

# **DRAINAGE SUMMARY REPORT “LITE”**

**For**

**31 Maple Tree Avenue  
Stamford, Connecticut**

**Prepared For**

**31 Maple Tree LLC**

**January 26, 2023**

**Revised: May 20, 2024**



**Matthew M. Kivijarvi, P.E.**  
**License No. 36982**

21UC\_DSR\_03

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# **1. Stormwater Management Standards**

## **1.1. Runoff and Pollution Reduction**

Standard 1: Runoff and Pollutant Reduction is not applicable to this project as determined by the Runoff and Pollutant Reduction Requirements Flowchart.

Refer to Appendix “E” for Directly Connected Impervious Area Tracking Worksheet

## **1.2. Peak Flow Control**

The proposed development will decrease peak runoff flow rates to less than pre-construction conditions to all points of concern. Refer to Appendices “B” and “C” for Existing and Proposed HydroCAD results, and to the HydroCAD Summary Table at the end of this introduction. The decrease in peak runoff flow rates meets the standard of reduction for all storms up to the 50-year storm.

Refer to Appendix “D” for Pipe Conveyance Calculations and refer to Appendix “A” for 72-Hour Drawdown Calculations.

## **1.3. Construction Erosion and Sediment Control**

During the construction phase of the project, treatment of storm water runoff will be provided by temporary sedimentation and other erosion control measures as outlined within the Final Site Plan Review Set. This includes the installation of silt fencing, an anti-tracking pad, and hay bales around catch basins. Periodic on-site inspections will be performed to ensure that these measures are maintained in effective working order. Once construction is complete and all disturbed areas are properly graded, seeded and stabilized, the proposed sedimentation and erosion control measures will be removed.

## **1.4. Operations and Maintenance**

Refer to Appendix “G” of the City of Stamford Stormwater Drainage Manual for a Standard City of Stamford Drainage Maintenance Agreement.

## **1.5. Stormwater Management Report**

The applicant is proposing to conduct site improvements on the subject property. Currently, the parcel supports a historic dwelling, garage, and a driveway. Vegetative cover at the property is primarily lawn with other ornamental plantings. The proposed improvements will include the construction of a multi-family building and parking improvements. Improvements also include the installation of a storm drainage system, site grading, and associated landscaping.

For a depiction of existing and proposed conditions, refer to a plan set prepared by D’Andrea Surveying and Engineering, P.C., entitled “Residential Development depicting property at 31 Maple Tree Avenue, Stamford, Connecticut, prepared for 31 Maple Tree LLC”.

The subject parcel is 14,125 square feet in size and is located approximately 400 feet east of the intersection of Maple Tree Avenue and Courtland Avenue. The proposed redevelopment of the parcel will increase the impervious coverage by approximately 3,919 square feet.

Based on the above information, the proposed improvements are designed in accordance with the City of Stamford Stormwater Drainage Manual and will not adversely impact adjacent or downstream properties or City-owned drainage facilities.

**HydroCAD Summary**  
 31 Maple Tree LLC  
 31 Maple Tree Avenue, Stamford, CT  
 Project ID: 21UC

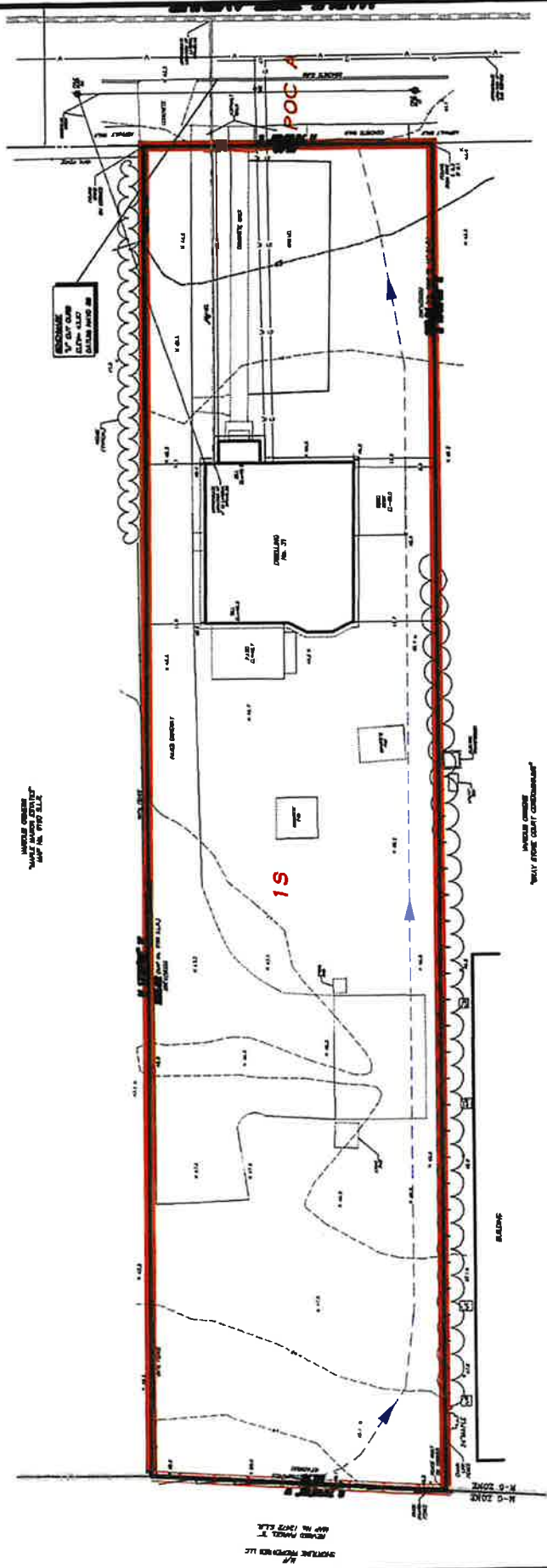
POC	1 Year Storm				2 Year Storm				5 Year Storm				10 Year Storm				25 Year Storm				50 Year Storm				100 Year Storm			
	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)	q <sub>ex</sub> (ft <sup>3</sup> /s)	q <sub>p</sub> (ft <sup>3</sup> /s)	Δq (ft <sup>3</sup> /s)	%Δq (ft <sup>3</sup> /s)
A	0.50	0.45	-0.05	-10%	0.68	0.58	-0.10	-15%	0.98	0.81	-0.17	-17%	1.19	0.97	-0.22	-18%	1.40	1.12	-0.28	-20%	1.61	1.28	-0.33	-20%	1.85	1.89	0.04	2%

Table 1: Comparison of Existing and Proposed Peak Flow Rates for all Points of Concern.

POC	1 Year Storm				2 Year Storm				5 Year Storm				10 Year Storm				25 Year Storm				50 Year Storm				100 Year Storm			
	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)	v <sub>ex</sub> (cf)	v <sub>p</sub> (cf)	Δv (cf)	%Δv (cf)
A	1,742	1,395	-347	-20%	2,358	1,883	-475	-20%	3,429	2,927	-502	-15%	4,199	3,723	-476	-11%	4,980	4,525	-455	-9%	5,769	5,331	-438	-8%	6,677	6,256	-421	-6%

Table 2: Comparison of Existing and Proposed Runoff Volumes for all Points of Concern.

**Exhibits “A & B”**  
**Existing and Proposed**  
**Watershed Maps**



**D'ANDREA SURVEYING & ENGINEERING, P.C.**

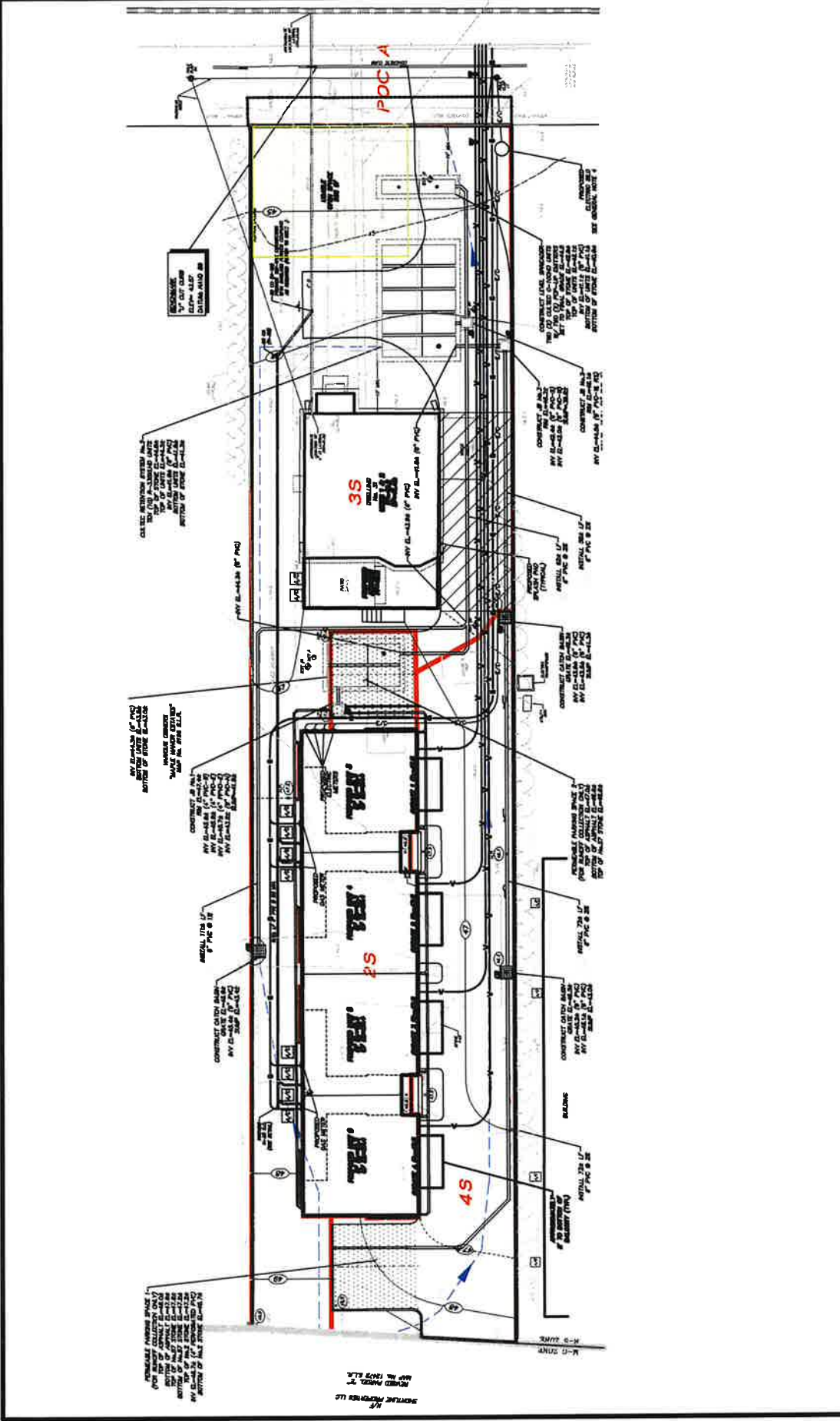
- LAND PLANNERS
- ENGINEERS
- SURVEYORS

P.O. BOX 549  
RIVERSIDE, CT 06878

6 NEIL LANE  
TEL. 637-1779

**EXHIBIT "A"**

**EXISTING CONDITIONS**



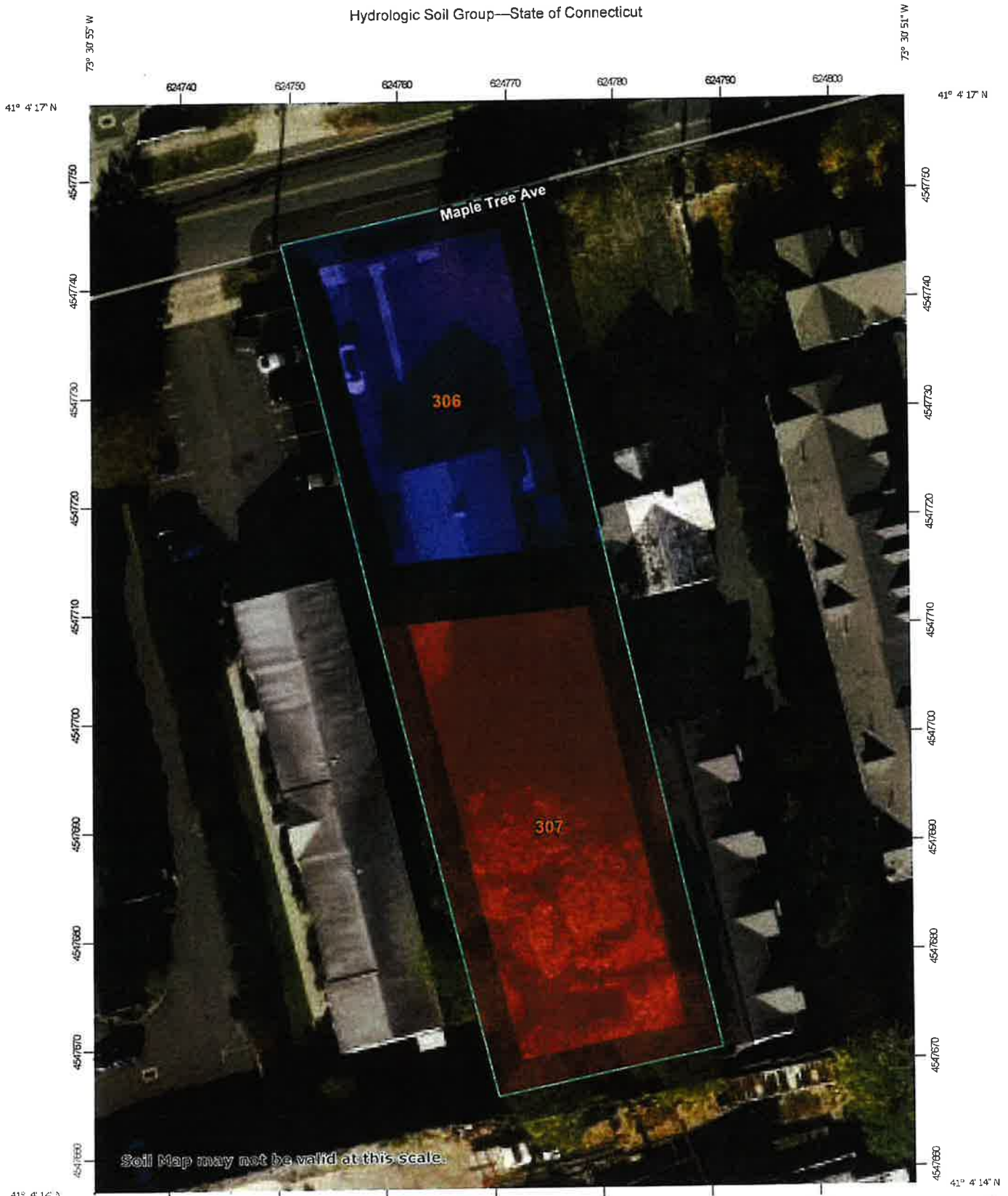
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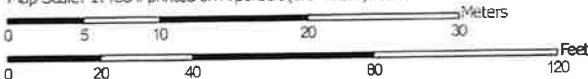
**Exhibit "C"**  
**NRCS Web Soil Survey**

Hydrologic Soil Group—State of Connecticut



Soil Map may not be valid at this scale.

Map Scale: 1:488 if printed on A portrait (9.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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: State of Connecticut  
Survey Area Data: Version 22, Sep 12, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 4, 2020—Oct 31, 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 LEGEND

	Area of Interest (AOI)		C
	C/D		D
	Not rated or not available		
<b>Soils</b>			
	A		A/D
	B		B/D
	C		C/D
	D		Not rated or not available
<b>Soil Rating Lines</b>			
	A		A/D
	B		B/D
	C		C/D
	D		Not rated or not available
<b>Water Features</b>			
	Streams and Canals		
<b>Transportation</b>			
	Rails		Interstate Highways
	US Routes		Major Roads
	Local Roads		
<b>Background</b>			
	Aerial Photography		
<b>Soil Rating Points</b>			
	A		A/D
	B		B/D

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
306	Udorthents-Urban land complex	B	0.2	43.9%
307	Urban land	D	0.2	56.1%
<b>Totals for Area of Interest</b>			<b>0.4</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

### Rating Options

*Aggregation Method:* Dominant Condition

**Exhibit "D"**  
**Site Vicinity Map**

# Google Maps 31 Maple Tree Ave



**Appendix "A"**  
**Runoff Volume  
And  
Retention System Sizing  
Calculations**

**BMP Drawdown Calculations:**

*Infiltration structures must be able to drain fully within 72 hours.*

**Retention System #1: Cultecs No.1**

$$t_{\text{drawdown}} = DV/kA$$

Where:

DV = Design Volume	=	188 ft <sup>3</sup>
k = Infiltration Rate	=	0.52 inches/hr
A = Bottom Area	=	196 ft <sup>2</sup>

$$t_{\text{drawdown}} = 22.1 \text{ hours} \quad \text{Drawdown Requirement Satisfied}$$

**Retention System #2: Cultecs No.2**

$$t_{\text{drawdown}} = DV/kA$$

Where:

DV = Design Volume	=	921 ft <sup>3</sup>
k = Infiltration Rate	=	0.52 inches/hr
A = Bottom Area	=	449 ft <sup>2</sup>

$$t_{\text{drawdown}} = 47.3 \text{ hours} \quad \text{Drawdown Requirement Satisfied}$$

**Appendix “B”**  
**HydroCAD Analysis –**  
**Existing Conditions**

**Area Listing (selected nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
8,847	80.0	>75% Grass cover, Good, HSG D (1S)
3,895	98.0	Paved parking, HSG D (1S)
1,323	98.0	Roofs, HSG D (1S)
260	98.0	Unconnected pavement, HSG D (1S)
<b>14,125</b>	<b>87.0</b>	<b>TOTAL AREA</b>

**31 Maple Tree Avenue**  
**- Existing**



**Existing Watershed 1S**



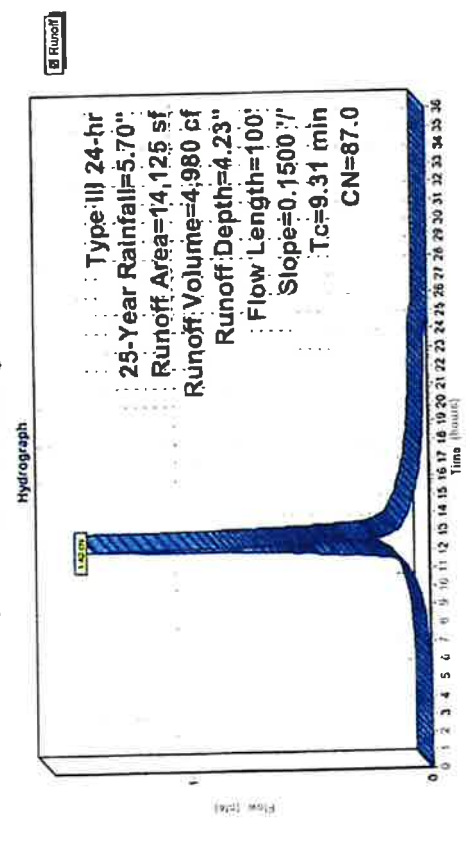
Summary for Subcatchment 1S: Existing Watershed 1S

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 4,980 cf, Depth= 4.23"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Slope (ft/ft)	Velocity (ft/Sec)	Capacity (cfs)	Description
5.00				Direct Entry,
4.31	100	0.1500	0.39	Sheet Flow, Grass; Short; n= 0.150 P2= 3.30"
9.31	100	Total		

Subcatchment 1S: Existing Watershed 1S



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3661 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Star-Ind method - Pond routing by Dyn-Star-Ind method

Subcatchment 1S: Existing Watershed 1S Runoff Area=14,125 sf 38.78% Impervious Runoff Depth=1.48"  
 Flow Length=100' Slope=0.1500 7' Tc=9.31 min CN=87.0 Runoff=0.50 cfs 1.742 cf

**Summary for Subcatchment 1S: Existing Watershed 1S**

Runoff = 0.50 cfs @ 12.13 hrs, Volume= 1,742 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Existing Watershed 1S Runoff Area=14,125 sf, 38.78% Impervious Runoff Depth=2.00"  
 Flow Length=100' Slope=0.1500 7' Tc=9.31 min CN=87.0 Runoff=0.68 cfs 2.358 cf

Summary for Subcatchment 1S: Existing Watershed 1S

Runoff = 0.68 cfs @ 12.13 hrs, Volume= 2,358 cf, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					
4.31	100	0.1500	0.39		Direct Entry, Sheet Flow, Grass, Short n= 0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 1S: Existing Watershed 1S**

Runoff = 0.98 cfs @ 12.13 hrs, Volume= 3,429 cf, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 5-Year Rainfall=4.30"

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stat-Ind method - Pond routing by Dyn-Stat-Ind method

**Subcatchment 1S: Existing Watershed 1S** Runoff Area= 14,125 sf 38.78% Impervious Runoff Depth= 2.91"  
 Flow Length= 100' Slope= 0.1500 Tc= 9.31 min CN= 87.0 Runoff= 0.98 cfs 3,429 cf

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Existing Watershed 1S Runoff Area=14,125 sf 38.78% Impervious Runoff Depth=3.57"  
 Flow Length=100' Slope=0.1500 % Tc=9.31 min CN=67.0 Runoff=1,19 cfs 4,199 cf

Summary for Subcatchment 1S: Existing Watershed 1S

Runoff = 1.19 cfs @ 12.13 hrs, Volume= 4,199 cf, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					
4.31	100	0.1500	0.39		Direct Entry, Sheet Flow, Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3681 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted CN  
 Reach routing by Dyn-Stor-Ind method - Paved routing by Dyn-Stor-Ind method  
 Subcatchment 1S: Existing Watershed 1S Runoff Area=14,125 sf 38.78% Impervious Runoff Depth=4.23"  
 Flow Length=100' Slope=0.1500 P1=9.31 min CN=87.0 Runoff=1.40 cfs 4,980 cf

**Summary for Subcatchment 1S: Existing Watershed 1S**

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 4,980 cf, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Impervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					
4.31	100	0.1500	0.39		Direct Entry, Sheet Flow, Grass: Short n=0.150 P2= 3.30"
9.31	100	Total			

Time span=0.00-36.00 hrs, df=0.01 hrs, 3601 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Summary for Subcatchment 1S: Existing Watershed 1S**

Runoff = 1.61 cfs @ 12.13 hrs, Volume= 5,769 cf, Depth= 4.90"

Subcatchment 1S: Existing Watershed 1S Runoff Area=14,125 sf 38.78% Impervious Runoff Depth=4.90"  
 Flow Length=100' Slope=0.1500 Tc=9.31 min CN=87.0 Runoff=1.61 cfs 5,769 cf

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, df= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.40"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					
4.31	100	0.1500	0.39		Direct Entry, Sheet Flow, Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

Time span=0.00-36.00 hrs. dt=0.01 hrs. 3601 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn Stor-Ind method - Pond routing by Dyn Stor-Ind method

Subcatchment 1S: Existing Watershed 1S Runoff Area=14,125 sf 38.78% Impervious Runoff Depth=5.67"  
 Flow Length=100' Slope=0.1500 P=1500 P= Flow Length=100' Tc=9.31 min. CN=87.0 Runoff=1.85 cfs 6,677 cf

Summary for Subcatchment 1S: Existing Watershed 1S

Runoff = 1.85 cfs @ 12.13 hrs, Volume= 6,677 cf, Depth= 5.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-Year Rainfall=7.20"

Area (sf)	CN	Description
3,895	98.0	Paved parking, HSG D
1,323	98.0	Roofs, HSG D
260	98.0	Unconnected pavement, HSG D
8,647	80.0	>75% Grass cover, Good, HSG D
14,125	87.0	Weighted Average
8,647		61.22% Pervious Area
5,478		38.78% Impervious Area
260		4.75% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					
4.31	100	0.1500	0.39		Direct Entry, Sheet Flow, Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

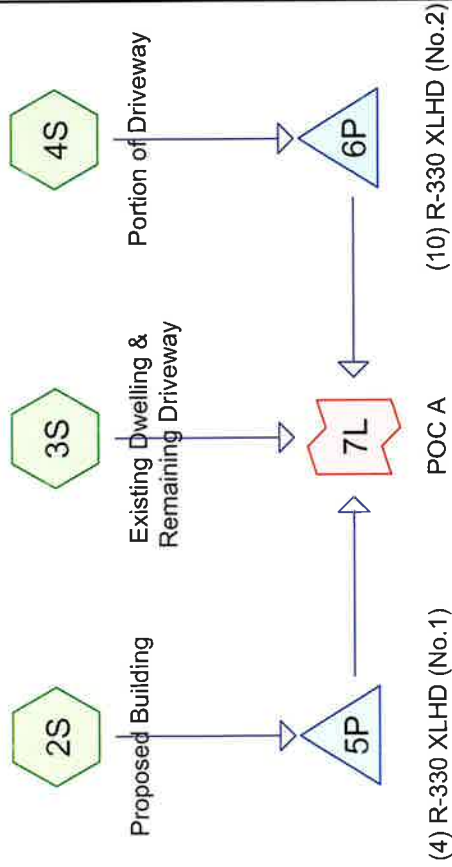
**Appendix “C”**  
**HydroCAD Analysis –**  
**Proposed Conditions**

**21UC\_Appendix\_B&C\_03**

**Area Listing (selected nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,728	80.0	>75% Grass cover, Good, HSG D (2S, 3S, 4S)
5,688	98.0	Paved parking, HSG D (2S, 3S, 4S)
3,709	98.0	Roofs, HSG D (2S, 3S)
<b>14,125</b>	<b>92.0</b>	<b>TOTAL AREA</b>

**31 Maple Tree Avenue  
 - Proposed**



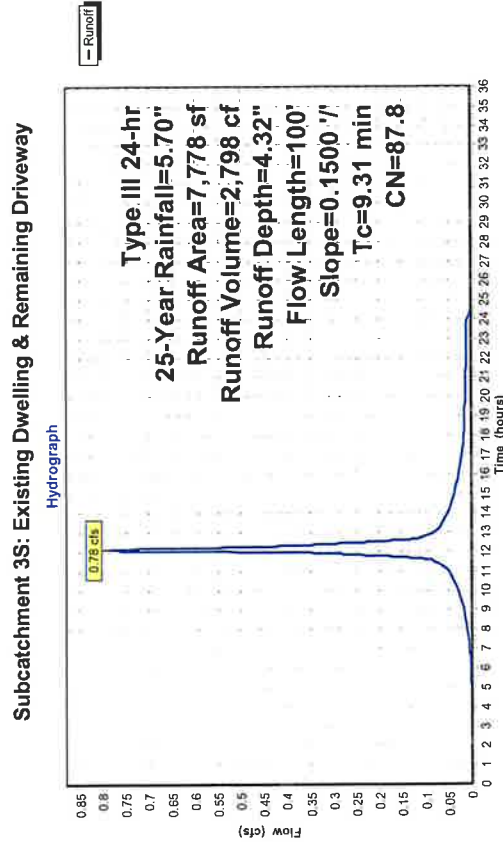
**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.78 cfs @ 12.13 hrs, Volume= 2,798 cf, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
2,156	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Sheet Flow, Grass: Short n= 0.150 P2= 3.30"
4.31	100	0.1500	0.39		
9.31	100	Total			



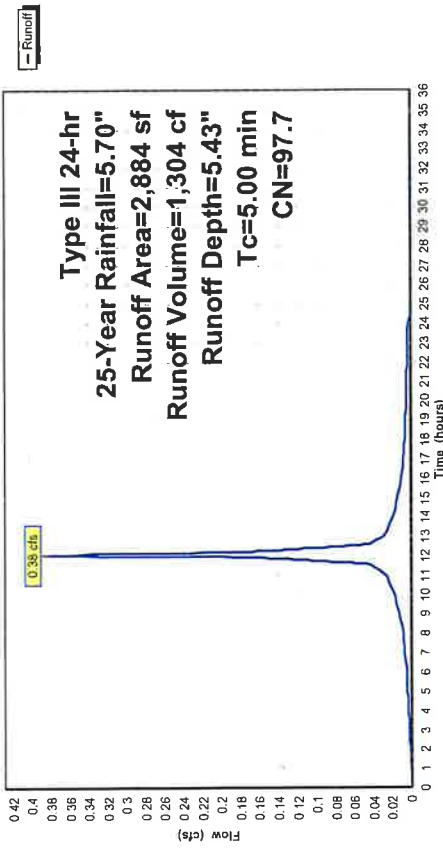
**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.38 cfs @ 12.07 hrs, Volume= 1,304 cf, Depth= 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry,



**Summary for Pond 5P: (4) R-330 XLHD (No. 1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 5.43" for 25-Year event  
 Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,304 cf  
 Outflow = 0.38 cfs @ 12.08 hrs, Volume= 1,116 cf, Atten= 1%, Lag= 0.5 min  
 Primary = 0.38 cfs @ 12.08 hrs, Volume= 1,116 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.61' @ 12.08 hrs Surf.Area= 195 sf Storage= 204 cf

Plug-Flow detention time= 118.3 min calculated for 1,116 cf (86% of inflow)  
 Center-of-Mass det. time= 54.7 min ( 802.0 - 747.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	43.00'	184 cf	11.17'W x 17.50'L x 3.54'H Field A
#2A	43.50'	231 cf	692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids Cultec R-330XLHD x 4 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
			415 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Horiz. Pop-up emitters X 2.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.38 cfs @ 12.08 hrs HW=44.61' TW=0.00' (Dynamic Tailwater)  
 1=Pop-up emitters (Weir Controls 0.38 cfs @ 1.09 fps)

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 1,532 cf, Depth= 5.31"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258	7.45%	Pervious Area
3,205	92.55%	Impervious Area

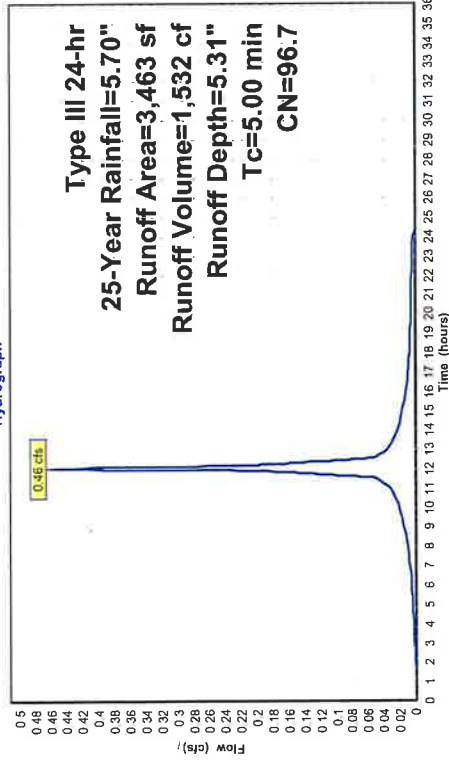
Tc (min) Length (feet) Slope (ft/ft) Velocity (ft/sec) Capacity (cfs) Description

5.00

Direct Entry,

**Subcatchment 4S: Portion of Driveway**

Hydrograph



**Pond 5P: (4) R-330 XLHD (No.1) - Chamber Wizard Field A**

**Chamber Model = Cuitec R-330XLHD (Cuitec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 2 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +12.0" End Stone x 2 = 17.50'

Base Length

2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

4 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 231.0 cf Chamber Storage

692.1 cf Field - 231.0 cf Chambers = 461.1 cf Stone x 40.0% Voids = 184.4 cf Stone Storage

Chamber Storage + Stone Storage = 415.4 cf = 0.010 af

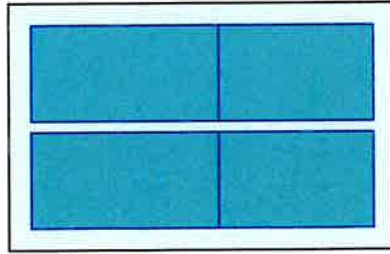
Overall Storage Efficiency = 60.0%

Overall System Size = 17.50' x 11.17' x 3.54'

4 Chambers

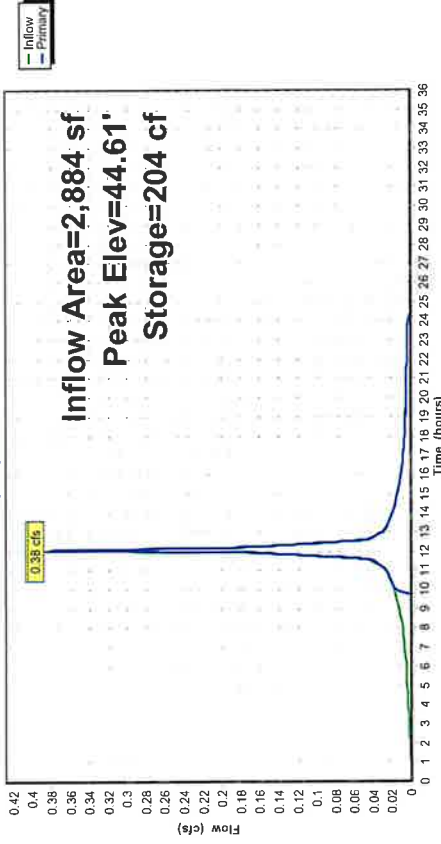
25.6 cy Field

17.1 cy Stone



**Pond 5P: (4) R-330 XLHD (No.1)**

Hydrograph



**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 5.31" for 25-Year event  
 Inflow = 0.46 cfs @ 12.07 hrs, Volume= 1,532 cf  
 Outflow = 0.13 cfs @ 12.39 hrs, Volume= 611 cf, Atten= 71%, Lag= 18.9 min  
 Primary = 0.13 cfs @ 12.39 hrs, Volume= 611 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.65' @ 12.39 hrs Surf.Area= 449 sf Storage= 948 cf

Plug-Flow detention time= 322.4 min calculated for 611 cf (40% of inflow)  
 Center-of-Mass det. time= 172.7 min ( 926.9 - 754.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	<b>25.67'W x 17.50'L x 3.54'H Field A</b> 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	<b>Cultec R-330XLHD</b> x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
			983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Vert. Pop-up emitters X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.13 cfs @ 12.39 hrs HW=44.65' TW=0.00' (Dynamic Tailwater)  
**1=Pop-up emitters** (Orifice Controls 0.13 cfs @ 1.32 fps)

**Pond 6P: (10) R-330 XLHD (No.2) - Chamber Wizard Field A**

**Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)**

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf  
 Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap  
 Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

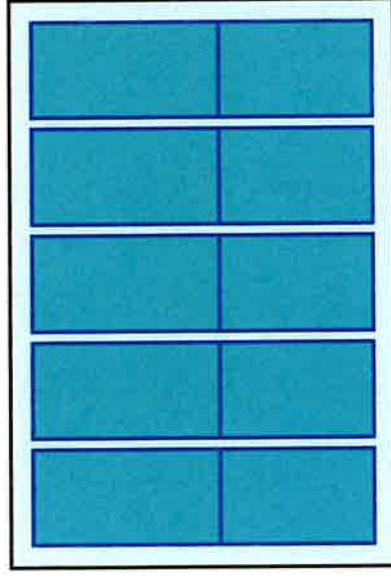
2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +12.0" End Stone x 2 = 17.50' Base Length

5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.67' Base Width  
 6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

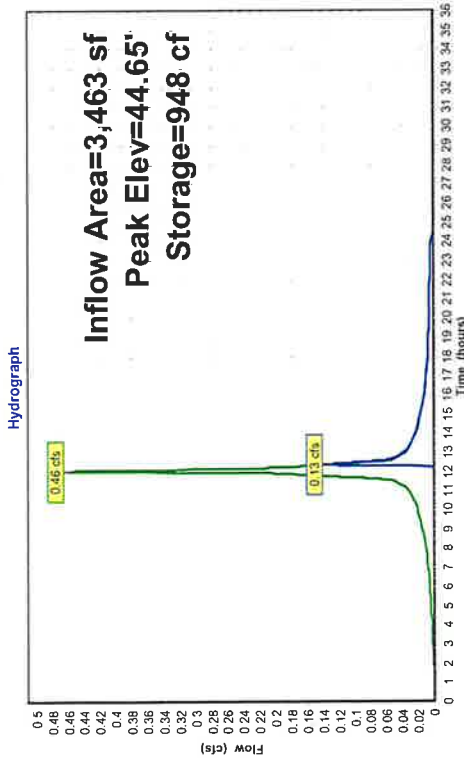
10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 577.5 cf Chamber Storage  
 1,590.8 cf Field - 577.5 cf Chambers = 1,013.3 cf Stone x 40.0% Voids = 405.3 cf Stone Storage

Chamber Storage + Stone Storage = 982.8 cf = 0.023 af  
 Overall Storage Efficiency = 61.8%  
 Overall System Size = 17.50' x 25.67' x 3.54'

10 Chambers  
 58.9 cy Field  
 37.5 cy Stone



Pond 6P: (10) R-330 XLHD (No.2)

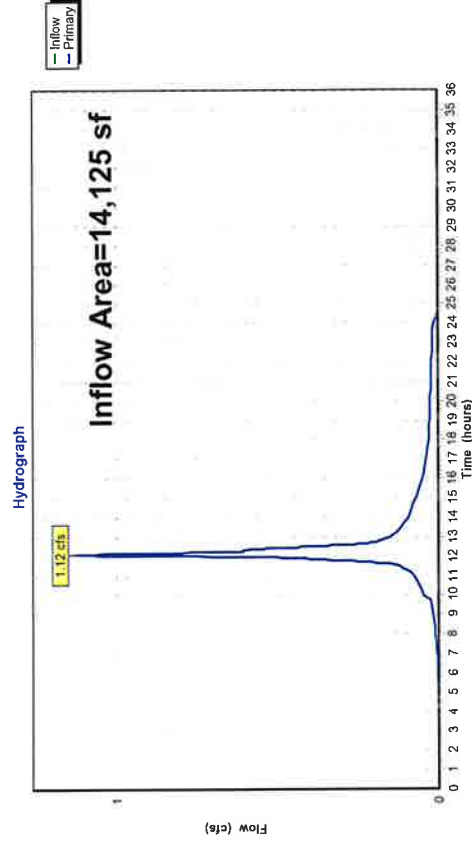


Summary for Link 7L: POC A

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 3.84" for 25-Year event  
 Inflow = 1.12 cfs @ 12.11 hrs, Volume= 4,525 cf  
 Primary = 1.12 cfs @ 12.11 hrs, Volume= 4,525 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 7L: POC A



**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.18 cfs @ 12.07 hrs, Volume= 586 cf, Depth= 2.44"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.29 cfs @ 12.13 hrs, Volume= 998 cf, Depth= 1.54"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
2,156	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 672 cf, Depth= 2.33"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 1-Year Rainfall=2.70"

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 2.44" for 1-Year event  
Inflow = 0.18 cfs @ 12.07 hrs, Volume= 586 cf  
Outflow = 0.18 cfs @ 12.08 hrs, Volume= 398 cf, Atten= 1%, Lag= 0.6 min  
Primary = 0.18 cfs @ 12.08 hrs, Volume= 398 cf

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258		7.45% Pervious Area
3,205		92.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 2.33" for 1-Year event  
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 672 cf  
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min  
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Volume	Invert	Avail.Storage	Storage	Description
#1A	43.00'	184 cf	11.17'W x 17.50'L x 3.54'H Field A	692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	Cultec R-330XLHD x 4 Inside #1	Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap	Row.Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage	

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Horiz. Pop-up emitters X 2.00 C= 0.600 Limited to weir flow at low heads

Primary Outflow Max=0.18 cfs @ 12.08 hrs HW=44.57' TW=0.00' (Dynamic Tailwater)  
1=Pop-up emitters (Weir Controls 0.18 cfs @ 0.84 fps)

**21UC\_Appendix\_B&C\_03**

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 Type III 24-hr 1-Year Rainfall=2.70"  
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 Page 15

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 43.48' @ 24.29 hrs Surf.Area= 449 sf Storage= 672 cf

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

Volume	Invert	Avail. Storage	Storage Description
#1A	41.30'	405 cf	<b>25.67'W x 17.50'L x 3.54'H Field A</b> 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	<b>Cultec R-330XLHD</b> x 10 Inside #1 Effective Size= 47.8" W x 30.0" H => 7.45 sf x 7.00' L = 52.2 cf Overall Size= 52.0" W x 30.5" H x 8.50' L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows 983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Vert. Pop-up emitters X 2.00</b> C= 0.600

**Primary Outflow** Max=0.00 cfs @ 0.00 hrs HW=41.30' TW=0.00' (Dynamic Tailwater)  
**1=Pop-up emitters** ( Controls 0.00 cfs)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 1.19' for 1-Year event  
 Inflow = 0.45 cfs @ 12.11 hrs, Volume= 1,395 cf  
 Primary = 0.45 cfs @ 12.11 hrs, Volume= 1,395 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**21UC\_Appendix\_B&C\_03**

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 Type III 24-hr 2-Year Rainfall=3.30"  
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**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 729 cf, Depth= 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.39 cfs @ 12.13 hrs, Volume= 1,342 cf, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
2,166	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 844 cf, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-Year Rainfall=3.30"

**21UC\_Appendix\_B&C\_03**

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 Type III 24-hr 2-Year Rainfall=3.30" Printed 5/20/2024 Page 17

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258	7.45%	Pervious Area
3,205	92.55%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry.</b>

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 3.03" for 2-Year event  
 Inflow = 0.22 cfs @ 12.07 hrs, Volume= 729 cf  
 Outflow = 0.22 cfs @ 12.08 hrs, Volume= 541 cf, Atten= 1%, Lag= 0.6 min  
 Primary = 0.22 cfs @ 12.08 hrs, Volume= 541 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.58' @ 12.08 hrs Surf.Area= 195 sf Storage= 199 cf

Plug-Flow detention time= 158.7 min calculated for 541 cf (74% of inflow)  
 Center-of-Mass det. time= 71.8 min ( 829.7 - 757.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	43.00'	184 cf	11.17"W x 17.50'L x 3.54'H Field A 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	Cultec R-330XLHD x 4 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
			415 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Horiz. Pop-up emitters X 2.00 C= 0.600 Limited to weir flow at low heads

**Primary Outflow** Max=0.22 cfs @ 12.08 hrs HW=44.58' TW=0.00' (Dynamic Tailwater)  
**↑=Pop-up emitters** (Weir Controls 0.22 cfs @ 0.90 fps)

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 2.92" for 2-Year event  
 Inflow = 0.26 cfs @ 12.07 hrs, Volume= 844 cf  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

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 Type III 24-hr 2-Year Rainfall=3.30" Printed 5/20/2024 Page 18

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.09' @ 24.29 hrs Surf.Area= 449 sf Storage= 844 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	25.67"W x 17.50'L x 3.54'H Field A 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	Cultec R-330XLHD x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
			983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Vert. Pop-up emitters X 2.00 C= 0.600

**Primary Outflow** Max=0.00 cfs @ 0.00 hrs HW=41.30' TW=0.00' (Dynamic Tailwater)  
**↑=Pop-up emitters** ( Controls 0.00 cfs)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 1.60" for 2-Year event  
 Inflow = 0.58 cfs @ 12.11 hrs, Volume= 1,883 cf  
 Primary = 0.58 cfs @ 12.11 hrs, Volume= 1,883 cf, Atten= 0%, Lag= 0.0 min  
 Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 969 cf, Depth= 4.03"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 5-Year Rainfall=4.30"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 1,938 cf, Depth= 2.99"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 5-Year Rainfall=4.30"

Area (sf)	CN	Description
2,156	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b>
					Grass: Short n=0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.34 cfs @ 12.07 hrs, Volume= 1,130 cf, Depth= 3.92"  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 5-Year Rainfall=4.30"

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 4.03" for 5-Year event  
Inflow = 0.29 cfs @ 12.07 hrs, Volume= 969 cf  
Outflow = 0.29 cfs @ 12.08 hrs, Volume= 781 cf, Atten= 1%, Lag= 0.5 min  
Primary = 0.29 cfs @ 12.08 hrs, Volume= 781 cf

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258		7.45% Pervious Area
3,205		92.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 3.92" for 5-Year event  
Inflow = 0.34 cfs @ 12.07 hrs, Volume= 1,130 cf  
Outflow = 0.01 cfs @ 14.93 hrs, Volume= 209 cf, Atten= 96%, Lag= 171.6 min  
Primary = 0.01 cfs @ 14.93 hrs, Volume= 209 cf

Volume	Invert	Avail. Storage	Storage Description
#1A	43.00'	184 cf	<b>11.17'W x 17.50'L x 3.54'H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	<b>Cultec R-330XLHD</b> x 4 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Horiz. Pop-up emitters X 2.00</b> C= 0.600 Limited to weir flow at low heads

**Primary Outflow** Max=0.29 cfs @ 12.08 hrs HW=44.59' TW=0.00' (Dynamic Tailwater)  
**1=Pop-up emitters** (Weir Controls 0.29 cfs @ 0.99 fps)

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 3.92" for 5-Year event  
Inflow = 0.34 cfs @ 12.07 hrs, Volume= 1,130 cf  
Outflow = 0.01 cfs @ 14.93 hrs, Volume= 209 cf, Atten= 96%, Lag= 171.6 min  
Primary = 0.01 cfs @ 14.93 hrs, Volume= 209 cf

**21UC\_Appendix\_B&C\_03**

Prepared by RVDI  
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 Type III 24-hr 5-Year Rainfall=4.30"  
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Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.55' @ 14.93 hrs Surf.Area= 449 sf Storage= 930 cf

Plug-Flow detention time= 581.3 min calculated for 209 cf (18% of inflow)  
 Center-of-Mass det. time= 336.8 min ( 1,097.2 - 760.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	<b>25.67'W x 17.50'L x 3.54'H Field A</b> 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	<b>Cultec R-330XLHD</b> x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows 983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Vert. Pop-up emitters X 2.00</b> C= 0.600

**Primary Outflow** Max=0.01 cfs @ 14.93 hrs HW=44.55' TW=0.00' (Dynamic Tailwater)  
**1"=Pop-up emitters** (Orifice Controls 0.01 cfs @ 0.73 fps)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 2.49" for 5-Year event  
 Inflow = 0.81 cfs @ 12.11 hrs, Volume= 2,927 cf  
 Primary = 0.81 cfs @ 12.11 hrs, Volume= 2,927 cf, Atten= 0%, Lag= 0.0 min  
 Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**21UC\_Appendix\_B&C\_03**

Prepared by RVDI  
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 Type III 24-hr 10-Year Rainfall=5.00"  
 Printed 5/20/2024  
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**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.33 cfs @ 12.07 hrs, Volume= 1,136 cf, Depth= 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.67 cfs @ 12.13 hrs, Volume= 2,365 cf, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
2,156	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b>
					Grass: Short n= 0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.40 cfs @ 12.07 hrs, Volume= 1,331 cf, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258	7.45%	Pervious Area
3,205	92.55%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 4.73" for 10-Year event  
 Inflow = 0.33 cfs @ 12.07 hrs, Volume= 1,136 cf  
 Outflow = 0.33 cfs @ 12.08 hrs, Volume= 948 cf, Atten= 1%, Lag= 0.5 min  
 Primary = 0.33 cfs @ 12.08 hrs, Volume= 948 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.60' @ 12.08 hrs Surf.Area= 195 sf Storage= 203 cf

Plug-Flow detention time= 127.5 min calculated for 948 cf (83% of inflow)  
 Center-of-Mass det. time= 58.6 min ( 808.1 - 749.6 )

Volume	Invert	Avail.Storage	Storage Description
#1A	43.00'	184 cf	<b>11.17"W x 17.50"L x 3.54"H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	<b>Cultec R-330XLHD</b> x 4 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Horiz. Pop-up emitters X 2.00</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.33 cfs @ 12.08 hrs HW=44.60' TW=0.00' (Dynamic Tailwater)  
**↑=Pop-up emitters** (Weir Controls 0.33 cfs @ 1.04 fps)

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 4.61" for 10-Year event  
 Inflow = 0.40 cfs @ 12.07 hrs, Volume= 1,331 cf  
 Outflow = 0.04 cfs @ 12.91 hrs, Volume= 410 cf, Atten= 91%, Lag= 50.4 min  
 Primary = 0.04 cfs @ 12.91 hrs, Volume= 410 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.58' @ 12.91 hrs Surf.Area= 449 sf Storage= 935 cf

Plug-Flow detention time= 403.5 min calculated for 410 cf (31% of inflow)  
 Center-of-Mass det. time= 224.9 min ( 981.8 - 756.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	<b>25.67"W x 17.50"L x 3.54"H Field A</b> 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	<b>Cultec R-330XLHD</b> x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
		983 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Vert. Pop-up emitters X 2.00</b> C= 0.600

**Primary OutFlow** Max=0.04 cfs @ 12.91 hrs HW=44.58' TW=0.00' (Dynamic Tailwater)  
**↑=Pop-up emitters** (Orifice Controls 0.04 cfs @ 0.94 fps)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 3.16" for 10-Year event  
 Inflow = 0.97 cfs @ 12.11 hrs, Volume= 3,723 cf  
 Primary = 0.97 cfs @ 12.11 hrs, Volume= 3,723 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.38 cfs @ 12.07 hrs, Volume= 1,304 cf, Depth= 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48	1.66%	Pervious Area
2,836	98.34%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.78 cfs @ 12.13 hrs, Volume= 2,798 cf, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
2,156	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422	56.85%	Pervious Area
3,356	43.15%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b>
					Grass: Short n=0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 1,532 cf, Depth= 5.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=5.70"

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 5.43" for 25-Year event

Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,304 cf

Outflow = 0.38 cfs @ 12.08 hrs, Volume= 1,116 cf, Atten= 1%, Lag= 0.5 min

Primary = 0.38 cfs @ 12.08 hrs, Volume= 1,116 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 44.61' @ 12.08 hrs Surf Area= 195 sf Storage= 204 cf

Plug-Flow detention time= 118.3 min calculated for 1,116 cf (86% of inflow)

Center-of-Mass det. time= 54.7 min ( 802.0 - 747.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	43.00'	184 cf	<b>11.17'W x 17.50'L x 3.54'H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	<b>Cultec R-330XLHD</b> x 4 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Horiz. Pop-up emitters X 2.00</b> C= 0.600 Limited to weir flow at low heads

**Primary Outflow** Max=0.38 cfs @ 12.08 hrs HW=44.61' TW=0.00' (Dynamic Tailwater)  
**↑=Pop-up emitters** (Weir Controls 0.38 cfs @ 1.09 fps)

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 5.31" for 25-Year event

Inflow = 0.46 cfs @ 12.07 hrs, Volume= 1,532 cf

Outflow = 0.13 cfs @ 12.39 hrs, Volume= 611 cf, Atten= 71%, Lag= 18.9 min

Primary = 0.13 cfs @ 12.39 hrs, Volume= 611 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Peak Elev= 44.65' @ 12.39 hrs Surf.Area= 449 sf Storage= 948 cf

Plug-Flow detention time= 322.4 min calculated for 611 cf (40% of inflow)  
Center-of-Mass det. time= 172.7 min ( 926.9 - 754.2 )

Volume #	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	<b>25.67'W x 17.50'L x 3.54'H Field A</b> 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	<b>Cutec R-330XLHD</b> x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows 983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device #	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Vert. Pop-up emitters X 2.00</b> C= 0.600

**Primary Outflow** Max=0.13 cfs @ 12.39 hrs HW=44.65' TW=0.00' (Dynamic Tailwater)  
**1=Pop-up emitters** (Orifice Controls 0.13 cfs @ 1.32' lps)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 3.84" for 25-Year event  
Inflow = 1.12 cfs @ 12.11 hrs, Volume= 4,525 cf  
Primary = 1.12 cfs @ 12.11 hrs, Volume= 4,525 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 1,472 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.40"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc Length Slope Velocity Capacity Description  
(min) (feet) (ft/ft) (ft/sec) (cfs)

5.00 **Direct Entry,**

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 0.90 cfs @ 12.13 hrs, Volume= 3,234 cf, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.40"

Area (sf)	CN	Description
2,166	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc Length Slope Velocity Capacity Description  
(min) (feet) (ft/ft) (ft/sec) (cfs)

5.00 **Direct Entry,**

4.31 **Sheet Flow,**

Grass: Short n= 0.150 P2= 3.30"

9.31 100 Total

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.51 cfs @ 12.07 hrs, Volume= 1,734 cf, Depth= 6.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.40"

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258	7.45%	Pervious Area
3,205	92.55%	Impervious Area

Tc Length Slope Velocity Capacity Description  
 (min) (feet) (ft/ft) (ft/sec) (cfs)

5.00 Direct Entry,

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 6.13" for 50-Year event  
 Inflow = 0.43 cfs @ 12.07 hrs, Volume= 1,472 cf  
 Outflow = 0.43 cfs @ 12.08 hrs, Volume= 1,284 cf, Atten= 1%, Lag= 0.5 min  
 Primary = 0.43 cfs @ 12.08 hrs, Volume= 1,284 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.62' @ 12.08 hrs Surf.Area= 195 sf Storage= 205 cf

Plug-Flow detention time= 110.2 min calculated for 1,284 cf (87% of inflow)  
 Center-of-Mass det. time= 51.4 min ( 796.8 - 745.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	43.00'	184 cf	11.17"W x 17.50"L x 3.54"H Field A 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	Cultec R-330XLHD x 4 inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
			415 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Horiz. Pop-up emitters X 2.00 C= 0.600 Limited to weir flow at low heads

Primary Outflow Max=0.43 cfs @ 12.08 hrs HW=44.62' TW=0.00' (Dynamic Tailwater)  
 ↑=Pop-up emitters (Weir Controls 0.43 cfs @ 1.13 fps)

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 6.01" for 50-Year event  
 Inflow = 0.51 cfs @ 12.07 hrs, Volume= 1,734 cf  
 Outflow = 0.23 cfs @ 12.22 hrs, Volume= 812 cf, Atten= 54%, Lag= 8.9 min  
 Primary = 0.23 cfs @ 12.22 hrs, Volume= 812 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 44.71' @ 12.22 hrs Surf.Area= 449 sf Storage= 958 cf  
 Plug-Flow detention time= 278.1 min calculated for 812 cf (47% of inflow)  
 Center-of-Mass det. time= 144.8 min ( 896.7 - 751.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	25.67"W x 17.50"L x 3.54"H Field A 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	Cultec R-330XLHD x 10 inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
			983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Vert. Pop-up emitters X 2.00 C= 0.600

Primary Outflow Max=0.23 cfs @ 12.22 hrs HW=44.71' TW=0.00' (Dynamic Tailwater)  
 ↑=Pop-up emitters (Orifice Controls 0.23 cfs @ 1.54 fps)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 4.53" for 50-Year event  
 Inflow = 1.28 cfs @ 12.11 hrs, Volume= 5,331 cf  
 Primary = 1.28 cfs @ 12.11 hrs, Volume= 5,331 cf, Atten= 0%, Lag= 0.0 min  
 Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**Summary for Subcatchment 2S: Proposed Building**

Runoff = 0.48 cfs @ 12.07 hrs, Volume= 1,664 cf, Depth= 6.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.20"

Area (sf)	CN	Description
327	98.0	Paved parking, HSG D
2,509	98.0	Roofs, HSG D
48	80.0	>75% Grass cover, Good, HSG D
2,884	97.7	Weighted Average
48		1.66% Pervious Area
2,836		98.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Subcatchment 3S: Existing Dwelling & Remaining Driveway**

Runoff = 1.03 cfs @ 12.13 hrs, Volume= 3,737 cf, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.20"

Area (sf)	CN	Description
2,156	98.0	Paved parking, HSG D
1,200	98.0	Roofs, HSG D
4,422	80.0	>75% Grass cover, Good, HSG D
7,778	87.8	Weighted Average
4,422		56.85% Pervious Area
3,356		43.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>
4.31	100	0.1500	0.39		<b>Sheet Flow,</b> Grass: Short n=0.150 P2= 3.30"
9.31	100	Total			

**Summary for Subcatchment 4S: Portion of Driveway**

Runoff = 0.58 cfs @ 12.07 hrs, Volume= 1,964 cf, Depth= 6.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-Year Rainfall=7.20"

Area (sf)	CN	Description
3,205	98.0	Paved parking, HSG D
0	98.0	Roofs, HSG D
258	80.0	>75% Grass cover, Good, HSG D
3,463	96.7	Weighted Average
258		7.45% Pervious Area
3,205		92.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					<b>Direct Entry,</b>

**Summary for Pond 5P: (4) R-330 XLHD (No.1)**

Inflow Area = 2,884 sf, 98.34% Impervious, Inflow Depth = 6.93" for 100-Year event  
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 1,664 cf  
Outflow = 0.48 cfs @ 12.08 hrs, Volume= 1,476 cf, Atten= 0%, Lag= 0.4 min  
Primary = 0.48 cfs @ 12.08 hrs, Volume= 1,476 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
Peak Elev= 44.63' @ 12.08 hrs Surf.Area= 195 sf Storage= 207 cf

Plug-Flow detention time= 102.6 min calculated for 1,476 cf (89% of inflow)  
Center-of-Mass det. time= 48.1 min (791.8 - 743.6)

Volume	Invert	Avail.Storage	Storage	Description
#1A	43.00'	184 cf	11.17"W x 17.50'L x 3.54'H Field A	692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	43.50'	231 cf	Cultec R-330XLHD x 4 Inside #1	Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage	

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	6.0" Horiz. Pop-up emitters X 2.00 C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=0.48 cfs @ 12.08 hrs HW=44.63' TW=0.00' (Dynamic Tailwater)  
**L-1=Pop-up emitters** (Weir Controls 0.48 cfs @ 1.18 fps)

**Summary for Pond 6P: (10) R-330 XLHD (No.2)**

Inflow Area = 3,463 sf, 92.55% Impervious, Inflow Depth = 6.81" for 100-Year event  
Inflow = 0.58 cfs @ 12.07 hrs, Volume= 1,964 cf  
Outflow = 0.45 cfs @ 12.13 hrs, Volume= 1,043 cf, Atten= 23%, Lag= 3.7 min  
Primary = 0.45 cfs @ 12.13 hrs, Volume= 1,043 cf

**21UC\_Appendix\_B&C\_03**

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Prepared by RVDI  
 HydroCAD@10.00-26 s/n 08481 © 2020 HydroCAD Software Solutions LLC  
 Type III 24-hr 100-Year Rainfall=7.20"  
 Printed 5/20/2024  
 Page 33

Peak Elev= 44.80' @ 12.13 hrs Surf.Area= 449 sf Storage= 974 cf

Plug-Flow detention time= 247.8 min calculated for 1,043 cf (53% of inflow)  
 Center-of-Mass det. time= 125.9 min ( 875.6 - 749.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	41.30'	405 cf	<b>25.67'W x 17.50'L x 3.54'H Field A</b> 1,591 cf Overall - 577 cf Embedded = 1,013 cf x 40.0% Voids
#2A	41.80'	577 cf	<b>Cultec R-330XLHD</b> x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
			983 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	<b>6.0" Vert. Pop-up emitters X 2.00</b> C= 0.600

**Primary Outflow** Max=0.45 cfs @ 12.13 hrs HW=44.79' TW=0.00' (Dynamic Tailwater)  
**1-1=Pop-up emitters** (Orifice Controls 0.45 cfs @ 1.85 fps)

**Summary for Link 7L: POC A**

Inflow Area = 14,125 sf, 66.53% Impervious, Inflow Depth = 5.31" for 100-Year event  
 Inflow = 1.89 cfs @ 12.12 hrs, Volume= 6,256 cf  
 Primary = 1.89 cfs @ 12.12 hrs, Volume= 6,256 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

**Stage-Area-Storage for Pond 5P: (4) R-330 XLHD (No.1)**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.00	0	45.60	334
43.05	4	45.65	340
43.10	8	45.70	345
43.15	12	45.75	351
43.20	16	45.80	356
43.25	20	45.85	360
43.30	23	45.90	365
43.35	27	45.95	369
43.40	31	46.00	373
43.45	35	46.05	377
43.50	39	46.10	381
43.55	47	46.15	385
43.60	54	46.20	389
43.65	62	46.25	393
43.70	69	46.30	397
43.75	77	46.35	400
43.80	84	46.40	404
43.85	92	46.45	408
43.90	99	46.50	412
43.95	107		
44.00	114		
44.05	122		
44.10	129		
44.15	137		
44.20	144		
44.25	152		
44.30	159		
44.35	166		
44.40	173		
44.45	181		
44.50	188		
<del>44.55</del>	195		
44.60	202		
44.65	210		
44.70	217		
44.75	224		
44.80	231		
44.85	238		
44.90	245		
44.95	252		
45.00	259		
45.05	266		
45.10	272		
45.15	279		
45.20	285		
45.25	292		
45.30	298		
45.35	305		
45.40	311		
45.45	317		
45.50	323		
45.55	329		

OUT

**Stage-Area-Storage for Pond 6P: (10) R-330 XLHD (No.2)**

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
41.30	0	43.90	795
41.35	9	43.95	808
41.40	18	44.00	821
41.45	27	44.05	833
41.50	36	44.10	845
41.55	45	44.15	856
41.60	54	44.20	866
41.65	63	44.25	876
41.70	72	44.30	885
41.75	81	44.35	894
41.80	90	44.40	903
41.85	108	44.45	912
41.90	126	44.50	921
41.95	144	44.55	930
42.00	162	44.60	939
42.05	180	44.65	948
42.10	199	44.70	957
42.15	217	44.75	966
42.20	235	44.80	975
42.25	253	44.85	<b>983</b>
42.30	270	44.90	983
42.35	288	44.95	983
42.40	306	45.00	983
42.45	324		
42.50	342		
42.55	359		
42.60	377		
42.65	394		
42.70	411		
42.75	429		
42.80	446		
42.85	464		
42.90	481		
42.95	498		
43.00	515		
43.05	532		
43.10	549		
43.15	566		
43.20	583		
43.25	599		
43.30	615		
43.35	631		
43.40	647		
43.45	663		
43.50	679		
43.55	694		
43.60	709		
43.65	724		
43.70	739		
43.75	754		
43.80	768		
43.85	782		

**Appendix “D”**

**Pipe Conveyance  
Calculations**

Project ID: 21UC\_Appendix\_D\_Conveyance\_&amp;\_Outlet\_Protection\_02.xlsx

Date: 5/20/2024

The following is a summary of the computations performed to design the proposed storm drainage system drain sizes. The proposed watershed flows were taken from the results of the HydroCAD storm drainage analysis performed on the site. Refer to Appendix "C" for HydroCAD model input data, computations, and results. Refer to Exhibit "B" for a depiction of the proposed on-site watershed areas. HydroCAD runoff computations are based on the 25-year design storm frequency event. Culvert conveyance computations are based on the Manning's Equation.

### Watershed Analysis Results

Drainage Area	Area (S.F.)	Impervious Area (S.F.)	CN	25-Year Peak Flow Rate (cfs)
2S	2,884	2,836	97.7	0.38
3S	7,778	3,356	87.8	0.78
4S	3,463	3,205	96.7	0.46
5P	-	-	-	0.38
6P	-	-	-	0.13

### Culvert Capacity Summary Table

Maximum pipe capacities were calculated using the Manning equation for full flow conditions. The proposed pipe information, 25-year peak design flows, and corresponding maximum capacities are summarized in the following table. Refer to the Development Plan for pipe and structure locations. All pipes have been sized to convey the flow rates for at least the 25-year design storm frequency event.

Pipe #	Diameter (inches)	Roughness (n)	Slope (%)	Contributing Watershed	25-Year Peak Design Flow (cfs)	Max Capacity (cfs)
1	6	0.011	2.0%	4S	0.46	0.94
2	6	0.011	2.0%	4S	0.46	0.94
3	6	0.011	2.0%	5P + (0.5)3S	0.77	0.94
4	6	0.011	2.0%	4S	0.46	0.94
5	6	0.011	2.0%	(0.5)3S	0.39	0.94

**Appendix “E”**  
**DCIA Worksheet**



Note to user: complete all cells of this color *only*

Part 1: General Information	
Project Name	Residential Development
Project Address	31 Maple Tree Avenue
Project Applicant	31 Maple Tree LLC
Date of Submittal	5/20/2024
Tax Account Number	000-6827

Part 2: Project Details	
1. What type of development is this? (choose from dropdown)	Redevelopment
2. What is the total area of the project site?	14,125 ft <sup>2</sup>
3. What is the total area of land disturbance for this project?	14,125 ft <sup>2</sup>
4. Does project site drain to High Quality Waters, a Direct Waterfront, or within 500 ft. of Tidal Wetlands? (Yes/No)	No
5. What is the <u>current DCIA</u> for the site?	5,478 ft <sup>2</sup>
6. Will the proposed development increase <b>DCIA</b> (without consideration of proposed stormwater management)? (Yes/No)	Yes
7. What is the <u>proposed-development total impervious area</u> for the site?	9,397 ft <sup>2</sup>

Part 3: Water Quality Target Total	
Does Standard 1 apply based on information above?	No, Skip to Part 4
Water Quality Volume (WQV)	N/A ft <sup>3</sup>
Standard 1 requirement	N/A
Required treatment/retention volume	N/A ft <sup>3</sup>
Provided treatment/retention volume for proposed development	ft <sup>3</sup>

Part 4: Proposed DCIA Tracking	
<u>Pre-development total impervious area</u>	5,478 ft <sup>2</sup>
<u>Current DCIA</u>	5,478 ft <sup>2</sup>
<u>Proposed-development total impervious area</u>	9,397 ft <sup>2</sup>
<u>Proposed-development DCIA</u> (after stormwater management)	3,544 ft <sup>2</sup>
Net change in <b>DCIA</b> from <u>pre-development</u> to <u>proposed-development</u>	-1,934 ft <sup>2</sup>

Part 5: Post-Development (As-Built Certified) DCIA Tracking	
<u>Post-development</u> (per as-built) <b>total impervious area</b>	ft <sup>2</sup>
<u>Post-development</u> (per as-built) <b>DCIA</b> (after stormwater management)	ft <sup>2</sup>
Net change in <b>DCIA</b> from <u>pre-development</u> to <u>post-development</u>	ft <sup>2</sup>

**Certification Statement**

I hereby certify that the information contained in this worksheet is true and correct.

Engineer's Signature  Date 5/20/24 Engineer's Seal

**Appendix “F”**  
**Soil Results Forms**

SOIL EVALUATION TEST RESULTS

Project Name: Residential Development      Engineering Firm's Name: D'Andrea Surveying & Engineering, P.C.  
 Project Address: 31 Maple Tree Avenue      Engineer's Name: Leonard C. D'Andrea

Test Pit or Soil Boring #:	1	Ground Elevation:	44.6	Depth Range in Inches
Elevation				
	Soil Texture (Percent Sand, Silt and Clay)			0
	Topsoil			17
	Brown Sandy Loam			32
	Sandy Gravel w/ Cobbles			95

**Saturated Hydraulic Conductivity Test Location #:** \_\_\_\_\_

Ground Elevation: \_\_\_\_\_

Top Elevation of Proposed Infiltration System: \_\_\_\_\_

Bottom Elevation of Proposed Infiltration System: \_\_\_\_\_

Elevation of Test\*: \_\_\_\_\_

Test Method (check one of the following acceptable methods\*\*):  
 \_\_\_\_\_ Borchole infiltration test (NHDES, 2008)  
 \_\_\_\_\_ Guelph permeameter - ASTM D5126-90 Method  
 \_\_\_\_\_ Falling head permeameter - ASTM D5126-90 Method  
 \_\_\_\_\_ Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods  
 \_\_\_\_\_ Amoozegar or Amoozegar (constant head) permeameter - Amoozegar 1992

Attach field data forms for the respective infiltration test method. \_\_\_\_\_

Calculated Saturated Hydraulic Conductivity Rate: \_\_\_\_\_

Elevation	Depth in Inches
N/A	Mottling (Seasonally High Groundwater) N/A
N/A	Groundwater N/A
N/A	Ledge N/A

\* All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.

\*\*A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

\* All field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed.

**TEST CERTIFICATION**

I HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Matthew M. Kivijarvi      Date: 1/5/2023  
 Name of Test Conductor      Signature of Test Conductor

1/5/2023

Soil Evaluation

Project Name: Residential Development      Engineering Firm's Name: D'Andrea Surveying & Engineering, P.C.  
 Project Address: 31 Maple Tree Avenue      Engineer's Name: Leonard C. D'Andrea

Test Pit or Soil Boring #:	2	Ground Elevation:	45.9
Elevation		Soil Texture (Percent Sand, Silt and Clay)	Depth Range in Inches
45.9			0
42.0		Topsoil	11
43.2		Dark Brown Sandy Loam	33
40.9		Light Brown Silty Sand w/ Cobbles	60
38.4		Tan Sandy Gravel	90

**Saturated Hydraulic Conductivity Test Location #:** \_\_\_\_\_

Ground Elevation: \_\_\_\_\_

Top Elevation of Proposed Infiltration System: \_\_\_\_\_

Bottom Elevation of Proposed Infiltration System: \_\_\_\_\_

Elevation of Test\*: \_\_\_\_\_

Test Method (check one of the following acceptable methods\*\*):

\_\_\_\_\_ Borehole infiltration test (NHDES, 2008)

\_\_\_\_\_ Guelph permeameter - ASTM D5126-90 Method

\_\_\_\_\_ Falling head permeameter - ASTM D5126-90 Method

\_\_\_\_\_ Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods

\_\_\_\_\_ Amoozegar or Amoozegar (constant head) permeameter - Amoozegar 1992

Attach field data forms for the respective infiltration test method. \_\_\_\_\_

Calculated Saturated Hydraulic Conductivity Rate: \_\_\_\_\_

Elevation	Depth in Inches
N/A	Mottling (Seasonally High Groundwater)
N/A	Groundwater
N/A	Leakage

\*\* A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

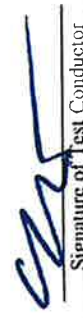
\* All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.

\* All field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed.

**TEST CERTIFICATION**

I HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT:

\_\_\_\_\_  
 Name of Test Conductor

  
 Signature of Test Conductor

\_\_\_\_\_  
 Date

1/5/2023



1/5/2023

Soil Evaluation

Project Name: Residential Development Engineering Firm's Name: D'Andrea Surveying & Engineering, P.C.  
 Project Address: 31 Maple Tree Avenue Engineer's Name: Leonard C. D'Andrea

Test Pit or Soil Boring #:	4	Ground Elevation:	46.7	Depth Range in Inches
Elevation	46.7	Soil Texture (Percent Sand, Silt and Clay)		0
		Top soil		
	46.3	Light Brown Loam		5
	44.0	Single Gravel w/ Cobbles		32
	38.8			95

**Saturated Hydraulic Conductivity Test Location #:** \_\_\_\_\_

Ground Elevation: \_\_\_\_\_

Top Elevation of Proposed Infiltration System: \_\_\_\_\_

Bottom Elevation of Proposed Infiltration System: \_\_\_\_\_

Elevation of Test\*: \_\_\_\_\_

Test Method (check one of the following acceptable methods\*\*):  
 Borchole infiltration test (NIHDES, 2008) \_\_\_\_\_  
 Guelph permeameter - ASTM D5126-90 Method \_\_\_\_\_  
 Falling head permeameter - ASTM D5126-90 Method \_\_\_\_\_  
 Double ring permeameter or infiltrometer - ASTM D3385-03, D5093-02, D5126-90 Methods \_\_\_\_\_  
 Amoozeimeter or Amoozeagar (constant head) permeameter - Amoozeagar 1992 \_\_\_\_\_

Attach field data forms for the respective infiltration test method. \_\_\_\_\_

Calculated Saturated Hydraulic Conductivity Rate: \_\_\_\_\_

Elevation	Depth in Inches
N/A	N/A
N/A	N/A
N/A	N/A

\* All test pits or soil borings shall be excavated to an elevation four feet below the proposed bottom elevation of the infiltration system.

\*\* A percolation test, performed in accordance with the guidelines of the Connecticut State Health Code or otherwise, is not an acceptable test for saturated hydraulic conductivity. Percolation tests overestimate the saturated hydraulic conductivity rate.

\* All field infiltration tests must be conducted in the actual location and soil layer where stormwater infiltration is proposed.

**TEST CERTIFICATION**

I HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND CORRECT.

Matthew M. Kivijarvi \_\_\_\_\_  
 Name of Test Conductor

*[Signature]* \_\_\_\_\_  
 Signature of Test Conductor

1/5/2023 \_\_\_\_\_  
 Date

