APPENDIX E
ENVIRONMENTAL FOOTPRINT ANALYSIS

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Mr. Ryan Richard
New York State Department of Environmental Conservation
Division of Environmental Remediation
21 South Putt Corners Rd
New Paltz, NY 12561-1620

03.06.2026

Re: Environmental Footprint Analysis
Brookfield Commons – 159 South Lexington Avenue, White Plains, NY
NYSDEC BCP Site No. C360246

Dear Mr. Richard:

This Environmental Footprint Analysis (EFA) has been prepared by AKRF, Inc. (AKRF) on behalf of Trinity Brookfield Commons Phase Three Limited Partnership (the "Participant") for the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site No. C360246 located at the above-referenced location, also identified as part of Tax Block 7, Part of Lot 1, Section 125.83 on the City of White Plains Tax Map (the "Site"). As further detailed in the November 2023 NYSDEC Memorandum, DER-31: Green and Sustainable Remediation Initiative, beginning January 1, 2024, all remedial work plans and reports submitted to NYSDEC pursuant to a remedial program under Part 375 are required to address green and sustainable remediation (GSR) in accordance with DER-31. The EFA was preemptively incorporated into the Remedial Action Work Plan (RAWP) and into the NYSDEC Decision Document as a requirement for the remedy alternatives.

This EFA focuses on the primary components of the remedy alternatives: removal and/or treatment of all contaminated soil, groundwater, and soil vapor to comply with UUSCOs, import of soil for backfill, and installation of an active sub-slab depressurization system (SSDS). Activities included removal and off-site disposal of existing fill materials, and daily use of several pieces of heavy machinery.

This EFA was performed consistent with NYSDEC guidelines, the methodologies used in the Environmental Protection Agency (EPA) Spreadsheets for Environmental Footprint Analysis (SEFA) tool, and the requirements of the Climate Leadership and Community Protection Act (CLCPA).

A. GREENHOUSE GASES

Greenhouse gases (GHGs) are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. The general warming of the Earth's atmosphere caused by this phenomenon is known as the "greenhouse effect." The United States Environmental Protection Agency (EPA) identifies seven types of GHGs that are relevant for GHG inventory purposes: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrogen trifluoride (NF_3), and sulfur hexafluoride (SF_6). There are no significant direct or indirect sources of HFCs, PFCs, NF_3, or SF_6 associated with the remedy alternatives; therefore, the GHG assessment focuses on CO_2, N_2O, and methane.

To present a complete inventory of all GHGs, component emissions are added together and presented as carbon dioxide equivalent (CO_2e) emissions—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted

by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing[1] of each chemical over a period of 20 years (e.g., CO_2 has a much shorter atmospheric lifetime than N_2O and therefore has a much lower GWP). The GWPs for the main GHGs discussed here are presented in **Table 1**.

Table 1
Global Warming Potential (GWP) for Major GHGs

Greenhouse Gas	20-Year Horizon GWP
Carbon Dioxide (CO_2)	1
Methane (CH_4)	84
Nitrous Oxide (N_2O)	264
Source: 6 NYCRR 496.5	

STATEWIDE GHG INVENTORY AND EMISSION LIMIT

In July 2019, New York State enacted the CLCPA establishing statewide GHG emission limits that represent a 40 percent reduction from 1990 levels by 2030, and an 85 percent reduction from 1990 levels by 2050. Among other requirements to meet the state's emission reduction goals, the CLCPA directs state agencies to determine if their decisions are consistent with the statewide GHG emission limits established by the CLCPA in the Environmental Conservation Law (ECL) Article 75[2].

As part of the regulations adopted at 6 NYCRR Part 496 in 2020, the New York State Energy Research and Development Authority (NYSERDA) developed the 1990 baseline GHG emissions for New York State consistent with the calculation requirements specified under the CLCPA. The statewide inventory is separated into four sectors—Energy Sector, Industrial Processes and Product Use, Agriculture Forestry and Other Land Use, and Waste. The GHG emissions associated with the remedy alternatives would fall within the Energy Sector (including emissions from the direct fuel combustion and electricity usage), the Industrial Processes and Product Use Sector (the embodied emissions from the manufacturing process of materials brought to the Site), and the Waste Sector (emissions associated with the end of life for materials removed from the Site for disposal).

The GHG inventory performed by NYSERDA determined a statewide 1990 annual baseline emission total of 409.78 million metric tons (MMT) of CO_2e. As established in 6 NYCRR Part 496, the statewide annual CO_2e emission limits for 2030 and 2050 as 245.87 MMT and 61.47 MMT, respectively.

B. METHODOLOGY

ON-SITE FUEL USAGE

Direct Emissions

Consistent with the SEFA tool, on-site fuel (i.e., direct) emissions were estimated based on the fuel consumption associated with construction equipment in operation during implementation of the remedy. On-site emissions were calculated for non-road construction engines based on specific estimates of construction activity and fuel consumption data from the NONROAD emissions module within model EPA's MOVES model. The detailed data, including the number, type, power rating, and hours of operation for all construction engines was coupled with fuel consumption rate data from EPA's MOVES model to estimate total fuel consumption throughout the duration of the construction activities.

Direct GHG emissions from Site work were calculated based on fuel consumption over the duration to complete the remedy—6 months to complete Track 1 or 2 months to complete Track 2. The quantity of fuel was then multiplied by a unit-specific CO_2 emission factor of 10.21 kg per gallon of diesel—taken from EPA's Emission Factors for Greenhouse Gas Inventories. In order to develop CO_2e emission factors,

[1] *Radiative forcing* is a measure of the influence a gas has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the gas as a GHG.

[2] CLCPA Section 7(2).

emission factors of N_2O and CH_4 for diesel construction equipment (1.01 g/gallon and 0.94 g/gallon, respectively) were also taken from EPA's Emission Factors Hub.

Upstream Emissions

Upstream GHG emissions were also projected based upon the estimated fuel consumption required for the remedy alternatives. Upstream emission factors for diesel have been specified by NYSDEC for upstream and out-of-state emissions.[3]

OFF-SITE FUEL USAGE

Consistent with the SEFA tool, GHG emissions associated with the truck and worker trips to the Site were estimated. The numbers of trucks (concrete trucks, dump trucks, and tractor trailers) and workers for each phase of construction activity were used to estimate truck and vehicle VMT. Distances for truck deliveries were developed based on estimates of the origin and destination of materials. Table 18-7 of the *CEQR Technical Manual* was used to determine the percentage of vehicle miles traveled by road type, and the most recent version of the EPA MOVES model provided an estimate of truck GHG emission factors, which were used to produce the associated emissions attributable to the remedy alternatives.

GHG emissions that would be generated by the remedy alternatives associated with the number of vehicle trips by mode (e.g., worker cars, delivery trucks) were calculated using the estimated number vehicles traveling to the Site to develop total vehicle miles traveled (VMT). VMT was calculated using an average round-trip commute distance of 25.3 miles for construction workers in the New York City Region (based on the average trip to work distance for the New York Metropolitan Area area)[4]; and round trip distances for truck deliveries was based on the identified origin and destination of materials and waste.

Based upon a duration of six months to complete Track 1, 24,156 VMT were estimated for construction worker travel. Construction/delivery truck trips were estimated to result in 87,150 VMT. In the two months to complete Track 2, 8,176 VMT were estimated for construction worker travel. Construction/delivery truck trips were estimated to result in 28,050 VMT. GHG emissions were then estimated directly using CO_2e emission factors from the most recent version of the EPA MOVES model (MOVES5).

MATERIAL EMISSIONS

Emissions related to the production of construction materials (embodied emissions) were estimated based on the quantity of materials brought to the Site along with the appropriate CO_2e emission factors used in the SEFA tool. Track 1 and 2 are anticipated to import 21,000 tons and 6,465 tons and of soil, respectively. In addition, Track 1 and 2 are anticipated to import 2 tons and 1 ton of carbon media, respectively.

WASTE EMISSIONS

Emissions associated with disposed materials exported from the Site were estimated based on the quantity of materials removed, the description of those materials, the destination, and the appropriate CO_2e emission factors used in the SEFA tool. Excavation under Track 1 is anticipated to export approximately 19,740 tons of non-hazardous soil, an estimated 1,262 tons of hazardous soil, and 116,985 gallons of groundwater. By contrast, excavation under Track 2 is anticipated to export approximately 6,077 tons of non-hazardous soil, an estimated 390 tons of hazardous soil, and 45,595 gallons of groundwater. Emissions associated with both waste handling and transportation of the materials to the landfill were included in the off-site fuel usage estimates.

C. PROJECTED CARBON FOOTPRINT

The estimated GHG emissions for the Track 1 or Track 2 remedy are presented in **Table 2** and **Table 3**, respectively. Detailed calculations can be found in Appendix A.

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[3] NYSDEC. Appendix A of the *2025 Statewide GHG Emission Report*. December 2025.

[4] New York State Department of Transportation (NYSDOT). *2009 NHTS, New York State Add-On*. Key Tables. Table 3: Average Travel Day Person-Trip Length by Mode and Purpose, trip-to work distance for SOV in NYMTC 10-county area. 2011.

Table 2
Summary of GHG Emissions—Alternative 2 (Track 1)
(metric tons CO2e)

Core Element	Energy Consumption (MMBtu)	Direct Emissions	Indirect Emissions	*Total*
On-Site Fuel Usage	7,279	481	150	631
Off-Site Fuel Usage	2,739	0	237	237
Material	1,184	0	54	54
Waste	3,387	0	240	240
Total	14,589	481	681	1,163
Note: Totals may not sum due to rounding. See detailed calculations in Appendix A.				

Table 3
Summary of GHG Emissions—Alternative 3 (Track 2)
(metric tons CO2e)

Core Element	Energy Consumption (MMBtu)	Direct Emissions	Indirect Emissions	*Total*
On-Site Fuel Usage	2,466	163	51	214
Off-Site Fuel Usage	890	0	77	77
Material	392	0	18	18
Waste	1,043	0	74	74
Total	4,790	163	220	383
Note: Totals may not sum due to rounding. See detailed calculations in Appendix A.				

If you have any questions or require additional information, please contact me at (646) 388-9846 or Colleen Griffiths (914) 922-2363.

Sincerely,
AKRF, Inc.

Kevin Edwards
Senior Technical Director

Enc. Attachment A – GHG Emissions Detailed Calculations

APPENDIX A

GHG EMISSIONS DETAILED CALCULATIONS

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Construction Emissions Summary

Table B
Summary of GHG Emissions--Alternative 2 (Track 1)
(metric tons CO2e)

Core Element	Energy Consumption (MMBtu)	Direct Emissions	Indirect Emissions	*Total*
On-Site Fuel Usage	7,279	*481*	*150*	*631*
Off-Site Fuel Usage	2,739	*0*	*237*	*237*
Material	1,184	*0*	*54*	*54*
Waste	3,387	*0*	*240*	*240*
Total	**14,589**	**481**	**681**	***1,163***

Note: Totals may not sum due to rounding. See detailed calculations in Attachment A.

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Construction Task Schedule

Representative Start Date 12/1/2026

Site	Task	Duration			Typical Duration (days)	
		Days	Start	End		
Brookfield Commons BCP Track 1	SOE	8	12/1/2026	12/9/2026	4	Mobilization/Site Prep
	Remedial Excavation	146	12/10/2026	5/5/2027	78	Soil Excavation/Disposal
	Loading for disposal	146	12/10/2026	5/5/2027	78	
	Reuse placement/compaction	26	5/6/2027	6/1/2027	14	
	Import placement/compaction	26	5/6/2027	6/1/2027	14	Site Restoration
	Total	180	12/1/2026	6/1/2027	96	

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Truck Schedule

Import/Export Material Type	Material Origin/Destination	CY	Tonnage	Total Trucks	Travel Distance (mi)
SOIL DISPOSAL					
	TOTAL	14,000	21,000	933	
	Landfill (SEFA Default)	*14,000*	*21,000*	933	25.0
	Recycling (SEFA Default)	*0*	*0*	0	50.0
	Non-BCP Landfill (SEFA Default)	*0*	*0*	0	25.0
SOIL IMPORT					
	TOTAL	14,000	21,000	700	
	Remediation Import (SEFA Deault)	*14,000*	*21,000*	700	25.0
GROUNDWATER DISPOSAL					
	TOTAL	---	435	71	
	Groundwater Disposal (SEFA Default)	---	435	71	50.0

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Worker Projections

Site	Start Date	End Date	Task	Workers Per Day	Modal Split	Auto Occupancy	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																															
	Dec-26	Dec-26	SOE	20	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	May-27	Remedial Excavation	20	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	118	154	147	169	162	22	0	0	0	0	0	0	0	0
	Dec-26	May-27	Loading for disposal	-	43%	1.17	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
	May-27	Jun-27	Reuse placement/compaction	20	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	0	0	0	0	0	0	0	0
	May-27	Jun-27	Import placement/compaction	-	43%	1.17	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
			Monthly Auto Trips (trip/month)				**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**169**	**154**	**147**	**169**	**162**	**154**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total Trips 956 trips

Site	Start Date	End Date	Task	One Way Trip Distance (mi)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	12.64	0	0	0	0	0	0	0	0	0	0	0	1301	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	May-27	Remedial Excavation	12.64	0	0	0	0	0	0	0	0	0	0	0	2973	3902	3716	4274	4088	557	0	0	0	0	0	0	0	0
	Dec-26	May-27	Loading for disposal	12.64	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
	May-27	Jun-27	Reuse placement/compaction	12.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3345	0	0	0	0	0	0	0	0
	May-27	Jun-27	Import placement/compaction	12.64	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
			Monthly VMT (mi/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4273.832479**	**3902.19487**	**3716.376068**	**4273.832**	**4088.014**	**3902.195**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total VMT 24.156 mi

Site	Start Date	End Date	Task	Fuel Economy (mpg)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	27.79	0	0	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	May-27	Remedial Excavation	27.79	0	0	0	0	0	0	0	0	0	0	0	107	140	134	154	147	20	0	0	0	0	0	0	0	0
	Dec-26	May-27	Loading for disposal	27.79	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
	May-27	Jun-27	Reuse placement/compaction	27.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0
	May-27	Jun-27	Import placement/compaction	27.79	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
			Monthly Fuel Consumption (gal/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**153.7743799**	**140.402695**	**133.7168521**	**153.7744**	**147.0885**	**140.4027**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Fuel Consumption
869 gallons
108 MMBtu

Site	Start Date	End Date	Task	CO2e Emission Factor	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	317	0	0	0	0	0	0	0	0	0	0	0	412	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	May-27	Remedial Excavation	317	0	0	0	0	0	0	0	0	0	0	0	943	1237	1178	1355	1296	177	0	0	0	0	0	0	0	0
	Dec-26	May-27	Loading for disposal	317	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
	May-27	Jun-27	Reuse placement/compaction	317	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1060	0	0	0	0	0	0	0	0
	May-27	Jun-27	Import placement/compaction	317	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
			Monthly Emissions (kg/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1355**	**1.237**	**1.178**	**1.355**	**1.296**	**1.237**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
			Monthly Emissions (MT/month)		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.4**	**1.2**	**1.2**	**1.4**	**1.3**	**1.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
7.659 kg
8 metric ton

Site	Start Date	End Date	Task	SEFA Default Factor Gasoline (MMBtu/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	0.03	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	May-27	Remedial Excavation	0.03	0	0	0	0	0	0	0	0	0	0	0	4	5	4	5	5	1	0	0	0	0	0	0	0	0
	Dec-26	May-27	Loading for disposal	0.03	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
	May-27	Jun-27	Reuse placement/compaction	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
	May-27	Jun-27	Import placement/compaction	0.03	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
			Monthly Upstream Energy Consumption (MMBtu/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5.074554537**	**4.63328893**	**4.412656119**	**5.074555**	**4.853922**	**4.633289**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total Energy Consumption
29 MMBtu

Site	Start Date	End Date	Task	NYSDEC GHG Factor (kg CO2e/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	3.56	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	May-27	Remedial Excavation	3.56	0	0	0	0	0	0	0	0	0	0	0	381	500	476	547	524	71	0	0	0	0	0	0	0	0
	Dec-26	May-27	Loading for disposal	3.56	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
	May-27	Jun-27	Reuse placement/compaction	3.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	428	0	0	0	0	0	0	0	0
	May-27	Jun-27	Import placement/compaction	3.56	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
			Monthly Upstream Emissions (kg/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**547**	**500**	**476**	**547**	**524**	**500**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
			Monthly Upstream Emissions (MT/month)		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
3.094 kg
3 metric ton

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Truck Emissions

Site	Start Date	End Date	Task	Truck Type	Total Trucks	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Dec-26	SOE																											
	Dec-26	May-27	Remedial Excavation																											
	Dec-26	May-27	Loading for disposal																											
	Dec-26	*May-27*	*Landfill (SEFA Default)*	DT	933	0	0	0	0	0	0	0	0	0	0	0	142	187	178	204	196	27	0	0	1	0	0	0	0	
	Dec-26	*May-27*	*Groundwater Disposal (SEFA Default)*	DT	71	0	0	0	0	0	0	0	0	0	0	0	11	14	14	16	15	2	0	0	0	0	0	0	0	
	May-27	Jun-27	Reuse placement/compaction																											
	May-27	Jun-27	Import placement/compaction																											
	May-27	*Jun-27*	*Remediation Import (SEFA Deault)*	DT	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663	0	0	1	0	0	0	0	
				Monthly trips (trip/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**153**	**201**	**192**	**220**	**211**	**692**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	

Site	Start Date	End Date	Task	Truck Type	One Way Trip Distance	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Dec-26	SOE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*May-27*	*Landfill (SEFA Default)*	DT	25	0	0	0	0	0	0	0	0	0	0	0	7100	9350	8900	10200	9800	1350	0	0	50	0	0	0	0	
	Dec-26	*May-27*	*Groundwater Disposal (SEFA Default)*	DT	50	0	0	0	0	0	0	0	0	0	0	0	1100	1400	1400	1600	1500	200	0	0	0	0	0	0	0	
	May-27	Jun-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	Jun-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	*Jun-27*	*Remediation Import (SEFA Deault)*	DT	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33150	0	0	50	0	0	0	0	
				Monthly VMT (mi/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8200**	**10750**	**10300**	**11800**	**11300**	**34700**	**0**	**0**	**100**	**0**	**0**	**0**	**0**	

Total VMT
87,150 mi

Site	Start Date	End Date	Task	Truck Type	Fuel Economy (mpg)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Dec-26	SOE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*May-27*	*Landfill (SEFA Default)*	DT	5.359	0	0	0	0	0	0	0	0	0	0	0	1325	1745	1661	1903	1829	252	0	0	9	0	0	0	0	
	Dec-26	*May-27*	*Groundwater Disposal (SEFA Default)*	DT	5.359	0	0	0	0	0	0	0	0	0	0	0	205	261	261	299	280	37	0	0	0	0	0	0	0	
	May-27	Jun-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	Jun-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	*Jun-27*	*Remediation Import (SEFA Deault)*	DT	5.359	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6186	0	0	9	0	0	0	0	
				Monthly Fuel Consumption (gal/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1530.134848**	**2005.969465**	**1921.999**	**2201.901366**	**2108.6**	**6475.083**	**0**	**0**	**18.66018**	**0**	**0**	**0**	**0**	

Total Fuel Consumption
16,262 gallon
2,231 MMBtu

Site	Start Date	End Date	Task	Truck Type	CO2e Emission Factor	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Dec-26	SOE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*May-27*	*Landfill (SEFA Default)*	DT	1,911	0	0	0	0	0	0	0	0	0	0	0	13570	17871	17011	19495	18731	2580	0	0	96	0	0	0	0	
	Dec-26	*May-27*	*Groundwater Disposal (SEFA Default)*	DT	1,911	0	0	0	0	0	0	0	0	0	0	0	2102	2676	2676	3058	2867	382	0	0	0	0	0	0	0	
	May-27	Jun-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	Jun-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	*Jun-27*	*Remediation Import (SEFA Deault)*	DT	1,911	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63360	0	0	96	0	0	0	0	
				Monthly Emissions (kg/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15,673**	**20,547**	**19,686**	**22,553**	**21,598**	**66,322**	**0**	**0**	**191**	**0**	**0**	**0**	**0**	
				Monthly Emissions (MT/month)		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**15.7**	**20.5**	**19.7**	**22.6**	**21.6**	**66.3**	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
166,570 kg
167 metric ton

Site	Start Date	End Date	Task	Truck Type	SEFA Default Factor Diesel (MMBtu/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Dec-26	SOE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*May-27*	*Landfill (SEFA Default)*	DT	0.017	0	0	0	0	0	0	0	0	0	0	0	23	30	28	32	31	4	0	0	0	0	0	0	0	
	Dec-26	*May-27*	*Groundwater Disposal (SEFA Default)*	DT	0.017	0	0	0	0	0	0	0	0	0	0	0	3	4	4	5	5	1	0	0	0	0	0	0	0	
	May-27	Jun-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	Jun-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	*Jun-27*	*Remediation Import (SEFA Deault)*	DT	0.017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	0	0	0	0	0	
				Monthly Upstream Energy Consumption (MMBtu/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**26**	**34**	**33**	**37**	**36**	**110**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total Energy Consumption
276 MMBtu

Site	Start Date	End Date	Task	Truck Type	NYSDEC GHG Factor (kg CO2e/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Dec-26	SOE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	May-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*May-27*	*Landfill (SEFA Default)*	DT	3.190	0	0	0	0	0	0	0	0	0	0	0	4236	5565	5297	6071	5833	804	0	0	30	0	0	0	0	
	Dec-26	*May-27*	*Groundwater Disposal (SEFA Default)*	DT	3.190	0	0	0	0	0	0	0	0	0	0	0	655	833	833	952	893	119	0	0	0	0	0	0	0	
	May-27	Jun-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	Jun-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	May-27	*Jun-27*	*Remediation Import (SEFA Deault)*	DT	3.190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19731	0	0	30	0	0	0	0	
				Monthly Upstream Emissions (kg/month)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4,881**	**6,399**	**6,131**	**7,024**	**6,726**	**20,654**	**0**	**0**	**60**	**0**	**0**	**0**	**0**	
				Monthly Upstream Emissions (MT/month)		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.9**	**6.4**	**6.1**	**7.0**	**6.7**	**20.7**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
51,873 kg
52 metric ton

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Equipment Schedule

	Start Date	End Date	Equipment	Engine type	Size (hp)	Qty	Daily use	Average Use	Load	Fuel Consumption Factor (g/hp-hr) 2026	Short-Term BSFC Factor (lb/day) 2026	Fuel Consumption Factor (gal/hp-hr) 2026	Short-Term BSFC Factor (gal/day) 2026
SOE													
	12/1/2026	12/9/2026	Excavator	diesel	250	4	95%	95%	59%	168.2825138	1580.383296	0.052923257	225.4424889
	12/1/2026	12/9/2026	Loader	diesel	200	1	95%	95%	59%	168.2825736	316.0767717	0.052923276	45.08851381
	12/1/2026	12/9/2026	On-Site Dump Truck	diesel	400	1	95%	95%	59%	168.2824166	632.1529535	0.052923226	90.17694349
Remedial Excavation													
	12/10/2026	5/5/2027	Excavator	diesel	250	4	95%	95%	59%	168.2825138	1580.383296	0.052923257	225.4424889
	12/10/2026	5/5/2027	Loader	diesel	200	1	95%	95%	59%	168.2825736	316.0767717	0.052923276	45.08851381
	12/10/2026	5/5/2027	On-Site Dump Truck	diesel	400	1	95%	95%	59%	168.2824166	632.1529535	0.052923226	90.17694349
Loading for disposal													
	12/10/2026	5/5/2027	(included above)										
Reuse placement/compaction													
	5/6/2027	6/1/2027	Excavator	diesel	250	4	95%	95%	59%	168.2825138	1580.383296	0.052923257	225.4424889
	5/6/2027	6/1/2027	Loader	diesel	200	1	95%	95%	59%	168.2825736	316.0767717	0.052923276	45.08851381
	5/6/2027	6/1/2027	On-Site Dump Truck	diesel	400	1	95%	95%	59%	168.2824166	632.1529535	0.052923226	90.17694349
Import placement/compaction													
	5/6/2027	6/1/2027	(included above)										

SOE	2528.613021		360.7079462
Remedial Excavation	2528.613021		360.7079462
Loading for disposal	0		0
Reuse placement/compaction	2528.613021		360.7079462
Import placement/compaction	0		0

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Equipment Emissions

Site	Start Date	End Date	Task	Annual BSFC Factor (lb/day)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	12/1/2026	12/9/2026	SOE	2528.613021												17,700													
	12/10/2026	5/5/2027	Remedial Excavation	2528.613021												40,458	53,101	50,572	58,158	55,629	7,586								
	12/10/2026	5/5/2027	Loading for disposal	0																									
	5/6/2027	6/1/2027	Reuse placement/compaction	2528.613021																	45,515								
	5/6/2027	6/1/2027	Import placement/compaction	0																									

Site	Start Date	End Date	Task	Annual Fuel Consumption (gal/day)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	360.7079462												2,525													
	Dec-26	May-27	Remedial Excavation	360.7079462												5,771	7,575	7,214	8,296	7,936	1,082								
	Dec-26	May-27	Loading for disposal	0																	6,493								
	May-27	Jun-27	Reuse placement/compaction	360.7079462																									
	May-27	Jun-27	Import placement/compaction	0																									
			Monthly Fuel Consumption (gal/month)		-	-	-	-	-	-	-	-	-	-	-	8,296	7,575	7,214	8,296	7,936	7,575	-	-	-	-	-	-	-	

Total Fuel Consumption
46,892 gal
6,434 MMBtu

Annual CO2 Emissions (kg/month)

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Dec-26	SOE												25,780													
	Dec-26	May-27	Remedial Excavation												58,925	77,339	73,657	84,705	81,022	11,048								
	Dec-26	May-27	Loading for disposal																	66,291								
	May-27	Jun-27	Reuse placement/compaction																									
	May-27	Jun-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	84,705	77,339	73,657	84,705	81,022	77,339	-	-	-	-	-	-	-	

Annual CH4 Emissions (kg/month)

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Dec-26	SOE												1.035													
	Dec-26	May-27	Remedial Excavation												2.366	3.106	2.958	3.401	3.254	0.444								
	Dec-26	May-27	Loading for disposal																									
	May-27	Jun-27	Reuse placement/compaction																	2.662								
	May-27	Jun-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	-	-	-	-	-	-	-	

Annual N2O Emissions (kg/month)

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Dec-26	SOE												0.202													
	Dec-26	May-27	Remedial Excavation												0.462	0.606	0.577	0.664	0.635	0.087								
	Dec-26	May-27	Loading for disposal																									
	May-27	Jun-27	Reuse placement/compaction																	0.519								
	May-27	Jun-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-	-	

Annual Direct CO2e Emissions (kg/month)

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Dec-26	SOE												25,920													
	Dec-26	May-27	Remedial Excavation												59,246	77,760	74,057	85,166	81,463	11,109								
	Dec-26	May-27	Loading for disposal																									
	May-27	Jun-27	Reuse placement/compaction																	66,652								
	May-27	Jun-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	85.166	77.760	74.057	85.166	81.463	77.760	-	-	-	-	-	-	-	
			Monthly Emissions (MT/month)	-	-	-	-	-	-	-	-	-	-	-	85.17	77.76	74.06	85.17	81.46	77.76	-	-	-	-	-	-	-	

Total Emissions
481.373 kg
481 metric ton

Annual Upstream Energy Consumption (MMBtu/month)

Site	Start Date	End Date	Task	SEFA Default Factor Diesel (MMBtu/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Dec-26	SOE	0.017												43													
	Dec-26	May-27	Remedial Excavation	0.017												98	129	123	141	135	18								
	Dec-26	May-27	Loading for disposal	0.017																									
	May-27	Jun-27	Reuse placement/compaction	0.017																	110								
	May-27	Jun-27	Import placement/compaction	0.017																									
			Monthly Fuel Consumption (MMBtu/month)		-	-	-	-	-	-	-	-	-	-	-	141	129	123	141	135	129	-	-	-	-	-	-	-	

Total Energy Consumption
797 MMBtu

Annual Upstream CO2e Emissions (kg/month)

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Dec-26	SOE												8,054													
	Dec-26	May-27	Remedial Excavation												18,409	24,162	23,011	26,463	25,313	3,452								
	Dec-26	May-27	Loading for disposal																									
	May-27	Jun-27	Reuse placement/compaction																	20,710								
	May-27	Jun-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	26,463	24,162	23,011	26,463	25,313	24,162	-	-	-	-	-	-	-	
			Monthly Emissions (MT/month)	-	-	-	-	-	-	-	-	-	-	-	26.46	24.16	23.01	26.46	25.31	24.16	-	-	-	-	-	-	-	

Total Emissions
149,574 kg
150 metric ton

Emissions Summary (metric ton)

	Monthly 2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Annual Total
Equipment-Direct	0	0	0	0	0	0	0	0	0	0	0	85	78	74	85	81	78	0	0	0	0	0	0	0		481
Equipment-Indirect	0	0	0	0	0	0	0	0	0	0	0	26	24	23	26	25	24	0	0	0	0	0	0	0		150
Trucks	0	0	0	0	0	0	0	0	0	0	0	16	21	20	23	22	66	0	0	0	0	0	0	0		167
Truck - Upstream	0	0	0	0	0	0	0	0	0	0	0	5	6	6	7	7	21	0	0	0	0	0	0	0		52
Cars	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0		8
Cars - Upstream	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0		3
Materials																										54
Waste																										240
Total	0	0	0	0	0	0	0	0	0	0	0	134	131	125	143	137	191	0	0	0	0	0	0	0		1154

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Imported Material Emissions

							Lookup ID 3	4	5	6	7	8	
Material	**SEFA Lookup**	**Quantity**	**Unit**	**Conversion**	**Quantity**	**Unit**	**Energy Usage (MMBtu)**	**GHG (lb CO2e)**	**NOx (lb)**	**SOx (lb)**	**PM (lb)**	**HAPs (lb)**	
Remediation Import (SEFA Deault)	Sand	14,000	CY	3000	42,000,000	lb	1,042	100,800	756	190	110	13	
Carbon Media	Granular activated carbon, primary				4,000	lbs	142	19,280	317	512	4	3	
						Total	1,184	120,080	1,073	702	114	16	lb
								60.040	0.537	0.351	0.057	0.008	ton
								54,467					kg
								54					MT

SEFA Tool Material Table

		Lookup ID 3	4	5	6	7	8	
Construction Materials	**Unit**	**Energy Usage (MMBtu/unit)**	**GHG (lb CO2e/unit)**	**NOx (lb/unit)**	**SOx (lb/unit)**	**PM (lb/unit)**	**HAPs (lb/unit)**	
Aluminum, Rolled Sheet	lb	0.0633	9.15	0.0148	0.0283	0.0088	0.00102	
Asphalt, mastic	lb	0.0412	0.85	0.00271	0.00798	0.000766	0.00107	
Asphalt, paving-grade	lb	0.5	8.58	0.0299	0.0969	0.0091	0.0133	
Ethanol, Corn, 95%	lb	0.0318	-0.0199	0.00425	0.00303	0.000469	0.0000846	
Ethanol, Corn, 99.7%	lb	0.0324	0.0591	0.00431	0.0031	0.000472	0.000087	
Ethanol, Petroleum, 99.7%	lb	0.0205	1.25	0.00199	0.00214	0.000277	0.0000589	
Gravel/Sand Mix, 65% Gravel	lb	0.0000248	0.0024	0.000018	0.00000452	0.00000261	0.000000308	
Gravel/sand/clay	lb	0.000028	0.00335	0.0000165	0.000015	0.000002	2.05E-10	
HDPE	lb	0.0332	1.94	0.00325	0.00409	0.000439	0.0000641	
Photovoltaic system (installed)	W	0.0336	4.47	0.015	0.032	0.00063	0.0000029	
PVC	lb	0.0262	2.02	0.004	0.00274	0.000372	0.000375	
Portland cement, US average	lb	0.0139	1.34	0.00654	0.0104	0.00378	0.00097	
Ready-mixed concrete, 20 MPa	ft3	0.217	19.5	0.0975	0.154	0.057	0.0141	
Round Gravel	lb	0.0000248	0.0024	0.000018	0.00000452	0.00000261	0.000000308	
Sand	lb	0.0000248	0.0024	0.000018	0.00000452	0.00000261	0.000000308	
Stainless Steel	lb	0.0116	3.4	0.0075	0.012	0.0044	0.000144	
Steel	lb	0.0044	1.1	0.0014	0.0017	0.00056	0.000067	
Other refined construction materials	lb	0.01885	2.115	0.0040375	0.0051325	0.00144275	0.000162525	
Other unrefined construction materials	lb	0.000028	0.00335	0.0000165	0.000015	0.000002	2.05E-10	
Cheese Whey	lbs	0.0025	0.031	0.000062	0.000033	0.000002	NP	
Emulsified vegetable oil	lbs	0.0077	3.44	0.0066	0.0019	0.000033	NP	
Granular activated carbon, primary	lbs	0.0356	4.82	0.0793	0.128	0.000987	0.000657	
Granular activated carbon, regenerated	lbs	0.00873	1.7	0.00733	0.0129	0.000886	0.000671	
Hydrogen Peroxide, 50% in H2O	lbs	0.00979	1.19	0.00142	0.0024	0.000308	0.0000629	
Iron (II) Sulfate	lbs	0.00147	0.167	0.000316	0.000589	0.000103	0.000023	
Lime, Hydrated, Packed	lbs	0.00206	0.762	0.000513	0.000358	0.00013	0.00000657	
Molasses	lbs	0.0044	0.48	0.0011	0.00024	0.0000041	NP	
Phosphoric Acid, 70% in H2O	lbs	0.0067	0.882	0.00282	0.0294	0.00171	0.000163	
Potassium Permanganate	lbs	0.00981	1.16	0.00234	0.0032	0.000422	0.000122	
Sodium Hydroxide, 50% in H2O	lbs	0.00977	1.09	0.00194	0.00352	0.000403	0.000129	
Other Treatment Chemicals & Materials	lbs	0.015	1.67	0.003	0.0065	0.00061	0.000016	

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Waste Emissions

							Lookup ID 3	4	5	6	7	8	
Material	SEFA Lookup	Quantity	Unit	Conversion	Quantity	Unit	Energy Usage (MMBtu)	GHG (lb CO2e)	NOx (lb)	SOx (lb)	PM (lb)	HAPs (lb)	
Landfill (SEFA Default)	Off-site non-hazardous waste landfill	13,160	CY	1.5	19,740	ton	3,158	493,500	2,764	1,481	7,896	28	
Landfill (SEFA Default)	Off-site hazardous waste landfill	840	CY	1.5	1,262	ton	227	34,705	194	104	555	2	
Groundwater Disposal (SEFA Default	Off-site waste water treatment (POTW)	116,985	gal	1000	117	gal x 1000	2	515	2	2	0	0	
						Total	3,387	528,720	2,960	1,586	8,451	30	lb
								264.360	1.480	0.793	4.226	0.015	ton
								239,823					kg
								240					MT

SEFA Tool Waste Table

		Lookup ID 3	4	5	6	7	8
Waste Treatment	Unit	Energy Usage (MMBtu/unit)	GHG (lb CO2e/unit)	NOx (lb/unit)	SOx (lb/unit)	PM (lb/unit)	HAPs (lb/unit)
Hazardous waste incineration	lb	0.00609	2.43	0.0016	0.00167	0.000209	0.000087
Off-site waste water treatment (POTW)	gal x 1000	0.015	4.4	0.016	0.015		
Off-site non-hazardous waste landfill	ton	0.16	25	0.14	0.075	0.4	0.0014
Off-site hazardous waste landfill	ton	0.18	27.5	0.154	0.0825	0.44	0.00154
Off-site Laboratory Analysis - Other	sample	0.058071029	6.85343842	0.131401957	0.303875767	0.045569824	0.033016529
Off-site Laboratory Analysis - Metals	sample	0.212	27.4693	0.6423	1.5072	0.2264	0.1643
Off-site Laboratory Analysis - Mercury	sample	0.073171472	9.325458	0.2127439	0.4982396	0.07473594	0.05423316
Off-site Laboratory Analysis - Inorganic Anions	sample	0.007402451	0.6459478	0.006768122	0.014792866	0.002202395	0.001554243
Off-site Laboratory Analysis - Alkalinity	sample	0.017439833	1.3381922	0.007010628	0.013249646	0.001940048	0.001283077
Off-site Laboratory Analysis - Perchlorate	sample	0.023884988	1.8717054	0.007980652	0.014153532	0.002054687	0.001287486
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0.033647504	4.29897	0.09545918	0.2226646	0.03350992	0.0242506
Off-site Laboratory Analysis - Sulfate	sample	0.014122473	1.4726728	0.007980652	0.013602382	0.001979731	0.001201507
Off-site Laboratory Analysis - PCBs	sample	0.0512769	5.224902	0.08333388	0.19047744	0.02843934	0.021208252
Off-site Laboratory Analysis - VOCs	sample	0.076204487	9.016814	0.10449804	0.2270738	0.03395084	0.02358922
Off-site Laboratory Analysis - SVOCs	sample	0.071560184	7.870422	0.14594452	0.3373038	0.05048534	0.03725774

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Grid Electricity Emissions

					2026												2027													
Site	**Start Date**	**End Date**	**Eletrical Equipment**	**Daily Energy Demand (kWh/day)**	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	
Brookfield Commons BCP																														
	12/1/2026	6/1/2027	Mobile Office 1	50												1,150	1,050	1,000	1,150	1,100	1,050									
	12/1/2026	6/1/2027	Mobile Office 2	50												1,150	1,050	1,000	1,150	1,100	1,050									
	1/1/2027	5/1/2027	Dewatering Pumps	11.93119792													251	239	274	262										

Total Demand

				Scope 1 Energy Consumption (kWh)	-	-	-	-	-	-	-	-	-	-	-	**2,300**	**2,351**	**2,239**	**2,574**	**2,462**	**2,100**	-	-	-	-	-	-	-		14,026	kWh
				Scope 1 Energy Consumption (MMBtu)	-	-	-	-	-	-	-	-	-	-	-	**8**	**8**	**8**	**9**	**8**	**7**	-	-	-	-	-	-	-		48	MMBtu
			eGrid MMBtu/MWh	7.35																									
				Scope 2 Energy Consumption (MMBtu)	-	-	-	-	-	-	-	-	-	-	-	**9**	**9**	**9**	**10**	**10**	**8**	-	-	-	-	-	-	-		55	MMBtu
			SEFA Transmission Loss %	10%																									
			Grid Baseload Emissions (g/kWh)	393.19																									
				Scope 3 Loss Energy Consumption (MMBtu)	-	-	-	-	-	-	-	-	-	-	-	**1.7**	**1.7**	**1.6**	**1.9**	**1.8**	**1.5**	-	-	-	-	-	-	-		10	MMBtu
				Scope 3 Loss Emissions (kg)	-	-	-	-	-	-	-	-	-	-	-	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	-	-	-	-	-	-	-		1	kg
				Scope 3 Loss Emissions (MT)	-	-	-	-	-	-	-	-	-	-	-	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	-	-	-	-	-	-	-		0.001	MT

					2026												2027													
Site	**Start Date**	**End Date**	**Eletrical Equipment**	**Scope 2 Grid Baseload Emissions (g/kWh)**	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	
Brookfield Commons BCP																														
	12/1/2026	6/1/2027	Mobile Office 1	393.194278												452,173	412,854	393,194	452,173	432,514	412,854									
	12/1/2026	6/1/2027	Mobile Office 2	393.194278												452,173	412,854	393,194	452,173	432,514	412,854									
	1/1/2027	5/1/2027	Dewatering Pumps	393.194278												393	8,650	8,257	9,437	8,650										

Total Emissions

					-	-	-	-	-	-	-	-	-	-	-	**904,740**	**834,358**	**794,646**	**913,784**	**873,678**	**825,708**	-	-	-	-	-	-	-		5,146,913	g
					-	-	-	-	-	-	-	-	-	-	-	905	834	795	914	874	826	-	-	-	-	-	-	-		5,147	kg
					-	-	-	-	-	-	-	-	-	-	-	0.9	0.8	0.8	0.9	0.9	0.8	-	-	-	-	-	-	-		5	MT

Scope 3 Upstream Energy Consumption

Natural Gas Generation - Upstream

				eGrid Resource Mix	98%																								
				Energy Factor (SEFA Default) (MMBtu/MWh)	1.6318																									
				GHG Emission Factor (SEFA Default) (lb/MWh)	270																									
				Monthly Energy Consumption (MMBtu/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69	3.77	3.59	4.13	3.95	3.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00		22.48	MMBtu
				Monthly GHG Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	277	283	269	310	296	253	-	-	-	-	-	-	-		1,686.85	kg
				Monthly GHG Emissions (MT/month)	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.3	0.3	0.3	0.3	-	-	-	-	-	-	-		1.69	MT

Oil Generation - Upstream

				eGrid Resource Mix	1%																								
				Energy Factor (SEFA Default) (MMBtu/MWh)	2.2954																									
				GHG Emission Factor (SEFA Default) (lb/MWh)	270																									
				Monthly Energy Consumption (MMBtu/month)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.16	MMBtu
				Monthly GHG Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	1	1	1	2	2	1	-	-	-	-	-	-	-		8.59	kg
				Monthly GHG Emissions (MT/month)	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-		0.01	MT

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Water Emissions

							Lookup ID 2	3	4	5	6	7	8	
Water Source	**Lookup**	**Quantity**	**Unit**	**Conversion**	**Quantity**	**Unit**	**Energy Usage (MMBtu)**	**GHG (lb CO2e)**	**NOx (lb)**	**SOx (lb)**	**PM (lb)**	**HAPs (lb)**	
NYC Public Water	Public Water (SEFA Default)	628,800	gal	0.001	629	gal x 1000	6	3,144	6	4	10	0	
*Water Consumption (10 gpm x 8 hr/day)						**Total**	6	3,144	6	4	10	0	lb
								1.572	0.003	0.002	0.005	0.000	ton
								1,426					kg
								1					MT

Water Usage Emission Factors

		Lookup ID 3	4	5	6	7	8
Water Source Type	**Unit**	**Energy Usage (MMBtu/unit)**	**GHG (lb CO2e/unit)**	**NOx (lb/unit)**	**SOx (lb/unit)**	**PM (lb/unit)**	**HAPs (lb/unit)**
Public Water (SEFA Default)	gal x 1000	0.0092	5	0.0097	0.0059	0.016	0.000015
Other	sample	0.071560184	7.870422	0.14594452	0.3373038	0.05048534	0.03725774

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
Emission Factors

BSFC Emission Factors (g/hp-hr)

ID	Equipment	Engine	SCC Code	HPmin	HPmax	HP	Equipment	Load	2026
	Dsl - Rubber Tire Loaders	2.27E+09	Diesel	175	300	200	Loader	59%	168.2826
	Dsl - Excavators	2.27E+09	Diesel	175	300	250	Excavator	59%	168.2825
	Dsl - Off-highway Trucks	2.27E+09	Diesel	301	600	400	On-Site Dump Tru	59%	168.2824

Fuel Properties

Densities	kg/L	g/gal	lb/gal
Diesel	0.84	3,179.75	7.01
Gasoline	0.74	2,801.21	6.18
LPG	0.54	2,044.12	4.51

BSFC Emission Factors (gal/hp-hr)

ID	Equipment	Engine	SCC Code	HPmin	HPmax	HP	Equipment	Load	2026
	Dsl - Rubber Tire Loaders	2.27E+09	Diesel	175	300	200	Loader	59%	0.0529
	Dsl - Excavators	2.27E+09	Diesel	175	300	250	Excavator	59%	0.0529
	Dsl - Off-highway Trucks	2.27E+09	Diesel	301	600	400	On-Site Dump Tru	59%	0.0529

EPA Fuel Emission Factors

Diesel

GWP-100	GWP-20	kg/gal	GHG	GWP-20 Equivalent Emissions		GWP-100 Equivalent Emissions		SEFA Default	
1	1	10.21	CO2	10.27	kg CO2e/gal	10.24268	kg CO2e/gal	10.20582833	kg CO2e/gal
28	84	0.00041	CH4	22.63168431	lb CO2e/gal	22.58124254	lb CO2e/gal	22.5	lb CO2e/gal
265	264	0.00008	N2O						

https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

GWP-20 Equivalent Emissions with Upstream	
13.4553228	kg CO2e/gal
29.66390707	lb CO2e/gal

Gasoline

GWP-100	GWP-20	kg/gal	GHG	GWP-20 Equivalent Emissions		GWP-100 Equivalent Emissions		SEFA Default	
1	1	8.78	CO2	8.83	kg CO2e/gal	8.81184	kg CO2e/gal	8.890410452	kg CO2e/gal
28	84	0.00038	CH4	19.47351852	lb CO2e/gal	19.42678052	lb CO2e/gal	19.6	lb CO2e/gal
265	264	0.00008	N2O						

https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

MOVES TRUCKS FACTORS

	CO2e
2026 - Truck Idling (g/hr)	7492.660006
2026 - Truck Cruising - 5mph (g/veh)	
2026 - Truck Cruising - 25mph (g/mi)	1911.302635
2026 - Auto Cruising - 25mph (g/mi)	317.0538945

Truck Mileage

10242.68	g/gal
1911.302635	g/mi
5.359004804	mpg
0.186601811	gal per mi
0.025601768	MMBtu/mi

Car Mileage

8811.84	g/gal
317.0538945	g/mi
27.79287734	mpg
0.035980442	gal per mi
0.004483163	MMBtu/mi

Distance Traveled On-site: approximately 0.1 mile per truck

0.1 mile per truck

HHV

Diesel	0.1372	mmBtu per gallon
Gasoline	0.1246	mmBtu per gallon

NYSDEC Upstream Emission Factor

Table A1. 2023 Emission Rates for Upstream Out-of-State Sources (g/mmbtu)

	Diesel Fuel	
CH4	115.000	g/MMBtu
N2O	0.250	g/MMBtu
CO2	13,542	g/MMBtu
CO2e	23,249	g/MMBtu

	Diesel Fuel	
CH4	15.778	g/gal
N2O	0.034	g/gal
CO2	1,858	g/gal
CO2e	3,190	g/gal

	Gasoline Fuel	
CH4	122.000	g/MMBtu
N2O	0.320	g/MMBtu
CO2	18,276	g/MMBtu
CO2e	28,570	g/MMBtu

	Gasoline Fuel	
CH4	15.201	g/gal
N2O	0.040	g/gal
CO2	2,277	g/gal
CO2e	3,560	g/gal

NYSDEC, Appendix A of the 2025 Statewide GHG Emission Report. December 2025

eGRID Baseload Electricity Factor

Data Year	eGRID subregion acronym	eGRID subregion name	eGRID subregion total annual heat input (MMBtu)	eGRID subregion annual net generation (MWh)	Unit	eGRID subregion annual CO2 total output emission rate	eGRID subregion annual CH4 total output emission rate	eGRID subregion annual N2O total output emission rate	eGRID subregion annual CO2 equivalent total output emission rate (GWP-100)	eGRID subregion annual CO2 equivalent total output emission rate (GWP-20)
2023	NYCW	NPCC NYC/Westchester	254301464	34602268	lb/MWh	864.469	0.022	0.002	865.744	866.845
					g/kWh	392.117	0.010	0.001	392.695	**393.194**

	NPCC NYC/Westchester Resource Mix
eGRID subregion coal generation	0.000%
eGRID subregion oil generation	0.500%
eGRID subregion gas generation	98.200%
eGRID subregion nuclear generation	0.000%
eGRID subregion hydro generation	0.000%
eGRID subregion biomass generation	0.500%
eGRID subregion wind generation	0.000%
eGRID subregion solar generation	0.100%
eGRID subregion geothermal generation	0.000%
eGRID subregion other fossil generation	0.700%
eGRID subregion other unknown/ purchased fuel generation	0.000%
	100.0%

Brookfield Commons BCP - Track 1
Environmental Footprint Analysis
SEFA Equipment Table

Table 3. Equipment Type and Representative Horsepower
Asphalt paver (150 HP)
Backhoe (100 HP)
Concrete paving machine (200 HP)
Dozer - large (200 HP)
Dozer - small (100 HP)
Drilling - direct push (60 HP)
Drilling - large rig (500 HP)
Drilling - medium rig (150 HP)
Dump truck (400 HP)
Excavator - large (250 HP)
Excavator - medium (175 HP)
Excavator/hoe - small (75 HP)
Generator - HP varies
Grader (175 HP)
Grout pump (20 HP)
Hydroseeder (20 HP)
Integrated tool carrier (100 HP)
Loader (200 HP)
Loader - small (75 HP)
Mobile laboratory (25 HP)
Mowers (5 HP)
Other - HP varies
Riding trencher (55 HP)
Roller (100 HP)
Rotary-screw air compressor - 250 cfm (60 HP)
Skid-steer - small (60 HP)
Telescopic handler (60 HP)
Tractor mower (25 HP)
Water truck (400 HP)

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Construction Emissions Summary

Table B
Summary of GHG Emissions--Alternative 3 (Track 2)
(metric tons CO2e)

Core Element	Energy Consumption (MMBtu)	Direct Emissions	Indirect Emissions	*Total*
On-Site Fuel Usage	2,466	*163*	*51*	*214*
Off-Site Fuel Usage	890	*0*	*77*	*77*
Material	392	*0*	*18*	*18*
Waste	1,043	*0*	*74*	*74*
Total	**4,790**	**163**	**220**	***383***

Note: Totals may not sum due to rounding. See detailed calculations in Attachment A.

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Construction Task Schedule

Representative Start Date 12/1/2026

Site	Task	Duration			Typical Duration (days)	
		Days	Start	End		
Brookfield Commons BCP Track 2	Remedial Excavation	51	12/1/2026	1/21/2027	78	Soil Excavation/Disposal
	Loading for disposal	51	12/1/2026	1/21/2027	78	
	Reuse placement/compaction	9	1/22/2027	1/31/2027	14	
	Import placement/compaction	9	1/22/2027	1/31/2027	14	Site Restoration
	Total	60	12/1/2026	1/31/2027	92	

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Truck Schedule

Import/Export Material Type	Material Origin/Destination	CY	Tonnage	Total Trucks	Travel Distance (mi)
SOIL DISPOSAL					
	TOTAL	4,310	6,465	287	
	Landfill (SEFA Default)	*4,310*	*6,465*	287	25.0
	Recycling (SEFA Default)	*0*	*0*	0	50.0
	Non-BCP Landfill (SEFA Default)	*0*	*0*	0	25.0
SOIL IMPORT					
	TOTAL	4,310	6,465	216	
	Remediation Import (SEFA Deault)	*4,310*	*6,465*	216	25.0
				0	25.0
GROUNDWATER DISPOSAL					
	TOTAL	---	169	28	
	Groundwater Disposal (SEFA Default)	---	169	28	50.0

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Worker Projections

Site	Start Date	End Date	Task	Workers Per Day	Modal Split	Auto Occupancy	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																															
	Dec-26	Jan-27	Remedial Excavation	20	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	169	110	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	Jan-27	Loading for disposal	-	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Reuse placement/compaction	20	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Import placement/compaction	-	43%	1.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Monthly Auto Trips (trip/month)				**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**169**	**154**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total Trips
323 trips

Site	Start Date	End Date	Task	One Way Trip Distance (mi)		2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation	12.64		0	0	0	0	0	0	0	0	0	0	0	4274	2787	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	Jan-27	Loading for disposal	12.64		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Reuse placement/compaction	12.64		0	0	0	0	0	0	0	0	0	0	0	0	1115	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Import placement/compaction	12.64		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Monthly VMT (mi/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4273.832479**	**3902**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total VMT
8,176 mi

Site	Start Date	End Date	Task	Fuel Economy (mpg)		2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation	27.79		0	0	0	0	0	0	0	0	0	0	0	154	100	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	Jan-27	Loading for disposal	27.79		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Reuse placement/compaction	27.79		0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Import placement/compaction	27.79		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Monthly Fuel Consumption (gal/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**153.7743799**	**140**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Fuel Consumption
294 gallons
37 MMBtu

Site	Start Date	End Date	Task	CO2e Emission Factor		2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation	317		0	0	0	0	0	0	0	0	0	0	0	1355	884	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	Jan-27	Loading for disposal	317		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Reuse placement/compaction	317		0	0	0	0	0	0	0	0	0	0	0	0	353	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Import placement/compaction	317		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Monthly Emissions (kg/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,355**	**1,237**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
			Monthly Emissions (MT/month)			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.4**	**1.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
2,592 kg
3 metric ton

Site	Start Date	End Date	Task	SEFA Default Factor Gasoline (MMBtu/gal)		2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation	0.03		0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	Jan-27	Loading for disposal	0.03		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Reuse placement/compaction	0.03		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Import placement/compaction	0.03		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Monthly Upstream Energy Consumption (MMBtu/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5.074554537**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total Energy Consumption
10 MMBtu

Site	Start Date	End Date	Task	NYSDEC GHG Factor (kg CO2e/gal)		2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation	3.56		0	0	0	0	0	0	0	0	0	0	0	547	357	0	0	0	0	0	0	0	0	0	0	0
	Dec-26	Jan-27	Loading for disposal	3.56		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Reuse placement/compaction	3.56		0	0	0	0	0	0	0	0	0	0	0	0	143	0	0	0	0	0	0	0	0	0	0	0
	Jan-27	Jan-27	Import placement/compaction	3.56		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Monthly Upstream Emissions (kg/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**547**	**500**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
			Monthly Upstream Emissions (MT/month)			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
1,047 kg
1 metric ton

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Truck Emissions

Site	Start Date	End Date	Task	Truck Type	Total Trucks	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation																											
	Dec-26	Jan-27	Loading for disposal																											
	Dec-26	*Jan-27*	*Landfill (SEFA Default)*	DT	287	0	0	0	0	0	0	0	0	0	0	0	174	113	0	0	0	0	0	0	1	0	0	0	0	
	Dec-26	*Jan-27*	*Groundwater Disposal (SEFA Default)*	DT	28	0	0	0	0	0	0	0	0	0	0	0	17	11	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Reuse placement/compaction																											
	Jan-27	Jan-27	Import placement/compaction																											
	Jan-27	*Jan-27*	*Remediation Import (SEFA Deault)*	DT	216	0	0	0	0	0	0	0	0	0	0	0	0	216	0	0	0	0	0	0	1	0	0	0	0	
			Monthly trips (trip/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**191**	**340**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	

Site	Start Date	End Date	Task	Truck Type	One Way Trip Distance	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	Jan-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*Jan-27*	*Landfill (SEFA Default)*	DT	25	0	0	0	0	0	0	0	0	0	0	0	8700	5650	0	0	0	0	0	0	50	0	0	0	0	
	Dec-26	*Jan-27*	*Groundwater Disposal (SEFA Default)*	DT	59	0	0	0	0	0	0	0	0	0	0	0	1700	1100	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	*Jan-27*	*Remediation Import (SEFA Deault)*	DT	25	0	0	0	0	0	0	0	0	0	0	0	0	10800	0	0	0	0	0	0	50	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	
			Monthly VMT (mi/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10400**	**17550**	**0**	**0**	**0**	**0**	**0**	**0**	**100**	**0**	**0**	**0**	**0**	

Total VMT
28,050 mi

Site	Start Date	End Date	Task	Truck Type	Fuel Economy (mpg)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	Jan-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*Jan-27*	*Landfill (SEFA Default)*	DT	5.359	0	0	0	0	0	0	0	0	0	0	0	1623	1054	0	0	0	0	0	0	9	0	0	0	0	
	Dec-26	*Jan-27*	*Groundwater Disposal (SEFA Default)*	DT	5.359	0	0	0	0	0	0	0	0	0	0	0	317	205	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	*Jan-27*	*Remediation Import (SEFA Deault)*	DT	5.359	0	0	0	0	0	0	0	0	0	0	0	0	2015	0	0	0	0	0	0	9	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	
			Monthly Fuel Consumption (gal/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1940.658831**	**3274.861778**	**0**	**0**	**0**	**0**	**0**	**0**	**18.66018**	**0**	**0**	**0**	**0**	

Total Fuel Consumption
5,234 gallon
718 MMBtu

Site	Start Date	End Date	Task	Truck Type	CO2e Emission Factor	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	Jan-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*Jan-27*	*Landfill (SEFA Default)*	DT	1,911	0	0	0	0	0	0	0	0	0	0	0	16626	10799	0	0	0	0	0	0	96	0	0	0	0	
	Dec-26	*Jan-27*	*Groundwater Disposal (SEFA Default)*	DT	1,911	0	0	0	0	0	0	0	0	0	0	0	3249	2102	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	*Jan-27*	*Remediation Import (SEFA Deault)*	DT	1,911	0	0	0	0	0	0	0	0	0	0	0	0	20642	0	0	0	0	0	0	96	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	
			Monthly Emissions (kg/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19,878**	**33,543**	**0**	**0**	**0**	**0**	**0**	**0**	**191**	**0**	**0**	**0**	**0**	
			Monthly Emissions (MT/month)			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**19.9**	**33.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
53,612 kg
54 metric ton

Site	Start Date	End Date	Task	Truck Type	SEFA Default Factor Diesel (MMBtu/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	Jan-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*Jan-27*	*Landfill (SEFA Default)*	DT	0.017	0	0	0	0	0	0	0	0	0	0	0	28	18	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*Jan-27*	*Groundwater Disposal (SEFA Default)*	DT	0.017	0	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	*Jan-27*	*Remediation Import (SEFA Deault)*	DT	0.017	0	0	0	0	0	0	0	0	0	0	0	0	34	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	
			Monthly Upstream Energy Consumption (MMBtu/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**33**	**56**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Total Energy Consumption
89 MMBtu

Site	Start Date	End Date	Task	Truck Type	NYSDEC GHG Factor (kg CO2e/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																														
	Dec-26	Jan-27	Remedial Excavation			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	Jan-27	Loading for disposal			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dec-26	*Jan-27*	*Landfill (SEFA Default)*	DT	3.190	0	0	0	0	0	0	0	0	0	0	0	5178	3363	0	0	0	0	0	0	30	0	0	0	0	
	Dec-26	*Jan-27*	*Groundwater Disposal (SEFA Default)*	DT	3.190	0	0	0	0	0	0	0	0	0	0	0	1012	655	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Reuse placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	Jan-27	Import placement/compaction			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Jan-27	*Jan-27*	*Remediation Import (SEFA Deault)*	DT	3.190	0	0	0	0	0	0	0	0	0	0	0	0	6428	0	0	0	0	0	0	30	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	
			Monthly Upstream Emissions (kg/month)			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6,190**	**10,446**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**0**	**0**	**0**	**0**	
			Monthly Upstream Emissions (MT/month)			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**6.2**	**10.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	

Total Emissions
16,696 kg
17 metric ton

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Equipment Schedule

	Start Date	End Date	Equipment	Engine type	Size (hp)	Qty	Daily use	Average Use	Load	Fuel Consumption Factor (g/hp-hr) 2026	Short-Term BSFC Factor (lb/day) 2026	Fuel Consumption Factor (gal/hp-hr) 2026	Short-Term BSFC Factor (gal/day) 2026
Remedial Excavation													
	12/1/2026	1/21/2027	Excavator	diesel	250	4	95%	95%	59%	168.2825138	1580.383296	0.052923257	225.4424889
	12/1/2026	1/21/2027	Loader	diesel	200	1	95%	95%	59%	168.2825736	316.0767717	0.052923276	45.08851381
	12/1/2026	1/21/2027	On-Site Dump Truck	diesel	400	1	95%	95%	59%	168.2824166	632.1529535	0.052923226	90.17694349
Loading for disposal													
	12/1/2026	1/21/2027	(included above)										
Reuse placement/compaction													
	1/22/2027	1/31/2027	Excavator	diesel	250	4	95%	95%	59%	168.2825138	1580.383296	0.052923257	225.4424889
	1/22/2027	1/31/2027	Loader	diesel	200	1	95%	95%	59%	168.2825736	316.0767717	0.052923276	45.08851381
	1/22/2027	1/31/2027	On-Site Dump Truck	diesel	400	1	95%	95%	59%	168.2824166	632.1529535	0.052923226	90.17694349
Import placement/compaction													
	1/22/2027	1/31/2027	(included above)										

Remedial Excavation	2528.613021		360.7079462
Loading for disposal	0		0
Reuse placement/compaction	2528.613021		360.7079462
Import placement/compaction	0		0

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Equipment Emissions

Site	Start Date	End Date	Task	Annual BSFC Factor (lb/day)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	12/1/2026	1/21/2027	Remedial Excavation	2528.613021												58,158	37,929												
	12/1/2026	1/21/2027	Loading for disposal	0																									
	1/22/2027	1/31/2027	Reuse placement/compaction	2528.613021													15,172												
	1/22/2027	1/31/2027	Import placement/compaction	0																									

Site	Start Date	End Date	Task	Annual Fuel Consumption (gal/day)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Jan-27	Remedial Excavation	360.7079462												8,296	5,411												
	Dec-26	Jan-27	Loading for disposal	0																									
	Jan-27	Jan-27	Reuse placement/compaction	360.7079462													2,164												
	Jan-27	Jan-27	Import placement/compaction	0																									
			Monthly Fuel Consumption (gal/month)		-	-	-	-	-	-	-	-	-	-	-	8,296	7,575	-	-	-	-	-	-	-	-	-	-	-	-

Total Fuel Consumption
15,871 gal
2,178 MMBtu

Annual CO2 Emissions (kg/month) **Annual CO2 Emissions (kg/month)**

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Jan-27	Remedial Excavation												84,705	55,242												
	Dec-26	Jan-27	Loading for disposal																									
	Jan-27	Jan-27	Reuse placement/compaction													22,097												
	Jan-27	Jan-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	84,705	77,339	-	-	-	-	-	-	-	-	-	-	-	-

Annual CH4 Emissions (kg/month) **Annual CH4 Emissions (kg/month)**

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Jan-27	Remedial Excavation												3.401	2.218												
	Dec-26	Jan-27	Loading for disposal																									
	Jan-27	Jan-27	Reuse placement/compaction													0.887												
	Jan-27	Jan-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-

Annual N2O Emissions (kg/month) **Annual N2O Emissions (kg/month)**

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Jan-27	Remedial Excavation												0.664	0.433												
	Dec-26	Jan-27	Loading for disposal																									
	Jan-27	Jan-27	Reuse placement/compaction													0.173												
	Jan-27	Jan-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-

Annual Direct CO2e Emissions (kg/month) **Annual Direct CO2e Emissions (kg/month)**

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Jan-27	Remedial Excavation												85,166	55,543												
	Dec-26	Jan-27	Loading for disposal																									
	Jan-27	Jan-27	Reuse placement/compaction													22,217												
	Jan-27	Jan-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	85,166	77,760	-	-	-	-	-	-	-	-	-	-	-	-
			Monthly Emissions (MT/month)	-	-	-	-	-	-	-	-	-	-	-	85.17	77.76	-	-	-	-	-	-	-	-	-	-	-	-

Total Emissions
162,926 kg
163 metric ton

Annual Upstream Energy Consumption (MMBtu/month) **Annual Upstream Energy Consumption (MMBtu/month)**

Site	Start Date	End Date	Task	SEFA Default Factor Diesel (MMBtu/gal)	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																													
	Dec-26	Jan-27	Remedial Excavation	0.017												141	92												
	Dec-26	Jan-27	Loading for disposal	0.017																									
	Jan-27	Jan-27	Reuse placement/compaction	0.017													37												
	Jan-27	Jan-27	Import placement/compaction	0.017																									
			Monthly Fuel Consumption (MMBtu/month)		-	-	-	-	-	-	-	-	-	-	-	141	129	-	-	-	-	-	-	-	-	-	-	-	-

Total Energy Consumption
270 MMBtu

Annual Upstream CO2e Emissions (kg/month) **Annual Upstream CO2e Emissions (kg/month)**

Site	Start Date	End Date	Task	2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28
Brookfield Commons BCP																												
	Dec-26	Jan-27	Remedial Excavation												26,463	17,259												
	Dec-26	Jan-27	Loading for disposal																									
	Jan-27	Jan-27	Reuse placement/compaction													6,903												
	Jan-27	Jan-27	Import placement/compaction																									
			Monthly Emissions (kg/month)	-	-	-	-	-	-	-	-	-	-	-	26,463	24,162	-	-	-	-	-	-	-	-	-	-	-	-
			Monthly Emissions (MT/month)	-	-	-	-	-	-	-	-	-	-	-	26.46	24.16	-	-	-	-	-	-	-	-	-	-	-	-

Total Emissions
50,625 kg
51 metric ton

Emissions Summary (metric ton)

	Monthly 2026 Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	2027 Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Annual Total
Equipment-Direct	0	0	0	0	0	0	0	0	0	0	0	85	78	0	0	0	0	0	0	0	0	0	0	0	0	163
Equipment-Indirect	0	0	0	0	0	0	0	0	0	0	0	26	24	0	0	0	0	0	0	0	0	0	0	0	0	51
Trucks	0	0	0	0	0	0	0	0	0	0	0	20	34	0	0	0	0	0	0	0	0	0	0	0	0	54
Truck - Upstream	0	0	0	0	0	0	0	0	0	0	0	6	10	0	0	0	0	0	0	0	0	0	0	0	0	17
Cars	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Cars - Upstream	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Materials																										18
Waste																										74
Total	0	0	0	0	0	0	0	0	0	0	0	140	148	0	0	0	0	0	0	0	0	0	0	0	0	380

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Imported Material Emissions

							Lookup ID 3	4	5	6	7	8	
Material	**SEFA Lookup**	**Quantity**	**Unit**	**Conversion**	**Quantity**	**Unit**	**Energy Usage (MMBtu)**	**GHG (lb CO2e)**	**NOx (lb)**	**SOx (lb)**	**PM (lb)**	**HAPs (lb)**	
Remediation Import (SEFA Deault)	Sand	4,310	CY	3000	12,930,000	lb	321	31,032	233	58	34	4	
Carbon Media	Granular activated carbon, primary				2,000	lbs	71	9,640	159	256	2	1	
						Total	392	40,672	391	314	36	5	lb
								20.336	0.196	0.157	0.018	0.003	ton
								18,449					kg
								18					MT

SEFA Tool Material Table

		Lookup ID 3	4	5	6	7	8	
Construction Materials	**Unit**	**Energy Usage (MMBtu/unit)**	**GHG (lb CO2e/unit)**	**NOx (lb/unit)**	**SOx (lb/unit)**	**PM (lb/unit)**	**HAPs (lb/unit)**	
Aluminum, Rolled Sheet	lb	0.0633	9.15	0.0148	0.0283	0.0088	0.00102	
Asphalt, mastic	lb	0.0412	0.85	0.00271	0.00798	0.000766	0.00107	
Asphalt, paving-grade	lb	0.5	8.58	0.0299	0.0969	0.0091	0.0133	
Ethanol, Corn, 95%	lb	0.0318	-0.0199	0.00425	0.00303	0.000469	0.0000846	
Ethanol, Corn, 99.7%	lb	0.0324	0.0591	0.00431	0.0031	0.000472	0.000087	
Ethanol, Petroleum, 99.7%	lb	0.0205	1.25	0.00199	0.00214	0.000277	0.0000589	
Gravel/Sand Mix, 65% Gravel	lb	0.0000248	0.0024	0.000018	0.00000452	0.00000261	0.000000308	
Gravel/sand/clay	lb	0.000028	0.00335	0.0000165	0.000015	0.000002	2.05E-10	
HDPE	lb	0.0332	1.94	0.00325	0.00409	0.000439	0.0000641	
Photovoltaic system (installed)	W	0.0336	4.47	0.015	0.032	0.00063	0.0000029	
PVC	lb	0.0262	2.02	0.004	0.00274	0.000372	0.000375	
Portland cement, US average	lb	0.0139	1.34	0.00654	0.0104	0.00378	0.00097	
Ready-mixed concrete, 20 MPa	ft3	0.217	19.5	0.0975	0.154	0.057	0.0141	
Round Gravel	lb	0.0000248	0.0024	0.000018	0.00000452	0.00000261	0.000000308	
Sand	lb	0.0000248	0.0024	0.000018	0.00000452	0.00000261	0.000000308	
Stainless Steel	lb	0.0116	3.4	0.0075	0.012	0.0044	0.000144	
Steel	lb	0.0044	1.1	0.0014	0.0017	0.00056	0.000067	
Other refined construction materials	lb	0.01885	2.115	0.0040375	0.0051325	0.00144275	0.000162525	
Other unrefined construction materials	lb	0.000028	0.00335	0.0000165	0.000015	0.000002	2.05E-10	
Cheese Whey	lbs	0.0025	0.031	0.000062	0.000033	0.000002	NP	
Emulsified vegetable oil	lbs	0.0077	3.44	0.0066	0.0019	0.000033	NP	
Granular activated carbon, primary	lbs	0.0356	4.82	0.0793	0.128	0.000987	0.000657	
Granular activated carbon, regenerated	lbs	0.00873	1.7	0.00733	0.0129	0.000886	0.000671	
Hydrogen Peroxide, 50% in H2O	lbs	0.00979	1.19	0.00142	0.0024	0.000308	0.0000629	
Iron (II) Sulfate	lbs	0.00147	0.167	0.000316	0.000589	0.000103	0.000023	
Lime, Hydrated, Packed	lbs	0.00206	0.762	0.000513	0.000358	0.00013	0.00000657	
Molasses	lbs	0.0044	0.48	0.0011	0.00024	0.0000041	NP	
Phosphoric Acid, 70% in H2O	lbs	0.0067	0.882	0.00282	0.0294	0.00171	0.000163	
Potassium Permanganate	lbs	0.00981	1.16	0.00234	0.0032	0.000422	0.000122	
Sodium Hydroxide, 50% in H2O	lbs	0.00977	1.09	0.00194	0.00352	0.000403	0.000129	
Other Treatment Chemicals & Materials	lbs	0.015	1.67	0.003	0.0065	0.00061	0.000016	

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Waste Emissions

							Lookup ID 3	4	5	6	7	8	
Material	SEFA Lookup	Quantity	Unit	Conversion	Quantity	Unit	Energy Usage (MMBtu)	GHG (lb CO2e)	NOx (lb)	SOx (lb)	PM (lb)	HAPs (lb)	
Landfill (SEFA Default)	Off-site non-hazardous waste landfill	4,051	CY	1.5	6,077	ton	972	151,928	851	456	2,431	9	
Landfill (SEFA Default)	Off-site hazardous waste landfill	259	CY	1.5	390	ton	70	10,722	60	32	172	1	
Groundwater Disposal (SEFA Default	Off-site waste water treatment (POTW)	45,595	gal	1000	46	gal x 1000							
						Total	1,043	162,650	911	488	2,602	9	lb
								81.325	0.455	0.244	1.301	0.005	ton
								73,777					kg
								74					MT

SEFA Tool Waste Table

		Lookup ID 3	4	5	6	7	8
Waste Treatment	Unit	Energy Usage (MMBtu/unit)	GHG (lb CO2e/unit)	NOx (lb/unit)	SOx (lb/unit)	PM (lb/unit)	HAPs (lb/unit)
Hazardous waste incineration	lb	0.00609	2.43	0.0016	0.00167	0.000209	0.000087
Off-site waste water treatment (POTW)	gal x 1000	0.015	4.4	0.016	0.015		
Off-site non-hazardous waste landfill	ton	0.16	25	0.14	0.075	0.4	0.0014
Off-site hazardous waste landfill	ton	0.18	27.5	0.154	0.0825	0.44	0.00154
Off-site Laboratory Analysis - Other	sample	0.058071029	6.85343842	0.131401957	0.303875767	0.045569824	0.033016529
Off-site Laboratory Analysis - Metals	sample	0.212	27.4693	0.6423	1.5072	0.2264	0.1643
Off-site Laboratory Analysis - Mercury	sample	0.073171472	9.325458	0.2127439	0.4982396	0.07473594	0.05423316
Off-site Laboratory Analysis - Inorganic Anions	sample	0.007402451	0.6459478	0.006768122	0.014792866	0.002202395	0.001554243
Off-site Laboratory Analysis - Alkalinity	sample	0.017439833	1.3381922	0.007010628	0.013249646	0.001940048	0.001283077
Off-site Laboratory Analysis - Perchlorate	sample	0.023884988	1.8717054	0.007980652	0.014153532	0.002054687	0.001287486
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0.033647504	4.29897	0.09545918	0.2226646	0.03350992	0.0242506
Off-site Laboratory Analysis - Sulfate	sample	0.014122473	1.4726728	0.007980652	0.013602382	0.001979731	0.001201507
Off-site Laboratory Analysis - PCBs	sample	0.0512769	5.224902	0.08333388	0.19047744	0.02843934	0.021208252
Off-site Laboratory Analysis - VOCs	sample	0.076204487	9.016814	0.10449804	0.2270738	0.03395084	0.02358922
Off-site Laboratory Analysis - SVOCs	sample	0.071560184	7.870422	0.14594452	0.3373038	0.05048534	0.03725774

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Grid Electricity Emissions

					2026												2027												
Site	**Start Date**	**End Date**	**Eletrical Equipment**	**Daily Energy Demand (kWh/day)**	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	
Brookfield Commons BCP																													
	12/1/2026	1/31/2027	Mobile Office 1	50												1,150	1,050													
	12/1/2026	1/31/2027	Mobile Office 2	50												1,150	1,050													
	1/1/2027	5/1/2027	Dewatering Pumps	11.93119792													251	239	274	262										
																													Total Demand
				Scope 1 Energy Consumption (kWh)	-	-	-	-	-	-	-	-	-	-	-	**2,300**	**2,351**	**239**	**274**	**262**	-	-	-	-	-	-	-	-	5,426	kWh
				Scope 1 Energy Consumption (MMBtu)	-	-	-	-	-	-	-	-	-	-	-	**8**	**8**	**1**	**1**	**1**	-	-	-	-	-	-	-	-	19	MMBtu
				eGrid MMBtu/MWh 7.35																									
				Scope 2 Energy Consumption (MMBtu)	-	-	-	-	-	-	-	-	-	-	-	**9**	**9**	**1**	**1**	**1**	-	-	-	-	-	-	-	-	21	MMBtu
				SEFA Transmission Loss % 10%																									
				Grid Baseload Emissions (g/kWh) 393.19																									
				Scope 3 Loss Energy Consumption (MMBtu)	-	-	-	-	-	-	-	-	-	-	-	**1.7**	**1.7**	**0.2**	**0.2**	**0.2**	-	-	-	-	-	-	-	-	4	MMBtu
				Scope 3 Loss Emissions (kg)	-	-	-	-	-	-	-	-	-	-	-	**0.2**	**0.2**	**0.0**	**0.0**	**0.0**	-	-	-	-	-	-	-	-	0	kg
				Scope 3 Loss Emissions (MT)	-	-	-	-	-	-	-	-	-	-	-	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	-	-	-	-	-	-	-	-	0.000	MT

					2026												2027												
Site	**Start Date**	**End Date**	**Eletrical Equipment**	**Scope 2 Grid Baseload Emissions (g/kWh)**	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	
Brookfield Commons BCP																													
	12/1/2026	1/31/2027	Mobile Office 1	393.194278												452,173	412,854													
	12/1/2026	1/31/2027	Mobile Office 2	393.194278												452,173	412,854													
	1/1/2027	5/1/2027	Dewatering Pumps	393.194278												393	8,650	8,257	9,437	8,650										Total Emissions
					-	-	-	-	-	-	-	-	-	-	-	**904,740**	**834,358**	**8,257**	**9,437**	**8,650**	-	-	-	-	-	-	-	-	-	1,765,442	g
					-	-	-	-	-	-	-	-	-	-	-	905	834	8	9	9	-	-	-	-	-	-	-	-	-	1,765	kg
					-	-	-	-	-	-	-	-	-	-	-	0.9	0.8	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	2	MT

Scope 3 Upstream Energy Consumption

Natural Gas Generation - Upstream

eGrid Resource Mix	98%																												
Energy Factor (SEFA Default) (MMBtu/MWh)	1.6318																												
GHG Emission Factor (SEFA Default) (lb/MWh)	270																												
Monthly Energy Consumption (MMBtu/month)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69	3.77	0.38	0.44	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.69	MMBtu
Monthly GHG Emissions (kg/month)		-	-	-	-	-	-	-	-	-	-	-	277	283	29	33	32	-	-	-	-	-	-	-	-	-	-	652.57	kg
Monthly GHG Emissions (MT/month)		-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	-	0.65	MT

Oil Generation - Upstream

eGrid Resource Mix	1%																												
Energy Factor (SEFA Default) (MMBtu/MWh)	2.2954																												
GHG Emission Factor (SEFA Default) (lb/MWh)	270																												
Monthly Energy Consumption (MMBtu/month)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	MMBtu
Monthly GHG Emissions (kg/month)		-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	-	-	-	-	-	-	-	-	-	-	3.32	kg
Monthly GHG Emissions (MT/month)		-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	-	0.00	MT

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Water Emissions

							Lookup ID 2	3	4	5	6	7	8	
Water Source	**Lookup**	**Quantity**	**Unit**	**Conversion**	**Quantity**	**Unit**	**Energy Usage (MMBtu)**	**GHG (lb CO2e)**	**NOx (lb)**	**SOx (lb)**	**PM (lb)**	**HAPs (lb)**	
NYC Public Water	Public Water (SEFA Default)	216,000	gal	0.001	216	gal x 1000	2	1,080	2	1	3	0	
*Water Consumption (10 gpm x 8 hr/day)						**Total**	2	1,080	2	1	3	0	lb
								0.540	0.001	0.001	0.002	0.000	ton
								490					kg
								0					MT

Water Usage Emission Factors

		Lookup ID 3	4	5	6	7	8
Water Source Type	**Unit**	**Energy Usage (MMBtu/unit)**	**GHG (lb CO2e/unit)**	**NOx (lb/unit)**	**SOx (lb/unit)**	**PM (lb/unit)**	**HAPs (lb/unit)**
Public Water (SEFA Default)	gal x 1000	0.0092	5	0.0097	0.0059	0.016	0.000015
Other	sample	0.071560184	7.870422	0.14594452	0.3373038	0.05048534	0.03725774

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
Emission Factors

BSFC Emission Factors (g/hp-hr)

ID	Equipment	Engine	SCC Code	HPmin	HPmax	HP	Equipment	Load	2026
	Dsl - Rubber Tire Loaders	2270002060	Diesel	175	300	200	Loader	59%	168.2826
	Dsl - Excavators	2270002036	Diesel	175	300	250	Excavator	59%	168.2825
	Dsl - Off-highway Trucks	2270002051	Diesel	301	600	400	On-Site Dump Tru	59%	168.2824

Fuel Properties

Densities	kg/L	g/gal	lb/gal
Diesel	0.84	3,179.75	7.01
Gasoline	0.74	2,801.21	6.18
LPG	0.54	2,044.12	4.51

BSFC Emission Factors (gal/hp-hr)

ID	Equipment	Engine	SCC Code	HPmin	HPmax	HP	Equipment	Load	2026
	Dsl - Rubber Tire Loaders	2270002060	Diesel	175	300	200	Loader	59%	0.0529
	Dsl - Excavators	2270002036	Diesel	175	300	250	Excavator	59%	0.0529
	Dsl - Off-highway Trucks	2270002051	Diesel	301	600	400	On-Site Dump Tru	59%	0.0529

EPA Fuel Emission Factors

Diesel

GWP-100	GWP-20	kg/gal	GHG	GWP-20 Equivalent Emissions	GWP-100 Equivalent Emissions	SEFA Default
1	1	10.21	CO2	10.27 kg CO2e/gal	10.24268 kg CO2e/gal	10.20582833 kg CO2e/gal
28	84	0.00041	CH4	22.63168431 lb CO2e/gal	22.58124254 lb CO2e/gal	22.5 lb CO2e/gal
265	264	0.00008	N2O			

https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

GWP-20 Equivalent Emissions with Upstream	
13.4553228	kg CO2e/gal
29.66390707	lb CO2e/gal

Gasoline

GWP-100	GWP-20	kg/gal	GHG	GWP-20 Equivalent Emissions	GWP-100 Equivalent Emissions	SEFA Default
1	1	8.78	CO2	8.83 kg CO2e/gal	8.81184 kg CO2e/gal	8.890410452 kg CO2e/gal
28	84	0.00038	CH4	19.47351852 lb CO2e/gal	19.42678052 lb CO2e/gal	19.6 lb CO2e/gal
265	264	0.00008	N2O			

https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf

MOVES TRUCKS FACTORS

	CO2e
2026 - Truck Idling (g/hr)	7492.660006
2026 - Truck Cruising - 5mph (g/veh)	
2026 - Truck Cruising - 25mph (g/mi)	1911.302635
2026 - Auto Cruising - 25mph (g/mi)	317.0538945

Truck Mileage

10242.68	g/gal
1911.302635	g/mi
5.359004804	mpg
0.186601811	gal per mi
0.025601768	MMBtu/mi

Car Mileage

8811.84	g/gal
317.0538945	g/mi
27.79287734	mpg
0.035980442	gal per mi
0.004483163	MMBtu/mi

Distance Traveled On-site: approximately 0.1 mile per truck

0.1 mile per truck

HHV

Diesel	0.1372	mmBtu per gallon
Gasoline	0.1246	mmBtu per gallon

NYSDEC Upstream Emission Factor

Table A1. 2023 Emission Rates for Upstream Out-of-State Sources (g/mmbtu)

	Diesel Fuel	
CH4	115.000	g/MMBtu
N2O	0.250	g/MMBtu
CO2	13,542	g/MMBtu
CO2e	23,249	g/MMBtu

	Diesel Fuel	
CH4	15.778	g/gal
N2O	0.034	g/gal
CO2	1,858	g/gal
CO2e	3,190	g/gal

	Gasoline Fuel	
CH4	122.000	g/MMBtu
N2O	0.320	g/MMBtu
CO2	18,276	g/MMBtu
CO2e	28,570	g/MMBtu

	Gasoline Fuel	
CH4	15.201	g/gal
N2O	0.040	g/gal
CO2	2,277	g/gal
CO2e	3,560	g/gal

NYSDEC, Appendix A of the 2025 Statewide GHG Emission Report. December 2025

eGRID Baseload Electricity Factor

Data Year	eGRID subregion acronym	eGRID subregion name	eGRID subregion total annual heat input (MMBtu)	eGRID subregion annual net generation (MWh)	Unit	eGRID subregion annual CO2 total output emission rate	eGRID subregion annual CH4 total output emission rate	eGRID subregion annual N2O total output emission rate	eGRID subregion annual CO2 equivalent total output emission rate (GWP-100)	eGRID subregion annual CO2 equivalent total output emission rate (GWP-20)
2023	NYCW	NPCC NYC/Westchester	254301464	34602268	lb/MWh	864.469	0.022	0.002	865.744	866.846
					g/kWh	392.117	0.010	0.001	392.695	**393.194**

	NPCC NYC/Westchester Resource Mix
eGRID subregion coal generation	0.000%
eGRID subregion oil generation	0.500%
eGRID subregion gas generation	98.200%
eGRID subregion nuclear generation	0.000%
eGRID subregion hydro generation	0.000%
eGRID subregion biomass generation	0.500%
eGRID subregion wind generation	0.000%
eGRID subregion solar generation	0.100%
eGRID subregion geothermal generation	0.000%
eGRID subregion other fossil generation	0.700%
eGRID subregion other unknown/ purchased fuel generation	0.000%
	100.0%

Brookfield Commons BCP - Track 2
Environmental Footprint Analysis
SEFA Equipment Table

Table 3. Equipment Type and Representative Horsepower
Asphalt paver (150 HP)
Backhoe (100 HP)
Concrete paving machine (200 HP)
Dozer - large (200 HP)
Dozer - small (100 HP)
Drilling - direct push (60 HP)
Drilling - large rig (500 HP)
Drilling - medium rig (150 HP)
Dump truck (400 HP)
Excavator - large (250 HP)
Excavator - medium (175 HP)
Excavator/hoe - small (75 HP)
Generator - HP varies
Grader (175 HP)
Grout pump (20 HP)
Hydroseeder (20 HP)
Integrated tool carrier (100 HP)
Loader (200 HP)
Loader - small (75 HP)
Mobile laboratory (25 HP)
Mowers (5 HP)
Other - HP varies
Riding trencher (55 HP)
Roller (100 HP)
Rotary-screw air compressor - 250 cfm (60 HP)
Skid-steer - small (60 HP)
Telescopic handler (60 HP)
Tractor mower (25 HP)
Water truck (400 HP)

APPENDIX F
CLIMATE VULNERABILITY ASSESSMENT

440 Park Avenue South, 7th Floor
New York, NY 10016
tel: 212.696.0670
www.akrf.com

Mr. Ryan Richard
New York State Department of Environmental Conservation
Division of Environmental Remediation
21 South Putt Corners Rd
New Paltz, NY 12561-1620

03.06.2026

Re: Climate Vulnerability Analysis
Brookfield Commons – 159 South Lexington Avenue, White Plains, NY
NYSDEC BCP Site No. C360246

Dear Mr. Richard:

This Climate Vulnerability Analysis (CVA) has been prepared by AKRF, Inc. (AKRF) on behalf of Trinity Brookfield Commons Phase Three Limited Partnership (the "Participant") for the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site No. C360246 located at the above-referenced location, also identified as part of Tax Block 7, Part of Lot 1, Section 125.83 on the City of White Plains Tax Map (the "Site"). As further detailed in the November 2023 NYSDEC Memorandum, DER-31: Green and Sustainable Remediation Initiative, beginning January 1, 2024, all remedial work plans and reports submitted to NYSDEC pursuant to a remedial program under Part 375 are required to address green and sustainable remediation (GSR) in accordance with DER-31. The EFA was preemptively incorporated into the Remedial Action Work Plan (RAWP) and into the NYSDEC Decision Document as a requirement for the remedy alternatives.

This CVA focuses on the risks associated with the construction and operation of the primary components of the remedy alternatives: removal and/or treatment of all contaminated soil, groundwater, and soil vapor to comply with UUSCOs, import of soil for backfill, and installation of an active sub-slab depressurization system (SSDS). Activities will include removal and off-site disposal of existing fill materials, and daily use of several pieces of heavy machinery.

POLICY CONTEXT

The New York State Sea Level Rise Task Force was created to assess potential impacts on the state's coastlines from rising seas and increased storm surge. The Task Force prepared a report of its findings and recommendations including protective and adaptive measures.[1] The recommendations are to: provide more protective standards for coastal development, wetlands protection, shoreline armoring, and post-storm recovery; implement adaptive measures for habitats; integrate climate change adaptation strategies into state environmental plans; and amend local and state regulations or statutes to respond to climate change. The Task Force also recommended the formal adoption of projections of sea-level rise.

The New York State Climate Action Plan Interim Report identified a number of policy options and actions that could increase the climate change resilience of natural systems, the built environment, and key economic sectors—focusing on agriculture, vulnerable coastal zones, ecosystems, water resources, energy infrastructure, public health, telecommunications and information infrastructure, and transportation.[2] New York State's Community Risk and Resiliency Act (CRRA)[3] requires that applicants for certain State

[1] New York State Sea Level Rise Task Force. *Report to the Legislature*. December 2010.

[2] NYSERDA. New York State Climate Action Plan Interim Report. November, 2010.

[3] *Community Risk and Resiliency Act.* Chapter 355, NY Laws of 2014. April 9, 2013. Signed September 22, 2014.

programs demonstrate that they have taken into account future physical climate risks from storm surges, sea-level rise and flooding, and required the NYSDEC to establish official State sea-level rise projections. In February 2017, DEC adopted a rule (6 NYCRR Part 490) defining the existing projections for use. These projections provide the basis for State adaptation decisions and are available for use by all decision makers. CRRA applies to specific State permitting, funding and regulatory decisions, including: smart growth assessments; funding for wastewater treatment plants; siting of hazardous waste facilities; design and construction of petroleum and chemical bulk storage facilities; oil and gas drilling; and State acquisition of open space. As required under the CRRA, DEC published implementation guidance and reference to climate change projections specific to New York State in August 2021.

In the Lower Hudson-New York City region, the Climate Change Adaptation Task Force is tasked with fostering collaboration and cooperation between public and private organizations working to build the resilience of the city's critical infrastructure against rising seas, higher temperatures, and changing precipitation patterns. The Task Force is composed of over 57 New York City and State agencies, public authorities, and companies that operate, regulate, or maintain critical infrastructure in the New York City region. Led by the Mayor's Office of Climate and Environmental Justice, the Task Force works together to assess risks, prioritize strategies, and examine how standards and regulations may need to be adjusted in response to a changing climate.

To assist the Task Force, the New York City Panel on Climate Change (NPCC) has prepared a set of climate change projections for New York City and the surrounding region within its fourth assessment report,[4,5] and has suggested approaches to create an effective adaptation program for critical infrastructure. The NPCC includes leading climatologists, sea-level rise specialists, adaptation experts, and engineers, as well as representatives from the insurance and legal sectors. The climate change projections include a summary of baseline and projected climate conditions throughout the 21st century including heat waves and cold events, intense precipitation and droughts, sea-level rise, and coastal storm levels and frequency.

The National Oceanic and Atmospheric Administration (NOAA) also developed the U.S. Climate Resiliency Toolkit, a website designed to provide tools, information, and subject matter expertise on climate resilience. As part of the toolkit, the Climate Explorer[6] tool presents historical meteorological data (between 1950 and 2013) for each county in the U.S. as well as provides projections of future climate conditions. Future climate conditions obtained by NOAA were generated by global climate models for the Coupled Model Intercomparison Project Phase 5 (CMIP5) and statistically downscaled to Westchester County. While the Climate Explorer tool provides historical data, 2024 observed meteorological conditions for Westchester County Airport weather station were used to represent conditions in Mount Vernon.

Temperature

NOAA projected that temperatures in Westchester County are likely to increase by up to 7.3 degrees Fahrenheit (° F) by the 2050s and experience up to 37 days with temperatures above 95° F. By the end of the century, temperatures are likely to increase by up to 12.7° F and experience up to 85 days with temperatures above 95° F.

The probability that the region would experience an increase in air temperatures and relative humidity (characterized as the heat index of a given location) is considered by NPCC to be "very likely." NPCC projected that temperatures are likely to increase by up to 7.1° F by the 2050s and that the region would experience up to 9 heat waves per year with an average duration up to 6 days. By the end of the century,

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[4] Braneon, C., Ortiz, L., Bader, D., Devineni, N., Orton, P., Rosenzweig, B., McPhearson, T., Smalls-Mantey, L., Gornitz, V., Mayo, T., Kadam, S., Sheerazi, H., Glenn, E., Yoon, L., Derras-Chouk, A., Towers, J., Leichenko, R., Balk, D., Marcotullio, P., & Horton, R. (2024). *NYC climate risk information 2022: Observations and projections*. Interim Report for Public Release https://climateassessment.nyc

[5] Balk, D., Braneon, C., Leichenko, R., Moss, R., Towers, J. (2024). *Climate Risk and Equity: Advancing Knowledge Toward a Sustainable Future: Introduction*. New York City Panel on Climate Change. https://climateassessment.nyc

[6] National Oceanic and Atmospheric Administration. *U.S. Climate Resilience Toolkit Climate Explorer (Version 3.1)*. https://crt-climate-explorer.nemac.org/

temperatures are likely to increase by up to 13.5° F with up to 10 heat waves per year with an average duration of 10 days.

Precipitation

NOAA projected that precipitation levels in Westchester County are likely to increase by up to 56.4 percent compared to the 1961–1990 base period by the 2050s and up to 55.8 percent by the end of the century with up to 5 rainfall events projected to result in 2 inches or more of precipitation.

NPCC projected that precipitation levels in the region are likely to increase by up to 13 percent compared to the 1971–2000 base period by the 2050s and up to 25 percent by the end of the century with up to 5 rainfall events projected to result in 2 inches or more of precipitation.

Sea Level Rise

NPCC has projected that sea levels are likely to increase by up to 23 inches by the 2050s and up to 65 inches by the end of the century (more detailed ranges and timescales are available). In general, the probability of increased sea levels is characterized by NPCC as "extremely likely," but there is uncertainty regarding the probability the various levels projected and timescale. Intense hurricanes are characterized by NPCC as "more likely than not" to increase in intensity and/or frequency, and the likelihood of changes in other large storms ("Nor'easters") are characterized by NPCC as unknown. Therefore, the projections for future 1-in-100 coastal storm surge levels for New York City include only sea-level rise at this time, and do not account for changes in storm frequency.

CLIMATE RISKS

Temperature & Urban Heat Island

Existing Conditions

In 2024, Westchester County had a mean maximum temperature of 63° F. The Site is identified as being vulnerable to extreme heat by the New York State Department of Health (DOH), with a Heat Vulnerability Index (HVI) of 6 out of 7—a high level of risk.[7] The Site is being redeveloped into an 11-story, 174-unit multi-family residential building with approximately 2,200 square feet of community space and associated parking. The area surrounding the Site generally consists of mixed-use commercial, residential, and institutional properties. The Bronx River is located west of the Site and bounded by green areas. Several other public parks and greenspaces are located within walking distance from the Site, and numerous other natural resources are easily accessible from the Site via public transportation.

Westchester County recorded 13 days with temperatures above 90° F and no days with temperatures above 95 degrees Fahrenheit in 2024.

Future Conditions

The Site is anticipated to experience increased temperatures up to 12.7° F by the end of the century—increasing the mean temperature to 75.7° F. By the 2080s, NOAA projects that the number of days with temperatures above 90° F would increase by 89 days (or 69 days above 95° F).

Similarly, NPCC projects the region will experience a future increase in annual mean temperatures between 4.2° F and 13.5° F by the end of the century—resulting in the mean temperature increasing to 76.5° F.[8, 9]

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[7] NYSDOH. *Heat Vulnerability Index, Westchester County, NY*. https://www.health.ny.gov/environmental/weather/vulnerability_index/docs/westchester.pdf

[8] NYSERDA. Climate Change in New York State. Updating the 2011 ClimAID Climate Risk Information Supplement to NYSERDA Report 11-18 (Responding to Climate Change in New York State). September 2014

[9] Braneon, C., Ortiz, L., Bader, D., Devineni, N., Orton, P., Rosenzweig, B., McPhearson, T., Smalls-Mantey, L., Gornitz, V., Mayo, T., Kadam, S., Sheerazi, H., Glenn, E., Yoon, L., Derras-Chouk, A., Towers, J., Leichenko, R., Balk, D., Marcotullio, P., & Horton, R. (2024). *NYC climate risk information 2022: Observations and projections*. Interim Report for Public Release https://climateassessment.nyc

Additionally, by the 2080s NPCC projects that the number of days with temperatures above 90° F would increase by 91 days (or 69 days above 95° F). By the end of the century, NPCC projects that the region would likely experience up to 10 heat waves per year with an average duration of 10 days.

Climate Vulnerability of the Remedy Alternatives

Since none of the alternatives would include structural elements that would be subject to thermal stress, the project is not impacted by the projected increase in temperature or urban heat island effect. Therefore, no further assessment of heat impacts is warranted.

Precipitation

Existing Conditions

Westchester County recorded 47.6 inches of precipitation in 2024. Precipitation in Westchester County was observed to have increased by a rate of 0.44 inches per decade over the period of 1950 to 2010, according to NOAA's Climate Explorer. Precipitation in the region was observed to have increased by a rate of 0.76 inches per decade with an average storm rainfall intensity of approximately 2 inches in one hour and a 10 percent chance of occurrence per year, according to the NPCC.

While White Plains has 5 flash floods on record, there are no historical records of stormwater flood conditions at the Site involving death, injury, or property or crop damage.

Future Conditions

Annual precipitation levels are anticipated to increase at the Site up to 52 percent (approximately 72.3 inches per year) by the 2050s and up to 52 percent (approximately 72.0 inches per year) by the end of the century. Under these conditions, it is projected that any existing flooding on the Site would increase.

According to the NPCC, annual precipitation levels are anticipated to increase in the region by up to 14 percent (approximately 56.7 inches per year) by the 2050s and up to 30 percent (approximately 64.6 inches per year) by the end of the century.[10]

Climate Vulnerability of the Remedy Alternatives

Track 1 and 2 would include excavation and regrading at the Site. Excavated material would be replaced with imported soil and would not impact the natural processes to slow, infiltrate, and filter runoff at the Site.

Furthermore, erosion and sedimentation control measures will be implemented during construction activities at the Site for each of the alternatives in accordance with a Stormwater Pollution Prevention Plan (SWPPP) that will be prepared for the project. The SWPPP will be submitted and approved by NYCDEP before the commencement of remediation excavation. It will contain requirements regarding stormwater management, erosion and sediment control, construction practices to minimize stormwater contamination, maintenance and inspection procedures, and the SWPPP Coordinator and their duties for the Site.

The SWPPP will also summarize procedures that are to be used during construction to minimize stormwater contamination as well as key erosion and sediment controls that will be implemented at the Site. The SWPPP will consider current precipitation levels that are anticipated to occur at the Site. Since construction will last 6 months for Track 1 or 2 months for Track 2, these measures will be resilient to the current rainfall levels of approximately 2 inches in one hour.

Overall, none of the alternatives would be impacted by increased future projected precipitation levels. Therefore, no further assessment of stormwater flooding impacts is warranted.

Sea Level Rise

Existing Conditions

[10] As noted by the NPCC, the greatest increases in precipitation are projected to occur during the winter months with smaller increased generally projected for the summer and fall seasons. However, NPCC projects that some reductions in mean precipitation is anticipated under the low-end scenario by 2100, with the greatest decreases projected for the summer and fall seasons.

According to current flood hazard projections,[11] the Site is not within the current 1-in-100 or the 1-in-500 coastal storm surge levels. The nearest floodplain is located approximately 0.25 mi to the northwest of the Site and adjacent to the Bronx River. This area has a flood elevation of 182 feet NAVD88.

Future Conditions

According to NPCC data (under the NPCC high-end estimate) and consistent with NYSDEC projections, by the 2050s, the 1-in-100 flood levels could reach 23 inches higher due to sea-level rise. By the end of the century, the 1-in-100 flood levels could reach 65 inches higher. Consequently, future flood elevations may increase up to 187.5 feet NAVD88 and may reach the Site.

Climate Vulnerability of the Remedy Alternatives

Since the Project may be impacted by future flood level, the potential impacts from flood conditions were considered. However, none of the alternatives considered would include the construction of mechanical, structural, or electrical elements that would be vulnerable to damage from flood waters. Therefore, the project would not be impacted by projected increases in sea level rise, and no further assessment of coastal flooding impacts is warranted.

CONCLUSIONS

Based on the review of potential flooding (from both sea level rise and increased precipitation) and heat impacts, the remedy is resilient to existing and future climate risks. During construction, the Site will not be vulnerable to potential stormwater events.

If you have any questions or require additional information, please contact me at (646) 388-9846 or Colleen Griffiths at (914) 922-2363.

Sincerely,
AKRF, Inc.

Kevin Edwards
Senior Technical Director

[11] FEMA. *Preliminary Flood Insurance Rate Map*. Panel 36119C0269F. Release Date: 9/28/2007.

APPENDIX G
CITIZEN PARTICIPATION PLAN

NEW YORK STATE | Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Brookfield Commons Phase 3
159 South Lexington Avenue
White Plains, New York 10601

March 2024; Revised June 6, 2026

BCP Site No. C360246
159 South Lexington Avenue
City of White Plains, Westchester County
New York 10601

Prepared by:

AKRF, Inc.
34 South Broadway, 3rd Floor
White Plains, New York 10601
(914) 949-7336

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Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Trinity Brookfield Commons Phase Three Limited Partnership ("Applicant")**
Site Name: **Brookfield Commons Phase 3 ("Site")**
Site Address: **159 South Lexington Avenue, White Plains, NY 10601**
Site County: **Westchester**
Site Number: **C360246**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision-makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment;
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process;
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process;
- Ensuring that NYSDEC makes site inve;stigation and cleanup decisions that benefit from input thatreflects the interests and perspectives found within the affected community; and

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision-making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the Site's investigation and cleanup program. The public's suggestions about this Citizen Participation Plan (CPP) and the CP program for the Site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the Site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC website. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the Site's investigation and cleanup process. The Site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- Residents, owners, and occupants of the Site and properties adjacent to the Site;
- The public water supplier which services the area in which the Site is located;
- Any person who has requested to be placed on the Site contact list;
- The administrator of any school or day care facility located on or near the Site for purposes of posting and/or dissemination of information at the facility; and
- Location(s) of reports and information.

The Site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the Site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first Site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html.

Subsequent fact sheets about the Site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive Site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the Site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the Site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.
- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the Site's investigation and cleanup process with questions, comments, or requests for information.

This CPP may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the Site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the Site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the Site, as described in Section 5.

If the Site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the Site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the Site has not yet been made.

To verify the significant threat status of the Site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html.

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation Plan (CPP)	Before start of Remedial Investigation **Note:** Applicant must submit CPP to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation Work Plan (RIWP):	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RIWP • Conduct 30-day public comment period	Before NYSDEC approves RIWP. If RIWP is submitted with application, public comment periods will be combined, and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Action Work Plan (RAWP):	
• Distribute fact sheet to site contact list about draft RAWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RAWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RAWP. Forty-five-day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the Site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Redevelopment Project-Related Issues

The Applicant submitted a BCP Application to the NYSDEC in August 2023, and the application was deemed complete on October 25, 2023. The BCP Application was available for public comment between November 1, 2023 and December 1, 2023. The BCA was executed on January 26, 2024.

The Site is part of a multi-story apartment building complex identified as Brookfield Commons or Winbrook and is currently occupied by a vacant nine-story apartment building with a basement and a south-adjacent parking lot. The exterior surface of the Site is surrounded by lawns and asphalt-paved walkways.

The Brookfield Commons (Winbrook) complex is located within the B3 (business) and RM-0.35 (residential multifamily) Zoning Districts, and the Central Parking Area (CPA) of the City of White Plains. The Phase 3 portion of the campus (the Site) is located entirely within the B3 Zoning District.

The entire Site is located in an En-Zone (Census Tract 93) and meets the interim criteria identified for a disadvantaged community. This indicates that the census tract has a "poverty rate of at least 20% and unemployment rate of at least 125% the statewide unemployment rate."

The proposed development for the Site will include demolition of the existing 90-unit public housing project building and construction of a new 174-unit mixed-income affordable housing building. All remedial investigation and remedial activities are expected to be conducted in accordance with Environmental Conservation Law (ECL) Article 27, Title 14, 6 New York Codes, Rules, and Regulations (NYCRR) 375-1.6(a), 375-3.6, and 375-6, and all applicable laws, rules, regulations, and guidance documents.

Potential Remediation/Construction-Related Issues

Issues of concern to the community during the on-Site remedial investigation phase will likely include those related to the possibility of discovering additional contamination associated with the historical Site uses including automotive repair, garages and an upholsterer, which could have potential impacts to on-site subsurface conditions including soil, groundwater, and soil vapor.

Issues of concern to the community during the on-site remediation phase will likely include those related to the on-site handling and off-site disposal of contaminated soil. The likely concern to the surrounding community will be the possibility of the generation of vapors or dust from the Site during remediation. On-Site air quality and dust levels will be monitored during any soil excavation and removal activities in accordance with a Site-specific Health and Safety Plan (HASP) that will be included as part of the RAWP. Dust suppression techniques will be employed to prevent the generation of dust. All air and dust monitoring will be performed in accordance with the New York State Department of Health's (NYSDOH) Community Air Monitoring Program (CAMP).

Additional remediation/construction concern will be the potential presence of trucks traveling through the community, and parking or idling at or near the Site during soil excavation and disposal. The RAWP will include provisions for on-Site soil handling techniques that minimize the number of trucks and duration of

time within or near the Site. In addition, provisions will be included to restrict truck traffic (to the extent possible) to designated routes along main roads while minimizing traffic within the community.

The concern over construction-related noise is also a common one for communities in which redevelopment is occurring. Construction plans will minimize noise to the extent possible and the operation of heavy equipment will be restricted to normal working hours. Additional mitigation measures will also be evaluated.

The site is located in an Environmental Justice Area. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

Fact sheets for this project will be translated into Spanish. For additional information, visit: https://statisticalatlas.com/tract/New-York/Bronx-County/005100/Race-and-Ethnicity

4. Site Information

Appendix C contains a map identifying the location of the Site.

Site Description

The approximately 1.284-acre project site is located at 159 South Lexington Avenue in White Plains, Westchester County, New York. The Site is part of White Plains Tax Block 7, Section 125.83, part of Lot 1. TheSite is currently occupied by a vacant nine-story apartment building with a basement and a south-adjacent parking lot. The exterior surface of the Site consists of an asphalt-paved parking and is surrounded by lawns and asphalt-paved walkways. Previous occupants of the Site included automotive repair, garages and an upholsterer.

The Site is part of a multi-story apartment building complex identified as Brookfield Commons or Winbrook. The Winbrook property is bounded by Quarropas Street and Fisher Court to the north, East Post Road to the south, Martin Luther King Boulevard to the east, and South Lexington Avenue to the west.

The greater surrounding area is built out with a mix of institutional/governmental, residential, community, and commercial uses.

The Site is currently zoned within the B3 (business) Zoning District, of the City of White Plains.

History of Site Use, Investigation, and Cleanup

Historic Sanborn fire insurance maps indicate that the Site was vacant as early as 1900. Between 1900 and 1930, the Property was developed with small residential buildings and associated garages, multiple three to four-story apartment buildings, an upholsterer, and an auto repair shop. These structures were demolished for construction of the existing apartment building and grounds, which were constructed in 1949-1950 as part of the Winbrook housing complex.

Previous subsurface investigation documented that the Site is underlain by a fill layer from ground surface to depths ranging from approximately three to six feet below ground surface (bgs). During a previous investigation conducted at the Site by AKRF in 2021, contaminated soil, groundwater, and soil vapor were present at the Site. The metals and polychlorinated biphenyl (PCBs) in soil; chlorinated solvents in groundwater in groundwater; and volatile organic compounds (VOCs) in the soil vapor were likely associated with former automotive and commercial uses at the Site.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's BCP as a **Volunteer**. This means that the Applicant was not responsible for the disposal or discharge of the contaminants, or whose ownership or operation of the Site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish, and wildlife to contaminants on the Site and to contamination that has migrated from the Site.

The Applicant has proposed that the Site will be used for the construction of a 11-story, 174-unit multi-family mixed-income affordable housing residential building.

To achieve this goal, the Applicant will conduct investigation activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement (BCA) executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant has completed a partial site investigation before it entered into the BCP. The Applicant submitted a partial investigation report to support the BCP Application. To meet the investigation goals and requirements of the BCP, additional work is needed before a remedy can be selected. The Applicant prepared a Remedial Investigation Work Plan (RIWP), which was submitted along with the BCP Application and is currently being reviewed by NYSDEC.

The Site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any otherparts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; an
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant will address any NYSDEC comments for the Draft RIWP and submit a finalized RIWP to NYSDEC for review and approval. The finalized RIWP will be placed in the document repositories for public review.

When the Remedial Investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report will also recommend whether cleanup action is needed to address Site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine whether the Site poses a significant threat to public health of the environment. If the Site is a "significant threat," it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by the NYSDEC. If the Site does not post a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the Site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

   or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a "Remedial Action Work Plan" (RAWP). The RAWP describes the Applicant's proposed remedy for addressing contamination related to the site.

Once the Applicant submits a Draft RAWP for approval, NYSDEC would announce the availability of the draft RAWP for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan, if necessary, before approvingthe proposed remedy. The NYSDOH must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the Site Decision Document (DD).

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a Final Engineering Report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the Site.

Certificate of Completion

When NYSDEC is satisfied that the cleanup requirements have been achieved or will be achieved for the site, it will approve the FER. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of Site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional controls (ICs) and engineering controls (ECs) required to ensure that the remedy implemented for the Site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan (SMP).

An *institutional control* (IC) is a non-physical restriction on use of the Site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* (EC) is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

APPENDIX A -
PROJECT CONTACTS AND LOCATIONS OF REPORTS AND INFORMATION

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Ryan Richard
Project Manager
NYSDEC
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, NY 12233
Email: ryan.richard@dec.ny.gov

Stephanie Mossey
Public Participation Specialist
NYSDEC Region 3
21 South Putt Corners Road
New Paltz, NY 12233
(845) 256-3018
Email: stephanie.mossey@dec.ny.gov.

New York State Department of Health (NYSDOH):

Johnathan Robinson
Project Manager
New York State Department of Health
Empire State Plaza, Corning Tower Rm. 1787
Albany, NY 12237
johnathan.robinson@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

White Plains Public Library 100 Martine Avenue White Plains, NY 10601 Brian Kenney – Director (914) 422-1400 Hours: Monday through Thursday: 10 am-9 pm Friday: 10 am-6 pm Saturday: 10 am-5 pm Sunday: 1 pm-5 pm	NYSDEC Region 3 White Plains Sub-Office 100 Hillside Avenue, Suite 1W White Plains, NY 10603 (914) 803-8157 Hours: Monday-Friday, 9 am – 4:45 pm (call for appointment)

APPENDIX B

SITE CONTACT LIST

Local, State, and Federal Officials

Hon. George Latimer Westchester County Executive 148 Martine Avenue White Plains, NY 10601	Hon. Thomas M. Roach Mayor of the City of White Plains City Hall 255 Main Street White Plains, NY 10601
Mr. Kenneth Jenkins Westchester County Deputy Executive 148 Martine Avenue White Plains, NY 10601	Mr. Christopher Gomez, AICP Commissioner City of White Plains Planning Department 70 Church Street White Plains, NY 10601
Blanca P. Lopez Acting Planning Commissioner Westchester County Planning Department 148 Martine Avenue, Room 416 White Plains, NY 10601	Ms. Judith Mezey Deputy Commissioner City of White Plains Planning Department 70 Church Street White Plains, NY 10601
Mr. Richard Hyman Chairman Westchester County Planning Board 148 Martine Avenue White Plains, NY 10601	Mr. John J. Ioris Chairman City of White Plains Planning Board 70 Church Street White Plains, NY 10601
Ms. Kathy Hochul Governor of New York State NY State Capitol Building Albany, New York 12224	Hon. Charles Schumer U.S. Senator 322 Hart Senate Office Building Washington, DC 20510
Hon. Andrea Stewart-Cousins NY State Senator 28 Wells Avenue, Building #3 Yonkers, NY 10701	Hon. Kirsten Gillibrand U.S. Senator 478 Russell Senate Office Building Washington, DC 20510
Hon. Jamaal Bowman U.S. House of Representatives 345 Cannon House Office Building Washington, DC 20003	Ms. Amy Paulin Assembly Member District Office 700 White Plains Road, Suite 355 Scarsdale, NY 10583

Local News Media

The Journal News 1133 Westchester Ave, Suite N110 White Plains, NY 10604	News 12 Westchester 6 Executive Plaza Yonkers, NY 10701
The White Plains Examiner Examiner Media, LLC 151 Harriman Road Mount Kisco, NY 10549	FiOS1 News Lower Hudson Valley 800 Westchester Avenue, Suite S-640 Rye Brook, NY 10573
The New York Times 229 West 43rd Street New York, NY 10036	WABC-TV 7 Lincoln Square New York, NY 10023
New York Daily News 4 New York Plaza New York, NY 10004	WNYW Fox 5 205 East 67th Street New York, NY 10021
New York Post 1211 6th Avenue New York, NY 10036	WNBC News 4 30 Rockefeller Plaza, 7th Floor New York, NY 10112

Public Water Supply

White Plains Department of Public Works
Bureau of Water
255 Main Street
White Plains, NY 10601

Community, Civic, Religious and Other Environmental Organizations:

Consolidated Edison Corporate Affairs
Jane Solnick – Director
511 Theodore Fremd Avenue
Rye, NY 10580

White Plains Department of Public Safety
Police Bureau
77 South Lexington Avenue
White Plains, NY 10601

White Plains Department of Public Safety
Fire Bureau
77 South Lexington Avenue
White Plains, NY 10601

Bethel Baptist Church
1 Fisher Court
White Plains, NY 10601

Little Mt Zion Holy Church
230 Dr. Martin Luther King Jr. Blvd
White Plains, NY 10601

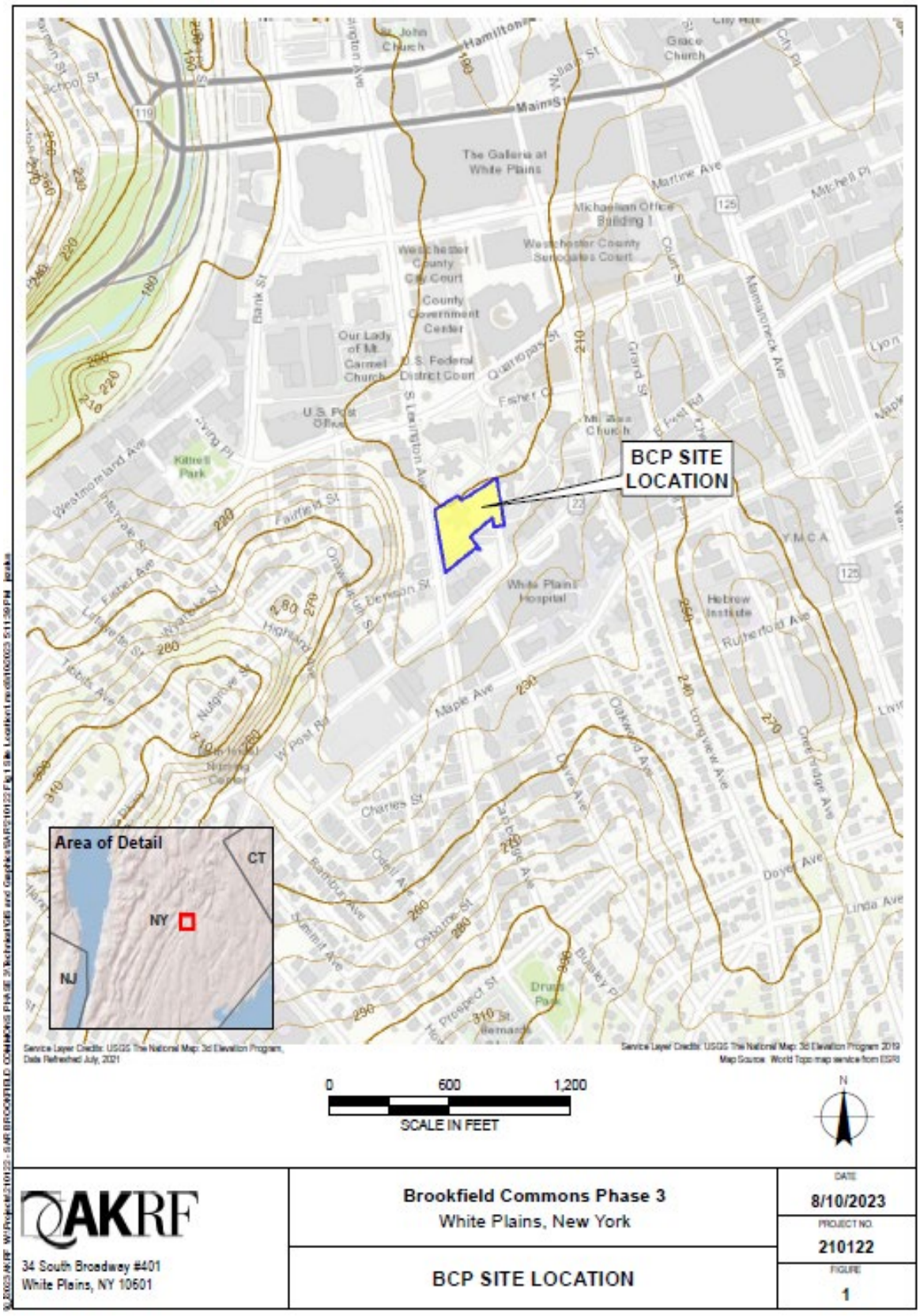
Trinity United Methodist Church
130 S. Lexington Avenue
White Plains, NY 10606

First Haitian Free Methodist Church of White Plains
162 S. Lexington Avenue
White Plains, NY 10606

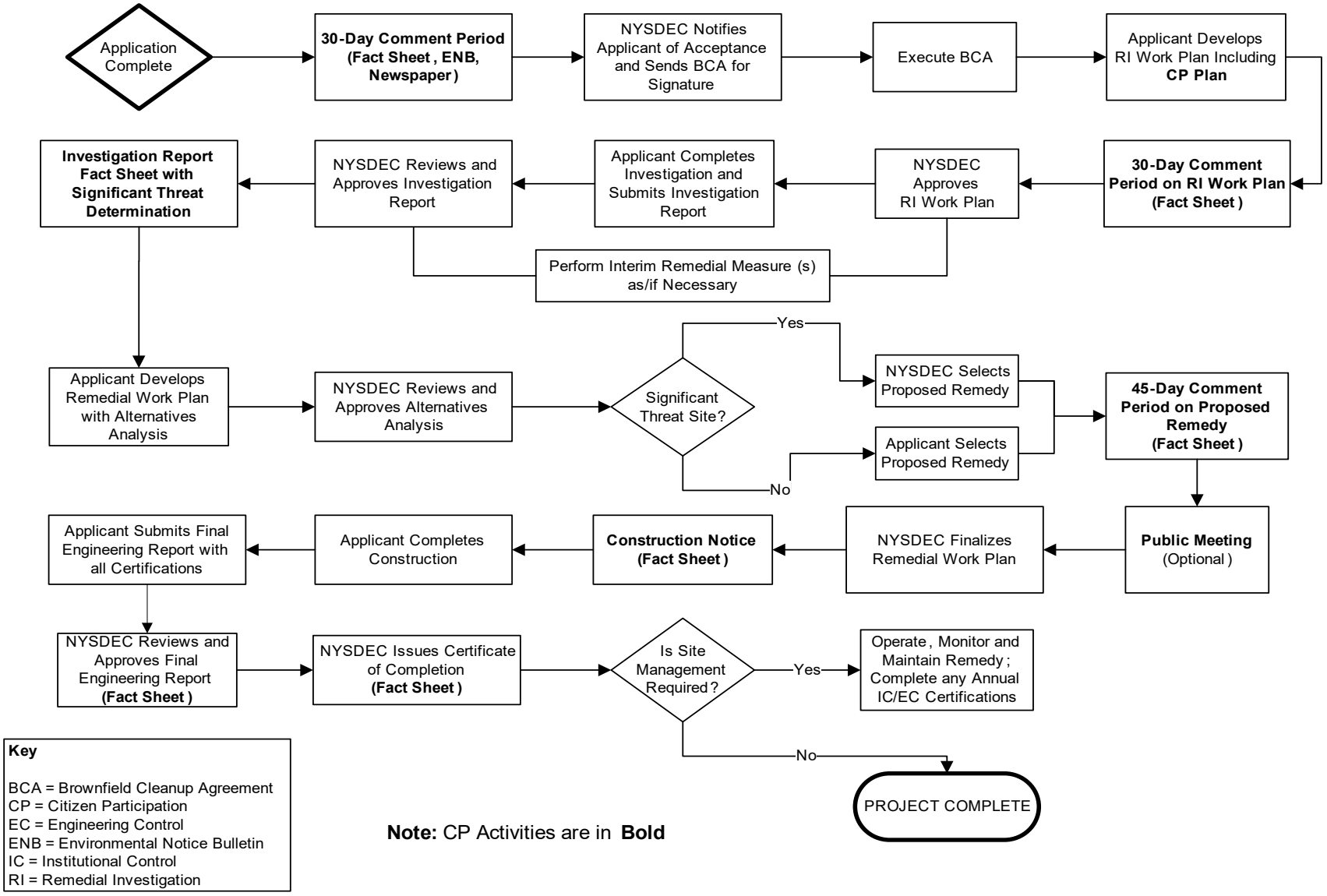
Allen African Methodist Episcopal Church
65 Fisher Avenue
White Plains, NY 10606

Calvary Baptist Church
188 Orawaupum Street
White Plains, NY 10606

APPENDIX C
SITE LOCATION MAP


BCP SITE LOCATION
Area of Detail
CT
NY
NJ
0
600
1,200
SCALE IN FEET
N
AKRF
34 South Broadway #401
White Plains, NY 10601
Brookfield Commons Phase 3
White Plains, New York
BCP SITE LOCATION
DATE
8/10/2023
PROJECT NO.
210122
FIGURE
1

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

Part 2. List Important Information Needed From the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated to the Community.

- Specific site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC's public web site for "environmental justice". DEC's EJ pages define an EJ area, and link to county maps to help determine if the site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential, or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial

stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: Brookfield Commons Phase 3

Site Number: C360246

Site Address and County: 159 South Lexington Avenue, Westchester

Remedial Party(ies): Trinity Brookfield Commons Phase Three Limited Partnership

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. *List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs.*

A limited subsurface investigation of the Site was conducted by AKRF and was documented in a Subsurface Investigation Letter Report, dated October 2021. The findings of the investigation were used to support the BCP Application.

- The contamination present at the Site stems from the presence of historical fill material and/or past on-site operations including an automotive repair shop and an upholsterer and/or migration from off-site including active- and closed-status petroleum spills, petroleum bulk storage facilities, hazardous waste generator, and a BCP site.
- The proposed Site use involves affordable housing. There will be restrictions for Site use, which will be determined following remediation.
- A Community Air Monitoring Plan (CAMP) will be developed as part of the Remedial Action Work Plan (RAWP) that will be implemented during all subsurface disturbance activities to mitigate potential exposures to particulates and organic vapors.
- The proposed remediation of the Site will not diminish, and may improve, the property values in the surrounding area.
- Adjacent property occupants and owners will be kept informed about the progress of the Site cleanup activities. Periodic fact sheets will be sent by mail.
- Local, state, and federal officials will be contacted about the Site remediation activities.
- Up to now, a Limited Subsurface Investigation was conducted on the Site. A draft Remedial Investigation Work Plan (RIWP) has been prepared and submitted along with the BCP application to further investigate the extent of on-site contamination. The RIWP includes provisions for analysis of soil, groundwater, and soil vapor beneath the entire Site. Findings from the Remedial Investigation will be used to prepare a RAWP, which includes the proposed remedy to address Site contamination and protect the health and safety of the public in the surrounding community.
- For more information about the Site or BCP program, contact the NYSDEC or NYSDOH Project Manager. Contact information is provided in Appendix A.

How were these issues and/or information needs identified?

These issues were identified based on a review of historic records of the Site presented in previous environmental reports, including: a Phase I Environmental Site Assessment (ESA) prepared by AKRF in June 2021, and the Subsurface Investigation Letter Report, prepared by AKRF dated October 2021. A description of the proposed project was also presented in the BCP Application.

Part 2. *List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.*

- Adjacent property owners and occupants will be informed of the Site remediation activities and can reach out to the Site's NYSDEC and/or NYSDOH Project Manager to obtain additional information.

- Nearby uses do not need to be restricted, since measures will be implemented during all investigation and remediation activities to protect the health safety of the public and local community. These measures include, monitoring for dust that may be emanating from the Site and implementing dust controls such as spraying water or minimizing subsurface disturbance. Odors will be mitigated by the use of protective foams and/or covering any contaminated areas of disturbance or stockpiles with tarps.

How were these information needs identified?

Research was completed to identify the names and contact information of adjacent property owners and local government officials. These individuals are included in the Site Contact List under Appendix B.

Part 3. *List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.*

- An initial Limited Subsurface Investigation of the Site was conducted by AKRF, which was documented in a Subsurface Investigation Letter Report, dated October 2021. The findings of the investigation were used to support the BCP Application, and were used to develop the RIWP, which was submitted to NYSDEC and NYSDOH for review and approval. The findings of the investigation will be used to develop a RAWP and a selected cleanup remedy.

- Document repositories, where copies of all documents regarding the investigation and remediation of the Site are available to the public, have been established at: White Plains Public Library, 100 Martine Avenue, White Plains, NY 10601; and NYSDEC Region 3 White Plains Sub-Office, 100 Hillside Avenue, Suite 1W, White Plains, NY 10603.

How were these issues and/or information needs identified?

These needs were identified by summarizing the project timeline and a review of the information included in the BCP Application. Any contact information or details pertaining to the Site that have changed since issuance of the BCP Application, have been updated in this CP Plan.

Part 4. *Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):*

a. Land use/zoning at and around site:
☒ **Residential** ☐ **Agricultural** ☒ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☒ **Yes** ☐ **No**

h. Special considerations:
☒ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
Project fact sheets will be translated to Spanish.

Part 5. *The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are other individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)*

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☒ **Local Officials:** See list in Appendix B of the Citizen Participation Plan

☒ **Media:** See list in Appendix B of the Citizen Participation Plan

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☒ **Citizens/Community Group(s):** See list in Appendix B of the Citizen Participation Plan

☐ **Environmental Justice Group(s):**

☐ **Environmental Group(s):** Click here to enter text.

☒ **Civic Group(s):** See list in Appendix B of the Citizen Participation Plan

☐ **Recreational Group(s):** Click here to enter text.

☒ **Other(s):** Schools and daycares, See list in Appendix B of the Citizen Participation Plan

Prepared/Updated By: Gregory Baird **Date:** January 30, 2024

Reviewed/Approved By: Stephanie Mossey **Date:**

APPENDIX H
HEALTH AND SAFETY PLAN

BROOKFIELD COMMONS PHASE 3
159 S. LEXINGTON AVENUE
WHITE PLAINS, NEW YORK

Health and Safety Plan

NYSDEC BCP Site No: C360246
AKRF Project Number: 210122

Prepared For:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 12th Floor
Albany, New York 12233

Prepared On Behalf Of:

Trinity Brookfield Commons Phase Three Limited Partnership
1350 Broadway, Suite #1700
New York, NY 10018

Prepared by:

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, New York 10016
212-696-0670

OCTOBER 2024; REVISED JUNE 26, 2026

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Figure 1 – Site Location Map
Figure 2 – Hospital Location Map

ATTACHMENTS

Attachment A – Potential Health Effects from On-Site Contaminants
Attachment B – Report Forms
Attachment C – Emergency Hand Signals

1.0 INTRODUCTION

This environmental Health and Safety Plan (HASP) has been developed for the implementation of a Remedial Action Work Plan (RAWP) by AKRF, Inc. (AKRF) personnel and its subcontractors at the property located at 159 S. Lexington Avenue, White Plains, hereafter referred to as the "Site." The Site is identified by the City of White Plains as Tax Block 7, Part of Lot 1, Section 125.83. The Applicant is enrolled in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as a Volunteer under BCP Site No. C360246.

The Site consists of the approximately 1.284-acre parcel developed with a vacant nine-story apartment building with a basement and surrounding lawns and walkways, which are part of a multi-story apartment building complex identified as Brookfield Commons or Winbrook. The Site location and topography of the Site and surrounding area are shown on Figure 1 and the Site layout is shown on Figure 2.

This HASP does not discuss routine health and safety issues common to general construction and excavation, including, but not, limited to slips, trips, falls, shoring, and other physical hazards. All AKRF employees are directed that all work must be performed in accordance with the AKRF's Generic HASP and all Occupation Safety and Health Administration (OSHA)-applicable regulations for the work activities required for the project. All project personnel are furthermore directed that they are not permitted to enter Permit Required Confined Spaces (as defined by OSHA). For issues unrelated to contaminated materials, all non-AKRF employees are to be bound by all applicable OSHA regulations as well as any more stringent requirements specified by their employer in their corporate HASP or otherwise. AKRF is not responsible for providing oversight for issues unrelated to contaminated materials for non-employees. This oversight shall be the responsibility of the employer of that worker or other official designated by that employer.

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

2.1 Hazard Evaluation

2.1.1 Hazards of Concern

Hazards of concern include: organic and inorganic chemicals, and heat and/or cold stress.

2.1.2 Physical Characteristics

Physical characteristics of the hazards of concern include solid, aqueous, and vapor states.

2.1.3 Hazardous Materials

The Site-specific hazardous materials that may be encountered during RAWP implementation include: historical fill material, chlorinated solvent-related VOCs, petroleum, SVOCs, and metals.

2.1.4 Chemicals of Concern

Chemical	REL/PEL/STEL	Health Hazards
Barium	REL= 0.5 mg/m^3 PEL= 0.5 mg/m^3	Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia.
Benzene	REL: 0.1 ppm N STEL: 1 ppm PEL: 1 ppm O STEL: 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen].
Carbon tetrachloride	N STEL: 2 ppm PEL: 10 ppm PEL C: 25 ppm; 5-min max peak 200 ppm	Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen].
Cis-1,2-dichloroethylene	PEL: 790 mg/m^3 REL: 790 mg/m^3	Irritation eyes, respiratory system; central nervous system depression.
Copper	REL: 1 mg/m^3 PEL: 1 mg/m^3	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia.
DDD, DDE, & DDT	REL: 0.5 mg/m^3 PEL: 1 mg/m^3	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen].

Chemical	REL/PEL/STEL	Health Hazards
Fuel Oils	REL: 100 mg/m^3	Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid).
Lead	REL: 0.050 mg/m3 PEL: 0.050 mg/m3	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.
Mercury	REL: 0.05 mg/m^3 REL C: 0.1 mg/m^3 PEL: 0.1 mg/m^3	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.
Nickel	REL: 0.015 mg/m^3 PEL: 1 mg/m^3	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen].
PAH	REL: 0.1 mg/m3 PEL: 0.2 mg/m3	Effects reported from occupational exposure to PAHs include chronic bronchitis, chronic cough irritation, bronchogenic cancer, dermatitis, cutaneous photosensitization, and pilosebaceous reactions. Reported health effects associated with chronic exposure to coal tar and its by-products (e.g., PAHs): Skin: erythema, burns, and warts on sun-exposed areas with progression to cancer. The toxic effects of coal tar are enhanced by exposure to ultraviolet light. Eyes: irritation and photosensitivity. Respiratory system: cough, bronchitis, and bronchogenic cancer. Gastrointestinal system: leukoplakia, buccal-pharyngeal cancer, and cancer of the lip. Hematopoietic system: leukemia (inconclusive) and lymphoma. Genitourinary system: hematuria and kidney and bladder cancers.
PCBs	REL: 0.001 mg/m^3 PEL: 0.5 mg/m^3	Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen].
Silver	REL: 0.01 mg/m^3 PEL: 0.01 mg/m^3	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance.

Chemical	REL/PEL/STEL	Health Hazards
Tetrachloroethylene (PCE)	PEL: 100 ppm PEL C: 200 ppm; max peak: 300 ppm	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen].
Trichloroethylene (TCE)	PEL: 100 ppm PEL C: 200 ppm; 5-min max peak: 300 ppm	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen].
Vinyl chloride	PEL: 1 ppm PEL C: 5 ppm	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen].
Zinc	REL: 5 mg/m^3 REL C: 15 mg/m^3 N STEL: 10 mg/m^3 PEL: 5 mg/m^3 (ZnO fume); 15 mg/m^3 (ZnO dust)	Chills, elevated body temperature, myalgia, cough, fatigue, chest pain, stomach cramps, nausea, anemia, changes in cholesterol levels, and vomiting.
Notes: REL: Recommended exposure limit (NIOSH) PEL: Permissable exposure limits (OSHA) STEL: Short-term exposure limit N: NIOSH O: OSHA C: Ceiling		

The potential health effects from these known and suspected on-site contaminants are provided in Attachment A.

2.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for the implementation of the HASP. The SSO will work under the direction of a Qualified Environmental Professional (QEP) and will be experienced in the implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel are outlined in Section 2.3 of this HASP.

2.3 Training

All personnel who enter the work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. In addition, all personnel will have up-to-date 8-hour refresher training. The training will allow personnel to recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;

- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in these objectives before work begins. A Site safety meeting will be conducted at the start of the project work. Additional meetings shall be conducted, as necessary, for new personnel working at the Site.

2.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physician's medical release for work will be confirmed by the SSO before an employee can begin Site activities. The medical release shall consider the type of work to be performed and the required personal protective equipment (PPE). The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste Site work.

2.5 Site Work Zones

During any activities involving subsurface disturbance, the work area must be divided into various zones to prevent the spread of any contamination, ensure that proper PPE is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where exposure to impacted media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support is the zone area where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may be changed by the SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins. The exclusion zone and CRZ are 10 and 25 feet from the drill rig during the RI, respectively. Control measures such as caution tape and/or traffic cones will be placed around the perimeter of the work area when needed.

2.6 Personal Protection Equipment (PPE)

The PPE required for various kinds of tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."

AKRF field personnel and other site personnel shall wear, at a minimum, Level D PPE. The protection will be based on the air monitoring described in Section 2.6.

Level D PPE includes donning of the following during drilling and sampling:

- Steel Toed Boots
- Hard Hat
- Work Gloves
- Safety Glasses
- Ear Plugs
- Nitrile Gloves
- Tyvek Suit [if non-aqueous phase liquid (NAPL) is present]

If PID readings exceed 5 ppm in the breathing zone, personnel will don Level C PPE, which includes Level D PPE and a half- or full-face respirator with a dual organic and particulate cartridge.

2.7 General Work Practices

To protect the health and safety of the field personnel, field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the SSO will determine the nature of the emergency, and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be taken to a hospital by on-site personnel. Directions to the hospital are provided below, and a Hospital Location Map showing the more direct route to the hospital is included as Figure 3.

3.1 Hospital Information

Hospital Name:	White Plains Hospital
Phone Number:	(914) 681-0600
Address:	41 E Post Road, White Plains, NY 10601
Directions:	Turn LEFT/head south from the Site onto South Lexington Avenue Turn LEFT onto East Post Road The Emergency Room will be on the RIGHT

3.2 Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF	Marc Godick	QA/QC Officer, QEP	(914) 922-2356
	Colleen Griffiths	Project Manager	(914) 922-2363
	Gregory Baird	Field Team Leader/SSO	(646) 823-5477 (cell)
	Micheal Iodice	Field Monitor/SSO	(908) 500-3227 (cell)
	Chad Walters	Field Monitor/SSO	(929) 428-2998 (cell)
Trinity Brookfield Commons Phase Three Limited Partnership	Allison Brown	Design & Contruction Manager	(646) 751-5112
NYSDEC Project Manager	Ryan Richard	Project Manager	845-256-3118
NYSDOH Project Manager	Johnathan Robinson	Project Manager	518-402-7881
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

4.1 Approval

Signed: _____ Date: _____

AKRF Project Manager

Signed: _____ Date: _____

AKRF Health and Safety Officer

Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the SSO.

4.2 Affidavit

I have read the Health and Safety Plan (HASP) for the project located at 159 S. Lexington Avenue, White Plains. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
Signed: _____ Company: _____ Date: _____
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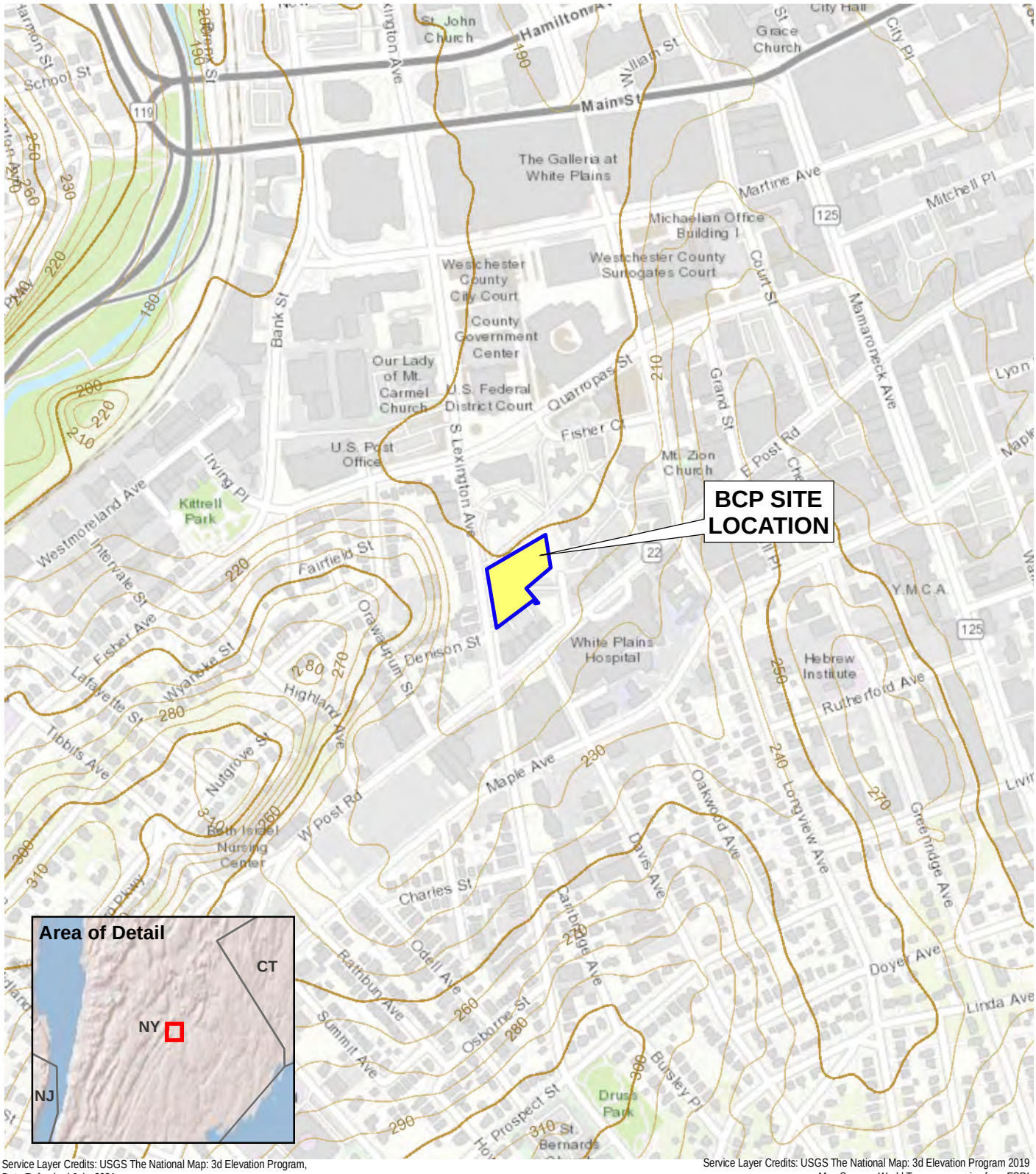
FIGURES



Service Layer Credits: USGS The National Map: 3d Elevation Program, Data Refreshed July, 2021

Service Layer Credits: USGS The National Map: 3d Elevation Program 2019
Map Source: World Topo map service from ESRI

0 600 1,200
SCALE IN FEET

N

AKRF
34 South Broadway #401
White Plains, NY 10601

Brookfield Commons Phase 3
White Plains, New York

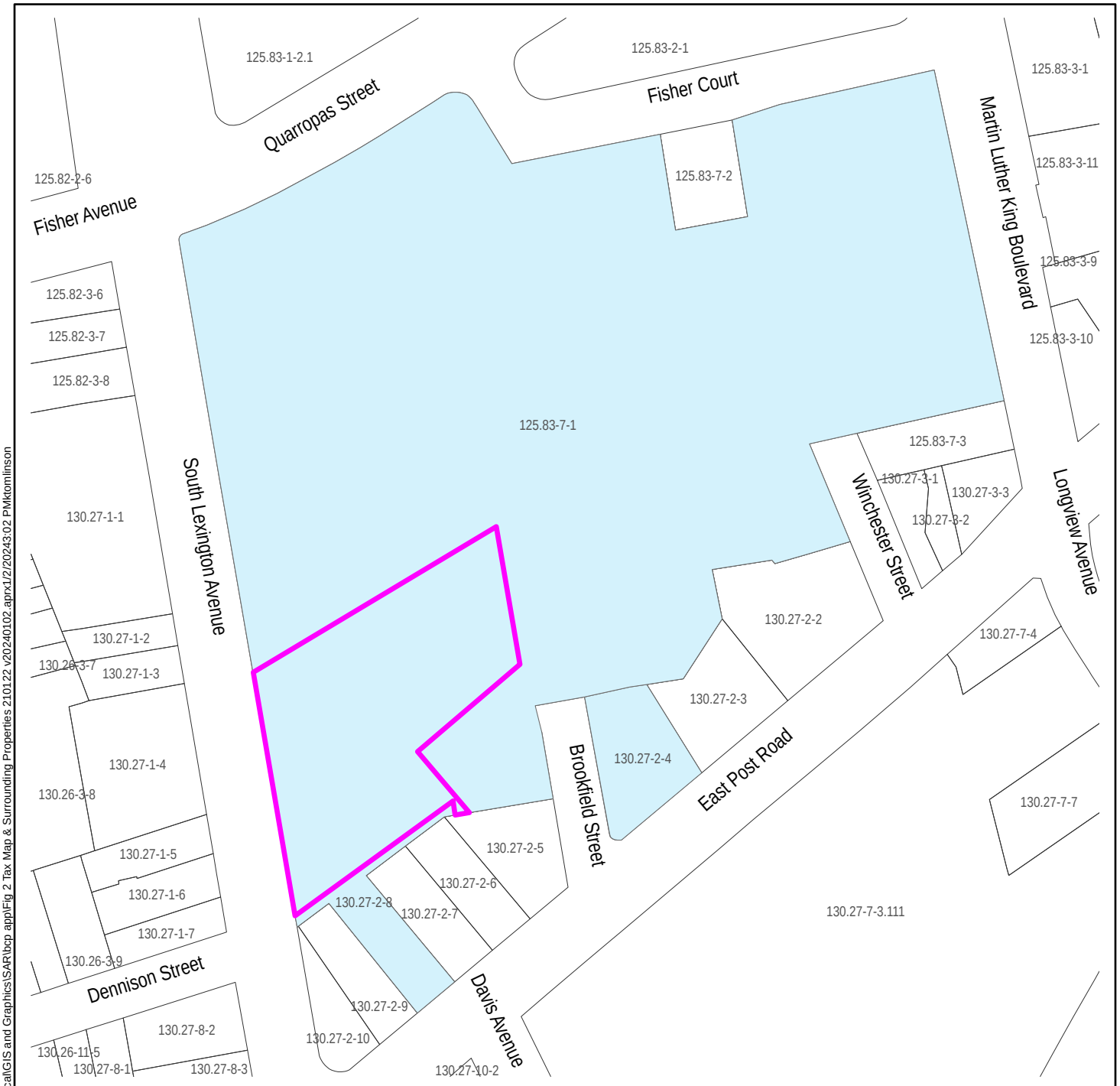
BCP SITE LOCATION

DATE
9/27/2024

PROJECT NO.
210122

FIGURE
1

©2024 AKRF W:\Projects\210122 - SAR BROOKFIELD COMMONS PHASE 3\Technical\GIS and Graphics\SAR\bcp RIR\210122 Fig 1 Site Location.mxd 9/27/2024 4:54:25 PM jszalus



0 150 300

SCALE IN FEET

LEGEND

- PROJECT SITE BOUNDARY
- 130.27-2-1 LOT BOUNDARY AND PRINT KEY (BLOCK AND LOT)
- ADJACENT PROPERTY

Map Source:
giswww.westchestergov.com (GIS database)

AKRF
440 Park Avenue South, New York, NY 10016

Brookfield Commons Phase 3
White Plains, New York

TAX MAP AND SURROUNDING PROPERTIES

DATE
1/2/2024

PROJECT NO.
210122

FIGURE
2

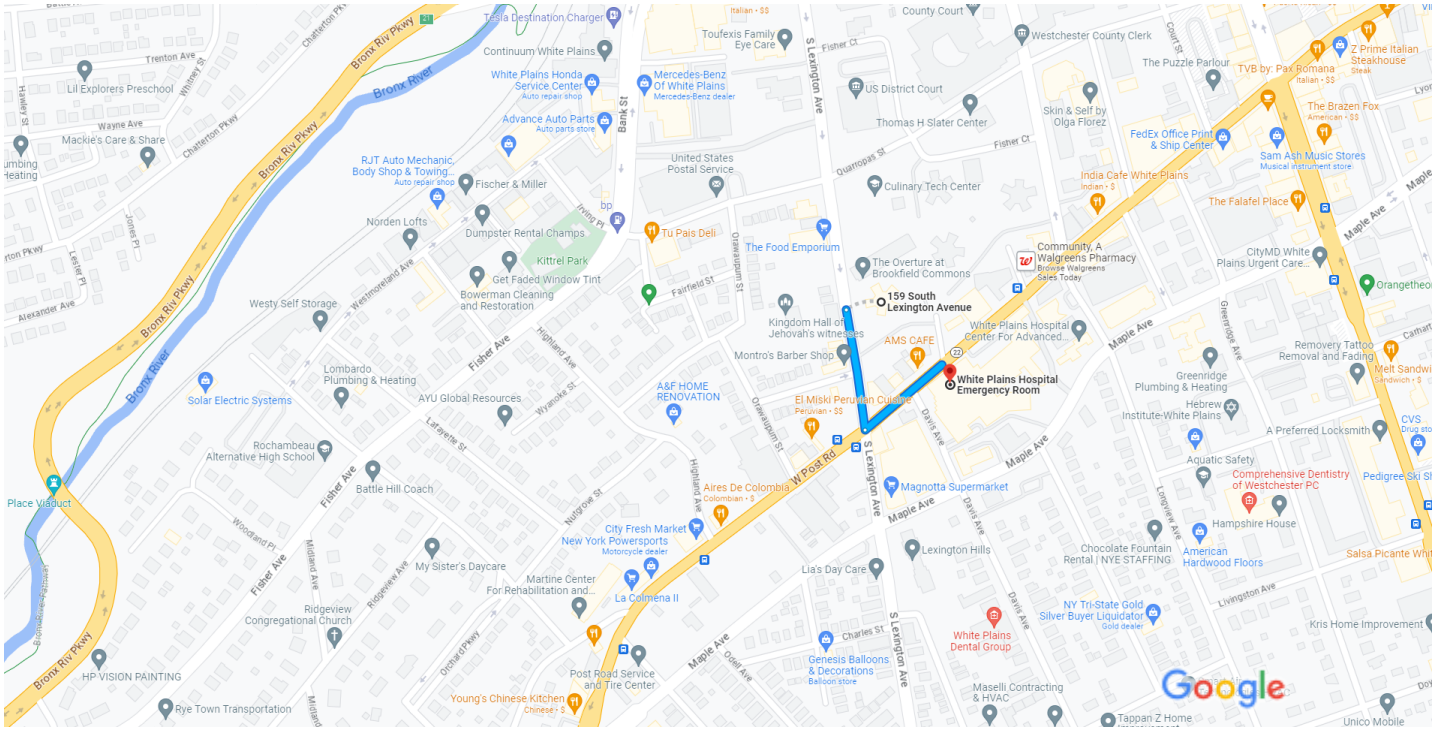
©2024 AKRF W:\Projects\210122 - SAR BROOKFIELD COMMONS PHASE 3\Technical\GIS and Graphics\SAR\bcp app\Fig 2 Tax Map & Surrounding Properties 210122 v20240102.aprx 1/2/20243:02 PMktomlinson

Google Maps

159 S Lexington Ave, White Plains, NY 10601 to White Plains Hospital Emergency Room, 41 E Post Rd, White Plains, NY 10601

Drive 0.2 mile, 1 min

FIGURE 1 - HOSPITAL ROUTE MAP



159 S Lexington Ave
White Plains, NY 10601

1. Head south on S Lexington Ave toward Dennison St

479 ft

2. Turn left onto E Post Rd
Destination will be on the right

397 ft

White Plains Hospital Emergency Room
41 E Post Rd, White Plains, NY 10601

ATTACHMENT A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,2-DICHLOROETHENE
CAS # 540-59-0, 156-59-2, and 156-60-5

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-dichloroethene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 1,2-dichloroethene occurs mainly in workplaces where it is made or used. Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired. *cis*-1,2-Dichloroethene has been found in at least 146 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA). *trans*-1,2-Dichloroethene was found in at least 563 NPL sites. 1,2-Dichloroethene was found at 336 sites, but the isomer (*cis*- or *trans*-) was not specified.

What is 1,2-dichloroethene?

(Pronounced 1,2-dī-klôr′ ō-ĕth′ēn)

1,2-Dichloroethene, also called 1,2-dichloroethylene, is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of 1,2-dichloroethene in air (about 17 parts of 1,2-dichloroethene per million parts of air [17 ppm]).

There are two forms of 1,2-dichloroethene; one is called *cis*-1,2-dichloroethene and the other is called *trans*-1,2-dichloroethene. Sometimes both forms are present as a mixture.

What happens to 1,2-dichloroethene when it enters the environment?

- 1,2-Dichloroethene evaporates rapidly into air.
- In the air, it takes about 5-12 days for half of it to break down.
- Most 1,2-dichloroethene in the soil surface or bodies of water will evaporate into air.
- 1,2-Dichloroethene can travel through soil or dissolve in water in the soil. It is possible that it can contaminate groundwater.
- In groundwater, it takes about 13-48 weeks to break down.
- There is a slight chance that 1,2-dichloroethene will break down into vinyl chloride, a different chemical which is believed to be more toxic than 1,2-dichloroethene.

How might I be exposed to 1,2-dichloroethene?

- Breathing 1,2-dichloroethene that has leaked from hazardous waste sites and landfills.
- Drinking contaminated tap water or breathing vapors from contaminated water while cooking, bathing, or washing dishes.
- Breathing 1,2-dichloroethene, touching it, or touching contaminated materials in the workplace.

How can 1,2-dichloroethene affect my health?

Breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you.

When animals breathed high levels of *trans*-1,2-dichloroethene for short or longer periods of time, their livers and lungs were damaged and the effects were more severe with longer exposure times. Animals that breathed very high

levels of *trans*-1,2-dichloroethene had damaged hearts.

Animals that ingested extremely high doses of *cis*- or *trans*-1,2-dichloroethene died.

Lower doses of *cis*-1,2-dichloroethene caused effects on the blood, such as decreased numbers of red blood cells, and also effects on the liver.

The long-term (365 days or longer) human health effects after exposure to low concentrations of 1,2-dichloroethene aren't known. One animal study suggested that an exposed fetus may not grow as quickly as one that hasn't been exposed.

Exposure to 1,2-dichloroethene hasn't been shown to affect fertility in people or animals.

How likely is 1,2-dichloroethene to cause cancer?

The EPA has determined that *cis*-1,2-dichloroethene is not classifiable as to its human carcinogenicity.

No EPA cancer classification is available for *trans*-1,2-dichloroethene.

Is there a medical test to show whether I've been exposed to 1,2-dichloroethene?

Tests are available to measure concentrations of the breakdown products of 1,2-dichloroethene in blood, urine, and tissues. However, these tests aren't used routinely to determine whether a person has been exposed to this compound. This is because after you are exposed to 1,2-dichloroethene, the breakdown products in your body that are detected with these tests may be the same as those that come from exposure to other chemicals. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum allowable level of *cis*-1,2-dichloroethene in drinking water at 0.07 milligrams per liter of water (0.07 mg/L) and *trans*-1,2-dichloroethene at 0.1 mg/L.

The EPA requires that any spills or accidental release of 1,000 pounds or more of 1,2-dichloroethene must be reported to the EPA.

The Occupational Health Safety and Health Administration (OSHA) has set the maximum allowable amount of 1,2-dichloroethene in workroom air during an 8-hour workday in a 40-hour workweek at 200 parts of 1,2-dichloroethene per million parts of air (200 ppm).

Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Fertility: Ability to reproduce.

Ingest: To eat or drink something.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Solvent: A chemical that can dissolve other substances.

References

This ToxFAQs information is taken from the 1996 Toxicological Profile for 1,2-Dichloroethene produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BARIUM AND COMPOUNDS

CAS # 7440-39-3

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

❏ Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
❏ The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
❏ Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.
❏ Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).
❏ Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

❏ Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
❏ Living in areas with unusually high natural levels of barium in the drinking water.
❏ Working in a job that involves barium production or use.
❏ Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

BARIUM AND COMPOUNDS
CAS # 7440-39-3

Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 μg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m^3) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m^3 of total dust and 5 mg/m^3 for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m^3 for soluble barium compounds. The NIOSH has set RELs of 10 mg/m^3 (total dust) for barium sulfate and 5 mg/m^3 (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE
CAS # 71-43-2

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

(Pronounced bĕn′zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

CARBON TETRACHLORIDE

CAS # 56-23-5

Division of Toxicology ToxFAQs™ **August 2005**

This fact sheet answers the most frequently asked health questions (FAQs) about carbon tetrachloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Carbon tetrachloride does not occur naturally. Exposure to this substance results mostly from breathing air, drinking water, or coming in contact with soil that is contaminated with it. Exposure to very high amounts of carbon tetrachloride can damage the liver, kidneys, and nervous system. Carbon tetrachloride can cause cancer in animals. Carbon tetrachloride has been found in at least 425 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is carbon tetrachloride?

Carbon tetrachloride is a manufactured chemical that does not occur naturally. It is a clear liquid with a sweet smell that can be detected at low levels. It is also called carbon chloride, methane tetrachloride, perchloromethane, tetrachloroethane, or benziform.

Carbon tetrachloride is most often found in the air as a colorless gas. It is not flammable and does not dissolve in water very easily. It was used in the production of refrigeration fluid and propellants for aerosol cans, as a pesticide, as a cleaning fluid and degreasing agent, in fire extinguishers, and in spot removers. Because of its harmful effects, these uses are now banned and it is only used in some industrial applications.

What happens to carbon tetrachloride when it enters the environment?

- ❏ It moves very quickly into the air upon release, so most of it is in the air.
- ❏ It evaporates quickly surface water.
- ❏ Only a small amount sticks to soil particles; the rest evaporates or moves into the groundwater.
- ❏ It is very stable in air (lifetime 30-100 years).
- ❏ It can be broken down or transformed in soil and water within several days.
- ❏ When it does break down, it forms chemicals that can destroy ozone in the upper atmosphere.
- ❏ It does not build up in animals. We do not know if it build up in plants.

How might I be exposed to carbon tetrachloride?

- ❏ Breathing contaminated air near manufacturing plants or waste sites.
- ❏ Breathing workplace air when it is used.
- ❏ Drinking contaminated water near manufacturing plants and waste sites.
- ❏ Breathing contaminated air and skin contact with water while showering or cooking with contaminated water.
- ❏ Swimming or bathing in contaminated water.
- ❏ Contact with or eating contaminated soil (pica child) at waste sites.

How can carbon tetrachloride affect my health?

High exposure to carbon tetrachloride can cause liver, kidney, and central nervous system damage. These effects can occur after ingestion or breathing carbon tetrachloride, and possibly from exposure to the skin. The liver is especially sensitive to carbon tetrachloride because it enlarges and cells are damaged or destroyed. Kidneys also are damaged, causing a build up of wastes in the blood. If exposure is low and brief, the liver and kidneys can repair the damaged cells and function normally again. Effects of carbon tetrachloride are more severe in persons who drink large amounts of alcohol.

If exposure is very high, the nervous system, including the brain, is affected. People may feel intoxicated and experience headaches, dizziness, sleepiness, and nausea and vomiting. These effects may subside if exposure is stopped, but in severe cases, coma and even death may occur.

CARBON TETRACHLORIDE
CAS # 56-23-5

There have been no studies of the effects of carbon tetrachloride on reproduction in humans, but studies in rats showed that long-term inhalation may cause decreased fertility.

How likely is carbon tetrachloride to cause cancer?

Studies in humans have not been able to determine whether or not carbon tetrachloride can cause cancer because usually there has been exposure to other chemicals at the same time. Swallowing or breathing carbon tetrachloride for years caused liver tumors in animals. Mice that breathed carbon tetrachloride also developed tumors of the adrenal gland. The Department of Health and Human Services (DHHS) has determined that carbon tetrachloride may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that carbon tetrachloride is possibly carcinogenic to humans, whereas the EPA determined that carbon tetrachloride is a probable human carcinogen.

How can carbon tetrachloride affect children?

The health effects of carbon tetrachloride have not been studied in children, but they are likely to be similar to those seen in adults exposed to the chemical. We do not know whether children differ from adults in their susceptibility to carbon tetrachloride.

A few survey-type studies suggest that maternal drinking water exposure to carbon tetrachloride might possibly be related to certain birth defects. Studies in animals showed that carbon tetrachloride can cause early fetal deaths, but did not cause birth defects. A study with human breast milk in a test tube suggested that it would be possible for carbon tetrachloride to pass from the maternal circulation to breast milk, but there is no direct demonstration of this occurring.

How can families reduce the risks of exposure to carbon tetrachloride?

❑ Discard any product that contains carbon tetrachloride that you may have at home and may have used in the past.

❑ Household chemicals should be stored out of the reach of children in their original containers.

❑ Sometimes older children sniff household chemical products to get high. Talk to your children about the dangers of sniffing chemicals.

Is there a medical test to determine whether I've been exposed to carbon tetrachloride?

Several sensitive and specific tests are available to measure carbon tetrachloride in exposed persons. The most convenient way is simply to measure carbon tetrachloride in the exhaled air. Carbon tetrachloride also can be measured in blood, fat, or other tissues. These tests are not usually done in the doctor's office because they require special equipment. Although these tests can show that a person has been exposed to carbon tetrachloride, the results cannot be used to reliably predict whether any adverse health effect might result. Because carbon tetrachloride leaves the body fairly quickly, these methods are best suited to detecting exposures that have occurred within the last several days.

Has the federal government made recommendations to protect human health?

The EPA has set a limit for carbon tetrachloride in drinking water of 5 parts of carbon tetrachloride per billion parts of water (5 ppb). The EPA has also set limits on how much carbon tetrachloride can be released from an industrial plant into waste water and is preparing to set limits on how much carbon tetrachloride can escape from an industrial plant into outside air.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for carbon tetrachloride in workplace air for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Carbon Tetrachloride (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

COPPER

CAS # 7440-50-8

Division of Toxicology ToxFAQs™ September 2002

This fact sheet answers the most frequently asked health questions (FAQs) about copper. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Copper is a reddish metal that occurs naturally in the environment. It also occurs naturally in plants and animals. Low levels of copper are essential for maintaining good health. High levels can cause harmful effects such as irritation of the nose, mouth and eyes, vomiting, diarrhea, stomach crumps, and nausea. Copper has been found in at least 884 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is copper?

Copper is a reddish metal that occurs naturally in rocks, soil, water, and air. Copper also occurs naturally in plants and animals.

Metallic copper can be easily molded or shaped. Metallic copper can be found in the U.S. penny, electrical wiring, and some water pipes. Metallic copper is also found in mixtures (called alloys) with other metals such as brass and bronze. Copper is also found as part of other compounds forming salts. Copper salts occur naturally, but are also manufactured. The most common copper salt is copper sulfate. Most copper compounds are blue-green in color. Copper compounds are commonly used in agriculture to treat plant diseases like mildew, for water treatment and, as preservatives for wood, leather, and fabrics.

What happens to copper when it enters the environment?

❑ Copper can enter the environment from the mining of copper and other metals and from factories that make or use metallic copper or copper compounds.

❑ It can also enter the environment through domestic waste water, combustion of fossil fuels and wastes, wood production, phosphate fertilizer production, and natural sources (e.g., windblown dust from soils, volcanoes, decaying vegetation, forest fires, and sea spray).

❑ Copper in soil strongly attaches to organic material and minerals.

❑ Copper that dissolves in water becomes rapidly bound to particles suspended in the water.

❑ Copper does not typically enter groundwater.

❑ Copper carried by particles emitted from smelters and ore processing plants is carried back to the ground by gravity or in rain or snow.

❑ Copper does not break down in the environment.

How might I be exposed to copper?

❑ Breathing air, drinking water, eating food, and by skin contact with soil, water, or other copper-containing substances.

❑ Some copper in the environment can be taken up by plants and animals.

❑ Higher exposure may occur if your water is corrosive and you have copper plumbing and brass water fixtures. ❑ You may be exposed to higher amounts of copper if you drink water or swim in lakes or reservoirs recently treated with copper to control algae or receive cooling water from a power plant that may have high amounts of dissolved copper.

❑ Using some garden products (e.g., fungicides) to control plant diseases.

❑ Living near bronze and brass production facilities may expose you to higher copper levels in soil.

❑ You may breathe copper-containing dust or have skin contact if you work in the industry of mining copper or

processing the ore. You may breathe high levels if you grind or weld copper metal.

How can copper affect my health?

Copper is essential for good health, but high amounts can be harmful. Long-term exposure to copper dust can irritate your nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea.

Drinking water with higher than normal levels of copper may cause vomiting, diarrhea, stomach cramps, and nausea. Intentionally high intakes of copper can cause liver and kidney damage and even death.

How likely is copper to cause cancer?

We do not know whether copper can cause cancer in humans. The EPA has determined that copper is not classifiable as to carcinogenicity.

How can copper affect children?

Exposure to high levels of copper will result in the same type of effects in children and adults. Studies in animals suggest that the young children may have more severe effects than adults; we do not know if this would also be true in humans. There is a very small percentage of infants and children who are unusually sensitive to copper.

We do not know if copper can cause birth defects or other developmental effects in humans. Studies in animals suggest that ingestion of high levels of copper may cause a decrease in fetal growth.

How can families reduce the risk of exposure to copper?

❑ The greatest potential source of copper exposure is through drinking water, especially in water that is first drawn in the morning after sitting in copper pipes and brass faucets overnight.

❑ To reduce exposure, run the water for at least 15-30 seconds before using it.

❑ If you are exposed to copper at work, you may carry copper home on your skin, clothes, or tools. You can avoid this by showering, and changing clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to copper?

Copper is normally found in all tissues of the body, blood, urine, feces, hair, and nails. High levels of copper in these samples can show that you have been exposed to higher than normal levels of copper. Tests to measure copper levels in the body are not routinely available at the doctor's office because they require special equipment. These tests cannot tell the extent of exposure or whether you will experience harmful effects.

Has the federal government made recommendations to protect human health?

The EPA has determined that drinking water should not contain more than 1.3 milligrams of copper per liter of water (1.3 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.1 mg per cubic meter (0.1 mg/m^3) of copper fumes (vapor generated from heating copper) and 1 mg/m^3 of copper dusts (fine metallic copper particles) and mists (aerosol of soluble copper) in workroom air during an 8-hour work shift, 40-hour workweek.

The Food and Nutrition Board of the Institute of Medicine recommends dietary allowances (RDAs) of 340 micrograms (340 µg) of copper per day for children aged 1-3 years, 440 µg/day for children aged 4-8 years, 700 µg/day for children aged 9-13 years, 890 µg/day for children aged 14-18 years, and 900 µg/day for adults.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Copper (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

DDT, DDE, AND DDD

CAS # 50-29-3, 72-55-9, 72-54-8

Division of Toxicology ToxFAQs™ **September 2002**

This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 441 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

❑ DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.

❑ DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.

❑ DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.

❑ They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.

❑ Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.

❑ DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

How might I be exposed to DDT, DDE, and DDD?

❑ Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.

❑ Eating contaminated imported foods from countries that still allow the use of DDT to control pests.

❑ Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.

❑ Infants fed on breast milk from mothers who have been exposed.

❑ Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months.

A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to

breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies.
In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer.
The Department of Health and Human Services (DHHS) determined that DDT may reasonable be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.
There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.
Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans. A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT,DDE, and DDE?

❑ Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
❑ Cooking will reduce the amount of DDT in fish.
❑ Washing fruit and vegetables will remove most DDT from their surface.
❑ Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m^3) in the workplace for an 8-hour shift, 40-hour workweek.
The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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FUEL OILS

CAS # 8008-20-6, 70892-10-3, 68476-30-2, 68476-34-6, 68476-31-3

This fact sheet answers the most frequently asked health questions (FAQs) about fuel oils. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Fuel oils are liquid mixtures produced from petroleum, and their use mostly involves burning them as fuels. Drinking or breathing fuel oils may cause nausea or nervous system effects. However, exposure under normal use conditions is not likely to be harmful. Fuel oils have been found in at least 26 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are fuel oils?

(Pronounced fyo͞o′əl oilz)

Fuel oils are a variety of yellowish to light brown liquid mixtures that come from crude petroleum. Some chemicals found in fuel oils may evaporate easily, while others may more easily dissolve in water.

Fuel oils are produced by different petroleum refining processes, depending on their intended uses. Fuel oils may be used as fuel for engines, lamps, heaters, furnaces, and stoves, or as solvents.

Some commonly found fuel oils include kerosene, diesel fuel, jet fuel, range oil, and home heating oil. These fuel oils differ from one another by their hydrocarbon compositions, boiling point ranges, chemical additives, and uses.

What happens to fuel oils when they enter the environment?

- Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.
- Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.
- Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.
- Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.
- Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

- Using a home kerosene heater or stove, or using fuel oils at work.
- Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.
- Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.
- Touching soil contaminated with fuel oils.
- Using fuel oils to wash paint or grease from skin or equipment.

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene

stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, lightheadedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

Is there a medical test to show whether I've been exposed to fuel oils?

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m^3) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- ❏ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- ❏ When lead is released to the air, it may travel long distances before settling to the ground.
- ❏ Once lead falls onto soil, it usually sticks to soil particles.
- ❏ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- ❏ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- ❏ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- ❏ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- ❏ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❏ Avoid exposure to sources of lead.

❏ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❏ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❏ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❏ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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MERCURY
CAS # 7439-97-6

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ **February 2001**

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❑ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❑ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❑ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❑ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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TRICHLOROETHYLENE

CAS # 79-01-6

Division of Toxicology ToxFAQs™ **July 2003**

This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

What happens to trichloroethylene when it enters the environment?

- Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.
- Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.
- Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.
- Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- Trichloroethylene does not build up significantly in plants and animals.

How might I be exposed to trichloroethylene?

- Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.
- Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.
- Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.
- Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

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Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is "probably carcinogenic to humans."

Is there a medical test to show whether I've been exposed to trichloroethylene?

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 100 parts of trichloroethylene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: The ability of a substance to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or gas.
Milligram (mg): One thousandth of a gram.
Nonflammable: Will not burn.
ppm: Parts per million.
Sediment: Mud and debris that have settled to the bottom of a body of water.
Solvent: A chemical that dissolves other substances.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Trichloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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TETRACHLOROETHYLENE
CAS # 127-18-4

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1997**

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is tetrachloroethylene?

(Pronounced tĕt′rə-klôr′ ō-ĕth′ə-lēn′)

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

What happens to tetrachloroethylene when it enters the environment?

- Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- It does not appear to collect in fish or other animals that live in water.

How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it.

How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethyl-

ene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

Is there a medical test to show whether I've been exposed to tetrachloroethylene?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be performed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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VINYL CHLORIDE

CAS # 75-01-4

Division of Toxicology and Environmental Medicine ToxFAQs™ **July 2006**

This fact sheet answers the most frequently asked health questions (FAQs) about vinyl chloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to vinyl chloride occurs mainly in the workplace. Breathing high levels of vinyl chloride for short periods of time can cause dizziness, sleepiness, unconsciousness, and at extremely high levels can cause death. Breathing vinyl chloride for long periods of time can result in permanent liver damage, immune reactions, nerve damage, and liver cancer. This substance has been found in at least 616 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is vinyl chloride?

Vinyl chloride is a colorless gas. It burns easily and it is not stable at high temperatures. It has a mild, sweet odor. It is a manufactured substance that does not occur naturally. It can be formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Vinyl chloride is also known as chloroethene, chloroethylene, and ethylene monochloride.

What happens to vinyl chloride when it enters the environment?

❑ Liquid vinyl chloride evaporates easily. Vinyl chloride in water or soil evaporates rapidly if it is near the surface.
❑ Vinyl chloride in the air breaks down in a few days to other substances, some of which can be harmful.
❑ Small amounts of vinyl chloride can dissolve in water.
❑ Vinyl chloride is unlikely to build up in plants or animals that you might eat.

How might I be exposed to vinyl chloride?

❑ Breathing vinyl chloride that has been released from plastics industries, hazardous waste sites, and landfills.
❑ Breathing vinyl chloride in air or during contact with your skin or eyes in the workplace.
❑ Drinking water from contaminated wells.

How can vinyl chloride affect my health?

Breathing high levels of vinyl chloride can cause you to feel dizzy or sleepy. Breathing very high levels can cause you to pass out, and breathing extremely high levels can cause death.

Some people who have breathed vinyl chloride for several years have changes in the structure of their livers. People are more likely to develop these changes if they breathe high levels of vinyl chloride. Some people who work with vinyl chloride have nerve damage and develop immune reactions. The lowest levels that produce liver changes, nerve damage, and immune reaction in people are not known. Some workers exposed to very high levels of vinyl chloride have problems with the blood flow in their hands. Their fingers turn white and hurt when they go into the cold.

The effects of drinking high levels of vinyl chloride are unknown. If you spill vinyl chloride on your skin, it will cause numbness, redness, and blisters.

Animal studies have shown that long-term exposure to vinyl chloride can damage the sperm and testes.

How likely is vinyl chloride to cause cancer?

The U.S. Department of Health and Human Services has determined that vinyl chloride is a known carcinogen. Studies in workers who have breathed vinyl chloride over many years showed an increased risk of liver, brain, lung cancer, and some cancers of the blood have also been observed in workers.

How can vinyl chloride affect children?

It has not been proven that vinyl chloride causes birth defects in humans, but studies in animals suggest that vinyl chloride might affect growth and development. Animal studies also suggest that infants and young children might be more susceptible than adults to vinyl chloride-induced cancer.

How can families reduce the risk of exposure to vinyl chloride?

Tobacco smoke contains low levels of vinyl chloride, so limiting your family's exposure to cigarette or cigar smoke may help reduce their exposure to vinyl chloride.

Is there a medical test to show whether I've been exposed to vinyl chloride?

The results of several tests can sometimes show if you have been exposed to vinyl chloride. Vinyl chloride can be measured in your breath, but the test must be done shortly after exposure. This is not helpful for measuring very low levels of vinyl chloride.

The amount of the major breakdown product of vinyl chloride, thiodiglycolic acid, in the urine may give some information about exposure. However, this test must be done shortly after exposure and does not reliably indicate the level of exposure.

Has the federal government made recommendations to protect human health?

Vinyl chloride is regulated in drinking water, food, and air. The EPA requires that the amount of vinyl chloride in drinking water not exceed 0.002 milligrams per liter (mg/L) of water.

The Occupational Safety and Health Administration (OSHA) has set a limit of 1 part vinyl chloride per 1 million parts of air (1 ppm) in the workplace.

The Food and Drug Administration (FDA) regulates the vinyl chloride content of various plastics. These include plastics that carry liquids and plastics that contact food. The limits for vinyl chloride content vary depending on the nature of the plastic and its use.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Toxicological Profile for Vinyl Chloride (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ZINC
CAS # 7440-66-6

Division of Toxicology ToxFAQs™ **August 2005**

This fact sheet answers the most frequently asked health questions (FAQs) about zinc. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Zinc is a naturally occurring element. Exposure to high levels of zinc occurs mostly from eating food, drinking water, or breathing workplace air that is contaminated. Low levels of zinc are essential for maintaining good health. Exposure to large amounts of zinc can be harmful. It can cause stomach cramps, anemia, and changes in cholesterol levels. Zinc has been found in at least 985 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is zinc?

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Pure zinc is a bluish-white shiny metal.

Zinc has many commercial uses as coatings to prevent rust, in dry cell batteries, and mixed with other metals to make alloys like brass, and bronze. A zinc and copper alloy is used to make pennies in the United States.

Zinc combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dyes, wood preservatives, and ointments.

What happens to zinc when it enters the environment?

❏ Some is released into the environment by natural processes, but most comes from human activities like mining, steel production, coal burning, and burning of waste.
❏ It attaches to soil, sediments, and dust particles in the air.
❏ Rain and snow remove zinc dust particles from the air.
❏ Depending on the type of soil, some zinc compounds can move into the groundwater and into lakes, streams, and rivers.
❏ Most of the zinc in soil stays bound to soil particles and does not dissolve in water.
❏ It builds up in fish and other organisms, but it does not build up in plants.

How might I be exposed to zinc?

❏ Ingesting small amounts present in your food and water.
❏ Drinking contaminated water or a beverage that has been stored in metal containers or flows through pipes that have been coated with zinc to resist rust.
❏ Eating too many dietary supplements that contain zinc.
❏ Working on any of the following jobs: construction, painting, automobile mechanics, mining, smelting, and welding; manufacture of brass, bronze, or other zinc-containing alloys; manufacture of galvanized metals; and manufacture of machine parts, rubber, paint, linoleum, oilcloths, batteries, some kind of glass, ceramics, and dyes.

How can zinc affect my health?

Zinc is an essential element in our diet. Too little zinc can cause problems, but too much zinc is also harmful.

Harmful effects generally begin at levels 10-15 times higher than the amount needed for good health. Large doses taken by mouth even for a short time can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia and decrease the levels of your good cholesterol. We do not know if high levels of zinc affect reproduction in humans. Rats that were fed large amounts of zinc became infertile.

Inhaling large amounts of zinc (as dusts or fumes) can cause a specific short-term disease called metal fume fever. We do not know the long-term effects of breathing high levels of zinc.

Putting low levels of zinc acetate and zinc chloride on the skin of rabbits, guinea pigs, and mice caused skin irritation. Skin irritation will probably occur in people.

How likely is zinc to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified zinc for carcinogenicity. Based on incomplete information from human and animal studies, the EPA has determined that zinc is not classifiable as to its human carcinogenicity.

How can zinc affect children?

Zinc is essential for proper growth and development of young children. It is likely that children exposed to very high levels of zinc will have similar effects as adults. We do not know whether children are more susceptible to the effects of excessive intake of zinc than the adults.

We do not know if excess zinc can cause developmental effects in humans. Animal studies have found decreased weight in the offspring of animals that ingested very high amounts of zinc.

How can families reduce the risks of exposure to zinc?

❑ Children living near waste sites that contain zinc may be exposed to higher levels of zinc through breathing contaminated air, drinking contaminated drinking water, touching or eating contaminated soil.

❑ Discourage your children from eating soil or putting their hands in their mouths and teach them to wash their hands frequently and before eating.

❑ If you use medicines or vitamin supplements containing zinc, make sure you use them appropriately and keep them out of the reach of children.

Is there a medical test to determine whether I've been exposed to zinc?

There are tests available to measure zinc in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. High levels of zinc in the feces can mean high recent zinc exposure. High levels of zinc in the blood can mean high zinc consumption and/or high exposure. Tests to measure zinc in hair may provide information on long-term zinc exposure; however, the relationship between levels in your hair and the amount of zinc you were exposed to is not clear.

Has the federal government made recommendations to protect human health?

The EPA recommends that drinking water should contain no more than 5 milligrams per liter of water (5 mg/L) because of taste. The EPA requires that any release of 1,000 pounds (or in some cases 5,000 pounds) into the environment be reported to the agency.

To protect workers, the Occupational Safety and Health Administration (OSHA) has set an average limit of 1 mg/m^3 for zinc chloride fumes and 5 mg/m^3 for zinc oxide (dusts and fumes) in workplace air during an 8-hour workday, 40-hour workweek.

Similarly, the National Institute for Occupational Safety and Health (NIOSH) has set the same standards for up to a 10-hour workday over a 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Zinc (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATTACHMENT B

REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: _____ Project Name/Number: _____

Report Date: _____ Project Manager Name: _____

Summary of any violations of procedures occurring that week:

_____

_____

_____

Summary of any job related injuries, illnesses, or near misses that week:

_____

_____

_____

_____

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

_____

_____

_____

Comments:

_____

_____

_____

Name: _____ Company: _____

Signature: _____ Title: _____

INCIDENT REPORT FORM

Date of Report: _____

Injured: _____

Employer: _____

Site: _____ Site Location: _____

Report Prepared By: _____ _____
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

___Injury	___ Illness	___ Near Miss
__ Property Damage	___ Fire	___ Chemical Exposure
__ On-site Equipment	___ Motor Vehicle	___ Electrical
__ Mechanical	___ Spill	___ Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of Accident/Incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

WITNESS TO ACCIDENT/INCIDENT:

Name:	_____	Company:	_____
Address:	_____	Address:	_____
Phone No.:	_____	Phone No.:	_____
Name:	_____	Company:	_____
Address:	_____	Address:	_____
Phone No.:	_____	Phone No.:	_____

INJURED - ILL:

Name: _____ SSN: _____

Address: _____ Age: _____

Length of Service: _____ Time on Present Job: _____

Time/Classification: _____

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: _____

NATURE OF INJURY OR ILLNESS: _____

_____

_____

_____

CLASSIFICATION OF INJURY:

__ Abrasions	_____ Dislocations	____ Punctures
__ Bites	_____ Faint/Dizziness	____ Radiation Burns
__ Blisters	_____ Fractures	____ Respiratory Allergy
__ Bruises	_____ Frostbite	____ Sprains
__ Chemical Burns	_____ Heat Burns	____ Toxic Resp. Exposure
__ Cold Exposure	_____ Heat Exhaustion	____ Toxic Ingestion
__ Concussion	_____ Heat Stroke	____ Dermal Allergy
__ Lacerations		

Part of Body Affected: _____

Degree of Disability: _____

Date Medical Care was Received: _____

Where Medical Care was Received: _____

Address (if off-site): _____

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: _____

_____

Cost of Damage: $ _____

ACCIDENT/INCIDENT LOCATION: _____

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

_____

_____

_____

_____

Was weather a factor?:_____

_____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

_____

_____

_____

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

_____

_____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

_____

_____

Modifications:

_____

Was injured using required equipment?:

_____

_____

If not, how did actual equipment use differ from plan?:

_____

_____

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?

_____

_____

_____

_____

_____

ACCIDENT/INCIDENT REPORT REVIEWED BY:

_____ _____

SSO Name Printed SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

_____ _____

Signature Title

_____ _____

Signature Title

_____ _____

Signature Title

ACCIDENT/INCIDENT FOLLOW-UP: Date: _____

Outcome of accident/incident: _____

_____

_____

_____

Physician's recommendations: _____

_____

_____

_____

Date injured returned to work: _____

Follow-up performed by:

_____ _____

Signature Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT C

EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATHE!

Hand gripping throat

LEAVE AREA IMMEDIATELY, NO DEBATE!

(No Picture) Grip partner's wrist or place both hands around waist

NEED ASSISTANCE!

Hands on top of head

OKAY! – I'M ALL RIGHT!

- I UNDERSTAND!

Thumbs up

NO! - NEGATIVE!

Thumbs down

APPENDIX I
COMMUNITY AIR MONITORING PLAN

BROOKFIELD COMMONS PHASE 3
159 S. LEXINGTON AVENUE
WHITE PLAINS, NEW YORK

Community Air Monitoring Plan

NYSDEC BCP Site No: C360246
AKRF Project Number: 210122

Prepared For:

NYSDEC
New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 12th Floor
Albany, New York 12233

Prepared On Behalf Of:

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1350 Broadway, Suite #1700
New York, NY 10018

Prepared by:

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440 Park Avenue South, 7th Floor
New York, New York 10016
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OCTOBER 2024

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Table 1 – Work Zone Air Monitoring Action Levels

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Attachment A – Special Requirements CAMP

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been developed for the implementation of a Remedial Action Work Plan (RAWP) by AKRF, Inc. (AKRF) personnel and its subcontractors at the property located at 159 South Lexington Avenue in White Plains, NY, hereafter referred to as the "Site." The Site is identified by the City of White Plains as Tax Block 7, Part of Lot 1, Section 125.83.

The Site currently consists of an approximately 1.284-acre parcel developed with a vacant nine-story apartment building with a basement and surrounding lawns and walkways, which are part of a multi-story apartment building complex identified as Brookfield Commons or Winbrook. The Site location and topography of the Site and surrounding area are shown on Figure 1 and the Site layout is shown on Figure 2. The Site is bounded to the north and east by new Brookfield Commons multi-story residential apartment building, known as "Phase 2 or The Overture"; to the south by a parking lot associated with the Winbrook complex, followed by a vacant lot and various commercial uses and former filling stations; and to the west by South Lexington Avenue, followed by various commercial use. The area surrounding the Site generally consists of mixed-use commercial, residential, and institutional properties.

2.0 AIR MONITORING PROGRAM

The purpose of the air monitoring program is to identify any exposure of the field personnel and the community to potential environmental hazards during demolition and in the soil and groundwater. Air Monitoring will be conducted in accordance with the New York State Department of Health (NYSDOH) and New York State Department of Environmental Conservation (NYSDEC) guidance. Results of the air monitoring will be used to determine the appropriate response action, if needed. Field personnel will be trained in the proper operation of all field instruments at the start of the field program. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, the project manager will be contacted immediately to obtain a replacement instrument and arrange for repairs.

2.1 Work Zone Air Monitoring

2.1.1 Volatile Organic Compound (VOC) Monitoring

Continuous monitoring for VOCs will be conducted using roving hand-held equipment during demolition and all ground-intrusive activities, including soil boring advancement and groundwater monitoring well installation. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a photoionization detector (PID) equipped with a 10.6 electron Volt (eV) lamp capable of calculating 15-minute running average concentrations. More frequent intervals of monitoring will be conducted if required as determined by the SSO. All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings will also be recorded.

2.1.2 Airborne Particulate Monitoring

A DustTrak® or equivalent would be used to measure real-time concentrations of total particulates 10 micrometers or less (PM10). Measurements for particulates will be taken prior to commencement of the demolition work and during soil disturbance. The action levels listed in Table 1 are based on 15-minute averages of the monitoring data. The measurements will be made at the breathing height of the workers and as close to their location as practicable. The Site Safety Officer (SSO) will set up the equipment and confirm that it is working properly. His/her qualified designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish background levels. The final measurement for the day will be performed after the end of work. The action levels for particulates and VOCs and required responses are listed in Table 1.

Table 1
Work Zone Action Levels and Required Responses

Monitoring	Action Level[1]	Response Action
Particulate	Less than 0.125 mg/m^3 above background	**Level D or D-Modified** (Requires coveralls and steel toe boots) (As applicable: Chemical resistant gloves, chemical resistant boot covers, hard hat, safety glasses, face shield, or escape mask)
	Between 0.125 mg/m^3 and 0.150 mg/m^3 above background	**Level C** (Requires full face or half face respirator, hooded chemical resistant two piece Tyvek suit or overalls, chemical resistant inner and outer gloves, chemical resistant boot covers, steel toe and shank boots) (As applicable: hard hat, face shield, or escape mask) Apply dust suppression measures. Resume work or upgrade.
	Greater than 0.150 mg/m^3 above background	Stop work. Apply additional dust suppression measures. Resume work when less than 0.150 mg/m^3 and maintain Level C.
Volatile Organic Compound (VOC)	Less than 5 ppm in breathing zone	**Level D or D-Modified**
	Between 5 and 50 ppm	**Level C**
	More than 50 ppm	Stop work. Resume work when source of vapors is abated and readings are less than 50 ppm above background.

Notes:
[1] - 15-minute time-weighted average
parts per million = ppm
milligrams per cubic meter = mg/m^3

2.2 Perimeter Community Air Monitoring

Fixed air monitoring stations will be set up at the upwind and downwind perimeters of the exclusion zone during demolition and all ground intrusive activities and will continuously log VOC and particulate levels. Each fixed monitoring station will be fully enclosed and equipped with the following:

- A PID equipped with a 10.6 eV lamp capable of calculating 15-minute running average VOC concentrations;
- A TSI 8530 DustTrak II or equivalent dust monitor capable of measuring the concentration of airborne respirable particulates less than 10 micrometers in size (PM10) and calculating 15-minute running average particulate concentrations; and
- A Netronix™ Thiamus™ ICU-820 or equivalent Global System for Mobile Communication (GSM)/Global Positioning System (GPS) device capable of recording air monitoring and location data.
- Each monitoring station will be capable of sending e-mail alerts to the SSO to indicate an exceedance of action levels. Additionally, the SSO will conduct an inspection of the monitoring stations on at least an hourly basis. Upon completion of Site activities, all air monitoring data will be available to download via the iEnvironet® website. All air monitoring data recorded at the fixed monitoring stations will be available for NYSDOH and NYSDEC review and will be included in the Final Engineering Report (FER).

2.2.1 Perimeter Community Air Monitoring Action Levels

VOC Action Levels

The following actions will be taken based on organic vapor levels measured:

If total organic vapor levels exceed 5 parts per million (ppm) above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background, but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average.

If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

Particulate Action Levels

The following actions will be taken based on particulate levels measured:

If the downwind particulate concentrations are greater than 0.1 milligrams per cubic meter (mg/m^3) above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of site activities. In such instances, dust suppression measures will be implemented and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 0.15 mg/m^3 above the background (upwind concentration) and provided that no visible dust is migrating from the work area.

If particulate levels persist at 0.15 mg/m^3 above the background, work must be stopped until dust suppression measures bring particulate levels to below 0.15 mg/m^3 above background.

2.3 Major Vapor Emission Response Plan

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work Site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or vapor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Sustained organic vapor levels approaching 1 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any time period.

Upon activation, the following activities shall be undertaken as part of the Major Vapor Emission Response Plan:

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and
- All Emergency contacts will go into effect as appropriate.
- All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

2.4 Special Requirements CAMP

Since work areas at the Site may be within 20 feet of potentially exposed populations, additional Site-specific CAMP air monitoring provisions will be implemented (as necessary) to ensure that the surrounding community is not exposed to Site-related contaminants during demolition and construction activities. The additional CAMP provisions include the following:

- Use of engineering controls such as vapor/dust barriers or special ventilation devices will be considered;
- Special consideration will be given to implementing planned activities when potentially exposed populations are at a minimum;
- If total VOC concentrations near the outside walls or next to intake vents of the west-adjacent occupied structures exceed 1 ppm, air monitoring should occur within the occupied structures; and
- If total particulate concentrations near the outside walls or next to intake vents of the west-adjacent occupied structures exceed 0.15 mg/m^3, work activities should be suspended until controls are implemented.

Additional information regarding the Special Requirements CAMP is provided in Attachment A.

2.6 Reporting

CAMP summary reports will be prepared and submitted to NYSDEC and NYSDOH for review as part of the daily reports. In the event there is an action level exceedance or complaint, NYSDEC and NYSDOH will be notified within 24 hours (same day to the extent possible) of the exceedance or complaint. The notification will include a description of the exceedance or complaint, the cause of the exceedance, and any corrective actions taken. All recorded CAMP data will be included in the FER.

ATTACHMENT A

SPECIAL REQUIREMENTS CAMP

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX J
QUALITY ASSURANCE PROJECT PLAN

BROOKFIELD COMMONS PHASE 3
159 S. LEXINGTON AVENUE
WHITE PLAINS, NEW YORK

Quality Assurance Project Plan

NYSDEC BCP Site Number: C360246
AKRF Project Number: 210122

Prepared For:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
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Prepared On Behalf Of:

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Prepared by:

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212-696-0670

NOVEMBER 2024

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Attachment A – Resumes for Remedial Engineer, QA/QC Officer, Project Manager, Field Team Leader, Site Safety Officers, Laboratory QA/QC Officer, and Third-Party Data Validator

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Remedial Action Work Plan (RAWP) for the site located at 159 S. Lexington Avenue in White Plains, NY, hereafter referred to as the "Site." The Site is identified by the City of White Plains as Tax Block 7, Part of Lot 1, Section 125.83. A Site location map is provided on Figure 1. The objective of this QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental investigative and sampling activities conducted under the New York State Department of Environmental Conservation (NYSDEC) oversight in the Brownfield Cleanup Program (BCP) (BCP Site No. C360246). Adherence to this QAPP will ensure that defensible data will be obtained during environmental work at the Site.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel, and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 Remedial Engineer

Ms. Rebecca Kinal, P.E. will serve as the Remedial Engineer (RE) for the RAWP. As the RE, Ms. Kinal will oversee the design and implementation of all Institutional Controls (ICs) and Engineering Controls (ECs) at the Site. Ms. Kinal's resume is included in Attachment A.

2.2 QA/QC Officer

Mr. Marc Godick, LEP, will serve as the quality assurance/quality control officer (QA/QC) and will be responsible for adherence to the QAPP including QA/QC. The project director will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic Site visits to assess implementation of the procedures. The project director will also be responsible for reviewing the Data Usability Summary Reports (DUSRs) prepared by a third-party data validator for soil and soil vapor/indoor air/ambient air analytical results. Mr. Godick's resume is included in Attachment A.

2.3 Project Manager

The project manager will be responsible for directing and coordinating all elements of the RAWP. The project manager will prepare reports and participate in meetings with the Site owner/Applicant, and/or the NYSDEC. Colleen Griffith will serve as the project manager for the RAWP. Ms. Griffiths' resume is included in Attachment A.

2.4 Field Team Leader, Field Technician, Site Safety Officer (SSO), and Alternates

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and Health and Safety Plan (HASP), included as Appendix G of the RAWP. The field team leader will also act as the field technician and Site Safety Officer (SSO) and will report to the project manager or project manager alternate on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified and responsible person able to act professionally and promptly during environmental work at the Site. Gregory Baird will be the field team leader. The alternate SSOs will be Micheal Iodice and Brian Quinn. Mr. Baird's, Mr. Iodice's, and Mr. Quinn's resumes are provided in Attachment A.

2.5 Laboratory Quality Assurance/Quality Control (QA/QC) Officer

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. The QA/QC officer will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued and will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be Carl Ambruster of Eurofins Environment Testing Northeast LLC (Eurofins), the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory being employed for all environmental sampling at the Site. Mr. Ambruster's resume is included in Attachment A.

2.6 Thirty-Party Data Validator

The third-party data validator will be responsible for reviewing the final data packages for soil, groundwater, and soil vapor and preparing a DUSR that will provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the laboratory analyses for the investigation. The third-party data validator will be Lori Beyer of L.A.B. Validation Corporation of East Northport, New York. Ms. Beyer's resume is included in Attachment A.

3.0 DATA QUALITY USABILITY OBJECTIVES

The objectives for the sampling include:

- During implementation of the RAWP, soil, groundwater, and soil vapor samples will be collected from soil borings, permanent groundwater monitoring wells, and temporary soil vapor points, respectively.
- Samples will be collected to delineate the extent of on-site contamination and identify contamination remaining in-place following completion of the Remedial Action.

Who will use the data?

- The collected data will be used by NYSDEC, NYSDOH, the Volunteer, and AKRF as part of the Site's enrollment in the BCP.

What types of data are needed?

- Soil samples will be collected from post-excavation endpoint locations distributed across the Site. Samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by EPA Method 8260, TCL semi-volatile organic compound SVOCs by EPA Method 8270, pesticides by EPA Method 8081, PCBs by EPA Method 8082, TAL metals by EPA Method 6000/7000 series, 1,4-dioxane by EPA Method 8270, and PFAS compounds by EPA Method 1633, using Category B deliverables.
- Groundwater samples will be collected from permanent monitoring wells to be installed for post-remedial monitoring and to define the extent of the groundwater treatment area and analyzed for VOCs by EPA Method 8260 using Category B deliverables.
- Soil vapor samples will be analyzed for VOCs by Method TO-15 using Category B deliverables.

How much data are needed?

- Approximately 114 post-excavation endpoint soil samples will be collected at the bottom of the Site surface and along the sidewalls.
- It is unknown how many groundwater and soil vapor samples are needed at this time.

Where, when, and how should the data be collected/generated?

- Soil endpoint sample locations are shown on Figure 9 of the RAWP. Soil samples will be collected using decontaminated stainless steel sampling trowel or hand auger, or a dedicated wooden tongue depressor. Soil samples will be placed directly into pre-sterilized, laboratory-issued containers by AKRF personnel and shipped to the laboratory via a courier with chain-of-custody (COC) documentation in accordance with appropriate EPA protocols to a NYSDOH ELAP-certified laboratory.
- Additional monitoring well locations will be provided in a separate Remedial Design Document. Groundwater samples will be collected in accordance with EPA low-flow sampling protocols approximately one to two weeks following monitoring well development. Samples will be collected by AKRF personnel using a submersible bladder pump with HDPE tubing. During sampling, water quality parameters will be recorded on log sheets until the parameters have stabilized within ±10% and turbidity is below 50 nephelometric turbidity units (NTUs). Groundwater samples slated for laboratory analysis will be placed in laboratory-supplied containers and shipped in accordance with appropriate EPA protocols to a NYSDOH ELAP-certified laboratory.

- Soil vapor sampling will be performed in accordance with the guidelines provided in the NYSDOH document entitled, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," (October 2006, revised 2017)." The soil vapor samples will be collected over a 2- or 8-hour time period using a 6-Liter, batch-certified SUMMA® canister equipped with a vacuum gauge and flow regulator set at a maximum rate of 0.2 liter per minute. After two or eight hours, the flow controller valve will be closed, the final vacuum noted, and the canister placed in a shipping carton for delivery to the laboratory.

Who will collect and generate the data?

- AKRF, and any subcontractor, will be responsible for performing the sampling. All samples will be analyzed by Eurofins Edison or Eurofins Burlington (subcontracted by AKRF), NYSDOH-certified laboratories. AKRF will be responsible for collecting, reviewing, assessing, and disseminating validated data. Third-party data validation and the preparation of a DUSR will be prepared by Ms. Lori Beyer of L.A.B. Validation Corporation.

How will the data be reported?

- The data will be reported in the Final Engineering Report (FER), and as EQuIS-compatible electronic data deliverables (EDDs) submitted to NYSDEC.

How will the data be archived?

- All hard-copy data will be maintained at AKRF offices for a minimum of one year. Field logbooks and forms/sampling logs will be scanned and all electronic data will be archived on the AKRF corporate server.

4.0 STANDARD OPERATING PROCEDURES (SOPS)

The following sections describe the SOPs for the remedial activities included in the RAWP. During these activities, safety monitoring will be performed as described in the HASP, included as Appendix E of the RAWP.

4.1 Decontamination of Sampling Equipment

All sampling equipment (augers, drilling rods, split spoon samplers, probe rods, pumps, etc.) will be either dedicated or decontaminated between sampling locations. Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground. The decontamination procedure will be as follows:

1. Scrub using tap water/Alconox® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/Alconox® mixture and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

4.2 Management of Investigation-Derived Waste (IDW)

IDW will be containerized in New York State Department of Transportation (NYSDOT)-approved 55-gallon drums. The drums will be sealed at the end of each work day and labeled with the date, the excavation grid(s), the type of waste (i.e., drill cuttings), and the name and phone number of an AKRF point-of-contact. All IDW exhibiting field evidence of contamination will be disposed of or treated according to applicable local, state, and federal regulations.

5.0 SAMPLING AND LABORATORY PROCEDURES

5.1 Soil Sampling

Soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system.
- Field screen the sample for evidence of contamination (e.g., odors, staining, etc.) using visual and olfactory methods and screen for volatile organic compounds (VOCs) using a photoionization detector (PID) equipped with an 11.7 electron Volt (eV) lamp.
- Collect an aliquot of soil from each proposed sample location, place in laboratory-supplied glassware, label the sample in accordance with Section 5.6.1, and place in an ice-filled cooler for shipment to the laboratory. Samples analyzed for the emerging contaminants, per- and polyfluorinated compounds (PFAS), should be contained in a separate cooler and the sample containers should be labeled with ballpoint pen, not permanent marker.
- A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.
  - stainless steel spoon
  - stainless steel bowl
  - steel hand auger or shovel without any coatings
- Complete the proper chain of custody (COC) paperwork and seal the cooler.
- Record sample location, sample depth, and sample observations (evidence of contamination, PID readings, soil classification, etc.) in field log book and boring log data sheet, if applicable.
- Decontaminate any soil sampling equipment between sample locations as described in Section 4.1 of this QAPP. Standard two-step decontamination using detergent (Alconox) and clean, PFAS-free water will be performed for sampling equipment (when analyzing for PFAS).

5.2 Groundwater Sampling

Groundwater sampling will be conducted according to the following procedures:

- Field screen the sample for evidence of contamination (e.g., odors, staining, etc.) using visual and olfactory methods and screen the well headspace for VOCs using a PID equipped with a 11.7 eV lamp.
- A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.
  - stainless steel inertia pump with high-density polyethylene (HDPE) tubing
  - peristaltic pump equipped with HDPE tubing and silicone tubing
  - stainless steel bailer with stainless steel ball
  - bladder pump with HDPE tubing [a low-density polyethylene (LDPE) bladder will be used as no industry-approved HDPE alternative currently exists]

- Collect the groundwater sample from each proposed sample location in laboratory-supplied glassware, label the sample in accordance with Section 5.6.1, and place in an ice-filled cooler for shipment to the laboratory. Samples analyzed for the emerging contaminants, PFAS, should be contained in a separate cooler and the sample containers should be labeled with ballpoint pen, not permanent marker.
- Complete the proper COC paperwork and seal the cooler.
- Record sample location, sample depth, and sample observations (evidence of contamination, PID readings, free phase liquid, etc.) in field log book and boring log data sheet, if applicable.
- Decontaminate any groundwater sampling equipment between sample locations as described in Section 4.1 of this QAPP. Standard two-step decontamination using detergent (Alconox) and clean, PFAS-free water will be performed for sampling equipment (when analyzing for PFAS).

5.3 Soil Vapor Sampling

Soil vapor sampling will be conducted according to the following procedures:

- Field screen the sample for evidence of contamination (e.g., odors, etc.) using olfactory methods and screen the purged vapors for VOCs using a PID equipped with an 11.7 eV lamp.
- Collect the soil vapor samples from each proposed sample locations in laboratory-supplied SUMMA® canisters, label the sample in accordance with Section 5.6.1, and place in shipment container for shipment to the laboratory.
- Complete the proper COC paperwork and seal the shipment container.
- Record sample location, sample depth, and sample observations (odors, PID readings, etc.) in field log book and boring log data sheet, if applicable.

5.4 Laboratory Methods

Table 1 summarizes the laboratory methods that will be used to analyze field samples and the sample container type, preservation, and applicable holding times. Eurofins of Edison, New Jersey, a NYSDOH ELAP-certified laboratory subcontracted to AKRF, will be used for all chemical analyses in accordance with the Division of Environmental Remediation (DER)-10 2.1(b) and 2.1(f) with Category B Deliverables.

Table 1
Laboratory Analytical Methods for Analysis Groups

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
Soil	TCL VOCs	8260C	Encore sampler (3) or Terracore Sampler (1)	4 °C 0 °C within 24 hrs	48 hours to extract 14 days to analyze
	TCL SVOCs	8270D	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
	TAL Metals and Hexavalent Chromium	6000/7000 Series, 6010C, and 7196A	Glass 8 oz. Jar	4 ºC	6 months holding time; Mercury 28 days holding time; Hexavalent chromium 30 days to extract, 7 days to analyze
	Pesticides	8081B	Glass 8 oz. Jar	4 ºC	14 days to extract 40 days to analyze
	PCBs	8082A	Glass 8 oz. Jar	4 ºC	14 days to extract 40 days to analyze
	1,4-Dioxane	8270D; 0.1 mg/kg RL	Glass 8 oz. Jar	4 ºC	14 days to extract; 40 days to analyze
	PFAS	1633; 0.2 ng/L RL	4 oz. HDPE Plastic Container	≤ 6 ºC,	14 days to extract; 40 days to analyze
Groundwater	VOCs	SW846 8260C	3, 40-ml VOAs	HCl, 4 °C	48 hours to extract; 14 days to analyze
	SVOCs and 1,4-Dioxane	8270D plus Selective Ion Monitoring (SIM); 0.35 µg/L RL	2, 1L Amber Glass	4°C	7 days to extract; 40 days to analyze
	PCBs	SW846 8082A	1L Amber Glass	4°C	7 days to extract; 40 days to analyze
	Pesticides	SW846 8081B	1L Amber Glass	4°C	7 days to extract; 40 days to analyze
	Metals	SW846 6000/7000 series	1, 250 mL, Plastic	HNO3, 4°C	6 months for metals; 28 days for mercury
	PFAS	1633; 0.2 ng/L RL	3, 250mL Polypropylene Bottles	≤ 6 ºC, Trizma	14 days to analyze
Soil Vapor	VOCs	TO-15	6-L SUMMA® Canister	None	14 days

5.5 Quality Control (QC) Sampling

In addition to the laboratory analysis of the soil and groundwater samples, additional analysis will be included for QC measures, as required by the Category B sampling techniques. These samples will include a field blank, trip blank, matrix spike/matrix spike duplicate (MS/MSD), and blind duplicate samples at a frequency of one sample per 20 field samples collected. QC samples will be analyzed for the same parameters as the accompanying samples, with the exception of any trip blanks, which will be analyzed for the VOC list only. Additionally, one equipment blank will be collected during each day of groundwater sampling.

5.6 Sample Handling

5.6.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody (COC) documents, and laboratory reports. All samples will be amended with the collection date at the end of the sample name in a year, month, day (YYYYMMDD) format. Blind duplicate sample nomenclature will consist of the sample type followed by an "X"; MS/MSD samples will be the same as the parent sample name but will be indicated as MS/MSD on the chain of custody; and trip and field blanks will consist of "TB-" and "FB-", respectively, followed by a sequential number of the trip/field blanks collected within the SDG. Special characters, including primes/apostrophes (’), will not be used for sample nomenclature.

5.6.1.1. Import Soil Sampling

In addition to the nomenclature detailed in Section 5.6.1, soil import samples will be identified with "ISP-" and the import sample number in sequential order that the import sample was collected. Table 2 provides examples of the sampling identification scheme for import soil samples.

Table 2
Import Sample Nomenclature

Sample Description	Sample Designation
Import soil sample ISP-01 collected on October 1, 2025	ISP-01_20251001
Blind duplicate of import soil sample ISP-01 collected on October 1, 2025	ISP-X_20251001
Field blank associated with import soil sample ISP-01 collected on October 1, 2025	ISP-01-FB_20251001
Trip blank associated with import soil sample ISP-01 collected on October 1, 2025	ISP-01-TB_20251001

5.6.1.2. Endpoint Soil Sampling and Post-Remedial Groundwater Sampling

In addition to the nomenclature detailed in Section 5.6.1, soil endpoint samples will be identified with "EP-" and the endpoint sample number in sequential order that the endpoint sample was collected, and the depth below grade the sample was collected from in parentheses. Post-remedial groundwater samples will be identified with "PR-MW-" and the monitoring well number. Table 3 provides examples of the sampling identification scheme for the post-excavation endpoint samples.

Table 3
Endpoint and Post-Remedial Groundwater Sample Nomenclature

Sample Description	Sample Designation
Excavation endpoint soil sample EP-01 collected from 15 feet below grade on October 1, 2025	EP-01_15_20251001

Sample Description	Sample Designation
Blind duplicate of excavation endpoint soil sample EP-01 collected from 15 feet below grade on October 1, 2025	EP-X_15_20251001
Second blind duplicate of excavation endpoint soil sample EP-20 collected from 15 feet below grade on October 7, 2025	EP-X2_15_20251007
Trip blank associated with endpoint samples collected on October 7, 2025	EP-TB-01_20251007
Second field blank associated with endpoint samples collected on October 12, 2025	EP-FB-02_20251012
Post-remedial groundwater sample collected from monitoring well MW-01 on December 15, 2025	PMW-01_20251215

5.6.1.3. Waste Classification/Tank Excavation Soil Sampling

In addition to the nomenclature detailed in Section 5.6.1, any confirmatory endpoint samples collected from a previously unknown tank excavation will be identified by the excavation grid area and the cardinal direction of the sidewalls. The sample(s) collected from the bottom of the excavation will be amended with a "B-", followed by the number of bottom samples collected from the excavation in sequential order. Waste classification samples will be amended with "WC-" and the alphanumeric grid identification. Five-point composite samples will be amended with "C-" and grab samples to be analyzed for VOCs will be amended with "G-". Additionally, samples will be amended with the depth the sample was collected in feet below grade in parentheses. The alphanumeric grid is presented on Figure 10 of the RAWP. Table 4 provides examples of the sampling identification scheme for proposed waste classification samples and any hotspot or tank excavation samples.

Table 4
Waste Classification/Tank Excavation Sample Nomenclature

Sample Description	Sample Designation
Waste classification composite sample collected between grade and 8 feet below grade in Grid A1 on April 1, 2025	WC-A1-C_0-8_ 20250401
Waste classification grab sample collected between grade and 8 feet below grade in Grid A1 on April 1, 2025	WC-A1-G_0-8_ 20250401
Soil sample collected from the southern sidewall of the first tank grave encountered at 8 feet below grade on April 1, 2025	UST-1S_8_20250401
Blind duplicate sample collected from the southern sidewall of the first tank grave encountered at 8 feet below grade on April 1, 2025	UST-X_8_20250401

Soil sample collected from the northern sidewall of the second tank grave encountered at 4 feet below grade on April 1, 2025	UST-2N_4_20250401
Soil sample collected from the bottom of the second tank grave at 15 feet below grade on April 1, 2025	UST-2B_15_20250401

5.6.1.4. Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification, including Site name, BCP Site number, Site address
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight in a secured area to await shipment to the laboratory. All samples will be shipped to the laboratory within 48 hours of sampling. At the start and end of each workday, field personnel will add ice to the cooler(s) as needed to confirm that all sample/cooler temperatures are maintained at <6° Celsius.

The samples will be prepared for shipment by placing each sample in laboratory-supplied glassware, then wrapping each container in bubble wrap to prevent breakage, and adding freezer packs and/or fresh ice in sealable plastic bags. The COC form will be properly completed by the sampler in ink, and all sample shipment transactions will be documented with signatures, and the date and time of custody transfer. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the samples remain under strict COC protocol.

5.6.1.5. Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

5.7 Field Instrumentation

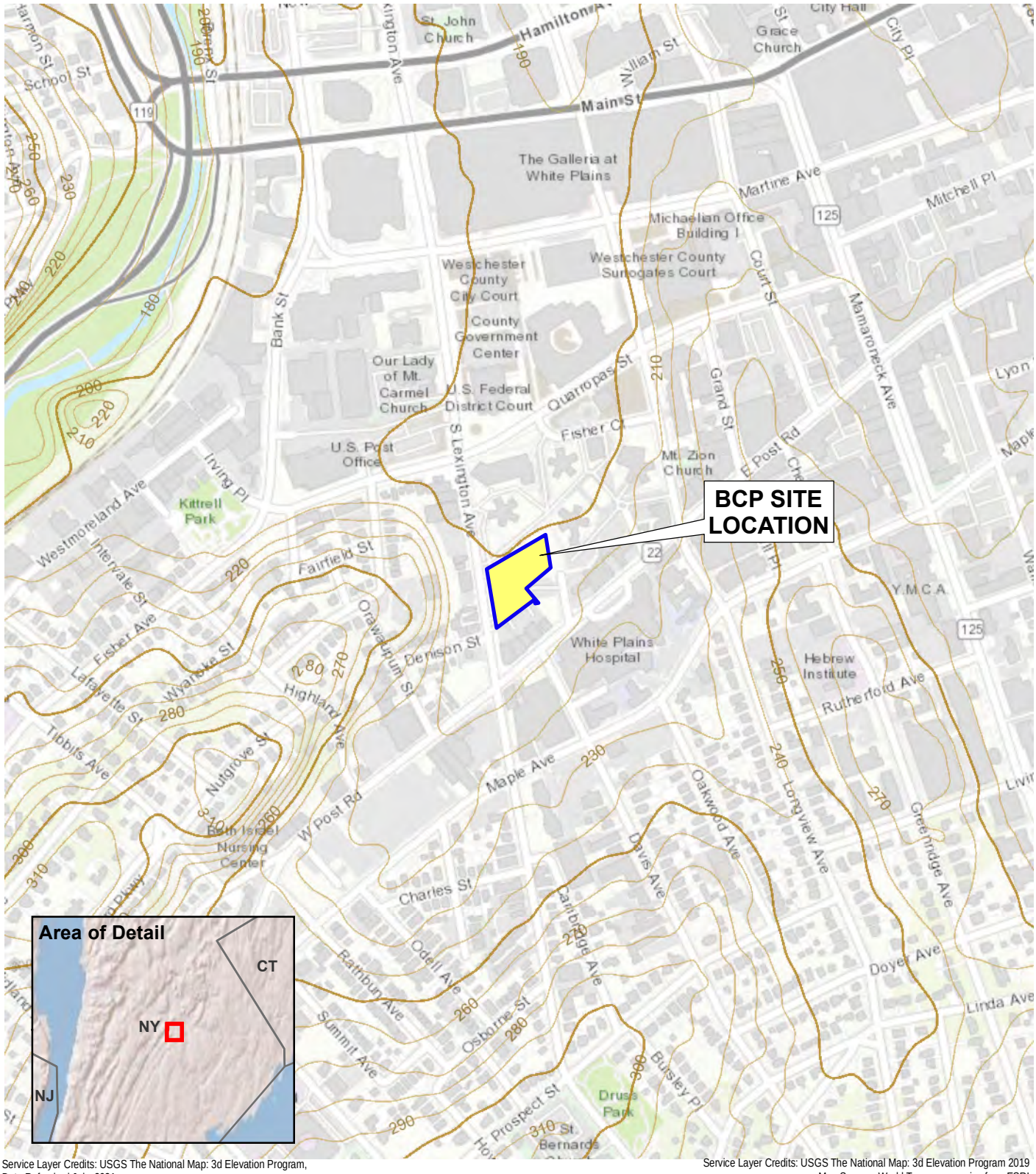
Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing

proper operation, maintenance, and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be equipped with a 11.7 eV lamp and will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas in accordance with the manufacturer's standards.

5.8 Quality Assurance (QA)

All sample laboratory analytical data will be reviewed by a third-party validator and a DUSR will be prepared to document the usability and validity of the data. The Final Engineering Report (FER) will include a detailed description of endpoint sampling activities, data summary tables, concentration map showing endpoint sample locations and concentrations, DUSR, and laboratory reports.

FIGURES



Service Layer Credits: USGS The National Map: 3d Elevation Program, Data Refreshed July, 2021

Service Layer Credits: USGS The National Map: 3d Elevation Program 2019
Map Source: World Topo map service from ESRI

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SCALE IN FEET

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AKRF
34 South Broadway #401
White Plains, NY 10601

Brookfield Commons Phase 3
White Plains, New York

BCP SITE LOCATION

DATE
9/27/2024

PROJECT NO.
210122

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©2024 AKRF W:\Projects\210122 - SAR BROOKFIELD COMMONS PHASE 3\Technical\GIS and Graphics\SAR\bcp RIR\210122 Fig 1 Site Location.mxd 9/27/2024 4:54:25 PM iszalus

ATTACHMENT A

RESUMES FOR REMEDIAL ENGINEER, QA/QC OFFICER, PROJECT MANAGER, FIELD TEAM LEADER, SITE SAFETY OFFICERS, LABORATORY QA/QC OFFICER, AND THIRD-PARTY DATA VALIDATOR

REBECCA KINAL, PE

VICE PRESIDENT/ENVIRONMENTAL ENGINEER

Rebecca Kinal, PE has extensive experience in the assessment and remediation of soil and groundwater contamination and other hazardous/non-hazardous waste problems. Rebecca's experience includes environmental due diligence, soil and groundwater investigations, leaking underground storage tank studies, soil gas/vapor intrusion surveys, and oversight of small- and large-scale remediation programs, including design of groundwater remediation systems and vapor mitigation systems. She has directed numerous Phase I and Phase II assessments and remediation programs, many of them in conjunction with commercial/residential developers, law firms, lending institutions, and public agencies. She is experienced in the cleanup of contaminated properties under New York State Brownfield Cleanup Program (BCP) regulations and the New York City "E-designation" program. As a part of this work, her duties have included technical and report review, engineering design, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

BACKGROUND

Education
MS, Rensselaer Polytechnic Institute, Hydrogeology, 1995
BS, Lafayette College, Civil Engineering, 1992

Licenses/Certifications
Professional Engineer, NY - 082046-1
OSHA 40 Hour HAZWOPER,
OSHA 8 Hour Refresher

Years of Experience
27 years in the industry
23 years with AKRF

References

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REBECCA KINAL, PE

VICE PRESIDENT / ENVIRONMENTAL ENGINEER

RELEVANT EXPERIENCE

New York City School Construction Authority On-Call Contracts for Environmental Consulting Services, Various Sites, NY

Rebecca Kinal has served as the project manager for AKRF's on-call hazardous materials consulting contract with the New York City School Construction Authority for over 10 years. For potential new school sites, assignments include initial due diligence; Phase I environmental site assessments (ESAs); and subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, contract specifications, and design drawings. The work has also included conducting indoor air quality testing, vapor intrusion assessments, preparation of specifications and construction management for petroleum storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours. Under the contract, Rebecca has managed several major efforts, including emergency remediation work related to flooding from Superstorm Sandy, expedited due diligence for large portfolios of proposed Universal Pre-Kindergarten (UPK and 3K) sites, specialized indoor air quality testing for a site with mercury contamination, and large Phase II investigations and remedial designs for sites with NYC Office of Environmental Remediation (OER) E-designations and New York State Department of Environmental Conservation (NYSDEC) involvement.

Real Estate Advisory Services – CUNY Real Estate Assets, Various Site, New York City, NY

AKRF teamed with RESGroup on the Real Estate Advisory Services project for City University of New York (CUNY.) Our services included a desk-top review of agency records, previous reports, and regulatory databases to identify environmental concerns at the CUNY-owned properties and assign each one a risk factor with respect to the environmental liabilities and anticipated remediation costs associated with the potential redevelopment. This evaluation was used to assist the project team in their valuation of the properties and selecting which sub-set of properties to market. Rebecca Kinal managed the project and worked with other team members to prepare the report deliverables.

New York City Department of Design & Construction (NYCDDC), East Side Coastal Resiliency (ESCR), New York, NY

AKRF was retained by the NYCDDC to provide a multi-disciplinary design for the protection of Lower Manhattan against another catastrophic hurricane. The main components of the design include levees, berms, retaining walls, cut-off walls, and increasing the ground elevation to mitigate and limit surging flood waters from entering Lower Manhattan. A large portion of the project's subsurface has been impacted by manufactured gas plant (MGP)-related contamination. Rebecca Kinal serves as the Engineer of Record for MGP mitigation design components of the project. Her work includes certification of the Mitigation Work Plan submitted to NYSDEC and review of contract specifications and drawings.

1731 West Farms Road, Bronx, NY

AKRF is providing environmental consulting and design services for the site of a former dry cleaning equipment repair facility in the West Farms neighborhood in the Bronx. The site, which is enrolled in the NYSDEC Brownfield Cleanup Program, is contaminated with the dry cleaner fluid perchloroethene (PCE) in soil vapor, soil, and groundwater (including in both overburden and bedrock aquifers). AKRFs services included preparing a Remedial Remediation

Action Work Plan, conducting a pre-design investigation to further delineate PCE contamination in soil and groundwater and gather data for in situ groundwater remediation design, preparing a design document and contract specifications, and coordinating with the design team to select remediation contractors to perform the work. Rebecca Kinal serves as the project manager and remedial engineer for the project. AKRF will oversee site remediation, anticipated to begin in second quarter of 2023..

Rheingold Houses, Brooklyn, NY

AKRF was retained by Los Sures United HFDC, to design a sub-slab depressurization system (SSDS) for the proposed Rheingold Houses Senior Supportive Housing project in the Bushwick neighborhood of Brooklyn. Rebecca Kinal coordinated with the project team to design the SSDS and prepare associated specifications and drawings. She also provided construction support and reviewed contractor submittals during construction of the new building.

1100 Myrtle Ave, Brooklyn, NY

Rebecca Kinal served as the Engineer of Record for remediation of the 1100 Myrtle Avenue site, a NYSDEC Brownfield redevelopment project in Brooklyn. The remediation included hot spot excavation, UST removal, soil management, a site-wide engineered cover system, and a sub-slab depressurization system (SSDS) and soil vapor extraction system (SVES). Rebecca reviewed the design documents, supervised field inspections, provided support to the project team regarding contractor submittals and field changes, and certified the Final Engineering Report and Site Management Plan. The Site received its Certificate of Completion in December 2000.

Northlight at Edge-on-Hudson, Sleepy Hollow, NY

AKRF was retained by the developer for environmental design and construction support for the redevelopment of Parcel F at Lighthouse Landing (aka, Edge-on-Hudson) with a five-story, 246-unit residential building. AKRF designed a sub-slab depressurization system for the new building and provided environmental oversight during building construction to ensure the work was conducted in accordance with an NYSDEC-approved Site Management Plan for the overall development area. Rebecca Kinal served as the Engineer of Record for the project. Her work included reviewing the design documents, providing support to the project team regarding contractor submittals and field changes, and certified the progress reports submitted the Village of Sleepy Hollow and a Construction Completion Report submitted to the NYSDEC.

Brooklyn Technical High School Athletic Field Improvements, Brooklyn, NY

Rebecca Kinal provided environmental support services to the selected contractor for improvements to the Brooklyn Tech H.S. athletic field facilities. These services included: preparation of an in situ sampling plan for waste characterization and disposal; supervision of waste characterization sampling activities; development and implementation of a community air monitoring program during all soil disturbance; and coordination for removal of a petroleum storage tank discovered construction.

Redevelopment at Polychrome R&D and Manufacturing Sites, AvalonBay, Yonkers, NY

Rebecca Kinal served as the Engineer of Record for remediation of the former Polychrome research and development (R&D) site, a NYSDEC Brownfield redevelopment project along the Hudson River. The remediation included hot spot excavation, LNAPL collection, in-situ soil stabilization (ISS), soil management, groundwater treatment, dewatering, shoreline permitting, groundwater discharge permitting, and a site-wide engineered cover systems, including a vapor barrier and sub-slab depressurization system (SSDS). Rebecca reviewed the design documents, supervised field

inspections, provided support to the project team regarding contractor submittals and field changes, and certified the Final Engineering Report and Site Management Plan. The Site received its Certificate of Completion in December 2019.

Montefiore Medical Center, Various Locations, NY

Rebecca Kinal provides environmental due diligence assistance to Montefiore Medical Center (MMC) for the ongoing expansion of their facilities, primarily in the Bronx and Westchester County. She conducts and manages environmental due diligence tasks related to their property transactions, including Phase I Environmental Site Assessments (ESAs), Phase II investigations, indoor air quality surveys/vapor intrusion assessments, and remediation cost estimates. She also assists MMC in making decisions with respect to environmental risk issues. Projects have ranged from small, single-lot properties to large hospital campuses.

Transaction Support, Confidential Client, Various Locations

Rebecca Kinal provided transaction support related to the proposed sale of a large construction equipment supply company. She managed inspections of 12 of the company's storage and maintenance yards located in New York, New Jersey, Connecticut, Rhode Island and Massachusetts to assess environmental concerns, and advise the client regarding environmental liabilities related to the proposed sale. The work was completed on an expedited turnaround to comply with the due diligence time-frame.

Street-Works Development, Hamilton Green (200 Hamilton Avenue), White Plains, NY

AKRF prepared the EIS under the New York State Environmental Quality Review Act (SEQRA) and provided site planning and environmental services for the development of Hamilton Green—a new vibrant, mixed-use community in downtown White Plains, NY. Rebecca Kinal managed environmental due diligence and remediation planning for the project, which included Phase I and II environmental assessments, a petroleum Spill investigation, preparation of remediation cost estimates, and application and acceptance to the NYSDEC Brownfield Cleanup Program (BCP).

United States Tennis Association, USTA NTC Master Plan Support, Queens, NY

AKRF prepared an EIS for the New York City Departments of City Planning (DCP) and Environmental Protection (DEP) as co-lead agencies to analyze the expansion of the National Tennis Center, which includes multiple improvements and construction projects at the USTA campus over several years. As part of the EIS requirements, AKRF prepared a Remedial Action Plan for implementation during the proposed project's construction. In accordance with the RAP, vapor mitigation systems were incorporated into the design for several of the proposed structures at the facility, including two new stadiums, a new transportation center, and several practice court facilities. Rebecca Kinal prepared the specifications and design drawings for the vapor mitigation and provided construction support to review contractor submittals and inspect the vapor barrier and sub-slab depressurization system installations.

New York City Economic Development Corporation (NYCEDC), Yankee Stadium, Bronx, NY

Rebecca Kinal performed the hazardous materials analysis for the Draft Environmental Impact Statement for the proposed new Yankee Stadium. The analysis included a Phase I Environmental Site Assessment of the entire project area and Subsurface (Phase II) Investigation in areas where environmental conditions were identified. The Phase II investigation included geophysical surveys to search for potential underground storage tanks; and soil, soil gas, and groundwater sampling at over 40 locations to determine potential environmental impacts during and after the proposed construction. Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs) were developed to specify environmental monitoring, soil management protocols, and health and safety requirements during construction

of the new stadium and redevelopment of the old stadium site. Rebecca also managed an extensive community air monitoring program during demolition of the old Yankee Stadium and construction of the New York City Department of Parks and Recreation's Heritage Field, which included short-term and long-term monitoring for airborne particulates and lead.

Roosevelt Union Free School District, Roosevelt UFSD

Rebecca Kinal managed environmental investigation and remediation activities for the sites of three new elementary schools and a new middle school in Roosevelt, New York. Remediation activities included removal/closure of contaminated dry wells and underground petroleum storage tanks, and excavation and off-site disposal of petroleum- and pesticide-contaminated soil. Remediation of the new middle school site, which also included a sub-slab depressurization system, was conducted through coordination with the NYSDEC, NYSDOH, New York State Education Department (NYSED), and the local school district. Upon completion of the remediation and school construction, Rebecca managed confirmatory indoor air testing and preparation of a Final Engineering Report to document the site clean-up. The NYSDEC issued a Certificate of Completion, allowing the new school to open on schedule.

MARC GODICK, LEP

SENIOR VICE PRESIDENT

Marc S. Godick, LEP is a Senior Vice President of the firm. He holds a BS in Chemical Engineering and an ME in Environmental Engineering. He has broad-based environmental experience which includes management of several on-call contracts and expertise in brownfield redevelopment, site assessment, remedial investigation, design and implementation of remedial measures, compliance assessment, and litigation support.

BACKGROUND

Education

ME, Pennsylvania State University, Engineering Science/Environmental Engineering, 1998
BS, Carnegie Mellon University, Chemical Engineering, 1989

Licenses/Certifications

Licensed Environmental Professional, CT - 396
OSHA 40 Hour HAZWOPER
OSHA 8 Hour Supervisor
OSHA 8 Hour Refresher

Professional Memberships

Member, Westchester County Stormwater Advisory Board, 2011–Present
Member, Westchester County Soil and Water Conservation District, 2005–2010, 2019–Present
Member, Village of Larchmont Planning Board, 2018–2019
Chair/Member, Village of Larchmont/Town of Mamaroneck Coastal Zone Management Commission, 1997–2018
Board of Directors, Sheldrake Environmental Center, Larchmont, New York, 2006–2008
Member, NYSDEC Risk-Based Corrective Action (RBCA) Advisory Group for Petroleum-Impacted Sites, 1997
Community Leadership Alliance, Pace University School of Law, 2001

Years of Experience

33 years in the industry
21 years with AKRF

References

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MARC GODICK, LEP

SENIOR VICE PRESIDENT

RELEVANT EXPERIENCE

On-Call Environmental Consulting (Various Locations), New York City School Construction Authority

Marc Godick is Program Manager for an on-call contract with the SCA for environmental assessment, remedial design, and plumbing disinfection. For new school sites, initial due diligence involves conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school and remediation requirements and associated costs. Once design for a school is underway, AKRF would prepare remediation plans and construction specifications and oversee the construction activities. For existing school sites, the work can involve conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, investigation and remediation of spills, and development of remediation cost estimates. Marc also manages AKRF's lead in drinking water sampling and plumbing disinfection work for SCA, including providing recommendations for mitigating exceedances.

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Marc Godick is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also developed a remedial plan for a former gas station site in the Bronx and implemented a remedial plan for capping a park site in Staten Island. In addition, Marc provided support to OER and an affordable housing developer to expedite an application for entry into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), as well as preparation and implementation of the remedial investigation and remedial plan.

New York City Department of Design and Construction, East Side Coastal Resiliency, Manhattan, NY

Marc Godick led the environmental investigation and related support for a multidisciplinary design team selected by the New York City agency partnership of DDC, DPR, and ORR for the Feasibility Study and Pre-Scoping Services for East Side Coastal Resiliency (ESCR) project. The AKRF Team provided design services, for 100+ year storm protection with anticipated sea level rise along the east side of Lower Manhattan. The ESCR subsurface exploration program involved a review of available utility plans and environmental reports involving manufactured gas plant (MGP) and potential petroleum-related contamination along a 2.5-mile study area from Montgomery Street to East 25th Street to develop a Subsurface Investigation Work Plan, which was approved by the NYCDEP. The program included both public and private utility mark-out services across vast areas of the project site containing critical infrastructure to enable the installation of numerous shallow and deep borings and groundwater wells. Marc supervised the implementation of the investigation, which was completed in two phases. He was also responsible for the interpreting the wide-range of environmental parameters to evaluate critical cost and environmental impacts for the City and design team, and to prepare technical reports for submission and approval by the NYCDEP to satisfy for City Environmental Quality Review (CEQR) requirements. He also supported the design and environmental review team, including preparation of the Hazardous Materials chapter for the Environmental Impact Statement, estimating cost impacts to the project for design and cost recovery purposes, and developing a soil management plan. Marc also managed the evaluation of potential hydraulic and contaminant migration impacts associated with former manufactured gas plants along the proposed flood control structure, and prepared a separate mitigation plan approved by NYSDEC to be implemented during construction to address potential coal tar impacts.

Gowanus Canal First Street Turning Basin, New York City Department of Design and Construction (DDC)

MARC GODICK, LEP

SENIOR VICE PRESIDENT

Marc Godick managed the remedial design for restoration of the filled-in former First Street Turning Basin in Brooklyn, New York. The remediation is being conducted as part of an Order of Consent between the City of New York and EPA for the Gowanus Canal Superfund Site. The remedial design included removal of fill and sediment within the fill-in basing in an approximately 475-foot by 50-foot area. The restored basin will provide enhanced waterfront access to the community and a boat launch for canoes and kayaks. Design considerations included geotechnical concerns related to adjacent buildings and new, existing bulkheads; soil, and water management; landscape design; and access/construction logistics. The design was completed in 2019.

3200 Jerome Avenue, Bronx, NY (Former PS 151)

Marc Godick managed the investigation and remediation of a former public school in the Bronx under the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP). The site was contaminated with trichloroethylene (TCE) from historic operations at the property prior to use as a school. The remedial investigation included soil, groundwater, and vapor intrusion assessment both on-site and off-site. The remedial design included excavation of the source area, in-situ chemical oxidation of groundwater, and installation of a sub-slab depressurization system (SSDS) and soil vapor extraction (SVE) system to address to potential vapor intrusion and residual contamination. Implementation of the remedy was complete in late 2014. The completed remediation allows for future multi-family residential, educational, childcare, and/or medical uses. Marc also provided litigation support in connection with a cost recovery claim against the former operator of the site.

Former United Hospital, 406 Boston Post Road, Port Chester, NY

AKRF is providing environmental consulting and site assessment/remediation services for the Former United Hospital site in Port Chester, NY. The approximately 15-acre site, which was developed as a hospital as early as 1915, will be redeveloped into a mixed-use community; an approximately 12-acre portion of the site was accepted in the Brownfield Cleanup Program in October 2020. AKRF has completed due diligence investigations (two Phase I ESAs and a Phase II ESI), prepared/submitted a BCP Application, prepared/submitted a Remedial Investigation Work Plan (RIWP), completed the initial phase of the Remedial Investigation (RI), and prepared an Interim Remedial Investigation Report (RIR). The second phase of the RI will be completed following demolition of the former hospital buildings, which will be followed by the preparation/submittal of the final RIR and a Remedial Action Work Plan (RAWP). AKRF will oversee structural demolition [including implementation of a NYSDEC-approved Community Air Monitoring Plan (CAMP)], which is anticipated to begin in the third quarter of 2023, and will continue to provide field oversight, regulatory coordination, and reporting throughout redevelopment of the site. Marc Godick is the principal in charge, working closely with AKRF's project manager to direct the regulatory and technical aspects of the project.

1731 West Farms Road, Bronx, NY

AKRF is providing environmental consulting and design services for the site of a former dry cleaning equipment repair facility in the West Farms neighborhood of the Bronx, NY. The site, which is enrolled in the NYSDEC Brownfield Cleanup Program, is contaminated with the dry-cleaning solvent tetrachloroethene (PCE) in soil vapor, soil, and groundwater (including in both overburden and bedrock aquifers). AKRF reviewed historical site characterization data, prepared an RAWP, conducted a pre-design investigation to further delineate PCE contamination in soil and groundwater and gather data for in-situ groundwater remediation design, prepared a design document and contract specifications, and coordinated with the design team to select remediation contractors to perform the work. AKRF will oversee site remediation, which is anticipated to begin in second quarter of 2023, and will provide field oversight, regulatory coordination, and reporting throughout redevelopment of the site. Marc Godick is the principal in charge, working closely with AKRF's project manager to direct the

regulatory and technical aspects of the project.

Remediation, Former Industrial Laundry/Dry Cleaning Plant, 2350 Fifth Avenue. New York, NY

Marc Godick managed the assessment, cleanup and post-remedial operations, maintenance and monitoring of the only NYSDEC listed inactive hazardous waste (State Superfund) site in Manhattan, a former laundry/dry cleaning plant in Harlem. Remedial investigation included evaluation of soil, groundwater, soil vapor, indoor air, and building materials. Interim remediation included the removal of contaminated building materials and operation of a sub-slab vapor extraction system retrofitted into the existing building. Marc coordinated with the regulatory agencies, site owner and occupants; and managed the investigation, remedial design, and remedial implementation activities. Phase 1 of the Remedial Action Work Plan consisted of further removal of contaminated building materials. Phase 2 of the remediation included an SSDS retrofitted into the existing building, soil vapor extraction (SVE) system, and chemical oxidation injection. Remedial action work was completed in 2014 and documented in a Final Engineering Report. NYSDEC issued Certificate of Completion in January 2015 and the site has been reclassified to a "Class 4" site (site properly closed – requires continued management). Marc continued to manage the project, including operations, maintenance and monitoring of the SSDS and SVE systems under the NYSDEC-approved Site Management Plan, until the recent sale of the property in March 2023.

Avalon Bay Communities, Inc., Avalon Yonkers – Yonkers, NY

Marc Godick managed the remediation of the Avalon Yonkers project, which is comprised of three separate sites enrolled in the York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), the Former Polychrome East Site, Former Polychrome West Site, and the Former Halstead Quinn/ATI Tank Farm Site. AKRF provided technical support and peer review during development of the Remedial Investigation Reports (RIRs) and Remedial Action Work Plans (RAWPs) for the former Polychrome East and West Sites. AKRF led the negotiations for the remedial scopes for the three sites implemented during the development activities. The remedial elements included hot spot removal and soil management, in-situ soil solidification (ISS), non-aqueous phase liquid (NAPL) containment, monitoring and recovery, dewatering, groundwater treatment and discharge, underground storage tank (UST) removal, site-wide engineered cover systems with a vapor management system (VMS). AKRF provided construction management support and performed environmental monitoring during the remedial activities in accordance with NYSDEC requirements. Prior to and during the remedial work, AKRF completed the design of a shoreline slurry wall, pile plugs, enhanced bioremediation, stormwater utility line anti-seep collars, and vapor the VMS (for the three buildings). AKRF successfully managed the remedial efforts, prepared the Final Engineering Reports (FERs) and Site Management Plans (SMPs), and obtained the Certificates of Completion (COCs) in late 2019.

57 Alexander Street, Rose Associates, Yonkers, NY

Marc Godick manages site assessment/remediation services for the transit-oriented redevelopment of 57 Alexander Street in Yonkers with 440 rental apartments along the Hudson River. The seven-story building is under construction on four acres that will include a landscaped public esplanade and resident amenities. The project is being remediated under the New York State BCP. The remedy included remediation of PCB-impacted soil exceeding EPA Toxic Substance Control Act (TSCA) thresholds, metals and petroleum hot spots, vapor mitigation using a vapor barrier and SSDS, and installation of a site cap. The remediation is nearly complete and occupancy of the building is expected in May 2023. The FER and SMP will be submitted to NYSDEC, and issuance of a COC is anticipated by the end of 2023.

Queens West Project, Avalon Bay Communities, Queens, NY

MARC GODICK, LEP

SENIOR VICE PRESIDENT

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF prepared an Environmental Impact Statement (EIS) that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of this project, Marc Godick managed one of the largest remediation projects completed under the NYSDEC BCP at the time that was contaminated by coal tar and petroleum. The remedy included the installation of a hydraulic barrier (sheet pile cut off wall), excavation of contaminated soil under a temporary structure to control odors during remediation, a vapor mitigation system below the buildings, and implementation of institution controls. The investigation, remediation design, and remedy implementation, and final sign-off (issuance of Certificate of Completion) were completed in two years. Total remediation costs were in excess of $13 million. Following completion of the remediation, Marc developed a cost allocation model and provided litigation support for a cost recovery action against a former operator of the site, including participation in a deposition as a fact witness prior to settlement between the parties.

COLLEEN GRIFFITHS

VICE PRESIDENT

Colleen Griffiths is a Vice President with diverse experience assessing environmental hazards. Her areas of expertise include overseeing Phase I and Phase II environmental site assessments, asbestos and lead-based paint surveys, preparing environmental specifications, managing air monitoring/project management services for asbestos abatement projects, and community air monitoring programs. She has prepared Remedial Action Plans (RAP), Construction Health and Safety Plans (CHASP) and Remedial Action Work Plans (RAWP) for various agencies.

BACKGROUND

Education
BS, University of Florida, Environmental Economics, 1991

Licenses/Certifications
OSHA 40 Hour HAZWOPER
OSHA 8 Hour Refresher
NYSDOL Certified Asbestos Inspector, Management Planner, and Project Designer

Years of Experience
30 years in the industry
23 years with AKRF

References

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COLLEEN GRIFFITHS

VICE PRESIDENT

RELEVANT EXPERIENCE

New York City School Construction Authority: On-Call Environmental Consulting

Colleen Griffiths serves as the Project Manager for the lead in drinking water and plumbing disinfection tasks under AKRF's on-call hazardous materials consulting contract with the New York City School Construction Authority (NYCSCA). AKRF performed lead in drinking water sampling in about 160 schools during two three-month periods in 2016 and 2017. AKRF continues to provide lead sampling, reporting and remedial recommendations, as new plumbing is installed. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of reports documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

Soil Sampling and Reporting – 31 Sites in New York and 3 Sites in Rhode Island (Confidential Commercial Client)

AKRF performed preliminary soil sampling at 31 commercial sites located in Rockland, Westchester, Putnam and Owego counties in New York and 3 commercial sites located in Rhode Island. Colleen Griffiths is serving as the Project Manager. Ongoing project support will include delineation sampling, waste characterization sampling, project design, bidding support, community air monitoring and construction management.

Public Health Lab Harlem Hospital, Manhattan, NY - Remediation Oversight and Community Air Monitoring

Through an on-call contract with the New York City Economic Development Corporation, AKRF is providing construction support and environmental monitoring services during demolition of existing structures and construction of a new public health laboratory on the Harlem Hospital campus. Colleen Griffiths is serving as the Project Manager. AKRF is performing community and work zone air monitoring and overseeing excavation and export of urban fill and petroleum-contaminated soil, documenting spill closure, documenting the import/placement of environmentally clean backfill, and preparation of daily reports to ensure compliance with the NYCDEP-approved Remediation Action Work Plan (RAWP).

New York City Economic Development Corporation, Former Bayside Fuel Oil Company Site Demolition, Brooklyn, NY

AKRF supported New York City Economic Development Corporation (EDC) with the demolition of this former fuel depot. The site is owned by the City of New York Department of Parks and Recreation (DPR) and EDC implemented the demolition of two existing buildings, twelve aboveground storage tanks, a load rack/canopy structure, and above-ground distribution piping. Colleen Griffiths acted as the hazardous materials project manager and oversaw the pre-demolition ACM, lead paint, universal waste and tank content surveys. Colleen prepared the project specifications and the Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP). As project manager, Colleen developed the Community Air Monitoring plan (CAMP), supervised its implementation and reporting during subsurface disturbance and demolition activities. AKRF also performed construction management, including reviewing contractor notifications and submittals.

New York City Housing Authority (NYCHA) On-Call Environmental Consulting Services - Brooklyn RAD Bundle

COLLEEN GRIFFITHS

VICE PRESIDENT

AKRF, Inc. (AKRF) was retained by the New York City Housing Authority (NYCHA) to perform Phase I Environmental Site Assessments (ESAs) of seven complexes in accordance with ASTM E1527-13 and Tier 1 Vapor Encroachment Screens (VES) in accordance with E2600-15. Colleen Griffiths managed preparation of Phase I ESAs of the seven complexes located in the Bedford-Stuyvesant neighborhood of Brooklyn, NY. Based on the findings of the Phase I ESAs and VES, Colleen coordinated preparation of the Phase II Work Plans and Health & Safety Plans, which were subsequently reviewed and approved by the New York City Department of Environmental Protection.

New York City Housing Authority (NYCHA) Permanent Affordability Commitment Together (PACT) Brooklyn Bundle Environmental Consulting Services, Scattered Sites, Brooklyn, NY

AKRF was retained by Brooklyn Housing Preservation Experience LLC (Omni NY and the Arker Companies) to provide environmental consulting services in connection with a joint application with NYCHA for conversion of assistance under the U.S. Department of Housing and Urban Development's (HUD) Rental Assistance Demonstration (RAD) and Section 18 disposition programs, and associated rehabilitation activities. The proposed action involved 37 residential buildings (approximately 2,625 residential units) within several groups of NYCHA housing developments: Armstrong I/II, Marcy-Greene Avenue Sites A and B, Berry Street-South 9th Street, Independence Towers, Williams Plaza, Warren Street Houses, and Weeksville Gardens. AKRF provided consulting services including preparation of the required environmental review documentation pursuant to the National Environmental Policy Act (NEPA) and HUD environmental standards (24 CFR Part 58), as well as supporting environmental studies related to hazardous materials, noise, and other areas. Colleen Griffiths managed the subsurface (Phase II) investigations, and preparation of the Remedial Action Plans (RAPs) and Phase I ESA updates in accordance with Freddie Mac financing requirements.

New York City Economic Development Corporation, Willets Point Demolition, Queens, NY

AKRF supported the New York City Economic Development Corporation (EDC) with Phase 1 of the Willets Point Redevelopment Plan, which includes the demolition of existing structures. AKRF also supported EDC with review of contractor notifications, submittals and air monitoring during abatement. Colleen Griffiths served as the Project Manager and oversaw the pre-demolition ACM, lead paint and universal waste surveys of about 70 structures throughout the 23-acre area site in Queens. Colleen prepared asbestos abatement specifications, and coordinated AKRF investigators, subcontractors and laboratories to accomplish the scope of work under significant time constraints.

Westchester County Department of Parks, Recreation, and Conservation, Merestead Site Development, Bedford, NY

AKRF prepared a Cultural Landscape Report (CLR) for the 130-acre Merestead property which is listed on the National Register of Historic Places. The CLR was part of Westchester County's proposal to rehabilitate of the Main House of the former Sloane Estate in Bedford, New York and to adapt the property for public use. The Merestead CLR was written in keeping with the guidelines provided in Guide to Cultural Landscapes Reports: Contents, Process, and Techniques (National Park Service [NPS] 1998). AKRF's hazardous materials effort provided analysis and design services associated with the rehabilitation of Merestead, a Westchester County Park on the National Register of Historic Places. Colleen Griffiths was responsible for the Phase I ESA, asbestos, lead and mold surveys, and preparation of specifications for rehabilitation of the 130-acre park owned by the Westchester County Parks Department of Parks, Recreation, and Conservation.

New York City Transit Hazardous Materials On-Call Contract, Various Locations, New York City, NY

As part of a five-year, $10 million on-call environmental engineering and consulting services contract with MTA New York City Transit (NYCT), AKRF has performed phase I environmental site assessments, asbestos, lead paint, indoor air quality and hazardous materials consulting services at various stations, tunnels and structures. Colleen Griffiths managed the firm's team of technicians responsible for lead work at construction worksites occupied by multiple contractors and

trades, monitoring contractor work practices, and inspection hazardous waste storage activities. She also lead AKRF's asbestos consulting services, coordinating the efforts of AKRF team members who conducted asbestos surveys and reporting, design services, and asbestos abatement oversight at manholes, stations, tunnels and other structures throughout New York. Colleen also oversaw the various team members, including sub-consultants and laboratories.

Hudson River Park Trust, Hudson River Park, New York, NY

AKRF serves as an on-call consultant for the ongoing development of the Hudson River Park, the approximately 5 to 6 mile section of waterfront property from Battery Place to 59th Street along the western edge of Manhattan. Colleen Griffiths has overseen asbestos, lead, and hazardous materials surveys, specification preparation, and abatement oversight at several piers and buildings throughout the park. Colleen prepared monitoring protocols for the lead-based paint disturbance and application of paints and coatings containing volatile organic compounds. Colleen also performed an asbestos survey and prepared asbestos abatement cost estimates for the Hudson River Park Trust.

Brooklyn Bridge Park Corporation, Brooklyn Bridge Park Phase I ESA and EIS, Brooklyn, NY

The New York State Urban Development Corporation (UDC), doing business as the Empire State Development Corporation (ESDC), in conjunction with its subsidiary, the Brooklyn Bridge Park Development Corporation (BBPDC), will prepare a Draft Environmental Impact Statement (DEIS) assessing the proposed Brooklyn Bridge Park area. The 70-acre Park would stretch along 1.3 miles of the East River between Atlantic Avenue and Jay Street and generally includes the waterfront area and piers, along with some upland property. It provides people with spectacular views of the Manhattan skyline and New York Harbor and includes an array of passive and active recreational opportunities, including lawns, pavilions, and a marina. AKRF prepared the Stormwater Pollution Prevention Plan (SWPPP) in accordance with the standards set forth in the New York State Department of Environmental Conservation (NYSDEC) General Permit for Stormwater Discharges from Construction Activities and, since 2012, AKRF has provided qualified SWPPP inspection services for the various stages of construction. Colleen Griffiths oversaw asbestos and lead survey services, including comprehensive asbestos surveys and lead sampling in five piers and eight buildings. She coordinated the preparation of asbestos and lead survey reports, asbestos abatement specifications, and led oversight of abatement activities and air monitoring.

GREGORY D. BAIRD

TECHNICAL DIRECTOR

Gregory Baird over 15 years of environmental consulting and contracting experience. His range of expertise includes: Due Diligence Phase I Environmental Site Assessments (ESAs), remediation oversight, planning and conducting environmental sampling programs (subsurface soil investigations, waste characterization sampling, groundwater monitoring, and indoor air quality/vapor intrusion surveys), underground storage tank inspections and closure oversight, and potable water sampling. He has prepared Remedial Action Plans (RAPs), Construction Health and Safety Plans (CHASPs) and Remedial Action Work Plans (RAWPs) for various agencies. Gregory also conducts comprehensive asbestos and lead-based paint surveys, prepares asbestos and hazardous materials removal specifications, and manages air monitoring services for asbestos abatement projects.

BACKGROUND

Education
BS, State University of New York at New Paltz, Geology, 2004

Licenses/Certifications
OSHA 40 Hour HAZWOPER
OSHA 10 Hour Construction Safety & Health Course
NYCDEP Asbestos Investigator
NYSDOL Asbestos Inspector, Project Monitor, and Air Technician
United States Environmental Protection Agency Lead Based Paint Risk Assessor and Inspector

Years of Experience
18 years in the industry
16 years with AKRF

References
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GREGORY D. BAIRD

TECHNICAL DIRECTOR

RELEVANT EXPERIENCE

New York City School Construction Authority: On-Call Environmental Consulting

AKRF has undertaken various assignments under four consecutive hazardous materials on-call contracts, including environmental assessment, remedial design, construction support, plumbing disinfection, and potable water (lead) sampling consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments, and subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems and contract specifications, and construction oversight. The work also includes conducting indoor air quality testing, vapor intrusion assessments, preparation of specifications and construction management for petroleum storage tank removals, and investigation and remediation of spills for existing schools. As the assistant project manager for the plumbing disinfection tasks and lead in drinking water, Gregory Baird provides lead sampling, reporting and remedial recommendations, reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of reports documenting the work was conducted in accordance with the specifications and applicable requirements. Gregory also plans and conducts various due diligence and environmental assessment tasks including Phase II (Subsurface) Environmental Site Investigations (soil, groundwater and soil gas investigations); Indoor Air Quality (IAQ) and Vapor Intrusion (VI) Assessments; and Underground Storage Tank (UST) investigations.

Public Health Lab Harlem Hospital, Manhattan, NY - Remediation Oversight and Community Air Monitoring

Through an on-call contract with the New York City Economic Development Corporation, AKRF is providing construction support and environmental monitoring services during demolition of existing structures and construction of a new public health laboratory on the Harlem Hospital campus. Gregory Baird is serving as the Deputy Project Manager overseeing the AKRF and WBE sub-consultant field staff. AKRF is performing community and work zone air monitoring and overseeing excavation and export of urban fill and petroleum-contaminated soil, documenting spill closure, documenting the import/placement of environmentally clean backfill, and preparation of daily reports to ensure compliance with the NYCDEP-approved RAWP.

New York City Economic Development Corporation, Former Bayside Fuel Oil Company Site Demolition, Brooklyn, NY

AKRF supported New York City Economic Development Corporation (EDC) with the demolition of this former fuel depot. The site is owned by the City of New York Department of Parks and Recreation (DPR) and EDC implemented the demolition of two existing buildings, twelve aboveground storage tanks, a load rack/canopy structure, and above-ground distribution piping. Gregory Baird performed the pre-demolition ACM, lead paint, universal waste and tank content surveys. Gregory oversaw the WBE sub-consultant field staff during air monitoring of asbestos abatement of the structures. AKRF also performed construction management, including reviewing contractor notifications and submittals.

New York City Housing Authority (NYCHA) Permanent Affordability Commitment Together (PACT) Brooklyn Bundle Environmental Consulting Services, Scattered Sites, Brooklyn, NY

GREGORY D. BAIRD

TECHNICAL DIRECTOR

AKRF was retained by Brooklyn Housing Preservation Experience LLC (Omni NY and the Arker Companies) to provide environmental consulting services in connection with a joint application with NYCHA for conversion of assistance under the U.S. Department of Housing and Urban Development's (HUD) Rental Assistance Demonstration (RAD) and Section 18 disposition programs, and associated rehabilitation activities. The proposed action involved 37 residential buildings (approximately 2,625 residential units) within several groups of NYCHA housing developments: Armstrong I/II, Marcy-Greene Avenue Sites A and B, Berry Street-South 9th Street, Independence Towers, Williams Plaza, Warren Street Houses, and Weeksville Gardens. AKRF provided consulting services including preparation of the required environmental review documentation pursuant to the National Environmental Policy Act (NEPA) and HUD environmental standards (24 CFR Part 58), as well as supporting environmental studies related to hazardous materials, noise, and other areas. Gregory Baird prepared the Phase I ESA for the Marcy-Greene Avenue Sites A and B located in the Bedford-Stuyvesant neighborhood of Brooklyn, NY.

New York City Economic Development Corporation, Willets Point Demolition, Queens, NY

AKRF supported the New York City Economic Development Corporation (EDC) with the first phase of the Willets Point Redevelopment Plan, which included the demolition of existing structures. AKRF also supported EDC with review of contractor notifications, submittals and air monitoring during abatement. Gregory Baird conducted the pre-demolition ACM, lead paint and universal waste surveys of approximately 70 structures throughout the 23-acre area site in Queens. Gregory oversaw the WBE sub-consultant field staff during air monitoring of asbestos abatement of the structures.

New York City Economic Development Corporation, Yankee Stadium, Bronx, NY

The analysis of the new Yankee Stadium included a Phase I Environmental Site Assessment of the entire project area and Subsurface (Phase II) Investigation in areas where environmental conditions were identified. The Phase II investigation included geophysical surveys to search for potential underground storage tanks; and soil, soil gas, and groundwater sampling at over 40 locations to determine potential environmental impacts during and after the proposed construction. Gregory Baird provided air monitoring and RAP oversight during the demolition and soil disturbance work.

Hudson River Park Trust, Hudson River Park, New York, NY

AKRF serves as an on-call consultant for the ongoing development of the Hudson River Park, the approximately 5 to 6 mile section of waterfront property from Battery Place to 59th Street along the western edge of Manhattan. Gregory Baird conducted multiple ACM surveys throughout the Park. Gregory also performed asbestos project monitoring during abatement of various areas and project management of field staff during asbestos abatement air monitoring.

United States Tennis Association, USTA NTC Master Plan Support, Queens, NY

AKRF prepared an EIS for the New York City Departments of City Planning (DCP) and Environmental Protection (DEP) as co-lead agencies to analyze the expansion of the National Tennis Center, which includes multiple improvements and construction projects at the USTA campus over several years. The EIS addressed a full range of environmental impacts associated with the tennis stadium, park space, and traffic improvements. Gregory Baird performed a comprehensive asbestos survey of the 20,000-seat Louis Armstrong stadium to identify and quantify ACM.

BRIAN QUINN

ENVIRONMENTAL PROFESSIONAL I – SITE ASSESSMENT AND REMEDIATION

Brian Quinn is an Environmental Professional I in AKRF's Site Assessment and Remediation group, with experience in environmental sampling and monitoring during site remediation, subsurface and vapor intrusion investigations, and groundwater remediation system operation and maintenance.

BACKGROUND

EDUCATION

B.A. Environmental Studies, Bucknell University, May 2020

CERTIFICATIONS

OSHA 40-hour Hazardous Waste Operations and Emergency Response Training

OSHA 30-hour Construction Safety Training

YEARS OF EXPERIENCE

Date started at AKRF: March 2022

Prior industry experience: Greenstar Environmental Solutions: February 2021- February 2022 (1 year)

RELEVANT EXPERIENCE

Construction Oversight and Community Air Monitoring – American Museum of Natural History, Manhattan, New York

AKRF prepared and is implementing a NYCDEP-approved RAP during construction of the new Gilder Center for Science, Education, and Innovation at the AMNH. Mr. Quinn serves as an on-site environmental monitor during construction to ensure compliance with the RAP. His duties include community and work zone air monitoring, overseeing excavation and export of contaminated soil, and documenting the import of environmentally clean backfill.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Personnel Resume

Carl Armbruster
QA Manager

Qualifications Summary

Mr. Armbruster has over 30 years of experience in the environmental laboratory and engineering industry that includes extensive technical, management/leadership experience in all aspects of the laboratory business. He is an action-oriented manager dedicated to ensuring the laboratory maintains a quality program that holds the highest credentials in PT scores, accreditations and customer satisfaction. His unique experience lends itself to working successfully with employees, managers and clients at all levels.

Professional Experience

Quality Assurance Manager – TestAmerica Edison - 2005 to Present

Mr. Armbruster is responsible for establishing and implementing the quality assurance program at the Edison facility; and for interfacing with the corporate Quality Assurance Director to ensure adherence with the overall Quality Management Plan. He is also responsible for monitoring implementation and compliance with NELAC and TestAmerica's QMP, conducting annual management system audits and data audits, as well as providing regulatory updates and technical support to the Laboratory Director, Operations Manager, Client Services and Sales department.

Project Manager/Assistant Technical Director – STL Edison --2000 to 2005

Laboratory Director − STL Whippany − 1998 to 2000

Account Manager − Clean Harbors Environmental Services − 1997 to 1998

Laboratory Manager − Waste Management Inc., and Chemical Waste Management Inc − 1988 to 1997

Environmental Scientist − ICF Technology − 1987 to 1988

Analytical Chemist − IT Corporation – 1985 to 1987

Analytical Chemist − Hess Environmental Laboratories – 1983 to 1985

Education

- MS in Biology – East Stroudsburg University, 1984
- BS in Environmental Studies - East Stroudsburg University, 1980

L.A.B. Validation Corp., 14 West Point Drive, East Northport, New York 11731

Lori A. Beyer

SUMMARY: General Manager/Laboratory Director with a solid technical background combined with Management experience in environmental testing industry. Outstanding organizational, leadership, communication and technical skills. Customer focused, quality oriented professional with consistently high marks in customer/employee satisfaction.

EXPERIENCE:

1998-Present L.A.B. Validation Corporation, 14 West Point Drive, East Northport, NY
President

- Perform Data Validation activities relating to laboratory generated Organic and Inorganic Environmental Data.

1998-Present American Analytical Laboratories, LLC. 56 Toledo Street, Farmingdale, NY
Laboratory Director/Technical Director

- Plan, direct and control the operation, development and implementation of programs for the entire laboratory in order to meet AAL's financial and operational performance standards.
- Ensures that all operations are in compliance with AAL's QA manual and other appropriate regulatory requirements.
- Actively maintains a safe and healthy working environmental that is demanded by local laws/regulations.
- Monitors and manages group's performance with respect to data quality, on time delivery, safety, analyst development/goal achievement and any other key performance indices.
- Reviews work for accuracy and completeness prior to release of results to customers.

1996-1998 Nytest Environmental, Inc. (NEI) Port Washington, New York
General Manager

- Responsible for controlling the operation of an 18,000 square foot facility to meet NEI's financial and operational performance standards.
- Management of 65 FTEs including Sales and Operations
- Ensure that all operations are in compliance with NEI's QA procedures
- Ensures that productivity indicators, staffing levels and other cost factors are held within established guidelines
- Maintains a quantified model of laboratory's capacity and uses this model as the basis for controlling the flow of work into and through the lab so as to ensure that customer requirements and lab's revenue and contribution targets are achieved.

1994-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Technical Project Manager

- Responsible for the coordination and implementation of environmental testing programs requirements between NEI and their customers
- Supervise Customer Service Department
- Assist in the development of major proposals
- Complete management of all Federal and State Contracts and assigned commercial contracts
- Provide technical assistance to the customer, including data validation and interpretation
- Review and implement Project specific QAPP's.

1995-1996 Nytest Environmental, Inc. (NEI) Port Washington, New York
Corporate QA/QC Officer

- Responsible for the implementation of QA practices as required in the NJDEP and EPA Contracts
- Primary contact for NJDEP QA/QC issues including SOP preparation, review and approval
- Responsible for review, verification and adherence to the Contract requirements and NEI QA Plan

1992-1994 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Manager

- Responsible for the accurate compilation, review and delivery of analytical data to the company's customers. Directly and effectively supervised a department of 22 personnel.
- Managed activities of the data processing software including method development, form creation, and production
- Implement new protocol requirements for report and data management formats
- Maintained control of data storage/archival areas as EPA/CLP document control officer

1987-1991 Nytest Environmental, Inc. (NEI) Port Washington, New York
Data Review Specialist

- Responsible for the review of GC, GC/MS, Metals and Wet Chemistry data in accordance with regulatory requirements
- Proficient with USEPA, NYSDEC, NJDEP and NEESA requirements
- Review data generated in accordance with SW846, NYSDEC ASP, EPA/CLP and 40 CFR Methodologies

1986-1987 Nytest Environmental, Inc (NEI) Port Washington, New York
GC/MS VOA Analyst

EDUCATION:

1982-1985 State University of New York at Stony Brook, New York; BS Biology/Biochemistry
1981-1982 University of Delaware; Biology/Chemistry
5/91 Rutgers University; Mass Spectral Data Interpretation Course, GC/MS Training
8/92 Westchester Community College; Organic Data Validation Course
9/93 Westchester Community College; Inorganic Data Validation Course

APPENDIX K
CONSTRUCTION QUALITY ASSURANCE PLAN

BROOKFIELD COMMONS PHASE 3
159 S. LEXINGTON AVENUE
WHITE PLAINS, NEW YORK

Construction Quality Assurance Project Plan

NYSDEC BCP Number: C360246

AKRF Project Number: 210122

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 12th Floor
Albany, New York 12233

Prepared on Behalf of:

Trinity Brookfield Commons Phase Three Limited Partnership
1350 Broadway, Suite #1700
New York, NY 10018

Prepared by:

AKRF, Inc.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

NOVEMBER 2024

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LIST OF ACRONYMS

Acronym	Definition
BCP	Brownfield Cleanup Project
CAMP	Community Air Monitoring Plan
CQAP	Construction Quality Assurance Plan
FER	Final Engineering Report
HASP	Health and Safety Plan
NYSDEC	New York State Department of Environmental Conservation
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAWP	Remedial Action Work Plan
SCO	Soil Cleanup Objective
SMMP	Soil/Material Management Plan

1.0 INTRODUCTION

This Construction Quality Assurance Plan (CQAP) has been prepared for remedial activities conducted under the Remedial Action Work Plan (RAWP) that will be performed at the Brookfield Commons Phase 3 project site located at 159 South Lexington Avenue in White Plains, NY (Tax Block 7, Lot 1, Section 125.83) under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), Site No. C360246. This CQAP supplements the NYSDEC-approved RAWP and provides monitoring, inspection, testing, and documentation protocols and procedures.

The following information is provided:

1. Responsibility, Authority and Qualifications – The responsibility, authority and qualifications of the key personnel involved in the project.
2. Inspection and Testing Activities – Inspections and tests that will be used to verify that construction activities meet or exceed all design criteria and federal, state, and local regulations and requirements.
3. Meetings – The requirements for project coordination meetings between the Applicant and its representatives, the remedial or environmental Contractors, and other involved parties.
4. Documentation and Reporting – Field documentation and reporting requirements.

2.0 RESPONSIBILITY AND AUTHORITY

Measures will be implemented to ensure that a functional quality control (QC) organization is active during the project and to provide support for the construction QC system in conducting inspections, tests and retesting (in the event of failure of any item of work). This includes oversight of subcontractors and compliance with contract provisions. Construction QC includes, but is not limited to, the inspections and tests required in the RAWP and approved submittals and will cover all project operations. A consultant hired by the BCP Applicant will manage field activities and coordinate the contractor's activities.

2.1 Applicant

Trinity Brookfield Commons Phase Three Limited Partnership (the "Applicant") is responsible for coordinating the project, including activities of the Site consultant, contractor(s) and subcontractor(s), to comply with the requirements of the RAWP and regulatory agencies. The Applicant is also responsible for completing and submitting documentation required by the RAWP, the CQAP, and the Quality Assurance Project Plan (QAPP) and has the authority to accept or reject the materials and workmanship of any subcontractors at the Site.

2.2 Construction Quality Assurance (QA) Officer (Consultant)

The Construction QA Officer will be an employee of the consultant hired by the Applicant and will perform activities that are necessary to assure the quality of construction. He/she will be on-site as required during construction activities and will have the authority to take any action necessary to maintain compliance with the RAWP and approved submittals and to monitor construction quality.

Specific responsibilities of the Construction QA Officer include:

- Supporting the Applicant and the consultant's field staff;
- Evaluating construction activities and activities of the field staff;
- Verifying that remedial activities are performed in accordance with the RAWP, approved submittals, and with federal, state, and local regulations and requirements;
- Verifying that data are properly recorded, validated, reduced, summarized, and inspected;
- Evaluating sampling and monitoring activities;
- Educating the field staff on construction QC requirements and procedures; and
- Scheduling and coordinating inspections.

2.3 Field Team Leader (Consultant)

The Field Team Leader will be an employee of AKRF, Inc. (AKRF) and will be on-site during construction activities. He/she will have authority to take any action necessary to maintain compliance with the RAWP and approved submittals and to maintain construction quality. The Field Team Leader will also manage the field staff discussed in this CQAP.

Specific responsibilities of the Field Team Leader include:

- Reviewing the RAWP for clarity and completeness so that the construction activities can be effectively implemented;
- Verifying that the contractor's work is in accordance with the RAWP, approved submittals, and this CQAP;

- Performing on-site inspection of the work in progress to assess compliance with the RAWP, approved submittals, and this CQAP;
- Scheduling and coordinating inspections;
- Reporting the results of all observations and tests as the work progresses and modifying materials and work to comply with the RAWP and approved submittals as noted below:
    1. Providing daily reports on field construction, material shipments, and inspection results.
    2. Review and interpretation of all data, drawings, and reports.
    3. Identification of all work that should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval.
    4. Rejection of defective work and verification that corrective measures are implemented.
    5. Making observations and records that will aid in the preparation of a report on remedial activities.
- Inspecting each delivery of materials and/or equipment;
- Reporting to the Construction QA Officer the results of all inspections, including work that is not of acceptable quality or that fails to meet the requirements of the RAWP, approved submittals, and this CQAP;
- Verifying that testing equipment meets established requirements that the tests are conducted according to the proper standardized procedures;
- Confirming that testing equipment, personnel, and procedures do not change over time, or making sure that any changes do not adversely impact the inspection process;
- Confirming that regular calibration of testing equipment occurs and is properly recorded; and
- Confirming that waste treatment or disposal is performed in accordance with applicable federal, state, and local laws and regulations.

2.4 Site Technician (Consultant)

A qualified scientist, geologist, or engineer (supplemented by additional personnel, if necessary) from AKRF will be on-site during remedial construction documenting site personnel, equipment, samples collected, contamination observations and any other observations of field activities. Specific responsibilities include:

- Calibration, operation, and maintenance of air monitoring instrumentation in accordance with the RAWP and approved submittals;
- Collecting, packaging, and shipping of environmental samples in accordance with the RAWP and QAPP;
- Documenting sample collection in a field notebook and identifying all sample locations in a field notebook or Site drawing;
- Preparing and logging manifests for transportation of any non-hazardous and hazardous materials;

- Informing the Site Project Coordinator when (if) the concentrations of air contaminants exceed action levels specified in the RAWP; and
- Maintaining and organizing the field equipment and supply storage area.

3.0 FIELD QUALITY CONTROL (QC) INSPECTIONS, TESTING, AND SAMPLING

The definable features of work are described in Sections 4.0 and 5.0 of the RAWP. This section describes the anticipated inspection, testing, and sampling requirements associated with these definable features of work.

3.1 Mobilization

Inspections will be performed to assure that Site laydown areas, support facilities, surface water controls, and air monitoring systems are established in accordance with the RAWP and approved submittals. In addition, the stakeout of existing utilities in work areas and the maintenance of Site security will be verified. There are no testing and sampling requirements associated with mobilization of the contractor(s).

Each delivery of materials and/or equipment will be inspected relative to approved submittals. Approved materials and/or equipment will be stored at a designated area of the Site.

Equipment will be set-up and tested in accordance with the RAWP and approved submittals.

3.2 Soil Excavation

The Soil/Materials Management Plan (SMMP), Section 4.1.6 of the RAWP, outlines the procedures to be performed during the handling of soil/fill materials on-site during all intrusive work. Inspections will be performed during soil excavation activities including concrete removal, soil excavation, stockpiling, and load out, shoring, and re-use and backfilling (if any). Any impacts to building structural elements will be documented and assessed immediately. AKRF will confirm that all soil excavation related work will be conducted as specified in the RAWP, or are equivalent. Air monitoring will be conducted as outlined in the Health and Safety Plan (HASP), provided as Appendix E of the RAWP. Soil screening will be conducted as outlined in Section 5.4 of the RAWP. Any corrective actions will be summarized in the Daily Reports.

3.3 Soil Sampling

Soil sampling activities at the Site include waste classification sampling, endpoint and/or reuse sampling, and sampling of clean backfill from off-site sources. Proposed endpoint sample locations are shown on Figure 9 of the RAWP. All soil sampling activities will be conducted in accordance with the QAPP and Sections 5.2 and 5.4 of the RAWP. The applicable Soil Cleanup Objectives (SCOs) for this Site are the PGWSCOs for CVOCs and Track 2 RRSCOs for all other compounds.

Soil and materials management on-site and off-site will be conducted in accordance with the SMMP (Section 5.4 of the RAWP).

3.4 Loading of Waste Material for Transportation

Inspections will be conducted to verify that material removed from the Site is properly loaded for transfer to a permitted treatment/disposal facility. Manifests and bills of lading will be maintained and will be included as an appendix in the Final Engineering Report (FER).

3.5 Site Restoration

Site restoration will be observed and recorded to verify compliance with the RAWP and approved submittals. The surface will be restored to match the surrounding ground surface.

4.0 MEETINGS

A pre-construction meeting with NYSDEC will be scheduled prior to the start of major construction activities. Representative members of the Volunteer and their foundation contractor, AKRF, NYSDEC, and NYSDOH, will be invited to attend. Additional meetings will be called as necessary if work conditions change or deviations are necessary.

Project personnel and visitors will be given health and safety briefings periodically by the Site Technician or Field Team Leader to assist Site personnel in safely conducting their work activities. The safety briefings will include information on new operations to be conducted, changes in work practices or changes in the Site's environmental conditions, as well as periodic reinforcement of previously discussed topics.

5.0 DOCUMENTATION AND REPORTING REQUIREMENTS

The value of the CQAP will be assured by proper documentation. The inspectors will use data sheets, field reports, log forms, schedules, and checklists to document Site work and verify compliance with the RAWP and approved submittals. Documentation will include, at a minimum, the following reports and information:

- Daily field construction reports;
- Photographs;
- Sampling chains of custody;
- Material disposition logs; and
- Variances to the RAWP and approved submittals.

5.1 Daily Report

The Site Technician or Field Team Leader will prepare a daily report that identifies the following:

- Work force and visitors to the Site;
- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alphanumeric grid map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of Community Air Monitoring Plan (CAMP) findings, including excursions;
- Apparent deviations from the RAWP;
- Weather conditions;
- Photographs of the Site and pertinent work; and
- An explanation of notable Site conditions.

5.2 Photographic Log

The photographic log will be kept to document construction activities by still photographs. The photographic log may also be used to record activities recorded in the daily report. All photographs will be taken with a camera capable of producing date and timestamps.

5.3 Sampling Documentation

The project field book will be used to document all sampling activities and how they correspond to the RAWP. All observations and field and/or laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, or photographs.

5.4 Material Disposition Tracking

All materials that are taken off-site for disposal will be tracked and final disposition confirmed. Copies of all waste manifests and bills of lading will be maintained by the Project Manager.

5.5 Variances to Remedial Action Work Plan (RAWP)

Required changes to the RAWP will be documented as construction proceeds. Any material deviations from the NYSDEC-approved RAWP will be communicated to the NYSDEC Project Manager. NYSDEC approval will be sought prior to proceeding with work deviating materially from the RAWP. In the event of an emergency change to the work plan, the NYSDEC Project Manager will be consulted immediately.

5.6 Final Engineering Report (FER)

At the completion of the project the consultant/construction manager will prepare an FER. This report will describe the implementation of the RAWP and will include a summary of the field work, as-built drawings for constructed elements, manifests, bills of lading, test results demonstrating that all mitigation and remedial systems are functioning properly, and photographic documentation. The FER will also include a description of the changes in the Remedial Action from the elements provided in the RAWP.

5.7 Document Storage

The Field Team Leader will maintain the current field book and all original field paperwork during the performance of work. The Project Manager will maintain the field paperwork after completion and will maintain all submittal document files.

APPENDIX L
STORM WATER POLLUTION PREVENTION PLAN

Brookfield Commons Phase 3

WHITE PLAINS, NEW YORK

Stormwater Pollution Prevention Plan for
State Pollutant Discharge Elimination
System General Permit for
Stormwater Discharges from
Construction Activity Permit No. GP-0-20-001

AKRF Project Number: 200154

Prepared for:

Trinity New York Development, LLC
1350 Broadway, Suite 2203
New York, NY 10018

Prepared by:

AKRF, Inc.
34 South Broadway, Suite 401
White Plains, NY 10601
914-949-7336

SEPTEMBER 6, 2022
REVISED FEBRUARY 22, 2023

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Appendix K – Record Plans
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1.0 INTRODUCTION

On behalf of Trinity New York Development, LLC, AKRF, Inc. (AKRF) has prepared this Stormwater Pollution Prevention Plan (SWPPP) for soil disturbance activities related to the construction of a residential building located within White Plains Housing Authority's Brookfield Commons campus (formerly known as Winbrook Housing) in White Plains, NY. These activities are described in detail in this SWPPP.

1.1 SWPPP Objectives

The Stormwater Pollution Prevention Plan (SWPPP) has been developed in accordance with the following applicable rules, regulations, and guidance documents:

- NYSDEC State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-20-001 (SPDES GP-0-20-001);
- NYSDEC Stormwater Management Design Manual, dated January 2015; and
- NYSDEC Standards and Specifications for Erosion and Sediment Control, dated November 2016.

The objectives of this SWPPP are to:

1. Outline Owner and Contractor responsibilities to maintain compliance with SPDES GP-0-20-001, including required inspections, maintenance, forms, and certifications.
2. Outline measures to install, inspect, and maintain erosion and sediment control measures for the proposed project. The objective of these measures is to eliminate or significantly minimize pollutant discharges to the receiving water bodies during construction activities.

1.2 Owner's Responsibilities

Trinity New York Development, LLC, the "Owner/Applicant," is responsible for ensuring that the Contractor installs and maintains the erosion and sediment control measures in accordance with this SWPPP. The Applicant is also responsible for ensuring that the appropriate forms and certifications contained herein are completed prior to and throughout the duration of demolition and construction activities. The Applicant shall keep a copy of this document, associated attachments, and any inspection reports generated on-site for the duration of the project and for a minimum of 5 years from the date the site achieves final stabilization. During this time period, it is the Applicant's responsibility to conform to any changes or updates to the current regulations as applicable to the project.

The Applicant shall ensure that the provisions of the SWPPP are implemented from the commencement of construction activity until all areas of disturbance have achieved final stabilization and the Notice of Termination (NOT) has been submitted to the NYSDEC.

The Applicant shall maintain a copy of this SWPPP report, the General Permit (SPDES GP-0-20-001), Notice of Intent (NOI in **Appendix A**), NOI acknowledgement letter, MS4 Acceptance Form (**Appendix A**), Owner Certification (Owner Certification Form in **Appendix A**), and Inspection Reports at the construction site until all disturbed areas have achieved final stabilization and the NOT has been submitted to the NYSDEC. The documents must be maintained in a secure location, such as a project trailer, on-site construction office, or

mailbox with lock; that is accessible during normal working hours to jurisdictional authorities performing a compliance inspection.

The Owner shall also ensure that at least one "trained contractor" is on site on a daily basis when soil disturbance activities are being performed (see definition of "trained contractor" in Section 1.3).

1.3 Contractor's Responsibilities

The Contractor is responsible for implementing this SWPPP and related project specifications and reviewing all forms, certifications, and contract drawings, in order to become familiar with all aspects related to the SPDES GP-0-20-001. The Contractor is responsible for completing the certification contained herein (see Contractor Certification Form in **Appendix A**), prior to the commencement of demolition and proposed construction activities. Each of the subcontractors involved in the implementation of erosion and sediment control measures must also indicate their specific responsibilities and sign the certification form. The Contractor is responsible for each of the subcontractors employed by the Contractor that are involved in the implementation of erosion and sediment controls for the project.

The Contractor shall retain a signed copy of this SWPPP and all associated attachments on-site from the initiation of demolition and proposed construction activities to the date of final stabilization.

It is the duty of the Contractor to properly install and maintain all erosion and sediment control measures on the site as per this SWPPP. The Contractor shall also be responsible for the daily inspection of all erosion and sediment control measures for the proposed project by a "Trained Contractor" as per this SWPPP. The Trained Contractor as defined by the General Permit "means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the trained contractor shall receive four (4) hours of training every three (3) years." Should the Owner, Owner's Representative, or any local authority having jurisdiction deem that the SWPPP or the Contractor's implementation of the SWPPP proves to be ineffective in eliminating or significantly minimizing the pollutants or achieving the goals of the SPDES GP-0-20-001, the Contractor shall take any necessary action to conform to the objectives of the permit at no additional cost to the Owner.

The Contractor shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed.

1.4 Reporting and Retention of Records

The owner or operator shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the DEC receives a complete NOT submitted in accordance with Part V. of the general permit.

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the NYSDEC Headquarters in Albany NY), all written correspondence requested by the Department, including individual permit applications, shall be sent to the appropriate DOW

Water (SPDES) Program contact at the Regional Office listed at 100 Hillside Avenue, Suite 1W, White Plains, NY 10603.

1.5 Standard Permit Conditions

The owner/operator and contractor shall familiarize themselves with the Standard Permit Conditions in Part VII of the General Permit, included in SWPPP Appendix A for reference. These standard permit conditions include, but are not limited to, requirements for:

- Clean Water Act violations
- Permit expiration and continuance
- Enforcement actions
- Duties to mitigate
- Duties to provide information to the NYSDEC
- Signatory Requirements
- Property Rights

2.0 EXISTING CONDITIONS

The Brookfield Commons campus consists of Westchester County Tax Map Section 125.83 Block 2 Lot 1, Section 125.83 Block 7 Lot 1, and Section 130.27 Block 2 Lot 1. The campus is bounded to the north by Quarropas Street, to the east by Dr. Martin Luther King Jr. Boulevard, to the south by East New York Post Road, and to the west by South Lexington Avenue. The Brookfield Commons campus is occupied by five 9-story residential towers with basements, designated by the White Plains Housing Authority as buildings No. 1 through 5, and by ancillary structures, parking lots, and playground areas.

The area of the proposed development, known as Phase 3, hereinafter referred to as the "Phase 3 site", is located near the southwestern portion of the Brookfield Commons campus (see Figure 1). The Phase 3 site is approximately 2.1 acres. The Phase 3 site is south of the on-going Phase 2 building construction, and the western portion of the Phase 3 site is currently occupied by existing Building No. 4. The remainder of the Phase 3 site is grass covered with trees, brick paved walkways, a concrete ramp, asphalt parking lots, and asphalt walkways. Elevations within the Phase 3 site range from about el. +197 to about el. +206. The Phase 3 site generally slopes downward from south to north.

As part of the Phase 3 development project, an interim parking lot will also be constructed, hereinafter referred to as "interim parking site". The interim parking site is located east of Phases 2 and 3, west of Building No. 3, and south of the Bethel Baptist Mission Church (see Figure 1). The interim parking site is approximately 0.6 acres. The interim parking site is currently occupied by existing playgrounds, a canopy structure, walking/driving paths and parking. The remainder of the site is covered by grassed and/or landscaped areas. Elevations range from about el. +196 to el. +205, with the interim parking site generally sloping downward from southwest to northeast.

2.1 Existing Drainage Patterns

Existing Conditions Drainage Area maps are included in **Appendix E** to depict drainage areas discharging to each design point (DP).

Phase 3 Site

In general, the Phase 3 site ultimately drains to one large culvert in the City right-of-way. DP-1 is designated as the 72-inch culvert in Fisher Avenue, to the northwest of the Phase 3 site. Runoff from the Phase 3 site discharges to DP-1 via two different stormwater collection networks on the Phase 3 site.

A catch basin to the north of existing Building No. 4 brings runoff from the portion of the Phase 3 site depicted as DA EX-1 through a 15-inch storm drain. Downstream to the west, the 15-inch storm drain connects with an additional catch basin and continues to an 18-inch storm drain, designated as DP-1A. An 8-inch roof leader brings runoff from the roof of existing Building No. 4 to the downstream catch basin. The 18-inch storm drain connects to a 42-inch culvert in South Lexington Avenue that ultimately drains to DP-1.

To the west of existing Building No. 4, DA EX-2 drains west away from the Phase 3 site into the right-of-way where runoff is collected by an existing catch basin to a 15-inch storm drain.

The portion of the Phase 3 site directly south of existing Building No. 4, referred to as DA EX-3, drains to two catch basins in the asphalt parking lot. The west catch basin connects to an 8-inch corrugated metal storm drain and subsequent 10-inch storm drain. The east catch basin connects to a 12-inch reinforced concrete storm drain. The storm drains meet downstream and connect to an 18-inch storm drain.

The area south of the Phase 3 site, referred to as DA EX-4, drains to two catch basins on former Brookfield Street to an 8-inch clay storm drain which connects downstream to an 18-inch storm drain. DA EX-2, DA EX-3, and DA EX-4 drain to a manhole west of existing Building No. 4 in the right-of-way, converging at DP-1C. The 18-inch storm drain leaving DP-1C connects to the 42-inch culvert in South Lexington Avenue (same as DP-1A) that ultimately drains to DP-1.

Refer to **Appendix K** for record plans of the site and city infrastructure depicting the existing storm drains described above.

Interim Parking Site

Existing catch basins drain a large area between Buildings 1, 2, and 3 and is identified as DA EX-101. The existing catch basins convey runoff through 8-inch and 10-inch storm drain pipes which connect to an existing catch basin between Building No. 3 and the church. The catch basin discharges to a 12-inch storm drain pipe designated as DP-2D (Refer to D-3A in **Appendix E**). An existing roof leader from the church also connects to the conveyance system, upstream of DP-2D. The 12-inch storm drain then conveys runoff to an 84-inch culvert in Fisher Court.

Refer to **Appendix K** for record plans of the site and city infrastructure depicting the existing storm drains described above.

2.2 Existing Soil Conditions

2.2.1 USDA Soil Description

According to USDA Web Soil Survey, the soil within the sites consists of Urban land (Uf) (**Appendix I**). The soil is not classified as a Hydrologic Soil Group (HSG). Urban land constitutes areas where at least 60% of the surface is covered by streets, parking lots, buildings, and other structures.

For the purposes of the stormwater analyses presented in this SWPPP, hydrologic soil group C is applied to the sites.

2.2.2 Geotechnical Results

In June 2021, a series of soil borings were conducted by GEODesign, Inc. across the site. Soil borings were completed to support design of the proposed building foundation. The borings indicate a 5-foot layer of uncontrolled fill underlain by layers of "Loose Sand, Medium Dense Silt, and Dense Sand."

A groundwater monitoring well was also installed on site, in addition to an existing groundwater monitoring well already installed at the site by others. Based on the results of the groundwater monitoring well readings, groundwater ranges from 4 to 6-feet below grade. The readings generally correspond to a groundwater elevation of 193 to 196-feet.

Refer to **Appendix J** for the full Geotechnical Report dated June 16, 2021.

2.3 Existing Natural Resources

2.3.1 Waterbodies

The project sites are not located along any waterbody nor do any waterbodies exist on the project sites. The city storm drainage system which captures the project site's runoff is tributary to the Bronx River.

2.3.2 303(d) Listed Waterbodies & Priority Waterbodies

According to Appendix E of the GP-0-20-001, the proposed project will not impact any waterbody in the NYS Section 303(d) List of Impaired/TMDL Waters related to segments impaired by pollutants related to construction activities.

The project is located within the watershed of the upper Bronx River, which is listed on the NYSDEC Waterbody Inventory/Priority Waterbodies List as an Impaired Segment. The known and suspected pollutants include pathogens, oxygen demand, floatables, oil/grease, silt/sediment, nutrients and salts. Impacted uses include aquatic life, recreation, and aesthetics. Sanitary discharge, urban storm runoff and streambank erosion are listed as known sources of pollutants.

2.3.3 Wetlands

There are no wetlands on the project sites.

2.4 Historic Resources

According to OPRHP correspondence dated August 20, 2021, the proposed project will have no impact on archaeological and/or historic resources listed in or eligible for the New York State and National Registers of Historic Place (see **Appendix D**).

3.0 PROPOSED PROJECT DESCRIPTION

Phase 3 Site

The proposed redevelopment of the Phase 3 site consists of constructing a 14-story, approximately 18,300 square foot, 189-unit multi-family residential apartment building. Site improvements will include an extension of the existing drive constructed as part of the Prelude and Phase 2 to former Brookfield Street,

establishment of Future Street between the Phase 2 and Phase 3 buildings, and the construction of a new parking lot to serve the proposed building. An outdoor amenity space is also proposed at the corner of Brookfield Street and Future Street.

Interim Parking Site

The proposed redevelopment of the interim parking site primarily consists of constructing 52 off-street parking spaces. A majority of the parking will be provided in a a new parking lot with a total of 42 spaces. A small drive will also be constructed to connect the new parking to existing site drives. The remaining 10 spaces will be constructed adjacent to the White Plains Housing Authority Administration building to formalize their existing parking. Access to these spaces will come from Fisher Court.

3.1 Anticipated Permits

The following is a list of anticipated authorizations for the construction activities associated with the proposed project.

3.1.1 New York State Department of Environmental Conservation

The total proposed construction activities will result 2.64 acres of disturbance which includes onsite improvements, and improvements to the adjacent sidewalks, Future Street and Brookfield Street. It also includes earth disturbance associated with developing the interim parking site. Therefore, coverage under the SPDES GP-0-20-001 is required. This SWPPP is being prepared in compliance with the requirements of the NYSDEC Stormwater Management Design Manual (SMDM) as well as the New York State Standards and Specifications for Erosion and Sediment Control.

3.2 Site Contamination

AKRF performed a Phase II subsurface investigation in May 2021, including six borings with collection of 12 soil samples, four temporary wells and collection of four groundwater samples, and collection of four soil vapor samples. Laboratory analysis indicated presence of varying levels of metals, lead, PCBs, PCE, VOCs and SVOCs. Based on the results of the investigation, the project is applying for coverage under the state's Brownfield Clean-Up Program (BCP). Initial earth moving activities at the site will be governed by the BCP or an individual SPDES permit.

4.0 POST-CONSTRUCTION STORMWATER PRACTICES

The proposed project is a redevelopment of previously developed portions of land consisting of largely impervious building and pavement surfaces. As a redevelopment project, the guidelines established in Chapter 9 of the New York State Stormwater Management Design Manual (NYSSMDM) are applicable. The proposed project will create an increase in impervious areas. Green infrastructure practices, including bioretention basins, a stormwater planter, and a green roof system (intensive), are proposed to meet Runoff Reduction (RRv) and Water Quality Volume (WQv) requirements. Hydrodynamic separators are also proposed to treat the remaining redeveloped impervious areas not captured by the green infrastructure practices. A subsurface detention system is proposed to attenuate the increase in stormwater quantity for the 1, 10 and 100-year storm events.

4.1 Water Quality Calculations

The proposed project improvements will increase impervious area and therefore necessitate water quality and runoff reduction volumes treatment requirements (See Figures D-1 and D-2 in **Appendix E**).

Since alternative stormwater management practices (SMP) have been proposed and the project includes both new development and redevelopment activities, treatment is required for 75% of the redevelopment areas and 100% of the new development area. The required water quality volume is calculated by taking a weighted average of the new development and redevelopment areas. The required Runoff Reduction Volume is based only on the new impervious area.

Phase 3 Site

The water quality volume and runoff reduction volume requirements for the Phase 3 Site are summarized in Table 1. See **Appendix F** for calculations.

Table 1: Water Quality Volume & Runoff Reduction Volume Summary for the Phase 3 Site

Factor	Amount
Total Site Area within Limit of Disturbance	90,926 SF
New Impervious Area	13,472 SF
Redeveloped Impervious Area	66,042 SF
Required Water Quality Volume	7,538 CF
Provided Water Quality Volume	8,807CF
Required Runoff Reduction Volume	480 CF
Provided Runoff Reduction Volume	1,267 CF

A total of six treatment practices are proposed on the Phase 3 site. The practices include a stormwater planter, a green roof system (intensive), a bioretention basins, and three hydrodynamic separators. Additionally, an existing hydrodynamic separator proposed during Phase 2 will be used for treatment. Due to the presence of shallow groundwater at the site, infiltration practices are not feasible for stormwater treatment and runoff reduction. Refer to Figure D-4 in **Appendix E** for a depiction of the drainage area to each stormwater treatment practice.

The flow-through stormwater planter, described in Section 5.3.9 of the NYSSMDM, is provided to treat runoff from the building roof within PR-2. This section of roof is mostly impervious with four extensive green roof areas. Runoff from PR-2 flows to a roof drain which conveys runoff to ground-level via plumbing within the proposed building. The runoff enters the stormwater planter through elevated downspouts arranged above the planter. The stormwater planter consists of an 18-inch-thick soil media on a 12-inch-thick drainage layer. A perforated underdrain connects the planter to a storm drain which leads to the proposed detention system. An overflow drain is located in the planter to direct flow to the proposed detention system when maximum ponding depth is exceeded.

The intensive green roof system is provided to treat runoff from the building roof within PR-5. In general, the northern half of the roof is the intensive green roof section, and the southern half is impervious area. Section 5.3.8 of the NYSSMDM (Green Roof Sizing and Design Criteria) states "The green roof area can be used as either an impervious area reduction or a volume reduction but not both." The proposed intensive green roof is used as a water quality volume reduction practice to provide treatment of the adjacent impervious roof area. As such, the intensive green roof is considered an impervious surface for the purposes of the stormwater quality calculations. The green roof section consists of an 8-inch thick soil media on an 8-inch thick drainage layer. The storage volume of the green roof system is greater than the calculated water quality volume for the building roof within PR-5. The green roof provides treatment of the water quality volume and runoff reduction.

One bioretention basin (F-5), as described in section 6.4 of the NYSSMDM, has been sized to treat the contributing water quality volume from the southeast quadrant of the proposed parking lot. The bioretention basin provides water quality treatment of the contributing drainage area (PR-11) and provides a 40% runoff reduction capacity in accordance with Table 3.5 of the NYSSMDM. An overflow catch basin is located in the bioretention basin to direct flow greater than the WQv flow to the proposed detention system.

Sizing calculations for the stormwater planter, bioretention basin and green roof have been performed using the NYSDEC sizing spreadsheets and are included with the water quality calculations in **Appendix F**.

As an alternative SMP established in section 9.2.1B.III of the NYSDEC SMDM, the First Defense units by Hydro International ("HDS units") will be installed to treat the water quality volume of the areas not captured by the stormwater planter, bioretention basin and green roof. HDS units treat runoff from the roof of the proposed Phase 3 building (PR-3, PR-4, and PR-5), the northeast quadrant of the interior parking lot (PR-7), the northwest quadrant of the interior parking lot (PR-8), the runoff from the inside corner of the building (PR-9), the southwest corner of the interior parking lot (PR-10), and runoff from the parking lot south of the building (PR-1). The three proposed HDS units are inline units that will treat runoff prior to discharge into the on-site detention system. An existing four-foot Downstream Defender HDS unit installed during Phase 2 will treat runoff from Future Street and the east side of the site (PR-16).

The three-foot diameter First Defense units have maximum flow rate of 15 CFS and a maximum treatment flow rate of 0.85 CFS for removal of total suspended solids (TSS). The combined water quality flow rate for drainage areas PR-1 and PR-10 is 0.40 CFS. The combined water quality flow rate for drainage areas PR-3, PR-4, PR-5, PR-8 and PR-9 is 0.55 CFS. The water quality flow rate for drainage area PR-7 is 0.14 CFS. The flow rate to each HDS unit is less than the maximum treatment flow rate for a three-foot diameter First Defense.

The existing four-foot diameter Downstream Defender has a maximum treatment flow rate of 1.12 CFS for removal of TSS. The water quality flow rate for drainage area PR-16 is 1.11 CFS, which is less than the maximum treatment flow rate for a four-foot diameter Downstream Defender.

Treated runoff from the First Defense units and existing Downstream Defender will be directed back into the stormwater conveyance systems which connect into the offsite storm drainage system. The provided water quality treatment and runoff reduction is summarized in Table 2.

Table 2: Water Quality and Runoff Reduction Volumes Provided for Phase 3 Site

Drainage Area	Treatment Practice	WQv Provided (CF)	RRv Provided (CF)
PR-1	Hydrodynamic Separator	1,215	0
PR-2	Stormwater Planter	440	198
PR-3	Hydrodynamic Separator	390	0
PR-4	Hydrodynamic Separator	177	0
PR-5	Green Roof	928	928
PR-7	Hydrodynamic Separator	516	0
PR-8	Hydrodynamic Separator	352	0
PR-9	Hydrodynamic Separator	126	0
PR-10	Hydrodynamic Separator	219	0
PR-11	Bioretention	307	141
PR-14	Hydrodynamic Separator	186	0
PR-16	HDS EX	3,951	0
Total		**8,807**	**1,267**

The provided WQv of 8,807 CF exceeds the required WQv of 7,538 CF. The provided RRv of 1,267 CF exceeds the required RRv of 480 CF.

Interim Parking Site

The water quality volume and runoff reduction volume requirements for the Interim Parking Site are summarized in Table 3. See **Appendix F** for calculations.

One bioretention basin (F-5), as described in section 6.4 of the NYSSMDM, has been sized to treat the contributing water quality volume from the east side of the middle proposed parking bay. The bioretention basin provides water quality treatment of the contributing drainage area (PR-103) and provides a 40% runoff reduction capacity in accordance with Table 3.5 of the NYSSMDM. An overflow catch basin is located in the bioretention basin to direct flow greater than the WQv flow to the proposed conveyance system.

Table 3: Water Quality Volume & Runoff Reduction Volume Summary for Interim Parking Site

Factor	Amount
Total Site Area within Limit of Disturbance	27,335 SF
New Impervious Area	1,920 SF
Redeveloped Impervious Area	20,125 SF
Required Water Quality Volume	2,046 CF
Provided Water Quality Volume	2,433 CF
Required Runoff Reduction Volume	68 CF
Provided Runoff Reduction Volume	95 CF

A total of two treatment practices are proposed on the Interim Parking site. The practices include a bioretention basin and a hydrodynamic separator. Due to the presence of shallow groundwater at the site, infiltration practices are not feasible for stormwater treatment and runoff reduction. Refer to Figure D-4A in **Appendix E** for a depiction of the drainage area to each stormwater treatment practice.

As an alternative SMP established in section 9.2.1B.III of the NYSDEC SMDM, the First Defense unit by Hydro International ("HDS units") will be installed to treat the water quality volume of the areas not captured by the bioretention basin. An HDS unit treats runoff from a portion of the proposed interim parking area (PR-103). The proposed HDS unit is an inline unit that will treat runoff prior to discharge to the conveyance system.

The three-foot diameter First Defense units have maximum flow rate of 15 CFS and a maximum treatment flow rate of 0.85 CFS for removal of total suspended solids (TSS). The water quality flow rate for drainage area PR-101 and PR-102 is 0.62 CFS, which is less than the maximum treatment flow rate for a three-foot diameter First Defense.

Treated runoff from the First Defense unit will be directed back into the stormwater conveyance system which connects into the offsite storm drainage system. The provided water quality treatment and runoff reduction is summarized in Table 4.

Table 4: Water Quality and Runoff Reduction Volumes Provided for Interim Parking Site

Drainage Area	Treatment Practice	WQv Provided (CF)	RRv Provided (CF)
PR-101	Hydrodynamic Separator	1,905	0
PR-102		294	0
PR-103	Bioretention	234	95
Total		**2,433**	**95**

The provided WQv of 2,433 CF exceeds the required WQv of 2,046 CF. The provided RRv of 95 CF exceeds the required RRv of 68 CF.

4.2 Water Quantity Calculations

Existing and proposed conditions were modeled in HydroCAD version 10 using the 24-hour extreme precipitation events as obtained from the Northeast Regional Climate Center (**Appendix G**). The Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service (SCS)) Type III rainfall distribution hydrograph was used to model the storm events.

Phase 3 Site

As described in Section 2.1 of this SWPPP, runoff from the Phase 3 Site is conveyed to the 72-inch culvert in Fisher Avenue (DP-1) via two on-site catch basin systems (DP-1A and DP-1C).

Figures D-3 and D-4 in **Appendix E** depict drainage areas and design points for existing and developed conditions respectively. Results of the Hydrologic Analyses are included **Appendix G** and are summarized below.

DP-1A – 18-inch Culvert Crossing South Lexington Avenue

Under existing conditions (including Phase 2 construction), stormwater runoff from existing Building No. 4 (159 South Lexington Avenue) along with runoff from the basketball courts, adjacent landscaped areas, and partially developed Future Street is collected by onsite catch basins that drain into an 18-inch storm drain connecting to an 18-inch culvert that crosses South Lexington Avenue (DP-1A).

During construction of the proposed building, new catch basins will be constructed on Former Brookfield Street just south of the proposed driveway and just south of the corner of Future Street and Former Brookfield Street, connected with 15-inch storm drains to the existing catch basins on Future Street. A trench drain at the pedestrian path northeast of the proposed building drains through a 12-inch storm drain to the catch basin on future street. The onsite catch basins drain to the 18-inch storm drain along the South Lexington Avenue curb line that discharges to the existing 18-inch culvert. Table 5 summarizes the comparison of existing and developed peak flow to DP-1A.

Table 5: Summary of Existing/Proposed Peak Flow Rates at DP-1A

Storm Event	Design Point 1A		
	Existing (CFS)	Developed (CFS)	% Change
1	3.3	2.2	-33%
10	6.7	4.4	-34%
25	8.6	5.6	-34%
50	10.3	6.7	-35%
100	12.4	8.0	-35%

DP-1C – 18-inch Pipe at West Side of Proposed Building

Under existing conditions, the portion of the site west of existing Building No. 4 drains to the right-of way to a catch basin on South Lexington Avenue which connects to the existing 18-inch pipe crossing South Lexington Avenue (DP-1C). The portion of the Site south of existing

Building No. 4 drains to two existing on-site catch basins. The offsite area to the south and east of the Site, consisting of small commercial buildings, a parking lot, and a section of Former Brookfield Street, drain to two offsite catch basins on Former Brookfield Street which drain to the 18-inch pipe crossing South Lexington Avenue.

Stormwater runoff from the proposed building and parking lot will be routed to a proposed subsurface detention system prior to discharging to a 24-inch HDPE storm drain that will connect to the 18-inch pipe crossing South Lexington Avenue. The detention system consists of 1,400 linear feet of watertight 30" HDPE pipe in a stone envelope. Due to the relatively high groundwater at the site, a shallow detention system profile is required. The system invert sits at elevation 195.40.

An outlet control structure provides detention of peak flow rates discharging to DP-1C for the 1, 10, and 100-year storm events. The outlet control structure includes a weir wall with a 7-inch diameter low-flow orifice, and a 12-inch long by 6-inch high high-flow orifice. The weir wall elevation is set to elevation 197.8 for extreme flows. Table 6 summarizes the comparison of existing and developed, detained peak flows to DP-1C.

Table 6: Summary of Existing/Proposed Peak Flow Rates at DP-1C

Storm Event	Design Point 1C		
	Existing (CFS)	Developed (CFS)	% Change
1	5.8	5.8	0%
10	11.4	11.1	-3%
25	14.5	14.4	-1%
50	17.4	17.2	-1%
100	20.8	20.5	-1%

DP-1 – 72-inch Culvert in Fisher Avenue

Under existing conditions, stormwater runoff that is routed to DP-1A and DP-1C is ultimately discharged to an existing 72-inch Culvert in Fisher Avenue (DP-1).

Underdeveloped conditions, runoff routed to DP-1A and DP-1C will continue to ultimately drain to DP-1. Table 7 summarizes the comparison of existing and developed peak flow to DP-1.

Table 7: Summary of Existing/Proposed Peak Flow Rates at DP-1

Storm Event	Design Point 1		
	Existing (CFS)	Developed (CFS)	% Change
1	9.1	8.0	-12%
10	18.1	15.4	-15%
25	23.1	20.0	-15%
50	27.7	23.9	-14%
100	33.3	28.5	-14%

Interim Parking Site

As described in Section 2.1 of this SWPPP, runoff from the Interim Parking Site is conveyed to a 12-inch storm drain pipe which discharges to an 84-inch culvert in Fisher Court.

Figures D-3A and D-4A in **Appendix E** depict drainage areas and design points for existing and developed conditions respectively. Results of the Hydrologic Analyses are included **Appendix G** and are summarized below.

DP-2D – 12-inch Storm Drain to Fisher Court

Under existing conditions, stormwater runoff from the existing playgrounds and canopy structure, existing walking/driving paths, existing parking and grassed areas, and the Bethel Baptist Mission Church, are collected in roof leaders and catch basins and conveyed through an on-site drainage system to a 12-inch drain (DP-2D) which connects to the 84-inch culvert in Fisher Court.

Under developed conditions, the area will be regraded for the proposed parking and a new on-site collection and conveyance system will be installed. The existing church roof leader will be connected to the new system, and new catch basins will be installed at low points and convey runoff through 12-inch storm drain pipes to a new manhole structure at DP-2D. Table 8 summarizes the comparison of existing and developed peak flow to DP-2D.

Table 8: Summary of Existing/Proposed Peak Flow Rates at DP-2D

Storm Event	Design Point 1		
	Existing (CFS)	Developed (CFS)	% Change
1	2.4	2.4	0%
10	5.1	5.2	2%
25	6.6	6.7	2%
50	8.0	8.1	1%
100	9.7	9.8	1%

Under developed conditions there is no increase in peak flows from existing conditions for the 1-year storm event. For the 10- and 100-year storm events, there is a minor increase of 0.1 CFS representing an increase in peak flow rates of 2% and 1%, respectively, for the developed condition.

4.3 Overall Project Water Quality and Water Quantity Summary

Stormwater management requirements for the Phase 3 site and Interim Parking Area are presented as separate analyses above. For the purposes of completing the NYSDEC Notice of Intent, WQv, RRv and Peak Flow values are aggregated in the tables below.

Table 9: Water Quality and Runoff Reduction Volumes Provided for Overall Project

Factor	Phase 3 Site	Interim Parking	Overall Project	Overall Project (NOI)
Total Site Area within Limit of Disturbance	90,926 SF	27,335 SF	118,261 SF	**2.7 Ac**
New Impervious Area	13,472 SF	1,920 SF	15,392 SF	**0.4 Ac**
Redeveloped Impervious Area	66,042 SF	20,125 SF	86,167 SF	**2.0 Ac**
Required Water Quality Volume	7,538 CF	2,046 CF	9,584 CF	**0.2200 Ac-Ft**
Provided Water Quality Volume	8,807CF	2,433 CF	11,240 CF	**0.2580 Ac-Ft**
Required Runoff Reduction Volume	480 CF	68 CF	548 CF	**0.0126 Ac-Ft**
Provided Runoff Reduction Volume	1,267 CF	95 CF	1,362 CF	**0.0313 Ac-Ft**

Table 10: Summary of Existing/Proposed Peak Flow Rates for Overall Project

Storm Event	Existing DP-1 (CFS)	Existing DP-2 (CFS)	Existing Overall (CFS)	Developed DP-1 (CFS)	Developed DP-2 (CFS)	Developed Overall (CFS)	% Change
1	9.1	2.4	**11.5**	8.0	2.4	**10.4**	-10%
10	18.1	5.1	**23.2**	15.4	5.2	**20.6**	-11%
25	23.1	6.6	**29.7**	20.0	6.7	**26.7**	-10%
50	27.7	8.0	**35.7**	23.9	8.1	**32.0**	-10%
100	33.3	9.7	**43.0**	28.5	9.8	**38.3**	-11%

4.4 Master Plan Stormwater Management Approach

The proposed project is intended to be the third phase of the overall Winbrook Housing Campus redevelopment project. The Prelude site was considered the first phase, and Brookfield Phase 2 the second phase.

The Phase 3 project would be considered part of a larger common plan of development for the master plan. Subsequent phases of the Master Plan would require development of individual stormwater management plans and SWPPPs. Due the presence of impervious surfaces throughout

the site, each phase of development is expected be designed per the redevelopment criteria in Chapter 9 of the NYSSMDM.

5.0 TEMPORARY EROSION AND SEDIMENT CONTROLS

The proposed work on the site will require demolition and excavation of the existing impervious surfaces and the removal of established vegetated areas, resulting in the exposure of soil to natural forces. If not properly managed, the temporary exposure of bare soil accelerates the potential for erosion. This acceleration in soil erosion could potentially lead to sedimentation in the onsite and offsite stormwater drainage systems. Measures to avoid impacts from the construction of the proposed project are discussed below.

The anticipated construction period for the site is expected to be Spring 2022 through Fall 2024.

5.1 **Erosion and Sediment Control Practices**

The following are specific erosion control measures as identified on the Erosion and Sediment Control Plan and Detail Drawings. Refer to drawings C-201 in **SWPPP Appendix C** for temporary erosion and sedimentation control plans and details within the project limits.

5.1.1 **Stabilized Construction Entrance / Exit (SCE)**

The construction entrance/exit shall have a stabilized aggregate pad underlain with filter cloth to prevent construction vehicles from tracking sediment off-site. The stabilized construction entrance is to be located at specific transition areas between concrete/asphalt to exposed earth.

5.1.2 **Silt Fence**

Silt fence shall be installed on the down gradient edge of disturbed areas parallel to existing or proposed contours or along the property line as perimeter control. Silt fence is to be used where stakes can be properly driven into the ground as per the Silt Fence detail in the New York State Standards and Specifications for Erosion and Sediment Control and as shown on the Erosion and Sediment Control Plan.

Silt fence controls sediment runoff where the soil has been disturbed by slowing the flow of water and encouraging the deposition of sediment before the water passes through the straw bale or silt fence. Built-up sediment shall be removed from silt fences when it has reached one-third the height of the bale/fence and properly disposed.

5.1.3 **Inlet Protection**

Inlet protection shall be installed at all drainage structure inlets during construction. The inlet protection shall be constructed in accordance with NYSDEC Standards and Specifications for Erosion and Sediment Control and the construction details provided on the drawings. Typically, they should be constructed to pass stormwater through, but prevent silt and sediment from entering the drainage system.

5.1.4 **Soil Stockpile**

Stockpiled soil is to be protected, stabilized, and sited in accordance with the Material Stockpiling Detail, as shown on the Erosion and Sediment Control Detail sheets. Soil

stockpiles and exposed soil shall be stabilized by seed, mulch, or other appropriate measures, when activities temporarily cease during construction for 7 days or more in accordance with NYSDEC requirements.

5.1.5 Dust Control

During the demolition and construction process, debris and any disturbed earth shall be wet down with water, if necessary, to control dust. Other NYSDOT approved dust palliatives may be used. See the following website for the latest list of approved dust palliatives: https://www.dot.ny.gov/divisions/engineering/environmental-analysis/water-ecology/stormwater-management. After demolition and construction activities, all disturbed areas shall be covered and/or vegetated to provide for dust control on the site.

5.1.6 Soil Stabilization

In areas where construction activities have ceased, temporary seeding or permanent landscaping shall be performed to control sediment-laden runoff and provide stabilization to control erosion during storm events. The contractor shall apply soil stabilizer in accordance with NYSDOT specifications and manufacturer's requirements. This temporary seeding/stabilization or permanent landscaping shall be in place no later than 7 days after demolition and construction activity has ceased.

5.1.7 Materials Handling

The Contractor must store construction and waste materials as far as practical from any environmentally sensitive areas. Where possible, materials shall be stored in a covered area to minimize any potential runoff. The Contractor shall incorporate storage practices to minimize exposure of the materials to stormwater, and spill prevention and response where practicable. Prior to commencing any construction activities, the Contractor shall obtain all necessary permits or verify that all permits have been obtained.

5.1.8 Dewatering

If required, GP-0-20-001 authorizes limited non-stormwater discharges including uncontaminated discharges from construction site dewatering operations. Any contaminated discharges must be properly permitted by the applicable regulatory authority and are not covered under this SWPPP.

Dewatering of contaminated groundwater may be required for construction activities. If so, the contractor will be required to pump the extracted fluids and either containerize it for off-site disposal or treat the water for disposal into the storm sewer. The treatment system would consist of, at a minimum, a fractionation tank, particulate filtration, and granular activated carbon absorption prior to storm sewer discharge. Permits/approval shall be obtained for any discharge to the storm sewer by the Westchester County Department of Environmental Facilities (WCDEP), the New York State Department of Environmental Conservation (NYSDEC) and the City of White Plains.

5.2 Sequence of Construction

1. A pre-construction meeting shall be held with representatives of the City, certified professional trained contractor, the engineer, and the representatives of any other applicable

organizations prior to any site disturbance. Any potential changes to the Erosion and Sediment Control Plan should be discussed at this meeting.

2. Prior to any construction activities, the contractor shall install stabilized construction entrances/exits and construction access areas as shown on the plan.
3. Install silt fence and perimeter controls, including inlet protection of adjacent on and off-site drainage structures, as indicated on the Erosion and Sediment Control Plan. Install site perimeter controls.
4. Prior to the start of construction, The City of White Plains Engineering Department must be contacted for a Sediment and Erosion Control Inspection.
5. Prior to the start of any construction associated with the building/site work, construction of public sanitary sewer and water main improvements shall be completed. Work shall consist of sawcutting an open trench to replace existing water/sewer mains. Following completion of the work, the trench shall be backfilled and patched with temporary/final pavement.
6. Disconnect and cap or abandon all necessary utility connections in accordance with all applicable ordinances. Begin demolition of existing building/pavements and clearing/grubbing in accordance with construction documents.
7. Soil stockpiles shall be protected by erosion and sediment controls as indicated by the drawings and details. When possible, soil stockpile should be located on grassy areas.
8. Begin excavation of proposed building footprint. Construct utility lines as needed to facilitate site drainage.
9. Begin construction of building, associated driveways, stormwater infrastructure and sanitary/water/electric/telecom utilities.
10. Install inlet protection immediately after installing drainage structures. Inlet protection shall remain installed and be maintained until all tributary areas are fully stabilized.
11. Once building and paved surfaces are complete, complete final grading in adjacent areas. Stabilize with appropriate measures as required.
12. Install bioretention soil media once tributary areas are fully stabilized. Bioretention basin shall not be used as an erosion and sediment control practice. It shall not receive sediment laden water.
13. Once tributary areas are fully stabilized, inlet protection can be removed. Drainage infrastructure shall be cleaned of any accumulated debris and sediment.
14. Remaining perimeter controls can be removed.

Notes:

1. Unsuitable material, construction debris, etc. shall be properly removed and disposed of off-site in accordance with applicable state and local codes, ordinances, and laws.
2. Dewatering – Contractor shall not discharge any groundwater into the existing stormwater drainage systems or into the waters of the State of New York unless NYSDEC and Westchester County permits have been obtained.

3. Contactor to provide dust control as required using a NYSDOT and NYSDEC approved dust palliative. See the following website for the latest list of approved dust palliatives: https://www.nysdot.gov/divisions/engineering/environmental-analysis/water-ecology/stormwater-management.

6.0 INSPECTION AND MAINTENANCE

6.1 Inspections and Record Keeping During Construction

Once the contract has been awarded, the name, address, and phone number of responsible parties for maintenance will be provided to the NYSDEC. The following is a description of the maintenance and inspection practices that will be implemented as part of the project. Maintenance and inspection are important to ensure that the stabilization and structural practices that are part of the SWPPP continue to be effective in preventing sediment and other pollutants from entering the stormwater system. It is the responsibility of the Owner or Operator/Applicant to ensure that inspections are completed in accordance with NYSDEC regulations. As described in Section III.A.6. of the General Permit, a Trained Contractor shall be responsible for the implementation of this SWPPP report, which shall include installing, constructing, repairing, replacing, inspecting, and maintaining erosion and sediment controls. The Trained Contractor shall be responsible for the construction of the post-construction stormwater management practices and shall be present onsite during all soil disturbance activities. At least one Trained Contractor shall be on site daily when soil disturbance activities are being performed.

6.2 Erosion and Sediment Control Inspection Report

As a part of the SWPPP inspection and maintenance activities during construction, the Erosion and Sediment Control Inspection Report shall be updated and kept on-site. A sample Erosion and Sediment Control Inspection Report is provided in **SWPPP Appendix B** of this report.

Inspections are to be conducted by the Qualified Inspector periodically according to the schedule required by the SPDES GP-0-20-001. During each inspection, the Qualified Inspector would record the areas of disturbance, deficiencies in erosion and sediment control practices, required maintenance, and areas of temporary or permanent stabilization. The need for modifications to the Erosion and Sediment Control Plan should be identified and implemented immediately.

The Erosion and Sediment Control Inspection Report will be completed by a Qualified Inspector to fully document each inspection. A Qualified Inspector is a person knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed Landscape Architect, or other NYSDEC endorsed individual(s). It also means someone working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect, provided the person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing the site inspection has received four hours of training, which has been endorsed by the NYSDEC, from a Soil and Water Conservation District, CPESC, Inc., or other NYSDEC endorsed entity, in proper erosion and sediment control principles no later than two years from the date SPDES GP-0-20-001 is issued. After receiving the initial training, an individual working under the direct supervision of the licensed Professional Engineer or licensed Landscape Architect shall receive four hours of training every three years.

6.3 **Inspections**

Inspections shall be conducted by the Qualified Inspector periodically according to the following schedule:

1. When construction activities are ongoing, the Qualified Inspector shall conduct a site inspection at least once every seven (7) calendar days.
2. If soil disturbance activities have been temporarily suspended (e.g., winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the Qualified Inspector shall conduct a site inspection at least once every thirty (30) calendar days. The Owner or Operator/Applicant shall notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections.
3. If soil disturbance activities have been shut down with partial project completion, the Qualified Inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The Owner or Operator/Applicant shall notify the Regional Office stormwater contact person in writing prior to the shutdown. If soil disturbance activities have not resumed within 2 years from the date of shutdown, the Owner or Operator/Applicant shall have the Qualified Inspector(s) perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed, and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the Notice of Termination (NOT). The Owner or Operator/Applicant shall then submit the completed NOT form in accordance with NYSDEC regulations.

During each inspection, the Qualified Inspector should fill out the Erosion and Sediment Control Inspection Report as directed below:

On the Erosion and Sediment Control Inspection Report site map, show the following:

- Disturbed site areas and drainage pathways.
- Site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period.
- Site areas that have undergone temporary or permanent stabilization.
- In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within fourteen (14) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.
- Photographs, including date stamp, of any deficiencies and recommendations.

- As deficiencies are fixed by the Contractor, a photograph, include date stamp, should be included in the report.
- Photograph of each outfall during a rain event.

Record the following information on the Erosion and Sediment Control Inspection Report:

- Date and time of inspection;
- Name and title of persons completing the inspection;
- A description of weather and soil conditions (e.g., dry, wet, saturated) at the time of inspection;
- Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;
- Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly, not per specification, or are not functioning as designed and need to be reinstalled or replaced;
- Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume in the allocated location on the Inspection Form Chart (i.e., 10 percent, 20 percent, and 50 percent).
- Corrective action(s) that must be taken to install, repair, replace, supplement, or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);
- Identification and status of all corrective actions that were required by the previous inspection;
- As deficiencies are fixed by the Contractor and/or corrective actions completed, a photograph, including date stamp, must also be included in the report.
- A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e., pipes, culverts, ditches, etc.) and overland flow;
- A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody.

The Qualified Inspector will give a brief explanation for all locations where he/she has noted that the erosion and sediment control practice was either not in conformance with specifications or in need of repair. This should be noted in the Erosion and Sediment Control Inspection Report. The Qualified Inspector will then give a brief recommendation for soil erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.

6.4 Erosion and Sediment Control Maintenance Measures

All maintenance described below shall be completed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control. Any material removed from erosion and sediment control measure shall be properly disposed.

All measures will be maintained in good working order; if repairs are found to be necessary, the Qualified Inspector shall notify the Owner or Operator/Applicant and appropriate Contractor (and Subcontractor) of any corrective actions needed within one business day. The Contractor (or Subcontractor) shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

A maintenance inspection report, titled "Erosion and Sediment Control Inspection Report," will be made after each inspection conducted by a Qualified Inspector.

Disturbed areas and material storage areas will be inspected for evidence of potential pollutants entering stormwater systems. Within one business day of the completion of the inspection, the Qualified Inspector shall notify the Owner or Operator/Applicant and the appropriate Contractor (or Subcontractor) of any corrective actions that need to be taken. The Contractor (or Subcontractor) shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame. A Record of Stabilization and Construction Activities will be prepared and kept on file with the completed Construction Duration Inspection Forms.

The following are the maintenance requirements for each practice that will be implemented at the site.

6.4.1 Stabilized Construction Entrance/Exit

The stabilized construction entrance/exit shall be maintained in a condition that will prevent the tracking or flow of sediment onto public rights-of-way. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately; streets shall be swept as needed. The gravel pad shall be replaced as necessary. Sediment tracked onto public streets should be removed on a daily basis.

6.4.2 Silt Fence

Maintenance of all silt fences shall be performed as needed. If a silt fence is knocked down, it shall be replaced immediately. When a silt fence appears deteriorated or ineffective and/or built up sediment reaches one-third the height of the bale or fence, the silt fence shall be replaced and/or cleaned accordingly. When "bulges" of material develop on the fence, they shall be removed.

6.4.3 Inlet Protection

Maintenance and inspection of the filter fabric cloth beneath inlet grates in paved and unpaved areas and/or the filter fabric at curb inlets shall be conducted. Where stone & block or curb drop inlet protection is utilized, the contractor shall also regularly inspect and maintain the stone and/or gravel filter. The filter fabric cloth and/or stone/gravel shall be cleaned of accumulated sediment and debris to allow water to pass and prevent clogging of the drainage structure. The drainage inlet protection should be inspected for integrity and visible sediment buildup. Collected sediment should be removed from the drainage inlet

protection and shall be disposed of properly in accordance with all applicable local, state, and federal requirements.

6.4.4 Soil Stockpile

The silt fencing should be inspected for bulges and proper installation. The soil stockpile should be stabilized with grass or NYSDEC approved rolled erosion control product.

6.4.5 Dust Control

The Contractor shall maintain all dust control measures through dry weather periods until all disturbed areas are stabilized.

6.4.6 Soil Stabilization

To ensure that the site is properly seeded and stabilized, the Contractor must initiate stabilization measures as soon as practicable in areas of the site where construction activities have permanently ceased and in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. The Contractor will be responsible for the maintenance of the vegetated cover for the duration of construction activities. The areas shall be monitored to ensure that vegetation achieves good coverage over the entire disturbed section. Additional seeding shall be completed as needed. Watering shall be provided as needed.

In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

6.5 Post-Construction Operation and Maintenance

Following completion of construction, a long-term inspection and maintenance program will be implemented to ensure the proper function of the stormwater management system. The program will be carried out by the Owner. A detailed checklist of the stormwater management system inspection and maintenance is included in the **Appendix H**.

The stormwater maintenance program will include the following:

6.5.1 Drainage Structures & Drainage Pipe

Drainage structures and pipe shall be maintained in accordance with the following guidelines:

- Drainage structures and drainage pipe shall be completely cleaned of accumulated debris and sediment upon the completion of construction activities.
- Drainage structures and pipes shall be inspected annually. Accumulated debris and sediment should be removed, and repairs made immediately as necessary.
- Drainage structure sumps shall be cleaned of accumulated sediment when the height of accumulated sediment in the sump is half the height of the sump.

6.5.2 Hydrodynamic Separator

The hydrodynamic separators shall be maintained in accordance with the manufacture's guidelines and the guidelines below:

- Hydrodynamic separators shall be inspected every six months for the first year to determine maintenance schedule which shall be at least once a year.
- Accumulated oil, debris and sediment should be removed, and repairs made immediately as necessary.

6.5.3 Bioretention Basin

Bioretention basin shall be maintained in accordance with the guidelines established in the New York State Stormwater Management Design Manual (latest edition), including:

- Maintenance responsibility for the bioretention basin and its buffers shall be vested with a responsible authority by means of a legally binding and enforceable maintenance agreement that is executed as a condition of plan approval.
- Structural components (overflow structure, grates, pipe, etc.) of the bioretention basin shall be inspected on an annual basis and repairs should be made immediately as required.
- Bioretention basin shall be inspected for accumulated silt and sediment at least annually following the spring melt condition.
- Silt and sediment shall be removed from the filter bed when accumulation exceeds one inch.
- When the filtering capacity substantially diminishes (when water ponds on the filter bed surface for more than 48 hours), then the top few inches of discolored material shall be removed and replaced with fresh material.
- Areas devoid of mulch shall be re-mulched on an annual basis.
- Dead or diseased plants shall be replaced.
- Removed material shall be disposed of in accordance with the regulations established by applicable governing agencies.
- In the event the bioretention basin becomes irreparably clogged, then an engineer should be retained to determine how to restore the basin to its original condition.

6.5.4 Green Roof

The Green Roof shall be maintained in accordance with the guidelines established in the New York State Stormwater Management Design Manual (latest edition), including:

- Clear roof drains when soil substrate, vegetation or debris clogs the drain inlet.

- Confirm uniform plant cover across green roof section.
- Check for weeds and manually remove as required.
- Apply slow release fertilizer as needed.
- Test growing media and apply amendments as needed.

6.5.5 Detention System (30" HDPE Pipe)

The detention system shall be maintained in accordance with the manufacture's guidelines. The manufacturer's operation and maintenance document is included in Appendix H. Maintenance shall be performed according to the suggested maintenance procedures contained in the manual.

6.5.6 Stormwater Planter

The Stormwater Planter shall be maintained in accordance with the guidelines established in the New York State Stormwater Management Design Manual (latest edition), including:

- Following construction, inspect planter structure after each storm event greater than 0.5 inches and at least twice in the first six months. Subsequently, inspect planter structure seasonally and after storm events equal to or exceeding the 1-year storm event.
- Remove debris and trash on a weekly or monthly basis, depending on rate of accumulation.
- Routine maintenance including pruning and replacing dead or dying vegetation, plant thinning, and erosion repair should be completed.
- Inspect plant bed for sediment build-up and remove and dispose of properly, as needed.
- Inspect splash pad for signs of erosion. Replace stones as necessary.
- Inspect roof leader connections and remove sediment and blockages as necessary.

7.0 POLLUTION PREVENTION MEASURES

7.1 Litter, Debris and Waste Materials

Litter, debris, and any waste materials shall not be permitted to enter or affect the stormwater system. During construction, waste materials shall be regularly collected in appropriate containers and areas. Storage contains should be covered prior to rainfall events. The Contractor shall collect waste materials and transport off-site in accordance with all local and state ordinances. A system of erosion and sediment controls, such as silt sack inlet protection, will be installed to prevent waste materials from entering the stormwater system. Regular collection of waste materials, proper disposal and catch basin sumps will prevent waste materials from entering the stormwater system after construction is completed.

7.2 Chemicals, Hazardous Materials, and Spill Prevention and Spill Cleanup

During construction, the Contractor must store construction materials/equipment, chemicals, and any potentially hazardous materials as far as practical from any environmentally sensitive areas. Where possible, materials shall be stored in a covered area to minimize any potential runoff. The Contractor shall incorporate storage practices to minimize exposure of the materials to stormwater. The Contractor shall implement necessary spill prevention and response. The Contractor is to regularly inspect for potential or active spills. The contractor shall work to prevent spills and immediately contain, remove, and dispose of spills. Any potentially impactful spill shall be immediately notified to the appropriate authority. Prior to commencing any construction activities, the Contractor shall obtain all necessary permits or verify that all permits have been obtained. All post-construction chemical and hazardous material storage and handling shall be in compliance with all applicable local, state, and federal ordinances.

In the event of a spill, the contractor shall take immediate action for rapid clean up. The contractor shall immediately contain the spread of the spill and recover spilled materials. The contractor shall clean the area and properly dispose of cleanup materials. The contractor shall keep spill response equipment on-site near potential spill areas. Spill response equipment shall include spill response kits, absorbent boom kits, and absorbent pellets.

7.3 Storage of Construction and Waste Materials

During construction, the Contractor must adequately store construction and waste materials to prevent pollution from entering the stormwater system. Sediment and erosion controls shall be place in a manner consistent with the SWPPP and the construction plans. All stockpiles shall be protected with perimeter silt fence and temporarily stabilized as required. Such stabilization shall include temporary vegetation or tarpaulin coverings. All waste containers shall be regularly maintained and properly covered.

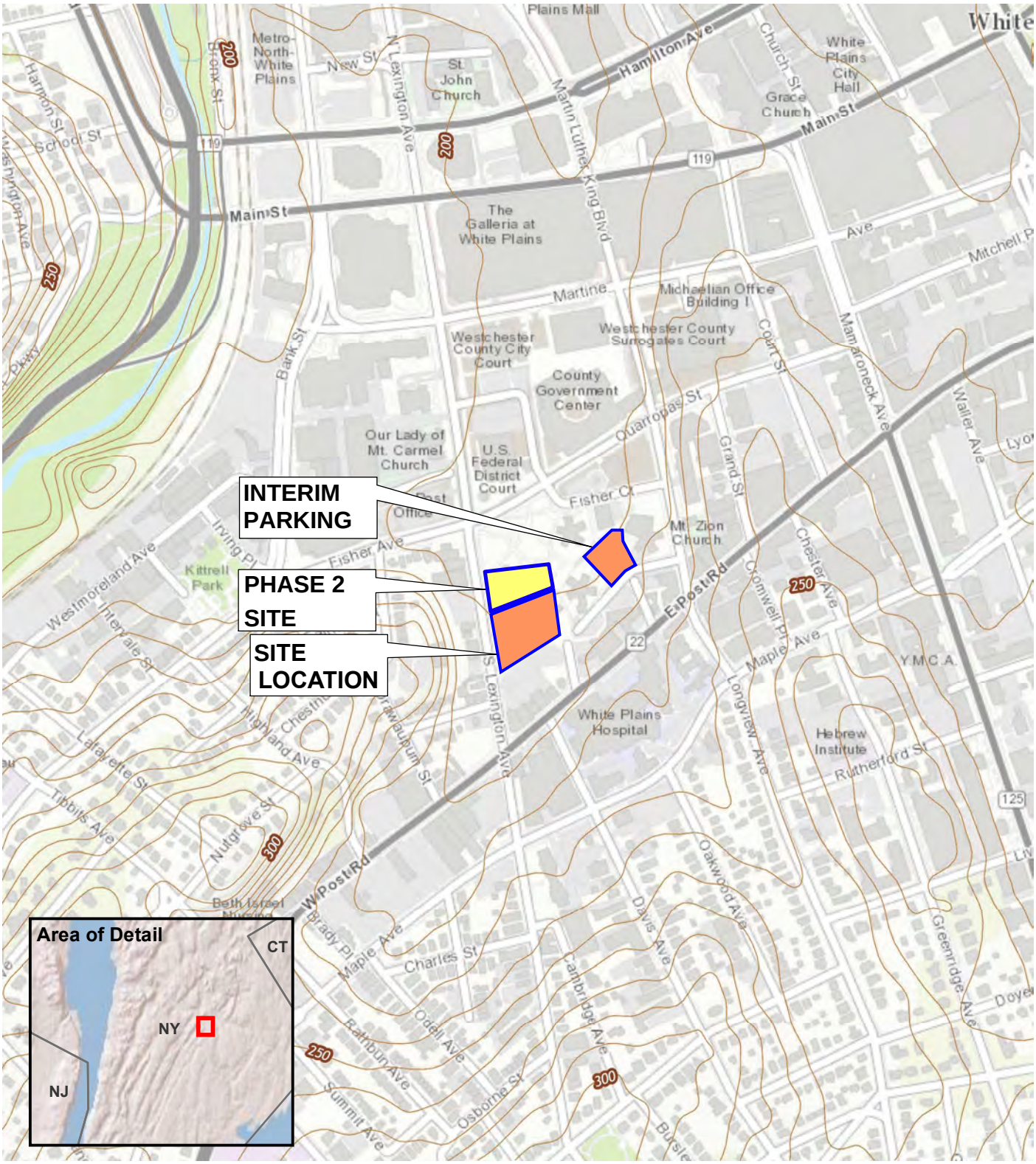
7.4 Vehicle Washing/Fueling and Material Washout

Any discharge from vehicle or equipment washing shall be directed to a vehicle wash station constructed in accordance with direction from the Qualified Inspector. Soaps, detergents, and solvents shall not be permitted for use in washing operations. Fueling of vehicles shall be done in a manner that prevents spillage of gasoline. Any spillage shall be immediately cleaned with the appropriate spill kit.

When necessary, the contractor shall utilize a container for the washout of any materials including but not limited to concrete, stucco, paint and curing compounds. Washout of these materials directly onto the ground shall be prohibited.

FIGURES

FIGURE 1 – PROPERTY LOCATION MAP



Map Source: World Topo base map service from ESRI

0 600 1,200

SCALE IN FEET

AKRF

Brookfield Commons Phase 3
White Plains, New York

SITE LOCATION

DATE
9/2/2022

PROJECT NO.
200154

FIGURE
1

APPENDIX A

SWPPPP PREPARER CERTIFICATION FORM

OWNER CERTIFICATION FORM

CONTRACTOR CERTIFICATION FROM

NOTICE OF INTENT

LETTER OF ACKNOWLEDGEMENT

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges From Construction Activity (GP-0-20-001)

Project Site Information

Project/Site Name

Owner/Operator Information

Owner/Operator (Company Name/Private Owner/Municipality Name)

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First name | MI | Last Name

Signature | Date

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Owner/Operator Certification Form

SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-20-001)

Project/Site Name: _____

eNOI Submission Number: _____

eNOI Submitted by: ☐ **Owner/Operator** ☐ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Owner/Operator First Name M.I. Last Name

_____

Signature

_____

Date

CONTRACTOR'S CERTIFICATION

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified -by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

SIGNED: _____ DATE: _____

NAME:

FIRM: _____

ADDRESS: _____

_____

PHONE: _____

SITE: _____

SCOPE

_____

TRAINED
CONTRACTOR'S NAME _____

TRAINED
CONTRACTOR'S TITLE _____

*The SWPPP Implementer must be a trained contractor responsible for SPPP implementation, an employee of the firm who has received training in accordance with SPDES GP-0-20-001.

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.35

(Submission #: HPM-CARA-KQYZQ, version 1)

Details

Originally Started By	JUSTIN SEENEY
Alternate Identifier	Brookfield Commons Phase 3
Submission ID	HPM-CARA-KQYZQ
Submission Reason	New
Status	Draft
Active Steps	Form Submitted

Form Input

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
Trinity New York Development, LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Musa

Owner/Operator Contact Person First Name
Omalawa

Owner/Operator Mailing Address
1350 Broadway, Suite 2203

City
New York

State
NY

Zip
10018

Phone
646 751 5105

Email
OMusa@trinityfinancial.com

Federal Tax ID
NONE PROVIDED

Project Location

Project/Site Name
Brookfield Commons Phase 3

Street Address (Not P.O. Box)
161 South Lexington Avenue

Side of Street
East

City/Town/Village (THAT ISSUES BUILDING PERMIT)
White Plains

State
NY

Zip
10601

DEC Region
3

County
WESTCHESTER

Name of Nearest Cross Street
Dennison Street

Distance to Nearest Cross Street (Feet)
200

Project In Relation to Cross Street
North

Tax Map Numbers Section-Block-Parcel
125.83-7-1

Tax Map Numbers
NONE PROVIDED

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are:
- Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates.
- The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates
41.02667753208254,-73.77082542648114

Project Details

2. What is the nature of this project?
Redevelopment with increase in impervious area

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse
Multifamily Residential

Post-Development Future Land Use
Multifamily Residential

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots.
NONE PROVIDED

---

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area.

*** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres)
10.9

Total Area to be Disturbed (acres)
2.7

Existing Impervious Area to be Disturbed (acres)
2.0

Future Impervious Area Within Disturbed Area (acres)
2.4

5. Do you plan to disturb more than 5 acres of soil at any one time?
No

---

6. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%)
0

B (%)
0

C (%)
100

D (%)
0

7. Is this a phased project?
No

8. Enter the planned start and end dates of the disturbance activities.

Start Date
03/31/2024

End Date
09/30/2027

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.
Bronx River

9a. Type of waterbody identified in question 9?
River Off Site

Other Waterbody Type Off Site Description
NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?
NONE PROVIDED

10. Has the surface waterbody(ies in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001?
No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001?
No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
No

If No, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as D (provided the map unit name is inclusive of slopes greater than 25%), E or F on the USDA Soil Survey?
NONE PROVIDED

If Yes, what is the acreage to be disturbed?
NONE PROVIDED

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?
No

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
Yes

16. What is the name of the municipality/entity that owns the separate storm sewer system?
City of White Plains

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?
No

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?
No

19. Is this property owned by a state authority, state agency, federal government or local government?
Yes

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.)
No

Required SWPPP Components

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?
Yes

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)?
Yes

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual?
Yes

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

SWPPP Preparer
AKRF

Contact Name (Last, Space, First)
Seeney, Justin

Mailing Address
34 South Broadway, Suite 401

City
White Plains

State
NY

Zip
10601

Phone
6463889542

Email
jseeney@akrf.com

Download SWPPP Preparer Certification Form
Please take the following steps to prepare and upload your preparer certification form:

1) Click on the link below to download a blank certification form

2) The certified SWPPP preparer should sign this form
3) Scan the signed form
4) Upload the scanned document
Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification

> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Erosion & Sediment Control Criteria

25. Has a construction sequence schedule for the planned management practices been prepared?
Yes

26. Select all of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural
Dust Control
Silt Fence
Stabilized Construction Entrance
Storm Drain Inlet Protection

Biotechnical
None

Vegetative Measures
Mulching
Seeding
Topsoiling

Permanent Structural
None

Other
NONE PROVIDED

Post-Construction Criteria

*** IMPORTANT: Completion of Questions 27-39 is not required if response to Question 22 is No.**

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
NONE PROVIDED

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).
All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)
0.2200

29. Post-construction SMP Identification
Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28).

Identify the SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use the Post-Construction SMP Identification section to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)
0.0313

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?
No

If Yes, go to question 36. If No, go to question 32.

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)
0.0126

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?
Yes

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. SMPs
Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRv Provided in #30).

Also, provide the total impervious area that contributes runoff to each practice selected.

NOTE: Use the Post-construction SMP Identification section to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question #29. (acre-feet)
0.2267

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).
0.2581

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?
Yes

If Yes, go to question 36.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv required and provided or select waiver (#36a), if applicable.

CPv Required (acre-feet)
NONE PROVIDED

CPv Provided (acre-feet)
NONE PROVIDED

36a. The need to provide channel protection has been waived because:
NONE PROVIDED

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (#37a), if applicable.

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
23.2

Post-Development (CFS)
20.6

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
43

Post-Development (CFS)
38.3

37a. The need to meet the Qp and Qf criteria has been waived because:
NONE PROVIDED

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

If Yes, Identify the entity responsible for the long term Operation and Maintenance
White Plains Housing Authority

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.
NONE PROVIDED

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs
Identify the Post-construction SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

Total Contributing Impervious Acres for Vegetated Swale (RR-5)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Garden (RR-6)
NONE PROVIDED

Total Contributing Impervious Acres for Stormwater Planter (RR-7)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)
NONE PROVIDED

Total Contributing Impervious Acres for Porous Pavement (RR-9)
NONE PROVIDED

Total Contributing Impervious Acres for Green Roof (RR-10)
0.179

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)
NONE PROVIDED

Total Contributing Impervious Acres for Infiltration Basin (I-2)
NONE PROVIDED

Total Contributing Impervious Acres for Dry Well (I-3)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Infiltration System (I-4)
NONE PROVIDED

Total Contributing Impervious Acres for Bioretention (F-5)
.103

Total Contributing Impervious Acres for Dry Swale (O-1)
NONE PROVIDED

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Pond (P-2)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Extended Detention (P-3)
NONE PROVIDED

Total Contributing Impervious Acres for Multiple Pond System (P-4)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Pond (P-5)
NONE PROVIDED

Total Contributing Impervious Acres for Surface Sand Filter (F-1)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Sand Filter (F-2)
NONE PROVIDED

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)
NONE PROVIDED

Total Contributing Impervious Acres for Organic Filter (F-4)
NONE PROVIDED

Total Contributing Impervious Acres for Shallow Wetland (W-1)
NONE PROVIDED

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)
NONE PROVIDED

Total Contributing Impervious Acres for Pond/Wetland System (W-3)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Wetland (W-4)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Swale (O-2)
NONE PROVIDED

Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Total Contributing Impervious Area for Hydrodynamic
1.774

Total Contributing Impervious Area for Wet Vault
NONE PROVIDED

Total Contributing Impervious Area for Media Filter
NONE PROVIDED

"Other" Alternative SMP?
NONE PROVIDED

Total Contributing Impervious Area for "Other"
NONE PROVIDED

Provide the name and manufaturer of the alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

Manufacturer of Alternative SMP
Hydro International

Name of Alternative SMP
Downstream Defender, First Defense

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility.
None

If SPDES Multi-Sector GP, then give permit ID
NONE PROVIDED

If Other, then identify
NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit?
No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth
NONE PROVIDED

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.
NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4?
Yes - Please attach the MS4 Acceptance form below

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?
NONE PROVIDED

MS4 SWPPP Acceptance Form Download
Download form from the link below. Complete, sign, and upload.
MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download
Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.
Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Status History

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9/1/2022 4:10:58 PM	JUSTIN SEENEY	Draft

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Under Review	DAVID GASPER	
Under Review	Daniel von Schilgen	

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information	
1. Owner/Operator Name:	Trinity New York Development, LLC
2. Contact Person:	Omalawa Musa
3. Street Address:	1350 Broadway, Suite 2203
4. City/State/Zip:	New York, NY 10018
II. Project Site Information	
5. Project/Site Name:	Brookfield Commons Phase 3
6. Street Address:	161 South Lexington Avenue
7. City/State/Zip:	White Plains, NY 10601
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information	
8. SWPPP Reviewed by:	
9. Title/Position:	
10. Date Final SWPPP Reviewed and Accepted:	
IV. Regulated MS4 Information	
11. Name of MS4:	
12. MS4 SPDES Permit Identification Number: NYR20A	
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

LETTER OF ACKNOWLEDGEMENT TO BE ADDED ONCE RECIEVED

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature

Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

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Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

   (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

   (ii) Control stormwater *discharge*s, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

   (iii) *Minimize* the amount of soil exposed during *construction activity*;

   (iv) *Minimize* the disturbance of *steep slopes*;

   (v) *Minimize* sediment *discharge*s from the site;

   (vi) Provide and maintain *natural buffer*s around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

   (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;

   (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

   (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments

listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

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

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be

calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **not** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits

must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land*

use control MS4, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

    a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with

the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

    a. Background information about the scope of the project, including the location, type and size of project

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection

schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

   (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

   (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

   (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

   (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located

in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

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

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

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

superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

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

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

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

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

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system

and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed

training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover
- Cross-country ski trails and walking/hiking trails
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development;
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path.
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

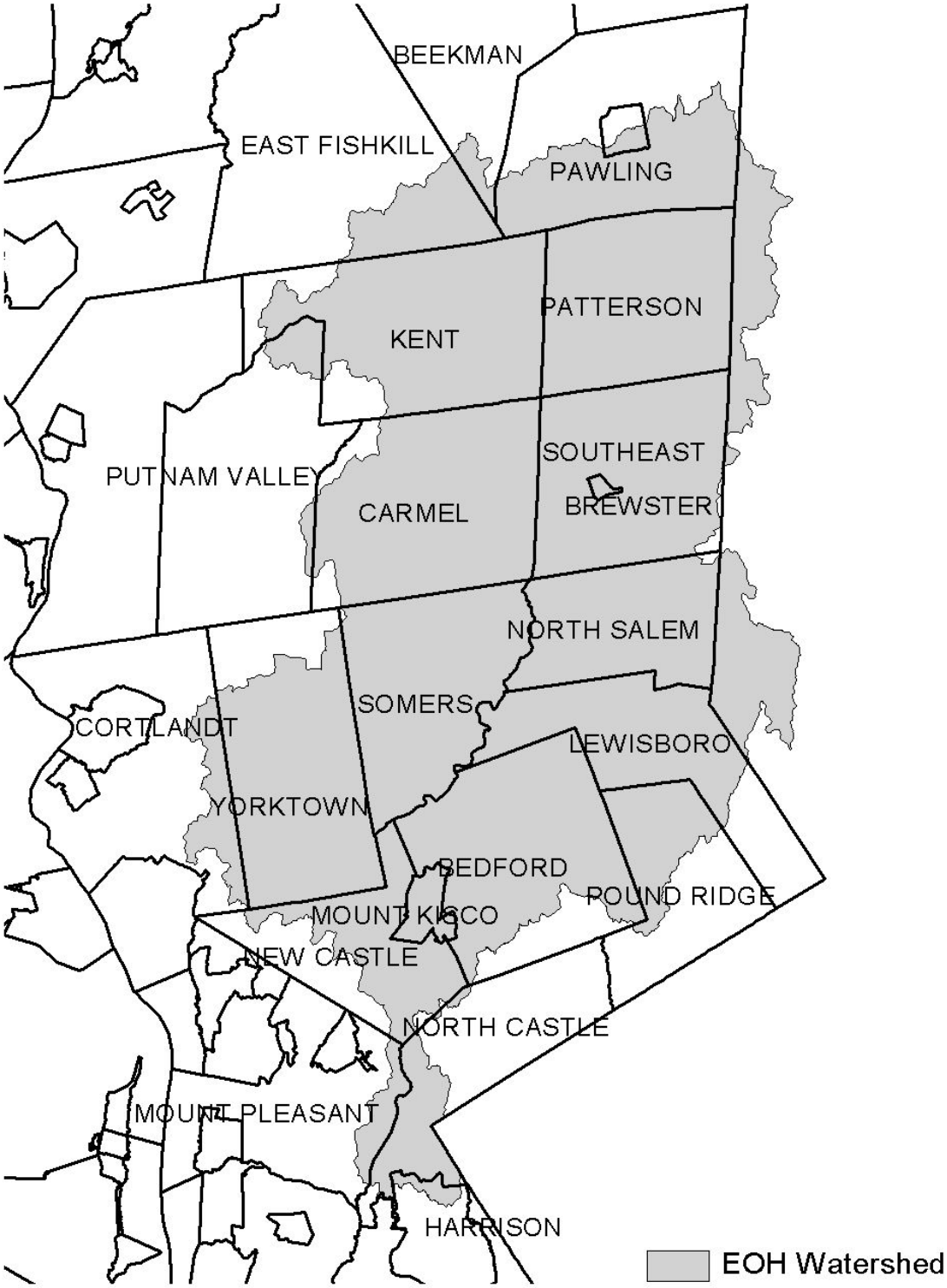


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

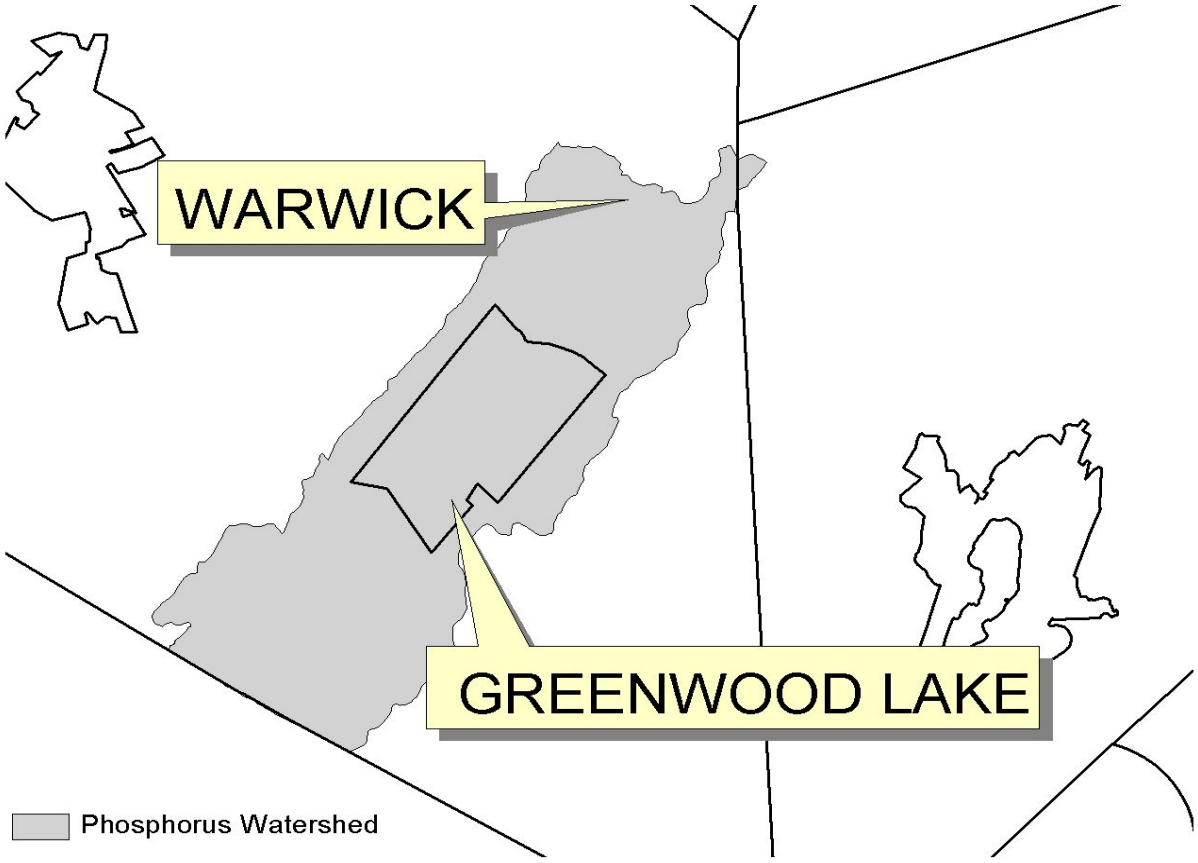


Figure 4 - Oscawana Lake Watershed

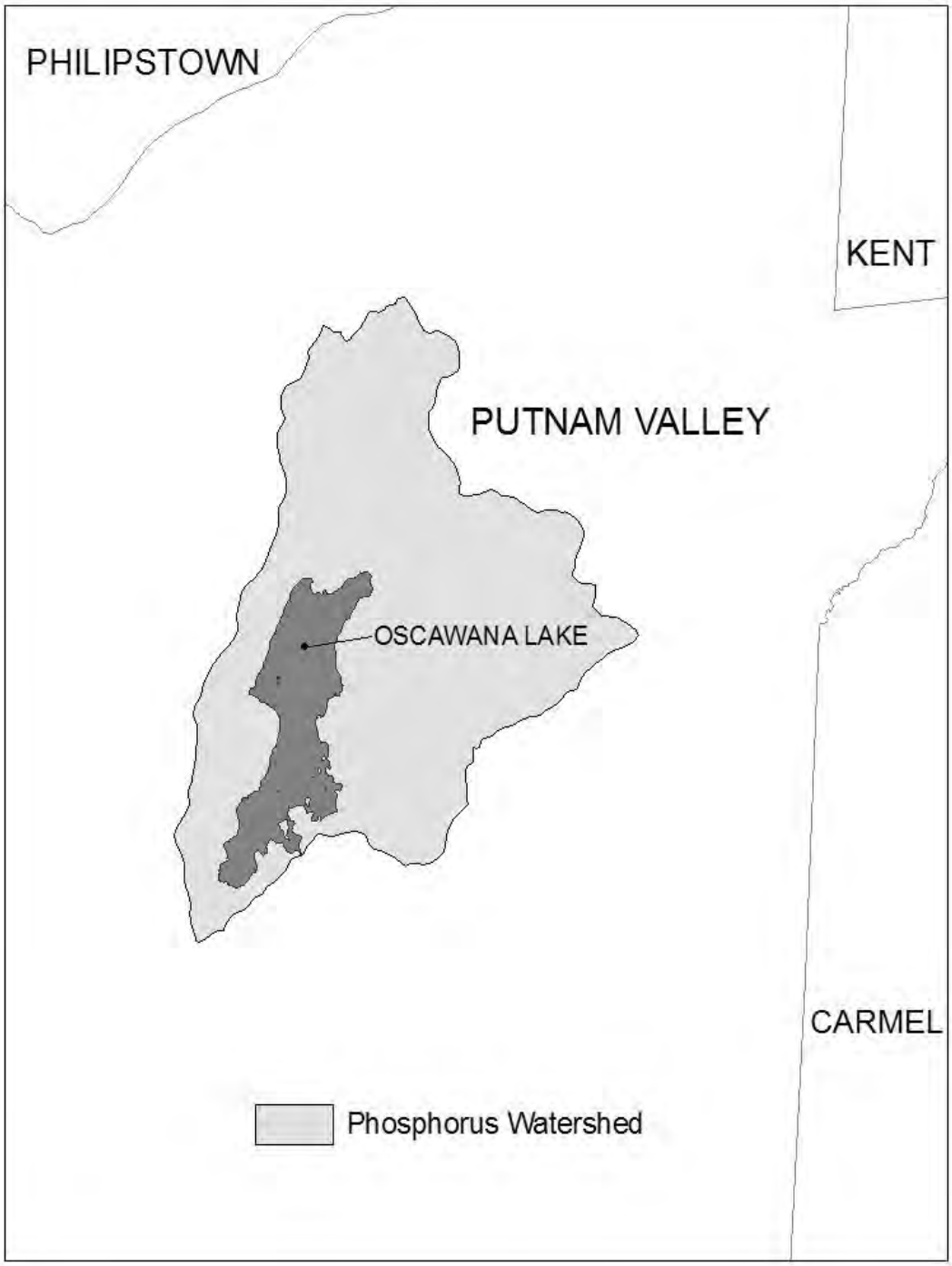
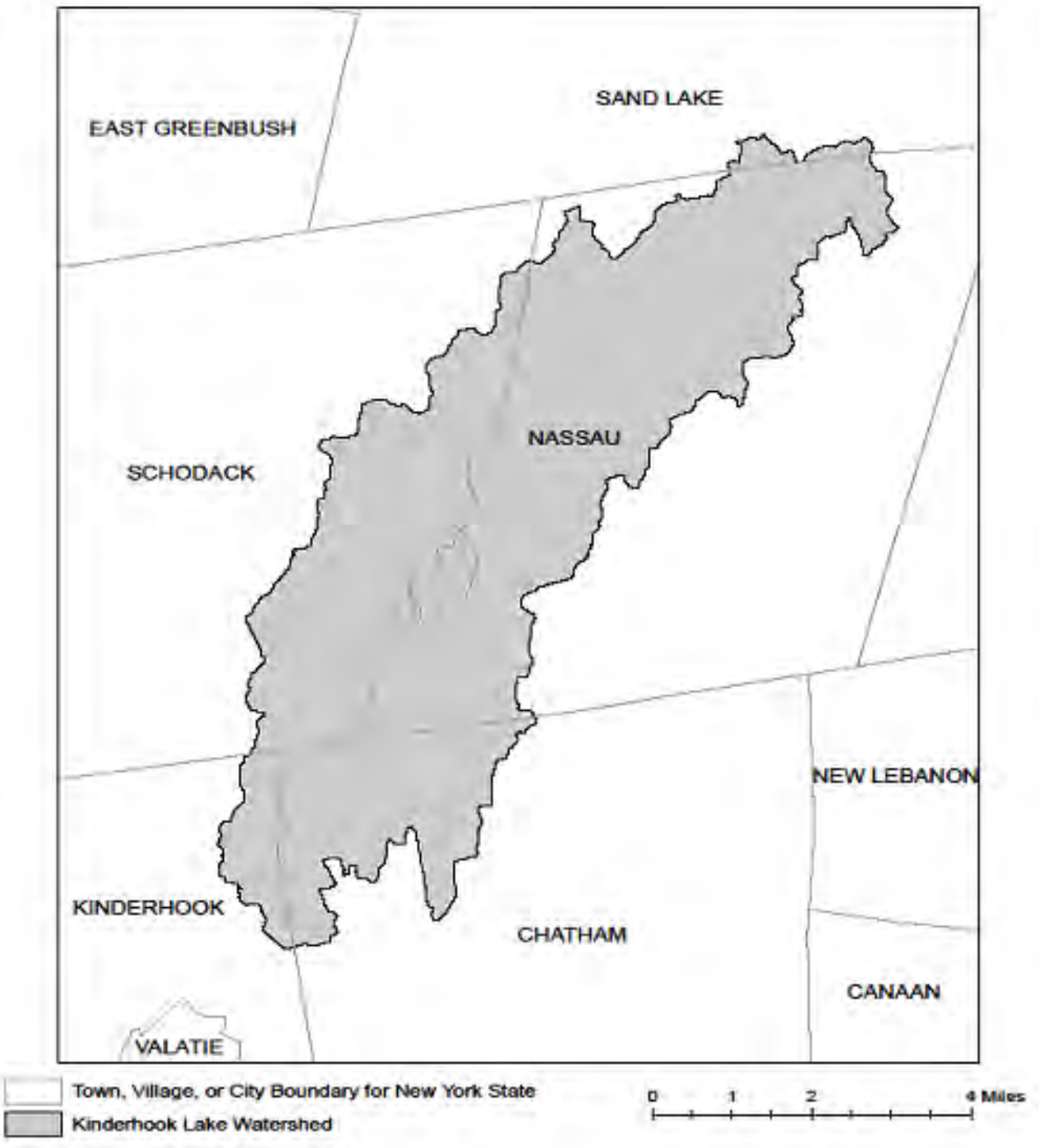


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	100 Hillside Avenue, Suite 1W White Plains, NY 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

APPENDIX B

EROSION AND SEDIMENT CONTROL INSPECTION REPORT

(CONSTRUCTION SITE LOG BOOK)

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

I. Initial Site Meeting Documents.
   a. Qualified Inspector's Credentials & Certification
   b. Permit Documents and their Location for compliance
   c. Contractor's Certifications
   d. Initial Site Assessment Checklist
   e. Pollution Prevention Measures (not from soil disturbance)
   f. Greater than 5 acres of Disturbance

II. Construction Duration Inspections
   a. Directions
   b. Site Plan/Sketch
   c. Other Required Reporting Items
   d. Runoff Controls
   e. Soil Stabilization
   f. Sediment Controls
   g. Post-Construction Stormwater Management
   h. Revisions to SWPPP
   i. Inspection Notes and Signature

III. Temporary Suspension of Construction
   a. Winter Shutdown
   b. Partial Project Completion
   c. Regional Office Notification Form

IV. Terminating Coverage
   a. Definition
   b. Post-Construction Stormwater Management Practice(s)

Use this appendix by properly completing Part I before construction starts and Part II for the duration of construction (along with other portions as noted) to meet the inspection requirement of NYSDEC SPDES GP for Construction Activities. **Please note** – the SWPPP preparer should tailor this document with stormwater management practice details that are specific to their SWPPP. Completed forms shall be kept on site at all times and made available to authorities upon request.

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part I. INITIAL SITE MEETING DOCUMENTS

Project Name and Location: Date: Weather:

Municipality: County: Permit #:

Entry Time: Exit Time:

Name of SPDES Permittee:

Name of Representative:

Qualified Inspector's Credentials & Certification

Qualified Inspector (QI) means a person that is knowledgeable in the principles and practices of erosion and sediment control (ESC). A person is considered qualified under the following conditions:

1. A licensed Professional Engineer; licensed Landscape Architect with documented training and education in the principles and practices of ESC;
2. An individual certified in ESC by CPESC, Incorporated or any other agency endorsed by the NYS Department of Environmental Conservation Office of Water Resources;
3. An individual working under the direct supervision of a qualified licensed Professional Engineer or qualified licensed Landscape Architect with documented training and education in the principles and practices of ESC and has completed the four (4) hour training program in the principles and practices of erosion and sediment control from either a Soil and Water Conservation District, CPESC or any other agency endorsed by the NYS Department of Environmental Conservation Office of Water Resources. This initial training must be completed no later than May 1, 2010. After receiving the initial training, an individual working under the direct supervision of a qualified licensed Professional Engineer or qualified licensed Landscape Architect must complete four (4) hours of training every three (3) years.
4. Any other individual endorsed by the NYS Department of Environmental Conservation by written documentation.

Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

To be completed by the QI:

Qualified Inspector Name (please print): _____

Title: _____ Date: _____

Address: _____

Phone: _____ Email: _____

CPESC#/Trained Inc. #: _____

☐ I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project.

Signature of Qualified Inspector: Date:

_____

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part I.b. Documents required at the Construction Site

The following documents are maintained at the site (check to complete):

		Yes	No	NA
1.	General Permit (GP-0-15-002)	☐	☐	☐
2.	NOI	☐	☐	☐
3.	NOI Acknowledgement Letter	☐	☐	☐
4.	SWPPP	☐	☐	☐
5.	MS4 SWPPP Acceptance Form	☐	☐	☐[1]
6.	Inspection reports	☐	☐	☐
7.	Approval letter for >5 acres of soil disturbance	☐	☐	☐

These forms will be kept at the construction site until all disturbed areas have achieved final stabilization and the Notice of termination has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock; that is accessible during normal working hours to an individual performing a compliance inspection.

Location of documents:_____

[1] This form only applies to areas within regulated, traditional land use control municipalities

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part I.c. STORM WATER PRE-CONSTRUCTION MEETING CERTIFICATION

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

The owner or operator shall have each of these contractors and subcontractors identified below sign a copy of the following certification statement before they commence any construction activity:

(NOTE: Attach additional sheets of this page for each contractor that will disturb soil on this project)

Contractor _____

Company Name _____

Business Address _____

City, State, Zip _____

Business Telephone Number _____

CERTIFICATION: *"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."*

_____

Signature Date

Printed Name: _____

Title (Must be an Office of company if form is a permit requirement) _____

Initial here if you received a copy of the Stormwater pollution Prevention Plan _____

The above listed contractor is responsible for the following practices: (check all that apply and add more as needed)

✓	SW Management Practice	✓	SW Management Practice	✓	SW Management Practice
	Construction Entrance/Exit		Diversions		Solid Waste
	Silt Fence		Sediment Traps		Sanitary Waste
	Check Dams		Sediment Basins		Hazardous Waste Management
	Inlet Protection		Dust Control		Record Keeping/SWPPP modifications
	Erosion Control		Concrete Wash-out		
	Vegetation		Fuel Storage/Containment		

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part I.d. Initial Site Assessment Checklist

(NOTE: ESC practices are to be put in place before any work is started)

Provide written comments as necessary

1. Contractors' Certification

Yes	No	NA	
☐	☐	☐	Have all contractors involved with stormwater related activities signed the contractors' certification?
☐	☐	☐	Are proposed areas of disturbance divided into areas >5 acres? (If no, see part I.f. of this form)

2. Resource Protection

Yes	No	NA	
☐	☐	☐	Are construction limits clearly flagged or fenced?
☐	☐	☐	Have important trees, vegetated areas suitable for filter strips (especially in perimeter areas), and existing underground utilities been flagged for protection?
☐	☐	☐	Creek crossings will be installed prior to land-disturbing activity, including clearing and blasting.

Describe corrective action(s): _____

Date correction needed: _____

3. Surface Water Protection

Yes	No	NA	
☐	☐	☐	Clean stormwater runoff will be diverted from areas to be disturbed
☐	☐	☐	Waterbodies located on site or in the vicinity of the site have been identified and will be protected using (describe practices, i.e., silt fence):

4. Stabilized Construction Entrance (SCE)

Yes	No	NA	
☐	☐	☐	A SCE is constructed where construction vehicles enter paved roads.
☐	☐	☐	A method is in place to remove and clean sediment tracked onto paved roads.

Corrective Action on above items: Practices need to be Installed [ ] Repaired [ ] Replaced [ ] Maintained [ ]

Describe corrective action(s): _____

Date correction needed: _____

5. Perimeter and Sediment Controls

Yes	No	NA	
☐	☐	☐	Silt fence material and installation comply with the standard drawing and specifications.
☐	☐	☐	Silt fences are installed at appropriate spacing intervals.
☐	☐	☐	Sediment/stormwater basin will be installed as first land disturbing activity.
☐	☐	☐	Sediment traps and barriers are installed.

Describe corrective action(s): _____

Date correction needed: _____

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part I.e. Pollution Prevention for Site Wastes and Hazardous Materials

The Operator has assigned the following representative to implement the spill prevention avoidance and response plan. _____
The spill prevention plan is contained in the SWPPP on page _____
Appropriate materials to control spills are onsite. Where? _____
The location of onsite concrete plants and washouts are located at _____
Describe corrective action(s): _____
Date correction needed: _____

Part I.f. Greater than 5 acres of Disturbance

The owner or operator of a construction activity shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the MS4 (provided the MS4 is not the owner or operator of the construction activity).

1. How much area will be disturbed at one time on this project? _____
2. If greater than 5 acres, has the NYSDEC or MS4 provided written authorization as required? ____

Part II. CONSTRUCTION DURATION INSPECTIONS

Part II. a. Directions

Construction Duration Inspections will be completed by the qualified inspector every 7 calendar days, or twice per week separated by 2 calendar days if the site has over 5 acres of soil disturbance (which also requires written approval from the Department or MS4), or as specified in the Permit. Completed forms shall be kept on site at all times and made available to authorities upon request. All inspection forms must be signed by the qualified inspector. Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor (or subcontractor) of any corrective actions that need to be taken. The contractor (or subcontractor) shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame. Unless approved by NYSDEC or a jurisdictional MS4, all ESC practices shall meet *NY Standards and Specifications for Erosion and Sediment Control* (Blue Book) specifications.

On a site plan or sketch that represents the project area, or an attached site map indicate the following:

1. Areas of disturbance at the time of inspection;

2. Areas that have been temporarily or permanently stabilized since the last inspection;

3. Areas that have *not* been actively worked within the past 14 days (7 days for sites with 5 acres or greater disturbed);

4. Location of discharge points;

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Project Name: _____ **Date:** _____

Project Number: _____ **Logged by:** _____

Weather: _____

SITE PLAN/SKETCH

Provide a concise sketch indicating construction activities, location and description of stormwater runoff from the site, stabilization activities, and soil erosion and sediment control BMPs. Indicate BMPs improperly installed or in need of repair. The inspector shall notify the Contractor(s) and Subcontractor(s) of necessary repairs of BMPs required within one business day of this inspection.

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part II. CONSTRUCTION DURATION INSPECTIONS **Page ____ of _____**

c. Other Permit Required Reporting

Area of Disturbance

Total area of disturbance (as shown on sketch plan and not including areas that have temporary or permanent stabilization measures applied) _____

Are all disturbances within the limits of the SWPPP? _____

Weather Conditions

A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

_____

_____

Maintain Water Quality

Yes	No	NA	
[ ]	[ ]	[ ]	Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ]	[ ]	[ ]	Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ]	[ ]	[ ]	All disturbance is within the limits of the approved plans.
[ ]	[ ]	[ ]	Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?
[ ]	[ ]	[ ]	Is there evidence of silt deposition from project in a stream, wetland, or other water body? If yes, where? _____ Remedial measure needed? _____

Housekeeping

1. General Site Conditions

Yes	No	NA	
[ ]	[ ]	[ ]	Is construction site litter and debris appropriately managed?
[ ]	[ ]	[ ]	Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ]	[ ]	[ ]	Is construction impacting the adjacent property?
[ ]	[ ]	[ ]	Is dust adequately controlled?

Describe corrective action(s): _____

Date correction needed: _____

d. Runoff Controls *Direct runoff away from exposed soils surfaces and control water that falls onto the site.*

Runoff Conveyance Systems

Are all runoff conveyance systems called for in the SWPPP installed, stabilized, and working? _____
If not, what specific areas need detailing? _____
Do all runoff conveyance systems have minimum side slopes 2H:1V or flatter? _____
Stabilized by geotextile fabric, seed, or mulch with no erosion occurring? _____

1. Excavation Dewatering ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Is there flowing water present?
[ ]	[ ]	[ ]	Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ]	[ ]	[ ]	Clean water from upstream pool is being pumped to the downstream pool.
[ ]	[ ]	[ ]	Sediment laden water from work area is being discharged to a silt-trapping device.
[ ]	[ ]	[ ]	Constructed upstream berm with one-foot minimum freeboard.
[ ]	[ ]	[ ]	Groundwater from excavations. (**Note**: NA – is being managed properly (sumps and sediment control))
[ ]	[ ]	[ ]	Sump pit is constructed in accordance with Blue Book standards and water is pumped to the portable sediment tank.
[ ]	[ ]	[ ]	All sediment collected in portable sediment tank is disposed of in sediment trapping device or as approved by inspector.

Describe corrective action(s): _____
Date correction needed: _____

CONSTRUCTION SITE LOG BOOK

2. Level Spreader ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Installed and constructed per plan and according to the Blue Book standards.
[ ]	[ ]	[ ]	Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ]	[ ]	[ ]	Flow sheets out of level spreader without erosion on downstream edge.

Describe corrective action(s): _____

Date correction needed: _____

3. Interceptor Dikes and Swales ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Installed and constructed per plan and according to the Blue Book standards with minimum side slopes 2H:1V or flatter.
[ ]	[ ]	[ ]	Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ]	[ ]	[ ]	Sediment-laden runoff directed to sediment trapping structure.

Describe corrective action(s): _____

Date correction needed: _____

4. Stone Check Dam ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Installed and constructed per plan and according to the Blue Book standards?
[ ]	[ ]	[ ]	Is channel stable (the flow is not eroding soil underneath or around the structure)?
[ ]	[ ]	[ ]	Check is in good condition (rocks in place and no permanent pools behind structure).
[ ]	[ ]	[ ]	Has accumulated sediment been removed?

Describe corrective action(s): _____

Date correction needed: _____

CONSTRUCTION SITE LOG BOOK

5. Rock Outlet Protection ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Installed per plan.
[ ]	[ ]	[ ]	Installed concurrently with pipe installation.

Describe corrective action(s): _____

Date correction needed: _____

6. Temporary Stream Crossing ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Maximum diameter pipes necessary to span creek without dredging are installed.
[ ]	[ ]	[ ]	Installed non-woven geotextile fabric beneath approaches.
[ ]	[ ]	[ ]	Is fill composed of aggregate (no earth or soil)?
[ ]	[ ]	[ ]	Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.
[ ]	[ ]	[ ]	Have construction crossings at concentrated flow areas been culverted?

Describe corrective action(s): _____

Date correction needed: _____

e. Soil Stabilization *Basic erosion control is achieved by covering all bare ground areas*

1. Topsoil and Spoil Stockpiles ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Stockpiles are stabilized with vegetation or approved rolled erosion control product.
[ ]	[ ]	[ ]	Sediment control is installed at the toe of the slope.

Describe corrective action(s): _____
Date correction needed: _____

2. Contaminated Soil Stockpile ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Sediment control is installed at the toe of the slope.
[ ]	[ ]	[ ]	Pile covered in plastic upon completion of fill material grading.
[ ]	[ ]	[ ]	Plastic tied down with sandbags or approved equal.

3. Revegetation ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Temporary seeding and mulch have been applied areas that have been inactive for 14 days or less (or, inactive for 7 days if over 5 acres disturbed)?
[ ]	[ ]	[ ]	Has soil preparation been applied as specified in the SWPPP and in accordance with the Blue Book? (Assure that all the necessary soil testing/fertilizer/lime, topsoil, decompaction has been applied.)
[ ]	[ ]	[ ]	Have rolled erosion control products specified for steep slopes or channels been installed?
[ ]	[ ]	[ ]	4 inches minimum of topsoil has been applied under permanent seeding.

Describe corrective action(s): _____
Date correction needed: _____

CONSTRUCTION SITE LOG BOOK

f. Sediment Controls

1. Stabilized Construction Entrance ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Stone is clean enough to effectively remove mud from vehicles.
[ ]	[ ]	[ ]	Installed per standards and specifications?
[ ]	[ ]	[ ]	Does all traffic use the stabilized entrance to enter and leave site?
[ ]	[ ]	[ ]	Is adequate drainage provided to prevent ponding at entrance?
[ ]	[ ]	[ ]	Tracking onto public streets in minimized and cleaned daily?

Describe corrective action(s): _____

Date correction needed: _____

2. Silt Fence ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Installed on contour, 10 feet from toe of slope (not across conveyance channels).
[ ]	[ ]	[ ]	Joints constructed by wrapping the two ends together for continuous support.
[ ]	[ ]	[ ]	Fabric buried 6 inches minimum.
[ ]	[ ]	[ ]	Posts are stable, fabric is tight and without rips or frayed areas.
[ ]	[ ]	[ ]	Bulges present within geotextile fabrics.

Sediment accumulation is ____% of total silt fence height.

Describe corrective action(s): _____

Date correction needed: _____

3. Drop Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices) ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ]	[ ]	[ ]	Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ]	[ ]	[ ]	Drainage area is 1acre or less.
[ ]	[ ]	[ ]	Excavated area is 900 cubic feet.
[ ]	[ ]	[ ]	Excavated side slopes should be 2:1.
[ ]	[ ]	[ ]	2" x 4" frame is constructed and structurally sound.
[ ]	[ ]	[ ]	Posts 3-foot maximum spacing between posts.
[ ]	[ ]	[ ]	Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ]	[ ]	[ ]	Posts are stable, fabric is tight and without rips or frayed areas.

Type of inlet control? _____
Sediment accumulation depth _____
Describe corrective action(s): _____
Date correction needed: _____

4. Temporary Sediment Trap ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Outlet structure is constructed per the approved plan or drawing.
[ ]	[ ]	[ ]	Geotextile fabric has been placed beneath rock fill. Sediment accumulation is 50 % of design capacity.

Describe corrective action(s): _____
Date correction needed: _____

CONSTRUCTION SITE LOG BOOK

5. Temporary Sediment Basin ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Basin and outlet structure constructed per the approved plan.
[ ]	[ ]	[ ]	Basin side slopes are stabilized with seed/mulch.
[ ]	[ ]	[ ]	Drainage structure flushed and basin surface restored upon removal of sediment basin facility. Sediment accumulation is 50 % of design capacity.

Describe corrective action(s): _____
Date correction needed: _____

6. Anti-Tracking/Decontamination Pad ☐ NA

Yes	No	NA	
[ ]	[ ]	[ ]	Prevents tracking or flowing of sediment out of the exclusion zone or rights-of-way.
[ ]	[ ]	[ ]	Anti-tracking/decontamination pad is stabilized with stone and drained on site to a sump.
[ ]	[ ]	[ ]	Wash water pumped from sump temporarily stored in drums and properly disposed of off-site.

Describe corrective action(s): _____
Date correction needed: _____

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in the SWPPP.

CONSTRUCTION SITE LOG BOOK

g. Post-Construction Stormwater Management

Report of any corrective action(s) that must be taken to install, correct, repair, replace or maintain any deficiencies identified with the construction of the post-construction stormwater management practice(s). Report the current phase of construction of all post-construction stormwater management practice(s) and whether the installation appears to be geometrically consistent with the approved hydraulic design (e.g. the pond, the outlet structure, orifice, pipe sizing and slope is geometrically consistent with the SWPPP):

_____

_____

h. Revisions to SWPPP

When the owner or operator becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any other report, or have made substantive revisions to the SWPPP (e.g., the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or impervious area) which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information. Failure of the owner or operator to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a permit violation.

Drawing No.	SWPPP Rev. No.	Comments/Notes	Reason for Change	Date Issued	MS4 Approval Necessary Yes/No

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part II. CONSTRUCTION DURATION INSPECTIONS **Page _____ of _____**

MODIFICATION & REASON:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Qualified Inspector (print name)

Date of Inspection

Qualified Inspector (signature)

Title: _____ Address: _____

Phone: _____ Email: _____

CPESC#/Trained Ind. #: _____

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Part III. TEMPORARY SUSPENSION OF CONSTRUCITON

Part III.a. Winter

For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator shall notify the Regional Office stormwater contact person in writing prior to reducing the frequency of inspections.

Use the Notification form below:

Part III.b. Partial Project Completion

For construction sites where soil disturbance activities have been shut down with partial project completion, the qualified inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The owner or operator shall notify the Regional Office stormwater contact person in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the owner or operator shall have the qualified inspector(s) perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the Notice of Termination (NOT). The owner or operator shall then submit the completed NOT form to the Department as defined in the NOT.

Use the Notification form below:

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part III.c. Notice to Reduce Frequency of SPDES General Permit Site Inspections

Project Name: _____
Location: _____
Municipality County:
Permit #: **NYR10**_____
Name of SPDES Permittee:

In accordance with the SPDES General Permit for Stormwater Discharges from Construction Activities, the owner or operator of the permitted site (below) hereby notifies the New York State Department of Environmental Conservation that (all earth disturbing) work on this project will be temporarily suspended *and temporary and or permanent stabilization measures have been applied to all disturbed areas.*

Reason for temporary suspension of work:

☐ Winter Shutdown – A qualified inspector will conduct a site inspection at least once every thirty (30) calendar days during this period. The standard site inspection frequency will resume when construction activities recommence.

☐ Other_____

Project Description _____

_____

Approximate date work will be suspended_____

Approximate date work will resume_____

Print Name _____

Signature_____

Title_____ Date _____

Mailing Address _____

City/State/Zip _____

Telephone(___)_____Fax _____

Send this form to the SPDES contact person within the Regional office's Division of Water

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Part IV. TERMINATION OF COVERAGE

Part IV.a. Definitions

An owner or operator may terminate coverage when one or more the following conditions have been met:

1. Total project completion - All construction activity identified in the SWPPP has been completed; and all areas of disturbance have achieved final stabilization; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

2. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved final stabilization; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

3. A new owner or operator has obtained coverage under this permit.

For projects that meet conditions of 1 and 2 above, the owner or operator shall have the qualified inspector perform a final site inspection and sign the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The qualified inspector shall certify that all disturbed areas have achieved final stabilization; all temporary, structural erosion and sediment control measures have been removed; and, all post-construction stormwater management practices have been constructed in conformance with the SWPPP.

Part IV.b. Post-Construction Stormwater Management Practice(s)

1. Ensure right-of-way(s) needed to maintain such practice(s) have been deed to the municipality in which the practice(s) is located; Does this apply? _____ If yes, liber and page # _____
2. And, an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s). Does this apply? _____ Municipality maintaining the practice?_____
3. Or, for post-construction stormwater management practices that are privately owned, a deed restriction is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan. Does this apply? _____ If yes, liber and page # _____
4. And, for post-construction stormwater management practices that are owned by a public or private institution (e.g., school, college, university), or government agency or authority, a procedures page is in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan. Location of the O & M plan?

_____

_____

APPENDIX C

SITE DRAWINGS AND EROSION AND SEDIMENTATION CONTROL PLANS SUBMITTED UNDER SEPARATE COVER

APPENDIX D

NEW YORK STATE HISTORIC PRESERVATION OFFICE DOCUMENTATION

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

August 20, 2021

Elizabeth Meade
Senior Technical Director/Archaeologist
AKRF
440 Park Avenue South
7th Floor
New York, NY 10016

Re: HUD
Brookfield Commons Phase 3 - Residential Community Project
159 S. Lexington Avenue, White Plains, Westchester County, NY
21PR05508

Dear Elizabeth Meade:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Based upon this review, it is the opinion of the New York SHPO that no historic properties, including archaeological and/or historic resources, will be affected by this undertaking.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

R. Daniel Mackay

Deputy State Historic Preservation Officer
Division for Historic Preservation

APPENDIX E

EXISTING AND DEVELOPED CONDITIONS MAPS

LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE*
- ROOF AREA
- IMPERVIOUS AREA
- PERVIOUS AREA

*EXCLUDES EARTH DISTURBANCE ACTIVITIES WITHIN THE PUBLIC RIGHTS-OF-WAY FOR THE PURPOSES OF CALCULATING POST-CONSTRUCTION STORMWATER MANAGEMENT REQUIREMENTS.

COVER	AREA (SF)	AREA (ac)	Area (%)
PERVIOUS	24,884	0.57	27.4%
IMPERVIOUS	66,042	1.52	72.6%
ROOF	9,022	0.21	9.9%
PAVEMENT	57,020	1.31	62.7%
TOTAL	90,926	2.09	

0 15 30 60
SCALE: 1" = 30'

OWNER
TRINITY NEW YORK DEVELOPMENT, LLC
1350 BROADWAY, SUITE 2203
NEW YORK, NY 10018

CIVIL ENGINEER
AKRF
AKRF INC.
34 SOUTH BROADWAY, SUITE 401
WHITE PLAINS, NY 10601
(914) 949-7336 (PHONE)

PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: EXISTING CONDITIONS IMPERVIOUS COVERAGE MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO. D-1
SCALE: 1" =30'	DATE: 1/11/2022	

LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE*
- ROOF AREA
- IMPERVIOUS AREA
- PERVIOUS AREA
- EXTENSIVE GREEN ROOF AREA
- INTENSIVE GREEN ROOF AREA
- STORMWATER PLANTER

*EXCLUDES EARTH DISTURBANCE ACTIVITIES WITHIN THE PUBLIC RIGHTS-OF-WAY FOR THE PURPOSES OF CALCULATING POST-CONSTRUCTION STORMWATER MANAGEMENT REQUIREMENTS.

COVER	AREA (SF)	AREA (AC)	Area (%)
PERVIOUS	11,412	0.26	12.6%
GREEN ROOF (EXTENSIVE)	2,731	0.06	3.0%
LAWN	8,289	0.19	9.1%
STORMWATER PLANTER	392	0.01	0.4%
IMPERVIOUS	79,514	1.83	87.4%
ROOF	12,739	0.29	14.0%
GREEN ROOF (INTENSIVE)	3,397	0.08	3.7%
PAVEMENT	63,378	1.45	69.7%
TOTAL	**90,926**	**2.09**	

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WHITE PLAINS, NY 10601
(914) 949-7336 (PHONE)

PROJECT	BROOKFIELD COMMONS PHASE 3
SHEET TITLE	PROPOSED CONDITIONS IMPERVIOUS COVERAGE MAP
DRAWN BY	YN
CHECKED BY	JS
SCALE	1" = 20'
DATE	1/11/2022
SHEET NO.	D-2

CITY SEWER DESIGN POINT	DESIGN POINT	DRAINAGE AREA NO.	DRAINAGE AREA (SF)	PAVED (SF)	ROOF (SF)	IMPERVIOUS (SF)	GREEN ROOF (SF)	BIORETENTION (SF)	LAWN (SF)	PERVIOUS (SF)
DP-1	DP-1A	EX-1	64,377	39,106	9,022	48,128	0	0	16,249	16,249
	DP-1C	EX-2	4,000	1,350	0	1,350	0	0	2,650	2,650
		EX-3	35,378	22,213	0	22,213	0	0	13,165	13,165
		EX-4	69,693	61,869	0	61,869	0	0	7,824	7,824
	TOTAL ON-SITE TO DP1		**173,448**	124,538	9,022	**133,560**	0	0	39,888	**39,888**

LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE*
- DRAINAGE BOUNDARY
- ROOF AREA
- IMPERVIOUS AREA
- PERVIOUS AREA
- FLOW PATH

*EXCLUDES EARTH DISTURBANCE ACTIVITIES WITHIN THE PUBLIC RIGHTS-OF-WAY FOR THE PURPOSES OF CALCULATING POST-CONSTRUCTION STORMWATER MANAGEMENT REQUIREMENTS.

OWNER

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PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: EXISTING CONDITIONS IMPERVIOUS COVERAGE MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO.: D-3
SCALE: 1" = 30'	DATE: 9/1/2022	

DP-1
LOCATED AT INTERSECTION OF
SOUTH LEXINGTON AVE AND
FISHER AVE

CITY SEWER DESIGN POINT	DESIGN POINT	DRAINAGE AREA NO.	DRAINAGE AREA (SF)	PAVED (SF)	ROOF (SF)	GREEN ROOF INTENSIVE[2]	IMPERVIOUS (SF)	GREEN ROOF EXTENSIVE[1] (SF)	BIORETENTION BASIN (SF)	STORMWATER PLANTER (SF)	LANDSCAPED (SF)	PERVIOUS (SF)
DP-1	DP-1C	PR-1	11,026	10,186	0	0	10,186	0	0	0	840	840
		PR-2	4,800	0	3,647	0	3,647	762	0	392	0	1,153
		PR-3	3,944	0	3,248	0	3,248	696	0	0	0	696
		PR-4	2,696	0	1,423	0	1,423	1,273	0	0	0	1,273
		PR-5	7,818	0	4,421	3,397	7,818	0	0	0	0	0
		PR-6	1,434	1,185	0	0	1,185	0	0	0	249	249
		PR-7	4,439	4,337	0	0	4,337	0	0	0	102	102
		PR-8	2,998	2,959	0	0	2,959	0	0	0	39	39
		PR-9	1,605	1,035	0	0	1,035	0	0	0	570	570
		PR-10	1,983	1,835	0	0	1,835	0	0	0	148	148
		PR-11	3,777	2,523	0	0	2,523	0	322	0	932	1,254
		PR-12	13,212	10,761	0	0	10,761	0	0	0	2,451	2,451
		PR-13	69,259	61,435	0	0	61,435	0	0	0	7,824	7,824
		PR-14	1,992	1,542	0	0	1,542	0	0	0	450	450
		PR-15	1,139	1,118	0	0	1,118	0	0	0	21	21
	DP-1A	PR-16	41,326	32,824	0	0	32,824	0	0	0	8,502	8,502
	TOTAL ON-SITE TO DP1		**173,448**	131,741	12,739	3,397	**147,877**	2,731	322	392	22,127	**25,571**

[1] CONSIDERED PERVIOUS FOR WATER QUALITY CALCULATIONS AND IMPERVIOUS FOR WATER QUANTITY CURVE NUMBER

[2] CONSIDERED IMPERVIOUS FOR BOTH WATER QUALITY CALCULATIONS AND WATER QUANTITY CURVE NUMBER

LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE*
- ROOF AREA
- IMPERVIOUS AREA
- PERVIOUS AREA
- EXTENSIVE GREEN ROOF AREA
- INTENSIVE GREEN ROOF AREA
- STORMWATER PLANTER
- DRAINAGE AREA BOUNDARY
- FLOW PATH

*EXCLUDES EARTH DISTURBANCE ACTIVITIES WITHIN THE PUBLIC RIGHTS-OF-WAY FOR THE PURPOSES OF CALCULATING POST-CONSTRUCTION STORMWATER MANAGEMENT REQUIREMENTS.

0 15 30 60
SCALE: 1" = 30'

OWNER
TRINITY NEW YORK DEVELOPMENT, LLC
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NEW YORK, NY 10018

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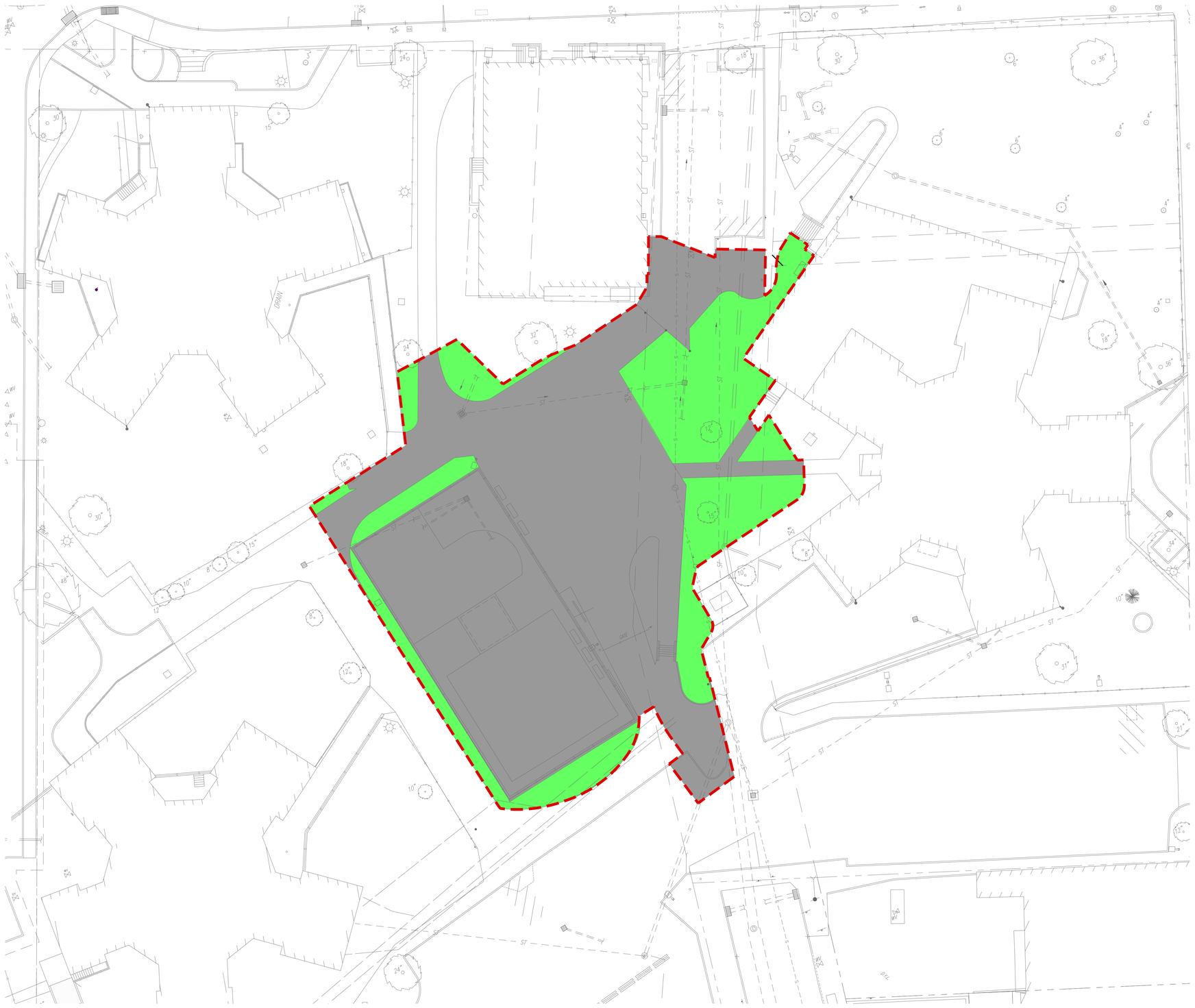
WHITE PLAINS, NY 10601
(914) 949-7336 (PHONE)

PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: PROPOSED CONDITIONS DRAINAGE AREA MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO.: D-4
SCALE: 1" = 30'	DATE: 9/1/2022	



LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE
- ROOF AREA
- IMPERVIOUS AREA
- IMPERVIOUS AREA
- PERVIOUS AREA

COVER	AREA (SF)	AREA (ac)	Area (%)
PERVIOUS	7,210	0.17	26.4%
IMPERVIOUS	20,125	0.46	73.6%
TOTAL	27,335	0.63	

0 10 20 40
SCALE: 1" = 20'

OWNER
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NEW YORK, NY 10018

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PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: EXISTING CONDITIONS IMPERVIOUS COVERAGE MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO.: D-1A
SCALE: 1" =20'	DATE: 09/01/2022	

LEGEND

PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE

IMPERVIOUS AREA

PERVIOUS AREA

COVER	AREA (SF)	AREA (AC)	Area (%)
PERVIOUS	5,290	0.12	19.4%
IMPERVIOUS	22,045	0.51	80.6%
TOTAL	27,335	0.63	

0 10 20 40

SCALE: 1" = 20'

OWNER

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NEW YORK, NY 10018

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WHITE PLAINS, NY 10601
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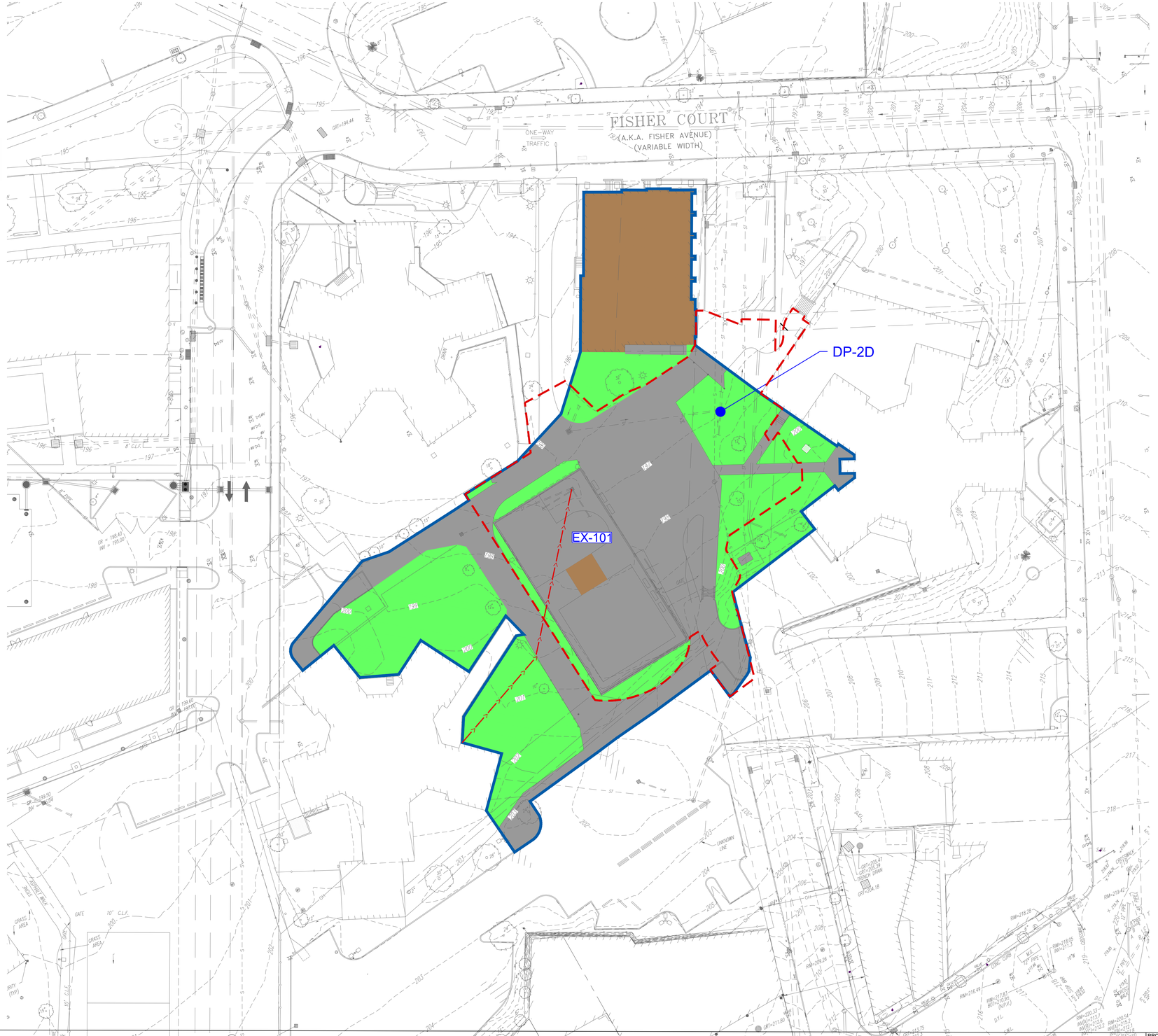
PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: PROPOSED CONDITIONS IMPERVIOUS COVERAGE MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO.: D-2A
SCALE: 1" = 20'	DATE: 09/01/2022	

CITY SEWER DESIGN POINT	DRAINAGE AREA NO.	DRAINAGE AREA (SF)	PAVED (SF)	ROOF (SF)	IMPERVIOUS (SF)	LAWN (SF)	PERVIOUS (SF)
DP-1	EX-101	51,578	25,438	6,592	32,030	19,548	19,548
	TOTAL ON-SITE TO DP-2D	**51,578**	25,438	6,592	**32,030**	19,548	**19,548**

LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE
- DRAINAGE BOUNDARY
- ROOF AREA
- IMPERVIOUS AREA
- PERVIOUS AREA
- FLOW PATH



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PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: EXISTING CONDITIONS IMPERVIOUS COVERAGE MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO.: D-3A
SCALE: 1" = 30'	DATE: 09/01/2022	

CITY SEWER DESIGN POINT	DESIGN POINT	DRAINAGE AREA NO.	DRAINAGE AREA (SF)	PAVED (SF)	ROOF (SF)	IMPERVIOUS (SF)	BIORETENTION BASIN (SF)	LANDSCAPED (SF)	PERVIOUS (SF)
DP-1	DP-1	PR-101	26,987	15,435	0	15,435	0	11,552	11,552
		PR-102	2,769	2,458	0	2,458	0	311	311
		PR-103	2,305	1,951	0	1,951	355	0	355
		PR-104	19,517	7,693	6,266	13,959	0	5,558	5,558
	TOTAL ON-SITE TO DP-2D		**51,578**	27,536	6,266	**33,802**	355	17,421	**17,776**

LEGEND

- PROPOSED LIMIT OF ON-SITE EARTH DISTURBANCE
- ROOF AREA
- IMPERVIOUS AREA
- PERVIOUS AREA
- DRAINAGE AREA BOUNDARY
- FLOW PATH

0 15 30 60
SCALE: 1" = 30'

OWNER
TRINITY NEW YORK DEVELOPMENT, LLC
1350 BROADWAY, SUITE 2203
NEW YORK, NY 10018

CIVIL ENGINEER
AKRF
AKRF INC.
34 SOUTH BROADWAY, SUITE 401
WHITE PLAINS, NY 10601
(914) 949-7336 (PHONE)

PROJECT: BROOKFIELD COMMONS PHASE 3		SHEET TITLE: PROPOSED CONDITIONS DRAINAGE AREA MAP
DRAWN BY: YN	CHECKED BY: JS	SHEET NO.: D-4
SCALE: 1" = 30'	DATE: 8/23/2022	

APPENDIX F

WATER QUALITY VOLUME CALCULATIONS

WQv REQUIRED CALCULATIONS:

[1]Site	[1]Total Site Area within LOD *(sq ft)* [1]	[1]Total Existing Impervious Area within Site LOD *(sq-ft)* [2]	[1]Total Proposed Impervious Area within Site LOD *(sq-ft)* [3]	Redeveloped Impervious Area *(sq ft)* [4] = [2]	New Impervious Area *(sq ft)* [5] = [3] - [4]	Redeveloped Impervious Factor (R) [6] = [4] / [3]	New Impervious Factor (N) [7] = [5] / [3]	Impervious Cover (I) *(%)* [8] = 100*[3] / [1]	Runoff Coefficient (Rv) [9] = 0.05 + 0.009*[8]	90% Rainfall Event Number (P) *(in)* [*10*]	WQv Required (cu ft) [11] = {([7] + [0.75] * [6]) * [10] * [9] * [1]} / 12	WQv Required (ac-ft) [12] = [11] / 43,560	Total RRv *(cu-ft)* [13] = [10]*0.95*[5]/12	HSG Specific Reduction Factor [14]	Required RRv *(cu-ft)* [15] = [14]*[13]
Phase 3 Site	90,926	66,042	79,514	66,042	13,472	0.831	0.169	87.4	0.84	1.5	**7,538**	0.1731	1,600	0.3	**480**

[1] - Refer to enclosed "Figure D-1 Existing Conditions Impervious Coverage Map" and "Figure D-2 - Developed Conditions Impervious Coverage Map".

WQv PROVIDED CALCULATIONS:

[2]Drainage Area (DA)	Total Area *(sq ft)* [16]	Impervious Area *(sq ft)* [17]	Impervious Cover (IC) *(%)* [18] = 100 * [17] / [16]	Runoff Coefficient (Rv) [19] = 0.05 + .009 * [18]	90% Rainfall Event Number (P) *(in)* [20]	Treatment Practice[3]	WQv Provided		RRv Applied *(cu-ft)* [23]	RRv Applied *(ac-ft)* [24] = [23] / 43,560	Remaining Volume Treated *(cu-ft)* [25] = [21] - [23]	Volume Treated *(ac-ft)* [26] = [25] / 43,560
							(cu ft) [21] = [20] * [19] * [16] / 12	*(ac-ft)* [22] = [21] / 43560				
PR-1	11,026	10,186	92.4	0.88	1.5	HDS A	1,215	0.0279	0	0.0000	1,215	0.0279
PR-2	4,800	3,647	76.0	0.73	1.5	SW PLANTER	440	0.0101	198	0.0045	242	0.0056
PR-3	3,944	3,248	82.4	0.79	1.5	HDS B	390	0.0090	0	0.0000	390	0.0090
PR-4	2,696	1,423	52.8	0.53	1.5	HDS B	177	0.0041	0	0.0000	177	0.0041
PR-5	7,818	7,818	100.0	0.95	1.5	GREEN ROOF -> HDS B	928	0.0213	928	0.0213	0	0.0000
PR-7	4,439	4,337	97.7	0.93	1.5	HDS C	516	0.0118	0	0.0000	516	0.0118
PR-8	2,998	2,959	98.7	0.94	1.5	HDS B	352	0.0081	0	0.0000	352	0.0081
PR-9	1,605	1,035	64.5	0.63	1.5	HDS B	126	0.0029	0	0.0000	126	0.0029
PR-10	1,983	1,835	92.5	0.88	1.5	HDS A	219	0.0050	0	0.0000	219	0.0050
PR-11	3,777	2,523	66.8	0.65	1.5	BIORETENION BASIN A	307	0.0071	141	0.0032	166	0.0038
PR-14	1,992	1,542	77.4	0.75	1.5	HDS A	186	0.0043	0	0.0000	186	0.0043
PR-16	41,326	32,824	79.4	0.76	1.5	HDS EX	3,951	0.0907	0	0.0000	3,951	0.0907
TOTAL	**88,404**	**73,377**	-	-	-		**8,807**	**0.2022**	**1,267**	**0.0291**	**7,540**	**0.1731**

[2] - Refer to enclosed "Figure D-4 - Proposed Conditions Drainage Area Map" for a depiction of drainage areas.

[3] - Refer to enclosed Hydrodynamic Separator, Bioretention Basin, Green Roof, and Stormwater Planter Sizing Worksheets.

WATER QUALITY FLOW CALCULATIONS:

Stormwater Treatment System Drainage Area	TREATED DRAINAGE AREAS	[5]A *(sq ft)* [27]	[5]WQv *(cu ft)* [28]	Runoff Depth (Q_a = WQv / A) *(in)* [29] = 12 * [27] / [28]	Curve Number (CN) [6][30]	Initil Abstraction (I_a) [7][31]	I_a/P *(1/in)* [32] = [31] / [20]	Unit Peak Discharge (q_u) *(csm/in)* [7][33]	Total Area *(sq mi)* [34] = [27] / 43560 / 640	Water Quality Flow Peak Discharge ($Q_{wq} = q_u * A * Q_a$) *(cfs)* [35] = [33] * [34] * [29]
HDS A	1, 10	13,009	1,434	1.3225	98	0.041	0.027	650	0.0005	0.40
HDS B	3, 4, 5, 8, 9	19,061	1,973	1.2424	98	0.062	0.041	650	0.0007	0.55
HDS C	7	4,337	516	1.4268	99	0.041	0.027	650	0.0002	0.14
HDS EX	16	41,326	3951	1.1473	98	0.041	0.027	650	0.0015	1.11

[5] - Sum of footprint and associated water quality volume for corresponding drainage areas

[6] - $CN = 1000/[10+5P+10Q_a-10(Q_a^2+1.25*Q_a*P)^{1/2}]$

[7] - Refer to TR-55 Chapter 4, Graphical Peak Dishcarge Method. Use tc=0.1 hr and Type III Rainfall Distribution

WQv REQUIRED CALCULATIONS:

[1]Site	[1]Total Site Area within LOD *(sq ft)* [1]	[1]Total Existing Impervious Area within Site LOD *(sq-ft)* [2]	[1]Total Proposed Impervious Area within Site LOD *(sq-ft)* [3]	Redeveloped Impervious Area *(sq ft)* [4] = [2]	New Impervious Area *(sq ft)* [5] = [3] - [4]	Redeveloped Impervious Factor (R) [6] = [4] / [3]	New Impervious Factor (N) [7] = [5] / [3]	Impervious Cover (I) *(%)* [8] = 100*[3] / [1]	Runoff Coefficient (Rv) [9] = 0.05 + 0.009*[8]	90% Rainfall Event Number (P) *(in)* [*10*]	WQv Required (cu ft) [11] = {([7] + [0.75] * [6]) * [10] * [9] * [1]} / 12	WQv Required (ac-ft) [12] = [11] / 43,560	Total RRv *(cu-ft)* [13] = [10]*0.95*[5]/12	HSG Specific Reduction Factor [14]	Required RRv *(cu-ft)* [15] = [14]*[13]
Interim Parking	27,335	20,125	22,045	20,125	1,920	0.913	0.087	80.6	0.78	1.5	**2,046**	0.0470	228	0.3	**68**

[1] - Refer to enclosed "Figure D-1A Existing Conditions Impervious Coverage Map" and "Figure D-2A - Developed Conditions Impervious Coverage Map".

WQv PROVIDED CALCULATIONS:

[2]Drainage Area (DA)	Total Area *(sq ft)* [16]	Impervious Area *(sq ft)* [17]	Impervious Cover (IC) *(%)* [18] = 100 * [17] / [16]	Runoff Coefficient (Rv) [19] = 0.05 + .009 * [18]	90% Rainfall Event Number (P) *(in)* [20]	Treatment Practice[3]	WQv Provided		RRv Applied *(cu-ft)* [23]	RRv Applied *(ac-ft)* [24] = [23] / 43,560	Remaining Volume Treated *(cu-ft)* [25] = [21] - [23]	Volume Treated *(ac-ft)* [26] = [25] / 43,560
							(cu ft) [21] = [20] * [19] * [16] / 12	*(ac-ft)* [22] = [21] / 43560				
PR-101	26,987	15,435	57.2	0.56	1.5	HDS D	1,905	0.0437	0	0.0000	1,905	0.0437
PR-102	2,769	2,458	88.8	0.85	1.5	HDS D	294	0.0067	0	0.0000	294	0.0067
PR-103	2,305	1,951	84.6	0.81	1.5	BIORETENTION BASIN B	234	0.0054	95	0.0022	139	0.0032
TOTAL	**32,061**	**19,844**	-	-	-		**2,433**	**0.0559**	**95**	**0.0022**	**2,338**	**0.0537**

[2] - Refer to enclosed "Figure D-4A - Proposed Conditions Drainage Area Map" for a depiction of drainage areas.

[3] - Refer to enclosed Hydrodynamic Separator, Bioretention Basin, Green Roof, and Stormwater Planter Sizing Worksheets.

WATER QUALITY FLOW CALCULATIONS:

Stormwater Treatment System Drainage Area	TREATED DRAINAGE AREAS	[5]A *(sq ft)* [27]	[5]WQv *(cu ft)* [28]	Runoff Depth (Q_a = WQv / A) *(in)* [29] = 12 * [27] / [28]	Curve Number (CN) [6][30]	Initil Abstraction (I_a) [7][31]	I_a/P *(1/in)* [32] = [31] / [20]	Unit Peak Discharge (q_u) *(csm/in)* [7][33]	Total Area *(sq mi)* [34] = [27] / 43560 / 640	Water Quality Flow Peak Discharge ($Q_{wq} = q_u * A * Q_a$) *(cfs)* [35] = [33] * [34] * [29]
HDS D	101, 102	29,756	2,199	0.8868	93	0.041	0.027	650	0.0011	0.62

[5] - Sum of footprint and associated water quality volume for corresponding drainage areas

[6] - CN = $1000/[10+5P+10Q_a-10(Q_a^2+1.25*Q_a*P)^{1/2}]$

[7] - Refer to TR-55 Chapter 4, Graphical Peak Dishcarge Method. Use tc=0.1 hr and Type III Rainfall Distribution

Stormwater Planter Worksheet

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

where:

Af Required Surface Area (ft2)

WQv Water Quality Volume (ft^3)

df Depth of the Soil Medium (ft)

k The Hyrdaulic Conductivity (ft/day), usually set at 4 ft/day when soil is loosely ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil***

hf Average Height of Water above planter bed (ft)

tf The Design Time to Filter the Treatment Volume Through the Filter Media (days)

Design Point:	**DP-1**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	0.11	0.08	0.76	0.73	440.29	1.50	Stormwater Planter

Calculate the Mimimum Filter Area			
Parameter	**Value**	**Units**	
WQv	440	*ft^3*	*WQv*
Depth of Soil Media	1.5	*ft*	*df*
Hydraulic Conductivity	4	*ft/d*	*k*
Average Height of Ponding	0.25	*ft*	*hf*
Filter Time	0.25	*d*	*tf*
Required Area of Filter	377	*ft^2*	*Af*

Area of Filter		
Width	19.7737199	*ft*
Length	19.7737199	*ft*
Area Provided	391	*ft^2*
Volume Provided	456.166667	

Runoff Reduction	
Soil Type	C
Flow Through Planter?	*Yes*

Determine the Runoff Reduction			
RRv	**440**	***ft^3***	
RRv Applied	**198**	***ft^3***	

Intensive Green Roof Worksheet

WQv ≤ VSM + VDL + (DP x AGR) VSM = AGR x DSM x nSM VDL = AGR x DDL x nDL

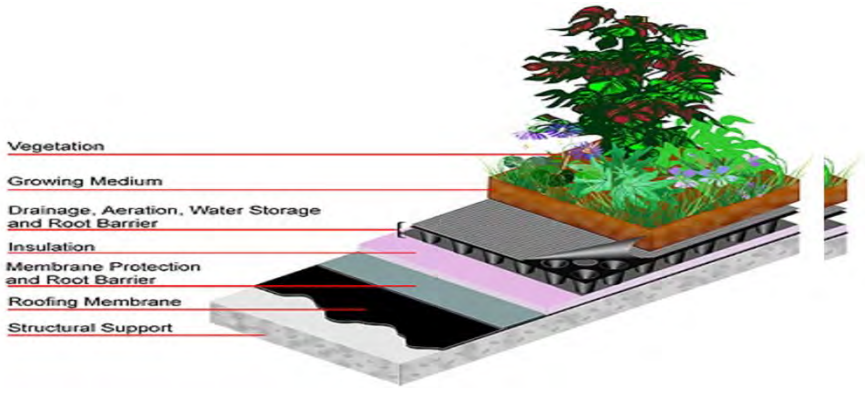
Design Point:	DP-1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
5	0.18	0.18	1.00	0.95	928.39	1.50	Green Roof (Intensive)

Enter Parameters for Proposed Green Roof				
				Notes
Green Roof Surface Area	AGR	3397	ft^2	
Depth of Soil Media	DSM	0.667	*ft*	*0.25-0.5*
Depth of Drainage Layer	DDL	0.67	*ft*	
Depth of Ponding Above Surface	DP	0.00	*ft*	
Porosity of the Soil Media	nSM	20%		*Max 20%*
Porosity of the Drainage Layer	nDL	25%		*Max 25%*

Calculations				
Volume Provided In Soil Media	VSM	453	ft^3	
Volume Provided In Drainage Layer	VDL	566	ft^3	
Volume in Ponding Layer		0	ft^3	
Storage Volume Provided in Green Roof		1,020	ft^3	

Runoff Reduction	**928**	**ft^3**	



WQv ≤ VSM + VDL + (DP x AGR) VSM = AGR x DSM x nSM VDL = AGR x DDL x nDL

Bioretention Worksheet

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

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

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

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

Design Point:	**DP-1**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
11	0.09	0.06	0.67	0.65	307.44	1.50	Bioretention A
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	67%	0.65	307	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	

Soil Information			
Soil Group	C		
Soil Infiltration Rate		*in/hour*	
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		307	*ft^3*	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.25	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**279**	***ft^2***	

Determine Actual Bio-Retention Area			
Filter Width	17.9164729	*ft*	
Filter Length	17.9164729	*ft*	
Filter Area	321	*ft^2*	
Actual Volume Provided	353	*ft^3*	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?			Select Practice	
RRv	141			
RRv applied	**141**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	166	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	*ft^3*	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Bioretention Worksheet

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

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

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

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

Design Point:	**DP-1**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
21	0.05	0.04	0.85	0.81	233.89	1.50	Bioretention B
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	85%	0.81	234	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	

Soil Information			
Soil Group	C		
Soil Infiltration Rate		*in/hour*	
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		234	*ft^3*	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.25	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**213**	***ft^2***	

Determine Actual Bio-Retention Area			
Filter Width	14.6628783	*ft*	
Filter Length	14.6628783	*ft*	
Filter Area	215	*ft^2*	
Actual Volume Provided	237	*ft^3*	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?			Select Practice	
RRv	95			
RRv applied	**95**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	139	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	*ft^3*	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Nonpoint Pollution Control
Division of Water Quality
401-02B
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

March 17, 2017

Mr. Dave Scott
Technical Product Manager
Hydro International
94 Hutchins Drive
Portland, ME 04102

Re: Revised MTD Lab Certification
Downstream Defender Stormwater Treatment Device by Hydro International
On-line Installation

TSS Removal Rate 50%

Dear Mr. Scott:

This revised certification letter supersedes the Department's prior certification dated August 18, 2015. This revision was completed to reflect the updated Manufactured Treatment Device (MTD) scaling methodology as agreed upon by the manufacturers' working group on September 19, 2016. In part, the updated scaling for hydrodynamic MTDs is based on the depth of the reference (tested) MTD from the top of the false floor utilized during removal efficiency testing, not from the physical bottom of the unit. Based on the above decision, Table A-2 of the NJCAT Technology Verification report located at http://www.njcat.org/uploads/newDocs/DDVerificationReport11117.pdf has been revised, and Table 1 noted below has been added.

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7 (c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Hydro International has requested an MTD Laboratory Certification for the Downstream Defender Stormwater Treatment Device.

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal

rate and the required maintenance plan. The NJCAT Verification Report dated August 2015 (Revised January 2017) with the Verification Appendix for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the Downstream Defender Stormwater Treatment Device by Hydro International at a TSS removal rate of 50% when designed, operated and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.

2. The Downstream Defender Stormwater Treatment Device shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in in item 6 below.

3. This Downstream Defender Stormwater Treatment Device cannot be used in series with another MTD or a media filter (such as a sand filter), to achieve an enhance removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found on-line at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Downstream Defender Stormwater Treatment Device, which is attached to this document. However, it is recommended to review the maintenance manual at https://hydro-int.com/sites/default/files/operations_maintenance_manual.pdf for any changes to the maintenance requirements.

6. Sizing Requirements:

   The example below demonstrates the sizing procedure for the Downstream Defender Stormwater Treatment Device:

   Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a Downstream Defender Stormwater Treatment Device. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

   Maximum Treatment Flow Rate (MTFR) Evaluation:

   The site runoff (Q) was based on the following:
   time of concentration = 10 minutes
   i=3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)
   c=0.99 (runoff coefficient for impervious)
   Q=ciA=0.99x3.2x0.25=0.79 cfs

   Given the site runoff is 0.79 cfs and based on Table 1 below, the Downstream Defender Model 4-ft with a MTFR of 1.12 cfs would be the smallest model approved that could be used for this site that could remove 50% of the TSS from the impervious area without exceeding the MTFR.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1 and Table A-2.

Table 1 Downstream Defender Models

Model	Manhole Diameter (ft.)	Treatment Chamber Depth (ft.)	Maximum Treatment Flowrate, MTFR (cfs)
4-ft	4	3.33	1.12
6-ft	6	4.83	2.52
8-ft	8	6.42	4.49
10-ft	10	7.92	7.00
12-ft	12	9.42	10.08

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Mr. Shashi Nayak of my office at (609) 633-7021.

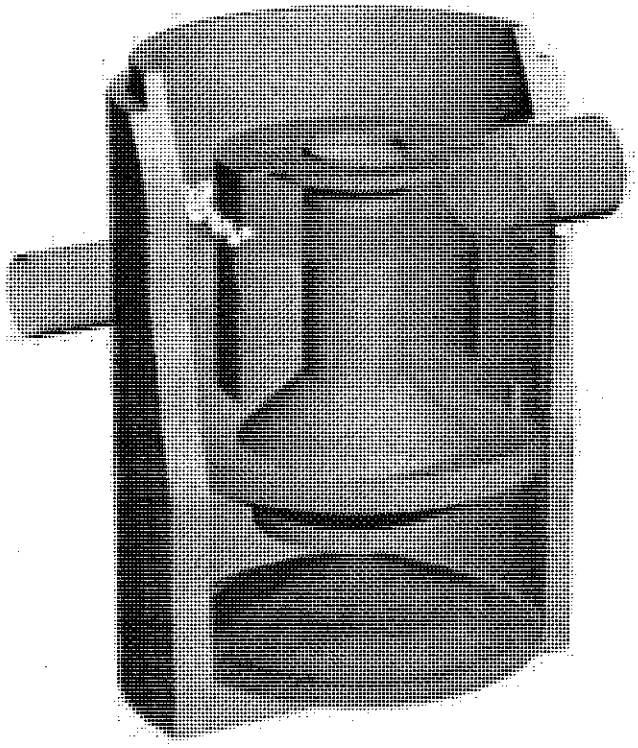
Sincerely,

James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

Attachment: Maintenance Plan

C: Chron File
Richard Magee, NJCAT
Vince Mazzei, NJDEP - DLUR
Ravi Patraju, NJDEP - BES
Gabriel Mahon, NJDEP - BNPC
Shashi Nayak, NJDEP - BNPC

Hydro International stormwater



Downstream Defender®

Stormwater Treatment System

Operation and Maintenance Manual

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DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's Downstream Defender. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc have a policy of continuous product development and reserve the right to amend specifications without notice.

Downstream Defender® by Hydro International

The Downstream Defender is an advanced Hydrodynamic Vortex Separator designed to provide high removal efficiencies of settleable solids and their associated pollutants, oil, and floatables over a wide range of flow rates.

The Downstream Defender has unique, flow-modifying internal components developed from extensive full-scale testing, CFD modeling and over thirty years of hydrodynamic separation experience in wastewater, combined sewer and stormwater applications. These internal components distinguish the Downstream Defender from simple swirl-type devices and conventional oil/grit separators by minimizing turbulence and headlosses, enhancing separation, and preventing washout of previously stored pollutants.

The high removal efficiencies and inherent low headlosses of the Downstream Defender allow for a small footprint making it a compact and economical solution for the treatment of non-point source pollution.

BENEFITS OF THE DOWNSTREAM DEFENDER

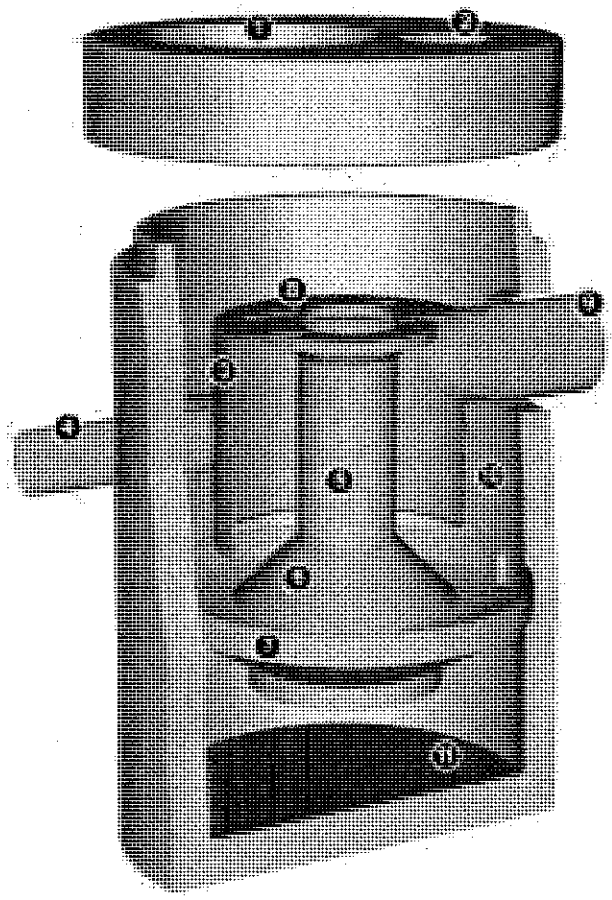
- Removes sediment, floatables, oil and grease
- No pollutant washouts
- Small footprint
- No loss of treatment capacity between clean-outs
- Low headloss
- Efficient over a wide ranges of flows
- Easy to install
- Low maintenance

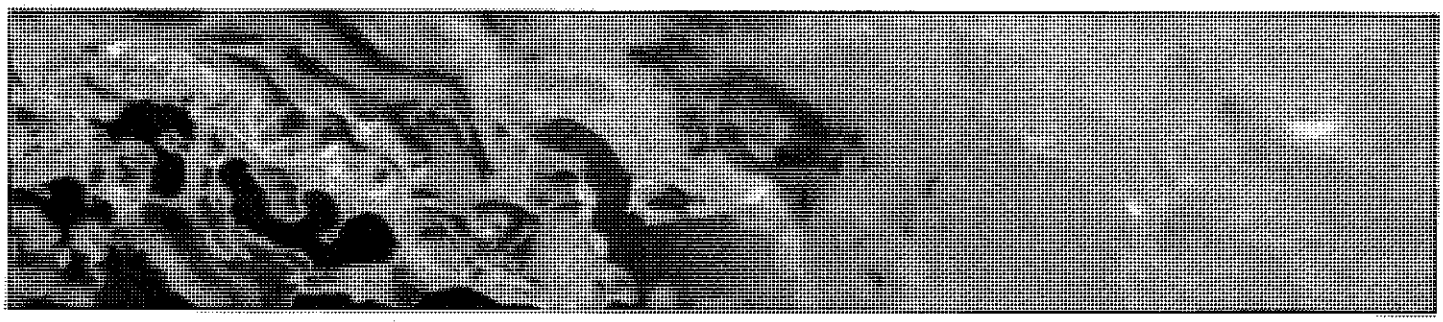
APPLICATIONS

- New developments and retrofits
- Utility yards
- Streets and roadways
- Parking lots
- Pre-treatment for filters, infiltration and storage
- Industrial and commercial facilities
- Wetlands protection

DOWNSTREAM DEFENDER COMPONENTS

1. **Central Access Port**
2. **Floatables Access Port (6-ft., 8-ft. and 10-ft. models only)**
3. **Dip Plate**
4. **Tangential Inlet**
5. **Center Shaft**
6. **Center Cone**
7. **Benching Skirt**
8. **Floatables Lid**
9. **Outlet Pipe**
10. **Floatables Storage**
11. **Isolated Sediment Storage Zone**





Operation

INTRODUCTION

The Downstream Defender operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The Downstream Defender has been designed to allow for easy and safe access for inspection/monitoring and clean-out procedures. Entry into the unit or removal of the internal components is not necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

POLLUTANT CAPTURE AND RETENTION

The internal components of the Downstream Defender have been designed to protect the oil, floatables and sediment storage volumes so that separator performance is not reduced as pollutants accumulate between clean-outs. Additionally, the Downstream Defender is designed and installed into the storm drain system so that the vessel remains wet between storm events. Oil and floatables are stored on the water surface in the outer annulus separate from the sediment storage volume in the sump of the unit providing the option for separate oil disposal, and accessories such as adsorbant pads. Since the oil/floatables and sediment storage volumes are isolated from the active separation region, the potential for re-suspension and washout of stored pollutants between clean-outs is minimized.

WET SUMP

The sump of the Downstream Defender retains a standing water level between storm events. The water in the sump prevents stored sediment from solidifying in the base of the unit. The clean-out procedure becomes more difficult and labor intensive if the system allows fine sediment to dry-out and consolidate. Dried sediment must be manually removed by maintenance crews. This is a labor intensive operation in a hazardous environment.

BLOCKAGE PROTECTION

The Downstream Defender has large clear openings and no internal restrictions or weirs, minimizing the risk of blockage and hydraulic losses. In addition to increasing the system headloss, orifices and internal weirs can increase the risk of blockage within the unit.

Maintenance

OVERVIEW

The Downstream Defender protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the Downstream Defender. The Downstream Defender will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the Downstream Defender will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in Table 1.

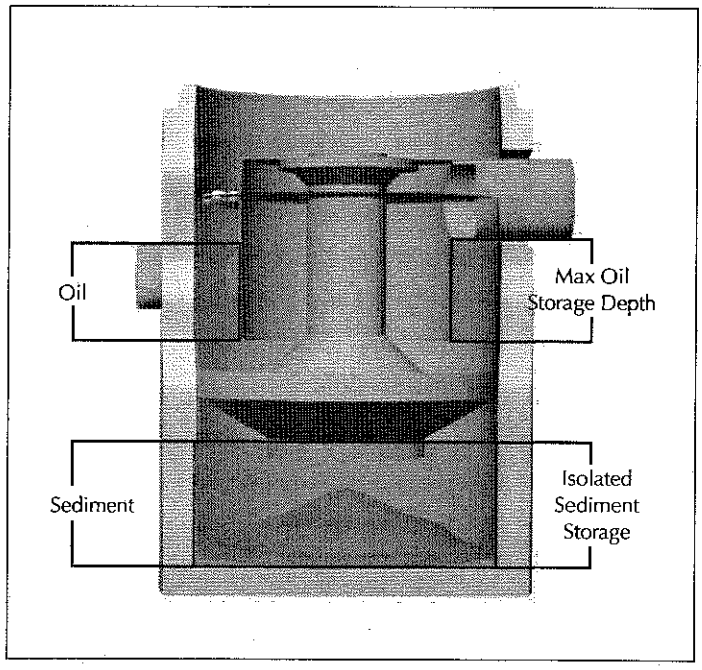


Figure 1: *Pollutant storage volumes of the Downswtream Defender*

The Downstream Defender allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole. On the 6-ft, 8-ft and 10-ft units, the floatables access port is above the outlet pipe between the concrete manhole wall and the dip plate. The sediment removal access ports for all Downstream Defender models are located directly over the hollow center shaft.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the Downstream Defender, nor do they require the internal components of the Downstream Defender to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

DETERMINING YOUR MAINTENANCE SCHEDULE

The frequency of cleanout is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil/flotables removal, for a 6-ft Downstream Defender typically takes less than 30 minutes and removes a combined water/oil volume of about 500 gallons.

INSPECTION PROCEDURES

Inspection is a simple process that does not involve entry into the Downstream Defender. Maintenance crews should be familiar with the Downstream Defender and its components prior to inspection.

SCHEDULING

- It is important to inspect your Downstream Defender every six months during the first year of operation to determine your site-specific rate of pollutant accumulation
- Typically, inspection may be conducted during any season of the year
- Sediment removal is not required unless sediment depths exceed 75% of maximum clean-out depths stated in Table 1

RECOMMENDED EQUIPMENT

- Safety Equipment and Personal Protective Equipment (traffic cones, work gloves, etc.)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net
- Sediment probe (such as a Sludge Judge®)
- Trash bag for removed floatables
- Downstream Defender Maintenance Log

Table 1

Downstream Defender Pollutant Storage Capacities and Max. Cleanout Depths

Unit Diameter	Total Oil Storage	Oil Clean-out Depth	Total Sediment Storage	Sediment Clean-out Depth	Max. Liquid Volume Removed
(feet)	(gallons)	(inches)	(gallons)	(inches)	(gallons)
4	70	<16	141	<18	384
6	216	<23	424	<24	1,239
8	540	<33	939	<30	2,884
10	1,050	<42	1,757	<36	5,546
12	1,770	<49	2,970	<42	9,460

NOTES

1. Refer to Dowmstream Defender Clean-out Detail (Fig. 1) for measurement of depths.

2. Oil accumulation is typically less than sediment, however, removal of oil and sediment during the same service is recommended.

3. Remove floatables first, then remove sediment storage volume.

4. Sediment removal is not required unless sediment depths exceed 75% of maximum clean-out depths stated in Table 1.

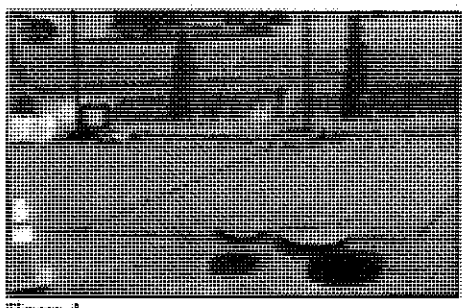


Figure 4

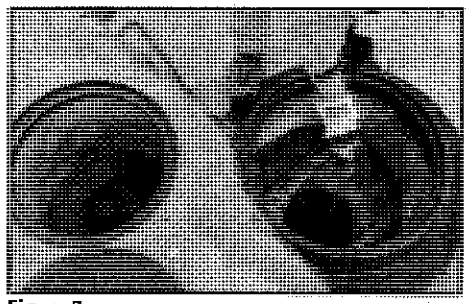


Figure 5

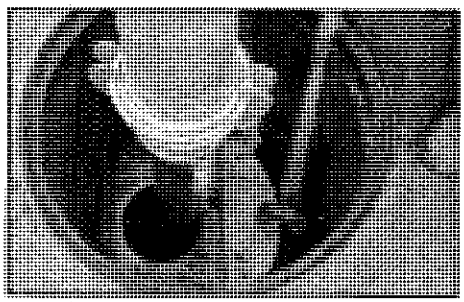


Figure 6

INSPECTION PROCEDURES

1. Set up any necessary safety equipment around the access port or grate of the Downstream Defender as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the lids to the manhole. Figure 4. (NOTE: The 4-ft Downstream Defender® will only have one lid).

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. See Figure 7 and 8 for typical inspection views.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the outer annulus of the chamber.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel. Figure 5.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

FLOATABLES AND SEDIMENT CLEANOUT

Floatables cleanout is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Figure 6.

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose and skimmer pole to be lowered to the base of the sump.

SCHEDULING

- Floatables and sump cleanout are typically conducted once a year during any season.
- If sediment depths are greater than 75% of maximum clean-out depths stated in Table 1, sediment removal is required.
- Floatables and sump cleanout should occur as soon as possible following a spill in the contributing drainage area.

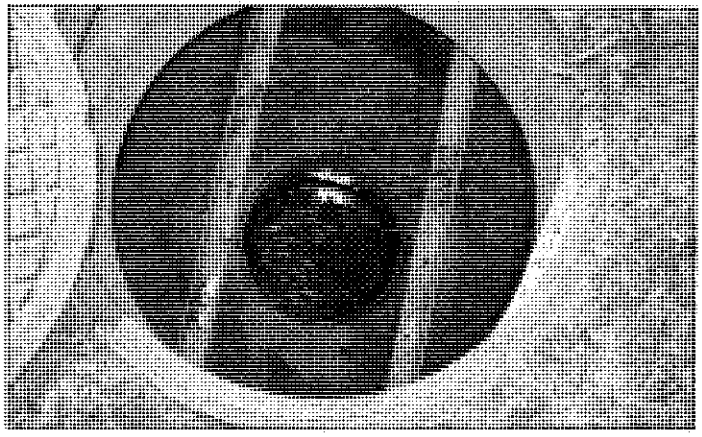


Figure 7: *View over Center Shaft into sediment storage Zone*

Figure 8: *View of outer annulus of floatables and oil collection zone*

RECOMMENDED EQUIPMENT

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (6-inch flexible hose recommended)
- Downstream Defender Maintenance Log

FLOATABLES AND SEDIMENT CLEAN OUT PROCEDURES

1. Set up any necessary safety equipment around the access port or grate of the Downstream Defender as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the lids to the manhole (NOTE: The 4-ft Downstream Defender® will only have one lid).
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.
4. Using the Floatables Port for access, remove oil and floatables stored on the surface of the water with the vactor hose or the skimmer net. Figure 9.
5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).
6. Once all floatables have been removed, drop the vactor hose to the base of the sump via the Central Access Port. Vactor out the sediment and gross debris off the sump floor. Figure 6.
7. Retract the vactor hose from the vessel.
8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.
9. Securely replace the grate or lid.

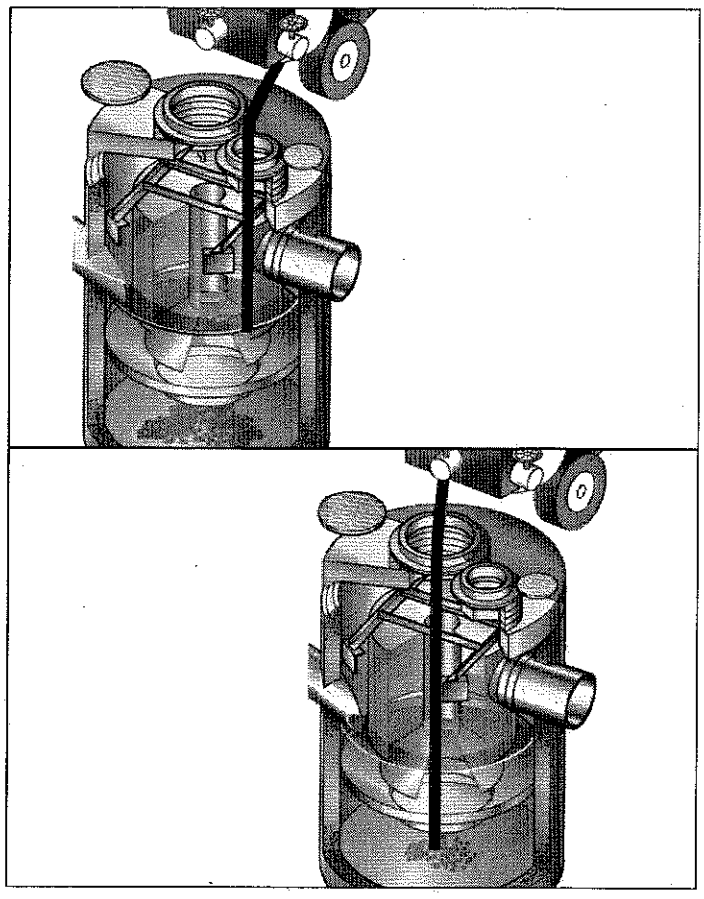


Figure 9: *Floatables and sediment are removed with a vactor hose*

Maintenance at a Glance

ACTIVITY	FREQUENCY
Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most cleanouts it is not necessary to remove the entire volume of liquid in the vessel. Only removing the first few inches of oils/floatables and the sediment storage volume is required.	

Hydro International stormwater

Downstream Defender Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL (CIRCLE ONE): **4-FT** **6-FT** **8-FT** **10-FT** **CUSTOM**

Hydro International stormwater

Downstream Defender Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment * Depth Measured	Volume of Sediment Removed	Site Activity and Comments

*Note: Sediment removal is not required unless sediment depths exceed 75% of maximum clean-out depths stated in Table 1.

Hydro International stormwater

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USDD0406

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Bureau of Nonpoint Pollution Control
Division of Water Quality
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609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

March 9, 2017

Mr. Dave Scott
Technical Product Manager
Hydro International
94 Hutchins Drive
Portland, ME 04102

Re: MTD Lab Certification
First Defense® HC (FDHC) Stormwater Treatment Device by Hydro International
On-line Installation

TSS Removal Rate 50%

Dear Mr. Scott:

This revised certification letter supersedes the Department's prior certification dated April 4, 2016. This revision was completed to reflect the updated Manufactured Treatment Device (MTD) scaling methodology as agreed upon by the manufacturers' working group on September 19, 2016. In part, the updated scaling for hydrodynamic MTDs is based on the depth of the reference (tested) MTD from the top of the false floor utilized during removal efficiency testing, not from the physical bottom of the unit. Based on the above decision, Table A-2 of the NJCAT Technology Verification report located at http://www.njcat.org/uploads/newDocs/FDHCVerificationReportFinal.pdf has been revised, and Table 1 noted below has been updated as well.

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7 (c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Hydro International has requested an MTD Laboratory Certification for the First Defense® HC Stormwater Treatment Device.

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report dated February 2016 (Revised

January 2017) with the Verification Appendix for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the First Defense® HC Stormwater Treatment Device by Hydro International at a TSS removal rate of 50% when designed, operated and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.

2. The First Defense® HC Stormwater Treatment Device shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in in item 6 below.

3. This First Defense® HC Stormwater Treatment Device cannot be used in series with another MTD or a media filter (such as a sand filter), to achieve an enhance removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found on-line at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the First Defense® HC Stormwater Treatment Device, which is attached to this document. However, it is recommended to review the maintenance manual at http://a2795.actonsoftware.com/acton/attachment/2795/f-0132/1/-/-/-/-/Hydro-International-First-Defense-Treatment-System.pdf for any changes to the maintenance requirements.

6. Sizing Requirements:

   The example below demonstrates the sizing procedure for the First Defense® HC Stormwater Treatment Device:

   Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a First Defense® HC Stormwater Treatment Device. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

   Maximum Treatment Flow Rate (MTFR) Evaluation:

   The site runoff (Q) was based on the following:
   time of concentration = 10 minutes
   i=3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)
   c=0.99 (curve number for impervious)
   Q=ciA=0.99x3.2x0.25=0.79 cfs

   Given the site runoff is 0.79 cfs and based on Table 1 below, the First Defense® HC Model 3-ft with a MTFR of 0.85 cfs would be the smallest model approved that could be used for this site that could remove 50% of the TSS from the impervious area without exceeding the MTFR.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1 and Table A-2.

Table 1 First Defense® HC Models

First Defense® Model	Manhole Diameter (ft)	Maximum Treatment Flowrate, MTFR (cfs)
3-ft	3	0.85
4-ft	4	1.5
5-ft	5	2.35
6-ft	6	3.38
7-ft	7	4.60
8-ft	8	6.00

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Mr. Shashi Nayak of my office at (609) 633-7021.

Sincerely,

James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

Attachment: Maintenance Plan

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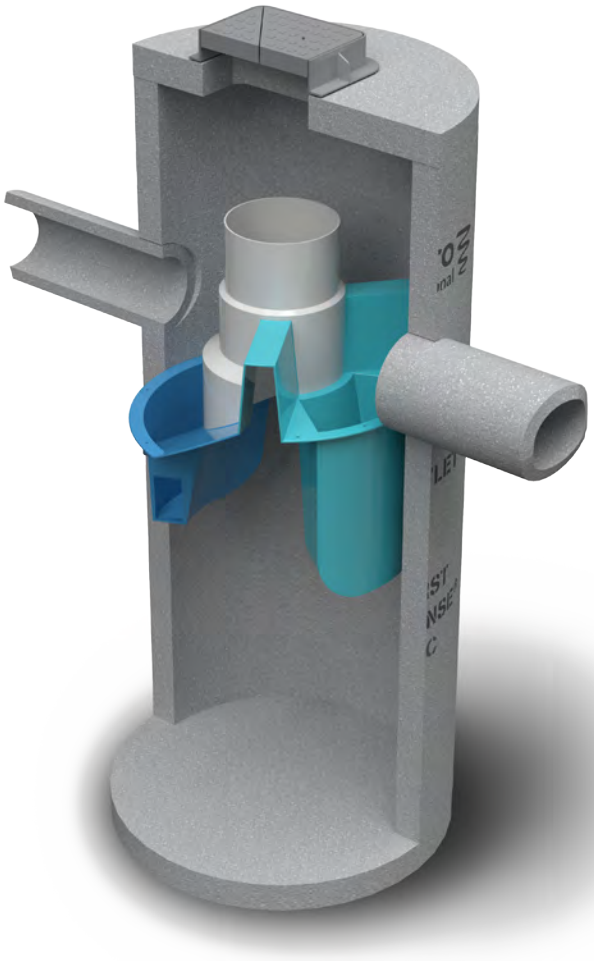
Hydro International



Operation and Maintenance Manual

First Defense® and First Defense® High Capacity

Vortex Separator for Stormwater Treatment

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8 First Defense® Installation Log

9 First Defense® Inspection and Maintenance Log

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I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations (refer to *Section II. Model Sizes & Configurations*, page 4) to accommodate a wide range of pipe sizes, peak flows and depth constraints.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 500% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

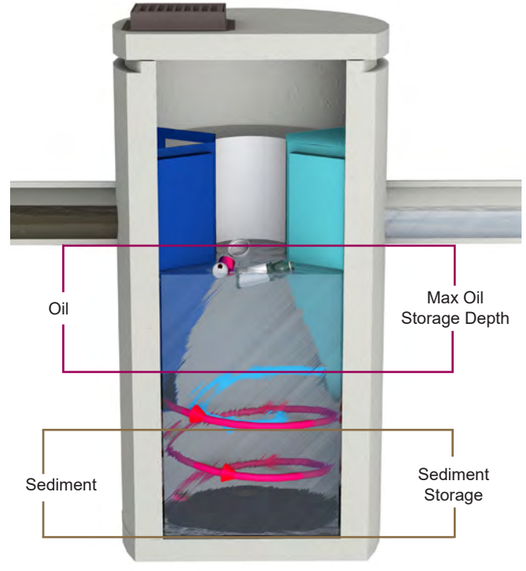


Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components of the First Defense®-4HC and First Defense®-6HC have modified geometries as to allow greater design flexibility needed to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2a - 2b). First Defense® model parameters and design criteria are shown in Table 1.

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

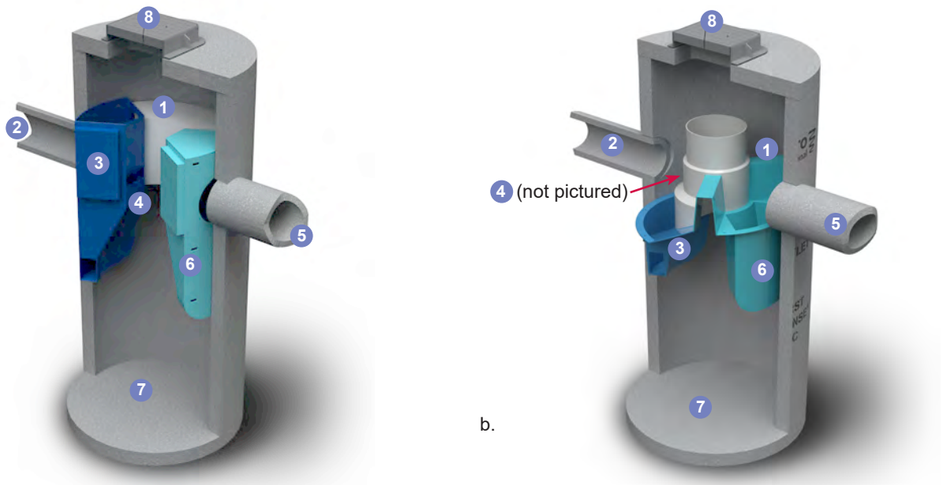


Fig.2a) First Defense®-4 and First Defense®-6; b) First Defense®-4HC and First Defense®-6HC, with higher capacity dual internal bypass and larger maximum pipe diameter.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates NJDEP Certified	Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Chamber Depth
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.85 / 24.0	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.75 / 1.14
FD-4HC	4 / 1.2	1.50 / 42.4	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	5.00 / 1.52
FD-5HC	5 / 1.5	2.35 / 66.2	20 / 566	24 / 609	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.25 / 1.60
FD-6HC	6 / 1.8	3.38 / 95.7	32 / 906	30 / 750	496 / 1878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	6.25 / 1.90
FD-7HC	7 / 2.1	4.60 / 130.2	40 / 1133	42 / 1067	750 / 2839	2.1 / 1.9	3.0 - 5.5 / 0.9 - 1.7	7.25 / 2.20
FD-8HC	8 / 2.4	6.00 / 169.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	8.00 / 2.43

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

III. Maintenance

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in Table 1.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense®-HC have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

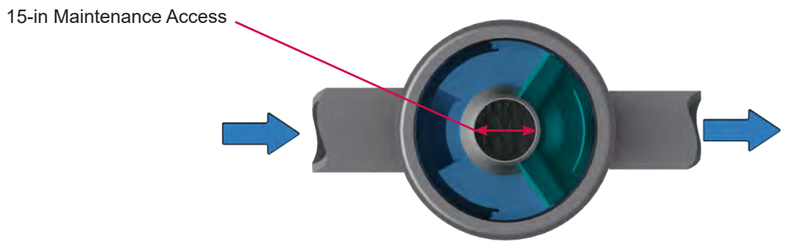


Fig.3 The central opening to the sump of the First Defense®-HC is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for a 6-ft First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.5).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose and skimmer pole to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Fig.4 Floatables are removed with a vactor hose (First Defense model FD-4, shown).

Recommended Equipment

- Safety Equipment (traffic cones, etc)

- Crow bar or other tool to remove grate or lid

- Pole with skimmer or net (if only floatables are being removed)

- Sediment probe (such as a Sludge Judge®)

- Vactor truck (flexible hose recommended)

- First Defense® Maintenance Log

Floatables and sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose (Fig.5) or with the skimmer or net (not pictured).

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor (Fig.5).

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Fig.5 Sediment is removed with a vactor hose (First Defense model FD-4, shown).

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

First Defense® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE): **FD-4** **FD-4HC** **FD-6** **FD-6HC**

INLET (CIRCLE ALL THAT APPLY): **GRATED INLET (CATCH BASIN)** **INLET PIPE (FLOW THROUGH)**

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

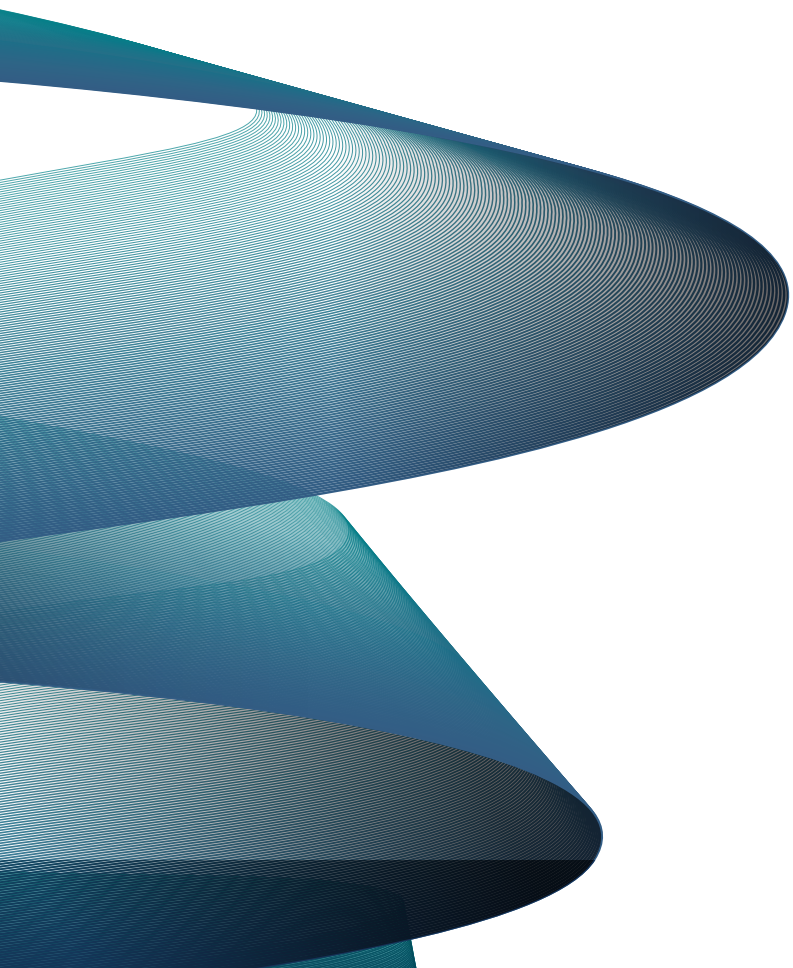
First Defense® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

Notes

Hydro International®



Stormwater Solutions

94 Hutchins Drive
Portland, ME 04102

Tel: (207) 756-6200
Fax: (207) 756-6212
stormwaterinquiry@hydro-int.com

www.hydro-int.com

Turning Water Around...®

FDHC_O+M_H_1703

APPENDIX G

EXTREME PRECIPITATION TABLE

EXISTING CONDITIONS HYDROCAD MODEL OUTPUT (PHASE 3 SITE)

PROPOSED CONDITIONS HYDROCAD MODEL OUTPUT (PHASE 3 SITE)

EXISTING CONDITIONS HYDROCAD MODEL OUTPUT (INTERIM PARKING SITE)

PROPOSED CONDITIONS HYDROCAD MODEL OUTPUT (INTERIM PARKING SITE)

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	73.771 degrees West
Latitude	41.027 degrees North
Elevation	0 feet
Date/Time	Wed, 26 May 2021 15:54:47 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.51	0.63	0.83	1.04	1.30	**1yr**	0.90	1.23	1.49	1.85	2.29	2.83	3.20	**1yr**	2.50	3.08	3.57	4.29	4.93	**1yr**
2yr	0.40	0.62	0.77	1.02	1.28	1.60	**2yr**	1.10	1.49	1.84	2.27	2.80	3.44	3.86	**2yr**	3.04	3.72	4.27	5.07	5.75	**2yr**
5yr	0.47	0.74	0.93	1.24	1.59	2.00	**5yr**	1.37	1.84	2.31	2.86	3.52	4.30	4.89	**5yr**	3.81	4.70	5.46	6.38	7.13	**5yr**
10yr	0.53	0.84	1.06	1.44	1.87	2.37	**10yr**	1.61	2.16	2.75	3.41	4.18	5.10	5.84	**10yr**	4.51	5.62	6.57	7.58	8.40	**10yr**
25yr	0.62	0.99	1.26	1.74	2.32	2.98	**25yr**	2.00	2.68	3.46	4.30	5.27	6.39	7.40	**25yr**	5.66	7.12	8.41	9.53	10.42	**25yr**
50yr	0.71	1.14	1.46	2.04	2.74	3.55	**50yr**	2.37	3.15	4.13	5.13	6.27	7.58	8.85	**50yr**	6.71	8.51	10.14	11.33	12.27	**50yr**
100yr	0.81	1.30	1.68	2.38	3.24	4.22	**100yr**	2.80	3.71	4.92	6.12	7.47	9.01	10.59	**100yr**	7.97	10.19	12.22	13.48	14.46	**100yr**
200yr	0.92	1.50	1.94	2.78	3.84	5.03	**200yr**	3.31	4.37	5.87	7.30	8.90	10.70	12.68	**200yr**	9.47	12.20	14.75	16.05	17.04	**200yr**
500yr	1.10	1.82	2.37	3.43	4.80	6.33	**500yr**	4.14	5.43	7.41	9.21	11.21	13.45	16.10	**500yr**	11.90	15.48	18.91	20.20	21.19	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.00	**1yr**	0.77	0.98	1.34	1.57	2.03	2.55	2.66	**1yr**	2.26	2.56	3.22	3.89	4.44	**1yr**
2yr	0.39	0.60	0.74	1.00	1.24	1.49	**2yr**	1.07	1.46	1.70	2.19	2.75	3.34	3.74	**2yr**	2.95	3.60	4.13	4.91	5.59	**2yr**
5yr	0.43	0.66	0.82	1.13	1.43	1.74	**5yr**	1.24	1.70	1.98	2.58	3.24	3.99	4.53	**5yr**	3.54	4.35	5.03	5.87	6.62	**5yr**
10yr	0.47	0.72	0.89	1.24	1.60	1.95	**10yr**	1.38	1.91	2.22	2.91	3.69	4.58	5.21	**10yr**	4.05	5.01	5.82	6.65	7.48	**10yr**
25yr	0.51	0.77	0.96	1.37	1.80	2.26	**25yr**	1.55	2.21	2.59	3.39	4.39	5.49	6.27	**25yr**	4.86	6.03	7.07	7.79	8.76	**25yr**
50yr	0.53	0.81	1.01	1.45	1.95	2.53	**50yr**	1.68	2.47	2.92	3.81	5.00	6.31	7.22	**50yr**	5.58	6.94	8.18	8.72	9.83	**50yr**
100yr	0.56	0.85	1.07	1.54	2.12	2.81	**100yr**	1.83	2.74	3.28	4.28	5.70	7.25	8.30	**100yr**	6.42	7.98	9.48	9.77	11.02	**100yr**
200yr	0.60	0.90	1.14	1.65	2.30	3.13	**200yr**	1.99	3.06	3.70	4.82	6.53	8.35	9.55	**200yr**	7.39	9.18	10.99	10.90	12.35	**200yr**
500yr	0.64	0.95	1.22	1.78	2.53	3.60	**500yr**	2.18	3.52	4.34	5.65	7.83	10.07	11.46	**500yr**	8.91	11.02	13.37	12.56	14.33	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.37	0.58	0.71	0.95	1.17	1.41	**1yr**	1.01	1.38	1.60	2.10	2.62	3.09	3.53	**1yr**	2.74	3.40	3.86	4.67	5.27	**1yr**
2yr	0.43	0.66	0.81	1.10	1.35	1.60	**2yr**	1.17	1.56	1.81	2.35	2.91	3.56	4.01	**2yr**	3.15	3.86	4.43	5.32	6.00	**2yr**
5yr	0.52	0.81	1.00	1.37	1.74	2.03	**5yr**	1.51	1.99	2.35	3.01	3.77	4.63	5.28	**5yr**	4.10	5.08	5.87	6.86	7.67	**5yr**
10yr	0.63	0.96	1.19	1.67	2.15	2.45	**10yr**	1.86	2.40	2.87	3.66	4.59	5.65	6.52	**10yr**	5.00	6.27	7.29	8.44	9.32	**10yr**
25yr	0.81	1.23	1.53	2.18	2.87	3.17	**25yr**	2.47	3.10	3.75	4.76	5.93	7.35	8.62	**25yr**	6.50	8.29	9.71	11.11	12.05	**25yr**
50yr	0.97	1.48	1.84	2.65	3.56	3.87	**50yr**	3.07	3.78	4.60	5.81	7.21	8.97	10.65	**50yr**	7.94	10.24	12.05	13.70	14.65	**50yr**
100yr	1.19	1.79	2.25	3.24	4.45	4.72	**100yr**	3.84	4.62	5.64	7.12	8.76	10.94	13.17	**100yr**	9.69	12.66	14.99	16.88	17.82	**100yr**
200yr	1.45	2.17	2.76	3.99	5.56	5.76	**200yr**	4.80	5.63	6.91	8.71	10.66	13.35	16.28	**200yr**	11.82	15.66	18.65	20.83	21.69	**200yr**
500yr	1.90	2.83	3.65	5.30	7.53	7.51	**500yr**	6.50	7.34	9.06	11.43	13.81	17.37	21.59	**500yr**	15.37	20.76	24.89	27.54	28.15	**500yr**

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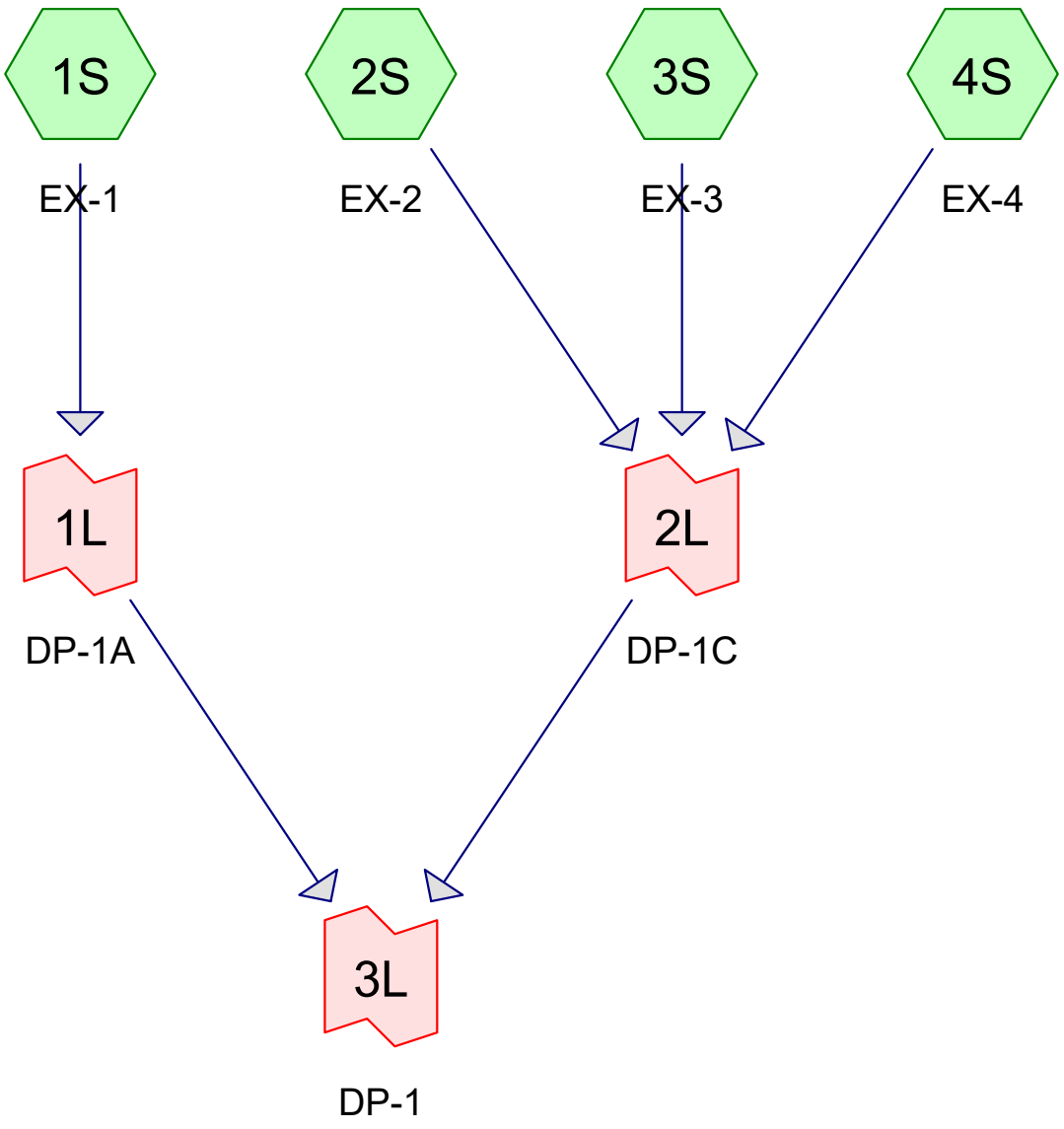


Subcat Reach Pond Link

Routing Diagram for Brookfield Phase3-EX
Prepared by AKRF, Inc, Printed 2/20/2023
HydroCAD® 10.20-2f s/n 04852 © 2022 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.83	2
2	10-YR	Type III 24-hr		Default	24.00	1	5.10	2
3	25-YR	Type III 24-hr		Default	24.00	1	6.39	2
4	50-YR	Type III 24-hr		Default	24.00	1	7.58	2
5	100-YR	Type III 24-hr		Default	24.00	1	9.01	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,824	79	50-75% Grass cover, Fair, HSG C (4S)
31,990	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
124,597	98	Paved parking, HSG C (1S, 2S, 3S, 4S)
9,022	98	Roofs, HSG C (1S)
173,433	**93**	**TOTAL AREA**

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

Subcatchment 1S: EX-1 Runoff Area=64,319 sf 74.70% Impervious Runoff Depth>2.00"
Tc=6.0 min CN=92 Runoff=3.3 cfs 10,717 cf

Subcatchment 2S: EX-2 Runoff Area=3,999 sf 33.01% Impervious Runoff Depth>1.24"
Tc=14.1 min CN=82 Runoff=0.1 cfs 414 cf

Subcatchment 3S: EX-3 Runoff Area=35,182 sf 62.94% Impervious Runoff Depth>1.75"
Tc=6.0 min CN=89 Runoff=1.6 cfs 5,117 cf

Subcatchment 4S: EX-4 Runoff Area=69,933 sf 88.81% Impervious Runoff Depth>2.38"
Tc=6.0 min CN=96 Runoff=4.1 cfs 13,889 cf

Link 1L: DP-1A Inflow=3.3 cfs 10,717 cf
Primary=3.3 cfs 10,717 cf

Link 2L: DP-1C Inflow=5.8 cfs 19,421 cf
Primary=5.8 cfs 19,421 cf

Link 3L: DP-1 Inflow=9.1 cfs 30,137 cf
Primary=9.1 cfs 30,137 cf

Total Runoff Area = 173,433 sf Runoff Volume = 30,137 cf Average Runoff Depth = 2.09"
22.96% Pervious = 39,814 sf 77.04% Impervious = 133,619 sf

Summary for Subcatchment 1S: EX-1

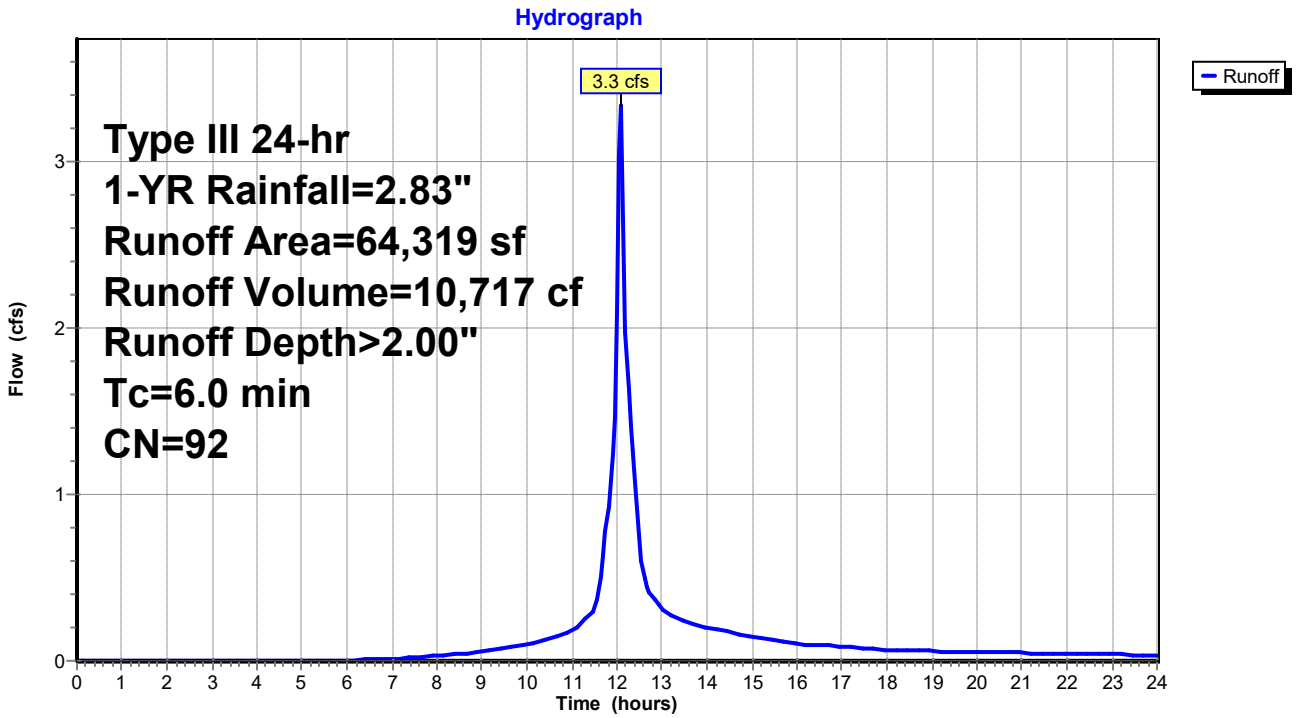
Runoff = 3.3 cfs @ 12.09 hrs, Volume= 10,717 cf, Depth> 2.00"
Routed to Link 1L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
39,024	98	Paved parking, HSG C
9,022	98	Roofs, HSG C
16,273	74	>75% Grass cover, Good, HSG C
64,319	92	Weighted Average
16,273		25.30% Pervious Area
48,046		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-1



Summary for Subcatchment 2S: EX-2

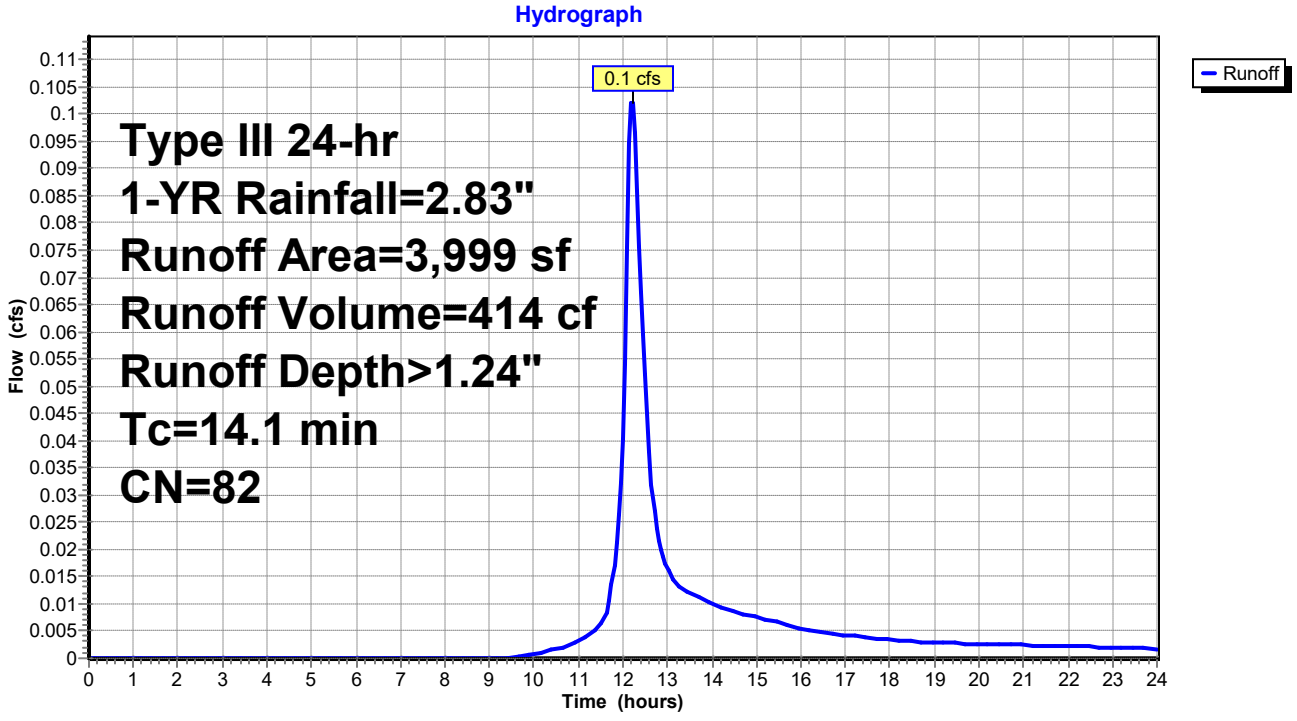
Runoff = 0.1 cfs @ 12.20 hrs, Volume= 414 cf, Depth> 1.24"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,320	98	Paved parking, HSG C
2,679	74	>75% Grass cover, Good, HSG C
3,999	82	Weighted Average
2,679		66.99% Pervious Area
1,320		33.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1					**Direct Entry,**

Subcatchment 2S: EX-2



Summary for Subcatchment 3S: EX-3

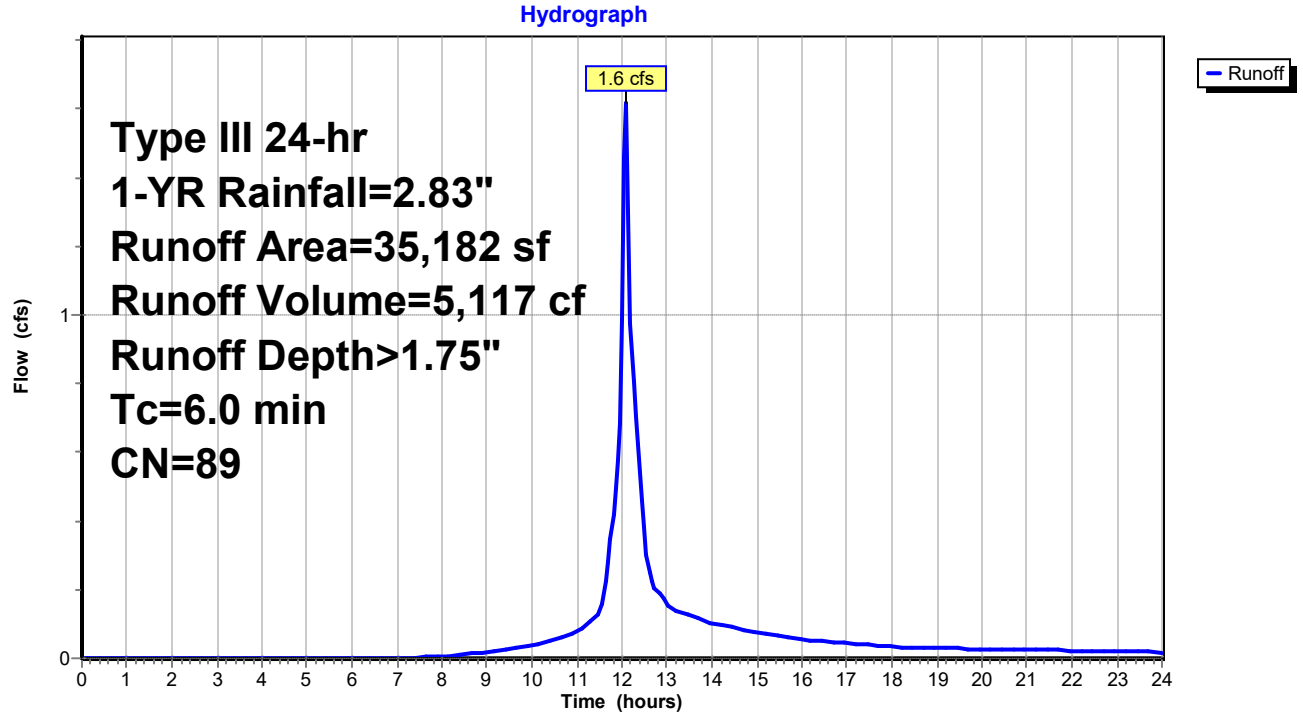
Runoff = 1.6 cfs @ 12.09 hrs, Volume= 5,117 cf, Depth> 1.75"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
22,144	98	Paved parking, HSG C
13,038	74	>75% Grass cover, Good, HSG C
35,182	89	Weighted Average
13,038		37.06% Pervious Area
22,144		62.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX-3



Summary for Subcatchment 4S: EX-4

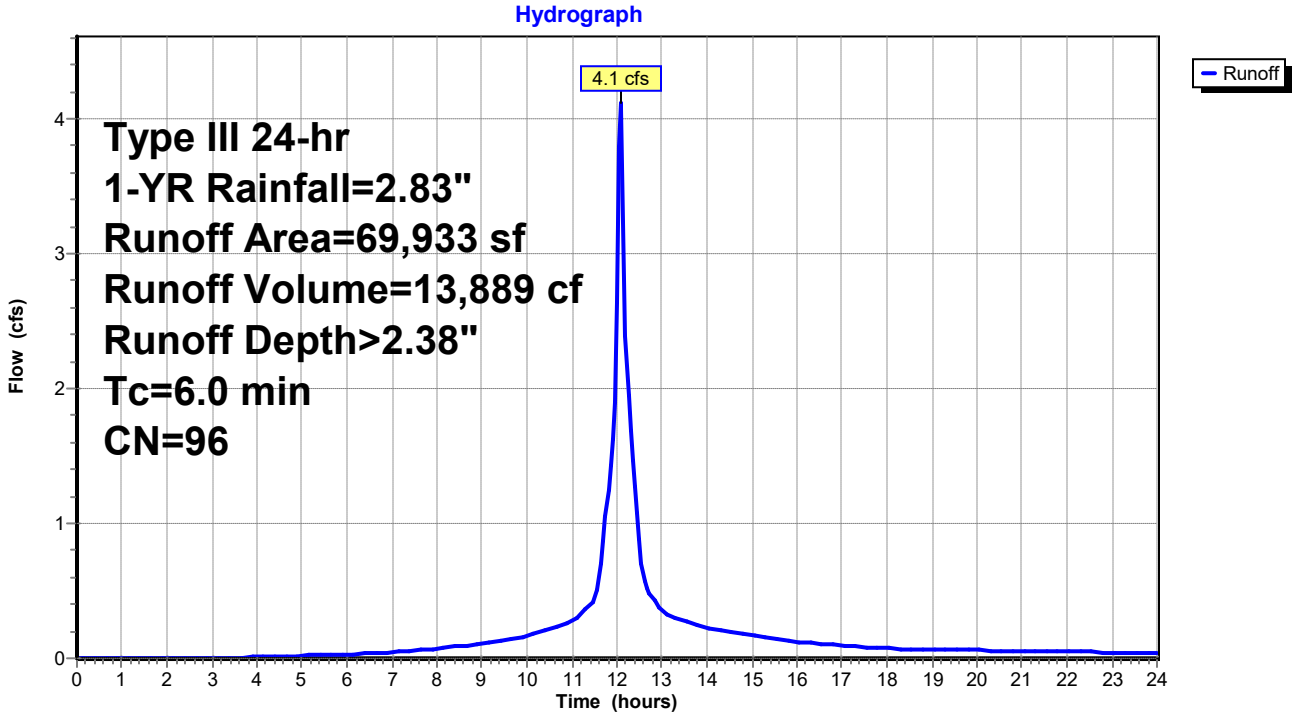
Runoff = 4.1 cfs @ 12.09 hrs, Volume= 13,889 cf, Depth> 2.38"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
62,109	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,933	96	Weighted Average
7,824		11.19% Pervious Area
62,109		88.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX-4

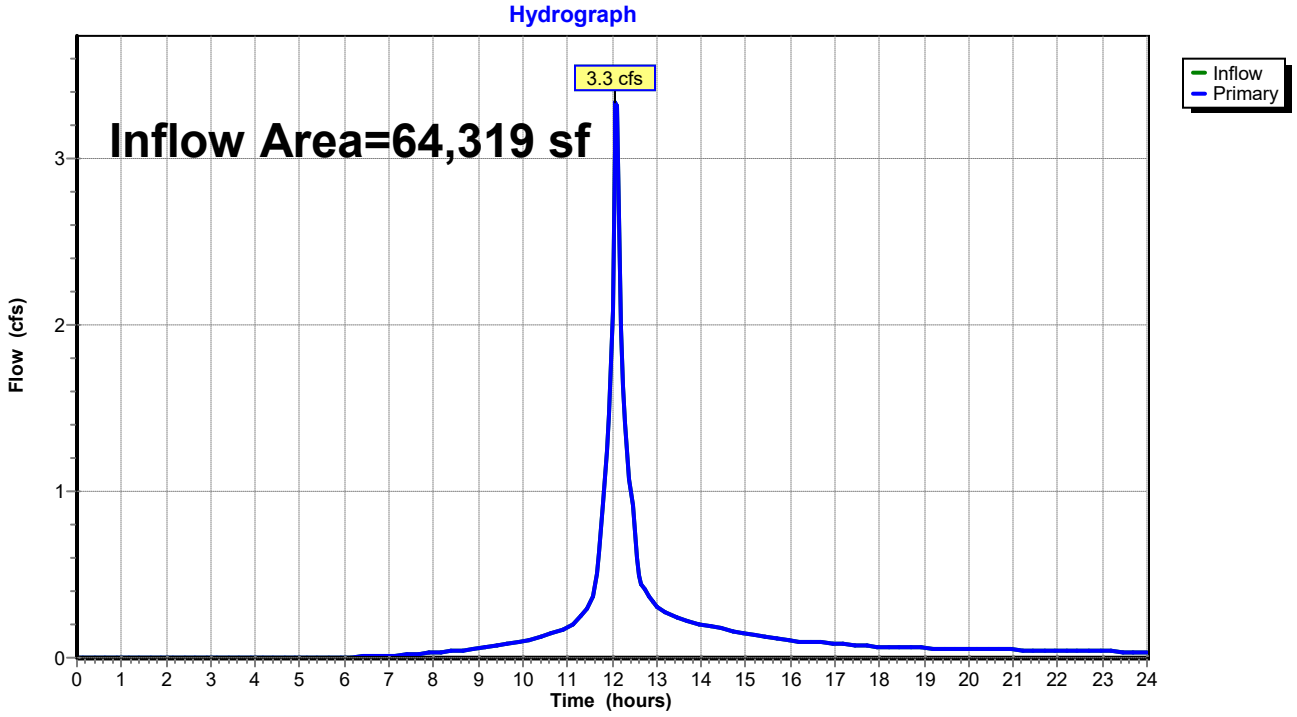


Summary for Link 1L: DP-1A

Inflow Area = 64,319 sf, 74.70% Impervious, Inflow Depth > 2.00" for 1-YR event
Inflow = 3.3 cfs @ 12.09 hrs, Volume= 10,717 cf
Primary = 3.3 cfs @ 12.09 hrs, Volume= 10,717 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1A

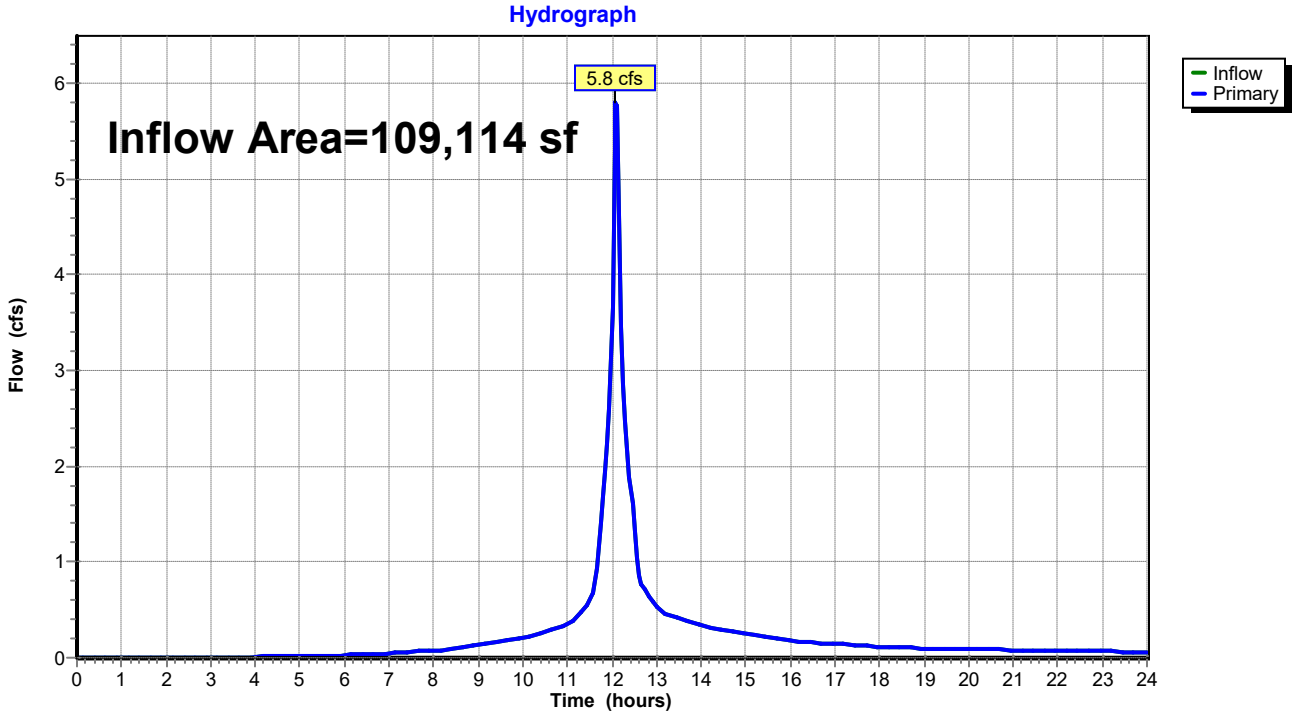


Summary for Link 2L: DP-1C

Inflow Area = 109,114 sf, 78.43% Impervious, Inflow Depth > 2.14" for 1-YR event
Inflow = 5.8 cfs @ 12.09 hrs, Volume= 19,421 cf
Primary = 5.8 cfs @ 12.09 hrs, Volume= 19,421 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1C

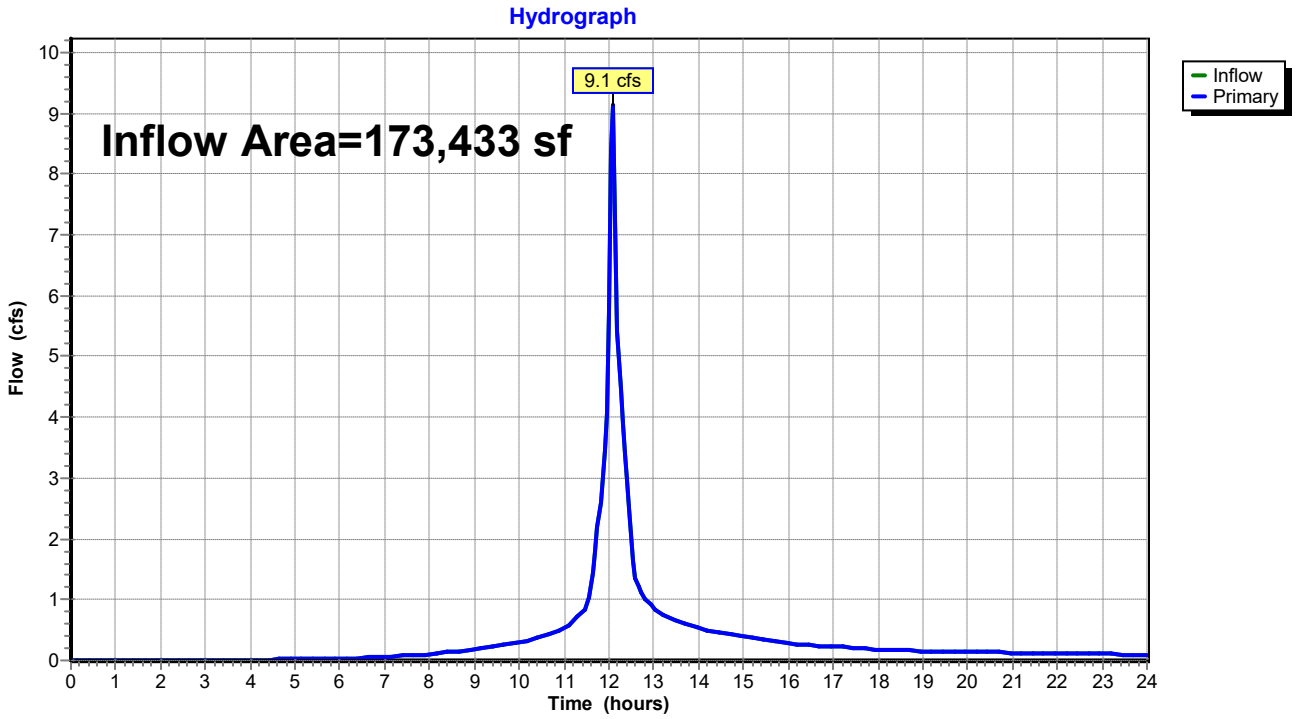


Summary for Link 3L: DP-1

Inflow Area = 173,433 sf, 77.04% Impervious, Inflow Depth > 2.09" for 1-YR event
Inflow = 9.1 cfs @ 12.09 hrs, Volume= 30,137 cf
Primary = 9.1 cfs @ 12.09 hrs, Volume= 30,137 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: EX-1 Runoff Area=64,319 sf 74.70% Impervious Runoff Depth>4.18"
Tc=6.0 min CN=92 Runoff=6.7 cfs 22,426 cf

Subcatchment 2S: EX-2 Runoff Area=3,999 sf 33.01% Impervious Runoff Depth>3.16"
Tc=14.1 min CN=82 Runoff=0.3 cfs 1,053 cf

Subcatchment 3S: EX-3 Runoff Area=35,182 sf 62.94% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=89 Runoff=3.5 cfs 11,331 cf

Subcatchment 4S: EX-4 Runoff Area=69,933 sf 88.81% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=96 Runoff=7.7 cfs 26,977 cf

Link 1L: DP-1A Inflow=6.7 cfs 22,426 cf
Primary=6.7 cfs 22,426 cf

Link 2L: DP-1C Inflow=11.4 cfs 39,361 cf
Primary=11.4 cfs 39,361 cf

Link 3L: DP-1 Inflow=18.1 cfs 61,788 cf
Primary=18.1 cfs 61,788 cf

Total Runoff Area = 173,433 sf Runoff Volume = 61,788 cf Average Runoff Depth = 4.28"
22.96% Pervious = 39,814 sf 77.04% Impervious = 133,619 sf

Summary for Subcatchment 1S: EX-1

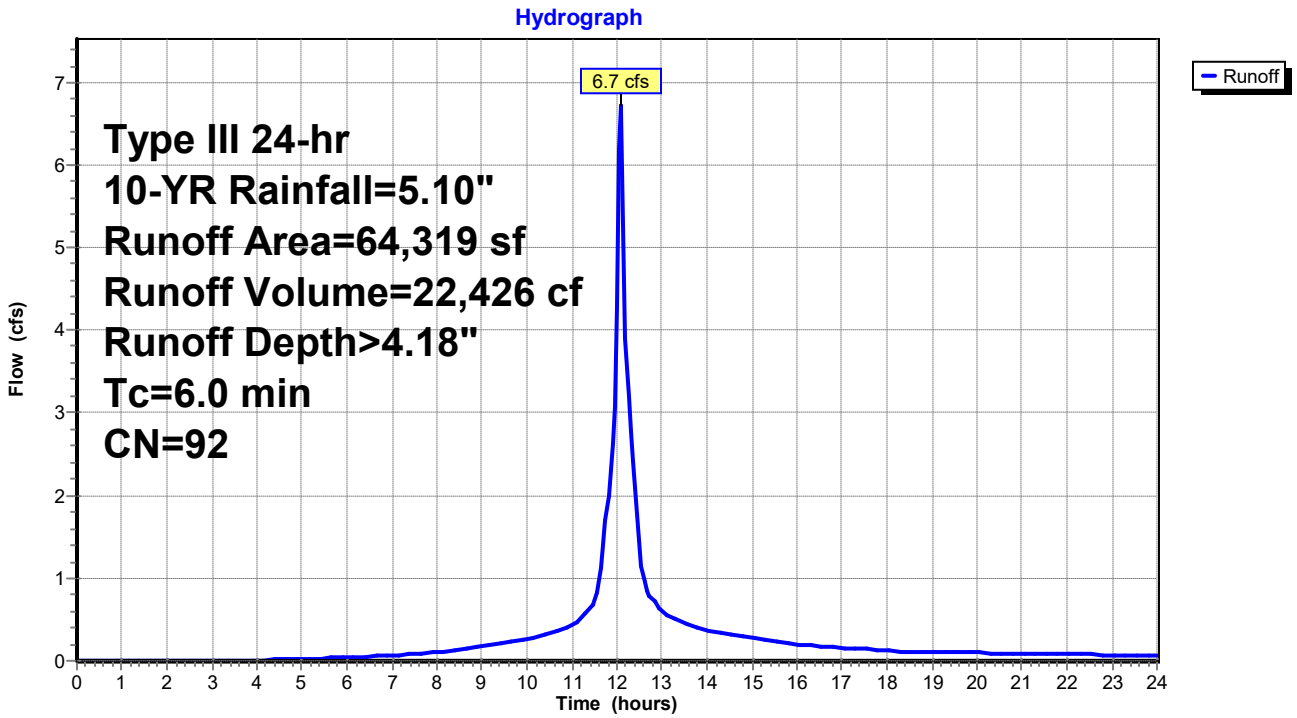
Runoff = 6.7 cfs @ 12.09 hrs, Volume= 22,426 cf, Depth> 4.18"
Routed to Link 1L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
39,024	98	Paved parking, HSG C
9,022	98	Roofs, HSG C
16,273	74	>75% Grass cover, Good, HSG C
64,319	92	Weighted Average
16,273		25.30% Pervious Area
48,046		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-1



Summary for Subcatchment 2S: EX-2

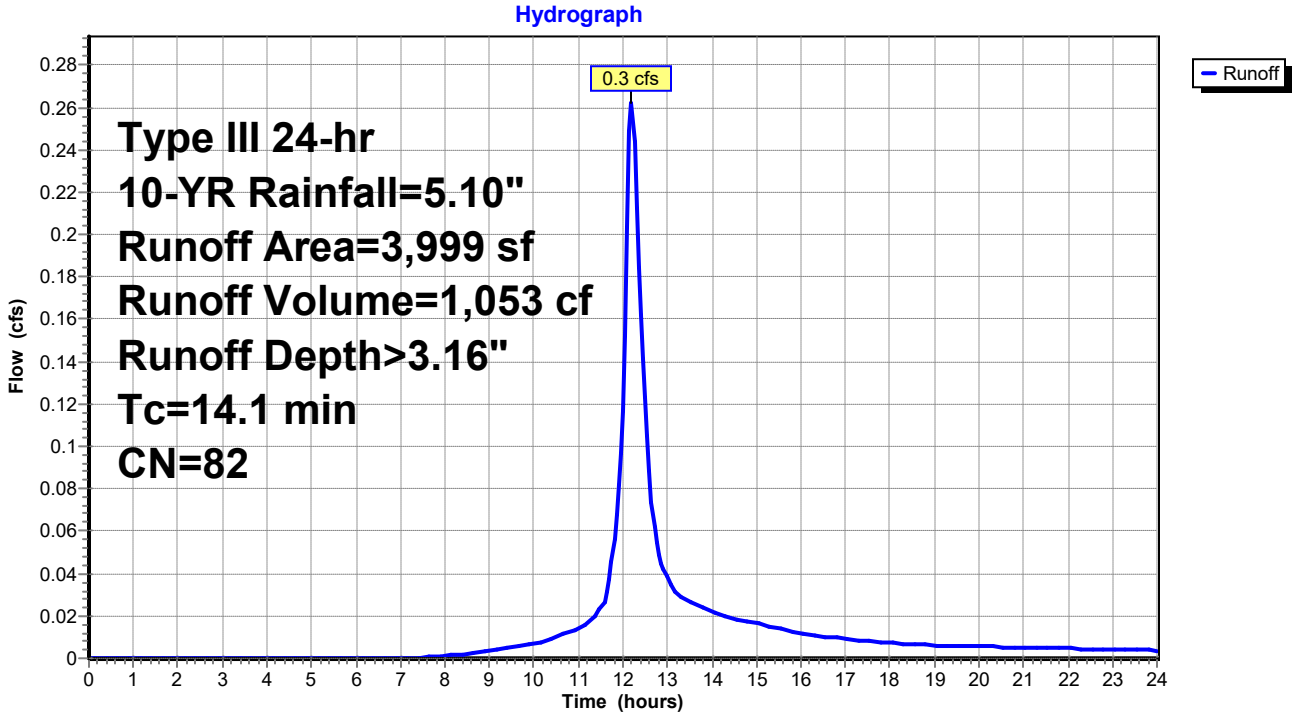
Runoff = 0.3 cfs @ 12.20 hrs, Volume= 1,053 cf, Depth> 3.16"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,320	98	Paved parking, HSG C
2,679	74	>75% Grass cover, Good, HSG C
3,999	82	Weighted Average
2,679		66.99% Pervious Area
1,320		33.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1					**Direct Entry,**

Subcatchment 2S: EX-2



Summary for Subcatchment 3S: EX-3

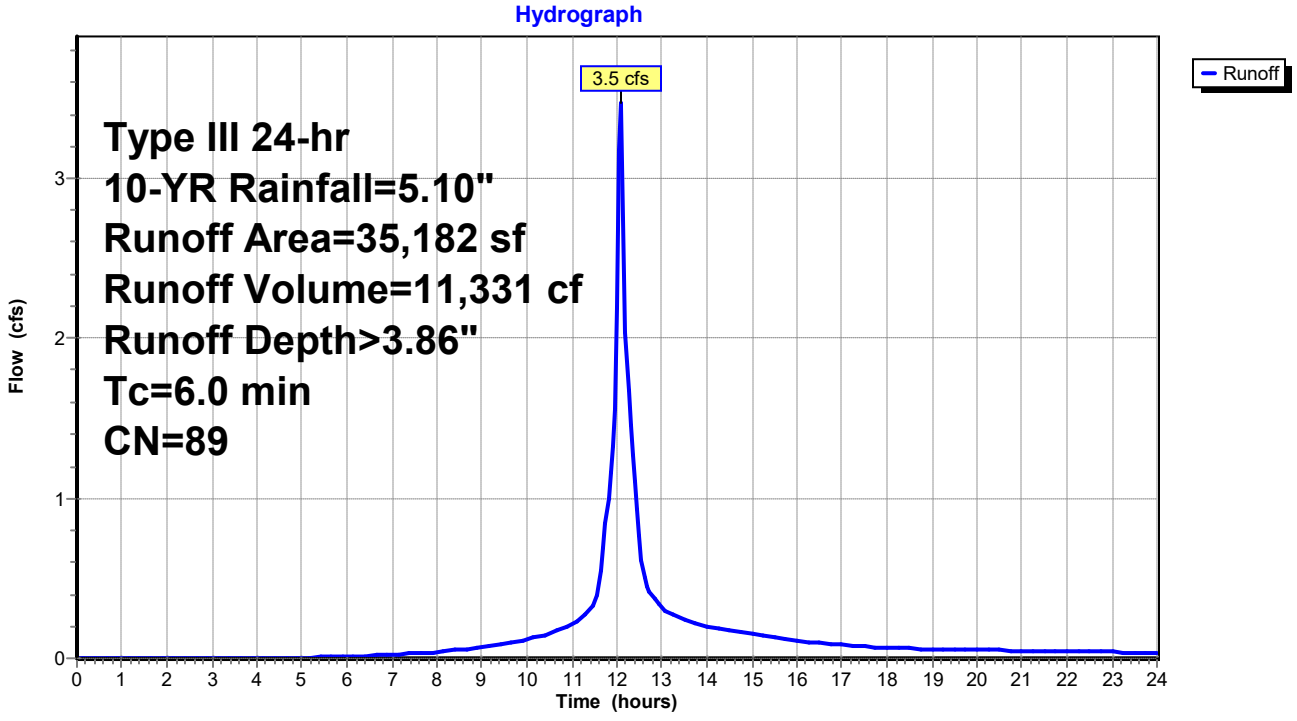
Runoff = 3.5 cfs @ 12.09 hrs, Volume= 11,331 cf, Depth> 3.86"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
22,144	98	Paved parking, HSG C
13,038	74	>75% Grass cover, Good, HSG C
35,182	89	Weighted Average
13,038		37.06% Pervious Area
22,144		62.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX-3



Summary for Subcatchment 4S: EX-4

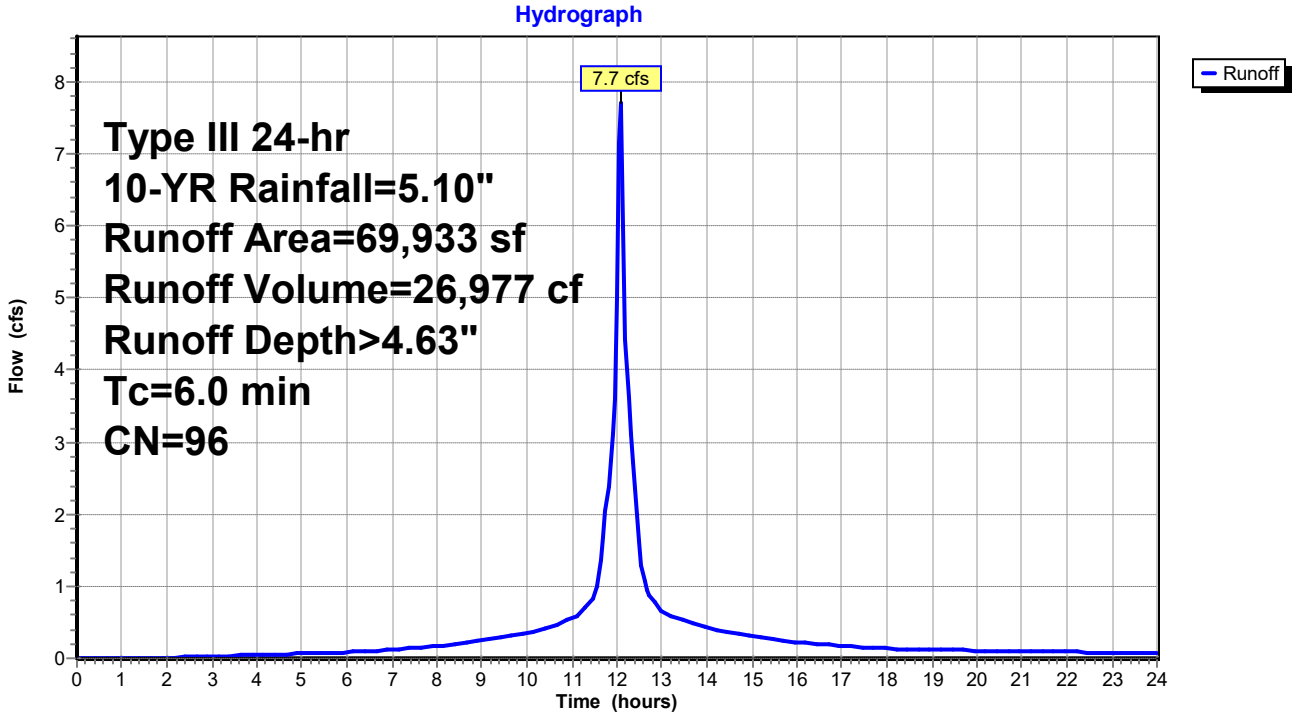
Runoff = 7.7 cfs @ 12.09 hrs, Volume= 26,977 cf, Depth> 4.63"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
62,109	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,933	96	Weighted Average
7,824		11.19% Pervious Area
62,109		88.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX-4

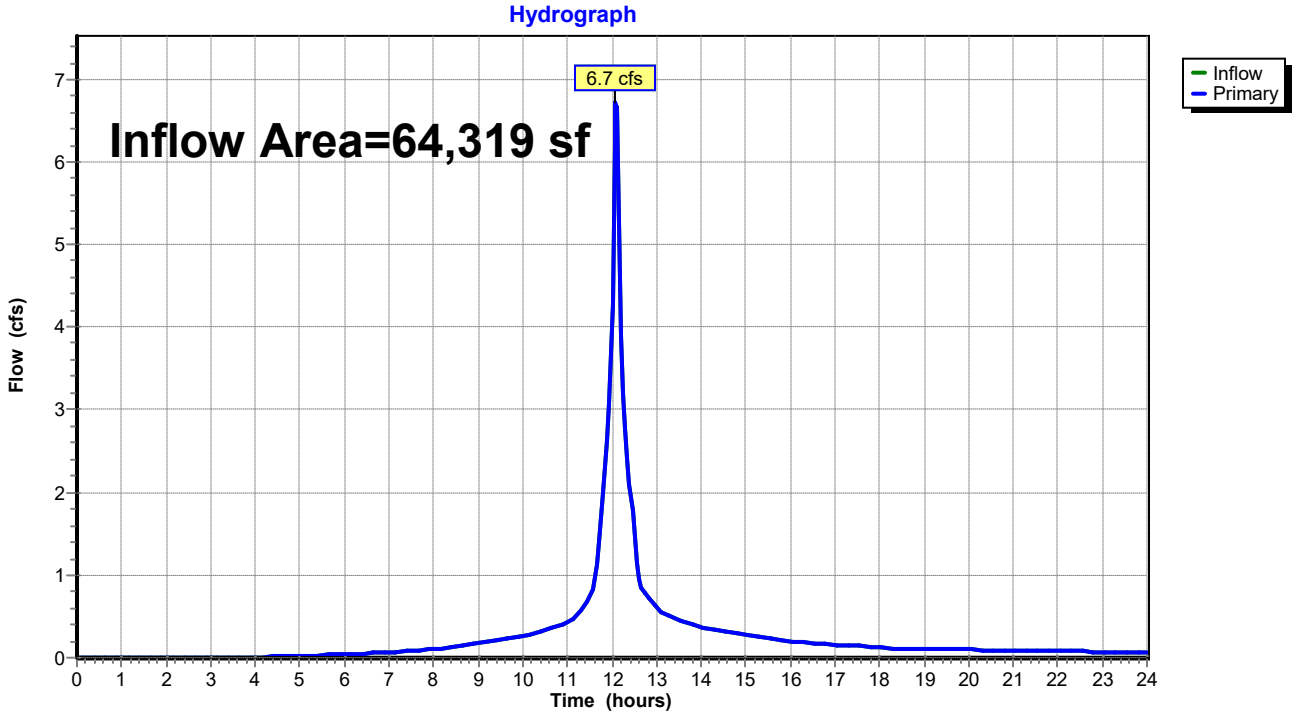


Summary for Link 1L: DP-1A

Inflow Area = 64,319 sf, 74.70% Impervious, Inflow Depth > 4.18" for 10-YR event
Inflow = 6.7 cfs @ 12.09 hrs, Volume= 22,426 cf
Primary = 6.7 cfs @ 12.09 hrs, Volume= 22,426 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1A

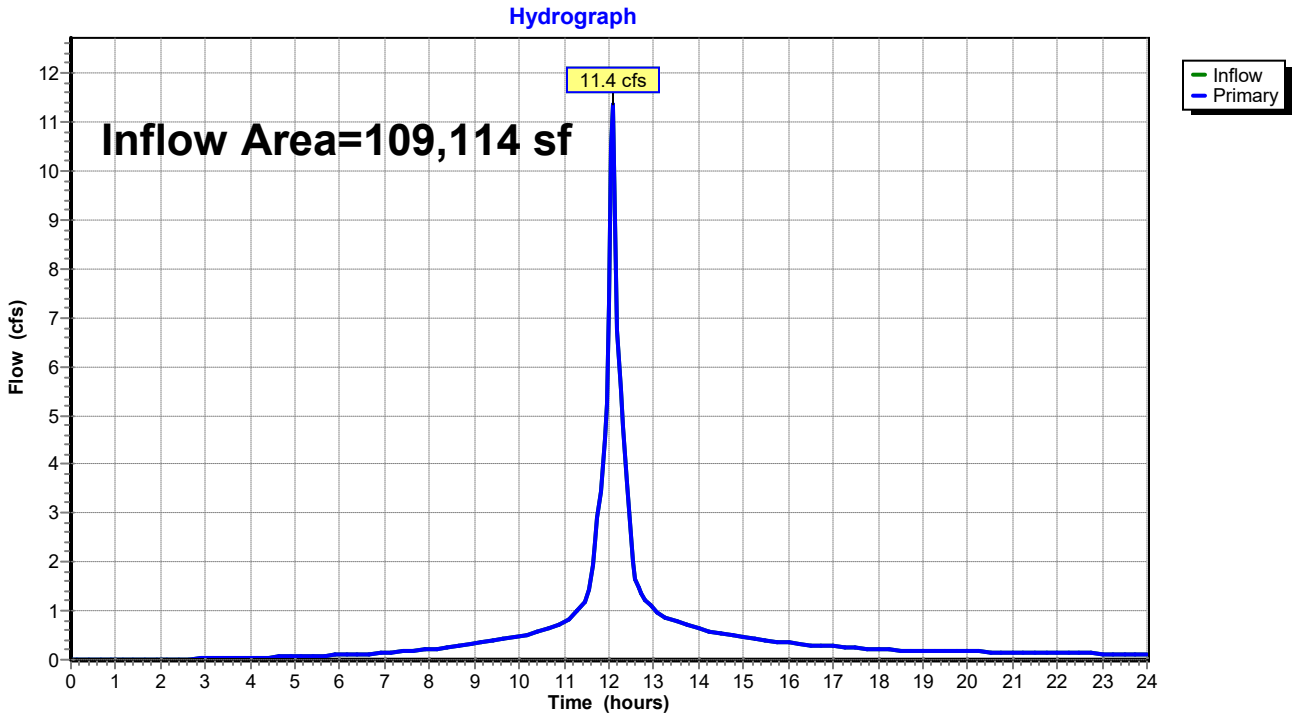


Summary for Link 2L: DP-1C

Inflow Area = 109,114 sf, 78.43% Impervious, Inflow Depth > 4.33" for 10-YR event
Inflow = 11.4 cfs @ 12.09 hrs, Volume= 39,361 cf
Primary = 11.4 cfs @ 12.09 hrs, Volume= 39,361 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1C

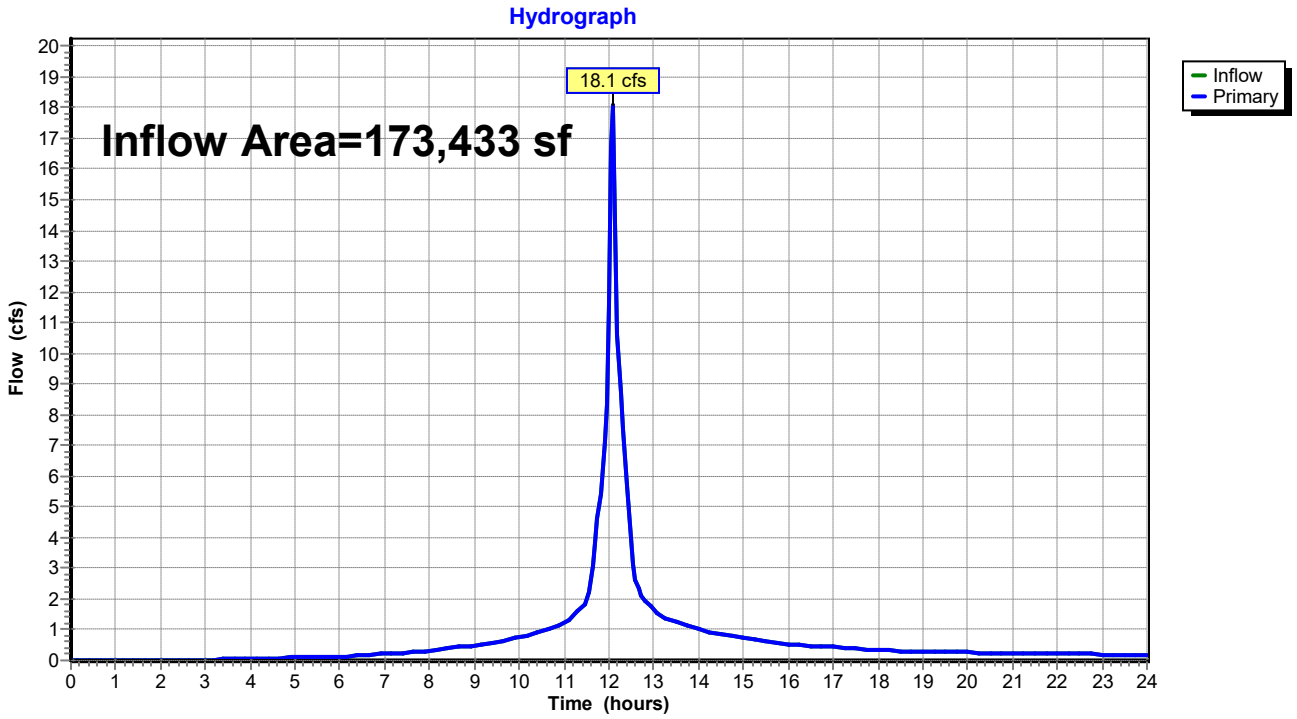


Summary for Link 3L: DP-1

Inflow Area = 173,433 sf, 77.04% Impervious, Inflow Depth > 4.28" for 10-YR event
Inflow = 18.1 cfs @ 12.09 hrs, Volume= 61,788 cf
Primary = 18.1 cfs @ 12.09 hrs, Volume= 61,788 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: EX-1 Runoff Area=64,319 sf 74.70% Impervious Runoff Depth>5.45"
Tc=6.0 min CN=92 Runoff=8.6 cfs 29,209 cf

Subcatchment 2S: EX-2 Runoff Area=3,999 sf 33.01% Impervious Runoff Depth>4.34"
Tc=14.1 min CN=82 Runoff=0.4 cfs 1,445 cf

Subcatchment 3S: EX-3 Runoff Area=35,182 sf 62.94% Impervious Runoff Depth>5.11"
Tc=6.0 min CN=89 Runoff=4.5 cfs 14,982 cf

Subcatchment 4S: EX-4 Runoff Area=69,933 sf 88.81% Impervious Runoff Depth>5.91"
Tc=6.0 min CN=96 Runoff=9.7 cfs 34,454 cf

Link 1L: DP-1A Inflow=8.6 cfs 29,209 cf
Primary=8.6 cfs 29,209 cf

Link 2L: DP-1C Inflow=14.5 cfs 50,882 cf
Primary=14.5 cfs 50,882 cf

Link 3L: DP-1 Inflow=23.1 cfs 80,092 cf
Primary=23.1 cfs 80,092 cf

Total Runoff Area = 173,433 sf Runoff Volume = 80,092 cf Average Runoff Depth = 5.54"
22.96% Pervious = 39,814 sf 77.04% Impervious = 133,619 sf

Summary for Subcatchment 1S: EX-1

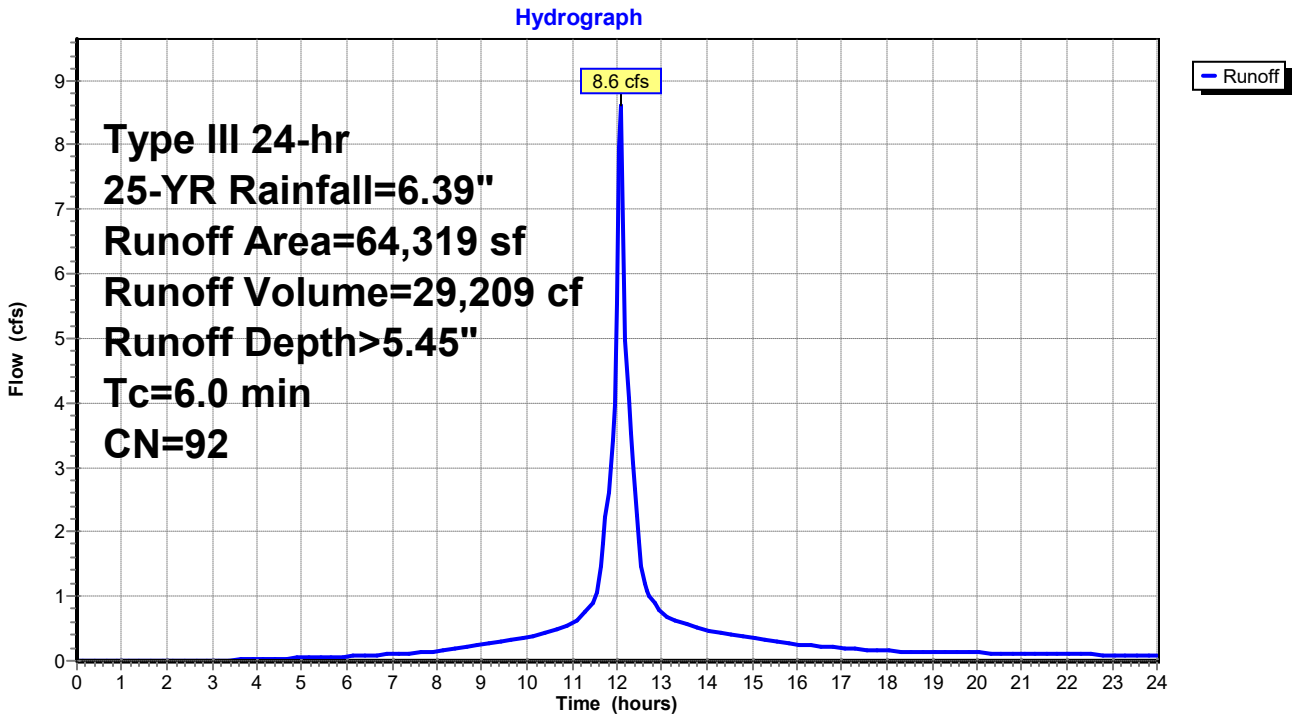
Runoff = 8.6 cfs @ 12.09 hrs, Volume= 29,209 cf, Depth> 5.45"
Routed to Link 1L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
39,024	98	Paved parking, HSG C
9,022	98	Roofs, HSG C
16,273	74	>75% Grass cover, Good, HSG C
64,319	92	Weighted Average
16,273		25.30% Pervious Area
48,046		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-1



Summary for Subcatchment 2S: EX-2

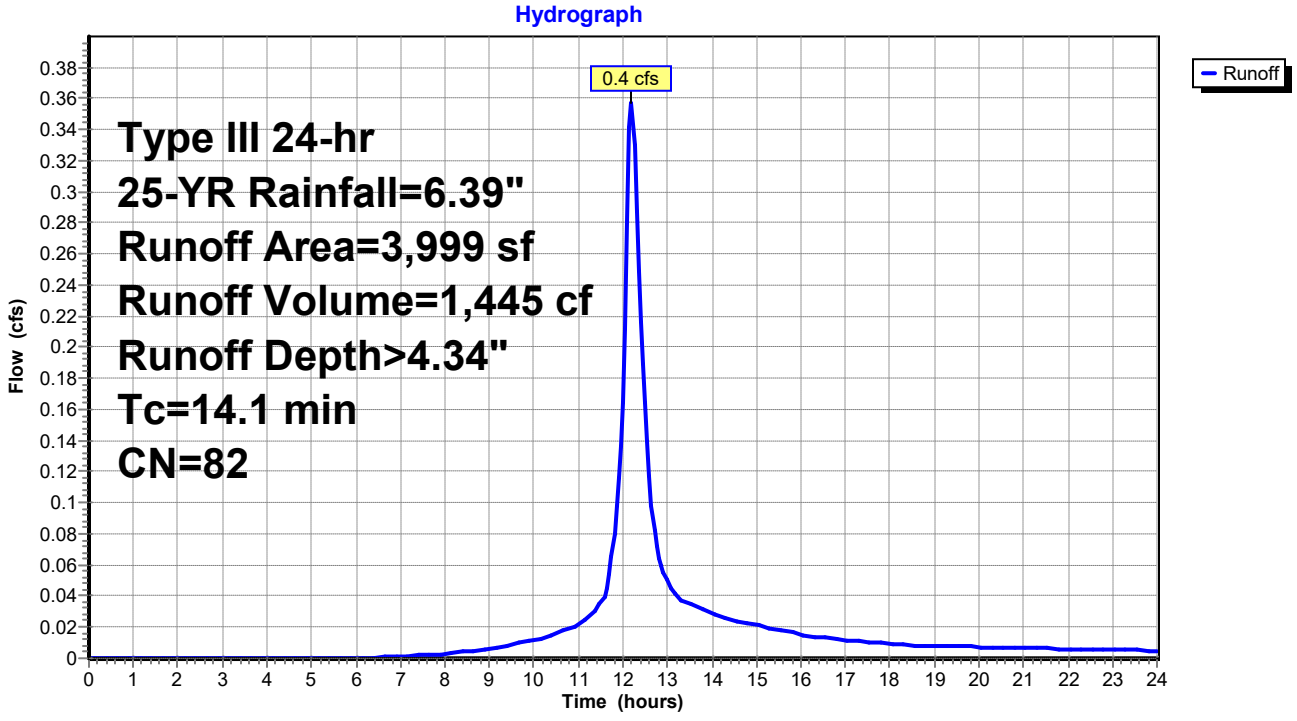
Runoff = 0.4 cfs @ 12.19 hrs, Volume= 1,445 cf, Depth> 4.34"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,320	98	Paved parking, HSG C
2,679	74	>75% Grass cover, Good, HSG C
3,999	82	Weighted Average
2,679		66.99% Pervious Area
1,320		33.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1					**Direct Entry,**

Subcatchment 2S: EX-2



Summary for Subcatchment 3S: EX-3

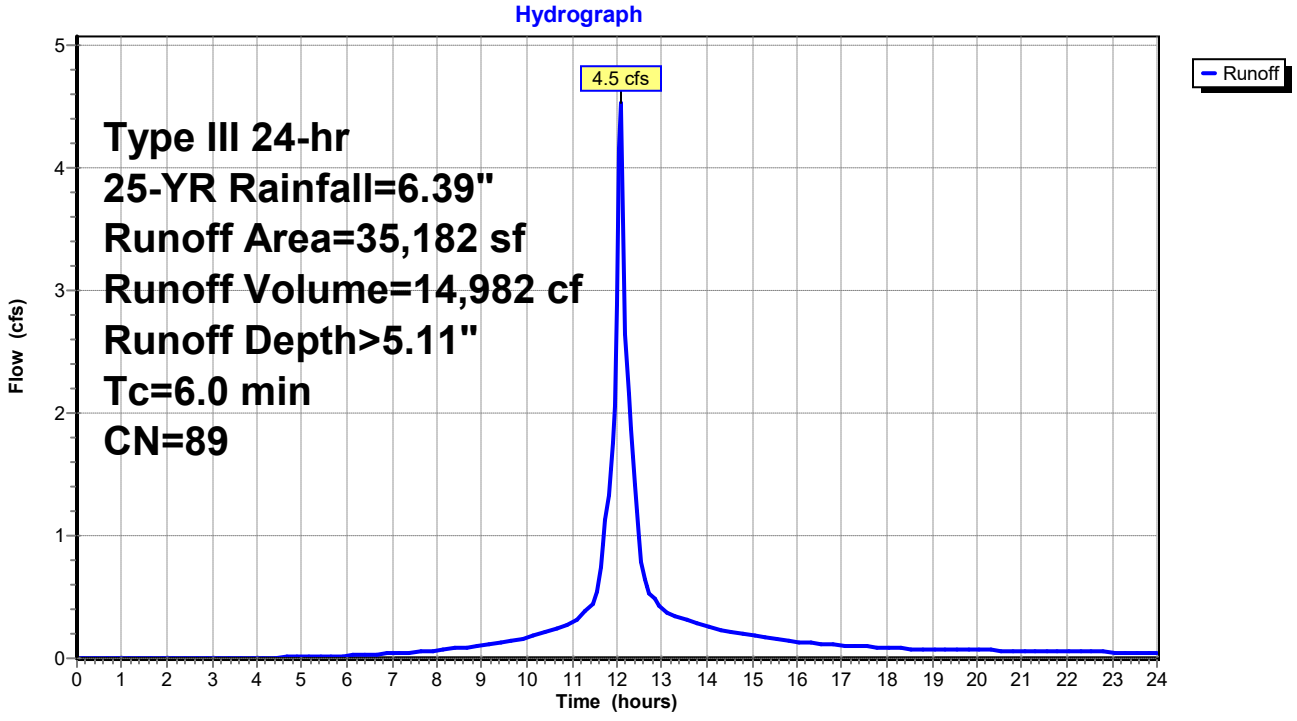
Runoff = 4.5 cfs @ 12.09 hrs, Volume= 14,982 cf, Depth> 5.11"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
22,144	98	Paved parking, HSG C
13,038	74	>75% Grass cover, Good, HSG C
35,182	89	Weighted Average
13,038		37.06% Pervious Area
22,144		62.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX-3



Summary for Subcatchment 4S: EX-4

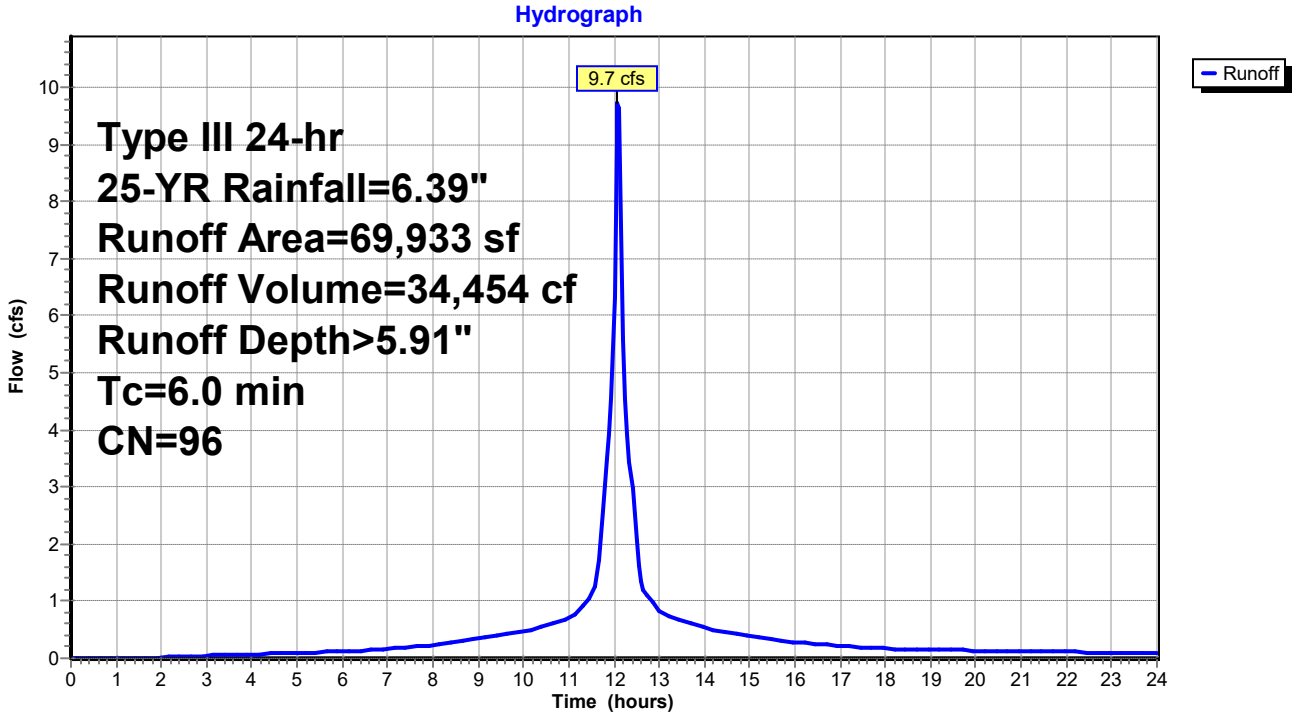
Runoff = 9.7 cfs @ 12.09 hrs, Volume= 34,454 cf, Depth> 5.91"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
62,109	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,933	96	Weighted Average
7,824		11.19% Pervious Area
62,109		88.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX-4

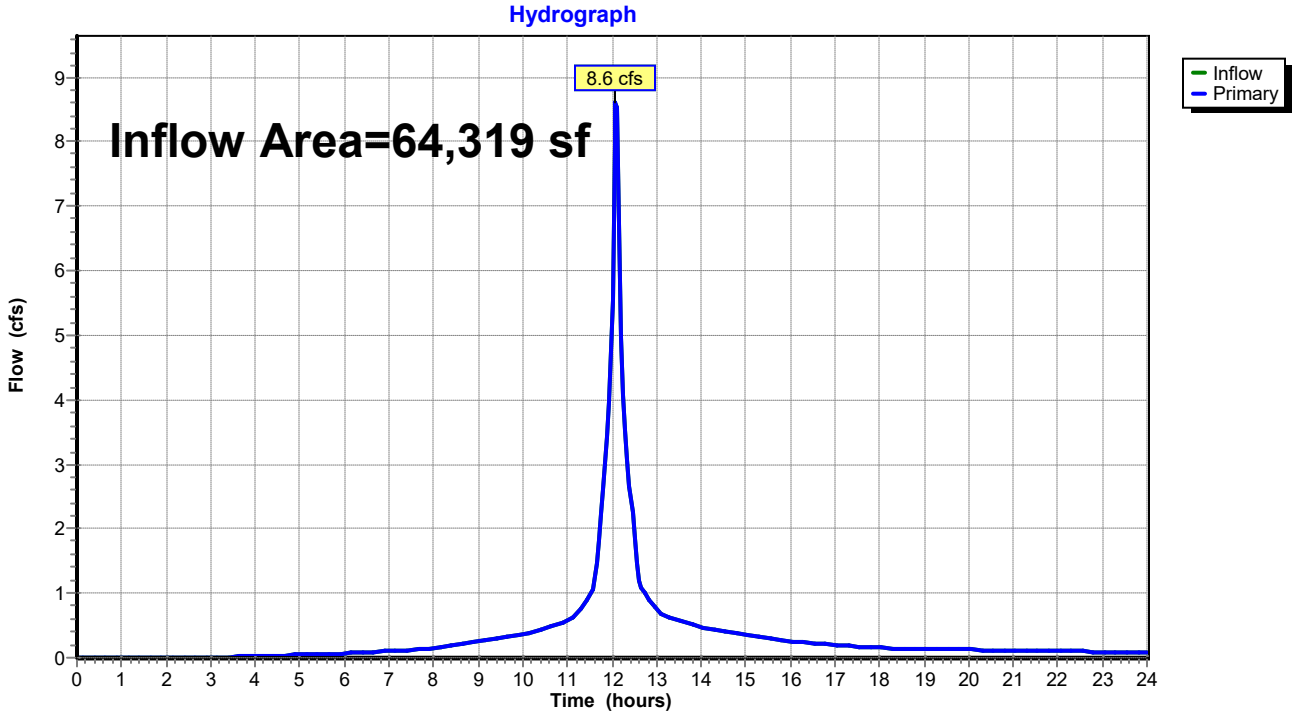


Summary for Link 1L: DP-1A

Inflow Area = 64,319 sf, 74.70% Impervious, Inflow Depth > 5.45" for 25-YR event
Inflow = 8.6 cfs @ 12.09 hrs, Volume= 29,209 cf
Primary = 8.6 cfs @ 12.09 hrs, Volume= 29,209 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1A

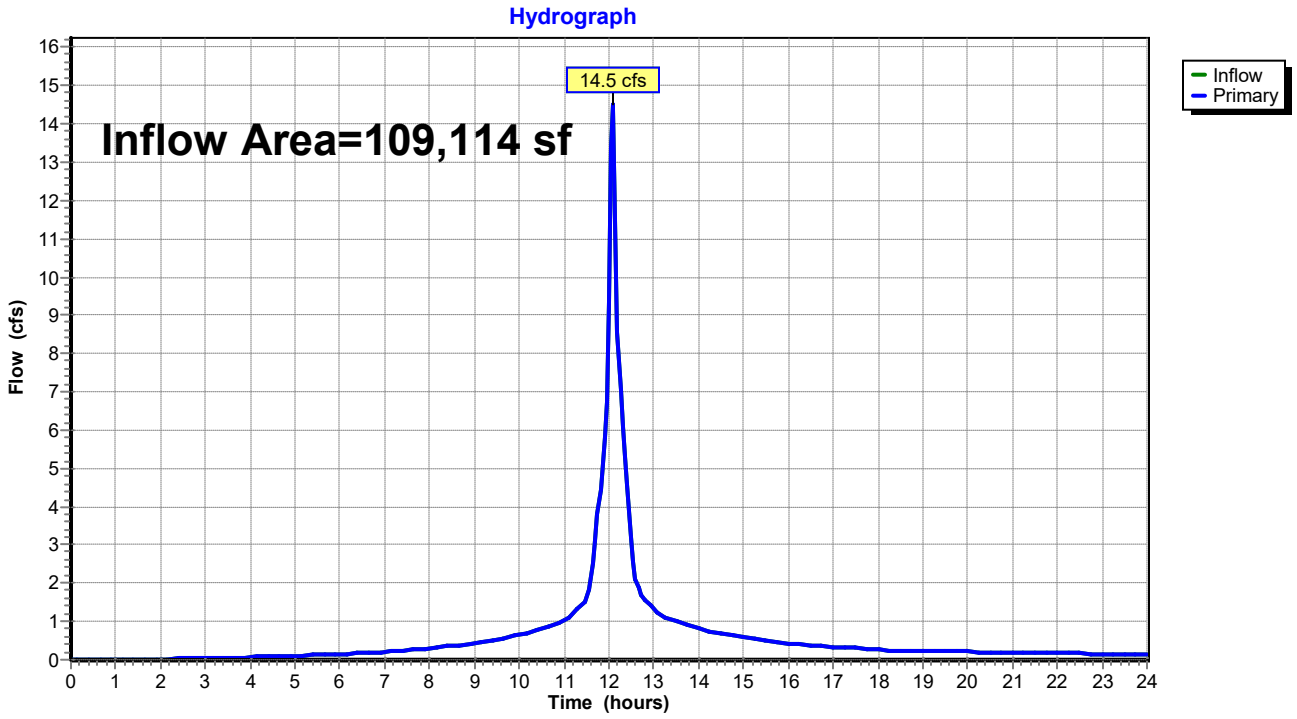


Summary for Link 2L: DP-1C

Inflow Area = 109,114 sf, 78.43% Impervious, Inflow Depth > 5.60" for 25-YR event
Inflow = 14.5 cfs @ 12.09 hrs, Volume= 50,882 cf
Primary = 14.5 cfs @ 12.09 hrs, Volume= 50,882 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1C

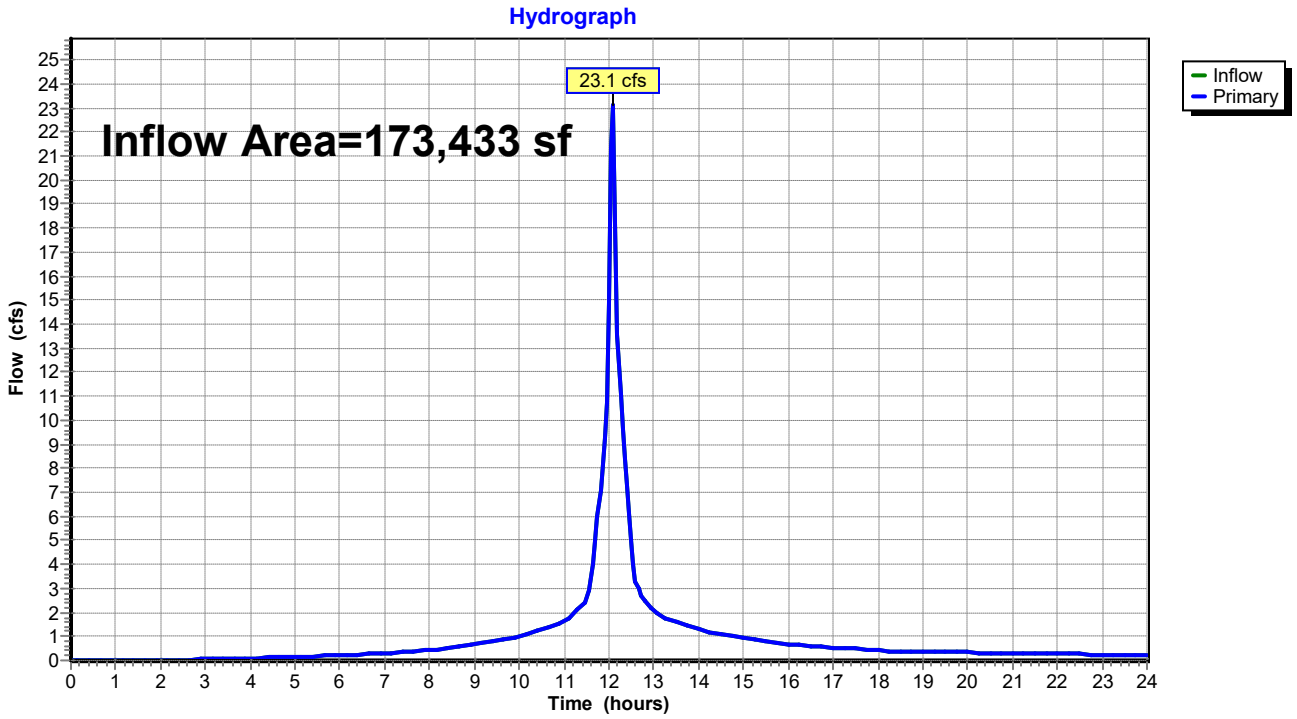


Summary for Link 3L: DP-1

Inflow Area = 173,433 sf, 77.04% Impervious, Inflow Depth > 5.54" for 25-YR event
Inflow = 23.1 cfs @ 12.09 hrs, Volume= 80,092 cf
Primary = 23.1 cfs @ 12.09 hrs, Volume= 80,092 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: EX-1 Runoff Area=64,319 sf 74.70% Impervious Runoff Depth>6.62"
Tc=6.0 min CN=92 Runoff=10.3 cfs 35,502 cf

Subcatchment 2S: EX-2 Runoff Area=3,999 sf 33.01% Impervious Runoff Depth>5.45"
Tc=14.1 min CN=82 Runoff=0.4 cfs 1,816 cf

Subcatchment 3S: EX-3 Runoff Area=35,182 sf 62.94% Impervious Runoff Depth>6.27"
Tc=6.0 min CN=89 Runoff=5.5 cfs 18,385 cf

Subcatchment 4S: EX-4 Runoff Area=69,933 sf 88.81% Impervious Runoff Depth>7.10"
Tc=6.0 min CN=96 Runoff=11.6 cfs 41,363 cf

Link 1L: DP-1A Inflow=10.3 cfs 35,502 cf
Primary=10.3 cfs 35,502 cf

Link 2L: DP-1C Inflow=17.4 cfs 61,564 cf
Primary=17.4 cfs 61,564 cf

Link 3L: DP-1 Inflow=27.7 cfs 97,066 cf
Primary=27.7 cfs 97,066 cf

Total Runoff Area = 173,433 sf Runoff Volume = 97,066 cf Average Runoff Depth = 6.72"
22.96% Pervious = 39,814 sf 77.04% Impervious = 133,619 sf

Summary for Subcatchment 1S: EX-1

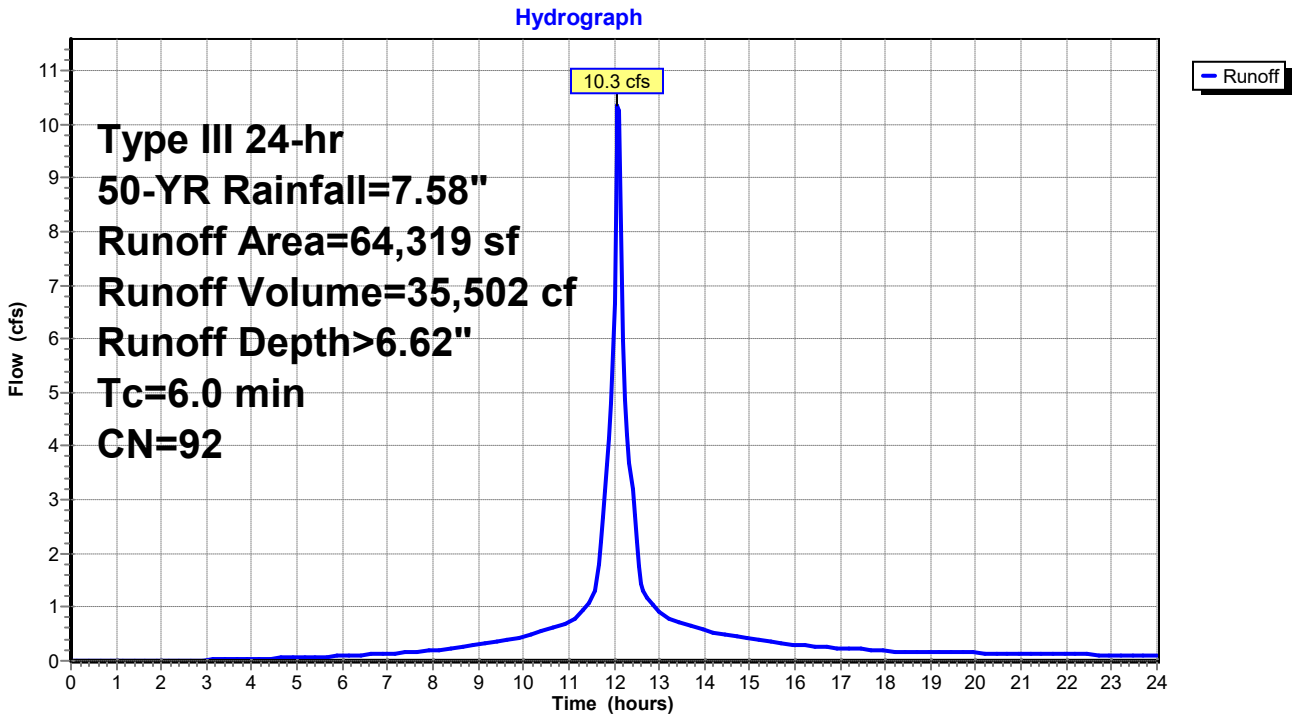
Runoff = 10.3 cfs @ 12.09 hrs, Volume= 35,502 cf, Depth> 6.62"
Routed to Link 1L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
39,024	98	Paved parking, HSG C
9,022	98	Roofs, HSG C
16,273	74	>75% Grass cover, Good, HSG C
64,319	92	Weighted Average
16,273		25.30% Pervious Area
48,046		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-1



Summary for Subcatchment 2S: EX-2

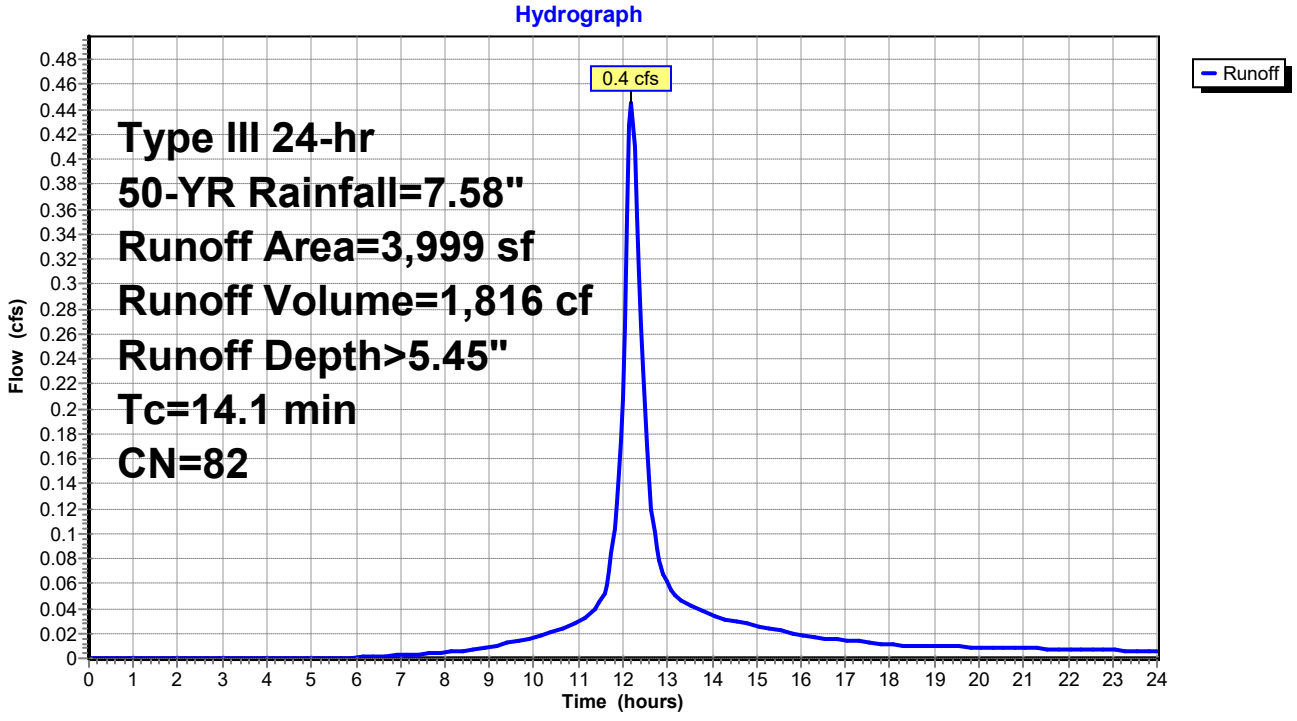
Runoff = 0.4 cfs @ 12.19 hrs, Volume= 1,816 cf, Depth> 5.45"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,320	98	Paved parking, HSG C
2,679	74	>75% Grass cover, Good, HSG C
3,999	82	Weighted Average
2,679		66.99% Pervious Area
1,320		33.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1					**Direct Entry,**

Subcatchment 2S: EX-2



Summary for Subcatchment 3S: EX-3

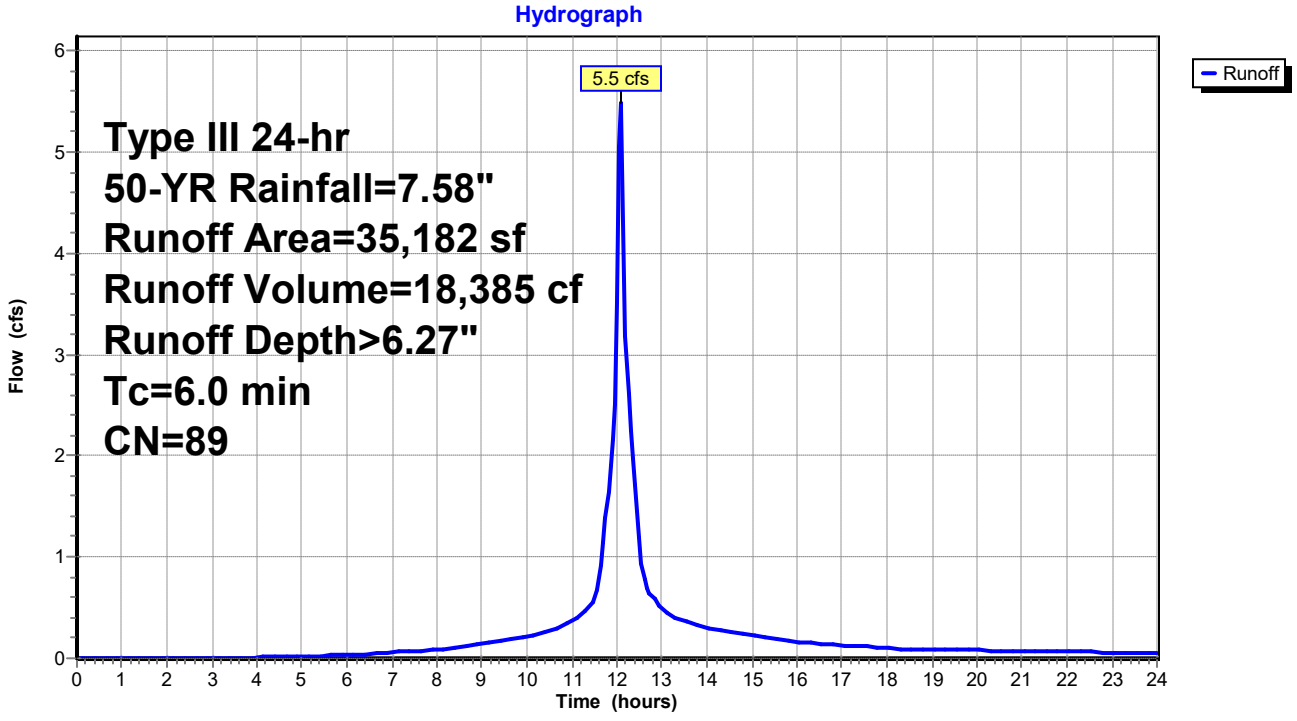
Runoff = 5.5 cfs @ 12.09 hrs, Volume= 18,385 cf, Depth> 6.27"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
22,144	98	Paved parking, HSG C
13,038	74	>75% Grass cover, Good, HSG C
35,182	89	Weighted Average
13,038		37.06% Pervious Area
22,144		62.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX-3



Summary for Subcatchment 4S: EX-4

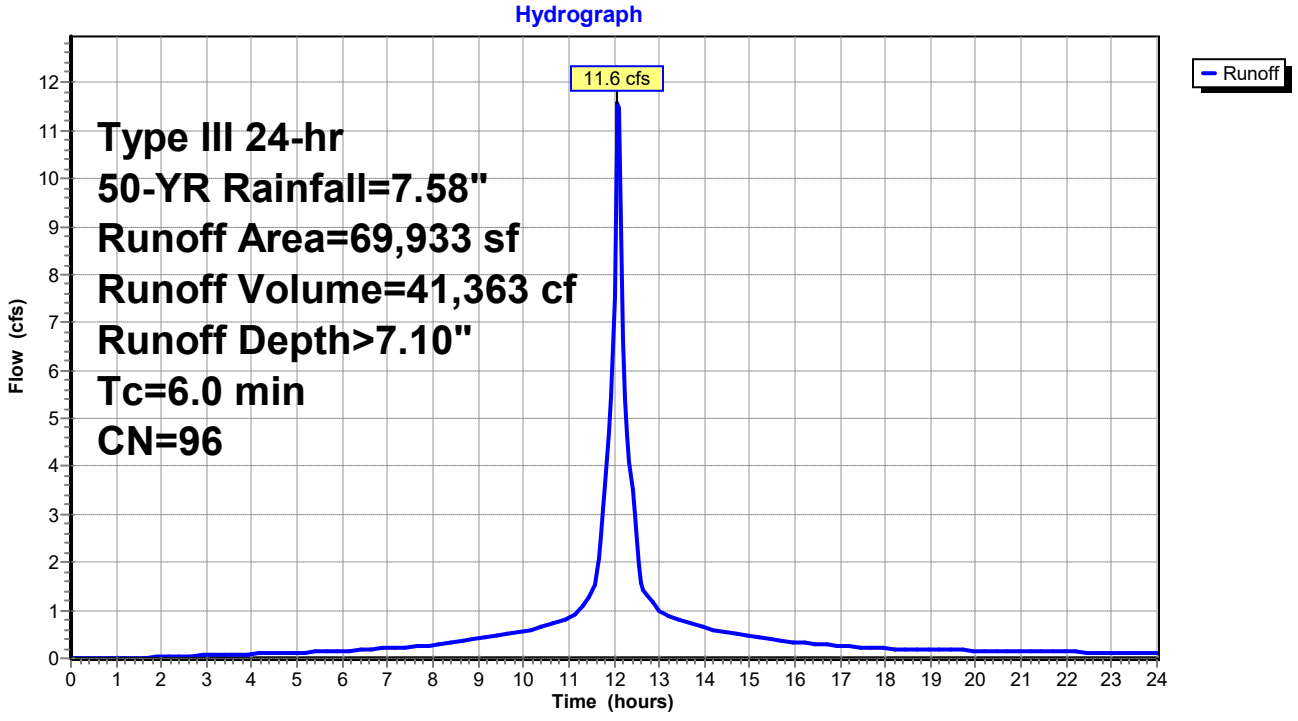
Runoff = 11.6 cfs @ 12.09 hrs, Volume= 41,363 cf, Depth> 7.10"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
62,109	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,933	96	Weighted Average
7,824		11.19% Pervious Area
62,109		88.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX-4

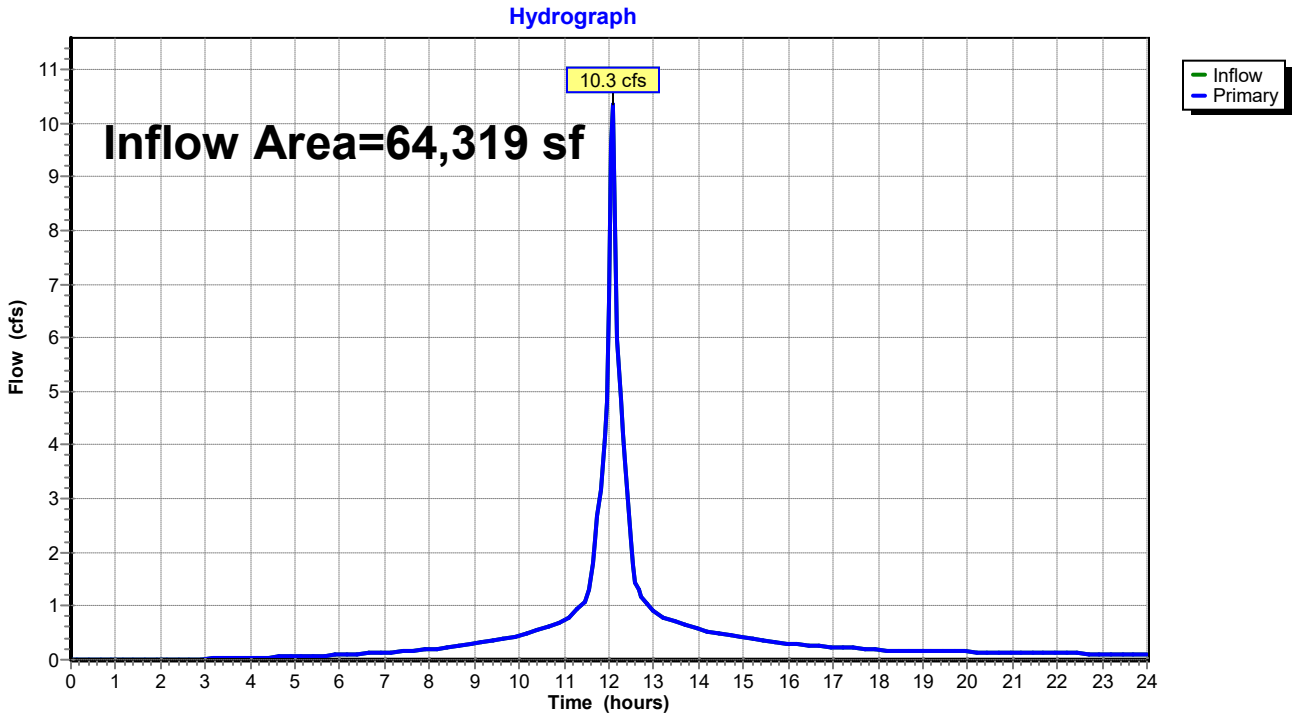


Summary for Link 1L: DP-1A

Inflow Area = 64,319 sf, 74.70% Impervious, Inflow Depth > 6.62" for 50-YR event
Inflow = 10.3 cfs @ 12.09 hrs, Volume= 35,502 cf
Primary = 10.3 cfs @ 12.09 hrs, Volume= 35,502 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1A

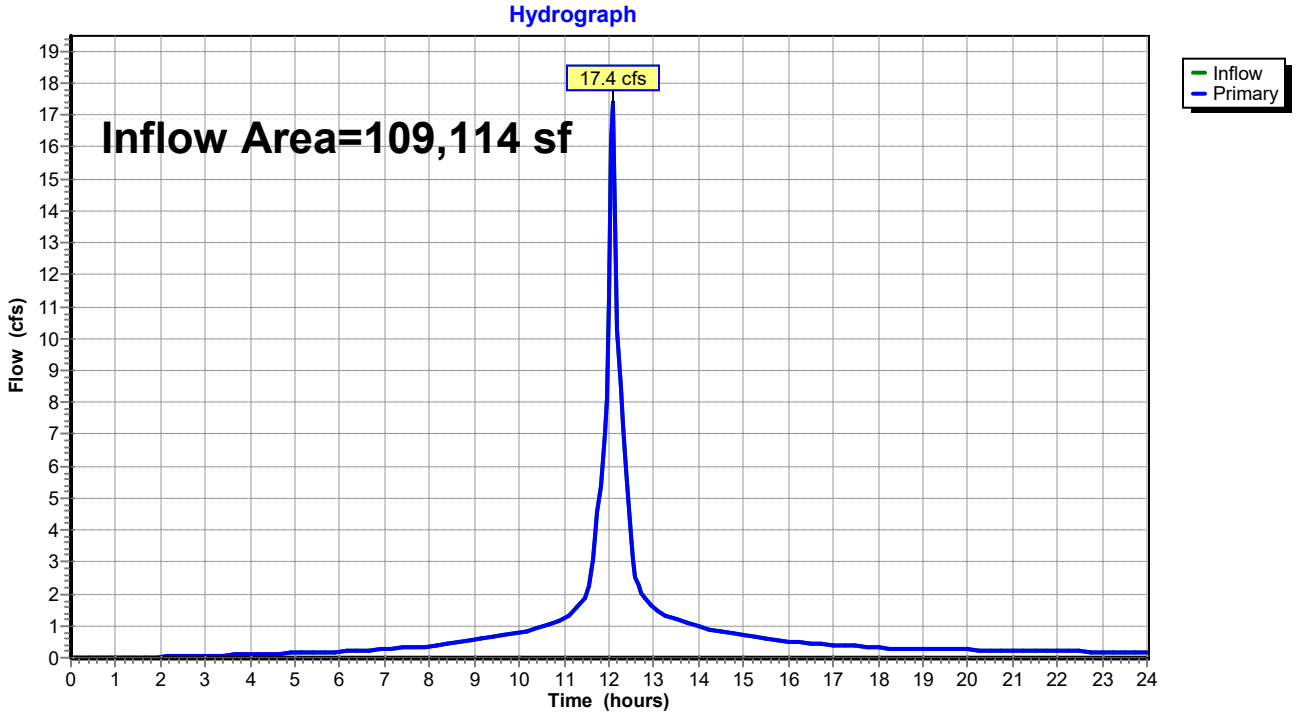


Summary for Link 2L: DP-1C

Inflow Area = 109,114 sf, 78.43% Impervious, Inflow Depth > 6.77" for 50-YR event
Inflow = 17.4 cfs @ 12.09 hrs, Volume= 61,564 cf
Primary = 17.4 cfs @ 12.09 hrs, Volume= 61,564 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1C

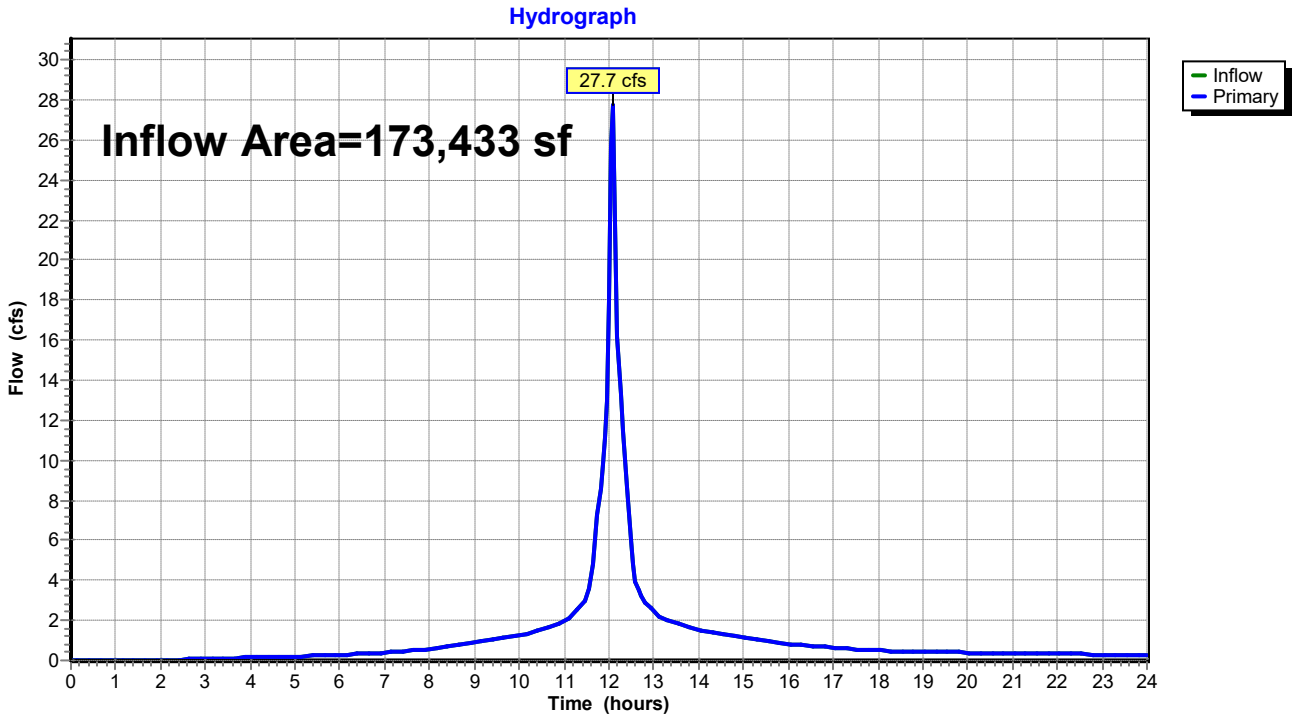


Summary for Link 3L: DP-1

Inflow Area = 173,433 sf, 77.04% Impervious, Inflow Depth > 6.72" for 50-YR event
Inflow = 27.7 cfs @ 12.09 hrs, Volume= 97,066 cf
Primary = 27.7 cfs @ 12.09 hrs, Volume= 97,066 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: EX-1 Runoff Area=64,319 sf 74.70% Impervious Runoff Depth>8.04"
Tc=6.0 min CN=92 Runoff=12.4 cfs 43,090 cf

Subcatchment 2S: EX-2 Runoff Area=3,999 sf 33.01% Impervious Runoff Depth>6.81"
Tc=14.1 min CN=82 Runoff=0.6 cfs 2,269 cf

Subcatchment 3S: EX-3 Runoff Area=35,182 sf 62.94% Impervious Runoff Depth>7.67"
Tc=6.0 min CN=89 Runoff=6.6 cfs 22,500 cf

Subcatchment 4S: EX-4 Runoff Area=69,933 sf 88.81% Impervious Runoff Depth>8.52"
Tc=6.0 min CN=96 Runoff=13.8 cfs 49,672 cf

Link 1L: DP-1A Inflow=12.4 cfs 43,090 cf
Primary=12.4 cfs 43,090 cf

Link 2L: DP-1C Inflow=20.8 cfs 74,441 cf
Primary=20.8 cfs 74,441 cf

Link 3L: DP-1 Inflow=33.3 cfs 117,531 cf
Primary=33.3 cfs 117,531 cf

Total Runoff Area = 173,433 sf Runoff Volume = 117,531 cf Average Runoff Depth = 8.13"
22.96% Pervious = 39,814 sf 77.04% Impervious = 133,619 sf

Summary for Subcatchment 1S: EX-1

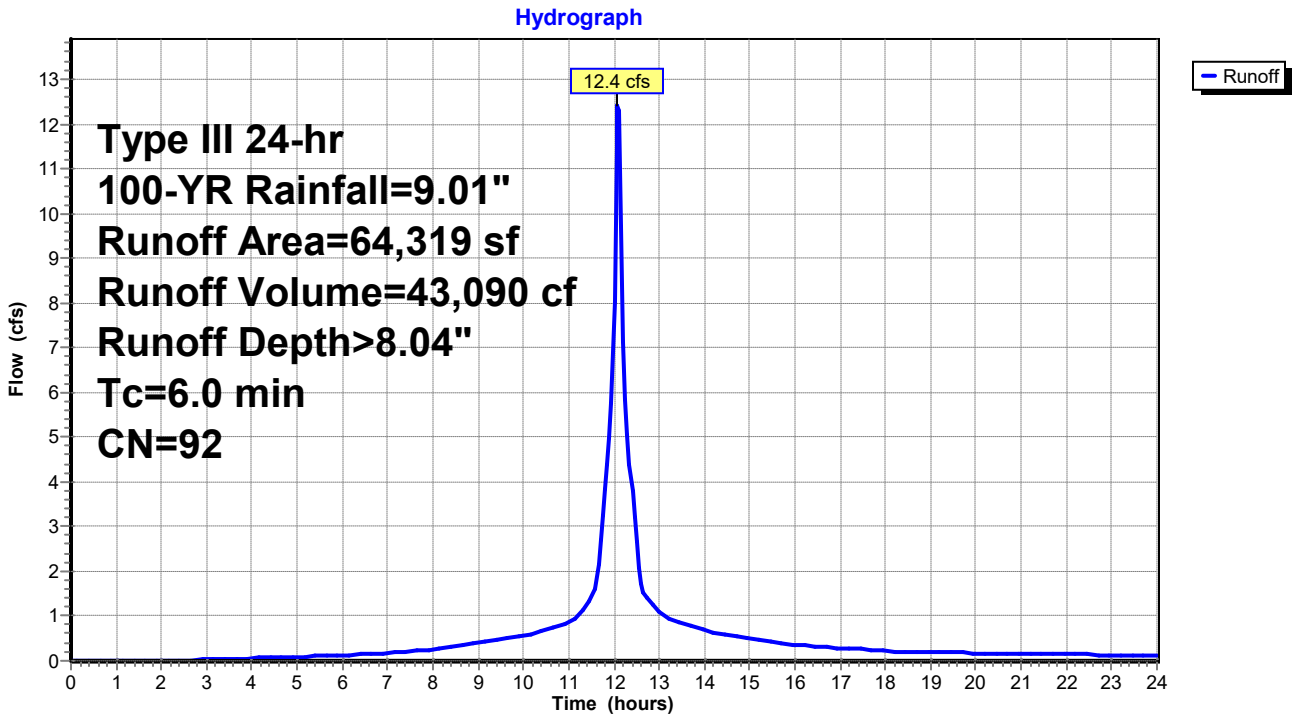
Runoff = 12.4 cfs @ 12.09 hrs, Volume= 43,090 cf, Depth> 8.04"
Routed to Link 1L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
39,024	98	Paved parking, HSG C
9,022	98	Roofs, HSG C
16,273	74	>75% Grass cover, Good, HSG C
64,319	92	Weighted Average
16,273		25.30% Pervious Area
48,046		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-1



Summary for Subcatchment 2S: EX-2

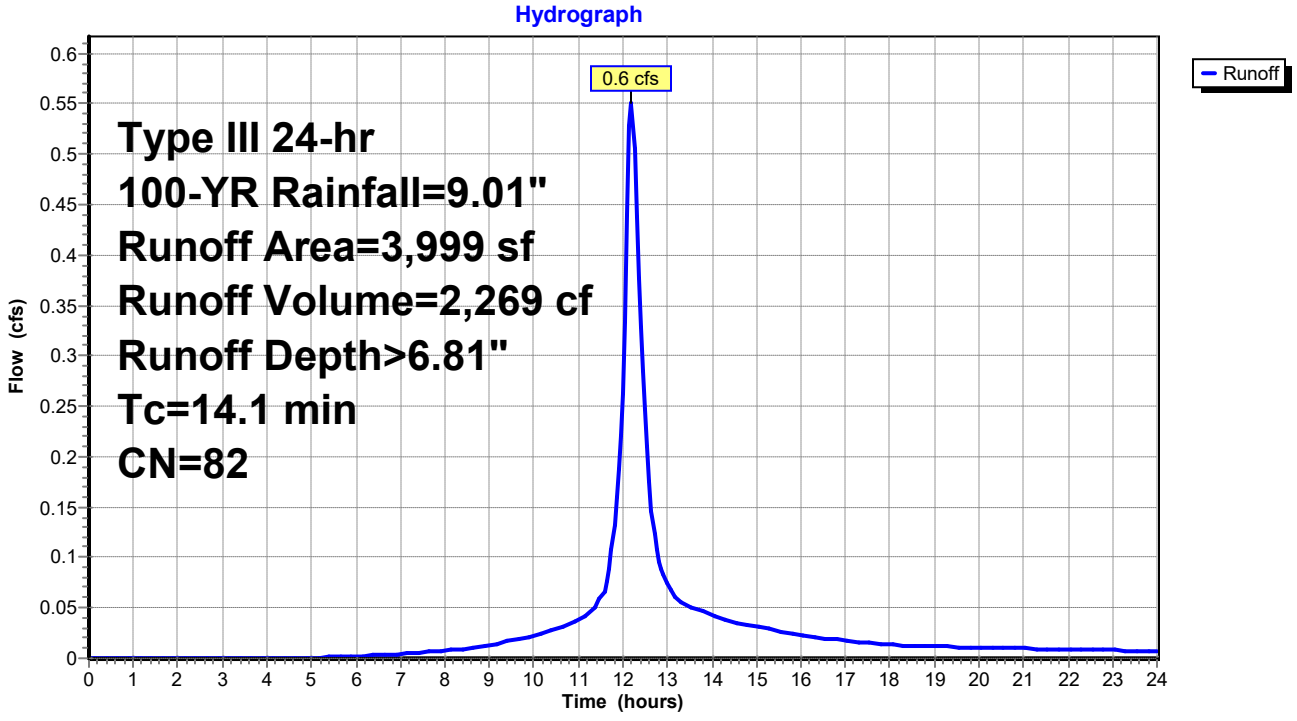
Runoff = 0.6 cfs @ 12.19 hrs, Volume= 2,269 cf, Depth> 6.81"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,320	98	Paved parking, HSG C
2,679	74	>75% Grass cover, Good, HSG C
3,999	82	Weighted Average
2,679		66.99% Pervious Area
1,320		33.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.1					**Direct Entry,**

Subcatchment 2S: EX-2



Summary for Subcatchment 3S: EX-3

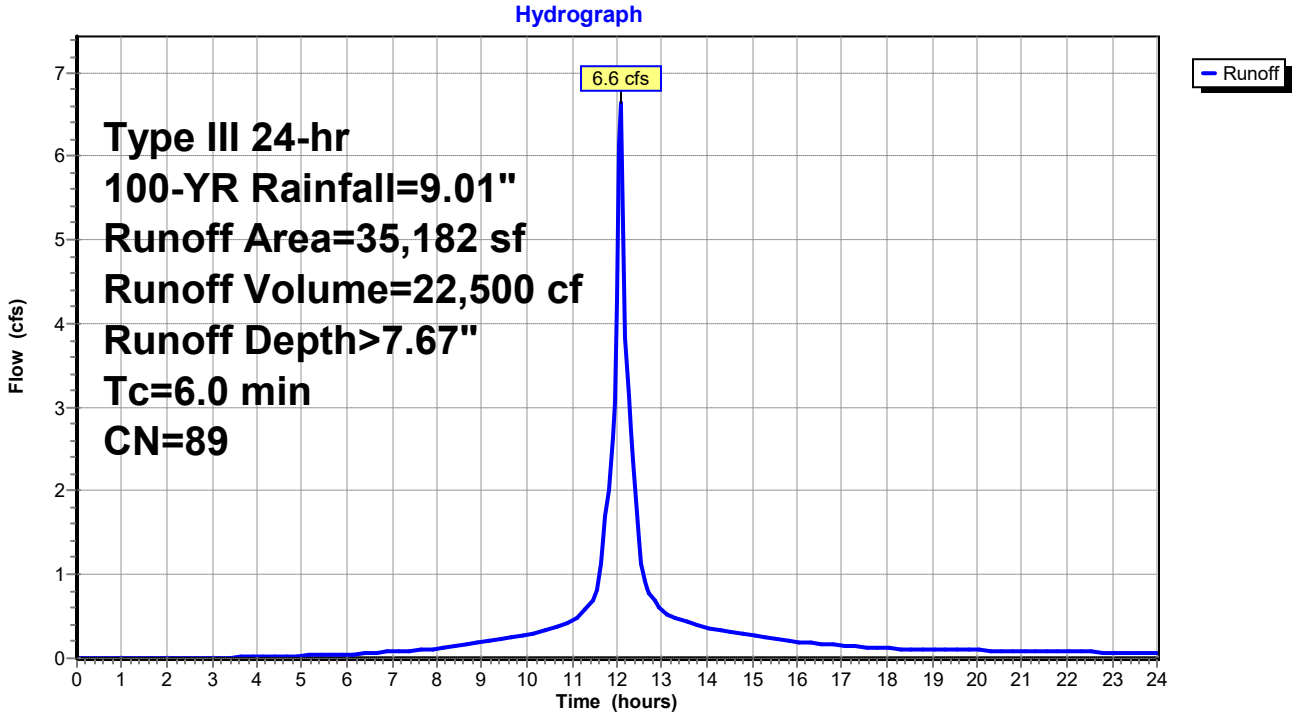
Runoff = 6.6 cfs @ 12.09 hrs, Volume= 22,500 cf, Depth> 7.67"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
22,144	98	Paved parking, HSG C
13,038	74	>75% Grass cover, Good, HSG C
35,182	89	Weighted Average
13,038		37.06% Pervious Area
22,144		62.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX-3



Summary for Subcatchment 4S: EX-4

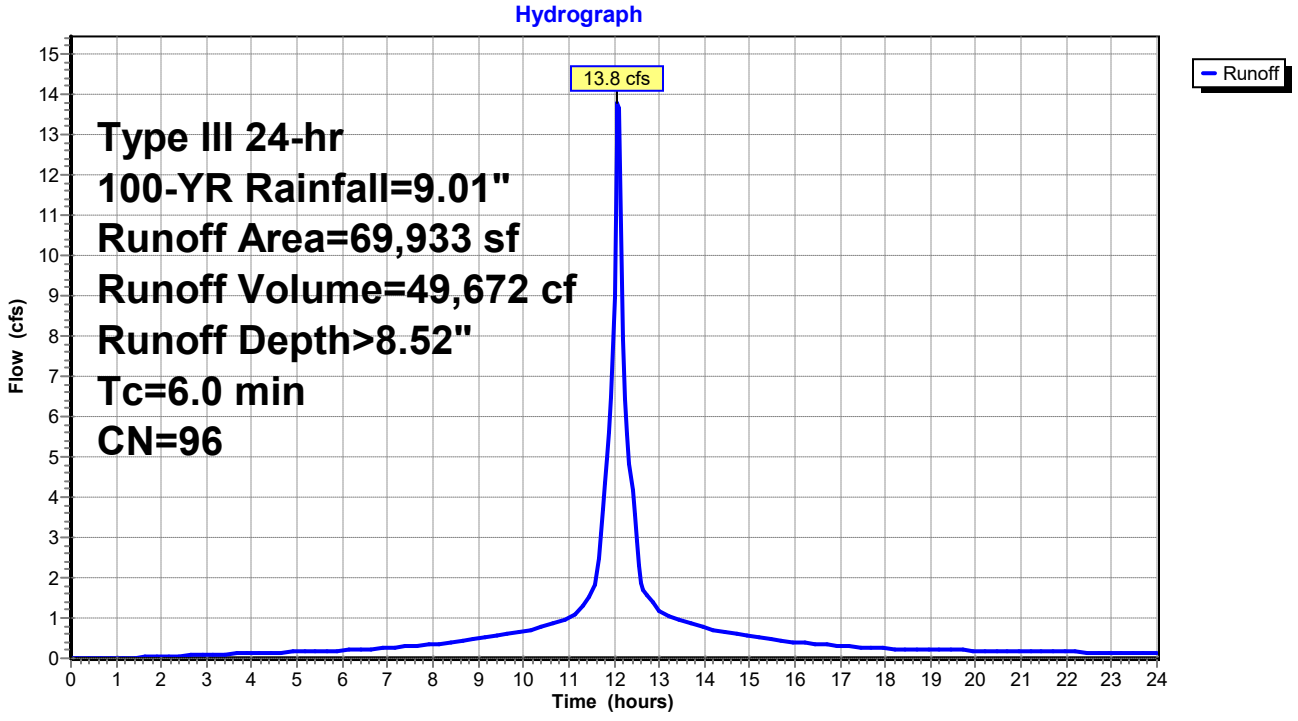
Runoff = 13.8 cfs @ 12.09 hrs, Volume= 49,672 cf, Depth> 8.52"
Routed to Link 2L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
62,109	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,933	96	Weighted Average
7,824		11.19% Pervious Area
62,109		88.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX-4

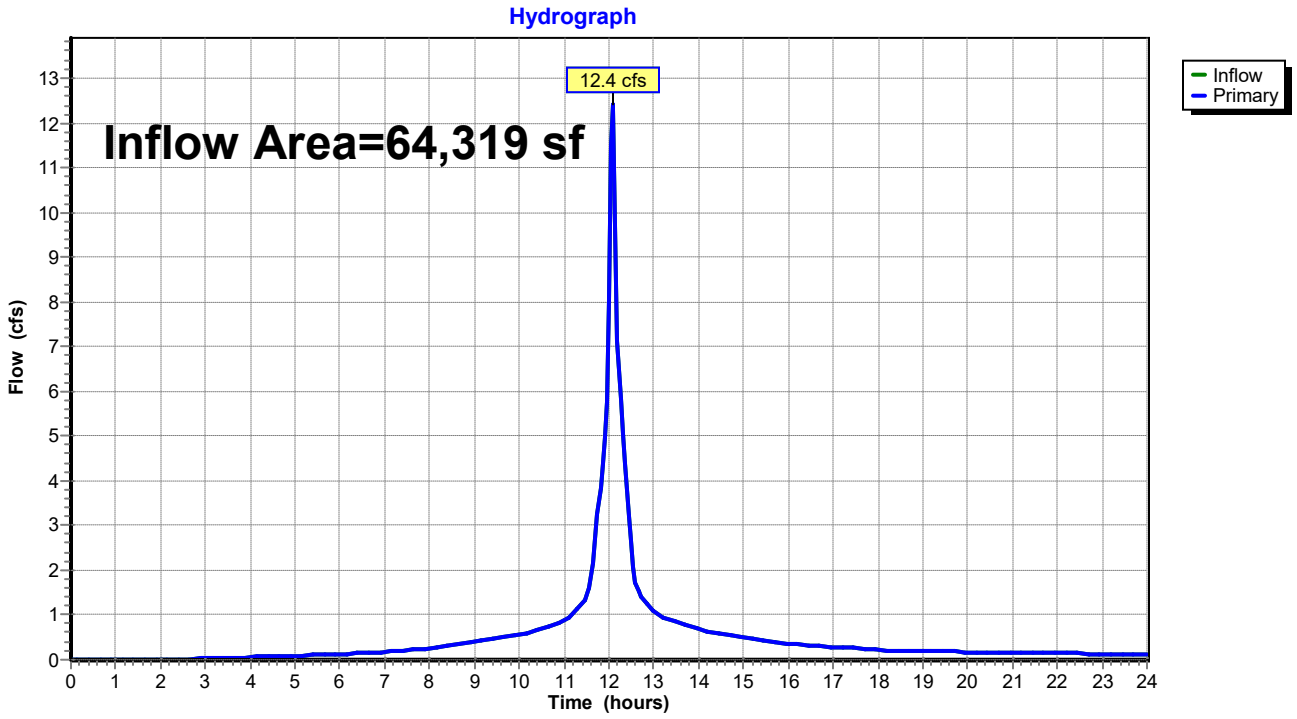


Summary for Link 1L: DP-1A

Inflow Area = 64,319 sf, 74.70% Impervious, Inflow Depth > 8.04" for 100-YR event
Inflow = 12.4 cfs @ 12.09 hrs, Volume= 43,090 cf
Primary = 12.4 cfs @ 12.09 hrs, Volume= 43,090 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1A

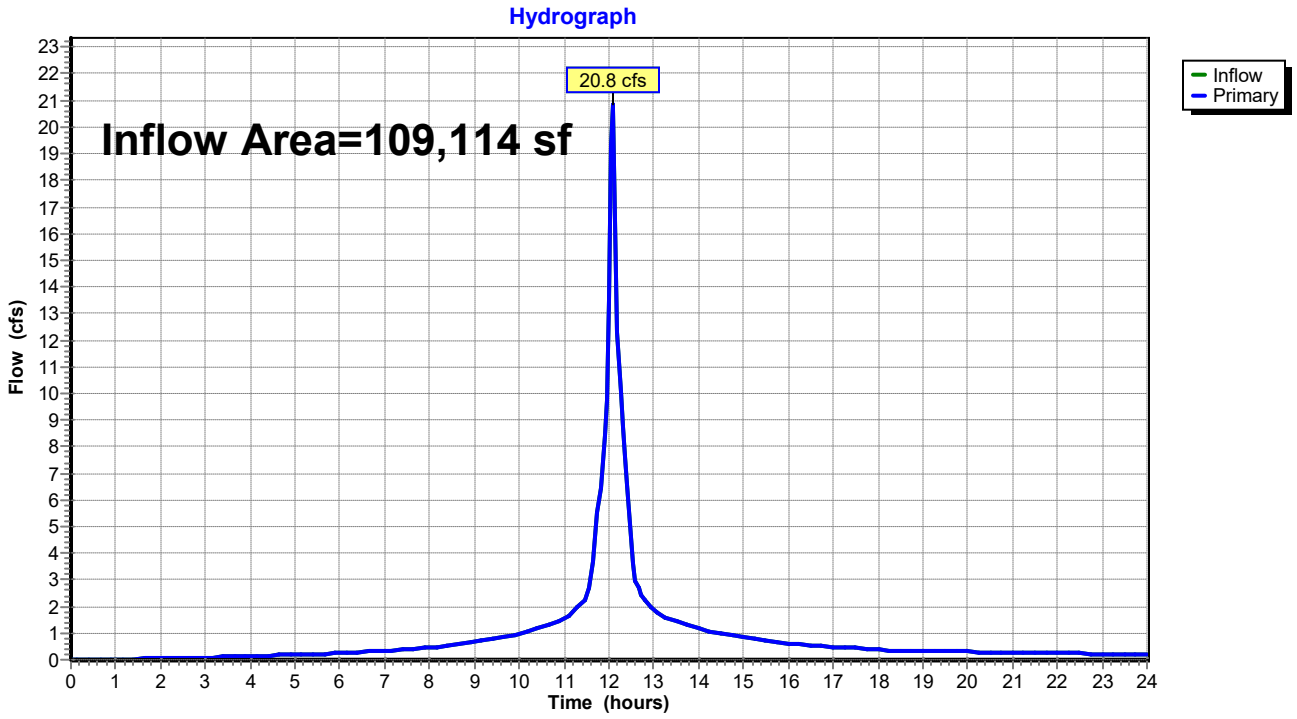


Summary for Link 2L: DP-1C

Inflow Area = 109,114 sf, 78.43% Impervious, Inflow Depth > 8.19" for 100-YR event
Inflow = 20.8 cfs @ 12.09 hrs, Volume= 74,441 cf
Primary = 20.8 cfs @ 12.09 hrs, Volume= 74,441 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1C

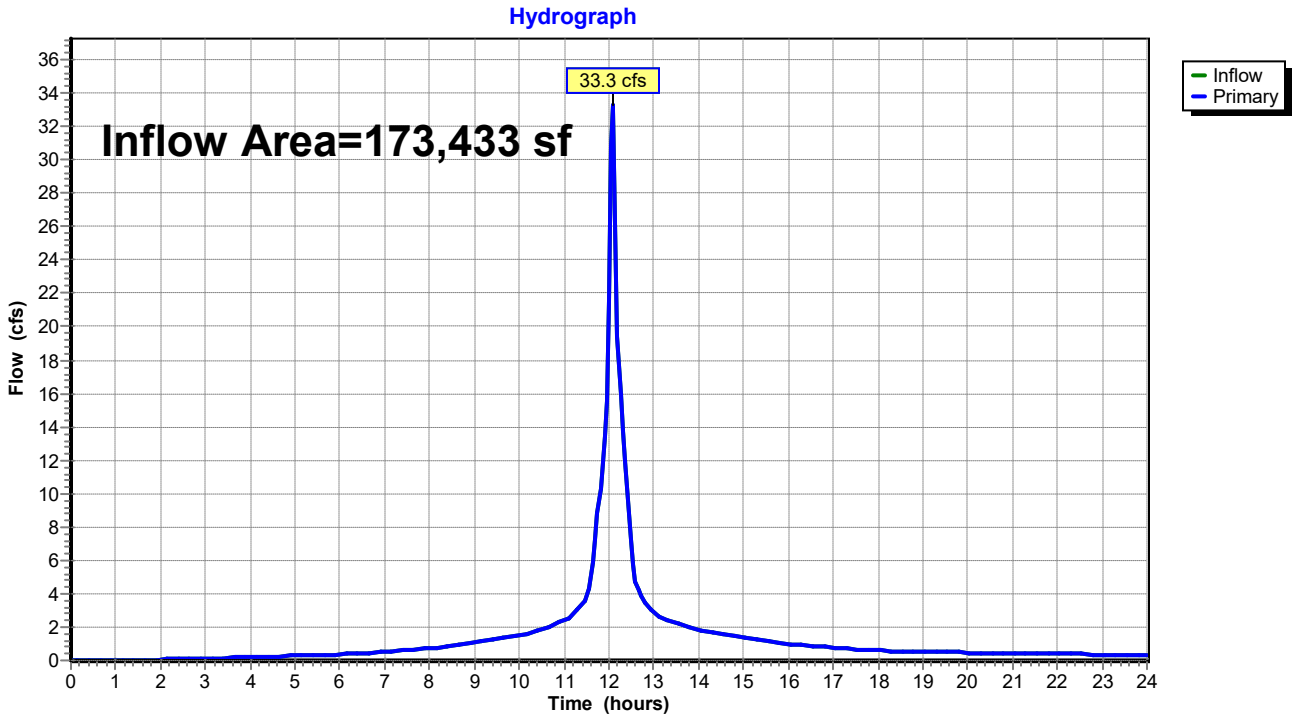


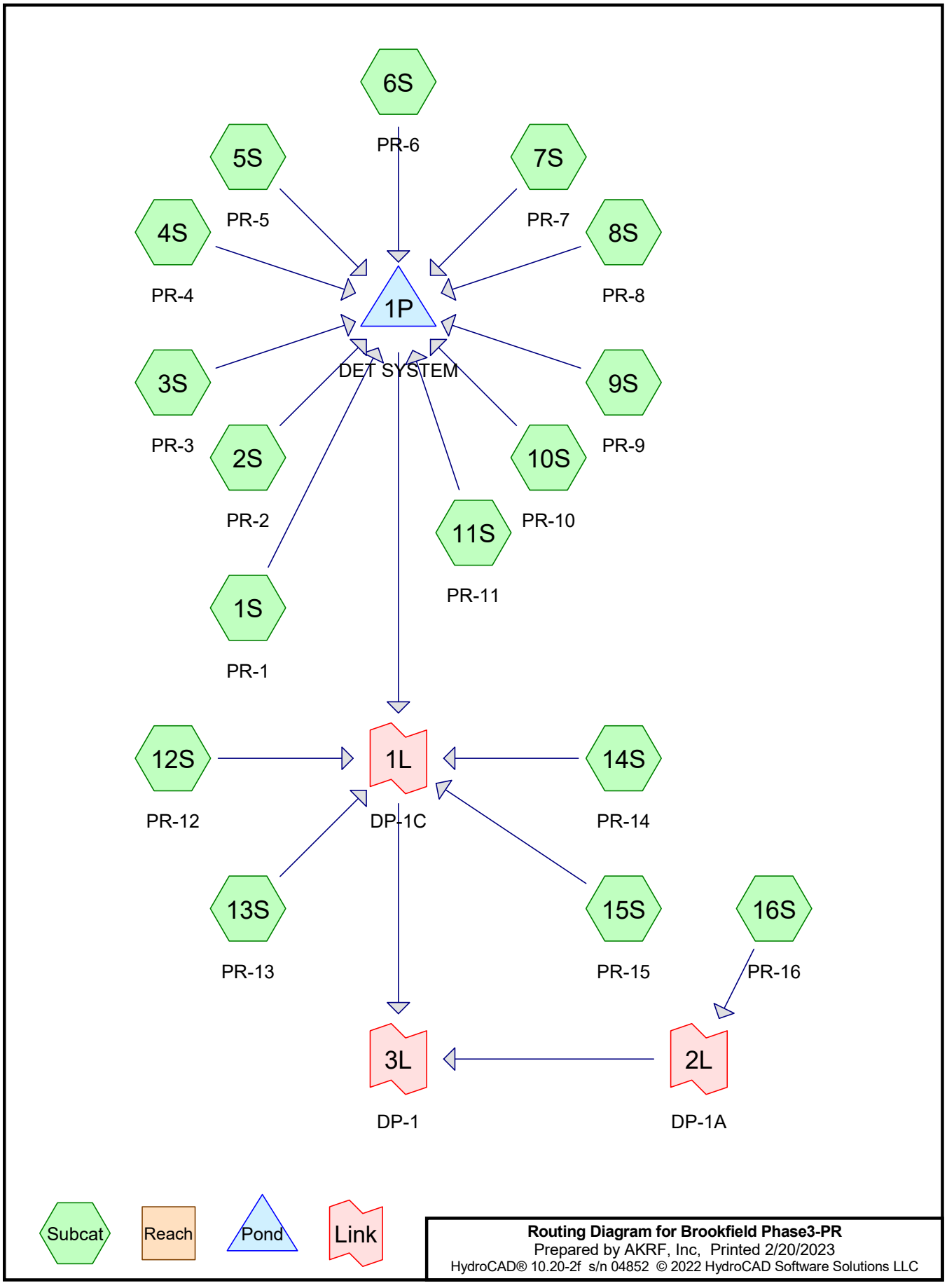
Summary for Link 3L: DP-1

Inflow Area = 173,433 sf, 77.04% Impervious, Inflow Depth > 8.13" for 100-YR event
Inflow = 33.3 cfs @ 12.09 hrs, Volume= 117,531 cf
Primary = 33.3 cfs @ 12.09 hrs, Volume= 117,531 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1





Routing Diagram for Brookfield Phase3-PR
Prepared by AKRF, Inc, Printed 2/20/2023
HydroCAD® 10.20-2f s/n 04852 © 2022 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.83	2
2	10-YR	Type III 24-hr		Default	24.00	1	5.10	2
3	25-YR	Type III 24-hr		Default	24.00	1	6.39	2
4	50-YR	Type III 24-hr		Default	24.00	1	7.58	2
5	100-YR	Type III 24-hr		Default	24.00	1	9.01	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,824	79	50-75% Grass cover, Fair, HSG C (13S)
14,626	74	>75% Grass cover, Good, HSG C (1S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 14S, 15S, 16S)
3,500	97	Extensive Green Roof (2S, 3S, 4S)
3,397	98	Intensive Green Roof (5S)
131,740	98	Paved parking, HSG C (1S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S)
11,994	98	Roofs, HSG C (2S, 3S, 4S, 5S)
367	74	Stormwater Planter (2S)
173,448	**95**	**TOTAL AREA**

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

Subcatchment 1S: PR-1 Runoff Area=11,026 sf 92.38% Impervious Runoff Depth>2.38"
Tc=6.0 min CN=96 Runoff=0.6 cfs 2,190 cf

Subcatchment 2S: PR-2 Runoff Area=5,735 sf 63.50% Impervious Runoff Depth>2.38"
Tc=6.0 min CN=96 Runoff=0.3 cfs 1,139 cf

Subcatchment 3S: PR-3 Runoff Area=3,009 sf 83.35% Impervious Runoff Depth>2.60"
Tc=6.0 min CN=98 Runoff=0.2 cfs 651 cf

Subcatchment 4S: PR-4 Runoff Area=2,696 sf 52.78% Impervious Runoff Depth>2.60"
Tc=6.0 min CN=98 Runoff=0.2 cfs 584 cf

Subcatchment 5S: PR-5 Runoff Area=7,818 sf 100.00% Impervious Runoff Depth>2.60"
Tc=6.0 min CN=98 Runoff=0.5 cfs 1,692 cf

Subcatchment 6S: PR-6 Runoff Area=1,434 sf 82.64% Impervious Runoff Depth>2.18"
Tc=6.0 min CN=94 Runoff=0.1 cfs 261 cf

Subcatchment 7S: PR-7 Runoff Area=4,439 sf 97.70% Impervious Runoff Depth>2.49"
Tc=6.0 min CN=97 Runoff=0.3 cfs 920 cf

Subcatchment 8S: PR-8 Runoff Area=2,998 sf 98.70% Impervious Runoff Depth>2.60"
Tc=6.0 min CN=98 Runoff=0.2 cfs 649 cf

Subcatchment 9S: PR-9 Runoff Area=1,605 sf 64.49% Impervious Runoff Depth>1.75"
Tc=6.0 min CN=89 Runoff=0.1 cfs 233 cf

Subcatchment 10S: PR-10 Runoff Area=1,983 sf 92.54% Impervious Runoff Depth>2.38"
Tc=6.0 min CN=96 Runoff=0.1 cfs 394 cf

Subcatchment 11S: PR-11 Runoff Area=3,777 sf 66.80% Impervious Runoff Depth>1.83"
Tc=6.0 min CN=90 Runoff=0.2 cfs 575 cf

Subcatchment 12S: PR-12 Runoff Area=13,212 sf 81.45% Impervious Runoff Depth>2.18"
Tc=6.0 min CN=94 Runoff=0.7 cfs 2,405 cf

Subcatchment 13S: PR-13 Runoff Area=69,259 sf 88.70% Impervious Runoff Depth>2.38"
Tc=6.0 min CN=96 Runoff=4.1 cfs 13,755 cf

Subcatchment 14S: PR-14 Runoff Area=1,992 sf 77.41% Impervious Runoff Depth>2.09"
Tc=6.0 min CN=93 Runoff=0.1 cfs 347 cf

Subcatchment 15S: PR-15 Runoff Area=1,139 sf 98.16% Impervious Runoff Depth>2.60"
Tc=6.0 min CN=98 Runoff=0.1 cfs 247 cf

Subcatchment 16S: PR-16 Runoff Area=41,326 sf 79.43% Impervious Runoff Depth>2.09"
Tc=6.0 min CN=93 Runoff=2.2 cfs 7,199 cf

Pond 1P: DET SYSTEM Peak Elev=196.30' Storage=0.051 af Inflow=2.7 cfs 9,289 cf
Outflow=1.0 cfs 9,208 cf

Link 1L: DP-1C Inflow=5.8 cfs 25,962 cf
Primary=5.8 cfs 25,962 cf

Link 2L: DP-1A Inflow=2.2 cfs 7,199 cf
Primary=2.2 cfs 7,199 cf

Link 3L: DP-1 Inflow=8.0 cfs 33,161 cf
Primary=8.0 cfs 33,161 cf

Total Runoff Area = 173,448 sf Runoff Volume = 33,241 cf Average Runoff Depth = 2.30"
15.17% Pervious = 26,317 sf 84.83% Impervious = 147,131 sf

Summary for Subcatchment 1S: PR-1

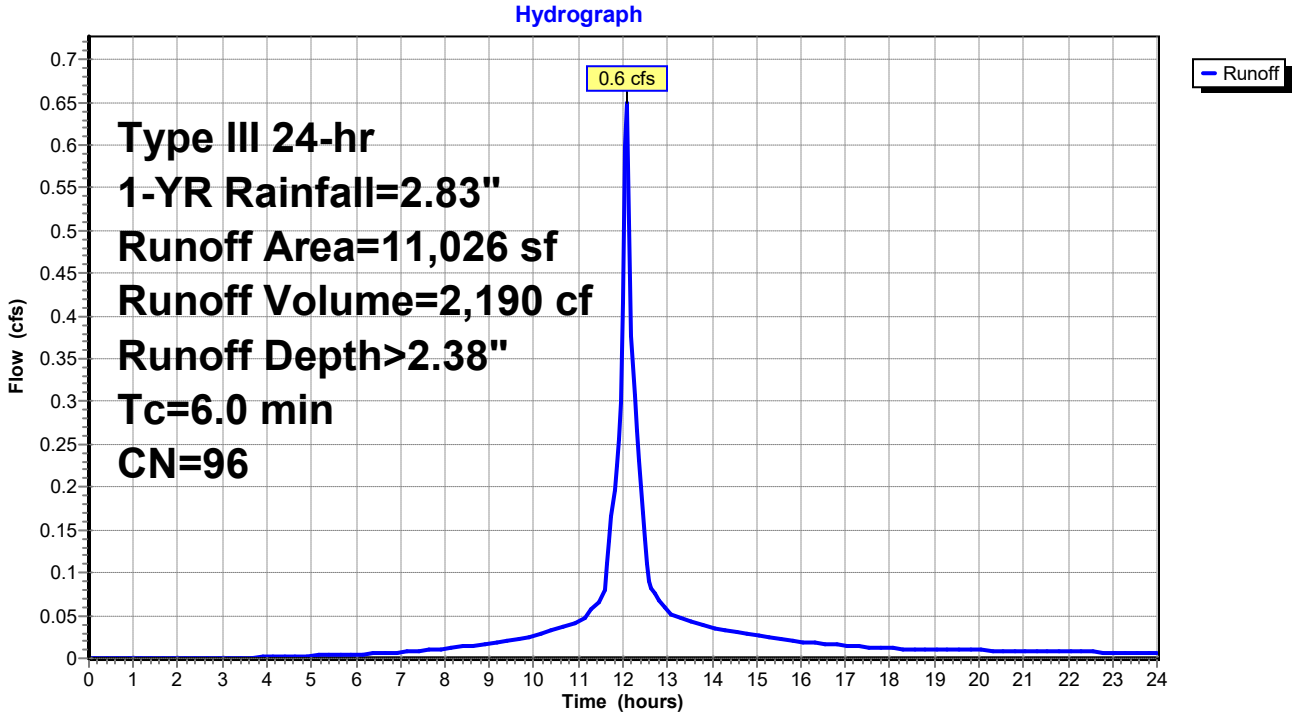
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,190 cf, Depth> 2.38"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
10,186	98	Paved parking, HSG C
840	74	>75% Grass cover, Good, HSG C
11,026	96	Weighted Average
840		7.62% Pervious Area
10,186		92.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-1



Summary for Subcatchment 2S: PR-2

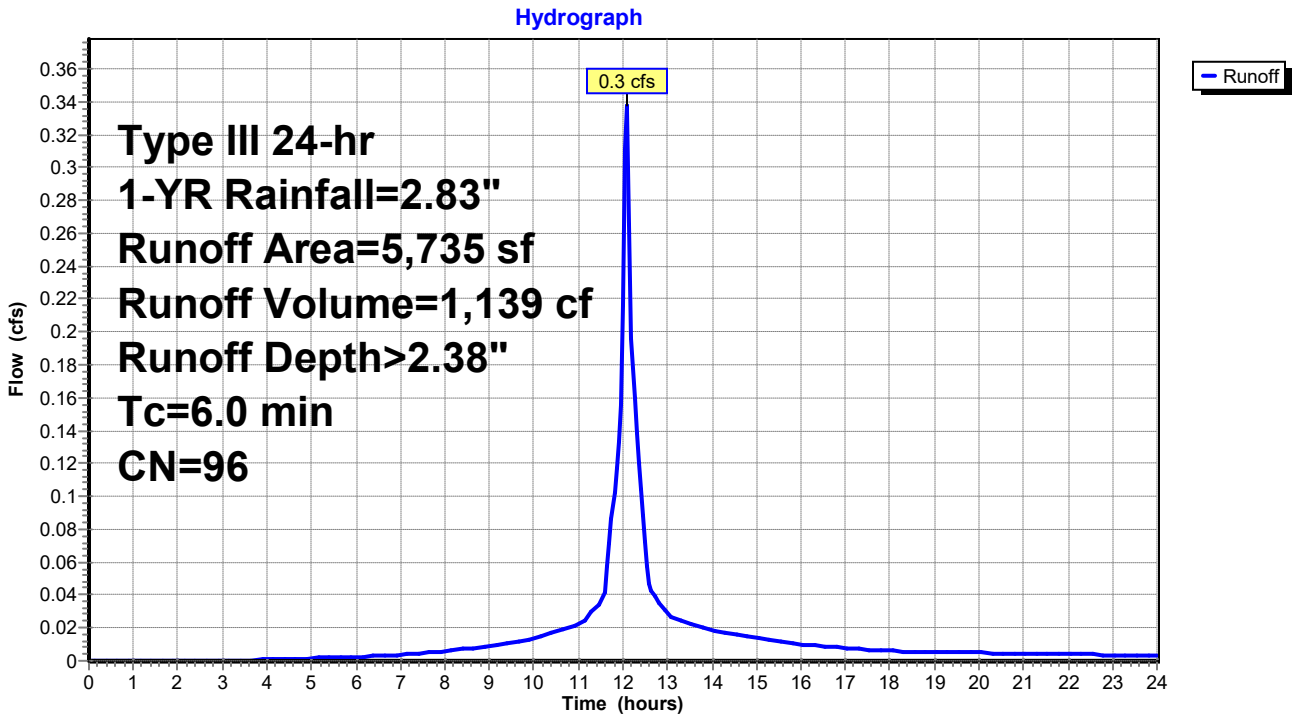
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,139 cf, Depth> 2.38"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

	Area (sf)	CN	Description
	3,642	98	Roofs, HSG C
*	1,726	97	Extensive Green Roof
*	367	74	Stormwater Planter
	5,735	96	Weighted Average
	2,093		36.50% Pervious Area
	3,642		63.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-2



Summary for Subcatchment 3S: PR-3

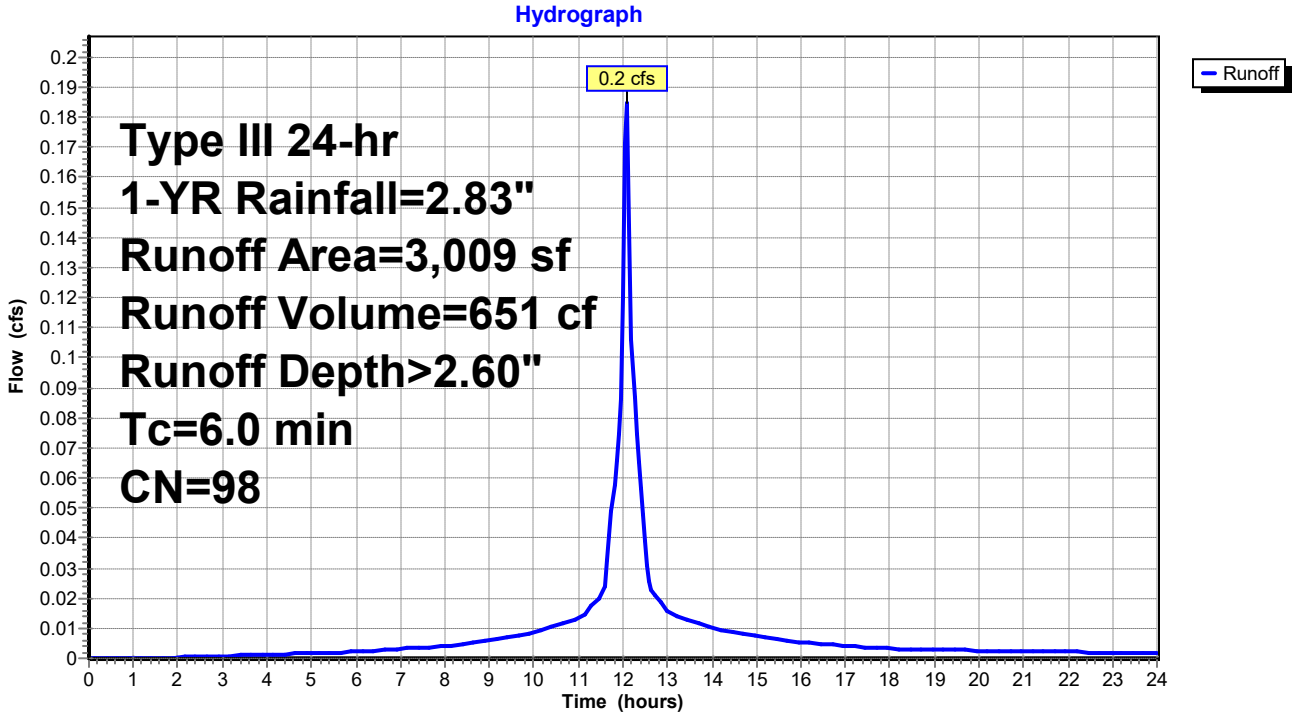
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 651 cf, Depth> 2.60"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

	Area (sf)	CN	Description
	2,508	98	Roofs, HSG C
*	501	97	Extensive Green Roof
	3,009	98	Weighted Average
	501		16.65% Pervious Area
	2,508		83.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-3



Summary for Subcatchment 4S: PR-4

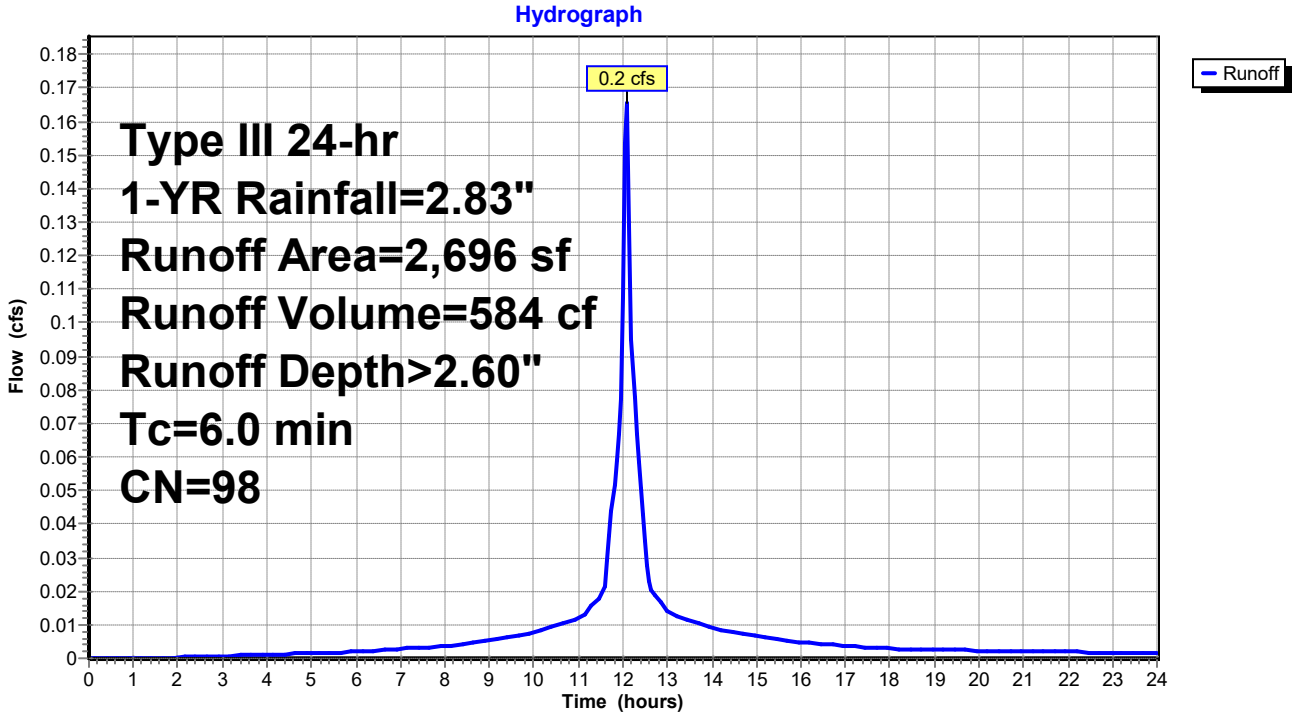
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 584 cf, Depth> 2.60"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

	Area (sf)	CN	Description
	1,423	98	Roofs, HSG C
*	1,273	97	Extensive Green Roof
	2,696	98	Weighted Average
	1,273		47.22% Pervious Area
	1,423		52.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-4



Summary for Subcatchment 5S: PR-5

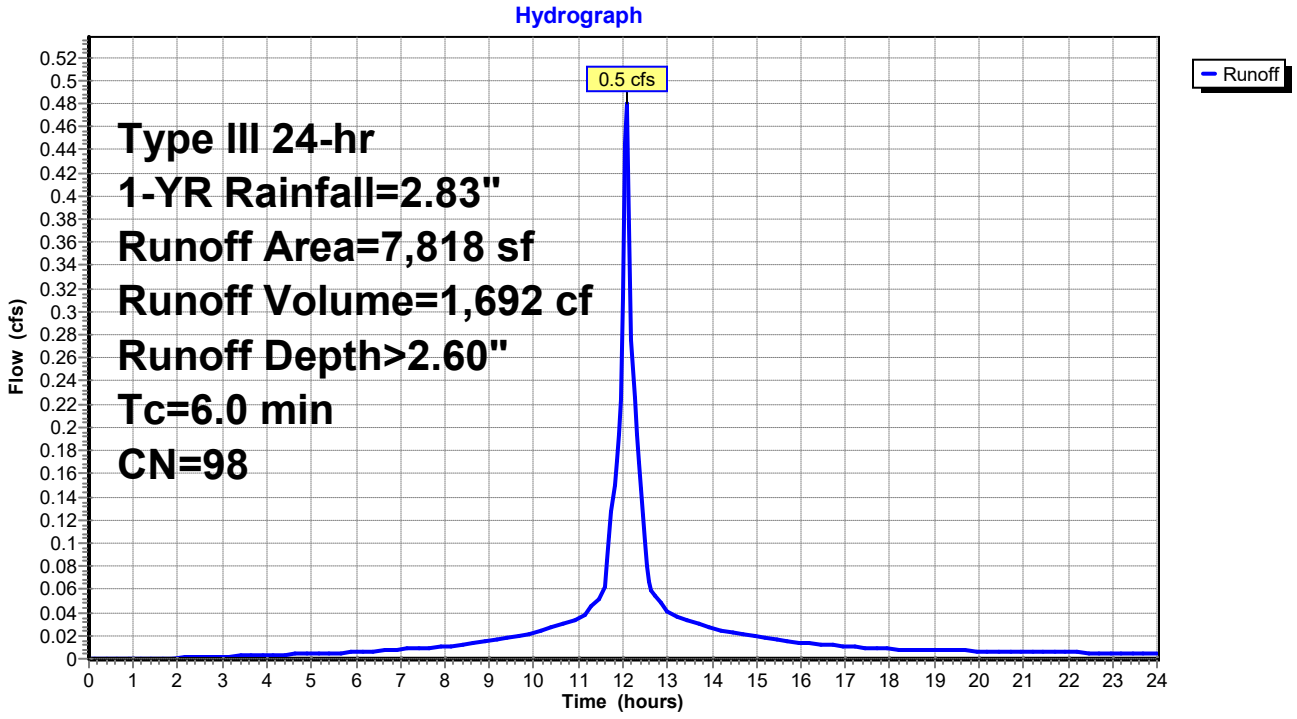
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,692 cf, Depth> 2.60"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

	Area (sf)	CN	Description
	4,421	98	Roofs, HSG C
*	3,397	98	Intensive Green Roof
	7,818	98	Weighted Average
	7,818		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PR-5



Summary for Subcatchment 6S: PR-6

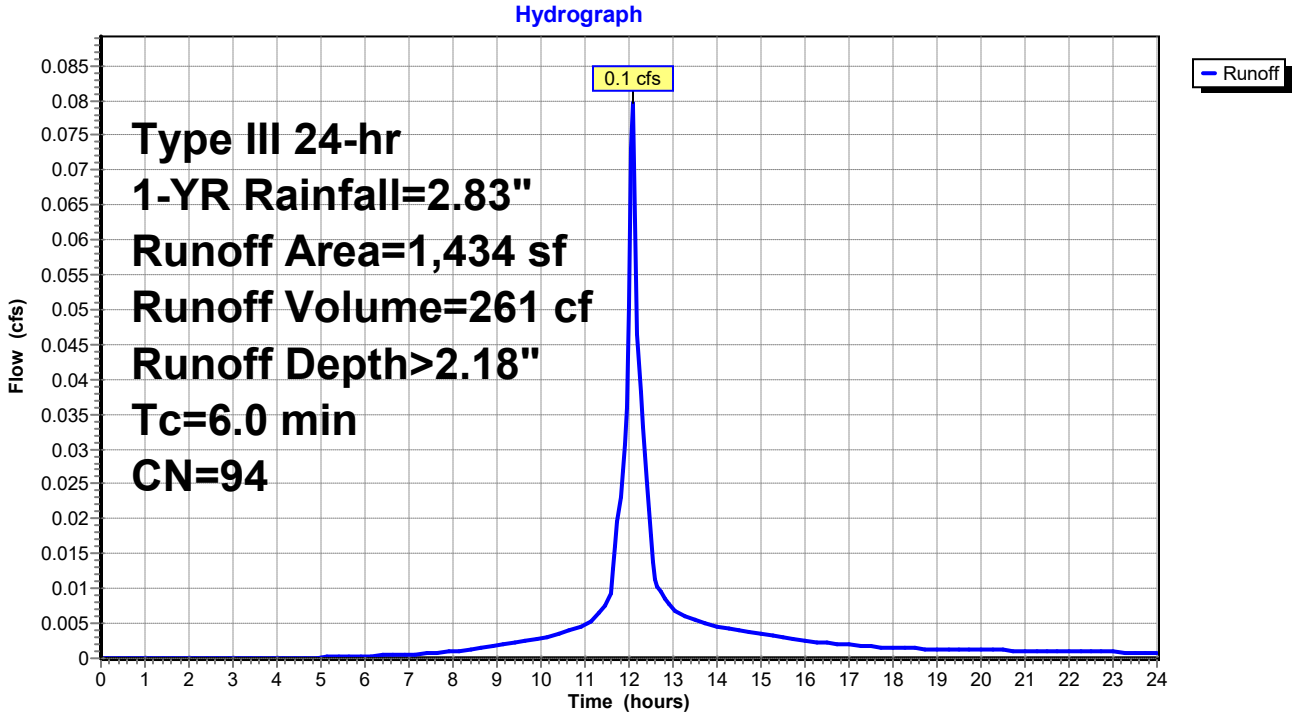
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 261 cf, Depth> 2.18"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,185	98	Paved parking, HSG C
249	74	>75% Grass cover, Good, HSG C
1,434	94	Weighted Average
249		17.36% Pervious Area
1,185		82.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PR-6



Summary for Subcatchment 7S: PR-7

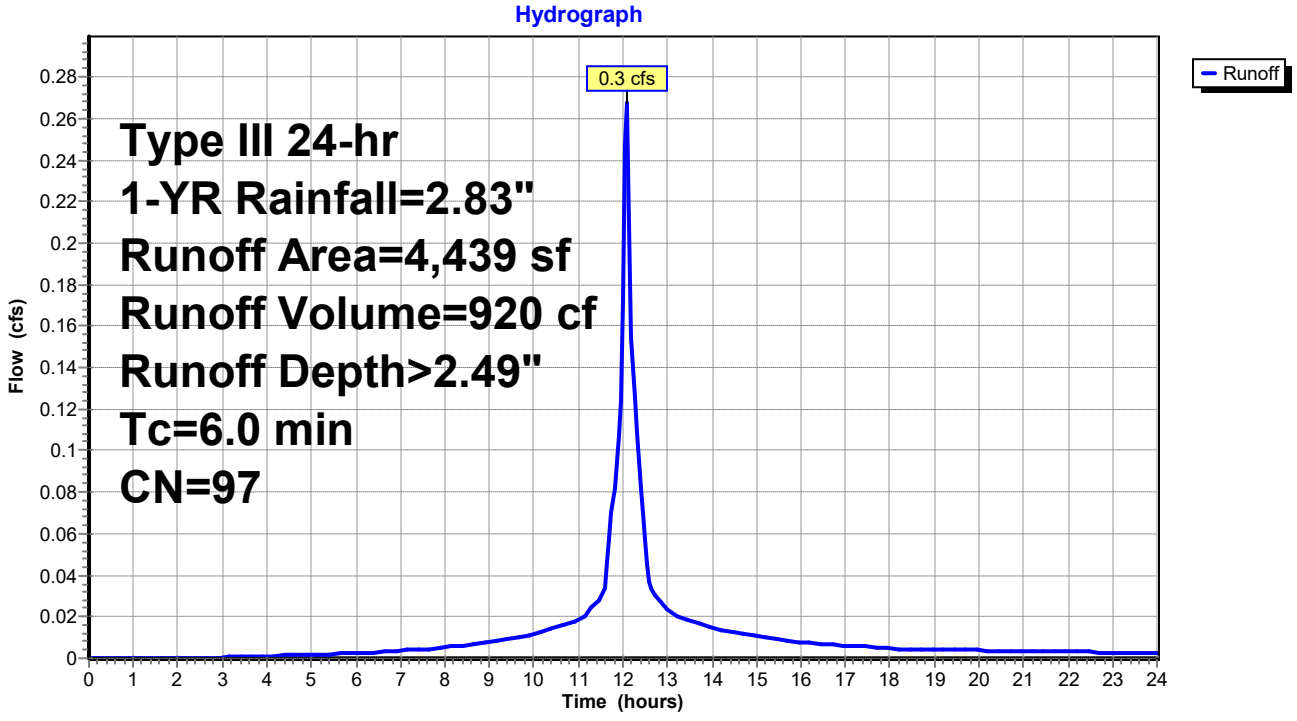
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 920 cf, Depth> 2.49"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
4,337	98	Paved parking, HSG C
102	74	>75% Grass cover, Good, HSG C
4,439	97	Weighted Average
102		2.30% Pervious Area
4,337		97.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PR-7



Summary for Subcatchment 8S: PR-8

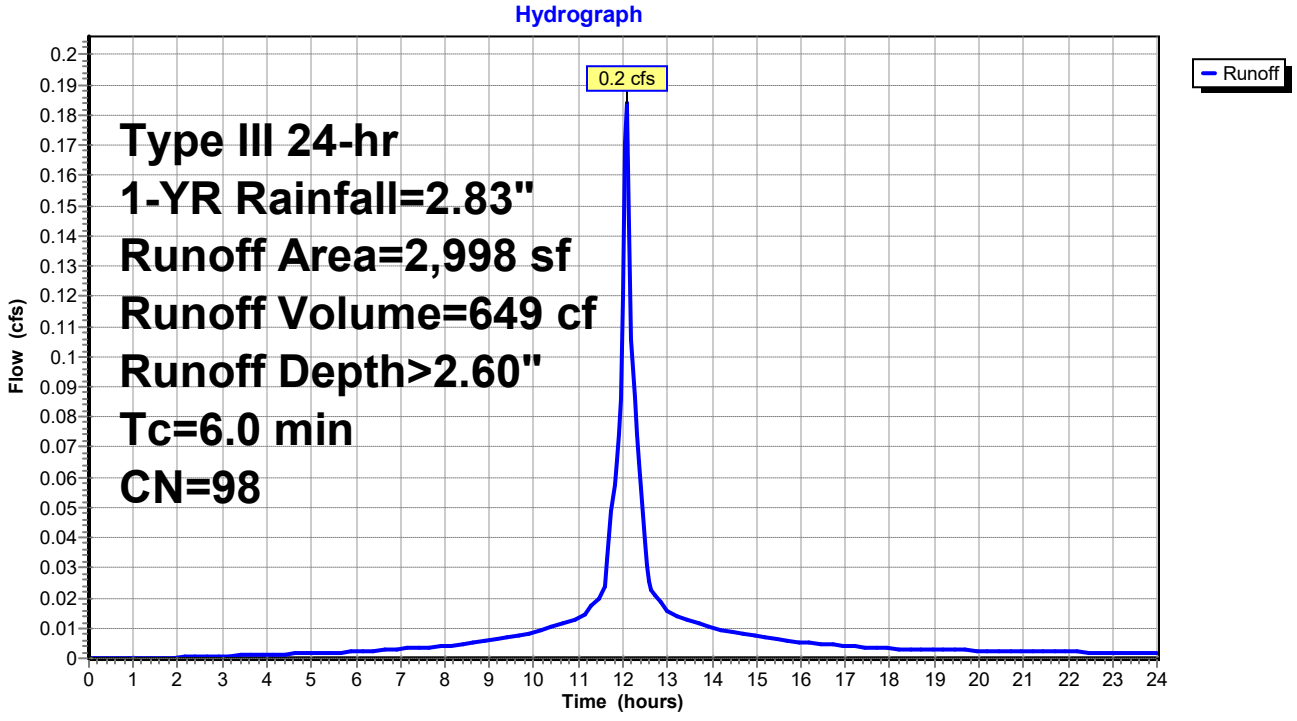
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 649 cf, Depth> 2.60"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
2,959	98	Paved parking, HSG C
39	74	>75% Grass cover, Good, HSG C
2,998	98	Weighted Average
39		1.30% Pervious Area
2,959		98.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PR-8



Summary for Subcatchment 9S: PR-9

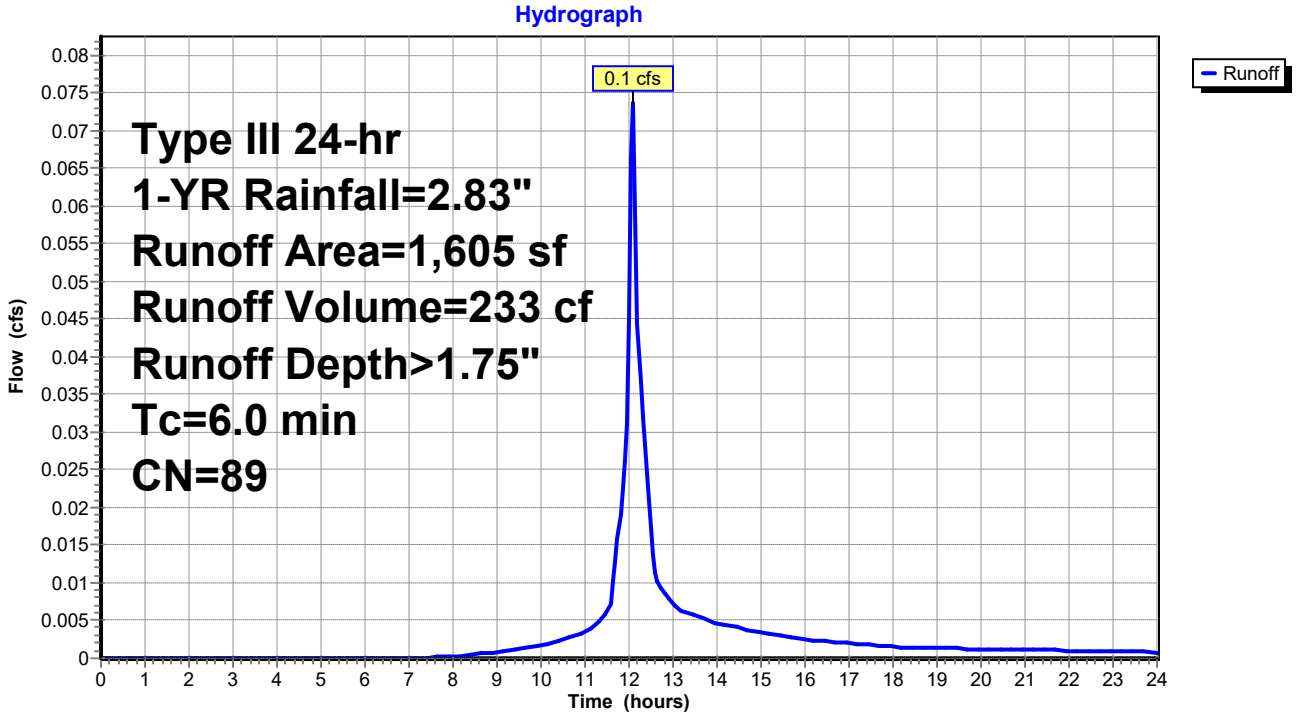
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 233 cf, Depth> 1.75"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,035	98	Paved parking, HSG C
570	74	>75% Grass cover, Good, HSG C
1,605	89	Weighted Average
570		35.51% Pervious Area
1,035		64.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

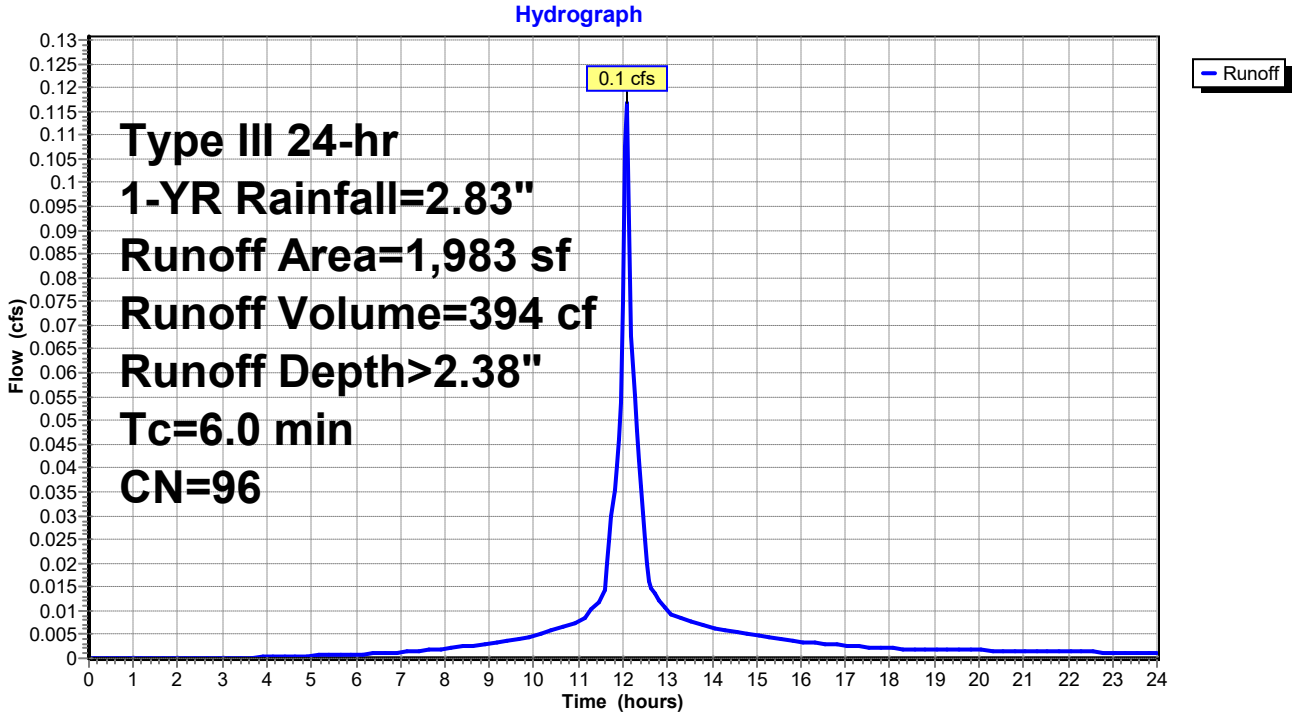
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 394 cf, Depth> 2.38"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,835	98	Paved parking, HSG C
148	74	>75% Grass cover, Good, HSG C
1,983	96	Weighted Average
148		7.46% Pervious Area
1,835		92.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S: PR-10



Summary for Subcatchment 11S: PR-11

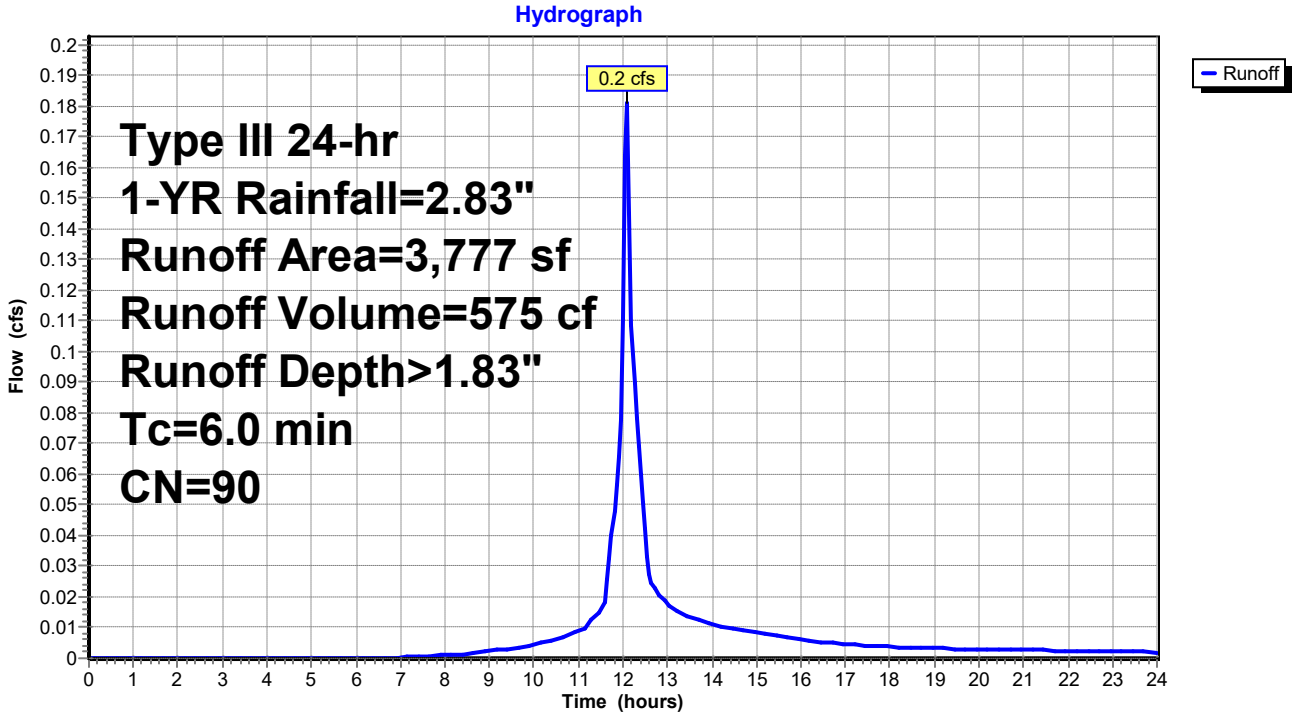
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 575 cf, Depth> 1.83"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
2,523	98	Paved parking, HSG C
1,254	74	>75% Grass cover, Good, HSG C
3,777	90	Weighted Average
1,254		33.20% Pervious Area
2,523		66.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11S: PR-11



Summary for Subcatchment 12S: PR-12

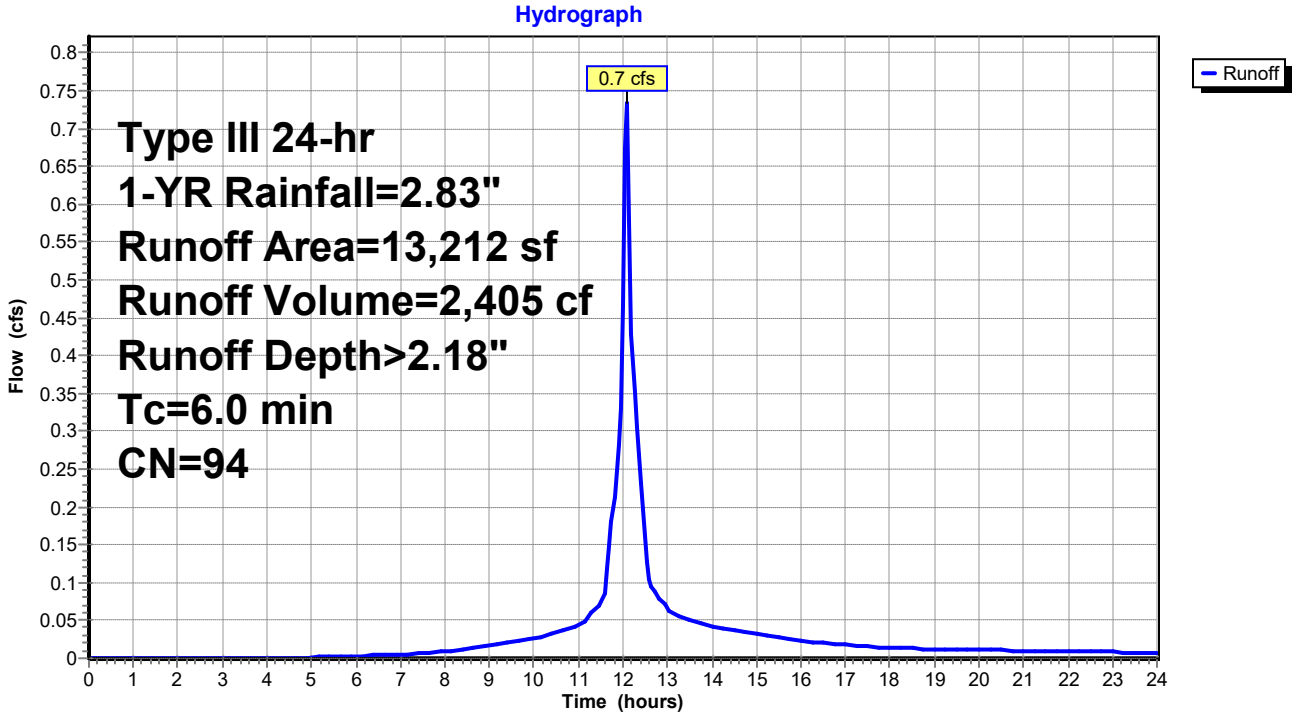
Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,405 cf, Depth> 2.18"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
10,761	98	Paved parking, HSG C
2,451	74	>75% Grass cover, Good, HSG C
13,212	94	Weighted Average
2,451		18.55% Pervious Area
10,761		81.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S: PR-12



Summary for Subcatchment 13S: PR-13

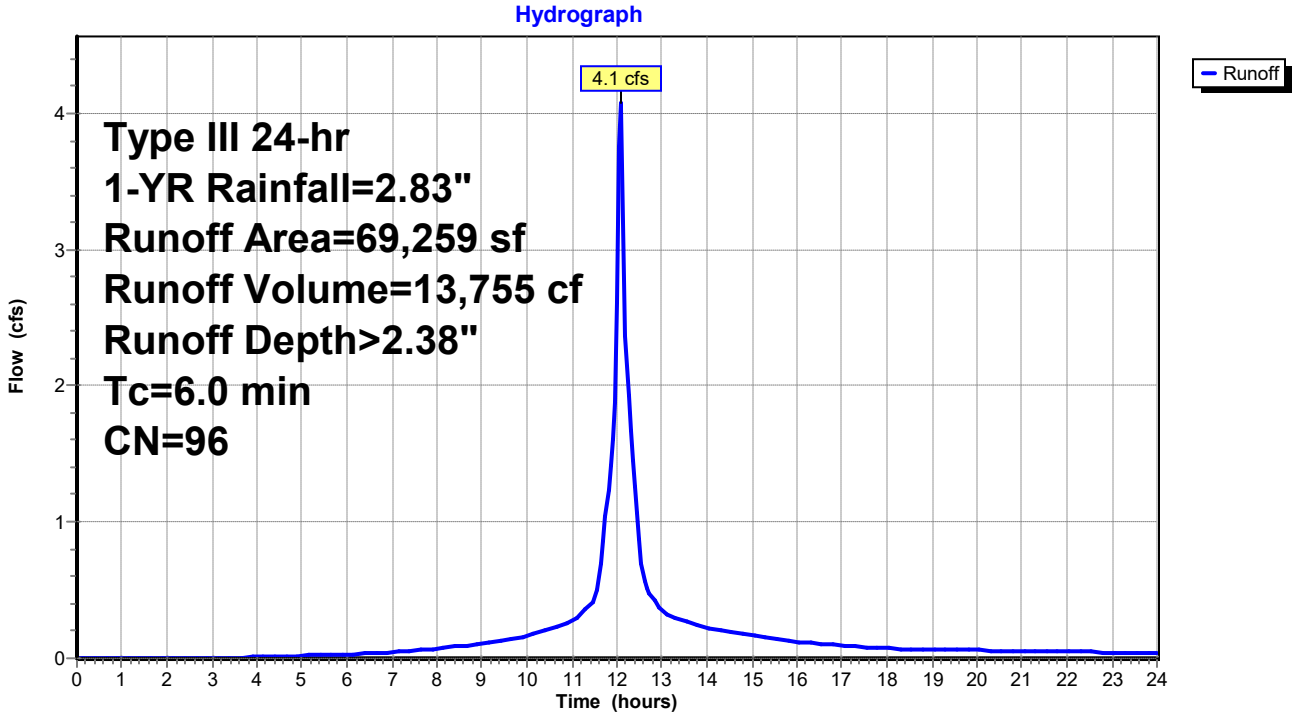
Runoff = 4.1 cfs @ 12.09 hrs, Volume= 13,755 cf, Depth> 2.38"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
61,435	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,259	96	Weighted Average
7,824		11.30% Pervious Area
61,435		88.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S: PR-13



Summary for Subcatchment 14S: PR-14

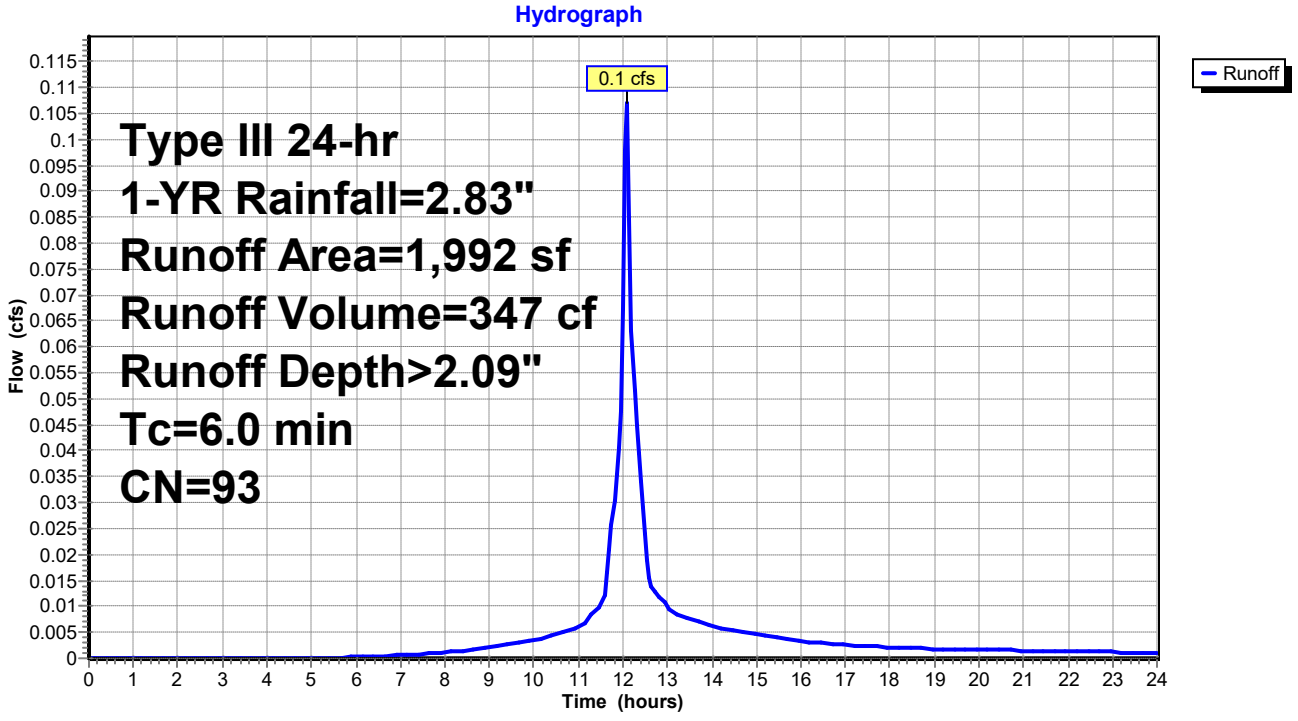
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 347 cf, Depth> 2.09"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,542	98	Paved parking, HSG C
450	74	>75% Grass cover, Good, HSG C
1,992	93	Weighted Average
450		22.59% Pervious Area
1,542		77.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14S: PR-14



Summary for Subcatchment 15S: PR-15

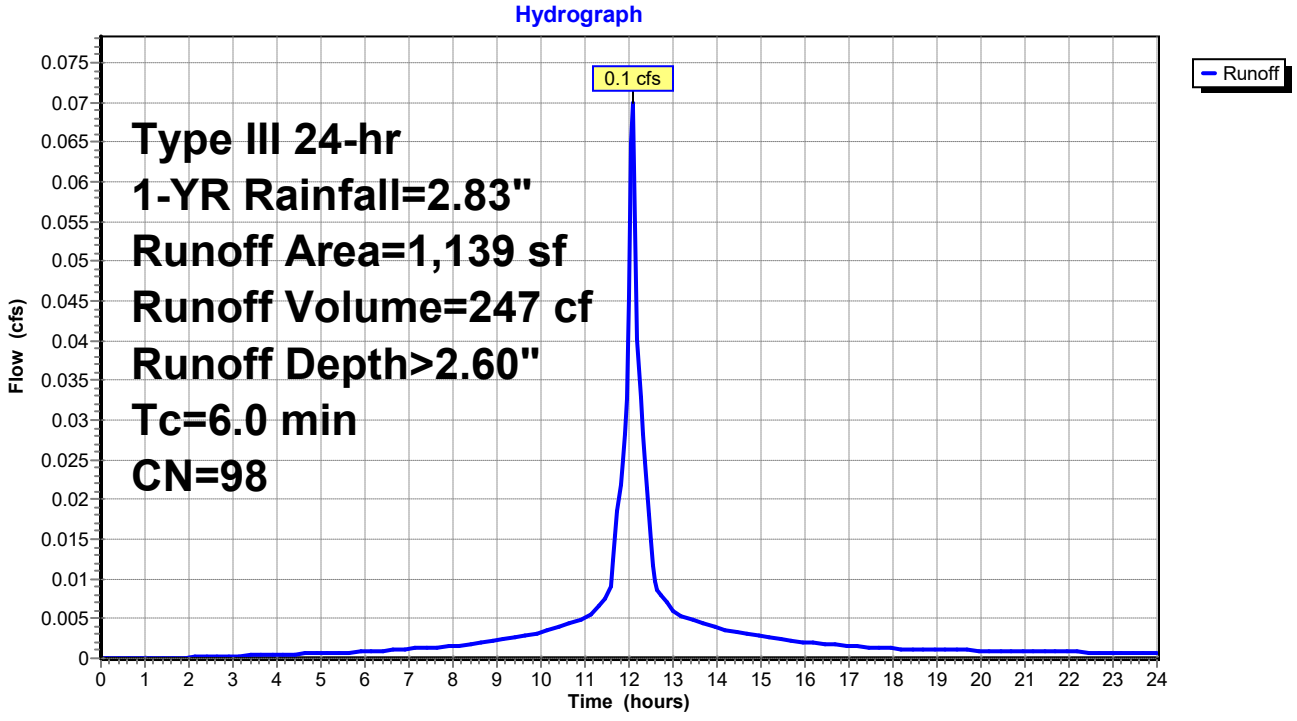
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 247 cf, Depth> 2.60"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,118	98	Paved parking, HSG C
21	74	>75% Grass cover, Good, HSG C
1,139	98	Weighted Average
21		1.84% Pervious Area
1,118		98.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 15S: PR-15



Summary for Subcatchment 16S: PR-16

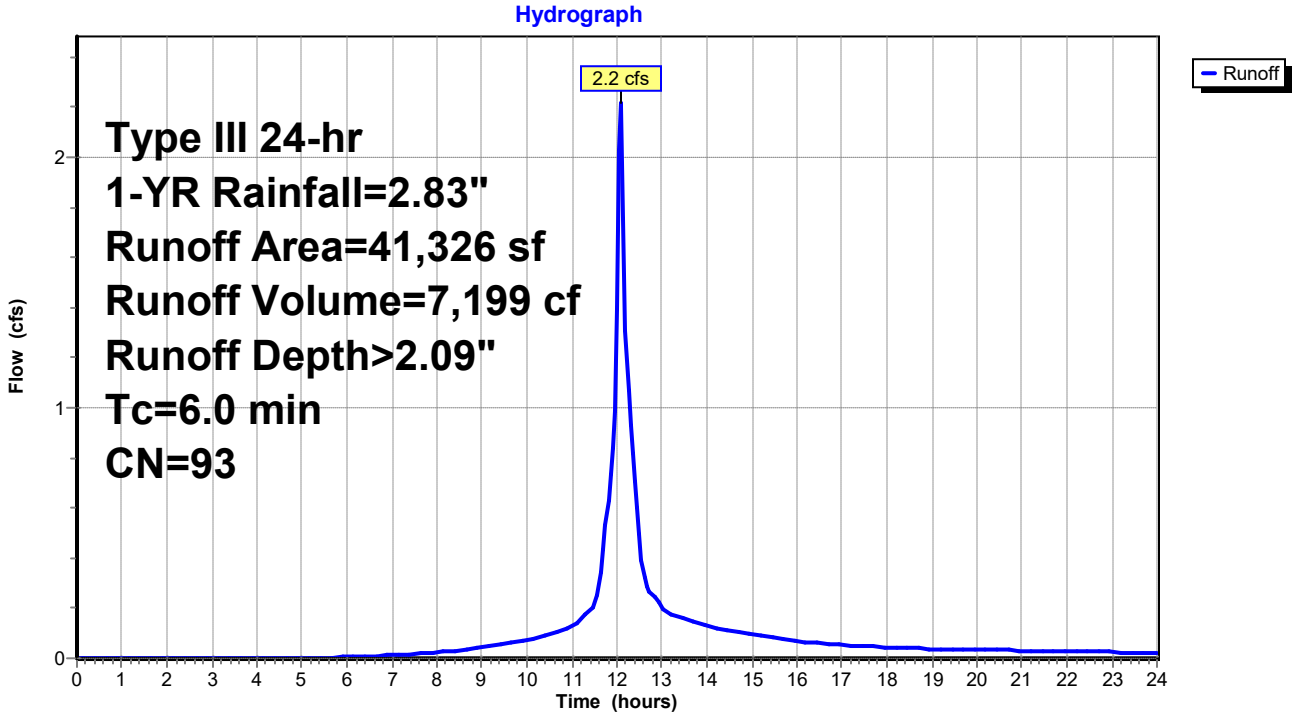
Runoff = 2.2 cfs @ 12.09 hrs, Volume= 7,199 cf, Depth> 2.09"
Routed to Link 2L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
32,824	98	Paved parking, HSG C
8,502	74	>75% Grass cover, Good, HSG C
41,326	93	Weighted Average
8,502		20.57% Pervious Area
32,824		79.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 16S: PR-16



Summary for Pond 1P: DET SYSTEM

Inflow Area = 46,520 sf, 84.80% Impervious, Inflow Depth > 2.40" for 1-YR event
Inflow = 2.7 cfs @ 12.09 hrs, Volume= 9,289 cf
Outflow = 1.0 cfs @ 12.34 hrs, Volume= 9,208 cf, Atten= 63%, Lag= 15.2 min
Primary = 1.0 cfs @ 12.34 hrs, Volume= 9,208 cf
Routed to Link 1L : DP-1C

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.30' @ 12.34 hrs Surf.Area= 0.077 ac Storage= 0.051 af

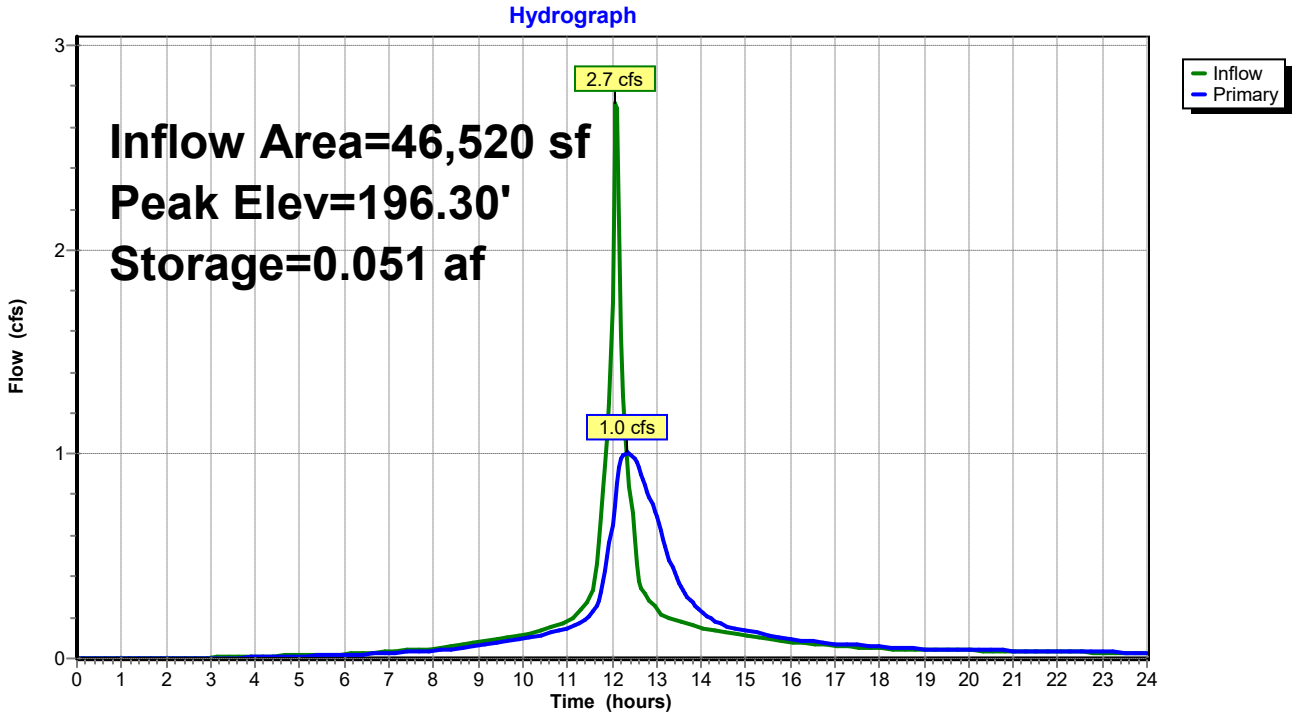
Plug-Flow detention time= 34.7 min calculated for 9,208 cf (99% of inflow)
Center-of-Mass det. time= 29.1 min (801.7 - 772.7)

Volume	Invert	Avail.Storage	Storage Description
#1	195.40'	0.158 af	**30.0" Round Pipe Storage** L= 1,400.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.29'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 195.29' / 194.66' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	195.40'	**7.0" Vert. 1-YR ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	196.30'	**12.0" W x 6.0" H Vert. 10-Year Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.0 cfs @ 12.34 hrs HW=196.30' (Free Discharge)
- **1=Culvert** (Passes 1.0 cfs of 3.3 cfs potential flow)
  - **2=1-YR ORIFICE** (Orifice Controls 1.0 cfs @ 3.76 fps)
- **3=10-Year Orifice** (Orifice Controls 0.0 cfs @ 0.18 fps)

Pond 1P: DET SYSTEM

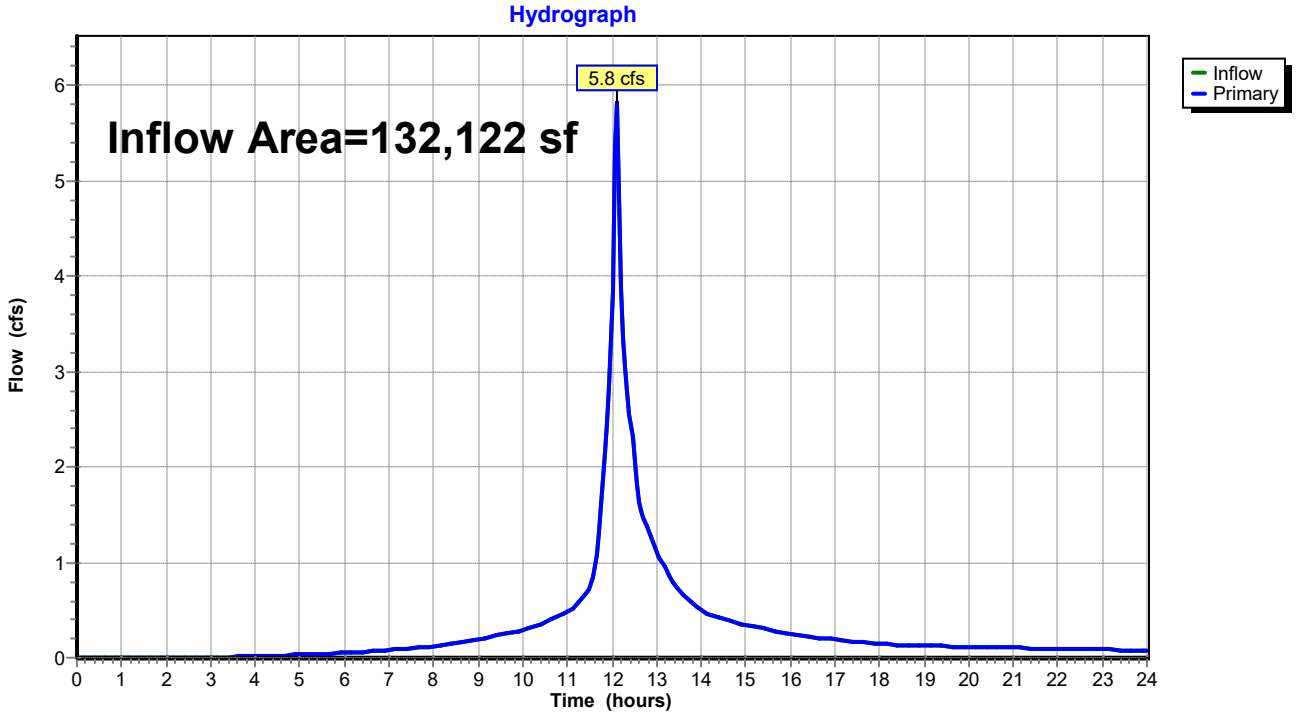


Summary for Link 1L: DP-1C

Inflow Area = 132,122 sf, 86.52% Impervious, Inflow Depth > 2.36" for 1-YR event
Inflow = 5.8 cfs @ 12.09 hrs, Volume= 25,962 cf
Primary = 5.8 cfs @ 12.09 hrs, Volume= 25,962 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1C

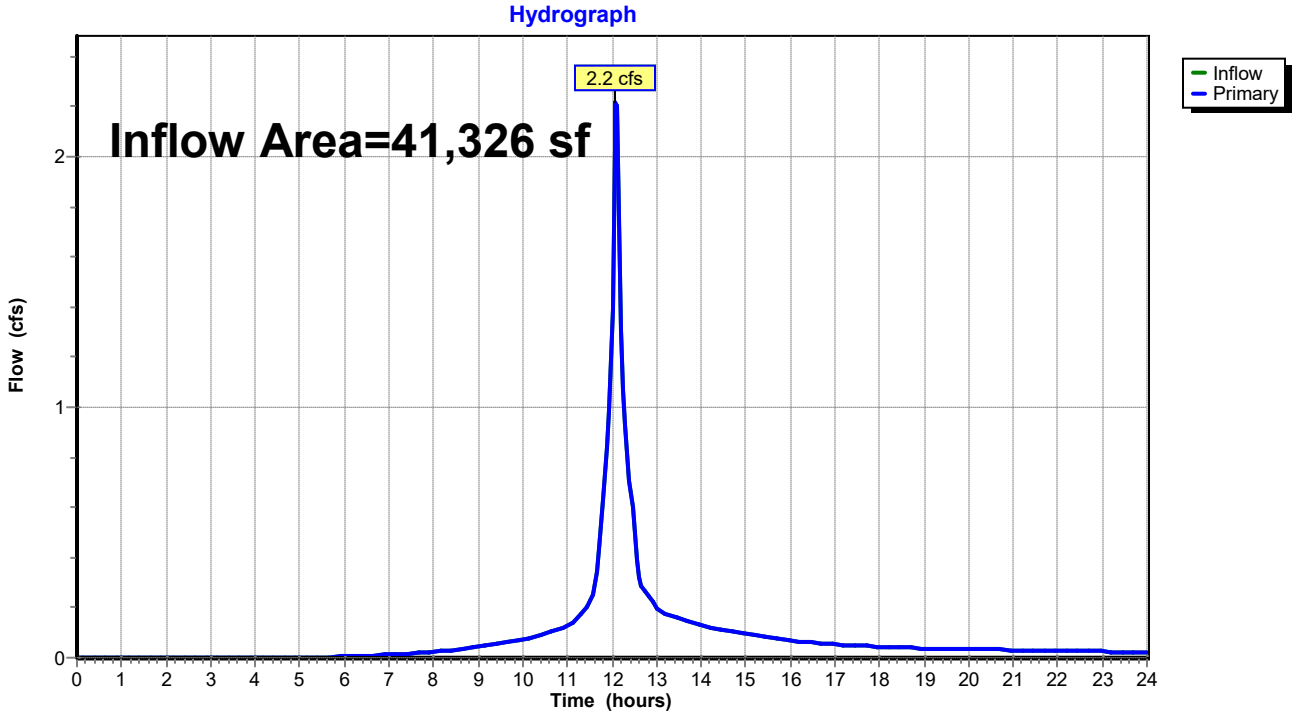


Summary for Link 2L: DP-1A

Inflow Area = 41,326 sf, 79.43% Impervious, Inflow Depth > 2.09" for 1-YR event
Inflow = 2.2 cfs @ 12.09 hrs, Volume= 7,199 cf
Primary = 2.2 cfs @ 12.09 hrs, Volume= 7,199 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1A

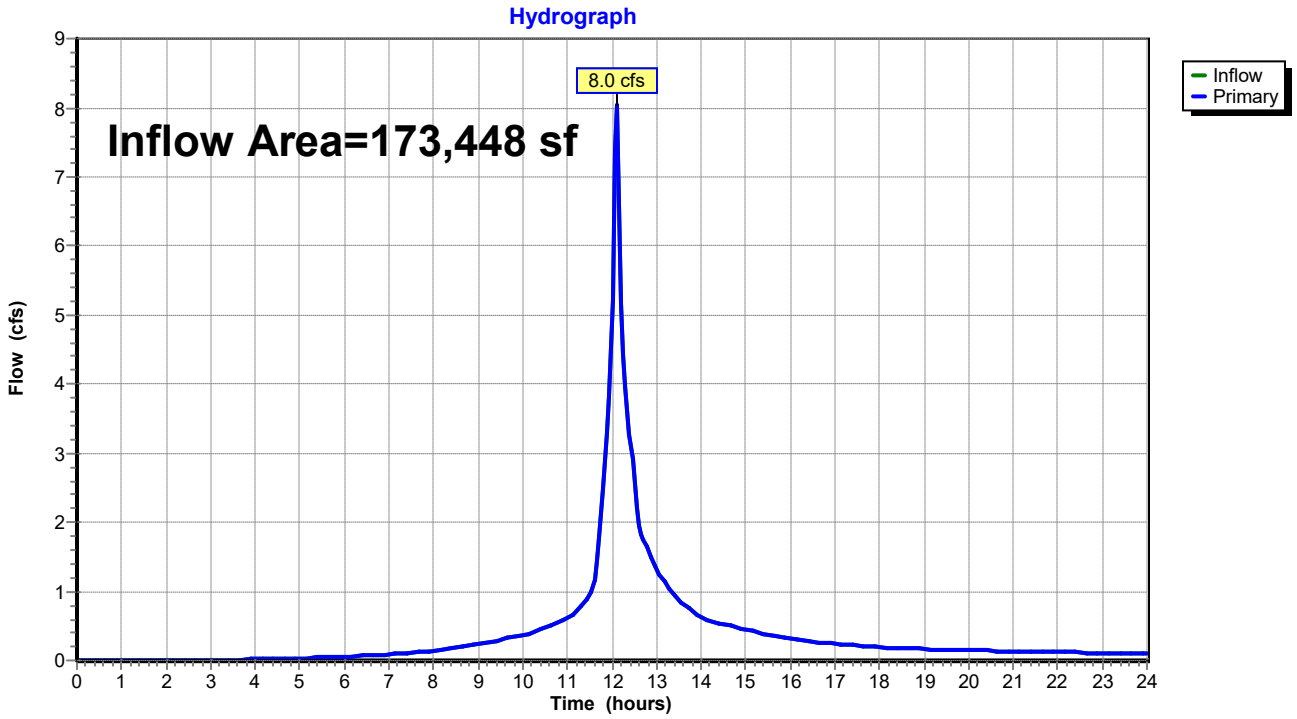


Summary for Link 3L: DP-1

Inflow Area = 173,448 sf, 84.83% Impervious, Inflow Depth > 2.29" for 1-YR event
Inflow = 8.0 cfs @ 12.09 hrs, Volume= 33,161 cf
Primary = 8.0 cfs @ 12.09 hrs, Volume= 33,161 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: PR-1 Runoff Area=11,026 sf 92.38% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=96 Runoff=1.2 cfs 4,253 cf

Subcatchment 2S: PR-2 Runoff Area=5,735 sf 63.50% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=96 Runoff=0.6 cfs 2,212 cf

Subcatchment 3S: PR-3 Runoff Area=3,009 sf 83.35% Impervious Runoff Depth>4.86"
Tc=6.0 min CN=98 Runoff=0.3 cfs 1,219 cf

Subcatchment 4S: PR-4 Runoff Area=2,696 sf 52.78% Impervious Runoff Depth>4.86"
Tc=6.0 min CN=98 Runoff=0.3 cfs 1,092 cf

Subcatchment 5S: PR-5 Runoff Area=7,818 sf 100.00% Impervious Runoff Depth>4.86"
Tc=6.0 min CN=98 Runoff=0.9 cfs 3,166 cf

Subcatchment 6S: PR-6 Runoff Area=1,434 sf 82.64% Impervious Runoff Depth>4.40"
Tc=6.0 min CN=94 Runoff=0.2 cfs 526 cf

Subcatchment 7S: PR-7 Runoff Area=4,439 sf 97.70% Impervious Runoff Depth>4.74"
Tc=6.0 min CN=97 Runoff=0.5 cfs 1,755 cf

Subcatchment 8S: PR-8 Runoff Area=2,998 sf 98.70% Impervious Runoff Depth>4.86"
Tc=6.0 min CN=98 Runoff=0.3 cfs 1,214 cf

Subcatchment 9S: PR-9 Runoff Area=1,605 sf 64.49% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=89 Runoff=0.2 cfs 517 cf

Subcatchment 10S: PR-10 Runoff Area=1,983 sf 92.54% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=96 Runoff=0.2 cfs 765 cf

Subcatchment 11S: PR-11 Runoff Area=3,777 sf 66.80% Impervious Runoff Depth>3.97"
Tc=6.0 min CN=90 Runoff=0.4 cfs 1,250 cf

Subcatchment 12S: PR-12 Runoff Area=13,212 sf 81.45% Impervious Runoff Depth>4.40"
Tc=6.0 min CN=94 Runoff=1.4 cfs 4,849 cf

Subcatchment 13S: PR-13 Runoff Area=69,259 sf 88.70% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=96 Runoff=7.6 cfs 26,717 cf

Subcatchment 14S: PR-14 Runoff Area=1,992 sf 77.41% Impervious Runoff Depth>4.29"
Tc=6.0 min CN=93 Runoff=0.2 cfs 713 cf

Subcatchment 15S: PR-15 Runoff Area=1,139 sf 98.16% Impervious Runoff Depth>4.86"
Tc=6.0 min CN=98 Runoff=0.1 cfs 461 cf

Subcatchment 16S: PR-16 Runoff Area=41,326 sf 79.43% Impervious Runoff Depth>4.29"
Tc=6.0 min CN=93 Runoff=4.4 cfs 14,785 cf

Pond 1P: DET SYSTEM Peak Elev=196.80' Storage=0.091 af Inflow=5.1 cfs 17,969 cf
Outflow=2.5 cfs 17,842 cf

Link 1L: DP-1C Inflow=11.1 cfs 50,581 cf
Primary=11.1 cfs 50,581 cf

Link 2L: DP-1A Inflow=4.4 cfs 14,785 cf
Primary=4.4 cfs 14,785 cf

Link 3L: DP-1 Inflow=15.4 cfs 65,366 cf
Primary=15.4 cfs 65,366 cf

Total Runoff Area = 173,448 sf Runoff Volume = 65,494 cf Average Runoff Depth = 4.53"
15.17% Pervious = 26,317 sf 84.83% Impervious = 147,131 sf

Summary for Subcatchment 1S: PR-1

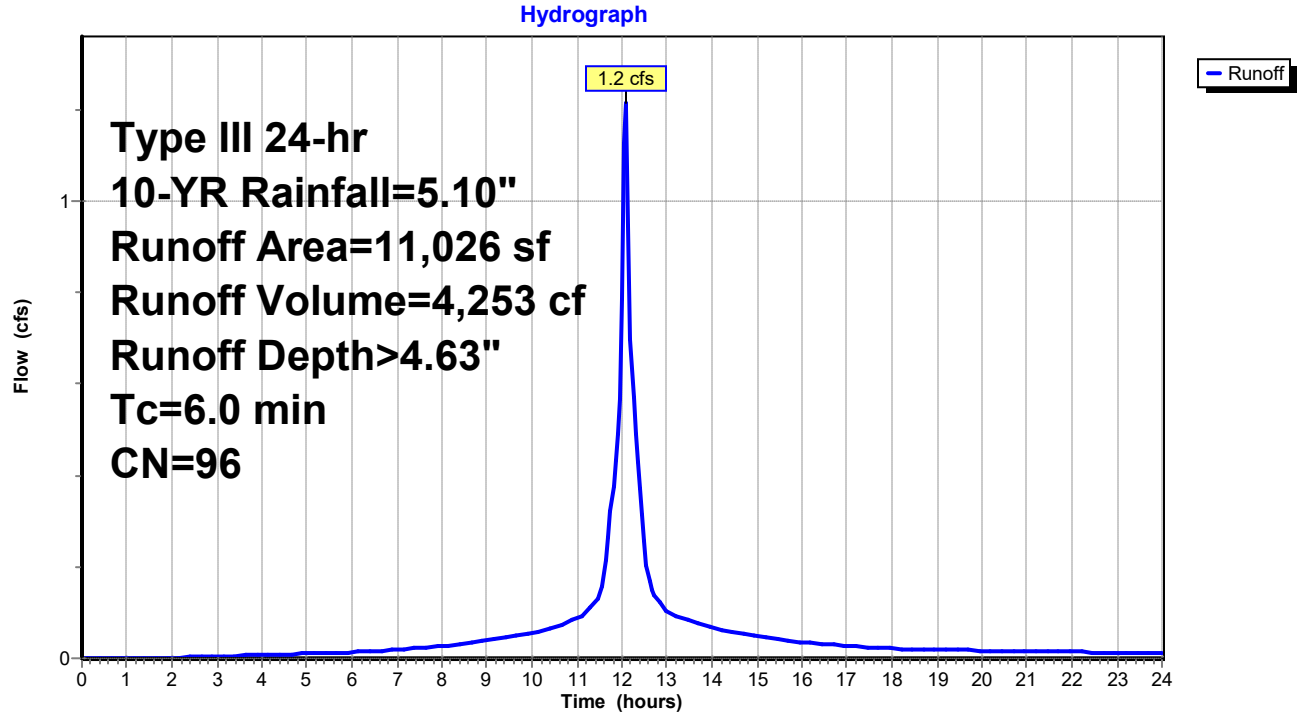
Runoff = 1.2 cfs @ 12.09 hrs, Volume= 4,253 cf, Depth> 4.63"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
10,186	98	Paved parking, HSG C
840	74	>75% Grass cover, Good, HSG C
11,026	96	Weighted Average
840		7.62% Pervious Area
10,186		92.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-1



Summary for Subcatchment 2S: PR-2

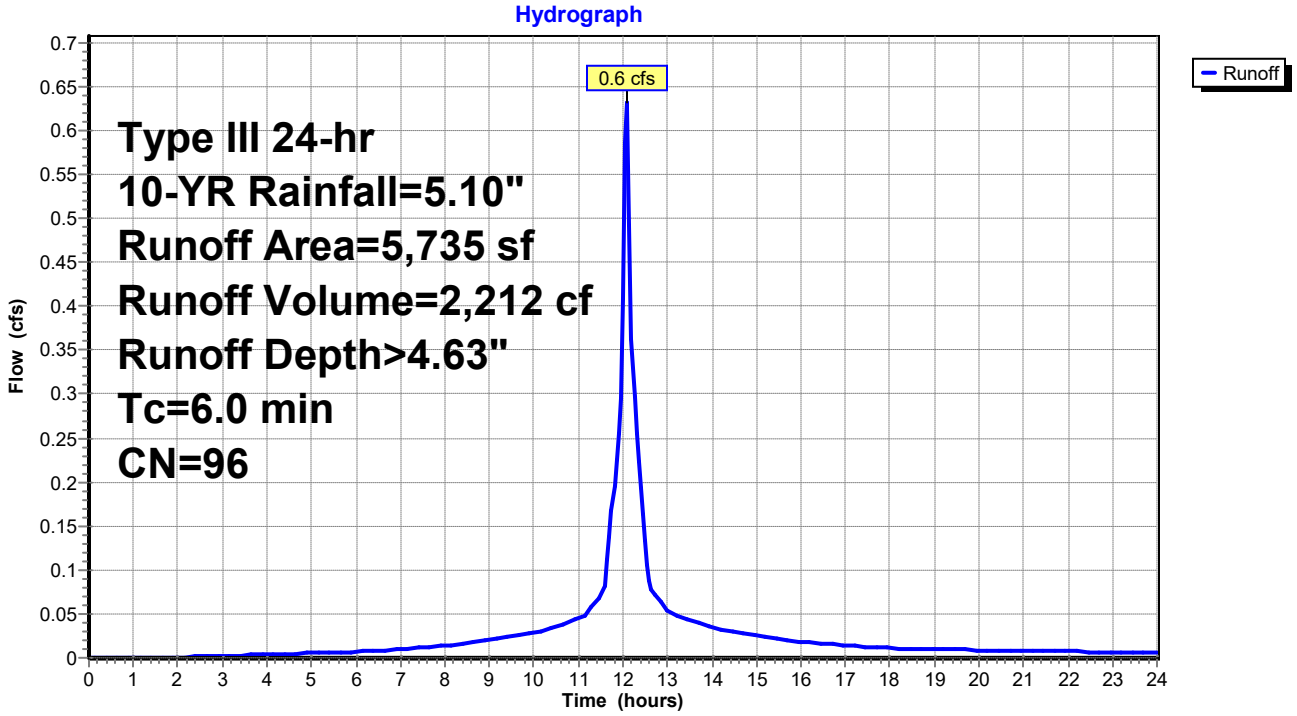
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,212 cf, Depth> 4.63"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

	Area (sf)	CN	Description
	3,642	98	Roofs, HSG C
*	1,726	97	Extensive Green Roof
*	367	74	Stormwater Planter
	5,735	96	Weighted Average
	2,093		36.50% Pervious Area
	3,642		63.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-2



Summary for Subcatchment 3S: PR-3

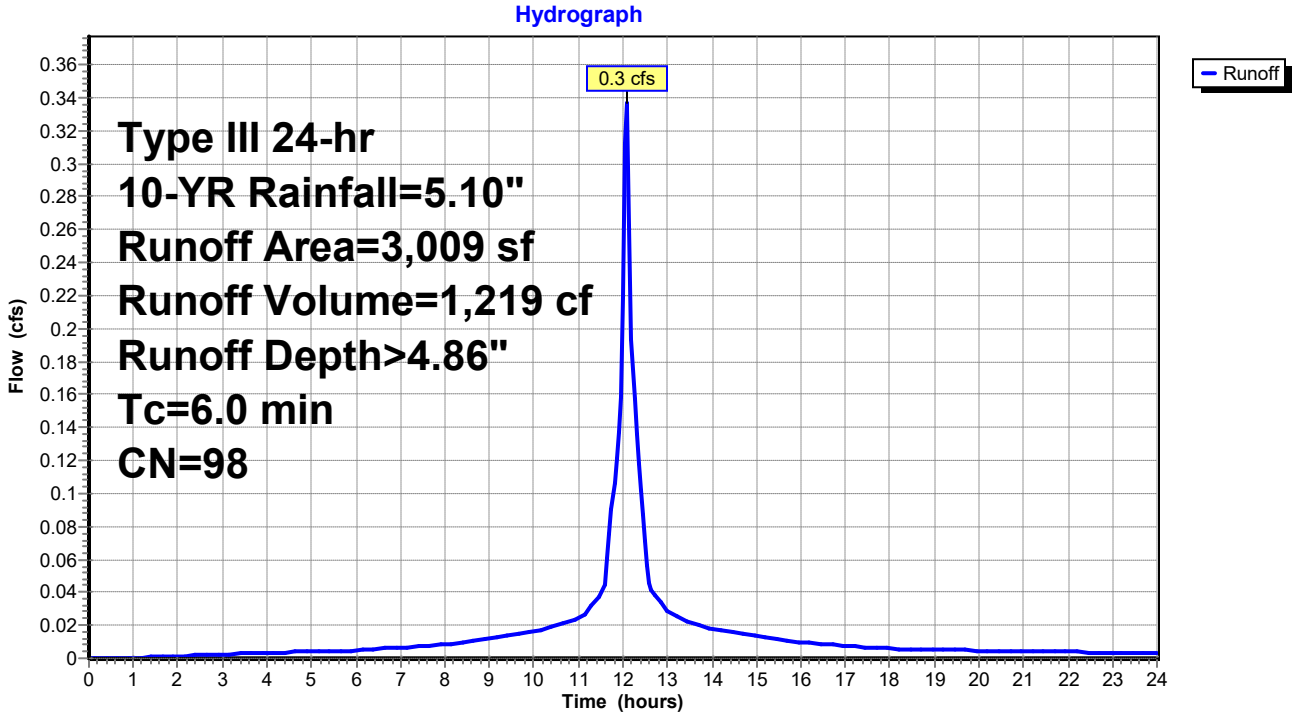
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,219 cf, Depth> 4.86"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

	Area (sf)	CN	Description
	2,508	98	Roofs, HSG C
*	501	97	Extensive Green Roof
	3,009	98	Weighted Average
	501		16.65% Pervious Area
	2,508		83.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-3



Summary for Subcatchment 4S: PR-4

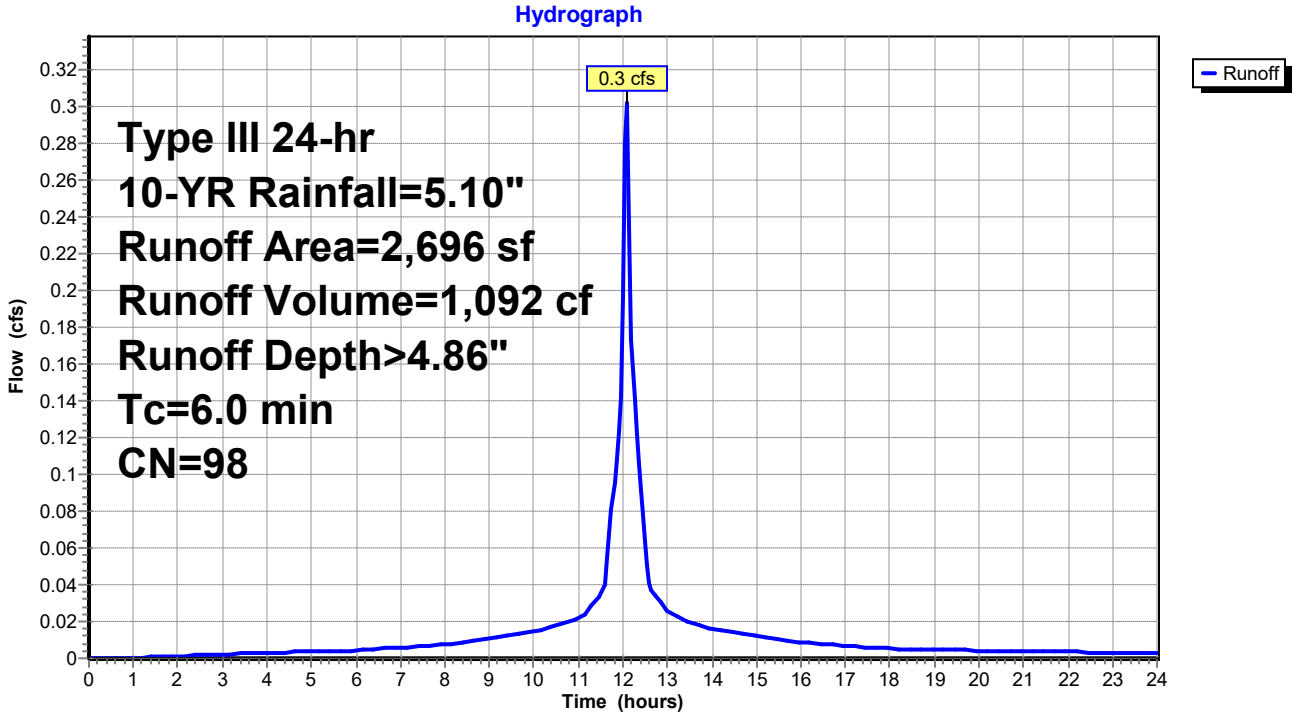
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,092 cf, Depth> 4.86"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

	Area (sf)	CN	Description
	1,423	98	Roofs, HSG C
*	1,273	97	Extensive Green Roof
	2,696	98	Weighted Average
	1,273		47.22% Pervious Area
	1,423		52.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-4



Summary for Subcatchment 5S: PR-5

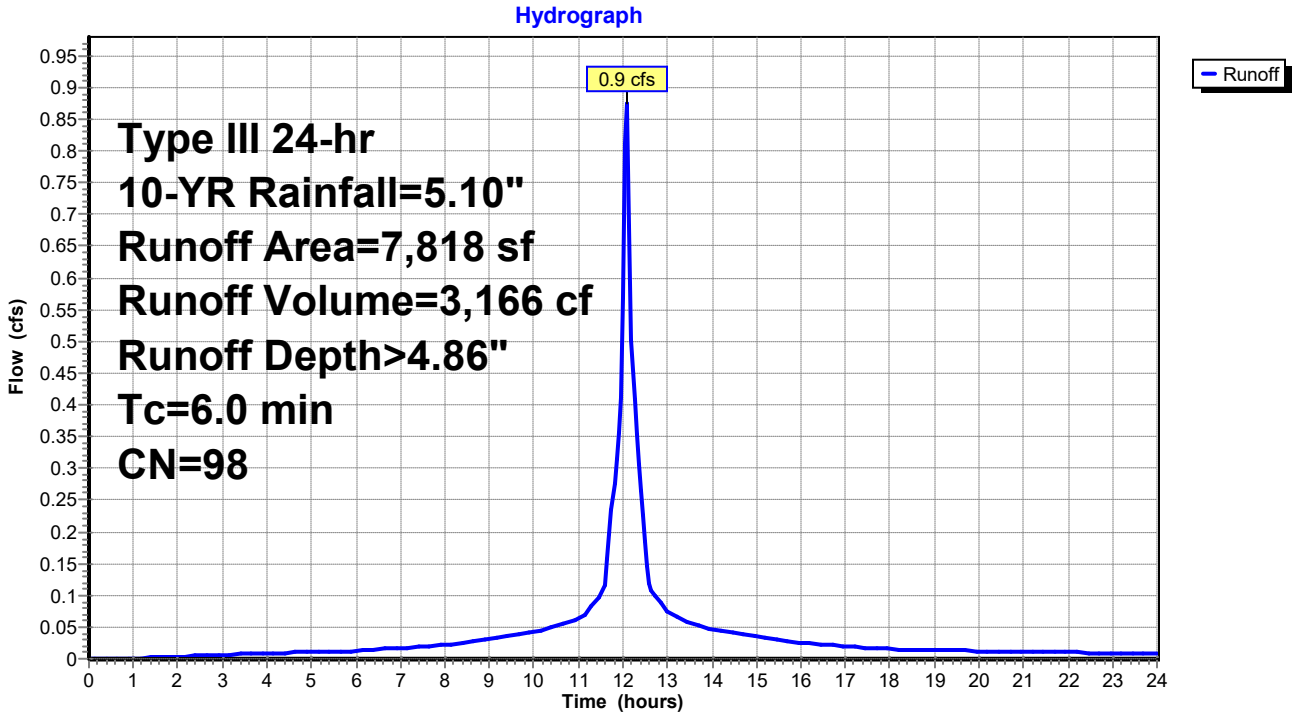
Runoff = 0.9 cfs @ 12.09 hrs, Volume= 3,166 cf, Depth> 4.86"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

	Area (sf)	CN	Description
	4,421	98	Roofs, HSG C
*	3,397	98	Intensive Green Roof
	7,818	98	Weighted Average
	7,818		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PR-5



Summary for Subcatchment 6S: PR-6

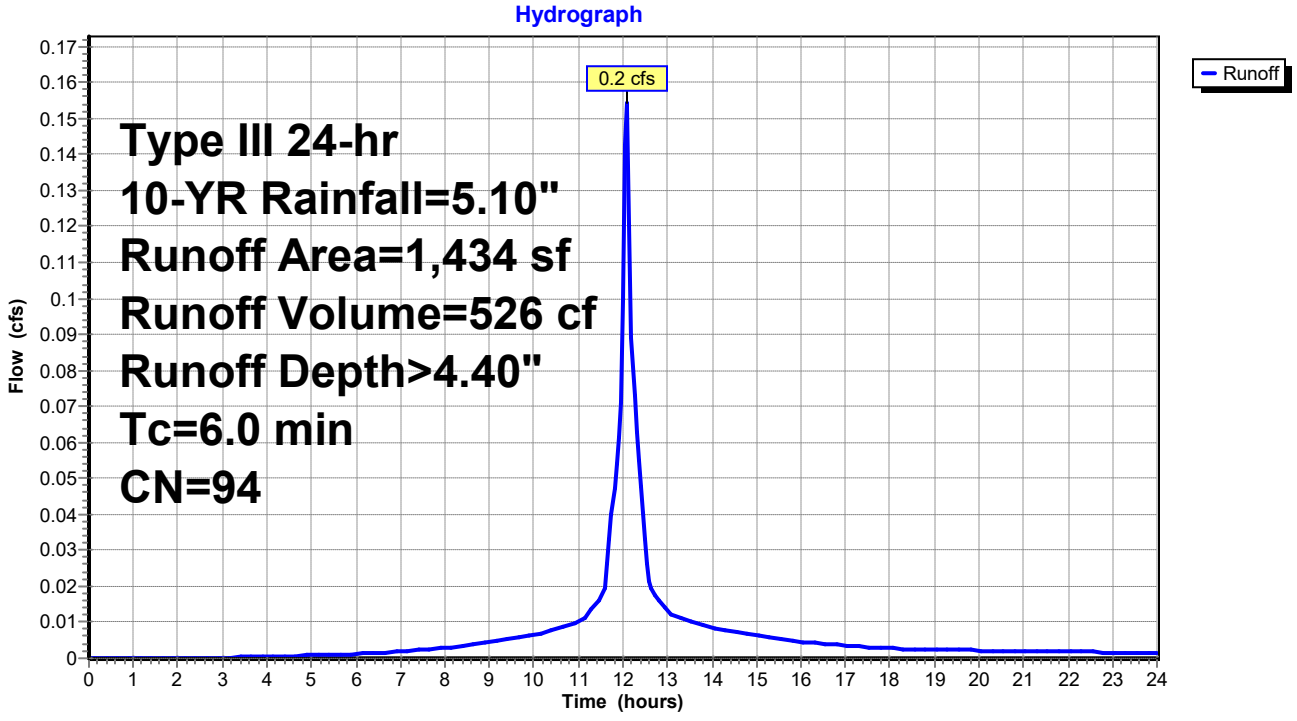
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 526 cf, Depth> 4.40"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,185	98	Paved parking, HSG C
249	74	>75% Grass cover, Good, HSG C
1,434	94	Weighted Average
249		17.36% Pervious Area
1,185		82.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PR-6



Summary for Subcatchment 7S: PR-7

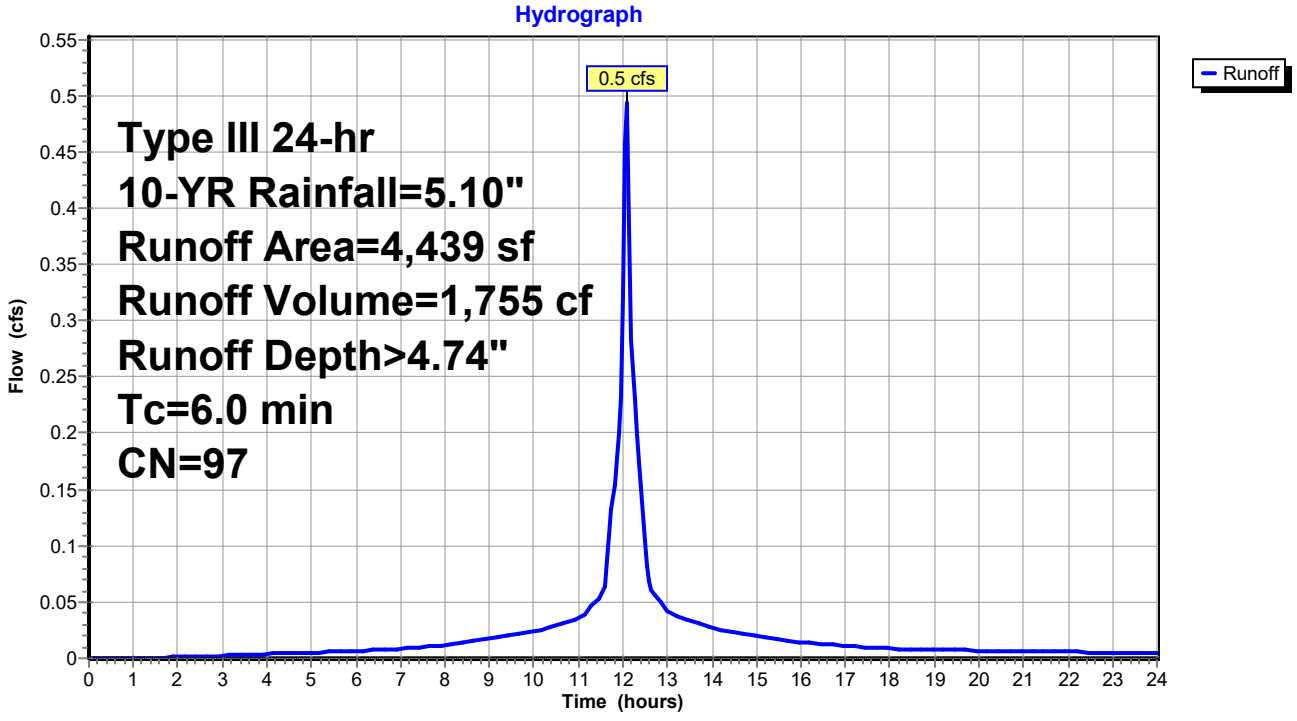
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,755 cf, Depth> 4.74"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
4,337	98	Paved parking, HSG C
102	74	>75% Grass cover, Good, HSG C
4,439	97	Weighted Average
102		2.30% Pervious Area
4,337		97.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PR-7



Summary for Subcatchment 8S: PR-8

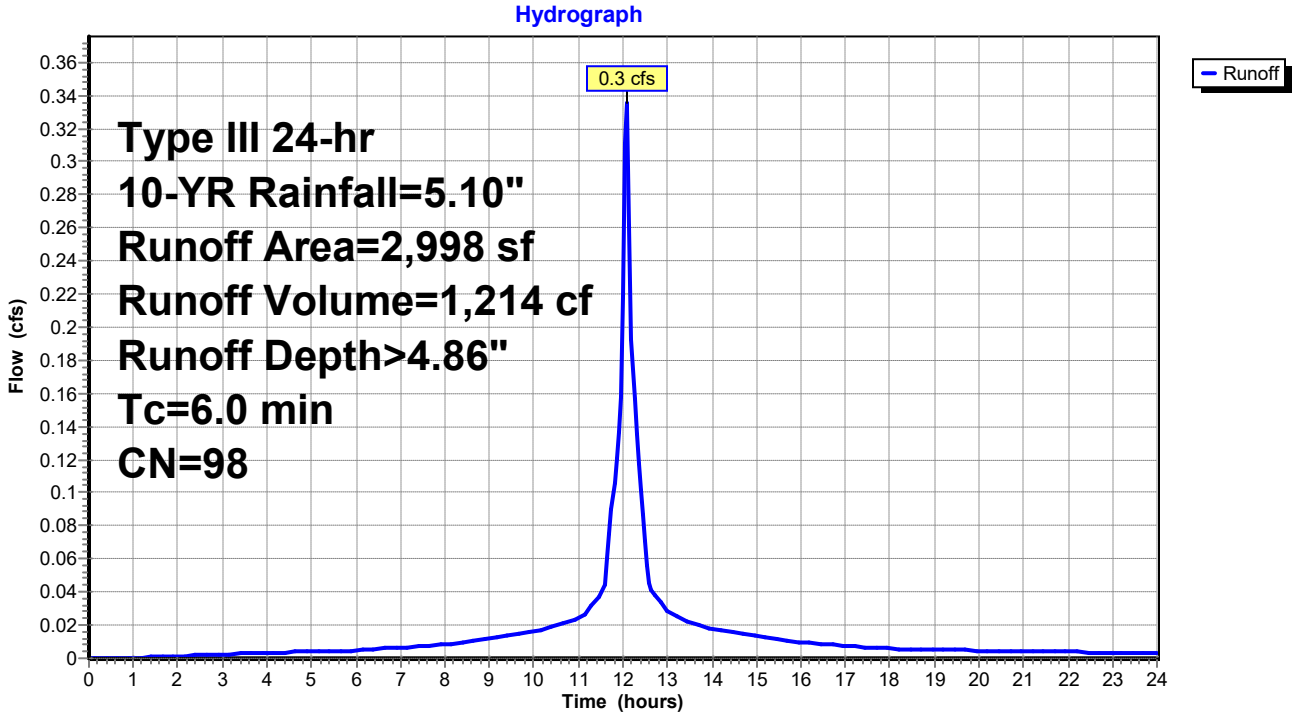
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,214 cf, Depth> 4.86"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
2,959	98	Paved parking, HSG C
39	74	>75% Grass cover, Good, HSG C
2,998	98	Weighted Average
39		1.30% Pervious Area
2,959		98.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PR-8



Summary for Subcatchment 9S: PR-9

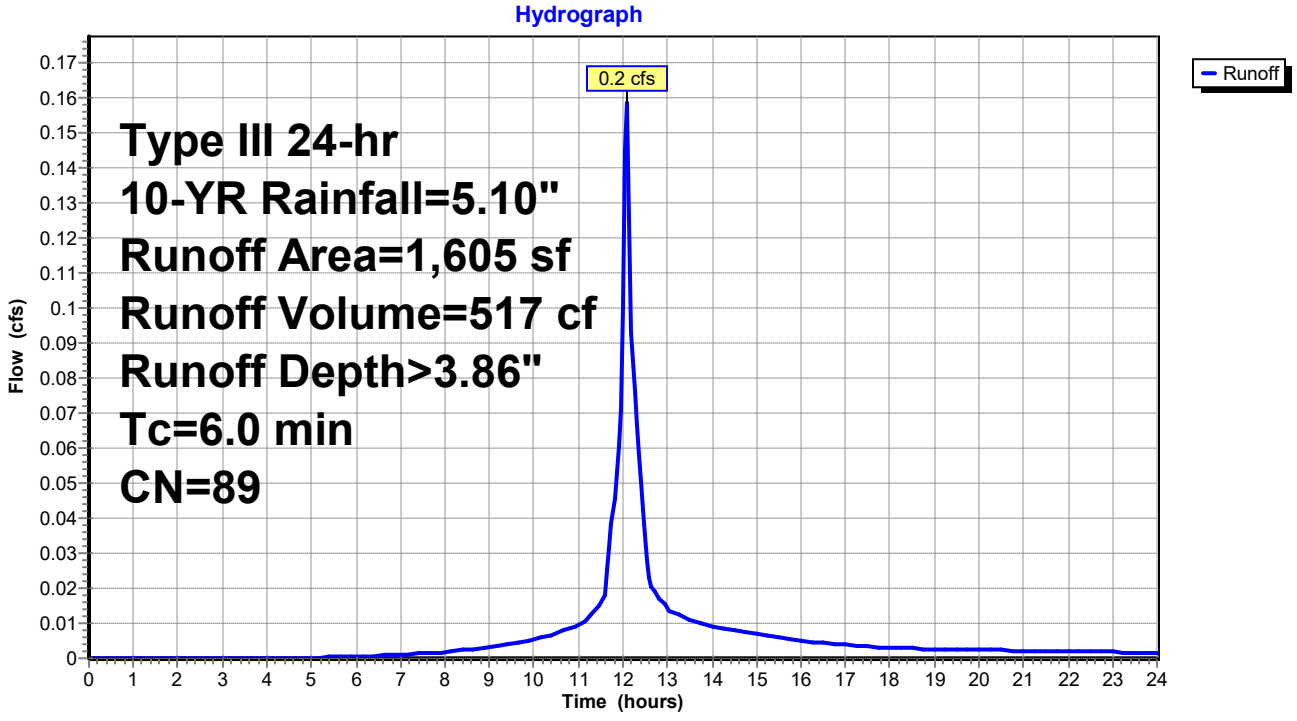
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 517 cf, Depth> 3.86"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,035	98	Paved parking, HSG C
570	74	>75% Grass cover, Good, HSG C
1,605	89	Weighted Average
570		35.51% Pervious Area
1,035		64.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

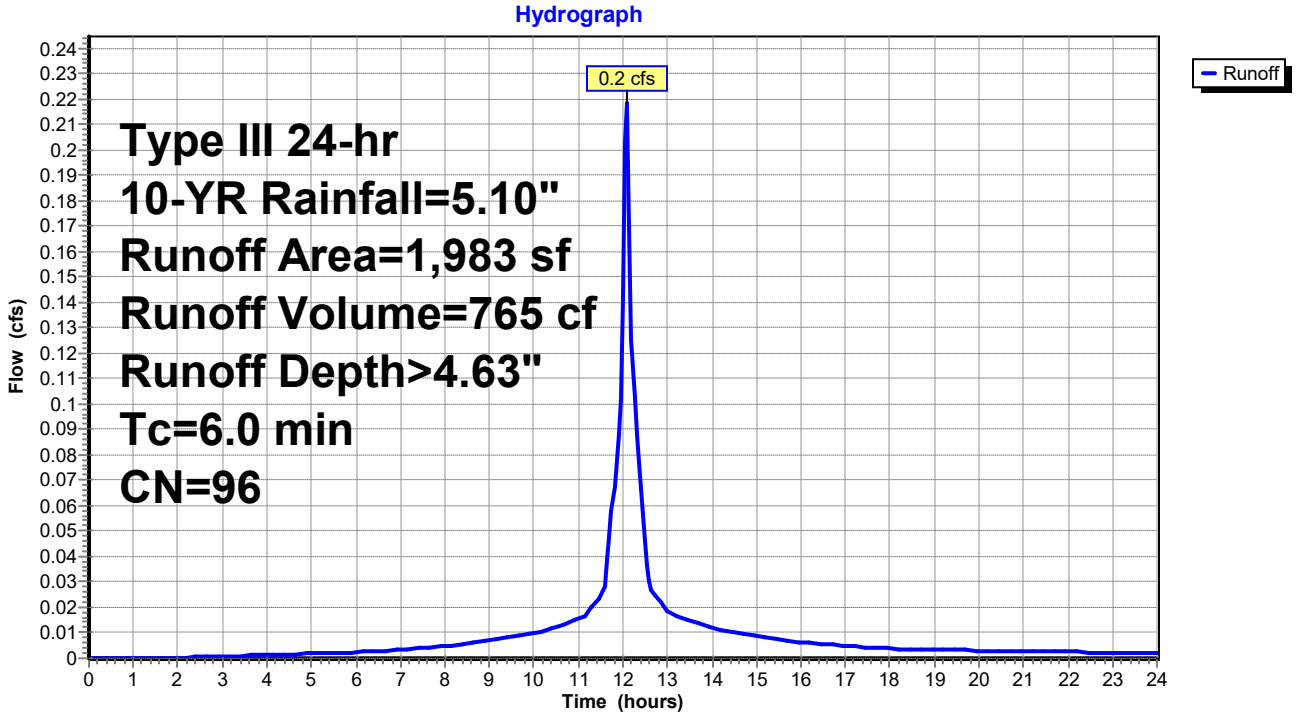
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 765 cf, Depth> 4.63"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,835	98	Paved parking, HSG C
148	74	>75% Grass cover, Good, HSG C
1,983	96	Weighted Average
148		7.46% Pervious Area
1,835		92.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S: PR-10



Summary for Subcatchment 11S: PR-11

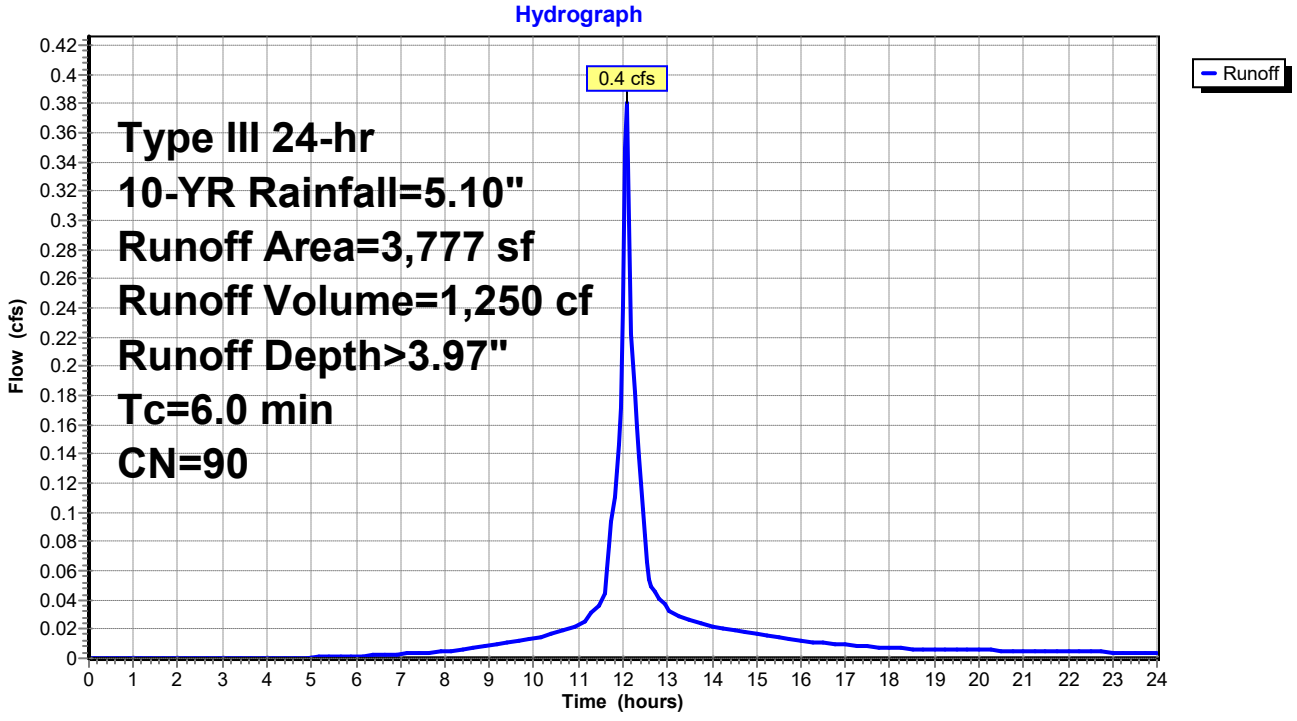
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,250 cf, Depth> 3.97"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
2,523	98	Paved parking, HSG C
1,254	74	>75% Grass cover, Good, HSG C
3,777	90	Weighted Average
1,254		33.20% Pervious Area
2,523		66.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11S: PR-11



Summary for Subcatchment 12S: PR-12

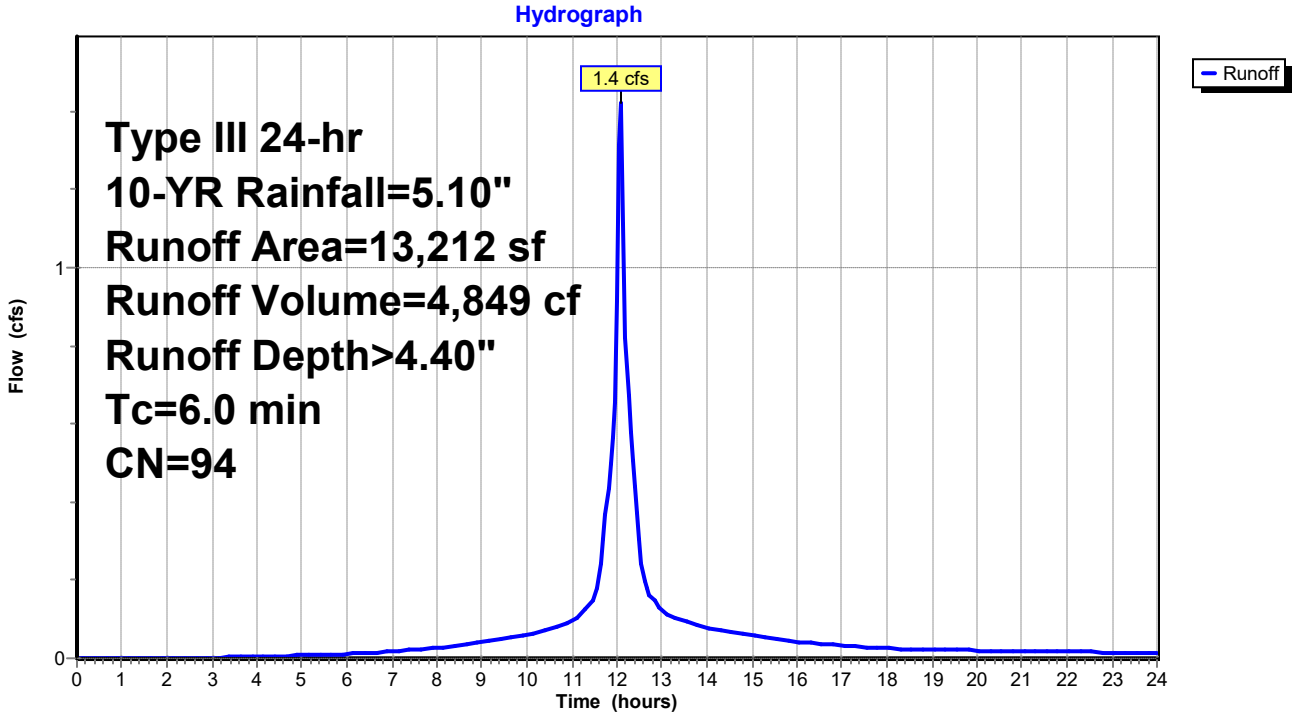
Runoff = 1.4 cfs @ 12.09 hrs, Volume= 4,849 cf, Depth> 4.40"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
10,761	98	Paved parking, HSG C
2,451	74	>75% Grass cover, Good, HSG C
13,212	94	Weighted Average
2,451		18.55% Pervious Area
10,761		81.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S: PR-12



Summary for Subcatchment 13S: PR-13

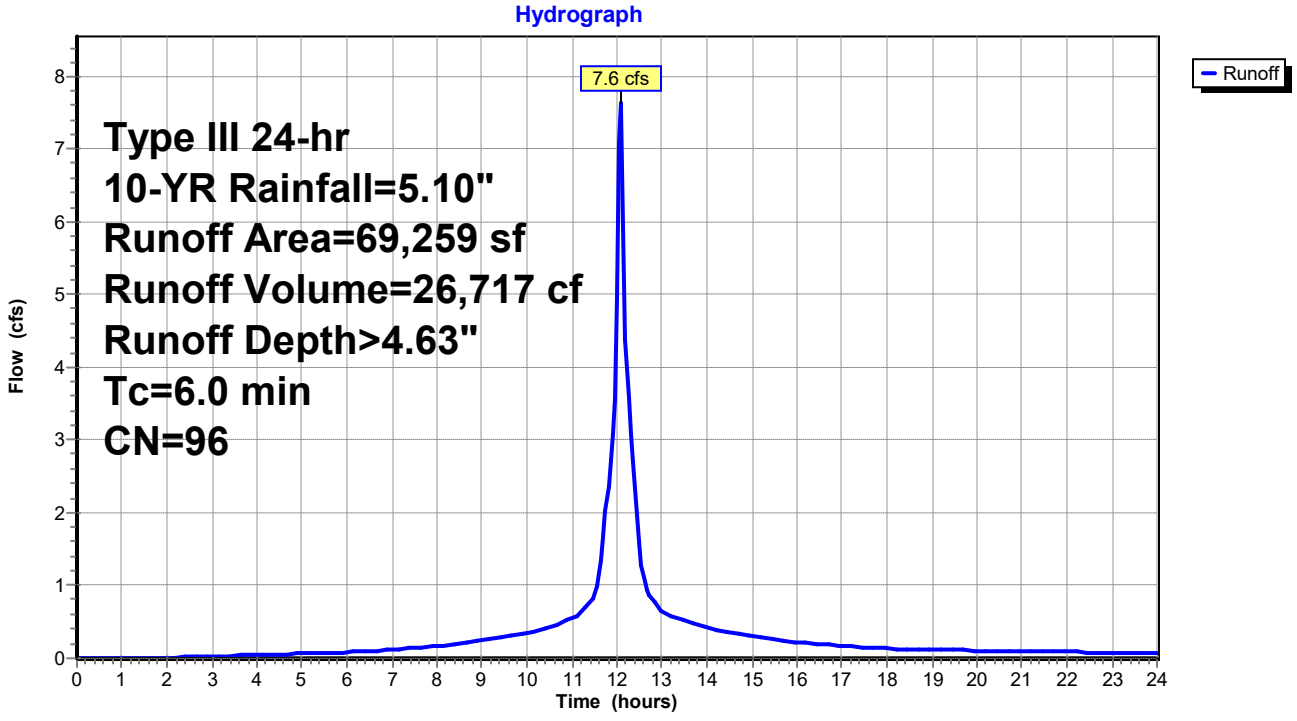
Runoff = 7.6 cfs @ 12.09 hrs, Volume= 26,717 cf, Depth> 4.63"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
61,435	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,259	96	Weighted Average
7,824		11.30% Pervious Area
61,435		88.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S: PR-13



Summary for Subcatchment 14S: PR-14

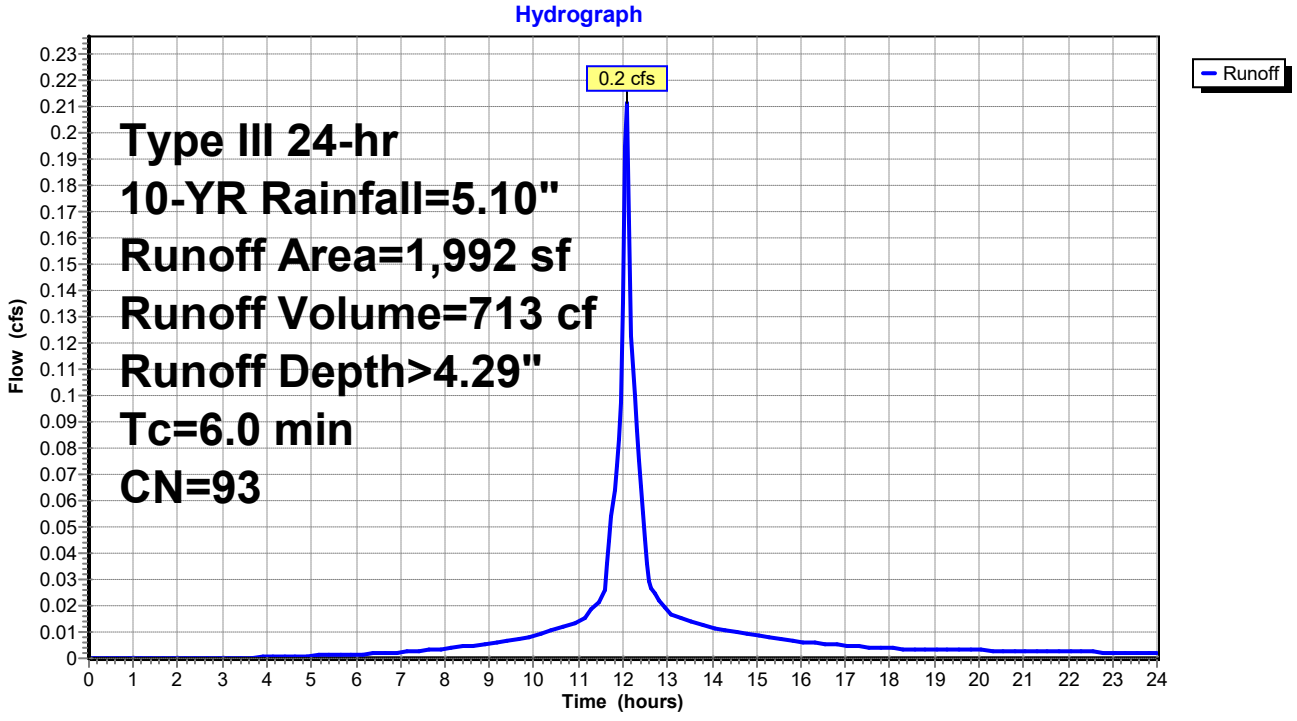
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 713 cf, Depth> 4.29"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,542	98	Paved parking, HSG C
450	74	>75% Grass cover, Good, HSG C
1,992	93	Weighted Average
450		22.59% Pervious Area
1,542		77.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14S: PR-14



Summary for Subcatchment 15S: PR-15

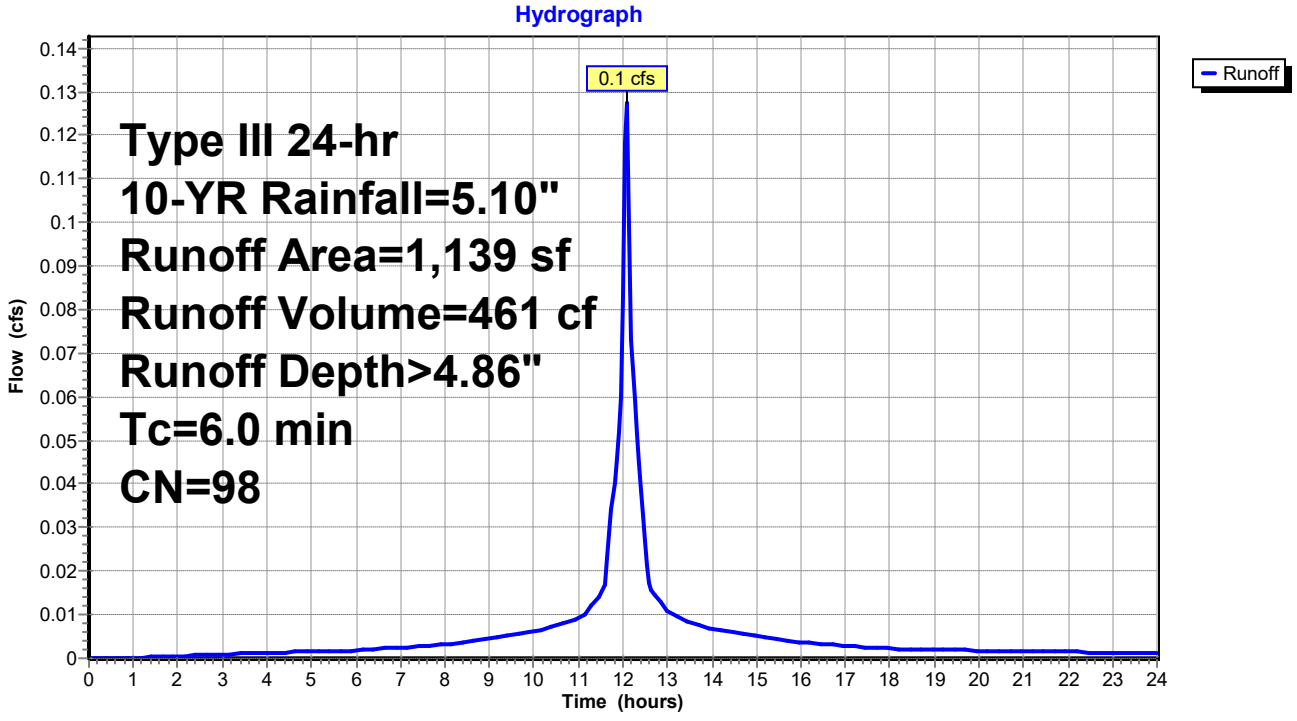
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 461 cf, Depth> 4.86"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,118	98	Paved parking, HSG C
21	74	>75% Grass cover, Good, HSG C
1,139	98	Weighted Average
21		1.84% Pervious Area
1,118		98.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 15S: PR-15



Summary for Subcatchment 16S: PR-16

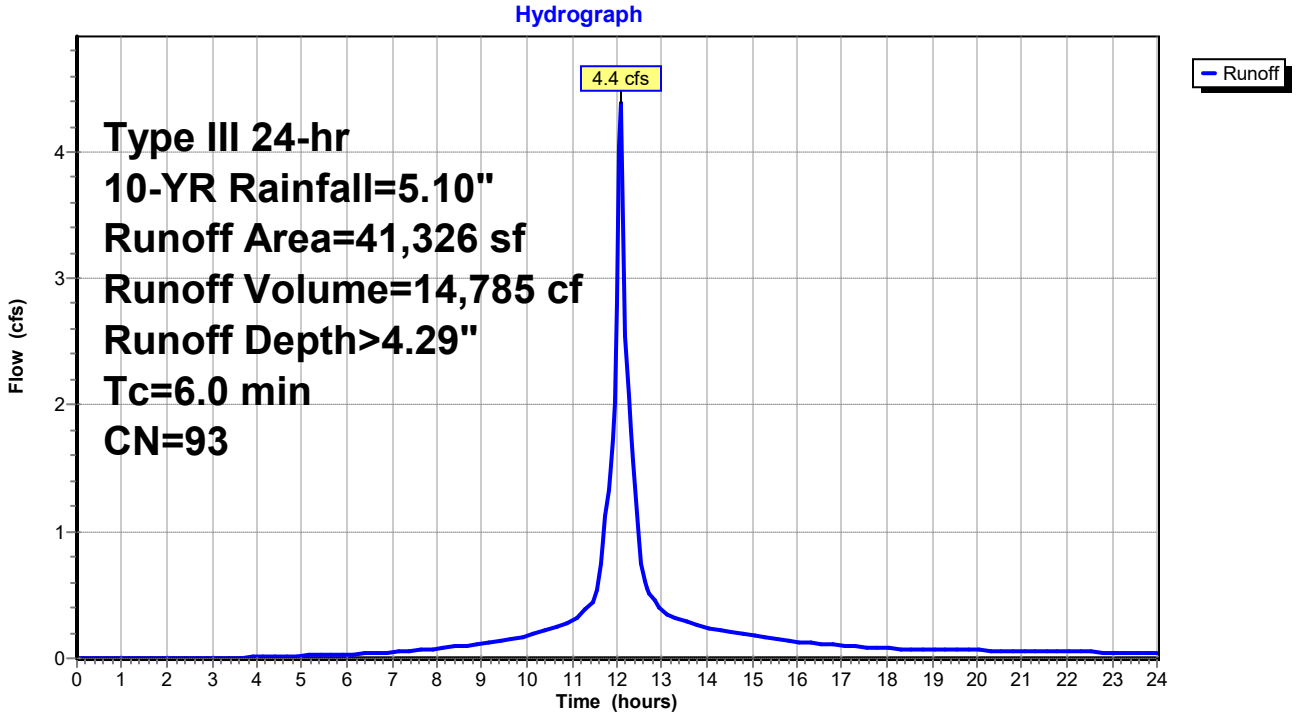
Runoff = 4.4 cfs @ 12.09 hrs, Volume= 14,785 cf, Depth> 4.29"
Routed to Link 2L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
32,824	98	Paved parking, HSG C
8,502	74	>75% Grass cover, Good, HSG C
41,326	93	Weighted Average
8,502		20.57% Pervious Area
32,824		79.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 16S: PR-16



Summary for Pond 1P: DET SYSTEM

Inflow Area = 46,520 sf, 84.80% Impervious, Inflow Depth > 4.64" for 10-YR event
Inflow = 5.1 cfs @ 12.09 hrs, Volume= 17,969 cf
Outflow = 2.5 cfs @ 12.25 hrs, Volume= 17,842 cf, Atten= 51%, Lag= 9.6 min
Primary = 2.5 cfs @ 12.25 hrs, Volume= 17,842 cf
Routed to Link 1L : DP-1C

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.80' @ 12.25 hrs Surf.Area= 0.080 ac Storage= 0.091 af

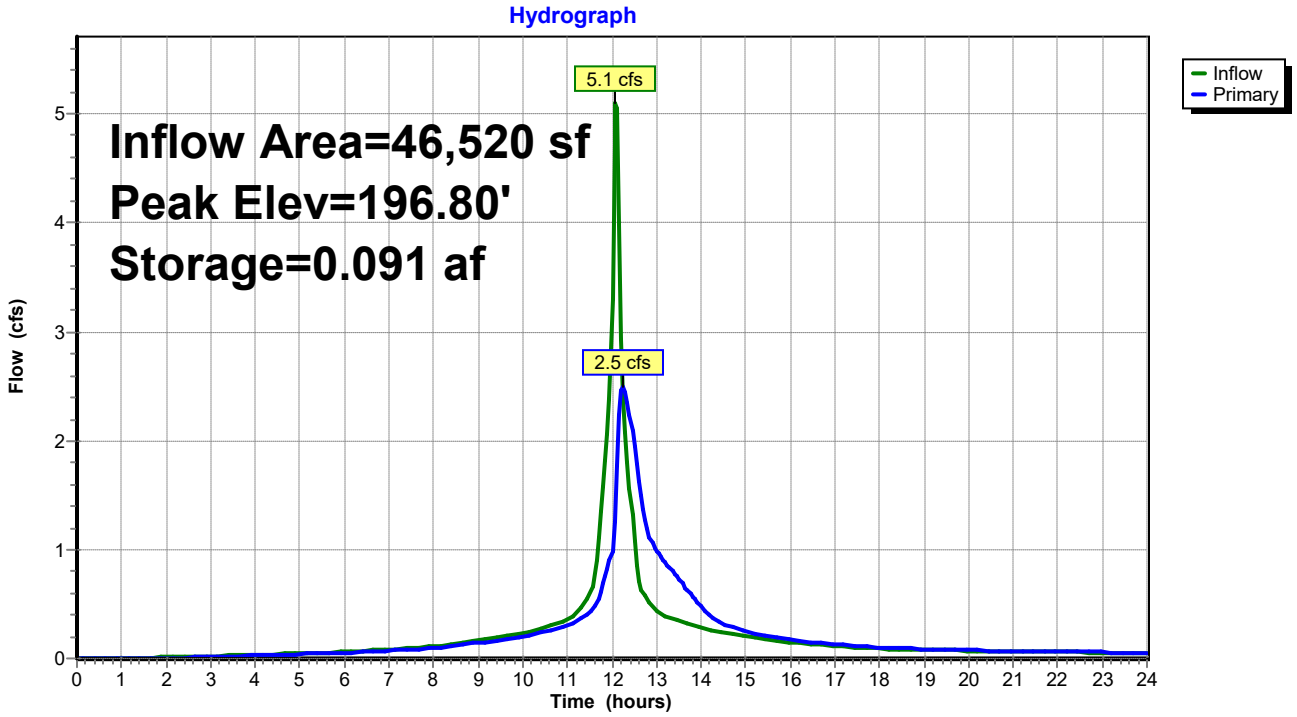
Plug-Flow detention time= 32.0 min calculated for 17,842 cf (99% of inflow)
Center-of-Mass det. time= 27.3 min (786.1 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1	195.40'	0.158 af	**30.0" Round Pipe Storage** L= 1,400.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.29'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 195.29' / 194.66' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	195.40'	**7.0" Vert. 1-YR ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	196.30'	**12.0" W x 6.0" H Vert. 10-Year Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.5 cfs @ 12.25 hrs HW=196.80' (Free Discharge)
- **1=Culvert** (Passes 1.4 cfs of 5.9 cfs potential flow)
  - **2=1-YR ORIFICE** (Orifice Controls 1.4 cfs @ 5.07 fps)
- **3=10-Year Orifice** (Orifice Controls 1.1 cfs @ 2.28 fps)

Pond 1P: DET SYSTEM

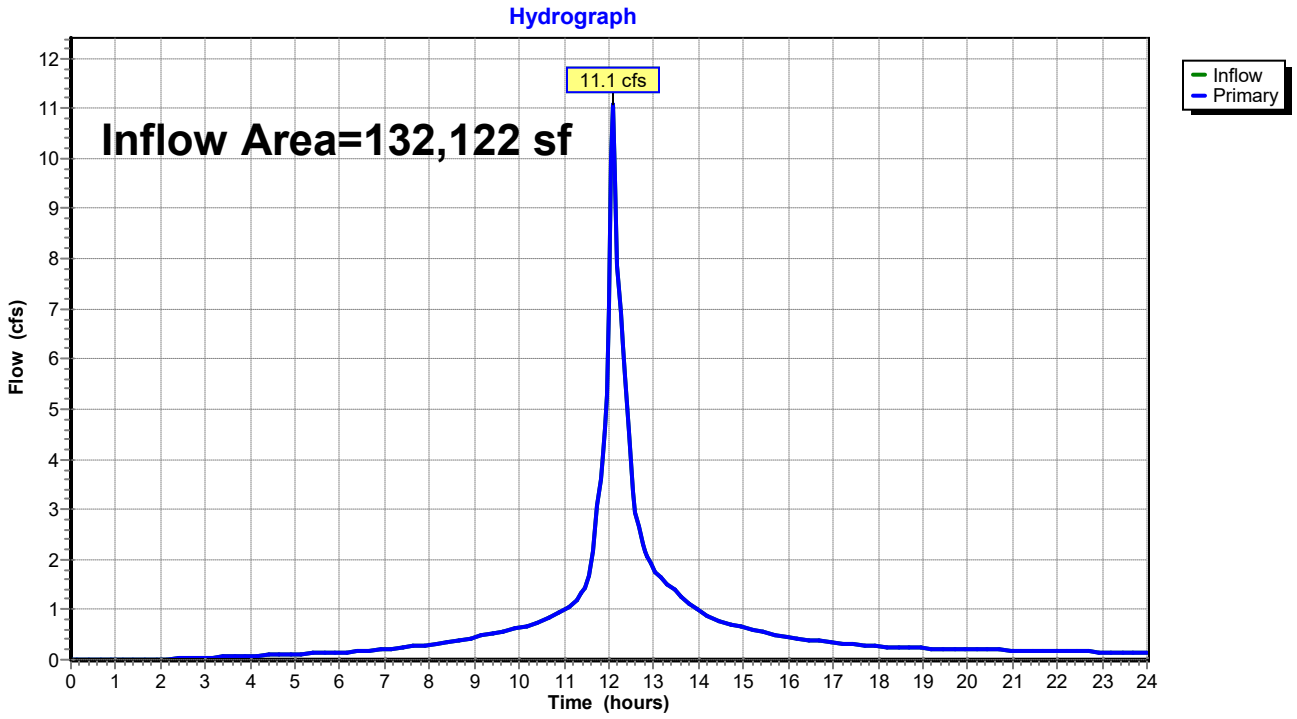


Summary for Link 1L: DP-1C

Inflow Area = 132,122 sf, 86.52% Impervious, Inflow Depth > 4.59" for 10-YR event
Inflow = 11.1 cfs @ 12.10 hrs, Volume= 50,581 cf
Primary = 11.1 cfs @ 12.10 hrs, Volume= 50,581 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1C

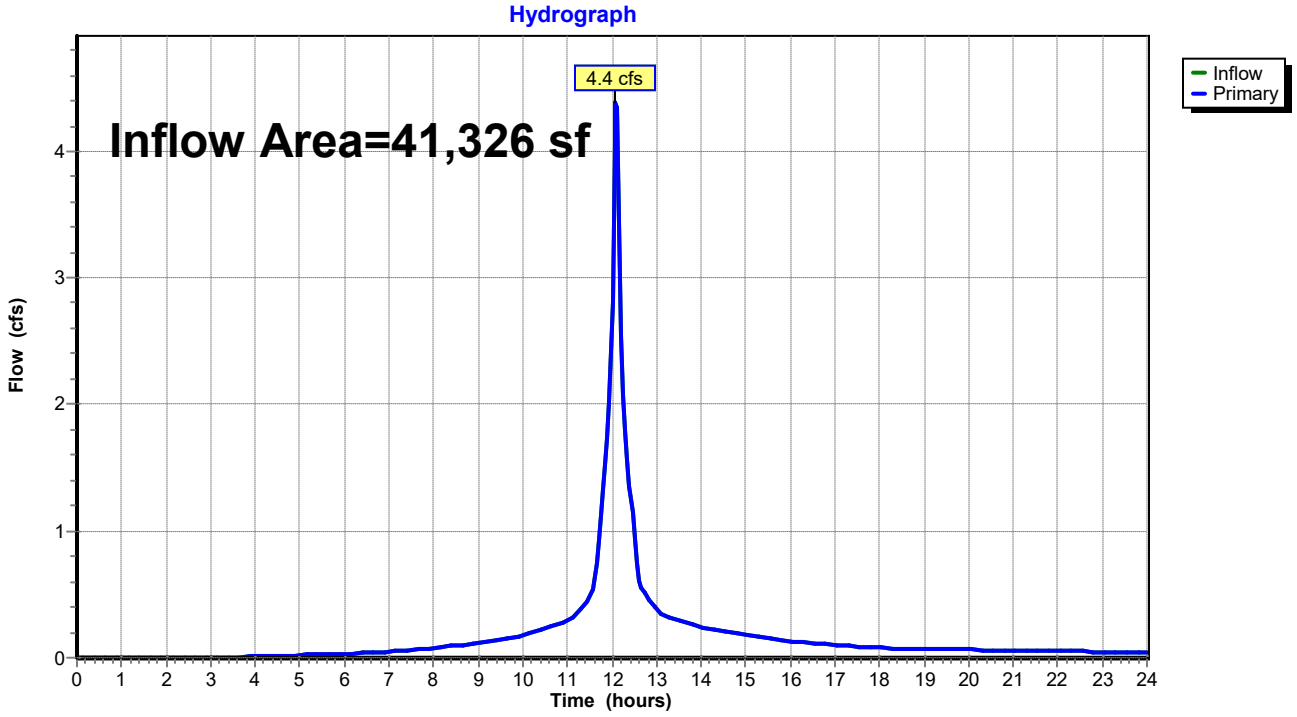


Summary for Link 2L: DP-1A

Inflow Area = 41,326 sf, 79.43% Impervious, Inflow Depth > 4.29" for 10-YR event
Inflow = 4.4 cfs @ 12.09 hrs, Volume= 14,785 cf
Primary = 4.4 cfs @ 12.09 hrs, Volume= 14,785 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1A

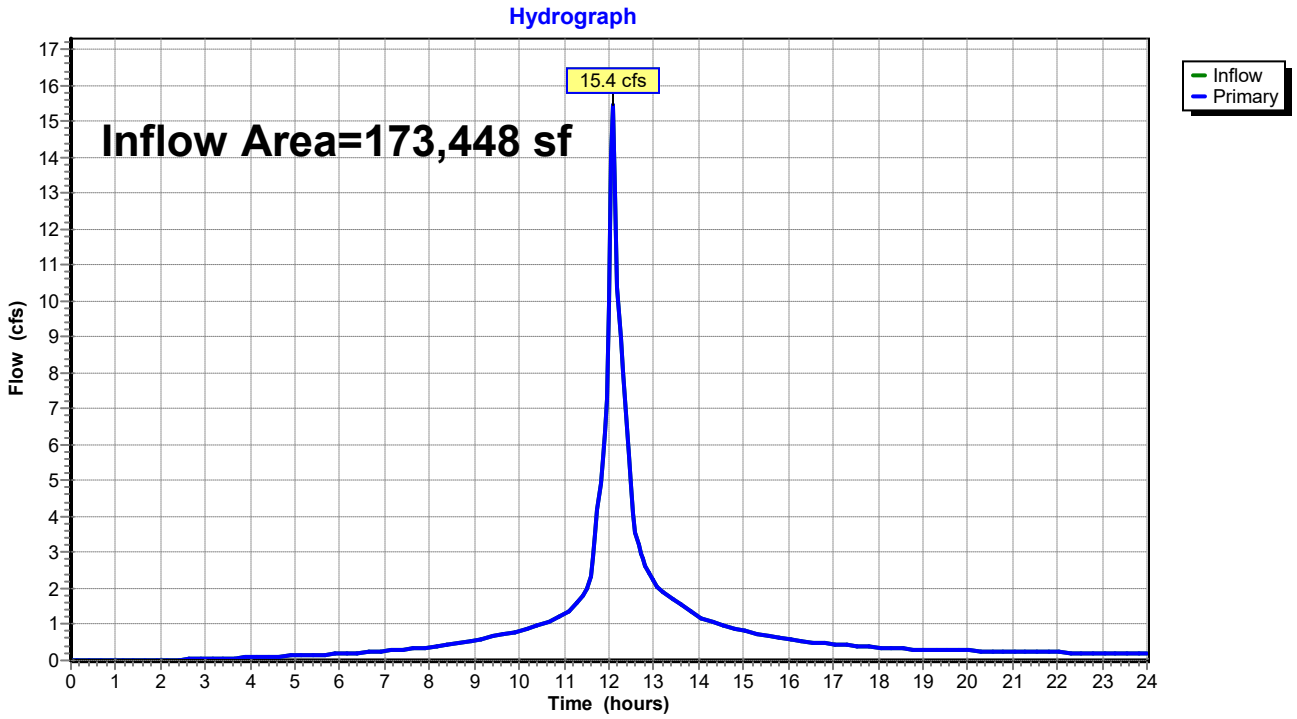


Summary for Link 3L: DP-1

Inflow Area = 173,448 sf, 84.83% Impervious, Inflow Depth > 4.52" for 10-YR event
Inflow = 15.4 cfs @ 12.09 hrs, Volume= 65,366 cf
Primary = 15.4 cfs @ 12.09 hrs, Volume= 65,366 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: PR-1 Runoff Area=11,026 sf 92.38% Impervious Runoff Depth>5.91"
Tc=6.0 min CN=96 Runoff=1.5 cfs 5,432 cf

Subcatchment 2S: PR-2 Runoff Area=5,735 sf 63.50% Impervious Runoff Depth>5.91"
Tc=6.0 min CN=96 Runoff=0.8 cfs 2,826 cf

Subcatchment 3S: PR-3 Runoff Area=3,009 sf 83.35% Impervious Runoff Depth>6.15"
Tc=6.0 min CN=98 Runoff=0.4 cfs 1,542 cf

Subcatchment 4S: PR-4 Runoff Area=2,696 sf 52.78% Impervious Runoff Depth>6.15"
Tc=6.0 min CN=98 Runoff=0.4 cfs 1,381 cf

Subcatchment 5S: PR-5 Runoff Area=7,818 sf 100.00% Impervious Runoff Depth>6.15"
Tc=6.0 min CN=98 Runoff=1.1 cfs 4,005 cf

Subcatchment 6S: PR-6 Runoff Area=1,434 sf 82.64% Impervious Runoff Depth>5.68"
Tc=6.0 min CN=94 Runoff=0.2 cfs 679 cf

Subcatchment 7S: PR-7 Runoff Area=4,439 sf 97.70% Impervious Runoff Depth>6.03"
Tc=6.0 min CN=97 Runoff=0.6 cfs 2,230 cf

Subcatchment 8S: PR-8 Runoff Area=2,998 sf 98.70% Impervious Runoff Depth>6.15"
Tc=6.0 min CN=98 Runoff=0.4 cfs 1,536 cf

Subcatchment 9S: PR-9 Runoff Area=1,605 sf 64.49% Impervious Runoff Depth>5.11"
Tc=6.0 min CN=89 Runoff=0.2 cfs 683 cf

Subcatchment 10S: PR-10 Runoff Area=1,983 sf 92.54% Impervious Runoff Depth>5.91"
Tc=6.0 min CN=96 Runoff=0.3 cfs 977 cf

Subcatchment 11S: PR-11 Runoff Area=3,777 sf 66.80% Impervious Runoff Depth>5.22"
Tc=6.0 min CN=90 Runoff=0.5 cfs 1,644 cf

Subcatchment 12S: PR-12 Runoff Area=13,212 sf 81.45% Impervious Runoff Depth>5.68"
Tc=6.0 min CN=94 Runoff=1.8 cfs 6,253 cf

Subcatchment 13S: PR-13 Runoff Area=69,259 sf 88.70% Impervious Runoff Depth>5.91"
Tc=6.0 min CN=96 Runoff=9.6 cfs 34,122 cf

Subcatchment 14S: PR-14 Runoff Area=1,992 sf 77.41% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=93 Runoff=0.3 cfs 924 cf

Subcatchment 15S: PR-15 Runoff Area=1,139 sf 98.16% Impervious Runoff Depth>6.15"
Tc=6.0 min CN=98 Runoff=0.2 cfs 584 cf

Subcatchment 16S: PR-16 Runoff Area=41,326 sf 79.43% Impervious Runoff Depth>5.56"
Tc=6.0 min CN=93 Runoff=5.6 cfs 19,162 cf

Pond 1P: DET SYSTEM Peak Elev=197.07' Storage=0.112 af Inflow=6.4 cfs 22,935 cf
Outflow=3.2 cfs 22,784 cf

Link 1L: DP-1C Inflow=14.4 cfs 64,666 cf
Primary=14.4 cfs 64,666 cf

Link 2L: DP-1A Inflow=5.6 cfs 19,162 cf
Primary=5.6 cfs 19,162 cf

Link 3L: DP-1 Inflow=20.0 cfs 83,828 cf
Primary=20.0 cfs 83,828 cf

Total Runoff Area = 173,448 sf Runoff Volume = 83,980 cf Average Runoff Depth = 5.81"
15.17% Pervious = 26,317 sf 84.83% Impervious = 147,131 sf

Summary for Subcatchment 1S: PR-1

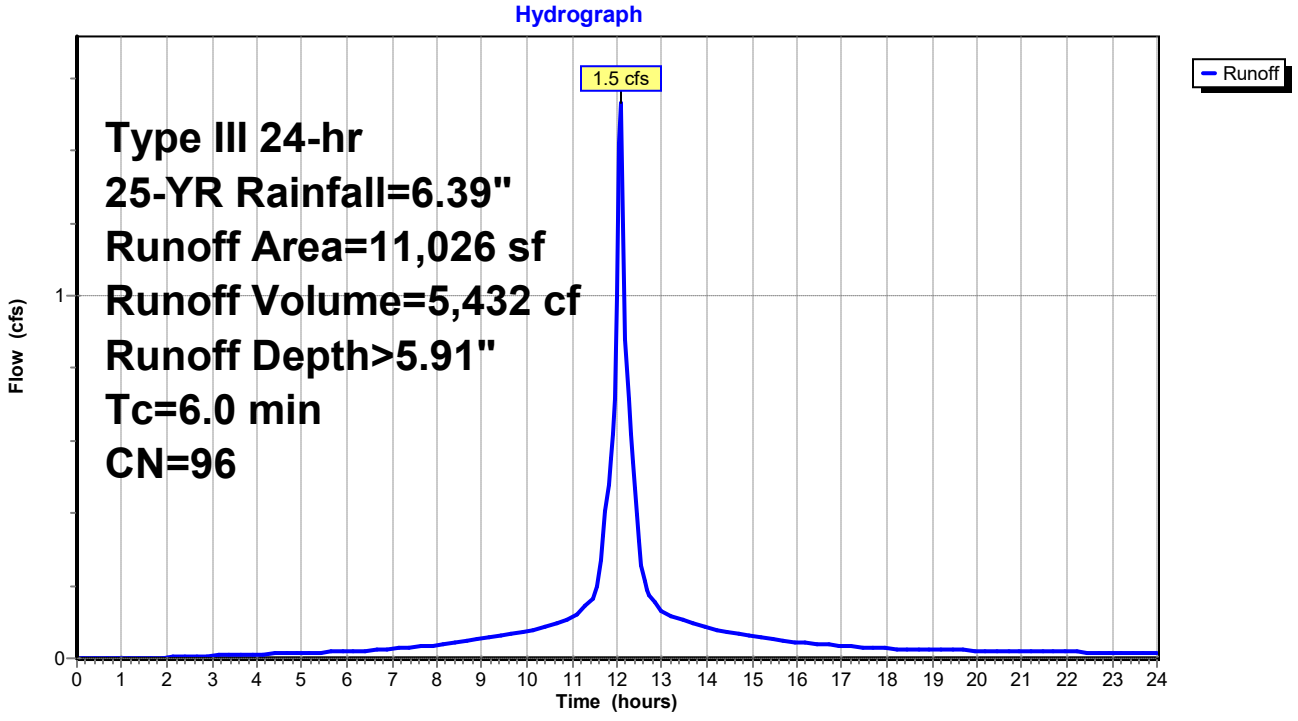
Runoff = 1.5 cfs @ 12.09 hrs, Volume= 5,432 cf, Depth> 5.91"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
10,186	98	Paved parking, HSG C
840	74	>75% Grass cover, Good, HSG C
11,026	96	Weighted Average
840		7.62% Pervious Area
10,186		92.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-1



Summary for Subcatchment 2S: PR-2

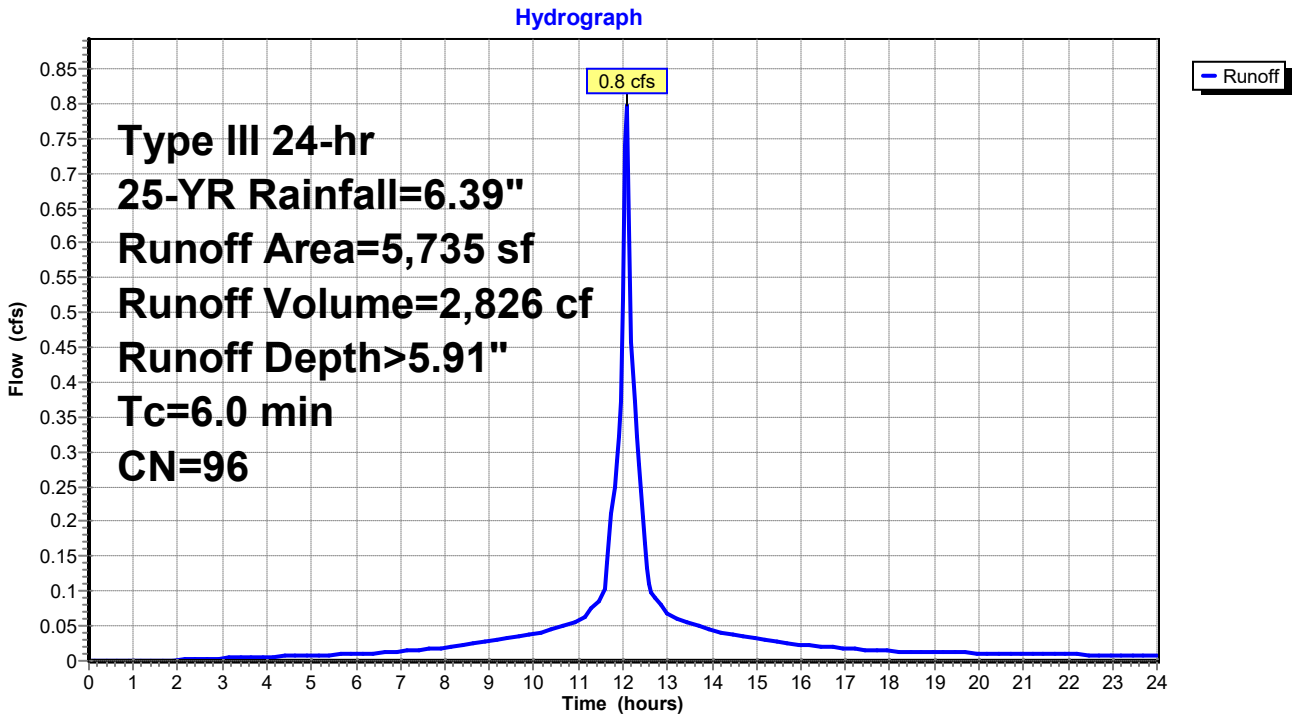
Runoff = 0.8 cfs @ 12.09 hrs, Volume= 2,826 cf, Depth> 5.91"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

	Area (sf)	CN	Description
	3,642	98	Roofs, HSG C
*	1,726	97	Extensive Green Roof
*	367	74	Stormwater Planter
	5,735	96	Weighted Average
	2,093		36.50% Pervious Area
	3,642		63.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-2



Summary for Subcatchment 3S: PR-3

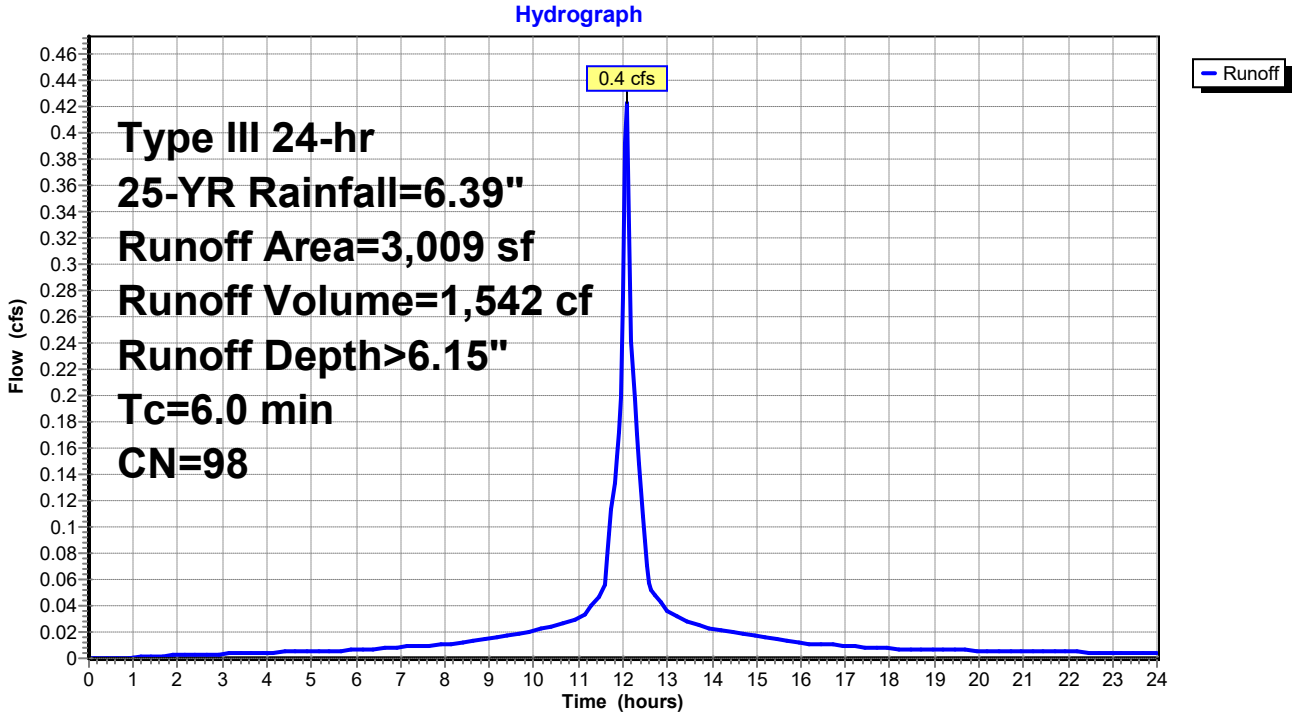
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,542 cf, Depth> 6.15"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

	Area (sf)	CN	Description
	2,508	98	Roofs, HSG C
*	501	97	Extensive Green Roof
	3,009	98	Weighted Average
	501		16.65% Pervious Area
	2,508		83.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-3



Summary for Subcatchment 4S: PR-4

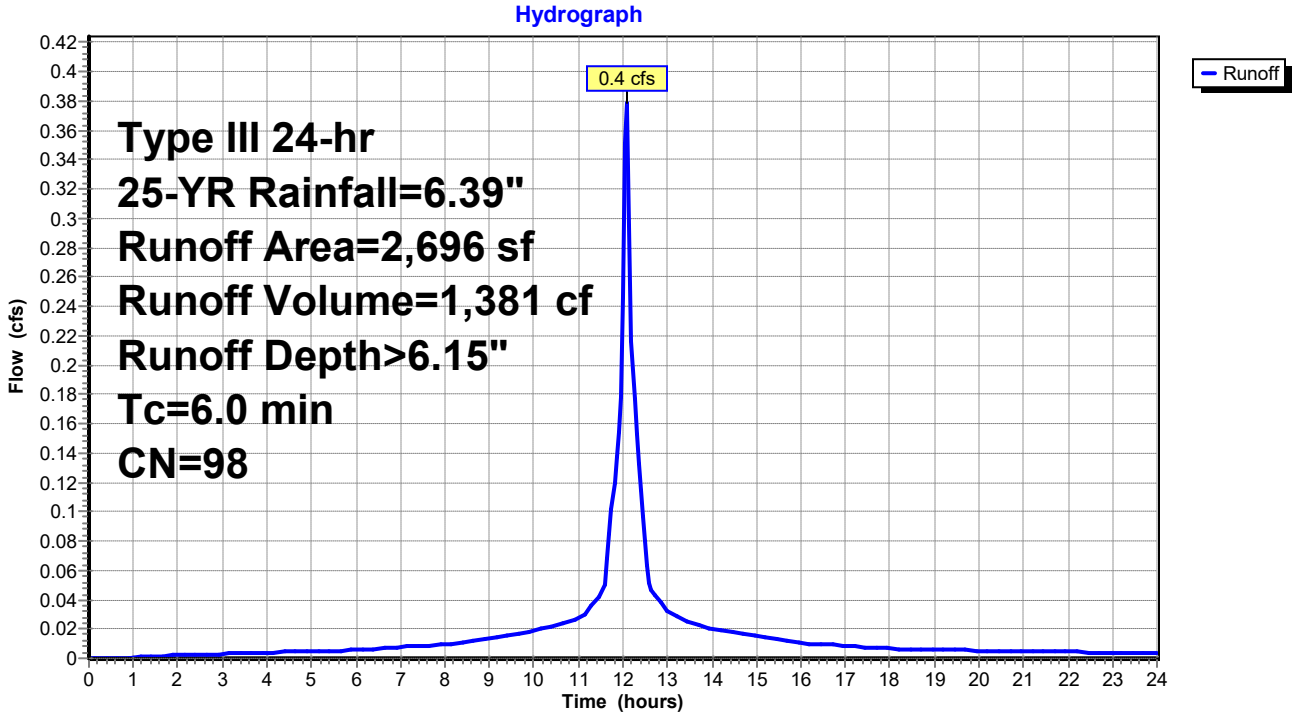
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,381 cf, Depth> 6.15"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

	Area (sf)	CN	Description
	1,423	98	Roofs, HSG C
*	1,273	97	Extensive Green Roof
	2,696	98	Weighted Average
	1,273		47.22% Pervious Area
	1,423		52.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-4



Summary for Subcatchment 5S: PR-5

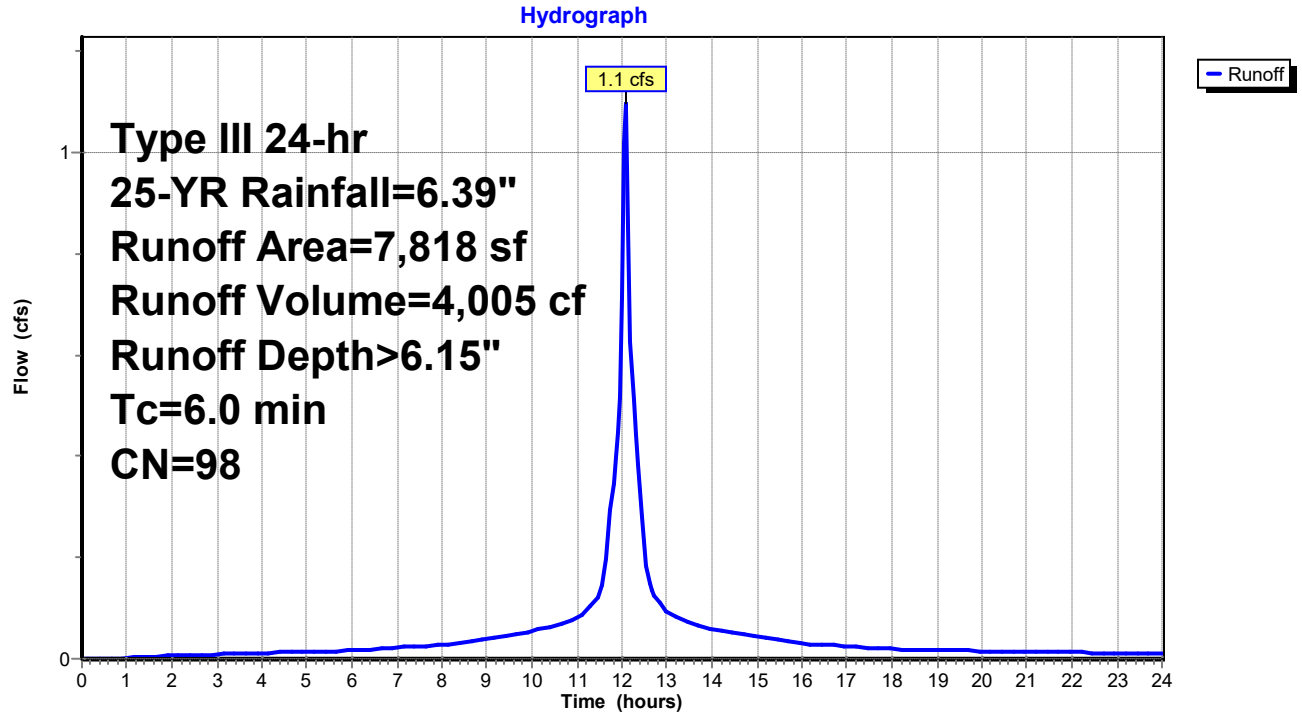
Runoff = 1.1 cfs @ 12.09 hrs, Volume= 4,005 cf, Depth> 6.15"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

	Area (sf)	CN	Description
	4,421	98	Roofs, HSG C
*	3,397	98	Intensive Green Roof
	7,818	98	Weighted Average
	7,818		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PR-5



Summary for Subcatchment 6S: PR-6

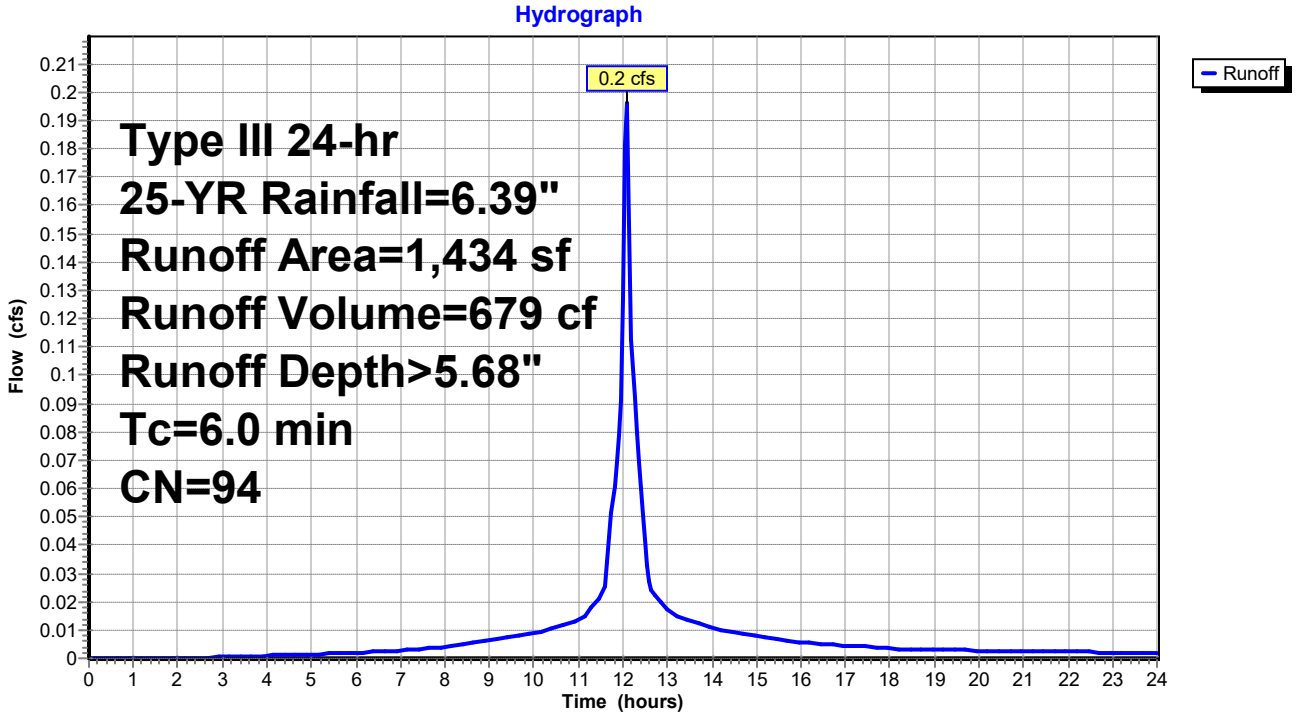
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 679 cf, Depth> 5.68"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,185	98	Paved parking, HSG C
249	74	>75% Grass cover, Good, HSG C
1,434	94	Weighted Average
249		17.36% Pervious Area
1,185		82.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PR-6



Summary for Subcatchment 7S: PR-7

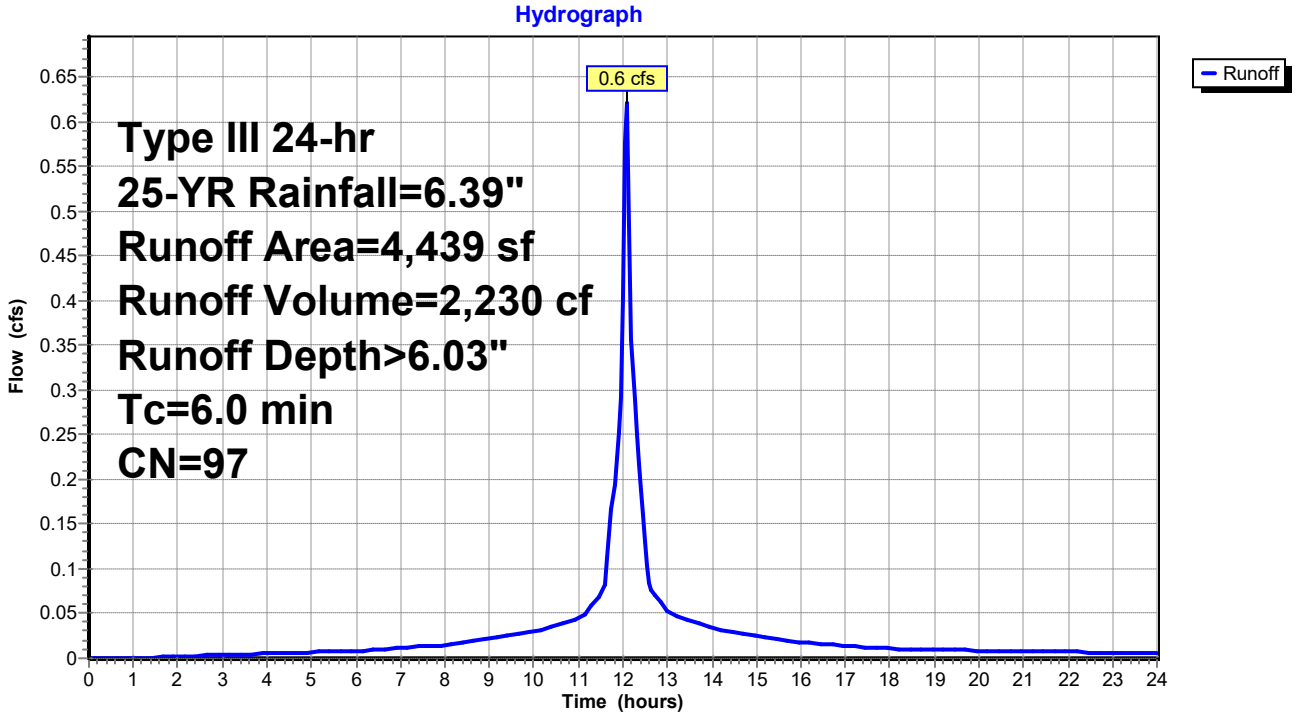
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,230 cf, Depth> 6.03"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
4,337	98	Paved parking, HSG C
102	74	>75% Grass cover, Good, HSG C
4,439	97	Weighted Average
102		2.30% Pervious Area
4,337		97.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PR-7



Summary for Subcatchment 8S: PR-8

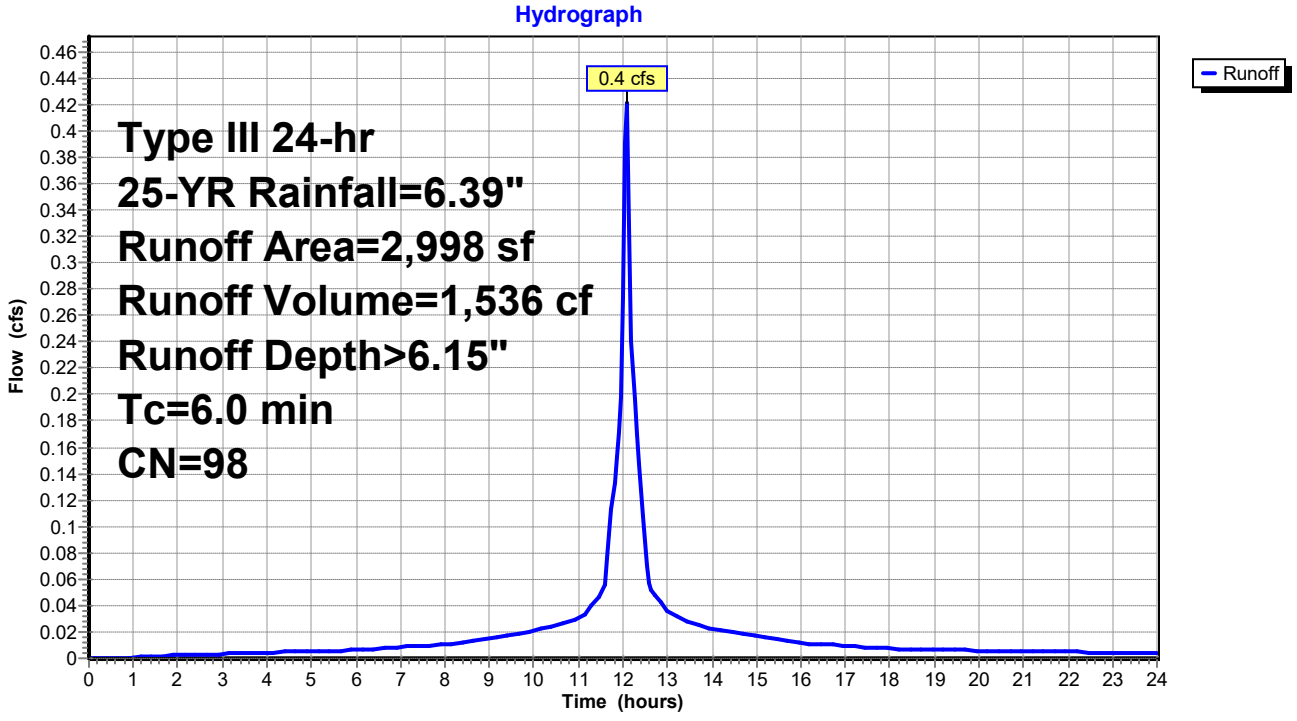
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,536 cf, Depth> 6.15"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
2,959	98	Paved parking, HSG C
39	74	>75% Grass cover, Good, HSG C
2,998	98	Weighted Average
39		1.30% Pervious Area
2,959		98.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PR-8



Summary for Subcatchment 9S: PR-9

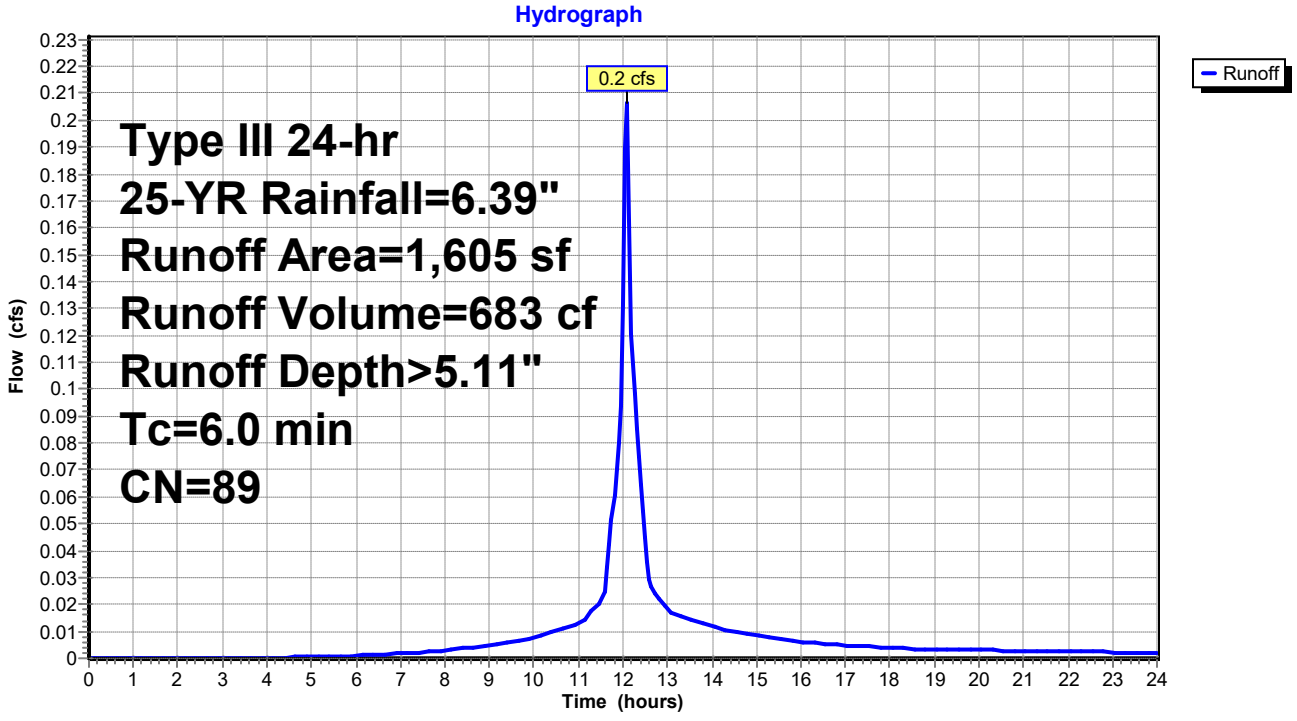
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 683 cf, Depth> 5.11"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,035	98	Paved parking, HSG C
570	74	>75% Grass cover, Good, HSG C
1,605	89	Weighted Average
570		35.51% Pervious Area
1,035		64.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

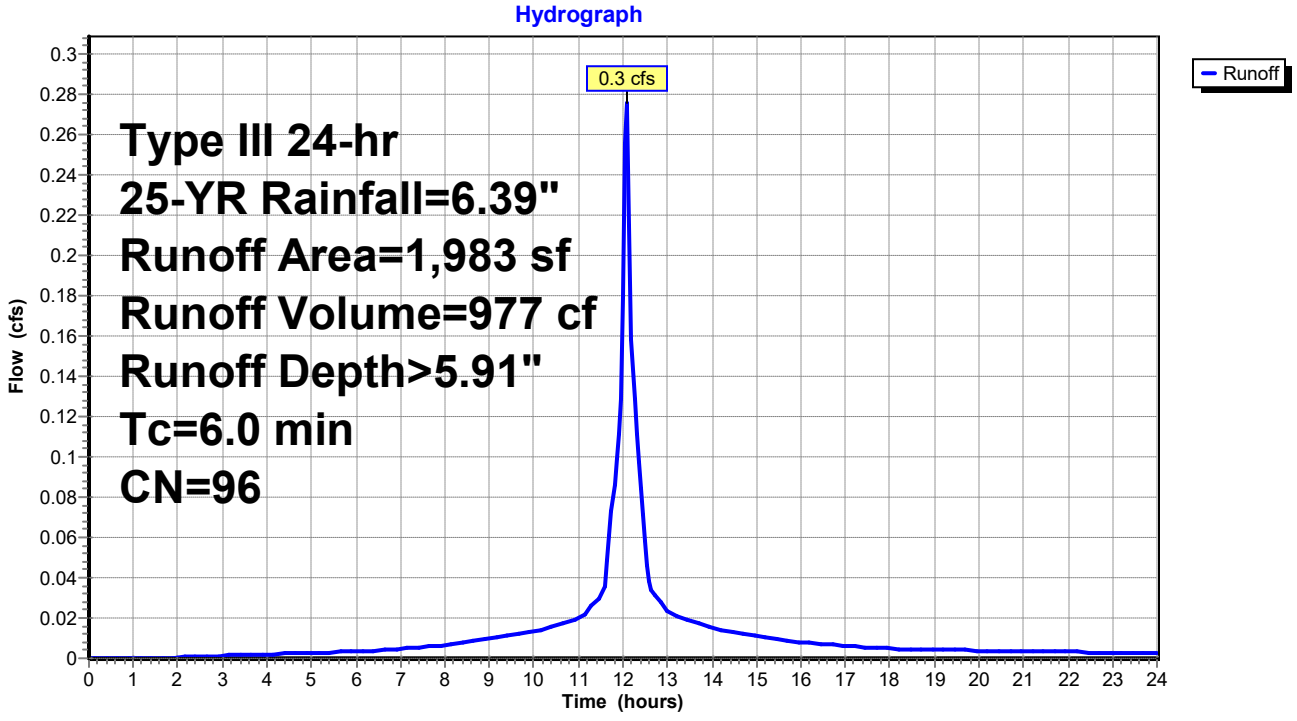
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 977 cf, Depth> 5.91"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,835	98	Paved parking, HSG C
148	74	>75% Grass cover, Good, HSG C
1,983	96	Weighted Average
148		7.46% Pervious Area
1,835		92.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S: PR-10



Summary for Subcatchment 11S: PR-11

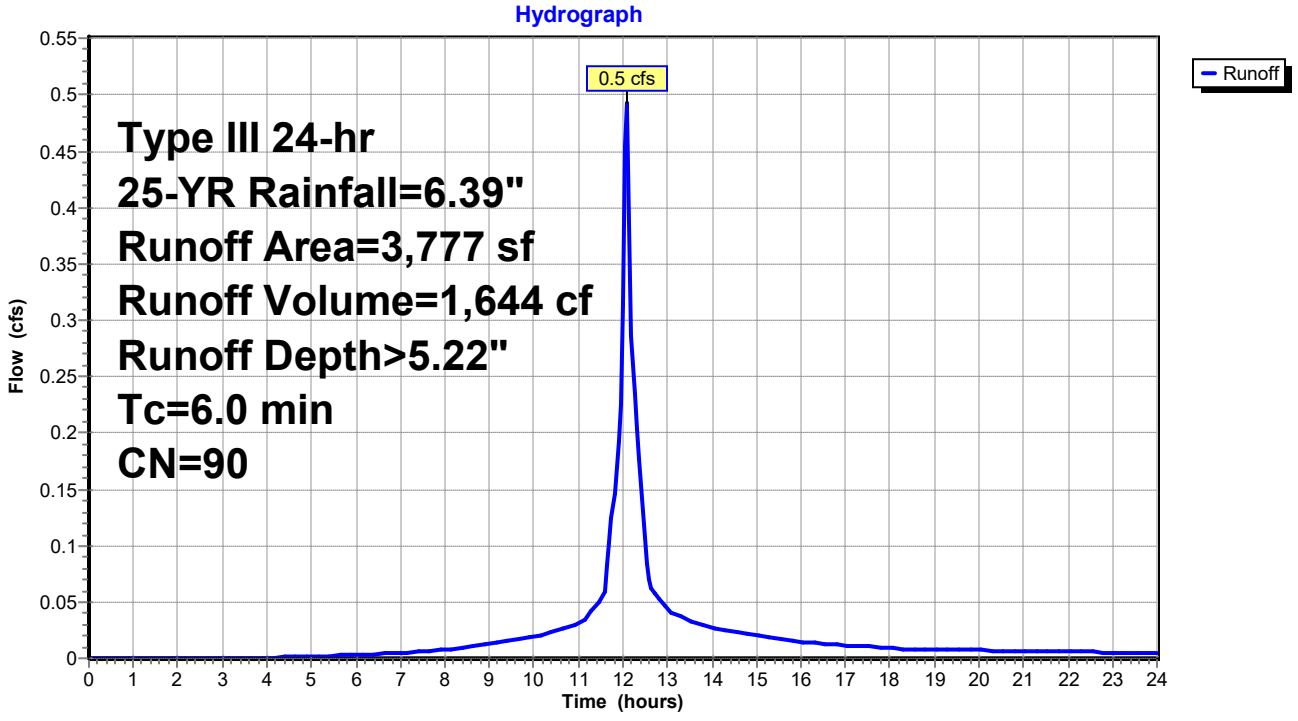
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,644 cf, Depth> 5.22"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
2,523	98	Paved parking, HSG C
1,254	74	>75% Grass cover, Good, HSG C
3,777	90	Weighted Average
1,254		33.20% Pervious Area
2,523		66.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11S: PR-11



Summary for Subcatchment 12S: PR-12

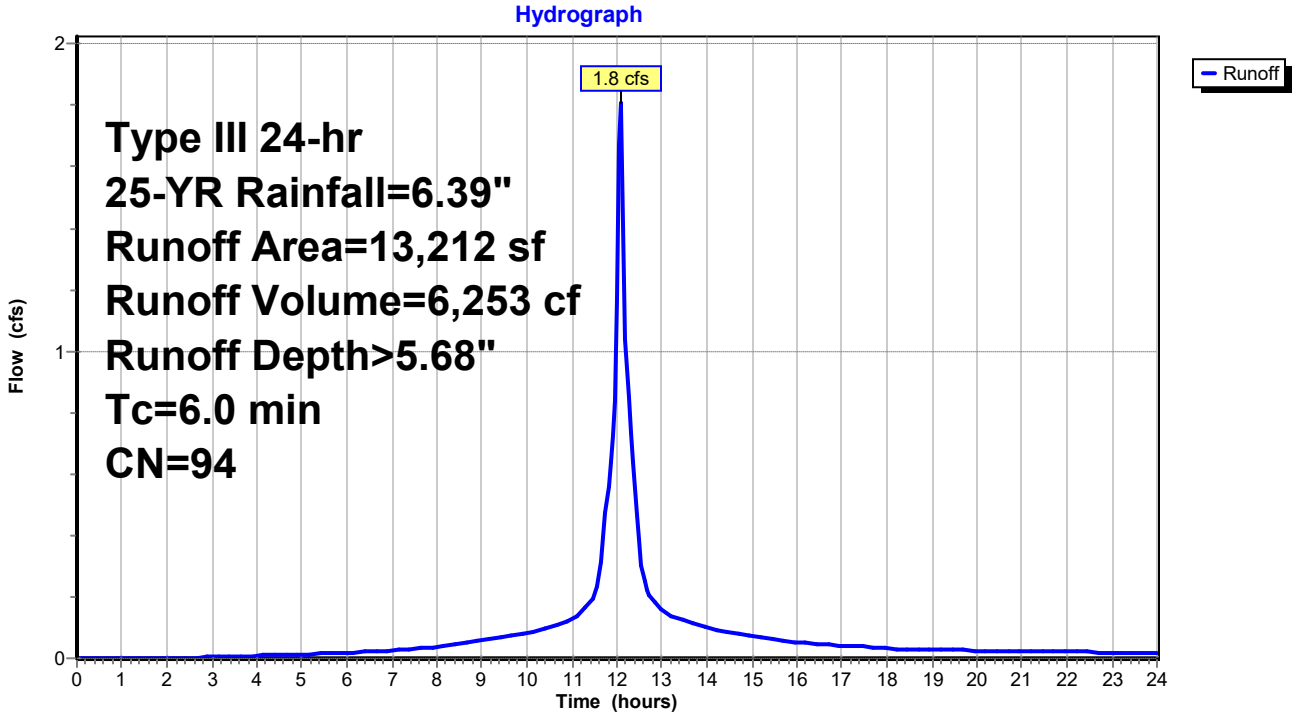
Runoff = 1.8 cfs @ 12.09 hrs, Volume= 6,253 cf, Depth> 5.68"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
10,761	98	Paved parking, HSG C
2,451	74	>75% Grass cover, Good, HSG C
13,212	94	Weighted Average
2,451		18.55% Pervious Area
10,761		81.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S: PR-12



Summary for Subcatchment 13S: PR-13

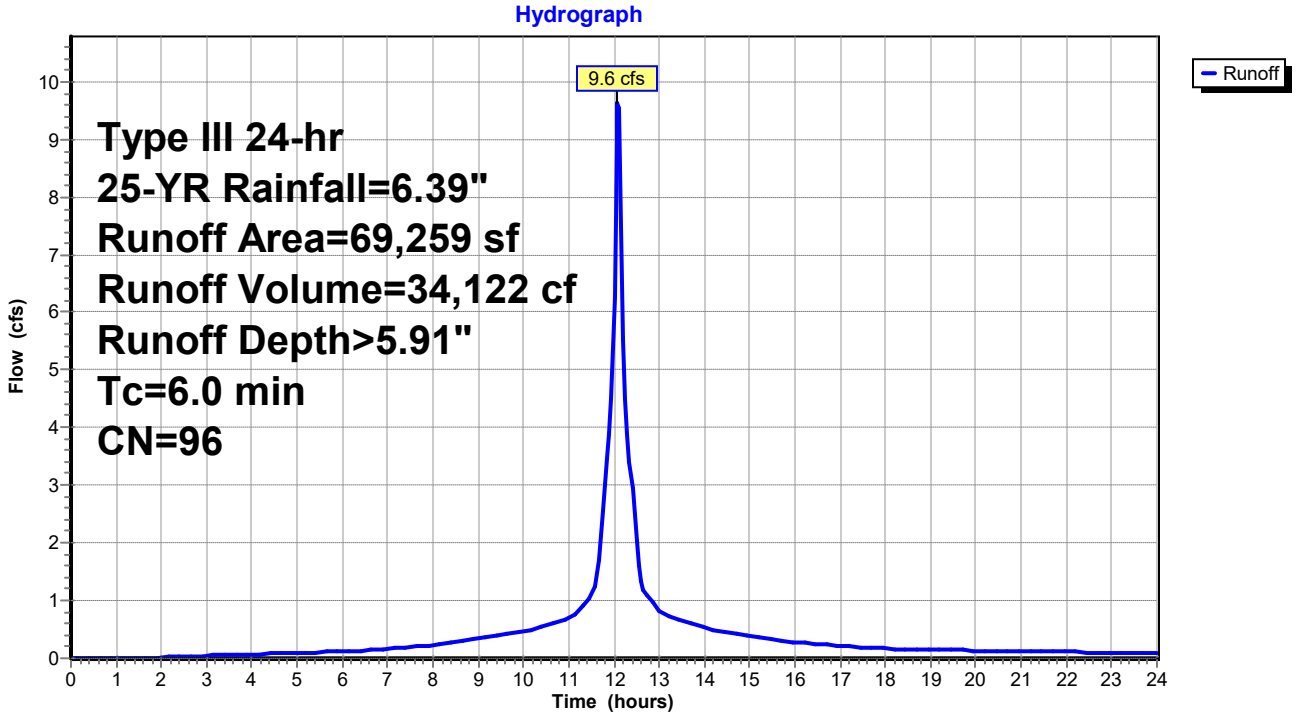
Runoff = 9.6 cfs @ 12.09 hrs, Volume= 34,122 cf, Depth> 5.91"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
61,435	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,259	96	Weighted Average
7,824		11.30% Pervious Area
61,435		88.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S: PR-13



Summary for Subcatchment 14S: PR-14

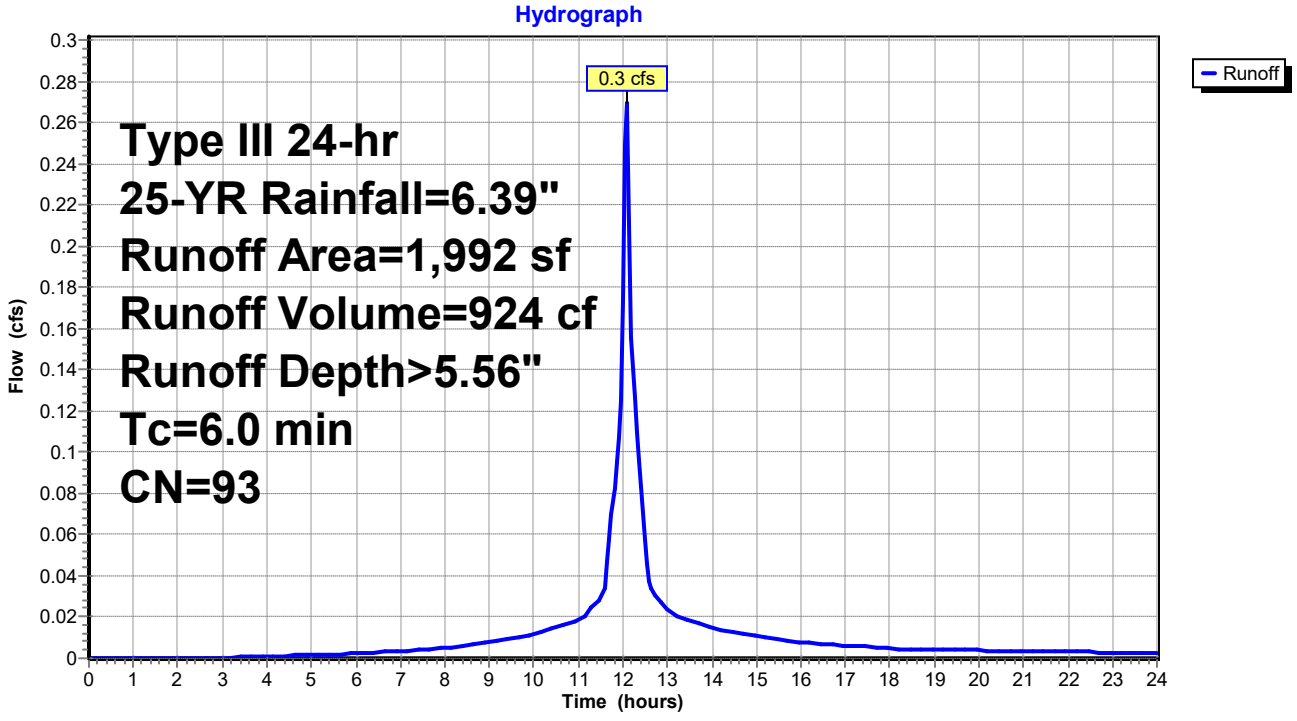
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 924 cf, Depth> 5.56"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,542	98	Paved parking, HSG C
450	74	>75% Grass cover, Good, HSG C
1,992	93	Weighted Average
450		22.59% Pervious Area
1,542		77.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14S: PR-14



Summary for Subcatchment 15S: PR-15

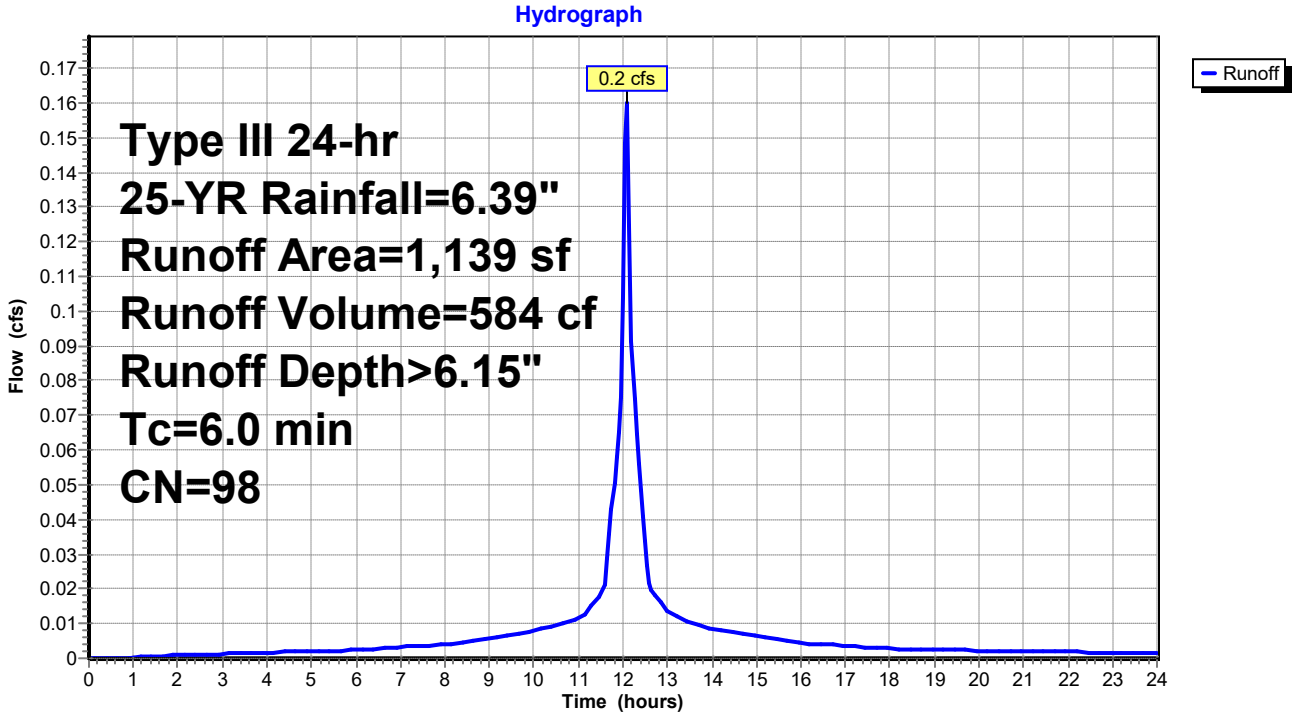
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 584 cf, Depth> 6.15"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,118	98	Paved parking, HSG C
21	74	>75% Grass cover, Good, HSG C
1,139	98	Weighted Average
21		1.84% Pervious Area
1,118		98.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 15S: PR-15



Summary for Subcatchment 16S: PR-16

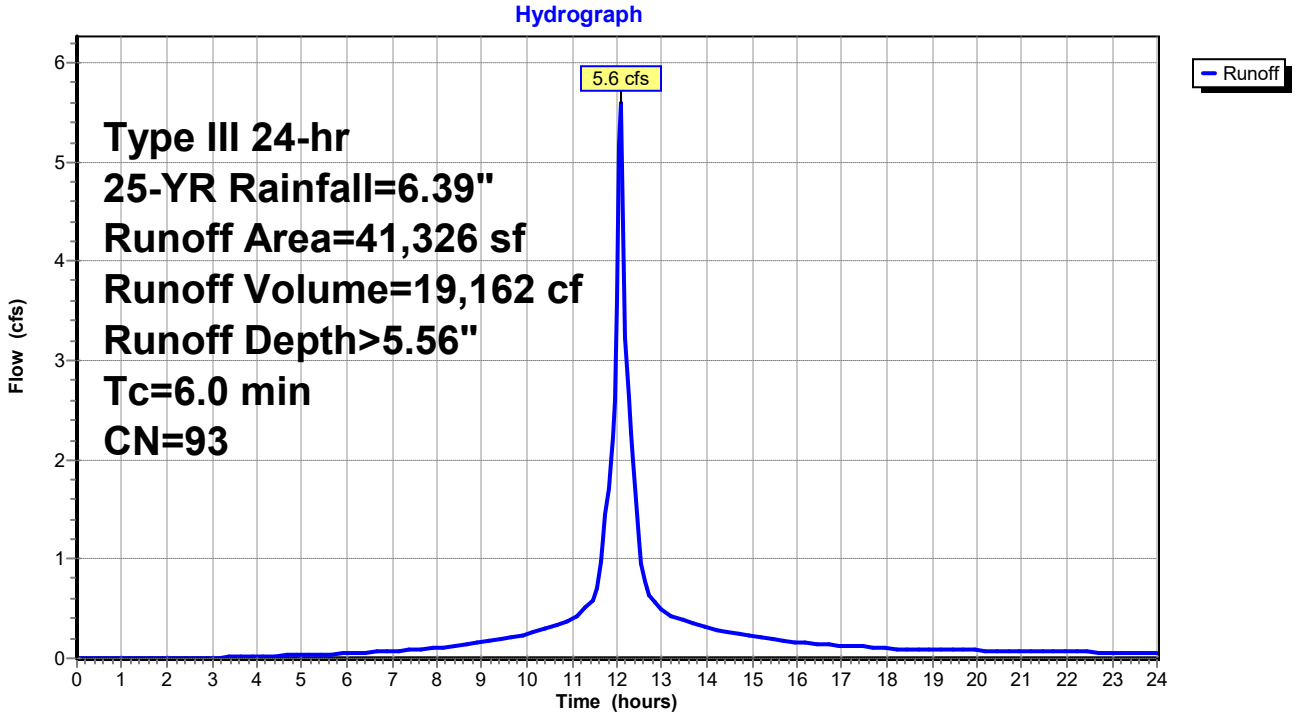
Runoff = 5.6 cfs @ 12.09 hrs, Volume= 19,162 cf, Depth> 5.56"
Routed to Link 2L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
32,824	98	Paved parking, HSG C
8,502	74	>75% Grass cover, Good, HSG C
41,326	93	Weighted Average
8,502		20.57% Pervious Area
32,824		79.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 16S: PR-16



Summary for Pond 1P: DET SYSTEM

Inflow Area = 46,520 sf, 84.80% Impervious, Inflow Depth > 5.92" for 25-YR event
Inflow = 6.4 cfs @ 12.09 hrs, Volume= 22,935 cf
Outflow = 3.2 cfs @ 12.24 hrs, Volume= 22,784 cf, Atten= 50%, Lag= 9.1 min
Primary = 3.2 cfs @ 12.24 hrs, Volume= 22,784 cf
Routed to Link 1L : DP-1C

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 197.07' @ 12.24 hrs Surf.Area= 0.076 ac Storage= 0.112 af

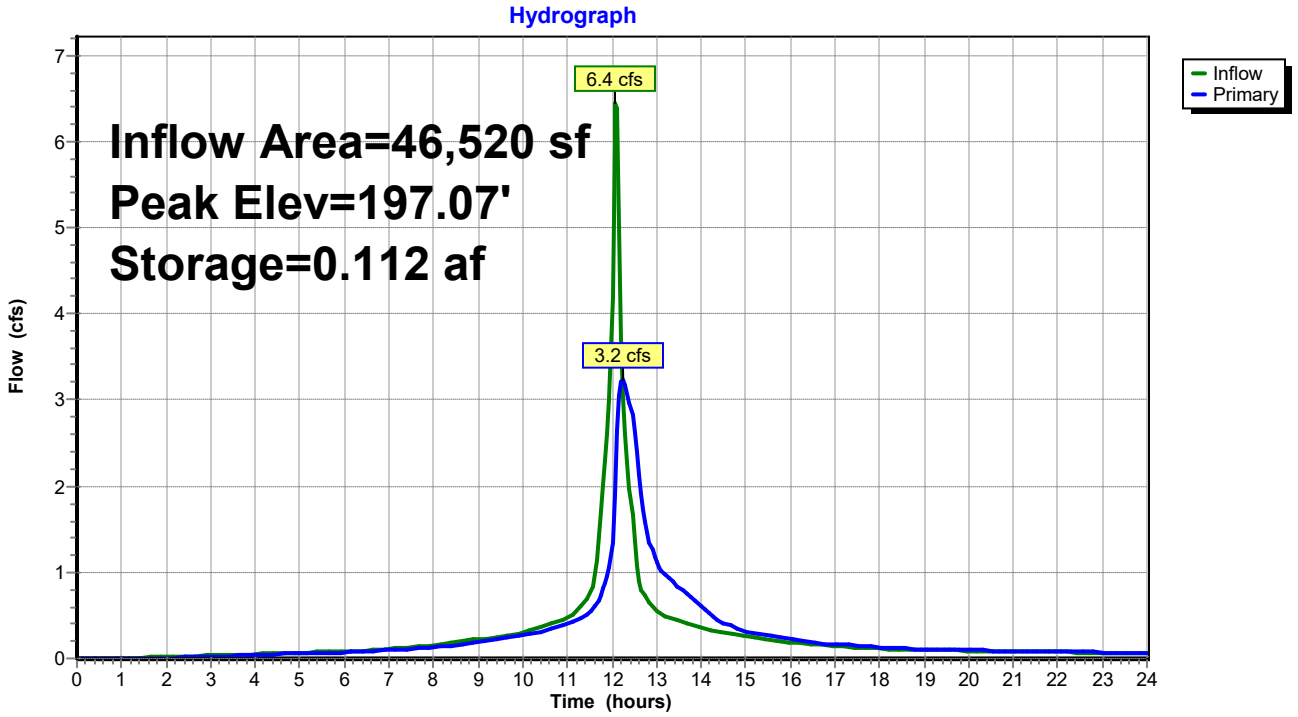
Plug-Flow detention time= 30.7 min calculated for 22,784 cf (99% of inflow)
Center-of-Mass det. time= 26.3 min (780.6 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1	195.40'	0.158 af	**30.0" Round Pipe Storage** L= 1,400.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.29'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 195.29' / 194.66' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	195.40'	**7.0" Vert. 1-YR ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	196.30'	**12.0" W x 6.0" H Vert. 10-Year Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.2 cfs @ 12.24 hrs HW=197.07' (Free Discharge)
- **1=Culvert** (Passes 1.5 cfs of 6.8 cfs potential flow)
  - **2=1-YR ORIFICE** (Orifice Controls 1.5 cfs @ 5.65 fps)
- **3=10-Year Orifice** (Orifice Controls 1.7 cfs @ 3.43 fps)

Pond 1P: DET SYSTEM

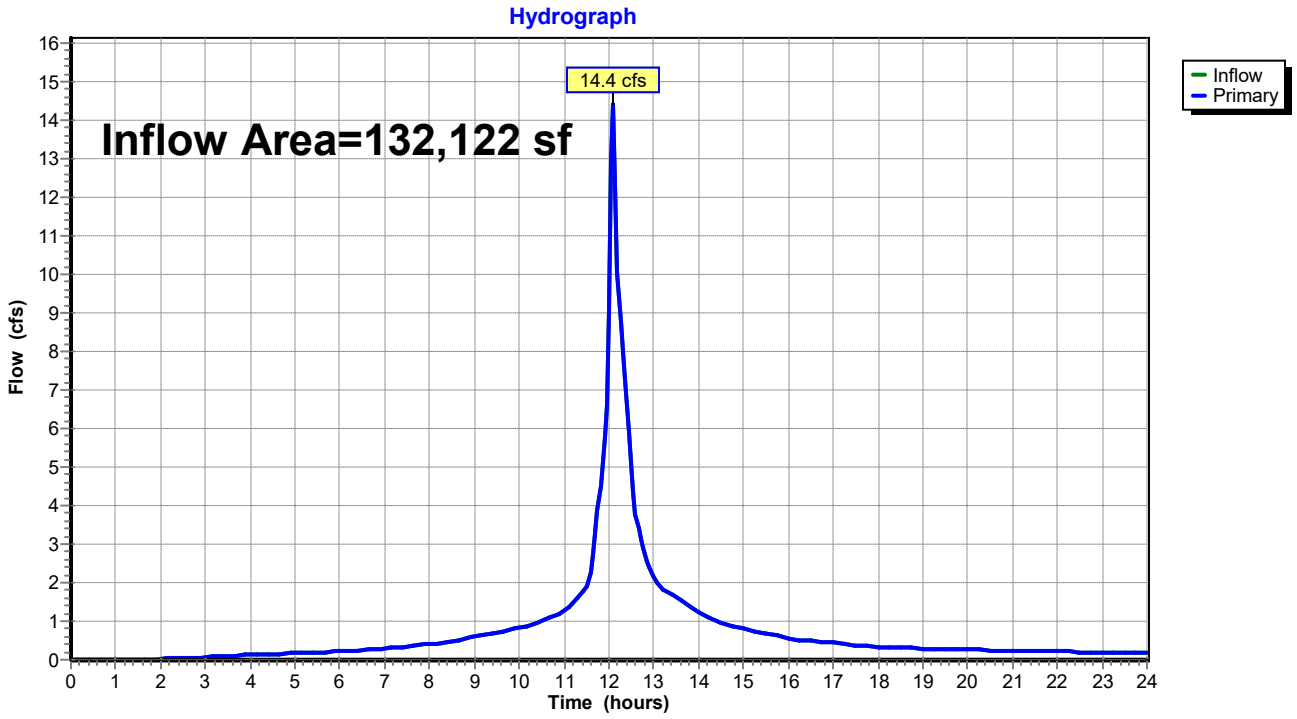


Summary for Link 1L: DP-1C

Inflow Area = 132,122 sf, 86.52% Impervious, Inflow Depth > 5.87" for 25-YR event
Inflow = 14.4 cfs @ 12.10 hrs, Volume= 64,666 cf
Primary = 14.4 cfs @ 12.10 hrs, Volume= 64,666 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1C

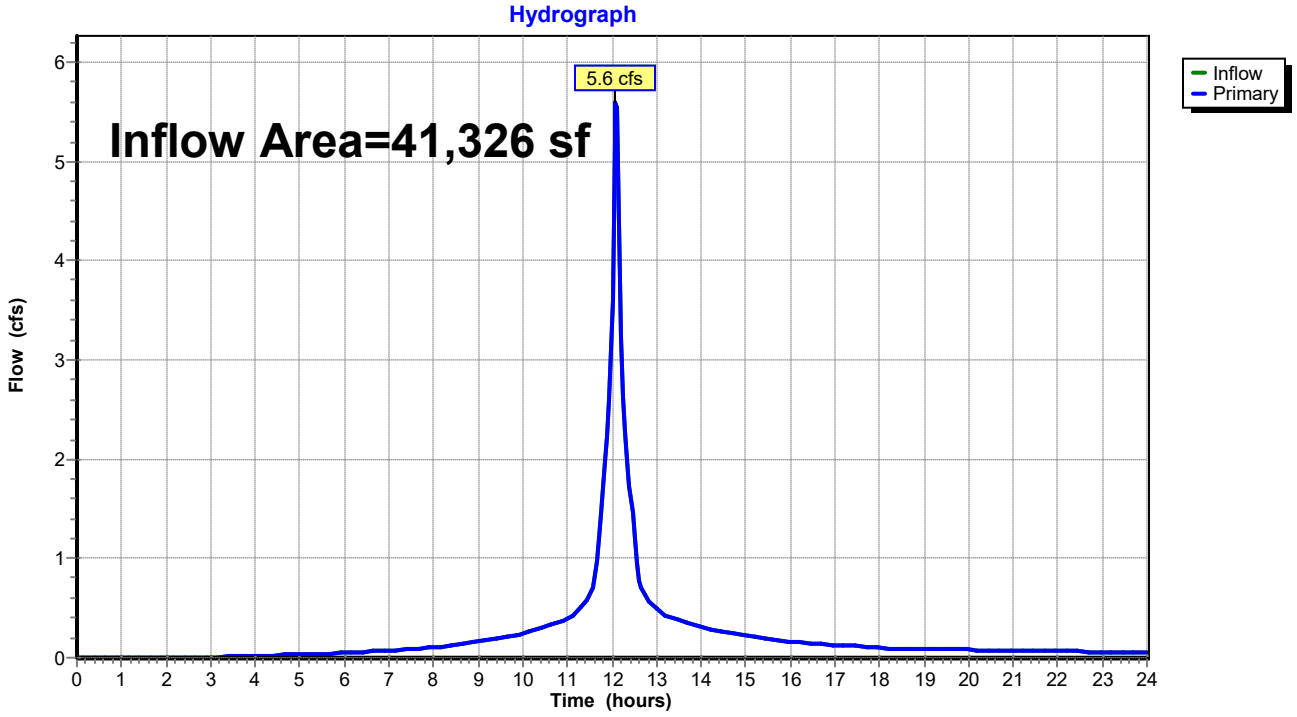


Summary for Link 2L: DP-1A

Inflow Area = 41,326 sf, 79.43% Impervious, Inflow Depth > 5.56" for 25-YR event
Inflow = 5.6 cfs @ 12.09 hrs, Volume= 19,162 cf
Primary = 5.6 cfs @ 12.09 hrs, Volume= 19,162 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1A

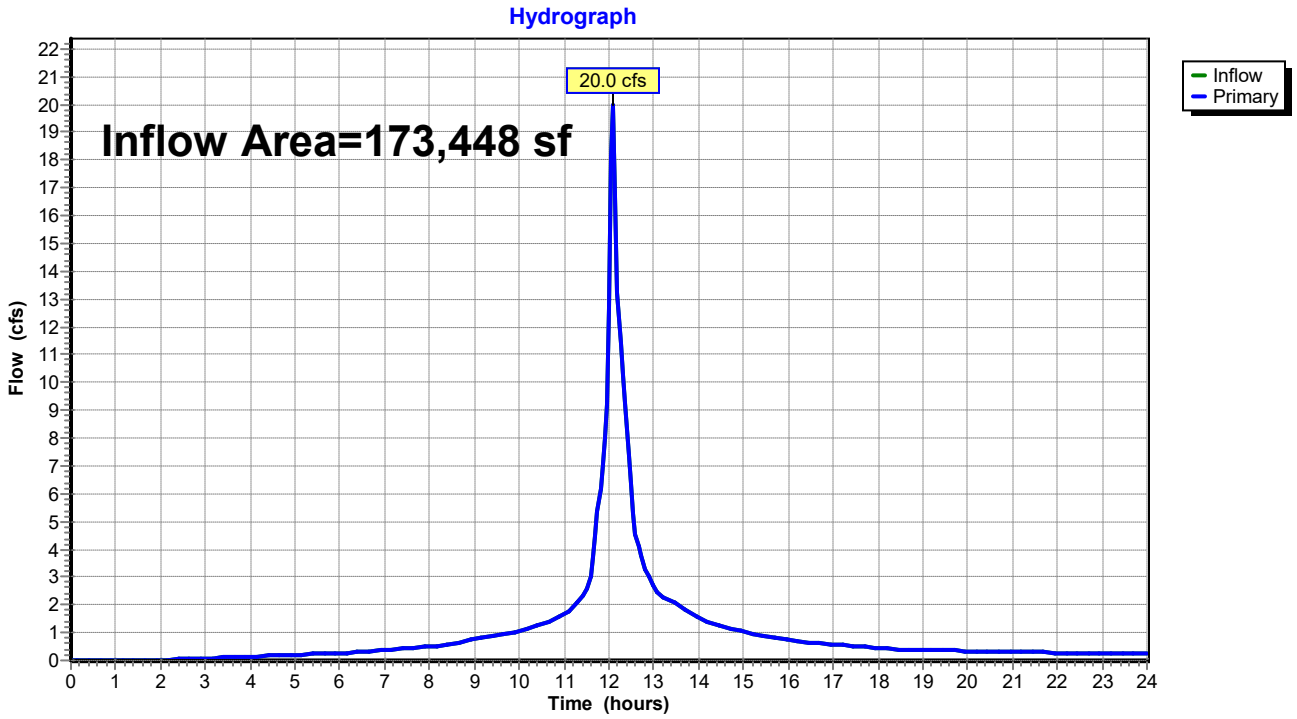


Summary for Link 3L: DP-1

Inflow Area = 173,448 sf, 84.83% Impervious, Inflow Depth > 5.80" for 25-YR event
Inflow = 20.0 cfs @ 12.09 hrs, Volume= 83,828 cf
Primary = 20.0 cfs @ 12.09 hrs, Volume= 83,828 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: PR-1 Runoff Area=11,026 sf 92.38% Impervious Runoff Depth>7.10"
Tc=6.0 min CN=96 Runoff=1.8 cfs 6,521 cf

Subcatchment 2S: PR-2 Runoff Area=5,735 sf 63.50% Impervious Runoff Depth>7.10"
Tc=6.0 min CN=96 Runoff=0.9 cfs 3,392 cf

Subcatchment 3S: PR-3 Runoff Area=3,009 sf 83.35% Impervious Runoff Depth>7.34"
Tc=6.0 min CN=98 Runoff=0.5 cfs 1,840 cf

Subcatchment 4S: PR-4 Runoff Area=2,696 sf 52.78% Impervious Runoff Depth>7.34"
Tc=6.0 min CN=98 Runoff=0.4 cfs 1,648 cf

Subcatchment 5S: PR-5 Runoff Area=7,818 sf 100.00% Impervious Runoff Depth>7.34"
Tc=6.0 min CN=98 Runoff=1.3 cfs 4,779 cf

Subcatchment 6S: PR-6 Runoff Area=1,434 sf 82.64% Impervious Runoff Depth>6.86"
Tc=6.0 min CN=94 Runoff=0.2 cfs 820 cf

Subcatchment 7S: PR-7 Runoff Area=4,439 sf 97.70% Impervious Runoff Depth>7.22"
Tc=6.0 min CN=97 Runoff=0.7 cfs 2,670 cf

Subcatchment 8S: PR-8 Runoff Area=2,998 sf 98.70% Impervious Runoff Depth>7.34"
Tc=6.0 min CN=98 Runoff=0.5 cfs 1,833 cf

Subcatchment 9S: PR-9 Runoff Area=1,605 sf 64.49% Impervious Runoff Depth>6.27"
Tc=6.0 min CN=89 Runoff=0.3 cfs 839 cf

Subcatchment 10S: PR-10 Runoff Area=1,983 sf 92.54% Impervious Runoff Depth>7.10"
Tc=6.0 min CN=96 Runoff=0.3 cfs 1,173 cf

Subcatchment 11S: PR-11 Runoff Area=3,777 sf 66.80% Impervious Runoff Depth>6.39"
Tc=6.0 min CN=90 Runoff=0.6 cfs 2,011 cf

Subcatchment 12S: PR-12 Runoff Area=13,212 sf 81.45% Impervious Runoff Depth>6.86"
Tc=6.0 min CN=94 Runoff=2.2 cfs 7,553 cf

Subcatchment 13S: PR-13 Runoff Area=69,259 sf 88.70% Impervious Runoff Depth>7.10"
Tc=6.0 min CN=96 Runoff=11.5 cfs 40,964 cf

Subcatchment 14S: PR-14 Runoff Area=1,992 sf 77.41% Impervious Runoff Depth>6.74"
Tc=6.0 min CN=93 Runoff=0.3 cfs 1,119 cf

Subcatchment 15S: PR-15 Runoff Area=1,139 sf 98.16% Impervious Runoff Depth>7.34"
Tc=6.0 min CN=98 Runoff=0.2 cfs 696 cf

Subcatchment 16S: PR-16 Runoff Area=41,326 sf 79.43% Impervious Runoff Depth>6.74"
Tc=6.0 min CN=93 Runoff=6.7 cfs 23,217 cf

Pond 1P: DET SYSTEM Peak Elev=197.35' Storage=0.132 af Inflow=7.7 cfs 27,525 cf
Outflow=3.8 cfs 27,352 cf

Link 1L: DP-1C Inflow=17.2 cfs 77,685 cf
Primary=17.2 cfs 77,685 cf

Link 2L: DP-1A Inflow=6.7 cfs 23,217 cf
Primary=6.7 cfs 23,217 cf

Link 3L: DP-1 Inflow=23.9 cfs 100,902 cf
Primary=23.9 cfs 100,902 cf

Total Runoff Area = 173,448 sf Runoff Volume = 101,075 cf Average Runoff Depth = 6.99"
15.17% Pervious = 26,317 sf 84.83% Impervious = 147,131 sf

Summary for Subcatchment 1S: PR-1

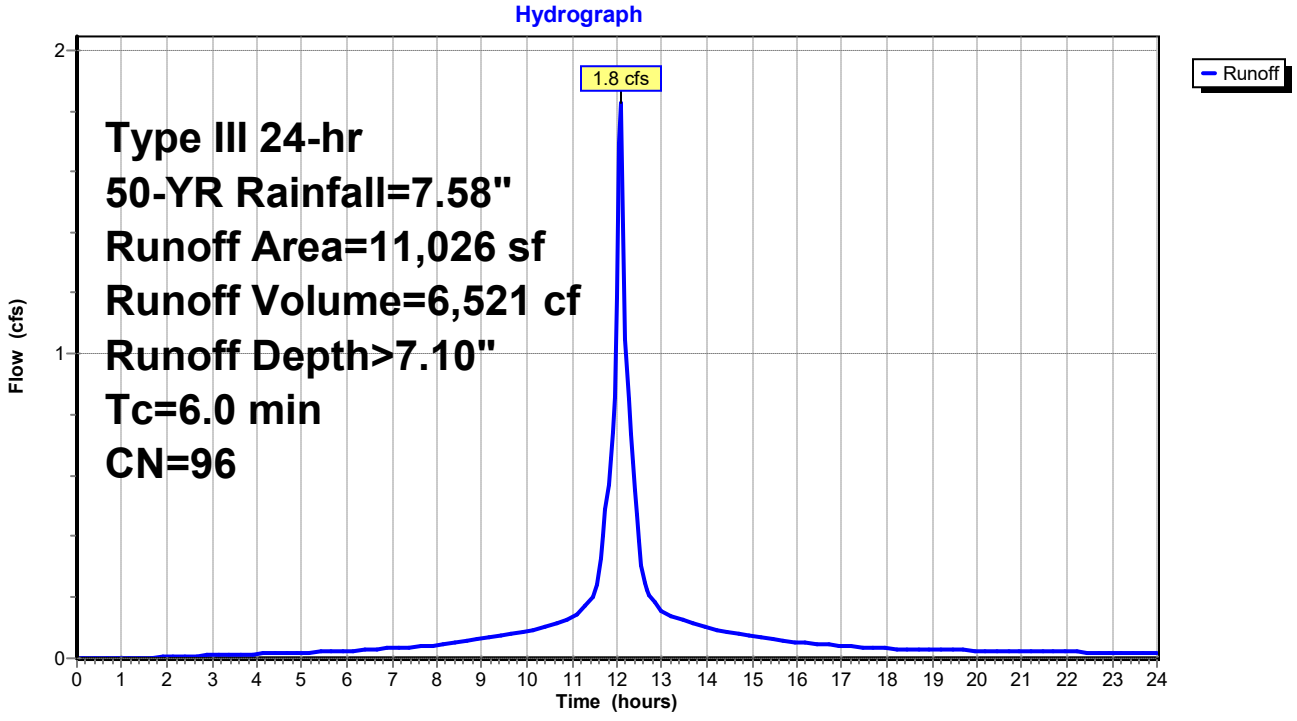
Runoff = 1.8 cfs @ 12.09 hrs, Volume= 6,521 cf, Depth> 7.10"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
10,186	98	Paved parking, HSG C
840	74	>75% Grass cover, Good, HSG C
11,026	96	Weighted Average
840		7.62% Pervious Area
10,186		92.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-1



Summary for Subcatchment 2S: PR-2

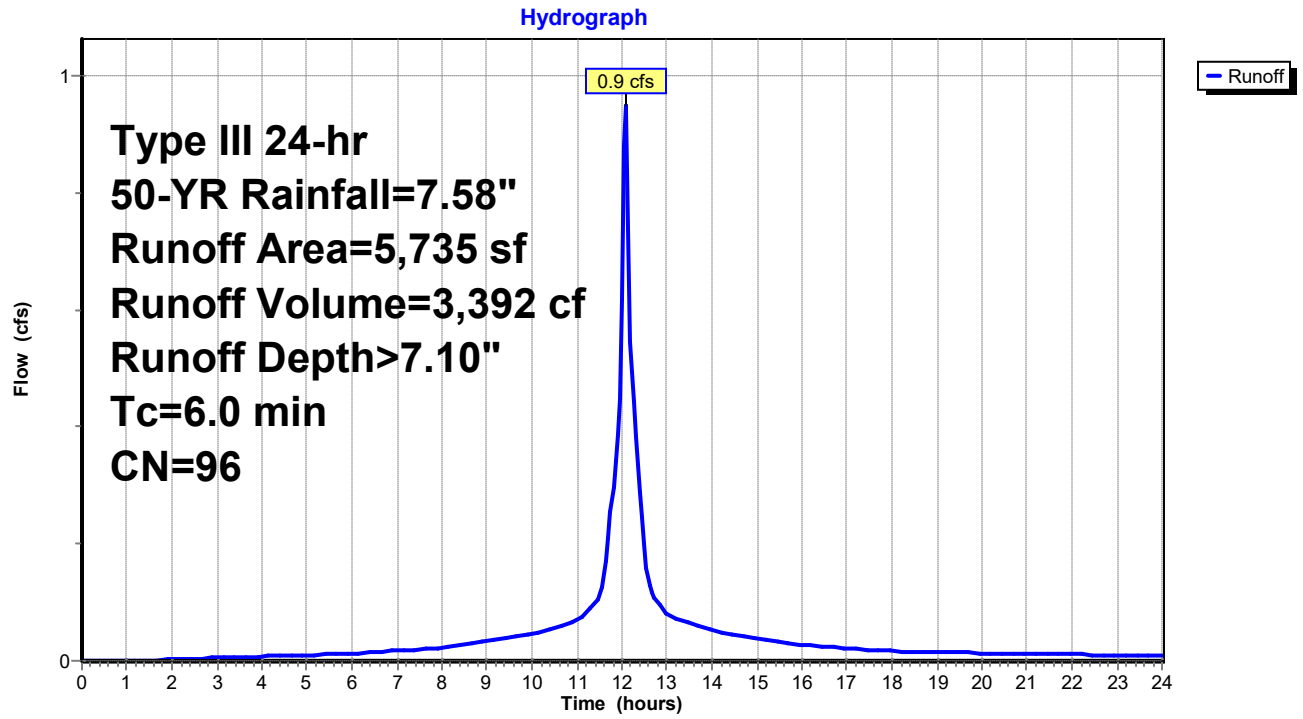
Runoff = 0.9 cfs @ 12.09 hrs, Volume= 3,392 cf, Depth> 7.10"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

	Area (sf)	CN	Description
	3,642	98	Roofs, HSG C
*	1,726	97	Extensive Green Roof
*	367	74	Stormwater Planter
	5,735	96	Weighted Average
	2,093		36.50% Pervious Area
	3,642		63.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-2



Summary for Subcatchment 3S: PR-3

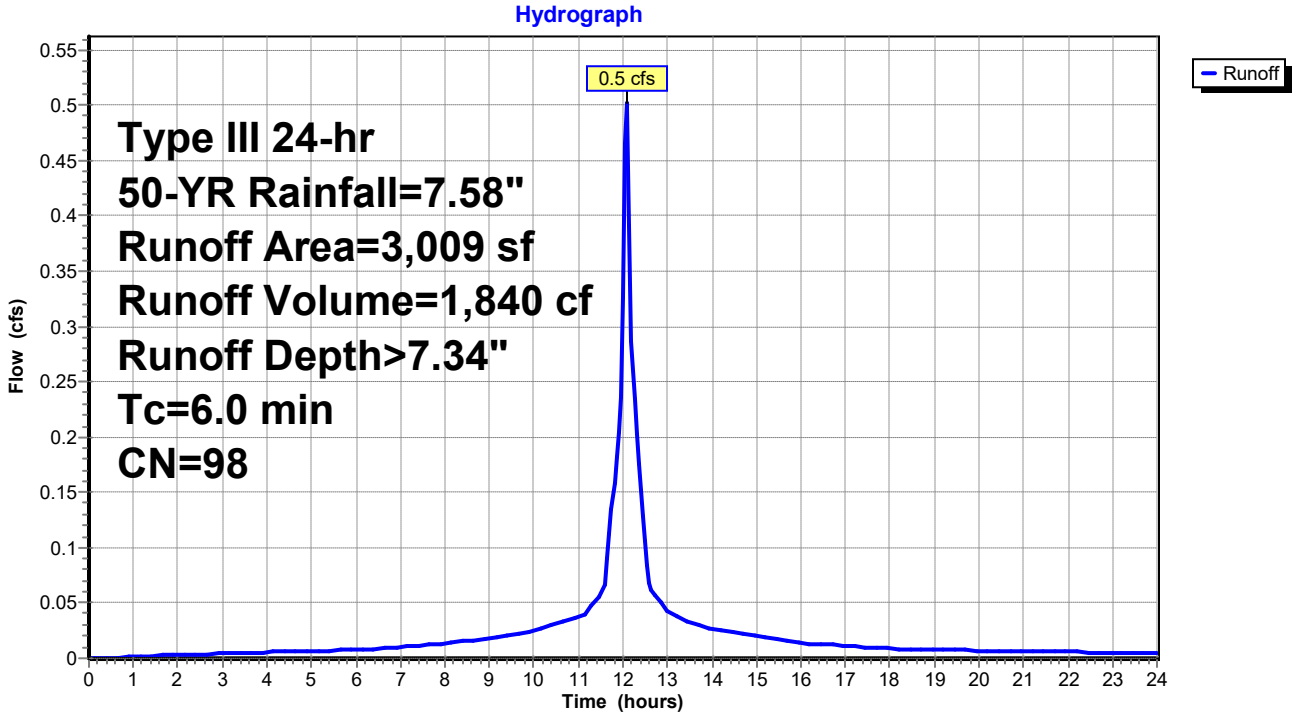
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,840 cf, Depth> 7.34"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

	Area (sf)	CN	Description
	2,508	98	Roofs, HSG C
*	501	97	Extensive Green Roof
	3,009	98	Weighted Average
	501		16.65% Pervious Area
	2,508		83.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-3



Summary for Subcatchment 4S: PR-4

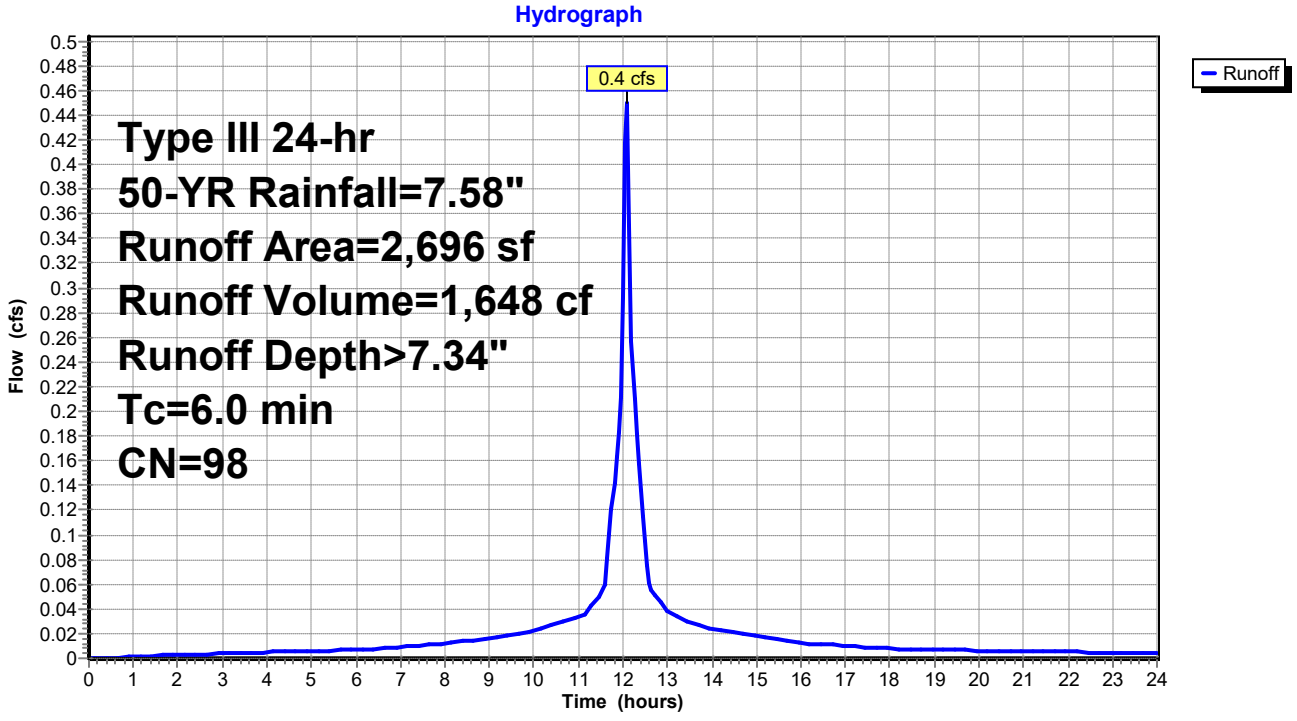
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,648 cf, Depth> 7.34"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

	Area (sf)	CN	Description
	1,423	98	Roofs, HSG C
*	1,273	97	Extensive Green Roof
	2,696	98	Weighted Average
	1,273		47.22% Pervious Area
	1,423		52.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-4



Summary for Subcatchment 5S: PR-5

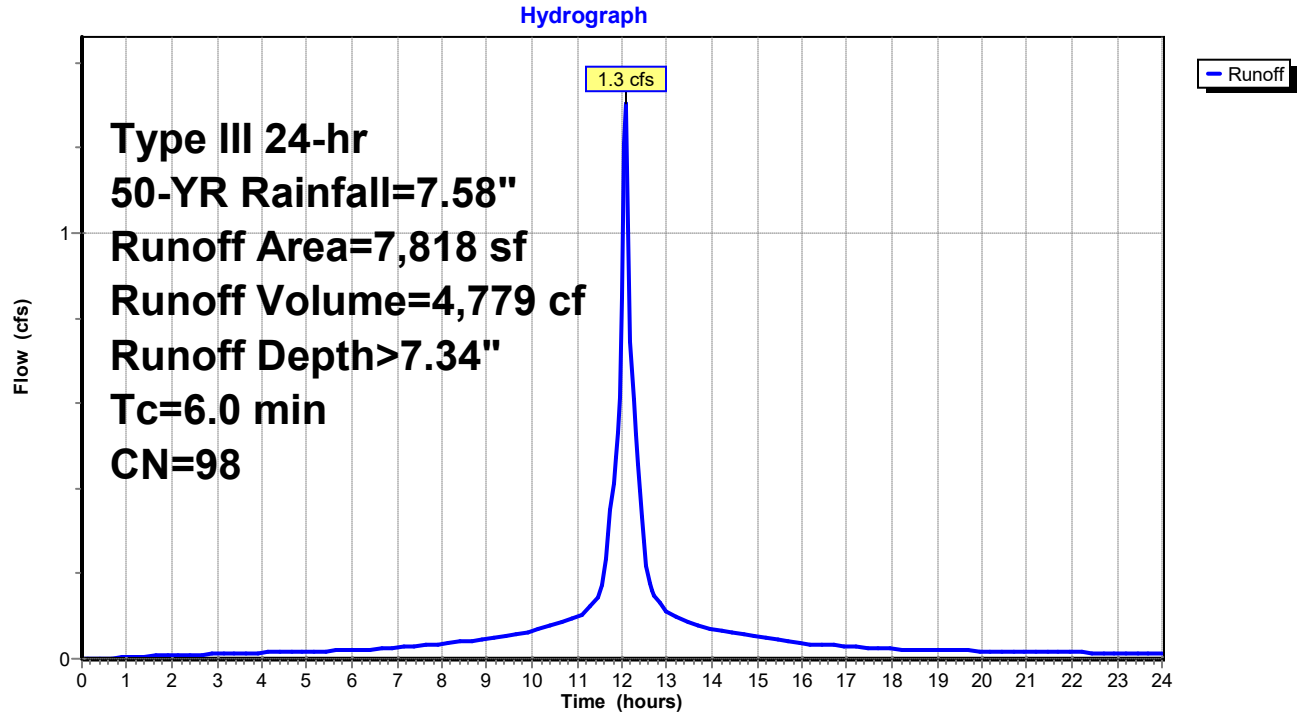
Runoff = 1.3 cfs @ 12.09 hrs, Volume= 4,779 cf, Depth> 7.34"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

	Area (sf)	CN	Description
	4,421	98	Roofs, HSG C
*	3,397	98	Intensive Green Roof
	7,818	98	Weighted Average
	7,818		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PR-5



Summary for Subcatchment 6S: PR-6

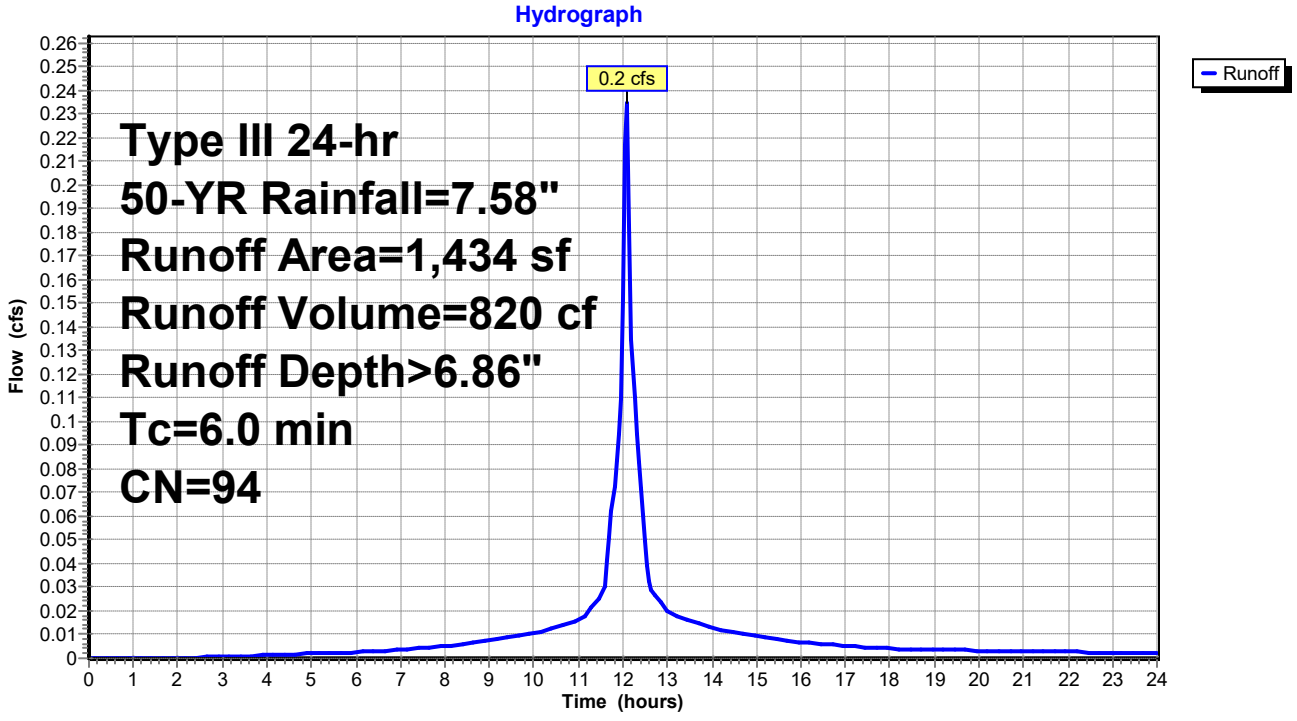
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 820 cf, Depth> 6.86"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,185	98	Paved parking, HSG C
249	74	>75% Grass cover, Good, HSG C
1,434	94	Weighted Average
249		17.36% Pervious Area
1,185		82.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PR-6



Summary for Subcatchment 7S: PR-7

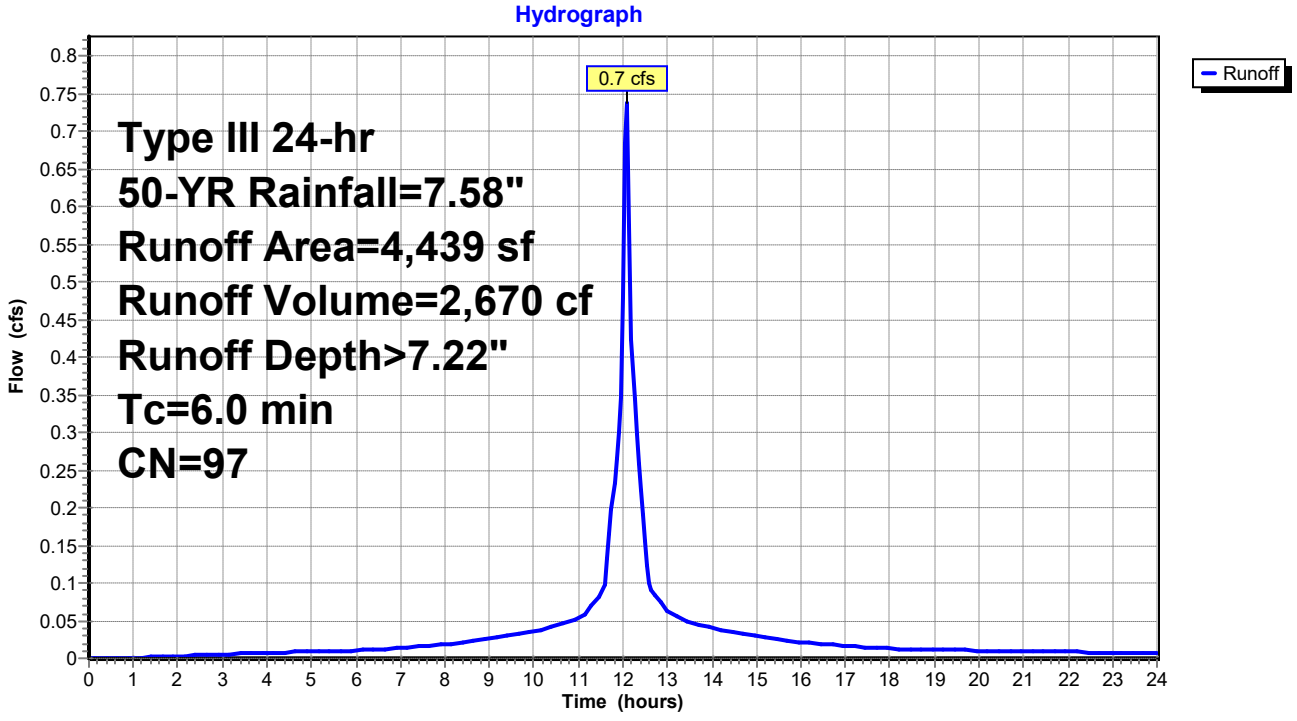
Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,670 cf, Depth> 7.22"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
4,337	98	Paved parking, HSG C
102	74	>75% Grass cover, Good, HSG C
4,439	97	Weighted Average
102		2.30% Pervious Area
4,337		97.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PR-7



Summary for Subcatchment 8S: PR-8

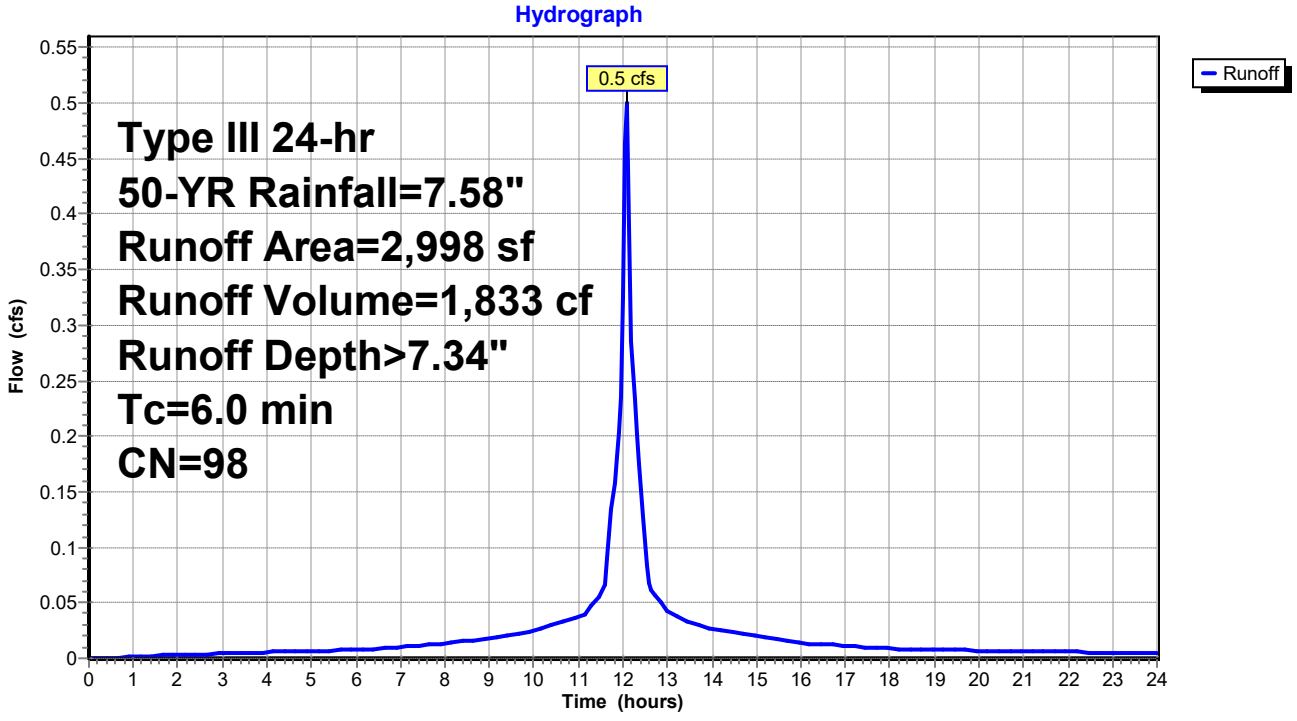
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,833 cf, Depth> 7.34"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
2,959	98	Paved parking, HSG C
39	74	>75% Grass cover, Good, HSG C
2,998	98	Weighted Average
39		1.30% Pervious Area
2,959		98.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PR-8



Summary for Subcatchment 9S: PR-9

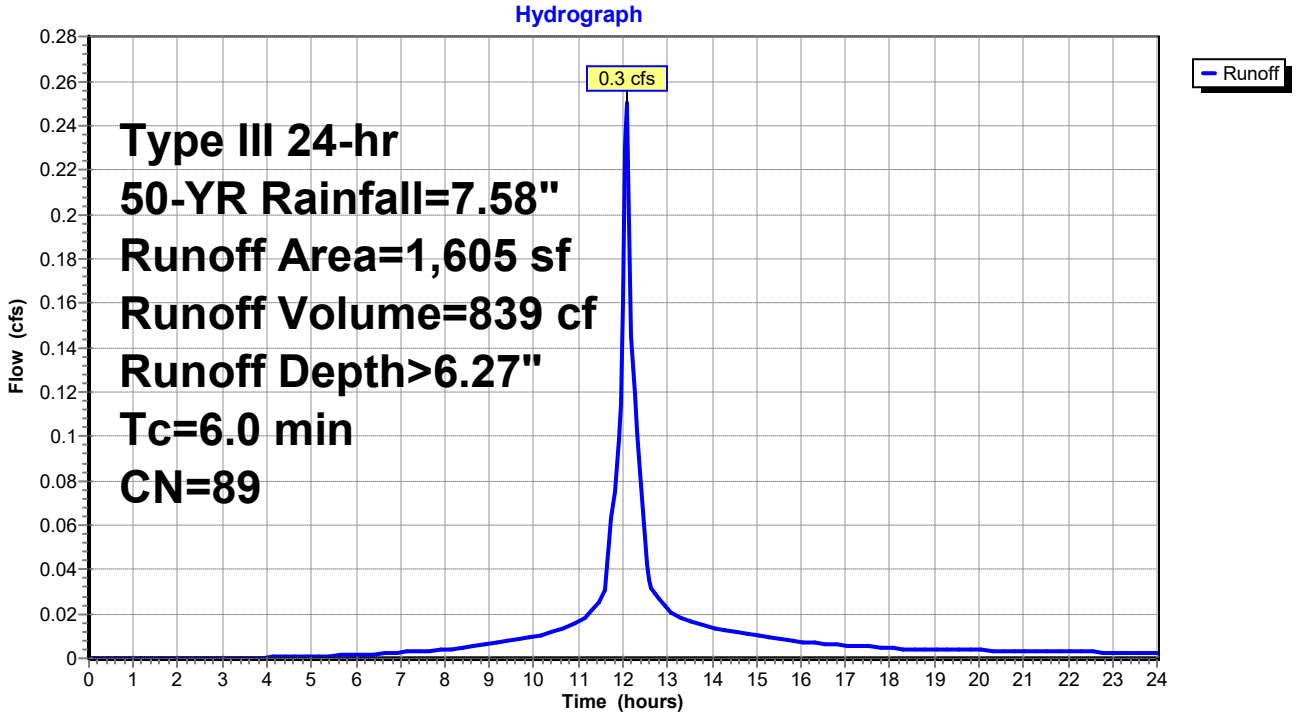
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 839 cf, Depth> 6.27"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,035	98	Paved parking, HSG C
570	74	>75% Grass cover, Good, HSG C
1,605	89	Weighted Average
570		35.51% Pervious Area
1,035		64.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

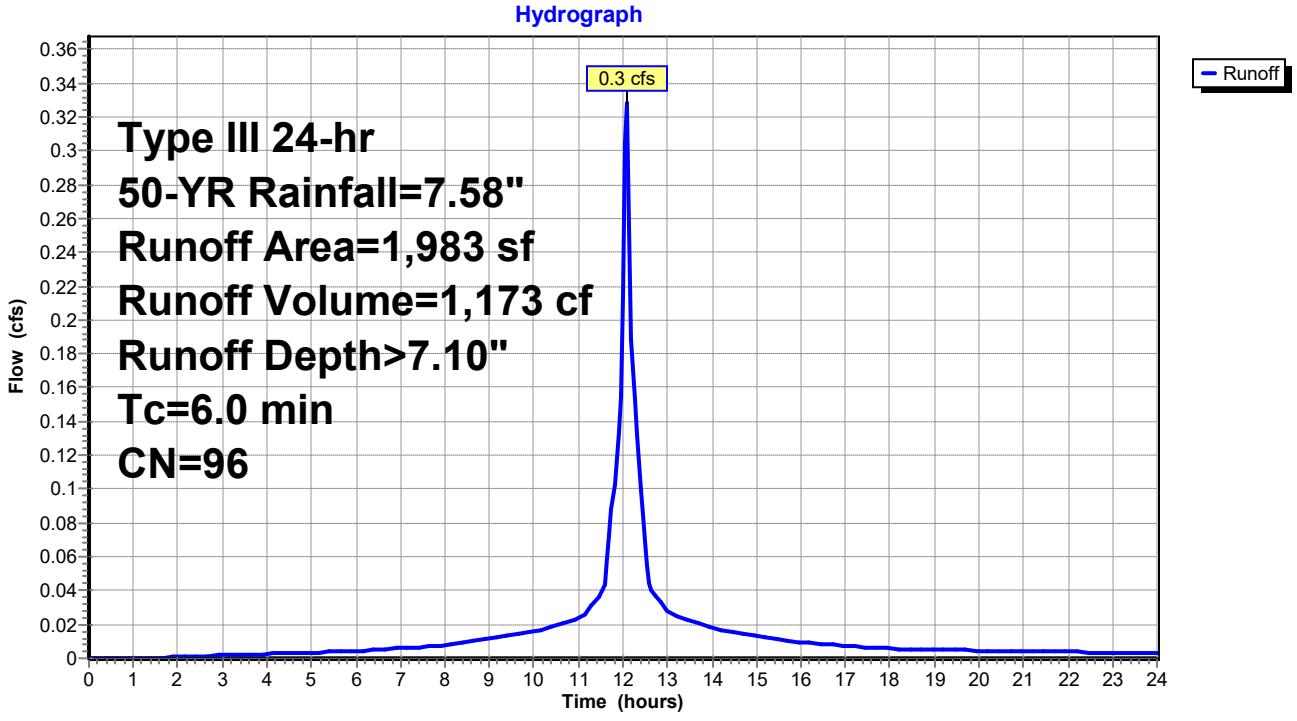
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,173 cf, Depth> 7.10"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,835	98	Paved parking, HSG C
148	74	>75% Grass cover, Good, HSG C
1,983	96	Weighted Average
148		7.46% Pervious Area
1,835		92.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S: PR-10



Summary for Subcatchment 11S: PR-11

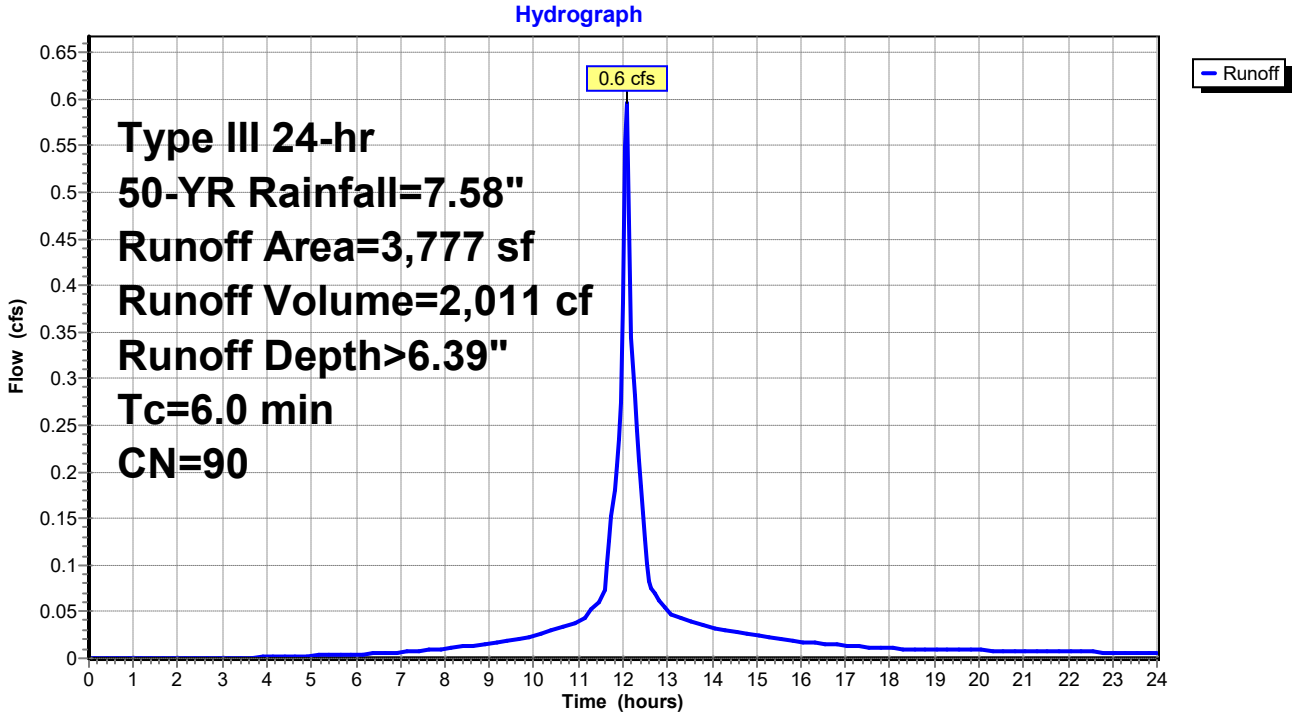
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,011 cf, Depth> 6.39"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
2,523	98	Paved parking, HSG C
1,254	74	>75% Grass cover, Good, HSG C
3,777	90	Weighted Average
1,254		33.20% Pervious Area
2,523		66.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11S: PR-11



Summary for Subcatchment 12S: PR-12

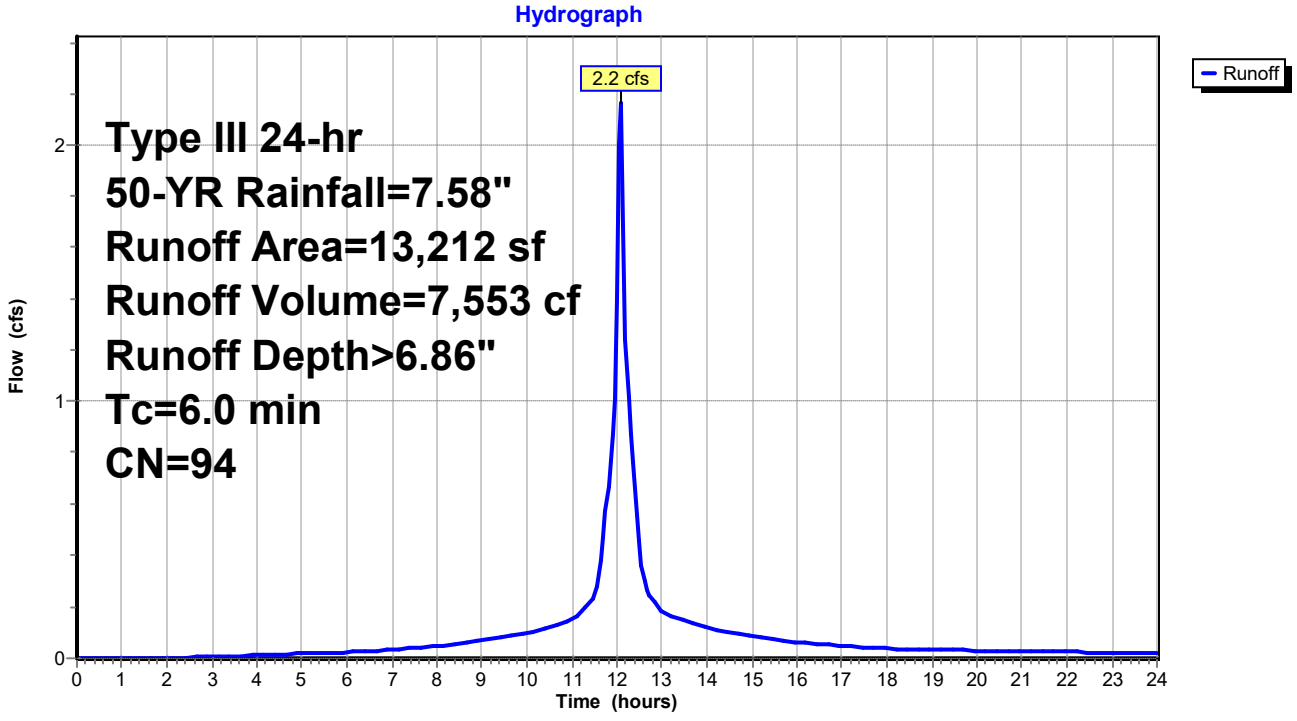
Runoff = 2.2 cfs @ 12.09 hrs, Volume= 7,553 cf, Depth> 6.86"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
10,761	98	Paved parking, HSG C
2,451	74	>75% Grass cover, Good, HSG C
13,212	94	Weighted Average
2,451		18.55% Pervious Area
10,761		81.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S: PR-12



Summary for Subcatchment 13S: PR-13

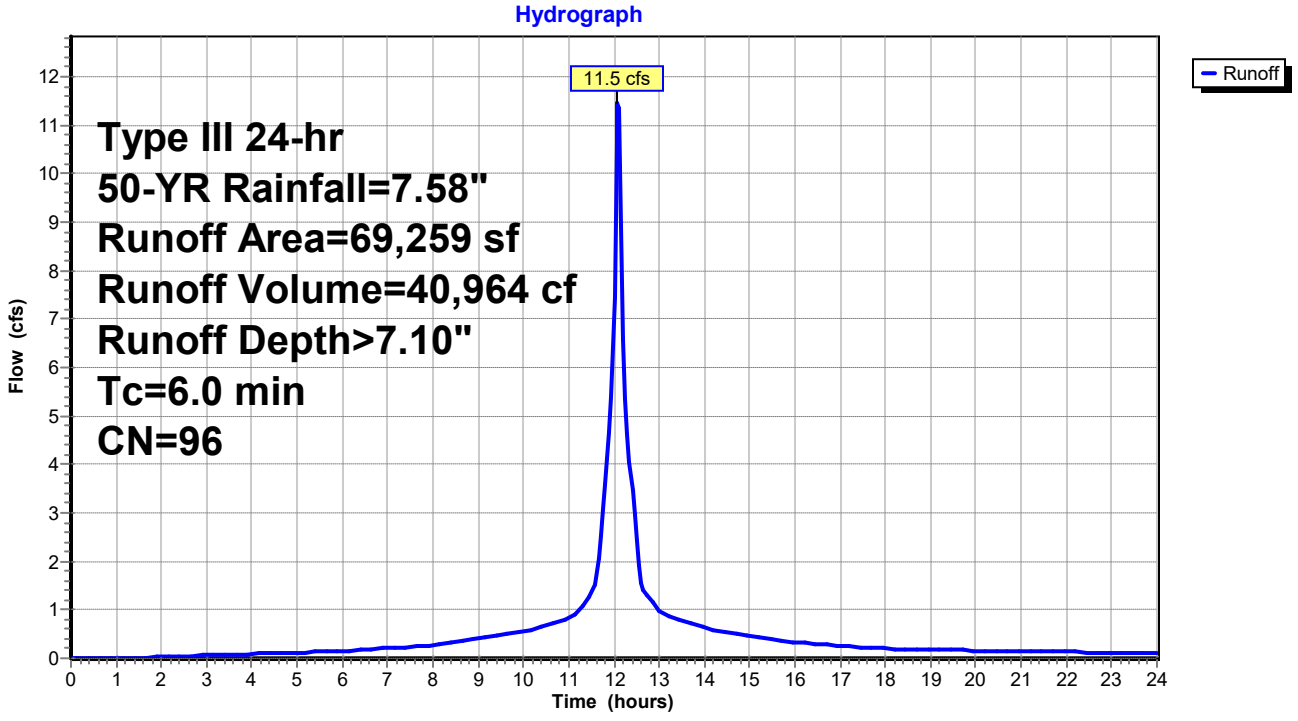
Runoff = 11.5 cfs @ 12.09 hrs, Volume= 40,964 cf, Depth> 7.10"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
61,435	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,259	96	Weighted Average
7,824		11.30% Pervious Area
61,435		88.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S: PR-13



Summary for Subcatchment 14S: PR-14

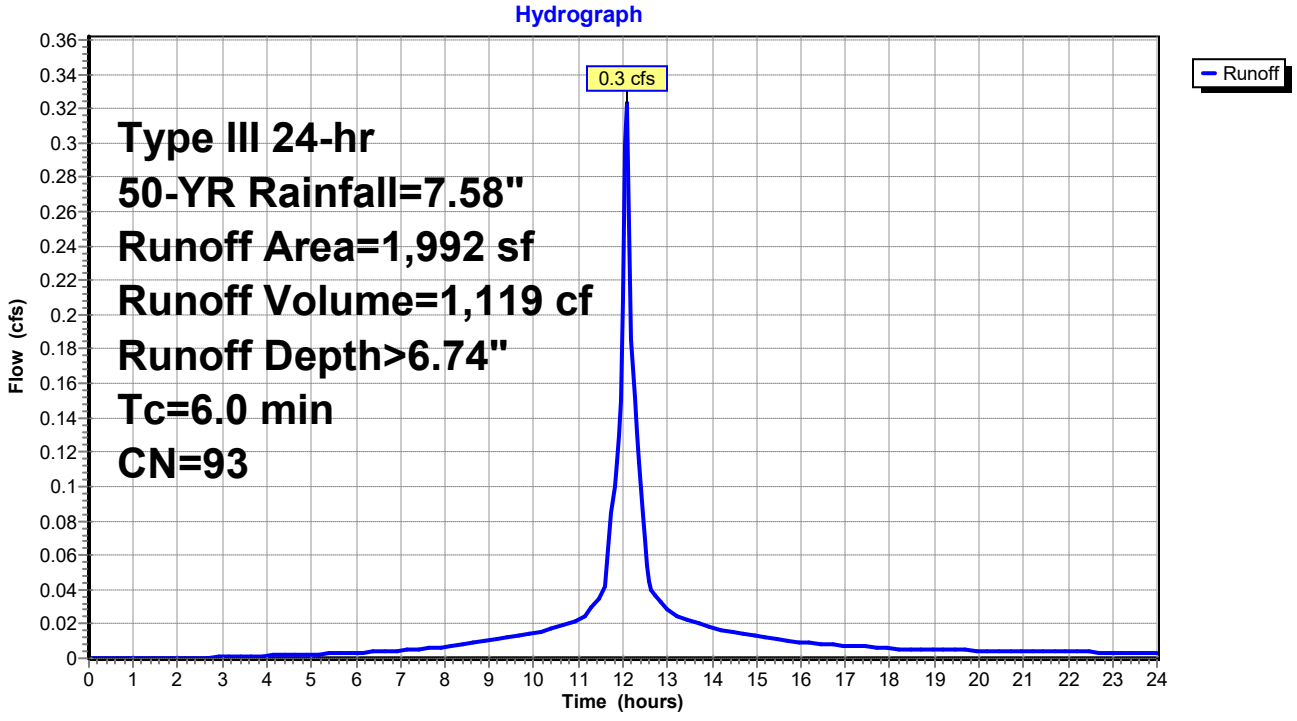
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,119 cf, Depth> 6.74"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,542	98	Paved parking, HSG C
450	74	>75% Grass cover, Good, HSG C
1,992	93	Weighted Average
450		22.59% Pervious Area
1,542		77.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14S: PR-14



Summary for Subcatchment 15S: PR-15

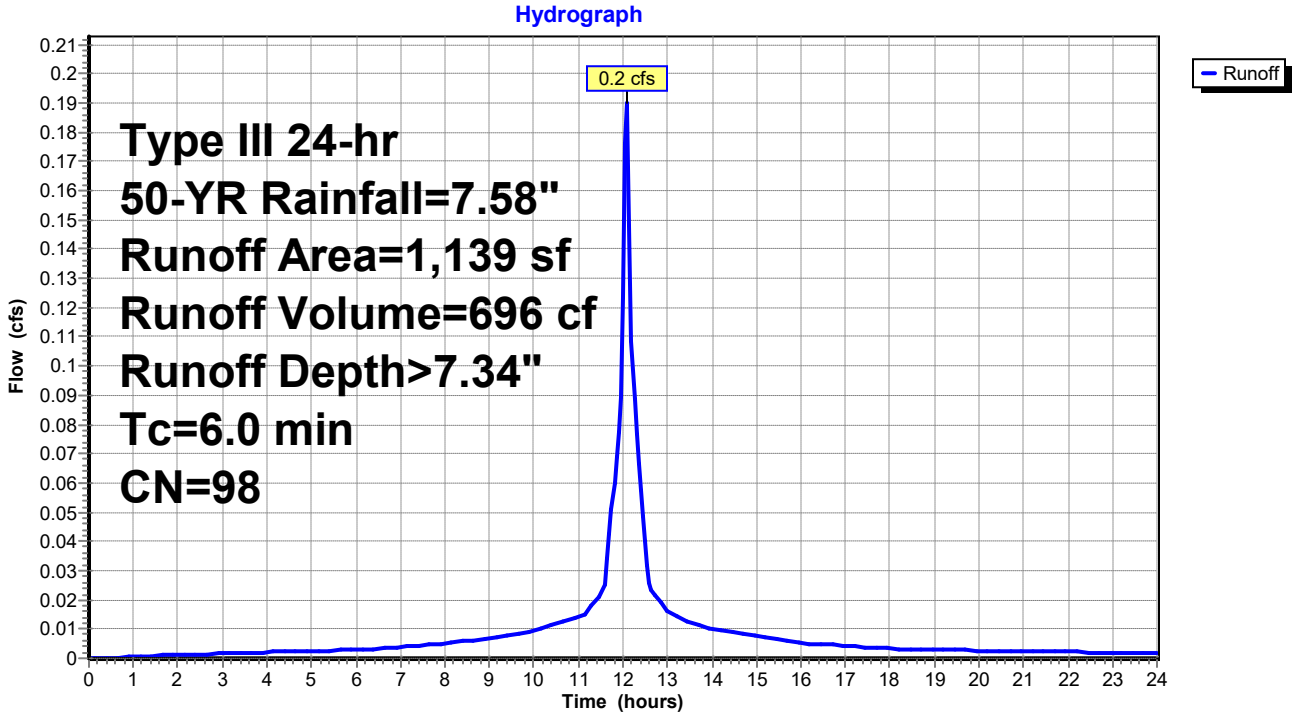
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 696 cf, Depth> 7.34"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,118	98	Paved parking, HSG C
21	74	>75% Grass cover, Good, HSG C
1,139	98	Weighted Average
21		1.84% Pervious Area
1,118		98.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 15S: PR-15



Summary for Subcatchment 16S: PR-16

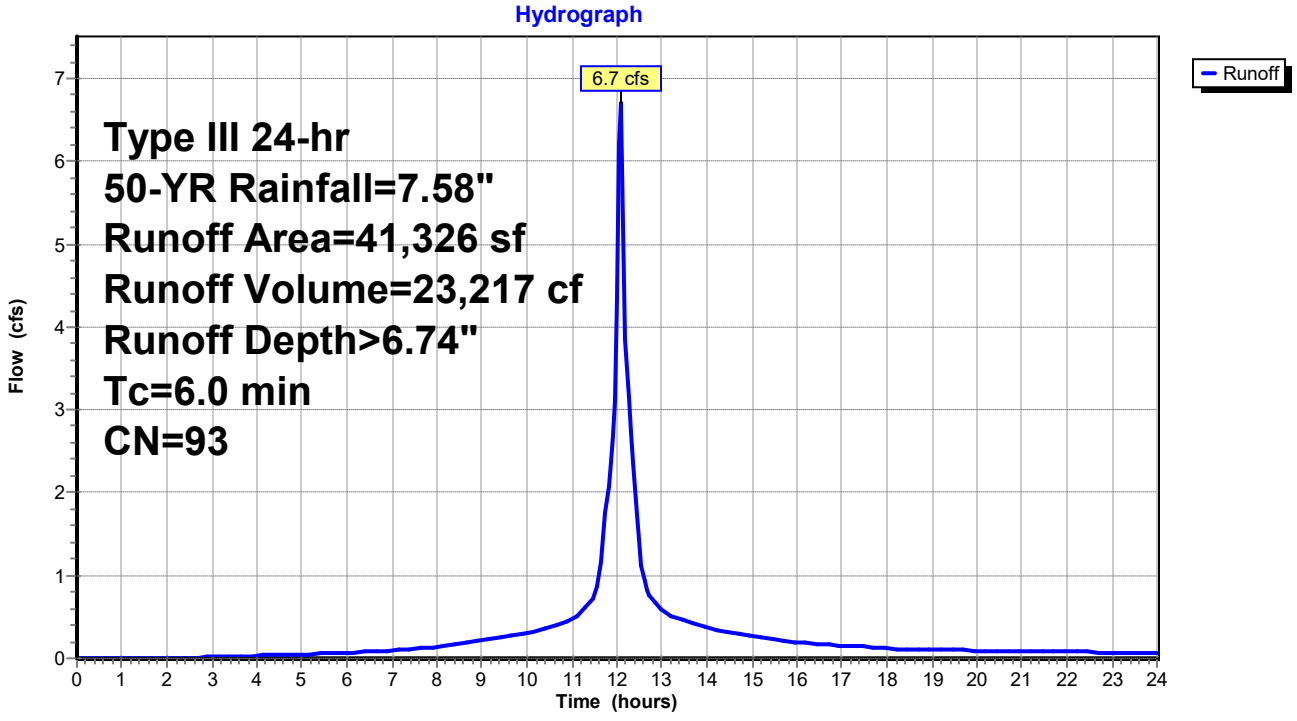
Runoff = 6.7 cfs @ 12.09 hrs, Volume= 23,217 cf, Depth> 6.74"
Routed to Link 2L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
32,824	98	Paved parking, HSG C
8,502	74	>75% Grass cover, Good, HSG C
41,326	93	Weighted Average
8,502		20.57% Pervious Area
32,824		79.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 16S: PR-16



Summary for Pond 1P: DET SYSTEM

Inflow Area = 46,520 sf, 84.80% Impervious, Inflow Depth > 7.10" for 50-YR event
Inflow = 7.7 cfs @ 12.09 hrs, Volume= 27,525 cf
Outflow = 3.8 cfs @ 12.24 hrs, Volume= 27,352 cf, Atten= 50%, Lag= 9.3 min
Primary = 3.8 cfs @ 12.24 hrs, Volume= 27,352 cf
Routed to Link 1L : DP-1C

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 197.35' @ 12.24 hrs Surf.Area= 0.066 ac Storage= 0.132 af

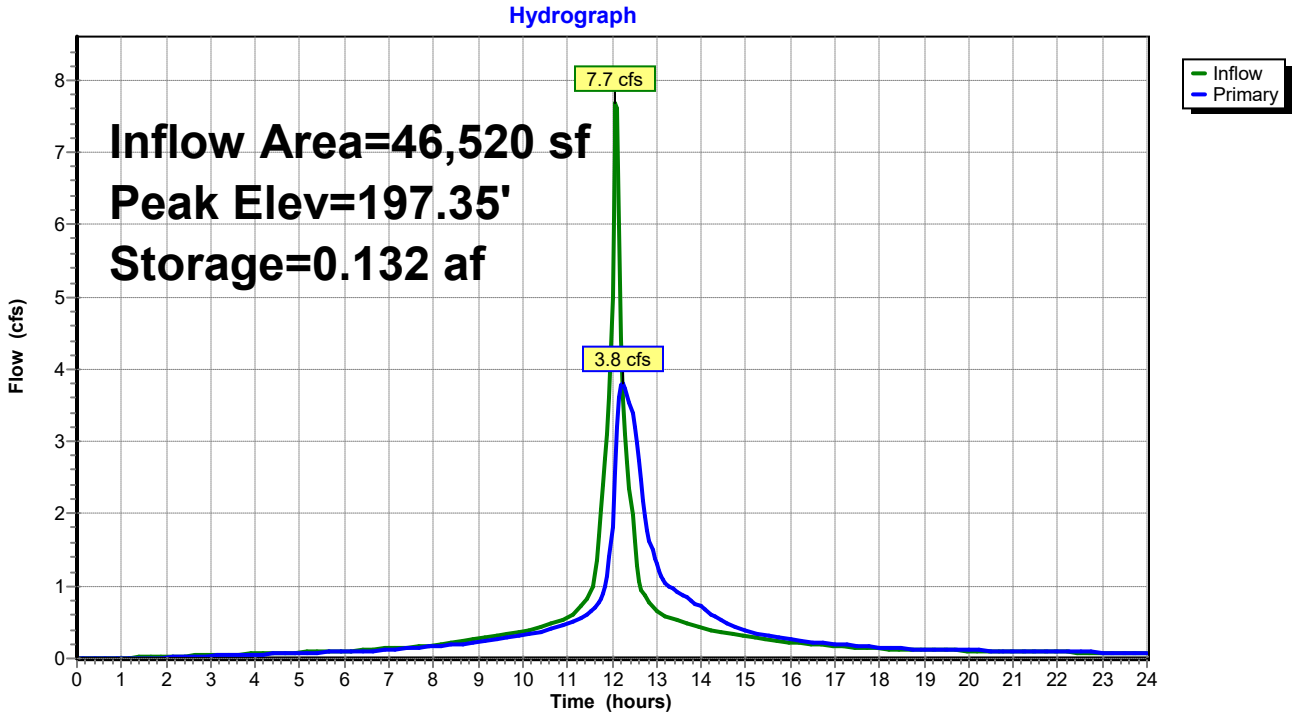
Plug-Flow detention time= 30.0 min calculated for 27,295 cf (99% of inflow)
Center-of-Mass det. time= 25.9 min (776.9 - 751.1)

Volume	Invert	Avail.Storage	Storage Description
#1	195.40'	0.158 af	**30.0" Round Pipe Storage** L= 1,400.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.29'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 195.29' / 194.66' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	195.40'	**7.0" Vert. 1-YR ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	196.30'	**12.0" W x 6.0" H Vert. 10-Year Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.8 cfs @ 12.24 hrs HW=197.35' (Free Discharge)
- **1=Culvert** (Passes 1.7 cfs of 7.6 cfs potential flow)
  - **2=1-YR ORIFICE** (Orifice Controls 1.7 cfs @ 6.20 fps)
- **3=10-Year Orifice** (Orifice Controls 2.1 cfs @ 4.29 fps)

Pond 1P: DET SYSTEM

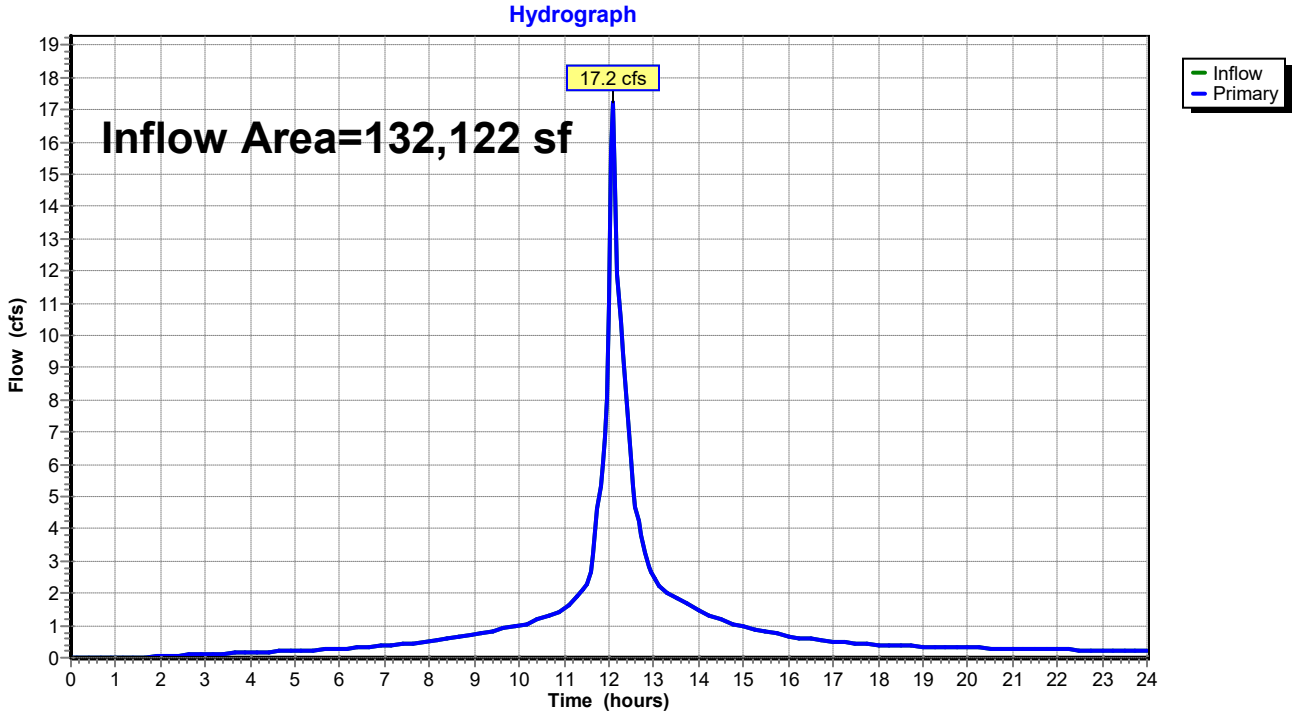


Summary for Link 1L: DP-1C

Inflow Area = 132,122 sf, 86.52% Impervious, Inflow Depth > 7.06" for 50-YR event
Inflow = 17.2 cfs @ 12.09 hrs, Volume= 77,685 cf
Primary = 17.2 cfs @ 12.09 hrs, Volume= 77,685 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1C

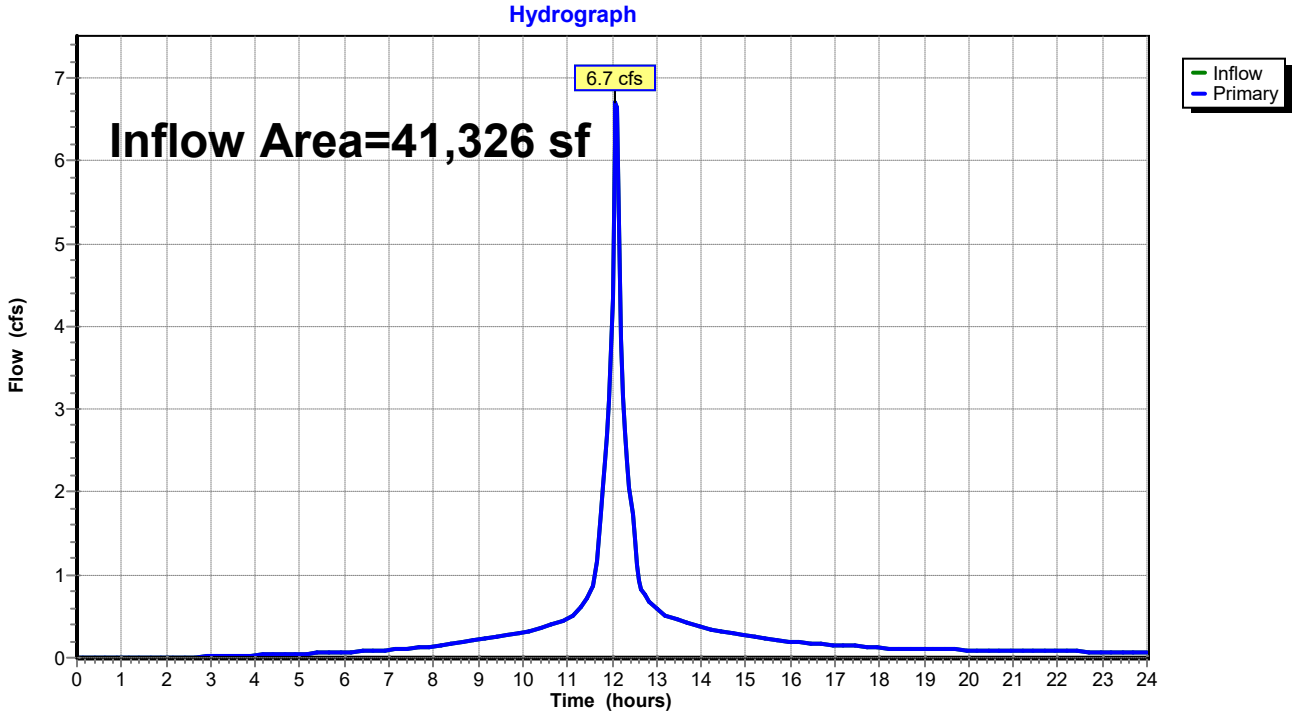


Summary for Link 2L: DP-1A

Inflow Area = 41,326 sf, 79.43% Impervious, Inflow Depth > 6.74" for 50-YR event
Inflow = 6.7 cfs @ 12.09 hrs, Volume= 23,217 cf
Primary = 6.7 cfs @ 12.09 hrs, Volume= 23,217 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1A

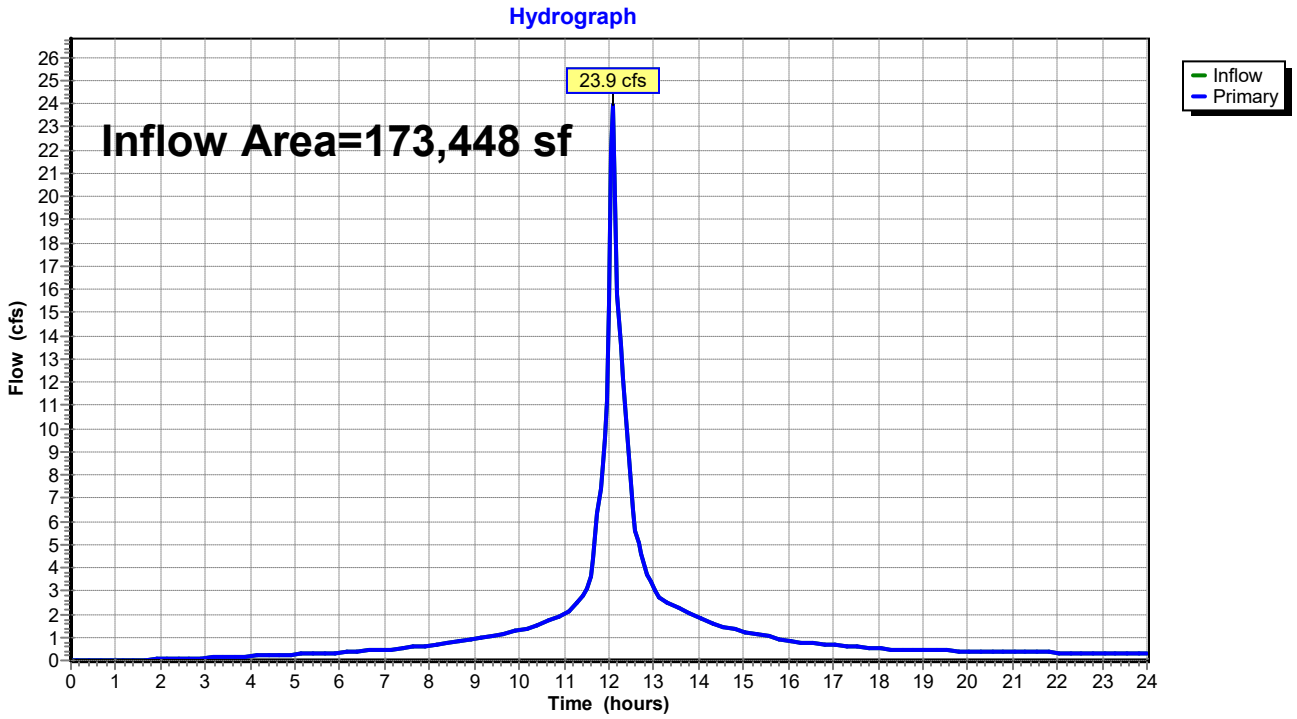


Summary for Link 3L: DP-1

Inflow Area = 173,448 sf, 84.83% Impervious, Inflow Depth > 6.98" for 50-YR event
Inflow = 23.9 cfs @ 12.09 hrs, Volume= 100,902 cf
Primary = 23.9 cfs @ 12.09 hrs, Volume= 100,902 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1



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

Subcatchment 1S: PR-1 Runoff Area=11,026 sf 92.38% Impervious Runoff Depth>8.52"
Tc=6.0 min CN=96 Runoff=2.2 cfs 7,832 cf

Subcatchment 2S: PR-2 Runoff Area=5,735 sf 63.50% Impervious Runoff Depth>8.52"
Tc=6.0 min CN=96 Runoff=1.1 cfs 4,073 cf

Subcatchment 3S: PR-3 Runoff Area=3,009 sf 83.35% Impervious Runoff Depth>8.76"
Tc=6.0 min CN=98 Runoff=0.6 cfs 2,198 cf

Subcatchment 4S: PR-4 Runoff Area=2,696 sf 52.78% Impervious Runoff Depth>8.76"
Tc=6.0 min CN=98 Runoff=0.5 cfs 1,969 cf

Subcatchment 5S: PR-5 Runoff Area=7,818 sf 100.00% Impervious Runoff Depth>8.76"
Tc=6.0 min CN=98 Runoff=1.6 cfs 5,710 cf

Subcatchment 6S: PR-6 Runoff Area=1,434 sf 82.64% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=94 Runoff=0.3 cfs 990 cf

Subcatchment 7S: PR-7 Runoff Area=4,439 sf 97.70% Impervious Runoff Depth>8.64"
Tc=6.0 min CN=97 Runoff=0.9 cfs 3,198 cf

Subcatchment 8S: PR-8 Runoff Area=2,998 sf 98.70% Impervious Runoff Depth>8.76"
Tc=6.0 min CN=98 Runoff=0.6 cfs 2,190 cf

Subcatchment 9S: PR-9 Runoff Area=1,605 sf 64.49% Impervious Runoff Depth>7.67"
Tc=6.0 min CN=89 Runoff=0.3 cfs 1,026 cf

Subcatchment 10S: PR-10 Runoff Area=1,983 sf 92.54% Impervious Runoff Depth>8.52"
Tc=6.0 min CN=96 Runoff=0.4 cfs 1,408 cf

Subcatchment 11S: PR-11 Runoff Area=3,777 sf 66.80% Impervious Runoff Depth>7.80"
Tc=6.0 min CN=90 Runoff=0.7 cfs 2,454 cf

Subcatchment 12S: PR-12 Runoff Area=13,212 sf 81.45% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=94 Runoff=2.6 cfs 9,118 cf

Subcatchment 13S: PR-13 Runoff Area=69,259 sf 88.70% Impervious Runoff Depth>8.52"
Tc=6.0 min CN=96 Runoff=13.7 cfs 49,193 cf

Subcatchment 14S: PR-14 Runoff Area=1,992 sf 77.41% Impervious Runoff Depth>8.16"
Tc=6.0 min CN=93 Runoff=0.4 cfs 1,355 cf

Subcatchment 15S: PR-15 Runoff Area=1,139 sf 98.16% Impervious Runoff Depth>8.76"
Tc=6.0 min CN=98 Runoff=0.2 cfs 832 cf

Subcatchment 16S: PR-16 Runoff Area=41,326 sf 79.43% Impervious Runoff Depth>8.16"
Tc=6.0 min CN=93 Runoff=8.0 cfs 28,103 cf

Pond 1P: DET SYSTEM Peak Elev=197.82' Storage=0.156 af Inflow=9.2 cfs 33,047 cf
Outflow=4.6 cfs 32,850 cf

Link 1L: DP-1C Inflow=20.5 cfs 93,348 cf
Primary=20.5 cfs 93,348 cf

Link 2L: DP-1A Inflow=8.0 cfs 28,103 cf
Primary=8.0 cfs 28,103 cf

Link 3L: DP-1 Inflow=28.5 cfs 121,451 cf
Primary=28.5 cfs 121,451 cf

Total Runoff Area = 173,448 sf Runoff Volume = 121,649 cf Average Runoff Depth = 8.42"
15.17% Pervious = 26,317 sf 84.83% Impervious = 147,131 sf

Summary for Subcatchment 1S: PR-1

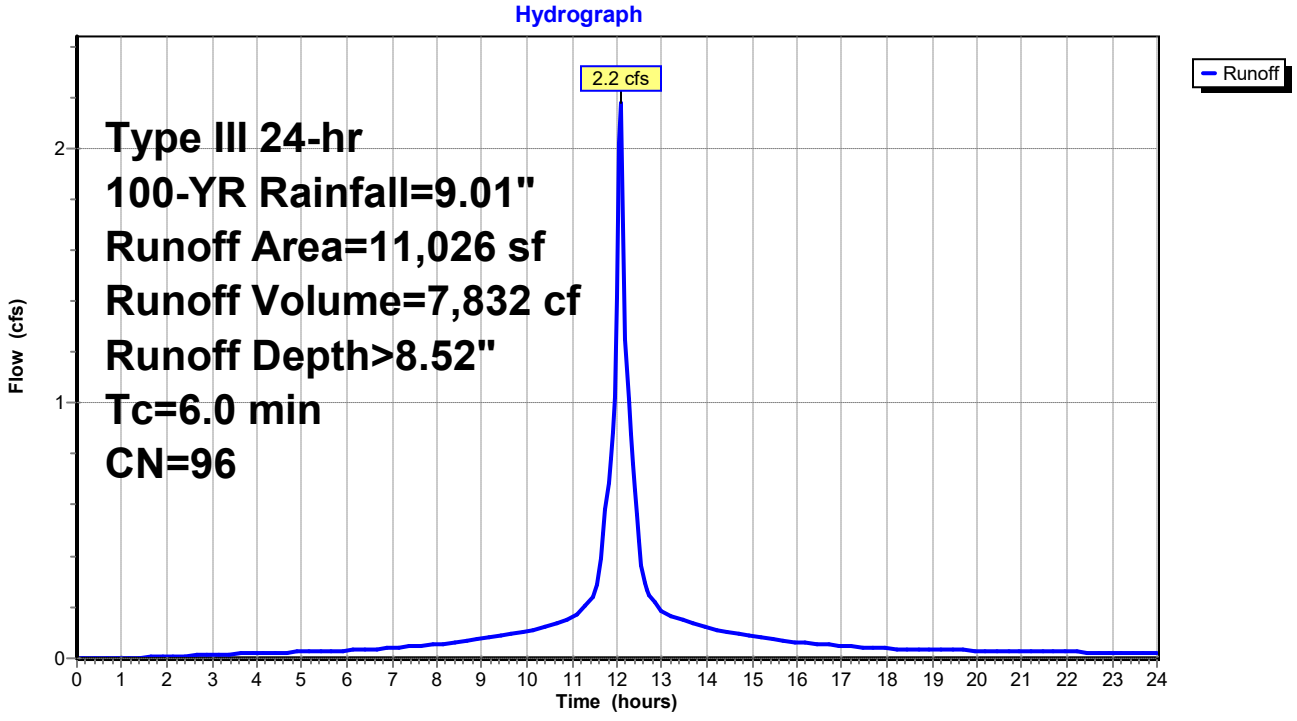
Runoff = 2.2 cfs @ 12.09 hrs, Volume= 7,832 cf, Depth> 8.52"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
10,186	98	Paved parking, HSG C
840	74	>75% Grass cover, Good, HSG C
11,026	96	Weighted Average
840		7.62% Pervious Area
10,186		92.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-1



Summary for Subcatchment 2S: PR-2

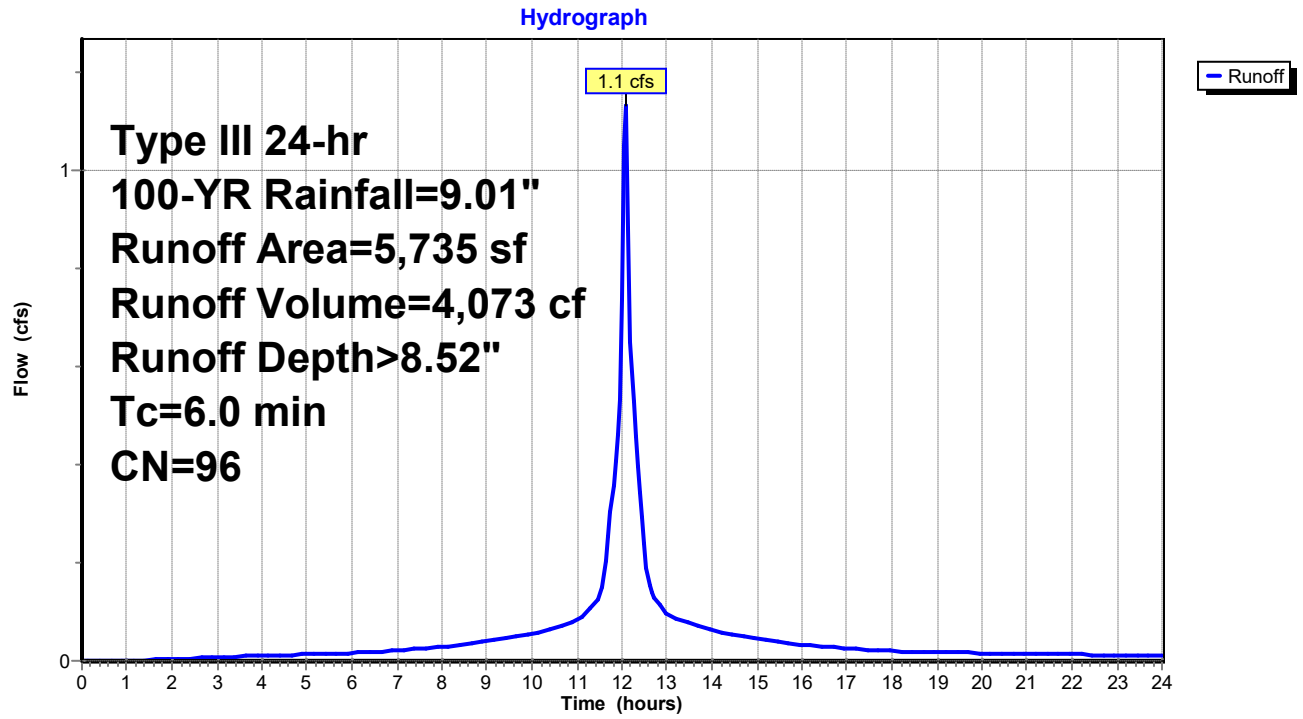
Runoff = 1.1 cfs @ 12.09 hrs, Volume= 4,073 cf, Depth> 8.52"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

	Area (sf)	CN	Description
	3,642	98	Roofs, HSG C
*	1,726	97	Extensive Green Roof
*	367	74	Stormwater Planter
	5,735	96	Weighted Average
	2,093		36.50% Pervious Area
	3,642		63.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-2



Summary for Subcatchment 3S: PR-3

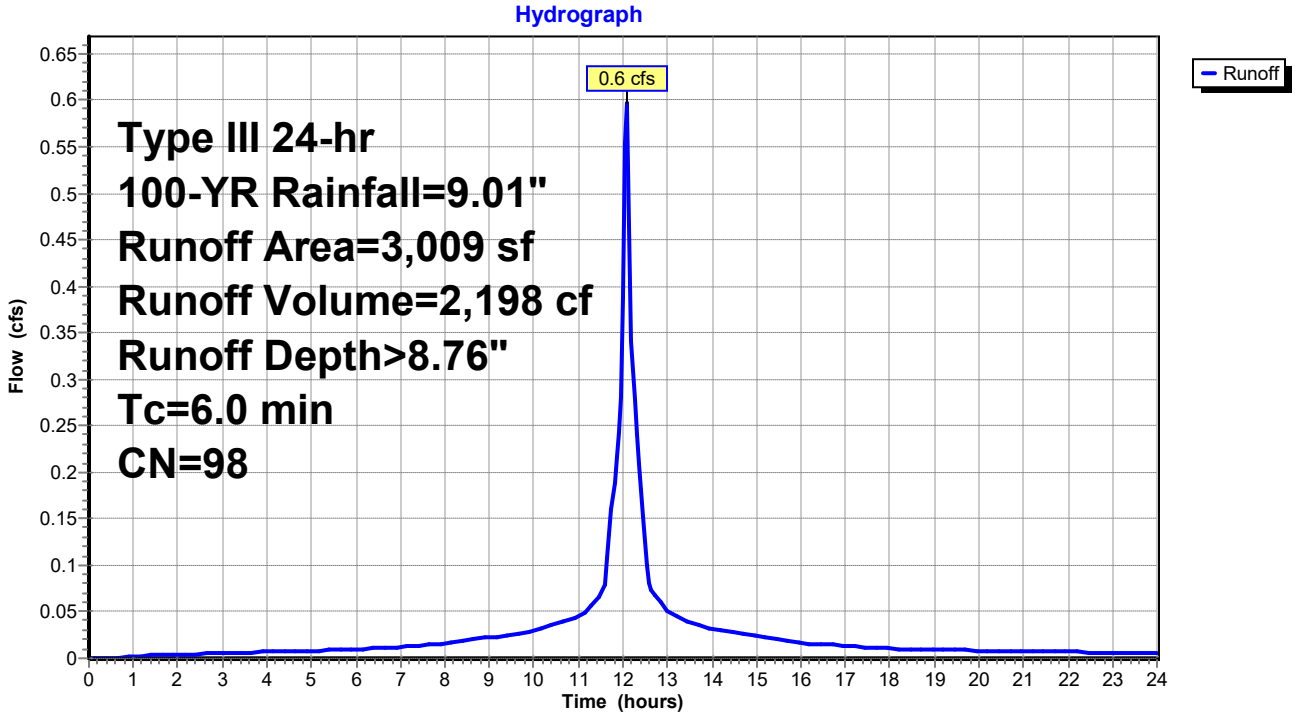
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,198 cf, Depth> 8.76"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

	Area (sf)	CN	Description
	2,508	98	Roofs, HSG C
*	501	97	Extensive Green Roof
	3,009	98	Weighted Average
	501		16.65% Pervious Area
	2,508		83.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-3



Summary for Subcatchment 4S: PR-4

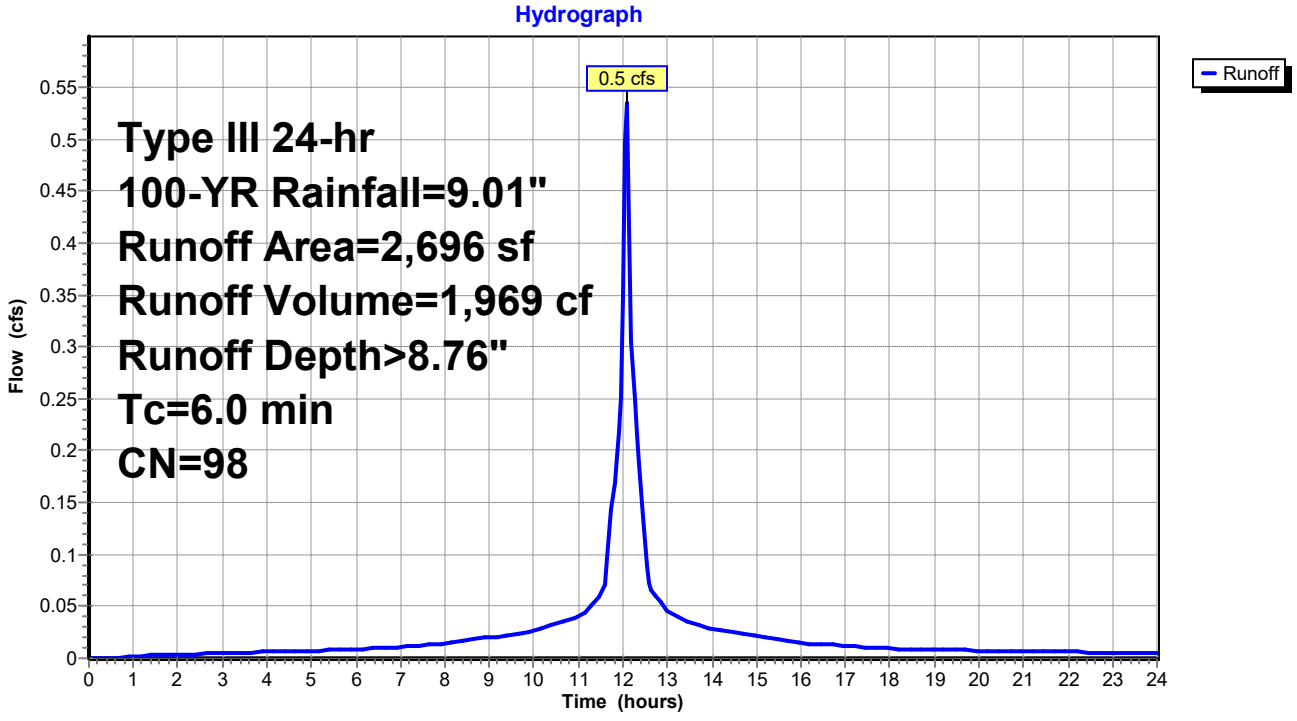
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,969 cf, Depth> 8.76"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

	Area (sf)	CN	Description
	1,423	98	Roofs, HSG C
*	1,273	97	Extensive Green Roof
	2,696	98	Weighted Average
	1,273		47.22% Pervious Area
	1,423		52.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-4



Summary for Subcatchment 5S: PR-5

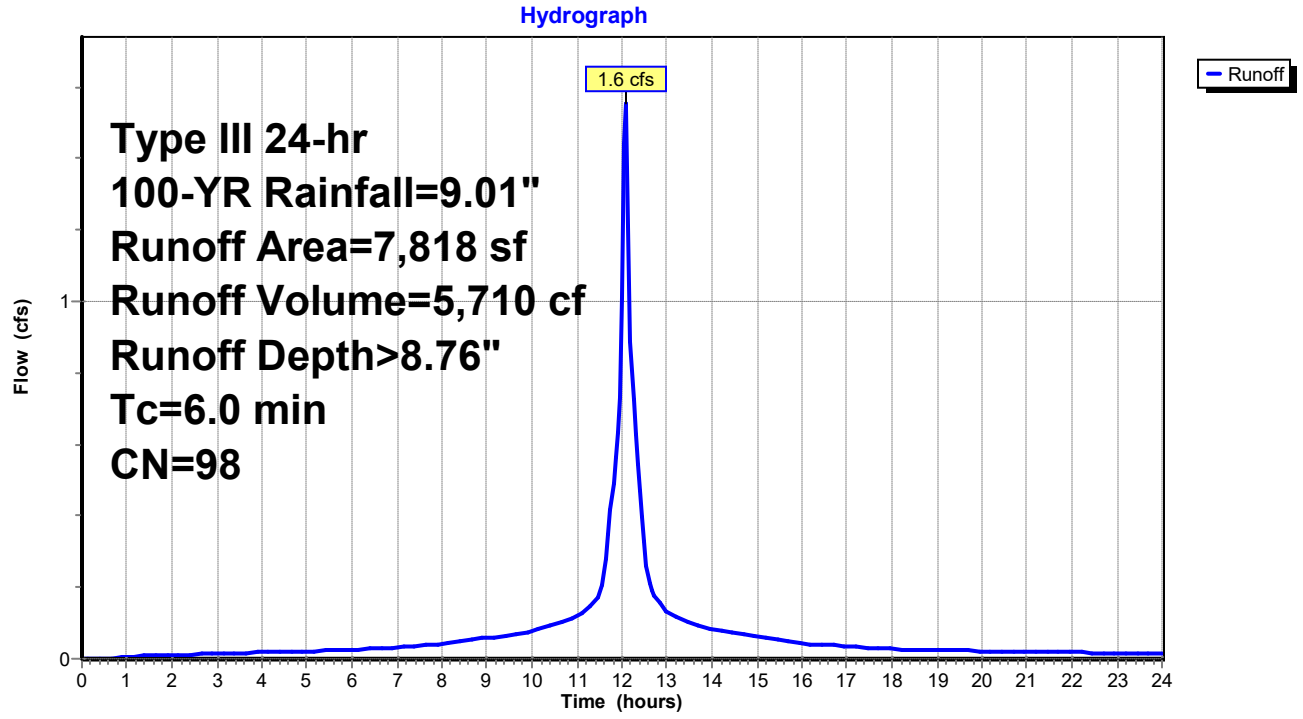
Runoff = 1.6 cfs @ 12.09 hrs, Volume= 5,710 cf, Depth> 8.76"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

	Area (sf)	CN	Description
	4,421	98	Roofs, HSG C
*	3,397	98	Intensive Green Roof
	7,818	98	Weighted Average
	7,818		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PR-5



Summary for Subcatchment 6S: PR-6

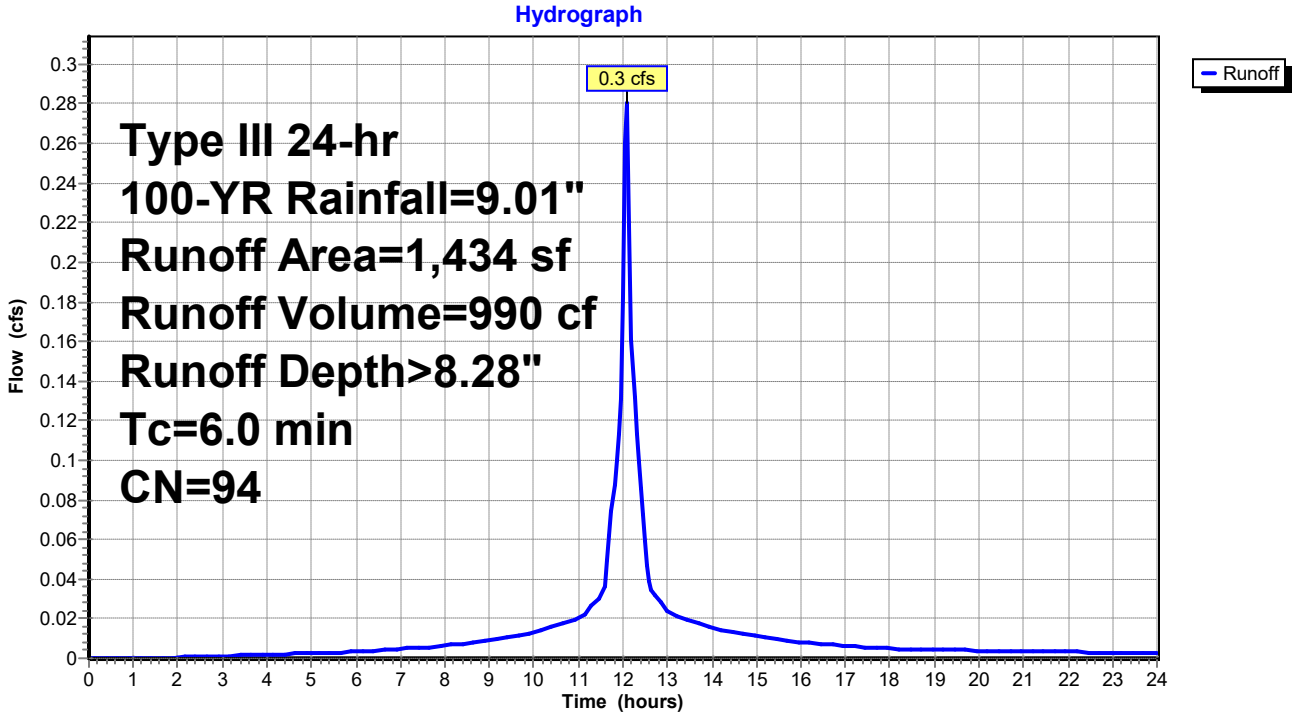
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 990 cf, Depth> 8.28"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,185	98	Paved parking, HSG C
249	74	>75% Grass cover, Good, HSG C
1,434	94	Weighted Average
249		17.36% Pervious Area
1,185		82.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PR-6



Summary for Subcatchment 7S: PR-7

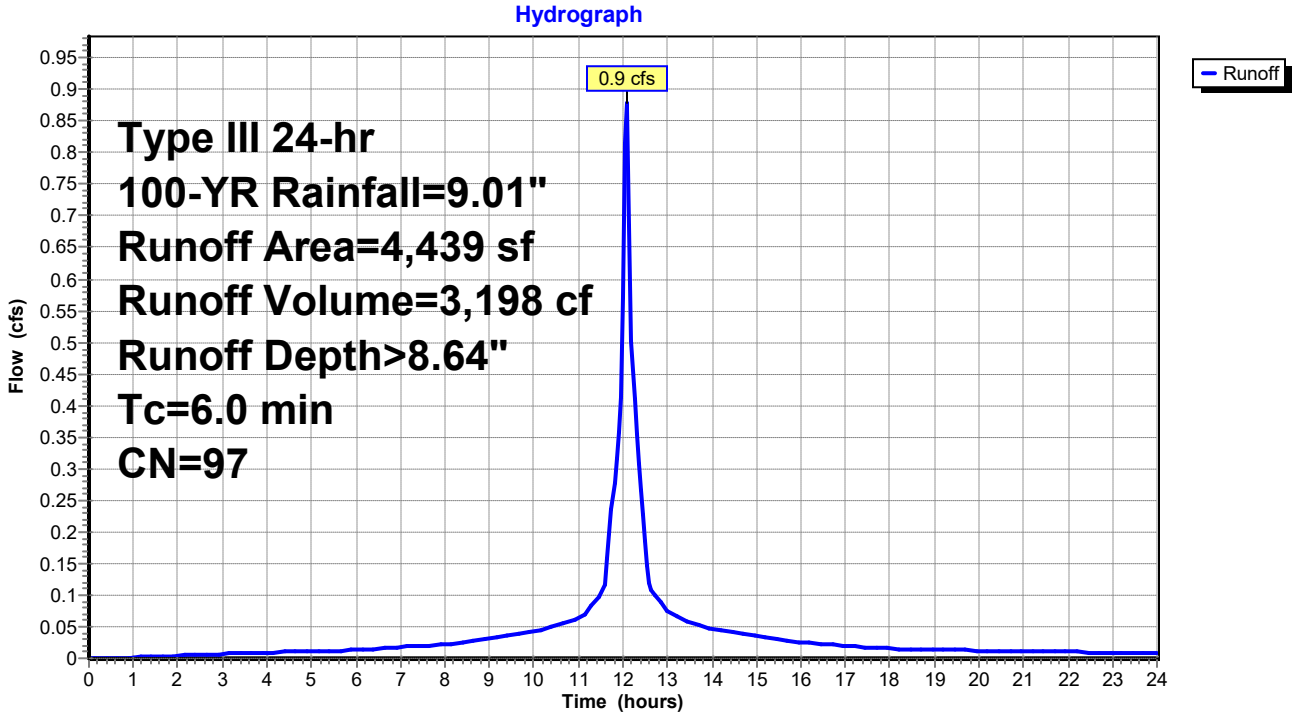
Runoff = 0.9 cfs @ 12.09 hrs, Volume= 3,198 cf, Depth> 8.64"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
4,337	98	Paved parking, HSG C
102	74	>75% Grass cover, Good, HSG C
4,439	97	Weighted Average
102		2.30% Pervious Area
4,337		97.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PR-7



Summary for Subcatchment 8S: PR-8

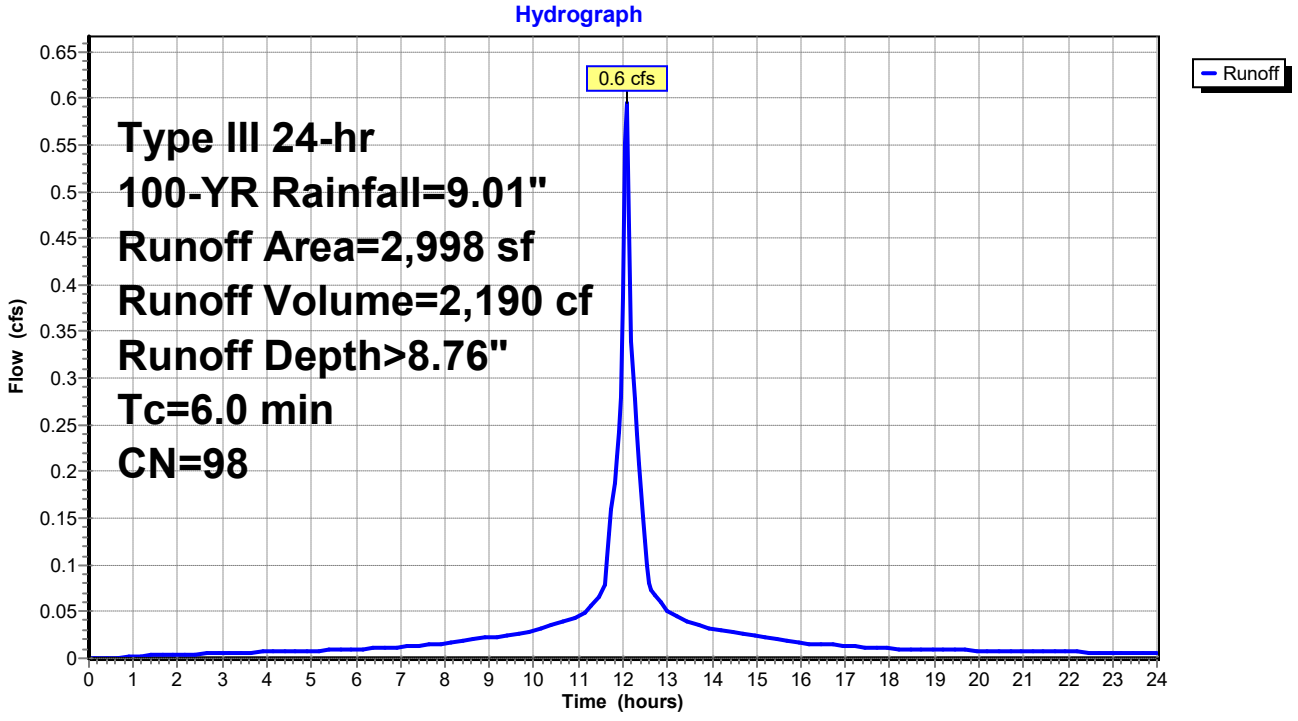
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,190 cf, Depth> 8.76"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
2,959	98	Paved parking, HSG C
39	74	>75% Grass cover, Good, HSG C
2,998	98	Weighted Average
39		1.30% Pervious Area
2,959		98.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PR-8



Summary for Subcatchment 9S: PR-9

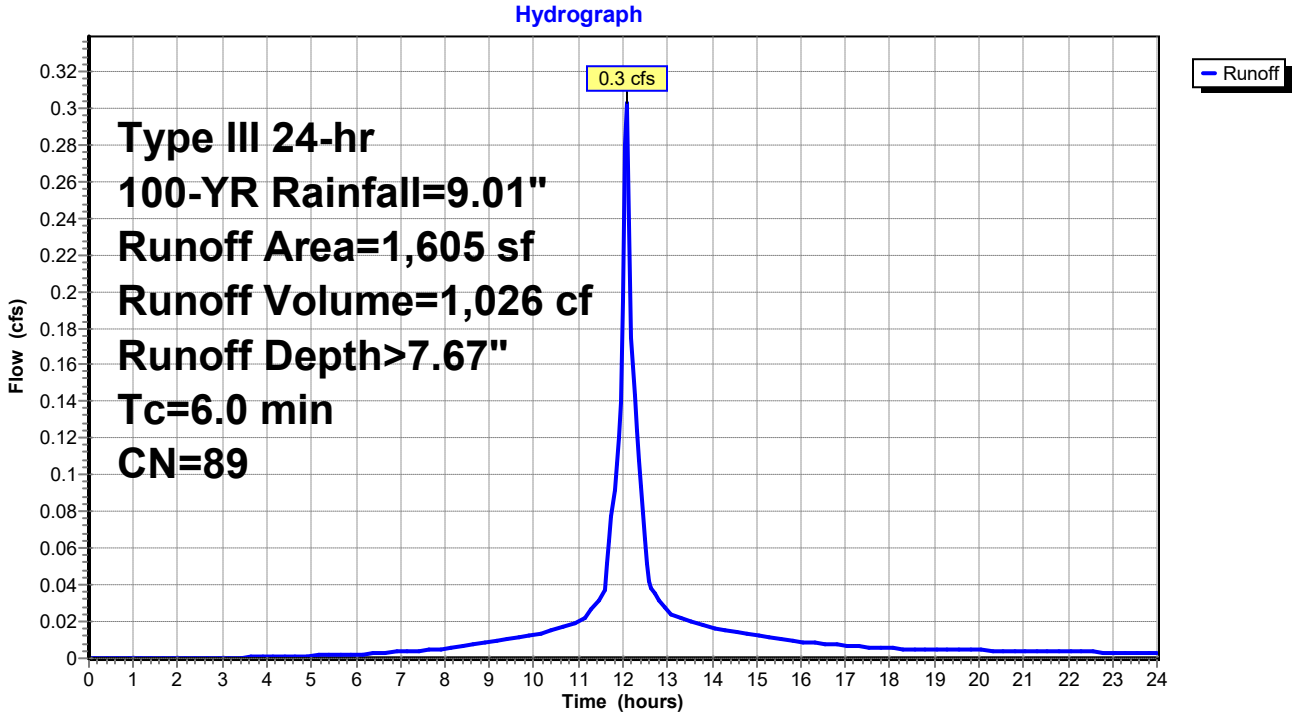
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,026 cf, Depth> 7.67"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,035	98	Paved parking, HSG C
570	74	>75% Grass cover, Good, HSG C
1,605	89	Weighted Average
570		35.51% Pervious Area
1,035		64.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S: PR-9



Summary for Subcatchment 10S: PR-10

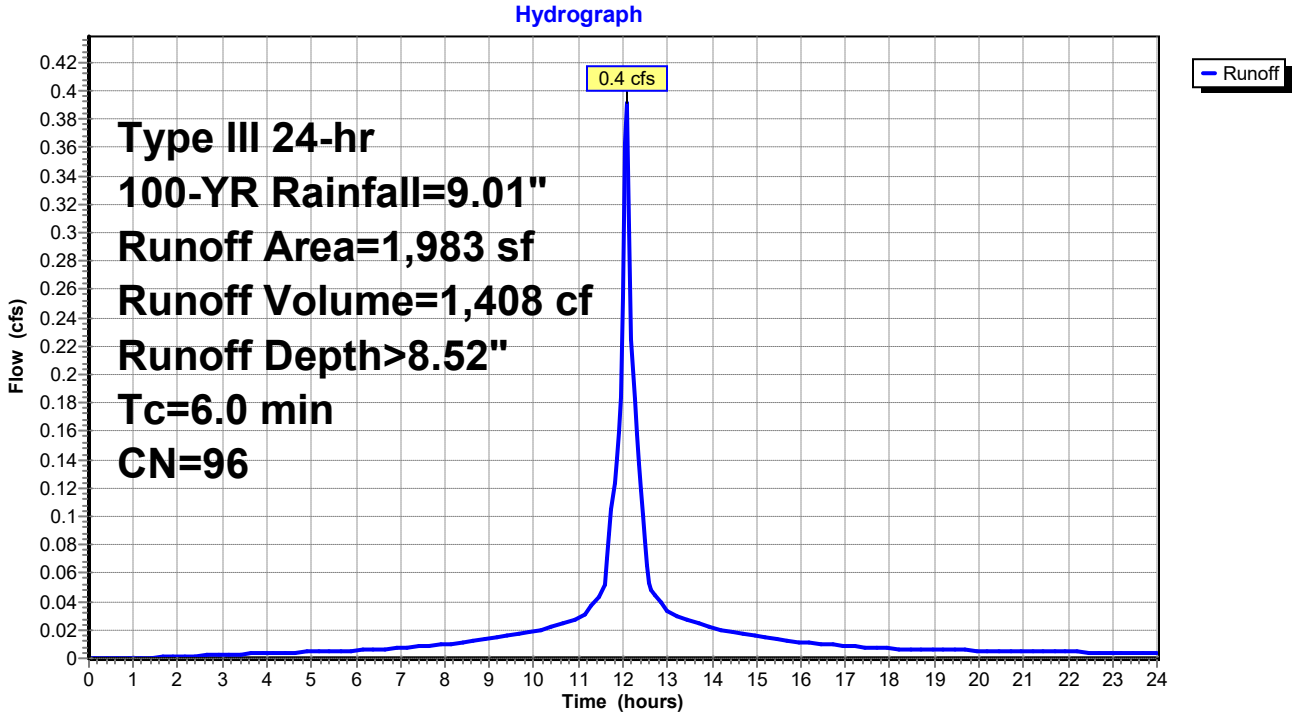
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,408 cf, Depth> 8.52"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,835	98	Paved parking, HSG C
148	74	>75% Grass cover, Good, HSG C
1,983	96	Weighted Average
148		7.46% Pervious Area
1,835		92.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S: PR-10



Summary for Subcatchment 11S: PR-11

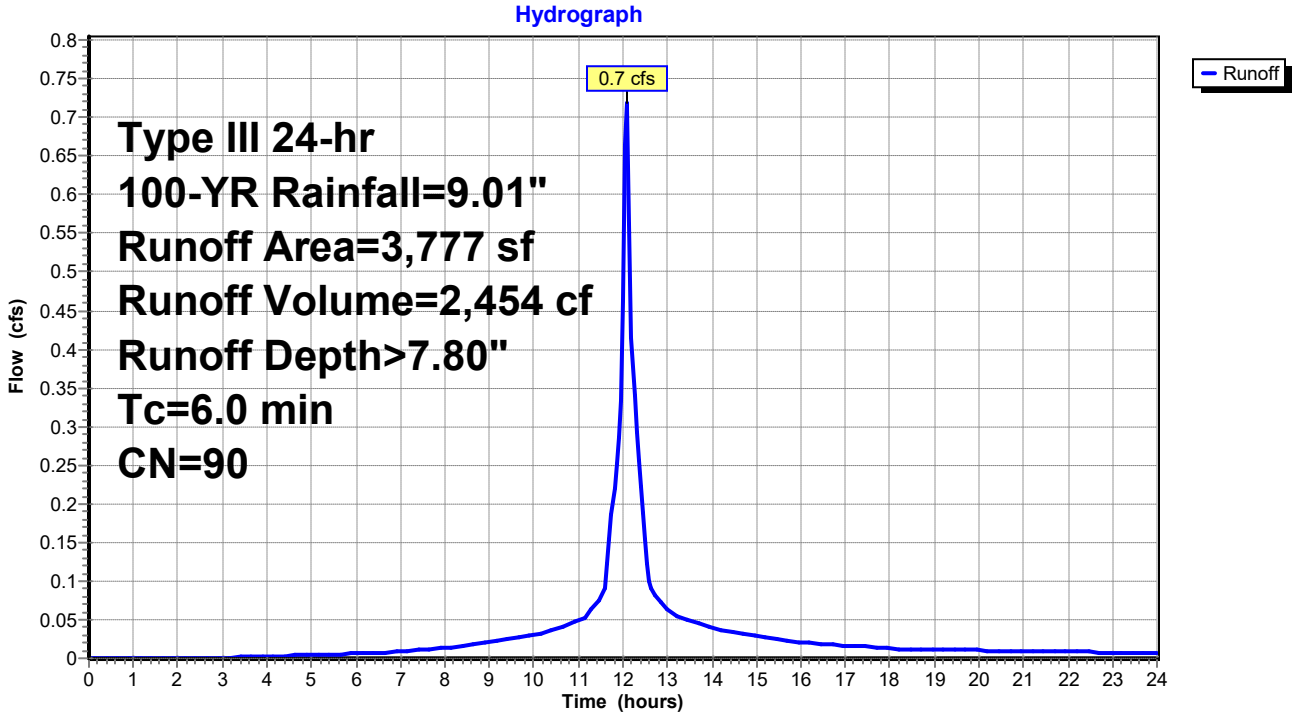
Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,454 cf, Depth> 7.80"
Routed to Pond 1P : DET SYSTEM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
2,523	98	Paved parking, HSG C
1,254	74	>75% Grass cover, Good, HSG C
3,777	90	Weighted Average
1,254		33.20% Pervious Area
2,523		66.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 11S: PR-11



Summary for Subcatchment 12S: PR-12

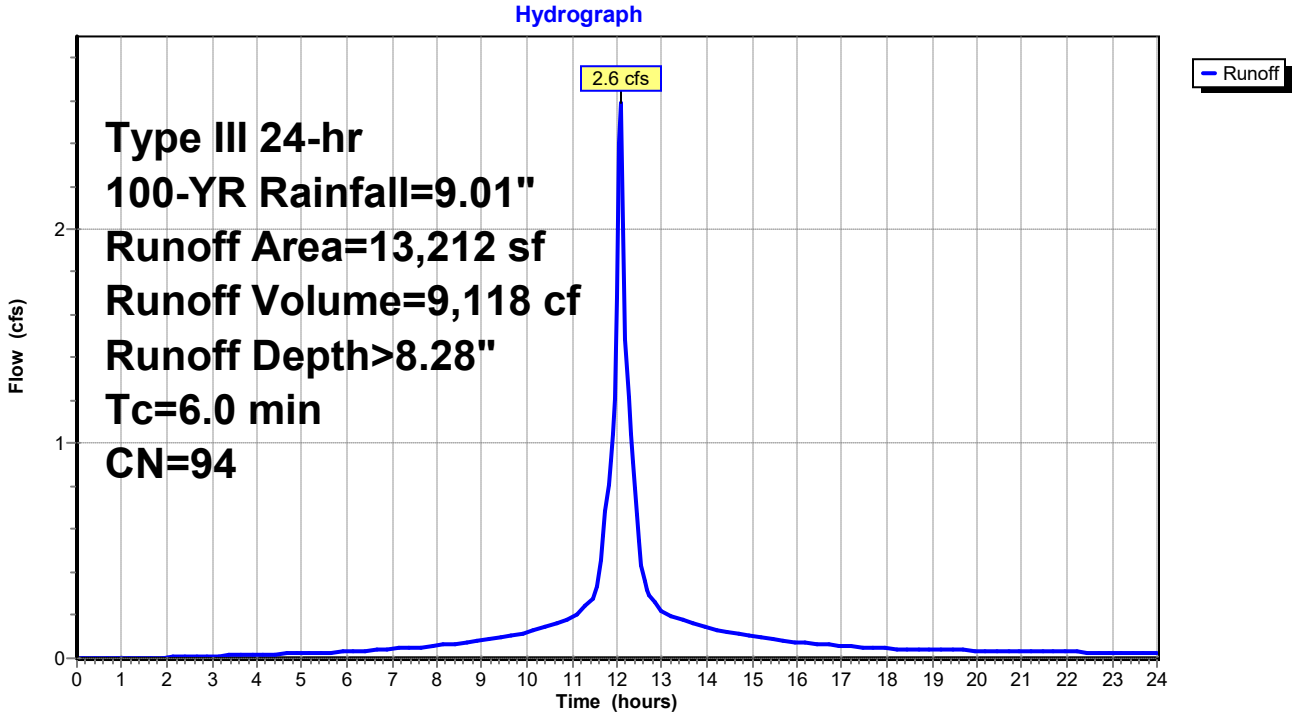
Runoff = 2.6 cfs @ 12.09 hrs, Volume= 9,118 cf, Depth> 8.28"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
10,761	98	Paved parking, HSG C
2,451	74	>75% Grass cover, Good, HSG C
13,212	94	Weighted Average
2,451		18.55% Pervious Area
10,761		81.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S: PR-12



Summary for Subcatchment 13S: PR-13

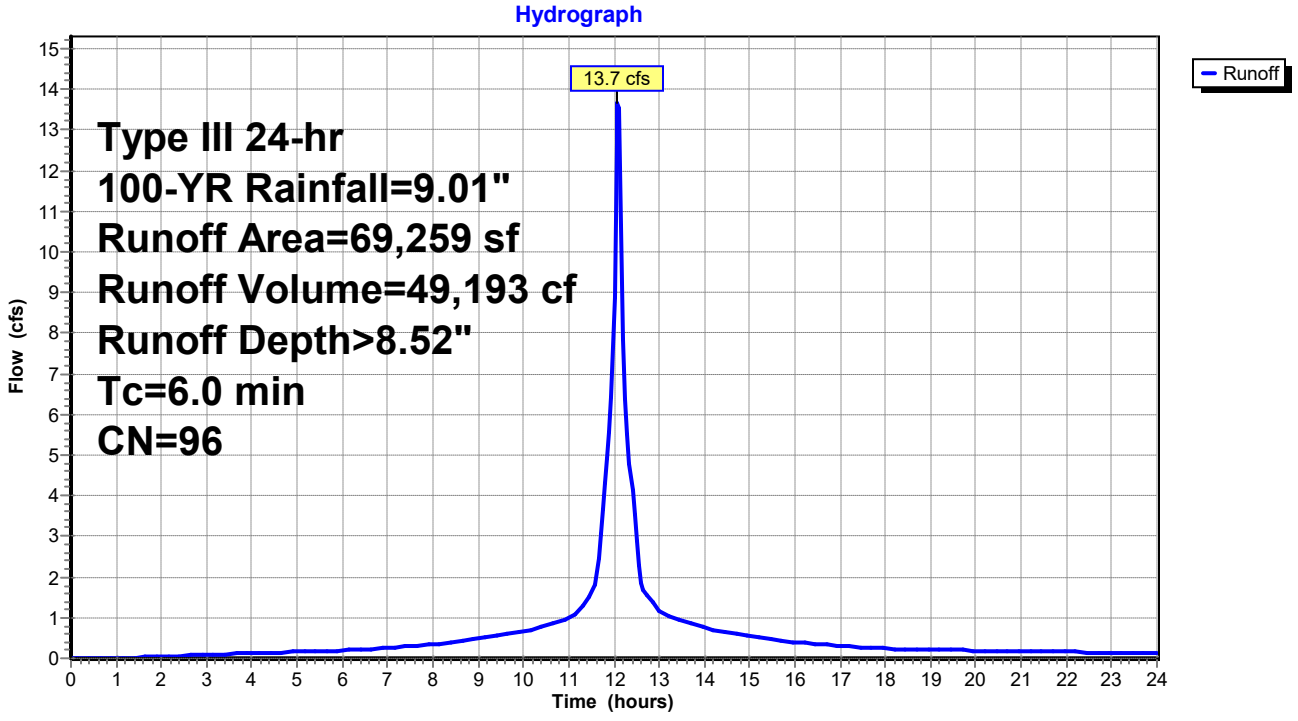
Runoff = 13.7 cfs @ 12.09 hrs, Volume= 49,193 cf, Depth> 8.52"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
61,435	98	Paved parking, HSG C
7,824	79	50-75% Grass cover, Fair, HSG C
69,259	96	Weighted Average
7,824		11.30% Pervious Area
61,435		88.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S: PR-13



Summary for Subcatchment 14S: PR-14

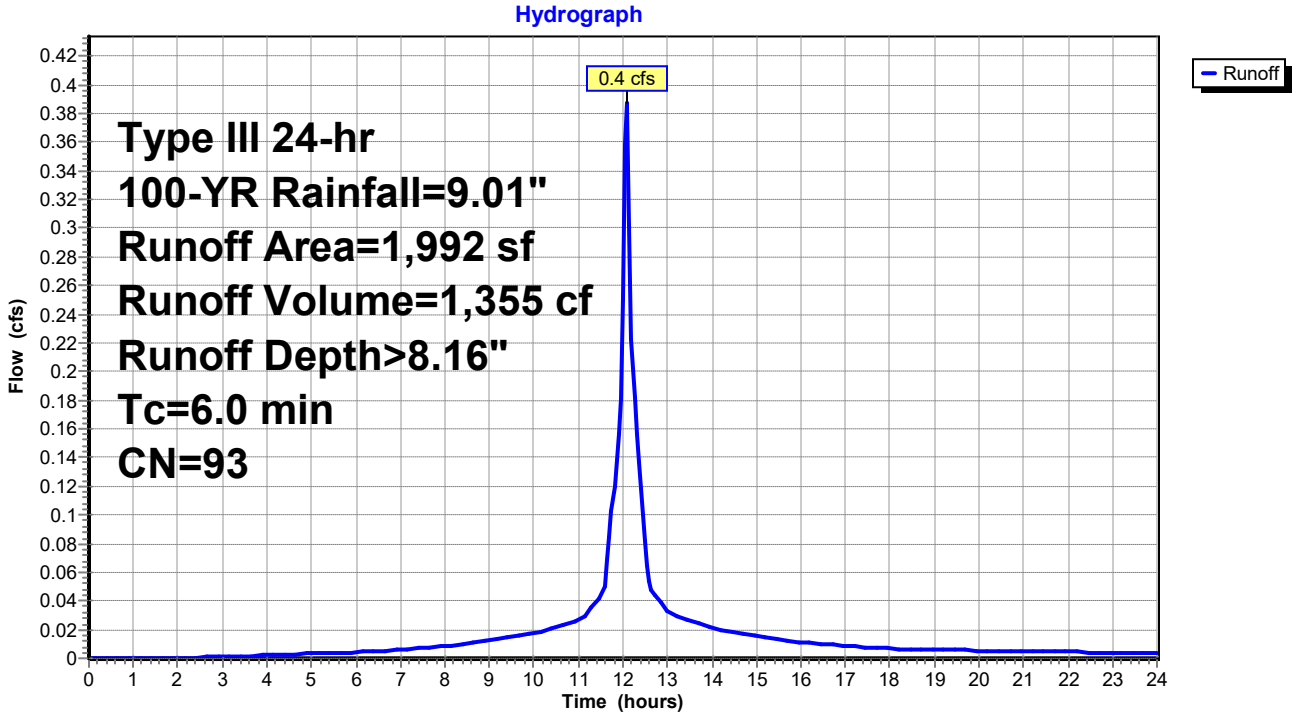
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,355 cf, Depth> 8.16"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,542	98	Paved parking, HSG C
450	74	>75% Grass cover, Good, HSG C
1,992	93	Weighted Average
450		22.59% Pervious Area
1,542		77.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 14S: PR-14



Summary for Subcatchment 15S: PR-15

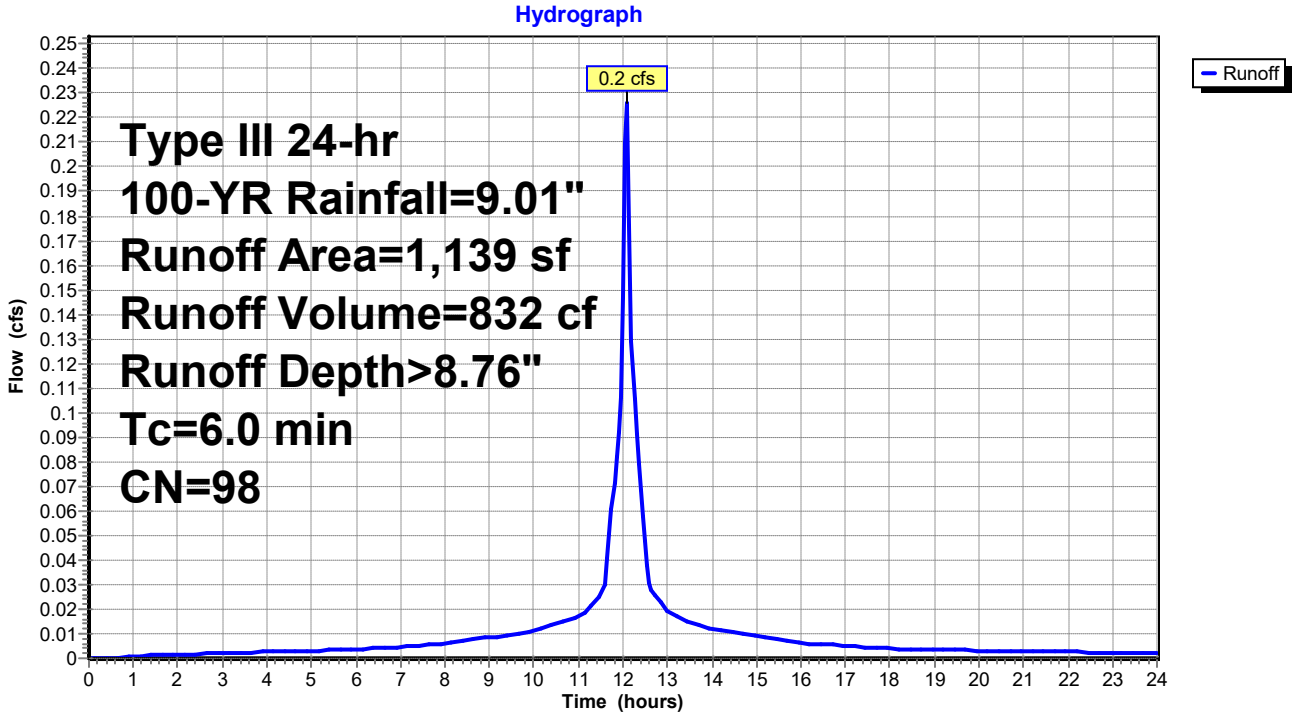
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 832 cf, Depth> 8.76"
Routed to Link 1L : DP-1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,118	98	Paved parking, HSG C
21	74	>75% Grass cover, Good, HSG C
1,139	98	Weighted Average
21		1.84% Pervious Area
1,118		98.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 15S: PR-15



Summary for Subcatchment 16S: PR-16

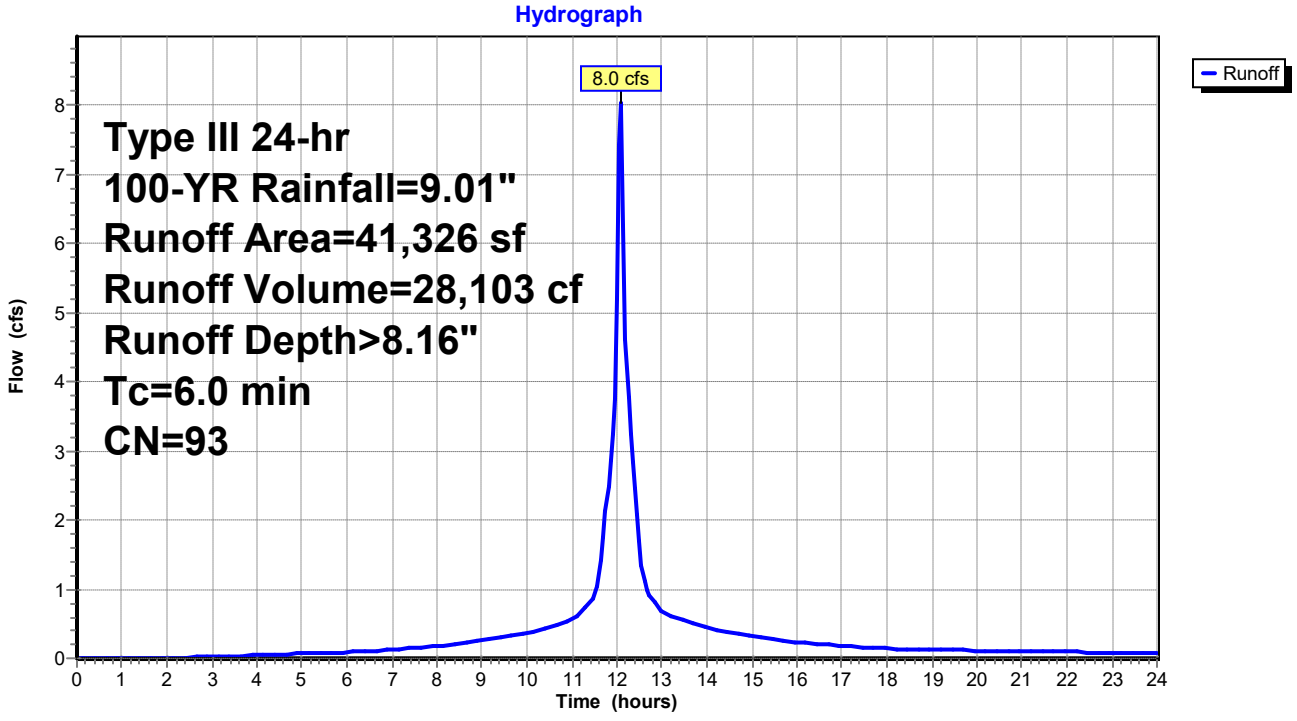
Runoff = 8.0 cfs @ 12.09 hrs, Volume= 28,103 cf, Depth> 8.16"
Routed to Link 2L : DP-1A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
32,824	98	Paved parking, HSG C
8,502	74	>75% Grass cover, Good, HSG C
41,326	93	Weighted Average
8,502		20.57% Pervious Area
32,824		79.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 16S: PR-16



Summary for Pond 1P: DET SYSTEM

Inflow Area = 46,520 sf, 84.80% Impervious, Inflow Depth > 8.52" for 100-YR event
Inflow = 9.2 cfs @ 12.09 hrs, Volume= 33,047 cf
Outflow = 4.6 cfs @ 12.24 hrs, Volume= 32,850 cf, Atten= 50%, Lag= 9.2 min
Primary = 4.6 cfs @ 12.24 hrs, Volume= 32,850 cf
Routed to Link 1L : DP-1C

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 197.82' @ 12.24 hrs Surf.Area= 0.029 ac Storage= 0.156 af

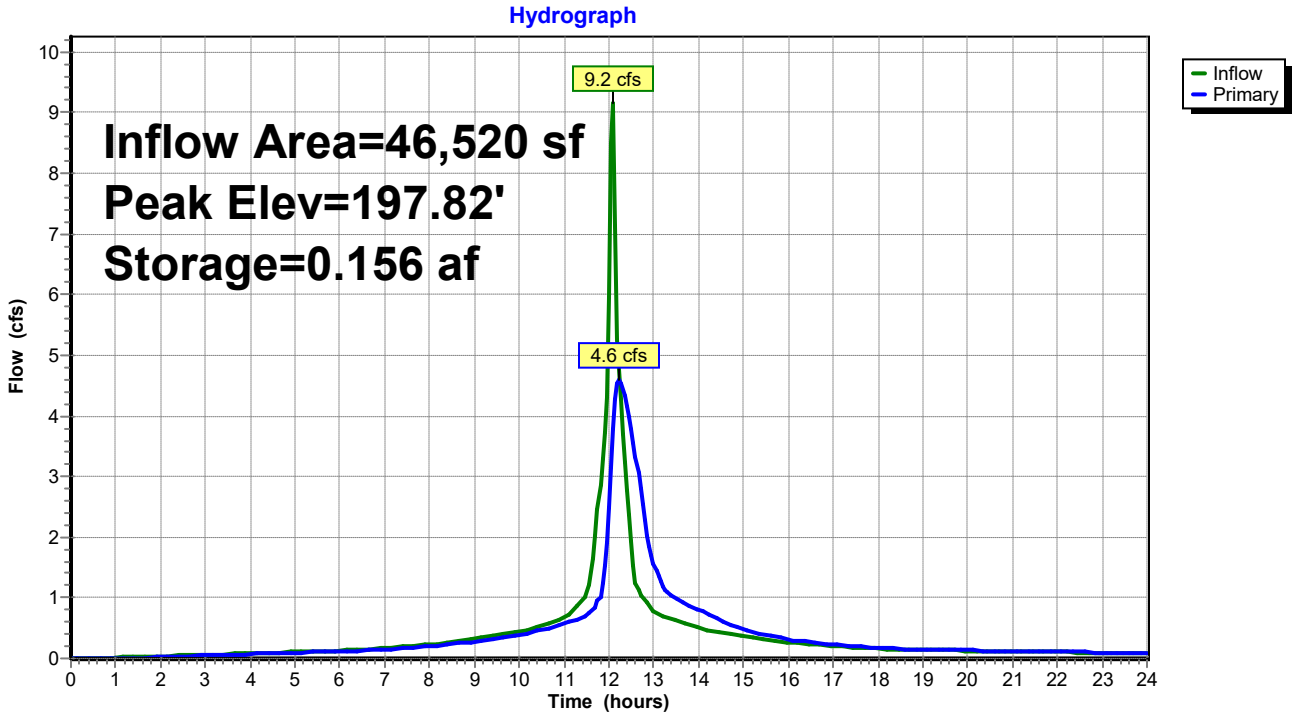
Plug-Flow detention time= 29.5 min calculated for 32,781 cf (99% of inflow)
Center-of-Mass det. time= 25.5 min (773.7 - 748.2)

Volume	Invert	Avail.Storage	Storage Description
#1	195.40'	0.158 af	**30.0" Round Pipe Storage** L= 1,400.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.29'	**18.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 195.29' / 194.66' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	195.40'	**7.0" Vert. 1-YR ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	196.30'	**12.0" W x 6.0" H Vert. 10-Year Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.6 cfs @ 12.24 hrs HW=197.81' (Free Discharge)
- **1=Culvert** (Passes 1.9 cfs of 8.9 cfs potential flow)
  - **2=1-YR ORIFICE** (Orifice Controls 1.9 cfs @ 7.01 fps)
- **3=10-Year Orifice** (Orifice Controls 2.7 cfs @ 5.39 fps)

Pond 1P: DET SYSTEM

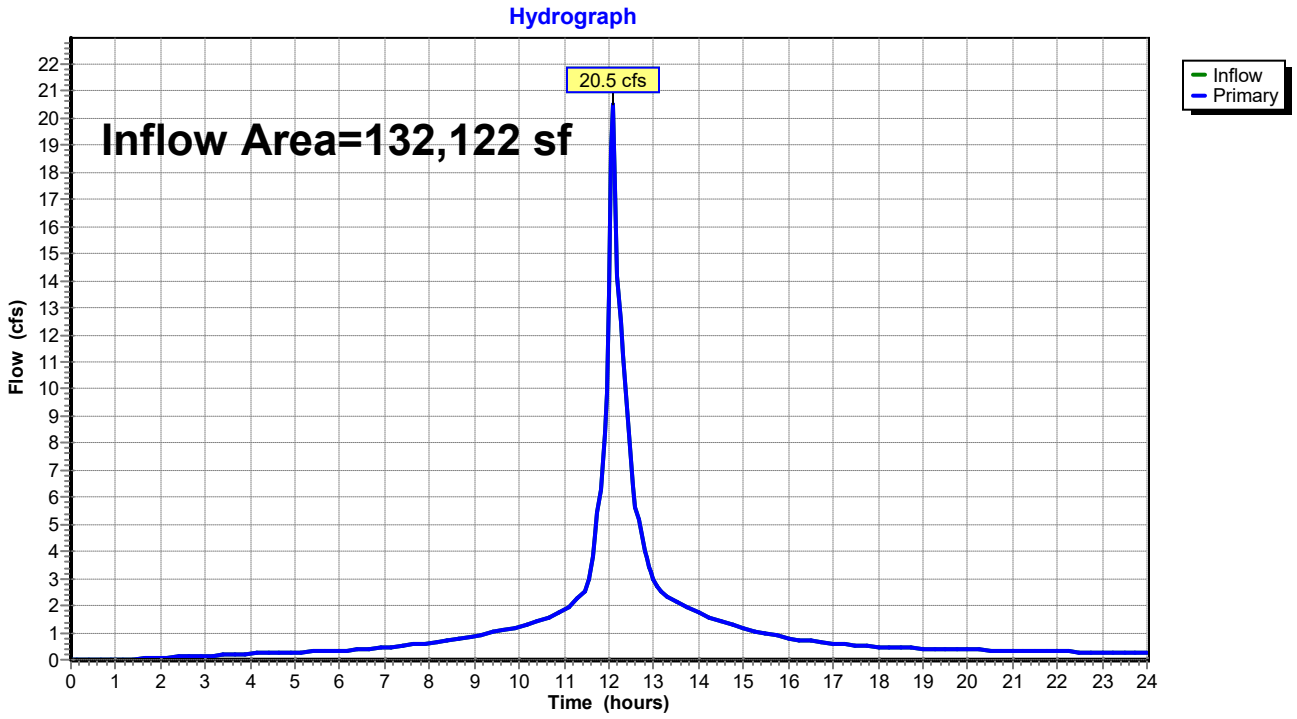


Summary for Link 1L: DP-1C

Inflow Area = 132,122 sf, 86.52% Impervious, Inflow Depth > 8.48" for 100-YR event
Inflow = 20.5 cfs @ 12.09 hrs, Volume= 93,348 cf
Primary = 20.5 cfs @ 12.09 hrs, Volume= 93,348 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-1C

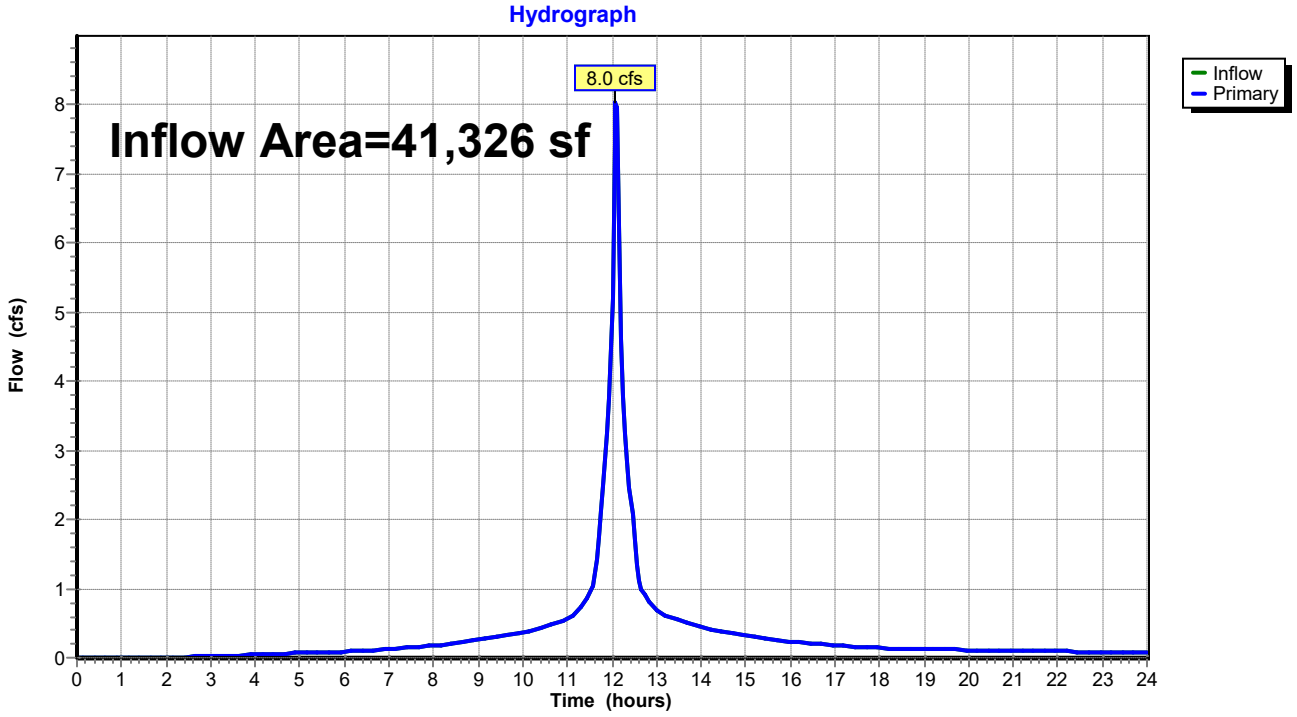


Summary for Link 2L: DP-1A

Inflow Area = 41,326 sf, 79.43% Impervious, Inflow Depth > 8.16" for 100-YR event
Inflow = 8.0 cfs @ 12.09 hrs, Volume= 28,103 cf
Primary = 8.0 cfs @ 12.09 hrs, Volume= 28,103 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 3L : DP-1

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: DP-1A

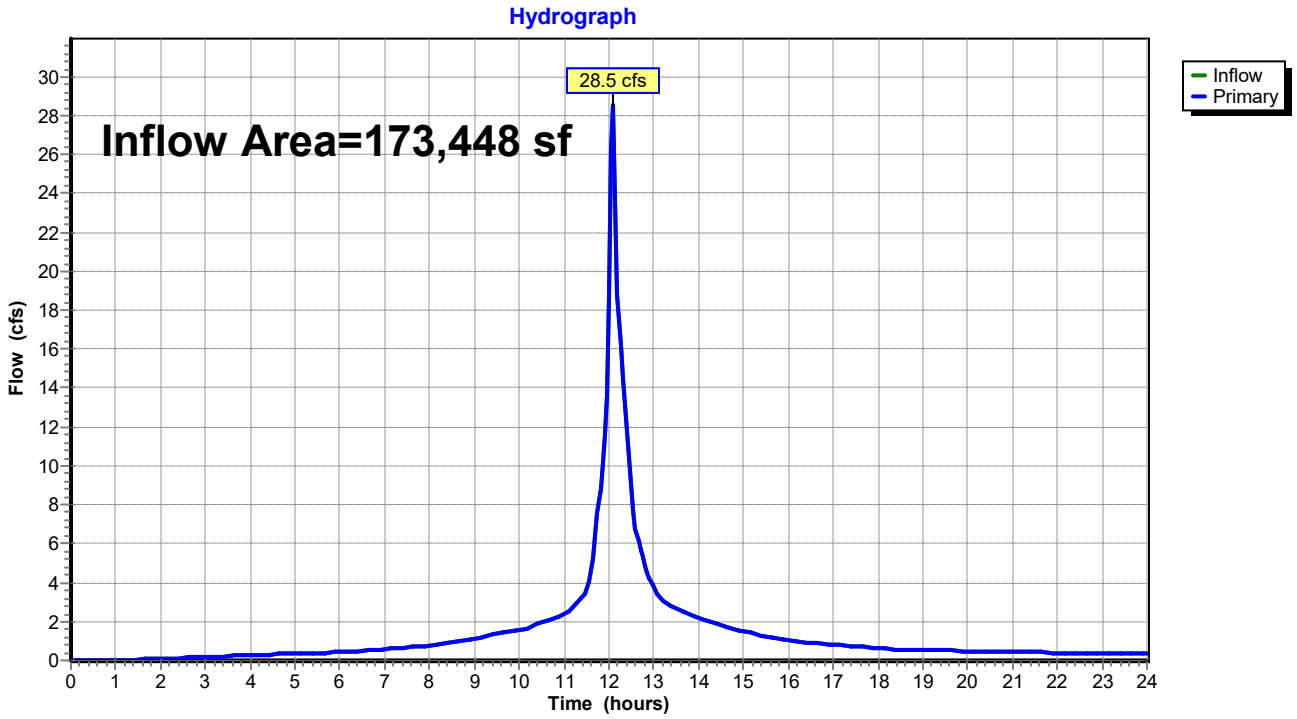


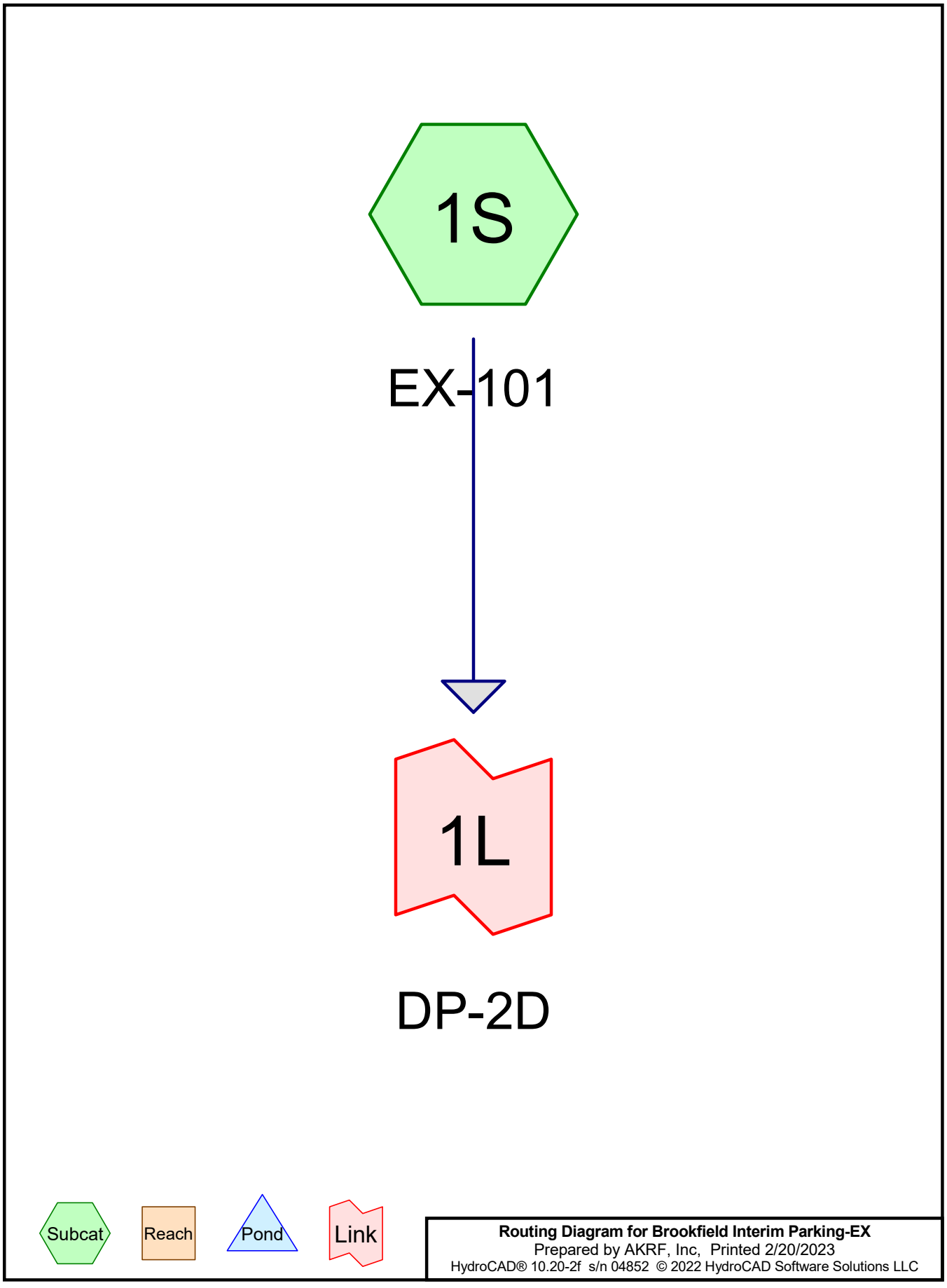
Summary for Link 3L: DP-1

Inflow Area = 173,448 sf, 84.83% Impervious, Inflow Depth > 8.40" for 100-YR event
Inflow = 28.5 cfs @ 12.09 hrs, Volume= 121,451 cf
Primary = 28.5 cfs @ 12.09 hrs, Volume= 121,451 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 3L: DP-1





Routing Diagram for Brookfield Interim Parking-EX
Prepared by AKRF, Inc, Printed 2/20/2023
HydroCAD® 10.20-2f s/n 04852 © 2022 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.83	2
2	10-YR	Type III 24-hr		Default	24.00	1	5.10	2
3	25-YR	Type III 24-hr		Default	24.00	1	6.39	2
4	50-YR	Type III 24-hr		Default	24.00	1	7.58	2
5	100-YR	Type III 24-hr		Default	24.00	1	9.01	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
19,548	74	>75% Grass cover, Good, HSG C (1S)
25,438	98	Paved parking, HSG C (1S)
6,592	98	Roofs, HSG C (1S)
51,578	**89**	**TOTAL AREA**

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

Subcatchment 1S: EX-101 Runoff Area=51,578 sf 62.10% Impervious Runoff Depth>1.75"
Tc=6.0 min CN=89 Runoff=2.4 cfs 7,502 cf

Link 1L: DP-2D Inflow=2.4 cfs 7,502 cf
Primary=2.4 cfs 7,502 cf

Total Runoff Area = 51,578 sf Runoff Volume = 7,502 cf Average Runoff Depth = 1.75"
37.90% Pervious = 19,548 sf 62.10% Impervious = 32,030 sf

Summary for Subcatchment 1S: EX-101

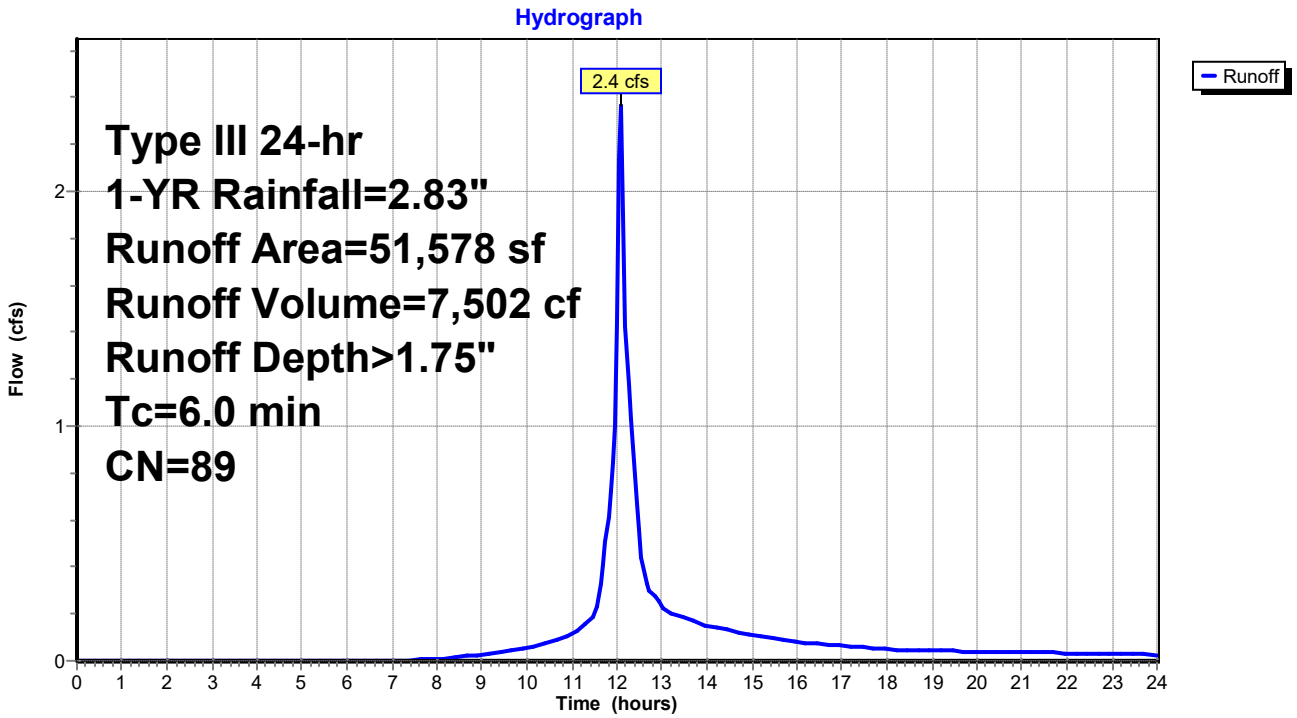
Runoff = 2.4 cfs @ 12.09 hrs, Volume= 7,502 cf, Depth> 1.75"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
25,438	98	Paved parking, HSG C
6,592	98	Roofs, HSG C
19,548	74	>75% Grass cover, Good, HSG C
51,578	89	Weighted Average
19,548		37.90% Pervious Area
32,030		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-101

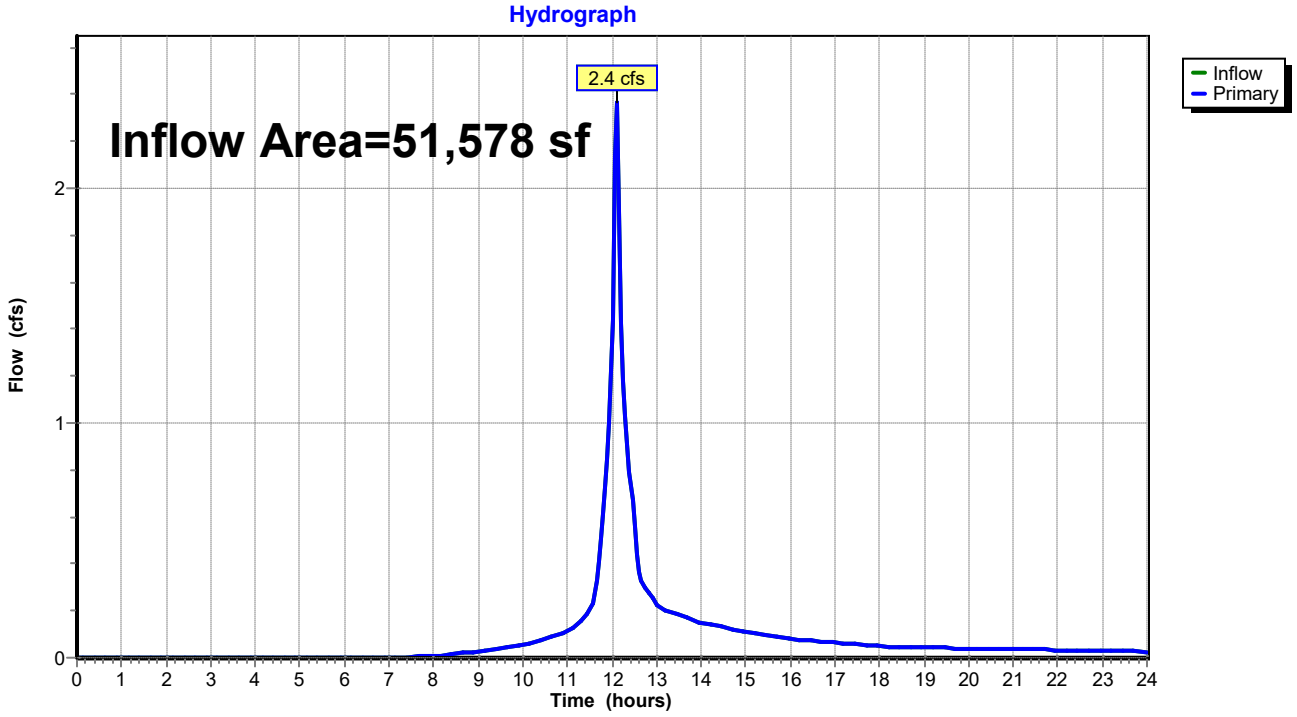


Summary for Link 1L: DP-2D

Inflow Area = 51,578 sf, 62.10% Impervious, Inflow Depth > 1.75" for 1-YR event
Inflow = 2.4 cfs @ 12.09 hrs, Volume= 7,502 cf
Primary = 2.4 cfs @ 12.09 hrs, Volume= 7,502 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: EX-101 Runoff Area=51,578 sf 62.10% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=89 Runoff=5.1 cfs 16,612 cf

Link 1L: DP-2D Inflow=5.1 cfs 16,612 cf
Primary=5.1 cfs 16,612 cf

Total Runoff Area = 51,578 sf Runoff Volume = 16,612 cf Average Runoff Depth = 3.86"
37.90% Pervious = 19,548 sf 62.10% Impervious = 32,030 sf

Summary for Subcatchment 1S: EX-101

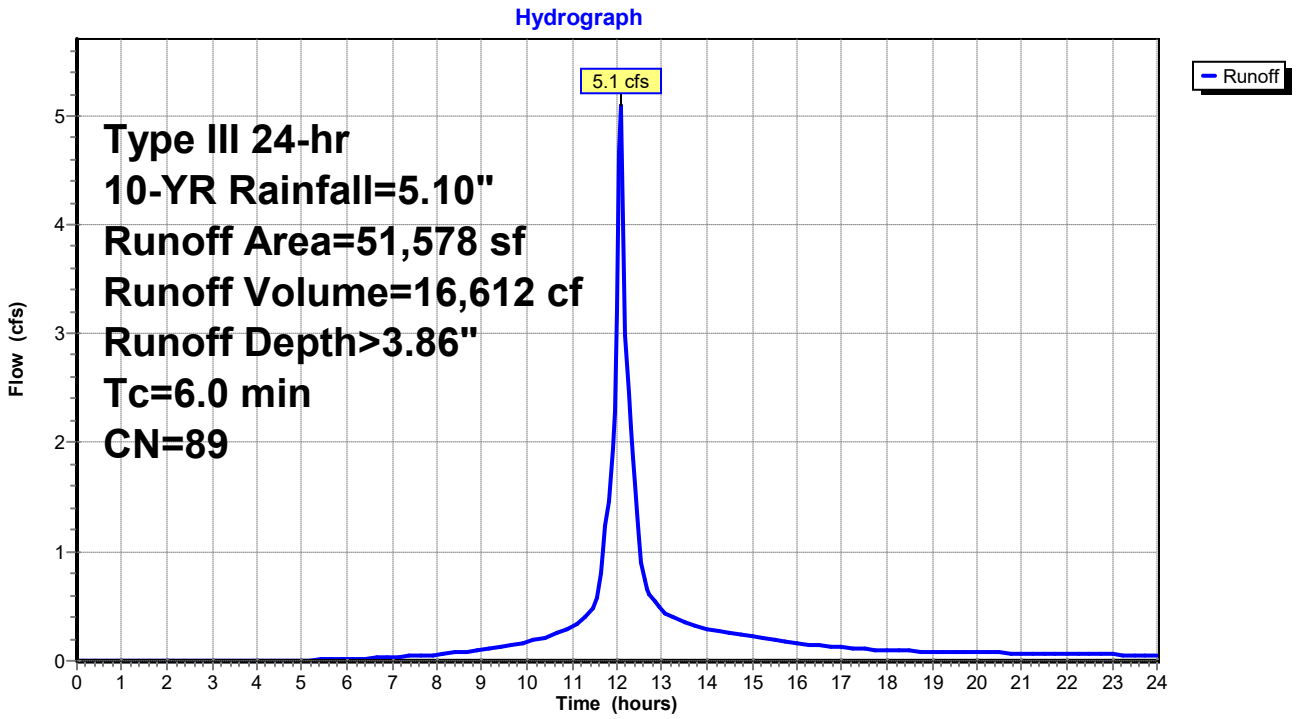
Runoff = 5.1 cfs @ 12.09 hrs, Volume= 16,612 cf, Depth> 3.86"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
25,438	98	Paved parking, HSG C
6,592	98	Roofs, HSG C
19,548	74	>75% Grass cover, Good, HSG C
51,578	89	Weighted Average
19,548		37.90% Pervious Area
32,030		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-101

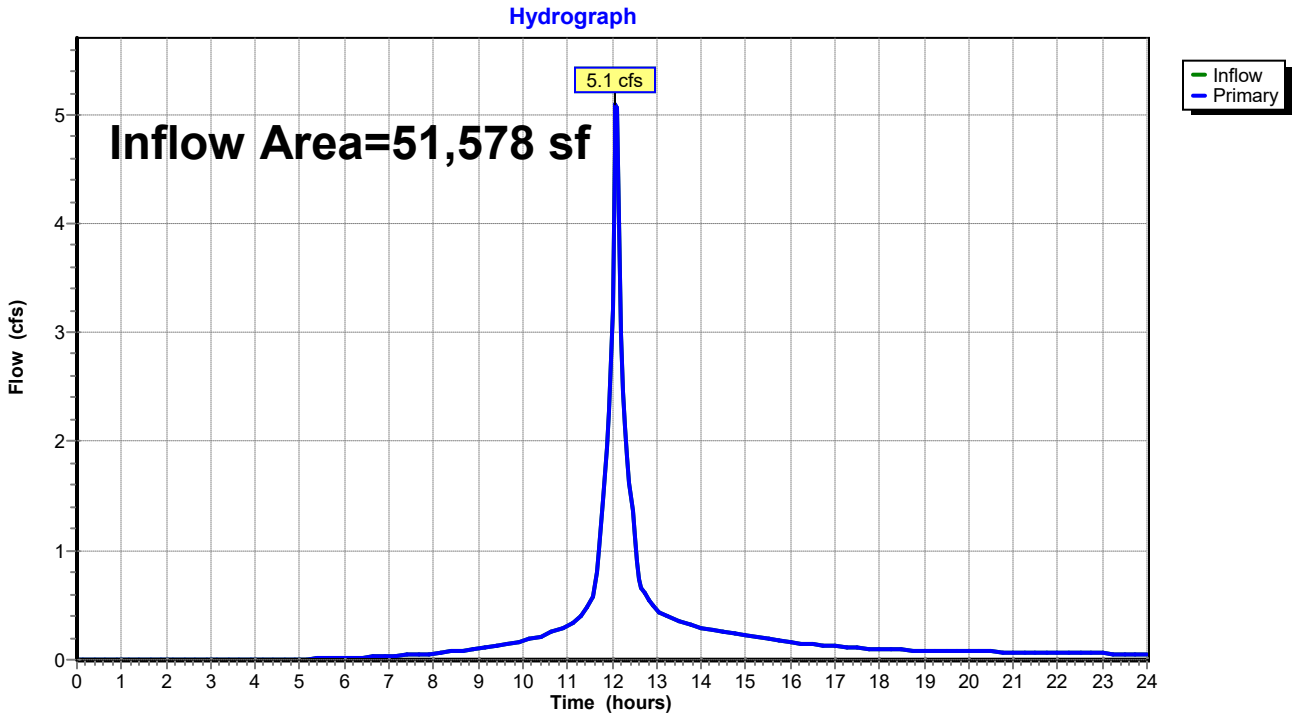


Summary for Link 1L: DP-2D

Inflow Area = 51,578 sf, 62.10% Impervious, Inflow Depth > 3.86" for 10-YR event
Inflow = 5.1 cfs @ 12.09 hrs, Volume= 16,612 cf
Primary = 5.1 cfs @ 12.09 hrs, Volume= 16,612 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: EX-101 Runoff Area=51,578 sf 62.10% Impervious Runoff Depth>5.11"
Tc=6.0 min CN=89 Runoff=6.6 cfs 21,965 cf

Link 1L: DP-2D Inflow=6.6 cfs 21,965 cf
Primary=6.6 cfs 21,965 cf

Total Runoff Area = 51,578 sf Runoff Volume = 21,965 cf Average Runoff Depth = 5.11"
37.90% Pervious = 19,548 sf 62.10% Impervious = 32,030 sf

Summary for Subcatchment 1S: EX-101

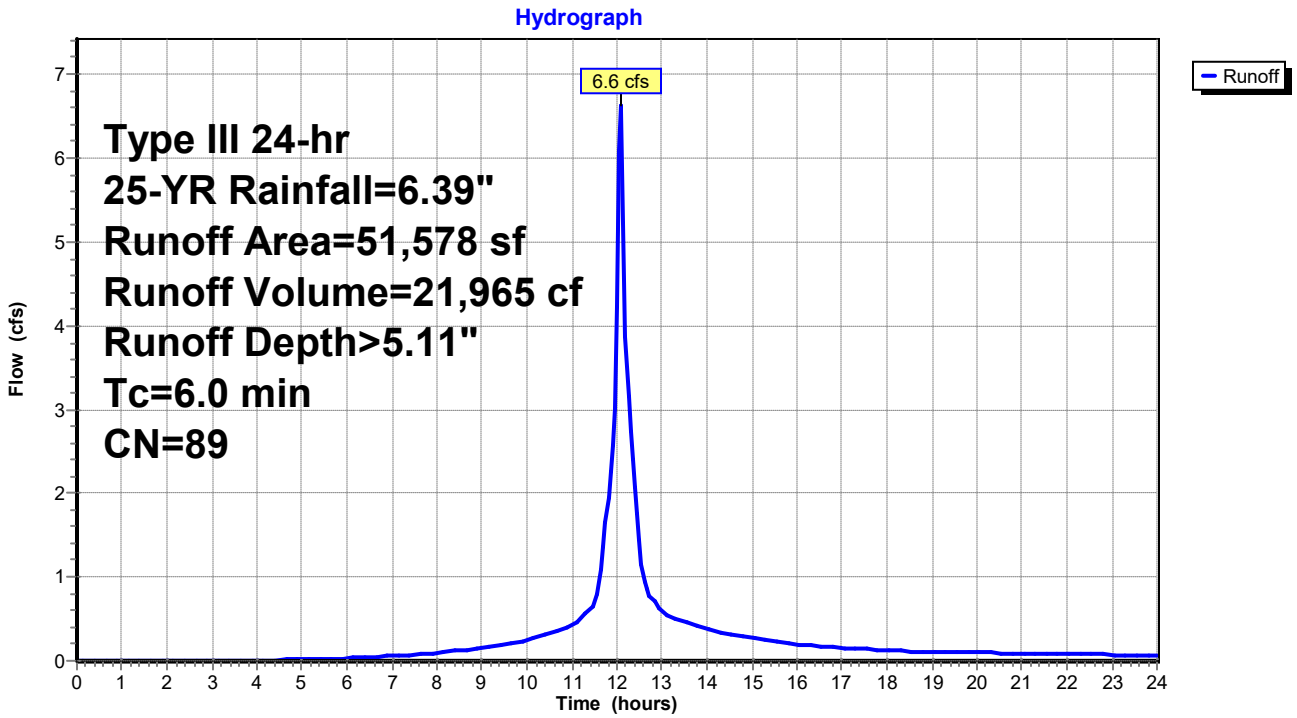
Runoff = 6.6 cfs @ 12.09 hrs, Volume= 21,965 cf, Depth> 5.11"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
25,438	98	Paved parking, HSG C
6,592	98	Roofs, HSG C
19,548	74	>75% Grass cover, Good, HSG C
51,578	89	Weighted Average
19,548		37.90% Pervious Area
32,030		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-101

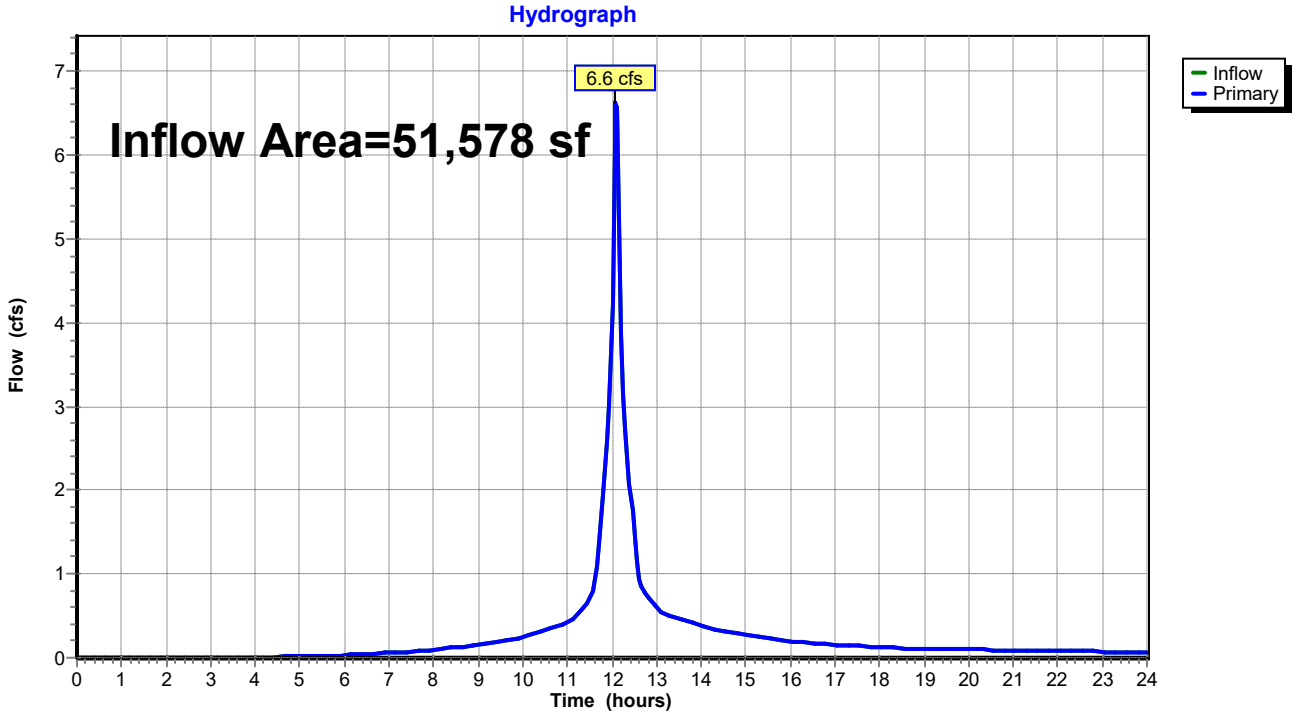


Summary for Link 1L: DP-2D

Inflow Area = 51,578 sf, 62.10% Impervious, Inflow Depth > 5.11" for 25-YR event
Inflow = 6.6 cfs @ 12.09 hrs, Volume= 21,965 cf
Primary = 6.6 cfs @ 12.09 hrs, Volume= 21,965 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: EX-101 Runoff Area=51,578 sf 62.10% Impervious Runoff Depth>6.27"
Tc=6.0 min CN=89 Runoff=8.0 cfs 26,953 cf

Link 1L: DP-2D Inflow=8.0 cfs 26,953 cf
Primary=8.0 cfs 26,953 cf

Total Runoff Area = 51,578 sf Runoff Volume = 26,953 cf Average Runoff Depth = 6.27"
37.90% Pervious = 19,548 sf 62.10% Impervious = 32,030 sf

Summary for Subcatchment 1S: EX-101

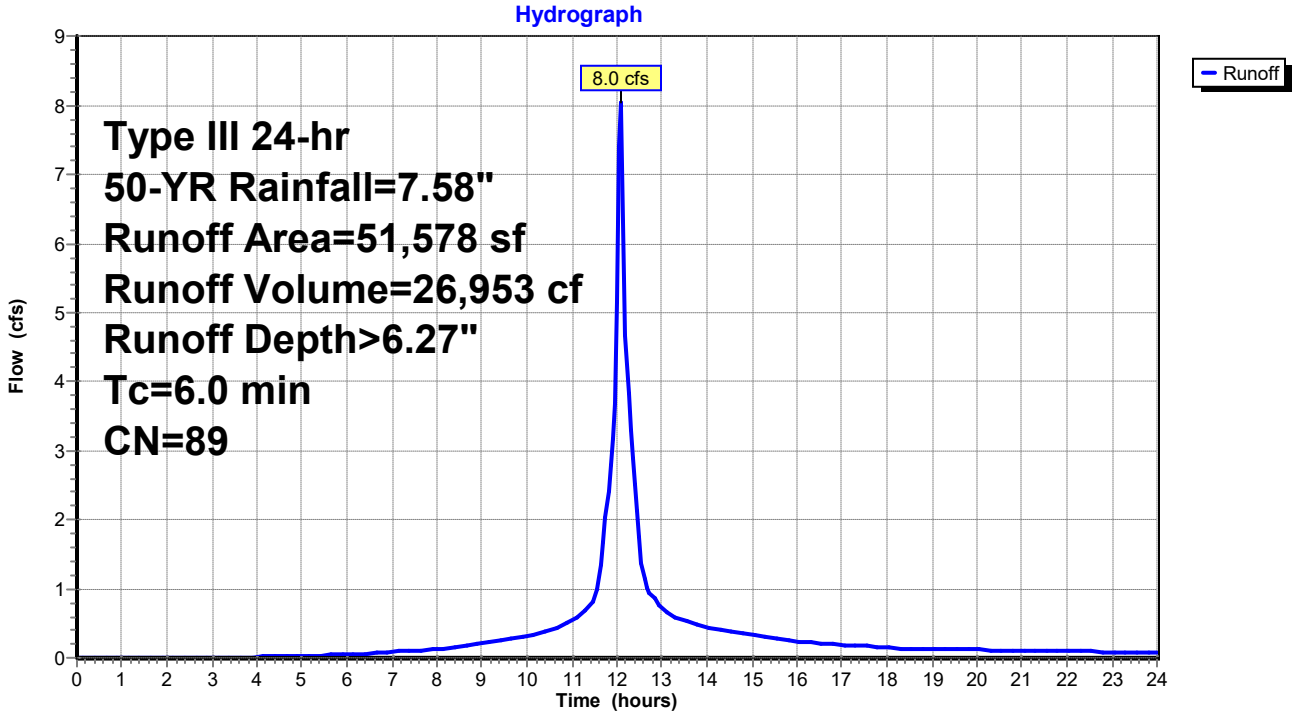
Runoff = 8.0 cfs @ 12.09 hrs, Volume= 26,953 cf, Depth> 6.27"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
25,438	98	Paved parking, HSG C
6,592	98	Roofs, HSG C
19,548	74	>75% Grass cover, Good, HSG C
51,578	89	Weighted Average
19,548		37.90% Pervious Area
32,030		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-101

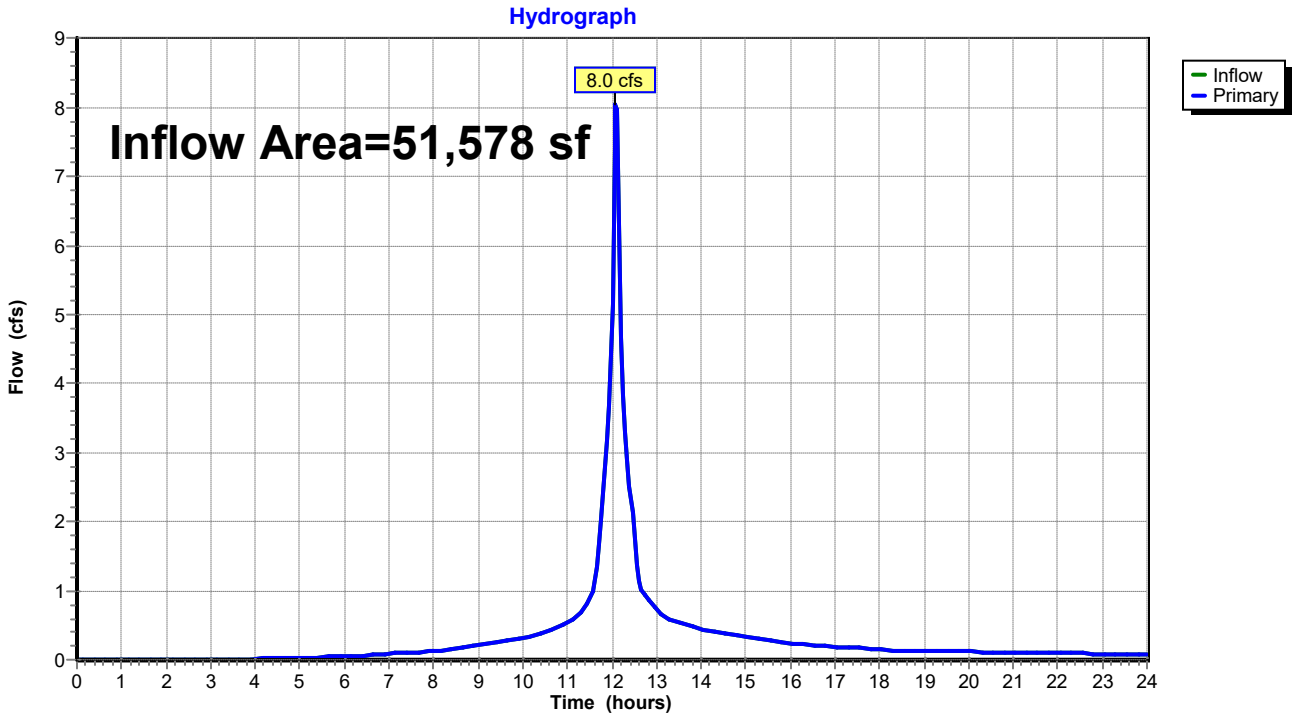


Summary for Link 1L: DP-2D

Inflow Area = 51,578 sf, 62.10% Impervious, Inflow Depth > 6.27" for 50-YR event
Inflow = 8.0 cfs @ 12.09 hrs, Volume= 26,953 cf
Primary = 8.0 cfs @ 12.09 hrs, Volume= 26,953 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: EX-101 Runoff Area=51,578 sf 62.10% Impervious Runoff Depth>7.67"
Tc=6.0 min CN=89 Runoff=9.7 cfs 32,986 cf

Link 1L: DP-2D Inflow=9.7 cfs 32,986 cf
Primary=9.7 cfs 32,986 cf

Total Runoff Area = 51,578 sf Runoff Volume = 32,986 cf Average Runoff Depth = 7.67"
37.90% Pervious = 19,548 sf 62.10% Impervious = 32,030 sf

Summary for Subcatchment 1S: EX-101

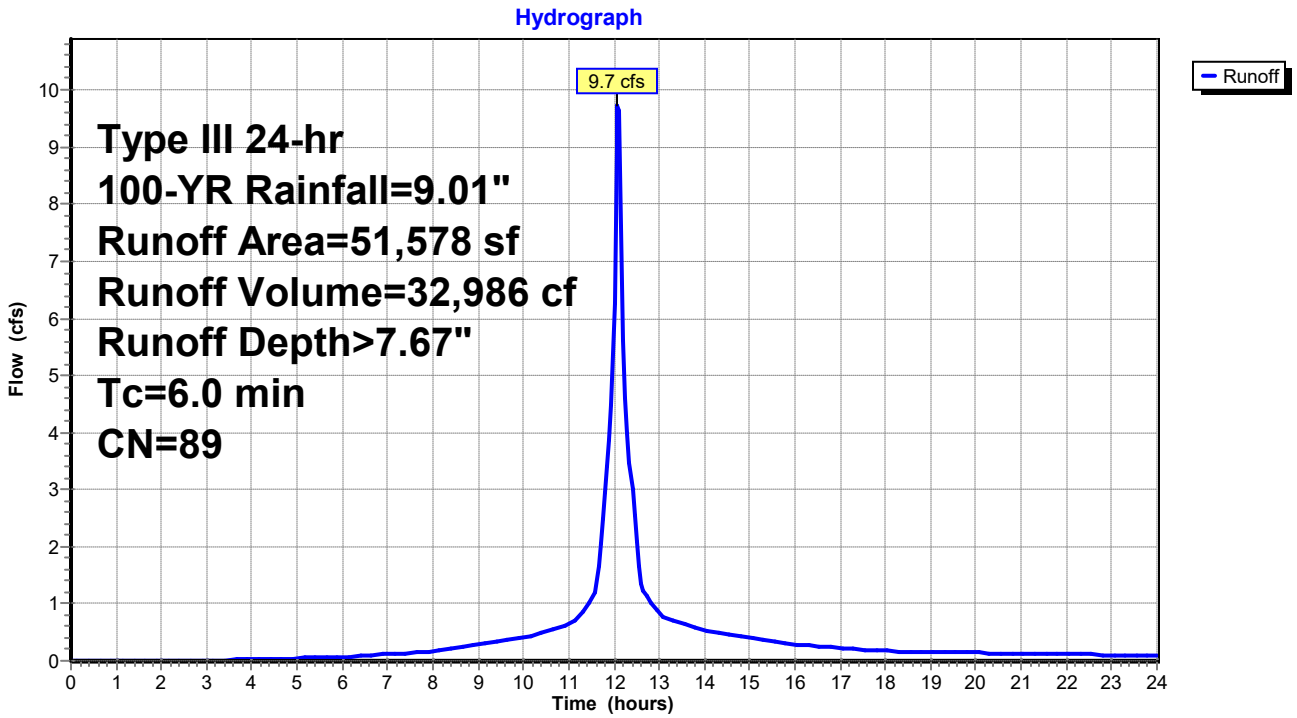
Runoff = 9.7 cfs @ 12.09 hrs, Volume= 32,986 cf, Depth> 7.67"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
25,438	98	Paved parking, HSG C
6,592	98	Roofs, HSG C
19,548	74	>75% Grass cover, Good, HSG C
51,578	89	Weighted Average
19,548		37.90% Pervious Area
32,030		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: EX-101

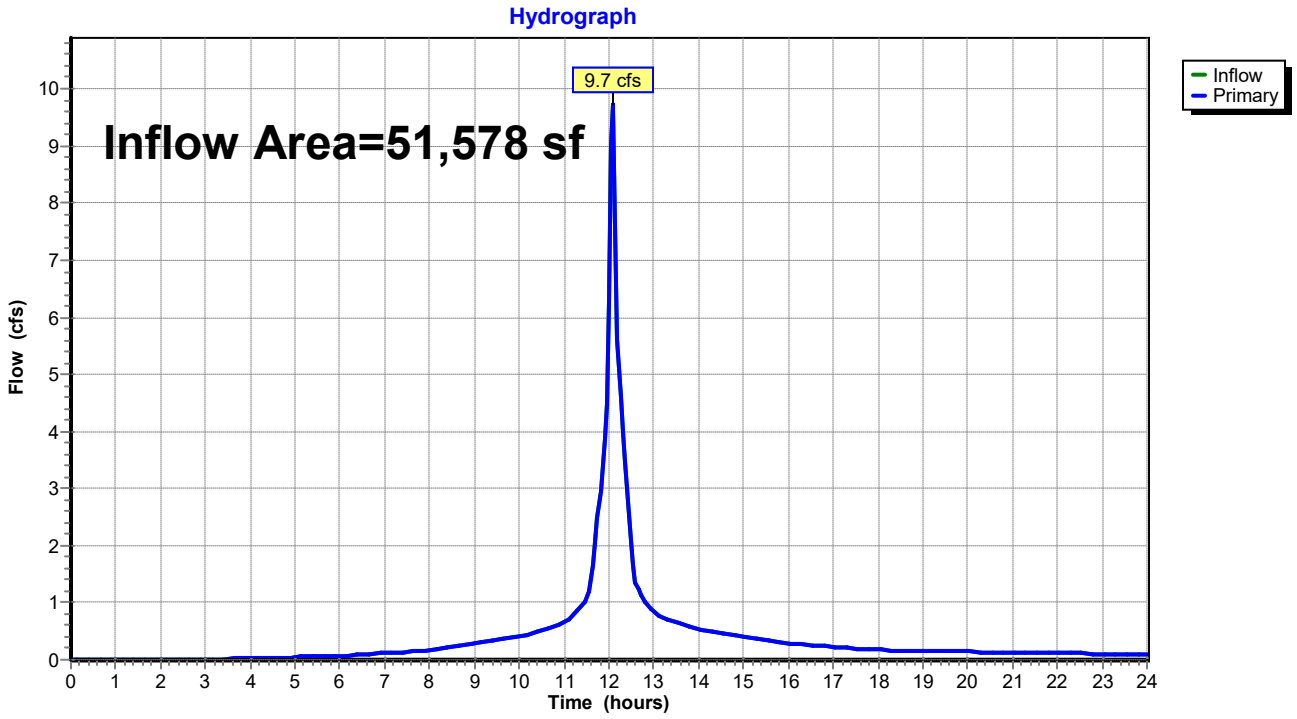


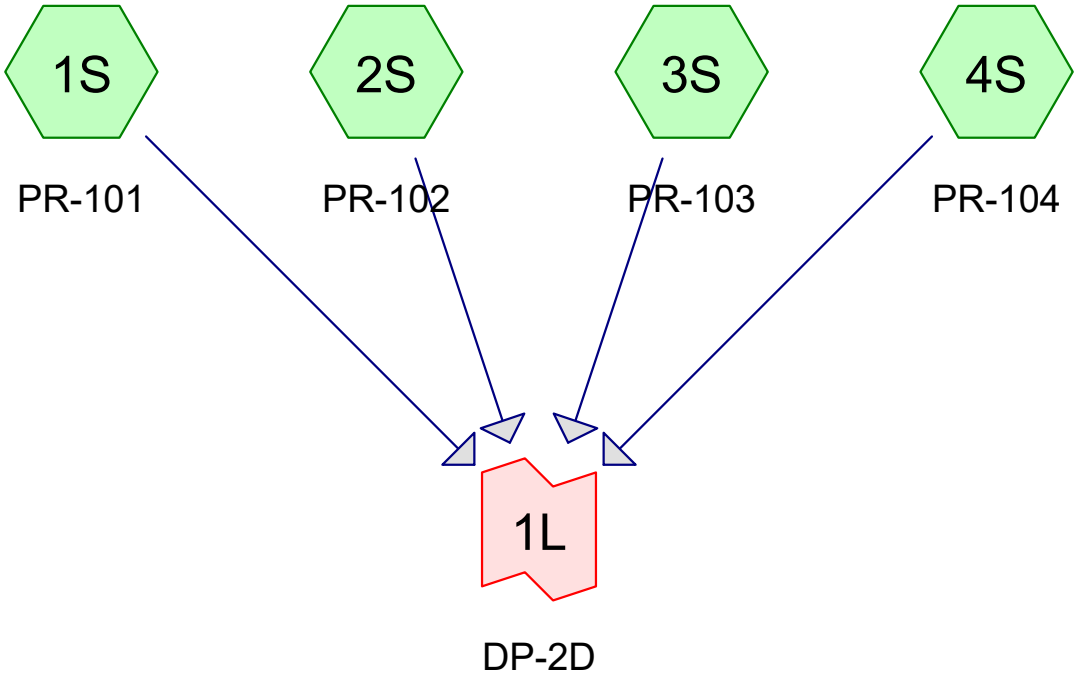
Summary for Link 1L: DP-2D

Inflow Area = 51,578 sf, 62.10% Impervious, Inflow Depth > 7.67" for 100-YR event
Inflow = 9.7 cfs @ 12.09 hrs, Volume= 32,986 cf
Primary = 9.7 cfs @ 12.09 hrs, Volume= 32,986 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D





Subcat Reach Pond Link

Routing Diagram for Brookfield Interim Parking-PR
Prepared by AKRF, Inc, Printed 2/20/2023
HydroCAD® 10.20-2f s/n 04852 © 2022 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.83	2
2	10-YR	Type III 24-hr		Default	24.00	1	5.10	2
3	25-YR	Type III 24-hr		Default	24.00	1	6.39	2
4	50-YR	Type III 24-hr		Default	24.00	1	7.58	2
5	100-YR	Type III 24-hr		Default	24.00	1	9.01	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
17,776	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S)
27,537	98	Paved parking, HSG C (1S, 2S, 3S, 4S)
6,266	98	Roofs, HSG C (4S)
51,579	**90**	**TOTAL AREA**

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

Subcatchment 1S: PR-101 Runoff Area=26,987 sf 57.19% Impervious Runoff Depth>1.67"
Tc=6.0 min CN=88 Runoff=1.2 cfs 3,748 cf

Subcatchment 2S: PR-102 Runoff Area=2,769 sf 88.77% Impervious Runoff Depth>2.28"
Tc=6.0 min CN=95 Runoff=0.2 cfs 527 cf

Subcatchment 3S: PR-103 Runoff Area=2,306 sf 84.61% Impervious Runoff Depth>2.18"
Tc=6.0 min CN=94 Runoff=0.1 cfs 420 cf

Subcatchment 4S: PR-104 Runoff Area=19,517 sf 71.52% Impervious Runoff Depth>1.91"
Tc=6.0 min CN=91 Runoff=1.0 cfs 3,109 cf

Link 1L: DP-2D Inflow=2.4 cfs 7,803 cf
Primary=2.4 cfs 7,803 cf

Total Runoff Area = 51,579 sf Runoff Volume = 7,803 cf Average Runoff Depth = 1.82"
34.46% Pervious = 17,776 sf 65.54% Impervious = 33,803 sf

Summary for Subcatchment 1S: PR-101

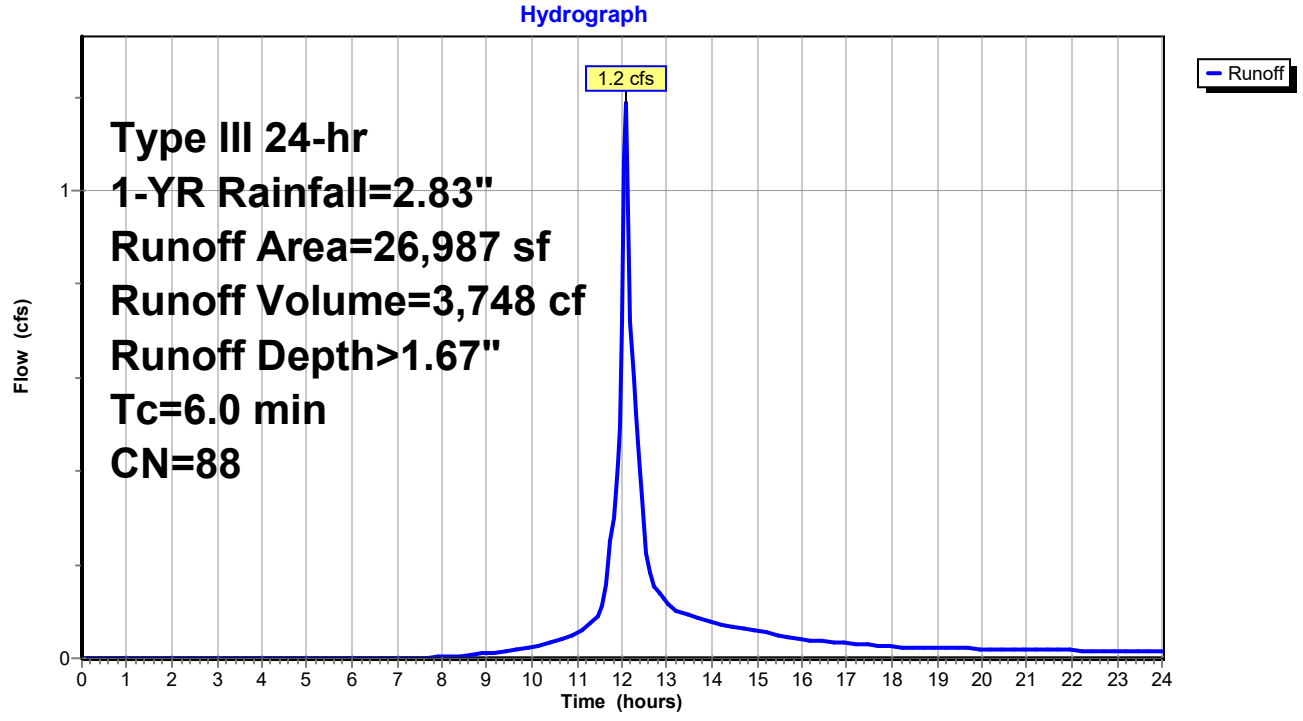
Runoff = 1.2 cfs @ 12.09 hrs, Volume= 3,748 cf, Depth> 1.67"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
15,435	98	Paved parking, HSG C
11,552	74	>75% Grass cover, Good, HSG C
26,987	88	Weighted Average
11,552		42.81% Pervious Area
15,435		57.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-101



Summary for Subcatchment 2S: PR-102

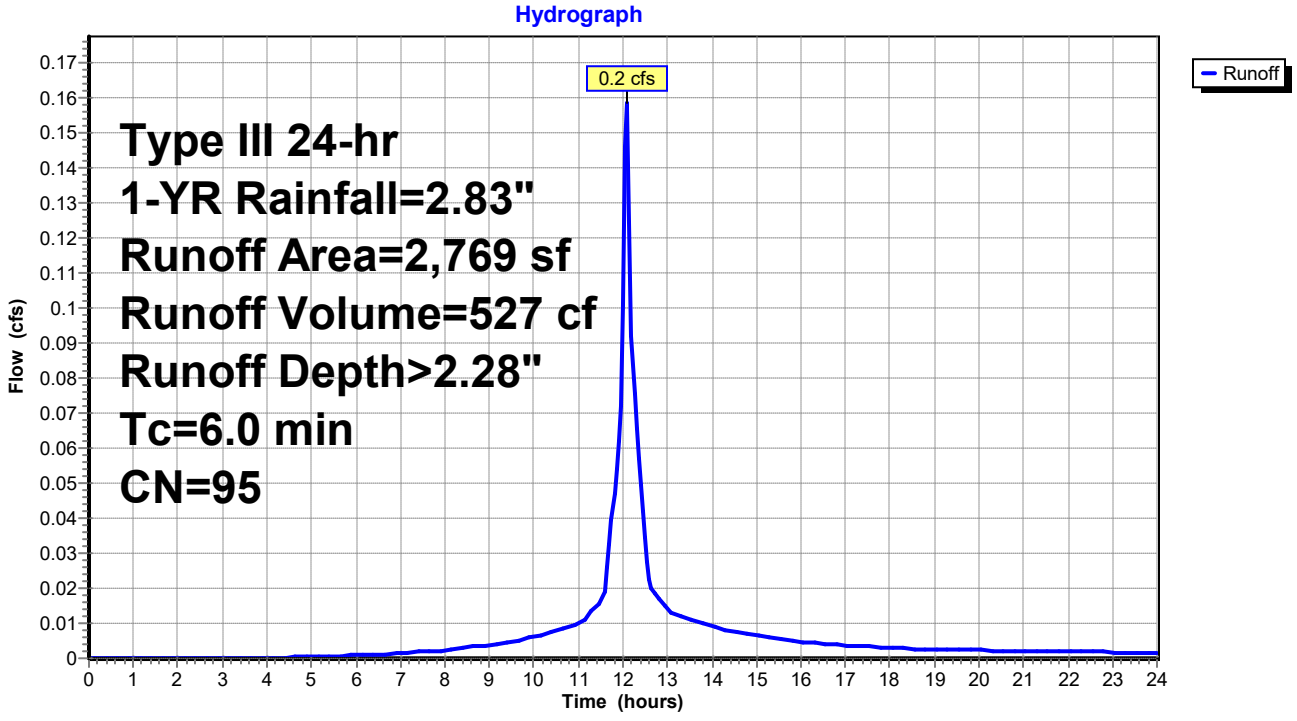
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 527 cf, Depth> 2.28"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
2,458	98	Paved parking, HSG C
311	74	>75% Grass cover, Good, HSG C
2,769	95	Weighted Average
311		11.23% Pervious Area
2,458		88.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-102



Summary for Subcatchment 3S: PR-103

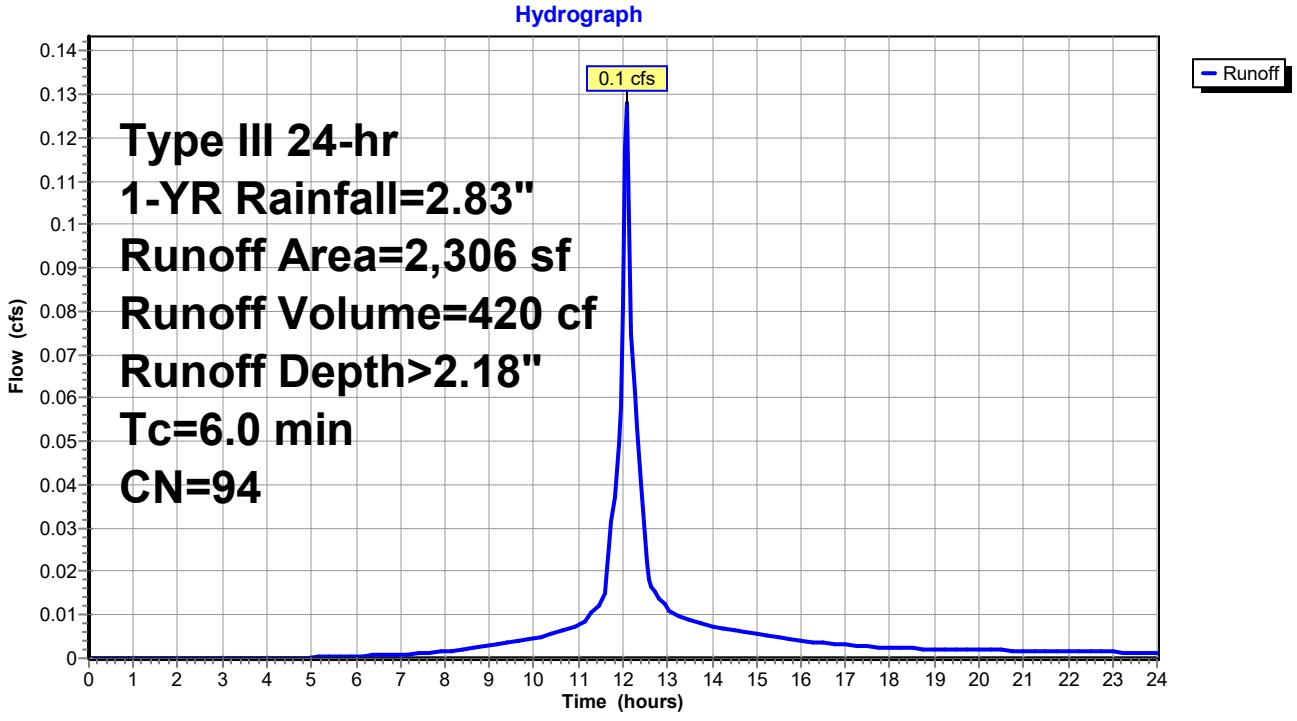
Runoff = 0.1 cfs @ 12.09 hrs, Volume= 420 cf, Depth> 2.18"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
1,951	98	Paved parking, HSG C
355	74	>75% Grass cover, Good, HSG C
2,306	94	Weighted Average
355		15.39% Pervious Area
1,951		84.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-103



Summary for Subcatchment 4S: PR-104

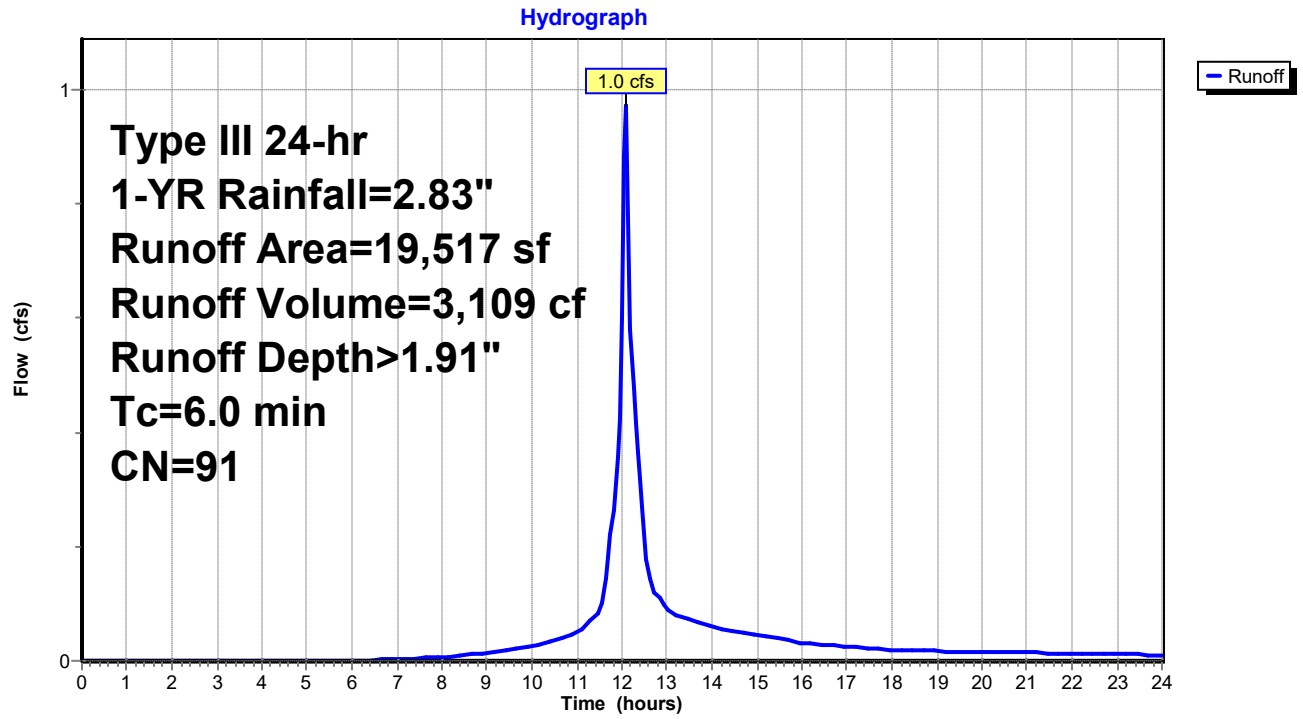
Runoff = 1.0 cfs @ 12.09 hrs, Volume= 3,109 cf, Depth> 1.91"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YR Rainfall=2.83"

Area (sf)	CN	Description
7,693	98	Paved parking, HSG C
6,266	98	Roofs, HSG C
5,558	74	>75% Grass cover, Good, HSG C
19,517	91	Weighted Average
5,558		28.48% Pervious Area
13,959		71.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-104

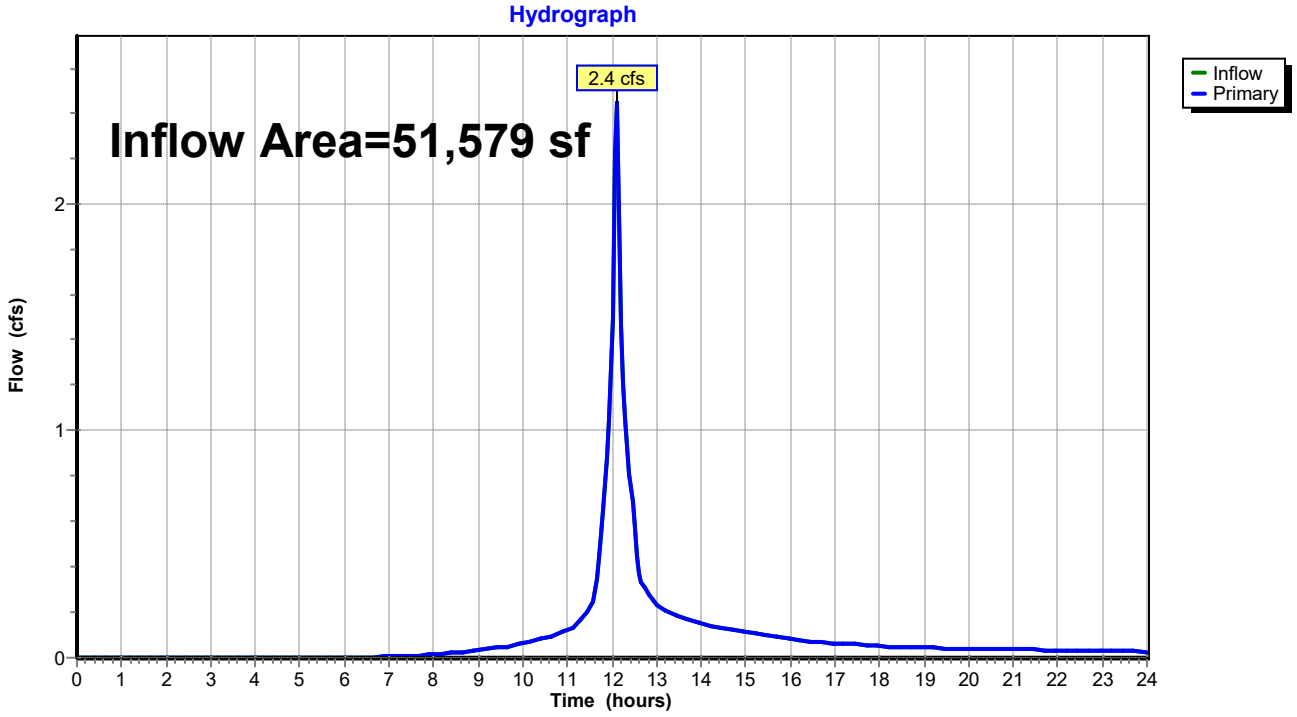


Summary for Link 1L: DP-2D

Inflow Area = 51,579 sf, 65.54% Impervious, Inflow Depth > 1.82" for 1-YR event
Inflow = 2.4 cfs @ 12.09 hrs, Volume= 7,803 cf
Primary = 2.4 cfs @ 12.09 hrs, Volume= 7,803 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: PR-101 Runoff Area=26,987 sf 57.19% Impervious Runoff Depth>3.76"
Tc=6.0 min CN=88 Runoff=2.6 cfs 8,459 cf

Subcatchment 2S: PR-102 Runoff Area=2,769 sf 88.77% Impervious Runoff Depth>4.52"
Tc=6.0 min CN=95 Runoff=0.3 cfs 1,042 cf

Subcatchment 3S: PR-103 Runoff Area=2,306 sf 84.61% Impervious Runoff Depth>4.40"
Tc=6.0 min CN=94 Runoff=0.2 cfs 846 cf

Subcatchment 4S: PR-104 Runoff Area=19,517 sf 71.52% Impervious Runoff Depth>4.08"
Tc=6.0 min CN=91 Runoff=2.0 cfs 6,630 cf

Link 1L: DP-2D Inflow=5.2 cfs 16,977 cf
Primary=5.2 cfs 16,977 cf

Total Runoff Area = 51,579 sf Runoff Volume = 16,977 cf Average Runoff Depth = 3.95"
34.46% Pervious = 17,776 sf 65.54% Impervious = 33,803 sf

Summary for Subcatchment 1S: PR-101

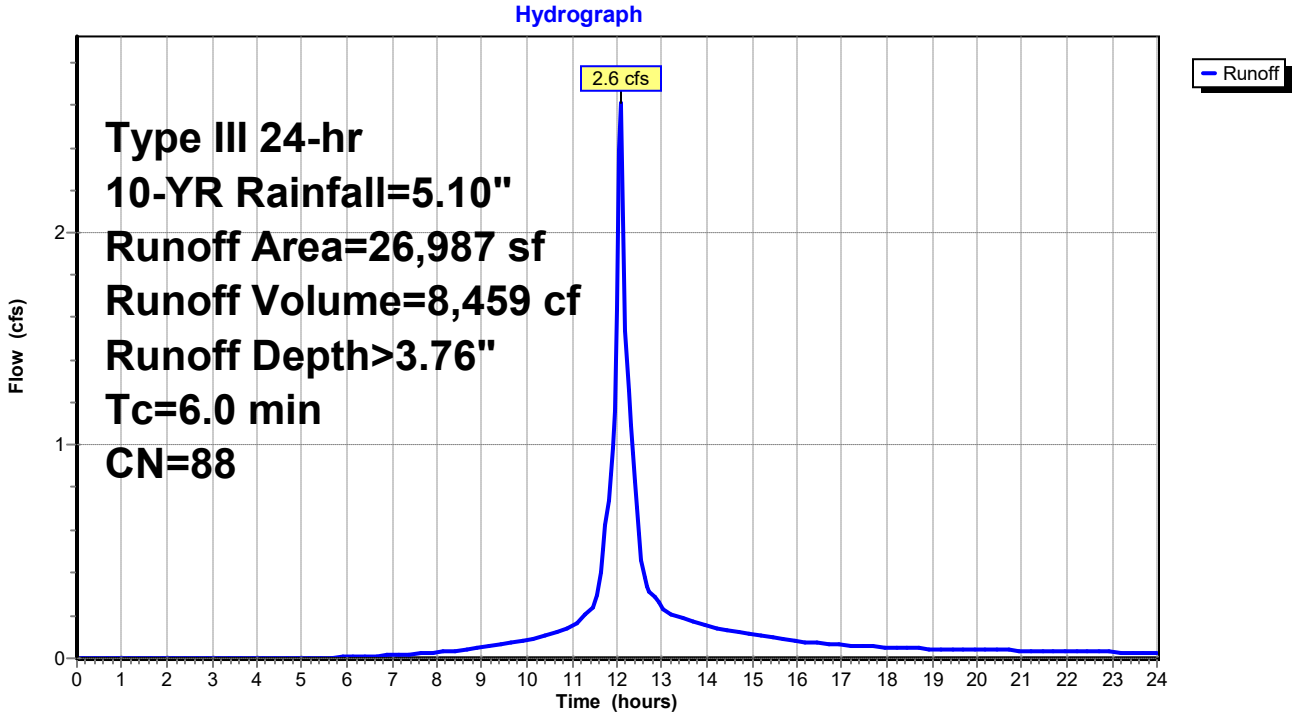
Runoff = 2.6 cfs @ 12.09 hrs, Volume= 8,459 cf, Depth> 3.76"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
15,435	98	Paved parking, HSG C
11,552	74	>75% Grass cover, Good, HSG C
26,987	88	Weighted Average
11,552		42.81% Pervious Area
15,435		57.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-101



Summary for Subcatchment 2S: PR-102

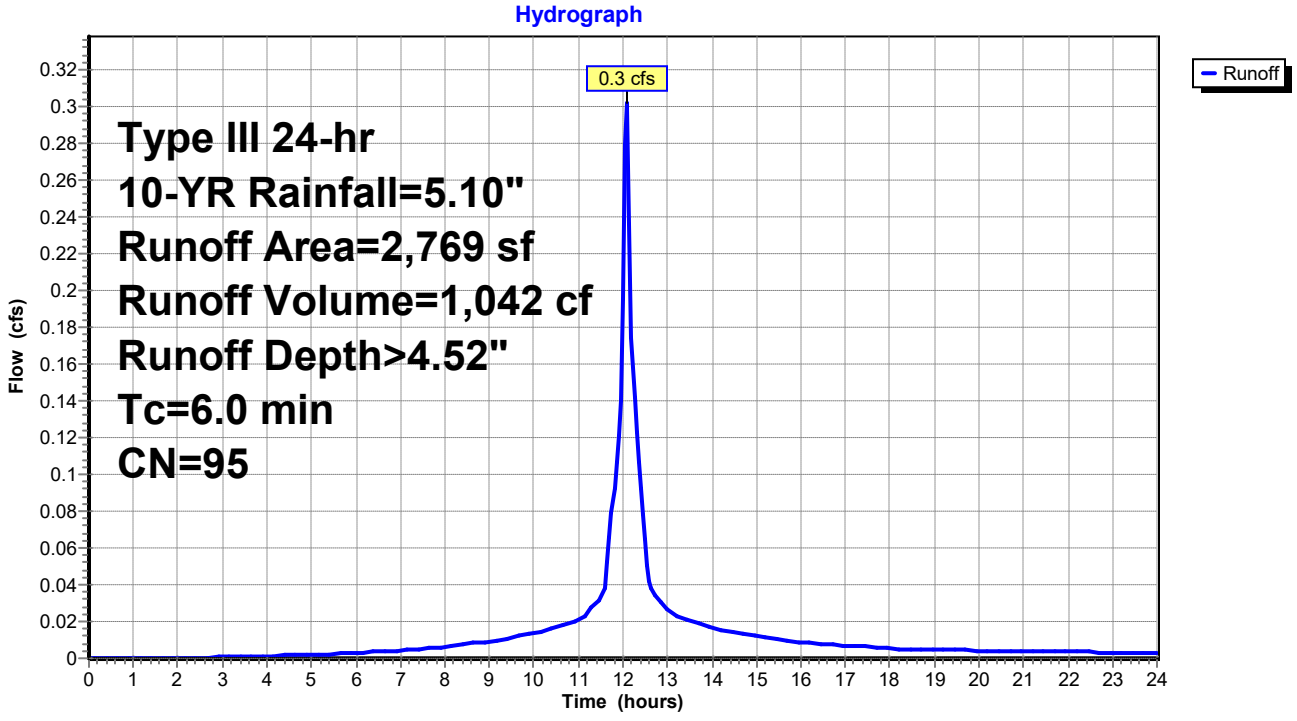
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,042 cf, Depth> 4.52"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
2,458	98	Paved parking, HSG C
311	74	>75% Grass cover, Good, HSG C
2,769	95	Weighted Average
311		11.23% Pervious Area
2,458		88.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-102



Summary for Subcatchment 3S: PR-103

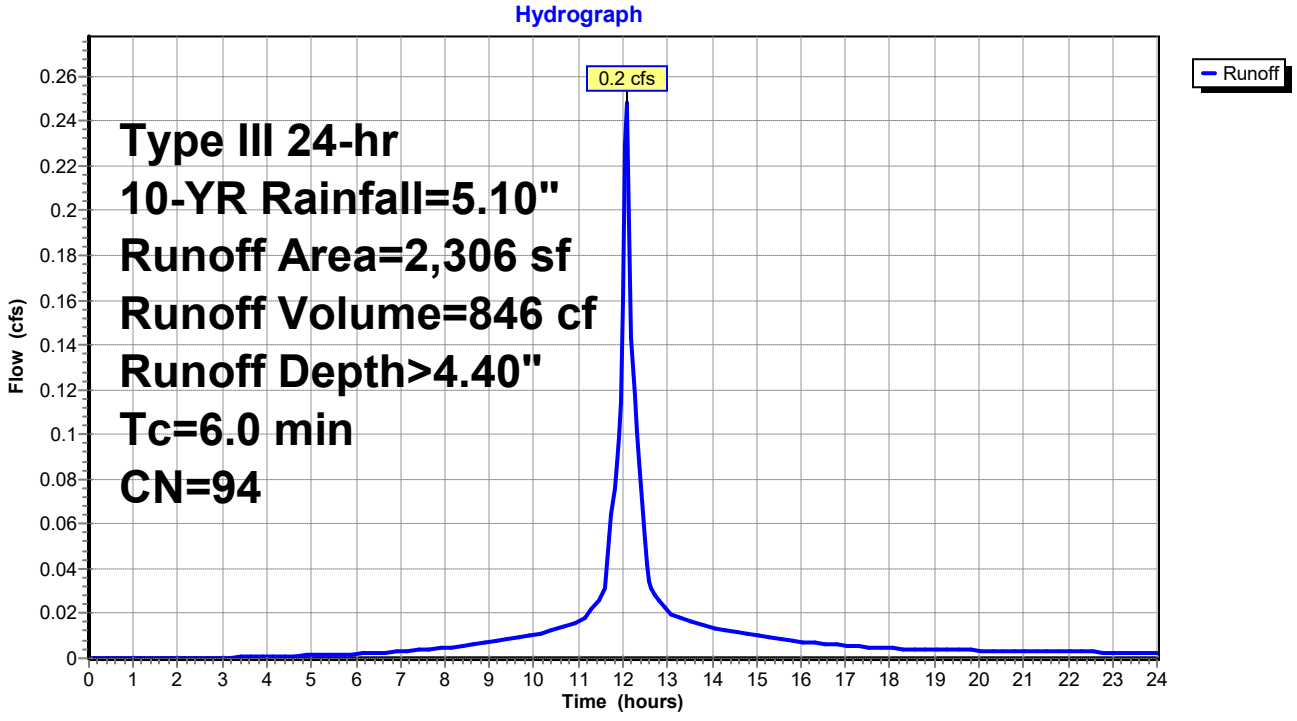
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 846 cf, Depth> 4.40"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
1,951	98	Paved parking, HSG C
355	74	>75% Grass cover, Good, HSG C
2,306	94	Weighted Average
355		15.39% Pervious Area
1,951		84.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-103



Summary for Subcatchment 4S: PR-104

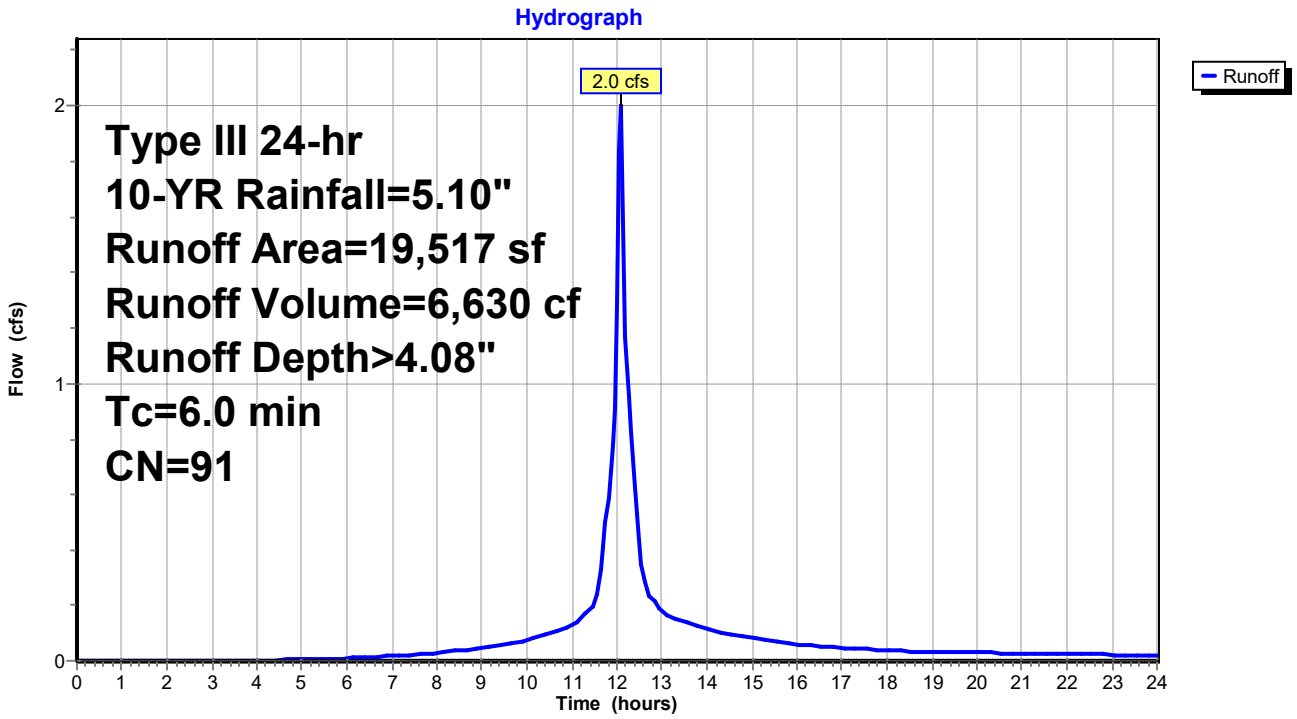
Runoff = 2.0 cfs @ 12.09 hrs, Volume= 6,630 cf, Depth> 4.08"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.10"

Area (sf)	CN	Description
7,693	98	Paved parking, HSG C
6,266	98	Roofs, HSG C
5,558	74	>75% Grass cover, Good, HSG C
19,517	91	Weighted Average
5,558		28.48% Pervious Area
13,959		71.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-104

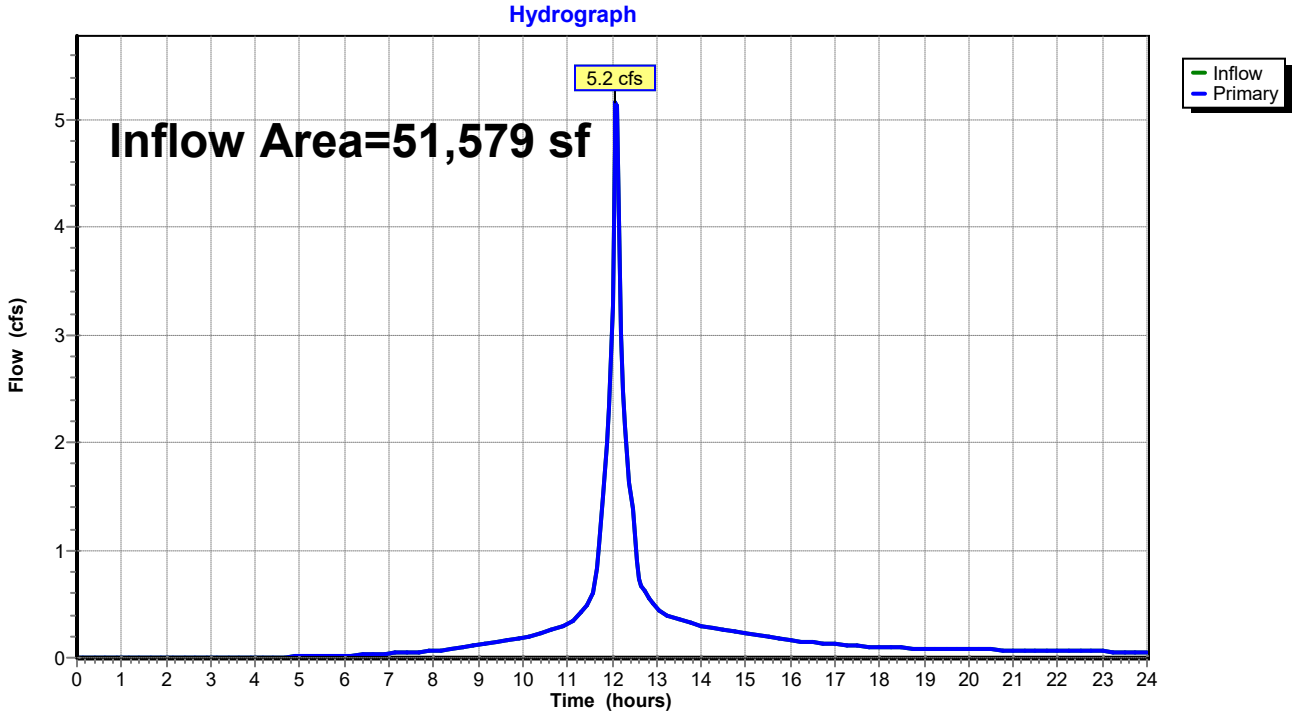


Summary for Link 1L: DP-2D

Inflow Area = 51,579 sf, 65.54% Impervious, Inflow Depth > 3.95" for 10-YR event
Inflow = 5.2 cfs @ 12.09 hrs, Volume= 16,977 cf
Primary = 5.2 cfs @ 12.09 hrs, Volume= 16,977 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: PR-101 Runoff Area=26,987 sf 57.19% Impervious Runoff Depth>5.00"
Tc=6.0 min CN=88 Runoff=3.4 cfs 11,241 cf

Subcatchment 2S: PR-102 Runoff Area=2,769 sf 88.77% Impervious Runoff Depth>5.80"
Tc=6.0 min CN=95 Runoff=0.4 cfs 1,337 cf

Subcatchment 3S: PR-103 Runoff Area=2,306 sf 84.61% Impervious Runoff Depth>5.68"
Tc=6.0 min CN=94 Runoff=0.3 cfs 1,091 cf

Subcatchment 4S: PR-104 Runoff Area=19,517 sf 71.52% Impervious Runoff Depth>5.34"
Tc=6.0 min CN=91 Runoff=2.6 cfs 8,678 cf

Link 1L: DP-2D Inflow=6.7 cfs 22,348 cf
Primary=6.7 cfs 22,348 cf

Total Runoff Area = 51,579 sf Runoff Volume = 22,348 cf Average Runoff Depth = 5.20"
34.46% Pervious = 17,776 sf 65.54% Impervious = 33,803 sf

Summary for Subcatchment 1S: PR-101

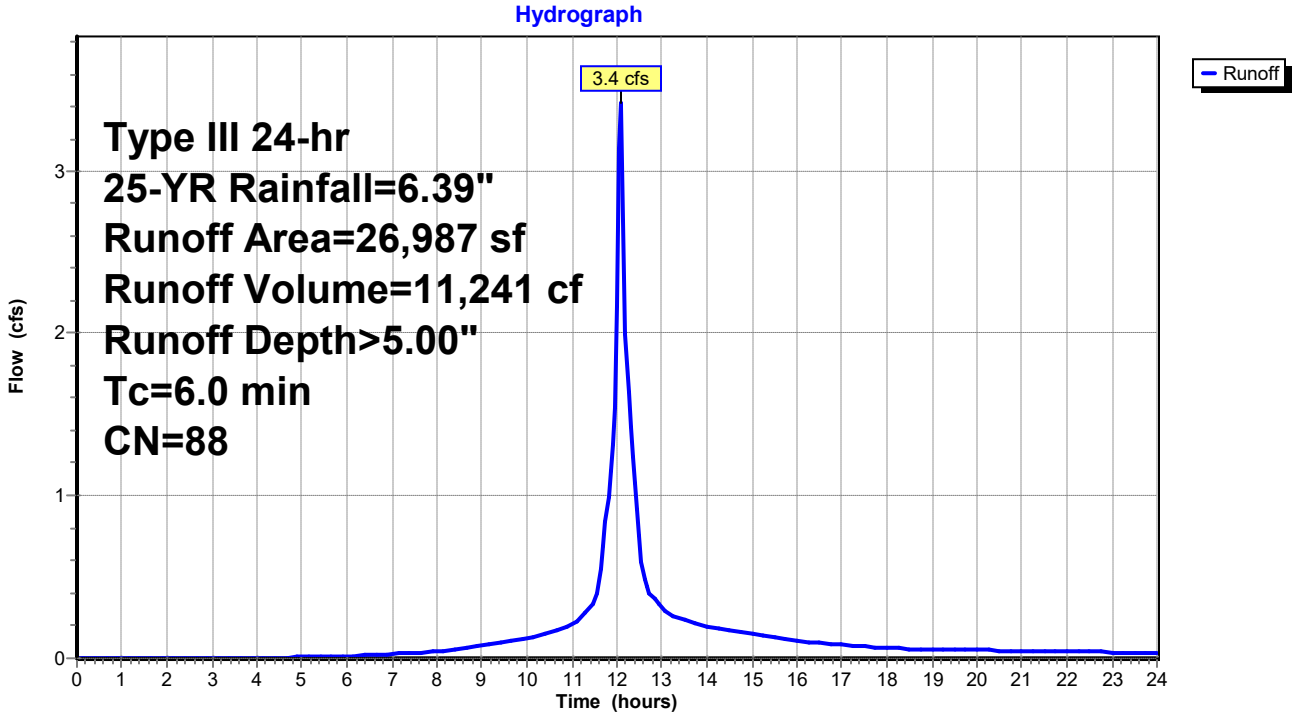
Runoff = 3.4 cfs @ 12.09 hrs, Volume= 11,241 cf, Depth> 5.00"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
15,435	98	Paved parking, HSG C
11,552	74	>75% Grass cover, Good, HSG C
26,987	88	Weighted Average
11,552		42.81% Pervious Area
15,435		57.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-101



Summary for Subcatchment 2S: PR-102

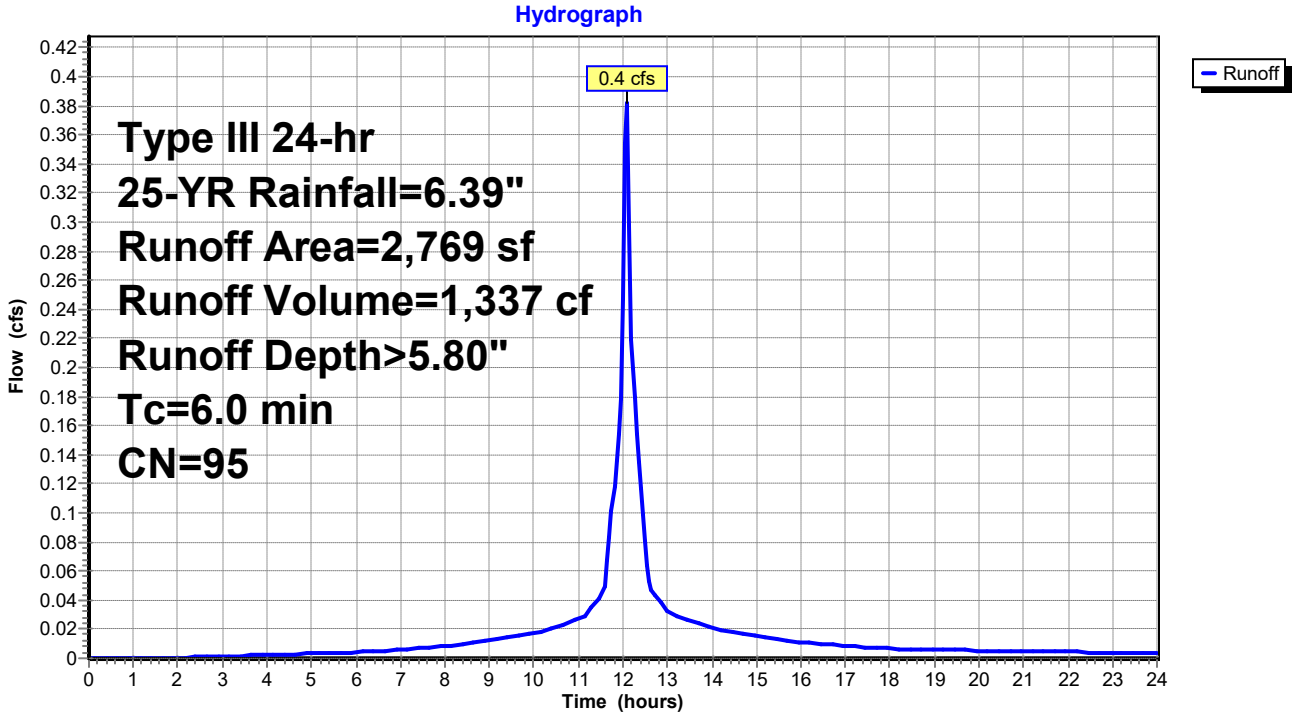
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,337 cf, Depth> 5.80"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
2,458	98	Paved parking, HSG C
311	74	>75% Grass cover, Good, HSG C
2,769	95	Weighted Average
311		11.23% Pervious Area
2,458		88.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-102



Summary for Subcatchment 3S: PR-103

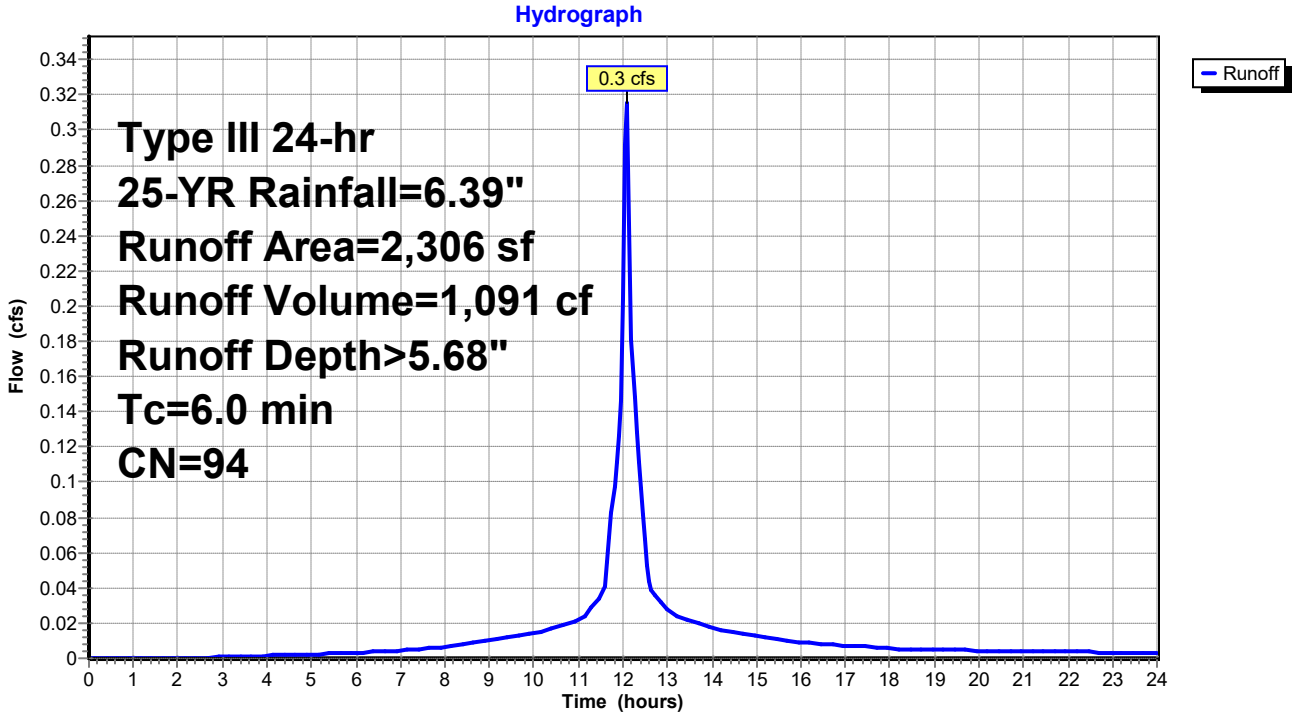
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,091 cf, Depth> 5.68"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
1,951	98	Paved parking, HSG C
355	74	>75% Grass cover, Good, HSG C
2,306	94	Weighted Average
355		15.39% Pervious Area
1,951		84.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-103



Summary for Subcatchment 4S: PR-104

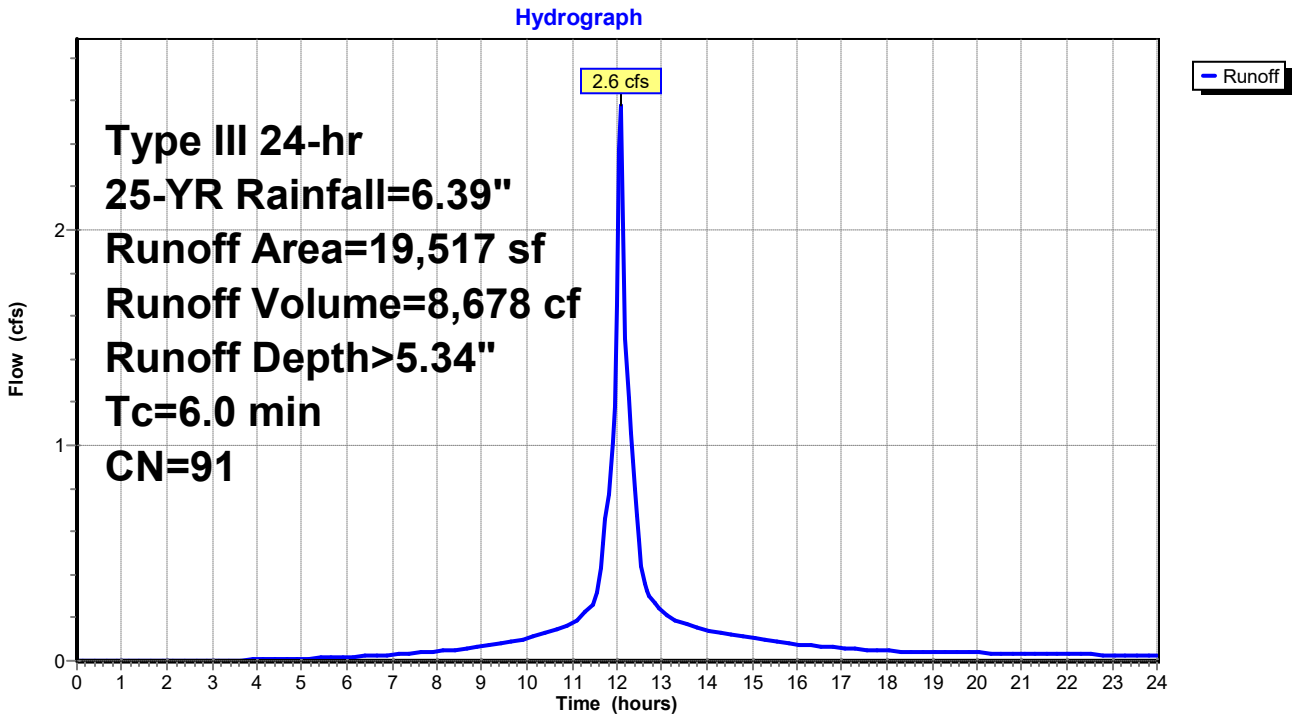
Runoff = 2.6 cfs @ 12.09 hrs, Volume= 8,678 cf, Depth> 5.34"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.39"

Area (sf)	CN	Description
7,693	98	Paved parking, HSG C
6,266	98	Roofs, HSG C
5,558	74	>75% Grass cover, Good, HSG C
19,517	91	Weighted Average
5,558		28.48% Pervious Area
13,959		71.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-104

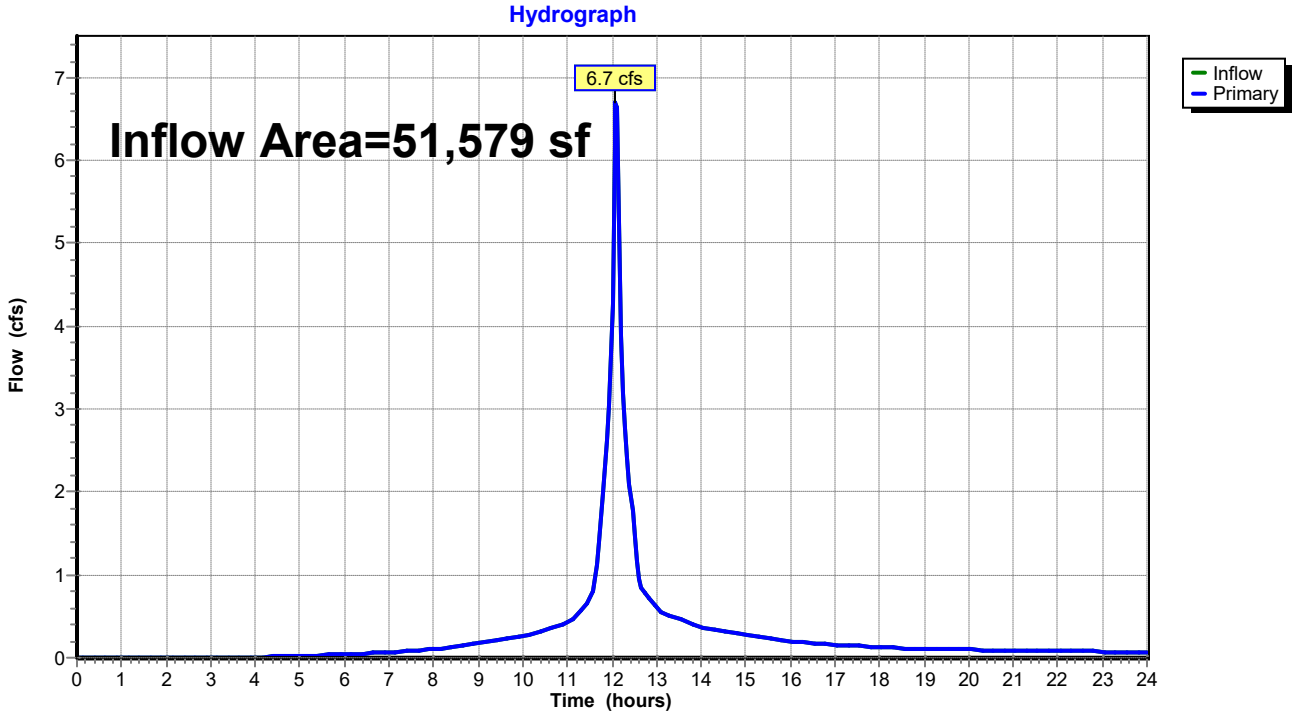


Summary for Link 1L: DP-2D

Inflow Area = 51,579 sf, 65.54% Impervious, Inflow Depth > 5.20" for 25-YR event
Inflow = 6.7 cfs @ 12.09 hrs, Volume= 22,348 cf
Primary = 6.7 cfs @ 12.09 hrs, Volume= 22,348 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: PR-101 Runoff Area=26,987 sf 57.19% Impervious Runoff Depth>6.15"
Tc=6.0 min CN=88 Runoff=4.2 cfs 13,839 cf

Subcatchment 2S: PR-102 Runoff Area=2,769 sf 88.77% Impervious Runoff Depth>6.98"
Tc=6.0 min CN=95 Runoff=0.5 cfs 1,610 cf

Subcatchment 3S: PR-103 Runoff Area=2,306 sf 84.61% Impervious Runoff Depth>6.86"
Tc=6.0 min CN=94 Runoff=0.4 cfs 1,318 cf

Subcatchment 4S: PR-104 Runoff Area=19,517 sf 71.52% Impervious Runoff Depth>6.51"
Tc=6.0 min CN=91 Runoff=3.1 cfs 10,581 cf

Link 1L: DP-2D Inflow=8.1 cfs 27,349 cf
Primary=8.1 cfs 27,349 cf

Total Runoff Area = 51,579 sf Runoff Volume = 27,349 cf Average Runoff Depth = 6.36"
34.46% Pervious = 17,776 sf 65.54% Impervious = 33,803 sf

Summary for Subcatchment 1S: PR-101

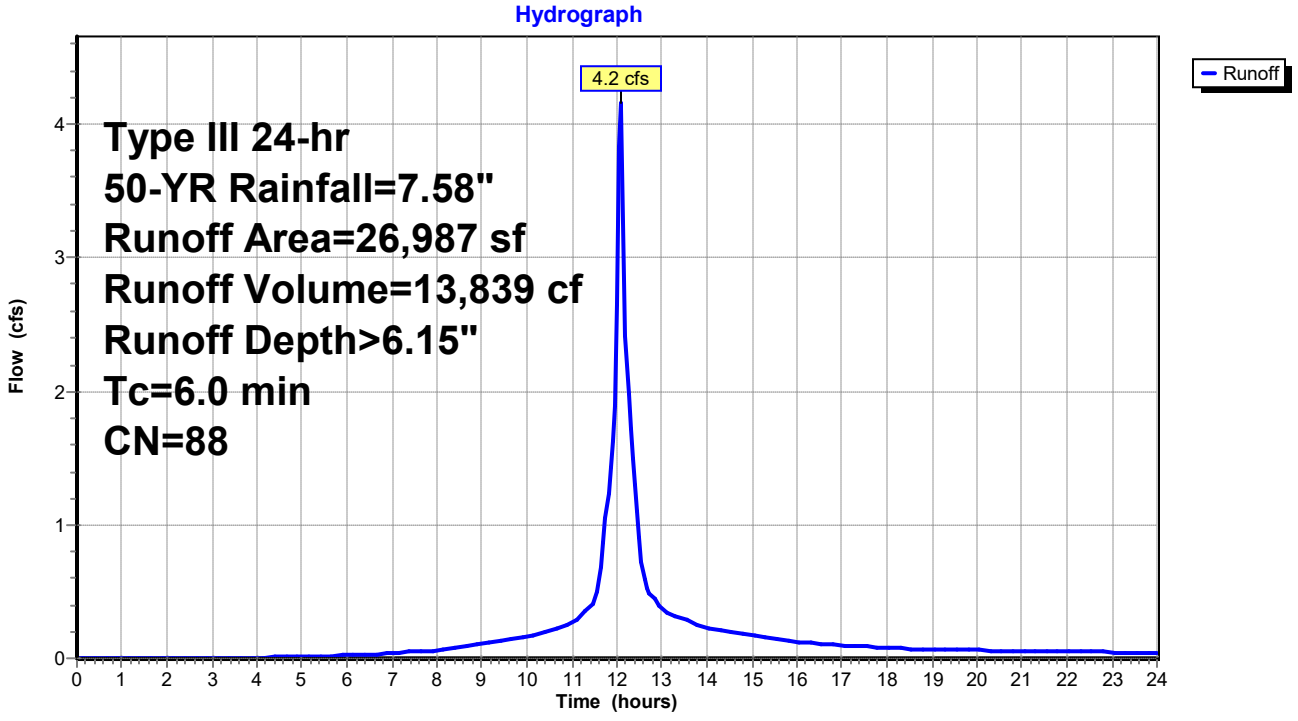
Runoff = 4.2 cfs @ 12.09 hrs, Volume= 13,839 cf, Depth> 6.15"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
15,435	98	Paved parking, HSG C
11,552	74	>75% Grass cover, Good, HSG C
26,987	88	Weighted Average
11,552		42.81% Pervious Area
15,435		57.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-101



Summary for Subcatchment 2S: PR-102

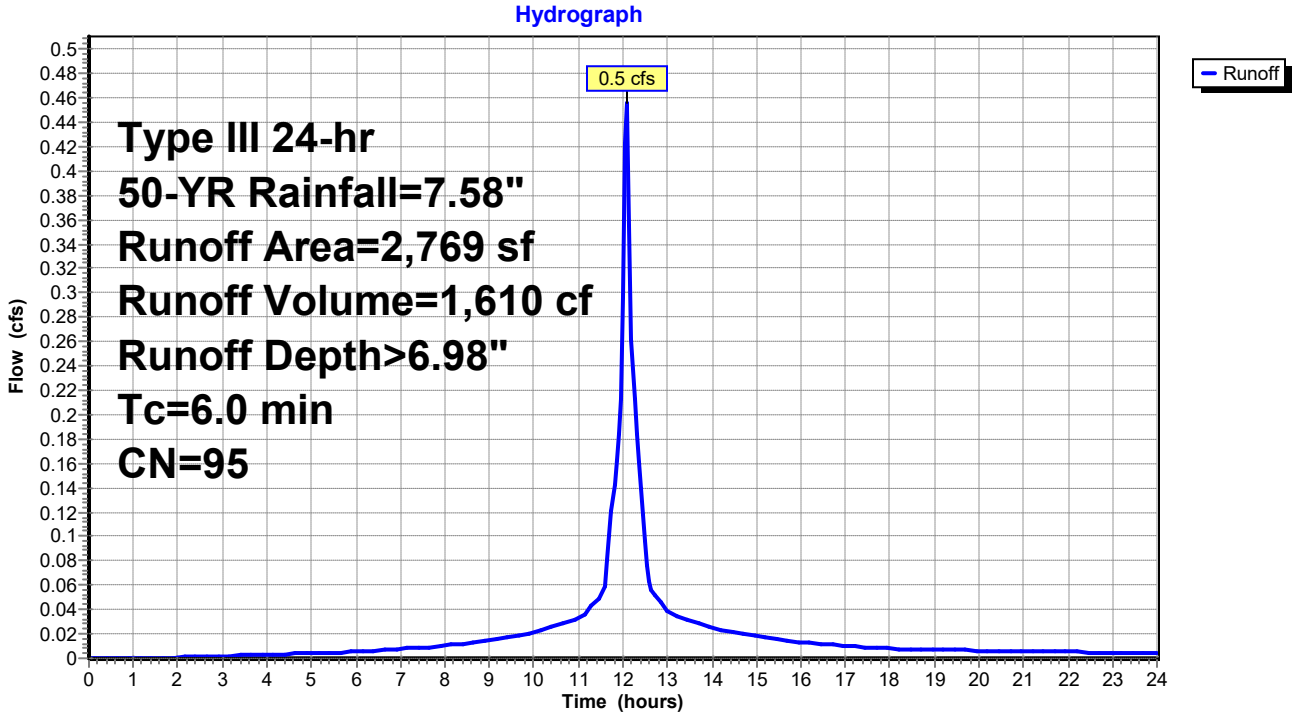
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,610 cf, Depth> 6.98"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
2,458	98	Paved parking, HSG C
311	74	>75% Grass cover, Good, HSG C
2,769	95	Weighted Average
311		11.23% Pervious Area
2,458		88.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-102



Summary for Subcatchment 3S: PR-103

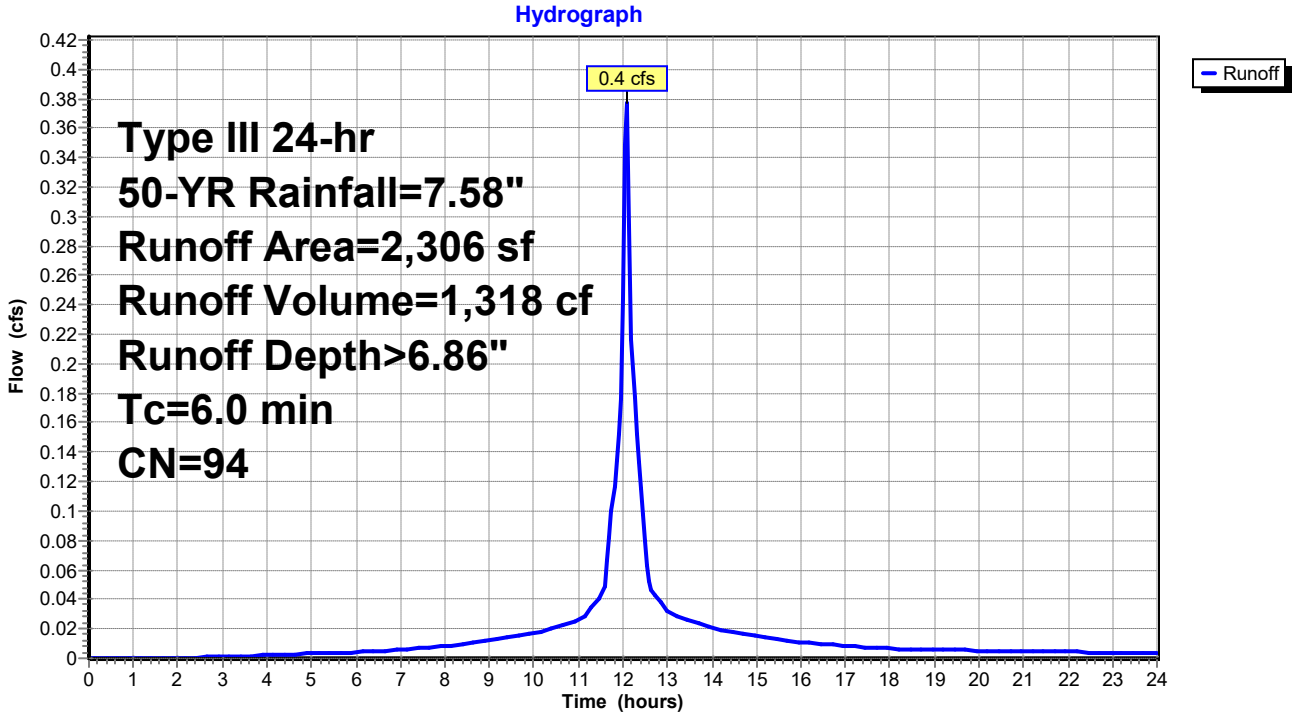
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,318 cf, Depth> 6.86"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
1,951	98	Paved parking, HSG C
355	74	>75% Grass cover, Good, HSG C
2,306	94	Weighted Average
355		15.39% Pervious Area
1,951		84.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-103



Summary for Subcatchment 4S: PR-104

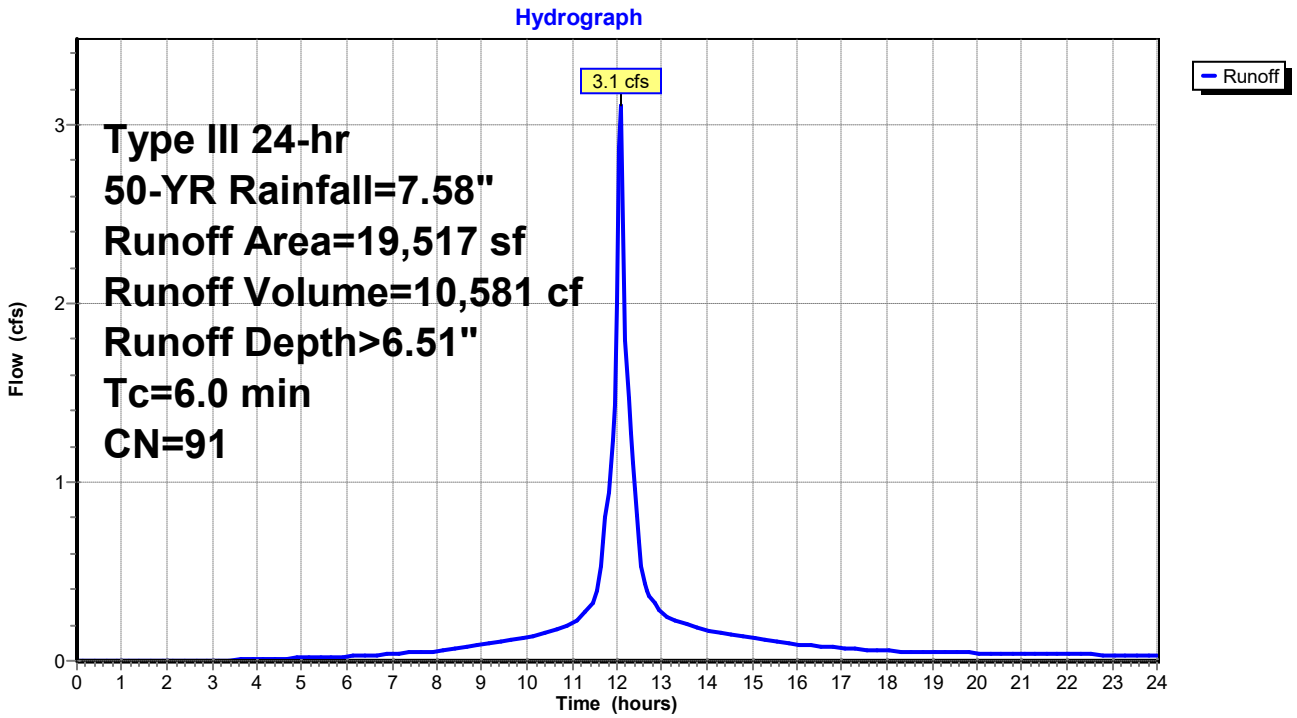
Runoff = 3.1 cfs @ 12.09 hrs, Volume= 10,581 cf, Depth> 6.51"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=7.58"

Area (sf)	CN	Description
7,693	98	Paved parking, HSG C
6,266	98	Roofs, HSG C
5,558	74	>75% Grass cover, Good, HSG C
19,517	91	Weighted Average
5,558		28.48% Pervious Area
13,959		71.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-104

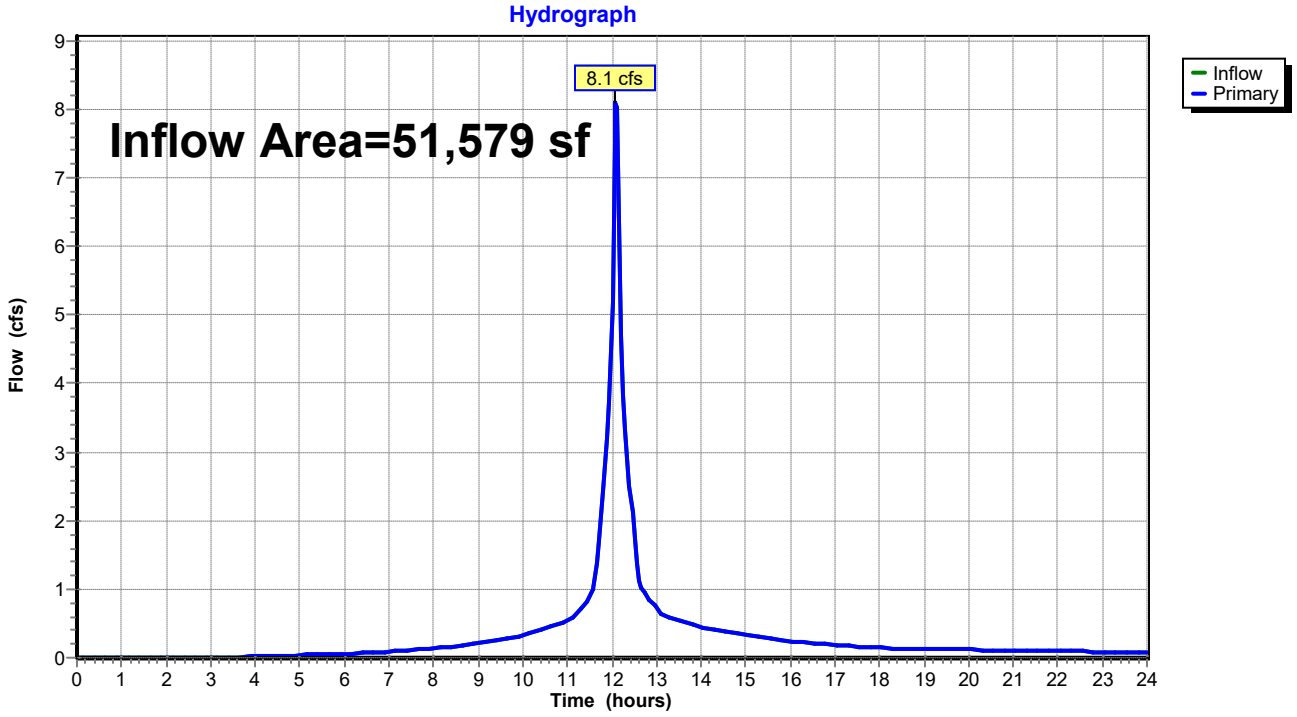


Summary for Link 1L: DP-2D

Inflow Area = 51,579 sf, 65.54% Impervious, Inflow Depth > 6.36" for 50-YR event
Inflow = 8.1 cfs @ 12.09 hrs, Volume= 27,349 cf
Primary = 8.1 cfs @ 12.09 hrs, Volume= 27,349 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



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

Subcatchment 1S: PR-101 Runoff Area=26,987 sf 57.19% Impervious Runoff Depth>7.55"
Tc=6.0 min CN=88 Runoff=5.0 cfs 16,985 cf

Subcatchment 2S: PR-102 Runoff Area=2,769 sf 88.77% Impervious Runoff Depth>8.40"
Tc=6.0 min CN=95 Runoff=0.5 cfs 1,939 cf

Subcatchment 3S: PR-103 Runoff Area=2,306 sf 84.61% Impervious Runoff Depth>8.28"
Tc=6.0 min CN=94 Runoff=0.5 cfs 1,591 cf

Subcatchment 4S: PR-104 Runoff Area=19,517 sf 71.52% Impervious Runoff Depth>7.92"
Tc=6.0 min CN=91 Runoff=3.7 cfs 12,878 cf

Link 1L: DP-2D Inflow=9.8 cfs 33,393 cf
Primary=9.8 cfs 33,393 cf

Total Runoff Area = 51,579 sf Runoff Volume = 33,393 cf Average Runoff Depth = 7.77"
34.46% Pervious = 17,776 sf 65.54% Impervious = 33,803 sf

Summary for Subcatchment 1S: PR-101

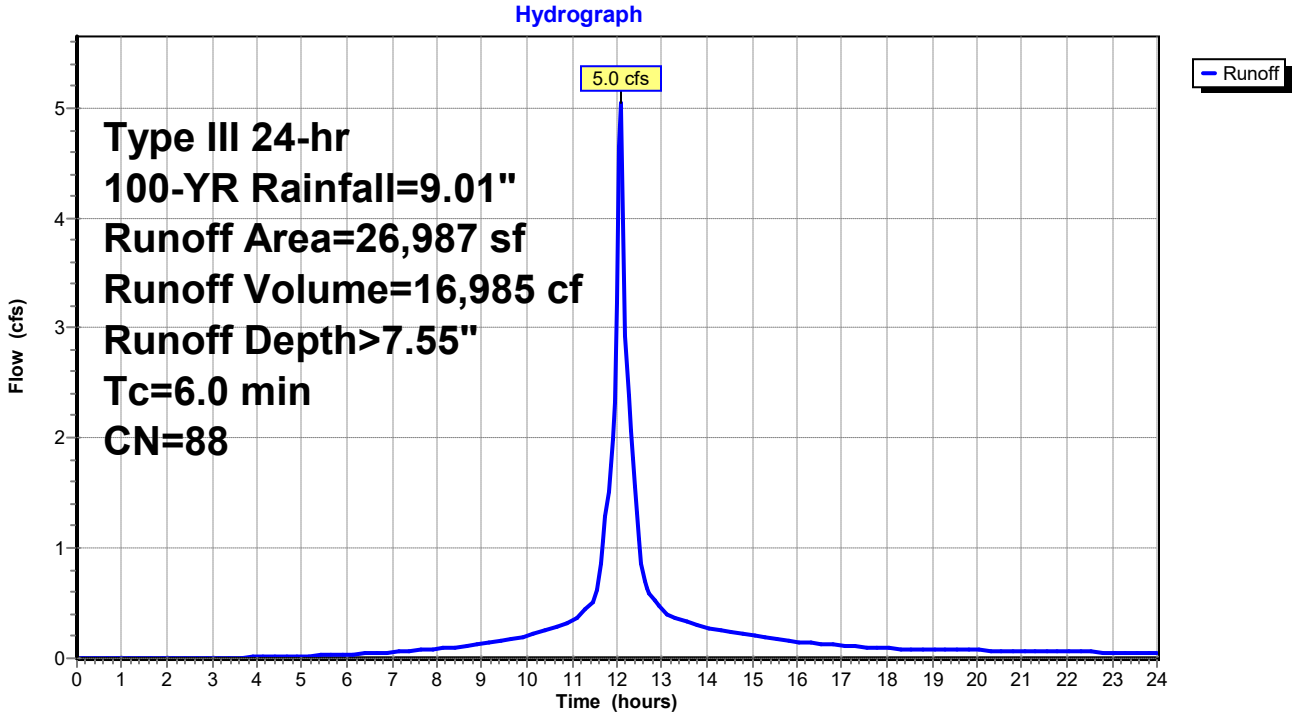
Runoff = 5.0 cfs @ 12.09 hrs, Volume= 16,985 cf, Depth> 7.55"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
15,435	98	Paved parking, HSG C
11,552	74	>75% Grass cover, Good, HSG C
26,987	88	Weighted Average
11,552		42.81% Pervious Area
15,435		57.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PR-101



Summary for Subcatchment 2S: PR-102

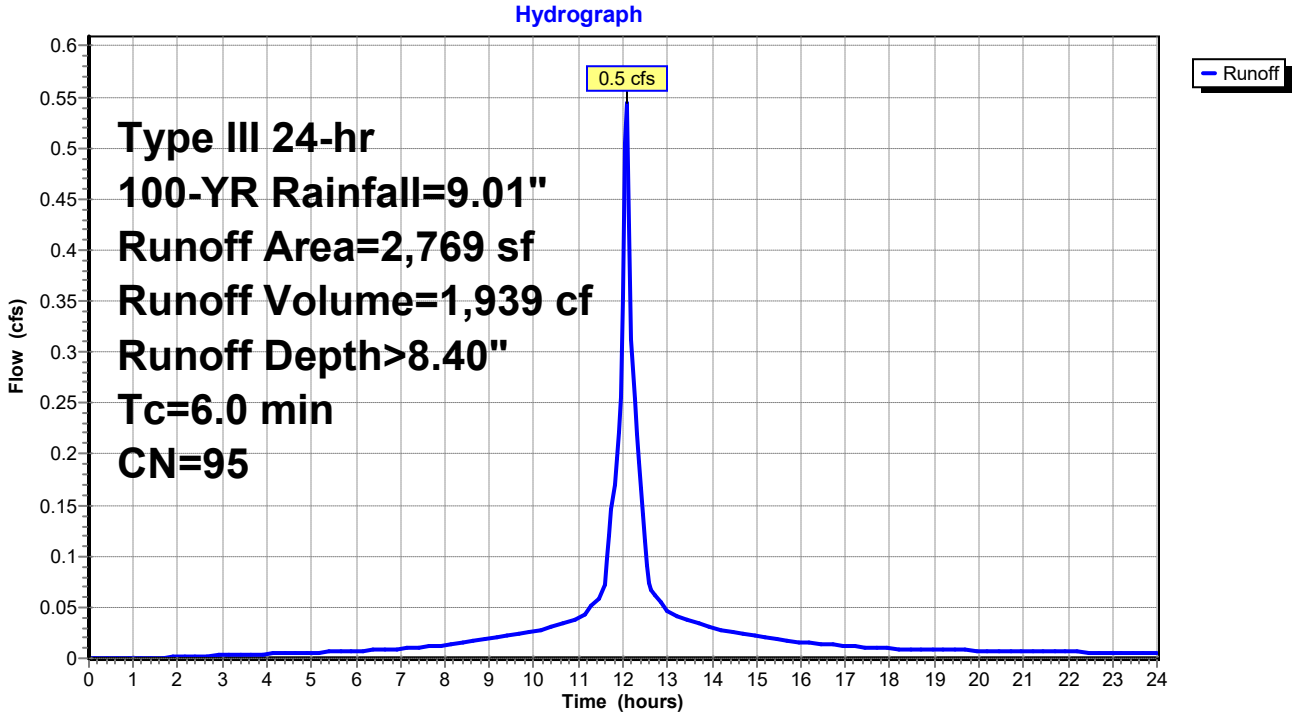
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,939 cf, Depth> 8.40"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
2,458	98	Paved parking, HSG C
311	74	>75% Grass cover, Good, HSG C
2,769	95	Weighted Average
311		11.23% Pervious Area
2,458		88.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PR-102



Summary for Subcatchment 3S: PR-103

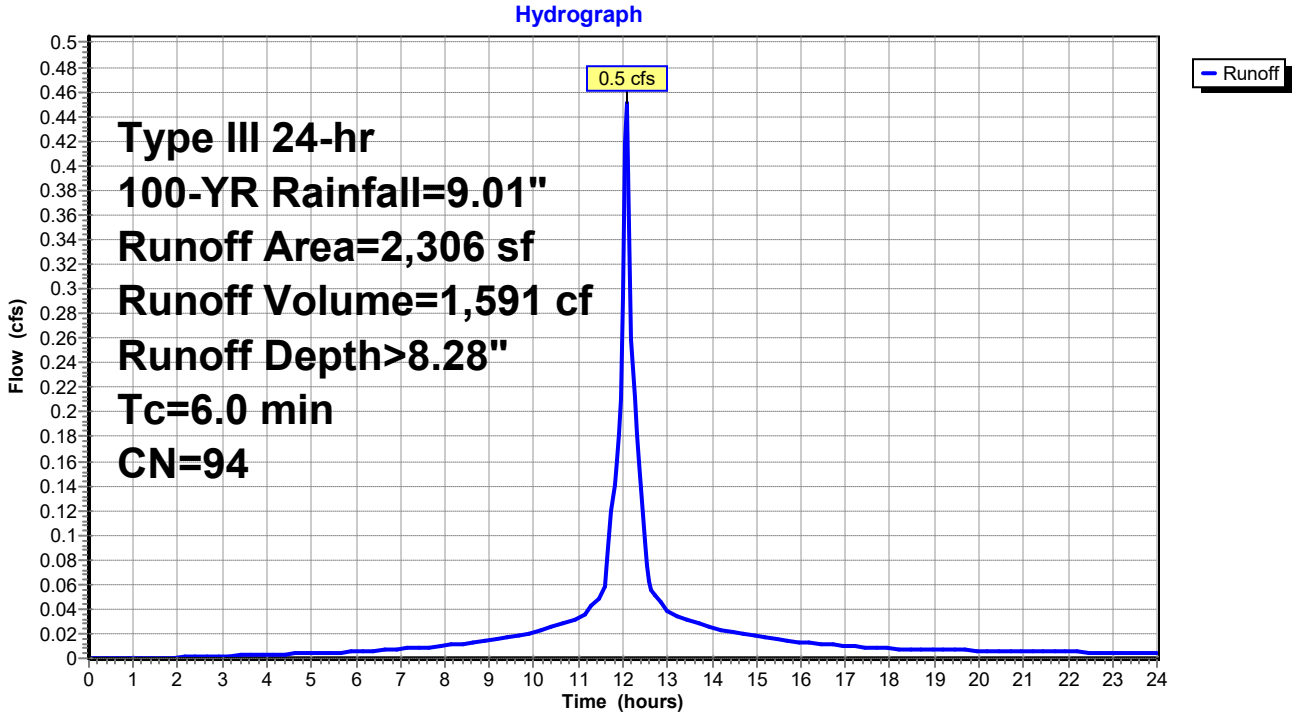
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,591 cf, Depth> 8.28"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
1,951	98	Paved parking, HSG C
355	74	>75% Grass cover, Good, HSG C
2,306	94	Weighted Average
355		15.39% Pervious Area
1,951		84.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PR-103



Summary for Subcatchment 4S: PR-104

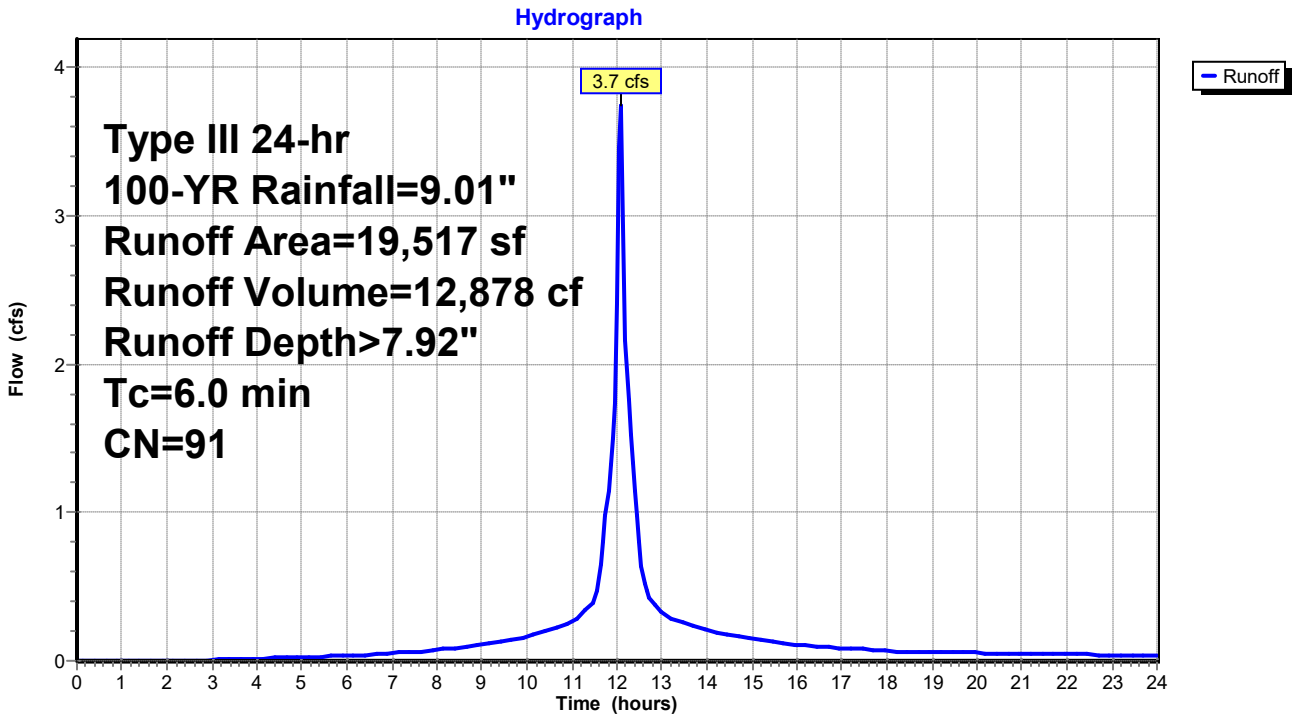
Runoff = 3.7 cfs @ 12.09 hrs, Volume= 12,878 cf, Depth> 7.92"
Routed to Link 1L : DP-2D

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=9.01"

Area (sf)	CN	Description
7,693	98	Paved parking, HSG C
6,266	98	Roofs, HSG C
5,558	74	>75% Grass cover, Good, HSG C
19,517	91	Weighted Average
5,558		28.48% Pervious Area
13,959		71.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PR-104

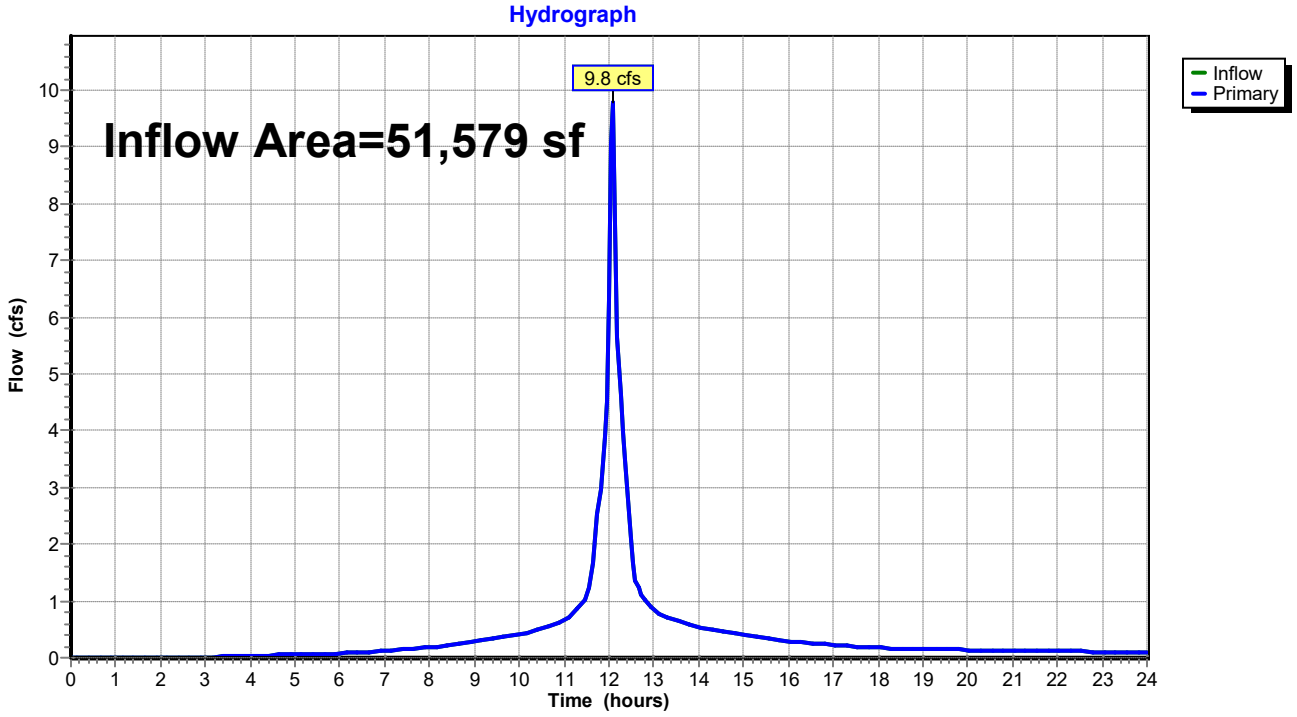


Summary for Link 1L: DP-2D

Inflow Area = 51,579 sf, 65.54% Impervious, Inflow Depth > 7.77" for 100-YR event
Inflow = 9.8 cfs @ 12.09 hrs, Volume= 33,393 cf
Primary = 9.8 cfs @ 12.09 hrs, Volume= 33,393 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 3L

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 1L: DP-2D



APPENDIX H

OPERATION AND MAINTENANCE CHECKLIST

FIRST DEFENSE OPERATION AND MAINTENANCE MANUAL

ADS TECHNICAL NOTE – RETENTION/DETENTION SYSTEM MAINTENANCE

STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**
Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
DRAINAGE STRUCTURES & DRAINAGE PIPE		
Drainage Structures		
1. Debris & accumulated sediment removed		
2. Sumps capacity; less than half full		
3. Grate/cover bolted and clear		
4. Concrete/masonry condition of structures		
a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (exposed rebar)		
d. Joint failures		
e. Water tightness		
5. Pipe connections		
Drainage Pipe		
1. Debris & accumulated sediment removed		
2. Pipe connections		
Other		
1. Complaints from residents		
2. Aesthetics		
3. Signs of hydrocarbon build-up		
4. Any public hazards (specify)		

STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**
Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
HYDRODYNAMIC SEPARATOR		
Structure		
1. Floating debris, oil, and grease removed		
2. Accumulated sediment removed		
3. Storage capacity; less than half full		
4. Cover present and functional		
5. Concrete/masonry condition of structures		
a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (exposed rebar)		
d. Joint failures		
e. Water tightness		
6. Pipe connections		
Other		
1. Complaints from residents		
2. Aesthetics		
3. Signs of hydrocarbon build-up		
4. Any public hazards (specify)		
5. Refer to manufacturer's operation and maintenance manual provided in this Appendix for additional recommendations.		

STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**
Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
BIORETENTION BASIN		
Berm and Embankments		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Seeps/leaks on downstream face		
Structures and Underdrain		
1. Debris removal necessary		
2. Excessive sediment accumulation inside of structure/underdrain		
3. Sumps capacity; less than half full		
4. Clean out cap visible and operable		
5. Grate/cover bolted and clear		
6. Concrete/masonry condition of structures		
a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (exposed rebar)		
d. Joint failures		
e. Water tightness		

STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**
Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
7. Pipe connections		
BIORETENTION BASIN (CONT.)		
Basin		
1. Vegetation adequate		
2. Undesirable vegetative growth or invasive species		
3. Mowing limited and growth adequate		
4. Debris removal required		
5. Visible pollution		
6. Sediment cleanout when depth exceeds one inch.		
7. Standing water or wet spots remain 48 hours after storm event.		
8. Mulch reapplied		
Other		
1. Encroachment on basin area		
2. Complaints from residents		
3. Aesthetics		
4. Signs of hydrocarbon build-up		
5. Any public hazards (specify)		

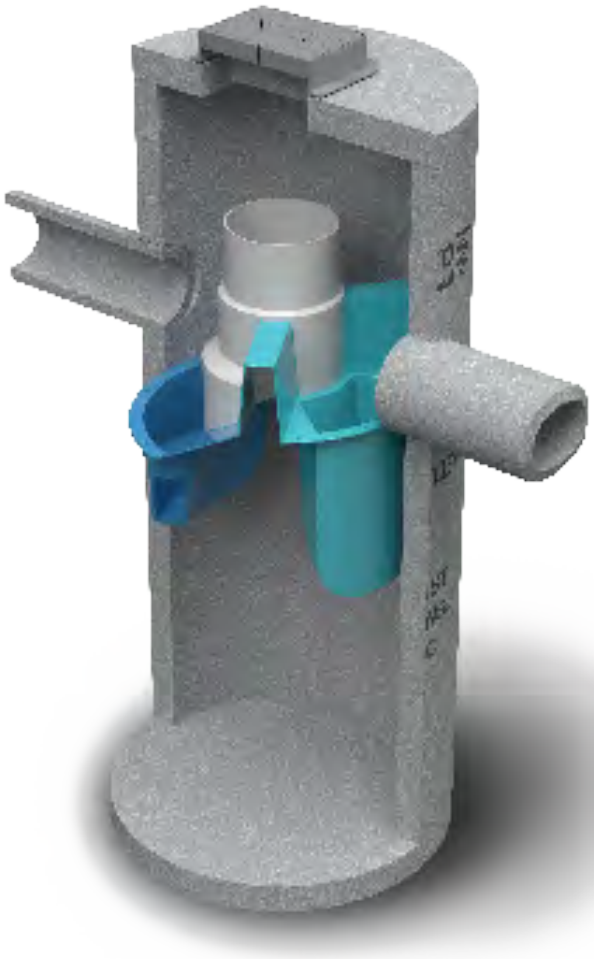
STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**
Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
DETENTION SYSTEM		
Structure		
1. Remove debris and accumulated sediment from inlets and outlets.		
2. Remove debris and accumulated sediment from storage pipes.		
3. CCTV inspection for deficiencies.		
4. Refer to ADS Technical Note – Retention/Detention System Maintenance, included in this Appendix, for additional guidance.		

STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**
Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
STORMWATER PLANTER		
Structure		
1. Routine maintenance including pruning and replacing dead or dying vegetation (or invasive species), plant thinning, and erosion repair (re-application of mulch) should be completed.		
2. Inspect plantings and provide supplemental irrigation as required.		
3. Inspect and remove any debris/blockages from inlet pipes/roof leaders, overflow grate, underdrain, and outlet pipes.		
4. Inspect sediment plant bed for sediment build-up and remove and dispose of properly, as needed (if depth exceeds 1-inch)		
5. Inspect splash pad for signs of erosion. Replace stones as necessary.		

STORMWATER MANAGEMENT SYSTEM		
Project Name:	**Location:**	
Site Status:	**Weather Condition:**	
Inspector:	**Date:**	**Time:**

Comments:

Actions to be Taken:



Operation and Maintenance Manual

First Defense® High Capacity and First Defense®Optimum

Vortex Separator for Stormwater Treatment

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3 **First Defense® by Hydro International**
- **Introduction**
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- **Pollutant Capture and Retention**

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- **First Defense® Components**

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8 **First Defense® Installation Log**

9 **First Defense® Inspection and Maintenance Log**

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DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's First Defense®. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc has a policy of continuous product development and reserves the right to amend specifications without notice.

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

The two product models described in this guide are the First Defense® High Capacity and the First Defense® Optimum; they are inspected and maintained identically.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

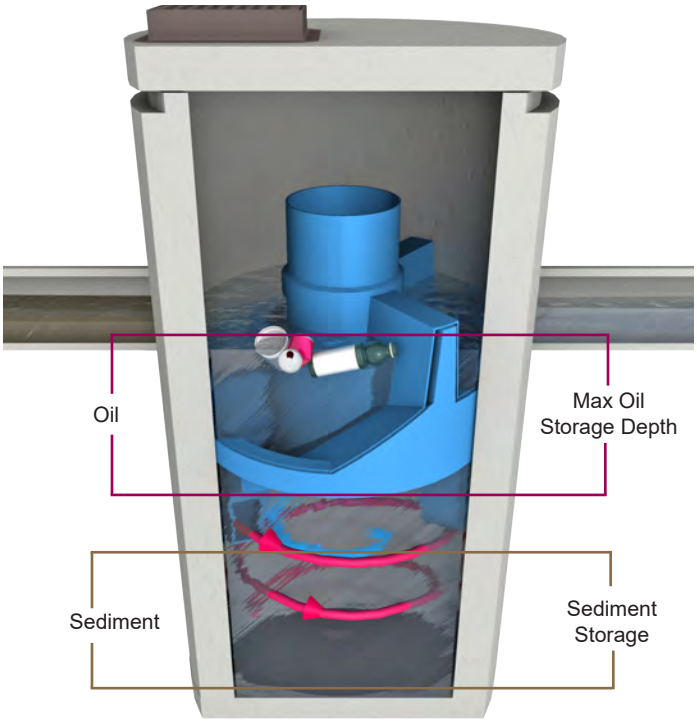

Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components have modified geometries allowing greater design flexibility to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2). First Defense® model sizes (diameter) are shown in Table 1.

III. Maintenance

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

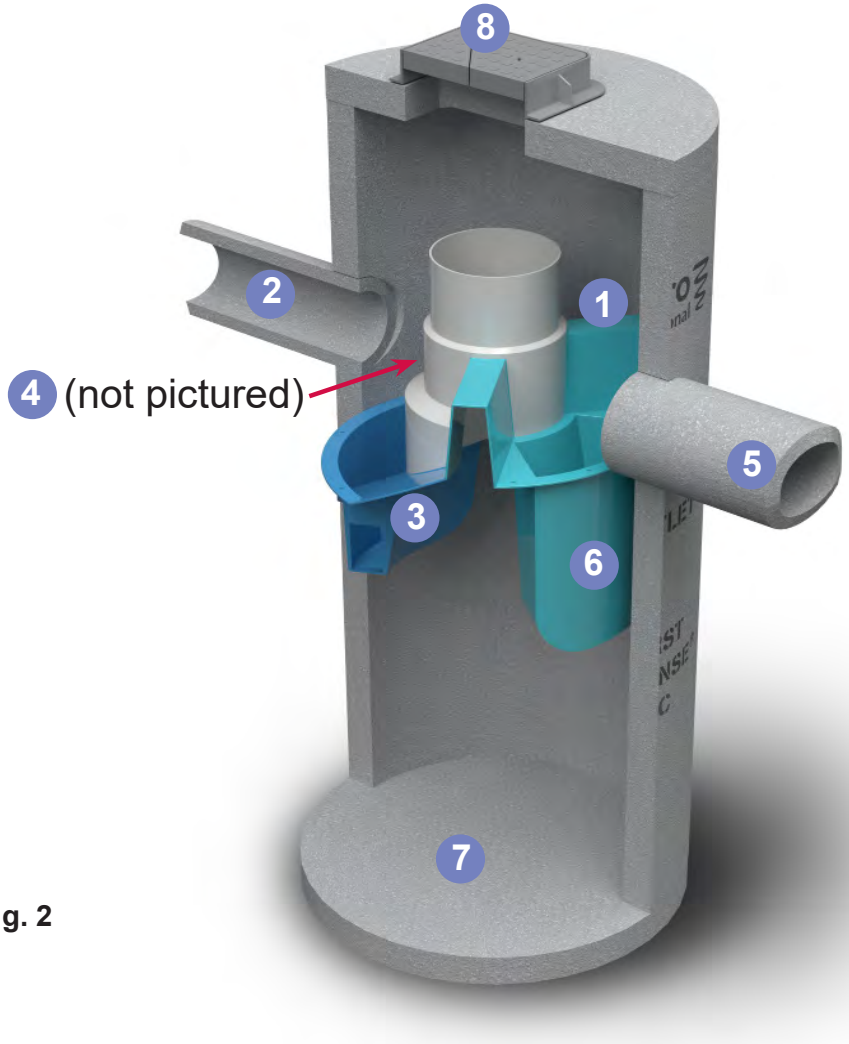

Fig. 2

Table 1

First Defense® Model Sizes
(ft / m) diameter
3 / 0.9
4 / 1.2
5 / 1.5
6 / 1.8
7 / 2.1
8 / 2.4
10 / 3.0

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense® have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

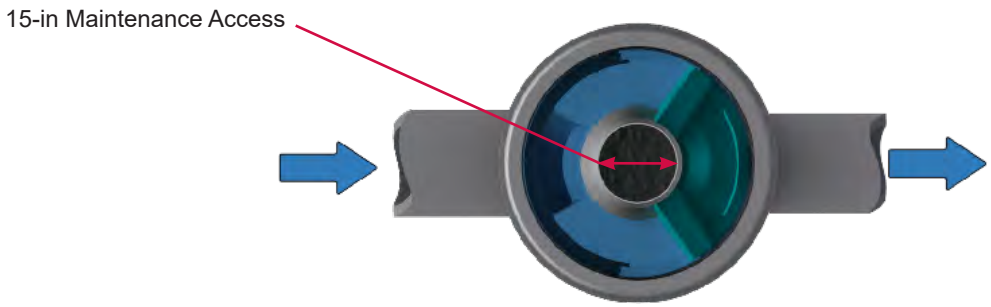

Fig.3 The central opening to the sump of the First Defense®is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.4).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Fig.4 Floatables are removed with a vactor hose

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and Sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose or with the skimmer or net

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

First Defense® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE): [3-FT] [4-FT] [5-FT] [6-FT] [7-FT] [8-FT] [10-FT]

INLET (CIRCLE ALL THAT APPLY): GRATED INLET (CATCH BASIN) INLET PIPE (FLOW THROUGH)

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

First Defense® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

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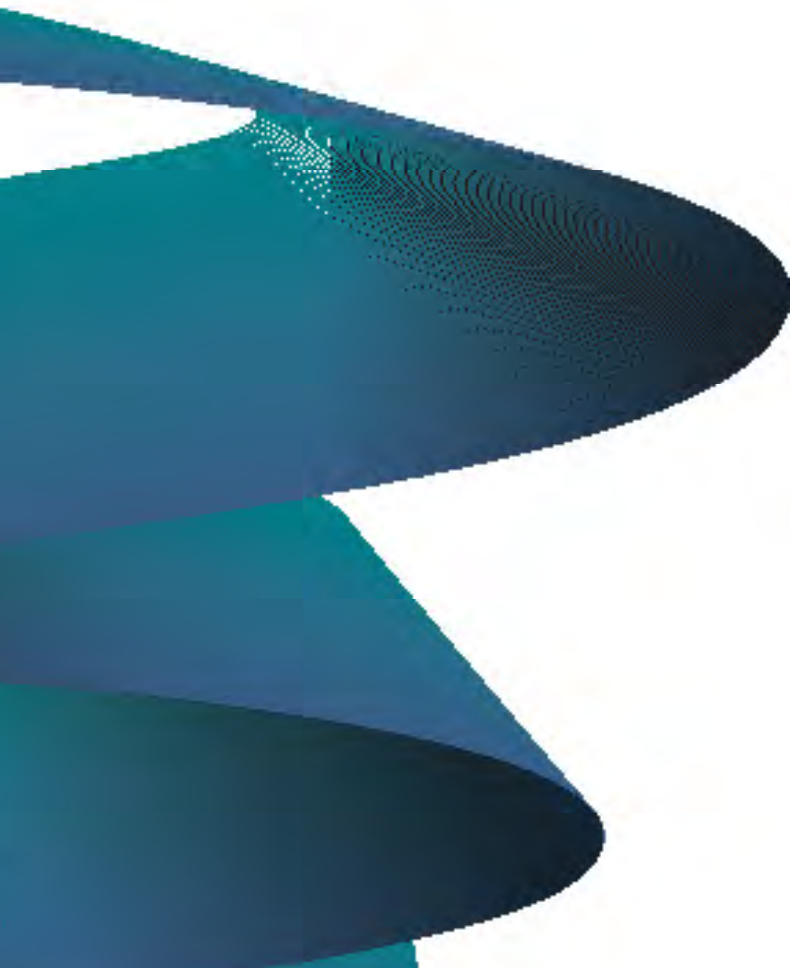
Hydro International®



Stormwater Solutions

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TECHNICAL NOTE

Retention/Detention System Maintenance

TN 6.01
February 2007

This document is provided for informational purposes only and is meant only to be a guide. Individuals using this information should make their own decisions as to suitability of this guideline for their individual projects and adjust accordingly.

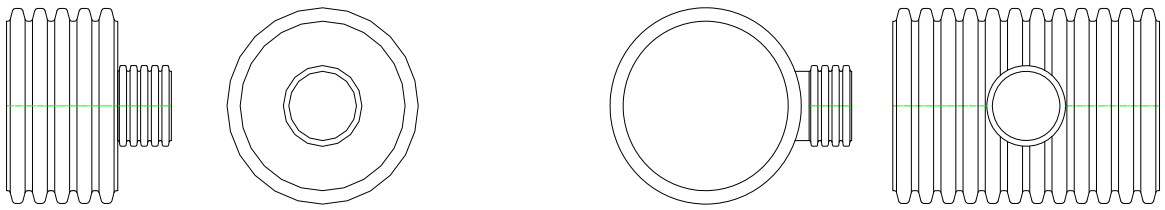
Introduction

A retention/detention system is comprised of a series of pipes and fittings that form an underground storage area, which retains or detains storm water runoff from a given area. As sediment and debris settle out of the detained stormwater, build up occurs that requires the system to be regularly inspected and cleaned in order for the system to perform as originally designed. The following provides the available fittings and guidelines for inspection and maintenance of an HDPE underground storage system.

System Accessories and Fittings

Concentric Reducers

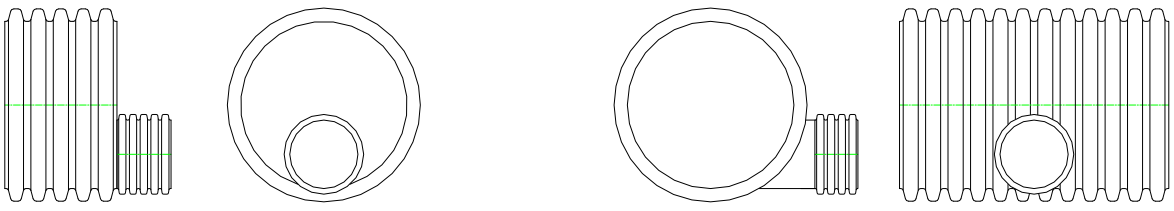
Concentric Reducers are fittings that transition between two pipes, either in line with one another or at perpendicular angles. The centerlines of the two pipes are at the same elevation. When a concentric reducer is used to connect the manifold pipe to the lateral pipes, most debris will be trapped in the manifold pipe.



SIDE VIEW SECTION VIEW SIDE VIEW SECTION VIEW

Eccentric Reducers

Eccentric Reducers are fittings that transition between two pipes, either in line with one another or at perpendicular angles. The inverts of the two pipes are at the same elevations. When an eccentric reducer is used to connect the manifold pipe to the lateral pipes, most debris will follow the flow of the storm water into the lateral pipes.



SIDE VIEW SECTION VIEW SIDE VIEW SECTION VIEW

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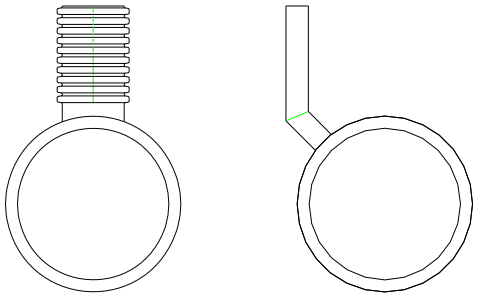
Riser

Each retention/detention system typically has risers strategically placed for maintenance and inspection of the system. These risers are typically 24” in diameter or larger and are placed on the manifold fittings.

Cleanouts

Cleanout ports are usually 4-, 6-, or 8-in diameter pipe and are placed on the manifold fittings. They are used for entrance of a pipe from a vacuum truck or a water-jetting device.



RISER
CROSS-SECTION VIEW

CLEANOUT
CROSS-SECTION VIEW

For a complete listing of available fittings and components please refer to the *ADS Fittings Manual*.

Maintenance Overview of a Retention/Detention System

Maintaining a clean and obstruction-free retention/detention system helps to ensure the system performs the intended function of the primary design. Build up of debris may obstruct flow through the laterals in a retention system or block the entranceway of the outlet pipe in a detention system. This may result in ineffective operation or complete failure of the system . Additionally, surrounding areas may potentially run the risk of damage due to flooding or other similar issues.

Inspection/Maintenance Frequency

All retention/detention systems must be cleaned and maintained. Underground systems may be maintained more cost effectively if these simple guidelines are followed. Inspection should be performed at a minimum of once per year. Cleaning should be done at the discretion of individuals responsible to maintain proper storage and flow. While maintenance can generally be performed year round, it should be scheduled during a relatively dry season.

Pre-Inspection

A post-installation inspection should be performed to allow the owner to measure the invert prior to accumulation of sediment. This survey will allow the monitoring of sediment build-up without requiring access to the retention/detention system.

The following is the recommended procedure for pre-inspections:

1) Locate the riser section or cleanouts of the retention/detention system. The riser will typically be 24” in diameter or larger and the cleanouts are usually 4”, 6” or 8” in diameter.
2) Remove the lid of the riser or clean outs.
3) Insert a measuring device into the opening and make note to a point of reference on the stick or string. (This is done so that sediment build up can be determined in the future without having to enter the system.)

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Inspection/Maintenance

A retention/detention system should be inspected at a minimum of one time a year or after major rain events if necessary.

The following is the recommended procedure to inspect system in service:

1) Locate the riser section of the retention/detention system. The riser will typically be 24” in diameter or larger.
2) Remove the lid from the riser.
3) Measure the sediment buildup at each riser and cleanout location. Only certified confined space entry personnel having appropriate equipment should be permitted to enter the retention/detention System.
4) Inspect each manifold, all laterals, and outlet pipes for sediment build up, obstructions, or other problems. Obstructions should be removed at this time.
5) If measured sediment build up is between 5% - 20% of the pipe diameter, cleaning should be considered; if sediment build up exceeds 20%, cleaning should be performed at the earliest opportunity. A thorough cleaning of the system (manifolds and laterals) shall be performed by either manual methods or by a vacuum truck.

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APPENDIX I

USDA WEB SOIL SURVEYS

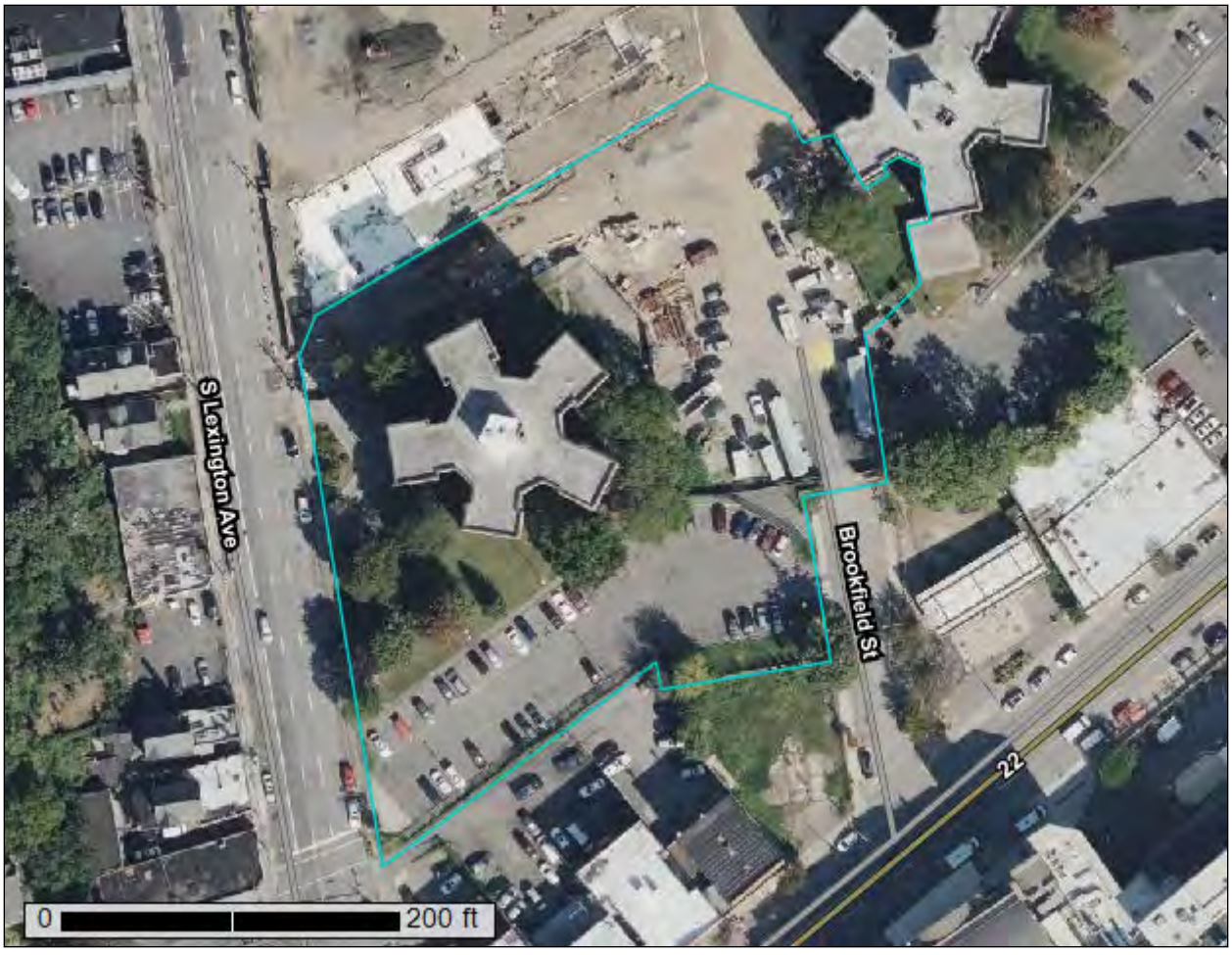
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Westchester County, New York



May 26, 2021

Preface

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:878 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 16, Jun 11, 2020

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

Date(s) aerial images were photographed: Aug 22, 2020—Sep 23, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Uf	Urban land	2.4	100.0%
Totals for Area of Interest		**2.4**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Westchester County, New York

Uf—Urban land

Map Unit Setting

National map unit symbol: bd7j
Elevation: 50 to 2,400 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Udorthents

Percent of map unit: 5 percent
Hydric soil rating: No

Riverhead

Percent of map unit: 2 percent
Hydric soil rating: No

Chatfield

Percent of map unit: 2 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 2 percent
Hydric soil rating: No

Unadilla

Percent of map unit: 2 percent
Hydric soil rating: No

Sutton

Percent of map unit: 2 percent
Hydric soil rating: No

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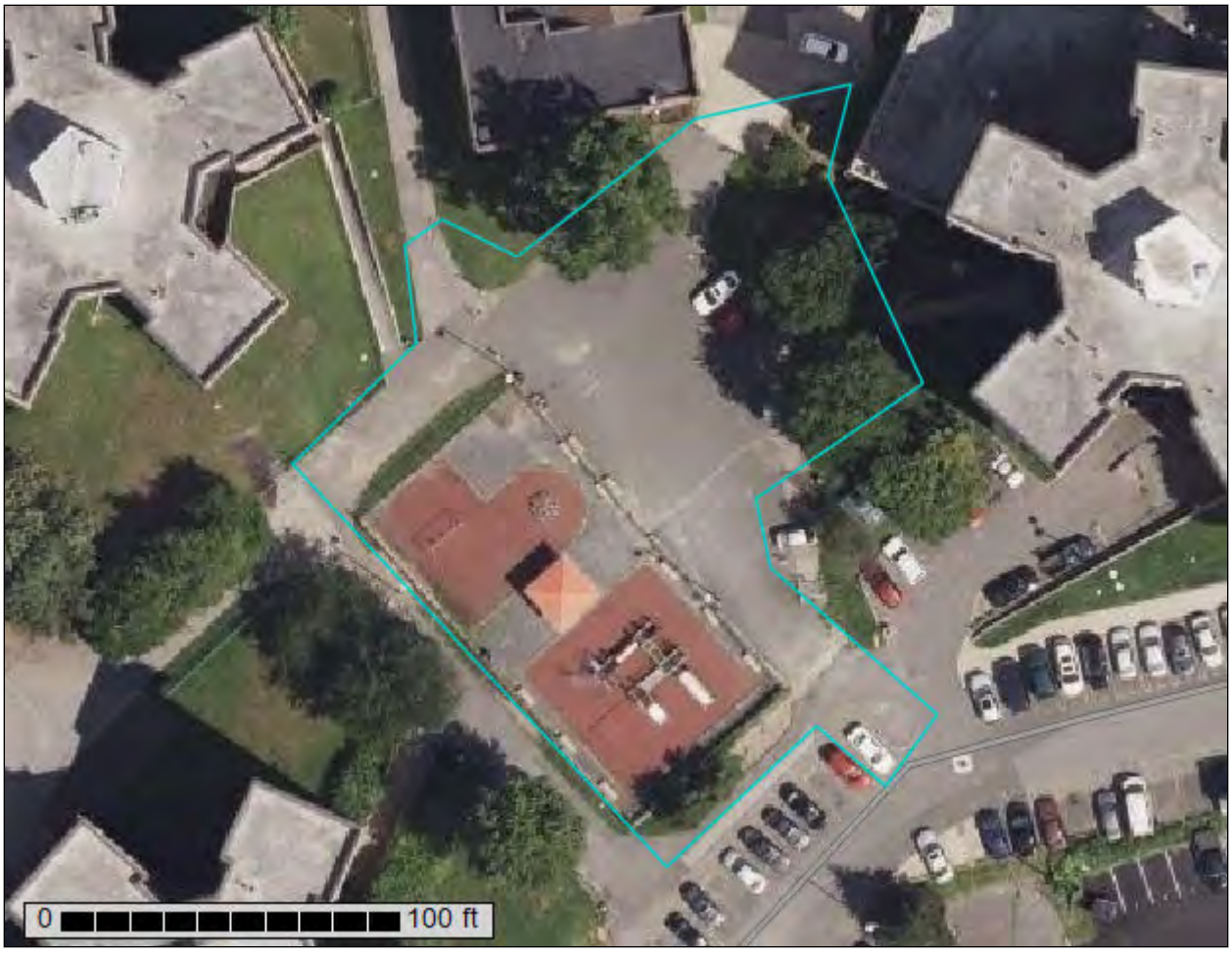

August 30, 2022

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

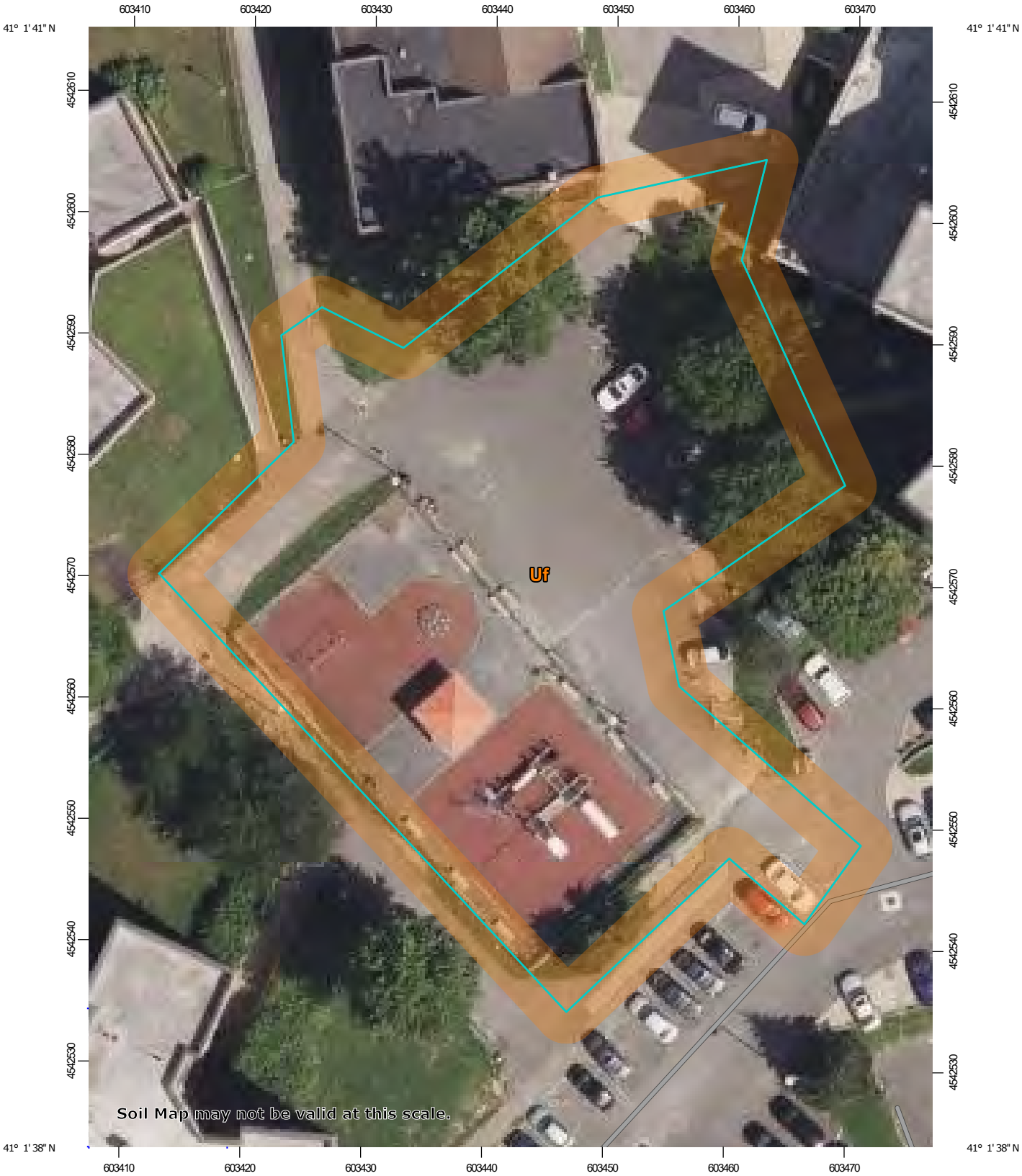
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:450 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 20 40 80 120

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 17, Sep 1, 2021

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

Date(s) aerial images were photographed: Apr 13, 2021—Sep 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Uf	Urban land	0.5	100.0%
Totals for Area of Interest		**0.5**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Westchester County, New York

Uf—Urban land

Map Unit Setting

National map unit symbol: bd7j
Elevation: 50 to 2,400 feet
Mean annual precipitation: 46 to 50 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 115 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Udorthents
Percent of map unit: 5 percent
Hydric soil rating: No

Riverhead
Percent of map unit: 2 percent
Hydric soil rating: No

Udorthents, wet substratum
Percent of map unit: 2 percent
Hydric soil rating: No

Unadilla
Percent of map unit: 2 percent
Hydric soil rating: No

Chatfield
Percent of map unit: 2 percent
Hydric soil rating: No

Sutton
Percent of map unit: 2 percent
Hydric soil rating: No

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APPENDIX J

GEOTECHNICAL REPORT

GEO DESIGN

UNDERGROUND INTELLIGENCE

PRELIMINARY GEOTECHNICAL EVALUATION REPORT

PROPOSED 9 TO 10-STORY BUILDING
BROOKFIELD COMMONS, PHASE 3
161 SOUTH LEXINGTON AVENUE
WHITE PLAINS, NEW YORK

Prepared for:
Trinity NY Development LLC
1350 Broadway, Suite #1700
New York, NY 10018

Prepared By:
GEODesign, Inc. P.C.
241West 30th Street, 5th Floor
New York, NY 10001

GEODesign File No. 3902-002
June 2021

GEO DESIGN

GEODesign, Inc. P.C.
241 West 30th Street, 5th Floor
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(212) 221-6651

June 16, 2021
File No. 3902-002

Omalawa Musa
Trinity NY Development LLC
1350 Broadway, Suite #1700
New York, NY 10018

Re: Preliminary Geotechnical Evaluation Report
Brookfield Commons – Phase 3
161 South Lexington Avenue White Plains, New York

Dear Mr. Musa:

GEODesign, Inc. P.C. (GEODesign) is pleased to submit this preliminary geotechnical evaluation report for the referenced project site.

We appreciate the opportunity to work with you. Please contact us if you have any questions or need additional information.

Sincerely,

GEODesign, Inc. P.C.

Jonathan Ciampi, PE
Senior Associate

Thomas G. Thomann, PhD, PE
Senior Principal / Reviewer

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Appendix C – Laboratory Test Results

1.0 – INTRODUCTION AND OBJECTIVES

1.1 GENERAL

This report provides preliminary geotechnical recommendations for the design and construction of a proposed building at 161 South Lexington Avenue in White Plains, New York (see Figure 1). Authorization to proceed was obtained in the form of an agreement between Trinity NY Development LLC and GEODesign, Inc. P.C. (GEODesign) dated May 18, 2020.

The geotechnical evaluations and recommendations presented herein are in general accordance with the 2020 NYS Building Code (Code).

1.2 SITE CONDITIONS AND PROJECT UNDERSTANDING

The project site is located at 161 South Lexington Avenue in White Plains, New York. The site is occupied by active parking lots, landscaped areas, walking paths, and a nine-story building (159 South Lexington Avenue). The project site is "Phase 3" of the Brookfield Commons redevelopment project, which has a total of seven phases.

The site is bounded by the Phase 2 portion of the project to the north, Brookfield Street to the east, several multi-story buildings to the south, and South Lexington Avenue to the west. We understand that the Phase 2 building is supported on piles.

The Phase 3 building is proposed to be 9 to 10 stories with no cellar level, and a building footprint of approximately 16,200 sq. ft.

1.3 OBJECTIVES AND SCOPE OF SERVICES

The objectives of this investigation were to evaluate the subsurface conditions at the site and provide geotechnical recommendations for the design and construction of the proposed building. The following scope of services was performed to achieve these objectives:

1. Retained and managed subcontractors to perform test borings and laboratory testing;
2. Provided full time inspection of the test boring operations;
3. Performed engineering evaluations and prepared this geotechnical evaluation report that includes the following:
    a. An Introductory Section presenting project background information and the scope of services;
    b. A Subsurface Conditions section that includes the following:
        - A description of the test boring and laboratory testing procedures and results;
        - A plan showing the test boring locations;
        - A description of the subsurface conditions;
    c. An Analyses and Recommendations section regarding the foundation design that includes the following:
        - Seismic site classification and liquefaction potential;
        - Recommended foundation type, estimated capacity, and bearing elevation;
        - Support of the ground floor slab;
        - Lateral soil and groundwater pressures on below-grade walls;

- Permanent groundwater control measures;

d. A Construction Recommendations section that includes the following:
   - Excavation considerations;
   - Adjacent building support considerations;
   - Temporary groundwater control;
   - Subgrade preparation;
   - Pile installation and testing recommendations;
   - Backfill and compaction control recommendations;
   - Pre-construction condition surveys;
   - Construction inspection and monitoring considerations;
e. A Summary and Conclusions section;
f. Appendices that include test boring logs, laboratory test results, and geophysical test results.

1.4 REPORT ORGANIZATION

This report is divided into five sections. Section 1 presents an introduction and the objectives of the study. Section 2 includes a description of the subsurface investigation methods and results. Section 3 provides engineering evaluation results and the foundation design and construction recommendations. A summary and conclusions are included in Section 4. Limitations of the subsurface explorations, analyses, and recommendations are included in Section 5. Tables and Figures are provided at the end of the text.

2.0 – SUBSURFACE CONDITIONS

2.1 GENERAL

The subsurface investigation included laboratory testing and a field investigation, which included drilling test borings and installing a groundwater observation well. Details of the subsurface investigation and the conditions encountered are described in the following sections.

2.2 SUBSURFACE INVESTIGATION

2.2.1 Test Boring Program

Six test borings, designated GD-1 through GD-6, were performed between May 21 and 24, 2021, at the locations shown in Figures 2. Special inspection of the test borings was performed on a continuous basis by GEODesign personnel under the direction of Mr. Jonathan Ciampi, PE of GEODesign.

The test borings were performed by Craig Geotechnical Drilling Co., Inc. of Mays Landing, NJ using a truck mounted CME-75 drilling rig. The boreholes were advanced using mud rotary drilling techniques with a 2-7/8 or 3-7/8 inch diameter tri-cone roller bit and a 4-inch diameter flush joint casing.

Soil samples were obtained using techniques and equipment in general accordance with the American Society for Testing and Materials (ASTM) Standard Specification D1586-Standard Penetration Test (SPT). The SPT consists of driving a 2 inch O.D. split spoon sampler for a distance of 24 inches, with repeated blows of a 140 lb. hammer free falling a distance of 30 inches. The standard penetration, or N-value, is determined as the number of blows required to advance the sampler 12 inches after the initial 6 inches of penetration. The recovered split-spoon samples were placed in jars, labeled with the project name and number, boring number, sample, depth, SPT blow counts and the amount of recovery.

Rock coring was performed using a five-foot long NX (2-1/8 in. O.D.) core barrel to verify the presence of rock and to assess its relative quality, as indicated by Core Recovery[1] and Rock Quality Designation (RQD)[2]. The top of rock was estimated based on the drilling operations (e.g., excessive rig chatter, difficult penetration) and split spoon sampler refusal (i.e., blow counts greater than 100 for a 6 inch interval).

Upon completion of Boring GD-1, a groundwater observation well was installed. The well was constructed of nominal 2-inch diameter Schedule 25 PVC pipe with a 10-foot screen between depths of approximately 15 and 25 feet, and 15 feet of riser pipe. The annulus between the pipe and the wall of the borehole was backfilled with filter sand. A flush-mount cap was installed at the top of the completed borehole.

---

[1] The Core Recovery is defined as the ratio (expressed as a percent) of the total length of recovered core to the length cored.

[2] The Rock Quality Designation (RQD) is defined as the ratio (expressed as a percentage) of the total length of recovered core samples having a length of at least twice the core diameter (e.g., about 4 in for NX-core) to the total length of core.

The GEODesign test boring logs are included in Appendix A.

Two test borings, designated as B-6 (OW) and B-7, were performed by AKRF on August 17 and 18, 2017, at the locations shown in Figure 2. The AKRF boring logs are included in Appendix B.

2.2.2 Laboratory Testing

Geotechnical laboratory testing was conducted on representative soil samples to verify the field classifications and assist in engineering evaluations. The laboratory test results, which include sieve analyses and percent fines are included in Appendix C.

2.3 GENERALIZED SUBSURFACE CONDITIONS

2.2.1 GEODesign Subsurface Investigation

The following generalized strata descriptions are based on interpretations of the subsurface investigation results:

Stratum 1 – Uncontrolled Fill: This stratum consists primarily of black and brown sand with varying amounts of silt and miscellaneous fill such as asphalt, concrete glass, and wood. The N-values range from 11 to 25 blows per foot (bpf), with an average of approximately 18 bpf. The thickness of this stratum is estimated to be less than 5 feet.

Stratum 2 – Upper Sand: This stratum generally consists of brown coarse to fine sand with varying amounts of silt and gravel. The N-values range from 3 to 12 bpf, with an average of approximately 7 bpf, indicative of a loose material. The thickness of this stratum is approximately 5 feet.

Stratum 3 – Silt: This stratum was encountered in borings GD-1, GD-3 and GD-4, as well as the AKRF borings, and generally consists of brown and gray silt with varying amounts of sand, clay, and gravel. The N-values range from 7 to 15 bpf, with an average of approximately 11 bpf, indicative of a medium dense material. The thickness of this stratum is approximately 5 to 25 feet.

Stratum 4 – Lower Sand: This stratum generally consists of brown and gray coarse to fine sand with varying amounts of silt and gravel. The N-values range from 11 bpf to split spoon refusal (i.e. greater than 100 blows per 6 inches of penetration), with an average of approximately 50 bpf, indicative of a very dense material. The thickness of this stratum is approximately 10 to 15 feet.

Stratum 5 –Soft Rock: This stratum generally consists of white to light gray decomposed granite. The N-values were typically split-spoon refusal, indicative of a very dense material. When rock coring was performed, the Core Recovery and RQD were 50% and 23%, respectively. The thickness of this stratum is approximately 0 to 10 feet.

Stratum 6 – Intermediate to Hard Rock: This stratum generally consists of white and gray medium to fine grained schist, gneiss, and granite that was slightly to moderately fractured with fresh to moderately weathered joints. The Core Recovery ranges from 65% to 100% and

the RQD ranges from 40% to 97%. The depth to the top of this stratum, which generally increases from south to north, varies from 20 to 49 feet (el. +180 to +150 feet).

2.4 GROUNDWATER LEVELS

A groundwater observation well was installed in boring GD-1. Additionally, an existing well, installed by others, was located within the proposed building footprint. Measurements taken on May 24, 2021 indicate groundwater depths of approximately 4 and 6 feet, which corresponds to approximately el. +193 to +196 feet.

Groundwater measurements were not taken over an extended period of time; therefore, the measurements do not adequately reflect seasonal or other time dependent variations that may occur. See limitations in Section 5.

3.0 – ANALYSES AND RECOMMENDATIONS

3.1 GENERAL

This section presents engineering analyses, evaluations, and recommendations related to the design and construction of the foundations and below grade structures. The evaluations and recommendations are based on the available subsurface information, our experience on other projects, and the design requirements provided herein for the proposed structure.

3.2 FOUNDATION DESIGN

3.2.1 Seismic Recommendations

Based on the soil profile, the recommended seismic site classification is Site Class "D". In accordance with the Code, if the Risk Category is I&II or III, the Seismic Design Category is "B". The appropriate Risk Category should be determined by the Architect or Structural Engineer. Liquefaction is not a concern at this site.

3.2.2 Foundation Recommendations

3.2.2.1 Columns and Walls

Option 1 – Mat Foundation

Consideration could be given to supporting the new building on a mat foundation bearing on Stratum 2. It is possible that if the building loads are high enough, this could result in unacceptable mat settlement due to consolidation of the silty material (i.e., Stratum 3). Considering our experience at similar sites, the relatively stiff nature of the silt, and the anticipated building loads, it is possible that the settlement may be acceptable. However, it will be necessary to perform additional borings to collect tube samples and perform laboratory consolidation tests. After the laboratory testing and settlement analyses are performed, we will provide a recommended allowable bearing capacity and modulus of subgrade reaction value for a mat foundation. The structural engineer will then design the mat foundation and estimate the mat stresses and deformations to determine if they are acceptable.

In addition, if a mat foundation is acceptable, approximately 5 feet of Stratum 1 soils will need to be excavated to reach Stratum 2. However, considering that the bottom of the mat will be placed at a minimum depth of 4 feet, this may not be a significant concern.

Based on the measured groundwater level, dewatering will be needed to properly prepare the mat foundation subgrade. We also understand that contaminated groundwater at the site will require additional treatment that may be costly. Section 3.3.3 of this report provides a discussion on the estimated groundwater pumping rates that may be required for temporary dewatering.

Option 2 – Pile Foundation

If the estimated mat settlements are not acceptable to the structural engineer, or the dewatering program required for construction of a mat foundation is too costly, we recommend that the building be supported on piles.

The vibrations from driving piles could result in unacceptable settlement and/or damage to adjacent structures if they are too close to the pile driving operations. Considering that there does not appear to be any existing buildings or other structures within close proximity of the new building location, we recommend that the building be supported on driven piles.

Considering the soil conditions above the rock and that the depth to bedrock is relatively shallow, it is anticipated that the driven piles will obtain their capacity from bearing on, or close to, the rock. For the purpose of preparing foundation designs, the following driven pile types, sizes, and estimated capacities should be considered:

Pile Type & Size	Estimated Allowable Compression Capacity (tons)	Estimated Allowable Tension Capacity (tons)	Estimated Allowable Lateral Capacity (tons)	Minimum Pile Length (ft)	Minimum Pile Spacing (ft)
HP12x63	150	3.5	5	20	2.5
13-3/8" OD open-ended steel pipe pile	150	3.5	5	20	2.5

Notes:

1. The piles will likely need to be driven to Stratum 6 (rock) to obtain the compression capacities shown above. However, if Stratum 5 (soft rock) is thick enough to provide the necessary resistance to meet the compression capacity and the piles meet the minimum pile length requirements, the piles can be founded within this stratum.
2. The piles should have a minimum yield strength of 50 ksi.
3. The recommended allowable tension capacities are based on the minimum pile length (i.e. pile cutoff to tip) and a factor of safety of 3.
4. The recommended allowable lateral capacities are based on the minimum pile length and a factor of safety of 2.

If the pile tension loads are greater than the pile tension capacity, drilled caissons or tiedown anchors will be required.

3.2.2.2 Ground Floor Slab

The ground floor slab will likely bear on Stratum 1 (fill). This slab could be designed as a slab-on-grade. If the fill contains a large amount of unsuitable material (e.g. wood, refuse,

metal, etc.), it will be necessary to remove the material and replace it with acceptable backfill.

3.2.3 Lateral Earth Pressures

The design lateral pressures for permanent below grade walls consist of static and seismic pressures that are influenced by the thickness and type of overburden material, and wall bracing conditions. We recommend that the below grade walls above and below the design groundwater level be designed for a static equivalent hydrostatic lateral soil pressure of 45 pcf and 85 pcf, respectively. (i.e., soil wall pressure is a triangular pressure).

In addition, a seismic lateral soil force of $6H^2$ (lb/ft. of wall), where H is the total vertical height of the wall, in feet, should be included. This force should be applied at a distance of H/3 from the top of the wall (i.e., seismic wall pressure is an inverted triangle).

The recommended lateral pressures do not include any surcharge loads adjacent to the walls or at the ground surface. We recommend that a uniform (i.e., rectangular) lateral pressure distribution of 0.40 times the design surcharge be added to the lateral soil pressure distribution. The structural engineer should determine the magnitude of the design surcharge loads (i.e., live loads).

3.2.4 Permanent Groundwater Control

Based on the measured groundwater level and taking into consideration that the groundwater level may fluctuate due to seasonal conditions, we recommend a design groundwater elevation of +199 feet.

If the bottom of the foundation elements (i.e., slab, elevator pits, ejector pits, etc.) will be above the design groundwater elevation, the below grade walls and the foundation should, at a minimum, be damproofed. Damproofing should be performed at the bottom of the foundation by installing a membrane, such as Grace Construction Products Florprufe, or approved equal. Damproofing of the below grade walls should be performed with a liquid applied membrane (LAM), such as Grace Construction Products Procor, or approved equal, for 2-sided forms, or a membrane, such as Grace Construction Products Preprufe, or approved equal, for blind-sided forms.

If the bottom of the foundation elements will be below the design groundwater elevation, the below grade walls and foundation should be designed to resist groundwater pressures and be waterproofed. Waterproofing materials should be installed on the outside of the perimeter walls (Grace Construction Products Bituthene 3000 for two-sided form applications and Preprufe 160R for blind side applications, or approved equivalent) and directly beneath the foundation (Grace Construction Products Preprufe 300R, or equivalent). The waterproofing on the perimeter walls is typically installed to the ground surface. Waterstops should be installed at applicable locations.

The installation of all waterproofing elements should be inspected on a full-time basis to confirm that the waterproofing is being applied as per the manufacturer's specifications and details.

3.3 CONSTRUCTION RECOMMENDATIONS

3.3.1 Excavation Considerations

Local temporary soil excavations above the natural groundwater level can have cut slopes as steep as 1H:1V (horizontal to vertical). Temporary soil excavations below the natural groundwater level should be no steeper than 2H:1V. The slopes of any excavations adjacent to any existing structures should be no steeper than 2H:1V, unless approved by the SOE engineer.

All vertical soil faces will require temporary support until the new foundation walls and foundations are constructed and the area is properly backfilled. Considering the subsurface conditions and the proposed excavation depths, a feasible support system could consist of sloped excavations and driven soldier piles and timber lagging with sufficient lateral restraint (e.g., anchors, rakers, bracing, etc.), if necessary. Design of the excavation support and lateral bracing must also consider the protection of surrounding subsurface utilities and other adjacent improvements, and groundwater control.

The design and construction of any slopes and/or temporary excavation support systems should be the responsibility of a licensed New York Professional Engineer. All excavations and temporary support systems should conform to pertinent OSHA and local safety regulations.

3.3.2 Adjacent Building Support

Adjacent building support is required at locations where the new foundations will be placed within the influence zone of adjacent building foundations. Based on a review of the site conditions, it does not appear that any excavation will be performed within the influence zone of any adjacent buildings.

If adjacent building support is required, the analysis and design should be performed by a licensed New York Professional Engineer. Adjacent building support installation should be inspected full time by a qualified engineer acting under the direction of the design engineer.

3.3.3 Temporary Groundwater Control

The groundwater level should be maintained sufficiently below the bottom of the excavation so that the foundation bearing surface can be adequately prepared. The need for temporary groundwater control will depend on the groundwater level at the time of construction and the proposed excavation depths.

Based on a measured groundwater elevation of +196 feet, it should be anticipated that temporary dewatering will be required during excavation operations. This will be the case if a mat foundation or a pile foundation is chosen.

If a mat foundation is chosen, this will require dewatering of a much larger area than isolated pile caps and the groundwater may need to be lower so that a suitable subgrade can be prepared for the mat foundation. Therefore, assuming that dewatering with well points or deep wells will be required for a mat foundation, we estimate a dewatering pumping rate of approximately 300 to over 1000 gallons per minute (gpm). If it is desired to obtain a more accurate estimate of the pumping rate, we recommend performing a pump test, which will generally include the

installation of a pumping well and observation wells, placing a pump in the pumping well, pumping water, and monitoring the flow and groundwater drawdown.

If a pile foundation is chosen, excavations for the pile caps, elevator pits, and/or ejector pits will likely be close to, or lower than the measured groundwater elevation. The amount of dewatering will depend on the final number and depth of the pile caps, elevator pits, and ejector pits. However, we anticipate that localized dewatering with sumps may be appropriate in most cases.

3.3.4 Subgrade Preparation

Subgrade surfaces for the slabs should be level and cleaned of loose soil, mud, and other material (such as concrete, brick, wood, debris, etc.) that can have a negative impact on the performance of the slab.

If necessary, the soil subgrade should be proof-rolled with a minimum of 6 passes of a smooth drum roller with a minimum 1,500 lb. static weight and minimum centrifugal force of 4,000 lbs. or similar approved equipment. The proof-rolling should not be performed when the subgrade is wet, muddy, or frozen.

Any unstable areas which cannot be stabilized by additional compaction should be excavated to competent material and the area backfilled with compacted structural fill or ¾" stone. If the foundation is constructed in the winter, the subgrade should be protected from frost to limit possible subgrade deterioration resulting from freezing and thawing cycles. Concrete should not be poured if the subgrade is wet, muddy, or frozen.

A minimum 6-inch thick layer of compacted coarse aggregate, commonly known as ¾" gravel or crushed stone, or a "mud-slab" (i.e., 2 inches of lean concrete), should be placed on the approved subgrade to protect the subgrade from disturbance.

3.3.5 Driven Pile Installation and Testing

Prior to driving any piles, the contractor should submit Wave Equation Analysis (WEAP) results of the proposed pile and hammer configuration to confirm that the proposed pile driving system will obtain the necessary pile capacity without overstressing the pile.

We recommend that a minimum of six test piles be installed and that all test piles be monitored using a Pile Driving Analyzer (PDA). A PDA provides real-time information regarding pile capacity and stresses during pile driving and will assist in deciding which piles to select for static load testing and will assist in developing the pile driving criteria. The PDA testing should be included in the contractors' scope and be performed by a company with sufficient PDA testing experience.

We recommend performing one static compression load test for the driven piles. The load test should be performed in accordance with ASTM D1143 and the Code requirements.

During the driving of piles, vibration and settlement monitoring should be performed at any structures that might be sensitive to damage due to vibrations.

3.3.6 Backfill and Compaction Requirements

Select backfill or structural backfill should consist of granular soils free of cinder, brick, asphalt, ash, and other unsuitable materials. Such material should not contain any boulders or cobbles larger than about 4 inches across, and should have a fines content (material passing the No. 200 sieve) between 5 and 15 percent. The subgrade underneath the backfill should be properly prepared and inspected (building foundations only) prior to placement of backfill.

All backfill should be placed in lifts not exceeding 8-in. in loose thickness. Backfill placed beneath slabs-on-grade, behind below grade walls, and underneath sidewalks should be compacted to a minimum of 90% of the maximum dry density.

3.3.7 Pre-construction Condition Survey and Monitoring

A pre-construction condition survey of any adjacent structures should be performed if damage occurs to the structures during construction. The report should include written documentation and photographs of the existing condition of the structures.

Based on the survey results, a monitoring program should be developed for the purpose of checking the performance of the adjacent structures and construction procedures. The monitoring program should include, at a minimum, recommendations for the location of survey points to monitor vertical and horizontal movements, locations for crack gauges, and locations for monitoring vibrations during key construction activities. The monitoring program should also include threshold levels for allowable movements and vibrations, and the procedures to be implemented if the threshold levels are exceeded during construction.

3.3.8 Construction Monitoring

We recommend that a geotechnical engineer familiar with the subsurface conditions and foundation design criteria, review and approve the foundation contractor's procedures and provide inspection services during excavation and foundation construction. Geotechnical related inspection services should include the following:

- Review and approval of contractor submittals related to foundation construction;
- Observation and documentation of all phases of excavation and foundation construction;
- Special inspection of the support of excavation;
- Special inspection of the pile installation and testing;
- Special inspection of structural fill placement and compaction.
- Monitoring of adjacent structures and interpretation of the monitoring data.

4.0 – SUMMARY AND CONCLUSIONS

This report provides geotechnical recommendations for the design and construction of a new 9 to 10-story building, as part of the Brookfield Commons Phase 3 development, located at 161 South Lexington Avenue in White Plains, New York.

Based on six test borings by GEODesign and two test borings by AKRF, the subsurface conditions above the bedrock generally consist of less than 5 feet of uncontrolled fill (Stratum 1), 5 feet of loose sand (Stratum 2), 5 to 25 feet of medium dense silt (Stratum 3), 10 to 15 feet of dense sand (Stratum 4), and up to 10 of soft rock (Stratum 5). The top of intermediate to medium hard bedrock (Stratum 6) was encountered at depths ranging from approximately 20 to 49 feet (el. +150 to +180 feet). Groundwater was measured in two wells at depth of approximately 4 and 6 feet (el. +193 to +196 feet).

The recommended seismic site classification is Site Class "D". If the new building is in Risk Category I&II, or III, the Seismic Design Category is "B". Liquefaction does not need to be considered for the foundation design.

Consideration could be given to supporting the new building on a mat foundation bearing on Stratum 2. It is possible that if the building loads are high enough, this could result in unacceptable mat settlement due to consolidation of the silty material (i.e., Stratum 3). Considering our experience at similar sites, the relatively stiff nature of the silt, and the anticipated building loads, it is possible that the settlement may be acceptable. However, it will be necessary to perform additional borings to collect tube samples and perform laboratory consolidation tests. After the laboratory testing and settlement analyses are performed, we will provide a recommended allowable bearing capacity and modulus of subgrade reaction value for a mat foundation. The structural engineer will then design the mat foundation and estimate the mat stresses and deformations to determine if they are acceptable.

If a mat foundation is chosen, this will require dewatering of a much larger area than isolated pile caps and the groundwater may need to be lower so that a suitable subgrade can be prepared for the mat foundation. Therefore, assuming that dewatering with well points or deep wells will be required for a mat foundation, we estimate a dewatering pumping rate of approximately 300 to over 1000 gallons per minute (gpm). If it is desired to obtain a more accurate estimate of the pumping rate, we recommend performing a pump test.

If the estimated mat settlements are not acceptable to the structural engineer, or the dewatering program required for construction of a mat foundation is too costly, we recommend that the building be supported on piles. This report includes recommendations for driven 150 ton driven piles. We anticipate that localized dewatering with sumps may be appropriate in most cases if the building is pile supported.

We recommend that at least six test piles be driven with a PDA, prior to the installation of production piles, for the purpose of verifying estimated pile lengths and assisting in developing pile driving criteria for the production piles. We also recommend that one static pile load tests be performed to confirm the allowable compression pile capacity.

The recommended design groundwater elevation is +199 feet. If the bottom of the foundation elements will be above the design groundwater elevation, the below grade walls and the foundation

should, at a minimum, be damproofed. If the bottom of the foundation elements will be below the design groundwater elevation, the below grade walls and foundation should be designed to resist groundwater pressures and be waterproofed.

The report includes additional information regarding the subsurface conditions and foundation design recommendations and additional recommendations regarding excavation considerations, adjacent building support, temporary groundwater control, subgrade preparation, driven pile installation and testing, backfill and compaction requirements, pre-construction condition surveys and monitoring, and construction inspection and monitoring.

5.0 – LIMITATIONS

Explorations

1. The analysis and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.
3. Water level readings have been made in the drill holes at times and under conditions stated on the logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature and other factors occurring since the time measurements were made.

Review

4. In the event that any changes in the nature, design, or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by GEODesign. It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

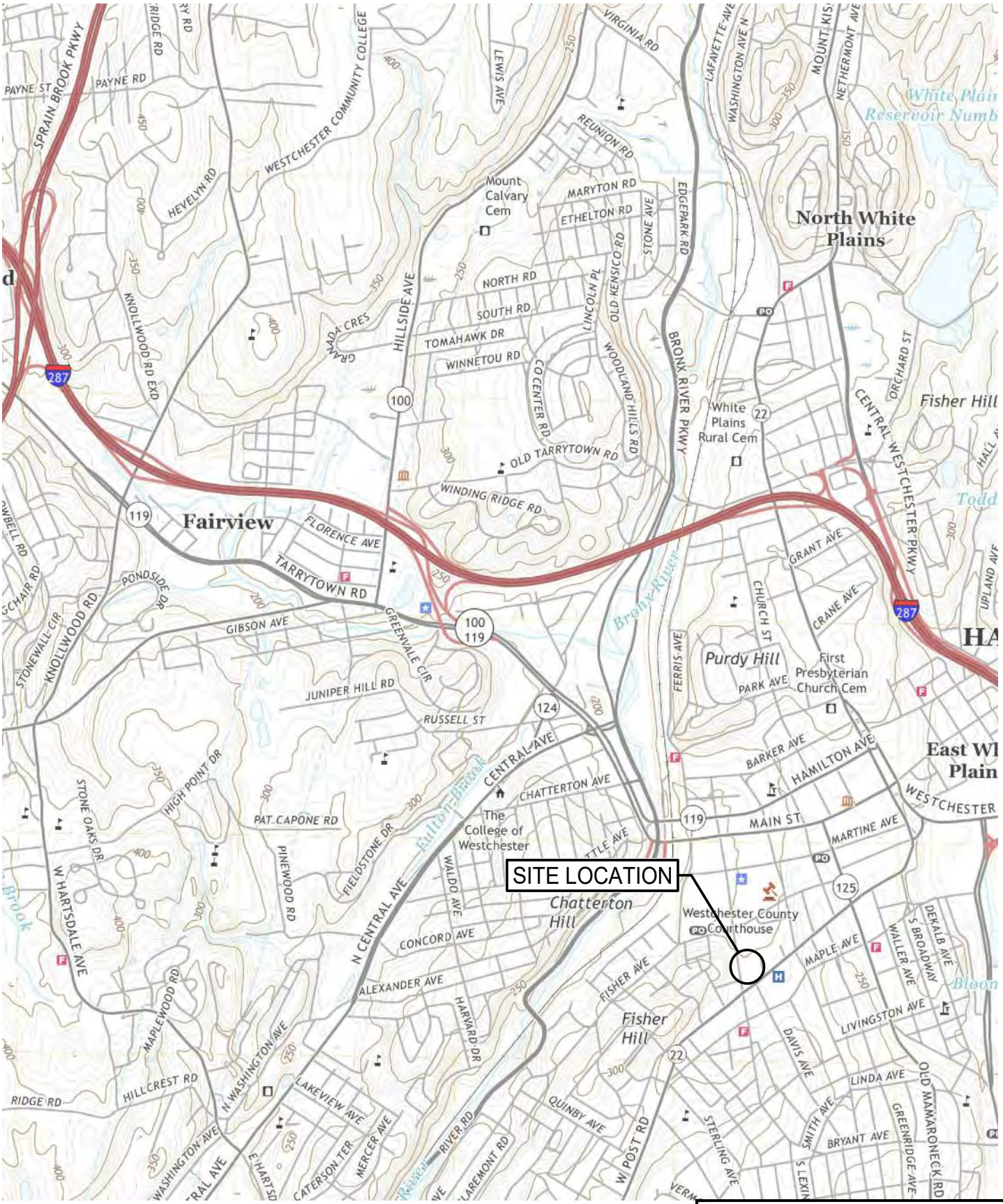
Construction

5. It is recommended that this firm be retained to provide soil engineering services during construction of the excavation and foundation phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

Uses of Report

6. This report has been prepared for the exclusive use of Trinity NY Development LLC for specific application to the proposed structure Brookfield Commons Phase 3 located at 161 South Lexington Avenue in White Plains, NY in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

FIGURES



MAP SOURCE: UNITED STATES GEOLOGICAL SURVEY, 2019, THE NATIONAL MAP - WHITE PLAINS, NEW YORK - WESTCHESTER COUNTY QUADRANGLE, 7.5 MINUTE SERIES

GEO DESIGN
241 WEST 30TH STREET, 5TH FLOOR
NEW YORK, NY 10001
212.221.6651
geocompanies.com

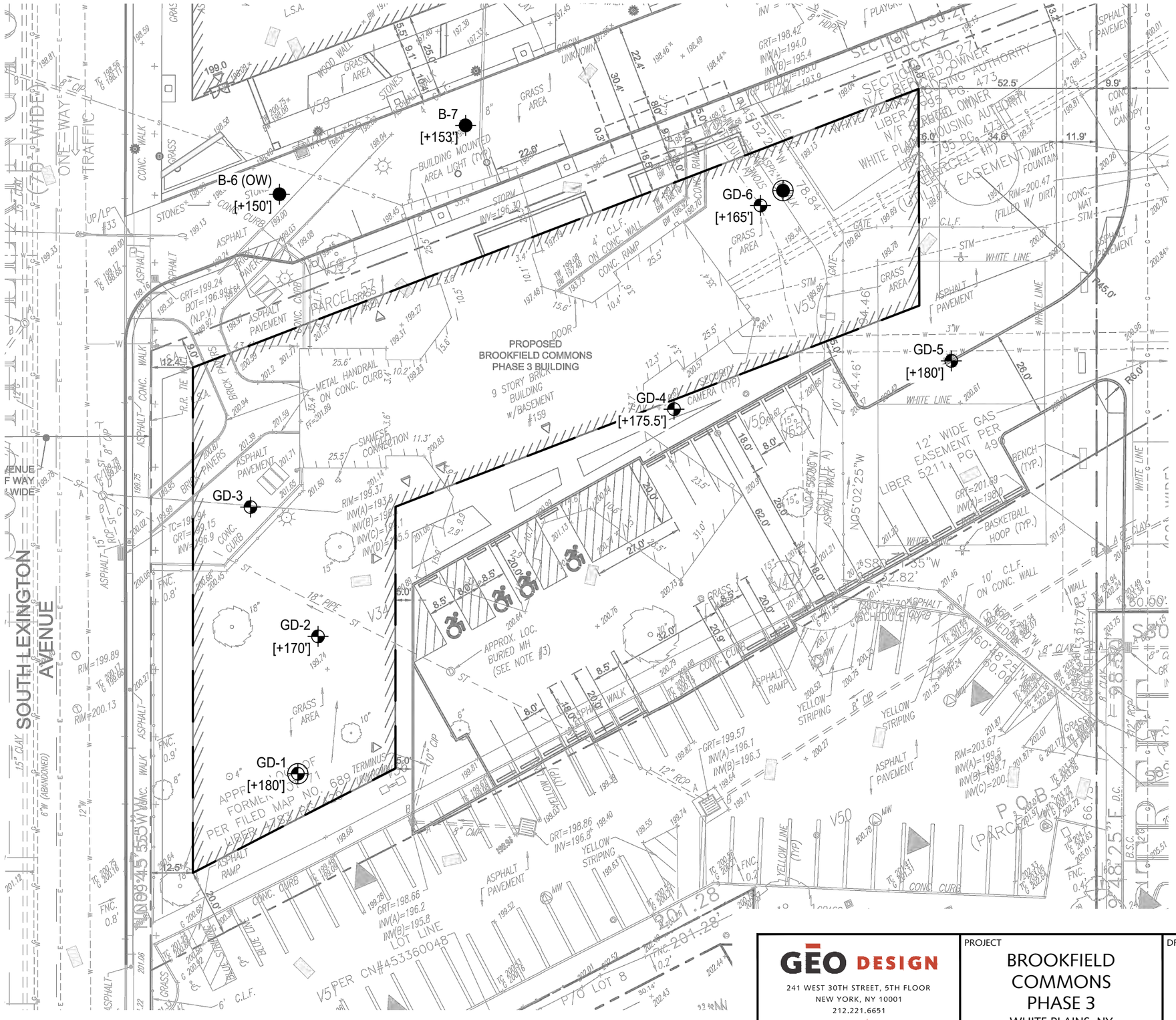
PROJECT
BROOKFIELD COMMONS PHASE 3
WHITE PLAINS, NY

DRAWING TITLE
SITE LOCATION PLAN

PROJECT NO.	3902-002
SCALE	1" = 2000'
DATE	06/09/2021
DESIGNED BY	JC
DRAWN BY	MFA
APPROVED BY	JC

DRAWING NO.
FIGURE 1
01 OF 01

M:\CL\3902 Trinity Financial\002 - BrookfieldCommons\Drawings\SiteLocation\Figure1_SiteLocation.dwg 6/10/2021 8:22 AM GD-STD_3.0.ctb


B-7
[+153']
B-6 (OW)
[+150']
GD-6
[+165']
GD-5
[+180']
GD-4
[+175.5']
GD-3
GD-2
[+170']
GD-1
[+180']
PROPOSED
BROOKFIELD COMMONS
PHASE 3 BUILDING
9 STORY BRICK
BUILDING
w/BASEMENT
#159
SOUTH LEXINGTON AVENUE
(ONE WAY 30' WIDE)
ONE WAY TRAFFIC
SECTION 130.27
BLOCK 2
LOT 1
N/F BERCKED OWNER
WHITE PLAINS HOUSING AUTHORITY
LIBER 7795 PG. 473
PARCEL 57
PARCEL 'H'
EASEMENT
12' WIDE GAS EASEMENT PER LIBER 5211 PG. 49
APPROX. LOC. BURIED MH (SEE NOTE #3)
FORMER BUILDING ON PARCEL PER FILED MAP NO. 689
TERMINUS OF 6" W (ABANDONED)
N09°45'55"W 201.28'
S09°45'55"E 201.28'
N95°02'25"W 252.82'
S95°02'25"E 252.82'
P/O LOT 8
LOT LINE
V5 PER CN#45336048
(PARCEL 'H')
P.O.B.
S48°25'F D.C.
BENCH (TYP.)
BASKETBALL HOOP (TYP.)
WATER FOUNTAIN
CONC. MAT STM
CANOPY
BUILDING MOUNTED AREA LIGHT (TYP)
SECURITY CAMERA (TYP)
SIAMESE CONNECTION
METAL HANDRAIL ON CONC. CURB
YELLOW STRIPING
YELLOW LINE (TYP)
WHITE LINE
CONC. CURB
CONC. WALK
ASPHALT PAVEMENT
GRASS AREA
BRICK PAVERS
R.R. TIE WALL
4' C.L.F. ON CONC. WALL
10' C.L.F. ON CONC. WALL
6' C.L.F.
SCHEDULE 40 GUIDE RAIL
SCHEDULE 80 GUIDE RAIL
TERMINUS
APPROX. LOC. OF FORMER
GRT=199.24
BOT=196.94 (N.P.V.)
GRT=199.57
INV(A)=196.1
INV(B)=196.3
GRT=198.86
INV=196.8
GRT=198.66
INV(A)=196.2
INV(B)=195.8
GRT=201.69
INV(A)=198.0
GRT=198.42
INV(A)=194.0
INV(B)=195.4
INV(C)=195.0
INV=193.9
RIM=199.37
INV(A)=193.8
INV(B)=193.7
INV(C)=193.5
RIM=203.67
INV(A)=199.5
INV(B)=199.7
INV(C)=200.
RIM=200.47
(FILLED W/ DIRT)
RIM=199.89
RIM=200.13
TC=199.94
GRT=196.9
INV=196.15
TC=198.56
G 198.11
TC=198.78
G 198.38
TC=200.17
G 199.66
TC=200.73
G 200.16
TC=200.35
G 200.02
TC=200.68
G 200.45
TC=200.76
G 200.22
TC=200.75
G 200.31
TC=200.52
G 200.31
TC=200.41
G 200.31
TC=200.53
G 200.16
TC=202.01
G 202.52
TC=202.49
G 202.44
TC=202.53
G 202.44
TC=202.53
G 202.44
TC=202.53

APPENDIX A
GEODESIGN TEST BORING LOGS

GEO DESIGN

GEODesign, Inc.
D/B/A GeoDesign Engineers Corporation
Geotechnical | Construction | Environmental
Engineers and Scientists

50 Park Place, Suite 1220
Newark, NJ 07102
Tel: 973.803.4515

BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-1
Page No.: 1 of 1
File No.: 3902-002

Boring Company:	Craig Geotechnical Drilling	Date Started:	5/21/2021
Foreman:	Mark Aquino	Date Completed:	5/21/2021
GeoDesign Rep.:	Mehmet Arslaner	Surface El. (ft):	200 (NAVD88)
Rig Type:	CME 75 Truck	Total Depth (ft):	25
Coordinates:		Rock Depth (ft):	20

	Barrel	Casing	Sampler
Type:	NX	FJ	SS
I.D.:	2.2 in.	4.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs	
Hammer Fall:	30 in.	30 in.	
Hammer Type:	Safety - Cathead		

GROUNDWATER OBSERVATIONS

DATE	DEPTH (ft)	ELEV. (ft)	NOTES
▼ 5/24/21	6.0	194.0	
▼			
▼			

Depth (ft)	Type	Number	Recovery (inches)	Pen. Resist (blows/6 in.)	Coring Time (min./ft)	Recovery (%)	RQD (%)	Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	WELL LOG	REMARKS/ OTHER TESTS
				SAMPLE INFORMATION: GENERAL / SOIL / ROCK / LAB								STRATA				
0	SS	1	10	3 3 3 1								SAND		(SP) Brown m-f SAND, little topsoil, trace silt		
												4.0 196.0				
												INFERRED BOULDER				Hard drilling from 4' to 6'
5												6.0 194.0				
	SS	2	6	1 7 8 4						34.6	40	CLAYEY SAND		(SC) Light brown CLAY, some fine sand, trace gravel, trace wood fragments		Sample 2 was taken from 6'-8'
												8.5 191.5				Hard drilling from 8'-10'
10												SAND				
	SS	3	15	8 7 15 18						16.8	15			(SM) Light brown and reddish orange c-f SAND, trace gravel, trace silt		
												14.0 186.0				
15	SS	4	0	50/0"								SOFT ROCK		No recovery		Hard drilling from 14'-19' Rig chattering Split spoon was bouncing and hit refusal in sample 4
20	C	1	57		1.5 2.5 2.5 3 3.5	95	80					20.0 180.0 BEDROCK		(BEDROCK) Gray, m-f grained, slightly weathered, slightly fractured, meduim hard GRANITE		25' Observation well installed 10' screen + 15' riser Hole was backfilled with filter sand and capped with bentonite
25												25.0 175.0				

Bottom of Exploration at 25.0 ft

NOTES:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; MC=Macrocore; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = Large Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) (SP) = Unified Soil Classification System symbol

GEO DESIGN

GEODesign, Inc.
D/B/A GeoDesign Engineers Corporation
Geotechnical | Construction | Environmental
Engineers and Scientists

50 Park Place, Suite 1220
Newark, NJ 07102
Tel: 973.803.4515

BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-2
Page No.: 1 of 2
File No.: 3902-002

Boring Company:	Craig Geotechnical Drilling	Date Started:	5/21/2021
Foreman:	Mark Aquino	Date Completed:	5/21/2021
GeoDesign Rep.:	Mehmet Arslaner	Surface El. (ft):	200 (NAVD88)
Rig Type:	CME 75 Truck	Total Depth (ft):	40
Coordinates:		Rock Depth (ft):	30

	Barrel	Casing	Sampler
Type:	NX	FJ	SS
I.D.:	2.2 in.	4.0 in.	1.38 in.
Hammer Wt.:		140 lbs	140 lbs
Hammer Fall:		30 in.	30 in.
Hammer Type:		Safety - Cathead	

GROUNDWATER OBSERVATIONS

DATE	DEPTH (ft)	ELEV. (ft)	NOTES
▼			
▼			
▼			

Depth (ft)	Type	Number	Recovery (inches)	Pen. Resist (blows/6 in.)	Coring Time (min./ft)	Recovery (%)	RQD (%)	Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
0	SS	1	18	9 10 10 8								FILL		(FILL) Brown fine SAND, little silt, trace brick, trace topsoil	
												3.5 — 196.5			
												SAND			
5	SS	2	12	1 1 2 2						38.3	16.4			(SM) Dark grayish brown m-f SAND, some silt, trace wood	
10	SS	3	9	10 6 6 10										(SM) Yellowish orange c-f SAND, little silt, trace gravel	
15	SS	4	18	88 80 36 26										(SM) Yellowish orange c-f SAND, little gravel, little silt	SS bouncing, switched to auto. hammer Hard drilling from 17-20'
20	SS	5	14	22 15 13 10						17.5	20			(SM) Light brown m-f SAND, little silt	Auto. hammer used for S-5
25															

NOTES:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; MC=Macrocore; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = Large Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) (SP) = Unified Soil Classification System symbol

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Tel: 973.803.4515

BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: **GD-2**

File No.: 3902-002

Depth (ft)	SAMPLE INFORMATION: GENERAL Type	Number	Recovery (inches)	SOIL Pen. Resist (blows/6 in.)	ROCK Coring Time (min./ft)	Recovery (%)	RQD (%)	LAB Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	STRATA Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
25	SS	6	1	50/1"								25.5 SAND 174.5 *(Continued)* SOFT ROCK		(SM) Light brown m-f SAND, little silt	Hard drilling and rig chatter up to 25'
												30.0 170.0 BEDROCK			Auto. hammer used for S-6 and hit refusal
30	C	1	42		3 2 2.5 2.5 3	70	63							(BEDROCK) Gray, m-f grained, slightly fractured, fresh joints, meduim hard GRANITE	White rock fragments in water return around 26'
35	C	2	57		3 3 3 3 3.5	95	81					40.0 160.0		(BEDROCK) Gray, m-f grained, slightly fractured, fresh joints, intermediate GRANITE	
40														Bottom of Exploration at 40.0 ft	
45															
50															
55															

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50 Park Place, Suite 1220
Newark, NJ 07102
Tel: 973.803.4515

BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-3
Page No.: 1 of 2
File No.: 3902-002

Boring Company:	Craig Geotechnical Drilling	Date Started:	5/24/2021
Foreman:	Mark Aquino	Date Completed:	5/24/2021
GeoDesign Rep.:	Mehmet Arslaner	Surface El. (ft):	201 (NAVD88)
Rig Type:	CME 75 Truck	Total Depth (ft):	37
Coordinates:		Rock Depth (ft):	32

	Barrel	Casing	Sampler
Type:	NX	FJ	SS
I.D.:	2.2 in.	4.0 in.	1.38 in.
Hammer Wt.:		140 lbs	140 lbs
Hammer Fall:		30 in.	30 in.
Hammer Type:		Safety - Cathead	

GROUNDWATER OBSERVATIONS

DATE	DEPTH (ft)	ELEV. (ft)	NOTES
▼			
▼			
▼			

Depth (ft)	SAMPLE INFORMATION: Type	Number	Recovery (inches)	Pen. Resist (blows/6 in.)	Coring Time (min./ft)	Recovery (%)	RQD (%)	Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	STRATA: Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
0												0.5 ASPHALT 201.5			Hard drilling and SS refusal below asphalt
												FILL			First sample taken at 5'
												4.0 197.0			
												CLAY			
5	SS	1	12	1 2 1 2						36.2	55.7			(CL) Brown CLAY and SAND, trace silt	
												8.5 192.5			
												SAND			
10	SS	2	10	2 2 4 5										(SM) Brown and gray m-f SAND, some silt	
												13.5 187.5			
												SILT			
15	SS	3	16	3 6 6 6						26.8	97.9			(ML) Gray SILT, some clay, little sand	
20	SS	4	12	3 4 4 5										(ML) Gray SILT, some clay, little sand	
												23.5 177.5			
												SAND			
25															

NOTES:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; MC=Macrocore; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = Large Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) (SP) = Unified Soil Classification System symbol

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BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: **GD-3**

Page No.: 2 of 2

File No.: 3902-002

Depth (ft)	SAMPLE INFORMATION: GENERAL Type	Number	Recovery (inches)	SOIL Pen. Resist (blows/6 in.)	ROCK Coring Time (min./ft)	Recovery (%)	RQD (%)	LAB Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	STRATA Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
25	SS	5	14	25 24 20 13								SAND *(Continued)*		(SP) Brown, black, and orange c-f SAND, trace gravel, trace silt	
												28.0 — 173.0			Hard drilling from 28'-30'
30												SOFT ROCK			
	C	1	30		3 1 1.5 1.75 1	50	23							(SOFT ROCK) White and Gray, m-f grained, slightly weathered, moderately fractured, soft GRANITE and SCHIST	
35												37.0 — 164.0			
														Bottom of Exploration at 37.0 ft	
40															
45															
50															
55															

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BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-4
Page No.: 1 of 2
File No.: 3902-002

Boring Company:	Craig Geotechnical Drilling	Date Started:	5/21/2021
Foreman:	Mark Aquino	Date Completed:	5/24/2021
GeoDesign Rep.:	Mehmet Arslaner	Surface El. (ft):	200.5 (NAVD88)
Rig Type:	CME 75 Truck	Total Depth (ft):	30
Coordinates:		Rock Depth (ft):	25

	Barrel	Casing	Sampler
Type:	NX	FJ	SS
I.D.:	2.2 in.	4.0 in.	1.38 in.
Hammer Wt.:		140 lbs	140 lbs
Hammer Fall:		30 in.	30 in.
Hammer Type:		Safety - Cathead	

GROUNDWATER OBSERVATIONS

DATE	DEPTH (ft)	ELEV. (ft)	NOTES
▼			
▼			
▼			

Depth (ft)	Type	Number	Recovery (inches)	Pen. Resist (blows/6 in.)	Coring Time (min./ft)	Recovery (%)	RQD (%)	Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
0	SS	1	20	7 12 13 8								0.5 TOPSOIL 200.0 FILL		(FILL) Black and brown c-f SAND, little gravel and topsoil, trace concrete, glass, and silt	
												3.5 197.0 SILT			
5	SS	2	12	3 3 4 3										(ML) Brown SILT, some m-f sand	
												8.5 192.0 SAND			
10	SS	3	13	19 21 18 16										(SM) Brown c-f SAND, little silt, trace gravel	
															Hard drilling at 14'
15	SS	4	12	22 16 12 50/1"						11.3	20			(SM) Light brown and yellowish orange c-f SAND, little silt, trace gravel	Auto. hammer used for S-4 SS refusal at 19"
												17.0 183.5 SOFT ROCK			
															Hard drilling and rig chatter from 18'-25'
20	SS	5	0	50/0"										No Recovery	SS refusal Spoon bouncing
25												25.0 175.5			

NOTES:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
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3) Abbreviations: A = Auger; C = Core; MC=Macrocore; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = Large Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) (SP) = Unified Soil Classification System symbol

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BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-4
Page No.: 2 of 2
File No.: 3902-002

Depth (ft)	SAMPLE INFORMATION: GENERAL Type	GENERAL Number	GENERAL Recovery (inches)	SOIL Pen. Resist (blows/6 in.)	ROCK Coring Time (min./ft)	ROCK Recovery (%)	ROCK RQD (%)	LAB Liquid Limit	LAB Plastic Limit	LAB Moisture Content (%)	LAB Percent Fines	STRATA Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
25	C	1	51		7.75 6 5 5 5	85	62					BEDROCK 30.0 170.5		(BEDROCK) White and gray m-f grained, slightly weathered, modereately fractured medium hard GRANITE	
30														Bottom of Exploration at 30.0 ft	
35															
40															
45															
50															
55															

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BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-5
Page No.: 1 of 1
File No.: 3902-002

Boring Company:	Craig Geotechnical Drilling	Date Started:	5/24/2021
Foreman:	Mark Aquino	Date Completed:	5/24/2021
GeoDesign Rep.:	Mehmet Arslaner	Surface El. (ft):	200 (NAVD88)
Rig Type:	CME 75 Truck	Total Depth (ft):	25
Coordinates:		Rock Depth (ft):	20

	Barrel	Casing	Sampler
Type:	NX	FJ	SS
I.D.:	2.2 in.	4.0 in.	1.38 in.
Hammer Wt.:		140 lbs	140 lbs
Hammer Fall:		30 in.	30 in.
Hammer Type:		Safety - Cathead	

GROUNDWATER OBSERVATIONS

DATE	DEPTH (ft)	ELEV. (ft)	NOTES
▼			
▼			
▼			

Depth (ft)	Type	Number	Recovery (inches)	Pen. Resist (blows/6 in.)	Coring Time (min./ft)	Recovery (%)	RQD (%)	Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
0												0.5 ASPHALT 3.5			
	SS	1	12	10 6 5 2								FILL		(FILL) Black, gray, brown, and orange c-f SAND, little silt, trace gravel, trace wood fragments	
												3.5 196.5			
												SAND			
5	SS	2	12	3 5 6 6										(SM) Greenish gray m-f SAND, little silt, trace gravel	
												8.5 191.5			
10	SS	3	8	12 23 46 8						8.8	9			(SP-SM) Greenish gray m-f SAND, trace silt, trace gravel	
												13.5 186.5			
15	SS	4	10	10 17 75/1"										(SM) Greenish gray c-f SAND, little silt	Switched to auto. hammer for S-4 after SS was bouncing for 25 blows SS refusal with auto. hammer
												20.0 180.0			
20	C	1	60		3.75 4.5 4.5 3.5 4	100	83					BEDROCK		(BEDROCK) White and gray m-f grained, slightly weathered, moderately fractured, meduim hard GRANITE	
25												25.0 175.0			

Bottom of Exploration at 25.0 ft

NOTES:
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3) Abbreviations: A = Auger; C = Core; MC=Macrocore; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = Large Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
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BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: GD-6
Page No.: 1 of 2
File No.: 3902-002

Boring Company:	Craig Geotechnical Drilling	Date Started:	5/24/2021
Foreman:	Mark Aquino	Date Completed:	5/24/2021
GeoDesign Rep.:	Mehmet Arslaner	Surface El. (ft):	199 (NAVD88)
Rig Type:	CME 75 Truck	Total Depth (ft):	39
Coordinates:		Rock Depth (ft):	34

	Barrel	Casing	Sampler
Type:	NX	FJ	SS
I.D.:	2.2 in.	4.0 in.	1.38 in.
Hammer Wt.:		140 lbs	140 lbs
Hammer Fall:		30 in.	30 in.
Hammer Type:		Safety - Cathead	

GROUNDWATER OBSERVATIONS

DATE	DEPTH (ft)	ELEV. (ft)	NOTES
▼			
▼			
▼			

Depth (ft)	Type	Number	Recovery (inches)	Pen. Resist (blows/6 in.)	Coring Time (min./ft)	Recovery (%)	RQD (%)	Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
0												0.5 ASPHALT 3.5			
	SS	1	20	10 6 8 4								FILL		(FILL) Black and brown c-f SAND, trace asphalt, glass, gravel and silt	
												3.5 195.5 SAND			
5	SS	2	12	3 4 4 3										(SM) Light brown c-f SAND, some to little silt, trace gravel	
10	SS	3	10	5 5 5 19								13.5 185.5		(SM) Greenish gray and brown fine SAND, little silt, trace gravel	
15	SS	4	16	96 24 25 27										(SP) Grayish brown m-f SAND, trace gravel, trace silt	Switched to auto. hammer for S-4 after 25 blows for 0" Inferred boulder at 15'
20	SS	5	14	17 20 17 19								23.5 175.5		(SP) Grayish brown m-f SAND, trace gravel, trace silt	Hard drilling at 23'
25															

NOTES:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made. AC = After coring; NR = Not Recorded.
3) Abbreviations: A = Auger; C = Core; MC=Macrocore; D = Driven; G = Grab; PS = Piston Sample; SS = Split Spoon; SSL = Large Split Spoon; ST = Shelby Tube; V = Vane; WOR/H = Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
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BORING LOG

PROJECT NAME

Brookfield Phase 3
151 South Lexington Ave
White Plains, NY

Boring No.: **GD-6**

Page No.: 2 of 2

File No.: 3902-002

Depth (ft)	SAMPLE INFORMATION: GENERAL Type	Number	Recovery (inches)	SOIL Pen. Resist (blows/6 in.)	ROCK Coring Time (min./ft)	Recovery (%)	RQD (%)	LAB Liquid Limit	Plastic Limit	Moisture Content (%)	Percent Fines	STRATA Depth & Elevation (ft)	SYMBOL	SAMPLE DESCRIPTION	REMARKS/ OTHER TESTS
25	SS	6	22	57 41 26 19						15.9	34.8			(SM) Gray, light brown, and yellowish orange m-f SAND, some silt, trace gravel	Auto. hammer used
												28.5 / 170.5			
30	SS	7	3	100/1"								30.5 / 168.5		(SP) Gray, light brown, and yellowish orange m-f SAND, trace gravel, trace silt	
												SOFT ROCK			
												34.0 / 165.0			
35	C	1	55		3.5 3.25 3 3 2.25	92	40					BEDROCK		Top 30": (BEDROCK) Black m-f grained, moderately weathered, moderately fractured, intermediate GNEISS Bottom 25": (BEDROCK) White and Gray m-f grained, slightly weathered, moderately fractured, intermediate GRANITE	
												39.0 / 160.0			
40														Bottom of Exploration at 39.0 ft	
45															
50															
55															

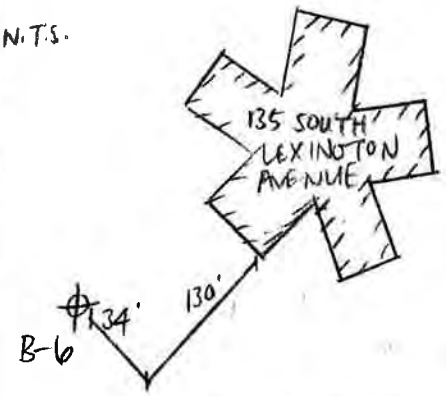
APPENDIX B
AKRF TEST BORING LOGS

LOG OF BORING B-6

PAGE 1 OF 4

AKRF Engineering, P.C.
440 Park Avenue South
New York, NY 10016

PROJECT NAME:	Brookfield Commons-Winbrook	CONTRACTOR:	Craig Geotechnical Drilling Co, Inc
PROJECT NO.:	170131	RIG TYPE & FOREMAN:	CME 75DX - Paul Mullin
PROJECT LOCATION:	135 S Lexington Ave, White Plains NY	SAMPLER TYPE(S):	split spoon, NQ core barrel
BOREHOLE COORD. (N/E):	41.0269°/-73.7711° (not surveyed)	HAMMER TYPE(S)	automatic
ELEVATION/DATUM:	+198/NAVD 88	DRILL BIT TYPE/DIA.:	tri-cone/3 7/8" & 2 5/8"
BORING START:	8/17/17 7am	CASING TYPE/DIA.:	steel flush joint/4"
BORING END:	8/17/17 2pm	WATER LEVEL:	1ST 8' END 6' 24H 7.1'
LOGGED BY:	Janie Pipa	NO. OF SAMPLES:	SS 13 U — C 3
		DRILLING METHOD:	mud rotary

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO.	REC (INCH)	TYPE	BLOWS PER 6-INCH PEN.	OBSERVATIONS & NOTES
	F	1	Light to dark brown f-m SAND, some Silt, trace f-c Gravel - including brick fragments (moist)(medium dense)(FILL)	S-1	20	SS	14 7 9 8	↑ N N.T.S.  BORING LOCATION SKETCH
		2						
		3	Light to dark brown fine SAND and Silt, trace fine Gravel - including brick and concrete fragments (moist)(medium dense)(FILL)	S-2	24	SS	6 7 5 6	
		4						
	S Class 4	5	Brown to gray f-m SAND, little Silt (moist)(loose) (SM)(NYS Class 4)	S-3	18	SS	2 3 3 2	
		6						
		7	Brown to gray SILT and f-m sand (moist)(loose)(ML) (NYS Class 5)	S-4	19	SS	3 3 4 3	- sampled 0' to 2' - sampled 2' to 4' - drove casing to 4' - 118 blows/0' to 4' - mixed mud using clean water and FL mud polymer - full tub - drilled out to 4' - quick/easy advance - light brown wash - sampled 4' to 6' - sampled 6' to 8' - pushed casing to 8' - drilled out to 8' - easy advance - light gray wash
		8						
	M Class 5	9	Gray SILT, trace f-c sand, trace fine Gravel (wet) (loose)(ML)(NYS Class 5)	S-5	20	SS	2 3 3 4	
		10						
		11	Gray clayey SILT (wet) (loose)(ML)(NYS Class 5)	S-6	14	SS	1 3 2 3	
		12						
		13						
		14						

LOG OF BORING B-6

PAGE 2 OF 4

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN.	OBSERVATIONS & NOTES
								-sampled 8' to 10' -sampled 10' to 12' -drilled out to 15' using drag bit -easy/quick advance -gray wash, 3/4 full tub
		15	Gray SILT (wet)(loose) (ML)(NYS class 5)	S-7	19	SS	2 3 4 6	
		16						
		17						-sampled 15' to 17' -drilled out to 20' -sampled 20' to 22' -drilled out to 25' -smooth/quick advance
		18						
		19						
		20	Gray clayey SILT (wet) (loose)(ML)(NYS class 5)	S-8	12	SS	2 4 5 6	-sampled 25' to 27' -drilled out to 30' -sampled 30' to 30'1" - split spoon refusal -attempted core run 32' to 37' -32' to 33' : 1min30sec -advanced to 37' quickly -no recovery in core barrel - possible boulder 32' to 33'
	M Class 5	21						
		22						
		23						
		24						
		25	Gray clayey SILT (wet) (loose)(ML) (NYS class 5)	S-9	12	SS	4 3 5 4	
		26						
		27						
		28						
		29						
		30	Gray clayey SILT (wet)(very dense)(ML) (NYC class 5)	S-10	10	SS	4 3 50/1"	
		31						

LOG OF BORING B-6

PAGE 3 OF 4

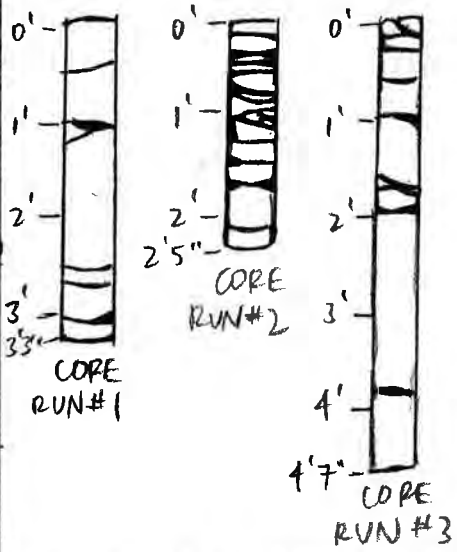
GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN.	OBSERVATIONS & NOTES
	S Class 4	33	NO recovery - possible boulder	C-0	0	C	1-33	- sampled 37' to 37'11" - split spoon refusal - drilled out to 40' - slow advance - rig chatter 37' to 40'
		34						
		35						
		36						- sampled 40' to 41'5" - split spoon refusal - drilled out to 45' - slow advance - rock fragments coming up in return - lost tooth of roller bit, unable to retrieve
		37	Light to dark brown f-c SAND, some silt, trace f-c Gravel (wet) (very dense) (SM) (NYS Class 4)	SH	11	SS	33 100/5"	
		38						- installed casing to 33' - pushed 8' to 15' - 135 blows / 15' to 18' - 270 blows / 18' to 23' - 215 blows / 23' to 28' - 323 blows / 28' to 33'
		39						
		40	Light gray to black soft SCHIST (SR)	SR	17	SS	47 61 100/5"	
		41						
		42						
	SR	43						- drilled out to 45' - grinding / slow advance
		44						
		45	White to black soft SCHIST (SR)	SH	1	SS	52/1"	- sampled 45' to 45'2" - split spoon refusal - drilled out to estimated top of competent rock at 49' - slow advance - grinding to 49'
		46						
		47						
		48						
TL	R Class 2	49	Light to dark gray slightly fractured slightly weathered gneissic SCHIST (NYS Class 2)	L-1	39	C	5-23*	- started coring at 49' *note that time per foot of rock coring, in minutes and seconds is recorded in the "BLOWS PER 6-INCH PEN" column total time of run is below time per foot

Form No. LOB-2 Revision No. 0 Print Date: February 29, 2016

LOG OF BORING B-6

PAGE 4 OF 4

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN.	OBSERVATIONS & NOTES
	R Class 2	51	Light to dark gray slightly fractured slightly weathered gneissic SCHIST (NYS class 2)	C-1	39	C	3:31 (8:54) 5:20 (14:14) 5:15 (19:29) 5:57 (25:26)	CORE RUN #1: 49' to 54' RECOVERY = 39/60" = 65%. RQD = 32"/60" = 53%.
		52						
		53						
		54						CORE RUN #2: 54' to 59' RECOVERY = 29"/60" = 48%. RQD = 0"/60" = 0%.
	SR	55	White to light gray intensely fractured, moderately weathered GNEISS (SR)				3:46 4:16 (8:02)	CORE RUN #3: 59' to 64' RECOVERY = 55"/60" = 92%. RQD = 48"/60" = 80%.
		56		C-2	29	C	2:50 (10:52)	
		57					2:43 (13:35)	
		58					4:07 (17:42)	
		59						
	R Class 2	60	White to light gray slightly fractured, slightly weathered GNEISS (NYS Class 2)				2:41	
		61					3:12 (5:53)	
		62		C-3	55	C	3:19 (9:12)	
		63					3:30 (12:42)	
		64					2:54 (15:36)	
			end of boring at 64'					



ROCK CORE SKETCHES

- installed groundwater observation well in completed borehole

Form No. LOB-2 Revision No. 0 Print Date: February 28, 2016

LOG OF BORING B-7

PAGE 1 OF 4

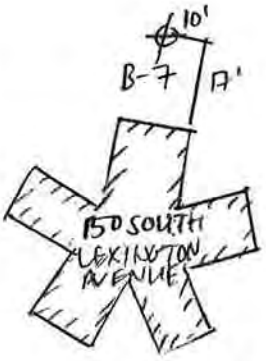
AKRF Engineering, P.C.
440 Park Avenue South
New York, NY 10016

PROJECT NAME:	Brookfield Commons-Winbrook	CONTRACTOR:	Craig Geotechnical Drilling, Inc
PROJECT NO.:	17013	RIG TYPE & FOREMAN:	CME45DX - Paul Mullin
PROJECT LOCATION:	135 S. Lexington Ave, White Plains, NY	SAMPLER TYPE(S):	Split spoon, NQ core barrel
BOREHOLE COORD. (N/E):	41.0270° / -73.7710° (not surveyed)	HAMMER TYPE(S)	automatic
ELEVATION/DATUM:	+198 / NAVD88	DRILL BIT TYPE/DIA.:	tri-cone / 3 7/8"
BORING START:	8/18/17 7am	CASING TYPE/DIA.:	steel flush joint / 4"
BORING END:	8/18/17 130pm	WATER LEVEL:	1ST 6' END - 24H -
LOGGED BY:	Janie Pipa	NO. OF SAMPLES:	SS 12 U - C 2
		DRILLING METHOD:	mud rotary

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN.	OBSERVATIONS & NOTES
		0	4" topsoil - Dark brown SILT and fine Sand, including roots	S1	19	SS	2 6 8 7	
		2	Brown to red f-c sand, some f-c gravel, some silt including cinders and brick fragments (moist) (medium dense) (Fill)	S2	15	SS	3 7 6 5	
		4	Brown f-c sand and silt, trace fine gravel - including brick and concrete fragments (moist) (medium dense) (Fill)	S3	0	SS	2 1 3 3	
		5	NO recovery					
	FT	6	Gray SILT, little f-c Sand, trace fine Gravel - including brick fragments (wet) (very loose) (Fill)	S4	9	SS	2 2 1 2	
		8	NO recovery	S5	0	SS	1 2 1 2	
		10	Gray f-c SAND and Silt - including plastic and concrete fragments (wet) (very loose) (Fill)	S6	8	SS	1 1 2 1	
		12						
		13						
		14						

N

N.T.S.



BORING LOCATION SKETCH

- Sampled 0' to 2'
- Sampled 2' to 4'
- drove casing to 4'
  - 93 blows to 0' to 4'
- mixed mud using clean water and EZ Mud polymer
- drilled out to 4'
  - brown wash, full tub
  - rig chatter at 2'
- sampled 4' to 6'
- sampled 6' to 8'
- pushed casing to 8'
- drilled out to 8'
  - easy quick advance

LOG OF BORING B-7

PAGE 2 OF 4

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN	OBSERVATIONS & NOTES
	F	15						- sampled 8' to 10' - sampled 10' to 12' - drilled out to 15'
		16	Gray clayey SILT (wet) (loose) (ML) (NYS class 5)	S7	15	SS	4 5 4 5	- rig chatter 14' to 15' - gray wash, 3/4 full tub
		17						- sampled 15' to 17'
		18						- pushed casing to 13'
		19						- drove casing to 18' - 420 blows / 13' to 18'
	M class 5	20						- drilled out to 20'
		21	Gray to brown clayey SILT (wet) (medium dense) (ML) (NYS class 5)	S8	20	SS	12 9 7 7	- rig chatter at 16' - light gray wash, 1/2 full tub
		22						- sampled 20' to 22'
		23						- drilled out to 25'
		24						- rig chatter at 23'
		25						- sampled 25' to 27'
		26	Gray to black fc Sand, and fc Gravel, little Silt (wet) (dense) (SM) (NYS class 4)	S9	13	SS	31 15 24 23	- drilled out to 30'
		27						- slow advance at 26' and 29' - rig grinding - gray wash, 3/4 full tub
	S class 4	28						- drove casing to 28'
		29						- 210 blows / 18' to 23' - 480 blows / 23' to 28'
		30						- drilled out to 30'
		31	Gray to black fc sand and fc Gravel trace Silt (wet) (medium dense) (SW) (NYS class 4)	S10	2	SS	6 9 15 15	- chatter at 28' - sampled 30' to 32' - gravel fragment in spoon tip

Form No. LOB-2 Revision No. 0 Print Date: February 29, 2016

LOG OF BORING B-7

PAGE 3 OF 4

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN.	OBSERVATIONS & NOTES
	S Class 4	33						- drilled out to 35' - slow advance - grinding 32' to 33' - gray brown wash, ½ full tub - sampled 35' to 35'2" - split spoon refusal - spoon bouncing - drive casing to 30' - 107 blows of 28" to 30' - drilled out to 40' - slow, steady advance - sampled 40' to 40'2" - split spoon refusal - drilled out to estimated top of competent rock at 46' - started coring at 46' * note that time per foot of rock coring, in minutes and seconds, is recorded in the "BLOWS PER 6-INCH PEN." column total time of core run is below time per foot - CORE RUN #1: 46' to 51' RECOVERY = 55"/60" = 92% RQD = 52"/60" = 87%
		34						
		35						
		36	Brown to black fc sand and f-c gravel, trace silt (wet)(very dense)(SW) (NYS class 4)	S11	2	SS	50/2"	
		37						
		38						
		39						
		40						
	SR	41	Gray to black soft GNEISSIC SCHIST (SR)	S12	1	SS	50/1"	
		42						
		43						
		44						
		45						
		46						
	R Class 2	47	Light to dark gray fresh GNEISS (NYS class 2)	C1	55	C	2 53 1:50 (1:47) 2:03 (1:46) 2 10 (1:56)	
		48						
		49						

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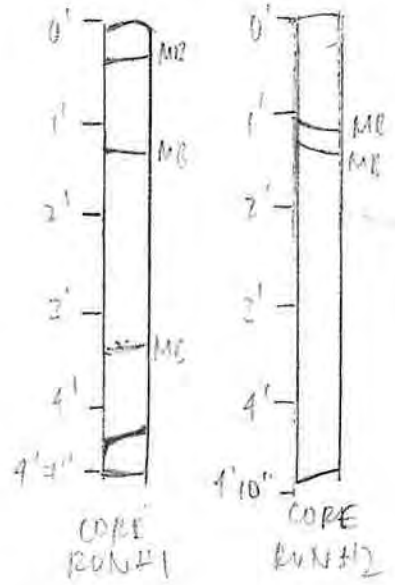
LOG OF BORING B-7

PAGE 4 OF 4

GRAPHIC LOG	MATERIAL & CLASS	DEPTH (FT)	MATERIAL DESCRIPTION	SAMPLE NO	SAMPLE REC. (INCH)	SAMPLE TYPE	SAMPLE BLOWS PER 6-INCH PEN	OBSERVATIONS & NOTES
	R (Class 2)	51	Light to dark gray fresh GNEISS (NYS Class 2)	R1	58	C	1:46 (2:40)	CORE RUN #1 - 51' to 56' RECOVERY = 58"/60" = 97%. RQD = 58"/60" = 97%.
		52					2:39	
		53	Light to dark gray fresh GNEISS (NYS Class 2)				1:54 (4:22)	
		54		R2	58	C	3:07 (8:28)	
		55					1:21 (9:49)	
		56	End of boring at 56'				2:40 (11:29)	



ROCK CORE SKETCHES
MR = MECHANICAL BREAK

- backfilled borehole using soil cuttings and hole plug bentonite pellets

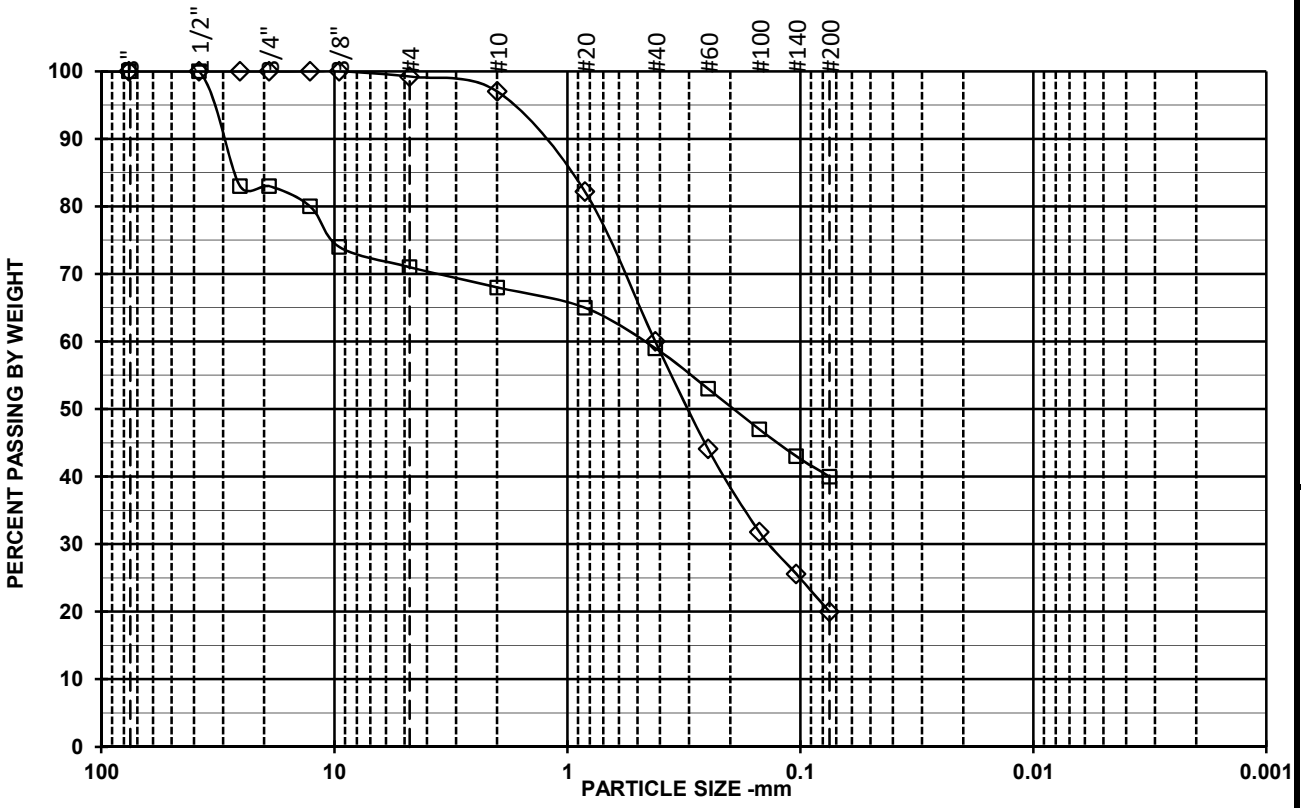
Form No. LOB-2 Revision No. 0 Print Date: February 29, 2016

APPENDIX C
LABORATORY TEST RESULTS

GeoDesign #3902-002
Brookfield Phase 3
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS			REMARKS
			WATER CONTENT (%)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	
GD-1	S-2	5-7	34.6	SC	40	
GD-1	S-3	10-12	16.8	SM	15	
GD-2	S-2	5-7	38.3	SM	16.4	
GD-2	S-5	20-22	17.5	SM	20	
GD-3	S-1	5-7	36.2	CL	55.7	
GD-3	S-3	15-17	26.8	ML	97.9	
GD-4	S-4	15-17	11.3	SM	20	
GD-5	S-3	10-12	8.8	SP-SM	9	
CD-6	S-6	25-27	15.9	SM	34.8	

Note: (1) USCS symbol based on visual observation and Sieve reported.



Open Symbols: Sieve analysis by ASTM D6913
Filled symbols: Hydrometer analysis by ASTM D7928 corrected for complete sample

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	USCS DESCRIPTION AND REMARKS	DATE
□	34.6				SC		Brownish gray, Clayey sand with gravel, Insufficient sample size	06/09/21
◇	17.5				SM		Brown, Silty sand	06/09/21
○								

Symbol	□	◇	○
Boring	GD-1	GD-2	
Sample	S-2	S-5	
Depth	5-7	20-22	
% +3"	0	0	
% Gravel	29	0.8	
% SAND	31	79.2	
%C SAND	3	2.2	
%M SAND	9	37	
%F SAND	19	40	
% FINES	40	20	
D_{100} (mm)	38.1	9.53	
D_{60} (mm)	0.471	0.419	
D_{30} (mm)		0.13	
D_{10} (mm)			
Cc			
Cu			

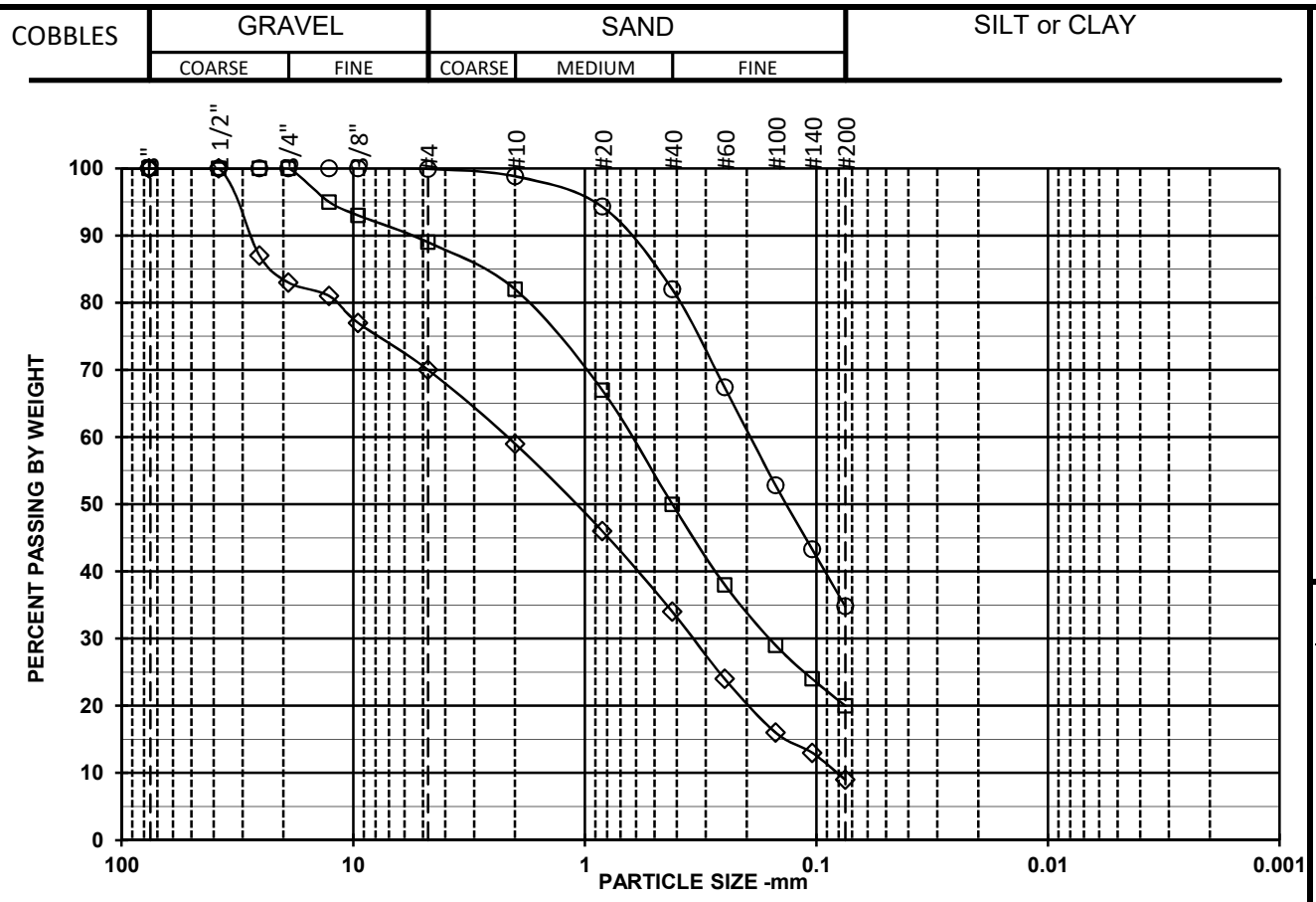
Sieve Size/ID #	Percent Finer Data		
6"	100	100.0	
4"	100	100.0	
3"	100	100.0	
1 1/2"	100	100.0	
1"	83	100.0	
3/4"	83	100.0	
1/2"	80	100.0	
3/8"	74	100.0	
#4	71	99.2	
#10	68	97.0	
#20	65	82.2	
#40	59	60.0	
#60	53	44.1	
#100	47	31.8	
#140	43	25.6	
#200	40	20.0	
5μ m			
2μ m			
1μ m			

GeoDesign #3902-002

TerraSense, LLC #8110-21008

Brookfield Phase 3

PARTICLE SIZE DISTRIBUTION
ASTM D6913 & ASTM D7928



Open Symbols: Sieve analysis by ASTM D6913
Filled symbols: Hydrometer analysis by ASTM D7928 corrected for complete sample

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	USCS DESCRIPTION AND REMARKS	DATE
□	11.3				SM		Brown, Silty sand, Insufficient sample size	06/09/21
◇	8.8				SP-SM		Dark brown, Poorly graded sand with silt and gravel, Insufficient sample size	06/09/21
○	15.9				SM		Brown, Silty sand	06/09/21

GeoDesign #3902-002

TerraSense, LLC #8110-21008

Brookfield Phase 3

Symbol	□	◇	○
Boring	GD-4	GD-5	CD-6
Sample	S-4	S-3	S-6
Depth	15-17	10-12	25-27
% +3"	0	0	0
% Gravel	11	30	0.1
% SAND	69	61	65.1
%C SAND	7	11	1.1
%M SAND	32	25	16.8
%F SAND	30	25	47.2
% FINES	20	9	34.8
D_{100} (mm)	19.1	38.1	9.53
D_{60} (mm)	0.631	2.16	0.192
D_{30} (mm)	0.16	0.34	
D_{10} (mm)		0.081	
Cc		0.7	
Cu		26.7	

Sieve Size/ID #	Percent Finer Data		
6"	100	100	100.0
4"	100	100	100.0
3"	100	100	100.0
1 1/2"	100	100	100.0
1"	100	87	100.0
3/4"	100	83	100.0
1/2"	95	81	100.0
3/8"	93	77	100.0
#4	89	70	99.9
#10	82	59	98.8
#20	67	46	94.3
#40	50	34	82.0
#60	38	24	67.4
#100	29	16	52.8
#140	24	13	43.3
#200	20	9	34.8
5μ m			
2μ m			
1μ m			

PARTICLE SIZE DISTRIBUTION
ASTM D6913 & ASTM D7928

APPENDIX K

RECORD PLANS

FISHER AVENUE

S. LEXINGTON AVENUE

GROVE STREET

WINCHESTER STREET

BROOKFIELD STREET

NEW YORK POST ROAD

M.H. No. 119 Rim 194.56 Inv. 187.70

M.H. No. 8 Rim 194.52 Inv. 185.70

M.H. No. 120 Rim 195.56 Inv. 188.45

M.H. No. 118 Rim 196.21 Inv. 186.76

60" R.C. SEWER

10"-V.T. SEWER

15"-V.T. SEWER

8"-V.T. SEWER

14"-WATER MAIN (S.L.L.)

6"-WATER MAIN

45"-R.C. SEWER

48"-BRICK DRAIN

15"-R.C. SEWER

FINISH GRADE LIMIT SECTION 2

CONTRACT LIMIT LINE SECTION 2

CONTRACT LIMIT LINE SECTION 1

FINISH GRADE LIMITS SECTION 1

SECOND SECTION

FIRST SECTION

CONTRACTOR FOR SECTION II TO MAKE RECONNECTIONS TO 8"-V.T. SEWER & 14"-WATER MAIN AS SHOWN

PROVIDE A GAS CUT-OFF INSIDE OF BUILDING CONFORMING TO REQUIREMENTS OF DEPT. OF PUBLIC SAFETY CITY OF W.P.

NEW HYDRANT BY CITY OF WHITE PLAINS

BOILER ROOM

N.M.H. No. 1 — N.M.H. No. 2 — N.M.H. No. 3 — N.M.H. No. 4 — N.M.H. No. 5 — N.M.H. No. 6 — N.M.H. No. 7 — N.M.H. No. 8

M.H. No. 121 Rim 197.65 Inv. 190.85

M.H. No. 122 Rim 202.74 Inv. 194.19

M.H. No. 20 Rim 193.73 Inv. 191.08

M.H. No. 134 Rim 200.28 Inv. 198.74

M.H. No. 103 Rim 200.73 Inv. 192.21

M.H. No. 104 Rim 201.13 Inv. 195.37

M.H. 102 Rim 198.99 Inv. 189.99

C.B. #14 C.B. #15 C.B. #16 C.B. #17 C.B. #18 C.B. #19 C.B. #20 C.B. #21 C.B. #22 C.B. #23 C.B. #24 C.B. #25

D.I. #8 D.I. #9 D.I. #10 D.I. #11 D.I. #12 D.I. #13 D.I. #15 D.I. #16 D.I. #17 D.I. #18 D.I. #19 D.I. #20 D.I. #21 D.I. #22 D.I. #23 D.I. #24 D.I. #25 D.I. #26 D.I. #27 D.I. #28

8"-STORM INV. 194.60

8"-SANITARY INV. 193.00

6"-STAND PIPE MAIN

3"-WATER

4"-GAS

4"-SUB SOIL DRAIN

FOOTING DRAIN TO SPILL INTO SUMP PIT EL-INV. C.I. THRU WALL

FOOTING DRAIN AROUND BLDGS. 1 & 2 TO EMPTY INTO PRESENT SUMP PITS IN BLDG'S

STORM WATER DRAIN FROM BLDG No. 2 RELOCATED

OMIT NEW M.H. No. 6

OMIT FOOTING DRAIN BETWEEN BLDG No. 1 & 2

D.I. #12 TO EMPTY INTO 60" R.C. SEWER LOCATED IN FISHER AVE.

STORM WATER FROM C.B. # 10, # 6 & D.I. # 9 TO EMPTY INTO NEW MANHOLE # 6 TO BE BUILT IN 48" BRICK DRAIN APPROXIMATELY 30 FT. NORTH OF PRESENT M.H. # 121 IN WINCHESTER ST.

STORM WATER FROM D.I. # 6 & MANHOLE # 5 TO EMPTY INTO NEW MANHOLE # 7 TO BE TO BE BUILT IN 48" BRICK DRAIN APPROX. 60 FT. NORTH, PRESENT M.H. # 122 IN WINCHESTER STREET, MANHOLE # 5 MOVED APPROXIMATELY 25'-0" EAST

STORM WATER FROM C.B. # 17, 21 & M.H. # 2 TO EMPTY INTO M.H. # 102, MANHOLE # 2 MOVED APPROXIMATELY 75' NORTH.

C.B. # 23 TO EMPTY INTO 42" STORM DRAIN NORTH OF MANHOLE # 103.

STORM WATER FROM C.B. # 16 & MANHOLE # 3 TO EMPTY INTO M.H. # 103, MANHOLE # 3 MOVED APPROXIMATELY 70' NORTH.

DATE	REVISIONS	BY
5-6-49	10 FOOTING DRAIN AROUND BLDGS. 1 & 2 TO EMPTY INTO PRESENT SUMP PITS IN BLDG'S	
5-6-49	9 STORM WATER DRAIN FROM BLDG No. 2 RELOCATED	
5-6-49	6 OMIT NEW M.H. No. 6	
5-6-49	7 OMIT FOOTING DRAIN BETWEEN BLDG No. 1 & 2	
4-20-49	12 D.I. #12 TO EMPTY INTO 60" R.C. SEWER LOCATED IN FISHER AVE.	
4-20-49	11 STORM WATER FROM C.B. # 10, # 6 & D.I. # 9 TO EMPTY INTO NEW MANHOLE # 6 TO BE BUILT IN 48" BRICK DRAIN APPROXIMATELY 30 FT. NORTH OF PRESENT M.H. # 121 IN WINCHESTER ST.	
4-20-49	4 STORM WATER FROM D.I. # 6 & MANHOLE # 5 TO EMPTY INTO NEW MANHOLE # 7 TO BE TO BE BUILT IN 48" BRICK DRAIN APPROX. 60 FT. NORTH, PRESENT M.H. # 122 IN WINCHESTER STREET, MANHOLE # 5 MOVED APPROXIMATELY 25'-0" EAST	
4-20-49	3 STORM WATER FROM C.B. # 17, 21 & M.H. # 2 TO EMPTY INTO M.H. # 102, MANHOLE # 2 MOVED APPROXIMATELY 75' NORTH.	
4-20-49	2 C.B. # 23 TO EMPTY INTO 42" STORM DRAIN NORTH OF MANHOLE # 103.	
4-20-49	1 STORM WATER FROM C.B. # 16 & MANHOLE # 3 TO EMPTY INTO M.H. # 103, MANHOLE # 3 MOVED APPROXIMATELY 70' NORTH.	

PIERMONT AVE. — S. EXCHANGE PL. — GROVE ST. — WINCHESTER ST. — BROOKFIELD ST. — NEW YORK POST ROAD

N

NOTE

275 — INDICATES HOUSE NUMBER & APPROXIMATE LOCATION OF BUILDINGS TO BE DEMOLISHED UNDER CONTRACT # 1. AT AN UNDETERMINED TIME DURING CONSTRUCTION WORK OF CONTRACT 1, 2, 3, & 4.

"LEGEND"

- EXISTING MANHOLE & SEWER
- NEW DRAIN INLET OR CATCH BASIN BY PLUMBING CONTR.
- NEW MANHOLE
- PIPING INSTALLED BY PLUMBING CONTR.

D.I.# DRAINAGE INLET
C.B.# CATCH BASIN
GR. 00.00 FINISHED GRADE ELEVATION
00.00 ELEVATION OF INVERT OF PIPE
(.000) SLOPE OF PIPE

PLAN

NOTE - FINISH FOR MANHOLE COVER NOT IN PLUMBING CONTRACT

8"

2'-0"

3'-9"

SECTION

FRAME & COVER TO BE SIMILAR AND EQUAL TO FLOCKHART TYPE 208-CC

MANHOLE FRAME & COVER

SCALE 1/2" = 1'-0"

YARD DRAINAGE INLET

OUTLET — INLET

PLAN

SEE DETAIL OF FRAME & COVER

2'-0"

6" BRICK OR CLASS "A" CONCRETE

IRON STEPS

VARIABLE

INSIDE TOPS EQUAL

2'-0"

OUTLET — INLET

CLASS "A" CONCRETE

SECTION

TYPICAL MANHOLE

SCALE 1/2" = 1'-0"

WINBROOK APARTMENTS

PROJECT SEC II N.Y.S. 32

WHITE PLAINS N.Y.

ALFRED FELLHEIMER
STEWARD WAGNER
CARL A. VOLLMER
ARCHITECTS & ENGINEERS
155 EAST 42ND ST. N.Y.C.

APPROVED Carl A Vollmer

REGISTERED ARCHITECT ALFRED FELLHEIMER No. 328 UNIVERSITY OF THE STATE OF NEW YORK

REGISTERED ARCHITECT STEWARD WAGNER No. 609 UNIVERSITY OF THE STATE OF NEW YORK

REGISTERED ARCHITECT CARL A. VOLLMER No. 1160 UNIVERSITY OF THE STATE OF NEW YORK

STATE OF NEW YORK ALFRED FELLHEIMER No. 5154 LICENSED PROFESSIONAL ENGINEER

FRED N. SEVERUD
STRUCTURAL ENGINEER

A. CARL STELLING ASSOCIATES
LANDSCAPE ARCHITECTS & SITE PLANNERS

N. Y. STATE DIV. OF HOUSING
WHITE PLAINS HOUSING AUTHORITY
Emil Strateman
APPROVED
DATE 1-3-49 DATE

SCALE	DATE	DATE ISSUED
1" = 30'	9-20-48	1-18-49

TITLE: PLUMBING GENERAL SITE PLAN

DRAWING NO. P-11

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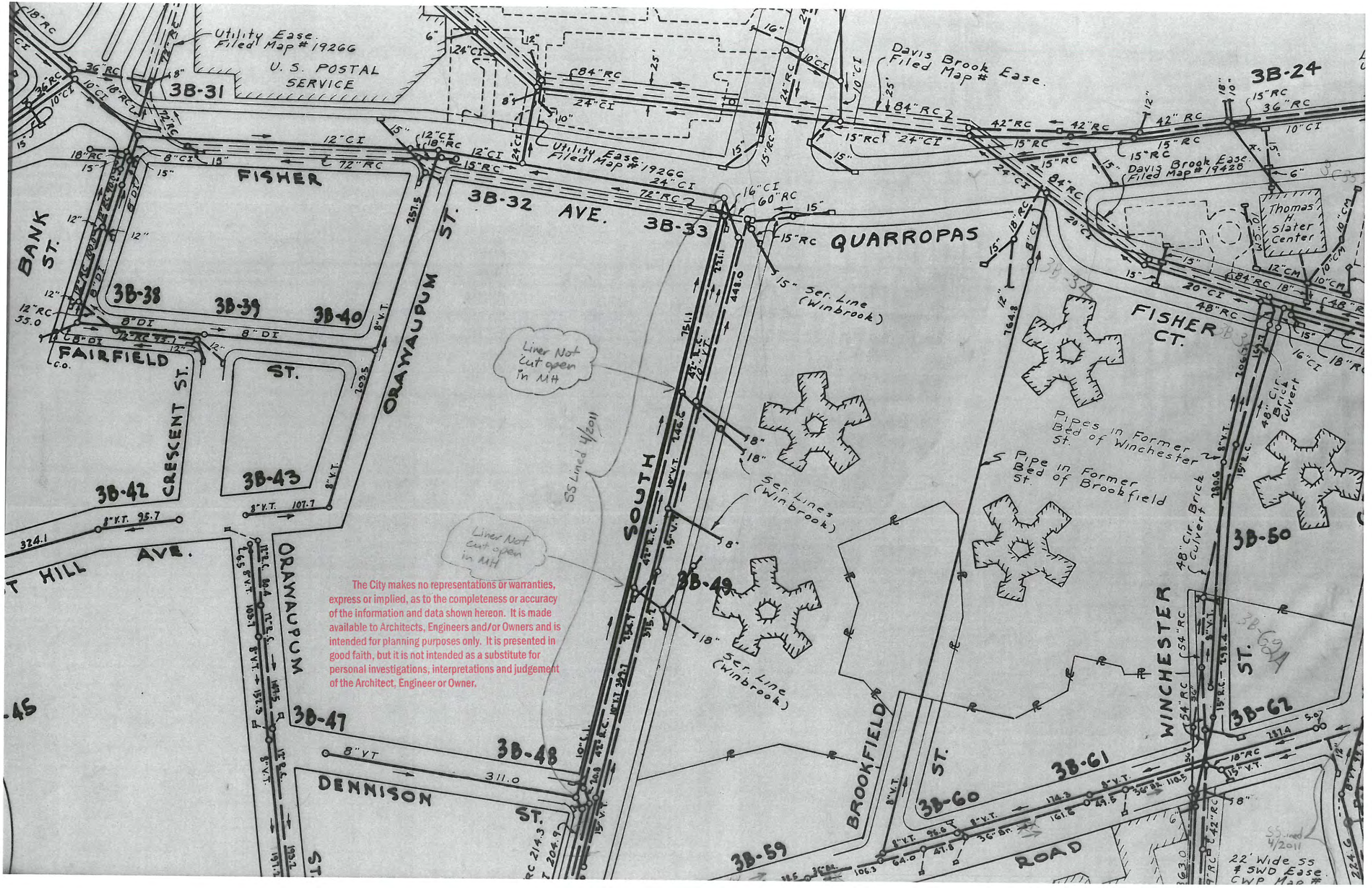

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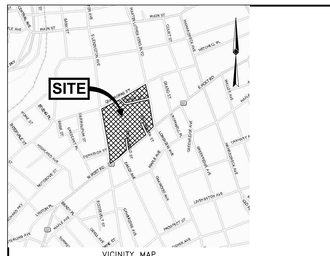
APPENDIX L

SITE SURVEY



VICINITY MAP
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NEW YORK STATE PLANE NAD 1983

LEGEND

- 123 — EXISTING CONTOUR
- x 123.45 — EXISTING SPOT ELEVATION
- x TC 123.45 — EXIST. TOP OF CURB ELEVATION
- x GI 123.45 — EXIST. GUTTER ELEVATION
- x TW 123.45 — EXIST. TOP OF WALL ELEVATION
- x BW 122.95 — EXIST. BOTTOM OF WALL ELEVATION
- x FF=123.45 — EXIST. FINISHED FLOOR ELEVATION
- x SS=123.45 — EXIST. DOOR SILL ELEVATION
- HYDRANT
- WV — WATER VALVE
- WM — WATER METER
- GV — GAS VALVE
- OH — OVERHEAD WIRES
- G — UNCONFIRMED LOC. UNDERGROUND GAS LINE PER REF. #3 & 10 (NOT FIELD VERIFIED, SEE NOTE #3)
- E — UNCONFIRMED LOC. UNDERGROUND ELEC. LINE PER REF. #3, 11 & 12 (NOT FIELD VERIFIED, SEE NOTE #3)
- S — UNCONFIRMED LOC. UNDERGROUND SAN. LINE PER REF. #3, 7 & 8 (NOT FIELD VERIFIED, SEE NOTE #3)
- ST — UNCONFIRMED LOC. UNDERGROUND STORM/DRAINAGE LINE PER REF. #3, 7 & 8 (NOT FIELD VERIFIED, SEE NOTE #3)
- T — UNCONFIRMED LOC. UNDERGROUND TEL. LINE PER REF. #3 (NOT FIELD VERIFIED, SEE NOTE #3)
- W — UNCONFIRMED LOC. UNDERGROUND WATER LINE PER REF. #3 & 7 (NOT FIELD VERIFIED, SEE NOTE #3)
- STM — UNCONFIRMED LOC. UNDERGROUND STEAM LINE PER REF. #3 (NOT FIELD VERIFIED, SEE NOTE #3)
- UNDERGROUND WATER LINE PER MARKOUT 07-11-17
- UNDERGROUND ELECTRIC LINE MARKOUT 07-11-17
- UNDERGROUND GAS LINE PER MARKOUT 07-11-17
- UNDERGROUND COMMUNICATION LINE PER MARKOUT 07-11-17
- UTILITY POLE
- UTILITY POLE/LIGHT POLE
- GUY WIRE
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL
- MONITORING WELL
- GAS METER
- ELECTRIC METER
- SIGN
- BOLLARD
- U-BOLLARD
- L.S.A. — LANDSCAPED AREA
- B.S.C. — BLUE STONE CURB
- G.C. — GRANITE CURB
- N.P.V. — NO PIPES VISIBLE
- F.O.W. — FULL OF WATER
- B.B. — BELGIUM BLOCK
- C.L.F. — CHAIN LINK FENCE
- E.O.C. — EDGE OF CONCRETE
- E.O.P. — EDGE OF PAVEMENT
- S.B. — STOP BAR
- W.L. — WHITE LINE
- Y.L. — YELLOW LINE
- D.W.L. — DASHED WHITE LINE
- D.Y.L. — DOUBLE YELLOW LINE
- CD — CELLAR DOOR
- AREA LIGHT
- ELECTRIC MANHOLE
- CON ED MANHOLE
- MANHOLE UNKNOWN
- WATER MANHOLE
- STORM/DRAINAGE MANHOLE
- SANITARY MANHOLE
- TRAFFIC MANHOLE
- C/O = CLEAN OUT
- PAINTED ARROWS
- TITLE REPORT EXCEPTION
- PARKING SPACE COUNT
- 1.0' — DENOTES OFFSET OF STRUCTURE AT GROUND LEVEL RELATIVE TO PROPERTY LINE
- DENOTES TREE & TRUNK DIAMETER
- MB — MAILBOX
- T — TELEPHONE
- PARKING METER
- NOT PART OF SURVEY (SHADED AREA). CURRENT FEATURES NOT SHOWN.

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SECTION 125.82 BLOCK 2 LOT 6

SECTION 125.83 BLOCK 1 LOT 2.1

SECTION 125.83 BLOCK 1 LOT 1.1

FISHER AVENUE (80' WIDE PER TAX MAP)

QUARROPAS STREET (85' WIDE, 80' WIDE PER TAX MAP) TWO-WAY TRAFFIC

R.O.W. LINE PER REF. #13

LOT LINE PER TAX MAP (TYP.)

DAVIS BROOK EASEMENT

DPW MONUMENT FOUND BENCHMARK #2519 ELEVATION=213.753

SOUTH LEXINGTON AVENUE (VARIABLE WIDTH)

BROOKFIELD STREET (FORMERLY KNOWN AS BROOKFIELD AVENUE)

FISHER COURT (A.K.A. FISHER AVENUE) (VARIABLE WIDTH)

MARTIN LUTHER KING JR. BOULEVARD (F.K.A. GROVE STREET) (VARIABLE WIDTH) ONE-WAY TRAFFIC

NEW YORK POST ROAD (A.K.A. EAST POST ROAD) (VARIABLE WIDTH) TWO-WAY

WINCHESTER STREET

PORTION OF SECTION 125.83 BLOCK 7 LOT 1
N/F REPUTED OWNER WHITE PLAINS HOUSING AUTHORITY

PHASE 1

PHASE 1 SUBAREA PARCEL

PHASE 2 SUBAREA: 51,812 S.F. OR 1.189 AC

PHASE 2 SUBAREA:

PHASE 3 SUBAREA: 44,396 S.F. OR 1.019 AC

PORTION OF SECTION 125.83 BLOCK 7 LOT 1
N/F REPUTED OWNER WHITE PLAINS HOUSING AUTHORITY PHASE TWO SUBAREA

SECTION 125.83 BLOCK 7 LOT 1
N/F REPUTED OWNER WHITE PLAINS HOUSING AUTHORITY
(PARCEL I)

SECTION 125.83 BLOCK 2 LOT 1
N/F REPUTED OWNER WHITE PLAINS HOUSING AUTHORITY
(PARCEL I)

SECTION 125.83 BLOCK 7 LOT 2
N/F REPUTED OWNER WINBROOK COMMUNITY PROJECT, DR. MARTIN LUTHER KING, JR. BOULEVARD

SECTION 125.83 BLOCK 3 LOT 1

SECTION 125.83 BLOCK 3 LOT 10

SECTION 125.83 BLOCK 3 LOT 11

SECTION 125.8 BLOCK 3 LOT 11

SECTION 130.27 BLOCK 1 LOT 1

SECTION 130.27 BLOCK 1 LOT 5

SECTION 130.27 BLOCK 1 LOT 6

SECTION 130.27 BLOCK 1 LOT 7

SECTION 130.27 BLOCK 1 LOT 8

SECTION 130.27 BLOCK 2 LOT 1

SECTION 130.27 BLOCK 2 LOT 2

SECTION 130.27 BLOCK 2 LOT 3

SECTION 130.27 BLOCK 2 LOT 4

SECTION 130.27 BLOCK 2 LOT 5

SECTION 130.27 BLOCK 2 LOT 6

SECTION 130.27 BLOCK 2 LOT 7

SECTION 130.27 BLOCK 2 LOT 8

SECTION 130.27 BLOCK 2 LOT 9

SECTION 130.27 BLOCK 2 LOT 10

SECTION 130.27 BLOCK 3 LOT 1

SECTION 130.27 BLOCK 3 LOT 2

SECTION 130.27 BLOCK 3 LOT 3

SECTION 130.27 BLOCK 3 LOT 4

SECTION 130.27 BLOCK 3 LOT 5

SECTION 130.27 BLOCK 7 LOT 1

SECTION 130.27 BLOCK 7 LOT 2

SECTION 130.27 BLOCK 8 LOT 2

SECTION 130.27 BLOCK 8 LOT 3

SECTION 130.27 BLOCK 8 LOT 4

SECTION 130.27 BLOCK 8 LOT 5

SECTION 130.27 BLOCK 8 LOT 6

SECTION 130.27 BLOCK 8 LOT 7

SECTION 130.27 BLOCK 8 LOT

APPENDIX M
REQUEST TO IMPORT/REUSE FILL MATERIAL

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.

SECTION 1 – SITE BACKGROUND

Site Name:

Site Number:

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Name and address of fill source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

Revised February 2025