TOWNSHIP of HOPEWELL
MERCER COUNTY

201 WASHINGTON CROSSING – PENNINGTON ROAD
TITUSVILLE, NEW JERSEY 08560-1410

PROJECT / APPLICATION

BLOCKS: 85 / 86

LOTS: 3 & 9 / 32 33 34 & 130

ADDRESS: 12 Wash Cross Penn Road, 1646 Reed Road, 24 & 26 Diverty Road

PROJECT NAME: The Collection at Hopewell - Preliminary/Final Major Subdivision and Site Plan

REPORTS AND SUPPORTING DOCUMENTS

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ENVIRONMENTAL IMPACT STATEMENT

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ENVIRONMENTAL IMPACT STATEMENT

The Collection at Hopewell
Block 85, Lot 3 & Portion of Lot 9; Block 86, Lots 32, 33, 34 & 130
Hopewell Township
Mercer County, New Jersey

Prepared By:

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November 2020

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Environmental Impact Statement
The Collection at Hopewell
Block 85, Lot 3 & Portion of Lot 9; Block 86, Lots 32, 33, 34 & 130
Hopewell Township
Mercer County, New Jersey

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Environmental Impact Statement

The Collection at Hopewell
Block 85, Lot 3 & Portion of Lot 9; Block 86, Lots 32, 33, 34 & 130
Hopewell Township
Mercer County, New Jersey

1.0 EXECUTIVE SUMMARY

The applicant is submitting a Preliminary and Final Site Plan and Subdivision Application to Hopewell Township to obtain approval to redevelop the mixed use residential and undeveloped agricultural property identified as The Collection at Hopewell (herein also referred to as the "site" or "subject property"). The proposed inclusionary project will result in the construction of a residential development comprised of townhomes and multi-family buildings. The project will satisfy a portion of the Hopewell Township affordable housing obligation. The subject property is designated as Block 85, Lot 3 (12 Washington Crossing Pennington Road), and a portion of Lot 9 (1646 Reed Road); and Block 86, Lots 32 (24 Diverty Road), 33, 34 (26 Diverty Road), and 130. The subject property is approximately 51 acres in size.

This Environmental Impact Statement (EIS) presents the findings of our comprehensive evaluation of the effects implementation of the proposed development may have on the subject property and surrounding vicinity. The EIS has been prepared in accordance with the Hopewell Township municipal code requirements for Environmental Impact Reports, which is outlined under Environmental Impact Reports, Section §17-68 and 17-84. Specifically, the EIS is intended to provide a concise summary of an assessment of the anticipated environmental impacts on the proposed development. This includes an evaluation of the adverse and positive environmental impacts of the proposed development as describe any anticipated public benefits.

All persons who participated in the preparation of this report have been identified in Attachment 1.

1.1 New Jersey Department of Environmental Protection (NJDEP) Permitting History

Certain permit approvals from the NJDEP Division of Land Use Regulation were received for the site which included Block 85, Lot 3 and Block 86, Lots 32 through 34 and 130, at 12 Washington Crossing Pennington Road and Route 31 in Hopewell Township. The permit approvals that affected the subject property are described in section 3.11, 3.14, and 3.16 below.

2.0 PROJECT OVERVIEW

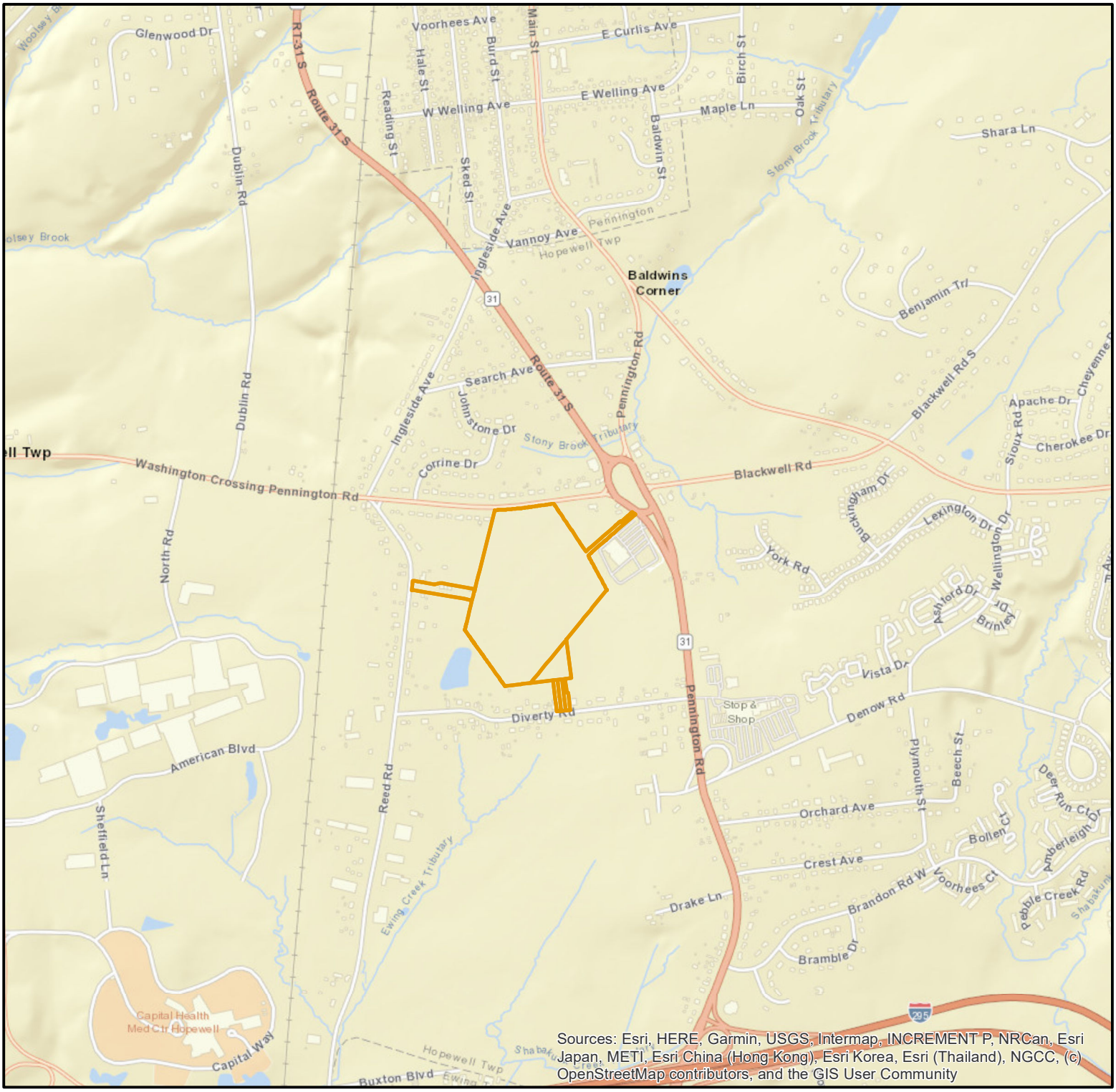
The subject property is identified as The Collection At Hopewell inclusive of approximately 51 acres on Block 85, Lot 3 and a portion of Lot 9, and Block 86 Lots 32 through 34 and 130, as illustrated on Figure 1 – Local Street Map, Figure 2 – USGS Topographic Quad Map, Figure 3 – Subject Property & Surrounding Area and Figure 4 – Tax Map. The majority of the subject property is undeveloped and consisting of agricultural fields (Block 85, Lot 3 and Block 86, Lot 130). Block 86, Lots 33 and 34 are each developed with a residential structure. Block 86, Lot 32 appears to be undeveloped. Block 85, portion of Lot 9 consists of agricultural land. Washington Crossing Pennington Road is present to the north, Diverty Road and several residential properties are located to the south, Reed Road is present to the west along with residential and commercial properties. Route 31/Pennington Road is located to the east/northeast along with commercial and residential properties. Stony Brook unnamed tributary (UNT) is present along the northwestern corner of the subject property.

This report presents an environmental analysis of the proposed activity as part of the municipal development plan approval process. The proposed development will result in the removal of any existing structures and agricultural fields. Upon completion, the development will result in the construction of twenty-nine residential buildings, three access roads, sufficient parking, various utilities (including a sanitary sewer pump station), a dog park, and associated stormwater management basins. Specifically, the buildings will be broken down as follows:

Type	Number of Buildings	Units
3-Story Traditional Townhome	10	61
3-Story Stacked Townhome	11	144
3 Story COAH Apartment	4	78
3-Story Multifamily Units	4	96
Total	29	379

For further details please reference the site plans entitled, "Preliminary and Final Major Subdivision & Preliminary and Final Site Plan for US Home at Hopewell Urban Renewal, LLC The Collection at Hopewell Block 85, Lot 3, Block 86, Lots 32-34 & 130" consisting of 63 sheets, as prepared by Bowman Consulting Group, LLC and dated August 1, 2020.

Figure 1 - Site Location Map



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

LEGEND

Subject Property

1 inch = 1,500 feet

0 700 1,400 2,800 Feet

Project: 4766 **Date:** 11/2/20

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Block 85, Lot 3, Lot 9 (Portion of)
Block 86, Lots 32,33,34, 130
Hopewell Twp., Mercer County

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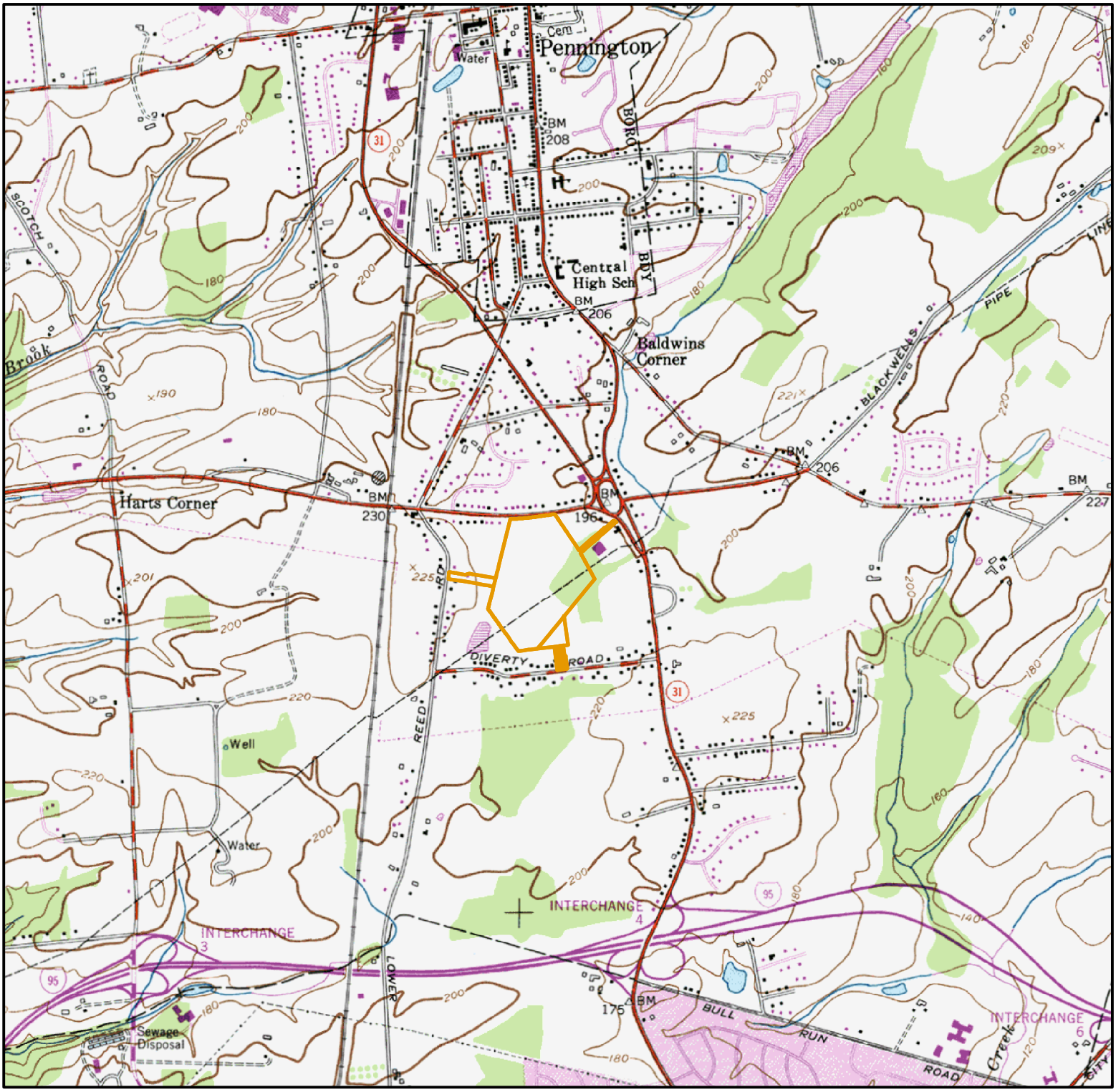
This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state authorized.

Figure 2 - USGS Topographic Quadrangle



LEGEND

Subject Property

1 inch = 2,000 feet

0 950 1,900 3,800 Feet

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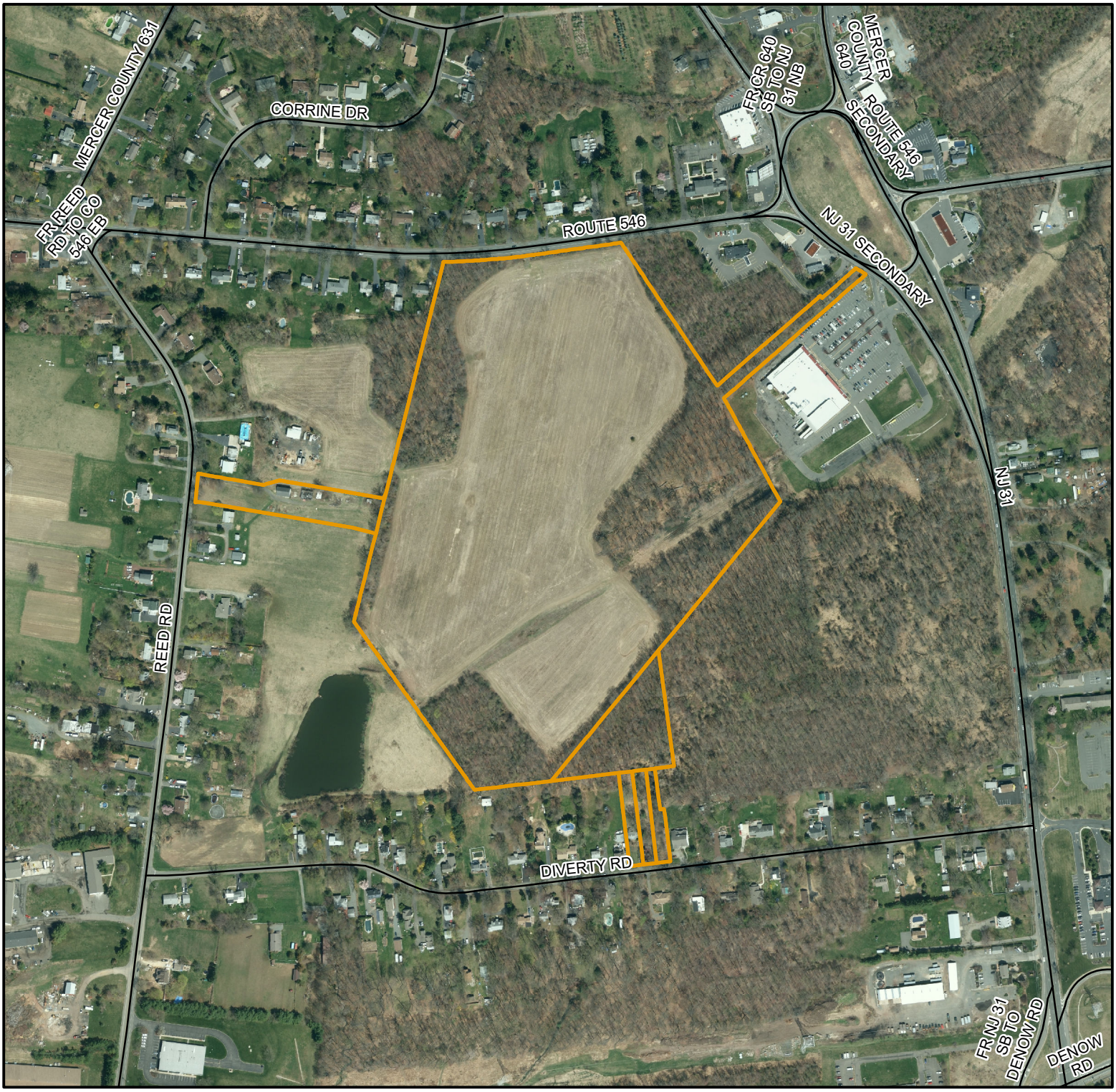
Figure 3 - Subject Property & Surrounding Area



LEGEND

Roads

Subject Property

1 inch = 500 feet

0 250 500 1,000 Feet

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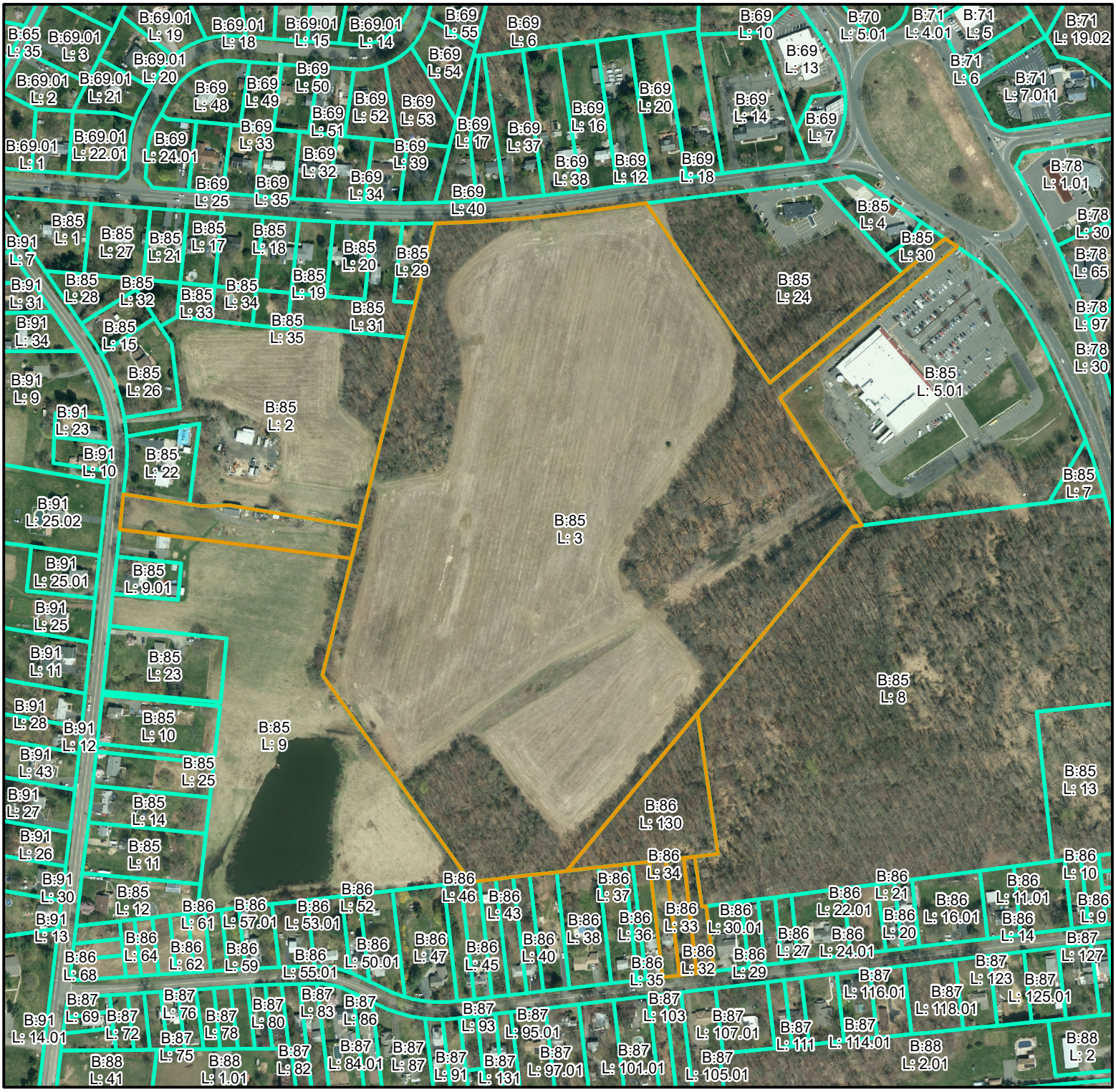
Figure 4 - Tax Map



LEGEND

- SubjectProperty
- Mercer County Lots

1 inch = 400 feet

0 200 400 800 Feet

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3.0 ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Sewer Facilities

A sewer conveyance system is proposed onsite. An onsite gravity system will lead to an onsite pump station, which will be owned by Hopewell Township. A forced main will lead from the pump station out to Reed Road and proceed north to the intersection with Washington-Pennington Road where it will connect to another forced main (being designed by others) which will ultimately flow to the pump station on Scotch Road. The system will be owned and maintained by Hopewell Township. The system has been designed in conjunction with Hopewell Township and the Ewing-Lawrence Sewage Authority and will be subject to their applicable permitting process.

The proposed pumphouse is located on the eastern side of the subject property in the general vicinity of stacked townhouse #11.

Approximately 5,445 linear feet of sanitary sewer line via 8" PVC is proposed onsite. The forced main will be approximately 2,041 linear feet via 6" pipe and will flow from the pump house out to Reed Road via Road #1.

3.1.1 Impacts

The sanitary sewer system is required to accommodate the proposed development, which is too large for a septic system. Overall, the proposed infrastructure will result in increased capacity and may allow for future development in the surrounding areas as they can potentially tie in to the new system all subject to applicable rule, regulations and separate permitting.

Per the Hopewell Township sewerage information, most properties in the township have onsite septic systems as the EPA will not allow construction of a treatment plant due to concerns of water quality in the Delaware River. Some neighborhoods and sites are tied into neighboring treatment authorities such as the Stony Brook Regional Sewerage Authority (SBRSA) or the Ewing-Lawrence Sewage Authority (ELSA); however, most properties have their own onsite septic systems.

3.2 Water Supply

Trenton Water Works, a City of Trenton owned water utility provides water to the site. The new connection is subject to approval by Trenton Water Works and NJDEP. The onsite water main is anticipated to connect Reed Road and Diverty Road via Road #1 and Road A.

3.2.1 Impacts

The proposed development is not anticipated to have a major or negative impact on the water supply as the onsite infrastructure will connect to existing water infrastructure. While demand on the overall system will obviously increase, it is presently anticipated that Trenton Water Works has sufficient unused capacity to adequately supply the proposed development.

3.3 Surface & Subsurface Hydrology & Drainage

The Stony Brook UNT is present along the northwestern corner of the subject property and continues across Washington Crossing-Pennington Road. This stream connects to the Stony Brook located further north of the subject property. This waterway is classified as FW2-NT by the NJDEP's Surface Water Quality Standards. FW-2 waters differ from FW-1 waters as they have not been set aside for ecological significance. NT indicates that the water is not capable of supporting trout, which thrive in cooler stream temperatures. The onsite stream drains approximately 40 acres. Additionally, the riparian zone, as defined by the Flood Hazard Control Act Rules, associated with the uncoded tributary is expected to be 50 feet which would not encroach into the proposed development.

No active wells are located onsite. Based upon the Phase I completed by others for Block 85, Lot 3, portion of the subject property, four abandoned monitoring wells are located onsite. According to the report, these wells were sampled prior to their reported decommissioning and reported no contaminants of concern above applicable NJDEP Groundwater Quality Standards (GWQS). The Geotechnical Report for Lot 3 of the subject property located groundwater in one test pit, at a depth of 83" below grade or elevation 195.98.

The site does not currently have a stormwater system in place and generally slopes to the northeast. The proposed development will result in five stormwater management basins. Each basin will be an extended detention-infiltration basin which will be excavated to a weathered rock limiting zone and backfilled with appropriately permeable soil.

3.3.1 Impacts

No impacts to streams will occur as a result of the proposed development.

Based on the extensive depth of groundwater, no impacts are anticipated to apply. The pending stormwater report by Bowman Consulting will expand upon this further. However, based upon the available information, no impacts to the surface or subsurface hydrology will occur as a result of the proposed development.

3.4 Air Quality

Existing air quality surrounding the site is typical of a central New Jersey suburban setting. There are existing hazardous air pollutants (HAP's) which come from cars, heavy duty trucks, buses, and other highway vehicles. These vehicles produce diesel particulate matter, diesel exhaust and/or carbon monoxide. There are known health standards associated with these pollutants.

There are no predicted impacts associated with air quality with this project. The proposed development will not require any air permits from the NJDEP during or following construction. There may be some temporary airborne dust associated with the construction process but these conditions will be localized and will dissipate with the stoppage of each workday. Standard construction mitigation measures such as application of mist to suppress dust, use of interior chutes and dumpster covers, prompt debris removal, wind covers, and use of crushed stone at access points will take place during construction, if necessary. Further, upon completion of the development, the air quality will not be impaired.

3.4.1 Impacts

The proposed development will not impact the onsite/surrounding air quality long term and is ultimately relatively consistent with other developments in the area. No variances regarding air quality will be required.

3.5 Traffic Volume

The development will result in the creation of new access to the subject property from Reed Road and emergency access via Diverty Road. The existing gravel access to and from Washington Crossing-Pennington Road will be replaced with a standard improved road for ingress and egress to the proposed development..

3.5.1 Impacts

Given that currently the majority of the subject property is an agricultural field, the development of 379 residential units as part of this inclusionary development will necessarily increase the traffic onsite. A Traffic Study is being complete which will detail the extent of this impact.

3.6 Noise

The State of New Jersey has promulgated noise standards, which generally dictate that noise levels are to be kept below 65 decibels during daytime and 50 decibels at night. Noise sources that may arise from the project will occur during two time periods: a temporary construction period and a post construction operational period. The inclusionary project will conduct construction activity to hours as outlined by the town. Construction noise during this time period can typically be higher for a limited duration than that of the project operations, and as a rule is greater in the earlier stages of the project. Construction noise is considered temporary since it ends with the completion of the project.

The proposed development will generate some ambient noise once it is completed, consistent with normal residential developments. However, the impact of that noise on the surrounding area will be reduced by the distance, relationship to existing roadway networks, adjacent commercial uses along Route 31 and existing tree buffers. The closest any proposed residence will be to an existing residence is approximately 300 feet, which is along the southern portion of the proposed development, and will be separated via a natural vegetative buffer.

3.6.1 Impacts

The increase in noise will have no long-term significant or adverse impacts to the subject property or surrounding area following the completion of the project. Operation of the venue will comply with all municipal laws and regulations regarding noise. Further, the proposed development will comply with all zoning requirements as per the Redevelopment Plan. No variances regarding noise will be required.

3.7 Geology

The site is located within the Piedmont geologic province within the Passaic formation (Kmv), with a lithology consisting primarily of siltstone and shale.

On a smaller scale, the surficial geology of the subject property falls within two classifications. The majority of the subject property is identified as "Weathered shale, mudstone, and sandstone" with a lithology of "Silty sand to silty clay with shale, mudstone, or sandstone fragments; reddish brown, yellow, light gray. As much as 10 feet thick on shale and mudstone, 30 feet thick on sandstone." A smaller classification, to the south and west is identified as an Eolian deposit with a lithology of "Windblown fine sand and silt; very pale brown, yellowish brown. As much as 15 feet thick."

3.7.1 Impacts

No long-term impacts to the geology of the subject property are anticipated. The majority of the proposed project will occur at grade and shallow depths. Bedrock will not be encountered or impacted, and any fill materials brought onsite will be consistent with construction standards.

3.8 Soils & Soil Capabilities

The subject property and surrounding area are not mapped within any areas mapped for soils with limiting factors.

Soil Type Name	Hydrologic Soil Group	Percent of Site
Bucks silt loam (BucB), 2 to 6% slopes	B	53%
Bucks silt loam (BucB2), 2 to 6% slopes, eroded	B	18%
Doylestown and Reaville variant silt loams (DOZA), 0 to 2% slopes	D	0.9%

Readington and Abbottstown silt loams (REFA), 0 to 2% slopes	C	0.2%
Readington and Abbottstown silt loams (REFB), 2 to 6% slopes	C	27.8%

- The BucB soils are described by the United States Department of Agriculture (USDA) as a well-drained silt loam derived from silty noncalcareous loess over residuum weathered from sandstone and shale. Weathered bedrock can be present at 48 to 80 inches below grade.

- The BucB2 soils are described similar to BucB soils by the USDA.

- The DOZA soils are described by the USDA as poorly drained silt loam derived from silty eolian deposits over shale.

- The REFA soils are described by the USDA as moderately well drained silt loam derived from fine loamy residuum weathered from acid red shale, siltstone, and fine-grain sandstone. Weathered bedrock can be present at 40 to 80 inches below grade.

- The REFB soils are described similar to REFA soils by the USDA.

- The onsite wetlands are found within the REFB and BucB silt loams.

No areas of erosion were observed onsite. Please refer to Figure 5 – Mercer County Soils Map for additional details.

3.8.1 Impacts

No unmitigated impacts to soils, soils with limiting factors, high acid or erodible soils are anticipated to occur as a result of the proposed development. The onsite soils are anticipated to be considered suitable for the proposed development and has been designed utilizing on-site data obtained via geotechnical investigation.

3.9 Topography

According to the available survey data, generally slopes to the northeast towards Washington Crossing – Pennington Road. The highest elevations of site are in the southwestern portion of the subject property near the border with Block 85, Lot 2. The lowest elevations are along the right of way where the site interests with Route 31. The elevation here is approximately 196.5 feet. The elevation in northeast corner of Block 85, Lot 3 is approximately 207 feet.

The elevation will remain highest along Reed Road at elevation 219 feet. As shown on the proposed grading plan, elevations of 208 to 211 feet will be found throughout the developed portions of the site but will slope to around 200 feet and below within the stormwater basins to be located throughout the site.

No steep slopes or severe elevations breaks are present or proposed.

As the slope is approximately 1% or less it is clear that no areas onsite have steep slopes (greater than 20%).

3.9.1 Impacts

No significant or adverse impacts to onsite topography will occur as a result of the proposed development. No grading which would significantly impact the existing topography of the site is proposed.

3.10 Vegetation

Vegetation onsite can be divided into four general communities; agricultural field, forest, wet meadow, and disturbed. Each community is described as follows:

- Agricultural field: This area consists of approximately 58.79% of the site and is actively maintained for agricultural purposes.

- Forest: Wooded areas consist of approximately 34.10% of the site. The forested areas consist of both wetlands and uplands, but the common species remain largely the same. Species include pin oak, white oak, scarlet oak, black cherry, sweet gum and black gum. No beech-dominated forests are located onsite

- Wet meadow: This area is approximately 2.31% of the site and encompasses the existing right of way. This area consists of wetlands and does not have any large trees as it likely cleared frequently to maintain the right of way. Sedges and other herbaceous growth are predominate here.

- Disturbed: This area is approximately 4.80% of the site and is highlighted by human activity. Maintained lawn, ornamental landscaping, and developed structures are present.

  Please see Figure 6 – Vegetative Communities Map for the location of these areas.

3.10.1 Impacts

The proposed development will not impact the wet meadow. The agricultural field and disturbed areas are current man-made areas that will be used for other man-made activities. The majority of the forested areas consist of regulated wetlands that will not be impacted. However; there are unregulated upland forested areas in the southwestern portion of Block 85, Lot 3 and on Block 86, Lot 130 that will have some clearing of forested areas and a reduced tree line. Please refer to sheet 3 of the site plans for details on the new tree line location.

3.11 Regulated Wetlands

The subject property previously received freshwater wetlands permitting per the below.

- **2019-01-19 – Letter of Interpretation (1106-03-0004.2)** identified three areas of intermediate resource area value wetlands and three areas of isolated wetlands. The LOI covered Block 85, Lot 3.

- **2019-09-13 – Letter of Interpretation (1106-03-0004.3)** confirmed there are no wetlands present on Block 86, Lots 32 through 34 or 130.

- Additional DEP permitting is described in sections 3.14 and 3.16 below.

Additional permitting to the NJDEP will be completed for the proposed development. No applications have been submitted as of yet. It is expected that a Transition Area Waiver-Averaging Plan, General Permit #2 – Underground Utility Lines, General Permit #6 – Non-tributary wetlands, General Permit #10 – Road Crossings, and General Permit #11 – Outfalls and Intake Structures may be required. Based

upon preliminary reviews, it is expected that the proposed development will adequately comply with the requirements of each required NJDEP permit.

Please refer to Figure 7 – Freshwater Wetlands Map and Attachment 3 for details.

3.11.1 Impacts

No impacts to non-isolated wetlands will occur as a result of the proposed development. Disturbances to the isolated wetlands and transition areas will occur in accordance with Freshwater Wetlands Protection Act and subject to review and approval by the NJDEP.

3.12 Wildlife & Wildlife Habitats

Natural Heritage Database Reports indicate whether species of special concern, State-listed threatened or endangered or Federal listed endangered species are known to utilize the site or its habitat characteristics. Please note that species of special concern do not have any regulatory protections.

Based on a review of a Natural Heritage Database Reports dated January 10 and October 24, 2018, breeding sightings of Cooper's Hawk, a species of special concern, were identified onsite. Foraging habitat for the Great Blue Heron, also a species of special concern was identified within the vicinity of the subject property. Foraging and/or breeding sightings were observed for the state endangered Bald Eagle, state threatened Grasshopper Sparrow and American Kestrel and species of special concern Cooper's Hawk, Eastern Meadowlark and Great Blue Heron were also identified as utilizing areas within one mile of the subject property.

Based on a review of the NJDEP's available Landscape (V. 3.3) data, the southern, western and eastern portions of the subject property are not mapped as containing any potential habitat. The majority if the subject property (Block 85, Lot 3) is Rank 1 which does not carry any regulatory thresholds. The southeastern portion of the subject property (Block 85, Lot 3 and Block 86, Lot 130) is mapped as Rank 2 habitat under link ID 449567. Rank 2 identifies areas of special concern, mapped in this area is breeding sighting for Cooper's Hawk. Areas of Rank 2 do not carry any regulatory thresholds. No vernal habitats, stream mapping, or other information suggesting aquatic biota was located onsite was identified.

The site is not mapped by the new NJDEP Division of Fish and Wildlife's Connecting Habitat across New Jersey (CHANJ) mapping. The CHANJ program "is an effort to make our landscape and roadways more permeable for terrestrial wildlife by identifying key areas and actions needed to achieve habitat connectivity across the state." This means that the site is not considered to be have a "core" habitat or any "corridor" between core habitats. The lack of such a designation is an indication that the site is likely not utilized by regulated species.

The NJDEP permitting for the onsite freshwater wetlands and flood hazard area riparian zone instituted the standard fifty-foot buffers for the respective regulated area. The potential wider regulatory buffers for each, reserved for areas of threatened or endangered species, were not issued. This indicates that no threatened or endangered species (state or federal) are known or thought to utilize the site.

No threatened or endangered species were observed onsite during the approximately eighty (80) man-hours spent onsite by Envirotactics personnel conducting site walkthroughs and wetland delineations.

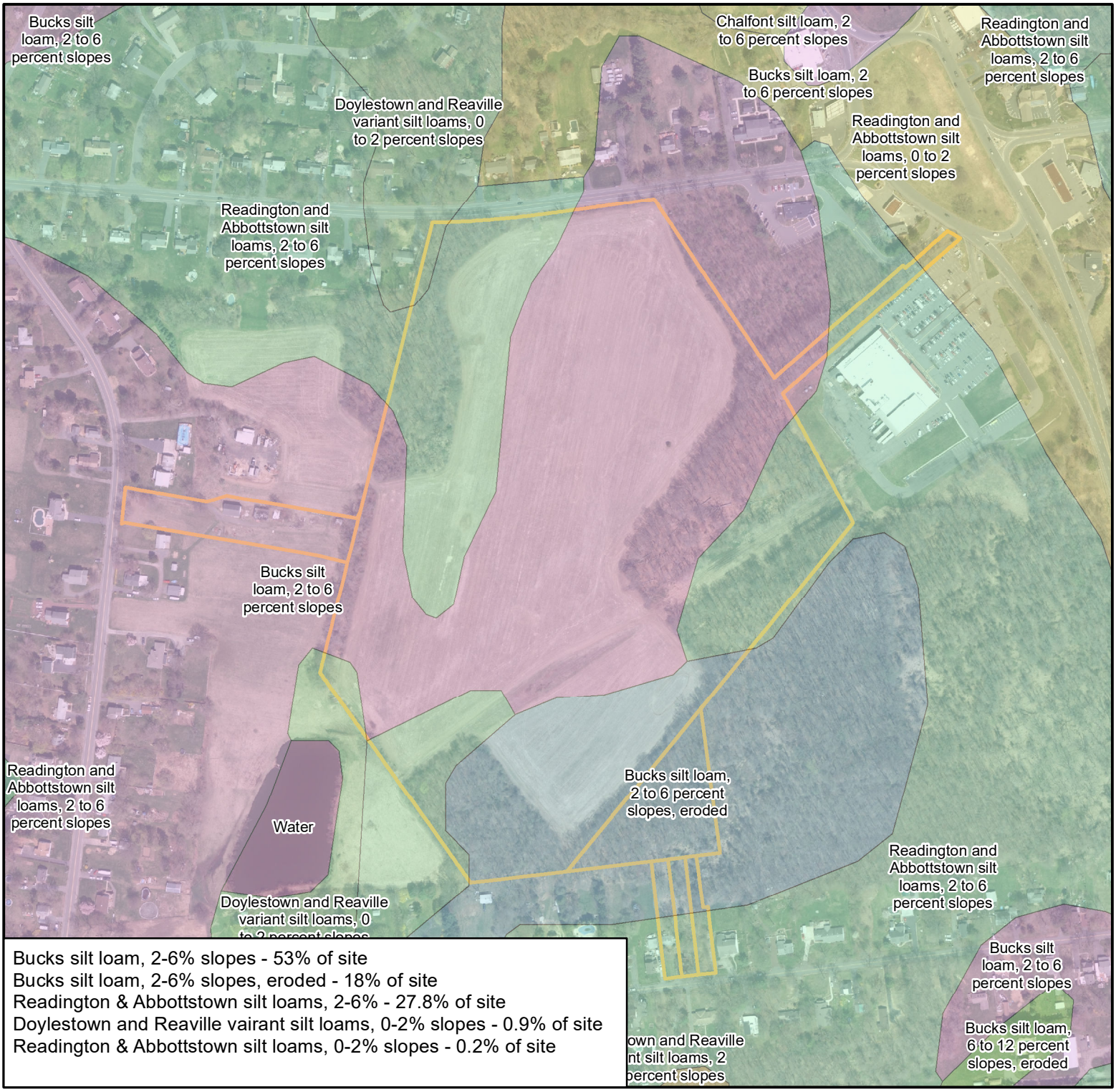
Please refer to Figure 8 – Piedmont Plains Landscape Map and Attachment 2 – Natural Heritage Database Report for additional details.

3.12.1 Impacts

No impacts to regulated wildlife are anticipated. The subject property is bound by all side by extensive development including a heavily utilized State Highway, commercial development, agricultural development and residences. In the context of potential habitat, the site is essentially an island in with limited interconnectivity with any potential habitat in the area. The active agricultural operations and other human disturbances onsite and on neighboring also likely presents enough disturbance to prevent the frequent use by any regulated wildlife.

All impacts to the wildlife utilizing the site will be completed in accordance with NJDEP permitting requirements. Wildlife habitat will be maintained onsite through the unaltered presence of forested wetlands and the wet meadow right of way. These typically high productive biomes are likely where any current onsite use by wildlife is actively utilized.

Figure 5 - Mercer County Soils Map



Bucks silt loam, 2-6% slopes - 53% of site
Bucks silt loam, 2-6% slopes, eroded - 18% of site
Readington & Abbottstown silt loams, 2-6% - 27.8% of site
Doylestown and Reaville vairant silt loams, 0-2% slopes - 0.9% of site
Readington & Abbottstown silt loams, 0-2% slopes - 0.2% of site

LEGEND

Subject Property

1 inch = 400 feet

0 200 400 800 Feet

Project: 4766 **Date:** 11/2/20

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Figure 6 - Vegetative Communities Map



LEGEND

- Agricultural Field (58.79%)
- Disturbed (4.80%)
- Forest (34.10%)
- Wet Meadow (2.31%)
- Subject Property

1 inch = 400 feet

0 200 400 800 Feet

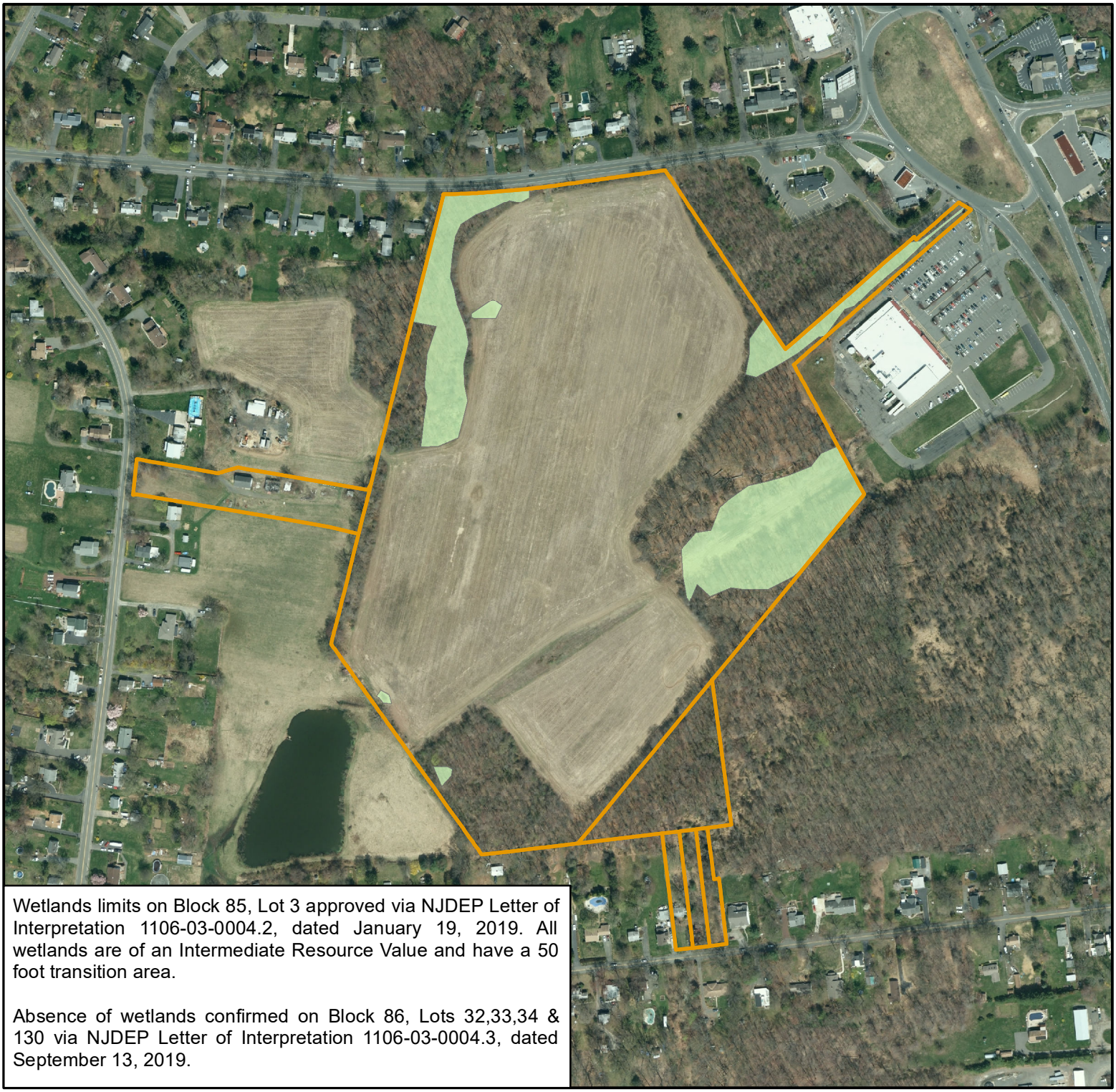
Project: 4766 **Date:** 11/2/20

The Collection at Hopewell
Block 85, Lot 3, Lot 9 (Portion of)
Block 86, Lots 32,33,34, 130
Hopewell Twp., Mercer County

enviroTACTICS
Your Environmental Resource
1330 Laurel Avenue, Building 3, Sea Girt, NJ 08750
Phone: 732.449.0077 Fax: 732.449.5810
www.envirotactics.com

This map was developed using New Jersey Department of Environmental Protection Geographic Information System Digital Data, but this secondary product has not been verified by NJDEP and is not state authorized.

Figure 7 - Freshwater Wetlands Map



Wetlands limits on Block 85, Lot 3 approved via NJDEP Letter of Interpretation 1106-03-0004.2, dated January 19, 2019. All wetlands are of an Intermediate Resource Value and have a 50 foot transition area.

Absence of wetlands confirmed on Block 86, Lots 32,33,34 & 130 via NJDEP Letter of Interpretation 1106-03-0004.3, dated September 13, 2019.

LEGEND

- Subject Property
- NJDEP Approved Wetlands

1 inch = 400 feet

0 200 400 800 Feet

Project:4766 Date: 11/2/20

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Figure 8 - Piedmont Plains Landscape Map



LEGEND

- Rank 1 - Habitat specific requirements
- Rank 2 - Special Concern
- Rank 3 - State Threatened
- Rank 4 - State Endangered
- Rank 5 - Federal Listed
- Subject Property

1 inch = 400 feet

0 200 400 800 Feet

Project: 4766 Date: 11/2/20

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3.13 Watercourses

An unnamed tributary (UNT) of Stony Brook is located along the northwestern corner of the subject property and crosses under Washington Crossing-Pennington Road and eventually drains further north to Stony Brook. A manmade pond is also present offsite to the southwest of the subject property.

Please refer to Figure 9 – Streams and Watercourses Map for details.

3.13.1 Impacts

A 50-foot riparian zone under the Flood Hazard Control Act Rules will apply to the Stony Brook UNT; however, this will already be accounted for as it located within an area of freshwater wetlands. Therefore, no impacts to any watercourses will occur as part of the proposed development.

3.14 Floods & Flood Hazard Areas/Stream Encroachment

The subject property is mapped within an X Zone on FEMA's Effective FIRM which carries no regulatory thresholds for flood insurance purposes. Approximately 2,400 feet northeast of the subject property, associated with Stony Brook are mapped areas within an A Zone with no calculated base flood elevations. There is no FEMA mapping for the "uncoded tributary" located offsite.

A Flood Hazard Area Applicability Determination was obtained from NJDEP for Block 85, Lot 3 on June 29, 2020 which indicated that there are no regulated flood hazard areas onsite and no regulated activities to the riparian zone are proposed. Another Applicability Determination, for Block 86, Lots 32-34 and 130, dated November 15, 2019 from NJDEP, indicated that there are no flood hazard areas or riparian zones onsite.

Please refer to Figure 10 – FEMA FIRM and Attachment 3 for details.

3.14.1 Impacts

The proposed development will not encroach into any stream or flood hazard area.

3.15 Waterfront/Shoreline Features

There are no waterfront or shoreline features present on the subject or adjacent properties.

3.15.1 Impacts

No impacts to waterfront or shoreline features will occur as a result of the proposed development.

3.16 Historic Sites & Archeological Resources

The site is partially located within archaeological grid CE146. The site is not identified as being historic on any of the available GIS layers. The site is not listed as being historic on the NJDEP Historic Preservation Office Mercer County Listing page, last updated October 1, 2020 and accessed on November 5, 2020.

The NJDEP's State Historic Preservation Office (SHPO), administers compliance with the New Jersey Register of Historic Places Act and also provides advice and comment for permitting within the NJDEP's permitting program. The SHPO concurred with a Phase IA Cultural Resource Reconnaissance for Block 85, Lot 3 and Portions of Block 86, Lots 32-34 and 130 as prepared by Paulus, Sokolowski and Sartor, Integrated Services (PS&S) dated June 2018, that stated that the site likely has low sensitivity for Native America and historic-period archaeological resources.

A Phase II investigation, completed by PS&S and dated October 31, 2018 was completed for 24-26 Diverty Road due to the age of the residential structure. This report concluded that "the building on the

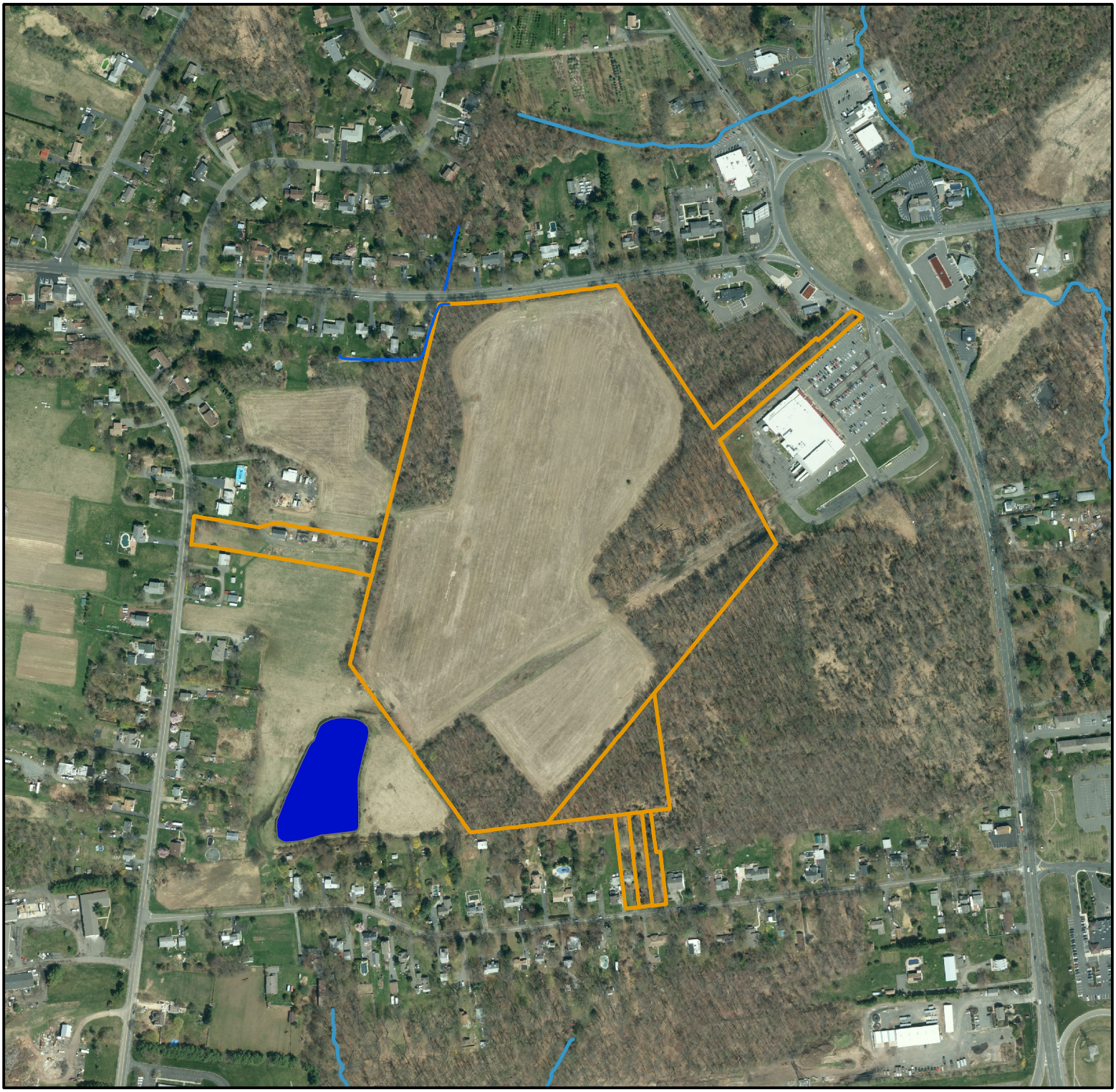
24-26 Diverty Road property, both of which were constructed ca. 1928-1935 after the opening of Diverty Road in the late 1920s, do not meet any of the Criteria for listing in the National Register of Historic Places."

Please see Figure 11 – Archaeologic & Historic Properties Map for details and the above reference PS&S reports for additional information on the history of the site.

3.16.1 Impacts

The proposed development will not result in the destruction of a historic structure and the development will not impact any known archaeologically sensitive or historical areas. An adequate investigation has already been completed and reviewed by the SHPO.

Figure 9 - Stream & Watercourses Map



LEGEND

- FW2-NT (SWQS)
- Water Bodies
- Stony Brook UNT (Approx)
- Subject Property

1 inch = 500 feet

0 250 500 1,000 Feet

Project: 4766 **Date:** 11/2/20

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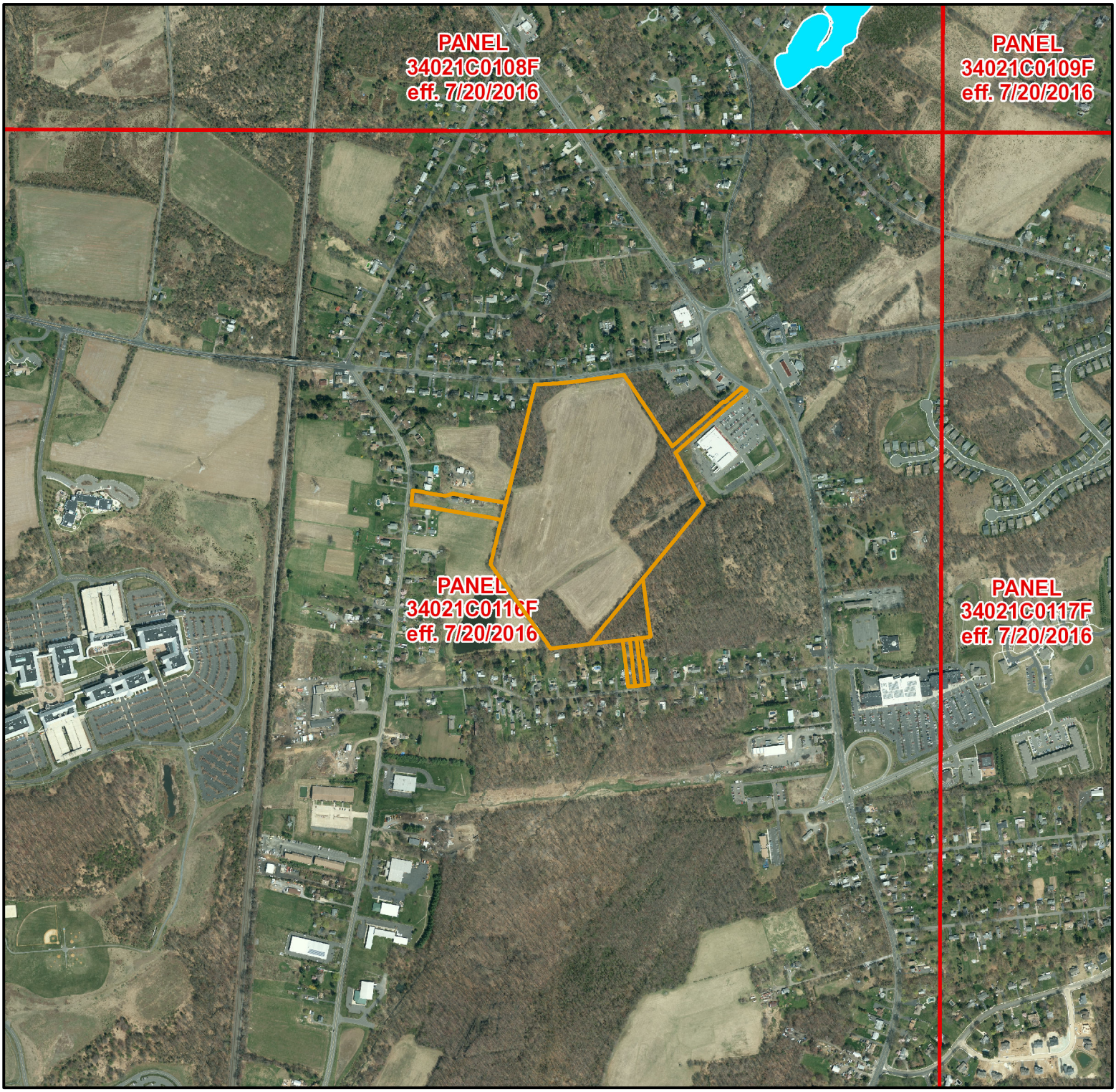
Figure 10 - FEMA FIRM



LEGEND

- Subject Property
- FIRM Panels
- Cross-Sections

Flood Hazard Boundaries

- Other Boundaries

Line Type

- Limit Lines
- SFHA / Flood Zone Boundary

Flood Hazard Zones

Zone Type

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

1 inch = 1,000 feet

0 490 980 1,960 Feet

Project: 4766 **Date:** 11/2/20

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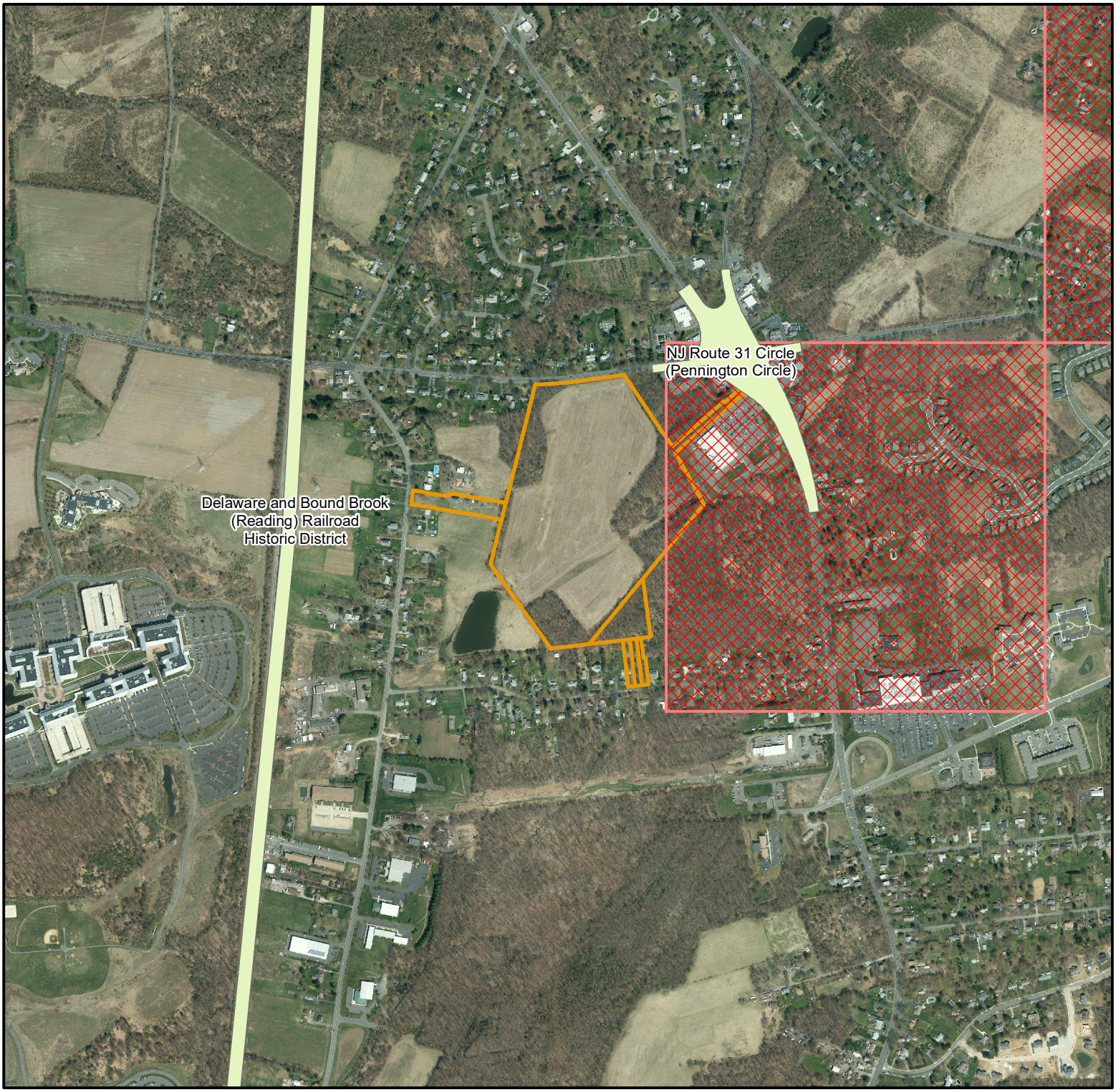
Figure 11 - Archeological & Historic Properties Map



LEGEND

- Historic Properties
- Archaeological Resource Presence Grid for New Jersey
- Subject Property

1 inch = 1,000 feet

0 490 980 1,960 Feet

Project:4766 Date: 11/2/20

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4.0 Assessment of Environmental Impact

4.1.1 Listing of unavoidable adverse impacts

The potential of unavoidable adverse impacts for several categories follows:

Air Pollution: Please refer to section 3.4 above for a discussion on any potential air impacts which are anticipated to be temporary.

Noise: Please refer to section 3.6 above for a discussion on any potential noise impacts which will be limited by adjacent commercial uses, adjacent roadways and natural vegetative buffers.

Sedimentation & Siltation: No impacts to the onsite stream are anticipated as there will be approximately 150 feet of vegetated buffer between the development and the stream. The development will also comply with all aspects of the Soil Erosion and Sediment Control and Stormwater Management permit approvals which should minimize the potential for sedimentation and siltation

Township Services: Please refer to section 3.1 and 3.2 above for a discussion on Sewer Facilities and Water Supply. The increased demand in township services is unavoidable for this inclusionary development but subject to approval by the applicable regulatory agencies.

Township Tax Structure:

It is anticipated that there will be an increase in the rateables paid to the township for the proposed development. The current tax benefit for each lot is as follows:

Property	**2020 Tax Paid**
Block 85, Lot 3	$0 (Township Owned)
Block 85, Lot 9	$8,535*
Block 86, Lot 32	$5,393
Block 86, Lot 33	$0 (associated with adjacent property)
Block 86, Lot 34	$5,850
Block 86, Lot 130	$0 (associated with adjacent property)
Total	$19,778

* Most of this property will remain as is. The changes to the tax structure in this instance are unknown.

Tax issues and related fiscal impacts and benefits will be addressed by others in a separate Fiscal Impact report.

4.1.2 Steps to minimize and mitigate environmental damage

There a few natural resources in the immediate vicinity of the subject property that will be impacted; therefore, no specific steps are required to minimize or mitigate the environmental damage to any natural resources.

However, steps will be taken to ensure that the construction phase limits the impact to the surrounding areas such as:

- Strict adherence to the pending permit approvals and associated conditions.

- Effective implementation of soil erosion and sediment control measures, including tree preservation, hay bales, silt fencing, and inlet filters, as well as, utilization of Stormwater Best Management Practices, should successfully minimize the site development's impact on existing natural resources.

- Strict adherence to the limits of disturbance parameters and stabilizing the construction entrance to reduce the amount of soil being brought off site.

- Every reasonable effort will be made to protect the existing vegetative buffers with the ultimate goal of providing for minimal disruption throughout the course of construction and after completion.

4.1.3 Alternatives

The proposed development is the preferred development but the no-build alternative was also assessed. The no-build alternative will result in the continued use of the subject property as a farm field until another development is proposed. The abundance of uplands and other site characteristics of the site make it a prime developable property. Additionally, the portion of the subject property along Diverty Road are in need of additional maintenance, which may not occur without the proposed development. The proposed development will result in a robust housing development fulfilling a portion of the Hopewell Township affordable housing need with minimal environmental impact and a substantial tax base increase for the township.

4.1.4 References to Regulation

The project has been reviewed and has been determined to be compliant with or require the following:

- *State*:
  - **NJDEP:**
    - The site is not located in a flood hazard area and no impacts to the riparian zone will occur. There no permits under the Flood Hazard Control Act Rules is required.
    - Permitting under the Freshwater Wetlands Protection Act will be required for proposed activities within regulated transition areas and non-tributary wetlands.
    - A Stormwater Management approval will be required and will be submitted concurrent with the Freshwater Wetlands permit application.
    - A Treatment Works Approval will be required.

- *Regional:*
  - ***Delaware Raritan Canal Commission (DRCC)****:*
    - A permit application to the DRCC will be submitted.
  - **Trenton Water Works**
    - An approval from the Trenton Water Works will be required for the proposed water infrastructure improvements.
  - **Ewing-Lawrence Sewage Authority**
    - An approval from the Ewing-Lawrence Sewerage Authority will be required for the sanitary sewer and force main infrastructure improvements.

- *County:*
  - **Mercer County Soil Conservation District**:

- As more than 5,000 square feet of soil will be disturbed, approval from the Mercer County Soil Conservation District will be required. Specifically, a Soil Erosion and Sediment Control approval and 5G3 General Permit for Construction Activities approval will be required.

- **Mercer County Planning Board:**
  - A Site Plan Application will be submitted to the county planning board.

- *Local:*
  - **Hopewell:**
    - The purpose of this EIS is to supplement information being submitted as part of the Hopewell Planning Board review process.

5.0 CONCLUSIONS

Based on the above inventory and analysis, it is Envirotactics' professional opinion that the proposed development will not result in any significant or adverse impact on the environment or cultural resources of the Hopewell Township. No negative impacts to any critical physical, social or historic environments will result from the proposed development. Additionally, the development will be completed in accordance with all permit requirements and approvals.

envirotactics
Your Environmental Resource

MICHAEL GREENE
Director of Land Use

EDUCATION:
Bachelor of Science, Environmental Science, Richard Stockton College of New Jersey, 2002

CERTIFICATIONS:
Certified Wetlands Specialist, Cook College, Rutgers University
40 Hour OSHA Health & Safety Training
8 Hour Annual OSHA Health & Safety Refresher Training

EXPERIENCE:
Land Use Manager, Senior Project Manager, Wetlands Specialist • Envirotactics, Inc. • Wall, New Jersey • February 2004 - Present
Mr. Greene is responsible for managing and directing of project managers and field personnel during all land use projects. These tasks include but are not limited to wetland investigations and delineations, Threatened and Endangered Species Assessments, GIS mapping and the preparation of CAFRA, Freshwater Wetlands, Flood Hazard Area and Pinelands permit application. Mr. Greene has prepared and submitted numerous land use applications throughout New Jersey. Additionally, Mr. Greene has provided expert witness testimony for land use applications to planning and zoning boards throughout New Jersey and to County Superior Courts and State Appellate Courts.

Mr. Greene is experienced in performing species and habitat analysis of sensitive areas throughout New Jersey and is fluent in performing GIS analysis on field collected GPS based survey information. His background includes extensive experience involving plant ecology and identification, wetland delineations, regulatory guidance, indoor air quality investigations and microbial sampling.

Microbial Consultant • Envirotactics, Inc. • Manasquan, New Jersey • March 2002 – 2007
Mr. Greene was also a Certified Microbial Consultant through the American Indoor Air Quality Council. Mr. Greene has completed numerous commercial and residential indoor air quality investigations dealing effectively with problematic toxic mold issues requiring remediation and final clearance sampling.

COURSES INSTRUCTED / GUEST LECTURER:
- Guest lecturer for a major insurance company on behalf of a mold remediation company, "Understanding Microbial Assessments and Water Intrusion Problems in Residential & Commercial Buildings", 2004.
- Guest lecturer, 2007 Coastal Development Institute, New Jersey Institute for Continuing Legal Education (ICLE), 2007.
- Guest lecturer for American Institute of Architects (Jersey Shore Chapter) that provided CEU's for Architects, "CAFRA Permitting & Regulations", 2008.
- Facilitator for Land Conservation Rally, "Wetlands: Impact on property acquisitions and development" roundtable, March 2011.
- Facilitator for Land Conservation Rally, "Wetlands" roundtable, March 2012.

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envirotactics
Your Environmental Resource

PATRICK C. LYMAN, CFM
Senior Project Manager

EDUCATION:

Master of Science, Homeland Security, Monmouth University, 2016
Bachelor of Arts, Environmental Studies, History, University of Colorado at Boulder, 2010
United States Coast Guard Marine Science Technician "A" School, 2014

CERTIFICATIONS:
Certified Floodplain Manager
Wetlands Delineation Series Certificate – Rutgers Office of Continuing Professional Ed.
40 Hour OSHA Health & Safety
8 hour Annual OSHA Health and Safety Refresher Training
Stream School – NJDEP & Stroud Water Research Center
Division/Group Supervisor/Marine Transportation System Unit Leader
ICS Course 100, 200, 300, 339, 700 and 800 Level Completions

EXPERIENCE:

Senior Project Manager Envirotactics, Inc. • Sea Girt, New Jersey
December 2010 - Present
Mr. Lyman is responsible for directing and managing various land use projects. These tasks include Freshwater Water Wetland investigations, delineations, and permit applications. Mr. Lyman also specializes in CAFRA, Waterfront Development, Flood Hazard Area, Tidelands, Pinelands and United States Army Corps of Engineer's permit applications as well as general regulatory guidance to current and prospective clients. Mr. Lyman has also completed Threatened and Endangered Species surveys and investigations for avian, reptile, and amphibian species within the Pinelands area and elsewhere. He is well-versed in GIS mapping and spatial analysis.

Marine Science Technician • United States Coast Guard Reserve. • Sector New York
July 2013 – Present
Petty Officer Lyman is assigned to the Incident Management Division (IMD) which is tasked with ensuring and maintaining the maritime safety and security of the central and northern New Jersey and New York waterways as a representative of the Captain of the Port. Primary responsibilities with the IMD office include preventing and responding to pollution incidents as well as investigating and identifying the Responsible Party.

Intern • Institute of Arctic and Alpine Research • Boulder, Colorado
June 2009 – August 2009
Mr. Lyman responsibilities included assisting with alpine water sampling, ecological data collection, and laboratory analysis as part of Dr. Diane McKnight's research with the University of Colorado's Mountain Research Station.

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H. MELISSA BUTERICK
Senior Project Manager

EDUCATION:
Bachelor of Arts, Earth Science, 2003, Boston University

CERTIFICATIONS:
40 Hour OSHA Health & Safety Training
8 Hour Annual OSHA Health & Safety Refresher Training
Flood Hazard Area Series Certification
NJDEP Subsurface Evaluator - NJDEP License #282753

EXPERIENCE:

Senior Project Manager • Envirotactics, Inc. • Sea Girt, New Jersey
August 2012 – Present
Ms. Buterick is responsible for managing numerous site remediation projects involving commercial, industrial and residential properties. Overall responsibility includes project management, proposal preparation, fieldwork oversight, soil/groundwater sampling and monitoring well installation oversight. Ms. Buterick has in-depth experience performing Phase I, Phase II Environmental Site Assessments (ESAs) and Preliminary Assessments (PAs) for commercial and industrial properties. Ms. Buterick is responsible for overall site assessment, investigation and remediation of contaminated sites including a broad experience with underground storage tank (UST) removals and Industrial Site Recovery Act (ISRA) projects. Additionally, Ms. Buterick is responsible for determining site specific soil, geologic and hydrogeologic characteristics at contaminated sites. Ms. Buterick is proficient with preparing PA Reports, Site Investigation Reports (SIRs) and Remedial Action Reports/Workplans (RARs/RAWs) in accordance with the NJDEP's Technical Requirements for Site Remediation N.J.A.C 7:26E and Administrative Requirements for the Remediation of Contaminated Sites N.J.AC. 7:26C. Additionally, Ms. Buterick utilizes geographic information system (GIS) mapping and assists in obtaining various land use permits for clients, for projects which may be regulated by Coastal Area Facility Review Act (CAFRA), Waterfront Development, Freshwater Wetlands, Coastal Wetlands and/or Flood Hazard Area regulations.

Project Manager • Groundwater & Environmental Services, Inc. • Neptune, New Jersey
December 2008 – August 2012
Ms. Buterick had in-depth experience performing site and remedial investigations/actions of retail gasoline properties. She managed a team of 3 personnel and a portfolio of up to 60 sites which included one of her client's most complex and publically sensitive at the time in New Jersey. During her time with GES, Ms. Buterick developed and conducted site assessments and investigations of contaminated sites associated with leaking USTs. She also dealt with site specific issues such as vapor intrusion, asbestos, contaminated groundwater in bedrock, and mitigation of sensitive receptors. She received a consultant of the year award for her efforts from GES' main client. Technical experience included soil and groundwater sampling and remediation, data compilation, and report preparation.

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Environmental Scientist • Brinkerhoff Environmental Services, Inc. • Manasquan, New Jersey
December 2004 – November 2008

Ms. Buterick had in-depth experience performing/preparing Phase I ESAs, PA Reports, SI and RA phase reports. She worked with a variety of properties including residential, commercial and industrial sites. Ms. Buterick assisted with site assessments and investigations of contaminated sites including a broad experience with UST removals and ISRA, indoor air quality assessments and vapor intrusion investigations. Technical experience included soil and groundwater sampling and remediation, data compilation and evaluation.

Scientist I • Sanofi-Aventis Pharmaceuticals • Bridgewater, New Jersey
June 2004 – December 2004

Ms. Buterick provided support to the environmental, health and safety division of Sanofi-Aventis. She was responsible for obtaining and maintaining the company's Material Safety Data Sheet library, managing incoming experimental isotopes, and assisting the industrial hygiene laboratory. She was also responsible for collecting ambient and personal air samples of laboratory personnel.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Parks & Forestry
State Forestry Service
Mail Code 501-04
Office of Natural Lands Management – Natural Heritage Program
P.O. Box 420
Trenton, NJ 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

January 10, 2018

Patrick Lyman
Envirotactics, Inc.
1330 Laurel Avenue, Building 3
Sea Girt, NJ 08750

Re: Lennar - Hopewell
Block(s) - 85, Lot(s) - 3
Hopewell Township, Mercer County

Dear Mr. Lyman:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the

watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,



Robert J. Cartica
Administrator

c: NHP File No. 18-4007437-13335

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Eastern Meadowlark	Sturnella magna	Breeding Sighting	2	NA	Special Concern	G5	S3B,S3N
	Grasshopper Sparrow	Ammodramus savannarum	Breeding Sighting	3	NA	State Threatened	G5	S2B,S3N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

October 24, 2018

Kelsey Kachelriess
Envirotactics, Inc.
1330 Laurel Avenue, Building 3
Sea Girt, NJ 08750

Re: 4766 Bowman Hopewell #2
Block(s) - 86, Lot(s) - 32, 33, 34 & 130
Hopewell Township, Mercer County

Dear Ms. Kachelriess:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by

the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,



Robert J. Cartica
Administrator

c: NHP File No. 18-4007437-15220

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	American Kestrel	Falco sparverius	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Eastern Meadowlark	Sturnella magna	Breeding Sighting	2	NA	Special Concern	G5	S3B,S3N
	Grasshopper Sparrow	Ammodramus savannarum	Breeding Sighting	3	NA	State Threatened	G5	S2B,S3N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N

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PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

CATHERINE R. McCABE
Commissioner

FEB 13 2019

Mitchell Newman
US Home Corporation dba Lennar
2465 Kuser Road
Hamilton, NJ 08690

RE: Freshwater Wetlands Letter of Interpretation: Line Verification – **Clarification**
File No. & Activity No.: 1106-03-0004.2 FWW180001
Applicant: US Home Corporation dba Lennar
Block and Lot: [85, 3]
Hopewell Township, Mercer County

Dear Mr. Newman:

This letter supersedes the Department's letter of January 9, 2019 and is to clarify the areas onsite that are considered isolated wetlands. The original designation that wetland points E1 through E5 and F1 through F5 were not isolated was done in error. Based on our site meeting held on December 12, 2018, the Department has determined that wetland points E1 through E5 and F1 through F5 are isolated wetlands and not part of a surface water tributary system. Wetland points D1 through D5 are also classified as isolated, as stated in the original letter.

All other determinations of the January 9, 2019 Letter of Interpretation – Line Verification (LOI) remain in effect. This letter does not extend the expiration of the LOI beyond the original five-year period. This letter shall be appended to the original letter referenced.

If you have any questions regarding this authorization, please contact Max Dolphin of our staff at (609) 633-6563. Please reference the file number in all communication.

Sincerely,

Stacey MacEwan

Stacey MacEwan, Environmental Specialist 3
Division of Land Use Regulation

c: Hopewell Township Municipal Construction Official
Hopewell Township Municipal Clerk
Agent

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

CATHERINE R. McCABE
Commissioner

JAN 09 2019

Mitchell Newman
US Home Corporation dba Lennar
2465 Kuser Road
Hamilton, NJ 08690

RE: Freshwater Wetlands Letter of Interpretation: Line Verification
File No. & Activity No.: 1106-03-0004.2 FWW180001
Applicant: US Home Corporation dba Lennar
Block and Lot: [85, 3]
Hopewell Township, Mercer County

Dear Mr. Newman:

This letter is in response to your request for a Letter of Interpretation to have Division of Land Use Regulation (Division) staff verify the boundary of the freshwater wetlands and/or State open waters on the referenced property.

In accordance with agreements between the State of New Jersey Department of Environmental Protection (NJDEP), the U.S. Army Corps of Engineers (USACOE) Philadelphia and New York Districts, and the U.S. Environmental Protection Agency (USEPA), the NJDEP is the lead agency for establishing the extent of State and Federally regulated wetlands and waters. The USEPA and/or USACOE retain the right to reevaluate and modify the jurisdictional determination at any time should the information prove to be incomplete or inaccurate.

Based upon the information submitted, and upon a site inspection conducted by Division staff on December 12, 2018, the Division has determined that the wetlands and waters boundary line(s) as shown on the plan map entitled: "**ATLA/NSPS LAND TITLE SURVEY BLOCK 85, LOT 3 AND BLOCK 36 LOTS 32, 33, 34 AND 130 TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY**", consisting of two sheets, dated February 10, 2018, last revised December 17, 2018, and prepared by Martin F. Tirella, P.L.S., of Bowman Consulting Group, Ltd., is accurate as shown.

The freshwater wetlands and waters boundary line(s), as determined in this letter, must be shown on any future site development plans. The line(s) should be labeled with the above file number and the following note:

"Freshwater Wetlands/Waters Boundary Line as verified by NJDEP"

Wetlands Resource Value Classification ("RVC")

In addition, the Division has determined that the resource value and the standard transition area or buffer required adjacent to the delineated wetlands are as follows:

Intermediate: All freshwater wetlands shown. [50 foot wetland buffer]

The Division has determined that the following wetland areas have been considered to be isolated wetlands and not part of a surface water tributary system: D1 through D5. RVC may affect requirements for wetland and/or transition area permitting. This classification may affect the requirements for an Individual Wetlands Permit (see N.J.A.C. 7:7A-9 and 10), the types of Statewide General Permits available for the property (see N.J.A.C. 7:7A-5 and 7) and any modification available through a transition area waiver (see N.J.A.C. 7:7A-8). Please refer to the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.) and implementing rules for additional information.

Wetlands resource value classification is based on the best information available to the Division. The classification is subject to reevaluation at any time if additional or updated information is made available, including, but not limited to, information supplied by the applicant.

General Information

Pursuant to the Freshwater Wetlands Protection Act Rules, you are entitled to rely upon this jurisdictional determination for a period of five years from the date of this letter unless it is determined that the letter is based on inaccurate or incomplete information. Should additional information be disclosed or discovered, the Division reserves the right to void the original letter of interpretation and issue a revised letter of interpretation.

Regulated activities proposed within a wetland, wetland transition area or water area, as defined by N.J.A.C. 7:7A-2.2 and 2.3 of the Freshwater Wetlands Protection Act Rules, require a permit from this office unless specifically exempted at N.J.A.C. 7:7A-2.4. The approved plan and supporting jurisdictional limit information are now part of the Division's public records.

Please be advised that any surface water features on the site or adjacent to the site may possess flood hazard areas and/or riparian zones and development within these areas may be subject to the Flood Hazard Area Control Act Rules at N.J.A.C. 7:13. The Division can verify the extent of flood hazard areas and/or riparian zones through a flood hazard area verification under the application procedures set forth at N.J.A.C. 7:13-5.1.

This letter in no way legalizes any fill which may have been placed, or other regulated activities which may have occurred on-site. This determination of jurisdiction extent or presence does not make a finding that wetlands or water areas are "isolated" or part of a surface water tributary system unless specifically called out in this letter as such. Furthermore, obtaining this determination does not affect your responsibility to obtain any local, State, or Federal permits which may be required.

Recording

Within 90 calendar days of the date of this letter, the applicant shall submit the following information to the clerk of each county in which the site is located, and shall send proof to the Division that this information is recorded on the deed of each lot referenced in the letter of interpretation:

1. The Department file number for the letter of interpretation;

2. The approval and expiration date of the letter of interpretation;

3. A metes and bounds description of the wetland boundary approved under the letter of interpretation;

4. The width and location of any transition area approved under the letter of interpretation; and

5. The following statement: "The State of New Jersey has determined that all or a portion of this lot lies in a freshwater wetland and/or transition area. Certain activities in wetlands and transition areas are regulated by the New Jersey Department of Environmental Protection and some activities may be prohibited on this site or may first require a freshwater wetland permit. Contact the Division of Land Use Regulation at (609) 292-0060 or http://www.nj.gov/dep/landuse for more information prior to any construction onsite."

Failure to have this information recorded in the deed of each lot and/or to submit proof of recording to the Division constitutes a violation of the Freshwater Wetlands Protection Act Rules and may result in suspension or termination of the letter of interpretation and/or subject the applicant to enforcement action pursuant to N.J.A.C. 7:7A-22.

Appeal Process

In accordance with N.J.A.C. 7:7A-21, any person who is aggrieved by this decision may request a hearing within 30 days of the date the decision is published in the DEP Bulletin by writing to: New Jersey Department of Environmental Protection, Office of Legal Affairs, Attention: Adjudicatory Hearing Requests, Mail Code 401-04L, P.O. Box 402, 401 East State Street, 7th Floor, Trenton, NJ 08625-0402. This request must include a completed copy of the Administrative Hearing Request Checklist found at www.state.nj.us/dep/landuse/forms. Hearing requests received after 30 days of publication notice may be denied. The DEP Bulletin is available on the Department's website at www.state.nj.us/dep/bulletin. In addition to your hearing request, you may file a request with the Office of Dispute Resolution to engage in alternative dispute resolution. Please see the website www.nj.gov/dep/odr for more information on this process.

Please contact Max Dolphin of our staff by e-mail at maxwell.dolphin@dep.nj.gov or by phone at (609) 633-6563 should you have any questions regarding this letter. Be sure to indicate the Department's file number in all communication.

Sincerely,

Stacey MacEwan

Stacey MacEwan, Environmental Specialist 3
Division of Land Use Regulation

c: Hopewell Township Municipal Clerk
Hopewell Township Municipal Construction Official
Agent (original)

State of New Jersey

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

CATHERINE R. McCABE
Commissioner

SEP 13 2019

Mitchell Newman
US Home Corporation DBA Lennar
2465 Kuser Road
Hamilton, NJ 08690

RE: Letter of Interpretation: Presence/Absence Determination
File No. & Activity No.: 1106-03-0004.3, FWW 190001
Applicant: US Home Corp
Block: 86; Lots: 130, 32, 33 & 34
Hopewell Township, Mercer County
Watershed: Alexauken Creek / Moore Creek / Jacobs Creek
Sub-watershed: Jacobs Creek (below/incl Woolsey Brook)

Dear Mr. Newman:

This letter is in response to your request for a Letter of Interpretation from the Division of Land Use Regulation indicating the presence or absence of freshwater wetlands and waters on the referenced property.

In accordance with agreements between the State of New Jersey Department of Environmental Protection, the U.S. Army Corps of Engineers Philadelphia and New York Districts, and the U.S. Environmental Protection Agency, the NJDEP, Division of Land Use Regulation is the lead agency for establishing the extent of State and Federally regulated wetlands and waters. The USEPA and/or USACE retains the right to reevaluate and modify the jurisdictional determination at any time should the information prove to be incomplete or inaccurate.

Based upon the information submitted, and upon a site inspection conducted by the staff of the Department on August 14, 2019, the Division of Land Use Regulation has determined that **freshwater wetlands and waters are not present** on the referenced property. In addition, the Department has determined **that no part of the above referenced property occurs within a transition area or buffer** as designated in N.J.A.C. 7:7A-3.3(d)1 and 2.

Pursuant to the Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A), you are entitled to rely upon this jurisdictional determination for a period of five years from the date of this letter. This letter in no way legalizes any fill which may have been placed, or other regulated activities which may have been conducted on this site. This determination does not affect your responsibility to obtain any State, Federal, county or municipal permits which may be required.

In accordance with N.J.A.C. 7:7A-21, any person who is aggrieved by this decision may request a hearing within 30 days of the date the decision is published in the DEP Bulletin by writing to: New Jersey

Department of Environmental Protection, Office of Legal Affairs, Attention: Adjudicatory Hearing Requests, Mail Code 401-04L, P.O. Box 402, 401 East State Street, 7th Floor, Trenton, NJ 08625-0402. This request must include a completed copy of the Administrative Hearing Request Checklist found at www.state.nj.us/dep/landuse/forms. Hearing requests received after 30 days of publication notice may be denied. The DEP Bulletin is available on the Department's website at www.state.nj.us/dep/bulletin. In addition to your hearing request, you may file a request with the Office of Dispute Resolution to engage in alternative dispute resolution. Please see the website www.nj.gov/dep/odr for more information on this process.

Please contact Max Dolphin of our staff by e-mail at maxwell.dolphin@dep.nj.gov or (609) 633-6563 should you have any questions regarding this letter. Be sure to indicate the Department's file number in all communication.

Sincerely,

Christopher Squazzo, Environmental Specialist III
Division of Land Use Regulation

c: Hopewell Township, Municipal Clerk
Hopewell Township, Construction Official
Agent – Kelsey Kachelriess

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By

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420

PHILIP D. MURPHY
Governor

SHELIA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

FLOOD HAZARD AREA
APPLICABILITY DETERMINATION
Flood Hazard Area Control Act Rules, N.J.A.C. 7:13 et. Seq

November 15, 2019

Mr. Kelsey Kachelriess
Envirotactics, Inc.
1330 Laurel Avenue
Sea Girt, New Jersey 08750

RE: File No. 1106-03-0004.3 APD 190001
Applicant: US home Corporation

Dear Mr. Kachelriess,

This is in response to your letter, received on May 22, 2019, concerning a property located off Diverty Road, within Lot Nos. 32-34 and 130 of Bloc No. 86, in Hopewell Township, Mercer County.

DECISION
A review of a drawing prepared by Bowman Consulting Group, Ltd, dated February 10, 2018, last revised January 28, 2019, entitled:

"ALTA/NSPS LAND TITLE SURVEY BLOCK 85, LOT 3 AND BLOCK 36 LOTS 32, 33, 34 AND 130 TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY", Sheet No. 1 of 2

indicates a Flood Hazard Area Permit is not required.

REASON FOR DECISION

A stream is not located on the property in question.

This letter does not relieve the applicant the responsibility of obtaining any other required State, Freshwater Wetlands, Federal or local permits and approvals. Pursuant to NJAC 7:13-2.5 (g), this applicability determination is based on the rules in effect and the information provided in the application regarding the site conditions and the proposed activities as of the date of issuance.

If you have any questions, I can be reached at dennis.contois@dep.nj.gov or (609) 633-6563.

Very truly yours,

Dennis Contois

Dennis Contois
Engineering Supervisor
Bureau of Inland Regulation

Cc: Hopewell Township Construction Official
Hopewell Township Engineer

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By

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey, 08625
www.state.nj.us/dep/landuse

PHILIP D. MURPHY
Governor

SHELIA Y. OLIVER
Lt. Governor

CATHERINE R.McCABE
Commissioner

FLOOD HAZARD AREA APPLICABILITY DETERMINATION

Flood Hazard Area Control Act Rules, N.J.A.C. 7:13-5.1

June 29, 2020

Mr. Patrick Lyman
Envirotactics, Inc.
1330 Laurel Avenue, Building #3
Sea Girt, New Jersey 08750

Re: Flood Hazard Area Applicability Determination
File No.: 1106-03-0004.2 APD 200001

Applicant: US Home Corporation

Dear Mr. Lyman,

This is in response to your letter received on March 18, 2020, concerning a proposed residential subdivision along an unnamed tributary to the Stony Brook, within Lot No. 3 of Block No. 85, in Hopewell Township, Mercer County.

DECISION

A review of a drawing prepared by Bowman Consulting, May 15, 2020, unrevised, unrevised, entitled:

"CONCEPTUAL PLAN FOR LENNAR-ZAITZ PARCEL HOPEWELL TOWNSHIP 202-01-15 BLOCK 85, LOT 3 AND BLOCK 86 LOTS 32-34 & 130 TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY"

"CONCEPTUAL SITE PLAN", Sheet No. 1 of 1

indicates a Flood Hazard Area Permit is not required.

REASON FOR DECISION

The stream in question has a drainage area of less than 50 acres. If no activity including a stormwater out fall structure outfall structure is proposed outside of the stream's 50 foot riparian zone then a Flood Hazard Area Permit is not required.

This letter does not relieve the applicant of the responsibility to obtain any Federal, State or local approvals that may be required, such as local building permits or freshwater wetlands approvals. This determination is based on a review of the information submitted by the applicant, and in accordance with the existing Flood Hazard Area Control Act rules. Therefore, this determination will become void if the project changes size, scope, location or impact, or if the Department determines that the submitted information is incomplete or inaccurate.

Pursuant to N.J.A.C. 7:13-5.1(f) and (g), this determination is valid for five years from the date of this letter, unless the Department amends N.J.A.C. 7:13 such that the proposed activity becomes regulated, or else the Department amends the flood hazard area or riparian zone onsite such that the proposed activity lies within one of these regulated areas. In such a case, this determination shall become void and the applicant shall obtain a new permit from the Department pursuant to N.J.A.C. 7:13-2.1 prior to commencing the regulated activities onsite.

Should you have any questions regarding this determination, please contact me at Dennis.Contois@dep.state.nj.us or by telephone at (609) 633-6563.

Sincerely,

Dennis Contois
Supervisor, Northern Engineering Section

c: Hopewell Township Construction Official
Hopewell Township Engineer

TRAFFIC ENGINEERING EVALUATION

TRAFFIC ENGINEERING EVALUATION

THE COLLECTION AT HOPEWELL
TOWNSHIP OF HOPEWELL
MERCER COUNTY, NEW JERSEY

PREPARED FOR:

U. S. HOME AT HOPEWELL URBAN RENEWAL, LLC
d/b/a LENNAR
2465 Kuser Road, 3rd Floor
Hamilton, New Jersey 08690

November 9, 2020
BCG File No. 080661-01-002

BOWMAN CONSULTING GROUP, LTD.
54 Horsehill Road
Cedar Knolls, New Jersey 07927
Phone: 973-359-8400

TRAFFIC ENGINEERING EVALUATION
THE COLLECTION AT HOPEWELL
TOWNSHIP OF HOPEWELL
MERCER COUNTY, NEW JERSEY

November 9, 2020

PREPARED FOR:

U. S. HOME AT HOPEWELL URBAN RENEWAL, LLC
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PREPARED BY:

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54 Horsehill Road, Suite 100
Cedar Knolls, New Jersey 07927



Eric L. Keller, P.E., P.P., LEED AP
Professional Engineer License No. 32054

TRAFFIC ENGINEERING EVALUATION
THE COLLECTION AT HOPEWELL
TOWNSHIP OF HOPEWELL
MERCER COUNTY, NEW JERSEY

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TRAFFIC ENGINEERING EVALUATION
THE COLLECTION AT HOPEWELL
TOWNSHIP OF HOPEWELL
MERCER COUNTY, NEW JERSEY

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V. Other Specific Project Trip Assignments

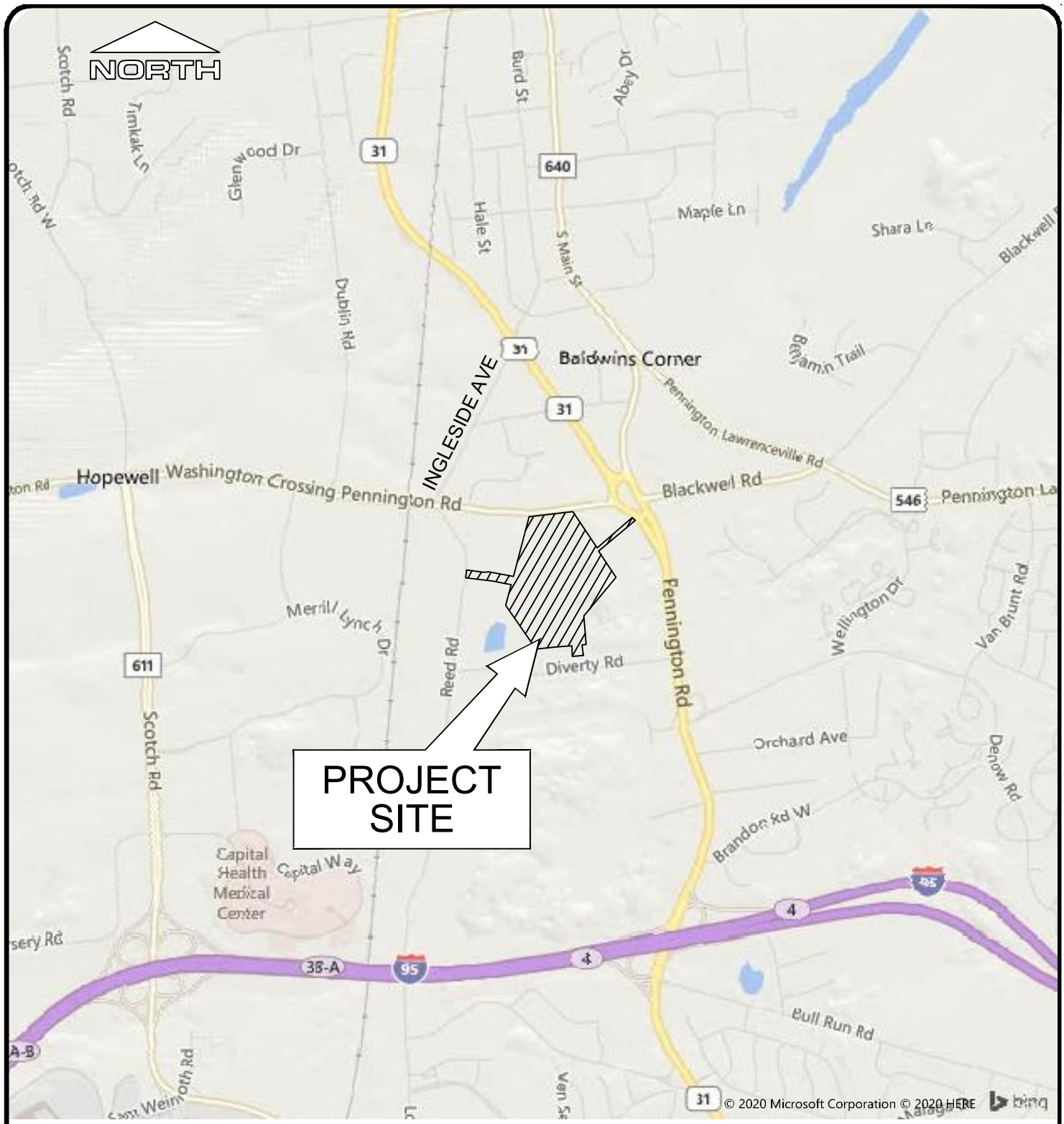
INTRODUCTION

This Traffic Engineering Evaluation was prepared to assess any traffic impacts that may occur from the proposed development of the subject site located on the south side of Washington Crossing-Pennington Road, east of Reed Road and north of Diverty Road, in the Township of Hopewell, Mercer County. The project is an inclusionary community which will fulfil a portion of the Hopewell Township affordable housing obligation, and is proposed to contain a total of 379 multi-family residential units in 29 buildings with a total of 943 parking spaces of which 266 spaces are provided in individual garages, 205 spaces in individual driveways, 103 parallel parking spaces along Road 1, Road A and Road B and the remaining 369 spaces provided in surface parking lots distributed throughout the site. The location of the site is illustrated in Figure 1.

The subject property is known on the Township of Hopewell tax maps as Block 85, Lots 3 and 9; and Block 86, Lots 32 to 34 and 130. The subject property contains 49.39 acres with approximately 650 feet of frontage along the south side of Washington Crossing-Pennington Road (County Route 546); approximately 196 feet along Reed Road; approximately 149 feet along Diverty Road; and approximately 42 feet along State Route 31. The site is predominantly vacant with portions used for agricultural purposes; there are single family dwellings on Lots 33 and 34 (in Block 86) with two structures located off of Reed Road. Access to the agricultural used portion of the site is currently provided from Reed Road, with the two existing homes being provided access from Diverty Road. Access to the proposed development project will be provided from Washington Crossing-Pennington Road and from Reed Road, with an emergency access drive extending to Diverty Road. No direct access is proposed to State Route 31 as that portion of the site is constrained with wetlands and transition areas.

Primary aspects of this study include the investigation of existing conditions adjacent to the site, the establishment of background traffic volumes for the surrounding streets, estimation of the development related trip generation utilizing known published sources, assignment of the development related volumes to the key intersections serving the proposed development site, and the assessment of intersection performance using established traffic engineering methodologies. The base year for anticipated build-out of the redevelopment is 2023.

The ensuing report will detail the existing and proposed conditions, summarize the traffic operations at key locations, and include our findings as to the effects of the proposed development on the existing street network.



SCALE: 1"=2,000'

0 2,000 4,000

CENTER OF PROJECT SITE:
x: 411,205 (E)
y: 536,144 (N)
N.J. STATE PLANE
COORDINATE SYSTEM

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DATE: 11/10/2020 SCALE: 1"=2000' CHKD.:

PROJ.: 080661-01-002

FIGURE 1

LOCATION MAP

THE COLLECTION AT HOPEWELL

TOWNSHIP OF HOPEWELL, MERCER COUNTY, N.J.

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EXISTING CONDITIONS

The site is predominantly vacant with portions used for agricultural purposes; there are single family dwellings on Lots 33 and 34 (in Block 86) with two structures located off of Reed Road. Access to the agricultural used portion of the site is currently provided from Reed Road, with the two existing homes being provided access from Diverty Road. Adjacent land uses include single family homes to the north, west and south; there is a ShopRite, bank and other retail uses to the east around the Pennington Circle, with another shopping center located to the south at the intersection of Route 31 with Denow Road. Further to the west along Scotch Road is the Merrill Lynch complex and the Capital Health Medical Center.

Our assessment of traffic conditions in this area included a study of the signalized intersection of Washington Crossing-Pennington Road (CR 546) with Scotch Road (CR 611); the unsignalized intersections of Washington Crossing-Pennington Road with Ingleside Avenue (CR 631) and Reed Road and Washington Crossing-Pennington Road with Route 31 SB. Field observations were made of the existing traffic control devices at the studied intersections. The signal timing for the Washington Crossing-Pennington Road with Scotch Road intersection was obtained and is contained in Appendix IV.

The following subsections include a brief description of key routes in the adjacent roadway system:

Study Roadways

State Route 31

State Route 31 serves as an urban principal arterial extending in a north-south direction in the vicinity of the Pennington Circle and the subject site. It begins to the south at U.S. Route 206 in Trenton and terminates at U.S. Route 46 to the north in White Township (Warren County). Route 31 intersects with Washington Crossing-Pennington Road (CR 546), Blackwell Road (CR 546) and Pennington Road (CR 640) at the Pennington Circle.

State Route 31 provides one travel lane in each direction north of the Pennington Circle and two travel lanes in each direction south of the Pennington Circle. There are generally two travel lanes within the Circle itself except for the connecting ramp between the southbound and northbound lanes at the south end of the Circle.

Washington Crossing-Pennington Road (CR 546)

Washington Crossing-Pennington Road (CR 546) serves as an urban minor arterial extending in an east-west direction. It begins to the west at State Route 29 and extends to the Pennington Circle. County Route 546 extends east of the Pennington Circle as Blackwell Road, Lawrenceville-Pennington Road and Franklin Corner Road before terminating to the east at U.S. Route 1 in Lawrence Township.

In the vicinity of the project's frontage, Washington Crossing-Pennington Road provides one travel lane in each direction with approximately nine foot (9') wide paved shoulders. The posted speed limit in this segment is 40 MPH, but west of Ingleside Avenue the posted speed limit increases to 45 MPH. There are no posted parking restrictions along either side of the street in the vicinity of the site frontage. There are no sidewalks in proximity to the subject site.

Scotch Road (CR 611)

Scotch Road serves as an urban minor arterial under County jurisdiction south of Washington Crossing-Pennington Road; while to the north it is a local, municipal street. Scotch Road begins to the south at Parkway Avenue in Ewing Township and extends in a northerly direction across Washington Crossing-Pennington Road and continuing to Pennington-Harbourton Road (CR 623). The Hopewell Township municipal complex is located in the northwest quadrant of the intersection of Washington Crossing-Pennington Road with Scotch Road.

South of Washington Crossing-Pennington Road, Scotch Road is a four-lane divided roadway with a variable width median. To the north of Washington Crossing-Pennington Road, Scotch Road provides one travel lane in each direction with narrow paved shoulders. The posted speed limit south of Washington Crossing-Pennington Road is 45 MPH and to the north of the intersection it is 40 MPH. There are no sidewalks in the vicinity of this intersection. There are "No Stopping or Standing" signs posted along Scotch Road south of Washington Crossing-Pennington Road, but there are no posted parking restrictions north of the intersection.

Ingleside Avenue (CR 631)

Ingleside Avenue (CR 631) serves as an urban major collector extending in a generally north-south direction. Ingleside Avenue extends from Washington Crossing-Pennington Road across Route 31, terminating at South Main Street (CR 640) in Pennington Borough to the north. The posted speed limit is 25 MPH.

In the vicinity of Washington Crossing-Pennington Road, the cartway provides one travel lane in each direction with no demarcated shoulders. There are no sidewalks nor are there any posted parking restrictions along this portion of the roadway.

Reed Road

Reed Road serves as an urban major collector street extending in a north-south direction. Reed Road begins to the north at Washington Crossing-Pennington Road and extends south where it becomes Lower Ferry Road in Ewing Township. Lower Ferry Road (CR 643) continues in a southerly direction before terminating at State Route 31. The posted speed limit in the vicinity of the site frontage is 25 MPH.

Reed Road provides one travel lane in each direction with a bike lane along each side of the road. There are posted no parking signs along this segment of Reed Road. There are no sidewalks along its length.

Studied Intersections

Washington Crossing-Pennington Road (CR 546) with Scotch Road (CR 611)

The intersection of Washington Crossing-Pennington Road with Scotch Road is controlled by a four-phase, semi-actuated traffic signal operating on a 90-second cycle length. Eastbound Washington Crossing-Pennington Road is provided with an exclusive left turn lane, an exclusive through lane and an exclusive right turn lane; while the westbound approach is provided with an exclusive left turn lane and a shared through/right turn lane. The northbound Scotch Road approach is provided with an exclusive left turn lane, an exclusive through lane and an exclusive right turn lane; while the southbound approach is provided with an exclusive left turn lane, an exclusive through lane and a shared through/right turn lane. The northbound approach of Scotch Road is provided with a lead green indication as is the westbound Washington Crossing-Pennington Road approach.

Washington Crossing-Pennington Road (CR 546) with Ingleside Avenue (CR 631) and Reed Road

The intersection of Washington Crossing-Pennington Road with Ingleside Avenue and Reed Road operates under Stop-controlled conditions on the side streets. This intersection has a slight offset of approximately 50 feet, with the centerline of Ingleside Avenue west of the Reed Road centerline. All approaches are provided with a single shared left/through/right lane except for the northbound Reed Road approach which is provided with a channelized right turn lane.

State Route 31 Southbound with Washington Crossing-Pennington Road (CR 546)

The intersection of Washington Crossing-Pennington Road at Route 31 operates under Yield controlled conditions. The Washington Crossing-Pennington Road approach provides one travel lane which merges into two southbound travel lanes on Route 31 southbound. There is a channelized right turn lane from southbound Route 31 onto westbound Washington Crossing-Pennington Road.

Traffic Volumes

Manual intersection traffic turning movement counts were performed at the following intersections on Wednesday, November 4, 2020:

1. Route 31 Southbound at north end of Pennington Circle (includes northbound Route 31)
2. Route 31 Northbound with Pennington Road (northeast quadrant of Circle)
3. Washington Crossing-Pennington Road with Ingleside Avenue/Reed Road

These counts were performed during the morning peak period from 7:00 AM to 9:00 AM and during the evening peak period from 4:00 PM to 6:30 PM. For the intersection of Washington Crossing-Pennington Road with Scotch Road, we are utilizing the count data collected by Langan Engineering for the CF Hopewell (aka Horseshoe or Hopewell

Parc) project. This count was conducted on Thursday, August 1, 2019 during the morning peak period from 6:00 AM to 10:00 AM and during the evening peak period from 2:00 PM to 6:00 PM.

Based on the manual traffic turning movement counts, the AM weekday peak hour varied by location from 7:15 to 8:15 AM to 7:45 to 8:45 AM; while the PM weekday peak hour generally occurred from 4:30 to 5:30 PM. The use of the individual peak hour data by location, regardless of the specific times, provides a more conservative analysis as we are analyzing the highest observed volumes during both peak periods.

Due to possible current, ongoing atypical traffic conditions on area roadways, we have reviewed other available traffic counts from prior studies in the area and available from the NJDOT to adjust the observed data collected during our count program. Based upon this review, we have adjusted our observed peak hour traffic count data by as much as 85% to adjust to typical baseline conditions. The adjustments were greater along the local and County roadways than along the State highway, likely reflecting the more localized impacts on traffic flows. As the Langan data was collected pre-pandemic (2019), we have used their data without adjustment.

It is our professional opinion that this is a very conservative approach to establishing baseline counts. It is clear from our recent traffic counts that traffic volumes on area roadways remain significantly lower than pre-pandemic traffic volumes. We believe that traffic volumes will remain at depressed levels as compared to pre-pandemic conditions for a period of years and possibly there will be long-term changes in traffic patterns with increased tele-commuting/work-from-home activities. As these impacts are speculative and very difficult to quantify, our decision in preparing this traffic study assumed that traffic would be as it was in 2019.

Existing traffic volumes, adjusted as described above, at the studied locations for the weekday AM peak hour and PM peak hour are illustrated in Figure 2. These existing traffic volume data were used as the basis for this traffic engineering evaluation. Appendix III contains the AM and PM peak period traffic turning movement counts as well as Figure 2A which illustrates the unadjusted traffic volume data and the other traffic data utilized for volume adjustments.

Capacity Analyses

The existing AM and PM peak hour intersection traffic volumes were analyzed to evaluate the quality of operation at the studied intersections. The methodology presented in 2010 Highway Capacity Manual, Chapter 18 entitled “Signalized Intersections” and Chapter 19 entitled “Unsignalized Intersections”. Intersection capacity calculations were completed using the Highway Capacity Software, version 7.7. Definitions of Levels of Service for stop- and signal-controlled intersections are provided in Appendix I.

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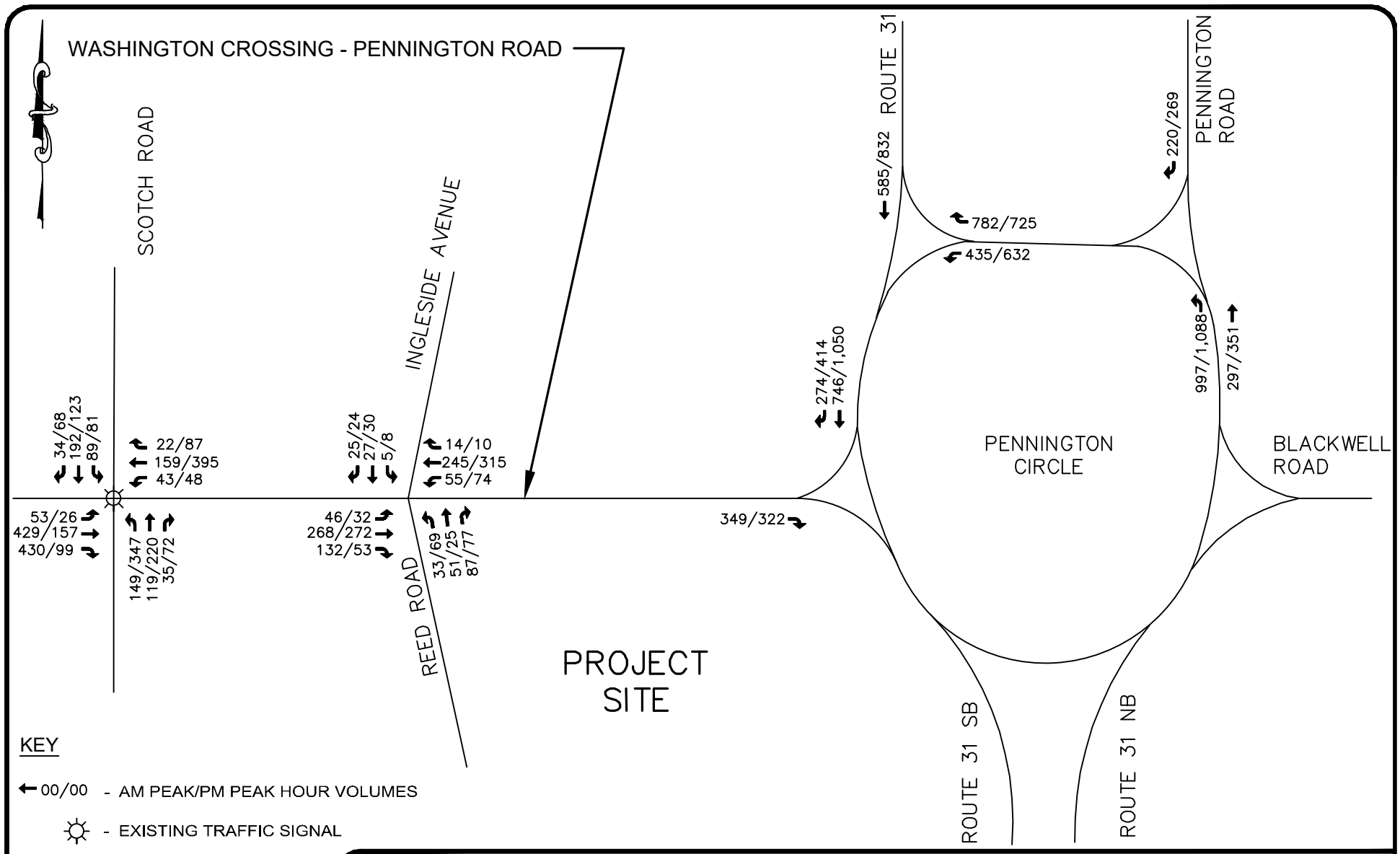

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No. 24GA28222600

DATE: 11/10/2020
CHKD.:
PROJ.: 080661-01-002

FIGURE 2
THE COLLECTION AT HOPEWELL
2020 EXISTING (ADJUSTED) TRAFFIC VOLUMES
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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The methodology addresses two measurements of an intersection's effectiveness in accommodating conflicting traffic movements; capacity and level of service (LOS). Capacity is defined for each approach as a maximum number of vehicles that may pass through the intersection given the prevailing roadway and traffic control conditions. The capacity is evaluated in terms of the ratio of actual traffic flow to capacity (v/c ratio). The second measure of effectiveness is average stopped delay per vehicle (seconds/vehicle), which determines the Level of Service.

Table 1 presents the levels of service for the AM and PM peak hours at the studied intersections and ramp junctions (at the Pennington Circle). As shown in Table 1, under 2020 Existing Conditions, all movements at the studied unsignalized intersection operate at acceptable LOS D or better during both peak hours, except for the northbound left turn and through lane movement on Reed Road which operate at LOS E during the PM peak hour. The studied signalized intersection operates at LOS D or better on all approaches during both peak hours, except for the eastbound Washington Crossing-Pennington Road left turn movement which operates at LOS E during the PM peak hour. This movement does not have a lead left green indication but has a low traffic utilization (26 PM peak hour trips). The various ramp movements at the Pennington Circle (merge and diverge junctions) operate at LOS C or better during both peak hours.

TABLE 1 - LEVEL OF SERVICE / AVERAGE VEHICLE DELAY COMPARISON - EXISTING & NO BUILD CONDITIONS
THE COLLECTION AT HOPEWELL, TOWNSHIP OF HOPEWELL, MERCER COUNTY

BCG 080661-01-002 11/9/2020

Intersection	2020 Existing Condition							2023 No Build Condition						
		AM PEAK			PM PEAK				AM PEAK			PM PEAK		
	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service
Washington Crossing-Pennington Rd. (CR 546) & Ingleside Ave. (CR 631)/Reed Rd. (Unsignalized)	EB-L	0.04	7.9	A	0.03	8.0	A	EB-L	0.05	8.1	A	0.04	8.3	A
	WB-L	0.06	8.4	A	0.07	8.2	A	WB-L	0.06	8.7	A	0.07	8.3	A
	NB-LT	0.41	31.4	D	0.48	36.8	E	NB-LT	0.57	51.4	F	0.68	67.0	F
	NB-R	0.14	11.2	B	0.11	10.6	B	NB-R	0.17	12.3	B	0.13	11.1	B
	SB-LTR	0.21	19.6	C	0.22	20.0	C	SB-LTR	0.28	25.2	D	0.30	24.8	C
Washington Crossing-Pennington Rd. (CR 546) & Scotch Rd. (Signalized)	EB-L	0.11	20.7	C	0.34	56.1	E	EB-L	0.12	20.8	C	0.35	56.7	E
	EB-T	0.68	31.0	C	0.25	22.1	C	EB-T	0.72	32.5	C	0.27	22.3	C
	EB-R	0.74	34.6	C	0.12	20.6	C	EB-R	0.76	35.4	D	0.13	20.7	C
	WB-L	0.13	17.3	B	0.09	15.0	B	WB-L	0.21	18.6	B	0.22	16.3	B
	WB-TR	0.23	15.6	B	0.60	21.6	C	WB-TR	0.25	15.8	B	0.64	22.5	C
	NB-L	0.28	20.7	C	0.64	27.5	C	NB-L	0.29	20.9	C	0.68	29.2	C
	NB-T	0.17	18.5	B	0.31	20.2	C	NB-T	0.24	19.4	B	0.36	20.9	C
	NB-R	0.04	17.2	B	0.10	17.8	B	NB-R	0.14	18.2	B	0.15	18.4	B
	SB-L	0.35	39.0	D	0.34	39.2	D	SB-L	0.38	40.0	D	0.37	40.0	D
	SB-TR	0.44	40.6	D	0.40	39.8	D	SB-TR	0.48	41.7	D	0.49	42.4	D
	OVERALL		29.2	C		25.7	C	OVERALL		29.4	C		26.5	C
Route 31 SB & Washington Crossing-Pennington Road (Merge/Diverge)	EB Ramp (Merge) (1)	0.35/ 0.23	---	B	0.39/ 0.19	---	B	EB Ramp (Merge) (1)	0.40/ 0.29	---	B	0.42/ 0.23	---	B
	WB Ramp (Diverge) (1)	0.21/ 0.15	---	B	0.28/ 0.24	---	B	WB Ramp (Diverge) (1)	0.23/ 0.19	---	B	0.30/ 0.24	---	B
Route 31 SB & Circle WB (Merge) Ramp	WB Ramp (Merge) (1)	0.50/ 0.13	---	B	0.64/ 0.18	---	C	WB Ramp (Merge) (1)	0.55/ 0.15	---	C	0.70/ 0.20	---	C

(1) For merge and diverge conditions, the first V/C ratio is for the highway and the second is for the ramp

PROPOSED CONDITIONS

The proposed development program will contain a total of 379 multi-family residential units in 29 buildings. There are a mix of building types with 61 units in traditional three-story townhouses, 144 units in three-story stacked townhouses; 78 affordable units in three-story apartment buildings and 96 units (market) in three-story apartment buildings. The project is proposed to contain a total of 943 parking spaces of which 266 spaces are provided in individual garages, 205 spaces in individual driveways, 103 parallel parking spaces along Road 1, Road A and Road B and the remaining 369 spaces provided in surface parking lots distributed throughout the site. This exceeds the parking requirement of 828 spaces as set forth in the Residential Site Improvement Standards (RSIS) based upon the mix of bedrooms.

The Year 2023 has been selected as the future analysis year for full occupancy of the proposed development. We have analyzed conditions for the Year 2023 without the project (No-Build) and with the project (Build).

Year 2023 No-Build Conditions

The proposed development is planned for construction and full occupancy in 2023. This year will be used as a basis for estimating background traffic growth on the surrounding street system. The annual growth rate published by the NJDOT in the April 2019 – April 2021 NJDOT Access Permit Table on Annual Background Growth Rates for all categories of roadway within the study area in Mercer County is one percent (1%).

We contacted the Township Engineer to determine what other projects within the study area of this project have been (or will be) approved but not constructed within the future horizon year. Based upon this correspondence we were informed that in addition to the CF Hopewell project on Scotch Road, there is an approval for the redevelopment of the existing liquor store in the northwest quadrant of the Pennington Circle.

We have obtained the traffic studies for each of these projects and have incorporated the trip generation for each project into our 2023 No Build traffic volumes. Copies of the trip assignment diagrams for these projects are contained in Appendix V. We note that the liquor store redevelopment project did not include the morning peak hour trip assignment, so this was developed based upon the distribution presented for the evening peak hour.

The general background growth rates as published by the NJDOT and the additional site specific traffic volumes were added to the existing 2020 traffic volumes from the traffic count program. These volumes yield the 2023 No Build traffic volumes, which are presented in Figure 3 for the AM and PM peak hours. These traffic volumes were used to evaluate future operations without the addition of the proposed development at the studied intersections.

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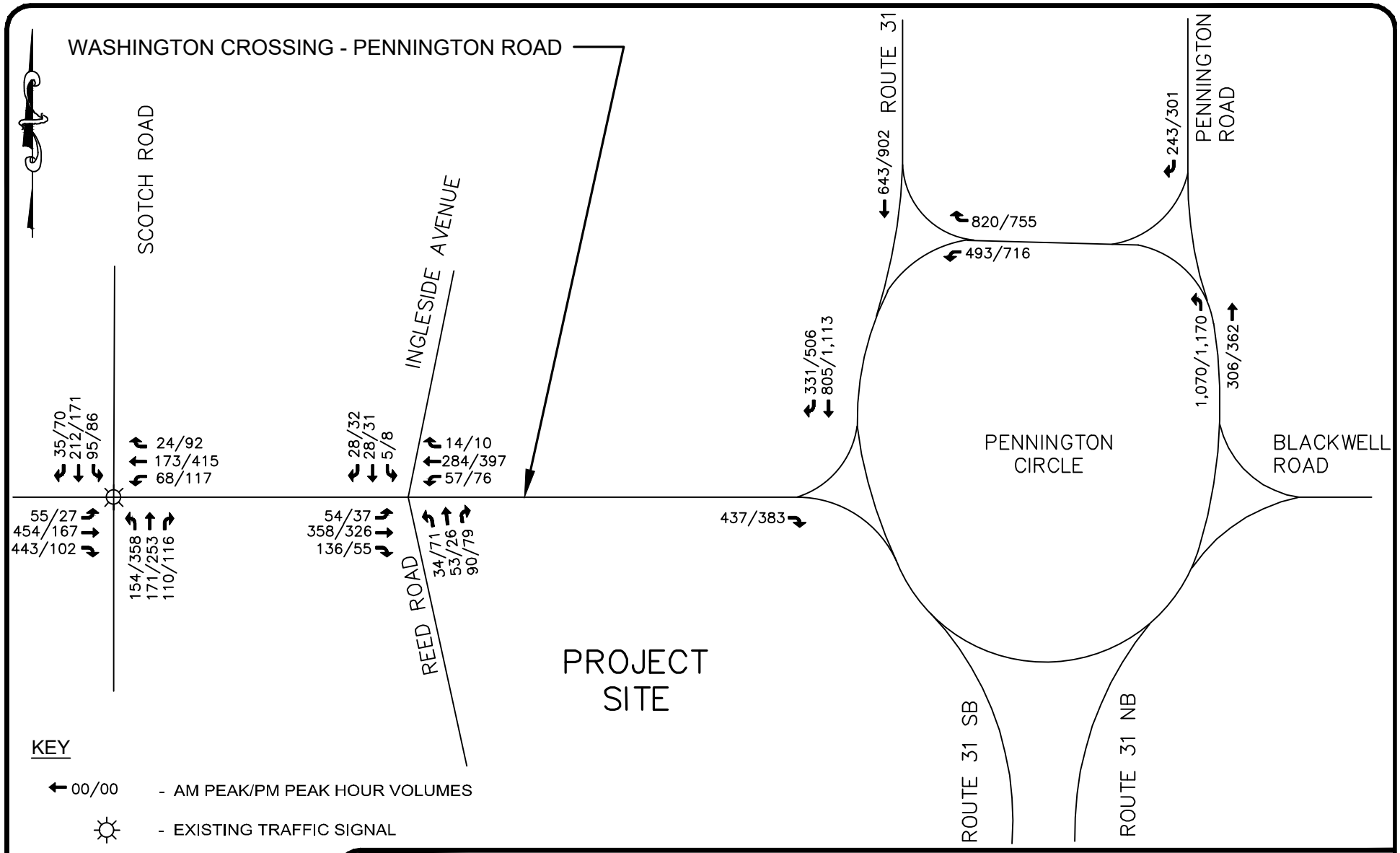

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DATE: 11/10/2020
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PROJ.: 080661-01-002

FIGURE 3
THE COLLECTION AT HOPEWELL
PROPOSED 2023 NO BUILD
TRAFFIC VOLUMES

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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The resulting levels of service for 2023 No-Build conditions at the studied intersections are summarized in Table 1. The results of the capacity analyses indicate that under future Year 2023 No-Build conditions, the levels of service for the studied intersections and various ramp junctions (at the Pennington Circle) would remain generally the same as the Existing 2020 levels of service during the AM and PM peak hours on each approach with nominal increases in the average delay of generally less than two (2) seconds. The northbound Reed Road left turn/through movement is calculated to deteriorate to LOS F during both the AM and PM peak hours (from LOS D and E, respectively) at its intersection with Washington Crossing-Pennington Road. This is a result of increased through traffic along Washington Crossing-Pennington Road from background traffic growth and traffic from the other two development projects included in the No Build conditions.

Site Trip Generation and Distribution

The trip generation for the proposed 379 multi-family, low-rise dwellings is based upon data compiled in the Trip Generation Manual, 10th Edition published by the Institute of Transportation Engineers (ITE) using Land Use Code (LUC) 220 for multi-family low-rise residential. While under the Trip Generation Manual descriptions for multi-family residential, this project would be categorized as a mid-rise development (which are buildings that are three to nine stories), we have used the trip generation rates for the low-rise multi-family housing as these yield higher volumes and therefore a more conservative analysis. We note that using the trip rates for the mid-rise multi-family residential use would decrease the site's trip generation by 20 to 25 percent or 35 to 43 trips. Table 2 illustrates the trip generation calculations for the proposed development using the higher trip rates for the low-rise multi-family residential units.

The peak hour trips from the proposed multi-family residential dwellings are likely to coincide temporally with the peak hour commuter trips on the surrounding roadway system. The trip assignment for the proposed development is based on observed traffic patterns of the traffic flows along the various streets within the study area. These travel patterns are considered to be representative of the traffic distribution associated with the proposed development. The distribution also takes into consideration the accessibility to the regional highway network including Interstate 295 and State Route 31.

The assignment of site generated traffic to the two proposed site access points also takes into consideration the location and density of individual neighborhoods within the overall development. This assignment of site generated traffic to the site access driveways also considers the regional destination of traffic (e.g. traffic destined to Scotch Road from the four multi-family apartment buildings would be more likely to utilize the Reed Road access).

The trip distribution is graphically presented in Figure 4. Applying the site trip distribution to the trip generation values presented in Table 2 resulted in the site trip assignment for the AM and PM peak hours shown in Figure 5.

THE COLLECTION AT HOPEWELL

TABLE 2 - TRIP GENERATION

10/21/2020

BCG #080661-01-002

WEEKDAY

CODE	LAND USE	AMOUNT	AM PEAK HOUR IN	AM PEAK HOUR OUT	AM PEAK HOUR TOTAL	PM PEAK HOUR IN	PM PEAK HOUR OUT	PM PEAK HOUR TOTAL
220	Multi-Family Housing - Low Rise (Formula)	379 units	39	130	169	122	72	194

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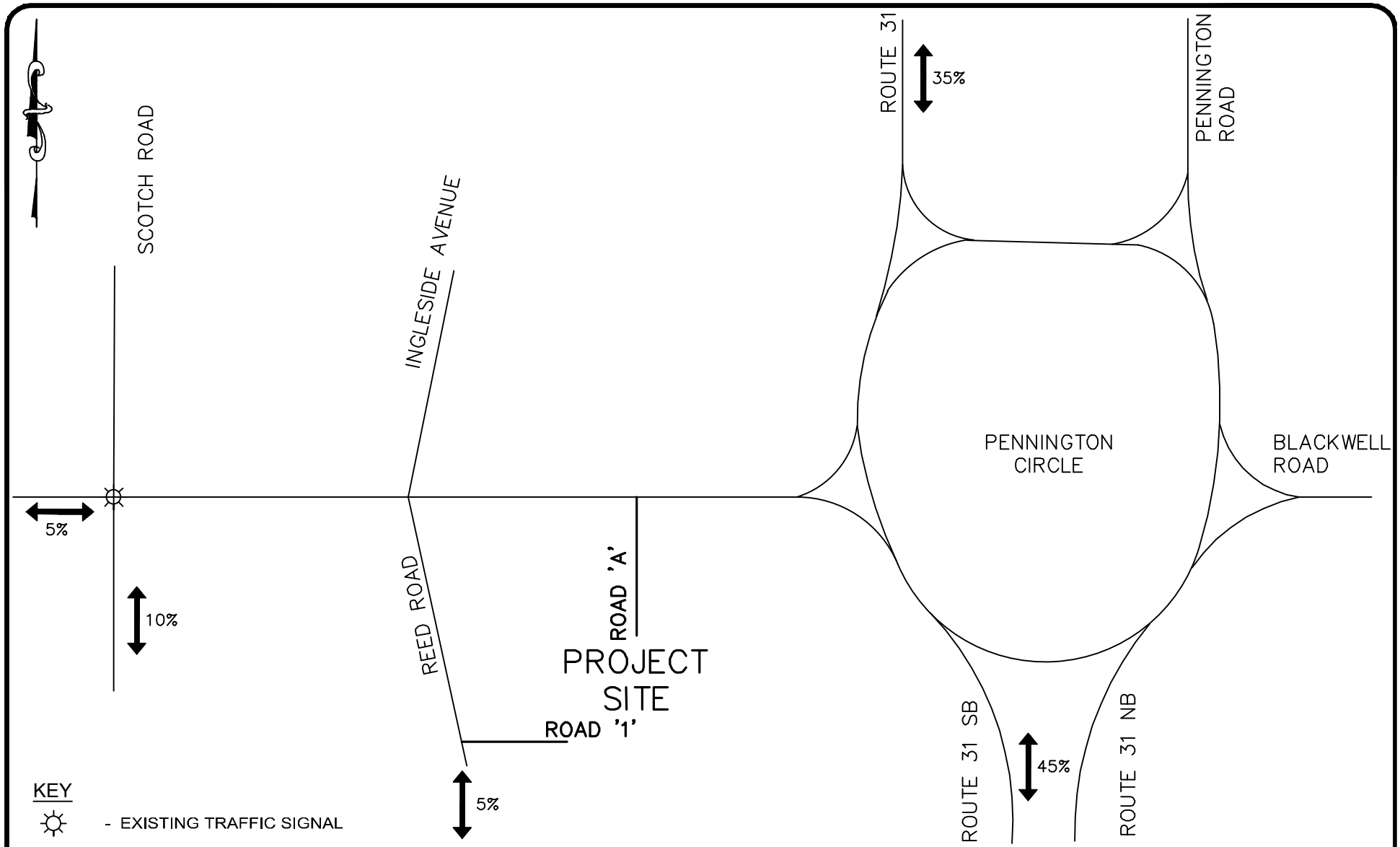

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DATE: 11/10/2020
CHKD.:
PROJ.: 080661-01-002

FIGURE 4
THE COLLECTION AT HOPEWELL
SITE TRIP DISTRIBUTION
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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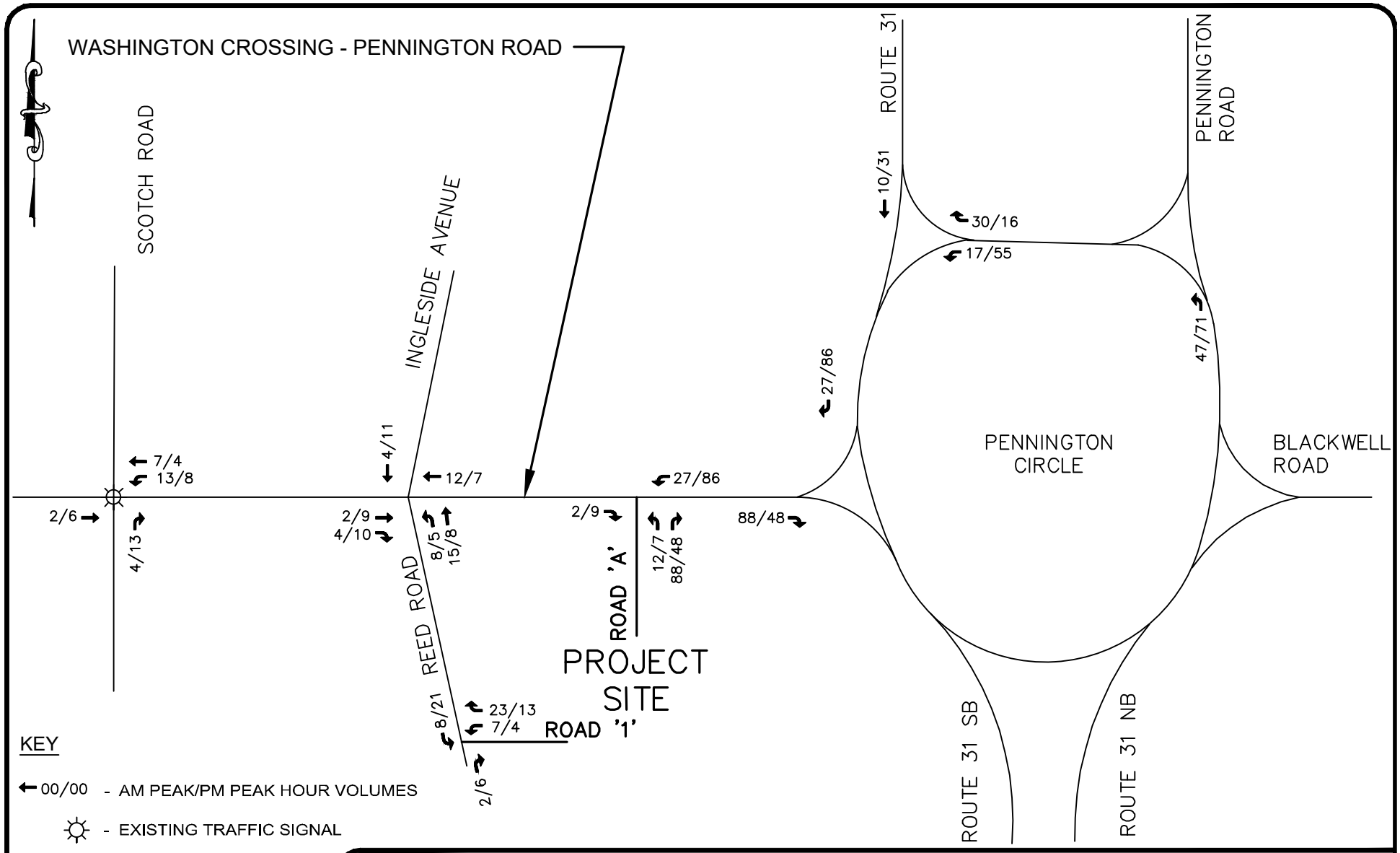

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FIGURE 5
THE COLLECTION AT HOPEWELL
SITE GENERATED TRAFFIC VOLUMES
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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Year 2023 Build Conditions

The site generated traffic volumes presented in Figure 5 were added to Year 2023 No-Build traffic volumes presented in Figure 3 to yield the AM and PM peak hour Year 2023 Build conditions, which are presented in Figure 6. These traffic volumes are used to analyze future operating conditions including the traffic from the proposed development.

The resulting levels of service for 2023 Build conditions at the studied intersections are summarized in Table 3. The results of the analyses indicate that under future Year 2023 Build conditions, the levels of service for the traffic movements at the studied intersections and various ramp junctions (at the Pennington Circle) would remain at LOS D or better during the AM and PM peak hours, with the exceptions noted under No Build conditions. The increases in average delay on each of the approach movements is generally less than one second.

The northbound Reed Road left turn/through movement is calculated to remain at LOS F during both the AM and PM peak hours and while the increase in average delay is fairly large, this is primarily a function of the high average delay that is calculated under NO Build conditions. Once levels of service reach LOS F, even small increases in traffic are calculated to have increased delays. This approach movement is calculated to have 23 additional AM peak hour trips and 13 PM peak hour trips, which is 1 additional vehicle every 3 to 5 minutes, which is a nominal change.

The operations of the two site access roads, Road ‘A’ with Washington Crossing-Pennington Road and Road ‘1’ with Reed Road are both calculated to operate at more than acceptable levels of service, LOS C or better during both peak hours under Build conditions. These levels of service and associated average delay represent conditions with low delay and limited queues for entering and exiting traffic. These levels of service will have a negligible impact on mainline operations of both roadways.

In summary, the proposed development of the subject tract and the associated site generated residential traffic will have a nominal impact on intersection operations at the studied locations during the weekday peak hours and other hours of the day.

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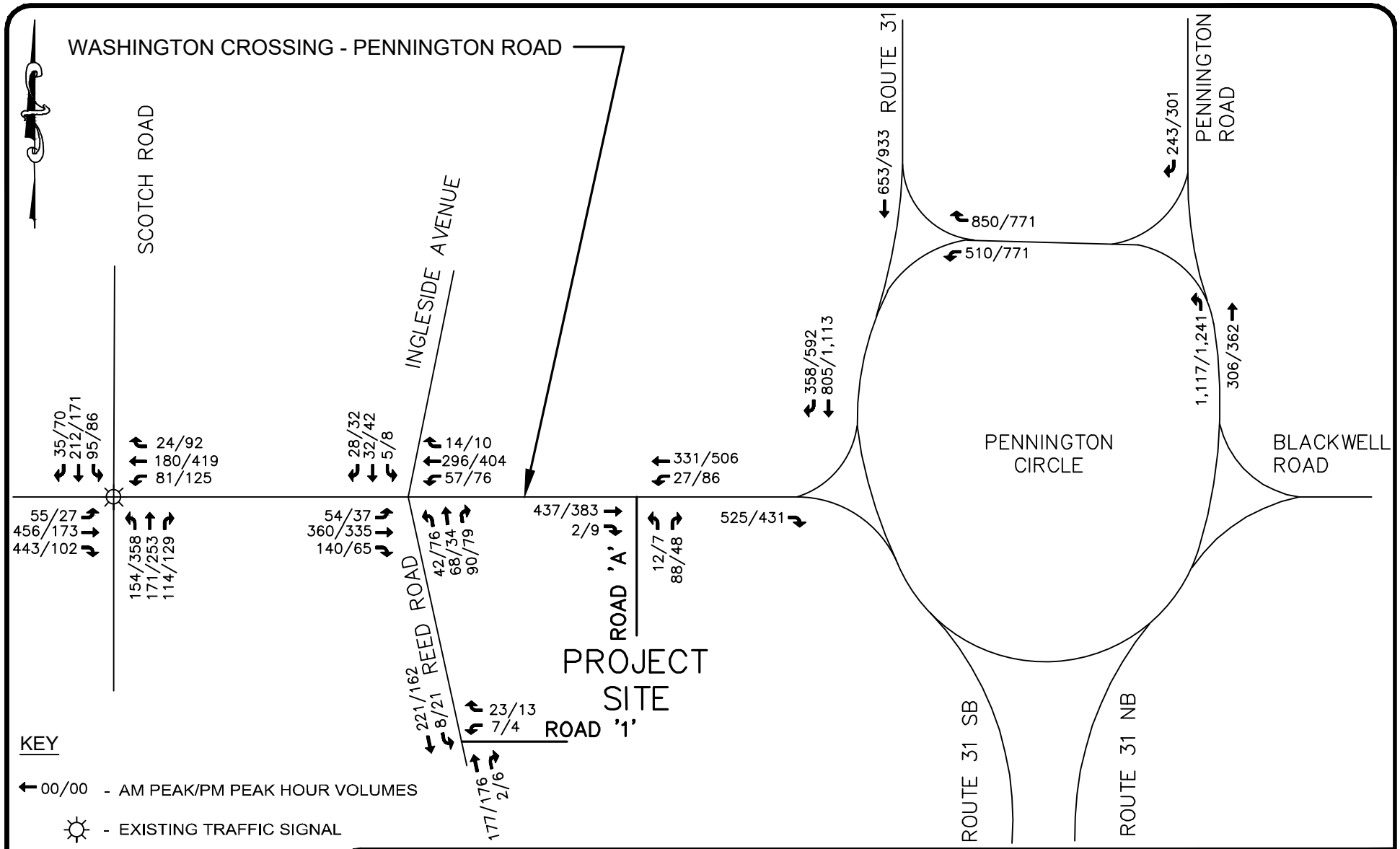

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FIGURE 6

THE COLLECTION AT HOPEWELL

2023 BUILD TRAFFIC VOLUMES

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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TABLE 3 - LEVEL OF SERVICE / AVERAGE VEHICLE DELAY COMPARISON - NO BUILD & BUILD CONDITIONS
THE COLLECTION AT HOPEWELL, TOWNSHIP OF HOPEWELL, MERCER COUNTY

BCG 080661-01-002 11/9/2020

Intersection	2023 No Build Condition							2023 Build Condition						
		AM PEAK			PM PEAK				AM PEAK			PM PEAK		
	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service
Washington Crossing-Pennington Rd. (CR 546) & Ingleside Ave. (CR 631)/Reed Rd. (Unsignalized)	EB-L	0.05	8.1	A	0.04	8.3	A	EB-L	0.05	8.1	A	0.04	8.3	A
	WB-L	0.06	8.7	A	0.07	8.3	A	WB-L	0.06	8.8	A	0.07	8.4	A
	NB-LT	0.57	51.4	F	0.68	67.0	F	NB-LT	0.76	74.8	F	0.83	97.6	F
	NB-R	0.17	12.3	B	0.13	11.1	B	NB-R	0.17	12.4	B	0.13	11.3	B
	SB-LTR	0.28	25.2	D	0.30	24.8	C	SB-LTR	0.32	28.0	D	0.38	29.4	D
Washington Crossing-Pennington Rd. (CR 546) & Scotch Rd. (Signalized)	EB-L	0.12	20.8	C	0.35	56.7	E	EB-L	0.12	20.8	C	0.35	56.7	E
	EB-T	0.72	32.5	C	0.27	22.3	C	EB-T	0.72	32.7	C	0.28	22.4	C
	EB-R	0.76	35.4	D	0.13	20.7	C	EB-R	0.76	35.4	D	0.13	20.7	C
	WB-L	0.21	18.6	B	0.22	16.3	B	WB-L	0.25	19.2	B	0.24	16.5	B
	WB-TR	0.25	15.8	B	0.64	22.5	C	WB-TR	0.26	15.9	B	0.64	22.6	C
	NB-L	0.29	20.9	C	0.68	29.2	C	NB-L	0.29	20.9	C	0.68	29.2	C
	NB-T	0.24	19.4	B	0.36	20.9	C	NB-T	0.24	19.4	B	0.36	20.9	C
	NB-R	0.14	18.2	B	0.15	18.4	B	NB-R	0.15	18.3	B	0.17	18.6	B
	SB-L	0.38	40.0	D	0.37	40.0	D	SB-L	0.38	40.0	D	0.37	40.0	D
	SB-TR	0.48	41.7	D	0.49	42.4	D	SB-TR	0.48	41.7	D	0.49	42.4	D
	OVERALL		29.4	C		26.5	C	OVERALL		29.3	C		26.5	C
Washington Crossing-Pennington Rd. (CR 546) & Road 'A' (Unsignalized)	WB-L							WB-L	0.03	8.4	A	0.08	8.4	A
	NB-L							NB-L	0.05	17.9	C	0.04	23.1	C
	NB-R							NB-R	0.17	12.5	B	0.08	11.1	B
Reed Road & Road 1 (Unsignalized)	WB-LR							WB-LR	0.04	10.0	A	0.02	9.8	A
	SB-L							SB-L	0.01	7.6	A	0.02	7.6	A
Route 31 SB & Washington Crossing-Pennington Road (Merge/Diverge)	EB Ramp (Merge) (1)	0.40/ 0.29	---	B	0.42/ 0.23	---	B	EB Ramp (Merge) (1)	0.43/ 0.35	---	B	0.43/ 0.25	---	B
	WB Ramp (Diverge) (1)	0.23/ 0.19	---	B	0.30/ 0.24	---	B	WB Ramp (Diverge) (1)	0.23/ 0.20	---	B	0.30/ 0.35	---	B
Route 31 SB & Circle Ramp WB (Merge)	WB Ramp (Merge) (1)	0.55/ 0.15	---	C	0.70/ 0.20	---	C	WB Ramp (Merge) (1)	0.56/ 0.15	---	C	0.74/ 0.22	---	C

(1) For merge and diverge conditions, the first V/C ratio is for the highway and the second is for the ramp

SITE PLAN EVALUATION

The site access will be provided by two site driveways, one to Washington Crossing-Pennington Road and one to Reed Road. The proposed site driveway (Road 'A') intersection with Washington Crossing-Pennington Road will be provided with an exclusive left turn lane on the Washington Crossing-Pennington Road westbound approach; an exclusive right turn lane on the Washington Crossing-Pennington Road eastbound approach; and the northbound site driveway (Road 'A') will be provided with an exclusive left turn lane and an exclusive right turn lane. There is one inbound lane on the site driveway entering the community.

As Washington Crossing-Pennington Road is under County jurisdiction, with a 40 MPH posted speed limit, the required minimum sight distance from Road 'A' is 300 feet (Section IV.11.B.2 of the Mercer County Design Standards). There is at least 600 feet in available sight distance in either direction along Washington Crossing-Pennington Road from Road 'A', exceeding the design requirement. The proposed left turn lane on Washington Crossing-Pennington Road is designed to be 110 feet long. The critical time period for the storage length is the PM peak hour when there is a greater percentage of entering traffic. Based upon the capacity analyses, the 95% queue length is less than one vehicle; but if we look at the calculated volume for the entering left turn movement we have a total of 86 vehicles in the PM peak hour or 1.43 vehicles per minute, average. Conservatively, doubling this average number of vehicles yields three vehicles, which would require 75 feet of storage. Therefore, the proposed left turn lane along Washington Crossing-Pennington Road is sufficient in design.

The site access driveway (Road 1) to Reed Road will be provided with a shared left turn/right turn lane exiting the site and one entering lane. It is not proposed to widen Reed Road to provide any exclusive lanes for access to the community as the traffic volumes are much lower than to Washington Crossing-Pennington Road. The AASHTO stopping sight distance for a design speed of 30 MPH is 200 feet. There is over 350 feet of sight distance in either direction along Reed Road from the proposed intersection of Road '1' and therefore, more than sufficient sight distance is provided.

Both Road A and Road 1 are divided roadways with landscaped medians, 12 feet wide on Road A and 10 feet wide on Road 1, that provide the primary circulation routes within the community. Road A and Road 1 intersect at a circle to facilitate movements within the internal street system and provide traffic calming measures within the community to manage traffic speeds. There are a series of other streets and alleys within the community that serve to disperse the site traffic to the various buildings within the development.

All of the internal roadways provide a looped circulation system except for the southerly extension of Road A across the gas pipeline easement. Road 3 and Road 4 loop within this portion of the development to Road A. The Residential Site Improvement Standards (RSIS) do not require two means of access to this portion of the community as these streets would be considered a multi-family access cul de sac which is permitted to accommodate up to 1000 vehicle trips per day. These 61 units would

generate 420 trips per day. Further, there is an emergency access driveway out to Diverty Road which provides alternate access in case of an emergency.

The internal streets are generally 24 feet in width except for Alley BB which is 20 feet in width. These widths are consistent with the design criteria set forth in the RSIS. The boulevard streets provide a 20 foot wide cartway for each one way roadway which exceeds the minimum width required by RSIS. The access and circulation system for this community is consistent with the design criteria for such streets set forth in the RSIS.

The townhouses and stacked townhouses are provided with individual garages and driveways. The COAH buildings and the apartment buildings are provided with surface parking lots proximate to the various buildings. There are surface parking lots within the townhouse section which provides sufficient guest parking at 0.5 spaces per unit as required by RSIS. Within the stacked townhouse section, on-street, parallel parking spaces are provided along Roads A and B, which also exceeds the surface parking requirement of 0.5 spaces per unit.

The internal sidewalk network is proposed to link all of the residential buildings as well as extending to the dog park and community garden along Road 1. The site plan provides for safe and efficient traffic operations without affecting the quality of traffic flow along area roadways. The site plan proposes designated crosswalks and STOP lines and STOP signs at the various internal site driveway intersections. The proposed site plan conforms to applicable standards from a traffic engineering viewpoint. Circulation and access to and from the site, as well as within the property are adequate for residents, visitors, deliveries and emergency services.

Residential Site Improvement Standards establish parking ratios based upon the type of units and the number of bedrooms. These standards are as follows for the two unit types:

- Townhouses/Stacked Townhouses
    - 2 Bedroom – 2.3 spaces/unit
    - 3 and 4 Bedroom – 2.4 spaces/unit

- Multi-Family/COAH Buildings
    - 1 Bedroom – 1.8 spaces/unit
    - 2 Bedroom – 2.0 spaces/unit
    - 3 Bedroom – 2.1 spaces/unit

Each of these parking ratios include the 0.5 spaces per unit for visitor parking as set forth in the RSIS. The visitor spaces must be provided in common parking areas or in on-street parking spaces. The proposed bedroom mix is 72 two-bedroom stacked townhouse units, 72 three-bedroom stacked townhouse units, 61 four-bedroom townhouse units; and in the multi-family/COAH buildings, 13 one-bedroom flats, 145 two-bedroom flats and 16 three-bedroom flats; for a total of 379 dwelling units. The parking requirement is therefore 828 parking spaces (2.18 spaces per unit) and 943

parking spaces (2.49 spaces per unit) are proposed, thereby exceeding the RSIS requirements.

These 943 parking spaces are comprised of 266 individual garages and 205 driveway spaces for the townhouses and stacked townhouses; 103 parallel parking spaces; and 369 perpendicular parking spaces primarily in parking lots. We note that the driveways for the townhouses are 18 feet in width (providing one parking space) and per RSIS, are not able to be counted as 1.5 spaces as the driveways are not 20 feet in width. RSIS parking standards require that 189 parking spaces (0.5 spaces per unit times 379 units) are available for guest parking and the project exceeds the required amount of available guest parking in both the surface lots and the on-street parallel parking. We have also examined the parking distribution by neighborhood and found that there is sufficient parking for all of the buildings within each neighborhood within the entire community.

CONCLUSIONS

The proposed development of 379 multi-family residential dwellings on the subject tract is an inclusionary community which will fulfil a portion of the Hopewell Township affordable housing obligation, and would have a negligible impact on traffic operations at the studied intersections during the weekday AM and PM peak commuting hours. The configuration of the site access driveways to both Washington Crossing-Pennington Road and to Reed Road distribute site generated traffic to the existing street network, minimizing the impact at any given intersection.

The incremental impact of the additional site-generated traffic results in a slight increase in the average delay on the affected approach movements at the studied intersections but would not be noticeable to motorists. Generally, these slight increases in average vehicle delay would be less than one (1) second and would not materially impact the operations of the study intersections or change the level of service.

Both proposed site access roadways will be provided with more than acceptable levels of service (LOS C or better) which will provide safe and efficient movement of traffic into and out of the proposed development. Further, both intersections are provided with more than sufficient sight distances in either direction along Washington Crossing-Pennington Road and Reed Road. The proposed design of the westbound left turn lane along Washington Crossing-Pennington Road into Road 'A' will provide more than sufficient storage to accommodate the traffic entering the site.

The side street approaches of Ingleside Avenue and Reed Road at Washington Crossing-Pennington Road are calculated to experience greater changes in average delay, particularly the Reed Road approach. However, this is primarily a result of the level of traffic volumes along Washington Crossing-Pennington Road that are calculated for No Build conditions. Again, our analysis approach was very conservative, one, in adjusted observed volumes upwards to pre-pandemic levels and two, using the higher trip generation volumes for low-rise, multi-family. It is anticipated that actual levels of service will be better and delays less than calculated for the foreseeable future.

Regardless, the site generated traffic added to the northbound Reed Road approach is only 23 vehicles during the AM peak hour and 13 vehicles during the PM peak hour, one additional vehicle every three to five minutes. Further, should residents prefer not to utilize Reed Road, they can travel on the internal street system within the community and exit directly to Washington Crossing-Pennington Road. This proposed intersection has sufficient capacity to accommodate additional site generated traffic, should residents so desire to follow that route.

The studied intersections would continue to operate at acceptable levels of service, LOS D or better, with the exception of the northbound Reed Road left turn/through movement during both peak hours (remains at LOS F from No Build conditions) and the eastbound left turn movement on Washington Crossing-Pennington Road at Scotch Road which will remain at LOS E during the PM peak hour as it did under No Build conditions.

It is our professional opinion that, based upon our traffic engineering evaluation, the proposed development will provide for safe and efficient traffic operations without affecting the quality of traffic flow along area roadways.

The proposed site plan conforms to applicable standards from a traffic engineering viewpoint. Circulation and access to and from the site, as well as within the property are adequate. The proposed traffic circle facilitates movements among the neighborhoods within the community while providing traffic calming measures to maintain the residential character of the internal street system. Sufficient parking is provided in accordance with RSIS requirements for the multi-family residential use.

In conclusion, this development project would have a minimal impact on the traffic operations of the existing roadway system and at the studied intersections. The design of the development will adequately serve the needs of this project's residents and guests.

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APPENDIX I

LEVEL OF SERVICE DEFINITIONS

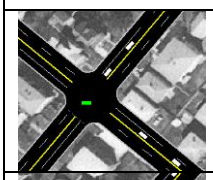
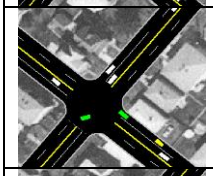
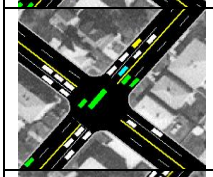
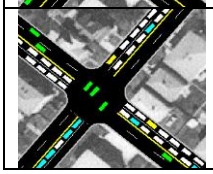
TRAFFIC OPERATIONS

Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the 2010 Highway Capacity Manual (HCM) and 2010 Highway Capacity Software.

For a signalized intersection, Level of Service (LOS) A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle.

LEVEL OF SERVICE /AVERAGE DELAY CRITERIA*

	Level Of Service (LOS)	Signalized Delay Range (average delay, sec/veh)	Unsignalized Delay Range (average delay in sec/veh)
	A	<=10	<=10
	B	>10 and <=20	>10 and <=15
	C	>20 and <=35	>15 and <=25
	D	>35 and <=55	>25 and <=35
	E	>55 and <=80	>35 and <=50
	F	>80	>50

* *Sources: Highway Capacity Manual (2010 Edition) & SimTraffic Version 5.0*

APPENDIX II

CAPACITY ANALYSES

IIA – 2020 EXISTING CONDITIONS
IIB – 2023 NO-BUILD CONDITIONS
IIC – 2023 BUILD CONDITIONS

APPENDIX IIA

2020 EXISTING CONDITIONS

HCS7 Two-Way Stop-Control Report

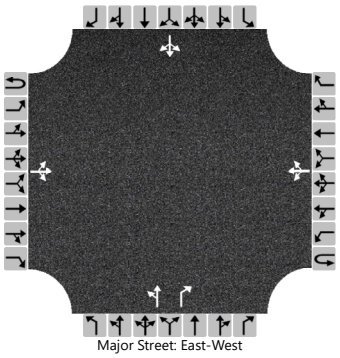
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2020
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		46	268	132		55	245	14		33	51	87		5	27	25
Percent Heavy Vehicles (%)		0				0				0	0	0		1	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.11	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.51	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		52				62				94		98			64	
Capacity, c (veh/h)		1282				1122				228		676			310	
v/c Ratio		0.04				0.06				0.41		0.14			0.21	
95% Queue Length, Q_{95} (veh)		0.1				0.2				1.9		0.5			0.8	
Control Delay (s/veh)		7.9				8.4				31.4		11.2			19.6	
Level of Service (LOS)		A				A				D		B			C	
Approach Delay (s/veh)	1.2				1.9				21.2				19.6			
Approach LOS									C				C			

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HCS7 Two-Way Stop-Control Report

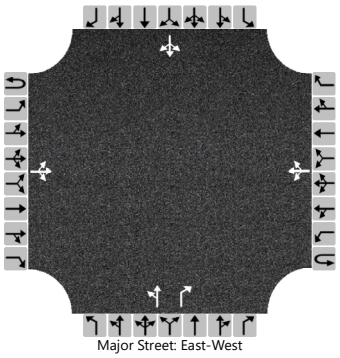
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2020
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		32	272	53		74	315	10		69	25	77		8	30	24
Percent Heavy Vehicles (%)		0				0				0	0	0		1	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.11	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.51	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34				80				101		83			67	
Capacity, c (veh/h)		1221				1221				211		725			305	
v/c Ratio		0.03				0.07				0.48		0.11			0.22	
95% Queue Length, Q_{95} (veh)		0.1				0.2				2.4		0.4			0.8	
Control Delay (s/veh)		8.0				8.2				36.8		10.6			20.0	
Level of Service (LOS)		A				A				E		B			C	
Approach Delay (s/veh)	1.0				2.1				25.0				20.0			
Approach LOS									D				C			

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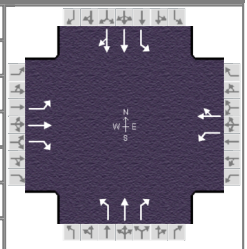
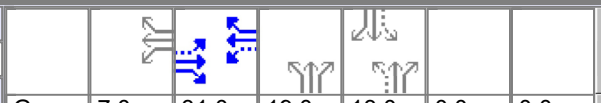
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bowman Consulting			Duration, h	0.25
Analyst	LDK	Analysis Date	Nov 9, 2020	Area Type	Other
Jurisdiction	County	Time Period	AM Peak	PHF	0.97
Urban Street	Washington Crossing-P…	Analysis Year	2020 Existing	Analysis Period	1> 7:00
Intersection	WCP/Scotch	File Name	EX-AM-WCP Scotch.xus		
Project Description	The Collection at Hopewell BCG 080661-01-002				

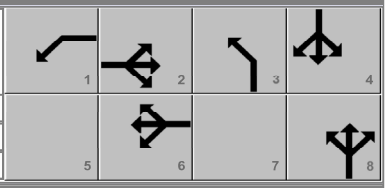


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	53	429	430	43	159	22	149	119	35	89	192	34

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	31.0	19.0	13.0	0.0	0.0
Yellow	3.0	5.0	3.0	5.0	0.0	0.0
Red	0.0	2.0	0.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6	3	8		4
Case Number		5.3	1.0	4.0	1.0	3.0		6.3
Phase Duration, s		38.0	10.0	48.0	22.0	42.0		20.0
Change Period, ($Y+R_c$), s		7.0	3.0	7.0	3.0	7.0		7.0
Max Allow Headway (*MAH*), s		0.0	3.0	0.0	3.0	3.0		3.0
Queue Clearance Time (g_s), s			3.3		7.4	5.9		7.9
Green Extension Time (g_e), s		0.0	0.0	0.0	0.2	0.8		0.5
Phase Call Probability			1.00		1.00	1.00		1.00
Max Out Probability			0.28		0.00	0.00		0.25

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	55	442	407	44	187		154	123	26	92	118	115
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1216	1885	1598	1781	1787		1753	1856	1610	1289	1900	1801
Queue Service Time (g_s), s	2.8	18.1	20.2	1.3	5.7		5.4	3.9	0.9	5.9	5.1	5.3
Cycle Queue Clearance Time (g_c), s	2.8	18.1	20.2	1.3	5.7		5.4	3.9	0.9	5.9	5.1	5.3
Green Ratio (*g/C*)	0.34	0.34	0.34	0.44	0.46		0.38	0.39	0.39	0.14	0.14	0.14
Capacity (*c*), veh/h	499	649	550	354	814		547	722	626	266	274	260
Volume-to-Capacity Ratio (*X*)	0.110	0.681	0.740	0.125	0.229		0.281	0.170	0.041	0.345	0.429	0.443
Back of Queue (*Q*), ft/ln (50 th percentile)	19.9	212.6	210.1	13.7	58.2		57	41.9	8.2	50.5	65.2	64.5
Back of Queue (*Q*), veh/ln (50 th percentile)	0.8	8.4	8.3	0.5	2.2		2.2	1.6	0.3	2.0	2.6	2.6
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.2	25.3	26.0	16.6	14.9		19.4	18.0	17.1	35.5	35.1	35.2
Incremental Delay (d_2), s/veh	0.4	5.7	8.7	0.7	0.7		1.3	0.5	0.1	3.5	4.8	5.4
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	20.7	31.0	34.6	17.3	15.6		20.7	18.5	17.2	39.0	40.0	40.6
Level of Service (LOS)	C	C	C	B	B		C	B	B	D	D	D
Approach Delay, s/veh / LOS	32.0	C		15.9	B		19.5	B		39.9	D	
Intersection Delay, s/veh / LOS	29.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.09	B	1.91	B	2.18	B
Bicycle LOS Score / LOS	1.98	B	0.87	A	0.99	A	0.76	A

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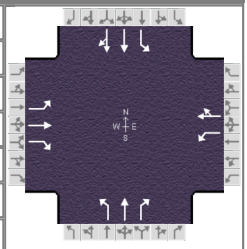
HCS7 Signalized Intersection Results Summary

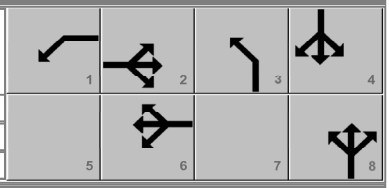
General Information				Intersection Information	
Agency	Bowman Consulting			Duration, h	0.25
Analyst	LDK	Analysis Date	Nov 9, 2020	Area Type	Other
Jurisdiction	County	Time Period	PM Peak	PHF	0.96
Urban Street	Washington Crossing-P…	Analysis Year	2020 Existing	Analysis Period	1> 4:30
Intersection	WCP/Scotch	File Name	EX-PM-WCP Scotch.xus		
Project Description	The Collection at Hopewell BCG 080661-01-002				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	26	157	99	48	395	87	347	220	72	81	123	68

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	31.0	19.0	13.0	0.0	0.0
Yellow	3.0	5.0	3.0	5.0	0.0	0.0
Red	0.0	2.0	0.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6	3	8		4
Case Number		5.3	1.0	4.0	1.0	3.0		6.3
Phase Duration, s		38.0	10.0	48.0	22.0	42.0		20.0
Change Period, ($Y+R_c$), s		7.0	3.0	7.0	3.0	7.0		7.0
Max Allow Headway (*MAH*), s		0.0	3.0	0.0	3.0	3.1		3.1
Queue Clearance Time (g_s), s			3.5		16.1	9.5		8.0
Green Extension Time (g_e), s		0.0	0.0	0.0	0.2	1.0		0.6
Phase Call Probability			1.00		1.00	1.00		1.00
Max Out Probability			0.41		1.00	0.00		0.34

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	27	164	67	50	502		361	229	65	84	102	97
Adjusted Saturation Flow Rate (*s*), veh/h/ln	911	1885	1598	1753	1826		1795	1900	1610	1170	1900	1680
Queue Service Time (g_s), s	0.0	5.6	2.6	1.5	18.6		14.1	7.5	2.3	6.0	4.4	4.7
Cycle Queue Clearance Time (g_c), s	31.0	5.6	2.6	1.5	18.6		14.1	7.5	2.3	6.0	4.4	4.7
Green Ratio (*g/C*)	0.34	0.34	0.34	0.44	0.46		0.38	0.39	0.39	0.14	0.14	0.14
Capacity (*c*), veh/h	80	649	550	556	832		569	739	626	249	274	243
Volume-to-Capacity Ratio (*X*)	0.338	0.252	0.121	0.090	0.604		0.636	0.310	0.103	0.339	0.371	0.400
Back of Queue (*Q*), ft/ln (50 th percentile)	20.7	62	24.2	14.9	194.2		157.7	81.7	21.1	46.9	55.2	54.1
Back of Queue (*Q*), veh/ln (50 th percentile)	0.8	2.5	1.0	0.6	7.7		6.3	3.3	0.8	1.9	2.2	2.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	45.0	21.2	20.2	14.6	18.4		22.2	19.1	17.5	35.5	34.8	35.0
Incremental Delay (d_2), s/veh	11.1	0.9	0.5	0.3	3.2		5.3	1.1	0.3	3.7	3.8	4.9
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	56.1	22.1	20.6	15.0	21.6		27.5	20.2	17.8	39.2	38.6	39.8
Level of Service (LOS)	E	C	C	B	C		C	C	B	D	D	D
Approach Delay, s/veh / LOS	25.3	C		21.0	C		24.0	C		39.2	D	
Intersection Delay, s/veh / LOS	25.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.09	B	1.91	B	2.18	B
Bicycle LOS Score / LOS	0.91	A	1.40	A	1.57	B	0.72	A

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	746	274
Peak Hour Factor (PHF)	0.93	0.94
Total Trucks, %	0.00	0.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000
Flow Rate (vi),pc/h	802	291
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.21	0.15

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.584
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	802	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	9.3
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	10.7

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1050	414
Peak Hour Factor (PHF)	0.99	0.89
Total Trucks, %	0.00	0.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000
Flow Rate (vi),pc/h	1061	465
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.28	0.24

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.600
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1061	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	12.3
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	12.9

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description			

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	746	349
Peak Hour Factor (PHF)	0.93	0.85
Total Trucks, %	10.70	8.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.923
Flow Rate (vi),pc/h	888	445
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.35	0.23

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.333
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	888	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1333	Average Density (D), pc/mi/ln	15.1
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	15.4

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1050	322
Peak Hour Factor (PHF)	0.99	0.90
Total Trucks, %	4.20	0.50
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.995
Flow Rate (vi),pc/h	1105	360
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.39	0.19

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.335
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1105	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1465	Average Density (D), pc/mi/ln	16.6
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	16.5

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1170	435
Peak Hour Factor (PHF)	0.93	0.90
Total Trucks, %	10.70	2.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.972
Flow Rate (vi),pc/h	1393	497
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.50	0.13

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.342
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1393	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1890	Average Density (D), pc/mi/ln	21.5
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	19.4

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1664	632
Peak Hour Factor (PHF)	0.99	0.93
Total Trucks, %	4.20	0.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.993
Flow Rate (vi),pc/h	1751	684
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.64	0.18

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.361
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	43.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1751	Ramp Junction Speed (S), mi/h	43.9
Flow Entering Ramp-Infl. Area (vR12), pc/h	2435	Average Density (D), pc/mi/ln	27.7
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	23.6

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APPENDIX IIB

2023 NO-BUILD CONDITIONS

HCS7 Two-Way Stop-Control Report

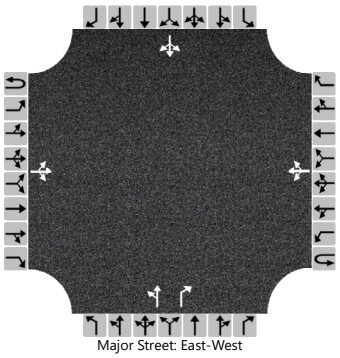
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	AM Peak - 2023 No Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		54	358	136		57	284	14		34	53	90		5	28	28
Percent Heavy Vehicles (%)		0				0				0	0	0		1	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.11	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.51	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		61				64				98		101			69	
Capacity, c (veh/h)		1236				1025				170		591			246	
v/c Ratio		0.05				0.06				0.57		0.17			0.28	
95% Queue Length, Q_{95} (veh)		0.2				0.2				3.0		0.6			1.1	
Control Delay (s/veh)		8.1				8.7				51.4		12.3			25.2	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.3				2.0				31.6				25.2			
Approach LOS									D				D			

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HCS7 Two-Way Stop-Control Report

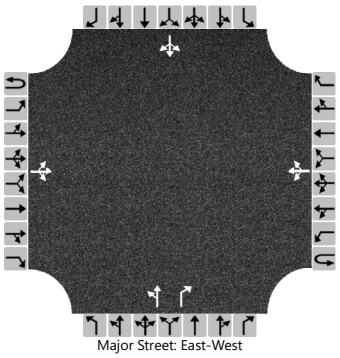
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	PM Peak - 2023 No Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		37	326	55		76	397	10		71	26	79		8	31	32
Percent Heavy Vehicles (%)		0				0				0	0	0		1	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.11	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.51	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40				82				104		85			76	
Capacity, c (veh/h)		1133				1160				154		671			257	
v/c Ratio		0.04				0.07				0.68		0.13			0.30	
95% Queue Length, Q_{95} (veh)		0.1				0.2				3.9		0.4			1.2	
Control Delay (s/veh)		8.3				8.3				67.0		11.1			24.8	
Level of Service (LOS)		A				A				F		B			C	
Approach Delay (s/veh)	1.1				2.0				42.0				24.8			
Approach LOS									E				C			

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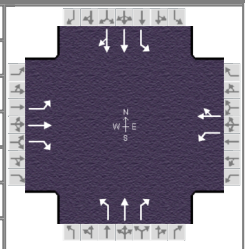
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bowman Consulting			Duration, h	0.25
Analyst	LDK	Analysis Date	Nov 9, 2020	Area Type	Other
Jurisdiction	County	Time Period	AM Peak	PHF	0.97
Urban Street	Washington Crossing-P…	Analysis Year	2023 No Build	Analysis Period	1> 7:00
Intersection	WCP/Scotch	File Name	NB-AM-WCP Scotch.xus		
Project Description	The Collection at Hopewell BCG 080661-01-002				

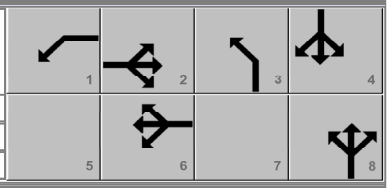


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	55	454	443	68	173	24	154	171	110	95	212	35

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	31.0	19.0	13.0	0.0	0.0
Yellow	3.0	5.0	3.0	5.0	0.0	0.0
Red	0.0	2.0	0.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6	3	8		4
Case Number		5.3	1.0	4.0	1.0	3.0		6.3
Phase Duration, s		38.0	10.0	48.0	22.0	42.0		20.0
Change Period, ($Y+R_c$), s		7.0	3.0	7.0	3.0	7.0		7.0
Max Allow Headway (*MAH*), s		0.0	3.0	0.0	3.0	3.1		3.1
Queue Clearance Time (g_s), s			4.0		7.6	7.8		8.7
Green Extension Time (g_e), s		0.0	0.0	0.0	0.2	1.1		0.6
Phase Call Probability			1.00		1.00	1.00		1.00
Max Out Probability			1.00		0.00	0.00		0.50

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	57	468	415	70	203		159	176	88	98	129	126
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1198	1885	1598	1781	1787		1753	1856	1610	1227	1900	1807
Queue Service Time (g_s), s	2.9	19.5	20.7	2.0	6.3		5.6	5.8	3.2	6.7	5.6	5.8
Cycle Queue Clearance Time (g_c), s	2.9	19.5	20.7	2.0	6.3		5.6	5.8	3.2	6.7	5.6	5.8
Green Ratio (*g/C*)	0.34	0.34	0.34	0.44	0.46		0.38	0.39	0.39	0.14	0.14	0.14
Capacity (*c*), veh/h	493	649	550	337	814		539	722	626	257	274	261
Volume-to-Capacity Ratio (*X*)	0.115	0.721	0.755	0.208	0.250		0.294	0.244	0.140	0.381	0.469	0.482
Back of Queue (*Q*), ft/ln (50 th percentile)	20.7	232	217.3	22.4	64		59.2	62.5	29.2	55	72.3	71.5
Back of Queue (*Q*), veh/ln (50 th percentile)	0.8	9.2	8.6	0.9	2.5		2.3	2.4	1.2	2.2	2.9	2.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.3	25.7	26.1	17.2	15.0		19.5	18.6	17.8	35.8	35.3	35.4
Incremental Delay (d_2), s/veh	0.5	6.8	9.3	1.4	0.7		1.4	0.8	0.5	4.2	5.7	6.3
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	20.8	32.5	35.4	18.6	15.8		20.9	19.4	18.2	40.0	41.0	41.7
Level of Service (LOS)	C	C	D	B	B		C	B	B	D	D	D
Approach Delay, s/veh / LOS	33.1	C		16.5	B		19.7	B		41.0	D	
Intersection Delay, s/veh / LOS	29.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.09	B	1.91	B	2.19	B
Bicycle LOS Score / LOS	2.04	B	0.94	A	1.19	A	0.78	A

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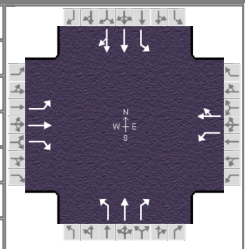
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bowman Consulting			Duration, h	0.25
Analyst	LDK	Analysis Date	Nov 9, 2020	Area Type	Other
Jurisdiction	County	Time Period	PM Peak	PHF	0.96
Urban Street	Washington Crossing-P…	Analysis Year	2023 No Build	Analysis Period	1> 4:30
Intersection	WCP/Scotch	File Name	NB-PM-WCP Scotch.xus		
Project Description	The Collection at Hopewell BCG 080661-01-002				

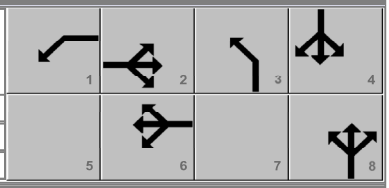


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	27	167	102	117	415	92	358	253	116	86	171	70

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	31.0	19.0	13.0	0.0	0.0
Yellow	3.0	5.0	3.0	5.0	0.0	0.0
Red	0.0	2.0	0.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6	3	8		4
Case Number		5.3	1.0	4.0	1.0	3.0		6.3
Phase Duration, s		38.0	10.0	48.0	22.0	42.0		20.0
Change Period, ($Y+R_c$), s		7.0	3.0	7.0	3.0	7.0		7.0
Max Allow Headway (*MAH*), s		0.0	3.0	0.0	3.0	3.1		3.1
Queue Clearance Time (g_s), s			5.7		16.7	10.9		8.6
Green Extension Time (g_e), s		0.0	0.0	0.0	0.2	1.2		0.7
Phase Call Probability			1.00		1.00	1.00		1.00
Max Out Probability			1.00		1.00	0.00		0.53

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	28	174	70	122	528		373	264	95	90	128	123
Adjusted Saturation Flow Rate (*s*), veh/h/ln	889	1885	1598	1753	1826		1795	1900	1610	1134	1900	1716
Queue Service Time (g_s), s	0.0	6.0	2.7	3.7	19.9		14.7	8.9	3.4	6.6	5.6	5.9
Cycle Queue Clearance Time (g_c), s	31.0	6.0	2.7	3.7	19.9		14.7	8.9	3.4	6.6	5.6	5.9
Green Ratio (*g/C*)	0.34	0.34	0.34	0.44	0.46		0.38	0.39	0.39	0.14	0.14	0.14
Capacity (*c*), veh/h	80	649	550	547	832		549	739	626	244	274	248
Volume-to-Capacity Ratio (*X*)	0.352	0.268	0.127	0.223	0.635		0.680	0.357	0.151	0.368	0.468	0.494
Back of Queue (*Q*), ft/ln (50 th percentile)	21.6	66.3	25.4	38.4	209.2		167.3	96.4	31.7	50.6	72.1	70.6
Back of Queue (*Q*), veh/ln (50 th percentile)	0.9	2.6	1.0	1.5	8.3		6.6	3.9	1.3	2.0	2.9	2.8
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	45.0	21.3	20.2	15.3	18.8		22.5	19.5	17.9	35.8	35.3	35.5
Incremental Delay (d_2), s/veh	11.7	1.0	0.5	0.9	3.7		6.7	1.3	0.5	4.2	5.6	6.9
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	56.7	22.3	20.7	16.3	22.5		29.2	20.9	18.4	40.0	41.0	42.4
Level of Service (LOS)	E	C	C	B	C		C	C	B	D	D	D
Approach Delay, s/veh / LOS	25.5	C		21.3	C		24.8	C		41.2	D	
Intersection Delay, s/veh / LOS	26.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.09	B	1.91	B	2.18	B
Bicycle LOS Score / LOS	0.94	A	1.56	B	1.69	B	0.77	A

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	805	331
Peak Hour Factor (PHF)	0.93	0.94
Total Trucks, %	0.00	0.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000
Flow Rate (vi),pc/h	866	352
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.23	0.19

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.590
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	866	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	10.0
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	11.2

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	414
Peak Hour Factor (PHF)	0.99	0.89
Total Trucks, %	0.00	0.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000
Flow Rate (vi),pc/h	1124	465
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.30	0.24

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.600
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1124	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	13.0
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	13.5

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	805	437
Peak Hour Factor (PHF)	0.93	0.85
Total Trucks, %	10.70	8.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.923
Flow Rate (vi),pc/h	959	557
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.40	0.29

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.336
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	959	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1516	Average Density (D), pc/mi/ln	17.2
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	16.8

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	383
Peak Hour Factor (PHF)	0.99	0.90
Total Trucks, %	4.20	0.50
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.995
Flow Rate (vi),pc/h	1171	428
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.42	0.23

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.338
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1171	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1599	Average Density (D), pc/mi/ln	18.2
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.5

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1286	493
Peak Hour Factor (PHF)	0.93	0.90
Total Trucks, %	10.70	2.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.972
Flow Rate (vi),pc/h	1531	564
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.55	0.15

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.348
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1531	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	2095	Average Density (D), pc/mi/ln	23.8
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	21.0

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1804	716
Peak Hour Factor (PHF)	0.99	0.93
Total Trucks, %	4.20	0.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.993
Flow Rate (vi),pc/h	1898	775
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.70	0.20

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.372
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	43.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1898	Ramp Junction Speed (S), mi/h	43.9
Flow Entering Ramp-Infl. Area (vR12), pc/h	2673	Average Density (D), pc/mi/ln	30.4
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	25.4

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APPENDIX IIC

2023 BUILD CONDITIONS

HCS7 Two-Way Stop-Control Report

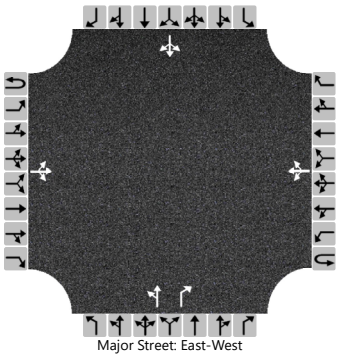
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	AM Peak - 2023 Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		54	360	140		57	296	14		42	68	90		5	32	28
Percent Heavy Vehicles (%)		0				0				0	0	0		1	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.11	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.51	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		61				64				124		101			73	
Capacity, c (veh/h)		1222				1020				163		588			228	
v/c Ratio		0.05				0.06				0.76		0.17			0.32	
95% Queue Length, Q_{95} (veh)		0.2				0.2				4.8		0.6			1.3	
Control Delay (s/veh)		8.1				8.8				74.8		12.4			28.0	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.3				1.9				46.7				28.0			
Approach LOS									E				D			

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HCS7 Two-Way Stop-Control Report

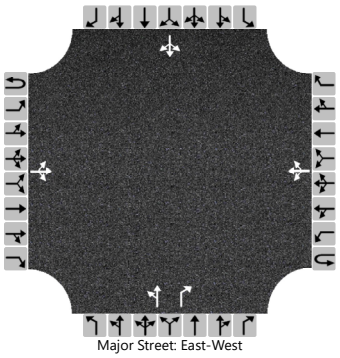
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	PM Peak - 2023 Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		37	335	65		76	404	10		76	34	79		8	42	32
Percent Heavy Vehicles (%)		0				0				0	0	0		1	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.11	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.51	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40				82				118		85			88	
Capacity, c (veh/h)		1126				1140				142		658			234	
v/c Ratio		0.04				0.07				0.83		0.13			0.38	
95% Queue Length, Q_{95} (veh)		0.1				0.2				5.4		0.4			1.7	
Control Delay (s/veh)		8.3				8.4				97.6		11.3			29.4	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.1				2.0				61.5				29.4			
Approach LOS									F				D			

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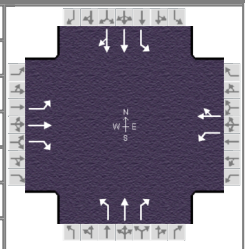
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bowman Consulting			Duration, h	0.25
Analyst	LDK	Analysis Date	Nov 9, 2020	Area Type	Other
Jurisdiction	County	Time Period	AM Peak	PHF	0.97
Urban Street	Washington Crossing-P…	Analysis Year	2023 Build	Analysis Period	1> 7:00
Intersection	WCP/Scotch	File Name	B-AM-WCP Scotch.xus		
Project Description	The Collection at Hopewell BCG 080661-01-002				

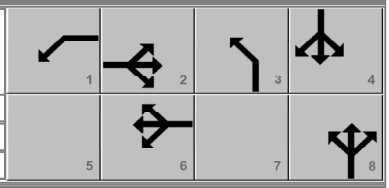


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	55	456	443	81	180	24	154	171	114	95	212	35

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	31.0	19.0	13.0	0.0	0.0
Yellow	3.0	5.0	3.0	5.0	0.0	0.0
Red	0.0	2.0	0.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6	3	8		4
Case Number		5.3	1.0	4.0	1.0	3.0		6.3
Phase Duration, s		38.0	10.0	48.0	22.0	42.0		20.0
Change Period, ($Y+R_c$), s		7.0	3.0	7.0	3.0	7.0		7.0
Max Allow Headway (*MAH*), s		0.0	3.0	0.0	3.0	3.1		3.1
Queue Clearance Time (g_s), s			4.5		7.6	7.8		8.7
Green Extension Time (g_e), s		0.0	0.0	0.0	0.2	1.1		0.6
Phase Call Probability			1.00		1.00	1.00		1.00
Max Out Probability			1.00		0.00	0.00		0.51

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	57	470	415	84	210		159	176	92	98	129	126
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1190	1885	1598	1781	1788		1753	1856	1610	1227	1900	1807
Queue Service Time (g_s), s	3.0	19.6	20.7	2.5	6.5		5.6	5.8	3.3	6.7	5.6	5.8
Cycle Queue Clearance Time (g_c), s	3.0	19.6	20.7	2.5	6.5		5.6	5.8	3.3	6.7	5.6	5.8
Green Ratio (*g/C*)	0.34	0.34	0.34	0.44	0.46		0.38	0.39	0.39	0.14	0.14	0.14
Capacity (*c*), veh/h	490	649	550	335	815		539	722	626	257	274	261
Volume-to-Capacity Ratio (*X*)	0.116	0.724	0.755	0.249	0.258		0.294	0.244	0.147	0.381	0.469	0.482
Back of Queue (*Q*), ft/ln (50 th percentile)	20.7	233.4	217.3	27	66.6		59.2	62.5	30.6	55	72.3	71.5
Back of Queue (*Q*), veh/ln (50 th percentile)	0.8	9.3	8.6	1.1	2.6		2.3	2.4	1.2	2.2	2.9	2.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.3	25.8	26.1	17.4	15.1		19.5	18.6	17.8	35.8	35.3	35.4
Incremental Delay (d_2), s/veh	0.5	6.9	9.3	1.8	0.8		1.4	0.8	0.5	4.2	5.7	6.3
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	20.8	32.7	35.4	19.2	15.9		20.9	19.4	18.3	40.0	41.0	41.7
Level of Service (LOS)	C	C	D	B	B		C	B	B	D	D	D
Approach Delay, s/veh / LOS	33.2	C		16.8	B		19.7	B		41.0	D	
Intersection Delay, s/veh / LOS	29.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.09	B	1.91	B	2.19	B
Bicycle LOS Score / LOS	2.04	B	0.97	A	1.19	A	0.78	A

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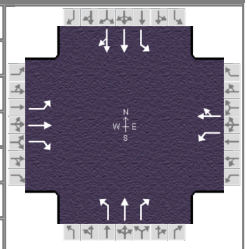
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Bowman Consulting			Duration, h	0.25
Analyst	LDK	Analysis Date	Nov 9, 2020	Area Type	Other
Jurisdiction	County	Time Period	PM Peak	PHF	0.96
Urban Street	Washington Crossing-P…	Analysis Year	2023 Build	Analysis Period	1> 4:30
Intersection	WCP/Scotch	File Name	B-PM-WCP Scotch.xus		
Project Description	The Collection at Hopewell BCG 080661-01-002				

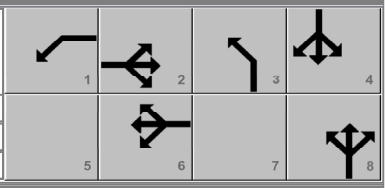


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	27	173	102	125	419	92	358	253	129	86	171	70

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.0	31.0	19.0	13.0	0.0	0.0
Yellow	3.0	5.0	3.0	5.0	0.0	0.0
Red	0.0	2.0	0.0	2.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6	3	8		4
Case Number		5.3	1.0	4.0	1.0	3.0		6.3
Phase Duration, s		38.0	10.0	48.0	22.0	42.0		20.0
Change Period, ($Y+R_c$), s		7.0	3.0	7.0	3.0	7.0		7.0
Max Allow Headway (*MAH*), s		0.0	3.0	0.0	3.0	3.1		3.1
Queue Clearance Time (g_s), s			6.0		16.7	10.9		8.6
Green Extension Time (g_e), s		0.0	0.0	0.0	0.2	1.3		0.7
Phase Call Probability			1.00		1.00	1.00		1.00
Max Out Probability			1.00		1.00	0.00		0.54

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	28	180	70	130	532		373	264	108	90	128	123
Adjusted Saturation Flow Rate (*s*), veh/h/ln	886	1885	1598	1753	1826		1795	1900	1610	1134	1900	1716
Queue Service Time (g_s), s	0.0	6.2	2.7	4.0	20.2		14.7	8.9	4.0	6.6	5.6	5.9
Cycle Queue Clearance Time (g_c), s	31.0	6.2	2.7	4.0	20.2		14.7	8.9	4.0	6.6	5.6	5.9
Green Ratio (*g/C*)	0.34	0.34	0.34	0.44	0.46		0.38	0.39	0.39	0.14	0.14	0.14
Capacity (*c*), veh/h	80	649	550	542	832		549	739	626	244	274	248
Volume-to-Capacity Ratio (*X*)	0.352	0.278	0.127	0.240	0.640		0.680	0.357	0.173	0.368	0.468	0.494
Back of Queue (*Q*), ft/ln (50 th percentile)	21.6	69	25.4	41.3	211.9		167.3	96.4	36.6	50.6	72.1	70.6
Back of Queue (*Q*), veh/ln (50 th percentile)	0.9	2.7	1.0	1.6	8.4		6.6	3.9	1.5	2.0	2.9	2.8
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	45.0	21.4	20.2	15.4	18.8		22.5	19.5	18.0	35.8	35.3	35.5
Incremental Delay (d_2), s/veh	11.7	1.1	0.5	1.0	3.8		6.7	1.3	0.6	4.2	5.6	6.9
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	56.7	22.4	20.7	16.5	22.6		29.2	20.9	18.6	40.0	41.0	42.4
Level of Service (LOS)	E	C	C	B	C		C	C	B	D	D	D
Approach Delay, s/veh / LOS	25.5	C		21.4	C		24.7	C		41.2	D	
Intersection Delay, s/veh / LOS	26.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.31	B	2.09	B	1.91	B	2.18	B
Bicycle LOS Score / LOS	0.95	A	1.58	B	1.72	B	0.77	A

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	805	358
Peak Hour Factor (PHF)	0.93	0.94
Total Trucks, %	0.00	0.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000
Flow Rate (vi),pc/h	866	381
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.23	0.20

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.592
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	866	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	10.0
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	11.2

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	592
Peak Hour Factor (PHF)	0.99	0.89
Total Trucks, %	0.00	0.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000
Flow Rate (vi),pc/h	1124	665
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.30	0.35

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.618
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.1
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1124	Ramp Junction Speed (S), mi/h	43.1
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	13.0
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	13.5

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	805	525
Peak Hour Factor (PHF)	0.93	0.85
Total Trucks, %	10.70	8.40
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.923
Flow Rate (vi),pc/h	959	669
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.43	0.35

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.338
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	959	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1628	Average Density (D), pc/mi/ln	18.5
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.6

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	431
Peak Hour Factor (PHF)	0.99	0.90
Total Trucks, %	4.20	0.50
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.995
Flow Rate (vi),pc/h	1171	481
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.43	0.25

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.339
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1171	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1652	Average Density (D), pc/mi/ln	18.8
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.9

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1306	510
Peak Hour Factor (PHF)	0.93	0.90
Total Trucks, %	10.70	2.90
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.972
Flow Rate (vi),pc/h	1555	583
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.56	0.15

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.349
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1555	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	2138	Average Density (D), pc/mi/ln	24.3
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	21.3

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1866	771
Peak Hour Factor (PHF)	0.99	0.93
Total Trucks, %	4.20	0.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.993
Flow Rate (vi),pc/h	1963	835
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.74	0.22

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.380
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	43.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1963	Ramp Junction Speed (S), mi/h	43.9
Flow Entering Ramp-Infl. Area (vR12), pc/h	2798	Average Density (D), pc/mi/ln	31.9
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	26.4

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HCS7 Two-Way Stop-Control Report

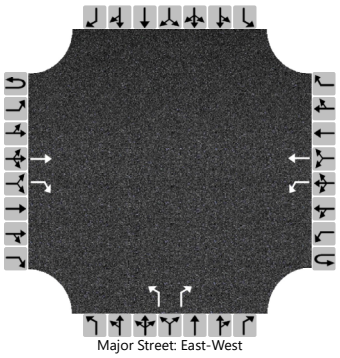
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/20
Analysis Year	2023
Time Analyzed	AM Peak (Build)
Intersection Orientation	East-West
Project Description	The Collection at Hopewell BCG #080661-01-002

Site Information

Intersection	WC-P/Road A
Jurisdiction	County
East/West Street	Washington-X-ing/Penningt
North/South Street	Road A
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			437	2		27	331			12		88				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			No							No						
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						30				13		99				
Capacity, c (veh/h)						1081				293		582				
v/c Ratio						0.03				0.05		0.17				
95% Queue Length, Q_{95} (veh)						0.1				0.1		0.6				
Control Delay (s/veh)						8.4				17.9		12.5				
Level of Service (LOS)						A				C		B				
Approach Delay (s/veh)						0.6				13.1						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

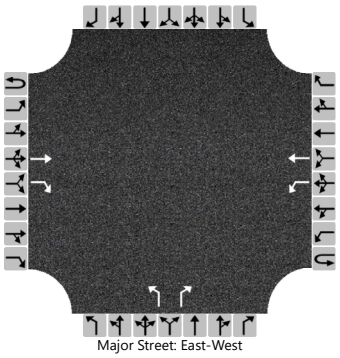
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	PM Peak (Build)
Intersection Orientation	East-West
Project Description	The Collection at Hopewell BCG #080661-01-002

Site Information

Intersection	WC-P/Road A
Jurisdiction	County
East/West Street	Washington-X-ing/Penningt
North/South Street	Road A
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			383	9		86	506			7		48				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			No							No						
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						92				8		52				
Capacity, c (veh/h)						1149				206		644				
v/c Ratio						0.08				0.04		0.08				
95% Queue Length, Q_{95} (veh)						0.3				0.1		0.3				
Control Delay (s/veh)						8.4				23.1		11.1				
Level of Service (LOS)						A				C		B				
Approach Delay (s/veh)						1.2				12.6						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

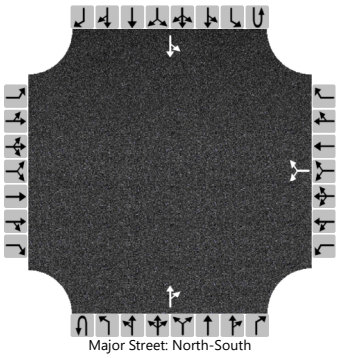
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	AM Peak (Build)
Intersection Orientation	North-South
Project Description	The Collection at Hopewell BCG #080661-01-002

Site Information

Intersection	Reed Rd/Road 1
Jurisdiction	Municipal
East/West Street	Road 1
North/South Street	Reed Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						7		23			177	2		8	221	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							34							9		
Capacity, c (veh/h)							753							1383		
v/c Ratio							0.04							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							10.0							7.6		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						10.0								0.3		
Approach LOS						B										

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HCS7 Two-Way Stop-Control Report

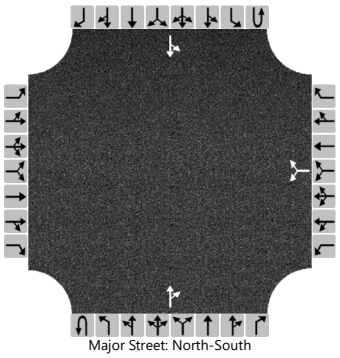
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	11/9/2020
Analysis Year	2023
Time Analyzed	PM Peak (Build)
Intersection Orientation	North-South
Project Description	The Collection at Hopewell BCG #080661-01-002

Site Information

Intersection	Reed Rd/Road 1
Jurisdiction	Municipal
East/West Street	Road 1
North/South Street	Reed Road
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						4		13			176	6		21	162	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							18							23		
Capacity, c (veh/h)							773							1389		
v/c Ratio							0.02							0.02		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							9.8							7.6		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					9.8								1.0			
Approach LOS					A											

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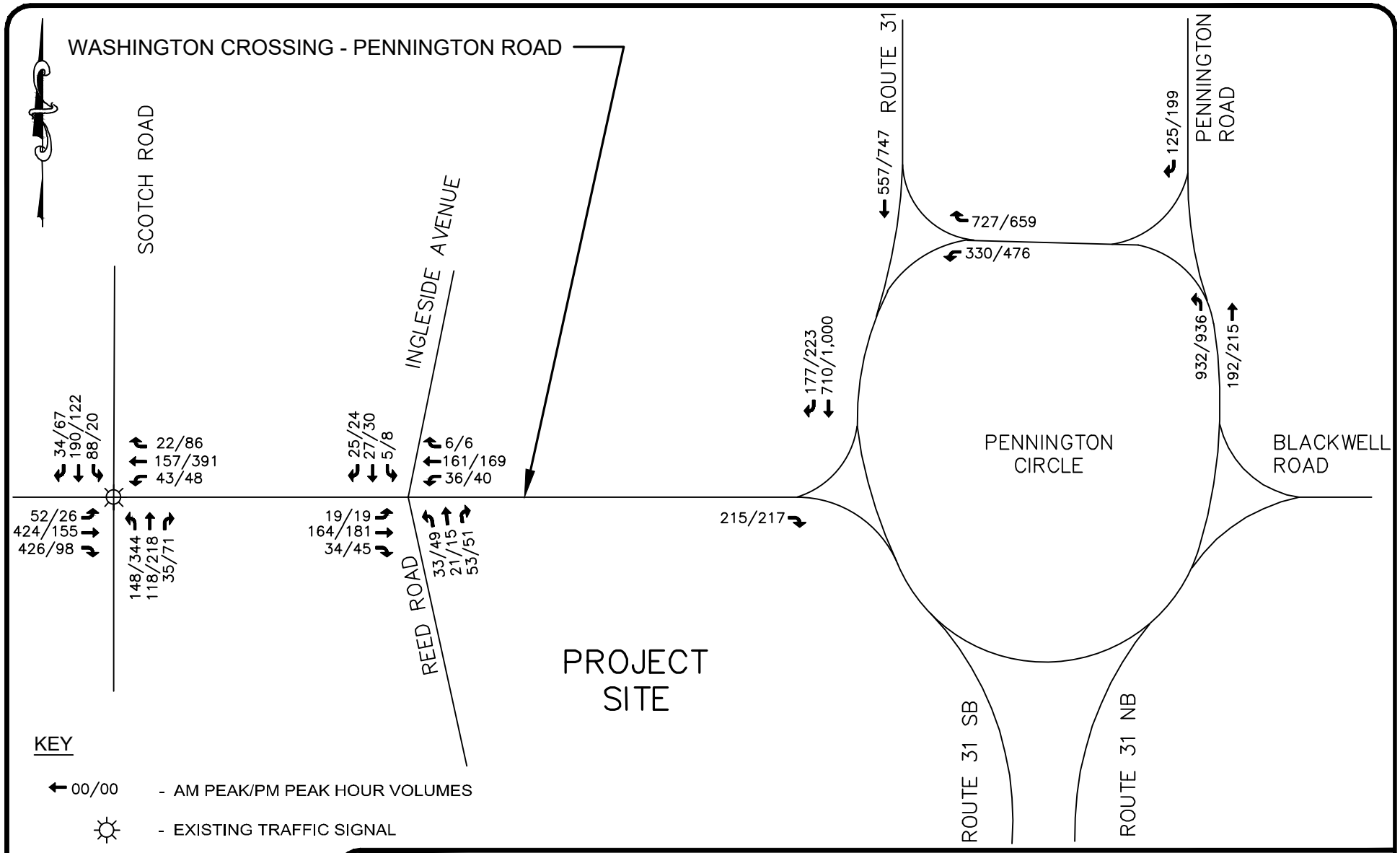
APPENDIX III

TRAFFIC COUNTS &
HISTORICAL COUNT DATA

V:\080661 - Zaitz Parcel Residential-Hopewell Twp\080661-01-002 (ENG) - Lennar-Zaitz Parcel Res-Hopewell Twp\Engineering\Engineering Plans\Traffic Figures\080661-Traffic Figures.dwg 11/10/20 03:42:20PM, brecchia, LAYOUT:EXISTING TRAFFIC 2A



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NJ Certificate of Authorization
No. 24GA28222600

DATE: 11/10/2020
CHKD.:
PROJ.: 080661-01-002

FIGURE 2A
THE COLLECTION AT HOPEWELL
EXISTING (UNADJUSTED) TRAFFIC VOLUMES
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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V:\080661 - Zaitz Parcel Residential-Hopewell Twp\080661-01-002 (ENG) - Lennar-Zaitz Parcel Res-Hopewell Twp\Engineering\Engineering Plans\Traffic Figures\080661-Traffic Figures.dwg, EXIS

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BrightViewEngineering.com

Hopewell, NJ
CR 546 & Reed Rd
Wednesday, November 4, 2020
Location: 40.30775, -74.796361

Count Name: CR 546/Reed Rd/CR631
Site Code:
Start Date: 11/04/2020

Turning Movement Data

Start Time	CR 631 (Ingleside Ave) Southbound						CR 546 Westbound						Reed Rd Northbound						CR 546 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	2	2	1	0	0	5	0	17	8	0	0	25	3	4	8	0	0	15	8	28	3	0	0	39	84
7:15 AM	8	5	0	0	0	13	3	23	5	0	0	31	5	3	12	0	0	20	8	21	2	0	0	31	95
7:30 AM	7	4	0	0	0	11	0	51	10	0	0	61	20	5	6	0	0	31	11	41	1	0	0	53	156
7:45 AM	8	8	1	0	0	17	2	43	11	0	0	56	13	8	9	0	0	30	12	43	7	0	0	62	165
Hourly Total	25	19	2	0	0	46	5	134	34	0	0	173	41	20	35	0	0	96	39	133	13	0	0	185	500
8:00 AM	5	8	3	0	0	16	2	32	7	0	0	41	11	2	11	0	0	24	4	39	6	0	0	49	130
8:15 AM	5	7	1	0	1	13	2	35	8	0	0	45	9	6	7	0	0	22	7	41	5	0	0	53	133
8:30 AM	6	7	1	0	0	14	1	28	9	0	0	38	7	3	6	0	0	16	13	35	5	0	0	53	121
8:45 AM	2	12	2	0	0	16	1	22	6	0	0	29	3	4	6	0	0	13	8	34	5	0	0	47	105
Hourly Total	18	34	7	0	1	59	6	117	30	0	0	153	30	15	30	0	0	75	32	149	21	0	0	202	489
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	5	7	3	0	0	15	2	42	13	0	1	57	10	2	15	0	0	27	12	43	9	0	1	64	163
4:15 PM	5	7	0	0	0	12	3	53	9	0	0	65	8	5	7	0	0	20	11	48	5	0	0	64	161
4:30 PM	10	6	2	0	0	18	0	36	12	0	0	48	19	2	11	0	0	32	9	43	3	0	0	55	153
4:45 PM	2	8	0	0	0	10	2	45	9	0	0	56	10	3	14	0	0	27	8	44	3	0	0	55	148
Hourly Total	22	28	5	0	0	55	7	176	43	0	1	226	47	12	47	0	0	106	40	178	20	0	1	238	625
5:00 PM	6	7	1	1	0	15	1	49	11	0	0	61	10	6	13	0	0	29	15	40	4	0	0	59	164
5:15 PM	6	9	4	0	0	19	3	39	8	0	0	50	12	4	11	0	0	27	13	54	8	1	0	76	172
5:30 PM	4	8	1	0	0	13	2	35	9	0	0	46	10	5	6	0	0	21	8	37	1	1	0	47	127
5:45 PM	5	5	1	0	0	11	2	43	5	0	0	50	11	3	9	0	0	23	9	33	4	0	0	46	130
Hourly Total	21	29	7	1	0	58	8	166	33	0	0	207	43	18	39	0	0	100	45	164	17	2	0	228	593
6:00 PM	7	7	0	0	0	14	0	33	4	0	0	37	7	3	11	0	0	21	8	27	7	0	0	42	114
6:15 PM	4	1	1	0	0	6	5	32	6	0	0	43	9	6	7	0	0	22	7	18	3	0	0	28	99
Grand Total	97	118	22	1	1	238	31	658	150	0	1	839	177	74	169	0	0	420	171	669	81	2	1	923	2420
Approach %	40.8	49.6	9.2	0.4	-	-	3.7	78.4	17.9	0.0	-	-	42.1	17.6	40.2	0.0	-	-	18.5	72.5	8.8	0.2	-	-	-
Total %	4.0	4.9	0.9	0.0	-	9.8	1.3	27.2	6.2	0.0	-	34.7	7.3	3.1	7.0	0.0	-	17.4	7.1	27.6	3.3	0.1	-	38.1	-
Lights	94	115	21	1	-	231	28	643	133	0	-	804	168	72	154	0	-	394	153	654	78	2	-	887	2316
% Lights	96.9	97.5	95.5	100.0	-	97.1	90.3	97.7	88.7	-	-	95.8	94.9	97.3	91.1	-	-	93.8	89.5	97.8	96.3	100.0	-	96.1	95.7
Buses	2	1	0	0	-	3	1	13	5	0	-	19	0	1	3	0	-	4	11	10	3	0	-	24	50
% Buses	2.1	0.8	0.0	0.0	-	1.3	3.2	2.0	3.3	-	-	2.3	0.0	1.4	1.8	-	-	1.0	6.4	1.5	3.7	0.0	-	2.6	2.1
Trucks	1	2	1	0	-	4	2	2	12	0	-	16	9	1	12	0	-	22	7	5	0	0	-	12	54
% Trucks	1.0	1.7	4.5	0.0	-	1.7	6.5	0.3	8.0	-	-	1.9	5.1	1.4	7.1	-	-	5.2	4.1	0.7	0.0	0.0	-	1.3	2.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-

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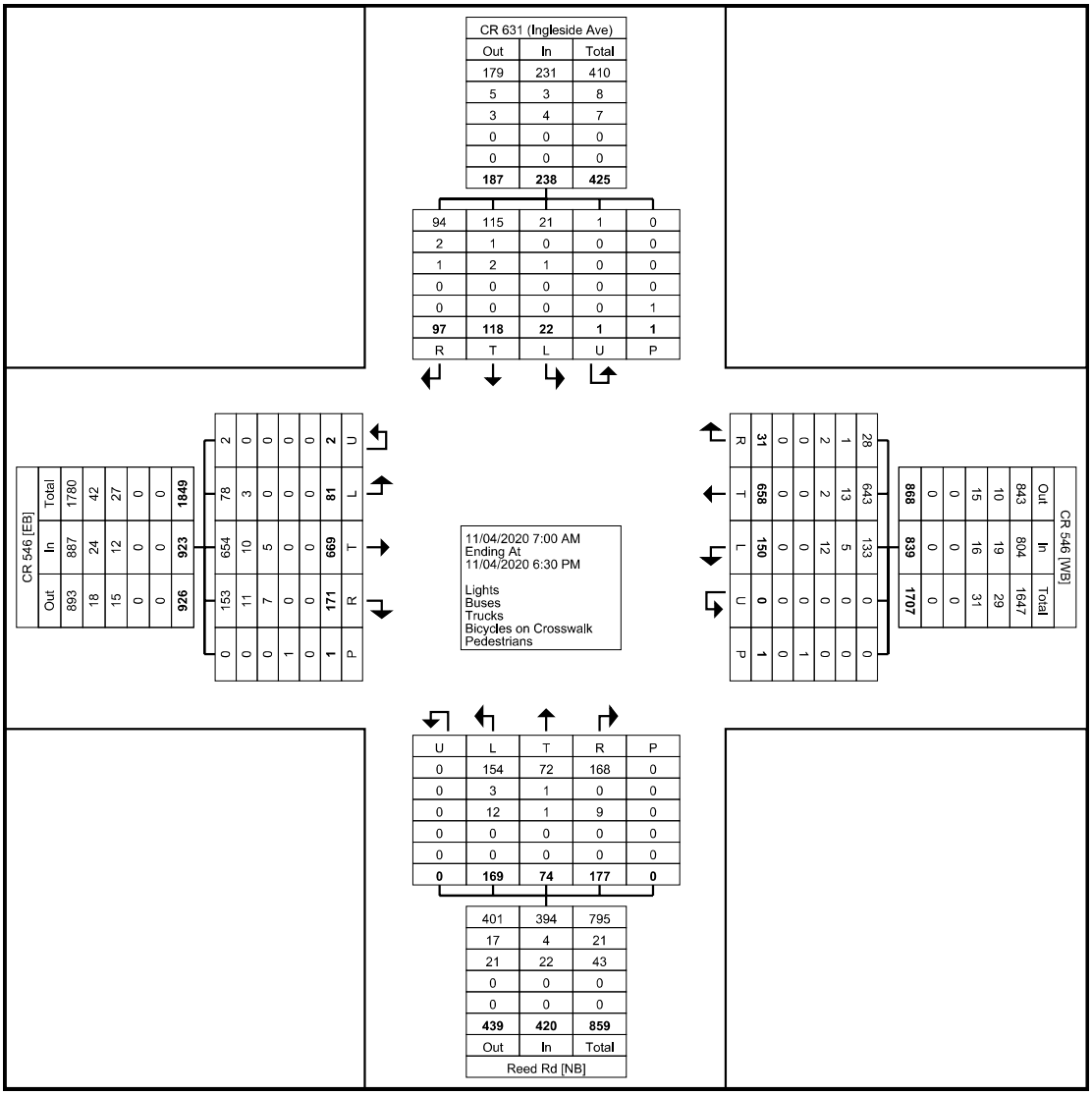
Hopewell, NJ
CR 546 & Reed Rd
Wednesday, November 4, 2020
Location: 40.30775, -74.796361

Count Name: CR 546/Reed Rd/CR631
Site Code:
Start Date: 11/04/2020



Turning Movement Data Plot

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Hopewell, NJ
CR 546 & Reed Rd
Wednesday, November 4, 2020
Location: 40.30775, -74.796361

Count Name: CR 546/Reed Rd/CR631
Site Code:
Start Date: 11/04/2020

Turning Movement Peak Hour Data (7:30 AM)

Start Time	CR 631 (Ingleside Ave) Southbound						CR 546 Westbound						Reed Rd Northbound						CR 546 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	7	4	0	0	0	11	0	51	10	0	0	61	20	5	6	0	0	31	11	41	1	0	0	53	156
7:45 AM	8	8	1	0	0	17	2	43	11	0	0	56	13	8	9	0	0	30	12	43	7	0	0	62	165
8:00 AM	5	8	3	0	0	16	2	32	7	0	0	41	11	2	11	0	0	24	4	39	6	0	0	49	130
8:15 AM	5	7	1	0	1	13	2	35	8	0	0	45	9	6	7	0	0	22	7	41	5	0	0	53	133
Total	25	27	5	0	1	57	6	161	36	0	0	203	53	21	33	0	0	107	34	164	19	0	0	217	584
Approach %	43.9	47.4	8.8	0.0	-	-	3.0	79.3	17.7	0.0	-	-	49.5	19.6	30.8	0.0	-	-	15.7	75.6	8.8	0.0	-	-	-
Total %	4.3	4.6	0.9	0.0	-	9.8	1.0	27.6	6.2	0.0	-	34.8	9.1	3.6	5.7	0.0	-	18.3	5.8	28.1	3.3	0.0	-	37.2	-
PHF	0.781	0.844	0.417	0.000	-	0.838	0.750	0.789	0.818	0.000	-	0.832	0.663	0.656	0.750	0.000	-	0.863	0.708	0.953	0.679	0.000	-	0.875	0.885
Lights	24	25	5	0	-	54	5	149	35	0	-	189	46	21	32	0	-	99	31	158	17	0	-	206	548
% Lights	96.0	92.6	100.0	-	-	94.7	83.3	92.5	97.2	-	-	93.1	86.8	100.0	97.0	-	-	92.5	91.2	96.3	89.5	-	-	94.9	93.8
Buses	1	1	0	0	-	2	1	10	0	0	-	11	0	0	1	0	-	1	3	5	2	0	-	10	24
% Buses	4.0	3.7	0.0	-	-	3.5	16.7	6.2	0.0	-	-	5.4	0.0	0.0	3.0	-	-	0.9	8.8	3.0	10.5	-	-	4.6	4.1
Trucks	0	1	0	0	-	1	0	2	1	0	-	3	7	0	0	0	-	7	0	1	0	0	-	1	12
% Trucks	0.0	3.7	0.0	-	-	1.8	0.0	1.2	2.8	-	-	1.5	13.2	0.0	0.0	-	-	6.5	0.0	0.6	0.0	-	-	0.5	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Wednesday, November 4, 2020
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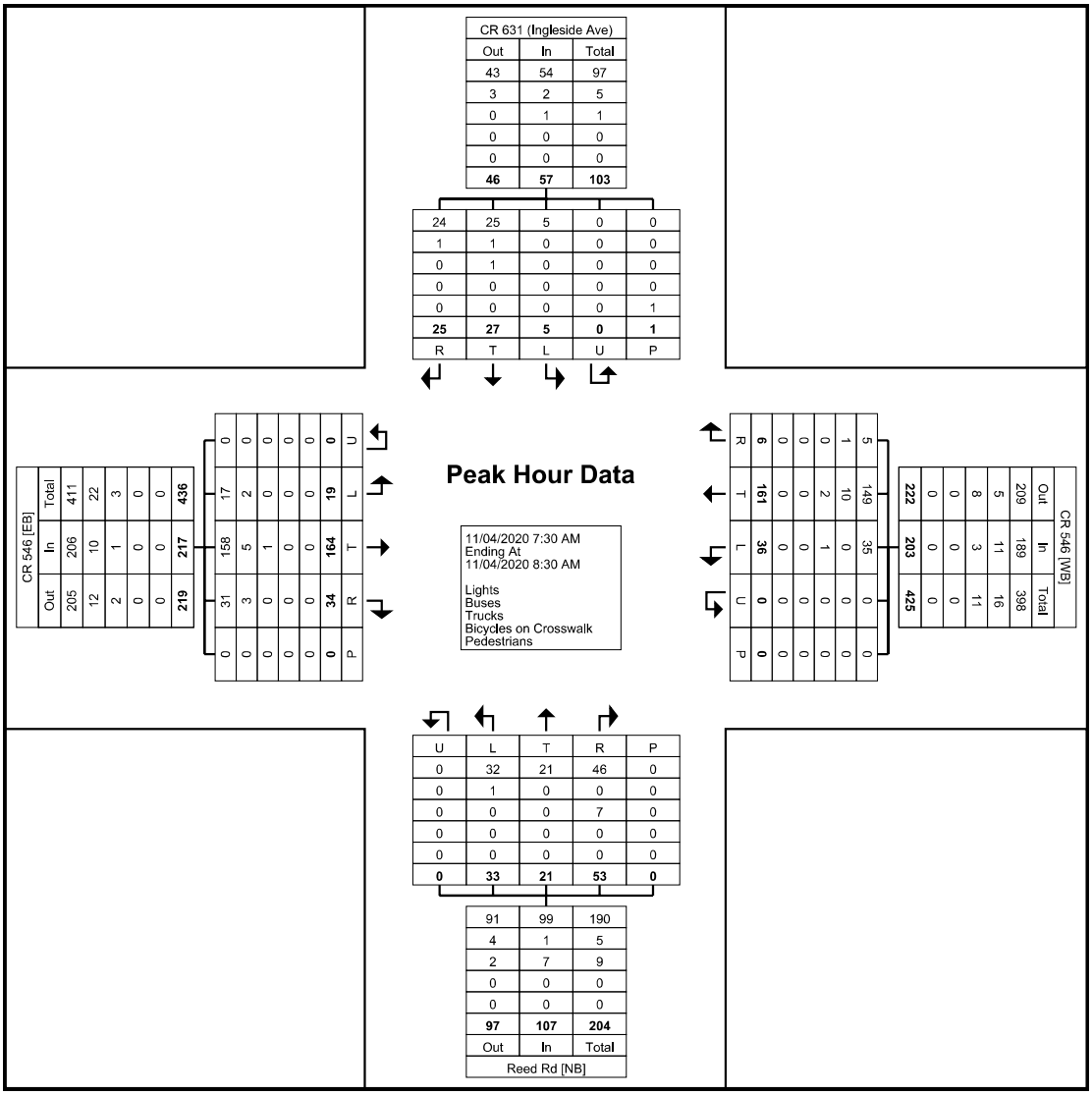

Turning Movement Peak Hour Data Plot (7:30 AM)

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Hopewell, NJ
CR 546 & Reed Rd
Wednesday, November 4, 2020
Location: 40.30775, -74.796361

Count Name: CR 546/Reed Rd/CR631
Site Code:
Start Date: 11/04/2020

Turning Movement Peak Hour Data (4:30 PM)

Start Time	CR 631 (Ingleside Ave) Southbound						CR 546 Westbound						Reed Rd Northbound						CR 546 Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:30 PM	10	6	2	0	0	18	0	36	12	0	0	48	19	2	11	0	0	32	9	43	3	0	0	55	153
4:45 PM	2	8	0	0	0	10	2	45	9	0	0	56	10	3	14	0	0	27	8	44	3	0	0	55	148
5:00 PM	6	7	1	1	0	15	1	49	11	0	0	61	10	6	13	0	0	29	15	40	4	0	0	59	164
5:15 PM	6	9	4	0	0	19	3	39	8	0	0	50	12	4	11	0	0	27	13	54	8	1	0	76	172
Total	24	30	7	1	0	62	6	169	40	0	0	215	51	15	49	0	0	115	45	181	18	1	0	245	637
Approach %	38.7	48.4	11.3	1.6	-	-	2.8	78.6	18.6	0.0	-	-	44.3	13.0	42.6	0.0	-	-	18.4	73.9	7.3	0.4	-	-	-
Total %	3.8	4.7	1.1	0.2	-	9.7	0.9	26.5	6.3	0.0	-	33.8	8.0	2.4	7.7	0.0	-	18.1	7.1	28.4	2.8	0.2	-	38.5	-
PHF	0.600	0.833	0.438	0.250	-	0.816	0.500	0.862	0.833	0.000	-	0.881	0.671	0.625	0.875	0.000	-	0.898	0.750	0.838	0.563	0.250	-	0.806	0.926
Lights	24	30	7	1	-	62	6	169	37	0	-	212	51	14	45	0	-	110	44	180	18	1	-	243	627
% Lights	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	92.5	-	-	98.6	100.0	93.3	91.8	-	-	95.7	97.8	99.4	100.0	100.0	-	99.2	98.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Trucks	0	0	0	0	-	0	0	0	3	0	-	3	0	1	4	0	-	5	1	1	0	0	-	2	10
% Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	7.5	-	-	1.4	0.0	6.7	8.2	-	-	4.3	2.2	0.6	0.0	0.0	-	0.8	1.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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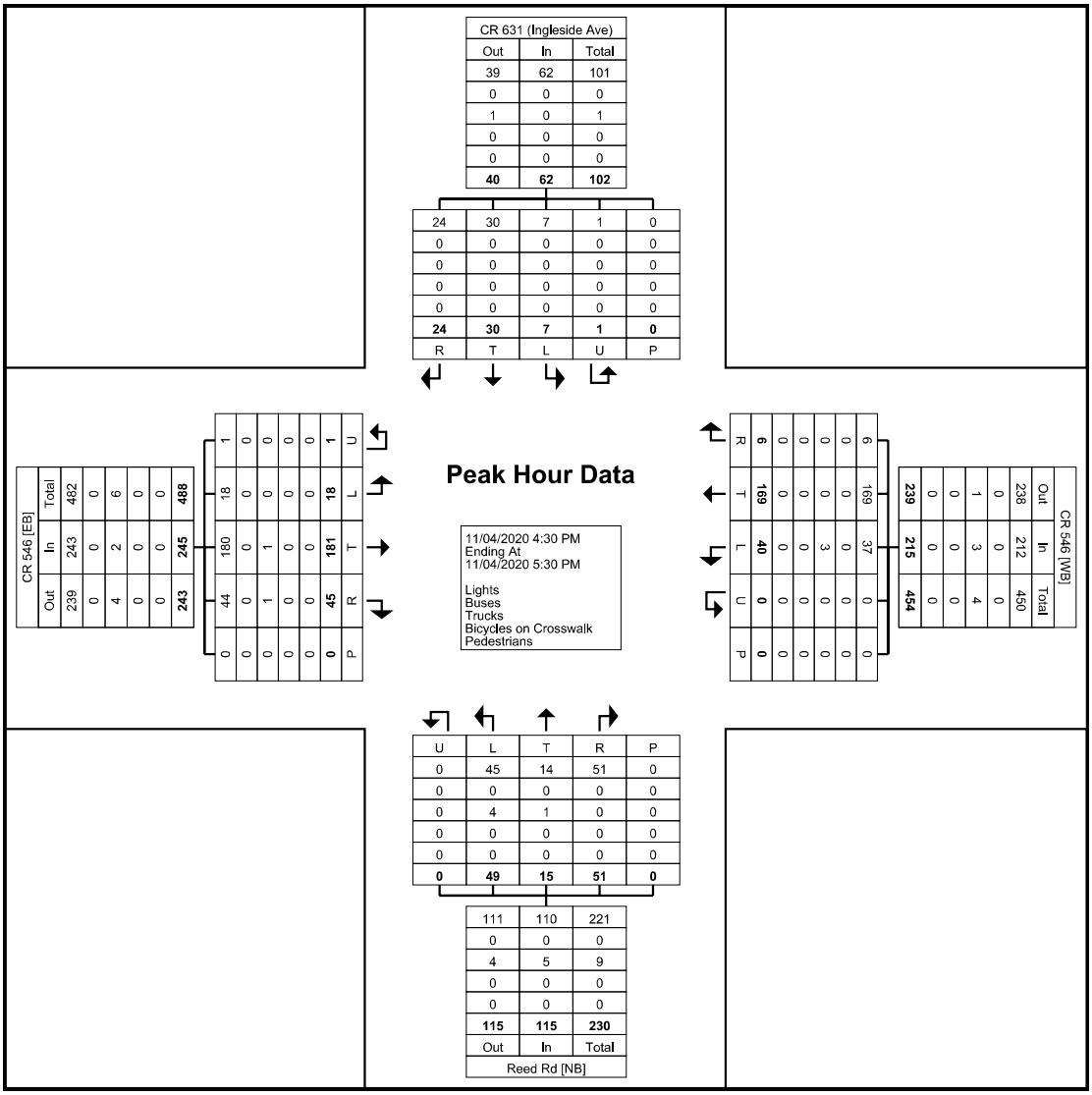
Hopewell, NJ
CR 546 & Reed Rd
Wednesday, November 4, 2020
Location: 40.30775, -74.796361

Count Name: CR 546/Reed Rd/CR631
Site Code:
Start Date: 11/04/2020
Page No: 6



Turning Movement Peak Hour Data Plot (4:30 PM)

Pennington Rd/Route 31 - TMC

Wed Nov 4, 2020
Full Length (7 AM-9 AM, 4 PM-6:30 PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 795873, Location: 40.308971, -74.78707

Bright View Engineering
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Leg	Pennington Rd					Route 31NB					Pennington Rd/Route 31 SB		Route 31 NB		
Direction	Southbound					Northbound					Northeastbound		Southeastbound		
Time	HR	BR	U	**App**	Ped*	T	BL	HL	**App**	Ped*	**App**	Ped*	**App**	Ped*	**Int**
2020-11-04 7:00AM	0	13	0	**13**	0	22	146	32	**200**	0	**0**	0	**0**	0	**213**
7:15AM	0	25	0	**25**	0	39	207	43	**289**	0	**0**	0	**0**	0	**314**
7:30AM	0	22	0	**22**	0	50	188	60	**298**	0	**0**	0	**0**	0	**320**
7:45AM	0	44	0	**44**	0	60	193	58	**311**	0	**0**	0	**0**	0	**355**
Hourly Total	0	104	0	**104**	0	171	734	193	**1098**	0	**0**	0	**0**	0	**1202**
8:00AM	0	34	0	**34**	0	43	139	44	**226**	0	**0**	0	**0**	0	**260**
8:15AM	1	31	0	**32**	0	51	169	51	**271**	0	**0**	0	**0**	0	**303**
8:30AM	0	44	0	**44**	0	46	157	50	**253**	0	**0**	0	**0**	0	**297**
8:45AM	0	42	0	**42**	0	35	161	45	**241**	0	**0**	0	**0**	0	**283**
Hourly Total	1	151	0	**152**	0	175	626	190	**991**	0	**0**	0	**0**	0	**1143**
9:00AM	0	0	0	**0**	0	0	0	0	**0**	0	**0**	0	**0**	0	**0**
Hourly Total	0	0	0	**0**	0	0	0	0	**0**	0	**0**	0	**0**	0	**0**
4:00PM	2	45	0	**47**	0	56	167	75	**298**	0	**0**	0	**0**	0	**345**
4:15PM	2	44	0	**46**	0	50	154	80	**284**	0	**0**	0	**0**	0	**330**
4:30PM	1	50	0	**51**	0	51	145	61	**257**	0	**0**	0	**0**	0	**308**
4:45PM	2	53	0	**55**	0	34	163	82	**279**	0	**0**	0	**0**	0	**334**
Hourly Total	7	192	0	**199**	0	191	629	298	**1118**	0	**0**	0	**0**	0	**1317**
5:00PM	1	52	0	**53**	0	62	181	68	**311**	0	**0**	0	**0**	0	**364**
5:15PM	2	38	0	**40**	0	68	164	72	**304**	0	**0**	0	**0**	0	**344**
5:30PM	6	30	0	**36**	0	55	139	58	**252**	0	**0**	0	**0**	0	**288**
5:45PM	2	36	0	**38**	0	69	137	67	**273**	0	**0**	0	**0**	0	**311**
Hourly Total	11	156	0	**167**	0	254	621	265	**1140**	0	**0**	0	**0**	0	**1307**
6:00PM	1	22	0	**23**	0	50	118	50	**218**	0	**0**	0	**0**	0	**241**
6:15PM	1	29	0	**30**	0	35	95	56	**186**	0	**0**	0	**0**	0	**216**
Hourly Total	2	51	0	**53**	0	85	213	106	**404**	0	**0**	0	**0**	0	**457**
Total	21	654	0	**675**	0	876	2823	1052	**4751**	0	**0**	0	**0**	0	**5426**
% Approach	3.1%	96.9%	0%	**-**	-	18.4%	59.4%	22.1%	**-**	-	**-**	-	**-**	-	**-**
% Total	0.4%	12.1%	0%	**12.4%**	-	16.1%	52.0%	19.4%	**87.6%**	-	**0%**	-	**0%**	-	**-**
Lights	19	634	0	**653**	-	833	2585	1021	**4439**	-	**0**	-	**0**	-	5092
% Lights	90.5%	96.9%	0%	**96.7%**	-	95.1%	91.6%	97.1%	**93.4%**	-	**-**	-	**-**	-	93.8%
Articulated Trucks and Single-Unit Trucks	1	12	0	**13**	-	29	220	20	**269**	-	**0**	-	**0**	-	282
% Articulated Trucks and Single-Unit Trucks	4.8%	1.8%	0%	**1.9%**	-	3.3%	7.8%	1.9%	**5.7%**	-	**-**	-	**-**	-	5.2%
Buses	1	8	0	**9**	-	14	18	11	**43**	-	**0**	-	**0**	-	52
% Buses	4.8%	1.2%	0%	**1.3%**	-	1.6%	0.6%	1.0%	**0.9%**	-	**-**	-	**-**	-	1.0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	0	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, T: Thru, U: U-Turn

Pennington Rd/Route 31 - TMC
Wed Nov 4, 2020
Full Length (7 AM-9 AM, 4 PM-6:30 PM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 795873, Location: 40.308971, -74.78707

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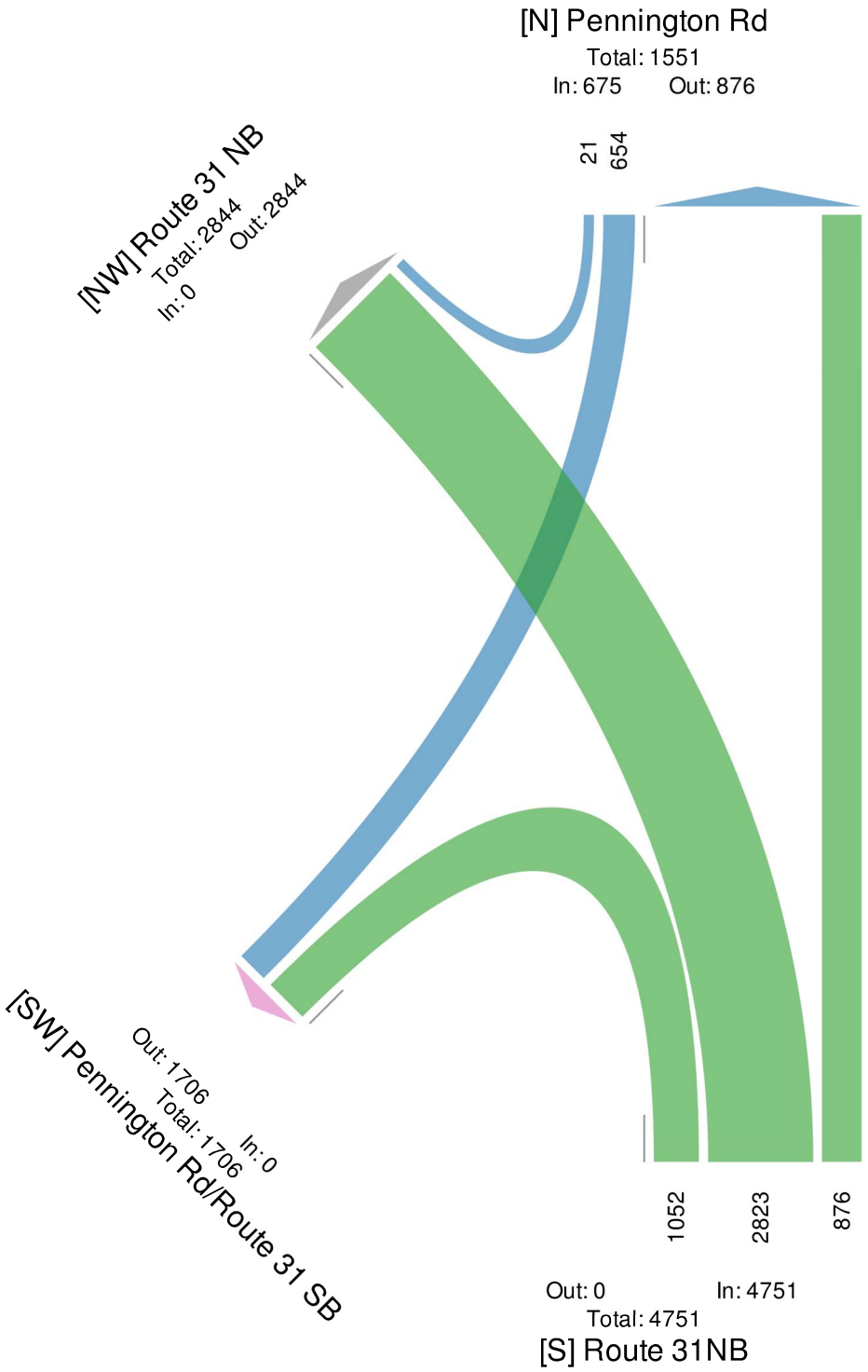

Pennington Rd/Route 31 - TMC
Wed Nov 4, 2020
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 795873, Location: 40.308971, -74.78707

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Leg	Pennington Rd					Route 31NB					Pennington Rd/Route 31 SB		Route 31 NB		
Direction	Southbound					Northbound					Northeastbound		Southeastbound		
Time	HR	BR	U	**App**	Ped*	T	BL	HL	**App**	Ped*	**App**	Ped*	**App**	Ped*	**Int**
2020-11-04 7:15AM	0	25	0	**25**	0	39	207	43	**289**	0	**0**	0	**0**	0	**314**
7:30AM	0	22	0	**22**	0	50	188	60	**298**	0	**0**	0	**0**	0	**320**
7:45AM	0	44	0	**44**	0	60	193	58	**311**	0	**0**	0	**0**	0	**355**
8:00AM	0	34	0	**34**	0	43	139	44	**226**	0	**0**	0	**0**	0	**260**
Total	0	125	0	**125**	0	192	727	205	**1124**	0	**0**	0	**0**	0	**1249**
% Approach	0%	100%	0%	**-**	-	17.1%	64.7%	18.2%	**-**	-	**-**	-	**-**	-	**-**
% Total	0%	10.0%	0%	**10.0%**	-	15.4%	58.2%	16.4%	**90.0%**	-	**0%**	-	**0%**	-	**-**
PHF	-	0.710	-	**0.710**	-	0.800	0.878	0.854	**0.904**	-	**-**	-	**-**	-	0.880
Lights	0	117	0	**117**	-	174	642	191	**1007**	-	**0**	-	**0**	-	1124
% Lights	0%	93.6%	0%	**93.6%**	-	90.6%	88.3%	93.2%	**89.6%**	-	**-**	-	**-**	-	90.0%
Articulated Trucks and Single-Unit Trucks	0	5	0	**5**	-	16	74	6	**96**	-	**0**	-	**0**	-	101
% Articulated Trucks and Single-Unit Trucks	0%	4.0%	0%	**4.0%**	-	8.3%	10.2%	2.9%	**8.5%**	-	**-**	-	**-**	-	8.1%
Buses	0	3	0	**3**	-	2	11	8	**21**	-	**0**	-	**0**	-	24
% Buses	0%	2.4%	0%	**2.4%**	-	1.0%	1.5%	3.9%	**1.9%**	-	**-**	-	**-**	-	1.9%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	0	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, T: Thru, U: U-Turn

Pennington Rd/Route 31 - TMC
Wed Nov 4, 2020
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 795873, Location: 40.308971, -74.78707

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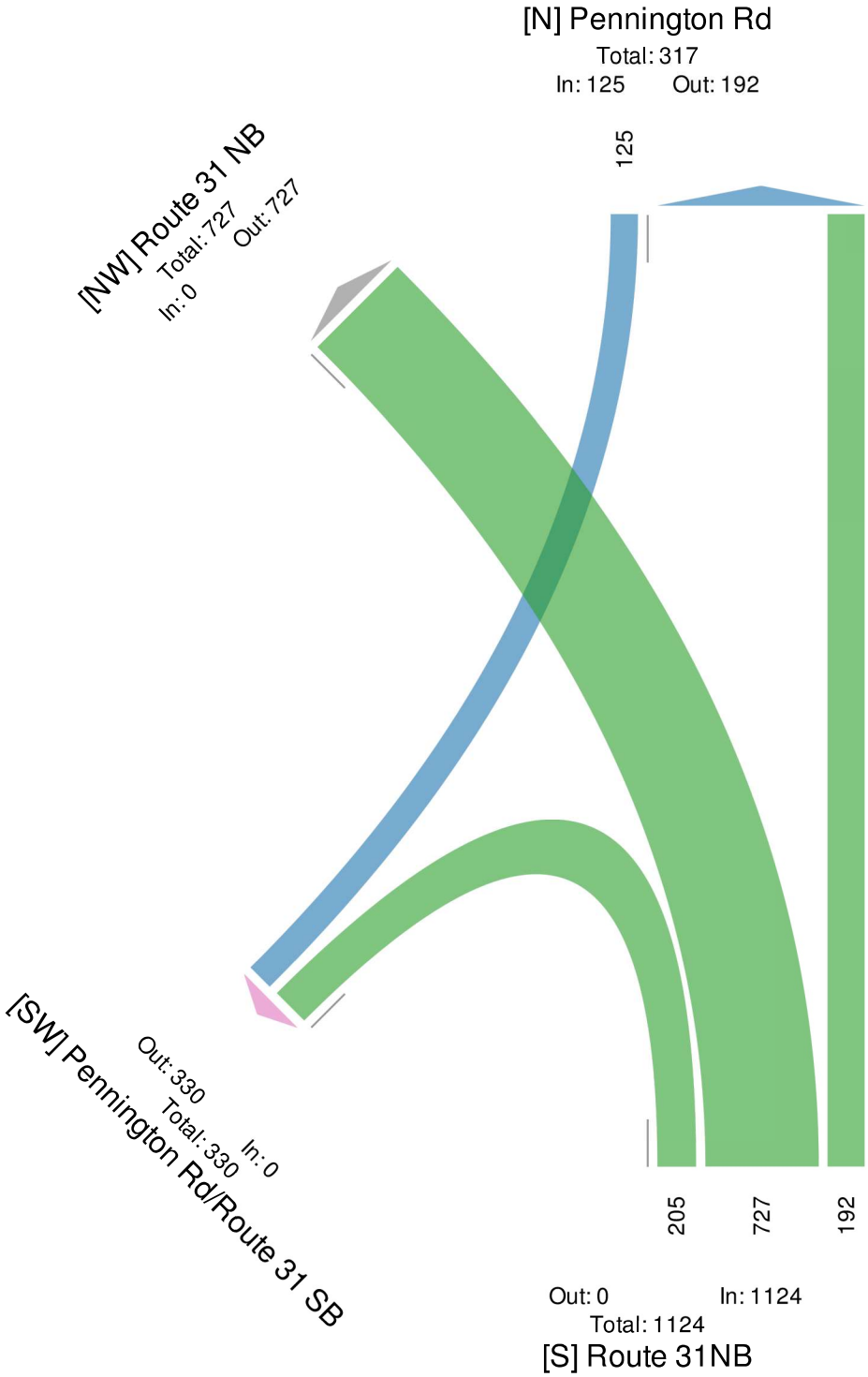

Pennington Rd/Route 31 - TMC

Wed Nov 4, 2020
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 795873, Location: 40.308971, -74.78707

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Leg	Pennington Rd					Route 31NB					Pennington Rd/Route 31 SB		Route 31 NB		
Direction	Southbound					Northbound					Northeastbound		Southeastbound		
Time	HR	BR	U	**App**	Ped*	T	BL	HL	**App**	Ped*	**App**	Ped*	**App**	Ped*	**Int**
2020-11-04 4:30PM	1	50	0	**51**	0	51	145	61	**257**	0	**0**	0	**0**	0	**308**
4:45PM	2	53	0	**55**	0	34	163	82	**279**	0	**0**	0	**0**	0	**334**
5:00PM	1	52	0	**53**	0	62	181	68	**311**	0	**0**	0	**0**	0	**364**
5:15PM	2	38	0	**40**	0	68	164	72	**304**	0	**0**	0	**0**	0	**344**
Total	6	193	0	**199**	0	215	653	283	**1151**	0	**0**	0	**0**	0	**1350**
% Approach	3.0%	97.0%	0%	**-**	-	18.7%	56.7%	24.6%	**-**	-	**-**	-	**-**	-	**-**
% Total	0.4%	14.3%	0%	**14.7%**	-	15.9%	48.4%	21.0%	**85.3%**	-	**0%**	-	**0%**	-	**-**
PHF	0.750	0.910		**-** **0.905**	-	0.790	0.902	0.863	**0.925**	-	**-**	-	**-**	-	0.927
Lights	6	190	0	**196**	-	212	614	281	**1107**	-	**0**	-	**0**	-	1303
% Lights	100%	98.4%	0%	**98.5%**	-	98.6%	94.0%	99.3%	**96.2%**	-	**-**	-	**-**	-	96.5%
Articulated Trucks and Single-Unit Trucks	0	2	0	**2**	-	2	37	2	**41**	-	**0**	-	**0**	-	43
% Articulated Trucks and Single-Unit Trucks	0%	1.0%	0%	**1.0%**	-	0.9%	5.7%	0.7%	**3.6%**	-	**-**	-	**-**	-	3.2%
Buses	0	1	0	**1**	-	1	2	0	**3**	-	**0**	-	**0**	-	4
% Buses	0%	0.5%	0%	**0.5%**	-	0.5%	0.3%	0%	**0.3%**	-	**-**	-	**-**	-	0.3%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	0	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, T: Thru, U: U-Turn

Pennington Rd/Route 31 - TMC
Wed Nov 4, 2020
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks and Single-Unit Trucks, Buses, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 795873, Location: 40.308971, -74.78707

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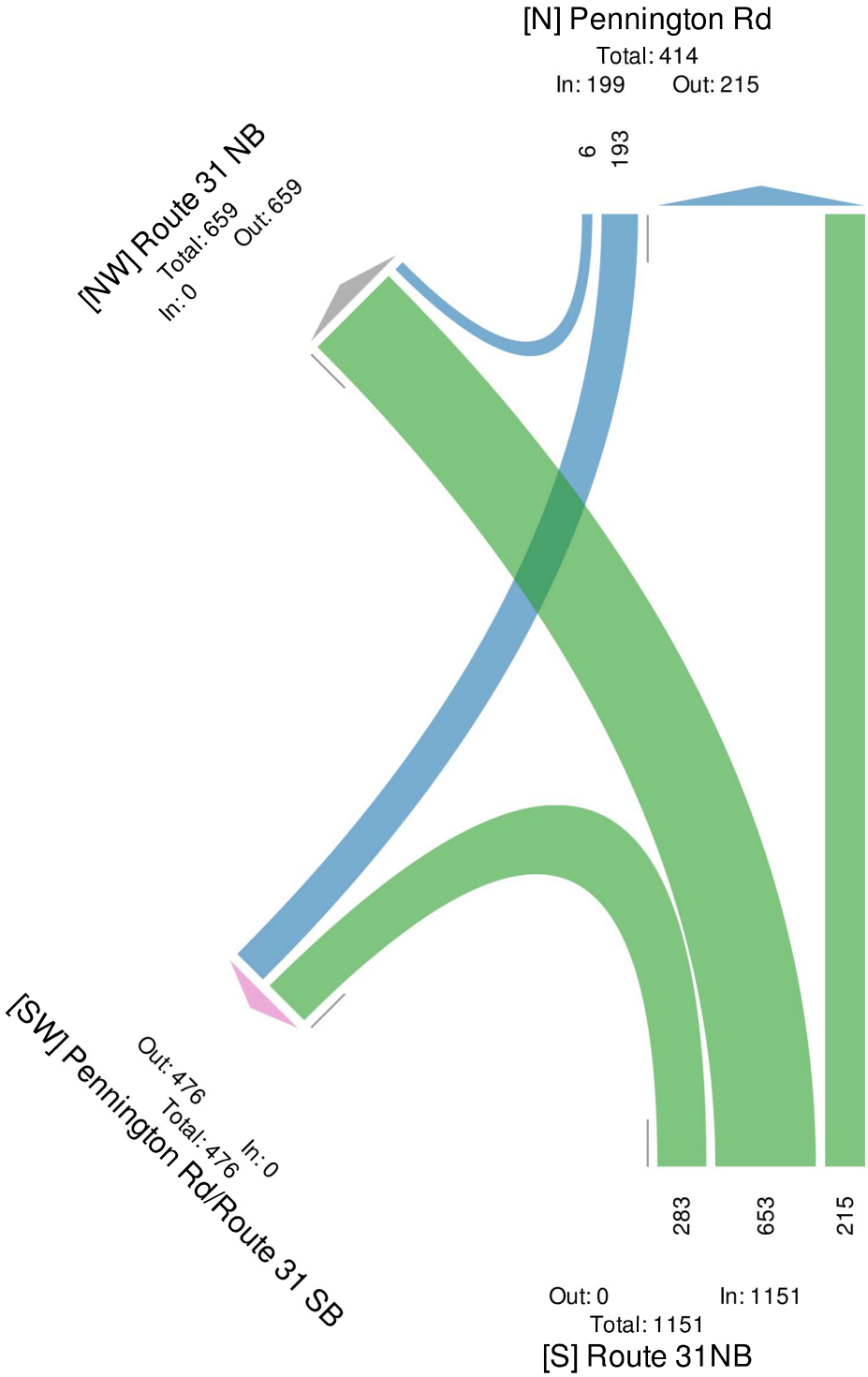

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Hopewell, NJ
Route 31SB & SC 546
Wednesday, November 4, 2020
Location: 40.308328, -74.787444

Count Name: Route 31 SB/CR 546
Site Code:
Start Date: 11/04/2020

Turning Movement Data

Start Time	Route 31 Southbound				CR 546 Westbound		CR 546 Eastbound			
	Right	Left	Peds	App. Total	Peds	App. Total	Thru	Peds	App. Total	Int. Total
7:00 AM	26	105	0	131	0	0	34	0	34	165
7:15 AM	32	137	0	169	0	0	24	0	24	193
7:30 AM	56	123	0	179	0	0	56	0	56	235
7:45 AM	53	190	0	243	0	0	63	0	63	306
Hourly Total	167	555	0	722	0	0	177	0	177	899
8:00 AM	43	188	0	231	0	0	53	0	53	284
8:15 AM	47	164	0	211	0	0	57	0	57	268
8:30 AM	34	168	0	202	0	0	42	0	42	244
8:45 AM	31	189	0	220	0	0	42	0	42	262
Hourly Total	155	709	0	864	0	0	194	0	194	1058
9:00 AM	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0
4:00 PM	59	248	0	307	0	0	56	0	56	363
4:15 PM	63	247	0	310	0	0	51	0	51	361
4:30 PM	48	252	0	300	0	0	60	0	60	360
4:45 PM	53	253	0	306	0	0	50	0	50	356
Hourly Total	223	1000	0	1223	0	0	217	0	217	1440
5:00 PM	58	241	0	299	0	0	55	0	55	354
5:15 PM	51	253	0	304	0	0	64	0	64	368
5:30 PM	49	233	0	282	0	0	59	0	59	341
5:45 PM	50	225	0	275	0	0	44	0	44	319
Hourly Total	208	952	0	1160	0	0	222	0	222	1382
6:00 PM	31	216	0	247	0	0	39	0	39	286
6:15 PM	42	173	0	215	0	0	27	0	27	242
Grand Total	826	3605	0	4431	0	0	876	0	876	5307
Approach %	18.6	81.4	-	-	-	-	100.0	-	-	-
Total %	15.6	67.9	-	83.5	-	0.0	16.5	-	16.5	-
Lights	789	3358	-	4147	-	0	838	-	838	4985
% Lights	95.5	93.1	-	93.6	-	-	95.7	-	95.7	93.9
Buses	19	16	-	35	-	0	9	-	9	44
% Buses	2.3	0.4	-	0.8	-	-	1.0	-	1.0	0.8
Trucks	18	231	-	249	-	0	29	-	29	278
% Trucks	2.2	6.4	-	5.6	-	-	3.3	-	3.3	5.2
Bicycles on Crosswalk	-	-	0	-	0	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	0	-	0	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-

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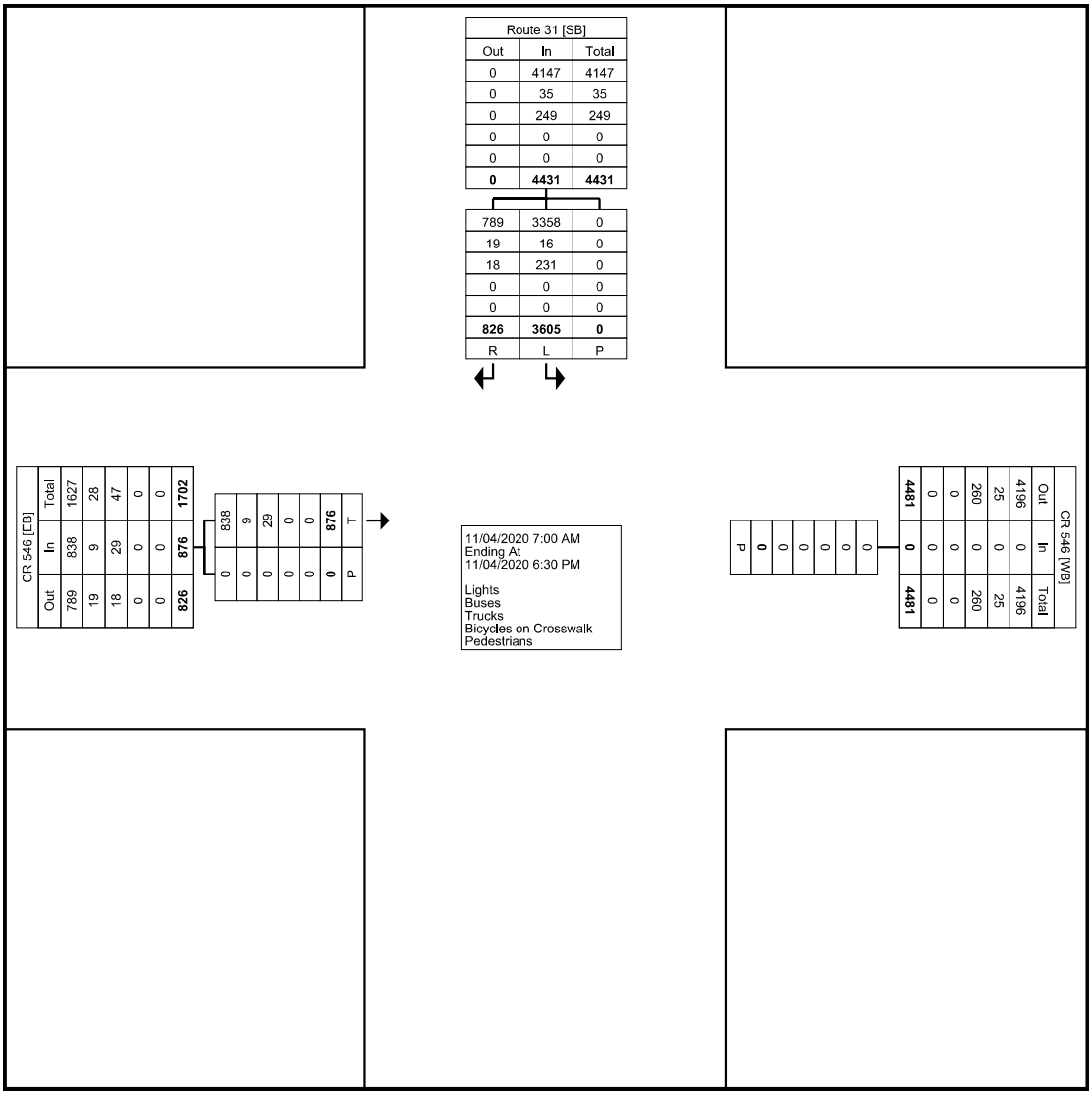
Hopewell, NJ
Route 31SB & SC 546
Wednesday, November 4, 2020
Location: 40.308328, -74.787444

Count Name: Route 31 SB/CR 546
Site Code:
Start Date: 11/04/2020



Turning Movement Data Plot

Bright View Engineering
Moving you forward

651 Old Mount Pleasant Avenue, Suite 100PO Box 99
Livingston, New Jersey 07039Roseland, NJ 07068
C: (732) 236-7557 T: (973) 228-0999
F: (201) 753-3904
BrightViewEngineering.com

Hopewell, NJ
Route 31SB & SC 546
Wednesday, November 4, 2020
Location: 40.308328, -74.787444

Count Name: Route 31 SB/CR 546
Site Code:
Start Date: 11/04/2020

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Route 31 Southbound				CR 546 Westbound		CR 546 Eastbound			
	Right	Left	Peds	App. Total	Peds	App. Total	Thru	Peds	App. Total	Int. Total
7:45 AM	53	190	0	243	0	0	63	0	63	306
8:00 AM	43	188	0	231	0	0	53	0	53	284
8:15 AM	47	164	0	211	0	0	57	0	57	268
8:30 AM	34	168	0	202	0	0	42	0	42	244
Total	177	710	0	887	0	0	215	0	215	1102
Approach %	20.0	80.0	-	-	-	-	100.0	-	-	-
Total %	16.1	64.4	-	80.5	-	0.0	19.5	-	19.5	-
PHF	0.835	0.934	-	0.913	-	0.000	0.853	-	0.853	0.900
Lights	161	630	-	791	-	0	191	-	191	982
% Lights	91.0	88.7	-	89.2	-	-	88.8	-	88.8	89.1
Buses	10	4	-	14	-	0	6	-	6	20
% Buses	5.6	0.6	-	1.6	-	-	2.8	-	2.8	1.8
Trucks	6	76	-	82	-	0	18	-	18	100
% Trucks	3.4	10.7	-	9.2	-	-	8.4	-	8.4	9.1
Bicycles on Crosswalk	-	-	0	-	0	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	0	-	0	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-

Bright View Engineering
Moving you forward

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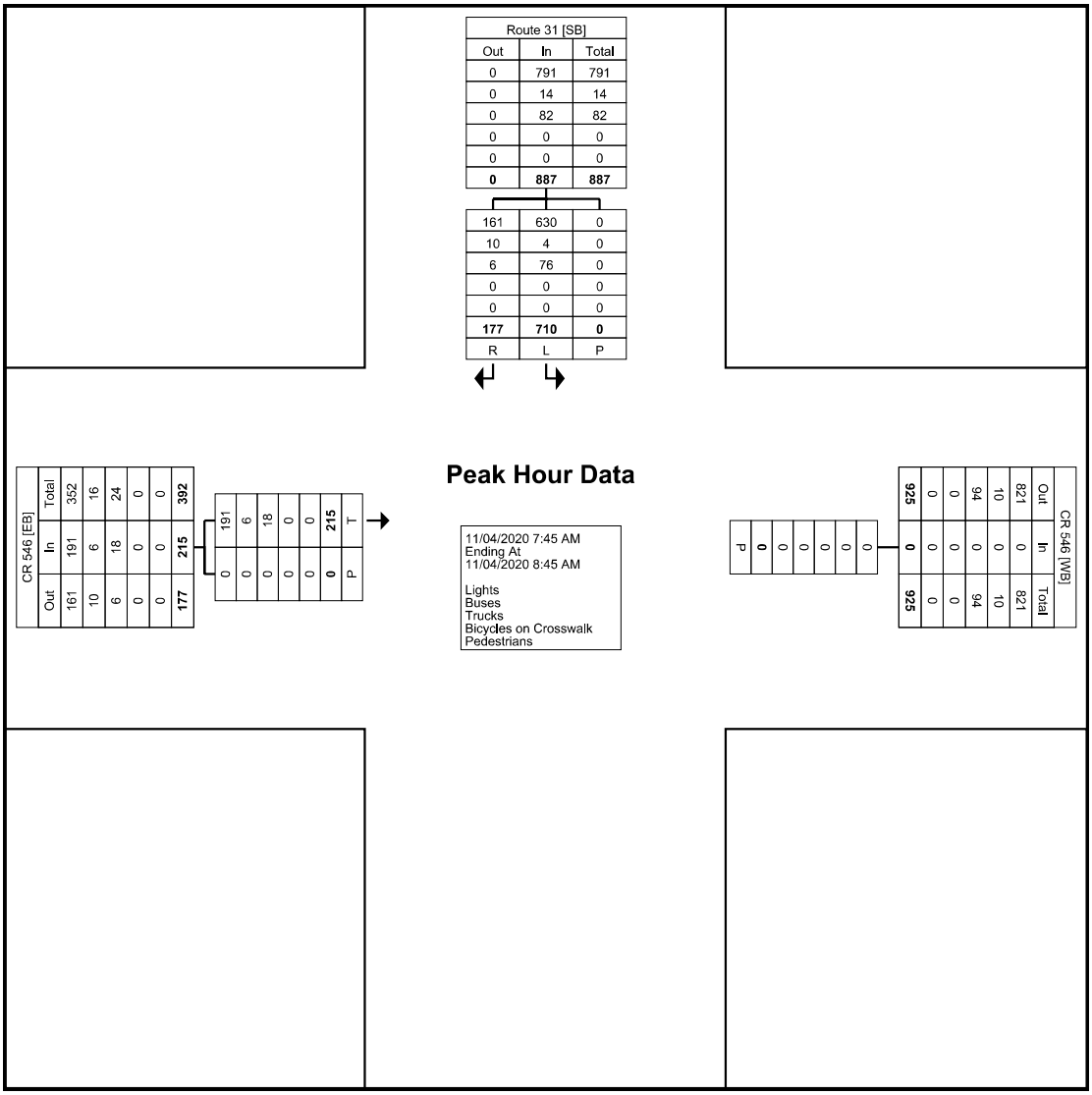
Hopewell, NJ
Route 31SB & SC 546
Wednesday, November 4, 2020
Location: 40.308328, -74.787444

Count Name: Route 31 SB/CR 546
Site Code:
Start Date: 11/04/2020



Turning Movement Peak Hour Data Plot (7:45 AM)

Bright View Engineering
Moving you forward

651 Old Mount Pleasant Avenue, Suite 100PO Box 99
Livingston, New Jersey 07039Roseland, NJ 07068
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F: (201) 753-3904
BrightViewEngineering.com

Hopewell, NJ
Route 31SB & SC 546
Wednesday, November 4, 2020
Location: 40.308328, -74.787444

Count Name: Route 31 SB/CR 546
Site Code:
Start Date: 11/04/2020

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Route 31 Southbound				CR 546 Westbound		CR 546 Eastbound			
	Right	Left	Peds	App. Total	Peds	App. Total	Thru	Peds	App. Total	Int. Total
4:00 PM	59	248	0	307	0	0	56	0	56	363
4:15 PM	63	247	0	310	0	0	51	0	51	361
4:30 PM	48	252	0	300	0	0	60	0	60	360
4:45 PM	53	253	0	306	0	0	50	0	50	356
Total	223	1000	0	1223	0	0	217	0	217	1440
Approach %	18.2	81.8	-	-	-	-	100.0	-	-	-
Total %	15.5	69.4	-	84.9	-	0.0	15.1	-	15.1	-
PHF	0.885	0.988	-	0.986	-	0.000	0.904	-	0.904	0.992
Lights	216	956	-	1172	-	0	216	-	216	1388
% Lights	96.9	95.6	-	95.8	-	-	99.5	-	99.5	96.4
Buses	0	2	-	2	-	0	0	-	0	2
% Buses	0.0	0.2	-	0.2	-	-	0.0	-	0.0	0.1
Trucks	7	42	-	49	-	0	1	-	1	50
% Trucks	3.1	4.2	-	4.0	-	-	0.5	-	0.5	3.5
Bicycles on Crosswalk	-	-	0	-	0	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	0	-	0	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-

Bright View Engineering
Moving you forward

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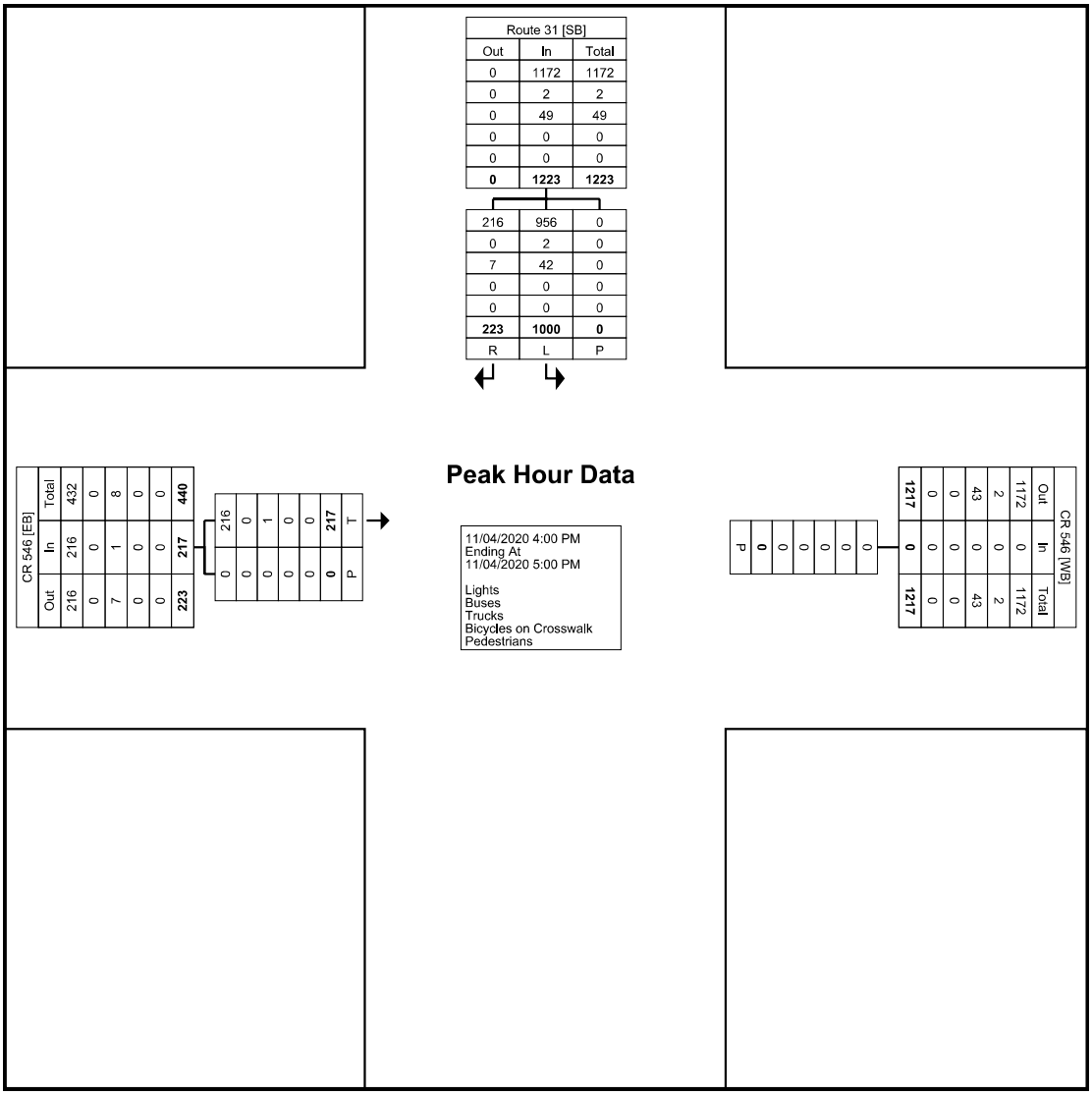
Livingston, New Jersey 07039Roseland, NJ 07068
C: (732) 236-7557 T: (973) 228-0999
F: (201) 753-3904
BrightViewEngineering.com

Hopewell, NJ
Route 31SB & SC 546
Wednesday, November 4, 2020
Location: 40.308328, -74.787444

Count Name: Route 31 SB/CR 546
Site Code:
Start Date: 11/04/2020



Turning Movement Peak Hour Data Plot (4:00 PM)

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 05/07/2019 to 05/14/2019

Site names: 5-4-307,NJ 31-5.77,00000031__
County: MERCER
Funct Class: Urban Principal Arterial - Other
Location: BET DIVERTY DR AND PENNINGTON CIRCLE

Seasonal Factor Grp: rg3_3U
Daily Factor Grp: rg3_3U
Axle Factor Grp: rg3_3U
Growth Factor Grp: rg3_3U

	Sun, May 5, 2019			Mon, May 6, 2019			Tue, May 7, 2019			Wed, May 8, 2019			Thu, May 9, 2019			Fri, May 10, 2019			Sat, May 11, 2019		
	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S
00:00							135	56	79	211	74	137	141	64	77	160	78	82	215	111	104
01:00							107	48	59	127	60	67	107	61	46	96	46	50	133	70	63
02:00							85	44	41	115	57	58	130	76	54	116	61	55	103	52	51
03:00							113	66	47	170	70	100	134	64	70	152	74	78	105	46	59
04:00							268	146	122	328	152	176	336	141	195	218	131	87	135	76	59
05:00							560	308	252	582	276	306	591	273	318	526	275	251	262	153	109
06:00							1,496	897	599	1,452	885	567	1,467	889	578	1,350	818	532	599	335	264
07:00							2,451	1,462	989	2,382	1,482	900	2,386	1,481	905	2,346	1,408	938	1,011	568	443
08:00							2,454	1,322	1,132	2,285	1,228	1,057	2,237	1,219	1,018	2,272	1,189	1,083	1,395	778	617
09:00							1,942	1,000	942	1,938	1,033	905	2,087	1,028	1,059	1,928	1,026	902	1,619	835	784
10:00							1,578	807	771	1,807	874	933	1,693	768	925	1,796	859	937	1,854	891	963
11:00							1,804	846	958	1,914	912	1,002	1,847	883	964	1,949	970	979	2,032	1,040	992
12:00							1,927	921	1,006	1,995	969	1,026	1,886	886	1,000	2,008	973	1,035	2,011	1,022	989
13:00							1,798	853	945	1,850	909	941	1,894	877	1,017	1,987	978	1,009	1,936	1,013	923
14:00							1,901	902	999	2,009	977	1,032	2,101	1,031	1,070	2,163	1,111	1,052	1,937	948	989
15:00							2,170	1,038	1,132	2,316	1,126	1,190	2,252	1,168	1,084	2,465	1,175	1,290	1,882	918	964
16:00							2,380	1,179	1,201	2,499	1,242	1,257	2,664	1,218	1,446	2,570	1,260	1,310	1,911	998	913
17:00							2,543	1,280	1,263	2,541	1,273	1,268	2,687	1,276	1,411	2,661	1,258	1,403	1,814	908	906
18:00							1,900	891	1,009	1,986	959	1,027	2,111	1,008	1,103	2,059	1,002	1,057	1,649	829	820
19:00							1,493	670	823	1,530	734	796	1,386	687	699	1,466	723	743	1,225	612	613
20:00							992	463	529	1,140	499	641	1,014	511	503	1,107	514	593	986	470	516
21:00							777	374	403	942	430	512	730	337	393	898	457	441	953	502	451
22:00							462	219	243	456	200	256	431	204	227	623	320	303	636	321	315
23:00							280	112	168	304	93	211	248	113	135	360	191	169	390	198	192
Total							31,616	15,904	15,712	32,879	16,514	16,365	32,560	16,263	16,297	33,276	16,897	16,379	26,793	13,694	13,099
AM Peak Vol							2,454	1,462	1,132	2,382	1,482	1,057	2,386	1,481	1,059	2,346	1,408	1,083	2,032	1,040	992
AM Peak Fct							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
AM Peak Hr							8: 00	7: 00	8: 00	7: 00	7: 00	8: 00	7: 00	7: 00	9: 00	7: 00	7: 00	8: 00	11: 00	11: 00	11: 00
PM Peak Vol							2,543	1,280	1,263	2,541	1,273	1,268	2,687	1,276	1,446	2,661	1,260	1,403	2,011	1,022	989
PM Peak Fct							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PM Peak Hr							17: 00	17: 00	17: 00	17: 00	17: 00	17: 00	17: 00	17: 00	16: 00	17: 00	16: 00	17: 00	12: 00	12: 00	12: 00
Seasonal Fct							.958	.958	.958	.958	.958	.958	.958	.958	.958	.958	.958	.958	.958	.958	.958
Daily Fct							1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Axle Fct							.487	.487	.487	.487	.487	.487	.487	.487	.487	.487	.487	.487	.487	.487	.487
Pulse Fct							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 05/07/2019 to 05/14/2019

Site names: 5-4-307,NJ 31-5.77,00000031__
County: MERCER
Funct Class: Urban Principal Arterial - Other
Location: BET DIVERTY DR AND PENNINGTON CIRCLE

Seasonal Factor Grp: rg3_3U
Daily Factor Grp: rg3_3U
Axle Factor Grp: rg3_3U
Growth Factor Grp: rg3_3U

	Sun, May 12, 2019			Mon, May 13, 2019			Tue, May 14, 2019			Wed, May 15, 2019			Thu, May 16, 2019			Fri, May 17, 2019			Sat, May 18, 2019		
	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S
00:00	188	99	89	120	45	75	149	63	86												
01:00	116	55	61	63	29	34	105	60	45												
02:00	62	38	24	81	45	36	103	41	62												
03:00	68	37	31	120	64	56	134	58	76												
04:00	52	24	28	238	130	108	228	137	91												
05:00	119	73	46	537	307	230	524	279	245												
06:00	231	141	90	1,348	789	559	1,503	911	592												
07:00	411	205	206	2,295	1,343	952	2,426	1,395	1,031												
08:00	645	344	301	2,247	1,162	1,085	2,352	1,272	1,080												
09:00	1,124	603	521	2,005	1,073	932	2,074	1,137	937												
10:00	1,409	710	699	1,664	861	803	1,621	789	832												
11:00	1,590	788	802	1,717	834	883	1,816	895	921												
12:00	1,747	843	904	1,701	819	882	1,862	956	906												
13:00	1,648	794	854	1,644	802	842	1,848	963	885												
14:00	1,521	796	725	1,748	897	851	1,928	970	958												
15:00	1,415	745	670	1,966	865	1,101	2,288	1,034	1,254												
16:00	1,362	723	639	2,223	982	1,241	2,493	1,115	1,378												
17:00	1,297	688	609	2,382	1,159	1,223	2,610	1,179	1,431												
18:00	1,200	599	601	1,752	858	894	1,873	894	979												
19:00	1,089	524	565	1,181	603	578	1,228	575	653												
20:00	822	391	431	818	403	415	869	458	411												
21:00	511	243	268	572	270	302	692	397	295												
22:00	324	156	168	356	175	181	341	167	174												
23:00	207	98	109	244	101	143	274	119	155												
Total	19,158	9,717	9,441	29,022	14,616	14,406	31,341	15,864	15,477												
AM Peak Vol	1,590	788	802	2,295	1,343	1,085	2,426	1,395	1,080												
AM Peak Fct	1	1	1	1	1	1	1	1	1												
AM Peak Hr	11: 00	11: 00	11: 00	7: 00	7: 00	8: 00	7: 00	7: 00	8: 00												
PM Peak Vol	1,747	843	904	2,382	1,159	1,241	2,610	1,179	1,431												
PM Peak Fct	1	1	1	1	1	1	1	1	1												
PM Peak Hr	12: 00	12: 00	12: 00	17: 00	17: 00	16: 00	17: 00	17: 00	17: 00												
Seasonal Fct	.958	.958	.958	.958	.958	.958	.958	.958	.958												
Daily Fct	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Axle Fct	.487	.487	.487	.487	.487	.487	.487	.487	.487												
Pulse Fct	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000												

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 06/03/2019 to 06/05/2019

Site names:	5-6-138,Reed Road-.53,11061399__	Seasonal Factor Grp:	rg3_5U
County:	MERCER	Daily Factor Grp:	rg3_5U
Funct Class:	Urban Major Collector	Axle Factor Grp:	rg3_5U
Location:	BET DIVERTY RD AND CORP LINE	Growth Factor Grp:	rg3_5U

	Sun, Jun 2, 2019			Mon, Jun 3, 2019			Tue, Jun 4, 2019			Wed, Jun 5, 2019			Thu, Jun 6, 2019			Fri, Jun 7, 2019			Sat, Jun 8, 2019		
	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S
00:00							2	1	1	2	0	2									
01:00							2	2	0	1	1	0									
02:00							3	1	2	2	1	1									
03:00							3	3	0	1	1	0									
04:00							14	2	12	16	2	14									
05:00							63	19	44	53	17	36									
06:00							126	78	48	143	78	65									
07:00							227	96	131	260	105	155									
08:00							315	102	213	290	82	208									
09:00							231	102	129	224	91	133									
10:00							184	108	76	201	114	87									
11:00							200	113	87	204	117	87									
12:00				215	118	97	214	105	109												
13:00				208	117	91	203	110	93												
14:00				194	114	80	196	112	84												
15:00				221	109	112	233	123	110												
16:00				304	180	124	323	201	122												
17:00				351	209	142	334	184	150												
18:00				224	118	106	172	89	83												
19:00				146	88	58	135	82	53												
20:00				93	53	40	102	55	47												
21:00				62	36	26	45	25	20												
22:00				28	21	7	28	14	14												
23:00				6	5	1	10	7	3												
Total				2,052	1,168	884	3,365	1,734	1,631	1,397	609	788									
AM Peak Vol				0	0	0	315	114	213	307	114	215									
AM Peak Fct							.865	.814	.888	.892	.864	.927									
AM Peak Hr				0: 00	0: 00	0: 00	8: 00	10: 45	8: 00	8: 15	10: 00	8: 15									
PM Peak Vol				372	223	153	354	214	160	0	0	0									
PM Peak Fct				.845	.82	.869	.868	.877	.833												
PM Peak Hr				16: 45	16: 30	16: 45	16: 45	16: 15	16: 45	0: 00	0: 00	0: 00									
Seasonal Fct				.912	.912	.912	.912	.912	.912	.912	.912	.912									
Daily Fct				.954	.954	.954	.932	.932	.932	.937	.937	.937									
Axle Fct				.491	.491	.491	.491	.491	.491	.491	.491	.491									
Pulse Fct				2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000									

Created 06/27/2019 4:31 PM ROAD AADT 2,868 NDIR AADT 1,389 PDIR AADT 1,478

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 04/02/2019 to 04/04/2019

Site names:	091123,Washington Crossing-Pennington Road-3.91,00000546__	Seasonal Factor Grp:	rg3_4U
County:	MERCER	Daily Factor Grp:	rg3_4U
Funct Class:	Urban Minor Arterial	Axle Factor Grp:	rg3_4U
Location:	Bet Dublin Rd and CO 631 Ingleside Ave	Growth Factor Grp:	rg3_4U

	Sun, Mar 31, 2019			Mon, Apr 1, 2019			Tue, Apr 2, 2019			Wed, Apr 3, 2019			Thu, Apr 4, 2019			Fri, Apr 5, 2019			Sat, Apr 6, 2019		
	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W
00:00										17	8	9	12	6	6						
01:00										4	1	3	6	3	3						
02:00										5	4	1	2	0	2						
03:00										9	6	3	2	2	0						
04:00										10	4	6	8	6	2						
05:00										57	34	23	58	39	19						
06:00										155	89	66	157	90	67						
07:00										530	295	235	499	277	222						
08:00										736	313	423	712	296	416						
09:00							533	245	288	553	243	310									
10:00							368	184	184	395	192	203									
11:00							436	236	200	418	239	179									
12:00							572	285	287	592	291	301									
13:00							493	207	286	483	233	250									
14:00							426	205	221	483	200	283									
15:00							483	245	238	587	260	327									
16:00							769	411	358	745	385	360									
17:00							933	553	380	905	523	382									
18:00							477	220	257	529	247	282									
19:00							272	125	147	360	168	192									
20:00							190	90	100	209	104	105									
21:00							118	39	79	154	71	83									
22:00							59	26	33	74	37	37									
23:00							29	19	10	39	21	18									
Total							6,158	3,090	3,068	8,049	3,968	4,081	1,456	719	737						
AM Peak Vol							533	245	288	736	324	433									
AM Peak Fct							.854	.704	.837	.92	.89	.88									
AM Peak Hr							9: 00	9: 00	9: 00	8: 00	7: 15	8: 15									
PM Peak Vol							943	553	392	945	543	402									
PM Peak Fct							.867	.818	.951	.82	.776	.889									
PM Peak Hr							16: 45	16: 45	16: 30	16: 30	16: 30	16: 30									
Seasonal Fct							.984	.984	.984	.984	.984	.984	.984	.984	.984						
Daily Fct							.965	.965	.965	.949	.949	.949	.926	.926	.926						
Axle Fct							.489	.489	.489	.489	.489	.489	.489	.489	.489						
Pulse Fct							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						

Created 05/31/2019 4:48 PM ROAD AADT 7,180 NDIR AADT 3,615 PDIR AADT 3,565

New Jersey Department of Transportation

Short-term Hourly Traffic Volume for 05/20/2019 to 05/22/2019

Site names:	c18509,WASHINGTON CROSSING-PENNINGTON RD-	Seasonal Factor Grp:	rg3_4U
County:	MERCER	Daily Factor Grp:	rg3_4U
Funct Class:	Urban Minor Arterial	Axle Factor Grp:	rg3_4U
Location:	BET CORRINE DR & NJ 31	Growth Factor Grp:	rg3_4U

	Sun, May 19, 2019			Mon, May 20, 2019			Tue, May 21, 2019			Wed, May 22, 2019			Thu, May 23, 2019			Fri, May 24, 2019			Sat, May 25, 2019		
	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S	Road	N	S
00:00							11	4	7	18	9	9									
01:00							9	3	6	7	3	4									
02:00							5	3	2	4	2	2									
03:00							4	4	0	1	1	0									
04:00							8	3	5	13	6	7									
05:00							41	17	24	59	31	28									
06:00							164	98	66	173	107	66									
07:00							537	289	248	578	303	275									
08:00							630	270	360	635	267	368									
09:00							450	221	229												
10:00							332	183	149												
11:00							424	238	186												
12:00				510	264	246	512	250	262												
13:00				450	228	222	479	229	250												
14:00				451	222	229	421	197	224												
15:00				515	250	265	531	260	271												
16:00				690	348	342	750	381	369												
17:00				681	371	310	724	408	316												
18:00				485	229	256	523	253	270												
19:00				342	178	164	340	181	159												
20:00				221	105	116	254	126	128												
21:00				150	76	74	168	68	100												
22:00				59	26	33	65	36	29												
23:00				28	13	15	40	13	27												
Total				4,582	2,310	2,272	7,422	3,735	3,687	1,488	729	759									
AM Peak Vol				0	0	0	630	314	360												
AM Peak Fct							.865	.853	.849												
AM Peak Hr				0: 00	0: 00	0: 00	7: 30	7: 30	8: 00												
PM Peak Vol				713	373	342	791	424	369												
PM Peak Fct				.933	.942	.91	.887	.891	.788												
PM Peak Hr				16: 30	16: 30	16: 00	16: 15	16: 15	16: 00												
Seasonal Fct				.949	.949	.949	.949	.949	.949	.949	.949	.949									
Daily Fct				1.024	1.024	1.024	.934	.934	.934	.914	.914	.914									
Axle Fct				.489	.489	.489	.489	.489	.489	.489	.489	.489									
Pulse Fct				2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000									

New Jersey Department of Transportation

Daily Volume from 02/28/2017 through 03/02/2017

Site Names: 111118, , Ingleside Avenue-.26, 11000631__, Hopewell Twp
County: MERCER
Funct. Urban Collector
Location: BET SEARCH AVE NJ 31

Seasonal Factor Group: RG3_FC17
Daily Factor Group: RG3_FC17
Axle Factor Group: RG3_FC17
Growth Factor Group: RG3_FC17

	Sun 02/26/2017			Mon 02/27/2017			Tue 02/28/2017			Wed 03/01/2017			Thu 03/02/2017			Fri 03/03/2017			Sat 03/04/2017		
	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N	ROAD	S	N
00:00										1	1	0	5	4	1						
01:00										0	0	0	1	0	1						
02:00										2	2	0	5	4	1						
03:00										3	3	0	1	1	0						
04:00										9	5	4	10	6	4						
05:00										25	10	15	19	7	12						
06:00										47	27	20	55	31	24						
07:00										130	45	85	109	43	66						
08:00										180	45	135	188	32	156						
09:00										111	30	81	97	23	74						
10:00							63	29	34	61	26	35									
11:00							72	33	39	88	45	43									
12:00							92	40	52	114	57	57									
13:00							94	38	56	83	35	48									
14:00							80	34	46	72	34	38									
15:00							99	39	60	96	36	60									
16:00							120	52	68	108	49	59									
17:00							141	65	76	134	70	64									
18:00							80	39	41	77	38	39									
19:00							73	36	37	60	22	38									
20:00							34	20	14	41	19	22									
21:00							34	13	21	27	16	11									
22:00							20	10	10	19	7	12									
23:00							7	5	2	7	3	4									
Volume							1,009	453	556	1,495	625	870	490	151	339						
AM Peak Vol										180	46	137									
AM Peak Fct										0.85	0.77	0.82									
AM Peak Hr										8:00	8:15	7:45									
PM Peak Vol							152	74	80	136	70	67									
PM Peak Fct							0.95	0.80	0.77	0.83	0.70	0.80									
PM Peak Hr							16:45	16:45	16:30	16:45	17:00	16:45									
Seasonal Fct							1.141	1.141	1.141	1.050	1.050	1.050	1.050	1.050	1.050						
Daily Fct							0.902	0.902	0.902	0.898	0.898	0.898	0.887	0.887	0.887						
Axle Fct							0.496	0.496	0.496	0.495	0.495	0.495	0.495	0.495	0.495						
Pulse Fct							2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						

Collected NJDOT
Created 09/07/2017 2:47:26PM

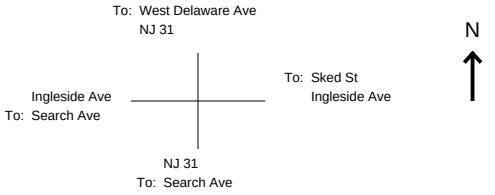
ROAD AADT 1,439 **S AADT 593** **N AADT 846**

NEW JERSEY DEPARTMENT OF TRANSPORTATION TRAFFIC COUNT SUMMARY

PROJECT NO:	9T2-214	SRI NO:	00000031__
ROUTE/m.p.:	00000031__/6.67	N-S STREET:	NJ 31
ROUTE/m.p.:	11000631__/0.51	E-W STREET:	Ingleside Ave
MUNICIPALITY:	Hopewell Twp	MUN. CODE:	1106
COUNTY:	Mercer	CO. CODE:	11
DATE(s):	Thu, 05/14/2009	COUNTED FOR:	NJDOT
TIME(s):	06:00 AM - 06:00 PM	PERSON:	Rikesh Patel
WEATHER:	Overcast	COUNTED BY:	Michael Baker Jr., Inc.
TEMP.:	74	ENUMER:	DW, GF, JM, JH
COMMENT:			

Factors for Year 2008

VEH TYPE: Total Volume(All Classes)

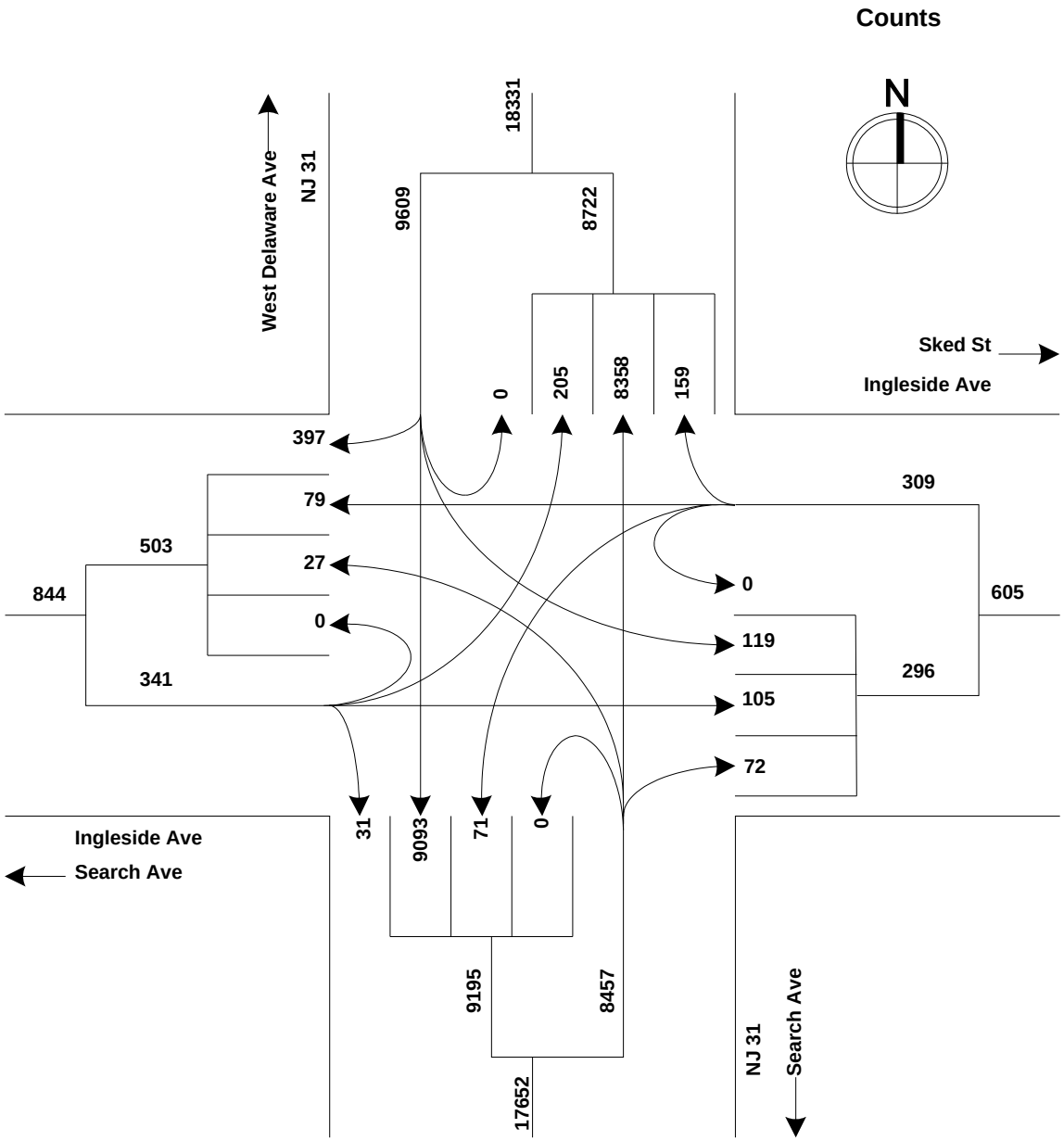


TIME PERIOD	NJ 31 U	LT	TH	NB RT	APPR. TOTAL	NJ 31 U	LT	TH	SB RT	APPR. TOTAL	Ingleside Ave U	LT	TH	EB RT	APPR. TOTAL	Ingleside Ave U	LT	TH	WB RT	APPR. TOTAL	GRAND TOTAL
6:00 - 06:15	0	0	92	0	92	0	0	70	4	74	0	2	2	1	5	0	2	3	0	5	176
6:15 - 06:30	0	0	111	0	111	0	0	121	6	127	0	2	1	0	3	0	1	2	1	4	245
6:30 - 06:45	0	0	187	0	187	0	0	106	7	113	0	8	0	0	8	0	3	2	2	7	315
6:45 - 07:00	0	0	140	3	143	0	2	122	12	136	0	1	1	0	2	0	1	1	3	5	286
Hour Total:	0	0	530	3	533	0	2	419	29	450	0	13	4	1	18	0	7	8	6	21	1022
7:00 - 07:15	0	1	162	1	164	0	2	109	5	116	0	2	2	0	4	0	1	0	1	2	286
7:15 - 07:30	0	2	186	2	190	0	3	116	6	125	0	5	1	3	9	0	1	1	2	4	328
7:30 - 07:45	0	0	198	1	199	0	6	140	16	162	0	3	3	0	6	0	0	0	0	0	367
7:45 - 08:00	0	1	183	8	192	0	7	178	20	205	0	0	3	0	3	0	2	2	1	5	405
Hour Total:	0	4	729	12	745	0	18	543	47	608	0	10	9	3	22	0	4	3	4	11	1386
8:00 - 08:15	0	0	164	1	165	0	1	173	13	187	0	5	0	0	5	0	1	0	1	2	359
8:15 - 08:30	0	0	170	1	171	0	0	150	28	178	0	2	0	0	2	0	1	2	6	9	360
8:30 - 08:45	0	1	210	0	211	0	1	126	25	152	0	1	4	1	6	0	2	2	1	5	374
8:45 - 09:00	0	1	175	0	176	0	1	114	12	127	0	2	1	0	3	0	1	1	1	3	309
Hour Total:	0	2	719	2	723	0	3	563	78	644	0	10	5	1	16	0	5	5	9	19	1402
9:00 - 09:15	0	0	155	1	156	0	2	104	7	113	0	2	1	0	3	0	0	2	1	3	275
9:15 - 09:30	0	0	164	0	164	0	1	87	4	92	0	7	0	0	7	0	1	1	0	2	265
9:30 - 09:45	0	0	169	1	170	0	0	128	12	140	0	3	3	0	6	0	1	1	0	2	318
9:45 - 10:00	0	1	161	2	164	0	1	132	8	141	0	5	5	2	12	0	2	1	3	6	323
Hour Total:	0	1	649	4	654	0	4	451	31	486	0	17	9	2	28	0	4	5	4	13	1181
10:00 - 10:15	0	1	144	0	145	0	2	117	5	124	0	3	3	1	7	0	1	1	2	4	280
10:15 - 10:30	0	0	127	2	129	0	3	98	3	104	0	2	2	0	4	0	1	1	1	3	240
10:30 - 10:45	0	0	143	0	143	0	3	119	5	127	0	5	0	0	5	0	0	0	0	0	275
10:45 - 11:00	0	0	118	0	118	0	0	120	1	121	0	5	2	0	7	0	0	0	1	1	247
Hour Total:	0	1	532	2	535	0	8	454	14	476	0	15	7	1	23	0	2	2	4	8	1042
11:00 - 11:15	0	0	117	0	117	0	3	131	3	137	0	2	1	0	3	0	2	2	0	4	261
11:15 - 11:30	0	0	148	0	148	0	1	112	1	114	0	3	0	1	4	0	2	1	3	6	272
11:30 - 11:45	0	0	139	2	141	0	0	93	4	97	0	6	3	2	11	0	0	0	1	1	250
11:45 - 12:00	0	0	176	0	176	0	2	100	4	106	0	0	1	0	1	0	0	0	3	3	286
Hour Total:	0	0	580	2	582	0	6	436	12	454	0	11	5	3	19	0	4	3	7	14	1069
12:00 - 12:15	0	0	144	1	145	0	0	194	5	199	0	4	3	0	7	0	3	4	3	10	361
12:15 - 12:30	0	0	152	0	152	0	1	178	11	190	0	3	3	0	6	0	0	4	3	7	355
12:30 - 12:45	0	1	163	0	164	0	6	222	6	234	0	1	5	0	6	0	1	2	2	5	409
12:45 - 1:00	0	1	161	2	164	0	4	186	5	195	0	9	1	1	11	0	1	3	3	7	377
Hour Total:	0	2	620	3	625	0	11	780	27	818	0	17	12	1	30	0	5	13	11	29	1502
1:00 - 1:15	0	0	172	1	173	0	5	173	8	186	0	1	4	0	5	0	1	0	5	6	370
1:15 - 1:30	0	1	166	1	168	0	1	197	7	205	0	7	5	0	12	0	0	0	4	4	389
1:30 - 1:45	0	0	172	1	173	0	6	188	7	201	0	9	4	2	15	0	0	1	4	5	394
1:45 - 2:00	0	1	164	2	167	0	1	241	9	251	0	6	5	0	11	0	2	2	1	5	434
Hour Total:	0	2	674	5	681	0	13	799	31	843	0	23	18	2	43	0	3	3	14	20	1587
2:00 - 2:15	0	2	187	0	189	0	2	236	10	248	0	6	1	1	8	0	1	4	8	13	458
2:15 - 2:30	0	0	189	2	191	0	1	290	7	298	0	9	2	5	16	0	1	3	6	10	515
2:30 - 2:45	0	0	197	3	200	0	0	277	1	278	0	7	0	0	7	0	0	0	4	4	489
2:45 - 3:00	0	1	187	4	192	0	3	226	9	238	0	4	1	0	5	0	3	1	8	12	447
Hour Total:	0	3	760	9	772	0	6	1029	27	1062	0	26	4	6	36	0	5	8	26	39	1909
3:00 - 3:15	0	1	202	3	206	0	3	253	8	264	0	0	0	0	0	0	5	1	6	12	482
3:15 - 3:30	0	0	211	3	214	0	5	289	11	305	0	4	2	2	8	0	7	0	4	11	538
3:30 - 3:45	0	0	230	2	232	0	5	270	9	284	0	5	4	2	11	0	3	2	6	11	538
3:45 - 4:00	0	2	213	2	217	0	1	321	9	331	0	6	1	0	7	0	2	2	8	12	567
Hour Total:	0	3	856	10	869	0	14	1133	37	1184	0	15	7	4	26	0	17	5	24	46	2125
4:00 - 4:15	0	0	215	3	218	0	5	258	12	275	0	6	1	1	8	0	0	2	9	11	512
4:15 - 4:30	0	0	231	3	234	0	2	313	12	327	0	7	3	1	11	0	1	3	4	8	580
4:30 - 4:45	0	1	214	1	216	0	7	302	9	318	0	3	7	1	11	0	2	2	2	6	551
4:45 - 5:00	0	1	220	4	225	0	1	285	7	293	0	7	4	1	12	0	4	2	9	15	545
Hour Total:	0	2	880	11	893	0	15	1158	40	1213	0	23	15	4	42	0	7	9	24	40	2188
5:00 - 5:15	0	0	248	3	251	0	8	328	2	338	0	5	2	0	7	0	2	2	11	15	611
5:15 - 5:30	0	5	188	2	195	0	5	323	8	336	0	7	4	1	12	0	6	6	6	18	561
5:30 - 5:45	0	2	193	4	199	0	4	360	10	374	0	8	2	2	12	0	0	3	4	7	592
5:45 - 6:00	0	0	200	0	200	0	2	317	4	323	0	5	2	0	7	0	0	4	5	9	539
Hour Total:	0	7	829	9	845	0	19	1328	24	1371	0	25	10	3	38	0	8	15	26	49	2303
6:00 - 6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 - 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 - 6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 - 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour Total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAILY TOT.	0	27	8358	72	8457	0	119	9093	397	9609	0	205	105	31	341	0	71	79	159	309	18716
PEAK HOUR	NorthBound Approach					SouthBound Approach					EastBound Approach					WestBound Approach					
7:45-08:45	0	2	727	10	739	0	9	627	86	722	0	8	7	1	16	0	6	6	9	21	1498
2:00-3:00	0	3	760	9	772	0	6	1029	27	1062	0	26	4	6	36	0	5	8	26	39	1909
4:45-5:45	0	8	849	13	870	0	18	1296	27	1341	0	27	12	4	43	0	12	13	30	55	2309

NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

COUNTY:	**Mercer**		
MUNICIPALITY:	**Hopewell Twp**		
LOCATION:	**NJ 31 and Ingleside Ave**	**INTERVAL:**	**12 HR COUNT**
DATE:	**Thu, 05/14/2009**	**FROM: 06:00 AM**	**TO: 06:00 PM**
COMMENT:			



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

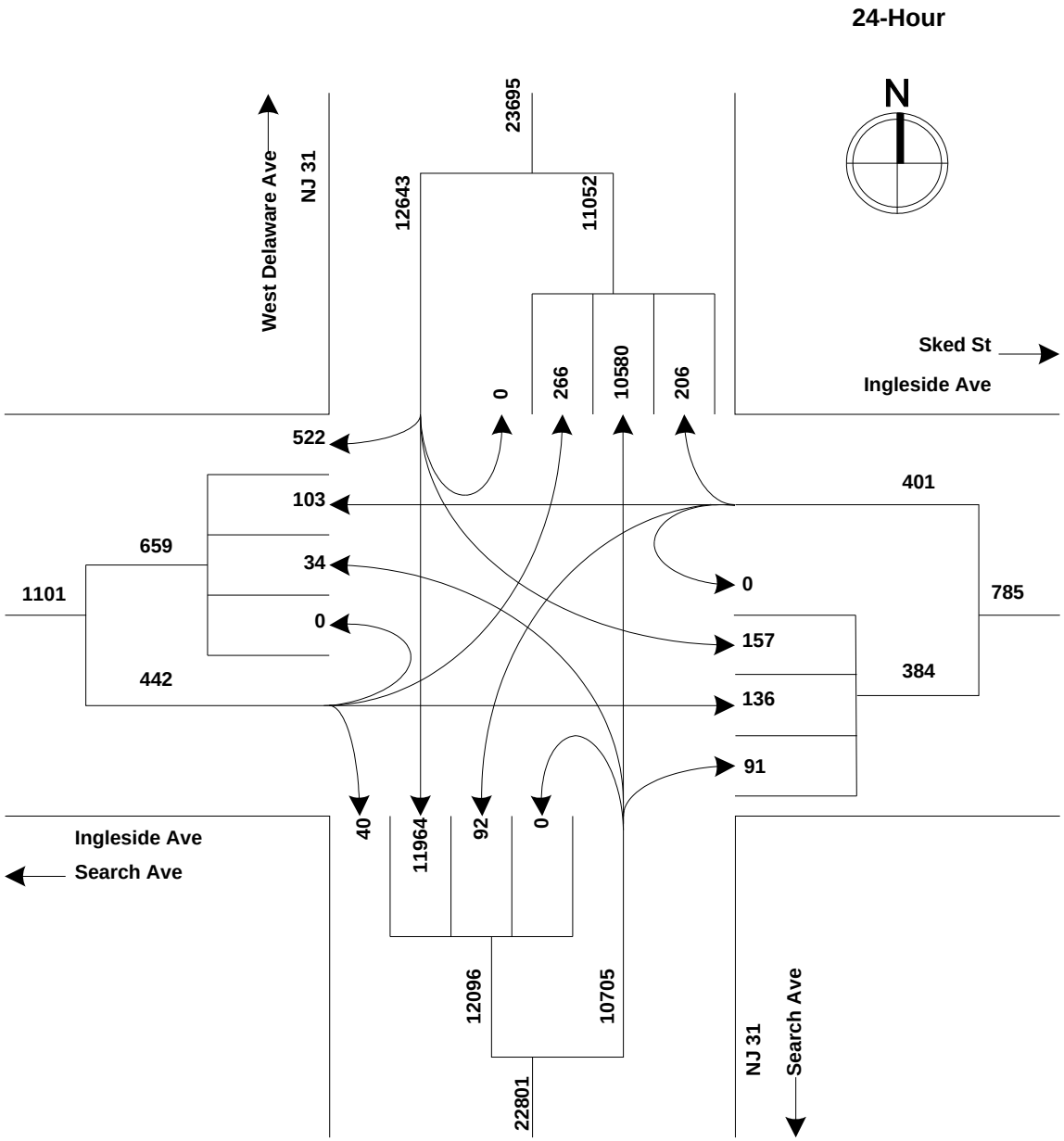
COUNTY: Mercer

MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

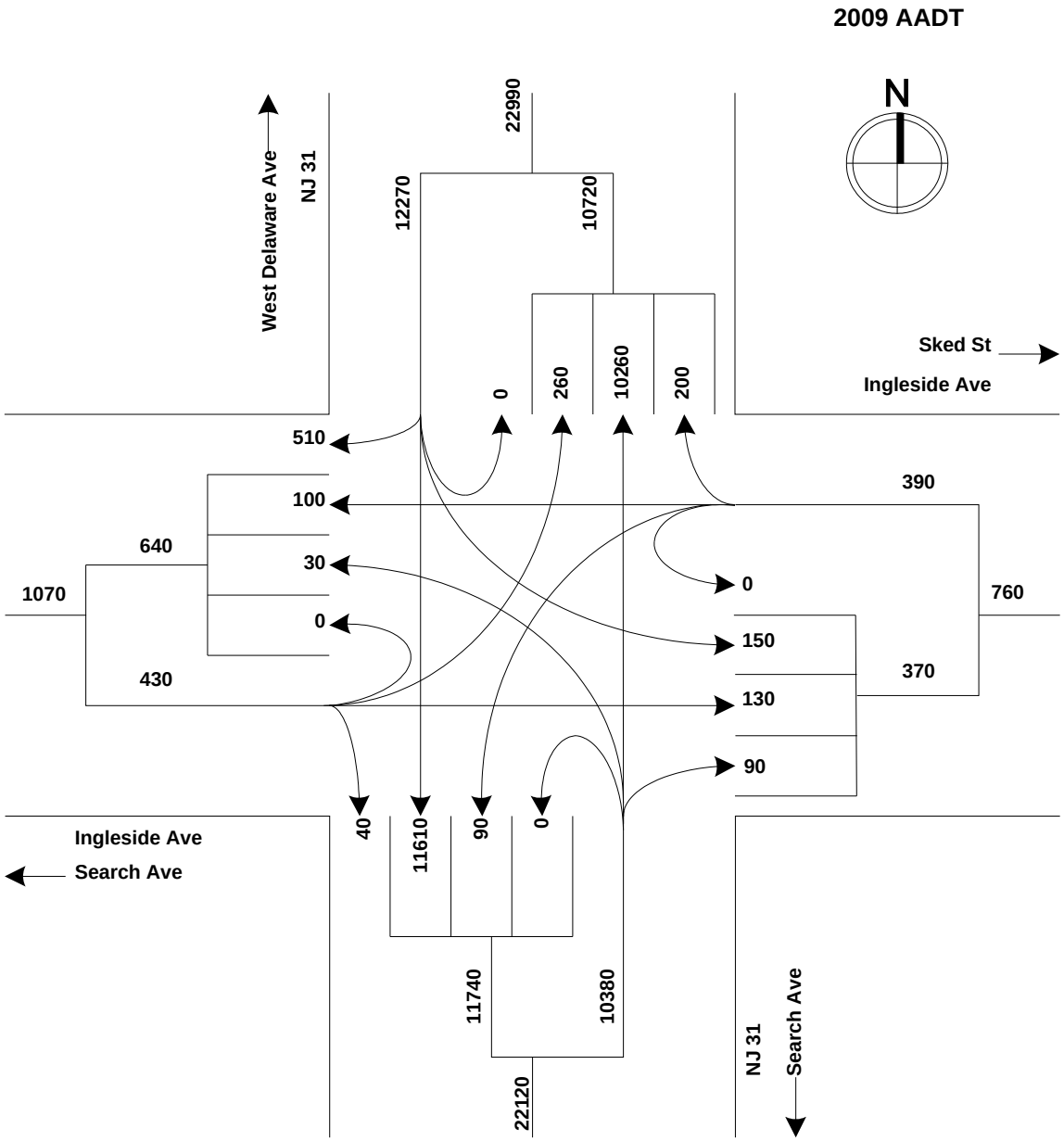
COUNTY: Mercer

MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

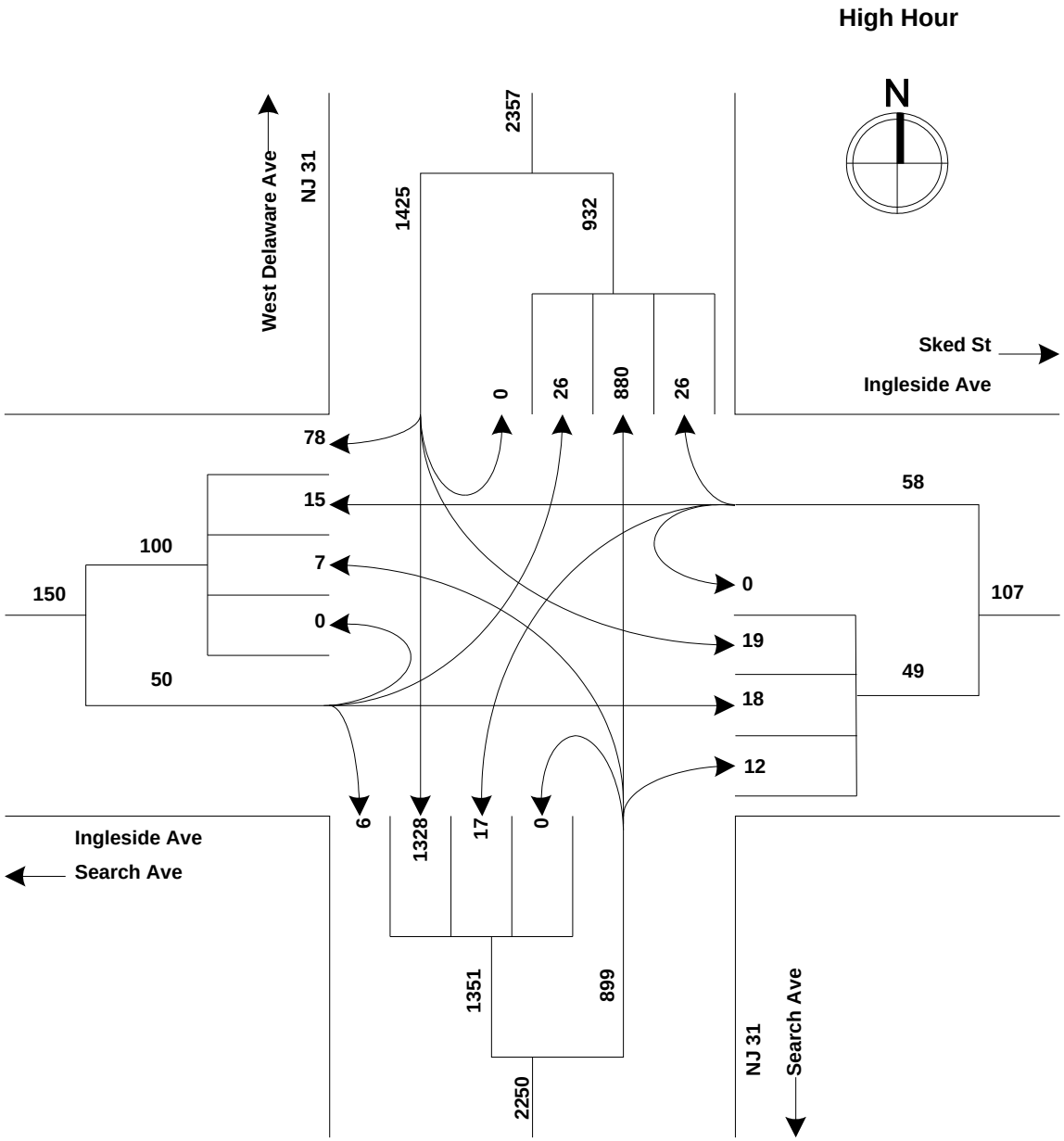
COUNTY: Mercer

MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

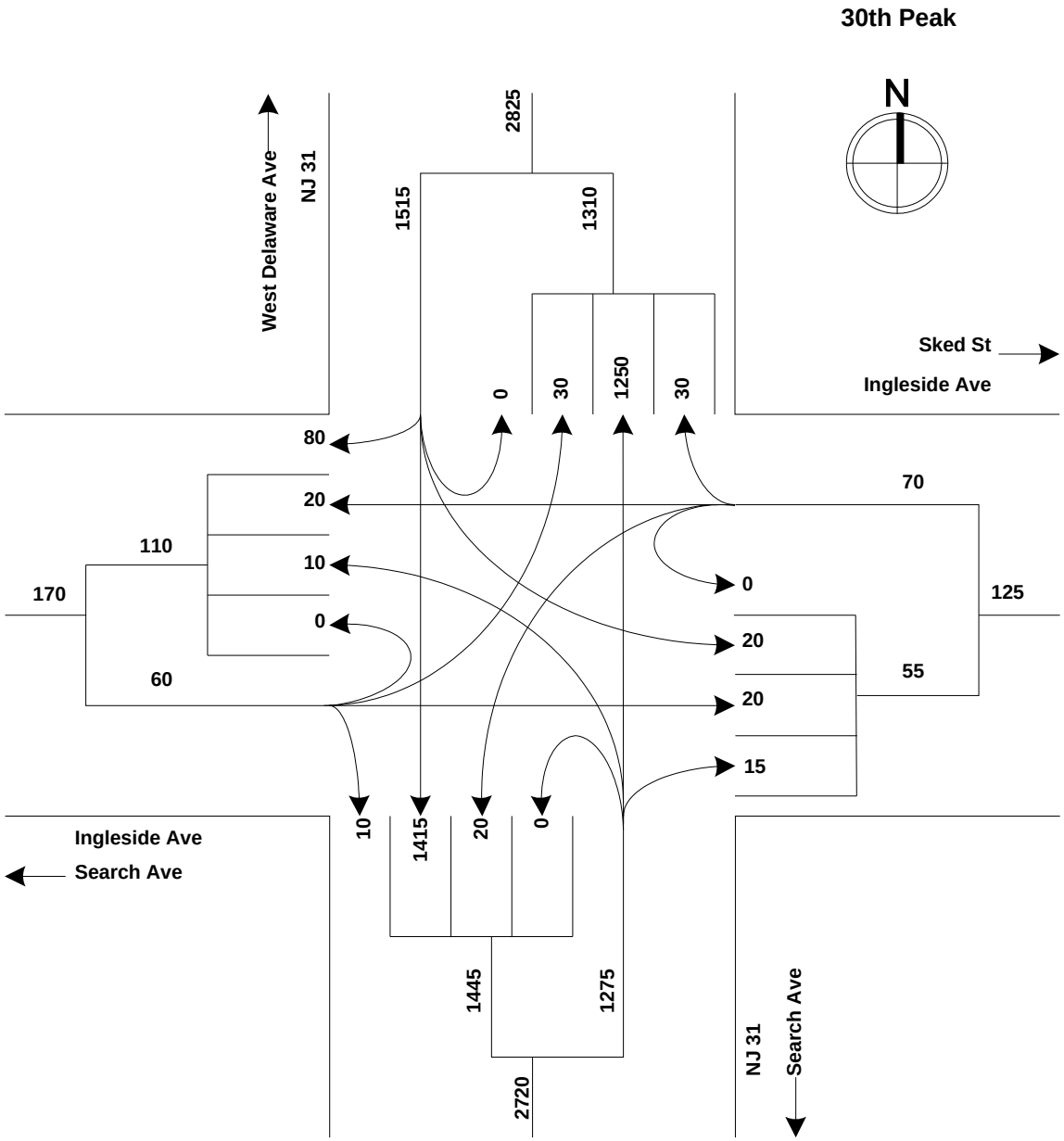
COUNTY: Mercer

MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

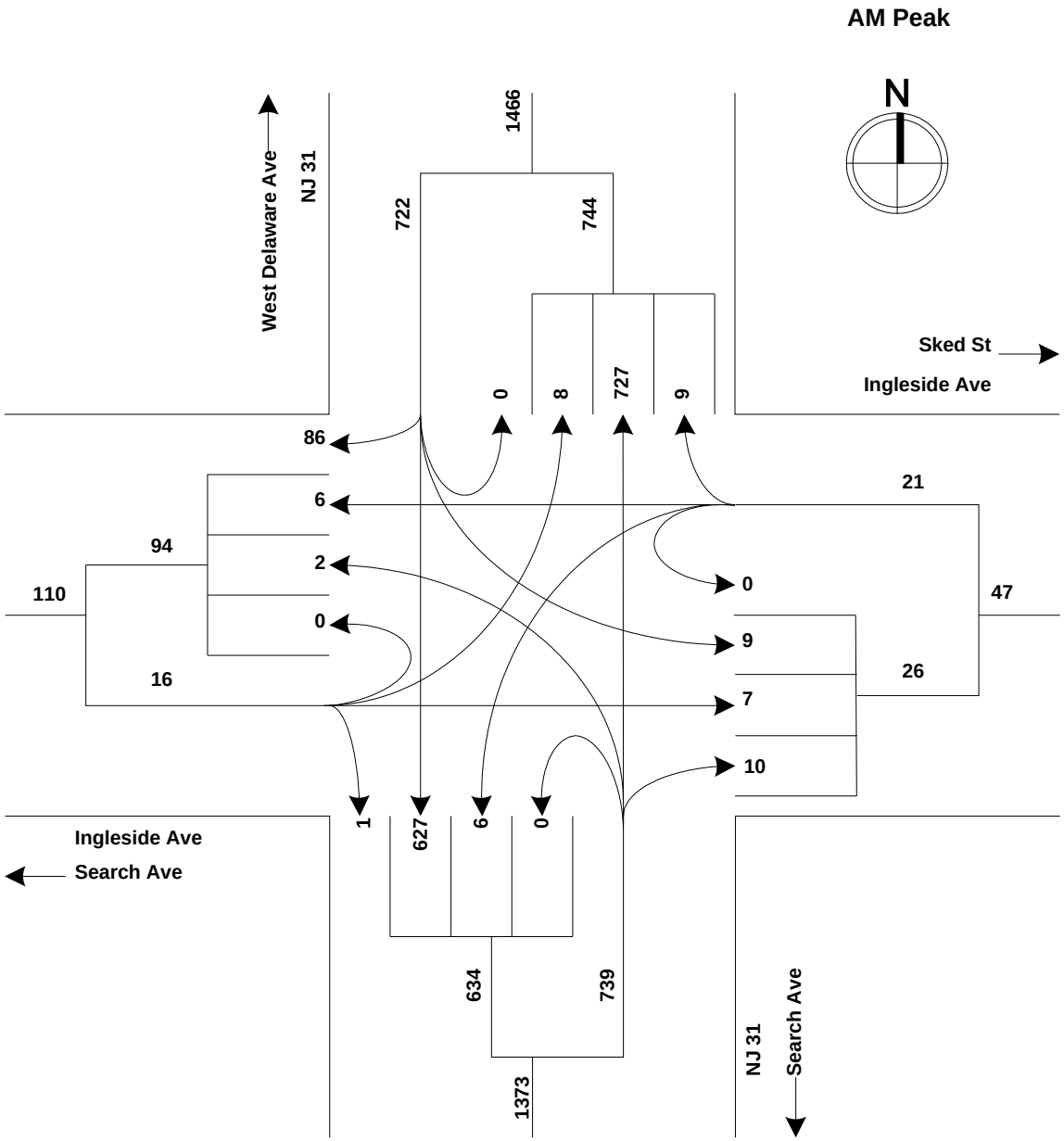
COUNTY: Mercer

MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

COUNTY: Mercer

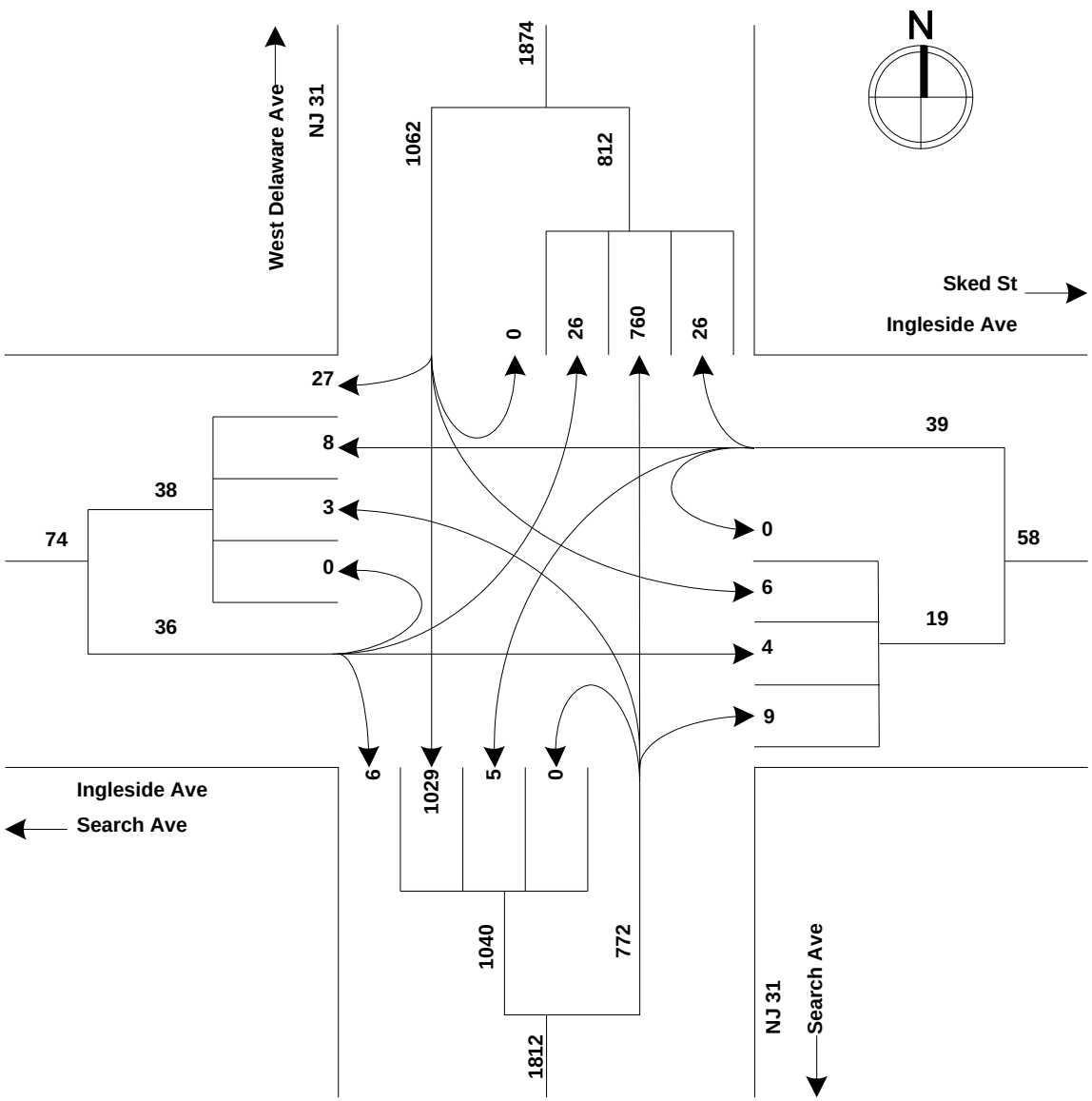
MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:

Midday Peak



NEW JERSEY DEPARTMENT OF TRANSPORTATION

TRAFFIC FLOW DIAGRAM

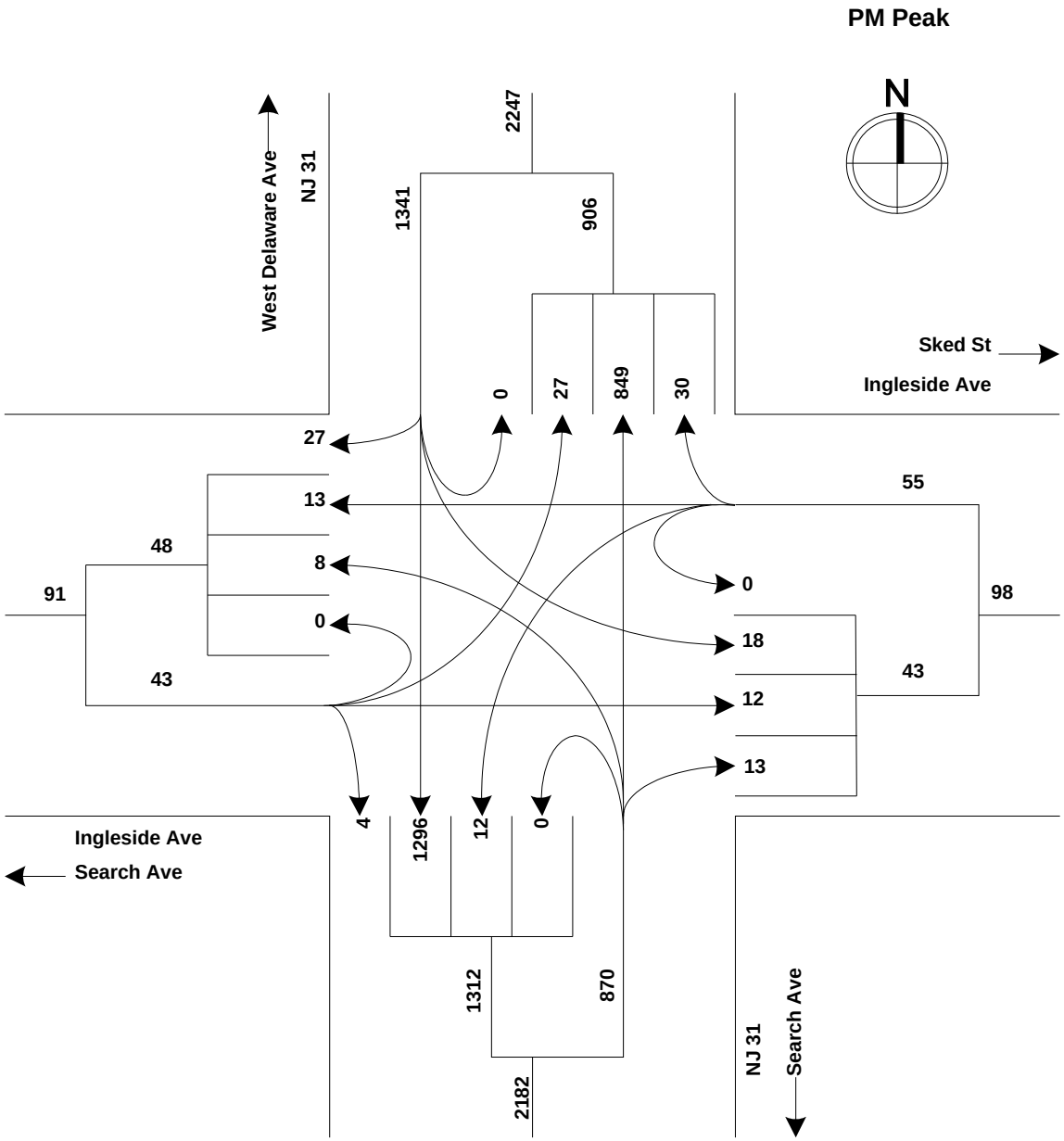
COUNTY: Mercer

MUNICIPALITY: Hopewell Twp

LOCATION: NJ 31 and Ingleside Ave **INTERVAL:** 12 HR COUNT

DATE: Thu, 05/14/2009 **FROM:** 06:00 AM **TO:** 06:00 PM

COMMENT:



APPENDIX IV

SIGNAL TIMING

Washington Crossing & Scotch

File # HO05
Pole # 60841HW
Controller: ASC/3 (A26021)
Monitor: EDI SSM-12LE (120809059)
Command: COORD. PLAN
Ring Sequence: 241 / 678

TIMING

FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
WALK				6				6
PED CLEAR				14				14
MIN. GREEN	4.0	10		14		10	5	14
EXTENSION	2.0			2.0			2.0	2.0
MAX GREEN	10	18		20		18	22	20
MAX II								
MAX STEP								
MAX LIMIT								
AMBER	3.0	5.0		5.0		5.0	3.0	5.0
RED CLEAR		2.0		2.0		2.0		2.0

Ø (1 & 6) Washington Crossing Rd. (W.B.)
Ø 2 Washington Crossing Rd. (E.B.)
Ø (4 & 7) Scotch Rd. (N.B.)
Ø 8 Scotch Rd. (S.B.)

RECALLS

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL	OFF	OFF		OFF		OFF	OFF	OFF
PED RECALL	OFF	OFF		OFF		OFF	OFF	OFF
MAX RECALL	OFF	ON		OFF		ON	OFF	OFF
MEMORY	OFF	OFF		OFF		OFF	OFF	OFF

Ø 1 Anti-Backup

DETECTORS (Video detection

	1	2	3	4	5	6	7	8
DELAY								
INHIBIT DELAY	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
ASSOCIATION	Ø1	Ø 2	Ø3	Ø4	Ø 5	Ø 6	Ø4	Ø 8

Washington Crossing & Scotch

COORDINATION CONSTANTS

TO REFERENCE	**00:00**	DET. ACCUM. INTERVAL	**CYCLE**
OFFSET REFERENCE	**T0**	CYCLES OF DET. ACCUM.	**001**
EXT. COORD. TYPE	**NONE**	MINUTES OF DET. ACCUM.	**001**
CYCLES OF NO SYNC	**000**	COORD. DUAL ENTRY	**4 & 8**

COORDINATION PLAN 1

PERM STATEGY	**T0**	OMIT STRATEGY	**MAX**
TO LOCATION	**END OF STEP 1**	3% WINDOW	**NO**
STRETCH 3% BY	**000**	GBP OMITS	**NO**
EARLY RETURN	**YES**	ONCE AROUND	**YES**
CYCLE LENGTH	**090**	MIN. CYCLE LENGTH	**090**
MAX CYCLE LENGTH	**150**	OFFSET	**000**
EXT. SYNC	**NO**	ACTIVE S.F.C.	
DET. PLAN	**001**	PROT. ONLT ENABLE	
CALC. WALK		REST IN WALK	
NO SKIP			

RING 1: 241

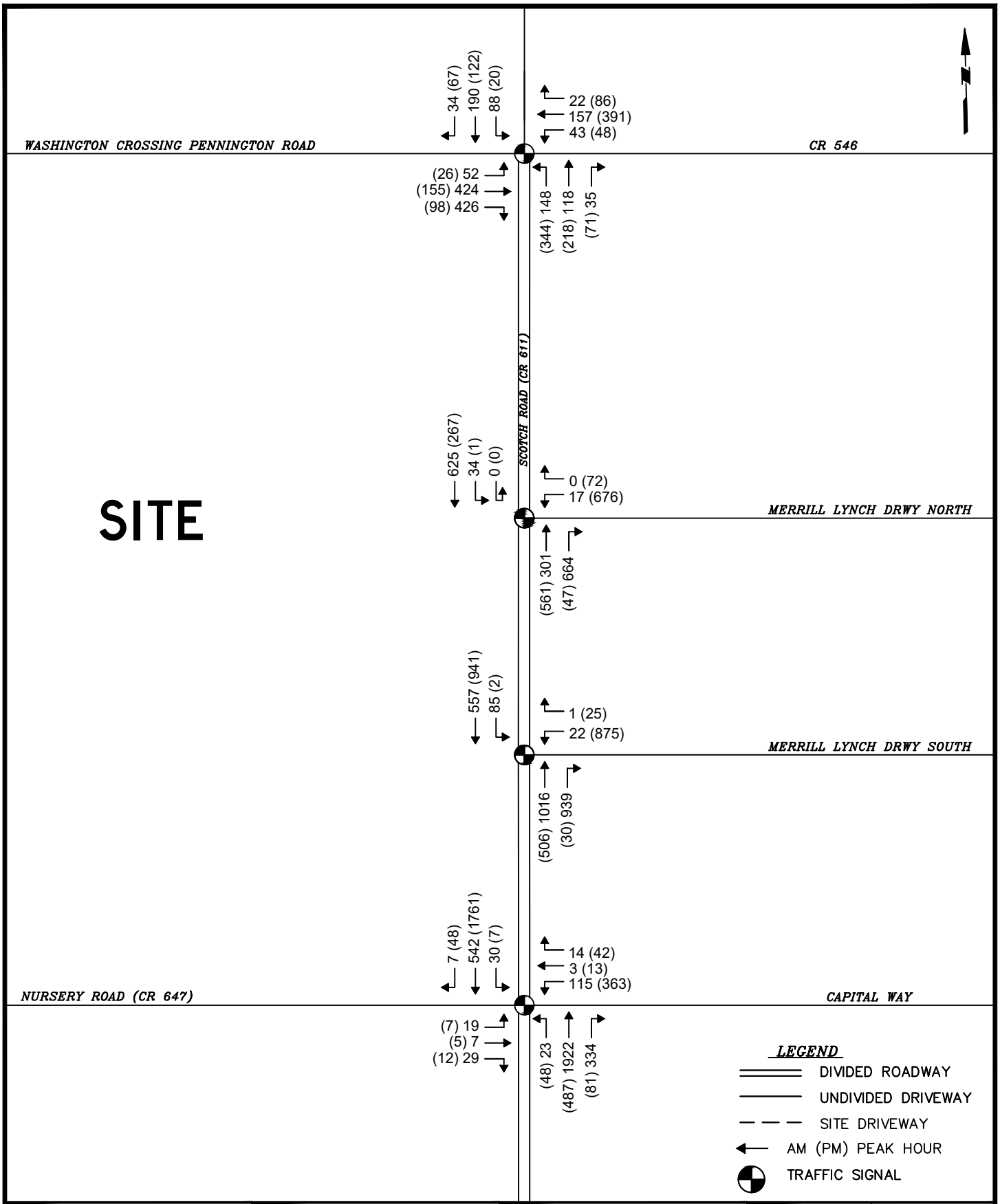
STEP	1	2	3	4	5	6	7	8	9	10
ST PRM	**000**	**000**	**000**	**000**	**000**	**000**	**000**	**000**	**000**	**000**
AC SPLIT	**028**	**085**	**100**	**000**	**000**	**000**	**000**	**000**	**000**	**000**
OPTION	**MAX**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
SPLIT	**GBP**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**
RESERV	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
PED?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

RING 2: 678

STEP	1	2	3	4	5	6	7	8	9	10
ST PRM	**000**	**000**	**000**	**000**	**000**	**000**	**000**	**000**	**000**	**000**
AC SPLIT	**028**	**055**	**100**	**000**	**000**	**000**	**000**	**000**	**000**	**000**
OPTION	**MAX**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
SPLIT	**GBP**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**	**REL**
RESERV	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
PED?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

APPENDIX V

OTHER SITE SPECIFIC TRIP GENERATION



LANGAN
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NJ Certificate of Authorization No.24GA27996400

Project
CF HOPEWELL HORSESHOE PROPERTY
BLOCK No. 93, LOT Nos. 3.01 &6.01
CITY
MERCER COUNTY NEW JERSEY

Drawing Title
2019 EXISTING TRAFFIC VOLUMES

Project No.	130145301
Date	08/18/2020
Drawn By	EJV
Checked By	KP

Drawing No.
FIGURE 2
Sheet 2 of 11

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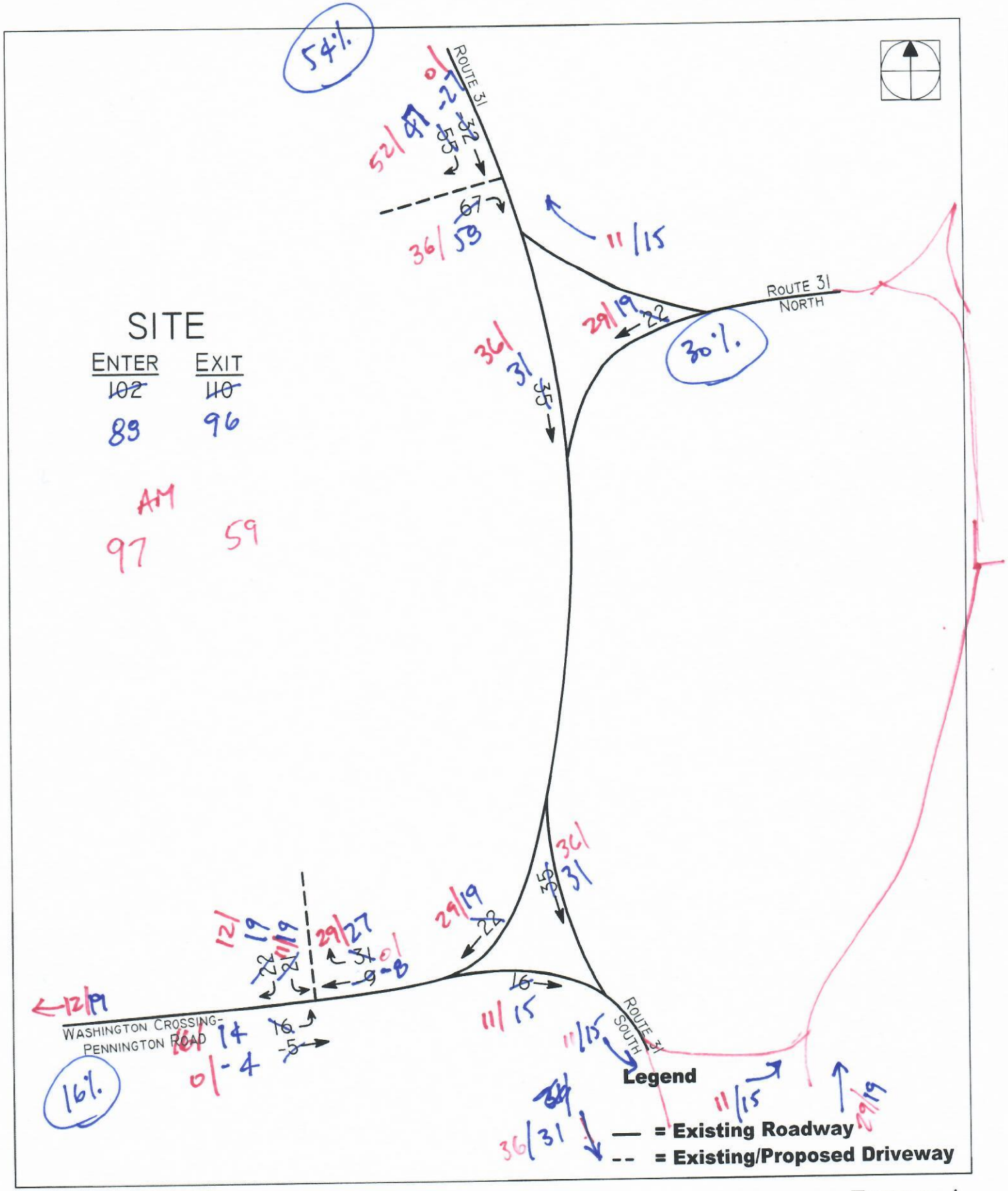
Filename: \\langan.com\data\LAW\data3\130145301\Project Data_Discipline\Traffic\Figures & Tables\Updated TIS Figures 08-2020.dwg Date: 8/19/2020 Time: 11:17 User: eviloria Style Table: Langan.stb Layout: 2-EXISTING



222 ROUTE 31, LLC
TOWNSHIP OF HOPEWELL
MERCER COUNTY, NEW JERSEY

FIGURE 4

ADDITIONAL SITE GENERATED TRAFFIC VOLUMES
MORNING PEAK HOUR / EVENING PEAK HOUR
5:15 P.M. TO 6:15 P.M.

DOLAN & DEAN
CONSULTING ENGINEERS, LLC

COMMUNITY IMPACT STATEMENT

COMMUNITY IMPACT STATEMENT

PROPOSED RESIDENTIAL DEVELOPMENT

HOPEWELL TOWNSHIP
MERCER COUNTY, NEW JERSEY

COMMUNITY IMPACT STATEMENT

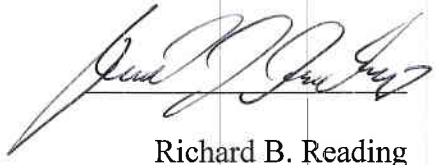
FOR

US HOME AT HOPEWELL URBAN RENEWAL, LLC
(dba LENNAR)
PRELIMINARY AND FINAL SITE PLAN

IN

HOPEWELL TOWNSHIP
MERCER COUNTY, NEW JERSEY

Richard B. Reading Associates
Princeton, New Jersey



Richard B. Reading
November 9, 2020

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APPENDICES

Summary Of Findings
Proposed Residential Subdivision by Us Home at Hopewell Urban Renewal, LLC (Dba Lennar) in
Hopewell Township, Mercer County, New Jersey

- The new residential subdivision that is proposed in Hopewell Township is to be built in the vicinity of the Washington Crossing - Pennington Road and Route 31 intersection in the south western portion of Hopewell Township. Based upon the Site Plans that have been prepared by Bowman Consulting, the proposed development would consist of 379 housing units, including 205 townhomes, and 96 condominium flats, as well as a total of 78 multi-family "affordable" housing units.

- The 301"market" housing units will be comprised of 61 town homes with an average price of $479,500, as well as 144 stacked townhome units with an average price of $326,950, and 96 condominium style flats with an average price of $299,000. The 78"affordable" housing units will include 15 one-bedroom units, 47 two-bedroom units, and 16 three-bedroom units with prices calculated to be affordable to families with "low" and" moderate" incomes in accordance with the current affordable housing regulations. The affordable housing units provide a range of sale prices with an average sale price of $149,377.

- The completed value of the 379 homes is estimated to be $116,685,717 and would, at the Township's current (2019/20) assessment ratio of 94.08 percent, yield an estimated assessed valuation of $109,777,923.

- The proposed new housing units have been estimated to be occupied by a total of 813 residents and this population would have allocated tax-supported municipal service costs amounting to $598,370.

- Based upon the design and pricing of the proposed housing units, and utilizing the "updated" (2018) demographic multipliers published by the Center for Urban Policy Research (Rutgers), the 359 new homes could be expected to generate 61 public school children to be enrolled in the Hopewell Valley Regional School District with an allocated cost of $1,385,430.

- The properties to be developed in Hopewell Township are within an area that has been designated to be in need of rehabilitation and eligible for tax abatement and Payments In Lieu Of Taxes (PILOT payments). There is an agreement between the Township and the developer for a thirty year -term tax exemption and abatement as provided for in the New Jersey laws providing for Payments In Lieu Of Taxes (PILOT Payments), as set forth in *N.J.S.A. 40A:20-1 et seq.*, for the residential housing units to be developed on the subject property. Under the terms of the agreement and assuming a complete build out in year one, the Township could expect to receive annual revenues amounting to $2,045,598 during the first year of the term of the exemption and abatement, with an increase to $2,577,775 in the sixth year of the term and to $3,775,789 in the eleventh year of the term.

- The annual revenues that would be generated for Hopewell Township by the proposed development with the PILOT exemption and abatement, which amounts to $2,045,598 in the first year, is a multiple of the tax revenues generated by the current use of the property, exceed the combined municipal and local school district service costs of $1,983,800 to yield an annual revenue surplus of $61,798, and are 3.5 times the annual revenues of $594,996 that the Township would otherwise retain with ordinary taxes, absent the PILOT agreement.

INTRODUCTION

The ensuing Community Impact Statement has been undertaken at the request of Us Home at Hopewell Urban Renewal, LLC (dba Lennar) in order to provide an examination of the economic base, market trends and the fiscal infrastructure which exists in the Township of Hopewell in Mercer County, New Jersey. The initial section of this evaluation presents an historical profile of the Township's residential and non-residential growth trends and documents the manner in which the Township generates and distributes municipal revenues and school district revenues. The findings of the fiscal profile are reviewed from an historical as well as a present perspective.

The second phase of the research undertaken involves a statistical analysis of the anticipated fiscal and economic effects that would be expected to result from the construction and occupancy of 379 new homes, comprised of a mix of townhomes and condominium flats to be built on the westerly side of Scotch Road in the southern portion of Hopewell Township. The data and evaluations contained on the following pages describe the nature and magnitude of this additional development, considers the available infrastructure of the community and calculates the added need for services resulting from the new development.

The research and analysis undertaken herein is intended to provide information whereby changes in services and facilities necessitated by the proposed development can be accomplished smoothly, with foresight, and without interruption of existing operations. Of particular concern in the following evaluation is detailed information pertaining to:

a) the economic and demographic composition of Hopewell Township, including historic and current levels of housing, population, employment and school enrollments;

b) the residential and non-residential ratable bases of Hopewell Township, the changes occurring in each during recent years and the effective tax rate of the Township;

c) the nature, scope and magnitude of the proposed development; and

d) the fiscal impact of the development upon municipal, school district and county operations, to include changes in tax revenues and budgetary appropriations, as well as the impact upon the existing tax structure.

ECONOMIC BASE AND FISCAL PROFILE

An examination of the current and historic characteristics of Hopewell Township and the manner by which the Township derives its revenues and manages its appropriations is a precursor to a fiscal impact analysis of the residential development proposed by Lennar Homes. This initial examination will furnish a useful insight into the nature of local fiscal operations and a benchmark by which changes may be measured and anticipated.

General Characteristics

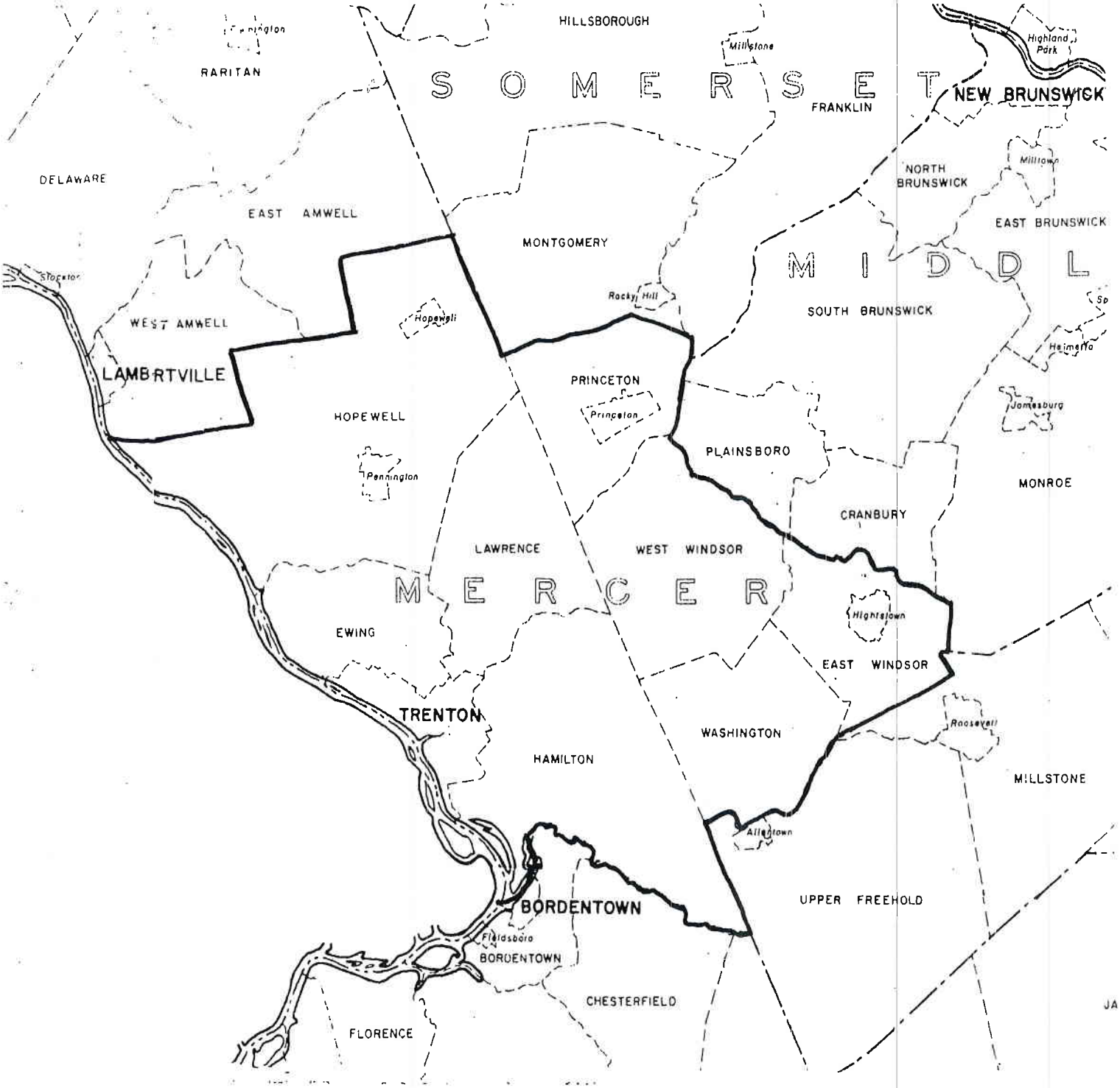
Hopewell Township is a suburban community located in the northwestern portion of Mercer County along the County's boundaries with Hunterdon and Somerset counties. The Township, as illustrated on Figure 1, fully inscribes the Boroughs of Hopewell and Pennington and is bounded by Ewing Township, Lawrence Township and Princeton in Mercer County; by East Amwell Township and West Amwell Township in Hunterdon County and by Montgomery Township in Somerset County. Hopewell Township, itself, includes a land area of 58.1 square miles, or approximately 25.7 percent of Mercer County's total land area of 226.0 square miles.

Population - At the time of the 1960 Census, the Hopewell Township contained a total population of 7,818 persons and represented 2.93 percent of Mercer County's total population of 266,392 persons. During the next ten years, the Township's population increased by 28.3 percent to a total of 10,030 persons as of the 1970 Census. Continued population growth was recorded during the 1970's with an increase of 8.6 percent (863 persons) to a total population of 10,893 persons as of the 1980 Census. The Township's total population increased by 697 persons (6.4 percent) during the 1980's to yield a total population of 11,590 persons at the time of the 1990 Census.

Between the 1990 and 2000 Census of Population, the population of Hopewell Township increased by 39.0 percent (4,515 persons) to yield a total population of 16,105 persons at the time of the 2000 Census of Population. At the time of the 2000 Census, the population of Hopewell Township (16,105 persons) represented 4.59 percent of Mercer County's total population of 350,761

FIGURE 1

LOCATION MAP



persons at that time. According to the Bureau of the Census, the Township had increased its population base to 17,304 persons in 2010, and the most recent population estimates that have been published by the U.S. Department of Commerce, Bureau of the Census, indicate that the Township's population base experienced a 2.4 percent increase in population (421 persons) between the 2010 Census and the Census Bureau's mid-year 2019 population estimate for Hopewell Township of 17,725 residents. The 2019 estimated population of the Township is 2.3 times the 1960 population base and 1.5 times the Township's 1990 population. These population trends are summarized below:

Population Growth Trends
Hopewell Township

	1960	1970	1980	1990	2000	2010	2019
Population	7,818	10,030	10,893	11,590	16,105	17,304	17,725
Change	------	2,212	863	697	4,515	1,863	421
% Change	------	28.3	8.6	6.4	39.0	11.6	2.4

Since 1960, Hopewell Township has accounted for an increased share of the County's total population and, according to the 2010 Census of Population, the Township represented 4.94 percent of the total population of Mercer County. This information is tabulated below, and the 1990 Census, 2000 Census, and 2010 Census population base of Hopewell Township is profiled in Table 1.

Population Trends
Hopewell Township as a Share of Mercer County

	1960	1970	1980	1990	2000	2010	2019
Hopewell Twp	7,818	10,030	10,893	11,590	16,105	17,304	17,725
Mercer Co.	266,392	304,116	307,863	325,824	350,761	350,248	367,430
Twp / Co. - %	2.93	3.30	3.53	3.56	4.59	4.94	4.82

Between the time of the 1970 Census and the 2010 Census the median age of Hopewell's residents increased from 32.6 years to 44.4 years, while the percentage of the population aged 0-19 decreased from 37.0 percent of the population in 1970 to 28.2 percent of the population in 2010. The age cohort distribution of Hopewell's resident population is further detailed in Table 2.

TABLE 1

HOPEWELL TOWNSHIP POPULATION BASE
1990, 2000 and 2010 CENSUS

	1990	2000	2010
TOTAL POPULATION	11,590	16,105	17,304
Male	5,929	8,208	8,509
Female	5,661	7,897	8,795
AGE			
Under 5 years	642	1,076	799
5 to 17 years	2,002	3,196	3,777
18 to 20 years	391	420	404
21 to 24 years	523	448	560
25 to 44 years	3,625	4,808	3,422
45 to 54 years	1,723	2,731	3,500
55 to 59 years	661	904	1,371
60 to 64 years	671	677	1,122
65 to 74 years	868	1,103	1,329
75 to 84 years	379	612	801
85 years and over	105	130	319
Median age	38.7	39.1	44.4
Under 18 years	2,644	4,272	4,576
Percent of total pop	22.8	26.5	26.4
65 years and over	1,352	1,845	2,449
Percent of total population	11.7	11.5	14.2
HOUSEHOLDS BY TYPE			
Total households	3,924	5,498	6,282
Family households (families)	3,240	4,429	4,928
Married-couple families	2,888	3,938	4,339
Percent of total households	73.6	71.6	69.1
Other family, male householder	105	115	175
Other family, female householder	247	376	414
Nonfamily households	684	1,069	1,354
Percent of total households	17.4	19.4	21.6
Householder living alone	543	878	1,118
Householder 65 years and over	212	355	497
Persons living in households	11,108	15,224	17,294
Persons per household	2.83	2.77	2.75
Persons living in group quarters	482	881	10
Institutionalized persons	482	868	0
Other persons in group quarters	0	13	10

TABLE 2
HOPEWELL TOWNSHIP, MERCER COUNTY
1970, 1980, 1990, 2000, 2010

	1970 Census		1980 Census		1990 Census		2000 Census		2010 Census	
Age Cohorts	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
0 - 4	706	7.0	497	4.6	642	5.5	1,076	6.7	799	4.6
5 - 9	1,002	10.0	714	6.6	733	6.3	1,269	7.9	1,260	7.3
10 - 14	1,136	11.3	1,004	9.2	781	6.7	1,221	7.6	1,565	9.0
15 - 19	872	8.7	1,076	9.9	737	6.4	1,009	6.3	1,257	7.3
20 - 24	475	4.7	726	6.7	665	5.7	565	3.5	559	3.2
25 - 29	510	5.1	583	5.3	667	5.8	621	3.9	489	2.8
30 - 34	606	6.1	712	6.5	788	6.8	1,015	6.3	625	3.6
35 - 54	2,937	29.3	3,231	29.7	3,893	33.6	5,903	36.6	5,808	33.6
55 - 59	535	5.3	746	6.8	661	5.7	907	5.6	1,371	7.9
60 - 64	408	4.1	583	5.3	671	5.8	677	4.2	1,122	6.5
65 - 74	542	5.4	642	5.9	868	7.5	1,103	6.8	1,329	7.7
75+	30	3.0	379	3.5	484	4.2	742	4.6	1,120	6.5
Total	**10,030**	**100.0**	**10,893**	**100.0**	**11,590**	**100.0**	**16,105**	**100.0**	**17,304**	**100.0**
Median Age	**32.6**		**35.8**		**38.7**		**39.1**		**44.4**	

Housing Trends - Consistent with the population growth previously examined, Hopewell Township has experienced a significant increase in its housing inventory since 1960. During the 1960's, Hopewell Township issued building permits authorizing the construction of 862 new residences within the Township. An additional 590 residential dwellings were authorized during the 1970's. During the 1980's, housing construction in Hopewell Township increased from the rates observed during the 1970's (59 units/year). As indicated in Table 2 during the period from January 1980 through December 1989, Hopewell Township issued building permits authorizing the construction of 630 residential units, or approximately 63 units/year. Between 1990 and 1999, 1990's, the Township has issued building permits authorizing the construction of 1,794 additional housing units, or an average of 179 new homes annually. During the ensuing decade the Township issued an additional 782 residential building permits at an average annual rate of 78 permits peryear. Since 2009 (2010-2019) the Township has issued an additional 200 residential building permits at an average annual rate of 20 units per year. The Township's building permit trends are further detailed on Table 3.

The 1990 housing stock of Hopewell Township was dominated by single-family detached and attached housing, which represented 3,849, or 94.5 percent of the 4,071 total housing units in the Township at that time. An additional 97 units were located within structures containing 2 to 4 housing units, 36 housing units were structures containing 5 or more housing units while 50 housing units were classified as mobile homes or other. Between the 1990 and 2000 Census, the total number of housing units in Hopewell Township increased by 38.3 percent to 5,629 housing units while the number of occupied housing units increased by 40.1 percent to 5,498 units. Single-family detached homes declined as a percentage of total housing units from 94.4 percent in 1990 to 85.8 percent in 2000. The median value of owner-occupied homes in Hopewell Township, which was $228,000 in 1990, had increased to $252,600 in 2000. By 2010, Hopewell Township contained a total of 6,551 year-round housing units of which 6,282 units (95.9 percent) were reported to be occupied. The 6,551 year-round housing units indicates an increase of 16.4 percent over the 2000 Census total number of housing units and a 60.9 percent increase over the total number of housing units in the Township during 1990. This information is further detailed on Table 4.

TABLE 3

HOPEWELL TOWNSHIP
RESIDENTIAL CONSTRUCTION
AUTHORIZED BY BUILDING PERMITS

Year	Units	Year	Units	Year	Units	Year	Units	Year	Units	Year	Units
1960	180	1970	69	1980	28	1990	30	2000	84	2010	4
1961	106	1971	89	1981	14	1991	24	2001	43	2011	1
1962	83	1972	76	1982	26	1992	42	2002	85	2012	68
1963	62	1973	97	1983	45	1993	442	2003	293	2013	38
1964	63	1974	45	1984	43	1994	273	2004	120	2014	31
1965	67	1975	28	1985	70	1995	178	2005	129	2015	24
1966	76	1976	38	1986	88	1996	133	2006	16	2016	14
1967	78	1977	60	1987	108	1997	272	2007	6	2017	5
1968	83	1978	46	1988	172	1998	281	2008	6	2018	9
1969	64	1979	42	1989	36	1999	119	2009	6	2019	6
Sub-Total 1960-69	862	Sub-Total 1970-79	590	Sub-Total 1980-89	630	Sub-Total 1990-99	1,794	Sub-Total 2000-08	782	2010-19	Sub Total 200

Source: New Jersey Department of Labor, Division of Planning and Research, Office of Demographic and Economic Analysis, Residential Building Permits, Annual Summaries 1960-2018.

TABLE 4
HOPEWELL TOWNSHIP HOUSING PROFILE
1990, 2000 AND 2010 CENSUS

	1990	2000	2010
TOTAL HOUSING UNITS	4,071	5,629	6,551
Occupied housing units	3,924	5,498	6,282
Owner occupied	3,551	5,109	5,780
Percent owner occupied	90.5	92.9	92.0
Renter occupied	373	389	502
Vacant housing units	147	131	269
For seasonal, recreational, or occasional use	15	17	62
Homeowner vacancy rate (percent)	1.8	0.7	1.1
Rental vacancy rate (percent)	5.4	3.2	5.3
Persons per owner-occupied unit	2.89	2.81	2.80
Persons per renter-occupied unit	2.25	2.21	2.23
Units with over 1 person per room	15	0	
UNITS IN STRUCTURE			
1-unit, detached	3,845	4,830	*
1-unit, attached	4	556	*
2 to 4 units	97	127	*
5 to 9 units	21	55	*
10 or more units	15	53	*
Mobile home, trailer, other	50	8	*
VALUE			
Specified owner-occupied units	3,035	4,625	*
Less than $50,000	12	60	*
$50,000 to $99,000	119	73	*
$100,000 to $149,000	323	227	*
$150,000 to $199,000	706	898	*
$200,000 to $299,000	1,002	1,774	*
$300,000 or more	873	1,593	*
Median (dollars)	228,000	252,600	*
CONTRACT RENT			
Specified renter-occupied units paying cash rent	264	343	*
Less than $250	13	0	*
$250 to $499	76	9	*
$500 to $749	105	99	*
$750 to $999	34	76	*
$1,000 or more	36	130	*
Median (dollars)	594	925	*

* Information not provided by the 2010 Census

School System - Hopewell Township, along with Hopewell Borough and Pennington Borough, are members of the Hopewell Valley Regional School District which provides educational services for students in grades K through 12 in these three municipalities. The number of students from Hopewell Township "on roll" in the regional school district decreased significantly from 1977 through 1988 despite the previously documented housing growth in Hopewell Township during the same period. Between 1977 and 1988, when the Township authorized the construction of 570 new homes, public school enrollment of Hopewell Township students declined from 2,438 students (1977-78) to 1,612 students (1988-89), a decrease of 826 students or, 33.9 percent. Following 1988, enrollment of Hopewell Township students in the regional school district increased steadily, from 1,612 students in 1988-89 to 2,094 students in the 1995-96 school year; 2,852 students in the 2000-01 school year; and 3,214 students in the 2006-07 school year. Since that time, the enrollment total of Hopewell Township and of the school district in its entirety has decreased, with 2,762 Hopewell Township students reported for the 2017-18 school year. The School District's total enrollment has decreased from a total of 4,037 students in 2005 to 3,620 students in 2015 and to 3,398 students in 2020. Since 2008, enrollment in the school district has declined by 448 students. Enrollment trends for Hopewell Township's public school students and for the Hopewell Valley Regional School District are detailed in Table 5.

Commercial Development - According to reports of the New Jersey Department of Labor, during 1975 there were 2,184 persons covered by New Jersey Unemployment Compensation (covered jobs) employed within Hopewell Township. By 1985, commercial activities in Hopewell Township, as measured by employment covered by unemployment compensation, had increased by 33.9 percent to a total of 2,924 covered jobs. During this ten-year interval (1975-1985), employment in Hopewell Township increased by an average of 74 jobs each year. A decline in employment was recorded during the next ten year interval (1985-1995), with 2,153 jobs reported in 1995, indicating a net decrease of 771 jobs.

Since 1995 the number of jobs within Hopewell Township is reported to have increased significantly. By 2003 the number of persons working in Hopewell was reported to be 4,535, and is reported to total 5,441 jobs during 2019. This employment information is further detailed in Table 6.

TABLE 5
HOPEWELL VALLEY REGIONAL SCHOOL DISTRICT

Year	Total Students Enrolled	Hopewell Twp. Students Enrolled	Net School Cost/Student[1]
1975-76	3,514	--	$ 1,440
1976-77	3,392	--	1,718
1977-78	3,254	2,438	1,892
1978-79	3,231	2,386	2,079
1979-80	3,026	2,258	2,310
1980-81	2,810	2,077	2,739
1981-82	2,726	2,035	3,030
1982-83	2,585	1,923	3,558
1983-84	2,428	1,795	3,952
1984-85	2,390	1,752	4,220
1985-86	2,300	1,709	4,489
1986-87	2,216	1,691	4,901
1987-88	2,300	1,661	5,584
1988-89	2,216	1,612	6,371
1989-90	2,279	1,625	7,113
1990-91	2,344	1,667	7,873
1991-92	2,457	1,708	7,796
1992-93	2,481	1,713	8,251
1993-94	2,604	1,827	8,693
1994-95	2,817	1,988	7,780
1995-96	2,948	2,094	7,997
1996-97	3,108	2,234	8,062
1997-98	3,300	2,354	8,675
1998-99	3,450	2,528	9,056
1999-00	3,588	2,724	9,636
2000-01	3,692	2,852	10,231
2001-02	3,821	2,941	10,861
2002-03	3,822	2,966	11,974
2003-04	3,890	2,998	12,845
2004-05	3,945	3,071	13,555
2005-06	4,037	3,175	14,279
2006-07	4,065	3,214	14,972
2007-08	4,017	3,175	15,867
2008-09	3,993	3,200	16,157
2009-10	3,905	3,195	16,267
2010-11	3,846	3,070	16,377
2011-12	3,846	3,038	16,377
2012-13	3,713	2,939	18,027
2013-14	3,676	2,910	18,620
2014-15	3,608	2,846	18,487
2015-16	3,620	2,852	19,568
2016-17	3,578	2,822	20,733
2017-18	3,535	2,762	20,855
2018-19	3,499	-------	22,212
2019-20	3,431	-------	24,122
2020-21	3,398	-------	24,908

Source: Rutgers University, Bureau of Government Research and Department of Government Service, New Jersey Legislative District Data Book, 1975-2017; Hopewell Regional School District, 2019-20 and 2020-21.

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[1]The net cost per pupil is the general fund budget per pupil, as implemented under the Comprehensive Educational Improvement and Financing Act, and is equal to the sum of general fund tax levy, budgeted general fund balance, miscellaneous revenue, and most forms of State formula aid. Expenditures for 2018-19, 2019-20, and 2020-21 reflect total operating expenditures.

TABLE 6

PRIVATE SECTOR EMPLOYMENT
COVERED BY NEW JERSEY UNEMPLOYMENT COMPENSATION
HOPEWELL TOWNSHIP, MERCER COUNTY
(Covered Jobs)

Year	Hopewell Township	Mercer County	Township/ County (%)
1975	2,184	100,808	2.2
1980	2,754	110,606	2.5
1981	3,003	112,870	2.7
1982	2,618	110,126	2.4
1983	2,869	114,432	2.5
1984	2,830	119,568	2.4
1985	2,924	122,183	2.4
1986	2,774	128,716	2.2
1987	2,591	131,445	2.0
1988	2,816	133,876	2.1
1989	3,042	133,311	2.3
1990	3,014	133,135	2.3
1991	2,737	130,242	2.1
1992	2,927	130,276	2.2
1993	2,730	132,261	2.1
1994	2,529	134,568	1.9
1995	2,153	134,352	1.6
1996	1,749	132,254	1.3
1997	1,626	136,832	1.2
1998	1,577	135,707	1.2
1999	1,450	142,888	1.0
2003	4,535	153,451	3.0
2004	*	151,358	*
2005	*	154,169	*
2006	*	165,981	*
2007	*	163,818	*
2008	*	155,549	*
2009	*	148,753	*
2010	*	152,452	*
2011	*	155,050	*
2012	*	155,910	*
2013	*	158,147	*
2014	*	163,186	*
2015	*	166,882	*
2016	5,381	176,967	3.0
2017	5,427	179,863	3.0
2018	5,393	182,323	3.0
2019	5,441	187,605	2.9

Source: New Jersey Department of Labor, Division of Planning and Research, Office of Demographic and Economic Analysis, New Jersey Covered Employment Trends, 1975-2019. Employment is as of September 30th

Note: Employment for 2004-2015 was not reported due to confidentiality/publication standards.

RATABLE BASE AND TAX RATE

The economic and demographic characteristics of Hopewell Township are reflected in the Township's ratable base, and changes in the Township's household base and commercial development since 2000 may be examined in terms of the per parcel and total valuations (assessments) of the taxable properties in the Township.

Ratable Base

Hopewell Township has undertaken periodic property revaluations in an effort to maintain assessments that approximate current market values. The ratio of assessed value to market value is expressed in the State equalization ratio which amounted to 100.43 percent in 2000, and was reported to be 94.08 percent in 2020. These assessment trends are further detailed in Table 7.

During 2000, the total equalized property valuation in Hopewell Township amounted to $1,408.6 million. This equalized valuation increased substantially by 2020, when it reached $4,166.3 million. The total equalized assessments increased by 195.8 percent between 2000 and 2020.

During the period from 2000 to 2020, when the Township's equalized valuation increased by 195.8 percent, the cost of municipal operations reflected in the local use budget increased from $13,491,012 to $23,110,929--an increase of $9,619,917, or 71.3 percent. Between 2000 and 2020, the growth of municipal costs (71.3 percent) was well below the increase in the equalized taxable base (195.8 percent).

Between 2000 and 2020, Class 2 residential properties decreased as a share of the Township's total ratables from 73.94 percent to 70.21 percent, a relative decrease of 5.05 percent. Non-residential properties (commercial/industrial) amounted to 13.94 percent of valuation in 2000 and 22.10 percent in 2020. Since 2000, the average equalized value of residential parcels has essentially doubled. During 2000, the average equalized residential (Class 2) property assessment amounted to $247,740 per parcel and this per parcel average had increased to $464,198 during 2020, indicating an relative increase of 87.4 percent

TABLE 7

HOPEWELL TOWNSHIP, MERCER COUNTY

RATABLE BASE COMPOSITION

LOCAL USE REVENUES AND TAXES

Year	Valuation Assessed	Valuation Equalized	Average Percent Comm/Ind	State Eq. Ratio	Local Use Budget	Residential Tax
2000	$1,760,308,600	$1,408,606,592	13.94	100.43	$13,491,012	$6,101
2020	$3,919,619,970	$4,166,262,723	22.10	94.08	$23,110,929	$13,879

Source: New Jersey Department of Community Affairs, Division of Local Government Services, Annual Report, 2000; Mercer County Tax Board, 2020.

In 2000, the average residential (Class 2) tax bill in Hopewell Township was $6,101 and between 2000 and 2020, this average annual tax increased at an average annual rate of 4.20 percent, resulting in a 2020 average residential (Class 2) tax of $13,879. This assessment and tax information is further detailed in Table 8.

Effective Tax Rates

The local or general tax rates levied in Hopewell Township reflect the ratio of assessed to true (market) value of the assessments in the Township. In 2000, the local (general) tax rate in Hopewell Township was $2.452 per $100 of assessed value. By 2020, this general tax rate had increased to $2.985 per $100 of assessed value. On an "equalized valuation" basis, the tax rate relative to current values increased from $2.463/$100 in 2000 to $2.808/$100 in 2020. During 2020, the general tax rate in Hopewell Township is $2.985 per $100 of valuation, with an equalized tax rate of $2.808.

Hopewell Township
Local and Equalized Tax Rates

Year	Local Rate	State Equalization Ratio	Equalized Rate
2000	2.452	100.43	2.463
2020	2.985	94.08	2.808

Overview

The preceding review of the economic, demographic, fiscal and financial characteristics of Hopewell Township has disclosed the Township to be a sizeable community in the context of Mercer County. As noted previously, Hopewell Township contains approximately 25.7 percent of the County's land area, and accounted for 4.86 percent of the County's 2010 population and 3.00 percent of the County's 2010 employment base.

Between 2000 and 2020, the equalized valuation (assessments) in Hopewell Township increased from $1,408.6 million to $4,166.3 million. In 2000, the average residential property in Hopewell Township was assessed at $248,805 and paid total taxes of $6,101 per year. By 2020, the average residential assessment had increased by 86.8 percent to $464,942 while the taxes paid by the average residential property had increased to $13,879 per year. From 2000 to 2020, the average residential tax paid in Hopewell Township increased at an average annual rate of 4.20 percent.

TABLE 8

HOPEWELL TOWNSHIP, MERCER COUNTY

AVERAGE RESIDENTIAL ASSESSMENTS AND TAXES

Year	Average Residential Assessment	Average Equalized Residential Assessment	Total Tax	Average Residential Property Tax *		
				Local Use	Regional School	County
2000	$248,805	$247,740	$6,101	$580	$3,998	$1,523
2020	$464,942	$494,198	$13,879	$2,520	$8,090	$3,269

Source: New Jersey Department of Community Affairs, Division of Local Government Services, Annual Report, 2000, Mercer County Tax Board, 2020.

PROJECT DESCRIPTION AND FISCAL IMPACTS

On the preceding pages, the economic base and fiscal infrastructure of Hopewell Township have been examined and quantified. With the information and insight gained in the foregoing examination, it is now possible to estimate the costs, revenues and overall fiscal effects that would be expected to accompany the proposed residential development in Hopewell Township.

Project Description

The development that is the subject of the ensuing fiscal assessment involves a proposal for the construction and occupancy of a residential development consisting of 379 homes, including 205 townhomes, and 96 condominium flats, as well as a total of 78 multi-family "affordable" housing units.

The 301"market" housing units will be comprised of 61 town homes with an average price of $479,500, as well as 144 stacked townhome units with an average price of $326,950, and 96 condominium style flats with an average price of $299,000.

The 78"affordable" housing units will include 15 one-bedroom units, 47 two-bedroom units, and 16 three-bedroom units with prices calculated to be affordable to families with "low" and" moderate" incomes in accordance with the current affordable housing regulations. The affordable housing units provide a range of sale prices with an average sale price of $149,377.

Based upon the unit distributions in the developer's plans and the current pricing schedule, the proposed residential development would be expected to represent an aggregate (completed) value of $116,685,700. This information is further detailed in the following tabulation:

Proposed Residential Development
Zaitz Tract, Hopewell Township

Residential	No Units	Sale Price/ Est Value	Aggregate Value
Market			
TH 3-BR	61	$479,500	$ 29,249,500
Stacked TH 2-BR	72	$299,000	$ 21,528,000
Stacked TH 3-BR	72	$354,900	$ 25,552,800
Condo Flat	96	$299,000	$ 28,704,000
Market Sub Total	301	$348,951	$105,034,300

(Continued)			
Affordable			
Condo-1BR	15	$ 123,472	$ 1,852,080
Condo-2BR	47	$ 149,399	$ 7,021,753
Condo-3BR	16	$ 173,599	$ 2,777,584
Apt Sub Total	78	$ 149,377	$ 11,651,417
Total	379	$307,878	$116,685,700

Population Determinants

There are a number of techniques and methods available in demographic analysis which may be utilized to estimate the anticipated population levels that would be generated by a proposed development. No single technique or methodology is universally applicable or accepted. Rather, all methods available for the pro forma calculation of anticipated population are subject to certain limitations.

Among the various techniques available for developing estimates of population, the "comparable"approach, or "case study" method, appears to offer the benefits of actual experiences, timely data, geographic proximity and known similarities in market sectors and product design. In the "case study" method, population determinants are generated on the basis of the actual occupancy experiences of comparable housing units in similar, recently constructed housing complexes. The reliability of the "case study" model is a function of the comparability of the "case study" housing units to the units proposed for construction.

Municipal Multipliers - Information is also available from the U.S. Department of Commerce, Bureau of the Census, which provides population and housing characteristics that can be examined to estimate municipal population and school children multiplier ratios on a per household basis. In this regard, at the time of the 2010 Census of Population (April 1, 2010), Hopewell Township contained a total population of 17,304 persons, of which 17,294 persons occupied 6,282 of the Township's 6,551 total housing units. At this time (2009-2010 school year), there were 3,195 children from Hopewell enrolled in the Township's public schools. These statistics

indicate that the average household in Hopewell Township contained 2.75 persons, including 0.509 public school children.

The proposed development differs from the Township's housing base to the extent that all (100.0 percent) of the proposed homes are "new", and 100.0 percent are "attached" housing units, as opposed to 11.3 percent "new", and 15.5 percent "attached" housing units in the Township's housing inventory[2]. In view of the differences in the type of housing units that are proposed vis-a-vis Hopewell's existing housing base, the use of municipal demographic cohorts as a "comparable" would not be appropriate. With 100.0 percent of the units in two- or three-bedroom, attached housing units configurations, the 301 "market" housing units represent a housing product that is designed to appeal to young professionals and to "empty nesters" that are the bookends of the population and have a limited appeal to families with children due to the size (2.44 bedrooms per unit) and housing type (attached). Additionally, the proposed development also includes 78 "affordable" housing units with unique pricing and occupancy requirements. In view of the differences in the type of housing units proposed vis-a-vis the Township's existing housing base, the use of municipal demographic cohorts as a "comparable" may not be the most appropriate.

Current Single Family and Multi Family Demographics

Given the unique location, mixed unit type nature of the proposed new housing units, demographic information for recently occupied detached and attached housing units in New Jersey would provide a more realistic basis for estimating the population and public school children likely to be generated by the proposed housing units, with an average of 2.35 bedrooms per unit.

Attached Housing Demographics - Given the location and type of the new housing units proposed, demographic information for recently occupied detached and attached housing units in New Jersey provides a more realistic basis for estimating the population, school age, and public school children likely to be generated by the new attached housing units in Hopewell Township. In this regard, a survey of the demographics of residents of housing units in New Jersey was provided

[2]Selected Housing Characteristics, 2013-2017 Census Bureau, American Community Survey, 5-Year Estimates

in a recent (updated[3]) November 2018 study of newly occupied housing units entitled, Who Lives in New Jersey Housing, which was prepared by the Center for Urban Policy Research (CUPR), Edward J. Bloustein School of Planning & Public Policy at Rutgers, The State University.

The CUPR study provides demographic multipliers for single-family detached homes, single-family attached homes, and multi-family (5 to 49 units), which includes condominiums and apartments. Demographic multipliers are provided for the State of New Jersey with adjustments for pricing (all values, below median or above median). Unlike the prior (2006) survey, information is not provided for three regions of the State (north, central, and south) and the updated data does not disaggregate owner- and renter-occupied units, nor does it provide the demographic multipliers for specialized housing products such as "age-restricted" or "transit-oriented" developments. The "updated" survey does provide demographic multipliers for low- and moderate-income households in multi-family rental housing units, which are defined as households with less that 80 percent of area-wide median income adjusted for household size.

Notwithstanding the limitations of the "updated" data, this analysis utilizes the updated multipliers for the housing types that are most similar to the proposed housing units. Accordingly, the demographic multipliers have been applied to the 301 "market" housing units are the multipliers for three bedroom single family attached units and for two-three bedroom units in building of 5-49 units per building. This information, which is presented in Appendices 1 and 2, indicates that the proposed housing units would be expected to be occupied by 1.889 to 2.755 residents per housing unit, including 0.036 to 0.318 public school children per housing unit.

Affordable Housing Demographics - In addition to the "market" priced housing units, the development proposal also contains 78 "affordable" (Mt. Laurel) housing units to be reserved and priced to be affordable for lower-income households in accordance with affordable housing regulations. To the extent that the 78 "affordable" (Mt. Laurel) housing units have specific occupancy, income, and pricing restrictions, the "CUPR" survey prepared in 2006 provides separate demographic multipliers for both owner occupied and renter occupied low- and moderate-income households in New Jersey living in "affordable" housing units, while the more recent update does not provide a similar level of housing unit detail and is not comprised of certified affordable housing

[3]Originally published in 2006.

units. The demographic multipliers for the 78 one-, two- and three-bedroom, owner-occupied, "affordable" housing units (Appendix 3) anticipate 1.37 to 2.51persons per unit including 0.060 to 0.540 public school children per "affordable" housing unit.

Utilizing the CUPR demographic multipliers for the "market" housing units and the CUPR demographic multipliers that are specific to "affordable" (Mt Laurel) housing units profiled in Appendix 3, the total number of residents and public school children generated by the housing units within the proposed development proposed in Hopewell Township have been estimated and are detailed below.

Added Population

Proposed Development in Hopewell Township
Updated CUPR Demographic Multipliers

Housing Category	No. of Units	Population Per Unit: Total Pop.	Population Per Unit: Public School	Estimated Population: Total Pop.	Estimated Population: Public School
SFA					
3-BR	61	2.755	0.318	168	20
5-49 Units					
2-BR	96	1.889	0.036	181	3
2-BR	72	1.889	0.036	136	3
3-BR	72	2.554	0.237	184	17
Subtotal	240	2.700	0.322	501	23
Affordable					
1BR	15	1.370	0.060	21	1
2BR	47	1.760	0.180	83	8
3BR	16	2.510	0.540	40	9
Subtotal	78	1.840	0.231	143	18
Total	379	2.144	0.160	813	61

As indicated in the preceding calculations, the standard CUPR multipliers applied to the 301 "market" housing units would yield 669 residents, including 43 public school children while the "affordable" demographic multipliers applied to the 78 "affordable" housing units would yield 143 residents and 18 public school children. Combined the 301 "market" and 78 "affordable"housing units would, at full build out, be estimated to be occupied by 813 residents, including 61 public school children.

IMPACT ANALYSIS

Fiscal Impact

The fiscal impact resulting from the construction and occupancy of the proposed residential development containing 379 housing units with 813 residents, including 61 public school children, may now be examined in terms of the various services provided by the Township to its residents and businesses. The determination of the fiscal impact of the proposed redevelopment involves the use of an econometric model which is a composite of two techniques generally referred to as the "proportional valuation method" and the "per capita multiplier method". The "proportional valuation method" is utilized first to assign a portion of total municipal expenditures to the non-residential (as opposed to the residential) valuation in the Township . Municipal expenditure levels proportionately allocated to residential valuation are then expressed in terms of per capita expenditures for the existing population base. School appropriations are expressed on a per pupil basis. Once these per capita and per pupil expense ratios are determined, the "per capita multiplier method" anticipates added costs from the proposed development by applying increased population and student enrollment to the current expense ratios.

Assumptions, Conditions and Qualifications

The preparation of a cost/revenue analysis, which measures the overall and specific impacts resulting from the development and occupancy of the proposed development, necessarily requires that certain empirical assumptions be made:

1) All dollars are 2020 dollars--the fiscal impact shown reflects the forecasted impact as if the development were completed, occupied, and functioning as a part of Hopewell Township in 2020;

2) Other growth or changes (demographic/economic) occurring in Hopewell Township during the development phases of the project may well have their own impact on fiscal matters, but are not included within the scope of this study in order to empirically assess the direct impact of the planned development;

3) The "proportional valuation method" assumes that, over the long run, current average operating costs furnish a reasonable estimate of future operating costs occasioned by growth, and that current levels of service, relative to current population, are reasonably accurate indicators of future service levels continued at the same relative scale, and;

4) The current distribution of expenditures among the various sectors of municipal service will remain constant in the short term and will serve as the primary indicator of the way in which additional expenditures will be subsequently allocated.

Utilizing the aforedescribed methodology and assumptions, the ultimate impact of the completion and occupancy of the proposed residential redevelopment can be determined through a cost/revenue analysis of the major sources of the services and taxing bodies affected by the new development. The primary sources of the services to be affected are: a) the municipality; b) the local and regional school district, and ; c) the County.

MUNICIPAL IMPACT

The fiscal effects anticipated to result from the proposed residential development containing 379 new housing units, including the addition of 813 new residents, shall be analyzed in this section in terms of the added costs expected to be incurred by the municipality in providing the various services required by the development.

Municipal Costs

Insofar as the costs of the services now being provided by the community serve as the statistical foundation for the costs to be generated by the proposed development, an analysis of existing service/cost relationships has been undertaken. A summary of Hopewell Township's current (2020) revenues and expenditures, as presented in Table 9, provides a useful profile for the determination of the fiscal impact attributable to the proposed development.

Before the data and relationships indicated in Table 9 may be utilized, certain adjustments must be made to separate its residential and non-residential components. As may be seen in Table 9, non-residential properties in the Hopewell Township , which include Class 4a Commercial and Class 4b Industrial properties, represent 2.78 percent of all properties and 22.10 percent of Hopewell Township's total assessed valuation. Given these distributions, 12.44 percent of the total current municipal expenditures would be assigned, in terms of cost/benefit (or cost generation), to the non-residential properties in Hopewell Township. Of the Township's current tax-supported appropriations of $16,070,002, approximately 12.44 percent, or $1,999,108, would be assigned to the Township's 203 non-residential (commercial/industrial) properties.

The Township's residential properties, which are represented by 6,265 Class 2 Residential, 352 Class 3a Farm and 7 Class 4c Apartment properties, represent 85.93 percent of the Township's total properties and 76.84 percent of the Township's total assessed valuation, and would be assigned 81.39 percent of the Township's total tax-supported costs. In this regard, $13,079,374 of the Township's total, tax-supported local use appropriations of $16,070,002 would be attributed to residential properties located within Hopewell Township.

TABLE 9

MUNICIPAL DATA - 2020
HOPEWELL TOWNSHIP, MERCER COUNTY

A. Current Assessments:

Category	Assessment	Percent	Parcels
1. Vacant Land	$ 35,978,200	0.92	307
2. Residential	$2,751,990,400	70.21	5,919
3a Farm-Regular	$ 255,473,400	6.52	339
3b Farm-Qualified	$ 5,500,970	0.14	516
4a Commercial	$ 501,663,300	12.80	179
4b Industrial	$ 364,462,100	9.30	24
4c Apartments	$ 4,551,600	0.12	7
Summary			
Residential (Class 2, 3a, 4c)	$3,012,015,400	76.84	6,265
Commercial/Industrial	$ 866,125,400	22.10	203
Other (Class 1 & 3b)	$ 41,479,170	1.06	823
Total	$3,919,619,970	100.0	7,291

B. Current Tax Structure:

Rate Per $100	***Percent***	***Rate***
Municipal Purpose	18.16	$0.542
Regional School District	58.29	$1.740
County Taxes	23.55	$0.703
Total	100.00	$2.985

C. Local Use Appropriations:	***Percent***	***Amount***
Municipal Purposes within CAPS	62.94	$14,610,069
Total Operations Excluded from CAPS	6.02	$ 1,397,034
Capital Improvements	1.53	$ 354,721
Debt Service	24.61	$ 5,711,611
Reserve for Uncollected Taxes	4.90	$ 1,137,494
Total General Appropriations	100.00	$23,210,929

D. General Revenues - Local Use:	***Percent***	***Amount***
Revenue from Property Taxes	69.23	$16,070,002
Miscellaneous Revenues	21.46	$ 4,981,427
Surplus Revenues	5.10	$ 1,183,500
Receipts from Delinquent Taxes	3.77	$ 876,000
Total General Revenues	100.00	$23,110,929

Note: State Equalization Ratio is 94.08.

Non-Residential Costs - The 203 existing non-residential (commercial and industrial) parcels in Hopewell Township have a total estimated (2020) employment base of 5,497 jobs and

were previously calculated to generate $1,999,108 in allocated, tax-supported, local use costs, or $364 per employee. The proposed development is entirely residential in nature and will not directly generate any on-site employment or employee-based municipal service costs.

Residential Costs - When the resident-based, tax-supported municipal appropriations of $13,079,374 are allocated among the Township's estimated year-end 2020 residential population of 17,770 residents, an average per capita, tax-supported cost appropriation of $736 is derived. Concentrated, higher-density residential developments with internal management structures and condominium associations, where many services are provided by the condominium association, will typically have "marginal" costs that are approximately 60 percent of the "average" per capita costs, or approximately $442 per capita. Despite these anticipated efficiencies, the full per capita cost allocation of $736 has ben applied to the projected total of 813 residents estimated to reside within the proposed residential redevelopment, yielding an allocated local use appropriation of $598,370 (813 x $736 = $598,370).

Cost Allocations - The actual experience and distribution of the municipality's expenditures among its various budgetary components provides a basis for the allocation of costs estimated for the proposed new development. The allocated costs would reflect an annual allotment of estimated appropriations predicated upon Hopewell Township's existing levels of service and appropriations. The estimated tax-supported costs of $598,370 amount to 3.7 percent of the tax-supported municipal appropriations that would be allocated to maintain the same level and quality of municipal services to the Township's existing residential and non-residential properties. The forecasted allocation takes into account factors associated with the lower costs attributable to the compact and self-contained nature of the proposed residential redevelopment and the economies of scale and efficiencies inherent in the addition of 813 persons to an estimated existing population base of approximately 17,770 persons.

SCHOOL DISTRICT SERVICE COSTS

The number of public school students expected to be generated by the proposed residential development furnishes the statistical basis for this element of the anticipated fiscal impact of the proposed development. As previously discussed, and utilizing the CUPR standard (Statewide) demographic multipliers, the 301 "market housing units have been estimated to generate 43 public school children while the 78 "affordable" housing units were estimated to generate 18 public school children, for a total of 61 public school children. Educational services for these students would be provided by the Hopewell Valley Regional School District, which furnishes educational services for Hopewell Township, Hopewell Borough and Pennington Borough students in grades K-12.

Hopewell Valley Regional School District Costs

The fiscal impact resulting from the addition of the 61 new students to the local school district has been statistically structured under the assumption that all new students were enrolled during 2020 (2020-21 school year). The addition of the new students into the current enrollment is preferable to the extent that it permits a more objective appraisal of the direct impact of the enrollment specific to the new development and also permits an analysis predicated upon known fiscal data and current (2020) dollars. The costs anticipated for the enrollment of 61 students in the local school district have been estimated on the basis of the actual per pupil appropriations for the 2020-21 school year.

During the 2020-21 school year, the Hopewell Valley Regional School District reported a total operating budget of $85,747,525, of which, $77,175,998, or 90.00 percent, is funded by local property tax revenues. Relative to the school district's enrollment, the budgeted appropriations equate to $25,235 per student with tax-supported costs amounting to $22,712 per student. Applying the tax-supported school district cost of $22,712 to the 61 new students to be enrolled, yields allocated tax-supported local school district costs of $1,385,430[4] (61 x $22,712= $1,385,430).

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[4]In view of the declining enrollment trends in the Hopewell Valley Regional School District, with a loss of 448 students since 2010, it is likely that the school district costs for the 61 new students will be less than the average per student costs used in this analysis. However, this analysis has not assumed any efficiencies in adding 61 students to a declining enrollment base and has estimated allocated costs at the present average cost per student

COUNTY SERVICE COSTS

A broad range of services are furnished by the County government, its agencies, offices and departments. These services, which are provided and available to all County residents without respect to municipality of residence, include the services of County Courts; Sheriff's office; various health, safety and welfare programs; maintenance of County roads; County education services; County parks; recreational facilities; etc. The nature of the services provided by the County are such that its services, facilities and operations are generally of countywide use and benefit, and the costs thereof are not allotted and cannot be segregated on a municipality-by-municipality basis. It is, therefore, difficult, to specifically separate and determine the actual measure of benefit, and the costs attendant thereto, received by Hopewell Township residents from Mercer County operations.

The absence of a direct cost/benefit relationship in the services supplied by the County does not preclude its analysis, but rather, focuses the correlations upon the actual manner in which County services are furnished and financed. Although County services are provided to the general public and, therefore, generate costs as a function of population (per capita), these services are not financed by the population, but through the assessment of a County Tax upon property valuations. A calculation of the estimated County costs and estimated County revenues resulting from the proposed development in Hopewell Township may also be derived from this bifurcated relationship between hypothetical costs and direct revenues.

County Costs

County services are provided primarily, and in some instances exclusively, for the benefit of County residents with only a limited amount of services rendered to non-residential properties and non-resident employees. Because the vast majority of Mercer County's services and associated costs are furnished to and for the benefit of County residents, only a nominal and indirect relationship exists relative to non-residential properties and the employees thereof. Of the total County appropriations, only those activities involved with general government, public safety, public works and judiciary could reasonably be perceived as providing a service/benefit to non-residential properties and their employees. These types of County services, which are provided for the joint benefit of residents and non-residents, account for approximately 39 percent of the total County

expenditures while the remaining 61 percent of Mercer County's expenditures are furnished exclusively for the County's residential population.

Residential Costs - During 2020, $228.9 million of Mercer County's total tax-supported expenditures of $269.3 million would be allocated to the County's resident population. With an estimated mid-year 2020 resident population of 369,150 persons, the tax-supported residential expenditures amount to $620 for each of the County's residents at this time. The proposed housing development is expected to have a resident population of 813 persons, which, at the present allocated cost of $620 per capita, would be assigned $504,060 in Mercer County costs. Given the magnitude of Mercer County operations, the absence of a direct cost/revenue basis for the provision of County services, and the fact that the added development would represent a nominal increase in the County's total population (0.22 percent), it is unlikely that County costs would increase proportionately. To the contrary, it is probable that the added development could be substantially accommodated and serviced by existing County facilities, equipment and personnel, and therefore no added allocated costs to Mercer County have been calculated or assigned.

ANNUAL REVENUES

The proposed residential development is located on a property that is within an area in Hopewell Township that has been designated as an area in need of redevelopment. Pursuant to the terms of a proposed Financial Agreement between the developer and the Township, the developer has formed an urban renewal entity that is qualified to do business under the provisions of the Long Term Tax Exemption Law, as set forth in *N.J.S.A. 40A:20-1 et seq.* In accordance with provisions of the Long Term Tax Exemption Law, the developer has prepared a Financial Agreement, one that will provide the Township with an increased share of the total annual revenues generated by the proposed residential development.

Current Revenues

The property that is the subject of this fiscal assessment involves a proposal for the redevelopment of a tract of land located between Washington Crossing-Pennington Road and Diverty Road in the immediate vicinity of Route 31 that is designated as Block 85, Lot 3; Block 86, Lots 32 and 33 (joined); and Block 86, Lots 34 and 130 (joined) on the official tax map of the Township of Hopewell.

Assessed Valuation - The redevelopment site consists of five (5) tax lots that have a combined current assessed valuation of $1,487,700.

Proposed Development Property
Current Assessments - Existing Use

			Assessed Value		
Block	Lot	Acres	Land	Improvements	Total
85	3	44.08	$1,101,600	$ 0	$ 1,101,600
86	32/33	0.78	$ 155,700	$ 29,500	$ 185,200
86	34/130	2.59	$ 181,400	$ 19,500	$ 200,900
Total		47.45	$1,438,700	$ 49,000	$1,487,700

Current Property Tax Revenues - The property to be redeveloped, as indicated in the preceding tabulation, has a total current assessment of $1,487,700, including $1,101,600 in a land assessment on a municipally owned parcel on which taxes are not presently collected. At the Township's current general tax rates, the full use and taxation of the subject property would be calculated to generate annual property tax revenues for the Township amounting to $8,063[5], along with property tax revenues of $25,866 for the Hopewell Valley Regional School District, and property tax revenues of $10,459[6] for Mercer County. The total property tax revenues generated by the existing property under full taxation amount to $44,408 and are attributable to the property taxes of $42,945 on the land assessment and taxes of $1,463 on the improvements. The annual property tax revenues applicable to a current assessed valuation of $1,487,700 are summarized below:

Hopewell Township Redevelopment Property
Existing Property Tax Revenues

		Land	Improvements	Total
Existing Assessment		$1,438,700	$ 49,000	$1,487,700
Property Taxes/$100				
Municipal	$0.542	$ 7,798	$ 266	$ 8,063
Regional School	$1.740	$ 25,033	$ 853	$ 25,866
County	$0.703	$ 10,114	$ 344	$ 10,459
Total	$2.985	$ 42,945	$ 1,463	$ 44,408

Financial Agreement With In-Lieu Payments

The proposed residential redevelopment is located on a property within Hopewell Township that is designated as an area in need of redevelopment. Pursuant to the terms of the Financial Agreement between the developer and the Township, the developer has formed an urban renewal entity (US Home at Hopewell Urban Renewal, LLC) that is qualified to do business under the provisions of the Long Term Tax Exemption Law providing for Payments In Lieu (PILOT Payments) during the 30-year term of the exemption.

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[5]Including $6,100 in local municipal purpose taxes, $446 for Open Space funds, and $1,517 in Fire District taxes.

[6]Including $9,134 in County operating funds, $922 in County Library funds and $402 for County Open Space funds.

Annual Service Charge

The Financial Agreement establishes the following terms for the payment of the Annual Service Charge:

Years 1 through 5 - An amount equal to 66 percent of the amount of *ad valorem* taxes on the Land and Improvements that such Unit (or other portion of the Project) would be subject to at such time in the absence of an exemption from taxation under the Long Term Tax Exemption Law;

Years 6 through 10 - An amount equal to 75 percent of the amount of *ad valorem* taxes on the Land and Improvements that such Unit (or other portion of the Project) would be subject to at such time in the absence of an exemption from taxation under the Long Term Tax Exemption Law;

Years 11through 30 - An amount equal to 99.5 percent of the amount of *ad valorem* taxes on the Land and Improvements that such Unit (or other portion of the Project) would be subject to at such time in the absence of an exemption from taxation under the Long Term Tax Exemption Law;

The proposed residential development, consisting of 301 "market" and 78 "affordable" housing units would be expected to represent a total project value of $116,685,700 when completed and occupied. At the Township's current assessment ratio of 94.08 percent, the completed residential development would have an estimated assessment of $109,777,923:

Proposed Residential Redevelopment
Project Value and Assessment

Residential	No Units	Sale Price/ Est Value	Aggregate Value
Market			
TH 3-BR	61	$479,500	$29,249,500
Stacked TH 2-BR	72	$299,000	$21,528,000
Stacked TH 3-BR	72	$354,900	$25,552,800
Condo Flat	96	$299,000	$28,704,000
Market Sub Total	301	$348,951	$105,034,300
Affordable			
Condo-1BR	15	$ 123,472	$ 1,852,080
Condo-2BR	47	$ 149,399	$ 7,021,753
Condo-3BR	16	$ 173,599	$ 2,777,584
Apt Sub Total	78	$ 149,377	$11,651,417
Total	379	$307,878	$116,685,700

With *ad valorem*, or Ordinary Applicable Taxes, the Project's estimated assessment $109,777,923 would, at the Township's current general tax rate of $2.985 per $100 of assessed value, yield an annual payment of $3,276,871. Pursuant to the terms of the Financial Agreement, the project will pay an Annual Service Charge that is based upon a proportion of the *ad valorem* taxes established for years 1 through 5, years 6 through 10 and years 11 through 30. Taxes paid are projected to increase at an annual rate of 2.0 percent through the 30 year term of the Financial Agreement. During the first stage (years 1 through 5) Annual Service Charge payment would be expected to increase from $2,162,735 in the first year, increase to an Annual Service Charge payment of $2,713,448 in the initial year of the second stage (years 6 through 10) with a further increase to an Annual Service Charge payment of $3,974,515 at the beginning of the third stage (years 11 through 30):

Illustrative Annual Service Charges [7]

	Ordinary Tax	PILOT Percent	Annual Payment
Year 1	$3,276,871	66.0	$ 2,162,735
Year 6	$3,617,930	75.0	$ 2,713,448
Year 11	$3,994,487	99.5	$ 3,974,515

As indicated in the preceding tabulation, the per unit Annual Service Charge amounts to $5,706.42 during year 1, increases to $7,159.49 in year 6 and increases to $10,486.85 in year 11. During the 30-year term of the tax exemption, the project would pay Annual Service Charges that amount to 87.2 percent of the ordinary applicable taxes.

Land Tax Credit - The land taxes are included in the Annual Service Charge payments that are based upon a proportion of the *ad valorem* taxes applied to assessment of the residential land and improvements associated with each Unit (or other portion of the Project) and are not subject to the alternate distribution applicable to a Land Tax Credit .

[7] These Annual Service Charges are illustrative and subject to annual adjustments due to changes in the general tax rate in Hopewell Township.

Annual Administrative Fee - Any cost or fees incurred by the Township to administer the Annual Service Charge shall be deemed to be included in the Annual Service Charge and the Township will not charge any additional administration or other fee in connection with the administration of the tax exemption.

Annual In-Lieu Payments - The completed residential development, pursuant to the provisions of the Financial Agreement, could be expected to make an **initial year** annual in-lieu payment **(year 1)** to the Township of Hopewell and Mercer County totaling $2,162,735. These payments would be distributed between the Township of Hopewell and the County as detailed in the following tabulation:

Proposed Residential Development in Hopewell Township
Distribution of Annual Service Charges

Total	Township of Hopewell	Mercer County
$2,162,735	$2,054,598	$108,137

Annual Revenue Comparisons

The payments that Hopewell Township would retain with the proposed tax abatement ($2,054,598) are over 245 times the property tax revenues ($8,063) that the Township currently receives from the existing property and are 3.5 times the property tax revenues of $594,996[8] that the Township would receive with Ordinary Applicable Taxes:

Proposed Residential Redevelopment
Annual Revenue Summary and Comparison

	Township of Hopewell
Existing Use[9]	$ 8,063
Proposed Residential Development	
Ordinary Taxes	$ 594,996
PILOT payments (ASC)	$2,054,598
Allocated Costs	$ 598,370

[8]The proposed development, with a completed project value of $116,685,717 and an estimated assessment of $109,777,923 would generate municipal property tax revenues of $594,996 at the current total municipal (municipal purpose, open space and fire district) property tax rate of $0.542 per $100 of assessed valuation

[9]Assumes full taxation on the assessed value of the subject tax lots.

As summarized in the preceding tabulation, the annual revenues that would be received by the Township with a Financial Agreement providing for in-lieu payments ($2,054,598) are over 245 times the current calculated municipal tax revenues of $8,063 and are 3.43 times the allocated municipal service costs of $598,370. Significantly, the annual revenues generated for the Township ($2,054,598) with the proposed tax-exemption greatly exceed the allocated municipal service costs of $598,370 allocated to the proposed residential redevelopment, notwithstanding the inclusion of 78 "affordable" housing units, and would in the first year of occupancy exceed the combined allocated municipal and school total cost of $1,983,800. The excess of municipal revenues over municipal and school costs would be expected to greatly in crease in the sixth year of the PILOT agreement when payments increase and then again in year eleven of the PILOT agreement when payments to the municipality increase for a second time.

During the 30-year term of the requested exemption, the proposed residential development would make total annual payments to the Township of Hopewell that will amount 4.8 times the revenues that would be received with ordinary taxes. Significantly, with the proposed Financial Agreement and PILOT payments, the Township of Hopewell will retain 95 percent of the total annual revenues generated as opposed to only 18.2 percent with ordinary applicable taxes. The anticipated revenues to be received by Hopewell Township during the term of the 30 year PILOT agreement are detailed on Table 10.

TABLE 10
PROPOSED RESIDENTIAL DEVELOPMENT
HOPEWELL TOWNSHIP
PROJECTED TAX AND PILOT PAYMENTS

	Year	PROJECT OAT Tot.	PROJECT OAT Municip.	PROJECT COST	PILOT Variable	Pilot Municip.	Paymnts County	Municipal Admin. Fee	Municipal Payment	Minimim Muni Payment
66.00	1	3,276,871	594,996	116,685,717	2,162,735	2,054,598	108,137	-	2,054,598	2,054,598
66.00	2	3,342,408	606,896	119,019,431	2,205,990	2,095,690	110,299	-	2,095,690	2,095,690
66.00	3	3,409,257	619,034	121,399,820	2,250,109	2,137,604	112,505	-	2,137,604	2,137,604
66.00	4	3,477,442	631,415	123,827,816	2,295,112	2,180,356	114,756	-	2,180,356	2,180,356
66.00	5	3,546,991	644,043	126,304,373	2,341,014	2,223,963	117,051	-	2,223,963	2,223,963
75.00	6	3,617,930	656,924	128,830,460	2,713,448	2,577,775	135,672	-	2,577,775	2,577,775
75.00	7	3,690,289	670,062	131,407,069	2,767,717	2,629,331	138,386	-	2,629,331	2,629,331
75.00	8	3,764,095	683,463	134,035,211	2,823,071	2,681,918	141,154	-	2,681,918	2,681,918
75.00	9	3,839,377	697,133	136,715,915	2,879,532	2,735,556	143,977	-	2,735,556	2,735,556
75.00	10	3,916,164	711,075	139,450,233	2,937,123	2,790,267	146,856	-	2,790,267	2,790,267
99.50	11	3,994,487	725,297	142,239,238	3,974,515	3,775,789	198,726	-	3,775,789	3,775,789
99.50	12	4,074,377	739,803	145,084,023	4,054,005	3,851,305	202,700	-	3,851,305	3,851,305
99.50	13	4,155,865	754,599	147,985,703	4,135,085	3,928,331	206,754	-	3,928,331	3,928,331
99.50	14	4,238,982	769,691	150,945,417	4,217,787	4,006,898	210,889	-	4,006,898	4,006,898
99.50	15	4,323,762	785,085	153,964,326	4,302,143	4,087,036	215,107	-	4,087,036	4,087,036
99.50	16	4,410,237	800,786	157,043,612	4,388,186	4,168,776	219,409	-	4,168,776	4,168,776
99.50	17	4,498,442	816,802	160,184,484	4,475,949	4,252,152	223,797	-	4,252,152	4,252,152
99.50	18	4,588,410	833,138	163,388,174	4,565,468	4,337,195	228,273	-	4,337,195	4,337,195
99.50	19	4,680,179	849,801	166,655,937	4,656,778	4,423,939	232,839	-	4,423,939	4,423,939
99.50	20	4,773,782	866,797	169,989,056	4,749,913	4,512,418	237,496	-	4,512,418	4,512,418
99.50	21	4,869,258	884,133	173,388,837	4,844,912	4,602,666	242,246	-	4,602,666	4,602,666
99.50	22	4,966,643	901,815	176,856,614	4,941,810	4,694,719	247,090	-	4,694,719	4,694,719
99.50	23	5,065,976	919,852	180,393,746	5,040,646	4,788,614	252,032	-	4,788,614	4,788,614
99.50	24	5,167,295	938,249	184,001,621	5,141,459	4,884,386	257,073	-	4,884,386	4,884,386
99.50	25	5,270,641	957,014	187,681,654	5,244,288	4,982,074	262,214	-	4,982,074	4,982,074
99.50	26	5,376,054	976,154	191,435,287	5,349,174	5,081,715	267,459	-	5,081,715	5,081,715
99.50	27	5,483,575	995,677	195,263,993	5,456,157	5,183,350	272,808	-	5,183,350	5,183,350
99.50	28	5,593,247	1,015,591	199,169,272	5,565,281	5,287,017	278,264	-	5,287,017	5,287,017
99.50	29	5,705,112	1,035,902	203,152,658	5,676,586	5,392,757	283,829	-	5,392,757	5,392,757
99.50	30	5,819,214	1,056,620	207,215,711	5,790,118	5,500,612	289,506	-	5,500,612	5,500,612
		132,936,362	24,137,845						115,848,806	115,848,806

FISCAL IMPACT OVERVIEW

In the preceding sections of this report, the nature and magnitude of the proposed residential development in Hopewell Township relative to the existing community have been defined and quantified, and the prospective impact thereof upon the various services furnished by the municipality, school system and County have been determined. The need for a variety of services, and the costs thereof, as a result of the proposed development, were subsequently refined to illustrate the ultimate impact through cost/revenue analysis.

Impact Summary

The results of these analyses, as previously discussed, indicate that the completed development would, with the proposed tax exemption, generate Annual Service Charges for Hopewell Township that amount to $2,054,598. The annual revenues generated for the municipality with the proposed tax abatement are 255 times the current municipal tax revenues of $8,063 and are 3.4 times the allocated municipal service costs of $598,370. Significantly, the annual revenues generated for the Township with the proposed tax-exemption ($2,054,598) also exceed the annual revenues of $594,996 that the Township would receive with ordinary applicable taxes.

Under Ordinary Applicable Taxes, Hopewell Township would receive only 18.2 percent of the property tax revenues generated by the proposed development. The utilization of the provisions for tax-exemption would provide the Township with 95.0 percent of the total annual revenues generated (annual service charges), and yield a first year annual payment to the Township amounting to $2,054,598.

Per Capita Comparisons

The total payments to Hopewell Township from the "market" housing units within the proposed residential redevelopment (301 residential units) with tax exemption amount to $1,849,440 and would equate to $2,765 for each of the anticipated total of 669 residents of the new market housing units. By way of comparison, the Township's 6,265 residential properties have a current assessment of $3,012,015,400 and pay municipal taxes of $16,325,123 at the current municipal tax rate of $0.542 per $100 of assessed valuation, or approximately $919 for each of the Township's 17,770 current residents. The per capita municipal revenues generated by market units within the

proposed residential redevelopment ($2,765) are three times the corresponding per capita municipal revenues of $919 of the Township's existing residential properties.

The foregoing analysis has demonstrated that, if the proposed development had been in existence during 2020, the annual municipal revenues generated for the Township would have amounted to $2,054,598 and would fully offset the allocated tax-supported municipal costs of $598,370 and resulted in an annual municipal revenue surplus of $1,456,228. Concentrated, higher-density residential developments will typically have "marginal" costs that are approximately 60 percent of the "average" per capita costs. Despite these anticipated efficiencies, this analysis has utilized the full per capita cost allocation to estimate the allocated local use cost of the proposed development. The annual revenues that would be generated for Hopewell Township by the proposed development with the PILOT exemption and abatement is a multiple of the tax revenues generated by the current use of the property, exceed the combined municipal and local school district service costs of $1,983,800 to yield an annual revenue surplus of $61,798, and are 3.5 times the annual revenues of $594,996 that the Township would otherwise retain with ordinary taxes, absent the PILOT agreement. These positive fiscal implications are achieved notwithstanding the provision of a significant component of 78 affordable housing units to assist the Township in meeting its affordable housing obligations.

The existing costs allocations for municipal operations provide one possible distribution of the estimated overall costs; but it is the overall cost estimate, and not the specific distribution of this cost, that is the most reliable product of this analysis. The actual and final determination of specific services, equipment, and manpower needs most appropriately rests with the various municipal and school authorities responsible for the provision of these services. Similarly, the allocation and/or reallocation of newly realized revenue sources should necessarily be reserved for those charged with the responsibility of managing these fiscal resources.

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APPENDIX 1	Updated CUPR Demographic Multipliers - Total Population
APPENDIX 2	Updated CUPR Demographic Multipliers - Public School Children
APPENDIX 3	CUPR Affordable Housing Demographic Multipliers

APPENDIX 1
CUPR Updated 2018 New Jersey Demographic Multipliers
Total Population

TOTAL PERSONS AND PERSONS BY AGE (Newer housing units built 2000-2016, from 2012-2016 ACS)

STRUCTURE TYPE/ BEDROOMS VALUE/TENURE		TOTAL PERSONS	AGE 0-4	5-17	18-34	35-44	45-54	55-64	65-74	75+
Single-Family Detached (Own/Rent), 2 BR										
All Values		1.830	0.039	0.060	0.119	0.064	0.122	0.310	0.665	0.451
Below Median	$284,000	1.782	0.065	0.080	0.174	0.091	0.111	0.275	0.539	0.448
Above Median	$284,000	1.880	0.013	0.039	0.063	0.036	0.133	0.346	0.794	0.455
Single-Family Detached (Own/Rent), 3 BR										
All Values		2.762	0.169	0.446	0.471	0.420	0.344	0.355	0.382	0.177
Below Median	$304,000	2.898	0.205	0.518	0.609	0.487	0.362	0.322	0.262	0.137
Above Median	$304,000	2.606	0.127	0.362	0.312	0.342	0.322	0.392	0.519	0.228
Single-Family Detached (Own/Rent), 4-5 BR										
All Values		3.780	0.266	1.044	0.548	0.651	0.692	0.329	0.170	0.079
Below Median	$506,000	3.837	0.288	1.031	0.655	0.674	0.647	0.300	0.165	0.076
Above Median	$506,000	3.719	0.243	1.057	0.433	0.627	0.740	0.360	0.177	0.082
Single-Family Attached (Own/Rent), 2 BR										
All Values		2.311	0.218	0.274	0.499	0.420	0.270	0.272	0.216	0.142
Below Median	$238,000	2.265	0.226	0.302	0.634	0.345	0.219	0.272	0.172	0.094
Above Median	$238,000	2.359	0.209	0.245	0.361	0.498	0.321	0.272	0.261	0.191
Single-Family Attached (Own/Rent), 3 BR										
All Values		3.002	0.301	0.572	0.675	0.547	0.363	0.316	0.162	0.065
Below Median	$283,000	3.241	0.344	0.735	0.841	0.528	0.378	0.255	0.108	0.053
Above Median	$283,000	2.755	0.258	0.403	0.504	0.566	0.348	0.379	0.219	0.078
2-4 Units (Own/Rent), 0-1 BR										
All Values		2.003	0.180	0.212	0.732	0.333	0.211	0.169	0.078	0.089
Below Median	$114,000	1.770	0.174	0.150	0.687	0.271	0.163	0.168	0.095	0.063
Above Median	$114,000	2.246	0.186	0.277	0.779	0.398	0.261	0.170	0.059	0.117
2-4 Units (Own/Rent), 2 BR										
All Values		2.829	0.349	0.501	0.827	0.477	0.297	0.228	0.095	0.055
Below Median	$145,000	2.877	0.412	0.520	0.926	0.436	0.288	0.198	0.058	0.039
Above Median	$145,000	2.779	0.283	0.480	0.723	0.520	0.305	0.260	0.135	0.073
2-4 Units (Own/Rent), 3 BR										
All Values		3.707	0.372	0.841	1.102	0.565	0.465	0.233	0.090	0.039
Below Median	$178,000	3.678	0.363	0.920	1.126	0.501	0.451	0.207	0.079	0.031
Above Median	$178,000	3.738	0.382	0.759	1.077	0.631	0.480	0.260	0.102	0.047

APPENDIX 1(continued)
CUPR Updated 2018 New Jersey Demographic Multipliers
Total Population

TOTAL PERSONS AND PERSONS BY AGE (continued) (Newer housing units built 2000-2016, from 2012-2016 ACS)

STRUCTURE TYPE/ BEDROOMS VALUE/TENURE		TOTAL PERSONS	AGE 0-4	5-17	18-34	35-44	45-54	55-64	65-74	75+
5-49 Units (Own), 0-1 BR										
All Values		1.352	0.031	0.012	0.314	0.377	0.189	0.081	0.193	0.155
Below Median	$210,000	1.254	0.000	0.021	0.063	0.340	0.216	0.099	0.280	0.234
Above Median	$210,000	1.475	0.070	0.000	0.631	0.423	0.154	0.059	0.084	0.055
5-49 Units (Own), 2 BR										
All Values		1.796	0.104	0.086	0.356	0.280	0.164	0.192	0.355	0.259
Below Median	$289,000	1.711	0.101	0.096	0.367	0.275	0.173	0.188	0.291	0.219
Above Median	$289,000	1.889	0.107	0.074	0.344	0.285	0.154	0.197	0.424	0.303
5-49 Units (Own), 3 BR										
All Values		2.362	0.184	0.325	0.521	0.394	0.372	0.291	0.158	0.117
Below Median	$303,000	2.207	0.190	0.207	0.639	0.336	0.305	0.279	0.098	0.153
Above Median	$303,000	2.554	0.176	0.471	0.377	0.465	0.454	0.307	0.232	0.072
5-49 Units (Rent), 0-1 BR										
All Values		1.568	0.064	0.127	0.507	0.218	0.173	0.190	0.144	0.147
Below Median	$119,000	1.479	0.054	0.111	0.340	0.165	0.224	0.242	0.184	0.157
Above Median	$119,000	1.662	0.074	0.143	0.681	0.272	0.118	0.135	0.102	0.136
5-49 Units (Rent), 2 BR										
All Values		2.512	0.263	0.368	0.865	0.420	0.245	0.170	0.101	0.080
Below Median	$185,000	2.660	0.314	0.492	0.847	0.411	0.283	0.161	0.091	0.060
Above Median	$185,000	2.359	0.211	0.239	0.882	0.430	0.206	0.180	0.112	0.100
5-49 Units (Rent), 3 BR										
All Values		3.571	0.351	0.995	1.043	0.609	0.351	0.157	0.056	0.010
Below Median	$178,000	3.722	0.454	1.202	0.886	0.643	0.304	0.136	0.078	0.019
Above Median	$178,000	3.406	0.238	0.767	1.215	0.571	0.403	0.181	0.031	0.000
50+ Units (Own), 0-1 BR										
All Values		1.318	0.062	0.003	0.339	0.336	0.073	0.096	0.089	0.319
Below Median	$314,000	1.206	0.049	0.000	0.195	0.226	0.041	0.075	0.078	0.540
Above Median	$314,000	1.443	0.077	0.007	0.497	0.457	0.108	0.120	0.102	0.075
50+ Units (Own), 2 BR										
All Values		2.011	0.207	0.078	0.469	0.417	0.164	0.193	0.146	0.337
Below Median	$500,000	1.689	0.079	0.022	0.256	0.169	0.098	0.237	0.224	0.605
Above Median	$500,000	2.356	0.345	0.138	0.698	0.684	0.235	0.147	0.061	0.048
50+ Units (Own), 3 BR										
All Values		2.944	0.524	0.212	0.499	0.795	0.186	0.313	0.344	0.070
Below Median	$836,000	3.007	0.516	0.127	0.626	0.683	0.182	0.374	0.387	0.112
Above Median	$836,000	2.840	0.537	0.352	0.291	0.980	0.193	0.213	0.275	0.000
50+ Units (Rent), 0-1 BR										
All Values		1.392	0.041	0.020	0.505	0.185	0.086	0.106	0.159	0.291
Below Median	$178,000	1.236	0.029	0.032	0.176	0.047	0.068	0.150	0.287	0.447
Above Median	$178,000	1.551	0.052	0.008	0.840	0.326	0.103	0.062	0.028	0.132
50+ Units (Rent), 2 BR										
All Values		2.243	0.178	0.148	0.896	0.398	0.162	0.129	0.111	0.221
Below Median	$281,000	2.134	0.101	0.198	0.764	0.257	0.168	0.153	0.171	0.322
Above Median	$281,000	2.355	0.257	0.096	1.032	0.543	0.155	0.105	0.049	0.118
50+ Units (Rent), 3 BR										
All Values		3.480	0.335	0.654	1.290	0.459	0.401	0.214	0.112	0.016
Below Median	$316,000	3.627	0.372	0.933	1.388	0.525	0.328	0.048	0.033	0.000
Above Median	$316,000	3.289	0.287	0.289	1.161	0.373	0.498	0.430	0.215	0.036

APPENDIX 2
CUPR Updated 2018 New Jersey Demographic Multipliers
Public School Children

PUBLIC SCHOOL CHILDREN (PSC) (Newer housing units built 2000-2016, from 2012-2016 ACS)

STRUCTURE TYPE/ BEDROOMS VALUE/TENURE		TOTAL PSC	PUBLIC SCHOOL GRADE Elementary (K-5)	Junior High School (6-8)	High School (9-12)
Single-Family Detached (Own/Rent), 2 BR					
All Values		0.052	0.027	0.012	0.013
Below Median	$284,000	0.071	0.035	0.018	0.018
Above Median	$284,000	0.033	0.019	0.007	0.008
Single-Family Detached (Own/Rent), 3 BR					
All Values		0.385	0.187	0.095	0.104
Below Median	$304,000	0.453	0.216	0.108	0.129
Above Median	$304,000	0.307	0.153	0.079	0.074
Single-Family Detached (Own/Rent), 4-5 BR					
All Values		0.848	0.381	0.219	0.248
Below Median	$506,000	0.851	0.397	0.219	0.235
Above Median	$506,000	0.846	0.364	0.220	0.261
Single-Family Attached (Own/Rent), 2 BR					
All Values		0.226	0.126	0.037	0.062
Below Median	$238,000	0.258	0.128	0.054	0.076
Above Median	$238,000	0.193	0.125	0.020	0.048
Single-Family Attached (Own/Rent), 3 BR					
All Values		0.477	0.246	0.112	0.118
Below Median	$283,000	0.630	0.318	0.141	0.172
Above Median	$283,000	0.318	0.173	0.083	0.062
2-4 Units (Own/Rent), 0-1 BR					
All Values		0.175	0.092	0.033	0.050
Below Median	$114,000	0.103	0.086	0.009	0.008
Above Median	$114,000	0.251	0.098	0.058	0.095
2-4 Units (Own/Rent), 2 BR					
All Values		0.471	0.242	0.096	0.133
Below Median	$145,000	0.500	0.272	0.116	0.112
Above Median	$145,000	0.439	0.209	0.075	0.155
2-4 Units (Own/Rent), 3 BR					
All Values		0.760	0.361	0.193	0.206
Below Median	$178,000	0.835	0.398	0.225	0.212
Above Median	$178,000	0.681	0.322	0.159	0.200

APPENDIX 2 (continued)
CUPR Updated 2018 New Jersey Demographic Multipliers
Public School Children

PUBLIC SCHOOL CHILDREN (PSC) (continued) (Newer housing units built 2000-2016, from 2012-2016 ACS)

STRUCTURE TYPE/ BEDROOMS VALUE/TENURE		TOTAL PSC	PUBLIC SCHOOL GRADE Elementary (K-5)	Junior High School (6-8)	High School (9-12)
5-49 Units (Own), 0-1 BR					
All Values		0.012	0.012	0.000	0.000
Below Median	$210,000	0.021	0.021	0.000	0.000
Above Median	$210,000	0.000	0.000	0.000	0.000
5-49 Units (Own), 2 BR					
All Values		0.058	0.035	0.015	0.008
Below Median	$289,000	0.078	0.045	0.017	0.016
Above Median	$289,000	0.036	0.024	0.013	0.000
5-49 Units (Own), 3 BR					
All Values		0.221	0.088	0.021	0.112
Below Median	$303,000	0.207	0.026	0.026	0.155
Above Median	$303,000	0.237	0.164	0.015	0.058
5-49 Units (Rent), 0-1 BR					
All Values		0.127	0.058	0.020	0.048
Below Median	$119,000	0.111	0.051	0.015	0.045
Above Median	$119,000	0.143	0.065	0.026	0.051
5-49 Units (Rent), 2 BR					
All Values		0.339	0.198	0.057	0.083
Below Median	$185,000	0.477	0.255	0.092	0.130
Above Median	$185,000	0.196	0.140	0.022	0.034
5-49 Units (Rent), 3 BR					
All Values		0.821	0.346	0.232	0.242
Below Median	$178,000	1.018	0.385	0.337	0.297
Above Median	$178,000	0.604	0.304	0.117	0.183
50+ Units (Own), 0-1 BR					
All Values		0.003	0.003	0.000	0.000
Below Median	$314,000	0.000	0.000	0.000	0.000
Above Median	$314,000	0.007	0.007	0.000	0.000
50+ Units (Own), 2 BR					
All Values		0.039	0.034	0.005	0.000
Below Median	$500,000	0.009	0.000	0.009	0.000
Above Median	$500,000	0.071	0.071	0.000	0.000
50+ Units (Own), 3 BR					
All Values		0.074	0.074	0.000	0.000
Below Median	$836,000	0.082	0.082	0.000	0.000
Above Median	$836,000	0.061	0.061	0.000	0.000
50+ Units (Rent), 0-1 BR					
All Values		0.018	0.011	0.004	0.003
Below Median	$178,000	0.032	0.020	0.006	0.006
Above Median	$178,000	0.004	0.003	0.001	0.000
50+ Units (Rent), 2 BR					
All Values		0.130	0.065	0.027	0.038
Below Median	$281,000	0.193	0.084	0.042	0.067
Above Median	$281,000	0.065	0.045	0.011	0.009
50+ Units (Rent), 3 BR					
All Values		0.614	0.227	0.178	0.209
Below Median	$316,000	0.896	0.343	0.219	0.334
Above Median	$316,000	0.245	0.076	0.125	0.044

APPENDIX 3

Demographic Multipliers - Affordable Housing

Household Size, School-Age Children, and Public School Children for Low- and Moderate-Income Households (LMI) in New Jersey (2000)

	Total Persons	*School-Age Children*	*Public School Children*
All Housing Types and Bedrooms	2.35	0.50	0.45
Single-Family, Detached			
2 BR	1.95	0.24	0.21
3 BR	2.49	0.51	0.46
4 BR	3.07	0.83	0.73
Single-Family, Attached			
2 BR	2.09	0.35	0.32
3 BR	3.05	0.86	0.78
5+ Units, Own			
1 BR	1.37	0.07	0.06
2 BR	1.76	0.21	0.18
3 BR	2.51	0.60	0.54
5+ Units, Rent			
1 BR	1.61	0.16	0.14
2 BR	2.76	0.68	0.62
3 BR	3.82	1.37	1.27

Note: The New Jersey Council on Affordable Housing (COAH) Uniform Housing Affordability Controls (UHAC) indicate the following occupancy standards: "A studio shall be affordable to a one-person household; a one-bedroom unit shall be affordable to a one and one-half person household; a two-bedroom unit shall be affordable to a three-person household; a three-bedroom unit shall be affordable to a four and one-half person household; and a four-bedroom unit shall be affordable to a six-person household." UHAC further indicates that "to the extent feasible...the administrative agent shall strive to: Provide an occupant for each unit bedroom; provide children of different sex with separate bedrooms; and prevent more than two persons from occupying a single bedroom." While these standards bear on the relationship between housing-unit size (bedrooms) and household size, we do not have empirical evidence on the number of persons found in different-size COAH units. For instance, a "smaller" household (e.g. a 3-person household in a 3-bedroom unit) may be able to afford such a home with a larger down payment.

Source: *U.S. Census of Population and Housing, Public Use Microdata Sample, 2000.*

STORMWATER MANAGEMENT REPORT

STORMWATER MANAGEMENT REPORT

THE COLLECTION AT HOPEWELL
PROPOSED MULTI-FAMILY RESIDENTIAL
Block 85, Lot 3 and Block 86, Lots 32, 33, 34 and 130
Township of Hopewell, Mercer County, NJ

Prepared for:

US HOME at HOPEWELL URBAN RENEWAL, LLC.
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Date: November 20, 2020

BCG File No.: 080661-01-002

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I. INTRODUCTION

This report has been prepared to describe and document (through engineering calculations and related technical data) the stormwater management system designed for a project known as "The Collection at Hopewell" proposed by US Home at Hopewell Urban Renewal, LLC. The subject property is located on Block 85, Lot 3 and Block 86, Lots 32, 33, 34 and 130 in the Township of Hopewell, Mercer County, New Jersey. This report accompanies proposed plans entitled "Preliminary and Final Site Plan and Subdivision for The Parc at Hopewell, LLC." prepared by Bowman Consulting Group, Ltd. dated November 20, 2020. The set of plans illustrate the existing and proposed conditions of the subject property as well as provide detail(s) for the various stormwater management systems described herein. Therefore, this report should be reviewed and considered in conjunction with the above referenced plans.

A. Location and Description of Project Site

The project site is in the Township of Hopewell (Mercer County, New Jersey) consists of 49.4 acres comprising Lot 3, Block 85 (46.10 acres of land) and Lots 32, 33, 34 and 130, Block 86 (total of 3.3 acres of land). Lot 3, Block 85 was previously utilized as agricultural fields (soybean) with wooded and wetland areas along the perimeter and portions of the site. Lots 32, 33, 34 and 130, Block 86 are former single-family homes and wooded lots. The subject site is bordered by Washington Crossing – Pennington Road (CR 546) to the North, commercial and wooded lots situated along US Hwy 31 (known as Rt. 30 or Pennington Road) to the East, single-family homes situated along Diverty Road to the South, and single-family homes, commercial, and farm use lots situated along Reed Road to the West. The Transcontinental Gas Pipeline and associated easement transects the site.

The *USDA Natural Resources Conservation Service - Web Soil Survey* for Mercer County, New Jersey identifies five types of soil within the project limits. Table No. 1.1 below summarizes the soil type identified by the subject Soil Survey as well as the "Hydrologic Soil Group" for the onsite soils. (copy provided in **Appendix No. 1**),

TABLE 1.1		
SUMMARY OF ON-SITE SOILS		
Mapping Identification	**Soil Type**	**Hydrologic Soil Group**
BucB	Bucks silt loam, 2 to 6 percent slopes	B
BucB2	Bucks silt loam, 2 to 6 percent slopes, eroded	B
DOZA	Doylestown and Reaville variant silt loams, 0 to 2 percent slopes	D
REFA	Readington and Abbottstown silt loams, 0 to 2 percent slopes,	C
REFB	Readington and Abbottstown silt loams, 0 to 2 percent slopes,	C

The site soil conditions are described and documented within the "Geotechnical Investigation Report" prepared by Ingram Engineering Services, Inc. (IES), dated September 29, 2020, which accompanies the Preliminary & Final Subdivision & Preliminary & Final Site Plan submission. IES completed a preliminary geotechnical exploration of the site in January 2018.

The sixty-seven (67) soil test pits were used to determine the depth to seasonal high groundwater (SHGW). Test Pits were excavated to average depths between eight (8') and ten (10') feet below ground surface (BGS). The ground water table was only encountered within one of the test pits excavated across the site, TP-118 in the area of SWM Basin B, at a depth of 83" below ground surface (elevation 195.98). The bottom elevation of this infiltration basin will be greater than 2' above the seasonal high groundwater.

B. Project Description

The proposed project (49.4 Ac) consists of subdividing the five lots and creating ten 3-story traditional townhouse buildings (61 units), eleven 3-story stacked townhouse buildings (144 units), four 3-story multi-family buildings (96 units), and four 3-story COAH apartment buildings (78 units) with associated parking, utilities, landscaping and lighting improvements . There will be a total of 379 units serviced by public water and sanitary sewer, gas, electric and bike paths. Stormwater will be managed by several rain gardens / bioretention basins and 5 extended detention / infiltration basins (A, B, C, D & E). The project can be described as having three sections based on general

housing type. The northern section consists of the stacked townhouses and 2 COAH apartment buildings, the central section consists of the multi-family and 2 COAH apartment buildings and the southern section consists of the townhouse buildings.

Basin A services the northern portion of the northern section and discharges to the wetlands area to the West. Basin B services the southern portion of the northern section, Road 1 and the eastern portion of the central section and discharges to the wetlands area to the East. Basin C services the eastern portion of the central section, the northern portion of the south section and discharges to the wetlands area to the East. Basin D services the southern portion of the south section and discharges to the west. Basin E services the western portion of the central section and discharges to Diverty Road.

II. OVERVIEW OF REGULATORY REQUIREMENTS

The stormwater management system for the proposed Residential Development project has been designed to comply to the greatest extent practicable with current regulatory requirements and standards. The applicable regulations and standards are as follows:

- The State of New Jersey's *"Stormwater Management Rules*", as set forth at NJAC 7:8
- Chapters §17-82 of the Township of Hopewell Ordinance.
- The "*Standards for Soil Erosion and Sediment Control in New Jersey*"
- The *"Residential Site Improvement Standards"* (NJAC 5:21), hereinafter referred to as the "RSIS".

In accordance with the NJ Stormwater Management Rules, a project is classified as a "Major development" if there is an increase of 0.25 acres of impervious surfaces or a disturbance of 1 acre or more. The proposed development results in a disturbance greater than 1 acre and new impervious surfaces in excess of 0.25 acres and therefore meets the condition of a "Major development". Compliance with each of the above-referenced standards necessitates the preparation of a stormwater management plan and design that addresses multiple considerations with respect to controlling and managing post-development stormwater runoff. These considerations are as follows:

- Use of Non-Structural Strategies to the maximum extent practicable
- Maintenance of average annual groundwater recharge volume
- Compliance with applicable Water Quality Management Standards
- "Quantity Control," achieved through peak flow attenuation
- Assuring minimization of erosion and sedimentation

- Providing an effective collection and conveyance system
- Providing for proper maintenance of the system

The remainder of this report will detail the manner in which the project's stormwater management design has addressed each of the above considerations.

The Appendices of this report contain engineering calculations and related technical documentation supporting the project's design as described herein.

III. METHODOLOGIES

This section of this report describes the engineering methodologies employed for the design of the project's storm water management system. All of the methods are specifically referenced in the applicable regulations and/or in one or more of the "References" listed in Section IX of this report. Most of the methods are specified and/or detailed in *The New Jersey Stormwater Best Management Practices Manual*, hereinafter referred to as the "BMP Manual." Specifically, the various methods used in the preparation of the project's plans and stormwater management design to address each of the multiple considerations described above were as follows:

A. Estimates of Runoff Rates and Volumes

1. Pre-Development versus Post-Development

The hydrologic estimates and modeling conducted for the design of the project's storm water management system utilized the National Resources Conservation Series (NRCS) "NRCS Methodology" which is specifically referenced for such applications in the BMP Manual. This method is also commonly known as the "TR-55 Method." Storm frequencies of 2, 10, 25 and 100-years were modeled, as required to demonstrate compliance with the "quantity control" provisions of the subject Rules. The 25-year storm was also modeled for proposed conditions because certain minimum design criteria pertaining to *The Standards for Soil Erosion and Sediment Control in New Jersey* are based upon the 25-year event. The models were created using the SCS NOAA 24-hour, Storm curve C rainfall distribution, also consistent with the guidance provided in the BMP Manual. According to data published by the State Office of the Natural Resources Conservation Service (copy provided in **Appendix No. 1**), the 24-hour rainfall depths for Mercer County for the four storm frequencies modeled are as follows:

- 2-year = 3.31 inches
- 10-year = 5.01 inches
- 25-year = 6.19 inches

- 100-year = 8.33 inches

2. Runoff Coefficients and Times of Concentration

As indicated in Subsection I-A of this report, all of the soils within the project site have been determined to be categorized within "Hydrologic Soil Group B" (HSG-B), "Hydrologic Soil Group C" (HSG-C) and "Hydrologic Soil Group D" (HSG-D) based upon the *NRCS - Web Soil Survey* for Mercer County, New Jersey. Copies of relevant information obtained from the above referenced soil survey and various Soil Conservation Service (SCS) technical publications pertaining to the soils mapping and HSG determination(s) are provided in **Appendix No. 1** of this report along with soil logs for the geotechnical Investigation. Accordingly, the following CN values have been employed for the various existing and proposed combinations of soil types and land cover:

EXISTING (GOOD)	
Impervious Surface	= 98
Brush (HSG-B)	= 55
Brush (HSG-C)	= 70
Brush (HSG-D)	= 77
Grass cover >75% (HSG-C)	= 74
Row Crops (SP&CR) (HSG-B)	= 75
Row Crops (SP&CR) (HSG-C)	= 82
Row Crops (SP&CR) (HSG-D)	= 85
Woods (HSG-B)	= 55
Woods (HSG-C)	= 70
Woods (HSG-D)	= 77

PROPOSED (GOOD)	
Impervious Surfaces	= 98
Grass cover >75% (HSG-B)	= 61
Grass cover >75% (HSG-C)	= 74
Grass cover >75% (HSG-D)	= 80

In addition to CN values, the above referenced NRCS Methodology for estimating stormwater runoff rates and volumes also necessitates the determination of a time of concentration for each subwatershed/drainage area. The times of concentration were estimated in accordance with the criteria given in the SCS 1986 TR-55 publication. In cases where a time of concentration was computed to be less than six minutes, a minimum of 0.1 hours or a six-minute time of concentration was employed pursuant to the criteria specified in the TR-55.

3. Weighted Average Volume Technique

Under proposed conditions, several of the subwatershed areas considered in the analyses include a significant quantity of "directly connected" impervious surfaces. As stated in the BMP Manual, due to the non-linear character of the runoff equations inherent in the TR-55 methodology, variations in cover conditions are not always accurately reflected by calculating a weighted average CN value for the entire subwatershed. Rather, a procedure termed the "weighted average volume technique" was presented and recommended in the BMP Manual for such subwatershed areas. Many of the pre- and post-development sub watershed areas considered in the design of the project's stormwater management system utilized the weighted average volume technique. In such cases, two hydrographs (one representing the directly connected impervious acreage within the area and the other representing the remaining acreage) were developed for the subwatershed. The hydrograph representing the impervious area was given the suffix "IMP" for identification. The hydrograph representing the remainder of the area was assigned the suffix "PER." Sections IV and V of this report identifies the subwatershed areas considered on a weighted average volume basis.

B. Water Quality Management

The project is defined as a "Major Development" per the NJ Stormwater Management Rules. Per the rules, the proposed stormwater measures shall be designed to reduce the post-development load of total suspended solid (TSS) in stormwater runoff generated from the water quality design storm (1.25 inches of rainfall in two hours) by 80%.

The proposed rain gardens / bioretention basins along with the infiltration portion of the proposed basins have been designed to provide 80% TSS removal to meet the regulations.

IV. EXISTING SITE CONDITIONS AND STORMWATER RUNOFF ESTIMATES

The subject site is currently an active agricultural field surrounded by wooded areas. The area of study consists of 40.4 acres and has been subdivided into ten (10) sub-watershed areas to more accurately model pre and post development flows. Stormwater runoff generated from the site under existing conditions flows overland as sheet flow and shallow concentrated flow towards seven (7) downstream "Analysis Points" (AP) and one (1) off-site sub-watershed areas that flow from the west, as identified on the accompanying drainage area maps.

The seven points of analysis are as follows:

- AP#1-located at the northwest corner of the property along Washington Crossing – Pennington Road and discharges to an existing headwall.
- AP#2-located at the northeast corner of the property along Washington Crossing-Pennington Road and discharges to the adjacent commercial site.
- AP#3-located at the northeast corner of the property and discharges to a headwall at Route 31.
- AP#4-located at the eastern portion of the site to the rear of the adjacent Shop Rite and discharges to wetlands.
- AP#5-located at the southwest corner of the site and discharges to the adjacent lots to the west.
- AP#6-located to the southwest of the site adjacent to existing single family lots.
- AP#7-located to the south of the site and discharges to Diverty Road.

The hydrologic models presented in this report focus upon the portion of the site that will be developed, as well as some minor off-site areas. As a result, the "area of study" is 53.409 acres as depicted on the "Existing Drainage Area Map", (Sheet 1 of 3) provided in **Appendix No. 6** of this report.

The developed portion of the site is located within soils with 'B' and 'C' type Hydrologic Soil Group ratings.

TABLE NO. 4.1
SUMMARY OF EXISTING WATERSHED PARAMETERS

DRAINAGE AREA NO.	AREA (AC)	CN VALUE	TIME OF CONCENTRATION (MIN.)
EDA-1	6.676	75	21.4
EDA-2	2.872	75	24.9
EDA-3	5.600	71	31.7
EDA-4	22.746	70	61.3
EDA-5	6.855	76	28.3
EDA-6	2.425	59	36.8
EDA-7	2.425	59	32.0
EDA-5 Offsite Perv	3.582	61	37.90
EDA-5 Offsite Imp	0.228	98	37.90
Total	53.409		

The peak rates of runoff from the pre-development hydrographs were created using the SCS Method for the NJ Water Quality Storm and the 2, 10, 25 and 100-yr. storm events, calculations are provided in **Appendix No. 2.** The peak flows and existing volumes resulting from the hydrographs are summarized in Tables No. 4.2 A & 4.2 B and Tables 4.3 A & B, respectively, below.

TABLE NO. 4.2 A				
SUMMARY OF EXISTING PEAK RUNOFF RATES				
Storm Frequency (Years)	**Peak Rate of Runoff to AP#1 (cfs)**	**Peak Rate of Runoff to AP#2 (cfs)**	**Peak Rate of Runoff to AP#3 (cfs)**	**Peak Rate of Runoff to AP#4 (cfs)**
WQ	0.78	0.32	0.26	0.67
2	6.12	2.45	3.26	8.46
10	13.33	5.35	7.87	21.04
25	18.74	7.52	11.45	30.95
100	28.90	11.60	18.33	50.12

TABLE NO. 4.2 B			
SUMMARY OF EXISTING PEAK RUNOFF RATES			
Storm Frequency (Years)	**Peak Rate of Runoff to AP#5 (cfs)**	**Peak Rate of Runoff to AP#6 (cfs)**	**Peak Rate of Runoff to AP#7 (cfs)**
WQ	1.14	0.00	0.00
2	6.71	0.40	0.36
10	15.27	1.64	1.65
25	21.89	2.77	2.83
100	34.61	5.12	5.31

TABLE NO. 4.3 A				
SUMMARY OF EXISTING VOLUMES				
Storm Frequency (Years)	**Volume of Runoff to AP#1 (ac-ft)**	**Volume of Runoff to AP#2 (ac-ft)**	**Volume of Runoff to AP#3 (ac-ft)**	**Volume of Runoff to AP#4 (ac-ft)**
WQ	0.048	0.021	0.019	0.063
2	0.645	0.278	0.436	1.655
10	1.358	0.584	0.982	3.805
25	1.904	0.819	1.413	5.509
100	2.954	1.271	2.254	8.863

TABLE NO. 4.3 B			
SUMMARY OF EXISTING VOLUMES			
Storm Frequency (Years)	**Volume of Runoff to AP#5 (ac-ft)**	**Volume of Runoff to AP#6 (ac-ft)**	**Volume of Runoff to AP#7 (ac-ft)**
WQ	0.078	0.000	0.000
2	0.898	0.082	0.076
10	1.937	0.247	0.234
25	2.752	0.391	0.375
100	4.343	0.693	0.671

V. DESCRIPTION OF PROPOSED CONDITIONS

Under proposed conditions, the above described 53.409 acre "area of study" was divided into separate sub-watershed areas for the five stormwater management basins, uncontrolled drainage areas that cannot be collected and treated by the stormwater management basin, and the off-site drainage area previously described. The location, size and proposed conditions are illustrated on the "Proposed Drainage Area Map" (Sheet 3 of 3) provided in **Appendix No. 6** of this report. As indicated in Subsection III-A-2 above, Tc calculations are included in **Appendix No. 3**.

The breakdown of each proposed sub-watershed to the Analysis Points are located within **Appendix No. 3**. As noted in Subsection III-A-3 above, pursuant to the guidance provided in the BMP Manual, separate hydrographs were created to model the impervious and pervious portions of any sub-watershed area containing a significant percentage of directly connected impervious cover.

VI. DESCRIPTION OF PROPOSED STORMWATER MANAGEMENT FACILITIES

The proposed onsite storm sewer system will collect on and limited areas of off-site stormwater runoff and convey it to the proposed rain gardens / bioretention basins and the proposed extended detention / infiltration basins for water quantity attenuation, groundwater recharge and water quality treatment. Outlet control structures have been provided from each basin to convey the stormwater to the Analysis Points. The outlet control structures will consist of a low flow orifice and weirs to regulate the discharge from the basins. In addition, the Basins have a 6-inch-thick layer of k-4 sand to infiltrate the stormwater runoff from the project and the soil beneath each infiltration system is to be removed and replaced with K-3 soil from the basin bottom to the SHWT/restrictive layer as determined during the geotechnical investigation (**See Appendix No. 1)**.

Appendix No. 3 of this report contains the hydrographs for the basin routings without infiltration while those with infiltration are located within **Appendix No. 4**.

VII. COMPLIANCE WITH STORMWATER MANAGEMENT RULES

This section of this report is intended to demonstrate that the stormwater management system designed for the Residential and Mixed-Use Development project, as described above, is compliant with the regulatory requirements pursuant to the applicable Rules to the maximum extent possible. The various considerations relevant to the design of the system were listed in Section II of this report. To reiterate, these considerations are as follows:

- Use of Non-Structural Strategies to the maximum extent practicable
- Maintenance of average annual groundwater recharge volume
- Compliance with applicable Water Quality Management Standards
- "Quantity Control," achieved through peak flow attenuation
- Assuring minimization of erosion and sedimentation
- Providing an effective collection and conveyance system
- Providing for proper maintenance of the system

Except for the requirement relevant to the maintenance of the proposed system, this section of this report will address each of the above considerations with respect to complying with the applicable rules and standards.

A. Use of Non-Structural Strategies

In accordance with N.J.A.C. 7:8-5.3 Nonstructural Stormwater Management Strategies, the design shall, to the maximum extent possible, incorporate nonstructural stormwater strategies to meet the stormwater runoff quantity, quality, and groundwater recharge requirements of the Stormwater Management Regulations. To determine if the proposed nonstructural strategies are sufficient for a development, the nine nonstructural strategies identified in both N.J.A.C. 7:8-5.3 and the New Jersey Stormwater Best Management Practices Manual are to be addressed. The nine strategies are identified below with a discussion of how each strategy has been incorporated into the proposed design.

1. *Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.*

The development and disturbed areas have been limited to the area of the existing farm. Areas previously disturbed by the farming activity will be re-vegetated. Mature treed areas of the site will be preserved to the extent practical to facilitate the

development. Wetlands areas and buffers are proposed to be preserved to the maximum extent practical as well.

2. *Minimize Impervious Surfaces and break up or disconnect the flow of runoff over impervious surfaces.*

Impervious surfaces have been minimized to propose only what is needed for the development in accordance with Township Zoning Regulations, RSIS Standards and other regulatory agency requirements. to the extent practical for this development.

3. *Maximize the protection of natural drainage features and vegetation.*

Previously disturbed portions of the site will be replanted to the maximum extent practical. Mature treed areas of the site will be preserved to the extent practical to facilitate the development. The proposed development will be located outside the limits of onsite connected wetlands and proposes limited disturbance of wetlands buffers.

4. *Minimize the decrease in the pre-construction "time of concentration."*

The proposed detention basins will detain stormwater pursuant to the stormwater regulations. The site has been designed to convey stormwater to rain gardens/bioretention basins onsite which will infiltrate the water quality storm and thus reduce post-construction time of concentrations. In addition, runoff is proposed to travel overland to basins thus also reducing post-construction times of concentration. This will decrease the pre-construction time of concentration to the maximum extent practical. It also enhances water quality and promotes groundwater recharge for the project.

5. *Minimize land disturbance including clearing and grading.*

The proposed development is designed to clear and grade the site in a way that minimizes the impacts as much as possible. The proposed grades are designed to match the existing topography along the roadway and property boundaries to the maximum extent possible.

6. *Minimize soil compaction.*

Soil compaction is required for the building, driveway, and parking area. Landscaped areas and the stormwater basins are to use lightweight compaction equipment during construction to promote the infiltration and recharge of stormwater into the on-site soils.

7. *Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.*

Plantings around the proposed building are low maintenance species. In common areas on-site, the amount of lawn space has been limited as much as possible which will reduce fertilizer and pesticide use on the site.

8. *Provided vegetated open-channel conveyance systems discharging into and through stable vegetated areas.*

Vegetated open-channel conveyance systems are provided to the maximum extent possible within the rear yards of the residential development. The use of vegetated open-channel conveyance systems elsewhere is limited due to the requirement of installing curbs and sidewalks within the roadways, parking lot and driveway areas.

9. *Provide other preventative source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:*

    a. *Site design features that help to prevent the accumulation of trash and debris in drainage systems;*

    b. *Site design features that help prevent discharge of trash and debris from drainage systems;*

    c. *Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and*

    d. *When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.*

Preventative source controls provided include NJPDES Phase II inlet curb pieces proposed to be installed on all Type ‘B’ inlets. The curb piece proposed is a Type “N-eco” curb piece as manufactured by Campbell Foundry. This curb piece will prevent trash and debris from entering the storm drainage system. Any garbage or debris within the roadway, parking lot area or drainage system can be disposed of in the proper manner as part of the routine maintenance of the facility.

The site requires approval from the Mercer County Soil Conservation District for Soil Erosion and Sediment Control Plan Certification. Upon disturbance of the land, the site shall be vegetated in accordance with the Soil Erosion Standards of New Jersey and the approved Soil Erosion and Sediment Control Plan for the project.

The proposed design of the site has incorporated to the maximum extent possible nonstructural stormwater strategies on-site and therefore meets the intent of the Nonstructural Stormwater Management Strategies.

B. Maintenance of Average Annual Groundwater Recharge

The State's Stormwater Management Rules and the Residential Site Improvement Standards require any project that disturbs (at least) an acre of land and/or increases the impervious cover on the site by (at least) 0.25 acre can be designed such that the average annual volume of groundwater recharge that occurs on the site at the present time is maintained (or increased).

The Annual Groundwater Recharge Analysis spread sheet contained in Appendix 1 of this report indicates that there is a deficit in the annual groundwater recharge due to the development of the site. The existing open spaces to remain, the proposed open spaces and the proposed stormwater infiltration facilities provide sufficient volume to meet the Annual Groundwater Recharge for the site.

C. Water Quality Management

As stated above, the basins have been designed as extended detention basins with infiltration. The TSS removal rate for an infiltration basin is 80%. Thus, the proposed basin will provide 80% TSS removal to meet the water quality management regulations of the rules.

Appendix No. 4 of this report contains the hydrographs for the water quality detention basin routings with infiltration. All proposed infiltration facilities provide for the infiltration of runoff to occur completely within 72 hours of the peak volume of the storm events analyzed.

D. Quantity Control (Peak Flow Attenuation)

The project's approach for compliance with the regulatory requirements for "quantity control" are set forth at Section 5.4(a)(3)(ii) and (iii) of the Stormwater Management Regulations (NJAC 7:8). Section 5.4(a)(3)(ii) states that demonstration through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10 and 1000-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. Section 5.4(a)(3)(iii) states that for stormwater runoff leaving a site, the post-construction peak rates of runoff to be reduced, i.e., 50% of the 2-year, 75% of the 10-year, and 80% of the 100-year storm event.

The proposed stormwater management system has been designed to meet the two sections of the regulations identified above for all Analysis Points as shown in the following tables.

TABLE NO. 7.1 A REQUIRED PEAK RUNOFF RATE REDUCTIONS				
Storm Frequency (Years)	**Peak Rate of Runoff to AP-#1 (cfs)**	**Peak Rate of Runoff to AP-#2 (cfs)**	**Peak Rate of Runoff to AP-#3 (cfs)**	**Peak Rate of Runoff to AP-#4 (cfs)**
2 (50%)	3.06	1.23	1.36	4.23
10 (75%)	10.00	4.01	5.90	15.78
100 (80%)	23.12	9.28	14.66	40.10

TABLE NO. 7.1 B REQUIRED PEAK RUNOFF RATE REDUCTIONS					
Storm Frequency (Years)	**Onsite Peak Rate of Runoff to AP-#5 (cfs)**	**Offsite Peak Rate of Runoff to AP-#5 (cfs)**	**Total Peak Rate of Runoff to AP-#5 (cfs)**	**Peak Rate of Runoff to AP-#6 (cfs)**	**Peak Rate of Runoff to AP-#7 (cfs)**
2 (50%)	5.81	1.11	4.02	0.20	0.18
10 (75%)	12.40	3.30	12.60	1.23	1.24
100 (80%)	26.50	8.97	30.17	4.10	4.25

TABLE 7.2 Reduction in Peak Rate of Stormwater Runoff to 'Point-of-Analysis' #1			
Storm Frequency (yr)	**Post-Development Peak Flow Rate (cfs)**	**Post-Development Peak Flow Rate Required (cfs)**	**Post-Development Reduction Ratio Provided (%)**
2	2.61	3.06	57%
10	6.68	10.00	50%
100	22.89	23.12	21%

TABLE 7.3 Reduction in Volume of Stormwater Runoff to 'Point-of-Analysis' #2						
Storm Frequency (yr)	**Pre-Development Volume of Runoff to AP-2 (ac-ft)**	**Pre-Development Peak Runoff to AP-2 (cfs)**	**Post-Development Volume of Runoff to AP-2 (ac-ft)**	**Post-Development Peak Runoff to AP-2 (cfs)**	**Post-Development Change in Volume (ac-ft)**	**Post-Development Change in Peak Runoff (cfs)**
WQ	0.021	0.32	0.038	1.18	+0.017	+0.86
2	0.278	2.45	0.169	2.09	-0.109	-0.36
10	0.584	5.35	0.303	3.82	-0.281	-1.53
25	0.819	7.52	0.402	5.09	-0.417	-2.43
100	1.271	11.60	0.588	7.43	-0.683	-4.17

TABLE 7.4 Reduction in Volume of Stormwater Runoff to 'Point-of-Analysis' #3						
Storm Frequency (yr)	**Pre-Development Volume of Runoff to AP-3 (ac-ft)**	**Pre-Development Peak Runoff to AP-3 (cfs)**	**Post-Development Volume of Runoff to AP-3 (ac-ft)**	**Post-Development Peak Runoff to AP-3 (cfs)**	**Post-Development Change in Volume (ac-ft)**	**Post-Development Change in Peak Runoff (cfs)**
WQ	0.019	0.26	0.049	1.64	+0.030	+1.38
2	0.436	3.26	0.233	2.96	-0.203	-0.30
10	0.982	7.87	0.458	6.35	-0.524	-1.52
25	1.413	11.45	0.635	8.99	-0.778	-2.46
100	2.254	18.33	0.980	14.09	-1.274	-4.24

TABLE 7.5
Reduction in Peak Rate of Stormwater Runoff to 'Point-of-Analysis' #4

Storm Frequency (yr)	Post-Development Peak Flow Rate (cfs)	Post-Development Peak Flow Rate Required (cfs)	Post-Development Reduction Ratio Provided (%)
2	2.61	4.23	69%
10	6.68	15.78	68%
100	22.89	40.10	54%

TABLE 7.6
Reduction in Peak Rate of Stormwater Runoff to 'Point-of-Analysis' #5

Storm Frequency (yr)	Post-Development Peak Flow Rate (cfs)	Post-Development Peak Flow Rate Required (cfs)	Post-Development Reduction Ratio Provided (%)
2	0.44	4.02	95%
10	2.53	12.60	85%
100	25.42	30.17	33%

TABLE 7.7
Reduction in Volume of Stormwater Runoff to 'Point-of-Analysis' #6

Storm Frequency (yr)	Pre-Development Volume of Runoff to AP-6 (ac-ft)	Pre-Development Peak Runoff to AP-6 (cfs)	Post-Development Volume of Runoff to AP-6 (ac-ft)	Post-Development Peak Runoff to AP-6 (cfs)	Post-Development Change in Volume (ac-ft)	Post-Development Change in Peak Runoff (cfs)
WQ	0.000	0.00	0.000	0.01	0.000	+0.01
2	0.082	0.40	0.010	0.15	-0.072	-0.25
10	0.247	1.64	0.024	0.36	-0.223	-1.28
25	0.391	2.77	0.034	0.53	-0.357	-2.24
100	0.693	5.12	0.055	0.84	-0.638	-4.28

TABLE 7.8 Reduction in Peak Rate of Stormwater Runoff to 'Point-of-Analysis' #7			
Storm Frequency (yr)	**Post-Development Peak Flow Rate (cfs)**	**Post-Development Peak Flow Rate Required (cfs)**	**Post-Development Reduction Ratio Provided (%)**
2	0.25	0.18	31%
10	1.02	1.24	38%
100	3.78	4.25	29%

As a result of the proposed improvements, the proposed site conditions will result in a reduction in the peak rate of runoff and volume to Analysis Points 2, 3 and 6 as well as meeting and exceeding the runoff rate reductions when compared to the pre-construction runoff hydrographs for the 2, 10 and 100-year storm events to Analysis Points 1, 4, 5 and 7. This decrease in peak runoff and volume is a benefit to downstream areas and especially the adjacent residential lots to the south.

Within **Appendix No. 4**, infiltration is analyzed within the rain gardens / bioretention basins and infiltration basins. The results show a greater reduction to Analysis Points 1, 4, 5 and 7 which is permitted under the pending NJ Stormwater Management Regulations to become effective on 3/2/2021.

E. Soil Erosion and Sediment Control Compliance

The project has also been designed to minimize erosion and sedimentation in accordance with *The Standards for Soil Erosion and Sediment Control in New Jersey*". A "Soil Erosion and Sediment Control Plan" is included in the set of project plans, specifying numerous practices to achieve this goal. The project's "Soil Erosion and Sediment Control Plan" is subject to review and approval by the Mercer County Soil Conservation District (MCSCD). The District's certification of the plan is required before any construction may commence, which provides further assurance that the project's implementation will minimize erosion and sedimentation.

In addition to the above referenced construction practice, the project's stormwater management system has also been designed consistent with the subject standards. In particular, the stormwater management system has been designed compliant with the standards for conduit outlet protection and off-site stability.

F. Collection and Conveyance System Design

The project's stormwater management system also includes a network of stormwater pipes and inlets to convey surface runoff to the proposed detention basin. The collection and conveyance system were designed for the peak rate of runoff during a 25-year storm. **Appendix No. 5** of this report contains the conveyance system calculations.

VIII. CONCLUSIONS

The proposed development and stormwater management facilities have been designed to reduce the peak rate of runoff and the peak volume as well as to enhance the runoff water quality. The above results demonstrate that the site meets or exceeds the requirements for water quantity for the 2, 10 and 100-year storm events. The proposed infiltration basins provide 80% TSS removal per the NJ Stormwater Management B.M.P. Manual for stormwater leaving the site as well as meeting the annual groundwater recharge requirements.

The enclosed calculations further demonstrate that the post-development conditions result in a reduction in the peak rate and volume of stormwater discharging offsite and will therefore result in a benefit to the surrounding existing stormwater facilities. Finally, it is the opinion of this office that the proposed development will be in compliance with all applicable stormwater management regulations as established by the NJDEP and Township standards.

IX. REFERENCES

The following documents were relied upon during the preparation of the project's stormwater management plan:

1. New Jersey Stormwater Best Management Practices Manual, New Jersey Department of Environmental Protection; April, 2004 (Revised September, 2009).

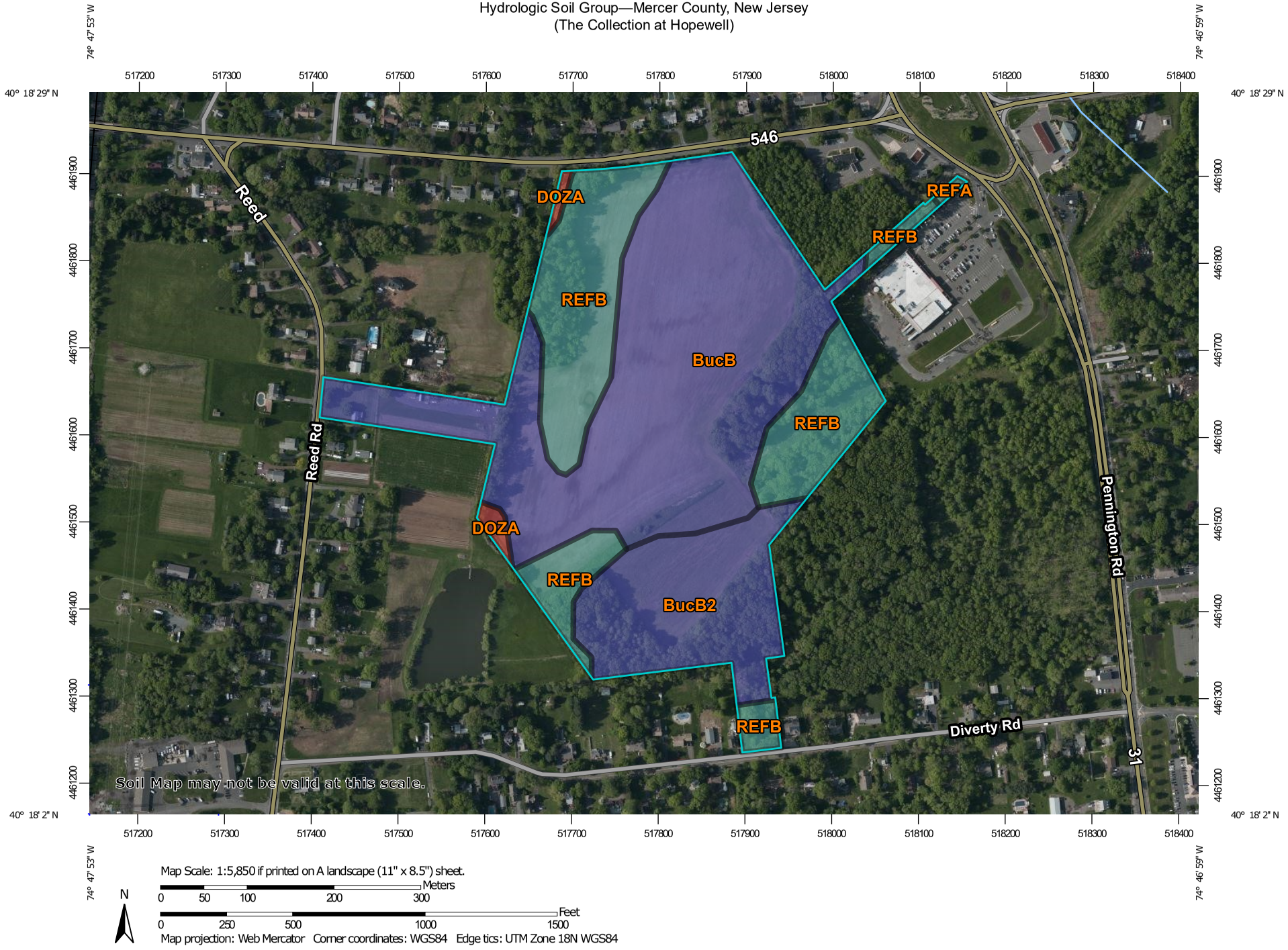
2. Residential Site Improvement Standards, New Jersey Administrative Code Title 5, Chapter 21; Adopted January 6, 1997; Revised June 4, 2007.

3. Standards for Soil Erosion and Sediment Control in New Jersey, New Jersey State Soil Conservation Committee; Adopted May, 2012.

4. Urban Hydrology for Small Watersheds, United States Department of Agriculture, Soil Conservation Service; June, 1986.

APPENDIX
No. 1: GENERAL DESIGN INFORMATION

Hydrologic Soil Group—Mercer County, New Jersey
(The Collection at Hopewell)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 16, Jun 1, 2020

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

Date(s) aerial images were photographed: May 2, 2019—Jul 9, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BucB	Bucks silt loam, 2 to 6 percent slopes	B	28.0	54.1%
BucB2	Bucks silt loam, 2 to 6 percent slopes, eroded	B	9.1	17.6%
DOZA	Doylestown and Reaville variant silt loams, 0 to 2 percent slopes	D	0.5	1.0%
REFA	Readington and Abbottstown silt loams, 0 to 2 percent slopes	C	0.1	0.2%
REFB	Readington and Abbottstown silt loams, 2 to 6 percent slopes	C	14.0	27.1%
Totals for Area of Interest			**51.8**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

NEW JERSEY 24 HOUR RAINFALL FREQUENCY DATA

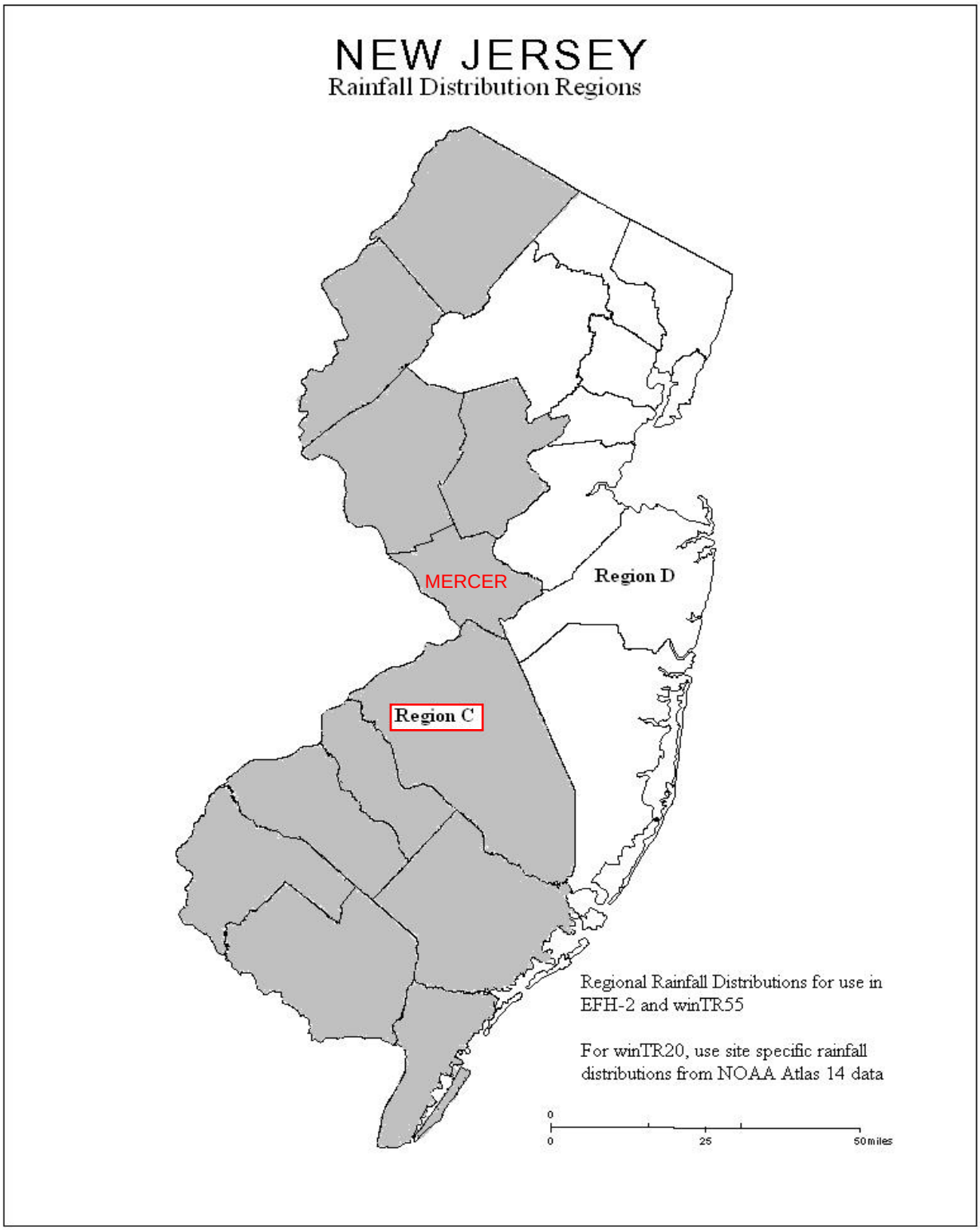
Rainfall amounts in Inches

County	1 year	2 year	5 year	10 year	25 year	50 year	100 year
Atlantic	2.72	3.31	4.30	5.16	6.46	7.61	8.90
Bergen	2.75	3.34	4.27	5.07	6.28	7.32	8.47
Burlington	2.77	3.36	4.34	5.18	6.45	7.56	8.81
Camden	2.73	3.31	4.25	5.06	6.28	7.34	8.52
Cape May	2.67	3.25	4.22	5.07	6.34	7.47	8.73
Cumberland	2.69	3.27	4.25	5.09	6.37	7.49	8.76
Essex	2.85	3.44	4.40	5.22	6.44	7.49	8.66
Gloucester	2.71	3.29	4.24	5.05	6.29	7.36	8.55
Hudson	2.73	3.31	4.23	5.02	6.19	7.20	8.31
Hunterdon	2.80	3.38	4.26	5.00	6.09	7.02	8.03
Mercer	2.74	3.31	4.23	5.01	6.19	7.20	8.33
Middlesex	2.76	3.35	4.30	5.12	6.36	7.43	8.63
Monmouth	2.79	3.38	4.38	5.23	6.53	7.66	8.94
Morris	2.94	3.54	4.47	5.24	6.37	7.32	8.35
Ocean	2.81	3.42	4.45	5.33	6.68	7.87	9.20
Passaic	2.87	3.47	4.42	5.23	6.43	7.47	8.62
Salem	2.69	3.26	4.20	5.00	6.22	7.28	8.45
Somerset	2.76	3.34	4.25	5.01	6.15	7.13	8.21
Sussex	2.68	3.22	4.02	4.70	5.72	6.60	7.58
Union	2.80	3.39	4.35	5.17	6.42	7.49	8.69
Warren	2.78	3.34	4.18	4.89	5.93	6.83	7.82

Notes: The average point rainfall amounts listed above were developed from data contained in NOAA Atlas 14 Volume 2.

Point rainfall estimates for specific locations may be obtained from the Precipitation Frequency Data Server located at http://www.nws.noaa.gov/ohd/hdsc/

For most hydrologic design procedures, the rainfall amounts listed above may be rounded to the nearest tenth of an inch.


NEW JERSEY
Rainfall Distribution Regions
MERCER
Region D
Region C
Regional Rainfall Distributions for use in EFH-2 and winTR55
For winTR20, use site specific rainfall distributions from NOAA Atlas 14 data
0
0
25
50 miles

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CLIENT:	Lennar	
PROJECT:	Zaitz Parcel (Phase 1) County Route 546	
REQUIREMENT:	PROFESSIONAL ENGINEERING SERVICES: Geotechnical/SWM	
LOCATION:	Hopewell Township, Mercer County, NJ	
DATE:	February 1st, 2018	
ATTENTION:	Mitchell Newman	via email

PURPOSE

The Purpose of this report is to present the Findings, Conclusions and Recommendations relative to the physical investigation performed at the above captioned project location.

INVESTIGATION

Steve Joran, P.E. of Ingram Engineering Services, Inc. (IES) was on site on January 16th, 2018 to conduct a series of test pit and double ring infiltrometer investigations within the proposed stormwater basin locations as depicted on the "Concept Plan for Lennar – Zaitz Parcel" prepared by Bowman Consulting Group, Ltd. dated December 19, 2017. The purpose of the testing was to determine if subsurface infiltration was feasible for the design of stormwater management facilities and provide the necessary infiltration data to design those systems.

IES performed twelve (12) investigative test pit investigations with a backhoe excavator and ran twelve (12) double ring infiltrometer tests. In addition to performing double ring infiltrometer testing, IES collected four (4) Tube Permeameter samples and delivered to a third-party laboratory to establish the permeability rates of the soil. Lab results can be found in **Appendix B**. All testing was performed in accordance to NJ Stormwater BMP Manual, Appendix E. Approximate test pit locations can be found in **Appendix A**.

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FINDINGS

Soils Investigation:

TP #1; Tested @ 25" BGS

Depth BGS	Soil Description
0" - 8"	Dk brown TOPSOIL
8" - 32"	Brown f sandy SILT
32" - 68"	Reddish brown SILT w/ trace sand
68" - 75"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating

Groundwater encountered at 54″ BGS



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TP #2; Tested @ 18" BGS

Depth BGS	Soil Description
0" - 9"	Dk brown TOPSOIL
9" - 24"	Brown f sandy SILT
24" - 54"	Reddish brown SILT w/ trace sand
54" - 62"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating

Groundwater encountered at 48″ BGS



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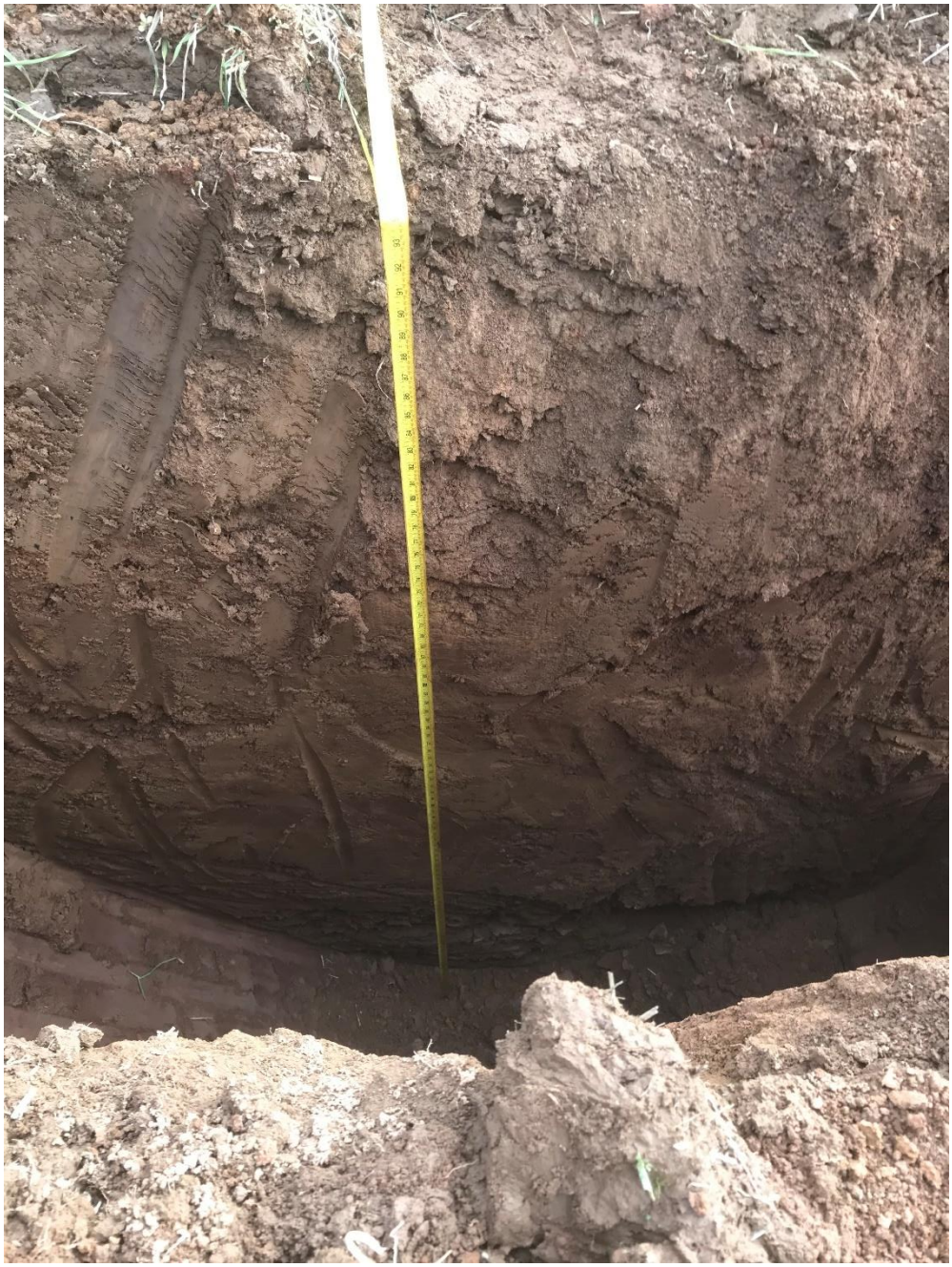
TP #3; Tested @ 56" BGS

Depth BGS	Soil Description
0" - 9"	Dk brown TOPSOIL
9" - 56"	Brown SILT w/ trace clay, moist
56" - 72"	Reddish brown SILT w/ trace
72" - 94"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating
94"	Machine Refusal

Limiting Zone @ 94″ BGS (Machine Refusal on Bedrock- Shale)



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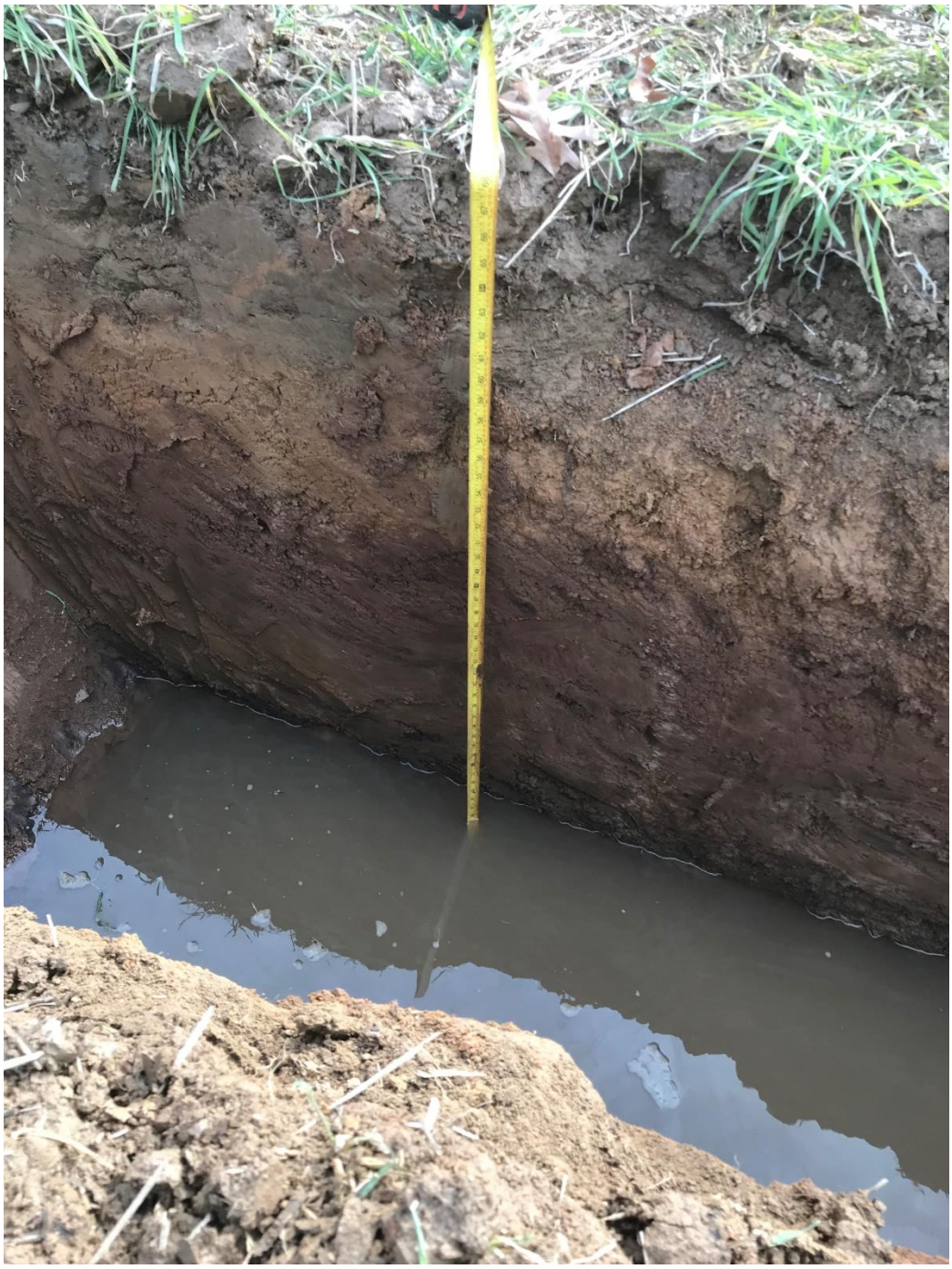
TP #4; Tested @ 16" BGS

Depth BGS	Soil Description
0" - 9"	Dk brown TOPSOIL
9" - 21"	Brown clayey SILT
21" - 58"	Reddish brown SILT w/ trace sand and weathered shale
58" - 70"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating

Groundwater encountered at 42″ BGS



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TP #5; Tested @ 18" BGS

Depth BGS	Soil Description
0" - 13"	Dk brown TOPSOIL
13" - 36"	Brown clayey SILT, moist
36" - 84"	Reddish brown SILT, stiff to very stiff
84" - 112"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating

Groundwater encountered at 49″ BGS (seepage through test pit sidewall)



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TP #6; Tested @ 26" BGS

Depth BGS	Soil Description
0" - 12"	Dk brown TOPSOIL
12" - 48"	Brown clayey SILT, moist
48" - 93"	Reddish brown SILT, stiff to very stiff
93" - 114"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating

Groundwater encountered at 54″ BGS (seepage through test pit sidewall)



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TP #7; Tested @ 15" BGS

Depth BGS	Soil Description
0" - 12"	Dk brown TOPSOIL
12" - 48"	Reddish brown SILT, stiff to very stiff
48" - 87"	Reddish brown SILT w/ trace sand and weathered shale, difficult excavating

Groundwater encountered at 45″ BGS (seepage through test pit sidewall)



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TP #8; Tested @ 49" BGS

Depth BGS	Soil Description
0" - 8"	Dk brown TOPSOIL
8" - 24"	Reddish brown clayey SILT w/ some sand and some gravel, weathered shale, dense
24" - 128"	Reddish brown silty CLAY, stiff

Groundwater encountered at 121″ BGS



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TP #9; Tested @ 64" BGS

Depth BGS	Soil Description
0" - 11"	Dk brown TOPSOIL
11" - 34"	Brown SILT, w/ trace clay, stiff to very stiff
34" - 132"	Reddish brown SILT w/ some weathered shale, stiff to very stiff

Groundwater encountered at 110″ BGS



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TP #10; Tested @ 72" BGS

Depth BGS	Soil Description
0" - 11"	Dk brown TOPSOIL
11" - 52"	Brown SILT w/ trace clay, sl. mottling
52" - 121"	Reddish brown SILT w/ some weathered shale, stiff to very stiff

NO GW or LZ encountered



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TP #11; Tested @ 13" BGS

Depth BGS	Soil Description
0" - 5"	Dk brown TOPSOIL
5" - 20"	Brown f sandy SILT
20" - 85"	Dark bluish gray fractured shale, very difficult excavating
85"	Machine refusal

Limiting Zone @ 85″ BGS (Machine Refusal on Bedrock- Shale)



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TP #12; Tested @ 13" BGS

Depth BGS	Soil Description
0" - 10"	Dk brown TOPSOIL
10" - 42"	Orange brown clayey SILT
42" - 78"	Dark bluish gray fractured shale, very difficult excavating

Groundwater encountered at 60″ BGS



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Infiltration Testing:

TP No. 1: 0", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 25" BGS

TP No. 2: ⅛", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 18" BGS

TP No. 3: 0", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 56" BGS

TP No. 4: ⅛", 1/16", 1/16", 1/16" → 1/16" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.125 INCHES/HOUR @ 16" BGS

TP No. 5: ¼", ⅛", ⅛", ⅛" → ⅛" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.25 INCHES/HOUR @ 18" BGS

TP No. 6: 0", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 26" BGS

TP No. 7: ⅛", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 15" BGS

TP No. 8: 0", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 49" BGS

TP No. 9: 0", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 64" BGS

TP No. 10: 0", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 72" BGS

TP No. 11: 1/16", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 13" BGS

TP No. 12: ⅛", 0", 0", 0" → 0" Final Stabilized Reading w/ 30 min. intervals
INFILTRATION RATE: 0.00 INCHES/HOUR @ 13" BGS

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CONCLUSIONS/RECOMMENDATIONS

1. The Design Engineer is recommended to use the above information for sizing of the Proposed Stormwater Management Facilities.

2. Due to the significantly high groundwater table encountered throughout the majority of the site (≈ 3.5'-5' BGS except for TP 8 & 9- ≈ 9'-10' BGS) and significantly impermeable subgrade soils encountered within the locations tested, it is IES' professional opinion that subsurface stormwater infiltration is not feasible and that an alternative stormwater management method such as a Rain Garden, Bioretention Bed, or similar be designed.

QUALIFICATIONS

Conclusions and Recommendations are based on the above Investigation and Findings. No other conclusions are to be drawn other than those specifically stated.

Very Truly Yours,

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(DE, MD, NJ, PA)
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Steve Joran, P.E.
Project Manager
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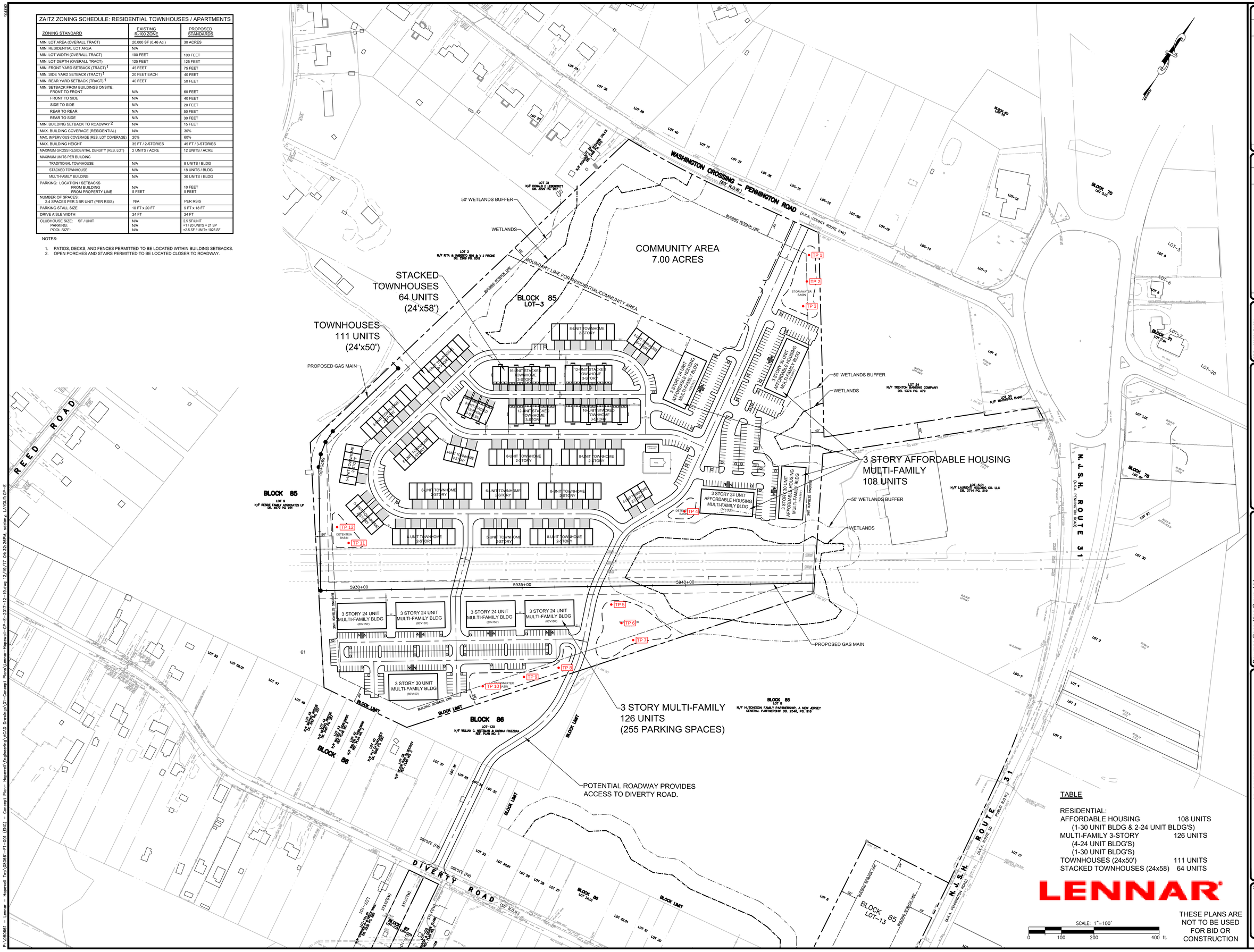
Appendix A:

Test Pit Locations

ZAITZ ZONING SCHEDULE: RESIDENTIAL TOWNHOUSES / APARTMENTS		
ZONING STANDARD	EXISTING R-100 ZONE	PROPOSED STANDARDS
MIN. LOT AREA (OVERALL TRACT)	20,000 SF (0.46 Ac.)	30 ACRES
MIN. RESIDENTIAL LOT AREA	N/A	
MIN. LOT WIDTH (OVERALL TRACT)	100 FEET	100 FEET
MIN. LOT DEPTH (OVERALL TRACT)	125 FEET	125 FEET
MIN. FRONT YARD SETBACK (TRACT) [1]	45 FEET	75 FEET
MIN. SIDE YARD SETBACK (TRACT) [1]	20 FEET EACH	40 FEET
MIN. REAR YARD SETBACK (TRACT) [1]	40 FEET	50 FEET
MIN. SETBACK FROM BUILDINGS ONSITE: FRONT TO FRONT	N/A	60 FEET
FRONT TO SIDE	N/A	40 FEET
SIDE TO SIDE	N/A	20 FEET
REAR TO REAR	N/A	50 FEET
REAR TO SIDE	N/A	30 FEET
MIN. BUILDING SETBACK TO ROADWAY [2]	N/A	15 FEET
MAX. BUILDING COVERAGE (RESIDENTIAL)	N/A	30%
MAX. IMPERVIOUS COVERAGE (RES. LOT COVERAGE)	20%	60%
MAX. BUILDING HEIGHT	35 FT / 2-STORIES	45 FT / 3-STORIES
MAXIMUM GROSS RESIDENTIAL DENSITY (RES. LOT)	2 UNITS / ACRE	12 UNITS / ACRE
MAXIMUM UNITS PER BUILDING		
TRADITIONAL TOWNHOUSE	N/A	8 UNITS / BLDG
STACKED TOWNHOUSE	N/A	18 UNITS / BLDG
MULTI-FAMILY BUILDING	N/A	30 UNITS / BLDG
PARKING: LOCATION / SETBACKS FROM BUILDING FROM PROPERTY LINE	N/A 5 FEET	10 FEET 5 FEET
NUMBER OF SPACES: 2.4 SPACES PER 3 BR UNIT (PER RSIS)	N/A	PER RSIS
PARKING STALL SIZE	10 FT x 20 FT	9 FT x 18 FT
DRIVE AISLE WIDTH	24 FT	24 FT
CLUBHOUSE SIZE: SF / UNIT PARKING: POOL SIZE:	N/A N/A N/A	2.5 SF/UNIT =1 / 20 UNITS = 21 SP =2.5 SF / UNIT= 1025 SF

NOTES:

1. PATIOS, DECKS, AND FENCES PERMITTED TO BE LOCATED WITHIN BUILDING SETBACKS.
2. OPEN PORCHES AND STAIRS PERMITTED TO BE LOCATED CLOSER TO ROADWAY.



TABLE

RESIDENTIAL:	
AFFORDABLE HOUSING (1-30 UNIT BLDG & 2-24 UNIT BLDG'S)	108 UNITS
MULTI-FAMILY 3-STORY (4-24 UNIT BLDG'S) (1-30 UNIT BLDG'S)	126 UNITS
TOWNHOUSES (24x50')	111 UNITS
STACKED TOWNHOUSES (24x58)	64 UNITS

LENNAR

SCALE: 1"=100'
0 100 200 400 ft.

THESE PLANS ARE NOT TO BE USED FOR BID OR CONSTRUCTION

NO.	DATE	REVISION
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

PROJ.: 05068-17-001
DATE: 12-19-2017
CHKD: SAD

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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PRELIMINARY

CONCEPT PLAN FOR
LENNAR - ZAITZ PARCEL HOPEWELL TWP
CONCEPT PLAN
DECEMBER 19, 2017
BLOCK 85, LOT 3
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 1 OF 1

P:\05068\1 - Lennar – Hopewell Twp\05068-1-FT-001 (ENG) - Concept Plan - Hopewell\Engineering\ACAD Drawings\01-Concept Plans\Lennar-Hopewell-CP-E-2017-12-19.dwg 12/19/17 04:32:26PM sdelany LAYOUT: CP-E

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Appendix B:

Soil Laboratory Results

KMA



TESTING AND INSPECTION SERVICES, LLC

Client Name: Ingram Engineering Services,
Client Address: 16 Hagerty Blvd., Suite 200
West Chester, PA 19382
Client Contact: Chadd Ingram, P.E.
Report Date: January 25, 2018
Reference No.: KMA# 201801-ZAI-1,2FH

Project Client: Lennar
Project Name: Zaitz Parcell
(sampled/submitted by an IES representative)
Sample Source: Test Pit Nos. 3 & 4 (tube samples)
Date Requested: January 18, 2018
Specimen ID: IES #180118-ZAI-1,2FH

Tube Permeameter Test

Sample No. 1 (Test Pit No. 3 @ 12" B.G.S)	
r = Radius of the standpipe, inches	5/32" = 0.15625
R = Radius of the Soil Core, inches	15/16" = 0.9375
L = Length of the Soil Core, inches	3" = 3.00
H_1 = Starting Height of Head, inches	18 1/4" = 18.250
H_2 = Final Height of Head, inches	15 19/32" = 15.59375
T = Time Elapsed to drop H_1 to H_2, min.	24h 0m = 1440 min
K = Final Permeability of Soil Core, in./hr.	5.46E-04
Soil Permeability Class	K0

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$

Measured Permeability Greater than (in/hr)	Soil Permeability Class
20	K5
6-20	K4
2-6	K3
0.6-2	K2
0.2-0.6	K1
Less than 0.2	K0

Tube Permeameter Test

Sample No. 2 (Test Pit No. 4 @ 12" B.G.S)	
r = Radius of the standpipe, inches	5/32"= 0.15625
R = Radius of the Soil Core, inches	15/16"= 0.9375
L = Length of the Soil Core, inches	2 3/4"= 2.75
H_1 = Starting Height of Head, inches	18 1/2" = 18.500
H_2 = Final Height of Head, inches	15 3/32" = 15.09375
T = Time Elapsed to drop H_1 to H_2, min.	24h 0m = 1440 min
K = Final Permeability of Soil Core, in./hr.	6.48E-04
Soil Permeability Class	K0

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$

Measured Permeability Greater than (in/hr)	Soil Permeability Class
20	K5
6-20	K4
2-6	K3
0.6-2	K2
0.2-0.6	K1
Less than 0.2	K0

Respectfully Submitted,

Cris W. Oslund

Cris W. Oslund
Laboratory Manager

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KMA



TESTING AND INSPECTION SERVICES, LLC

Client Name: Ingram Engineering Services,
Client Address: 16 Hagerty Blvd., Suite 200
West Chester, PA 19382
Client Contact: Chadd Ingram, P.E.
Report Date: January 25, 2018
Reference No.: KMA# 201801-ZAI-3,4FH

Project Client: Lennar
Project Name: Zaitz Parcell
(sampled/submitted by an IES representative)
Sample Source: Test Pit Nos. 6 & 9 (tube samples)
Date Requested: January 18, 2018
Specimen ID: IES #180118-ZAI-3,4FH

Tube Permeameter Test

Sample No. 3 (Test Pit No. 6 @ 24" B.G.S)	
r = Radius of the standpipe, inches	5/32" = 0.15625
R = Radius of the Soil Core, inches	15/16" = 0.9375
L = Length of the Soil Core, inches	2 3/4" = 2.75
H_1 = Starting Height of Head, inches	18 1/4" = 18.250
H_2 = Final Height of Head, inches	13 9/32" = 13.28125
T = Time Elapsed to drop H_1 to H_2, min.	24h 0m = 1440 min
K = Final Permeability of Soil Core, in./hr.	1.01E-03
Soil Permeability Class	K0

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$

Measured Permeability Greater than (in/hr)	Soil Permeability Class
20	K5
6-20	K4
2-6	K3
0.6-2	K2
0.2-0.6	K1
Less than 0.2	K0

Tube Permeameter Test

Sample No. 4 (Test Pit No. 9 @ 52" B.G.S)	
r = Radius of the standpipe, inches	5/32"= 0.15625
R = Radius of the Soil Core, inches	15/16"= 0.9375
L = Length of the Soil Core, inches	3 3/4"= 3.75
H_1 = Starting Height of Head, inches	18 1/4" = 18.250
H_2 = Final Height of Head, inches	17 31/32" = 17.96875
T = Time Elapsed to drop H_1 to H_2, min.	24h 0m = 1440 min
K = Final Permeability of Soil Core, in./hr.	6.74E-05
Soil Permeability Class	K0

$$K(in/hr) = 60\,\text{min}/hr \times \frac{L(in)}{T(\text{min})} \times \frac{r^2}{R^2} \times \ln\left(\frac{H_1}{H_2}\right)$$

Measured Permeability Greater than (in/hr)	Soil Permeability Class
20	K5
6-20	K4
2-6	K3
0.6-2	K2
0.2-0.6	K1
Less than 0.2	K0

Respectfully Submitted,

Cris W. Oslund

Cris W. Oslund
Laboratory Manager

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CLIENT:	Lennar Homes
PROJECT:	Zaitz – South Property
REQUIREMENT:	PROFESSIONAL ENGINEERING SERVICES: Geotechnical/SWM
LOCATION:	24-26 Diverty Road Pennington, New Jersey 08534
DATE:	November 8th, 2018
ATTENTION:	Mitch Newman via email

PURPOSE

The Purpose of this report is to present the Findings, Conclusions, and Recommendations relative to the physical investigation performed at the above captioned project location pursuant to roadway and SWM facility construction.

INVESTIGATION

On Thursday and Friday, October 25th – 26th, 2018, Michael MacCall, PE, Project Manager, and a Senior Technician from Ingram Engineering Services, Inc. (IES), were on-site to conduct a series of test pit investigations to perform infiltration testing and Dual Mass Cone Penetrometer Testing at the above captioned project location to provide results for roadway and SWM Facility construction and design considerations. A backhoe excavator was available to perform the test pit investigations where needed to provide an understanding of the soil profiles. Testing is relative to the construction of proposed subsurface stormwater management facilities and collector road construction. Test Pit Locations were pre-determined and shown in the provided concept plan entitled "Lennar – Zaitz Parcel Hopewell Township" by Bowman Consulting dated 12/19/2017.

IES performed eight (8) double-ring infiltrometer tests within excavated eight (8) test pits. A stormwater test was proposed at Test Pit Location 10, however, due to shallow rock during test pit excavation, this location was not tested. All testing was performed in accordance to NJ BMP Manual Appendix E: Soil Testing Criteria. Soil testing locations were pre-determined by Michael MacCall, PE, and chosen in order to maximize potential infiltration, within proposed grading plan and existing site condition restraints. The following location plan indicates approximate test pit locations.

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Approximate test pit locations can be found below with red depicting DMCP test pits and blue depicting SWM test pits:



Test Pit Locations

Zaitz South Parcel Test Pit Locations			
Test Pit No.	Type	Latitude	Longitude
1	Roadway	40.301547	-74.798267
2	Roadway	40.301989	-74.789323
3	Roadway	40.302465	-74.789397
4	Roadway	40.302898	-74.789160
14	Roadway	40.301792	-74.789155
6	Stormwater	40.302244	-74.789217
7	Stormwater	40.302509	-74.789045
8	Stormwater	40.302778	-74.789007
9	Stormwater	40.303114	-74.788985
10	Stormwater	40.302463	-74.789943
11	Stormwater	40.302528	-74.789586
12	Stormwater	40.302845	-74.789575
13	Stormwater	40.303004	-75.789339

Test Pit Coordinates (approximate)

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FINDINGS

Test Pit Log

Test Pit 1	▲ Depth	Description
	0" – 13"	Topsoil, root matting
	13"– 32"	Tan to Light Brown SILT with little to trace clay and f. sand (Hydrometer & Atterberg analysis performed)
	32" – 64"	Red Brown Sandy SILT with some f-c gravels
	64" -68"	Weathered Rock (Shale), rippable
	68"+	Rock (Shale), unrippable
		Limiting Zone at 64" BGS (Groundwater)
		DMCP Testing performed at approximately 12" and 40" BGS

Test Pit 2	▲ Depth	Description
	0" – 6"	Topsoil, root matting
	6"– 48"	Light Brown Tan Clayey SILT, feint mottling
	48" – 84"	Red Brown Silty SAND with gravel (weathered shale)
	84"+	Rock (Shale) Unrippable
		Limiting Zone at 82" BGS (Groundwater)
		DMCP Testing performed at approximately 12" and 38" BGS

Test Pit 3	▲ Depth	Description
	0" – 10"	Topsoil, root matting
	10"– 51"	Light Brown Clayey SILT with little to trace f. sand
	51" – 88"	Red Brown Silty SAND with shale gravels
	88"+	Rock (Shale), Unrippable
		Limiting Zone at 88" BGS (Rock)
		DMCP Testing performed at approximately 18" and 40" BGS

Test Pit 4	▲ Depth	Description
	0" – 12"	Topsoil, root matting
	12"– 60"	Red Brown Sandy SILT with some gravels
	60" – 62"	Weathered Shale, Rippable
	62"+	Rock (Shale), Unrippable
		Limiting Zone at 62" BGS (Rock)
		DMCP Testing performed at approximately 12" and 40" BGS

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Test Pit 5

▲ Depth	Description
0" – 10"	Topsoil, root matting
10"– 40"	Light Brown Tan Clayey SILT, feint mottling
40" – 89"	Red Brown Sandy Silty CLAY with some to little f. gravel (Hydrometer Analysis performed)
89" – 96"+	Weathered Shale, rippable
96"+	Rock (Shale), unrippable
	Limiting Zone at 78" BGS (Groundwater)
	Infiltration test @ 53" BGS

Test Pit 6

▲ Depth	Description
0" – 10"	Topsoil, root matting
10"– 55"	Tan SILT with little clay and f. sand
55" – 97"	Red Brown Silty SAND with some f-c gravel
97"+	Rock (Shale), unrippable
	Limiting Zone at 97" BGS (Rock)
	Infiltration test @ 61"

Test Pit 7

▲ Depth	Description
0" – 10"	Topsoil, root matting
10"– 44"	Tan SILT with little clay and f. sand
44" – 75"	Red Brown Sandy f-m GRAVEL with some silt
75"+	Rock (Shale), Unrippable
	Limiting Zone at 75" BGS (Rock)
	Infiltration test @ 50"

Test Pit 8

▲ Depth	Description
0" – 9"	Topsoil, root matting
9"– 48"	Tan SILT with little clay and f. sand
48" – 72"	Red Brown Sandy Silty CLAY with f-m gravel (Hydrometer Analysis performed)
72" – 74"	Weathered Shale, Rippable
74"+	Rock (Shale), Unrippable
	Limiting Zone at 74" BGS (Rock)
	Infiltration test @ 50"

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Test Pit 9

▲ Depth	Description
0" – 8"	Topsoil, root matting
8"– 24"	Light Brown SILT with little to trace clay and f. sand, feint mottling
24" – 42"	Red Brown Silty SAND with some f-c shale gravels and little to trace clay
42" – 60"	Red Brown Sandy GRAVEL with silt (weathered shale)
60"+	Rock (Shale), unrippable
	Limiting Zone at 60" BGS (Rock)
	Infiltration test @ 35" BGS

Test Pit 10

▲ Depth	Description
0" – 6"	Topsoil, Root Matting
6"– 12"	Light Brown SILT with little to trace clay and f. sand,
12" – 24"	Red Brown Silty SAND with some f-c shale gravels and little to trace clay
24"+	Rock (Shale), unrippable
	Limiting Zone at 24" BGS (Rock)
	No infiltration test performed

Test Pit 11

▲ Depth	Description
0" – 9"	Topsoil, Root Matting
9"– 28"	Brown Silty CLAY with little f-c sand and f. gravels
28" – 72"	Red Brown Silty SAND with some f-c shale gravels and little to trace silt & clay
72"+	Rock (Shale), unrippable
	Limiting Zone at 72" BGS (Rock)
	Infiltration test @ 47" BGS

Test Pit 12

▲ Depth	Description
0" – 8"	Topsoil, Root Matting
8"– 60"	Red Brown Sandy SILT with f-c shale gravels, little to trace clay, increasing gravels at 18" BGS (Gradation performed)
60"+	Rock (Shale), unrippable
	Limiting Zone at 60" BGS (Rock)
	Infiltration test @ 35" BGS

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Test Pit 13	**▲ Depth**	**Description**
	0" – 8"	Topsoil, Root Matting
	8"– 47"	Light Brown SILT with little to trace clay and f. sand, feint mottling
	47" – 73"	Red Brown Silty SAND with some f-c shale gravels and little to trace clay
	73"+	Rock (Shale), unrippable
		Limiting Zone at 73" BGS (Rock)
		Infiltration test @ 48" BGS

Test Pit 14	**▲ Depth**	**Description**
	0" – 13"	Topsoil
	13"– 50"	FILL - Dark Brown SILT with some sand and gravel and root mat, little organics
	50" – 71"	Brown Sandy SILT with some to little gravels, some sandy pockets
	71" – 73"	Weathered Shale, rippable
	73"+	Rock (Shale), unrippable
		Limiting Zone at 73" BGS (Rock)
		DMCP Testing performed at approximately 12" and 40" BGS

Infiltration Testing

Infiltration Testing was performed in accordance with NJ BMP Manual Appendix E Soil Testing Criteria including a 4-hour presoak, an 18-24 hour additional presoak, and subsequent infiltration testing following presoaks ensuring 3 consecutive readings did not change between 0.2 inches.

Test No. 5 (@ TP 5); Test Hole contained water following 18-24 presoak, thus, failed per NJ BMP Manual Appendix E. Falling Head Analysis performed in lieu of failed field testing.

INFILTRATION RATE: >60 Minutes per Inch @ 53" BGS
HYDROMETER ANALYS: .00803 Inches per Hour

Test No. 6 (@ TP 6); 5", 5", 5", 5": → " Final Stabilized Reading w/ 10 min. intervals

INFILTRATION RATE: 2.0 Minutes per Inch @ 61" BGS

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Test No. 7 (@ TP 7); 2.5", 2.5", 2.4", 2.4": → 2.4" Final Stabilized Reading w/ 30 min. intervals

INFILTRATION RATE: 4.17 Minutes per Inch @ 50" BGS

Test No. 8 (@ TP 8); 7", 7", 7", 7": → 7.0" Final Stabilized Reading w/ 10 min. intervals

INFILTRATION RATE: 1.43 Minutes per Inch @ 35" BGS

Test No. 9 (@ TP 9); 7", 7", 7", 7": → 7.0" Final Stabilized Reading w/ 10 min. intervals

INFILTRATION RATE: 1.43 Minutes per Inch @ 60" BGS

Test No. 11 (@ TP 11); 7", 7", 7", 7": → 7.0" Final Stabilized Reading w/ 10 min. intervals

INFILTRATION RATE: 1.43 Minutes per Inch @ 47" BGS

Test No. 12 (@ TP 12); 1.2", 1.1", 1.1", 1": → 1.0" Final Stabilized Reading w/ 10 min. intervals

INFILTRATION RATE: 10 Minutes per Inch @ 35" BGS

Test No. 13 (@ TP 13); 3.1", 3.0", 3.0", 3.0": → 0.75" Final Stabilized Reading w/ 10 min. intervals

INFILTRATION RATE: 3.34 Minutes per Inch @ 48" BGS

DMCP Testing

DMCP Testing was performed within five (5) test pits at locations at Test Pits 1, 2, 3, 4, and 14. DMCP testing was performed immediately below the top soil layer and a deeper elevation below to ascertain CBR values for proposed locations of the collector drive in the above shown concept plan. Test locations with an "A" description were performed within the same test pit number at a deeper elevation. Soil profiles were found to be generally medium stiff to stiff in the soil tested in this method. CBR results were as follows:

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Test Location	Depth Below Ground Surface (in.)	Measured CBR Value
1	11.97	8.30
1A	40.00	12.1
2	11.97	11.2
2A	38.03	18.1
3	17.99	14
3A	40.00	14.2
4	12.01	24.6
4A	40.00	64
14	12.01	27.2
14A	40.00	61.3

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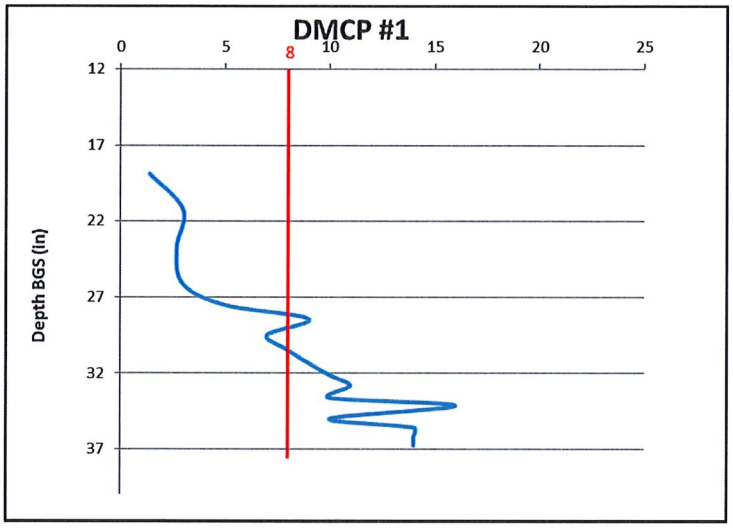
DMCP #1				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
14.3	364	1	60	3
18.9	479	1	115	1.4
21.2	539	1	60	3
23.8	604	1	65	2.7
26.1	664	1	60	3
27.5	699	1	35	5
28.4	722	1	23	9
29.5	749	1	27	7
30.5	774	1	25	8
31.3	796	1	22	9
32.1	816	1	20	10
32.8	834	1	18	11
33.6	854	1	20	10
34.1	867	1	13	16
35.0	889	1	22	10
35.6	904	1	15	14
36.2	919	1	15	14
36.8	934	1	15	14
	Average			8.3
	Recommended			**8**



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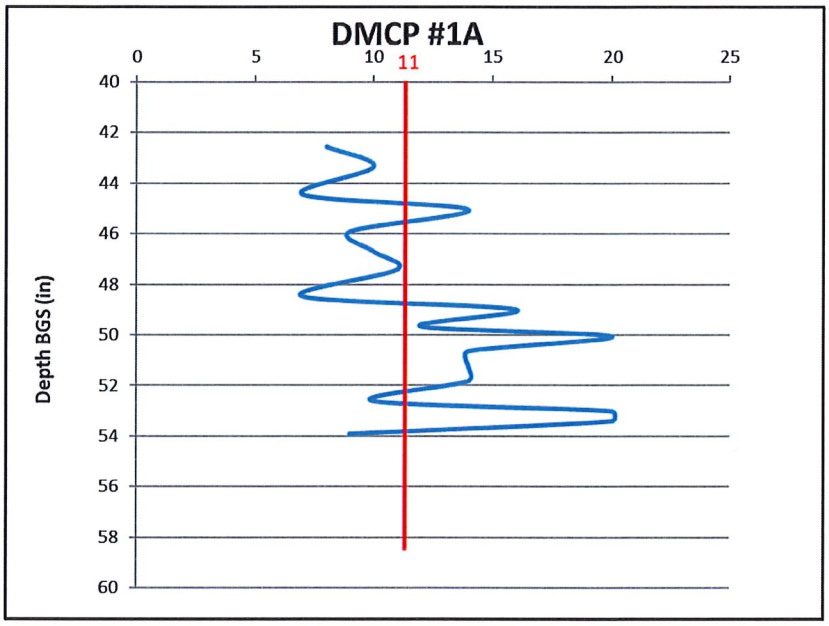
DMCP #1A				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
41.6	1056	1	40	4.7
42.6	1081	1	25	8
43.3	1101	1	20	10
44.4	1129	1	28	7
45.0	1144	1	15	14
45.9	1166	1	22	9
46.7	1186	1	20	10
47.4	1204	1	18	11
48.5	1231	1	27	7
49.0	1244	1	13	16
49.6	1261	1	17	12
50.0	1271	1	10	20
50.6	1286	1	15	14
51.2	1301	1	15	14
51.8	1316	1	15	14
52.6	1336	1	20	10
53.0	1346	1	10	20
53.4	1356	1	10	20
53.9	1369	1	23	9
	Average			12.1
	Recommended			**11**



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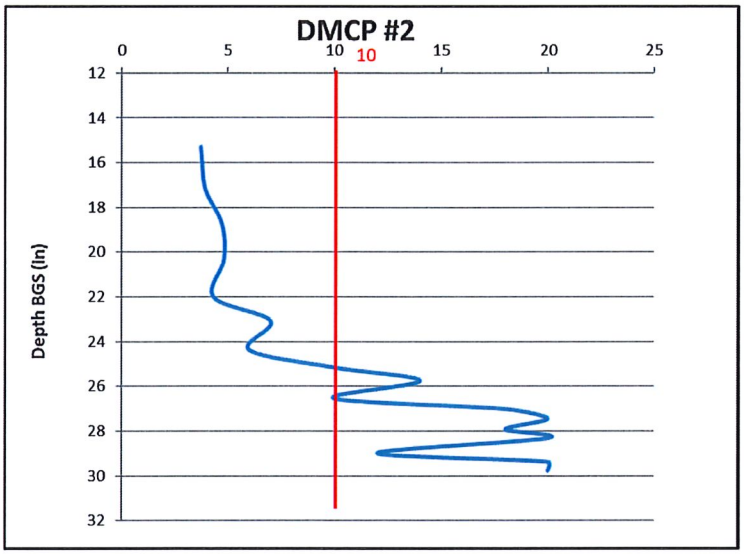
DMCP #2				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
13.3	339	1	35	5
15.3	389	1	50	3.7
17.2	436	1	47	3.9
18.7	476	1	40	4.7
20.3	516	1	40	4.8
22.0	559	1	43	4.3
23.1	586	1	27	7
24.4	619	1	33	6
25.2	639	1	20	10
25.7	654	1	15	14
26.5	674	1	20	10
27.0	686	1	12	18
27.4	697	1	11	20
27.9	709	1	12	18
28.3	719	1	10	20
29.0	736	1	17	12
29.4	746	1	10	20
29.8	756	1	10	20
	Average			11.2
	Recommended			**10**



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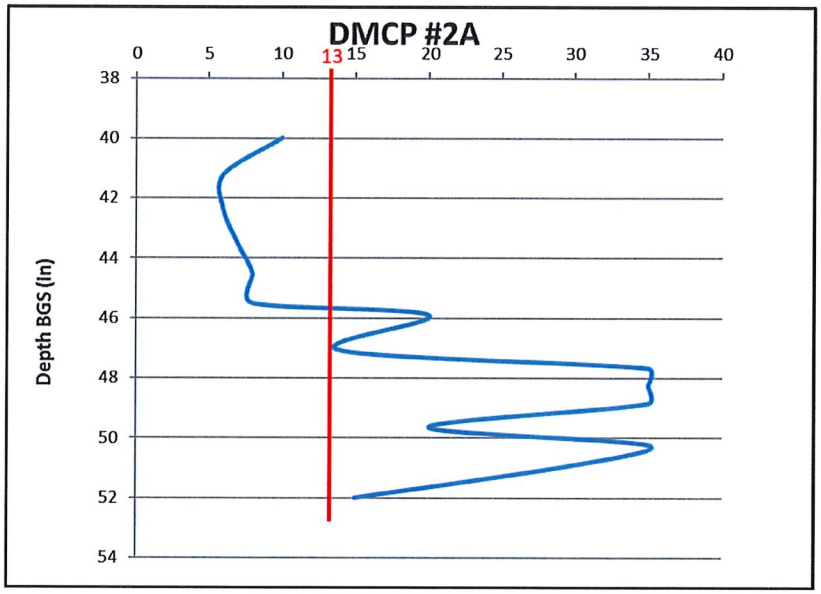
DMCP #2A				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
39.2	996	1	30	6
40.0	1016	1	20	10
41.2	1047	1	31	6
42.4	1077	1	30	6
43.5	1106	1	29	7
44.5	1131	1	25	8
45.5	1156	1	25	8
45.9	1166	1	10	20
47.1	1196	2	15	14
47.7	1211	2	8	35
48.3	1226	2	8	35
48.9	1241	2	8	35
49.6	1261	2	10	20
50.2	1276	2	8	35
50.9	1293	2	9	30
52.0	1321	2	14	15
	Average			18.1
	Recommended			**13**



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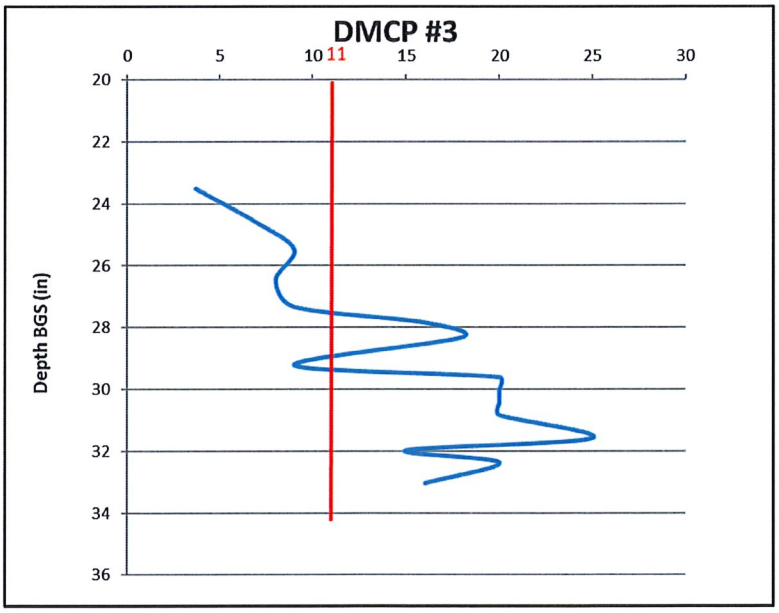
DMCP #3				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
21.5	547	1	90	1.9
23.5	597	1	50	3.7
24.6	625	1	28	7
25.5	647	1	22	9
26.5	672	1	25	8
27.3	694	1	22	9
27.8	707	1	13	16
28.3	719	1	12	18
29.2	742	1	23	9
29.6	752	1	10	20
30.0	762	1	10	20
30.4	773	1	11	20
30.8	783	1	10	20
31.6	802	2	10	25
32.0	812	2	15	15
32.4	822	2	10	20
33.0	839	2	14	16
	Average			14.0
	Recommended			**11**



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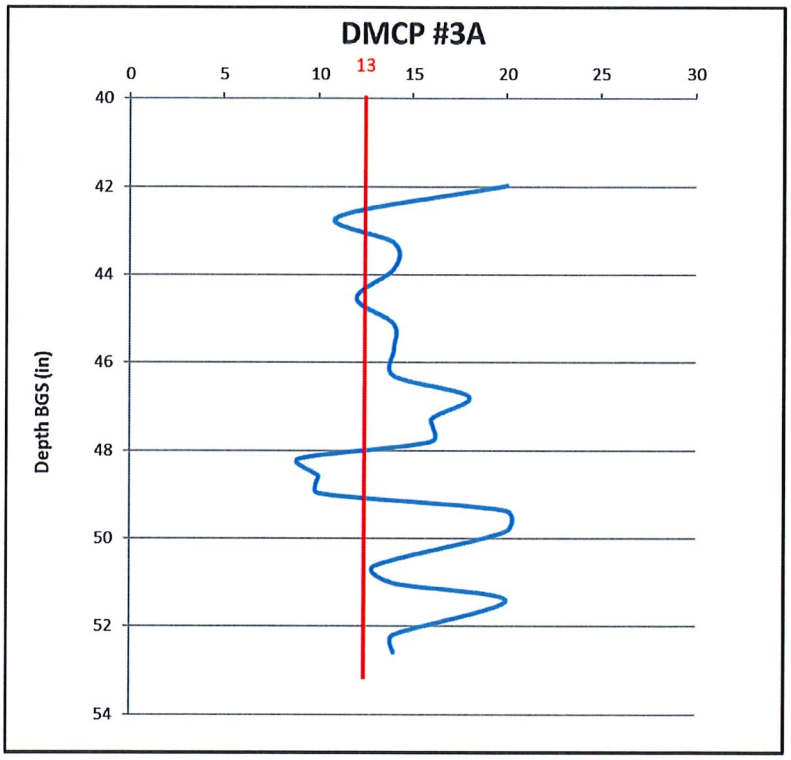
DMCP #3A				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
41.6	1056	1	40	4.7
42.0	1066	1	10	20
42.7	1084	1	18	11
43.3	1099	1	15	14
43.9	1114	1	15	14
44.5	1131	1	17	12
45.1	1146	1	15	14
45.7	1161	1	15	14
46.3	1176	1	15	14
46.8	1188	1	12	18
47.3	1201	1	13	16
47.8	1214	1	13	16
48.2	1224	1	23	9
48.6	1234	1	20	10
49.0	1244	1	20	10
49.4	1254	2	10	20
49.8	1266	2	11	20
50.6	1286	2	16	13
51.0	1296	2	15	14
51.4	1306	2	10	20
52.2	1326	2	15	14
52.6	1336	2	15	14
	Average			14.2
	Recommended			**13**



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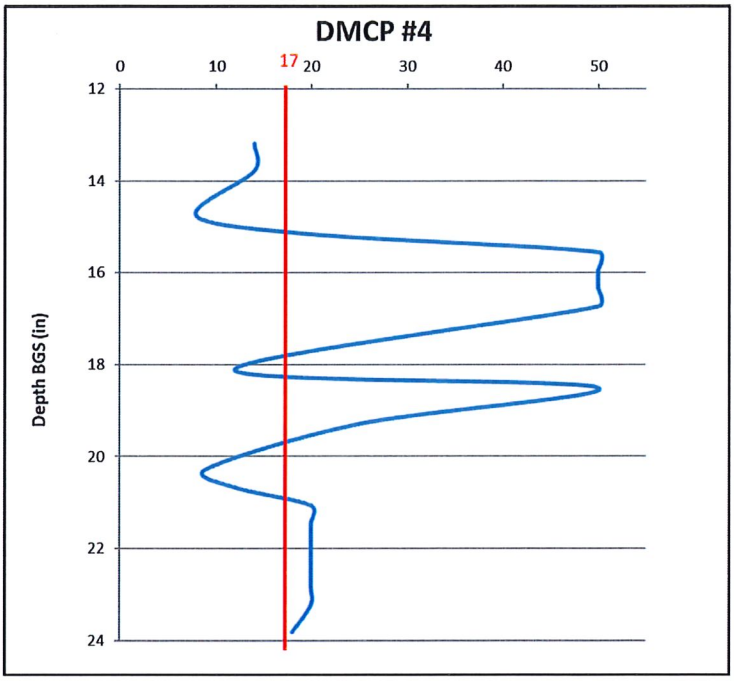
DMCP #4				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
12.6	320	1	15	14
13.2	335	1	15	14
13.8	350	1	15	14
14.8	375	1	25	8
15.2	385	1	10	20
15.6	395	2	5	50
15.9	405	2	5	50
16.3	415	2	5	50
16.7	425	2	5	50
18.1	460	2	18	12
18.5	470	2	5	50
19.3	490	2	10	25
20.3	515	2	23	9
20.7	525	2	18	12
21.1	535	2	10	20
21.5	545	2	10	20
21.9	557	2	11	20
22.4	568	2	12	20
22.8	580	2	12	20
23.2	590	2	11	20
23.8	605	2	13	18
	Average			24.6
	Recommended			**17**



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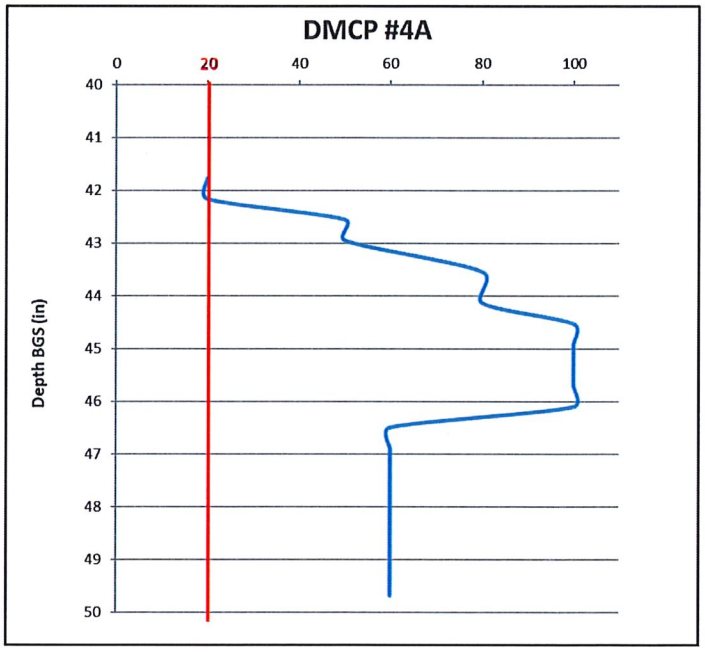
DMCP #4A				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
41.4	1051	1	35	5
41.8	1061	1	10	20
42.2	1071	1	10	20
42.6	1081	2	5	50
43.0	1091	2	5	50
43.5	1106	5	3	80
44.1	1121	5	3	80
44.5	1131	5	2	100
44.9	1141	5	2	100
45.3	1151	5	2	100
45.7	1161	5	2	100
46.1	1171	5	2	100
46.5	1181	5	4	60
46.9	1191	5	4	60
47.3	1202	5	4	60
47.7	1212	5	4	60
48.1	1222	5	4	60
48.5	1232	5	4	60
48.9	1242	5	4	60
49.3	1252	5	4	60
49.7	1262	5	4	60
	Average			64.0
	Recommended			**20**



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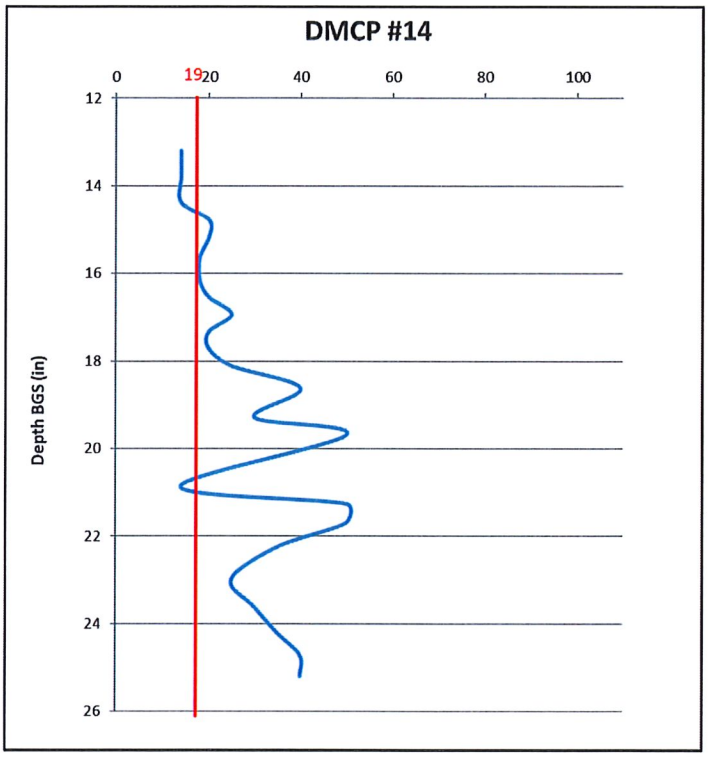
DMCP #14				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
12.6	320	1	15	14
13.2	335	1	15	14
13.8	350	1	15	14
14.4	365	1	15	14
14.8	375	1	10	20
15.2	385	1	10	20
15.6	397	1	12	18
16.1	410	1	13	18
16.5	420	1	10	20
16.9	430	1	10	25
17.3	440	1	10	20
17.7	450	1	10	20
18.1	460	1	10	25
18.6	473	2	7	40
19.3	490	2	9	30
19.7	500	2	5	50
20.9	530	2	15	14
21.3	540	2	5	50
21.7	551	2	6	50
22.2	565	2	7	35
23.0	584	2	10	25
23.6	600	2	8	30
24.2	615	2	8	35
24.7	628	2	7	40
25.2	640	2	6	40
	Average			27.2
	Recommended			**19**



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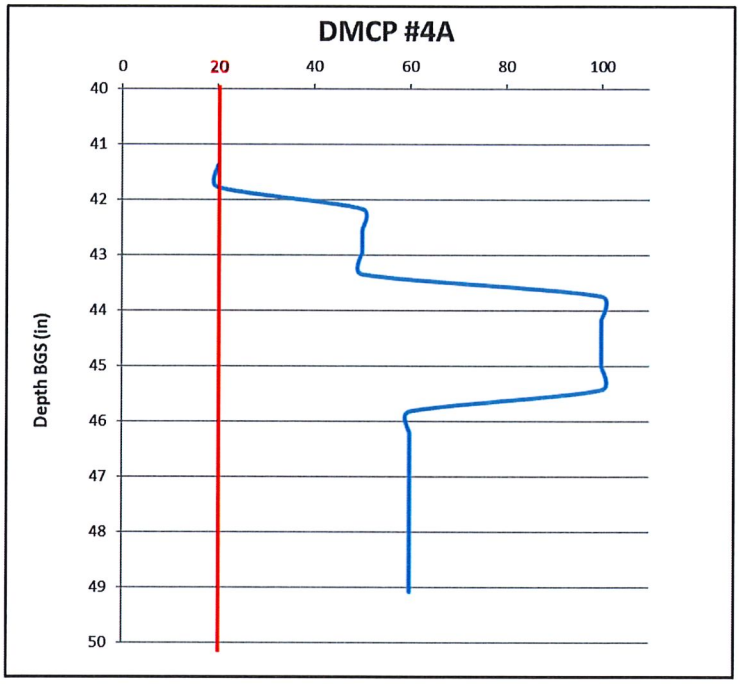
DMCP #14A				
Depth BGS		Blows	Index	CBR %
(in)	(mm)		mm/blow	
41.0	1041	1	25	8
41.4	1051	1	10	20
41.8	1061	1	10	20
42.2	1071	2	5	50
42.6	1081	2	5	50
43.0	1091	2	5	50
43.3	1101	2	5	50
43.7	1111	5	2	100
44.2	1122	5	2	100
44.6	1132	5	2	100
45.0	1143	5	2	100
45.4	1154	5	2	100
45.8	1164	5	4	60
46.2	1174	5	4	60
46.6	1184	5	4	60
47.0	1195	5	4	60
47.4	1205	5	4	60
47.8	1215	5	4	60
48.2	1225	5	4	60
48.7	1237	5	4	60
49.1	1247	5	4	60
	Average			61.3
	Recommended			**20**



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CONCLUSIONS/RECOMMENDATIONS

Stormwater Design

1. The Design Engineer is recommended to use the above information for sizing of the Proposed Stormwater Management Facilities. The BMP minimum factor of safety is suitable design rate reduction to ensure the longevity of the systems given the presence of fine grain soils in some locations. However, given the rapid infiltration rates at Test Pits 6,7,8,9,11,12 and 13, the placement of amended soils within basin facilities may deemed required. Amended soil placement to impede the flow of stormwater infiltration into the subgrade is typically required when subgrade soils drain too fast as the subgrade soils are meant to function as a "scrubber" prior to stormwater reaching the water table. The Civil Design Engineer of Record should take to into consideration when designing the stormwater management facilities.

2. The following ranges of depths can be considered with similar infiltration within the below test pits. Note – given the presence and variations of fine-grained content noted in the stratums tested, a factor of safety should be applied to design infiltration rates.

   Test Pit 5: 40" – 53"
   Test Pit 6: 55" – 70"
   Test Pit 7: 44" – 51"
   Test Pit 8: 48" – 50"
   Test Pit 9: 24" – 35"
   Test Pit 11: 28" – 47"
   Test Pit 12: 18" – 35"
   Test Pit 13: 47" – 48"

3. The geotextile fabric is recommended to not be utilized at the bottom of any subsurface infiltration facility as the liner is serving too often as a hydraulically restrictive material and creating a 'bath tub' effect, ergo – only utilize the geotextile on the sides and top of the trench.

4. It is recommended that a Soils Engineer or representative thereof is present on-site during the construction of the stormwater management system in order to ensure the system was constructed as designed and to oversee the excavation of the fine grain soils. Given the localized investigation, it is paramount that the entire bed bottom is verified to be situated within the correct infiltration stratum.

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Pavement Design/CBR Testing

Test Location	Depth Below Ground Surface (in.)	Measured CBR Value	Recommended CBR Value
1	11.97	8.30	8
1A	40.00	12.1	11
2	11.97	11.2	10
2A	38.03	18.1	13
3	17.99	14	11
3A	40.00	14.2	13
4	12.01	24.6	17
4A	40.00	64	20
14	12.01	27.2	19
14A	40.00	61.3	20

Based upon the field data summarized above, the above CBR values may be utilized by the design Engineer for Pavement Design. IES notes that there were elevated CBR values indicative of impediments of larger gravels from weathered shale fragments. The lower recommended CBR values are indicative of conservative values to utilize for design. Typically, soils located on the South section of the property nearest to Diverty Road were found to have lower CBR counts indicative of finer grained soils encountered within the subgrade. On the North section of the property, subgrade soils explored were found to be more granular and stiffer in nature. IES does not anticipate subgrade remediation for roadway construction at this time.

If on-site soils are to be utilized for the filling and grading for roadway construction, IES recommends the use of deeper subgrade soils consisting of Reddish-Brown Silty SAND with gravels (i.e. weathered shale sections) as these soils are suitable for structural fill as well as tolerant to varying amounts of moisture given the coarse-grained content. The upper soils consisting of Sandy SILT, Clayey SILT, and SILT may be used for structural fill, however, strict adherence to water content of the soil upon placement is required. As these fine-grained soils are moisture sensitive, during excessively wet conditions, pumping and deflection of placed compacted lifts would be anticipated.

It is recommended during any filling or grading of the roadway is overseen by IES on a full-time basis to ensure adequate compaction is provided via nuclear moisture-density gauge testing. Additionally, prior to placement of the stone subgrade for asphalt, IES shall oversee and direct proofroll testing of the collector road roadway.

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QUALIFICATIONS

Conclusions and Recommendations are based on the above Investigation and Findings. No other conclusions are to be drawn other than those specifically stated.

Very Truly Yours,

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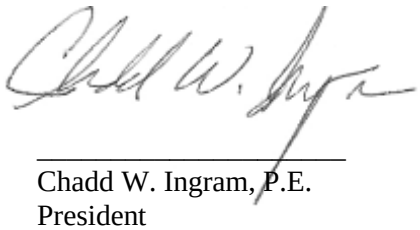
GEOTECHNICAL INVESTIGATION REPORT

HOPEWELL PARKE
HOPEWELL TOWNSHIP
MERCER COUNTY, NEW JERSEY

PREPARED FOR

LENNAR HOMES- TRI-STATE DIVISION
2465 KUSER ROAD, 3RD FLOOR
HAMILTON, NJ 08690

SEPTEMBER 29TH, 2020



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Executive Summary:

IES has been retained by the Client to perform a geotechnical investigation to assess the general subsurface soil profiles, groundwater conditions, and geology to determine the existing subsurface characteristics and the engineering properties as they pertain to the proposed stormwater management facilities.

This geotechnical investigation was performed throughout the site via exploratory test pit investigations. Soil stratums/classifications were consistent throughout the site, typical soils throughout the site consisted of four predominant (4) strata:

- **Stratum I: 0" to 8": TOPSOIL**
  Dark Brown to Brown Topsoil consisting of silt loam. Soils were generally found to be moist to damp during the investigation. Root matting was commonly encountered throughout this stratum as well as deeper into below stratums, this was typically isolated to the test pits completed near or within the wooded areas.
- **Stratum II: 8" to 39": ML (SILT)**
  Light Brown to Grayish Brown SILT was encountered underlying the topsoil layer. This stratum has trace clay deposits and trace fine sand deposits throughout. Based on direct observation of the excavation, this stratum is dense and generally dry to moist.
- **Stratum III: 39"to 65": CL (Silty CLAY – Completely Decomposed Shale)**
  Reddish Brown Silty Clay with some too few gravels varying from fine to coarse was encountered underlying Stratum II. This stratum is residual soils from the parent rock (Shale) existing within the subsurface soils. These soils were generally found to be dense very dense based upon observations during excavations. Soils were generally found to be dry upon excavation.
- **Stratum IV: 65" – 99" (Limits of Exploration): Slightly Weathered Shale**
  Decomposed Shale was generally found in this stratum and was found to be of similar color and morphology to the above residual soil in Stratum III. State of the weathering of the rock varied between very weathered to slightly weathered. In slightly weathered conditions, excavation via large track hoe excavator was difficult and commonly resulted in bucket refusal. The depth of refusal varied between 32-inches and 99-inches. This slightly weathered rock is considered to be a limiting layer for stormwater design purposes.

Given the soil classifications, and the results from laboratory analysis IES has drawn the following conclusions/provides the following recommendations:

Minimal infiltration rates were realized in localized areas. The site as a whole yielded poor infiltration and therefore infiltration is not reccomended at the site with the current in-situ soils encountered during the investigation. Infiltration may be possible should the subgrade soils below proposed BMP Facility bottom elevations be remdiated with soils more condusive to infiltration K3 Soils or better.

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September 23rd, 2019

Mr. Mitchell Newman
Vice President Land
Lennar Homes- Tri-State Division
2465 Kuser Road, 3rd Floor
Hamilton, NJ 08690



Re: Geotechnical Engineering Report
Hopewell Parke
Hopewell Township
Mercer County, New Jersey

Mr. Newman:

Submitted herewith is the *Geotechnical Engineering Report* for the above referenced project. Lennar Homes- Tri-State Division (Client), has retained Ingram Engineering Services, Inc. (IES) to perform a geotechnical investigation and analysis in order to make recommendations for stormwater BMP facility designs and construction considerations for the existing in-situ soils beneath the proposed subdivision. This investigation is to assist the Design Engineer in relation to proposed stormwater BMP facility design as they relate to the in-situ infiltration potential, presence of limiting zones and subsurface geology. Any environmentally related services are beyond this investigation's scope of work. Presented herewith is the required information. IES appreciates the opportunity to be of service with you on this project. If we may be of further assistance, please do not hesitate to contact our office.

Purpose and Scope of Work:

The purpose of this investigation was to assess the general subsurface soil profiles, groundwater conditions, and geology to determine the existing subsurface characteristics and the engineering properties as they pertain to the proposed stormwater management facilities. Upon evaluation of these subsurface conditions, this report is to provide general recommendations regarding the in-situ infiltration potential of the subsurface soils as well as general earthwork, construction guidelines and recommendations related to stormwater facilities. This report describes the site conditions, documents the work performed, and presents the data, conclusions and recommendations of the field investigation performed.

The scope of the investigation and evaluation entailed subsurface exploration via test pit investigations and sampling of in-situ soil samples for laboratory analysis, to conclude with a geotechnical evaluation and all recommendations warranted. This report and evaluation are

limited to the data reviewed, collected and analyzed by IES and addresses the current site conditions investigated as they relate to the proposed stormwater management BMP facilities for due diligence purposes.

The scope of services performed included the excavation of a total of sixty-seven (67) exploratory test pits, tube permeameter soil testing, visual soil classification and lithology of the test pits, index laboratory soil analysis on representative samples retrieved from the test pit investigations, a geotechnical analysis of the field findings and field logs, and the preparation of a written geotechnical engineering report. A plan entitled "Hopewell Parke Soil Pit and Boring Locations with Proposed Infiltration BMPs" dated 08/01/2020, prepared by Bowman Consulting. (hereafter referred to as the "Plans") was provided to IES and depicts locations of the proposed site including stormwater facilities and associated infrastructure.

Site Description:

The proposed construction site consists primarily of an open farmland (soybeans) with some mature trees surrounding (which accounts for ~25%), and varying topography. The existing property is bordered by County Road 546 (Washington Crossing Pennington Road) to the North, NJ Route 31 to the East, Diverty Road to the South, and Reed Road to the West. IES does not anticipate any significant earthwork (cut/fills over 3 to 5 feet) will be required. In the event the above-mentioned assumptions change, and more substantial earthwork operations are required, IES shall be contacted to reevaluate the findings, conclusions, and recommendations offered in this report.

Historical aerial photography available for review indicates that the proposed construction site has primarily remained unchanged since as early as the 1930's with no significant site improvements observed. The surrounding area was slowly developed over time with the addition of residential structures and businesses appear as early as the 1940's and continuing to present time. Refer to Historic Aerials located in Appendix A.

Field Investigations and Subsurface Conditions:

On September 8th, 9th, 10th, and 11th of 2020, IES performed exploratory test pits at sixty-seven (67) locations within the proposed subdivision. The field study consisted of test pit excavations, visual lithology classification and soil sampling for laboratory permeability analysis at the proposed site utilizing a John Deere 85-G excavator. Test Pits were excavated to average depths between eight (8') and ten (10') feet below ground surface (BGS) or until refusal was encountered. The test pit locations were rough survey staked in the field via handheld GPS by IES (accurate to approximately 20 feet). A Geotechnical Engineer from IES was present and inspected the test pit investigations on a full-time basis. The findings and locations are shown in Appendices B and C to include the Geotechnical Exploration Map and Test Pit Logs, respectively.

The soil samples obtained from the investigation were examined and visually classified in the field on the attached test pit logs. Representative undisturbed soil samples were collected and analyzed via Permeability testing to determine in-situ infiltration rates. Laboratory testing was performed in accordance with applicable ASTM standards. The laboratory results are incorporated into the findings, recommendations and conclusions discussed throughout this *Geotechnical Engineering Report.* Final exploration logs represent the interpretation of individual samples and the field logs. Stratification lines on the logs represent an approximate boundary between soil types, although these transitions may be gradual and vary across the site. Elevations on the test pit logs were taken from the plan set *"Hopewell Parke Soil Pit and Boring Locations with Proposed Infiltration BMPS"* from Bowman Consulting dated 08/01/2020. Refer to Appendix D for the Index Laboratory Test Results.

Within the depths explored, the subsurface soil profiles within all test investigation locations were, in general, similar and consisted primarily of the following soil profile:

- **Stratum I: 0" to 8": TOPSOIL**
  Dark Brown to Brown Topsoil consisting of silt loam. Soils were generally found to be moist to damp during the investigation. Root matting was commonly encountered throughout this stratum as well as deeper into below stratums, this was typically isolated to the test pits completed near or within the wooded areas.

- **Stratum II: 8" to 39": ML (SILT)**
  Light Brown to Grayish Brown SILT was encountered underlying the topsoil layer. This stratum has trace clay deposits and trace fine sand deposits throughout. Based on direct observation of the excavation, this stratum is dense and generally dry to moist.

- **Stratum III: 39"to 65": CL (Silty CLAY – Completely Decomposed Shale)**
  Reddish Brown Silty Clay with some too few gravels varying from fine to coarse was encountered underlying Stratum II. This stratum is residual soils from the parent rock (Shale) existing within the subsurface soils. These soils were generally found to be dense very dense based upon observations during excavations. Soils were generally found to be dry upon excavation.

- **Stratum IV: 65" – 99" (Limits of Exploration): Slightly Weathered Shale**
  Decomposed Shale was generally found in this stratum and was found to be of similar color and morphology to the above residual soil in Stratum III. State of the weathering of the rock varied between very weathered to slightly weathered. In slightly weathered conditions, excavation via large track hoe excavator was difficult and commonly resulted in bucket refusal. The depth of refusal varied between 32-inchesa and 99-inches. This slightly weathered rock is considered to be a limiting layer for stormwater design purposes.

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USGS GEOLOGIC MAP



According to the Geologic Map of New Jersey, the site Geology belongs to the Passaic Formation and Passaic Formation gray bed. The underlying geoplogy encountered within the test pits completed during this investigation were generally consistent with the Passaic Formation. USGS classifies these as follows:

- Passaic Formation: *"Predominantly red beds consisting of argillaceous siltstone; silty mudstone; argillaceous, very fine grained sandstone; and shale; mostly reddish-brown to brownish-purple, and grayish-red. Red beds occur typically in 3- to 7-m (10- to 23-ft-)-thick, cyclic playa-lake-mudflat sequences and fining-upward fluvial sequences. Lamination is commonly indistinct due to burrowing, desiccation, and paleosol formation. Where layering is preserved, most bedforms are wavy parallel lamination and trough and climbing-ripple cross lamination. Calcite- or dolomite-filled vugs and flattened cavities, mostly 0.5 to 0.2 mm (0.02-0.08 in) across, occur mostly in the lower half. Sand-filled burrows, 2 to 5 mm (0.08-0.2 in) in diameter, are prevalent in the upper two-thirds of the unit. Desiccation cracks, intraformational breccias, and curled silt laminae are abundant in the lower half. Lake cycles, mostly 2 to 5 m (7-16 ft) thick, have a basal, greenish-gray, argillaceous siltstone; a medial, dark-gray to black, pyritic, carbonaceous, fossiliferous, and, in places, calcareous lake-bottom fissile mudstone or siltstone; and an upper thick-bedded, gray to reddish and purplish-gray argillaceous siltstone with desiccation cracks, intraformational breccias,*

burrows, and mineralized vugs. Thickness of the formation between Sourland Mountain and Sand Brook syncline is about 3,500 m (11,483 ft)."

- Passaic Formation (gray bed): *"Upper Triassic gray lake deposits (Trpg) consist of gray to black silty mudstone, gray and greenish- to purplish-gray argillaceous siltstone, black shale, and medium- to dark-gray, argillaceous, fine-grained sandstone and are abundant in the lower half of the Passaic Formation. Gray lakebeds occur in groups of two to five cycles although they also occur as single cycles in some parts of the formation. Several lakebed sequences consisting of one or two thick groups of drab-colored beds as much as 30 m (98 ft) thick or more can be traced over tens of kilometers. Many gray-bed sequences are locally correlated within fault blocks; some can be correlated across major faults or intrusive rock units. Thickness of the (entire Passaic) formation between Sourland Mountain and Sand Brook syncline is about 3,500 m (11,483 ft)"*

The USDA Web Soil Survey indicates that the site varies between hydric and not hydric soil types consisting of silt loams with majority of the site being not hydric, Bucks Silt Loam.

The ground water table was only encountered within one of the test pits excavated across the site, TP-118 at a depth of 83" below ground surface (elevation 195.98). It should be noted that the ground water data presented on the individual test pit logs may not be representative of daily or seasonal variations in the ground water level. Deep excavations, below the weathered shale, Stratum IV, may encounter water seepage, requiring dewatering techniques during construction activities. It is not anticipated that groundwater will be encountered within the depths of the proposed excavation.

Recommendations:

Based on the information and findings obtained from this geotechnical investigations, IES recommendations related to important aspects of design and construction are provided below. In the event the above-mentioned assumptions change, and more substantial earthwork operations are required, IES shall be contacted to reevaluate the findings, conclusions, and recommendations offered in this report.

- ***Stormwater Facilities***

  Minimal infiltration rates were realized in localized areas with the majority of the site yielding poor infiltration. Therefore, infiltration is not reccomended at the site with the current in-situ soils encountered during the investigation. Infiltration may be possible should the subgrade soils below proposed BMP Facility bottom elevations be remdiated with soils more condusive to infiltration K3 Soils or better.

This can be achieved by the replacement of the subgrade soils of infiltration facilities with the aforementioned K3 soils (2-6 in./hr.). In the instances of weathered rock limiting zones, these limiting zones were based upon the depth of bucket refusal encoutnered at rock beneath the groundsurface, however; the bucket refusal encountered directly correlated with the size and type of excavator used during this investigation. In the event of excavations to be completed with equipment having more powerful and larger excavating capabilities, the depth of the limiting zone may be deeper than those elevations described in this report. Subsequently, the subgrades within the weathered rock layer have a potential for increased infiltration rates prudent to subsurface infiltration. Potentially, the K3 soils may be used as a 'buffer' between the bottom of the facilities to the weathered rock layer to promote site infiltration. In this instance, test pits and/or borings should be performed on either side of the facility to ensure intact, competent rock and/or a groundwater table (conventional limiting zones) are not within two feet (2') of the designed bottom of facility elevation.

The NJ BMP Manual recommends a design infiltration rate between 0.5 to 10 inches per hour as well as a minimum 24-inch vertical separation between facility bottom and any limiting layer. The BMP Manual states a factor of safety between 1 and 10 be used for design with a factor of safety of 2 being the recommended value. The Design Engineer is recommended to use the results of the field infiltration testing for sizing of the Proposed Stormwater Management Facilities. The minimal vertical distance from the proposed basin bottom and the seasonal high water table is designated at 24" by the NJ-BMP Manual.

Subgrade under the proposed infiltration facilities shall **NOT** be compacted or subject to excessive equipment traffic. Areas that where soils have been subjected to construction traffic shall be scarified to a minimum depth of 12-inches. In the event an accumulation of fine-grained material and/or surface ponding is encountered within the subbase of the facility, material within that area shall be removed and replaced with approved material. It is recommended that a Soils Engineer or representative thereof is present on-site during the construction of the stormwater management system in order to ensure the system was constructed as designed and to oversee the excavation of the fine grain soils. Given the localized investigation, it is paramount that the entire bed bottom is verified to be situated within the correct infiltration stratum. It is recommended that no fabric be placed on the bottom of any proposed infiltration basin and that non-woven fabric be permeable >2in/hr.

Limitations and Qualifications:

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The conclusions and recommendations included in this report are based on the subsurface data and conditions collected during the field investigations in conjunction with the site plans, data and historical information provided. This report is for geotechnical study only. The general subsurface conditions used in our evaluation were based on interpolation of the subsurface data at the test pit locations.

It should be noted that soil conditions between test pits can vary significantly from the conditions found at the individual test pits. This is particularly true in areas that have been disturbed by prior construction and earthwork and it is not uncommon to find buried construction debris or unconsolidated/nonstructural fill in these areas. IES will not be responsible for the presence of buried unsuitable fill materials or unexpected conditions that may be delineated or encountered at the site. IES should be informed immediately of such conditions so that we may modify our conclusions and recommendations.

The recommendations outlined in this geotechnical report are based on the assumption that the provisions for strict field inspection will be followed as specified and directed, either by a representative of IES or other qualified personnel, to include oversight and inspection of compaction, backfill placement, and/or other significant earthwork or structural fill construction activities.

These professional services have been performed, the findings derived, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all warranties either expressed or implied. This company is not responsible for the conclusions, opinions or recommendations of others based on these data.

Should you have any questions, kindly contact the undersigned.

Very Truly Yours,

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APPENDIX A

Historic Aerials

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Historic Aerial 1931

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Historic Aerial 1940

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Historic Aerial 1979

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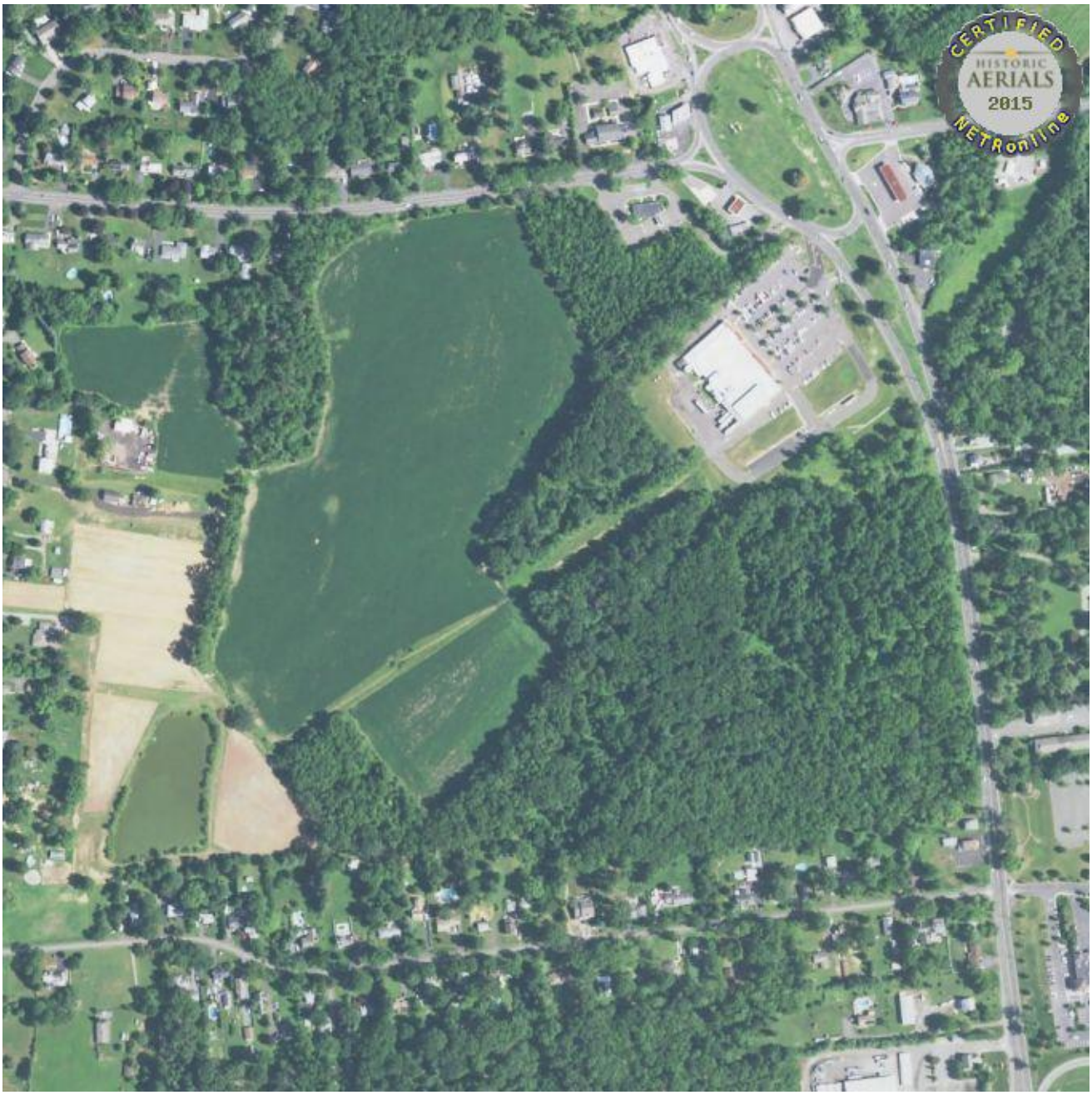

Historic Aerial 2015

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APPENDIX B

Geotechnical Exploration Map

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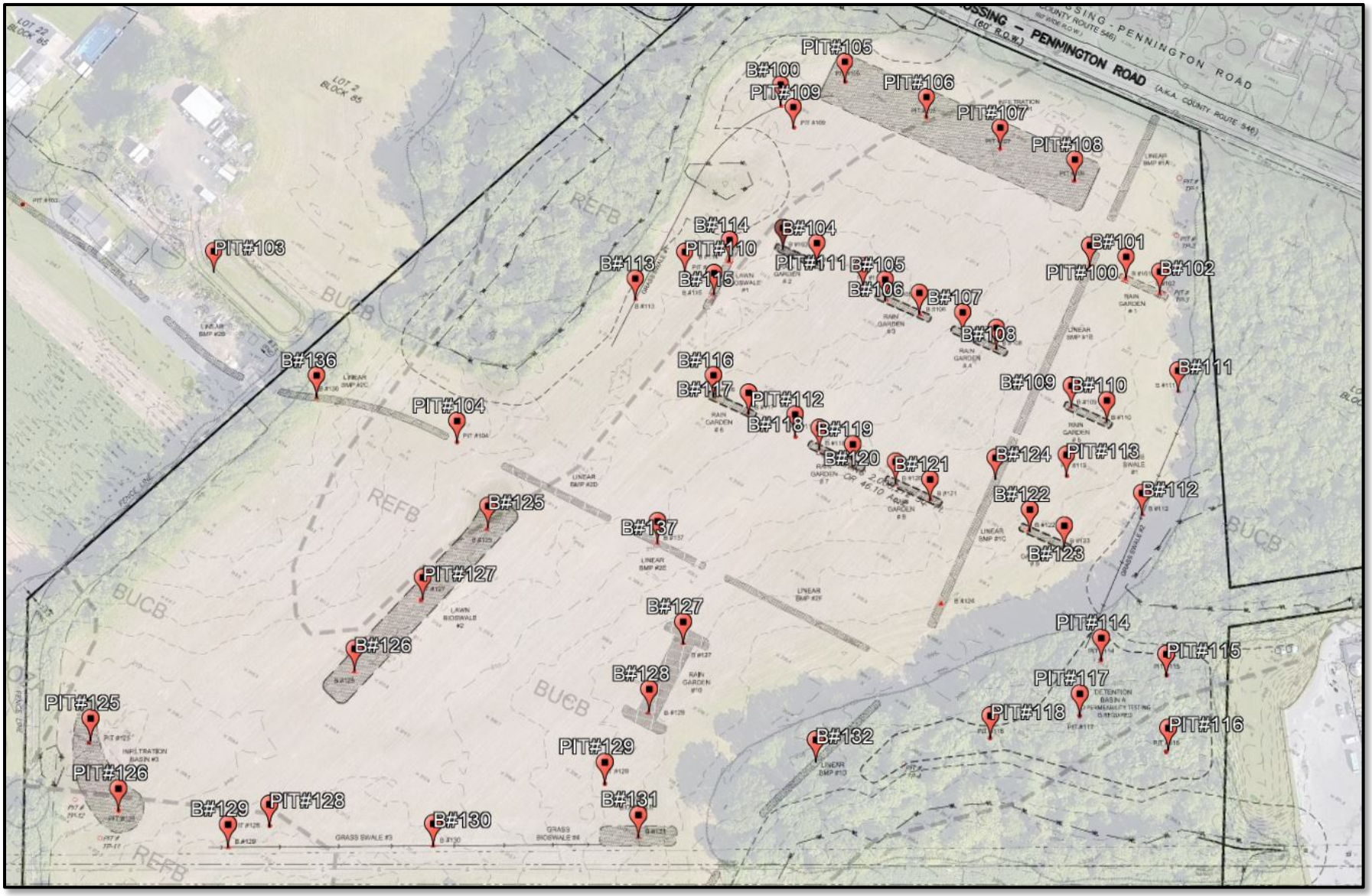
GEOTECHNICAL EXPLORATION MAP



Lennar – Hopewell Parke

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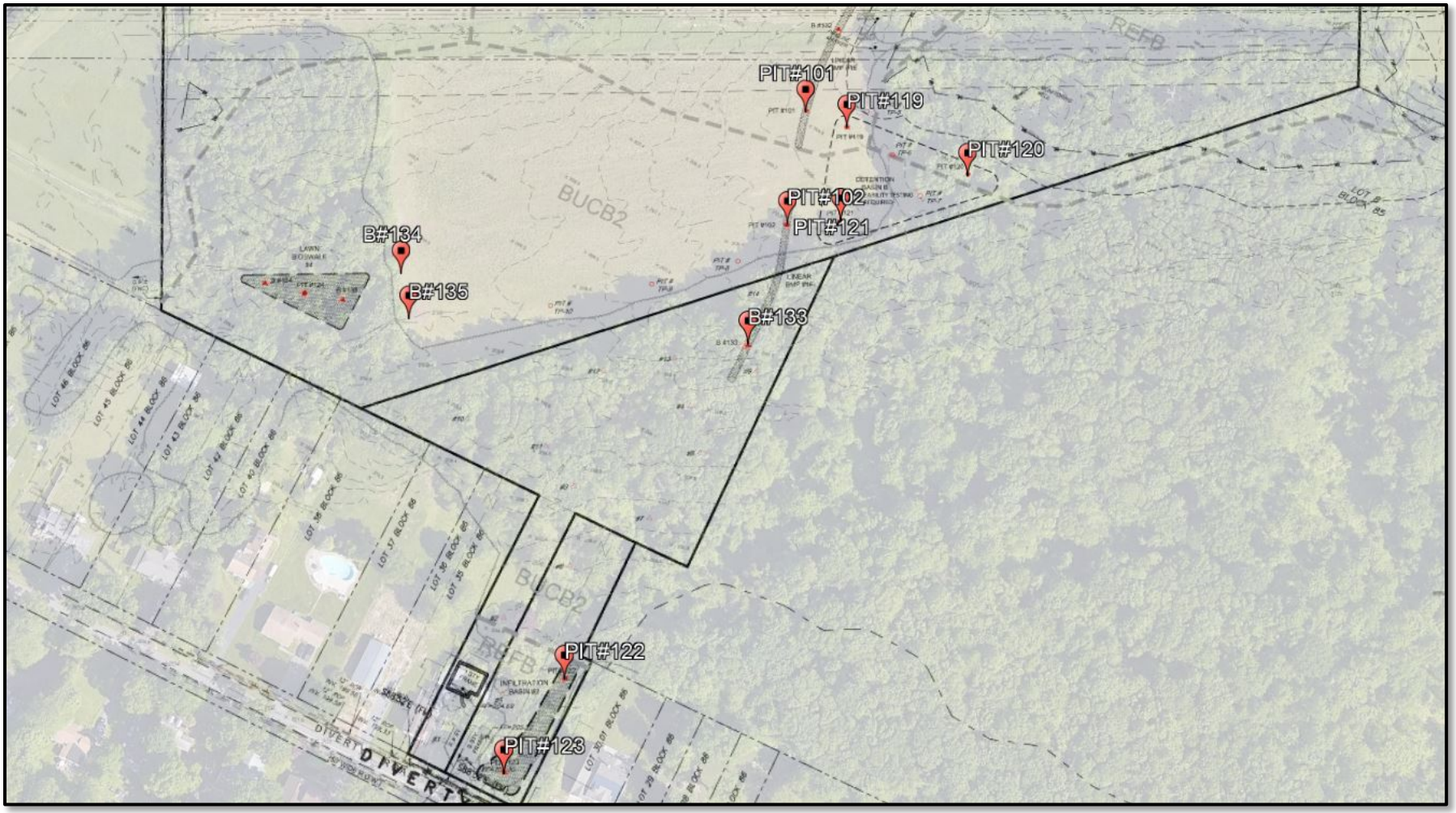
GEOTECHNICAL EXPLORATION MAP



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APPENDIX C

Test Pit Logs

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Stormwater Testing Results

Proposed BMP	Test Location(s)	Average Elevation of Limiting Zone	Limiting Zone Type	Elevation of Permeameter Sample	Average Elevation of Permeameter Sample	Laboratory Tested Infiltration Rate (in./hr.)	Average Infiltration Rate (in./hr.)
Infiltration Basin #1	TP#105	202.23	Weathered Rock	204.67	204.69	1.403	0.740
	TP#106			204.33		1.359	
	TP#107			203.67		0.040	
	TP#108			206.10		0.158	
NA	B#100	203.62	Weathered Rock	206.30	205.95	1.553	1.698
	TP#109			205.60		1.842	
Rain Garden #1	B#101	202.17	Weathered Rock	206.92	205.46	0.077	0.151
	B#102			204.00		0.225	
Rain Garden #2	B#103	207.62	Weathered Rock	209.43	209.66	0.073	0.042
	B#104			209.88		0.010	
Rain Garden #3	TP#111	207.16	Weathered Rock	209.07	204.69	0.238	0.428
	B#105			210.03		0.599	
	B#106			209.80		0.446	
Rain Garden #4	B#107	203.91	Weathered Rock	208.12	206.20	0.093	0.327
	B#108			204.28		0.560	
Rain Garden #5	B#109	200.47	Weathered Rock	202.60	202.55	0.010	0.007
	B#110			202.50		0.003	
NA	B#111	202.01	Weathered Rock	202.85	204.05	0.007	0.009
	TP#113			205.25		0.010	
Rain Garden #6	B#116	205.74	Weathered Rock	207.98	207.74	0.010	0.081
	B#117			207.50		0.152	
Rain Garden #7	TP#112	204.29	Weathered Rock	207.17	204.69	0.323	0.751
	B#118			207.07		0.388	
	B#119			206.47		1.541	
Rain Garden #8	B#120	204.41	Weathered Rock	206.23	206.41	1.328	0.711
	B#121			206.58		0.094	
Rain Garden #9	B#122	201.21	Weathered Rock	203.92	203.33	0.293	0.157
	B#123			202.75		0.020	
Grass Swale #1	TP#110	208.24	Weathered Rock	210.42	210.23	0.000	0.071
	B#113			210.05		0.142	
Grass Swale #2	B#112	201.38	Weathered Rock	203.38	203.38	0.030	0.030
Linear BMP #1A	TP#100	203.33	Weathered Rock	205.33	205.33	1.375	1.375
Linear BMP #1C	B#124	202.75	Weathered Rock	204.83	204.83	0.164	0.164
Linear BMP #2B	TP#103	210.40	Weathered Rock	211.23	211.23	0.013	0.013
Linear BMP #2C	B#136	210.29	Weathered Rock	214.13	212.33	0.080	0.099
	TP#104			210.53		0.118	
Linear BMP #2E	B#137	205.85	Weathered Rock	207.85	207.85	0.037	0.037
Lawn Bioswale #1	B#114	208.25	Weathered Rock	209.75	210.29	0.117	0.070
	B#115			210.83		0.023	
Lawn Bioswale #2	B#125	204.6	Weathered Rock	204.12	204.69	0.273	0.179
	TP#127			209.75		0.160	
	B#126			205.93		0.104	
Rain Garden #10	B#127	199.42	Weathered Rock	204.50	204.80	0.141	0.082
	B#128			205.10		0.023	
Linear BMP #1D	B#132	198.33	Weathered Rock	202.50	202.50	0.381	0.381
Infiltration Basin #3	TP#125	201.59	Weathered Rock	202.67	204.08	0.060	0.040
	TP#126			205.50		0.020	
Grass Swale #3	B#129	205.13	Weathered Rock	210.37	204.69	0.161	0.133
	TP#128			210.60		0.000	
	B#130			204.00		0.237	
NA	TP#129	202.55	Weathered Rock	204.55	204.55	0.060	0.060
Lawn Bioswale #3	B#131	203.58	Weathered Rock	205.58	205.58	0.642	0.642
Linear BMP #1E	TP#101	Not Encountered	Not Encountered	199.47	199.47	1.720	1.720
Linear BMP #1F	TP#102	200.69	Weathered Rock	202.17	203.98	0.966	0.612
	B#133			205.80		0.258	
Lawn Bioswale #4	B#134	204.83	Weathered Rock	207.23	207.24	0.091	0.047
	B#135			207.25		0.003	
Infiltration Basin #2	TP#122	194.96	Weathered Rock	199.83	199.17	0.017	0.020
	TP#123			198.50		0.023	
Detention Basin A	TP#114	199.77	Weathered Rock	NA	NA		NA
	TP#115			NA			
	TP#116			NA			
	TP#117			NA			
	TP#118	195.98	Ground Water	NA			
Detention Basin B	TP#119	198.75	Weathered Rock	NA	NA		NA
	TP#120			NA			
	TP#121			NA			

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TP #105

Test @ 46" BGS (Elev. 204.67)

Depth BGS	Elevation	Soil Description
0" to 7"	208.50 to 207.92	Topsoil, little root matting
7" to 46"	207.92 to 204.67	Light Brown to Gray Brown SILT with some to little clay, little to trace f. sand, very dense, dry
46" to 74"	204.67 to 202.33	Red Brown Silty CLAY with little fine gravel and sand, very dense
74"	202.33	Bucket Refusal - Weathered Shale

74" BGS 202.33) = Machine Refusal Encountered

TP #106

Test @ 50" BGS (Elev. 204.33)

Depth BGS	Elevation	Soil Description
0" to 6"	208.50 to 208.04	Topsoil, little root matting
6" to 50"	208.04 to 204.33	Light Brown to Gray Brown SILT with some to little clay, little to trace f. sand, very dense, dry
50" to 87"	204.33 to 201.25	Red Brown Silty CLAY with little fine gravel and sand, very dense
87"	201.25	Bucket Refusal - Weathered Shale

87" BGS 201.25) = Machine Refusal Encountered

TP #107

Test @ 64" BGS (Elev. 203.67)

Depth BGS	Elevation	Soil Description
0" to 9"	209.00 to 208.25	Topsoil, little root matting
9" to 64"	208.25 to 203.67	Light Brown to Gray Brown f. Sandy SILT with some to little clay very dense, dry
64" to 99"	203.67 to 200.75	Red Brown Silty CLAY with little fine gravel and sand, very dense
99"	200.75	Bucket Refusal - Weathered Shale

99" BGS 200.75) = Machine Refusal Encountered

TP #108

Test @ 36" BGS (Elev. 206.10)

Depth BGS	Elevation	Soil Description
0" to 7"	209.10 to 208.52	Topsoil, little root matting
7" to 32"	208.52 to 206.43	Light Brown to Gray Brown SILT, very dense
32" to 54"	206.43 to 204.60	Red Brown Silty Clayey SAND with gravel (weathered shale), very dense
54"	204.60	Bucket Refusal - Weathered Shale

54" BGS 204.60) = Machine Refusal Encountered

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B100

Test @ 42" BGS (Elev. 206.30)

Depth BGS	Elevation	Soil Description
0" to 6"	209.80 to 209.34	Topsoil, little root matting
6" to 47"	209.34 to 205.88	Light Brown to Gray Brown SILT with some to little clay, little to fine sand, very dense, dry
47" to 61"	205.88 to 204.72	Red Brown Silty CLAY with gravel (weathered shale material) and little to trace sand, very dense, dry
61"	204.72	Bucket Refusal - Weathered Shale

61" BGS 204.72) = Machine Refusal Encountered

TP #109

Test @ 48" BGS (Elev. 205.60)

Depth BGS	Elevation	Soil Description
0" to 6"	209.60 to 209.10	Topsoil, little root matting
6" to 48"	209.10 to 205.60	Light Brown to Gray Brown SILT with some to little clay, little to fine sand, very dense, dry
48" to 85"	205.60 to 202.52	Red Brown Silty CLAY with little fine gravel and sand, very dense, dry to damp
85"	202.52	Bucket Refusal - Weathered Shale

85" BGS 202.52) = Machine Refusal Encountered

B101

Test @ 19" BGS (Elev. 206.92)

Depth BGS	Elevation	Soil Description
0" to 5"	208.50 to 208.08	Topsoil, little root matting
5" to 29"	208.08 to 206.08	Light Brown to Tan Brown v.f. Sandy SILT, dry, very dense
29" to 43"	206.08 to 204.92	Red Brown Silty SAND with gravels & cobbles (weathered shale), very dense, dry
43"	204.92	Bucket Refusal - Weathered Shale

43" BGS 204.92) = Machine Refusal Encountered

B102

Test @ 42" BGS (Elev. 204.00)

Depth BGS	Elevation	Soil Description
0" to 11"	207.50 to 206.58	Topsoil, little root matting (up to 1" diameter roots)
11" to 55"	206.58 to 202.92	Light Brown to Tan Brown v.f. Sandy SILT, dry, very dense
55" to 97"	202.92 to 199.42	Red Brown Silty CLAY with some sand and f. gravel (weathered shale), very dense, dry
97"	199.42	Bucket Refusal - Weathered Shale

97" BGS 199.42) = Machine Refusal Encountered

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B103

Test @ 32" BGS (Elev. 209.43)

Depth BGS	Elevation	Soil Description
0" to 9"	212.10 to 211.35	Topsoil, little root matting
9" to 32"	211.35 to 209.43	Light Brown to Tan Brown f. Sandy SILT, dense, dry
32" to 56"	209.43 to 207.43	Red Brown Silty Clayey SAND with fine to medium gravels & cobbles (weathered shale), very dense, dry
56"	207.43	Bucket Refusal - Weathered Shale

56" BGS 207.43) = Machine Refusal Encountered

B104

Test @ 29" BGS (Elev. 209.88)

Depth BGS	Elevation	Soil Description
0" to 7"	212.30 to 211.72	Topsoil, little root matting
7" to 29"	211.72 to 209.88	Light Brown to Tan Brown f. Sandy SILT, dense, dry
29" to 54"	209.88 to 207.80	Red Brown Silty Clayey SAND with fine to medium gravels (weathered shale), very dense, dry
54"	207.80	Bucket Refusal - Weathered Shale

54" BGS 207.80) = Machine Refusal Encountered

TP #111

Test @ 40" BGS (Elev. 209.07)

Depth BGS	Elevation	Soil Description
0" to 7"	212.40 to 211.82	Topsoil, little root matting
7" to 31"	211.82 to 209.82	Light Brown to Tan Brown f. Sandy SILT, very dense, dry
31" to 80"	209.82 to 205.73	Red Brown Silty Clayey SAND with gravel (weathered shale), very dense, dry
80"	205.73	Bucket Refusal - Weathered Shale

80" BGS 205.73) = Machine Refusal Encountered

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B105

Test @ 26" BGS (Elev. 210.03)

Depth BGS	Elevation	Soil Description
0" to 7"	212.20 to 211.62	Topsoil, little root matting
7" to 31"	211.62 to 209.62	Light Brown to Gray Brown f. Sandy SILT, very dense, dry
31" to 51"	209.62 to 207.95	Red Brown Silty Clayey SAND with gravel and cobbles (weathered shale), very dense, dry
51"	207.95	Bucket Refusal - Weathered Shale

51" BGS 207.95) = Machine Refusal Encountered

B106

Test @ 24" BGS (Elev. 209.80)

Depth BGS	Elevation	Soil Description
0" to 6"	211.80 to 211.30	Topsoil, little root matting
6" to 31"	211.30 to 209.22	Light Brown to Gray Brown f. Sandy SILT, very dense, dry
31" to 48"	209.22 to 207.80	Red Brown Silty Clayey SAND with gravel and cobbles (weathered shale), very dense, dry
48"	207.80	Bucket Refusal - Weathered Shale

48" BGS 207.80) = Machine Refusal Encountered

B107

Test @ 31" BGS (Elev. 208.12)

Depth BGS	Elevation	Soil Description
0" to 9"	210.70 to 209.95	Topsoil, little root matting
9" to 31"	209.95 to 208.12	Light Brown to Gray Brown f. Sandy SILT, very dense, dry
31" to 60"	208.12 to 205.70	Red Brown Silty Clayey SAND with gravel and cobbles (weathered shale), very dense, dry
60"	205.70	Bucket Refusal - Weathered Shale

60" BGS 205.70) = Machine Refusal Encountered

B108

Test @ 65" BGS (Elev. 204.28)

Depth BGS	Elevation	Soil Description
0" to 11"	209.70 to 208.78	Topsoil, little root matting
11" to 65"	208.78 to 204.28	Light Brown to Tan f. Sandy SILT, very dense, dry
65" to 90"	204.28 to 202.20	Red Brown Silty Clayey SAND with some fine to medium grave (weathered shale), very dense, dry
90"	202.20	Bucket Refusal - Weathered Shale

91" BGS 202.12) = Machine Refusal Encountered

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B109

Test @ 66" BGS (Elev. 202.60)

Depth BGS	Elevation	Soil Description
0" to 9"	208.10 to 207.35	Topsoil, little root matting
9" to 66"	207.35 to 202.60	Light Brown to Tan Brown f. Sandy SILT, very dense, dry
66" to 91"	202.60 to 200.52	Red Brown Silty Clayey SAND with few to little gravel (weathered shale), very dense, dry
91"	200.52	Bucket Refusal - Weathered Shale

91" BGS 200.52) = Machine Refusal Encountered

B110

Test @ 60" BGS (Elev. 202.50)

Depth BGS	Elevation	Soil Description
0" to 8"	207.50 to 206.83	Topsoil, little root matting
8" to 72"	206.83 to 201.50	Light Brown to Tan Brown f. Sandy SILT, very dense, dry
72" to 85"	201.50 to 200.42	Red Brown Silty Clayey SAND with some gravel (weathered shale), very dense, dry
85"	200.42	Bucket Refusal - Weathered Shale

85" BGS 200.42) = Machine Refusal Encountered

B111

Test @ 39" BGS (Elev. 202.85)

Depth BGS	Elevation	Soil Description
0" to 6"	206.10 to 205.60	Topsoil, little root matting
6" to 31"	205.60 to 203.52	Light Brown to Tan Brown f. Sandy SILT, very dense, dry
31" to 63"	203.52 to 200.85	Red Brown Silty Clayey SAND with some to few f. gravel (weathered shale), very dense, dry
63"	200.85	Bucket Refusal - Weathered Shale

63" BGS 200.85) = Machine Refusal Encountered

TP #113

Test @ 30" BGS (Elev. 205.25)

Depth BGS	Elevation	Soil Description
0" to 8"	207.75 to 207.08	Topsoil, little root matting
8" to 32"	207.08 to 205.08	Light Brown f. Sandy SILT, very dense, dry
32" to 55"	205.08 to 203.17	Red Brown Silty Clayey SAND with some gravels & cobbles (weatherd shale), very dense, dry
55"	203.17	Bucket Refusal - Weathered Shale

55" BGS 203.17) = Machine Refusal Encountered

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B116

Test @ 47" BGS (Elev. 207.98)

Depth BGS	Elevation	Soil Description
0" to 7"	211.90 to 211.32	Topsoil, little root matting
7" to 49"	211.32 to 207.82	Light Brown to Tan Brown f. Sandy SILT, dense, dry
49" to 71"	207.82 to 205.98	Red Brown Silty Clayey SAND with gravels and cobbles (weathered shale), very dense, dry
71"	205.98	Bucket Refusal - Weathered Shale

71" BGS 205.98) = Machine Refusal Encountered

B117

Test @ 42" BGS (Elev. 207.50)

Depth BGS	Elevation	Soil Description
0" to 6"	211.00 to 210.50	Topsoil, little root matting
6" to 33"	210.50 to 208.25	Brown f. Sandy SILT, dense, dry to damp
33" to 66"	208.25 to 205.50	Red Brown Silty Clayey SAND with gravel (weathered shale), very dense, dry
66"	205.50	Bucket Refusal - Weathered Shale

66" BGS 205.50) = Machine Refusal Encountered

TP #112

Test @ 40" BGS (Elev. 207.17)

Depth BGS	Elevation	Soil Description
0" to 7"	210.50 to 209.96	Topsoil, little root matting
7" to 34"	209.96 to 207.67	Light Brown to Tan Brown f. Sandy SILT, dense, dry
34" to 64"	207.67 to 205.17	Red Brown Silty Clayey SAND with few f. gravels (weathered shale)
64"	205.17	Bucket Refusal - Very Dense soil profile (weathered shale)

64" BGS 205.17) = Machine Refusal Encountered

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B118

Test @ 40" BGS (Elev. 207.07)

Depth BGS	Elevation	Soil Description
0" to 7"	210.40 to 209.82	Topsoil, little root matting
7" to 25"	209.82 to 208.32	Brown f. Sandy SILT, dense, dry to damp
25" to 49"	208.32 to 206.32	Red Brown Silty Clayey SAND with gravel (weathered shale), very dense, dry
49" to 65"	206.32 to 204.98	Red Brown Silty Clayey SAND with gravel (weathered shale), very dense, dry
65"	204.98	Bucket Refusal - Weathered Shale

65" BGS 204.98) = Machine Refusal Encountered

B119

Test @ 40" BGS (Elev. 206.47)

Depth BGS	Elevation	Soil Description
0" to 9"	209.80 to 209.05	Topsoil, little root matting
9" to 35"	209.05 to 206.88	Tan Brown to Light Brown f. Sandy SILT, dense, dry
35" to 85"	206.88 to 202.72	Red Brown Silty Clayey SAND with gravels and cobbles (weathered shale), very dense, dry
85"	202.72	Bucket Refusal - Weathered Shale

85" BGS 202.72) = Machine Refusal Encountered

B120

Test @ 38" BGS (Elev. 206.23)

Depth BGS	Elevation	Soil Description
0" to 8"	209.40 to 208.73	Topsoil, little root matting
8" to 24"	208.73 to 207.40	Light Brown to Red Brown f. Sandy SILT with some to little clay, very dense, dry
24" to 62"	207.40 to 204.23	Red Brown Silty Clayey SAND with gravels and cobbles (weathered shale), very dense, dry
62"	204.23	Bucket Refusal - Weathered Shale

62" BGS 204.23) = Machine Refusal Encountered

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B121

Test @ 23" BGS (Elev. 206.58)

Depth BGS	Elevation	Soil Description
0" to 7"	208.50 to 207.92	Topsoil, little root matting
7" to 27"	207.92 to 206.25	Light Brown to Red Brown f. Sandy SILT, very dense, dry
27" to 47"	206.25 to 204.58	Red Brown Silty Clayey SAND with some gravels (weathered shale), very dense, dry
47"	204.58	Bucket Refusal - Weathered Shale

47" BGS 204.58) = Machine Refusal Encountered

B122

Test @ 37" BGS (Elev. 203.92)

Depth BGS	Elevation	Soil Description
0" to 7"	207.00 to 206.42	Topsoil, little root matting
7" to 37"	206.42 to 203.92	Light Brown to Tan Brown f. Sandy SILT, very dense, dry
37" to 63"	203.92 to 201.75	Red Brown Silty Clayey SAND with gravels, channers (weathered shale), dry, very dense
63"	201.75	Bucket Refusal - Weathered Shale

63" BGS 201.75) = Machine Refusal Encountered

B123

Test @ 39" BGS (Elev. 202.75)

Depth BGS	Elevation	Soil Description
0" to 7"	206.00 to 205.42	Topsoil, little root matting
7" to 42"	205.42 to 202.50	Light Brown to Tan Brown f. Sandy SILT, very dense, dry
42" to 64"	202.50 to 200.67	Red Brown Silty Clayey SAND with some gravel (weathered shale), very dense, dry
64"	200.67	Bucket Refusal - Weathered Shale

64" BGS 200.67) = Machine Refusal Encountered

TP #110

Test @ 13" BGS (Elev. 210.42)

Depth BGS	Elevation	Soil Description
0" to 9"	211.50 to 210.75	Topsoil, little root matting
9" to 17"	210.75 to 210.08	Brown SILT with some f. sand, little clay, damp
17" to 37"	210.08 to 208.42	Red Brown Silty Clayey SAND with gravels and small cobbles (weathered shale), very dense, dry
37"	208.42	Bucket Refusal - Weathered Shale

37" BGS 208.42) = Machine Refusal Encountered

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B113

Test @ 18" BGS (Elev. 210.05)

Depth BGS	Elevation	Soil Description
0" to 5"	211.55 to 211.13	Topsoil, little root matting
5" to 22"	211.13 to 209.72	Light Brown to Tan Brown f. Sandy SILT, dense, dry
22" to 42"	209.72 to 208.05	Red Brown Silty Clayey SAND, very dense, dry
42"	208.05	Bucket Refusal - Weathered Shale

42" BGS 208.05) = Machine Refusal Encountered

B112

Test @ 29" BGS (Elev. 203.38)

Depth BGS	Elevation	Soil Description
0" to 6"	205.80 to 205.30	Topsoil, little root matting
6" to 33"	205.30 to 203.05	Light Brown to Gray Brown f. Sandy SILT, very dense, dry
33" to 53"	203.05 to 201.38	Red Brown Silty SAND with some clay and f. gravel (weathered shale), very dense, dry
53"	201.38	Bucket Refusal - Weathered Shale

53" BGS 201.38) = Machine Refusal Encountered

TP #100

Test @ 32" BGS (Elev. 205.33)

Depth BGS	Elevation	Soil Description
0" to 12"	208.00 to 207.00	Topsoil, little root matting
12" to 32"	207.00 to 205.33	Tan to Light Brown to Gray Brown f. Sandy SILT with little clay, very dense, dry
32" to 56"	205.33 to 203.33	Red Brown Silty CLAYEY sand with some f-m gravel (weathered shale)
56"	203.33	Bucket Refusal - Weathered Shale

56" BGS 203.33) = Machine Refusal Encountered

B124

Test @ 38" BGS (Elev. 204.83)

Depth BGS	Elevation	Soil Description
0" to 8"	208.00 to 207.33	Topsoil, little root matting
8" to 33"	207.33 to 205.25	Light Brown f. Sandy SILT, very dense, dry
33" to 63"	205.25 to 202.75	Red Brown Silty Clayey SAND with some gravels & cobbles (weatherd shale), very dense, dry
63"	202.75	Bucket Refusal - Weathered Shale

63" BGS 202.75) = Machine Refusal Encountered

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TP #103

Test @ 62" BGS (Elev. 211.23)

Depth BGS	Elevation	Soil Description
0" to 6"	216.40 to 215.90	Topsoil, little root matting
6" to 62"	215.90 to 211.23	Light Brown to Gray Brown f. Sandy SILT, very dense, dry
62" to 72"	211.23 to 210.40	Red Brown Silty Clayey SAND, very dense, dry
72"	210.40	Bucket Refusal - Weathered Shale

72" BGS 210.40) = Machine Refusal Encountered

B136

Test @ 20" BGS (Elev. 214.13)

Depth BGS	Elevation	Soil Description
0" to 6"	215.80 to 215.30	Topsoil, little root matting
6" to 33"	215.30 to 213.05	Tan Brown to Orange Brown f. Sandy SILT, very dense, dry
33" to 45"	213.05 to 212.05	Red Brown Silty Clayey SAND, very dense, dry
45"	212.05	Bucket Refusal - Weathered Shale

45" BGS 212.05) = Machine Refusal Encountered

TP #104

Test @ 8" BGS (Elev. 210.53)

Depth BGS	Elevation	Soil Description
0" to 6"	211.20 to 210.70	Topsoil, little root matting
6" to 22"	210.70 to 209.37	Light Brown to Tan Brown Sandy SILT, very dense, dry
22" to 32"	209.37 to 208.53	Red Brown Silty Clayey SAND with gravels and small cobbles (weathered shale), very dense, dry
32"	208.53	Bucket Refusal - Weathered Shale

32" BGS 208.53) = Machine Refusal Encountered

B137

Test @ 27" BGS (Elev. 207.85)

Depth BGS	Elevation	Soil Description
0" to 8"	210.10 to 209.43	Topsoil, little root matting
8" to 40"	209.43 to 206.77	Light Brown to Red Brown to Tan Brown f. Sandy SILT, some silty clayey sand pockets, dry, dense
40" to 51"	206.77 to 205.85	Red Brown Silty Clayey SAND with gravel and cobbles (weathered shale), very dense, dry
51"	205.85	Bucket Refusal - Weathered Shale

51" BGS 205.85) = Machine Refusal Encountered

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B114

Test @ 21" BGS (Elev. 209.75)

Depth BGS	Elevation	Soil Description
0" to 6"	211.50 to 211.00	Topsoil, little root matting
6" to 21"	211.00 to 209.75	Light Brown to Tan Brown f. Sandy SILT, dense, dry
21" to 46"	209.75 to 207.67	Red Brown Silty Clayey SAND with fine to medium gravels & cobbles (weathered shale), very dense, dry
46"	207.67	Bucket Refusal - Weathered Shale

46" BGS 207.67) = Machine Refusal Encountered

B115

Test @ 20" BGS (Elev. 210.83)

Depth BGS	Elevation	Soil Description
0" to 6"	212.50 to 212.04	Topsoil, little root matting
6" to 24"	212.04 to 210.50	Light Brown to Tan Brown f. Sandy SILT, dense, dry, some dense pockets of silt & sand
24" to 44"	210.50 to 208.83	Red Brown Silty Clayey SAND with fine to medium gravels & cobbles (weathered shale), very dense, dry
44"	208.83	Bucket Refusal - Weathered Shale

44" BGS 208.83) = Machine Refusal Encountered

B125

Test @ 55" BGS (Elev. 204.12)

Depth BGS	Elevation	Soil Description
0" to 12"	208.70 to 207.70	Topsoil, little root matting (wet at surface, dry below)
12" to 33"	207.70 to 205.95	Light Brown to Tan Brown f. Sandy SILT, very dense, dry to moist
33" to 79"	205.95 to 202.12	Red Brown Silty Clayey SAND with some to little gravels and cobbles (weathered shale), very dense, dry
79"	202.12	Bucket Refusal - Weathered Shale

79" BGS 202.12) = Machine Refusal Encountered

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TP #127

Test @ 9" BGS (Elev. 209.75)

Depth BGS	Elevation	Soil Description
0" to 5"	210.50 to 210.08	Topsoil, little root matting
5" to 12"	210.08 to 209.50	Brown Sandy SILT with few f. gravel, very dense, dry
12" to 33"	209.50 to 207.75	Red Brown Silty Clayey SAND, very dense, dry
33"	207.75	Bucket Refusal - Weathered Shale

33" BGS 207.75) = Machine Refusal Encountered

B126

Test @ 56" BGS (Elev. 205.93)

Depth BGS	Elevation	Soil Description
0" to 8"	210.60 to 209.93	Topsoil, little root matting
8" to 33"	209.93 to 207.85	Light Brown to tan Brown f. Sandy SILT, very dense, dry
33" to 80"	207.85 to 203.93	Red Brown Silty Clayey SAND with gravel, some cobbles (weathered shale), very dense, dry
80"	203.93	Bucket Refusal - Weathered Shale

80" BGS 203.93) = Machine Refusal Encountered

B127

Test @ 36" BGS (Elev. 204.50)

Depth BGS	Elevation	Soil Description
0" to 6"	207.50 to 207.00	Topsoil, little root matting
6" to 36"	207.00 to 204.50	Tan to Tan Brown f-m Sandy SILT, dry, dense
36" to 62"	204.50 to 202.33	Red Brown Silty Clayye SAND with some gravel and cobbles (weathered shale), very dense, dry
62" to 97"	202.33 to 199.42	Red Brown Silty Clayye SAND with gravel and cobbles (weathered shale), very dense, dry
97"	199.42	Bucket Refusal - Weathered Shale

97" BGS 199.42) = Machine Refusal Encountered

B128

Test @ 24" BGS (Elev. 205.10)

Depth BGS	Elevation	Soil Description
0" to 9"	207.10 to 206.35	Topsoil, little root matting
9" to 56"	206.35 to 202.43	Light Brown to tan Brown f. Sandy SILT, very dense, dry
56" to 96"	202.43 to 199.10	Red Brown Silty Clayey SAND with gravel, some cobbles (weathered shale), very dense, dry

No limiting Zone Encountered

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B132

Test @ 24" BGS (Elev. 202.50)

Depth BGS	Elevation	Soil Description
0" to 16"	204.50 to 203.17	Topsoil, little root matting (up to 1" in diameter)
16" to 58"	203.17 to 199.67	Light Brown to Tan Brown f. Sandy SILT, medium dense, dry
58" to 74"	199.67 to 198.33	Brown Silty SAND with gravel, few to little clay, dry, very dense
74"	198.33	Bucket Refusal - Weathered Shale

74" BGS 198.33) = Machine Refusal Encountered

TP #125

Test @ 76" BGS (Elev. 202.67)

Depth BGS	Elevation	Soil Description
0" to 9"	209.00 to 208.25	Topsoil, little root matting
9" to 83"	208.25 to 202.08	Light Brown to Orange Brown Sandy SILT with few to little f. gravel, dry, dense
83" to 132"	202.08 to 198.00	Red Brown Silty Clayey SAND with few to trace gravels and small cobbles, moist to wet, very dense

100" BGS 200.67) = Machine Refusal Encountered

TP #126

Test @ 54" BGS (Elev. 205.50)

Depth BGS	Elevation	Soil Description
0" to 9"	210.00 to 209.25	Topsoil, little root matting
9" to 38"	209.25 to 206.83	Light Brown to Tan Brown Sandy SILT with some to little f. gravel, dry, dense
38" to 90"	206.83 to 202.50	Gray to Gray Brown to Tan Brown Silty SAND with gravel, little clay (weathered shale), very dense, dry
90"	202.50	Bucket Refusal - Weathered Shale

90" BGS 202.50) = Machine Refusal Encountered

B129

Test @ 16" BGS (Elev. 210.37)

Depth BGS	Elevation	Soil Description
0" to 7"	211.70 to 211.12	Topsoil, little root matting
7" to 21"	211.12 to 209.95	Light Brown to Tan Brown Silty SAND with some f. gravel, dry, dense
21" to 41"	209.95 to 208.28	Light Brown to Gray Silty SAND with gravel and cobbles (weathered slate), very dense, dry
41"	208.28	Bucket Refusal - Weathered Slate

41" BGS 208.28) = Machine Refusal Encountered

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TP #128

Test @ 12" BGS (Elev. 210.60)

Depth BGS	Elevation	Soil Description
0" to 6"	211.60 to 211.10	Topsoil, little root matting
6" to 36"	211.10 to 208.60	Light Brown to Tan Brown Silty SAND with gravel, dry, dense
36" to 55"	208.60 to 207.02	Light Brown to Tan Brown Sandy GRAVEL with silt (weathered shale), very dense, dry
55"	207.02	Bucket Refusal - Weathered Shale

55" BGS 207.02) = Machine Refusal Encountered

B130

Test @ 36" BGS (Elev. 204.00)

Depth BGS	Elevation	Soil Description
0" to 10"	207.00 to 206.17	Topsoil, little root matting
10" to 61"	206.17 to 201.92	Light Brown to tan Brown Sandy SILT with little to trace gravel, dry, dense
61" to 83"	201.92 to 200.08	Light Brown to Tan Brown Silty SAND with gravel and some small cobbles (weathered shale), dry, very dense
83"	200.08	Bucket Refusal - Weathered Shale

83" BGS 200.08) = Machine Refusal Encountered

TP #129

Test @ 39" BGS (Elev. 204.55)

Depth BGS	Elevation	Soil Description
0" to 9"	207.80 to 207.05	Topsoil, little root matting
9" to 48"	207.05 to 203.80	Light Brown to Tan Brown Sandy SILT with some f. gravel, dense, dry
48" to 63"	203.80 to 202.55	Tan to Light Brown Silty SAND with gravel (weathered slate), very dense, dry
63"	202.55	Bucket Refusal - Weathered Slate

63" BGS 202.55) = Machine Refusal Encountered

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B131

Test @ 17" BGS (Elev. 205.58)

Depth BGS	Elevation	Soil Description
0" to 7"	207.00 to 206.42	Topsoil, little root matting
7" to 21"	206.42 to 205.25	Light Brown to Tan Brown f. Sandy SILT, some pokckets of f. gravel, dry, dense
21" to 41"	205.25 to 203.58	Tan Brown to Light Brown Silty SAND with gravel and cobbles (weathered shale), very dense, dry
41"	203.58	Bucket Refusal - Weathered Shale

41" BGS 203.58) = Machine Refusal Encountered

TP #101

Test @ 64" BGS (Elev. 199.47)

Depth BGS	Elevation	Soil Description
0" to 7"	204.80 to 204.22	Topsoil, little root matting
7" to 63"	204.22 to 199.55	Light Brown to Tan Brown Sandy SILT with some to little silty clay pockets, dry, dense
63" to 113"	199.55 to 195.38	Red Brown Silty Clayey SAND, very dense, dry

No limiting zone encountered

TP #102

Test @ 40" BGS (Elev. 202.17)

Depth BGS	Elevation	Soil Description
0" to 7"	205.50 to 204.92	Topsoil, little root matting
7" to 33"	204.92 to 202.75	Light Brown f. Sandy SILT, dry, dense
33" to 87"	202.75 to 198.25	Red Brown Silty Clayey SAND with few gravels (weathered shale), very dense, dry
87" to 108"	198.25	Tan to Tan Brown f. Sandy SILT, very dense, dry

No limiting zone encountered

B133

Test @ 30" BGS (Elev. 205.80)

Depth BGS	Elevation	Soil Description
0" to 5"	208.30 to 207.88	Topsoil, little root matting
5" to 37"	207.88 to 205.22	Light Brown to Tan Brown v.f. Sandy SILT, dry, dense
37" to 49"	205.22 to 204.22	Red Brown Silty Clayey SAND (residual shale material), dry, dense
49" to 62"	204.22 to 203.13	Red Brown Silty Clayey SAND with gravel, few small cobbles (weathered shale), very dense, dry
62"	203.13	Bucket Refusal - Weathered Shale

62" BGS 203.13) = Machine Refusal Encountered

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B134

Test @ 26" BGS (Elev. 207.23)

Depth BGS	Elevation	Soil Description
0" to 10"	209.40 to 208.57	Topsoil, little root matting, moist to wet
10" to 31"	208.57 to 206.82	Light Brown f. Sandy SILT, some clay, moist to wet
31" to 60"	206.82 to 204.40	Gray to Dark Gray Silty SAND with gravel, moist to wet
60"	204.40	Bucket Refusal - Weathered Shale

60" BGS 204.40) = Machine Refusal Encountered

B135

Test @ 33" BGS (Elev. 207.25)

Depth BGS	Elevation	Soil Description
0" to 5"	210.00 to 209.58	Topsoil, little root matting
5" to 27"	209.58 to 207.75	Light Brown to Brown f. Sandy SILT, moist to wet, minor perched water
27" to 47"	207.75 to 206.08	Red Brown Silty Clayey SAND, moist to wet, very dense
47" to 57"	206.08 to 205.25	Gray to Gray Brown Silty Clayye SAND with some gravel (weathered shale)
57"	205.25	Bucket Refusal - Weathered Shale

57" BGS 205.25) = Machine Refusal Encountered

TP #122

Test @ 32" BGS (Elev. 199.83)

Depth BGS	Elevation	Soil Description
0" to 6"	202.50 to 202.00	Topsoil, little root matting
6" to 46"	202.00 to 198.67	Light Brown to Tan Brown v.f. Sandy SILT, little to trace clay, dry, dense
46" to 60"	198.67 to 197.50	Red Brown Silty Clayey SAND, very dense, dry
60"	197.50	Bucket Refusal - Weathered Shale

60" BGS 197.50) = Machine Refusal Encountered

TP #123

Test @ 24" BGS (Elev. 198.50)

Depth BGS	Elevation	Soil Description
0" to 6"	200.50 to 200.00	FILL - Soil & #3 Stone
6" to 16"	200.00 to 199.17	Topsoil, root matting (up to 1" in diameter)
16" to 60"	199.17 to 195.50	Light Brown to Tan Brown v.f. Sandy SILT, dense, dry to damp
60" to 97"	195.50 to 192.42	Red Brown Silty SAND with gravel, some to little clay (weathered shale), very dense, dry
97"	192.42	Bucket Refusal - Weathered Shale

97" BGS 192.42) = Machine Refusal Encountered

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TP #114

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 10"	205.60 to 204.77	Topsoil, little root matting (up to 1" in diameter)
10" to 40"	204.77 to 202.27	Light Brown to Tan Brown f. Sandy SILT, dense, dry
40" to 45"	202.27 to 201.85	Red Brown Silty SAND with gravel, dry, dense
45"	201.85	Bucket Refusal - Weathered Shale

45" BGS 201.85) = Machine Refusal Encountered

TP #115

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 6"	205.00 to 204.50	Topsoil, little root matting (up to 1" in diameter)
6" to 42"	204.50 to 201.50	Light Brown to Tan Brown f. Sandy SILT, dense, dry
42" to 48"	201.50 to 201.00	Red Brown Silty SAND with gravel, dry, dense
48"	201.00	Bucket Refusal - Weathered Shale

48" BGS 201.00) = Machine Refusal Encountered

TP #116

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 6"	202.50 to 202.00	Topsoil, little root matting (up to 1" in diameter)
6" to 63"	202.00 to 197.25	Light Brown to Tan Brown f. Sandy SILT, dense, dry
63" to 69"	197.25 to 196.75	Red Brown Silty SAND with gravel, dry, dense
69"	196.75	Bucket Refusal - Weathered Shale

69" BGS 196.75) = Machine Refusal Encountered

TP #117

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 13"	204.30 to 203.22	Topsoil, little root matting
13" to 53"	203.22 to 199.88	Light Brown to Tan Brown f. Sandy SILT, dense, dry
53" to 58"	199.88 to 199.47	Red Brown Silty SAND with gravel, dry, dense
58"	199.47	Bucket Refusal - Weathered Shale

58" BGS 199.47) = Machine Refusal Encountered

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TP #118

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 12"	202.90 to 201.90	Topsoil, little root matting
12" to 75"	201.90 to 196.65	Light Brown to Tan Brown f. Sandy SILT, few to little clay, dry, medium dense
75" to 108"	196.65 to 193.90	Red Brown to Brown Silty CLAY with some to little sand, very wet, soft

83" BGS 195.98) = Groundwater Encountered

TP #119

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 8"	204.10 to 203.43	Topsoil, little root matting
8" to 51"	203.43 to 199.85	Light Brown f. Sandy SILT wth some to little clay, damp to moist, dense
51" to 82"	199.85 to 197.27	Red Brown Silty Clayey SAND with little to few f. gravel, very dense, dry to moist
82"	197.27	Bucket Refusal - Weathered Shale

82" BGS 197.27) = Machine Refusal Encountered

TP #120

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 7"	203.00 to 202.42	Topsoil, little root matting
7" to 26"	202.42 to 200.83	Light Brown to Tan Brown v.f. Sandy SILT with some clay pockets, dry, dense
26" to 58"	200.83 to 198.17	Red Brown Silty Clayey SAND with some f-m gravel (weatherd shale), very dense, dry
58"	198.17	Bucket Refusal - Weathered Shale

58" BGS 198.17) = Machine Refusal Encountered

TP #121

No Testing Performed

Depth BGS	Elevation	Soil Description
0" to 8"	205.30 to 204.63	Topsoil, little root matting
8" to 32"	204.63 to 202.63	Light Brown to Tan Brown v.f. Sandy SILT, some silty clay pockets, dense, dry to moist
32" to 54"	202.63 to 200.80	Red Brown Silty Clayey SAND, very dense, dry
54"	200.80	Bucket Refusal - Weathered Shale

54" BGS 200.80) = Machine Refusal Encountered

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APPENDIX D

Index Laboratory Test Results

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-105 46"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.09	10.74	1,800	**0.00100**
2	12.09	10.84	1,800	**0.00092**
3	12.09	10.69	1,800	**0.00104**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00099 cm/s

Average K Value = 1.403 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-106 50"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.05	10.71	1,800	**0.00100**
2	12.05	10.81	1,800	**0.00092**
3	12.05	10.76	1,800	**0.00096**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00096 cm/s

Average K Value = 1.359 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-107 64"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.96	11.93	1,800	**0.00002**
2	11.96	11.89	1,800	**0.00005**
3	11.96	11.94	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00003 cm/s

Average K Value = 0.040 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-108 30"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.97	11.81	1,800	**0.00011**
2	11.97	11.85	1,800	**0.00009**
3	11.97	11.78	1,800	**0.00014**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00011 cm/s

Average K Value = 0.158 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-100 42"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	10.45	1,800	**0.00114**
2	11.95	10.55	1,800	**0.00106**
3	11.95	10.50	1,800	**0.00110**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00110 cm/s

Average K Value = 1.553 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
West Chester PA 19382
Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-109 48-85"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	10.19	1,800	**0.00135**
2	11.95	10.32	1,800	**0.00124**
3	11.95	10.24	1,800	**0.00131**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00130 cm/s

Average K Value = 1.842 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-101 19"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	16.51 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	10.68	10.60	1,800	**0.00007**
2	10.68	10.63	1,800	**0.00004**
3	10.68	10.62	1,800	**0.00005**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00005 cm/s

Average K Value = 0.077 Inches Per Hour

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-102 42"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.02	11.75	1,800	**0.00019**
2	12.02	11.84	1,800	**0.00013**
3	12.02	11.80	1,800	**0.00016**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00016 cm/s

Average K Value = 0.225 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-103 32"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.97	1,800	**0.00005**
2	12.04	11.98	1,800	**0.00004**
3	12.04	11.95	1,800	**0.00006**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00005 cm/s

Average K Value = 0.073 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-104 29"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.96	11.95	1,800	**0.00001**
2	11.96	11.95	1,800	**0.00001**
3	11.96	11.95	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.010 Inches Per Hour

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-111 40"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.07	11.82	1,800	**0.00018**
2	12.07	11.85	1,800	**0.00016**
3	12.07	11.83	1,800	**0.00017**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00017 cm/s

Average K Value = 0.238 Inches Per Hour

Ingram Engineering Services, Inc.
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-105 26"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.06	11.47	1,800	**0.00042**
2	12.06	11.45	1,800	**0.00044**
3	12.06	11.50	1,800	**0.00040**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00042 cm/s

Average K Value = 0.599 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/29/20

Sample ID: B-106 24"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.05	11.61	1,800	**0.00031**
2	12.05	11.59	1,800	**0.00033**
3	12.05	11.63	1,800	**0.00030**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00032 cm/s

Average K Value = 0.446 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/29/20

Sample ID: B-107 31"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.06	11.93	1,800	**0.00009**
2	12.06	12.01	1,800	**0.00004**
3	12.06	11.96	1,800	**0.00007**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00007 cm/s

Average K Value = 0.093 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/29/20

Sample ID: B-108 65"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.07	11.46	1,800	**0.00044**
2	12.07	11.59	1,800	**0.00034**
3	12.07	11.51	1,800	**0.00040**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00040 cm/s

Average K Value = 0.560 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-109 66"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.96	11.95	1,800	**0.00001**
2	11.96	11.95	1,800	**0.00001**
3	11.96	11.95	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.010 Inches Per Hour

Ingram Engineering Services, Inc.
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-110 60"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.97	11.97	1,800	**0.00000**
2	11.97	11.96	1,800	**0.00001**
3	11.97	11.97	1,800	**0.00000**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00000 cm/s

Average K Value = 0.003 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-111 39"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.94	1,800	**0.00001**
2	11.95	11.95	1,800	**0.00000**
3	11.95	11.94	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00000 cm/s

Average K Value = 0.007 Inches Per Hour

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-113 30"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.06	12.05	1,800	**0.00001**
2	12.06	12.06	1,800	**0.00000**
3	12.06	12.04	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.010 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-116 47"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.94	1,800	**0.00001**
2	11.95	11.95	1,800	**0.00000**
3	11.95	11.93	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.010 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/29/20

Sample ID: B-117 42"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.85	1,800	**0.00007**
2	11.95	11.75	1,800	**0.00014**
3	11.95	11.80	1,800	**0.00011**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00011 cm/s

Average K Value = 0.152 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-112 40"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.64	1,800	**0.00029**
2	12.04	11.79	1,800	**0.00018**
3	12.04	11.73	1,800	**0.00022**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00023 cm/s

Average K Value = 0.323 Inches Per Hour

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-118 40"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.56	1,800	**0.00028**
2	11.95	11.43	1,800	**0.00038**
3	11.95	11.72	1,800	**0.00016**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00027 cm/s

Average K Value = 0.388 Inches Per Hour

Ingram Engineering Services, Inc.
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-119 40"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	10.49	1,800	**0.00117**
2	12.04	10.71	1,800	**0.00099**
3	12.04	10.57	1,800	**0.00110**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00109 cm/s

Average K Value = 1.541 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-120 38"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	10.98	1,800	**0.00078**
2	12.04	10.64	1,800	**0.00105**
3	12.04	10.72	1,800	**0.00098**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00094 cm/s

Average K Value = 1.328 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-121 23"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.97	11.90	1,800	**0.00005**
2	11.97	11.82	1,800	**0.00011**
3	11.97	11.91	1,800	**0.00004**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00007 cm/s

Average K Value = 0.094 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
West Chester PA 19382
Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-122 37"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.74	1,800	**0.00021**
2	12.04	11.76	1,800	**0.00020**
3	12.04	11.75	1,800	**0.00021**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00021 cm/s

Average K Value = 0.293 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-123 39"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.05	12.03	1,800	**0.00001**
2	12.05	12.02	1,800	**0.00002**
3	12.05	12.04	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.020 Inches Per Hour

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-110 13"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	12.04	1,800	**0.00000**
2	12.04	12.04	1,800	**0.00000**
3	12.04	12.04	1,800	**0.00000**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00000 cm/s

Average K Value = 0.000 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/29/20

Sample ID: B-113 18"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.94	11.83	1,800	**0.00008**
2	11.94	11.77	1,800	**0.00012**
3	11.94	11.80	1,800	**0.00010**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00010 cm/s

Average K Value = 0.142 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-112 29"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.93	1,800	**0.00001**
2	11.95	11.91	1,800	**0.00003**
3	11.95	11.92	1,800	**0.00002**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00002 cm/s

Average K Value = 0.030 Inches Per Hour

Ingram Engineering Services, Inc.
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-100 32"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	15.24	13.62	1,800	**0.00095**
2	15.24	13.51	1,800	**0.00102**
3	15.24	13.64	1,800	**0.00094**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00097 cm/s

Average K Value = 1.375 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-124 38"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.86	1,800	**0.00013**
2	12.04	11.88	1,800	**0.00011**
3	12.04	11.89	1,800	**0.00011**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00012 cm/s

Average K Value = 0.164 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-103 62"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.44	12.43	1,800	**0.00001**
2	12.44	12.42	1,800	**0.00001**
3	12.44	12.43	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.013 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-136 20"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.87	1,800	**0.00012**
2	12.04	12.02	1,800	**0.00001**
3	12.04	11.99	1,800	**0.00004**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00006 cm/s

Average K Value = 0.080 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-104 8"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.96	11.85	1,800	**0.00008**
2	11.96	11.88	1,800	**0.00006**
3	11.96	11.80	1,800	**0.00011**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00008 cm/s

Average K Value = 0.118 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-137 27"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.94	11.90	1,800	**0.00003**
2	11.94	11.92	1,800	**0.00001**
3	11.94	11.89	1,800	**0.00004**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00003 cm/s

Average K Value = 0.037 Inches Per Hour

Ingram Engineering Services, Inc.
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-114 21"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.05	12.00	1,800	**0.00004**
2	12.05	11.85	1,800	**0.00014**
3	12.05	11.95	1,800	**0.00007**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00008 cm/s

Average K Value = 0.117 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-115 20"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.94	11.91	1,800	**0.00002**
2	11.94	11.92	1,800	**0.00001**
3	11.94	11.92	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00002 cm/s

Average K Value = 0.023 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-125 55"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	15.24	14.89	1,800	**0.00020**
2	15.24	14.88	1,800	**0.00020**
3	15.24	14.92	1,800	**0.00018**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00019 cm/s

Average K Value = 0.273 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/29/20

Sample ID: TP-127 9"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.07	11.94	1,800	**0.00009**
2	12.07	11.88	1,800	**0.00013**
3	12.07	11.91	1,800	**0.00011**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00011 cm/s

Average K Value = 0.160 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-126 54"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.85	1,800	**0.00007**
2	11.95	11.84	1,800	**0.00008**
3	11.95	11.85	1,800	**0.00007**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00007 cm/s

Average K Value = 0.104 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/29/20

Sample ID: B-127 36"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.85	1,800	**0.00007**
2	11.95	11.77	1,800	**0.00013**
3	11.95	11.81	1,800	**0.00010**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00010 cm/s

Average K Value = 0.141 Inches Per Hour

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Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-128 24"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	12.02	1,800	**0.00001**
2	12.04	12.00	1,800	**0.00003**
3	12.04	12.03	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00002 cm/s

Average K Value = 0.023 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-132 24"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.96	11.57	1,800	**0.00028**
2	11.96	11.60	1,800	**0.00026**
3	11.96	11.59	1,800	**0.00027**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00027 cm/s

Average K Value = 0.381 Inches Per Hour

Ingram Engineering Services, Inc.
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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-125 76"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.89	1,800	**0.00004**
2	11.95	11.92	1,800	**0.00002**
3	11.95	11.86	1,800	**0.00006**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00004 cm/s

Average K Value = 0.060 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-126 54"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.96	11.93	1,800	**0.00002**
2	11.96	11.95	1,800	**0.00001**
3	11.96	11.94	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.020 Inches Per Hour

Ingram Engineering Services, Inc.
16 Hagerty Blvd. Suite 400
West Chester PA 19382
Office 484-947-5549

Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-129 16"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.92	1,800	**0.00008**
2	12.04	11.84	1,800	**0.00014**
3	12.04	11.88	1,800	**0.00011**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00011 cm/s

Average K Value = 0.161 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-128 12"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	12.04	1,800	**0.00000**
2	12.04	12.04	1,800	**0.00000**
3	12.04	12.04	1,800	**0.00000**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00000 cm/s

Average K Value = 0.000 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-130 36"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.95	11.65	1,800	**0.00022**
2	11.95	11.77	1,800	**0.00013**
3	11.95	11.73	1,800	**0.00016**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00017 cm/s

Average K Value = 0.237 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-129 37"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.08	12.03	1,800	**0.00004**
2	12.08	12.04	1,800	**0.00003**
3	12.08	11.99	1,800	**0.00006**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00004 cm/s

Average K Value = 0.060 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-131 17"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.43	1,800	**0.00044**
2	12.04	11.44	1,800	**0.00043**
3	12.04	11.37	1,800	**0.00048**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00045 cm/s

Average K Value = 0.642 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-101 64"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.01	10.38	1,800	**0.00124**
2	12.01	10.36	1,800	**0.00125**
3	12.01	10.48	1,800	**0.00115**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00121 cm/s

Average K Value = 1.720 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: TP-102 40"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	11.14	1,800	**0.00066**
2	12.04	10.95	1,800	**0.00080**
3	12.04	11.24	1,800	**0.00058**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00068 cm/s

Average K Value = 0.966 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: B-133 30"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.06	11.77	1,800	**0.00021**
2	12.06	11.90	1,800	**0.00011**
3	12.06	11.74	1,800	**0.00023**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00018 cm/s

Average K Value = 0.258 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/29/20

Sample ID: B-134 36"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.94	11.84	1,800	**0.00007**
2	11.94	11.89	1,800	**0.00004**
3	11.94	11.82	1,800	**0.00009**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00006 cm/s

Average K Value = 0.091 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client: Lennar Homes
Project: Hopewell Parke
Location: Hopewell Township, New Jersey

Tested By: G. Urich
Checked By: K. Fischer
Report Date: 9/28/20

Sample ID: B-135 33"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	11.94	11.94	1,800	**0.00000**
2	11.94	11.94	1,800	**0.00000**
3	11.94	11.93	1,800	**0.00001**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00000 cm/s

Average K Value = 0.003 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-122 32"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.04	12.02	1,800	**0.00001**
2	12.04	12.01	1,800	**0.00002**
3	12.04	12.04	1,800	**0.00000**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00001 cm/s

Average K Value = 0.017 Inches Per Hour

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Falling Head Permeability Test Laboratory Report

Client:	Lennar Homes	**Tested By:**	G. Urich
Project:	Hopewell Parke	**Checked By:**	K. Fischer
Location:	Hopewell Township, New Jersey	**Report Date:**	9/28/20

Sample ID: TP-123 24"

Sample Data	
Diameter of Sample Tube:	7.30 cm
Cross-Sectional Area of Sample Tube (**a**) =	41.85 cm^2
Diameter of Sample:	7.30 cm
Cross-Sectional Area of Sample (**A**) =	41.85 cm^2
Length of Sample (**L**):	15.24 cm

Permeability Testing Data

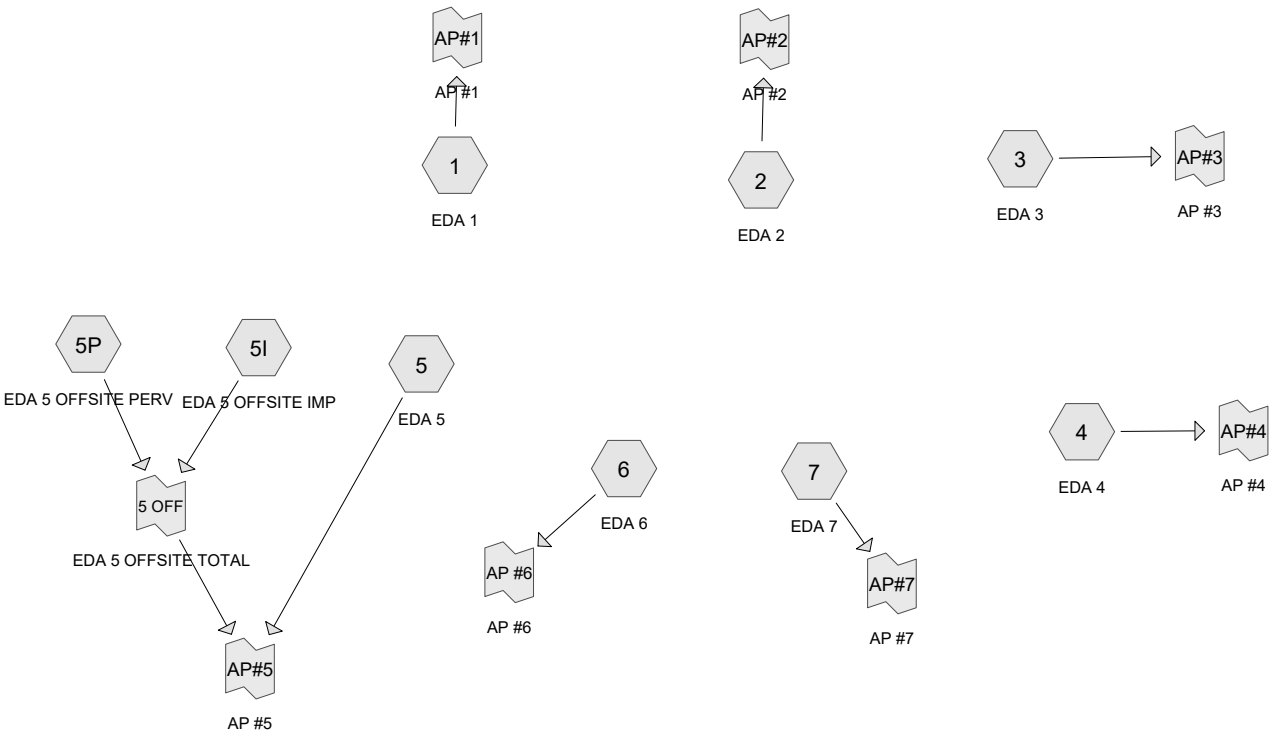
Trial #	Initial Head (cm) (h_1)	Final Head (cm) (h_2)	Elapsed Time (s) (t)	Hydraulic Conductivity (cm/s) (K)
1	12.05	12.04	1,800	**0.00001**
2	12.05	12.02	1,800	**0.00002**
3	12.05	12.02	1,800	**0.00002**

$$K = 2.303 \left(\frac{a * L}{A * t}\right) Log \left(\frac{h_1}{h_2}\right)$$

Average K Value = 0.00002 cm/s

Average K Value = 0.023 Inches Per Hour

APPENDIX
No. 2: TR-55 CALCULATIONS - EXISTING CONDITIONS



Subcat Reach Pond Link

Routing Diagram for 2020-12-01 EDA_080661-Zaitz
Prepared by Bowman Consulting, Printed 1/11/2021
HydroCAD® 10.10-3a s/n 09435 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA 1 Runoff Area=6.670 ac Runoff Depth=0.09"
Flow Length=1,065' Tc=21.4 min CN=75 Runoff=0.78 cfs 0.048 af

Subcatchment2: EDA 2 Runoff Area=2.872 ac Runoff Depth=0.09"
Flow Length=596' Tc=24.9 min CN=75 Runoff=0.32 cfs 0.021 af

Subcatchment3: EDA 3 Runoff Area=5.600 ac Runoff Depth=0.04"
Flow Length=1,439' Tc=31.7 min CN=71 Runoff=0.26 cfs 0.019 af

Subcatchment4: EDA 4 Runoff Area=22.746 ac Runoff Depth=0.03"
Flow Length=1,634' Tc=61.3 min CN=70 Runoff=0.67 cfs 0.063 af

Subcatchment5: EDA 5 Runoff Area=6.855 ac Runoff Depth=0.10"
Flow Length=1,022' Tc=28.3 min CN=76 Runoff=0.85 cfs 0.058 af

Subcatchment5I: EDA 5 OFFSITE IMP Runoff Area=0.228 ac Runoff Depth=1.03"
Flow Length=726' Tc=37.9 min CN=98 Runoff=0.30 cfs 0.020 af

Subcatchment5P: EDA 5 OFFSITE PERV Runoff Area=3.582 ac Runoff Depth=0.00"
Flow Length=726' Tc=37.9 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment6: EDA 6 Runoff Area=2.425 ac Runoff Depth=0.00"
Flow Length=260' Slope=0.0120 '/' Tc=36.8 min CN=59 Runoff=0.00 cfs 0.000 af

Subcatchment7: EDA 7 Runoff Area=2.425 ac Runoff Depth=0.00"
Flow Length=490' Tc=32.0 min UI Adjusted CN=58 Runoff=0.00 cfs 0.000 af

Link 5 OFF: EDA 5 OFFSITE TOTAL Inflow=0.30 cfs 0.020 af
Primary=0.30 cfs 0.020 af

Link AP #6: AP #6 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link AP#1: AP #1 Inflow=0.78 cfs 0.048 af
Primary=0.78 cfs 0.048 af

Link AP#2: AP #2 Inflow=0.32 cfs 0.021 af
Primary=0.32 cfs 0.021 af

Link AP#3: AP #3 Inflow=0.26 cfs 0.019 af
Primary=0.26 cfs 0.019 af

Link AP#4: AP #4 Inflow=0.67 cfs 0.063 af
Primary=0.67 cfs 0.063 af

Link AP#5: AP #5 Inflow=1.14 cfs 0.078 af
Primary=1.14 cfs 0.078 af

Link AP#7: AP #7

Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1: EDA 1

Runoff = 0.78 cfs @ 1.44 hrs, Volume= 0.048 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.391	55	Woods, Good, HSG B
2.446	70	Woods, Good, HSG C
0.192	77	Woods, Good, HSG D
0.013	65	Brush, Good, HSG C
0.687	75	Row crops, SR + CR, Good, HSG B
2.941	82	Row crops, SR + CR, Good, HSG C
6.670	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0310	0.20		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
9.0	915	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	1,065	Total			

Summary for Subcatchment 2: EDA 2

Runoff = 0.32 cfs @ 1.50 hrs, Volume= 0.021 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	55	Woods, Good, HSG B
0.037	70	Woods, Good, HSG C
0.022	65	Brush, Good, HSG C
2.289	75	Row crops, SR + CR, Good, HSG B
0.400	82	Row crops, SR + CR, Good, HSG C
0.014	87	Dirt roads, HSG C
2.872	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	150	0.0090	0.12		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.6	446	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
24.9	596	Total			

Summary for Subcatchment 3: EDA 3

Runoff = 0.26 cfs @ 1.87 hrs, Volume= 0.019 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.024	55	Woods, Good, HSG B
0.405	70	Woods, Good, HSG C
0.109	74	>75% Grass cover, Good, HSG C
4.062	75	Row crops, SR + CR, Good, HSG B
5.600	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	150	0.0100	0.13		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.1	448	0.0130	1.84		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
5.5	532	0.0100	1.61		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
1.1	124	0.0140	1.90		**Shallow Concentrated Flow, SCF 3** Unpaved Kv= 16.1 fps
1.6	185	0.0360	1.88	38.23	**Channel Flow, CHANNEL** Area= 20.3 sf Perim= 10.0' r= 2.03' n= 0.240 Sheet flow over Dense Grass
31.7	1,439	Total			

Summary for Subcatchment 4: EDA 4

Runoff = 0.67 cfs @ 2.25 hrs, Volume= 0.063 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
4.032	55	Woods, Good, HSG B
3.202	70	Woods, Good, HSG C
0.613	48	Brush, Good, HSG B
1.006	65	Brush, Good, HSG C
13.828	75	Row crops, SR + CR, Good, HSG B
0.065	82	Row crops, SR + CR, Good, HSG C
22.746	70	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	150	0.0100	0.06		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
8.8	927	0.0120	1.76		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.0	557	0.0017	0.66		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
61.3	1,634	Total			

Summary for Subcatchment 5: EDA 5

Runoff = 0.85 cfs @ 1.55 hrs, Volume= 0.058 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.080	77	Woods, Good, HSG D
0.202	65	Brush, Good, HSG C
0.079	73	Brush, Good, HSG D
3.586	75	Row crops, SR + CR, Good, HSG B
2.344	82	Row crops, SR + CR, Good, HSG C
0.172	85	Row crops, SR + CR, Good, HSG D
6.855	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	150	0.0280	0.19		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
0.9	105	0.0160	2.04		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.5	767	0.0030	0.88		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
28.3	1,022	Total			

Summary for Subcatchment 5I: EDA 5 OFFSITE IMP

Runoff = 0.30 cfs @ 1.50 hrs, Volume= 0.020 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.228	98	Unconnected pavement, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 5P: EDA 5 OFFSITE PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
3.582	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 6: EDA 6

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.844	55	Woods, Good, HSG B
0.456	70	Woods, Good, HSG C
0.056	65	Brush, Good, HSG C
0.069	75	Row crops, SR + CR, Good, HSG B
2.425	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.8	150	0.0120	0.07		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
1.0	110	0.0120	1.76		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
36.8	260	Total			

Summary for Subcatchment 7: EDA 7

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Adj	Description
1.807	55		Woods, Good, HSG B
0.301	70		Woods, Good, HSG C
0.268	65		Brush, Good, HSG C
0.049	98		Unconnected roofs, HSG C
2.425	59	58	Weighted Average, UI Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	150	0.0190	0.08		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
2.2	340	0.0250	2.55		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
32.0	490	Total			

Summary for Link 5 OFF: EDA 5 OFFSITE TOTAL

Inflow Area = 3.810 ac, Inflow Depth = 0.06" for NJ WQ event
Inflow = 0.30 cfs @ 1.50 hrs, Volume= 0.020 af
Primary = 0.30 cfs @ 1.50 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP #6: AP #6

Inflow Area = 2.425 ac, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 6.670 ac, Inflow Depth = 0.09" for NJ WQ event
Inflow = 0.78 cfs @ 1.44 hrs, Volume= 0.048 af
Primary = 0.78 cfs @ 1.44 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 2.872 ac, Inflow Depth = 0.09" for NJ WQ event
Inflow = 0.32 cfs @ 1.50 hrs, Volume= 0.021 af
Primary = 0.32 cfs @ 1.50 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#3: AP #3

Inflow Area = 5.600 ac, Inflow Depth = 0.04" for NJ WQ event
Inflow = 0.26 cfs @ 1.87 hrs, Volume= 0.019 af
Primary = 0.26 cfs @ 1.87 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#4: AP #4

Inflow Area = 22.746 ac, Inflow Depth = 0.03" for NJ WQ event
Inflow = 0.67 cfs @ 2.25 hrs, Volume= 0.063 af
Primary = 0.67 cfs @ 2.25 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#5: AP #5

Inflow Area = 10.665 ac, Inflow Depth = 0.09" for NJ WQ event
Inflow = 1.14 cfs @ 1.53 hrs, Volume= 0.078 af
Primary = 1.14 cfs @ 1.53 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#7: AP #7

Inflow Area = 2.425 ac, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA 1 Runoff Area=6.670 ac Runoff Depth>1.16"
Flow Length=1,065' Tc=21.4 min CN=75 Runoff=6.12 cfs 0.645 af

Subcatchment2: EDA 2 Runoff Area=2.872 ac Runoff Depth>1.16"
Flow Length=596' Tc=24.9 min CN=75 Runoff=2.45 cfs 0.278 af

Subcatchment3: EDA 3 Runoff Area=5.600 ac Runoff Depth>0.93"
Flow Length=1,439' Tc=31.7 min CN=71 Runoff=3.26 cfs 0.436 af

Subcatchment4: EDA 4 Runoff Area=22.746 ac Runoff Depth>0.87"
Flow Length=1,634' Tc=61.3 min CN=70 Runoff=8.46 cfs 1.655 af

Subcatchment5: EDA 5 Runoff Area=6.855 ac Runoff Depth>1.22"
Flow Length=1,022' Tc=28.3 min CN=76 Runoff=5.81 cfs 0.696 af

Subcatchment5I: EDA 5 OFFSITE IMP Runoff Area=0.228 ac Runoff Depth>3.06"
Flow Length=726' Tc=37.9 min CN=98 Runoff=0.39 cfs 0.058 af

Subcatchment5P: EDA 5 OFFSITE PERV Runoff Area=3.582 ac Runoff Depth>0.48"
Flow Length=726' Tc=37.9 min CN=61 Runoff=0.75 cfs 0.144 af

Subcatchment6: EDA 6 Runoff Area=2.425 ac Runoff Depth>0.41"
Flow Length=260' Slope=0.0120 '/' Tc=36.8 min CN=59 Runoff=0.40 cfs 0.082 af

Subcatchment7: EDA 7 Runoff Area=2.425 ac Runoff Depth>0.37"
Flow Length=490' Tc=32.0 min UI Adjusted CN=58 Runoff=0.36 cfs 0.076 af

Link 5 OFF: EDA 5 OFFSITE TOTAL Inflow=1.11 cfs 0.202 af
Primary=1.11 cfs 0.202 af

Link AP #6: AP #6 Inflow=0.40 cfs 0.082 af
Primary=0.40 cfs 0.082 af

Link AP#1: AP #1 Inflow=6.12 cfs 0.645 af
Primary=6.12 cfs 0.645 af

Link AP#2: AP #2 Inflow=2.45 cfs 0.278 af
Primary=2.45 cfs 0.278 af

Link AP#3: AP #3 Inflow=3.26 cfs 0.436 af
Primary=3.26 cfs 0.436 af

Link AP#4: AP #4 Inflow=8.46 cfs 1.655 af
Primary=8.46 cfs 1.655 af

Link AP#5: AP #5 Inflow=6.71 cfs 0.898 af
Primary=6.71 cfs 0.898 af

Link AP#7: AP #7

Inflow=0.36 cfs 0.076 af
Primary=0.36 cfs 0.076 af

Summary for Subcatchment 1: EDA 1

Runoff = 6.12 cfs @ 12.33 hrs, Volume= 0.645 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.391	55	Woods, Good, HSG B
2.446	70	Woods, Good, HSG C
0.192	77	Woods, Good, HSG D
0.013	65	Brush, Good, HSG C
0.687	75	Row crops, SR + CR, Good, HSG B
2.941	82	Row crops, SR + CR, Good, HSG C
6.670	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0310	0.20		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
9.0	915	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	1,065	Total			

Summary for Subcatchment 2: EDA 2

Runoff = 2.45 cfs @ 12.38 hrs, Volume= 0.278 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.110	55	Woods, Good, HSG B
0.037	70	Woods, Good, HSG C
0.022	65	Brush, Good, HSG C
2.289	75	Row crops, SR + CR, Good, HSG B
0.400	82	Row crops, SR + CR, Good, HSG C
0.014	87	Dirt roads, HSG C
2.872	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	150	0.0090	0.12		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.6	446	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
24.9	596	Total			

Summary for Subcatchment 3: EDA 3

Runoff = 3.26 cfs @ 12.49 hrs, Volume= 0.436 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
1.024	55	Woods, Good, HSG B
0.405	70	Woods, Good, HSG C
0.109	74	>75% Grass cover, Good, HSG C
4.062	75	Row crops, SR + CR, Good, HSG B
5.600	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	150	0.0100	0.13		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.1	448	0.0130	1.84		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
5.5	532	0.0100	1.61		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
1.1	124	0.0140	1.90		**Shallow Concentrated Flow, SCF 3** Unpaved Kv= 16.1 fps
1.6	185	0.0360	1.88	38.23	**Channel Flow, CHANNEL** Area= 20.3 sf Perim= 10.0' r= 2.03' n= 0.240 Sheet flow over Dense Grass
31.7	1,439	Total			

Summary for Subcatchment 4: EDA 4

Runoff = 8.46 cfs @ 12.92 hrs, Volume= 1.655 af, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
4.032	55	Woods, Good, HSG B
3.202	70	Woods, Good, HSG C
0.613	48	Brush, Good, HSG B
1.006	65	Brush, Good, HSG C
13.828	75	Row crops, SR + CR, Good, HSG B
0.065	82	Row crops, SR + CR, Good, HSG C
22.746	70	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	150	0.0100	0.06		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
8.8	927	0.0120	1.76		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.0	557	0.0017	0.66		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
61.3	1,634	Total			

Summary for Subcatchment 5: EDA 5

Runoff = 5.81 cfs @ 12.42 hrs, Volume= 0.696 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.080	77	Woods, Good, HSG D
0.202	65	Brush, Good, HSG C
0.079	73	Brush, Good, HSG D
3.586	75	Row crops, SR + CR, Good, HSG B
2.344	82	Row crops, SR + CR, Good, HSG C
0.172	85	Row crops, SR + CR, Good, HSG D
6.855	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	150	0.0280	0.19		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
0.9	105	0.0160	2.04		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.5	767	0.0030	0.88		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
28.3	1,022	Total			

Summary for Subcatchment 5I: EDA 5 OFFSITE IMP

Runoff = 0.39 cfs @ 12.50 hrs, Volume= 0.058 af, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.228	98	Unconnected pavement, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 5P: EDA 5 OFFSITE PERV

Runoff = 0.75 cfs @ 12.67 hrs, Volume= 0.144 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
3.582	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 6: EDA 6

Runoff = 0.40 cfs @ 12.68 hrs, Volume= 0.082 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Description
1.844	55	Woods, Good, HSG B
0.456	70	Woods, Good, HSG C
0.056	65	Brush, Good, HSG C
0.069	75	Row crops, SR + CR, Good, HSG B
2.425	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.8	150	0.0120	0.07		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
1.0	110	0.0120	1.76		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
36.8	260	Total			

Summary for Subcatchment 7: EDA 7

Runoff = 0.36 cfs @ 12.62 hrs, Volume= 0.076 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-Year Rainfall=3.31"

Area (ac)	CN	Adj	Description
1.807	55		Woods, Good, HSG B
0.301	70		Woods, Good, HSG C
0.268	65		Brush, Good, HSG C
0.049	98		Unconnected roofs, HSG C
2.425	59	58	Weighted Average, UI Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	150	0.0190	0.08		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
2.2	340	0.0250	2.55		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
32.0	490	Total			

Summary for Link 5 OFF: EDA 5 OFFSITE TOTAL

Inflow Area = 3.810 ac, Inflow Depth > 0.64" for 2-Year event
Inflow = 1.11 cfs @ 12.61 hrs, Volume= 0.202 af
Primary = 1.11 cfs @ 12.61 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP #6: AP #6

Inflow Area = 2.425 ac, Inflow Depth > 0.41" for 2-Year event
Inflow = 0.40 cfs @ 12.68 hrs, Volume= 0.082 af
Primary = 0.40 cfs @ 12.68 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 6.670 ac, Inflow Depth > 1.16" for 2-Year event
Inflow = 6.12 cfs @ 12.33 hrs, Volume= 0.645 af
Primary = 6.12 cfs @ 12.33 hrs, Volume= 0.645 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 2.872 ac, Inflow Depth > 1.16" for 2-Year event
Inflow = 2.45 cfs @ 12.38 hrs, Volume= 0.278 af
Primary = 2.45 cfs @ 12.38 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#3: AP #3

Inflow Area = 5.600 ac, Inflow Depth > 0.93" for 2-Year event
Inflow = 3.26 cfs @ 12.49 hrs, Volume= 0.436 af
Primary = 3.26 cfs @ 12.49 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#4: AP #4

Inflow Area = 22.746 ac, Inflow Depth > 0.87" for 2-Year event
Inflow = 8.46 cfs @ 12.92 hrs, Volume= 1.655 af
Primary = 8.46 cfs @ 12.92 hrs, Volume= 1.655 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#5: AP #5

Inflow Area = 10.665 ac, Inflow Depth > 1.01" for 2-Year event
Inflow = 6.71 cfs @ 12.44 hrs, Volume= 0.898 af
Primary = 6.71 cfs @ 12.44 hrs, Volume= 0.898 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#7: AP #7

Inflow Area = 2.425 ac, Inflow Depth > 0.37" for 2-Year event
Inflow = 0.36 cfs @ 12.62 hrs, Volume= 0.076 af
Primary = 0.36 cfs @ 12.62 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA 1 Runoff Area=6.670 ac Runoff Depth>2.44"
Flow Length=1,065' Tc=21.4 min CN=75 Runoff=13.33 cfs 1.358 af

Subcatchment2: EDA 2 Runoff Area=2.872 ac Runoff Depth>2.44"
Flow Length=596' Tc=24.9 min CN=75 Runoff=5.35 cfs 0.584 af

Subcatchment3: EDA 3 Runoff Area=5.600 ac Runoff Depth>2.10"
Flow Length=1,439' Tc=31.7 min CN=71 Runoff=7.87 cfs 0.982 af

Subcatchment4: EDA 4 Runoff Area=22.746 ac Runoff Depth>2.01"
Flow Length=1,634' Tc=61.3 min CN=70 Runoff=21.04 cfs 3.802 af

Subcatchment5: EDA 5 Runoff Area=6.855 ac Runoff Depth>2.52"
Flow Length=1,022' Tc=28.3 min CN=76 Runoff=12.40 cfs 1.442 af

Subcatchment5I: EDA 5 OFFSITE IMP Runoff Area=0.228 ac Runoff Depth>4.74"
Flow Length=726' Tc=37.9 min CN=98 Runoff=0.59 cfs 0.090 af

Subcatchment5P: EDA 5 OFFSITE PERV Runoff Area=3.582 ac Runoff Depth>1.36"
Flow Length=726' Tc=37.9 min CN=61 Runoff=2.73 cfs 0.405 af

Subcatchment6: EDA 6 Runoff Area=2.425 ac Runoff Depth>1.22"
Flow Length=260' Slope=0.0120 '/' Tc=36.8 min CN=59 Runoff=1.64 cfs 0.247 af

Subcatchment7: EDA 7 Runoff Area=2.425 ac Runoff Depth>1.16"
Flow Length=490' Tc=32.0 min UI Adjusted CN=58 Runoff=1.65 cfs 0.234 af

Link 5 OFF: EDA 5 OFFSITE TOTAL Inflow=3.30 cfs 0.495 af
Primary=3.30 cfs 0.495 af

Link AP #6: AP #6 Inflow=1.64 cfs 0.247 af
Primary=1.64 cfs 0.247 af

Link AP#1: AP #1 Inflow=13.33 cfs 1.358 af
Primary=13.33 cfs 1.358 af

Link AP#2: AP #2 Inflow=5.35 cfs 0.584 af
Primary=5.35 cfs 0.584 af

Link AP#3: AP #3 Inflow=7.87 cfs 0.982 af
Primary=7.87 cfs 0.982 af

Link AP#4: AP #4 Inflow=21.04 cfs 3.802 af
Primary=21.04 cfs 3.802 af

Link AP#5: AP #5 Inflow=15.27 cfs 1.937 af
Primary=15.27 cfs 1.937 af

Link AP#7: AP #7

Inflow=1.65 cfs 0.234 af
Primary=1.65 cfs 0.234 af

Summary for Subcatchment 1: EDA 1

Runoff = 13.33 cfs @ 12.32 hrs, Volume= 1.358 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.391	55	Woods, Good, HSG B
2.446	70	Woods, Good, HSG C
0.192	77	Woods, Good, HSG D
0.013	65	Brush, Good, HSG C
0.687	75	Row crops, SR + CR, Good, HSG B
2.941	82	Row crops, SR + CR, Good, HSG C
6.670	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0310	0.20		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
9.0	915	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	1,065	Total			

Summary for Subcatchment 2: EDA 2

Runoff = 5.35 cfs @ 12.36 hrs, Volume= 0.584 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.110	55	Woods, Good, HSG B
0.037	70	Woods, Good, HSG C
0.022	65	Brush, Good, HSG C
2.289	75	Row crops, SR + CR, Good, HSG B
0.400	82	Row crops, SR + CR, Good, HSG C
0.014	87	Dirt roads, HSG C
2.872	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	150	0.0090	0.12		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.6	446	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
24.9	596	Total			

Summary for Subcatchment 3: EDA 3

Runoff = 7.87 cfs @ 12.46 hrs, Volume= 0.982 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
1.024	55	Woods, Good, HSG B
0.405	70	Woods, Good, HSG C
0.109	74	>75% Grass cover, Good, HSG C
4.062	75	Row crops, SR + CR, Good, HSG B
5.600	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	150	0.0100	0.13		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.1	448	0.0130	1.84		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
5.5	532	0.0100	1.61		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
1.1	124	0.0140	1.90		**Shallow Concentrated Flow, SCF 3** Unpaved Kv= 16.1 fps
1.6	185	0.0360	1.88	38.23	**Channel Flow, CHANNEL** Area= 20.3 sf Perim= 10.0' r= 2.03' n= 0.240 Sheet flow over Dense Grass
31.7	1,439	Total			

Summary for Subcatchment 4: EDA 4

Runoff = 21.04 cfs @ 12.87 hrs, Volume= 3.802 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
4.032	55	Woods, Good, HSG B
3.202	70	Woods, Good, HSG C
0.613	48	Brush, Good, HSG B
1.006	65	Brush, Good, HSG C
13.828	75	Row crops, SR + CR, Good, HSG B
0.065	82	Row crops, SR + CR, Good, HSG C
22.746	70	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	150	0.0100	0.06		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
8.8	927	0.0120	1.76		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.0	557	0.0017	0.66		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
61.3	1,634	Total			

Summary for Subcatchment 5: EDA 5

Runoff = 12.40 cfs @ 12.41 hrs, Volume= 1.442 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.080	77	Woods, Good, HSG D
0.202	65	Brush, Good, HSG C
0.079	73	Brush, Good, HSG D
3.586	75	Row crops, SR + CR, Good, HSG B
2.344	82	Row crops, SR + CR, Good, HSG C
0.172	85	Row crops, SR + CR, Good, HSG D
6.855	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	150	0.0280	0.19		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
0.9	105	0.0160	2.04		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.5	767	0.0030	0.88		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
28.3	1,022	Total			

Summary for Subcatchment 5I: EDA 5 OFFSITE IMP

Runoff = 0.59 cfs @ 12.50 hrs, Volume= 0.090 af, Depth> 4.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.228	98	Unconnected pavement, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 5P: EDA 5 OFFSITE PERV

Runoff = 2.73 cfs @ 12.58 hrs, Volume= 0.405 af, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
3.582	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 6: EDA 6

Runoff = 1.64 cfs @ 12.57 hrs, Volume= 0.247 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Description
1.844	55	Woods, Good, HSG B
0.456	70	Woods, Good, HSG C
0.056	65	Brush, Good, HSG C
0.069	75	Row crops, SR + CR, Good, HSG B
2.425	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.8	150	0.0120	0.07		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
1.0	110	0.0120	1.76		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
36.8	260	Total			

Summary for Subcatchment 7: EDA 7

Runoff = 1.65 cfs @ 12.51 hrs, Volume= 0.234 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-Year Rainfall=5.01"

Area (ac)	CN	Adj	Description
1.807	55		Woods, Good, HSG B
0.301	70		Woods, Good, HSG C
0.268	65		Brush, Good, HSG C
0.049	98		Unconnected roofs, HSG C
2.425	59	58	Weighted Average, UI Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	150	0.0190	0.08		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
2.2	340	0.0250	2.55		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
32.0	490	Total			

Summary for Link 5 OFF: EDA 5 OFFSITE TOTAL

Inflow Area = 3.810 ac, Inflow Depth > 1.56" for 10-Year event
Inflow = 3.30 cfs @ 12.57 hrs, Volume= 0.495 af
Primary = 3.30 cfs @ 12.57 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP #6: AP #6

Inflow Area = 2.425 ac, Inflow Depth > 1.22" for 10-Year event
Inflow = 1.64 cfs @ 12.57 hrs, Volume= 0.247 af
Primary = 1.64 cfs @ 12.57 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 6.670 ac, Inflow Depth > 2.44" for 10-Year event
Inflow = 13.33 cfs @ 12.32 hrs, Volume= 1.358 af
Primary = 13.33 cfs @ 12.32 hrs, Volume= 1.358 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 2.872 ac, Inflow Depth > 2.44" for 10-Year event
Inflow = 5.35 cfs @ 12.36 hrs, Volume= 0.584 af
Primary = 5.35 cfs @ 12.36 hrs, Volume= 0.584 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#3: AP #3

Inflow Area = 5.600 ac, Inflow Depth > 2.10" for 10-Year event
Inflow = 7.87 cfs @ 12.46 hrs, Volume= 0.982 af
Primary = 7.87 cfs @ 12.46 hrs, Volume= 0.982 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#4: AP #4

Inflow Area = 22.746 ac, Inflow Depth > 2.01" for 10-Year event
Inflow = 21.04 cfs @ 12.87 hrs, Volume= 3.802 af
Primary = 21.04 cfs @ 12.87 hrs, Volume= 3.802 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#5: AP #5

Inflow Area = 10.665 ac, Inflow Depth > 2.18" for 10-Year event
Inflow = 15.27 cfs @ 12.43 hrs, Volume= 1.937 af
Primary = 15.27 cfs @ 12.43 hrs, Volume= 1.937 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#7: AP #7

Inflow Area = 2.425 ac, Inflow Depth > 1.16" for 10-Year event
Inflow = 1.65 cfs @ 12.51 hrs, Volume= 0.234 af
Primary = 1.65 cfs @ 12.51 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA 1 Runoff Area=6.670 ac Runoff Depth>3.43"
Flow Length=1,065' Tc=21.4 min CN=75 Runoff=18.74 cfs 1.904 af

Subcatchment2: EDA 2 Runoff Area=2.872 ac Runoff Depth>3.42"
Flow Length=596' Tc=24.9 min CN=75 Runoff=7.52 cfs 0.819 af

Subcatchment3: EDA 3 Runoff Area=5.600 ac Runoff Depth>3.03"
Flow Length=1,439' Tc=31.7 min CN=71 Runoff=11.45 cfs 1.413 af

Subcatchment4: EDA 4 Runoff Area=22.746 ac Runoff Depth>2.91"
Flow Length=1,634' Tc=61.3 min CN=70 Runoff=30.95 cfs 5.509 af

Subcatchment5: EDA 5 Runoff Area=6.855 ac Runoff Depth>3.52"
Flow Length=1,022' Tc=28.3 min CN=76 Runoff=17.31 cfs 2.011 af

Subcatchment5I: EDA 5 OFFSITE IMP Runoff Area=0.228 ac Runoff Depth>5.91"
Flow Length=726' Tc=37.9 min CN=98 Runoff=0.73 cfs 0.112 af

Subcatchment5P: EDA 5 OFFSITE PERV Runoff Area=3.582 ac Runoff Depth>2.11"
Flow Length=726' Tc=37.9 min CN=61 Runoff=4.45 cfs 0.629 af

Subcatchment6: EDA 6 Runoff Area=2.425 ac Runoff Depth>1.94"
Flow Length=260' Slope=0.0120 '/' Tc=36.8 min CN=59 Runoff=2.77 cfs 0.391 af

Subcatchment7: EDA 7 Runoff Area=2.425 ac Runoff Depth>1.86"
Flow Length=490' Tc=32.0 min UI Adjusted CN=58 Runoff=2.83 cfs 0.375 af

Link 5 OFF: EDA 5 OFFSITE TOTAL Inflow=5.17 cfs 0.742 af
Primary=5.17 cfs 0.742 af

Link AP #6: AP #6 Inflow=2.77 cfs 0.391 af
Primary=2.77 cfs 0.391 af

Link AP#1: AP #1 Inflow=18.74 cfs 1.904 af
Primary=18.74 cfs 1.904 af

Link AP#2: AP #2 Inflow=7.52 cfs 0.819 af
Primary=7.52 cfs 0.819 af

Link AP#3: AP #3 Inflow=11.45 cfs 1.413 af
Primary=11.45 cfs 1.413 af

Link AP#4: AP #4 Inflow=30.95 cfs 5.509 af
Primary=30.95 cfs 5.509 af

Link AP#5: AP #5 Inflow=21.89 cfs 2.752 af
Primary=21.89 cfs 2.752 af

Link AP#7: AP #7

Inflow=2.83 cfs 0.375 af
Primary=2.83 cfs 0.375 af

Summary for Subcatchment 1: EDA 1

Runoff = 18.74 cfs @ 12.32 hrs, Volume= 1.904 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.391	55	Woods, Good, HSG B
2.446	70	Woods, Good, HSG C
0.192	77	Woods, Good, HSG D
0.013	65	Brush, Good, HSG C
0.687	75	Row crops, SR + CR, Good, HSG B
2.941	82	Row crops, SR + CR, Good, HSG C
6.670	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0310	0.20		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
9.0	915	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	1,065	Total			

Summary for Subcatchment 2: EDA 2

Runoff = 7.52 cfs @ 12.36 hrs, Volume= 0.819 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.110	55	Woods, Good, HSG B
0.037	70	Woods, Good, HSG C
0.022	65	Brush, Good, HSG C
2.289	75	Row crops, SR + CR, Good, HSG B
0.400	82	Row crops, SR + CR, Good, HSG C
0.014	87	Dirt roads, HSG C
2.872	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	150	0.0090	0.12		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.6	446	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
24.9	596	Total			

Summary for Subcatchment 3: EDA 3

Runoff = 11.45 cfs @ 12.45 hrs, Volume= 1.413 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
1.024	55	Woods, Good, HSG B
0.405	70	Woods, Good, HSG C
0.109	74	>75% Grass cover, Good, HSG C
4.062	75	Row crops, SR + CR, Good, HSG B
5.600	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	150	0.0100	0.13		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.1	448	0.0130	1.84		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
5.5	532	0.0100	1.61		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
1.1	124	0.0140	1.90		**Shallow Concentrated Flow, SCF 3** Unpaved Kv= 16.1 fps
1.6	185	0.0360	1.88	38.23	**Channel Flow, CHANNEL** Area= 20.3 sf Perim= 10.0' r= 2.03' n= 0.240 Sheet flow over Dense Grass
31.7	1,439	Total			

Summary for Subcatchment 4: EDA 4

Runoff = 30.95 cfs @ 12.86 hrs, Volume= 5.509 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
4.032	55	Woods, Good, HSG B
3.202	70	Woods, Good, HSG C
0.613	48	Brush, Good, HSG B
1.006	65	Brush, Good, HSG C
13.828	75	Row crops, SR + CR, Good, HSG B
0.065	82	Row crops, SR + CR, Good, HSG C
22.746	70	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	150	0.0100	0.06		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
8.8	927	0.0120	1.76		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.0	557	0.0017	0.66		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
61.3	1,634	Total			

Summary for Subcatchment 5: EDA 5

Runoff = 17.31 cfs @ 12.40 hrs, Volume= 2.011 af, Depth> 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.080	77	Woods, Good, HSG D
0.202	65	Brush, Good, HSG C
0.079	73	Brush, Good, HSG D
3.586	75	Row crops, SR + CR, Good, HSG B
2.344	82	Row crops, SR + CR, Good, HSG C
0.172	85	Row crops, SR + CR, Good, HSG D
6.855	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	150	0.0280	0.19		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
0.9	105	0.0160	2.04		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.5	767	0.0030	0.88		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
28.3	1,022	Total			

Summary for Subcatchment 5I: EDA 5 OFFSITE IMP

Runoff = 0.73 cfs @ 12.50 hrs, Volume= 0.112 af, Depth> 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.228	98	Unconnected pavement, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 5P: EDA 5 OFFSITE PERV

Runoff = 4.45 cfs @ 12.56 hrs, Volume= 0.629 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
3.582	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 6: EDA 6

Runoff = 2.77 cfs @ 12.55 hrs, Volume= 0.391 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Description
1.844	55	Woods, Good, HSG B
0.456	70	Woods, Good, HSG C
0.056	65	Brush, Good, HSG C
0.069	75	Row crops, SR + CR, Good, HSG B
2.425	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.8	150	0.0120	0.07		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
1.0	110	0.0120	1.76		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
36.8	260	Total			

Summary for Subcatchment 7: EDA 7

Runoff = 2.83 cfs @ 12.49 hrs, Volume= 0.375 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-Year Rainfall=6.19"

Area (ac)	CN	Adj	Description
1.807	55		Woods, Good, HSG B
0.301	70		Woods, Good, HSG C
0.268	65		Brush, Good, HSG C
0.049	98		Unconnected roofs, HSG C
2.425	59	58	Weighted Average, UI Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	150	0.0190	0.08		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
2.2	340	0.0250	2.55		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
32.0	490	Total			

Summary for Link 5 OFF: EDA 5 OFFSITE TOTAL

Inflow Area = 3.810 ac, Inflow Depth > 2.34" for 25-Year event
Inflow = 5.17 cfs @ 12.55 hrs, Volume= 0.742 af
Primary = 5.17 cfs @ 12.55 hrs, Volume= 0.742 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP #6: AP #6

Inflow Area = 2.425 ac, Inflow Depth > 1.94" for 25-Year event
Inflow = 2.77 cfs @ 12.55 hrs, Volume= 0.391 af
Primary = 2.77 cfs @ 12.55 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 6.670 ac, Inflow Depth > 3.43" for 25-Year event
Inflow = 18.74 cfs @ 12.32 hrs, Volume= 1.904 af
Primary = 18.74 cfs @ 12.32 hrs, Volume= 1.904 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 2.872 ac, Inflow Depth > 3.42" for 25-Year event
Inflow = 7.52 cfs @ 12.36 hrs, Volume= 0.819 af
Primary = 7.52 cfs @ 12.36 hrs, Volume= 0.819 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#3: AP #3

Inflow Area = 5.600 ac, Inflow Depth > 3.03" for 25-Year event
Inflow = 11.45 cfs @ 12.45 hrs, Volume= 1.413 af
Primary = 11.45 cfs @ 12.45 hrs, Volume= 1.413 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#4: AP #4

Inflow Area = 22.746 ac, Inflow Depth > 2.91" for 25-Year event
Inflow = 30.95 cfs @ 12.86 hrs, Volume= 5.509 af
Primary = 30.95 cfs @ 12.86 hrs, Volume= 5.509 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#5: AP #5

Inflow Area = 10.665 ac, Inflow Depth > 3.10" for 25-Year event
Inflow = 21.89 cfs @ 12.43 hrs, Volume= 2.752 af
Primary = 21.89 cfs @ 12.43 hrs, Volume= 2.752 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#7: AP #7

Inflow Area = 2.425 ac, Inflow Depth > 1.86" for 25-Year event
Inflow = 2.83 cfs @ 12.49 hrs, Volume= 0.375 af
Primary = 2.83 cfs @ 12.49 hrs, Volume= 0.375 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: EDA 1 Runoff Area=6.670 ac Runoff Depth>5.31"
Flow Length=1,065' Tc=21.4 min CN=75 Runoff=28.90 cfs 2.954 af

Subcatchment2: EDA 2 Runoff Area=2.872 ac Runoff Depth>5.31"
Flow Length=596' Tc=24.9 min CN=75 Runoff=11.60 cfs 1.271 af

Subcatchment3: EDA 3 Runoff Area=5.600 ac Runoff Depth>4.83"
Flow Length=1,439' Tc=31.7 min CN=71 Runoff=18.33 cfs 2.254 af

Subcatchment4: EDA 4 Runoff Area=22.746 ac Runoff Depth>4.68"
Flow Length=1,634' Tc=61.3 min CN=70 Runoff=50.12 cfs 8.863 af

Subcatchment5: EDA 5 Runoff Area=6.855 ac Runoff Depth>5.42"
Flow Length=1,022' Tc=28.3 min CN=76 Runoff=26.50 cfs 3.099 af

Subcatchment5I: EDA 5 OFFSITE IMP Runoff Area=0.228 ac Runoff Depth>8.04"
Flow Length=726' Tc=37.9 min CN=98 Runoff=0.99 cfs 0.153 af

Subcatchment5P: EDA 5 OFFSITE PERV Runoff Area=3.582 ac Runoff Depth>3.66"
Flow Length=726' Tc=37.9 min CN=61 Runoff=7.99 cfs 1.092 af

Subcatchment6: EDA 6 Runoff Area=2.425 ac Runoff Depth>3.43"
Flow Length=260' Slope=0.0120 '/' Tc=36.8 min CN=59 Runoff=5.12 cfs 0.693 af

Subcatchment7: EDA 7 Runoff Area=2.425 ac Runoff Depth>3.32"
Flow Length=490' Tc=32.0 min UI Adjusted CN=58 Runoff=5.31 cfs 0.671 af

Link 5 OFF: EDA 5 OFFSITE TOTAL Inflow=8.97 cfs 1.245 af
Primary=8.97 cfs 1.245 af

Link AP #6: AP #6 Inflow=5.12 cfs 0.693 af
Primary=5.12 cfs 0.693 af

Link AP#1: AP #1 Inflow=28.90 cfs 2.954 af
Primary=28.90 cfs 2.954 af

Link AP#2: AP #2 Inflow=11.60 cfs 1.271 af
Primary=11.60 cfs 1.271 af

Link AP#3: AP #3 Inflow=18.33 cfs 2.254 af
Primary=18.33 cfs 2.254 af

Link AP#4: AP #4 Inflow=50.12 cfs 8.863 af
Primary=50.12 cfs 8.863 af

Link AP#5: AP #5 Inflow=34.61 cfs 4.343 af
Primary=34.61 cfs 4.343 af

Link AP#7: AP #7

Inflow=5.31 cfs 0.671 af
Primary=5.31 cfs 0.671 af

Summary for Subcatchment 1: EDA 1

Runoff = 28.90 cfs @ 12.31 hrs, Volume= 2.954 af, Depth> 5.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.391	55	Woods, Good, HSG B
2.446	70	Woods, Good, HSG C
0.192	77	Woods, Good, HSG D
0.013	65	Brush, Good, HSG C
0.687	75	Row crops, SR + CR, Good, HSG B
2.941	82	Row crops, SR + CR, Good, HSG C
6.670	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	150	0.0310	0.20		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
9.0	915	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	1,065	Total			

Summary for Subcatchment 2: EDA 2

Runoff = 11.60 cfs @ 12.36 hrs, Volume= 1.271 af, Depth> 5.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.110	55	Woods, Good, HSG B
0.037	70	Woods, Good, HSG C
0.022	65	Brush, Good, HSG C
2.289	75	Row crops, SR + CR, Good, HSG B
0.400	82	Row crops, SR + CR, Good, HSG C
0.014	87	Dirt roads, HSG C
2.872	75	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	150	0.0090	0.12		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.6	446	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
24.9	596	Total			

Summary for Subcatchment 3: EDA 3

Runoff = 18.33 cfs @ 12.45 hrs, Volume= 2.254 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
1.024	55	Woods, Good, HSG B
0.405	70	Woods, Good, HSG C
0.109	74	>75% Grass cover, Good, HSG C
4.062	75	Row crops, SR + CR, Good, HSG B
5.600	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	150	0.0100	0.13		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
4.1	448	0.0130	1.84		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
5.5	532	0.0100	1.61		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
1.1	124	0.0140	1.90		**Shallow Concentrated Flow, SCF 3** Unpaved Kv= 16.1 fps
1.6	185	0.0360	1.88	38.23	**Channel Flow, CHANNEL** Area= 20.3 sf Perim= 10.0' r= 2.03' n= 0.240 Sheet flow over Dense Grass
31.7	1,439	Total			

Summary for Subcatchment 4: EDA 4

Runoff = 50.12 cfs @ 12.84 hrs, Volume= 8.863 af, Depth> 4.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
4.032	55	Woods, Good, HSG B
3.202	70	Woods, Good, HSG C
0.613	48	Brush, Good, HSG B
1.006	65	Brush, Good, HSG C
13.828	75	Row crops, SR + CR, Good, HSG B
0.065	82	Row crops, SR + CR, Good, HSG C
22.746	70	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	150	0.0100	0.06		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
8.8	927	0.0120	1.76		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.0	557	0.0017	0.66		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
61.3	1,634	Total			

Summary for Subcatchment 5: EDA 5

Runoff = 26.50 cfs @ 12.40 hrs, Volume= 3.099 af, Depth> 5.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.080	77	Woods, Good, HSG D
0.202	65	Brush, Good, HSG C
0.079	73	Brush, Good, HSG D
3.586	75	Row crops, SR + CR, Good, HSG B
2.344	82	Row crops, SR + CR, Good, HSG C
0.172	85	Row crops, SR + CR, Good, HSG D
6.855	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	150	0.0280	0.19		**Sheet Flow, SHEET FLOW** Cultivated: Residue>20% n= 0.170 P2= 3.31"
0.9	105	0.0160	2.04		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
14.5	767	0.0030	0.88		**Shallow Concentrated Flow, SCF 2** Unpaved Kv= 16.1 fps
28.3	1,022	Total			

Summary for Subcatchment 5I: EDA 5 OFFSITE IMP

Runoff = 0.99 cfs @ 12.50 hrs, Volume= 0.153 af, Depth> 8.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.228	98	Unconnected pavement, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 5P: EDA 5 OFFSITE PERV

Runoff = 7.99 cfs @ 12.54 hrs, Volume= 1.092 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
3.582	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	150	0.0030	0.09		**Sheet Flow, SHEET FLOW** Grass: Short n= 0.150 P2= 3.31"
9.4	576	0.0040	1.02		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
37.9	726	Total			

Summary for Subcatchment 6: EDA 6

Runoff = 5.12 cfs @ 12.53 hrs, Volume= 0.693 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Description
1.844	55	Woods, Good, HSG B
0.456	70	Woods, Good, HSG C
0.056	65	Brush, Good, HSG C
0.069	75	Row crops, SR + CR, Good, HSG B
2.425	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.8	150	0.0120	0.07		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
1.0	110	0.0120	1.76		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
36.8	260	Total			

Summary for Subcatchment 7: EDA 7

Runoff = 5.31 cfs @ 12.47 hrs, Volume= 0.671 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-Year Rainfall=8.33"

Area (ac)	CN	Adj	Description
1.807	55		Woods, Good, HSG B
0.301	70		Woods, Good, HSG C
0.268	65		Brush, Good, HSG C
0.049	98		Unconnected roofs, HSG C
2.425	59	58	Weighted Average, UI Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	150	0.0190	0.08		**Sheet Flow, SHEET FLOW** Woods: Light underbrush n= 0.400 P2= 3.31"
2.2	340	0.0250	2.55		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
32.0	490	Total			

Summary for Link 5 OFF: EDA 5 OFFSITE TOTAL

Inflow Area = 3.810 ac, Inflow Depth > 3.92" for 100-Year event
Inflow = 8.97 cfs @ 12.54 hrs, Volume= 1.245 af
Primary = 8.97 cfs @ 12.54 hrs, Volume= 1.245 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP #6: AP #6

Inflow Area = 2.425 ac, Inflow Depth > 3.43" for 100-Year event
Inflow = 5.12 cfs @ 12.53 hrs, Volume= 0.693 af
Primary = 5.12 cfs @ 12.53 hrs, Volume= 0.693 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 6.670 ac, Inflow Depth > 5.31" for 100-Year event
Inflow = 28.90 cfs @ 12.31 hrs, Volume= 2.954 af
Primary = 28.90 cfs @ 12.31 hrs, Volume= 2.954 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 2.872 ac, Inflow Depth > 5.31" for 100-Year event
Inflow = 11.60 cfs @ 12.36 hrs, Volume= 1.271 af
Primary = 11.60 cfs @ 12.36 hrs, Volume= 1.271 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#3: AP #3

Inflow Area = 5.600 ac, Inflow Depth > 4.83" for 100-Year event
Inflow = 18.33 cfs @ 12.45 hrs, Volume= 2.254 af
Primary = 18.33 cfs @ 12.45 hrs, Volume= 2.254 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#4: AP #4

Inflow Area = 22.746 ac, Inflow Depth > 4.68" for 100-Year event
Inflow = 50.12 cfs @ 12.84 hrs, Volume= 8.863 af
Primary = 50.12 cfs @ 12.84 hrs, Volume= 8.863 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#5: AP #5

Inflow Area = 10.665 ac, Inflow Depth > 4.89" for 100-Year event
Inflow = 34.61 cfs @ 12.42 hrs, Volume= 4.343 af
Primary = 34.61 cfs @ 12.42 hrs, Volume= 4.343 af, Atten= 0%, Lag= 0.0 min

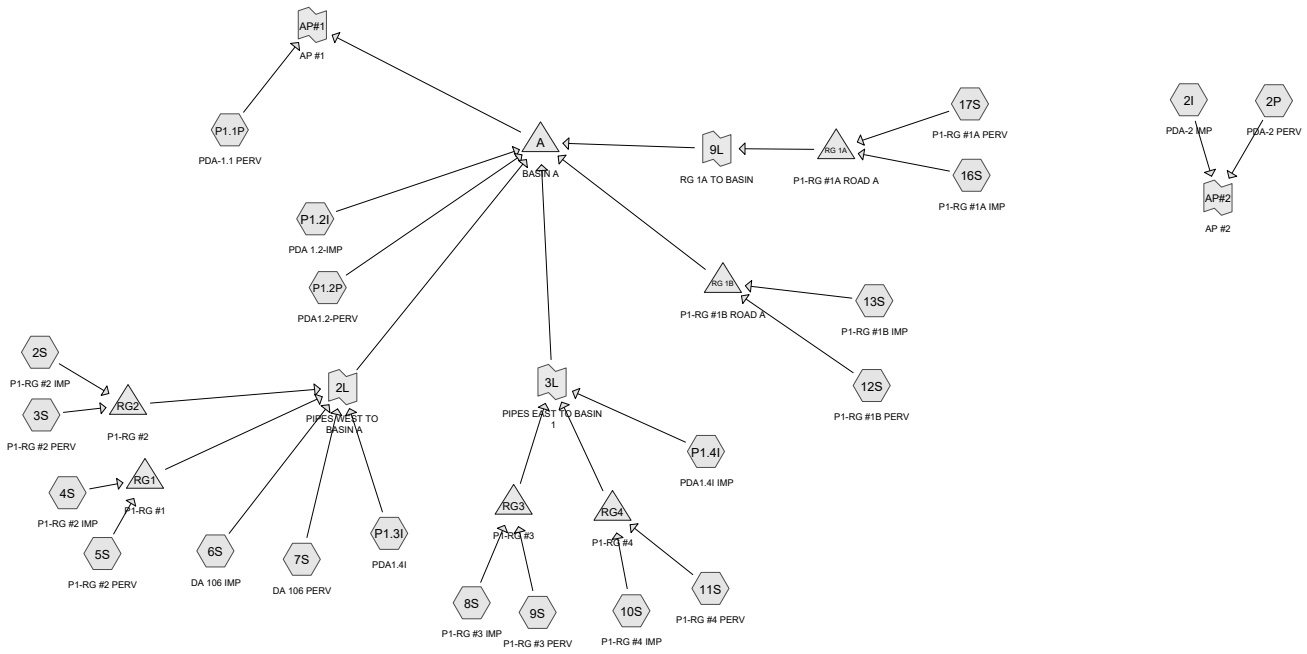
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP#7: AP #7

Inflow Area = 2.425 ac, Inflow Depth > 3.32" for 100-Year event
Inflow = 5.31 cfs @ 12.47 hrs, Volume= 0.671 af
Primary = 5.31 cfs @ 12.47 hrs, Volume= 0.671 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

APPENDIX
No. 3: TR-55 CALCULATIONS - PROPOSED CONDITIONS (no infiltration)



Subcat Reach Pond Link

Routing Diagram for 2020-11-20 PDA TO AP#1-BASIN A_AP#2_080661-Zaitz

Prepared by Bowman Consulting, Printed 1/11/2021

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2I: PDA-2 IMP Runoff Area=0.409 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.035 af

Subcatchment2P: PDA-2 PERV Runoff Area=0.810 ac 0.00% Impervious Runoff Depth=0.04"
Tc=10.0 min CN=71 Runoff=0.05 cfs 0.003 af

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.020 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=63 Runoff=0.00 cfs 0.000 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.46 cfs 0.014 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=66 Runoff=0.00 cfs 0.000 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.017 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.020 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.64 cfs 0.019 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.052 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.023 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=0.03"
Flow Length=963' Tc=21.4 min CN=69 Runoff=0.14 cfs 0.009 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=2.52 cfs 0.075 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=0.03"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=0.07 cfs 0.004 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=6.40 cfs 0.191 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.27 cfs 0.038 af

Pond A: BASIN A Peak Elev=205.20' Storage=14,538 cf Inflow=10.78 cfs 0.334 af
Outflow=0.00 cfs 0.000 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.21' Storage=1,014 cf Inflow=0.78 cfs 0.023 af
Outflow=0.00 cfs 0.000 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.43' Storage=2,253 cf Inflow=1.74 cfs 0.052 af
Outflow=0.00 cfs 0.000 af

Pond RG1: P1-RG #1 Peak Elev=211.05' Storage=605 cf Inflow=0.46 cfs 0.014 af
Outflow=0.00 cfs 0.000 af

Pond RG2: P1-RG #2 Peak Elev=211.01' Storage=843 cf Inflow=0.67 cfs 0.020 af
Outflow=0.02 cfs 0.001 af

Pond RG3: P1-RG #3 Peak Elev=211.46' Storage=685 cf Inflow=0.67 cfs 0.020 af
Outflow=0.13 cfs 0.005 af

Pond RG4: P1-RG #4 Peak Elev=211.46' Storage=682 cf Inflow=0.64 cfs 0.019 af
Outflow=0.09 cfs 0.004 af

Link 2L: PIPES WEST TO BASIN A Inflow=6.98 cfs 0.208 af
Primary=6.98 cfs 0.208 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=1.27 cfs 0.046 af
Primary=1.27 cfs 0.046 af

Link 9L: RG 1A TO BASIN Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link AP#1: AP #1 Inflow=0.14 cfs 0.009 af
Primary=0.14 cfs 0.009 af

Link AP#2: AP #2 Inflow=1.18 cfs 0.038 af
Primary=1.18 cfs 0.038 af

Summary for Subcatchment 2I: PDA-2 IMP

Runoff = 1.18 cfs @ 1.09 hrs, Volume= 0.035 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.126	98	Paved parking, HSG B
0.283	98	Paved parking, HSG C
0.409	98	Weighted Average
0.409		100.00% Impervious Area

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

Summary for Subcatchment 2P: PDA-2 PERV

Runoff = 0.05 cfs @ 1.32 hrs, Volume= 0.003 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.168	61	>75% Grass cover, Good, HSG B
0.642	74	>75% Grass cover, Good, HSG C
0.810	71	Weighted Average
0.810		100.00% Pervious Area

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

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.00 cfs @ 1.80 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 0.46 cfs @ 1.09 hrs, Volume= 0.014 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.00 cfs @ 1.76 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 0.58 cfs @ 1.09 hrs, Volume= 0.017 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 0.64 cfs @ 1.09 hrs, Volume= 0.019 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 1.74 cfs @ 1.09 hrs, Volume= 0.052 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 0.78 cfs @ 1.09 hrs, Volume= 0.023 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 0.14 cfs @ 1.84 hrs, Volume= 0.009 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 2.52 cfs @ 1.09 hrs, Volume= 0.075 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 0.07 cfs @ 1.83 hrs, Volume= 0.004 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3l: PDA1.4l

Runoff = 6.40 cfs @ 1.09 hrs, Volume= 0.191 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4l: PDA1.4l IMP

Runoff = 1.27 cfs @ 1.09 hrs, Volume= 0.038 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 0.49" for NJ WQ event
Inflow = 10.78 cfs @ 1.09 hrs, Volume= 0.334 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 205.20' @ 3.85 hrs Surf.Area= 21,932 sf Storage= 14,538 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.50' (Free Discharge)
- **1=Orifice/Grate** (Controls 0.00 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 0.93" for NJ WQ event
Inflow = 0.78 cfs @ 1.09 hrs, Volume= 0.023 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.21' @ 2.40 hrs Surf.Area= 1,652 sf Storage= 1,014 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=205.60' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG 1B: P1-RG #1B ROAD A

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 0.80" for NJ WQ event
Inflow = 1.74 cfs @ 1.09 hrs, Volume= 0.052 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.43' @ 2.40 hrs Surf.Area= 3,007 sf Storage= 2,253 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.68' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 0.60" for NJ WQ event
Inflow = 0.46 cfs @ 1.09 hrs, Volume= 0.014 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 211.05' @ 2.40 hrs Surf.Area= 956 sf Storage= 605 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.42' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 0.79" for NJ WQ event
Inflow = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af
Outflow = 0.02 cfs @ 1.96 hrs, Volume= 0.001 af, Atten= 96%, Lag= 51.9 min
Primary = 0.02 cfs @ 1.96 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.01' @ 1.96 hrs Surf.Area= 934 sf Storage= 843 cf

Plug-Flow detention time= 86.8 min calculated for 0.001 af (3% of inflow)
Center-of-Mass det. time= 50.8 min (121.1 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 1.96 hrs HW=211.01' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.28 fps)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 0.82" for NJ WQ event
Inflow = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af
Outflow = 0.13 cfs @ 1.37 hrs, Volume= 0.005 af, Atten= 81%, Lag= 16.7 min
Primary = 0.13 cfs @ 1.37 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.46' @ 1.35 hrs Surf.Area= 757 sf Storage= 685 cf

Plug-Flow detention time= 45.2 min calculated for 0.005 af (23% of inflow)
Center-of-Mass det. time= 27.2 min (97.5 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 1.37 hrs HW=211.46' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.51 fps)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 0.81" for NJ WQ event
Inflow = 0.64 cfs @ 1.09 hrs, Volume= 0.019 af
Outflow = 0.09 cfs @ 1.47 hrs, Volume= 0.004 af, Atten= 86%, Lag= 22.6 min
Primary = 0.09 cfs @ 1.47 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.46' @ 1.45 hrs Surf.Area= 756 sf Storage= 682 cf

Plug-Flow detention time= 51.0 min calculated for 0.004 af (19% of inflow)
Center-of-Mass det. time= 30.2 min (100.5 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 1.47 hrs HW=211.46' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.09 cfs @ 0.46 fps)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 0.76" for NJ WQ event
Inflow = 6.98 cfs @ 1.09 hrs, Volume= 0.208 af
Primary = 6.98 cfs @ 1.09 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 0.55" for NJ WQ event
Inflow = 1.27 cfs @ 1.09 hrs, Volume= 0.046 af
Primary = 1.27 cfs @ 1.09 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth = 0.01" for NJ WQ event
Inflow = 0.14 cfs @ 1.84 hrs, Volume= 0.009 af
Primary = 0.14 cfs @ 1.84 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 1.219 ac, 33.55% Impervious, Inflow Depth = 0.37" for NJ WQ event
Inflow = 1.18 cfs @ 1.09 hrs, Volume= 0.038 af
Primary = 1.18 cfs @ 1.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2I: PDA-2 IMP Runoff Area=0.409 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.105 af

Subcatchment2P: PDA-2 PERV Runoff Area=0.810 ac 0.00% Impervious Runoff Depth=0.94"
Tc=10.0 min CN=71 Runoff=0.80 cfs 0.064 af

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=63 Runoff=0.04 cfs 0.003 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.54 cfs 0.041 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.70"
Tc=6.0 min CN=66 Runoff=0.10 cfs 0.007 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.68 cfs 0.051 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.14 cfs 0.012 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.75 cfs 0.056 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.007 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=2.04 cfs 0.154 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.92 cfs 0.069 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.01 cfs 0.001 af

Subcatchment P1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=0.84"
Flow Length=963' Tc=21.4 min CN=69 Runoff=2.61 cfs 0.299 af

Subcatchment P1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=2.96 cfs 0.223 af

Subcatchment P1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=0.84"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=1.23 cfs 0.137 af

Subcatchment P1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=7.50 cfs 0.567 af

Subcatchment P1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=1.49 cfs 0.113 af

Pond A: BASIN A Peak Elev=206.88' Storage=56,028 cf Inflow=16.45 cfs 1.387 af
Outflow=0.13 cfs 0.217 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.65' Storage=1,739 cf Inflow=0.93 cfs 0.070 af
Outflow=0.37 cfs 0.033 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.81' Storage=3,417 cf Inflow=2.12 cfs 0.161 af
Outflow=1.50 cfs 0.092 af

Pond RG1: P1-RG #1 Peak Elev=211.48' Storage=1,017 cf Inflow=0.64 cfs 0.048 af
Outflow=0.47 cfs 0.026 af

Pond RG2: P1-RG #2 Peak Elev=211.09' Storage=919 cf Inflow=0.82 cfs 0.062 af
Outflow=0.80 cfs 0.043 af

Pond RG3: P1-RG #3 Peak Elev=211.53' Storage=734 cf Inflow=0.81 cfs 0.061 af
Outflow=0.79 cfs 0.046 af

Pond RG4: P1-RG #4 Peak Elev=211.53' Storage=732 cf Inflow=0.77 cfs 0.059 af
Outflow=0.76 cfs 0.044 af

Link 2L: PIPES WEST TO BASIN A Inflow=9.05 cfs 0.699 af
Primary=9.05 cfs 0.699 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=3.03 cfs 0.202 af
Primary=3.03 cfs 0.202 af

Link 9L: RG 1A TO BASIN Inflow=0.37 cfs 0.033 af
Primary=0.37 cfs 0.033 af

Link AP#1: AP #1 Inflow=2.61 cfs 0.516 af
Primary=2.61 cfs 0.516 af

Link AP#2: AP #2 Inflow=2.09 cfs 0.169 af
Primary=2.09 cfs 0.169 af

Summary for Subcatchment 2I: PDA-2 IMP

Runoff = 1.39 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.126	98	Paved parking, HSG B
0.283	98	Paved parking, HSG C
0.409	98	Weighted Average
0.409		100.00% Impervious Area

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

Summary for Subcatchment 2P: PDA-2 PERV

Runoff = 0.80 cfs @ 12.19 hrs, Volume= 0.064 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.168	61	>75% Grass cover, Good, HSG B
0.642	74	>75% Grass cover, Good, HSG C
0.810	71	Weighted Average
0.810		100.00% Pervious Area

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

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 0.78 cfs @ 12.13 hrs, Volume= 0.059 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.04 cfs @ 12.15 hrs, Volume= 0.003 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 0.54 cfs @ 12.13 hrs, Volume= 0.041 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 0.051 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 0.14 cfs @ 12.15 hrs, Volume= 0.012 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 0.78 cfs @ 12.13 hrs, Volume= 0.059 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.056 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.08 cfs @ 12.15 hrs, Volume= 0.007 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 2.04 cfs @ 12.13 hrs, Volume= 0.154 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 0.92 cfs @ 12.13 hrs, Volume= 0.069 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 2.61 cfs @ 12.35 hrs, Volume= 0.299 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 2.96 cfs @ 12.13 hrs, Volume= 0.223 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 1.23 cfs @ 12.33 hrs, Volume= 0.137 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3I: PDA1.4I

Runoff = 7.50 cfs @ 12.13 hrs, Volume= 0.567 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4I: PDA1.4I IMP

Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.113 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 2.03" for 2-yr event
Inflow = 16.45 cfs @ 12.14 hrs, Volume= 1.387 af
Outflow = 0.13 cfs @ 24.13 hrs, Volume= 0.217 af, Atten= 99%, Lag= 719.2 min
Primary = 0.13 cfs @ 24.13 hrs, Volume= 0.217 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.88' @ 24.13 hrs Surf.Area= 27,585 sf Storage= 56,028 cf

Plug-Flow detention time= 970.2 min calculated for 0.217 af (16% of inflow)
Center-of-Mass det. time= 702.1 min (1,496.7 - 794.6)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.13 cfs @ 24.13 hrs HW=206.88' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.13 cfs @ 3.80 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 2.82" for 2-yr event
Inflow = 0.93 cfs @ 12.13 hrs, Volume= 0.070 af
Outflow = 0.37 cfs @ 12.29 hrs, Volume= 0.033 af, Atten= 61%, Lag= 10.0 min
Primary = 0.37 cfs @ 12.29 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.65' @ 12.29 hrs Surf.Area= 1,673 sf Storage= 1,739 cf

Plug-Flow detention time= 285.2 min calculated for 0.033 af (46% of inflow)
Center-of-Mass det. time= 148.5 min (908.1 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.36 cfs @ 12.29 hrs HW=206.65' (Free Discharge)
- **1=Orifice/Grate** (Weir Controls 0.36 cfs @ 0.74 fps)

Summary for Pond RG 1B: P1-RG #1B ROAD A

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 2.48" for 2-yr event
Inflow = 2.12 cfs @ 12.13 hrs, Volume= 0.161 af
Outflow = 1.50 cfs @ 12.21 hrs, Volume= 0.092 af, Atten= 29%, Lag= 4.9 min
Primary = 1.50 cfs @ 12.21 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.81' @ 12.21 hrs Surf.Area= 3,110 sf Storage= 3,417 cf

Plug-Flow detention time= 235.8 min calculated for 0.092 af (57% of inflow)
Center-of-Mass det. time= 118.9 min (882.9 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.45 cfs @ 12.21 hrs HW=210.81' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.45 cfs @ 1.18 fps)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 2.06" for 2-yr event
Inflow = 0.64 cfs @ 12.13 hrs, Volume= 0.048 af
Outflow = 0.47 cfs @ 12.22 hrs, Volume= 0.026 af, Atten= 27%, Lag= 5.3 min
Primary = 0.47 cfs @ 12.22 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.48' @ 12.22 hrs Surf.Area= 964 sf Storage= 1,017 cf

Plug-Flow detention time= 247.7 min calculated for 0.026 af (54% of inflow)
Center-of-Mass det. time= 122.9 min (899.5 - 776.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 12.22 hrs HW=211.48' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.41 cfs @ 0.77 fps)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 2.49" for 2-yr event
Inflow = 0.82 cfs @ 12.13 hrs, Volume= 0.062 af
Outflow = 0.80 cfs @ 12.15 hrs, Volume= 0.043 af, Atten= 3%, Lag= 1.1 min
Primary = 0.80 cfs @ 12.15 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.09' @ 12.15 hrs Surf.Area= 950 sf Storage= 919 cf

Plug-Flow detention time= 185.2 min calculated for 0.043 af (69% of inflow)
Center-of-Mass det. time= 85.9 min (850.6 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.79 cfs @ 12.15 hrs HW=211.09' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.79 cfs @ 0.97 fps)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 2.54" for 2-yr event
Inflow = 0.81 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.79 cfs @ 12.14 hrs, Volume= 0.046 af, Atten= 2%, Lag= 1.0 min
Primary = 0.79 cfs @ 12.14 hrs, Volume= 0.046 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.53' @ 12.14 hrs Surf.Area= 768 sf Storage= 734 cf

Plug-Flow detention time= 164.0 min calculated for 0.046 af (75% of inflow)
Center-of-Mass det. time= 74.4 min (837.5 - 763.2)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.78 cfs @ 12.14 hrs HW=211.53' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 0.78 cfs @ 0.96 fps)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 2.52" for 2-yr event
Inflow = 0.77 cfs @ 12.13 hrs, Volume= 0.059 af
Outflow = 0.76 cfs @ 12.14 hrs, Volume= 0.044 af, Atten= 2%, Lag= 1.0 min
Primary = 0.76 cfs @ 12.14 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.53' @ 12.14 hrs Surf.Area= 768 sf Storage= 732 cf

Plug-Flow detention time= 168.7 min calculated for 0.044 af (74% of inflow)
Center-of-Mass det. time= 76.4 min (839.8 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.75 cfs @ 12.14 hrs HW=211.52' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 0.75 cfs @ 0.95 fps)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 2.55" for 2-yr event
Inflow = 9.05 cfs @ 12.13 hrs, Volume= 0.699 af
Primary = 9.05 cfs @ 12.13 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 2.41" for 2-yr event
Inflow = 3.03 cfs @ 12.14 hrs, Volume= 0.202 af
Primary = 3.03 cfs @ 12.14 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 1.30" for 2-yr event
Inflow = 0.37 cfs @ 12.29 hrs, Volume= 0.033 af
Primary = 0.37 cfs @ 12.29 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth > 0.50" for 2-yr event
Inflow = 2.61 cfs @ 12.35 hrs, Volume= 0.516 af
Primary = 2.61 cfs @ 12.35 hrs, Volume= 0.516 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 1.219 ac, 33.55% Impervious, Inflow Depth = 1.66" for 2-yr event
Inflow = 2.09 cfs @ 12.14 hrs, Volume= 0.169 af
Primary = 2.09 cfs @ 12.14 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2I: PDA-2 IMP Runoff Area=0.409 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=2.10 cfs 0.161 af

Subcatchment2P: PDA-2 PERV Runoff Area=0.810 ac 0.00% Impervious Runoff Depth=2.09"
Tc=10.0 min CN=71 Runoff=1.86 cfs 0.141 af

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.091 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=63 Runoff=0.13 cfs 0.009 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.063 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=66 Runoff=0.26 cfs 0.017 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.03 cfs 0.079 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.49 cfs 0.034 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.091 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.10 cfs 0.007 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.13 cfs 0.087 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.10 cfs 0.007 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.30 cfs 0.020 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=3.08 cfs 0.237 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.106 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.003 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=1.94"
Flow Length=963' Tc=21.4 min CN=69 Runoff=6.56 cfs 0.687 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=4.47 cfs 0.344 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=1.94"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=3.09 cfs 0.316 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=11.34 cfs 0.872 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=2.26 cfs 0.174 af

Pond A: BASIN A Peak Elev=207.43' Storage=71,739 cf Inflow=30.28 cfs 2.376 af
Outflow=1.65 cfs 1.090 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.73' Storage=1,862 cf Inflow=1.43 cfs 0.110 af
Outflow=1.36 cfs 0.072 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.90' Storage=3,674 cf Inflow=3.37 cfs 0.257 af
Outflow=3.06 cfs 0.188 af

Pond RG1: P1-RG #1 Peak Elev=211.53' Storage=1,058 cf Inflow=1.08 cfs 0.080 af
Outflow=1.05 cfs 0.058 af

Pond RG2: P1-RG #2 Peak Elev=211.12' Storage=951 cf Inflow=1.31 cfs 0.099 af
Outflow=1.28 cfs 0.080 af

Pond RG3: P1-RG #3 Peak Elev=211.56' Storage=758 cf Inflow=1.28 cfs 0.097 af
Outflow=1.26 cfs 0.082 af

Pond RG4: P1-RG #4 Peak Elev=211.56' Storage=756 cf Inflow=1.23 cfs 0.094 af
Outflow=1.21 cfs 0.078 af

Link 2L: PIPES WEST TO BASIN A Inflow=15.14 cfs 1.123 af
Primary=15.14 cfs 1.123 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=4.71 cfs 0.334 af
Primary=4.71 cfs 0.334 af

Link 9L: RG 1A TO BASIN Inflow=1.36 cfs 0.072 af
Primary=1.36 cfs 0.072 af

Link AP#1: AP #1 Inflow=6.68 cfs 1.777 af
Primary=6.68 cfs 1.777 af

Link AP#2: AP #2 Inflow=3.82 cfs 0.303 af
Primary=3.82 cfs 0.303 af

Summary for Subcatchment 2I: PDA-2 IMP

Runoff = 2.10 cfs @ 12.13 hrs, Volume= 0.161 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.126	98	Paved parking, HSG B
0.283	98	Paved parking, HSG C
0.409	98	Weighted Average
0.409		100.00% Impervious Area

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

Summary for Subcatchment 2P: PDA-2 PERV

Runoff = 1.86 cfs @ 12.18 hrs, Volume= 0.141 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.168	61	>75% Grass cover, Good, HSG B
0.642	74	>75% Grass cover, Good, HSG C
0.810	71	Weighted Average
0.810		100.00% Pervious Area

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

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 1.18 cfs @ 12.13 hrs, Volume= 0.091 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.063 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.017 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.079 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 0.49 cfs @ 12.14 hrs, Volume= 0.034 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 1.18 cfs @ 12.13 hrs, Volume= 0.091 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 1.13 cfs @ 12.13 hrs, Volume= 0.087 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.020 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 3.08 cfs @ 12.13 hrs, Volume= 0.237 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 1.39 cfs @ 12.13 hrs, Volume= 0.106 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.05 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 6.56 cfs @ 12.33 hrs, Volume= 0.687 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 4.47 cfs @ 12.13 hrs, Volume= 0.344 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 3.09 cfs @ 12.32 hrs, Volume= 0.316 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3I: PDA1.4I

Runoff = 11.34 cfs @ 12.13 hrs, Volume= 0.872 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4I: PDA1.4I IMP

Runoff = 2.26 cfs @ 12.13 hrs, Volume= 0.174 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 3.47" for 10-yr event
Inflow = 30.28 cfs @ 12.14 hrs, Volume= 2.376 af
Outflow = 1.65 cfs @ 14.00 hrs, Volume= 1.090 af, Atten= 95%, Lag= 111.7 min
Primary = 1.65 cfs @ 14.00 hrs, Volume= 1.090 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 207.43' @ 14.00 hrs Surf.Area= 29,483 sf Storage= 71,739 cf

Plug-Flow detention time= 491.6 min calculated for 1.090 af (46% of inflow)
Center-of-Mass det. time= 355.7 min (1,142.9 - 787.2)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.65 cfs @ 14.00 hrs HW=207.43' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.21 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 1.47 cfs @ 2.14 fps)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 4.40" for 10-yr event
Inflow = 1.43 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.36 cfs @ 12.15 hrs, Volume= 0.072 af, Atten= 5%, Lag= 1.5 min
Primary = 1.36 cfs @ 12.15 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.73' @ 12.15 hrs Surf.Area= 1,702 sf Storage= 1,862 cf

Plug-Flow detention time= 204.7 min calculated for 0.072 af (65% of inflow)
Center-of-Mass det. time= 99.5 min (852.4 - 752.9)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.35 cfs @ 12.15 hrs HW=206.72' (Free Discharge)
- **1=Orifice/Grate** (Weir Controls 1.35 cfs @ 1.16 fps)

Summary for Pond RG 1B: P1-RG #1B ROAD A

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 3.95" for 10-yr event
Inflow = 3.37 cfs @ 12.13 hrs, Volume= 0.257 af
Outflow = 3.06 cfs @ 12.16 hrs, Volume= 0.188 af, Atten= 9%, Lag= 1.9 min
Primary = 3.06 cfs @ 12.16 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.90' @ 12.16 hrs Surf.Area= 3,173 sf Storage= 3,674 cf

Plug-Flow detention time= 181.5 min calculated for 0.188 af (73% of inflow)
Center-of-Mass det. time= 86.5 min (845.5 - 759.0)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.00 cfs @ 12.16 hrs HW=210.89' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 3.00 cfs @ 1.51 fps)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 3.44" for 10-yr event
Inflow = 1.08 cfs @ 12.13 hrs, Volume= 0.080 af
Outflow = 1.05 cfs @ 12.15 hrs, Volume= 0.058 af, Atten= 2%, Lag= 1.0 min
Primary = 1.05 cfs @ 12.15 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.53' @ 12.15 hrs Surf.Area= 970 sf Storage= 1,058 cf

Plug-Flow detention time= 178.0 min calculated for 0.058 af (73% of inflow)
Center-of-Mass det. time= 79.8 min (852.9 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.04 cfs @ 12.15 hrs HW=211.53' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.04 cfs @ 1.06 fps)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 3.98" for 10-yr event
Inflow = 1.31 cfs @ 12.13 hrs, Volume= 0.099 af
Outflow = 1.28 cfs @ 12.14 hrs, Volume= 0.080 af, Atten= 2%, Lag= 1.0 min
Primary = 1.28 cfs @ 12.14 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.12' @ 12.14 hrs Surf.Area= 957 sf Storage= 951 cf

Plug-Flow detention time= 147.9 min calculated for 0.080 af (81% of inflow)
Center-of-Mass det. time= 67.7 min (827.3 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.26 cfs @ 12.14 hrs HW=211.12' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.26 cfs @ 1.13 fps)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 4.03" for 10-yr event
Inflow = 1.28 cfs @ 12.13 hrs, Volume= 0.097 af
Outflow = 1.26 cfs @ 12.14 hrs, Volume= 0.082 af, Atten= 1%, Lag= 0.9 min
Primary = 1.26 cfs @ 12.14 hrs, Volume= 0.082 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.56' @ 12.14 hrs Surf.Area= 774 sf Storage= 758 cf

Plug-Flow detention time= 131.3 min calculated for 0.082 af (84% of inflow)
Center-of-Mass det. time= 60.2 min (818.0 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.23 cfs @ 12.14 hrs HW=211.56' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.23 cfs @ 1.12 fps)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 4.01" for 10-yr event
Inflow = 1.23 cfs @ 12.13 hrs, Volume= 0.094 af
Outflow = 1.21 cfs @ 12.14 hrs, Volume= 0.078 af, Atten= 1%, Lag= 0.9 min
Primary = 1.21 cfs @ 12.14 hrs, Volume= 0.078 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.56' @ 12.14 hrs Surf.Area= 773 sf Storage= 756 cf

Plug-Flow detention time= 134.5 min calculated for 0.078 af (84% of inflow)
Center-of-Mass det. time= 61.6 min (819.8 - 758.2)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.18 cfs @ 12.14 hrs HW=211.55' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.18 cfs @ 1.11 fps)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 4.10" for 10-yr event
Inflow = 15.14 cfs @ 12.13 hrs, Volume= 1.123 af
Primary = 15.14 cfs @ 12.13 hrs, Volume= 1.123 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 3.97" for 10-yr event
Inflow = 4.71 cfs @ 12.13 hrs, Volume= 0.334 af
Primary = 4.71 cfs @ 12.13 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 2.88" for 10-yr event
Inflow = 1.36 cfs @ 12.15 hrs, Volume= 0.072 af
Primary = 1.36 cfs @ 12.15 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth > 1.71" for 10-yr event
Inflow = 6.68 cfs @ 12.33 hrs, Volume= 1.777 af
Primary = 6.68 cfs @ 12.33 hrs, Volume= 1.777 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 1.219 ac, 33.55% Impervious, Inflow Depth = 2.98" for 10-yr event
Inflow = 3.82 cfs @ 12.15 hrs, Volume= 0.303 af
Primary = 3.82 cfs @ 12.15 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2I: PDA-2 IMP Runoff Area=0.409 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=2.58 cfs 0.200 af

Subcatchment2P: PDA-2 PERV Runoff Area=0.810 ac 0.00% Impervious Runoff Depth=2.99"
Tc=10.0 min CN=71 Runoff=2.67 cfs 0.202 af

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=1.45 cfs 0.113 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=2.25"
Tc=6.0 min CN=63 Runoff=0.20 cfs 0.013 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=1.01 cfs 0.078 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=2.52"
Tc=6.0 min CN=66 Runoff=0.39 cfs 0.025 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=1.26 cfs 0.098 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=61 Runoff=0.78 cfs 0.052 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=1.45 cfs 0.113 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.010 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.108 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.010 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=61 Runoff=0.47 cfs 0.031 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=3.79 cfs 0.294 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=1.71 cfs 0.132 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.005 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=2.80"
Flow Length=963' Tc=21.4 min CN=69 Runoff=9.66 cfs 0.993 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=5.50 cfs 0.426 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=2.80"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=4.54 cfs 0.457 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=13.96 cfs 1.081 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=2.78 cfs 0.215 af

Pond A: BASIN A Peak Elev=207.83' Storage=83,981 cf Inflow=38.50 cfs 3.083 af
Outflow=4.02 cfs 1.791 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.75' Storage=1,897 cf Inflow=1.78 cfs 0.137 af
Outflow=1.70 cfs 0.099 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.94' Storage=3,783 cf Inflow=4.26 cfs 0.325 af
Outflow=4.02 cfs 0.256 af

Pond RG1: P1-RG #1 Peak Elev=211.55' Storage=1,078 cf Inflow=1.40 cfs 0.104 af
Outflow=1.37 cfs 0.082 af

Pond RG2: P1-RG #2 Peak Elev=211.14' Storage=970 cf Inflow=1.65 cfs 0.126 af
Outflow=1.62 cfs 0.106 af

Pond RG3: P1-RG #3 Peak Elev=211.58' Storage=774 cf Inflow=1.61 cfs 0.123 af
Outflow=1.59 cfs 0.108 af

Pond RG4: P1-RG #4 Peak Elev=211.58' Storage=771 cf Inflow=1.55 cfs 0.118 af
Outflow=1.53 cfs 0.103 af

Link 2L: PIPES WEST TO BASIN A Inflow=18.95 cfs 1.419 af
Primary=18.95 cfs 1.419 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=5.88 cfs 0.426 af
Primary=5.88 cfs 0.426 af

Link 9L: RG 1A TO BASIN Inflow=1.70 cfs 0.099 af
Primary=1.70 cfs 0.099 af

Link AP#1: AP #1 Inflow=11.34 cfs 2.785 af
Primary=11.34 cfs 2.785 af

Link AP#2: AP #2 Inflow=5.09 cfs 0.402 af
Primary=5.09 cfs 0.402 af

Summary for Subcatchment 2I: PDA-2 IMP

Runoff = 2.58 cfs @ 12.13 hrs, Volume= 0.200 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.126	98	Paved parking, HSG B
0.283	98	Paved parking, HSG C
0.409	98	Weighted Average
0.409		100.00% Impervious Area

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

Summary for Subcatchment 2P: PDA-2 PERV

Runoff = 2.67 cfs @ 12.18 hrs, Volume= 0.202 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.168	61	>75% Grass cover, Good, HSG B
0.642	74	>75% Grass cover, Good, HSG C
0.810	71	Weighted Average
0.810		100.00% Pervious Area

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

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 1.45 cfs @ 12.13 hrs, Volume= 0.113 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.013 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 1.01 cfs @ 12.13 hrs, Volume= 0.078 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.025 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.098 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.052 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 1.45 cfs @ 12.13 hrs, Volume= 0.113 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.010 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 1.39 cfs @ 12.13 hrs, Volume= 0.108 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.010 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.47 cfs @ 12.14 hrs, Volume= 0.031 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 3.79 cfs @ 12.13 hrs, Volume= 0.294 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 1.71 cfs @ 12.13 hrs, Volume= 0.132 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.005 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 9.66 cfs @ 12.32 hrs, Volume= 0.993 af, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 5.50 cfs @ 12.13 hrs, Volume= 0.426 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 4.54 cfs @ 12.31 hrs, Volume= 0.457 af, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3I: PDA1.4I

Runoff = 13.96 cfs @ 12.13 hrs, Volume= 1.081 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4I: PDA1.4I IMP

Runoff = 2.78 cfs @ 12.13 hrs, Volume= 0.215 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 4.51" for 25-yr event
Inflow = 38.50 cfs @ 12.14 hrs, Volume= 3.083 af
Outflow = 4.02 cfs @ 13.11 hrs, Volume= 1.791 af, Atten= 90%, Lag= 58.4 min
Primary = 4.02 cfs @ 13.11 hrs, Volume= 1.791 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 207.83' @ 13.11 hrs Surf.Area= 30,910 sf Storage= 83,981 cf

Plug-Flow detention time= 384.2 min calculated for 1.791 af (58% of inflow)
Center-of-Mass det. time= 268.2 min (1,051.9 - 783.7)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=4.01 cfs @ 13.11 hrs HW=207.83' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.21 cfs @ 6.05 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 3.81 cfs @ 2.98 fps)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 5.49" for 25-yr event
Inflow = 1.78 cfs @ 12.13 hrs, Volume= 0.137 af
Outflow = 1.70 cfs @ 12.15 hrs, Volume= 0.099 af, Atten= 5%, Lag= 1.4 min
Primary = 1.70 cfs @ 12.15 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.75' @ 12.15 hrs Surf.Area= 1,710 sf Storage= 1,897 cf

Plug-Flow detention time= 182.8 min calculated for 0.099 af (72% of inflow)
Center-of-Mass det. time= 87.9 min (837.9 - 750.0)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.70 cfs @ 12.15 hrs HW=206.75' (Free Discharge)
- **1=Orifice/Grate** (Weir Controls 1.70 cfs @ 1.25 fps)

Summary for Pond RG 1B: P1-RG #1B ROAD A

[93] Warning: Storage range exceeded by 0.01'

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 5.00" for 25-yr event
Inflow = 4.26 cfs @ 12.13 hrs, Volume= 0.325 af
Outflow = 4.02 cfs @ 12.15 hrs, Volume= 0.256 af, Atten= 6%, Lag= 1.6 min
Primary = 4.02 cfs @ 12.15 hrs, Volume= 0.256 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.94' @ 12.15 hrs Surf.Area= 3,200 sf Storage= 3,783 cf

Plug-Flow detention time= 161.8 min calculated for 0.256 af (79% of inflow)
Center-of-Mass det. time= 76.9 min (833.7 - 756.8)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.97 cfs @ 12.15 hrs HW=210.94' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 3.97 cfs @ 1.66 fps)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 4.44" for 25-yr event
Inflow = 1.40 cfs @ 12.13 hrs, Volume= 0.104 af
Outflow = 1.37 cfs @ 12.15 hrs, Volume= 0.082 af, Atten= 2%, Lag= 1.0 min
Primary = 1.37 cfs @ 12.15 hrs, Volume= 0.082 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.55' @ 12.15 hrs Surf.Area= 973 sf Storage= 1,078 cf

Plug-Flow detention time= 154.3 min calculated for 0.082 af (79% of inflow)
Center-of-Mass det. time= 68.7 min (839.8 - 771.1)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.35 cfs @ 12.15 hrs HW=211.54' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.35 cfs @ 1.16 fps)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 5.03" for 25-yr event
Inflow = 1.65 cfs @ 12.13 hrs, Volume= 0.126 af
Outflow = 1.62 cfs @ 12.14 hrs, Volume= 0.106 af, Atten= 2%, Lag= 1.0 min
Primary = 1.62 cfs @ 12.14 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.14' @ 12.14 hrs Surf.Area= 961 sf Storage= 970 cf

Plug-Flow detention time= 130.7 min calculated for 0.106 af (85% of inflow)
Center-of-Mass det. time= 60.6 min (817.9 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.59 cfs @ 12.14 hrs HW=211.14' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.59 cfs @ 1.22 fps)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 5.09" for 25-yr event
Inflow = 1.61 cfs @ 12.13 hrs, Volume= 0.123 af
Outflow = 1.59 cfs @ 12.14 hrs, Volume= 0.108 af, Atten= 1%, Lag= 0.8 min
Primary = 1.59 cfs @ 12.14 hrs, Volume= 0.108 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.58' @ 12.14 hrs Surf.Area= 777 sf Storage= 774 cf

Plug-Flow detention time= 115.1 min calculated for 0.108 af (88% of inflow)
Center-of-Mass det. time= 53.7 min (809.2 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.55 cfs @ 12.14 hrs HW=211.58' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.55 cfs @ 1.21 fps)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 5.06" for 25-yr event
Inflow = 1.55 cfs @ 12.13 hrs, Volume= 0.118 af
Outflow = 1.53 cfs @ 12.14 hrs, Volume= 0.103 af, Atten= 1%, Lag= 0.8 min
Primary = 1.53 cfs @ 12.14 hrs, Volume= 0.103 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.58' @ 12.14 hrs Surf.Area= 777 sf Storage= 771 cf

Plug-Flow detention time= 118.5 min calculated for 0.103 af (87% of inflow)
Center-of-Mass det. time= 55.0 min (810.9 - 755.9)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.49 cfs @ 12.14 hrs HW=211.57' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.49 cfs @ 1.20 fps)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 5.18" for 25-yr event
Inflow = 18.95 cfs @ 12.13 hrs, Volume= 1.419 af
Primary = 18.95 cfs @ 12.13 hrs, Volume= 1.419 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 5.06" for 25-yr event
Inflow = 5.88 cfs @ 12.13 hrs, Volume= 0.426 af
Primary = 5.88 cfs @ 12.13 hrs, Volume= 0.426 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 3.98" for 25-yr event
Inflow = 1.70 cfs @ 12.15 hrs, Volume= 0.099 af
Primary = 1.70 cfs @ 12.15 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth > 2.68" for 25-yr event
Inflow = 11.34 cfs @ 12.36 hrs, Volume= 2.785 af
Primary = 11.34 cfs @ 12.36 hrs, Volume= 2.785 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 1.219 ac, 33.55% Impervious, Inflow Depth = 3.96" for 25-yr event
Inflow = 5.09 cfs @ 12.15 hrs, Volume= 0.402 af
Primary = 5.09 cfs @ 12.15 hrs, Volume= 0.402 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2I: PDA-2 IMP Runoff Area=0.409 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=3.45 cfs 0.270 af

Subcatchment2P: PDA-2 PERV Runoff Area=0.810 ac 0.00% Impervious Runoff Depth=4.71"
Tc=10.0 min CN=71 Runoff=4.20 cfs 0.318 af

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.94 cfs 0.152 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=3.79"
Tc=6.0 min CN=63 Runoff=0.34 cfs 0.022 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.35 cfs 0.105 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=66 Runoff=0.63 cfs 0.041 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.69 cfs 0.132 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=1.36 cfs 0.089 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.94 cfs 0.152 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.27 cfs 0.018 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.86 cfs 0.145 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.27 cfs 0.018 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.82 cfs 0.053 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=5.06 cfs 0.396 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=2.28 cfs 0.178 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.14 cfs 0.009 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=4.48"
Flow Length=963' Tc=21.4 min CN=69 Runoff=15.55 cfs 1.589 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=7.35 cfs 0.574 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=4.48"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=7.30 cfs 0.731 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=18.66 cfs 1.457 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=3.71 cfs 0.290 af

Pond A: BASIN A Peak Elev=208.55' Storage=108,083 cf Inflow=53.60 cfs 4.382 af
Outflow=10.46 cfs 3.084 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.78' Storage=1,954 cf Inflow=2.42 cfs 0.187 af
Outflow=2.32 cfs 0.149 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=211.02' Storage=3,783 cf Inflow=5.88 cfs 0.449 af
Outflow=5.95 cfs 0.380 af

Pond RG1: P1-RG #1 Peak Elev=211.58' Storage=1,111 cf Inflow=1.98 cfs 0.147 af
Outflow=1.95 cfs 0.125 af

Pond RG2: P1-RG #2 Peak Elev=211.18' Storage=1,004 cf Inflow=2.28 cfs 0.174 af
Outflow=2.25 cfs 0.155 af

Pond RG3: P1-RG #3 Peak Elev=211.61' Storage=800 cf Inflow=2.21 cfs 0.169 af
Outflow=2.20 cfs 0.154 af

Pond RG4: P1-RG #4 Peak Elev=211.61' Storage=796 cf Inflow=2.13 cfs 0.163 af
Outflow=2.11 cfs 0.148 af

Link 2L: PIPES WEST TO BASIN A Inflow=25.85 cfs 1.957 af
Primary=25.85 cfs 1.957 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=8.00 cfs 0.592 af
Primary=8.00 cfs 0.592 af

Link 9L: RG 1A TO BASIN Inflow=2.32 cfs 0.149 af
Primary=2.32 cfs 0.149 af

Link AP#1: AP #1 Inflow=22.89 cfs 4.673 af
Primary=22.89 cfs 4.673 af

Link AP#2: AP #2 Inflow=7.43 cfs 0.588 af
Primary=7.43 cfs 0.588 af

Summary for Subcatchment 2I: PDA-2 IMP

Runoff = 3.45 cfs @ 12.13 hrs, Volume= 0.270 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.126	98	Paved parking, HSG B
0.283	98	Paved parking, HSG C
0.409	98	Weighted Average
0.409		100.00% Impervious Area

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

Summary for Subcatchment 2P: PDA-2 PERV

Runoff = 4.20 cfs @ 12.18 hrs, Volume= 0.318 af, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.168	61	>75% Grass cover, Good, HSG B
0.642	74	>75% Grass cover, Good, HSG C
0.810	71	Weighted Average
0.810		100.00% Pervious Area

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

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 1.94 cfs @ 12.13 hrs, Volume= 0.152 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.34 cfs @ 12.13 hrs, Volume= 0.022 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 1.35 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.63 cfs @ 12.13 hrs, Volume= 0.041 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.132 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 1.36 cfs @ 12.13 hrs, Volume= 0.089 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 1.94 cfs @ 12.13 hrs, Volume= 0.152 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 1.86 cfs @ 12.13 hrs, Volume= 0.145 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.053 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 5.06 cfs @ 12.13 hrs, Volume= 0.396 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 2.28 cfs @ 12.13 hrs, Volume= 0.178 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.009 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 15.55 cfs @ 12.32 hrs, Volume= 1.589 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 7.35 cfs @ 12.13 hrs, Volume= 0.574 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 7.30 cfs @ 12.30 hrs, Volume= 0.731 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3I: PDA1.4I

Runoff = 18.66 cfs @ 12.13 hrs, Volume= 1.457 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4I: PDA1.4I IMP

Runoff = 3.71 cfs @ 12.13 hrs, Volume= 0.290 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 6.41" for 100-yr event
Inflow = 53.60 cfs @ 12.13 hrs, Volume= 4.382 af
Outflow = 10.46 cfs @ 12.65 hrs, Volume= 3.084 af, Atten= 80%, Lag= 31.2 min
Primary = 10.46 cfs @ 12.65 hrs, Volume= 3.084 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 208.55' @ 12.65 hrs Surf.Area= 37,459 sf Storage= 108,083 cf

Plug-Flow detention time= 303.7 min calculated for 3.084 af (70% of inflow)
Center-of-Mass det. time= 205.7 min (984.4 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=10.40 cfs @ 12.65 hrs HW=208.55' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.25 cfs @ 7.29 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 1.40 cfs @ 0.59 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 8.75 cfs @ 4.07 fps)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 7.48" for 100-yr event
Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.187 af
Outflow = 2.32 cfs @ 12.15 hrs, Volume= 0.149 af, Atten= 4%, Lag= 1.3 min
Primary = 2.32 cfs @ 12.15 hrs, Volume= 0.149 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.78' @ 12.15 hrs Surf.Area= 1,723 sf Storage= 1,954 cf

Plug-Flow detention time= 157.1 min calculated for 0.149 af (80% of inflow)
Center-of-Mass det. time= 76.1 min (822.6 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.31 cfs @ 12.15 hrs HW=206.78' (Free Discharge)
- **1=Orifice/Grate** (Weir Controls 2.31 cfs @ 1.38 fps)

Summary for Pond RG 1B: P1-RG #1B ROAD A

[93] Warning: Storage range exceeded by 0.09'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 6.91" for 100-yr event
Inflow = 5.88 cfs @ 12.13 hrs, Volume= 0.449 af
Outflow = 5.95 cfs @ 12.12 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.0 min
Primary = 5.95 cfs @ 12.12 hrs, Volume= 0.380 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.02' @ 12.12 hrs Surf.Area= 3,200 sf Storage= 3,783 cf

Plug-Flow detention time= 136.4 min calculated for 0.380 af (85% of inflow)
Center-of-Mass det. time= 65.8 min (819.8 - 754.0)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.65 cfs @ 12.12 hrs HW=211.00' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 5.65 cfs @ 1.86 fps)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 6.29" for 100-yr event
Inflow = 1.98 cfs @ 12.13 hrs, Volume= 0.147 af
Outflow = 1.95 cfs @ 12.14 hrs, Volume= 0.125 af, Atten= 2%, Lag= 0.9 min
Primary = 1.95 cfs @ 12.14 hrs, Volume= 0.125 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.58' @ 12.14 hrs Surf.Area= 977 sf Storage= 1,111 cf

Plug-Flow detention time= 126.6 min calculated for 0.125 af (85% of inflow)
Center-of-Mass det. time= 57.2 min (825.2 - 768.0)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.92 cfs @ 12.14 hrs HW=211.58' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.92 cfs @ 1.30 fps)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 6.95" for 100-yr event
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.174 af
Outflow = 2.25 cfs @ 12.14 hrs, Volume= 0.155 af, Atten= 1%, Lag= 0.9 min
Primary = 2.25 cfs @ 12.14 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.18' @ 12.14 hrs Surf.Area= 967 sf Storage= 1,004 cf

Plug-Flow detention time= 107.8 min calculated for 0.155 af (89% of inflow)
Center-of-Mass det. time= 51.2 min (805.6 - 754.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.20 cfs @ 12.14 hrs HW=211.17' (Free Discharge)
1=Orifice/Grate (Weir Controls 2.20 cfs @ 1.36 fps)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 7.01" for 100-yr event
Inflow = 2.21 cfs @ 12.13 hrs, Volume= 0.169 af
Outflow = 2.20 cfs @ 12.14 hrs, Volume= 0.154 af, Atten= 1%, Lag= 0.8 min
Primary = 2.20 cfs @ 12.14 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.61' @ 12.14 hrs Surf.Area= 783 sf Storage= 800 cf

Plug-Flow detention time= 93.4 min calculated for 0.154 af (91% of inflow)
Center-of-Mass det. time= 44.9 min (797.5 - 752.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.14 cfs @ 12.14 hrs HW=211.61' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 2.14 cfs @ 1.35 fps)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 6.98" for 100-yr event
Inflow = 2.13 cfs @ 12.13 hrs, Volume= 0.163 af
Outflow = 2.11 cfs @ 12.14 hrs, Volume= 0.148 af, Atten= 1%, Lag= 0.8 min
Primary = 2.11 cfs @ 12.14 hrs, Volume= 0.148 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.61' @ 12.14 hrs Surf.Area= 783 sf Storage= 796 cf

Plug-Flow detention time= 96.0 min calculated for 0.147 af (90% of inflow)
Center-of-Mass det. time= 46.1 min (799.1 - 753.0)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.06 cfs @ 12.14 hrs HW=211.61' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.06 cfs @ 1.33 fps)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 7.14" for 100-yr event
Inflow = 25.85 cfs @ 12.13 hrs, Volume= 1.957 af
Primary = 25.85 cfs @ 12.13 hrs, Volume= 1.957 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 7.03" for 100-yr event
Inflow = 8.00 cfs @ 12.13 hrs, Volume= 0.592 af
Primary = 8.00 cfs @ 12.13 hrs, Volume= 0.592 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 5.96" for 100-yr event
Inflow = 2.32 cfs @ 12.15 hrs, Volume= 0.149 af
Primary = 2.32 cfs @ 12.15 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

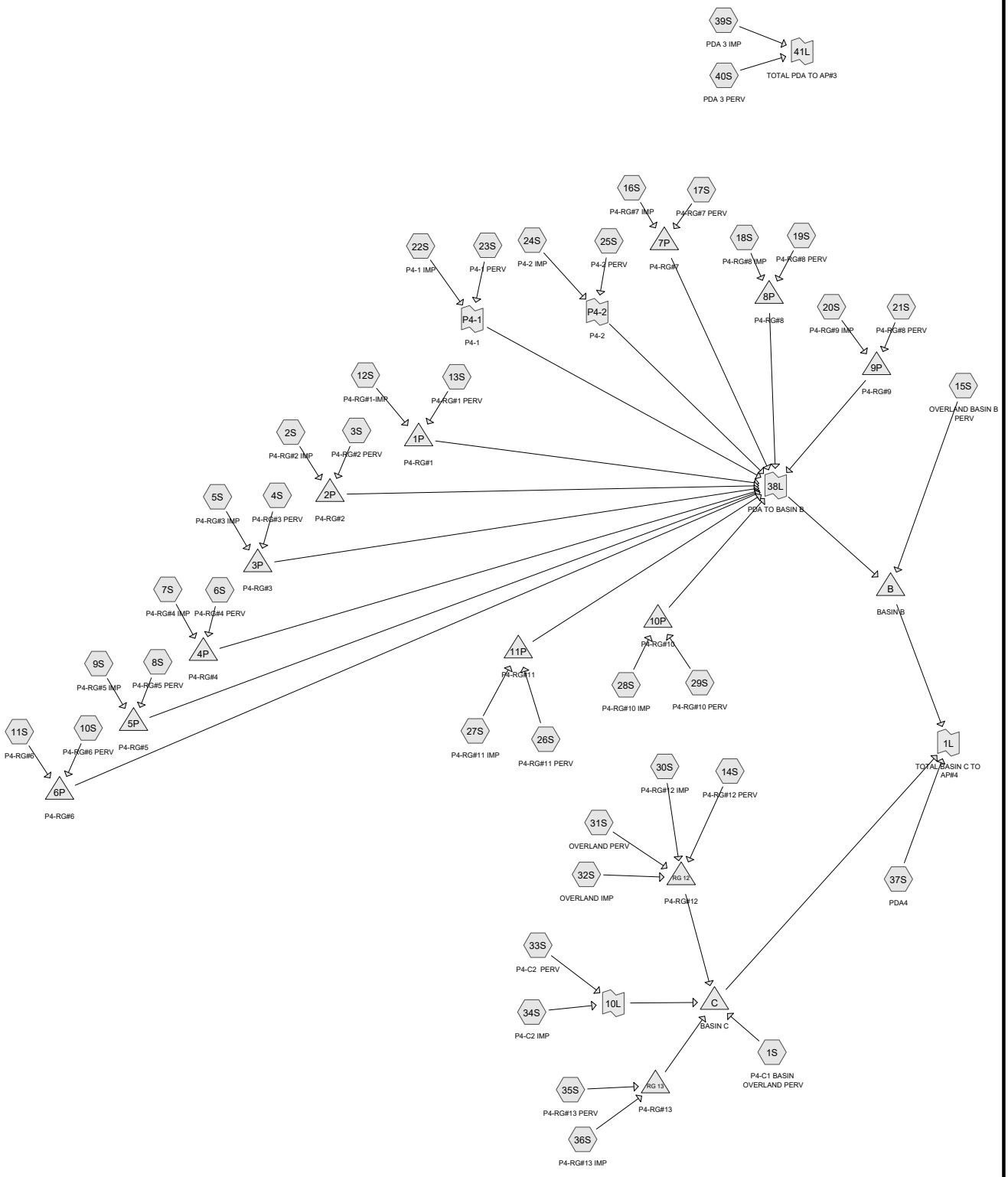
Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth > 4.50" for 100-yr event
Inflow = 22.89 cfs @ 12.34 hrs, Volume= 4.673 af
Primary = 22.89 cfs @ 12.34 hrs, Volume= 4.673 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#2: AP #2

Inflow Area = 1.219 ac, 33.55% Impervious, Inflow Depth = 5.78" for 100-yr event
Inflow = 7.43 cfs @ 12.15 hrs, Volume= 0.588 af
Primary = 7.43 cfs @ 12.15 hrs, Volume= 0.588 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs



Routing Diagram for 2020-11-20 PDA TO AP#4-BASIN B-C_AP#3_080661-Zaitz

Prepared by Bowman Consulting, Printed 1/11/2021

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.017 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=68 Runoff=0.00 cfs 0.000 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.029 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=64 Runoff=0.00 cfs 0.000 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.19 cfs 0.035 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.55 cfs 0.016 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=98 Runoff=1.85 cfs 0.049 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.87 cfs 0.026 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=55 Runoff=0.00 cfs 0.000 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.84 cfs 0.025 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.85 cfs 0.055 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.011 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=4.08 cfs 0.122 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=64 Runoff=0.03 cfs 0.001 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.97 cfs 0.059 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=98 Runoff=2.57 cfs 0.068 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=98 Runoff=1.27 cfs 0.034 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=2.17 cfs 0.065 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.009 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth=0.03"
Tc=16.1 min CN=69 Runoff=0.07 cfs 0.004 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth=1.03"
Tc=16.1 min CN=98 Runoff=3.35 cfs 0.135 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=198' Tc=13.8 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.53 cfs 0.046 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=710' Tc=43.3 min CN=68 Runoff=0.10 cfs 0.007 af

Subcatchment39S: PDA 3 IMP Runoff Area=0.568 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.64 cfs 0.049 af

Subcatchment40S: PDA 3 PERV Runoff Area=1.982 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=62 Runoff=0.00 cfs 0.000 af

Pond 1P: P4-RG#1 Peak Elev=208.67' Storage=1,006 cf Inflow=0.87 cfs 0.026 af
Outflow=0.09 cfs 0.003 af

Pond 2P: P4-RG#2 Peak Elev=208.51' Storage=417 cf Inflow=0.58 cfs 0.017 af
Outflow=0.45 cfs 0.008 af

Pond 3P: P4-RG#3 Peak Elev=209.21' Storage=263 cf Inflow=0.98 cfs 0.029 af
Outflow=1.10 cfs 0.024 af

Pond 4P: P4-RG#4 Peak Elev=208.57' Storage=235 cf Inflow=1.19 cfs 0.035 af
Outflow=1.26 cfs 0.031 af

Pond 5P: P4-RG#5 Peak Elev=213.37' Storage=605 cf Inflow=0.55 cfs 0.016 af
Outflow=0.07 cfs 0.003 af

Pond 6P: P4-RG#6 Peak Elev=213.92' Storage=745 cf Inflow=1.85 cfs 0.049 af
Outflow=2.03 cfs 0.035 af

Pond 7P: P4-RG#7 Peak Elev=210.36' Storage=908 cf Inflow=0.84 cfs 0.025 af
Outflow=0.11 cfs 0.005 af

Pond 8P: P4-RG#8 Peak Elev=209.83' Storage=2,404 cf Inflow=1.85 cfs 0.055 af
Outflow=0.00 cfs 0.000 af

Pond 9P: P4-RG#9 Peak Elev=209.92' Storage=488 cf Inflow=0.38 cfs 0.011 af
Outflow=0.00 cfs 0.000 af

Pond 10P: P4-RG#10 Peak Elev=206.96' Storage=388 cf Inflow=1.27 cfs 0.034 af
Outflow=1.50 cfs 0.026 af

Pond 11P: P4-RG#11 Peak Elev=208.15' Storage=2,296 cf Inflow=2.57 cfs 0.068 af
Outflow=0.43 cfs 0.018 af

Pond B: BASIN B	Peak Elev=202.13' Storage=14,333 cf	Inflow=10.40 cfs 0.334 af Outflow=0.13 cfs 0.060 af
Pond C: BASIN C	Peak Elev=201.71' Storage=8,936 cf	Inflow=5.05 cfs 0.208 af Outflow=0.05 cfs 0.047 af
Pond RG 12: P4-RG#12	Peak Elev=206.22' Storage=293 cf	Inflow=2.49 cfs 0.074 af Outflow=2.50 cfs 0.069 af
Pond RG 13: P4-RG#13	Peak Elev=204.75' Storage=0.046 af	Inflow=1.53 cfs 0.046 af Outflow=0.00 cfs 0.000 af
Link 1L: TOTAL BASIN C TO AP#4		Inflow=0.29 cfs 0.115 af Primary=0.29 cfs 0.115 af
Link 10L:		Inflow=3.36 cfs 0.140 af Primary=3.36 cfs 0.140 af
Link 38L: PDA TO BASIN B		Inflow=10.40 cfs 0.334 af Primary=10.40 cfs 0.334 af
Link 41L: TOTAL PDA TO AP#3		Inflow=1.64 cfs 0.049 af Primary=1.64 cfs 0.049 af
Link P4-1: P4-1		Inflow=4.08 cfs 0.122 af Primary=4.08 cfs 0.122 af
Link P4-2: P4-2		Inflow=1.97 cfs 0.059 af Primary=1.97 cfs 0.059 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 0.58 cfs @ 1.09 hrs, Volume= 0.017 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.00 cfs @ 1.75 hrs, Volume= 0.000 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 0.98 cfs @ 1.09 hrs, Volume= 0.029 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.00 cfs @ 1.78 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 1.19 cfs @ 1.09 hrs, Volume= 0.035 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 0.55 cfs @ 1.09 hrs, Volume= 0.016 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.85 cfs @ 1.03 hrs, Volume= 0.049 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 0.87 cfs @ 1.09 hrs, Volume= 0.026 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 0.84 cfs @ 1.09 hrs, Volume= 0.025 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 1.85 cfs @ 1.09 hrs, Volume= 0.055 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.38 cfs @ 1.09 hrs, Volume= 0.011 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 4.08 cfs @ 1.09 hrs, Volume= 0.122 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 0.03 cfs @ 1.78 hrs, Volume= 0.001 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 1.97 cfs @ 1.09 hrs, Volume= 0.059 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.57 cfs @ 1.03 hrs, Volume= 0.068 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.27 cfs @ 1.03 hrs, Volume= 0.034 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 2.17 cfs @ 1.09 hrs, Volume= 0.065 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.32 cfs @ 1.09 hrs, Volume= 0.009 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 0.07 cfs @ 1.80 hrs, Volume= 0.004 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 3.35 cfs @ 1.22 hrs, Volume= 0.135 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 1.53 cfs @ 1.09 hrs, Volume= 0.046 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 0.10 cfs @ 2.11 hrs, Volume= 0.007 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Subcatchment 39S: PDA 3 IMP

Runoff = 1.64 cfs @ 1.09 hrs, Volume= 0.049 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.568	98	Paved parking, HSG B
0.568		100.00% Impervious Area

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

Summary for Subcatchment 40S: PDA 3 PERV

Runoff = 0.00 cfs @ 2.03 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.646	55	Woods, Good, HSG B
0.406	70	Woods, Good, HSG C
0.820	61	>75% Grass cover, Good, HSG B
0.110	74	>75% Grass cover, Good, HSG C
1.982	62	Weighted Average
1.982		100.00% Pervious Area

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

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth = 0.65" for NJ WQ event
Inflow = 0.87 cfs @ 1.09 hrs, Volume= 0.026 af
Outflow = 0.09 cfs @ 1.65 hrs, Volume= 0.003 af, Atten= 89%, Lag= 33.3 min
Primary = 0.09 cfs @ 1.65 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.67' @ 1.65 hrs Surf.Area= 1,184 sf Storage= 1,006 cf

Plug-Flow detention time= 62.5 min calculated for 0.003 af (13% of inflow)
Center-of-Mass det. time= 38.0 min (108.3 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 1.65 hrs HW=208.67' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.09 cfs @ 0.47 fps)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth = 0.80" for NJ WQ event
Inflow = 0.58 cfs @ 1.09 hrs, Volume= 0.017 af
Outflow = 0.45 cfs @ 1.20 hrs, Volume= 0.008 af, Atten= 22%, Lag= 6.2 min
Primary = 0.45 cfs @ 1.20 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.51' @ 1.20 hrs Surf.Area= 508 sf Storage= 417 cf

Plug-Flow detention time= 25.5 min calculated for 0.008 af (48% of inflow)
Center-of-Mass det. time= 13.6 min (83.9 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.44 cfs @ 1.20 hrs HW=208.51' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.44 cfs @ 0.79 fps)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth = 0.84" for NJ WQ event
Inflow = 0.98 cfs @ 1.09 hrs, Volume= 0.029 af
Outflow = 1.10 cfs @ 1.07 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 1.10 cfs @ 1.07 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.21' @ 1.05 hrs Surf.Area= 310 sf Storage= 263 cf

Plug-Flow detention time= 11.3 min calculated for 0.024 af (82% of inflow)
Center-of-Mass det. time= 5.2 min (75.6 - 70.4)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.99 cfs @ 1.07 hrs HW=209.20' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.99 cfs @ 1.04 fps)

Summary for Pond 4P: P4-RG#4

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth = 0.85" for NJ WQ event
Inflow = 1.19 cfs @ 1.09 hrs, Volume= 0.035 af
Outflow = 1.26 cfs @ 1.10 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.5 min
Primary = 1.26 cfs @ 1.10 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.57' @ 1.10 hrs Surf.Area= 259 sf Storage= 235 cf

Plug-Flow detention time= 9.0 min calculated for 0.031 af (87% of inflow)
Center-of-Mass det. time= 4.1 min (74.4 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	161	0	0	161
207.70	183	43	43	187
207.95	204	48	91	212
208.20	226	54	145	238
208.45	248	59	204	265
208.70	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.25 cfs @ 1.10 hrs HW=208.57' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.25 cfs @ 1.13 fps)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth = 0.63" for NJ WQ event
Inflow = 0.55 cfs @ 1.09 hrs, Volume= 0.016 af
Outflow = 0.07 cfs @ 1.53 hrs, Volume= 0.003 af, Atten= 87%, Lag= 26.1 min
Primary = 0.07 cfs @ 1.53 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.37' @ 1.53 hrs Surf.Area= 726 sf Storage= 605 cf

Plug-Flow detention time= 54.1 min calculated for 0.003 af (17% of inflow)
Center-of-Mass det. time= 32.2 min (102.5 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 1.53 hrs HW=213.37' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.43 fps)

Summary for Pond 6P: P4-RG#6

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth = 0.27" for NJ WQ event
Inflow = 1.85 cfs @ 1.03 hrs, Volume= 0.049 af
Outflow = 2.03 cfs @ 1.02 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 2.03 cfs @ 1.02 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.92' @ 1.02 hrs Surf.Area= 773 sf Storage= 745 cf

Plug-Flow detention time= 16.0 min calculated for 0.035 af (71% of inflow)
Center-of-Mass det. time= 7.9 min (72.6 - 64.7)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.78 cfs @ 1.02 hrs HW=213.90' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.78 cfs @ 1.27 fps)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth = 0.77" for NJ WQ event
Inflow = 0.84 cfs @ 1.09 hrs, Volume= 0.025 af
Outflow = 0.11 cfs @ 1.52 hrs, Volume= 0.005 af, Atten= 87%, Lag= 25.5 min
Primary = 0.11 cfs @ 1.52 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.36' @ 1.52 hrs Surf.Area= 988 sf Storage= 908 cf

Plug-Flow detention time= 51.7 min calculated for 0.005 af (19% of inflow)
Center-of-Mass det. time= 31.3 min (101.6 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 1.52 hrs HW=210.36' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.50 fps)

Summary for Pond 8P: P4-RG#8

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth = 0.80" for NJ WQ event
Inflow = 1.85 cfs @ 1.09 hrs, Volume= 0.055 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.83' @ 2.40 hrs Surf.Area= 2,725 sf Storage= 2,404 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.85' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth = 0.56" for NJ WQ event
Inflow = 0.38 cfs @ 1.09 hrs, Volume= 0.011 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.92' @ 2.40 hrs Surf.Area= 900 sf Storage= 488 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.34' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 10P: P4-RG#10

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth = 0.61" for NJ WQ event
Inflow = 1.27 cfs @ 1.03 hrs, Volume= 0.034 af
Outflow = 1.50 cfs @ 1.01 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 1.50 cfs @ 1.01 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.96' @ 1.01 hrs Surf.Area= 412 sf Storage= 388 cf

Plug-Flow detention time= 13.2 min calculated for 0.026 af (77% of inflow)
Center-of-Mass det. time= 6.1 min (70.8 - 64.7)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.39 cfs @ 1.01 hrs HW=206.96' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.39 cfs @ 1.17 fps)

Summary for Pond 11P: P4-RG#11

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth = 0.70" for NJ WQ event
Inflow = 2.57 cfs @ 1.03 hrs, Volume= 0.068 af
Outflow = 0.43 cfs @ 1.26 hrs, Volume= 0.018 af, Atten= 83%, Lag= 14.2 min
Primary = 0.43 cfs @ 1.26 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.15' @ 1.26 hrs Surf.Area= 2,306 sf Storage= 2,296 cf

Plug-Flow detention time= 43.3 min calculated for 0.018 af (27% of inflow)
Center-of-Mass det. time= 27.4 min (92.1 - 64.7)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 1.26 hrs HW=208.15' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.41 cfs @ 0.78 fps)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth = 0.27" for NJ WQ event
Inflow = 10.40 cfs @ 1.07 hrs, Volume= 0.334 af
Outflow = 0.13 cfs @ 2.15 hrs, Volume= 0.060 af, Atten= 99%, Lag= 64.8 min
Primary = 0.13 cfs @ 2.15 hrs, Volume= 0.060 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 202.13' @ 2.15 hrs Surf.Area= 19,632 sf Storage= 14,333 cf

Plug-Flow detention time= 391.4 min calculated for 0.060 af (18% of inflow)
Center-of-Mass det. time= 372.0 min (446.0 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.13 cfs @ 2.15 hrs HW=202.13' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.13 cfs @ 1.17 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth = 0.38" for NJ WQ event
Inflow = 5.05 cfs @ 1.15 hrs, Volume= 0.208 af
Outflow = 0.05 cfs @ 2.31 hrs, Volume= 0.047 af, Atten= 99%, Lag= 69.5 min
Primary = 0.05 cfs @ 2.31 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 201.71' @ 2.31 hrs Surf.Area= 13,085 sf Storage= 8,936 cf

Plug-Flow detention time= 509.6 min calculated for 0.047 af (23% of inflow)
Center-of-Mass det. time= 490.5 min (568.5 - 78.0)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.05 cfs @ 2.31 hrs HW=201.71' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.59 fps)
- **2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 12: P4-RG#12

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth = 0.68" for NJ WQ event
Inflow = 2.49 cfs @ 1.09 hrs, Volume= 0.074 af
Outflow = 2.50 cfs @ 1.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.3 min
Primary = 2.50 cfs @ 1.10 hrs, Volume= 0.069 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.22' @ 1.10 hrs Surf.Area= 309 sf Storage= 293 cf

Plug-Flow detention time= 5.8 min calculated for 0.069 af (92% of inflow)
Center-of-Mass det. time= 2.8 min (73.1 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.49 cfs @ 1.10 hrs HW=206.22' (Free Discharge)
1=Orifice/Grate (Weir Controls 2.49 cfs @ 1.42 fps)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth = 0.48" for NJ WQ event
Inflow = 1.53 cfs @ 1.09 hrs, Volume= 0.046 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 2.40 hrs Surf.Area= 316.026 ac Storage= 0.046 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 0.05" for NJ WQ event
Inflow = 0.29 cfs @ 2.14 hrs, Volume= 0.115 af
Primary = 0.29 cfs @ 2.14 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth = 0.46" for NJ WQ event
Inflow = 3.36 cfs @ 1.22 hrs, Volume= 0.140 af
Primary = 3.36 cfs @ 1.22 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth = 0.30" for NJ WQ event
Inflow = 10.40 cfs @ 1.07 hrs, Volume= 0.334 af
Primary = 10.40 cfs @ 1.07 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 41L: TOTAL PDA TO AP#3

Inflow Area = 2.550 ac, 22.27% Impervious, Inflow Depth = 0.23" for NJ WQ event
Inflow = 1.64 cfs @ 1.09 hrs, Volume= 0.049 af
Primary = 1.64 cfs @ 1.09 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth = 0.29" for NJ WQ event
Inflow = 4.08 cfs @ 1.09 hrs, Volume= 0.122 af
Primary = 4.08 cfs @ 1.09 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth = 0.96" for NJ WQ event
Inflow = 1.97 cfs @ 1.09 hrs, Volume= 0.059 af
Primary = 1.97 cfs @ 1.09 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.24 cfs 0.020 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.68 cfs 0.051 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>0.79"
Tc=6.0 min CN=68 Runoff=0.08 cfs 0.005 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.15 cfs 0.087 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>0.61"
Tc=6.0 min CN=64 Runoff=0.06 cfs 0.005 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.105 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.06 cfs 0.005 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.65 cfs 0.049 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.78 cfs 0.067 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>3.08"
Tc=0.0 min CN=98 Runoff=2.20 cfs 0.146 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.02 cfs 0.077 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.007 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.014 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>0.28"
Tc=6.0 min CN=55 Runoff=0.23 cfs 0.039 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.074 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.004 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=2.17 cfs 0.164 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.09 cfs 0.008 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.033 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.004 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=4.79 cfs 0.361 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>0.61"
Tc=6.0 min CN=64 Runoff=2.46 cfs 0.189 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=2.31 cfs 0.174 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.02 cfs 0.002 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>0.49"
Tc=0.0 min CN=61 Runoff=0.20 cfs 0.015 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>3.08"
Tc=0.0 min CN=98 Runoff=3.05 cfs 0.203 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>3.08"
Tc=0.0 min CN=98 Runoff=1.51 cfs 0.100 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>0.49"
Tc=0.0 min CN=61 Runoff=0.15 cfs 0.011 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=2.55 cfs 0.192 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>0.49"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.04 cfs 0.004 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.028 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.84"
Tc=16.1 min CN=69 Runoff=1.45 cfs 0.144 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>3.07"
Tc=16.1 min CN=98 Runoff=3.98 cfs 0.401 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>0.49"
Flow Length=198' Tc=13.8 min CN=61 Runoff=0.21 cfs 0.025 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.80 cfs 0.136 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>0.78"
Flow Length=710' Tc=43.3 min CN=68 Runoff=1.84 cfs 0.306 af

Subcatchment39S: PDA 3 IMP Runoff Area=0.568 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.93 cfs 0.146 af

Subcatchment40S: PDA 3 PERV Runoff Area=1.982 ac 0.00% Impervious Runoff Depth>0.53"
Tc=6.0 min CN=62 Runoff=1.06 cfs 0.087 af

Pond 1P: P4-RG#1 Peak Elev=208.76' Storage=1,110 cf Inflow=1.10 cfs 0.084 af
Outflow=1.06 cfs 0.062 af

Pond 2P: P4-RG#2 Peak Elev=208.53' Storage=427 cf Inflow=0.71 cfs 0.054 af
Outflow=0.70 cfs 0.045 af

Pond 3P: P4-RG#3 Peak Elev=209.22' Storage=267 cf Inflow=1.23 cfs 0.092 af
Outflow=1.23 cfs 0.087 af

Pond 4P: P4-RG#4 Peak Elev=208.58' Storage=238 cf Inflow=1.45 cfs 0.110 af
Outflow=1.46 cfs 0.105 af

Pond 5P: P4-RG#5 Peak Elev=213.43' Storage=651 cf Inflow=0.70 cfs 0.054 af
Outflow=0.69 cfs 0.040 af

Pond 6P: P4-RG#6 Peak Elev=213.93' Storage=752 cf Inflow=2.48 cfs 0.213 af
Outflow=2.39 cfs 0.199 af

Pond 7P: P4-RG#7 Peak Elev=210.44' Storage=987 cf Inflow=1.03 cfs 0.078 af
Outflow=1.00 cfs 0.058 af

Pond 8P: P4-RG#8 Peak Elev=210.01' Storage=2,910 cf Inflow=2.26 cfs 0.172 af
Outflow=2.03 cfs 0.115 af

Pond 9P: P4-RG#9 Peak Elev=210.37' Storage=914 cf Inflow=0.49 cfs 0.038 af
Outflow=0.16 cfs 0.017 af

Pond 10P: P4-RG#10 Peak Elev=206.97' Storage=390 cf Inflow=1.65 cfs 0.111 af
Outflow=1.60 cfs 0.103 af

Pond 11P: P4-RG#11 Peak Elev=208.30' Storage=2,640 cf Inflow=3.25 cfs 0.218 af
Outflow=2.85 cfs 0.168 af

Pond B: BASIN B Peak Elev=203.42' Storage=42,013 cf Inflow=22.57 cfs 1.763 af
Outflow=2.17 cfs 1.348 af

Pond C: BASIN C Peak Elev=203.00' Storage=27,116 cf Inflow=7.66 cfs 0.799 af
Outflow=0.19 cfs 0.186 af

Pond RG 12: P4-RG#12 Peak Elev=206.25' Storage=302 cf Inflow=3.09 cfs 0.239 af
Outflow=3.10 cfs 0.233 af

Pond RG 13: P4-RG#13 Peak Elev=204.75' Storage=0.160 af Inflow=1.89 cfs 0.161 af
Outflow=0.00 cfs 0.000 af

Link 1L: TOTAL BASIN C TO AP#4 Inflow=4.11 cfs 1.840 af
Primary=4.11 cfs 1.840 af

Link 10L: Inflow=5.41 cfs 0.545 af
Primary=5.41 cfs 0.545 af

Link 38L: PDA TO BASIN B Inflow=22.45 cfs 1.724 af
Primary=22.45 cfs 1.724 af

Link 41L: TOTAL PDA TO AP#3 Inflow=2.96 cfs 0.233 af
Primary=2.96 cfs 0.233 af

Link P4-1: P4-1 Inflow=7.19 cfs 0.550 af
Primary=7.19 cfs 0.550 af

Link P4-2: P4-2 Inflow=2.33 cfs 0.176 af
Primary=2.33 cfs 0.176 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.020 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.005 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 1.15 cfs @ 12.13 hrs, Volume= 0.087 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.06 cfs @ 12.15 hrs, Volume= 0.005 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 1.39 cfs @ 12.13 hrs, Volume= 0.105 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.06 cfs @ 12.15 hrs, Volume= 0.005 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.049 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 0.78 cfs @ 12.15 hrs, Volume= 0.067 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.20 cfs @ 12.04 hrs, Volume= 0.146 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 1.02 cfs @ 12.13 hrs, Volume= 0.077 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.08 cfs @ 12.15 hrs, Volume= 0.007 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 0.16 cfs @ 12.15 hrs, Volume= 0.014 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 0.23 cfs @ 12.19 hrs, Volume= 0.039 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 0.98 cfs @ 12.13 hrs, Volume= 0.074 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.004 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 2.17 cfs @ 12.13 hrs, Volume= 0.164 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.09 cfs @ 12.15 hrs, Volume= 0.008 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.44 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.004 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 4.79 cfs @ 12.13 hrs, Volume= 0.361 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 2.46 cfs @ 12.15 hrs, Volume= 0.189 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 2.31 cfs @ 12.13 hrs, Volume= 0.174 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.02 cfs @ 12.15 hrs, Volume= 0.002 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.20 cfs @ 12.06 hrs, Volume= 0.015 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.05 cfs @ 12.04 hrs, Volume= 0.203 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.51 cfs @ 12.04 hrs, Volume= 0.100 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.15 cfs @ 12.06 hrs, Volume= 0.011 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 2.55 cfs @ 12.13 hrs, Volume= 0.192 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.04 cfs @ 12.26 hrs, Volume= 0.004 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.37 cfs @ 12.13 hrs, Volume= 0.028 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 1.45 cfs @ 12.27 hrs, Volume= 0.144 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 3.98 cfs @ 12.24 hrs, Volume= 0.401 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 0.21 cfs @ 12.27 hrs, Volume= 0.025 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 1.80 cfs @ 12.13 hrs, Volume= 0.136 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 1.84 cfs @ 12.67 hrs, Volume= 0.306 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Subcatchment 39S: PDA 3 IMP

Runoff = 1.93 cfs @ 12.13 hrs, Volume= 0.146 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.568	98	Paved parking, HSG B
0.568		100.00% Impervious Area

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

Summary for Subcatchment 40S: PDA 3 PERV

Runoff = 1.06 cfs @ 12.15 hrs, Volume= 0.087 af, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.646	55	Woods, Good, HSG B
0.406	70	Woods, Good, HSG C
0.820	61	>75% Grass cover, Good, HSG B
0.110	74	>75% Grass cover, Good, HSG C
1.982	62	Weighted Average
1.982		100.00% Pervious Area

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

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 2.10" for 2-yr event
Inflow = 1.10 cfs @ 12.13 hrs, Volume= 0.084 af
Outflow = 1.06 cfs @ 12.15 hrs, Volume= 0.062 af, Atten= 4%, Lag= 1.2 min
Primary = 1.06 cfs @ 12.15 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.76' @ 12.15 hrs Surf.Area= 1,217 sf Storage= 1,110 cf

Plug-Flow detention time= 172.5 min calculated for 0.061 af (73% of inflow)
Center-of-Mass det. time= 77.9 min (847.8 - 770.0)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.06 cfs @ 12.15 hrs HW=208.76' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.06 cfs @ 1.07 fps)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 2.48" for 2-yr event
Inflow = 0.71 cfs @ 12.13 hrs, Volume= 0.054 af
Outflow = 0.70 cfs @ 12.14 hrs, Volume= 0.045 af, Atten= 1%, Lag= 0.7 min
Primary = 0.70 cfs @ 12.14 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.53' @ 12.14 hrs Surf.Area= 517 sf Storage= 427 cf

Plug-Flow detention time= 128.9 min calculated for 0.045 af (83% of inflow)
Center-of-Mass det. time= 57.2 min (820.6 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.68 cfs @ 12.14 hrs HW=208.53' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.68 cfs @ 0.92 fps)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 2.64" for 2-yr event
Inflow = 1.23 cfs @ 12.13 hrs, Volume= 0.092 af
Outflow = 1.23 cfs @ 12.14 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.5 min
Primary = 1.23 cfs @ 12.14 hrs, Volume= 0.087 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.22' @ 12.13 hrs Surf.Area= 311 sf Storage= 267 cf

Plug-Flow detention time= 60.7 min calculated for 0.087 af (94% of inflow)
Center-of-Mass det. time= 27.9 min (791.3 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 12.14 hrs HW=209.21' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.19 cfs @ 1.11 fps)

Summary for Pond 4P: P4-RG#4

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 2.63" for 2-yr event
Inflow = 1.45 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.46 cfs @ 12.13 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.4 min
Primary = 1.46 cfs @ 12.13 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.58' @ 12.13 hrs Surf.Area= 260 sf Storage= 238 cf

Plug-Flow detention time= 47.6 min calculated for 0.105 af (95% of inflow)
Center-of-Mass det. time= 22.2 min (784.4 - 762.2)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	161	0	0	161
207.70	183	43	43	187
207.95	204	48	91	212
208.20	226	54	145	238
208.45	248	59	204	265
208.70	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.40 cfs @ 12.13 hrs HW=208.58' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.40 cfs @ 1.17 fps)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 2.07" for 2-yr event
Inflow = 0.70 cfs @ 12.13 hrs, Volume= 0.054 af
Outflow = 0.69 cfs @ 12.15 hrs, Volume= 0.040 af, Atten= 2%, Lag= 1.0 min
Primary = 0.69 cfs @ 12.15 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.43' @ 12.14 hrs Surf.Area= 742 sf Storage= 651 cf

Plug-Flow detention time= 166.7 min calculated for 0.040 af (74% of inflow)
Center-of-Mass det. time= 74.4 min (845.0 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.67 cfs @ 12.15 hrs HW=213.43' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.67 cfs @ 0.92 fps)

Summary for Pond 6P: P4-RG#6

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 1.15" for 2-yr event
Inflow = 2.48 cfs @ 12.05 hrs, Volume= 0.213 af
Outflow = 2.39 cfs @ 12.07 hrs, Volume= 0.199 af, Atten= 4%, Lag= 0.8 min
Primary = 2.39 cfs @ 12.07 hrs, Volume= 0.199 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.93' @ 12.07 hrs Surf.Area= 775 sf Storage= 752 cf

Plug-Flow detention time= 69.0 min calculated for 0.199 af (93% of inflow)
Center-of-Mass det. time= 31.4 min (833.9 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.30 cfs @ 12.07 hrs HW=213.93' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.30 cfs @ 1.38 fps)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 2.41" for 2-yr event
Inflow = 1.03 cfs @ 12.13 hrs, Volume= 0.078 af
Outflow = 1.00 cfs @ 12.15 hrs, Volume= 0.058 af, Atten= 3%, Lag= 1.1 min
Primary = 1.00 cfs @ 12.15 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.44' @ 12.15 hrs Surf.Area= 1,003 sf Storage= 987 cf

Plug-Flow detention time= 167.9 min calculated for 0.058 af (74% of inflow)
Center-of-Mass det. time= 75.8 min (840.2 - 764.4)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.99 cfs @ 12.15 hrs HW=210.44' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.99 cfs @ 1.04 fps)

Summary for Pond 8P: P4-RG#8

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 2.48" for 2-yr event
Inflow = 2.26 cfs @ 12.13 hrs, Volume= 0.172 af
Outflow = 2.03 cfs @ 12.16 hrs, Volume= 0.115 af, Atten= 10%, Lag= 2.1 min
Primary = 2.03 cfs @ 12.16 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.01' @ 12.16 hrs Surf.Area= 2,827 sf Storage= 2,910 cf

Plug-Flow detention time= 193.1 min calculated for 0.115 af (67% of inflow)
Center-of-Mass det. time= 91.7 min (855.0 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.98 cfs @ 12.16 hrs HW=210.01' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.98 cfs @ 1.31 fps)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 1.89" for 2-yr event
Inflow = 0.49 cfs @ 12.13 hrs, Volume= 0.038 af
Outflow = 0.16 cfs @ 12.36 hrs, Volume= 0.017 af, Atten= 68%, Lag= 13.9 min
Primary = 0.16 cfs @ 12.36 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.37' @ 12.36 hrs Surf.Area= 989 sf Storage= 914 cf

Plug-Flow detention time= 292.4 min calculated for 0.017 af (46% of inflow)
Center-of-Mass det. time= 151.5 min (926.4 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 12.36 hrs HW=210.37' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.15 cfs @ 0.56 fps)

Summary for Pond 10P: P4-RG#10

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 2.02" for 2-yr event
Inflow = 1.65 cfs @ 12.05 hrs, Volume= 0.111 af
Outflow = 1.60 cfs @ 12.05 hrs, Volume= 0.103 af, Atten= 3%, Lag= 0.4 min
Primary = 1.60 cfs @ 12.05 hrs, Volume= 0.103 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.97' @ 12.05 hrs Surf.Area= 412 sf Storage= 390 cf

Plug-Flow detention time= 71.1 min calculated for 0.103 af (93% of inflow)
Center-of-Mass det. time= 32.4 min (799.4 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.59 cfs @ 12.05 hrs HW=206.97' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.59 cfs @ 1.22 fps)

Summary for Pond 11P: P4-RG#11

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 2.25" for 2-yr event
Inflow = 3.25 cfs @ 12.05 hrs, Volume= 0.218 af
Outflow = 2.85 cfs @ 12.07 hrs, Volume= 0.168 af, Atten= 12%, Lag= 1.6 min
Primary = 2.85 cfs @ 12.07 hrs, Volume= 0.168 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.30' @ 12.07 hrs Surf.Area= 2,344 sf Storage= 2,640 cf

Plug-Flow detention time= 160.2 min calculated for 0.168 af (77% of inflow)
Center-of-Mass det. time= 72.0 min (834.2 - 762.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.76 cfs @ 12.07 hrs HW=208.29' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 2.76 cfs @ 1.47 fps)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 1.41" for 2-yr event
Inflow = 22.57 cfs @ 12.12 hrs, Volume= 1.763 af
Outflow = 2.17 cfs @ 13.27 hrs, Volume= 1.348 af, Atten= 90%, Lag= 69.2 min
Primary = 2.17 cfs @ 13.27 hrs, Volume= 1.348 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 203.42' @ 13.27 hrs Surf.Area= 23,325 sf Storage= 42,013 cf

Plug-Flow detention time= 273.0 min calculated for 1.348 af (76% of inflow)
Center-of-Mass det. time= 180.6 min (996.5 - 815.9)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.17 cfs @ 13.27 hrs HW=203.42' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 2.17 cfs @ 5.20 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 1.45" for 2-yr event
Inflow = 7.66 cfs @ 12.17 hrs, Volume= 0.799 af
Outflow = 0.19 cfs @ 19.58 hrs, Volume= 0.186 af, Atten= 97%, Lag= 444.6 min
Primary = 0.19 cfs @ 19.58 hrs, Volume= 0.186 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 203.00' @ 19.58 hrs Surf.Area= 15,161 sf Storage= 27,116 cf

Plug-Flow detention time= 502.6 min calculated for 0.186 af (23% of inflow)
Center-of-Mass det. time= 295.5 min (1,090.8 - 795.2)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.19 cfs @ 19.58 hrs HW=203.00' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.69 fps)
- **2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 12: P4-RG#12

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 2.19" for 2-yr event
Inflow = 3.09 cfs @ 12.13 hrs, Volume= 0.239 af
Outflow = 3.10 cfs @ 12.13 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.4 min
Primary = 3.10 cfs @ 12.13 hrs, Volume= 0.233 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.25' @ 12.13 hrs Surf.Area= 312 sf Storage= 302 cf

Plug-Flow detention time= 27.7 min calculated for 0.233 af (98% of inflow)
Center-of-Mass det. time= 13.3 min (781.7 - 768.4)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.98 cfs @ 12.13 hrs HW=206.24' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 2.98 cfs @ 1.51 fps)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 1.68" for 2-yr event
Inflow = 1.89 cfs @ 12.13 hrs, Volume= 0.161 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 24.00 hrs Surf.Area= 316.090 ac Storage= 0.160 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 0.84" for 2-yr event
Inflow = 4.11 cfs @ 12.70 hrs, Volume= 1.840 af
Primary = 4.11 cfs @ 12.70 hrs, Volume= 1.840 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 1.80" for 2-yr event
Inflow = 5.41 cfs @ 12.25 hrs, Volume= 0.545 af
Primary = 5.41 cfs @ 12.25 hrs, Volume= 0.545 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 1.55" for 2-yr event
Inflow = 22.45 cfs @ 12.12 hrs, Volume= 1.724 af
Primary = 22.45 cfs @ 12.12 hrs, Volume= 1.724 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 41L: TOTAL PDA TO AP#3

Inflow Area = 2.550 ac, 22.27% Impervious, Inflow Depth > 1.09" for 2-yr event
Inflow = 2.96 cfs @ 12.14 hrs, Volume= 0.233 af
Primary = 2.96 cfs @ 12.14 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 1.29" for 2-yr event
Inflow = 7.19 cfs @ 12.13 hrs, Volume= 0.550 af
Primary = 7.19 cfs @ 12.13 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 2.90" for 2-yr event
Inflow = 2.33 cfs @ 12.13 hrs, Volume= 0.176 af
Primary = 2.33 cfs @ 12.13 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.82 cfs 0.056 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.03 cfs 0.079 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.10 cfs 0.007 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>1.86"
Tc=6.0 min CN=68 Runoff=0.19 cfs 0.012 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>1.56"
Tc=6.0 min CN=64 Runoff=0.17 cfs 0.012 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=2.10 cfs 0.162 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.20 cfs 0.013 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=0.97 cfs 0.075 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=2.71 cfs 0.185 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>4.73"
Tc=0.0 min CN=98 Runoff=3.33 cfs 0.225 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.54 cfs 0.118 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.30 cfs 0.020 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.56 cfs 0.038 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>0.96"
Tc=6.0 min CN=55 Runoff=1.76 cfs 0.132 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.49 cfs 0.114 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.011 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=3.28 cfs 0.252 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.31 cfs 0.021 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.051 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.18 cfs 0.012 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=7.23 cfs 0.556 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>1.56"
Tc=6.0 min CN=64 Runoff=7.21 cfs 0.482 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=3.49 cfs 0.268 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.006 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>1.35"
Tc=0.0 min CN=61 Runoff=0.70 cfs 0.042 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>4.73"
Tc=0.0 min CN=98 Runoff=4.61 cfs 0.312 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>4.73"
Tc=0.0 min CN=98 Runoff=2.28 cfs 0.154 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>1.35"
Tc=0.0 min CN=61 Runoff=0.51 cfs 0.030 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=3.85 cfs 0.296 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>1.34"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.14 cfs 0.012 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=0.56 cfs 0.043 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>1.93"
Tc=16.1 min CN=69 Runoff=3.63 cfs 0.331 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>4.72"
Tc=16.1 min CN=98 Runoff=6.01 cfs 0.618 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>1.34"
Flow Length=198' Tc=13.8 min CN=61 Runoff=0.76 cfs 0.069 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=2.72 cfs 0.209 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>1.83"
Flow Length=710' Tc=43.3 min CN=68 Runoff=4.80 cfs 0.719 af

Subcatchment39S: PDA 3 IMP Runoff Area=0.568 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=2.91 cfs 0.224 af

Subcatchment40S: PDA 3 PERV Runoff Area=1.982 ac 0.00% Impervious Runoff Depth>1.42"
Tc=6.0 min CN=62 Runoff=3.45 cfs 0.234 af

Pond 1P: P4-RG#1 Peak Elev=208.80' Storage=1,164 cf Inflow=1.83 cfs 0.138 af
Outflow=1.78 cfs 0.116 af

Pond 2P: P4-RG#2 Peak Elev=208.56' Storage=443 cf Inflow=1.12 cfs 0.086 af
Outflow=1.12 cfs 0.077 af

Pond 3P: P4-RG#3 Peak Elev=209.26' Storage=280 cf Inflow=1.93 cfs 0.146 af
Outflow=1.94 cfs 0.141 af

Pond 4P: P4-RG#4 Peak Elev=208.63' Storage=250 cf Inflow=2.28 cfs 0.173 af
Outflow=2.29 cfs 0.169 af

Pond 5P: P4-RG#5 Peak Elev=213.46' Storage=675 cf Inflow=1.17 cfs 0.088 af
Outflow=1.15 cfs 0.075 af

Pond 6P: P4-RG#6 Peak Elev=214.05' Storage=805 cf Inflow=4.92 cfs 0.410 af
Outflow=5.01 cfs 0.396 af

Pond 7P: P4-RG#7 Peak Elev=210.48' Storage=1,026 cf Inflow=1.65 cfs 0.126 af
Outflow=1.62 cfs 0.105 af

Pond 8P: P4-RG#8 Peak Elev=210.08' Storage=3,091 cf Inflow=3.59 cfs 0.274 af
Outflow=3.32 cfs 0.216 af

Pond 9P: P4-RG#9 Peak Elev=210.43' Storage=974 cf Inflow=0.85 cfs 0.064 af
Outflow=0.82 cfs 0.043 af

Pond 10P: P4-RG#10 Peak Elev=207.03' Storage=415 cf Inflow=2.78 cfs 0.184 af
Outflow=2.72 cfs 0.177 af

Pond 11P: P4-RG#11 Peak Elev=208.41' Storage=2,744 cf Inflow=5.31 cfs 0.353 af
Outflow=5.58 cfs 0.303 af

Pond B: BASIN B	Peak Elev=204.47' Storage=68,025 cf	Inflow=42.29 cfs 3.260 af Outflow=8.62 cfs 2.753 af
Pond C: BASIN C	Peak Elev=203.76' Storage=39,051 cf	Inflow=13.56 cfs 1.388 af Outflow=1.30 cfs 0.646 af
Pond RG 12: P4-RG#12	Peak Elev=206.33' Storage=312 cf	Inflow=5.06 cfs 0.389 af Outflow=5.06 cfs 0.384 af
Pond RG 13: P4-RG#13	Peak Elev=204.75' Storage=0.277 af	Inflow=3.24 cfs 0.278 af Outflow=0.00 cfs 0.000 af
Link 1L: TOTAL BASIN C TO AP#4		Inflow=14.09 cfs 4.119 af Primary=14.09 cfs 4.119 af
Link 10L:		Inflow=9.62 cfs 0.948 af Primary=9.62 cfs 0.948 af
Link 38L: PDA TO BASIN B		Inflow=40.59 cfs 3.128 af Primary=40.59 cfs 3.128 af
Link 41L: TOTAL PDA TO AP#3		Inflow=6.35 cfs 0.458 af Primary=6.35 cfs 0.458 af
Link P4-1: P4-1		Inflow=14.41 cfs 1.037 af Primary=14.41 cfs 1.037 af
Link P4-2: P4-2		Inflow=3.57 cfs 0.274 af Primary=3.57 cfs 0.274 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 0.82 cfs @ 12.14 hrs, Volume= 0.056 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.079 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 1.74 cfs @ 12.13 hrs, Volume= 0.134 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 2.10 cfs @ 12.13 hrs, Volume= 0.162 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 0.97 cfs @ 12.13 hrs, Volume= 0.075 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 2.71 cfs @ 12.14 hrs, Volume= 0.185 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.33 cfs @ 12.04 hrs, Volume= 0.225 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 1.54 cfs @ 12.13 hrs, Volume= 0.118 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.020 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 1.76 cfs @ 12.15 hrs, Volume= 0.132 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.114 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.011 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 3.28 cfs @ 12.13 hrs, Volume= 0.252 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 7.23 cfs @ 12.13 hrs, Volume= 0.556 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 7.21 cfs @ 12.14 hrs, Volume= 0.482 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 3.49 cfs @ 12.13 hrs, Volume= 0.268 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.70 cfs @ 12.05 hrs, Volume= 0.042 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 4.61 cfs @ 12.04 hrs, Volume= 0.312 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.28 cfs @ 12.04 hrs, Volume= 0.154 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.51 cfs @ 12.05 hrs, Volume= 0.030 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 3.85 cfs @ 12.13 hrs, Volume= 0.296 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.14 cfs @ 12.23 hrs, Volume= 0.012 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.56 cfs @ 12.13 hrs, Volume= 0.043 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 3.63 cfs @ 12.26 hrs, Volume= 0.331 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 6.01 cfs @ 12.24 hrs, Volume= 0.618 af, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 0.76 cfs @ 12.24 hrs, Volume= 0.069 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 2.72 cfs @ 12.13 hrs, Volume= 0.209 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 4.80 cfs @ 12.63 hrs, Volume= 0.719 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Subcatchment 39S: PDA 3 IMP

Runoff = 2.91 cfs @ 12.13 hrs, Volume= 0.224 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.568	98	Paved parking, HSG B
0.568		100.00% Impervious Area

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

Summary for Subcatchment 40S: PDA 3 PERV

Runoff = 3.45 cfs @ 12.14 hrs, Volume= 0.234 af, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.646	55	Woods, Good, HSG B
0.406	70	Woods, Good, HSG C
0.820	61	>75% Grass cover, Good, HSG B
0.110	74	>75% Grass cover, Good, HSG C
1.982	62	Weighted Average
1.982		100.00% Pervious Area

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

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 3.46" for 10-yr event
Inflow = 1.83 cfs @ 12.13 hrs, Volume= 0.138 af
Outflow = 1.78 cfs @ 12.15 hrs, Volume= 0.116 af, Atten= 3%, Lag= 1.1 min
Primary = 1.78 cfs @ 12.15 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.80' @ 12.15 hrs Surf.Area= 1,234 sf Storage= 1,164 cf

Plug-Flow detention time= 133.8 min calculated for 0.116 af (84% of inflow)
Center-of-Mass det. time= 60.3 min (827.2 - 766.9)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.76 cfs @ 12.15 hrs HW=208.80' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.76 cfs @ 1.26 fps)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 3.95" for 10-yr event
Inflow = 1.12 cfs @ 12.13 hrs, Volume= 0.086 af
Outflow = 1.12 cfs @ 12.14 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.7 min
Primary = 1.12 cfs @ 12.14 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.56' @ 12.14 hrs Surf.Area= 530 sf Storage= 443 cf

Plug-Flow detention time= 99.4 min calculated for 0.077 af (90% of inflow)
Center-of-Mass det. time= 45.7 min (804.1 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.08 cfs @ 12.14 hrs HW=208.56' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.08 cfs @ 1.08 fps)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 4.18" for 10-yr event
Inflow = 1.93 cfs @ 12.13 hrs, Volume= 0.146 af
Outflow = 1.94 cfs @ 12.13 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.4 min
Primary = 1.94 cfs @ 12.13 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.26' @ 12.13 hrs Surf.Area= 316 sf Storage= 280 cf

Plug-Flow detention time= 42.7 min calculated for 0.141 af (96% of inflow)
Center-of-Mass det. time= 20.6 min (778.0 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.86 cfs @ 12.13 hrs HW=209.26' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.86 cfs @ 1.29 fps)

Summary for Pond 4P: P4-RG#4

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 4.16" for 10-yr event
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.173 af
Outflow = 2.29 cfs @ 12.13 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.4 min
Primary = 2.29 cfs @ 12.13 hrs, Volume= 0.169 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.63' @ 12.13 hrs Surf.Area= 265 sf Storage= 250 cf

Plug-Flow detention time= 33.0 min calculated for 0.168 af (97% of inflow)
Center-of-Mass det. time= 16.1 min (772.4 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	161	0	0	161
207.70	183	43	43	187
207.95	204	48	91	212
208.20	226	54	145	238
208.45	248	59	204	265
208.70	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.19 cfs @ 12.13 hrs HW=208.62' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 2.19 cfs @ 1.36 fps)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 3.42" for 10-yr event
Inflow = 1.17 cfs @ 12.13 hrs, Volume= 0.088 af
Outflow = 1.15 cfs @ 12.14 hrs, Volume= 0.075 af, Atten= 1%, Lag= 0.9 min
Primary = 1.15 cfs @ 12.14 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.46' @ 12.14 hrs Surf.Area= 751 sf Storage= 675 cf

Plug-Flow detention time= 127.7 min calculated for 0.075 af (84% of inflow)
Center-of-Mass det. time= 57.5 min (825.3 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.13 cfs @ 12.14 hrs HW=213.46' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.13 cfs @ 1.09 fps)

Summary for Pond 6P: P4-RG#6

[93] Warning: Storage range exceeded by 0.05'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 2.22" for 10-yr event
Inflow = 4.92 cfs @ 12.07 hrs, Volume= 0.410 af
Outflow = 5.01 cfs @ 12.06 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min
Primary = 5.01 cfs @ 12.06 hrs, Volume= 0.396 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 214.05' @ 12.06 hrs Surf.Area= 791 sf Storage= 805 cf

Plug-Flow detention time= 40.3 min calculated for 0.395 af (96% of inflow)
Center-of-Mass det. time= 19.8 min (822.9 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.82 cfs @ 12.06 hrs HW=214.04' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 4.82 cfs @ 1.77 fps)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 3.86" for 10-yr event
Inflow = 1.65 cfs @ 12.13 hrs, Volume= 0.126 af
Outflow = 1.62 cfs @ 12.14 hrs, Volume= 0.105 af, Atten= 2%, Lag= 1.0 min
Primary = 1.62 cfs @ 12.14 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.48' @ 12.14 hrs Surf.Area= 1,011 sf Storage= 1,026 cf

Plug-Flow detention time= 132.1 min calculated for 0.105 af (84% of inflow)
Center-of-Mass det. time= 60.6 min (820.3 - 759.7)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.59 cfs @ 12.14 hrs HW=210.48' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.59 cfs @ 1.22 fps)

Summary for Pond 8P: P4-RG#8

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 3.96" for 10-yr event
Inflow = 3.59 cfs @ 12.13 hrs, Volume= 0.274 af
Outflow = 3.32 cfs @ 12.16 hrs, Volume= 0.216 af, Atten= 8%, Lag= 1.8 min
Primary = 3.32 cfs @ 12.16 hrs, Volume= 0.216 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.08' @ 12.16 hrs Surf.Area= 2,863 sf Storage= 3,091 cf

Plug-Flow detention time= 153.6 min calculated for 0.216 af (79% of inflow)
Center-of-Mass det. time= 71.7 min (830.0 - 758.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.27 cfs @ 12.16 hrs HW=210.08' (Free Discharge)
1=Orifice/Grate (Weir Controls 3.27 cfs @ 1.55 fps)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 3.18" for 10-yr event
Inflow = 0.85 cfs @ 12.13 hrs, Volume= 0.064 af
Outflow = 0.82 cfs @ 12.15 hrs, Volume= 0.043 af, Atten= 3%, Lag= 1.1 min
Primary = 0.82 cfs @ 12.15 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.43' @ 12.15 hrs Surf.Area= 1,001 sf Storage= 974 cf

Plug-Flow detention time= 194.2 min calculated for 0.043 af (68% of inflow)
Center-of-Mass det. time= 89.3 min (862.3 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.81 cfs @ 12.15 hrs HW=210.43' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 0.81 cfs @ 0.98 fps)

Summary for Pond 10P: P4-RG#10

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 3.35" for 10-yr event
Inflow = 2.78 cfs @ 12.05 hrs, Volume= 0.184 af
Outflow = 2.72 cfs @ 12.05 hrs, Volume= 0.177 af, Atten= 2%, Lag= 0.3 min
Primary = 2.72 cfs @ 12.05 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 207.03' @ 12.05 hrs Surf.Area= 418 sf Storage= 415 cf

Plug-Flow detention time= 48.3 min calculated for 0.176 af (96% of inflow)
Center-of-Mass det. time= 23.3 min (787.8 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.71 cfs @ 12.05 hrs HW=207.03' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 2.71 cfs @ 1.46 fps)

Summary for Pond 11P: P4-RG#11

[93] Warning: Storage range exceeded by 0.07'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 3.65" for 10-yr event
Inflow = 5.31 cfs @ 12.05 hrs, Volume= 0.353 af
Outflow = 5.58 cfs @ 12.05 hrs, Volume= 0.303 af, Atten= 0%, Lag= 0.3 min
Primary = 5.58 cfs @ 12.05 hrs, Volume= 0.303 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.41' @ 12.05 hrs Surf.Area= 2,356 sf Storage= 2,744 cf

Plug-Flow detention time= 123.6 min calculated for 0.302 af (86% of inflow)
Center-of-Mass det. time= 57.0 min (815.5 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.55 cfs @ 12.05 hrs HW=208.41' (Free Discharge)
1=Orifice/Grate (Weir Controls 5.55 cfs @ 1.85 fps)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 2.61" for 10-yr event
Inflow = 42.29 cfs @ 12.13 hrs, Volume= 3.260 af
Outflow = 8.62 cfs @ 12.58 hrs, Volume= 2.753 af, Atten= 80%, Lag= 27.4 min
Primary = 8.62 cfs @ 12.58 hrs, Volume= 2.753 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.47' @ 12.58 hrs Surf.Area= 26,383 sf Storage= 68,025 cf

Plug-Flow detention time= 216.4 min calculated for 2.748 af (84% of inflow)
Center-of-Mass det. time= 146.4 min (953.6 - 807.1)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=8.62 cfs @ 12.58 hrs HW=204.47' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 2.99 cfs @ 7.17 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 5.63 cfs @ 3.22 fps)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 2.53" for 10-yr event
Inflow = 13.56 cfs @ 12.17 hrs, Volume= 1.388 af
Outflow = 1.30 cfs @ 13.56 hrs, Volume= 0.646 af, Atten= 90%, Lag= 83.4 min
Primary = 1.30 cfs @ 13.56 hrs, Volume= 0.646 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 203.76' @ 13.56 hrs Surf.Area= 16,419 sf Storage= 39,051 cf

Plug-Flow detention time= 345.1 min calculated for 0.645 af (46% of inflow)
Center-of-Mass det. time= 209.7 min (1,000.6 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.30 cfs @ 13.56 hrs HW=203.76' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.24 cfs @ 7.07 fps)
- **2=Sharp-Crested Rectangular Weir** (Weir Controls 1.06 cfs @ 2.33 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 12: P4-RG#12

[93] Warning: Storage range exceeded by 0.05'

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 3.57" for 10-yr event
Inflow = 5.06 cfs @ 12.13 hrs, Volume= 0.389 af
Outflow = 5.06 cfs @ 12.13 hrs, Volume= 0.384 af, Atten= 0%, Lag= 0.0 min
Primary = 5.06 cfs @ 12.13 hrs, Volume= 0.384 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.33' @ 12.13 hrs Surf.Area= 316 sf Storage= 312 cf

Plug-Flow detention time= 18.2 min calculated for 0.384 af (99% of inflow)
Center-of-Mass det. time= 9.1 min (774.1 - 765.0)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.86 cfs @ 12.13 hrs HW=206.32' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 4.86 cfs @ 1.77 fps)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 2.90" for 10-yr event
Inflow = 3.24 cfs @ 12.14 hrs, Volume= 0.278 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 24.00 hrs Surf.Area= 316.156 ac Storage= 0.277 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 1.88" for 10-yr event
Inflow = 14.09 cfs @ 12.64 hrs, Volume= 4.119 af
Primary = 14.09 cfs @ 12.64 hrs, Volume= 4.119 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 3.13" for 10-yr event
Inflow = 9.62 cfs @ 12.25 hrs, Volume= 0.948 af
Primary = 9.62 cfs @ 12.25 hrs, Volume= 0.948 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 2.82" for 10-yr event
Inflow = 40.59 cfs @ 12.13 hrs, Volume= 3.128 af
Primary = 40.59 cfs @ 12.13 hrs, Volume= 3.128 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 41L: TOTAL PDA TO AP#3

Inflow Area = 2.550 ac, 22.27% Impervious, Inflow Depth > 2.15" for 10-yr event
Inflow = 6.35 cfs @ 12.13 hrs, Volume= 0.458 af
Primary = 6.35 cfs @ 12.13 hrs, Volume= 0.458 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 2.43" for 10-yr event
Inflow = 14.41 cfs @ 12.13 hrs, Volume= 1.037 af
Primary = 14.41 cfs @ 12.13 hrs, Volume= 1.037 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 4.50" for 10-yr event
Inflow = 3.57 cfs @ 12.13 hrs, Volume= 0.274 af
Primary = 3.57 cfs @ 12.13 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=1.31 cfs 0.086 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=1.26 cfs 0.098 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.010 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>2.70"
Tc=6.0 min CN=68 Runoff=0.28 cfs 0.018 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=2.15 cfs 0.166 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>2.34"
Tc=6.0 min CN=64 Runoff=0.27 cfs 0.018 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=2.59 cfs 0.200 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.31 cfs 0.021 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=1.20 cfs 0.093 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=4.31 cfs 0.285 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>5.87"
Tc=0.0 min CN=98 Runoff=4.10 cfs 0.279 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=1.90 cfs 0.147 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.47 cfs 0.031 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.89 cfs 0.059 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>1.58"
Tc=6.0 min CN=55 Runoff=3.14 cfs 0.217 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=1.83 cfs 0.142 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.26 cfs 0.017 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=4.04 cfs 0.313 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.50 cfs 0.033 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.064 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.29 cfs 0.019 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=8.91 cfs 0.689 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>2.34"
Tc=6.0 min CN=64 Runoff=11.04 cfs 0.723 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=4.30 cfs 0.332 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.13 cfs 0.009 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>2.08"
Tc=0.0 min CN=61 Runoff=1.11 cfs 0.064 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>5.87"
Tc=0.0 min CN=98 Runoff=5.68 cfs 0.387 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>5.87"
Tc=0.0 min CN=98 Runoff=2.80 cfs 0.191 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>2.08"
Tc=0.0 min CN=61 Runoff=0.81 cfs 0.047 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=4.74 cfs 0.367 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>2.07"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.22 cfs 0.019 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=0.70 cfs 0.054 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>2.79"
Tc=16.1 min CN=69 Runoff=5.32 cfs 0.478 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>5.86"
Tc=16.1 min CN=98 Runoff=7.41 cfs 0.766 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>2.07"
Flow Length=198' Tc=13.8 min CN=61 Runoff=1.22 cfs 0.107 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=3.35 cfs 0.259 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>2.67"
Flow Length=710' Tc=43.3 min CN=68 Runoff=7.12 cfs 1.048 af

Subcatchment39S: PDA 3 IMP Runoff Area=0.568 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=3.59 cfs 0.278 af

Subcatchment40S: PDA 3 PERV Runoff Area=1.982 ac 0.00% Impervious Runoff Depth>2.16"
Tc=6.0 min CN=62 Runoff=5.42 cfs 0.357 af

Pond 1P: P4-RG#1 Peak Elev=208.83' Storage=1,199 cf Inflow=2.36 cfs 0.178 af
Outflow=2.31 cfs 0.155 af

Pond 2P: P4-RG#2 Peak Elev=208.58' Storage=453 cf Inflow=1.42 cfs 0.108 af
Outflow=1.42 cfs 0.099 af

Pond 3P: P4-RG#3 Peak Elev=209.29' Storage=288 cf Inflow=2.42 cfs 0.184 af
Outflow=2.43 cfs 0.179 af

Pond 4P: P4-RG#4 Peak Elev=208.66' Storage=258 cf Inflow=2.86 cfs 0.218 af
Outflow=2.87 cfs 0.213 af

Pond 5P: P4-RG#5 Peak Elev=213.48' Storage=691 cf Inflow=1.51 cfs 0.114 af
Outflow=1.50 cfs 0.100 af

Pond 6P: P4-RG#6 Peak Elev=214.12' Storage=805 cf Inflow=6.85 cfs 0.564 af
Outflow=6.79 cfs 0.550 af

Pond 7P: P4-RG#7 Peak Elev=210.51' Storage=1,051 cf Inflow=2.09 cfs 0.159 af
Outflow=2.06 cfs 0.139 af

Pond 8P: P4-RG#8 Peak Elev=210.14' Storage=3,154 cf Inflow=4.54 cfs 0.346 af
Outflow=4.78 cfs 0.289 af

Pond 9P: P4-RG#9 Peak Elev=210.45' Storage=992 cf Inflow=1.11 cfs 0.083 af
Outflow=1.08 cfs 0.062 af

Pond 10P: P4-RG#10 Peak Elev=207.07' Storage=431 cf Inflow=3.61 cfs 0.238 af
Outflow=3.54 cfs 0.230 af

Pond 11P: P4-RG#11 Peak Elev=208.46' Storage=2,744 cf Inflow=6.79 cfs 0.451 af
Outflow=6.77 cfs 0.400 af

Pond B: BASIN B Peak Elev=205.10' Storage=85,386 cf Inflow=57.23 cfs 4.386 af
Outflow=14.55 cfs 3.800 af

Pond C: BASIN C Peak Elev=204.22' Storage=46,795 cf Inflow=17.98 cfs 1.824 af
Outflow=2.78 cfs 1.065 af

Pond RG 12: P4-RG#12 Peak Elev=206.39' Storage=312 cf Inflow=6.48 cfs 0.498 af
Outflow=6.51 cfs 0.493 af

Pond RG 13: P4-RG#13 Peak Elev=204.75' Storage=0.365 af Inflow=4.24 cfs 0.366 af
Outflow=0.00 cfs 0.000 af

Link 1L: TOTAL BASIN C TO AP#4 Inflow=23.79 cfs 5.913 af
Primary=23.79 cfs 5.913 af

Link 10L: Inflow=12.71 cfs 1.245 af
Primary=12.71 cfs 1.245 af

Link 38L: PDA TO BASIN B Inflow=53.37 cfs 4.169 af
Primary=53.37 cfs 4.169 af

Link 41L: TOTAL PDA TO AP#3 Inflow=8.99 cfs 0.635 af
Primary=8.99 cfs 0.635 af

Link P4-1: P4-1 Inflow=19.91 cfs 1.412 af
Primary=19.91 cfs 1.412 af

Link P4-2: P4-2 Inflow=4.43 cfs 0.341 af
Primary=4.43 cfs 0.341 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 1.31 cfs @ 12.14 hrs, Volume= 0.086 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.098 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.28 cfs @ 12.13 hrs, Volume= 0.018 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 2.15 cfs @ 12.13 hrs, Volume= 0.166 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 0.018 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 2.59 cfs @ 12.13 hrs, Volume= 0.200 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 1.20 cfs @ 12.13 hrs, Volume= 0.093 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 4.31 cfs @ 12.14 hrs, Volume= 0.285 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 4.10 cfs @ 12.04 hrs, Volume= 0.279 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 1.90 cfs @ 12.13 hrs, Volume= 0.147 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.47 cfs @ 12.14 hrs, Volume= 0.031 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 0.89 cfs @ 12.14 hrs, Volume= 0.059 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 3.14 cfs @ 12.14 hrs, Volume= 0.217 af, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 1.83 cfs @ 12.13 hrs, Volume= 0.142 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 4.04 cfs @ 12.13 hrs, Volume= 0.313 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.033 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.064 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 8.91 cfs @ 12.13 hrs, Volume= 0.689 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 11.04 cfs @ 12.14 hrs, Volume= 0.723 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 4.30 cfs @ 12.13 hrs, Volume= 0.332 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.11 cfs @ 12.05 hrs, Volume= 0.064 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.68 cfs @ 12.04 hrs, Volume= 0.387 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.80 cfs @ 12.04 hrs, Volume= 0.191 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.81 cfs @ 12.05 hrs, Volume= 0.047 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 4.74 cfs @ 12.13 hrs, Volume= 0.367 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.22 cfs @ 12.22 hrs, Volume= 0.019 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.054 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 5.32 cfs @ 12.25 hrs, Volume= 0.478 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 7.41 cfs @ 12.24 hrs, Volume= 0.766 af, Depth> 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 1.22 cfs @ 12.23 hrs, Volume= 0.107 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.259 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 7.12 cfs @ 12.62 hrs, Volume= 1.048 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Subcatchment 39S: PDA 3 IMP

Runoff = 3.59 cfs @ 12.13 hrs, Volume= 0.278 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.568	98	Paved parking, HSG B
0.568		100.00% Impervious Area

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

Summary for Subcatchment 40S: PDA 3 PERV

Runoff = 5.42 cfs @ 12.14 hrs, Volume= 0.357 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.646	55	Woods, Good, HSG B
0.406	70	Woods, Good, HSG C
0.820	61	>75% Grass cover, Good, HSG B
0.110	74	>75% Grass cover, Good, HSG C
1.982	62	Weighted Average
1.982		100.00% Pervious Area

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

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 4.45" for 25-yr event
Inflow = 2.36 cfs @ 12.13 hrs, Volume= 0.178 af
Outflow = 2.31 cfs @ 12.15 hrs, Volume= 0.155 af, Atten= 2%, Lag= 1.0 min
Primary = 2.31 cfs @ 12.15 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.83' @ 12.15 hrs Surf.Area= 1,245 sf Storage= 1,199 cf

Plug-Flow detention time= 114.7 min calculated for 0.155 af (87% of inflow)
Center-of-Mass det. time= 53.0 min (818.4 - 765.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.28 cfs @ 12.15 hrs HW=208.83' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.28 cfs @ 1.38 fps)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 4.99" for 25-yr event
Inflow = 1.42 cfs @ 12.13 hrs, Volume= 0.108 af
Outflow = 1.42 cfs @ 12.14 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.7 min
Primary = 1.42 cfs @ 12.14 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.58' @ 12.14 hrs Surf.Area= 538 sf Storage= 453 cf

Plug-Flow detention time= 85.0 min calculated for 0.099 af (92% of inflow)
Center-of-Mass det. time= 40.0 min (796.1 - 756.2)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.37 cfs @ 12.14 hrs HW=208.58' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.37 cfs @ 1.16 fps)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 5.26" for 25-yr event
Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.184 af
Outflow = 2.43 cfs @ 12.13 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.4 min
Primary = 2.43 cfs @ 12.13 hrs, Volume= 0.179 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.29' @ 12.13 hrs Surf.Area= 319 sf Storage= 288 cf

Plug-Flow detention time= 35.5 min calculated for 0.179 af (97% of inflow)
Center-of-Mass det. time= 17.3 min (772.0 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.34 cfs @ 12.13 hrs HW=209.28' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.34 cfs @ 1.39 fps)

Summary for Pond 4P: P4-RG#4

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 5.23" for 25-yr event
Inflow = 2.86 cfs @ 12.13 hrs, Volume= 0.218 af
Outflow = 2.87 cfs @ 12.13 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.4 min
Primary = 2.87 cfs @ 12.13 hrs, Volume= 0.213 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.66' @ 12.13 hrs Surf.Area= 268 sf Storage= 258 cf

Plug-Flow detention time= 27.2 min calculated for 0.213 af (98% of inflow)
Center-of-Mass det. time= 13.4 min (767.2 - 753.8)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	161	0	0	161
207.70	183	43	43	187
207.95	204	48	91	212
208.20	226	54	145	238
208.45	248	59	204	265
208.70	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.75 cfs @ 12.13 hrs HW=208.65' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.75 cfs @ 1.47 fps)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 4.40" for 25-yr event
Inflow = 1.51 cfs @ 12.13 hrs, Volume= 0.114 af
Outflow = 1.50 cfs @ 12.14 hrs, Volume= 0.100 af, Atten= 1%, Lag= 0.8 min
Primary = 1.50 cfs @ 12.14 hrs, Volume= 0.100 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.48' @ 12.14 hrs Surf.Area= 756 sf Storage= 691 cf

Plug-Flow detention time= 110.3 min calculated for 0.100 af (88% of inflow)
Center-of-Mass det. time= 50.4 min (816.7 - 766.3)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.46 cfs @ 12.14 hrs HW=213.48' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.46 cfs @ 1.19 fps)

Summary for Pond 6P: P4-RG#6

[93] Warning: Storage range exceeded by 0.12'

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 3.05" for 25-yr event
Inflow = 6.85 cfs @ 12.07 hrs, Volume= 0.564 af
Outflow = 6.79 cfs @ 12.08 hrs, Volume= 0.550 af, Atten= 1%, Lag= 0.2 min
Primary = 6.79 cfs @ 12.08 hrs, Volume= 0.550 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 214.12' @ 12.08 hrs Surf.Area= 791 sf Storage= 805 cf

Plug-Flow detention time= 30.7 min calculated for 0.549 af (97% of inflow)
Center-of-Mass det. time= 15.5 min (817.1 - 801.6)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.65 cfs @ 12.08 hrs HW=214.11' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 6.65 cfs @ 1.97 fps)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 4.89" for 25-yr event
Inflow = 2.09 cfs @ 12.13 hrs, Volume= 0.159 af
Outflow = 2.06 cfs @ 12.14 hrs, Volume= 0.139 af, Atten= 2%, Lag= 0.9 min
Primary = 2.06 cfs @ 12.14 hrs, Volume= 0.139 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.51' @ 12.14 hrs Surf.Area= 1,016 sf Storage= 1,051 cf

Plug-Flow detention time= 115.5 min calculated for 0.138 af (87% of inflow)
Center-of-Mass det. time= 53.9 min (811.6 - 757.7)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.02 cfs @ 12.14 hrs HW=210.50' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 2.02 cfs @ 1.32 fps)

Summary for Pond 8P: P4-RG#8

[93] Warning: Storage range exceeded by 0.04'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 5.00" for 25-yr event
Inflow = 4.54 cfs @ 12.13 hrs, Volume= 0.346 af
Outflow = 4.78 cfs @ 12.15 hrs, Volume= 0.289 af, Atten= 0%, Lag= 1.2 min
Primary = 4.78 cfs @ 12.15 hrs, Volume= 0.289 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.14' @ 12.15 hrs Surf.Area= 2,876 sf Storage= 3,154 cf

Plug-Flow detention time= 136.4 min calculated for 0.288 af (83% of inflow)
Center-of-Mass det. time= 64.3 min (820.4 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.72 cfs @ 12.15 hrs HW=210.14' (Free Discharge)
1=Orifice/Grate (Weir Controls 4.72 cfs @ 1.76 fps)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 4.13" for 25-yr event
Inflow = 1.11 cfs @ 12.13 hrs, Volume= 0.083 af
Outflow = 1.08 cfs @ 12.15 hrs, Volume= 0.062 af, Atten= 3%, Lag= 1.1 min
Primary = 1.08 cfs @ 12.15 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.45' @ 12.15 hrs Surf.Area= 1,004 sf Storage= 992 cf

Plug-Flow detention time= 167.1 min calculated for 0.062 af (75% of inflow)
Center-of-Mass det. time= 75.0 min (846.9 - 771.9)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.07 cfs @ 12.15 hrs HW=210.45' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.07 cfs @ 1.07 fps)

Summary for Pond 10P: P4-RG#10

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 4.32" for 25-yr event
Inflow = 3.61 cfs @ 12.05 hrs, Volume= 0.238 af
Outflow = 3.54 cfs @ 12.05 hrs, Volume= 0.230 af, Atten= 2%, Lag= 0.3 min
Primary = 3.54 cfs @ 12.05 hrs, Volume= 0.230 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 207.07' @ 12.05 hrs Surf.Area= 422 sf Storage= 431 cf

Plug-Flow detention time= 39.4 min calculated for 0.230 af (97% of inflow)
Center-of-Mass det. time= 19.4 min (782.4 - 763.1)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.53 cfs @ 12.05 hrs HW=207.07' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 3.53 cfs @ 1.59 fps)

Summary for Pond 11P: P4-RG#11

[93] Warning: Storage range exceeded by 0.12'

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 4.66" for 25-yr event
Inflow = 6.79 cfs @ 12.05 hrs, Volume= 0.451 af
Outflow = 6.77 cfs @ 12.05 hrs, Volume= 0.400 af, Atten= 0%, Lag= 0.0 min
Primary = 6.77 cfs @ 12.05 hrs, Volume= 0.400 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.46' @ 12.04 hrs Surf.Area= 2,356 sf Storage= 2,744 cf

Plug-Flow detention time= 106.7 min calculated for 0.399 af (89% of inflow)
Center-of-Mass det. time= 50.3 min (806.9 - 756.7)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.61 cfs @ 12.05 hrs HW=208.45' (Free Discharge)
↳**1=Orifice/Grate** (Weir Controls 6.61 cfs @ 1.96 fps)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 3.52" for 25-yr event
Inflow = 57.23 cfs @ 12.13 hrs, Volume= 4.386 af
Outflow = 14.55 cfs @ 12.47 hrs, Volume= 3.800 af, Atten= 75%, Lag= 20.5 min
Primary = 14.55 cfs @ 12.47 hrs, Volume= 3.800 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 205.10' @ 12.47 hrs Surf.Area= 28,265 sf Storage= 85,386 cf

Plug-Flow detention time= 185.5 min calculated for 3.792 af (86% of inflow)
Center-of-Mass det. time= 122.8 min (925.3 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=14.54 cfs @ 12.47 hrs HW=205.10' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 3.39 cfs @ 8.13 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 11.15 cfs @ 4.14 fps)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 3.32" for 25-yr event
Inflow = 17.98 cfs @ 12.17 hrs, Volume= 1.824 af
Outflow = 2.78 cfs @ 13.05 hrs, Volume= 1.065 af, Atten= 85%, Lag= 52.7 min
Primary = 2.78 cfs @ 13.05 hrs, Volume= 1.065 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.22' @ 13.05 hrs Surf.Area= 17,203 sf Storage= 46,795 cf

Plug-Flow detention time= 287.2 min calculated for 1.065 af (58% of inflow)
Center-of-Mass det. time= 170.4 min (958.8 - 788.4)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.78 cfs @ 13.05 hrs HW=204.22' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.27 cfs @ 7.78 fps)
- **2=Sharp-Crested Rectangular Weir** (Weir Controls 2.51 cfs @ 3.22 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 12: P4-RG#12

[93] Warning: Storage range exceeded by 0.11'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 4.56" for 25-yr event
Inflow = 6.48 cfs @ 12.13 hrs, Volume= 0.498 af
Outflow = 6.51 cfs @ 12.13 hrs, Volume= 0.493 af, Atten= 0%, Lag= 0.1 min
Primary = 6.51 cfs @ 12.13 hrs, Volume= 0.493 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.39' @ 12.13 hrs Surf.Area= 316 sf Storage= 312 cf

Plug-Flow detention time= 14.6 min calculated for 0.492 af (99% of inflow)
Center-of-Mass det. time= 7.4 min (770.8 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.24 cfs @ 12.13 hrs HW=206.38' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 6.24 cfs @ 1.93 fps)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 3.82" for 25-yr event
Inflow = 4.24 cfs @ 12.14 hrs, Volume= 0.366 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 24.00 hrs Surf.Area= 316.205 ac Storage= 0.365 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 2.70" for 25-yr event
Inflow = 23.79 cfs @ 12.59 hrs, Volume= 5.913 af
Primary = 23.79 cfs @ 12.59 hrs, Volume= 5.913 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 4.11" for 25-yr event
Inflow = 12.71 cfs @ 12.25 hrs, Volume= 1.245 af
Primary = 12.71 cfs @ 12.25 hrs, Volume= 1.245 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 3.76" for 25-yr event
Inflow = 53.37 cfs @ 12.12 hrs, Volume= 4.169 af
Primary = 53.37 cfs @ 12.12 hrs, Volume= 4.169 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 41L: TOTAL PDA TO AP#3

Inflow Area = 2.550 ac, 22.27% Impervious, Inflow Depth > 2.99" for 25-yr event
Inflow = 8.99 cfs @ 12.13 hrs, Volume= 0.635 af
Primary = 8.99 cfs @ 12.13 hrs, Volume= 0.635 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 3.31" for 25-yr event
Inflow = 19.91 cfs @ 12.13 hrs, Volume= 1.412 af
Primary = 19.91 cfs @ 12.13 hrs, Volume= 1.412 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 5.61" for 25-yr event
Inflow = 4.43 cfs @ 12.13 hrs, Volume= 0.341 af
Primary = 4.43 cfs @ 12.13 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=2.27 cfs 0.148 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=1.69 cfs 0.132 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.27 cfs 0.018 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>4.36"
Tc=6.0 min CN=68 Runoff=0.45 cfs 0.029 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=2.87 cfs 0.224 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>3.90"
Tc=6.0 min CN=64 Runoff=0.45 cfs 0.029 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=3.46 cfs 0.270 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.55 cfs 0.036 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=1.60 cfs 0.125 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=7.50 cfs 0.489 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>7.91"
Tc=0.0 min CN=98 Runoff=5.48 cfs 0.376 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=2.53 cfs 0.198 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.82 cfs 0.053 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=1.55 cfs 0.101 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>2.88"
Tc=6.0 min CN=55 Runoff=6.01 cfs 0.396 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=2.45 cfs 0.191 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.45 cfs 0.030 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=5.40 cfs 0.422 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.86 cfs 0.056 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=1.10 cfs 0.086 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.50 cfs 0.033 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=11.90 cfs 0.929 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>3.90"
Tc=6.0 min CN=64 Runoff=18.51 cfs 1.204 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=5.74 cfs 0.448 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.23 cfs 0.015 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>3.56"
Tc=0.0 min CN=61 Runoff=1.93 cfs 0.110 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>7.91"
Tc=0.0 min CN=98 Runoff=7.59 cfs 0.521 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>7.91"
Tc=0.0 min CN=98 Runoff=3.75 cfs 0.257 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>3.56"
Tc=0.0 min CN=61 Runoff=1.41 cfs 0.080 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=6.33 cfs 0.494 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.39 cfs 0.033 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=0.93 cfs 0.072 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>4.46"
Tc=16.1 min CN=69 Runoff=8.55 cfs 0.766 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>7.89"
Tc=16.1 min CN=98 Runoff=9.90 cfs 1.032 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=198' Tc=13.8 min CN=61 Runoff=2.16 cfs 0.183 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=4.47 cfs 0.349 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>4.31"
Flow Length=710' Tc=43.3 min CN=68 Runoff=11.62 cfs 1.691 af

Subcatchment39S: PDA 3 IMP Runoff Area=0.568 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=4.79 cfs 0.374 af

Subcatchment40S: PDA 3 PERV Runoff Area=1.982 ac 0.00% Impervious Runoff Depth>3.67"
Tc=6.0 min CN=62 Runoff=9.31 cfs 0.606 af

Pond 1P: P4-RG#1 Peak Elev=208.88' Storage=1,259 cf Inflow=3.35 cfs 0.251 af
Outflow=3.29 cfs 0.228 af

Pond 2P: P4-RG#2 Peak Elev=208.61' Storage=470 cf Inflow=1.96 cfs 0.149 af
Outflow=1.96 cfs 0.141 af

Pond 3P: P4-RG#3 Peak Elev=209.33' Storage=302 cf Inflow=3.31 cfs 0.253 af
Outflow=3.33 cfs 0.248 af

Pond 4P: P4-RG#4 Peak Elev=208.71' Storage=269 cf Inflow=3.91 cfs 0.299 af
Outflow=3.93 cfs 0.294 af

Pond 5P: P4-RG#5 Peak Elev=213.52' Storage=719 cf Inflow=2.15 cfs 0.161 af
Outflow=2.13 cfs 0.147 af

Pond 6P: P4-RG#6 Peak Elev=214.24' Storage=805 cf Inflow=10.62 cfs 0.864 af
Outflow=10.54 cfs 0.850 af

Pond 7P: P4-RG#7 Peak Elev=210.55' Storage=1,092 cf Inflow=2.90 cfs 0.221 af
Outflow=2.87 cfs 0.200 af

Pond 8P: P4-RG#8 Peak Elev=210.21' Storage=3,154 cf Inflow=6.26 cfs 0.478 af
Outflow=6.64 cfs 0.420 af

Pond 9P: P4-RG#9 Peak Elev=210.48' Storage=1,023 cf Inflow=1.60 cfs 0.118 af
Outflow=1.56 cfs 0.098 af

Pond 10P: P4-RG#10 Peak Elev=207.14' Storage=436 cf Inflow=5.15 cfs 0.337 af
Outflow=5.29 cfs 0.329 af

Pond 11P: P4-RG#11 Peak Elev=208.56' Storage=2,744 cf Inflow=9.52 cfs 0.630 af
Outflow=9.96 cfs 0.580 af

Pond B: BASIN B	Peak Elev=206.14' Storage=116,258 cf	Inflow=84.09 cfs 6.527 af Outflow=30.56 cfs 5.790 af
Pond C: BASIN C	Peak Elev=205.10' Storage=62,729 cf	Inflow=26.17 cfs 2.640 af Outflow=5.50 cfs 1.856 af
Pond RG 12: P4-RG#12	Peak Elev=206.48' Storage=312 cf	Inflow=9.10 cfs 0.700 af Outflow=9.08 cfs 0.694 af
Pond RG 13: P4-RG#13	Peak Elev=204.75' Storage=0.530 af	Inflow=6.13 cfs 0.532 af Outflow=0.00 cfs 0.000 af
Link 1L: TOTAL BASIN C TO AP#4		Inflow=43.07 cfs 9.338 af Primary=43.07 cfs 9.338 af
Link 10L:		Inflow=18.44 cfs 1.798 af Primary=18.44 cfs 1.798 af
Link 38L: PDA TO BASIN B		Inflow=78.37 cfs 6.131 af Primary=78.37 cfs 6.131 af
Link 41L: TOTAL PDA TO AP#3		Inflow=14.09 cfs 0.980 af Primary=14.09 cfs 0.980 af
Link P4-1: P4-1		Inflow=30.39 cfs 2.133 af Primary=30.39 cfs 2.133 af
Link P4-2: P4-2		Inflow=5.97 cfs 0.463 af Primary=5.97 cfs 0.463 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 2.27 cfs @ 12.13 hrs, Volume= 0.148 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.132 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 2.87 cfs @ 12.13 hrs, Volume= 0.224 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 3.46 cfs @ 12.13 hrs, Volume= 0.270 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.036 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 1.60 cfs @ 12.13 hrs, Volume= 0.125 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 7.50 cfs @ 12.13 hrs, Volume= 0.489 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.48 cfs @ 12.04 hrs, Volume= 0.376 af, Depth> 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 2.53 cfs @ 12.13 hrs, Volume= 0.198 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.053 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 1.55 cfs @ 12.13 hrs, Volume= 0.101 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 6.01 cfs @ 12.14 hrs, Volume= 0.396 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 2.45 cfs @ 12.13 hrs, Volume= 0.191 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.030 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 5.40 cfs @ 12.13 hrs, Volume= 0.422 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.86 cfs @ 12.13 hrs, Volume= 0.056 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 1.10 cfs @ 12.13 hrs, Volume= 0.086 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.50 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 11.90 cfs @ 12.13 hrs, Volume= 0.929 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 18.51 cfs @ 12.13 hrs, Volume= 1.204 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 5.74 cfs @ 12.13 hrs, Volume= 0.448 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.23 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.93 cfs @ 12.05 hrs, Volume= 0.110 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 7.59 cfs @ 12.04 hrs, Volume= 0.521 af, Depth> 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.75 cfs @ 12.04 hrs, Volume= 0.257 af, Depth> 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.41 cfs @ 12.05 hrs, Volume= 0.080 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 6.33 cfs @ 12.13 hrs, Volume= 0.494 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.39 cfs @ 12.22 hrs, Volume= 0.033 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.93 cfs @ 12.13 hrs, Volume= 0.072 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 8.55 cfs @ 12.25 hrs, Volume= 0.766 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 9.90 cfs @ 12.24 hrs, Volume= 1.032 af, Depth> 7.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 2.16 cfs @ 12.22 hrs, Volume= 0.183 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 4.47 cfs @ 12.13 hrs, Volume= 0.349 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 11.62 cfs @ 12.61 hrs, Volume= 1.691 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Subcatchment 39S: PDA 3 IMP

Runoff = 4.79 cfs @ 12.13 hrs, Volume= 0.374 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.568	98	Paved parking, HSG B
0.568		100.00% Impervious Area

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

Summary for Subcatchment 40S: PDA 3 PERV

Runoff = 9.31 cfs @ 12.13 hrs, Volume= 0.606 af, Depth> 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.646	55	Woods, Good, HSG B
0.406	70	Woods, Good, HSG C
0.820	61	>75% Grass cover, Good, HSG B
0.110	74	>75% Grass cover, Good, HSG C
1.982	62	Weighted Average
1.982		100.00% Pervious Area

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

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 6.27" for 100-yr event
Inflow = 3.35 cfs @ 12.13 hrs, Volume= 0.251 af
Outflow = 3.29 cfs @ 12.14 hrs, Volume= 0.228 af, Atten= 2%, Lag= 1.0 min
Primary = 3.29 cfs @ 12.14 hrs, Volume= 0.228 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.88' @ 12.14 hrs Surf.Area= 1,264 sf Storage= 1,259 cf

Plug-Flow detention time= 92.2 min calculated for 0.228 af (91% of inflow)
Center-of-Mass det. time= 43.5 min (806.7 - 763.2)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.23 cfs @ 12.14 hrs HW=208.87' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 3.23 cfs @ 1.55 fps)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 6.90" for 100-yr event
Inflow = 1.96 cfs @ 12.13 hrs, Volume= 0.149 af
Outflow = 1.96 cfs @ 12.14 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.6 min
Primary = 1.96 cfs @ 12.14 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.61' @ 12.14 hrs Surf.Area= 552 sf Storage= 470 cf

Plug-Flow detention time= 66.8 min calculated for 0.140 af (94% of inflow)
Center-of-Mass det. time= 32.4 min (785.8 - 753.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.89 cfs @ 12.14 hrs HW=208.61' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 1.89 cfs @ 1.29 fps)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 7.23" for 100-yr event
Inflow = 3.31 cfs @ 12.13 hrs, Volume= 0.253 af
Outflow = 3.33 cfs @ 12.13 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.4 min
Primary = 3.33 cfs @ 12.13 hrs, Volume= 0.248 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.33' @ 12.13 hrs Surf.Area= 324 sf Storage= 302 cf

Plug-Flow detention time= 26.9 min calculated for 0.247 af (98% of inflow)
Center-of-Mass det. time= 13.5 min (764.7 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.20 cfs @ 12.13 hrs HW=209.32' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 3.20 cfs @ 1.54 fps)

Summary for Pond 4P: P4-RG#4

[93] Warning: Storage range exceeded by 0.01'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 7.18" for 100-yr event
Inflow = 3.91 cfs @ 12.13 hrs, Volume= 0.299 af
Outflow = 3.93 cfs @ 12.13 hrs, Volume= 0.294 af, Atten= 0%, Lag= 0.3 min
Primary = 3.93 cfs @ 12.13 hrs, Volume= 0.294 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.71' @ 12.13 hrs Surf.Area= 272 sf Storage= 269 cf

Plug-Flow detention time= 20.6 min calculated for 0.294 af (98% of inflow)
Center-of-Mass det. time= 10.4 min (760.9 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	161	0	0	161
207.70	183	43	43	187
207.95	204	48	91	212
208.20	226	54	145	238
208.45	248	59	204	265
208.70	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.77 cfs @ 12.13 hrs HW=208.70' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 3.77 cfs @ 1.63 fps)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 6.22" for 100-yr event
Inflow = 2.15 cfs @ 12.13 hrs, Volume= 0.161 af
Outflow = 2.13 cfs @ 12.14 hrs, Volume= 0.147 af, Atten= 1%, Lag= 0.8 min
Primary = 2.13 cfs @ 12.14 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.52' @ 12.14 hrs Surf.Area= 766 sf Storage= 719 cf

Plug-Flow detention time= 87.0 min calculated for 0.147 af (91% of inflow)
Center-of-Mass det. time= 41.2 min (805.3 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.08 cfs @ 12.14 hrs HW=213.52' (Free Discharge)
1=Orifice/Grate (Weir Controls 2.08 cfs @ 1.34 fps)

Summary for Pond 6P: P4-RG#6

[93] Warning: Storage range exceeded by 0.24'

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 4.67" for 100-yr event
Inflow = 10.62 cfs @ 12.09 hrs, Volume= 0.864 af
Outflow = 10.54 cfs @ 12.08 hrs, Volume= 0.850 af, Atten= 1%, Lag= 0.0 min
Primary = 10.54 cfs @ 12.08 hrs, Volume= 0.850 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 214.24' @ 12.08 hrs Surf.Area= 791 sf Storage= 805 cf

Plug-Flow detention time= 21.3 min calculated for 0.850 af (98% of inflow)
Center-of-Mass det. time= 11.1 min (809.0 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.40 cfs @ 12.08 hrs HW=214.24' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 10.40 cfs @ 2.28 fps)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 6.79" for 100-yr event
Inflow = 2.90 cfs @ 12.13 hrs, Volume= 0.221 af
Outflow = 2.87 cfs @ 12.14 hrs, Volume= 0.200 af, Atten= 1%, Lag= 0.9 min
Primary = 2.87 cfs @ 12.14 hrs, Volume= 0.200 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.55' @ 12.14 hrs Surf.Area= 1,024 sf Storage= 1,092 cf

Plug-Flow detention time= 93.8 min calculated for 0.200 af (91% of inflow)
Center-of-Mass det. time= 44.9 min (799.9 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.80 cfs @ 12.14 hrs HW=210.54' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.80 cfs @ 1.47 fps)

Summary for Pond 8P: P4-RG#8

[93] Warning: Storage range exceeded by 0.11'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 6.91" for 100-yr event
Inflow = 6.26 cfs @ 12.13 hrs, Volume= 0.478 af
Outflow = 6.64 cfs @ 12.11 hrs, Volume= 0.420 af, Atten= 0%, Lag= 0.0 min
Primary = 6.64 cfs @ 12.11 hrs, Volume= 0.420 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.21' @ 12.11 hrs Surf.Area= 2,876 sf Storage= 3,154 cf

Plug-Flow detention time= 113.4 min calculated for 0.420 af (88% of inflow)
Center-of-Mass det. time= 54.6 min (807.9 - 753.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.30 cfs @ 12.11 hrs HW=210.20' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 6.30 cfs @ 1.93 fps)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 5.91" for 100-yr event
Inflow = 1.60 cfs @ 12.13 hrs, Volume= 0.118 af
Outflow = 1.56 cfs @ 12.15 hrs, Volume= 0.098 af, Atten= 2%, Lag= 1.0 min
Primary = 1.56 cfs @ 12.15 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.48' @ 12.15 hrs Surf.Area= 1,010 sf Storage= 1,023 cf

Plug-Flow detention time= 136.3 min calculated for 0.098 af (83% of inflow)
Center-of-Mass det. time= 61.3 min (831.0 - 769.8)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.54 cfs @ 12.15 hrs HW=210.48' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.54 cfs @ 1.21 fps)

Summary for Pond 10P: P4-RG#10

[93] Warning: Storage range exceeded by 0.06'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 6.13" for 100-yr event
Inflow = 5.15 cfs @ 12.05 hrs, Volume= 0.337 af
Outflow = 5.29 cfs @ 12.05 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.1 min
Primary = 5.29 cfs @ 12.05 hrs, Volume= 0.329 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 207.14' @ 12.05 hrs Surf.Area= 423 sf Storage= 436 cf

Plug-Flow detention time= 29.2 min calculated for 0.329 af (98% of inflow)
Center-of-Mass det. time= 14.7 min (775.6 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.19 cfs @ 12.05 hrs HW=207.14' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 5.19 cfs @ 1.81 fps)

Summary for Pond 11P: P4-RG#11

[93] Warning: Storage range exceeded by 0.22'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 6.52" for 100-yr event
Inflow = 9.52 cfs @ 12.05 hrs, Volume= 0.630 af
Outflow = 9.96 cfs @ 12.05 hrs, Volume= 0.580 af, Atten= 0%, Lag= 0.1 min
Primary = 9.96 cfs @ 12.05 hrs, Volume= 0.580 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.56' @ 12.05 hrs Surf.Area= 2,356 sf Storage= 2,744 cf

Plug-Flow detention time= 85.7 min calculated for 0.580 af (92% of inflow)
Center-of-Mass det. time= 41.3 min (795.6 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.72 cfs @ 12.05 hrs HW=208.56' (Free Discharge)
↑**1=Orifice/Grate** (Weir Controls 9.72 cfs @ 2.23 fps)

Summary for Pond B: BASIN B

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 5.23" for 100-yr event
Inflow = 84.09 cfs @ 12.12 hrs, Volume= 6.527 af
Outflow = 30.56 cfs @ 12.33 hrs, Volume= 5.790 af, Atten= 64%, Lag= 12.7 min
Primary = 30.56 cfs @ 12.33 hrs, Volume= 5.790 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 206.14' @ 12.33 hrs Surf.Area= 31,385 sf Storage= 116,258 cf

Plug-Flow detention time= 151.4 min calculated for 5.778 af (89% of inflow)
Center-of-Mass det. time= 96.1 min (892.0 - 795.9)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=30.25 cfs @ 12.33 hrs HW=206.14' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 3.95 cfs @ 9.49 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Weir Controls 6.54 cfs @ 0.95 fps)
- **4=Sharp-Crested Rectangular Weir** (Orifice Controls 19.75 cfs @ 6.17 fps)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 4.81" for 100-yr event
Inflow = 26.17 cfs @ 12.17 hrs, Volume= 2.640 af
Outflow = 5.50 cfs @ 12.80 hrs, Volume= 1.856 af, Atten= 79%, Lag= 37.8 min
Primary = 5.50 cfs @ 12.80 hrs, Volume= 1.856 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 205.10' @ 12.80 hrs Surf.Area= 18,746 sf Storage= 62,729 cf

Plug-Flow detention time= 242.5 min calculated for 1.856 af (70% of inflow)
Center-of-Mass det. time= 143.8 min (928.2 - 784.4)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=5.50 cfs @ 12.80 hrs HW=205.10' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.31 cfs @ 9.01 fps)
- **2=Sharp-Crested Rectangular Weir** (Weir Controls 5.20 cfs @ 4.45 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG 12: P4-RG#12

[93] Warning: Storage range exceeded by 0.20'

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 6.41" for 100-yr event
Inflow = 9.10 cfs @ 12.13 hrs, Volume= 0.700 af
Outflow = 9.08 cfs @ 12.13 hrs, Volume= 0.694 af, Atten= 0%, Lag= 0.0 min
Primary = 9.08 cfs @ 12.13 hrs, Volume= 0.694 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.48' @ 12.13 hrs Surf.Area= 316 sf Storage= 312 cf

Plug-Flow detention time= 10.8 min calculated for 0.694 af (99% of inflow)
Center-of-Mass det. time= 5.6 min (766.7 - 761.1)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.74 cfs @ 12.13 hrs HW=206.46' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 8.74 cfs @ 2.16 fps)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 5.55" for 100-yr event
Inflow = 6.13 cfs @ 12.14 hrs, Volume= 0.532 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 24.00 hrs Surf.Area= 316.298 ac Storage= 0.530 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 4.27" for 100-yr event
Inflow = 43.07 cfs @ 12.37 hrs, Volume= 9.338 af
Primary = 43.07 cfs @ 12.37 hrs, Volume= 9.338 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 5.94" for 100-yr event
Inflow = 18.44 cfs @ 12.24 hrs, Volume= 1.798 af
Primary = 18.44 cfs @ 12.24 hrs, Volume= 1.798 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 5.52" for 100-yr event
Inflow = 78.37 cfs @ 12.12 hrs, Volume= 6.131 af
Primary = 78.37 cfs @ 12.12 hrs, Volume= 6.131 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 41L: TOTAL PDA TO AP#3

Inflow Area = 2.550 ac, 22.27% Impervious, Inflow Depth > 4.61" for 100-yr event
Inflow = 14.09 cfs @ 12.13 hrs, Volume= 0.980 af
Primary = 14.09 cfs @ 12.13 hrs, Volume= 0.980 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

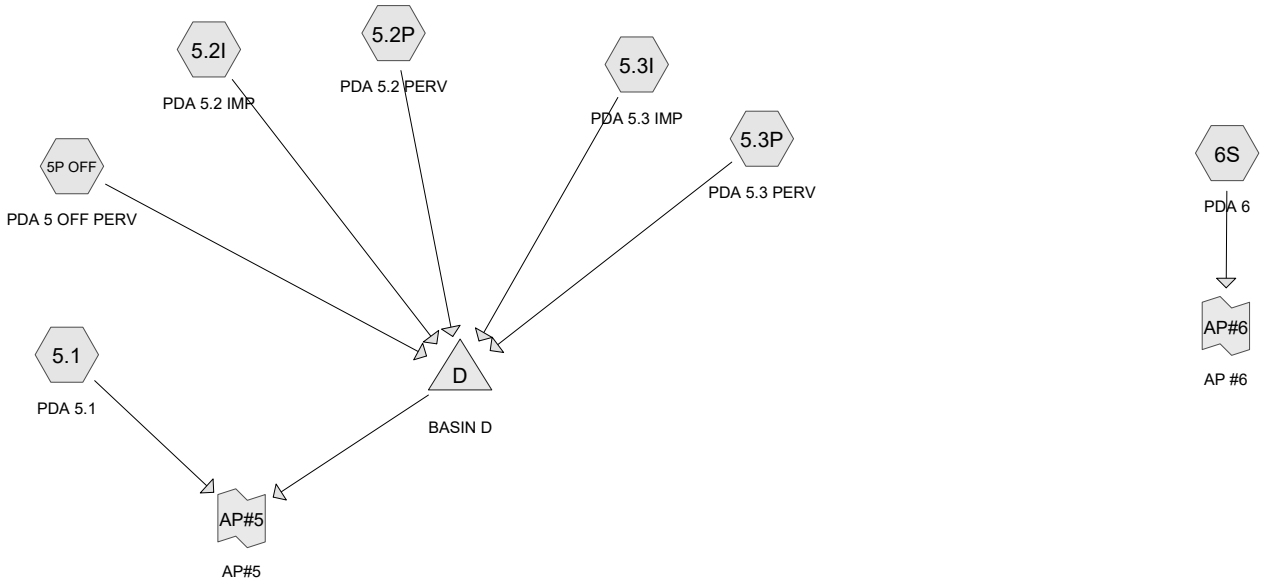
Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 5.00" for 100-yr event
Inflow = 30.39 cfs @ 12.13 hrs, Volume= 2.133 af
Primary = 30.39 cfs @ 12.13 hrs, Volume= 2.133 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 7.61" for 100-yr event
Inflow = 5.97 cfs @ 12.13 hrs, Volume= 0.463 af
Primary = 5.97 cfs @ 12.13 hrs, Volume= 0.463 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



Subcat Reach Pond Link

Routing Diagram for 2020-11-20 PDA TO AP#5-BASIN D_080661-Zaitz
Prepared by Bowman Consulting, Printed 1/11/2021
HydroCAD® 10.10-3a s/n 09435 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=72 Runoff=0.03 cfs 0.002 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.26 cfs 0.038 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=359' Tc=19.1 min CN=65 Runoff=0.02 cfs 0.001 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=3.04 cfs 0.091 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=0.01"
Tc=17.5 min CN=65 Runoff=0.01 cfs 0.000 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=0.13"
Flow Length=470' Tc=9.8 min CN=78 Runoff=0.37 cfs 0.014 af

Subcatchment6S: PDA 6 Runoff Area=0.147 ac 0.00% Impervious Runoff Depth=0.03"
Tc=6.0 min CN=69 Runoff=0.01 cfs 0.000 af

Pond D: BASIN D Peak Elev=207.72' Storage=6,246 cf Inflow=4.40 cfs 0.143 af
Outflow=0.00 cfs 0.000 af

Link AP#5: AP#5 Inflow=0.03 cfs 0.002 af
Primary=0.03 cfs 0.002 af

Link AP#6: AP #6 Inflow=0.01 cfs 0.000 af
Primary=0.01 cfs 0.000 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 0.03 cfs @ 1.24 hrs, Volume= 0.002 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 1.26 cfs @ 1.09 hrs, Volume= 0.038 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 0.02 cfs @ 1.91 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 3.04 cfs @ 1.09 hrs, Volume= 0.091 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 0.01 cfs @ 1.89 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 0.37 cfs @ 1.22 hrs, Volume= 0.014 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Subcatchment 6S: PDA 6

Runoff = 0.01 cfs @ 1.54 hrs, Volume= 0.000 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.055	61	>75% Grass cover, Good, HSG B
0.092	74	>75% Grass cover, Good, HSG C
0.147	69	Weighted Average
0.147		100.00% Pervious Area

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

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 0.32" for NJ WQ event
Inflow = 4.40 cfs @ 1.10 hrs, Volume= 0.143 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 207.72' @ 3.15 hrs Surf.Area= 9,196 sf Storage= 6,246 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=207.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.03 cfs @ 1.24 hrs, Volume= 0.002 af
Primary = 0.03 cfs @ 1.24 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#6: AP #6

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth = 0.03" for NJ WQ event
Inflow = 0.01 cfs @ 1.54 hrs, Volume= 0.000 af
Primary = 0.01 cfs @ 1.54 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=1.00"
Tc=6.0 min CN=72 Runoff=0.44 cfs 0.030 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=1.48 cfs 0.112 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=0.65"
Flow Length=359' Tc=19.1 min CN=65 Runoff=0.78 cfs 0.092 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=3.57 cfs 0.269 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=0.65"
Tc=17.5 min CN=65 Runoff=0.44 cfs 0.050 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=1.35"
Flow Length=470' Tc=9.8 min CN=78 Runoff=1.90 cfs 0.143 af

Subcatchment6S: PDA 6 Runoff Area=0.147 ac 0.00% Impervious Runoff Depth=0.84"
Tc=6.0 min CN=69 Runoff=0.15 cfs 0.010 af

Pond D: BASIN D Peak Elev=209.84' Storage=29,022 cf Inflow=7.32 cfs 0.666 af
Outflow=0.00 cfs 0.000 af

Link AP#5: AP#5 Inflow=0.44 cfs 0.030 af
Primary=0.44 cfs 0.030 af

Link AP#6: AP #6 Inflow=0.15 cfs 0.010 af
Primary=0.15 cfs 0.010 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 0.44 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 1.48 cfs @ 12.13 hrs, Volume= 0.112 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 0.78 cfs @ 12.32 hrs, Volume= 0.092 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 3.57 cfs @ 12.13 hrs, Volume= 0.269 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 0.44 cfs @ 12.30 hrs, Volume= 0.050 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 1.90 cfs @ 12.18 hrs, Volume= 0.143 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Subcatchment 6S: PDA 6

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.055	61	>75% Grass cover, Good, HSG B
0.092	74	>75% Grass cover, Good, HSG C
0.147	69	Weighted Average
0.147		100.00% Pervious Area

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

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 1.49" for 2-yr event
Inflow = 7.32 cfs @ 12.14 hrs, Volume= 0.666 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 209.84' @ 25.15 hrs Surf.Area= 12,317 sf Storage= 29,022 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=207.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 0.06" for 2-yr event
Inflow = 0.44 cfs @ 12.14 hrs, Volume= 0.030 af
Primary = 0.44 cfs @ 12.14 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#6: AP #6

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth = 0.84" for 2-yr event
Inflow = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af
Primary = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=2.17"
Tc=6.0 min CN=72 Runoff=0.99 cfs 0.064 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=2.23 cfs 0.172 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=359' Tc=19.1 min CN=65 Runoff=2.27 cfs 0.231 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=5.39 cfs 0.414 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=1.63"
Tc=17.5 min CN=65 Runoff=1.27 cfs 0.124 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=2.69"
Flow Length=470' Tc=9.8 min CN=78 Runoff=3.80 cfs 0.284 af

Subcatchment6S: PDA 6 Runoff Area=0.147 ac 0.00% Impervious Runoff Depth=1.94"
Tc=6.0 min CN=69 Runoff=0.36 cfs 0.024 af

Pond D: BASIN D Peak Elev=210.07' Storage=31,943 cf Inflow=13.29 cfs 1.225 af
Outflow=2.39 cfs 0.513 af

Link AP#5: AP#5 Inflow=2.53 cfs 0.577 af
Primary=2.53 cfs 0.577 af

Link AP#6: AP #6 Inflow=0.36 cfs 0.024 af
Primary=0.36 cfs 0.024 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 0.99 cfs @ 12.13 hrs, Volume= 0.064 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 2.23 cfs @ 12.13 hrs, Volume= 0.172 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 2.27 cfs @ 12.30 hrs, Volume= 0.231 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 5.39 cfs @ 12.13 hrs, Volume= 0.414 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 1.27 cfs @ 12.28 hrs, Volume= 0.124 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 3.80 cfs @ 12.17 hrs, Volume= 0.284 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Subcatchment 6S: PDA 6

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.024 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.055	61	>75% Grass cover, Good, HSG B
0.092	74	>75% Grass cover, Good, HSG C
0.147	69	Weighted Average
0.147		100.00% Pervious Area

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

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 2.74" for 10-yr event
Inflow = 13.29 cfs @ 12.15 hrs, Volume= 1.225 af
Outflow = 2.39 cfs @ 12.88 hrs, Volume= 0.513 af, Atten= 82%, Lag= 43.6 min
Primary = 2.39 cfs @ 12.88 hrs, Volume= 0.513 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.07' @ 12.88 hrs Surf.Area= 12,789 sf Storage= 31,943 cf

Plug-Flow detention time= 324.3 min calculated for 0.513 af (42% of inflow)
Center-of-Mass det. time= 178.8 min (984.4 - 805.7)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.35 cfs @ 12.88 hrs HW=210.07' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.35 cfs @ 0.64 fps)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 1.21" for 10-yr event
Inflow = 2.53 cfs @ 12.87 hrs, Volume= 0.577 af
Primary = 2.53 cfs @ 12.87 hrs, Volume= 0.577 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#6: AP #6

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth = 1.94" for 10-yr event
Inflow = 0.36 cfs @ 12.14 hrs, Volume= 0.024 af
Primary = 0.36 cfs @ 12.14 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=72 Runoff=1.40 cfs 0.091 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=2.75 cfs 0.213 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=2.43"
Flow Length=359' Tc=19.1 min CN=65 Runoff=3.48 cfs 0.343 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=98 Runoff=6.63 cfs 0.514 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=2.43"
Tc=17.5 min CN=65 Runoff=1.95 cfs 0.184 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=3.68"
Flow Length=470' Tc=9.8 min CN=78 Runoff=5.18 cfs 0.389 af

Subcatchment6S: PDA 6 Runoff Area=0.147 ac 0.00% Impervious Runoff Depth=2.80"
Tc=6.0 min CN=69 Runoff=0.53 cfs 0.034 af

Pond D: BASIN D Peak Elev=210.18' Storage=33,328 cf Inflow=17.70 cfs 1.644 af
Outflow=9.09 cfs 0.932 af

Link AP#5: AP#5 Inflow=9.46 cfs 1.023 af
Primary=9.46 cfs 1.023 af

Link AP#6: AP #6 Inflow=0.53 cfs 0.034 af
Primary=0.53 cfs 0.034 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.091 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 2.75 cfs @ 12.13 hrs, Volume= 0.213 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 3.48 cfs @ 12.30 hrs, Volume= 0.343 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 6.63 cfs @ 12.13 hrs, Volume= 0.514 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 1.95 cfs @ 12.27 hrs, Volume= 0.184 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 5.18 cfs @ 12.17 hrs, Volume= 0.389 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Subcatchment 6S: PDA 6

Runoff = 0.53 cfs @ 12.13 hrs, Volume= 0.034 af, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.055	61	>75% Grass cover, Good, HSG B
0.092	74	>75% Grass cover, Good, HSG C
0.147	69	Weighted Average
0.147		100.00% Pervious Area

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

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 3.68" for 25-yr event
Inflow = 17.70 cfs @ 12.15 hrs, Volume= 1.644 af
Outflow = 9.09 cfs @ 12.40 hrs, Volume= 0.932 af, Atten= 49%, Lag= 15.1 min
Primary = 9.09 cfs @ 12.40 hrs, Volume= 0.932 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.18' @ 12.40 hrs Surf.Area= 13,119 sf Storage= 33,328 cf

Plug-Flow detention time= 236.6 min calculated for 0.932 af (57% of inflow)
Center-of-Mass det. time= 115.2 min (917.7 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=9.04 cfs @ 12.40 hrs HW=210.18' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 9.04 cfs @ 1.01 fps)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 2.15" for 25-yr event
Inflow = 9.46 cfs @ 12.40 hrs, Volume= 1.023 af
Primary = 9.46 cfs @ 12.40 hrs, Volume= 1.023 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#6: AP #6

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth = 2.80" for 25-yr event
Inflow = 0.53 cfs @ 12.13 hrs, Volume= 0.034 af
Primary = 0.53 cfs @ 12.13 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=4.83"
Tc=6.0 min CN=72 Runoff=2.17 cfs 0.143 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=3.67 cfs 0.287 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=4.02"
Flow Length=359' Tc=19.1 min CN=65 Runoff=5.84 cfs 0.567 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=8.86 cfs 0.692 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=4.02"
Tc=17.5 min CN=65 Runoff=3.27 cfs 0.305 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=5.53"
Flow Length=470' Tc=9.8 min CN=78 Runoff=7.69 cfs 0.585 af

Subcatchment6S: PDA 6 Runoff Area=0.147 ac 0.00% Impervious Runoff Depth=4.48"
Tc=6.0 min CN=69 Runoff=0.84 cfs 0.055 af

Pond D: BASIN D Peak Elev=210.34' Storage=35,413 cf Inflow=25.94 cfs 2.436 af
Outflow=24.05 cfs 1.724 af

Link AP#5: AP#5 Inflow=25.42 cfs 1.867 af
Primary=25.42 cfs 1.867 af

Link AP#6: AP #6 Inflow=0.84 cfs 0.055 af
Primary=0.84 cfs 0.055 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 2.17 cfs @ 12.13 hrs, Volume= 0.143 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 3.67 cfs @ 12.13 hrs, Volume= 0.287 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 5.84 cfs @ 12.29 hrs, Volume= 0.567 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 8.86 cfs @ 12.13 hrs, Volume= 0.692 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 3.27 cfs @ 12.27 hrs, Volume= 0.305 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 7.69 cfs @ 12.17 hrs, Volume= 0.585 af, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Subcatchment 6S: PDA 6

Runoff = 0.84 cfs @ 12.13 hrs, Volume= 0.055 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.055	61	>75% Grass cover, Good, HSG B
0.092	74	>75% Grass cover, Good, HSG C
0.147	69	Weighted Average
0.147		100.00% Pervious Area

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

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 5.45" for 100-yr event
Inflow = 25.94 cfs @ 12.15 hrs, Volume= 2.436 af
Outflow = 24.05 cfs @ 12.21 hrs, Volume= 1.724 af, Atten= 7%, Lag= 3.5 min
Primary = 24.05 cfs @ 12.21 hrs, Volume= 1.724 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.34' @ 12.21 hrs Surf.Area= 13,609 sf Storage= 35,413 cf

Plug-Flow detention time= 176.3 min calculated for 1.722 af (71% of inflow)
Center-of-Mass det. time= 77.2 min (874.6 - 797.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=23.51 cfs @ 12.21 hrs HW=210.33' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 23.51 cfs @ 1.42 fps)

Summary for Link AP#5: AP#5

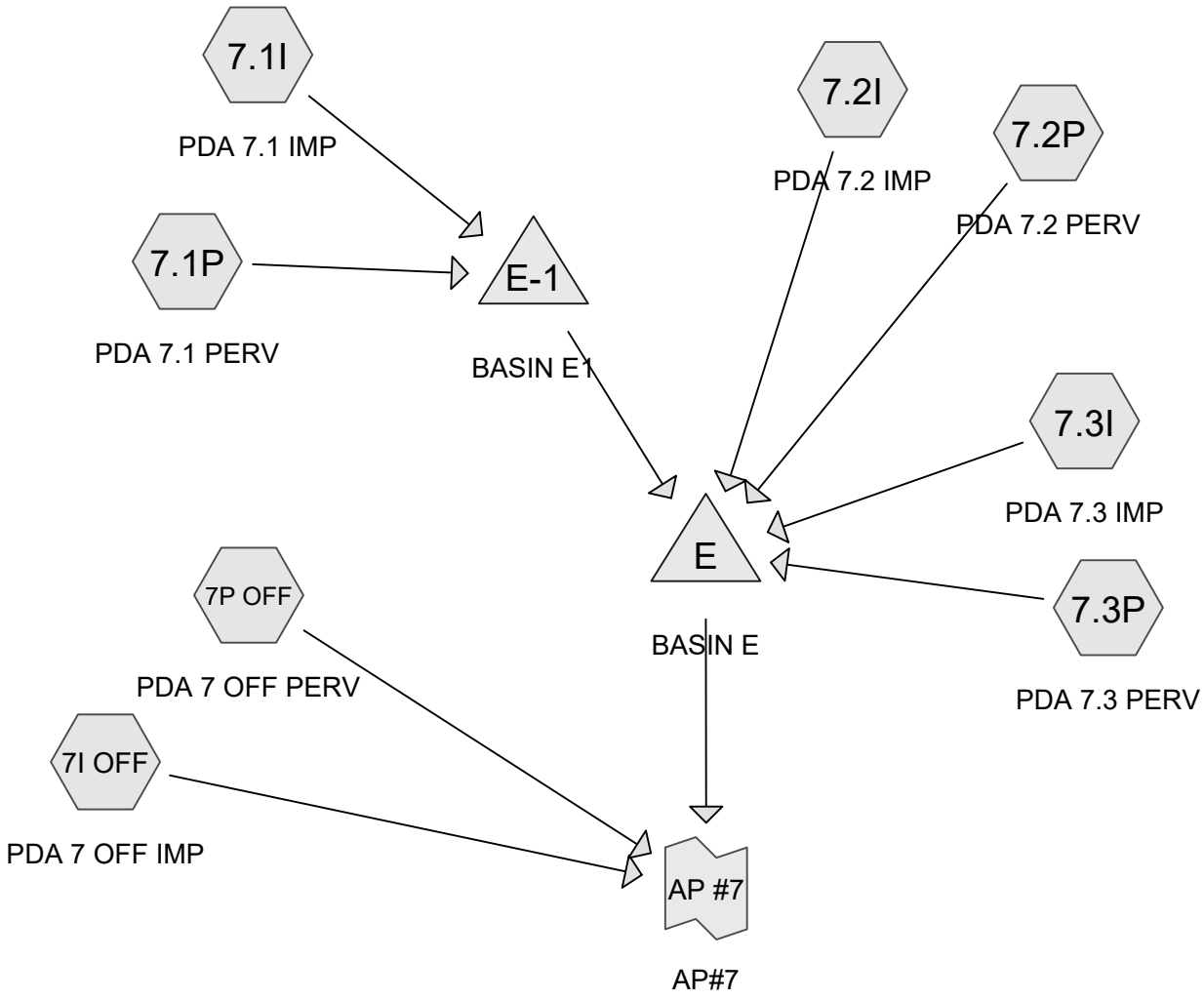
Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 3.92" for 100-yr event
Inflow = 25.42 cfs @ 12.21 hrs, Volume= 1.867 af
Primary = 25.42 cfs @ 12.21 hrs, Volume= 1.867 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#6: AP #6

Inflow Area = 0.147 ac, 0.00% Impervious, Inflow Depth = 4.48" for 100-yr event
Inflow = 0.84 cfs @ 12.13 hrs, Volume= 0.055 af
Primary = 0.84 cfs @ 12.13 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs



Subcat Reach Pond Link

Routing Diagram for 2020-11-20 PDA TO AP#7-BASIN E-080661-Zaitz
Prepared by Bowman Consulting, Printed 1/11/2021
HydroCAD® 10.10-3a s/n 09435 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=3.28 cfs 0.098 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=622' Tc=59.2 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth=1.03"
Tc=9.5 min CN=98 Runoff=0.22 cfs 0.007 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth=0.00"
Tc=18.8 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth=1.03"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.40 cfs 0.017 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=355' Tc=20.3 min CN=66 Runoff=0.02 cfs 0.001 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=96 Runoff=0.11 cfs 0.003 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth=0.07"
Tc=6.0 min CN=74 Runoff=0.01 cfs 0.000 af

Pond E: BASIN E Peak Elev=199.25' Storage=4,508 cf Inflow=0.71 cfs 0.123 af
Outflow=0.06 cfs 0.043 af

Pond E-1: BASIN E1 Peak Elev=205.50' Storage=3,570 cf Inflow=3.28 cfs 0.098 af
Outflow=0.16 cfs 0.098 af

Link AP #7: AP#7 Inflow=0.12 cfs 0.046 af
Primary=0.12 cfs 0.046 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 3.28 cfs @ 1.09 hrs, Volume= 0.098 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.22 cfs @ 1.14 hrs, Volume= 0.007 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.40 cfs @ 1.24 hrs, Volume= 0.017 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 0.02 cfs @ 1.90 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.11 cfs @ 1.10 hrs, Volume= 0.003 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.01 cfs @ 1.20 hrs, Volume= 0.000 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth = 0.30" for NJ WQ event
Inflow = 0.71 cfs @ 1.20 hrs, Volume= 0.123 af
Outflow = 0.06 cfs @ 10.08 hrs, Volume= 0.043 af, Atten= 91%, Lag= 532.6 min
Primary = 0.06 cfs @ 10.08 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 199.25' @ 10.08 hrs Surf.Area= 5,307 sf Storage= 4,508 cf

Plug-Flow detention time= 618.2 min calculated for 0.043 af (35% of inflow)
Center-of-Mass det. time= 445.4 min (702.1 - 256.8)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.06 cfs @ 10.08 hrs HW=199.25' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.84 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth = 0.39" for NJ WQ event
Inflow = 3.28 cfs @ 1.09 hrs, Volume= 0.098 af
Outflow = 0.16 cfs @ 1.89 hrs, Volume= 0.098 af, Atten= 95%, Lag= 47.6 min
Primary = 0.16 cfs @ 1.89 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 205.50' @ 1.89 hrs Surf.Area= 7,136 sf Storage= 3,570 cf

Plug-Flow detention time= 231.2 min calculated for 0.097 af (100% of inflow)

Center-of-Mass det. time= 231.8 min (302.1 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 1.89 hrs HW=205.50' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 4.55 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 0.11" for NJ WQ event
Inflow = 0.12 cfs @ 1.11 hrs, Volume= 0.046 af
Primary = 0.12 cfs @ 1.11 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=3.85 cfs 0.290 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>0.48"
Flow Length=622' Tc=59.2 min CN=61 Runoff=0.31 cfs 0.074 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>3.07"
Tc=9.5 min CN=98 Runoff=0.26 cfs 0.022 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>0.49"
Tc=18.8 min CN=61 Runoff=0.09 cfs 0.012 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>3.07"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.47 cfs 0.050 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>0.69"
Flow Length=355' Tc=20.3 min CN=66 Runoff=0.61 cfs 0.073 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=96 Runoff=0.15 cfs 0.011 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>1.11"
Tc=6.0 min CN=74 Runoff=0.10 cfs 0.007 af

Pond E: BASIN E Peak Elev=200.06' Storage=9,673 cf Inflow=1.46 cfs 0.392 af
Outflow=0.23 cfs 0.170 af

Pond E-1: BASIN E1 Peak Elev=206.03' Storage=8,293 cf Inflow=3.85 cfs 0.364 af
Outflow=0.20 cfs 0.235 af

Link AP #7: AP#7 Inflow=0.25 cfs 0.188 af
Primary=0.25 cfs 0.188 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 3.85 cfs @ 12.13 hrs, Volume= 0.290 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 0.31 cfs @ 13.01 hrs, Volume= 0.074 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.26 cfs @ 12.16 hrs, Volume= 0.022 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.09 cfs @ 12.35 hrs, Volume= 0.012 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.47 cfs @ 12.26 hrs, Volume= 0.050 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 0.61 cfs @ 12.34 hrs, Volume= 0.073 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 0.97" for 2-yr event
Inflow = 1.46 cfs @ 12.29 hrs, Volume= 0.392 af
Outflow = 0.23 cfs @ 21.55 hrs, Volume= 0.170 af, Atten= 84%, Lag= 555.5 min
Primary = 0.23 cfs @ 21.55 hrs, Volume= 0.170 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 200.06' @ 21.55 hrs Surf.Area= 7,522 sf Storage= 9,673 cf

Plug-Flow detention time= 474.2 min calculated for 0.170 af (43% of inflow)
Center-of-Mass det. time= 226.2 min (1,138.9 - 912.7)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.23 cfs @ 21.55 hrs HW=200.06' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 4.70 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Sharp-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.78 fps)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 1.46" for 2-yr event
Inflow = 3.85 cfs @ 12.13 hrs, Volume= 0.364 af
Outflow = 0.20 cfs @ 15.08 hrs, Volume= 0.235 af, Atten= 95%, Lag= 177.4 min
Primary = 0.20 cfs @ 15.08 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.03' @ 15.08 hrs Surf.Area= 10,741 sf Storage= 8,293 cf

Plug-Flow detention time= 284.2 min calculated for 0.235 af (64% of inflow)

Center-of-Mass det. time= 165.4 min (961.0 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 15.08 hrs HW=206.03' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.20 cfs @ 5.75 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.58 fps)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 0.46" for 2-yr event
Inflow = 0.25 cfs @ 12.14 hrs, Volume= 0.188 af
Primary = 0.25 cfs @ 12.14 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=5.81 cfs 0.446 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>1.32"
Flow Length=622' Tc=59.2 min CN=61 Runoff=1.07 cfs 0.206 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>4.73"
Tc=9.5 min CN=98 Runoff=0.39 cfs 0.033 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>1.34"
Tc=18.8 min CN=61 Runoff=0.32 cfs 0.033 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>4.72"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.72 cfs 0.077 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>1.70"
Flow Length=355' Tc=20.3 min CN=66 Runoff=1.72 cfs 0.177 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>4.50"
Tc=6.0 min CN=96 Runoff=0.23 cfs 0.017 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>2.34"
Tc=6.0 min CN=74 Runoff=0.22 cfs 0.014 af

Pond E: BASIN E Peak Elev=200.31' Storage=11,672 cf Inflow=3.16 cfs 0.780 af
Outflow=1.00 cfs 0.553 af

Pond E-1: BASIN E1 Peak Elev=206.49' Storage=13,861 cf Inflow=5.91 cfs 0.653 af
Outflow=0.69 cfs 0.459 af

Link AP #7: AP#7 Inflow=1.02 cfs 0.584 af
Primary=1.02 cfs 0.584 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 5.81 cfs @ 12.13 hrs, Volume= 0.446 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 1.07 cfs @ 12.89 hrs, Volume= 0.206 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.39 cfs @ 12.16 hrs, Volume= 0.033 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.32 cfs @ 12.31 hrs, Volume= 0.033 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.72 cfs @ 12.26 hrs, Volume= 0.077 af, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 1.72 cfs @ 12.32 hrs, Volume= 0.177 af, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.23 cfs @ 12.13 hrs, Volume= 0.017 af, Depth> 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.22 cfs @ 12.13 hrs, Volume= 0.014 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 1.94" for 10-yr event
Inflow = 3.16 cfs @ 12.29 hrs, Volume= 0.780 af
Outflow = 1.00 cfs @ 13.87 hrs, Volume= 0.553 af, Atten= 68%, Lag= 94.9 min
Primary = 1.00 cfs @ 13.87 hrs, Volume= 0.553 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 200.31' @ 13.87 hrs Surf.Area= 8,165 sf Storage= 11,672 cf

Plug-Flow detention time= 252.1 min calculated for 0.553 af (71% of inflow)
Center-of-Mass det. time= 128.2 min (1,021.1 - 892.9)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.00 cfs @ 13.87 hrs HW=200.31' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.29 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Sharp-Crested Rectangular Weir** (Weir Controls 0.82 cfs @ 1.83 fps)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 2.61" for 10-yr event
Inflow = 5.91 cfs @ 12.13 hrs, Volume= 0.653 af
Outflow = 0.69 cfs @ 13.95 hrs, Volume= 0.459 af, Atten= 88%, Lag= 109.2 min
Primary = 0.69 cfs @ 13.95 hrs, Volume= 0.459 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.49' @ 13.95 hrs Surf.Area= 13,220 sf Storage= 13,861 cf

Plug-Flow detention time= 240.8 min calculated for 0.459 af (70% of inflow)

Center-of-Mass det. time= 134.0 min (934.6 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.70 cfs @ 13.95 hrs HW=206.49' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.23 cfs @ 6.62 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 2.39 fps)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 1.42" for 10-yr event
Inflow = 1.02 cfs @ 13.85 hrs, Volume= 0.584 af
Primary = 1.02 cfs @ 13.85 hrs, Volume= 0.584 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>5.87"
Tc=6.0 min CN=98 Runoff=7.16 cfs 0.554 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>2.04"
Flow Length=622' Tc=59.2 min CN=61 Runoff=1.74 cfs 0.318 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>5.86"
Tc=9.5 min CN=98 Runoff=0.48 cfs 0.042 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>2.07"
Tc=18.8 min CN=61 Runoff=0.51 cfs 0.051 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>5.85"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.88 cfs 0.095 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>2.51"
Flow Length=355' Tc=20.3 min CN=66 Runoff=2.61 cfs 0.262 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>5.63"
Tc=6.0 min CN=96 Runoff=0.28 cfs 0.021 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>3.27"
Tc=6.0 min CN=74 Runoff=0.31 cfs 0.020 af

Pond E: BASIN E Peak Elev=200.50' Storage=13,246 cf Inflow=4.71 cfs 1.108 af
Outflow=1.81 cfs 0.875 af

Pond E-1: BASIN E1 Peak Elev=206.82' Storage=18,428 cf Inflow=7.41 cfs 0.872 af
Outflow=0.96 cfs 0.659 af

Link AP #7: AP#7 Inflow=1.87 cfs 0.916 af
Primary=1.87 cfs 0.916 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 7.16 cfs @ 12.13 hrs, Volume= 0.554 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 1.74 cfs @ 12.86 hrs, Volume= 0.318 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.48 cfs @ 12.16 hrs, Volume= 0.042 af, Depth> 5.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.51 cfs @ 12.30 hrs, Volume= 0.051 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.88 cfs @ 12.26 hrs, Volume= 0.095 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 2.61 cfs @ 12.31 hrs, Volume= 0.262 af, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.28 cfs @ 12.13 hrs, Volume= 0.021 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.31 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 25-yr Rainfall=6.11"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 2.75" for 25-yr event
Inflow = 4.71 cfs @ 12.29 hrs, Volume= 1.108 af
Outflow = 1.81 cfs @ 13.00 hrs, Volume= 0.875 af, Atten= 62%, Lag= 42.4 min
Primary = 1.81 cfs @ 13.00 hrs, Volume= 0.875 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 200.50' @ 13.00 hrs Surf.Area= 8,654 sf Storage= 13,246 cf

Plug-Flow detention time= 190.8 min calculated for 0.875 af (79% of inflow)
Center-of-Mass det. time= 99.4 min (995.9 - 896.5)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.81 cfs @ 13.00 hrs HW=200.50' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.69 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Sharp-Crested Rectangular Weir** (Weir Controls 1.62 cfs @ 2.31 fps)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 3.48" for 25-yr event
Inflow = 7.41 cfs @ 12.13 hrs, Volume= 0.872 af
Outflow = 0.96 cfs @ 13.96 hrs, Volume= 0.659 af, Atten= 87%, Lag= 110.0 min
Primary = 0.96 cfs @ 13.96 hrs, Volume= 0.659 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.82' @ 13.96 hrs Surf.Area= 15,089 sf Storage= 18,428 cf

Plug-Flow detention time= 235.2 min calculated for 0.657 af (75% of inflow)

Center-of-Mass det. time= 141.1 min (942.8 - 801.8)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.96 cfs @ 13.96 hrs HW=206.82' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.24 cfs @ 7.16 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.71 cfs @ 3.63 fps)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 2.22" for 25-yr event
Inflow = 1.87 cfs @ 12.97 hrs, Volume= 0.916 af
Primary = 1.87 cfs @ 12.97 hrs, Volume= 0.916 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=9.56 cfs 0.746 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>3.50"
Flow Length=622' Tc=59.2 min CN=61 Runoff=3.10 cfs 0.545 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>7.90"
Tc=9.5 min CN=98 Runoff=0.64 cfs 0.056 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>3.54"
Tc=18.8 min CN=61 Runoff=0.90 cfs 0.087 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>7.89"
Flow Length=290' Tc=17.9 min CN=98 Runoff=1.18 cfs 0.128 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>4.11"
Flow Length=355' Tc=20.3 min CN=66 Runoff=4.33 cfs 0.429 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>7.66"
Tc=6.0 min CN=96 Runoff=0.38 cfs 0.029 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>5.05"
Tc=6.0 min CN=74 Runoff=0.47 cfs 0.031 af

Pond E: BASIN E Peak Elev=200.88' Storage=16,774 cf Inflow=7.61 cfs 1.744 af
Outflow=3.67 cfs 1.498 af

Pond E-1: BASIN E1 Peak Elev=207.34' Storage=27,019 cf Inflow=10.18 cfs 1.291 af
Outflow=2.12 cfs 1.043 af

Link AP #7: AP#7 Inflow=3.78 cfs 1.558 af
Primary=3.78 cfs 1.558 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 9.56 cfs @ 12.13 hrs, Volume= 0.746 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 3.10 cfs @ 12.83 hrs, Volume= 0.545 af, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.64 cfs @ 12.16 hrs, Volume= 0.056 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.90 cfs @ 12.29 hrs, Volume= 0.087 af, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 1.18 cfs @ 12.26 hrs, Volume= 0.128 af, Depth> 7.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 4.33 cfs @ 12.30 hrs, Volume= 0.429 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.031 af, Depth> 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

[95] Warning: Outlet Device #3 rise exceeded

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 4.33" for 100-yr event
Inflow = 7.61 cfs @ 12.29 hrs, Volume= 1.744 af
Outflow = 3.67 cfs @ 12.69 hrs, Volume= 1.498 af, Atten= 52%, Lag= 24.5 min
Primary = 3.67 cfs @ 12.69 hrs, Volume= 1.498 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 200.88' @ 12.69 hrs Surf.Area= 9,704 sf Storage= 16,774 cf

Plug-Flow detention time= 139.7 min calculated for 1.495 af (86% of inflow)
Center-of-Mass det. time= 75.1 min (980.1 - 905.1)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=3.67 cfs @ 12.69 hrs HW=200.88' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 6.42 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Sharp-Crested Rectangular Weir** (Orifice Controls 3.45 cfs @ 3.41 fps)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 5.16" for 100-yr event
Inflow = 10.18 cfs @ 12.13 hrs, Volume= 1.291 af
Outflow = 2.12 cfs @ 13.55 hrs, Volume= 1.043 af, Atten= 79%, Lag= 85.6 min
Primary = 2.12 cfs @ 13.55 hrs, Volume= 1.043 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 207.34' @ 13.55 hrs Surf.Area= 17,367 sf Storage= 27,019 cf

Plug-Flow detention time= 240.2 min calculated for 1.043 af (81% of inflow)
Center-of-Mass det. time= 159.4 min (961.3 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.11 cfs @ 13.55 hrs HW=207.34' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.27 cfs @ 7.97 fps)
- **2=Orifice/Grate** (Weir Controls 0.85 cfs @ 0.99 fps)
- **3=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.03 fps)

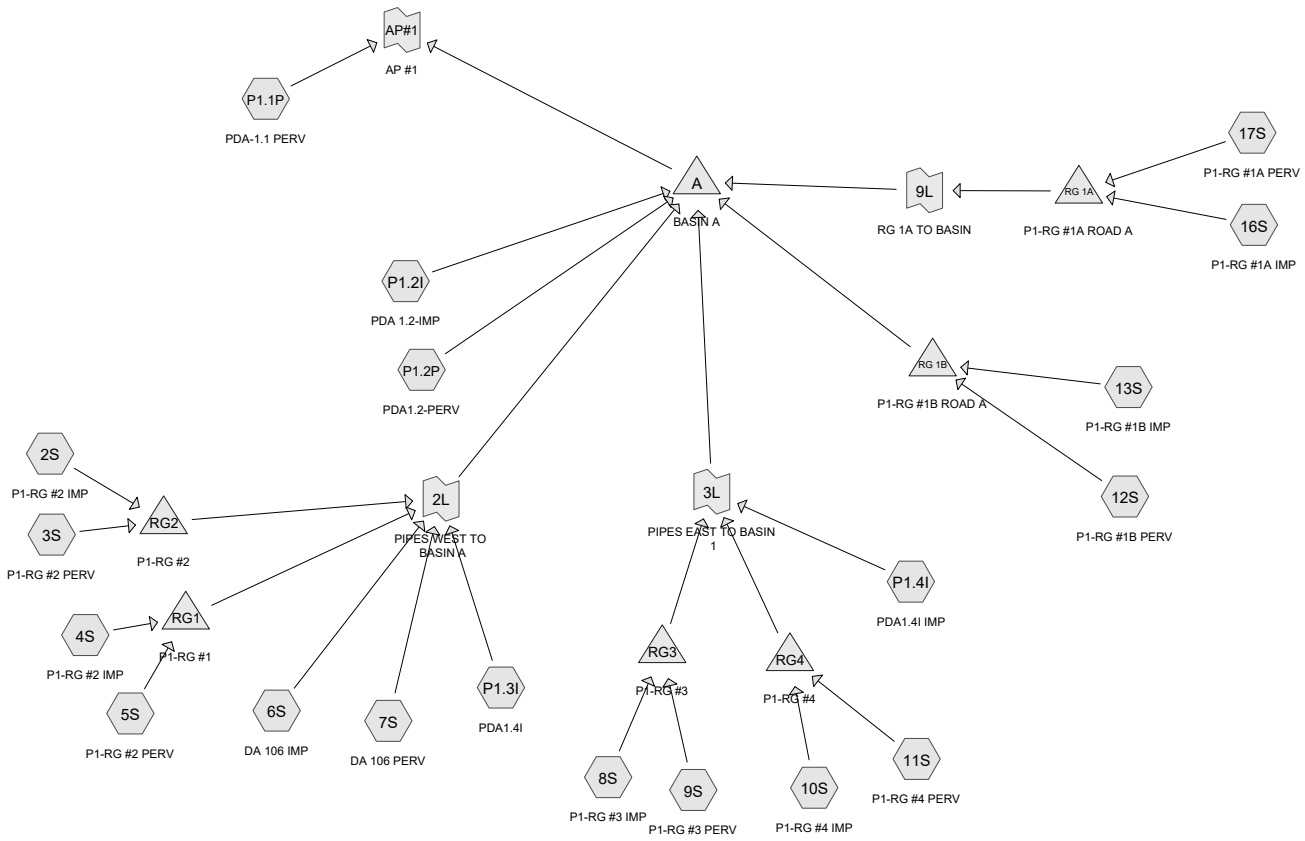
Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 3.78" for 100-yr event
Inflow = 3.78 cfs @ 12.67 hrs, Volume= 1.558 af
Primary = 3.78 cfs @ 12.67 hrs, Volume= 1.558 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

APPENDIX

No. 4: TR-55 CALCULATIONS - PROPOSED CONDITIONS (with infiltration)



Subcat Reach Pond Link

Routing Diagram for 2020-11-20 PDA TO AP#1-BASIN A-INFIL-080661-Zaitz
Prepared by Bowman Consulting, Printed 1/11/2021
HydroCAD® 10.10-3a s/n 09435 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.020 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=63 Runoff=0.00 cfs 0.000 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.46 cfs 0.014 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=66 Runoff=0.00 cfs 0.000 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.017 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.020 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.64 cfs 0.019 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.052 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.023 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=0.03"
Flow Length=963' Tc=21.4 min CN=69 Runoff=0.14 cfs 0.009 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=2.52 cfs 0.075 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=0.03"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=0.07 cfs 0.004 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=6.40 cfs 0.191 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.27 cfs 0.038 af

Pond A: BASIN A Peak Elev=204.96' Storage=9,470 cf Inflow=10.78 cfs 0.325 af
Primary=0.00 cfs 0.000 af Secondary=1.17 cfs 0.325 af Outflow=1.17 cfs 0.325 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=205.98' Storage=635 cf Inflow=0.78 cfs 0.023 af
Primary=0.00 cfs 0.000 af Secondary=0.09 cfs 0.023 af Outflow=0.09 cfs 0.023 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.20' Storage=1,553 cf Inflow=1.74 cfs 0.052 af
Primary=0.00 cfs 0.000 af Secondary=0.15 cfs 0.052 af Outflow=0.15 cfs 0.052 af

Pond RG1: P1-RG #1 Peak Elev=210.82' Storage=380 cf Inflow=0.46 cfs 0.014 af
Primary=0.00 cfs 0.000 af Secondary=0.05 cfs 0.014 af Outflow=0.05 cfs 0.014 af

Pond RG2: P1-RG #2 Peak Elev=210.78' Storage=631 cf Inflow=0.67 cfs 0.020 af
Primary=0.00 cfs 0.000 af Secondary=0.05 cfs 0.020 af Outflow=0.05 cfs 0.020 af

Pond RG3: P1-RG #3 Peak Elev=211.44' Storage=668 cf Inflow=0.67 cfs 0.020 af
Primary=0.00 cfs 0.000 af Secondary=0.04 cfs 0.020 af Outflow=0.05 cfs 0.020 af

Pond RG4: P1-RG #4 Peak Elev=211.41' Storage=645 cf Inflow=0.64 cfs 0.019 af
Primary=0.00 cfs 0.000 af Secondary=0.04 cfs 0.019 af Outflow=0.04 cfs 0.019 af

Link 2L: PIPES WEST TO BASIN A Inflow=6.98 cfs 0.208 af
Primary=6.98 cfs 0.208 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=1.27 cfs 0.038 af
Primary=1.27 cfs 0.038 af

Link 9L: RG 1A TO BASIN Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link AP#1: AP #1 Inflow=0.14 cfs 0.009 af
Primary=0.14 cfs 0.009 af

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.00 cfs @ 1.80 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 0.46 cfs @ 1.09 hrs, Volume= 0.014 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.00 cfs @ 1.76 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 0.58 cfs @ 1.09 hrs, Volume= 0.017 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 0.64 cfs @ 1.09 hrs, Volume= 0.019 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 1.74 cfs @ 1.09 hrs, Volume= 0.052 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 0.78 cfs @ 1.09 hrs, Volume= 0.023 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 0.14 cfs @ 1.84 hrs, Volume= 0.009 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 2.52 cfs @ 1.09 hrs, Volume= 0.075 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 0.07 cfs @ 1.83 hrs, Volume= 0.004 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3l: PDA1.4l

Runoff = 6.40 cfs @ 1.09 hrs, Volume= 0.191 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4l: PDA1.4l IMP

Runoff = 1.27 cfs @ 1.09 hrs, Volume= 0.038 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 0.47" for NJ WQ event
Inflow = 10.78 cfs @ 1.09 hrs, Volume= 0.325 af
Outflow = 1.17 cfs @ 1.72 hrs, Volume= 0.325 af, Atten= 89%, Lag= 37.7 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 1.17 cfs @ 1.72 hrs, Volume= 0.325 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 204.96' @ 1.72 hrs Surf.Area= 21,164 sf Storage= 9,470 cf

Plug-Flow detention time= 84.1 min calculated for 0.325 af (100% of inflow)
Center-of-Mass det. time= 83.8 min (154.6 - 70.8)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	204.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.23'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.50' (Free Discharge)
- **1=Orifice/Grate** (Controls 0.00 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.17 cfs @ 1.72 hrs HW=204.96' (Free Discharge)
- **5=Exfiltration** (Controls 1.17 cfs)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 0.93" for NJ WQ event
Inflow = 0.78 cfs @ 1.09 hrs, Volume= 0.023 af
Outflow = 0.09 cfs @ 1.61 hrs, Volume= 0.023 af, Atten= 89%, Lag= 30.7 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.09 cfs @ 1.61 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 205.98' @ 1.61 hrs Surf.Area= 1,652 sf Storage= 635 cf

Plug-Flow detention time= 68.9 min calculated for 0.023 af (100% of inflow)

Center-of-Mass det. time= 69.0 min (139.3 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.60'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 203.33'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=205.60' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.09 cfs @ 1.61 hrs HW=205.98' (Free Discharge)
2=Exfiltration (Controls 0.09 cfs)

Summary for Pond RG 1B: P1-RG #1B ROAD A

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 0.80" for NJ WQ event
Inflow = 1.74 cfs @ 1.09 hrs, Volume= 0.052 af
Outflow = 0.15 cfs @ 1.80 hrs, Volume= 0.052 af, Atten= 91%, Lag= 42.3 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.15 cfs @ 1.80 hrs, Volume= 0.052 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.20' @ 1.80 hrs Surf.Area= 3,007 sf Storage= 1,553 cf

Plug-Flow detention time= 95.6 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time= 95.7 min (166.0 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.68'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.76'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.68' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.15 cfs @ 1.80 hrs HW=210.20' (Free Discharge)
└**2=Exfiltration** (Controls 0.15 cfs)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 0.60" for NJ WQ event
Inflow = 0.46 cfs @ 1.09 hrs, Volume= 0.014 af
Outflow = 0.05 cfs @ 1.63 hrs, Volume= 0.014 af, Atten= 89%, Lag= 32.3 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.05 cfs @ 1.63 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.82' @ 1.63 hrs Surf.Area= 956 sf Storage= 380 cf

Plug-Flow detention time= 70.9 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 71.0 min (141.5 - 70.5)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.42'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 208.25'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.42' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.05 cfs @ 1.63 hrs HW=210.82' (Free Discharge)
└**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 0.79" for NJ WQ event
Inflow = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af
Outflow = 0.05 cfs @ 1.81 hrs, Volume= 0.020 af, Atten= 92%, Lag= 43.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.05 cfs @ 1.81 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 210.78' @ 1.81 hrs Surf.Area= 890 sf Storage= 631 cf

Plug-Flow detention time= 119.8 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 119.7 min (190.0 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.62'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.05 cfs @ 1.81 hrs HW=210.77' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 0.82" for NJ WQ event
Inflow = 0.67 cfs @ 1.09 hrs, Volume= 0.020 af
Outflow = 0.05 cfs @ 1.85 hrs, Volume= 0.020 af, Atten= 93%, Lag= 45.3 min
Primary = 0.00 cfs @ 1.85 hrs, Volume= 0.000 af
Secondary = 0.04 cfs @ 1.84 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.44' @ 1.84 hrs Surf.Area= 753 sf Storage= 668 cf

Plug-Flow detention time= 152.7 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 153.0 min (223.2 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.16'

Primary OutFlow Max=0.00 cfs @ 1.85 hrs HW=211.44' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.08 fps)

Secondary OutFlow Max=0.04 cfs @ 1.84 hrs HW=211.44' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.04 cfs)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 0.81" for NJ WQ event
Inflow = 0.64 cfs @ 1.09 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 1.85 hrs, Volume= 0.019 af, Atten= 94%, Lag= 45.5 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.04 cfs @ 1.85 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.41' @ 1.85 hrs Surf.Area= 748 sf Storage= 645 cf

Plug-Flow detention time= 160.7 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 160.9 min (231.2 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 203.91'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.44' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.04 cfs @ 1.85 hrs HW=211.41' (Free Discharge)
2=Exfiltration (Controls 0.04 cfs)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 0.76" for NJ WQ event
Inflow = 6.98 cfs @ 1.09 hrs, Volume= 0.208 af
Primary = 6.98 cfs @ 1.09 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 0.45" for NJ WQ event
Inflow = 1.27 cfs @ 1.09 hrs, Volume= 0.038 af
Primary = 1.27 cfs @ 1.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth = 0.01" for NJ WQ event
Inflow = 0.14 cfs @ 1.84 hrs, Volume= 0.009 af
Primary = 0.14 cfs @ 1.84 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=63 Runoff=0.04 cfs 0.003 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.54 cfs 0.041 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.70"
Tc=6.0 min CN=66 Runoff=0.10 cfs 0.007 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.68 cfs 0.051 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.14 cfs 0.012 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.75 cfs 0.056 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.007 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=2.04 cfs 0.154 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=0.92 cfs 0.069 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61 Runoff=0.01 cfs 0.001 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=0.84"
Flow Length=963' Tc=21.4 min CN=69 Runoff=2.61 cfs 0.299 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=2.96 cfs 0.223 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=0.84"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=1.23 cfs 0.137 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=7.50 cfs 0.567 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=1.49 cfs 0.113 af

Pond A: BASIN A Peak Elev=205.43' Storage=19,694 cf Inflow=13.86 cfs 1.138 af
Primary=0.00 cfs 0.000 af Secondary=1.45 cfs 1.138 af Outflow=1.45 cfs 1.138 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.25' Storage=1,076 cf Inflow=0.93 cfs 0.070 af
Primary=0.00 cfs 0.000 af Secondary=0.10 cfs 0.070 af Outflow=0.10 cfs 0.070 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.61' Storage=2,795 cf Inflow=2.12 cfs 0.161 af
Primary=0.00 cfs 0.000 af Secondary=0.16 cfs 0.161 af Outflow=0.16 cfs 0.161 af

Pond RG1: P1-RG #1 Peak Elev=211.22' Storage=763 cf Inflow=0.64 cfs 0.048 af
Primary=0.00 cfs 0.000 af Secondary=0.06 cfs 0.048 af Outflow=0.06 cfs 0.048 af

Pond RG2: P1-RG #2 Peak Elev=211.04' Storage=877 cf Inflow=0.82 cfs 0.062 af
Primary=0.28 cfs 0.007 af Secondary=0.06 cfs 0.055 af Outflow=0.34 cfs 0.062 af

Pond RG3: P1-RG #3 Peak Elev=211.52' Storage=725 cf Inflow=0.81 cfs 0.061 af
Primary=0.64 cfs 0.014 af Secondary=0.05 cfs 0.048 af Outflow=0.68 cfs 0.061 af

Pond RG4: P1-RG #4 Peak Elev=211.52' Storage=724 cf Inflow=0.77 cfs 0.059 af
Primary=0.63 cfs 0.013 af Secondary=0.04 cfs 0.046 af Outflow=0.67 cfs 0.059 af

Link 2L: PIPES WEST TO BASIN A Inflow=8.32 cfs 0.638 af
Primary=8.32 cfs 0.638 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=2.34 cfs 0.139 af
Primary=2.34 cfs 0.139 af

Link 9L: RG 1A TO BASIN Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link AP#1: AP #1 Inflow=2.61 cfs 0.299 af
Primary=2.61 cfs 0.299 af

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 0.78 cfs @ 12.13 hrs, Volume= 0.059 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.04 cfs @ 12.15 hrs, Volume= 0.003 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 0.54 cfs @ 12.13 hrs, Volume= 0.041 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 0.051 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 0.14 cfs @ 12.15 hrs, Volume= 0.012 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 0.78 cfs @ 12.13 hrs, Volume= 0.059 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.056 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.08 cfs @ 12.15 hrs, Volume= 0.007 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 2.04 cfs @ 12.13 hrs, Volume= 0.154 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 0.92 cfs @ 12.13 hrs, Volume= 0.069 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 2.61 cfs @ 12.35 hrs, Volume= 0.299 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 2.96 cfs @ 12.13 hrs, Volume= 0.223 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 1.23 cfs @ 12.33 hrs, Volume= 0.137 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3l: PDA1.4l

Runoff = 7.50 cfs @ 12.13 hrs, Volume= 0.567 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4l: PDA1.4l IMP

Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.113 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 1.66" for 2-yr event
Inflow = 13.86 cfs @ 12.14 hrs, Volume= 1.138 af
Outflow = 1.45 cfs @ 13.11 hrs, Volume= 1.138 af, Atten= 90%, Lag= 58.4 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 1.45 cfs @ 13.11 hrs, Volume= 1.138 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 205.43' @ 13.11 hrs Surf.Area= 22,694 sf Storage= 19,694 cf

Plug-Flow detention time= 118.3 min calculated for 1.138 af (100% of inflow)
Center-of-Mass det. time= 118.0 min (892.8 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	204.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.23'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.50' (Free Discharge)
- **1=Orifice/Grate** (Controls 0.00 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.45 cfs @ 13.11 hrs HW=205.43' (Free Discharge)
- **5=Exfiltration** (Controls 1.45 cfs)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 2.82" for 2-yr event
Inflow = 0.93 cfs @ 12.13 hrs, Volume= 0.070 af
Outflow = 0.10 cfs @ 12.89 hrs, Volume= 0.070 af, Atten= 89%, Lag= 45.8 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.10 cfs @ 12.89 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.25' @ 12.89 hrs Surf.Area= 1,652 sf Storage= 1,076 cf

Plug-Flow detention time= 79.3 min calculated for 0.070 af (100% of inflow)

Center-of-Mass det. time= 79.2 min (838.7 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.60'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 203.33'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=205.60' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.10 cfs @ 12.89 hrs HW=206.25' (Free Discharge)
2=Exfiltration (Controls 0.10 cfs)

Summary for Pond RG 1B: P1-RG #1B ROAD A

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 2.48" for 2-yr event
Inflow = 2.12 cfs @ 12.13 hrs, Volume= 0.161 af
Outflow = 0.16 cfs @ 13.26 hrs, Volume= 0.161 af, Atten= 93%, Lag= 67.9 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.16 cfs @ 13.26 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.61' @ 13.26 hrs Surf.Area= 3,007 sf Storage= 2,795 cf

Plug-Flow detention time= 136.0 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 135.8 min (899.8 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.68'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.76'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.68' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.16 cfs @ 13.26 hrs HW=210.61' (Free Discharge)
└**2=Exfiltration** (Controls 0.16 cfs)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 2.06" for 2-yr event
Inflow = 0.64 cfs @ 12.13 hrs, Volume= 0.048 af
Outflow = 0.06 cfs @ 13.06 hrs, Volume= 0.048 af, Atten= 90%, Lag= 56.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.06 cfs @ 13.06 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.22' @ 13.06 hrs Surf.Area= 956 sf Storage= 763 cf

Plug-Flow detention time= 98.7 min calculated for 0.048 af (100% of inflow)
Center-of-Mass det. time= 98.7 min (875.2 - 776.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.42'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 208.25'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.42' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.06 cfs @ 13.06 hrs HW=211.22' (Free Discharge)
└**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 2.49" for 2-yr event
Inflow = 0.82 cfs @ 12.13 hrs, Volume= 0.062 af
Outflow = 0.34 cfs @ 12.28 hrs, Volume= 0.062 af, Atten= 59%, Lag= 9.4 min
Primary = 0.28 cfs @ 12.28 hrs, Volume= 0.007 af
Secondary = 0.06 cfs @ 12.28 hrs, Volume= 0.055 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 211.04' @ 12.28 hrs Surf.Area= 941 sf Storage= 877 cf

Plug-Flow detention time= 108.1 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 108.0 min (872.7 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.62'

Primary OutFlow Max=0.27 cfs @ 12.28 hrs HW=211.04' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.27 cfs @ 0.67 fps)

Secondary OutFlow Max=0.06 cfs @ 12.28 hrs HW=211.04' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 2.54" for 2-yr event
Inflow = 0.81 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.68 cfs @ 12.19 hrs, Volume= 0.061 af, Atten= 16%, Lag= 3.8 min
Primary = 0.64 cfs @ 12.19 hrs, Volume= 0.014 af
Secondary = 0.05 cfs @ 12.19 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.52' @ 12.19 hrs Surf.Area= 766 sf Storage= 725 cf

Plug-Flow detention time= 105.4 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 105.3 min (868.4 - 763.2)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.16'

Primary OutFlow Max=0.61 cfs @ 12.19 hrs HW=211.51' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.61 cfs @ 0.89 fps)

Secondary OutFlow Max=0.05 cfs @ 12.19 hrs HW=211.51' (Free Discharge)
2=Exfiltration (Controls 0.05 cfs)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 2.52" for 2-yr event
Inflow = 0.77 cfs @ 12.13 hrs, Volume= 0.059 af
Outflow = 0.67 cfs @ 12.20 hrs, Volume= 0.059 af, Atten= 13%, Lag= 4.5 min
Primary = 0.63 cfs @ 12.20 hrs, Volume= 0.013 af
Secondary = 0.04 cfs @ 12.20 hrs, Volume= 0.046 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.52' @ 12.20 hrs Surf.Area= 766 sf Storage= 724 cf

Plug-Flow detention time= 117.3 min calculated for 0.059 af (100% of inflow)
Center-of-Mass det. time= 117.2 min (880.6 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 203.91'

Primary OutFlow Max=0.61 cfs @ 12.20 hrs HW=211.51' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 0.61 cfs @ 0.89 fps)

Secondary OutFlow Max=0.04 cfs @ 12.20 hrs HW=211.51' (Free Discharge)
└**2=Exfiltration** (Controls 0.04 cfs)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 2.33" for 2-yr event
Inflow = 8.32 cfs @ 12.13 hrs, Volume= 0.638 af
Primary = 8.32 cfs @ 12.13 hrs, Volume= 0.638 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 1.65" for 2-yr event
Inflow = 2.34 cfs @ 12.18 hrs, Volume= 0.139 af
Primary = 2.34 cfs @ 12.18 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth = 0.29" for 2-yr event
Inflow = 2.61 cfs @ 12.35 hrs, Volume= 0.299 af
Primary = 2.61 cfs @ 12.35 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.091 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=63 Runoff=0.13 cfs 0.009 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.063 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=66 Runoff=0.26 cfs 0.017 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.03 cfs 0.079 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.49 cfs 0.034 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.091 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.10 cfs 0.007 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.13 cfs 0.087 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.10 cfs 0.007 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.30 cfs 0.020 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=3.08 cfs 0.237 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.106 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.003 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=1.94"
Flow Length=963' Tc=21.4 min CN=69 Runoff=6.56 cfs 0.687 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=4.47 cfs 0.344 af

SubcatchmentP1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=1.94"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=3.09 cfs 0.316 af

SubcatchmentP1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=11.34 cfs 0.872 af

SubcatchmentP1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=2.26 cfs 0.174 af

Pond A: BASIN A Peak Elev=206.32' Storage=41,187 cf Inflow=24.62 cfs 1.992 af
Primary=0.04 cfs 0.004 af Secondary=2.00 cfs 1.988 af Outflow=2.05 cfs 1.992 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.63' Storage=1,710 cf Inflow=1.43 cfs 0.110 af
Primary=0.20 cfs 0.007 af Secondary=0.11 cfs 0.103 af Outflow=0.31 cfs 0.110 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=210.82' Storage=3,425 cf Inflow=3.37 cfs 0.257 af
Primary=1.54 cfs 0.051 af Secondary=0.17 cfs 0.206 af Outflow=1.71 cfs 0.257 af

Pond RG1: P1-RG #1 Peak Elev=211.49' Storage=1,022 cf Inflow=1.08 cfs 0.080 af
Primary=0.55 cfs 0.014 af Secondary=0.07 cfs 0.067 af Outflow=0.62 cfs 0.080 af

Pond RG2: P1-RG #2 Peak Elev=211.12' Storage=947 cf Inflow=1.31 cfs 0.099 af
Primary=1.22 cfs 0.030 af Secondary=0.06 cfs 0.069 af Outflow=1.28 cfs 0.099 af

Pond RG3: P1-RG #3 Peak Elev=211.56' Storage=756 cf Inflow=1.28 cfs 0.097 af
Primary=1.22 cfs 0.038 af Secondary=0.05 cfs 0.060 af Outflow=1.26 cfs 0.097 af

Pond RG4: P1-RG #4 Peak Elev=211.55' Storage=754 cf Inflow=1.23 cfs 0.094 af
Primary=1.17 cfs 0.036 af Secondary=0.04 cfs 0.057 af Outflow=1.21 cfs 0.094 af

Link 2L: PIPES WEST TO BASIN A Inflow=14.01 cfs 1.028 af
Primary=14.01 cfs 1.028 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=4.62 cfs 0.247 af
Primary=4.62 cfs 0.247 af

Link 9L: RG 1A TO BASIN Inflow=0.20 cfs 0.007 af
Primary=0.20 cfs 0.007 af

Link AP#1: AP #1 Inflow=6.56 cfs 0.691 af
Primary=6.56 cfs 0.691 af

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 1.18 cfs @ 12.13 hrs, Volume= 0.091 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.063 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.017 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.079 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 0.49 cfs @ 12.14 hrs, Volume= 0.034 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 1.18 cfs @ 12.13 hrs, Volume= 0.091 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 1.13 cfs @ 12.13 hrs, Volume= 0.087 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.020 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 3.08 cfs @ 12.13 hrs, Volume= 0.237 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 1.39 cfs @ 12.13 hrs, Volume= 0.106 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.05 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 6.56 cfs @ 12.33 hrs, Volume= 0.687 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 4.47 cfs @ 12.13 hrs, Volume= 0.344 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 3.09 cfs @ 12.32 hrs, Volume= 0.316 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3l: PDA1.4l

Runoff = 11.34 cfs @ 12.13 hrs, Volume= 0.872 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4l: PDA1.4l IMP

Runoff = 2.26 cfs @ 12.13 hrs, Volume= 0.174 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 2.91" for 10-yr event
Inflow = 24.62 cfs @ 12.13 hrs, Volume= 1.992 af
Outflow = 2.05 cfs @ 13.36 hrs, Volume= 1.992 af, Atten= 92%, Lag= 73.5 min
Primary = 0.04 cfs @ 13.36 hrs, Volume= 0.004 af
Secondary = 2.00 cfs @ 13.36 hrs, Volume= 1.988 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 206.32' @ 13.36 hrs Surf.Area= 25,684 sf Storage= 41,187 cf

Plug-Flow detention time= 204.6 min calculated for 1.990 af (100% of inflow)
Center-of-Mass det. time= 204.5 min (974.3 - 769.8)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	204.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.23'

Primary OutFlow Max=0.04 cfs @ 13.36 hrs HW=206.32' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.40 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=2.00 cfs @ 13.36 hrs HW=206.32' (Free Discharge)
- **5=Exfiltration** (Controls 2.00 cfs)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area =	0.300 ac,	90.00% Impervious,	Inflow Depth =	4.40" for 10-yr event
Inflow =	1.43 cfs @	12.13 hrs,	Volume=	0.110 af
Outflow =	0.31 cfs @	12.47 hrs,	Volume=	0.110 af, Atten= 78%, Lag= 20.6 min
Primary =	0.20 cfs @	12.47 hrs,	Volume=	0.007 af
Secondary =	0.11 cfs @	12.47 hrs,	Volume=	0.103 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.63' @ 12.47 hrs Surf.Area= 1,666 sf Storage= 1,710 cf

Plug-Flow detention time= 113.3 min calculated for 0.110 af (100% of inflow)

Center-of-Mass det. time= 113.1 min (866.0 - 752.9)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.60'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 203.33'

Primary OutFlow Max=0.19 cfs @ 12.47 hrs HW=206.63' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.19 cfs @ 0.61 fps)

Secondary OutFlow Max=0.11 cfs @ 12.47 hrs HW=206.63' (Free Discharge)
2=Exfiltration (Controls 0.11 cfs)

Summary for Pond RG 1B: P1-RG #1B ROAD A

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 3.95" for 10-yr event
Inflow = 3.37 cfs @ 12.13 hrs, Volume= 0.257 af
Outflow = 1.71 cfs @ 12.26 hrs, Volume= 0.257 af, Atten= 49%, Lag= 7.7 min
Primary = 1.54 cfs @ 12.26 hrs, Volume= 0.051 af
Secondary = 0.17 cfs @ 12.26 hrs, Volume= 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.82' @ 12.26 hrs Surf.Area= 3,112 sf Storage= 3,425 cf

Plug-Flow detention time= 126.3 min calculated for 0.257 af (100% of inflow)
Center-of-Mass det. time= 126.1 min (885.2 - 759.0)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.68'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.76'

Primary OutFlow Max=1.52 cfs @ 12.26 hrs HW=210.82' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 1.52 cfs @ 1.20 fps)

Secondary OutFlow Max=0.17 cfs @ 12.26 hrs HW=210.82' (Free Discharge)
└**2=Exfiltration** (Controls 0.17 cfs)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 3.44" for 10-yr event
Inflow = 1.08 cfs @ 12.13 hrs, Volume= 0.080 af
Outflow = 0.62 cfs @ 12.25 hrs, Volume= 0.080 af, Atten= 43%, Lag= 7.4 min
Primary = 0.55 cfs @ 12.25 hrs, Volume= 0.014 af
Secondary = 0.07 cfs @ 12.25 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.49' @ 12.25 hrs Surf.Area= 965 sf Storage= 1,022 cf

Plug-Flow detention time= 107.0 min calculated for 0.080 af (100% of inflow)
Center-of-Mass det. time= 106.8 min (879.9 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.42'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 208.25'

Primary OutFlow Max=0.54 cfs @ 12.25 hrs HW=211.49' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 0.54 cfs @ 0.85 fps)

Secondary OutFlow Max=0.07 cfs @ 12.25 hrs HW=211.49' (Free Discharge)
└**2=Exfiltration** (Controls 0.07 cfs)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 3.98" for 10-yr event
Inflow = 1.31 cfs @ 12.13 hrs, Volume= 0.099 af
Outflow = 1.28 cfs @ 12.14 hrs, Volume= 0.099 af, Atten= 2%, Lag= 0.9 min
Primary = 1.22 cfs @ 12.14 hrs, Volume= 0.030 af
Secondary = 0.06 cfs @ 12.14 hrs, Volume= 0.069 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 211.12' @ 12.14 hrs Surf.Area= 956 sf Storage= 947 cf

Plug-Flow detention time= 91.8 min calculated for 0.099 af (100% of inflow)
Center-of-Mass det. time= 91.7 min (851.3 - 759.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.62'

Primary OutFlow Max=1.19 cfs @ 12.14 hrs HW=211.12' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.19 cfs @ 1.11 fps)

Secondary OutFlow Max=0.06 cfs @ 12.14 hrs HW=211.12' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 4.03" for 10-yr event
Inflow = 1.28 cfs @ 12.13 hrs, Volume= 0.097 af
Outflow = 1.26 cfs @ 12.14 hrs, Volume= 0.097 af, Atten= 1%, Lag= 0.9 min
Primary = 1.22 cfs @ 12.14 hrs, Volume= 0.038 af
Secondary = 0.05 cfs @ 12.14 hrs, Volume= 0.060 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.56' @ 12.14 hrs Surf.Area= 773 sf Storage= 756 cf

Plug-Flow detention time= 91.0 min calculated for 0.097 af (100% of inflow)
Center-of-Mass det. time= 91.0 min (848.8 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.16'

Primary OutFlow Max=1.19 cfs @ 12.14 hrs HW=211.55' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.19 cfs @ 1.11 fps)

Secondary OutFlow Max=0.05 cfs @ 12.14 hrs HW=211.55' (Free Discharge)
2=Exfiltration (Controls 0.05 cfs)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 4.01" for 10-yr event
Inflow = 1.23 cfs @ 12.13 hrs, Volume= 0.094 af
Outflow = 1.21 cfs @ 12.14 hrs, Volume= 0.094 af, Atten= 1%, Lag= 0.9 min
Primary = 1.17 cfs @ 12.14 hrs, Volume= 0.036 af
Secondary = 0.04 cfs @ 12.14 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.55' @ 12.14 hrs Surf.Area= 773 sf Storage= 754 cf

Plug-Flow detention time= 100.1 min calculated for 0.093 af (100% of inflow)
Center-of-Mass det. time= 100.1 min (858.3 - 758.2)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 203.91'

Primary OutFlow Max=1.14 cfs @ 12.14 hrs HW=211.55' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 1.14 cfs @ 1.09 fps)

Secondary OutFlow Max=0.04 cfs @ 12.14 hrs HW=211.55' (Free Discharge)
└**2=Exfiltration** (Controls 0.04 cfs)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 3.75" for 10-yr event
Inflow = 14.01 cfs @ 12.13 hrs, Volume= 1.028 af
Primary = 14.01 cfs @ 12.13 hrs, Volume= 1.028 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 2.94" for 10-yr event
Inflow = 4.62 cfs @ 12.13 hrs, Volume= 0.247 af
Primary = 4.62 cfs @ 12.13 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 0.26" for 10-yr event
Inflow = 0.20 cfs @ 12.47 hrs, Volume= 0.007 af
Primary = 0.20 cfs @ 12.47 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth = 0.67" for 10-yr event
Inflow = 6.56 cfs @ 12.33 hrs, Volume= 0.691 af
Primary = 6.56 cfs @ 12.33 hrs, Volume= 0.691 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment2S: P1-RG #2 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.94 cfs 0.152 af

Subcatchment3S: P1-RG #2 PERV Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=3.79"
Tc=6.0 min CN=63 Runoff=0.34 cfs 0.022 af

Subcatchment4S: P1-RG #2 IMP Runoff Area=0.160 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.35 cfs 0.105 af

Subcatchment5S: P1-RG #2 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=66 Runoff=0.63 cfs 0.041 af

Subcatchment6S: DA 106 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.69 cfs 0.132 af

Subcatchment7S: DA 106 PERV Runoff Area=0.300 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=1.36 cfs 0.089 af

Subcatchment8S: P1-RG #3 IMP Runoff Area=0.230 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.94 cfs 0.152 af

Subcatchment9S: P1-RG #3 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.27 cfs 0.018 af

Subcatchment10S: P1-RG #4 IMP Runoff Area=0.220 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=1.86 cfs 0.145 af

Subcatchment11S: P1-RG #4 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.27 cfs 0.018 af

Subcatchment12S: P1-RG #1B PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.82 cfs 0.053 af

Subcatchment13S: P1-RG #1B IMP Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=5.06 cfs 0.396 af

Subcatchment16S: P1-RG #1A IMP Runoff Area=0.270 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=2.28 cfs 0.178 af

Subcatchment17S: P1-RG #1A PERV Runoff Area=0.030 ac 0.00% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=61 Runoff=0.14 cfs 0.009 af

SubcatchmentP1.1P: PDA-1.1 PERV Runoff Area=4.258 ac 0.00% Impervious Runoff Depth=4.48"
Flow Length=963' Tc=21.4 min CN=69 Runoff=15.55 cfs 1.589 af

SubcatchmentP1.2I: PDA 1.2-IMP Runoff Area=0.871 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=7.35 cfs 0.574 af

Subcatchment P1.2P: PDA1.2-PERV Runoff Area=1.959 ac 0.00% Impervious Runoff Depth=4.48"
Flow Length=428' Slope=0.0100 '/' Tc=20.5 min CN=69 Runoff=7.30 cfs 0.731 af

Subcatchment P1.3I: PDA1.4I Runoff Area=2.210 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=18.66 cfs 1.457 af

Subcatchment P1.4I: PDA1.4I IMP Runoff Area=0.440 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=3.71 cfs 0.290 af

Pond A: BASIN A Peak Elev=207.75' Storage=81,558 cf Inflow=53.28 cfs 3.833 af
Primary=3.52 cfs 0.582 af Secondary=2.97 cfs 3.250 af Outflow=6.49 cfs 3.833 af

Pond RG 1A: P1-RG #1A ROAD A Peak Elev=206.77' Storage=1,944 cf Inflow=2.42 cfs 0.187 af
Primary=2.19 cfs 0.053 af Secondary=0.12 cfs 0.134 af Outflow=2.31 cfs 0.187 af

Pond RG 1B: P1-RG #1B ROAD A Peak Elev=211.02' Storage=3,783 cf Inflow=5.88 cfs 0.449 af
Primary=5.92 cfs 0.183 af Secondary=0.18 cfs 0.266 af Outflow=6.10 cfs 0.449 af

Pond RG1: P1-RG #1 Peak Elev=211.58' Storage=1,107 cf Inflow=1.98 cfs 0.147 af
Primary=1.88 cfs 0.058 af Secondary=0.07 cfs 0.088 af Outflow=1.95 cfs 0.147 af

Pond RG2: P1-RG #2 Peak Elev=211.17' Storage=1,000 cf Inflow=2.28 cfs 0.174 af
Primary=2.19 cfs 0.083 af Secondary=0.06 cfs 0.090 af Outflow=2.25 cfs 0.174 af

Pond RG3: P1-RG #3 Peak Elev=211.61' Storage=798 cf Inflow=2.21 cfs 0.169 af
Primary=2.15 cfs 0.093 af Secondary=0.05 cfs 0.077 af Outflow=2.20 cfs 0.169 af

Pond RG4: P1-RG #4 Peak Elev=211.61' Storage=795 cf Inflow=2.13 cfs 0.163 af
Primary=2.07 cfs 0.090 af Secondary=0.04 cfs 0.073 af Outflow=2.11 cfs 0.163 af

Link 2L: PIPES WEST TO BASIN A Inflow=25.71 cfs 1.819 af
Primary=25.71 cfs 1.819 af

Link 3L: PIPES EAST TO BASIN 1 Inflow=7.91 cfs 0.473 af
Primary=7.91 cfs 0.473 af

Link 9L: RG 1A TO BASIN Inflow=2.19 cfs 0.053 af
Primary=2.19 cfs 0.053 af

Link AP#1: AP #1 Inflow=16.56 cfs 2.171 af
Primary=16.56 cfs 2.171 af

Summary for Subcatchment 2S: P1-RG #2 IMP

Runoff = 1.94 cfs @ 12.13 hrs, Volume= 0.152 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.030	98	Unconnected pavement, HSG C
0.200	98	Unconnected pavement, HSG B
0.230	98	Weighted Average
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 3S: P1-RG #2 PERV

Runoff = 0.34 cfs @ 12.13 hrs, Volume= 0.022 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.010	74	>75% Grass cover, Good, HSG C
0.060	61	>75% Grass cover, Good, HSG B
0.070	63	Weighted Average
0.070		100.00% Pervious Area

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

Summary for Subcatchment 4S: P1-RG #2 IMP

Runoff = 1.35 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.020	98	Unconnected pavement, HSG C
0.140	98	Unconnected pavement, HSG B
0.160	98	Weighted Average
0.160		100.00% Impervious Area
0.160		100.00% Unconnected

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

Summary for Subcatchment 5S: P1-RG #2 PERV

Runoff = 0.63 cfs @ 12.13 hrs, Volume= 0.041 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.050	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.120	66	Weighted Average
0.120		100.00% Pervious Area

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

Summary for Subcatchment 6S: DA 106 IMP

Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.132 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.170	98	Unconnected pavement, HSG B
0.030	98	Unconnected pavement, HSG C
0.200	98	Weighted Average
0.200		100.00% Impervious Area
0.200		100.00% Unconnected

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

Summary for Subcatchment 7S: DA 106 PERV

Runoff = 1.36 cfs @ 12.13 hrs, Volume= 0.089 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.300	61	>75% Grass cover, Good, HSG B
0.300		100.00% Pervious Area

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

Summary for Subcatchment 8S: P1-RG #3 IMP

Runoff = 1.94 cfs @ 12.13 hrs, Volume= 0.152 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.230	98	Unconnected pavement, HSG B
0.230		100.00% Impervious Area
0.230		100.00% Unconnected

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

Summary for Subcatchment 9S: P1-RG #3 PERV

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 10S: P1-RG #4 IMP

Runoff = 1.86 cfs @ 12.13 hrs, Volume= 0.145 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.220	98	Unconnected pavement, HSG B
0.220		100.00% Impervious Area
0.220		100.00% Unconnected

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

Summary for Subcatchment 11S: P1-RG #4 PERV

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 12S: P1-RG #1B PERV

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.053 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 13S: P1-RG #1B IMP

Runoff = 5.06 cfs @ 12.13 hrs, Volume= 0.396 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.600	98	Unconnected pavement, HSG B
0.600		100.00% Impervious Area
0.600		100.00% Unconnected

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

Summary for Subcatchment 16S: P1-RG #1A IMP

Runoff = 2.28 cfs @ 12.13 hrs, Volume= 0.178 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.270	98	Unconnected pavement, HSG B
0.270		100.00% Impervious Area
0.270		100.00% Unconnected

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

Summary for Subcatchment 17S: P1-RG #1A PERV

Runoff = 0.14 cfs @ 12.13 hrs, Volume= 0.009 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.030	61	>75% Grass cover, Good, HSG B
0.030		100.00% Pervious Area

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

Summary for Subcatchment P1.1P: PDA-1.1 PERV

Runoff = 15.55 cfs @ 12.32 hrs, Volume= 1.589 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
2.657	70	Woods, Good, HSG C
0.326	55	Woods, Good, HSG B
0.192	77	Woods, Good, HSG D
0.276	61	>75% Grass cover, Good, HSG B
0.807	74	>75% Grass cover, Good, HSG C
4.258	69	Weighted Average
4.258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	89	0.0200	0.12		**Sheet Flow, SHEET** Grass: Dense n= 0.240 P2= 3.31"
0.7	115	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
7.9	759	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
21.4	963	Total			

Summary for Subcatchment P1.2I: PDA 1.2-IMP

Runoff = 7.35 cfs @ 12.13 hrs, Volume= 0.574 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.372	98	Unconnected pavement, HSG B
0.499	98	Unconnected pavement, HSG C
0.871	98	Weighted Average
0.871		100.00% Impervious Area
0.871		100.00% Unconnected

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

Summary for Subcatchment P1.2P: PDA1.2-PERV

Runoff = 7.30 cfs @ 12.30 hrs, Volume= 0.731 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.801	61	>75% Grass cover, Good, HSG B
1.158	74	>75% Grass cover, Good, HSG C
1.959	69	Weighted Average
1.959		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.31"
2.9	278	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.5	428	Total			

Summary for Subcatchment P1.3I: PDA1.4I

Runoff = 18.66 cfs @ 12.13 hrs, Volume= 1.457 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
2.210	98	Unconnected pavement, HSG B
2.210		100.00% Impervious Area
2.210		100.00% Unconnected

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

Summary for Subcatchment P1.4I: PDA1.4I IMP

Runoff = 3.71 cfs @ 12.13 hrs, Volume= 0.290 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.440	98	Unconnected pavement, HSG B
0.440		100.00% Impervious Area
0.440		100.00% Unconnected

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

Summary for Pond A: BASIN A

Inflow Area = 8.210 ac, 66.15% Impervious, Inflow Depth = 5.60" for 100-yr event
Inflow = 53.28 cfs @ 12.14 hrs, Volume= 3.833 af
Outflow = 6.49 cfs @ 12.92 hrs, Volume= 3.833 af, Atten= 88%, Lag= 47.3 min
Primary = 3.52 cfs @ 12.92 hrs, Volume= 0.582 af
Secondary = 2.97 cfs @ 12.92 hrs, Volume= 3.250 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 207.75' @ 12.92 hrs Surf.Area= 30,630 sf Storage= 81,558 cf

Plug-Flow detention time= 242.2 min calculated for 3.833 af (100% of inflow)
Center-of-Mass det. time= 242.0 min (1,006.0 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	161,373 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	19,634	1,095.0	0	0	19,634
205.00	21,284	1,105.0	10,227	10,227	21,469
206.00	24,627	1,124.0	22,935	33,162	25,019
207.00	28,016	1,143.0	26,303	59,465	28,629
208.00	31,510	1,161.0	29,746	89,211	32,124
209.00	42,755	1,377.0	36,990	126,201	75,768
209.75	51,163	1,415.0	35,172	161,373	84,275

Device	Routing	Invert	Outlet Devices
#1	Primary	206.15'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	208.50'	**50.0' long x 20.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	208.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	207.00'	**1.7' long x 1.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	204.50'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.23'

Primary OutFlow Max=3.51 cfs @ 12.92 hrs HW=207.75' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.20 cfs @ 5.90 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 3.31 cfs @ 2.84 fps)

Secondary OutFlow Max=2.97 cfs @ 12.92 hrs HW=207.75' (Free Discharge)
- **5=Exfiltration** (Controls 2.97 cfs)

Summary for Pond RG 1A: P1-RG #1A ROAD A

Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 7.48" for 100-yr event
Inflow = 2.42 cfs @ 12.13 hrs, Volume= 0.187 af
Outflow = 2.31 cfs @ 12.16 hrs, Volume= 0.187 af, Atten= 4%, Lag= 2.0 min
Primary = 2.19 cfs @ 12.16 hrs, Volume= 0.053 af
Secondary = 0.12 cfs @ 12.16 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 206.77' @ 12.16 hrs Surf.Area= 1,721 sf Storage= 1,944 cf

Plug-Flow detention time= 92.5 min calculated for 0.187 af (100% of inflow)

Center-of-Mass det. time= 92.3 min (838.9 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1	205.60'	2,077 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.60	1,652	318.3	0	0	1,652
206.60	1,652	318.3	1,652	1,652	1,970
206.85	1,752	325.0	425	2,077	2,323

Device	Routing	Invert	Outlet Devices
#1	Primary	206.60'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.60'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 203.33'

Primary OutFlow Max=2.10 cfs @ 12.16 hrs HW=206.77' (Free Discharge)
1=Orifice/Grate (Weir Controls 2.10 cfs @ 1.34 fps)

Secondary OutFlow Max=0.12 cfs @ 12.16 hrs HW=206.77' (Free Discharge)
2=Exfiltration (Controls 0.12 cfs)

Summary for Pond RG 1B: P1-RG #1B ROAD A

[93] Warning: Storage range exceeded by 0.09'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.780 ac, 76.92% Impervious, Inflow Depth = 6.91" for 100-yr event
Inflow = 5.88 cfs @ 12.13 hrs, Volume= 0.449 af
Outflow = 6.10 cfs @ 12.14 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.6 min
Primary = 5.92 cfs @ 12.14 hrs, Volume= 0.183 af
Secondary = 0.18 cfs @ 12.14 hrs, Volume= 0.266 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.02' @ 12.14 hrs Surf.Area= 3,200 sf Storage= 3,783 cf

Plug-Flow detention time= 104.4 min calculated for 0.448 af (100% of inflow)
Center-of-Mass det. time= 104.4 min (858.4 - 754.0)

Volume	Invert	Avail.Storage	Storage Description
#1	209.68'	3,783 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.68	3,007	565.6	0	0	3,007
210.68	3,007	565.6	3,007	3,007	3,573
210.93	3,200	575.0	776	3,783	4,438

Device	Routing	Invert	Outlet Devices
#1	Primary	210.68'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.68'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.76'

Primary OutFlow Max=5.65 cfs @ 12.14 hrs HW=211.00' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 5.65 cfs @ 1.86 fps)

Secondary OutFlow Max=0.17 cfs @ 12.14 hrs HW=211.00' (Free Discharge)
└**2=Exfiltration** (Controls 0.17 cfs)

Summary for Pond RG1: P1-RG #1

Inflow Area = 0.280 ac, 57.14% Impervious, Inflow Depth = 6.29" for 100-yr event
Inflow = 1.98 cfs @ 12.13 hrs, Volume= 0.147 af
Outflow = 1.95 cfs @ 12.14 hrs, Volume= 0.147 af, Atten= 2%, Lag= 0.9 min
Primary = 1.88 cfs @ 12.14 hrs, Volume= 0.058 af
Secondary = 0.07 cfs @ 12.14 hrs, Volume= 0.088 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.58' @ 12.14 hrs Surf.Area= 977 sf Storage= 1,107 cf

Plug-Flow detention time= 87.5 min calculated for 0.147 af (100% of inflow)
Center-of-Mass det. time= 87.5 min (855.6 - 768.0)

Volume	Invert	Avail.Storage	Storage Description
#1	210.42'	1,279 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.42	956	207.6	0	0	956
211.42	956	207.6	956	956	1,164
211.75	1,000	215.0	323	1,279	1,422

Device	Routing	Invert	Outlet Devices
#1	Primary	211.42'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.42'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 208.25'

Primary OutFlow Max=1.85 cfs @ 12.14 hrs HW=211.57' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 1.85 cfs @ 1.28 fps)

Secondary OutFlow Max=0.07 cfs @ 12.14 hrs HW=211.57' (Free Discharge)
└**2=Exfiltration** (Controls 0.07 cfs)

Summary for Pond RG2: P1-RG #2

Inflow Area = 0.300 ac, 76.67% Impervious, Inflow Depth = 6.95" for 100-yr event
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.174 af
Outflow = 2.25 cfs @ 12.14 hrs, Volume= 0.174 af, Atten= 1%, Lag= 0.9 min
Primary = 2.19 cfs @ 12.14 hrs, Volume= 0.083 af
Secondary = 0.06 cfs @ 12.14 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.17' @ 12.14 hrs Surf.Area= 967 sf Storage= 1,000 cf

Plug-Flow detention time= 78.5 min calculated for 0.173 af (100% of inflow)
Center-of-Mass det. time= 78.6 min (832.9 - 754.3)

Volume	Invert	Avail.Storage	Storage Description
#1	210.00'	1,076 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.00	741	0	0	741
210.25	788	191	191	796
210.50	836	203	394	851
210.75	885	215	609	908
211.00	933	227	836	965
211.25	982	239	1,076	1,023

Device	Routing	Invert	Outlet Devices
#1	Primary	211.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.62'

Primary OutFlow Max=2.14 cfs @ 12.14 hrs HW=211.17' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.14 cfs @ 1.35 fps)

Secondary OutFlow Max=0.06 cfs @ 12.14 hrs HW=211.17' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond RG3: P1-RG #3

Inflow Area = 0.290 ac, 79.31% Impervious, Inflow Depth = 7.01" for 100-yr event
Inflow = 2.21 cfs @ 12.13 hrs, Volume= 0.169 af
Outflow = 2.20 cfs @ 12.14 hrs, Volume= 0.169 af, Atten= 1%, Lag= 0.8 min
Primary = 2.15 cfs @ 12.14 hrs, Volume= 0.093 af
Secondary = 0.05 cfs @ 12.14 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.61' @ 12.14 hrs Surf.Area= 783 sf Storage= 798 cf

Plug-Flow detention time= 77.1 min calculated for 0.169 af (100% of inflow)
Center-of-Mass det. time= 77.3 min (829.8 - 752.6)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 207.16'

Primary OutFlow Max=2.09 cfs @ 12.14 hrs HW=211.61' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.09 cfs @ 1.34 fps)

Secondary OutFlow Max=0.05 cfs @ 12.14 hrs HW=211.61' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond RG4: P1-RG #4

Inflow Area = 0.280 ac, 78.57% Impervious, Inflow Depth = 6.98" for 100-yr event
Inflow = 2.13 cfs @ 12.13 hrs, Volume= 0.163 af
Outflow = 2.11 cfs @ 12.14 hrs, Volume= 0.163 af, Atten= 1%, Lag= 0.8 min
Primary = 2.07 cfs @ 12.14 hrs, Volume= 0.090 af
Secondary = 0.04 cfs @ 12.14 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 211.61' @ 12.14 hrs Surf.Area= 782 sf Storage= 795 cf

Plug-Flow detention time= 83.1 min calculated for 0.163 af (100% of inflow)
Center-of-Mass det. time= 83.4 min (836.4 - 753.0)

Volume	Invert	Avail.Storage	Storage Description
#1	210.44'	861 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
210.44	582	0	0	582
210.69	624	151	151	631
210.94	667	161	312	681
211.19	710	172	484	731
211.44	753	183	667	782
211.69	797	194	861	834

Device	Routing	Invert	Outlet Devices
#1	Primary	211.44'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	210.44'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 203.91'

Primary OutFlow Max=2.01 cfs @ 12.14 hrs HW=211.60' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 2.01 cfs @ 1.32 fps)

Secondary OutFlow Max=0.04 cfs @ 12.14 hrs HW=211.60' (Free Discharge)
└**2=Exfiltration** (Controls 0.04 cfs)

Summary for Link 2L: PIPES WEST TO BASIN A

Inflow Area = 3.290 ac, 85.11% Impervious, Inflow Depth = 6.64" for 100-yr event
Inflow = 25.71 cfs @ 12.13 hrs, Volume= 1.819 af
Primary = 25.71 cfs @ 12.13 hrs, Volume= 1.819 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 3L: PIPES EAST TO BASIN 1

Inflow Area = 1.010 ac, 88.12% Impervious, Inflow Depth = 5.61" for 100-yr event
Inflow = 7.91 cfs @ 12.13 hrs, Volume= 0.473 af
Primary = 7.91 cfs @ 12.13 hrs, Volume= 0.473 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link 9L: RG 1A TO BASIN

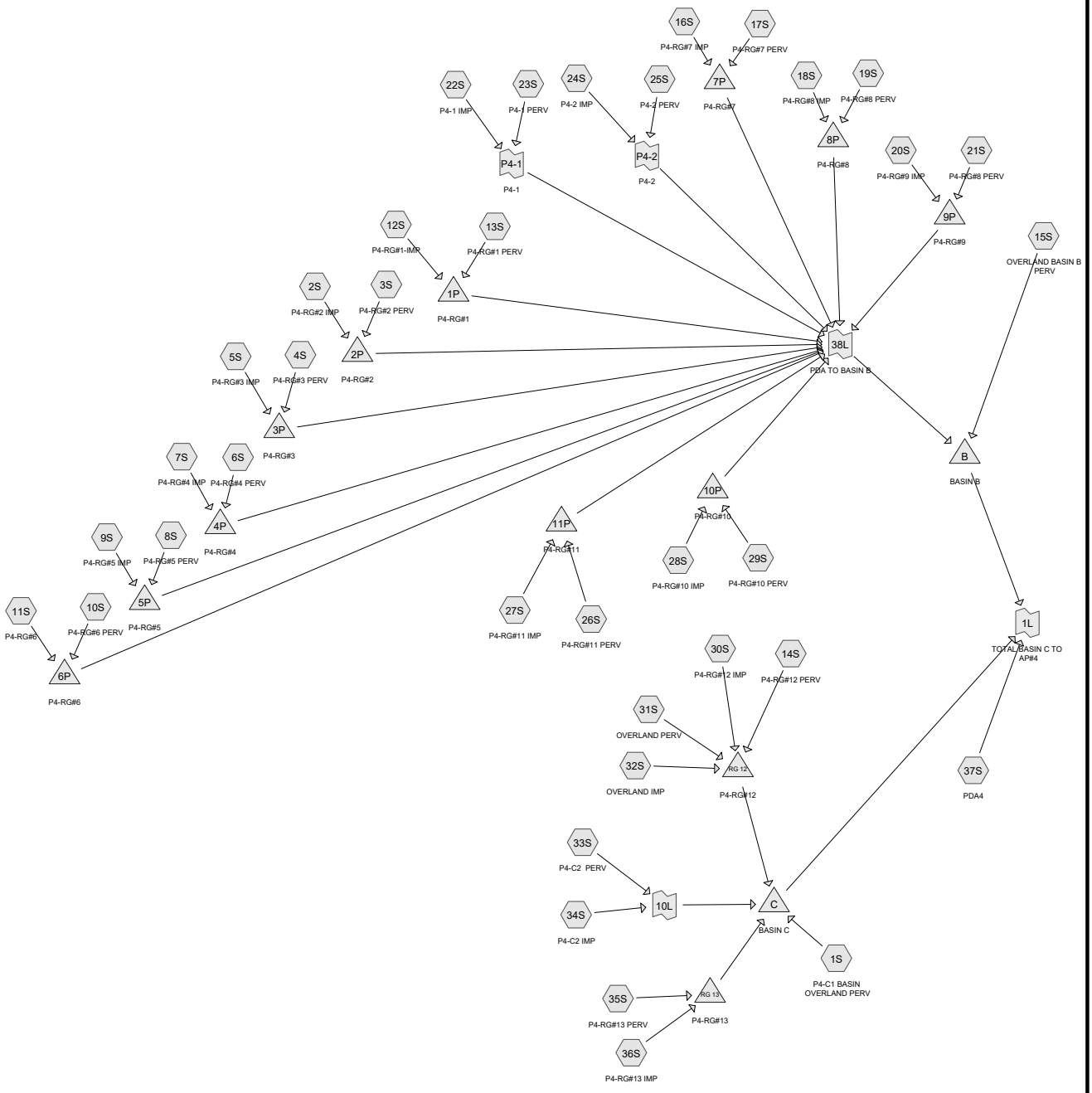
Inflow Area = 0.300 ac, 90.00% Impervious, Inflow Depth = 2.11" for 100-yr event
Inflow = 2.19 cfs @ 12.16 hrs, Volume= 0.053 af
Primary = 2.19 cfs @ 12.16 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link AP#1: AP #1

Inflow Area = 12.468 ac, 43.56% Impervious, Inflow Depth = 2.09" for 100-yr event
Inflow = 16.56 cfs @ 12.34 hrs, Volume= 2.171 af
Primary = 16.56 cfs @ 12.34 hrs, Volume= 2.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs



Routing Diagram for 2020-11-20 PDA TO AP#4-BASIN B-C_INFIL_080661-Zaitz

Prepared by Bowman Consulting, Printed 1/11/2021

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.017 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=68 Runoff=0.00 cfs 0.000 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.029 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=64 Runoff=0.00 cfs 0.000 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.19 cfs 0.035 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.55 cfs 0.016 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=98 Runoff=1.85 cfs 0.049 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.87 cfs 0.026 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=55 Runoff=0.00 cfs 0.000 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.84 cfs 0.025 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.85 cfs 0.055 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.011 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=4.08 cfs 0.122 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=64 Runoff=0.03 cfs 0.001 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.97 cfs 0.059 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=98 Runoff=2.57 cfs 0.068 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=98 Runoff=1.27 cfs 0.034 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=2.17 cfs 0.065 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.009 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth=0.03"
Tc=16.1 min CN=69 Runoff=0.07 cfs 0.004 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth=1.03"
Tc=16.1 min CN=98 Runoff=3.35 cfs 0.135 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=198' Tc=13.8 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.53 cfs 0.046 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth=0.02"
Flow Length=710' Tc=43.3 min CN=68 Runoff=0.10 cfs 0.007 af

Pond 1P: P4-RG#1 Peak Elev=208.56' Storage=873 cf Inflow=0.87 cfs 0.026 af
Primary=0.00 cfs 0.000 af Secondary=0.06 cfs 0.026 af Outflow=0.06 cfs 0.026 af

Pond 2P: P4-RG#2 Peak Elev=208.51' Storage=417 cf Inflow=0.58 cfs 0.017 af
Primary=0.45 cfs 0.006 af Secondary=0.02 cfs 0.012 af Outflow=0.48 cfs 0.017 af

Pond 3P: P4-RG#3 Peak Elev=209.21' Storage=264 cf Inflow=0.98 cfs 0.029 af
Primary=1.15 cfs 0.022 af Secondary=0.02 cfs 0.007 af Outflow=1.17 cfs 0.029 af

Pond 4P: P4-RG#4 Peak Elev=211.75' Storage=0 cf Inflow=1.19 cfs 0.035 af
Primary=1.19 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.035 af

Pond 5P: P4-RG#5 Peak Elev=213.27' Storage=532 cf Inflow=0.55 cfs 0.016 af
Primary=0.00 cfs 0.000 af Secondary=0.04 cfs 0.016 af Outflow=0.04 cfs 0.016 af

Pond 6P: P4-RG#6 Peak Elev=213.90' Storage=728 cf Inflow=1.85 cfs 0.049 af
Primary=1.80 cfs 0.030 af Secondary=0.05 cfs 0.019 af Outflow=1.85 cfs 0.049 af

Pond 7P: P4-RG#7 Peak Elev=210.30' Storage=845 cf Inflow=0.84 cfs 0.025 af
Primary=0.00 cfs 0.000 af Secondary=0.05 cfs 0.025 af Outflow=0.05 cfs 0.025 af

Pond 8P: P4-RG#8 Peak Elev=209.60' Storage=1,788 cf Inflow=1.85 cfs 0.055 af
Primary=0.00 cfs 0.000 af Secondary=0.13 cfs 0.055 af Outflow=0.13 cfs 0.055 af

Pond 9P: P4-RG#9 Peak Elev=209.71' Storage=309 cf Inflow=0.38 cfs 0.011 af
Primary=0.00 cfs 0.000 af Secondary=0.04 cfs 0.011 af Outflow=0.04 cfs 0.011 af

Pond 10P: P4-RG#10 Peak Elev=206.97' Storage=390 cf Inflow=1.27 cfs 0.034 af
Primary=1.58 cfs 0.023 af Secondary=0.02 cfs 0.010 af Outflow=1.60 cfs 0.034 af

Pond 11P: P4-RG#11 Peak Elev=208.12' Storage=2,227 cf Inflow=2.57 cfs 0.068 af
Primary=0.15 cfs 0.004 af Secondary=0.12 cfs 0.064 af Outflow=0.26 cfs 0.068 af

Pond B: BASIN B Peak Elev=201.87' Storage=9,424 cf Inflow=10.59 cfs 0.302 af
Primary=0.00 cfs 0.000 af Secondary=1.11 cfs 0.302 af Outflow=1.11 cfs 0.302 af

Pond C: BASIN C Peak Elev=201.50' Storage=6,152 cf Inflow=5.05 cfs 0.206 af
Primary=0.00 cfs 0.000 af Secondary=0.72 cfs 0.206 af Outflow=0.72 cfs 0.206 af

Pond RG 12: P4-RG#12 Peak Elev=206.22' Storage=292 cf Inflow=2.49 cfs 0.074 af
Primary=2.46 cfs 0.067 af Secondary=0.02 cfs 0.008 af Outflow=2.48 cfs 0.074 af

Pond RG 13: P4-RG#13 Peak Elev=204.75' Storage=0.008 af Inflow=1.53 cfs 0.046 af
Primary=0.00 cfs 0.000 af Secondary=1.29 cfs 0.046 af Outflow=1.29 cfs 0.046 af

Link 1L: TOTAL BASIN C TO AP#4 Inflow=0.10 cfs 0.007 af
Primary=0.10 cfs 0.007 af

Link 10L: Inflow=3.36 cfs 0.140 af
Primary=3.36 cfs 0.140 af

Link 38L: PDA TO BASIN B Inflow=10.59 cfs 0.302 af
Primary=10.59 cfs 0.302 af

Link P4-1: P4-1 Inflow=4.08 cfs 0.122 af
Primary=4.08 cfs 0.122 af

Link P4-2: P4-2 Inflow=1.97 cfs 0.059 af
Primary=1.97 cfs 0.059 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 0.58 cfs @ 1.09 hrs, Volume= 0.017 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.00 cfs @ 1.75 hrs, Volume= 0.000 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 0.98 cfs @ 1.09 hrs, Volume= 0.029 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.00 cfs @ 1.78 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 1.19 cfs @ 1.09 hrs, Volume= 0.035 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 0.55 cfs @ 1.09 hrs, Volume= 0.016 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.85 cfs @ 1.03 hrs, Volume= 0.049 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 0.87 cfs @ 1.09 hrs, Volume= 0.026 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 0.84 cfs @ 1.09 hrs, Volume= 0.025 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 1.85 cfs @ 1.09 hrs, Volume= 0.055 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.38 cfs @ 1.09 hrs, Volume= 0.011 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 4.08 cfs @ 1.09 hrs, Volume= 0.122 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 0.03 cfs @ 1.78 hrs, Volume= 0.001 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 1.97 cfs @ 1.09 hrs, Volume= 0.059 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.57 cfs @ 1.03 hrs, Volume= 0.068 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.27 cfs @ 1.03 hrs, Volume= 0.034 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 2.17 cfs @ 1.09 hrs, Volume= 0.065 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.32 cfs @ 1.09 hrs, Volume= 0.009 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 0.07 cfs @ 1.80 hrs, Volume= 0.004 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 3.35 cfs @ 1.22 hrs, Volume= 0.135 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 1.53 cfs @ 1.09 hrs, Volume= 0.046 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 0.10 cfs @ 2.11 hrs, Volume= 0.007 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth = 0.65" for NJ WQ event
Inflow = 0.87 cfs @ 1.09 hrs, Volume= 0.026 af
Outflow = 0.06 cfs @ 1.85 hrs, Volume= 0.026 af, Atten= 94%, Lag= 45.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.06 cfs @ 1.85 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 208.56' @ 1.85 hrs Surf.Area= 1,139 sf Storage= 873 cf

Plug-Flow detention time= 154.2 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 154.5 min (224.8 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.65'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=207.65' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.06 cfs @ 1.85 hrs HW=208.56' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth = 0.80" for NJ WQ event
Inflow = 0.58 cfs @ 1.09 hrs, Volume= 0.017 af
Outflow = 0.48 cfs @ 1.21 hrs, Volume= 0.017 af, Atten= 18%, Lag= 6.7 min
Primary = 0.45 cfs @ 1.21 hrs, Volume= 0.006 af
Secondary = 0.02 cfs @ 1.21 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.51' @ 1.21 hrs Surf.Area= 508 sf Storage= 417 cf

Plug-Flow detention time= 114.5 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 115.0 min (185.3 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.45'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=0.41 cfs @ 1.21 hrs HW=208.51' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.41 cfs @ 0.78 fps)

Secondary OutFlow Max=0.02 cfs @ 1.21 hrs HW=208.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth = 0.84" for NJ WQ event
Inflow = 0.98 cfs @ 1.09 hrs, Volume= 0.029 af
Outflow = 1.17 cfs @ 1.06 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 1.15 cfs @ 1.06 hrs, Volume= 0.022 af
Secondary = 0.02 cfs @ 1.05 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.21' @ 1.05 hrs Surf.Area= 310 sf Storage= 264 cf

Plug-Flow detention time= 41.2 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 41.9 min (112.3 - 70.4)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.10'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=1.01 cfs @ 1.06 hrs HW=209.20' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.01 cfs @ 1.05 fps)

Secondary OutFlow Max=0.02 cfs @ 1.05 hrs HW=209.21' (Free Discharge)
2=Exfiltration (Controls 0.02 cfs)

Summary for Pond 4P: P4-RG#4

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth = 0.85" for NJ WQ event
Inflow = 1.19 cfs @ 1.09 hrs, Volume= 0.035 af
Outflow = 1.19 cfs @ 1.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 1.19 cfs @ 1.09 hrs, Volume= 0.035 af
Secondary = 0.00 cfs @ 1.09 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 211.75' @ 1.09 hrs Surf.Area= 161 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (70.3 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	211.75'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
211.75	161	0	0	161
212.00	183	43	43	187
212.25	204	48	91	212
212.50	226	54	145	238
212.75	248	59	204	265
213.00	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	211.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=47.62 cfs @ 1.09 hrs HW=211.75' (Free Discharge)
1=Orifice/Grate (Orifice Controls 47.62 cfs @ 8.75 fps)

Secondary OutFlow Max=0.01 cfs @ 1.09 hrs HW=211.75' (Free Discharge)
2=Exfiltration (Controls 0.01 cfs)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth = 0.63" for NJ WQ event
Inflow = 0.55 cfs @ 1.09 hrs, Volume= 0.016 af
Outflow = 0.04 cfs @ 1.81 hrs, Volume= 0.016 af, Atten= 92%, Lag= 43.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.04 cfs @ 1.81 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.27' @ 1.81 hrs Surf.Area= 700 sf Storage= 532 cf

Plug-Flow detention time= 129.6 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 129.9 min (200.2 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.35'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=212.35' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.04 cfs @ 1.81 hrs HW=213.27' (Free Discharge)
2=Exfiltration (Controls 0.04 cfs)

Summary for Pond 6P: P4-RG#6

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth = 0.27" for NJ WQ event
Inflow = 1.85 cfs @ 1.03 hrs, Volume= 0.049 af
Outflow = 1.85 cfs @ 1.04 hrs, Volume= 0.049 af, Atten= 0%, Lag= 1.0 min
Primary = 1.80 cfs @ 1.04 hrs, Volume= 0.030 af
Secondary = 0.05 cfs @ 1.04 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.90' @ 1.04 hrs Surf.Area= 768 sf Storage= 728 cf

Plug-Flow detention time= 59.9 min calculated for 0.049 af (100% of inflow)
Center-of-Mass det. time= 60.5 min (125.2 - 64.7)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=1.74 cfs @ 1.04 hrs HW=213.90' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.74 cfs @ 1.26 fps)

Secondary OutFlow Max=0.05 cfs @ 1.04 hrs HW=213.90' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth = 0.77" for NJ WQ event
Inflow = 0.84 cfs @ 1.09 hrs, Volume= 0.025 af
Outflow = 0.05 cfs @ 1.85 hrs, Volume= 0.025 af, Atten= 94%, Lag= 45.3 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.05 cfs @ 1.85 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.30' @ 1.85 hrs Surf.Area= 975 sf Storage= 845 cf

Plug-Flow detention time= 155.7 min calculated for 0.025 af (100% of inflow)
Center-of-Mass det. time= 156.0 min (226.3 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 204.41'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.34' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.05 cfs @ 1.85 hrs HW=210.30' (Free Discharge)
2=Exfiltration (Controls 0.05 cfs)

Summary for Pond 8P: P4-RG#8

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth = 0.80" for NJ WQ event
Inflow = 1.85 cfs @ 1.09 hrs, Volume= 0.055 af
Outflow = 0.13 cfs @ 1.83 hrs, Volume= 0.055 af, Atten= 93%, Lag= 44.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.13 cfs @ 1.83 hrs, Volume= 0.055 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.60' @ 1.83 hrs Surf.Area= 2,594 sf Storage= 1,788 cf

Plug-Flow detention time= 128.6 min calculated for 0.055 af (100% of inflow)
Center-of-Mass det. time= 128.8 min (199.1 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.85'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.75'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=208.85' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.13 cfs @ 1.83 hrs HW=209.60' (Free Discharge)
2=Exfiltration (Controls 0.13 cfs)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth = 0.56" for NJ WQ event
Inflow = 0.38 cfs @ 1.09 hrs, Volume= 0.011 af
Outflow = 0.04 cfs @ 1.62 hrs, Volume= 0.011 af, Atten= 89%, Lag= 31.7 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.04 cfs @ 1.62 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.71' @ 1.62 hrs Surf.Area= 860 sf Storage= 309 cf

Plug-Flow detention time= 71.3 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 71.5 min (141.7 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 201.21'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.34' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.04 cfs @ 1.62 hrs HW=209.71' (Free Discharge)
2=Exfiltration (Controls 0.04 cfs)

Summary for Pond 10P: P4-RG#10

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth = 0.61" for NJ WQ event
Inflow = 1.27 cfs @ 1.03 hrs, Volume= 0.034 af
Outflow = 1.60 cfs @ 1.01 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 1.58 cfs @ 1.01 hrs, Volume= 0.023 af
Secondary = 0.02 cfs @ 1.01 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 206.97' @ 1.01 hrs Surf.Area= 412 sf Storage= 390 cf

Plug-Flow detention time= 52.3 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 52.9 min (117.6 - 64.7)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.83'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.33'

Primary OutFlow Max=1.44 cfs @ 1.01 hrs HW=206.96' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.44 cfs @ 1.18 fps)

Secondary OutFlow Max=0.02 cfs @ 1.01 hrs HW=206.96' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond 11P: P4-RG#11

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth = 0.70" for NJ WQ event
Inflow = 2.57 cfs @ 1.03 hrs, Volume= 0.068 af
Outflow = 0.26 cfs @ 1.52 hrs, Volume= 0.068 af, Atten= 90%, Lag= 29.3 min
Primary = 0.15 cfs @ 1.52 hrs, Volume= 0.004 af
Secondary = 0.12 cfs @ 1.52 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.12' @ 1.52 hrs Surf.Area= 2,298 sf Storage= 2,227 cf

Plug-Flow detention time= 162.1 min calculated for 0.068 af (100% of inflow)
Center-of-Mass det. time= 162.5 min (227.2 - 64.7)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.09'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.42'

Primary OutFlow Max=0.14 cfs @ 1.52 hrs HW=208.12' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.14 cfs @ 0.54 fps)

Secondary OutFlow Max=0.12 cfs @ 1.52 hrs HW=208.12' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.12 cfs)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth = 0.24" for NJ WQ event
Inflow = 10.59 cfs @ 1.07 hrs, Volume= 0.302 af
Outflow = 1.11 cfs @ 1.76 hrs, Volume= 0.302 af, Atten= 90%, Lag= 41.4 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 1.11 cfs @ 1.76 hrs, Volume= 0.302 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 201.87' @ 1.76 hrs Surf.Area= 17,352 sf Storage= 9,424 cf

Plug-Flow detention time= 105.7 min calculated for 0.302 af (100% of inflow)
Center-of-Mass det. time= 105.2 min (176.5 - 71.3)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.77'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=201.00' (Free Discharge)
- **1=Orifice/Grate** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.11 cfs @ 1.76 hrs HW=201.87' (Free Discharge)
- **5=Exfiltration** (Controls 1.11 cfs)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth = 0.38" for NJ WQ event
Inflow = 5.05 cfs @ 1.15 hrs, Volume= 0.206 af
Outflow = 0.72 cfs @ 1.85 hrs, Volume= 0.206 af, Atten= 86%, Lag= 41.6 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.72 cfs @ 1.85 hrs, Volume= 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 201.50' @ 1.85 hrs Surf.Area= 12,746 sf Storage= 6,152 cf

Plug-Flow detention time= 88.7 min calculated for 0.206 af (100% of inflow)
Center-of-Mass det. time= 89.0 min (166.9 - 77.9)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.75'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=201.00' (Free Discharge)
- **1=Orifice/Grate** (Controls 0.00 cfs)
- **2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.72 cfs @ 1.85 hrs HW=201.50' (Free Discharge)
- **5=Exfiltration** (Controls 0.72 cfs)

Summary for Pond RG 12: P4-RG#12

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth = 0.68" for NJ WQ event
Inflow = 2.49 cfs @ 1.09 hrs, Volume= 0.074 af
Outflow = 2.48 cfs @ 1.10 hrs, Volume= 0.074 af, Atten= 1%, Lag= 0.2 min
Primary = 2.46 cfs @ 1.10 hrs, Volume= 0.067 af
Secondary = 0.02 cfs @ 1.10 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.22' @ 1.10 hrs Surf.Area= 309 sf Storage= 292 cf

Plug-Flow detention time= 17.3 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (88.3 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.03'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.47'

Primary OutFlow Max=2.45 cfs @ 1.10 hrs HW=206.22' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 2.45 cfs @ 1.41 fps)

Secondary OutFlow Max=0.02 cfs @ 1.10 hrs HW=206.22' (Free Discharge)
└**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth = 0.48" for NJ WQ event
Inflow = 1.53 cfs @ 1.09 hrs, Volume= 0.046 af
Outflow = 1.29 cfs @ 1.15 hrs, Volume= 0.046 af, Atten= 16%, Lag= 3.5 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 1.29 cfs @ 1.15 hrs, Volume= 0.046 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 1.15 hrs Surf.Area= 316.004 ac Storage= 0.008 af

Plug-Flow detention time= 4.5 min calculated for 0.046 af (100% of inflow)
Center-of-Mass det. time= 4.5 min (74.7 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	204.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 200.69'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=637.28 cfs @ 1.15 hrs HW=204.75' (Free Discharge)
└**2=Exfiltration** (Controls 637.28 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.10 cfs @ 2.11 hrs, Volume= 0.007 af
Primary = 0.10 cfs @ 2.11 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth = 0.46" for NJ WQ event
Inflow = 3.36 cfs @ 1.22 hrs, Volume= 0.140 af
Primary = 3.36 cfs @ 1.22 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth = 0.27" for NJ WQ event
Inflow = 10.59 cfs @ 1.07 hrs, Volume= 0.302 af
Primary = 10.59 cfs @ 1.07 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth = 0.29" for NJ WQ event
Inflow = 4.08 cfs @ 1.09 hrs, Volume= 0.122 af
Primary = 4.08 cfs @ 1.09 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth = 0.96" for NJ WQ event
Inflow = 1.97 cfs @ 1.09 hrs, Volume= 0.059 af
Primary = 1.97 cfs @ 1.09 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.24 cfs 0.020 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.68 cfs 0.051 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>0.79"
Tc=6.0 min CN=68 Runoff=0.08 cfs 0.005 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.15 cfs 0.087 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>0.61"
Tc=6.0 min CN=64 Runoff=0.06 cfs 0.005 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.105 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.06 cfs 0.005 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.65 cfs 0.049 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.78 cfs 0.067 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>3.08"
Tc=0.0 min CN=98 Runoff=2.20 cfs 0.146 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.02 cfs 0.077 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.007 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.014 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>0.28"
Tc=6.0 min CN=55 Runoff=0.23 cfs 0.039 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.074 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.004 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=2.17 cfs 0.164 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.09 cfs 0.008 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.033 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.004 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=4.79 cfs 0.361 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>0.61"
Tc=6.0 min CN=64 Runoff=2.46 cfs 0.189 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=2.31 cfs 0.174 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>0.49"
Tc=6.0 min CN=61 Runoff=0.02 cfs 0.002 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>0.49"
Tc=0.0 min CN=61 Runoff=0.20 cfs 0.015 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>3.08"
Tc=0.0 min CN=98 Runoff=3.05 cfs 0.203 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>3.08"
Tc=0.0 min CN=98 Runoff=1.51 cfs 0.100 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>0.49"
Tc=0.0 min CN=61 Runoff=0.15 cfs 0.011 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=2.55 cfs 0.192 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>0.49"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.04 cfs 0.004 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=0.37 cfs 0.028 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.84"
Tc=16.1 min CN=69 Runoff=1.45 cfs 0.144 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>3.07"
Tc=16.1 min CN=98 Runoff=3.98 cfs 0.401 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>0.49"
Flow Length=198' Tc=13.8 min CN=61 Runoff=0.21 cfs 0.025 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=1.80 cfs 0.136 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>0.78"
Flow Length=710' Tc=43.3 min CN=68 Runoff=1.84 cfs 0.306 af

Pond 1P: P4-RG#1 Peak Elev=208.74' Storage=1,086 cf Inflow=1.10 cfs 0.084 af
Primary=0.76 cfs 0.017 af Secondary=0.06 cfs 0.066 af Outflow=0.82 cfs 0.083 af

Pond 2P: P4-RG#2 Peak Elev=208.53' Storage=426 cf Inflow=0.71 cfs 0.054 af
Primary=0.68 cfs 0.021 af Secondary=0.03 cfs 0.030 af Outflow=0.70 cfs 0.051 af

Pond 3P: P4-RG#3 Peak Elev=209.22' Storage=266 cf Inflow=1.23 cfs 0.092 af
Primary=1.22 cfs 0.064 af Secondary=0.02 cfs 0.023 af Outflow=1.23 cfs 0.087 af

Pond 4P: P4-RG#4 Peak Elev=211.75' Storage=0 cf Inflow=1.45 cfs 0.110 af
Primary=1.45 cfs 0.110 af Secondary=0.00 cfs 0.000 af Outflow=1.45 cfs 0.110 af

Pond 5P: P4-RG#5 Peak Elev=213.42' Storage=644 cf Inflow=0.70 cfs 0.054 af
Primary=0.57 cfs 0.010 af Secondary=0.05 cfs 0.043 af Outflow=0.62 cfs 0.054 af

Pond 6P: P4-RG#6 Peak Elev=213.93' Storage=750 cf Inflow=2.48 cfs 0.213 af
Primary=2.34 cfs 0.133 af Secondary=0.05 cfs 0.066 af Outflow=2.39 cfs 0.199 af

Pond 7P: P4-RG#7 Peak Elev=210.43' Storage=973 cf Inflow=1.03 cfs 0.078 af
Primary=0.80 cfs 0.017 af Secondary=0.06 cfs 0.062 af Outflow=0.86 cfs 0.078 af

Pond 8P: P4-RG#8 Peak Elev=209.91' Storage=2,623 cf Inflow=2.26 cfs 0.172 af
Primary=0.47 cfs 0.019 af Secondary=0.15 cfs 0.153 af Outflow=0.62 cfs 0.172 af

Pond 9P: P4-RG#9 Peak Elev=210.03' Storage=591 cf Inflow=0.49 cfs 0.038 af
Primary=0.00 cfs 0.000 af Secondary=0.05 cfs 0.038 af Outflow=0.05 cfs 0.038 af

Pond 10P: P4-RG#10 Peak Elev=206.97' Storage=390 cf Inflow=1.65 cfs 0.111 af
Primary=1.58 cfs 0.072 af Secondary=0.02 cfs 0.032 af Outflow=1.60 cfs 0.104 af

Pond 11P: P4-RG#11 Peak Elev=208.27' Storage=2,590 cf Inflow=3.25 cfs 0.218 af
Primary=2.41 cfs 0.059 af Secondary=0.12 cfs 0.154 af Outflow=2.54 cfs 0.212 af

Pond B: BASIN B Peak Elev=202.62' Storage=24,255 cf Inflow=18.15 cfs 1.286 af
Primary=1.20 cfs 0.193 af Secondary=1.71 cfs 1.085 af Outflow=2.90 cfs 1.278 af

Pond C: BASIN C Peak Elev=202.06' Storage=13,598 cf Inflow=7.65 cfs 0.772 af
Primary=0.11 cfs 0.032 af Secondary=0.91 cfs 0.737 af Outflow=1.02 cfs 0.769 af

Pond RG 12: P4-RG#12 Peak Elev=206.25' Storage=302 cf Inflow=3.09 cfs 0.239 af
Primary=3.09 cfs 0.206 af Secondary=0.02 cfs 0.027 af Outflow=3.10 cfs 0.233 af

Pond RG 13: P4-RG#13 Peak Elev=204.75' Storage=0.010 af Inflow=1.89 cfs 0.161 af
Primary=0.00 cfs 0.000 af Secondary=1.59 cfs 0.161 af Outflow=1.59 cfs 0.161 af

Link 1L: TOTAL BASIN C TO AP#4 Inflow=3.14 cfs 0.531 af
Primary=3.14 cfs 0.531 af

Link 10L: Inflow=5.41 cfs 0.545 af
Primary=5.41 cfs 0.545 af

Link 38L: PDA TO BASIN B Inflow=18.03 cfs 1.247 af
Primary=18.03 cfs 1.247 af

Link P4-1: P4-1 Inflow=7.19 cfs 0.550 af
Primary=7.19 cfs 0.550 af

Link P4-2: P4-2 Inflow=2.33 cfs 0.176 af
Primary=2.33 cfs 0.176 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.020 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.03 cfs @ 12.15 hrs, Volume= 0.002 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.005 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 1.15 cfs @ 12.13 hrs, Volume= 0.087 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.06 cfs @ 12.15 hrs, Volume= 0.005 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 1.39 cfs @ 12.13 hrs, Volume= 0.105 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.06 cfs @ 12.15 hrs, Volume= 0.005 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.049 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 0.78 cfs @ 12.15 hrs, Volume= 0.067 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.20 cfs @ 12.04 hrs, Volume= 0.146 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 1.02 cfs @ 12.13 hrs, Volume= 0.077 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.08 cfs @ 12.15 hrs, Volume= 0.007 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 0.16 cfs @ 12.15 hrs, Volume= 0.014 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 0.23 cfs @ 12.19 hrs, Volume= 0.039 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 0.98 cfs @ 12.13 hrs, Volume= 0.074 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.004 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 2.17 cfs @ 12.13 hrs, Volume= 0.164 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.09 cfs @ 12.15 hrs, Volume= 0.008 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.44 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.004 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 4.79 cfs @ 12.13 hrs, Volume= 0.361 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 2.46 cfs @ 12.15 hrs, Volume= 0.189 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 2.31 cfs @ 12.13 hrs, Volume= 0.174 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.02 cfs @ 12.15 hrs, Volume= 0.002 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.20 cfs @ 12.06 hrs, Volume= 0.015 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.05 cfs @ 12.04 hrs, Volume= 0.203 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.51 cfs @ 12.04 hrs, Volume= 0.100 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.15 cfs @ 12.06 hrs, Volume= 0.011 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 2.55 cfs @ 12.13 hrs, Volume= 0.192 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.04 cfs @ 12.26 hrs, Volume= 0.004 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.37 cfs @ 12.13 hrs, Volume= 0.028 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 1.45 cfs @ 12.27 hrs, Volume= 0.144 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 3.98 cfs @ 12.24 hrs, Volume= 0.401 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 0.21 cfs @ 12.27 hrs, Volume= 0.025 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 1.80 cfs @ 12.13 hrs, Volume= 0.136 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 1.84 cfs @ 12.67 hrs, Volume= 0.306 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 2.10" for 2-yr event
Inflow = 1.10 cfs @ 12.13 hrs, Volume= 0.084 af
Outflow = 0.82 cfs @ 12.22 hrs, Volume= 0.083 af, Atten= 25%, Lag= 5.2 min
Primary = 0.76 cfs @ 12.22 hrs, Volume= 0.017 af
Secondary = 0.06 cfs @ 12.22 hrs, Volume= 0.066 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.74' @ 12.22 hrs Surf.Area= 1,209 sf Storage= 1,086 cf

Plug-Flow detention time= 125.7 min calculated for 0.083 af (99% of inflow)
Center-of-Mass det. time= 118.3 min (888.2 - 770.0)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.65'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=0.67 cfs @ 12.22 hrs HW=208.73' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.67 cfs @ 0.91 fps)

Secondary OutFlow Max=0.06 cfs @ 12.22 hrs HW=208.73' (Free Discharge)
2=Exfiltration (Controls 0.06 cfs)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 2.48" for 2-yr event
Inflow = 0.71 cfs @ 12.13 hrs, Volume= 0.054 af
Outflow = 0.70 cfs @ 12.14 hrs, Volume= 0.051 af, Atten= 1%, Lag= 0.7 min
Primary = 0.68 cfs @ 12.14 hrs, Volume= 0.021 af
Secondary = 0.03 cfs @ 12.14 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.53' @ 12.14 hrs Surf.Area= 516 sf Storage= 426 cf

Plug-Flow detention time= 98.1 min calculated for 0.051 af (95% of inflow)
Center-of-Mass det. time= 70.3 min (833.7 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.45'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=0.65 cfs @ 12.14 hrs HW=208.53' (Free Discharge)
1=Orifice/Grate (Weir Controls 0.65 cfs @ 0.91 fps)

Secondary OutFlow Max=0.03 cfs @ 12.14 hrs HW=208.53' (Free Discharge)
2=Exfiltration (Controls 0.03 cfs)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 2.64" for 2-yr event
Inflow = 1.23 cfs @ 12.13 hrs, Volume= 0.092 af
Outflow = 1.23 cfs @ 12.14 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.5 min
Primary = 1.22 cfs @ 12.14 hrs, Volume= 0.064 af
Secondary = 0.02 cfs @ 12.13 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.22' @ 12.13 hrs Surf.Area= 311 sf Storage= 266 cf

Plug-Flow detention time= 51.6 min calculated for 0.087 af (94% of inflow)
Center-of-Mass det. time= 18.5 min (782.0 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.10'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=1.17 cfs @ 12.14 hrs HW=209.21' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.17 cfs @ 1.10 fps)

Secondary OutFlow Max=0.02 cfs @ 12.13 hrs HW=209.21' (Free Discharge)
2=Exfiltration (Controls 0.02 cfs)

Summary for Pond 4P: P4-RG#4

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 2.63" for 2-yr event
Inflow = 1.45 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.45 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 12.13 hrs, Volume= 0.110 af
Secondary = 0.00 cfs @ 12.13 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 211.75' @ 12.13 hrs Surf.Area= 161 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 0.109 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (762.2 - 762.2)

Volume	Invert	Avail.Storage	Storage Description
#1	211.75'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
211.75	161	0	0	161
212.00	183	43	43	187
212.25	204	48	91	212
212.50	226	54	145	238
212.75	248	59	204	265
213.00	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	211.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=47.62 cfs @ 12.13 hrs HW=211.75' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 47.62 cfs @ 8.75 fps)

Secondary OutFlow Max=0.01 cfs @ 12.13 hrs HW=211.75' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 2.07" for 2-yr event
Inflow = 0.70 cfs @ 12.13 hrs, Volume= 0.054 af
Outflow = 0.62 cfs @ 12.21 hrs, Volume= 0.054 af, Atten= 12%, Lag= 4.6 min
Primary = 0.57 cfs @ 12.21 hrs, Volume= 0.010 af
Secondary = 0.05 cfs @ 12.21 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 213.42' @ 12.21 hrs Surf.Area= 740 sf Storage= 644 cf

Plug-Flow detention time= 97.2 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 96.3 min (866.9 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.35'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=0.53 cfs @ 12.21 hrs HW=213.42' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.53 cfs @ 0.85 fps)

Secondary OutFlow Max=0.05 cfs @ 12.21 hrs HW=213.42' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 6P: P4-RG#6

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 1.15" for 2-yr event
Inflow = 2.48 cfs @ 12.05 hrs, Volume= 0.213 af
Outflow = 2.39 cfs @ 12.07 hrs, Volume= 0.199 af, Atten= 4%, Lag= 0.8 min
Primary = 2.34 cfs @ 12.07 hrs, Volume= 0.133 af
Secondary = 0.05 cfs @ 12.07 hrs, Volume= 0.066 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.93' @ 12.07 hrs Surf.Area= 774 sf Storage= 750 cf

Plug-Flow detention time= 53.2 min calculated for 0.199 af (93% of inflow)
Center-of-Mass det. time= 16.0 min (818.5 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=2.25 cfs @ 12.07 hrs HW=213.93' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.25 cfs @ 1.37 fps)

Secondary OutFlow Max=0.05 cfs @ 12.07 hrs HW=213.93' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 2.41" for 2-yr event
Inflow = 1.03 cfs @ 12.13 hrs, Volume= 0.078 af
Outflow = 0.86 cfs @ 12.21 hrs, Volume= 0.078 af, Atten= 17%, Lag= 4.8 min
Primary = 0.80 cfs @ 12.21 hrs, Volume= 0.017 af
Secondary = 0.06 cfs @ 12.21 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.43' @ 12.21 hrs Surf.Area= 1,001 sf Storage= 973 cf

Plug-Flow detention time= 115.2 min calculated for 0.078 af (100% of inflow)
Center-of-Mass det. time= 114.5 min (878.9 - 764.4)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 204.41'

Primary OutFlow Max=0.75 cfs @ 12.21 hrs HW=210.42' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 0.75 cfs @ 0.95 fps)

Secondary OutFlow Max=0.06 cfs @ 12.21 hrs HW=210.42' (Free Discharge)
└**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond 8P: P4-RG#8

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 2.48" for 2-yr event
Inflow = 2.26 cfs @ 12.13 hrs, Volume= 0.172 af
Outflow = 0.62 cfs @ 12.38 hrs, Volume= 0.172 af, Atten= 73%, Lag= 15.0 min
Primary = 0.47 cfs @ 12.38 hrs, Volume= 0.019 af
Secondary = 0.15 cfs @ 12.38 hrs, Volume= 0.153 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.91' @ 12.38 hrs Surf.Area= 2,770 sf Storage= 2,623 cf

Plug-Flow detention time= 129.0 min calculated for 0.172 af (100% of inflow)
Center-of-Mass det. time= 128.4 min (891.7 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.85'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.75'

Primary OutFlow Max=0.46 cfs @ 12.38 hrs HW=209.91' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 0.46 cfs @ 0.81 fps)

Secondary OutFlow Max=0.15 cfs @ 12.38 hrs HW=209.91' (Free Discharge)
└**2=Exfiltration** (Controls 0.15 cfs)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 1.89" for 2-yr event
Inflow = 0.49 cfs @ 12.13 hrs, Volume= 0.038 af
Outflow = 0.05 cfs @ 13.09 hrs, Volume= 0.038 af, Atten= 91%, Lag= 57.5 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.05 cfs @ 13.09 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.03' @ 13.09 hrs Surf.Area= 922 sf Storage= 591 cf

Plug-Flow detention time= 97.6 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 96.9 min (871.8 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 201.21'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=209.34' (Free Discharge)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.05 cfs @ 13.09 hrs HW=210.03' (Free Discharge)
2=Exfiltration (Controls 0.05 cfs)

Summary for Pond 10P: P4-RG#10

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 2.02" for 2-yr event
Inflow = 1.65 cfs @ 12.05 hrs, Volume= 0.111 af
Outflow = 1.60 cfs @ 12.05 hrs, Volume= 0.104 af, Atten= 3%, Lag= 0.4 min
Primary = 1.58 cfs @ 12.05 hrs, Volume= 0.072 af
Secondary = 0.02 cfs @ 12.05 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.97' @ 12.05 hrs Surf.Area= 412 sf Storage= 390 cf

Plug-Flow detention time= 56.8 min calculated for 0.103 af (93% of inflow)
Center-of-Mass det. time= 19.0 min (786.0 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.83'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.33'

Primary OutFlow Max=1.57 cfs @ 12.05 hrs HW=206.97' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.57 cfs @ 1.21 fps)

Secondary OutFlow Max=0.02 cfs @ 12.05 hrs HW=206.97' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond 11P: P4-RG#11

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 2.25" for 2-yr event
Inflow = 3.25 cfs @ 12.05 hrs, Volume= 0.218 af
Outflow = 2.54 cfs @ 12.10 hrs, Volume= 0.212 af, Atten= 22%, Lag= 3.5 min
Primary = 2.41 cfs @ 12.10 hrs, Volume= 0.059 af
Secondary = 0.12 cfs @ 12.10 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.27' @ 12.10 hrs Surf.Area= 2,339 sf Storage= 2,590 cf

Plug-Flow detention time= 120.8 min calculated for 0.212 af (98% of inflow)
Center-of-Mass det. time= 105.4 min (867.6 - 762.3)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.09'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.42'

Primary OutFlow Max=2.36 cfs @ 12.10 hrs HW=208.27' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 2.36 cfs @ 1.39 fps)

Secondary OutFlow Max=0.12 cfs @ 12.10 hrs HW=208.27' (Free Discharge)
└**2=Exfiltration** (Controls 0.12 cfs)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 1.03" for 2-yr event
Inflow = 18.15 cfs @ 12.12 hrs, Volume= 1.286 af
Outflow = 2.90 cfs @ 12.78 hrs, Volume= 1.278 af, Atten= 84%, Lag= 39.5 min
Primary = 1.20 cfs @ 12.78 hrs, Volume= 0.193 af
Secondary = 1.71 cfs @ 12.78 hrs, Volume= 1.085 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 202.62' @ 12.78 hrs Surf.Area= 21,023 sf Storage= 24,255 cf

Plug-Flow detention time= 121.6 min calculated for 1.275 af (99% of inflow)
Center-of-Mass det. time= 117.6 min (903.1 - 785.5)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.77'

Primary OutFlow Max=1.20 cfs @ 12.78 hrs HW=202.62' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 1.20 cfs @ 2.87 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.71 cfs @ 12.78 hrs HW=202.62' (Free Discharge)
- **5=Exfiltration** (Controls 1.71 cfs)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 1.41" for 2-yr event
Inflow = 7.65 cfs @ 12.17 hrs, Volume= 0.772 af
Outflow = 1.02 cfs @ 13.21 hrs, Volume= 0.769 af, Atten= 87%, Lag= 62.5 min
Primary = 0.11 cfs @ 13.21 hrs, Volume= 0.032 af
Secondary = 0.91 cfs @ 13.21 hrs, Volume= 0.737 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 202.06' @ 13.21 hrs Surf.Area= 13,640 sf Storage= 13,598 cf

Plug-Flow detention time= 128.7 min calculated for 0.769 af (100% of inflow)
Center-of-Mass det. time= 125.9 min (920.2 - 794.3)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.75'

Primary OutFlow Max=0.11 cfs @ 13.21 hrs HW=202.06' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 3.26 fps)
- **2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.91 cfs @ 13.21 hrs HW=202.06' (Free Discharge)
- **5=Exfiltration** (Controls 0.91 cfs)

Summary for Pond RG 12: P4-RG#12

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 2.19" for 2-yr event
Inflow = 3.09 cfs @ 12.13 hrs, Volume= 0.239 af
Outflow = 3.10 cfs @ 12.13 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.4 min
Primary = 3.09 cfs @ 12.13 hrs, Volume= 0.206 af
Secondary = 0.02 cfs @ 12.13 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.25' @ 12.13 hrs Surf.Area= 312 sf Storage= 302 cf

Plug-Flow detention time= 26.0 min calculated for 0.233 af (98% of inflow)
Center-of-Mass det. time= 11.6 min (780.0 - 768.4)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.03'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.47'

Primary OutFlow Max=2.97 cfs @ 12.13 hrs HW=206.24' (Free Discharge)
- **1=Orifice/Grate** (Weir Controls 2.97 cfs @ 1.50 fps)

Secondary OutFlow Max=0.02 cfs @ 12.13 hrs HW=206.24' (Free Discharge)
- **2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 1.68" for 2-yr event
Inflow = 1.89 cfs @ 12.13 hrs, Volume= 0.161 af
Outflow = 1.59 cfs @ 12.18 hrs, Volume= 0.161 af, Atten= 16%, Lag= 3.1 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 1.59 cfs @ 12.18 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 12.18 hrs Surf.Area= 316.005 ac Storage= 0.010 af

Plug-Flow detention time= 4.5 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 3.7 min (785.4 - 781.7)

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	204.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 200.69'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=637.28 cfs @ 12.18 hrs HW=204.75' (Free Discharge)
↑—**2=Exfiltration** (Controls 637.28 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 0.24" for 2-yr event
Inflow = 3.14 cfs @ 12.68 hrs, Volume= 0.531 af
Primary = 3.14 cfs @ 12.68 hrs, Volume= 0.531 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 1.80" for 2-yr event
Inflow = 5.41 cfs @ 12.25 hrs, Volume= 0.545 af
Primary = 5.41 cfs @ 12.25 hrs, Volume= 0.545 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 1.12" for 2-yr event
Inflow = 18.03 cfs @ 12.12 hrs, Volume= 1.247 af
Primary = 18.03 cfs @ 12.12 hrs, Volume= 1.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 1.29" for 2-yr event
Inflow = 7.19 cfs @ 12.13 hrs, Volume= 0.550 af
Primary = 7.19 cfs @ 12.13 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 2.90" for 2-yr event
Inflow = 2.33 cfs @ 12.13 hrs, Volume= 0.176 af
Primary = 2.33 cfs @ 12.13 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.82 cfs 0.056 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.03 cfs 0.079 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.10 cfs 0.007 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>1.86"
Tc=6.0 min CN=68 Runoff=0.19 cfs 0.012 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>1.56"
Tc=6.0 min CN=64 Runoff=0.17 cfs 0.012 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=2.10 cfs 0.162 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.20 cfs 0.013 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=0.97 cfs 0.075 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=2.71 cfs 0.185 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>4.73"
Tc=0.0 min CN=98 Runoff=3.33 cfs 0.225 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.54 cfs 0.118 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.30 cfs 0.020 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.56 cfs 0.038 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>0.96"
Tc=6.0 min CN=55 Runoff=1.76 cfs 0.132 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=1.49 cfs 0.114 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.16 cfs 0.011 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=3.28 cfs 0.252 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.31 cfs 0.021 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.051 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.18 cfs 0.012 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=7.23 cfs 0.556 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>1.56"
Tc=6.0 min CN=64 Runoff=7.21 cfs 0.482 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=3.49 cfs 0.268 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>1.35"
Tc=6.0 min CN=61 Runoff=0.08 cfs 0.006 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>1.35"
Tc=0.0 min CN=61 Runoff=0.70 cfs 0.042 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>4.73"
Tc=0.0 min CN=98 Runoff=4.61 cfs 0.312 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>4.73"
Tc=0.0 min CN=98 Runoff=2.28 cfs 0.154 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>1.35"
Tc=0.0 min CN=61 Runoff=0.51 cfs 0.030 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=3.85 cfs 0.296 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>1.34"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.14 cfs 0.012 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=0.56 cfs 0.043 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>1.93"
Tc=16.1 min CN=69 Runoff=3.63 cfs 0.331 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>4.72"
Tc=16.1 min CN=98 Runoff=6.01 cfs 0.618 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>1.34"
Flow Length=198' Tc=13.8 min CN=61 Runoff=0.76 cfs 0.069 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=2.72 cfs 0.209 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>1.83"
Flow Length=710' Tc=43.3 min CN=68 Runoff=4.80 cfs 0.719 af

Pond 1P: P4-RG#1 Peak Elev=208.80' Storage=1,159 cf Inflow=1.83 cfs 0.138 af
Primary=1.72 cfs 0.054 af Secondary=0.06 cfs 0.077 af Outflow=1.78 cfs 0.130 af

Pond 2P: P4-RG#2 Peak Elev=208.56' Storage=442 cf Inflow=1.12 cfs 0.086 af
Primary=1.09 cfs 0.045 af Secondary=0.03 cfs 0.035 af Outflow=1.12 cfs 0.080 af

Pond 3P: P4-RG#3 Peak Elev=209.26' Storage=279 cf Inflow=1.93 cfs 0.146 af
Primary=1.92 cfs 0.116 af Secondary=0.02 cfs 0.025 af Outflow=1.94 cfs 0.141 af

Pond 4P: P4-RG#4 Peak Elev=211.75' Storage=0 cf Inflow=2.28 cfs 0.173 af
Primary=2.28 cfs 0.173 af Secondary=0.00 cfs 0.000 af Outflow=2.28 cfs 0.173 af

Pond 5P: P4-RG#5 Peak Elev=213.46' Storage=673 cf Inflow=1.17 cfs 0.088 af
Primary=1.11 cfs 0.033 af Secondary=0.05 cfs 0.053 af Outflow=1.16 cfs 0.086 af

Pond 6P: P4-RG#6 Peak Elev=214.05' Storage=805 cf Inflow=4.92 cfs 0.410 af
Primary=4.95 cfs 0.323 af Secondary=0.05 cfs 0.073 af Outflow=5.00 cfs 0.396 af

Pond 7P: P4-RG#7 Peak Elev=210.48' Storage=1,022 cf Inflow=1.65 cfs 0.126 af
Primary=1.56 cfs 0.048 af Secondary=0.06 cfs 0.072 af Outflow=1.62 cfs 0.120 af

Pond 8P: P4-RG#8 Peak Elev=210.06' Storage=3,047 cf Inflow=3.59 cfs 0.274 af
Primary=2.97 cfs 0.083 af Secondary=0.16 cfs 0.184 af Outflow=3.12 cfs 0.267 af

Pond 9P: P4-RG#9 Peak Elev=210.38' Storage=922 cf Inflow=0.85 cfs 0.064 af
Primary=0.22 cfs 0.007 af Secondary=0.05 cfs 0.056 af Outflow=0.27 cfs 0.064 af

Pond 10P: P4-RG#10 Peak Elev=207.03' Storage=415 cf Inflow=2.78 cfs 0.184 af
Primary=2.70 cfs 0.142 af Secondary=0.02 cfs 0.035 af Outflow=2.72 cfs 0.177 af

Pond 11P: P4-RG#11 Peak Elev=208.40' Storage=2,744 cf Inflow=5.31 cfs 0.353 af
Primary=5.30 cfs 0.155 af Secondary=0.13 cfs 0.174 af Outflow=5.43 cfs 0.329 af

Pond B: BASIN B Peak Elev=203.83' Storage=51,695 cf Inflow=40.29 cfs 2.623 af
Primary=3.71 cfs 0.848 af Secondary=2.62 cfs 1.698 af Outflow=6.32 cfs 2.547 af

Pond C: BASIN C Peak Elev=203.00' Storage=27,127 cf Inflow=13.54 cfs 1.360 af
Primary=0.19 cfs 0.111 af Secondary=1.24 cfs 1.159 af Outflow=1.44 cfs 1.270 af

Pond RG 12: P4-RG#12 Peak Elev=206.33' Storage=312 cf Inflow=5.06 cfs 0.389 af
Primary=5.04 cfs 0.356 af Secondary=0.02 cfs 0.028 af Outflow=5.06 cfs 0.384 af

Pond RG 13: P4-RG#13 Peak Elev=204.75' Storage=0.017 af Inflow=3.24 cfs 0.278 af
Primary=0.00 cfs 0.000 af Secondary=2.74 cfs 0.278 af Outflow=2.74 cfs 0.278 af

Link 1L: TOTAL BASIN C TO AP#4 Inflow=8.68 cfs 1.678 af
Primary=8.68 cfs 1.678 af

Link 10L: Inflow=9.62 cfs 0.948 af
Primary=9.62 cfs 0.948 af

Link 38L: PDA TO BASIN B Inflow=38.57 cfs 2.491 af
Primary=38.57 cfs 2.491 af

Link P4-1: P4-1 Inflow=14.41 cfs 1.037 af
Primary=14.41 cfs 1.037 af

Link P4-2: P4-2 Inflow=3.57 cfs 0.274 af
Primary=3.57 cfs 0.274 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 0.82 cfs @ 12.14 hrs, Volume= 0.056 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.079 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 1.74 cfs @ 12.13 hrs, Volume= 0.134 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 2.10 cfs @ 12.13 hrs, Volume= 0.162 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 0.97 cfs @ 12.13 hrs, Volume= 0.075 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 2.71 cfs @ 12.14 hrs, Volume= 0.185 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.33 cfs @ 12.04 hrs, Volume= 0.225 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 1.54 cfs @ 12.13 hrs, Volume= 0.118 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.020 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 1.76 cfs @ 12.15 hrs, Volume= 0.132 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.114 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.011 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 3.28 cfs @ 12.13 hrs, Volume= 0.252 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.18 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 7.23 cfs @ 12.13 hrs, Volume= 0.556 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 7.21 cfs @ 12.14 hrs, Volume= 0.482 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 3.49 cfs @ 12.13 hrs, Volume= 0.268 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.70 cfs @ 12.05 hrs, Volume= 0.042 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 4.61 cfs @ 12.04 hrs, Volume= 0.312 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.28 cfs @ 12.04 hrs, Volume= 0.154 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.51 cfs @ 12.05 hrs, Volume= 0.030 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 3.85 cfs @ 12.13 hrs, Volume= 0.296 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.14 cfs @ 12.23 hrs, Volume= 0.012 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.56 cfs @ 12.13 hrs, Volume= 0.043 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 3.63 cfs @ 12.26 hrs, Volume= 0.331 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 6.01 cfs @ 12.24 hrs, Volume= 0.618 af, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 0.76 cfs @ 12.24 hrs, Volume= 0.069 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 2.72 cfs @ 12.13 hrs, Volume= 0.209 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 4.80 cfs @ 12.63 hrs, Volume= 0.719 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 3.46" for 10-yr event
Inflow = 1.83 cfs @ 12.13 hrs, Volume= 0.138 af
Outflow = 1.78 cfs @ 12.15 hrs, Volume= 0.130 af, Atten= 3%, Lag= 1.1 min
Primary = 1.72 cfs @ 12.15 hrs, Volume= 0.054 af
Secondary = 0.06 cfs @ 12.15 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.80' @ 12.15 hrs Surf.Area= 1,233 sf Storage= 1,159 cf

Plug-Flow detention time= 99.3 min calculated for 0.130 af (94% of inflow)
Center-of-Mass det. time= 65.9 min (832.9 - 766.9)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.65'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=1.70 cfs @ 12.15 hrs HW=208.80' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 1.70 cfs @ 1.25 fps)

Secondary OutFlow Max=0.06 cfs @ 12.15 hrs HW=208.80' (Free Discharge)
└**2=Exfiltration** (Controls 0.06 cfs)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 3.95" for 10-yr event
Inflow = 1.12 cfs @ 12.13 hrs, Volume= 0.086 af
Outflow = 1.12 cfs @ 12.14 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.7 min
Primary = 1.09 cfs @ 12.14 hrs, Volume= 0.045 af
Secondary = 0.03 cfs @ 12.14 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.56' @ 12.14 hrs Surf.Area= 529 sf Storage= 442 cf

Plug-Flow detention time= 75.3 min calculated for 0.080 af (93% of inflow)
Center-of-Mass det. time= 38.6 min (797.0 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.45'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=1.06 cfs @ 12.14 hrs HW=208.56' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.06 cfs @ 1.07 fps)

Secondary OutFlow Max=0.03 cfs @ 12.14 hrs HW=208.56' (Free Discharge)
2=Exfiltration (Controls 0.03 cfs)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 4.18" for 10-yr event
Inflow = 1.93 cfs @ 12.13 hrs, Volume= 0.146 af
Outflow = 1.94 cfs @ 12.13 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.4 min
Primary = 1.92 cfs @ 12.13 hrs, Volume= 0.116 af
Secondary = 0.02 cfs @ 12.13 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.26' @ 12.13 hrs Surf.Area= 316 sf Storage= 279 cf

Plug-Flow detention time= 38.9 min calculated for 0.141 af (96% of inflow)
Center-of-Mass det. time= 16.4 min (773.8 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.10'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=1.85 cfs @ 12.13 hrs HW=209.25' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.85 cfs @ 1.28 fps)

Secondary OutFlow Max=0.02 cfs @ 12.13 hrs HW=209.25' (Free Discharge)
2=Exfiltration (Controls 0.02 cfs)

Summary for Pond 4P: P4-RG#4

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 4.16" for 10-yr event
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.173 af
Outflow = 2.28 cfs @ 12.13 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min
Primary = 2.28 cfs @ 12.13 hrs, Volume= 0.173 af
Secondary = 0.00 cfs @ 12.13 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 211.75' @ 12.13 hrs Surf.Area= 161 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 0.173 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (756.3 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1	211.75'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
211.75	161	0	0	161
212.00	183	43	43	187
212.25	204	48	91	212
212.50	226	54	145	238
212.75	248	59	204	265
213.00	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	211.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=47.63 cfs @ 12.13 hrs HW=211.75' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 47.63 cfs @ 8.75 fps)

Secondary OutFlow Max=0.01 cfs @ 12.13 hrs HW=211.75' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 3.42" for 10-yr event
Inflow = 1.17 cfs @ 12.13 hrs, Volume= 0.088 af
Outflow = 1.16 cfs @ 12.14 hrs, Volume= 0.086 af, Atten= 1%, Lag= 0.9 min
Primary = 1.11 cfs @ 12.14 hrs, Volume= 0.033 af
Secondary = 0.05 cfs @ 12.14 hrs, Volume= 0.053 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 213.46' @ 12.14 hrs Surf.Area= 750 sf Storage= 673 cf

Plug-Flow detention time= 83.4 min calculated for 0.086 af (97% of inflow)
Center-of-Mass det. time= 67.5 min (835.3 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.35'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=1.08 cfs @ 12.14 hrs HW=213.46' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 1.08 cfs @ 1.07 fps)

Secondary OutFlow Max=0.05 cfs @ 12.14 hrs HW=213.46' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 6P: P4-RG#6

[93] Warning: Storage range exceeded by 0.05'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 2.22" for 10-yr event
Inflow = 4.92 cfs @ 12.07 hrs, Volume= 0.410 af
Outflow = 5.00 cfs @ 12.06 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min
Primary = 4.95 cfs @ 12.06 hrs, Volume= 0.323 af
Secondary = 0.05 cfs @ 12.07 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 214.05' @ 12.06 hrs Surf.Area= 791 sf Storage= 805 cf

Plug-Flow detention time= 33.2 min calculated for 0.395 af (96% of inflow)
Center-of-Mass det. time= 12.6 min (815.7 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=4.75 cfs @ 12.06 hrs HW=214.04' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 4.75 cfs @ 1.76 fps)

Secondary OutFlow Max=0.05 cfs @ 12.07 hrs HW=214.04' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 3.86" for 10-yr event
Inflow = 1.65 cfs @ 12.13 hrs, Volume= 0.126 af
Outflow = 1.62 cfs @ 12.14 hrs, Volume= 0.120 af, Atten= 2%, Lag= 1.0 min
Primary = 1.56 cfs @ 12.14 hrs, Volume= 0.048 af
Secondary = 0.06 cfs @ 12.14 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.48' @ 12.14 hrs Surf.Area= 1,010 sf Storage= 1,022 cf

Plug-Flow detention time= 96.1 min calculated for 0.120 af (96% of inflow)
Center-of-Mass det. time= 69.6 min (829.4 - 759.7)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 204.41'

Primary OutFlow Max=1.54 cfs @ 12.14 hrs HW=210.48' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.54 cfs @ 1.21 fps)

Secondary OutFlow Max=0.06 cfs @ 12.14 hrs HW=210.48' (Free Discharge)
2=Exfiltration (Controls 0.06 cfs)

Summary for Pond 8P: P4-RG#8

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 3.96" for 10-yr event
Inflow = 3.59 cfs @ 12.13 hrs, Volume= 0.274 af
Outflow = 3.12 cfs @ 12.17 hrs, Volume= 0.267 af, Atten= 13%, Lag= 2.8 min
Primary = 2.97 cfs @ 12.17 hrs, Volume= 0.083 af
Secondary = 0.16 cfs @ 12.17 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.06' @ 12.17 hrs Surf.Area= 2,855 sf Storage= 3,047 cf

Plug-Flow detention time= 109.5 min calculated for 0.267 af (98% of inflow)
Center-of-Mass det. time= 93.7 min (851.9 - 758.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.85'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.75'

Primary OutFlow Max=2.78 cfs @ 12.17 hrs HW=210.05' (Free Discharge)
1=Orifice/Grate (Weir Controls 2.78 cfs @ 1.47 fps)

Secondary OutFlow Max=0.15 cfs @ 12.17 hrs HW=210.05' (Free Discharge)
2=Exfiltration (Controls 0.15 cfs)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 3.18" for 10-yr event
Inflow = 0.85 cfs @ 12.13 hrs, Volume= 0.064 af
Outflow = 0.27 cfs @ 12.36 hrs, Volume= 0.064 af, Atten= 68%, Lag= 13.8 min
Primary = 0.22 cfs @ 12.36 hrs, Volume= 0.007 af
Secondary = 0.05 cfs @ 12.36 hrs, Volume= 0.056 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.38' @ 12.36 hrs Surf.Area= 990 sf Storage= 922 cf

Plug-Flow detention time= 135.0 min calculated for 0.064 af (100% of inflow)
Center-of-Mass det. time= 134.3 min (907.4 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 201.21'

Primary OutFlow Max=0.22 cfs @ 12.36 hrs HW=210.38' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 0.22 cfs @ 0.63 fps)

Secondary OutFlow Max=0.05 cfs @ 12.36 hrs HW=210.38' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 10P: P4-RG#10

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 3.35" for 10-yr event
Inflow = 2.78 cfs @ 12.05 hrs, Volume= 0.184 af
Outflow = 2.72 cfs @ 12.05 hrs, Volume= 0.177 af, Atten= 2%, Lag= 0.3 min
Primary = 2.70 cfs @ 12.05 hrs, Volume= 0.142 af
Secondary = 0.02 cfs @ 12.05 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 207.03' @ 12.05 hrs Surf.Area= 418 sf Storage= 415 cf

Plug-Flow detention time= 41.7 min calculated for 0.176 af (96% of inflow)
Center-of-Mass det. time= 16.5 min (781.0 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.83'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.33'

Primary OutFlow Max=2.68 cfs @ 12.05 hrs HW=207.03' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.68 cfs @ 1.45 fps)

Secondary OutFlow Max=0.02 cfs @ 12.05 hrs HW=207.03' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond 11P: P4-RG#11

[93] Warning: Storage range exceeded by 0.06'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 3.65" for 10-yr event
Inflow = 5.31 cfs @ 12.05 hrs, Volume= 0.353 af
Outflow = 5.43 cfs @ 12.05 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.4 min
Primary = 5.30 cfs @ 12.05 hrs, Volume= 0.155 af
Secondary = 0.13 cfs @ 12.05 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.40' @ 12.05 hrs Surf.Area= 2,356 sf Storage= 2,744 cf

Plug-Flow detention time= 92.5 min calculated for 0.329 af (93% of inflow)
Center-of-Mass det. time= 54.2 min (812.6 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.09'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.42'

Primary OutFlow Max=5.24 cfs @ 12.05 hrs HW=208.40' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 5.24 cfs @ 1.82 fps)

Secondary OutFlow Max=0.13 cfs @ 12.05 hrs HW=208.40' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.13 cfs)

Summary for Pond B: BASIN B

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 2.10" for 10-yr event
Inflow = 40.29 cfs @ 12.13 hrs, Volume= 2.623 af
Outflow = 6.32 cfs @ 12.68 hrs, Volume= 2.547 af, Atten= 84%, Lag= 32.8 min
Primary = 3.71 cfs @ 12.68 hrs, Volume= 0.848 af
Secondary = 2.62 cfs @ 12.68 hrs, Volume= 1.698 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 203.83' @ 12.68 hrs Surf.Area= 24,497 sf Storage= 51,695 cf

Plug-Flow detention time= 134.4 min calculated for 2.547 af (97% of inflow)
Center-of-Mass det. time= 117.0 min (904.5 - 787.5)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.77'

Primary OutFlow Max=3.70 cfs @ 12.68 hrs HW=203.83' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 2.52 cfs @ 6.04 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Weir Controls 1.18 cfs @ 1.87 fps)

Secondary OutFlow Max=2.62 cfs @ 12.68 hrs HW=203.83' (Free Discharge)
- **5=Exfiltration** (Controls 2.62 cfs)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 2.48" for 10-yr event
Inflow = 13.54 cfs @ 12.17 hrs, Volume= 1.360 af
Outflow = 1.44 cfs @ 13.44 hrs, Volume= 1.270 af, Atten= 89%, Lag= 76.0 min
Primary = 0.19 cfs @ 13.44 hrs, Volume= 0.111 af
Secondary = 1.24 cfs @ 13.44 hrs, Volume= 1.159 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 203.00' @ 13.44 hrs Surf.Area= 15,162 sf Storage= 27,127 cf

Plug-Flow detention time= 203.4 min calculated for 1.268 af (93% of inflow)
Center-of-Mass det. time= 166.8 min (957.8 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.75'

Primary OutFlow Max=0.19 cfs @ 13.44 hrs HW=203.00' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.69 fps)
- **2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.24 cfs @ 13.44 hrs HW=203.00' (Free Discharge)
- **5=Exfiltration** (Controls 1.24 cfs)

Summary for Pond RG 12: P4-RG#12

[93] Warning: Storage range exceeded by 0.05'

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 3.57" for 10-yr event
Inflow = 5.06 cfs @ 12.13 hrs, Volume= 0.389 af
Outflow = 5.06 cfs @ 12.13 hrs, Volume= 0.384 af, Atten= 0%, Lag= 0.0 min
Primary = 5.04 cfs @ 12.13 hrs, Volume= 0.356 af
Secondary = 0.02 cfs @ 12.13 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.33' @ 12.13 hrs Surf.Area= 316 sf Storage= 312 cf

Plug-Flow detention time= 17.7 min calculated for 0.383 af (98% of inflow)
Center-of-Mass det. time= 8.5 min (773.5 - 765.0)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.03'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.47'

Primary OutFlow Max=4.85 cfs @ 12.13 hrs HW=206.32' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 4.85 cfs @ 1.77 fps)

Secondary OutFlow Max=0.02 cfs @ 12.13 hrs HW=206.32' (Free Discharge)
└**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 2.90" for 10-yr event
Inflow = 3.24 cfs @ 12.14 hrs, Volume= 0.278 af
Outflow = 2.74 cfs @ 12.19 hrs, Volume= 0.278 af, Atten= 15%, Lag= 3.3 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 2.74 cfs @ 12.19 hrs, Volume= 0.278 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 12.19 hrs Surf.Area= 316.009 ac Storage= 0.017 af

Plug-Flow detention time= 4.5 min calculated for 0.278 af (100% of inflow)
Center-of-Mass det. time= 3.7 min (785.2 - 781.5)

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	204.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 200.69'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=637.29 cfs @ 12.19 hrs HW=204.75' (Free Discharge)
└**2=Exfiltration** (Controls 637.29 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 0.77" for 10-yr event
Inflow = 8.68 cfs @ 12.65 hrs, Volume= 1.678 af
Primary = 8.68 cfs @ 12.65 hrs, Volume= 1.678 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 3.13" for 10-yr event
Inflow = 9.62 cfs @ 12.25 hrs, Volume= 0.948 af
Primary = 9.62 cfs @ 12.25 hrs, Volume= 0.948 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 2.24" for 10-yr event
Inflow = 38.57 cfs @ 12.13 hrs, Volume= 2.491 af
Primary = 38.57 cfs @ 12.13 hrs, Volume= 2.491 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 2.43" for 10-yr event
Inflow = 14.41 cfs @ 12.13 hrs, Volume= 1.037 af
Primary = 14.41 cfs @ 12.13 hrs, Volume= 1.037 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 4.50" for 10-yr event
Inflow = 3.57 cfs @ 12.13 hrs, Volume= 0.274 af
Primary = 3.57 cfs @ 12.13 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P4-C1 BASIN OVERLAND Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=2.27 cfs 0.148 af

Subcatchment2S: P4-RG#2 IMP Runoff Area=0.200 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=1.69 cfs 0.132 af

Subcatchment3S: P4-RG#2 PERV Runoff Area=0.060 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.27 cfs 0.018 af

Subcatchment4S: P4-RG#3 PERV Runoff Area=0.080 ac 0.00% Impervious Runoff Depth>4.36"
Tc=6.0 min CN=68 Runoff=0.45 cfs 0.029 af

Subcatchment5S: P4-RG#3 IMP Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=2.87 cfs 0.224 af

Subcatchment6S: P4-RG#4 PERV Runoff Area=0.090 ac 0.00% Impervious Runoff Depth>3.90"
Tc=6.0 min CN=64 Runoff=0.45 cfs 0.029 af

Subcatchment7S: P4-RG#4 IMP Runoff Area=0.410 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=3.46 cfs 0.270 af

Subcatchment8S: P4-RG#5 PERV Runoff Area=0.120 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.55 cfs 0.036 af

Subcatchment9S: P4-RG#5 IMP Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=1.60 cfs 0.125 af

Subcatchment10S: P4-RG#6 PERV Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=7.50 cfs 0.489 af

Subcatchment11S: P4-RG#6 Runoff Area=0.570 ac 100.00% Impervious Runoff Depth>7.91"
Tc=0.0 min CN=98 Runoff=5.48 cfs 0.376 af

Subcatchment12S: P4-RG#1-IMP Runoff Area=0.300 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=2.53 cfs 0.198 af

Subcatchment13S: P4-RG#1 PERV Runoff Area=0.180 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.82 cfs 0.053 af

Subcatchment14S: P4-RG#12 PERV Runoff Area=0.340 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=1.55 cfs 0.101 af

Subcatchment15S: OVERLAND BASIN B Runoff Area=1.650 ac 0.00% Impervious Runoff Depth>2.88"
Tc=6.0 min CN=55 Runoff=6.01 cfs 0.396 af

Subcatchment16S: P4-RG#7 IMP Runoff Area=0.290 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=2.45 cfs 0.191 af

Subcatchment17S: P4-RG#7 PERV Runoff Area=0.100 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.45 cfs 0.030 af

Subcatchment18S: P4-RG#8 IMP Runoff Area=0.640 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=5.40 cfs 0.422 af

Subcatchment19S: P4-RG#8 PERV Runoff Area=0.190 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.86 cfs 0.056 af

Subcatchment20S: P4-RG#9 IMP Runoff Area=0.130 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=1.10 cfs 0.086 af

Subcatchment21S: P4-RG#8 PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.50 cfs 0.033 af

Subcatchment22S: P4-1 IMP Runoff Area=1.410 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=11.90 cfs 0.929 af

Subcatchment23S: P4-1 PERV Runoff Area=3.710 ac 0.00% Impervious Runoff Depth>3.90"
Tc=6.0 min CN=64 Runoff=18.51 cfs 1.204 af

Subcatchment24S: P4-2 IMP Runoff Area=0.680 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=5.74 cfs 0.448 af

Subcatchment25S: P4-2 PERV Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>3.55"
Tc=6.0 min CN=61 Runoff=0.23 cfs 0.015 af

Subcatchment26S: P4-RG#11 PERV Runoff Area=0.370 ac 0.00% Impervious Runoff Depth>3.56"
Tc=0.0 min CN=61 Runoff=1.93 cfs 0.110 af

Subcatchment27S: P4-RG#11 IMP Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>7.91"
Tc=0.0 min CN=98 Runoff=7.59 cfs 0.521 af

Subcatchment28S: P4-RG#10 IMP Runoff Area=0.390 ac 100.00% Impervious Runoff Depth>7.91"
Tc=0.0 min CN=98 Runoff=3.75 cfs 0.257 af

Subcatchment29S: P4-RG#10 PERV Runoff Area=0.270 ac 0.00% Impervious Runoff Depth>3.56"
Tc=0.0 min CN=61 Runoff=1.41 cfs 0.080 af

Subcatchment30S: P4-RG#12 IMP Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=6.33 cfs 0.494 af

Subcatchment31S: OVERLAND PERV Runoff Area=0.110 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=403' Tc=13.2 min CN=61 Runoff=0.39 cfs 0.033 af

Subcatchment32S: OVERLAND IMP Runoff Area=0.110 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=0.93 cfs 0.072 af

Subcatchment33S: P4-C2 PERV Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>4.46"
Tc=16.1 min CN=69 Runoff=8.55 cfs 0.766 af

Subcatchment34S: P4-C2 IMP Runoff Area=1.570 ac 100.00% Impervious Runoff Depth>7.89"
Tc=16.1 min CN=98 Runoff=9.90 cfs 1.032 af

Subcatchment35S: P4-RG#13 PERV Runoff Area=0.620 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=198' Tc=13.8 min CN=61 Runoff=2.16 cfs 0.183 af

Subcatchment36S: P4-RG#13 IMP Runoff Area=0.530 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=4.47 cfs 0.349 af

Subcatchment37S: PDA4 Runoff Area=4.705 ac 0.00% Impervious Runoff Depth>4.31"
Flow Length=710' Tc=43.3 min CN=68 Runoff=11.62 cfs 1.691 af

Pond 1P: P4-RG#1 Peak Elev=208.87' Storage=1,255 cf Inflow=3.35 cfs 0.251 af
Primary=3.22 cfs 0.143 af Secondary=0.06 cfs 0.090 af Outflow=3.29 cfs 0.233 af

Pond 2P: P4-RG#2 Peak Elev=208.61' Storage=469 cf Inflow=1.96 cfs 0.149 af
Primary=1.93 cfs 0.101 af Secondary=0.03 cfs 0.040 af Outflow=1.96 cfs 0.141 af

Pond 3P: P4-RG#3 Peak Elev=209.33' Storage=302 cf Inflow=3.31 cfs 0.253 af
Primary=3.31 cfs 0.221 af Secondary=0.02 cfs 0.027 af Outflow=3.33 cfs 0.248 af

Pond 4P: P4-RG#4 Peak Elev=211.75' Storage=0 cf Inflow=3.91 cfs 0.299 af
Primary=3.91 cfs 0.299 af Secondary=0.00 cfs 0.000 af Outflow=3.91 cfs 0.299 af

Pond 5P: P4-RG#5 Peak Elev=213.52' Storage=716 cf Inflow=2.15 cfs 0.161 af
Primary=2.08 cfs 0.087 af Secondary=0.05 cfs 0.065 af Outflow=2.13 cfs 0.153 af

Pond 6P: P4-RG#6 Peak Elev=214.24' Storage=805 cf Inflow=10.62 cfs 0.864 af
Primary=10.47 cfs 0.769 af Secondary=0.05 cfs 0.081 af Outflow=10.53 cfs 0.850 af

Pond 7P: P4-RG#7 Peak Elev=210.54' Storage=1,090 cf Inflow=2.90 cfs 0.221 af
Primary=2.81 cfs 0.122 af Secondary=0.06 cfs 0.084 af Outflow=2.87 cfs 0.206 af

Pond 8P: P4-RG#8 Peak Elev=210.20' Storage=3,154 cf Inflow=6.26 cfs 0.478 af
Primary=6.31 cfs 0.232 af Secondary=0.16 cfs 0.216 af Outflow=6.47 cfs 0.448 af

Pond 9P: P4-RG#9 Peak Elev=210.47' Storage=1,019 cf Inflow=1.60 cfs 0.118 af
Primary=1.51 cfs 0.044 af Secondary=0.05 cfs 0.067 af Outflow=1.56 cfs 0.111 af

Pond 10P: P4-RG#10 Peak Elev=207.14' Storage=436 cf Inflow=5.15 cfs 0.337 af
Primary=5.27 cfs 0.292 af Secondary=0.02 cfs 0.038 af Outflow=5.30 cfs 0.329 af

Pond 11P: P4-RG#11 Peak Elev=208.56' Storage=2,744 cf Inflow=9.52 cfs 0.630 af
Primary=9.68 cfs 0.385 af Secondary=0.13 cfs 0.200 af Outflow=9.81 cfs 0.585 af

Pond B: BASIN B Peak Elev=205.59' Storage=99,578 cf Inflow=83.57 cfs 5.689 af
Primary=19.37 cfs 3.062 af Secondary=4.04 cfs 2.407 af Outflow=23.41 cfs 5.470 af

Pond C: BASIN C Peak Elev=204.42' Storage=50,228 cf Inflow=26.15 cfs 2.610 af
Primary=3.43 cfs 0.719 af Secondary=1.78 cfs 1.595 af Outflow=5.22 cfs 2.314 af

Pond RG 12: P4-RG#12 Peak Elev=206.48' Storage=312 cf Inflow=9.10 cfs 0.700 af
Primary=9.07 cfs 0.665 af Secondary=0.02 cfs 0.029 af Outflow=9.08 cfs 0.694 af

Pond RG 13: P4-RG#13 Peak Elev=204.75' Storage=0.032 af Inflow=6.13 cfs 0.532 af
Primary=0.00 cfs 0.000 af Secondary=5.25 cfs 0.532 af Outflow=5.25 cfs 0.532 af

Link 1L: TOTAL BASIN C TO AP#4 Inflow=33.41 cfs 5.472 af
Primary=33.41 cfs 5.472 af

Link 10L: Inflow=18.44 cfs 1.798 af
Primary=18.44 cfs 1.798 af

Link 38L: PDA TO BASIN B Inflow=77.83 cfs 5.292 af
Primary=77.83 cfs 5.292 af

Link P4-1: P4-1 Inflow=30.39 cfs 2.133 af
Primary=30.39 cfs 2.133 af

Link P4-2: P4-2 Inflow=5.97 cfs 0.463 af
Primary=5.97 cfs 0.463 af

Summary for Subcatchment 1S: P4-C1 BASIN OVERLAND PERV

Runoff = 2.27 cfs @ 12.13 hrs, Volume= 0.148 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.500	61	>75% Grass cover, Good, HSG B
0.500		100.00% Pervious Area

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

Summary for Subcatchment 2S: P4-RG#2 IMP

Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.132 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.200	98	Water Surface, HSG B
0.200		100.00% Impervious Area

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

Summary for Subcatchment 3S: P4-RG#2 PERV

Runoff = 0.27 cfs @ 12.13 hrs, Volume= 0.018 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.060	61	>75% Grass cover, Good, HSG B
0.060		100.00% Pervious Area

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

Summary for Subcatchment 4S: P4-RG#3 PERV

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.040	61	>75% Grass cover, Good, HSG B
0.040	74	>75% Grass cover, Good, HSG C
0.080	68	Weighted Average
0.080		100.00% Pervious Area

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

Summary for Subcatchment 5S: P4-RG#3 IMP

Runoff = 2.87 cfs @ 12.13 hrs, Volume= 0.224 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.170	98	Water Surface, HSG B
0.170	98	Water Surface, HSG C
0.340	98	Weighted Average
0.340		100.00% Impervious Area

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

Summary for Subcatchment 6S: P4-RG#4 PERV

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.020	74	>75% Grass cover, Good, HSG C
0.070	61	>75% Grass cover, Good, HSG B
0.090	64	Weighted Average
0.090		100.00% Pervious Area

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

Summary for Subcatchment 7S: P4-RG#4 IMP

Runoff = 3.46 cfs @ 12.13 hrs, Volume= 0.270 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.250	98	Water Surface, HSG C
0.160	98	Water Surface, HSG B
0.410	98	Weighted Average
0.410		100.00% Impervious Area

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

Summary for Subcatchment 8S: P4-RG#5 PERV

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.036 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.120	61	>75% Grass cover, Good, HSG B
0.120		100.00% Pervious Area

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

Summary for Subcatchment 9S: P4-RG#5 IMP

Runoff = 1.60 cfs @ 12.13 hrs, Volume= 0.125 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.190	98	Water Surface, HSG B
0.190		100.00% Impervious Area

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

Summary for Subcatchment 10S: P4-RG#6 PERV

Runoff = 7.50 cfs @ 12.13 hrs, Volume= 0.489 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.650	61	>75% Grass cover, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 11S: P4-RG#6

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.48 cfs @ 12.04 hrs, Volume= 0.376 af, Depth> 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.570	98	Water Surface, HSG B
0.570		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					**Direct Entry, 6**

Summary for Subcatchment 12S: P4-RG#1-IMP

Runoff = 2.53 cfs @ 12.13 hrs, Volume= 0.198 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.300	98	Unconnected pavement, HSG B
0.300		100.00% Impervious Area
0.300		100.00% Unconnected

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

Summary for Subcatchment 13S: P4-RG#1 PERV

Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.053 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B
0.180		100.00% Pervious Area

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

Summary for Subcatchment 14S: P4-RG#12 PERV

Runoff = 1.55 cfs @ 12.13 hrs, Volume= 0.101 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.340	61	>75% Grass cover, Good, HSG B
0.340		100.00% Pervious Area

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

Summary for Subcatchment 15S: OVERLAND BASIN B PERV

Runoff = 6.01 cfs @ 12.14 hrs, Volume= 0.396 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.650	55	Woods, Good, HSG B
1.650		100.00% Pervious Area

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

Summary for Subcatchment 16S: P4-RG#7 IMP

Runoff = 2.45 cfs @ 12.13 hrs, Volume= 0.191 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.290	98	Water Surface, HSG B
0.290		100.00% Impervious Area

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

Summary for Subcatchment 17S: P4-RG#7 PERV

Runoff = 0.45 cfs @ 12.13 hrs, Volume= 0.030 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.100	61	>75% Grass cover, Good, HSG B
0.100		100.00% Pervious Area

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

Summary for Subcatchment 18S: P4-RG#8 IMP

Runoff = 5.40 cfs @ 12.13 hrs, Volume= 0.422 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.640	98	Water Surface, HSG B
0.640		100.00% Impervious Area

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

Summary for Subcatchment 19S: P4-RG#8 PERV

Runoff = 0.86 cfs @ 12.13 hrs, Volume= 0.056 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.190	61	>75% Grass cover, Good, HSG B
0.190		100.00% Pervious Area

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

Summary for Subcatchment 20S: P4-RG#9 IMP

Runoff = 1.10 cfs @ 12.13 hrs, Volume= 0.086 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.130	98	Water Surface, HSG B
0.130		100.00% Impervious Area

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

Summary for Subcatchment 21S: P4-RG#8 PERV

Runoff = 0.50 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

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

Summary for Subcatchment 22S: P4-1 IMP

Runoff = 11.90 cfs @ 12.13 hrs, Volume= 0.929 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	98	Water Surface, HSG B
1.300	98	Water Surface, HSG C
1.410	98	Weighted Average
1.410		100.00% Impervious Area

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

Summary for Subcatchment 23S: P4-1 PERV

Runoff = 18.51 cfs @ 12.13 hrs, Volume= 1.204 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
2.910	61	>75% Grass cover, Good, HSG B
3.710	64	Weighted Average
3.710		100.00% Pervious Area

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

Summary for Subcatchment 24S: P4-2 IMP

Runoff = 5.74 cfs @ 12.13 hrs, Volume= 0.448 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.680	98	Water Surface, HSG B
0.680		100.00% Impervious Area

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

Summary for Subcatchment 25S: P4-2 PERV

Runoff = 0.23 cfs @ 12.13 hrs, Volume= 0.015 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.050		100.00% Pervious Area

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

Summary for Subcatchment 26S: P4-RG#11 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.93 cfs @ 12.05 hrs, Volume= 0.110 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Summary for Subcatchment 27S: P4-RG#11 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 7.59 cfs @ 12.04 hrs, Volume= 0.521 af, Depth> 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.790	98	Water Surface, HSG B
0.790		100.00% Impervious Area

Summary for Subcatchment 28S: P4-RG#10 IMP

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.75 cfs @ 12.04 hrs, Volume= 0.257 af, Depth> 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.390	98	Water Surface, HSG B
0.390		100.00% Impervious Area

Summary for Subcatchment 29S: P4-RG#10 PERV

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.41 cfs @ 12.05 hrs, Volume= 0.080 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.270	61	>75% Grass cover, Good, HSG B
0.270		100.00% Pervious Area

Summary for Subcatchment 30S: P4-RG#12 IMP

Runoff = 6.33 cfs @ 12.13 hrs, Volume= 0.494 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.750	98	Unconnected pavement, HSG B
0.750		100.00% Impervious Area
0.750		100.00% Unconnected

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

Summary for Subcatchment 31S: OVERLAND PERV

Runoff = 0.39 cfs @ 12.22 hrs, Volume= 0.033 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	61	>75% Grass cover, Good, HSG B
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	150	0.0330	0.23		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	154	0.0110	1.69		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.8	99	0.0150	1.97		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.2	403	Total			

Summary for Subcatchment 32S: OVERLAND IMP

Runoff = 0.93 cfs @ 12.13 hrs, Volume= 0.072 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.110	98	Unconnected pavement, HSG B
0.110		100.00% Impervious Area
0.110		100.00% Unconnected

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

Summary for Subcatchment 33S: P4-C2 PERV

Runoff = 8.55 cfs @ 12.25 hrs, Volume= 0.766 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.840	61	>75% Grass cover, Good, HSG B
1.220	74	>75% Grass cover, Good, HSG C
2.060	69	Weighted Average
2.060		100.00% Pervious Area

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

Summary for Subcatchment 34S: P4-C2 IMP

Runoff = 9.90 cfs @ 12.24 hrs, Volume= 1.032 af, Depth> 7.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.340	98	Unconnected pavement, HSG B
0.230	98	Unconnected pavement, HSG C
1.570	98	Weighted Average
1.570		100.00% Impervious Area
1.570		100.00% Unconnected

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

Summary for Subcatchment 35S: P4-RG#13 PERV

Runoff = 2.16 cfs @ 12.22 hrs, Volume= 0.183 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.620	61	>75% Grass cover, Good, HSG B
0.620		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0200	0.19		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
0.5	48	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
13.8	198	Total			

Summary for Subcatchment 36S: P4-RG#13 IMP

Runoff = 4.47 cfs @ 12.13 hrs, Volume= 0.349 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.530	98	Unconnected pavement, HSG B
0.530		100.00% Impervious Area
0.530		100.00% Unconnected

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

Summary for Subcatchment 37S: PDA4

Runoff = 11.62 cfs @ 12.61 hrs, Volume= 1.691 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.389	55	Woods, Good, HSG B
3.214	70	Woods, Good, HSG C
0.606	61	>75% Grass cover, Good, HSG B
0.496	74	>75% Grass cover, Good, HSG C
4.705	68	Weighted Average
4.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.2	150	0.0200	0.09		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
14.1	560	0.0017	0.66		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
43.3	710	Total			

Summary for Pond 1P: P4-RG#1

Inflow Area = 0.480 ac, 62.50% Impervious, Inflow Depth > 6.27" for 100-yr event
Inflow = 3.35 cfs @ 12.13 hrs, Volume= 0.251 af
Outflow = 3.29 cfs @ 12.14 hrs, Volume= 0.233 af, Atten= 2%, Lag= 1.0 min
Primary = 3.22 cfs @ 12.14 hrs, Volume= 0.143 af
Secondary = 0.06 cfs @ 12.14 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.87' @ 12.14 hrs Surf.Area= 1,263 sf Storage= 1,255 cf

Plug-Flow detention time= 67.3 min calculated for 0.232 af (93% of inflow)
Center-of-Mass det. time= 27.0 min (790.2 - 763.2)

Volume	Invert	Avail.Storage	Storage Description
#1	207.65'	1,289 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.65	791	0	0	791
207.90	887	210	210	891
208.15	982	234	443	991
208.40	1,079	258	701	1,093
208.65	1,176	282	982	1,196
208.90	1,273	306	1,289	1,299

Device	Routing	Invert	Outlet Devices
#1	Primary	208.65'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.65'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=3.17 cfs @ 12.14 hrs HW=208.87' (Free Discharge)
1=Orifice/Grate (Weir Controls 3.17 cfs @ 1.54 fps)

Secondary OutFlow Max=0.06 cfs @ 12.14 hrs HW=208.87' (Free Discharge)
2=Exfiltration (Controls 0.06 cfs)

Summary for Pond 2P: P4-RG#2

Inflow Area = 0.260 ac, 76.92% Impervious, Inflow Depth > 6.90" for 100-yr event
Inflow = 1.96 cfs @ 12.13 hrs, Volume= 0.149 af
Outflow = 1.96 cfs @ 12.14 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.6 min
Primary = 1.93 cfs @ 12.14 hrs, Volume= 0.101 af
Secondary = 0.03 cfs @ 12.14 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.61' @ 12.14 hrs Surf.Area= 551 sf Storage= 469 cf

Plug-Flow detention time= 54.4 min calculated for 0.141 af (94% of inflow)
Center-of-Mass det. time= 20.0 min (773.4 - 753.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.45'	521 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.45	294	0	0	294
207.70	340	79	79	343
207.95	387	91	170	394
208.20	434	103	273	445
208.45	482	114	387	498
208.70	593	134	521	611

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.45'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=1.87 cfs @ 12.14 hrs HW=208.61' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.87 cfs @ 1.29 fps)

Secondary OutFlow Max=0.03 cfs @ 12.14 hrs HW=208.61' (Free Discharge)
2=Exfiltration (Controls 0.03 cfs)

Summary for Pond 3P: P4-RG#3

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.420 ac, 80.95% Impervious, Inflow Depth > 7.23" for 100-yr event
Inflow = 3.31 cfs @ 12.13 hrs, Volume= 0.253 af
Outflow = 3.33 cfs @ 12.13 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.4 min
Primary = 3.31 cfs @ 12.13 hrs, Volume= 0.221 af
Secondary = 0.02 cfs @ 12.13 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 209.33' @ 12.13 hrs Surf.Area= 324 sf Storage= 302 cf

Plug-Flow detention time= 26.0 min calculated for 0.247 af (98% of inflow)
Center-of-Mass det. time= 12.4 min (763.6 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	208.10'	309 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.10	108	0	0	108
208.35	213	39	39	214
208.60	241	57	96	246
208.85	269	64	160	278
209.10	298	71	231	311
209.35	327	78	309	345

Device	Routing	Invert	Outlet Devices
#1	Primary	209.10'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.10'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.50'

Primary OutFlow Max=3.18 cfs @ 12.13 hrs HW=209.32' (Free Discharge)
1=Orifice/Grate (Weir Controls 3.18 cfs @ 1.54 fps)

Secondary OutFlow Max=0.02 cfs @ 12.13 hrs HW=209.32' (Free Discharge)
2=Exfiltration (Controls 0.02 cfs)

Summary for Pond 4P: P4-RG#4

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.500 ac, 82.00% Impervious, Inflow Depth > 7.18" for 100-yr event
Inflow = 3.91 cfs @ 12.13 hrs, Volume= 0.299 af
Outflow = 3.91 cfs @ 12.13 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min
Primary = 3.91 cfs @ 12.13 hrs, Volume= 0.299 af
Secondary = 0.00 cfs @ 12.13 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 211.75' @ 12.13 hrs Surf.Area= 161 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 0.299 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (750.5 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1	211.75'	269 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
211.75	161	0	0	161
212.00	183	43	43	187
212.25	204	48	91	212
212.50	226	54	145	238
212.75	248	59	204	265
213.00	272	65	269	294

Device	Routing	Invert	Outlet Devices
#1	Primary	208.45'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	211.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=47.63 cfs @ 12.13 hrs HW=211.75' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 47.63 cfs @ 8.75 fps)

Secondary OutFlow Max=0.01 cfs @ 12.13 hrs HW=211.75' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Summary for Pond 5P: P4-RG#5

Inflow Area = 0.310 ac, 61.29% Impervious, Inflow Depth > 6.22" for 100-yr event
Inflow = 2.15 cfs @ 12.13 hrs, Volume= 0.161 af
Outflow = 2.13 cfs @ 12.14 hrs, Volume= 0.153 af, Atten= 1%, Lag= 0.8 min
Primary = 2.08 cfs @ 12.14 hrs, Volume= 0.087 af
Secondary = 0.05 cfs @ 12.14 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 213.52' @ 12.14 hrs Surf.Area= 765 sf Storage= 716 cf

Plug-Flow detention time= 62.8 min calculated for 0.152 af (95% of inflow)
Center-of-Mass det. time= 33.8 min (797.8 - 764.1)

Volume	Invert	Avail.Storage	Storage Description
#1	212.35'	781 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.35	465	0	0	465
212.60	528	124	124	532
212.85	592	140	264	600
213.10	657	156	420	670
213.35	722	172	592	740
213.60	787	189	781	810

Device	Routing	Invert	Outlet Devices
#1	Primary	213.35'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.35'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=2.03 cfs @ 12.14 hrs HW=213.51' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 2.03 cfs @ 1.32 fps)

Secondary OutFlow Max=0.05 cfs @ 12.14 hrs HW=213.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 6P: P4-RG#6

[93] Warning: Storage range exceeded by 0.24'

Inflow Area = 2.220 ac, 25.68% Impervious, Inflow Depth > 4.67" for 100-yr event
Inflow = 10.62 cfs @ 12.09 hrs, Volume= 0.864 af
Outflow = 10.53 cfs @ 12.08 hrs, Volume= 0.850 af, Atten= 1%, Lag= 0.0 min
Primary = 10.47 cfs @ 12.08 hrs, Volume= 0.769 af
Secondary = 0.05 cfs @ 12.08 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 214.24' @ 12.08 hrs Surf.Area= 791 sf Storage= 805 cf

Plug-Flow detention time= 19.5 min calculated for 0.850 af (98% of inflow)
Center-of-Mass det. time= 9.0 min (806.9 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	212.75'	805 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
212.75	499	0	0	499
213.00	556	132	132	560
213.25	614	146	278	623
213.50	673	161	439	688
213.75	732	176	614	752
214.00	791	190	805	817

Device	Routing	Invert	Outlet Devices
#1	Primary	213.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	212.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 210.29'

Primary OutFlow Max=10.34 cfs @ 12.08 hrs HW=214.24' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 10.34 cfs @ 2.28 fps)

Secondary OutFlow Max=0.05 cfs @ 12.08 hrs HW=214.24' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Summary for Pond 7P: P4-RG#7

Inflow Area = 0.390 ac, 74.36% Impervious, Inflow Depth > 6.79" for 100-yr event
Inflow = 2.90 cfs @ 12.13 hrs, Volume= 0.221 af
Outflow = 2.87 cfs @ 12.14 hrs, Volume= 0.206 af, Atten= 1%, Lag= 0.9 min
Primary = 2.81 cfs @ 12.14 hrs, Volume= 0.122 af
Secondary = 0.06 cfs @ 12.14 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.54' @ 12.14 hrs Surf.Area= 1,024 sf Storage= 1,090 cf

Plug-Flow detention time= 68.4 min calculated for 0.206 af (93% of inflow)
Center-of-Mass det. time= 31.3 min (786.2 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area**

Conductivity to Groundwater Elevation = 204.41'

Primary OutFlow Max=2.74 cfs @ 12.14 hrs HW=210.54' (Free Discharge)
1=Orifice/Grate (Weir Controls 2.74 cfs @ 1.46 fps)

Secondary OutFlow Max=0.06 cfs @ 12.14 hrs HW=210.54' (Free Discharge)
2=Exfiltration (Controls 0.06 cfs)

Summary for Pond 8P: P4-RG#8

[93] Warning: Storage range exceeded by 0.10'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.830 ac, 77.11% Impervious, Inflow Depth > 6.91" for 100-yr event
Inflow = 6.26 cfs @ 12.13 hrs, Volume= 0.478 af
Outflow = 6.47 cfs @ 12.12 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.0 min
Primary = 6.31 cfs @ 12.12 hrs, Volume= 0.232 af
Secondary = 0.16 cfs @ 12.12 hrs, Volume= 0.216 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.20' @ 12.12 hrs Surf.Area= 2,876 sf Storage= 3,154 cf

Plug-Flow detention time= 81.8 min calculated for 0.448 af (94% of inflow)
Center-of-Mass det. time= 45.8 min (799.1 - 753.3)

Volume	Invert	Avail.Storage	Storage Description
#1	208.85'	3,154 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.85	2,173	0	0	2,173
209.10	2,313	561	561	2,321
209.35	2,453	596	1,156	2,469
209.60	2,594	631	1,787	2,619
209.85	2,735	666	2,453	2,769
210.10	2,876	701	3,154	2,920

Device	Routing	Invert	Outlet Devices
#1	Primary	209.85'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	208.85'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 202.75'

Primary OutFlow Max=5.97 cfs @ 12.12 hrs HW=210.19' (Free Discharge)
1=Orifice/Grate (Weir Controls 5.97 cfs @ 1.90 fps)

Secondary OutFlow Max=0.16 cfs @ 12.12 hrs HW=210.19' (Free Discharge)
2=Exfiltration (Controls 0.16 cfs)

Summary for Pond 9P: P4-RG#9

Inflow Area = 0.240 ac, 54.17% Impervious, Inflow Depth > 5.91" for 100-yr event
Inflow = 1.60 cfs @ 12.13 hrs, Volume= 0.118 af
Outflow = 1.56 cfs @ 12.14 hrs, Volume= 0.111 af, Atten= 2%, Lag= 0.9 min
Primary = 1.51 cfs @ 12.14 hrs, Volume= 0.044 af
Secondary = 0.05 cfs @ 12.14 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 210.47' @ 12.14 hrs Surf.Area= 1,010 sf Storage= 1,019 cf

Plug-Flow detention time= 102.7 min calculated for 0.111 af (94% of inflow)
Center-of-Mass det. time= 69.6 min (839.4 - 769.8)

Volume	Invert	Avail.Storage	Storage Description
#1	209.34'	1,137 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
209.34	788	0	0	788
209.59	836	203	203	844
209.84	885	215	418	901
210.09	934	227	645	958
210.34	983	240	885	1,016
210.59	1,033	252	1,137	1,076

Device	Routing	Invert	Outlet Devices
#1	Primary	210.34'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	209.34'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 201.21'

Primary OutFlow Max=1.48 cfs @ 12.14 hrs HW=210.47' (Free Discharge)
1=Orifice/Grate (Weir Controls 1.48 cfs @ 1.19 fps)

Secondary OutFlow Max=0.05 cfs @ 12.14 hrs HW=210.47' (Free Discharge)
2=Exfiltration (Controls 0.05 cfs)

Summary for Pond 10P: P4-RG#10

[93] Warning: Storage range exceeded by 0.06'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.660 ac, 59.09% Impervious, Inflow Depth > 6.13" for 100-yr event
Inflow = 5.15 cfs @ 12.05 hrs, Volume= 0.337 af
Outflow = 5.30 cfs @ 12.05 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.1 min
Primary = 5.27 cfs @ 12.05 hrs, Volume= 0.292 af
Secondary = 0.02 cfs @ 12.04 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 207.14' @ 12.05 hrs Surf.Area= 423 sf Storage= 436 cf

Plug-Flow detention time= 27.6 min calculated for 0.329 af (98% of inflow)
Center-of-Mass det. time= 12.9 min (773.8 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1	205.83'	436 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.83	270	0	0	270
206.08	301	71	71	305
206.33	333	79	151	342
206.58	366	87	238	380
206.83	399	96	333	418
207.08	423	103	436	450

Device	Routing	Invert	Outlet Devices
#1	Primary	206.83'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.83'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.33'

Primary OutFlow Max=5.17 cfs @ 12.05 hrs HW=207.14' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 5.17 cfs @ 1.81 fps)

Secondary OutFlow Max=0.02 cfs @ 12.04 hrs HW=207.13' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond 11P: P4-RG#11

[93] Warning: Storage range exceeded by 0.22'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.160 ac, 68.10% Impervious, Inflow Depth > 6.52" for 100-yr event
Inflow = 9.52 cfs @ 12.05 hrs, Volume= 0.630 af
Outflow = 9.81 cfs @ 12.05 hrs, Volume= 0.585 af, Atten= 0%, Lag= 0.1 min
Primary = 9.68 cfs @ 12.05 hrs, Volume= 0.385 af
Secondary = 0.13 cfs @ 12.05 hrs, Volume= 0.200 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 208.56' @ 12.05 hrs Surf.Area= 2,356 sf Storage= 2,744 cf

Plug-Flow detention time= 61.7 min calculated for 0.584 af (93% of inflow)
Center-of-Mass det. time= 20.9 min (775.1 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1	207.09'	2,744 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.09	2,036	0	0	2,036
207.34	2,099	517	517	2,114
207.59	2,163	533	1,050	2,193
207.84	2,227	549	1,598	2,272
208.09	2,291	565	2,163	2,352
208.34	2,356	581	2,744	2,433

Device	Routing	Invert	Outlet Devices
#1	Primary	208.09'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	207.09'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.42'

Primary OutFlow Max=9.45 cfs @ 12.05 hrs HW=208.55' (Free Discharge)
↑—**1=Orifice/Grate** (Weir Controls 9.45 cfs @ 2.21 fps)

Secondary OutFlow Max=0.13 cfs @ 12.05 hrs HW=208.55' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.13 cfs)

Summary for Pond B: BASIN B

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 14.970 ac, 42.35% Impervious, Inflow Depth > 4.56" for 100-yr event
Inflow = 83.57 cfs @ 12.12 hrs, Volume= 5.689 af
Outflow = 23.41 cfs @ 12.41 hrs, Volume= 5.470 af, Atten= 72%, Lag= 17.3 min
Primary = 19.37 cfs @ 12.41 hrs, Volume= 3.062 af
Secondary = 4.04 cfs @ 12.41 hrs, Volume= 2.407 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 205.59' @ 12.41 hrs Surf.Area= 29,737 sf Storage= 99,578 cf

Plug-Flow detention time= 106.8 min calculated for 5.458 af (96% of inflow)
Center-of-Mass det. time= 84.6 min (868.8 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	127,751 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
201.00	4,224	0	0
202.00	19,252	11,738	11,738
203.00	22,102	20,677	32,415
204.00	24,997	23,550	55,965
205.00	27,949	26,473	82,438
206.00	30,957	29,453	111,891
206.50	32,483	15,860	127,751

Device	Routing	Invert	Outlet Devices
#1	Primary	202.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	206.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**50.0' long x 12.0' 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) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#4	Primary	203.50'	**2.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.77'

Primary OutFlow Max=19.36 cfs @ 12.41 hrs HW=205.59' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 3.67 cfs @ 8.80 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **4=Sharp-Crested Rectangular Weir** (Orifice Controls 15.70 cfs @ 4.90 fps)

Secondary OutFlow Max=4.04 cfs @ 12.41 hrs HW=205.59' (Free Discharge)
- **5=Exfiltration** (Controls 4.04 cfs)

Summary for Pond C: BASIN C

Inflow Area = 6.590 ac, 44.92% Impervious, Inflow Depth > 4.75" for 100-yr event
Inflow = 26.15 cfs @ 12.17 hrs, Volume= 2.610 af
Outflow = 5.22 cfs @ 12.83 hrs, Volume= 2.314 af, Atten= 80%, Lag= 39.5 min
Primary = 3.43 cfs @ 12.83 hrs, Volume= 0.719 af
Secondary = 1.78 cfs @ 12.83 hrs, Volume= 1.595 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.42' @ 12.83 hrs Surf.Area= 17,542 sf Storage= 50,228 cf

Plug-Flow detention time= 186.5 min calculated for 2.314 af (89% of inflow)
Center-of-Mass det. time= 130.3 min (914.9 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1	201.00'	90,624 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
201.00	11,982	511.0	0	0	11,982
202.00	13,542	530.0	12,754	12,754	13,640
203.00	15,159	549.0	14,343	27,097	15,358
204.00	16,833	567.0	15,989	43,086	17,051
205.00	18,563	586.0	17,691	60,777	18,887
206.00	20,345	605.0	19,447	80,224	20,784
206.50	21,260	615.0	10,400	90,624	21,802

Device	Routing	Invert	Outlet Devices
#1	Primary	201.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.25'	**1.0' long x 3.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	206.00'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	205.75'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#5	Secondary	201.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 198.75'

Primary OutFlow Max=3.43 cfs @ 12.83 hrs HW=204.42' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.28 cfs @ 8.07 fps)
- **2=Sharp-Crested Rectangular Weir** (Weir Controls 3.15 cfs @ 3.53 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.78 cfs @ 12.83 hrs HW=204.42' (Free Discharge)
- **5=Exfiltration** (Controls 1.78 cfs)

Summary for Pond RG 12: P4-RG#12

[93] Warning: Storage range exceeded by 0.20'

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth > 6.41" for 100-yr event
Inflow = 9.10 cfs @ 12.13 hrs, Volume= 0.700 af
Outflow = 9.08 cfs @ 12.13 hrs, Volume= 0.694 af, Atten= 0%, Lag= 0.0 min
Primary = 9.07 cfs @ 12.13 hrs, Volume= 0.665 af
Secondary = 0.02 cfs @ 12.13 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.48' @ 12.13 hrs Surf.Area= 316 sf Storage= 312 cf

Plug-Flow detention time= 10.7 min calculated for 0.694 af (99% of inflow)
Center-of-Mass det. time= 5.4 min (766.5 - 761.1)

Volume	Invert	Avail.Storage	Storage Description
#1	205.03'	312 cf	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.03	186	0	0	186
205.28	211	50	50	215
205.53	236	56	105	244
205.78	262	62	168	274
206.03	289	69	237	306
206.28	316	76	312	338

Device	Routing	Invert	Outlet Devices
#1	Primary	206.03'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	205.03'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 199.47'

Primary OutFlow Max=8.72 cfs @ 12.13 hrs HW=206.46' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 8.72 cfs @ 2.15 fps)

Secondary OutFlow Max=0.02 cfs @ 12.13 hrs HW=206.46' (Free Discharge)
└**2=Exfiltration** (Controls 0.02 cfs)

Summary for Pond RG 13: P4-RG#13

Inflow Area = 1.150 ac, 46.09% Impervious, Inflow Depth > 5.55" for 100-yr event
Inflow = 6.13 cfs @ 12.14 hrs, Volume= 0.532 af
Outflow = 5.25 cfs @ 12.20 hrs, Volume= 0.532 af, Atten= 14%, Lag= 3.5 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 5.25 cfs @ 12.20 hrs, Volume= 0.532 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 204.75' @ 12.20 hrs Surf.Area= 316.018 ac Storage= 0.032 af

Plug-Flow detention time= 4.5 min calculated for 0.531 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (782.7 - 778.9)

Volume	Invert	Avail.Storage	Storage Description
#1	204.75'	539.107 af	**Custom Stage Data (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
204.75	316.000	0.000	0.000	316.000
205.00	362.000	84.685	84.685	362.000
205.25	408.000	96.193	180.878	408.000
205.50	454.000	107.699	288.576	454.000
205.75	501.000	119.327	407.903	501.000
206.00	549.000	131.204	539.107	549.001

Device	Routing	Invert	Outlet Devices
#1	Primary	205.75'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Secondary	204.75'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 200.69'

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.75' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=637.32 cfs @ 12.20 hrs HW=204.75' (Free Discharge)
└**2=Exfiltration** (Controls 637.32 cfs)

Summary for Link 1L: TOTAL BASIN C TO AP#4

Inflow Area = 26.265 ac, 35.41% Impervious, Inflow Depth > 2.50" for 100-yr event
Inflow = 33.41 cfs @ 12.56 hrs, Volume= 5.472 af
Primary = 33.41 cfs @ 12.56 hrs, Volume= 5.472 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 10L:

Inflow Area = 3.630 ac, 43.25% Impervious, Inflow Depth > 5.94" for 100-yr event
Inflow = 18.44 cfs @ 12.24 hrs, Volume= 1.798 af
Primary = 18.44 cfs @ 12.24 hrs, Volume= 1.798 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link 38L: PDA TO BASIN B

Inflow Area = 13.320 ac, 47.60% Impervious, Inflow Depth > 4.77" for 100-yr event
Inflow = 77.83 cfs @ 12.12 hrs, Volume= 5.292 af
Primary = 77.83 cfs @ 12.12 hrs, Volume= 5.292 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-1: P4-1

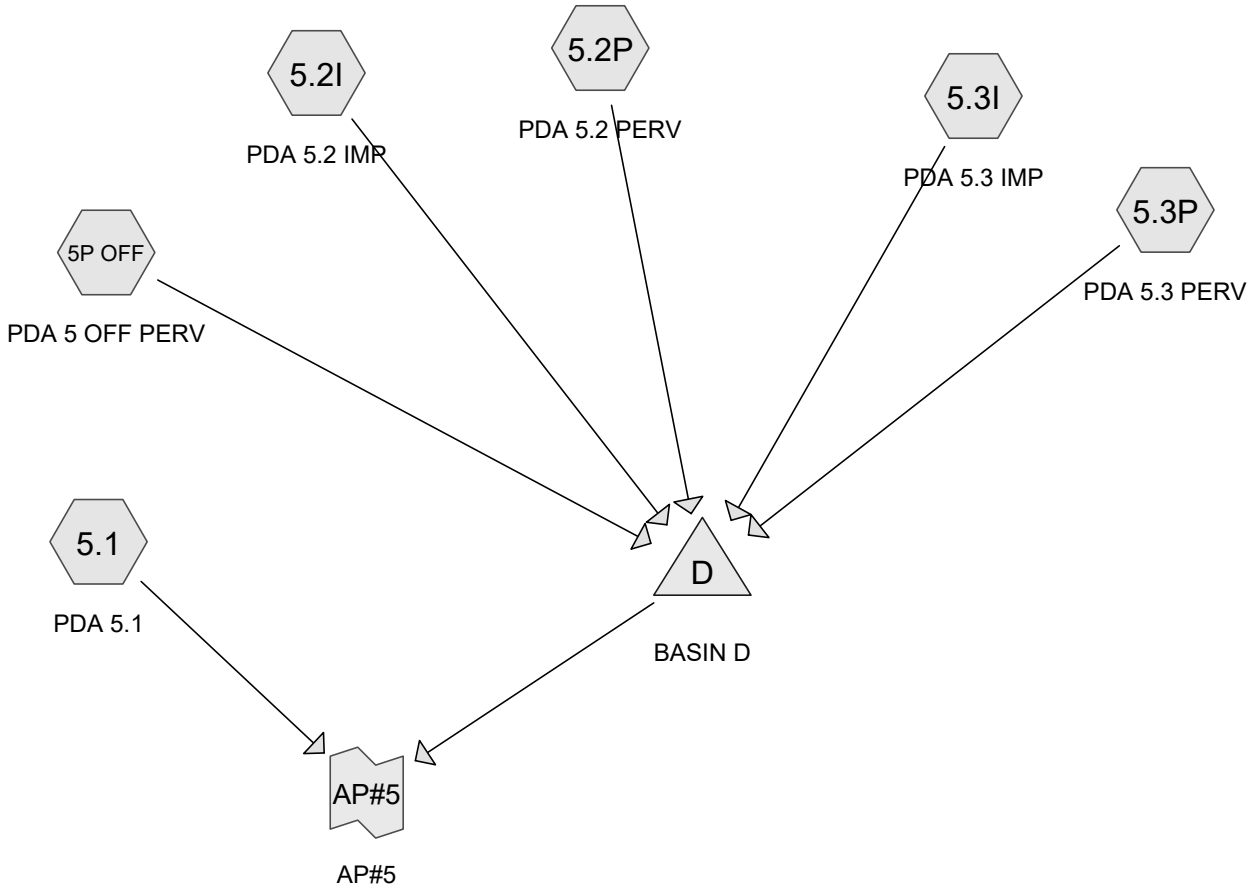
Inflow Area = 5.120 ac, 27.54% Impervious, Inflow Depth > 5.00" for 100-yr event
Inflow = 30.39 cfs @ 12.13 hrs, Volume= 2.133 af
Primary = 30.39 cfs @ 12.13 hrs, Volume= 2.133 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link P4-2: P4-2

Inflow Area = 0.730 ac, 93.15% Impervious, Inflow Depth > 7.61" for 100-yr event
Inflow = 5.97 cfs @ 12.13 hrs, Volume= 0.463 af
Primary = 5.97 cfs @ 12.13 hrs, Volume= 0.463 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



Subcat Reach Pond Link

Routing Diagram for 2020-11-20 PDA TO AP#5-BASIN D_INFIL_080661-Zaitz
Prepared by Bowman Consulting, Printed 1/11/2021
HydroCAD® 10.10-3a s/n 09435 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=72 Runoff=0.03 cfs 0.002 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=1.26 cfs 0.038 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=359' Tc=19.1 min CN=65 Runoff=0.02 cfs 0.001 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=3.04 cfs 0.091 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=0.01"
Tc=17.5 min CN=65 Runoff=0.01 cfs 0.000 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=0.13"
Flow Length=470' Tc=9.8 min CN=78 Runoff=0.37 cfs 0.014 af

Pond D: BASIN D Peak Elev=207.49' Storage=4,167 cf Inflow=4.40 cfs 0.143 af
Discarded=0.49 cfs 0.143 af Primary=0.00 cfs 0.000 af Outflow=0.49 cfs 0.143 af

Link AP#5: AP#5 Inflow=0.03 cfs 0.002 af
Primary=0.03 cfs 0.002 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 0.03 cfs @ 1.24 hrs, Volume= 0.002 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 1.26 cfs @ 1.09 hrs, Volume= 0.038 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 0.02 cfs @ 1.91 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 3.04 cfs @ 1.09 hrs, Volume= 0.091 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 0.01 cfs @ 1.89 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 0.37 cfs @ 1.22 hrs, Volume= 0.014 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 0.32" for NJ WQ event
Inflow = 4.40 cfs @ 1.10 hrs, Volume= 0.143 af
Outflow = 0.49 cfs @ 1.81 hrs, Volume= 0.143 af, Atten= 89%, Lag= 42.7 min
Discarded = 0.49 cfs @ 1.81 hrs, Volume= 0.143 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 207.49' @ 1.81 hrs Surf.Area= 8,872 sf Storage= 4,167 cf

Plug-Flow detention time= 86.0 min calculated for 0.143 af (100% of inflow)
Center-of-Mass det. time= 86.2 min (158.5 - 72.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	207.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 204.60'

Discarded OutFlow Max=0.49 cfs @ 1.81 hrs HW=207.49' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=207.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 0.00" for NJ WQ event
Inflow = 0.03 cfs @ 1.24 hrs, Volume= 0.002 af
Primary = 0.03 cfs @ 1.24 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=1.00"
Tc=6.0 min CN=72 Runoff=0.44 cfs 0.030 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=1.48 cfs 0.112 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=0.65"
Flow Length=359' Tc=19.1 min CN=65 Runoff=0.78 cfs 0.092 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=98 Runoff=3.57 cfs 0.269 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=0.65"
Tc=17.5 min CN=65 Runoff=0.44 cfs 0.050 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=1.35"
Flow Length=470' Tc=9.8 min CN=78 Runoff=1.90 cfs 0.143 af

Pond D: BASIN D Peak Elev=208.32' Storage=12,043 cf Inflow=7.32 cfs 0.666 af
Discarded=0.69 cfs 0.666 af Primary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.666 af

Link AP#5: AP#5 Inflow=0.44 cfs 0.030 af
Primary=0.44 cfs 0.030 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 0.44 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 1.48 cfs @ 12.13 hrs, Volume= 0.112 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 0.78 cfs @ 12.32 hrs, Volume= 0.092 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 3.57 cfs @ 12.13 hrs, Volume= 0.269 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 0.44 cfs @ 12.30 hrs, Volume= 0.050 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 1.90 cfs @ 12.18 hrs, Volume= 0.143 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 1.49" for 2-yr event
Inflow = 7.32 cfs @ 12.14 hrs, Volume= 0.666 af
Outflow = 0.69 cfs @ 13.51 hrs, Volume= 0.666 af, Atten= 91%, Lag= 82.1 min
Discarded = 0.69 cfs @ 13.51 hrs, Volume= 0.666 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 208.32' @ 13.51 hrs Surf.Area= 10,056 sf Storage= 12,043 cf

Plug-Flow detention time= 172.5 min calculated for 0.665 af (100% of inflow)
Center-of-Mass det. time= 172.3 min (982.4 - 810.1)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	207.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 204.60'

Discarded OutFlow Max=0.69 cfs @ 13.51 hrs HW=208.32' (Free Discharge)
2=Exfiltration (Controls 0.69 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=207.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 0.06" for 2-yr event
Inflow = 0.44 cfs @ 12.14 hrs, Volume= 0.030 af
Primary = 0.44 cfs @ 12.14 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=2.17"
Tc=6.0 min CN=72 Runoff=0.99 cfs 0.064 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=2.23 cfs 0.172 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=359' Tc=19.1 min CN=65 Runoff=2.27 cfs 0.231 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=4.73"
Tc=6.0 min CN=98 Runoff=5.39 cfs 0.414 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=1.63"
Tc=17.5 min CN=65 Runoff=1.27 cfs 0.124 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=2.69"
Flow Length=470' Tc=9.8 min CN=78 Runoff=3.80 cfs 0.284 af

Pond D: BASIN D Peak Elev=209.58' Storage=25,820 cf Inflow=13.29 cfs 1.225 af
Discarded=1.03 cfs 1.225 af Primary=0.00 cfs 0.000 af Outflow=1.03 cfs 1.225 af

Link AP#5: AP#5 Inflow=0.99 cfs 0.064 af
Primary=0.99 cfs 0.064 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 0.99 cfs @ 12.13 hrs, Volume= 0.064 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 2.23 cfs @ 12.13 hrs, Volume= 0.172 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 2.27 cfs @ 12.30 hrs, Volume= 0.231 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 5.39 cfs @ 12.13 hrs, Volume= 0.414 af, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 1.27 cfs @ 12.28 hrs, Volume= 0.124 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 3.80 cfs @ 12.17 hrs, Volume= 0.284 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 2.74" for 10-yr event
Inflow = 13.29 cfs @ 12.15 hrs, Volume= 1.225 af
Outflow = 1.03 cfs @ 13.77 hrs, Volume= 1.225 af, Atten= 92%, Lag= 97.4 min
Discarded = 1.03 cfs @ 13.77 hrs, Volume= 1.225 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 209.58' @ 13.77 hrs Surf.Area= 11,912 sf Storage= 25,820 cf

Plug-Flow detention time= 284.0 min calculated for 1.223 af (100% of inflow)
Center-of-Mass det. time= 284.1 min (1,089.7 - 805.7)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	207.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 204.60'

Discarded OutFlow Max=1.03 cfs @ 13.77 hrs HW=209.58' (Free Discharge)
└**2=Exfiltration** (Controls 1.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=207.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 0.14" for 10-yr event
Inflow = 0.99 cfs @ 12.13 hrs, Volume= 0.064 af
Primary = 0.99 cfs @ 12.13 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment5.1: PDA 5.1 Runoff Area=0.355 ac 0.00% Impervious Runoff Depth=4.83"
Tc=6.0 min CN=72 Runoff=2.17 cfs 0.143 af

Subcatchment5.2I: PDA 5.2 IMP Runoff Area=0.435 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=3.67 cfs 0.287 af

Subcatchment5.2P: PDA 5.2 PERV Runoff Area=1.695 ac 0.00% Impervious Runoff Depth=4.02"
Flow Length=359' Tc=19.1 min CN=65 Runoff=5.84 cfs 0.567 af

Subcatchment5.3I: PDA 5.3 IMP Runoff Area=1.050 ac 100.00% Impervious Runoff Depth=7.91"
Tc=6.0 min CN=98 Runoff=8.86 cfs 0.692 af

Subcatchment5.3P: PDA 5.3 PERV Runoff Area=0.910 ac 0.00% Impervious Runoff Depth=4.02"
Tc=17.5 min CN=65 Runoff=3.27 cfs 0.305 af

Subcatchment5P OFF: PDA 5 OFF PERV Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=5.53"
Flow Length=470' Tc=9.8 min CN=78 Runoff=7.69 cfs 0.585 af

Pond D: BASIN D Peak Elev=210.27' Storage=34,502 cf Inflow=25.94 cfs 2.436 af
Discarded=1.24 cfs 1.725 af Primary=16.84 cfs 0.711 af Outflow=18.09 cfs 2.436 af

Link AP#5: AP#5 Inflow=17.60 cfs 0.854 af
Primary=17.60 cfs 0.854 af

Summary for Subcatchment 5.1: PDA 5.1

Runoff = 2.17 cfs @ 12.13 hrs, Volume= 0.143 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.090	80	>75% Grass cover, Good, HSG D
0.163	74	>75% Grass cover, Good, HSG C
0.102	61	>75% Grass cover, Good, HSG B
0.355	72	Weighted Average
0.355		100.00% Pervious Area

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

Summary for Subcatchment 5.2I: PDA 5.2 IMP

Runoff = 3.67 cfs @ 12.13 hrs, Volume= 0.287 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.285	98	Unconnected pavement, HSG B
0.150	98	Unconnected pavement, HSG C
0.435	98	Weighted Average
0.435		100.00% Impervious Area
0.435		100.00% Unconnected

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

Summary for Subcatchment 5.2P: PDA 5.2 PERV

Runoff = 5.84 cfs @ 12.29 hrs, Volume= 0.567 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.278	61	>75% Grass cover, Good, HSG B
0.187	74	>75% Grass cover, Good, HSG C
0.230	80	>75% Grass cover, Good, HSG D
1.695	65	Weighted Average
1.695		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0100	0.14		**Sheet Flow, SHEET** Grass: Short n= 0.150 P2= 3.31"
1.5	209	0.0200	2.28		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
19.1	359	Total			

Summary for Subcatchment 5.3I: PDA 5.3 IMP

Runoff = 8.86 cfs @ 12.13 hrs, Volume= 0.692 af, Depth= 7.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.310	98	Unconnected pavement, HSG B
0.740	98	Unconnected pavement, HSG C
1.050	98	Weighted Average
1.050		100.00% Impervious Area
1.050		100.00% Unconnected

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

Summary for Subcatchment 5.3P: PDA 5.3 PERV

Runoff = 3.27 cfs @ 12.27 hrs, Volume= 0.305 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.310	74	>75% Grass cover, Good, HSG C
0.910	65	Weighted Average
0.910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, PERV + PIPES**

Summary for Subcatchment 5P OFF: PDA 5 OFF PERV

Runoff = 7.69 cfs @ 12.17 hrs, Volume= 0.585 af, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.220	78	Row crops, straight row, Good, HSG B
0.050	89	Row crops, straight row, Good, HSG D
1.270	78	Weighted Average
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	150	0.0140	0.34		**Sheet Flow, SHEET** Cultivated: Residue<=20% n= 0.060 P2= 3.31"
2.4	320	0.0190	2.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
9.8	470	Total			

Summary for Pond D: BASIN D

Inflow Area = 5.360 ac, 27.71% Impervious, Inflow Depth = 5.45" for 100-yr event
Inflow = 25.94 cfs @ 12.15 hrs, Volume= 2.436 af
Outflow = 18.09 cfs @ 12.32 hrs, Volume= 2.436 af, Atten= 30%, Lag= 9.8 min
Discarded = 1.24 cfs @ 12.32 hrs, Volume= 1.725 af
Primary = 16.84 cfs @ 12.32 hrs, Volume= 0.711 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 210.27' @ 12.32 hrs Surf.Area= 13,396 sf Storage= 34,502 cf

Plug-Flow detention time= 231.8 min calculated for 2.433 af (100% of inflow)
Center-of-Mass det. time= 232.2 min (1,029.6 - 797.4)

Volume	Invert	Avail.Storage	Storage Description
#1	207.00'	37,684 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
207.00	8,203	456.3	0	0	8,203
208.00	9,601	475.1	8,893	8,893	9,672
209.00	11,054	494.0	10,319	19,212	11,208
210.00	12,565	512.8	11,801	31,013	12,796
210.50	14,132	531.0	6,670	37,684	14,330

Device	Routing	Invert	Outlet Devices
#1	Primary	210.00'	**50.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	207.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 204.60'

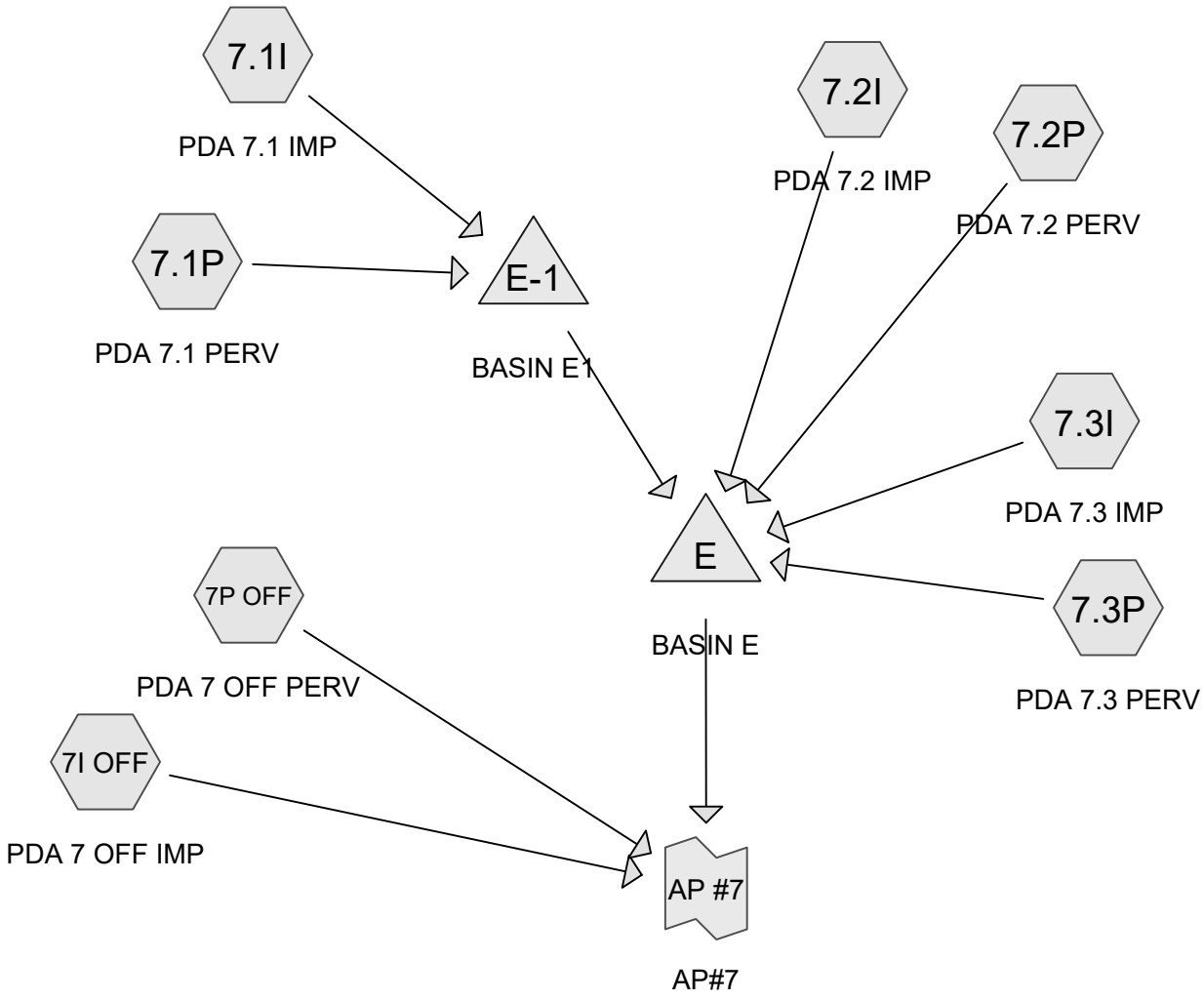
Discarded OutFlow Max=1.24 cfs @ 12.32 hrs HW=210.26' (Free Discharge)
└**2=Exfiltration** (Controls 1.24 cfs)

Primary OutFlow Max=16.20 cfs @ 12.32 hrs HW=210.26' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 16.20 cfs @ 1.24 fps)

Summary for Link AP#5: AP#5

Inflow Area = 5.715 ac, 25.98% Impervious, Inflow Depth = 1.79" for 100-yr event
Inflow = 17.60 cfs @ 12.32 hrs, Volume= 0.854 af
Primary = 17.60 cfs @ 12.32 hrs, Volume= 0.854 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs



Subcat Reach Pond Link

Routing Diagram for 2020-11-20 PDA TO AP#7-BASIN E-INFIL-080661-Zaitz
Prepared by Bowman Consulting, Printed 1/11/2021
HydroCAD® 10.10-3a s/n 09435 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=98 Runoff=3.28 cfs 0.098 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=622' Tc=59.2 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth=1.03"
Tc=9.5 min CN=98 Runoff=0.22 cfs 0.007 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth=0.00"
Tc=18.8 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth=1.03"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.40 cfs 0.017 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=355' Tc=20.3 min CN=66 Runoff=0.02 cfs 0.001 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=96 Runoff=0.11 cfs 0.003 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth=0.07"
Tc=6.0 min CN=74 Runoff=0.01 cfs 0.000 af

Pond E: BASIN E Peak Elev=198.45' Storage=1,134 cf Inflow=0.71 cfs 0.123 af
Discarded=0.16 cfs 0.123 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.123 af

Pond E-1: BASIN E1 Peak Elev=205.50' Storage=3,570 cf Inflow=3.28 cfs 0.098 af
Outflow=0.16 cfs 0.098 af

Link AP #7: AP#7 Inflow=0.12 cfs 0.004 af
Primary=0.12 cfs 0.004 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 3.28 cfs @ 1.09 hrs, Volume= 0.098 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.22 cfs @ 1.14 hrs, Volume= 0.007 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.40 cfs @ 1.24 hrs, Volume= 0.017 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 0.02 cfs @ 1.90 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.11 cfs @ 1.10 hrs, Volume= 0.003 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.01 cfs @ 1.20 hrs, Volume= 0.000 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr NJ WQ Rainfall=1.25"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth = 0.30" for NJ WQ event
Inflow = 0.71 cfs @ 1.20 hrs, Volume= 0.123 af
Outflow = 0.16 cfs @ 2.40 hrs, Volume= 0.123 af, Atten= 78%, Lag= 71.9 min
Discarded = 0.16 cfs @ 2.40 hrs, Volume= 0.123 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 198.45' @ 2.40 hrs Surf.Area= 3,079 sf Storage= 1,134 cf

Plug-Flow detention time= 92.3 min calculated for 0.123 af (100% of inflow)
Center-of-Mass det. time= 92.2 min (349.0 - 256.8)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	198.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.96'

Discarded OutFlow Max=0.16 cfs @ 2.40 hrs HW=198.45' (Free Discharge)
└**4=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=198.00' (Free Discharge)
├**1=Orifice/Grate** (Controls 0.00 cfs)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth = 0.39" for NJ WQ event
Inflow = 3.28 cfs @ 1.09 hrs, Volume= 0.098 af
Outflow = 0.16 cfs @ 1.89 hrs, Volume= 0.098 af, Atten= 95%, Lag= 47.6 min
Primary = 0.16 cfs @ 1.89 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 205.50' @ 1.89 hrs Surf.Area= 7,136 sf Storage= 3,570 cf

Plug-Flow detention time= 231.2 min calculated for 0.097 af (100% of inflow)
Center-of-Mass det. time= 231.8 min (302.1 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 1.89 hrs HW=205.50' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 4.55 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth = 0.01" for NJ WQ event
Inflow = 0.12 cfs @ 1.11 hrs, Volume= 0.004 af
Primary = 0.12 cfs @ 1.11 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>3.07"
Tc=6.0 min CN=98 Runoff=3.85 cfs 0.290 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>0.48"
Flow Length=622' Tc=59.2 min CN=61 Runoff=0.31 cfs 0.074 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>3.07"
Tc=9.5 min CN=98 Runoff=0.26 cfs 0.022 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>0.49"
Tc=18.8 min CN=61 Runoff=0.09 cfs 0.012 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>3.07"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.47 cfs 0.050 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>0.69"
Flow Length=355' Tc=20.3 min CN=66 Runoff=0.61 cfs 0.073 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=96 Runoff=0.15 cfs 0.011 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>1.11"
Tc=6.0 min CN=74 Runoff=0.10 cfs 0.007 af

Pond E: BASIN E Peak Elev=199.11' Storage=3,799 cf Inflow=1.46 cfs 0.392 af
Discarded=0.28 cfs 0.319 af Primary=0.02 cfs 0.007 af Outflow=0.31 cfs 0.326 af

Pond E-1: BASIN E1 Peak Elev=206.03' Storage=8,293 cf Inflow=3.85 cfs 0.364 af
Outflow=0.20 cfs 0.235 af

Link AP #7: AP#7 Inflow=0.25 cfs 0.024 af
Primary=0.25 cfs 0.024 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 3.85 cfs @ 12.13 hrs, Volume= 0.290 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 0.31 cfs @ 13.01 hrs, Volume= 0.074 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.26 cfs @ 12.16 hrs, Volume= 0.022 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.09 cfs @ 12.35 hrs, Volume= 0.012 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.47 cfs @ 12.26 hrs, Volume= 0.050 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 0.61 cfs @ 12.34 hrs, Volume= 0.073 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 2-yr Rainfall=3.31"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 0.97" for 2-yr event
Inflow = 1.46 cfs @ 12.29 hrs, Volume= 0.392 af
Outflow = 0.31 cfs @ 14.93 hrs, Volume= 0.326 af, Atten= 79%, Lag= 158.5 min
Discarded = 0.28 cfs @ 14.93 hrs, Volume= 0.319 af
Primary = 0.02 cfs @ 14.93 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 199.11' @ 14.93 hrs Surf.Area= 4,962 sf Storage= 3,799 cf

Plug-Flow detention time= 150.9 min calculated for 0.326 af (83% of inflow)
Center-of-Mass det. time= 66.0 min (978.7 - 912.7)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	198.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.96'

Discarded OutFlow Max=0.28 cfs @ 14.93 hrs HW=199.11' (Free Discharge)
└**4=Exfiltration** (Controls 0.28 cfs)

Primary OutFlow Max=0.02 cfs @ 14.93 hrs HW=199.11' (Free Discharge)
├**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.14 fps)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 1.46" for 2-yr event
Inflow = 3.85 cfs @ 12.13 hrs, Volume= 0.364 af
Outflow = 0.20 cfs @ 15.08 hrs, Volume= 0.235 af, Atten= 95%, Lag= 177.4 min
Primary = 0.20 cfs @ 15.08 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.03' @ 15.08 hrs Surf.Area= 10,741 sf Storage= 8,293 cf

Plug-Flow detention time= 284.2 min calculated for 0.235 af (64% of inflow)
Center-of-Mass det. time= 165.4 min (961.0 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 15.08 hrs HW=206.03' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.20 cfs @ 5.75 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.58 fps)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 0.06" for 2-yr event
Inflow = 0.25 cfs @ 12.13 hrs, Volume= 0.024 af
Primary = 0.25 cfs @ 12.13 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>4.73"
Tc=6.0 min CN=98 Runoff=5.81 cfs 0.446 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>1.32"
Flow Length=622' Tc=59.2 min CN=61 Runoff=1.07 cfs 0.206 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>4.73"
Tc=9.5 min CN=98 Runoff=0.39 cfs 0.033 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>1.34"
Tc=18.8 min CN=61 Runoff=0.32 cfs 0.033 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>4.72"
Flow Length=290' Tc=17.9 min CN=98 Runoff=0.72 cfs 0.077 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>1.70"
Flow Length=355' Tc=20.3 min CN=66 Runoff=1.72 cfs 0.177 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>4.50"
Tc=6.0 min CN=96 Runoff=0.23 cfs 0.017 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>2.34"
Tc=6.0 min CN=74 Runoff=0.22 cfs 0.014 af

Pond E: BASIN E Peak Elev=200.10' Storage=9,997 cf Inflow=3.16 cfs 0.780 af
Discarded=0.49 cfs 0.498 af Primary=0.32 cfs 0.161 af Outflow=0.80 cfs 0.659 af

Pond E-1: BASIN E1 Peak Elev=206.49' Storage=13,861 cf Inflow=5.91 cfs 0.653 af
Outflow=0.69 cfs 0.459 af

Link AP #7: AP#7 Inflow=0.45 cfs 0.192 af
Primary=0.45 cfs 0.192 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 5.81 cfs @ 12.13 hrs, Volume= 0.446 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 1.07 cfs @ 12.89 hrs, Volume= 0.206 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.39 cfs @ 12.16 hrs, Volume= 0.033 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.32 cfs @ 12.31 hrs, Volume= 0.033 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 0.72 cfs @ 12.26 hrs, Volume= 0.077 af, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 1.72 cfs @ 12.32 hrs, Volume= 0.177 af, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.23 cfs @ 12.13 hrs, Volume= 0.017 af, Depth> 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.22 cfs @ 12.13 hrs, Volume= 0.014 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 10-yr Rainfall=4.97"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 1.94" for 10-yr event
Inflow = 3.16 cfs @ 12.29 hrs, Volume= 0.780 af
Outflow = 0.80 cfs @ 15.23 hrs, Volume= 0.659 af, Atten= 75%, Lag= 176.6 min
Discarded = 0.49 cfs @ 15.23 hrs, Volume= 0.498 af
Primary = 0.32 cfs @ 15.23 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 200.10' @ 15.23 hrs Surf.Area= 7,627 sf Storage= 9,997 cf

Plug-Flow detention time= 177.6 min calculated for 0.659 af (84% of inflow)
Center-of-Mass det. time= 103.6 min (996.5 - 892.9)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	198.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.96'

Discarded OutFlow Max=0.49 cfs @ 15.23 hrs HW=200.10' (Free Discharge)
└**4=Exfiltration** (Controls 0.49 cfs)

Primary OutFlow Max=0.32 cfs @ 15.23 hrs HW=200.10' (Free Discharge)
├**1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 4.80 fps)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.15 cfs @ 1.03 fps)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 2.61" for 10-yr event
Inflow = 5.91 cfs @ 12.13 hrs, Volume= 0.653 af
Outflow = 0.69 cfs @ 13.95 hrs, Volume= 0.459 af, Atten= 88%, Lag= 109.2 min
Primary = 0.69 cfs @ 13.95 hrs, Volume= 0.459 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 206.49' @ 13.95 hrs Surf.Area= 13,220 sf Storage= 13,861 cf

Plug-Flow detention time= 240.8 min calculated for 0.459 af (70% of inflow)
Center-of-Mass det. time= 134.0 min (934.6 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.70 cfs @ 13.95 hrs HW=206.49' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.23 cfs @ 6.62 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 2.39 fps)

Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 0.47" for 10-yr event
Inflow = 0.45 cfs @ 12.13 hrs, Volume= 0.192 af
Primary = 0.45 cfs @ 12.13 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7.1I: PDA 7.1 IMP Runoff Area=1.133 ac 100.00% Impervious Runoff Depth>7.90"
Tc=6.0 min CN=98 Runoff=9.56 cfs 0.746 af

Subcatchment7.1P: PDA 7.1 PERV Runoff Area=1.870 ac 0.00% Impervious Runoff Depth>3.50"
Flow Length=622' Tc=59.2 min CN=61 Runoff=3.10 cfs 0.545 af

Subcatchment7.2I: PDA 7.2 IMP Runoff Area=0.085 ac 100.00% Impervious Runoff Depth>7.90"
Tc=9.5 min CN=98 Runoff=0.64 cfs 0.056 af

Subcatchment7.2P: PDA 7.2 PERV Runoff Area=0.295 ac 0.00% Impervious Runoff Depth>3.54"
Tc=18.8 min CN=61 Runoff=0.90 cfs 0.087 af

Subcatchment7.3I: PDA 7.3 IMP Runoff Area=0.195 ac 100.00% Impervious Runoff Depth>7.89"
Flow Length=290' Tc=17.9 min CN=98 Runoff=1.18 cfs 0.128 af

Subcatchment7.3P: PDA 7.3 PERV Runoff Area=1.254 ac 0.00% Impervious Runoff Depth>4.11"
Flow Length=355' Tc=20.3 min CN=66 Runoff=4.33 cfs 0.429 af

Subcatchment7I OFF: PDA 7 OFF IMP Runoff Area=0.045 ac 0.00% Impervious Runoff Depth>7.66"
Tc=6.0 min CN=96 Runoff=0.38 cfs 0.029 af

Subcatchment7P OFF: PDA 7 OFF PERV Runoff Area=0.073 ac 0.00% Impervious Runoff Depth>5.05"
Tc=6.0 min CN=74 Runoff=0.47 cfs 0.031 af

Pond E: BASIN E Peak Elev=200.64' Storage=14,522 cf Inflow=7.61 cfs 1.744 af
Discarded=0.61 cfs 0.627 af Primary=2.52 cfs 0.905 af Outflow=3.13 cfs 1.532 af

Pond E-1: BASIN E1 Peak Elev=207.34' Storage=27,019 cf Inflow=10.18 cfs 1.291 af
Outflow=2.12 cfs 1.043 af

Link AP #7: AP#7 Inflow=2.62 cfs 0.964 af
Primary=2.62 cfs 0.964 af

Summary for Subcatchment 7.1I: PDA 7.1 IMP

Runoff = 9.56 cfs @ 12.13 hrs, Volume= 0.746 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.133	98	Unconnected pavement, HSG B
1.133		100.00% Impervious Area
1.133		100.00% Unconnected

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

Summary for Subcatchment 7.1P: PDA 7.1 PERV

Runoff = 3.10 cfs @ 12.83 hrs, Volume= 0.545 af, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
1.870	61	>75% Grass cover, Good, HSG B
1.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
40.8	102	0.0040	0.04		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.31"
1.2	120	0.0100	1.61		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
12.8	100	0.0250	0.13		**Sheet Flow, SHEET-2** Grass: Dense n= 0.240 P2= 3.31"
4.4	300	0.0050	1.14		**Shallow Concentrated Flow, SCF-2** Unpaved Kv= 16.1 fps
59.2	622	Total			

Summary for Subcatchment 7.2I: PDA 7.2 IMP

Runoff = 0.64 cfs @ 12.16 hrs, Volume= 0.056 af, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.085	98	Unconnected pavement, HSG B
0.085		100.00% Impervious Area
0.085		100.00% Unconnected

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

Summary for Subcatchment 7.2P: PDA 7.2 PERV

Runoff = 0.90 cfs @ 12.29 hrs, Volume= 0.087 af, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.295	61	>75% Grass cover, Good, HSG B
0.295		100.00% Pervious Area

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

Summary for Subcatchment 7.3I: PDA 7.3 IMP

Runoff = 1.18 cfs @ 12.26 hrs, Volume= 0.128 af, Depth> 7.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.150	98	Unconnected pavement, HSG B
0.045	98	Unconnected pavement, HSG C
0.195	98	Weighted Average
0.195		100.00% Impervious Area
0.195		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	42	0.0180	1.13		**Sheet Flow, SHEET** Smooth surfaces n= 0.011 P2= 3.31"
16.3	108	0.0160	0.11		**Sheet Flow, SHEET 2** Grass: Dense n= 0.240 P2= 3.31"
1.0	140	0.0210	2.33		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
17.9	290	Total			

Summary for Subcatchment 7.3P: PDA 7.3 PERV

Runoff = 4.33 cfs @ 12.30 hrs, Volume= 0.429 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.797	61	>75% Grass cover, Good, HSG B
0.457	74	>75% Grass cover, Good, HSG C
1.254	66	Weighted Average
1.254		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	150	0.0080	0.13		**Sheet Flow, sheet** Grass: Short n= 0.150 P2= 3.31"
0.4	66	0.0300	2.79		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
0.7	139	0.0400	3.22		**Shallow Concentrated Flow, SCF** Unpaved Kv= 16.1 fps
20.3	355	Total			

Summary for Subcatchment 7I OFF: PDA 7 OFF IMP

Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.029 af, Depth> 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.045	96	Gravel surface, HSG C
0.045		100.00% Pervious Area

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

Summary for Subcatchment 7P OFF: PDA 7 OFF PERV

Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.031 af, Depth> 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 100-yr Rainfall=8.15"

Area (ac)	CN	Description
0.073	74	>75% Grass cover, Good, HSG C
0.073		100.00% Pervious Area

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

Summary for Pond E: BASIN E

Inflow Area = 4.832 ac, 29.24% Impervious, Inflow Depth > 4.33" for 100-yr event
Inflow = 7.61 cfs @ 12.29 hrs, Volume= 1.744 af
Outflow = 3.13 cfs @ 12.81 hrs, Volume= 1.532 af, Atten= 59%, Lag= 31.1 min
Discarded = 0.61 cfs @ 12.81 hrs, Volume= 0.627 af
Primary = 2.52 cfs @ 12.81 hrs, Volume= 0.905 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 200.64' @ 12.81 hrs Surf.Area= 9,041 sf Storage= 14,522 cf

Plug-Flow detention time= 110.2 min calculated for 1.528 af (88% of inflow)
Center-of-Mass det. time= 53.0 min (958.1 - 905.1)

Volume	Invert	Avail.Storage	Storage Description
#1	198.00'	23,271 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
198.00	2,015	358.0	0	0	2,015
199.00	4,693	739.0	3,261	3,261	35,279
200.00	7,381	845.0	5,986	9,248	48,664
201.00	10,033	889.0	8,673	17,921	54,797
201.50	11,381	908.0	5,350	23,271	57,551

Device	Routing	Invert	Outlet Devices
#1	Primary	199.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	201.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	200.00'	**1.5' long x 0.75' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	198.00'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 194.96'

Discarded OutFlow Max=0.61 cfs @ 12.81 hrs HW=200.64' (Free Discharge)
└**4=Exfiltration** (Controls 0.61 cfs)

Primary OutFlow Max=2.52 cfs @ 12.81 hrs HW=200.64' (Free Discharge)
├**1=Orifice/Grate** (Orifice Controls 0.20 cfs @ 5.97 fps)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.31 cfs @ 2.62 fps)

Summary for Pond E-1: BASIN E1

Inflow Area = 3.003 ac, 37.73% Impervious, Inflow Depth > 5.16" for 100-yr event
Inflow = 10.18 cfs @ 12.13 hrs, Volume= 1.291 af
Outflow = 2.12 cfs @ 13.55 hrs, Volume= 1.043 af, Atten= 79%, Lag= 85.6 min
Primary = 2.12 cfs @ 13.55 hrs, Volume= 1.043 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 207.34' @ 13.55 hrs Surf.Area= 17,367 sf Storage= 27,019 cf

Plug-Flow detention time= 240.2 min calculated for 1.043 af (81% of inflow)
Center-of-Mass det. time= 159.4 min (961.3 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	204.50'	29,808 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.50	0	0.0	0	0	0
205.00	4,367	462.0	728	728	16,986
206.00	10,595	927.0	7,255	7,983	68,388
207.00	16,200	1,142.0	13,299	21,281	103,802
207.50	17,920	1,151.0	8,526	29,808	105,542

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	207.25'	**28.0" x 28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	206.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.11 cfs @ 13.55 hrs HW=207.34' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.27 cfs @ 7.97 fps)
- **2=Orifice/Grate** (Weir Controls 0.85 cfs @ 0.99 fps)
- **3=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.03 fps)

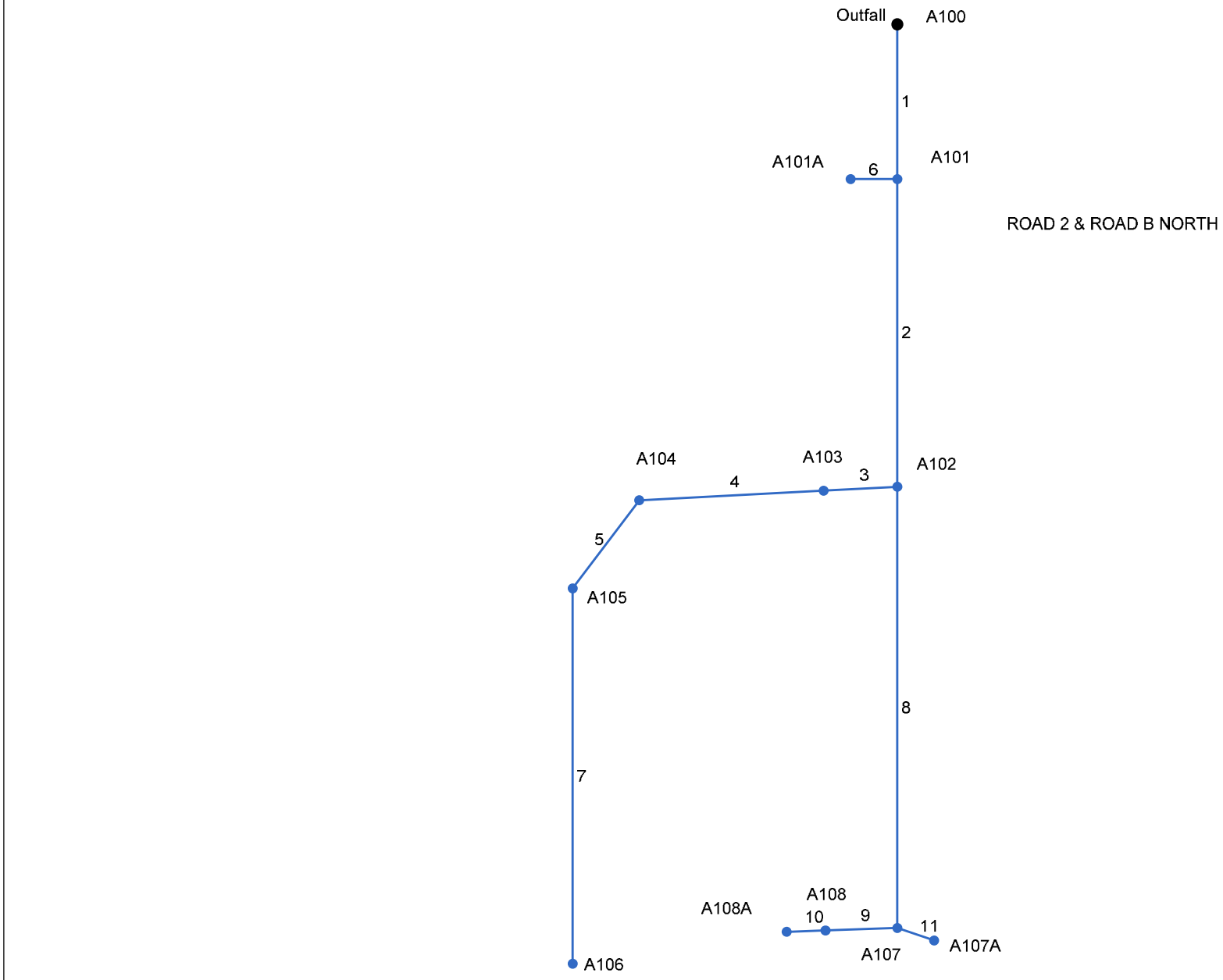
Summary for Link AP #7: AP#7

Inflow Area = 4.950 ac, 28.55% Impervious, Inflow Depth > 2.34" for 100-yr event
Inflow = 2.62 cfs @ 12.79 hrs, Volume= 0.964 af
Primary = 2.62 cfs @ 12.79 hrs, Volume= 0.964 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

APPENDIX
No. 5: CONVEYANCE SYSTEM CALCULATIONS

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



Project File: A100-A106.stm	Number of lines: 11	Date: 1/11/2021

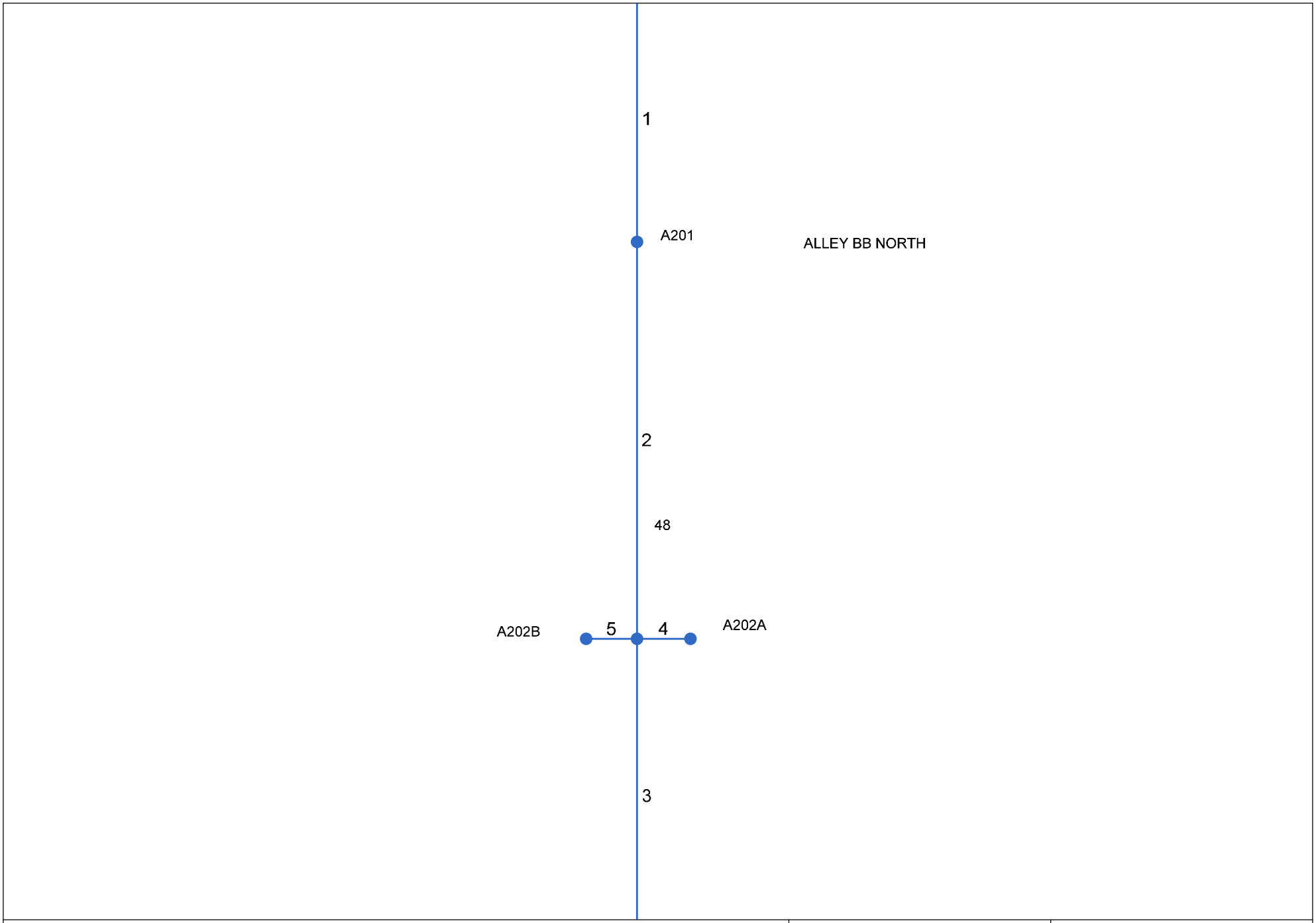
Storm Sewer Tabulation

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	80.000	0.12	2.54	0.99	0.12	2.51	10.0	16.7	5.2	13.14	29.00	2.80	30	0.50	204.50	204.90	207.00	207.06	206.50	211.29	A101-A100
2	1	159.000	0.24	2.30	0.99	0.24	2.28	10.0	15.7	5.4	12.25	28.91	3.98	30	0.50	204.90	205.69	207.26	206.86	211.29	211.33	A102-A101
3	2	38.000	0.24	1.00	0.99	0.24	0.99	10.0	15.4	5.4	5.38	15.99	4.52	24	0.50	206.29	206.48	207.09	207.30	211.33	211.40	A103-A102
4	3	95.000	0.33	0.76	0.99	0.33	0.75	10.0	14.8	5.5	4.17	7.39	4.30	18	0.49	206.73	207.20	207.54	208.01	211.40	211.67	A104-A103
5	4	57.000	0.28	0.43	0.99	0.28	0.43	10.0	14.1	5.6	2.40	7.36	1.92	18	0.49	207.20	207.48	208.35	208.37	211.67	212.40	A105-A104
6	1	24.000	0.12	0.12	0.99	0.12	0.12	10.0	10.0	6.5	0.77	4.57	2.63	15	0.50	206.88	207.00	207.26	207.35	211.29	211.30	A101A-A101
7	5	194.000	0.15	0.15	0.99	0.15	0.15	10.0	10.0	6.5	0.96	4.57	1.97	15	0.50	207.50	208.47	208.45	208.86	212.40	211.25	A106-A105
8	2	228.000	0.17	1.06	0.99	0.17	1.05	10.0	10.4	6.4	6.72	17.72	5.01	24	0.61	206.03	207.43	206.88	208.35	211.33	211.20	A107-A102
9	8	37.000	0.17	0.51	0.99	0.17	0.50	10.0	10.2	6.5	3.26	8.82	3.52	15	1.86	206.93	207.62	208.35	208.35	211.20	211.20	A108-A107
10	9	20.000	0.34	0.34	0.99	0.34	0.34	10.0	10.0	6.5	2.19	4.57	2.52	15	0.50	207.62	207.72	208.50	208.51	211.20	210.84	A108A-A108
11	8	20.000	0.38	0.38	0.99	0.38	0.38	10.0	10.0	6.5	2.44	14.22	3.26	15	4.85	207.43	208.40	208.35	209.03	211.20	210.34	A107A-A107

Project File: A100-A106.stm | Number of lines: 11 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: A200-A203.stm	Number of lines: 5	Date: 1/11/2021

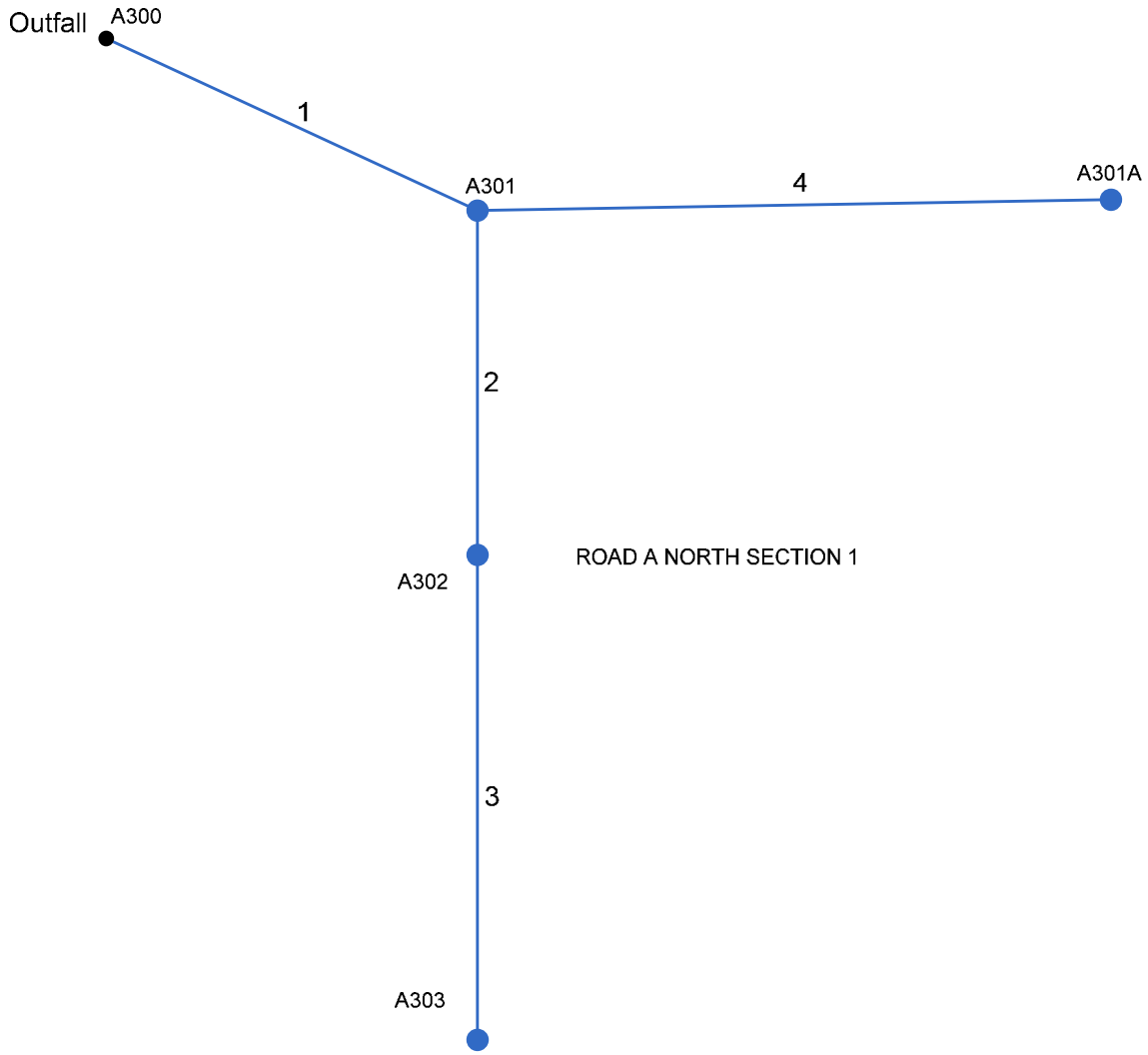
Storm Sewer Tabulation

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	92.000	0.24	1.10	0.99	0.24	1.09	10.0	12.2	6.0	6.56	10.50	4.51	18	1.00	204.50	205.42	206.00	206.41	206.80	210.95	A201-A200
2	1	149.000	0.00	0.86	0.99	0.00	0.85	10.0	11.3	6.2	5.27	7.45	3.40	18	0.50	205.42	206.17	206.92	207.26	210.95	211.09	A202-A201
3	2	118.000	0.28	0.28	0.99	0.28	0.28	10.0	10.0	6.5	1.80	4.57	1.90	15	0.50	206.42	207.01	207.67	207.76	211.09	211.90	A203-A202
4	2	20.000	0.29	0.29	0.99	0.29	0.29	10.0	10.0	6.5	1.87	3.56	4.26	12	1.00	207.72	207.92	208.23	208.50	211.09	211.44	A202A-A202
5	2	19.000	0.29	0.29	0.99	0.29	0.29	10.0	10.0	6.5	1.87	3.65	4.31	12	1.05	207.68	207.88	208.19	208.46	211.09	211.44	A202B-A202

Project File: A200-A203.stm | Number of lines: 5 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: A300-A303.stm	Number of lines: 4	Date: 1/11/2021

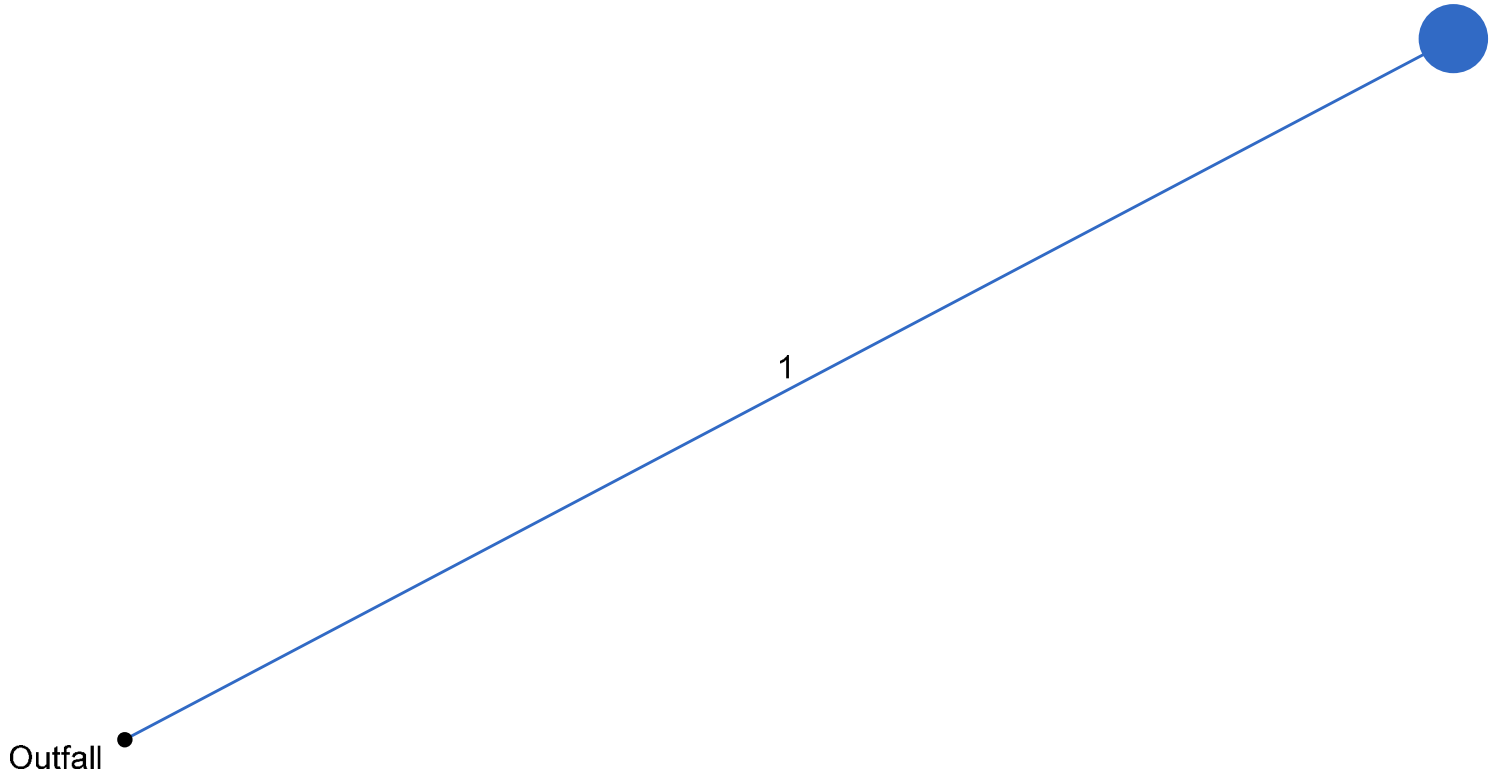
Storm Sewer Tabulation

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	84.000	0.19	1.44	0.99	0.19	1.43	10.0	11.5	6.2	8.78	7.25	4.97	18	0.48	204.50	204.90	206.00	206.59	206.00	211.40	A301-A300
2	1	71.000	0.45	0.75	0.99	0.45	0.74	10.0	11.1	6.3	4.64	8.54	2.64	18	0.66	205.15	205.62	206.94	207.07	211.40	210.68	A302-A301
3	2	100.000	0.30	0.30	0.99	0.30	0.30	10.0	10.0	6.5	1.93	4.57	1.59	15	0.50	205.52	206.02	207.12	207.20	210.68	210.84	A303-A302
4	1	130.000	0.50	0.50	0.99	0.50	0.50	10.0	10.0	6.5	3.22	4.57	4.03	15	0.50	207.10	207.75	207.87	208.52	211.40	209.04	A301A-A301

Project File: A300-A303.stm | Number of lines: 4 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

A400-A401



Project File: A400-A401.stm	Number of lines: 1	Date: 1/11/2021

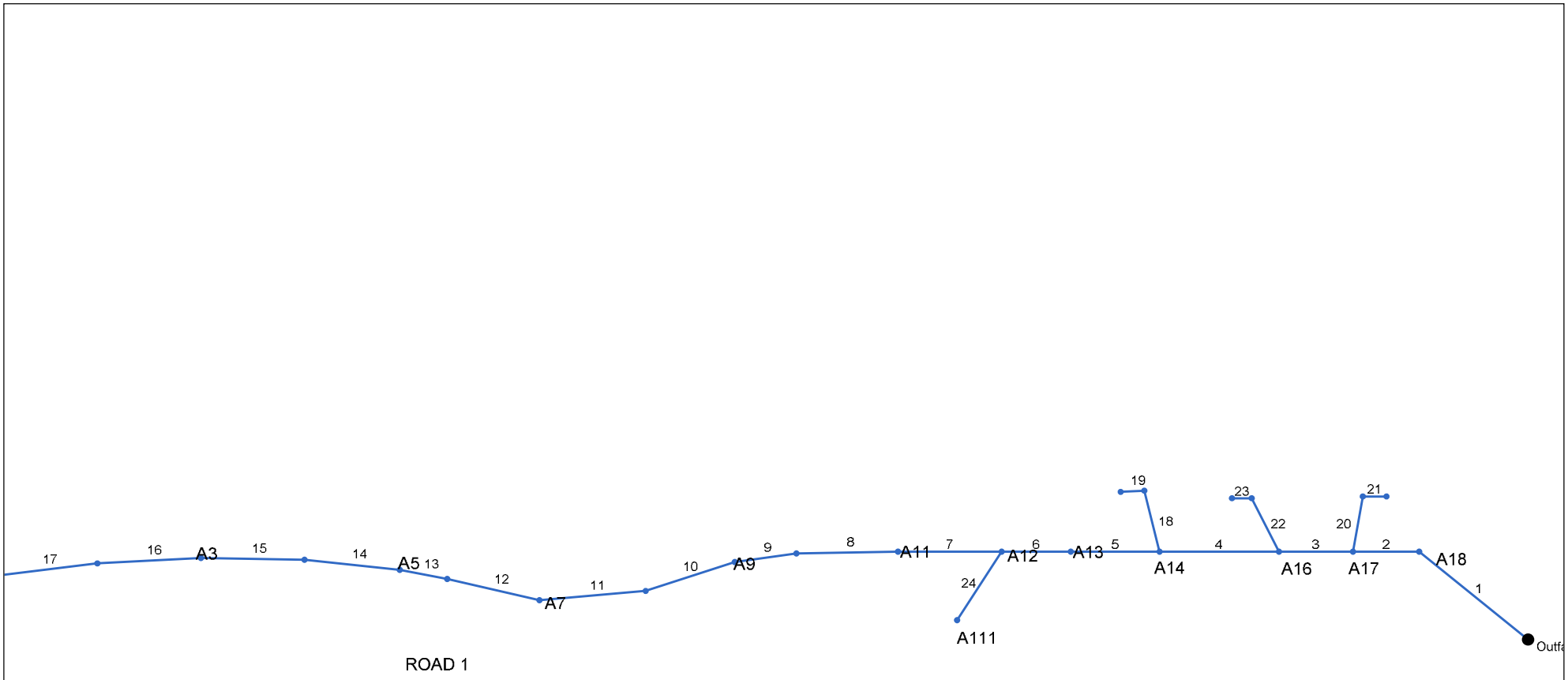
Storm Sewer Tabulation

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	90.000	0.30	0.30	0.99	0.30	0.30	10.0	10.0	6.5	1.93	3.54	1.66	15	0.30	204.50	204.77	205.75	205.82	205.75	206.60	A400-A401

A400-A401 | Number of lines: 1 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: A1 - A19.stm	Number of lines: 24	Date: 1/11/2021

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	142.000	0.27	7.48	0.99	0.27	7.41	10.0	15.6	5.4	39.94	43.05	4.82	42	0.18	201.85	202.11	204.68	204.90	212.75	208.65	A18
2	1	67.000	0.21	7.21	0.99	0.21	7.14	10.0	15.3	5.4	38.88	54.97	4.32	42	0.30	202.11	202.31	205.27	205.35	208.65	208.74	A17
3	2	75.000	0.06	6.84	0.99	0.06	6.77	10.0	14.9	5.5	37.31	44.99	3.89	42	0.20	202.31	202.46	205.80	205.89	208.74	208.65	A16
4	3	121.000	0.26	6.30	0.99	0.26	6.24	10.0	14.7	5.5	34.59	7.96	11.01	24	0.12	202.46	202.61	206.21	209.04	208.65	208.65	A14
5	4	90.000	0.24	5.83	0.99	0.24	5.77	10.0	14.2	5.6	32.52	33.54	3.38	42	0.11	202.76	202.86	211.79	211.89	208.65	208.65	A13
6	5	70.000	0.14	5.59	0.99	0.14	5.53	10.0	13.9	5.7	31.48	116.1	4.45	36	3.03	203.28	205.40	211.98	212.13	208.65	210.28	A12
7	6	105.000	0.04	3.07	0.99	0.04	3.04	10.0	13.1	5.8	17.74	63.44	2.51	36	0.90	205.45	206.40	212.53	212.61	210.28	211.25	A11
8	7	103.000	0.27	3.03	0.99	0.27	3.00	10.0	12.7	5.9	17.71	26.46	5.64	24	1.37	206.50	207.91	212.66	213.29	211.25	211.25	A10
9	8	63.000	0.16	2.76	0.99	0.16	2.73	10.0	12.6	5.9	16.20	10.25	9.17	18	0.95	208.41	209.01	213.54	215.04	211.25	212.75	A9
10	9	95.000	0.07	2.60	0.99	0.07	2.57	10.0	12.4	6.0	15.37	8.55	8.70	18	0.66	209.01	209.64	215.69	217.73	212.75	213.96	A8
11	10	108.000	0.11	2.53	0.99	0.11	2.50	10.0	12.2	6.0	15.07	7.76	8.53	18	0.55	209.64	210.23	218.31	220.54	213.96	214.50	A7
12	11	96.000	0.20	2.42	0.99	0.20	2.40	10.0	12.0	6.1	14.51	6.61	8.21	18	0.40	210.23	210.61	221.15	222.98	214.50	212.35	A6
13	12	49.000	0.57	2.22	0.99	0.56	2.20	10.0	11.9	6.1	13.35	6.78	10.88	15	1.10	210.86	211.40	223.51	225.60	212.35	213.35	A5
14	13	97.000	0.52	1.65	0.99	0.51	1.63	10.0	11.7	6.1	9.99	4.54	8.14	15	0.49	211.40	211.88	226.52	228.85	213.35	214.25	A4
15	14	105.000	0.47	1.13	0.99	0.47	1.12	10.0	11.4	6.2	6.92	4.46	5.64	15	0.48	211.88	212.38	229.36	230.57	214.25	215.25	A3
16	15	105.000	0.41	0.66	0.99	0.41	0.65	10.0	10.9	6.3	4.12	4.46	3.35	15	0.48	212.38	212.88	230.82	231.24	215.25	215.25	A2
17	16	105.000	0.25	0.25	0.99	0.25	0.25	10.0	10.0	6.5	1.61	2.51	2.05	12	0.50	213.13	213.65	231.33	231.55	215.25	215.25	A1
18	4	64.000	0.09	0.21	0.99	0.09	0.21	10.0	10.6	6.3	1.32	6.56	1.08	15	1.03	206.80	207.46	211.79	211.82	208.65	210.10	A28
19	18	24.000	0.12	0.12	0.99	0.12	0.12	10.0	10.0	6.5	0.77	4.57	0.63	15	0.50	207.46	207.58	211.85	211.85	210.10	210.13	A29
20	2	57.000	0.08	0.16	0.99	0.08	0.16	10.0	10.6	6.4	1.01	13.06	4.66	15	4.09	206.80	209.13	207.04	209.52	208.74	211.32	A45
21	20	24.000	0.08	0.08	0.99	0.08	0.08	10.0	10.0	6.5	0.51	2.52	2.52	12	0.50	209.38	209.50	209.69	209.81	211.32	211.17	A46
22	3	61.000	0.15	0.48	0.99	0.15	0.48	10.0	10.1	6.5	3.07	36.97	3.07	24	2.67	205.35	206.98	206.21	207.59	208.65	211.10	A31

Project File: A1 - A19.stm

Number of lines: 24

Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; 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	20.000	0.33	0.33	0.99	0.33	0.33	10.0	10.0	6.5	2.12	2.52	3.59	12	0.50	208.80	208.90	209.50	209.60	211.10	210.50	A34
24	6	83.000	2.38	2.38	0.99	2.36	2.36	10.0	10.0	6.5	15.31	5.15	8.66	18	0.24	205.45	205.65	212.53	214.30	210.28	207.86	A111

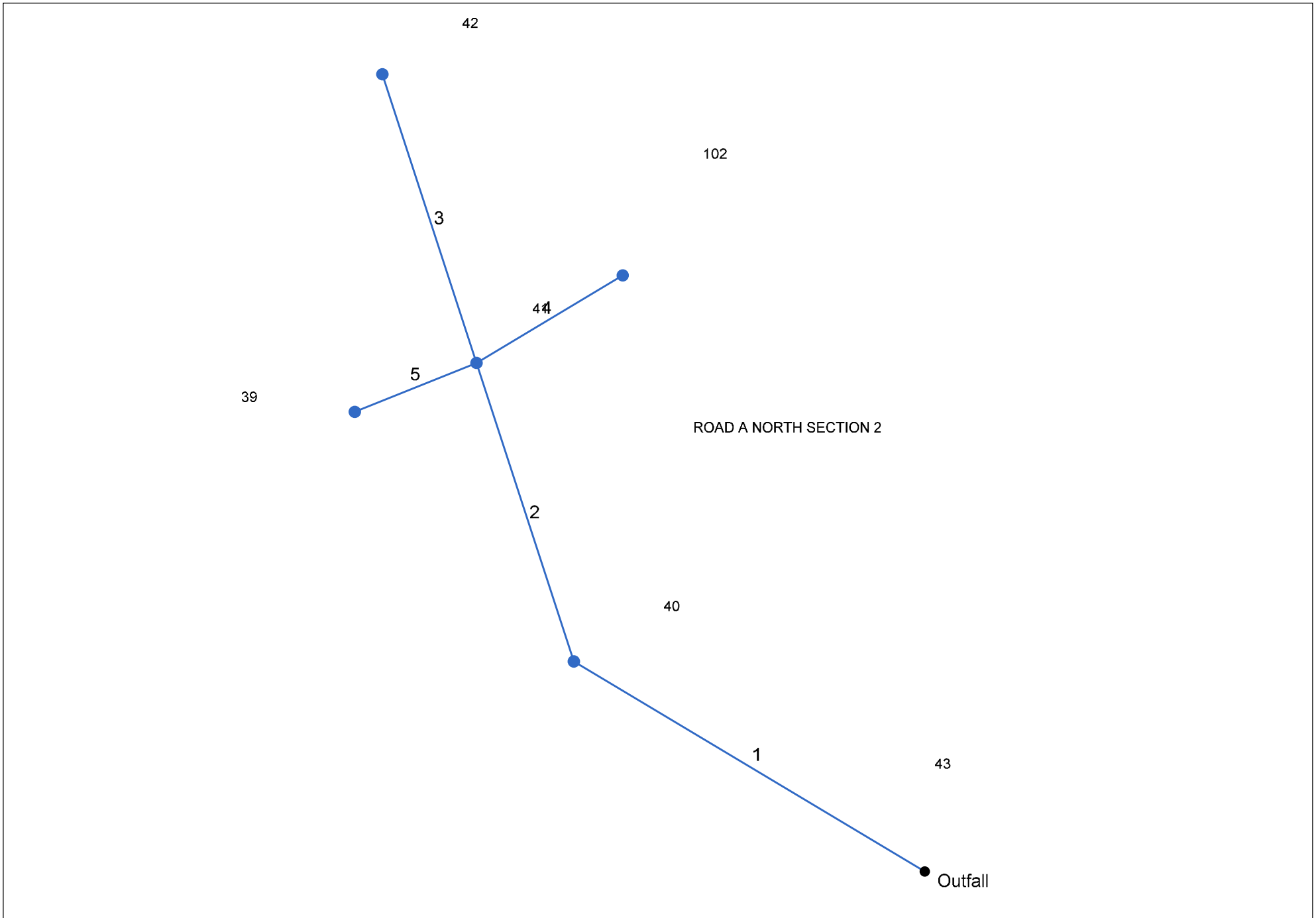
Project File: A1 - A19.stm

Number of lines: 24

Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: A42- A43.stm	Number of lines: 5	Date: 1/11/2021

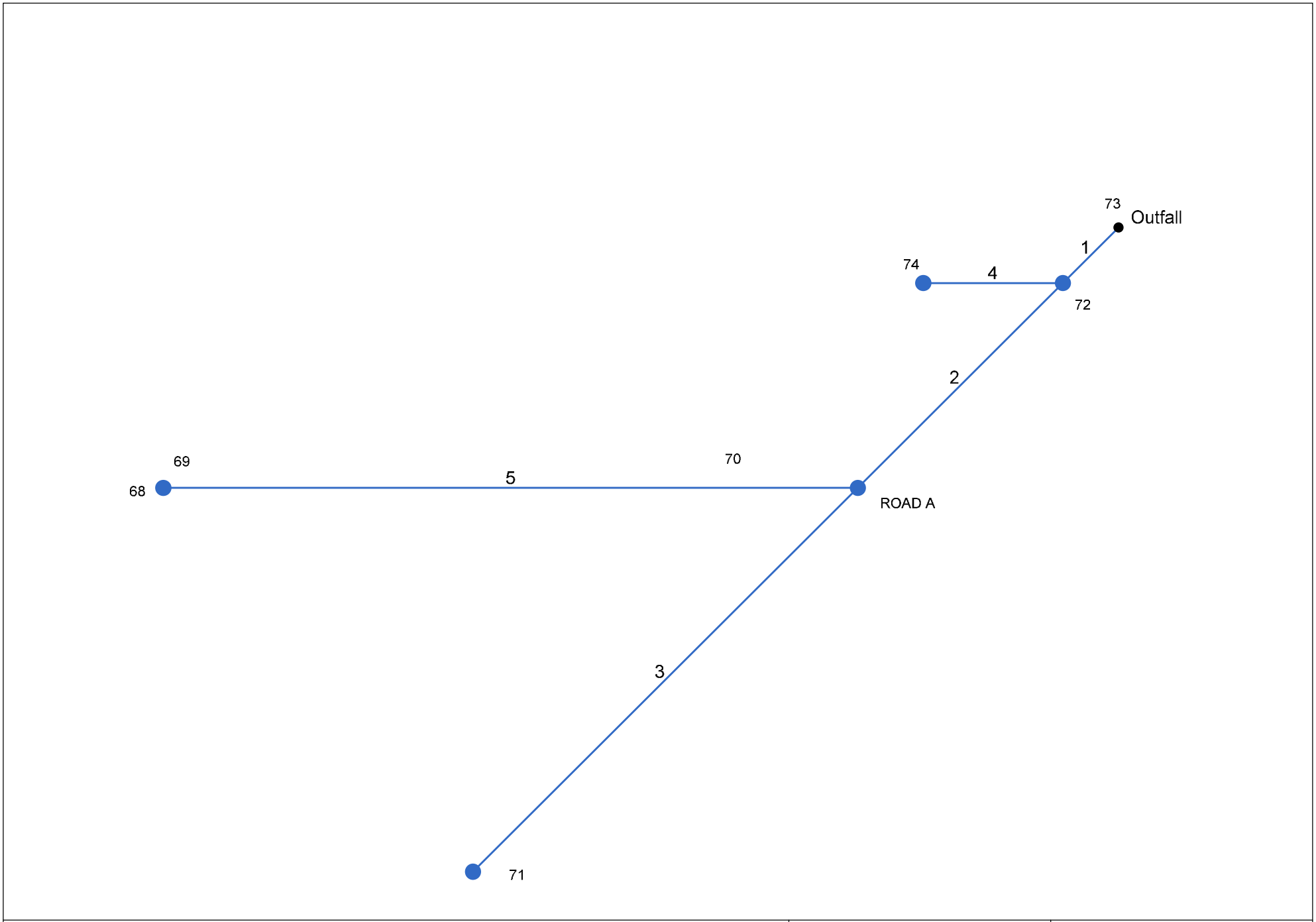
Storm Sewer Tabulation

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	156.000	0.39	1.46	0.99	0.39	1.45	10.0	12.1	6.0	8.71	13.24	5.48	18	1.59	203.00	205.48	204.50	206.62	204.79	209.85	40-43
2	1	120.000	0.22	1.07	0.99	0.22	1.06	10.0	11.6	6.1	6.50	9.59	4.89	18	0.83	205.48	206.48	206.62	207.47	209.85	209.94	41-40
3	2	116.000	0.23	0.23	0.99	0.23	0.23	10.0	10.0	6.5	1.48	4.28	2.69	15	0.44	206.74	207.25	207.47	207.73	209.94	209.85	42-41
4	2	65.000	0.24	0.24	0.99	0.24	0.24	10.0	10.0	6.5	1.54	5.07	3.53	15	0.62	208.00	208.40	208.47	208.89	209.94	210.34	102-41
5	2	50.000	0.38	0.38	0.99	0.38	0.38	10.0	10.0	6.5	2.44	5.78	4.25	15	0.80	208.00	208.40	208.57	209.03	209.94	210.34	39-41

Project File: A42- A43.stm | Number of lines: 5 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: A68 - A73.stm	Number of lines: 5	Date: 1/11/2021

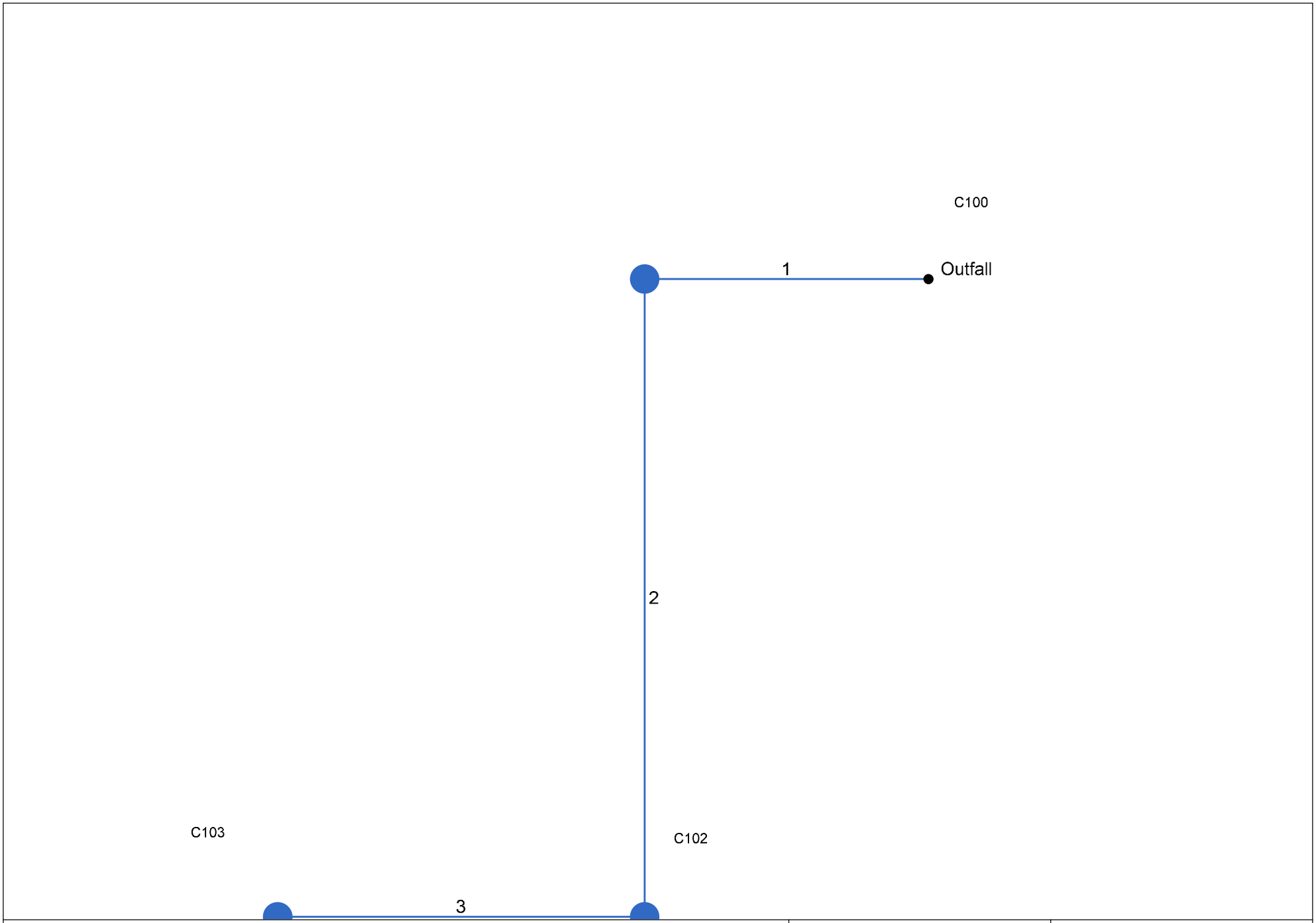
Storm Sewer Tabulation

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	22.000	0.02	3.66	0.99	0.02	3.62	10.0	12.4	6.0	24.82	32.72	5.03	24 x 38 e	0.64	203.00	203.14	205.00	205.06	209.28	206.24	72-73
2	1	81.000	0.40	2.75	0.99	0.40	2.72	10.0	12.0	6.0	19.23	29.18	3.87	24 x 38 e	0.51	203.14	203.55	205.91	206.09	206.24	206.25	70-72
3	2	152.000	1.67	1.67	0.99	1.65	1.65	10.0	10.0	6.5	12.64	19.24	4.02	24	0.72	203.55	204.65	206.35	206.83	206.25	207.25	71-70
4	1	39.000	0.89	0.89	0.99	0.88	0.88	10.0	10.0	6.5	6.13	7.31	5.55	15	1.28	204.39	204.89	205.51	205.89	206.24	206.74	74-72
5	2	194.000	0.68	0.68	0.99	0.67	0.67	10.0	10.0	6.5	4.98	17.49	1.71	24	0.60	203.65	204.81	206.35	206.43	206.25	208.00	69-70

Project File: A68 - A73.stm | Number of lines: 5 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: C103 - C100.stm	Number of lines: 3	Date: 1/11/2021

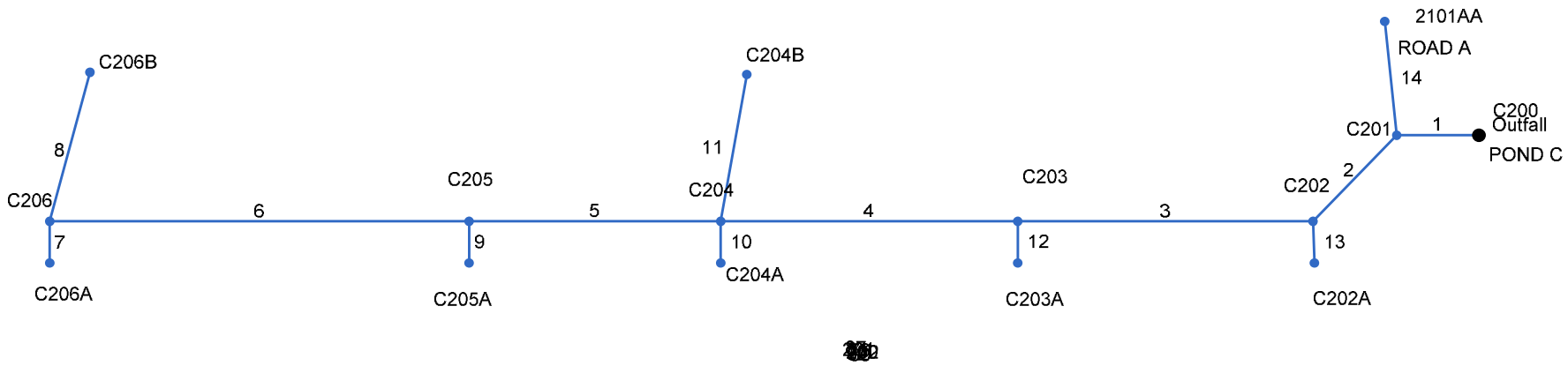
Storm Sewer Tabulation

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	41.000	0.24	1.15	0.99	0.24	1.14	10.0	10.8	6.3	7.20	8.68	4.15	18	0.68	201.97	202.25	203.47	203.63	0.00	205.75	C101-C100
2	1	93.000	0.31	0.91	0.99	0.31	0.90	10.0	10.3	6.4	5.79	7.39	3.28	18	0.49	202.25	202.71	204.05	204.33	205.75	209.65	C102-C101
3	2	53.000	0.60	0.60	0.99	0.59	0.59	10.0	10.0	6.5	3.86	4.52	3.15	15	0.49	202.96	203.22	204.58	204.77	209.65	206.00	C103-C102

Project File: C103 - C100.stm | Number of lines: 3 | Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: C200 - C206.stm	Number of lines: 14	Date: 1/11/2021

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	47.000	0.21	4.64	0.99	0.21	4.59	10.0	16.1	5.3	31.69	37.68	4.49	36	0.32	202.00	202.15	205.00	205.10	204.52	206.01	C201-C200
2	1	69.000	0.24	3.55	0.99	0.24	3.51	10.0	15.8	5.4	19.69	29.21	4.01	30	0.51	202.40	202.75	205.57	205.73	206.01	206.95	C202-C-201
3	2	169.000	0.23	3.10	0.99	0.23	3.07	10.0	15.0	5.5	17.72	29.09	3.61	30	0.50	202.75	203.60	206.15	206.47	206.95	207.62	C203-C202
4	3	170.000	0.21	2.64	0.99	0.21	2.61	10.0	14.0	5.7	15.63	29.17	3.19	30	0.51	203.60	204.46	206.77	207.02	207.62	208.90	C204-C203
5	4	144.000	0.65	1.65	0.99	0.64	1.63	12.0	13.3	5.8	10.31	14.35	3.28	24	0.40	204.96	205.54	207.38	207.68	208.90	209.32	C205-C204
6	5	240.000	0.18	0.85	0.99	0.18	0.84	10.0	12.1	6.0	5.92	7.43	3.35	18	0.50	205.79	206.99	207.93	208.69	209.32	209.93	C206-C205
7	6	24.000	0.17	0.17	0.99	0.17	0.17	10.0	10.0	6.5	1.93	4.57	1.58	15	0.50	207.38	207.50	209.08	209.10	209.93	209.54	C206A-C206
8	6	89.000	0.50	0.50	0.99	0.50	0.50	11.5	11.5	6.2	3.05	4.54	2.48	15	0.49	207.11	207.55	209.08	209.28	209.93	209.49	C206B-C206
9	5	24.000	0.15	0.15	0.99	0.15	0.15	10.0	10.0	6.5	0.96	4.57	0.79	15	0.50	206.38	206.50	207.93	207.93	209.32	209.00	C205A-C205
10	4	24.000	0.23	0.23	0.99	0.23	0.23	10.0	10.0	6.5	1.48	4.57	1.21	15	0.50	205.63	205.75	207.38	207.39	208.90	208.90	C204A-C204
11	4	86.000	0.55	0.55	0.99	0.54	0.54	10.0	10.0	6.5	3.54	4.57	2.88	15	0.50	205.41	205.84	207.38	207.63	208.90	208.84	C204B-C204
12	3	24.000	0.23	0.23	0.99	0.23	0.23	10.0	10.0	6.5	1.48	4.57	1.21	15	0.50	204.50	204.62	206.77	206.79	207.62	207.62	C203A-C203
13	2	24.000	0.21	0.21	0.99	0.21	0.21	10.0	10.0	6.5	1.35	4.57	1.10	15	0.50	203.83	203.95	206.15	206.17	206.95	206.93	C202A-C202
14	1	66.000	0.88	0.88	0.99	0.87	0.87	10.0	10.0	6.5	5.66	7.43	3.20	18	0.50	202.17	202.50	205.57	205.76	206.01	206.03	C201A-C201

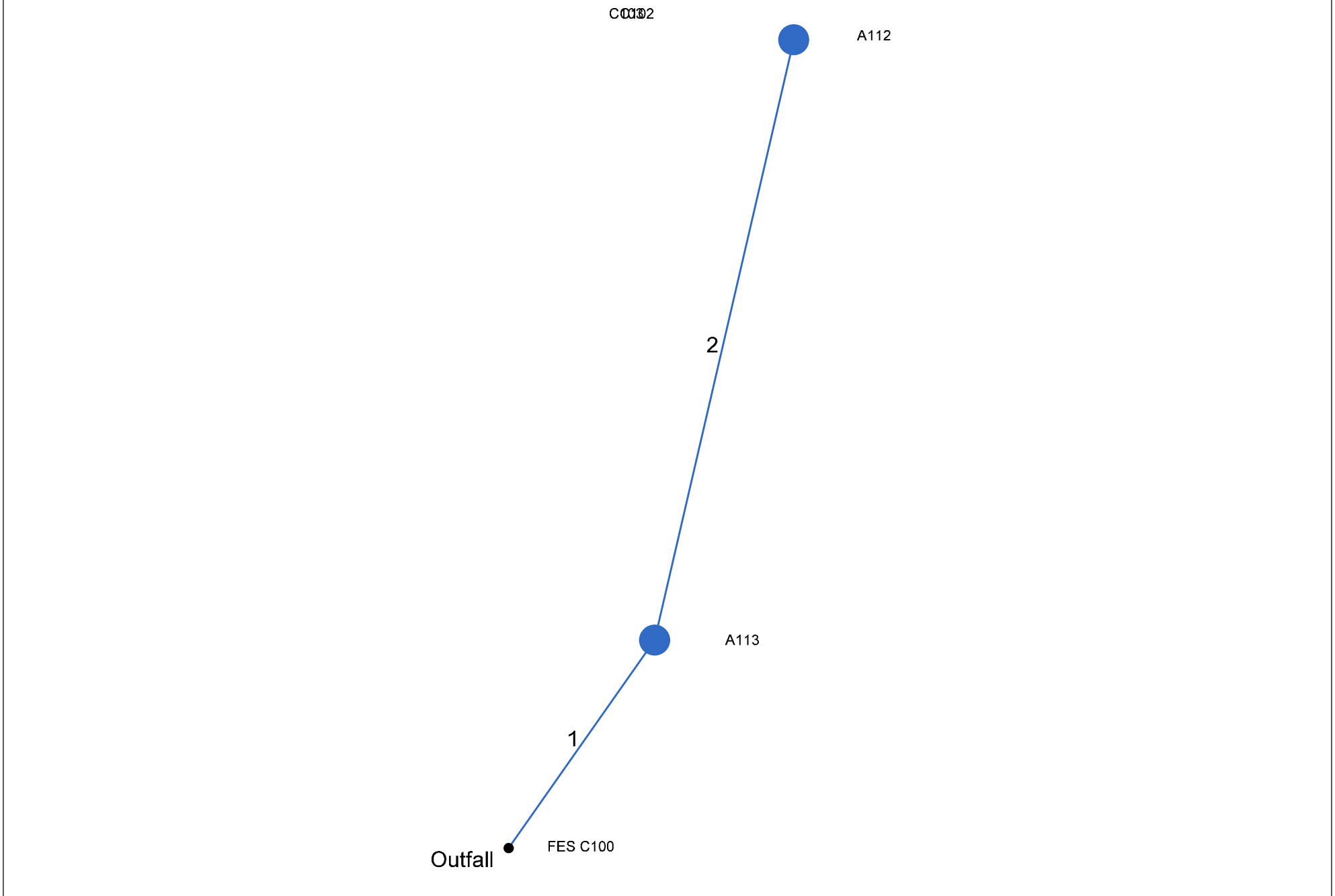
Project File: C200 - C206.stm

Number of lines: 14

Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: A112-A114.stm	Number of lines: 2	Date: 1/11/2021

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	35.000	0.63	1.96	0.99	0.62	1.94	10.0	17.5	5.1	9.92	17.10	3.21	24	0.57	207.00	207.20	209.00	209.05	209.21	210.00	A113-A114
2	1	85.000	1.33	1.33	0.99	1.32	1.32	17.1	17.1	5.2	6.80	7.64	3.85	18	0.53	207.30	207.75	209.16	209.52	210.00	210.45	A112-A113

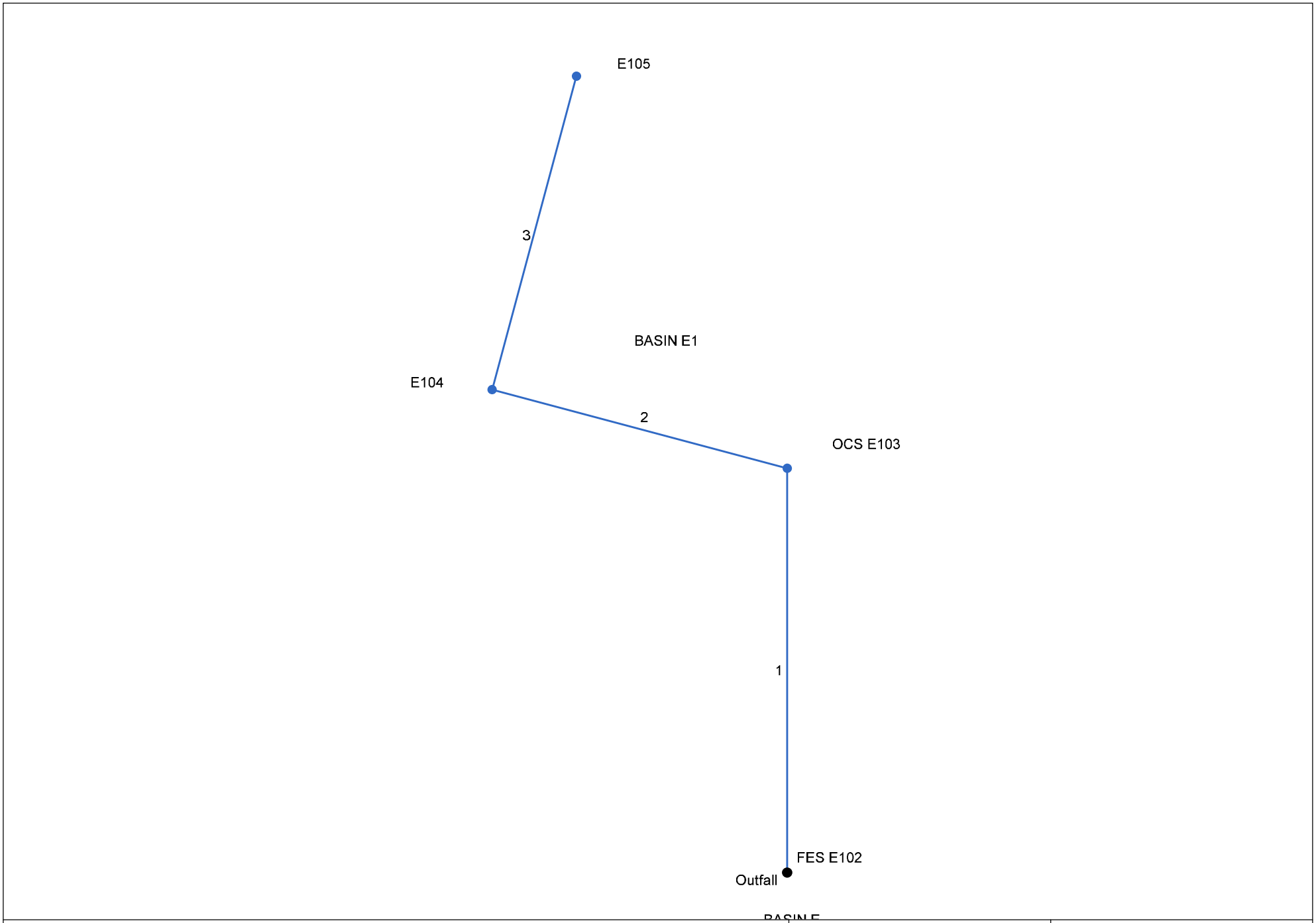
Project File: A112-A114.stm

Number of lines: 2

Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

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



Project File: E105 - E01 DITCH.stm	Number of lines: 3	Date: 1/11/2021

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	218.000	2.97	3.35	0.99	2.94	3.32	0.0	18.8	4.9	16.36	22.62	5.94	24	1.00	200.00	202.18	202.00	203.64	202.00	207.00	E103-E102
2	1	164.000	0.00	0.38	0.99	0.00	0.38	0.0	17.0	5.2	1.95	4.54	2.16	15	0.49	202.32	203.13	203.64	203.83	207.00	208.36	E104-OCS E103
3	2	175.000	0.38	0.38	0.99	0.38	0.38	15.3	15.3	5.4	2.05	4.55	2.40	15	0.50	203.13	204.00	204.38	204.66	208.36	207.50	E105-E104

Project File: E105 - E01 DITCH.stm

Number of lines: 3

Run Date: 1/11/2021

NOTES:Intensity = 106.91 / (Inlet time + 13.90) ^ 0.88; Return period =Yrs. 25 ; c = cir e = ellip b = box

APPENDIX
No. 6: DRAINAGE AREA MAPS

XREFS: V:\085681-ALLA, BND\ LOT 1 BLK 85-HOPEWELL TWP.dwg
TM-LENNAR-ZAITZ.dwg
SHT-SEC.dwg
SHT-TITLE.dwg

EDA-1
TOTAL AREA
6.670 Ac

EDA-2
TOTAL AREA
2.872 Ac

EDA-3
TOTAL AREA
5.600 Ac

EDA-4
TOTAL AREA
22.746 Ac

EDA 5 OFFSITE
TOTAL AREA
3.810 Ac

EDA-5
TOTAL AREA
6.855 Ac

EDA-6
TOTAL AREA
2.425 Ac

EDA-7
TOTAL AREA
2.425 Ac

AP#1
AP#2
AP#3
AP#4
AP #5
AP#6
AP #7

EXISTING HEADWALL

DOZA (D)
BucB (B)
BucB2 (B)
REFB (C)
REFA (C)

LOT 2 BLOCK 85 N/F FELICE PIRONE D.B. 6190 PG. 1998
LOT 22 BLOCK 85
LOT 23 BLOCK 85
LOT 24 BLOCK 85 N/F WACHOVIA BANK / TAX PROPERTIES PRIOR D.B. 1374 PG 1479
LOT 5.01 BLOCK 85 N/F LAURENTI HOLDING CO. LLC. D.B. 3714 PG 219
LOT 9 BLOCK 85 N/F MICHAEL M. KANE D.B. 6219 PG. 1475
CONTAINING 2,008,271 Sq. Ft. OR 46.10 Ac.±
N/F HOPEWELL TOWNSHIP D.B. 6145 PG. 1878
WILLIAM HEITZMAN & FRIZZER (DEED BOOK 143)

MAGNETIC

150' @ 0.3%
576' @ 0.4%
150' @ 2.8%
150' @ 3.1%
105' @ 1.6%
916' @ 1.1%
150' @ 1.0%
448' @ 1.3%
446' @ 1.0%
150' @ 0.9%
532' @ 1.0%
124' @ 1.4%
767' @ 0.3%
557' @ 0.2%
927' @ 1.2%
150' @ 1.0%
150' @ 1.2%
110' @ 1.2%
150' @ 1.9%
340' @ 2.5%

INLET Gr. 216.36 INV. IN (15"): 215.30 INV. OUT (15"): 215.20
INLET Gr. 214.64 INV. IN (18"): 211.44 INV. OUT (18"): 210.94
INV: IN (4"): 214.59 (A) INV: IN (4"): 213.49 (B) INV: IN (4"): 214.09 (C) INV: OUT (18"): 211.89 (D)
INV: IN (18"): 206.56 INV: OUT (18"): 206.46
INLET Gr. 211.15 INV: OUT (18"): 208.78
INLET Gr. 219.54 INV. OUT (15"): 216.64
4"PVC Inv.=209.62
INLET Gr. 218.36 INV. IN (15"): 215.46 INV. OUT (15"): 215.41
INLET Gr. 219.68 BOTTOM OF STRUCTURE: 216± TOP OF DEBRIS: 219± DEBRIS FILLED
INLET Gr. 219.59 BOTTOM OF STRUCTURE: 215± DEBRIS FILLED
INLET Gr. 219.01 INV. OUT (15"): 215.51
SEPTIC TANK (BY OTHERS)
INLET Gr. 216.78 INV. IN (15"): 215.36 (A) INV. OUT (15"): 214.81 (B) INV. OUT (15"): 214.36
INLET Gr. 218.55 INV. OUT (15"): 214.60
INLET Gr. 216.39 INV. IN (15"): 214.89 (A) INV. OUT (15"): 214.39 (B) INV. OUT (15"): 214.29 (C)
INLET Gr. 216.78 INV. IN (15"): 214.68 INV. OUT (15"): 214.58
INLET Gr. 216.63 DEBRIS FILL B.O.S.: 192±
INLET Gr. 196.32
INLET Gr. 198.54 INV. OUT (6"): 194.64
INLET Gr. 198.68 INV. IN (15"): 193.98 INV. OUT (18"): 193.68
O.C.S. Gr. 195.61 INV. IN (6"): 195.11 INV. OUT (12"): 194.91
INLET Gr. 198.28 INV. IN (18"): 193.80 INV. OUT (18"): 193.68
INLET Gr. 197.45 INV. IN (24"): 193.76 (A) INV. IN (24"): 193.65 (B) INV. OUT (24"): 193.55 (C)
INLET Gr. 197.27 INV. IN (18"): 193.91 INV. IN (18"): 193.53 INV. OUT (24"): 193.53
24" RCP Inv.=193.74
24" RCP Inv.=194.51
INLET Gr. 197.68 INV. OUT (18"): 194.18
INLET Gr. 197.07 INV. IN (18"): 193.67 INV. OUT (18"): 193.42
24" RCP Inv.=194.48
INLET Gr. 201.58 INV. OUT (8"): 200.18
INLET Gr. 201.75 INV. OUT (8"): 198.45
INLET Gr. 201.16 INV. IN (24"): 194.36 INV. OUT (24"): 194.46
HEADWALL 8" DIP Inv.=197.14
8" DIP Inv.=195.37
INLET Gr. 201.71 INV. OUT (8"): 198.21
INLET Gr. 201.71 INV. OUT (8"): 198.81
O.C.S. Gr. 197.55 WIER: 196.29 ORIFICE: (4") 193.94 INV.: (18") 194.05
INLET Gr. 198.06
INLET Gr. 198.62 INV. IN (8"): 195.12 (A) INV. IN (8"): 195.12 (B) INV. IN (18"): 195.02 (C) INV. OUT (18"): 194.97 (D)
INLET Gr. 198.63
INLET Gr. 202.08
INLET Gr. 202.12
INLET Gr. 202.02
INLET Gr. 200.99 INV. OUT (15"): 195.94
TREELINE
EXISTING HEADWALL 18" INV=191.66
CHANNEL

SEPTIC TANK (BY OTHERS)
PIPELINE MARKER
MONITORING WELL
FIRE HYD. MARKER
W.L. 207.37

MATCH LINE
207.9
203.7
199.5
T/=204.44
INV.=205.22
INV.=204.30
83°17'37" W
DIVERTER ROAD

SCALE: 1"=80'
0 80 160 320 ft.

THESE PLANS ARE NOT TO BE USED FOR BID OR CONSTRUCTION

PLANS ARE FINAL FOR SANITARY SEWER AND WATER MAIN DESIGN

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL

EXISTING DRAINAGE AREA MAP

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 & 139; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 1 OF 3

No.	DESCRIPTION	DATE	CHKD
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1			

REVISION

DRWG.: 085681-01-001
DATE: 10/20/2021
CHKD: SAD

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V:\085681 - Zaitz Parcel Redistrict-Hopewell Twp\085681-01-002 (ENG) - Lennar-Zaitz Parcel Res-Hopewell Twp\Engineering\Engineering Plans\DA-EXISTING.dwg 01/21/21 09:03:58AM, ddelony, LAYOUT: SHT-EDA

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL
PROPOSED INLET DRAINAGE AREA MAP

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 & 130; AND PART OF BLOCK 85, LOT 9

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 2 OF 3

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NJ Certificate of Authorization No. 24GA28222600

SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PROJ.: 080661-F1-001
DATE: 11-20-2020
CHKD: SAD

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5		
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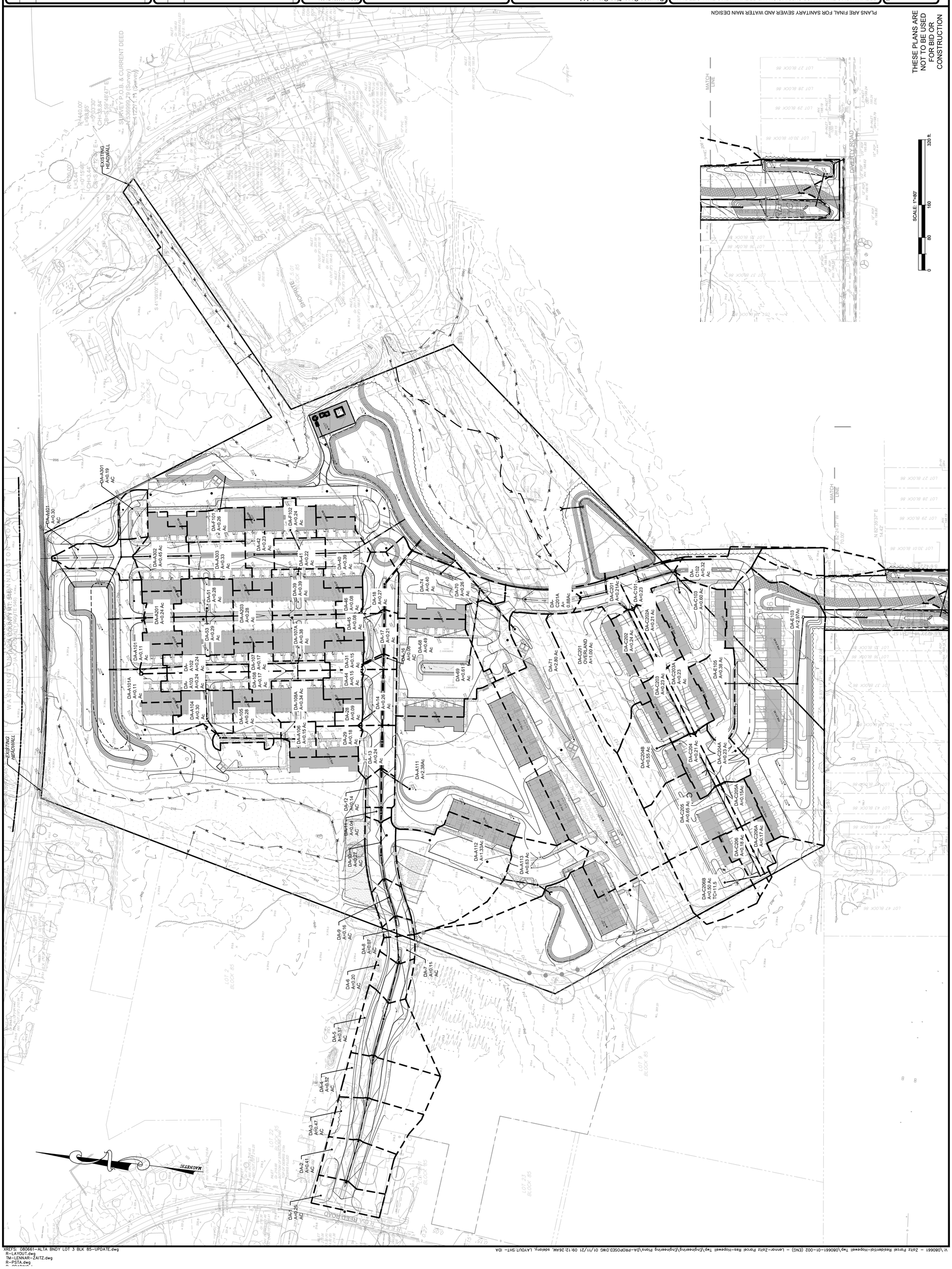
PLANS ARE FINAL FOR SANITARY SEWER AND WATER MAIN DESIGN

THESE PLANS ARE NOT TO BE USED FOR BID OR CONSTRUCTION



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PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL

PROPOSED DRAINAGE AREA MAP

BLOCK 86, LOT 3, BLOCK 86, LOTS 32-34 &130, AND PART OF BLOCK 85, LOT 9

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 3 OF 3

Bowman Consulting Group, Ltd.
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BOWMAN CONSULTING

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PROJ. 080661-F1-001
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PLANS ARE FINAL FOR SANITARY SEWER AND WATER MAIN DESIGN

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SCALE: 1"=80'

0 80 160 320 ft.

MATCH LINE

AP#1 AP#2 AP#3 AP#4 AP #5 AP#6 AP #7

REFA (C) REFB (C) BucB (B) BucB2 (B) DOZA (D) DOZB (D)

P1-RGH1A A=0.30
P1-2 A=0.19
PDA 2 A=0.30
P1-RGH1B A=0.30
P1-RGH4 A=0.28
P1-RGH3 A=0.29
P1-RGH2 A=0.30
P1-RGH A=0.09
P1-1 A=1.65
P1-RGH5 A=0.29
P1-RGH6 A=0.29
P1-RGH7 A=0.30
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STORMWATER MANAGEMENT FACILITIES MAINTENANCE MANUAL

STORMWATER MANAGEMENT FACILITIES MAINTENANCE MANUAL

The Collection at Hopewell

Block 85, Lot 3; Block 86, Lots 32-34 & 130;
and part of Block 85, Lot 9
Township of Hopewell
Mercer County, NJ

Dated: November 20, 2020

Prepared by:
(BCG #080661-01-002)

303 West Main Street
Freehold, NJ 07728
Phone: 732-665-5500
NJ Certificate of Authorization 24GA280443700



Sean A. Delany
New Jersey Professional Engineer
License No. 24GE04447100

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Detention Basin
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PART I

This manual consists of three parts. The first part includes an introduction and description of facilities and a list of project contacts. The second part provides the operational, routine inspection and maintenance instructions for the facilities and equipment. Part three contains Appendix A, which includes a Maintenance Work Order Checklist, Maintenance Log, Inspection Checklist, and Inspection Log.

A. Introduction and Description of Facilities

This report has been prepared to describe the operations and maintenance procedures of the stormwater management system designed for the proposed residential development on Lot 3 of Block 85, Lots 32-34 & 130 of Block 86 and part of Lot 9 of Block 85 in the Township of Hopewell, New Jersey, consisting of 49.4+/- acres.

The subject site is bounded by County Road 546 (Washington Crossing Pennington Road) to the North (commercial and single family homes), NJ Route 31 to the East (commercial), Diverty Road to the South (single family homes), and Reed Road to the West (agriculture, commercial and single family homes). The site is transected by a Transcontinental Gas Pipe Line easement. The property was previously utilized as an agricultural field with wooded areas along the perimeter and interior portions of the site.

The project is serviced by two roadways which are both ingress and egress separated by median islands. The first roadway is located adjacent to the east bound lane of County Road 546 (Washington Crossing-Pennington Road) and approximately 725 feet west of the south bound lane of NJ State Highway Route 31 (Pennington Road) intersection. The second roadway is located adjacent to the north bound lane of Reed Road and approximately 1,050 feet south of the east bound lane of Washington Crossing-Pennington Road intersection.

The proposed project consists of subdividing the lots and creating a 87 Lot subdivision for the development of 379 residential units consisting of 61 Townhome units in 10 three-story buildings, 144 Stacked Townhome units in 11 three-story buildings, 96 multi-family units in 4 three-story buildings, and 78 COAH units in 4 three-story buildings along with paved roads and parking areas including a boulevard roadway, landscaping and lighting, underground utilities, water mains, sanitary sewer mains and onsite pump station and stormwater management collection system and facilities.

The proposed onsite storm sewer system will collect on and off-site stormwater runoff and convey it to five stormwater management basins for attenuation and water quality treatment. The basins are extended detention basins with infiltration. The basins will be supplemented by vegetated swales and a series of 12 rain gardens along the median of the roadways, 8 rain gardens near several residential units and two rain gardens located within parking lot islands. The rain gardens are interconnected with the storm sewer system. The stormwater management controls and best management practices employed for this project are discussed in more detail in the Stormwater Management Report.

The proposed stormwater management system is designed to regulate the rates of runoff generated by the 2, 10 and 100 year, 24-hour design storms events. The detention basins and

rain gardens are designed to treat the water quality design storm event in accordance with the NJDEP Storm Water Management Standards for 80% TSS removal and provides the necessary pretreatment of stormwater runoff before discharging offsite. The basins and rain gardens allow runoff to infiltrate into the ground and are designed to fully drain within the required 72 hours. The basins are each equipped with one (1) outlet control structure that regulates stormwater discharge rates for larger storm events.

This manual is intended to provide guidance and instruction to the present landowners and/or assigned entities the minimally recommended operation and maintenance of the stormwater management system, rain gardens and basins and has been prepared using the NJDEP guidance documents entitled "Stormwater Management Facilities Maintenance Manual". Any covenants, easements, deed restrictions, etc. regarding the owning and maintenance of stormwater management facilities shall be deem included in the maintenance manual by reference.

B. Project Contacts

Property Owners	
Block 85, Lot 3	Township of Hopewell 201 Washington Crossing - Pennington Road Titusville, NJ 08560
Block 85, Lot 9	Michael M. Kane 1646 Reed Road Pennington NJ 08534
Block 86 Lots 32, 33, 34, & 130	William C. Heitzman & Frizzera Dorina 100 Aunt Molly Road Hopewell Township, NJ 08525
Responsible Representative	Homeowners Association US Home at Hopewell Urban Renewal, LLC 2465 Kuser Rd., 3rd Floor Hamilton, NJ 08690 609-245-2200
Township Contact	Mark Kataryniak Community Devel. Dir. /Engineer/Zoning Officer 201 Washington Crossing - Pennington Road Titusville, NJ 08560 P: 609-537-0243
Design Engineer	Bowman Consulting Group, Ltd 303 W. Main Street Freehold, NJ 07728 Phone: 732-665-5500

PART II

A-1. OPERATIONAL, ROUTINE INSPECTION AND MAINTENANCE INSTRUCTIONS TO THE STORMWATER MANAGEMENT FACILITIES FOR DETENTION BASINS

The detention basins have been designed to attenuate stormwater runoff and provide a controlled discharge rate to minimize flooding and improve the quality of runoff from the property and infiltration for groundwater recharge. Without proper routine inspection and maintenance, the basins may not function as intended during the design of the project.

Routine maintenance of the facility should be separated into two basic types. Functional maintenance is required to ensure safe and effective operation. This can be further broken down into the two categories of preventative and corrective maintenance. Aesthetic maintenance, which is necessary to maintain the visual appeal and aesthetic quality of the basins, should be incorporated into the preventative maintenance efforts. The following are the preventative, corrective and aesthetic maintenance procedures that are to be performed on a routine basis:

1. Preventative Maintenance Procedures

The purpose of preventative maintenance inspections is to ensure that the stormwater management aspects of the basins remain operational which minimizes or eliminates the need for corrective or emergency maintenance.

a. Sediment Removal and Disposal

The detention basins should be evaluated for excessive deposition of sediment. Accumulated sediment should be removed before it threatens the storage volume of the basins. Sediment removal should take place when the basin is thoroughly dry. Consideration should be given to evacuating all standing water from the basin before desilting activities are performed. This may be accomplished by means of pumping the water out of the basin. An appropriate stand-by pump should be available for this procedure. Inspection tasks should be performed on a quarterly basis as well as after every storm exceeding one inch of rainfall. Should sediment be observed, the inspector should identify the upstream sources of sediment and recommend required stabilization measures.

b. Removal and Disposal of Trash and Debris

A regularly scheduled program of debris and trash removal will reduce the chance of components becoming clogged and inoperable during storm events. Additionally, removal of trash and debris will prevent possible damage to vegetated areas and eliminate potential mosquito breeding habitats. Disposal of debris and trash should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. These tasks should be performed on a quarterly basis as well as after every storm exceeding one inch of rainfall.

c. Maintenance of Adjacent Vegetated Areas

Grass areas, trees, shrubs adjacent to the basin require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth and to provide bank stabilization. The application of fertilizers should follow manufacturer's instructions to reduce run-off into the basin. Additionally, provisions should be made to re-seed and re-establish grass cover in areas damaged by sediment accumulation, stormwater flow, or other causes. Mowing and or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Adjacent vegetated areas must also be inspected at least annually for erosion and scour. The basin must be inspected for unwanted tree growth at least once a year.

d. Structural Components

Structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

e. Elimination of Potential Mosquito Breeding Habitats

The most effective mosquito control program is one that eliminates potential breeding habitats. Almost any stagnant pool of water can be attractive to mosquitoes, and the source of a large mosquito population. A maintenance program dedicated to eliminating potential breeding areas is certainly preferable to chemical means of controlling mosquitoes. The most important maintenance function, which can be performed in this case, is to make sure that all obstructions to natural flow patterns are removed before the stagnant water condition can develop. The wet basin has an aerator which should be checked monthly and operated continuously between late Spring and late Fall and properly stored over the winter for reinstallation the following Spring.

f. Inspection

Regularly scheduled maintenance inspections of the facility should be performed by a qualified representative at least once a year. These inspections are separate from the "routine" inspections discussed above. The primary purpose of these inspections is to ascertain the operational condition and safety of the facility, particularly the condition of embankments and other operational-related aspects. Inspections will also provide information on the effectiveness of regularly scheduled preventative and aesthetic maintenance procedures and will help to identify where changes in the extent and scheduling of the procedures are warranted. Finally, the facility inspections should also be used to determine the need for and timing of corrective maintenance procedures. It should be noted that, in addition to regularly scheduled inspections, the owners or their representatives should perform an informal inspection during every visit to the basin.

g. Reporting

The recording of all maintenance work and inspections provide valuable data on the facility condition. Review of this information will also help to establish more efficient and beneficial maintenance procedures and practices. Recorded information should be directed to the owners for review and subsequent follow-up on recommendations. Data obtained from informal inspections should be retained and available upon request.

2. Corrective Maintenance Procedures

a. Removal of Debris and Sediment

Sediment, debris and trash which threaten the discharge capacity of the basin should be removed immediately and disposed of properly. Equipment and personnel must be available to perform the removal work on short notice. As noted previously, it is recommended that water be evacuated from the basin before any significant amount of sediment or settled debris or trash is removed from the basin. The lack of an available disposal site should not delay the removal of trash, debris, and sediment. Temporary disposal sites should be utilized if necessary.

b. Structural Repairs

Structural damage to inlet structures, manholes, flared end sections, outlet control structures and retaining walls from vandalism, flood events, or other causes must be repaired promptly. Equipment, materials and personnel must be available to perform these repairs on short notice. The immediacy of the repairs will depend upon the nature of the damage and its effects on the operation of the facility. The analysis of structural damage and the design and performance of structural repairs should only be undertaken by the consulting professional engineer.

c. Extermination of Mosquitoes

If neglected, the basin can readily become an ideal mosquito breeding area. If mosquito control in the facility becomes necessary, the preventative maintenance program should also be re-evaluated, and more emphasis placed on control of mosquito breeding habitats.

d. Erosion Repair

Vegetative cover or other protective measures are necessary to prevent the loss of soil from the erosive forces of wind and water. Where a re-seeding program has not been effective in maintaining a non-erosive vegetative cover, or other factors have exposed soils to erosion, corrective steps should be initiated to prevent further loss of soil and any subsequent danger to the stability of the facility. Soil loss can be controlled by a variety of materials and methods, including rip-rap, gabion lining, sod, seeding, concrete lining and regrading. When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density and diversity should be performed at least twice annually during both the growing and non-growing season. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection

requirements presented above. Use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health must not compromise the intended purpose of the infiltration basin.

e. Elimination of Trees, Brush, Roots and Animal Burrows

The stability of side slopes can be impaired by large roots and animal burrows. Trees and brush with extensive, woody root systems should be completely removed from side slopes to prevent their destabilization and the creation of seepage routes. Roots should also be completely removed to prevent their decomposition within the side slopes. Root voids and burrows should be plugged by filling with material similar to the existing material, and capped just below grade with stone, concrete or other material. If the plugging of the burrows does not discourage the animals from returning, further measures should be taken to either remove the animal population or to make critical areas of the facility unattractive to them. Vegetated areas should be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the remaining vegetation and basin subsoil.

f. Snow and Ice Removal

Accumulations of snow and ice can threaten the functioning of the inlets and outlet control structure. Providing the equipment, material and personnel to monitor and remove snow and ice from these critical areas is necessary to assure the continued functioning of the facility during the winter months.

3. Aesthetic Maintenance Procedures

a. Graffiti Removal

The timely removal of this obvious eyesore will restore the aesthetic quality of the basin. Removal can be accomplished by painting or otherwise covering it, or removing it with scrapers, solvents or cleansers. Timely removal is important to discourage further graffiti and other acts of vandalism.

b. Grass Trimming/Landscape Maintenance

Trimming of grass within and around the basin and proper care of landscape plantings around structures will provide for a neat and attractive appearance of the facility.

c. Control of Weeds

Although a regular grass maintenance program will keep weed intrusion to a minimum, some weeds will invariably appear. Periodic weeding, either chemically or mechanically, will not only help to maintain a healthy turf, but will also keep grassed areas looking attractive. Application of chemicals should be monitored closely so as not to affect the health of the stormwater management facility. Excessive growth of weeds within the basin can also be unattractive and can be controlled mechanically as discussed in the previous section.

4. Summary of Maintenance Procedures

Preventative Maintenance

a) Sediment Removal and Disposal
b) Removal and Disposal of Trash and Debris
c) Maintenance of Adjacent Vegetated Areas
d) Structural Components
e) Elimination of Mosquito Breeding Habitats
f) Inspection
g) Reporting

Corrective Maintenance

a) Removal of Debris and Sediment
b) Structure Repairs
c) Extermination of Mosquitoes
d) Erosion Repair
f) Elimination of Trees, Brush, Roots and Animal Burrows
g) Snow and Ice Removal

Aesthetic Maintenance

a) Graffiti Removal
b) Grass Trimming
c) Control of Weeds

A-2. MAINTENANCE EQUIPMENT AND MATERIALS FOR DETENTION BASINS

The following is a list of the equipment and materials that may be required to maintain the stormwater facilities:

Grass Maintenance Equipment

1. Riding Mowers
2. Hand Mowers
3. Gas Powered Trimmers
4. Gas Powered Edgers
5. Seed Spreaders
6. Fertilizer Spreaders
7. De-Thatching Equipment
8. Pesticide and Herbicide Application Equipment
9. Grass Clipping and Leaf Collection Equipment

Vegetative Cover Maintenance Equipment

1. Saws
2. Pruning Shears
3. Hedge Trimmers
4. Wood Chippers
5. Aquatic Weed Harvester (owned/operated by subcontractor)

Transportation Equipment

1. Trucks for Transportation of Materials
2. Trucks for Transportation of Equipment
3. Vehicles for Transportation of Personnel

Debris, Trash and Sediment Removal Equipment

1. Loader
2. Backhoe
3. Grader
4. Dredging Equipment
5. Portable Pump for Dewatering

Miscellaneous Equipment

1. Shovels
2. Rakes
3. Picks
4. Wheel Barrows
5. Fence Repair Tools
6. Painting Equipment
7. Gloves
8. Standard Mechanics Tools
9. Tools for Maintenance of Equipment

Materials

1. Topsoil
2. Fill
3. Seed
4. Soil Amenities (Fertilizer, Lime, etc.)
5. Chemicals (Pesticides, Herbicides etc.)
6. Mulch
7. Paint Removers (for Graffiti)
8. Spare Parts for Equipment

A-3. CHECKLISTS AND LOGS FOR DETENTION BASINS

Included in this report in Appendix A are sample Checklists and Logs regarding various aspects and dam/berm maintenance and inspection. They include:

1. INSPECTION CHECKLIST provides a comprehensive checklist of inspection items for use by the inspectors.

2. INSPECTION LOG provides a summary table for recording the results of inspections of the basin.

3. MAINTENANCE WORK ORDER AND CHECKLIST is a comprehensive form for recording both required and completed maintenance work.

4. MAINTENANCE LOG provides a summary table for recording of maintenance work at the site.

B-1. OPERATIONAL, ROUTINE INSPECTION AND MAINTENANCE INSTRUCTIONS TO THE STORMWATER MANAGEMENT FACILITIES FOR RAIN GARDENS

The rain gardens have been designed to capture, filter, and infiltrate stormwater runoff at the source (roof and surface runoff), be an aesthetically pleasing garden and supplement the attenuation of stormwater runoff to the basins. Without proper routine inspection and maintenance, the rain gardens may not function as intended during the design of the project.

Routine maintenance of the rain garden should be separated into two basic types. Functional maintenance is required to ensure safe and effective operation. This can be further broken down into the two categories of preventative and corrective maintenance. Aesthetic maintenance, which is necessary to maintain the visual appeal and aesthetic quality of the rain gardens, should be incorporated into the preventative maintenance efforts. The following are the preventative, corrective and aesthetic maintenance procedures that are to be performed on a routine basis:

1. Preventative Maintenance Procedures

The purpose of preventative maintenance inspections is to ensure that the stormwater management aspects of the rain gardens remain operational which minimizes or eliminates the need for corrective or emergency maintenance.

a. Plantings

Plantings should be inspected bi-weekly during the establishment of the rain garden for failure to flourish, disease and pests.

b. Watering

Water is essential to establish and maintain the perennial and shrub plantings that comprise the rain garden and provide filtration and infiltration. Plantings should be watered every day for the first week and then weekly for the next three months unless there is enough rainfall. Frequency and the amount of watering should also be determined by the directions of the nursery/supplier or qualified representative. During hot weather and drought conditions, watering will be more frequent and should be determined by the nursery/ supplier or qualified representative for the new or established rain gardens.

c. Mulching

A 3-inch layer of mulch should be maintained between plants to prevent weeds and retain moisture for the first year. Once the rain garden plants become established and denser mulching will be more difficult and not necessary. Keep mulch away from any drain inlets.

d. Weeding

Remove weeds and other invasive plants from the rain garden by hand by pulling from the base and removing the root. Properly dispose the weeds. Take care not the remove rain garden plantings. Reference landscaping plan & specifications (as attached to this manual) to identify

rain garden plantings from weeds and invasive plants. Less weeding will be necessary once the rain garden matures.

e. Mowing

No mowing or line trimmer is permitted within the rain garden. Mowing and trimmer will damage the plantings and destroy the rain garden. Mowing of adjacent vegetated areas is discussed below.

f. Pruning

Prune overgrown plantings annually when plants are dormant or as directed by the nursery or supplier to encourage new growth during the growing season. Remove dead plant material and deadhead flowers as directed. Some flowers may remain for food supply during the winter months for birds or to provide a pleasant view.

g. Drainage

The rain garden is to be inspected twice a year to determined if the permeability of the infiltration bed has been maintained.

h. Sediment Removal and Disposal

The rain gardens should be evaluated for excessive deposition of sediment. Accumulated sediment should be removed before it threatens the storage volume and infiltration of the rain gardens. Sediment removal should take place when the rain gardens are thoroughly dry. Consideration should be given to evacuating all standing water from the rain garden before desilting activities are performed. This may be accomplished by means of pumping the water out of the rain garden. An appropriate stand-by pump should be available for this procedure. Inspection tasks should be performed on a monthly basis as well as after every storm exceeding one inch of rainfall. Should sediment be observed, the inspector should identify the upstream sources of sediment and recommend required stabilization measures. Disposal of sediment to be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

i. Removal and Disposal of Trash and Debris

A regularly scheduled program of debris and trash removal will reduce the chance of components becoming clogged and inoperable during storm events. Additionally, removal of trash and debris will prevent possible damage to vegetated areas and eliminate potential mosquito breeding habitats. Disposal of debris and trash to be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. These tasks should be performed on a quarterly basis as well as after every storm exceeding one inch of rainfall.

j. No Stockpiling

The rain gardens may not be used for stockpiling of plowed snow and ice, compost, or any other material.

k. Maintenance of Adjacent Vegetated Areas

Grass areas, trees, shrubs adjacent to the rain garden require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth. The application of fertilizers should follow manufacturer's instructions to reduce run-off into the rain gardens. Additionally, provisions should be made to re-seed and re-establish grass cover in the adjacent areas damaged by sediment accumulation, stormwater flow, or other causes that may compromise the function of the rain gardens. Mowing (not the rain garden) and or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Adjacent vegetated areas must also be inspected at least annually for erosion and scour.

l. Structural Components

Structural components must be inspected for vandalism, cracking, subsidence, erosion, and deterioration at least annually.

m. Elimination of Potential Mosquito Breeding Habitats

The most effective mosquito control program is one that eliminates potential breeding habitats. Almost any stagnant pool of water can be attractive to mosquitoes, and the source of a large mosquito population. A maintenance program dedicated to eliminating potential breeding areas is certainly preferable to chemical means of controlling mosquitoes. The most important maintenance function, which can be performed in this case, is to make sure that all obstructions to natural flow patterns are removed before the stagnant water condition can develop.

n. Inspection

Regularly scheduled maintenance inspections of the facility should be performed by a qualified representative at least once during the growing season and once during the dormant season. These inspections are separate from the "routine" inspections discussed above. The primary purpose of these inspections is to ascertain the operational condition and safety of the facility. Inspections will also provide information on the effectiveness of regularly scheduled preventative and aesthetic maintenance procedures and will help to identify where changes in the extent and scheduling of the procedures are warranted. Finally, the facility inspections should also be used to determine the need for and timing of corrective maintenance procedures. It should be noted that, in addition to regularly scheduled inspections, the owners or their representatives should perform an informal inspection during every visit to the basin.

o. Reporting

The recording of all maintenance work and inspections provide valuable data on the facility condition. Review of this information will also help to establish more efficient and beneficial maintenance procedures and practices. Recorded information should be directed to the owners for review and subsequent follow-up on recommendations. Data obtained from informal inspections should be retained and available upon request.

2. Corrective Maintenance Procedures

a. Plantings

Plantings which have disease and pests or fail to flourish will be immediately removed and disposed of properly. A qualified representative must identify and determine why the plantings must be removed and recommend a corrective measure and replace planting with same or another suitable rain garden plant. Equipment and personnel must be available to perform the removal work on short notice.

b. Watering

Adjust watering amount and frequency as is directed by the nursery is necessary to establish and maintain the plantings. Nursery contact or a qualified representative must be available for direction. Equipment and personnel must be available immediately to perform the work on short notice.

c. Mulching

Replace mulch as necessary to maintain the rain garden. Remove mulch from any drain inlets. Equipment and personnel must be available to perform the work.

d. Weeding

Remove weeds and other invasive plants from the rain garden by hand by pulling from the base and removing the root. Take care not the remove rain garden plantings. Reference landscaping plan & specifications (as attached to this manual) to identify rain garden plantings from weeds and invasive plants. Disposal of weeds and invasive plants to be done at suitable disposal sites and in compliance with all applicable local, state and federal waste regulations. Equipment and personnel must be available to perform the work.

e. Mowing

No mowing or line trimmer is permitted within the rain garden.

f. Pruning

Prune overgrown plantings annually when plants are dormant. Nursery contact or a qualified representative must be available for direction. Equipment and personnel must be available to perform the work.

g. Drainage

The permeability of the infiltration bed must be immediately corrected to maintain the infiltration of runoff. A qualified representative must be available to determine the cause and corrective measure needed to restore the rain garden. Equipment and personnel must be available immediately to perform the work on short notice.

h. Sediment Removal and Disposal

Sediment which threaten the discharge capacity and infiltration of the rain garden should be removed immediately and disposed of properly. Equipment and personnel must be available to perform the removal work on short notice. As noted previously, it is recommended that water be evacuated from the rain garden before any significant amount of sediment. The lack of an available disposal site should not delay the removal of trash, debris, and sediment. Temporary disposal sites should be utilized if necessary.

i. Removal and Disposal of Trash and Debris

Trash and debris which threaten the discharge capacity and infiltration of the rain garden must be removed immediately and disposed of properly. Equipment and personnel must be available to perform the removal work on short notice. The lack of an available disposal site should not delay the removal of trash, debris, and sediment. Temporary disposal sites should be utilized if necessary

i. No Stockpiling

Any stockpiling of plowed snow and ice, compost, or any other material can threaten the functioning of the drains/inlets. Any stockpiling must be removed immediately and disposed of properly. Equipment and personnel must be available to monitor and perform the removal work on short notice. The lack of an available disposal site should not delay the removal of any stockpiling. Temporary disposal sites should be utilized if necessary.

k. Maintenance of Adjacent Vegetated Areas

Overgrown grass areas, trees, shrubs adjacent to the rain garden comprise the rain garden by impeding runoff that would be used to sustain the plantings. Misuse of fertilizer can affect the growth of the plantings and infiltrate the ground water. A qualified representative must be available to recommend a remediation. Re-seed and re-establish grass cover in any damaged adjacent areas. Equipment and personnel must be available to monitor and perform the maintenance on short notice.

l. Structural Components

Damage to drains/inlet and infiltration beds due to vandalism, flood events, or other causes must be repaired promptly. Equipment, materials and personnel must be available to perform

these repairs on short notice. The immediacy of the repairs will depend upon the nature of the damage and its effects on the operation of the rain garden. The analysis of structural damage and the design and performance of drainage repairs should only be undertaken by the consulting professional engineer.

m. Elimination of Potential Mosquito Breeding Habitats

If neglected, the rain garden can readily become an ideal mosquito breeding area. If mosquito control in the facility becomes necessary, the preventative maintenance program should also be re-evaluated, and more emphasis placed on control of mosquito breeding habitats.

3. Aesthetic Maintenance Procedures

a. Grass Trimming/Landscape Maintenance

Proper care and maintenance of landscaped plantings and trimming of grass in adjacent areas will provide for a neat and attractive appearance of the rain garden. Certain plantings will provide a food source for birds and bees and provide a pleasant view throughout the year.

b. Control of Weeds

Periodic weeding will not only help to maintain a functioning rain garden but will provide a pleasant view. Application of chemicals should be monitored closely so as not to affect the health of the rain garden. Excessive growth of weeds can also be unattractive and can be controlled mechanically as discussed in the previous section.

4. Summary of Maintenance Procedures

Preventative Maintenance

a) Plantings
b) Watering
c) Mulching
d) Weeding
e) Mowing
f) Pruning
g) Drainage
h) Sediment Removal and Disposal
i) Removal and Disposal of Trash and Debris
j) No Stockpiling
k) Maintenance of Adjacent Vegetated Areas
l) Structural Components
m) Elimination of Potential Mosquito Breeding Habitats
n) Inspection
o) Reporting

Corrective Maintenance

a) Plantings
b) Watering
c) Mulching
d) Weeding
e) Mowing
f) Pruning
g) Drainage
h) Sediment Removal and Disposal
i) Removal and Disposal of Trash and Debris
j) No Stockpiling
k) Maintenance of Adjacent Vegetated Areas
l) Structural Components
m) Elimination of Potential Mosquito Breeding Habitats

Aesthetic Maintenance

a) Grass Trimming
b) Control of Weeds

B-2. MAINTENANCE EQUIPMENT AND MATERIALS FOR RAIN GARDENS

The following is a list of the equipment and materials that may be required to maintain the rain gardens:

Grass Maintenance Equipment (ONLY Adjacent areas)

1. Riding Mowers
2. Hand Mowers
3. Gas Powered Trimmers
4. Gas Powered Edgers
5. Seed Spreaders
6. Fertilizer Spreaders
7. De-Thatching Equipment
8. Pesticide and Herbicide Application Equipment
9. Grass Clipping and Leaf Collection Equipment

Vegetative Cover Maintenance Equipment

1. Garden Shovel
2. Rake
3. Pruning Shears
4. Water hose

Transportation Equipment

1. Trucks for Transportation of Materials
2. Trucks for Transportation of Equipment
3. Vehicles for Transportation of Personnel

Debris, Trash and Sediment Removal Equipment

1. Wheel Barrow
2. Bags

Miscellaneous Equipment

1. Shovel
2. Rake
3. Pick
4. Wheel Barrow
5. Gloves

Materials

1. Topsoil
2. Replacement Media for Infiltration bed
3. Triple-Shredded Hardwood Mulch
4. Replacement Perennial Plantings

5. Replacement Shrub Plantings
5. Spare Parts for Equipment

B-3. CHECKLISTS AND LOGS FOR RAIN GARDENS

Included in this report in Appendix A are sample Checklists and Logs regarding various aspects and dam/berm maintenance and inspection. They include:

1. INSPECTION CHECKLIST provides a comprehensive checklist of inspection items for use by the inspectors.

2. INSPECTION LOG provides a summary table for recording the results of inspections of the basin.

3. MAINTENANCE WORK ORDER AND CHECKLIST is a comprehensive form for recording both required and completed maintenance work.

4. MAINTENANCE LOG provides a summary table for recording of maintenance work at the site.

PART III

APPENDIX A

A-1

INSPECTION CHECKLIST FOR STORMWATER MANAGEMENT FACILITIES DETENTION BASIN

Inspection Checklist
for
Stormwater Management Facilities
Detention Basin

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,
County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

Date: _____
Weather:_____

Facility Item	O.K.[1]	Routine[2]	Urgent[3]	Comments[4]
1. Embankments and Side Slopes				
A. Vegetation				
B. Linings				
C. Erosion				
D. Settlement				
E. Sloughing				
F. Trash and Debris				
G. Seepage				
H. Aesthetics				
I. Other:				
2. Bottoms (Detention & Infiltration)				
A. Vegetation				
B. Erosion				
C. Standing Water				
D. Settlement				
E. Trash and Debris				
F. Sediment				
G. Aesthetics				
H. Other:				
3. Inlet Structure				
A. Condition of Structure				
B. Erosion				
C. Trash & Debris				
D. Sediment				
E. Aesthetics				
F. Other:				

Facility Item	O.K.[1]	Routine[2]	Urgent[3]	Comments[4]
4. Outlet Structure (Detention & Retention)				
A. Condition of Structure				
B. Erosion				
C. Trash & Debris				
D. Sediment				
E. Mechanical Components				
F. Aesthetics				
G. Other:				
5. Emergency Spillway				
A. Vegetation				
B. Lining				
C. Erosion				
D. Trash & Debris				
E. Other:				
6. Perimeter				
A. Vegetation				
B. Erosion				
C. Trash & Debris				
D. Aesthetics				
E. Other:				
7. Access Roads				
A. Vegetation				
B. Road Surface				
C. Fence & Gates				
D. Erosion				
E. Aesthetics				
8. Miscellaneous				
A. Effectiveness of Exist. Maint. Program				
B. Dam Inspections				
C. Potential Mosquito Habitats				
D. Mosquitoes				
E.				
F.				

[1]The item checked is in good condition, and the maintenance program is adequate.
[2]The item checked requires attention, but does not present an immediate threat in the facility function or other facility components.
[3]The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.
[4]Provide explanation and details if columns 2 or 3 are checked.

Remarks(Refer to Item No., If Applicable):

Inspector:_____

A-2

INSPECTION LOG FOR

STORMWATER MANAGEMENT FACILITIES

DETENTION BASIN

Inspection Log
for
Stormwater Management Facilities
Detention Basin

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,
County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

Date:										

Facility Item

Indicate Condition(i.e. 1, 2, or 3)

1. Embankments and Side Slopes

A. Vegetation										
B. Linings										
C. Erosion										
D. Settlement										
E. Sloughing										
F. Trash and Debris										
G. Seepage										
H. Aesthetics										
I. Other:										

2. Bottoms (Detention & Infiltration)

A. Vegetation										
B. Erosion										
C. Standing Water										
D. Settlement										
E. Trash and Debris										
F. Sediment										
G. Aesthetics										
H. Other:										

3. Inlet Structure

A. Condition of Structure										
B. Erosion										
C. Trash & Debris										
D. Sediment										
E. Aesthetics										
F. Other:										

4. Outlet Structure (Detention & Retention)

A. Condition of Structure										
B. Erosion										
C. Trash & Debris										
D. Sediment										
E. Mechanical Components										
F. Aesthetics										

G. Other:										

5. Emergency Spillway

A. Vegetation										
B. Lining										
C. Erosion										
D. Trash & Debris										
E. Other:										

6. Perimeter

A. Vegetation										
B. Erosion										
C. Trash & Debris										
D. Aesthetics										
E. Other:										

7. Access Roads

A. Vegetation										
B. Road Surface										
C. Fence & Gates										
D. Erosion										
E. Aesthetics										

8. Miscellaneous

A. Effectiveness of Exist. Maint. Program										
B. Dam Inspections										
C. Potential Mosquito Habitats										
D. Mosquitoes										
E.										
F.										
G.										

1 The item checked is in good condition, and the maintenance program is adequate.
2 The item checked requires attention, but does not present an immediate threat to the facility function or other facility components
3 The item checked requires immediate attention to keep the facility operational to prevent damage to other facility components

Remarks (Refer to Item No., If Applicable):

A-3

MAINTENANCE WORK ORDER AND CHECKLIST FOR STORMWATER MANAGEMENT FACILITIES DETENTION BASIN

Maintenance Work Order and Checklist for Stormwater Management Facilities

Detention Basin

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,
County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

Equipment: _____ Work Completed: Date:_____ Time:_____

Weather: _____ Total Manhours of Work:_____

A. Preventative Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Grass Cutting			
A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Access Areas and Roads			
E. Other:			
2. Grass Maintenance			
A. Fertilizing			
B. Re-Seeding			
C. De-Thatching			
D. Pest Control			
E. Other:			
3. Vegetative Cover			
A. Fertilizing			
B. Pruning			
C. Pest Control			
D. Other:			
4. Trash and Debris Removal			
A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Access Areas and Roads			
E. Inlets			
F. Outlets and Trash Racks			
G. Other:			

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
5. Sediment Control			
A. Inlets			
B. Outlets and Trash Racks			
C. Bottoms			
6. Mechanical Components			
A.			
B.			
C.			
D.			
E.			
F.			
G.			
7. Elimination of Potential Mosquito Breeding Habitat			
8. Pond Maintenance			
A. Aeration Equipment			
B. Debris & Trash Removal			
C. Weed Removal			
D. Other:			
9. Other Preventative Maintenance			
A.			
B.			
C.			

B. Corrective Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Removal of Debris & Sediment			
2. Structural Reports			
3. Dam, Embankment, & Slope Repairs			
4. Dewatering			

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
5. Pond Maintenance			
6. Control of Mosquitoes			
7. Erosion Repair			
8. Elimination of Trees, Brush, Roots, & Animal Burrows			
9. Snow & Ice Removal			

C. Aesthetic Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Graffiti Removal			
2. Grass Trimming			
3. Weeding			
4. Other:			

Remarks (Refer to Item No., If Applicable):

Work Order Prepared By: _____

Work Completed By: _____

A-4

MAINTENANCE LOG FOR

STORMWATER MANAGEMENT FACILITIES

DETENTION BASIN

Maintenance Log
for
Stormwater Management Facilities
Detention Basin

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,

County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

A. Preventative Maintenance

Date:										
Work Items	(X) Completed									
1. Grass Cutting										
A. Bottoms										
B. Embankments and Side Slopes										
C. Perimeter Area										
D. Access Area										
E. Other:										
2. Grass Maintenance										
A. Fertilizing										
B. Re-Seeding										
C. De-Thatching										
D. Pest Control										
E. Other:										
3. Vegetative Cover										
A. Fertilizing										
B. Pruning										
C. Pest Control										
D. Other:										
4. Trash and Debris Removal										
A. Bottoms										
B. Embankments and Side Slopes										
C. Perimeter Area										
D. Access Area										
E. Inlets										
F. Outlets and Trash Racks										
G. Other:										
5. Sediment Control										
A. Inlets										
B. Outlets and Trash Racks										
C. Bottoms										

6. Mechanical Components

A.										
B.										
C.										
D.										
E.										
F.										
G.										

7. Elimination of Potential Mosquito Breeding Habitat

8. Other Preventative Maintenance

A.										
B.										
C.										

B. Corrective Maintenance

Work Items										
1. Removal of Debris & Sediment										
2. Structural Reports										
3. Dam, Embankment, & Slope Repairs										
4. Dewatering										
5. Control of Mosquitoes										
6. Erosion Repair										
7. Elimination of Trees, Brush, Roots, & Animal Burrows										
8. Snow & Ice Removal										

C. Aesthetic Maintenance

Work Items										
1. Graffiti Removal										
2. Grass Trimming										
3. Weeding										
4. Other:										

Remarks (Refer to Item No., If Applicable):

B-1

INSPECTION CHECKLIST FOR

STORMWATER MANAGEMENT FACILITIES

RAIN GARDEN

Inspection Checklist
for
Stormwater Management Facilities
Rain Garden

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,

County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

Date: _____

Weather:_____

1. Side Slopes & Bottom

Facility Item	O.K.[1]	Routine[2]	Urgent[3]	Comments[4]
A. Vegetation*				
B. Erosion				
C. Settlement				
D. Sloughing				
E. Trash and Debris				
F. Seepage				
G Aesthetics				
H Other:				

2. Bottom

A. Vegetation				
B. Erosion				
C. Standing Water				
D. Settlement				
E. Trash and Debris				
F. Sediment				
G. Aesthetics				
H. Other:				

3. Inlet/Drain Structure

A. Condition of Structure				
B. Erosion				
C. Trash & Debris				
D. Sediment				
E. Aesthetics				
F. Other:				

Facility Item	O.K.[1]	Routine[2]	Urgent[3]	Comments[4]
4. Outlet/Drain Structure				
A. Condition of Structure				
B. Erosion				
C. Trash & Debris				
D. Sediment				
E. Aesthetics				
F. Other:				
5. Perimeter				
A. Vegetation				
B. Erosion				
C. Trash & Debris				
D. Aesthetics				
E. Other:				
6. Accessibility				
A. Acess				
B. Erosion				
C. Aesthetics				
D. Other:				
7. Miscellaneous				
A. Effectiveness of Exist. Maint. Program				
B. Potential Mosquito Habitats				
C. Mosquitoes				
D. Other:				

[1]The item checked is in good condition, and the maintenance program is adequate.

[2]The item checked requires attention, but does not present an immediate threat in the facility function or other facility components.

[3]The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.

[4]Provide explanation and details if columns 2 or 3 are checked.

* Note any invasive or non-rain garden plantings

Remarks(Refer to Item No., If Applicable):

Inspector:_____

B-2

INSPECTION LOG FOR

STORMWATER MANAGEMENT FACILITIES

RAIN GARDEN

Inspection Log
for
Stormwater Management Facilities
Rain Garden

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,
County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

Date:										

Facility Item

Indicate Condition(i.e. 1, 2, or 3)

1. Side Slopes & Bottom

A. Vegetation*										
B. Erosion										
C. Settlement										
D. Sloughing										
E. Trash and Debris										
F. Seepage										
G. Aesthetics										
H. Other:										

2. Inlet/Drain Structure

A. Condition of Structure										
B. Erosion										
C. Trash & Debris										
D. Sediment										
E. Aesthetics										
F. Other:										

3. Outlet/Drain Structure

A. Condition of Structure										
B. Erosion										
C. Trash & Debris										
D. Sediment										
E. Aesthetics										
F. Other:										

4. Perimeter

A. Vegetation										
B. Erosion										
C. Trash & Debris										
D. Aesthetics										
E. Other:										

SWM Inspection Log

5. Accessibility

A. Acess										
B. Erosion										
C. Aesthetics										
D. Other:										

6. Miscellaneous

A. Effectiveness of Exist. Maint. Program										
B. Potential Mosquito Habitats										
C. Mosquitoes										
D. Other										

1 The item checked is in good condition, and the maintenance program is adequate.

2 The item checked requires attention, but does not present an immediate threat to the facility function or other facility components

3 The item checked requires immediate attention to keep the facility operational to prevent damage to other facility components

* Note any invasive or non-rain garden plantings

Remarks (Refer to Item No., If Applicable):

B-3

MAINTENANCE WORK ORDER AND CHECKLIST FOR STORMWATER MANAGEMENT FACILITIES

RAIN GARDEN

Maintenance Work Order and Checklist for Stormwater Management Facilities

Rain Garden

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,
County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

Equipment: _____ Work Completed: Date:_____ Time:_____

Weather: _____ Total Manhours of Work:_____

A. Preventative Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Mowing			
A. Perimeter **ONLY**			
2. Grass Maintenance Perimeter			
A. Fertilizing			
B. Re-Seeding			
C. De-Thatching			
D. Pest Control			
E. Other:			
3. Plantings/Vegetation Cover			
A. Watering			
B. Mulching			
C. Weeding			
D. Pruning			
E Pest Control			
4. Trash and Debris Removal			
A. Side Slopes and Bottom			
B. Perimeter			
C. Access area			
D. Inlet/Drain Structure			
E. Outlet/Drain Structure			
F. Other			

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
5. Sediment Control			
A. Bottom			
B. Inlet/Outlet Drains			
6. Elimination of Potential Mosquito Breeding Habitat			
7. Other Preventative Maintenance			

B. Corrective Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Replantings			
2. Mulching			
3. Watering			
4. Removal of Debris & Sediment			
5. Inlet/Outlet Repairs			
6. Structural Reports			
7. Side Slope & Bottom Reparis			
8. Control of Mosquitoes			
9. Erosion Repair			
10. Elimination of Weeds, Invasive & Non-Rain Garden Plants			
11. Snow & Ice Removal			

C. Aesthetic Maintenance

Work Items	Items Required (X)	Items Done (X)	Comments and Special Instructions
1. Grass Trimming			
2. Weeding			
3. Other:			

Remarks (Refer to Item No., If Applicable):

B-4

MAINTENANCE LOG FOR

STORMWATER MANAGEMENT FACILITIES

RAIN GARDEN

Maintenance Log
for
Stormwater Management Facilities
Rain Garden

Name of Facility: The Collection at Hopewell
Location: Township of Hopewell,
County Rd 546 (Washington Crossing Pennington Road), Diverty Road and Reed Road

A. Preventative Maintenance

Work Items (X) Completed	Date:									
1. Mowing										
A. Perimeter **ONLY**										
2. Grass Maintenance										
A. Fertilizing										
B. Re-Seeding										
C. De-Thatching										
D. Pest Control										
E. Other:										
3. Vegetative Cover										
A. Fertilizing										
B. Pruning										
C. Pest Control										
D. Other:										
4. Trash and Debris Removal										
A. Bottoms										
B. Embankments and Side Slopes										
C. Perimeter Areas										
D. Access Areas and Roads										
E. Inlets										
F. Outlets and Trash Racks										
G. Other:										
5. Sediment Control										
A. Inlets										
B. Outlets and Trash Racks										
C. Bottoms										
6. Mechanical Components										
A.										
B.										
C.										

D.										
E.										
F.										
G.										

7. Elimination of Potential Mosquito Breeding Habitat

8. Other Preventative Maintenance

A.										
B.										
C.										

B. Corrective Maintenance

Work Items										
1. Removal of Debris & Sediment										
2. Structural Reports										
3. Dam, Embankment, & Slope Repairs										
4. Dewatering										
5. Control of Mosquitoes										
6. Erosion Repair										
7. Elimination of Trees, Brush, Roots, & Animal Burrows										
8. Snow & Ice Removal										

C. Aesthetic Maintenance

Work Items										
1. Grass Trimming										
2. Weeding										
3. Other:										

Remarks (Refer to Item No., If Applicable):

APPENDIX ‘B’
COST ESTIMATE

ANNUAL STORMWATER SYSTEMS
MAINTENANCE ESTIMATE

ENGINEER'S ESTIMATE

PROJECT NAME:	The Collection at Hopewell	DATE:	November 20, 2020
MUNICIPALITY:	Township of Hopewell	PROJECT NO.	#080661-01-002
PREPARED BY:	Bowman	REVIEWED BY:	SAD

ITEM NO	DESCRIPTION	APPROX. QTY	UNIT	UNIT PRICE	TOTAL
	DETENTION BASIN	5	EA.		
1	Inspection (Quart. & after 1" rainfall events)	20	EA.	$800.00	$16,000.00
2	General Trash and Debris Removal (12 per Yr.)	60	EA.	$150.00	$9,000.00
3	Sediment Removal (1 per Yr.)	5	EA.	$300.00	$1,500.00
4	Storm Sewer System Inspection (2 per Yr.)	10	EA.	$1,500.00	$15,000.00
					$41,500.00
	RAIN GARDENS	20	EA.		
5	Inspection (Monthly & after 1" rainfall events)	240	EA.	$200.00	$48,000.00
6	General Trash and Debris Removal (12 per Yr.)	240	EA.	$50.00	$12,000.00
7	Sediment Removal (1 per Yr.)	20	EA.	$100.00	$2,000.00
					$62,000.00
		Estimated Annual Maintance Cost			$207,000.00

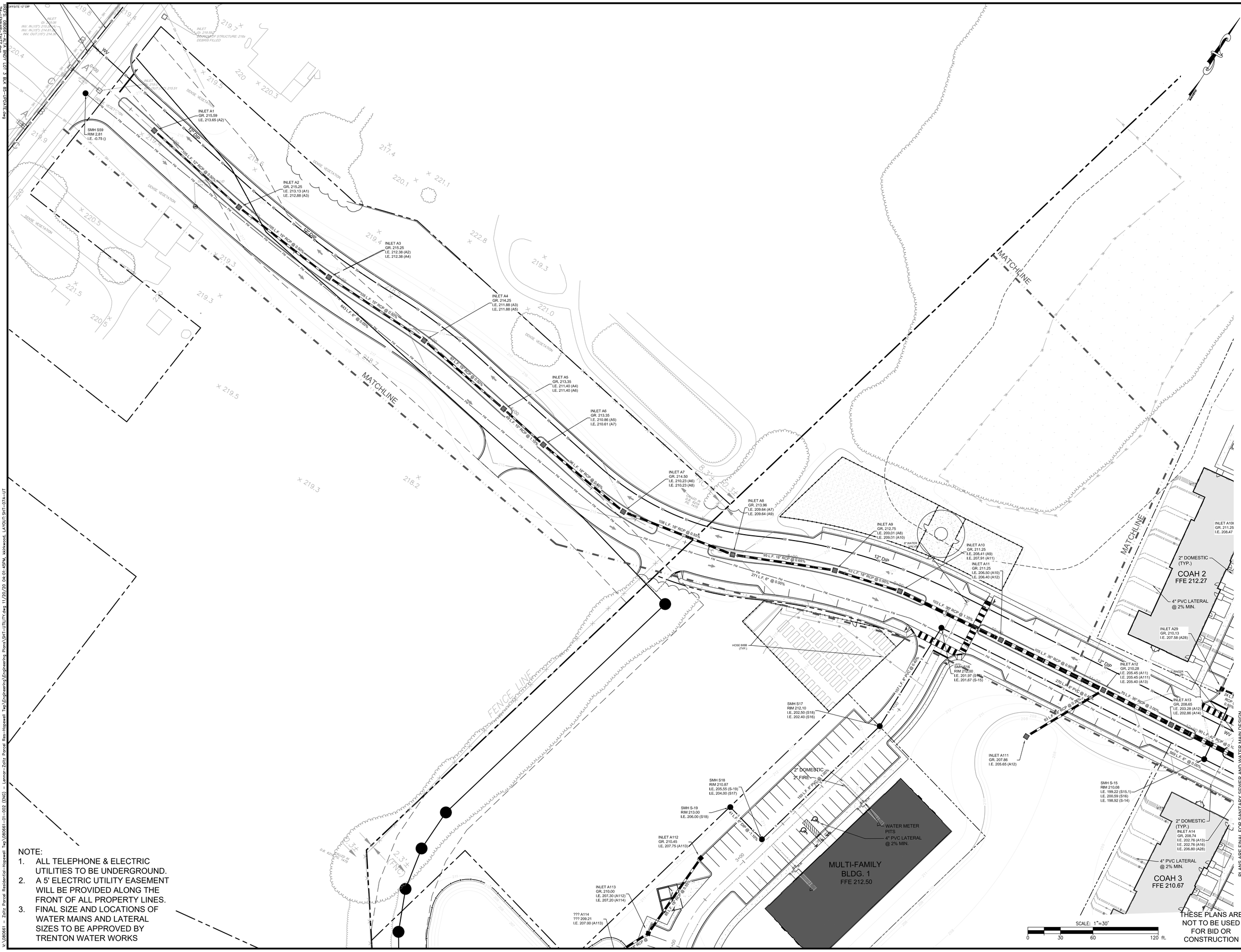
Remarks:

APPENDIX ‘C’

UTILITY PLANS

LANDSCAPING PLANS

W:\080661 – Zoltz Parcel Residential–Hopewell Twp\080661-01-002 (ENG) – Lennar–Zoltz Parcel Res–Hopewell Twp\Engineering\Engineering Plans\SHT–UTILITY.dwg 11/20/20 04:01:45PM, kkirkwood, LAYOUT: SHT–07A–UT



NOTE:
1. ALL TELEPHONE & ELECTRIC UTILITIES TO BE UNDERGROUND.
2. A 5' ELECTRIC UTILITY EASEMENT WILL BE PROVIDED ALONG THE FRONT OF ALL PROPERTY LINES.
3. FINAL SIZE AND LOCATIONS OF WATER MAINS AND LATERAL SIZES TO BE APPROVED BY TRENTON WATER WORKS

NO.	REVISION	DATE	CHKD
12			
11			
10			
9			
8			
7			

NO.	REVISION	DATE	CHKD
6			
5			
4			
3			
2			
1			

PROJ.: 080661-LF-001
DATE: 11-20-2020
CHKD: SAD

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Bowman
CONSULTING

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Freehold, New Jersey 07728
www.bowmanconsulting.com
E-mail: NJ@BowmanConsulting.com

SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL
UTILITIES PLAN

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 & 130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

PLANS ARE FINAL FOR SANITARY SEWER AND WATER MAIN DESIGN

THESE PLANS ARE NOT TO BE USED FOR BID OR CONSTRUCTION

SHEET No. 7 OF A

NOTE:
1. ALL TELEPHONE & ELECTRIC UTILITIES TO BE UNDERGROUND.
2. A 5' ELECTRIC UTILITY EASEMENT WILL BE PROVIDED ALONG THE FRONT OF ALL PROPERTY LINES.
3. FINAL SIZE AND LOCATIONS OF WATER MAINS AND LATERAL SIZES TO BE APPROVED BY TRENTON WATER WORKS

HEADWALL INV 15"=204.92
DRAINAGE DITCH
MATCHLINE
SWM BASIN 'A'
SMH S-15.3 RIM 210.72 I.E. 202.72 (S15.2)
FES A100 206.50 I.E. 204.50(A101)
??? FES A400 ??? 205.75 I.E. 204.50 (A401)
INLET A401 GR. 206.60 I.E. 204.77 (FES A400)
66 L.F. 12" RCP @ 0.30%
FES A200 206.8 I.E. 204.5(A201)
FES A300 206.0 I.E. 204.5(A301)
8" WATER VALVE
8" DIP
8" DOMESTIC (TYP.)
4" PVC LATERAL @ 2% MIN.
INLET A101A GR. 211.29 I.E. 207.00 (A101)
STACKED TOWNHOUSE 1 FFE 212.27
INLET A104 GR. 211.00 I.E. 207.15 (A105) I.E. 207.15 (A103)
INLET A103 GR. 211.19 I.E. 206.68 (A104) I.E. 206.18 (A102)
INLET A101 GR. 210.51 I.E. 204.90 (A102) I.E. 206.88 (A101A) I.E. 204.90 (FES A100)
SMH S-14.3 RIM 211.25 I.E. 205.25 (S-14.2)
4" PVC LATERAL @ 2% MIN.
STACKED TOWNHOUSE 2 FFE 212.27
2" DOMESTIC (TYP.)
INLET A201 GR. 210.95 I.E. 205.42 (A202) I.E. 205.42 (FES A200)
STACKED TOWNHOUSE 3 FFE 212.27
SMH S-14.2 RIM 211.56 I.E. 203.75 (S-14.3) I.E. 203.65 (S-14.1)
INLET A102 GR. 211.70 I.E. 206.03 (A103) I.E. 206.03 (A107) I.E. 205.53 (A101)
INLET A202A GR. 211.44 I.E. 207.92 (A202)
INLET A202B GR. 211.44 I.E. 207.68 (A202)
STM MH A202 RIM 211.09 I.E. 206.42 (A203) I.E. 207.72 (A202A) I.E. 207.68 (A202B) I.E. 206.17 (A201)
STACKED TOWNHOUSE 5 FFE 213.25
STACKED TOWNHOUSE 6 FFE 213.25
INLET A203 GR. 211.90 I.E. 207.91 (A202)
INLET A107 GR. 211.20 I.E. 206.93 (A108) I.E. 207.43 (A107A) I.E. 207.43 (A102)
SMH S-14.1 RIM 211.65 I.E. 202.77 (S-14.2) I.E. 202.67 (S-14)
INLET A107A GR. 210.34 I.E. 208.40 (A107)
STACKED TOWNHOUSE 8 FFE 212.27
INLET A28 GR. 210.10 I.E. 207.46 (A14) I.E. 207.46 (A29)
INLET A44 GR. 211.10 I.E. 208.60 (A31)
STACKED TOWNHOUSE 9 FFE 212.27
INLET A39 GR. 210.34 I.E. 208.40 (A41)
INLET A31 GR. 210.14 I.E. 208.47 (A44) I.E. 206.98 (A16)
INLET A45 GR. 211.32
STACKED TOWNHOUSE 7 FFE 212.00
INLET A42 GR. 209.85 I.E. 207.25 (A41)
INLET F101 GR. 210.00 I.E. 205.25 (FES F100)
FES F100 205.50 I.E. 204.76
STM MH A301 RIM 211.40 I.E. 205.15 (A302) I.E. 207.75 (A301A) I.E. 204.90 (FES A300)
INLET A301A GR. 209.04 I.E. 207.10 (A301)
INLET A302 GR. 210.68 I.E. 205.52 (A303) I.E. 205.62 (A301)
SMH S-4.2 RIM 210.12 I.E. 205.00 (S-4.1)
COAH 1 FFE 211.85
SMH S-4.1 RIM 210.20 I.E. 203.50 (S-4.2) I.E. 203.40 (S-4)
FES F100 205.50 I.E. 204.76
COAH 2 FFE 212.27
INLET A106 GR. 211.25 I.E. 208.47 (A105)
INLET A108 GR. 211.20 I.E. 207.62 (A108A) I.E. 207.62 (A107)
SMH S15.1 RIM 211.88 I.E. 200.24 (S15.2) I.E. 200.14 (S-15)
INLET A108A GR. 210.84 I.E. 207.72 (A108)
INLET A29 GR. 210.13 I.E. 207.58 (A28)
INLET A10 GR. 211.25 I.E. 208.41 (A9) I.E. 207.91 (A11)
INLET A11 GR. 211.25 I.E. 206.50 (A10) I.E. 206.40 (A12)
SMH S15.2 RIM 211.64 I.E. 201.22 (S-15.3) I.E. 201.12 (S15.1)
INLET A105 GR. 211.42 I.E. 207.50 (A106) I.E. 207.40 (A104)
INLET A12 GR. 210.28 I.E. 205.45 (A11) I.E. 205.45 (A111) I.E. 205.40 (A13)
INLET A13 GR. 208.65 I.E. 203.28 (A12) I.E. 202.86 (A14)
SMH S16 RIM 212.00 I.E. 201.97 (S-15) I.E. 201.67 (S-15)
INLET A111 GR. 207.86 I.E. 205.65 (A12)
105 L.F. 36" RCP @ 0.35%
105 L.F. 36" RCP @ 0.50%
270 L.F. 24" RCP @ 0.40%
70 L.F. 36" RCP @ 3.00%
50 L.F. 24" RCP @ 0.40%
90 L.F. 24" RCP @ 0.10%
368 L.F. 6" DIP @ 0.00%
12" DIP
98 L.F. 24" RCP @ 0.50%
98 L.F. 24" RCP @ 0.40%
284 L.F. 24" RCP @ 0.40%
284 L.F. 24" RCP @ 0.60%
23 L.F. 15" RCP @ 1.00%
37 L.F. 18" RCP @ 1.85%
37 L.F. 18" RCP @ 0.50%
37 L.F. 12" RCP @ 0.50%
159 L.F. 24" RCP @ 1.00%
159 L.F. 24" RCP @ 0.60%
65 L.F. 15" RCP @ 0.60%
65 L.F. 15" RCP @ 0.60%
130 L.F. 15" RCP @ 0.60%
130 L.F. 15" RCP @ 0.60%
382 L.F. 24" RCP @ 0.60%
382 L.F. 24" RCP @ 1.00%
65 L.F. 15" RCP @ 0.60%
SCALE: 1"=30'
0 30 60 120 ft.
THESE PLANS ARE NOT TO BE USED FOR BID OR CONSTRUCTION

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DATE: 11-20-2020
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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN
THE COLLECTION at HOPEWELL
UTILITIES PLAN
BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 &130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

PLANS ARE FINAL FOR SANITARY SEWER AND WATER MAIN DESIGN

SHEET No. 7 OF B

V:\060661 - Zaitz Parcel Residential--Hopewell Twp\060661-01--002 (ENG) - Lennar--Zaitz Parcel Res--Hopewell Twp\Engineering\Engineering Plans\SHT--UTILITY.dwg 11/20/20 04:02:23PM kkirkwood LAYOUT: SHT--07B--UT

NOTE:
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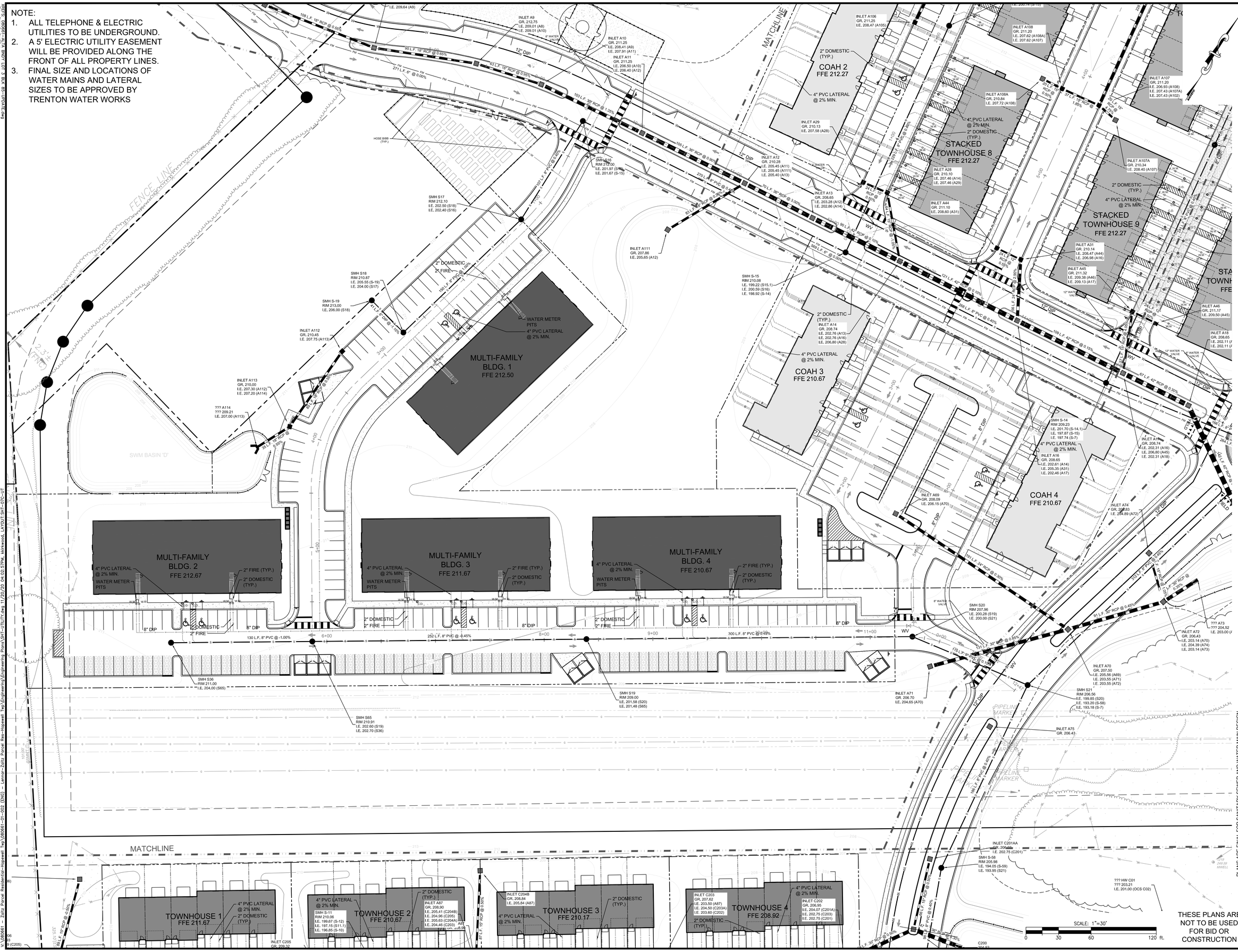

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PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL UTILITIES PLAN

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 &130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

SHEET No. 7 OF C

MATCHLINE

TOWNHOUSE 1
FFE 211.67
4" PVC LATERAL @ 2% MIN.
2" DOMESTIC (TYP.)

TOWNHOUSE 2
FFE 210.67
4" PVC LATERAL @ 2% MIN.
SMH S-11
RIM 210.06
I.E. 199.67 (S-12)
I.E. 197.15 (S11.1)
I.E. 196.85 (S-10)
2" DOMESTIC (TYP.)
INLET A87
GR. 208.90
I.E. 205.41 (C204B)
I.E. 204.96 (C205)
I.E. 205.63 (C204A)
I.E. 204.46 (C203)

TOWNHOUSE 3
FFE 210.17
INLET C204B
GR. 208.84
I.E. 205.84 (A87)
4" PVC LATERAL @ 2% MIN.
2" DOMESTIC (TYP.)

TOWNHOUSE 4
FFE 208.92
INLET C203
GR. 207.62
I.E. 203.50 (A87)
I.E. 204.50 (C203A)
I.E. 203.60 (C202)
2" DOMESTIC (TYP.)
4" PVC LATERAL @ 2% MIN.
INLET C202
GR. 206.95
I.E. 204.07 (C201A)
I.E. 202.75 (C203)
I.E. 202.75 (C201)

TOWNHOUSE 5
FFE 211.42
4" PVC LATERAL @ 2% MIN.
2" DOMESTIC (TYP.)

TOWNHOUSE 6
FFE 209.97
INLET C204A
GR. 208.90
I.E. 205.75 (A87)
4" PVC LATERAL @ 2% MIN.
2" DOMESTIC (TYP.)

TOWNHOUSE 7
FFE 208.72
INLET C203A
GR. 207.62
I.E. 204.62 (C203)
2" DOMESTIC (TYP.)
4" PVC LATERAL @ 2% MIN.
INLET C201A
GR. 206.93
I.E. 203.95 (C202)

TOWNHOUSE 8
FFE 210.42
2" DOMESTIC (TYP.)
4" PVC LATERAL @ 2% MIN.

TOWNHOUSE 9
FFE 211.62
2" DOMESTIC (TYP.)
4" PVC LATERAL @ 2% MIN.

TOWNHOUSE 10
FFE 210.42
2" DOMESTIC (TYP.)
4" PVC LATERAL @ 2% MIN.

INLET C205
GR. 209.32
I.E. 206.38 (C205A)
I.E. 205.79 (A87)
I.E. 205.54 (C206)

INLET C205A
GR. 209.00
I.E. 206.50 (C205)

SMH S-12
RIM 210.00
I.E. 200.05 (S-13)
I.E. 199.95 (S-11)

SMH S-13
RIM 210.01
I.E. 201.75 (S-12)

INLET C206A
GR. 209.54
I.E. 207.60 (C206)

SMH S11.1
RIM 211.00
I.E. 197.53 (S11.2)
I.E. 197.43 (S-11)

SMH S11.2
RIM 210.84
I.E. 197.85 (S11.3)
I.E. 197.75 (S11.1)

SMH S11.3
RIM 210.01
I.E. 198.43 (S11.4)
I.E. 198.33 (S11.2)

SMH S11.4
RIM 208.78
I.E. 200.78 (S11.3)

INLET E105
GR. 207.50
I.E. 204.00 (E104)

INLET C103
GR. 206.00
I.E. 203.22 (C102)

INLET C102
GR. 209.65
I.E. 202.96 (C103)
I.E. 202.71 (C101)

INLET C201AA
GR. 205.00
I.E. 202.75 (C201)

SMH S-58
RIM 205.98
I.E. 194.05 (S-59)
I.E. 193.95 (S21)

??? HW C01
??? 203.21
I.E. 201.00 (OCS C02)

C200
204.52
I.E. 202.0

INLET C201
GR. 207.02
I.E. 202.42 (C201AA)
I.E. 202.40 (C202)
I.E. 202.15 (C200)

SMH S-59
RIM 205.98
I.E. 194.75 (S-10)
I.E. 194.45 (S-58)

OS OCS C02
GR. 205.00
I.E. 201.50 (HW C01)

SWM BASIN 'C'

INLET C101
GR. 205.75
I.E. 202.25 (C102)
I.E. 202.25 (FES C100)

FES C100
203.79
I.E. 202.00 (C101)

SMH S-10
RIM 203.00
I.E. 195.79 (S-11)
I.E. 195.69 (S-59)

SWM BASIN 'D'

SWM BASIN 'E1'

SWM BASIN 'E'

STM MH E104
RIM 208.36
I.E. 203.13 (E105)
I.E. 203.13 (E103)

OS E103
GR. 206.50
I.E. 202.32 (E104)
I.E. 202.18 (FES E102)

FES E102
202.24
I.E. 200.00 (E103)
I.E. 200.00 (E103)

FES E102
I.E. 200.00

FES E101
200.87
I.E. 199.08 (A134)
I.E. 199.08 (FES E100)

F.E.S. FES E101
I.E. 199.08

FES E100
200.79
I.E. 199.00 (FES E101)

F.E.S. FES E100
I.E. 199.00

Reinforced Concrete OCS E02
I.E. 196.19

OS OCS E02
GR. 200.00
I.E. 196.19 (E01)

Reinforced Concrete E01
I.E. 195.91
I.E. -4.17

STM MH E01
RIM 199.56
I.E. 195.91 (OCS E02)
I.E. -4.17 ()

S 83°17'37" W

10 L.F. 12" RCP @ 0.70%

12" DIP STUB

12" CAP

12" GATE VALVE

CONCRETE WATER TENSION MB

INV. 198.19
B-INLET GR=199.4

INV. 198.80
12" RCP
INV. 199.16
12" RCP
INV. 198.62
12" RCP
15" RCP 195.85
15" RCP 195.85
B-INLET GR=198.79
B-INLET GR=198.80
E-INLET GR=199.24

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SCALE: 1"=30'
0 30 60 120 ft.

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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL

UTILITIES PLAN

BLOCK 85, LOT 3, BLOCK 86, LOTS 32-34 & 130, AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 7 OF D

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SCALE: 1"=30'
0 30 60 120 ft.

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PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL
UTILITIES PLAN

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 & 130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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W:\080661 – Zoltz Parcel Residential–Hopewell Twp\080661-01-002 (ENG) – Lennar–Zoltz Parcel Res–Hopewell Twp\Engineering\Engineering Plans\SHT–UTILITY.dwg 11/20/20 04:04:18PM, kkirkwood, LAYOUT: SHT–07E–UT

PLANT SCHEDULE PLANT SCHEDULE A						
DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT	
ARRS	10	ACER RUBRUM `RED SUNSET`	RED SUNSET MAPLE	B & B	2" TO 2-1/2" CAL	
ASAC	1	ACER SACCHARUM	SUGAR MAPLE	B & B	2" TO 2-1/2" CAL	
BNDU	8	BETULA NIGRA `DURAHEAT`	DURAHEAT RIVER BIRCH	B & B	10` TO 12` HT	
CBFH	12	CARPINUS BETULUS `FASTIGIATA`	PYRAMIDAL EUROPEAN HORNBEAN	B & B	2" TO 2-1/2" CAL	
LSRO	8	LIQUIDAMBAR STYRACIFLUA `ROTUNDILOBA` TM	ROUND-LOBED SWEET GUM	B & B	2" TO 2-1/2" CAL	
MG	2	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	B & B	8` TO 10` HT	
PABG	27	PLATANUS X ACERIFOLIA `BLOODGOOD`	LONDON PLANE TREE	B & B	2-1/2" TO 3" CAL	
UPAE	15	ULMUS AMERICANA `PRINCETON`	AMERICAN ELM	B & B	2-1/2" TO 3" CAL	
UAAE	4	ULMUS PARVIFOLIA `ALLEE`	ALLEE LACEBARK ELM	B & B	2" TO 2-1/2" CAL	
EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT	
PABI	8	PICEA ABIES	NORWAY SPRUCE	B & B	6` TO 8` HT	
PPGL	8	PICEA PUNGENS `GLAUCA`	COLORADO BLUE SPRUCE	B & B	6` TO 8` HT	
GROUND COVERS	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	SPACING
LMBB	120	LIRIOPE MUSCARI `BIG BLUE`	BIG BLUE LILYTURF	4" POT	4" POT	12" o.c.
RAGL	14	RHUS AROMATICA `GRO-LOW`	GRO-LOW FRAGRANT SUMAC	CONTAINER	15" TO 18"	24" o.c.

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THE COLLECTION at HOPEWELL
LANDSCAPE PLAN

BLOCK 85, LOT 3, BLOCK 86, LOTS 32-34 & 130, AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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PLANT SCHEDULE PLANT SCHEDULE B

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT
ARRS	6	ACER RUBRUM `RED SUNSET`	RED SUNSET MAPLE	B & B	2" TO 2-1/2" CAL
ASAC	9	ACER SACCHARUM	SUGAR MAPLE	B & B	2" TO 2-1/2" CAL
ALAS	6	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	B & B	2" TO 2-1/2" CAL
BNDU	10	BETULA NIGRA `DURAHEAT`	DURAHEAT RIVER BIRCH	B & B	10` TO 12` HT
CBFH	27	CARPINUS BETULUS `FASTIGIATA`	PYRAMIDAL EUROPEAN HORNBEAN	B & B	2" TO 2-1/2" CAL
MG	4	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	B & B	8` TO 10` HT
NWBG	10	NYSSA SYLVATICA `WILDFIRE`	BLACK GUM	B & B	2-1/2" TO 3" CAL
PABG	18	PLATANUS X ACERIFOLIA `BLOODGOOD`	LONDON PLANE TREE	B & B	2-1/2" TO 3" CAL
QBIC	7	QUERCUS BICOLOR	SWAMP WHITE OAK	B & B	2" TO 2-1/2" CAL
TTSL	17	TILIA TOMENTOSA	SILVER LINDEN	B & B	2" TO 2-1/2" CAL
UAAE	30	ULMUS PARVIFOLIA `ALLEE`	ALLEE LACEBARK ELM	B & B	2" TO 2-1/2" CAL
ZSGV	9	ZELKOVA SERRATA `GREEN VASE`	GREEN VASE ZELKOVA	B & B	2" TO 2-1/2" CAL

EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT
IOAH	12	ILEX OPACA	AMERICAN HOLLY	B & B	6` TO 8` HT
JSSJ	45	JUNIPERUS SCOPULORUM `SKYROCKET`	SKYROCKET JUNIPER	B & B	6` TO 8` HT
JE	6	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	B & B	6` TO 8` HT
PA	5	PICEA ABIES	NORWAY SPRUCE	B & B	6` TO 8` HT
PABI	16	PICEA ABIES	NORWAY SPRUCE	B & B	6` TO 8` HT
PPGL	6	PICEA PUNGENS `GLAUCA`	COLORADO BLUE SPRUCE	B & B	6` TO 8` HT

WASHINGTON CROSSING - PENNINGTON ROAD (A.K.A COUNTY RT. 546)

HEADWALL INV 15"=204.92

DRAINAGE DITCH

STORMWATER MANAGEMENT SEED MIXTURE

SWM BASIN 'A'

STACKED TOWNHOUSE 1

STACKED TOWNHOUSE 2

STACKED TOWNHOUSE 3

STACKED TOWNHOUSE 4

STACKED TOWNHOUSE 5

STACKED TOWNHOUSE 6

STACKED TOWNHOUSE 7

STACKED TOWNHOUSE 8

STACKED TOWNHOUSE 9

COAH 1

COAH 2

ROAD 1 (PRIVATE)

ROAD 2 (PRIVATE)

ROAD A (PRIVATE)

ROAD B (PRIVATE)

ALLEY AA (PRIVATE)

ALLEY BB (PRIVATE)

SEE RAIN GARDEN PLAN ENLARGEMENT (TYP)

BIORETENTION SWALE SEED MIX

(6) JE
(3) PPGL
(4) PABI
(6) IOAH
(5) PA
(6) IOAH
(4) PABI
(7) PABG
(3) PPGL
(3) TTSL
(10) NWBG
(1) ZSGV
(6) ALAS
(1) UAAE
(6) ASAC
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(1) ARRS
(3) ZSGV
(3) ARRS
(3) TTSL
(5) CBFH
(2) TTSL
(11) CBFH
(4) PABG
(3) PABG
(2) UAAE
(2) ARRS
(1) QBIC
(6) QBIC
(5) PABI
(1) BNDU
(3) BNDU
(3) ASAC

SCALE: 1"=30'
0 30 60 120 ft.

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PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL

LANDSCAPE PLAN

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 &130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 9 OF B

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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

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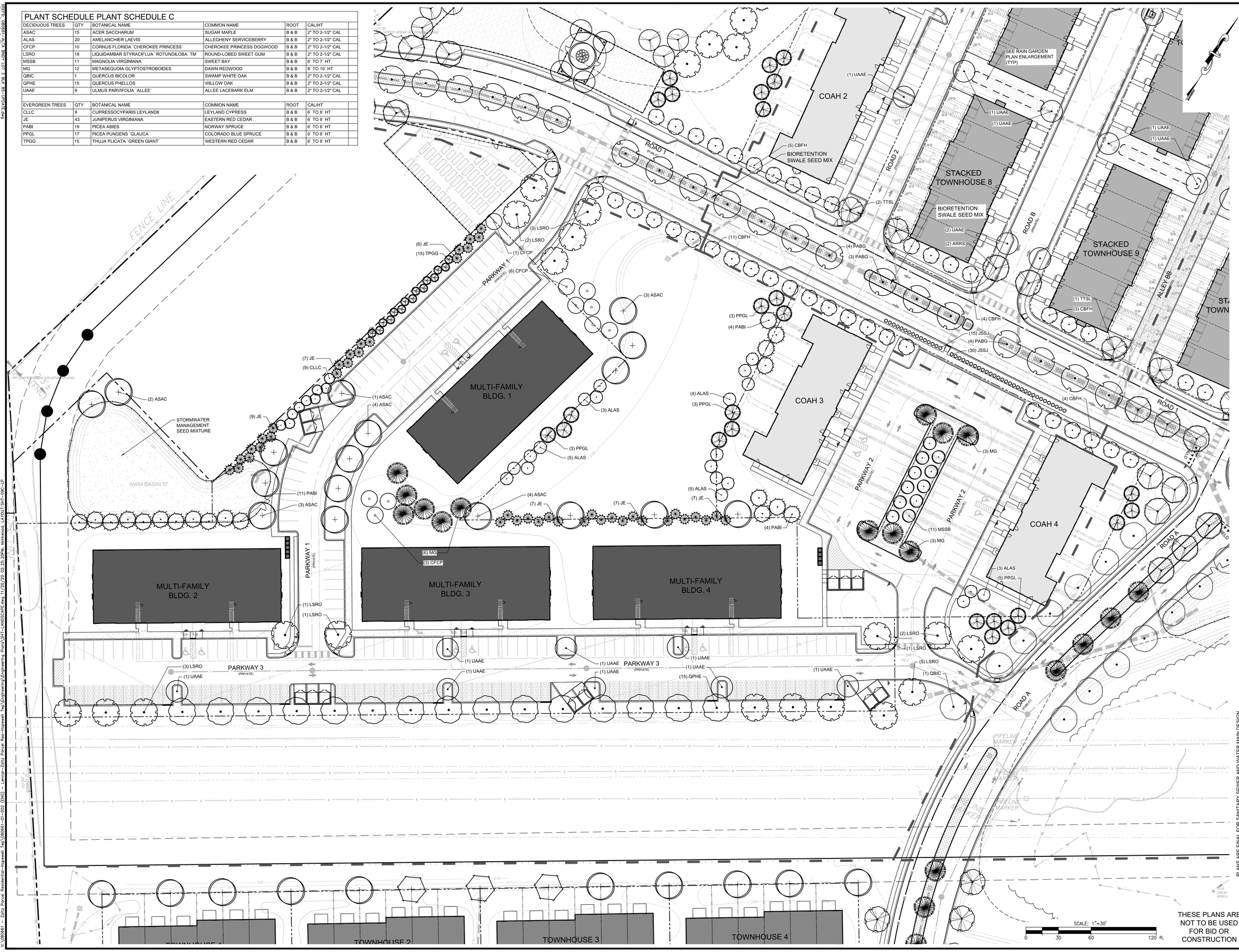
PLANT SCHEDULE PLANT SCHEDULE C

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT
ASAC	15	ACER SACCHARUM	SUGAR MAPLE	B & B	2" TO 2-1/2" CAL
ALAS	20	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	B & B	2" TO 2-1/2" CAL
CFCP	10	CORNUS FLORIDA `CHEROKEE PRINCESS`	CHEROKEE PRINCESS DOGWOOD	B & B	2" TO 2-1/2" CAL
LSRO	18	LIQUIDAMBAR STYRACIFLUA `ROTUNDILOBA` TM	ROUND-LOBED SWEET GUM	B & B	2" TO 2-1/2" CAL
MSSB	11	MAGNOLIA VIRGINIANA	SWEET BAY	B & B	6` TO 7` HT
MG	12	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	B & B	8` TO 10` HT
QBIC	1	QUERCUS BICOLOR	SWAMP WHITE OAK	B & B	2" TO 2-1/2" CAL
QPHE	15	QUERCUS PHELLOS	WILLOW OAK	B & B	2" TO 2-1/2" CAL
UAAE	8	ULMUS PARVIFOLIA `ALLEE`	ALLEE LACEBARK ELM	B & B	2" TO 2-1/2" CAL

EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT
CLLC	9	CUPRESSOCYPARIS LEYLANDII	LEYLAND CYPRESS	B & B	6` TO 8` HT
JE	43	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	B & B	6` TO 8` HT
PABI	19	PICEA ABIES	NORWAY SPRUCE	B & B	6` TO 8` HT
PPGL	17	PICEA PUNGENS `GLAUCA`	COLORADO BLUE SPRUCE	B & B	6` TO 8` HT
TPGG	15	THUJA PLICATA `GREEN GIANT`	WESTERN RED CEDAR	B & B	6` TO 8` HT



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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

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PLANT SCHEDULE PLANT SCHEDULE D						
DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT	
ARRS	1	ACER RUBRUM `RED SUNSET`	RED SUNSET MAPLE	B & B	2" TO 2-1/2" CAL	
ASAC	14	ACER SACCHARUM	SUGAR MAPLE	B & B	2" TO 2-1/2" CAL	
ALAS	15	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	B & B	2" TO 2-1/2" CAL	
CFCP	13	CORNUS FLORIDA `CHEROKEE PRINCESS`	CHEROKEE PRINCESS DOGWOOD	B & B	2" TO 2-1/2" CAL	
MG	9	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	B & B	8` TO 10` HT	
NWBG	13	NYSSA SYLVATICA `WILDFIRE`	BLACK GUM	B & B	2-1/2" TO 3" CAL	
PABG	12	PLATANUS X ACERIFOLIA `BLOODGOOD`	LONDON PLANE TREE	B & B	2-1/2" TO 3" CAL	
TTSL	19	TILIA TOMENTOSA	SILVER LINDEN	B & B	2" TO 2-1/2" CAL	
UPAE	21	ULMUS AMERICANA `PRINCETON`	AMERICAN ELM	B & B	2-1/2" TO 3" CAL	
EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT	
CLLC	15	CUPRESSOCYPARIS LEYLANDII	LEYLAND CYPRESS	B & B	6` TO 8` HT	
IOAH	10	ILEX OPACA	AMERICAN HOLLY	B & B	6` TO 8` HT	
JE	43	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	B & B	6` TO 8` HT	
PABI	11	PICEA ABIES	NORWAY SPRUCE	B & B	6` TO 8` HT	
PPGL	23	PICEA PUNGENS `GLAUCA`	COLORADO BLUE SPRUCE	B & B	6` TO 8` HT	
TPGG	41	THUJA PLICATA `GREEN GIANT`	WESTERN RED CEDAR	B & B	6` TO 8` HT	

SCALE: 1"=30'
0 30 60 120 ft.

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LANDSCAPE PLAN

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TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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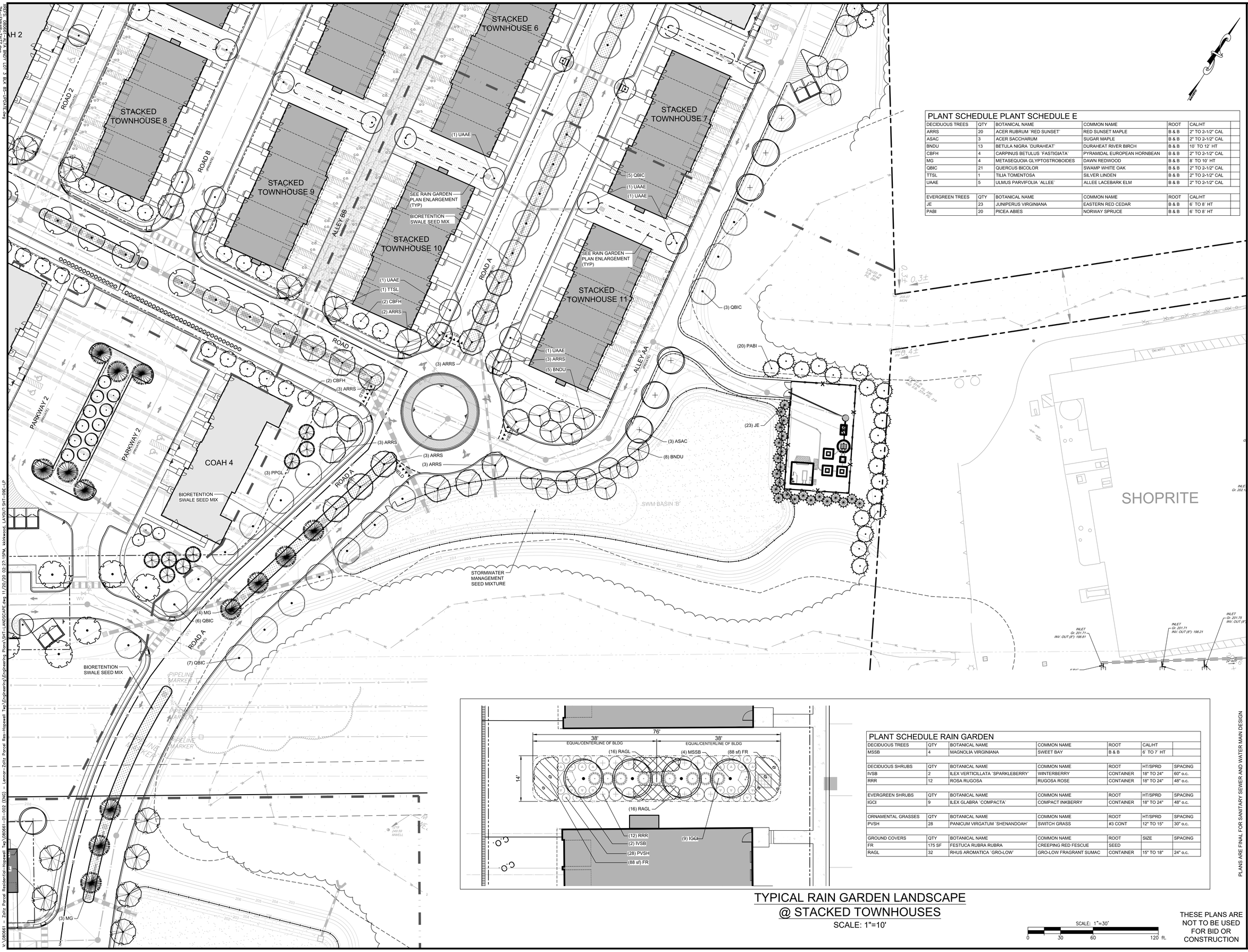

PLANT SCHEDULE PLANT SCHEDULE E					
DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT
ARRS	20	ACER RUBRUM `RED SUNSET`	RED SUNSET MAPLE	B & B	2" TO 2-1/2" CAL
ASAC	3	ACER SACCHARUM	SUGAR MAPLE	B & B	2" TO 2-1/2" CAL
BNDU	13	BETULA NIGRA `DURAHEAT`	DURAHEAT RIVER BIRCH	B & B	10` TO 12` HT
CBFH	4	CARPINUS BETULUS `FASTIGIATA`	PYRAMIDAL EUROPEAN HORNBEAN	B & B	2" TO 2-1/2" CAL
MG	4	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	B & B	8` TO 10` HT
QBIC	21	QUERCUS BICOLOR	SWAMP WHITE OAK	B & B	2" TO 2-1/2" CAL
TTSL	1	TILIA TOMENTOSA	SILVER LINDEN	B & B	2" TO 2-1/2" CAL
UAAE	5	ULMUS PARVIFOLIA `ALLEE`	ALLEE LACEBARK ELM	B & B	2" TO 2-1/2" CAL
EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT
JE	23	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	B & B	6` TO 8` HT
PABI	20	PICEA ABIES	NORWAY SPRUCE	B & B	6` TO 8` HT

PLANT SCHEDULE RAIN GARDEN						
DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CAL/HT	
MSSB	4	MAGNOLIA VIRGINIANA	SWEET BAY	B & B	6` TO 7` HT	
DECIDUOUS SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	ROOT	HT/SPRD	SPACING
IVSB	2	ILEX VERTICILLATA `SPARKLEBERRY`	WINTERBERRY	CONTAINER	18" TO 24"	60" o.c.
RRR	12	ROSA RUGOSA	RUGOSA ROSE	CONTAINER	18" TO 24"	48" o.c.
EVERGREEN SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	ROOT	HT/SPRD	SPACING
IGCI	9	ILEX GLABRA `COMPACTA`	COMPACT INKBERRY	CONTAINER	18" TO 24"	48" o.c.
ORNAMENTAL GRASSES	QTY	BOTANICAL NAME	COMMON NAME	ROOT	HT/SPRD	SPACING
PVSH	28	PANICUM VIRGATUM `SHENANDOAH`	SWITCH GRASS	#3 CONT	12" TO 15"	30" o.c.
GROUND COVERS	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	SPACING
FR	175 SF	FESTUCA RUBRA RUBRA	CREEPING RED FESCUE	SEED		
RAGL	32	RHUS AROMATICA `GRO-LOW`	GRO-LOW FRAGRANT SUMAC	CONTAINER	15" TO 18"	24" o.c.

TYPICAL RAIN GARDEN LANDSCAPE @ STACKED TOWNHOUSES

SCALE: 1"=10'

SCALE: 1"=30'

0 30 60 120 ft.

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THE COLLECTION at HOPEWELL
LANDSCAPE PLAN

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 & 130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

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SUPPLEMENTAL TRAFFIC ENGINEERING EVALUATION
PREPARED BY BOWMAN CONSULTING GROUP
JULY 6, 2021

Bowman

July 6, 2021

VIA EMAIL

Mr. Mitchell Newman
Lennar
2465 Kuser Rd, 3rd Floor
Hamilton, New Jersey 08690

RE: The Collections at Hopewell
Supplemental Traffic Engineering Evaluation
Township of Hopewell, Mercer County
BCG File No. 080661-01-002

Dear Mr. Newman:

We have prepared this Supplemental Traffic Engineering Evaluation to address a number of items as raised in the review letter prepared by Dolan & Dean dated May 17, 2021 and comments from the Planning Board at their hearing on June 24, 2021. Specifically, these comments from the Planning Board include the following:

1. Conduct traffic counts at the intersection of County Route 546 with Dublin Road
2. Operational analyses of the above intersection; and impact of project on school related traffic from the proposed project
3. Review of the Woodmont Federal development traffic on area roadways
4. Operational analysis of site generated traffic without the Reed Road access
5. Improvement plan for the intersection of Road A with Road 4

Our specific responses to the Dolan & Dean review of the Traffic Impact Study are as follows:

T1. No response needed

T2. No response needed

T3. We provided testimony regarding the appropriateness of the equation. Figure 4.2 in the Trip Generation Handbook, 3rd Edition provides a flow chart to guide the use of the data contained in the Trip Generation Manual. Based upon this flow chart, the use of the equation to calculate this site's trip generation is reasonable and appropriate.

T4. As was testified to, we have reviewed the DVRPC and US Census date journey-to-work data and believe that our trip assignment is based upon reasonable assumptions and parameters. These data are at a macro level and is not suitable for use in site specific trip assignments.

T5. We have updated the bus/truck percentages for the applicable movements at the studied intersections based upon the observed vehicle classification. The updated capacity analysis worksheets are contained in Appendix A. We have also updated Tables 1 and 3 to reflect these

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updated truck percentages. This did not include the signalized intersection of CR 546 with Scotch Road as the Langan count data did not include truck percentages. As shown in Tables 1A and 3A, there are no material impacts to the levels of service or average delay as a result of updating the truck percentages.

T6. This was addressed in testimony. There are poor levels of service already occurring under existing conditions, which will be exacerbated under no build conditions. The amount of traffic added by the proposed project is minor and does not materially impact operations. This is a County intersection and they did not comment upon its operations.

T7. The operations of the intersection of CR 546 with Dublin Road will be addressed in a subsequent section of this evaluation letter.

T8. The ownership of the various lots within this application are listed on the site plan cover sheet.

T9. The operational aspects of not having a site access to Reed Road is addressed in a subsequent section of this evaluation letter.

County Route 546/Dublin Road

We conducted a manual turning movement count at this intersection on Tuesday, June 29, 2021 between 7:00 and 9:00 AM and between 4:00 and 6:00 PM. To again adjust this traffic count to be representative of typical travel conditions, we utilized a mainline traffic count that was available from the NJDOT from April 2019 (which is contained in the initial report). Comparing our observed traffic count data to the peak hour mainline flows on CR 546, we adjusted the turning movement volumes between 40 percent and 180 percent depending upon the peak hour and the direction of flow. These adjusted traffic flows for this intersection are presented in Figure 2C.

We then applied the traffic from the other development projects (as we did within the initial study) plus a background growth rate to yield the 2023 No Build traffic volumes, which are presented in Figure 3C.

To address the traffic generated by the proposed Collections at Hopewell project which would potentially travel to and from the middle and high schools, we had to first estimate the potential number of school children that might attend these two schools. The fiscal analysis calculated that there would be 61 school age children in the K-12 sector. A reasonable and conservative estimation is that one-third of the students are in each of the elementary, middle school and high school cohorts. Therefore, two thirds of the students potentially would be traveling to this destination or 40 some students.

If it is assumed that half of these students (which would also include multiple children per car) are driven by parents (or themselves for the high school), this would be 20 vehicles. We believe this to be a very conservative approach, with a higher trip assignment than we believe would actually occur. Some parents dropping off students would continue on their way to work or other destinations and may not travel back through this intersection, but again we have assumed all would return. We have presented the Build traffic volumes in Figure 6C.

TABLE 1A - LEVEL OF SERVICE / AVERAGE VEHICLE DELAY COMPARISON - EXISTING & NO BUILD CONDITIONS
THE COLLECTION AT HOPEWELL, TOWNSHIP OF HOPEWELL, MERCER COUNTY

BCG 080661-01-002 11/9/2020
Rev. 6/30/21

Intersection	2020 Existing Condition						2023 No Build Condition					
		AM PEAK			PM PEAK			AM PEAK			PM PEAK	
	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service
Washington Crossing-Pennington Rd. (CR 546) & Ingleside Ave. (CR 631)/Reed Rd. (Unsignalized)	EB-L	0.04	8.1	A	0.03	8.0	A	EB-L	0.05	8.2	A	0.04	8.3	A
	WB-L	0.06	8.4	A	0.07	8.3	A	WB-L	0.06	8.8	A	0.07	8.5	A
	NB-LT	0.42	31.9	D	0.50	38.9	E	NB-LT	0.58	52.7	F	0.70	72.6	F
	NB-R	0.15	11.5	B	0.11	10.6	B	NB-R	0.18	12.8	B	0.13	11.1	B
	SB-LTR	0.21	20.1	C	0.22	20.1	C	SB-LTR	0.29	25.9	D	0.30	24.9	C
Washington Crossing-Pennington Rd. (CR 546) & Scotch Rd. (Signalized)	EB-L	0.11	20.7	C	0.34	56.1	E	EB-L	0.12	20.8	C	0.35	56.7	E
	EB-T	0.68	31.0	C	0.25	22.1	C	EB-T	0.72	32.5	C	0.27	22.3	C
	EB-R	0.74	34.6	C	0.12	20.6	C	EB-R	0.76	35.4	D	0.13	20.7	C
	WB-L	0.13	17.3	B	0.09	15.0	B	WB-L	0.21	18.6	B	0.22	16.3	B
	WB-TR	0.23	15.6	B	0.60	21.6	C	WB-TR	0.25	15.8	B	0.64	22.5	C
	NB-L	0.28	20.7	C	0.64	27.5	C	NB-L	0.29	20.9	C	0.68	29.2	C
	NB-T	0.17	18.5	B	0.31	20.2	C	NB-T	0.24	19.4	B	0.36	20.9	C
	NB-R	0.04	17.2	B	0.10	17.8	B	NB-R	0.14	18.2	B	0.15	18.4	B
	SB-L	0.35	39.0	D	0.34	39.2	D	SB-L	0.38	40.0	D	0.37	40.0	D
	SB-TR	0.44	40.6	D	0.40	39.8	D	SB-TR	0.48	41.7	D	0.49	42.4	D
	OVERALL		29.2	C		25.7	C	OVERALL		29.4	C		26.5	C
Route 31 SB & Washington Crossing-Pennington Road (Merge/Diverge)	EB Ramp (Merge) (1)	0.36/ 0.24	---	B	0.39/ 0.19	---	B	EB Ramp (Merge) (1)	0.40/ 0.30	---	B	0.42/ 0.23	---	B
	WB Ramp (Diverge) (1)	0.24/ 0.17	---	B	0.29/ 0.25	---	B	WB Ramp (Diverge) (1)	0.25/ 0.20	---	B	0.31/ 0.31	---	B
Route 31 SB & Circle Ramp WB (Merge)	WB Ramp (Merge) (1)	0.50/ 0.14	---	B	0.64/ 0.18	---	C	WB Ramp (Merge) (1)	0.56/ 0.15	---	C	0.70/ 0.20	---	C
Washington Crossing-Pennington Rd. (CR 546) & Dublin Road (Unsignalized)	EB-LT	0.02	8.3	A	0.02	8.2	A	EB-LT	0.02	8.4	A	0.02	8.4	A
	SB-LR	0.12	14.6	B	0.12	16.1	C	SB-LR	0.14	16.4	C	0.14	18.4	C

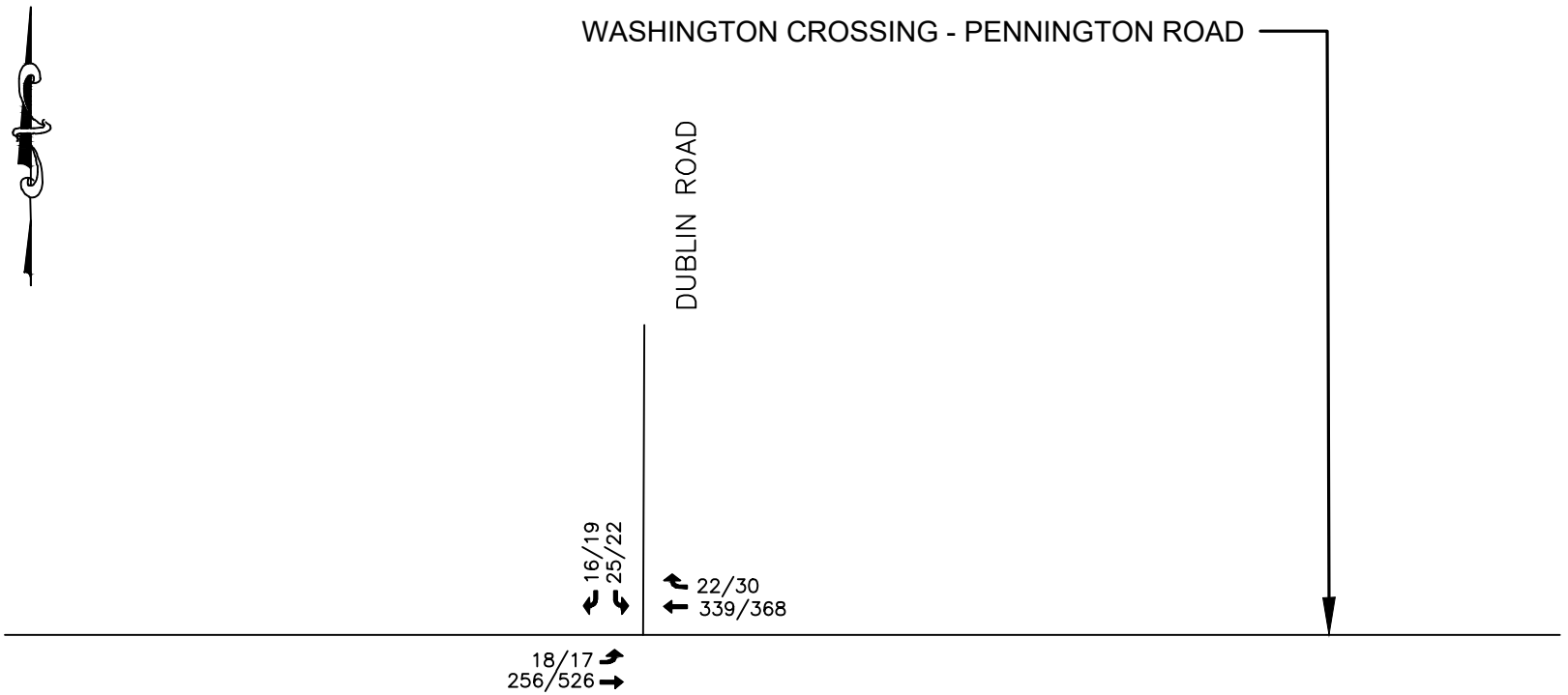
(1) For merge and diverge conditions, the first V/C ratio is for the highway and the second is for the ramp

TABLE 3A - LEVEL OF SERVICE / AVERAGE VEHICLE DELAY COMPARISON - NO BUILD & BUILD CONDITIONS
THE COLLECTION AT HOPEWELL, TOWNSHIP OF HOPEWELL, MERCER COUNTY

BCG 080661-01-002 11/9/2020
Rev. 6/30/21

Intersection	2023 No Build Condition							2023 Build Condition						
		AM PEAK			PM PEAK				AM PEAK			PM PEAK		
	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service
Washington Crossing-Pennington Rd. (CR 546) & Ingleside Ave. (CR 631)/Reed Rd. (Unsignalized)	EB-L	0.05	8.2	A	0.04	8.3	A	EB-L	0.05	8.3	A	0.04	8.3	A
	WB-L	0.06	8.8	A	0.07	8.5	A	WB-L	0.06	8.8	A	0.07	8.5	A
	NB-LT	0.58	52.7	F	0.70	72.6	F	NB-LT	0.77	77.4	F	0.87	107.2	F
	NB-R	0.18	12.8	B	0.13	11.1	B	NB-R	0.18	12.8	B	0.13	11.3	B
	SB-LTR	0.29	25.9	D	0.30	24.9	C	SB-LTR	0.33	29.0	D	0.38	29.5	D
Washington Crossing-Pennington Rd. (CR 546) & Scotch Rd. (Signalized)	EB-L	0.12	20.8	C	0.35	56.7	E	EB-L	0.12	20.8	C	0.35	56.7	E
	EB-T	0.72	32.5	C	0.27	22.3	C	EB-T	0.72	32.7	C	0.28	22.4	C
	EB-R	0.76	35.4	D	0.13	20.7	C	EB-R	0.76	35.4	D	0.13	20.7	C
	WB-L	0.21	18.6	B	0.22	16.3	B	WB-L	0.25	19.2	B	0.24	16.5	B
	WB-TR	0.25	15.8	B	0.64	22.5	C	WB-TR	0.26	15.9	B	0.64	22.6	C
	NB-L	0.29	20.9	C	0.68	29.2	C	NB-L	0.29	20.9	C	0.68	29.2	C
	NB-T	0.24	19.4	B	0.36	20.9	C	NB-T	0.24	19.4	B	0.36	20.9	C
	NB-R	0.14	18.2	B	0.15	18.4	B	NB-R	0.15	18.3	B	0.17	18.6	B
	SB-L	0.38	40.0	D	0.37	40.0	D	SB-L	0.38	40.0	D	0.37	40.0	D
	SB-TR	0.48	41.7	D	0.49	42.4	D	SB-TR	0.48	41.7	D	0.49	42.4	D
	OVERALL		29.4	C		26.5	C	OVERALL		29.3	C		26.5	C
Washington Crossing-Pennington Rd. (CR 546) & Road 'A' (Unsignalized)	WB-L							WB-L	0.03	8.4	A	0.08	8.4	A
	NB-L							NB-L	0.05	17.9	C	0.04	23.1	C
	NB-R							NB-R	0.17	12.5	B	0.08	11.1	B
Reed Road & Road 1 (Unsignalized)	WB-LR							WB-LR	0.04	10.0	A	0.02	9.8	A
	SB-L							SB-L	0.01	7.6	A	0.02	7.6	A
Route 31 SB & Washington Crossing-Pennington Road (Merge/Diverge)	EB Ramp (Merge) (1)	0.40/ 0.30	---	B	0.42/ 0.23	---	B	EB Ramp (Merge) (1)	0.43/ 0.36	---	B	0.42/ 0.23	---	B
	WB Ramp (Diverge) (1)	0.25/ 0.20	---	B	0.31/ 0.31	---	B	WB Ramp (Diverge) (1)	0.25/ 0.22	---	B	0.31/ 0.36	---	B
Route 31 SB & Circle Ramp WB (Merge)	WB Ramp (Merge) (1)	0.56/ 0.15	---	C	0.70/ 0.20	---	C	WB Ramp (Merge) (1)	0.57/ 0.16	---	C	0.74/ 0.22	---	C
Washington Crossing-Pennington Rd. (CR 546) & Dublin Road (Unsignalized)	EB-LT	0.02	8.4	A	0.02	8.4	A	EB-LT	0.02	8.5	A	0.02	8.5	A
	SB-LR	0.14	16.4	C	0.14	18.4	C	SB-LR	0.22	18.6	C	0.17	19.8	C

(1) For merge and diverge conditions, the first V/C ratio is for the highway and the second is for the ramp



KEY

← 00/00 - AM PEAK/PM PEAK HOUR VOLUMES

☼ - EXISTING TRAFFIC SIGNAL

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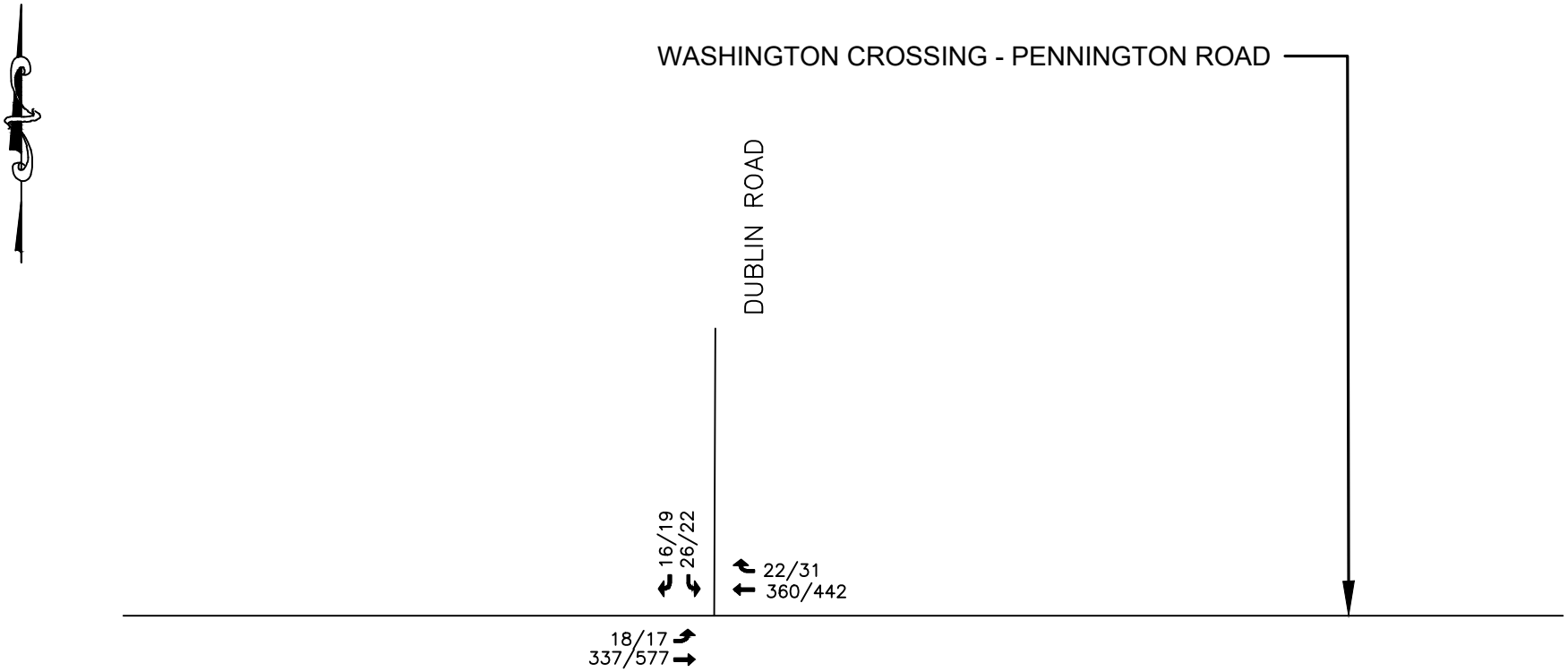
NJ Certificate of Authorization
No. 24GA28222600

DATE: 11/10/2020 CHKD.:

PROJ.: 080661-01-002

FIGURE 2C
THE COLLECTION AT HOPEWELL
2020 EXISTING (ADJUSTED) TRAFFIC VOLUMES

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY



KEY

← 00/00 - AM PEAK/PM PEAK HOUR VOLUMES

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DATE: 11/10/2020 CHKD.:

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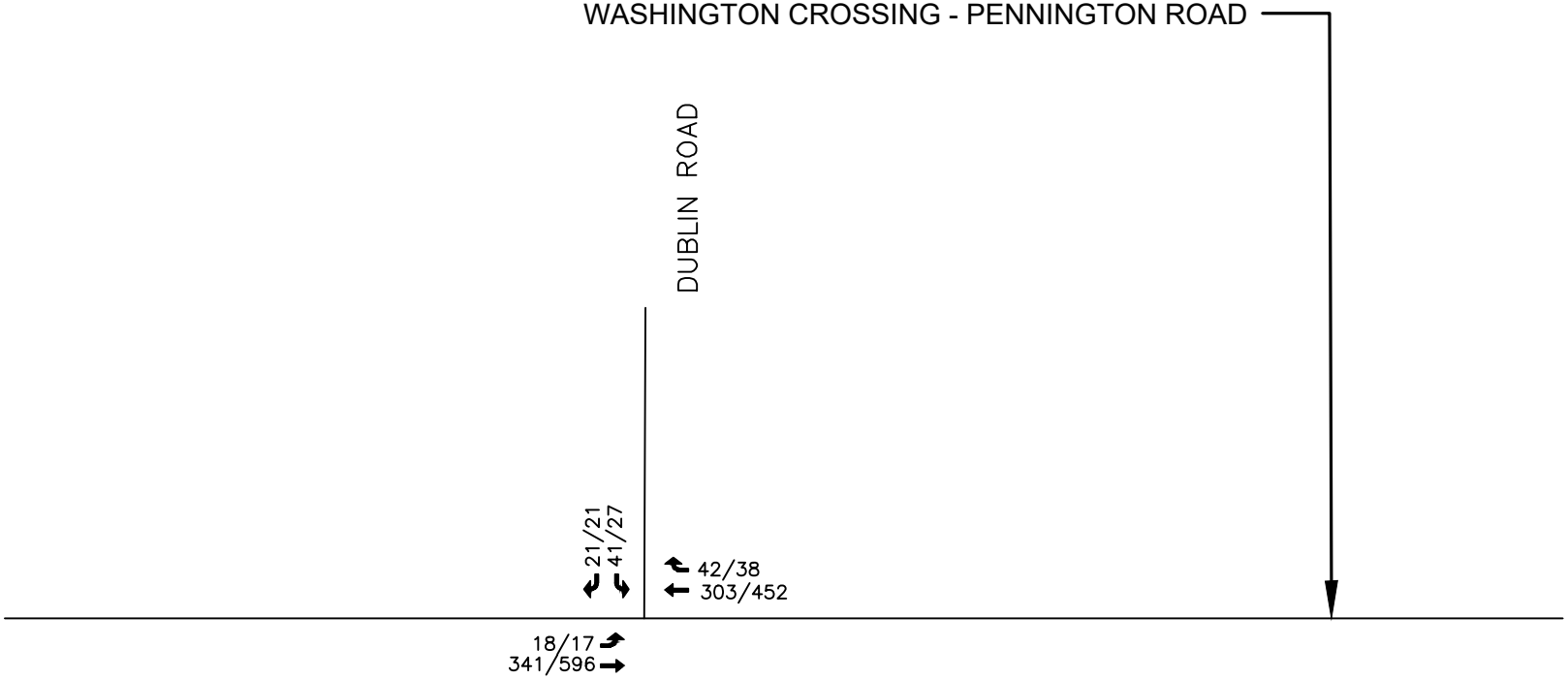
FIGURE 3C
THE COLLECTION AT HOPEWELL
PROPOSED 2023 NO BUILD TRAFFIC VOLUMES

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY



KEY

← 00/00 - AM PEAK/PM PEAK HOUR VOLUMES

☼ - EXISTING TRAFFIC SIGNAL

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PROJ.: 080661-01-002

FIGURE 6C

THE COLLECTION AT HOPEWELL

2023 BUILD TRAFFIC VOLUMES

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

We conducted capacity analyses of this unsignalized intersection and found that the Dublin Road approach operates at Los C or better during both peak hours and under each analysis period (Existing, No Build and Build). These levels of service at this intersection are summarized in Tables 1A and 3A. The capacity analysis worksheets for this intersection are contained in Appendix B.

The incremental impact of potential travel to and from the schools is negligible. To provide a sensitivity analysis, we doubled the volumes to and from Dublin Road and found that the levels of service remained at LOS C. Therefore, the Collections at Hopewell development will not have any impact on the operations of the intersection of Dublin Road with CR 546.

Woodmont Federal Traffic

We have reviewed the traffic study prepared by Shropshire Associates, dated April 19, 2019, specifically the site generated traffic volumes and assignment. This project is located east of State Route 31 and south of Interstate 295. Limited traffic volumes (two-way volumes of 16 AM and 18 PM) were assigned to Bull Run Road and to Denow Road toward Route 31. Given these low intensities, this traffic would be included with the background traffic growth accounted for using an annual growth rate and does not any measurable impact on our analyses.

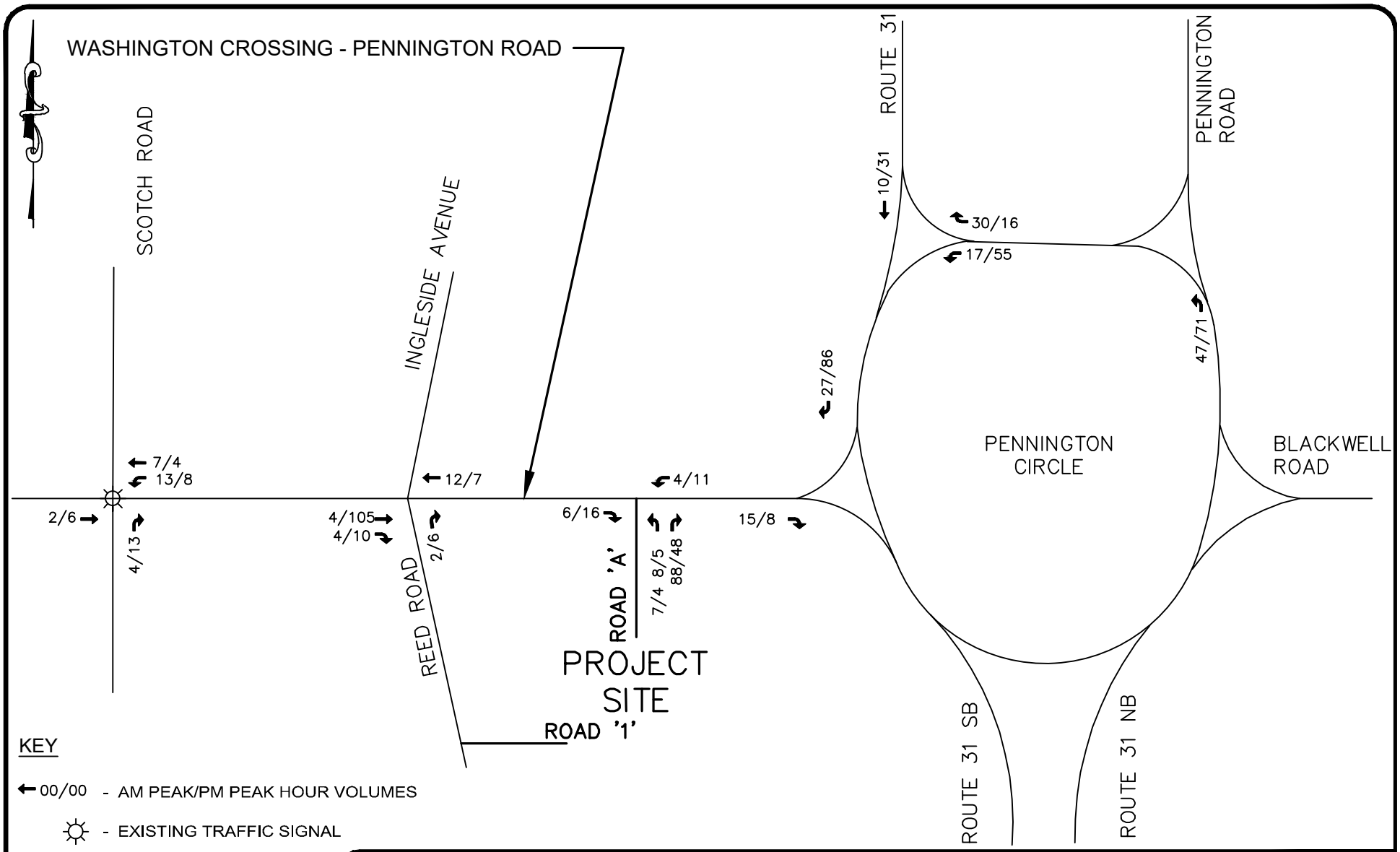
No Reed Road Access via Road 1

Should for any reason Road 1 not extend through Lot 9 to Reed Road, the circulation system for the Collections at Hopewell remains compliant with the Residential Site Improvement Standards (RSIS) as there is an emergency access to Diverty Road. This configuration is illustrated in Exhibit A-3.3 appended hereto.

As has been testified to, the boulevard road network (Road A and Road 1) is provided for stormwater management purposes and not to be compliant with RSIS. RSIS would permit these roads to be undivided and the circulation system would still comply. Further, the other internal streets loop to Road A and/or to Road 1. Nevertheless, we do acknowledge that the proposed boulevard style internal roads enhance safe operations of the internal circulation system in the unlikely event of a lane blockage.

From a traffic operational perspective, all site generated traffic would utilize the Road A intersection with CR 546. The modified trip assignment for this access configuration is illustrated in Figure 5B and the 2023 Build traffic volumes in Figure 6B. The level of service summary for the intersections of Road A and Reed Road/Ingleside Avenue with CR 546 are presented in Table 3B. As shown in this table, the intersection of Road A with CR 546 continues to operate at an acceptable level of service, LOS D or better during both peak hours even without the Reed Road access. The capacity analysis worksheets for the access configuration without the Reed Road access are contained in Appendix C. We have also reviewed the number of vehicles that may queue in the left turn lane for Road A and there is no change in the queue length, remaining below one vehicle on average.

V:\080661 - Zaitz Parcel Residential-Hopewell Twp\080661-01-002 (ENG) - Lennar-Zaitz Parcel Res-Hopewell Twp\Engineering\Engineering Plans\Traffic Figures\080661-Traffic Figures.dwg 07/06/21 01:29:32PM, rnutakor, LAYOUT:SITE GENERATED 5B



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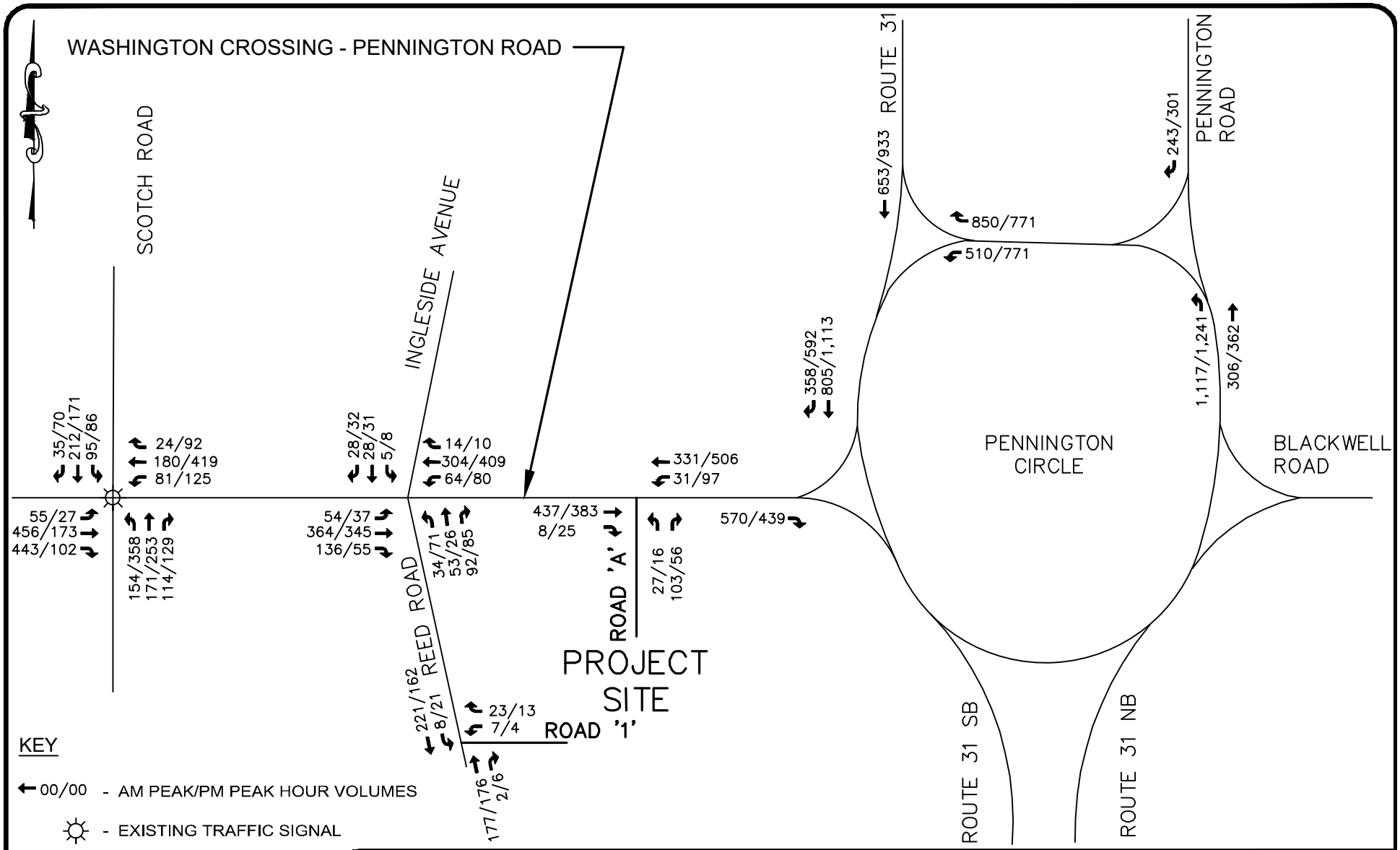
DATE: 11/10/2020
CHKD.:
PROJ.: 080661-01-002

FIGURE 5B
THE COLLECTION AT HOPEWELL
SITE GENERATED TRAFFIC VOLUMES
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

V:\080661 - Zaitz Parcel Residential-Hopewell Twp\080661-01-002 (ENG) - Lennar-Zaitz Parcel Res-Hopewell Twp\Engineering\Engineering Plans\Traffic Figures\080661-Traffic Figures.dwg 07/06/21 01:30:36PM, rnutakor, LAYOUT:BUILD TRAFFIC 6B



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DATE: 11/10/2020
CHKD.:
PROJ.: 080661-01-002

FIGURE 6B
THE COLLECTION AT HOPEWELL
2023 BUILD TRAFFIC VOLUMES
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

TABLE 3B - LEVEL OF SERVICE / AVERAGE VEHICLE DELAY COMPARISON - NO BUILD & BUILD CONDITIONS
(Without Reed Road Access)
THE COLLECTION AT HOPEWELL, TOWNSHIP OF HOPEWELL, MERCER COUNTY

BCG 080661-01-002 6/30/2021

Intersection	2023 No Build Condition							2023 Build Condition						
		AM PEAK			PM PEAK				AM PEAK			PM PEAK		
	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service	LANE GROUP	V/C Ratio	Delay (sec)	Levels of Service	V/C Ratio	Delay (sec)	Levels of Service
Washington Crossing-Pennington Rd. (CR 546) & Ingleside Ave. (CR 631)/Reed Rd. (Unsignalized)	EB-L	0.05	8.2	A	0.04	8.3	A	EB-L	0.05	8.3	A	0.04	8.3	A
	WB-L	0.06	8.8	A	0.07	8.5	A	WB-L	0.07	8.9	A	0.08	8.5	A
	NB-LT	0.58	52.7	F	0.70	72.6	F	NB-LT	0.63	62.0	F	0.76	87.0	F
	NB-R	0.18	12.8	B	0.13	11.1	B	NB-R	0.18	12.9	B	0.14	11.4	B
	SB-LTR	0.29	25.9	D	0.30	24.9	C	SB-LTR	0.31	28.3	D	0.32	26.8	D
Washington Crossing-Pennington Rd. (CR 546) & Road 'A' (Unsignalized)	WB-L							WB-L	0.03	8.5	A	0.09	8.5	A
	NB-L							NB-L	0.11	18.9	C	0.09	25.0	D
	NB-R							NB-R	0.20	12.7	B	0.09	11.2	B

(1) For merge and diverge conditions, the first V/C ratio is for the highway and the second is for the ramp

The impact of the additional site traffic at the Reed Road/Ingleside Avenue intersection with CR 546 remains negligible. We note that the northbound Reed Road left turn/through movement remains at LOS F as it is calculated to do so under No Build conditions with or without The Collections having access to Reed Road. The incremental site traffic volumes through this intersection decrease somewhat when compared to providing the access to Reed Road.

Road A and Road 4 Signing & Striping Exhibit

We have prepared an exhibit illustrating our recommendation to address the Planning Board's comments regarding traffic flow at this intersection. This is presented in Exhibit A-20 appended hereto and proposes yellow median striping to reinforce and guide traffic through this curve. In addition, we propose a sharp curve warning sign in advance in each direction with a 5 MPH advisory speed. We are also recommending a "big arrow" sign for the southbound traffic on Road A to reinforce that the road makes a bend to the right.

In summary, it remains our professional opinion that the traffic generated by the Collections at Hopewell can be accommodated on the existing street network and that the incremental impacts are negligible. Further, while we believe that the Road 1 connection to Reed Road is a satisfactory arrangement from an on-site and off-site circulation and mobility perspective, it is not necessary from either an RSIS or traffic operations perspective.

Sincerely,
BOWMAN CONSULTING GROUP, LTD.

Eric L. Keller, P.E., P.P., LEED AP
Vice President
ekeller@bowman.com

Attachments

Cc: Mitch Newman, Lennar
Frank Petrino, Esq.
Creigh Rahenkamp
S. Delany



THESE PLANS ARE NOT TO BE USED FOR BID OR CONSTRUCTION

PLANS ARE FINAL FOR SANITARY SEWER AND WATER MAIN DESIGN

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL

OVERALL SITE PLAN

RENDERING W/O ROAD TO REED RD

BLOCK 85, LOT 3 AND BLOCK 86, LOTS 32-34 & 130

TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

Bowman

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SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PROJ.: 080661-F1-001
DATE: 7.1.2021
CHKD: SAD

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SHEET No. 1 OF 1

REVISION	DATE	CHKD
12		
11		
10		
9		
8		
7		

REVISION	DATE	CHKD
6		
5		
4		
3		
2		
1		

EXHIBIT A-20

MULTI-FAMILY BLDG. 3

MULTI-FAMILY BLDG. 4

COAH 4

PARKWAY 2 (PRIVATE)

PARKWAY 2 (PRIVATE)

PARKWAY 3 (PRIVATE)

ROAD A (PUBLIC)

ROAD A (PUBLIC)

ROAD A (PUBLIC)

ROAD 3 (PRIVATE)

ROAD 4 (PRIVATE)

YIELD

YIELD

W1-1A

W1-1A

W1-6

1219
249.59
ANWELL

W1-1A
36"x36"
5 MPH
LEFT AND RIGHT ARROW

W1-6
48"x24"
RIGHT ARROW

SCALE: 1"=30'
0 30 60 120 ft.

12			
11			
10			
9			
8			
7			

6			
5			
4			
3			
2			
1			

REVISION DATE CHKD

PROJ. 080661-F1-001
DATE: 7-1-2021
DRAWN BY: JCO

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No. 24GA28029900

SEAN A. DELANY, N.J. Professional Engineer, Lic. 24GE04447100

PRELIMINARY & FINAL MAJOR SUBDIVISION AND PRELIMINARY & FINAL SITE PLAN

THE COLLECTION at HOPEWELL

TRAFFIC WARNING MEASURES W/ RECREATIONAL AREA EXHIBIT

BLOCK 85, LOT 3; BLOCK 86, LOTS 32-34 &130; AND PART OF BLOCK 85, LOT 9
TOWNSHIP OF HOPEWELL, MERCER COUNTY, NEW JERSEY

SHEET No. 1 OF 1

X:\080661 - Zoltz Parcel Residential-Hopewell Twp\080661-01-002 (ENG) - Lennar-Zoltz Parcel Res-Hopewell Twp\Engineering\Exhibits\RecreationAreas-2021-06-11_REV.dwg 07/02/21 10:01:21AM, courtmell, LAYOUT: A-20-STRIPING
XREF: (R-ADMIN.dwg, R-FSTA.dwg, TM-LENNAR-ZAZ-2.dwg

APPENDIX A
UPDATED CAPACITY ANALYSIS WORKSHEETS – CORRECTED TRUCK PERCENTAGES

HCS7 Two-Way Stop-Control Report

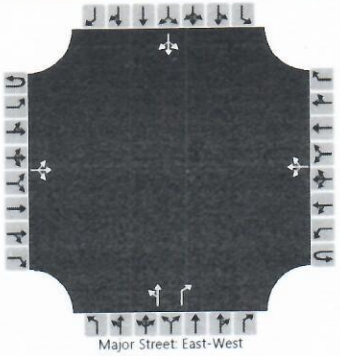
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2020
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		46	268	132		55	245	14		33	51	87		5	27	25
Percent Heavy Vehicles (%)		11				3				3	0	13		1	7	4
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.21				4.13				7.13	6.50	6.33		7.11	6.57	6.24
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.30				2.23				3.53	4.00	3.42		3.51	4.07	3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		52				62				94		98			64	
Capacity, c (veh/h)		1221				1106				226		647			302	
v/c Ratio		0.04				0.06				0.42		0.15			0.21	
95% Queue Length, Q_{95} (veh)		0.1				0.2				1.9		0.5			0.8	
Control Delay (s/veh)		8.1				8.4				31.9		11.5			20.1	
Level of Service (LOS)		A				A				D		B			C	
Approach Delay (s/veh)	1.3				1.9				21.5				20.1			
Approach LOS									C				C			

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HCS7 Two-Way Stop-Control Report

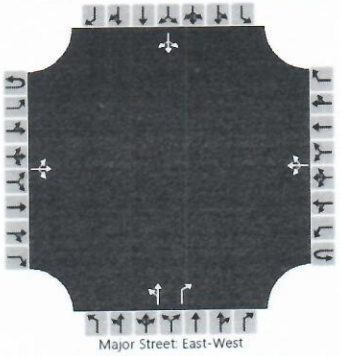
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2020
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		32	272	53		74	315	10		69	25	77		8	30	24
Percent Heavy Vehicles (%)		0				8				8	7	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.18				7.18	6.57	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.27				3.57	4.06	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34				80				101		83			67	
Capacity, c (veh/h)		1221				1177				204		725			305	
v/c Ratio		0.03				0.07				0.50		0.11			0.22	
95% Queue Length, Q_{95} (veh)		0.1				0.2				2.5		0.4			0.8	
Control Delay (s/veh)		8.0				8.3				38.9		10.6			20.1	
Level of Service (LOS)		A				A				E		B			C	
Approach Delay (s/veh)	1.0				2.1				26.1				20.1			
Approach LOS									D				C			

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1170	435
Peak Hour Factor (PHF)	0.93	0.90
Total Trucks, %	10.70	6.80
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.936
Flow Rate (vi),pc/h	1393	516
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.50	0.14

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.342
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1393	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1909	Average Density (D), pc/mi/ln	21.7
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	19.6

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HCS7 Freeway Merge Report

Project Information

Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data

TRUCK %'s CORRECT

	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi)	1664	632
Peak Hour Factor (PHF)	0.99	0.93
Total Trucks, %	4.20	0.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.993
Flow Rate (vi),pc/h	1751	684
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.64	0.18

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.361
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (VOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	43.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1751	Ramp Junction Speed (S), mi/h	43.9
Flow Entering Ramp-Infl. Area (vR12), pc/h	2435	Average Density (D), pc/mi/ln	27.7
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	23.6

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	746	349
Peak Hour Factor (PHF)	0.93	0.85
Total Trucks, %	11.30	11.20
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.898	0.899
Flow Rate (vi),pc/h	893	457
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.36	0.24

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.334
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	893	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1350	Average Density (D), pc/mi/ln	15.3
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	15.6

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

TRUCK %'s CORRECT

Geometric Data	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right
Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Demand and Capacity		
Demand Volume (Vi)	1050	322
Peak Hour Factor (PHF)	0.99	0.90
Total Trucks, %	4.20	0.50
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.995
Flow Rate (vi),pc/h	1105	360
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.39	0.19

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.335
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (VOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1105	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1465	Average Density (D), pc/mi/ln	16.6
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	16.5

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2020
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	746	274
Peak Hour Factor (PHF)	0.93	0.94
Total Trucks, %	11.30	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.898	0.917
Flow Rate (vi),pc/h	893	318
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.24	0.17

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.587
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	893	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	10.3
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	11.5

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HCS7 Freeway Diverge Report

Project Information

Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2020 Existing
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi)	1050	414
Peak Hour Factor (PHF)	0.99	0.89
Total Trucks, %	4.40	3.10
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.958	0.970
Flow Rate (vi),pc/h	1107	480
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.29	0.25

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.601
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1107	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	12.8
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	13.3

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HCS7 Two-Way Stop-Control Report

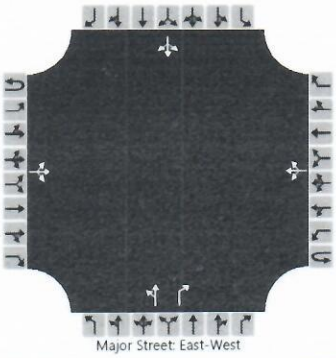
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2023
Time Analyzed	AM Peak - 2023 No Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		54	358	136		57	284	14		34	53	90		5	28	28
Percent Heavy Vehicles (%)		11				3				3	0	13		1	7	4
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.21				4.13				7.13	6.50	6.33		7.11	6.57	6.24
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.30				2.23				3.53	4.00	3.42		3.51	4.06	3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		61				64				98		101			69	
Capacity, c (veh/h)		1176				1010				168		565			240	
v/c Ratio		0.05				0.06				0.58		0.18			0.29	
95% Queue Length, Q_{95} (veh)		0.2				0.2				3.1		0.6			1.1	
Control Delay (s/veh)		8.2				8.8				52.7		12.8			25.9	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.4				2.0				32.4				25.9			
Approach LOS									D				D			

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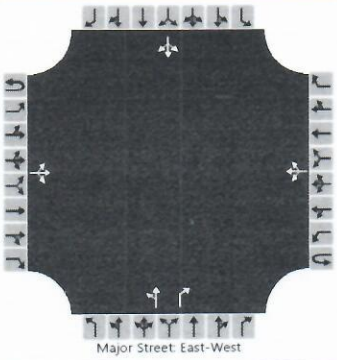
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	LDK	Intersection	WC-Penn/Reed/Ingleside
Agency/Co.	Bowman Consulting Group	Jurisdiction	County
Date Performed	6/30/21	East/West Street	Washington X-ing-Penningt
Analysis Year	2023	North/South Street	Reed/Ingleside (631)
Time Analyzed	PM Peak - 2023 No Build	Peak Hour Factor	0.93
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	The Collection at Hopewell		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		37	326	55		76	397	10		71	26	79		8	31	32
Percent Heavy Vehicles (%)		0				8				8	7	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized									No							
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.18				7.18	6.57	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.27				3.57	4.06	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40				82				104		85			76	
Capacity, c (veh/h)		1133				1120				148		671			256	
v/c Ratio		0.04				0.07				0.70		0.13			0.30	
95% Queue Length, Q_{95} (veh)		0.1				0.2				4.1		0.4			1.2	
Control Delay (s/veh)		8.3				8.5				72.6		11.1			24.9	
Level of Service (LOS)		A				A				F		B			C	
Approach Delay (s/veh)	1.1				2.0				45.0				24.9			
Approach LOS									E				C			

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1286	493
Peak Hour Factor (PHF)	0.93	0.90
Total Trucks, %	10.70	6.80
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.936
Flow Rate (vi),pc/h	1531	585
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.56	0.15

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.348
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1531	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	2116	Average Density (D), pc/mi/ln	24.0
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	21.2

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data	TRUCK %'s CORRECT	
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1804	716
Peak Hour Factor (PHF)	0.99	0.93
Total Trucks, %	4.20	0.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.993
Flow Rate (vi),pc/h	1898	775
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.70	0.20

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.372
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	43.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1898	Ramp Junction Speed (S), mi/h	43.9
Flow Entering Ramp-Infl. Area (vR12), pc/h	2673	Average Density (D), pc/mi/ln	30.4
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	25.4

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	805	437
Peak Hour Factor (PHF)	0.93	0.85
Total Trucks, %	11.30	11.20
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.898	0.899
Flow Rate (vi),pc/h	964	572
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.40	0.30

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.337
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (VOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	964	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1536	Average Density (D), pc/mi/ln	17.5
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.0

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

TRUCK %'s CORRECT

Geometric Data	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right
Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Demand and Capacity		
Demand Volume (Vi)	1113	383
Peak Hour Factor (PHF)	0.99	0.90
Total Trucks, %	4.20	0.50
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.995
Flow Rate (vi),pc/h	1171	428
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.42	0.23

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.338
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1171	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1599	Average Density (D), pc/mi/ln	18.2
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.5

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HCS7 Freeway Diverge Report

Project Information

Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi)	805	331
Peak Hour Factor (PHF)	0.93	0.94
Total Trucks, %	11.30	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.898	0.917
Flow Rate (vi),pc/h	964	384
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.25	0.20

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.593
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (VOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	964	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	11.2
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	12.1

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 No Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	506
Peak Hour Factor (PHF)	0.99	0.89
Total Trucks, %	4.40	3.10
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.958	0.970
Flow Rate (vi),pc/h	1174	586
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.31	0.31

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.611
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (VOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1174	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	13.6
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	13.9

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HCS7 Two-Way Stop-Control Report

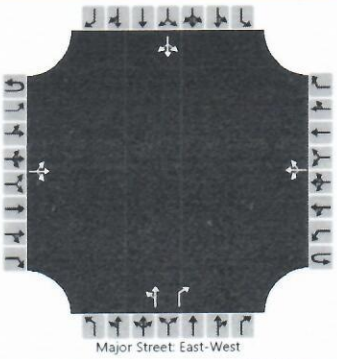
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2023
Time Analyzed	AM Peak - 2023 Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		54	360	140		57	296	14		42	68	90		5	32	28
Percent Heavy Vehicles (%)		11				3				3	0	13		1	7	4
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.21				4.13				7.13	6.50	6.33		7.11	6.57	6.24
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.30				2.23				3.53	4.00	3.42		3.51	4.07	3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		61				64				124		101			73	
Capacity, c (veh/h)		1162				1006				161		562			222	
v/c Ratio		0.05				0.06				0.77		0.18			0.33	
95% Queue Length, Q_{95} (veh)		0.2				0.2				4.9		0.7			1.4	
Control Delay (s/veh)		8.3				8.8				77.4		12.8			29.0	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.4				2.0				48.3				29.0			
Approach LOS									E				D			

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HCS7 Two-Way Stop-Control Report

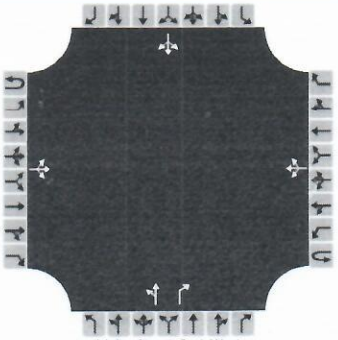
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2023
Time Analyzed	PM Peak - 2023 Build
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		37	335	65		76	404	10		76	34	79		8	42	32
Percent Heavy Vehicles (%)		0				8				8	7	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.18				7.18	6.57	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.27				3.57	4.06	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40				82				118		85			88	
Capacity, c (veh/h)		1126				1101				136		658			233	
v/c Ratio		0.04				0.07				0.87		0.13			0.38	
95% Queue Length, Q_{95} (veh)		0.1				0.2				5.6		0.4			1.7	
Control Delay (s/veh)		8.3				8.5				107.2		11.3			29.5	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.1				2.0				67.1				29.5			
Approach LOS									F				D			

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1306	510
Peak Hour Factor (PHF)	0.93	0.90
Total Trucks, %	10.70	6.80
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.903	0.936
Flow Rate (vi),pc/h	1555	605
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.57	0.16

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.350
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1555	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	2160	Average Density (D), pc/mi/ln	24.5
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	21.5

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/Circle WB - The Collection at Hopewell BCG 080661-01-002		

TRUCK %'S CORRECT

Geometric Data	Freeway	Ramp
Number of Lanes (N), ln	2	2
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	100
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Left
Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Demand and Capacity		
Demand Volume (Vi)	1866	771
Peak Hour Factor (PHF)	0.99	0.93
Total Trucks, %	4.20	0.70
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.993
Flow Rate (vi),pc/h	1963	835
Capacity (c), pc/h	3800	3800
Volume-to-Capacity Ratio (v/c)	0.74	0.22

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.380
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (VOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	43.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (V12), pc/h	1963	Ramp Junction Speed (S), mi/h	43.9
Flow Entering Ramp-Infl. Area (VR12), pc/h	2798	Average Density (D), pc/mi/ln	31.9
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	26.4

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HCS7 Freeway Merge Report

Project Information

Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi)	805	525
Peak Hour Factor (PHF)	0.93	0.85
Total Trucks, %	11.30	11.20
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.898	0.899
Flow Rate (vi),pc/h	964	687
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.43	0.36

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.339
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	964	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1651	Average Density (D), pc/mi/ln	18.8
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.8

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HCS7 Freeway Merge Report

Project Information			
Analyst	LDK	Date	11/10/2020
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 EB - The Collection at Hopewell BCG 080661-01-002		

TRUCK %'s CORRECT

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	383
Peak Hour Factor (PHF)	0.99	0.90
Total Trucks, %	4.20	0.50
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.960	0.995
Flow Rate (vi),pc/h	1171	428
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.42	0.23

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (MS)	0.338
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influenece Area Speed (SR), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1171	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	1599	Average Density (D), pc/mi/ln	18.2
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.5

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HCS7 Freeway Diverge Report

Project Information

Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	AM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

	Freeway	Ramp
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

	Freeway	Ramp
Demand Volume (Vi)	805	358
Peak Hour Factor (PHF)	0.93	0.94
Total Trucks, %	11.30	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.898	0.917
Flow Rate (vi),pc/h	964	415
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.25	0.22

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.595
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	964	Ramp Junction Speed (S), mi/h	43.2
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	11.2
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	12.1

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HCS7 Freeway Diverge Report

Project Information			
Analyst	LDK	Date	6/30/21
Agency	Bowman Consulting Group	Analysis Year	2023 Build
Jurisdiction	NJDOT	Time Period Analyzed	PM Peak
Project Description	Rt 31 SB/CR 546 WB - The Collection at Hopewell BCG 080661-01-002		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Deceleration Length (LA),ft	1500	50
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1113	592
Peak Hour Factor (PHF)	0.99	0.89
Total Trucks, %	4.40	3.10
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.958	0.970
Flow Rate (vi),pc/h	1174	686
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.31	0.36

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	-	Number of Outer Lanes on Freeway (NO)	0
Distance to Upstream Ramp (LUP), ft	-	Speed Index (DS)	0.620
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	Off-Ramp Influenece Area Speed (SR), mi/h	43.1
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	1.000	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	1174	Ramp Junction Speed (S), mi/h	43.1
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	13.6
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	13.9

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APPENDIX B
CAPACITY ANALYSIS WORKSHEETS – CR 546/DUBLIN ROAD

HCS7 Two-Way Stop-Control Report

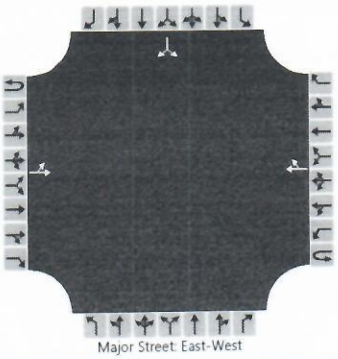
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	7/1/2021
Analysis Year	2021
Time Analyzed	AM Peak - Existing
Intersection Orientation	East-West
Project Description	The Collections at Hopewell BCG #080661-01-002

Site Information

Intersection	CR 546/Dublin Road
Jurisdiction	County
East/West Street	CR 546
North/South Street	Dublin Rd
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		18	259				339	22						25		16
Percent Heavy Vehicles (%)		1												1		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.41		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		22													50	
Capacity, c (veh/h)		1125													427	
v/c Ratio		0.02													0.12	
95% Queue Length, Q_{95} (veh)		0.1													0.4	
Control Delay (s/veh)		8.3													14.6	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)	0.7												14.6			
Approach LOS													B			

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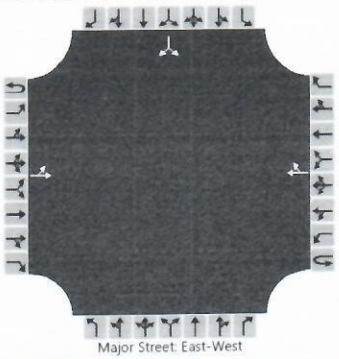
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	LDK	Intersection	CR 546/Dublin Road
Agency/Co.	Bowman Consulting Group	Jurisdiction	County
Date Performed	7/1/2021	East/West Street	CR 546
Analysis Year	2021	North/South Street	Dublin Rd
Time Analyzed	PM Peak - Existing	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	The Collections at Hopewell BCG #080661-01-002		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		17	526				368	30						22		19
Percent Heavy Vehicles (%)		1												1		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.41		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18													43	
Capacity, c (veh/h)		1146													367	
v/c Ratio		0.02													0.12	
95% Queue Length, Q_{95} (veh)		0.0													0.4	
Control Delay (s/veh)		8.2													16.1	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.4												16.1			
Approach LOS													C			

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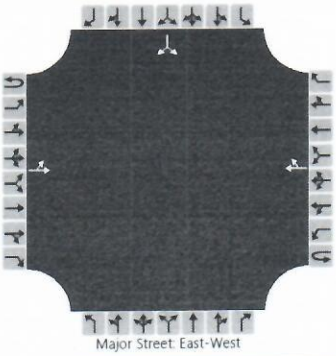
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	LDK	Intersection	CR 546/Dublin Road
Agency/Co.	Bowman Consulting Group	Jurisdiction	County
Date Performed	7/1/2021	East/West Street	CR 546
Analysis Year	2023	North/South Street	Dublin Rd
Time Analyzed	AM Peak - No Build	Peak Hour Factor	0.82
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	The Collections at Hopewell BCG #080661-01-002		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		18	337				368	22						26		16
Percent Heavy Vehicles (%)		1												1		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.41		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		22													51	
Capacity, c (veh/h)		1092													366	
v/c Ratio		0.02													0.14	
95% Queue Length, Q_{95} (veh)		0.1													0.5	
Control Delay (s/veh)		8.4													16.4	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.6												16.4			
Approach LOS													C			

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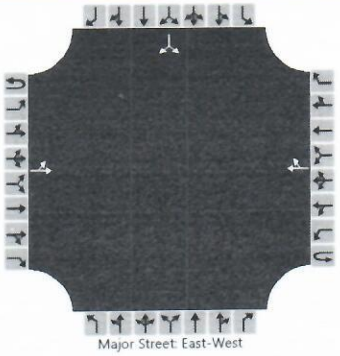
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	LDK	Intersection	CR 546/Dublin Road
Agency/Co.	Bowman Consulting Group	Jurisdiction	County
Date Performed	7/1/2021	East/West Street	CR 546
Analysis Year	2023	North/South Street	Dublin Rd
Time Analyzed	PM Peak - No Build	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	The Collections at Hopewell BCG #080661-01-002		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		17	577				442	31						22		19
Percent Heavy Vehicles (%)		1												1		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.41		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18													43	
Capacity, c (veh/h)		1071													312	
v/c Ratio		0.02													0.14	
95% Queue Length, Q_{95} (veh)		0.1													0.5	
Control Delay (s/veh)		8.4													18.4	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.4												18.4			
Approach LOS													C			

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HCS7 Two-Way Stop-Control Report

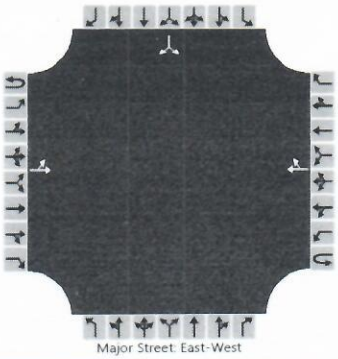
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	7/1/2021
Analysis Year	2023
Time Analyzed	AM Peak - Build
Intersection Orientation	East-West
Project Description	The Collections at Hopewell BCG #080661-01-002

Site Information

Intersection	CR 546/Dublin Road
Jurisdiction	County
East/West Street	CR 546
North/South Street	Dublin Rd
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		18	341				383	42						41		21
Percent Heavy Vehicles (%)		1												1		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.41		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		22													76	
Capacity, c (veh/h)		1053													340	
v/c Ratio		0.02													0.22	
95% Queue Length, Q_{95} (veh)		0.1													0.8	
Control Delay (s/veh)		8.5													18.6	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.6												18.6			
Approach LOS													C			

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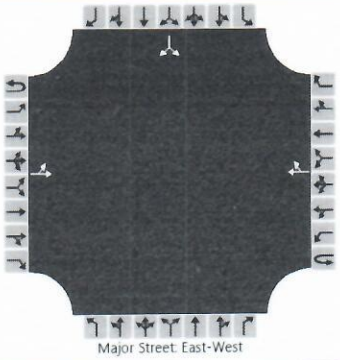
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	LDK	Intersection	CR 546/Dublin Road
Agency/Co.	Bowman Consulting Group	Jurisdiction	County
Date Performed	7/1/2021	East/West Street	CR 546
Analysis Year	2023	North/South Street	Dublin Rd
Time Analyzed	PM Peak - Build	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	The Collections at Hopewell BCG #080661-01-002		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		17	596				452	38						27		21
Percent Heavy Vehicles (%)		1												1		1
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.41		6.21
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18													51	
Capacity, c (veh/h)		1055													293	
v/c Ratio		0.02													0.17	
95% Queue Length, Q_{95} (veh)		0.1													0.6	
Control Delay (s/veh)		8.5													19.8	
Level of Service (LOS)		A													C	
Approach Delay (s/veh)	0.4												19.8			
Approach LOS													C			

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APPENDIX C
CAPACITY ANALYSIS WORKSHEETS – NO REED ROAD ACCESS

HCS7 Two-Way Stop-Control Report

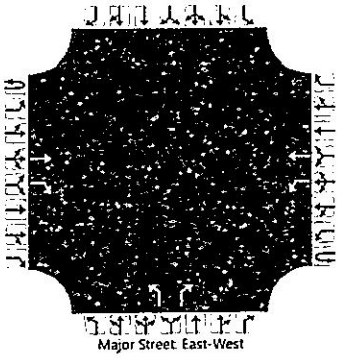
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	5/12/21
Analysis Year	2023
Time Analyzed	AM Peak (Build No Reed Rd
Intersection Orientation	East-West
Project Description	The Collection at Hopewell BCG #080661-01-002

Site Information

Intersection	WC-P/Road A
Jurisdiction	County
East/West Street	Washington-X-ing/Penningt
North/South Street	Road A
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			437	8		31	331			27		103				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No								No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						35				30		116				
Capacity, c (veh/h)						1075				288		582				
v/c Ratio						0.03				0.11		0.20				
95% Queue Length, Q_{95} (veh)						0.1				0.3		0.7				
Control Delay (s/veh)						8.5				18.9		12.7				
Level of Service (LOS)						A				C		B				
Approach Delay (s/veh)						0.7				14.0						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

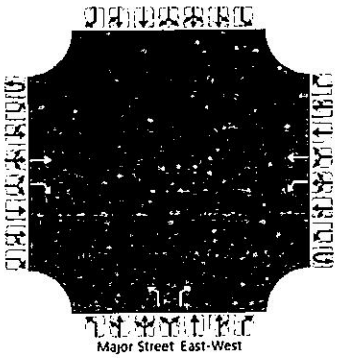
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	5/12/21
Analysis Year	2023
Time Analyzed	PM Peak(Build No Reed Rd)
Intersection Orientation	East-West
Project Description	The Collection at Hopewell BCG #080661-01-002

Site Information

Intersection	WC-P/Road A
Jurisdiction	County
East/West Street	Washington-X-ing/Penningt
North/South Street	Road A
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			383	25		97	506			16		56				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No								No						
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						104				17		60				
Capacity, c (veh/h)						1132				197		644				
v/c Ratio						0.09				0.09		0.09				
95% Queue Length, Q_{95} (veh)						0.3				0.3		0.3				
Control Delay (s/veh)						8.5				25.0		11.2				
Level of Service (LOS)						A				D		B				
Approach Delay (s/veh)						1.4				14.2						
Approach LOS										B						

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HCS7 Two-Way Stop-Control Report

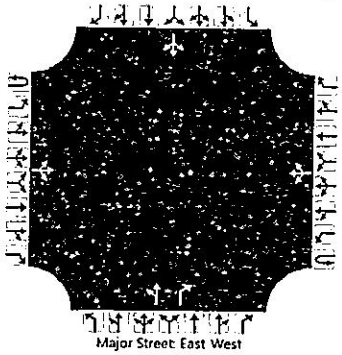
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2023
Time Analyzed	AM Peak - Build (No Reed)
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		54	364	136		64	304	14		34	53	92		5	28	28
Percent Heavy Vehicles (%)		11				3				3	0	13		0	7	4
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.21				4.13				7.13	6.50	6.33		7.10	6.57	6.24
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.30				2.23				3.53	4.00	3.42		3.50	4.07	3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		61				72				98		103			69	
Capacity, c (veh/h)		1153				1006				154		560			222	
v/c Ratio		0.05				0.07				0.63		0.18			0.31	
95% Queue Length, Q_{95} (veh)		0.2				0.2				3.5		0.7			1.3	
Control Delay (s/veh)		8.3				8.9				62.0		12.9			28.3	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.4				2.1				36.8				28.3			
Approach LOS									E				D			

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HCS7 Two-Way Stop-Control Report

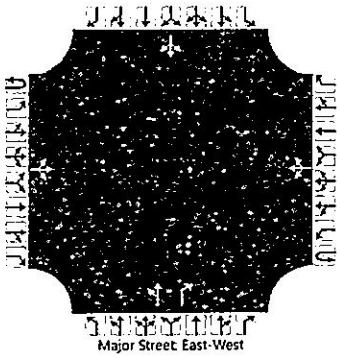
General Information

Analyst	LDK
Agency/Co.	Bowman Consulting Group
Date Performed	6/30/21
Analysis Year	2023
Time Analyzed	PM Peak - Build (No Reed)
Intersection Orientation	East-West
Project Description	The Collection at Hopewell

Site Information

Intersection	WC-Penn/Reed/Ingleside
Jurisdiction	County
East/West Street	Washington X-ing-Penningt
North/South Street	Reed/Ingleside (631)
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	1		0	1	0
Configuration			LTR				LTR			LT		R			LTR	
Volume (veh/h)		37	345	55		80	409	10		71	26	85		8	31	32
Percent Heavy Vehicles (%)		0				8				8	7	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized										No						
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.18				7.18	6.57	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.27				3.57	4.06	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		40				86				104		91			76	
Capacity, c (veh/h)		1121				1101				137		654			240	
v/c Ratio		0.04				0.08				0.76		0.14			0.32	
95% Queue Length, Q_{95} (veh)		0.1				0.3				4.5		0.5			1.3	
Control Delay (s/veh)		8.3				8.5				87.0		11.4			26.8	
Level of Service (LOS)		A				A				F		B			D	
Approach Delay (s/veh)	1.1				2.1				51.7				26.8			
Approach LOS									F				D			

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