

Stormwater Management Report

for

**108, 112, 118, 122-126 South Avenue East
& 32 High Street**

Block 478, Lots 2, 3, 4, 5 & 6

2 Chestnut Street

Township of Cranford

Union County, New Jersey



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1.0 INTRODUCTION

This report contains the stormwater management calculations required by the Local, County, and State agencies for their review of the Preliminary and Final Major Site Plan for 108-126 South Avenue East, 32 and 41 High Street, currently known as Block 478, Lots 2, 3, 4, 5, and 6 (Tract -1) and 2 Chestnut Street, and Township property at Block 483 Lots 18 and 17.01 (Track-2) in the Township of Cranford, Union County, New Jersey. The property is located within the Downtown Transition (D-T) District, Core, and Business Zone Township’s Zoning Map and has a total area of 0.803 acres (Tract-1), and 0.12 acres (portion of Tract-2, Block 483, lot 18). Tract-1 is occupied by four (4) one-story masonry and frame commercial buildings, and Tract-2 is occupied by a one (1) 2.5 story three-family residential home, and municipal parking lot. The project proposes a Mixed-use development, with associated parking areas.

2.0 EXISTING CONDITIONS

Tract-1:

Tract-1 is located on S. Avenue east. Based on the NRCS web soil survey map for Union County, the soils within the project are Urban Land (UL) with hydrologic group rating D. A copy of the soils map can be found in Appendix A.

Under existing conditions, the project site has a total drainage area of 34,988 SF with 33,195 SF of impervious cover consisting of roof areas, walkways, and parking areas. The project site is divided into three subdrainage areas. Drainage Area 1 (17,675 SF) and Drainage Area 2 (12,797 SF) drain towards the south, where runoff is collected by three inlets. Drainage Area 3 (4,516 SF) drains to South Avenue, where runoff is collected by the municipal conveyance system.

The following table summarizes the pre-development peak runoff rates from the proposed site.

Table 3.1

Summary of Pre-Development Peak Runoff Rates: Drainage Areas 1 and 2 (South of Site)	
2-Yr. Storm (cfs)	10-Yr. Storm (cfs)
2.18	3.38

Table 3.2

Summary of Pre-Development Peak Runoff Rates: Drainage Area 3 (South Avenue)	
2-Yr. Storm (cfs)	10-Yr. Storm (cfs)
0.33	0.51

Detailed computations are presented in Appendix B of this report.

Tract-2:

Tract 2 is a 5,080 Sf (approximately 0.12 acre) tract of land which is bordered to the north by Chestnut street and to the west by a municipal parking lot. The site is presently occupied by single family dwelling and associated driveway.

3.0 PROPOSED CONDITIONS

The project consists of a multi-family residential building, associated parking area, and an underground detention basin. The project will include the removal of existing single-story masonry buildings and a commercial building. The proposed facility will result in a land disturbance of 0.89 acres; however, there will be a marginal decrease in impervious cover. The project is classified as a minor development and does not require compliance with New Jersey Stormwater Management Rules at N.J.A.C. 7:8. Per discussions with the Township stormwater engineer, the project will maintain existing flows to South Avenue for the 2-Yr. and 10-Yr. Storms.

In the proposed condition, all impervious stormwater runoff (building roof area) will be directed to an underground detention basin below the parking area adjacent to South Avenue. Most of the parking area will be covered by the building roof that will direct the water towards the basin. The basin will attenuate discharge to the existing municipal stormwater conveyance system on South Avenue. The following sections detail the site’s compliance with the NJSMR and requests from the Township stormwater engineer.

For Tract 2, the proposed development involves the removal of the existing dwelling unit and conversion of the lot to a parking lot connecting to the municipal parking lot to provide the additional parking required for the proposed development on Tract 1.

3.1 Water Quantity Control

Tract-1:

In the proposed condition, the site will drain to an underground detention basin below the parking

area adjacent to South Avenue, which will in turn discharge to existing municipal stormwater conveyance system. In accordance with the township’s stormwater ordinance, the detention basin was designed to attenuate discharge to the existing municipal stormwater conveyance system on South Avenue. The following table summarizes the estimated peak inflows, outflows, and water surface elevations for the underground detention basin.

Table 4.1

UNDERGROUND DETENTION BASIN SUMMARY		
Storm Frequency	2-Yr. Storm	10-Yr. Storm
Peak Inflow (cfs)	2.53	3.90
Peak Outflow (cfs)	0.24	0.51
Maximum Water Surface Elevation (ft)	60.50	61.50

As previously noted, the basin was designed in accordance with the township’s stormwater engineer’s requests to reduce the post-development peak runoff rates from the site. Table 4.2 presents a comparison of the existing versus the proposed runoff from the overall project site.

Table 4.2

Pre-Development vs. Post-Development Peak Runoff Rate towards South Avenue (cfs)			
Storm Frequency (Year)	Pre-Development Peak Runoff Rate (cfs)	Estimated Post-Development Peak Runoff Rate (cfs)	
2	0.33	0.24	O.K.
10	0.51	0.51	O.K.

Table 4.3

Pre-Development vs. Post-Development Peak Runoff Rate towards South of Site (cfs)			
Storm Frequency (Year)	Pre-Development Peak Runoff Rate (cfs)	Estimated Post-Development Peak Runoff Rate (cfs)	
2	2.18	0.00	O.K.
10	3.38	0.00	O.K.

Based upon Tables 4.2 and 4.3, the proposed outflows meet the requests of the Township of Cranford stormwater engineer. Detailed computations are presented in Appendix C of this report.

Tract-2:

The overall lot area is 0.170 acres; therefore, the overall site disturbance will be less than 1 acre. The project proposes a decrease in impervious cover of 39 square feet (0.001 acres) which will therefore decrease overall stormwater runoff. The project proposes an increase in motor vehicle surface of 3,667 SF (0.084 acres), which is less than a 0.25 acre increase. Therefore, the project does not meet the definition of a major development per N.J.A.C. 7:8 -1.2 and will not require compliance with the NJAC 7:8 New Jersey Stormwater Management Rules.

3.2 Water Quality Control

Tract-1:

The entirety of Tract 1 is proposed to be covered by non-total suspended solid (non-TSS) producing surfaces and therefore does not require water quality treatment.

Tract-2:

Per the requirements of the Township of Cranford, one Filterra manufactured stormwater treatment device is being proposed for the new parking area to provide water quality treatment for runoff generated by the New Jersey Water Quality Design Storm (1.25 inches in 2 hours). The devices were sized by the manufacturer to provide treatment for the Water Quality Storm, while allowing additional flow to bypass treatment to be collected by the municipal system.

3.3 Groundwater Recharge

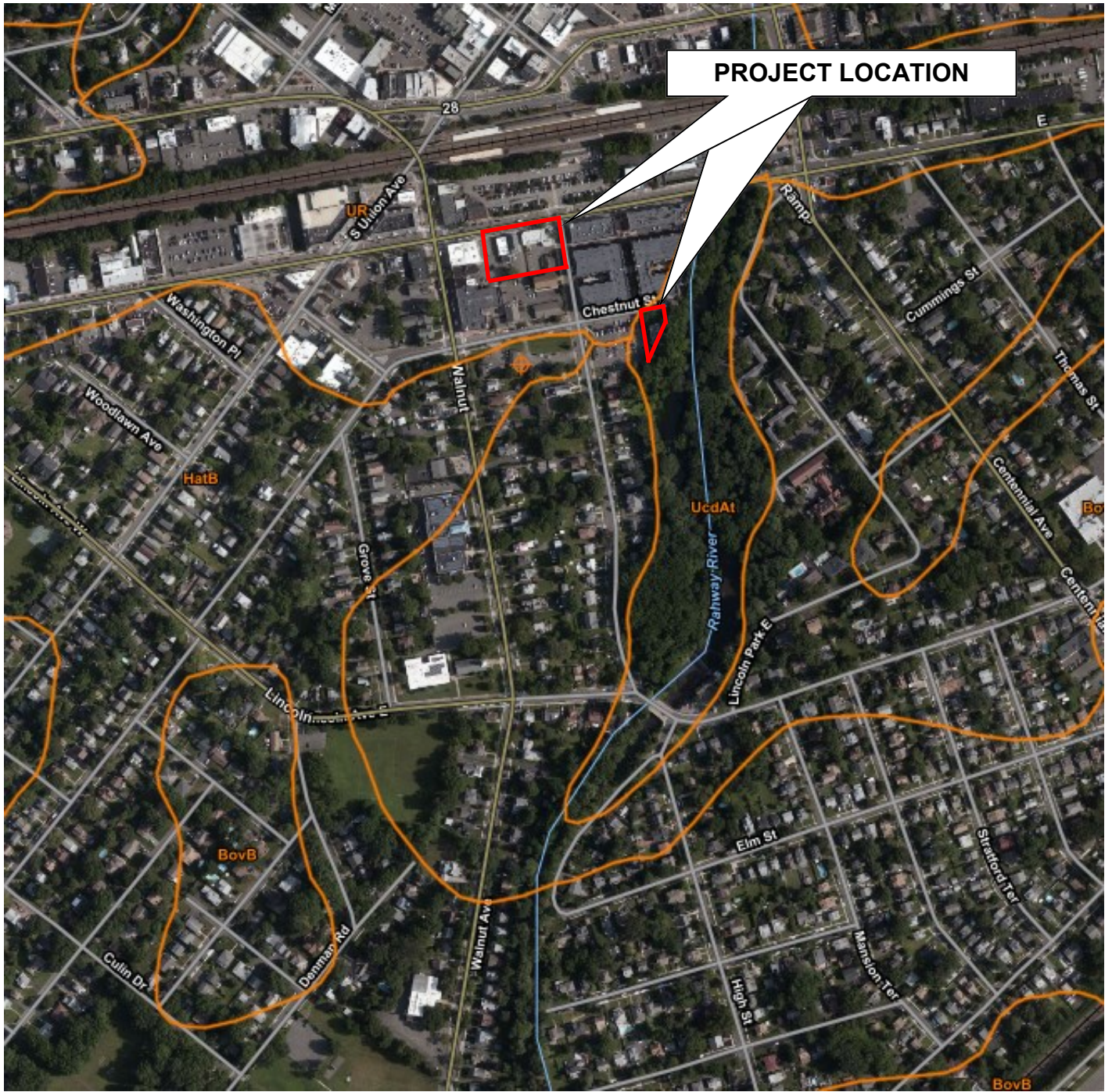
The Subject property is a developed site located within the Metropolitan State Planning Area, PA-1,

and is therefore not subject to groundwater recharge requirements.

4.0 CONCLUSION

Based upon the calculations present in this report, the proposed stormwater management system meets the requirements of the New Jersey Best Management Practices Manual and the requests of the Township's stormwater engineer.

APPENDIX A
Supporting Documents



SOIL MAP

MAP SOURCE : WEB SOIL SURVEY

Soils:

UR - Urban Land

UcdAt - Udifluvents, 0 to 3 percent slopes, frequently flooded



Preliminary and Final Site Plan
 108, 112, 118, 122-126 South Avenue East
 Block 478, Lots 2, 3, 4,5, and 6
 2 Chestnut Street Block 483, Lot 18
 Cranford Township

SCALE: AS SHOWN

DATE: December 2020

JOB No.: 16753.001

DRAWING No.: 1

APPENDIX B
Pre-Development Runoff Calculations

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
DA1-EX IMP	Pre-Development 2 year	2	4,190.000	727.000	1.18
DA1-EX IMP	Pre-Development 10 year	10	6,548.000	727.000	1.80
DA1-EX-PERV	Pre-Development 2 year	2	225.000	727.000	0.07
DA1-EX-PERV	Pre-Development 10 year	10	441.000	727.000	0.14
DA2-EX-IMP	Pre-Development 2 year	2	3,320.000	727.000	0.93
DA2-EX-IMP	Pre-Development 10 year	10	5,188.000	727.000	1.43
DA2-EX-PERV	Pre-Development 2 year	2	17.000	727.000	0.01
DA2-EX-PERV	Pre-Development 10 year	10	33.000	727.000	0.01
DA3-EX	Pre-Development 2 year	2	1,191.000	727.000	0.33
DA3-EX	Pre-Development 10 year	10	1,861.000	727.000	0.51

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
O-1	Pre-Development 2 year	2	1,191.000	727.000	0.33
O-1	Pre-Development 10 year	10	1,861.000	727.000	0.51
PROPERTY REAR	Pre-Development 2 year	2	7,752.000	727.000	2.18
PROPERTY REAR	Pre-Development 10 year	10	12,210.000	727.000	3.38

Subsection: Unit Hydrograph Summary
 Label: DA1-EX IMP
 Scenario: Pre-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.366 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	1.18 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	1.18 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.366 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.16 in
Runoff Volume (Pervious)	4,194.092 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	4,190.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.15 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-EX IMP
Scenario: Pre-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA1-EX IMP
 Scenario: Pre-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.366 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	1.81 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	1.80 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.366 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.93 in
Runoff Volume (Pervious)	6,553.766 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	6,548.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.15 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-EX IMP
Scenario: Pre-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA1-EX-PERV
 Scenario: Pre-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.040 acres
<hr/>	
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.07 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.07 ft ³ /s
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Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.040 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
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Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.55 in
Runoff Volume (Pervious)	224.995 ft ³
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Hydrograph Volume (Area under Hydrograph curve)	
Volume	225.000 ft ³
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SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.45 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-EX-PERV
Scenario: Pre-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA1-EX-PERV
 Scenario: Pre-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.040 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.14 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.14 ft ³ /s
Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.040 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.04 in
Runoff Volume (Pervious)	441.653 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	441.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.45 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-EX-PERV
Scenario: Pre-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	4.000 min
Unit receding limb, Tr	16.000 min
Total unit time, Tb	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA2-EX-IMP
 Scenario: Pre-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.290 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.93 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.93 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.290 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.16 in
Runoff Volume (Pervious)	3,323.188 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	3,320.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.29 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA2-EX-IMP
Scenario: Pre-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA2-EX-IMP
 Scenario: Pre-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.290 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	1.43 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	1.43 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.290 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.93 in
Runoff Volume (Pervious)	5,192.875 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	5,188.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.29 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA2-EX-IMP
Scenario: Pre-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	4.000 min
Unit receding limb, Tr	16.000 min
Total unit time, Tb	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA2-EX-PERV
 Scenario: Pre-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.003 acres
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Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.01 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.01 ft ³ /s
<hr/>	
Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.003 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
<hr/>	
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.55 in
Runoff Volume (Pervious)	16.875 ft ³
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Hydrograph Volume (Area under Hydrograph curve)	
Volume	17.000 ft ³
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SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.03 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA2-EX-PERV
Scenario: Pre-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA2-EX-PERV
 Scenario: Pre-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.003 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.01 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.01 ft ³ /s
Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.003 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.04 in
Runoff Volume (Pervious)	33.124 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	33.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.03 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA2-EX-PERV
Scenario: Pre-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	4.000 min
Unit receding limb, Tr	16.000 min
Total unit time, Tb	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA3-EX
 Scenario: Pre-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.104 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.33 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.33 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.104 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.16 in
Runoff Volume (Pervious)	1,191.764 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,191.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.18 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA3-EX
Scenario: Pre-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, Tp	4.000 min
Unit receding limb, Tr	16.000 min
Total unit time, Tb	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA3-EX
 Scenario: Pre-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.104 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.51 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.51 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.104 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.93 in
Runoff Volume (Pervious)	1,862.272 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,861.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.18 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA3-EX
Scenario: Pre-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Addition Summary
Label: O-1
Scenario: Pre-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA3-EX

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	DA3-EX	1,190.682	727.000	0.33
Flow (In)	O-1	1,190.682	727.000	0.33

Subsection: Addition Summary
Label: O-1
Scenario: Pre-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA3-EX

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	DA3-EX	1,860.619	727.000	0.51
Flow (In)	O-1	1,860.619	727.000	0.51

Subsection: Addition Summary
 Label: PROPERTY REAR
 Scenario: Pre-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Summary for Hydrograph Addition at 'PROPERTY REAR'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA1-EX-PERV
<Catchment to Outflow Node>	DA1-EX IMP
<Catchment to Outflow Node>	DA2-EX-PERV
<Catchment to Outflow Node>	DA2-EX-IMP

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	DA1-EX-PERV	224.666	727.000	0.07
Flow (From)	DA1-EX IMP	4,190.284	727.000	1.18
Flow (From)	DA2-EX-PERV	16.850	727.000	0.01
Flow (From)	DA2-EX-IMP	3,320.171	727.000	0.93
Flow (In)	PROPERTY REAR	7,751.970	727.000	2.18

Subsection: Addition Summary
 Label: PROPERTY REAR
 Scenario: Pre-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Summary for Hydrograph Addition at 'PROPERTY REAR'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA1-EX-PERV
<Catchment to Outflow Node>	DA1-EX IMP
<Catchment to Outflow Node>	DA2-EX-PERV
<Catchment to Outflow Node>	DA2-EX-IMP

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	DA1-EX-PERV	441.091	727.000	0.14
Flow (From)	DA1-EX IMP	6,547.949	727.000	1.80
Flow (From)	DA2-EX-PERV	33.082	727.000	0.01
Flow (From)	DA2-EX-IMP	5,188.266	727.000	1.43
Flow (In)	PROPERTY REAR	12,210.388	727.000	3.38

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
DA1-PR Imp	Post-Development 2 year	2	8,816.000	727.000	2.47
DA1-PR Imp	Post-Development 10 year	10	13,776.000	727.000	3.79
DA1-PR Perv	Post-Development 2 year	2	168.000	727.000	0.05
DA1-PR Perv	Post-Development 10 year	10	331.000	727.000	0.11

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
O-1	Post-Development 2 year	2	8,353.000	784.000	0.24
O-1	Post-Development 10 year	10	12,902.000	764.000	0.51

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft ³)
Basin (IN)	Post-Development 2 year	2	8,984.000	727.000	2.53	(N/A)	(N/A)
Basin (OUT)	Post-Development 2 year	2	8,353.000	784.000	0.24	60.50	4,209.000
Basin (IN)	Post-Development 10 year	10	14,107.000	727.000	3.90	(N/A)	(N/A)
Basin (OUT)	Post-Development 10 year	10	12,902.000	764.000	0.51	61.50	6,293.000

Subsection: Unit Hydrograph Summary
 Label: DA1-PR Imp
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.770 acres

Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	2.48 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	2.47 ft ³ /s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.770 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.16 in
Runoff Volume (Pervious)	8,823.637 ft ³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	8,816.000 ft ³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	8.72 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-PR Imp
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA1-PR Imp
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.770 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	3.80 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	3.79 ft ³ /s
Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.770 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.93 in
Runoff Volume (Pervious)	13,787.978 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	13,776.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	8.72 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-PR Imp
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA1-PR Perv
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Storm Event	NOAA-D (3.39 in)
Return Event	2 years
Duration	1,440.000 min
Depth	3.39 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.030 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.05 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.05 ft ³ /s
Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.030 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.55 in
Runoff Volume (Pervious)	168.746 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	168.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.34 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-PR Perv
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Unit Hydrograph Summary
 Label: DA1-PR Perv
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Storm Event	NOAA-D (5.17 in)
Return Event	10 years
Duration	1,440.000 min
Depth	5.17 in
Time of Concentration (Composite)	6.000 min
Area (User Defined)	0.030 acres
Computational Time Increment	0.800 min
Time to Peak (Computed)	727.200 min
Flow (Peak, Computed)	0.11 ft ³ /s
Output Increment	1.002 min
Time to Flow (Peak Interpolated Output)	727.000 min
Flow (Peak Interpolated Output)	0.11 ft ³ /s
Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	0.030 acres
Maximum Retention (Pervious)	2.50 in
Maximum Retention (Pervious, 20 percent)	0.50 in
Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.04 in
Runoff Volume (Pervious)	331.240 ft ³
Hydrograph Volume (Area under Hydrograph curve)	
Volume	331.000 ft ³
SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	6.000 min
Computational Time Increment	0.800 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.34 ft ³ /s

Subsection: Unit Hydrograph Summary
Label: DA1-PR Perv
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

SCS Unit Hydrograph Parameters	
Unit peak time, T_p	4.000 min
Unit receding limb, T_r	16.000 min
Total unit time, T_b	20.000 min

Subsection: Addition Summary
Label: O-1
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
Outlet-1	Basin

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	Outlet-1	8,353.188	784.000	0.24
Flow (In)	O-1	8,353.188	784.000	0.24

Subsection: Addition Summary
Label: O-1
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

Summary for Hydrograph Addition at 'O-1'

Upstream Link	Upstream Node
Outlet-1	Basin

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	Outlet-1	12,902.012	764.000	0.51
Flow (In)	O-1	12,902.012	764.000	0.51

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
58.50	0.00	(N/A)	0.00
58.60	0.01	(N/A)	0.00
58.70	0.05	(N/A)	0.00
58.80	0.07	(N/A)	0.00
58.90	0.09	(N/A)	0.00
59.00	0.10	(N/A)	0.00
59.10	0.12	(N/A)	0.00
59.20	0.13	(N/A)	0.00
59.30	0.14	(N/A)	0.00
59.40	0.15	(N/A)	0.00
59.50	0.16	(N/A)	0.00
59.60	0.16	(N/A)	0.00
59.70	0.17	(N/A)	0.00
59.80	0.18	(N/A)	0.00
59.90	0.19	(N/A)	0.00
60.00	0.19	(N/A)	0.00
60.10	0.20	(N/A)	0.00
60.20	0.21	(N/A)	0.00
60.30	0.21	(N/A)	0.00
60.40	0.22	(N/A)	0.00
60.50	0.24	(N/A)	0.00
60.60	0.29	(N/A)	0.00
60.70	0.34	(N/A)	0.00
60.80	0.37	(N/A)	0.00
60.90	0.39	(N/A)	0.00
61.00	0.42	(N/A)	0.00
61.10	0.44	(N/A)	0.00
61.20	0.46	(N/A)	0.00
61.30	0.48	(N/A)	0.00
61.40	0.50	(N/A)	0.00
61.50	0.51	(N/A)	0.00

Contributing Structures

- None Contributing
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1

Subsection: Composite Rating Curve
Label: Composite Outlet Structure - 1
Scenario: Post-Development 2 year

Return Event: 2 years
Storm Event: NOAA-D (3.39 in)

Composite Outflow Summary

Contributing Structures
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1 + Orifice - 2
Orifice - 1 + Orifice - 2
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Orifice - 1 + Orifice - 2
Orifice - 1 + Orifice - 2

Subsection: Composite Rating Curve
 Label: Composite Outlet Structure - 1
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
58.50	0.00	(N/A)	0.00
58.60	0.01	(N/A)	0.00
58.70	0.05	(N/A)	0.00
58.80	0.07	(N/A)	0.00
58.90	0.09	(N/A)	0.00
59.00	0.10	(N/A)	0.00
59.10	0.12	(N/A)	0.00
59.20	0.13	(N/A)	0.00
59.30	0.14	(N/A)	0.00
59.40	0.15	(N/A)	0.00
59.50	0.16	(N/A)	0.00
59.60	0.16	(N/A)	0.00
59.70	0.17	(N/A)	0.00
59.80	0.18	(N/A)	0.00
59.90	0.19	(N/A)	0.00
60.00	0.19	(N/A)	0.00
60.10	0.20	(N/A)	0.00
60.20	0.21	(N/A)	0.00
60.30	0.21	(N/A)	0.00
60.40	0.22	(N/A)	0.00
60.50	0.24	(N/A)	0.00
60.60	0.29	(N/A)	0.00
60.70	0.34	(N/A)	0.00
60.80	0.37	(N/A)	0.00
60.90	0.39	(N/A)	0.00
61.00	0.42	(N/A)	0.00
61.10	0.44	(N/A)	0.00
61.20	0.46	(N/A)	0.00
61.30	0.48	(N/A)	0.00
61.40	0.50	(N/A)	0.00
61.50	0.51	(N/A)	0.00

Contributing Structures

- None Contributing
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1
- Orifice - 1

Subsection: Composite Rating Curve
Label: Composite Outlet Structure - 1
Scenario: Post-Development 10 year

Return Event: 10 years
Storm Event: NOAA-D (5.17 in)

Composite Outflow Summary

Contributing Structures
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1 + Orifice - 2
Orifice - 1 + Orifice - 2
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Orifice - 1 + Orifice - 2
Orifice - 1 + Orifice - 2
Orifice - 1 + Orifice - 2
Orifice - 1 + Orifice - 2

Subsection: Level Pool Pond Routing Summary
 Label: Basin (IN)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Infiltration

Infiltration Method (Computed)	No Infiltration
-----------------------------------	-----------------

Initial Conditions

Elevation (Water Surface, Initial)	58.50 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary

Flow (Peak In)	2.53 ft ³ /s	Time to Peak (Flow, In)	727.000 min
Flow (Peak Outlet)	0.24 ft ³ /s	Time to Peak (Flow, Outlet)	784.000 min

Elevation (Water Surface, Peak)	60.50 ft
Volume (Peak)	4,208.582 ft ³

Mass Balance (ft³)

Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	8,984.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	8,353.000 ft ³
Volume (Retained)	627.000 ft ³
Volume (Unrouted)	-4.000 ft ³
Error (Mass Balance)	0.048 %

Subsection: Level Pool Pond Routing Summary
 Label: Basin (IN)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Infiltration

Infiltration Method (Computed)	No Infiltration
-----------------------------------	-----------------

Initial Conditions

Elevation (Water Surface, Initial)	58.50 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary

Flow (Peak In)	3.90 ft ³ /s	Time to Peak (Flow, In)	727.000 min
Flow (Peak Outlet)	0.51 ft ³ /s	Time to Peak (Flow, Outlet)	764.000 min

Elevation (Water Surface, Peak)	61.50 ft
Volume (Peak)	6,292.809 ft ³

Mass Balance (ft³)

Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	14,107.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	12,902.000 ft ³
Volume (Retained)	1,198.000 ft ³
Volume (Unrouted)	-7.000 ft ³
Error (Mass Balance)	0.048 %

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Peak Discharge	0.24 ft ³ /s
Time to Peak	784.000 min
Hydrograph Volume	8,352.039 ft ³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
121.000	0.00	0.00	0.00	0.00	0.00
126.000	0.00	0.00	0.00	0.00	0.00
131.000	0.00	0.00	0.00	0.00	0.00
136.000	0.00	0.00	0.00	0.00	0.00
141.000	0.00	0.00	0.00	0.00	0.00
146.000	0.00	0.00	0.00	0.00	0.00
151.000	0.00	0.00	0.00	0.00	0.00
156.000	0.00	0.00	0.00	0.00	0.00
161.000	0.00	0.00	0.00	0.00	0.00
166.000	0.00	0.00	0.00	0.00	0.00
171.000	0.00	0.00	0.00	0.00	0.00
176.000	0.00	0.00	0.00	0.00	0.00
181.000	0.00	0.00	0.00	0.00	0.00
186.000	0.00	0.00	0.00	0.00	0.00
191.000	0.00	0.00	0.00	0.00	0.00
196.000	0.00	0.00	0.00	0.01	0.01
201.000	0.01	0.01	0.01	0.01	0.01
206.000	0.01	0.01	0.01	0.01	0.01
211.000	0.01	0.01	0.01	0.01	0.01
216.000	0.01	0.01	0.01	0.01	0.01
221.000	0.01	0.01	0.01	0.01	0.01
226.000	0.01	0.01	0.01	0.01	0.01
231.000	0.01	0.01	0.01	0.01	0.01
236.000	0.01	0.01	0.01	0.01	0.01
241.000	0.01	0.01	0.01	0.01	0.01
246.000	0.01	0.01	0.01	0.01	0.01
251.000	0.01	0.01	0.01	0.01	0.01
256.000	0.01	0.01	0.01	0.01	0.01
261.000	0.01	0.01	0.01	0.01	0.01
266.000	0.01	0.01	0.01	0.01	0.01
271.000	0.01	0.01	0.01	0.01	0.01
276.000	0.01	0.01	0.01	0.01	0.01
281.000	0.01	0.01	0.01	0.01	0.01
286.000	0.01	0.01	0.01	0.01	0.01
291.000	0.01	0.01	0.01	0.01	0.01
296.000	0.01	0.01	0.01	0.01	0.01
301.000	0.01	0.01	0.01	0.01	0.01
306.000	0.01	0.01	0.01	0.01	0.01
311.000	0.01	0.01	0.01	0.01	0.01

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
316.000	0.01	0.01	0.01	0.01	0.01
321.000	0.01	0.01	0.01	0.01	0.01
326.000	0.01	0.01	0.01	0.01	0.02
331.000	0.02	0.02	0.02	0.02	0.02
336.000	0.02	0.02	0.02	0.02	0.02
341.000	0.02	0.02	0.02	0.02	0.02
346.000	0.02	0.02	0.02	0.02	0.02
351.000	0.02	0.02	0.02	0.02	0.02
356.000	0.02	0.02	0.02	0.02	0.02
361.000	0.02	0.02	0.02	0.02	0.02
366.000	0.02	0.02	0.02	0.02	0.02
371.000	0.02	0.02	0.02	0.02	0.02
376.000	0.02	0.02	0.02	0.02	0.02
381.000	0.02	0.02	0.02	0.02	0.02
386.000	0.02	0.02	0.02	0.02	0.03
391.000	0.03	0.03	0.03	0.03	0.03
396.000	0.03	0.03	0.03	0.03	0.03
401.000	0.03	0.03	0.03	0.03	0.03
406.000	0.03	0.03	0.03	0.03	0.03
411.000	0.03	0.03	0.03	0.03	0.03
416.000	0.03	0.03	0.03	0.03	0.03
421.000	0.03	0.03	0.03	0.03	0.03
426.000	0.03	0.03	0.03	0.03	0.03
431.000	0.03	0.03	0.03	0.03	0.03
436.000	0.03	0.03	0.03	0.03	0.03
441.000	0.03	0.03	0.03	0.03	0.03
446.000	0.03	0.04	0.04	0.04	0.04
451.000	0.04	0.04	0.04	0.04	0.04
456.000	0.04	0.04	0.04	0.04	0.04
461.000	0.04	0.04	0.04	0.04	0.04
466.000	0.04	0.04	0.04	0.04	0.04
471.000	0.04	0.04	0.04	0.04	0.04
476.000	0.04	0.04	0.04	0.04	0.04
481.000	0.04	0.04	0.04	0.04	0.04
486.000	0.04	0.04	0.04	0.04	0.04
491.000	0.04	0.04	0.04	0.04	0.04
496.000	0.04	0.04	0.04	0.05	0.05
501.000	0.05	0.05	0.05	0.05	0.05
506.000	0.05	0.05	0.05	0.05	0.05
511.000	0.05	0.05	0.05	0.05	0.05
516.000	0.05	0.05	0.05	0.05	0.05
521.000	0.05	0.05	0.05	0.05	0.05
526.000	0.05	0.05	0.05	0.05	0.05

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
531.000	0.05	0.05	0.05	0.05	0.05
536.000	0.05	0.05	0.05	0.05	0.05
541.000	0.05	0.05	0.05	0.05	0.05
546.000	0.05	0.05	0.05	0.05	0.05
551.000	0.05	0.05	0.05	0.05	0.05
556.000	0.05	0.05	0.06	0.06	0.06
561.000	0.06	0.06	0.06	0.06	0.06
566.000	0.06	0.06	0.06	0.06	0.06
571.000	0.06	0.06	0.06	0.06	0.06
576.000	0.06	0.06	0.06	0.06	0.06
581.000	0.06	0.06	0.06	0.06	0.06
586.000	0.06	0.06	0.06	0.06	0.06
591.000	0.06	0.06	0.06	0.06	0.07
596.000	0.07	0.07	0.07	0.07	0.07
601.000	0.07	0.07	0.07	0.07	0.07
606.000	0.07	0.07	0.07	0.07	0.07
611.000	0.07	0.07	0.07	0.07	0.07
616.000	0.07	0.07	0.07	0.07	0.07
621.000	0.07	0.07	0.07	0.07	0.07
626.000	0.08	0.08	0.08	0.08	0.08
631.000	0.08	0.08	0.08	0.08	0.08
636.000	0.08	0.08	0.08	0.08	0.08
641.000	0.08	0.08	0.08	0.08	0.08
646.000	0.08	0.08	0.08	0.08	0.08
651.000	0.08	0.08	0.09	0.09	0.09
656.000	0.09	0.09	0.09	0.09	0.09
661.000	0.09	0.09	0.09	0.09	0.09
666.000	0.09	0.09	0.09	0.09	0.09
671.000	0.10	0.10	0.10	0.10	0.10
676.000	0.10	0.10	0.10	0.10	0.10
681.000	0.10	0.10	0.10	0.10	0.11
686.000	0.11	0.11	0.11	0.11	0.11
691.000	0.11	0.11	0.11	0.11	0.11
696.000	0.11	0.12	0.12	0.12	0.12
701.000	0.12	0.12	0.12	0.12	0.13
706.000	0.13	0.13	0.13	0.13	0.13
711.000	0.13	0.14	0.14	0.14	0.14
716.000	0.14	0.15	0.15	0.15	0.16
721.000	0.16	0.16	0.17	0.17	0.17
726.000	0.18	0.18	0.19	0.19	0.20
731.000	0.20	0.20	0.21	0.21	0.21
736.000	0.21	0.21	0.21	0.21	0.21
741.000	0.22	0.22	0.22	0.22	0.22

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
746.000	0.22	0.22	0.22	0.22	0.22
751.000	0.22	0.23	0.23	0.23	0.23
756.000	0.23	0.23	0.23	0.23	0.23
761.000	0.23	0.24	0.24	0.24	0.24
766.000	0.24	0.24	0.24	0.24	0.24
771.000	0.24	0.24	0.24	0.24	0.24
776.000	0.24	0.24	0.24	0.24	0.24
781.000	0.24	0.24	0.24	0.24	0.24
786.000	0.24	0.24	0.24	0.24	0.24
791.000	0.24	0.24	0.24	0.24	0.24
796.000	0.24	0.24	0.24	0.24	0.24
801.000	0.24	0.24	0.24	0.24	0.24
806.000	0.24	0.24	0.24	0.24	0.24
811.000	0.24	0.24	0.23	0.23	0.23
816.000	0.23	0.23	0.23	0.23	0.23
821.000	0.23	0.23	0.23	0.23	0.23
826.000	0.23	0.23	0.23	0.23	0.23
831.000	0.23	0.22	0.22	0.22	0.22
836.000	0.22	0.22	0.22	0.22	0.22
841.000	0.22	0.22	0.22	0.22	0.22
846.000	0.22	0.22	0.22	0.22	0.22
851.000	0.22	0.22	0.22	0.22	0.22
856.000	0.22	0.22	0.22	0.22	0.22
861.000	0.22	0.22	0.22	0.22	0.22
866.000	0.22	0.22	0.22	0.22	0.21
871.000	0.21	0.21	0.21	0.21	0.21
876.000	0.21	0.21	0.21	0.21	0.21
881.000	0.21	0.21	0.21	0.21	0.21
886.000	0.21	0.21	0.21	0.21	0.21
891.000	0.21	0.21	0.21	0.21	0.21
896.000	0.21	0.21	0.21	0.21	0.21
901.000	0.21	0.21	0.21	0.21	0.21
906.000	0.21	0.21	0.21	0.21	0.21
911.000	0.21	0.21	0.21	0.21	0.21
916.000	0.21	0.20	0.20	0.20	0.20
921.000	0.20	0.20	0.20	0.20	0.20
926.000	0.20	0.20	0.20	0.20	0.20
931.000	0.20	0.20	0.20	0.20	0.20
936.000	0.20	0.20	0.20	0.20	0.20
941.000	0.20	0.20	0.20	0.20	0.20
946.000	0.20	0.20	0.20	0.20	0.20
951.000	0.20	0.20	0.20	0.20	0.20
956.000	0.20	0.20	0.20	0.19	0.19

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
961.000	0.19	0.19	0.19	0.19	0.19
966.000	0.19	0.19	0.19	0.19	0.19
971.000	0.19	0.19	0.19	0.19	0.19
976.000	0.19	0.19	0.19	0.19	0.19
981.000	0.19	0.19	0.19	0.19	0.19
986.000	0.19	0.19	0.19	0.19	0.19
991.000	0.19	0.19	0.19	0.19	0.19
996.000	0.19	0.19	0.19	0.19	0.18
1,001.000	0.18	0.18	0.18	0.18	0.18
1,006.000	0.18	0.18	0.18	0.18	0.18
1,011.000	0.18	0.18	0.18	0.18	0.18
1,016.000	0.18	0.18	0.18	0.18	0.18
1,021.000	0.18	0.18	0.18	0.18	0.18
1,026.000	0.18	0.18	0.18	0.18	0.18
1,031.000	0.18	0.18	0.18	0.18	0.18
1,036.000	0.18	0.18	0.18	0.17	0.17
1,041.000	0.17	0.17	0.17	0.17	0.17
1,046.000	0.17	0.17	0.17	0.17	0.17
1,051.000	0.17	0.17	0.17	0.17	0.17
1,056.000	0.17	0.17	0.17	0.17	0.17
1,061.000	0.17	0.17	0.17	0.17	0.17
1,066.000	0.17	0.17	0.17	0.17	0.17
1,071.000	0.17	0.17	0.17	0.17	0.17
1,076.000	0.17	0.16	0.16	0.16	0.16
1,081.000	0.16	0.16	0.16	0.16	0.16
1,086.000	0.16	0.16	0.16	0.16	0.16
1,091.000	0.16	0.16	0.16	0.16	0.16
1,096.000	0.16	0.16	0.16	0.16	0.16
1,101.000	0.16	0.16	0.16	0.16	0.16
1,106.000	0.16	0.16	0.16	0.16	0.16
1,111.000	0.16	0.16	0.16	0.15	0.15
1,116.000	0.15	0.15	0.15	0.15	0.15
1,121.000	0.15	0.15	0.15	0.15	0.15
1,126.000	0.15	0.15	0.15	0.15	0.15
1,131.000	0.15	0.15	0.15	0.15	0.15
1,136.000	0.15	0.15	0.15	0.15	0.15
1,141.000	0.15	0.15	0.15	0.15	0.15
1,146.000	0.15	0.15	0.15	0.15	0.15
1,151.000	0.14	0.14	0.14	0.14	0.14
1,156.000	0.14	0.14	0.14	0.14	0.14
1,161.000	0.14	0.14	0.14	0.14	0.14
1,166.000	0.14	0.14	0.14	0.14	0.14
1,171.000	0.14	0.14	0.14	0.14	0.14

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,176.000	0.14	0.14	0.14	0.14	0.14
1,181.000	0.14	0.14	0.14	0.14	0.14
1,186.000	0.14	0.14	0.14	0.13	0.13
1,191.000	0.13	0.13	0.13	0.13	0.13
1,196.000	0.13	0.13	0.13	0.13	0.13
1,201.000	0.13	0.13	0.13	0.13	0.13
1,206.000	0.13	0.13	0.13	0.13	0.13
1,211.000	0.13	0.13	0.13	0.13	0.13
1,216.000	0.13	0.13	0.13	0.13	0.13
1,221.000	0.13	0.13	0.13	0.13	0.13
1,226.000	0.13	0.12	0.12	0.12	0.12
1,231.000	0.12	0.12	0.12	0.12	0.12
1,236.000	0.12	0.12	0.12	0.12	0.12
1,241.000	0.12	0.12	0.12	0.12	0.12
1,246.000	0.12	0.12	0.12	0.12	0.12
1,251.000	0.12	0.12	0.12	0.12	0.12
1,256.000	0.12	0.12	0.12	0.12	0.12
1,261.000	0.12	0.12	0.12	0.12	0.12
1,266.000	0.11	0.11	0.11	0.11	0.11
1,271.000	0.11	0.11	0.11	0.11	0.11
1,276.000	0.11	0.11	0.11	0.11	0.11
1,281.000	0.11	0.11	0.11	0.11	0.11
1,286.000	0.11	0.11	0.11	0.11	0.11
1,291.000	0.11	0.11	0.11	0.11	0.11
1,296.000	0.11	0.11	0.11	0.11	0.11
1,301.000	0.11	0.11	0.11	0.11	0.10
1,306.000	0.10	0.10	0.10	0.10	0.10
1,311.000	0.10	0.10	0.10	0.10	0.10
1,316.000	0.10	0.10	0.10	0.10	0.10
1,321.000	0.10	0.10	0.10	0.10	0.10
1,326.000	0.10	0.10	0.10	0.10	0.10
1,331.000	0.10	0.10	0.10	0.10	0.10
1,336.000	0.10	0.10	0.10	0.10	0.10
1,341.000	0.10	0.10	0.10	0.10	0.09
1,346.000	0.09	0.09	0.09	0.09	0.09
1,351.000	0.09	0.09	0.09	0.09	0.09
1,356.000	0.09	0.09	0.09	0.09	0.09
1,361.000	0.09	0.09	0.09	0.09	0.09
1,366.000	0.09	0.09	0.09	0.09	0.09
1,371.000	0.09	0.09	0.09	0.09	0.09
1,376.000	0.09	0.09	0.09	0.09	0.09
1,381.000	0.09	0.09	0.09	0.09	0.09
1,386.000	0.08	0.08	0.08	0.08	0.08

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 1.002 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,391.000	0.08	0.08	0.08	0.08	0.08
1,396.000	0.08	0.08	0.08	0.08	0.08
1,401.000	0.08	0.08	0.08	0.08	0.08
1,406.000	0.08	0.08	0.08	0.08	0.08
1,411.000	0.08	0.08	0.08	0.08	0.08
1,416.000	0.08	0.08	0.08	0.08	0.08
1,421.000	0.08	0.08	0.08	0.08	0.08
1,426.000	0.08	0.08	0.08	0.07	0.07
1,431.000	0.07	0.07	0.07	0.07	0.07
1,436.000	0.07	0.07	0.07	0.07	0.07

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Peak Discharge	0.51 ft ³ /s
Time to Peak	764.000 min
Hydrograph Volume	12,901.218 ft ³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
83.000	0.00	0.00	0.00	0.00	0.00
88.000	0.00	0.00	0.00	0.00	0.00
93.000	0.00	0.00	0.00	0.00	0.00
98.000	0.00	0.00	0.00	0.00	0.00
103.000	0.00	0.00	0.00	0.00	0.00
108.000	0.00	0.00	0.00	0.00	0.00
113.000	0.00	0.00	0.00	0.00	0.00
118.000	0.00	0.00	0.00	0.00	0.00
123.000	0.00	0.00	0.00	0.00	0.00
128.000	0.00	0.00	0.00	0.00	0.00
133.000	0.00	0.00	0.01	0.01	0.01
138.000	0.01	0.01	0.01	0.01	0.01
143.000	0.01	0.01	0.01	0.01	0.01
148.000	0.01	0.01	0.01	0.01	0.01
153.000	0.01	0.01	0.01	0.01	0.01
158.000	0.01	0.01	0.01	0.01	0.01
163.000	0.01	0.01	0.01	0.01	0.01
168.000	0.01	0.01	0.01	0.01	0.01
173.000	0.01	0.01	0.01	0.01	0.01
178.000	0.01	0.01	0.01	0.01	0.01
183.000	0.01	0.01	0.01	0.01	0.01
188.000	0.01	0.01	0.01	0.01	0.01
193.000	0.01	0.01	0.01	0.01	0.01
198.000	0.01	0.01	0.01	0.01	0.01
203.000	0.01	0.01	0.01	0.01	0.01
208.000	0.01	0.01	0.01	0.01	0.01
213.000	0.01	0.01	0.01	0.01	0.01
218.000	0.01	0.01	0.01	0.02	0.02
223.000	0.02	0.02	0.02	0.02	0.02
228.000	0.02	0.02	0.02	0.02	0.02
233.000	0.02	0.02	0.02	0.02	0.02
238.000	0.02	0.02	0.02	0.02	0.02
243.000	0.02	0.02	0.02	0.02	0.02
248.000	0.02	0.02	0.02	0.02	0.02
253.000	0.02	0.02	0.02	0.02	0.02
258.000	0.02	0.03	0.03	0.03	0.03
263.000	0.03	0.03	0.03	0.03	0.03
268.000	0.03	0.03	0.03	0.03	0.03
273.000	0.03	0.03	0.03	0.03	0.03

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
278.000	0.03	0.03	0.03	0.03	0.03
283.000	0.03	0.03	0.03	0.03	0.03
288.000	0.03	0.03	0.03	0.03	0.03
293.000	0.03	0.03	0.03	0.03	0.03
298.000	0.03	0.03	0.03	0.03	0.03
303.000	0.03	0.03	0.04	0.04	0.04
308.000	0.04	0.04	0.04	0.04	0.04
313.000	0.04	0.04	0.04	0.04	0.04
318.000	0.04	0.04	0.04	0.04	0.04
323.000	0.04	0.04	0.04	0.04	0.04
328.000	0.04	0.04	0.04	0.04	0.04
333.000	0.04	0.04	0.04	0.04	0.04
338.000	0.04	0.04	0.04	0.04	0.04
343.000	0.04	0.04	0.04	0.04	0.04
348.000	0.04	0.04	0.04	0.04	0.04
353.000	0.04	0.04	0.04	0.04	0.04
358.000	0.04	0.04	0.05	0.05	0.05
363.000	0.05	0.05	0.05	0.05	0.05
368.000	0.05	0.05	0.05	0.05	0.05
373.000	0.05	0.05	0.05	0.05	0.05
378.000	0.05	0.05	0.05	0.05	0.05
383.000	0.05	0.05	0.05	0.05	0.05
388.000	0.05	0.05	0.05	0.05	0.05
393.000	0.05	0.05	0.05	0.05	0.05
398.000	0.05	0.05	0.05	0.05	0.05
403.000	0.05	0.05	0.05	0.05	0.05
408.000	0.05	0.05	0.05	0.05	0.05
413.000	0.05	0.05	0.05	0.05	0.05
418.000	0.05	0.05	0.05	0.05	0.06
423.000	0.06	0.06	0.06	0.06	0.06
428.000	0.06	0.06	0.06	0.06	0.06
433.000	0.06	0.06	0.06	0.06	0.06
438.000	0.06	0.06	0.06	0.06	0.06
443.000	0.06	0.06	0.06	0.06	0.06
448.000	0.06	0.06	0.06	0.06	0.06
453.000	0.06	0.06	0.06	0.06	0.06
458.000	0.06	0.06	0.06	0.06	0.06
463.000	0.06	0.06	0.06	0.06	0.06
468.000	0.06	0.06	0.06	0.07	0.07
473.000	0.07	0.07	0.07	0.07	0.07
478.000	0.07	0.07	0.07	0.07	0.07
483.000	0.07	0.07	0.07	0.07	0.07
488.000	0.07	0.07	0.07	0.07	0.07

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
493.000	0.07	0.07	0.07	0.07	0.07
498.000	0.07	0.07	0.07	0.07	0.07
503.000	0.07	0.07	0.07	0.07	0.07
508.000	0.07	0.07	0.07	0.07	0.07
513.000	0.07	0.07	0.07	0.07	0.07
518.000	0.08	0.08	0.08	0.08	0.08
523.000	0.08	0.08	0.08	0.08	0.08
528.000	0.08	0.08	0.08	0.08	0.08
533.000	0.08	0.08	0.08	0.08	0.08
538.000	0.08	0.08	0.08	0.08	0.08
543.000	0.08	0.08	0.08	0.08	0.08
548.000	0.08	0.08	0.08	0.08	0.08
553.000	0.08	0.08	0.08	0.08	0.08
558.000	0.08	0.08	0.08	0.08	0.08
563.000	0.08	0.08	0.08	0.09	0.09
568.000	0.09	0.09	0.09	0.09	0.09
573.000	0.09	0.09	0.09	0.09	0.09
578.000	0.09	0.09	0.09	0.09	0.09
583.000	0.09	0.09	0.09	0.09	0.09
588.000	0.09	0.09	0.09	0.09	0.09
593.000	0.09	0.09	0.09	0.09	0.09
598.000	0.10	0.10	0.10	0.10	0.10
603.000	0.10	0.10	0.10	0.10	0.10
608.000	0.10	0.10	0.10	0.10	0.10
613.000	0.10	0.10	0.10	0.10	0.10
618.000	0.10	0.10	0.10	0.10	0.10
623.000	0.10	0.10	0.11	0.11	0.11
628.000	0.11	0.11	0.11	0.11	0.11
633.000	0.11	0.11	0.11	0.11	0.11
638.000	0.11	0.11	0.11	0.11	0.11
643.000	0.11	0.11	0.11	0.11	0.11
648.000	0.12	0.12	0.12	0.12	0.12
653.000	0.12	0.12	0.12	0.12	0.12
658.000	0.12	0.12	0.12	0.12	0.12
663.000	0.12	0.13	0.13	0.13	0.13
668.000	0.13	0.13	0.13	0.13	0.13
673.000	0.13	0.13	0.13	0.13	0.14
678.000	0.14	0.14	0.14	0.14	0.14
683.000	0.14	0.14	0.14	0.14	0.14
688.000	0.15	0.15	0.15	0.15	0.15
693.000	0.15	0.15	0.15	0.15	0.16
698.000	0.16	0.16	0.16	0.16	0.16
703.000	0.16	0.17	0.17	0.17	0.17

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
708.000	0.17	0.17	0.18	0.18	0.18
713.000	0.18	0.18	0.19	0.19	0.19
718.000	0.20	0.20	0.20	0.21	0.21
723.000	0.22	0.23	0.25	0.30	0.34
728.000	0.37	0.40	0.41	0.43	0.44
733.000	0.45	0.46	0.46	0.47	0.47
738.000	0.48	0.48	0.49	0.49	0.49
743.000	0.49	0.50	0.50	0.50	0.50
748.000	0.50	0.50	0.50	0.51	0.51
753.000	0.51	0.51	0.51	0.51	0.51
758.000	0.51	0.51	0.51	0.51	0.51
763.000	0.51	0.51	0.51	0.51	0.51
768.000	0.51	0.51	0.51	0.51	0.51
773.000	0.51	0.51	0.51	0.51	0.51
778.000	0.51	0.51	0.51	0.51	0.51
783.000	0.51	0.51	0.50	0.50	0.50
788.000	0.50	0.50	0.50	0.50	0.50
793.000	0.50	0.50	0.50	0.50	0.49
798.000	0.49	0.49	0.49	0.49	0.49
803.000	0.49	0.49	0.49	0.49	0.48
808.000	0.48	0.48	0.48	0.48	0.48
813.000	0.48	0.48	0.48	0.47	0.47
818.000	0.47	0.47	0.47	0.47	0.47
823.000	0.46	0.46	0.46	0.46	0.46
828.000	0.46	0.46	0.46	0.45	0.45
833.000	0.45	0.45	0.45	0.45	0.45
838.000	0.44	0.44	0.44	0.44	0.44
843.000	0.44	0.44	0.43	0.43	0.43
848.000	0.43	0.43	0.43	0.43	0.42
853.000	0.42	0.42	0.42	0.42	0.42
858.000	0.42	0.41	0.41	0.41	0.41
863.000	0.41	0.41	0.40	0.40	0.40
868.000	0.40	0.40	0.40	0.39	0.39
873.000	0.39	0.39	0.39	0.39	0.39
878.000	0.38	0.38	0.38	0.38	0.38
883.000	0.38	0.37	0.37	0.37	0.37
888.000	0.37	0.36	0.36	0.36	0.36
893.000	0.36	0.36	0.35	0.35	0.35
898.000	0.35	0.35	0.34	0.34	0.34
903.000	0.34	0.34	0.33	0.33	0.33
908.000	0.33	0.32	0.32	0.32	0.32
913.000	0.31	0.31	0.31	0.31	0.30
918.000	0.30	0.30	0.30	0.29	0.29

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
923.000	0.29	0.29	0.28	0.28	0.28
928.000	0.28	0.28	0.27	0.27	0.27
933.000	0.27	0.27	0.26	0.26	0.26
938.000	0.26	0.26	0.25	0.25	0.25
943.000	0.25	0.25	0.25	0.24	0.24
948.000	0.24	0.24	0.24	0.24	0.24
953.000	0.24	0.24	0.24	0.24	0.23
958.000	0.23	0.23	0.23	0.23	0.23
963.000	0.23	0.23	0.23	0.23	0.23
968.000	0.23	0.23	0.22	0.22	0.22
973.000	0.22	0.22	0.22	0.22	0.22
978.000	0.22	0.22	0.22	0.22	0.22
983.000	0.22	0.22	0.22	0.22	0.22
988.000	0.22	0.22	0.22	0.22	0.22
993.000	0.22	0.22	0.22	0.22	0.22
998.000	0.22	0.22	0.22	0.21	0.21
1,003.000	0.21	0.21	0.21	0.21	0.21
1,008.000	0.21	0.21	0.21	0.21	0.21
1,013.000	0.21	0.21	0.21	0.21	0.21
1,018.000	0.21	0.21	0.21	0.21	0.21
1,023.000	0.21	0.21	0.21	0.21	0.21
1,028.000	0.21	0.21	0.21	0.21	0.21
1,033.000	0.21	0.21	0.21	0.21	0.21
1,038.000	0.21	0.21	0.21	0.21	0.21
1,043.000	0.21	0.21	0.21	0.21	0.21
1,048.000	0.20	0.20	0.20	0.20	0.20
1,053.000	0.20	0.20	0.20	0.20	0.20
1,058.000	0.20	0.20	0.20	0.20	0.20
1,063.000	0.20	0.20	0.20	0.20	0.20
1,068.000	0.20	0.20	0.20	0.20	0.20
1,073.000	0.20	0.20	0.20	0.20	0.20
1,078.000	0.20	0.20	0.20	0.20	0.20
1,083.000	0.20	0.20	0.20	0.20	0.20
1,088.000	0.20	0.20	0.20	0.19	0.19
1,093.000	0.19	0.19	0.19	0.19	0.19
1,098.000	0.19	0.19	0.19	0.19	0.19
1,103.000	0.19	0.19	0.19	0.19	0.19
1,108.000	0.19	0.19	0.19	0.19	0.19
1,113.000	0.19	0.19	0.19	0.19	0.19
1,118.000	0.19	0.19	0.19	0.19	0.19
1,123.000	0.19	0.19	0.19	0.19	0.19
1,128.000	0.19	0.19	0.19	0.19	0.18
1,133.000	0.18	0.18	0.18	0.18	0.18

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,138.000	0.18	0.18	0.18	0.18	0.18
1,143.000	0.18	0.18	0.18	0.18	0.18
1,148.000	0.18	0.18	0.18	0.18	0.18
1,153.000	0.18	0.18	0.18	0.18	0.18
1,158.000	0.18	0.18	0.18	0.18	0.18
1,163.000	0.18	0.18	0.18	0.18	0.18
1,168.000	0.18	0.18	0.18	0.18	0.18
1,173.000	0.18	0.17	0.17	0.17	0.17
1,178.000	0.17	0.17	0.17	0.17	0.17
1,183.000	0.17	0.17	0.17	0.17	0.17
1,188.000	0.17	0.17	0.17	0.17	0.17
1,193.000	0.17	0.17	0.17	0.17	0.17
1,198.000	0.17	0.17	0.17	0.17	0.17
1,203.000	0.17	0.17	0.17	0.17	0.17
1,208.000	0.17	0.17	0.17	0.17	0.17
1,213.000	0.17	0.17	0.16	0.16	0.16
1,218.000	0.16	0.16	0.16	0.16	0.16
1,223.000	0.16	0.16	0.16	0.16	0.16
1,228.000	0.16	0.16	0.16	0.16	0.16
1,233.000	0.16	0.16	0.16	0.16	0.16
1,238.000	0.16	0.16	0.16	0.16	0.16
1,243.000	0.16	0.16	0.16	0.16	0.16
1,248.000	0.16	0.16	0.16	0.16	0.16
1,253.000	0.16	0.16	0.16	0.16	0.16
1,258.000	0.15	0.15	0.15	0.15	0.15
1,263.000	0.15	0.15	0.15	0.15	0.15
1,268.000	0.15	0.15	0.15	0.15	0.15
1,273.000	0.15	0.15	0.15	0.15	0.15
1,278.000	0.15	0.15	0.15	0.15	0.15
1,283.000	0.15	0.15	0.15	0.15	0.15
1,288.000	0.15	0.15	0.15	0.15	0.15
1,293.000	0.15	0.15	0.15	0.15	0.15
1,298.000	0.15	0.15	0.14	0.14	0.14
1,303.000	0.14	0.14	0.14	0.14	0.14
1,308.000	0.14	0.14	0.14	0.14	0.14
1,313.000	0.14	0.14	0.14	0.14	0.14
1,318.000	0.14	0.14	0.14	0.14	0.14
1,323.000	0.14	0.14	0.14	0.14	0.14
1,328.000	0.14	0.14	0.14	0.14	0.14
1,333.000	0.14	0.14	0.14	0.14	0.14
1,338.000	0.14	0.14	0.14	0.14	0.14
1,343.000	0.13	0.13	0.13	0.13	0.13
1,348.000	0.13	0.13	0.13	0.13	0.13

Subsection: Pond Routed Hydrograph (total out)
 Label: Basin (OUT)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.002 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
1,353.000	0.13	0.13	0.13	0.13	0.13
1,358.000	0.13	0.13	0.13	0.13	0.13
1,363.000	0.13	0.13	0.13	0.13	0.13
1,368.000	0.13	0.13	0.13	0.13	0.13
1,373.000	0.13	0.13	0.13	0.13	0.13
1,378.000	0.13	0.13	0.13	0.13	0.13
1,383.000	0.13	0.13	0.13	0.12	0.12
1,388.000	0.12	0.12	0.12	0.12	0.12
1,393.000	0.12	0.12	0.12	0.12	0.12
1,398.000	0.12	0.12	0.12	0.12	0.12
1,403.000	0.12	0.12	0.12	0.12	0.12
1,408.000	0.12	0.12	0.12	0.12	0.12
1,413.000	0.12	0.12	0.12	0.12	0.12
1,418.000	0.12	0.12	0.12	0.12	0.12
1,423.000	0.12	0.12	0.12	0.12	0.12
1,428.000	0.12	0.11	0.11	0.11	0.11
1,433.000	0.11	0.11	0.11	0.11	0.11
1,438.000	0.11	0.11	0.11	(N/A)	(N/A)

Subsection: Pond Inflow Summary
 Label: Basin (IN)
 Scenario: Post-Development 2 year

Return Event: 2 years
 Storm Event: NOAA-D (3.39 in)

Summary for Hydrograph Addition at 'Basin'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA1-PR Imp
<Catchment to Outflow Node>	DA1-PR Perv

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	DA1-PR Imp	8,815.625	727.000	2.47
Flow (From)	DA1-PR Perv	168.499	727.000	0.05
Flow (In)	Basin	8,984.124	727.000	2.53

Subsection: Pond Inflow Summary
 Label: Basin (IN)
 Scenario: Post-Development 10 year

Return Event: 10 years
 Storm Event: NOAA-D (5.17 in)

Summary for Hydrograph Addition at 'Basin'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	DA1-PR Imp
<Catchment to Outflow Node>	DA1-PR Perv

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	DA1-PR Imp	13,775.740	727.000	3.79
Flow (From)	DA1-PR Perv	330.819	727.000	0.11
Flow (In)	Basin	14,106.559	727.000	3.90

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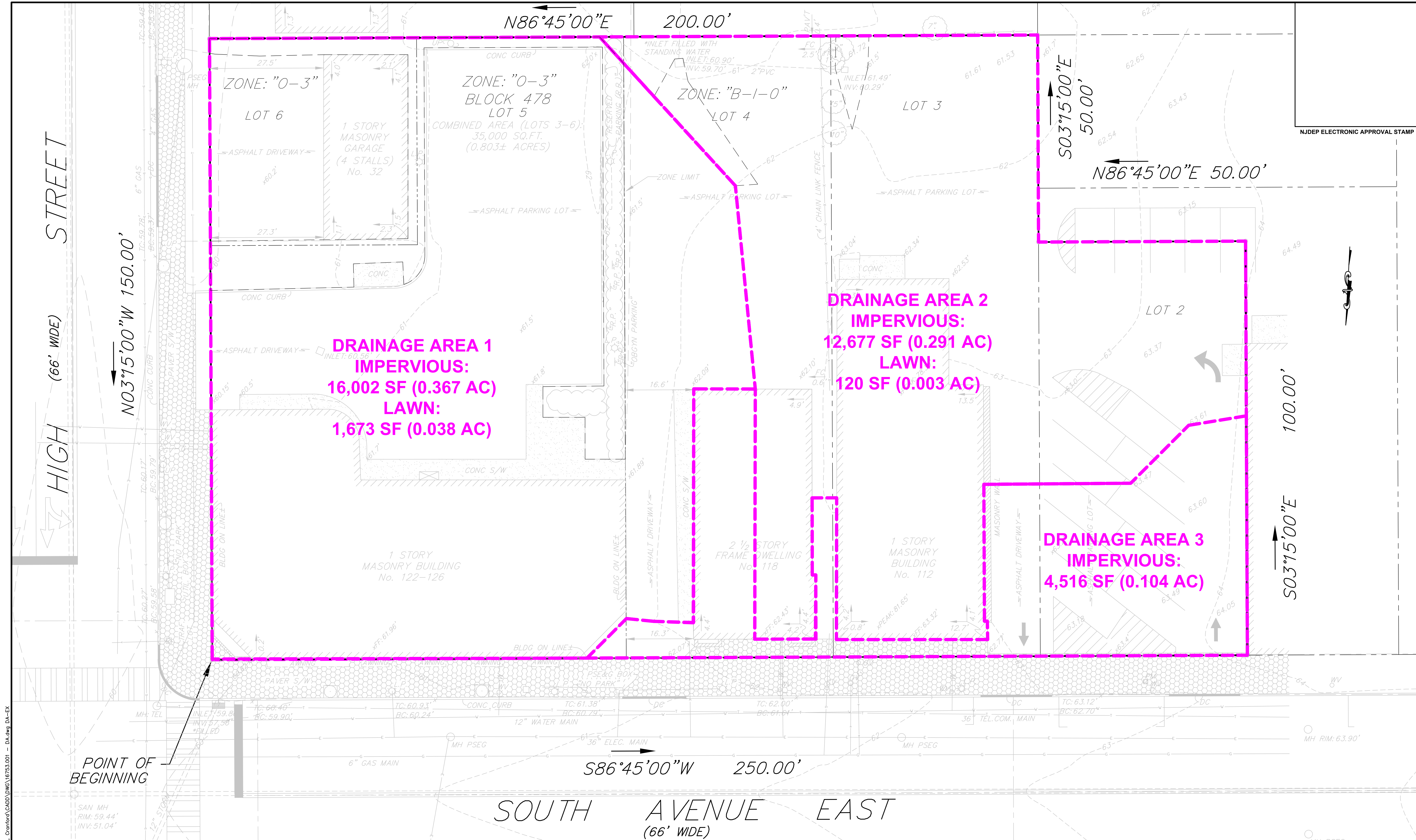
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APPENDIX D
Drainage Area Maps



NJDEP ELECTRONIC APPROVAL STAMP

PRE-DEVELOPMENT DRAINAGE AREA
TOTAL AREA = 0.80 AC
IMPERVIOUS = 0.76 AC
LAWN = 0.04 AC

No.	Date	Revision	Revised By	Checked By
06	04/06/2023	Revise per Planning Board Memorandums	SP	BF
05	03/01/2023	Revise for Planning Board Submission	JB	BF
04	02/21/2023	Revise per DRC Meeting		BF
03	01/26/2023	Revised per Completeness Review dated 01/20/2023		
02	11/07/2022	Revised for Township Submission	MS	BF
01	05/20/2021	Revised per NJDEP Comments	SP	BF



EXISTING DRAINAGE AREAS - TRACT 1
FOR PRELIMINARY AND FINAL SITE PLAN FOR MIXED USE DEVELOPMENT
BLOCK 478, LOTS 2, 3, 4, 5, AND 6
BLOCK 483, LOT 18, AND 17.01
 TOWNSHIP OF CRANFORD
 UNION COUNTY NEW JERSEY

DATE: 2/19/2021
 DESIGNED BY: BF
 CHECKED BY: WS
 SCALE: 1" = 10'
 FIELD BOOK
 PROJECT NUMBER: 16753.001
 SHEET: 1 of 4

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N86°45'00"E 200.00'

S03°15'00"E 50.00'

N86°45'00"E 50.00'

100.00'

S03°15'00"E

S86°45'00"W 250.00'

SOUTH AVENUE EAST (66' WIDE)

N03°15'00"W 150.00'

STREET

HIGH (66' WIDE)

TRASH ROOM
FF 60.25

STAIRWELL
FF 62.20

STAIRWELL
FF 63.11

RETAIL BUILDING
FF 64.00
No. 122-126

4-STORY MULTI-PURPOSE BUILDING
LOBBY
FF 61.60 (FRONT)
FF 64.00 (REAR)

PROPOSED DRAINAGE AREA
IMPERVIOUS:
33,678 SF (0.77 AC)
LAWN:
1,310 SF (0.03 AC)

1 STORY MASONRY BUILDING
FF 63.35
No. 112

DUMPSTER ROOM
STAIRWELL
FF 64.0

POST-DEVELOPMENT DRAINAGE AREA
TOTAL AREA = 0.80 AC
IMPERVIOUS = 0.77 AC
LAWN = 0.03 AC

NJDEP ELECTRONIC APPROVAL STAMP

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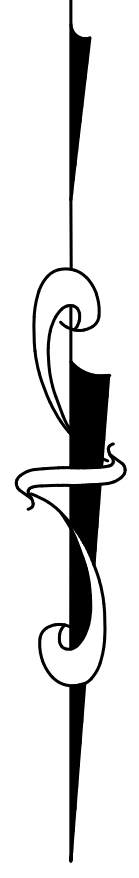


PROPOSED DRAINAGE AREAS - TRACT 1
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WOODED
 S27°49'04"W 108.95'
 x60.6'
 x60.8'
 x60.5'
BLOCK 483
LOT 18
 AREA:
 5,080 SQ.FT.
 (0.12+ ACRES)

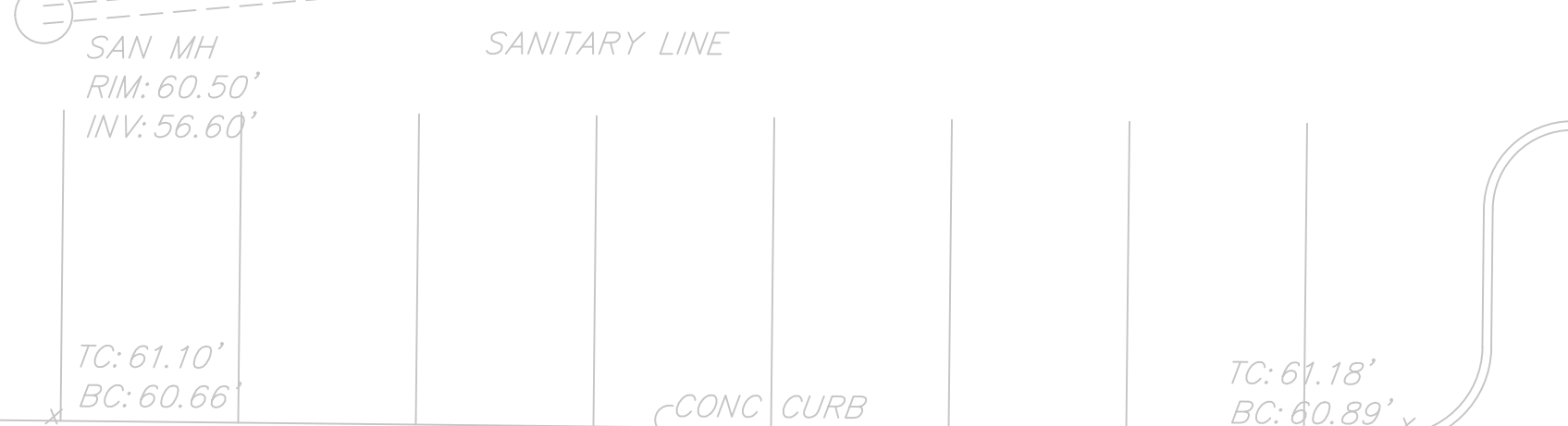
LOT 17.01

N00°30'00"E 150.00'

DRAINAGE AREA 1
3,874 SF (0.089 ACRES)
2,760 SF IMPERVIOUS
1,114 SF PERVIOUS

S00°30'00"W 53.20'

S89°30'00"E 50.00'
CHESTNUT (66' WIDE) STREET



No.	Date	Revision	Revised By	Checked By
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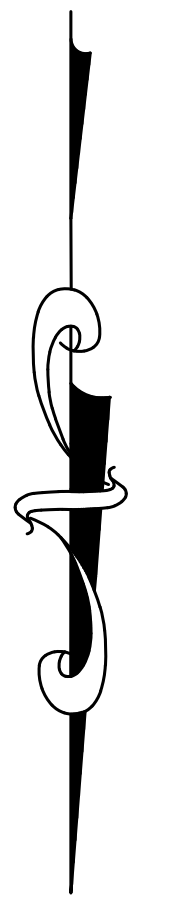
Corporate Office:
 1800 Route 34, Suite 101
 Wall, New Jersey 07719
 732.312.9800
 FPAengineers.com

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EXISTING DRAINAGE AREAS - TRACT 2
 FOR
PRELIMINARY AND FINAL SITE PLAN
 FOR
MIXED USE DEVELOPMENT
BLOCK 478, LOTS 2, 3, 4, 5, AND 6
BLOCK 483, LOT 18, AND 17.01
 TOWNSHIP OF CRANFORD
 UNION COUNTY NEW JERSEY

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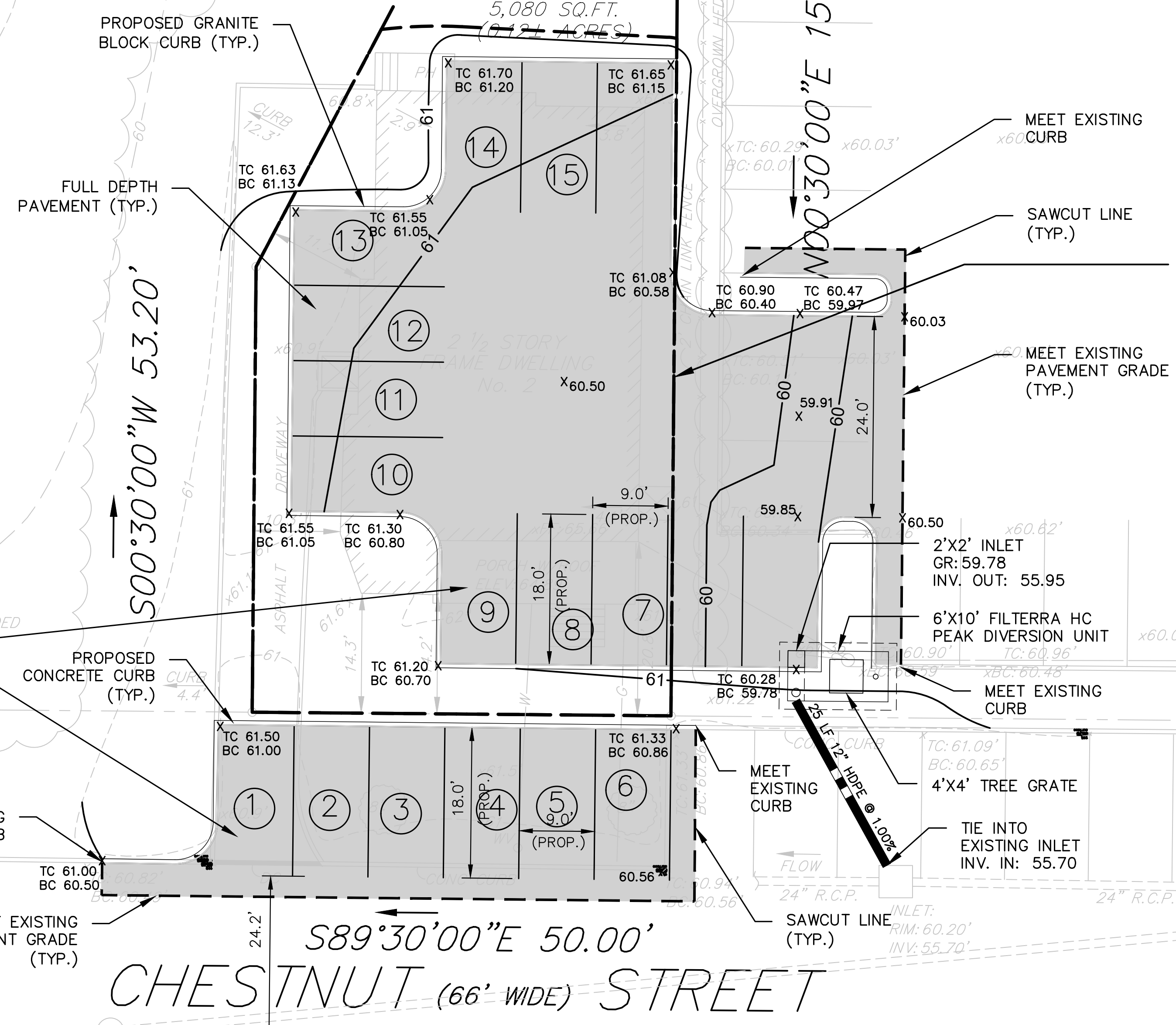
WOODED
 $S27^{\circ}49'04''W$ 108.95'
 $\times 60.6'$
 $\times 60.8'$

PRIVATELY OWNED
 PUBLIC OPEN
 SPACE, ±978 SF

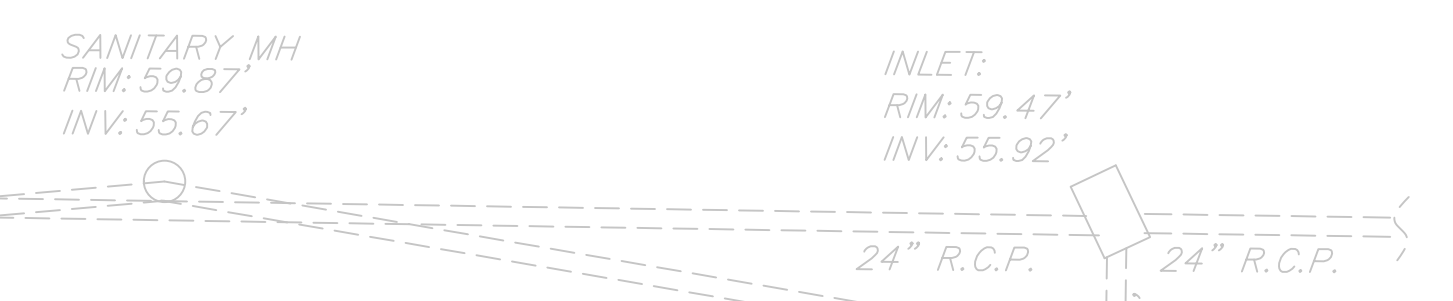
LOT 17.01

AREA:
 5,080 SQ.FT.
 (0.12 ACRES)

DRAINAGE AREA 1
 3,874 SF (0.089 ACRES)
 2,721 SF IMPERVIOUS
 1,153 SF PERVIOUS



$S89^{\circ}30'00''E$ 50.00'
CHESTNUT (66' WIDE) STREET



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