ecology website is www.ecy.wa.gov.

Alternative BMPs that utilize treatment processes such as filtering or centrifugal separation, rather than a detention and settling volume, must be designed to ensure treatment of 90 percent of the average annual runoff volume. For the design of these BMPs, the water quality flow rate (WQF)

considered equivalent to the Water Quality Volume (WQv) shall be determined utilizing the Rational Method (Equation 4) with an intensity (i) appropriate for the water quality precipitation event. This intensity shall be calculated using the table given in Appendix C.

$$WQF = C * i * A \qquad \text{(Equation 4)}$$

Where

WQF = Water Quality Flow Rate in cubic feet per second (cfs)
C = Rational Method Coefficient of Runoff
i = Intensity (in/hr)
A = Area draining to the BMP (acres)

Alternative post-construction BMPs may include, but are not limited to: vegetated swales, vegetated filter strips, hydrodynamic separators, high-flow media filters, cartridge filters, membrane filters, subsurface flow wetlands, multi-chamber treatment trains, road shoulder media filter drains, wetland channels, rain barrels, green roofs, and rain gardens. The Director may also consider non-structural post-construction approaches.

f. Surface Water Protection. If the project site contains any streams, rivers, lakes, wetlands or other surface waters, certain construction activities at the site may be regulated under the CWA and/or state isolated wetland permit requirements. Sections 404 and 401 of the Act regulate the discharge of dredged or fill material into surface waters and the impacts of such activities on water quality, respectively. Construction activities in surface waters which may be subject to CWA regulation and/or state isolated wetland permit requirements include, but are not limited to: sewer line crossings, grading, backfilling or culverting streams, filling wetlands, road and utility line construction, bridge installation and installation of flow control structures. If the project contains streams, rivers, lakes or wetlands or possible wetlands, the permittee shall contact the appropriate U.S. Army Corps of Engineers District Office. (CAUTION: Any area of seasonally wet hydric soil is a potential wetland - please consult the Soil Survey and list of hydric soils for your County, available at your county's Soil and Water Conservation District. If you have any questions about Section 401 water quality certification, please contact the Ohio Environmental Protection Agency, Section 401 Coordinator.)

U.S. Army Corps of Engineers (Section 404 regulation):

- Huntington, WV District (304) 399-5210 (Muskingum River, Hocking River, Scioto River, Little Miami River, and Great Miami River Basins)
- Buffalo, NY District (716) 879-4330 (Lake Erie Basin)
- Pittsburgh, PA District (412) 395-7155 (Mahoning River Basin)
- Louisville, KY District (502) 315-6686 (Ohio River)

Ohio EPA 401/404 and non-jurisdictional stream/wetland coordinator can be contacted at (614) 644-2001 (all of Ohio)

Concentrated storm water runoff from BMPs to natural wetlands shall be converted to diffuse flow before the runoff enters the wetlands. The flow should be released such that no erosion occurs downslope. Level spreaders may need to be placed in series, particularly on steep sloped sites, to ensure non-erosive velocities. Other structural BMPs may be used between storm water features and natural wetlands, in order to protect the natural hydrology, hydroperiod, and wetland flora. If the applicant proposes to discharge to natural wetlands, a hydrologic analysis shall be performed. The applicant shall attempt to match the pre-development hydroperiods and hydrodynamics that support the wetland. The applicant shall assess whether their construction activity will adversely impact the hydrologic flora and fauna of the wetland. Practices such as vegetative buffers, infiltration basins, conservation of forest cover, and the preservation of intermittent streams, depressions, and drainage corridors may be used to maintain wetland hydrology.

g. Other controls.

i. **Non-Sediment Pollutant Controls.** In accordance with Part II.E, no solid (other than sediment) or liquid waste, including building materials, shall be discharged in storm water runoff. The permittee must implement all necessary BMPs to prevent the discharge of non-sediment pollutants to the drainage system of the site or surface waters of the state or an MS4. Under no circumstance shall wastewater from the washout of concrete trucks, stucco, paint, form release oils, curing compounds, and other construction materials be discharged directly into a drainage channel, storm sewer or surface waters of the state. Also, no pollutants from vehicle fuel, oils, or other vehicle fluids can be discharged to surface waters of the state. No exposure of storm water to waste materials is recommended. The SWP3 must include methods to minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, and sanitary waste to precipitation, storm water runoff, and snow melt. In accordance with Part II.D.3, the SWP3 shall include measures to prevent and respond to chemical spills and leaks. You may also reference the existence of other plans (i.e., Spill Prevention Control and Countermeasure (SPCC) plans, spill control programs, Safety Response Plans, etc.) provided that such plan addresses conditions of this permit condition and a copy of such plan is maintained on site.

ii. **Off-site traffic.** Off-site vehicle tracking of sediments and dust generation shall be minimized. In accordance with Part II.D.1, the SWP3 shall include methods to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. No detergents may be used to wash vehicles. Wash waters shall be treated in a sediment basin or alternative control that provides equivalent treatment prior to discharge.

iii. **Compliance with other requirements.** The SWP3 shall be consistent with applicable State and/or local waste disposal, sanitary sewer or septic system regulations, including provisions prohibiting waste disposal by

open burning and shall provide for the proper disposal of contaminated soils to the extent these are located within the permitted area.

iv. **Trench and ground water control**. In accordance with Part II.C, there shall be no turbid discharges to surface waters of the state resulting from dewatering activities. If trench or ground water contains sediment, it shall pass through a sediment settling pond or other equally effective sediment control device, prior to being discharged from the construction site. Alternatively, sediment may be removed by settling in place or by dewatering into a sump pit, filter bag or comparable practice. Ground water which does not contain sediment or other pollutants is not required to be treated prior to discharge. However, care must be taken when discharging ground water to ensure that it does not become pollutant-laden by traversing over disturbed soils or other pollutant sources.

v. **Contaminated Sediment.** Where construction activities are to occur on sites with contamination from previous activities, operators shall be aware that concentrations of materials that meet other criteria (is not considered a Hazardous Waste, meeting VAP standards, etc.) may still result in storm water discharges in excess of Ohio Water Quality Standards. Such discharges are not authorized by this permit. Appropriate BMPs include, but are not limited to:

- The use of berms, trenches, and pits to collect contaminated runoff and prevent discharges;
- Pumping runoff into a sanitary sewer (with prior approval of the sanitary sewer operator) or into a container for transport to an appropriate treatment/disposal facility; and
- Covering areas of contamination with tarps or other methods that prevent storm water from coming into contact with the material.

Operators should consult with Ohio EPA Division of Surface Water prior to seeking permit coverage.

h. Maintenance. All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All sediment control practices must be maintained in a functional condition until all up-slope areas they control are permanently stabilized. The SWP3 shall be designed to minimize maintenance requirements. The applicant shall provide a description of maintenance procedures needed to ensure the continued performance of control practices.

i. Inspections. The permittee shall assign “qualified inspection personnel” to conduct inspections to ensure that the control practices are functional and to evaluate whether the SWP3 is adequate and properly implemented in accordance with the schedule proposed in Part III.G.1.g of this permit or whether additional control measures are required. At a minimum, procedures in a SWP3 shall provide that all controls on the site are inspected:

- after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day, excluding weekends and holidays unless work is scheduled; and
- once every seven calendar days.

The inspection frequency may be reduced to at least once every month for dormant sites if:

- the entire site is temporarily stabilized or
- runoff is unlikely due to weather conditions for extended periods of time (e.g., site is covered with snow, ice, or the ground is frozen).

The beginning and ending dates of any reduced inspection frequency shall be documented in the SWP3.
Once a definable area has achieved final stabilization, the area may be marked on the SWP3 and no further inspection requirements shall apply to that portion of the site.

Following each inspection, a checklist must be completed and signed by the qualified inspection personnel representative. At a minimum, the inspection report shall include:

i. the inspection date;
ii. names, titles, and qualifications of personnel making the inspection;
iii. weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
iv. weather information and a description of any discharges occurring at the time of the inspection;
v. location(s) of discharges of sediment or other pollutants from the site;
vi. location(s) of BMPs that need to be maintained;
vii. location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
viii. location(s) where additional BMPs are needed that did not exist at the time of inspection; and
ix. corrective action required including any changes to the SWP3 necessary and implementation dates.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of or the potential for pollutants entering the drainage system. Erosion and sediment control measures identified in the SWP3 shall be observed to ensure that those are operating correctly. Discharge locations shall be inspected to ascertain whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.

The permittee shall maintain for three years following the submittal of a notice of termination form, a record summarizing the results of the inspection, names(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWP3 and a certification as to whether the facility is in compliance with the SWP3 and the permit and identify any incidents of non-compliance. The record and certification shall be signed in accordance with Part V.G. of this permit.

i. **When practices require repair or maintenance.** If the inspection reveals that a control practice is in need of repair or maintenance, with the exception of a sediment settling pond, it shall be repaired or maintained within 3 days of the inspection. Sediment settling ponds shall be repaired or maintained within 10 days of the inspection.

ii. **When practices fail to provide their intended function.** If the inspection reveals that a control practice fails to perform its intended function and that another, more appropriate control practice is required, the SWP3 shall be amended and the new control practice shall be installed within 10 days of the inspection.

iii. **When practices depicted on the SWP3 are not installed.** If the inspection reveals that a control practice has not been implemented in accordance with the schedule contained in Part III.G.1.h of this permit, the control practice shall be implemented within 10 days from the date of the inspection. If the inspection reveals that the planned control practice is not needed, the record shall contain a statement of explanation as to why the control practice is not needed.

3. Approved State or local plans. All dischargers regulated under this general permit must comply, except those exempted under state law, with the lawful requirements of municipalities, counties and other local agencies regarding discharges of storm water from construction activities. All erosion and sediment control plans and storm water management plans approved by local officials shall be retained with the SWP3 prepared in accordance with this permit. Applicable requirements for erosion and sediment control and storm water management approved by local officials are, upon submittal of a NOI form, incorporated by reference and enforceable under this permit even if they are not specifically included in an SWP3 required under this permit. When the project is located within the jurisdiction of a regulated municipal separate storm sewer system (MS4), the permittee shall certify that the SWP3 complies with the requirements of the storm water management program of the MS4 operator.

4. Exceptions. If specific site conditions prohibit the implementation of any of the erosion and sediment control practices contained in this permit or site-specific conditions are such that implementation of any erosion and sediment control practices contained in this permit will result in no environmental benefit, then the permittee shall provide justification for rejecting each practice based on site conditions. Exceptions from implementing the erosion and sediment control standards contained in this permit will be approved or denied on a case-by-case basis.

The permittee may request approval from Ohio EPA to use alternative methods to satisfy conditions in this permit if the permittee can demonstrate that the alternative methods are sufficient to protect the overall integrity of receiving streams and the watershed. Alternative methods will be approved or denied on a case-by-case basis.

PART IV. NOTICE OF TERMINATION REQUIREMENTS

A. Failure to notify.

The terms and conditions of this permit shall remain in effect until a signed Notice of Termination (NOT) form is submitted. Failure to submit an NOT constitutes a violation of this permit and may affect the ability of the permittee to obtain general permit coverage in the future.

B. When to submit an NOT.

1. Permittees wishing to terminate coverage under this permit shall submit an NOT form in accordance with Part V.G. of this permit. Compliance with this permit is required until an NOT form is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT form is submitted. Prior to submitting the NOT form, the permittee shall conduct a site inspection in accordance with Part III.G.2.i of this permit and have a maintenance plan in place to ensure all post-construction BMPs will be maintained in perpetuity.

2. All permittees shall submit an NOT form within 45 days of completing all permit requirements. Enforcement actions may be taken if a permittee submits an NOT form without meeting one or more of the following conditions:

    a. Final stabilization (see definition in Part VII) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);

    b. Another operator(s) has assumed control over all areas of the site that have not been finally stabilized;

    c. A maintenance plan is in place to ensure all post construction BMPs are adequately maintained in the long-term;

    d. For non-residential developments, all elements of the storm water pollution prevention plan have been completed, the disturbed soil at the identified facility have been stabilized and temporary erosion and sediment control measures have been removed at the appropriate time, or all storm water discharges associated with construction activity from the identified facility that are authorized by the above referenced NPDES general permit have otherwise been eliminated. (i)For residential developments only, temporary stabilization has been completed and the lot, which includes a home, has been transferred to the homeowner; (ii) final stabilization has been completed and the lot, which does not include a home, has been transferred to the property owner; (iii) no stabilization has been implemented on a lot, which includes a home, and the lot has been transferred to the homeowner; or

e. An exception has been granted under Part III.G.4.

C. How to submit an NOT.

To terminate permit coverage, the permitee shall submit a complete and accurate Notice of Termination (NOT) form using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: https://ebiz.epa.ohio.gov/. Submission through the Ohio EPA eBusiness Center will require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOT. Existing eBusiness Center account holders can access the NOT form through their existing account and submit using their existing PIN. Please see the following link for guidance: **http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance**. Alternatively, if you are unable to access the NOT form through the agency eBusiness Center due to a demonstrated hardship, the NOT may be submitted on paper NOT forms provided by Ohio EPA. NOT information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOT form.

PART V. STANDARD PERMIT CONDITIONS.

A. Duty to comply.

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of ORC Chapter 6111 and is grounds for enforcement action.

Ohio law imposes penalties and fines for persons who knowingly make false statements or knowingly swear or affirm the truth of a false statement previously made.

B. Continuation of an expired general permit.

An expired general permit continues in force and effect until a new general permit is issued.

C. Need to halt or reduce activity not a defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to mitigate.

The permittee shall 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.

E. Duty to provide information.

The permittee shall furnish to the director, within 10 days of written request, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee

shall also furnish to the director upon request copies of records required to be kept by this permit.

F. Other information.

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI, SWP3, NOT or in any other report to the director, he or she shall promptly submit such facts or information.

G. Signatory requirements.

All NOIs, NOTs, SWP3s, reports, certifications or information either submitted to the director or that this permit requires to be maintained by the permittee, shall be signed.

1. These items shall 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 that 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 permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

    b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

    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 U.S. EPA).

2. All reports required by the permits and other information requested by the director shall be signed by a person described in Part V.G.1 of this permit 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 V.G.1 of this permit and submitted to the director;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator of a well or well field, superintendent, 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 the director.

3. Changes to authorization. If an authorization under Part V.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 of this permit must be submitted to the director prior to or together with any reports, information or applications to be signed by an authorized representative.

H. Certification.

Any person signing documents under this section shall 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 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

I. Oil and hazardous substance liability.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under section 311 of the CWA or 40 CFR Part 112. 40 CFR Part 112 establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable surface waters of the state or adjoining shorelines.

J. Property rights.

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

K. 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 shall not be affected thereby.

L. Transfers.

Ohio NPDES general permit coverage is transferable. Ohio EPA must be notified in writing sixty days prior to any proposed transfer of coverage under an Ohio NPDES general permit. The transferee must inform Ohio EPA it will assume the responsibilities of the original permittee transferor.

M. Environmental laws.

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper operation and maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWP3s. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

O. Inspection and entry.

The permittee shall allow the director or an authorized representative of Ohio EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment); and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

P. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

Q. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

R. Bypass

The provisions of 40 CFR Section 122.41(m), relating to "Bypass," are specifically incorporated herein by reference in their entirety. For definition of "Bypass," see Part VII.C.

S. Upset

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "Upset," see Part VII.GG.

T. Monitoring and Records

The provisions of 40 CFR Section 122.41(j), relating to "Monitoring and Records," are specifically incorporated herein by reference in their entirety.

U. Reporting Requirements

The provisions of 40 CFR Section 122.41(l), relating to "Reporting Requirements," are specifically incorporated herein by reference in their entirety.

PART VI. REOPENER CLAUSE

If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with construction activity covered by this permit, the permittee of such discharge may be required to obtain coverage under an individual permit or an alternative general permit in accordance with Part I.C of this permit or the permit may be modified to include different limitations and/or requirements.

Permit modification or revocation will be conducted according to ORC Chapter 6111.

PART VII. DEFINITIONS

A. "Act" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117 and Pub. L. 100-4, 33 U.S.C. 1251 et. seq.

B. "Bankfull channel" means a channel flowing at channel capacity and conveying the bankfull discharge. Delineated by the highest water level that has been maintained for a sufficient period of time to leave evidence on the landscape, such as the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial or

the point at which the clearly scoured substrate of the stream ends and terrestrial vegetation begins.

C. "Bankfull discharge" means the streamflow that fills the main channel and just begins to spill onto the floodplain; it is the discharge most effective at moving sediment and forming the channel.

D. "Best management practices (BMPs)" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices (both structural and non-structural) to prevent or reduce the pollution of surface waters of the state. BMP's also include treatment requirements, operating procedures and practices to control plant and/or construction site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage.

E. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

F. "Channelized stream" means the definition set forth in Section 6111.01 (M) of the ORC.

G. "Commencement of construction" means the initial disturbance of soils associated with clearing, grubbing, grading, placement of fill, or excavating activities or other construction activities.

H. "Concentrated storm water runoff" means any storm water runoff which flows through a drainage pipe, ditch, diversion or other discrete conveyance channel.

I. "Director" means the director of the Ohio Environmental Protection Agency.

J. "Discharge" means the addition of any pollutant to the surface waters of the state from a point source.

K. "Disturbance" means any clearing, grading, excavating, filling, or other alteration of land surface where natural or man-made cover is destroyed in a manner that exposes the underlying soils.

L. "Drainage watershed" means for purposes of this permit the total contributing drainage area to a BMP, i.e., the "watershed" directed to the practice. This would also include any off-site drainage.

M. "Final stabilization" means that either:

1. All soil disturbing activities at the site are complete and a uniform perennial vegetative cover (e.g., evenly distributed, without large bare areas) with a density of at least 70 percent cover for the area has been established on all unpaved areas and areas not covered by permanent structures or equivalent stabilization measures (such as the use of mulches, rip-rap, gabions or geotextiles) have been employed. In addition, all temporary erosion and sediment control practices are removed and disposed of and all trapped sediment is permanently stabilized to prevent further erosion; or

2. For individual lots in residential construction by either:

   a. The homebuilder completing final stabilization as specified above or

   b. The homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters of the state and which are not being returned to their pre-construction agricultural use, must meet the final stabilization criteria in (1) or (2) above.

N. "General contractor" – for the purposes of this permit, the primary individual or company solely accountable to perform a contract. The general contractor typically supervises activities, coordinates the use of subcontractors, and is authorized to direct workers at a site to carry out activities required by the permit.

O. "Individual Lot NOI" means a Notice of Intent for an individual lot to be covered by this permit (see Part I of this permit).

P. "Larger common plan of development or sale"- means a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

Q. "MS4" means municipal separate storm sewer system which means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) that are:

1. Owned or operated by the federal government, state, municipality, township, county, district(s) or other public body (created by or pursuant to state or federal law) including special district under state law such as a sewer district, flood control district or drainage districts or similar entity or a designated and approved management agency under section 208 of the act that discharges into surface waters of the state; and
2. Designed or used for collecting or conveying solely storm water,
3. Which is not a combined sewer and
4. Which is not a part of a publicly owned treatment works.

R. "National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and enforcing pretreatment requirements, under sections 307, 402, 318 and 405 of the CWA. The term includes an "approved program."

S. "Natural channel design" means an engineering technique that uses knowledge of the natural process of a stream to create a stable stream that will maintain its form and function over time.

T. "NOI" means notice of intent to be covered by this permit.

U. "NOT" means notice of termination.

V. "Operator" means any party associated with a construction project that meets either of the following two criteria:

1. The party has day-to-day operational control all activities at a project which are necessary to ensure compliance with a SWP3 for the site and all permit conditions including the ability to authorize modifications to the SWP3, construction plans and site specification to ensure compliance with the General Permit, or

2. Property owner meets the definition of operator should the party which has day to day operational control require additional authorization from the owner for modifications to the SWP3, construction plans, and/or site specification to ensure compliance with the permit or refuses to accept all responsibilities as listed above (Part VII.V.1).

Subcontractors generally are not considered operators for the purposes of this permit. As set forth in Part I.F.1, there can be more than one operator at a site and under these circumstances, the operators shall be co-permittees.

W. "Ordinary high water mark" means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

X. "Owner or operator" means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

Y. "Permanent stabilization" means the establishment of permanent vegetation, decorative landscape mulching, matting, sod, rip rap and landscaping techniques to provide permanent erosion control on areas where construction operations are complete or where no further disturbance is expected for at least one year.

Z. "Percent imperviousness" means the impervious area created divided by the total area of the project site.

AA. "Point source" means 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, landfill leachate collection system, vessel or the floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

BB. "Qualified inspection personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess all conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.

CC. "Rainwater and Land Development" is a manual describing construction and post-construction best management practices and associated specifications. A copy of the manual may be obtained by contacting the Ohio Department of Natural Resources, Division of Soil & Water Conservation.

DD. "Riparian area" means the transition area between flowing water and terrestrial (land) ecosystems composed of trees, shrubs and surrounding vegetation which serve to stabilize erodible soil, improve both surface and ground water quality, increase stream shading and enhance wildlife habitat.

EE. "Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

FF. "Sediment settling pond" means a sediment trap, sediment basin or permanent basin that has been temporarily modified for sediment control, as described in the latest edition of the Rainwater and Land Development manual.

GG. "State isolated wetland permit requirements" means the requirements set forth in Sections 6111.02 through 6111.029 of the ORC.

HH. "Storm water" means storm water runoff, snow melt and surface runoff and drainage.

II. "Steep slopes" means slopes that are 15 percent or greater in grade. Where a local government or industry technical manual has defined what is to be considered a "steep slope," this permit's definition automatically adopts that definition.

JJ. "Stream edge" means the ordinary high water mark.

KK. "Subcontractor" – for the purposes of this permit, an individual or company that takes a portion of a contract from the general contractor or from another subcontractor.

LL. "Surface waters of the state" or "water bodies" means all streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways which are situated wholly or partially within the boundaries of the state, except those private waters which do not combine or effect a junction with natural surface or underground waters. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the ORC are not included.

MM. "SWP3" means storm water pollution prevention plan.

NN. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment

facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

OO. "Temporary stabilization" means the establishment of temporary vegetation, mulching, geotextiles, sod, preservation of existing vegetation and other techniques capable of quickly establishing cover over disturbed areas to provide erosion control between construction operations.

PP. "Water Quality Volume (WQ_v)" means the volume of storm water runoff which must be captured and treated prior to discharge from the developed site after construction is complete.

EMH&T

APPENDIX B: Contractor & Subcontractor SWPPP Acknowledgement Form

UNIVERSITY BLVD PHASE 2/SHIER RINGS ROAD & AVERY ROAD INTERSECTION
Storm Water Pollution Prevention Plan
Contractor & Subcontractor Acknowledgement

"I have been informed of the terms and conditions of Ohio's storm water general permit for construction activities (the "Permit") and have reviewed and understand the conditions and responsibilities of this Storm Water Pollution Prevention Plan ("SWPPP"); I acknowledge my responsibilities under the Permit and SWPPP."

Company Name: _____

Signature: _____

Printed Name: _____

Date: _____

SWPPP Role: _____

Company Name: _____

Signature: _____

Printed Name: _____

Date: _____

SWPPP Role: _____

Company Name: _____

Signature: _____

Printed Name: _____

Date: _____

SWPPP Role: _____

EMH&T

APPENDIX C: Erosion & Sediment Control Plan & Best Management Practice Details

EROSION & SEDIMENT CONTROL NOTES

Prior to Construction Operations in a particular area, all sedimentation and erosion control features shall be in place. Field adjustments with respect to locations and dimensions may be made by the Engineer.

The Contractor shall place inlet and channel protection for erosion control immediately after construction of the inlets or channels which are not tributary to a sediment basin or dam.

It may become necessary to remove portions of the barrier during construction to facilitate the grading operations in certain areas. However, the barrier shall be in place in the evening or during any inclement weather.

All soil stockpiles, including trench excavation stockpiles shall be protected from erosion by perimeter control devices such as silt fences. These perimeter control devices shall be maintained throughout the life of the project. Excavated materials shall not be stored on existing public roadway pavements. This includes excess or unusable excavated soil.

The limits of seeding and mulching are all areas within the grading limits. Those areas disturbed outside the seeding limits shall be seeded and mulched at the Contractor's expense.

CMSC Item 207 – Construction Seeding: Any area which will be left dormant (undisturbed) for more than 14 days shall be seeded within 7 days of terminated work. If permanent seeding is not applied at this time, construction seeding shall be done which shall consist of fertilizing, watering and seeding at the rates indicated under Items 207 and 659.

Seeding has been assumed to be 5'–0" outside the work limits or the right–of–way, whichever is greater. All areas not designated to be seeded shall remain under natural ground cover. Those areas disturbed outside the seeding limits shall be seeded and mulched at the Contractor's expense.

The Requirements of CMSC Item 659 shall govern the construction of this work, except as noted. This work shall consist of all labor, equipment and materials necessary to permanently seed disturbed areas.

MAINTENANCE: It is the Contractor's responsibility to maintain the sediment control features used on this project. The site shall be inspected at a minimum of every seven days and within 24 hours of a one–half inch (0.5") or greater rain event over a 24–hour period. Records of these inspections shall be kept and made available to jurisdictional agencies if requested. Any sediment or debris which has reduced the efficiency of a structure shall be removed immediately. Should a structure or feature become damaged, the Contractor shall repair or replace at no additional cost to the City. Not all details shown on this sheet may be required for this project.

SCHEDULE: The Contractor shall provide a schedule of operations to the City of Dublin. Sedimentation and erosion control features shall be placed in accordance with this schedule. The recommended construction sequence is as follows:

Phase 1

1. Where indicated on the plans, install storm drain inlet protection on existing inlets and establish concrete washout area.
2. Ensure a stabilized construction entrance and staging area are installed and utilized throughout construction activities.
3. Install perimeter controls where shown on the plans.
4. Place the check dams in the existing ditches.

Phase 2

1. Begin excavating the sediment basins, installing the outlet structures, temporary pipe, and skimmers.
2. Ensure basin slopes above normal pool are stabilized with erosion control matting.
3. Commence with clearing, grading, and fill activities.
4. Ensure disturbed areas that are to remain idle for more than 14 days are temporarily stabilized.
5. Install the proposed utilities. Utilize a dewatering filter bag for any muddy water encountered.
6. Install storm drain inlet protection on the newly constructed storm inlets.
7. Install the proposed culvert where Cosgray Ditch passes through the roadway corridor. Utilize the stream pump around detail.
8. Ensure the perimeter controls are installed per the phase 2 portion of the plans.
9. Construct the existing basin improvements. Ensure all disturbed areas are permanently stabilized.
10. Begin installing roadway curb and pavement, ensure concrete washout area is utilized for concrete wash.
11. Permanently seed and stabilize the disturbed areas that are at final grade.
12. Remove the ditch check dams, storm drain protection and perimeter controls. Permanently stabilize areas if disturbed during BMP removal.
13. Once permanent vegetation is established, remove the temporary pipe and skimmer from the basin outlet structures upon approval from the City. Install the post–construction water quality orifices.

The Contractor shall be responsible to ensure that off–site tracking of sediments by vehicles and equipment is minimized. All such off–site sediment shall be cleaned up daily. Construction and maintenance of stabilized construction entrances are a part of that responsibility.

The Contractor shall be responsible to ensure that no solid or liquid waste is discharged into storm water runoff. Sediment–laden water shall be filtered through the use of sediment filtering fences or sedimentation basins prior to discharge to surface waters. Concrete trucks will not be allowed to wash out or discharge surplus concrete into or along–side rivers, streams, and creeks or into natural or man–made channels or swales leading thereto. Concrete truck wash water and surplus concrete shall be confined to areas approved by the Engineer; after solidifying, these waste materials shall be removed from the site.

The Contractor shall be responsible to have the current "Plan", including this narrative, immediately available or posted on the site.

The Contractor shall be responsible to delineate, on the "Plan", all erosion and sedimentation control work actually performed; and to amend the "Plan" as required as a result of his work.

The Contractor shall be responsible to perform the required maintenance procedures and document them as required by the General Permit and the "Plan".

The following estimated quantities are included for use by the contractor to control sedimentation and erosion:

Item 207	– Construction Seeding and Mulching	45,330	Sq. Yd.
Item 207	– Perimeter Filter Fabric Fence	12,967	Ft
Item 207	– Inlet Protection	124	Each
Item 207	– Temporary Construction Entrance#	1	Each
Item 207	– Filter Sock	50	Ft
Item Special	– Stream Pump Around	1	LS
Item Special	– Rock Check Dam	155	Each
Item Special	– Concrete Washout Area#	1	LS

\# Contractor to determine location and coordinate approval with the City.

PROJECT DESCRIPTION: The project consists of constructing a four lane roadway on new alignment with sidewalks, shared–use paths, lighting, storm sewer, water mains, sanitary sewer and roundabouts.

EPA PERMIT #: 4GC07621*AG

EXISTING SITE CONDITIONS: The site currently consists of existing underdeveloped land and existing roadway.

AREAS OF DISTURBANCE: The project limits will be disturbed for road construction and grading.

RECEIVING STREAM: The site runoff drains east through ditches, storm sewer and overland flow to Cosgray Ditch.

ADJACENT AREAS: The project is bounded by agricultural fields on the north and south of University Boulevard, commercial and industrial sites on the north and south of Shier Rings Road, and commercial and undeveloped sites on the west and east of Avery Road.

CRITICAL AREAS: There is an existing wetland at the northwest tie–in to Eiterman Road that needs to be protected. Also, Cosgray Ditch stream was realigned and restored by a separate project near the limits of this project. Care shall be taken to avoid sedimentation of the improved channel.

EROSION AND SEDIMENT MEASURES: Erosion and sediment will be controlled by the use of temporary sediment traps, inlet protection at existing and proposed storm sewer structures and perimeter filter fabric fence. All construction entrances must be stabilized.

PERMANENT STABILIZATION: All disturbed areas shall be seeded and mulched.

MAINTENANCE: All erosion control devices are to be inspected by the construction superintendent daily and after rainfalls. Any damaged facilities are to be replaced/repaired immediately as may be necessary.

ITEM SPECIAL – ROCK CHECK DAM

This work shall consist of installing, maintaining, and removing Rock Check Dams as shown in the details right at the locations indicated on the plans. Payment shall be per each and shall include all equipment, material, labor, and incidentals necessary to complete the work to the satisfaction of the Engineer.

Pumping Note: Basin dewatering shall utilize a geotextile filter bag placed on stabilized ground prior to discharge.

EROSION & SEDIMENT CONTROL PRACTICES SUBJECT TO FIELD MODIFICATION AT THE DIRECTION OF THE CITY OF DUBLIN AND/OR OHIO EPA.

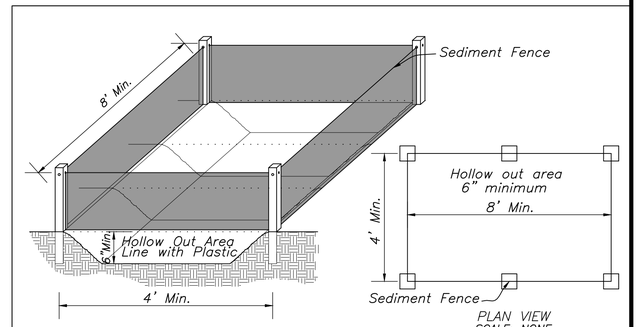
EROSION & SEDIMENT CONTROL NARRATIVE

PLAN DESIGNER: EMH&T, Inc.
Engineers, Surveyors, Planners, Scientists
5500 New Albany Road
Columbus, Ohio 43054
PH: 614–775–4500 FAX: 614–775–4800

DEVELOPER: City of Dublin
6555 Shier Rings Road
Dublin, Ohio 43016
Tel: (614) 410–4740
Fax: (614) 410–4699

SITE CONTACT: Same as Developer.

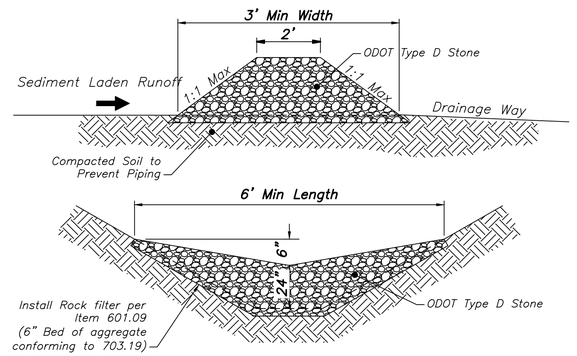
CONTRACTOR RESPONSIBILITY: Details have been provided on the plans in an effort to help the Contractor provide erosion and sedimentation control. The details shown on the plan shall be considered a minimum. Additional or alternate details may be found in the Ohio's Rainwater and Land Development Manual. The Contractor shall be solely responsible for providing necessary and adequate measures for proper control of erosion and sediment runoff from the site along with proper maintenance and inspection in compliance with the NPDES General Permit for Storm Water Discharges Associated with Construction Activity.



NOTES: Concrete trucks shall utilize areas to washout trucks. Accumulated concrete shall be removed from the site and disposed of properly.

Contractor to determine location of Concrete Washout Area.

CONCRETE WASHOUT AREA
Scale: Not to Scale



Maintenance:

1. Aggregate check dams shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
2. Close attention shall be paid to the repair of damaged check dams, end runs and undercutting beneath dams.
3. Necessary repairs to check dams shall be accomplished promptly.
4. Sediment deposits should be removed after each rainfall. They must be removed when the level of deposition reaches approximately one–half the height of the barrier.
5. Any sediment deposits remaining in place after the aggregate is no longer required shall be dressed to conform to the existing grade, prepared and seeded.

ITEM SPECIAL ROCK CHECK DAM
Scale: Not to Scale

CALCULATED CPG CHECKED MRB

SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT

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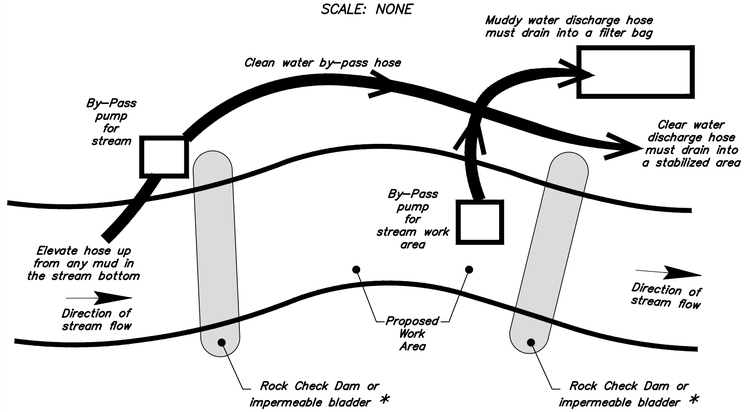
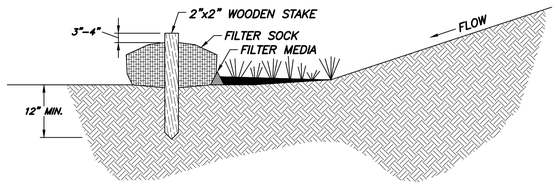
Xrefs: 20181446-CD-REPT-E, 20181446-CP-REPT-ROAD-WEST-N, 20181446-CS-REPT-E

STREAM DAM AND BY-PASS PUMP DETAIL

SCALE: NONE



* Non-erodable material only



1. Materials – Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 3/8" to 2".

2. Filter socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

Installation:

3. Filter socks will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed midslope.

4. Upon installation of the filter sock, additional filter media (matching the media inside of the sock) shall be placed on the upland side of the filter sock. Filter media shall extend halfway up the sock and slope at a maximum of 45 degrees to existing ground elevation.

5. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.

6. Filter socks are not to be used in concentrated flow situations or in runoff channels.

Maintenance:

7. Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.

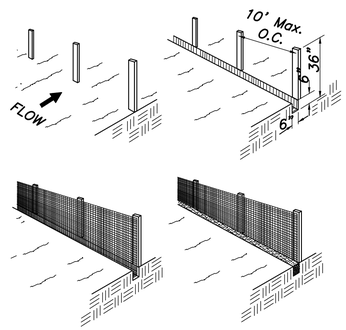
8. Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.

9. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.

10. Removal – Filter socks will be dispersed on site when no longer required in such as way as to facilitate and not obstruct seedings.

FILTER SOCK
SCALE: NONE

2"x2" Pencil sharpened 42" lg. post.



Maintenance Sediment fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

Should the fabric on a sediment fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly.

Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately one-half the height of the barrier.

Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared and seeded.

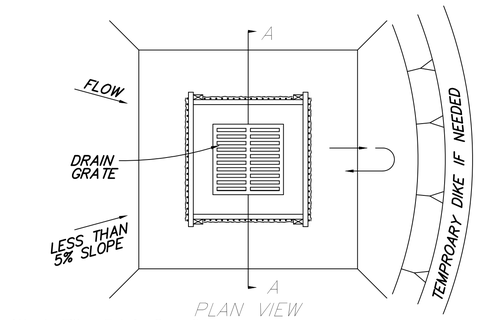
Sediment Fence: This sediment barrier utilizes standard strength or extra strength synthetic filter fabrics. It is designed for situations in which only sheet or overland flows are expected.

1. The height of a sediment fence shall not exceed 36-inches (higher fences may impound volumes of water sufficient to cause failure of the structure).

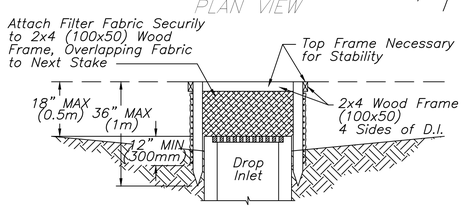
The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum of a 6 inch overlap, and securely sealed.

1. Posts shall be spaced a maximum of 10 feet apart at the barrier location and driven securely into the ground (minimum of 16 inches). When extra strength fabric is used without the wire support fence, post spacing shall not exceed 6 feet.
2. A trench shall be excavated approximately 6 inches wide and 6 inches deep along the line of posts and upslope from the barrier.
3. When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1-inch long, tie wires or hog rings. The wire shall extend into the trench a minimum of 2-inches and shall not extend more than 36-inches above the original ground surface.
4. The standard strength filter fabric shall be stapled or wired to the fence, and 8-inches of the fabric shall be extended into the trench. The fabric shall not extend more than 36-inches above the original ground surface. Filter fabric shall not be stapled to existing trees.
5. When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions of Item No. 6 applying.
6. The trench shall be backfilled and soil compacted over the filter fabric.
7. Sediment fences shall be removed when they have served their useful purpose,but not before the upslope area has been permanently stabilized.

ITEM 207 – PERIMETER FILTER FABRIC FENCE
SCALE: NONE



PLAN VIEW



SECTION A-A

NOTES:

1. Drop Inlet Sediment Barriers are to be used for Small, Nearly Level Drainage Areas. (Less Than 5 %)

2. Use 2"x4" (100x50mm) Wood or Equivalent Metal Stakes, 3' (1m) Minimum Length.

3. Install 2"x4" (100x50mm) Wood Top Frame to Insure Stability.

4. The Top of the Frame (Ponding Height) must be well Below the Ground Elevation Downslope to Prevent Runoff from by- passing the Inlet. A Temporary Dike may be Necessary on the Downslope Side of the Structure.

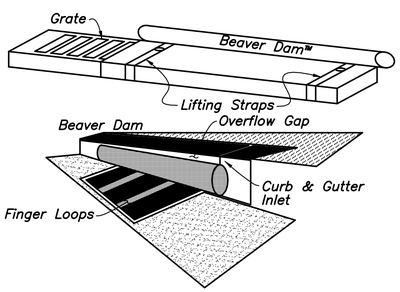
SILT FENCE DROP INLET PROTECTION
SCALE: NONE

PROVIDE FOR INLETS AS ALTERNATE TO DANDY BAG

Installation: Stand grate on end. Place Dandy Bag over grate. Flip grate over so that open end is up. Pull up slack. Tuck flap in. Be sure end of grate is completely covered by flap or Dandy Bag will not fit properly. Holding handles, carefully place Dandy Bag with grate inserted into Catch Basin frame so that red dot on the top of the Dandy Bag is visible.

Maintenance: After silt has dried, remove it from the surface of Dandy Bag with broom.

ITEM 207 – INLET PROTECTION
(DANDY BAG)
SCALE: NONE



Installation: Stand grate on end. Slide the Beaver Dam Bag on with Dam on top of the grate. Pull all excess down. Lay unit on its side. Carefully tuck flap in. Press Velcro strips together. Install the unit making sure front edge of grate is inserted in frame first then lower back into place. Press Velcro dots together which are located under lifting straps. This insures straps remain flush with gutter.

Maintenance: With a stiff bristle broom sweep silt and other debris off surface after each event.

ITEM 207 – INLET PROTECTION – THE BEAVER DAM
SCALE: NONE

CALCULATED CPG CHECKED MRB

SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT

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3 Xrefs: 2018144B-03-REFR-E, 2018144B-03-REFR-ROAD-WEST-E, 2018144B-03-REFR-E

LEGEND

- *Perimeter Filter Fabric Fence*
- *Temporary Ditch*
- *Rock Check Dam (For detail see sheet 88)*
- *Inlet Protection (Beaver Dam) (For detail see sheet 89)*
- *Inlet Protection (Dandy Bag) (For detail see sheet 89)*
- *Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)*
- CWA — *Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)*
- ✳ — *Installed in Phase 1*

Sheet: 1 inch = 50 feet

CALCULATED CPC
CHECKED MRB

PRE CONSTRUCTION SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/ SHIER RINGS RD & AVERY RD INTERSECTION IMPROVEMENT

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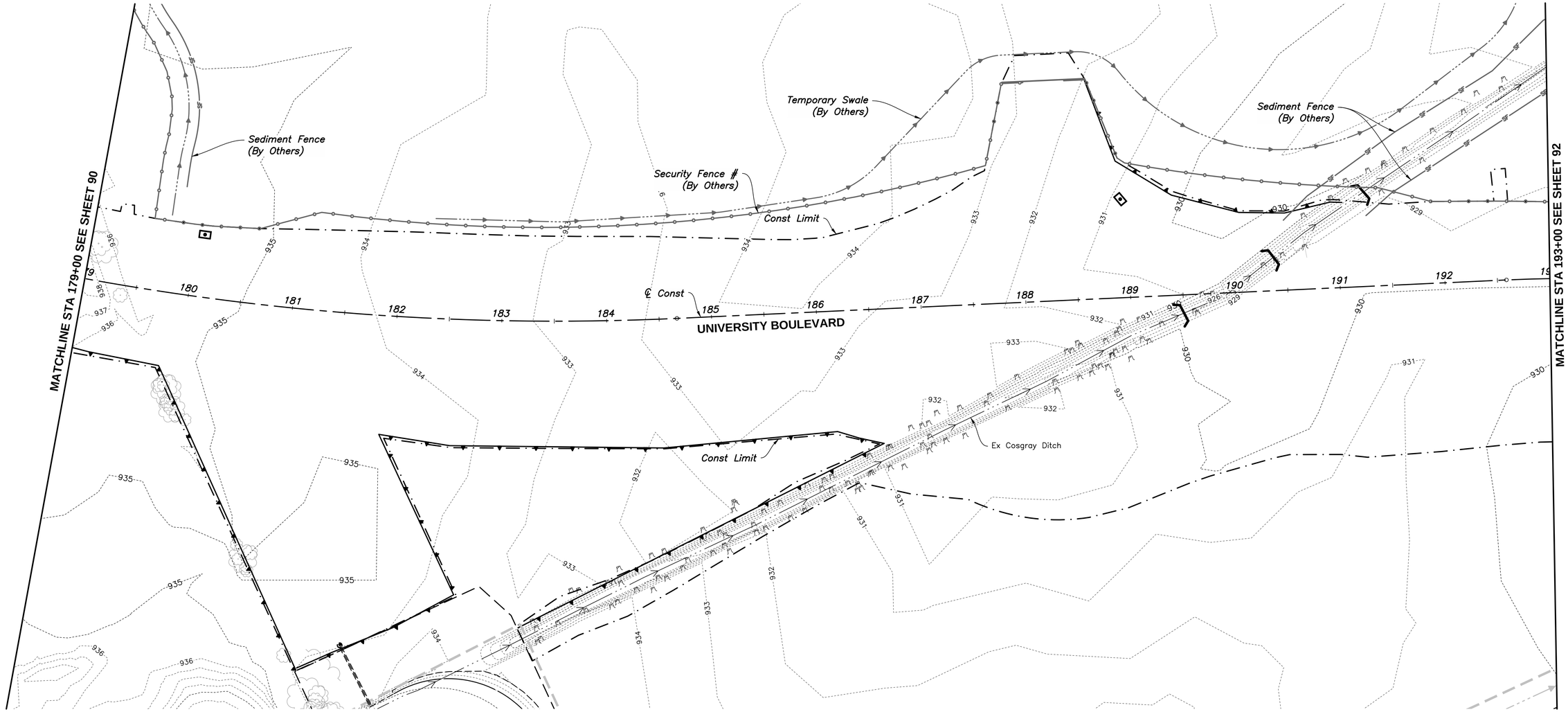

LEGEND

- *Perimeter Filter Fabric Fence*
- *Temporary Ditch*
- *Rock Check Dam (For detail see sheet 88)*
- *Inlet Protection (Beaver Dam) (For detail see sheet 89)*
- *Inlet Protection (Dandy Bag) (For detail see sheet 89)*
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- CWA — *Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)*
- ✳ — *Installed in Phase 1*
- # — *Installed by Others, If not Installed, Include in this Project and Maintain*

N

Horiz: 1 inch = 50 feet

CALCULATED CPC | CHECKED MRB

PRE CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT

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Crossing (By Others)

Sediment Fence (By Others)

Sediment Basin (By Others)

Erosion Fence (By Others)

Sediment Fence (By Others)

Existing Stockpile

Staging Area (By Others)

Ditch (By Others)

Sediment Fence (By Others)

Erosion Fence (By Others)

Const Limit

Stream Crossing (By Others)

Ex Cosgray Ditch

MATCHLINE STA 193+00 SEE ABOVE

MATCHLINE @ PT STA 206+33.48 SEE SHEET 93

℄ Const

UNIVERSITY BOULEVARD

Cosgray Ditch Relocation (By Others)

Const Limit

EXISTING SHIER RINGS ROAD

Const Limit

MATCHLINE SEE RIGHT

MATCHLINE SEE LEFT

N

Horiz: 1 inch = 50 feet

CALCULATED CPC

CHECKED MRB

PRE CONSTRUCTION SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/ SHIER RINGS RD & AVERY RD INTERSECTION IMPROVEMENT

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LEGEND

- Perimeter Filter Fabric Fence
- Temporary Ditch
- Rock Check Dam (For detail see sheet 89)
- Inlet Protection (Beaver Dam) (For detail see sheet 89)
- Inlet Protection (Dandy Bag) (For detail see sheet 89)
- Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)
- CWA — Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)
- Installed in Phase 1
- # — Installed by Others, If not Installed, Include in this Project and Maintain

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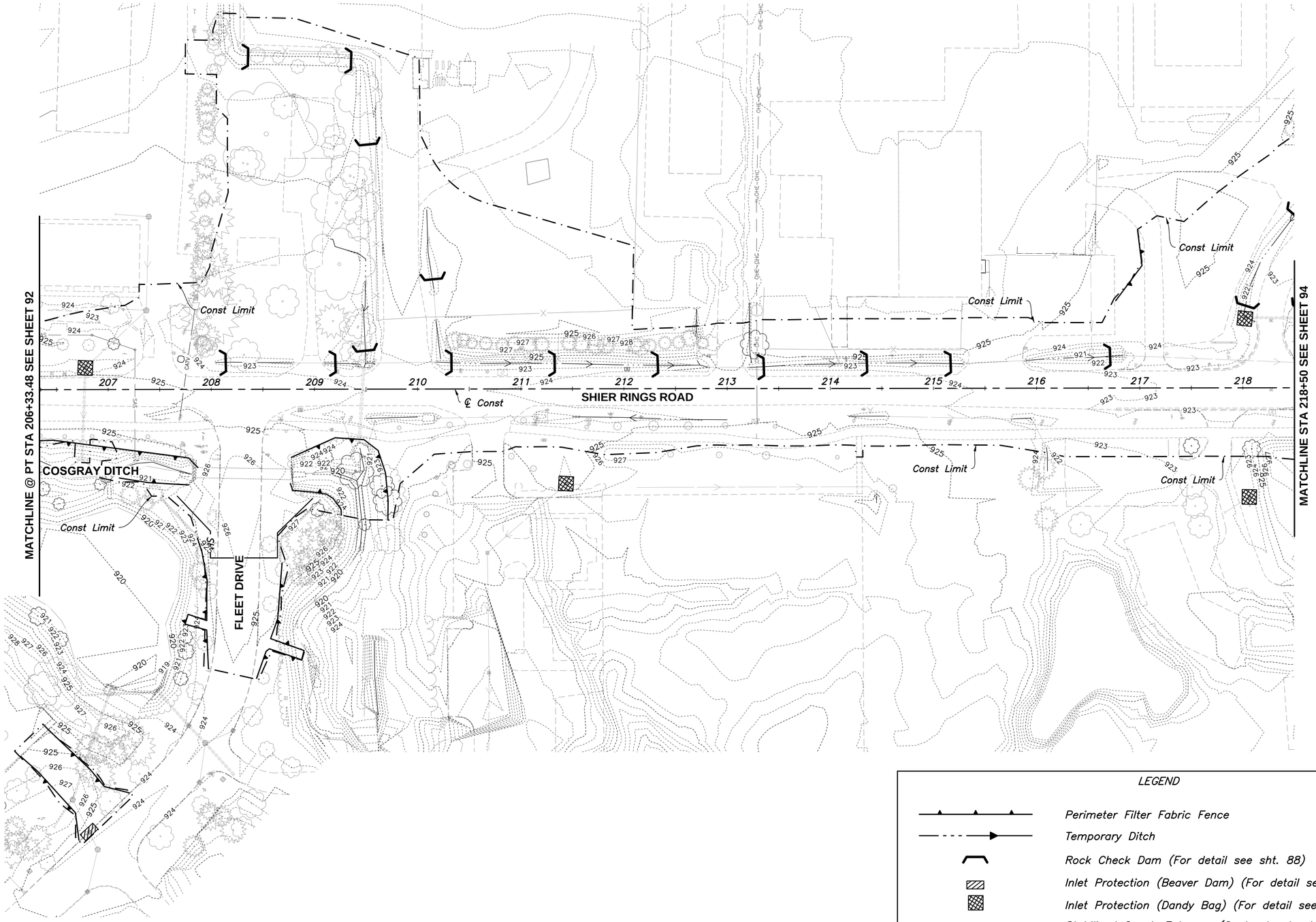

LEGEND

	Perimeter Filter Fabric Fence
	Temporary Ditch
	Rock Check Dam (For detail see sht. 88)
	Inlet Protection (Beaver Dam) (For detail see sht. 89)
	Inlet Protection (Dandy Bag) (For detail see sht. 89)
	Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)
CWA	Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)
	Installed in Phase 1

Hori: 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

PRE CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT

MATCHLINE STA 218+50 SEE SHEET 93

PROJECT DATA			
TOTAL AREA (LIMITS OF CONSTRUCTION):	37.49 ACRES	RUNOFF COEFFICIENT FOR PRE-CONSTRUCTION SITE:	0.58
PROJECT EARTH DISTURBED AREA:	35.35 ACRES		
ESTIMATED CONTRACTOR EARTH DISTURBED AREA:	1.00 ACRES	RUNOFF COEFFICIENT FOR POST CONSTRUCTION SITE:	0.67
NOTICE OF INTENT EARTH DISTURBED AREA:	36.35 ACRES	SOIL AND WATER CONSERVATION MAPS:	FRANKLIN COUNTY
IMPERVIOUS (PAVED) AREA FOR PRE-CONSTRUCTION SITE:	6.80 ACRES	IMMEDIATE RECEIVING WATERS:	COSGRAY DITCH
IMPERVIOUS (PAVED) AREA FOR POST CONSTRUCTION SITE:	14.77 ACRES	SUBSEQUENT RECEIVING WATERS:	SCIOTO RIVER

LEGEND

- Perimeter Filter Fabric Fence
- Temporary Ditch
- Rock Check Dam (For detail see sht. 88)
- Inlet Protection (Beaver Dam) (For detail see sht. 89)
- Inlet Protection (Dandy Bag) (For detail see sht. 89)
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Horiz: 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

PRE CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT

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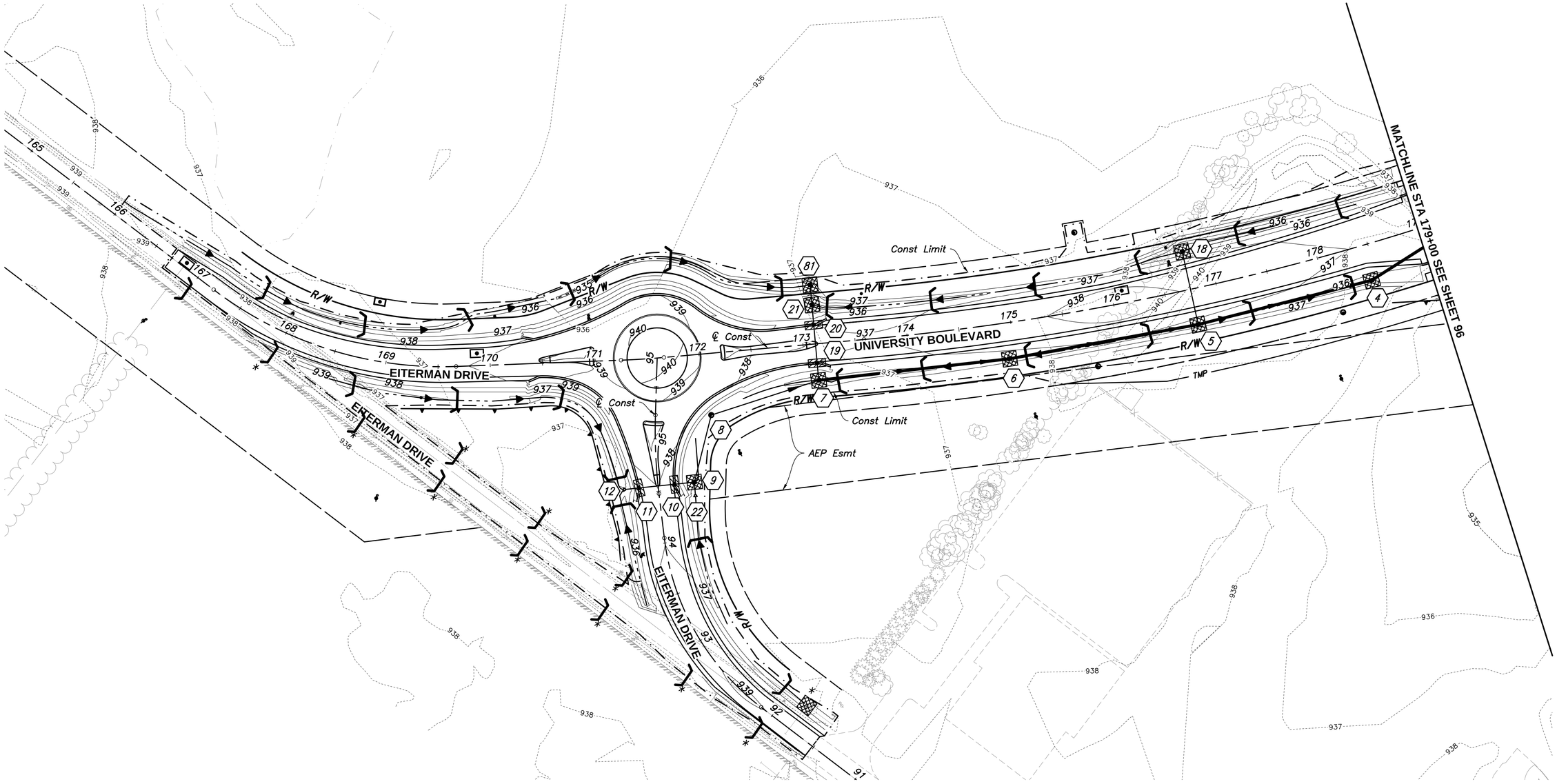
3 Xrefs: 20181446-CU-REFR-E, 20181446-CP-REFR-ROAD-WEST-N, 20181446-CS-REFR-E



LEGEND

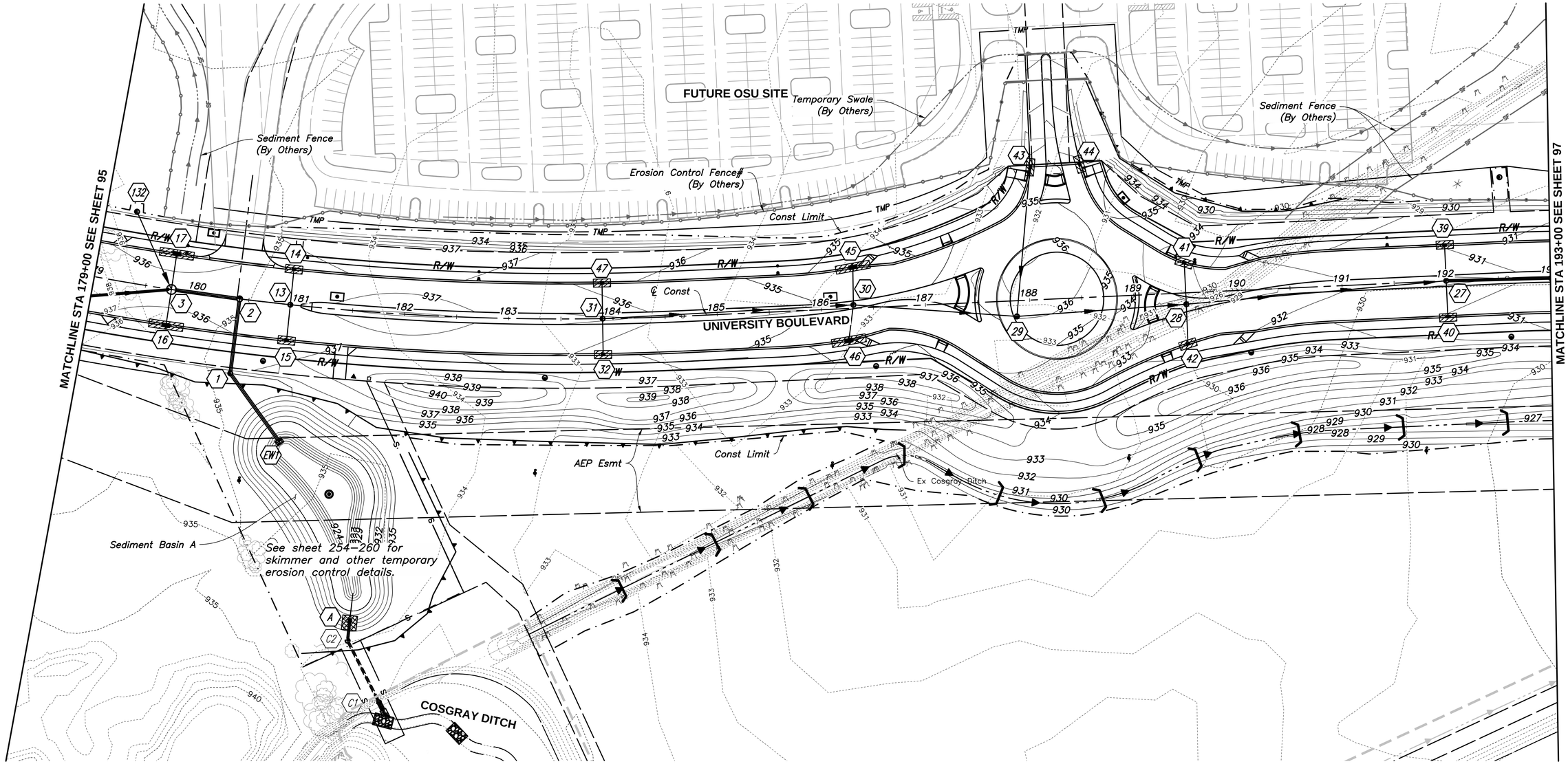
- Perimeter Filter Fabric Fence
- Temporary Ditch
- Rock Check Dam (For detail see sheet 88)
- Inlet Protection (Beaver Dam) (For detail see sheet 89)
- Inlet Protection (Dandy Bag) (For detail see sheet 89)
- Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)
- CWA — Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)
- * — Installed in Phase 1

Hori: 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

POST CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT



LEGEND

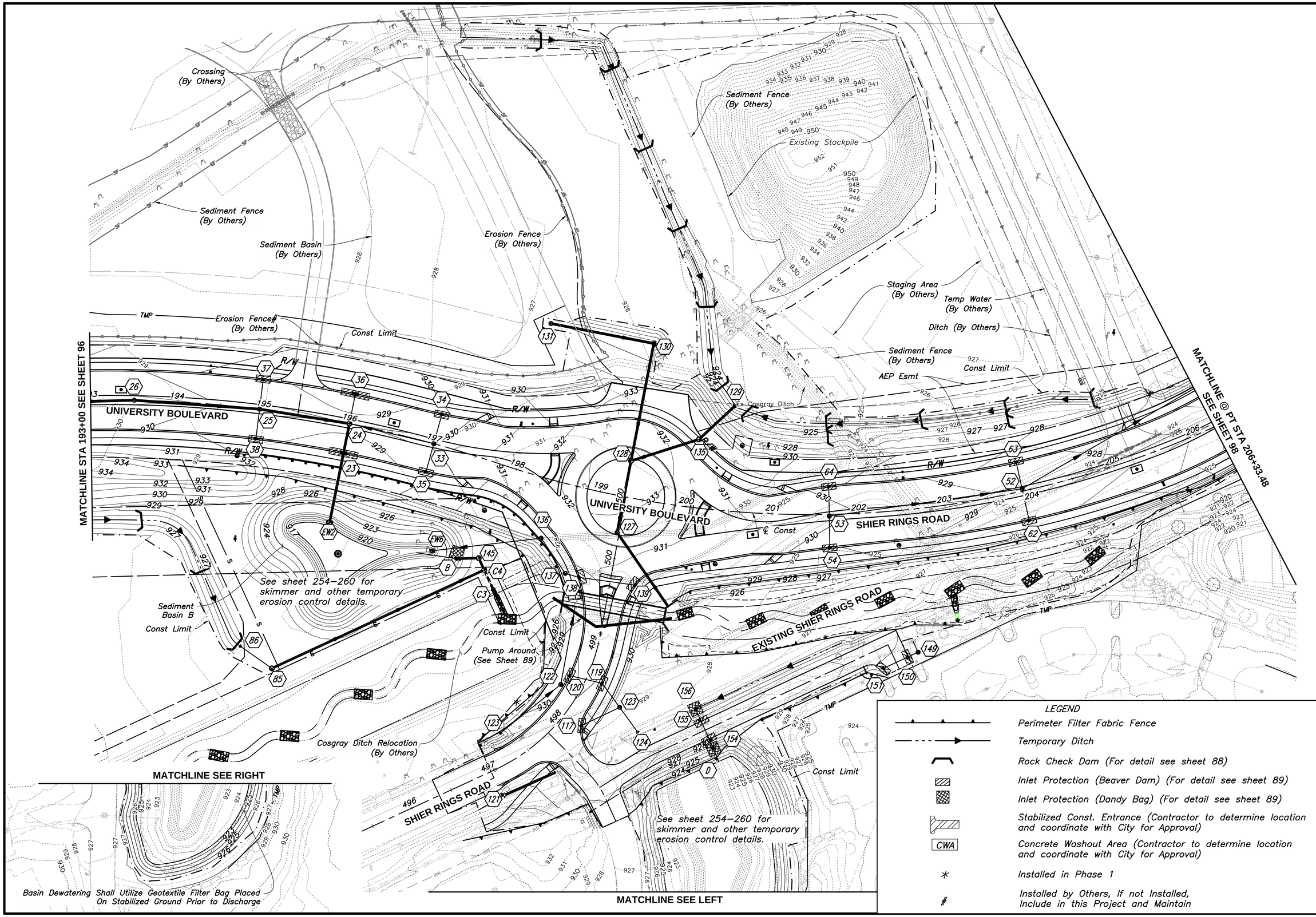
	Perimeter Filter Fabric Fence
	Temporary Ditch
	Rock Check Dam (For detail see sheet 88)
	Inlet Protection (Beaver Dam) (For detail see sheet 89)
	Inlet Protection (Dandy Bag) (For detail see sheet 89)
	Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)
CWA	Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)
*	Installed in Phase 1
#	Installed by Others, If not Installed, Include in this Project and Maintain

Hori: 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

POST CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT



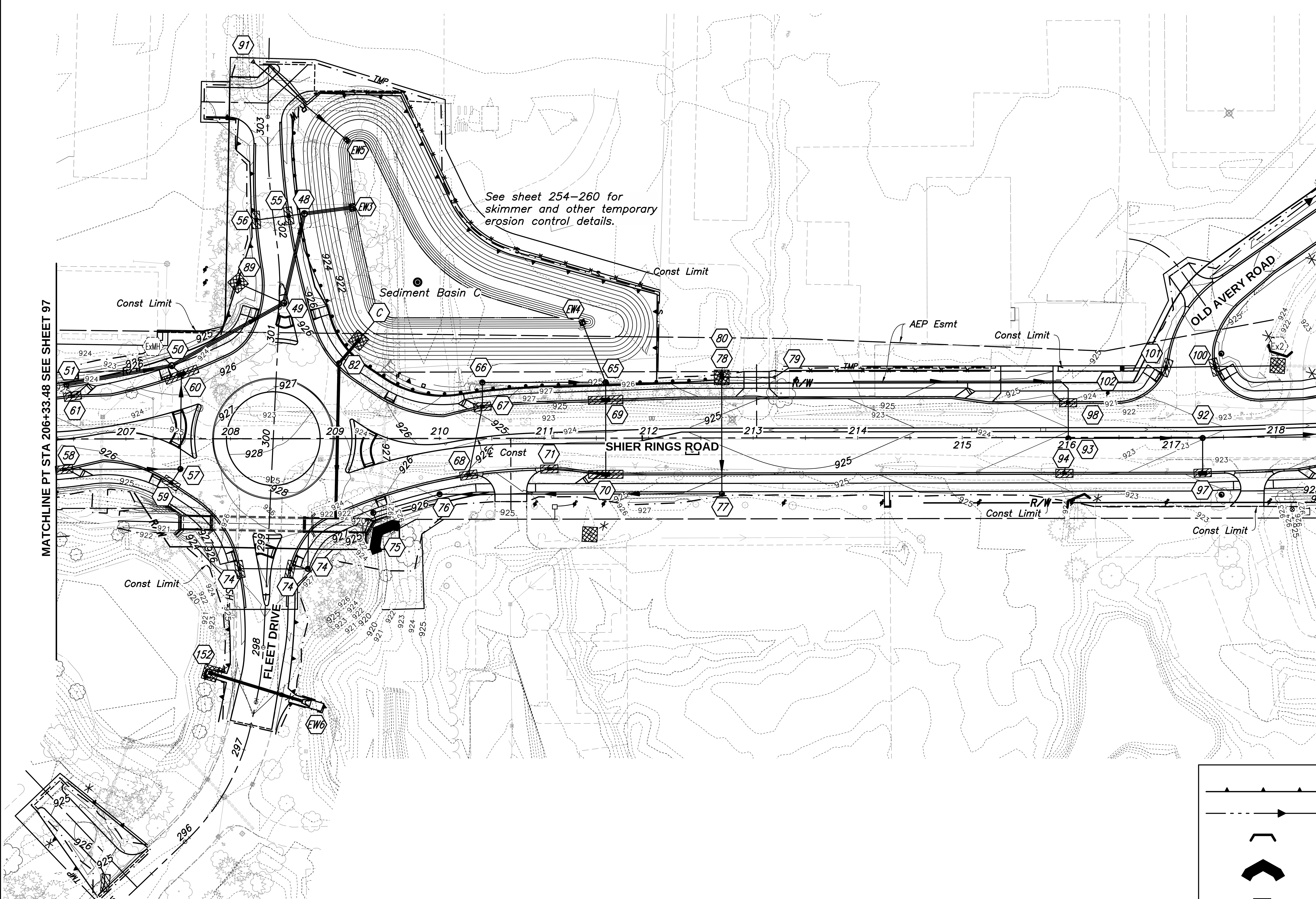
N

Hori: 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

POST CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT



LEGEND

- Perimeter Filter Fabric Fence
- Temporary Ditch
- Rock Check Dam (For detail see sheet 88)
- Compost Filter Sock (For detail see sheet 89)
- Inlet Protection (Beaver Dam) (For detail see sheet 89)
- Inlet Protection (Dandy Bag) (For detail see sheet 89)
- Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)
- CWA — Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)
- * — Installed in Phase 1

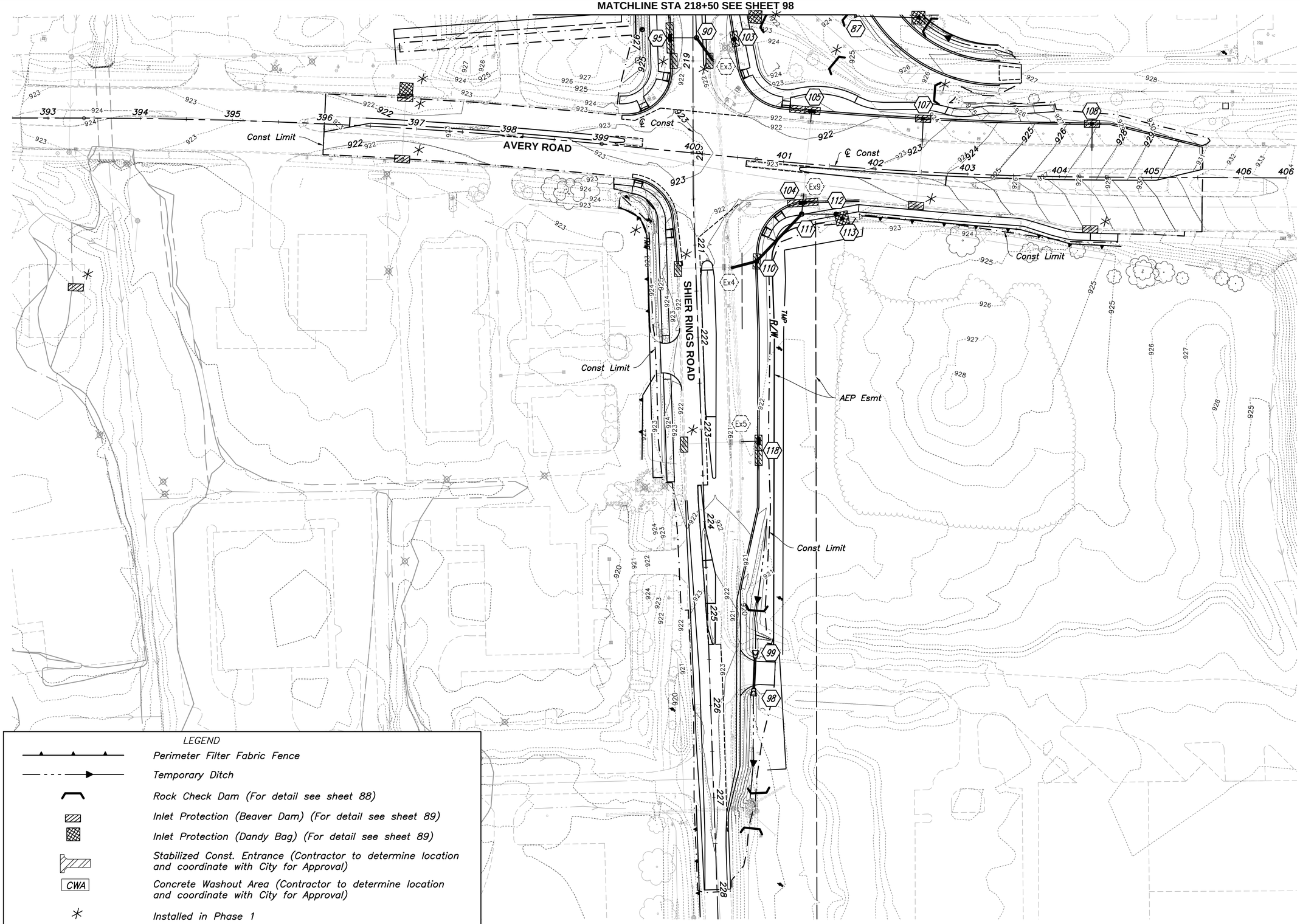
Horiz. 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

POST CONSTRUCTION SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/ SHIER RINGS RD & AVERY RD INTERSECTION IMPROVEMENT

MATCHLINE STA 218+50 SEE SHEET 98



LEGEND

- Perimeter Filter Fabric Fence
- Temporary Ditch
- Rock Check Dam (For detail see sheet 88)
- Inlet Protection (Beaver Dam) (For detail see sheet 89)
- Inlet Protection (Dandy Bag) (For detail see sheet 89)
- Stabilized Const. Entrance (Contractor to determine location and coordinate with City for Approval)
- CWA — Concrete Washout Area (Contractor to determine location and coordinate with City for Approval)
- * — Installed in Phase 1

Hori: 1 inch = 50 feet

CALCULATED CPG
CHECKED MRB

POST CONSTRUCTION
SEDIMENT AND EROSION CONTROL PLAN

UNIVERSITY BLVD-PHASE 2/
SHIER RINGS RD & AVERY RD
INTERSECTION IMPROVEMENT

EMH&T

APPENDIX D: Water Quality and Sediment Basin Calculations & Drawdown Graphs

SHIER RINGS ROAD REALIGNMENT & UNIVERSITY BOULEVARD

REDEVELOPMENT WATER QUALITY VOLUME CALCULATIONS							
Total Site Area (acres)	Existing Impervious Area (acres)	Existing % Impervious	Existing Rv	Proposed Impervious Area (acres)	Proposed % Impervious	Proposed Rv	Required WQv Treatment (ac-ft)
29.02	4.35	15%	0.18	13.56	47%	0.47	**0.702**

$$WQ_v = \frac{P \times A \times \left((R_v \times 0.2) + (R_{v2} - R_{v1})\right)}{12}$$

Where:
P = 0.90 inches
A = total site area (acres)
Rv1 = volumetric runoff coefficient for existing conditions (currrent site impervious area)
Rv2 = volumetric runoff coefficient for proposed conditions (post-construction site impervious area)

Rv = the volumetric runoff coefficient
Rv = 0.05+0.9i
Where i = fraction of post-construction impervious surface

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SHIER RINGS ROAD REALIGNMENT & UNIVERSITY BOULEVARD
OVERALL WATER QUALITY TREATMENT

WATER QUALITY VOLUME CALCULATIONS

BMP	Subarea 1.1	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)
Basin A	Impervious	2.53	100%	0.95	0.180	-
	Pervious	6.17	0%	0.05	0.023	-
	Industrial	0.00	72%	0.70	0.000	-
	Commercial	0.00	85%	0.82	0.000	-
	Total	**8.70**	**29%**	**0.31**	**0.203**	930.76

Required Permanent Pool Volume =	10636	cu-ft
Provided Permanent Pool Volume =	30492	cu-ft

Water Quality Volume calculated using the Ohio EPA formula:

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:
A = area draining into the BMP (acres)
P = 0.90" precipitation depth
Rv = the volumetric runoff coefficient
Rv = 0.05+0.9i
Where i = fraction of post-construction impervious surface

SEDIMENT BASIN CALCULATIONS

BMP	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (67 CY/Tributary Acre) (ac-ft)	Dewatering Volume Elevation (feet)	Required Sediment Storage Volume (37 CY/Disturbed Acre) (ac-ft)
Basin A	8.70	5.82	0.36	931.28	0.13

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SHIER RINGS ROAD REALIGNMENT & UNIVERSITY BOULEVARD
OVERALL WATER QUALITY TREATMENT

WATER QUALITY VOLUME CALCULATIONS

BMP	Subarea 2.1	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)
Basin B	Impervious	3.81	100%	0.95	0.271	-
	Pervious	5.60	0%	0.05	0.021	-
	Industrial	0.00	72%	0.70	0.000	-
	Commercial	0.00	85%	0.82	0.000	-
	Total	**9.41**	**40%**	**0.41**	**0.292**	923.90

Required Permanent Pool Volume =	15273	cu-ft
Provided Permanent Pool Volume =	39640	cu-ft

Water Quality Volume calculated using the Ohio EPA formula:

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:
A = area draining into the BMP (acres)
P = 0.90" precipitation depth
Rv = the volumetric runoff coefficient
Rv = 0.05+0.9i
Where i = fraction of post-construction impervious surface

SEDIMENT BASIN CALCULATIONS

BMP	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (67 CY/Tributary Acre) (ac-ft)	Dewatering Volume Elevation (feet)	Required Sediment Storage Volume (37 CY/Disturbed Acre) (ac-ft)
Basin B	9.41	8.49	0.39	924.17	0.19

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SHIER RINGS ROAD REALIGNMENT & UNIVERSITY BOULEVARD
OVERALL WATER QUALITY TREATMENT

WATER QUALITY VOLUME CALCULATIONS

BMP	Subarea 4.1, Offsite 4.2 & 4.3	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)
Basin C	Impervious	3.58	100%	0.95	0.255	-
	Pervious	3.66	0%	0.05	0.014	-
	Industrial	7.79	72%	0.70	0.408	-
	Commercial	0.04	85%	0.82	0.003	-
	Total	**15.08**	**61%**	**0.60**	**0.680**	921.69

Required Permanent Pool Volume =	35523	cu-ft
Provided Permanent Pool Volume =	101582	cu-ft

Water Quality Volume calculated using the Ohio EPA formula:

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:
A = area draining into the BMP (acres)
P = 0.90" precipitation depth
Rv = the volumetric runoff coefficient
Rv = 0.05+0.9i
Where i = fraction of post-construction impervious surface

SEDIMENT BASIN CALCULATIONS

BMP	Tributary Area (acres)	Disturbed Area (acres)	Required Dewatering Volume (67 CY/Tributary Acre) (ac-ft)	Dewatering Volume Elevation (feet)	Required Sediment Storage Volume (37 CY/Disturbed Acre) (ac-ft)
Basin C	15.08	6.19	0.63	921.62	0.14

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SERVICE CENTER BASIN - SHIER RINGS ROAD REALIGNMENT & UNIVERSITY BOULEVARD

WATER QUALITY VOLUME CALCULATIONS

BMP	Subarea Identifier	Area (acres)	Percent Impervious (%)	Rv	Water Quality Volume (ac-ft)	Water Quality Volume Elevation (feet)
Service Center Basin	Impervious	9.243	100%	0.95	0.549	-
	Pervious	6.363	0%	0.05	0.020	-
	Total	**15.606**	**59%**	**0.58**	**0.569**	923.08

Required Permanent Pool Volume =	-	cu-ft
Provided Permanent Pool Volume =	-	cu-ft

Water Quality Volume calculated using the Ohio EPA formula from 2004:

$$WQ_v = \frac{R_v \times P \times A}{12}$$

where:

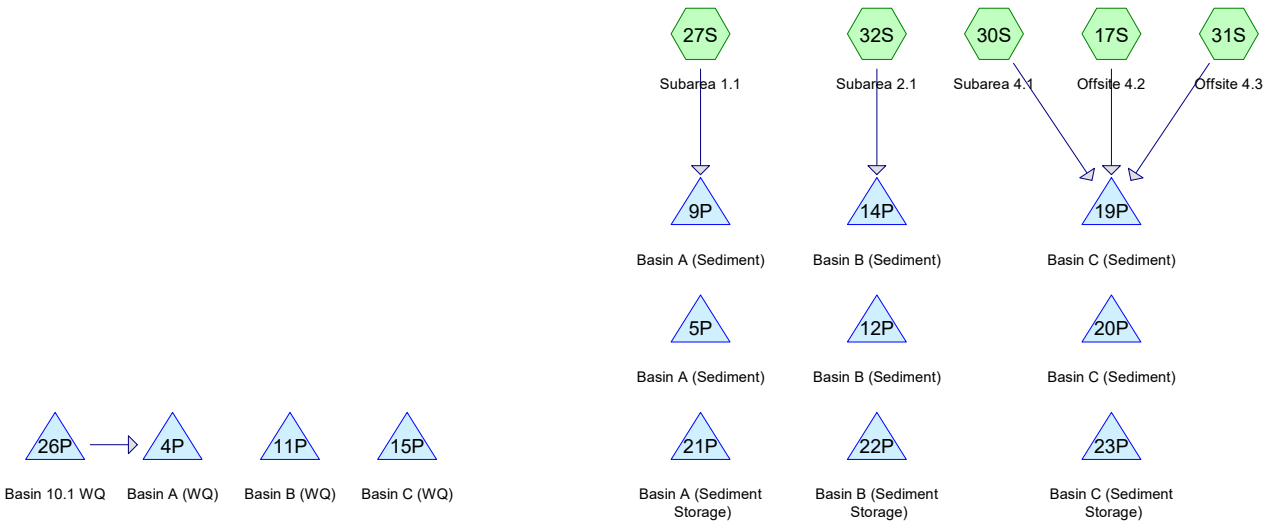
A = area draining into the BMP (acres)

P = 0.75" precipitation depth

Rv = the volumetric runoff coefficient

Rv = 0.05+0.9i

Where i = fraction of post-construction impervious surface



Subcat Reach Pond Link

Routing Diagram for Shier Rings Road Detention Basins
Prepared by Symanetc, Printed 6/9/2020
HydroCAD® 10.10-3a s/n 03828 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	2.20	2
2	2-yr	Type II 24-hr		Default	24.00	1	2.63	2
3	5-yr	Type II 24-hr		Default	24.00	1	3.24	2
4	10-yr	Type II 24-hr		Default	24.00	1	3.74	2
5	25-yr	Type II 24-hr		Default	24.00	1	4.44	2
6	50-yr	Type II 24-hr		Default	24.00	1	5.02	2
7	100-yr	Type II 24-hr		Default	24.00	1	5.63	2

Summary for Subcatchment 17S: Offsite 4.2

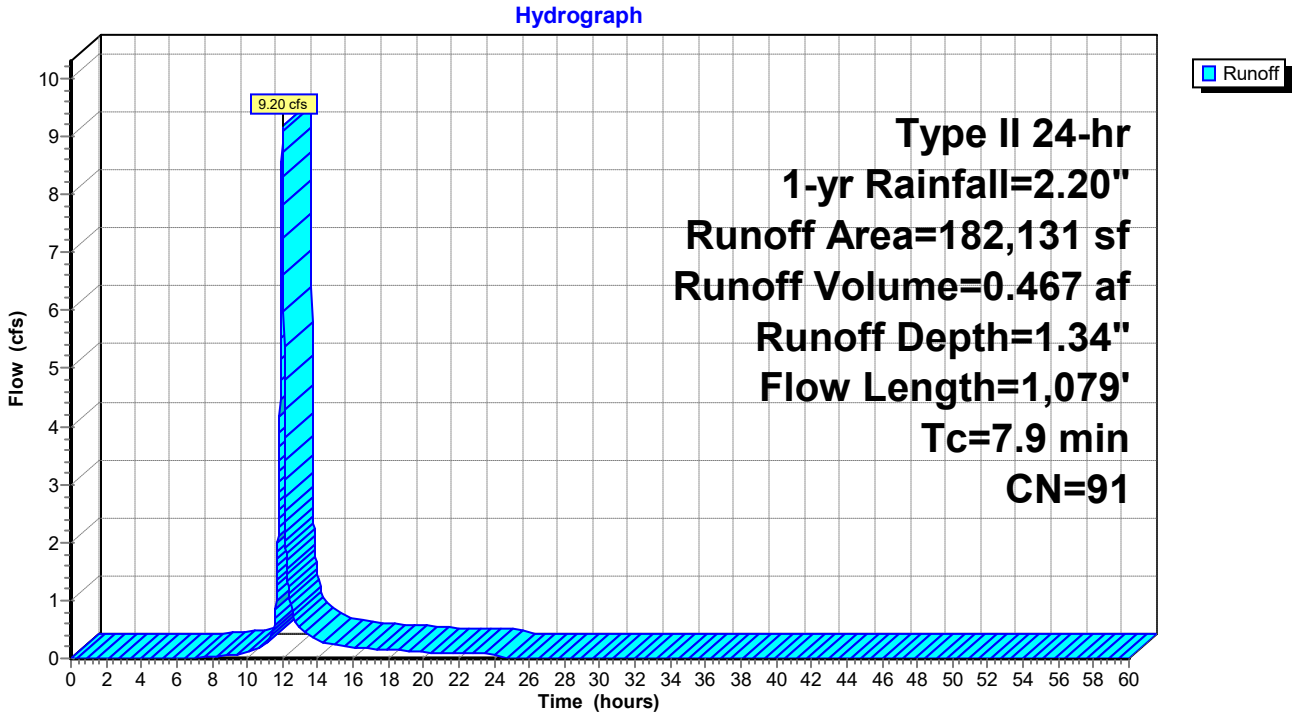
Runoff = 9.20 cfs @ 11.99 hrs, Volume= 0.467 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (sf)	CN	Description
115	98	Paved roads w/curbs & sewers, HSG C
77,438	91	Urban industrial, 72% imp, HSG C
63,553	93	Urban industrial, 72% imp, HSG D
1,284	74	>75% Grass cover, Good, HSG C
761	80	>75% Grass cover, Good, HSG D
8,415	85	Row crops, straight row, Good, HSG C
30,565	89	Row crops, straight row, Good, HSG D
182,131	91	Weighted Average
80,502		44.20% Pervious Area
101,629		55.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0124	1.03		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.63"
1.9	180	0.0061	1.59		**Shallow Concentrated Flow, Shallow Concentrated Flow** Paved Kv= 20.3 fps
4.4	799		3.00		**Direct Entry, Assumed Pipe Velocity**
7.9	1,079	Total			

Subcatchment 17S: Offsite 4.2



Hydrograph for Subcatchment 17S: Offsite 4.2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.02	0.00	0.00
2.00	0.05	0.00	0.00
3.00	0.08	0.00	0.00
4.00	0.11	0.00	0.00
5.00	0.14	0.00	0.00
6.00	0.18	0.00	0.00
7.00	0.22	0.00	0.01
8.00	0.26	0.00	0.02
9.00	0.32	0.01	0.06
10.00	0.40	0.03	0.10
11.00	0.52	0.08	**0.26**
12.00	1.46	0.71	**9.17**
13.00	1.70	0.90	0.52
14.00	1.80	0.99	0.31
15.00	1.88	1.06	0.25
16.00	1.94	1.11	0.19
17.00	1.98	1.15	0.17
18.00	2.03	1.19	0.15
19.00	2.06	1.22	0.13
20.00	2.09	1.25	0.11
21.00	2.12	1.27	0.10
22.00	2.15	1.30	0.10
23.00	2.18	1.32	0.10
24.00	**2.20**	**1.34**	0.09
25.00	2.20	1.34	0.00
26.00	2.20	1.34	0.00
27.00	2.20	1.34	0.00
28.00	2.20	1.34	0.00
29.00	2.20	1.34	0.00
30.00	2.20	1.34	0.00
31.00	2.20	1.34	0.00
32.00	2.20	1.34	0.00
33.00	2.20	1.34	0.00
34.00	2.20	1.34	0.00
35.00	2.20	1.34	0.00
36.00	2.20	1.34	0.00
37.00	2.20	1.34	0.00
38.00	2.20	1.34	0.00
39.00	2.20	1.34	0.00
40.00	2.20	1.34	0.00
41.00	2.20	1.34	0.00
42.00	2.20	1.34	0.00
43.00	2.20	1.34	0.00
44.00	2.20	1.34	0.00
45.00	2.20	1.34	0.00
46.00	2.20	1.34	0.00
47.00	2.20	1.34	0.00
48.00	2.20	1.34	0.00
49.00	2.20	1.34	0.00
50.00	2.20	1.34	0.00
51.00	2.20	1.34	0.00
52.00	2.20	1.34	0.00
53.00	2.20	1.34	0.00
54.00	2.20	1.34	0.00
55.00	2.20	1.34	0.00
56.00	2.20	1.34	0.00
57.00	2.20	1.34	0.00
58.00	2.20	1.34	0.00
59.00	2.20	1.34	0.00
60.00	2.20	1.34	0.00

Summary for Subcatchment 27S: Subarea 1.1

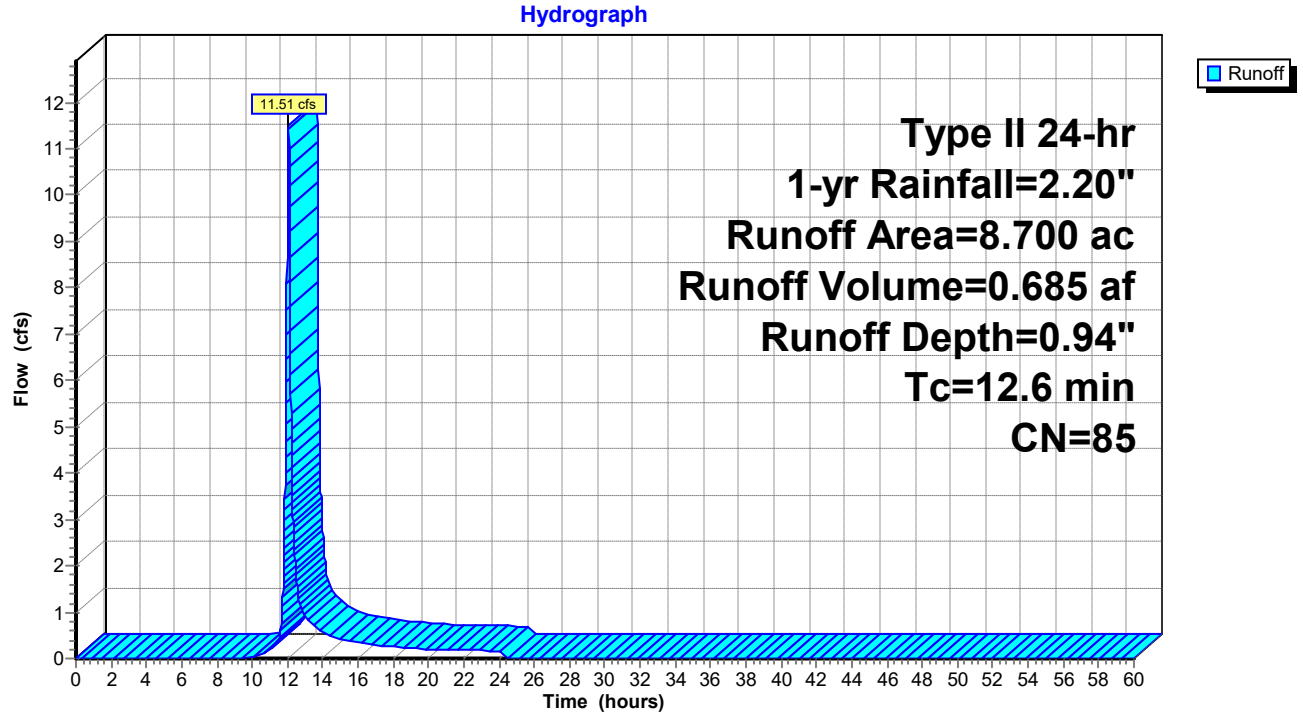
Runoff = 11.51 cfs @ 12.05 hrs, Volume= 0.685 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
0.188	98	Paved parking, HSG C
0.046	98	Paved parking, HSG D
1.451	98	Paved roads w/curbs & sewers, HSG C
0.846	98	Paved roads w/curbs & sewers, HSG D
2.428	74	>75% Grass cover, Good, HSG C
0.735	80	>75% Grass cover, Good, HSG D
2.593	85	Row crops, straight row, Good, HSG C
0.249	89	Row crops, straight row, Good, HSG D
0.157	70	Woods, Good, HSG C
0.007	79	Woods/grass comb., Good, HSG D
8.700	85	Weighted Average
6.169		70.91% Pervious Area
2.531		29.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6					**Direct Entry, Storm Sewer Computation Sheet**

Subcatchment 27S: Subarea 1.1



Hydrograph for Subcatchment 27S: Subarea 1.1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.02	0.00	0.00
2.00	0.05	0.00	0.00
3.00	0.08	0.00	0.00
4.00	0.11	0.00	0.00
5.00	0.14	0.00	0.00
6.00	0.18	0.00	0.00
7.00	0.22	0.00	0.00
8.00	0.26	0.00	0.00
9.00	0.32	0.00	0.00
10.00	0.40	0.00	0.02
11.00	0.52	0.01	0.17
12.00	1.46	0.43	**10.25**
13.00	1.70	0.58	**0.92**
14.00	1.80	0.65	0.55
15.00	1.88	0.71	0.43
16.00	1.94	0.75	0.34
17.00	1.98	0.78	0.29
18.00	2.03	0.81	0.26
19.00	2.06	0.84	0.23
20.00	2.09	0.86	0.19
21.00	2.12	0.89	0.18
22.00	2.15	0.91	0.18
23.00	2.18	0.93	0.17
24.00	**2.20**	**0.94**	0.16
25.00	2.20	0.94	0.00
26.00	2.20	0.94	0.00
27.00	2.20	0.94	0.00
28.00	2.20	0.94	0.00
29.00	2.20	0.94	0.00
30.00	2.20	0.94	0.00
31.00	2.20	0.94	0.00
32.00	2.20	0.94	0.00
33.00	2.20	0.94	0.00
34.00	2.20	0.94	0.00
35.00	2.20	0.94	0.00
36.00	2.20	0.94	0.00
37.00	2.20	0.94	0.00
38.00	2.20	0.94	0.00
39.00	2.20	0.94	0.00
40.00	2.20	0.94	0.00
41.00	2.20	0.94	0.00
42.00	2.20	0.94	0.00
43.00	2.20	0.94	0.00
44.00	2.20	0.94	0.00
45.00	2.20	0.94	0.00
46.00	2.20	0.94	0.00
47.00	2.20	0.94	0.00
48.00	2.20	0.94	0.00
49.00	2.20	0.94	0.00
50.00	2.20	0.94	0.00
51.00	2.20	0.94	0.00
52.00	2.20	0.94	0.00
53.00	2.20	0.94	0.00
54.00	2.20	0.94	0.00
55.00	2.20	0.94	0.00
56.00	2.20	0.94	0.00
57.00	2.20	0.94	0.00
58.00	2.20	0.94	0.00
59.00	2.20	0.94	0.00
60.00	2.20	0.94	0.00

Summary for Subcatchment 30S: Subarea 4.1

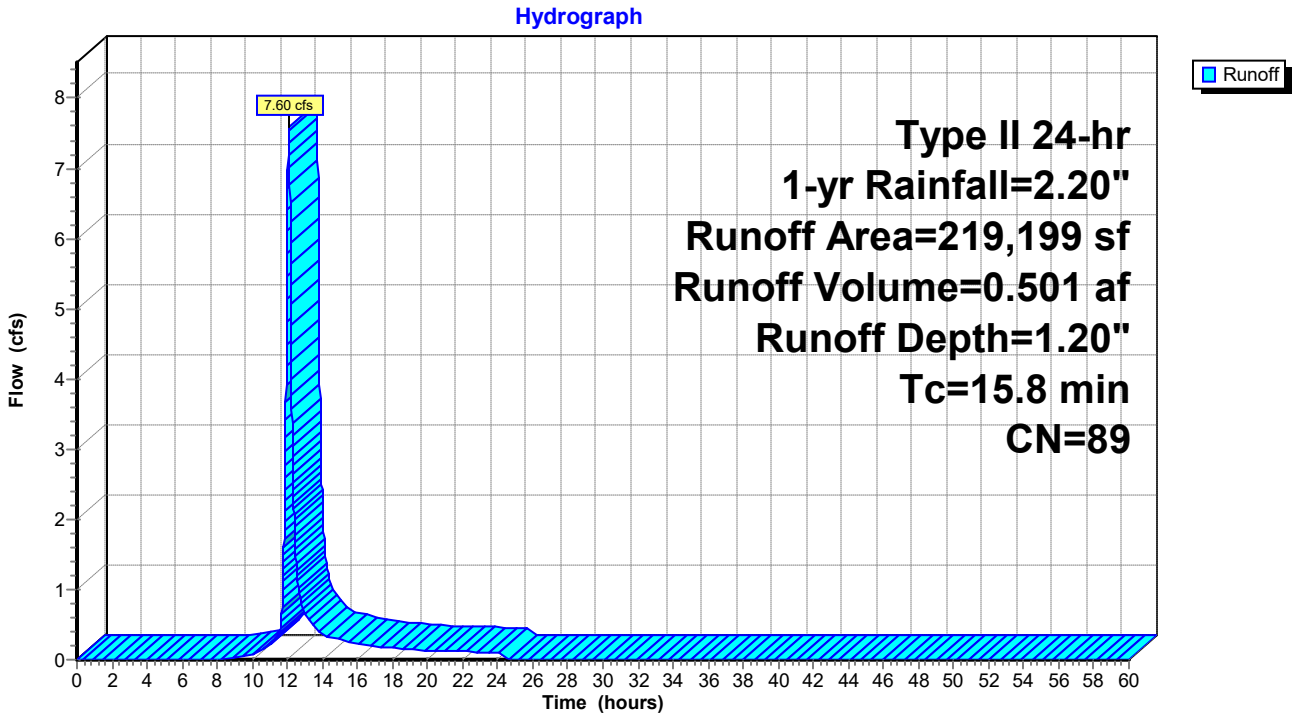
Runoff = 7.60 cfs @ 12.08 hrs, Volume= 0.501 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (sf)	CN	Description
86,082	98	Paved roads w/curbs & sewers, HSG C
44,619	98	Paved roads w/curbs & sewers, HSG D
1,614	91	Urban industrial, 72% imp, HSG C
57,614	74	>75% Grass cover, Good, HSG C
18,786	80	>75% Grass cover, Good, HSG D
2,997	85	Row crops, straight row, Good, HSG C
3,473	89	Row crops, straight row, Good, HSG D
4,014	70	Woods, Good, HSG C
219,199	89	Weighted Average
87,336		39.84% Pervious Area
131,863		60.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8					**Direct Entry, Storm Sewer Computation Sheet**

Subcatchment 30S: Subarea 4.1



Hydrograph for Subcatchment 30S: Subarea 4.1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.02	0.00	0.00
2.00	0.05	0.00	0.00
3.00	0.08	0.00	0.00
4.00	0.11	0.00	0.00
5.00	0.14	0.00	0.00
6.00	0.18	0.00	0.00
7.00	0.22	0.00	0.00
8.00	0.26	0.00	0.00
9.00	0.32	0.00	0.03
10.00	0.40	0.02	0.07
11.00	0.52	0.05	0.20
12.00	1.46	0.60	**6.11**
13.00	1.70	0.78	**0.65**
14.00	1.80	0.87	0.37
15.00	1.88	0.93	0.29
16.00	1.94	0.98	0.23
17.00	1.98	1.01	0.19
18.00	2.03	1.05	0.17
19.00	2.06	1.08	0.15
20.00	2.09	1.11	0.13
21.00	2.12	1.13	0.12
22.00	2.15	1.15	0.11
23.00	2.18	1.17	0.11
24.00	**2.20**	**1.20**	0.11
25.00	2.20	1.20	0.00
26.00	2.20	1.20	0.00
27.00	2.20	1.20	0.00
28.00	2.20	1.20	0.00
29.00	2.20	1.20	0.00
30.00	2.20	1.20	0.00
31.00	2.20	1.20	0.00
32.00	2.20	1.20	0.00
33.00	2.20	1.20	0.00
34.00	2.20	1.20	0.00
35.00	2.20	1.20	0.00
36.00	2.20	1.20	0.00
37.00	2.20	1.20	0.00
38.00	2.20	1.20	0.00
39.00	2.20	1.20	0.00
40.00	2.20	1.20	0.00
41.00	2.20	1.20	0.00
42.00	2.20	1.20	0.00
43.00	2.20	1.20	0.00
44.00	2.20	1.20	0.00
45.00	2.20	1.20	0.00
46.00	2.20	1.20	0.00
47.00	2.20	1.20	0.00
48.00	2.20	1.20	0.00
49.00	2.20	1.20	0.00
50.00	2.20	1.20	0.00
51.00	2.20	1.20	0.00
52.00	2.20	1.20	0.00
53.00	2.20	1.20	0.00
54.00	2.20	1.20	0.00
55.00	2.20	1.20	0.00
56.00	2.20	1.20	0.00
57.00	2.20	1.20	0.00
58.00	2.20	1.20	0.00
59.00	2.20	1.20	0.00
60.00	2.20	1.20	0.00

Summary for Subcatchment 31S: Offsite 4.3

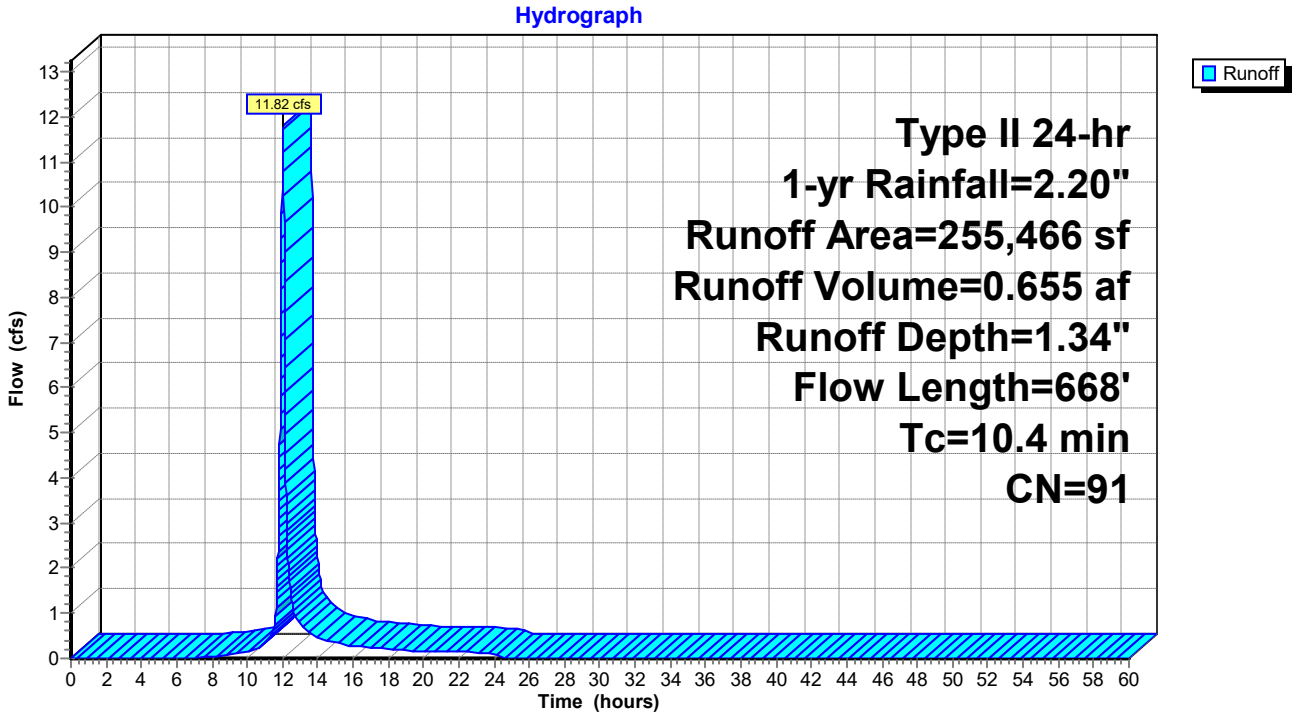
Runoff = 11.82 cfs @ 12.02 hrs, Volume= 0.655 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (sf)	CN	Description
1,935	95	Urban commercial, 85% imp, HSG D
16,657	98	Paved roads w/curbs & sewers, HSG C
8,652	98	Paved roads w/curbs & sewers, HSG D
37,091	91	Urban industrial, 72% imp, HSG C
159,597	93	Urban industrial, 72% imp, HSG D
14,016	74	>75% Grass cover, Good, HSG C
17,518	80	>75% Grass cover, Good, HSG D
255,466	91	Weighted Average
86,897		34.02% Pervious Area
168,569		65.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.1346	2.45		**Sheet Flow, A to B Sheet Flow** Smooth surfaces n= 0.011 P2= 2.63"
7.8	35	0.0056	0.08		**Sheet Flow, B to C Sheet Flow** Grass: Short n= 0.150 P2= 2.63"
0.2	49	0.0620	4.01		**Shallow Concentrated Flow, C to D Shallow Concentrated Flow** Unpaved Kv= 16.1 fps
1.4	410	0.0070	4.90	127.94	**Channel Flow, D to E Channel Flow** Area= 26.1 sf Perim= 16.1' r= 1.62' n= 0.035
0.6	109		3.00		**Direct Entry, E to F Assumed Pipe**
10.4	668	Total			

Subcatchment 31S: Offsite 4.3



Hydrograph for Subcatchment 31S: Offsite 4.3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.02	0.00	0.00
2.00	0.05	0.00	0.00
3.00	0.08	0.00	0.00
4.00	0.11	0.00	0.00
5.00	0.14	0.00	0.00
6.00	0.18	0.00	0.00
7.00	0.22	0.00	0.01
8.00	0.26	0.00	0.03
9.00	0.32	0.01	0.08
10.00	0.40	0.03	0.14
11.00	0.52	0.08	0.35
12.00	1.46	0.71	**11.57**
13.00	1.70	0.90	**0.76**
14.00	1.80	0.99	0.45
15.00	1.88	1.06	0.35
16.00	1.94	1.11	0.27
17.00	1.98	1.15	0.24
18.00	2.03	1.19	0.21
19.00	2.06	1.22	0.18
20.00	2.09	1.25	0.15
21.00	2.12	1.27	0.14
22.00	2.15	1.30	0.14
23.00	2.18	1.32	0.13
24.00	**2.20**	**1.34**	0.13
25.00	2.20	1.34	0.00
26.00	2.20	1.34	0.00
27.00	2.20	1.34	0.00
28.00	2.20	1.34	0.00
29.00	2.20	1.34	0.00
30.00	2.20	1.34	0.00
31.00	2.20	1.34	0.00
32.00	2.20	1.34	0.00
33.00	2.20	1.34	0.00
34.00	2.20	1.34	0.00
35.00	2.20	1.34	0.00
36.00	2.20	1.34	0.00
37.00	2.20	1.34	0.00
38.00	2.20	1.34	0.00
39.00	2.20	1.34	0.00
40.00	2.20	1.34	0.00
41.00	2.20	1.34	0.00
42.00	2.20	1.34	0.00
43.00	2.20	1.34	0.00
44.00	2.20	1.34	0.00
45.00	2.20	1.34	0.00
46.00	2.20	1.34	0.00
47.00	2.20	1.34	0.00
48.00	2.20	1.34	0.00
49.00	2.20	1.34	0.00
50.00	2.20	1.34	0.00
51.00	2.20	1.34	0.00
52.00	2.20	1.34	0.00
53.00	2.20	1.34	0.00
54.00	2.20	1.34	0.00
55.00	2.20	1.34	0.00
56.00	2.20	1.34	0.00
57.00	2.20	1.34	0.00
58.00	2.20	1.34	0.00
59.00	2.20	1.34	0.00
60.00	2.20	1.34	0.00

Summary for Subcatchment 32S: Subarea 2.1

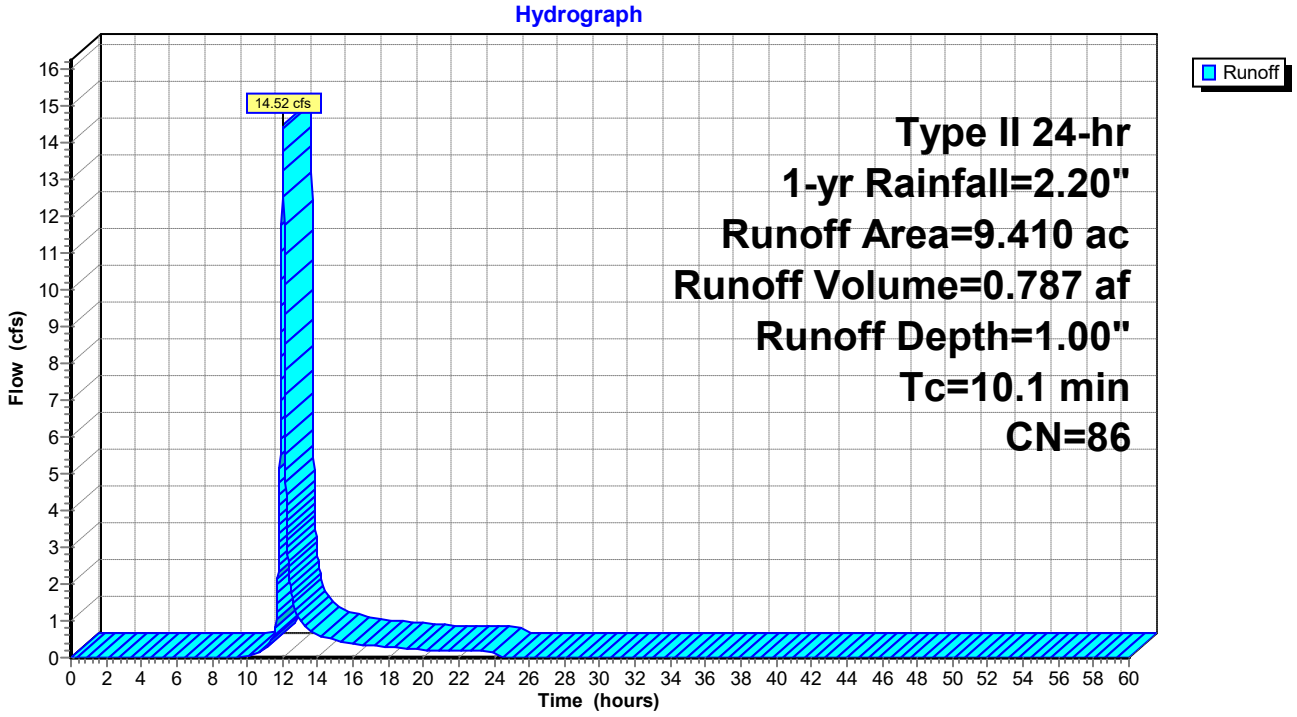
Runoff = 14.52 cfs @ 12.02 hrs, Volume= 0.787 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
1.921	98	Paved roads w/curbs & sewers, HSG C
1.885	98	Paved roads w/curbs & sewers, HSG D
2.914	74	>75% Grass cover, Good, HSG C
1.722	80	>75% Grass cover, Good, HSG D
0.672	85	Row crops, straight row, Good, HSG C
0.296	89	Row crops, straight row, Good, HSG D
9.410	86	Weighted Average
5.604		59.55% Pervious Area
3.806		40.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1					**Direct Entry, Storm Sewer Computation Sheet**

Subcatchment 32S: Subarea 2.1



Hydrograph for Subcatchment 32S: Subarea 2.1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.02	0.00	0.00
2.00	0.05	0.00	0.00
3.00	0.08	0.00	0.00
4.00	0.11	0.00	0.00
5.00	0.14	0.00	0.00
6.00	0.18	0.00	0.00
7.00	0.22	0.00	0.00
8.00	0.26	0.00	0.00
9.00	0.32	0.00	0.00
10.00	0.40	0.00	0.05
11.00	0.52	0.02	0.25
12.00	1.46	0.46	**14.13**
13.00	1.70	0.63	**1.01**
14.00	1.80	0.70	0.61
15.00	1.88	0.76	0.48
16.00	1.94	0.80	0.38
17.00	1.98	0.84	0.33
18.00	2.03	0.87	0.29
19.00	2.06	0.90	0.25
20.00	2.09	0.92	0.22
21.00	2.12	0.94	0.20
22.00	2.15	0.96	0.20
23.00	2.18	0.98	0.19
24.00	**2.20**	**1.00**	0.18
25.00	2.20	1.00	0.00
26.00	2.20	1.00	0.00
27.00	2.20	1.00	0.00
28.00	2.20	1.00	0.00
29.00	2.20	1.00	0.00
30.00	2.20	1.00	0.00
31.00	2.20	1.00	0.00
32.00	2.20	1.00	0.00
33.00	2.20	1.00	0.00
34.00	2.20	1.00	0.00
35.00	2.20	1.00	0.00
36.00	2.20	1.00	0.00
37.00	2.20	1.00	0.00
38.00	2.20	1.00	0.00
39.00	2.20	1.00	0.00
40.00	2.20	1.00	0.00
41.00	2.20	1.00	0.00
42.00	2.20	1.00	0.00
43.00	2.20	1.00	0.00
44.00	2.20	1.00	0.00
45.00	2.20	1.00	0.00
46.00	2.20	1.00	0.00
47.00	2.20	1.00	0.00
48.00	2.20	1.00	0.00
49.00	2.20	1.00	0.00
50.00	2.20	1.00	0.00
51.00	2.20	1.00	0.00
52.00	2.20	1.00	0.00
53.00	2.20	1.00	0.00
54.00	2.20	1.00	0.00
55.00	2.20	1.00	0.00
56.00	2.20	1.00	0.00
57.00	2.20	1.00	0.00
58.00	2.20	1.00	0.00
59.00	2.20	1.00	0.00
60.00	2.20	1.00	0.00

Summary for Pond 4P: Basin A (WQ)

Inflow = 0.13 cfs @ 0.00 hrs, Volume= 0.475 af
Outflow = 0.19 cfs @ 0.00 hrs, Volume= 0.623 af, Atten= 0%, Lag= 0.0 min
Primary = 0.19 cfs @ 0.00 hrs, Volume= 0.623 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 930.76' Surf.Area= 0.288 ac Storage= 0.204 af
Peak Elev= 930.76' @ 0.00 hrs Surf.Area= 0.288 ac Storage= 0.204 af (0.000 af above start)

Plug-Flow detention time= 716.0 min calculated for 0.418 af (88% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

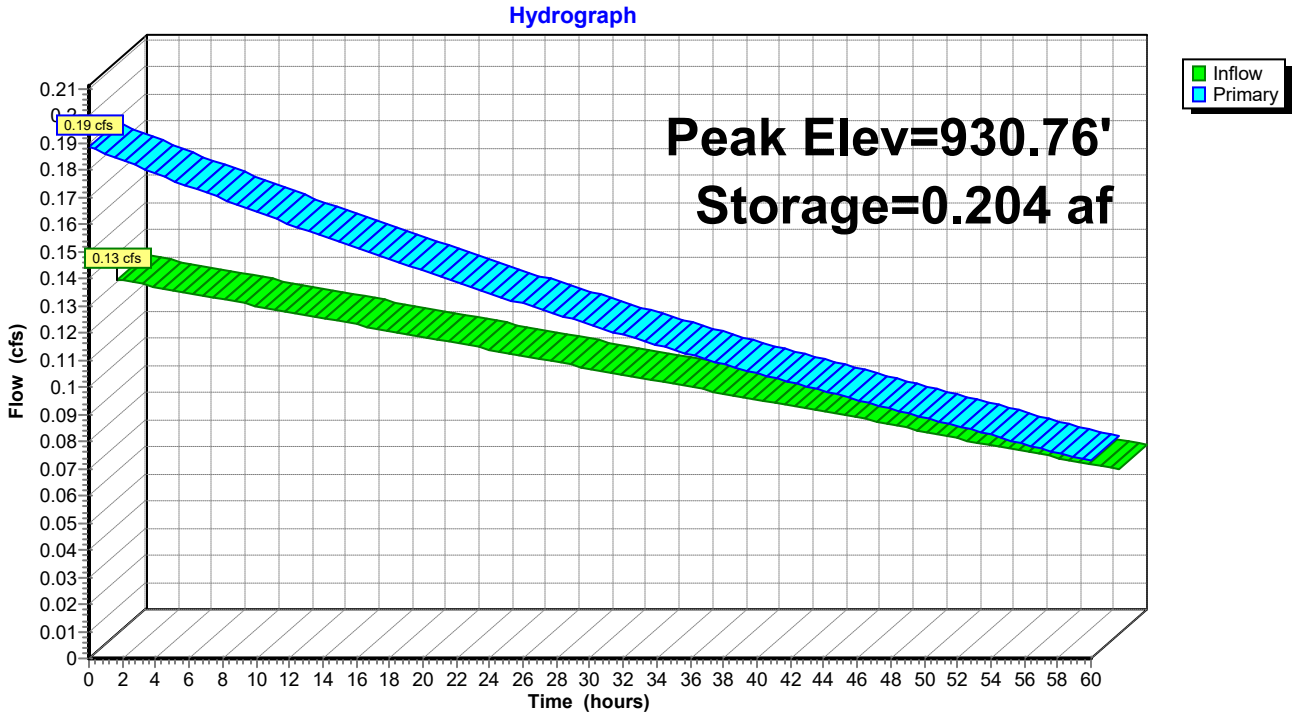
Volume	Invert	Avail.Storage	Storage Description
#1	930.00'	1.895 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
930.00	0.250	0.000	0.000
931.00	0.300	0.275	0.275
932.00	0.350	0.325	0.600
933.00	0.400	0.375	0.975
934.00	0.460	0.430	1.405
935.00	0.520	0.490	1.895

Device	Routing	Invert	Outlet Devices
#1	Primary	930.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.19 cfs @ 0.00 hrs HW=930.76' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.19 cfs @ 3.84 fps)

Pond 4P: Basin A (WQ)



Hydrograph for Pond 4P: Basin A (WQ)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.13**	**0.204**	**930.76**	**0.19**
2.00	0.13	0.195	930.73	0.18
4.00	0.13	0.186	930.70	0.18
6.00	0.12	0.178	930.67	0.17
8.00	0.12	0.170	930.64	0.17
10.00	0.12	0.162	930.61	0.16
12.00	0.12	0.154	930.58	0.16
14.00	0.11	0.147	930.56	0.16
16.00	0.11	0.141	930.53	0.15
18.00	0.11	0.135	930.51	0.15
20.00	0.11	0.129	930.49	0.14
22.00	0.11	0.123	930.47	0.14
24.00	0.10	0.117	930.45	0.13
26.00	0.10	0.112	930.43	0.13
28.00	0.10	0.107	930.41	0.13
30.00	0.10	0.103	930.40	0.12
32.00	0.09	0.098	930.38	0.12
34.00	0.09	0.094	930.36	0.12
36.00	0.09	0.090	930.35	0.11
38.00	0.09	0.087	930.34	0.11
40.00	0.08	0.083	930.32	0.10
42.00	0.08	0.080	930.31	0.10
44.00	0.08	0.077	930.30	0.10
46.00	0.08	0.074	930.29	0.10
48.00	0.07	0.071	930.28	0.09
50.00	0.07	0.068	930.27	0.09
52.00	0.07	0.066	930.26	0.09
54.00	0.07	0.063	930.25	0.08
56.00	0.07	0.061	930.24	0.08
58.00	0.06	0.059	930.23	0.08
60.00	0.06	0.057	930.22	0.07

Summary for Pond 5P: Basin A (Sediment)

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.08 cfs @ 0.00 hrs, Volume= 0.337 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 0.00 hrs, Volume= 0.337 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 931.28' Surf.Area= 0.314 ac Storage= 0.361 af
Peak Elev= 931.28' @ 0.00 hrs Surf.Area= 0.314 ac Storage= 0.361 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

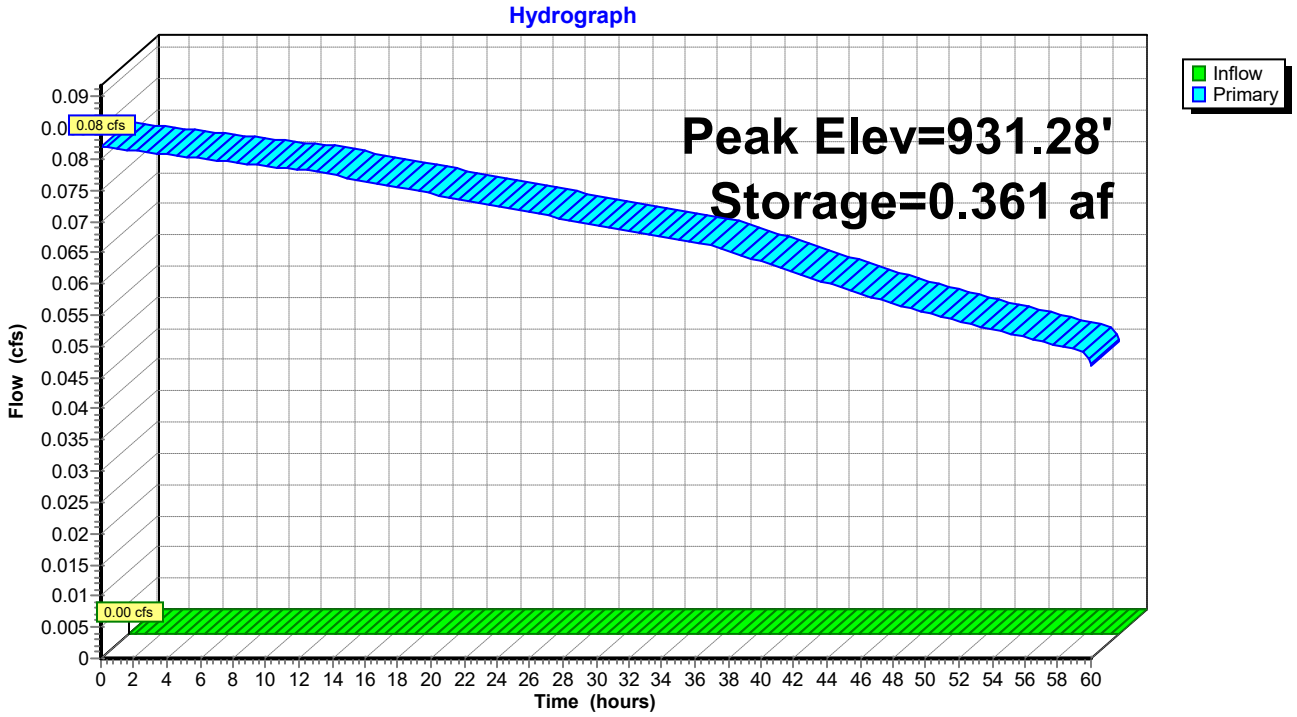
Volume	Invert	Avail.Storage	Storage Description
#1	930.00'	1.890 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
930.00	0.250	0.000	0.000
931.00	0.300	0.275	0.275
932.00	0.350	0.325	0.600
933.00	0.400	0.375	0.975
934.00	0.460	0.430	1.405
935.00	0.510	0.485	1.890

Device	Routing	Invert	Outlet Devices
#1	Primary	930.00'	**Marlee Float Model-1 2.5-in**

Primary OutFlow Max=0.08 cfs @ 0.00 hrs HW=931.28' (Free Discharge)
↑—**1=Marlee Float Model-1 2.5-in** (Custom Controls 0.08 cfs)

Pond 5P: Basin A (Sediment)



Hydrograph for Pond 5P: Basin A (Sediment)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.361**	**931.28**	**0.08**
2.00	0.00	0.347	931.24	0.08
4.00	0.00	0.334	931.19	0.08
6.00	0.00	0.321	931.15	0.08
8.00	0.00	0.308	931.11	0.08
10.00	0.00	0.295	931.06	0.08
12.00	0.00	0.282	931.02	0.08
14.00	0.00	0.269	930.98	0.08
16.00	0.00	0.256	930.94	0.08
18.00	0.00	0.243	930.89	0.08
20.00	0.00	0.231	930.85	0.07
22.00	0.00	0.219	930.81	0.07
24.00	0.00	0.207	930.77	0.07
26.00	0.00	0.195	930.73	0.07
28.00	0.00	0.183	930.69	0.07
30.00	0.00	0.172	930.64	0.07
32.00	0.00	0.160	930.60	0.07
34.00	0.00	0.149	930.56	0.07
36.00	0.00	0.138	930.52	0.07
38.00	0.00	0.127	930.48	0.07
40.00	0.00	0.116	930.45	0.06
42.00	0.00	0.106	930.41	0.06
44.00	0.00	0.096	930.37	0.06
46.00	0.00	0.086	930.33	0.06
48.00	0.00	0.076	930.30	0.06
50.00	0.00	0.067	930.26	0.06
52.00	0.00	0.058	930.23	0.05
54.00	0.00	0.049	930.19	0.05
56.00	0.00	0.041	930.16	0.05
58.00	0.00	0.032	930.13	0.05
60.00	0.00	0.024	930.10	0.05

Summary for Pond 9P: Basin A (Sediment)

Inflow Area = 8.700 ac, 29.09% Impervious, Inflow Depth = 0.94" for 1-yr event
Inflow = 11.51 cfs @ 12.05 hrs, Volume= 0.685 af
Outflow = 0.42 cfs @ 15.07 hrs, Volume= 0.483 af, Atten= 96%, Lag= 181.0 min
Primary = 0.42 cfs @ 15.07 hrs, Volume= 0.483 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 931.57' @ 15.07 hrs Surf.Area= 0.329 ac Storage= 0.455 af

Plug-Flow detention time= 1,025.6 min calculated for 0.483 af (71% of inflow)
Center-of-Mass det. time= 918.8 min (1,765.8 - 847.0)

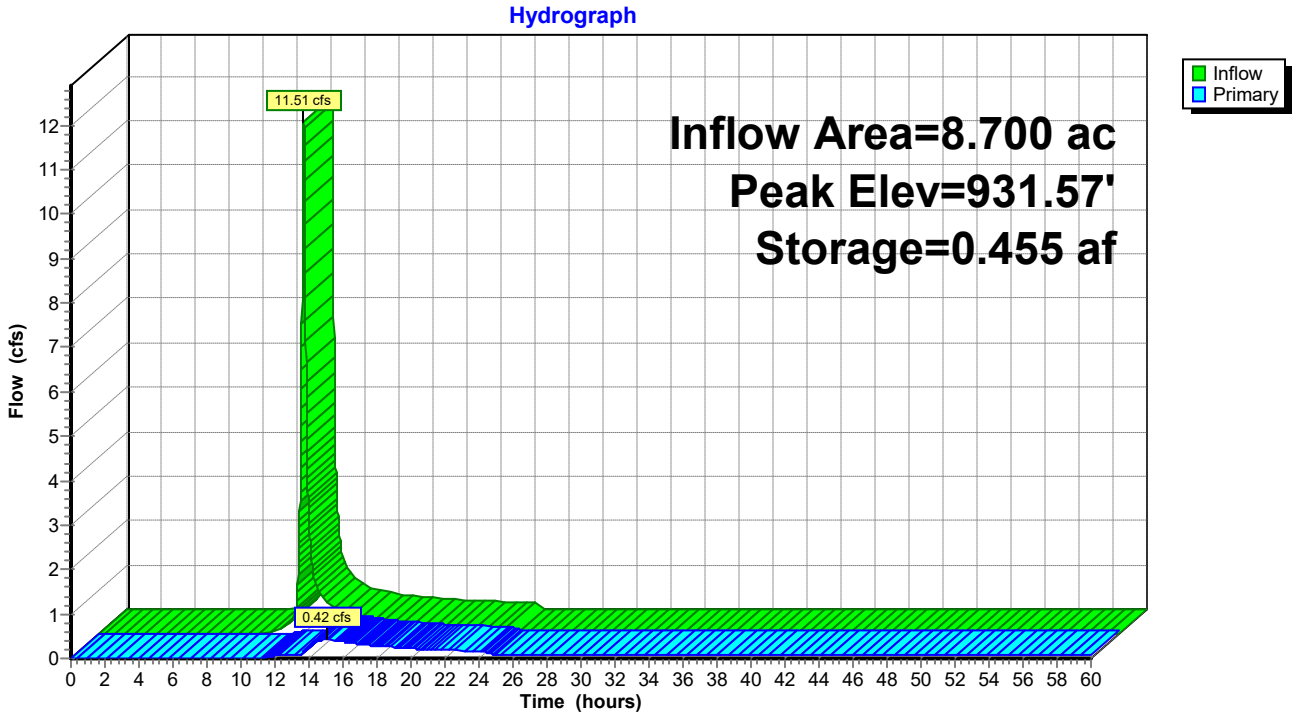
Volume	Invert	Avail.Storage	Storage Description
#1	930.00'	1.890 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
930.00	0.250	0.000	0.000
931.00	0.300	0.275	0.275
932.00	0.350	0.325	0.600
933.00	0.400	0.375	0.975
934.00	0.460	0.430	1.405
935.00	0.510	0.485	1.890

Device	Routing	Invert	Outlet Devices
#1	Device 4	930.00'	**Marlee Float Model-1 2.5-in**
#2	Device 4	931.50'	**18.0" x 12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	932.92'	**1.5" x 5.0" Horiz. AA-S139 Grate X 9.00 columns** X 4 rows C= 0.600 in 27.5" x 27.5" Grate (36% open area) Limited to weir flow at low heads
#4	Primary	930.00'	**24.0" Round Culvert** L= 65.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 930.00' / 929.62' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.41 cfs @ 15.07 hrs HW=931.57' (Free Discharge)
└**4=Culvert** (Passes 0.41 cfs of 9.15 cfs potential flow)
  ├**1=Marlee Float Model-1 2.5-in** (Custom Controls 0.09 cfs)
  ├**2=Orifice/Grate** (Weir Controls 0.32 cfs @ 0.88 fps)
  └**3=AA-S139 Grate** (Controls 0.00 cfs)

Pond 9P: Basin A (Sediment)



Hydrograph for Pond 9P: Basin A (Sediment)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	930.00	0.00
2.00	0.00	0.000	930.00	0.00
4.00	0.00	0.000	930.00	0.00
6.00	0.00	0.000	930.00	0.00
8.00	0.00	0.000	930.00	0.00
10.00	0.02	0.000	930.00	0.00
12.00	**10.25**	0.131	930.50	0.07
14.00	**0.55**	**0.447**	**931.55**	**0.26**
16.00	0.34	**0.453**	**931.57**	**0.38**
18.00	0.26	0.448	931.55	0.28
20.00	0.19	0.444	931.54	0.23
22.00	0.18	0.440	931.53	0.19
24.00	0.16	0.439	931.52	0.17
26.00	0.00	0.424	931.48	0.08
28.00	0.00	0.410	931.43	0.08
30.00	0.00	0.396	931.39	0.08
32.00	0.00	0.382	931.35	0.08
34.00	0.00	0.369	931.30	0.08
36.00	0.00	0.355	931.26	0.08
38.00	0.00	0.342	931.22	0.08
40.00	0.00	0.328	931.18	0.08
42.00	0.00	0.315	931.13	0.08
44.00	0.00	0.302	931.09	0.08
46.00	0.00	0.289	931.05	0.08
48.00	0.00	0.276	931.00	0.08
50.00	0.00	0.263	930.96	0.08
52.00	0.00	0.250	930.92	0.08
54.00	0.00	0.238	930.88	0.08
56.00	0.00	0.226	930.83	0.07
58.00	0.00	0.213	930.79	0.07
60.00	0.00	0.202	930.75	0.07

Summary for Pond 11P: Basin B (WQ)

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.24 cfs @ 0.00 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 0.00 hrs, Volume= 0.285 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 923.90' Surf.Area= 0.354 ac Storage= 0.294 af
Peak Elev= 923.90' @ 0.00 hrs Surf.Area= 0.354 ac Storage= 0.294 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

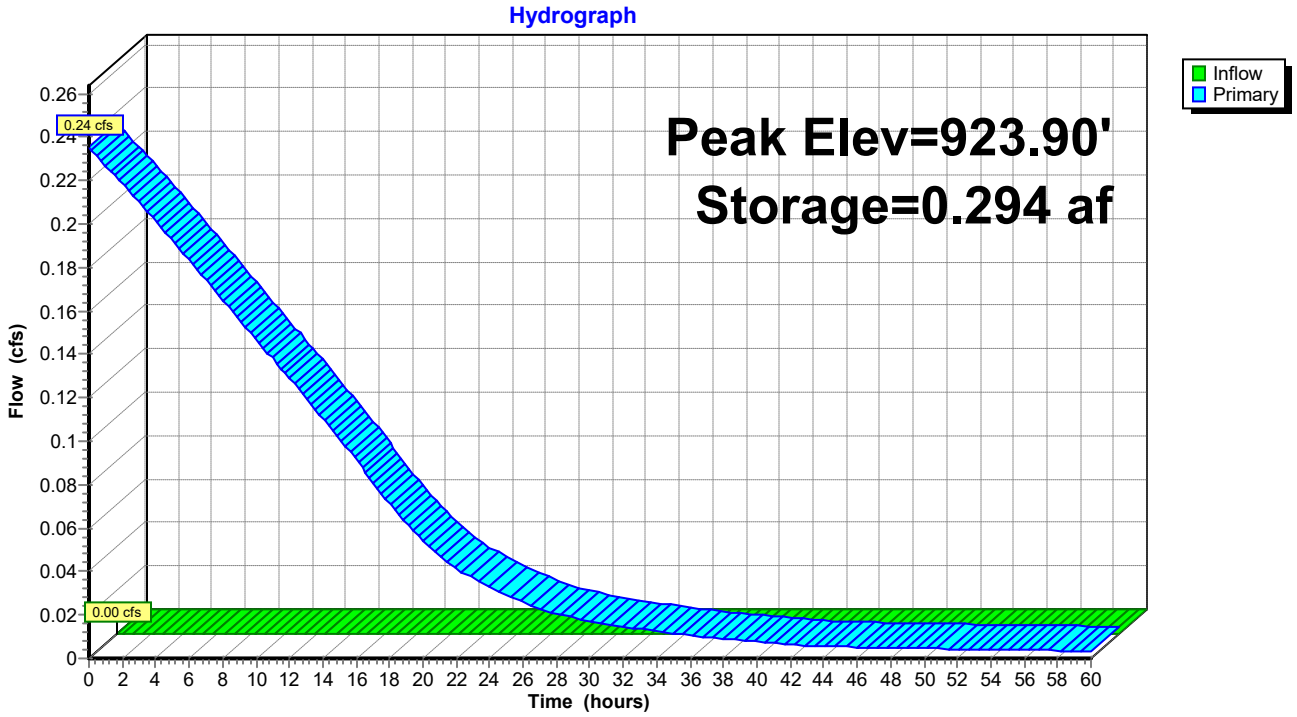
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	2.330 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.300	0.000	0.000
924.00	0.360	0.330	0.330
925.00	0.430	0.395	0.725
926.00	0.500	0.465	1.190
927.00	0.570	0.535	1.725
928.00	0.640	0.605	2.330

Device	Routing	Invert	Outlet Devices
#1	Primary	923.00'	**3.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 0.00 hrs HW=923.90' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.22 fps)

Pond 11P: Basin B (WQ)



Hydrograph for Pond 11P: Basin B (WQ)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.294**	**923.90**	**0.24**
2.00	0.00	0.257	923.79	0.22
4.00	0.00	0.222	923.69	0.20
6.00	0.00	0.190	923.60	0.18
8.00	0.00	0.162	923.51	0.17
10.00	0.00	0.136	923.43	0.15
12.00	0.00	0.113	923.36	0.13
14.00	0.00	0.093	923.30	0.11
16.00	0.00	0.076	923.25	0.09
18.00	0.00	0.063	923.21	0.07
20.00	0.00	0.053	923.17	0.05
22.00	0.00	0.045	923.15	0.04
24.00	0.00	0.039	923.13	0.03
26.00	0.00	0.034	923.11	0.03
28.00	0.00	0.030	923.10	0.02
30.00	0.00	0.027	923.09	0.02
32.00	0.00	0.024	923.08	0.01
34.00	0.00	0.022	923.07	0.01
36.00	0.00	0.020	923.07	0.01
38.00	0.00	0.019	923.06	0.01
40.00	0.00	0.017	923.06	0.01
42.00	0.00	0.016	923.05	0.01
44.00	0.00	0.015	923.05	0.01
46.00	0.00	0.014	923.05	0.01
48.00	0.00	0.013	923.04	0.00
50.00	0.00	0.013	923.04	0.00
52.00	0.00	0.012	923.04	0.00
54.00	0.00	0.011	923.04	0.00
56.00	0.00	0.010	923.03	0.00
58.00	0.00	0.010	923.03	0.00
60.00	0.00	0.009	923.03	0.00

Summary for Pond 12P: Basin B (Sediment)

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.16 cfs @ 0.00 hrs, Volume= 0.392 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 0.00 hrs, Volume= 0.392 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 924.17' Surf.Area= 0.372 ac Storage= 0.392 af
Peak Elev= 924.17' @ 0.00 hrs Surf.Area= 0.372 ac Storage= 0.392 af

Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= (not calculated: no inflow)

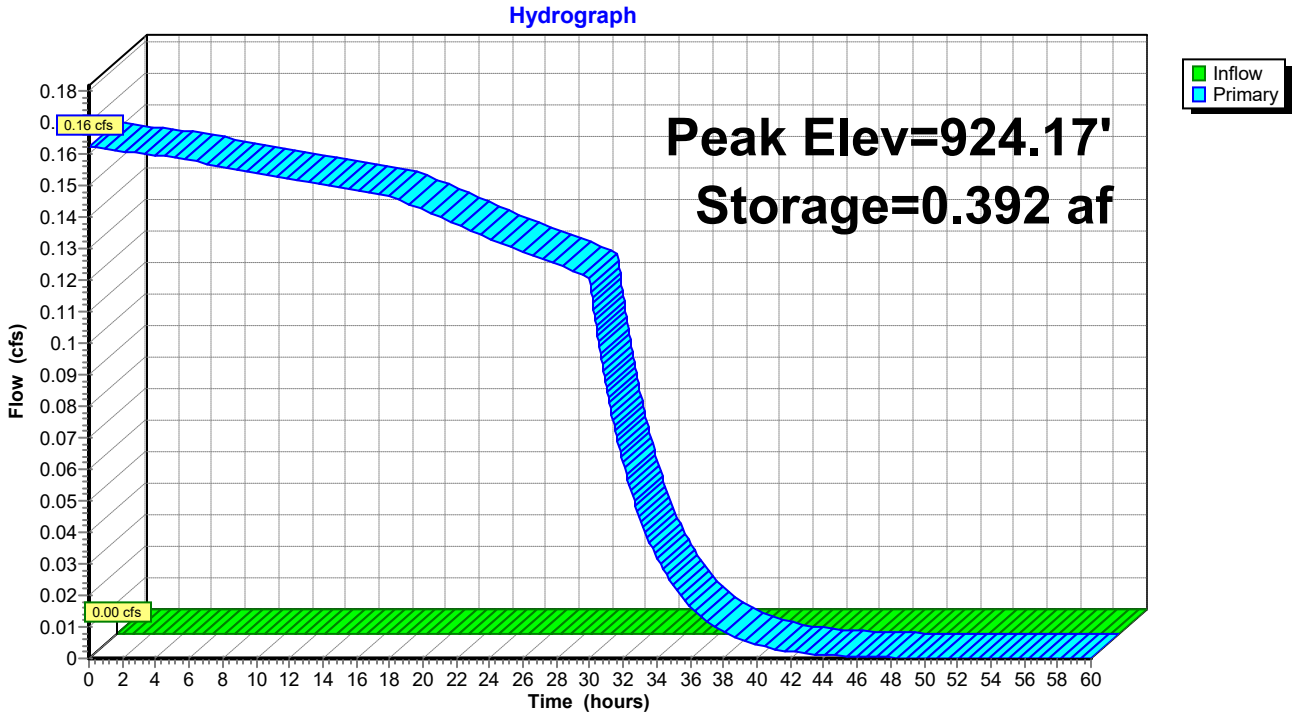
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	2.330 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.300	0.000	0.000
924.00	0.360	0.330	0.330
925.00	0.430	0.395	0.725
926.00	0.500	0.465	1.190
927.00	0.570	0.535	1.725
928.00	0.640	0.605	2.330

Device	Routing	Invert	Outlet Devices
#1	Primary	923.00'	**Marlee Float Model-2 3.0-in**

Primary OutFlow Max=0.16 cfs @ 0.00 hrs HW=924.17' (Free Discharge)
↑—**1=Marlee Float Model-2 3.0-in** (Custom Controls 0.16 cfs)

Pond 12P: Basin B (Sediment)



Hydrograph for Pond 12P: Basin B (Sediment)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.392**	**924.17**	**0.16**
2.00	0.00	0.366	924.10	0.16
4.00	0.00	0.339	924.03	0.16
6.00	0.00	0.313	923.95	0.16
8.00	0.00	0.287	923.88	0.16
10.00	0.00	0.261	923.81	0.15
12.00	0.00	0.236	923.73	0.15
14.00	0.00	0.211	923.66	0.15
16.00	0.00	0.186	923.59	0.15
18.00	0.00	0.162	923.51	0.15
20.00	0.00	0.138	923.44	0.14
22.00	0.00	0.115	923.37	0.14
24.00	0.00	0.093	923.30	0.13
26.00	0.00	0.071	923.23	0.13
28.00	0.00	0.050	923.16	0.12
30.00	0.00	0.030	923.10	0.12
32.00	0.00	0.015	923.05	0.06
34.00	0.00	0.008	923.03	0.03
36.00	0.00	0.004	923.01	0.02
38.00	0.00	0.002	923.01	0.01
40.00	0.00	0.001	923.00	0.00
42.00	0.00	0.001	923.00	0.00
44.00	0.00	0.000	923.00	0.00
46.00	0.00	0.000	923.00	0.00
48.00	0.00	0.000	923.00	0.00
50.00	0.00	0.000	923.00	0.00
52.00	0.00	0.000	923.00	0.00
54.00	0.00	0.000	923.00	0.00
56.00	0.00	0.000	923.00	0.00
58.00	0.00	0.000	923.00	0.00
60.00	0.00	0.000	923.00	0.00

Summary for Pond 14P: Basin B (Sediment)

Inflow Area = 9.410 ac, 40.45% Impervious, Inflow Depth = 1.00" for 1-yr event
Inflow = 14.52 cfs @ 12.02 hrs, Volume= 0.787 af
Outflow = 0.09 cfs @ 24.14 hrs, Volume= 0.347 af, Atten= 99%, Lag= 727.3 min
Primary = 0.09 cfs @ 24.14 hrs, Volume= 0.347 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 924.93' @ 24.14 hrs Surf.Area= 0.425 ac Storage= 0.694 af

Plug-Flow detention time= 1,416.1 min calculated for 0.347 af (44% of inflow)
Center-of-Mass det. time= 1,288.8 min (2,129.3 - 840.5)

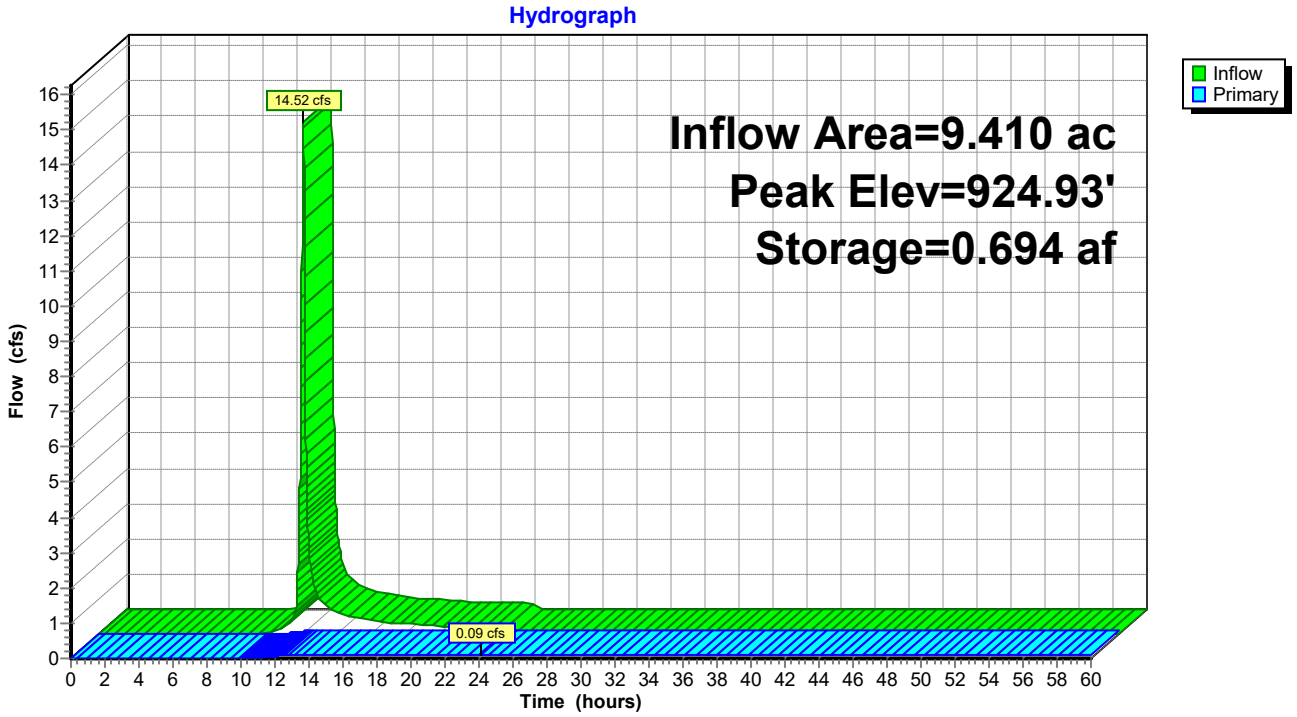
Volume	Invert	Avail.Storage	Storage Description
#1	923.00'	2.330 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
923.00	0.300	0.000	0.000
924.00	0.360	0.330	0.330
925.00	0.430	0.395	0.725
926.00	0.500	0.465	1.190
927.00	0.570	0.535	1.725
928.00	0.640	0.605	2.330

Device	Routing	Invert	Outlet Devices
#1	Device 4	923.00'	**Marlee Float Model-1 2.5-in**
#2	Device 4	925.25'	**10.0" x 8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 4	926.50'	**5.0" x 1.5" Horiz. Orifice/Grate X 4.00 columns** X 9 rows C= 0.600 in 27.5" x 27.5" Grate (36% open area) Limited to weir flow at low heads
#4	Primary	923.00'	**24.0" Round Culvert** L= 29.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 923.00' / 910.24' S= 0.4400 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=0.09 cfs @ 24.14 hrs HW=924.93' (Free Discharge)
└**4=Culvert** (Passes 0.09 cfs of 18.36 cfs potential flow)
  ├**1=Marlee Float Model-1 2.5-in** (Custom Controls 0.09 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 14P: Basin B (Sediment)



Hydrograph for Pond 14P: Basin B (Sediment)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	923.00	0.00
2.00	0.00	0.000	923.00	0.00
4.00	0.00	0.000	923.00	0.00
6.00	0.00	0.000	923.00	0.00
8.00	0.00	0.000	923.00	0.00
10.00	0.05	0.002	923.01	0.00
12.00	**14.13**	0.194	923.61	0.07
14.00	**0.61**	0.527	924.52	0.09
16.00	0.38	0.591	924.68	0.09
18.00	0.29	0.631	924.78	0.09
20.00	0.22	0.659	924.84	0.09
22.00	0.20	0.677	924.89	0.09
24.00	0.18	**0.694**	**924.93**	**0.09**
26.00	0.00	**0.681**	**924.90**	**0.09**
28.00	0.00	0.666	924.86	0.09
30.00	0.00	0.652	924.83	0.09
32.00	0.00	0.637	924.79	0.09
34.00	0.00	0.622	924.76	0.09
36.00	0.00	0.608	924.72	0.09
38.00	0.00	0.593	924.69	0.09
40.00	0.00	0.579	924.65	0.09
42.00	0.00	0.565	924.62	0.09
44.00	0.00	0.550	924.58	0.09
46.00	0.00	0.536	924.54	0.09
48.00	0.00	0.522	924.51	0.09
50.00	0.00	0.508	924.47	0.08
52.00	0.00	0.494	924.44	0.08
54.00	0.00	0.480	924.40	0.08
56.00	0.00	0.467	924.37	0.08
58.00	0.00	0.453	924.33	0.08
60.00	0.00	0.439	924.30	0.08

Summary for Pond 15P: Basin C (WQ)

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.60 cfs @	0.00 hrs,	Volume=	0.654 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.60 cfs @	0.00 hrs,	Volume=	0.654 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 921.69' Surf.Area= 0.705 ac Storage= 0.681 af
Peak Elev= 921.69' @ 0.00 hrs Surf.Area= 0.705 ac Storage= 0.681 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

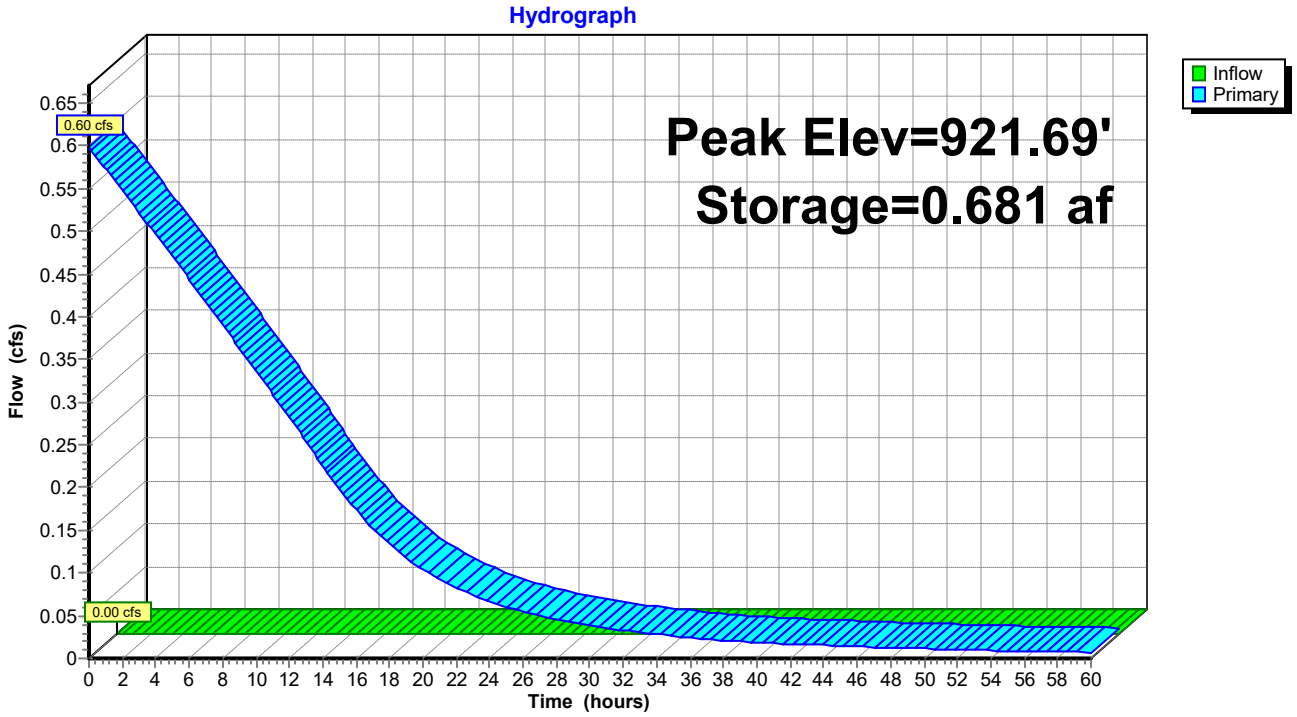
Volume	Invert	Avail.Storage	Storage Description
#1	920.65'	3.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
920.65	0.570	0.000	0.000
921.00	0.650	0.214	0.214
922.00	0.730	0.690	0.904
923.00	0.810	0.770	1.674
924.00	0.890	0.850	2.524
925.00	0.980	0.935	3.459

Device	Routing	Invert	Outlet Devices
#1	Primary	920.65'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 0.00 hrs HW=921.69' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.60 cfs @ 4.39 fps)

Pond 15P: Basin C (WQ)



Hydrograph for Pond 15P: Basin C (WQ)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.681**	**921.69**	**0.60**
2.00	0.00	0.586	921.55	0.55
4.00	0.00	0.500	921.43	0.50
6.00	0.00	0.422	921.32	0.44
8.00	0.00	0.353	921.21	0.39
10.00	0.00	0.293	921.12	0.34
12.00	0.00	0.242	921.04	0.28
14.00	0.00	0.200	920.98	0.23
16.00	0.00	0.167	920.93	0.17
18.00	0.00	0.142	920.89	0.13
20.00	0.00	0.122	920.86	0.10
22.00	0.00	0.107	920.83	0.08
24.00	0.00	0.095	920.81	0.07
26.00	0.00	0.085	920.79	0.05
28.00	0.00	0.076	920.78	0.05
30.00	0.00	0.070	920.77	0.04
32.00	0.00	0.064	920.76	0.03
34.00	0.00	0.059	920.75	0.03
36.00	0.00	0.054	920.74	0.02
38.00	0.00	0.051	920.74	0.02
40.00	0.00	0.047	920.73	0.02
42.00	0.00	0.044	920.73	0.02
44.00	0.00	0.042	920.72	0.02
46.00	0.00	0.039	920.72	0.01
48.00	0.00	0.037	920.71	0.01
50.00	0.00	0.035	920.71	0.01
52.00	0.00	0.033	920.71	0.01
54.00	0.00	0.032	920.70	0.01
56.00	0.00	0.030	920.70	0.01
58.00	0.00	0.029	920.70	0.01
60.00	0.00	0.028	920.70	0.01

Summary for Pond 19P: Basin C (Sediment)

Inflow Area = 15.078 ac, 61.22% Impervious, Inflow Depth = 1.29" for 1-yr event
Inflow = 27.26 cfs @ 12.02 hrs, Volume= 1.623 af
Outflow = 1.34 cfs @ 13.63 hrs, Volume= 1.311 af, Atten= 95%, Lag= 97.0 min
Primary = 1.34 cfs @ 13.63 hrs, Volume= 1.311 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 922.15' @ 13.63 hrs Surf.Area= 0.742 ac Storage= 1.012 af

Plug-Flow detention time= 950.9 min calculated for 1.311 af (81% of inflow)
Center-of-Mass det. time= 870.0 min (1,692.1 - 822.1)

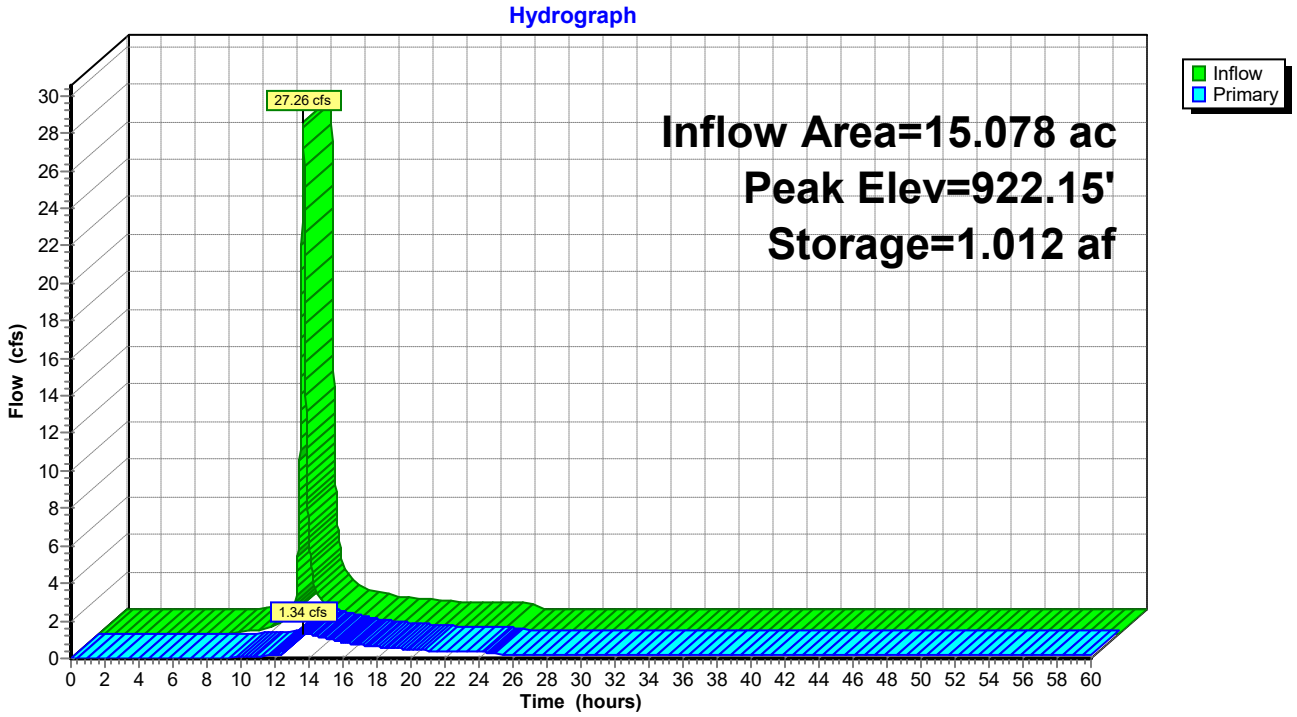
Volume	Invert	Avail.Storage	Storage Description
#1	920.65'	3.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
920.65	0.570	0.000	0.000
921.00	0.650	0.214	0.214
922.00	0.730	0.690	0.904
923.00	0.810	0.770	1.674
924.00	0.890	0.850	2.524
925.00	0.980	0.935	3.459

Device	Routing	Invert	Outlet Devices
#1	Primary	920.65'	**Marlee Float Model-2 4.0-in**
#2	Primary	922.00'	**20.0" x 16.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.34 cfs @ 13.63 hrs HW=922.15' (Free Discharge)
└**1=Marlee Float Model-2 4.0-in** (Custom Controls 0.23 cfs)
└**2=Orifice/Grate** (Weir Controls 1.11 cfs @ 1.26 fps)

Pond 19P: Basin C (Sediment)



Hydrograph for Pond 19P: Basin C (Sediment)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	920.65	0.00
2.00	0.00	0.000	920.65	0.00
4.00	0.00	0.000	920.65	0.00
6.00	0.00	0.000	920.65	0.00
8.00	0.06	0.003	920.65	0.01
10.00	0.32	0.026	920.70	0.06
12.00	**26.85**	**0.457**	**921.37**	**0.19**
14.00	**1.13**	**1.009**	**922.14**	**1.30**
16.00	0.69	0.978	922.10	0.87
18.00	0.53	0.957	922.07	0.63
20.00	0.39	0.942	922.05	0.48
22.00	0.35	0.933	922.04	0.39
24.00	0.33	0.927	922.03	0.36
26.00	0.00	0.888	921.98	0.23
28.00	0.00	0.851	921.93	0.22
30.00	0.00	0.814	921.88	0.22
32.00	0.00	0.777	921.83	0.22
34.00	0.00	0.741	921.78	0.22
36.00	0.00	0.706	921.72	0.22
38.00	0.00	0.670	921.67	0.21
40.00	0.00	0.635	921.62	0.21
42.00	0.00	0.601	921.58	0.21
44.00	0.00	0.567	921.53	0.20
46.00	0.00	0.533	921.48	0.20
48.00	0.00	0.500	921.43	0.20
50.00	0.00	0.468	921.38	0.19
52.00	0.00	0.436	921.34	0.19
54.00	0.00	0.404	921.29	0.19
56.00	0.00	0.373	921.24	0.19
58.00	0.00	0.343	921.20	0.18
60.00	0.00	0.313	921.15	0.18

Summary for Pond 20P: Basin C (Sediment)

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.21 cfs @ 0.00 hrs, Volume= 0.631 af, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 0.00 hrs, Volume= 0.631 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 921.62' Surf.Area= 0.700 ac Storage= 0.632 af
Peak Elev= 921.62' @ 0.00 hrs Surf.Area= 0.700 ac Storage= 0.632 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

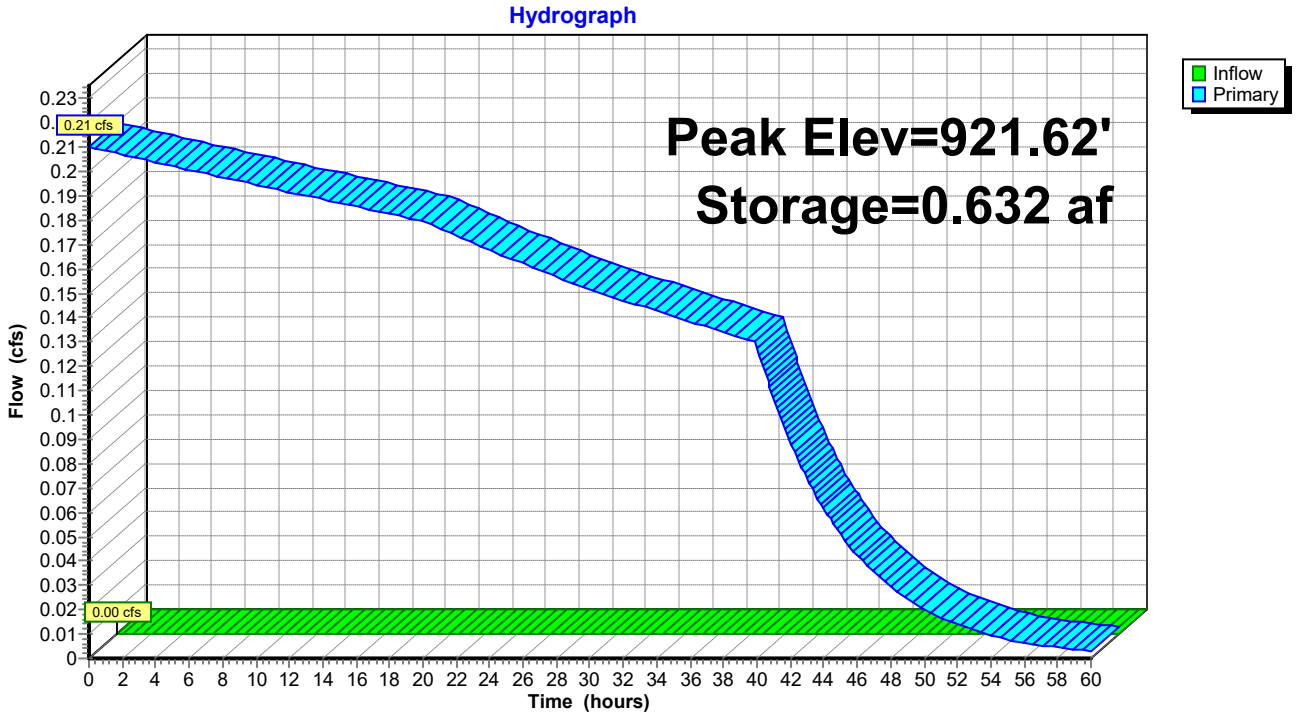
Volume	Invert	Avail.Storage	Storage Description
#1	920.65'	3.459 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
920.65	0.570	0.000	0.000
921.00	0.650	0.214	0.214
922.00	0.730	0.690	0.904
923.00	0.810	0.770	1.674
924.00	0.890	0.850	2.524
925.00	0.980	0.935	3.459

Device	Routing	Invert	Outlet Devices
#1	Primary	920.65'	**Marlee Float Model-2 4.0-in**

Primary OutFlow Max=0.21 cfs @ 0.00 hrs HW=921.62' (Free Discharge)
↑—**1=Marlee Float Model-2 4.0-in** (Custom Controls 0.21 cfs)

Pond 20P: Basin C (Sediment)



Hydrograph for Pond 20P: Basin C (Sediment)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.632**	**921.62**	**0.21**
2.00	0.00	0.597	921.57	0.21
4.00	0.00	0.563	921.52	0.20
6.00	0.00	0.530	921.47	0.20
8.00	0.00	0.497	921.43	0.20
10.00	0.00	0.465	921.38	0.19
12.00	0.00	0.433	921.33	0.19
14.00	0.00	0.401	921.28	0.19
16.00	0.00	0.370	921.24	0.19
18.00	0.00	0.340	921.19	0.18
20.00	0.00	0.310	921.15	0.18
22.00	0.00	0.281	921.10	0.17
24.00	0.00	0.253	921.06	0.17
26.00	0.00	0.225	921.02	0.16
28.00	0.00	0.199	920.98	0.16
30.00	0.00	0.174	920.94	0.15
32.00	0.00	0.149	920.90	0.15
34.00	0.00	0.125	920.86	0.14
36.00	0.00	0.102	920.82	0.14
38.00	0.00	0.079	920.79	0.13
40.00	0.00	0.057	920.75	0.13
42.00	0.00	0.040	920.72	0.09
44.00	0.00	0.027	920.70	0.06
46.00	0.00	0.019	920.68	0.04
48.00	0.00	0.013	920.67	0.03
50.00	0.00	0.009	920.67	0.02
52.00	0.00	0.006	920.66	0.01
54.00	0.00	0.004	920.66	0.01
56.00	0.00	0.003	920.66	0.01
58.00	0.00	0.002	920.65	0.00
60.00	0.00	0.001	920.65	0.00

Summary for Pond 21P: Basin A (Sediment Storage)

Volume	Invert	Avail.Storage	Storage Description
#1	924.00'	0.700 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
924.00	0.050	0.000	0.000
925.00	0.070	0.060	0.060
926.00	0.090	0.080	0.140
927.00	0.110	0.100	0.240
928.00	0.130	0.120	0.360
929.00	0.150	0.140	0.500
930.00	0.250	0.200	0.700

Summary for Pond 22P: Basin B (Sediment Storage)

Volume	Invert	Avail.Storage	Storage Description
#1	917.00'	0.910 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
917.00	0.080	0.000	0.000
918.00	0.100	0.090	0.090
919.00	0.120	0.110	0.200
920.00	0.140	0.130	0.330
921.00	0.170	0.155	0.485
922.00	0.190	0.180	0.665
923.00	0.300	0.245	0.910

Summary for Pond 23P: Basin C (Sediment Storage)

Volume	Invert	Avail.Storage	Storage Description
#1	914.00'	2.332 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
914.00	0.230	0.000	0.000
915.00	0.260	0.245	0.245
916.00	0.290	0.275	0.520
917.00	0.320	0.305	0.825
918.00	0.360	0.340	1.165
919.00	0.390	0.375	1.540
920.65	0.570	0.792	2.332

Summary for Pond 26P: Basin 10.1 WQ

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.13 cfs @ 0.00 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 0.00 hrs, Volume= 0.475 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 931.43' Surf.Area= 2.000 ac Storage= 0.860 af
Peak Elev= 931.43' @ 0.00 hrs Surf.Area= 2.000 ac Storage= 0.860 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

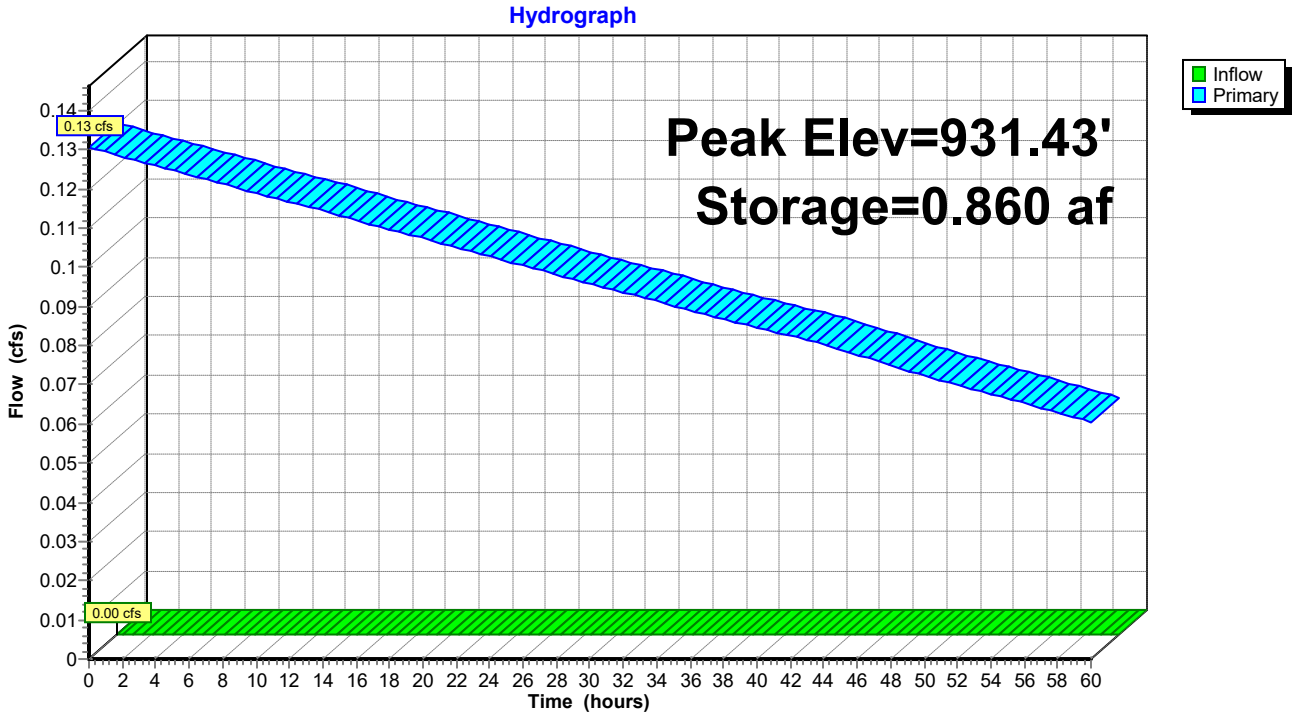
Volume	Invert	Avail.Storage	Storage Description
#1	931.00'	8.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
931.00	2.000	0.000	0.000
935.00	2.000	8.000	8.000

Device	Routing	Invert	Outlet Devices
#1	Primary	931.00'	**3.0" Vert. WQ Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.13 cfs @ 0.00 hrs HW=931.43' (Free Discharge)
↳**1=WQ Orifice** (Orifice Controls 0.13 cfs @ 2.66 fps)

Pond 26P: Basin 10.1 WQ



Hydrograph for Pond 26P: Basin 10.1 WQ

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.860**	**931.43**	**0.13**
2.00	0.00	0.839	931.42	0.13
4.00	0.00	0.818	931.41	0.13
6.00	0.00	0.797	931.40	0.12
8.00	0.00	0.777	931.39	0.12
10.00	0.00	0.757	931.38	0.12
12.00	0.00	0.737	931.37	0.12
14.00	0.00	0.718	931.36	0.11
16.00	0.00	0.700	931.35	0.11
18.00	0.00	0.681	931.34	0.11
20.00	0.00	0.663	931.33	0.11
22.00	0.00	0.646	931.32	0.11
24.00	0.00	0.629	931.31	0.10
26.00	0.00	0.612	931.31	0.10
28.00	0.00	0.595	931.30	0.10
30.00	0.00	0.579	931.29	0.10
32.00	0.00	0.564	931.28	0.09
34.00	0.00	0.549	931.27	0.09
36.00	0.00	0.534	931.27	0.09
38.00	0.00	0.519	931.26	0.09
40.00	0.00	0.505	931.25	0.08
42.00	0.00	0.491	931.25	0.08
44.00	0.00	0.478	931.24	0.08
46.00	0.00	0.465	931.23	0.08
48.00	0.00	0.452	931.23	0.07
50.00	0.00	0.440	931.22	0.07
52.00	0.00	0.428	931.21	0.07
54.00	0.00	0.417	931.21	0.07
56.00	0.00	0.406	931.20	0.07
58.00	0.00	0.395	931.20	0.06
60.00	0.00	0.385	931.19	0.06

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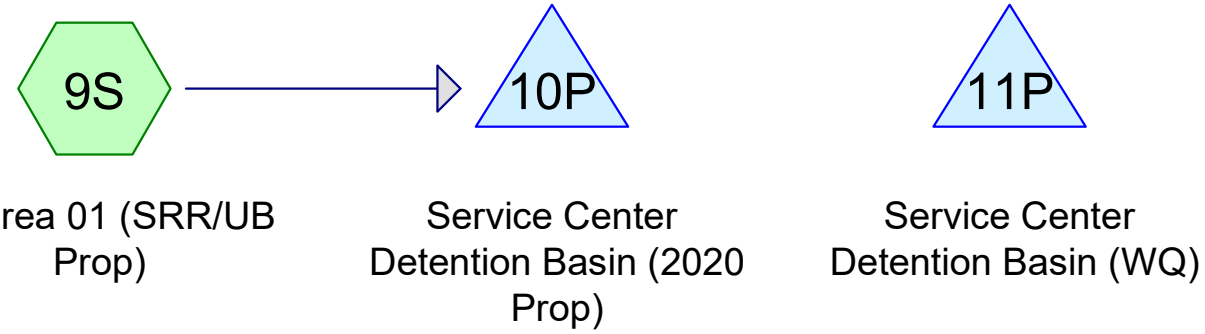


Subcat Reach Pond Link

Routing Diagram for Service Center Basin
Prepared by Symanetc, Printed 9/9/2020
HydroCAD® 10.10-3a s/n 03828 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 9S: Subarea 01 (SRR/UB Prop)

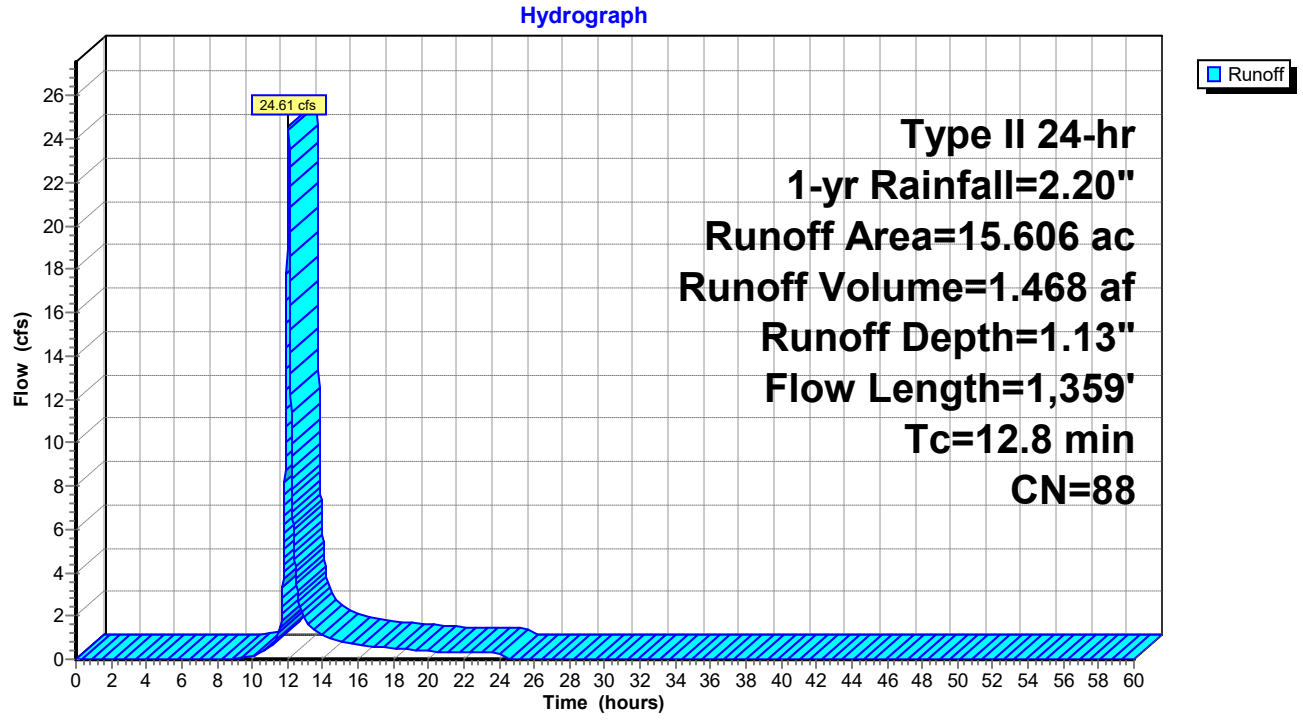
Runoff = 24.61 cfs @ 12.05 hrs, Volume= 1.468 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.20"

Area (ac)	CN	Description
0.619	98	Water Surface, HSG C
8.633	98	Paved parking, HSG C
6.354	74	>75% Grass cover, Good, HSG C
15.606	88	Weighted Average
6.354		40.72% Pervious Area
9.252		59.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	64	0.1569	0.29		**Sheet Flow, A to B Sheet Flow** Grass: Short n= 0.150 P2= 2.20"
1.1	36	0.0055	0.55		**Sheet Flow, B to C Sheet Flow** Smooth surfaces n= 0.011 P2= 2.20"
4.3	467	0.0081	1.83		**Shallow Concentrated Flow, C to D Overland Flow** Paved Kv= 20.3 fps
2.6	542		3.50		**Direct Entry, D to Basin Headwall Pipe Flow**
1.2	250		3.50		**Direct Entry, Basin Headwall to Outlet**
12.8	1,359	Total			

Subcatchment 9S: Subarea 01 (SRR/UB Prop)



Hydrograph for Subcatchment 9S: Subarea 01 (SRR/UB Prop)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.02	0.00	0.00
2.00	0.05	0.00	0.00
3.00	0.08	0.00	0.00
4.00	0.11	0.00	0.00
5.00	0.14	0.00	0.00
6.00	0.18	0.00	0.00
7.00	0.22	0.00	0.00
8.00	0.26	0.00	0.00
9.00	0.32	0.00	0.05
10.00	0.40	0.01	0.18
11.00	0.52	0.04	0.56
12.00	1.46	0.55	**22.12**
13.00	1.70	0.73	**1.87**
14.00	1.80	0.81	1.10
15.00	1.88	0.87	0.86
16.00	1.94	0.91	0.67
17.00	1.98	0.95	0.58
18.00	2.03	0.99	0.52
19.00	2.06	1.02	0.45
20.00	2.09	1.04	0.38
21.00	2.12	1.06	0.36
22.00	2.15	1.09	0.34
23.00	2.18	1.11	0.33
24.00	**2.20**	**1.13**	0.32
25.00	2.20	1.13	0.00
26.00	2.20	1.13	0.00
27.00	2.20	1.13	0.00
28.00	2.20	1.13	0.00
29.00	2.20	1.13	0.00
30.00	2.20	1.13	0.00
31.00	2.20	1.13	0.00
32.00	2.20	1.13	0.00
33.00	2.20	1.13	0.00
34.00	2.20	1.13	0.00
35.00	2.20	1.13	0.00
36.00	2.20	1.13	0.00
37.00	2.20	1.13	0.00
38.00	2.20	1.13	0.00
39.00	2.20	1.13	0.00
40.00	2.20	1.13	0.00
41.00	2.20	1.13	0.00
42.00	2.20	1.13	0.00
43.00	2.20	1.13	0.00
44.00	2.20	1.13	0.00
45.00	2.20	1.13	0.00
46.00	2.20	1.13	0.00
47.00	2.20	1.13	0.00
48.00	2.20	1.13	0.00
49.00	2.20	1.13	0.00
50.00	2.20	1.13	0.00
51.00	2.20	1.13	0.00
52.00	2.20	1.13	0.00
53.00	2.20	1.13	0.00
54.00	2.20	1.13	0.00
55.00	2.20	1.13	0.00
56.00	2.20	1.13	0.00
57.00	2.20	1.13	0.00
58.00	2.20	1.13	0.00
59.00	2.20	1.13	0.00
60.00	2.20	1.13	0.00

Summary for Pond 10P: Service Center Detention Basin (2020 Prop)

Inflow Area = 15.606 ac, 59.28% Impervious, Inflow Depth = 1.13" for 1-yr event
Inflow = 24.61 cfs @ 12.05 hrs, Volume= 1.468 af
Outflow = 0.80 cfs @ 15.31 hrs, Volume= 1.397 af, Atten= 97%, Lag= 195.5 min
Primary = 0.80 cfs @ 15.31 hrs, Volume= 1.397 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 923.62' @ 15.31 hrs Surf.Area= 0.707 ac Storage= 0.941 af

Plug-Flow detention time= 782.9 min calculated for 1.397 af (95% of inflow)
Center-of-Mass det. time= 755.7 min (1,590.3 - 834.6)

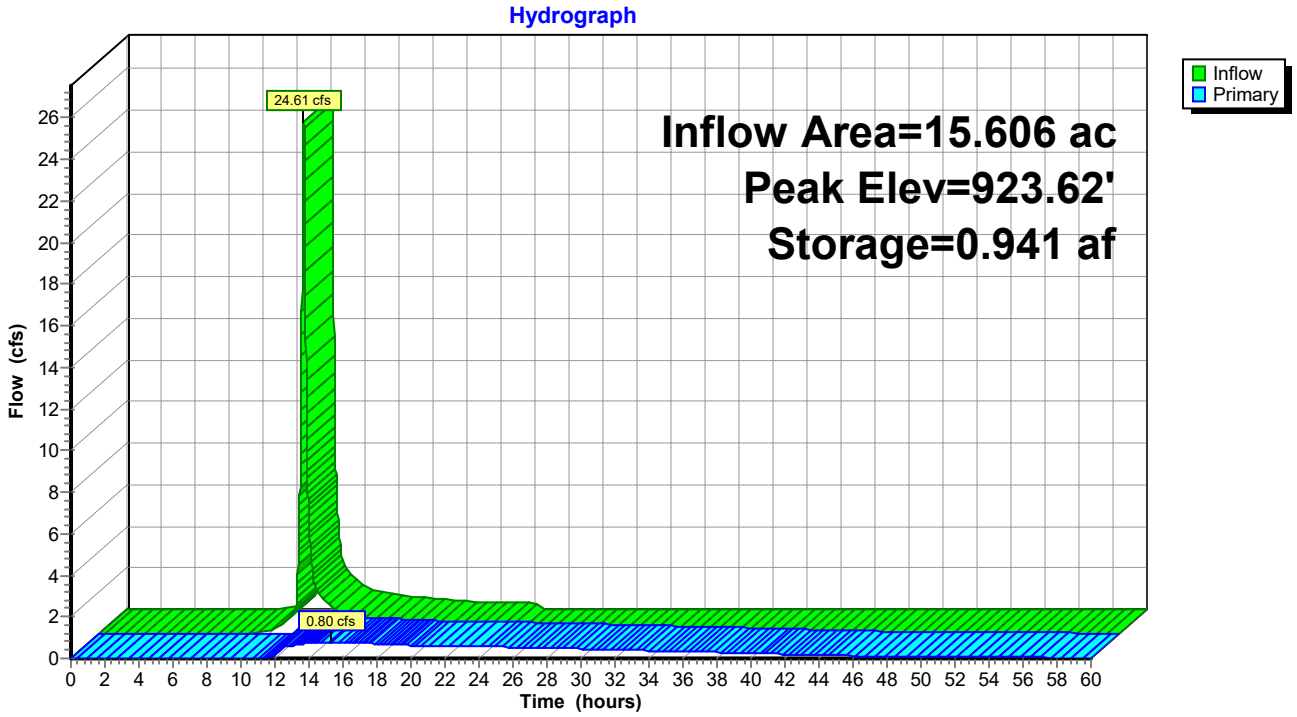
Volume	Invert	Avail.Storage	Storage Description
#1	922.20'	4.308 af	**Existing Contours (NP=922.20) (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.20	0.620	0.000	0.000
923.00	0.670	0.516	0.516
924.00	0.730	0.700	1.216
925.00	0.800	0.765	1.981
926.00	0.860	0.830	2.811
927.00	1.000	0.930	3.741
927.50	1.270	0.567	4.308

Device	Routing	Invert	Outlet Devices
#1	Primary	922.20'	**18.0" Round 18" Outlet Culvert** L= 10.8' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 922.20' / 922.15' S= 0.0046 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	922.20'	**4.7" Vert. WQ Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	923.50'	**4.5" Horiz. Second Stage Outlet** C= 0.600 Limited to weir flow at low heads
#4	Device 1	925.25'	**8.0" W x 4.0" H Vert. Third Stage Outlet** C= 0.600 Limited to weir flow at low heads
#5	Device 1	926.00'	**12.0" W x 8.0" H Vert. Fourth Stage Outlet** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.80 cfs @ 15.31 hrs HW=923.62' (Free Discharge)
└**1=18" Outlet Culvert** (Passes 0.80 cfs of 5.31 cfs potential flow)
  ├**2=WQ Orifice** (Orifice Controls 0.64 cfs @ 5.32 fps)
  ├**3=Second Stage Outlet** (Weir Controls 0.16 cfs @ 1.12 fps)
  ├**4=Third Stage Outlet** (Controls 0.00 cfs)
  └**5=Fourth Stage Outlet** (Controls 0.00 cfs)

Pond 10P: Service Center Detention Basin (2020 Prop)



Hydrograph for Pond 10P: Service Center Detention Basin (2020 Prop)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	922.20	0.00
2.00	0.00	0.000	922.20	0.00
4.00	0.00	0.000	922.20	0.00
6.00	0.00	0.000	922.20	0.00
8.00	0.00	0.000	922.20	0.00
10.00	0.18	0.010	922.22	0.00
12.00	**22.12**	0.333	922.72	0.33
14.00	**1.10**	**0.927**	**923.60**	**0.75**
16.00	0.67	**0.938**	**923.61**	**0.79**
18.00	0.52	0.911	923.57	0.71
20.00	0.38	0.874	923.52	0.63
22.00	0.34	0.832	923.46	0.60
24.00	0.32	0.790	923.40	0.58
26.00	0.00	0.702	923.27	0.54
28.00	0.00	0.615	923.15	0.50
30.00	0.00	0.536	923.03	0.46
32.00	0.00	0.463	922.92	0.42
34.00	0.00	0.397	922.82	0.38
36.00	0.00	0.338	922.73	0.34
38.00	0.00	0.286	922.65	0.29
40.00	0.00	0.241	922.58	0.25
42.00	0.00	0.203	922.52	0.20
44.00	0.00	0.173	922.48	0.16
46.00	0.00	0.149	922.44	0.13
48.00	0.00	0.130	922.41	0.10
50.00	0.00	0.115	922.38	0.08
52.00	0.00	0.103	922.36	0.07
54.00	0.00	0.093	922.35	0.06
56.00	0.00	0.084	922.34	0.05
58.00	0.00	0.077	922.32	0.04
60.00	0.00	0.071	922.31	0.03

Summary for Pond 11P: Service Center Detention Basin (WQ)

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.48 cfs @ 0.00 hrs, Volume= 0.538 af, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 0.00 hrs, Volume= 0.538 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 923.08' Surf.Area= 0.675 ac Storage= 0.570 af
Peak Elev= 923.08' @ 0.00 hrs Surf.Area= 0.675 ac Storage= 0.570 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

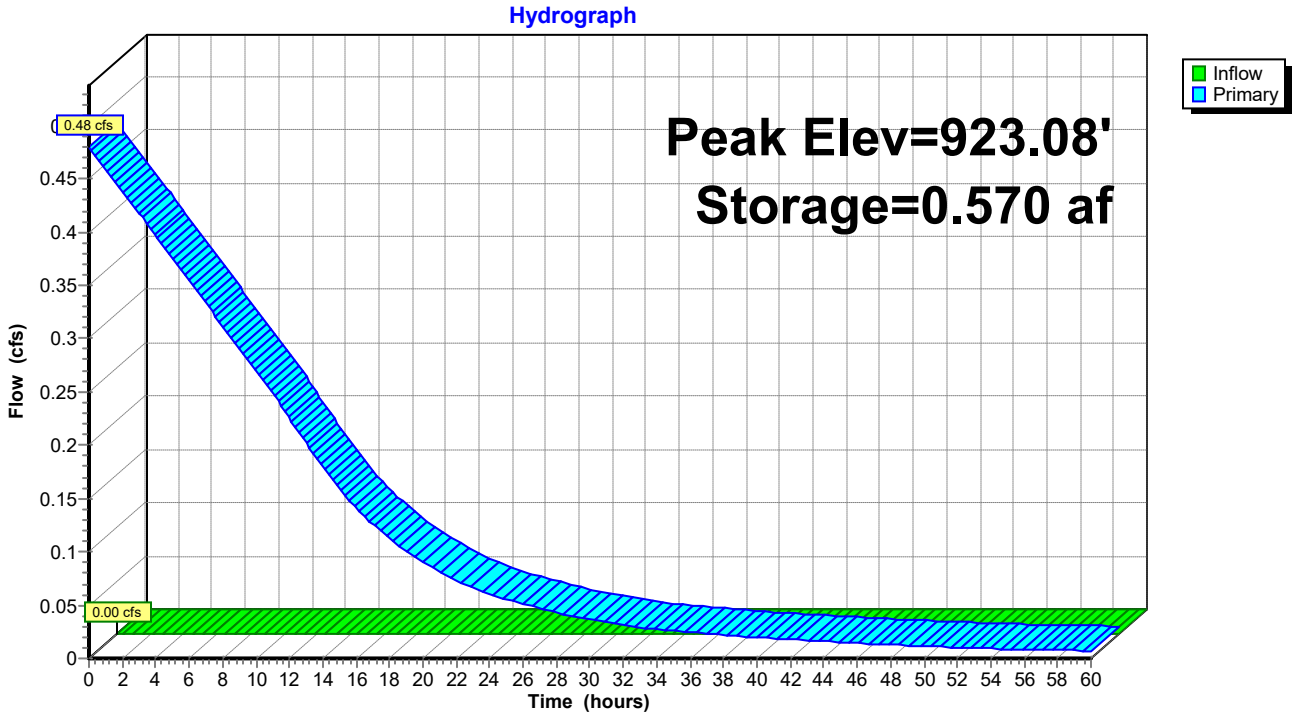
Volume	Invert	Avail.Storage	Storage Description
#1	922.20'	4.308 af	**Prop Contours (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
922.20	0.620	0.000	0.000
923.00	0.670	0.516	0.516
924.00	0.730	0.700	1.216
925.00	0.800	0.765	1.981
926.00	0.860	0.830	2.811
927.00	1.000	0.930	3.741
927.50	1.270	0.567	4.308

Device	Routing	Invert	Outlet Devices
#1	Primary	922.20'	**4.7" Vert. WQ Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.48 cfs @ 0.00 hrs HW=923.08' (Free Discharge)
1=WQ Orifice (Orifice Controls 0.48 cfs @ 3.98 fps)

Pond 11P: Service Center Detention Basin (WQ)



Hydrograph for Pond 11P: Service Center Detention Basin (WQ)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.570**	**923.08**	**0.48**
2.00	0.00	0.494	922.97	0.44
4.00	0.00	0.425	922.86	0.40
6.00	0.00	0.363	922.77	0.35
8.00	0.00	0.308	922.68	0.31
10.00	0.00	0.260	922.61	0.27
12.00	0.00	0.219	922.55	0.22
14.00	0.00	0.185	922.49	0.18
16.00	0.00	0.159	922.45	0.14
18.00	0.00	0.138	922.42	0.11
20.00	0.00	0.122	922.39	0.09
22.00	0.00	0.108	922.37	0.07
24.00	0.00	0.097	922.36	0.06
26.00	0.00	0.088	922.34	0.05
28.00	0.00	0.080	922.33	0.04
30.00	0.00	0.074	922.32	0.04
32.00	0.00	0.068	922.31	0.03
34.00	0.00	0.063	922.30	0.03
36.00	0.00	0.059	922.29	0.02
38.00	0.00	0.055	922.29	0.02
40.00	0.00	0.052	922.28	0.02
42.00	0.00	0.049	922.28	0.02
44.00	0.00	0.046	922.27	0.02
46.00	0.00	0.043	922.27	0.01
48.00	0.00	0.041	922.27	0.01
50.00	0.00	0.039	922.26	0.01
52.00	0.00	0.037	922.26	0.01
54.00	0.00	0.036	922.26	0.01
56.00	0.00	0.034	922.25	0.01
58.00	0.00	0.033	922.25	0.01
60.00	0.00	0.032	922.25	0.01

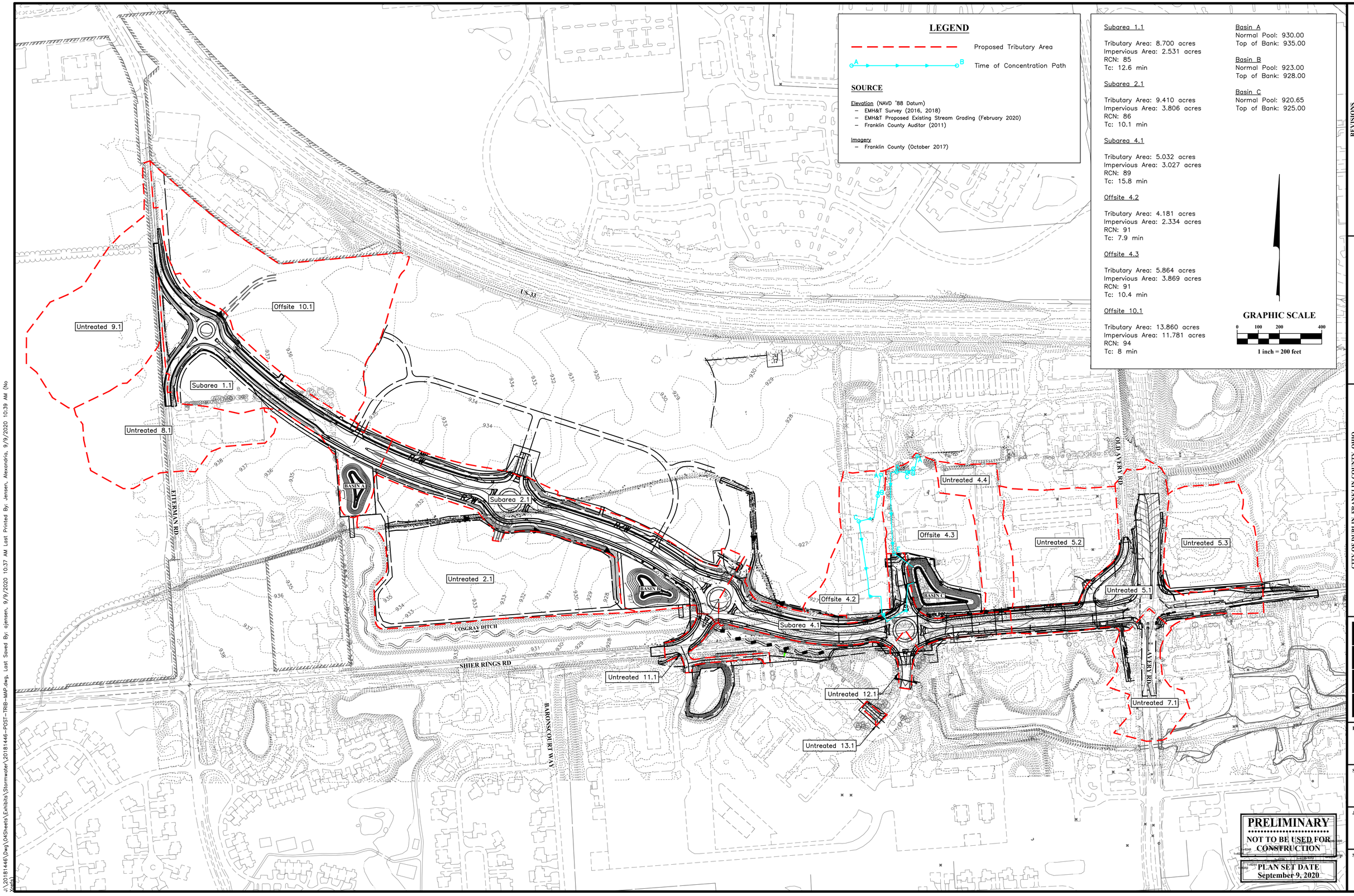
TABLE OF CONTENTS

Project Reports
1 Routing Diagram

Current Event
2 Subcat 9S: Subarea 01 (SRR/UB Prop)
4 Pond 10P: Service Center Detention Basin (2020 Prop)
7 Pond 11P: Service Center Detention Basin (WQ)

EMH&T

APPENDIX E: Stormwater Tributary Map


LEGEND
Proposed Tributary Area
A
B
Time of Concentration Path
SOURCE
Elevation (NAVD '88 Datum)
– EMH&T Survey (2016, 2018)
– EMH&T Proposed Existing Stream Grading (February 2020)
– Franklin County Auditor (2011)
Imagery
– Franklin County (October 2017)
Subarea 1.1
Tributary Area: 8.700 acres
Impervious Area: 2.531 acres
RCN: 85
Tc: 12.6 min
Subarea 2.1
Tributary Area: 9.410 acres
Impervious Area: 3.806 acres
RCN: 86
Tc: 10.1 min
Subarea 4.1
Tributary Area: 5.032 acres
Impervious Area: 3.027 acres
RCN: 89
Tc: 15.8 min
Offsite 4.2
Tributary Area: 4.181 acres
Impervious Area: 2.334 acres
RCN: 91
Tc: 7.9 min
Offsite 4.3
Tributary Area: 5.864 acres
Impervious Area: 3.869 acres
RCN: 91
Tc: 10.4 min
Offsite 10.1
Tributary Area: 13.860 acres
Impervious Area: 11.781 acres
RCN: 94
Tc: 8 min
Basin A
Normal Pool: 930.00
Top of Bank: 935.00
Basin B
Normal Pool: 923.00
Top of Bank: 928.00
Basin C
Normal Pool: 920.65
Top of Bank: 925.00
GRAPHIC SCALE
0 100 200 400
1 inch = 200 feet
Offsite 10.1
Untreated 9.1
Subarea 1.1
Untreated 8.1
BASIN A
Subarea 2.1
Untreated 2.1
BASIN B
Untreated 4.4
Offsite 4.3
Untreated 5.2
Untreated 5.3
BASIN C
Offsite 4.2
Untreated 5.1
Subarea 4.1
Untreated 11.1
Untreated 12.1
Untreated 13.1
Untreated 7.1
US 33
ETTERMAN RD
COSGRAY DITCH
SHIER RINGS RD
BARONSCOURT WAY
OLD AVERY RD
AVERY RD
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
PLAN SET DATE
September 9, 2020
REVISIONS
MARK DATE DESCRIPTION
CITY OF DUBLIN
CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
STORMWATER MANAGEMENT PLAN
FOR
UNIVERSITY BLVD PHASE 2 AND SHIER RINGS RD & AVERY RD INTERSECTION
EXHIBIT 2: POST-DEVELOPED TRIBUTARY MAP
EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, Ohio 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com
DATE
September 9, 2020
SCALE
1" = 200'
JOB NO.
2018-1446
SHEET
01/01
J:\2018\1446\Dwg\04Sheets\Exhibits\Stormwater\20181446-POST-TRIB-MAP.dwg, Last Saved By: djensen, 9/9/2020 10:37 AM Last Printed By: Jensen, Alexandria, 9/9/2020 10:39 AM (No Xrefs)

EMH&T

APPENDIX F: Land Disturbance and Stabilization Activities Log

UNIVERSITY BLVD PHASE 2/SHIER RINGS ROAD & AVERY ROAD INTERSECTION
LAND DISTURBANCE AND STABILIZATION ACTIVITIES LOG

Project Area Description	Land Disturbance Start Date	Land Disturbance Completion Date	Application of Temporary Stabilization Controls Date	Application of Permanent Stabilization Controls Date

EMH&T

APPENDIX G: Ohio EPA & USACE Surface Water Impact Permits

ENTERED DIRECTOR'S JOURNAL

Ohio Environmental Protection Agency

Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: _____ Date: _____

5/7/2020

Certified Mail

Re: Rings Farm and Shier Rings Road Corridor
Permit - Intermediate Approval
401 Wetlands
Franklin
DSW401196456

May 7, 2020

Paul Hammersmith
City of Dublin
6555 Shier Rings Road
Dublin, OH 43061

Subject: Rings Farm and Shier Rings Road Corridor
Franklin / Washington / Dublin
Grant of a Section 401 Water Quality Certification
Corps Public Notice No. LRH-2019-643-SCR
Ohio EPA ID No. 196456

Dear Stakeholders:

I hereby authorize the above referenced project under the following authorities and it is subject to the following modifications and/or conditions:

Section 401 Water Quality Certification

Pursuant to Section 401 of the Federal Water Pollution Control Act, Public Law 95-217, I hereby certify that the above-referenced project will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Federal Water Pollution Control Act. This authorization is specifically limited to a Section 401 Water Quality Certification (here after referred to as "certification") with respect to water pollution and does not relieve the Certification Holder of further Certifications or Permits as may be necessary under the law. I have determined that a lowering of water quality in the Upper Scioto Watershed (HUC 05060001) as authorized by this certification is necessary. I have made this determination based upon the consideration of all public comments, if submitted, and the technical, social, and economic considerations concerning this application and its impact on waters of the state.

PART I ON-SITE WATER RESOURCES AND IMPACTS

A. Watershed Setting

The Rings Farm and Shier Rings Road Corridor project is located within the Hayden Run – Scioto River watershed, which has an area of 47.72 square miles. Hayden Run is considered a Warmwater Habitat (WWH); there are no designated waters on-site. There are no other Aquatic Life Use designations with this watershed.

B. Project Description

The project is proposing to construct a new roadway and an associated commercial and institutional development. The project is located on an approximate 122-acre site.

C. Impacts to Waters of the State

1. Streams

Stream ID	Existing Use	Type* E, I, or P	QHEI Score*	Impact Type	Total Length on Site (LF)	Total Length Impacted (LF)	Percent Avoided
Stream 1	N/A	I	30.5	Relocation	3776	2870	21.7
			44.25	Culvert		85	
				Totals	**3776**	**2955**	**21.7**

* As provided by applicant

2. Wetlands

Wetland ID	Isolated or Non-isolated?	Forested or Non-Forested	Category	Total Acreage on Site	Total Acreage Impacted	Percent Avoided
Wetland A	Non-isolated	Non-forested	1	0.83	0	100
Wetland B	Non-isolated	Non-forested	1	0.22	0.22	0
			Totals	**1.05**	**0.22**	**79.0**

PART II TERMS & CONDITIONS

A. This certification shall remain valid and in effect as long as the 404 Permit issued by the U.S. Army Corps of Engineers for this project is in effect.

B. Terms and conditions outlined in this section apply to project and mitigation construction as described in this certification.

C. The Certification Holder shall notify Ohio EPA, in writing, and in accordance with *Part IV* (*NOTIFICATIONS TO OHIO EPA*) of this certification, upon the start and completion of site development and mitigation construction.

D. A copy of this certification shall remain on-site for the duration of the project and mitigation construction activities.

E. In the event of an inadvertent spill, the Certification Holder must immediately call the Ohio EPA Spill Hotline at 1-800-282-9378, as well as the Ohio EPA Section 401 Manager (614-644-2001).

F. Unpermitted impacts to surface water resources and/or their buffers occurring as a result of this project must be reported within 24 hours of occurrence to Ohio EPA, Division of Surface Water, Section 401 Manager (614-644-2001), for further evaluation.

G. Any authorized representative of the director shall be allowed to inspect the authorized activity at reasonable times to ensure that it is being or has been accomplished in accordance with the terms and conditions of this certification.

H. In the event that there is a conflict between the certification application, including the mitigation plan, and the conditions within this certification, the condition shall prevail unless Ohio EPA agrees, in writing, that the certification application or other provision prevails.

I. The Certification Holder shall provide electronic maps of the development area and the mitigation area to Ohio EPA 401 Section within 30 days of the date of this certification. When sending the electronic files, include the Ohio EPA ID Number and the Army Corps of Engineers Number (if applicable). If possible, these electronic maps shall be GIS shape files or Geodatabase files. If this is not possible, the electronic maps shall be in another electronic format readable in GIS (GIF, TIF, etc). The electronic files shall be sent to the following e-mail address: EPA.401Webmail@epa.ohio.gov

If the files are too large to send by e-mail (over 25 MB), a disk containing the electronic files shall be mailed to the following address:

Ohio Environmental Protection Agency
Division of Surface Water
Attn: 401 Manager
50 West Town Street, Suite 700
PO Box 1049
Columbus, OH 43216-1049

J. This proposal may require other permits from Ohio EPA. For information concerning application procedures, contact the Ohio EPA District Office as follows:

Ohio Environmental Protection Agency
Central District Office
50 W. Town Street, Suite 700
Columbus, Ohio 43215-1049
614-728-3778

Additional information regarding environmental permitting assistance at Ohio EPA can be found at http://www.epa.ohio.gov/dir/permit_assistance.aspx

K. Best Management Practices (BMPs)

1. All water resources and their buffers which are to be avoided, shall be clearly indicated on site drawings demarcated in the field and protected with suitable materials (e.g., silt fencing) prior to site disturbance. These materials shall remain in place and be maintained throughout the construction process and removed after completion of construction.

2. All BMPs for storm water management shall be designed and implemented in accordance with the most current edition of the Ohio Department of Natural Resources Rainwater and Land Development Manual, unless otherwise required by the National Pollutant Discharge Elimination System (NPDES) general permit for storm water discharges associated with construction activities (construction general permit), if required.

   A copy of the Rainwater and Land Development Manual is available at: http://epa.ohio.gov/Portals/35/storm/technical_assistance/RLD_11-6-14All.pdf
   A copy of the NPDES construction general permit is available on the "Construction Activities" tab at: http://www.epa.ohio.gov/dsw/storm/construction_index.aspx

3. Straw bales shall not be used as a form of erosion/sediment control.

4. Grass filter strips shall be established adjacent to all avoided/relocated and un-culverted waters of the state, including wetlands and existing buffer

areas. Filter strips shall be vegetated with non-invasive species native to Ohio and shall be designed and implemented in accordance with the most current edition of the Rainwater and Land Development Manual.

5. Fill material shall consist of suitable non-erodible material and shall be stabilized to prevent erosion.

6. Materials used for fill or bank protection shall consist of suitable material free from toxic contaminants in other than trace quantities. Broken asphalt is specifically excluded from use as fill or bank protection.

7. Concrete rubble used for fill or bank stabilization shall be in accordance with ODOT specifications; free of exposed re-bar; and, free of all debris, soil and fines.

8. Chemically treated lumber which may include, but is not limited to, chromated copper arsenate and creosote treated lumber shall not be used in structures that come into contact with waters of the state.

9. Trees removed from temporary impact areas to facilitate construction shall be replaced with appropriate tree species native to Ohio.

10. All temporary fill material must be removed to an area that has no waters of the state at the completion of construction activities and the stream bottom restored to pre-construction elevations to the maximum extent practicable.

11. Culverts

    a. Stream culverts shall be installed and designed at the streambed slope to allow for the natural movement of aquatic organisms and bedload to form a stable bed inside the culvert.

    b. The culvert base or invert with the substrate shall be installed below the sediment to allow natural channel bottom to develop and to be retained.

    c. The channel bottom substrate shall be similar to and contiguous with the immediate upstream and downstream reaches of the stream. The culvert shall be designed and sized to accommodate bankfull discharge and match the existing depth of flow to facilitate the passage of aquatic organisms.

    d. Where culverts are installed for temporary crossings, the bottom elevations of the stream shall be restored as nearly as possible to pre-project conditions.

L. PART III MITIGATION

A. Description of Required Mitigation

As mitigation for 2955 linear feet (LF) of intermittent stream impacts, the certificate holder shall provide the following mitigation:

- Establish 2370 LF of intermittent stream on-site with 50-foot riparian buffer on each side. Additional buffer width will be provided on 400 LF with this segment of stream.

- Establish 576 LF of intermittent stream on-site with reduced riparian buffer.

- Preserve 175 LF of intermittent stream on-site.

- Purchase 270 LF of credit from The Nature Conservancy's Huntington District In-lieu Fee program.

As mitigation for 0.22 acre of non-forested, Category 1 wetland impacts, the applicant shall purchase 0.4 acre of wetland mitigation bank credit from Stream + Wetlands Foundation Big Darby – Hellbranch Wetlands Mitigation Bank.

B. Mitigation and Monitoring Plan

As mitigation for impacts described in Part I.C of this certification the Certification Holder shall implement the mitigation plan dated March 6, 2020, and in accordance with the conditions in this certification.

C. Timing of Mitigation Requirements

1. Mitigation construction shall be initiated concurrently with the stream impacts and shall be completed within one year of the initial impacts.

2. Within 30 days of the date of certification, a copy of the fully executed mitigation bank agreement and the fully executed in-lieu fee program agreement with Stream + Wetlands Foundation and The Nature Conservancy, respectively, shall be provided to Ohio EPA. **Impacts to waters of the state shall not occur until the terms of this condition have been met**.

D. Long Term Protection

1. For a minimum of 2726 linear feet of the above described stream mitigation area, including buffers, the Certification Holder shall submit to Ohio EPA an acceptable, notarized, recorded, and filed Environmental Covenant and Conservation Easement within 30 days of substantial completion of the

discharges of fill into waters of the state, authorized in this certification. The Environmental Covenant and Conservation Easement shall include, as attachments, a metes and bounds (survey) description of the protected area, survey map, and an aerial photograph showing the boundaries of the protected area and all mitigation areas inside the protected area and shall protect Stream 1 (Cosgray Ditch).

2. Signs shall be placed within visual distance along the mitigation area that indicate the area is a protected stream mitigation project and that mowing, dumping, or any other activity that would result in a degradation of the stream without prior authorization from Ohio EPA is prohibited.

E. Agency Site Visits

The Certification Holder shall arrange on-site mitigation meetings with Ohio EPA during the growing season that follows the submittal of the second and fifth annual mitigation monitoring reports. The purpose of this inspection is to determine if the mitigation project has been constructed in accordance with the mitigation and monitoring plan approved by Ohio EPA and the terms and conditions of this certification, as well as to determine progress toward compliance with the performance goals for the site. The Certification Holder is responsible for undertaking any modifications identified by Ohio EPA.

F. Reporting

1. Annual Update Reports

A mitigation construction and project update report shall be submitted to Ohio EPA by December 31 of each year following the date of this certification and until mitigation construction is complete and a mitigation monitoring report is ready for submittal. Each update report shall contain, at a minimum, the following information:

a. The status of all of the mitigation required for the project as specified in the application and certification including the filing of the required Environmental Covenant and Conservation Easement;

b. The status of the filling activities at the development site including dates filling was started and completed, or are expected to be started and completed. If filling activities have not been completed, a drawing shall be provided, which shows the locations and acreage/feet of wetlands/streams that have not yet been filled. If filling activities have been completed, then as-built drawings shall be submitted, which show where fill was placed;

c. Mitigation construction start date, completion date, or expected start and completion date;

d. A discussion of the extent to which the mitigation has been completed according to the timelines specified in this certification;

e. Current contact information for all responsible parties including phone number, e-mail, and mailing addresses. For the purposes of this condition, responsible parties include, but may not be limited to the Certification Holder, consultant, Environmental Covenant and Conservation Easement holder(s), and Environmental Covenant and Conservation Easement owner(s);

f. As-built drawings sized 11" by 17" (to scale) of each of the mitigation areas, once construction is complete.

2. Annual Mitigation Monitoring Reports

a. The mitigation monitoring period shall commence immediately following completion of mitigation construction and shall continue through a five-year monitoring period, except as provided for in the contingency plan.

b. Annual mitigation monitoring reports shall be submitted to Ohio EPA by December 31 of the first full year following the end of the first full growing season and completion of mitigation construction. All subsequent reports shall be submitted by December 31st of each of the monitoring years.

c. Annual mitigation monitoring reports shall be prepared in the format prescribed in the Ohio EPA Monitoring Report Guidelines document available at http://epa.ohio.gov/portals/35/401/401MonitoringReportGuidelines.pdf and include the Monitoring Report Checklist provided at http://epa.ohio.gov/portals/35/401/401MonitoringReportChecklistTable.pdf.

d. Each annual report shall contain the **current contact information** for the Certification Holder, agent, environmental covenant and conservation easement holder(s), and environmental covenant and conservation easement owner(s) including phone number, e-mail, and mailing addresses.

e. Each annual report shall clearly identify the specific monitoring period the report is intended to represent, as well as the calendar year the monitoring occurred. The report shall also provide a

summary of current mitigation status, which compares the previous years' monitoring information with the current report including graphs and tables showing trends, etc.

f. Each annual report shall include a cover letter. The cover letter shall identify the status of the mitigation project and identify any items needing immediate attention or questions for the regulatory agencies.

g. The first monitoring report shall contain a full copy of the final U.S. Army Corps of Engineers 404 permit for the project.

h. Each annual monitoring report shall contain a list of species planted in all mitigation areas.

i. The first-year report shall include plan views and cross sections of the as-built mitigation area including the location and types of planting.

j. At a minimum, the first, third, and fifth year annual reports shall contain updated drawings sized 11" by 17" or larger (to scale) of the mitigation stream reflecting the current conditions, corrective or other actions that occurred, changes in dominant vegetation, and other pertinent information.

k. Each annual report shall include photographs to be collected as follows:

   i. An adequate number of fixed observation points shall be selected, with no fewer than three fixed observation points per distinct mitigation area, to provide representative overviews of each distinct mitigation area. The use of stakes with unique numbers to designate photo locations is recommended;

   ii. Photographs shall be taken from these points at the same position and angle during the growing season of each monitoring year. The fixed observation points shall be marked on the base map;

   iii. Additional photographs of areas of interest within each distinct mitigation area shall be marked on the base map and provided in each monitoring report.

G. Monitoring Requirements – Streams

1. Site Drawings

At a minimum, the first, third and fifth year annual reports shall include longitudinal (profile view along the thalweg) and cross-sectional plan view measurements of the mitigation stream and shall be taken to include those measurements necessary to determine sinuosity, meander wavelength, belt width, radius of curvature, and meander arc length for a minimum of two meander bends.

As follows, cross section measurements shall:

i. Be collected over a minimum distance of 30 bankfull widths, with at least one cross section through a pool area and another through a riffle area;

ii. Include bankfull width, bankfull maximum depth, flood prone area width, entrenchment ratio, bankfull cross-sectional area, and bank height;

iii. Encompass two consistent permanent cross sections for each analysis; and,

iv. Lowest bank height elevations shall be collected where those differ significantly from bankfull stage.

As follows, longitudinal profile measurements shall:

i. Include those measurements necessary to determine average water surface slope, riffle slope, pool slope, and riffle/pool or step/pool sequences over the entire measured reach; and,

ii. Provide elevation data for the thalweg, water surface, and bankfull stage over the entire measured reach.

2. Stream Stability

Observations of the stream mitigation channel and banks, including up and downstream, shall be made. Signs of negative effects from the stream mitigation such as excessive bank erosion, sedimentation, headcutting, aggradation, entrenchment, or degradation shall be noted in the annual report, and corrective actions shall be taken.

3. Hydrology Monitoring

Water level data and estimated flow shall be collected once during high flow season (February 15 – April 30) and once during low flow season (August 16 – October 31) of each monitoring year. Ground water levels shall be

measured in the absence of inundated conditions. Observations should be made at base flow conditions. Large rain events or drought conditions occurring within the immediate watershed should be noted in this section. Additional hydrology data should be collected if monitoring events occur outside of normal conditions to document the flow regime of the stream.

4. Riparian Buffer Vegetation Monitoring

   a. The location and name of each plant community type within the mitigation area and buffer area shall be marked on a scaled drawing or scaled aerial photograph (base map) and named. The dominant plant species shall be visually determined in each vegetation layer of each community type, and the scientific names of these species shall be included in the report.

   b. For forested riparian buffers, standard forestry measurements (e.g., frequency, density, and dominance) for all woody species shall be calculated. These data shall be graphed against time to demonstrate that each of these areas is developing into a functional forested ecosystem.

5. Qualitative Habitat Evaluation Index (QHEI)

   QHEI assessments, using the most current version of that document available at the time the assessment is performed, shall be completed during years one, three and five.

H. Performance Goals – Streams

Within five years after completion of construction of the mitigation, the Certification Holder shall have:

1. Developed a minimum of 2946 linear feet of intermittent stream.

2. Developed a minimum QHEI score of 55.

3. Developed a minimum of 7.8 acres of native upland/floodplain buffer as measured from the top of the bank with no more than five percent relative coverage of invasive species as listed in Appendix 7 of the Guidelines for Mitigation Banking in Ohio available at http://www.lrb.usace.army.mil/Portals/45/docs/regulatory/MitandMon/guidelineswetlandmitigation-Ohio.pdf. A minimum of 6.8 acres will be protected with an Environmental Covenant, and a minimum of 0.3 acre will be protected with a Conservation Easement.

4. Demonstrated that a minimum of 400 native, live and healthy (disease and

pest free) woody plants per acre (of which at least 200 are tree species) are present at the end of the monitoring period in the upland buffer.

5. Demonstrated that the stream mitigation channel and banks including up and downstream of the mitigation are stable and show no signs of excessive bank erosion, sedimentation, headcutting, aggradation, entrenchment, or degradation.

I. Contingency Plans

If the mitigation areas are not performing as proposed by the end of the fifth year of post construction monitoring, the monitoring period may be extended and/or the Certification Holder may be required to revise the existing mitigation or seek out new or additional mitigation areas.

Ohio EPA may reduce or increase the number of years for which monitoring is required to be conducted based on the effectiveness of the mitigation.

PART IV NOTIFICATIONS TO OHIO EPA

All notifications, correspondence, and reports regarding this certification shall reference the following information:

Certification Holder Name: City of Dublin
Project Name: Rings Farm and Shier Rings Road Corridor
Ohio EPA ID No.: 196456

and shall be sent to:

Ohio Environmental Protection Agency
Division of Surface Water, 401/IWP Unit
Lazarus Government Center
50 West Town Street
P.O. Box 1049
Columbus, Ohio 43216-1049

You are hereby notified that this action of the director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within 30 days after notice of the director's action. The appeal must be accompanied by a filing fee of $70.00, made payable to “Treasurer, State of Ohio," which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment

of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the director within three days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission
30 East Broad Street, 4th Floor
Columbus, Ohio 43215

Sincerely,

Laurie A. Stevenson
Director

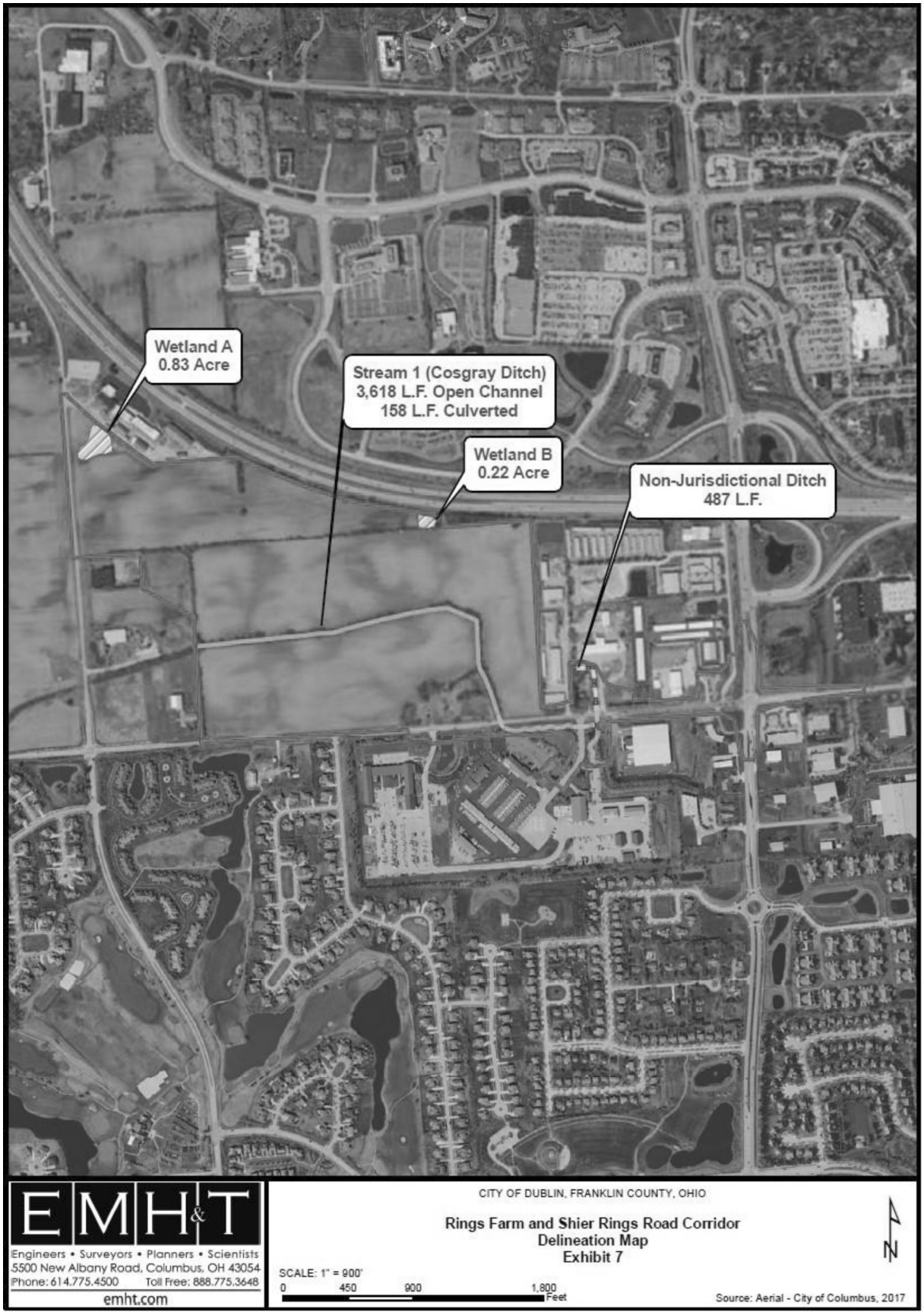
ec: Kayla Adkins, Kayla.N.Adkins@usace.army.mil, Department of the Army, Huntington District, Corps of Engineers
Cory Wilson, cory.l.wilson@usace.army.mil, Department of the Army, Huntington District, Corps of Engineers
Candice Bauer, bauer.candice@epa.gov, U.S. EPA, Region 5
Dana Rzeznik, rzeznik.dana@epa.gov, U.S. EPA, Region 5
Patrice Ashfield, Ohio@fws.gov, U.S. Fish & Wildlife Service
Mike Pettegrew, mike.pettegrew@dnr.state.oh.us, ODNR, Office of Real Estate
Diana Welling, dwelling@ohiohistory.org, Ohio Historical Preservation Office
Matt Lamoreaux, Matthew.Lamoreaux@epa.ohio.gov, Ohio EPA, DSW, 401/Wetlands/Mitigation Section
Marianne Piekutowski, Marianne.Piekutowski@epa.ohio.gov, Ohio EPA, DSW
Andrea Kilbourne, Andrea.Kilbourne@epa.ohio.gov, Ohio EPA, DSW, Mitigation Coordinator
Jeff Lewis, Jeffrey.Lewis@epa.ohio.gov, Ohio EPA, DSW CDO
Devin Schenk, dschenk@TNC.org, The Nature Conservancy
Heather Dardinger, hdardinger@emht.com, EMH&T
Mike Sweder, msweder@dublin.oh.us, City of Dublin

Attachments: Site Location Map
Mitigation Location Map

Ohio EPA has developed a customer service survey to get feedback from regulated entities that have contacted Ohio EPA for regulatory assistance, or worked with the Agency to obtain a permit, license or other authorization. Ohio EPA's goal is to provide our customers with the best possible customer service, and your feedback is important to us in meeting this goal. Please take a few minutes to complete this

survey and share your experience with us at
http://www.surveymonkey.com/s/ohioepacustomersurvey

ATTACHMENT 1
Ohio EPA #196456
Site Location Map


Wetland A
0.83 Acre
Stream 1 (Cosgray Ditch)
3,618 L.F. Open Channel
158 L.F. Culverted
Wetland B
0.22 Acre
Non-Jurisdictional Ditch
487 L.F.
E M H&T
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com
CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
Rings Farm and Shier Rings Road Corridor
Delineation Map
Exhibit 7
SCALE: 1" = 900'
0 450 900 1,800 Feet
N
Source: Aerial - City of Columbus, 2017

ATTACHMENT 2
Ohio EPA #196456
Mitigation Location Map

Floodplain Bottwidth = 144.5'
Floodplain Bottwidth = 69.4'
Floodplain Bottwidth = 85.5'
SHIER RINGS ROAD
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
PLAN SET DATE
April 2019
GRAPHIC SCALE
REVISIONS
CITY OF DUBLIN
CITY OF DUBLIN, FRANKLIN COUNTY, OHIO
STREAM RESTORATION AND RELOCATION
FOR
COSGRAY DITCH
PROPOSED STREAM ALIGNMENT
EMH&T
DATE
March 2020
SCALE
1" = 100'
JOB NO.
2019-0207
SHEET
EXHIBIT 7

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO ATTENTION OF

June 10, 2020

Regulatory Division
North Branch
LRH-2019-138-SCR

VALIDATED PERMIT

Mr. Paul Hammersmith
City of Dublin
Department of Public Works
6555 Shier Rings Road
Dublin, Ohio 43016

Dear Mr. Hammersmith:

Enclosed is the validated Department of the Army (DA) Permit Number LRH-2019-643-SCR, authorizing the discharge of dredged and/or fill material within waters of the United States associated with the University Boulevard Phase II Project. The project site is located on a 140-acre parcel north of Shier Rings Road and west of Avery Road along U.S. 33, in Dublin, Franklin County, Ohio (40.097033 Latitude, -83.167260 Longitude).

The validated DA permit is for your records. A copy of the DA permit must be supplied to the project engineers responsible for the construction activities. If any changes in the location and plans of the work are found necessary, revised plans must be submitted to this office for approval, as required by law, before work is initiated.

Upon completion of the work, the attached certification must be signed and returned to this office. If you have any questions regarding the information in this letter or the enclosures, please contact Kayla Adkins of the North Branch at 304-399-5850, by mail at the above address, or by email at kayla.n.adkins@usace.army.mil.

Sincerely,

Teresa Spagna
Digitally signed by Teresa Spagna
Date: 2020.06.10 09:07:45 -04'00'

Teresa D. Spagna
Chief, North Branch

Enclosures

Printed on Recycled Paper

cc:
Dana Rzeznik
U. S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

Patrice Ashfield
U. S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, Ohio 43230

Diana Welling
Ohio History Connection
800 East 17th Avenue
Columbus, Ohio 43211

Jeff Boyles
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216

John Kessler
Ohio Department of Natural Resources
2045 Morse Road
Columbus, Ohio 43229

Heather Dardinger
EMH&T, Inc.
5500 New Albany Road
Columbus, Ohio 43054

EMH&T

APPENDIX H: Inspection Reports

EROSION & SEDIMENT CONTROL SITE INSPECTION

UNIVERSITY BLVD PHASE 2/SHIER RINGS ROAD & AVERY ROAD INTERSECTION

Inspector:	Name:	Company:	Phone:

Site Contact:	Name:	Company:	Phone:

Date:		Time Arrived:	
Site Conditions:			
Construction Activity:			

Construction Entrance/Exit	
• Has a stabilized exit been established?	Yes ☐ No ☐ N/A ☐
• Is the exit blocking existing drainage?	Yes ☐ No ☐ N/A ☐
• Does the exit need top dressed with additional stone?	Yes ☐ No ☐ N/A ☐
• Is mud noted on offsite streets?	Yes ☐ No ☐ N/A ☐
Comments:	

Concrete Washout Area	
• Has designated area been established?	Yes ☐ No ☐ N/A ☐
• Is washwater overflowing?	Yes ☐ No ☐ N/A ☐
Comments:	

Dewatering Activities	
• Is muddy water being pumped into storm sewers/surface waters?	Yes ☐ No ☐ N/A ☐
Comments:	

EROSION & SEDIMENT CONTROL SITE OBSERVATION

Project: University Blvd Phase 2/Shier Rings Road & Avery Road Intersection Date:

Perimeter Controls - Sediment Fence/Straw Wattles	
• Has sediment fence been properly installed – trenched, backfilled, tight?	Yes ☐ No ☐ N/A ☐
• Are gaps present in the fence or runoff flowing under the fence?	Yes ☐ No ☐ N/A ☐
• Does the fence need to be repaired or installed?	Yes ☐ No ☐ N/A ☐
Comments:	

Storm Sewer Inlet Protection	
• Have inlets been protected?	Yes ☐ No ☐ N/A ☐
• Are they damaged or in need of replacement?	Yes ☐ No ☐ N/A ☐
• Does accumulated sediment need removed from the protection?	Yes ☐ No ☐ N/A ☐
Comments:	

Soil Stabilization	
• Does it appear that disturbed areas have been idle for more than 14 days?	Yes ☐ No ☐ N/A ☐
• Are disturbed areas present within 50' of a stream?	Yes ☐ No ☐ N/A ☐
• Are disturbed areas present that are to remain idle over the winter?	Yes ☐ No ☐ N/A ☐
• Are soil stockpiles present on site?	Yes ☐ No ☐ N/A ☐
• Does it appear that areas are at final grade and need stabilized?	Yes ☐ No ☐ N/A ☐
Comments:	

Sediment Basin	
• Has the basin been installed prior to major land disturbing activities?	Yes ☐ No ☐ N/A ☐
• Has the outlet dewatering structure been installed?	Yes ☐ No ☐ N/A ☐
• Has the basin embankments been stabilized?	Yes ☐ No ☐ N/A ☐
• Are temporary diversions being used to direct runoff into the basin?	Yes ☐ No ☐ N/A ☐
• Does accumulated sediment within the basin need removed?	Yes ☐ No ☐ N/A ☐
Comments:	

EROSION & SEDIMENT CONTROL SITE OBSERVATION

Project: University Blvd Phase 2/Shier Rings Road & Avery Road Intersection Date:

Check Dams	
• Is runoff flowing around the ends of the check dams?	Yes ☐ No ☐ N/A ☐
• Does accumulated sediment need to be removed?	Yes ☐ No ☐ N/A ☐
Comments:	

Additional Comments:

"I certify under the 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Inspector Signature: _____Date:_____

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APPENDIX I: SWPPP Amendment Log

UNIVERSITY BLVD PHASE 2/SHIER RINGS ROAD & AVERY ROAD INTERSECTION
SWPPP AMENDMENT LOG

Amendment Number	Description of the Amendment	Amendment Date	Amendment Prepared By (Name & Title)

EMH&T

APPENDIX J: Post-construction Water Quality Operation & Maintenance Plan

Inspection Item	Maintenance Procedures	Frequency of Inspection
Inlet/Outlet Structure & Side Slopes	• Do not fertilize surrounding basin • Remove accumulated sediment and debris from inlet and outlet structures. • Mow side slopes	Monthly
Basin Embankment	• Repair undercut/eroded areas and stabilize	Every 6 Months
Storm Sewer System	• Remove debris from the sewer system to ensure positive flow to the basin	Every 6 Months
Stormwater Basins	• Inspect for damage, paying particular attention to the outlet control structure • Check for signs of eutrophic conditions (algae buildup) • Note signs of hydrocarbon build-up, remove appropriately • Monitor sediment accumulation in the facility • Examine to ensure inlet and outlet devices are free of debris and are operational • Inspect for invasive vegetation, remove as necessary.	Annually
Stormwater Basins Sediment Accumulation	• Monitor sediment accumulations and remove sediment when the pool volume has become reduced significantly (50% of permanent pool volume lost), or the pond becomes eutrophic.	5 to 10 years
Micropool Sediment Accumulations	• Monitor sediment accumulations and remove sediment when the pool volume has become reduced significantly (25% of permanent pool volume lost) or the pond becomes eutrophic.	3 to 7 years

The Owner shall be responsible for the inspection and maintenance of the basin, associated outlet structure and all other maintenance procedures listed above. Inspections and maintenance that are conducted shall be documented and filed for future reviews by the City of Dublin Stormwater Management Program. Stormwater Basins treat incoming stormwater runoff by physical, biological, and chemical processes. The primary removal mechanisms is the gravitational settling of particulates, organic matter, metals, bacteria and organics as stormwater runoff resides in the forebay and micropool. Other contaminants such as hydrocarbons are broken down and eliminated by volatilization and chemical activity. Stormwater Basins are utilized to remove 80% of the total suspended solids load in typical urban-post development runoff when designed and maintained properly.

Stormwater basins naturally collect sediment, including gravel, sand, and mud, as well as other debris like litter. To maintain its capacity and function, a basin should be kept free of excessive debris, litter, and sediment. The design depth should be verified every 3-7 years to ensure that the basin will continue to function properly. Property owners or contracted personnel shall position themselves in the middle of the stormwater basin and several measurements around center of the stormwater basin shall be taken using a Stadia Rod to determine the depth of the permanent pool. The accumulated sediment should be excavated to restore the permanent pool depth to the respective design depths. The permanent pool is to be temporarily drained/pumped down so that the accumulated sediment can be removed. It is recommended that sediment excavated from stormwater basins be tested prior to the sediment disposal. Sediment removed from the stormwater basin should be stored properly until disposal to ensure no exposure to stormwater runoff.