STORMWATER MANAGEMENT REPORT

Prepared for:

ER/UDC WEST WINDSOR LLC

Block 47; Lots 2-6

Township of West Windsor
Mercer County, New Jersey

Prepared by:

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1. Introduction

The subject property is located in the Township of West Windsor, Mercer County, New Jersey. The property is identified as Block 47, Lots 2 through 6 on the Township of West Windsor tax maps and is a total of 3.904 acres in size and will hereafter be referred to as “the site”. The site is bordered to the north by Princeton-Hightstown Road and commercial beyond; to the east by Southfield Road with commercial beyond; to the west by commercial use; and to the south by McGetrick Lane with open space and residential uses beyond. A tax map and aerial map is included in the Appendix for reference.

The site is currently partially developed with residential houses and undeveloped open spaces within the redeveloped B-2A Zone. The site is proposed to subdivide the lots into two lots, Proposed Lot 2.01 and Proposed Lot 2.02 as well as relocated and widen a portion of McGetrick Lane. Proposed Lot 2.01 is proposed to construct a QuickChek food store with fuel sales with ancillary parking, sidewalks, driveways, stormwater and utility improvements. Proposed Lot 2.02 is proposed to construct a restaurant with drive-thru with ancillary parking, sidewalks, driveways, stormwater and utility improvements. Proposed stormwater management systems will convey the runoff from the proposed development and impervious areas.

This report summarizes the design objectives, methodology, and calculations for the conveyance, detention, treatment and discharge of stormwater runoff leaving the site and is meant to accompany the Site Plan documents prepared by Bohler Engineering. Pre-development and post-development conditions are examined for stormwater quantity analysis, water quality analysis, groundwater recharge, green infrastructure, soil erosion and sediment control, and low impact development based on the *NJDEP Stormwater Management Regulations* of March 2020.

2. Pre-Development Site Conditions

The site contains a total area of 3.904 acres. The disturbed watershed area is a total of 4.462 acres in size and consists of three unique drainage areas: Existing Drainage Area E1, E2, and E3, which are described in more detail below. The runoff generated in Drainage Area E1 outfalls via piped and overland flow to an existing storm inlet within Princeton-Hightstown Road, Tributary to the existing storm drainage system. The runoff generated in Drainage Areas E2 outfalls via overland flow to McGetrick Lane and adjacent Block 21.27, Lot 1, Tributary to Bear Brook. The runoff generated in Drainage Area E3 outfalls via overland flow to an existing storm inlet along Southfield Road, Tributary to Bear Brook. The runoff from all Drainage Areas ultimately flows southwest to Bear Brook. The Existing Drainage Area Map in Appendix illustrates the limits of the existing drainage area and how it relates to the existing site conditions.

2.1 Point of Analysis 1

All existing drainage areas flows to the west to one point of analysis being the Tributary to Bear Brook where it crosses the western property line. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.1.1 Existing Drainage Area E1

Consisting of the northern portion of the site, Existing Drainage Area E1 (E1) contains 0.785 acres of land, which consists of woods, grass, parking lot, driveways and portions of the residential houses. The topography of the area slopes towards Princeton-Hightstown Road which runs from south to north, with a maximum on site elevation of approximately 96.50 down to a minimum elevation of approximately 93.35 with slopes ranging from 0.5% to 8%. CN values used are shown in Table 2.1.1 and a calculated time of concentration of 10.5 minutes was used. The runoff from E1 flows through a storm pipe and overland to the Tributary of the existing stormwater system and ultimately flows southeast to Bear Brook. E1 discharges to Point of Analysis 1. Refer to Table 3.3 for a comparison of the pre- and post- development stormwater flows.

TABLE 2.1.1

CN Values	
Area Description	**CN**
Woods, HSG B	55
Grass, HSG B	61
Impervious, HSG B	98

2.2 Point of Analysis 2

The existing drainage area E2 flows to the west to one point of analysis being the Tributary to Bear Brook where it crosses the southern property line. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.2.1 Existing Drainage Area E2

Consisting of majority of the site, Existing Drainage Area #E2 contains 3.524 acres of land, which consists of woods, grass and portions of driveways and residential houses. The topography of the area slopes towards the southern

Tributary to Bear Brook which runs from northeast to southwest, with a maximum on site elevation of approximately 96.30 down to a minimum elevation of approximately 91.05 with slopes ranging from 0.5% to 8%. CN values used are shown in Table 2.2.1 and a calculated time of concentration of 26.3 minutes was used. The runoff from E2 flows overland to the Tributary to McGetrick Lane and adjacent Block 21.27, Lot 1 and ultimately flows southeast to Bear Brook. E2 discharges to Point of Analysis 2. Refer to Table 3.3 for a comparison of the pre- and post- development stormwater flows.

TABLE 2.2.1

CN Values	
Area Description	**CN**
Woods, HSG B	55
Grass, HSG B	61
Impervious, HSG B	98

2.3 Point of Analysis 3

The existing drainage area E3 flows to the south to one point of analysis being the Tributary to Bear Brook where it crosses the southern property line. The Existing Drainage Area Map in Appendix C illustrates the identified point of analysis and how it relates to the existing topography on the site.

2.3.1 Existing Drainage Area E3

Consisting of the eastern portion of the site, Existing Drainage Area E3 contains 0.280 acres of land, which consists of woods, grass, portion of a residential building and the existing road. The topography of the area slopes towards the southern Tributary to Bear Brook which runs from north to south, with a maximum on site elevation of approximately 95.50 down to a minimum elevation of approximately 91.58 with slopes ranging from 0.5% to 8%. CN values used are shown in Table 2.3.1 and a calculated time of concentration of 3.2 minutes was used. The runoff from E3 flows overland to an existing storm inlet within Southfield Road and the Tributary to Bear Brook. E3 discharges to Point of Analysis 3. Refer to Table 3.3 for a comparison of the pre- and post- development stormwater flows.

TABLE 2.3.1

CN Values	
Area Description	**CN**
Woods, HSG B	55
Grass, HSG B	61
Impervious, HSG B	98

3. Post-Development Site Conditions

The post-development condition for the site includes the construction of a QuickChek food store with fuel sales on Proposed Lot 2.01, a restaurant with drive-thru on Proposed Lot 2.02, and McGetrick Lane widening and relocation. The proposed site is designed in a manner that generally maintains the existing drainage patterns, although a significant amount of earthwork will be required. Proposed stormwater conveyance systems will collect the runoff from the proposed building and impervious areas via inlets, manholes, porous pavement, porous pavers, and storm sewer piping, and redirect it to the proposed basins throughout the site. The construction of the proposed improvements will require approximately ±4.462 acres of land disturbance and will create approximately ±2.899 acres of impervious coverage on the site.

The studied watershed area in the post-development condition contains the same 4.462-acre area, which was studied in the pre-development condition, and which is also tributary to the same point of analysis. The sub-drainage areas contributing to these analysis points are unique to the proposed conditions, which are described in further detail below. The Proposed Drainage Area Map in the Appendix illustrates the limits of each proposed drainage area and how they relate to the proposed site conditions.

3.1 Point of Analysis 1

Refer to Section 2.1 above for a detailed description of Point of Analysis 1. Below is a description of the sub-drainage areas tributary to POA-1, which have been collectively designed in accordance with NJDEP criteria in order to comply with water quality, water quantity, ground water recharge and green infrastructure requirements. Refer to the Proposed Drainage Area Map for more information.

Times of concentration were calculated for each proposed drainage area using the McCuen-Spiess equation for sheet flow, see Appendix B. CN values used in calculations are the same described in the prior section.

Ultimately, the total proposed runoff at Point of Analysis 1 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.iii. Post-development peak runoff rates for the 2-, 10-, and 100-year storm events for flows tributary to Point of Analysis 1 meet or exceed the 50, 25, and 20 percent reductions, respectively, of the pre-development peak runoff rates for the subject improvements only. Refer to Table 3.3 for a comparison of pre-development flows to the post-development flows for Point of Analysis 1.

3.1.1 Proposed Drainage Area P1-A (Bypass)

Drainage Area P1-A consists of the area along the Princeton-Hightstown Road frontage which includes grass area, driveways and sidewalk. Drainage Area P1-A consists of 0.212 acres of grass area and 0.158 acres of impervious surface for a total of 0.370 acres. Storm runoff will be collected via overland sheet flow to the existing storm inlet within Princeton-Hightstown Road.

3.1.2 Proposed Drainage Area P1-B (Porous Paver Area #1)

Drainage Area P1-B consists of the car parking spaces and driveway on the west side of Proposed Lot 2.02 and drains to Porous Paver #1. The porous paver system operates in series with Porous Paver #3. An impervious liner is proposed under the storage bed with perforated underdrains in the storage bed. Drainage Area P1-B consists of 0.044 acres of porous paver and 0.103 acres of impervious surface and 0.016 acres of grass area, fulfilling the 3 to 1 contributory drainage area for porous pavement systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous paver portions.

3.1.3 Proposed Drainage Area P1-C (Porous Paver Area #2)

Drainage Area P1-C consists of the car parking spaces and driveway on the north side of Proposed Lot 2.02 and drains to Porous Paver #2. The porous pavement system operates in series with Porous Paver #3. An impervious liner is proposed under the storage bed with perforated underdrains in the storage bed. Drainage Area P1-C consists of 0.062 acres of porous pavers and 0.127 acres of impervious surface and 0.048 acres of grass area, fulfilling the 3 to 1 contributory drainage area for porous pavement systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous paver portions.

3.1.4 Proposed Drainage Area P1-D (Porous Paver Area #3)

Drainage Area P1-D consists of the proposed restaurant building, parking and patio area in the center of Proposed Lot 2.02 and drains to Porous Paver #3. The porous concrete system operates independently with the first orifice set at the Water Quality storm elevation and conveys the runoff from the 2, 10 and 100-year storms. Drainage Area P1-D consists of 0.157 acres of porous pavers, 0.105 acres of impervious surface and 0.009 acres of grass, fulfilling the 3 to 1 contributory drainage area for porous pavement systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous paver portions.

3.2 Point of Analysis 2

Refer to Section 2.1 above for a detailed description of Point of Analysis 2. Below is a description of the sub-drainage areas tributary to POA-2, which have been collectively designed in accordance with NJDEP criteria in order to comply with water quality, water quantity, ground water recharge and green infrastructure requirements. Refer to the Proposed Drainage Area Map for more information.

Times of concentration were calculated for each proposed drainage area using the McCuen-Spiess equation for sheet flow, see Appendix B. CN values used in calculations are the same described in the prior section.

Ultimately, the total proposed runoff at Point of Analysis 2 meets the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.iii. Post-development peak runoff rates for the 2-, 10-, and 100-year storm events for flows tributary to Point of Analysis 2 meet or exceed the 50, 25, and 20 percent reductions, respectively, of the pre-development peak runoff rates for the subject improvements only. Refer to Table 3.3 for a comparison of pre-development flows to the post-development flows for Point of Analysis 2.

3.2.1 Proposed Drainage Area P2-A (Bioretention Basin #1)

Drainage Area P2-A consists of the Bioretention Basin #1 area, proposed parking, driveways, sidewalk, grass areas of Proposed Lot 2.01 and portions of Proposed Lot 2.02. Basin #1 is proposed to be a small-scale bioretention basin. The drainage area for Basin #1 consists of approximately 0.755 acres of grass area, 0.928 acres of impervious, for a total drainage area of 1.683 acres. Due to high groundwater, an impervious liner is proposed under the sand and gravel layers. An underdrain is proposed in the gravel layer to convey water to the outlet structure.

Per the New Jersey Best Management Practices manual for small-scale bioretention basins, the tributary area for each basin must not exceed 2.50 acres (excluding the area of the basin). The Basin #1 contributory drainage area is 2.448 AC. Basin #1 meets this criterion as shown on the Proposed Drainage Area Map included in the Appendix of this report.

3.2.2 Proposed Drainage Area P2-B (Bioretention Basin #2)

Drainage Area P2-B consists of the Bioretention Basin #2 area. Basin #2 is proposed to be a small-scale bioretention basin. The drainage area for Basin #2 consists of approximately 0.043 acres of grass area and 0.297 acres of impervious for a total drainage area of 0.340 acres.

Drainage Area P2-C (Porous Paver Area #4) and P2-H (Basin #2) is also tributary to Bioretention Basin #2.

Per the New Jersey Best Management Practices manual for small-scale bioretention basins, the tributary area for each basin must not exceed 2.50 acres (excluding the area of the basin). The Basin #1 contributory drainage area is 0.592 AC. Basin #2 meets this criterion as shown on the Proposed Drainage Area Map included in the Appendix of this report.

3.2.3 Proposed Drainage Area P2-C (Porous Paver Area #4)

Drainage Area P2-C consists of the car parking spaces and a portion of the driveway on the west side of Proposed Lot 2.01 and drains to Bioretention Basin #2. The porous paver system operates in series with Bioretention Basin #2. An impervious liner is proposed under the storage bed with perforated underdrains in the storage bed. Drainage Area P2-C consists of 0.026 acres of porous pavers and 0.050 acres of impervious surface and 0.009 acres of grass area, fulfilling the 3 to 1 contributory drainage area for porous pavement systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous paver portions.

3.2.4 Proposed Drainage Area P2-D (Porous Paver Area #5)

Drainage Area P2-D consists of the car parking spaces and driveway on the southeast corner of Proposed Lot 2.01 and drains to Bioretention Basin #1. The porous paver system operates in series with Bioretention Basin #1. An impervious liner is proposed under the storage bed with perforated underdrains in the storage bed. Drainage Area P2-D consists of 0.094 acres of porous pavers and 0.125 acres of impervious surface and 0.011 acres of grass area, fulfilling the 3 to 1 contributory drainage area for porous pavement systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous paver portions.

3.2.5 Proposed Drainage Area P2-E (Porous Paver Area #6)

Drainage Area P2-C consists of the car parking spaces and concrete sidewalk around the proposed QuickChek building of Proposed Lot 2.01 and drains to Bioretention Basin #1. The porous paver system operates in series with Bioretention Basin #1. An impervious liner is proposed under the storage bed with perforated underdrains in the storage bed. Drainage Area P2-C consists of 0.176 acres of porous pavers and 0.004 acres of grass area, fulfilling the 3 to 1 contributory drainage area for porous pavement

systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous paver portions.

3.2.6 Proposed Drainage Area P2-F (Porous Pavement #7)

Drainage Area P2-F consists of a portion of the McGetrick Lane roadway expansion, concrete sidewalk, and Porous Pavement #7 which drains to Bioretention Basin #1. An impervious liner is proposed under the storage bed with perforated underdrains in the storage bed. Drainage Area P2-F consists of 0.133 acres of porous concrete, 0.124 acres of impervious area and 0.116 acres of grass area, fulfilling the 3 to 1 contributory drainage area for porous pavement systems from the NJDEP BMP Manual. Storm runoff will be collected via overland sheet flow to the porous pavement portions.

3.2.7 Proposed Drainage Area P2-G (Bypass)

Drainage Area P2-G consists of the area along western property line of Proposed Lot 2.02 which includes mostly grass area. Drainage Area P2-G consists of 0.079 acres of grass area and 0.008 acres of wooded area for a total of 0.087 acres. Storm runoff will be collected via overland sheet flow to the Point of Analysis 2.

3.2.8 Proposed Drainage Area P2-H (Bioretention Basin #2)

Drainage Area P2-H consists of the area along the northern property line of Proposed Lot 2.01 which includes impervious area. Drainage Area P2-H consists of 0.165 acres of impervious area and 0.024 acres of grass area for a total of 0.189 acres. Storm runoff will be collected via an ‘B’ inlet located on Princeton-Hightstown Road and will be routed to Bioretention Basin #2.

Along the frontage of Princeton-Hightstown Road a 10-foot-wide shoulder has been proposed, which consists of 0.098 acres of proposed motor vehicle surface. The portion of the P2-H Drainage area that extends into Princeton-Hightstown Road and Southfield Road is utilized to capture a portion of the proposed shoulder’s motor vehicle surface and a portion of the existing motor vehicle surface areas to be routed and treated by the onsite Bioretention Basin #2. The total motor vehicle surface area being captured and managed onsite is 0.110 acres which exceeds the total proposed motor vehicle surface area for the proposed shoulder.

3.3 Point of Analysis 3

Refer to Section 2.1 above for a detailed description of Point of Analysis 3. Below is a description of the sub-drainage areas tributary to POA-3, which have been collectively designed in accordance with NJDEP criteria in order to comply with water quality, water quantity, ground water recharge and green infrastructure requirements. Refer to the Proposed Drainage Area Map for more information.

Times of concentration were calculated for each proposed drainage area using the McCuen-Spiess equation for sheet flow. CN values used in calculations are the same described in the prior section.

Ultimately, the total proposed runoff at Point of Analysis 3 is not required to meet the stormwater management criteria set forth in NJAC § 7:8-5.4(a)3.iii.

3.3.1 Proposed Drainage Area P3-A

Drainage Area P3-A consists of a portion of McGetrick Lane, sidewalk and grass areas of the proposed McGetrick Lane right-of-way. The drainage area consists of 0.282 acres of grass and 0.095 acres of impervious area for a total of 0.377 acres. The runoff from Drainage Area P3-A is routed via overland flow to the existing storm inlet within the Southfield Road right-of-way, and ultimately flows to Bear Brook. The routing of the runoff from Proposed Drainage Area P3-A is depicted on the Inlet Area Map in Appendix C.

3.4 Proposed Structural Stormwater Management Strategies

The entire site ultimately flows to the same Point of Analysis #1 in the pre- and post-development conditions. Several practices have been implemented throughout the site in order to achieve water quantity, water quality, and groundwater recharge compliance in post-development conditions.

3.4.1 Bio-Retention Systems

Basins #1 and #2 are proposed to be aboveground bioretention basins. All of the proposed bioretention basins have been designed as small-scale and will operate independently. All of the above-mentioned bio-retention systems have been designed with an underdrain and impervious liner due to the shallow groundwater table and will therefore not be utilized to meet the groundwater recharge requirements. The bioretention system meets the minimum requirements outlined in the *New Jersey Stormwater Best Management Practices Manual* by providing 18 inches of soil bed depth, a 6-inch sand layer beneath the soil bed, and a proposed underdrain system to discharge storm water out of the system. The bioretention basins also provide

biocontainment and treatment of the entire Water Quality Design Storm volume and a storage depth of 12 inches maximum for a flat-bottom system. The bio-retention system for this site will achieve 80% TSS removal based on the 18-inch thick soil layer with the appropriate vegetation.

TABLE 3.4.1.1

DESIGN PARAMETERS		
TSS Removal Rate	**Depth of Soil Bed**	**Vegetation**
80%	18 inches	Terrestrial Forested Community
80%	24 inches	Site-Tolerant Grasses
90%	24 inches	Terrestrial Forested Community
Storage Volume	Entire Water Quality Design Storm Volume	
Minimum Density of Vegetation	85%	
Appropriate Species Selection	See Chapter 7 of the *NJ Stormwater Best Management Practices Manual*	
Maximum Design Storm Drain Time	72 Hours, Using Slowest Design Permeability Rate	
Permeability Rate Factor of Safety	2	
Minimum Subsoil Design Permeability Rate	0.5 inches/hour	
Soil Testing Requirements	Must be consistent with Appendix E of the *NJ Stormwater Best Management Practices Manual*	

Table 3.4.1.2 - Small-Scale Bioretention Systems Summary

Bioretention Basin #	1	2
Contributory Drainage Area (Acres)	2.448	0.592
Basin Area (Acres)	0.263	0.026
Soil Bed Depth (Inches)	18	18
Subsoil Permeability (Inches/Hour)	N/A	3.6
Drain Time (Hours)	16.0	18.0
Underdrain Size (Inches)	6	N/A
Water Quality Storm Depth (Feet)	0.42	0.90
TSS Removal Rate (%)	80	80
System Bottom Elevation	88.50	91.70
Seasonal High Ground Water Elevation	85.20	89.70

3.4.2 Pervious Paving Systems

Pervious paving materials have been proposed as part of the overall site design and stormwater management system to reduce the impervious surface on site, provide 80% TSS removal for pervious paved surfaces and their tributary areas, and reduce the peak flows of runoff. The pervious paving systems have been designed to have a maximum ratio of additional inflow area to the pavement surface area of 3:1 or less, a maximum surface slope of 5%, a storage bed that fully contains the Water Quality Design Storm runoff volume, and to discharge the design storm within 72 hours of a rain event.

TABLE 3.2.8

DESIGN PARAMETERS	
Porous Asphalt, Pervious Concrete and Permeable Interlocking Paver Units	20 inches/hour Minimum Infiltration Rate

Table 3.4.2 - Pervious Paving Systems Summary

Pervious Paving System #	1	2	3	4	5	6	7
Porous Area (Acres)	0.044	0.062	0.157	0.026	0.094	0.176	0.133
Additional Drainage Area (Acres)	0.119	0.186	0.419*	0.064	0.136	0.004	0.240
Drainage Area Ratio	2.7:1	3:1	0.7:1	2.5:1	1.5:1	0:1	1.8:1
Surface Slope (%)	1.5%	1.1%	1.5%	1.75%	1.1%	1.0%	2.0%
Underdrain Size (Inches)	2-3”	6”	N/A	6”	6”	6”	2-6”
Drain Time (Hours)	18	14	18	18	16	28	26
System Bottom Elevation	92.10	92.90	92.00	94.00	94.00	94.25	89.50
Seasonal High Groundwater Elevation	88.50	91.90	90.00	91.10	93.00	93.00	88.50

*Porous Paver Area #3 includes additional drainage area from Porous Paver Areas #1 & 2.

3.4.3 Emergency Spillways

The emergency spillways associated with the proposed bioretention basin #2 have been designed to pass the 100-year storm with the culvert off. Bioretention basin #1 has been designed to pass a design storm that is equivalent to the 100-year storm plus 50%. At least one foot of freeboard is provided above the peak water elevation while the emergency spillway is operating. Refer to Table 4.6.3 for the Emergency Spillway Discharge Capacity summary table.

3.5 Post-Development Summary

TABLE 3.5.1

REQUIRED AND PROPOSED STORMWATER QUANTITY CONTROL: EXISTING VS. PROPOSED FLOW SUMMARY

	Existing Drainage Area #1	Reductions	Proposed Drainage Area #1
2 yr. Flow (cfs)	0.96 cfs	50%= 0.48 cfs	44.2% 0.42 cfs
10 yr. Flow (cfs)	1.71 cfs	75%= 1.28 cfs	50.6% 0.86 cfs
100 yr. Flow (cfs)	3.39 cfs	80%= 2.71 cfs	57.3% 1.93 cfs

	Existing Drainage Area #2	Reductions	Proposed Drainage Area #2
2 yr. Flow (cfs)	0.96 cfs	50%= 0.48 cfs	50% 0.48 cfs
10 yr. Flow (cfs)	2.58 cfs	75%= 1.94 cfs	60.5% 1.56 cfs
100 yr. Flow (cfs)	6.84 cfs	80%= 5.47 cfs	75.6% 5.17 cfs

	Existing Drainage Area #3	Reductions	Proposed Road Drainage Area #1
2 yr. Flow (cfs)	0.48 cfs	50%= 0.24 cfs	50% 0.24 cfs
10 yr. Flow (cfs)	0.89 cfs	75%= 0.66 cfs	41.6% 0.52 cfs
100 yr. Flow (cfs)	1.80 cfs	80%= 1.44 cfs	33.3% 1.20 cfs

TABLE 3.5.2

REQUIRED AND PROPOSED GROUNDWATER RECHARGE SUMMARY
(Refer to Appendix B for Groundwater Recharge Worksheet)

Recharge Analysis	Annual Recharge Volume (CF)
Pre-Developed Conditions	177,253
Post-Developed Conditions	77,228
Total Recharge Deficit	100,025

Proposed BMPs	Proposed BMP Annual Recharge Volume (CF)
Bioretention Basin #2	40,000
Porous Paver Area #3	61,678
Total	101,678

TABLE 3.5.3

REQUIRED AND PROPOSED STORMWATER QUALITY CONTROL SUMMARY
(Refer to Appendix D for Required TSS Removal Map and Proposed TSS Removal Map)

	Required TSS Removal (AC)	Proposed TSS Removal (AC)
Motor Vehicle Surface Not Treated (0% TSS Removal)	N/A	0.175
Existing Motor Vehicle Surface (50% TSS Removal)*	0.531	N/A
New Motor Vehicle Surface (80% TSS Removal)	1.790	1.003
TSS in Series** (90% TSS Removal)	N/A	0.714
TSS in Series*** (96% TSS Removal)	N/A	0.429
TSS Removal Rate	73.2%	80.0%

*Proposed pavement on top of existing pavement = 50% TSS Removal Rate
**TSS in Series Calculation: First BMP TSS = 50%, Second BMP TSS = 80 (TSS Removal Rate in Series = (50 + 80) – ((50*80)/100) = 90%
***TSS in Series Calculation: First BMP TSS = 80%, Second BMP TSS = 80 (TSS Removal Rate in Series = (80 + 80) – ((80*80)/100) = 96%

4. Stormwater Management Design Methodology

In accordance with the NJDEP Stormwater Management Regulations, the proposed development must meet the requirements, if appropriate, for stormwater quantity reductions, water quality, groundwater recharge, soil erosion and sediment control, and low impact development. The following sections describe how each of the above items are addressed on site in the post-development condition.

4.1 Stormwater Quantity Controls

The Assessment of stormwater quantity has been based upon the DelMarVa region Unit Hydrograph as described in Technical Release Number 55 (TR55), “Urban Hydrology for Small Watersheds”. Theoretical storms are modeled with the 24-Hour DelMarVa

Unit Dimensionless Hydrograph using the NOAA Atlas 14 Type C rainfall distribution and recurrence intervals of 2, 10, and 100 years. Hydrograph creation and routings are accomplished using the *HydroCAD* Version 10.00 program by HydroCAD Software Solutions, LLC. The following techniques from the *NJDEP Stormwater Management Regulations* is being applied to each drainage area as noted in section 3.3:

2. NJAC § 7:8-5.4(a)3.iii states the post-development peak runoff rates for the 2-, 10-, and 100-year storm events are 50, 75, and 80 percent, respectively, of the pre-development peak runoff rates. The above section of the NJAC will be applied to drainage areas that are impacted by the proposed development and flow to a detention or retention system.

The project's proposed stormwater management facilities for stormwater peak flow attenuation will consist of two (2) basins, six (6) porous paver systems, and one (1) porous pavement system addressing the drainage areas outlined in Section 3 of this report. The study requires the establishment of a point of analysis, as indicated in Section 2. Existing and proposed CN and Tc calculations, as well as existing and proposed hydrographs are provided in Appendix A. The information below describes the methodology in which the stormwater calculations were procured.

4.1.1 Site Soils

Site soil information has been obtained from the USDA Natural Resources Conservation Service (NRCS) web soil survey database, last revised in 2020. The soil types present on site are included in Table 4.1.1 and were used to determine HSG ratings for cover types. Additionally, Soil Testing in accordance with Chapter 12 of the NJDEP BMP Manual, were conducted to determine the HSG ratings on site. Please refer to the Appendix for the Geotechnical Testing. The results determined on site that the majority of the soil is considered HSG 'B'.

TABLE 4.1.1

Soil Types Present On-Site

Soil Symbol	Soil Name	Slopes	HSG Rating
SacC	Sassafras	5-10%	B

4.1.2 Rainfall Data

Rainfall data used in the stormwater calculations of this report are obtained from several different sources based on the latest NJDEP stormwater regulations. The Water Quality storm event is based on the NJDEP BMP Manual Chapter 5

definition of having a total rainfall depth of 1.25 inches and a total duration of two (2) hours. Twenty-four-hour rainfall frequency data in Mercer County for all other storms is obtained from the NOAA Atlas 14, Volume 2, Precipitation-Frequency Atlas of the United States, updated in 2006 and listed in the table below:

TABLE 4.1.2

Event (year)	2	10	25	100
Rainfall (in)	3.31	5.01	6.19	8.33

4.1.3 Pipe Sizing

Calculations for sizing the stormwater pipe networks associated with the proposed stormwater management conveyance system can be found in Appendix B of this report. The Rational Method has been used to size the storm piping for the 25-year storm event. An Inlet Area Map is included in Appendix C.

4.2 Water Quality Controls

Water quality analysis is based on the requirements of *NJDEP Stormwater Management Regulations*, which requires the use of green infrastructure to provide 80% TSS removal of post-development runoff from new regulated motor vehicle surfaces generated from the water quality design storm before discharging the runoff. Small scale bioretention basins and porous pavement areas proposed on-site each provide 80% TSS removal. To be considered as green infrastructure, the small-scale bioretention basins are proposed with a maximum drainage area of 2.5 acres (excluding the basin area), and the porous pavement areas are proposed with a maximum additional inflow area of three times the area occupied by the porous pavement. Refer to Table 3.5.3 for the Required and Proposed Stormwater Quality Control Summary.

Motor Vehicle Surface Areas:
Existing Motor Vehicle Surface Area: 0.444 Acres
Proposed Motor Vehicle Surface Area: 2.183 Acres
Net Increase in Motor Vehicle Surface Area: 2.183 Acres – 0.444 Acres = 1.739 Acres

Required:
Existing Motor Vehicle Surface Area – 50% TSS Removal Treatment required
Net Increase in Motor Vehicle Surface Area – 80% TSS Removal Treatment required

$$\frac{50\% \ (0.531 \text{ Ac.}) + 80\% \ (1.790 \text{ Ac.})}{2.321 \text{ Ac.}} = 73.2\%$$

Proposed:

$$\frac{0\% \ (0.175 \text{ Ac.}) + 80\% \ (1.003 \text{ Ac.}) + 90\%^{*} \ (0.714 \text{ Ac.}) + 96\%^{**} \ (0.429 \text{ Ac.})}{2.321 \text{ Ac.}} = 80.0\%$$

80.0% Weighted Proposed TSS Removal Rate > 73.9% Required TSS Removal Rate

As calculated the weighted proposed TSS removal rate is greater than the required rate; the project, as designed, meets the water quality requirement for the proposed development.

*90% TSS removal reflects the drainage areas that go through the 50% TSS removal First Defense Unit and then 80% TSS removal Bioretention Basin BMPs in Series.
**96% TSS removal reflects the drainage areas that go through the 80% TSS removal Porous Paver Area and then 80% TSS removal Bioretention Basin BMPs in Series.

4.3 Groundwater Recharge

The NJDEP Stormwater Management Regulations require that a proposed land development site comply with either of the following groundwater recharge requirements:

1. Demonstrate that 100% of the site's average annual pre-developed groundwater recharge volume will be maintained after development; or

2. Demonstrate that 100% of the difference between the site's pre-development and post-development 2-year runoff volume is infiltrated.

Additionally, NJAC § 7:8-5.4(a)2 states that the groundwater recharge requirement does not apply to projects within the urban redevelopment area nor projects where recharge would be inconsistent with a remedial action work plan.

Proposed pervious paver area #3 and Bioretention Basin #2 are designed to maximize groundwater recharge for the development, which adequately resupplies local groundwater volume per NJDEP requirements. Refer to the NJDEP Annual Groundwater Recharge Analysis spreadsheet within the Appendix for quantifications of the pre- vs. post-development recharge volumes, which demonstrates that the combination of the proposed pervious pavement and concrete provides the required annual groundwater recharge deficit. Refer to Table 3.5.2 for the Required and Proposed Groundwater Recharge Summary.

4.4 Soil Erosion and Sediment Control

The Soil Erosion and Sediment Control plans and details are included within the Site Plan documents prepared by Bohler Engineering and must be followed throughout construction. Silt fences, stabilized construction entrances, a temporary stockpile and inlet filters are proposed during construction. It is noted that stormwater from the site during construction will drain to a temporary sediment basin on the southern portion of the site, which will ultimately be converted into bioretention basin #1 for the project. This

report and the Site Plan documents prepared by Bohler Engineering NJ, LLC are being submitted to the Mercer County Soil Conservation District for certification.

4.5 Low-Impact Development and Non-Structural Stormwater Management Facilities

In accordance with the NJDEP regulations and the latest *New Jersey Stormwater Best Management Practices Manual*, several non-structural stormwater management strategies have been incorporated into the design of the site and are listed below:

4.5.1 Vegetation and Landscaping

A comprehensive Landscape Plan has been incorporated into the design of the proposed improvements on the site that provides low maintenance landscaping. The use of lawn areas has been minimized where applicable and fertilizers and pesticides are to be used sparingly.

4.5.1.1 Native Ground Cover

Native plants including ground cover, shrubs and trees instead of turf grass have been proposed as part of the landscape design for the site. The native plantings will also require little or no irrigation once they are established.

4.5.2 Minimize Land Disturbance

The proposed design of the site incorporates the preservation of existing vegetative areas that will remain undisturbed. The undisturbed areas will be protected during construction and will have easements and/or deed restrictions established as required by other NJDEP regulations and permits to ensure these areas remain undisturbed in the future

4.5.3 Impervious Area Management

Impervious areas are the primary source of additional runoff in the post-development site condition. The sections below describe the measures that have been taken in the proposed site design to minimize the amount of impervious proposed on site

4.5.3.1 Streets, Sidewalks, and Parking, Driveway Areas

As part of the proposed site design, porous pavement and pavers with landscaped islands are proposed to minimize the amount of impervious parking on site as well as to break up the impervious surface.

4.5.4 Preventative Source Controls

The proposed development complies with this strategy by providing a trash receptacle at a key location along the entrance of the QuickChek building. Floatable and total suspended solids are eliminated at 80% with the 18" vegetative layer in the aboveground bioretention basins. Trash racks are to be provided at each outlet structure to help prevent larger debris from entering the downstream water sources. Refer to the Operations & Maintenance Manual for the project for more information regarding maintenance and preventative actions to be followed.

4.6 Stormwater Management Facility Design Details

4.6.1 Precautions and Protections during Construction

Precautions and protections during construction are included as part of the Soil Erosion & Sediment Control Plan which includes protections such as silt fences, stabilized construction entrances, temporary stockpile and inlet filters are proposed during construction.

4.6.2 Discharge Provisions and Capacity

TABLE 4.6.2

Outlet Structure Discharge Capacity

Outlet Structure	WQ-Storm Discharge Capacity (cfs)	2-yr Storm Discharge Capacity (cfs)	10-Yr Storm Discharge Capacity (cfs)	100-Yr Storm Discharge Capacity (cfs)
O.S. #130 (Bioretention Basin #1)	0.36	0.41	1.33	4.40
O.S. #430 (Bioretention Basin #2)	0.00	0.11	1.30	4.38
O.S. #700 (Porous Paver Area #1)	0.21	0.19	0.22	1.15
O.S. #640 (Porous Paver Area #2)	0.21	0.31	0.45	0.74
O.S. #620 (Porous Paver Area #3)	0.00	0.15	0.32	1.03
O.S. #330 (Porous Paver Area #5)	0.05	0.33	0.85	1.57
O.S. #331 (Porous Paver Area #6)	0.01	0.04	0.07	0.12
O.S. #110 (Porous Pavement Area #7)	0.03	0.07	0.27	1.35

4.6.3 Emergency Spillway Provisions and Capacity

TABLE 4.6.3

Emergency Spillway Discharge Capacity

Outlet Structure	Top of Basin Elevation	Spillway Elevation	100-Yr Storm Basin Elevation	100-Yr Storm Spillway Capacity (cfs)	100-Yr Storm + 50% Basin Elevation	100-Yr Storm + 50% Spillway Capacity (cfs)
Emergency Spillway #1 (Bioretention Basin #1) (105' Spillway Length)	95.28	94.13	94.24	N/A	94.29	17.40
Emergency Spillway #2 (Bioretention Basin #2) (24" RCP Pipe)	96.40	95.55	95.50	N/A	95.65	8.17

5. Conclusions

As demonstrated in the above sections, the stormwater management plan for the proposed development meets the *NJDEP Stormwater Management Regulations* of March 2020, and addresses the requirements for stormwater quantity reductions, water quality, groundwater recharge, soil erosion and sediment control, and low impact development. As a result of the design calculations contained herein, Bohler Engineering anticipates that the stormwater design will not have a negative impact to surrounding areas.

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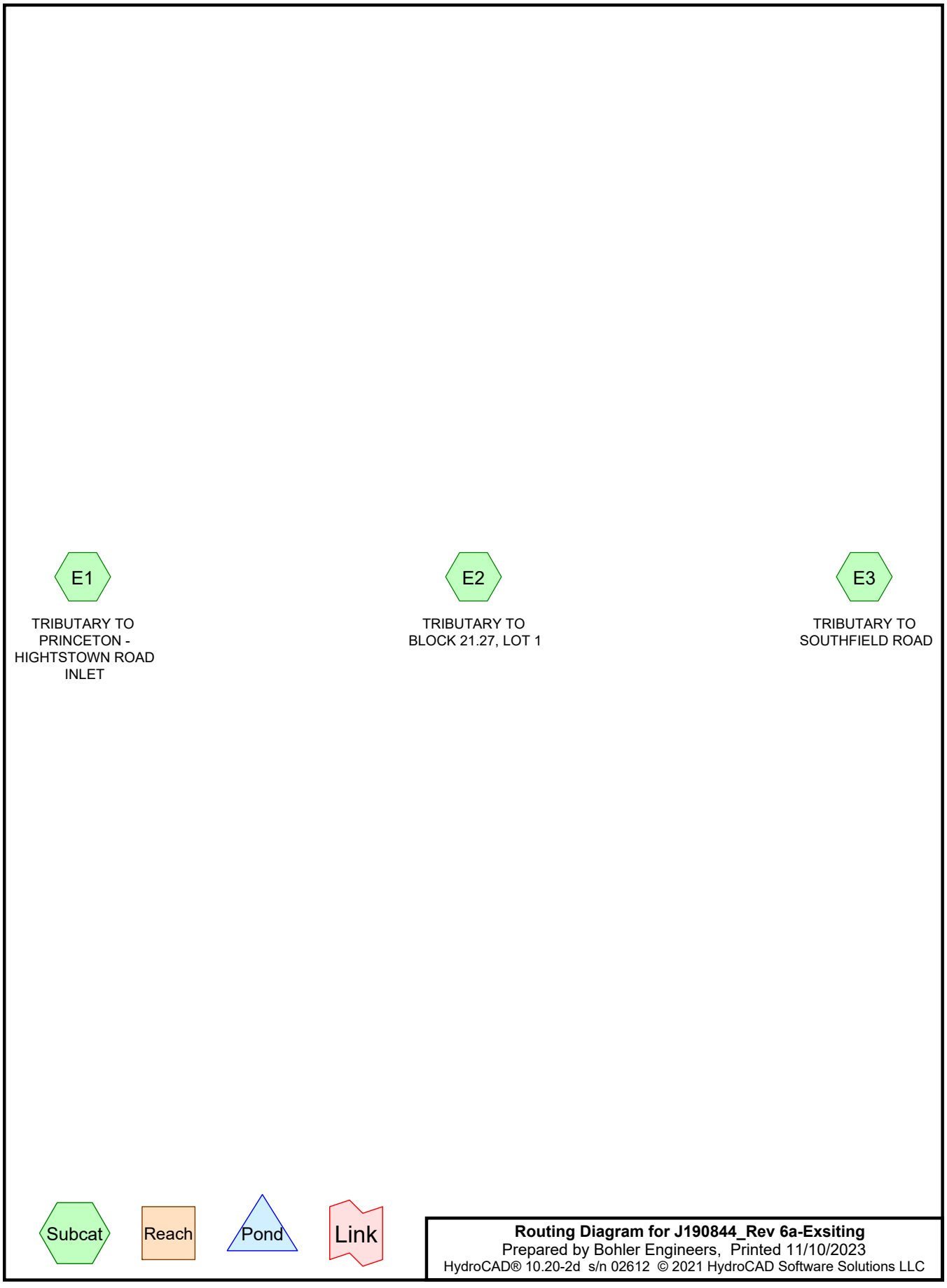
A. PRE- vs. POST-DEVELOPMENT HYDROGRAPHS

- **Water Quality Storm Event**
- **2-Year Storm Event**
- **10-Year Storm Event**
- **100-Year Storm Event**



Routing Diagram for J190844_Rev 6a-Exsiting
Prepared by Bohler Engineers, Printed 11/10/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.969	61	>75% Grass cover, Good, HSG B (E1, E2, E3)
0.897	98	Paved parking, HSG B (E1, E2, E3)
0.723	55	Woods, Good, HSG B (E1, E2, E3)
4.589	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.589	HSG B	E1, E2, E3
0.000	HSG C	
0.000	HSG D	
0.000	Other	
4.589		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.969	0.000	0.000	0.000	2.969	>75% Grass cover, Good	E1, E2, E3
0.000	0.897	0.000	0.000	0.000	0.897	Paved parking	E1, E2, E3
0.000	0.723	0.000	0.000	0.000	0.723	Woods, Good	E1, E2, E3
0.000	**4.589**	**0.000**	**0.000**	**0.000**	**4.589**	**TOTAL AREA**	

Summary for Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

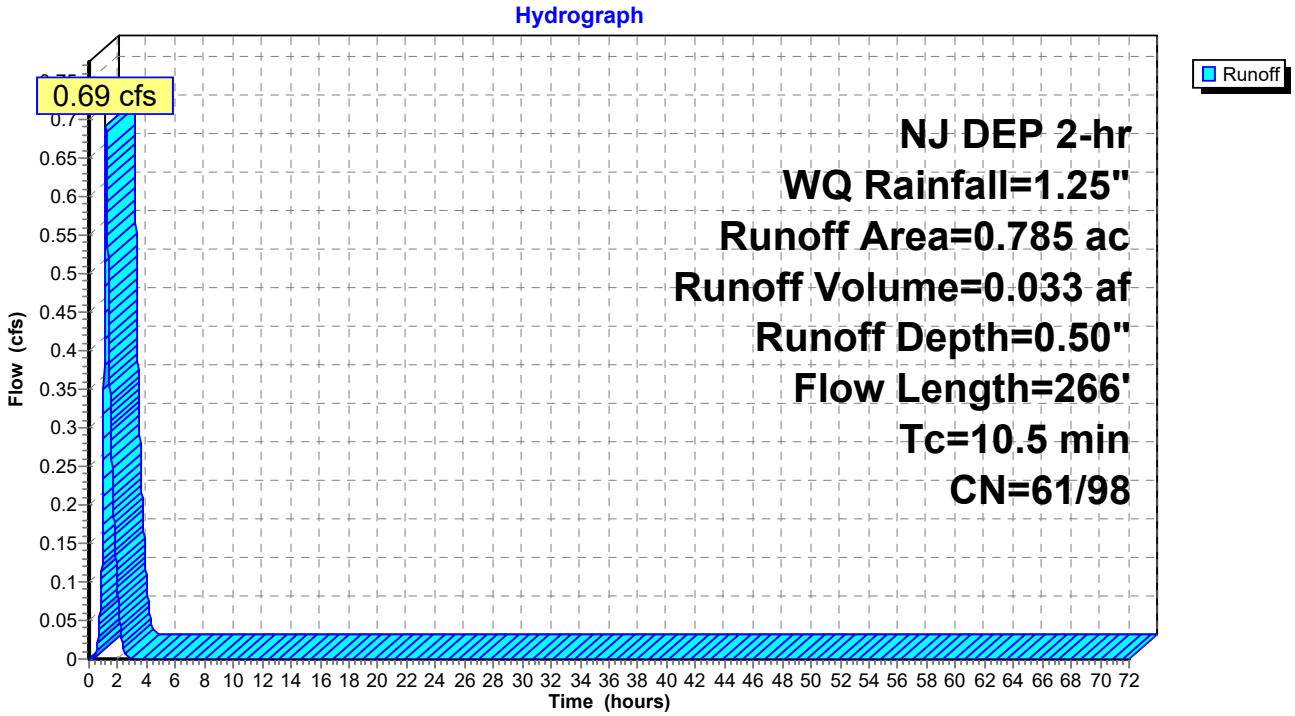
Runoff = 0.69 cfs @ 1.17 hrs, Volume= 0.033 af, Depth= 0.50"
Routed to nonexistent node EDA 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.020	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
0.380	98	Paved parking, HSG B
0.785	79	Weighted Average
0.405	61	51.59% Pervious Area
0.380	98	48.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	23	0.0120	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.35"
0.1	6	0.0130	0.80		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	237	0.0060	1.57		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
10.5	266	Total			

Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



Summary for Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1

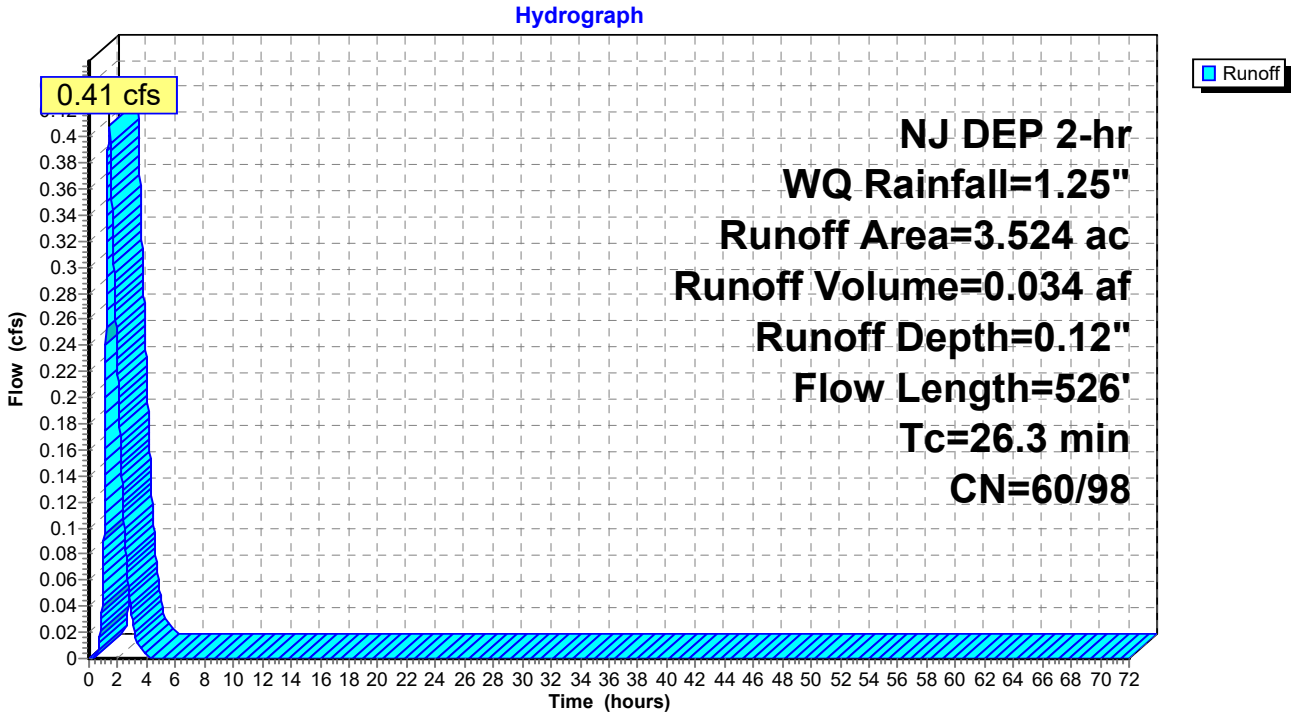
Runoff = 0.41 cfs @ 1.40 hrs, Volume= 0.034 af, Depth= 0.12"
Routed to nonexistent node EDA 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.689	55	Woods, Good, HSG B
2.435	61	>75% Grass cover, Good, HSG B
0.400	98	Paved parking, HSG B
3.524	64	Weighted Average
3.124	60	88.65% Pervious Area
0.400	98	11.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	18	0.0360	0.16		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
9.2	31	0.0150	0.06		**Sheet Flow, BC** Woods: Light underbrush n= 0.400 P2= 3.35"
1.6	59	0.0160	0.63		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
0.1	9	0.0570	1.19		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.4	71	0.0050	0.49		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
11.1	331	0.0050	0.49		**Shallow Concentrated Flow, FG** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0210	2.94		**Shallow Concentrated Flow, HI** Paved Kv= 20.3 fps
26.3	526	Total			

Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1



Summary for Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD

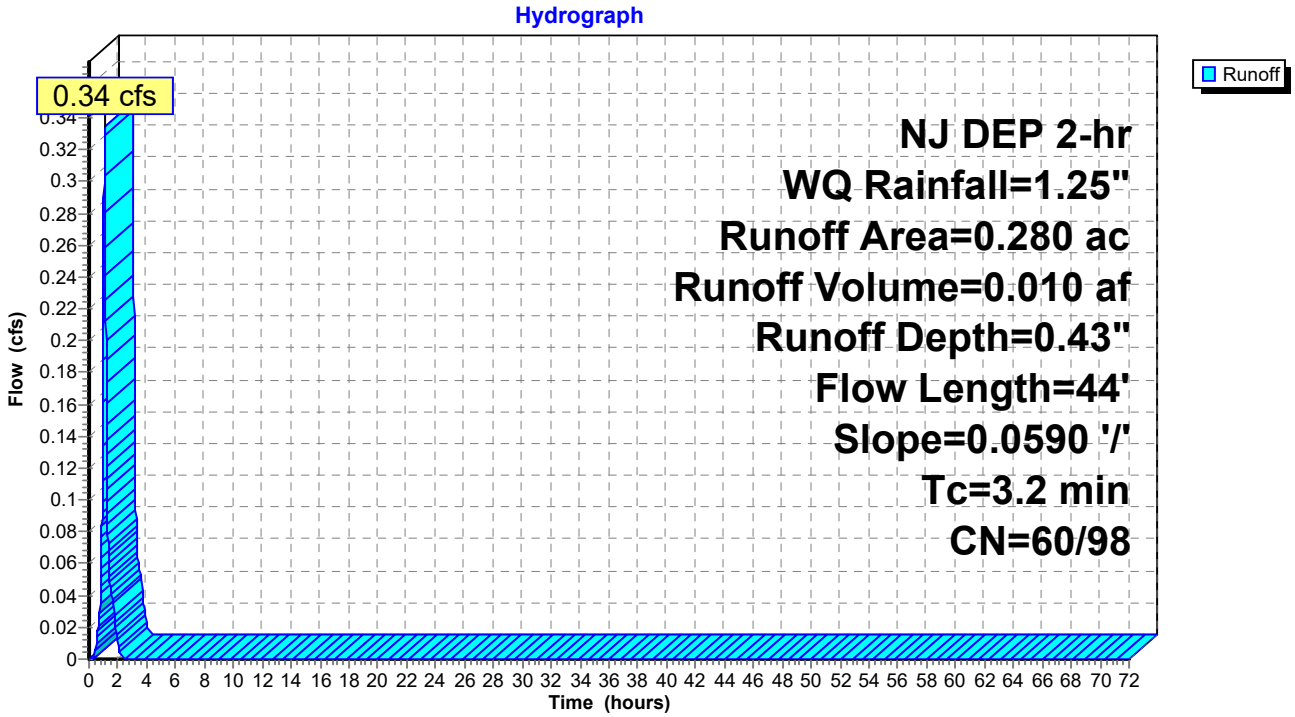
Runoff = 0.34 cfs @ 1.09 hrs, Volume= 0.010 af, Depth= 0.43"
Routed to nonexistent node EDA 3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.014	55	Woods, Good, HSG B
0.149	61	>75% Grass cover, Good, HSG B
0.117	98	Paved parking, HSG B
0.280	76	Weighted Average
0.163	60	58.21% Pervious Area
0.117	98	41.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	44	0.0590	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"

Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.969	61	>75% Grass cover, Good, HSG B (E1, E2, E3)
0.897	98	Paved parking, HSG B (E1, E2, E3)
0.723	55	Woods, Good, HSG B (E1, E2, E3)
4.589	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.589	HSG B	E1, E2, E3
0.000	HSG C	
0.000	HSG D	
0.000	Other	
4.589		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.969	0.000	0.000	0.000	2.969	>75% Grass cover, Good	E1, E2, E3
0.000	0.897	0.000	0.000	0.000	0.897	Paved parking	E1, E2, E3
0.000	0.723	0.000	0.000	0.000	0.723	Woods, Good	E1, E2, E3
0.000	**4.589**	**0.000**	**0.000**	**0.000**	**4.589**	**TOTAL AREA**	

Summary for Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

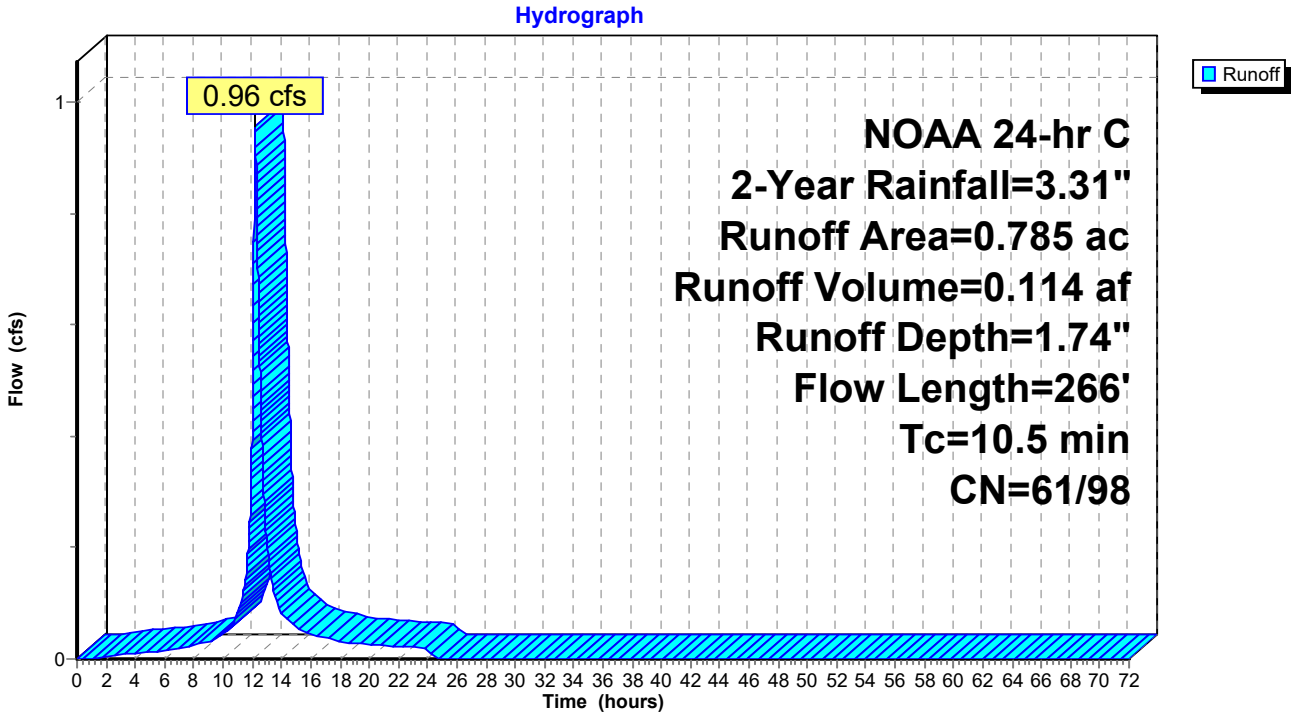
Runoff = 0.96 cfs @ 12.20 hrs, Volume= 0.114 af, Depth= 1.74"
Routed to nonexistent node EDA 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.020	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
0.380	98	Paved parking, HSG B
0.785	79	Weighted Average
0.405	61	51.59% Pervious Area
0.380	98	48.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	23	0.0120	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.35"
0.1	6	0.0130	0.80		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	237	0.0060	1.57		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
10.5	266	Total			

Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



Summary for Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1

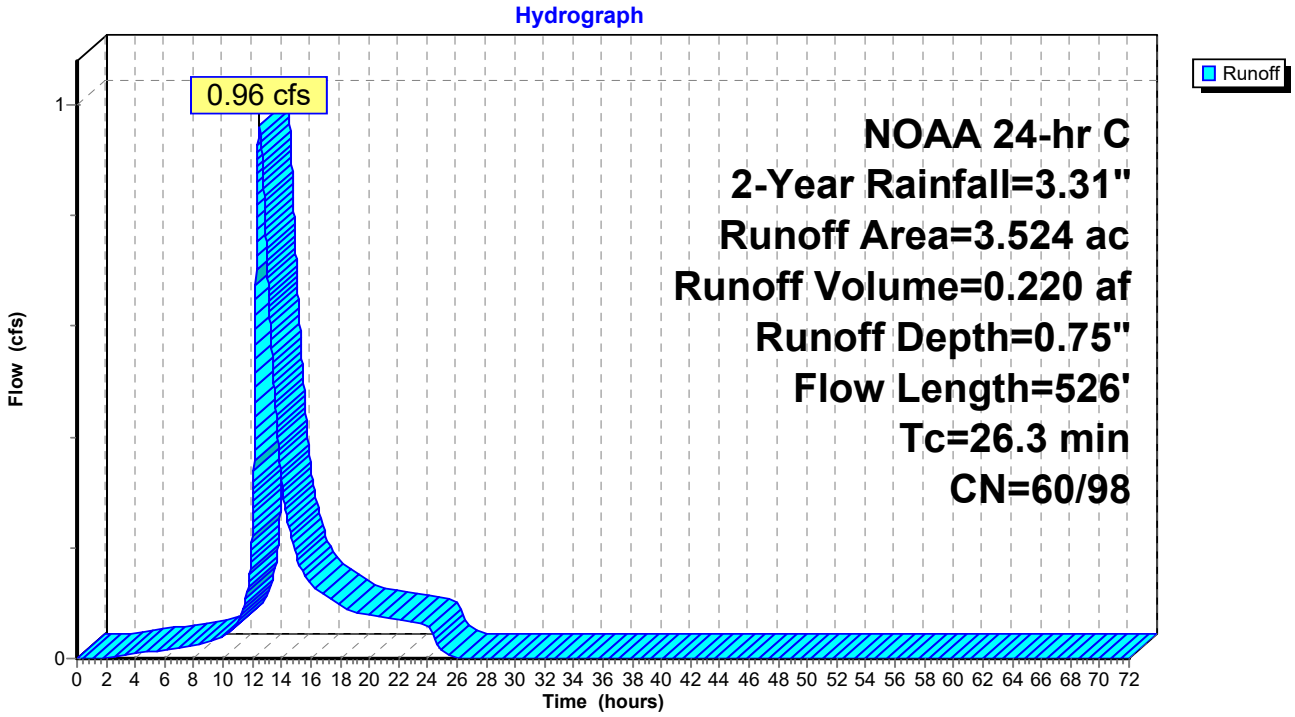
Runoff = 0.96 cfs @ 12.50 hrs, Volume= 0.220 af, Depth= 0.75"
Routed to nonexistent node EDA 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.689	55	Woods, Good, HSG B
2.435	61	>75% Grass cover, Good, HSG B
0.400	98	Paved parking, HSG B
3.524	64	Weighted Average
3.124	60	88.65% Pervious Area
0.400	98	11.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	18	0.0360	0.16		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
9.2	31	0.0150	0.06		**Sheet Flow, BC** Woods: Light underbrush n= 0.400 P2= 3.35"
1.6	59	0.0160	0.63		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
0.1	9	0.0570	1.19		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.4	71	0.0050	0.49		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
11.1	331	0.0050	0.49		**Shallow Concentrated Flow, FG** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0210	2.94		**Shallow Concentrated Flow, HI** Paved Kv= 20.3 fps
26.3	526	Total			

Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1



Summary for Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD

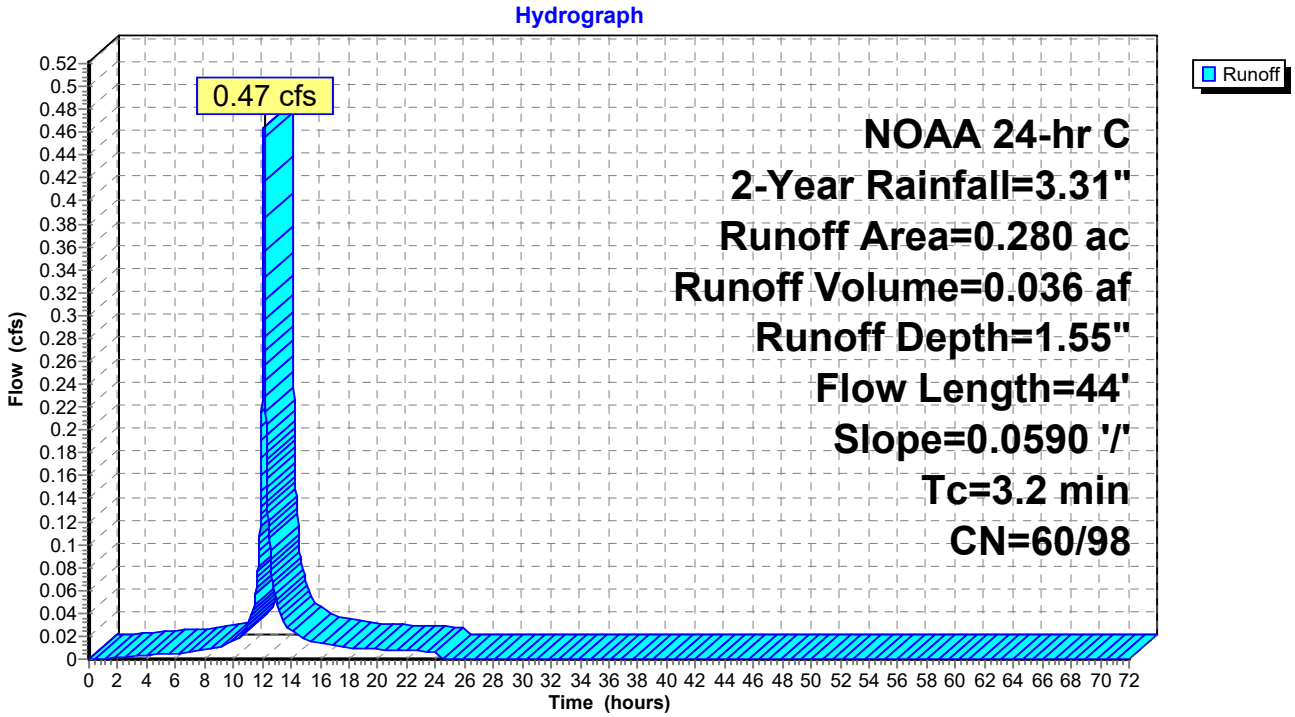
Runoff = 0.47 cfs @ 12.12 hrs, Volume= 0.036 af, Depth= 1.55"
Routed to nonexistent node EDA 3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.014	55	Woods, Good, HSG B
0.149	61	>75% Grass cover, Good, HSG B
0.117	98	Paved parking, HSG B
0.280	76	Weighted Average
0.163	60	58.21% Pervious Area
0.117	98	41.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	44	0.0590	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"

Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD



Summary for Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

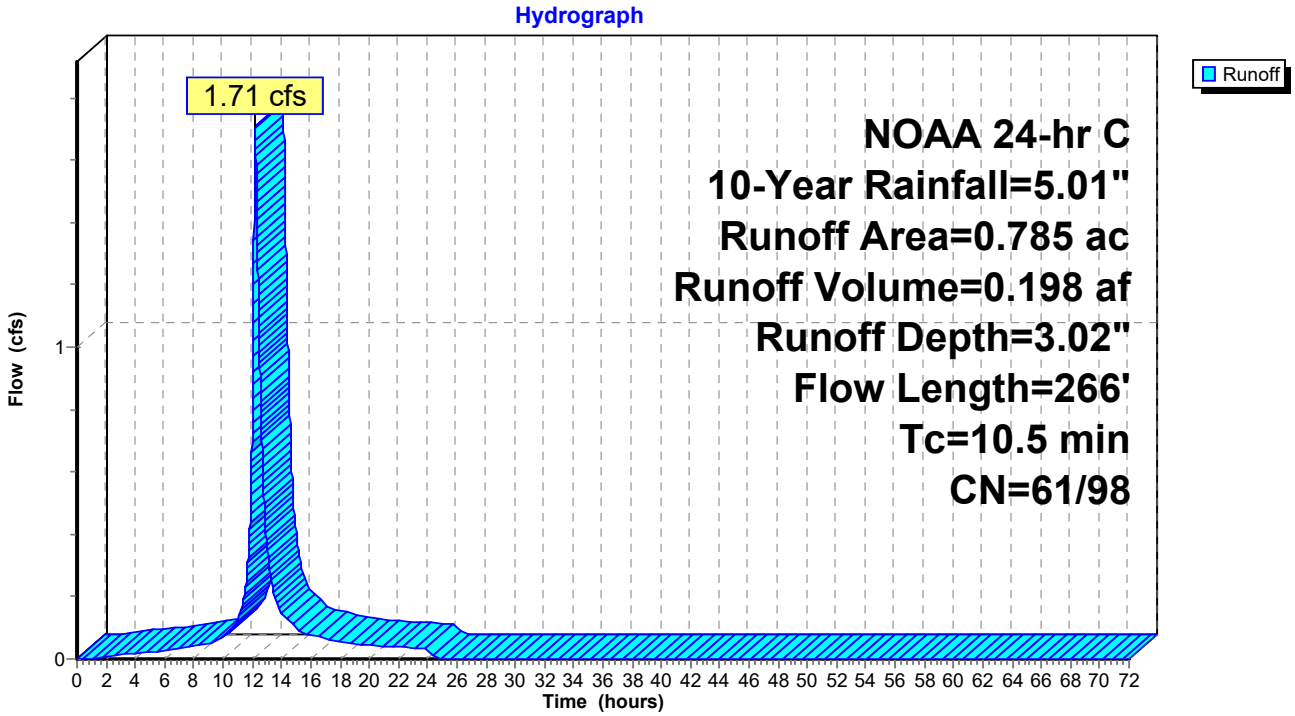
Runoff = 1.71 cfs @ 12.20 hrs, Volume= 0.198 af, Depth= 3.02"
Routed to nonexistent node EDA 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.020	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
0.380	98	Paved parking, HSG B
0.785	79	Weighted Average
0.405	61	51.59% Pervious Area
0.380	98	48.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	23	0.0120	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.35"
0.1	6	0.0130	0.80		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	237	0.0060	1.57		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
10.5	266	Total			

Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



Summary for Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1

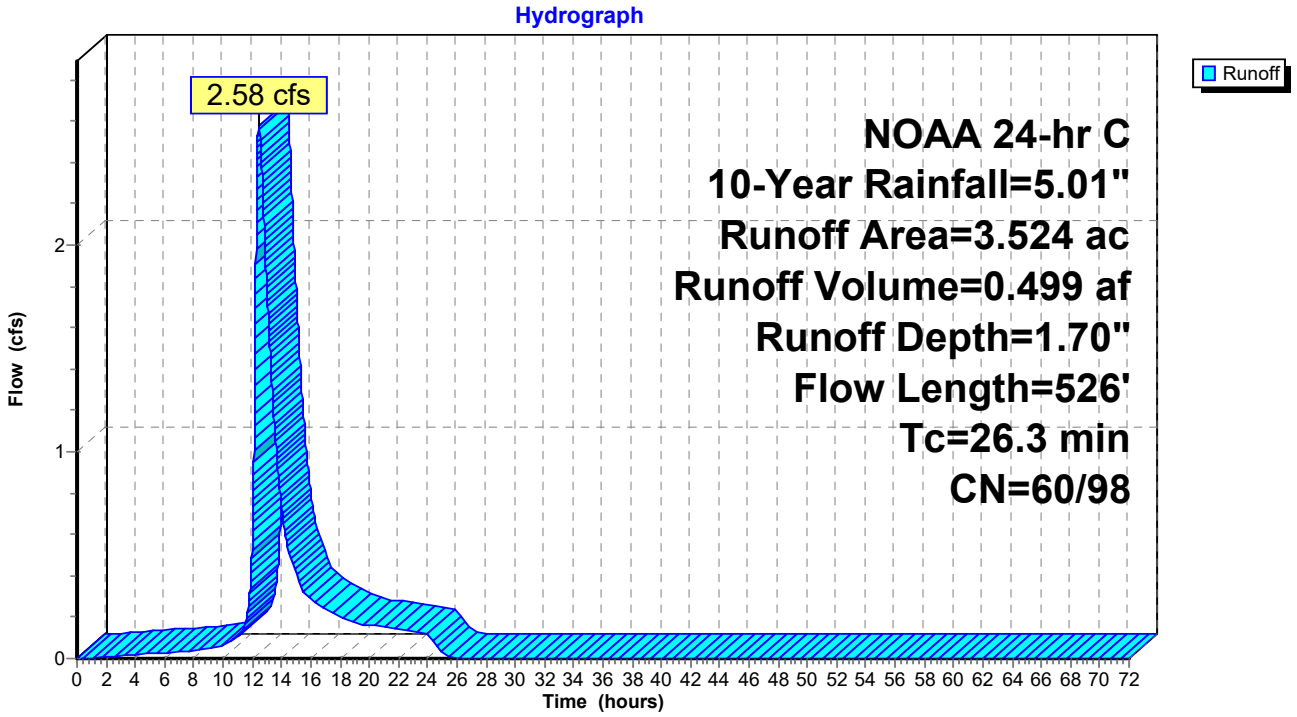
Runoff = 2.58 cfs @ 12.45 hrs, Volume= 0.499 af, Depth= 1.70"
Routed to nonexistent node EDA 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.689	55	Woods, Good, HSG B
2.435	61	>75% Grass cover, Good, HSG B
0.400	98	Paved parking, HSG B
3.524	64	Weighted Average
3.124	60	88.65% Pervious Area
0.400	98	11.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	18	0.0360	0.16		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
9.2	31	0.0150	0.06		**Sheet Flow, BC** Woods: Light underbrush n= 0.400 P2= 3.35"
1.6	59	0.0160	0.63		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
0.1	9	0.0570	1.19		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.4	71	0.0050	0.49		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
11.1	331	0.0050	0.49		**Shallow Concentrated Flow, FG** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0210	2.94		**Shallow Concentrated Flow, HI** Paved Kv= 20.3 fps
26.3	526	Total			

Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1



Summary for Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD

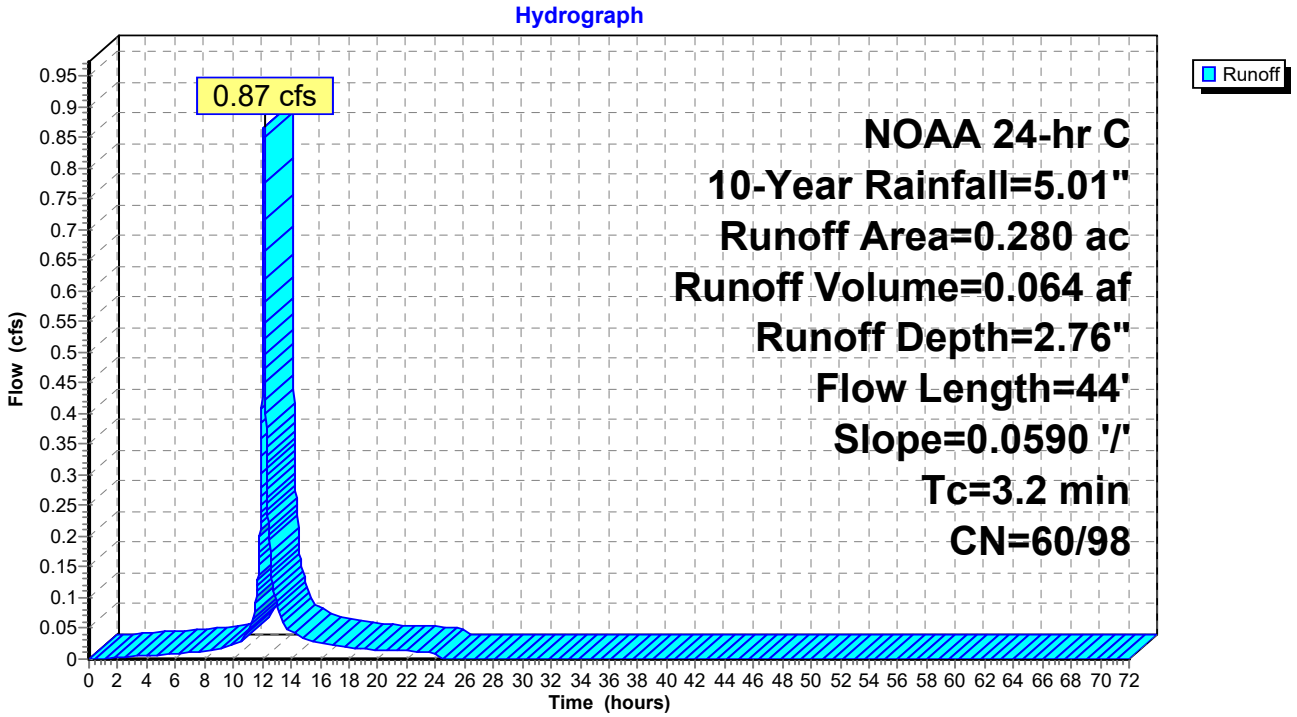
Runoff = 0.87 cfs @ 12.12 hrs, Volume= 0.064 af, Depth= 2.76"
Routed to nonexistent node EDA 3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.014	55	Woods, Good, HSG B
0.149	61	>75% Grass cover, Good, HSG B
0.117	98	Paved parking, HSG B
0.280	76	Weighted Average
0.163	60	58.21% Pervious Area
0.117	98	41.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	44	0.0590	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"

Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD



Summary for Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

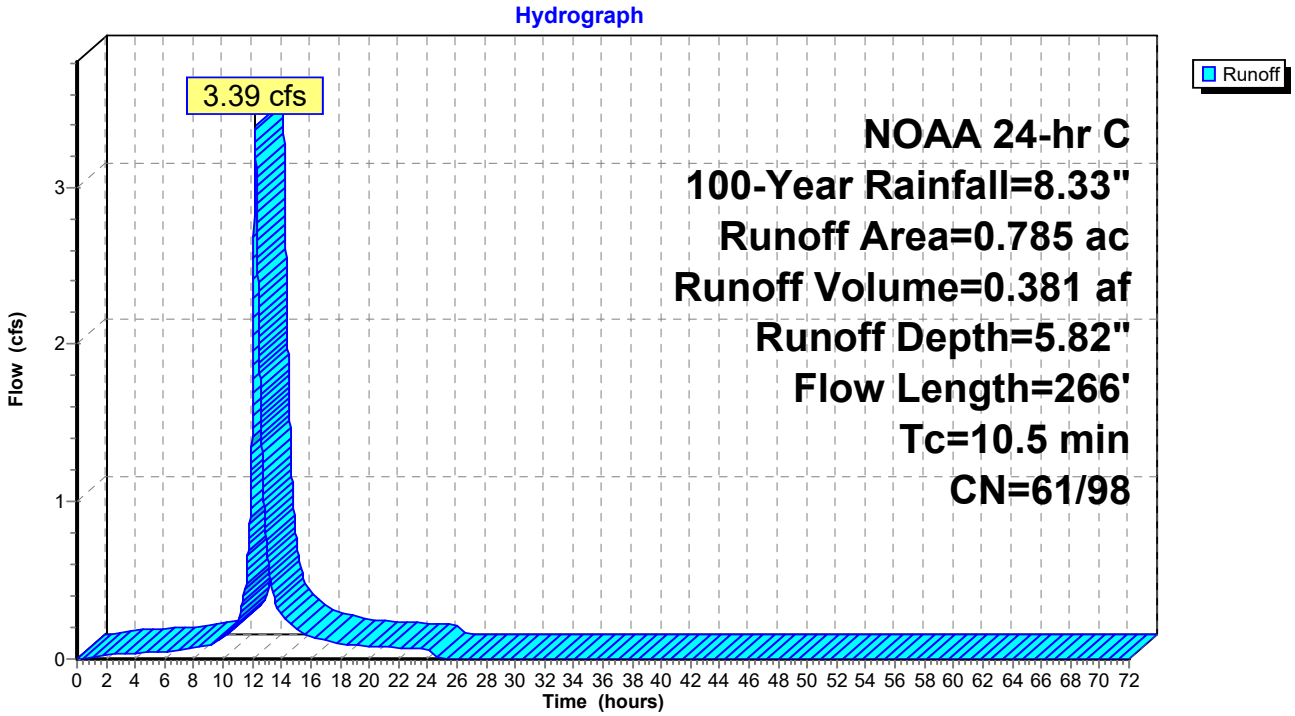
Runoff = 3.39 cfs @ 12.20 hrs, Volume= 0.381 af, Depth= 5.82"
Routed to nonexistent node EDA 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.020	55	Woods, Good, HSG B
0.385	61	>75% Grass cover, Good, HSG B
0.380	98	Paved parking, HSG B
0.785	79	Weighted Average
0.405	61	51.59% Pervious Area
0.380	98	48.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	23	0.0120	0.05		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.35"
0.1	6	0.0130	0.80		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	237	0.0060	1.57		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
10.5	266	Total			

Subcatchment E1: TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



Summary for Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1

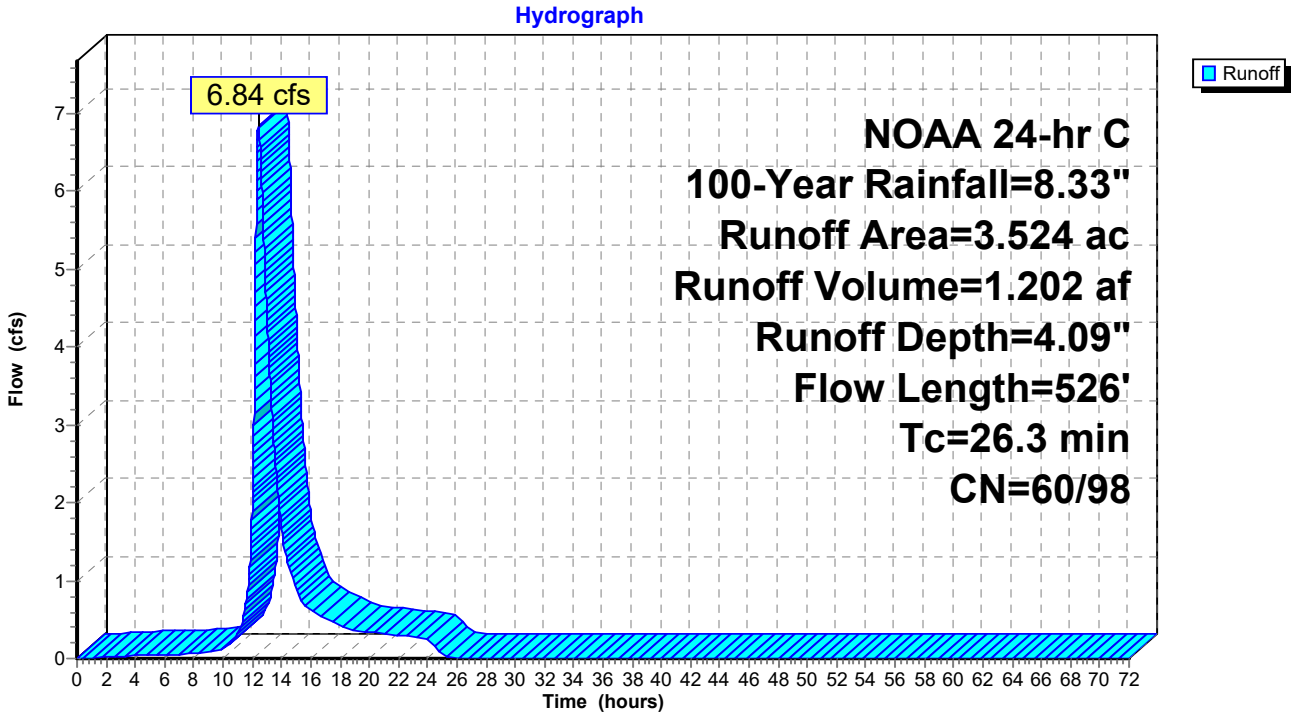
Runoff = 6.84 cfs @ 12.40 hrs, Volume= 1.202 af, Depth= 4.09"
Routed to nonexistent node EDA 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.689	55	Woods, Good, HSG B
2.435	61	>75% Grass cover, Good, HSG B
0.400	98	Paved parking, HSG B
3.524	64	Weighted Average
3.124	60	88.65% Pervious Area
0.400	98	11.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	18	0.0360	0.16		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
9.2	31	0.0150	0.06		**Sheet Flow, BC** Woods: Light underbrush n= 0.400 P2= 3.35"
1.6	59	0.0160	0.63		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
0.1	9	0.0570	1.19		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.4	71	0.0050	0.49		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
11.1	331	0.0050	0.49		**Shallow Concentrated Flow, FG** Short Grass Pasture Kv= 7.0 fps
0.0	7	0.0210	2.94		**Shallow Concentrated Flow, HI** Paved Kv= 20.3 fps
26.3	526	Total			

Subcatchment E2: TRIBUTARY TO BLOCK 21.27, LOT 1



Summary for Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD

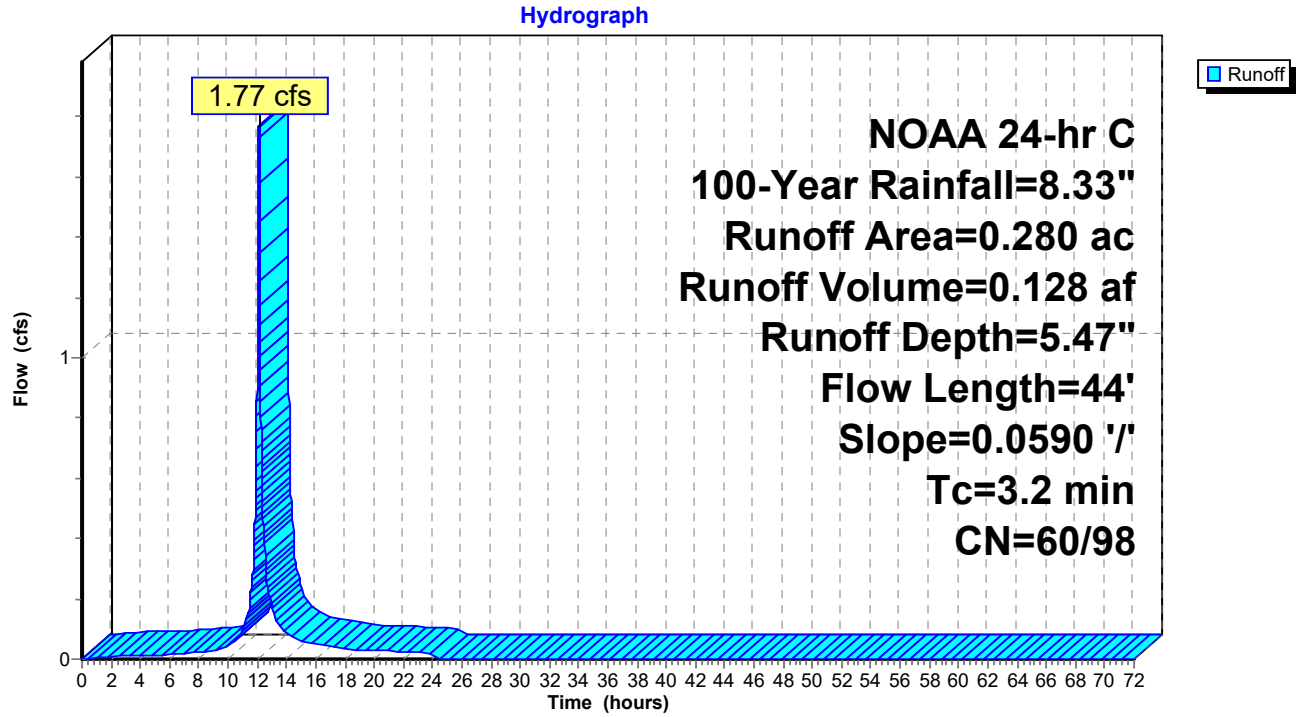
Runoff = 1.77 cfs @ 12.11 hrs, Volume= 0.128 af, Depth= 5.47"
Routed to nonexistent node EDA 3

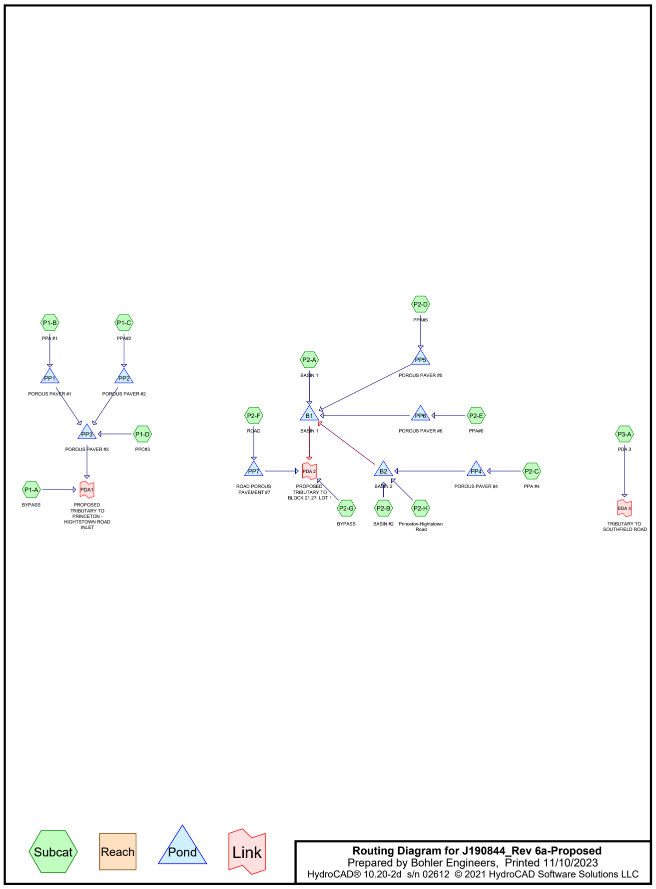
Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.014	55	Woods, Good, HSG B
0.149	61	>75% Grass cover, Good, HSG B
0.117	98	Paved parking, HSG B
0.280	76	Weighted Average
0.163	60	58.21% Pervious Area
0.117	98	41.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	44	0.0590	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"

Subcatchment E3: TRIBUTARY TO SOUTHFIELD ROAD





Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.043	79	<50% Grass cover, Poor, HSG B (P2-B)
1.582	61	>75% Grass cover, Good, HSG B (P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-G, P2-H, P3-A)
2.659	98	Paved parking, HSG B (P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-H, P3-A)
0.297	98	Roofs, HSG B (P2-B)
0.008	55	Woods, Good, HSG B (P2-G)
4.589	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.589	HSG B	P1-A, P1-B, P1-C, P1-D, P2-A, P2-B, P2-C, P2-D, P2-E, P2-F, P2-G, P2-H, P3-A
0.000	HSG C	
0.000	HSG D	
0.000	Other	
4.589		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.043	0.000	0.000	0.000	0.043	<50% Grass cover, Poor	P2-B
0.000	1.582	0.000	0.000	0.000	1.582	>75% Grass cover, Good	P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-G, P2-H, P3-A
0.000	2.659	0.000	0.000	0.000	2.659	Paved parking	P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-H, P3-A
0.000	0.297	0.000	0.000	0.000	0.297	Roofs	P2-B
0.000	0.008	0.000	0.000	0.000	0.008	Woods, Good	P2-G
0.000	**4.589**	**0.000**	**0.000**	**0.000**	**4.589**	**TOTAL AREA**	

Summary for Subcatchment P1-A: BYPASS

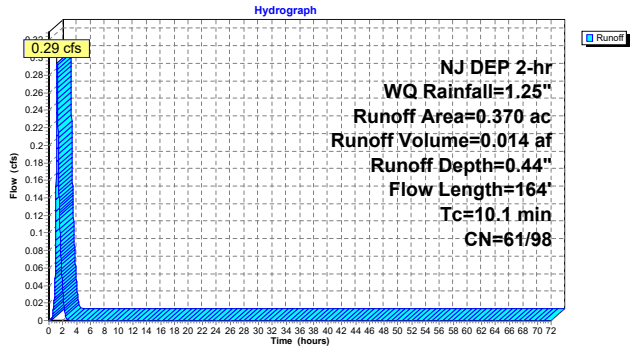
Runoff = 0.29 cfs @ 1.17 hrs, Volume= 0.014 af, Depth= 0.44"
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.212	61	>75% Grass cover, Good, HSG B
0.158	98	Paved parking, HSG B
0.370	77	Weighted Average
0.212	61	57.30% Pervious Area
0.158	98	42.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	9	0.0560	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.6	8	0.1200	0.22		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.35"
3.6	35	0.0280	0.16		**Sheet Flow, C-D** Grass: Short n= 0.150 P2= 3.35"
3.2	17	0.0090	0.09		**Sheet Flow, D-E** Grass: Short n= 0.150 P2= 3.35"
0.3	11	0.0075	0.61		**Sheet Flow, E-F** Smooth surfaces n= 0.011 P2= 3.35"
0.9	7	0.0380	0.13		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 3.35"
0.6	77	0.0110	2.13		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
10.1	164	Total			

Subcatchment P1-A: BYPASS



Summary for Subcatchment P1-B: PPA #1

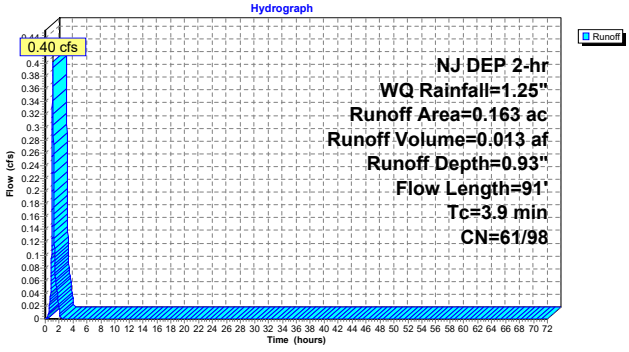
Runoff = 0.40 cfs @ 1.10 hrs, Volume= 0.013 af, Depth= 0.93"
Routed to Pond PP1 : POROUS PAVER #1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.147	98	Paved parking, HSG B
0.016	61	>75% Grass cover, Good, HSG B
0.163	94	Weighted Average
0.016	61	9.82% Pervious Area
0.147	98	90.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	27	0.0200	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.5	64	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
3.9	91	Total			

Subcatchment P1-B: PPA #1



Summary for Subcatchment P1-C: PPA#2

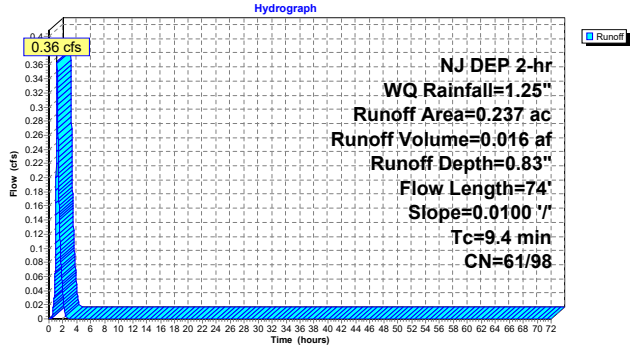
Runoff = 0.36 cfs @ 1.16 hrs, Volume= 0.016 af, Depth= 0.83"
Routed to Pond PP2 : POROUS PAVER #2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.189	98	Paved parking, HSG B
0.048	61	>75% Grass cover, Good, HSG B
0.237	91	Weighted Average
0.048	61	20.25% Pervious Area
0.189	98	79.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.2	7	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.4	74	Total			

Subcatchment P1-C: PPA#2



Summary for Subcatchment P1-D: PPC#3

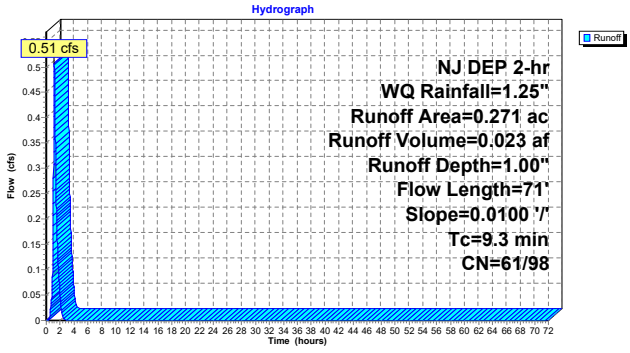
Runoff = 0.51 cfs @ 1.16 hrs, Volume= 0.023 af, Depth= 1.00"
Routed to Pond PP3 : POROUS PAVER #3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.009	61	>75% Grass cover, Good, HSG B
0.262	98	Paved parking, HSG B
0.271	97	Weighted Average
0.009	61	3.32% Pervious Area
0.262	98	96.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.1	4	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
9.3	71	Total			

Subcatchment P1-D: PPC#3



Summary for Subcatchment P2-A: BASIN 1

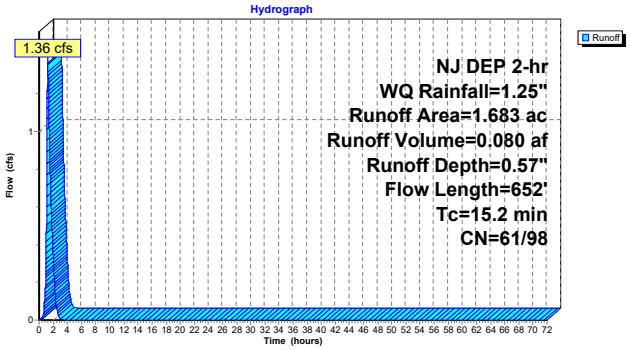
Runoff = 1.36 cfs @ 1.24 hrs, Volume= 0.080 af, Depth= 0.57"
Routed to Pond B1 : BASIN 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.928	98	Paved parking, HSG B
0.755	61	>75% Grass cover, Good, HSG B
1.683	81	Weighted Average
0.755	61	44.86% Pervious Area
0.928	98	55.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
3.5	148	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	437	0.0030	2.88	3.54	**Pipe Channel, CD** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
15.2	652	Total			

Subcatchment P2-A: BASIN 1



Summary for Subcatchment P2-B: BASIN #2

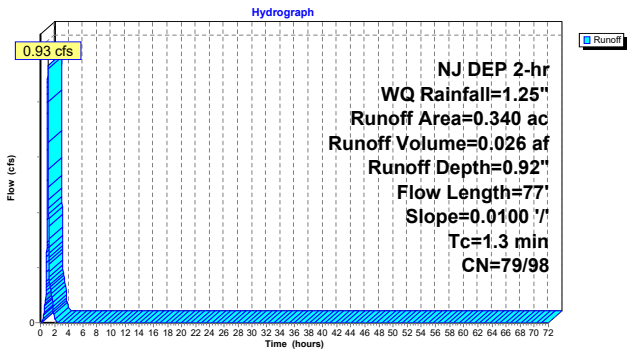
Runoff = 0.93 cfs @ 1.08 hrs, Volume= 0.026 af, Depth= 0.92"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.297	98	Roofs, HSG B
0.043	79	<50% Grass cover, Poor, HSG B
0.340	96	Weighted Average
0.043	79	12.65% Pervious Area
0.297	98	87.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	77	0.0100	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-B: BASIN #2



Summary for Subcatchment P2-C: PPA #4

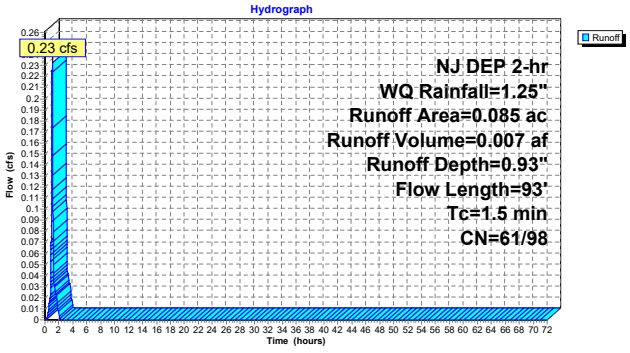
Runoff = 0.23 cfs @ 1.08 hrs, Volume= 0.007 af, Depth= 0.93"
Routed to Pond PP4 : POROUS PAVER #4

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.076	98	Paved parking, HSG B
0.009	61	>75% Grass cover, Good, HSG B
0.085	94	Weighted Average
0.009	61	10.59% Pervious Area
0.076	98	89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	67	0.0160	1.19		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
0.6	26	0.0075	0.73		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
1.5	93	Total			

Subcatchment P2-C: PPA #4



Summary for Subcatchment P2-D: PPA#5

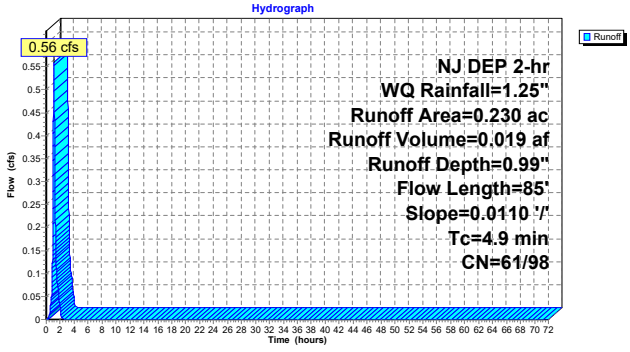
Runoff = 0.56 cfs @ 1.11 hrs, Volume= 0.019 af, Depth= 0.99"
Routed to Pond PP5 : POROUS PAVER #5

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.219	98	Paved parking, HSG B
0.011	61	>75% Grass cover, Good, HSG B
0.230	96	Weighted Average
0.011	61	4.78% Pervious Area
0.219	98	95.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	24	0.0110	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
1.0	61	0.0110	1.00		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
4.9	85	Total			

Subcatchment P2-D: PPA#5



Summary for Subcatchment P2-E: PPA#6

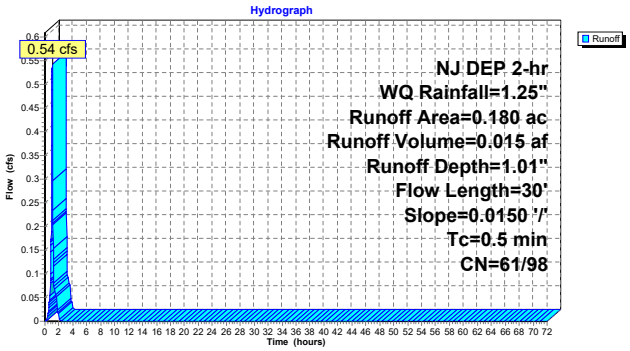
Runoff = 0.54 cfs @ 1.08 hrs, Volume= 0.015 af, Depth= 1.01"
Routed to Pond PP6 : POROUS PAVER #6

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.176	98	Paved parking, HSG B
0.004	61	>75% Grass cover, Good, HSG B
0.180	97	Weighted Average
0.004	61	2.22% Pervious Area
0.176	98	97.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-E: PPA#6



Summary for Subcatchment P2-F: ROAD

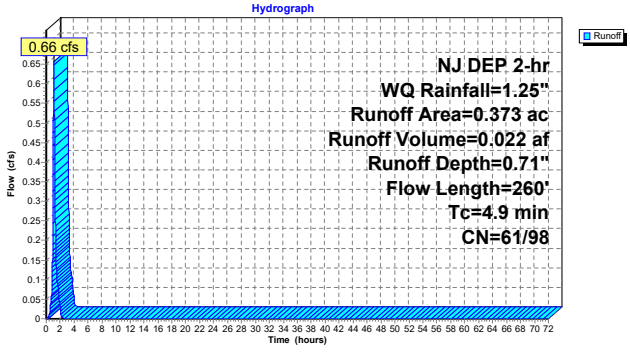
Runoff = 0.66 cfs @ 1.11 hrs, Volume= 0.022 af, Depth= 0.71"
Routed to Pond PP7 : ROAD POROUS PAVEMENT #7

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.257	98	Paved parking, HSG B
0.116	61	>75% Grass cover, Good, HSG B
0.373	86	Weighted Average
0.116	61	31.10% Pervious Area
0.257	98	68.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0250	1.12		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
2.3	31	0.0700	0.23		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
0.3	22	0.0400	1.37		**Sheet Flow, CD** Smooth surfaces n= 0.011 P2= 3.35"
2.0	187	0.0060	1.57		**Shallow Concentrated Flow, DE** Paved Kv= 20.3 fps
4.9	260	Total			

Subcatchment P2-F: ROAD



Summary for Subcatchment P2-G: BYPASS

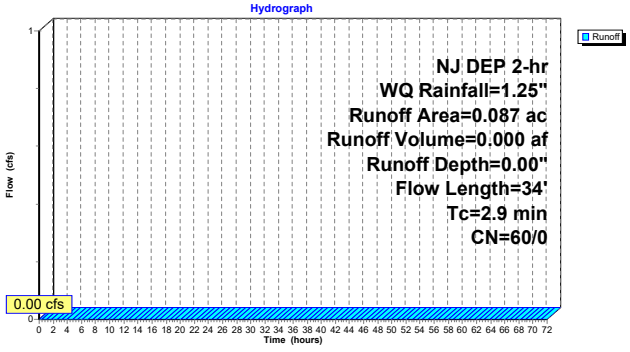
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.079	61	>75% Grass cover, Good, HSG B
0.000	98	Paved parking, HSG B
0.008	55	Woods, Good, HSG B
0.087	60	Weighted Average
0.087	60	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	12	0.1100	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
0.4	7	0.2900	0.30		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
1.6	15	0.0400	0.16		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
2.9	34	Total			

Subcatchment P2-G: BYPASS



Summary for Subcatchment P2-H: Princeton-Hightstown Road

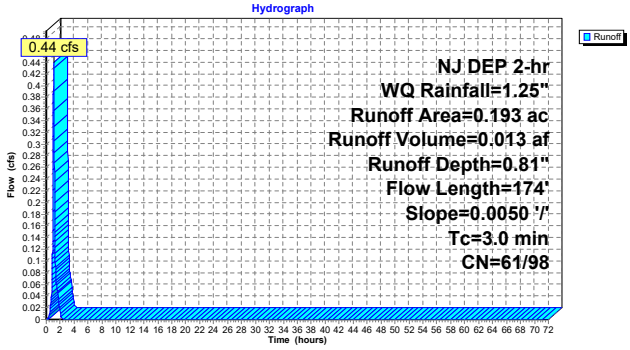
Runoff = 0.44 cfs @ 1.09 hrs, Volume= 0.013 af, Depth= 0.81"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.041	61	>75% Grass cover, Good, HSG B
0.152	98	Paved parking, HSG B
0.193	90	Weighted Average
0.041	61	21.24% Pervious Area
0.152	98	78.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	100	0.0050	0.81		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.35"
0.9	74	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	174	Total			

Subcatchment P2-H: Princeton-Hightstown Road



Summary for Subcatchment P3-A: PDA 3

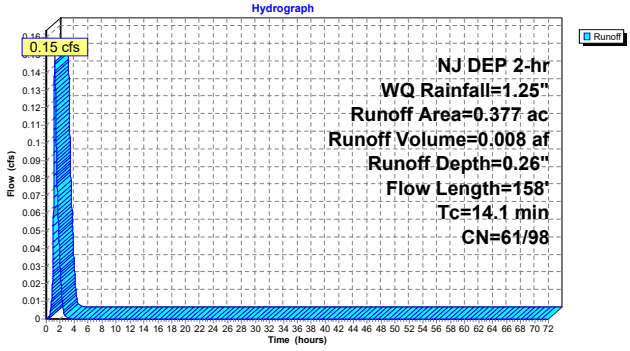
Runoff = 0.15 cfs @ 1.22 hrs, Volume= 0.008 af, Depth= 0.26"
Routed to Link EDA 3 : TRIBUTARY TO SOUTHFIELD ROAD

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Rainfall=1.25"

Area (ac)	CN	Description
0.282	61	>75% Grass cover, Good, HSG B
0.095	98	Paved parking, HSG B
0.377	70	Weighted Average
0.282	61	74.80% Pervious Area
0.095	98	25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	7	0.1800	0.25		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
4.6	40	0.0200	0.14		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
7.6	53	0.0100	0.12		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
0.5	27	0.0170	0.91		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.9	31	0.0070	0.59		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
14.1	158	Total			

Subcatchment P3-A: PDA 3



Summary for Pond B1: BASIN 1

Inflow Area = 2.711 ac, 68.17% Impervious, Inflow Depth > 0.45" for WQ event
Inflow = 1.39 cfs @ 1.25 hrs, Volume= 0.102 af
Outflow = 0.36 cfs @ 2.04 hrs, Volume= 0.102 af, Atten= 74%, Lag= 47.4 min
Primary = 0.36 cfs @ 2.04 hrs, Volume= 0.102 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 91.64' @ 2.04 hrs Surf.Area= 0.117 ac Storage= 0.043 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 43.8 min (271.3 - 227.5)

Volume	Invert	Avail.Storage	Storage Description
#1	91.25'	0.617 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

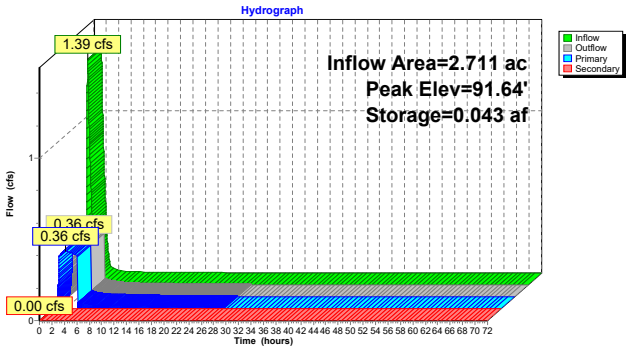
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
91.25	0.105	398.0	0.000	0.000	0.105
92.00	0.128	423.0	0.087	0.087	0.143
93.00	0.160	437.0	0.144	0.231	0.167
94.00	0.193	452.0	0.176	0.407	0.194
95.00	0.227	466.0	0.210	0.617	0.219

Device	Routing	Invert	Outlet Devices
#1	Primary	89.25'	**15.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 89.25' / 89.09' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	89.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	93.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	94.13'	**105.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

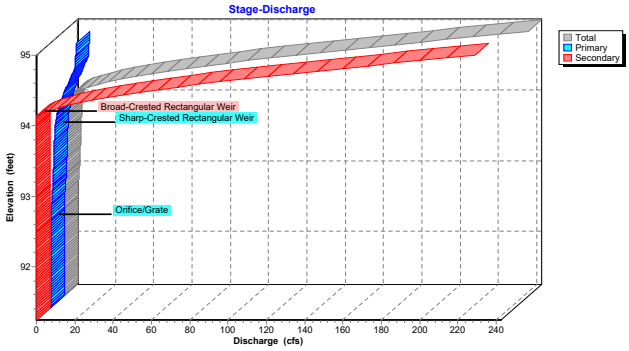
Primary OutFlow Max=0.36 cfs @ 2.04 hrs HW=91.64' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.36 cfs of 7.18 cfs potential flow)
  - **2=Underdrain** (Orifice Controls 0.36 cfs @ 7.24 fps)
  - **3=Orifice/Grate** (Controls 0.00 cfs)
  - **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.25' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B1: BASIN 1



Pond B1: BASIN 1



Summary for Pond B2: BASIN 2

Inflow Area = 0.618 ac, 84.95% Impervious, Inflow Depth = 0.89" for WQ event
Inflow = 1.40 cfs @ 1.08 hrs, Volume= 0.046 af
Outflow = 0.06 cfs @ 0.82 hrs, Volume= 0.046 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.06 cfs @ 0.82 hrs, Volume= 0.046 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.17' @ 1.85 hrs Surf.Area= 0.034 ac Storage= 0.033 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 204.5 min (303.0 - 98.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.20'	0.109 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

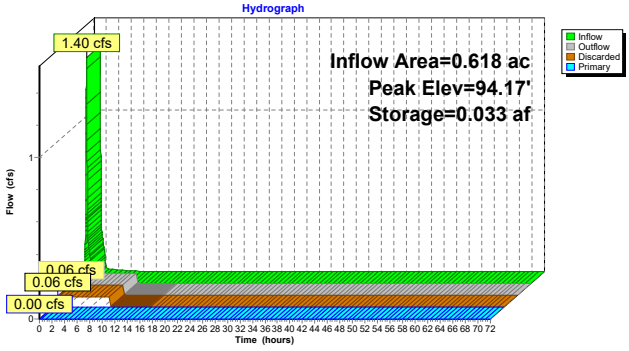
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
93.20	0.034	0.000	0.000
94.20	0.034	0.034	0.034
96.40	0.034	0.075	0.109

Device	Routing	Invert	Outlet Devices
#1	Primary	92.20'	**24.0" Round Culvert** L= 66.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.20' / 92.18' S= 0.0003 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Discarded	93.20'	**3.600 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	94.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	95.05'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	95.55'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 in 48.0" x 48.0" Grate (100% open area) Limited to weir flow at low heads

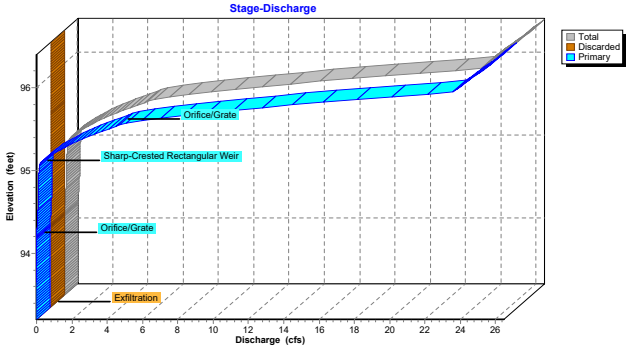
Discarded OutFlow Max=0.06 cfs @ 0.82 hrs HW=93.23' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.20' TW=91.25' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.00 cfs of 2.97 cfs potential flow)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond B2: BASIN 2



Pond B2: BASIN 2



Summary for Pond PP1: POROUS PAVER #1

Inflow Area = 0.163 ac, 90.18% Impervious, Inflow Depth = 0.93" for WQ event
Inflow = 0.40 cfs @ 1.10 hrs, Volume= 0.013 af
Outflow = 0.21 cfs @ 1.22 hrs, Volume= 0.013 af, Atten= 48%, Lag= 7.2 min
Primary = 0.21 cfs @ 1.22 hrs, Volume= 0.013 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 92.49' @ 2.43 hrs Surf.Area= 0.041 ac Storage= 0.006 af

Plug-Flow detention time= 142.1 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 142.5 min (213.2 - 70.7)

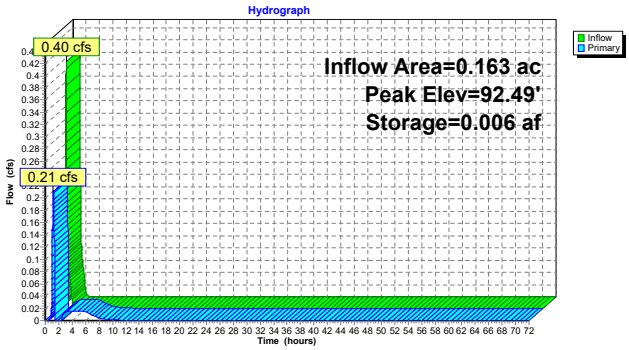
Volume	Invert	Avail.Storage	Storage Description
#1	92.10'	0.035 af	**Custom Stage Data (Irregular)**Listed below (Recalc) 0.087 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.10	0.041	243.4	0.000	0.000	0.041
94.23	0.041	243.4	0.087	0.087	0.053

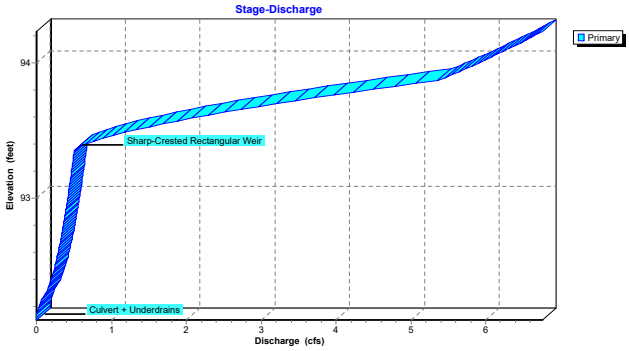
Device	Routing	Invert	Outlet Devices
#1	Primary	92.10'	**15.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.10' / 92.00' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.10'	**3.0" Vert. Underdrains X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	93.35'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.21 cfs @ 1.22 hrs HW=92.42' TW=92.18' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.21 cfs of 0.32 cfs potential flow)
  └**2=Underdrains** (Orifice Controls 0.21 cfs @ 2.14 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP1: POROUS PAVER #1



Pond PP1: POROUS PAVER #1



Summary for Pond PP2: POROUS PAVER #2

Inflow Area = 0.237 ac, 79.75% Impervious, Inflow Depth = 0.83" for WQ event
Inflow = 0.36 cfs @ 1.16 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 1.37 hrs, Volume= 0.016 af, Atten= 42%, Lag= 12.7 min
Primary = 0.21 cfs @ 1.37 hrs, Volume= 0.016 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 93.21' @ 1.37 hrs Surf.Area= 0.052 ac Storage= 0.007 af

Plug-Flow detention time= 48.4 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 48.3 min (127.5 - 79.2)

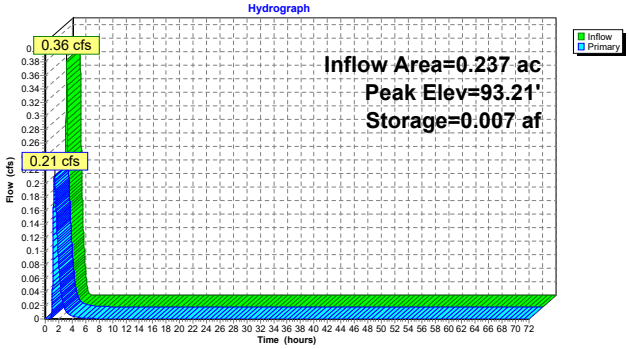
Volume	Invert	Avail.Storage	Storage Description
#1	92.90'	0.040 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.099 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.90	0.052	298.0	0.000	0.000	0.052
94.80	0.052	298.0	0.099	0.099	0.065

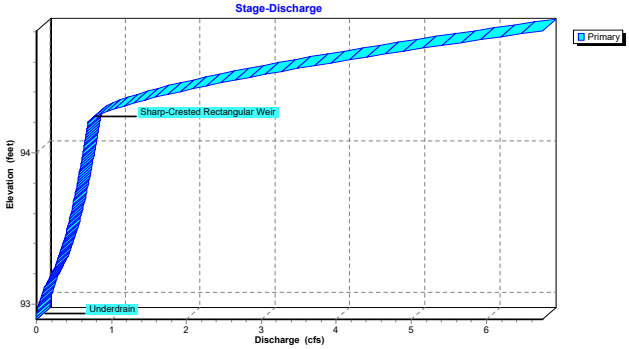
Device	Routing	Invert	Outlet Devices
#1	Primary	92.80'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.80' / 92.41' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.90'	**5.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.21 cfs @ 1.37 hrs HW=93.21' TW=92.32' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.21 cfs of 0.73 cfs potential flow)
└─**2=Underdrain** (Orifice Controls 0.21 cfs @ 1.91 fps)
└─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP2: POROUS PAVER #2



Pond PP2: POROUS PAVER #2



Summary for Pond PP3: POROUS PAVER #3

Inflow Area = 0.671 ac, 89.12% Impervious, Inflow Depth = 0.92" for WQ event
Inflow = 0.84 cfs @ 1.20 hrs, Volume= 0.052 af
Outflow = 0.08 cfs @ 1.04 hrs, Volume= 0.052 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.08 cfs @ 1.04 hrs, Volume= 0.052 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 92.51' @ 2.19 hrs Surf.Area= 0.157 ac Storage= 0.032 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 157.5 min (284.8 - 127.3)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	0.163 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.408 af Overall x 40.0% Voids

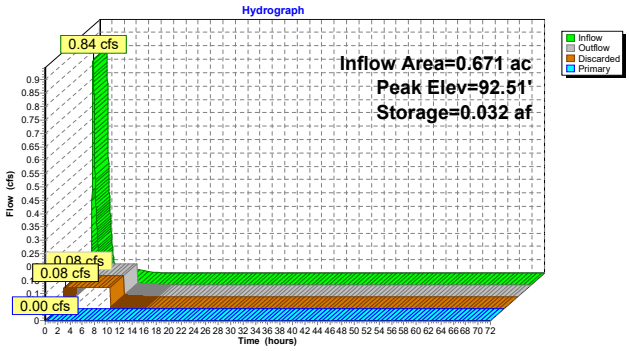
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
92.00	0.157	0.000	0.000
94.60	0.157	0.408	0.408

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**15.0" Round Culvert** L= 58.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.00' / 91.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Discarded	92.00'	**1.000 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	92.55'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	94.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

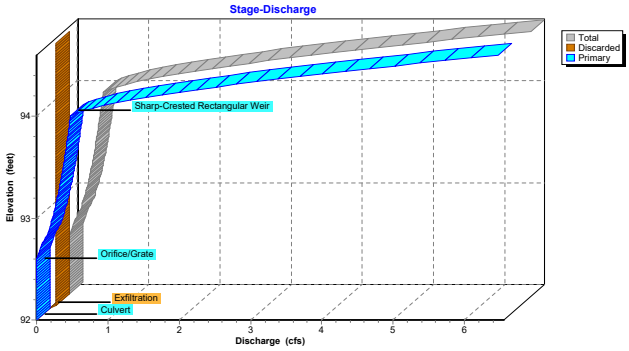
Discarded OutFlow Max=0.08 cfs @ 1.04 hrs HW=92.03' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=92.00' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)
└─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP3: POROUS PAVER #3



Pond PP3: POROUS PAVER #3



Summary for Pond PP4: POROUS PAVER #4

Inflow Area = 0.085 ac, 89.41% Impervious, Inflow Depth = 0.93" for WQ event
Inflow = 0.23 cfs @ 1.08 hrs, Volume= 0.007 af
Outflow = 0.04 cfs @ 1.15 hrs, Volume= 0.006 af, Atten= 83%, Lag= 4.5 min
Primary = 0.04 cfs @ 1.15 hrs, Volume= 0.006 af
Routed to Pond B2 : BASIN 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.18' @ 1.98 hrs Surf.Area= 0.027 ac Storage= 0.005 af

Plug-Flow detention time= 217.3 min calculated for 0.006 af (99% of inflow)
Center-of-Mass det. time= 217.4 min (284.4 - 67.0)

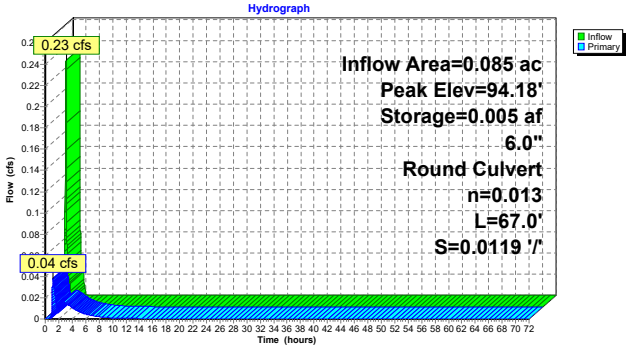
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.027 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.027	176.0	0.000	0.000	0.027
95.00	0.027	176.0	0.027	0.027	0.031

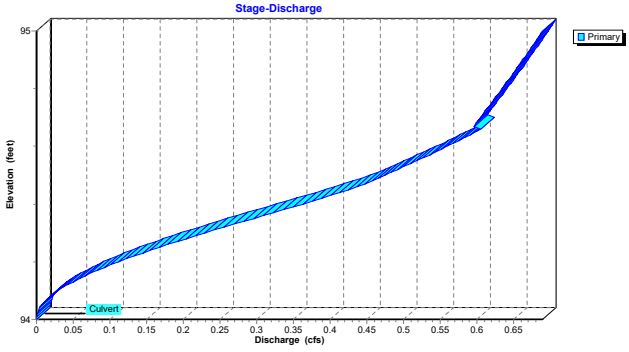
Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**6.0" Round Culvert** L= 67.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.20' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.20 sf

Primary OutFlow Max=0.04 cfs @ 1.15 hrs HW=94.15' TW=93.88' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.04 cfs @ 1.14 fps)

Pond PP4: POROUS PAVER #4



Pond PP4: POROUS PAVER #4



Summary for Pond PP5: POROUS PAVER #5

Inflow Area = 0.230 ac, 95.22% Impervious, Inflow Depth = 0.99" for WQ event
Inflow = 0.56 cfs @ 1.11 hrs, Volume= 0.019 af
Outflow = 0.05 cfs @ 1.82 hrs, Volume= 0.009 af, Atten= 91%, Lag= 42.6 min
Primary = 0.05 cfs @ 1.82 hrs, Volume= 0.009 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.43' @ 1.82 hrs Surf.Area= 0.094 ac Storage= 0.016 af

Plug-Flow detention time= 217.2 min calculated for 0.009 af (50% of inflow)
Center-of-Mass det. time= 204.8 min (277.1 - 72.2)

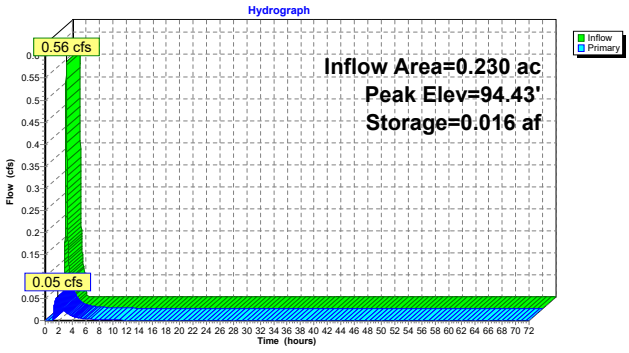
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.038 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.094 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.094	532.0	0.000	0.000	0.094
95.00	0.094	532.0	0.094	0.094	0.106

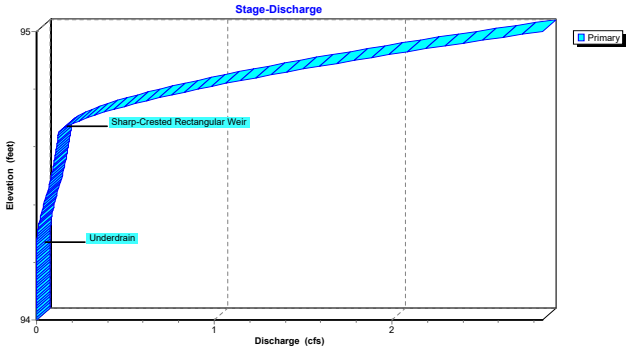
Device	Routing	Invert	Outlet Devices
#1	Primary	91.87'	**24.0" Round Culvert** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 91.87' / 91.69' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.65'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.05 cfs @ 1.82 hrs HW=94.43' TW=91.62' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.05 cfs of 15.40 cfs potential flow)
↑**2=Underdrain** (Orifice Controls 0.05 cfs @ 1.43 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP5: POROUS PAVER #5



Pond PP5: POROUS PAVER #5



Summary for Pond PP6: POROUS PAVER #6

Inflow Area = 0.180 ac, 97.78% Impervious, Inflow Depth = 1.01" for WQ event
Inflow = 0.54 cfs @ 1.08 hrs, Volume= 0.015 af
Outflow = 0.01 cfs @ 2.01 hrs, Volume= 0.013 af, Atten= 98%, Lag= 55.7 min
Primary = 0.01 cfs @ 2.01 hrs, Volume= 0.013 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.32' @ 2.01 hrs Surf.Area= 0.198 ac Storage= 0.014 af

Plug-Flow detention time= 1,013.7 min calculated for 0.013 af (83% of inflow)
Center-of-Mass det. time= 1,008.3 min (1,073.8 - 65.5)

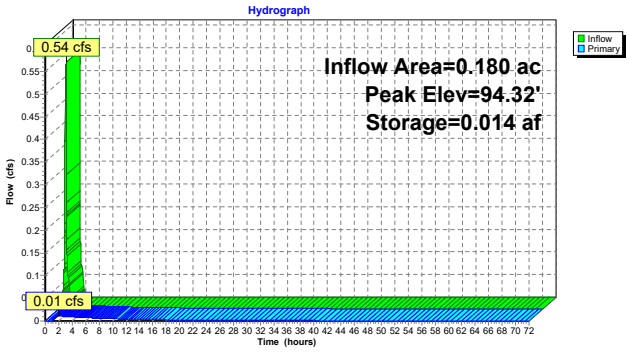
Volume	Invert	Avail.Storage	Storage Description
#1	94.25'	0.198 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.25	0.198	718.0	0.000	0.000	0.198
95.25	0.198	718.0	0.198	0.198	0.214

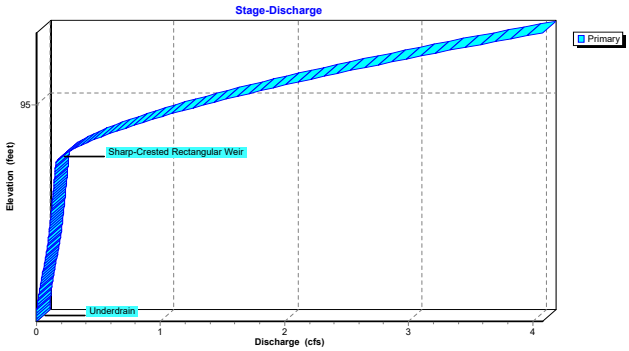
Device	Routing	Invert	Outlet Devices
#1	Primary	92.84'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.84' / 92.74' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.01 cfs @ 2.01 hrs HW=94.32' TW=91.64' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.01 cfs of 4.89 cfs potential flow)
↑—**2=Underdrain** (Orifice Controls 0.01 cfs @ 0.92 fps)
└—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP6: POROUS PAVER #6



Pond PP6: POROUS PAVER #6



Summary for Pond PP7: ROAD POROUS PAVEMENT #7

Inflow Area = 0.373 ac, 68.90% Impervious, Inflow Depth = 0.71" for WQ event
Inflow = 0.66 cfs @ 1.11 hrs, Volume= 0.022 af
Outflow = 0.03 cfs @ 1.95 hrs, Volume= 0.021 af, Atten= 95%, Lag= 50.4 min
Primary = 0.03 cfs @ 1.95 hrs, Volume= 0.021 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 89.65' @ 1.95 hrs Surf.Area= 0.133 ac Storage= 0.020 af

Plug-Flow detention time= 620.0 min calculated for 0.021 af (94% of inflow)
Center-of-Mass det. time= 617.2 min (689.4 - 72.2)

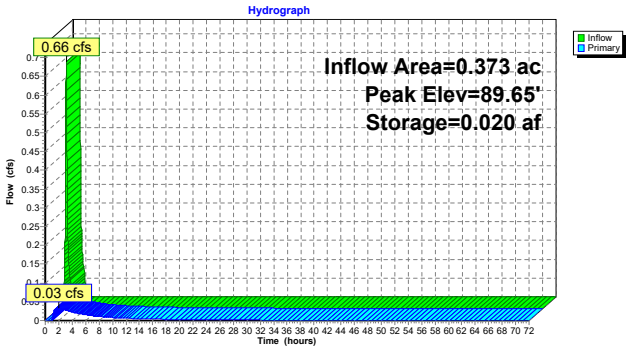
Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	0.133 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
89.50	0.133	832.0	0.000	0.000	0.133
90.50	0.133	832.0	0.133	0.133	0.152

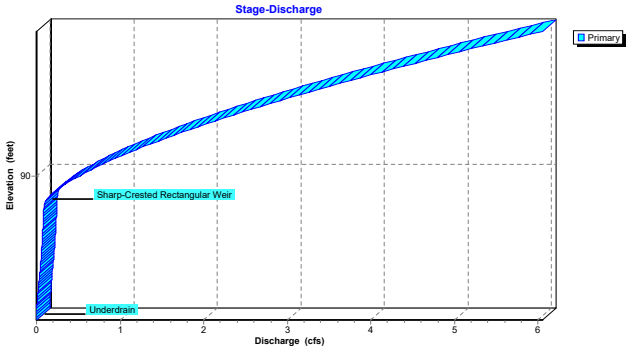
Device	Routing	Invert	Outlet Devices
#1	Primary	87.28'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 87.28' / 87.23' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	89.50'	**2.5" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	89.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.03 cfs @ 1.95 hrs HW=89.65' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.03 cfs of 7.80 cfs potential flow)
↑—**2=Underdrain** (Orifice Controls 0.03 cfs @ 1.31 fps)
└—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP7: ROAD POROUS PAVEMENT #7



Pond PP7: ROAD POROUS PAVEMENT #7

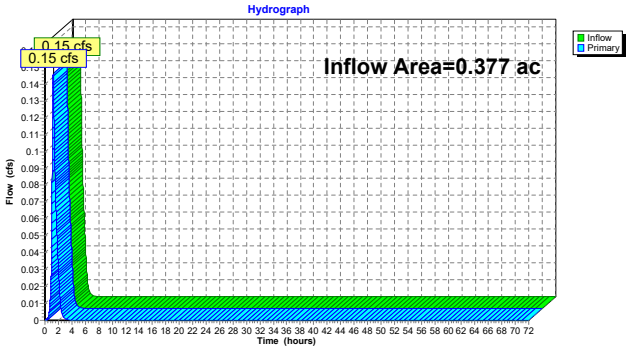


Summary for Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

Inflow Area = 0.377 ac, 25.20% Impervious, Inflow Depth = 0.26" for WQ event
Inflow = 0.15 cfs @ 1.22 hrs, Volume= 0.008 af
Primary = 0.15 cfs @ 1.22 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

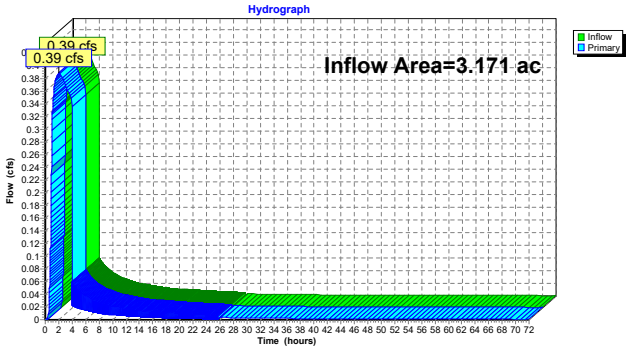


Summary for Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Inflow Area = 3.171 ac, 66.38% Impervious, Inflow Depth > 0.46" for WQ event
Inflow = 0.39 cfs @ 2.01 hrs, Volume= 0.123 af
Primary = 0.39 cfs @ 2.01 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

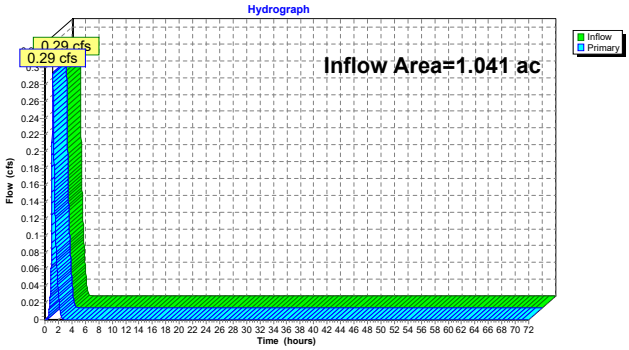


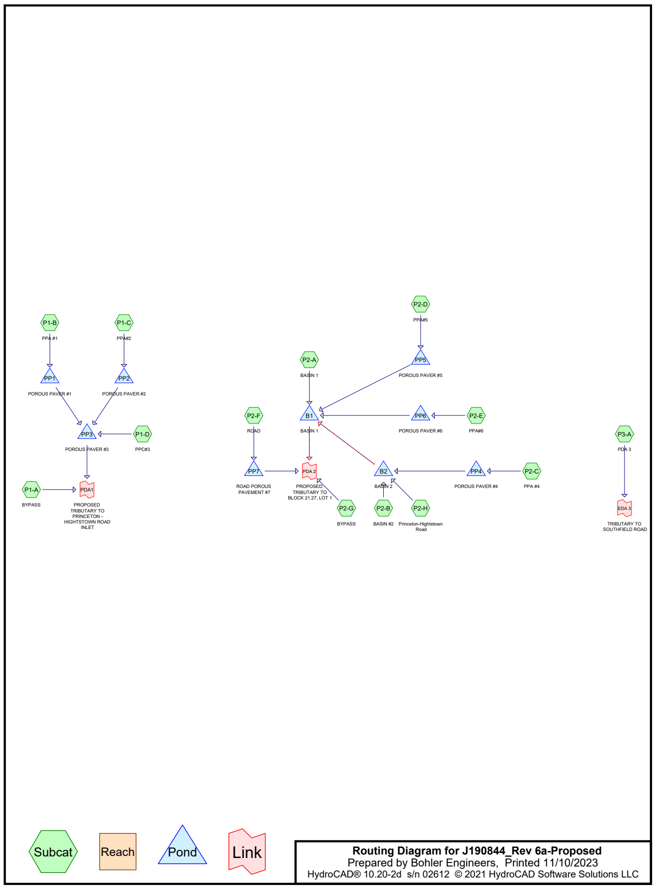
Summary for Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Inflow Area = 1.041 ac, 72.62% Impervious, Inflow Depth = 0.16" for WQ event
Inflow = 0.29 cfs @ 1.17 hrs, Volume= 0.014 af
Primary = 0.29 cfs @ 1.17 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET





Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.043	79	<50% Grass cover, Poor, HSG B (P2-B)
1.582	61	>75% Grass cover, Good, HSG B (P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-G, P2-H, P3-A)
2.659	98	Paved parking, HSG B (P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-H, P3-A)
0.297	98	Roofs, HSG B (P2-B)
0.008	55	Woods, Good, HSG B (P2-G)
4.589	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.589	HSG B	P1-A, P1-B, P1-C, P1-D, P2-A, P2-B, P2-C, P2-D, P2-E, P2-F, P2-G, P2-H, P3-A
0.000	HSG C	
0.000	HSG D	
0.000	Other	
4.589		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.043	0.000	0.000	0.000	0.043	<50% Grass cover, Poor	P2-B
0.000	1.582	0.000	0.000	0.000	1.582	>75% Grass cover, Good	P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-G, P2-H, P3-A
0.000	2.659	0.000	0.000	0.000	2.659	Paved parking	P1-A, P1-B, P1-C, P1-D, P2-A, P2-C, P2-D, P2-E, P2-F, P2-H, P3-A
0.000	0.297	0.000	0.000	0.000	0.297	Roofs	P2-B
0.000	0.008	0.000	0.000	0.000	0.008	Woods, Good	P2-G
0.000	**4.589**	**0.000**	**0.000**	**0.000**	**4.589**	**TOTAL AREA**	

Summary for Subcatchment P1-A: BYPASS

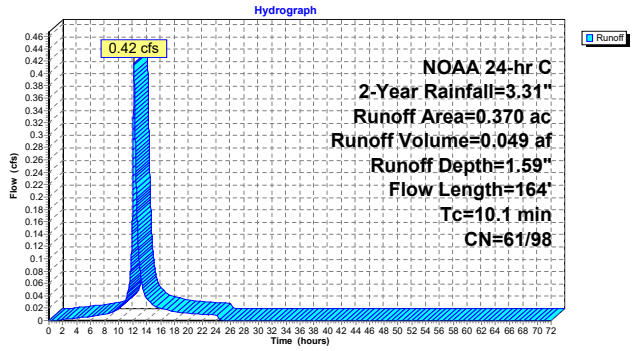
Runoff = 0.42 cfs @ 12.19 hrs, Volume= 0.049 af, Depth= 1.59"
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.212	61	>75% Grass cover, Good, HSG B
0.158	98	Paved parking, HSG B
0.370	77	Weighted Average
0.212	61	57.30% Pervious Area
0.158	98	42.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	9	0.0560	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.6	8	0.1200	0.22		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.35"
3.6	35	0.0280	0.16		**Sheet Flow, C-D** Grass: Short n= 0.150 P2= 3.35"
3.2	17	0.0090	0.09		**Sheet Flow, D-E** Grass: Short n= 0.150 P2= 3.35"
0.3	11	0.0075	0.61		**Sheet Flow, E-F** Smooth surfaces n= 0.011 P2= 3.35"
0.9	7	0.0380	0.13		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 3.35"
0.6	77	0.0110	2.13		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
10.1	164	Total			

Subcatchment P1-A: BYPASS



Summary for Subcatchment P1-B: PPA #1

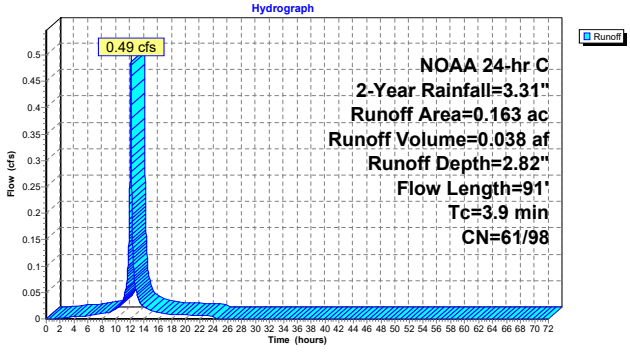
Runoff = 0.49 cfs @ 12.12 hrs, Volume= 0.038 af, Depth= 2.82"
Routed to Pond PP1 : POROUS PAVER #1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.147	98	Paved parking, HSG B
0.016	61	>75% Grass cover, Good, HSG B
0.163	94	Weighted Average
0.016	61	9.82% Pervious Area
0.147	98	90.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	27	0.0200	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.5	64	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
3.9	91	Total			

Subcatchment P1-B: PPA #1



Summary for Subcatchment P1-C: PPA#2

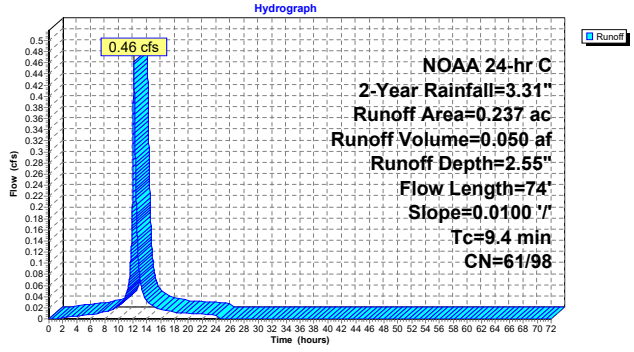
Runoff = 0.46 cfs @ 12.18 hrs, Volume= 0.050 af, Depth= 2.55"
Routed to Pond PP2 : POROUS PAVER #2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.189	98	Paved parking, HSG B
0.048	61	>75% Grass cover, Good, HSG B
0.237	91	Weighted Average
0.048	61	20.25% Pervious Area
0.189	98	79.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.2	7	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.4	74	Total			

Subcatchment P1-C: PPA#2



Summary for Subcatchment P1-D: PPC#3

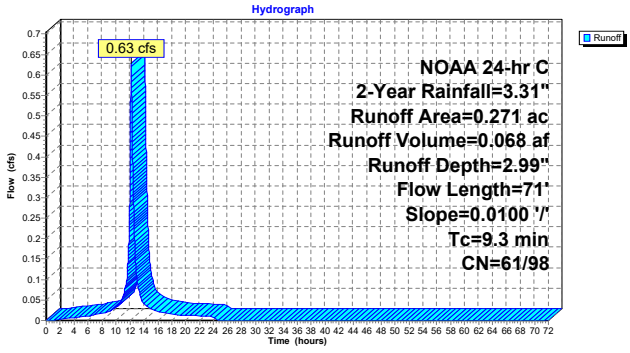
Runoff = 0.63 cfs @ 12.17 hrs, Volume= 0.068 af, Depth= 2.99"
Routed to Pond PP3 : POROUS PAVER #3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.009	61	>75% Grass cover, Good, HSG B
0.262	98	Paved parking, HSG B
0.271	97	Weighted Average
0.009	61	3.32% Pervious Area
0.262	98	96.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.1	4	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
9.3	71	Total			

Subcatchment P1-D: PPC#3



Summary for Subcatchment P2-A: BASIN 1

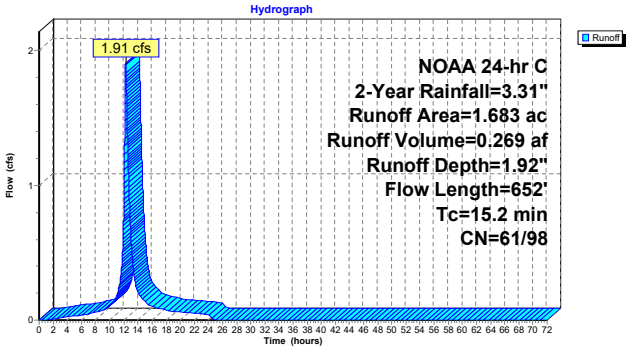
Runoff = 1.91 cfs @ 12.26 hrs, Volume= 0.269 af, Depth= 1.92"
Routed to Pond B1 : BASIN 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.928	98	Paved parking, HSG B
0.755	61	>75% Grass cover, Good, HSG B
1.683	81	Weighted Average
0.755	61	44.86% Pervious Area
0.928	98	55.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
3.5	148	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	437	0.0030	2.88	3.54	**Pipe Channel, CD** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
15.2	652	Total			

Subcatchment P2-A: BASIN 1



Summary for Subcatchment P2-B: BASIN #2

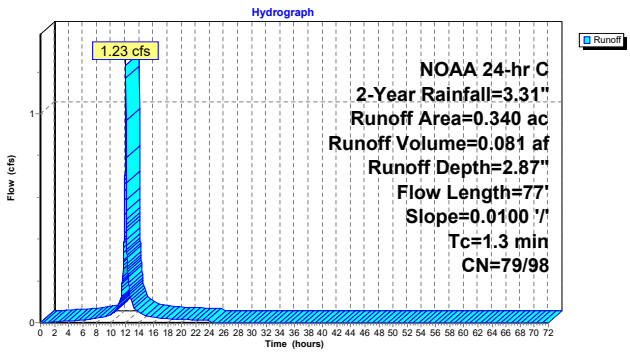
Runoff = 1.23 cfs @ 12.10 hrs, Volume= 0.081 af, Depth= 2.87"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.297	98	Roofs, HSG B
0.043	79	<50% Grass cover, Poor, HSG B
0.340	96	Weighted Average
0.043	79	12.65% Pervious Area
0.297	98	87.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	77	0.0100	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-B: BASIN #2



Summary for Subcatchment P2-C: PPA #4

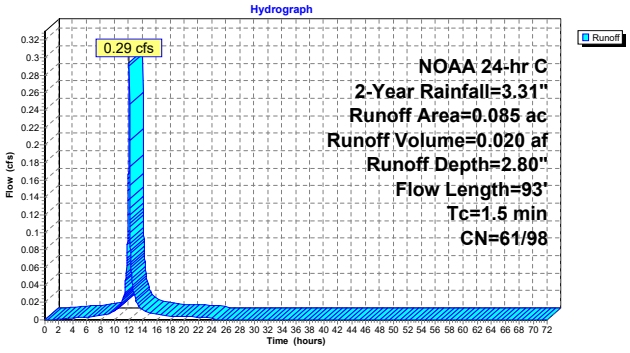
Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 2.80"
Routed to Pond PP4 : POROUS PAVER #4

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.076	98	Paved parking, HSG B
0.009	61	>75% Grass cover, Good, HSG B
0.085	94	Weighted Average
0.009	61	10.59% Pervious Area
0.076	98	89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	67	0.0160	1.19		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
0.6	26	0.0075	0.73		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
1.5	93	Total			

Subcatchment P2-C: PPA #4



Summary for Subcatchment P2-D: PPA#5

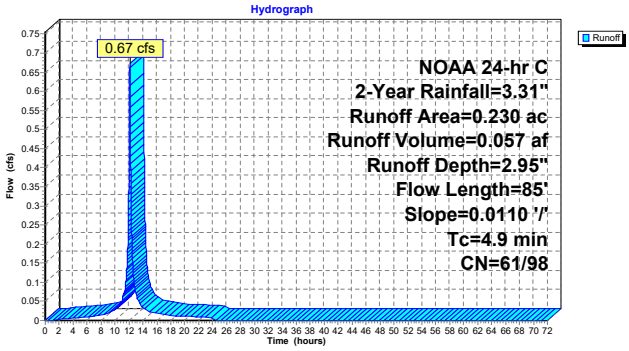
Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.057 af, Depth= 2.95"
Routed to Pond PP5 : POROUS PAVER #5

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.219	98	Paved parking, HSG B
0.011	61	>75% Grass cover, Good, HSG B
0.230	96	Weighted Average
0.011	61	4.78% Pervious Area
0.219	98	95.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	24	0.0110	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
1.0	61	0.0110	1.00		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
4.9	85	Total			

Subcatchment P2-D: PPA#5



Summary for Subcatchment P2-E: PPA#6

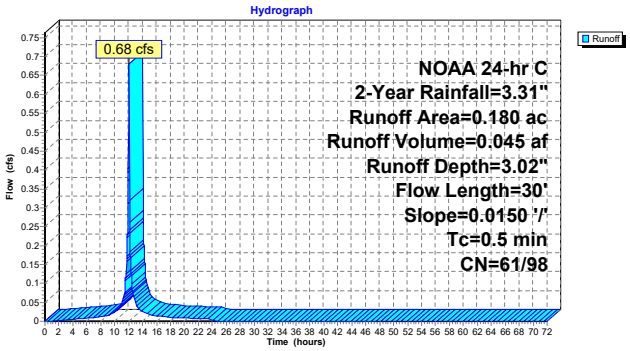
Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.045 af, Depth= 3.02"
Routed to Pond PP6 : POROUS PAVER #6

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.176	98	Paved parking, HSG B
0.004	61	>75% Grass cover, Good, HSG B
0.180	97	Weighted Average
0.004	61	2.22% Pervious Area
0.176	98	97.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-E: PPA#6



Summary for Subcatchment P2-F: ROAD

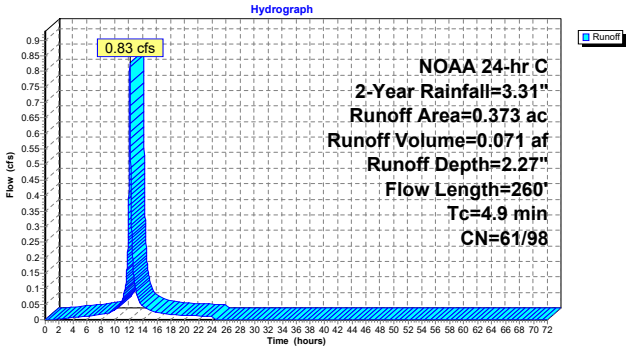
Runoff = 0.83 cfs @ 12.13 hrs, Volume= 0.071 af, Depth= 2.27"
Routed to Pond PP7 : ROAD POROUS PAVEMENT #7

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.257	98	Paved parking, HSG B
0.116	61	>75% Grass cover, Good, HSG B
0.373	86	Weighted Average
0.116	61	31.10% Pervious Area
0.257	98	68.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0250	1.12		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
2.3	31	0.0700	0.23		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
0.3	22	0.0400	1.37		**Sheet Flow, CD** Smooth surfaces n= 0.011 P2= 3.35"
2.0	187	0.0060	1.57		**Shallow Concentrated Flow, DE** Paved Kv= 20.3 fps
4.9	260	Total			

Subcatchment P2-F: ROAD



Summary for Subcatchment P2-G: BYPASS

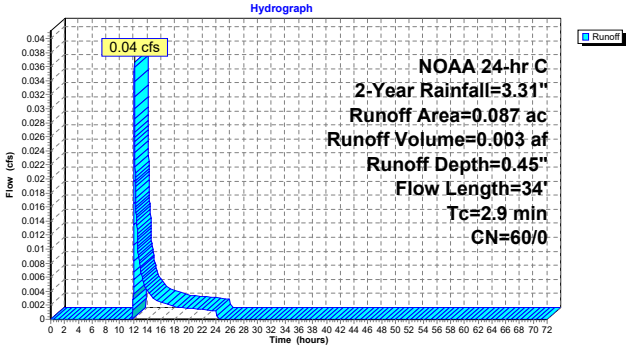
Runoff = 0.04 cfs @ 12.12 hrs, Volume= 0.003 af, Depth= 0.45"
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.079	61	>75% Grass cover, Good, HSG B
0.000	98	Paved parking, HSG B
0.008	55	Woods, Good, HSG B
0.087	60	Weighted Average
0.087	60	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	12	0.1100	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
0.4	7	0.2900	0.30		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
1.6	15	0.0400	0.16		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
2.9	34	Total			

Subcatchment P2-G: BYPASS



Summary for Subcatchment P2-H: Princeton-Hightstown Road

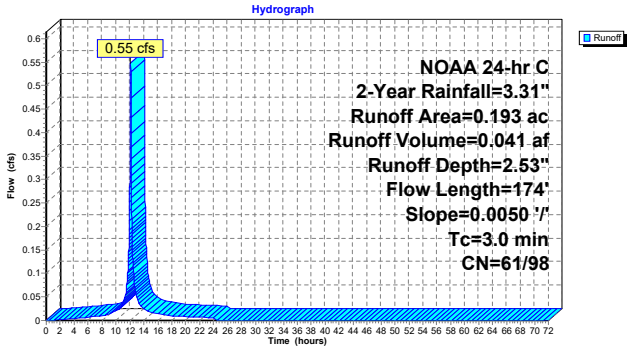
Runoff = 0.55 cfs @ 12.11 hrs, Volume= 0.041 af, Depth= 2.53"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.041	61	>75% Grass cover, Good, HSG B
0.152	98	Paved parking, HSG B
0.193	90	Weighted Average
0.041	61	21.24% Pervious Area
0.152	98	78.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	100	0.0050	0.81		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.35"
0.9	74	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	174	Total			

Subcatchment P2-H: Princeton-Hightstown Road



Summary for Subcatchment P3-A: PDA 3

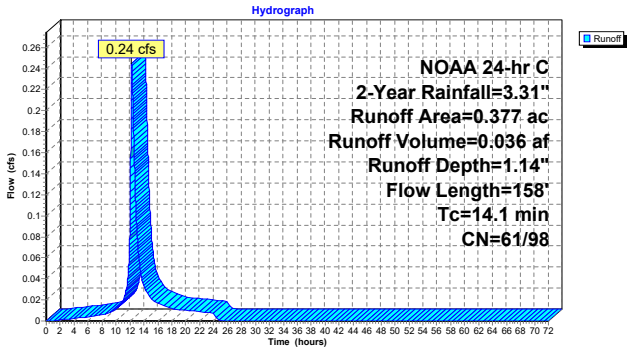
Runoff = 0.24 cfs @ 12.25 hrs, Volume= 0.036 af, Depth= 1.14"
Routed to Link EDA 3 : TRIBUTARY TO SOUTHFIELD ROAD

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.282	61	>75% Grass cover, Good, HSG B
0.095	98	Paved parking, HSG B
0.377	70	Weighted Average
0.282	61	74.80% Pervious Area
0.095	98	25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	7	0.1800	0.25		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
4.6	40	0.0200	0.14		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
7.6	53	0.0100	0.12		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
0.5	27	0.0170	0.91		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.9	31	0.0070	0.59		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
14.1	158	Total			

Subcatchment P3-A: PDA 3



Summary for Pond B1: BASIN 1

Inflow Area = 2.711 ac, 68.17% Impervious, Inflow Depth > 1.72" for 2-Year event
Inflow = 2.35 cfs @ 12.27 hrs, Volume= 0.388 af
Outflow = 0.40 cfs @ 14.13 hrs, Volume= 0.388 af, Atten= 83%, Lag= 112.1 min
Primary = 0.40 cfs @ 14.13 hrs, Volume= 0.388 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 92.28' @ 14.13 hrs Surf.Area= 0.137 ac Storage= 0.124 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 110.9 min (988.6 - 877.7)

Volume	Invert	Avail.Storage	Storage Description
#1	91.25'	0.617 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

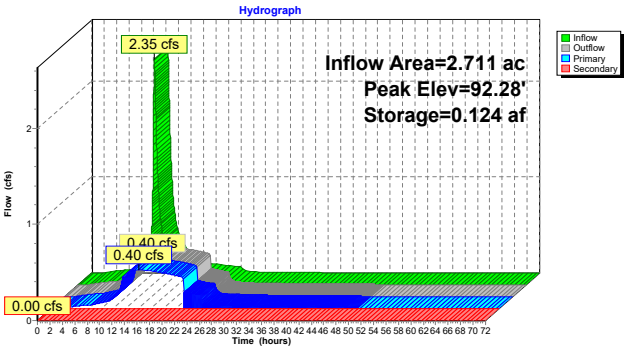
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
91.25	0.105	398.0	0.000	0.000	0.105
92.00	0.128	423.0	0.087	0.087	0.143
93.00	0.160	437.0	0.144	0.231	0.167
94.00	0.193	452.0	0.176	0.407	0.194
95.00	0.227	466.0	0.210	0.617	0.219

Device	Routing	Invert	Outlet Devices
#1	Primary	89.25'	**15.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 89.25' / 89.09' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	89.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	93.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	94.13'	**105.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

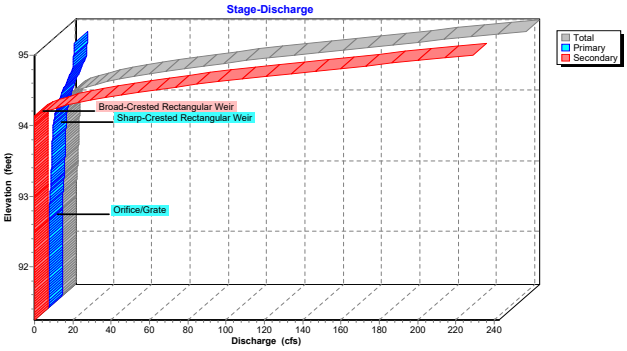
Primary OutFlow Max=0.40 cfs @ 14.13 hrs HW=92.28' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.40 cfs of 8.79 cfs potential flow)
  - **2=Underdrain** (Orifice Controls 0.40 cfs @ 8.21 fps)
  - **3=Orifice/Grate** (Controls 0.00 cfs)
  - **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.25' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B1: BASIN 1



Pond B1: BASIN 1



Summary for Pond B2: BASIN 2

Inflow Area = 0.618 ac, 84.95% Impervious, Inflow Depth = 2.75" for 2-Year event
Inflow = 1.77 cfs @ 12.10 hrs, Volume= 0.142 af
Outflow = 0.18 cfs @ 12.83 hrs, Volume= 0.142 af, Atten= 90%, Lag= 43.8 min
Discarded = 0.06 cfs @ 10.73 hrs, Volume= 0.111 af
Primary = 0.11 cfs @ 12.83 hrs, Volume= 0.030 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.77' @ 12.83 hrs Surf.Area= 0.034 ac Storage= 0.053 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 208.3 min (1,009.5 - 801.2)

Volume	Invert	Avail.Storage	Storage Description
#1	93.20'	0.109 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

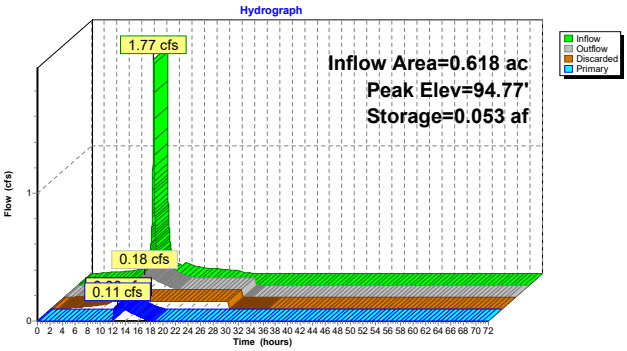
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
93.20	0.034	0.000	0.000
94.20	0.034	0.034	0.034
96.40	0.034	0.075	0.109

Device	Routing	Invert	Outlet Devices
#1	Primary	92.20'	**24.0" Round Culvert** L= 66.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.20' / 92.18' S= 0.0003 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Discarded	93.20'	**3.600 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	94.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	95.05'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	95.55'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 in 48.0" x 48.0" Grate (100% open area) Limited to weir flow at low heads

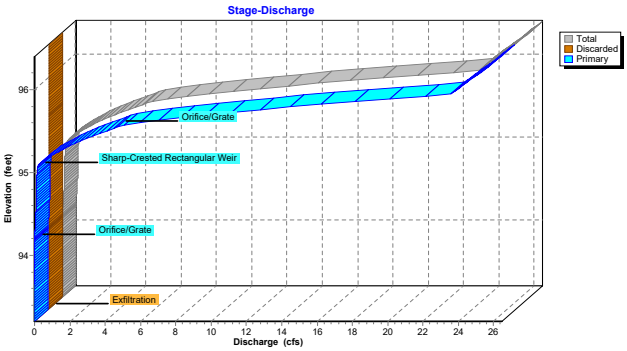
Discarded OutFlow Max=0.06 cfs @ 10.73 hrs HW=93.23' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.11 cfs @ 12.83 hrs HW=94.77' TW=92.09' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.11 cfs of 14.71 cfs potential flow)
  └**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 3.36 fps)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond B2: BASIN 2



Pond B2: BASIN 2



Summary for Pond PP1: POROUS PAVER #1

Inflow Area = 0.163 ac, 90.18% Impervious, Inflow Depth = 2.82" for 2-Year event
Inflow = 0.49 cfs @ 12.12 hrs, Volume= 0.038 af
Outflow = 0.19 cfs @ 12.15 hrs, Volume= 0.038 af, Atten= 62%, Lag= 1.9 min
Primary = 0.19 cfs @ 12.15 hrs, Volume= 0.038 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 92.86' @ 13.18 hrs Surf.Area= 0.041 ac Storage= 0.012 af

Plug-Flow detention time= 164.7 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 164.0 min (924.0 - 760.0)

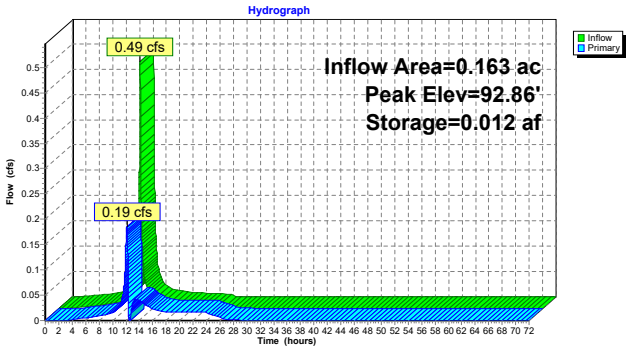
Volume	Invert	Avail.Storage	Storage Description
#1	92.10'	0.035 af	**Custom Stage Data (Irregular)**Listed below (Recalc) 0.087 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.10	0.041	243.4	0.000	0.000	0.041
94.23	0.041	243.4	0.087	0.087	0.053

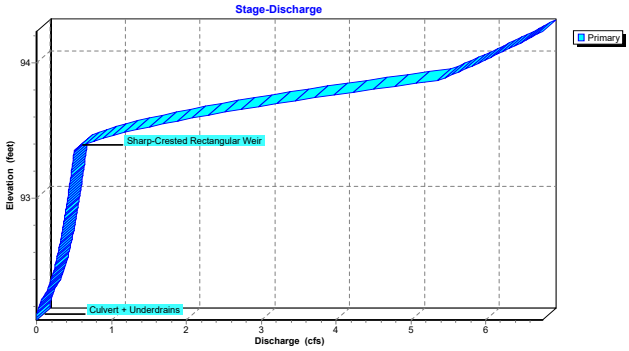
Device	Routing	Invert	Outlet Devices
#1	Primary	92.10'	**15.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.10' / 92.00' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.10'	**3.0" Vert. Underdrains X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	93.35'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.19 cfs @ 12.15 hrs HW=92.51' TW=92.36' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.19 cfs of 0.46 cfs potential flow)
  └**2=Underdrains** (Orifice Controls 0.19 cfs @ 1.90 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP1: POROUS PAVER #1



Pond PP1: POROUS PAVER #1



Summary for Pond PP2: POROUS PAVER #2

Inflow Area = 0.237 ac, 79.75% Impervious, Inflow Depth = 2.55" for 2-Year event
Inflow = 0.46 cfs @ 12.18 hrs, Volume= 0.050 af
Outflow = 0.31 cfs @ 12.37 hrs, Volume= 0.050 af, Atten= 34%, Lag= 11.7 min
Primary = 0.31 cfs @ 12.37 hrs, Volume= 0.050 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 93.33' @ 12.37 hrs Surf.Area= 0.052 ac Storage= 0.009 af

Plug-Flow detention time= 50.2 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 50.0 min (821.9 - 771.9)

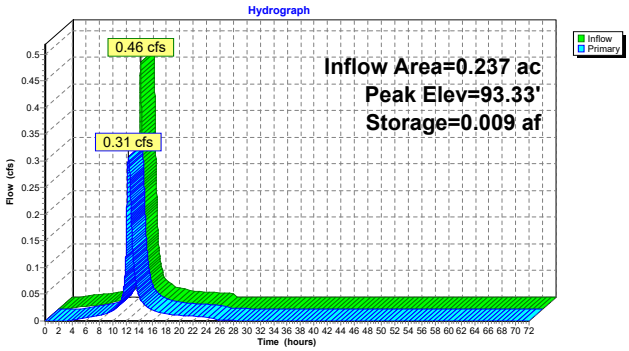
Volume	Invert	Avail.Storage	Storage Description
#1	92.90'	0.040 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.099 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.90	0.052	298.0	0.000	0.000	0.052
94.80	0.052	298.0	0.099	0.099	0.065

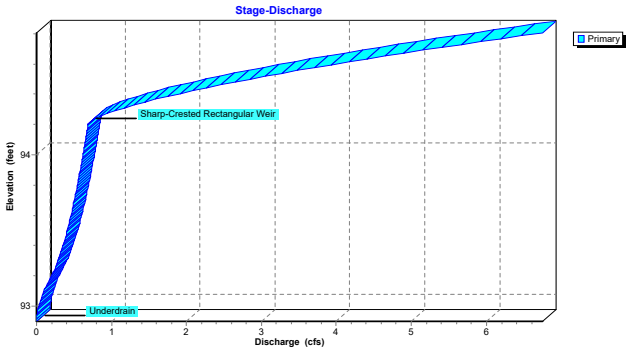
Device	Routing	Invert	Outlet Devices
#1	Primary	92.80'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.80' / 92.41' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.90'	**5.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.31 cfs @ 12.37 hrs HW=93.33' TW=92.62' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.31 cfs of 1.13 cfs potential flow)
└─**2=Underdrain** (Orifice Controls 0.31 cfs @ 2.25 fps)
└─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP2: POROUS PAVER #2



Pond PP2: POROUS PAVER #2



Summary for Pond PP3: POROUS PAVER #3

Inflow Area = 0.671 ac, 89.12% Impervious, Inflow Depth = 2.79" for 2-Year event
Inflow = 1.06 cfs @ 12.19 hrs, Volume= 0.156 af
Outflow = 0.23 cfs @ 13.15 hrs, Volume= 0.156 af, Atten= 78%, Lag= 57.8 min
Discarded = 0.08 cfs @ 11.23 hrs, Volume= 0.127 af
Primary = 0.15 cfs @ 13.15 hrs, Volume= 0.029 af
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 92.85' @ 13.15 hrs Surf.Area= 0.157 ac Storage= 0.053 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 170.0 min (992.9 - 822.9)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	0.163 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.408 af Overall x 40.0% Voids

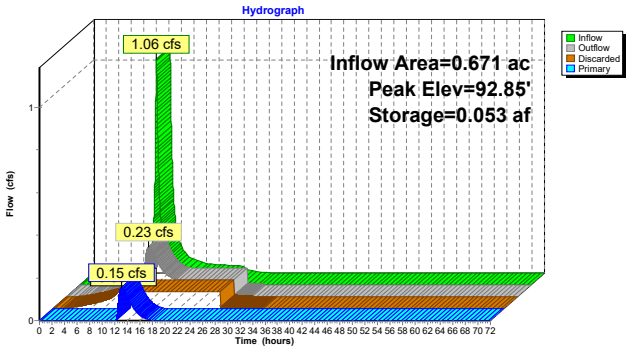
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
92.00	0.157	0.000	0.000
94.60	0.157	0.408	0.408

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**15.0" Round Culvert** L= 58.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.00' / 91.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Discarded	92.00'	**1.000 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	92.55'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	94.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

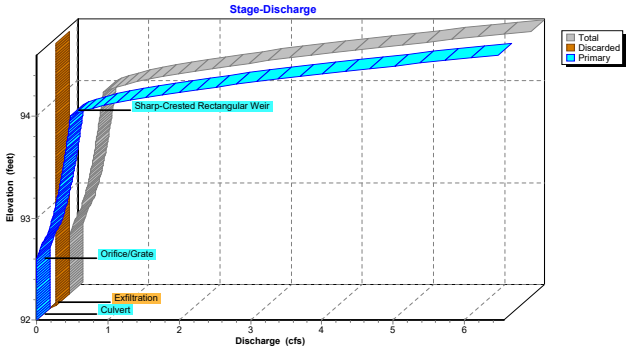
Discarded OutFlow Max=0.08 cfs @ 11.23 hrs HW=92.03' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.15 cfs @ 13.15 hrs HW=92.85' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.15 cfs of 2.82 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.86 fps)
└─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP3: POROUS PAVER #3



Pond PP3: POROUS PAVER #3



Summary for Pond PP4: POROUS PAVER #4

Inflow Area = 0.085 ac, 89.41% Impervious, Inflow Depth = 2.80" for 2-Year event
Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.020 af
Outflow = 0.04 cfs @ 12.01 hrs, Volume= 0.020 af, Atten= 86%, Lag= 0.0 min
Primary = 0.04 cfs @ 12.01 hrs, Volume= 0.020 af
Routed to Pond B2 : BASIN 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.46' @ 14.70 hrs Surf.Area= 0.027 ac Storage= 0.013 af

Plug-Flow detention time= 300.8 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 298.2 min (1,054.7 - 756.5)

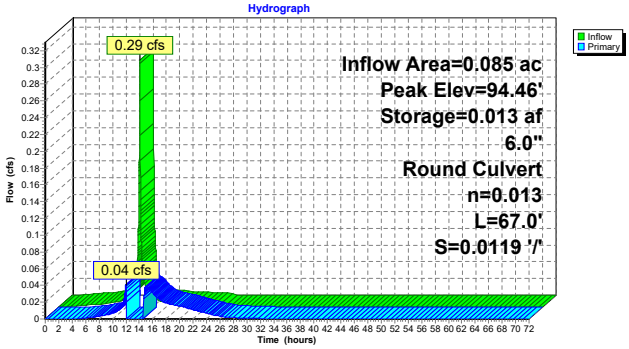
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.027 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.027	176.0	0.000	0.000	0.027
95.00	0.027	176.0	0.027	0.027	0.031

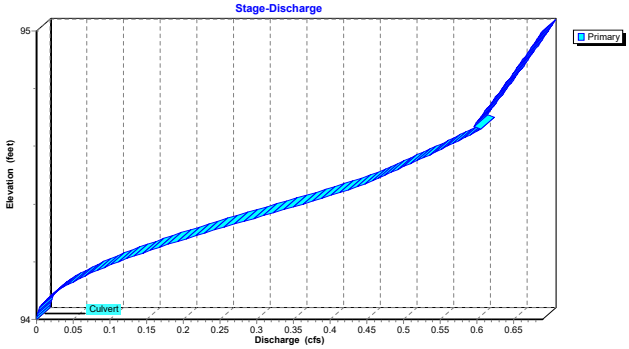
Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**6.0" Round Culvert** L= 67.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.20' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.20 sf

Primary OutFlow Max=0.04 cfs @ 12.01 hrs HW=94.17' TW=93.95' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.04 cfs @ 1.06 fps)

Pond PP4: POROUS PAVER #4



Pond PP4: POROUS PAVER #4



Summary for Pond PP5: POROUS PAVER #5

Inflow Area = 0.230 ac, 95.22% Impervious, Inflow Depth = 2.95" for 2-Year event
Inflow = 0.67 cfs @ 12.13 hrs, Volume= 0.057 af
Outflow = 0.33 cfs @ 12.30 hrs, Volume= 0.047 af, Atten= 51%, Lag= 10.4 min
Primary = 0.33 cfs @ 12.30 hrs, Volume= 0.047 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.71' @ 12.30 hrs Surf.Area= 0.094 ac Storage= 0.027 af

Plug-Flow detention time= 235.2 min calculated for 0.047 af (83% of inflow)
Center-of-Mass det. time= 162.8 min (922.9 - 760.1)

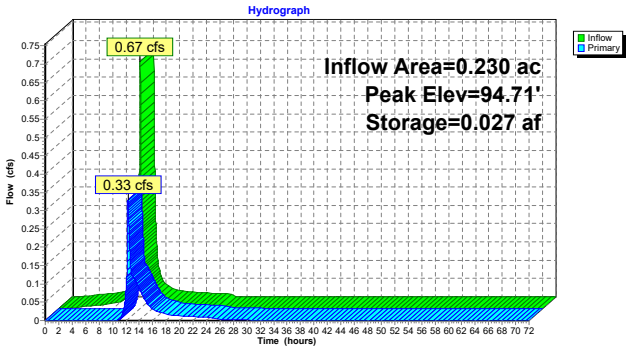
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.038 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.094 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.094	532.0	0.000	0.000	0.094
95.00	0.094	532.0	0.094	0.094	0.106

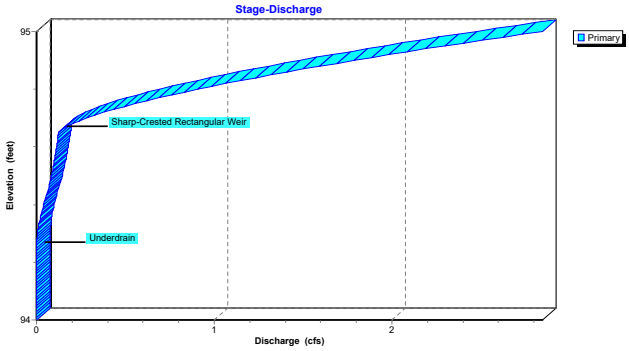
Device	Routing	Invert	Outlet Devices
#1	Primary	91.87'	**24.0" Round Culvert** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 91.87' / 91.69' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.65'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.33 cfs @ 12.30 hrs HW=94.71' TW=91.63' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.33 cfs of 16.98 cfs potential flow)
↑**2=Underdrain** (Orifice Controls 0.14 cfs @ 2.79 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.80 fps)

Pond PP5: POROUS PAVER #5



Pond PP5: POROUS PAVER #5



Summary for Pond PP6: POROUS PAVER #6

Inflow Area = 0.180 ac, 97.78% Impervious, Inflow Depth = 3.02" for 2-Year event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.045 af
Outflow = 0.04 cfs @ 13.22 hrs, Volume= 0.042 af, Atten= 94%, Lag= 68.0 min
Primary = 0.04 cfs @ 13.22 hrs, Volume= 0.042 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.40' @ 13.22 hrs Surf.Area= 0.198 ac Storage= 0.030 af

Plug-Flow detention time= 687.5 min calculated for 0.042 af (92% of inflow)
Center-of-Mass det. time= 644.1 min (1,396.7 - 752.6)

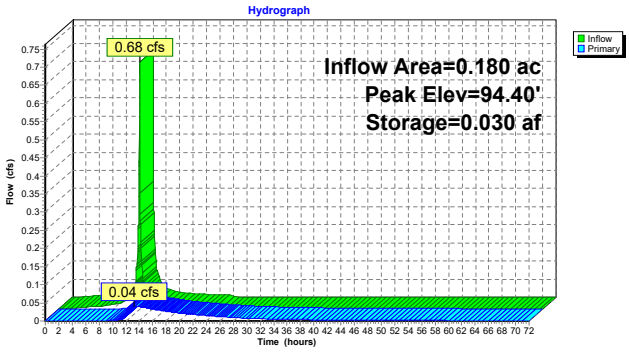
Volume	Invert	Avail.Storage	Storage Description
#1	94.25'	0.198 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.25	0.198	718.0	0.000	0.000	0.198
95.25	0.198	718.0	0.198	0.198	0.214

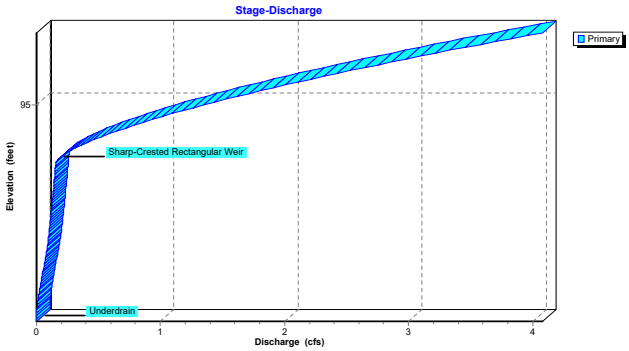
Device	Routing	Invert	Outlet Devices
#1	Primary	92.84'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.84' / 92.74' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.04 cfs @ 13.22 hrs HW=94.40' TW=92.21' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.04 cfs of 5.16 cfs potential flow)
↑—**2=Underdrain** (Orifice Controls 0.04 cfs @ 1.32 fps)
└—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP6: POROUS PAVER #6



Pond PP6: POROUS PAVER #6



Summary for Pond PP7: ROAD POROUS PAVEMENT #7

Inflow Area = 0.373 ac, 68.90% Impervious, Inflow Depth = 2.27" for 2-Year event
Inflow = 0.83 cfs @ 12.13 hrs, Volume= 0.071 af
Outflow = 0.07 cfs @ 13.23 hrs, Volume= 0.069 af, Atten= 91%, Lag= 66.0 min
Primary = 0.07 cfs @ 13.23 hrs, Volume= 0.069 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 89.81' @ 13.23 hrs Surf.Area= 0.133 ac Storage= 0.041 af

Plug-Flow detention time= 456.7 min calculated for 0.069 af (97% of inflow)
Center-of-Mass det. time= 439.2 min (1,208.6 - 769.4)

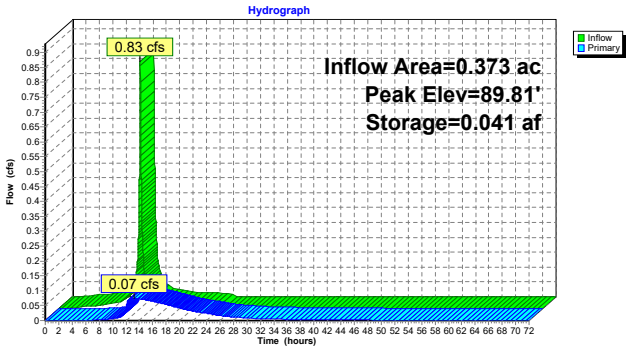
Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	0.133 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
89.50	0.133	832.0	0.000	0.000	0.133
90.50	0.133	832.0	0.133	0.133	0.152

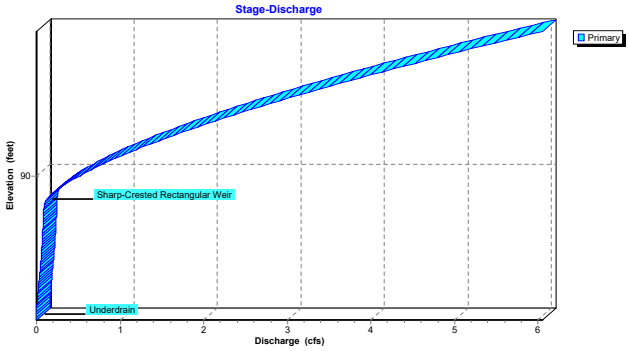
Device	Routing	Invert	Outlet Devices
#1	Primary	87.28'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 87.28' / 87.23' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	89.50'	**2.5" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	89.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.07 cfs @ 13.23 hrs HW=89.81' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.07 cfs of 8.16 cfs potential flow)
↑—**2=Underdrain** (Orifice Controls 0.07 cfs @ 2.19 fps)
└—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP7: ROAD POROUS PAVEMENT #7



Pond PP7: ROAD POROUS PAVEMENT #7

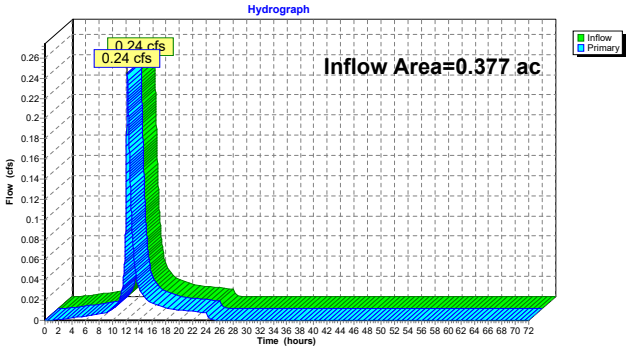


Summary for Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

Inflow Area = 0.377 ac, 25.20% Impervious, Inflow Depth = 1.14" for 2-Year event
Inflow = 0.24 cfs @ 12.25 hrs, Volume= 0.036 af
Primary = 0.24 cfs @ 12.25 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

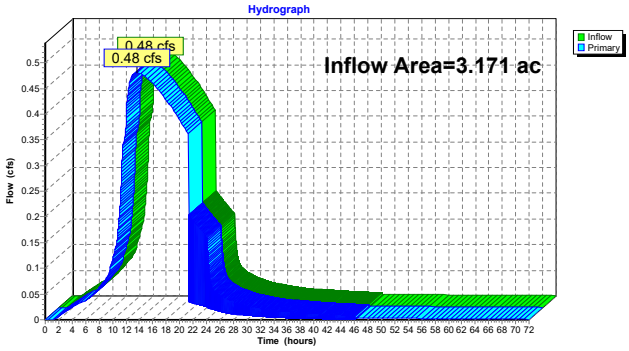


Summary for Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Inflow Area = 3.171 ac, 66.38% Impervious, Inflow Depth > 1.74" for 2-Year event
Inflow = 0.48 cfs @ 13.72 hrs, Volume= 0.460 af
Primary = 0.48 cfs @ 13.72 hrs, Volume= 0.460 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

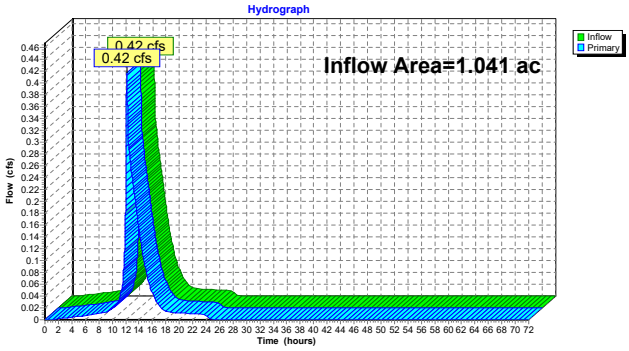


Summary for Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Inflow Area = 1.041 ac, 72.62% Impervious, Inflow Depth = 0.90" for 2-Year event
Inflow = 0.42 cfs @ 12.19 hrs, Volume= 0.078 af
Primary = 0.42 cfs @ 12.19 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



Summary for Subcatchment P1-A: BYPASS

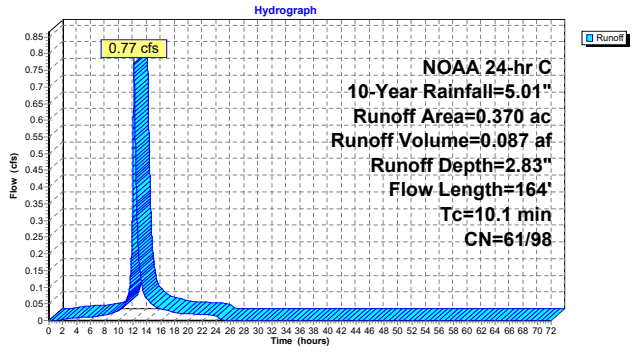
Runoff = 0.77 cfs @ 12.19 hrs, Volume= 0.087 af, Depth= 2.83"
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.212	61	>75% Grass cover, Good, HSG B
0.158	98	Paved parking, HSG B
0.370	77	Weighted Average
0.212	61	57.30% Pervious Area
0.158	98	42.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	9	0.0560	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.6	8	0.1200	0.22		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.35"
3.6	35	0.0280	0.16		**Sheet Flow, C-D** Grass: Short n= 0.150 P2= 3.35"
3.2	17	0.0090	0.09		**Sheet Flow, D-E** Grass: Short n= 0.150 P2= 3.35"
0.3	11	0.0075	0.61		**Sheet Flow, E-F** Smooth surfaces n= 0.011 P2= 3.35"
0.9	7	0.0380	0.13		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 3.35"
0.6	77	0.0110	2.13		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
10.1	164	Total			

Subcatchment P1-A: BYPASS



Summary for Subcatchment P1-B: PPA #1

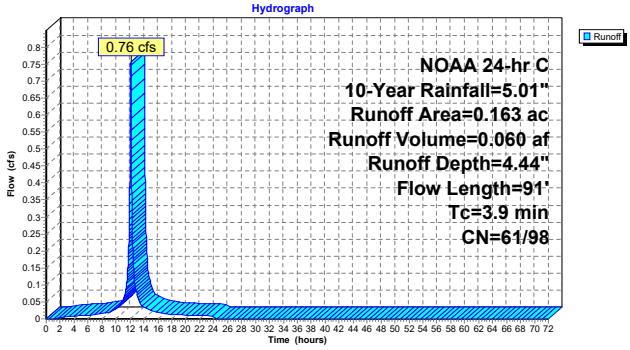
Runoff = 0.76 cfs @ 12.12 hrs, Volume= 0.060 af, Depth= 4.44"
Routed to Pond PP1 : POROUS PAVER #1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.147	98	Paved parking, HSG B
0.016	61	>75% Grass cover, Good, HSG B
0.163	94	Weighted Average
0.016	61	9.82% Pervious Area
0.147	98	90.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	27	0.0200	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.5	64	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
3.9	91	Total			

Subcatchment P1-B: PPA #1



Summary for Subcatchment P1-C: PPA#2

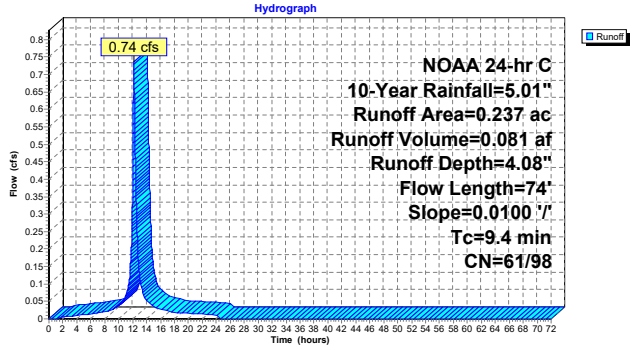
Runoff = 0.74 cfs @ 12.18 hrs, Volume= 0.081 af, Depth= 4.08"
Routed to Pond PP2 : POROUS PAVER #2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.189	98	Paved parking, HSG B
0.048	61	>75% Grass cover, Good, HSG B
0.237	91	Weighted Average
0.048	61	20.25% Pervious Area
0.189	98	79.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.2	7	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.4	74	Total			

Subcatchment P1-C: PPA#2



Summary for Subcatchment P1-D: PPC#3

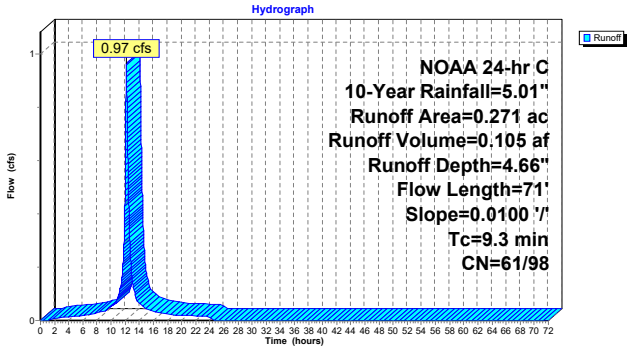
Runoff = 0.97 cfs @ 12.17 hrs, Volume= 0.105 af, Depth= 4.66"
Routed to Pond PP3 : POROUS PAVER #3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.009	61	>75% Grass cover, Good, HSG B
0.262	98	Paved parking, HSG B
0.271	97	Weighted Average
0.009	61	3.32% Pervious Area
0.262	98	96.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.1	4	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
9.3	71	Total			

Subcatchment P1-D: PPC#3



Summary for Subcatchment P2-A: BASIN 1

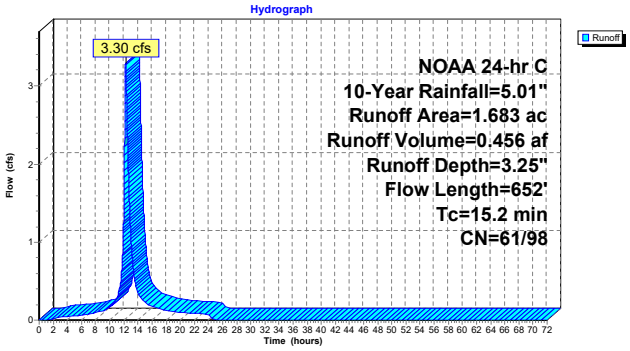
Runoff = 3.30 cfs @ 12.26 hrs, Volume= 0.456 af, Depth= 3.25"
Routed to Pond B1 : BASIN 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.928	98	Paved parking, HSG B
0.755	61	>75% Grass cover, Good, HSG B
1.683	81	Weighted Average
0.755	61	44.86% Pervious Area
0.928	98	55.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
3.5	148	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	437	0.0030	2.88	3.54	**Pipe Channel, CD** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
15.2	652	Total			

Subcatchment P2-A: BASIN 1



Summary for Subcatchment P2-B: BASIN #2

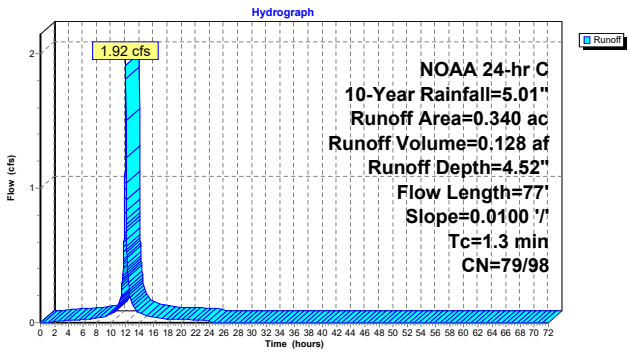
Runoff = 1.92 cfs @ 12.10 hrs, Volume= 0.128 af, Depth= 4.52"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.297	98	Roofs, HSG B
0.043	79	<50% Grass cover, Poor, HSG B
0.340	96	Weighted Average
0.043	79	12.65% Pervious Area
0.297	98	87.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	77	0.0100	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-B: BASIN #2



Summary for Subcatchment P2-C: PPA #4

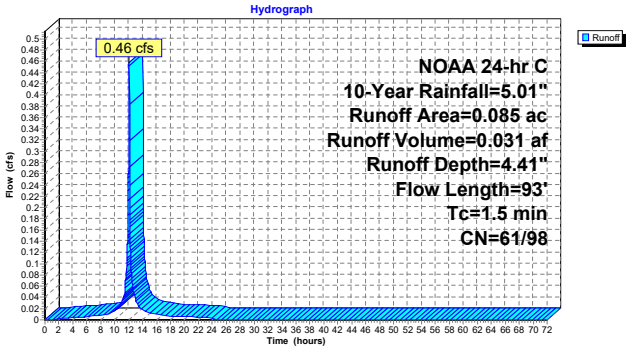
Runoff = 0.46 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 4.41"
Routed to Pond PP4 : POROUS PAVER #4

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.076	98	Paved parking, HSG B
0.009	61	>75% Grass cover, Good, HSG B
0.085	94	Weighted Average
0.009	61	10.59% Pervious Area
0.076	98	89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	67	0.0160	1.19		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
0.6	26	0.0075	0.73		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
1.5	93	Total			

Subcatchment P2-C: PPA #4



Summary for Subcatchment P2-D: PPA#5

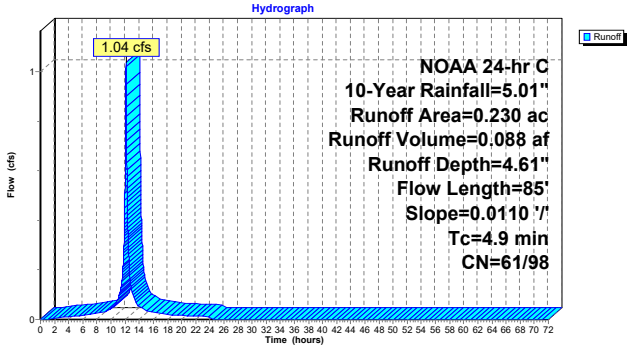
Runoff = 1.04 cfs @ 12.13 hrs, Volume= 0.088 af, Depth= 4.61"
Routed to Pond PP5 : POROUS PAVER #5

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.219	98	Paved parking, HSG B
0.011	61	>75% Grass cover, Good, HSG B
0.230	96	Weighted Average
0.011	61	4.78% Pervious Area
0.219	98	95.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	24	0.0110	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
1.0	61	0.0110	1.00		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
4.9	85	Total			

Subcatchment P2-D: PPA#5



Summary for Subcatchment P2-E: PPA#6

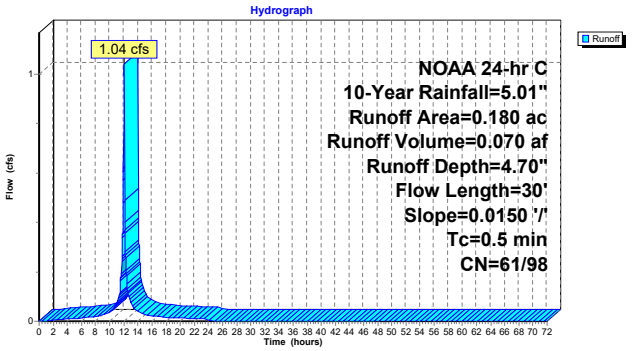
Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 4.70"
Routed to Pond PP6 : POROUS PAVER #6

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.176	98	Paved parking, HSG B
0.004	61	>75% Grass cover, Good, HSG B
0.180	97	Weighted Average
0.004	61	2.22% Pervious Area
0.176	98	97.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-E: PPA#6



Summary for Subcatchment P2-F: ROAD

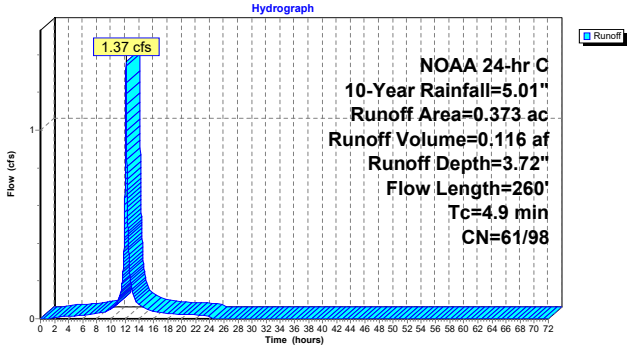
Runoff = 1.37 cfs @ 12.13 hrs, Volume= 0.116 af, Depth= 3.72"
Routed to Pond PP7 : ROAD POROUS PAVEMENT #7

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.257	98	Paved parking, HSG B
0.116	61	>75% Grass cover, Good, HSG B
0.373	86	Weighted Average
0.116	61	31.10% Pervious Area
0.257	98	68.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0250	1.12		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
2.3	31	0.0700	0.23		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
0.3	22	0.0400	1.37		**Sheet Flow, CD** Smooth surfaces n= 0.011 P2= 3.35"
2.0	187	0.0060	1.57		**Shallow Concentrated Flow, DE** Paved Kv= 20.3 fps
4.9	260	Total			

Subcatchment P2-F: ROAD



Summary for Subcatchment P2-G: BYPASS

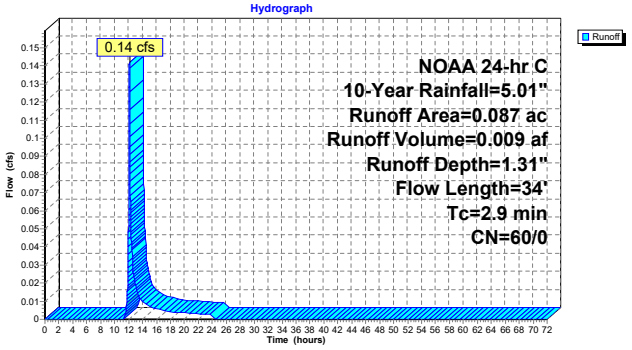
Runoff = 0.14 cfs @ 12.12 hrs, Volume= 0.009 af, Depth= 1.31"
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.079	61	>75% Grass cover, Good, HSG B
0.000	98	Paved parking, HSG B
0.008	55	Woods, Good, HSG B
0.087	60	Weighted Average
0.087	60	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	12	0.1100	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
0.4	7	0.2900	0.30		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
1.6	15	0.0400	0.16		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
2.9	34	Total			

Subcatchment P2-G: BYPASS



Summary for Subcatchment P2-H: Princeton-Hightstown Road

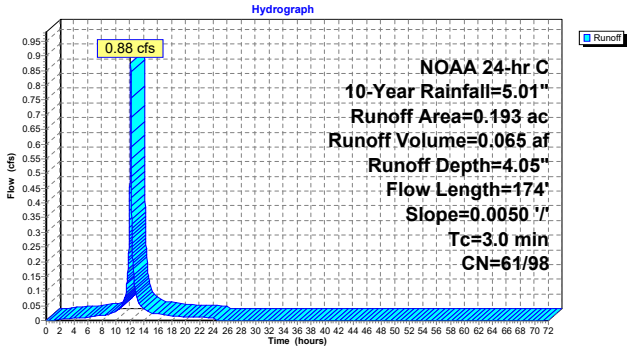
Runoff = 0.88 cfs @ 12.11 hrs, Volume= 0.065 af, Depth= 4.05"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.041	61	>75% Grass cover, Good, HSG B
0.152	98	Paved parking, HSG B
0.193	90	Weighted Average
0.041	61	21.24% Pervious Area
0.152	98	78.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	100	0.0050	0.81		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.35"
0.9	74	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	174	Total			

Subcatchment P2-H: Princeton-Hightstown Road



Summary for Subcatchment P3-A: PDA 3

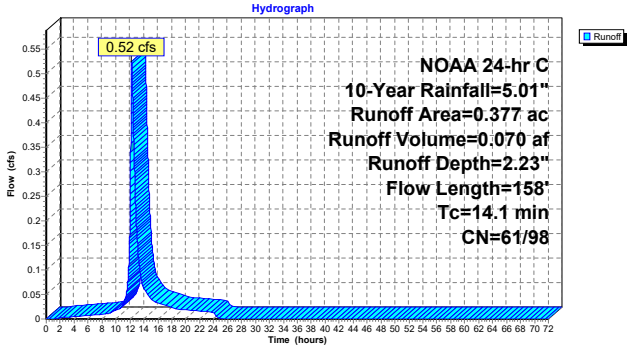
Runoff = 0.52 cfs @ 12.25 hrs, Volume= 0.070 af, Depth= 2.23"
Routed to Link EDA 3 : TRIBUTARY TO SOUTHFIELD ROAD

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.282	61	>75% Grass cover, Good, HSG B
0.095	98	Paved parking, HSG B
0.377	70	Weighted Average
0.282	61	74.80% Pervious Area
0.095	98	25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	7	0.1800	0.25		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
4.6	40	0.0200	0.14		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
7.6	53	0.0100	0.12		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
0.5	27	0.0170	0.91		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.9	31	0.0070	0.59		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
14.1	158	Total			

Subcatchment P3-A: PDA 3



Summary for Pond B1: BASIN 1

Inflow Area = 2.711 ac, 68.17% Impervious, Inflow Depth > 3.07" for 10-Year event
Inflow = 5.30 cfs @ 12.22 hrs, Volume= 0.693 af
Outflow = 1.33 cfs @ 13.09 hrs, Volume= 0.693 af, Atten= 75%, Lag= 52.2 min
Primary = 1.33 cfs @ 13.09 hrs, Volume= 0.693 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 92.97' @ 13.09 hrs Surf.Area= 0.159 ac Storage= 0.225 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 144.8 min (1,001.8 - 857.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.25'	0.617 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

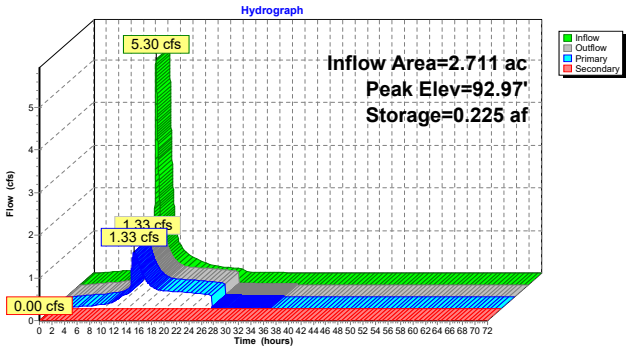
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
91.25	0.105	398.0	0.000	0.000	0.105
92.00	0.128	423.0	0.087	0.087	0.143
93.00	0.160	437.0	0.144	0.231	0.167
94.00	0.193	452.0	0.176	0.407	0.194
95.00	0.227	466.0	0.210	0.617	0.219

Device	Routing	Invert	Outlet Devices
#1	Primary	89.25'	**15.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 89.25' / 89.09' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	89.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	93.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	94.13'	**105.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

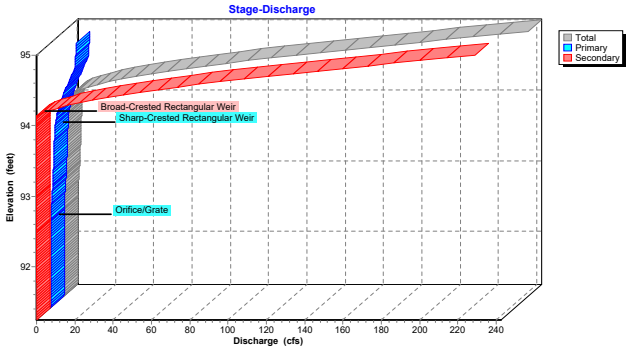
Primary OutFlow Max=1.33 cfs @ 13.09 hrs HW=92.97' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.33 cfs of 10.22 cfs potential flow)
  - **2=Underdrain** (Orifice Controls 0.45 cfs @ 9.12 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.88 cfs @ 2.32 fps)
  - **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.25' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B1: BASIN 1



Pond B1: BASIN 1



Summary for Pond B2: BASIN 2

Inflow Area = 0.618 ac, 84.95% Impervious, Inflow Depth = 4.36" for 10-Year event
Inflow = 2.77 cfs @ 12.10 hrs, Volume= 0.225 af
Outflow = 1.36 cfs @ 12.17 hrs, Volume= 0.225 af, Atten= 51%, Lag= 4.4 min
Discarded = 0.06 cfs @ 9.58 hrs, Volume= 0.133 af
Primary = 1.30 cfs @ 12.17 hrs, Volume= 0.092 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 95.25' @ 12.17 hrs Surf.Area= 0.034 ac Storage= 0.070 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 178.4 min (975.9 - 797.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.20'	0.109 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

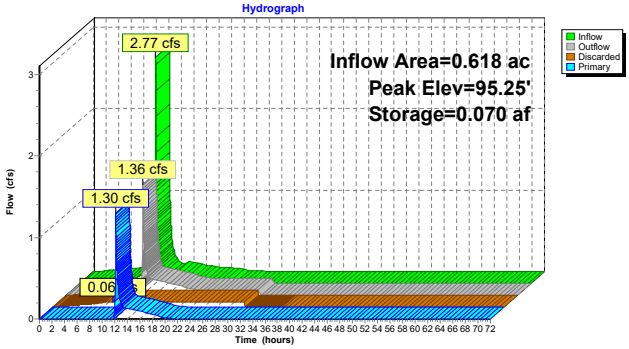
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
93.20	0.034	0.000	0.000
94.20	0.034	0.034	0.034
96.40	0.034	0.075	0.109

Device	Routing	Invert	Outlet Devices
#1	Primary	92.20'	**24.0" Round Culvert** L= 66.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.20' / 92.18' S= 0.0003 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Discarded	93.20'	**3.600 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	94.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	95.05'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	95.55'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 in 48.0" x 48.0" Grate (100% open area) Limited to weir flow at low heads

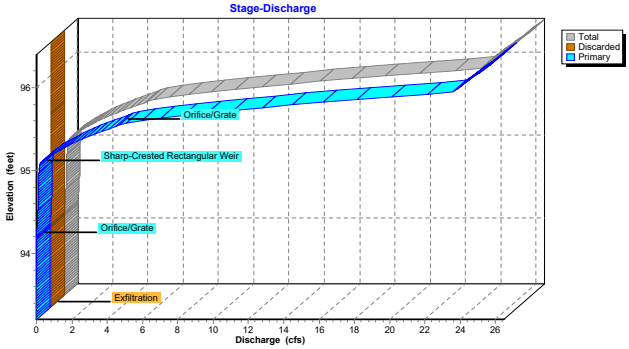
Discarded OutFlow Max=0.06 cfs @ 9.58 hrs HW=93.23' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.30 cfs @ 12.17 hrs HW=95.25' TW=91.82' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.30 cfs of 18.32 cfs potential flow)
  └**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 4.73 fps)
  └**4=Sharp-Crested Rectangular Weir** (Weir Controls 1.14 cfs @ 1.45 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond B2: BASIN 2



Pond B2: BASIN 2



Summary for Pond PP1: POROUS PAVER #1

Inflow Area = 0.163 ac, 90.18% Impervious, Inflow Depth = 4.44" for 10-Year event
Inflow = 0.76 cfs @ 12.12 hrs, Volume= 0.060 af
Outflow = 0.22 cfs @ 12.17 hrs, Volume= 0.060 af, Atten= 71%, Lag= 3.1 min
Primary = 0.22 cfs @ 12.17 hrs, Volume= 0.060 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 93.31' @ 13.09 hrs Surf.Area= 0.041 ac Storage= 0.020 af

Plug-Flow detention time= 156.4 min calculated for 0.060 af (100% of inflow)
Center-of-Mass det. time= 155.9 min (909.0 - 753.1)

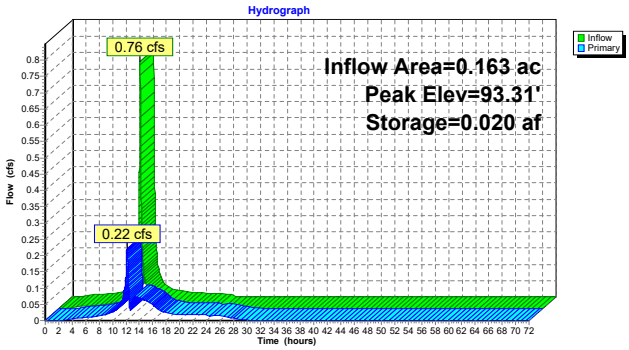
Volume	Invert	Avail.Storage	Storage Description
#1	92.10'	0.035 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.087 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.10	0.041	243.4	0.000	0.000	0.041
94.23	0.041	243.4	0.087	0.087	0.053

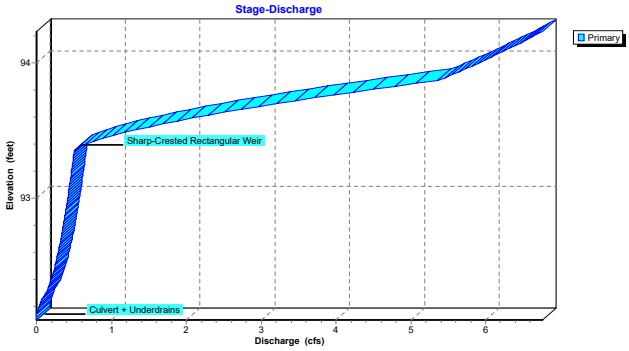
Device	Routing	Invert	Outlet Devices
#1	Primary	92.10'	**15.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.10' / 92.00' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.10'	**3.0" Vert. Underdrains X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	93.35'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.22 cfs @ 12.17 hrs HW=92.91' TW=92.70' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.22 cfs of 1.54 cfs potential flow)
  └**2=Underdrains** (Orifice Controls 0.22 cfs @ 2.24 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP1: POROUS PAVER #1



Pond PP1: POROUS PAVER #1



Summary for Pond PP2: POROUS PAVER #2

Inflow Area = 0.237 ac, 79.75% Impervious, Inflow Depth = 4.08" for 10-Year event
Inflow = 0.74 cfs @ 12.18 hrs, Volume= 0.081 af
Outflow = 0.45 cfs @ 12.41 hrs, Volume= 0.081 af, Atten= 40%, Lag= 13.9 min
Primary = 0.45 cfs @ 12.41 hrs, Volume= 0.081 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 93.57' @ 12.41 hrs Surf.Area= 0.052 ac Storage= 0.014 af

Plug-Flow detention time= 46.4 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 46.1 min (812.5 - 766.4)

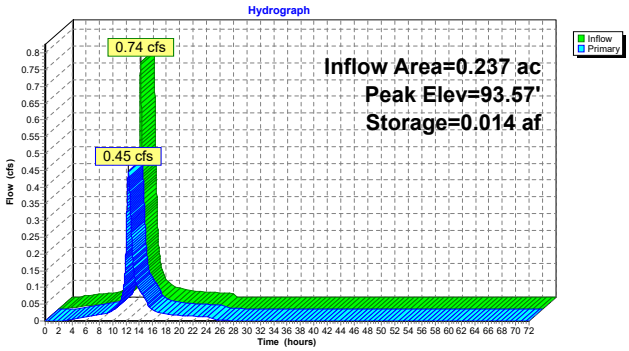
Volume	Invert	Avail.Storage	Storage Description
#1	92.90'	0.040 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.099 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.90	0.052	298.0	0.000	0.000	0.052
94.80	0.052	298.0	0.099	0.099	0.065

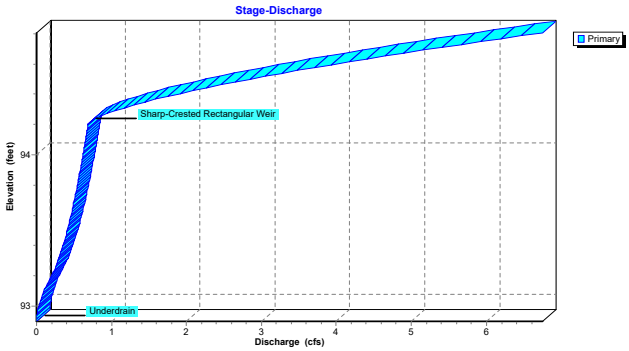
Device	Routing	Invert	Outlet Devices
#1	Primary	92.80'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.80' / 92.41' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.90'	**5.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.45 cfs @ 12.41 hrs HW=93.57' TW=93.05' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.45 cfs of 2.03 cfs potential flow)
└─**2=Underdrain** (Orifice Controls 0.45 cfs @ 3.27 fps)
└─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP2: POROUS PAVER #2



Pond PP2: POROUS PAVER #2



Summary for Pond PP3: POROUS PAVER #3

Inflow Area = 0.671 ac, 89.12% Impervious, Inflow Depth = 4.40" for 10-Year event
Inflow = 1.55 cfs @ 12.19 hrs, Volume= 0.246 af
Outflow = 0.40 cfs @ 13.04 hrs, Volume= 0.246 af, Atten= 74%, Lag= 51.2 min
Discarded = 0.08 cfs @ 10.27 hrs, Volume= 0.153 af
Primary = 0.32 cfs @ 13.04 hrs, Volume= 0.093 af
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 93.29' @ 13.04 hrs Surf.Area= 0.157 ac Storage= 0.081 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 158.1 min (971.2 - 813.2)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	0.163 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.408 af Overall x 40.0% Voids

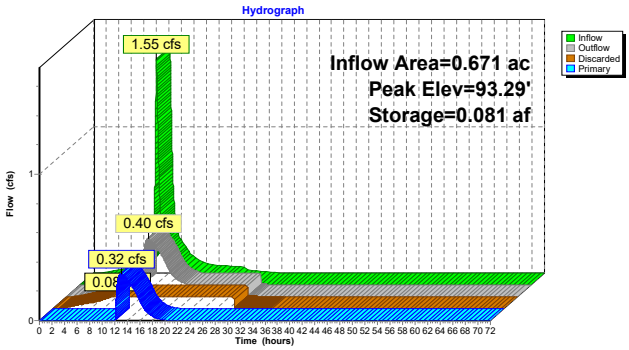
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
92.00	0.157	0.000	0.000
94.60	0.157	0.408	0.408

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**15.0" Round Culvert** L= 58.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.00' / 91.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Discarded	92.00'	**1.000 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	92.55'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	94.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

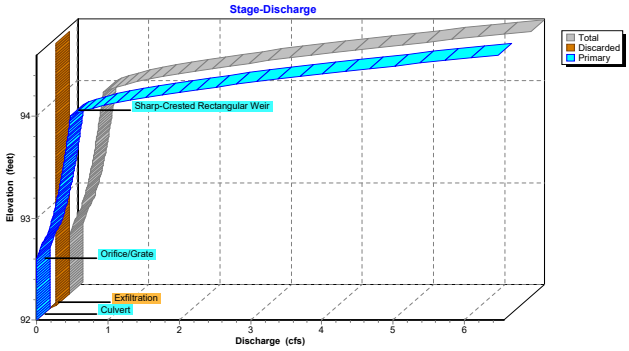
Discarded OutFlow Max=0.08 cfs @ 10.27 hrs HW=92.03' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.32 cfs @ 13.04 hrs HW=93.29' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.32 cfs of 5.18 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 3.64 fps)
└─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP3: POROUS PAVER #3



Pond PP3: POROUS PAVER #3



Summary for Pond PP4: POROUS PAVER #4

Inflow Area = 0.085 ac, 89.41% Impervious, Inflow Depth = 4.41" for 10-Year event
Inflow = 0.46 cfs @ 12.10 hrs, Volume= 0.031 af
Outflow = 0.05 cfs @ 15.18 hrs, Volume= 0.031 af, Atten= 89%, Lag= 185.0 min
Primary = 0.05 cfs @ 15.18 hrs, Volume= 0.031 af
Routed to Pond B2 : BASIN 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.76' @ 14.84 hrs Surf.Area= 0.027 ac Storage= 0.021 af

Plug-Flow detention time= 323.5 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 321.9 min (1,071.6 - 749.8)

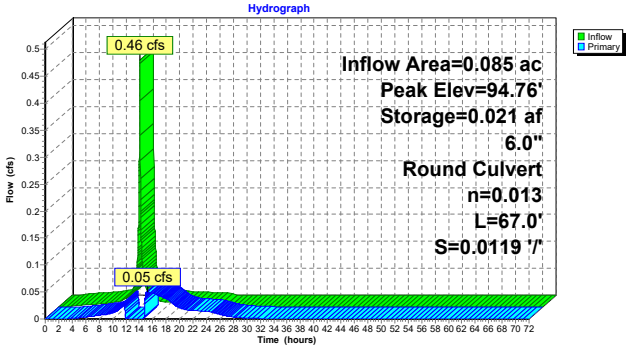
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.027 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.027	176.0	0.000	0.000	0.027
95.00	0.027	176.0	0.027	0.027	0.031

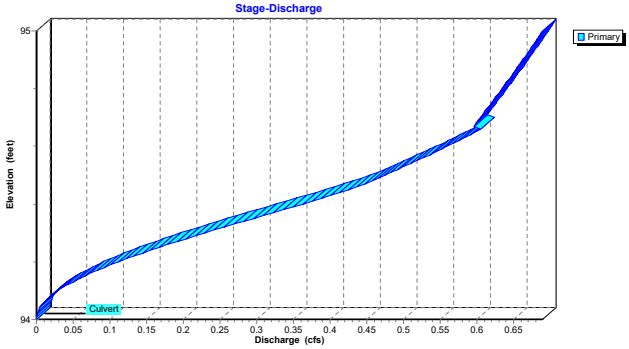
Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**6.0" Round Culvert** L= 67.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.20' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.20 sf

Primary OutFlow Max=0.05 cfs @ 15.18 hrs HW=94.72' TW=94.72' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.05 cfs @ 0.25 fps)

Pond PP4: POROUS PAVER #4



Pond PP4: POROUS PAVER #4



Summary for Pond PP5: POROUS PAVER #5

Inflow Area = 0.230 ac, 95.22% Impervious, Inflow Depth = 4.61" for 10-Year event
Inflow = 1.04 cfs @ 12.13 hrs, Volume= 0.088 af
Outflow = 0.85 cfs @ 12.18 hrs, Volume= 0.079 af, Atten= 18%, Lag= 3.2 min
Primary = 0.85 cfs @ 12.18 hrs, Volume= 0.079 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.79' @ 12.18 hrs Surf.Area= 0.094 ac Storage= 0.030 af

Plug-Flow detention time= 182.9 min calculated for 0.079 af (89% of inflow)
Center-of-Mass det. time= 128.0 min (880.6 - 752.6)

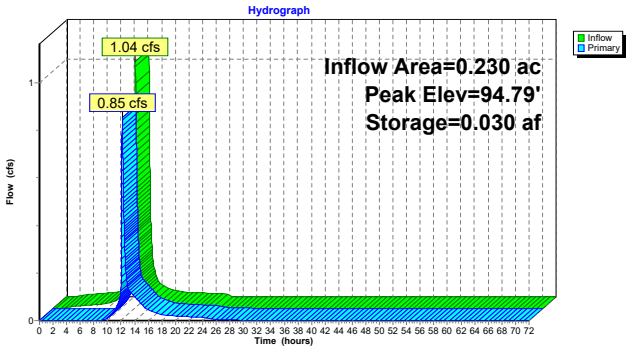
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.038 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.094 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.094	532.0	0.000	0.000	0.094
95.00	0.094	532.0	0.094	0.094	0.106

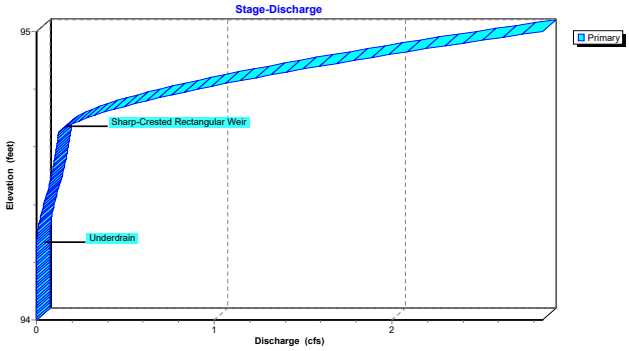
Device	Routing	Invert	Outlet Devices
#1	Primary	91.87'	**24.0" Round Culvert** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 91.87' / 91.69' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.65'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.85 cfs @ 12.18 hrs HW=94.79' TW=91.86' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.85 cfs of 17.66 cfs potential flow)
↑**2=Underdrain** (Orifice Controls 0.15 cfs @ 3.11 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.70 cfs @ 1.23 fps)

Pond PP5: POROUS PAVER #5



Pond PP5: POROUS PAVER #5



Summary for Pond PP6: POROUS PAVER #6

Inflow Area = 0.180 ac, 97.78% Impervious, Inflow Depth = 4.70" for 10-Year event
Inflow = 1.04 cfs @ 12.09 hrs, Volume= 0.070 af
Outflow = 0.07 cfs @ 13.02 hrs, Volume= 0.067 af, Atten= 93%, Lag= 55.5 min
Primary = 0.07 cfs @ 13.02 hrs, Volume= 0.067 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.47' @ 13.02 hrs Surf.Area= 0.198 ac Storage= 0.044 af

Plug-Flow detention time= 579.1 min calculated for 0.067 af (95% of inflow)
Center-of-Mass det. time= 547.4 min (1,292.2 - 744.8)

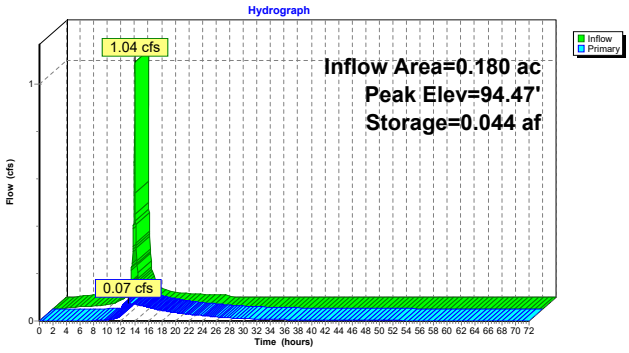
Volume	Invert	Avail.Storage	Storage Description
#1	94.25'	0.198 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.25	0.198	718.0	0.000	0.000	0.198
95.25	0.198	718.0	0.198	0.198	0.214

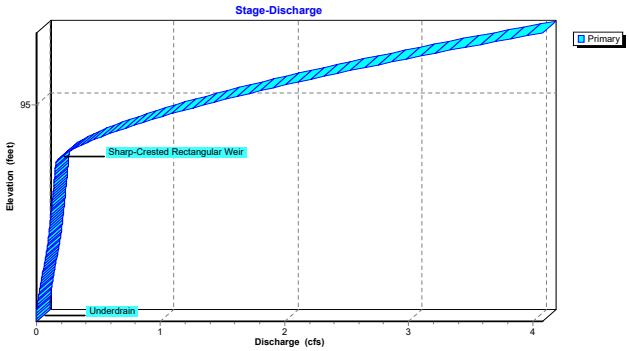
Device	Routing	Invert	Outlet Devices
#1	Primary	92.84'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.84' / 92.74' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.07 cfs @ 13.02 hrs HW=94.47' TW=92.96' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.07 cfs of 5.35 cfs potential flow)
↑—**2=Underdrain** (Orifice Controls 0.07 cfs @ 1.61 fps)
└—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP6: POROUS PAVER #6



Pond PP6: POROUS PAVER #6



Summary for Pond PP7: ROAD POROUS PAVEMENT #7

Inflow Area = 0.373 ac, 68.90% Impervious, Inflow Depth = 3.72" for 10-Year event
Inflow = 1.37 cfs @ 12.13 hrs, Volume= 0.116 af
Outflow = 0.27 cfs @ 12.60 hrs, Volume= 0.113 af, Atten= 80%, Lag= 28.3 min
Primary = 0.27 cfs @ 12.60 hrs, Volume= 0.113 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 89.96' @ 12.60 hrs Surf.Area= 0.133 ac Storage= 0.061 af

Plug-Flow detention time= 393.7 min calculated for 0.113 af (98% of inflow)
Center-of-Mass det. time= 381.8 min (1,147.2 - 765.4)

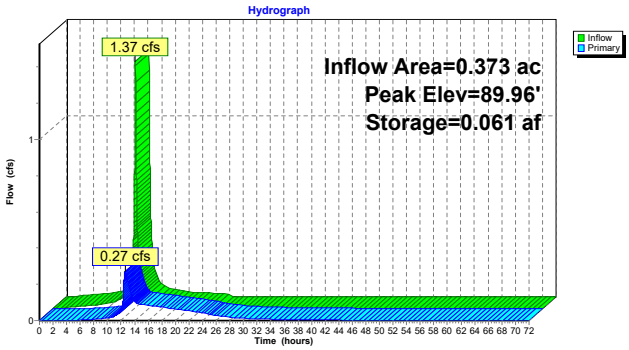
Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	0.133 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
89.50	0.133	832.0	0.000	0.000	0.133
90.50	0.133	832.0	0.133	0.133	0.152

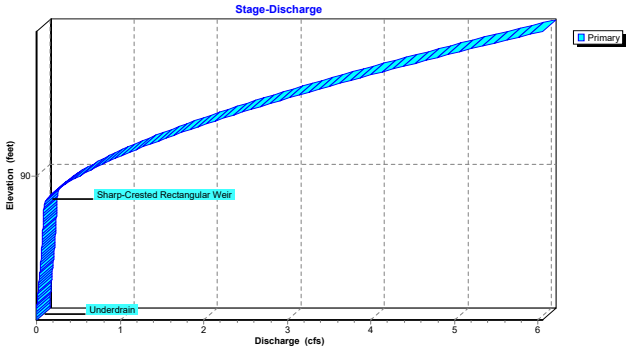
Device	Routing	Invert	Outlet Devices
#1	Primary	87.28'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 87.28' / 87.23' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	89.50'	**2.5" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	89.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.27 cfs @ 12.60 hrs HW=89.96' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.27 cfs of 8.46 cfs potential flow)
↑—**2=Underdrain** (Orifice Controls 0.10 cfs @ 2.86 fps)
└—**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.78 fps)

Pond PP7: ROAD POROUS PAVEMENT #7



Pond PP7: ROAD POROUS PAVEMENT #7

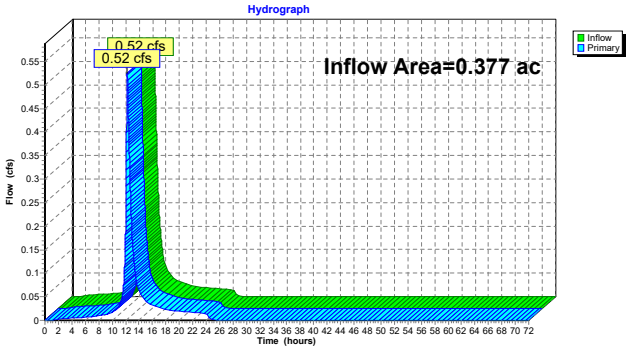


Summary for Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

Inflow Area = 0.377 ac, 25.20% Impervious, Inflow Depth = 2.23" for 10-Year event
Inflow = 0.52 cfs @ 12.25 hrs, Volume= 0.070 af
Primary = 0.52 cfs @ 12.25 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

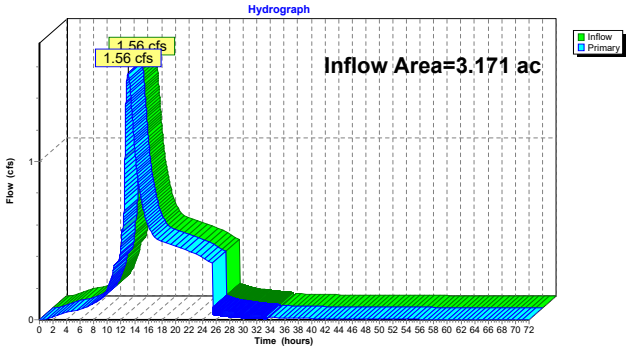


Summary for Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Inflow Area = 3.171 ac, 66.38% Impervious, Inflow Depth > 3.09" for 10-Year event
Inflow = 1.56 cfs @ 13.01 hrs, Volume= 0.816 af
Primary = 1.56 cfs @ 13.01 hrs, Volume= 0.816 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

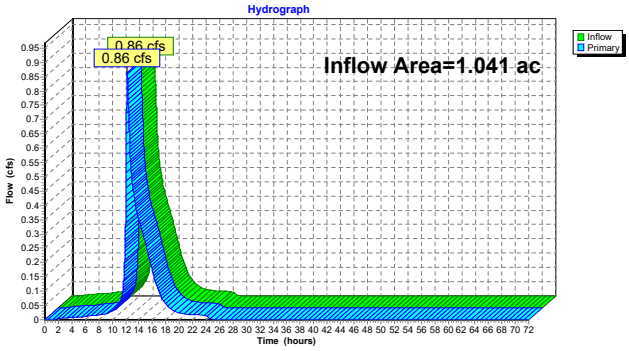


Summary for Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Inflow Area = 1.041 ac, 72.62% Impervious, Inflow Depth = 2.07" for 10-Year event
Inflow = 0.86 cfs @ 12.23 hrs, Volume= 0.180 af
Primary = 0.86 cfs @ 12.23 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



Summary for Subcatchment P1-A: BYPASS

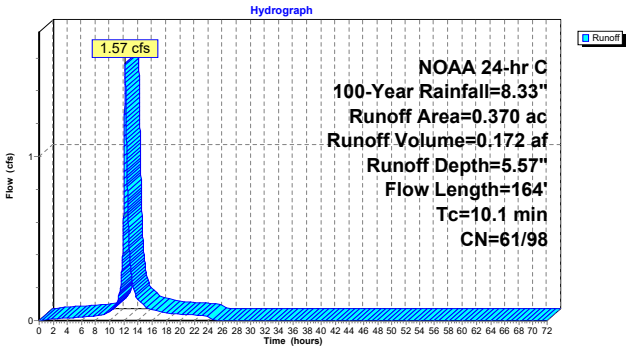
Runoff = 1.57 cfs @ 12.19 hrs, Volume= 0.172 af, Depth= 5.57"
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.212	61	>75% Grass cover, Good, HSG B
0.158	98	Paved parking, HSG B
0.370	77	Weighted Average
0.212	61	57.30% Pervious Area
0.158	98	42.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	9	0.0560	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.6	8	0.1200	0.22		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.35"
3.6	35	0.0280	0.16		**Sheet Flow, C-D** Grass: Short n= 0.150 P2= 3.35"
3.2	17	0.0090	0.09		**Sheet Flow, D-E** Grass: Short n= 0.150 P2= 3.35"
0.3	11	0.0075	0.61		**Sheet Flow, E-F** Smooth surfaces n= 0.011 P2= 3.35"
0.9	7	0.0380	0.13		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 3.35"
0.6	77	0.0110	2.13		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
10.1	164	Total			

Subcatchment P1-A: BYPASS



Summary for Subcatchment P1-B: PPA #1

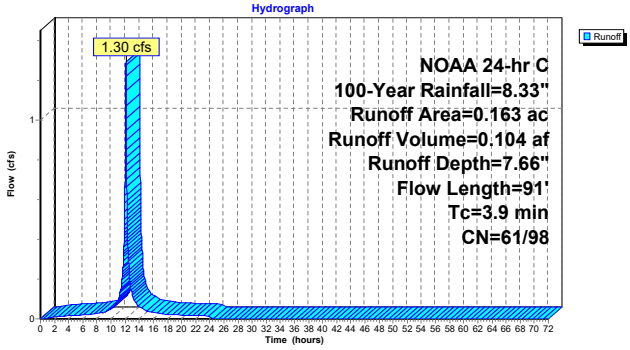
Runoff = 1.30 cfs @ 12.12 hrs, Volume= 0.104 af, Depth= 7.66"
Routed to Pond PP1 : POROUS PAVER #1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.147	98	Paved parking, HSG B
0.016	61	>75% Grass cover, Good, HSG B
0.163	94	Weighted Average
0.016	61	9.82% Pervious Area
0.147	98	90.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	27	0.0200	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.5	64	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
3.9	91	Total			

Subcatchment P1-B: PPA #1



Summary for Subcatchment P1-C: PPA#2

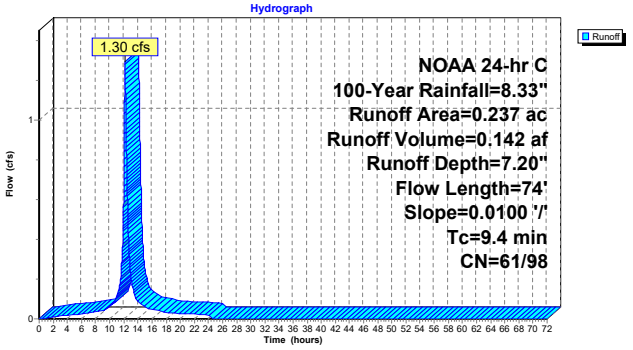
Runoff = 1.30 cfs @ 12.18 hrs, Volume= 0.142 af, Depth= 7.20"
Routed to Pond PP2 : POROUS PAVER #2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.189	98	Paved parking, HSG B
0.048	61	>75% Grass cover, Good, HSG B
0.237	91	Weighted Average
0.048	61	20.25% Pervious Area
0.189	98	79.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.2	7	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.4	74	Total			

Subcatchment P1-C: PPA#2



Summary for Subcatchment P1-D: PPC#3

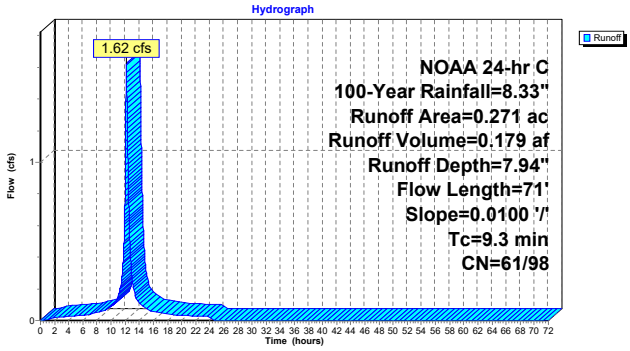
Runoff = 1.62 cfs @ 12.17 hrs, Volume= 0.179 af, Depth= 7.94"
Routed to Pond PP3 : POROUS PAVER #3

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.009	61	>75% Grass cover, Good, HSG B
0.262	98	Paved parking, HSG B
0.271	97	Weighted Average
0.009	61	3.32% Pervious Area
0.262	98	96.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.35"
0.1	4	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
9.3	71	Total			

Subcatchment P1-D: PPC#3



Summary for Subcatchment P2-A: BASIN 1

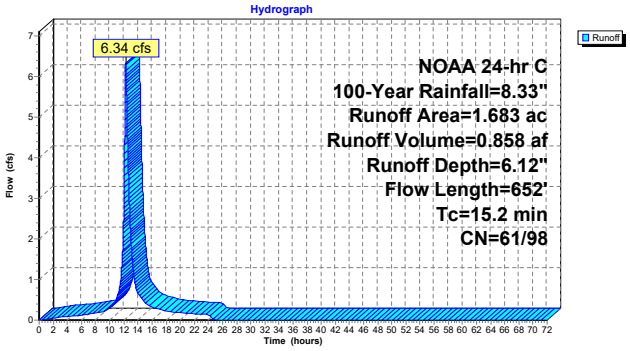
Runoff = 6.34 cfs @ 12.26 hrs, Volume= 0.858 af, Depth= 6.12"
Routed to Pond B1 : BASIN 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.928	98	Paved parking, HSG B
0.755	61	>75% Grass cover, Good, HSG B
1.683	81	Weighted Average
0.755	61	44.86% Pervious Area
0.928	98	55.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	67	0.0100	0.12		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
3.5	148	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
2.5	437	0.0030	2.88	3.54	**Pipe Channel, CD** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, bends & connections
15.2	652	Total			

Subcatchment P2-A: BASIN 1



Summary for Subcatchment P2-B: BASIN #2

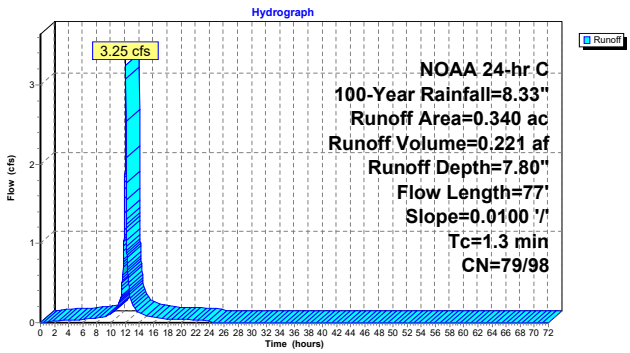
Runoff = 3.25 cfs @ 12.10 hrs, Volume= 0.221 af, Depth= 7.80"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.297	98	Roofs, HSG B
0.043	79	<50% Grass cover, Poor, HSG B
0.340	96	Weighted Average
0.043	79	12.65% Pervious Area
0.297	98	87.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	77	0.0100	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-B: BASIN #2



Summary for Subcatchment P2-C: PPA #4

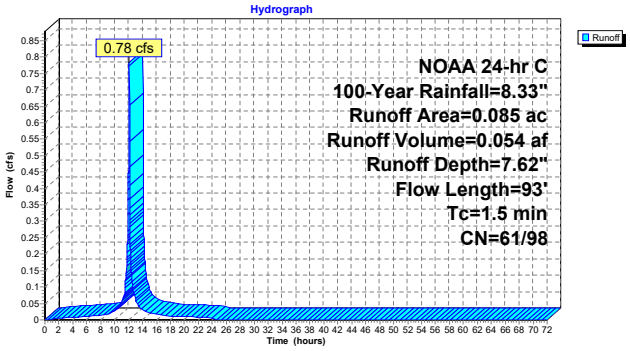
Runoff = 0.78 cfs @ 12.10 hrs, Volume= 0.054 af, Depth= 7.62"
Routed to Pond PP4 : POROUS PAVER #4

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.076	98	Paved parking, HSG B
0.009	61	>75% Grass cover, Good, HSG B
0.085	94	Weighted Average
0.009	61	10.59% Pervious Area
0.076	98	89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	67	0.0160	1.19		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
0.6	26	0.0075	0.73		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
1.5	93	Total			

Subcatchment P2-C: PPA #4



Summary for Subcatchment P2-D: PPA#5

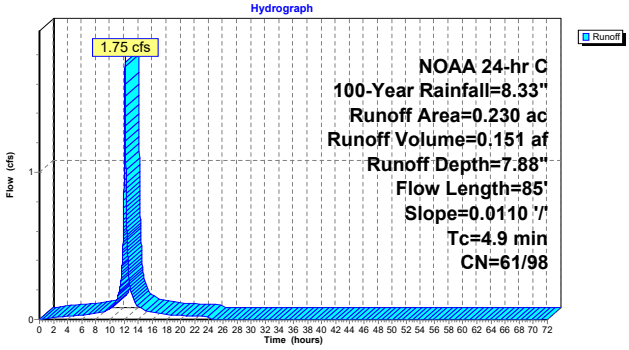
Runoff = 1.75 cfs @ 12.13 hrs, Volume= 0.151 af, Depth= 7.88"
Routed to Pond PP5 : POROUS PAVER #5

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.219	98	Paved parking, HSG B
0.011	61	>75% Grass cover, Good, HSG B
0.230	96	Weighted Average
0.011	61	4.78% Pervious Area
0.219	98	95.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	24	0.0110	0.10		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
1.0	61	0.0110	1.00		**Sheet Flow, BC** Smooth surfaces n= 0.011 P2= 3.35"
4.9	85	Total			

Subcatchment P2-D: PPA#5



Summary for Subcatchment P2-E: PPA#6

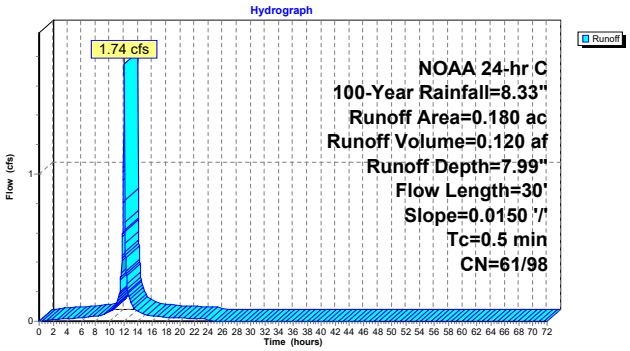
Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.120 af, Depth= 7.99"
Routed to Pond PP6 : POROUS PAVER #6

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.176	98	Paved parking, HSG B
0.004	61	>75% Grass cover, Good, HSG B
0.180	97	Weighted Average
0.004	61	2.22% Pervious Area
0.176	98	97.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0150	0.99		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"

Subcatchment P2-E: PPA#6



Summary for Subcatchment P2-F: ROAD

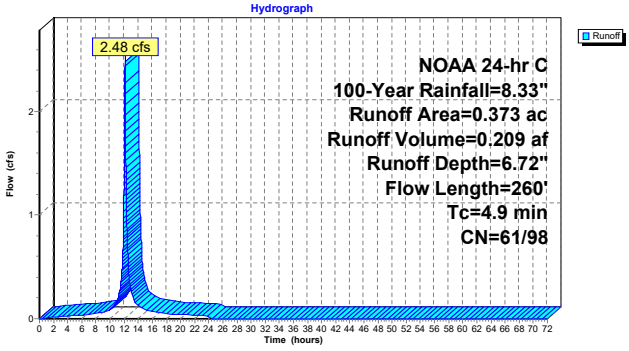
Runoff = 2.48 cfs @ 12.13 hrs, Volume= 0.209 af, Depth= 6.72"
Routed to Pond PP7 : ROAD POROUS PAVEMENT #7

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.257	98	Paved parking, HSG B
0.116	61	>75% Grass cover, Good, HSG B
0.373	86	Weighted Average
0.116	61	31.10% Pervious Area
0.257	98	68.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	20	0.0250	1.12		**Sheet Flow, AB** Smooth surfaces n= 0.011 P2= 3.35"
2.3	31	0.0700	0.23		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
0.3	22	0.0400	1.37		**Sheet Flow, CD** Smooth surfaces n= 0.011 P2= 3.35"
2.0	187	0.0060	1.57		**Shallow Concentrated Flow, DE** Paved Kv= 20.3 fps
4.9	260	Total			

Subcatchment P2-F: ROAD



Summary for Subcatchment P2-G: BYPASS

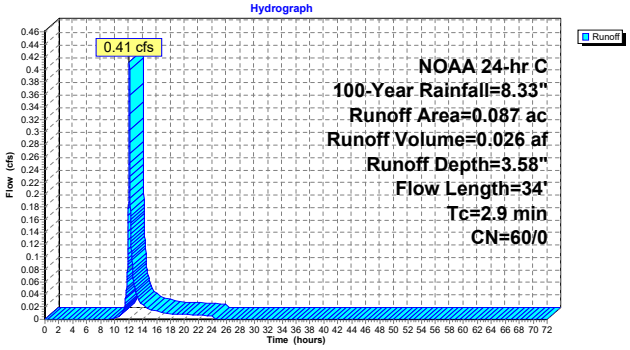
Runoff = 0.41 cfs @ 12.11 hrs, Volume= 0.026 af, Depth= 3.58"
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.079	61	>75% Grass cover, Good, HSG B
0.000	98	Paved parking, HSG B
0.008	55	Woods, Good, HSG B
0.087	60	Weighted Average
0.087	60	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	12	0.1100	0.23		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
0.4	7	0.2900	0.30		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
1.6	15	0.0400	0.16		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
2.9	34	Total			

Subcatchment P2-G: BYPASS



Summary for Subcatchment P2-H: Princeton-Hightstown Road

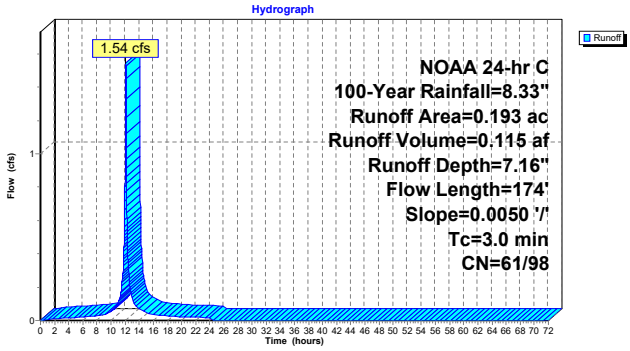
Runoff = 1.54 cfs @ 12.11 hrs, Volume= 0.115 af, Depth= 7.16"
Routed to Pond B2 : BASIN 2

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.041	61	>75% Grass cover, Good, HSG B
0.152	98	Paved parking, HSG B
0.193	90	Weighted Average
0.041	61	21.24% Pervious Area
0.152	98	78.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	100	0.0050	0.81		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.35"
0.9	74	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	174	Total			

Subcatchment P2-H: Princeton-Hightstown Road



Summary for Subcatchment P3-A: PDA 3

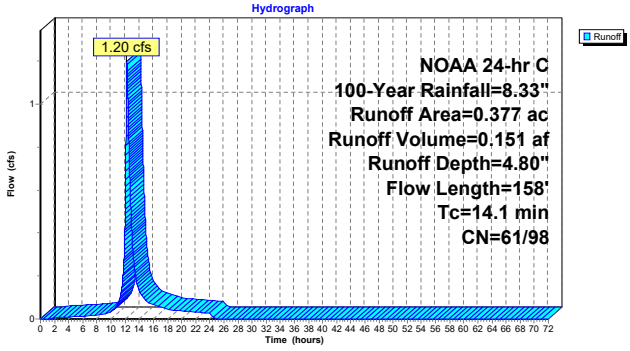
Runoff = 1.20 cfs @ 12.25 hrs, Volume= 0.151 af, Depth= 4.80"
Routed to Link EDA 3 : TRIBUTARY TO SOUTHFIELD ROAD

Runoff by SCS TR-20 method, UH=Delmarva, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.282	61	>75% Grass cover, Good, HSG B
0.095	98	Paved parking, HSG B
0.377	70	Weighted Average
0.282	61	74.80% Pervious Area
0.095	98	25.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	7	0.1800	0.25		**Sheet Flow, AB** Grass: Short n= 0.150 P2= 3.35"
4.6	40	0.0200	0.14		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.35"
7.6	53	0.0100	0.12		**Sheet Flow, CD** Grass: Short n= 0.150 P2= 3.35"
0.5	27	0.0170	0.91		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
0.9	31	0.0070	0.59		**Shallow Concentrated Flow, EF** Short Grass Pasture Kv= 7.0 fps
14.1	158	Total			

Subcatchment P3-A: PDA 3



Summary for Pond B1: BASIN 1

Inflow Area = 2.711 ac, 68.17% Impervious, Inflow Depth = 5.98" for 100-Year event
Inflow = 10.50 cfs @ 12.14 hrs, Volume= 1.352 af
Outflow = 4.40 cfs @ 12.70 hrs, Volume= 1.352 af, Atten= 58%, Lag= 34.0 min
Primary = 4.40 cfs @ 12.70 hrs, Volume= 1.352 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.06' @ 12.70 hrs Surf.Area= 0.195 ac Storage= 0.419 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 125.1 min (965.1 - 840.0)

Volume	Invert	Avail.Storage	Storage Description
#1	91.25'	0.617 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

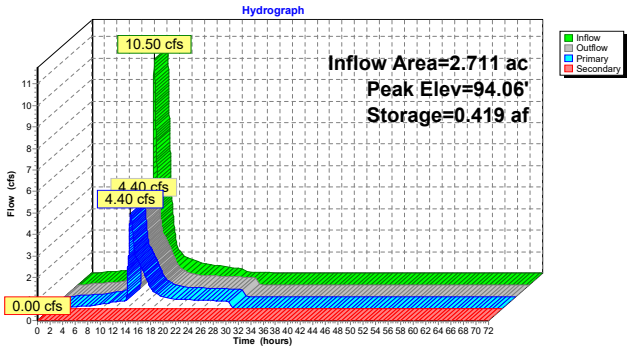
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
91.25	0.105	398.0	0.000	0.000	0.105
92.00	0.128	423.0	0.087	0.087	0.143
93.00	0.160	437.0	0.144	0.231	0.167
94.00	0.193	452.0	0.176	0.407	0.194
95.00	0.227	466.0	0.210	0.617	0.219

Device	Routing	Invert	Outlet Devices
#1	Primary	89.25'	**15.0" Round Culvert** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 89.25' / 89.09' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	89.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	93.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	94.13'	**105.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

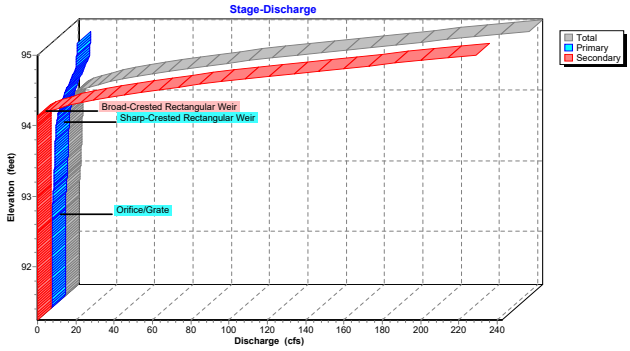
Primary OutFlow Max=4.40 cfs @ 12.70 hrs HW=94.06' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 4.40 cfs of 12.17 cfs potential flow)
  - **2=Underdrain** (Orifice Controls 0.51 cfs @ 10.42 fps)
  - **3=Orifice/Grate** (Orifice Controls 2.16 cfs @ 5.51 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 1.72 cfs @ 1.67 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.25' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond B1: BASIN 1



Pond B1: BASIN 1



Summary for Pond B2: BASIN 2

Inflow Area = 0.618 ac, 84.95% Impervious, Inflow Depth = 7.57" for 100-Year event
Inflow = 4.76 cfs @ 12.10 hrs, Volume= 0.390 af
Outflow = 4.44 cfs @ 12.11 hrs, Volume= 0.390 af, Atten= 7%, Lag= 0.9 min
Discarded = 0.06 cfs @ 6.96 hrs, Volume= 0.154 af
Primary = 4.38 cfs @ 12.11 hrs, Volume= 0.236 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 95.53' @ 12.11 hrs Surf.Area= 0.034 ac Storage= 0.079 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 134.5 min (921.9 - 787.4)

Volume	Invert	Avail.Storage	Storage Description
#1	93.20'	0.109 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

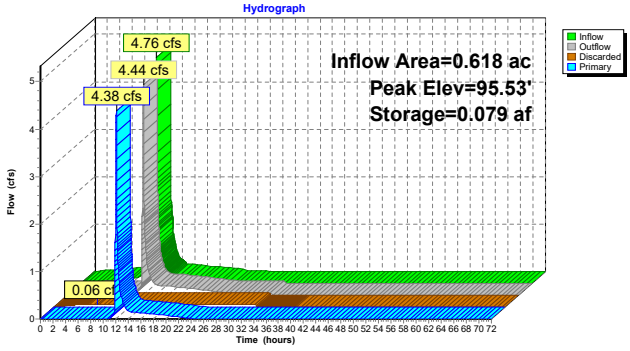
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
93.20	0.034	0.000	0.000
94.20	0.034	0.034	0.034
96.40	0.034	0.075	0.109

Device	Routing	Invert	Outlet Devices
#1	Primary	92.20'	**24.0" Round Culvert** L= 66.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.20' / 92.18' S= 0.0003 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Discarded	93.20'	**3.600 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	94.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	95.05'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	95.55'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 in 48.0" x 48.0" Grate (100% open area) Limited to weir flow at low heads

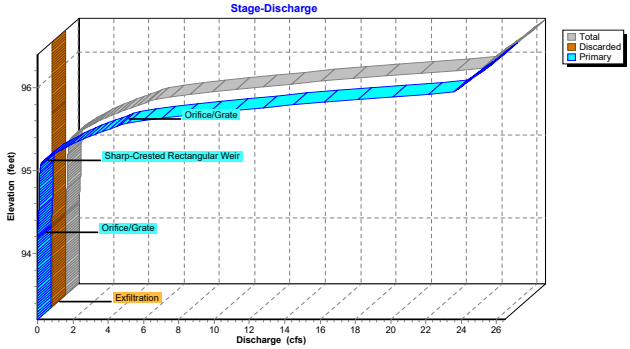
Discarded OutFlow Max=0.06 cfs @ 6.96 hrs HW=93.23' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=4.37 cfs @ 12.11 hrs HW=95.53' TW=92.71' (Dynamic Tailwater)
└**1=Culvert** (Passes 4.37 cfs of 20.56 cfs potential flow)
  └**3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.36 fps)
  └**4=Sharp-Crested Rectangular Weir** (Weir Controls 4.18 cfs @ 2.25 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond B2: BASIN 2



Pond B2: BASIN 2



Summary for Pond PP1: POROUS PAVER #1

Inflow Area = 0.163 ac, 90.18% Impervious, Inflow Depth = 7.66" for 100-Year event
Inflow = 1.30 cfs @ 12.12 hrs, Volume= 0.104 af
Outflow = 1.15 cfs @ 12.14 hrs, Volume= 0.104 af, Atten= 11%, Lag= 1.5 min
Primary = 1.15 cfs @ 12.14 hrs, Volume= 0.106 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.12' @ 12.68 hrs Surf.Area= 0.041 ac Storage= 0.033 af

Plug-Flow detention time= 150.2 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 149.9 min (896.6 - 746.6)

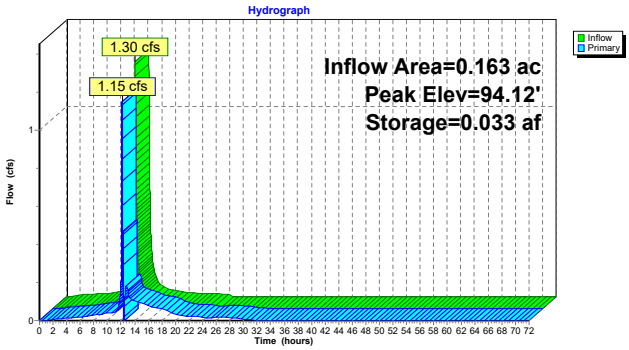
Volume	Invert	Avail.Storage	Storage Description
#1	92.10'	0.035 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.087 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.10	0.041	243.4	0.000	0.000	0.041
94.23	0.041	243.4	0.087	0.087	0.053

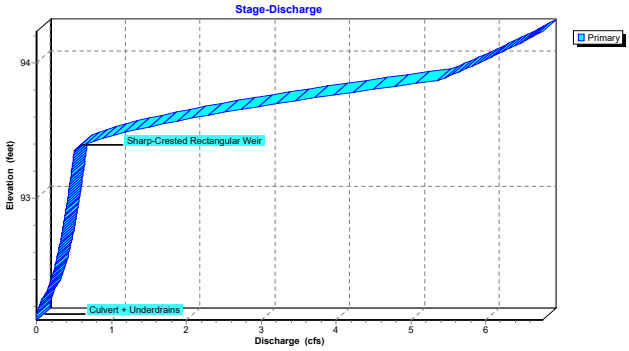
Device	Routing	Invert	Outlet Devices
#1	Primary	92.10'	**15.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.10' / 92.00' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.10'	**3.0" Vert. Underdrains X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	93.35'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.14 cfs @ 12.14 hrs HW=93.52' TW=93.29' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.14 cfs of 2.84 cfs potential flow)
  └**2=Underdrains** (Orifice Controls 0.23 cfs @ 2.31 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.92 cfs @ 1.35 fps)

Pond PP1: POROUS PAVER #1



Pond PP1: POROUS PAVER #1



Summary for Pond PP2: POROUS PAVER #2

Inflow Area = 0.237 ac, 79.75% Impervious, Inflow Depth = 7.20" for 100-Year event
Inflow = 1.30 cfs @ 12.18 hrs, Volume= 0.142 af
Outflow = 0.74 cfs @ 12.41 hrs, Volume= 0.142 af, Atten= 43%, Lag= 14.1 min
Primary = 0.74 cfs @ 12.41 hrs, Volume= 0.142 af
Routed to Pond PP3 : POROUS PAVER #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.29' @ 12.44 hrs Surf.Area= 0.052 ac Storage= 0.029 af

Plug-Flow detention time= 58.6 min calculated for 0.142 af (100% of inflow)
Center-of-Mass det. time= 58.7 min (819.7 - 761.0)

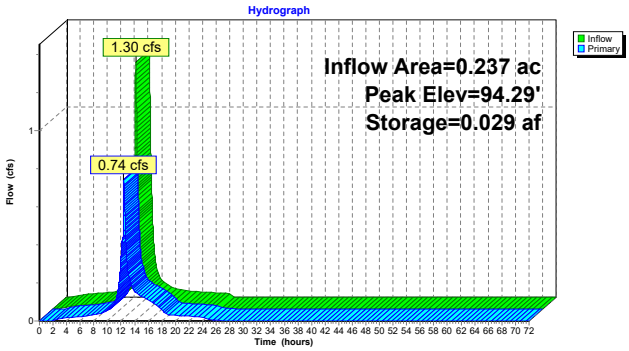
Volume	Invert	Avail.Storage	Storage Description
#1	92.90'	0.040 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.099 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
92.90	0.052	298.0	0.000	0.000	0.052
94.80	0.052	298.0	0.099	0.099	0.065

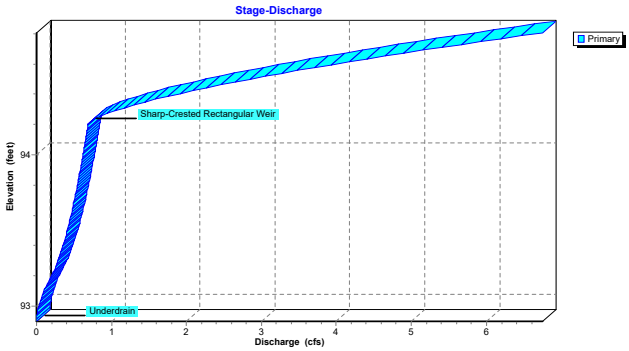
Device	Routing	Invert	Outlet Devices
#1	Primary	92.80'	**15.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.80' / 92.41' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	92.90'	**5.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.20'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.74 cfs @ 12.41 hrs HW=94.29' TW=93.91' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.74 cfs of 3.62 cfs potential flow)
└─**2=Underdrain** (Orifice Controls 0.40 cfs @ 2.95 fps)
└─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 0.97 fps)

Pond PP2: POROUS PAVER #2



Pond PP2: POROUS PAVER #2



Summary for Pond PP3: POROUS PAVER #3

Inflow Area = 0.671 ac, 89.12% Impervious, Inflow Depth = 7.64" for 100-Year event
Inflow = 3.14 cfs @ 12.15 hrs, Volume= 0.427 af
Outflow = 1.11 cfs @ 12.68 hrs, Volume= 0.428 af, Atten= 65%, Lag= 31.7 min
Discarded = 0.08 cfs @ 7.93 hrs, Volume= 0.184 af
Primary = 1.03 cfs @ 12.68 hrs, Volume= 0.244 af
Routed to Link PDA1 : PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.12' @ 12.68 hrs Surf.Area= 0.157 ac Storage= 0.133 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 150.2 min (959.7 - 809.5)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	0.163 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.408 af Overall x 40.0% Voids

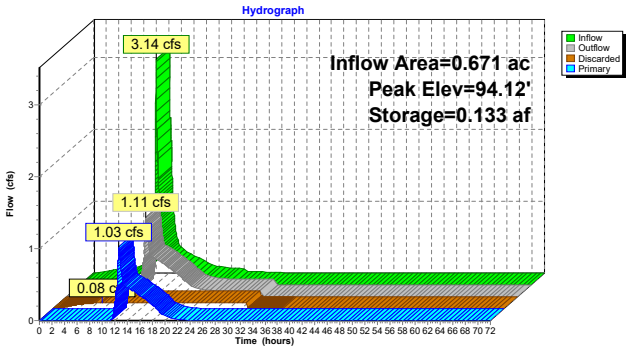
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
92.00	0.157	0.000	0.000
94.60	0.157	0.408	0.408

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**15.0" Round Culvert** L= 58.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.00' / 91.42' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Discarded	92.00'	**1.000 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	92.55'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	94.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

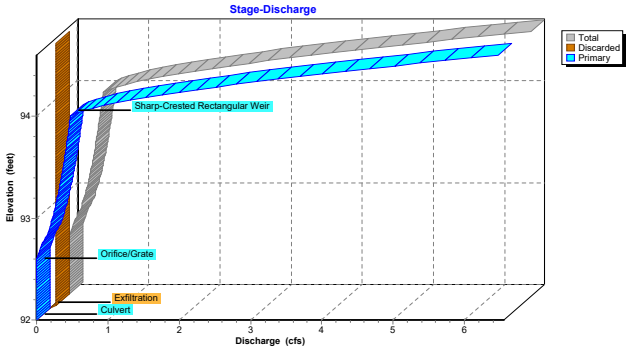
Discarded OutFlow Max=0.08 cfs @ 7.93 hrs HW=92.03' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=1.03 cfs @ 12.68 hrs HW=94.12' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.03 cfs of 7.42 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.50 cfs @ 5.70 fps)
└─**4=Sharp-Crested Rectangular Weir** (Weir Controls 0.53 cfs @ 1.12 fps)

Pond PP3: POROUS PAVER #3



Pond PP3: POROUS PAVER #3



Summary for Pond PP4: POROUS PAVER #4

Inflow Area = 0.085 ac, 89.41% Impervious, Inflow Depth = 7.62" for 100-Year event
Inflow = 0.78 cfs @ 12.10 hrs, Volume= 0.054 af
Outflow = 0.30 cfs @ 12.32 hrs, Volume= 0.054 af, Atten= 62%, Lag= 13.4 min
Primary = 0.30 cfs @ 12.32 hrs, Volume= 0.054 af
Routed to Pond B2 : BASIN 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 95.51' @ 12.32 hrs Surf.Area= 0.027 ac Storage= 0.027 af

Plug-Flow detention time= 299.5 min calculated for 0.054 af (100% of inflow)
Center-of-Mass det. time= 298.6 min (1,042.0 - 743.4)

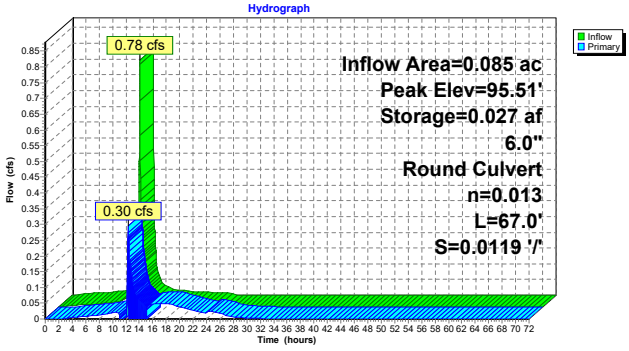
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.027 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.027	176.0	0.000	0.000	0.027
95.00	0.027	176.0	0.027	0.027	0.031

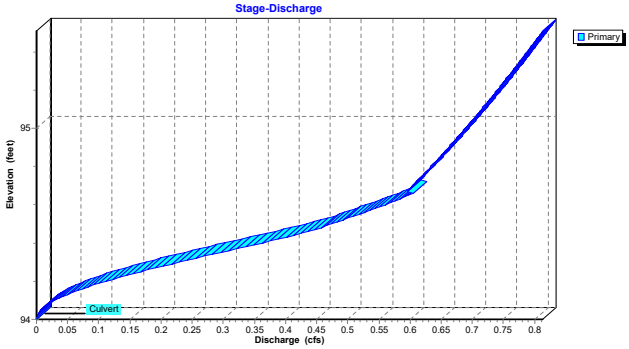
Device	Routing	Invert	Outlet Devices
#1	Primary	94.00'	**6.0" Round Culvert** L= 67.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.00' / 93.20' S= 0.0119 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.20 sf

Primary OutFlow Max=0.29 cfs @ 12.32 hrs HW=95.49' TW=95.26' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.29 cfs @ 1.45 fps)

Pond PP4: POROUS PAVER #4



Pond PP4: POROUS PAVER #4



Summary for Pond PP5: POROUS PAVER #5

Inflow Area = 0.230 ac, 95.22% Impervious, Inflow Depth = 7.88" for 100-Year event
Inflow = 1.75 cfs @ 12.13 hrs, Volume= 0.151 af
Outflow = 1.57 cfs @ 12.16 hrs, Volume= 0.141 af, Atten= 10%, Lag= 2.1 min
Primary = 1.57 cfs @ 12.16 hrs, Volume= 0.141 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.88' @ 12.16 hrs Surf.Area= 0.094 ac Storage= 0.033 af

Plug-Flow detention time= 133.7 min calculated for 0.141 af (94% of inflow)
Center-of-Mass det. time= 96.6 min (842.2 - 745.6)

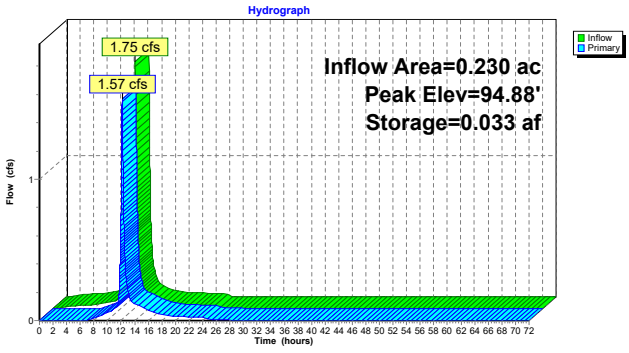
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	0.038 af	**Custom Stage Data (Irregular)** Listed below (Recalc) 0.094 af Overall x 40.0% Voids

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.00	0.094	532.0	0.000	0.000	0.094
95.00	0.094	532.0	0.094	0.094	0.106

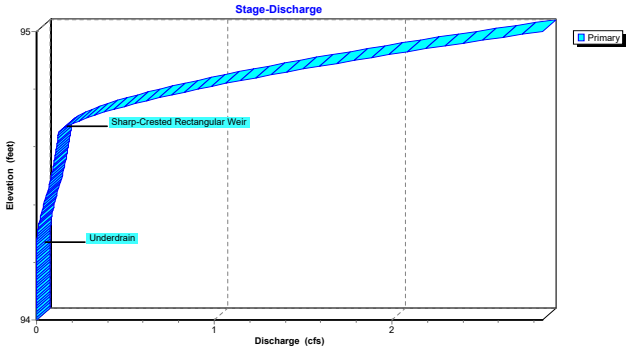
Device	Routing	Invert	Outlet Devices
#1	Primary	91.87'	**24.0" Round Culvert** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 91.87' / 91.69' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.65'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.57 cfs @ 12.16 hrs HW=94.88' TW=92.97' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.57 cfs of 18.32 cfs potential flow)
↑**2=Underdrain** (Orifice Controls 0.17 cfs @ 3.41 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.40 cfs @ 1.56 fps)

Pond PP5: POROUS PAVER #5



Pond PP5: POROUS PAVER #5



Summary for Pond PP6: POROUS PAVER #6

Inflow Area = 0.180 ac, 97.78% Impervious, Inflow Depth = 7.99" for 100-Year event
Inflow = 1.74 cfs @ 12.09 hrs, Volume= 0.120 af
Outflow = 0.12 cfs @ 13.10 hrs, Volume= 0.116 af, Atten= 93%, Lag= 60.8 min
Primary = 0.12 cfs @ 13.10 hrs, Volume= 0.116 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.62' @ 13.10 hrs Surf.Area= 0.198 ac Storage= 0.074 af

Plug-Flow detention time= 510.3 min calculated for 0.116 af (97% of inflow)
Center-of-Mass det. time= 488.9 min (1,226.5 - 737.6)

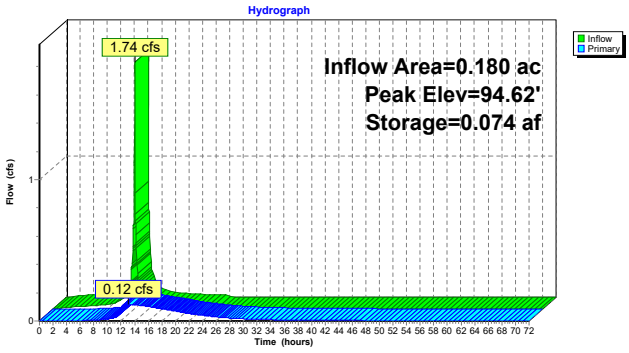
Volume	Invert	Avail.Storage	Storage Description
#1	94.25'	0.198 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
94.25	0.198	718.0	0.000	0.000	0.198
95.25	0.198	718.0	0.198	0.198	0.214

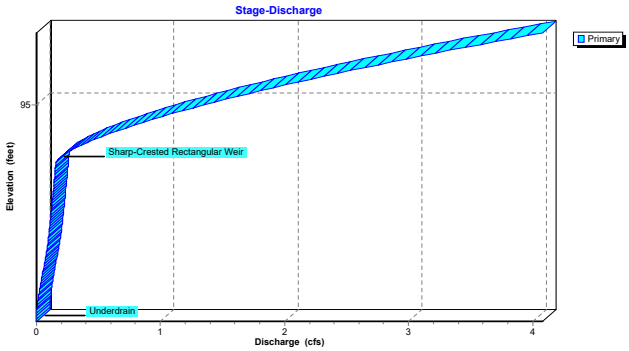
Device	Routing	Invert	Outlet Devices
#1	Primary	92.84'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 92.84' / 92.74' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	94.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	94.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.12 cfs @ 13.10 hrs HW=94.62' TW=93.95' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 4.85 cfs potential flow)
↑**2=Underdrain** (Orifice Controls 0.12 cfs @ 2.39 fps)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP6: POROUS PAVER #6



Pond PP6: POROUS PAVER #6



Summary for Pond PP7: ROAD POROUS PAVEMENT #7

Inflow Area = 0.373 ac, 68.90% Impervious, Inflow Depth = 6.72" for 100-Year event
Inflow = 2.48 cfs @ 12.13 hrs, Volume= 0.209 af
Outflow = 1.35 cfs @ 12.28 hrs, Volume= 0.207 af, Atten= 46%, Lag= 8.9 min
Primary = 1.35 cfs @ 12.28 hrs, Volume= 0.207 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 90.11' @ 12.28 hrs Surf.Area= 0.133 ac Storage= 0.081 af

Plug-Flow detention time= 274.2 min calculated for 0.207 af (99% of inflow)
Center-of-Mass det. time= 267.2 min (1,028.3 - 761.0)

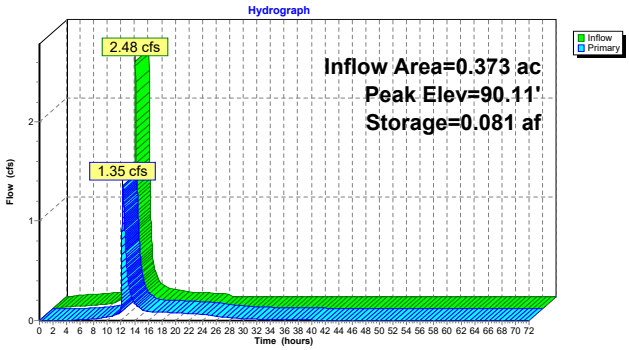
Volume	Invert	Avail.Storage	Storage Description
#1	89.50'	0.133 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
89.50	0.133	832.0	0.000	0.000	0.133
90.50	0.133	832.0	0.133	0.133	0.152

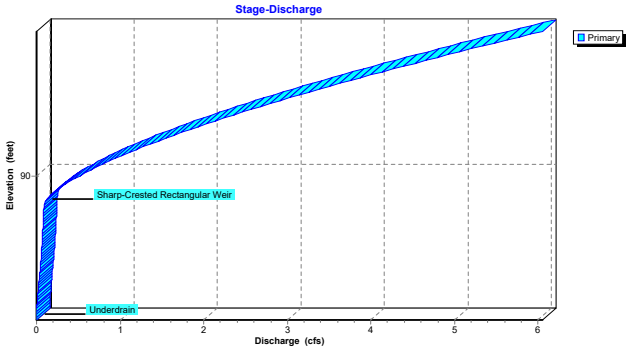
Device	Routing	Invert	Outlet Devices
#1	Primary	87.28'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 87.28' / 87.23' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	89.50'	**2.5" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	89.90'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.35 cfs @ 12.28 hrs HW=90.11' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.35 cfs of 8.77 cfs potential flow)
↑**2=Underdrain** (Orifice Controls 0.12 cfs @ 3.42 fps)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.24 cfs @ 1.49 fps)

Pond PP7: ROAD POROUS PAVEMENT #7



Pond PP7: ROAD POROUS PAVEMENT #7

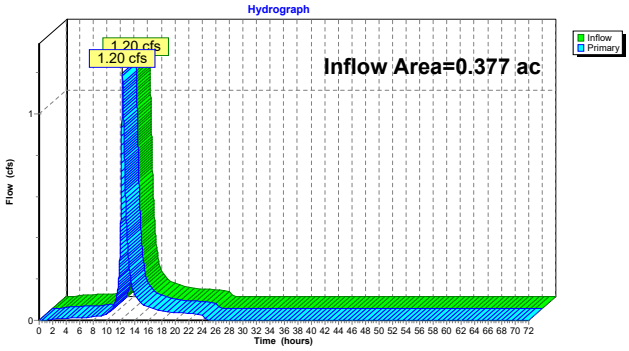


Summary for Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

Inflow Area = 0.377 ac, 25.20% Impervious, Inflow Depth = 4.80" for 100-Year event
Inflow = 1.20 cfs @ 12.25 hrs, Volume= 0.151 af
Primary = 1.20 cfs @ 12.25 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link EDA 3: TRIBUTARY TO SOUTHFIELD ROAD

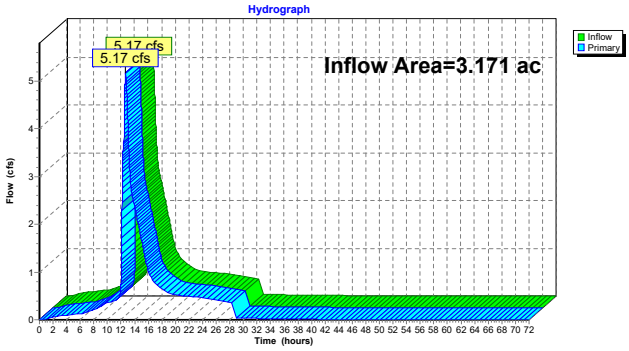


Summary for Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Inflow Area = 3.171 ac, 66.38% Impervious, Inflow Depth > 6.00" for 100-Year event
Inflow = 5.17 cfs @ 12.66 hrs, Volume= 1.585 af
Primary = 5.17 cfs @ 12.66 hrs, Volume= 1.585 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA 2: PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

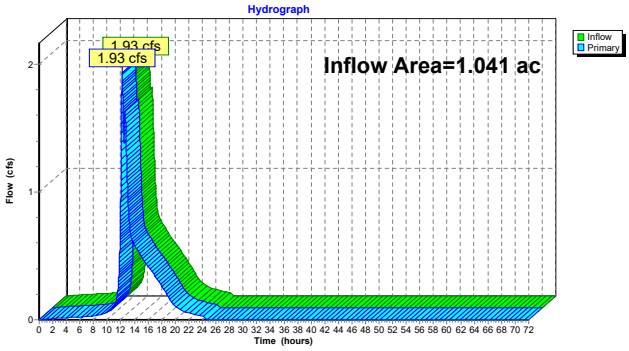


Summary for Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET

Inflow Area = 1.041 ac, 72.62% Impervious, Inflow Depth = 4.79" for 100-Year event
Inflow = 1.93 cfs @ 12.19 hrs, Volume= 0.415 af
Primary = 1.93 cfs @ 12.19 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

Link PDA1: PROPOSED TRIBUTARY TO PRINCETON - HIGHTSTOWN ROAD INLET



B. DESIGN CALCULATIONS

- **McCuen-Spiess Sheet Flow Calculations**
- **Storm Sewer Profiles**
- **Emergency Spillway Calculations**
- **Scour Hole Calculations**
- **Rip Rap Pad Calculations**
- **Pipe Sizing**
- **Groundwater Recharge Worksheet**
- **Low Impact Development Checklist**
- **NJDEP Nonstructural Strategies Points System (NSPS)**
- **Basin Drain Time**
- **Sediment Basin Calculations**
- **First Defense Sizing Calculations**

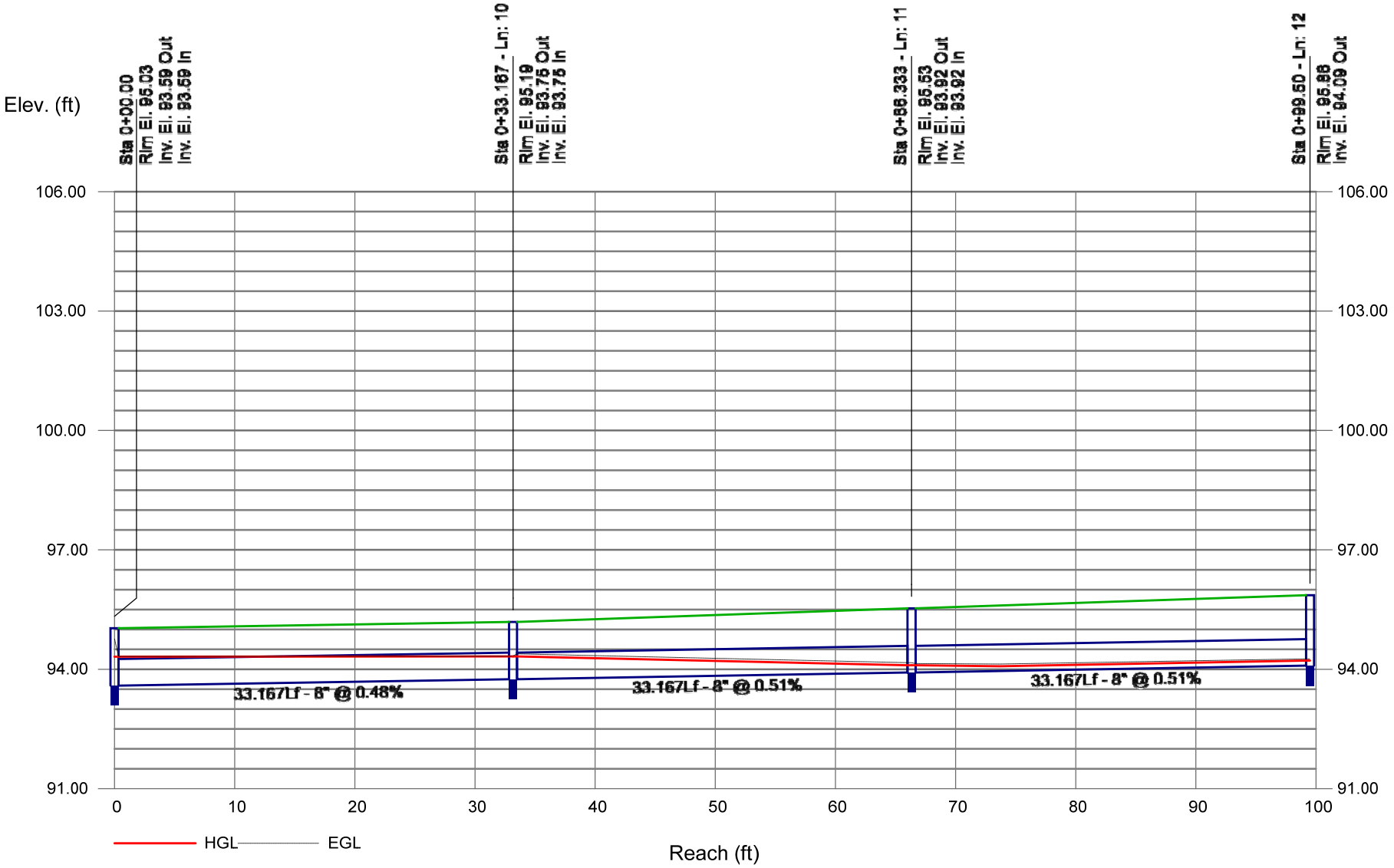
McCuen-Spiess Sheet Flow Calculations

Date: 09/18/2023

Drainage Area	Slope (ft/ft)	Cover Type	Mannings n values	Max. Sheet Flow Length (ft)	Final Max. Sheet Flow Length (ft)
E1	0.012	Woods: Light Underbrush	0.4	27.4	28
E2	0.036	Grass: Short	0.15	126.5	100
E3	0.059	Grass: Short	0.15	161.9	100
P1-A	0.056	Grass: Short	0.15	157.8	100
P1-B	0.02	Grass: Short	0.15	94.3	95
P1-C	0.01	Grass: Short	0.15	66.7	67
P1-D	0.01	Grass: Short	0.15	66.7	67
P2-A	0.01	Grass: Short	0.15	66.7	67
P2-B	0.01	Smooth Surface	0.011	909.1	100
P2-C	0.016	Smooth Surface	0.011	1149.9	100
P2-D	0.011	Grass: Short	0.15	69.9	70
P2-E	0.015	Smooth Surface	0.011	1113.4	100
P2-F	0.025	Smooth Surface	0.011	1437.4	100
P2-G	0.11	Grass: Short	0.15	221.1	100
P2-H	0.005	Smooth Surface	0.011	642.8	100
P3-A	0.18	Grass: Short	0.15	282.8	100

Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



Storm Sewer Profile

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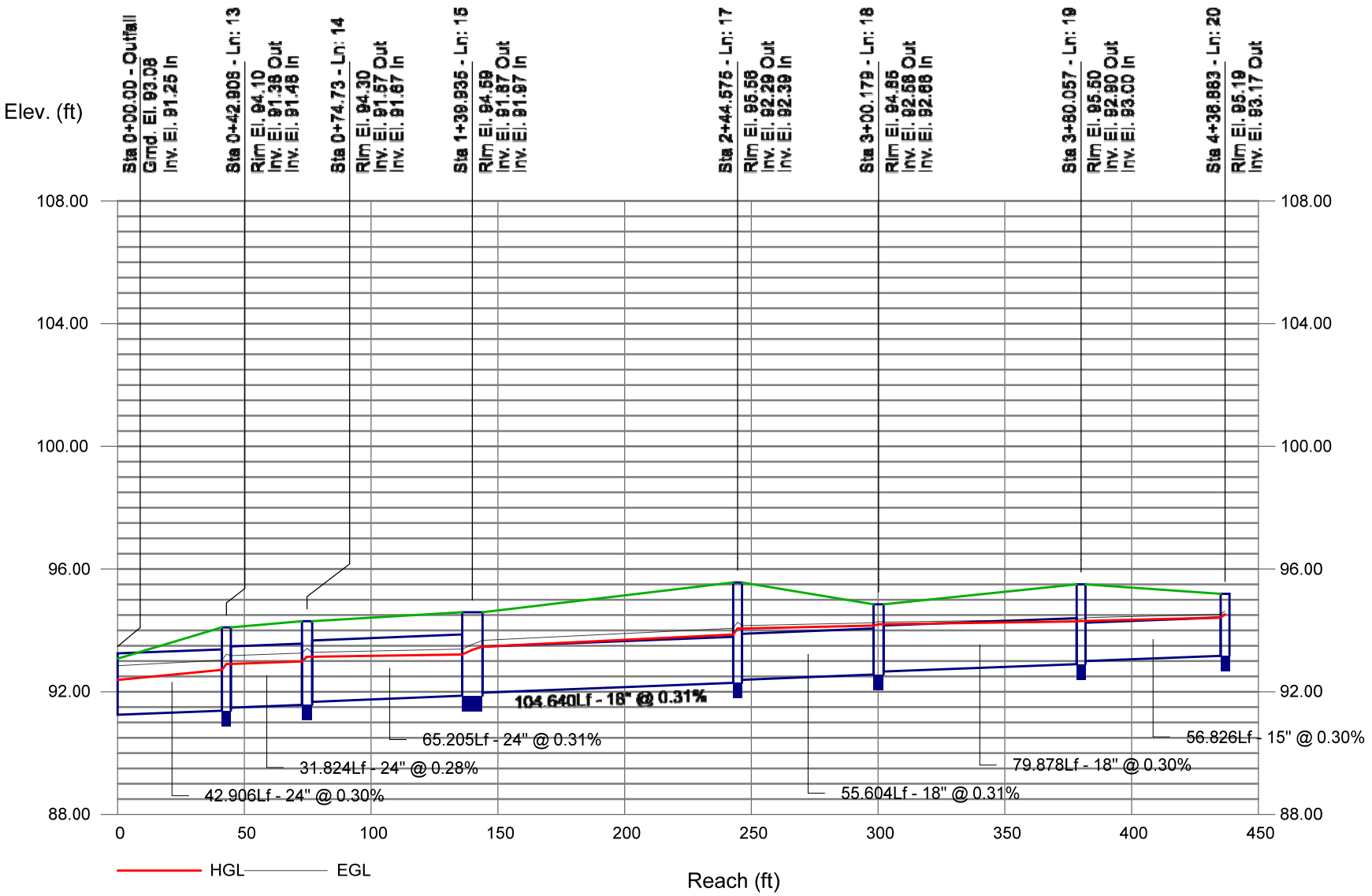
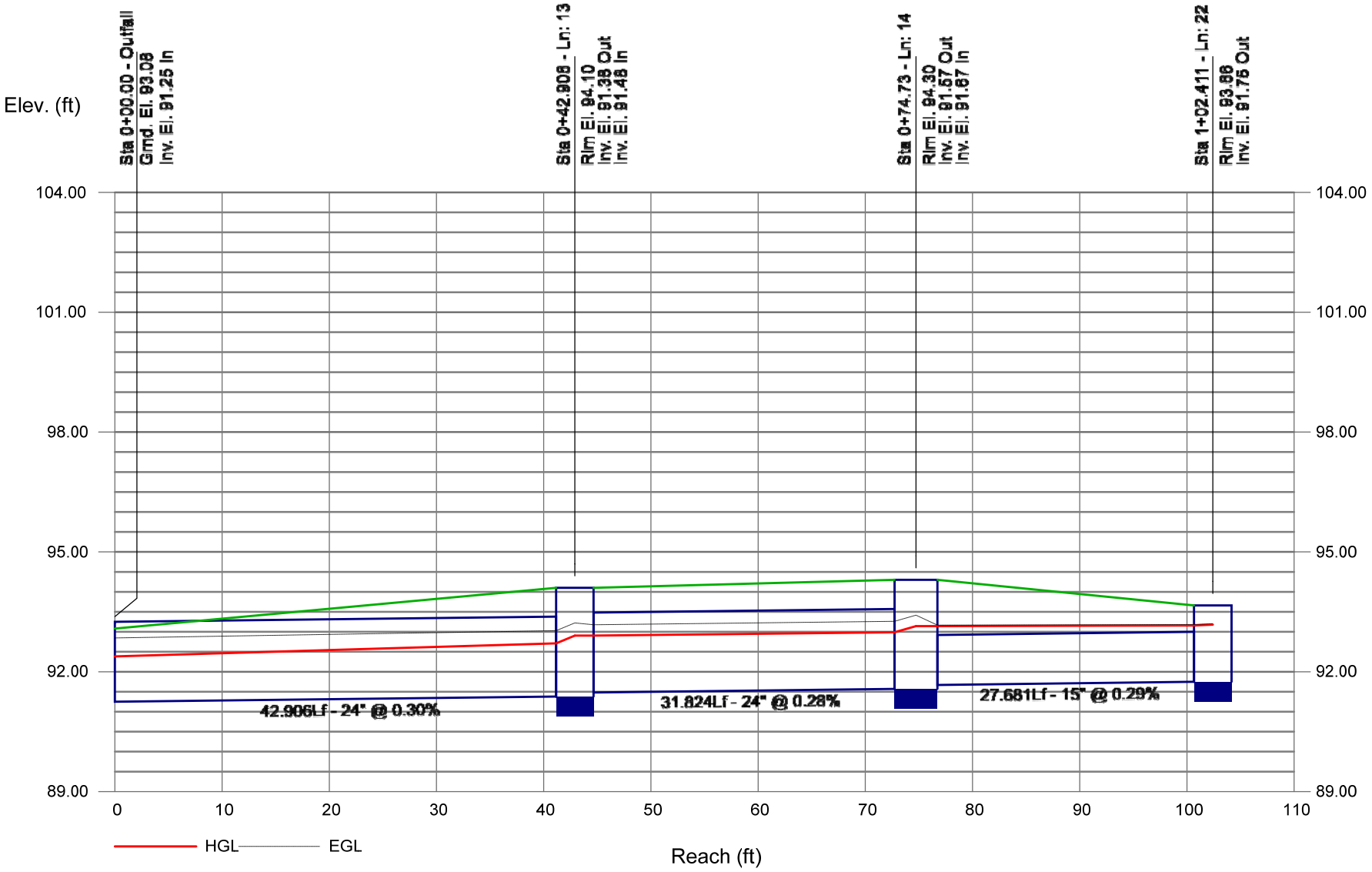


Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



Storm Sewer Profile

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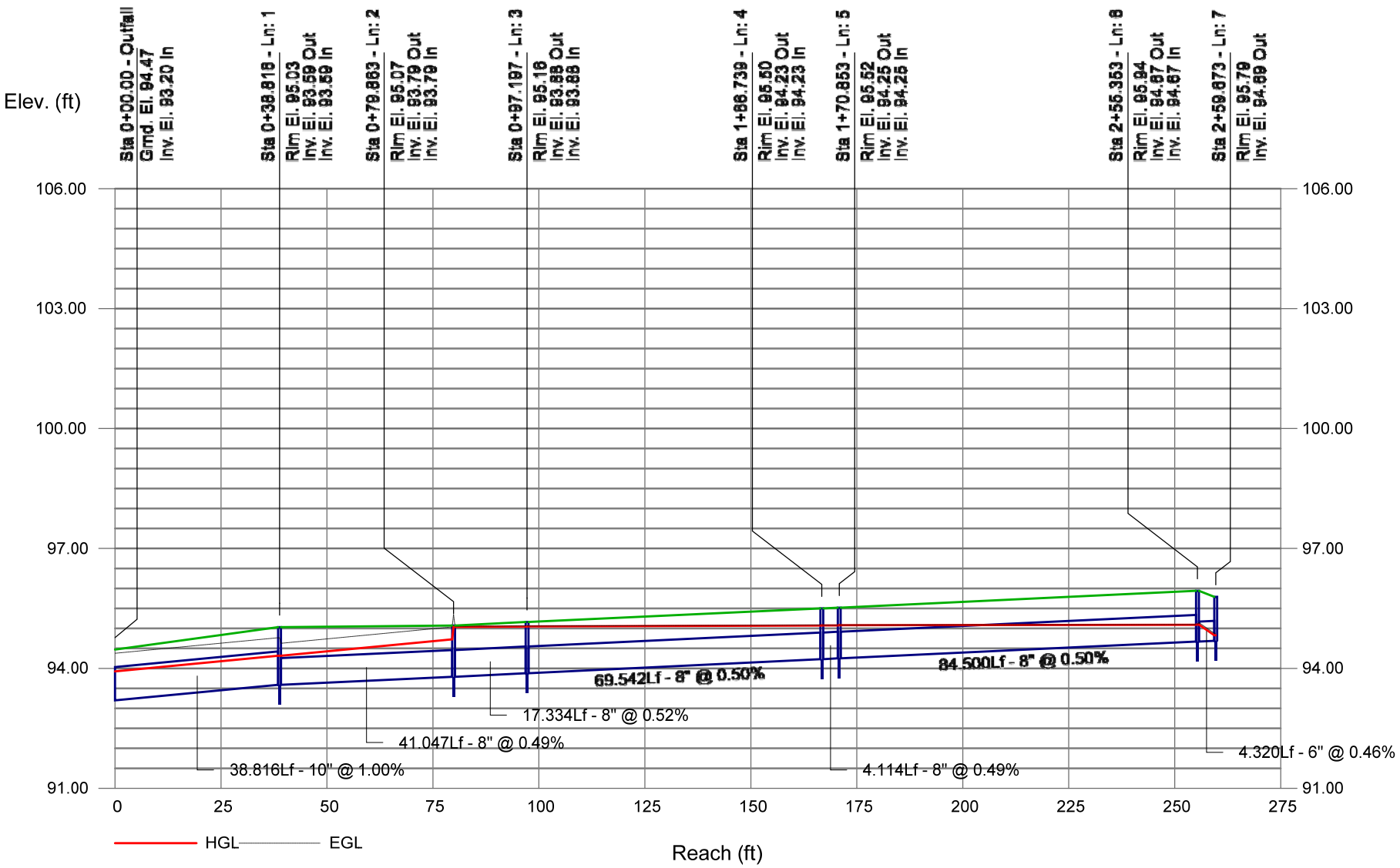
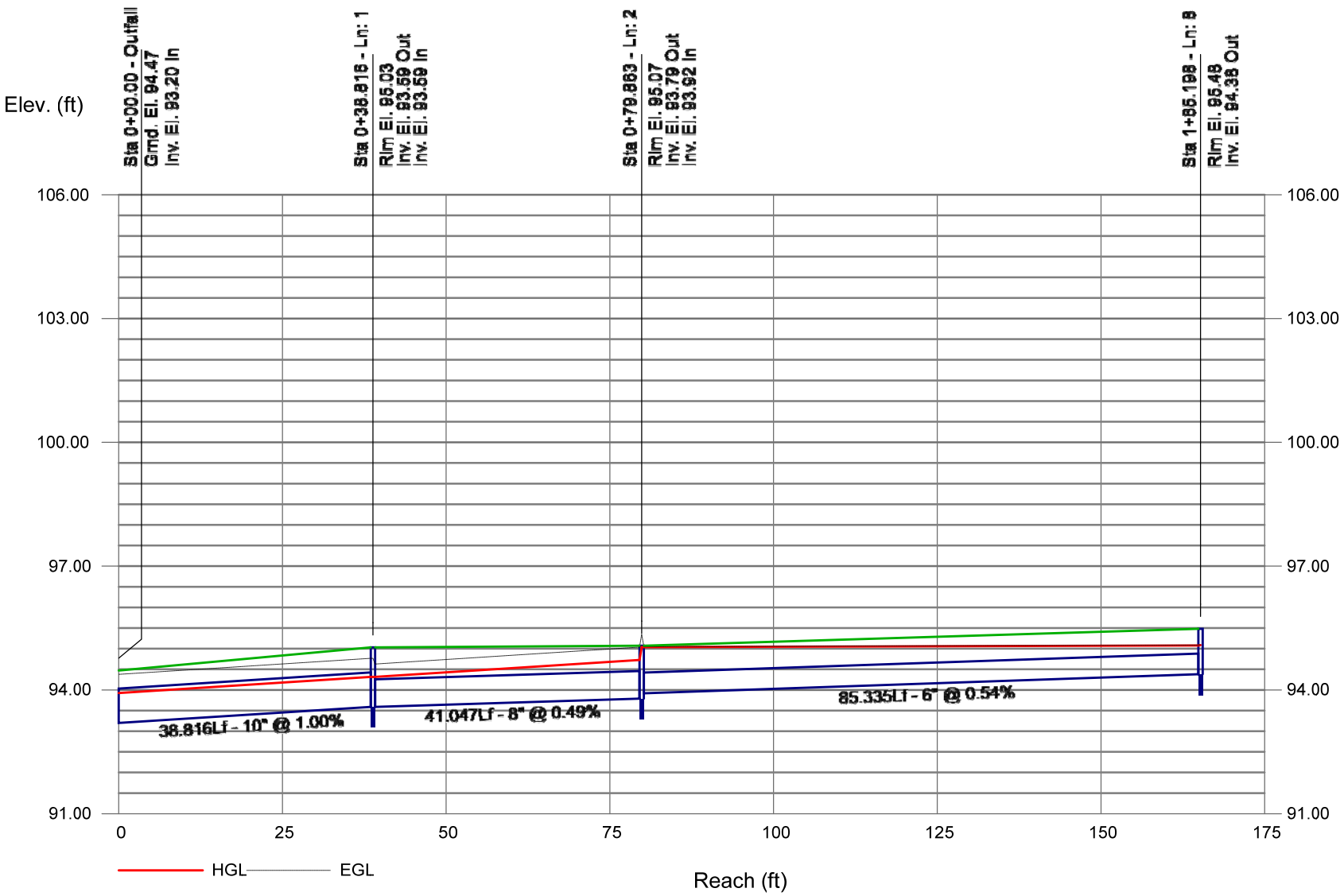


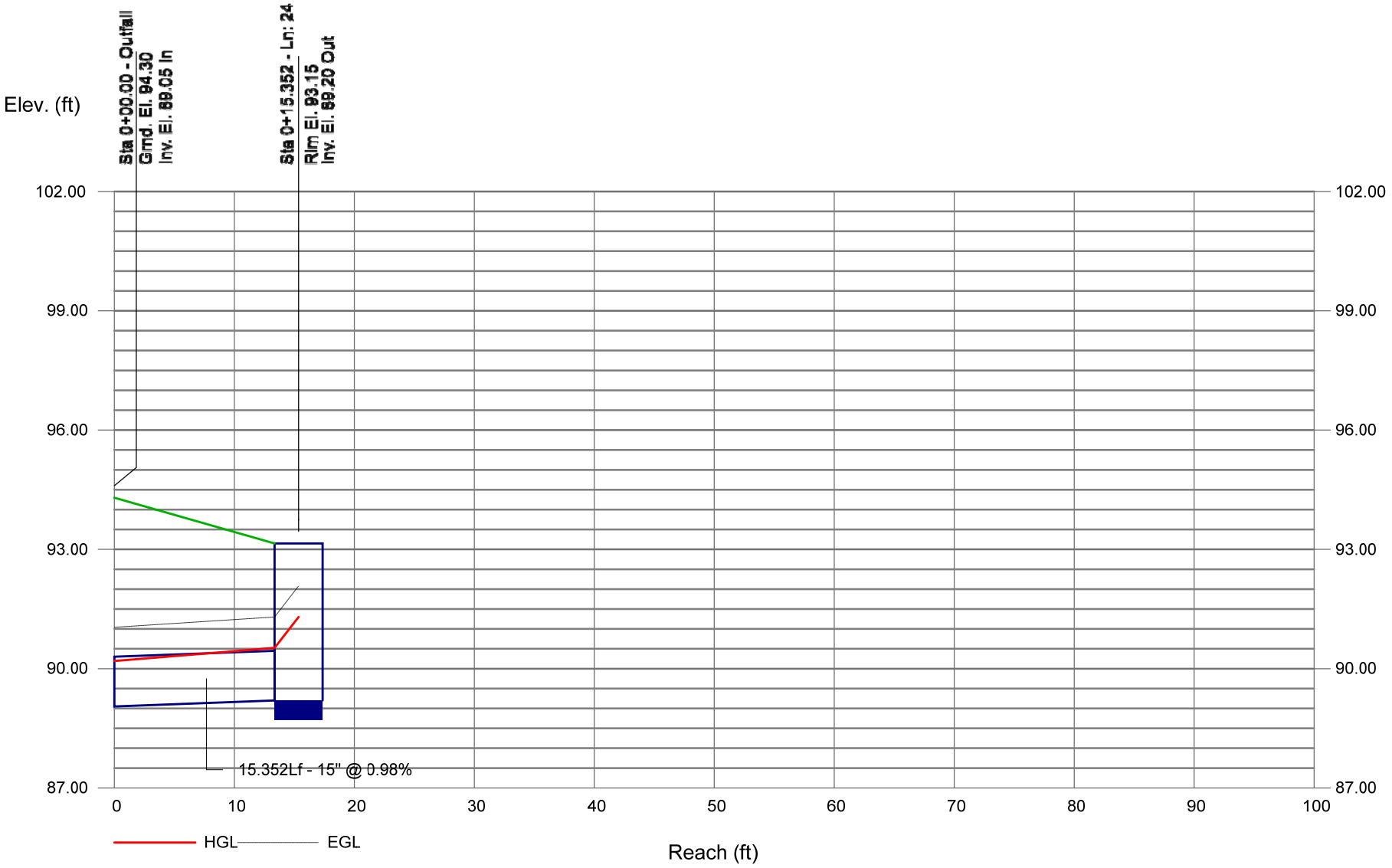
Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



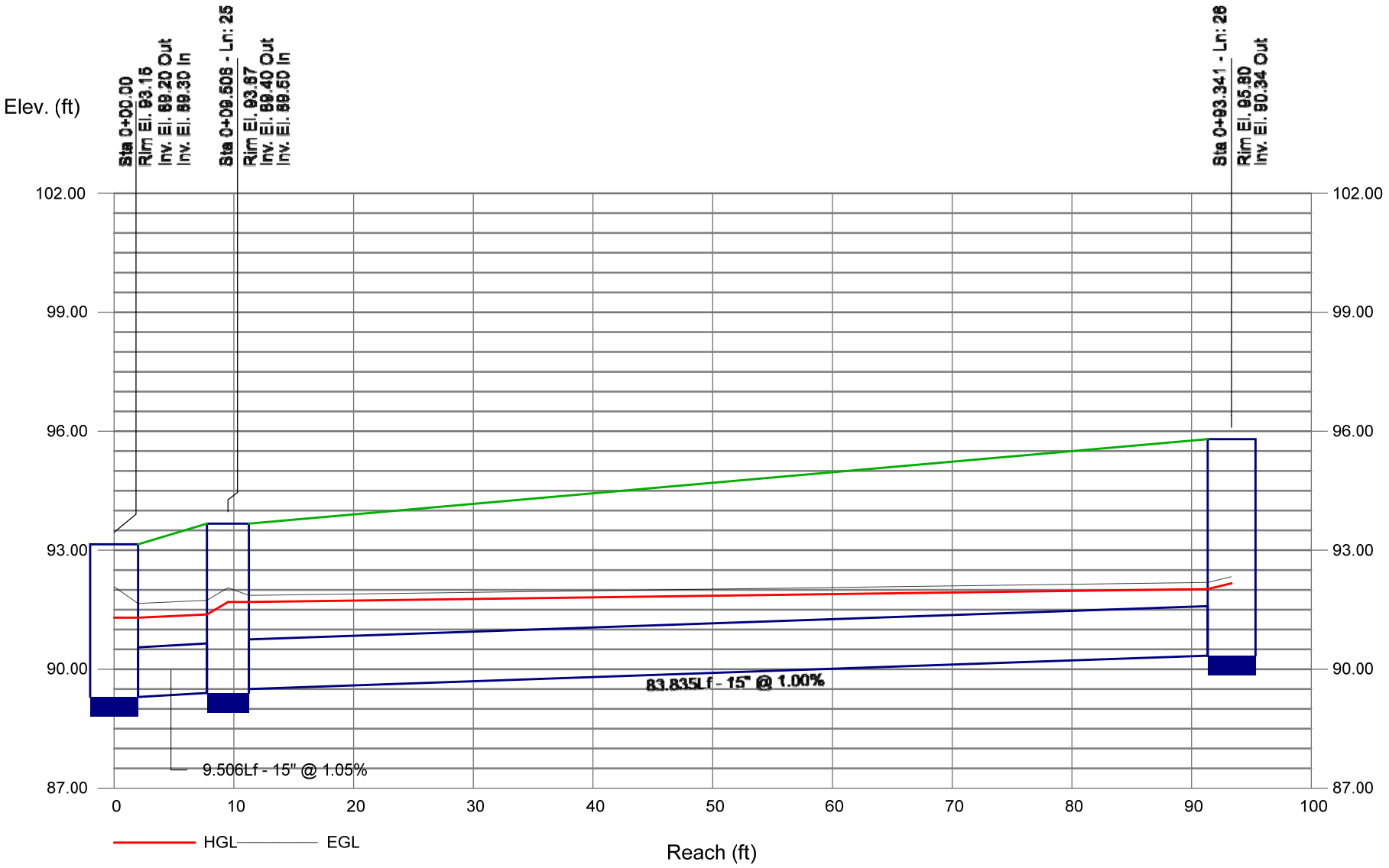
Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



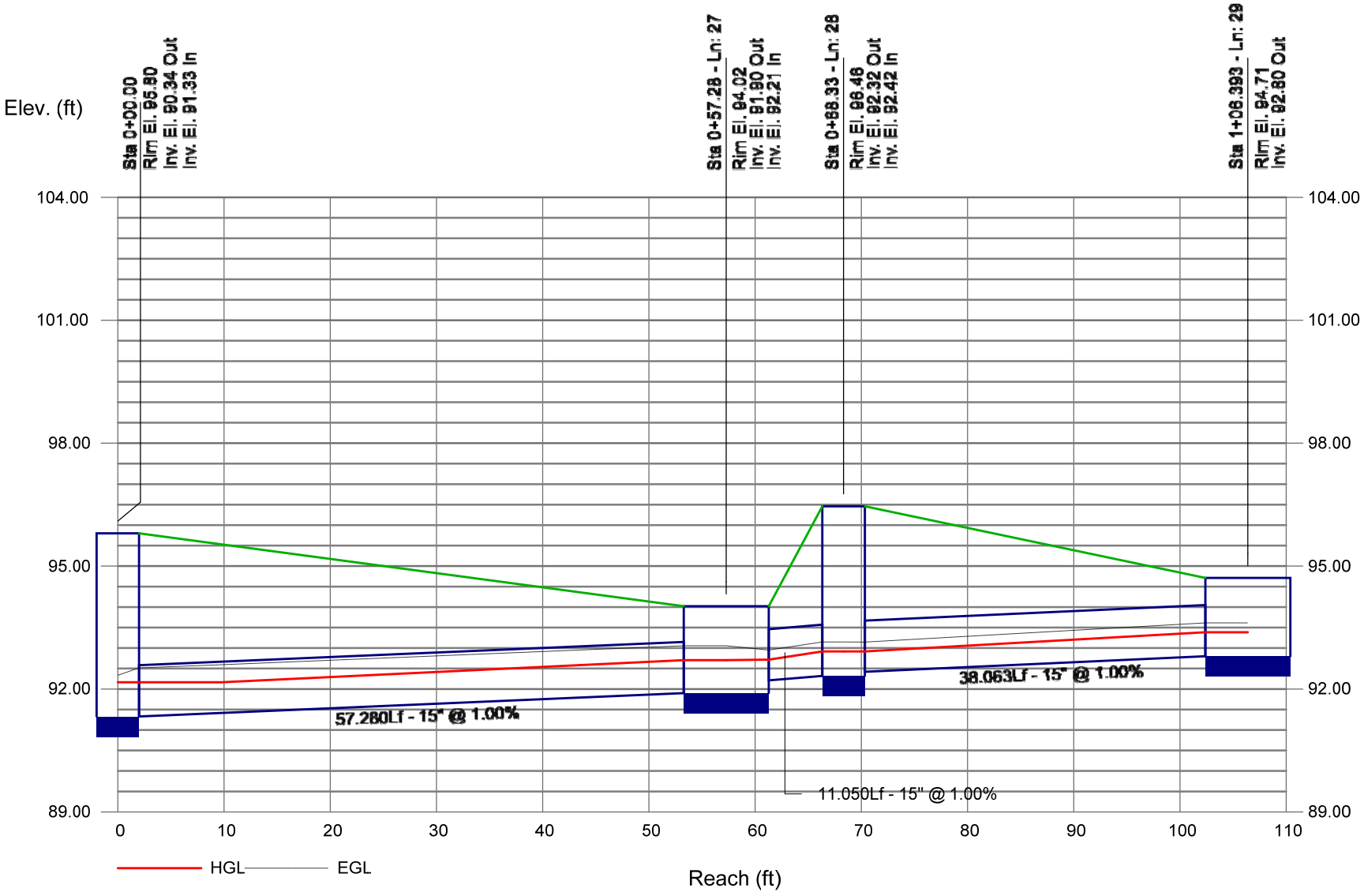
Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



Storm Sewer Profile

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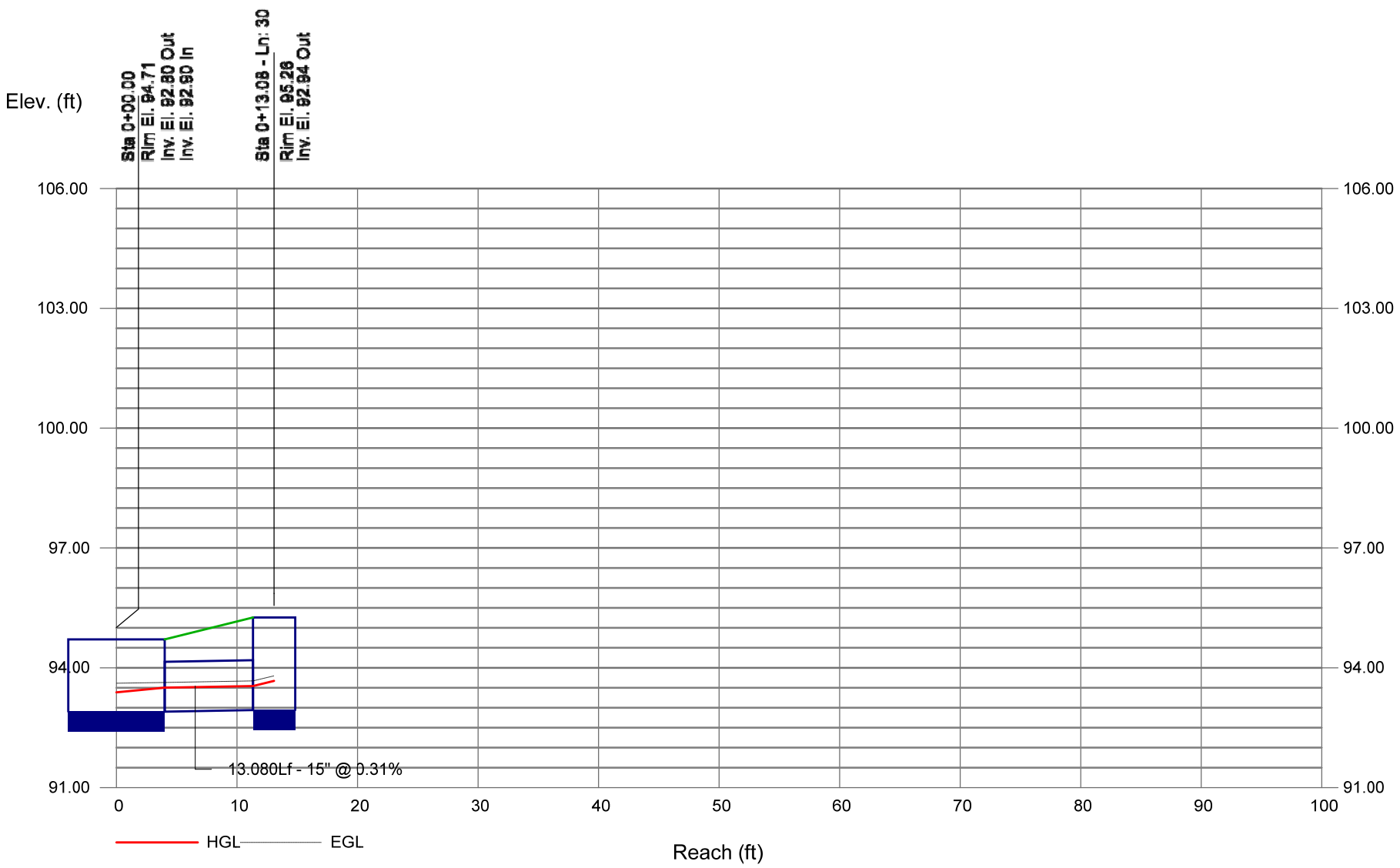

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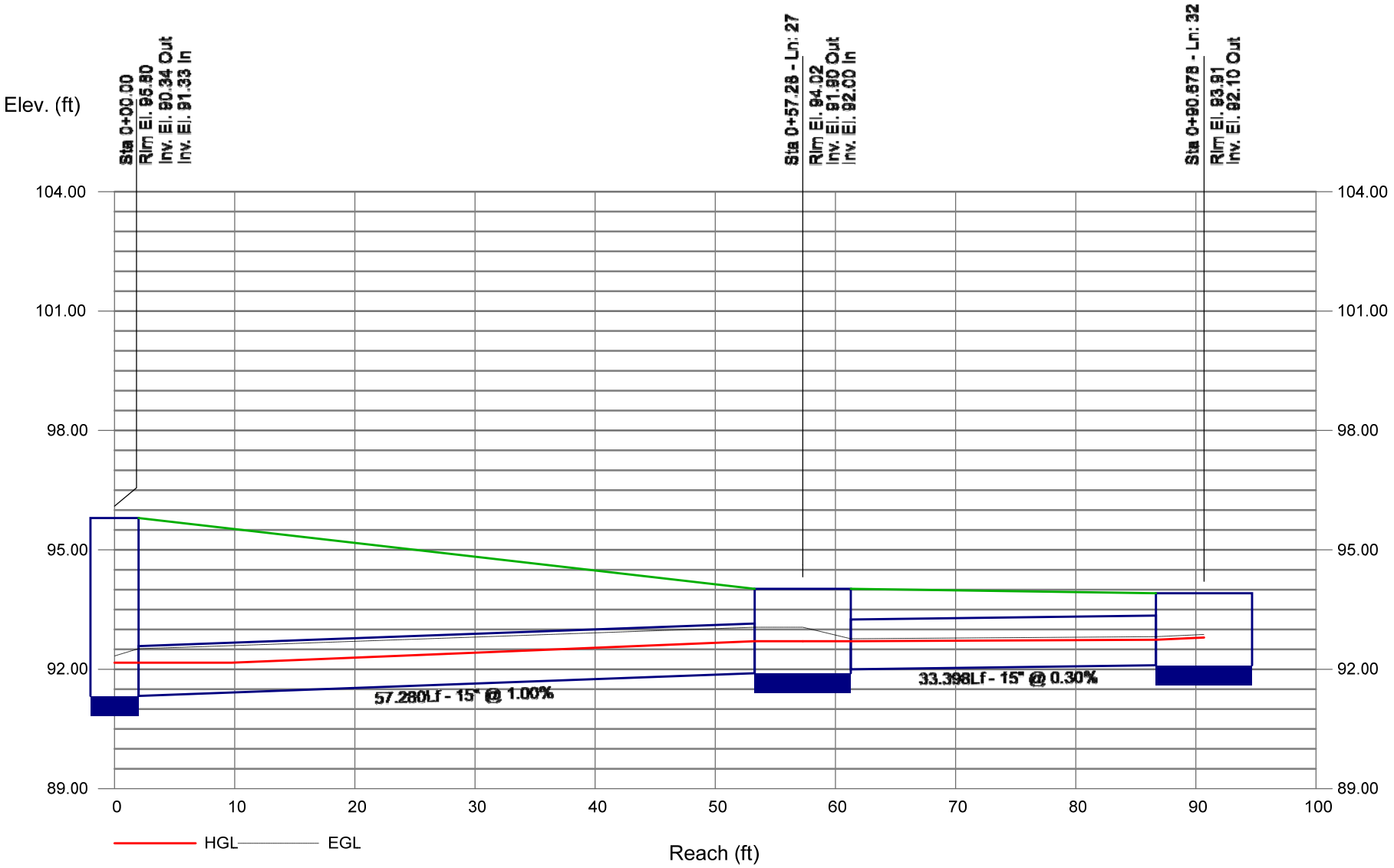
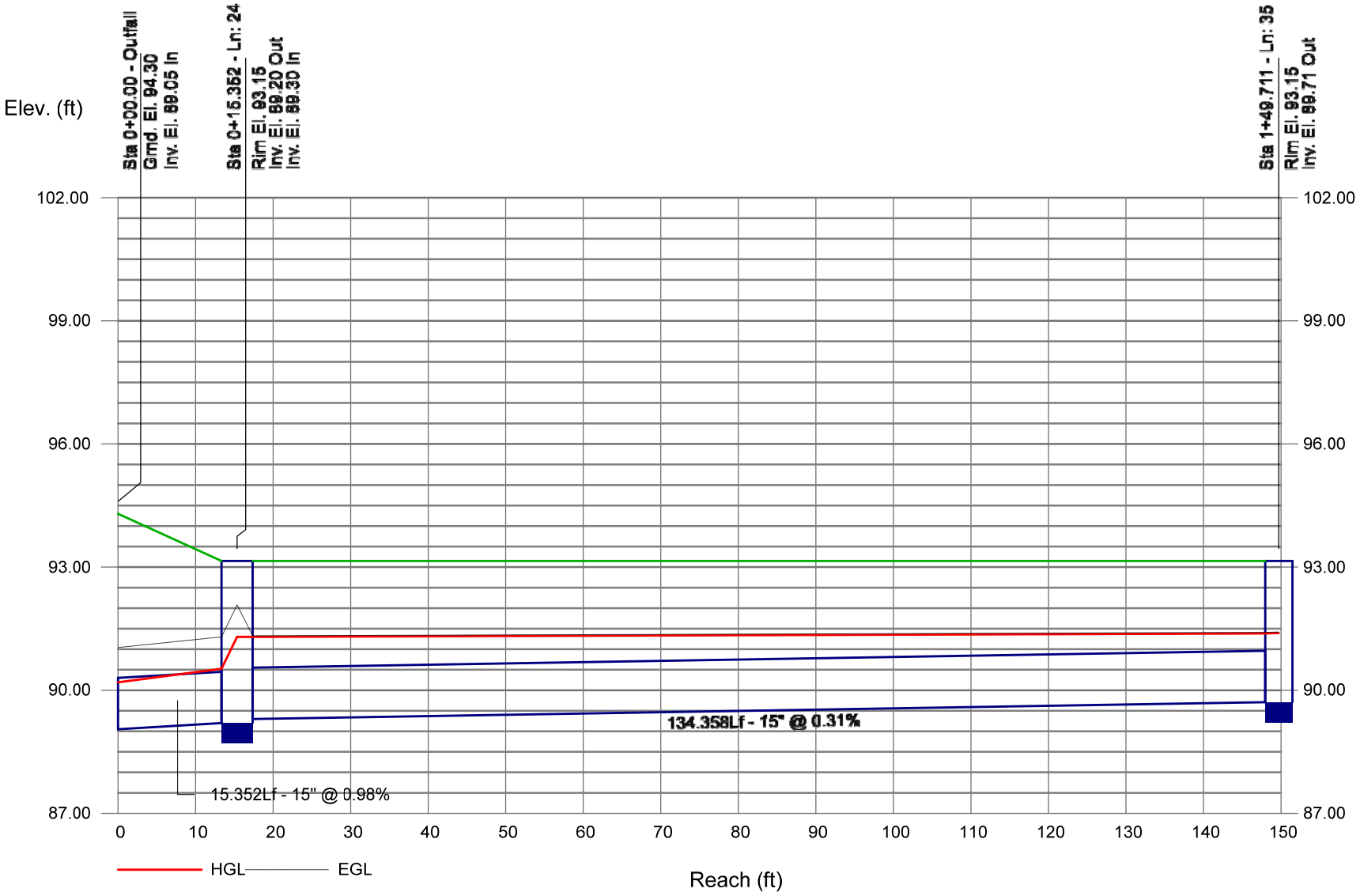


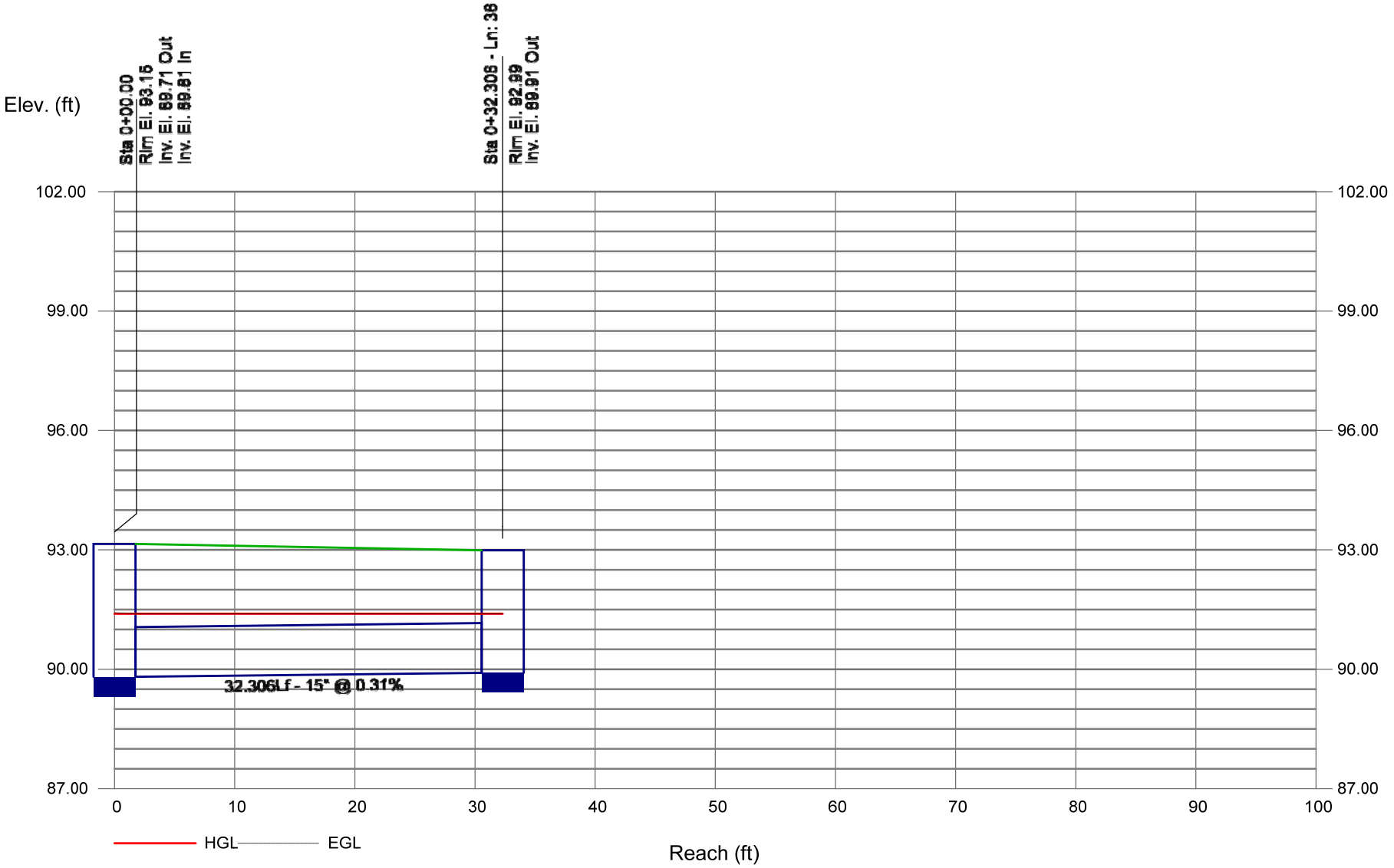
Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



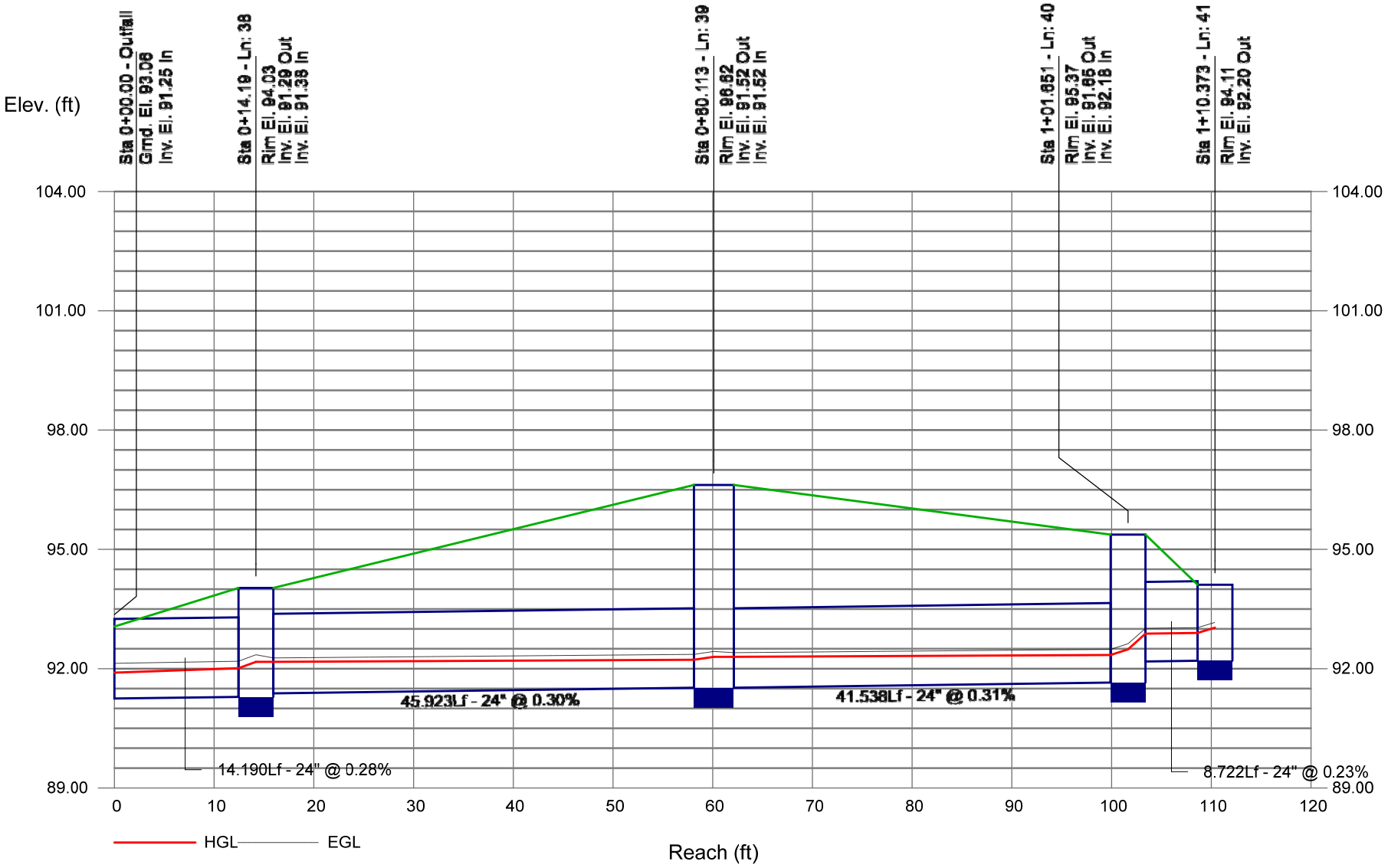
Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



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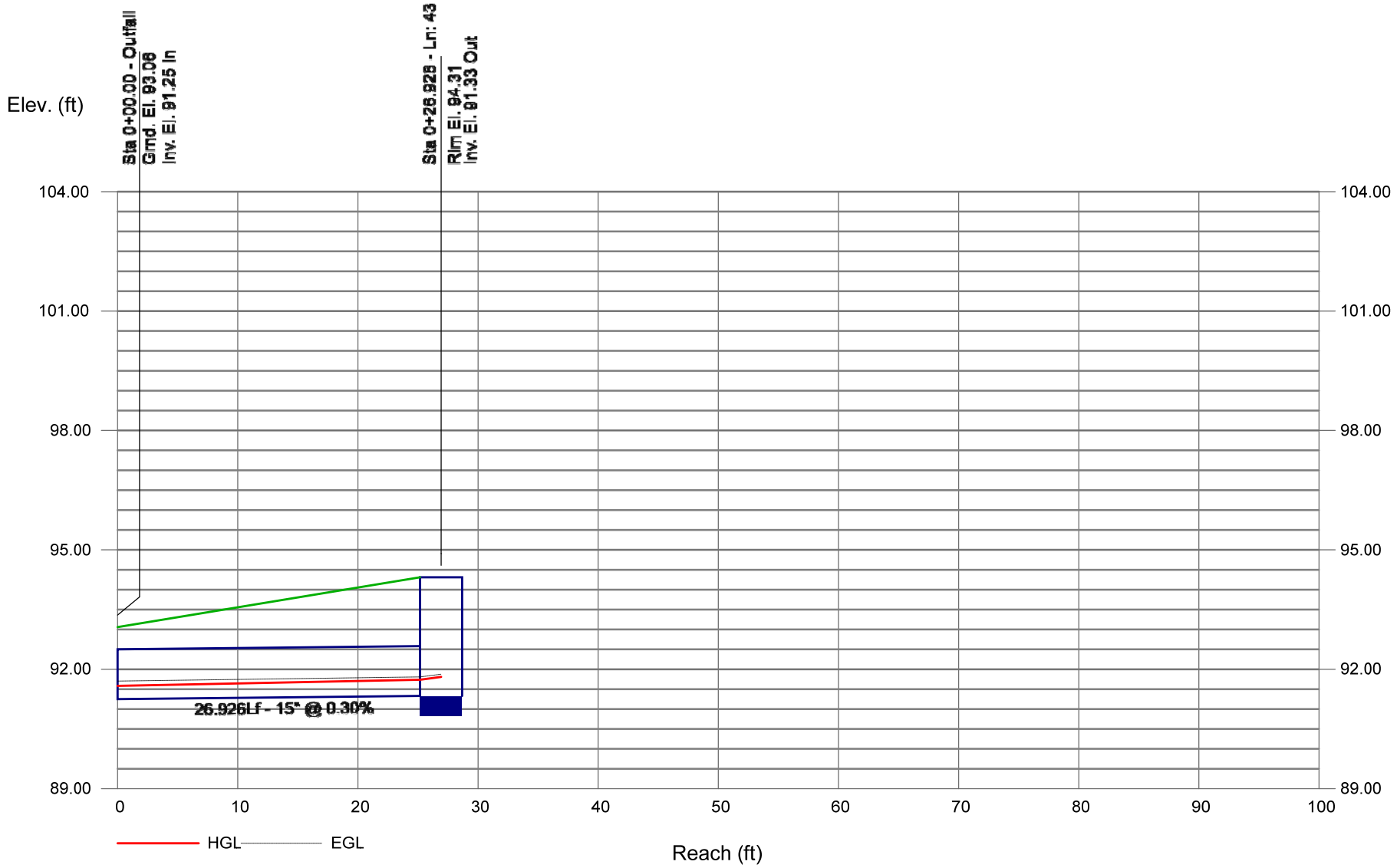
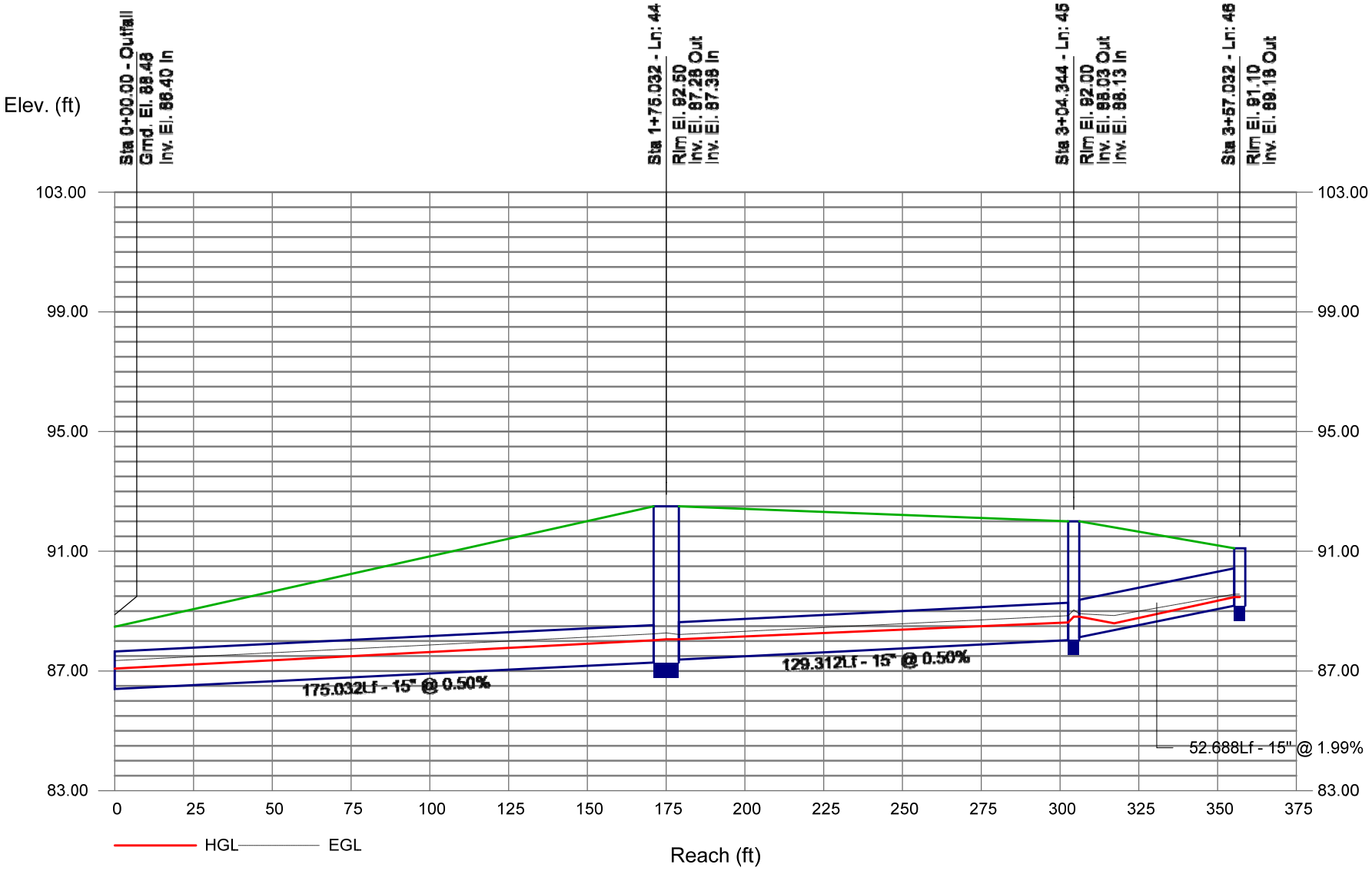


Storm Sewer Profile

Proj. file: Pipe Calcs_revised.stm



Summary for Pond B1: BASIN 1

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 2.711 ac, 68.17% Impervious, Inflow Depth = 9.87" for 150 Year event
Inflow = 17.75 cfs @ 12.12 hrs, Volume= 2.231 af
Outflow = 17.40 cfs @ 12.13 hrs, Volume= 1.798 af, Atten= 2%, Lag= 0.9 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1
Secondary = 17.40 cfs @ 12.13 hrs, Volume= 1.798 af
Routed to Link PDA 2 : PROPOSED TRIBUTARY TO BLOCK 21.27, LOT 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 94.29' @ 12.13 hrs Surf.Area= 0.203 ac Storage= 0.465 af

Plug-Flow detention time= 168.6 min calculated for 1.798 af (81% of inflow)
Center-of-Mass det. time= 64.9 min (894.3 - 829.4)

Volume	Invert	Avail.Storage	Storage Description
#1	91.25'	0.617 af	**Custom Stage Data (Irregular)** Listed below (Recalc)

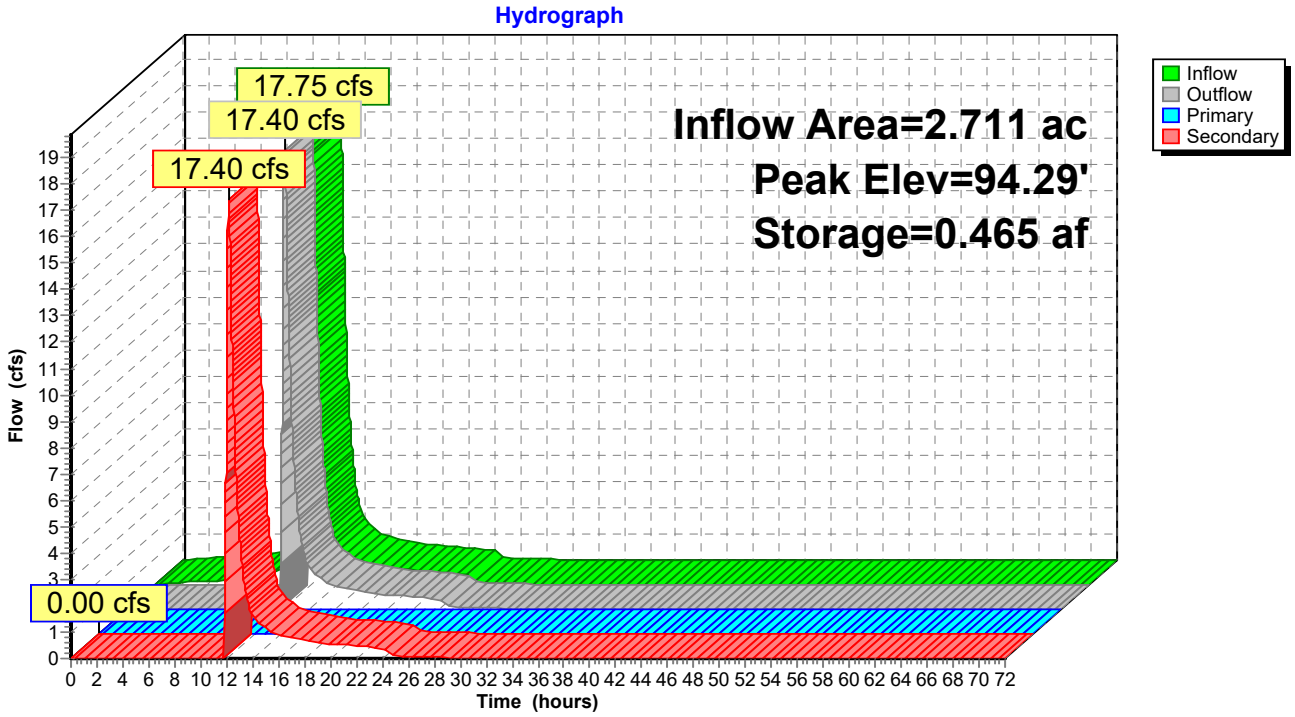
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
91.25	0.105	398.0	0.000	0.000	0.105
92.00	0.128	423.0	0.087	0.087	0.143
93.00	0.160	437.0	0.144	0.231	0.167
94.00	0.193	452.0	0.176	0.407	0.194
95.00	0.227	466.0	0.210	0.617	0.219

Device	Routing	Invert	Outlet Devices
#1	Primary	89.25'	**15.0" Round Culvert X 0.00** L= 53.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 89.25' / 89.09' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	89.25'	**3.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	93.80'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	94.13'	**105.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

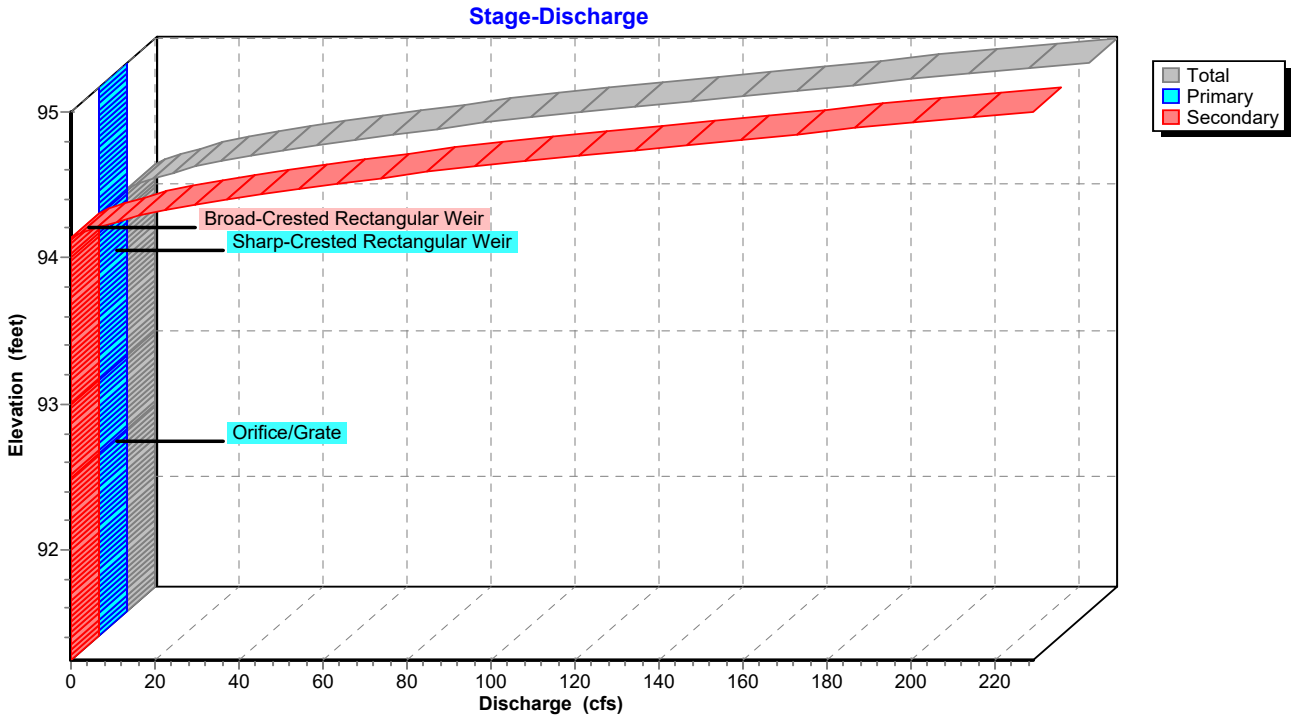
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.25' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Controls 0.00 cfs)
  - **2=Underdrain** (Passes 0.00 cfs of 0.32 cfs potential flow)
  - **3=Orifice/Grate** (Controls 0.00 cfs)
  - **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=17.39 cfs @ 12.13 hrs HW=94.29' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 17.39 cfs @ 1.01 fps)

Pond B1: BASIN 1



Pond B1: BASIN 1



Summary for Pond B2: BASIN 2

[80] Warning: Exceeded Pond PP4 by 0.65' @ 11.36 hrs (0.49 cfs 0.098 af)

Inflow Area = 0.618 ac, 84.95% Impervious, Inflow Depth = 11.67" for 150 Year event
Inflow = 9.04 cfs @ 12.09 hrs, Volume= 0.601 af
Outflow = 8.40 cfs @ 12.11 hrs, Volume= 0.601 af, Atten= 7%, Lag= 0.9 min
Discarded = 0.06 cfs @ 3.69 hrs, Volume= 0.167 af
Primary = 8.33 cfs @ 12.11 hrs, Volume= 0.434 af
Routed to Pond B1 : BASIN 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 95.66' @ 12.11 hrs Surf.Area= 0.034 ac Storage= 0.084 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 109.7 min (885.9 - 776.2)

Volume	Invert	Avail.Storage	Storage Description
#1	93.20'	0.109 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

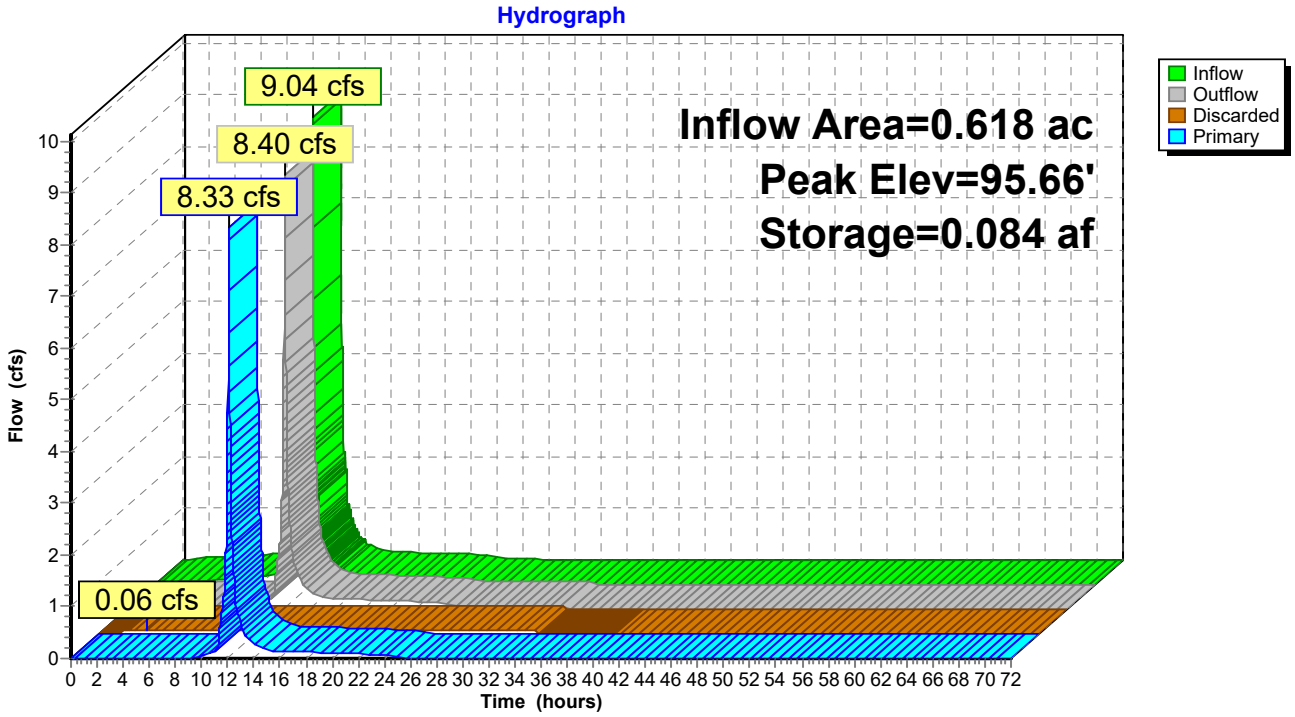
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
93.20	0.034	0.000	0.000
94.20	0.034	0.034	0.034
96.40	0.034	0.075	0.109

Device	Routing	Invert	Outlet Devices
#1	Primary	92.20'	**24.0" Round Culvert** L= 66.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 92.20' / 92.18' S= 0.0003 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Discarded	93.20'	**3.600 in/hr Exfiltration X 0.50 over Surface area**
#3	Device 1	94.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	95.05'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Device 1	95.55'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 in 48.0" x 48.0" Grate (100% open area) Limited to weir flow at low heads

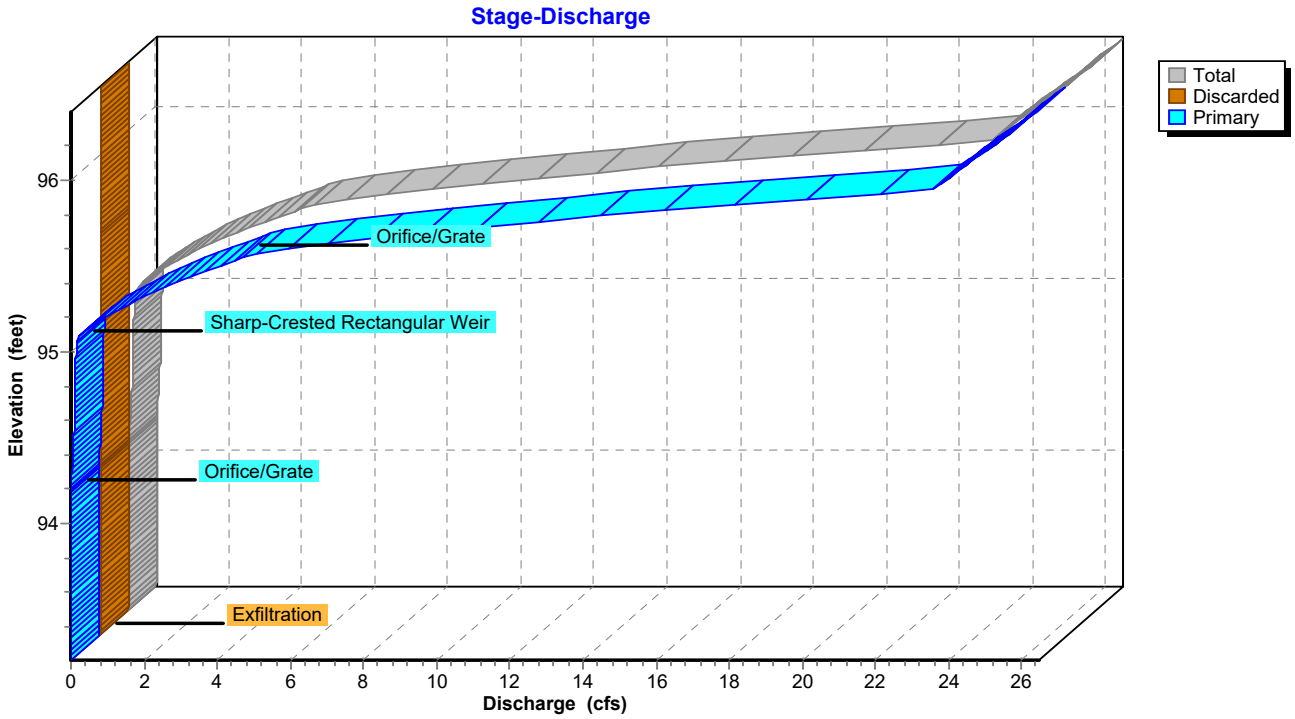
Discarded OutFlow Max=0.06 cfs @ 3.69 hrs HW=93.23' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=8.28 cfs @ 12.11 hrs HW=95.66' TW=94.29' (Dynamic Tailwater)
└**1=Culvert** (Passes 8.28 cfs of 20.78 cfs potential flow)
├**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.65 fps)
├**4=Sharp-Crested Rectangular Weir** (Weir Controls 6.09 cfs @ 2.56 fps)
└**5=Orifice/Grate** (Weir Controls 2.00 cfs @ 1.10 fps)

Pond B2: BASIN 2



Pond B2: BASIN 2



BOHLER

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 9/18/2023
Project: ERD WW, LLC
Project No: J190844

Calculated By: CPR
Checked By: TXL

Conduit Outlet Protection Calculations

Scour Hole # 1

Design Parameters:

Design Storm Flow for 25 Year, Q	0.82	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW [1]	1.29	ft
Scour Hole Depth, y (1/2 D_o or D_o)	8	in

Apron Dimension Calculations:

Minimum Bottom Width, $W_1 = 2W_o$	**W_1 = 2.50 ft**
Minimum Bottom Length, $L_1 = 3D_o$	**L_1 = 3.75 ft**
Minimum Top Width *(max side slope of 3:1)*, W_2	**W_2 = 6.25 ft**
Minimum Top Length *(max side slope of 3:1)*, L_2	**L_2 = 7.50 ft**

Rip Rap Stone Size Calculations:

Unit Dicharge, $q = Q/D_o$ = 0.66 cfs per foot

- **Case I: $y = 1/2\ D_o$**

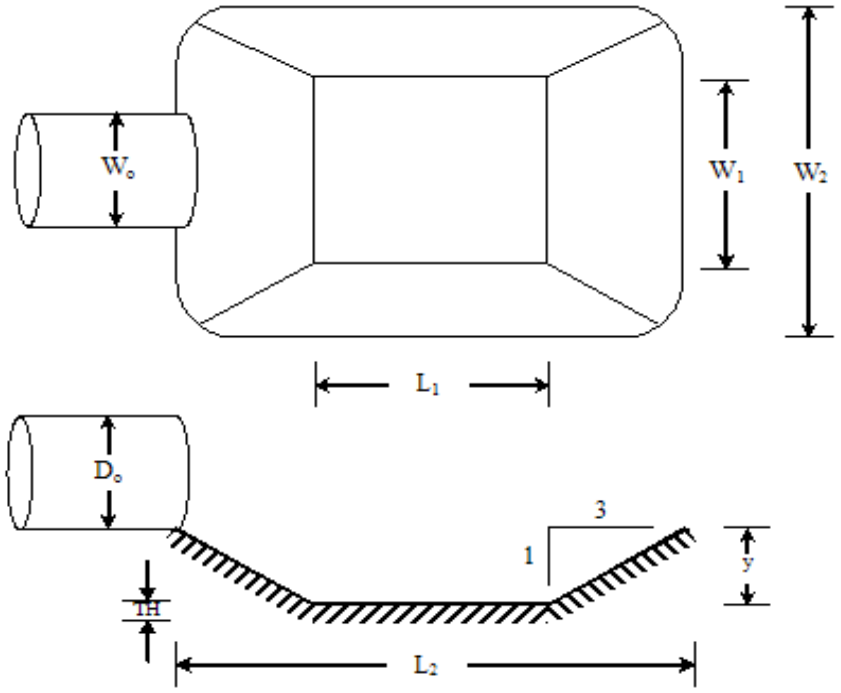
  Median Stone, $d_{50} = \dfrac{0.0125\ q^{1.33}}{TW}$ = 0.07 in Therefore, use ***d50* = 6 in**

  Apron Thickness, $TH = 2 \times d_{50}$ with filter fabric . . . . . ***TH* = 12 in**

- **Case II: $y = D_o$**

  Median Stone, $d_{50} = \dfrac{0.0082\ q^{1.33}}{TW}$ =

  Apron Thickness, $TH = 2 \times d_{50}$ with filter fabric . . . . . .



Notes:

1. The side slopes shall be 3:1 or flatter.
2. The bottom grade shall be 0.0% (level).
3. There shall be no overfall at the end of the apron or at the end of the culvert.
4. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
5. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
6. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
7. Where the scour hole is to be placed within an existing or proposed waterway:
   a. The scour hole sidewalls should be eliminated to maintain a smooth hydraulic line along the waterway bottom to avoid inviting turbulent flow from a sudden depression in the waterway.
   b. If the flow in the waterway is greater than the flow from the proposed outlet, the rip-rap used to construct the scour hole should be sized based on the greater flow value according to the standard rip-rap.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

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Checked By: TXL

Conduit Outlet Protection Calculations

Scour Hole # 2

Design Parameters:

Design Storm Flow for 25 Year, Q	1.99	cfs
Vertical Dimension of Outlet Pipe, D_o	10	in
Horizontal Dimension of Outlet Pipe, W_o	10	in
Tailwater Depth, TW [1]	0.96	ft
Scour Hole Depth, y (1/2 D_o or D_o)	5	in

Apron Dimension Calculations:

Minimum Bottom Width, $W_1 = 2W_o$	W_1 =	1.67 ft
Minimum Bottom Length, $L_1 = 3D_o$	L_1 =	2.50 ft
Minimum Top Width *(max side slope of 3:1)*, W_2	W_2 =	4.17 ft
Minimum Top Length *(max side slope of 3:1)*, L_2	L_2 =	5.00 ft

Rip Rap Stone Size Calculations:

Unit Dicharge, $q = Q/D_o$ = 2.39 cfs per foot

- **Case I: $y = 1/2\ D_o$**

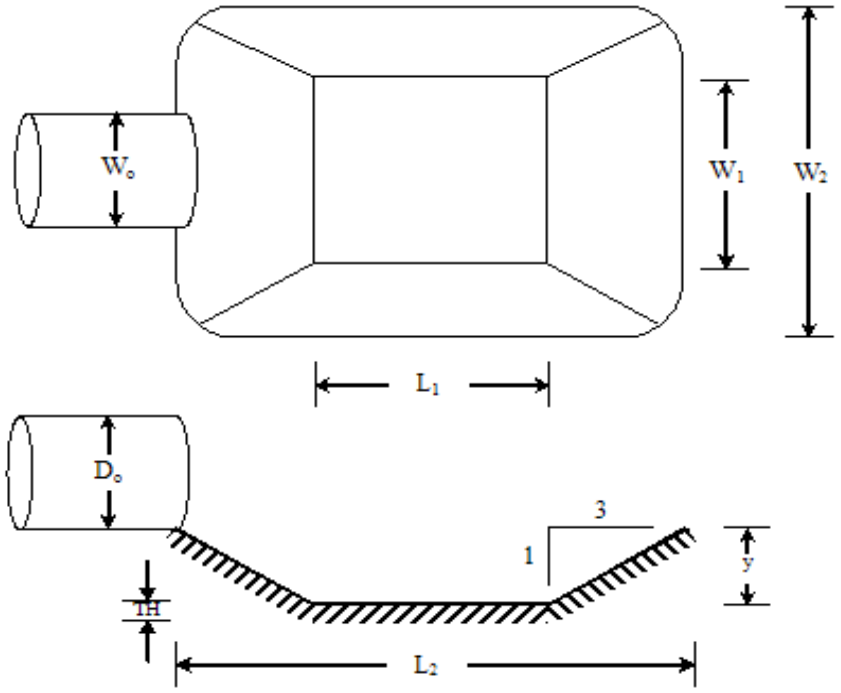
  Median Stone, $d_{50} = \dfrac{0.0125\ q^{1.33}}{TW}$ = 0.50 in Therefore, use $d50$ = 6 in

  Apron Thickness, $TH = 2 \times d_{50}$ with filter fabric . . . . . TH = 12 in

- **Case II: $y = D_o$**

  Median Stone, $d_{50} = \dfrac{0.0082\ q^{1.33}}{TW}$ =

  Apron Thickness, $TH = 2 \times d_{50}$ with filter fabric . . . . . .



Notes:

1. The side slopes shall be 3:1 or flatter.
2. The bottom grade shall be 0.0% (level).
3. There shall be no overfall at the end of the apron or at the end of the culvert.
4. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
5. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
6. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
7. Where the scour hole is to be placed within an existing or proposed waterway:
   a. The scour hole sidewalls should be eliminated to maintain a smooth hydraulic line along the waterway bottom to avoid inviting turbulent flow from a sudden depression in the waterway.
   b. If the flow in the waterway is greater than the flow from the proposed outlet, the rip-rap used to construct the scour hole should be sized based on the greater flow value according to the standard rip-rap.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.

BOHLER

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Date: 9/18/2023
Project: ERD WW, LLC
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Checked By: TXL

Conduit Outlet Protection Calculations

Rip Rap Pad # 1

Design Parameters:

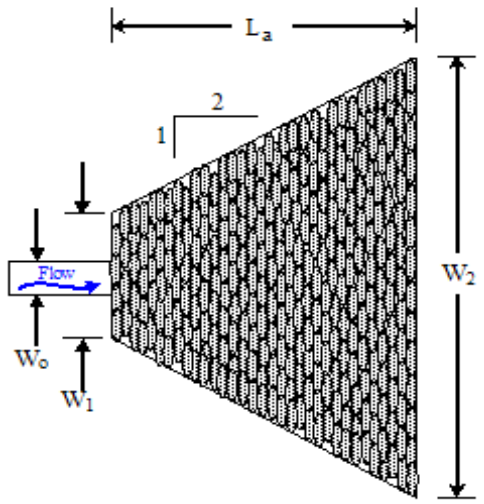
Design Storm Flow for 25 Year, Q	3.90	cfs
Vertical Dimension of Outlet Pipe, D_o	24	in
Horizontal Dimension of Outlet Pipe, W_o	24	in
Tailwater Depth, TW [1]	1.39	ft

Apron Dimension Calculations:

Unit Dicharge, $q = Q/W_o$ = 1.95 cfs per foot

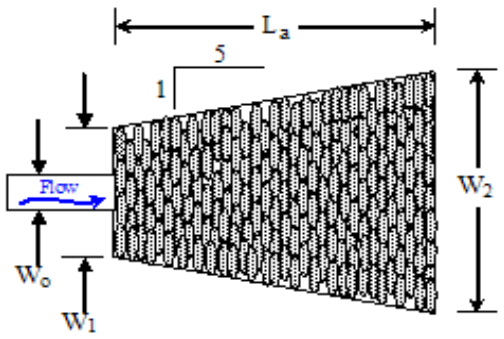
- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a :
  Width, $W_1 = 3W_o$ = W_1 =
  Width, $W_2 = 3W_o + L_a$ = W_2 =



- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 4.14 ft or L_a : **6 ft**
  Width, $W_1 = 3W_o$ = 6. ft or W_1 = **6 ft**
  Width, $W_2 = 3W_o + 0.4L_a$ = 7.65 ft or W_2 = **8 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.42 in d_{50} : **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

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Project: ERD WW, LLC
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Calculated By: CPR
Checked By: TXL

Conduit Outlet Protection Calculations

Rip Rap Pad # 2

Design Parameters:

Design Storm Flow for 25 Year, Q	8.90	cfs
Vertical Dimension of Outlet Pipe, D_o	24	in
Horizontal Dimension of Outlet Pipe, W_o	24	in
Tailwater Depth, TW [1]	1.39	ft

Apron Dimension Calculations:

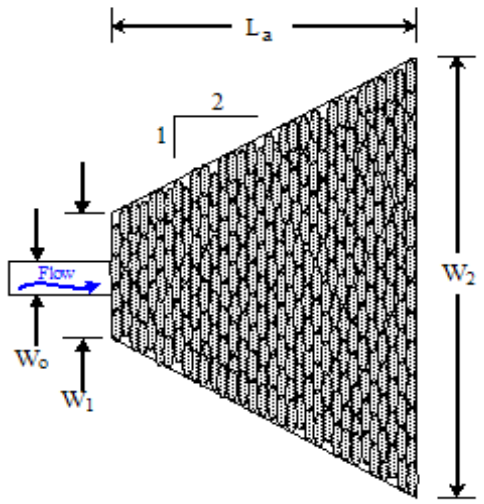
Unit Dicharge, $q = Q/W_o$ = 4.45 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a :

  Width, $W_1 = 3W_o$ = W_1 =

  Width, $W_2 = 3W_o + L_a$ = W_2 =

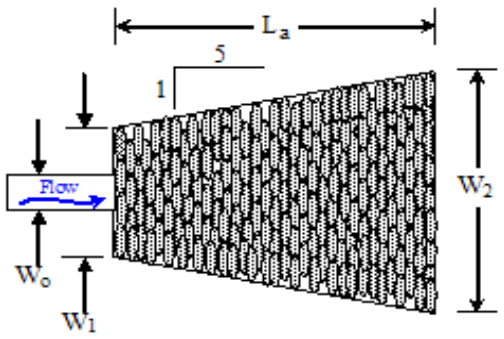


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 9.44 ft or L_a : **10 ft**

  Width, $W_1 = 3W_o$ = 6. ft or W_1 = **6 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 9.78 ft or W_2 = **10 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 1.26 in d_{50} : **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 9/18/2023
Project: ERD WW, LLC
Project No: J190844

Calculated By: MRK
Checked By: TXL

Conduit Outlet Protection Calculations

Rip Rap Pad # 3

Design Parameters:

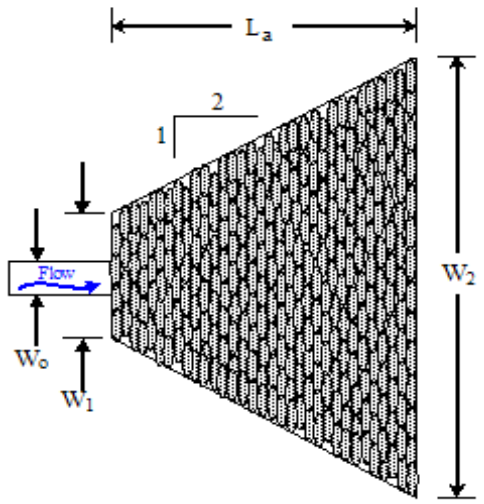
Design Storm Flow for 25 Year, Q	0.17	cfs
Vertical Dimension of Outlet Pipe, D_o	6	in
Horizontal Dimension of Outlet Pipe, W_o	6	in
Tailwater Depth, TW [1]	0.28	ft

Apron Dimension Calculations:

Unit Dicharge, $q = Q/W_o$ = 0.34 cfs per foot

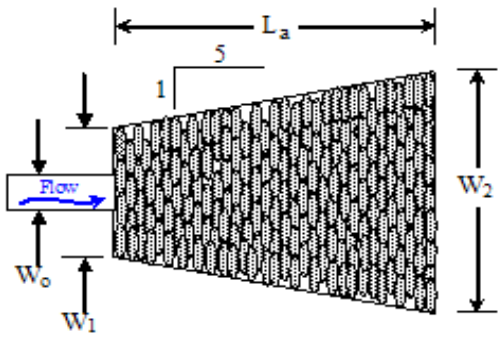
- **Case I: $TW < 1/2\ D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = — L_a :
Width, $W_1 = 3W_o$ = — W_1 =
Width, $W_2 = 3W_o + L_a$ = — W_2 =



- **Case II: $TW \geq 1/2\ D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 1.44 ft or L_a : **6 ft**
Width, $W_1 = 3W_o$ = 1.5 ft or W_1 = **6 ft**
Width, $W_2 = 3W_o + 0.4L_a$ = 2.08 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.20 in — d_{50} : **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

BOHLER

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 9/15/2023
Project: ERD WW, LLC
Project No: J190844

Calculated By: MAI
Checked By: TXL

Conduit Outlet Protection Calculations

Rip Rap Pad # 4

Design Parameters:

Design Storm Flow for 25 Year, Q	1.41	cfs
Vertical Dimension of Outlet Pipe, D_o	10	in
Horizontal Dimension of Outlet Pipe, W_o	10	in
Tailwater Depth, TW [1]	1.70	ft

Apron Dimension Calculations:

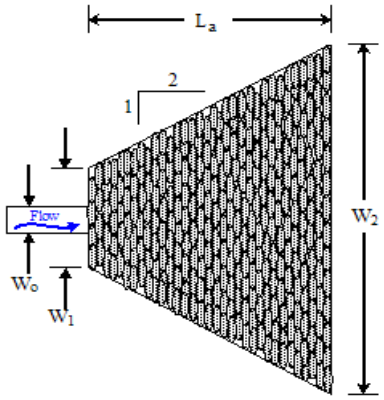
Unit Dicharge, $q = Q/W_o$ = 1.69 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a :

  Width, $W_1 = 3W_o$ = W_1 =

  Width, $W_2 = 3W_o + L_a$ = W_2 =

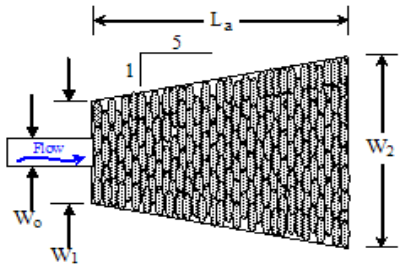


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 5.56 ft or L_a : **6 ft**

  Width, $W_1 = 3W_o$ = 2.5 ft or W_1 = **6 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 4.72 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.28 in d_{50} : **6 in**

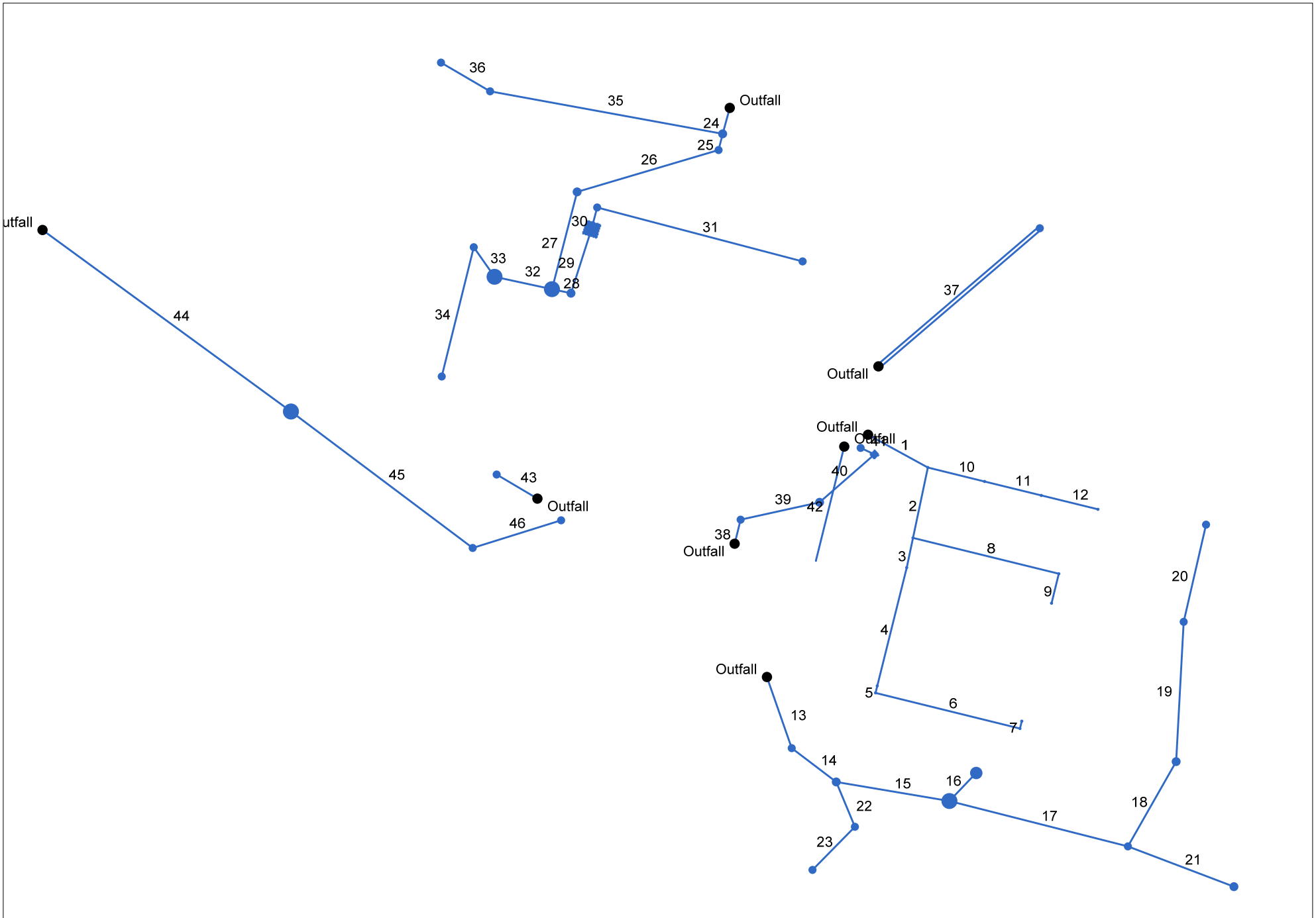
Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2 year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: Pipe Calcs_revised.stm	Number of lines: 46	Date: 9/25/2023

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	38.816	0.14	0.40	0.99	0.14	0.40	6.0	10.4	6.9	2.72	2.85	5.39	10	1.00	93.20	93.59	93.93	94.32	94.47	95.03	CO 510 - OS 500
2	1	41.047	0.16	0.23	0.99	0.16	0.23	6.0	10.3	6.9	1.57	1.10	4.49	8	0.49	93.59	93.79	94.32	94.72	95.03	95.07	CO 520 - CO 510
3	2	17.334	0.01	0.05	0.99	0.01	0.05	6.0	10.0	7.0	0.34	1.13	0.99	8	0.52	93.79	93.88	95.04	95.05	95.07	95.16	CO 520 - CO 510
4	3	69.542	0.01	0.04	0.99	0.01	0.04	6.0	8.5	7.3	0.29	1.11	0.83	8	0.50	93.88	94.23	95.05	95.07	95.16	95.50	CO 530 - CO 520
5	4	4.114	0.01	0.03	0.99	0.01	0.03	6.0	8.4	7.3	0.22	1.09	0.62	8	0.49	94.23	94.25	95.07	95.08	95.50	95.52	CO 530 - CO 520
6	5	84.500	0.01	0.02	0.99	0.01	0.02	6.0	6.1	7.9	0.16	1.11	0.56	8	0.50	94.25	94.67	95.08	95.09	95.52	95.94	CO 540 - CO 530
7	6	4.320	0.01	0.01	0.99	0.01	0.01	6.0	6.0	7.9	0.08	0.50	1.11	6	0.46	94.67	94.69	95.10	94.83	95.94	95.79	Pipe - (82)
8	2	85.335	0.01	0.02	0.99	0.01	0.02	6.0	6.7	7.7	0.15	0.54	0.78	6	0.54	93.92	94.38	95.04	95.08	95.07	95.48	Pipe - (78) (2)
9	8	17.271	0.01	0.01	0.99	0.01	0.01	6.0	6.0	7.9	0.08	0.72	0.40	6	0.98	94.38	94.55	95.09	95.09	95.48	95.65	Pipe - (79)
10	1	33.167	0.01	0.03	0.99	0.01	0.03	6.0	6.8	7.7	0.23	1.09	0.69	8	0.48	93.59	93.75	94.32	94.32	95.03	95.19	CO 511 - CO 510
11	10	33.167	0.01	0.02	0.99	0.01	0.02	6.0	6.4	7.8	0.16	1.12	1.26	8	0.51	93.75	93.92	94.32	94.10	95.19	95.53	CO 511 - CO 510
12	11	33.167	0.01	0.01	0.99	0.01	0.01	6.0	6.0	7.9	0.08	1.12	1.36	8	0.51	93.92	94.09	94.10	94.22	95.53	95.86	CO 511 - CO 510
13	End	42.906	0.01	1.44	0.99	0.01	1.24	6.0	9.2	7.1	10.03	12.45	4.99	24	0.30	91.25	91.38	92.38	92.71	93.08	94.10	IN 310 - FES 300
14	13	31.824	0.15	1.43	0.97	0.15	1.23	6.0	9.0	7.2	10.00	12.03	4.19	24	0.28	91.48	91.57	92.91	92.99	94.10	94.30	IN 320 - IN 310
15	14	65.205	0.00	1.05	0.00	0.00	0.88	6.0	8.7	7.2	7.56	12.53	3.21	24	0.31	91.67	91.87	93.14	93.21	94.30	94.59	OS 330 - IN 320
16	15	22.127	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	0.09	6.44	0.85	15	0.99	92.62	92.84	93.37	92.96	94.59	96.56	Pipe - (92)
17	15	104.640	0.25	1.05	0.97	0.24	0.88	6.0	8.2	7.4	6.44	5.81	3.64	18	0.31	91.97	92.29	93.47	93.86	94.59	95.56	IN 340 - OS 330
18	17	55.604	0.14	0.68	0.61	0.09	0.56	6.0	7.0	7.7	4.29	5.81	2.43	18	0.31	92.39	92.56	94.06	94.16	95.56	94.85	IN 350 - IN 340
19	18	79.878	0.07	0.54	0.99	0.07	0.47	6.0	6.4	7.8	3.71	5.76	2.14	18	0.30	92.66	92.90	94.20	94.29	94.85	95.50	IN 360 - IN 350
20	19	56.826	0.47	0.47	0.86	0.40	0.40	6.0	6.0	7.9	3.21	3.53	2.62	15	0.30	93.00	93.17	94.31	94.42	95.50	95.19	IN 370 - IN 360
21	17	64.519	0.12	0.12	0.62	0.07	0.07	6.0	6.0	7.9	0.59	3.50	0.48	15	0.29	92.39	92.58	94.06	94.07	95.56	94.49	Pipe - (107)
22	14	27.681	0.16	0.23	0.85	0.14	0.21	6.0	7.3	7.6	1.56	3.47	1.27	15	0.29	91.67	91.75	93.14	93.16	94.30	93.66	IN 210 - MH 200

Project File: Pipe Calcs_revised.stm

Number of lines: 46

Run Date: 9/25/2023

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	34.450	0.07	0.07	0.99	0.07	0.07	6.0	6.0	7.9	0.55	3.48	0.45	15	0.29	91.85	91.95	93.18	93.18	93.66	94.95	IN 220 - IN 210 (2
24	End	15.352	0.19	1.10	0.99	0.19	1.07	6.0	10.3	6.9	8.68	6.38	7.23	15	0.98	89.05	89.20	90.19	90.52	0.00	93.15	Pipe - (132)
25	24	9.506	0.28	0.69	0.99	0.28	0.67	6.0	10.2	6.9	5.89	6.62	4.80	15	1.05	89.30	89.40	91.30	91.38	93.15	93.67	Pipe - (126)
26	25	83.835	0.01	0.41	0.99	0.01	0.39	6.0	9.8	7.0	4.02	6.46	3.28	15	1.00	89.50	90.34	91.69	92.02	93.67	95.80	MH 610 - IN 600
27	26	57.280	0.00	0.40	0.00	0.00	0.38	6.0	9.6	7.0	3.97	6.44	4.65	15	1.00	91.33	91.90	92.17	92.71	95.80	94.02	RD 1 - CO 540
28	27	11.050	0.01	0.24	0.99	0.01	0.23	6.0	7.1	7.6	2.23	6.44	4.32	15	1.00	92.21	92.32	92.72	92.92	94.02	96.46	MH 630 - OS 620
29	28	38.063	0.00	0.23	0.00	0.00	0.22	6.0	7.0	7.7	2.16	6.45	4.28	15	1.00	92.42	92.80	92.92	93.39	96.46	94.71	OS 640 - MH 630
30	29	13.080	0.07	0.23	0.99	0.07	0.22	6.0	6.9	7.7	1.68	3.57	2.86	15	0.31	92.90	92.94	93.50	93.54	94.71	95.26	IN 650 - OS 640
31	30	120.660	0.16	0.16	0.93	0.15	0.15	6.0	6.0	7.9	1.18	3.53	2.28	15	0.30	93.04	93.40	93.67	93.89	95.26	95.52	IN 660 - IN 650
32	27	33.398	0.00	0.16	0.00	0.00	0.15	6.0	9.3	7.1	1.41	3.53	2.11	15	0.30	92.00	92.10	92.71	92.74	94.02	93.91	OS 700 - OS 620
33	32	20.608	0.14	0.16	0.95	0.13	0.15	6.0	9.1	7.1	1.09	3.48	1.63	15	0.29	92.10	92.16	92.80	92.81	93.91	94.69	IN 710 - OS 700
34	33	75.988	0.02	0.02	0.99	0.02	0.02	6.0	6.0	7.9	0.16	3.55	0.40	15	0.30	92.26	92.49	92.85	92.86	94.69	94.69	IN 720 - IN 710
35	24	134.358	0.18	0.22	0.99	0.18	0.22	6.0	8.1	7.4	1.61	3.57	1.31	15	0.31	89.30	89.71	91.30	91.38	93.15	93.15	Pipe - (129)
36	35	32.306	0.04	0.04	0.99	0.04	0.04	6.0	6.0	7.9	0.31	3.59	0.26	15	0.31	89.81	89.91	91.39	91.39	93.15	92.99	Pipe - (130)
37	End	120.882	0.19	0.19	0.99	0.19	0.19	6.0	6.0	7.9	1.49	1.49	2.64	10(2b)	0.10	93.20	93.32	93.52	94.41	92.65	94.75	Pipe - (128)
38	End	14.190	0.07	0.08	0.95	0.07	0.08	6.0	6.6	7.8	3.44	12.01	3.64	24	0.28	91.25	91.29	91.90	92.01	93.06	94.03	IN 410 - FES 400
39	38	45.923	0.00	0.01	0.99	0.00	0.01	6.0	6.3	7.9	2.93	12.49	2.75	24	0.30	91.38	91.52	92.17	92.22	94.03	96.62	OS 420 - IN 410
40	39	41.538	0.01	0.01	0.99	0.01	0.01	6.0	6.1	7.9	2.93	12.65	2.81	24	0.31	91.52	91.65	92.30	92.34	96.62	95.37	Pipe - (134)
41	40	8.722	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	2.85	10.83	2.91	24	0.23	92.18	92.20	92.88	92.90	95.37	94.11	IN 430 - OS 420
42	End	67.153	0.07	0.07	0.98	0.07	0.07	6.0	6.0	7.9	0.55	0.00	3.11	6	-0.39	92.18	91.92	92.56	93.03	0.00	0.00	Pipe - (76)
43	End	26.926	0.10	0.10	0.92	0.09	0.09	6.0	6.0	7.9	0.73	3.52	2.44	15	0.30	91.25	91.33	91.58	91.74	93.06	94.31	IN 150 - FES 140
44	End	175.032	0.10	0.42	0.91	0.09	0.37	6.0	7.1	7.6	2.84	4.58	3.94	15	0.50	86.40	87.28	87.08	88.03	88.48	92.50	IN 110 - IN 100

Project File: Pipe Calcs_revised.stm | Number of lines: 46 | Run Date: 9/25/2023

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	44	129.312	0.25	0.32	0.85	0.21	0.28	6.0	6.5	7.8	2.20	4.58	3.52	15	0.50	87.38	88.03	88.06	88.62	92.50	92.00	IN 120 - IN 110
46	45	52.688	0.07	0.07	0.98	0.07	0.07	6.0	6.0	7.9	0.55	9.12	1.89	15	1.99	88.13	89.18	88.62	89.47	92.00	91.10	OS 130 - IN 120

Project File: Pipe Calcs_revised.stm

Number of lines: 46

Run Date: 9/25/2023

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MERCER CO., WEST WINDSOR TWP	44.9	1.43

Project Name:	ERD, LLC
Description:	Prop. QuickChek and Restaurant
Analysis Date:	09/18/23

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.897	Impervious areas	Sassafras	0.0	-
2	2.969	Open space	Sassafras	13.2	142,417
3	0.723	Woods	Sassafras	13.3	34,836
4	0				
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	4.6			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				10.6	177,253

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	2.979	Impervious areas	Sassafras	0.0	-
2	1.61	Open space	Sassafras	13.2	77,228
3	0				
4	0				
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	4.6			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				4.6	77,228

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)	129,765
Post-Development Annual Recharge Deficit=	***100,025***	(cubic feet)	

Recharge Efficiency Parameters Calculations (area averages)

RWC=	3.80	(in)	DRWC=	0.76	(in)
ERWC =	1.08	(in)	EDRWC=	0.22	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
ERD, LLC	Prop. QuickChek and Restaurant	09/18/23	Bioretention Basin #2

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	1124.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	10.2	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-20.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	24.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	1.08	in
ERWC Modified to consider dEXC	EDRWC	0.60	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.47	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.52	in
Inches of Rainfall to capture	Pdesign	0.65	in
Recharge Provided Avg. over Imp. Area		21.8	in
Runoff Captured Avg. over imp. Area		23.7	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.05	unitless
BMP Volume	VBMP	951	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	40,000	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	22,041	sq.ft
Root Zone Water Capacity	RWC	3.80	in
RWC Modified to consider dEXC	DRWC	2.11	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	3.7	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		40,000	cu.ft
Avg BMP Recharge Efficiency		92.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		67.8%	%
%Runoff Recharged		10.6%	%
%Rainfall Recharged		8.2%	%

CALCULATION CHECK MESSAGES

Volume Balance-> OK
dBMP Check---> OK
dEXC Check---> OK

BMP Location---> Location is selected as distributed or undetermined

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
ERD, LLC	Prop. QuickChek and Restaurant	09/18/23	Porous Paver Area #3

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	6839.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	5.7	in
Upper level of the BMP surface (negative if above ground)	dBMPu	7.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	42.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	1.08	in
ERWC Modified to consider dEXC	EDRWC	0.22	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.17	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	1.67	in
Inches of Rainfall to capture	Pdesign	1.90	in
Recharge Provided Avg. over Imp. Area		29.5	in
Runoff Captured Avg. over imp. Area		33.2	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.27	unitless
BMP Volume	VBMP	3,271	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	61,678	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	25,091	sq.ft
Root Zone Water Capacity	RWC	3.80	in
RWC Modified to consider dEXC	DRWC	0.76	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	5.7	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		61,678	cu.ft
Avg BMP Recharge Efficiency		88.9%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		95.0%	%
%Runoff Recharged		16.3%	%
%Rainfall Recharged		12.7%	%

CALCULATION CHECK MESSAGES

Volume Balance-> OK
dBMP Check---> OK
dEXC Check---> OK

BMP Location---> Location is selected as distributed or undetermined

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

New Jersey Stormwater Best Management Practices Manual

February 2004

APPENDIX A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: Township of West Windsor

County: Mercer County Date: 10/29/2021

Review board or agency: Planning Board

Proposed land development name: Warehouse

Lot(s): 2-6 Block(s): 47

Project or application number: _____

Applicant's name: East Ridge Development, LLC

Applicant's address: 250 Miron Drive,

Southlake, Texas 06877

Telephone: (571) 426-3094 Fax: (203) 438-2279

Email address: Lharder@eastridgedev.com

Designer's name: Bohler Engineering: c/o Tung-To Lam, PE

Designer's address: 30 Independence Boulevard, Suite 200

Warren, NJ 07059

Telephone: 908-668-8300 Fax: 856-930-4001

Email address: TLam@bohlereng.com

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

This site has been designed to with two above-ground bioretention basins along with porous pavement in parking areas where possible. Low maintenance landscaping shall supplement in areas to be disturbed, minimizing lawns and the potential use of fertilizers and pesticides. Native plants including ground cover, shrubs and trees instead of turf grass have been proposed as part of the landscape design for the site. The native plants will also require little to no irrigation once they are established. Soil compaction will be minimized through the use of light grading equipment in lawn areas and the basin.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

Stormwater Management N.J.A.C. 7:8, last amended 3/2/2020 & NJ Best Management Practices, revised 03/2021

Do regulations include nonstructural requirements? Yes: _____ No: X

If yes, briefly describe: _____

List LID-BMPs prohibited by local regulations: N/A

Pre-design meeting held? Yes: _____ Date: _____ No: X

Meeting held with: _____

Pre-design site walk held? Yes: _____ Date: _____ No: X

Site walk held with: _____

Other agencies with stormwater review jurisdiction:

Name: Township of West Windsor

Required approval: Site Plan Approval

Name: Mercer County Soil Conservation District

Required approval: Soil Erosion and Sediment Control Certification

Name: _____

Required approval: _____

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: _____ No: X

If yes, was this inventory a factor in the site's layout and design? Yes: _____ No: _____

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: X If yes, specify % of site: _____

Native ground cover? Yes: X No: _____ If yes, specify % of site: 100%

Vegetated buffers? Yes: _____ No: X If yes, specify % of site: _____

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: X If yes, specify % of site: _____

Native ground cover? Yes: _____ No: X If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: X If yes, specify % of site: _____

D. If vegetated filter strips or buffers are utilized, specify their functions: N/A

Reduce runoff volume increases through lower runoff coefficient: Yes: _____ No: _____

Reduce runoff pollutant loads through runoff treatment: Yes: _____ No: _____

Maintain groundwater recharge by preserving natural areas: Yes: _____ No: _____

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: X No: _____

If yes, were these inventories factors in the site's layout and design? Yes: X No: _____

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: _____ No: X

If yes, how: _____

_____

Restrict temporary site disturbance during construction? Yes: X No: _____

If yes, how: Tree protection and super silt fences will be constructed to limit the construction activities.

_____

Consider soils and slopes in selecting disturbance limits? Yes: X No: _____

If yes, how: The majority of the site is hydraulic soil group B and the proposed design attempts to maintain similar drainage patterns from pre to post-development.

_____

C. Specify percentage of site to be cleared: 100% Regraded: 100%

D. Specify percentage of cleared areas done so for buildings: +/-6.9%

For driveways and parking: +/-46.6% For roadways: +/-7.4%

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

The proposed improvements are designed to minimize the amount of impervious parking on site, with proposed pervious pavement parking areas and landscape areas within parking areas. In order to reduce the percentages in C and D above, smaller buildings or less parking areas would have to be proposed.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: N/A HSG B: 100% HSG C: N/A HSG D: N/A

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: N/A HSG B: 100% HSG C: N/A HSG D: N/A

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

The entirety of the site area consists of HSG B.; therefore it is not possible to avoid development in this area.

I. Does the site include Karst topography? Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 15.5% Proposed: 62.6% (56% with porous pavement)

B. Specify maximum site impervious coverage allowed by regulations: 70%

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity	N/A	
Residential access – medium intensity	N/A	
Residential access – high intensity with parking	N/A	
Residential access – high intensity without parking	N/A	
Neighborhood	N/A	
Minor collector – low intensity without parking	N/A	
Minor collector – with one parking lane	N/A	
Minor collector – with two parking lanes	N/A	
Minor collector – without parking	N/A	
Major collector	N/A	

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: 9' x18' Regulations: 9' x 18', 10' x 18' & 10' x 20'

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: Proposed Lot 1: 52 spaces
Proposed Lot 2: 45 spaces Regulations: Proposed Lot 1:29 spaces (min.) & 42 spaces (max.)
Proposed Lot 2: 45 spaces

F. Specify percentage of total site impervious cover created by buildings: +/- 6.9%

By driveways and parking: +/- 46.4% By roadways: +/- 7.4%

+/- 41.3% (with porous pavement)

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

In order to reduce the percentages in F above, the building are and proposed parking spaces would need to be reduced.

H. Specify percentage of total impervious area that will be unconnected:

Total site: 0% Buildings: 0% Driveways and parking: 0% Roads: N/A

I. Specify percentage of total impervious area that will be porous:

Total site: 5.4% Buildings: 0% Driveways and parking: 5.4% Roads: 0%

J. Specify percentage of total building roof area that will be vegetated: 0%

K. Specify percentage of total parking area located beneath buildings: 0%

L. Specify percentage of total parking located within multi-level parking deck: 0%

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 75% Vegetated swale: 25% Natural channel: 0%

Stormwater management facility: _____ Other: _____

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

To increase the percentages of the vegetated swale and natural channel, the proposed buildings and parking areas would need to be reduced.

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: Slopes were reduced to the greatest extent practical.

Increase overland flow roughness: The landscaped areas of the site propose plantings and meadow seeding in order to reduce the amount of mowed grasses.

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: 1

Specify the spacing between the trash receptacles: N/A

Compare trash receptacles proposed with those required by regulations:

Proposed: 1 Regulations: not specified

B. Pet Waste Stations N/A

Specify the number of pet waste stations provided: _____

Specify the spacing between the pet waste stations: _____

Compare pet waste stations proposed with those required by regulations:

Proposed: _____ Regulations: _____

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 100%

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: as necessary Regulations: not specified

Litter collection: Proposed: as necessary Regulations: not specified

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

Eco grate at proposed inlet castings to minimize vertical opening and trash racks attached to proposed outlet structures.

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1.	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.	X	
2.	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.		X
3.	Maximize the protection of natural drainage features and vegetation.	X	
4.	Minimize the decrease in the pre-construction time of concentration.	X	
5.	Minimize land disturbance including clearing and grading.	X	
6.	Minimize soil compaction.	X	
7.	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.	X	
8.	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.	X	
9.	Provide preventative source controls.	X	

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

In order to minimize impervious surfaces and provide additional vegetated open-channel conveyance systems, the proposed improvements would need to be broken up and spread out to provide additional internal vegetated islands for stormwater to drain to. Such a design would result in greater ground disturbance.

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project:	ER/UDC West Windsor, LLC
Date:	September 18, 2023
User:	MAI
Notes:	Proposed QuickChek food store with fuel sales and restaurant with drive-thru

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 4.6 **Acres**

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:	PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5	Total % Area
Percent of Each Planning Area within Site:		100.0%					100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space		3.0			3.0	214
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous		0.7			0.7	73
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious		0.9			0.9	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
	HSG Subtotals (Acres):	0.0	4.6	0.0	0.0	**Total Area:**	4.6
	HSG Subtotals (%):	0.0%	100.0%	0.0%	0.0%	**Total % Area:**	100.0%

Points Subtotal: **287**

Total Existing Site Points: **287**

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space		1.2			1.2	89
3	Brush and Shrub		0.4			0.4	30
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous		0.0			0.0	1
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving		0.7			0.7	52
13	Directly Connected Impervious		2.3			2.3	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
	HSG Subtotals (Acres):	0.0	4.6	0.0	0.0	**Total Area:**	4.6
	HSG Subtotals (%):	0.0%	100.0%	0.0%	0.0%	**Total % Area:**	100.0%
						Points Subtotal:	**171**

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =	49%	% of Site
Total Unconnected Impervious Coverage with Small D/S Pervious =	0%	% of Site
Total Unconnected Impervious Coverage with Large D/S Pervious =	0%	% of Site
Total Site Impervious Coverage =	49%	% of Site
Effective Site Impervious Coverage =	49%	% of Site
Specify Source of Maximum Allowable Impervious Coverage:	Table	(None or Table)
Allowable Site Impervious Cover from Maximum Impervious Cover Table:	70%	

Note: See Maximum Impervious Cover Table Worksheet for Details

Points Subtotal: **20**

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =		% of Site
Maximum Allowable Site Disturbance by Municipal Ordinance =		% of Site

Points Subtotal: **0**

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =	3189	Feet
Length of Vegetated Runoff Conveyance System =	687	Feet
% of Total Runoff Conveyance System That is Vegetated =	22%	

Points Subtotal: **29**

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =		% of Site
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =		Acres
Maximum Proposed Cluster Lot Size (Note:1/4 Acre or Less) =		Acres
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =		% of Clustered Site Portion

Points Subtotal: **0**

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:	Yes	(Yes or No)
Percent of Proposed Lawn Areas to be Graded with Such Equipment:	100%	% of Lawn Areas

Points Subtotal: **33**

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):	No	(Yes or No)
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):	No	(Yes or No)
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):	No	(Yes or No)

Points Subtotal: **0**

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points: **252**

Ratio of Proposed to Existing Site Points: **88%**

Required Site Points Ratio: **88%**

Nonstructural Point System Results: **Proposed Nonstructural Measures are Adequate**

Hydrograph for Pond B1: BASIN 1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0.000	91.25	0.00	0.00	**0.00**
2.00	0.05	0.000	91.25	0.05	0.05	0.00
4.00	0.09	0.000	91.25	0.09	0.09	0.00
6.00	0.12	0.000	91.25	0.12	0.12	0.00
8.00	0.20	0.000	91.25	0.20	0.20	0.00
10.00	0.37	0.001	91.25	0.32	0.32	0.00
12.00	**5.84**	**0.117**	**92.22**	**0.40**	**0.40**	0.00
14.00	**1.07**	**0.325**	**93.56**	**2.18**	**2.18**	0.00
16.00	0.65	0.202	92.82	0.94	0.94	0.00
18.00	0.48	0.178	92.66	0.57	0.57	0.00
20.00	0.38	0.165	92.57	0.45	0.45	0.00
22.00	0.29	0.150	92.47	0.42	0.42	0.00
24.00	0.21	0.124	92.28	0.40	0.40	0.00
26.00	0.04	0.072	91.88	0.37	0.37	0.00
28.00	0.02	0.018	91.42	0.34	0.34	0.00
30.00	0.02	0.000	91.25	0.00	0.00	0.00
32.00	0.01	0.000	91.25	0.00	0.00	0.00
34.00	0.01	0.000	91.25	0.00	0.00	0.00
36.00	0.01	0.000	91.25	0.00	0.00	0.00
38.00	0.01	0.000	91.25	0.00	0.00	0.00
40.00	0.01	0.000	91.25	0.00	0.00	0.00
42.00	0.00	0.000	91.25	0.00	0.00	0.00
44.00	0.00	0.000	91.25	0.00	0.00	0.00
46.00	0.00	0.000	91.25	0.00	0.00	0.00
48.00	0.00	0.000	91.25	0.00	0.00	0.00
50.00	0.00	0.000	91.25	0.00	0.00	0.00
52.00	0.00	0.000	91.25	0.00	0.00	0.00
54.00	0.00	0.000	91.25	0.00	0.00	0.00
56.00	0.00	0.000	91.25	0.00	0.00	0.00
58.00	0.00	0.000	91.25	0.00	0.00	0.00
60.00	0.00	0.000	91.25	0.00	0.00	0.00
62.00	0.00	0.000	91.25	0.00	0.00	0.00
64.00	0.00	0.000	91.25	0.00	0.00	0.00
66.00	0.00	0.000	91.25	0.00	0.00	0.00
68.00	0.00	0.000	91.25	0.00	0.00	0.00
70.00	0.00	0.000	91.25	0.00	0.00	0.00
72.00	0.00	0.000	91.25	0.00	0.00	0.00

Basin Drain Time =
30.0 - 14.0 = 16 hours

Hydrograph for Pond B2: BASIN 2

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	93.20	0.00	0.00	0.00
2.00	0.03	0.000	93.20	0.03	0.03	0.00
4.00	0.05	0.000	93.20	0.05	0.05	0.00
6.00	0.07	0.000	93.20	0.06	**0.06**	0.00
8.00	0.10	0.004	93.31	0.06	**0.06**	0.00
10.00	0.19	0.016	93.66	0.06	0.06	0.00
12.00	**2.82**	**0.073**	**95.35**	**2.41**	0.06	**2.35**
14.00	**0.19**	**0.063**	**95.06**	**0.24**	0.06	**0.18**
16.00	0.16	0.056	94.85	0.22	0.06	0.16
18.00	0.13	0.047	94.57	0.19	0.06	0.13
20.00	0.11	0.037	94.30	0.16	0.06	0.10
22.00	0.08	0.030	94.08	0.12	0.06	0.06
24.00	0.07	0.025	93.94	0.08	0.06	0.01
26.00	0.00	0.016	93.68	0.06	0.06	0.00
28.00	0.00	0.007	93.39	0.06	0.06	0.00
30.00	0.00	0.000	93.20	0.00	0.00	0.00
32.00	0.00	0.000	93.20	0.00	0.00	0.00
34.00	0.00	0.000	93.20	0.00	0.00	0.00
36.00	0.00	0.000	93.20	0.00	0.00	0.00
38.00	0.00	0.000	93.20	0.00	0.00	0.00
40.00	0.00	0.000	93.20	0.00	0.00	0.00
42.00	0.00	0.000	93.20	0.00	0.00	0.00
44.00	0.00	0.000	93.20	0.00	0.00	0.00
46.00	0.00	0.000	93.20	0.00	0.00	0.00
48.00	0.00	0.000	93.20	0.00	0.00	0.00
50.00	0.00	0.000	93.20	0.00	0.00	0.00
52.00	0.00	0.000	93.20	0.00	0.00	0.00
54.00	0.00	0.000	93.20	0.00	0.00	0.00
56.00	0.00	0.000	93.20	0.00	0.00	0.00
58.00	0.00	0.000	93.20	0.00	0.00	0.00
60.00	0.00	0.000	93.20	0.00	0.00	0.00
62.00	0.00	0.000	93.20	0.00	0.00	0.00
64.00	0.00	0.000	93.20	0.00	0.00	0.00
66.00	0.00	0.000	93.20	0.00	0.00	0.00
68.00	0.00	0.000	93.20	0.00	0.00	0.00
70.00	0.00	0.000	93.20	0.00	0.00	0.00
72.00	0.00	0.000	93.20	0.00	0.00	0.00

Basin Drain Time =
30.0 - 12.0 = 18 hours

Hydrograph for Pond PP1: POROUS PAVER #1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	92.10	0.00
2.00	0.01	0.001	92.14	0.00
4.00	0.02	0.001	92.17	0.01
6.00	0.02	0.001	92.18	0.02
8.00	0.03	0.002	92.20	0.03
10.00	0.05	0.002	92.24	0.04
12.00	**0.74**	**0.017**	**93.14**	**0.20**
14.00	**0.06**	**0.030**	**93.91**	**0.10**
16.00	0.03	0.022	93.41	0.08
18.00	0.02	0.015	93.00	0.06
20.00	0.02	0.010	92.73	0.03
22.00	0.02	0.009	92.64	0.02
24.00	0.02	0.008	92.59	0.02
26.00	0.00	0.006	92.45	0.02
28.00	0.00	0.003	92.29	0.02
30.00	0.00	0.001	92.16	0.01
32.00	0.00	0.000	92.13	0.00
34.00	0.00	0.000	92.12	0.00
36.00	0.00	0.000	92.11	0.00
38.00	0.00	0.000	92.11	0.00
40.00	0.00	0.000	92.11	0.00
42.00	0.00	0.000	92.11	0.00
44.00	0.00	0.000	92.11	0.00
46.00	0.00	0.000	92.11	0.00
48.00	0.00	0.000	92.10	0.00
50.00	0.00	0.000	92.10	0.00
52.00	0.00	0.000	92.10	0.00
54.00	0.00	0.000	92.10	0.00
56.00	0.00	0.000	92.10	0.00
58.00	0.00	0.000	92.10	0.00
60.00	0.00	0.000	92.10	0.00
62.00	0.00	0.000	92.10	0.00
64.00	0.00	0.000	92.10	0.00
66.00	0.00	0.000	92.10	0.00
68.00	0.00	0.000	92.10	0.00
70.00	0.00	0.000	92.10	0.00
72.00	0.00	0.000	92.10	0.00

Basin Drain Time =
32.0 - 12.0 = 16 hours

Hydrograph for Pond PP2: POROUS PAVER #2

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	92.90	0.00
2.00	0.01	0.001	92.93	0.00
4.00	0.02	0.002	92.98	0.02
6.00	0.02	0.002	92.99	0.02
8.00	0.04	0.002	93.01	0.03
10.00	0.06	0.003	93.05	0.06
12.00	**0.64**	**0.010**	**93.37**	**0.34**
14.00	**0.09**	**0.022**	**93.96**	**0.15**
16.00	0.05	0.011	93.44	0.11
18.00	0.03	0.003	93.06	0.06
20.00	0.03	0.002	93.00	0.03
22.00	0.02	0.002	92.99	0.02
24.00	0.02	0.002	92.99	0.02
26.00	0.00	0.001	92.93	0.00
28.00	0.00	0.000	92.92	0.00
30.00	0.00	0.000	92.91	0.00
32.00	0.00	0.000	92.91	0.00
34.00	0.00	0.000	92.91	0.00
36.00	0.00	0.000	92.91	0.00
38.00	0.00	0.000	92.91	0.00
40.00	0.00	0.000	92.91	0.00
42.00	0.00	0.000	92.90	0.00
44.00	0.00	0.000	92.90	0.00
46.00	0.00	0.000	92.90	0.00
48.00	0.00	0.000	92.90	0.00
50.00	0.00	0.000	92.90	0.00
52.00	0.00	0.000	92.90	0.00
54.00	0.00	0.000	92.90	0.00
56.00	0.00	0.000	92.90	0.00
58.00	0.00	0.000	92.90	0.00
60.00	0.00	0.000	92.90	0.00
62.00	0.00	0.000	92.90	0.00
64.00	0.00	0.000	92.90	0.00
66.00	0.00	0.000	92.90	0.00
68.00	0.00	0.000	92.90	0.00
70.00	0.00	0.000	92.90	0.00
72.00	0.00	0.000	92.90	0.00

Basin Drain Time =
26.0 - 14.0 = 12 hours

Hydrograph for Pond PP3: POROUS PAVER #3

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0.000	92.00	0.00	0.00	0.00
2.00	0.02	0.000	92.00	0.02	0.02	0.00
4.00	0.06	0.000	92.00	0.06	0.06	0.00
6.00	0.07	0.000	92.00	0.07	**0.07**	0.00
8.00	0.11	0.002	92.03	0.08	**0.08**	0.00
10.00	0.18	0.011	92.18	0.08	0.08	0.00
12.00	**1.37**	**0.060**	**92.95**	**0.28**	0.08	**0.20**
14.00	**0.37**	**0.120**	**93.91**	**0.54**	0.08	**0.46**
16.00	0.25	0.089	93.41	0.43	0.08	0.35
18.00	0.16	0.062	92.99	0.30	0.08	0.22
20.00	0.09	0.046	92.73	0.15	0.08	0.07
22.00	0.07	0.040	92.64	0.10	0.08	0.02
24.00	0.07	0.037	92.59	0.08	0.08	0.00
26.00	0.02	0.028	92.45	0.08	0.08	0.00
28.00	0.02	0.018	92.29	0.08	0.08	0.00
30.00	0.01	0.007	92.11	0.08	0.08	0.00
32.00	0.00	0.000	92.00	0.00	0.00	0.00
34.00	0.00	0.000	92.00	0.00	0.00	0.00
36.00	0.00	0.000	92.00	0.00	0.00	0.00
38.00	0.00	0.000	92.00	0.00	0.00	0.00
40.00	0.00	0.000	92.00	0.00	0.00	0.00
42.00	0.00	0.000	92.00	0.00	0.00	0.00
44.00	0.00	0.000	92.00	0.00	0.00	0.00
46.00	0.00	0.000	92.00	0.00	0.00	0.00
48.00	0.00	0.000	92.00	0.00	0.00	0.00
50.00	0.00	0.000	92.00	0.00	0.00	0.00
52.00	0.00	0.000	92.00	0.00	0.00	0.00
54.00	0.00	0.000	92.00	0.00	0.00	0.00
56.00	0.00	0.000	92.00	0.00	0.00	0.00
58.00	0.00	0.000	92.00	0.00	0.00	0.00
60.00	0.00	0.000	92.00	0.00	0.00	0.00
62.00	0.00	0.000	92.00	0.00	0.00	0.00
64.00	0.00	0.000	92.00	0.00	0.00	0.00
66.00	0.00	0.000	92.00	0.00	0.00	0.00
68.00	0.00	0.000	92.00	0.00	0.00	0.00
70.00	0.00	0.000	92.00	0.00	0.00	0.00
72.00	0.00	0.000	92.00	0.00	0.00	0.00

Basin Drain Time =
32.0 - 14.0 = 18 hours

Hydrograph for Pond PP4: POROUS PAVER #4

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	94.00	0.00
2.00	0.01	0.000	94.01	0.00
4.00	0.01	0.001	94.04	0.00
6.00	0.01	0.001	94.05	0.01
8.00	0.01	0.002	94.07	0.01
10.00	0.03	0.003	94.09	0.02
12.00	**0.46**	**0.015**	**94.57**	**0.00**
14.00	**0.03**	**0.027**	**95.00**	**0.00**
16.00	0.02	0.023	94.86	0.06
18.00	0.01	0.016	94.58	0.06
20.00	0.01	0.009	94.32	0.05
22.00	0.01	0.004	94.16	0.03
24.00	0.01	0.003	94.10	0.01
26.00	0.00	0.001	94.05	0.00
28.00	0.00	0.001	94.03	0.00
30.00	0.00	0.001	94.02	0.00
32.00	0.00	0.000	94.02	0.00
34.00	0.00	0.000	94.01	0.00
36.00	0.00	0.000	94.01	0.00
38.00	0.00	0.000	94.01	0.00
40.00	0.00	0.000	94.01	0.00
42.00	0.00	0.000	94.01	0.00
44.00	0.00	0.000	94.01	0.00
46.00	0.00	0.000	94.01	0.00
48.00	0.00	0.000	94.01	0.00
50.00	0.00	0.000	94.01	0.00
52.00	0.00	0.000	94.01	0.00
54.00	0.00	0.000	94.00	0.00
56.00	0.00	0.000	94.00	0.00
58.00	0.00	0.000	94.00	0.00
60.00	0.00	0.000	94.00	0.00
62.00	0.00	0.000	94.00	0.00
64.00	0.00	0.000	94.00	0.00
66.00	0.00	0.000	94.00	0.00
68.00	0.00	0.000	94.00	0.00
70.00	0.00	0.000	94.00	0.00
72.00	0.00	0.000	94.00	0.00

Basin Drain Time =
32.0 - 14.0 = 18 hours

Hydrograph for Pond PP5: POROUS PAVER #5

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	94.00	0.00
2.00	0.01	0.001	94.03	0.00
4.00	0.02	0.004	94.11	0.00
6.00	0.03	0.008	94.22	0.00
8.00	0.04	0.013	94.35	0.02
10.00	0.08	0.016	94.43	0.05
12.00	**0.99**	**0.029**	**94.78**	**0.75**
14.00	**0.09**	**0.024**	**94.63**	**0.12**
16.00	0.05	0.018	94.47	0.07
18.00	0.03	0.015	94.40	0.04
20.00	0.03	0.014	94.38	0.03
22.00	0.02	0.014	94.37	0.03
24.00	0.02	0.013	94.36	0.02
26.00	0.00	0.012	94.31	0.01
28.00	0.00	0.011	94.29	0.00
30.00	0.00	0.010	94.28	0.00
32.00	0.00	0.010	94.27	0.00
34.00	0.00	0.010	94.27	0.00
36.00	0.00	0.010	94.27	0.00
38.00	0.00	0.010	94.26	0.00
40.00	0.00	0.010	94.26	0.00
42.00	0.00	0.010	94.26	0.00
44.00	0.00	0.010	94.26	0.00
46.00	0.00	0.010	94.26	0.00
48.00	0.00	0.010	94.26	0.00
50.00	0.00	0.010	94.26	0.00
52.00	0.00	0.010	94.26	0.00
54.00	0.00	0.010	94.26	0.00
56.00	0.00	0.010	94.26	0.00
58.00	0.00	0.010	94.26	0.00
60.00	0.00	0.010	94.26	0.00
62.00	0.00	0.010	94.26	0.00
64.00	0.00	0.010	94.25	0.00
66.00	0.00	0.010	94.25	0.00
68.00	0.00	0.010	94.25	0.00
70.00	0.00	0.010	94.25	0.00
72.00	0.00	0.010	94.25	0.00

Basin Drain Time =
28.0 - 12.0 = 16 hours

Hydrograph for Pond PP6: POROUS PAVER #6

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	94.25	0.00
2.00	0.01	0.001	94.25	0.00
4.00	0.02	0.003	94.27	0.00
6.00	0.02	0.007	94.28	0.00
8.00	0.03	0.011	94.30	0.01
10.00	0.06	0.016	94.33	0.01
12.00	**1.05**	**0.047**	**94.49**	**0.08**
14.00	**0.07**	**0.071**	**94.61**	**0.11**
16.00	0.04	0.061	94.56	0.10
18.00	0.02	0.051	94.51	0.09
20.00	0.02	0.042	94.46	0.07
22.00	0.02	0.035	94.43	0.05
24.00	0.02	0.030	94.40	0.04
26.00	0.00	0.024	94.37	0.03
28.00	0.00	0.020	94.35	0.02
30.00	0.00	0.017	94.34	0.02
32.00	0.00	0.015	94.33	0.01
34.00	0.00	0.013	94.32	0.01
36.00	0.00	0.012	94.31	0.01
38.00	0.00	0.011	94.30	0.01
40.00	0.00	0.010	94.30	0.01
42.00	0.00	0.009	94.30	0.00
44.00	0.00	0.008	94.29	0.00
46.00	0.00	0.008	94.29	0.00
48.00	0.00	0.007	94.29	0.00
50.00	0.00	0.007	94.28	0.00
52.00	0.00	0.006	94.28	0.00
54.00	0.00	0.006	94.28	0.00
56.00	0.00	0.006	94.28	0.00
58.00	0.00	0.005	94.28	0.00
60.00	0.00	0.005	94.28	0.00
62.00	0.00	0.005	94.27	0.00
64.00	0.00	0.005	94.27	0.00
66.00	0.00	0.005	94.27	0.00
68.00	0.00	0.004	94.27	0.00
70.00	0.00	0.004	94.27	0.00
72.00	0.00	0.004	94.27	0.00

Basin Drain Time =
42.0 - 14.0 = 28 hours

Hydrograph for Pond PP7: ROAD POROUS PAVEMENT #7

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	89.50	0.00
2.00	0.02	0.001	89.51	0.00
4.00	0.03	0.005	89.53	0.00
6.00	0.03	0.009	89.57	0.01
8.00	0.05	0.013	89.60	0.02
10.00	0.09	0.020	89.65	0.03
12.00	**1.36**	**0.056**	**89.92**	**0.13**
14.00	**0.13**	**0.058**	**89.93**	**0.17**
16.00	0.07	0.053	89.90	0.09
18.00	0.05	0.049	89.87	0.08
20.00	0.04	0.043	89.82	0.08
22.00	0.04	0.037	89.78	0.07
24.00	0.03	0.032	89.74	0.06
26.00	0.00	0.024	89.68	0.04
28.00	0.00	0.018	89.63	0.03
30.00	0.00	0.014	89.60	0.02
32.00	0.00	0.011	89.58	0.01
34.00	0.00	0.009	89.57	0.01
36.00	0.00	0.008	89.56	0.01
38.00	0.00	0.007	89.55	0.01
40.00	0.00	0.006	89.55	0.00
42.00	0.00	0.006	89.54	0.00
44.00	0.00	0.005	89.54	0.00
46.00	0.00	0.005	89.54	0.00
48.00	0.00	0.004	89.53	0.00
50.00	0.00	0.004	89.53	0.00
52.00	0.00	0.004	89.53	0.00
54.00	0.00	0.003	89.53	0.00
56.00	0.00	0.003	89.52	0.00
58.00	0.00	0.003	89.52	0.00
60.00	0.00	0.003	89.52	0.00
62.00	0.00	0.003	89.52	0.00
64.00	0.00	0.003	89.52	0.00
66.00	0.00	0.003	89.52	0.00
68.00	0.00	0.002	89.52	0.00
70.00	0.00	0.002	89.52	0.00
72.00	0.00	0.002	89.52	0.00

Basin Drain Time =
40.0 - 14.0 = 26 hours

BOHLER

35 Technology Drive, Warren, NJ 07059
(908) 668-8300

Date: 9/18/2023
Project: West Windsor, NJ
Project No: J190844

Calculated By: CPR
Checked By: TXL

Sediment Storage Capacity Calculations

Sediment Basin # 1

TRAP EFFICIENCY METHOD:

Sediment type:		Sandy Loam
Trap efficiency value:		75%
Curve used:	(see Curve 24-1)	Course Grained Curve
Ratio of capacity to annual inflow (C/I):	(see Curve 24-1)	0.0245
Average annual surface runoff (R):	(see Figure 24-1)	20.0 in
Watershed area (A):		4.56 Ac.
Avergae annual surface runoff, $I = \frac{R \times A}{12}$ =		7.60 Ac ft
Total capacity, C = I × C/I =		0.19 Ac ft

SEDIMENT STORAGE CAPACITY METHOD:

1. DETEMINE VOLUME FOR SEDIMENT STORAGE USING METHOD 2

a. Determine drainage area, DA, and average annual erosion, A:

Drainage area, (DA):		2.53 Ac.
Land use type:		Construction areas
Average annual erosion, (A):		50.0 ton/ac/yr
(DA) × (A) =		126 tons/yr

b. Determine delivery rate, DR:

Watershed area (A):		0.00 sq mi
Sediment delivery ratio:	(refer to Curve 24-2)	Sandy
DR =	(refer to Curve 24-2)	42%

c. Determine sediment density, γ:

Soil texture:	(refer to Table 24-1)	Sand, aerated
γ =		92.5 lbs/cf

d. Determine the minimum volume for sediment storage for the planned life of the structure:

V = (DA) (A) (DR) (TE) (1/γ) (2,000 lbs/ton) (1/43,560 sf/ac) = 0.020 Ac ft

2. Determine the minimum volume for temporary floodway storage:

2-year, 24 hour Rainfall intensity:	Mercer County	3.3 inches
Soil type:		Sassafras
Soil group:		B
CN:		84
Volume 2-yr design storm:	17,860 CF	0.410 Ac ft
Total volume required (including sediment):		0.430 Ac ft

DETERMINE THE LARGER VOLUME OF THE TWO METHODS:

TOTAL VOLUME REQUIRED: 0.430 Ac ft
or 18,726 CF

DEWATERING:

Trap efficiency value: 50%

Curve: (refer to Curve 24-1) Course Grained Curve

Ratio of capacity to annual inflow, (C/I): (refer to Curve 24-1) 0.0075

Average annual surface runoff, (R): (refer to Figure 24-1) 20.0 in

Watershed area, (A): 4.56 Ac.

Avergae annual surface runoff, $I = \frac{R \times A}{12} =$ 7.60 Ac ft

Total capacity, C = I × C/I = 0.06 Ac ft
or 2,484 CF

SEDIMENT BASIN BOTTOM ELEVATION: 92.25

ELEVATION OF SEDIMENT STORAGE: 92.50

THE TOTAL VOLUME FROM 92.25 to 92.50 : 0.23 Ac ft
or 9,826 CF

ELEVATION OF EMERGENCY SPILLWAY: 94.04

THE TOTAL VOLUME FROM 92.50 to 94.04 : 0.27 Ac ft
or 11,715 CF

TOTAL VOLUME OF THE SEDIMENTAL BASIN 0.49 Ac ft
or **21,541 CF**

ELEVATION OF 4" DEWATERING ORFICE: **92.50**

ELEVATION TOP OF RISER: **93.04**

SEDIMENT BASIN # 1

ELEVATION	AREA (SF)	INCR. VOL. (CF)	TOTAL VOLUME (CF)
92	5576		
93	6970	4705	4705
94	8407	7689	12393
95	9888	9148	21541

September 18, 2023

First Defense High Capacity Sizing

The First Defense High Capacity is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment total suspended solids (TSS), trash and hydrocarbons from Stormwater runoff without washing out previously captured pollutants. The First Defense® High Capacity is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

NJDEP Certification Letters

First Defense: https://njstormwater.org/pdf/FDHC_Certification_2017-03-09.pdf

Certification Letter Product Rating Table

First Defense® Model	Manhole Diameter (ft)	Maximum Treatment Flowrate, MTFR (cfs)
3-ft	3	0.85
4-ft	4	1.5
5-ft	5	2.35
6-ft	6	3.38
7-ft	7	4.60
8-ft	8	6.00

Design Sizing

Site ID	Drainage Area (ac)	Q (cfs)	F.D. Size
FD W/ B Inlet #370	0.474	0.47	3-ft
FD W/ B Inlet #430	0.236	0.67	3-ft

The 3-ft First Defense High Capacity units are suitable for each of the two locations.

C. SUPPLEMENTAL SUBSURFACE INVESTIGATION

- **Stormwater Investigation**

Melick-Tully
& Associates

A Division of GZA

STORMWATER INVESTIGATION
Proposed Quick Chek Food Store and Restaurant
West Windsor, Mercer County, New Jersey
ER/UDC West Windsor, LLC

August 30, 2021
File No. 26.0092434.00

PREPARED FOR:

ER/UDC West Windsor, LLC
P. O. Box 391
Williston, Vermont 05493

Melick-Tully & Associates, A Division of GZA
117 Canal Road
South Bound Brook, NJ 08880
732-356-3400

GZA has 32 Offices Nationwide
www.melick-tully.com www.gza.com

Melick-Tully
& Associates
A Division of GZA

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

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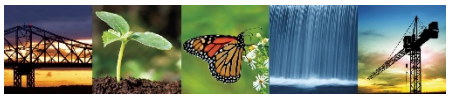


August 30, 2021
File No. 26.P000237.22

ER/UDC West Windsor, LLC
P. O. Box 391
Williston, Vermont 05493

Attention: Mr. Larry Harder

Report
Stormwater Investigation
Proposed Quick Chek Food Store and Restaurant
West Windsor, Mercer County, New Jersey
ER/UDC West Windsor, LLC

Introduction

This report presents the results of a stormwater investigation completed by Melick-Tully & Associates, a Division of GZA GeoEnvironmental, Inc. (MTA) at the site of a proposed Quick Chek food store and a proposed restaurant which may be constructed in West Windsor, Mercer County, New Jersey. The site is located adjacent to and west of Southfield Road between Princeton-Hightstown Road and McGetrick Lane, as shown on the attached Site Location Map, Plate 1. Our work was performed in general conformance with our proposal dated June 30, 2021.

Proposed Construction

A site layout plan provided to us indicates that the development would consist of two facilities and associated site improvements. The eastern half of the property would be developed by a Quick Chek food store approximately 5,869 square feet in plan area with a finish floor elevation of +97.00 feet. A canopy with eight fuel dispensers would be located to the north of the food store area and four underground storage tanks would be

located north of the canopy. On-site paved parking and roadway areas would be constructed to service the proposed facility.

Adjacent to and west of the Quick Chek development, a restaurant approximately 4,541 square feet in plan area with a drive-thru would be constructed with a finish floor elevation of +96.50 feet. The building would be located on the west parcel with a drive-thru lane south and east of the building. On-site paved parking and roadway areas would be constructed north and west of the proposed restaurant.

On-site stormwater management facilities are currently planned. These currently include seven above-ground stormwater management basins, seven areas of porous asphalt pavement below proposed car parking areas on both developments, and porous concrete pavements adjacent to the two structures.

Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil and groundwater conditions via test pits and borings in accessible portions of the proposed development;

2) collect tube samples of the soil layers encountered from all proposed test pit locations for laboratory tube permeameter permeability testing;

3) perform cased borehole permeability testing at selected locations; and

4) prepare a brief summary report of our findings for use by the basin designer in their evaluation of the stormwater improvements.

To accomplish these purposes, a subsurface exploration program consisting of 28 supervised test pit excavations and two test borings were performed at the site in the locations of proposed stormwater management facilities shown on Bohler's preliminary site plan dated April 27, 2021. The test pits were advanced using a track-mounted excavator (CAT 308) and extended to depths of 12 to 13 feet below existing

surface grades. The test borings were advanced using a geoprobe with continuous core sampling and extended to depths of 10 feet below grade. A cased borehole permeability test was performed adjacent to each boring following completion at depths of 2 and 8.5 feet below grade. The locations of the explorations are shown in relation to proposed site features on the Plot Plan, Plate 2.

All field work was performed under the direct technical supervision of a geotechnical engineer from MTA. Our representative located the explorations in the field, supervised the soil sampling operations, maintained continuous logs of the explorations as the work proceeded, and obtained samples of the materials encountered in the explorations for identification purposes. We also obtained relatively undisturbed tube samples from the test pits for laboratory tube permeameter permeability testing and performed cased borehole permeability testing adjacent to each boring.

Detailed descriptions of the encountered subsurface conditions are described on the Test Pit Logs, Plates 3-1 through 3-28, and Test Boring Logs, Plates 4-1 and 4-2. The soils were visually classified in general accordance with the procedures of the United States Department of Agriculture Soil Classification System (USDA) described on Plate 5.

All soil samples were brought to our office, and selected samples were subjected to laboratory grain-size and tube permeameter permeability testing. The results of the gradation testing are presented on Plates 6-1 and 6-2, while the permeability test results are presented on Plate 7.

The following discussion of our findings are subject to the Limitations attached as an Appendix to this report.

Site Conditions

Surface Features: The site contains five separate lots (Lots 2 through 6). Lot 2 consists of a one-story masonry building with a basement and a paved parking lot to the west. Lot 3 consists of a two-story frame building and a detached frame garage. Lot 4 consists of a two-story frame building and a detached one-story garage structure. Lot 5 consists of a one-story frame building with a detached frame garage. And Lot 6 consists of a one-story frame building to the west and previously consisted of a one-story frame building to the southeast, which had already been demolished at the time of our investigation. Grass lawns with trees, bushes, and driveways cover the surface between the buildings. Princeton-Hightstown Road borders the property to the north, Southfield Road to the east, and McGetrick Lane to the south.

Topographic information shown on the plans provided to us indicates that the ground surface elevations slope downward from approximately Elevation +96 feet in the northeast to approximately Elevation +93 in the western and southern portions of the site.

Subsurface Conditions: Approximately 2 inches of asphalt pavement was encountered at the surface in Test Pits 16 and 19. Fill was encountered at the surface in Test Pits 10 and 11. The remaining test pits were performed in grass lawn areas where approximately 3 to 26 inches of topsoil was encountered. Fill was also encountered below the surface materials in Test Pits 16, 17, 21, and 22. Fill thicknesses varied from about 1.3 feet to 5.8 feet and typically consisted of sandy loam, sandy clay loam, and clay soils. The surface and fill materials were underlain by interlayered sand, loamy sand, sandy loam, sandy clay loam, clay loam, and clay soils. Generally, clayey soils were encountered near the surface while sandier soils were encountered at deeper depths.

Groundwater seepage was observed in 17 of the test pits (Test Pits 1 through 16, and 20) at depths of approximate 9.5 to 13 feet below grade, corresponding approximately to elevations ranging from +81 feet to +84.5 feet. In addition, groundwater levels were obtained in five wells installed on August 12, 2021 for an environmental baseline on the proposed Quick Chek property. Depths to groundwater varied from approximately 7.7 to 10.8 feet in the wells, corresponding approximately to elevations ranging from +84.2 feet and +85.6 feet. Mottling, which is indicative of seasonally saturated conditions, was observed in the test pits at depths ranging from 7 to 108 inches below grade. In addition, the sidewalls in some of the test pits collapsed during excavation within a few feet of the observed groundwater seepage levels, suggesting groundwater levels in those test pits are likely near sidewall caving depths.

Permeability Test Results

Laboratory tube permeameter permeability tests were performed on tube samples of the subsoils collected below the proposed stormwater management facilities in each test pit. The permeability tests indicate that the deeper sandy subsoils (sand, loamy sand, and sandy loam) generally exhibited permeabilities of 1 inch per hour to greater than 20 inches per hour, while the surficial silty and clayey soils (sandy clay loam, loam, clay loam, and clay) generally exhibited permeability of less than 1 inch per hour, and often less than 0.06 inches per hour. The laboratory tube permeability tests are summarized on Plate 7.

Cased borehole permeability testing was performed below proposed porous concrete pavement areas around the proposed Quick Chek building. Field permeability tests were performed in Boring 1 at a depth of 3.3 feet below grade and in Boring 2 at a depth of 8.5 feet below grade. The field permeability tests indicate that the silty clay soils in Boring 1 and loamy sand soils in Boring 2 exhibited permeabilities of less than 0.06

inches per hour. It is possible that the bottom of the cased borehole test for Boring 2 was at or near the groundwater level which may explain the slow rate observed even though the soils were sandy.

Please contact us if you have any questions regarding this information.

The following Plates and Appendix are attached and complete this report:

Plate 1 – Site Location Map
Plate 2 – Plot Plan
Plates 3-1 through 3-28 – Test Pit Logs
Plates 4-1 and 4-2 – Test Boring Logs
Plate 5 – USDA Soil Textural Triangle
Plates 6-1 and 6-2 – Gradation Curves
Plate 7 – Summary of Laboratory Tube Permeameter Permeability Test Results
Appendix – Limitations

Respectfully submitted,

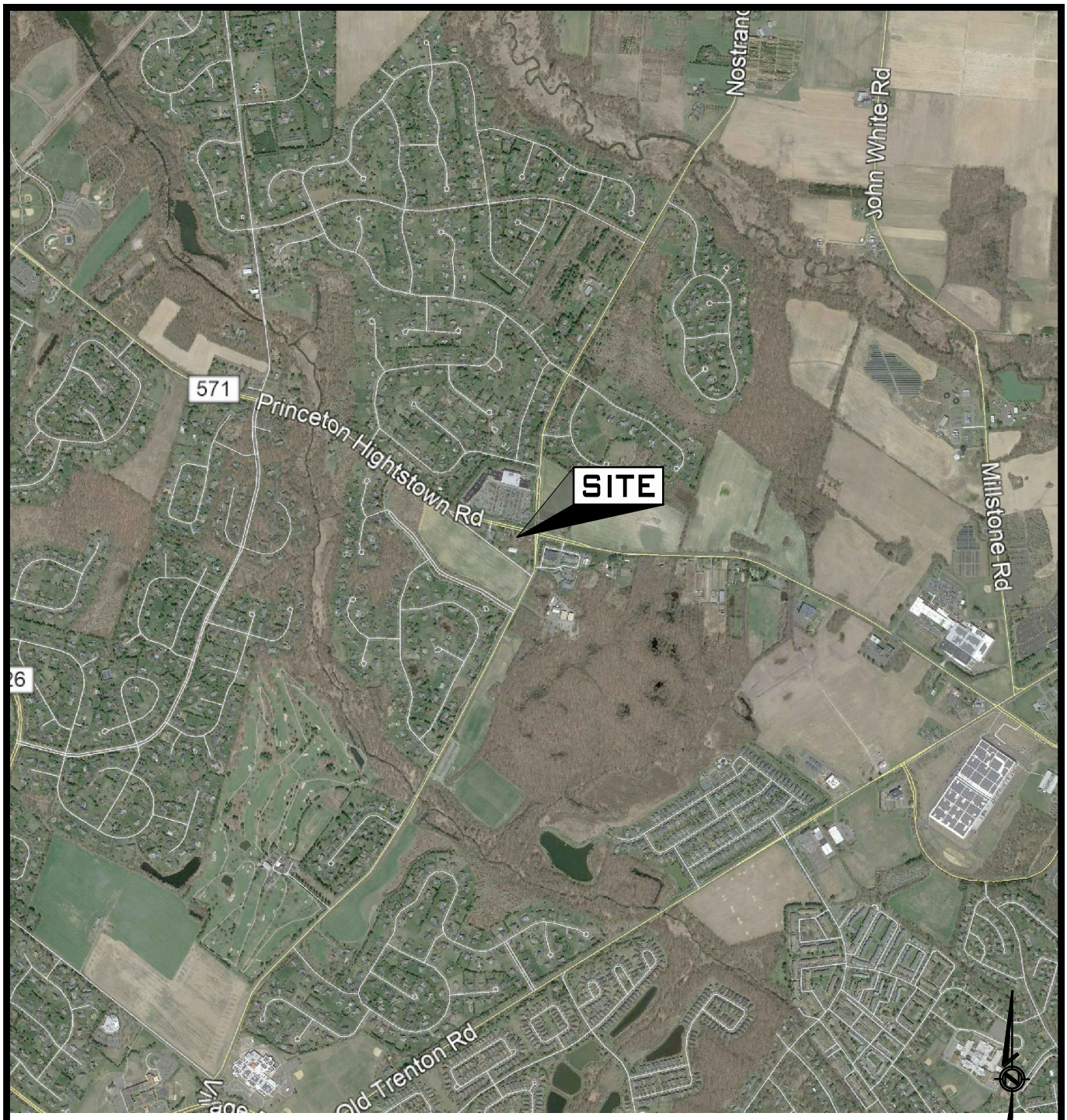
MELICK-TULLY and ASSOCIATES,
a Division of GZA GeoEnvironmental, Inc.

Cory S. Karinja, P.E.
Project Manager

Eugene M. Gallagher, Jr., P.E.
Principal

Mark R. Denno, P.E.
Consultant/Reviewer

CSK:EMG/mh
(1 copy submitted via e-mail)



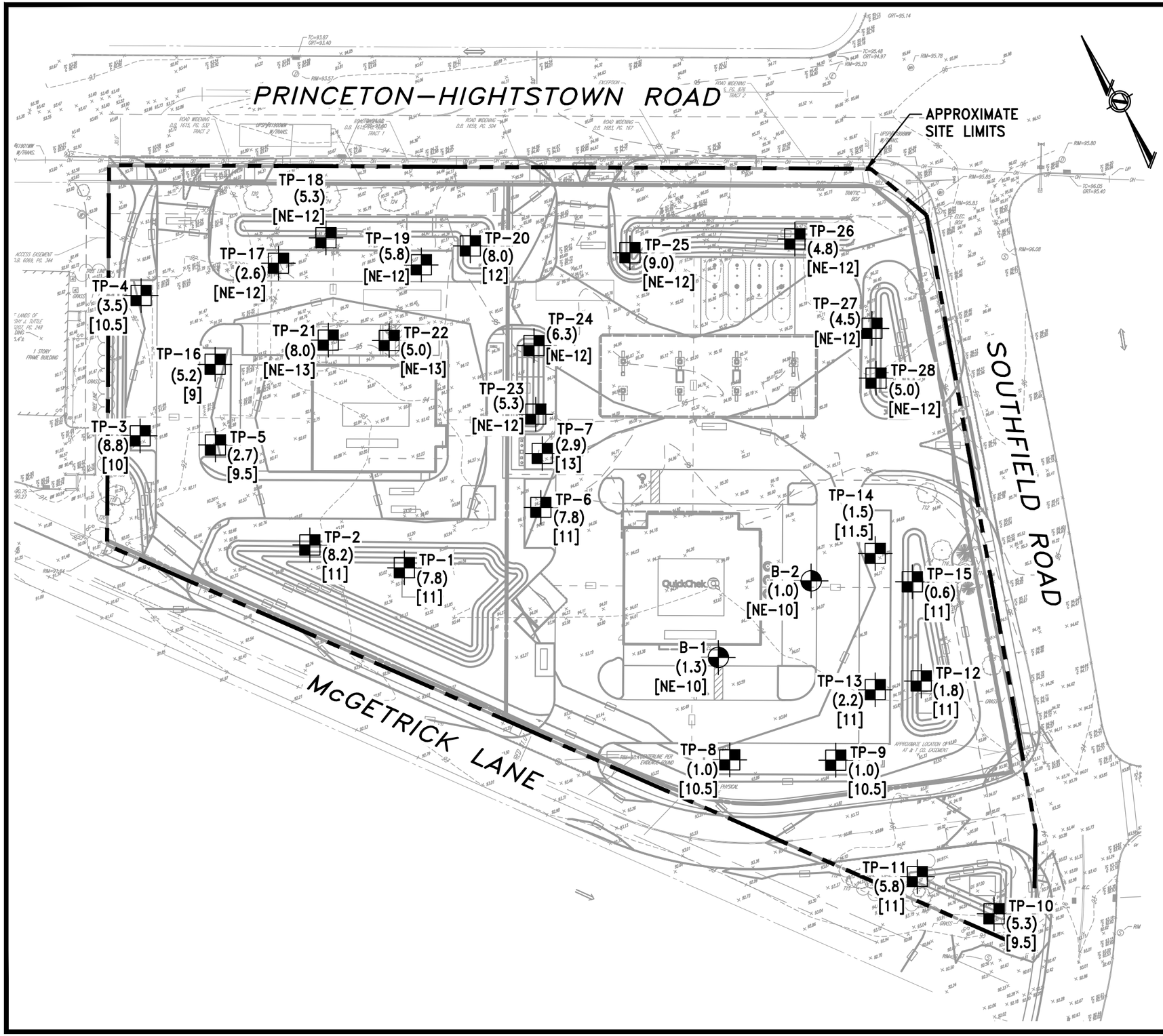
Aerial Photo courtesy of Google Earth Pro

MELICK–TULLY AND ASSOCIATES
A Division of GZA
Geotechnical Engineers & Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356–3400

SITE LOCATION MAP

PROPOSED QUICK CHEK FOOD STORE
WEST WINDSOR, NEW JERSEY
ER/UDC WEST WINDSOR, LLC

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
26.0092434.00	–	VJD	CSK	8/5/21	1"=2,000'	1



KEY:

B–1	NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY
TP–1	NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY
(1.0)	APPROXIMATE DEPTH IN FEET TO SOIL MOTTLING BELOW THE EXISTING GROUND SURFACE
[10]	APPROXIMATE DEPTH IN FEET TO GROUNDWATER BELOW THE GROUND SURFACE
NE	NOT ENCOUNTERED

NOTES:

1. This drawing is part of Melick–Tully and Associates, a Division of GZA, Report No. 26.0092434.00 and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by Bohler Eng., entitled "Grading Plan" dated 4/28/20 (revised 4/27/21), scale 1"= 30'.

PLOT PLAN

PROPOSED QUICK CHEK FOOD STORE
WEST WINDSOR, NEW JERSEY
ER/UDC WEST WINDSOR, LLC

MELICK–TULLY AND ASSOCIATES
A Division of GZA
Geotechnical Engineers & Environmental Consultants
117 Canal Road
South Bound Brook, New Jersey 08880
(732) 356–3400

JOB NO.	FILE NO.			
26.0092434.00	–			
DR. BY	CHK. BY	DATE	SCALE	PLATE
VJD	CSK	8/5/21	1"= 60'	2

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-1
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 93
Final Test Pit Depth (ft.): 12.5
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/26/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1.5	0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 10% gravel, moderate medium granular, slightly moist, friable, abrupt smooth boundary, common medium roots	1		
2			12-27	Light yellowish brown (10YR, 6/4) sandy clay loam, 5% gravel, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3	S2, T2	3	27-42	Dark yellowish brown (10YR, 4/6) sandy loam, 30% gravel, 10% cobbles, moderate medium granular, slightly moist, friable, clear smooth boundary	3		
4				Strong brown (7.5YR, 5/8) sandy loam, moderate medium granular, slightly moist, friable, clear smooth boundary	4		
5	S3, T3	5.5			5		
6			42-94		6		
7					7		
8				Yellowish brown (10YR, 5/6) sandy clay loam, 5% gravel, moderate medium crumb, wet, friable, common medium prominent light gray (10YR, 7/1) mottles encountered from 94 inches to 150 inches	8		
9	S4, T4	9			9		
10			94-150		10		
11					11		
12					12		
13				End of exploration at 12.5 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 94"			
14				Note: Sidewalls caving below 10'			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-1

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-2
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 93
Final Test Pit Depth (ft.): 12.5
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/26/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1	0-10	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, friable, abrupt smooth boundary, common medium roots	1		
2			10-23	Light yellowish brown (10YR, 6/4) sandy clay loam, 25% gravel, moderate medium crumb, slightly moist, friable, clear smooth boundary, few medium roots	2		
3	S2, T2	3	23-55	Yellowish brown (10YR, 5/6) sandy loam, 35% gravel, 10% cobbles, moderate medium granular, slightly moist, friable, clear smooth boundary	3		
4					4		
5				Light yellowish brown (10YR, 6/4) sandy loam, 10% gravel, moderate medium granular, moist, friable, clear smooth boundary	5		
6	S3, T3	6	55-98		6		
7					7		
8					8		
9				Yellowish brown (10YR, 5/6) sandy clay loam, 15% gravel, moderate medium crumb, wet, friable, common medium prominent light gray (10YR, 7/1) mottled encountered from 98 inches to 150 inches	9		
10	S4, T4	10	98-150		10		
11					11		
12					12		
13				End of exploration at 12.5 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 98"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-2

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-3
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 91
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
7/26/21		10	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-7	Topsoil - Brown (10YR, 6/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2	S1, T1	2	7-38	Yellowish brown (10YR, 5/4) clay loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3					3		
4	S2, T2	4	38-64	Yellowish brown (10YR, 5/6) loamy sand, 25% gravel, moderate medium granular, slightly moist, friable, clear smooth boundary	4		
5					5		
6			64-106	Light brownish gray (10YR, 6/2) loamy sand, strong medium granular, slightly moist, loose, clear smooth boundary	6		
7	S3, T3	7			7		
8					8		
9			106-156	Yellowish brown (10YR, 5/6) sandy clay loam, 30% gravel, moderate medium granular, wet, friable, common medium prominent light gray (10YR, 7/1) mottles encountered from 106 inches to 156 inches	9		
10	S4, T4	10			10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10' Soil mottling observed @ 106"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-3

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-4
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 92
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/26/21		10.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2	S1, T1	2	7-42	Yellowish brown (10YR, 5/4) clay loam, moderate medium subangular blocky, moist, friable, clear smooth boundary, common fine faint light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 27 inches to 42 inches	2		
3					3		
4	S2, T2	4	42-82	Light brownish gray (10YR, 6/2) sandy clay loam, moderate medium subangular blocky, slightly moist, firm, clear smooth boundary, many coarse prominent strong brown (7.5YR, 4/6) mottles encountered from 42 inches to 82 inches	4		
5					5		
6					6		
7			82-94	Light yellowish brown (10YR, 6/4) sandy loam, moderate medium granular, moist, friable, clear smooth boundary	7		
8	S3, T3	8	94-156	Light gray (10YR, 7/2) fine sandy loam, moderate coarse granular, moist, friable, many coarse prominent strong brown (7.5YR, 4/6) mottles encountered from 94 inches to 140 inches	8		
9	S4, T4	9			9	16.6	
10					10		
11					11		
12	St	12			12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10.5' Soil mottling observed @ 42"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-4

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-5
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 92
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/26/21		9.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2			7-27	Yellowish brown (10YR, 5/4) clay, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3			27-32	Yellowish brown (10YR, 5/8) loamy sand, 10% gravel, moderate coarse granular, slightly moist, loose, abrupt smooth boundary	3		
4	S2, T2	4		Pale brown (10YR, 6/3) sandy loam, moderate medium granular, moist, friable, clear smooth boundary, common medium prominent light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 32 inches to 105 inches	4		
5					5		
6			32-105		6		
7					7		
8					8		
9				Strong brown (7.5YR, 4/6) sandy loam, strong coarse granular, wet, loose	9		
10	S3, T3	10			10		
11			105-144		11		
12					12		
13				End of exploration at 12 feet. Moderate groundwater seepage encountered @ 9.5' Soil mottling observed @ 32"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-5

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-6
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/26/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-3	Topsoil - Brown (10YR, 6/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2	S1, T1	2	3-34	Yellowish brown (10YR, 5/6) clay, moderate medium subangular blocky, slightly moist, firm, clear smooth boundary	2		
3					3		
4	S2, T2	4	34-64	Strong brown (7.5YR, 4/6) loam, 10% gravel, moderate medium granular, slightly moist, friable, clear smooth boundary	4		
5					5		
6	S3, T3	6		Strong brown (7.5YR, 4/6) loamy sand, moderate medium granular, slightly moist, friable, common medium prominent light gray (10YR, 7/1) mottles encountered from 93 inches to 156 inches	6		
7					7		
8					8		
9			64-156		9		
10					10		
11	S4, T4	11			11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 93"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-6

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-7
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/26/2021 - 7/26/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/26/21		13	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-13	Topsoil - Brown (10YR, 5/3) silt loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium roots	1	8.8	
2			13-35	Yellowish brown (10YR, 5/6) sandy loam, 40% gravel, moderate coarse granular, friable, clear smooth boundary	2		
3					3		
4	S2, T2	4		Yellowish brown (10YR, 5/6) sandy loam, 40% gravel, moderate medium subangular blocky, moist, firm, clear smooth boundary, common medium prominent light gray (10YR, 7/1) mottles encountered from 35 inches to 80 inches	4		
5			35-80		5		
6					6		
7				Light brownish gray (10YR, 6/2) sandy loam, moderate medium granular, moist, friable	7		
8	S3, T3	8			8		
9					9		
10			80-156		10		
11					11		
12					12		
13	S4	13			13		
				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 13' Soil mottling observed @ 35"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-7

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-8
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		10.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 20% gravel, 10% cobbles, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common fine roots	1		
2	S1, T1	2.5	12-54	Light yellowish brown (10YR, 6/4) clay loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium distinct strong brown (7.5YR, 4/6) and light gray (10YR, 7/1) mottles encountered from 12 inches to 54 inches	2		
3					3		
4					4		
5	S2, T2	5.5	53-75	Yellowish brown (10YR, 5/4) loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 53 inches to 75 inches	5		
6					6		
7	S3, T3	6.5	75-156	Yellowish brown (10YR, 6/8) loamy sand, 15% gravel, moderate medium granular, slightly moist, loose, common fine distinct light gray (10YR, 7/1) mottles encountered from 75 inches to 156 inches - (wet)	7		
8					8		
9					9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10.5' Soil mottling observed @ 12" Note: Sidewalls collapsing below 9'			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-8

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-9
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		10.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 15% gravel, moderate fine granular, slightly moist, loose, abrupt smooth boundary, common fine roots	1		
2				Brown (10YR, 5/3) silty clay loam, moderate medium subangular blocky, slightly moist, friable, diffuse smooth boundary, common medium distinct light gray (10YR, 7/1) and yellowish brown (10YR, 5/8) mottles encountered from 12 inches to 65 inches	2		
3	S1, T1	3			3		
4			12-65		4		
5					5		
6	S2, T2	6		Yellowish brown (10YR, 5/6) sandy loam, 20% gravel, strong coarse granular, slightly moist, loose, common medium prominent light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 65 inches to 156 inches	6		
7					7		
8				- (wet)	8		
9			65-156		9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 10.5' Soil mottling observed @ 12"			
15				Note: Sidewalls collapsing below 8'			

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-9

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-10
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		9.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2.5	0-64	Fill - Light yellowish brown (10YR, 6/4) sandy loam, 10% gravel, weak fine granular, slightly moist, friable, abrupt smooth boundary, common medium roots	1		
2					2		
3					3		
4					4		
5					5		
6	S2, T2	6	64-105	Strong brown (7.5YR, 4/6) loam, 20% gravel, moderate coarse granular, moist, loose, clear smooth boundary, common coarse prominent light gray (10YR, 7/1) mottles encountered from 64 inches to 105 inches	6		
7					7		
8					8		
9	S3, T3	10	105-156	Light brownish gray (10YR, 6/2) loamy sand, 20% gravel, strong coarse granular, wet, loose, many coarse distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 105 inches to 156 inches	9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 9.5' Soil mottling observed @ 64"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-10

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-11
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94.5
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1–13	S1, T1	3	0-70	Fill - Brown (10YR, 5/3) sandy clay loam, 20% gravel, 10% cobbles, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium roots	1–13		
6–8	S2, T2	6.5	70-98	Brown (10YR, 5/3) loam, 10% gravel, moderate medium granular, slightly moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 70 inches to 98 inches			
9–13	S3, T3	9	98-156	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, wet, loose, common medium distinct light gray (10YR, 7/1) mottled encountered 98 inches to 156 inches			
14–15				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 70" Note: Sidewalls caving below 10'			

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-11

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-12
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, weak medium granular, moist, loose, clear smooth boundary, common medium roots	1		
2				Yellowish brown (10YR, 5/6) clay, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 21 inches to 78 inches	2		
3	S1, T1	3			3		
4			12-78		4		
5					5		
6					6		
7				Brown (10YR, 5/3) sandy loam, 15% gravel, moderate medium subangular blocky, moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 78 inches to 130 inches	7		
8	S2, T2	7.5			8	9.3	
9			78-130		9		
10					10		
11	S3, T3	11		Yellowish brown (10YR, 5/8) sandy loam, moderate medium granular, wet, friable	11		
12			130-156		12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 21"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-12

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-13
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1–2			0-26	Topsoil - Brown (10YR, 5/3) sandy loam, 10% gravel, moderate medium crumb, moist, friable, abrupt smooth boundary, common medium roots	1–2		
3–5	S1, T1	3	26-68	Yellowish brown (10YR, 5/4) clay, moderate medium subangular blocky, slightly moist, firm, clear smooth boundary, common medium prominent light gray (10YR, 7/1) mottles encountered from 26 inches to 68 inches	3–5		
6–8	S2, T2	6.5	68-105	Light brownish gray (10YR, 6/2) sandy loam, 20% gravel, moderate medium granular, moist, loose, clear smooth boundary	6–8		
9–13	S3, T3	9.5	105-156	Yellowish red (5YR, 4/6) sandy loam, 35% gravel, moderate coarse granular, moist, loose, common medium distinct light brownish gray (10YR, 6/2) mottles from 132 inches to 156 inches	9–13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 26"			

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-13

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-14
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, moist, loose, clear smooth boundary, common medium roots	1		
2				Yellowish brown (10YR, 5/4) silty clay loam, strong coarse subangular blocky, slightly moist, firm, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 17 inches to 58 inches	2		
3	S1, T1	3	12-58		3		
4					4		
5				Strong brown (7.5YR, 4/6) loamy sand, moderate coarse granular, moist, loose, clear smooth boundary	5		
6	S2, T2	6	58-92		6		
7					7		
8				Brownish yellow (10YR, 6/6) sandy loam, strong coarse granular, moist, loose, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 92 inches to 156 inches	8		
9	S3, T3	9			9		
10			92-156		10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11.5' Soil mottling observed @ 12"			
15				Note: Sidewalls collapsing below 10.5'			

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-14

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-15
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate fine crumb, moist, loose, abrupt smooth boundary, common medium roots	1		
2			7-65	Yellowish brown (10YR, 5/4) clay loam, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary, common medium distinct light gray (10YR, 7/1) mottles encountered from 7 inches to 65 inches	2		
3	S1, T1	3			3		
4					4		
5					5		
6			65-98	Yellowish brown (10YR, 5/6) sandy loam, moderate medium granular, moist, loose, clear smooth boundary	6		
7	S2, T2	6.5			7		
8					8		
9	S3, T3	9	98-156	Light brownish gray (10YR, 6/2) sandy loam, moderate medium granular, moist, loose, many coarse prominent strong brown (7.5YR, 4/6) mottles encountered from 98 inches to 156 inches	9		
10					10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Moderate groundwater seepage encountered @ 11' Soil mottling observed @ 7"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-15

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-16
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 91.5
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/27/2021 - 7/27/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/27/21		9	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-2	2" Asphalt	1		
			2-15				
2	S1, T1	1.5	15-27	Yellowish brown (10YR, 5/6) sandy clay loam, moderate medium subangular blocky, moist, friable, clear smooth boundary Fill - Dark gray (10YR, 4/1) clay, 45% gravel, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary	2		
3	S2, T2	3		Yellowish brown (10YR, 5/6) sand, single grain, slightly moist, loose, clear smooth boundary	3	4.1	
4			27-62		4		
5					5		
6	S3, T3	6		Brownish yellow (10YR, 6/6) loam, 5% gravel, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, common medium faint light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 62 inches to 104 inches	6		
7			62-104		7		
8					8		
9				Strong brown (7.5YR, 4/6) sandy loam, 20% gravel, moderate medium granular, wet, friable	9		
10	S4, T4	10			10		
			104-144				
11					11		
12					12		
13				End of exploration at 12 feet. Moderate groundwater seepage encountered @ 9' Soil mottling observed @ 62"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-16

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-17
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94.5
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-16	Topsoil - Grayish brown (10YR, 5/2) loam, 10% gravel, moderate medium crumb, slightly moist, firm, abrupt smooth boundary, common medium roots	1		
2	S1, T1	2	16-31	Fill - Yellowish brown (10YR, 5/8) sandy loam, 10% gravel, moderate medium granular, slightly moist, friable, abrupt smooth boundary	2		
3	S2, T2	3.5	31-46	Brown (10YR, 4/3) sandy clay loam, 35% gravel, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 31 inches to 46 inches	3		
4					4		
5	S3, T3	5	46-90	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, slightly moist, firm, clear smooth boundary, common medium faint light gray (10YR, 7/1) mottles encountered from 46 inches to 90 inches	5		
6					6		
7					7		
8			90-144	Yellowish brown (10YR, 5/6) loam, 20% gravel, moderate medium subangular blocky	8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 31"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-17

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-18
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 96
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-16	Topsoil - Dark gray (10YR, 4/1) sandy loam, moderate medium granular, slightly moist, friable, clear smooth boundary, common medium roots	1		
2				Yellowish brown (10YR, 5/6) loam, 20% gravel, moderate coarse granular, slightly moist, friable, clear smooth boundary	2		
3	S1, T1	3			3		
4			16-64		4		
5					5		
6	S2, T2	6		Yellowish brown (10YR, 5/6) sandy loam, 15% gravel, moderate medium granular, slightly moist, friable, common medium faint light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 64 inches to 144 inches	6		
7					7		
8					8		
9			64-144		9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 64"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-18

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-19
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1.5	0-2	2" Asphalt	1	12.3	
			2-18	Dark gray (10YR, 4/1) sandy loam, 45% gravel, moderate medium granular, slightly moist, firm, abrupt smooth boundary			
2			18-34	Yellowish brown (10YR, 5/8) sandy clay loam, 10% gravel, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary	2		
3					3		
4	S2, T2	4		Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, slightly moist, firm, clear smooth boundary	4		
5			34-70		5		
6				Light yellowish brown (10YR, 6/4) sandy loam, 10% gravel, moderate coarse granular, moist, friable, common medium distinct light gray (10YR, 7/1) mottles encountered from 70 inches to 144 inches	6		
7	S3, T3	7			7		
8					8		
9			70-144		9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 70"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-19

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-20
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95.5
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/28/21		12	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-12	Topsoil - Brown (10YR, 5/3) sandy loam, 5% gravel, moderate medium crumb, slightly moist, loose, clear smooth boundary, common coarse roots	1		
2	S1, T1	2	12-44	Yellowish brown (10YR, 5/6) clay, moderate coarse subangular blocky, slightly moist, firm, clear smooth boundary	2		
3					3		
4	S2, T2	4.5	44-130	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, moderate medium granular, slightly moist, loose, clear smooth boundary, common medium faint light gray (10YR, 7/1) mottles encountered from 96 inches to 130 inches	4		
5					5		
6					6		
7					7		
8					8		
9					9		
10					10		
11	S3, T3	11	130-144	Brownish yellow (10YR, 6/6) sandy loam, moderate medium granular, wet, friable	11		
12					12		
13				End of exploration at 12 feet. Slight groundwater seepage encountered @ 12' Soil mottling observed @ 96"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-20

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-21
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-8	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, moderate fine crumb, slightly moist, loose, clear smooth boundary, common medium roots	1		
2	S1, T1	2		Fill - Brown (10YR, 5/3) sandy clay loam, 10% gravel, moderate medium subangular blocky, slightly moist, firm, clear wavy boundary	2		
3			8-60		3		
4					4		
5					5		
6	S2, T2	6		Yellowish brown (10YR, 5/6) sandy clay loam, 15% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary	6		
7			60-96		7		
8					8		
9				Strong brown (7.5YR, 5/8) sandy loam, 10% gravel, strong fine crumb, moist, firm, few fine faint light gray (7.5YR, 7/1) mottles encountered from 96 inches to 156 inches	9		
10	S3, T3	10			10		
11			96-156		11		
12					12		
13					13		
14				End of exploration at 13 feet. Groundwater seepage not encountered Soil mottling observed @ 96"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-21

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-22
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95
Final Test Pit Depth (ft.): 13
Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-8	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, many medium roots	1		
2	T1	2	8-54	Fill - Brown (10YR, 5/3) sandy clay loam, 10% gravel, moderate medium subangular blocky	2		
3					3		
4					4		
5			54-90	Yellowish brown (10YR, 5/6) loam, 10% gravel, weak medium subangular blocky, slightly moist, firm, clear smooth boundary, few fine faint gray (7.5YR, 5/1) mottles encountered from 60 inches to 90 inches	5		
6	T2	6			6		
7					7		
8			90-156	Strong brown (7.5YR, 5/8) loamy sand, 10% gravel, moderate medium crumb, moist, firm, few fine faint light gray (7.5YR, 7/1) mottles encountered from 90 inches to 156 inches	8		
9					9		
10	T3	10			10		
11					11		
12					12		
13					13		
14				End of exploration at 13 feet. Groundwater seepage not encountered Soil mottling observed @ 60"			
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-22

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-23
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-7	Topsoil - Brown (10YR, 5/3) sandy loam, 10% gravel, moderate medium granular, slightly moist, loose, clear smooth boundary, common medium roots	1		
2	S1, T1	2	7-50	Brown (10YR, 5/3) clay loam, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary, few fine roots	2		
3					3		
4					4		
5	S2, T2	5	50-144	Yellowish brown (10YR, 5/6) loam, 30% gravel, moderate medium crumb, slightly moist, firm, common medium distinct light gray (10YR, 7/1) mottles encountered from 64 inches to 144 inches	5		
6					6		
7					7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 64"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-23

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-24
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/28/2021 - 7/28/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/28/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	3	0-7	Topsoil - Brown (10YR, 5/3) sandy loam, moderate medium granular, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2			7-75	Yellowish brown (10YR, 5/6) clay, 5% gravel, moderate medium subangular blocky, slightly moist, friable, clear smooth boundary	2		
3					3		
4					4		
5					5		
6					6		
7	S2, T2	7.5	75-137	Yellowish brown (10YR, 5/8) loam, 10% gravel, moderate medium granular, moist, friable, clear smooth boundary, common medium distinct light gray (10YR, 7/1) and strong brown (7.5YR, 4/6) mottles encountered from 75 inches to 137 inches	7		
8					8		
9					9		
10					10		
11					11		
12	S3, T3	12	137-144	Yellowish brown (10YR, 5/4) sandy loam, moderate medium granular, moist, friable	12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 75"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-24

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-25
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95.5
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-6	Topsoil - Very dark brown (7.5YR, 2.5/2) sandy loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, few fine roots	1		
2	T1	2	6-108	Yellowish brown (10YR, 5/6) sandy loam, 10% gravel, weak medium subangular blocky, slightly moist, firm, gradual smooth boundary	2		
3					3		
4					4		
5					5		
6					6		
7	S1, T2	7			7	8.4	
8					8		
9					9		
10	S2, T3	10	108-144	Brownish yellow (10YR, 6/8) sandy loam, 10% gravel, moderate medium crumb, moist, firm, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 108 inches to 144 inches	10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 108"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-25

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-26
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 96
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-6	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2	S1, T1	2	6-54	Yellowish brown (10YR, 5/6) clay loam, 5% gravel, moderate medium angular blocky, slightly moist, firm, clear wavy boundary	2		
3					3		
4					4		
5			54-96	Strong brown (7.5YR, 5/8) loam, 10% gravel, weak medium crumb, moist, firm, gradual smooth boundary, few fine faint light gray (7.5YR, 7/1) mottles encountered from 54 inches to 96 inches	5		
6	S2, T2	6			6	11.1	
7					7		
8					8		
9			96-144	Brownish yellow (10YR, 6/8) sandy loam, 5% gravel, moderate medium crumb, moist, friable, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 96 inches to 144 inches	9		
10	S3, T3	10			10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 54"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-26

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-27
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 96
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2	0-4	Topsoil - Very dark brown (7.5YR, 2.5/2) sandy loam, 5-10% gravel, weak fine crumb, slightly moist, loose, abrupt smooth boundary, few fine roots	1		
2			4-60	Yellowish brown (10YR, 5/6) sandy clay loam, 10% gravel, moderate fine subangular blocky, slightly moist, firm, gradual smooth boundary, few fine faint light gray (7.5YR, 7/1) mottles encountered from 54 inches to 60 inches	2		
3					3		
4					4		
5					5		
6	S2, T2	6	60-102	Brownish yellow (10YR, 6/8) sandy loam, 5% gravel, weak medium subangular blocky, moist, firm, clear smooth boundary, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 60 inches to 102 inches	6		
7					7		
8					8		
9			102-144	Strong brown (7.5YR, 5/8) loam, 15% gravel, moderate medium subangular blocky, moist, firm, common medium distinct light gray (7.5YR, 7/1) mottles encountered from 102 inches to 144 inches	9		
10	S3, T3	10			10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 54"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-27

TEST PIT LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

East Ridge Development
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: TP-28
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Nick Pytlowany
Contractor: Heritage
Operator: Chris

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 96
Final Test Pit Depth (ft.): 12
Date Start - Finish: 7/29/2021 - 7/29/2021

Type of Excavator: Track Excavator
Excavator Model: CAT 308

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
7/29/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-4	Topsoil - Very dark brown (7.5YR, 2.5/2) loam, weak fine crumb, slightly moist, loose, abrupt smooth boundary, common medium roots	1		
2	T1	2		Yellowish brown (10YR, 5/6) sandy clay loam, 5-10% gravel, weak medium subangular blocky, slightly moist, firm, clear wavy boundary	2		
3			4-60		3		
4					4		
5					5		
6	S2	6	60-90	Brownish yellow (10YR, 6/8) clay loam, 5% gravel, weak fine angular blocky, slightly moist, firm, clear smooth boundary, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 60 inches to 90 inches	6		
7					7		
8				Brownish yellow (10YR, 6/8) sandy loam, 5% gravel, moderate medium crumb, moist, firm, common fine distinct light gray (7.5YR, 7/1) mottles encountered from 90 inches to 144 inches	8		
9					9		
10	S3	10	90-144		10		
11					11		
12					12		
13				End of exploration at 12 feet. Groundwater seepage not encountered Soil mottling observed @ 60"			
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3-28

TEST BORING LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

Quick Chek
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: B-1
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Ohm Patel
Contractor: Gold Star
Operator: Darren/Brian

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 10
Date Start - Finish: 8/13/2021 - 8/13/2021

Type of Excavator: Geoprobe
Excavator Model:

Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
8/13/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1	1.5	0-9	9" Topsoil - Brown (10YR, 4/3) silt loam, moderate medium crumb, dry, loose, few fine roots	1	26.0	
2			9-48	Yellowish brown (10YR, 5/4) silty clay, moderate medium subangular blocky, slightly moist, firm, common medium distinct light gray (10YR, 7/2) mottles encountered at 16 inches to 48 inches	2		
3					3		
4					4		
5	S2	6.5	48-90	Light gray (10YR, 7/1) silt loam, moderate medium subangular blocky, slightly moist, friable, many coarse prominent dark reddish brown (5YR, 3/4) mottles encountered at 48 inches to 90 inches	5		
6					6		
7					7		
8	S3	8.5	90-120	Brownish yellow (10YR, 6/8) loamy sand, 25% gravel, weak medium granular, slightly moist, friable, common medium distinct light brownish gray (10YR, 6/2) mottles encountered at 90 inches to 120 inches	8		
9					9		
10					10		
11				End of exploration at 10 feet. Groundwater seepage not encountered Soil mottling observed @ 16"			
12							
13							
14							
15							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4-1

TEST BORING LOG

MTA, a Division of GZA GeoEnvironmental, Inc
Engineers and Scientists

Quick Chek
Prop. Quick Chek Food Store and Restaurant
West Windsor, NJ

EXPLORATION NO.: B-2
SHEET: 1 of 1
PROJECT NO: 26.0092434.00
REVIEWED BY: Cory Karinja

Logged By: Ohm Patel
Contractor: Gold Star
Operator: Darren/Brian

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94
Final Test Pit Depth (ft.): 10
Date Start - Finish: 8/13/2021 - 8/13/2021

Type of Excavator: Geoprobe
Excavator Model:

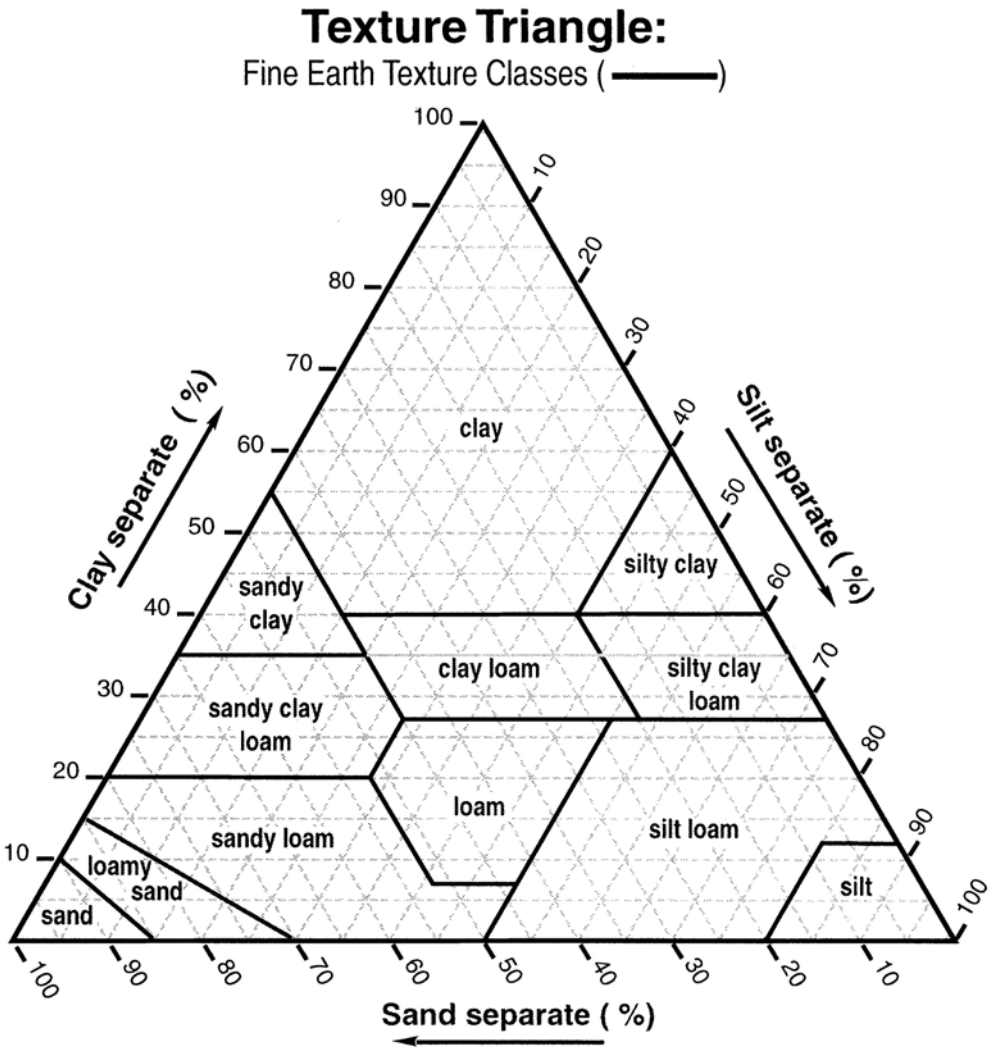
Groundwater Depth (ft.)			
Date	**Time**	**Water Depth**	**Stab.Time**
8/13/21		NE	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-6	6" Topsoil - Brown (10YR, 4/3) silt loam, weak medium crumb, dry, loose, few fine roots	1		
2	S1	2	6-45	Yellowish brown (10YR, 5/4) silty clay, moderate medium subangular blocky, dry, friable, common medium distinct light gray (10YR, 7/2) mottles encountered at 12 inches to 45 inches	2		
3					3		
4					4		
5			45-90	Light gray (10YR, 7/1) loam, moderate medium subangular blocky, dry, friable, common medium distinct dark reddish brown (5YR, 3/4) mottles encountered at 45 inches to 90 inches	5		
6					6		
7	S2	6.5			7		
8	S3	8	90-120	Brownish yellow (10YR, 6/8) loamy sand, weak medium granular, slightly moist, friable, common medium distinct very pale brown (10YR, 8/4) mottles encountered at 90 inches to 120 inches	8	12.5	
9					9		
10					10		
11				End of exploration at 10 feet. Groundwater seepage not encountered Soil mottling observed @ 12"			
12							
13							
14							
15							

REMARKS

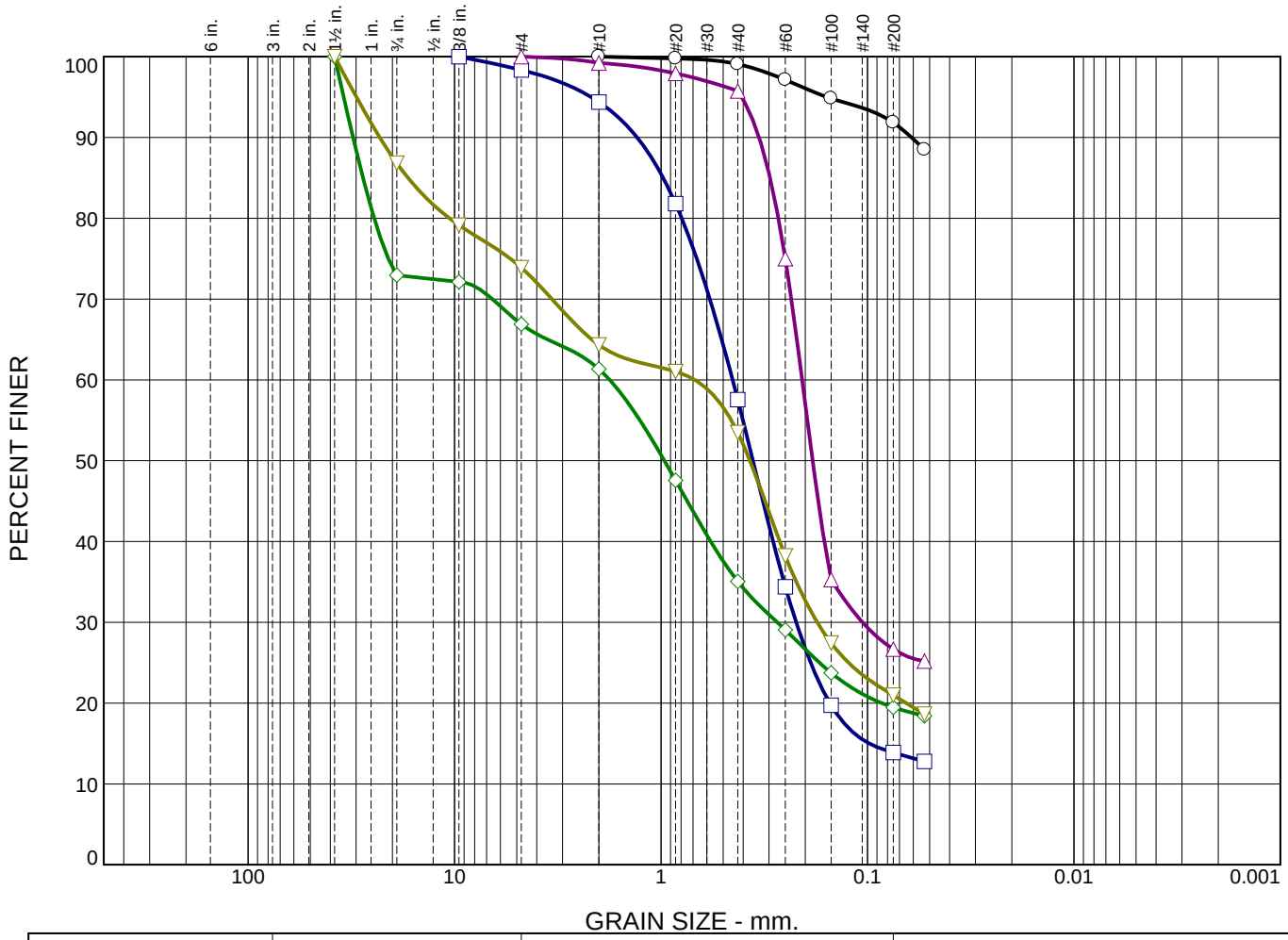
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 4-2



USDA SOIL CLASSIFICATION SYSTEM

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.9	7.3	91.8	
□	0.0	0.0	1.7	3.9	36.8	43.7	13.9	
△	0.0	0.0	0.0	0.8	3.4	69.1	26.7	
◇	0.0	27.0	6.1	5.6	26.2	15.6	19.5	
▽	0.0	13.2	12.9	9.6	10.8	32.5	21.0	

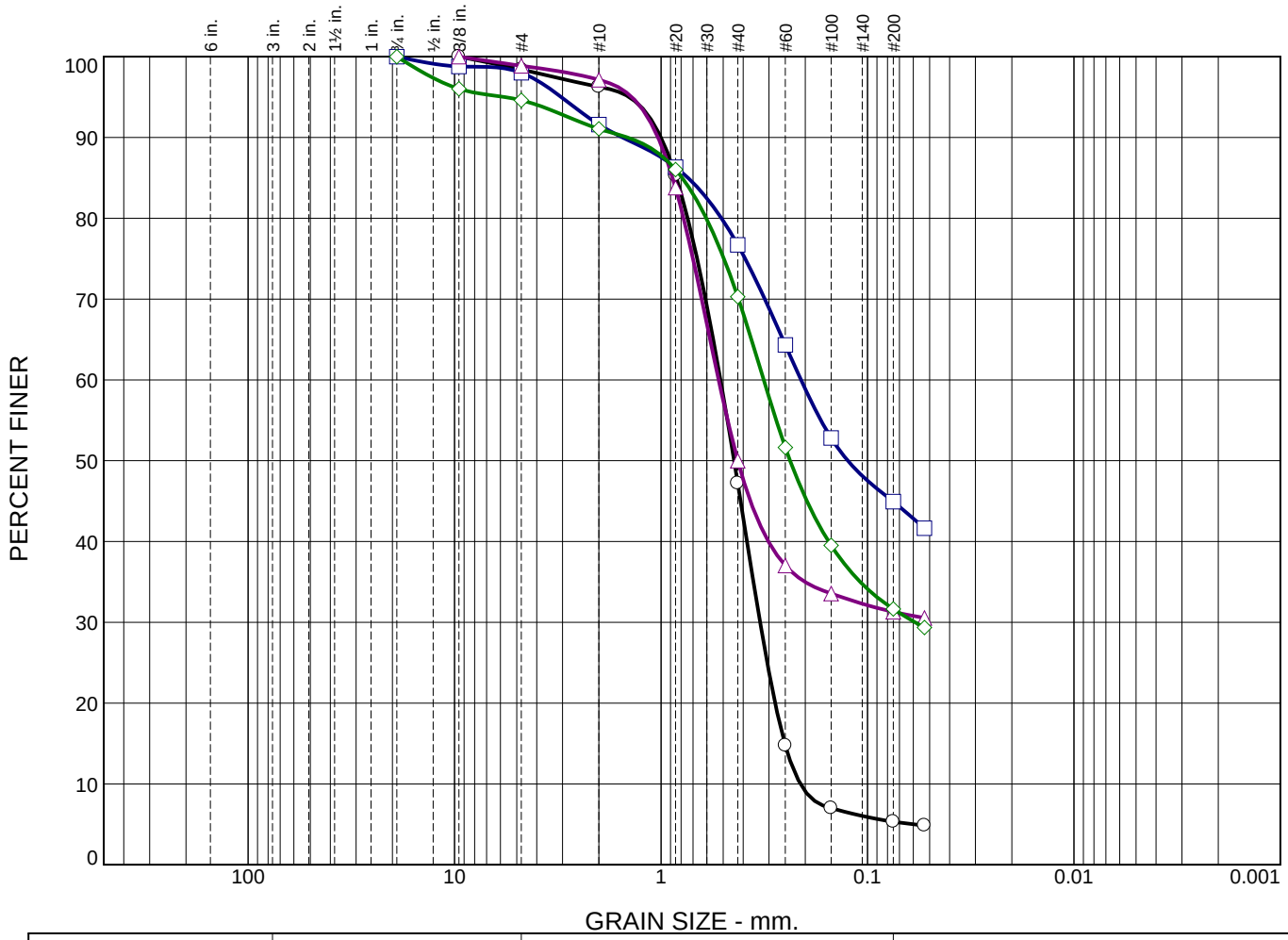
SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-1	1	1.5	Silty Clay (MC=26.0%)	CL
□	B-2	3	8	Loamy Sand (MC=12.5%)	SM
△	TP-4	4	9	Sandy Loam (MC=16.6%)	SM
◇	TP-7	2	4	Sandy Loam (MC=8.8%)	SM
▽	TP-12	2	7.5	Sandy Loam (MC=9.3%)	SM

Melick-Tully & Associates
a Division of GZA GeoEnvironmental, Inc.
South Bound Brook, NJ

Client: ER/UDC West Windsor
Project: Proposed Quick Chek Food Store and Restaurant
Project No.: 26.0092434.00 **Plate** 6-1

Gradation Curve(s)



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.6	2.1	49.1	41.9	5.3	
□	0.0	0.0	2.0	6.4	14.9	31.8	44.9	
△	0.0	0.0	1.1	1.8	47.1	18.7	31.3	
◇	0.0	0.0	5.4	3.5	20.8	38.6	31.7	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	TP-16	2	3	Sand (MC=4.1%)	SP-SM
□	TP-19	1	1.5	Sandy Clay Loam (MC=12.3%)	SM
△	TP-25	2	7	Sandy Loam (MC=8.4%)	SM
◇	TP-26	2	6	Sandy Loam (MC=11.1%)	SM

Melick-Tully & Associates
a Division of GZA GeoEnvironmental, Inc.
South Bound Brook, NJ

Client: ER/UDC West Windsor
Project: Proposed Quick Chek Food Store and Restaurant
Project No.: 26.0092434.00 **Plate** 6-2

Summary of Laboratory Tube Permeameter Permeability Test Results
ER/UDC West Windsor LLC - West Windsor, NJ
26.0092434.00

Test Pit No.	Depth (ft)	Permeability Rate (in/hr)	USDA Visual Soil Classification
TP-1	5.5	>20	Loamy Sand
TP-1	9	0.91	Sandy Clay Loam
TP-2	3	3.5	Sandy Loam
TP-2	6	11.1	Sandy Loam
TP-2	10	0.44	Sandy Clay Loam
TP-3	4	>20	Loamy Sand
TP-3	7	17.5	Loamy Sand
TP-4	4	<0.06	Sandy Clay Loam
TP-4	9	<0.06	Fine Sandy Loam
TP-5	1	<0.06	Clay
TP-5	4	1.0	Sandy Loam
TP-6	4	4.0	Sandy Loam
TP-6	6	>20	Loamy Sand
TP-7	4	2.8	Sandy Loam
TP-7	8	4.0	Sandy Loam
TP-8	2.5	<0.06	Clay Loam
TP-8	6.5	16.6	Loamy Sand
TP-9	3	<0.06	Silty Clay Loam
TP-9	6	14.9	Sandy Loam
TP-10	6	1.9	Loam
TP-10	10	>20	Loamy Sand
TP-11	6.5	0.30	Loam
TP-11	9	2.2	Sandy Loam
TP-12	3	<0.06	Clay
TP-12	7.5	1.4	Sandy Loam
TP-13	3	<0.06	Clay
TP-13	6.5	1.5	Sandy Loam
TP-14	3	<0.06	Silty Clay Loam
TP-14	6	>20	Loamy Sand
TP-15	3	<0.06	Clay Loam
TP-15	6.5	16.3	Sandy Loam
TP-16	1.5	<0.06	Sandy Clay Loam
TP-16	3	>20	Sand
TP-17	3.5	<0.06	Sandy Clay Loam
TP-17	5	2.0	Sandy Loam
TP-18	3	<0.06	Loam
TP-18	6	6.4	Sandy Loam
TP-19	1.5	0.52	Sandy Clay Loam
TP-19	4	17.5	Sandy Loam

Summary of Laboratory Tube Permeameter Permeability Test Results
ER/UDC West Windsor LLC - West Windsor, NJ
26.0092434.00

Test Pit No.	Depth (ft)	Permeability Rate (in/hr)	USDA Visual Soil Classification
TP-20	2	<0.06	Clay
TP-20	4.5	>20	Sandy Loam
TP-21	6	2.6	Sandy Loam
TP-21	10	>20	Loamy Sand
TP-22	6	1.9	Loam
TP-22	10	>20	Loamy Sand
TP-23	2	<0.06	Clay Loam
TP-23	5	3.6	Sandy Loam
TP-24	3	<0.06	Clay
TP-24	7.5	7.7	Sandy Loam
TP-25	2	1.0	Sandy Loam
TP-25	7	1.5	Sandy Loam
TP-25	10	2.2	Sandy Loam
TP-26	2	<0.06	Clay Loam
TP-26	6	1.0	Sandy Loam
TP-27	6	5.5	Sandy Loam
TP-27	10	10.2	Loamy Sand
TP-28	2	0.74	Sandy Clay Loam
TP-28	10	7.1	Sandy Loam

APPENDIX

APPENDIX

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape measurement from existing site features. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The findings and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils engineering practices for the exclusive use of ER/UDC West Windsor, LLC for specific application to the design of the proposed stormwater management facilities. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the findings and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the findings of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from 2 widely-spaced test borings and 28 test pit excavations performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The findings and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil engineering report was prepared for the project by Melick-Tully and Associates, a Division of GZA GeoEnvironmental Inc. (MTA) for design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that MTA be retained to provide on-site soils engineering services during the earthwork construction phase of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Proactive by Design

SUPPLEMENTAL STORMWATER INVESTIGATION

PROPOSED QUICK CHEK FOOD STORE AND RESTAURANT
ER/UDC WEST WINDSOR, LLC
WEST WINDSOR, MERCER COUNTY, NEW JERSEY

July 12, 2022
File No. 26.0092434.02

PREPARED FOR:
ER/UDC West Windsor, LLC
P. O. Box 391
Williston, Vermont

GZA GeoEnvironmental Inc.
117 Canal Road | South Bound Brook, NJ 08880
732-356-340

32 Offices Nationwide
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July 12, 2022
File No. 26.0092434.02

ER/UDC West Windsor, LLC
P. O. Box 391
Williston, Vermont 05493

Attention: Mr. Len Kuhn

Report
Supplemental Stormwater Investigation
Proposed Quick Chek Food Store and Restaurant
West Windsor, Mercer County, New Jersey
ER/UDC West Windsor, LLC

Introduction

This report presents the results of a supplemental stormwater investigation completed by GZA GeoEnvironmental, Inc. (GZA) at the site of a proposed Quick Chek food store and a proposed restaurant which may be constructed in West Windsor, Mercer County, New Jersey. The site is located adjacent to and west of Southfield Road between Princeton-Hightstown Road and McGetrick Lane, as shown on the attached Site Location Map, Plate 1. Our work was performed in general conformance with our proposal dated May 13, 2022.

Proposed Construction

Plans provided to us indicate that the development would consist of two facilities and associated site improvements. The eastern half of the property would be developed by a Quick Chek food store approximately 5,869 square feet in plan area. A canopy with eight fuel dispensers would be located to the north of the food store area and four underground storage tanks would be located north of the canopy. On-site paved parking and roadway areas would be constructed to service the proposed facility.

Adjacent to and west of the Quick Chek development, a restaurant with drive-thru approximately 4,541 square feet in plan area would be constructed. The building would be located on the eastern side of this portion of the parcel with a drive-thru lane south and east of the building. On-site paved parking and roadway areas would be constructed north and west of the proposed restaurant.

On-site stormwater facilities are planned for the development consisting of above ground basins and porous asphalt and concrete areas.

It is our understanding that a portion of McGetrick Lane will be realigned through the development and enter Southfield Road about 100 feet north of its current position. As a result of this realignment, additional stormwater testing consisting of 4 test pits was requested by Bohler in unexplored areas being considered for stormwater facilities.

Purpose and Scope of Work

The purpose of our services was to:

1) explore the subsurface soil and groundwater conditions via test pits in four accessible locations adjacent to McGetrick Lane and within the proposed development;

2) collect tube samples of the soil layers encountered from all proposed test pit locations for laboratory tube permeameter permeability testing; and

3) prepare a brief summary report of our findings for use by Bohler in their evaluation of the stormwater improvements.

To accomplish these purposes, a subsurface exploration program consisting of 4 supervised test pit excavations was performed at the site along the McGetrick Lane roadway realignment per Bohler's request. The test pits were advanced using a track-mounted excavator (CAT 308) and extended to depths of approximately 12 feet

below existing surface grades. The approximate locations of the test pits performed for this investigation are shown in relation to proposed site features on the Plot Plan, Plate 2.

All field work was performed under the direct technical supervision of a geologist from GZA. Our representative located the explorations in the field, maintained continuous logs of the explorations as the work proceeded, obtained bulk samples of the materials encountered in the test pits suitable for identification purposes, and obtained relatively undisturbed tube samples from the test pits for laboratory tube permeameter permeability testing.

Detailed descriptions of the encountered subsurface conditions are presented on the Test Pit Logs, Plates 3A through 3D. The soils observed during the test pit excavations were visually classified in general accordance with the procedures of the United States Department of Agriculture Soil Classification System (USDA) described on Plate 4.

The following discussion of our findings are subject to the Limitations attached as an Appendix to this report.

Findings

Topsoil was encountered at the surface in the test pits ranging from about 12 to 14 inches in thickness. In Test Pit 3, the topsoil was underlain by clay loam fill which extended to a depth of approximately 3 feet below grade. The remaining test pits encountered native soils below the topsoil. The topsoil and fill materials were underlain by interlayered loamy sand, sandy loam, sandy clay loam, sandy clay, and clay soils. The materials containing more clay were observed closer to the intersection of McGetrick Lane and Southfield Road.

Groundwater seepage was observed in the test pits at depths ranging from approximately 10 to 11.5 feet below grade, corresponding to Elevations of +82.5 feet and +83.5 feet. Mottling, indicative of seasonally saturated conditions, was observed in the test pits at depths ranging from 36 to 72 inches below grade.

Laboratory tube permeameter permeability tests were performed on relatively undisturbed tube samples of the subsoils collected in each test pit. The permeability tests indicate that the sandy subsoils (loamy sand and sandy loam) generally exhibited permeabilities of 1 inch per hour to greater than 19.1 inches per hour, while the silty and clayey soils (sandy clay loam, loam, clay loam, and clay) exhibited permeability of less than 1 inch per hour. The laboratory tube permeameter tests are shown on the individual test pit logs.

Please contact us if you have any questions regarding this information.

The following Plates and Appendix are attached and complete this report:

Plate 1 – Site Location Map
Plate 2 – Plot Plan
Plates 3A through 3D– Test Pit Logs
Plate 4 – USDA Soil Textural Triangle
Appendix – Limitations

Respectfully submitted,

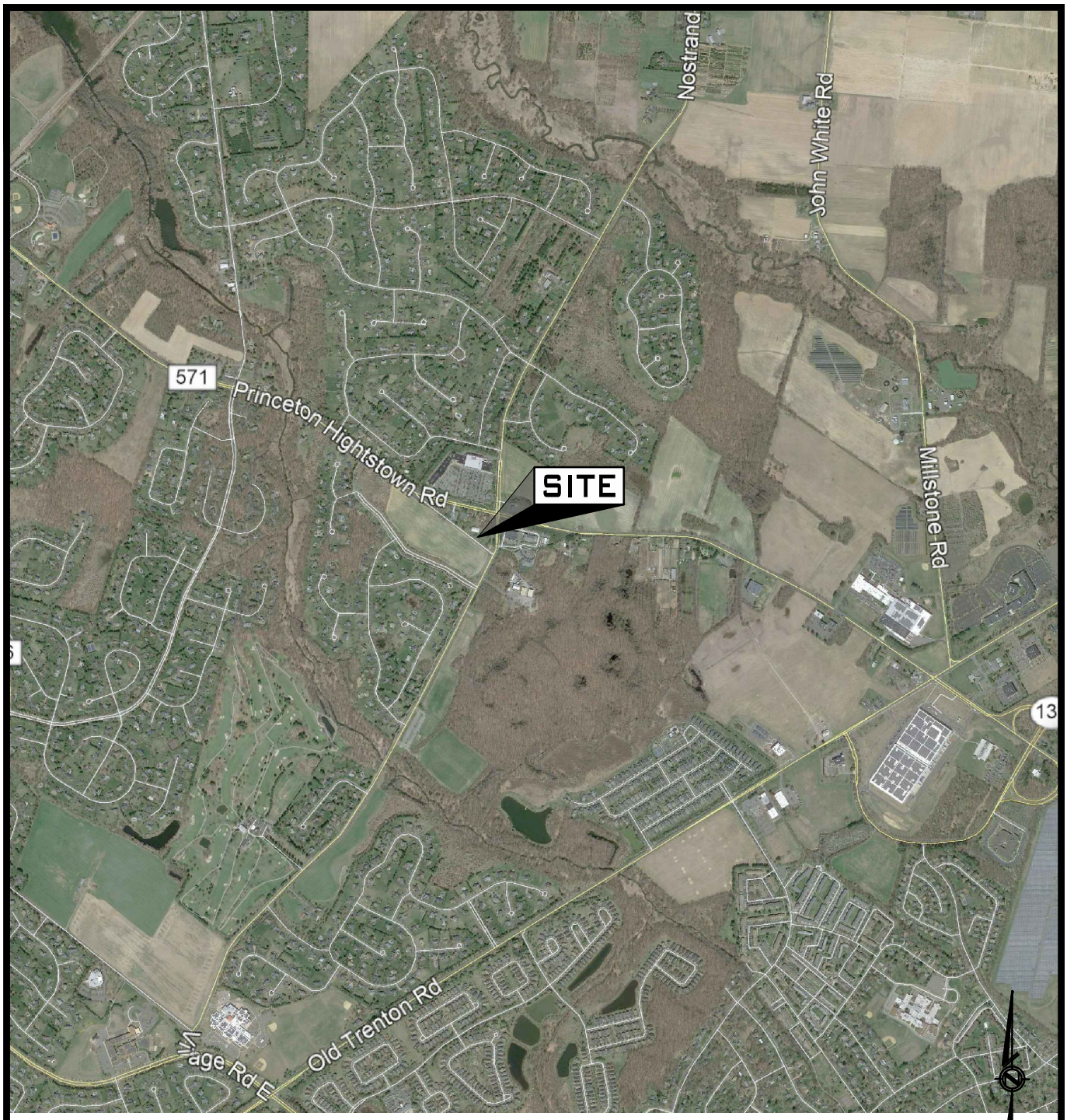
GZA GeoEnvironmental, Inc.

Cory S. Karinja, P.E.
Project Manager

Mark R. Denno, P.E.
Principal

Christopher P. Tansey, P.E.
Consultant/Reviewer

CSK:MRD/ck
(1 copy submitted via e-mail)



Aerial Photo courtesy of Google Earth Pro

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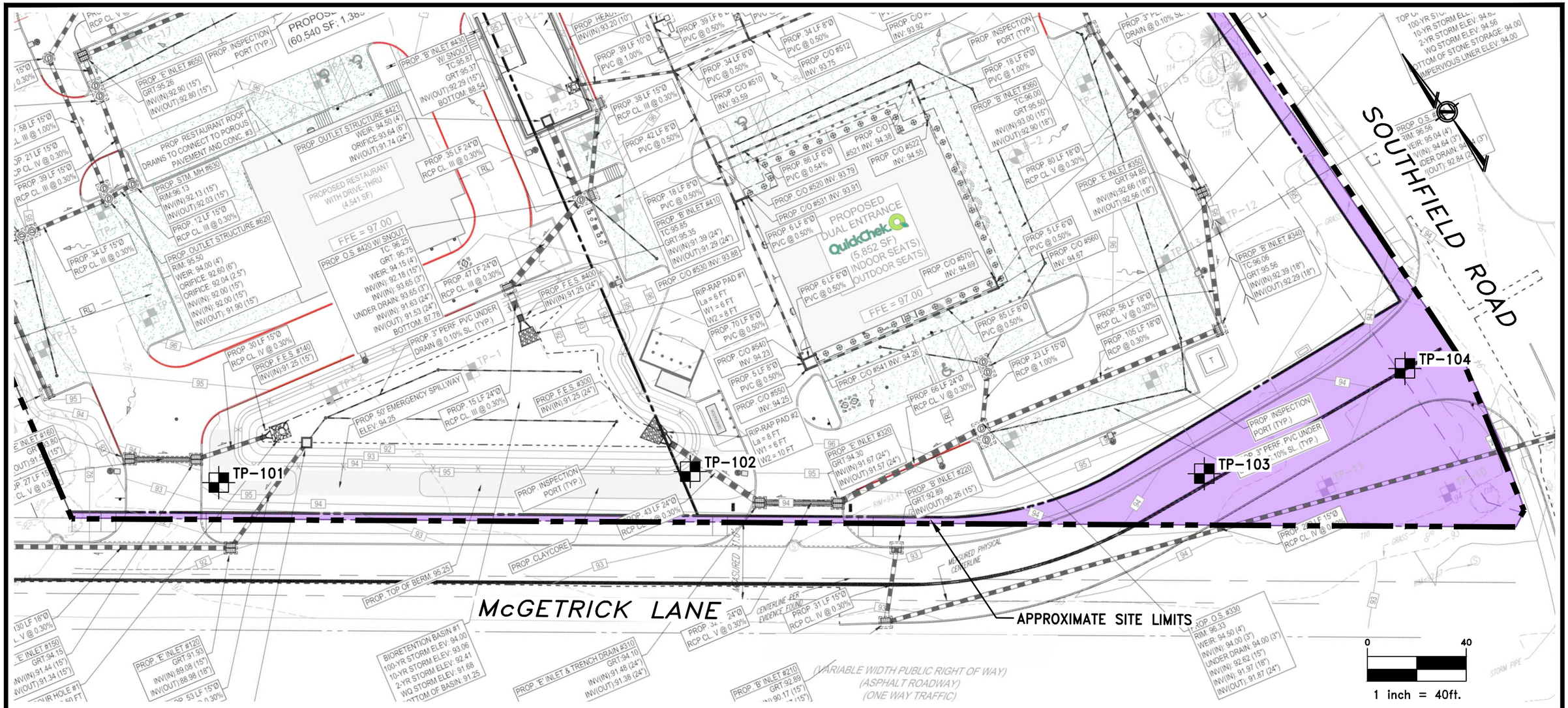
SITE LOCATION MAP

PROPOSED QUICK CHEK FOOD STORE
WEST WINDSOR, NEW JERSEY
ER/UDC WEST WINDSOR, LLC

JOB NO.	FILE NO.	DR. BY	CHK. BY	DATE	SCALE	PLATE
26.0092434.02	–	VJD	CSK	6/22/22	1"=2,000'	1



KEY:

TP-101 NUMBER AND APPROXIMATE LOCATION OF TEST PITS PERFORMED FOR THIS STUDY

NOTES:

1. This drawing is part of GZA GeoEnvironmental, Inc. Report No. 26.0092434.02 and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by Bohler Eng., entitled "Drainage Plan" dated 11/4/21 (revised 3/9/22), scale 1"= 30'.

PLOT PLAN

PROPOSED QUICK CHEK FOOD STORE
WEST WINDSOR, NEW JERSEY
ER/UDC WEST WINDSOR, LLC

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JOB NO.	FILE NO.			
26.0092434.02	–			
DR. BY	**CHK. BY**	**DATE**	**SCALE**	**PLATE**
VJD	CSK	6/22/22	1"= 40'	2

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-101
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 92.5
Final Test Pit Depth (ft.): 12.3
Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe
Excavator Model: John Deere 410G

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
6/15/22		10	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	1.5	0-12	Topsoil - Brown (10YR, 4/3) clay loam, 20% gravel, weak fine crumb, slightly moist, friable, clear smooth boundary, many fine roots	1		
2			12-20	Yellowish brown (10YR, 5/4) sandy clay loam, 20% gravel, weak medium crumb, moist, friable, abrupt smooth boundary, few fine roots	2		
3	S2, T2	3	20-54		3		
4				Strong brown (7.5YR, 5/8) gravelly sandy loam, 30% gravel, moderate medium granular, moist, firm, abrupt smooth boundary	4		
5	S3, T3	5		Light yellowish brown (10YR, 6/4) sandy loam, 20% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary, common medium distinct gray (10YR, 6/1) mottles encountered from 72 inches to 84 inches	5		
6			54-84		6		
7					7		
8				Brownish yellow (10YR, 6/6) loamy sand, 20% gravel, 5% cobbles, moderate medium granular, moist, firm, common medium distinct gray (10YR, 6/1) and reddish brown (2.5YR, 4/4) mottles encountered throughout layer	8		
9					9		
10	S4, T4	10	84-148		10		
11					11		
12					12		
13				End of exploration at 12.3 feet. Moderate groundwater seepage encountered @ 10' Estimated seasonal high groundwater observed @ 72"			
14							
15				Tube Permeability Test Results: 19.1 in/hr @ 3'			
16				1.6 in/hr @ 5' 14.2 in/hr @ 10'			
17							
18							
19							
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-102
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 93.5
Final Test Pit Depth (ft.): 12
Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe
Excavator Model: John Deere 410G

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
6/15/22		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-14	Topsoil - Brown (10YR, 4/3) clay loam, 10% gravel, weak fine crumb, moist, friable, abrupt smooth boundary, many fine roots	1		
2	S1, T1	2	14-36	Light olive brown (2.5Y, 5/3) sandy clay loam, 5% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary, few medium roots	2		
3					3		
4	S2, T2	4	36-84	Strong brown (7.5YR, 5/8) sandy loam, 30% gravel, moderate medium granular, moist, firm, clear smooth boundary, common medium distinct gray (10YR, 6/1) mottles encountered from 60 inches to 84 inches	4		
5					5		
6					6		
7					7		
8	S3, T3	7.5	84-96	Light yellowish brown (10YR, 6/4) sandy loam, 20% gravel, moderate medium subangular blocky, moist, friable, clear smooth boundary, common medium distinct gray (10YR, 6/1) and strong brown (7.5YR, 5/8) mottles encountered throughout layer	8		
9			96-144		9		
10				Brownish yellow (10YR, 6/6) loamy sand, 5% gravel, moderate medium granular, moist, firm, common medium faint strong brown (7.5YR, 4/6) and reddish brown (2.5YR, 4/4) mottles encountered throughout layer	10		
11					11		
12					12		
13				End of exploration at 12 feet. Slight groundwater encountered @ 11' Estimated seasonal high groundwater observed @ 60" Note: Sidewall collapsing below 11'			
14							
15				Tube Permeability Test Results: 0.52 in/hr @ 2' 1.8 in/hr @ 4' 7.5 in/hr @ 7.5'			
16							
17							
18							
19							
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-103
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 94

Final Test Pit Depth (ft.): 12
Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe

Excavator Model: John Deere 410G

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab.Time
6/15/22		11	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1	S1, T1	2.5	0-14	Topsoil - Dark brown (10YR, 3/3) clay, 10% gravel, moderate medium subangular blocky, moist, firm, abrupt wavy boundary, many fine roots	1		
2			14-42	Brown (10YR, 4/3) clay, 20% gravel, moderate medium subangular blocky, moist, friable, abrupt smooth boundary	2		
3					3		
4	S2, T2	5	42-84	Strong brown (7.5YR, 8/8) sandy clay loam, 30% gravel, moderate medium subangular blocky, moist, firm, gradual smooth boundary, common coarse distinct gray (10YR, 6/1) mottles encountered throughout layer	4		
5					5		
6					6		
7	S3, T3	8	84-144	Light olive brown (2.5Y, 5/3) sandy loam, 30% gravel, moderate medium granular, friable, common medium distinct gray (10YR, 6/1) mottles encountered throughout layer	7		
8					8		
9					9		
10					10		
11					11		
12					12		
13				End of exploration at 12 feet. Slight groundwater seepage encountered @ 11' Estimated seasonal high groundwater observed @ 42"			
14							
15				Tube Permeability Test Results: 0.48 in/hr @ 2.5'			
16				0.52 in/hr @ 5'			
17				3.3 in/hr @ 8'			
18							
19							
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

TEST PIT LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

ER/UDC West Windsor, LLC
Prop. Quick Chek and Restaurant
West Windsor

EXPLORATION NO.: TP-104
SHEET: 1 of 1
PROJECT NO: 26.0092434.02
REVIEWED BY: Cory Karinja

Logged By: Jeremy Weremeichik
Contractor: Heritage Excavating
Operator: Travis

Test Pit Location: See Plan
Ground Surface Elev. (ft.): 95

Final Test Pit Depth (ft.): 12
Date Start - Finish: 6/15/2022 - 6/15/2022

Type of Excavator: Rubber-tire Backhoe
Excavator Model: John Deere 410G

Groundwater Depth (ft.)

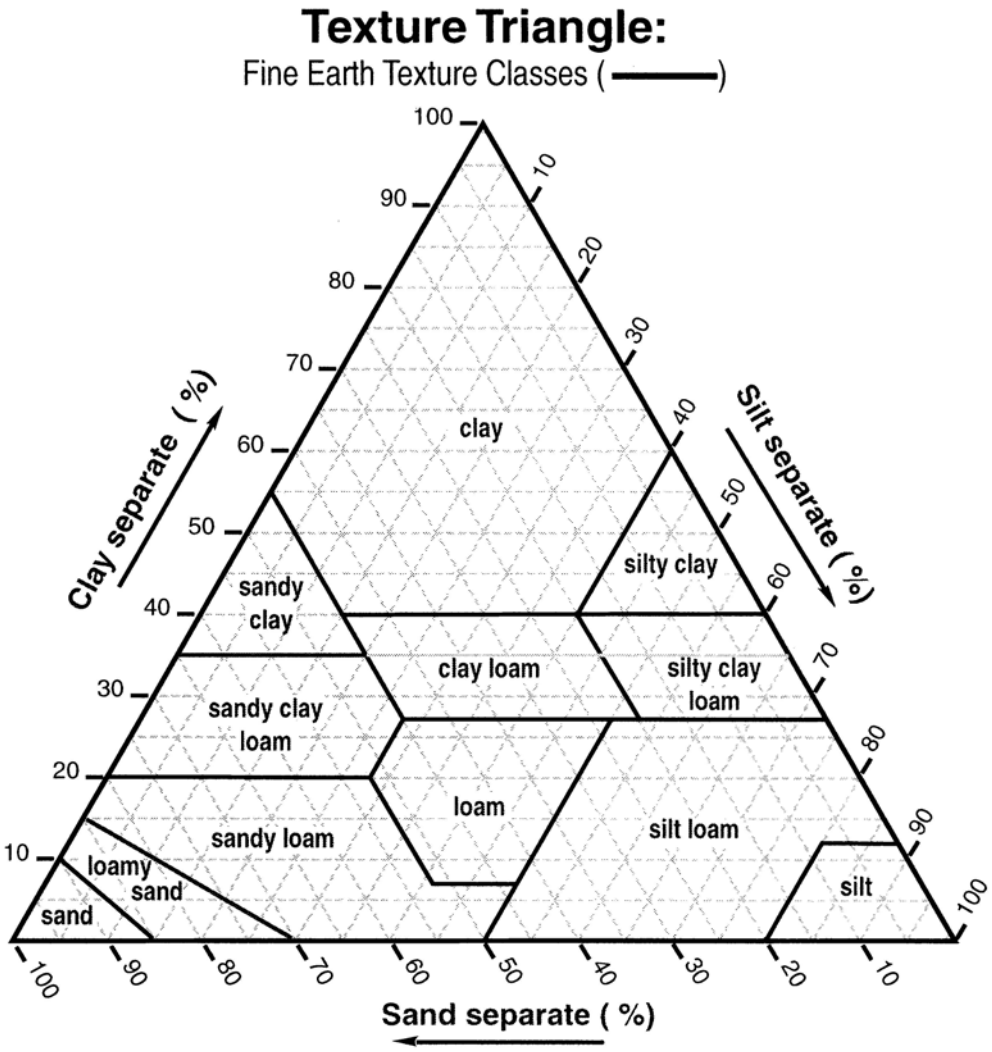
Date	Time	Water Depth	Stab.Time
6/15/22		11.5	

Depth (ft)	Sample No.	Sample Depth (ft.)	Stratum Depth (in.)	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
1			0-14	Topsoil/Fill - Very dark brown (10YR, 2/2) silty clay, 40% gravel, 5% cobbles, moderate medium subangular blocky, slightly moist, firm, abrupt smooth boundary, many medium roots	1		
2	S1, T1	2	14-36	Fill - Brown (10YR, 4/3) clay loam, 10% gravel, moderate medium subangular blocky, slightly moist, firm, gradual irregular boundary, few medium roots	2		
3					3		
4	S2, T2	4	36-72	Dark yellowish brown (10YR, 4/6) sandy loam, 15% gravel, moderate medium crumb, moist, friable, clear smooth boundary, common fine faint gray (10YR, 6/1) and strong brown (7.5YR, 4/6) mottles encountered throughout layer	4		
5					5		
6					6		
7			72-108	Dark yellowish brown (10YR, 4/4) sandy clay, 50% gravel, 5% cobbles, moderate medium subangular blocky, moist, friable, abrupt smooth boundary, few fine distinct strong brown (7.5YR, 4/6) mottles encountered throughout layer	7		
8	S3, T3	8			8		
9					9		
10			108-144	Pale brown (2.5Y, 8/3) loamy sand, 10% gravel, moderate medium granular, moist, firm, common fine distinct strong brown (7.5YR, 4/6) mottles encountered throughout layer	10		
11					11		
12					12		
13				End of exploration at 12 feet. Slight groundwater seepage encountered @ 11.5' Estimated seasonal high groundwater observed @ 36"			
14							
15				Tube Permeability Test Results: 0.48 in/hr @ 2' 1.0 in/hr @ 4' 0.59 in/hr @ 8'			
16							
17							
18							
19							
20							

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D



USDA SOIL CLASSIFICATION SYSTEM

APPENDIX

APPENDIX

Limitations

A. Subsurface Information

Locations: The locations of the explorations were approximately determined by tape measurement from existing site features. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils engineering practices for the exclusive use of ER/UDC West Windsor, LLC for specific application to the design of the proposed Quick Chek and restaurant. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the findings and/or recommendations contained in this report shall not be considered valid unless the changes are reviewed and findings of this report modified or verified in writing.

Changed Conditions During Construction: The findings and/or recommendations submitted in this report are based in part upon the data obtained from 4 widely-spaced test pit excavations performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The findings contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

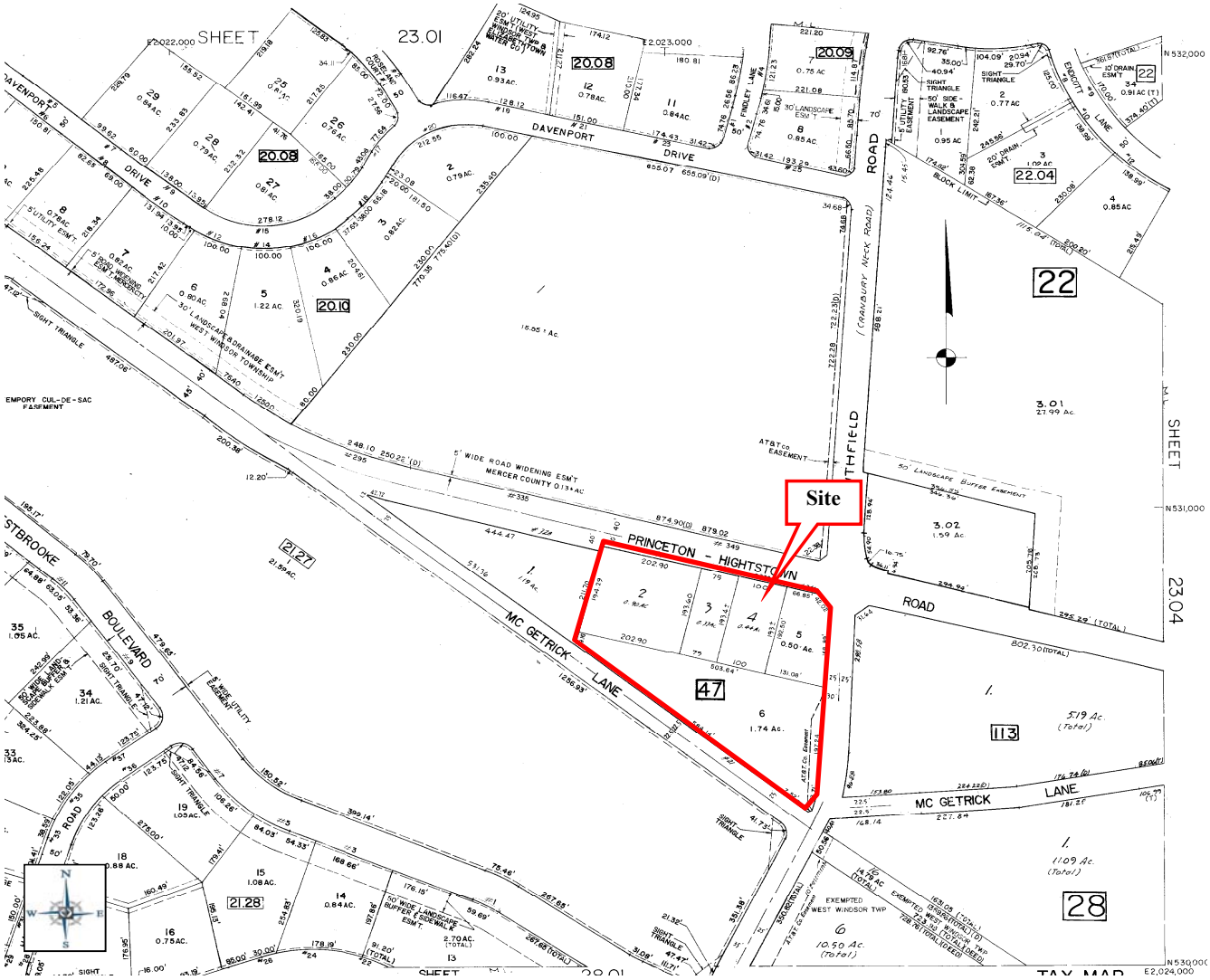
This soil investigation report was prepared for the project by GZA GeoEnvironmental Inc. (GZA) for stormwater design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address stormwater design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that GZA be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

D. MAPS

- **Tax Map**
- **Aerial Map**
- **Soil Map**
- **State Planning Area Map**
- **USGS Map**
- **HUC 14 Watershed Map**
- **FEMA FIRM Map**
- **Drainage Area Maps**
  - **Existing Drainage Area Map**
  - **Proposed Drainage Area Map**
  - **Inlet Drainage Area Map**
- **Required TSS Removal Map**
- **Proposed TSS Removal Map**



Tax Map

Source: West Windsor Township Tax Map, Sheet #23.03

Date Access: 02/27/2020

East Ridge NJ, LLC

332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg / Date: 2/27/2020	BOHLER
Checked by: vm / Scale: nts	

Aerial Map

Source: NJ GeoWeb

Date Access: 02/27/2020

East Ridge NJ, LLC

332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg — Date: 2/27/2020	BOHLER
Checked by: vm — Scale: nts	

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SacC	Sassafras sandy loam, 5 to 10 percent slopes, Northern Coastal Plain	2.8	100.0%
Totals for Area of Interest		**2.8**	**100.0%**

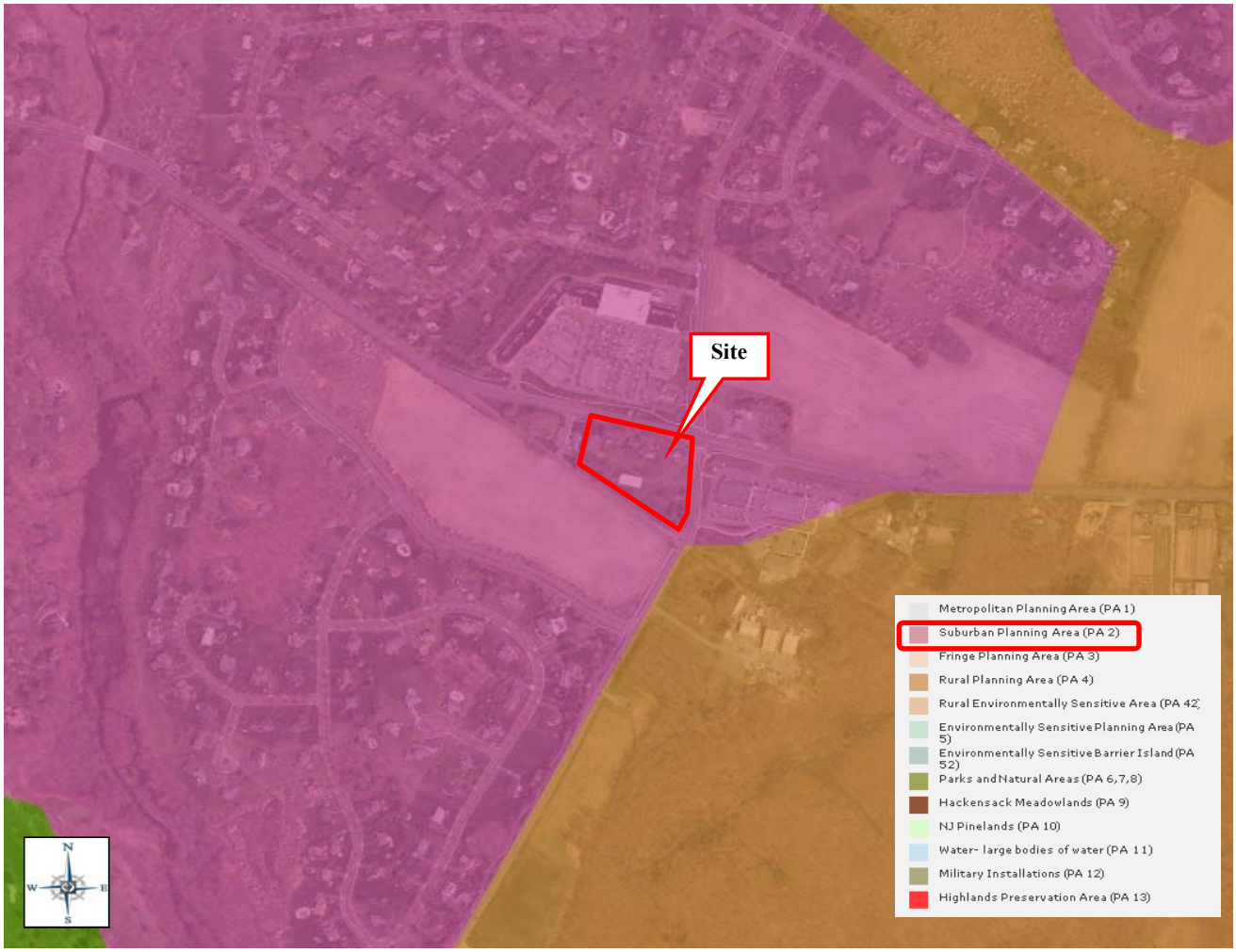
Soils Map

Source: NRCS Web Soil Survey, 2012

Date Access: 02/27/2020

East Ridge NJ, LLC

332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg — Date: 2/27/2020	BOHLER
Checked by: vm — Scale: nts	



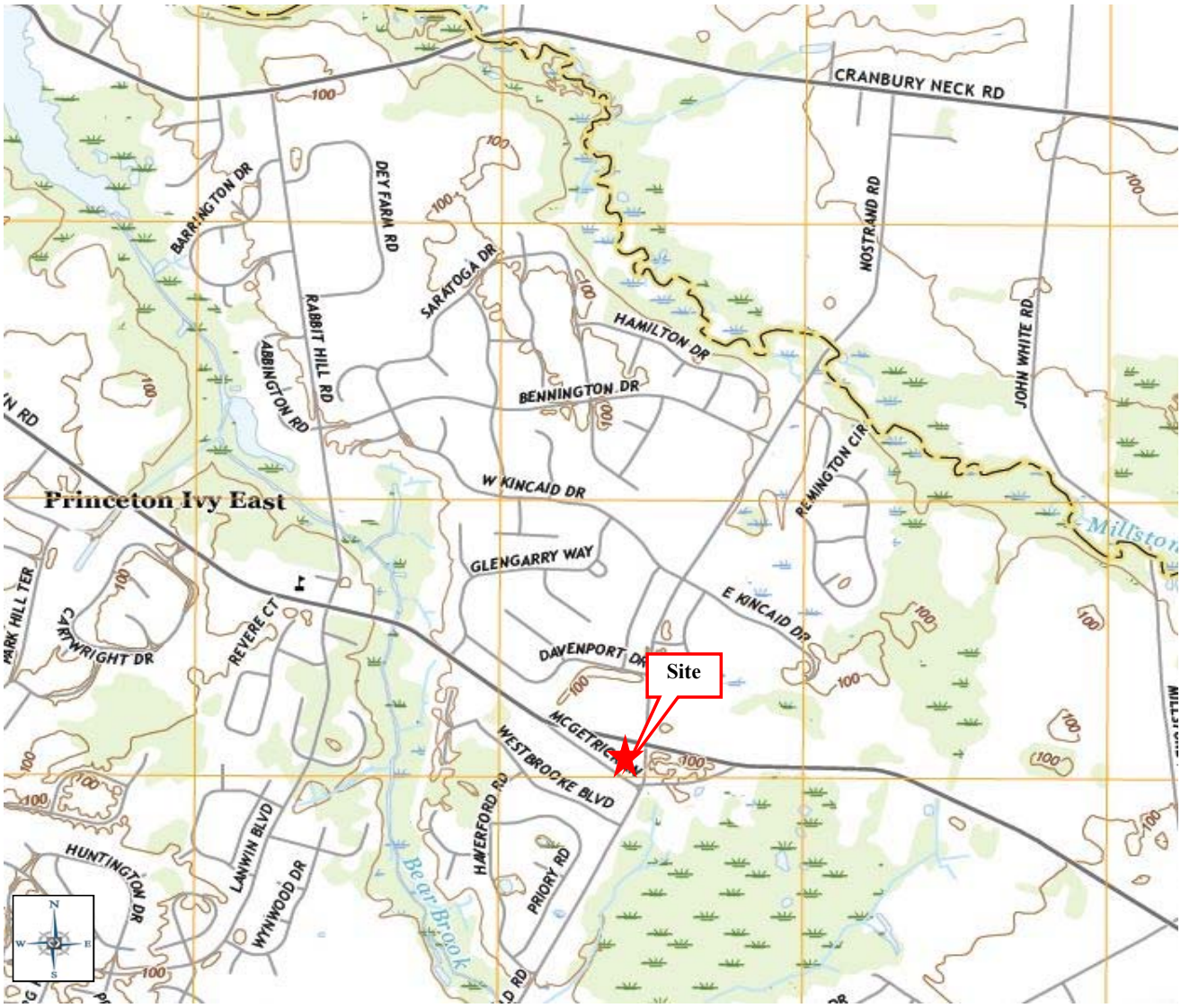
State Planning Area Map

Source: NJ GeoWeb

Date Access: 02/27/2020

East Ridge NJ, LLC

332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg — Date: 2/27/2020	BOHLER
Checked by: vm — Scale: nts	

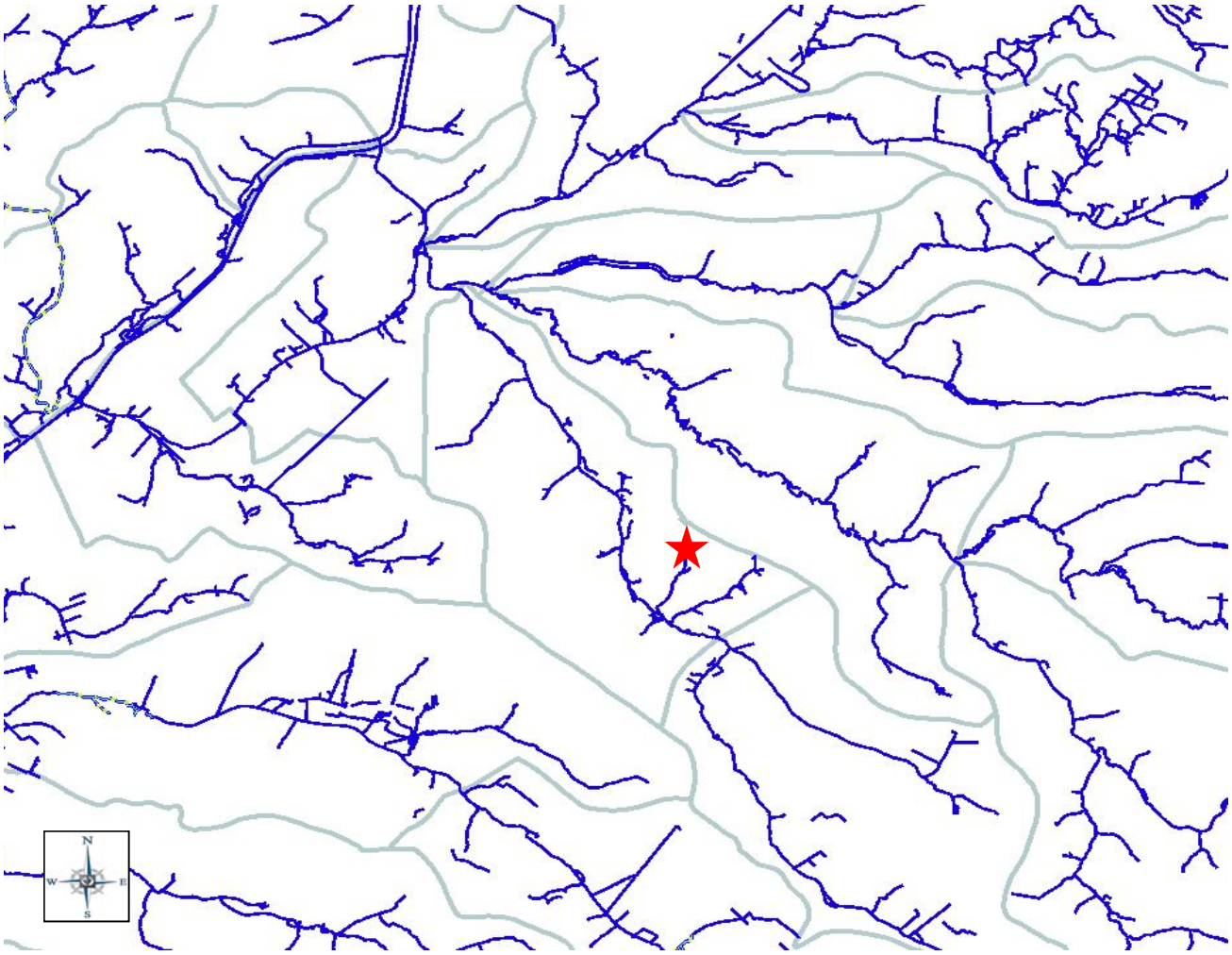


USGS Map
468,654-ft. E; 530,608 ft. N
Hightstown Quadrangle

Source: USGS, 1986

Date Access: 02/27/2020

East Ridge NJ, LLC	
332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg — Date: 2/27/2020	BOHLER
Checked by: vm — Scale: nts	



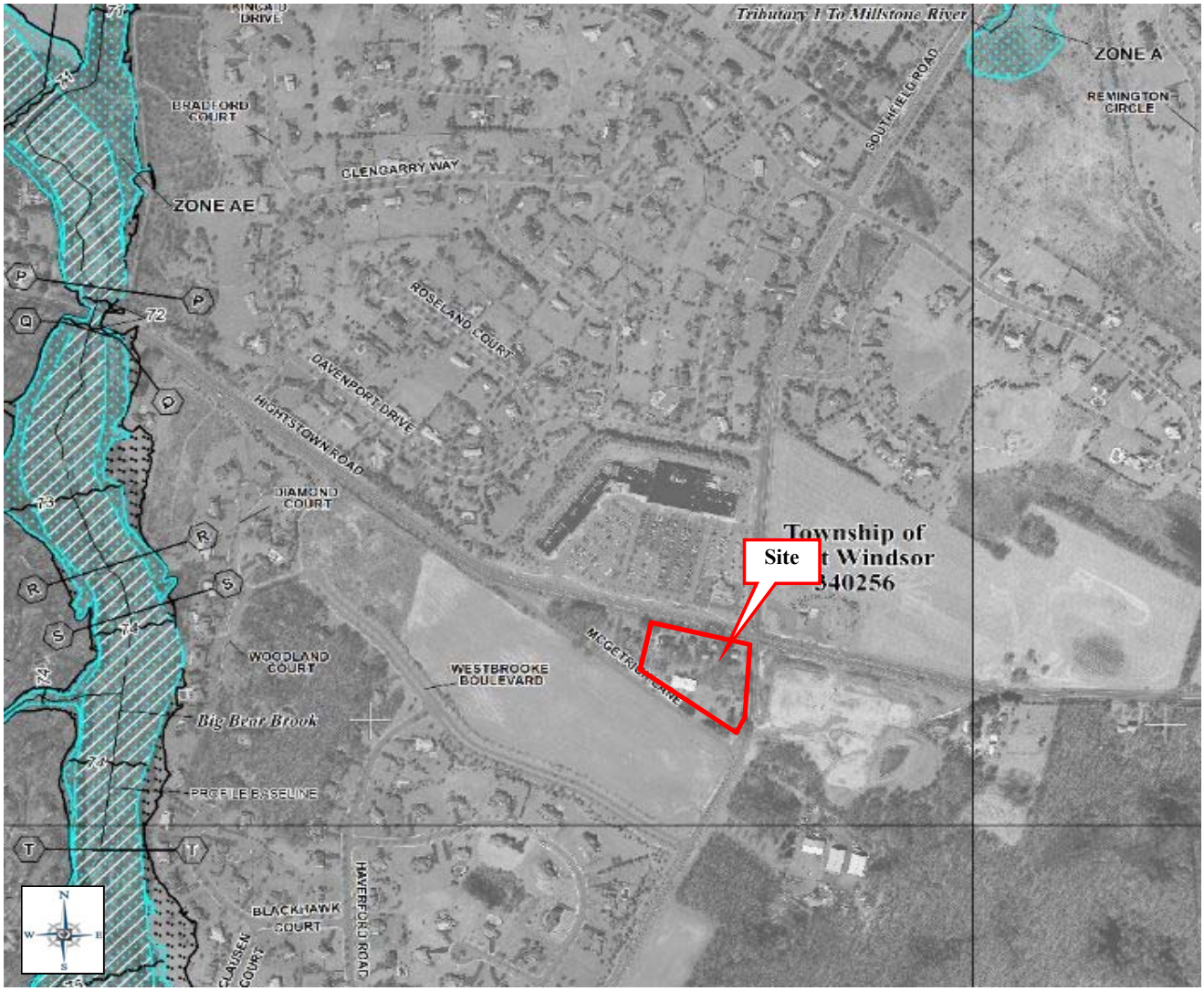
HUC-14 Sub-Watershed Map

Source: NJ GeoWeb

Date Access: 02/27/2020

East Ridge NJ, LLC

332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	BOHLER
Prepared by: gg — Date: 2/27/2020	
Checked by: vm — Scale: nts	



FEMA Flood Map

Source:FEMA FIRM Map #34021C0162F, Date 07/20/2016

Date Access: 02/27/2020

East Ridge NJ, LLC

332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg — Date: 2/27/2020	BOHLER
Checked by: vm — Scale: nts	

Delaware Raritan Canal Commission
Review Zone Map

Source: NJ GeoWeb

Date Access: 02/27/2020

East Ridge NJ, LLC	
332 Hightstown Road & 125 Southfield Road **Block 47; Lots 2-6**	**Township of West Windsor, Mercer County, New Jersey**
BENJ# J190844	
Prepared by: gg — Date: 2/27/2020	BOHLER
Checked by: vm — Scale: nts	

NAD 1983

PRINCETON - HIGHTSTOWN ROAD

(A.K.A. MERCER COUNTY ROUTE #571)
(70' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

SOUTHFIELD ROAD

(A.K.A. CRANBURY NECK ROAD)
(70' WIDE PUBLIC RIGHT OF WAY)
(VARIABLE WIDTH ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

MCGETRICK LANE

(45' WIDE R.O.W. PER ROAD RETURN BOOK A, PAGE 107 & TAX MAP)
(ASPHALT ROADWAY)
(ONE WAY TRAFFIC)

POINT OF ANALYSIS #1

POINT OF ANALYSIS #2

POINT OF ANALYSIS #3

EXISTING E1
WOODS, GOOD, HSG B = 0.020 AC; CN = 55
GRASS, GOOD, HSG B = 0.385 AC; CN = 61
IMPERVIOUS, HSG B = 0.380 AC; CN = 98
TOTAL AREA = 0.785 AC; CN = 79; TC = 10.5 MINUTES

EXISTING E2
WOODS, GOOD, HSG B = 0.689 AC; CN = 55
GRASS, GOOD, HSG B = 2.435 AC; CN = 61
IMPERVIOUS, HSG B = 0.400 AC; CN = 98
TOTAL AREA = 3.524 AC; CN = 64; TC = 26.3 MINUTES

EXISTING E3
WOODS, GOOD, HSG B = 0.014 AC; CN = 55
GRASS, GOOD, HSG B = 0.149 AC; CN = 61
IMPERVIOUS, HSG B = 0.117 AC; CN = 98
TOTAL AREA = 0.280 AC; CN = 76; TC = 3.2 MINUTES

BLOCK 47 LOT 1 — N/F LANDS OF TIMOTHY J. TUTTLE D.B. 5202, PG. 248

BLOCK 47 LOT 2 — N/F LANDS OF HENJOCON, L.L.C. D.B. 5720, PG. 120

BLOCK 47 LOT 3 — N/F LANDS OF HENJOCON, L.L.C. D.B. 5720, PG. 127

BLOCK 47 LOT 4 — N/F LANDS OF HENJOCON, L.L.C. D.B. 5720, PG. 134

BLOCK 47 LOT 5 — N/F LANDS OF HENJOCON, L.L.C. D.B. 5720, PG. 141

BLOCK 47 LOT 6 — N/F LANDS OF HENJOCON, L.L.C. D.B. 5720, PG. 148

GRAPHIC SCALE 1 INCH = 30 FEET

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	03/09/2022	REV. PER DRCC COMMENTS	CPR / TXL
2	12/05/2022	REV. PER TOWNSHIP COMMENTS	CPR / TXL
3	02/21/2023	REV. PER TOWNSHIP COMMENTS	CPR / TXL
4	03/29/2023	REV. PER TOWNSHIP COMMENTS	MED / TXL
5	09/18/2023	REV. PER COUNTY ROW IMPROVMENTS	MAI / TXL
6	11/07/2023	REV. PER TOWNSHIP COMMENTS	MAI / TXL

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FOR EXHIBIT PURPOSES ONLY

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

PROJECT No.: J190844
DRAWN BY: CPR
CHECKED BY: TXL
DATE: 11/04/2021
CAD I.D.: J190844-EDAM-6A

PROJECT:
PRELIMINARY & FINAL MAJOR SITE PLAN & PRELIMINARY & FINAL MAJOR SUBDIVISION PLAN
FOR
ER/UDC WEST WINDSOR LLC
PROPOSED QUICKCHEK FOOD STORE WITH FUEL SALES AND RESTAURANT WITH DRIVE-THRU
MAP: 23.03 | BLK: 47 | LOTS: 2-6
332-340 HIGHTSTOWN ROAD AND 125 SOUTHFIELD ROAD
TOWNSHIP OF WEST WINDSOR
MERCER COUNTY, NEW JERSEY

BOHLER
BOHLER ENGINEERING NJ, LLC
30 INDEPENDENCE BLVD., SUITE 200
WARREN, NJ 07059
Phone: (908) 668-8300
Fax: (908) 754-4401
www.BohlerEngineering.com
NJ CERT. OF AUTHORIZATION NO: 24GA28161700 & MH000122

T. LAM
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 47863
NEW YORK LICENSE No. 092942
CONNECTICUT LICENSE No. 30024
PENNSYLVANIA LICENSE No. 76746

SHEET TITLE:
EXISTING DRAINAGE AREAS MAP

SHEET NUMBER:
C-01

REVISION 6 - 11/07/2023

NAD 1983

PROPOSED P1-A (BYPASS)
GRASS, GOOD, HSG B = 0.212 AC; CN = 61
IMPERVIOUS, HSG B = 0.158 AC; CN = 98
TOTAL AREA = 0.370 AC; CN =72; TC = 10.1 MINUTES

PROPOSED P1-C (POROUS PAVER AREA #2)
GRASS, GOOD, HSG B = 0.048 AC; CN = 61
IMPERVIOUS, HSG B = 0.127 AC; CN = 98
POROUS PAVER, HSG B = 0.062 AC; 98
TOTAL AREA = 0.237 AC; CN = 90; TC = 9.4 MINUTES

PROPOSED P1-B (POROUS PAVER AREA #1)
GRASS, GOOD, HSG B = 0.016 AC; CN = 61
IMPERVIOUS, HSG B = 0.103 AC; CN = 98
POROUS PAVER, HSG B = 0.044 AC; 98
TOTAL AREA = 0.163 AC; CN = 94; TC = 3.9 MINUTES

PROPOSED P2-G (BYPASS)
WOODS, GOOD, HSG B = 0.008 AC; CN = 55
GRASS, GOOD, HSG B = 0.079 AC; CN = 61
TOTAL AREA = 0.087 AC; CN = 60; TC = 2.9 MINUTES

PROPOSED P1-D (POROUS PAVER AREA #3)
GRASS, GOOD, HSG B = 0.009 AC; CN = 61
IMPERVIOUS, HSG B = 0.105 AC; CN = 98
POROUS PAVER, HSG B = 0.157 AC; 98
TOTAL AREA = 0.271 AC; CN = 97; TC = 9.3 MINUTES

PROPOSED P2-A (BIORETENTION BASIN #1)
GRASS, GOOD, HSG B = 0.755 AC; CN = 61
IMPERVIOUS, HSG B = 0.928 AC; CN = 98
TOTAL AREA = 1.683 AC; CN = 81; TC = 15.2 MINUTES

BASIN AREA: 0.263 AC.
CONTRIBUTORY DRAINAGE AREA: 2.448 AC.

PROPOSED P2-F (POROUS PAVEMENT AREA #7)
GRASS, GOOD, HSG B = 0.116 AC; CN = 61
IMPERVIOUS, HSG B = 0.124 AC; CN = 98
POROUS PAVEMENT, HSG B = 0.133 AC; 98
TOTAL AREA = 0.373 AC; CN = 86; TC = 4.9 MINUTES

PROPOSED P2-C (POROUS PAVER AREA #4)
GRASS, GOOD, HSG B = 0.009 AC; CN = 61
IMPERVIOUS, HSG B = 0.050 AC; CN = 98
POROUS PAVER, HSG B = 0.026 AC; 98
TOTAL AREA = 0.085 AC; CN = 94; TC = 1.5 MINUTES

PROPOSED P2-H (BASIN #2)
GRASS, GOOD, HSG B = 0.041 AC; CN = 61
IMPERVIOUS, HSG B = 0.149 AC; CN = 98
TOTAL AREA = 0.193 AC; CN =90; TC = 3.0 MINUTES

PROPOSED P2-B (BIORETENTION BASIN #2)
GRASS, GOOD, HSG B = 0.043 AC; CN = 61
IMPERVIOUS, HSG B = 0.297 AC; CN = 98
TOTAL AREA = 0.340 AC; CN = 96; TC = 1.3 MINUTES

BASIN AREA: 0.026 AC.
CONTRIBUTORY DRAINAGE AREA: 0.592 AC.

PROPOSED P2-E (POROUS PAVER AREA #6)
GRASS, GOOD, HSG B = 0.004 AC; CN = 61
POROUS PAVER, HSG B = 0.176 AC; 98
TOTAL AREA = 0.180 AC; CN = 97; TC = 0.5 MINUTES

PROPOSED P2-D (POROUS PAVER AREA #5)
GRASS, GOOD, HSG B = 0.011 AC; CN = 61
IMPERVIOUS, HSG B = 0.125 AC; CN = 98
POROUS PAVER, HSG B = 0.094 AC; 98
TOTAL AREA = 0.230 AC; CN = 96; TC = 4.9 MINUTES

PROPOSED P3-A (BYPASS)
GRASS, GOOD, HSG B = 0.282 AC; CN = 61
IMPERVIOUS, HSG B = 0.095 AC; CN = 98
TOTAL AREA = 0.377 AC; CN = 72; TC = 14.1 MINUTES

PRINCETON - HIGHTSTOWN ROAD
(A.K.A. MERCER COUNTY ROUTE #571)
(70' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

POINT OF ANALYSIS #1

POINT OF ANALYSIS #2

POINT OF ANALYSIS #3

PROPOSED RESTAURANT WITH DRIVE-THRU (4,541 SF)
FFE = 97.00

PROPOSED DUAL ENTRANCE QuickChek (5,852 SF) (10 INDOOR SEATS) (16 OUTDOOR SEATS)
FFE = 97.00

SOUTHFIELD ROAD
(A.K.A CRANBURY NECK ROAD)
(VARIABLE WIDTH PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

MCGETRICK LANE
(45' WIDE R.O.W. PER ROAD RETURN BOOK, A, PAGE 107 & TAX MAP)
(ASPHALT ROADWAY)
(ONE WAY TRAFFIC)

BLOCK 47 LOT 4
N/F LANDS OF TIMOTHY J. TUTTLE D.B. 5207, PG. 249

1 STORY FRAME BUILDING

ACCESS EASEMENT D.B. 6068, PG. 344

APPROXIMATE LOCATION OF AT & T CO. EASEMENT

MEASURED PHYSICAL CENTERLINE
CENTERLINE PER EVIDENCE FOUND

SIDELINE PER EVIDENCE FOUND

ROAD WIDENING D.B. 1675, PG. 532 TRACT 2

ROAD WIDENING D.B. 1659, PG. 504

ROAD WIDENING D.B. 1766, PG. 876 TRACT 2

ROAD WIDENING D.B. 1667, PG. 167

DHCC PSH/LB. 522A, PG. 43

LOT 3 D.B. 5726, PG. 148 TRACT 3

LOT 2 D.B. 5726, PG. 148 TRACT 3

LOT 1 D.B. 5726, PG. 141 TRACT 1

POB

OthA

STORMWATER QUANTITY REQUIREMENTS

	EXISTING DRAINAGE AREA #1	REDUCTIONS	PROPOSED DRAINAGE AREA #1
2-YEAR FLOW (CFS)	0.96 CFS	50% = 0.48 CFS	44.2% 0.42 CFS
10-YEAR FLOW (CFS)	1.71 CFS	75% = 1.28 CFS	50.6% 0.86 CFS
100-YEAR FLOW (CFS)	3.39 CFS	80% = 2.71 CFS	57.3% 1.93 CFS
	EXISTING DRAINAGE AREA #2	REDUCTIONS	PROPOSED DRAINAGE AREA #2
2-YEAR FLOW (CFS)	0.96 CFS	50% = 0.48 CFS	50% 0.48 CFS
10-YEAR FLOW (CFS)	2.58 CFS	75% = 1.94 CFS	60.5% 1.56 CFS
100-YEAR FLOW (CFS)	6.84 CFS	80% = 5.47 CFS	75.6% 5.17 CFS
	EXISTING DRAINAGE AREA #3	REDUCTIONS	PROPOSED DRAINAGE AREA #3
2-YEAR FLOW (CFS)	0.48 CFS	50% = 0.24 CFS	50% 0.24 CFS
10-YEAR FLOW (CFS)	0.89 CFS	75% = 0.66 CFS	41.2% 0.52 CFS
100-YEAR FLOW (CFS)	1.80 CFS	80% = 1.44 CFS	33.0% 1.20 CFS

BMP AREA CALCULATIONS

	BIORETENTION BASIN 1	BIORETENTION BASIN 2	POROUS PAVER AREA #1	POROUS PAVER AREA #2	POROUS PAVER AREA #3	POROUS PAVER AREA #4	POROUS PAVER AREA #5	POROUS PAVER AREA #6	POROUS PAVEMENT #7
TOTAL DRAINAGE AREA	1.683 AC.	0.340 AC.	0.163 AC.	0.237 AC.	0.271 AC.	0.085 AC.	0.230 AC.	0.180 AC.	0.373 AC.
IMPERVIOUS AREA	0.928 AC.	0.297 AC.	0.147 AC.	0.189 AC.	0.262 AC.	0.081 AC.	0.219 AC.	0.176 AC.	0.257 AC.
PERVIOUS AREA	0.755 AC.	0.043 AC.	0.016 AC.	0.044 AC.	0.009 AC.	0.009 AC.	0.011 AC.	0.004 AC.	0.116 AC.
MOTOR VEHICLE SURFACE	0.842 AC.	0 AC.	0.147 AC.	0.127 AC.	0.073 AC.	0.081 AC.	0.219 AC.	0.132 AC.	0.209 AC.
NAD 1983 STATE PLANE NORTHING	468,735	468,831	468,614	468,748	468,686	468,824	468,983	468,945	468,641
NAD 1983 STATE PLAN EASTING	530,658	530,754	530,819	530,845	530,783	530,690	530,524	530,607	530,645

PRINCETON-HIGHTSTOWN ROAD AND SOUTHFIELD ROAD MOTOR VEHICLE SURFACE CALCULATIONS

PROPOSED SHOULDER ON PRINCETON-HIGHTSTOWN ROAD MOTOR VEHICLE SURFACE AREA	0.098 AC.
PRINCETON-HIGHTSTOWN ROAD AND SOUTHFIELD ROAD MOTOR VEHICLE SURFACE BEING MANAGED ONSITE	0.110 AC.

MOTOR VEHICLE SURFACE CALCULATIONS

	EXISTING	PROPOSED
NEW MOTOR VEHICLE SURFACE	N/A	1.790 AC.
TOTAL MOTOR VEHICLE SURFACE	0.531 AC.	2.321 AC.

GROUNDWATER RECHARGE REQUIREMENTS

RECHARGE ANALYSIS	PROPOSED
PRE-DEVELOPED CONDITIONS	177,253 CF
POST-DEVELOPED CONDITIONS	77,228 CF
TOTAL RECHARGE DEFICIT	100,025 CF
PROP. BMP	**PROP. BMP ANNUAL RECHARGE VOLUME**
BIORETENTION BASIN #2	40,000 CF
POROUS PAVER AREA #3	61,678 CF
TOTAL BMP ANNUAL RECHARGE VOLUME	101,678 CF

STORMWATER QUALITY REQUIREMENTS

	REQUIRED TSS REMOVAL (AC.)	PROPOSED TSS REMOVAL (AC.)
MOTOR VEHICLE SURFACE NOT TREATED (0% TSS REMOVAL)	N/A	0.175
EXISTING MOTOR VEHICLE SURFACE (50% TSS REMOVAL)	0.531	N/A
NEW MOTOR VEHICLE SURFACE (80% TSS REMOVAL)	1.790	1.003
TSS IN SERIES* (90% TSS REMOVAL)	N/A	0.714
TSS IN SERIES** (96% TSS REMOVAL)	N/A	0.429
TSS REMOVAL RATE	73.2%	80.0%

GRAPHIC SCALE 30 0 15 30 60 120
1 INCH = 30 FEET

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6	11/07/2023	REV. PER TOWNSHIP COMMENTS	MAI / TXL

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PROJECT No.:	J190844
DRAWN BY:	CPR
CHECKED BY:	TXL
DATE:	11/04/2021
CAD I.D.:	J190844-PDAM-6A

PROJECT:
PRELIMINARY & FINAL MAJOR SITE PLAN & PRELIMINARY & FINAL MAJOR SUBDIVISION PLAN
FOR
ER/UDC WEST WINDSOR LLC
PROPOSED QUICKCHEK FOOD STORE WITH FUEL SALES AND RESTAURANT WITH DRIVE-THRU
MAP: 23.03 | BLK: 47 | LOTS: 2-6
332-340 HIGHTSTOWN ROAD AND 125 SOUTHFIELD ROAD
TOWNSHIP OF WEST WINDSOR
MERCER COUNTY, NEW JERSEY

BOHLER ENGINEERING NJ, LLC
30 INDEPENDENCE BLVD., SUITE 200
WARREN, NJ 07059
Phone: (908) 668-8300
Fax: (908) 754-4401
www.BohlerEngineering.com
NJ CERT. OF AUTHORIZATION NO: 24GA28161700 & MH000122

T. LAM
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 47863
NEW YORK LICENSE No. 092942
CONNECTICUT LICENSE No. 30024
PENNSYLVANIA LICENSE No. 76746

SHEET TITLE:
PROPOSED DRAINAGE AREAS MAP

SHEET NUMBER:
C-01

REVISION 6 - 11/07/2023

J:\2019\J190844\CAD\DRAWINGS\PLAN SET\DRAINAGE MAPS\J190844-PDAM-6A-----LAYOUT: C-1 PDAM

NAD 1983

PRINCETON - HIGHTSTOWN ROAD

(A.K.A. MERCER COUNTY ROUTE #571)
(70' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

TPM-A

POINT OF ANALYSIS #1

INLET AREA 850
AREA: 0.040 AC
C=0.99

INLET AREA 840
AREA: 0.183 AC
C=0.99

INLET AREA 830
AREA: 0.276 AC
C=0.99

INLET AREA 810
AREA: 0.193 AC
C=0.99

INLET AREA 710
AREA: 0.137 AC
0.95

INLET AREA 650
AREA: 0.071 AC
C=0.99

INLET AREA 660
AREA: 0.163 AC
C=0.93

INLET AREA 430
AREA: 0.231 AC
C=0.96

POROUS PAVER AREA #3
AREA: 0.17 AC
C=0.99

ROOF AREA 1
AREA: 0.10 AC
C=0.99

PROPOSED RESTAURANT
WITH DRIVE-THRU
(4,541 SF)
PHASE 2
FFE = 97.00

BASIN AREA 2
AREA: 0.051 AC
C=0.61

ROOF AREA 2
AREA: 0.135 AC
C=0.99

INLET AREA 720
AREA: 0.024 AC
C=0.99

INLET AREA 410
AREA: 0.072 AC
C=0.95

INLET AREA 370
AREA: 0.474 AC
C=0.86

INLET AREA 160
AREA: 0.099 AC
C=0.92

INLET AREA 420
AREA: 0.070 AC
C=0.98

ROOF AREA 2
AREA: 0.158 AC
C=0.99

PROPOSED
DUAL ENTRANCE
QuickChek
(5,852 SF)
(10 INDOOR SEATS)
(16 OUTDOOR SEATS)
FFE = 97.00

INLET AREA 360
AREA: 0.065 AC
C=0.99

INLET AREA 340
AREA: 0.245 AC
C=0.97

BASIN AREA 1
AREA: 0.294 AC
C=0.61

ROAD INLET AREA 110
AREA: 0.10 AC
C=0.91

ROAD INLET AREA 120
AREA: 0.250 AC
C=0.85

INLET AREA 350
AREA: 0.141 AC
C=0.61

INLET AREA 310
AREA: 0.149 AC
C=0.97

INLET AREA 341
AREA: 0.116 AC
C=0.62

ROAD INLET AREA 200
AREA: 0.158 AC
C=0.85

ROAD INLET AREA 210
AREA: 0.066 AC
C=0.99

POINT OF ANALYSIS #2

POINT OF ANALYSIS #3

LIMIT OF WORK

PROP. S.W.L.

200' STORAGE LENGTH

TPM-B

SOUTHFIELD ROAD

(A.K.A. CRANBURY NECK ROAD)
(VARIABLE WIDTH PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

MCGETRICK LANE

(45' WIDE R.O.W. PER ROAD RETURN
BOOK A, PAGE 107 & TAX MAP)
(ASPHALT ROADWAY)
(ONE WAY TRAFFIC)

BLOCK 47
LOT 1
N/F LANDS OF
TIMOTHY J. TUTTLE
D.B. 5207, PG. 248

1 STORY
FRAME BUILDING

ACCESS EASEMENT
D.B. 6069, PG. 344

APPROXIMATE LOCATION OF
AT & T CO. EASEMENT

MEASURED PHYSICAL
CENTERLINE
CENTERLINE PER
EVIDENCE FOUND

SIDELINE PER
EVIDENCE FOUND

P.O.B.
D.B. 5720, PG. 148
TRACT 5

SacA

SacC

OthA

GRAPHIC SCALE
30 0 15 30 60 120
1 INCH = 30 FEET

G:\2019\J190844\CAD\DRAWINGS\PLAN SETS\DRAINAGE MAPS\J190844-IDAM-6A.dwg — LAYOUT: C-1 IDAM

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LANDSCAPE ARCHITECTURE
LAND USE PLANNING
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
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5	09/18/2023	REV. PER COUNTY ROW IMPROVMENTS	MAI/TDW
6	11/07/2023	REV. PER TOWNSHIP COMMENTS	MAI / TXL

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PROJECT No.: J190844
DRAWN BY: CPR
CHECKED BY: TXL
DATE: 11/04/2021
CAD I.D.: J190844-IDAM-6A

PROJECT:

PRELIMINARY & FINAL MAJOR SITE PLAN & PRELIMINARY & FINAL MAJOR SUBDIVISION PLAN

FOR

ER/UDC WEST WINDSOR LLC

PROPOSED QUICKCHEK FOOD STORE WITH FUEL SALES AND RESTAURANT WITH DRIVE-THRU

**MAP: 23.03 | BLK: 47 | LOTS: 2-6
332-340 HIGHTSTOWN ROAD AND
125 SOUTHFIELD ROAD
TOWNSHIP OF WEST WINDSOR
MERCER COUNTY, NEW JERSEY**

BOHLER
BOHLER ENGINEERING NJ, LLC
30 INDEPENDENCE BLVD., SUITE 200
WARREN, NJ 07059
Phone: (908) 668-8300
Fax: (908) 754-4401
www.BohlerEngineering.com
NJ CERT. OF AUTHORIZATION NO: 24GA28161700 & MH000122

T. LAM
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 47863
NEW YORK LICENSE No. 092942
CONNECTICUT LICENSE No. 30024
PENNSYLVANIA LICENSE No. 76746

SHEET TITLE:

INLET DRAINAGE AREAS MAP

SHEET NUMBER:

C-01

REVISION 6 - 11/07/2023

PRINCETON - HIGHTSTOWN ROAD

(A.K.A. MERCER COUNTY ROUTE #571)
(70' WIDE PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

ZONE B-2

NAD 1983

TM-A

TM-B

ZONE BOUNDARY

LIMIT OF WORK

P.O.B. THIS SURVEY LOT 5 D.B. 5720, PG. 141 TRACT 4

P.O.B. LOT 2 D.B. 5720, PG. 120 TRACT 1

P.O.B. LOT 3 D.B. 5720, PG. 127 IRON BAR FOUND TRACT 2

P.O.B. TRACT 3

P.O.B. (TO REMAIN) P.O.B. D.B. 5720, PG. 148 TRACT 5

BLOCK 47 LOT 1
N/F LANDS OF TIMOTHY J. TUTTLE
D.B. 5207, PG. 248

BLOCK 47 LOT 2
N/F LANDS OF HENJOCON, L.L.C.
D.B. 5720, PG. 120

BLOCK 47 LOT 3
N/F LANDS OF HENJOCON, L.L.C.
D.B. 5720, PG. 127

BLOCK 47 LOT 4
N/F LANDS OF HENJOCON, L.L.C.
D.B. 5720, PG. 134

BLOCK 47 LOT 5
N/F LANDS OF HENJOCON, L.L.C.
D.B. 5720, PG. 141

BLOCK 47 LOT 6
N/F LANDS OF HENJOCON, L.L.C.
D.B. 5720, PG. 148

SOUTHFIELD ROAD

(A.K.A. CRANBURY NECK ROAD)
(70' WIDE PUBLIC RIGHT OF WAY)
(VARIABLE WIDTH PUBLIC RIGHT OF WAY)
(ASPHALT ROADWAY)
(TWO WAY TRAFFIC)

ZONE B-4

MCGETRICK LANE

(45' WIDE R.O.W. PER ROAD RETURN BOOK A, PAGE 107 & TAX MAP)
(ASPHALT ROADWAY)
(ONE WAY TRAFFIC)

ZONE P-1

ZONE R-30

REQUIRED 50% TSS REMOVAL
EXISTING MOTOR VEHICLE SURFACE = 0.531 AC.

REQUIRED TSS REMOVAL CALCULATION:
= (0.531 AC. x 50% + 1.790 AC. x 80%) /
(0.531 AC. + 1.790 AC.) = 73.2%

GRAPHIC SCALE 30 0 15 30 60 120
1 INCH = 30 FEET

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CAD I.D.:	J190844-WQDM-2A

PROJECT:
PRELIMINARY & FINAL MAJOR SITE PLAN & PRELIMINARY & FINAL MAJOR SUBDIVISION PLAN
FOR
ER/UDC WEST WINDSOR LLC
PROPOSED QUICKCHEK FOOD STORE WITH FUEL SALES AND RESTAURANT WITH DRIVE-THRU
MAP: 23.03 | BLK: 47 | LOTS: 2-6
332-340 HIGHTSTOWN ROAD AND 125 SOUTHFIELD ROAD
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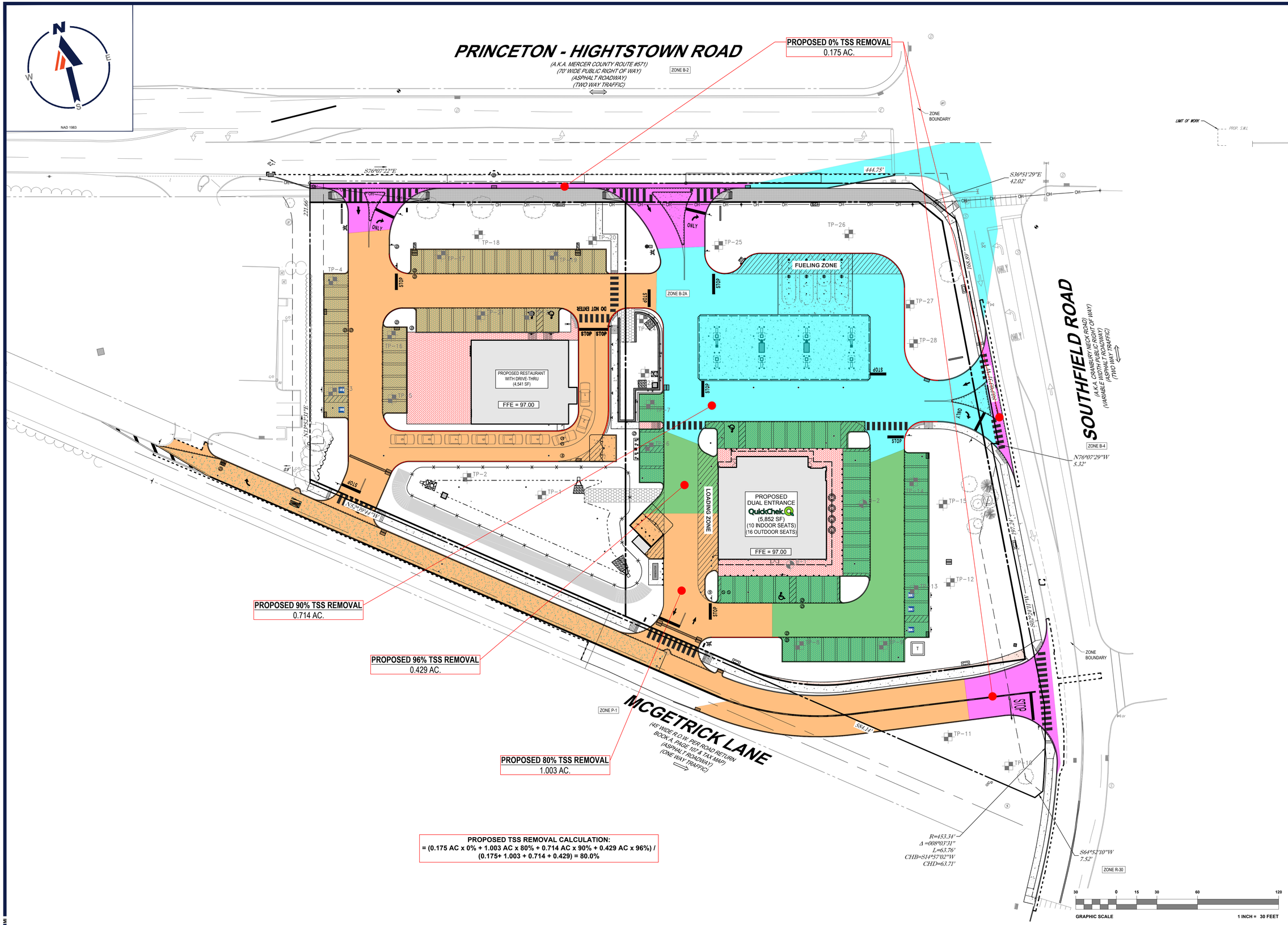
PENNSYLVANIA LICENSE NO. 76746

SHEET TITLE:
REQUIRED TSS REMOVAL MAP

SHEET NUMBER:
C-01

REVISION 6 - 11/07/2023



PROPOSED TSS REMOVAL CALCULATION:
= (0.175 AC x 0% + 1.003 AC x 80% + 0.714 AC x 90% + 0.429 AC x 96%) / (0.175+ 1.003 + 0.714 + 0.429) = 80.0%

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PRELIMINARY & FINAL MAJOR SITE PLAN & PRELIMINARY & FINAL MAJOR SUBDIVISION PLAN

FOR

ER/UDC WEST WINDSOR LLC

PROPOSED QUICKCHEK FOOD STORE WITH FUEL SALES AND RESTAURANT WITH DRIVE-THRU

MAP: 23.03 | BLK: 47 | LOTS: 2-6
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CONNECTICUT LICENSE No. 30024
PENNSYLVANIA LICENSE No. 76746

SHEET TITLE:

PROPOSED TSS REMOVAL MAP

SHEET NUMBER:

C-02

REVISION 6 - 11/07/2023