ZARIN & STEINMETZ LLP

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May 31, 2023

Via Town's Online Application Portal (ID No. PBCK-22-2)

Hon. Steven Kessler
Chairperson of the Town of Cortlandt Planning Board
and Members of the Planning Board
1 Heady Street
Cortlandt Manor, New York 10567

Re: Bilal Ahmad - Application for Site Plan Approval (PB 2022-10)
2054 East Main Street, Section 23.20 Block 1 Lots 2 & 3 (the "Property")

Dear Chairperson Kessler and Members of the Planning Board:

As you are aware, our firm represents Bilal Ahmad, the Applicant in the above-referenced application for Site Plan Approval, and contract vendee of the Property.

We last appeared before your Board May 2, 2023 and met with your Board at the site visit held May 13, 2023. In response to the comments received from your Board at the meeting and site visit, and in anticipation of the Board's June 6th regular meeting and public hearing on this application, please find enclosed the following for your review:

- Site Plan drawing Striping & Sign Plan (Sheet No. C-301) prepared by DTS Provident Design Engineering, LLP, dated April 26, 2023, and last revised May 31, 2023.
- Stormwater Summary Report, prepared by DTS Provident Design Engineer, LLP, dated May 31, 2023.

In addition to the enclosed documents, please also find below written responses to the Board's questions and requests for additional information.

Bistro/Restaurant.

The proposed Marriott flag hotel includes a restaurant on the main level. (See Sheet A101). This restaurant provides a limited menu and is provided primarily for hotel guests but is open to the public for a fee. While the restaurant is open to the public, it is the applicant's experience in owning multiple other hotels that the public will not use the restaurant except in very rare instances. For example, in the Oneonta Marriott, the restaurant includes a small Starbucks coffee shop. This is not the case here.

The restaurant does not operate continuously throughout the day. Breakfast is served from 6:30 am to 10 am on the weekdays and from 7 am to 10:30 am on the weekends. Dinner is served from 5 pm to 10 pm daily.

Food and beverage deliveries occur one to two times per week, and all deliveries are made using a 28-foot box truck (or smaller) that will utilize a loading area along the building's easterly façade facing East Main Street. Items will be delivered through the lower-level entrance and brought to the bistro/restaurant and hotel storage areas using the building's elevator.

Refuse.

The Site Plan provides an 8-foot-deep by 20-foot-wide dumpster enclosure along the northerly side of the site's parking area. (See Sheet C-301). The dumpster enclosure will hold two dumpsters: one for recyclables and one for trash. This is standard for Marriott brand hotels of this size, and in the Applicant's experience, is adequate for the hotel's operations. A private carting company will pick up the refuse once weekly during winter months and twice weekly during the summer. Additional pickups will be scheduled as necessary upon request of hotel staff. Recycling and trash will be brought to the refuse enclosure by hotel staff using the north westerly side door, which has a ramp and connects to a walkway extending around the entire building.

Loading/Parking.

Trucks accessing the site during operations (post construction) will be limited to box trucks. As described above, the restaurant will receive food and beverage deliveries one to two times per week from box trucks no larger than 28 feet in length, well below the length of the Mohegan Fire Department's 40-foot ladder truck that can maneuver the site. There will be no laundry service deliveries, as all laundry is done on site. Standard deliveries (via Amazon, DHL, FedEx, UPS and USPS) will be made as part of the course of business. No other types of deliveries are expected in the regular course of business. Deliveries to the restaurant will be made using the loading area identified and lower-level door closest to East Main Street and will bring items to the main level using the interior elevator. (See Sheet C-301). All other deliveries will be made to the front desk and using the front entrance.

The Site Plan provides two electric vehicle charging stations, located at the north-east corner of the parking area, closest to East Main Street. The Applicant proposes to install the necessary infrastructure (i.e., conduits) in the parking area during initial construction to allow for three additional charging stations if demand requires them to be installed. These additional charging stations would be located adjacent to the locations where the charging stations are proposed to be installed and are identified on the Striping and Sign Plan with an "EV." (See Sheet C-301).

Because of the changes in the number of employees on site during the day, the greater number of which are on site during the hotel's non-peak hours, Marriott instructs that no parking areas be restricted to "employee only" parking. However, the hotel shall direct staff to park in the spaces closest to East Main Street. Should guests park in the spaces provided closest to East Main Street, they will have access to the building through the lower-level door, as guest room keys provide access through any building door.

In addition to the responses provided above, the Applicant's landscape architect (Keplinger Freeman Associates) is scheduled to conduct a site visit with the Town's arborist on June 6th, the day of the next meeting. As such, while we intend to have information regarding the tree removal and trimming to provide to your Board at the meeting, no additional information is provided herein.

We hope that the above responses satisfy the comments of the Board, and of all interested agencies/departments, and that your Board will have sufficient information so as to close the public hearing on this application at the June 6th meeting. We look forward to once again meeting with your Board in the continued review of this Application. In the meantime, if you have any questions or require any additional information, please do not hesitate to contact us.

Respectfully submitted,

ZARIN & STEINMETZ LLP

By: _____
David S. Steinmetz
Brian T. Sinsabaugh

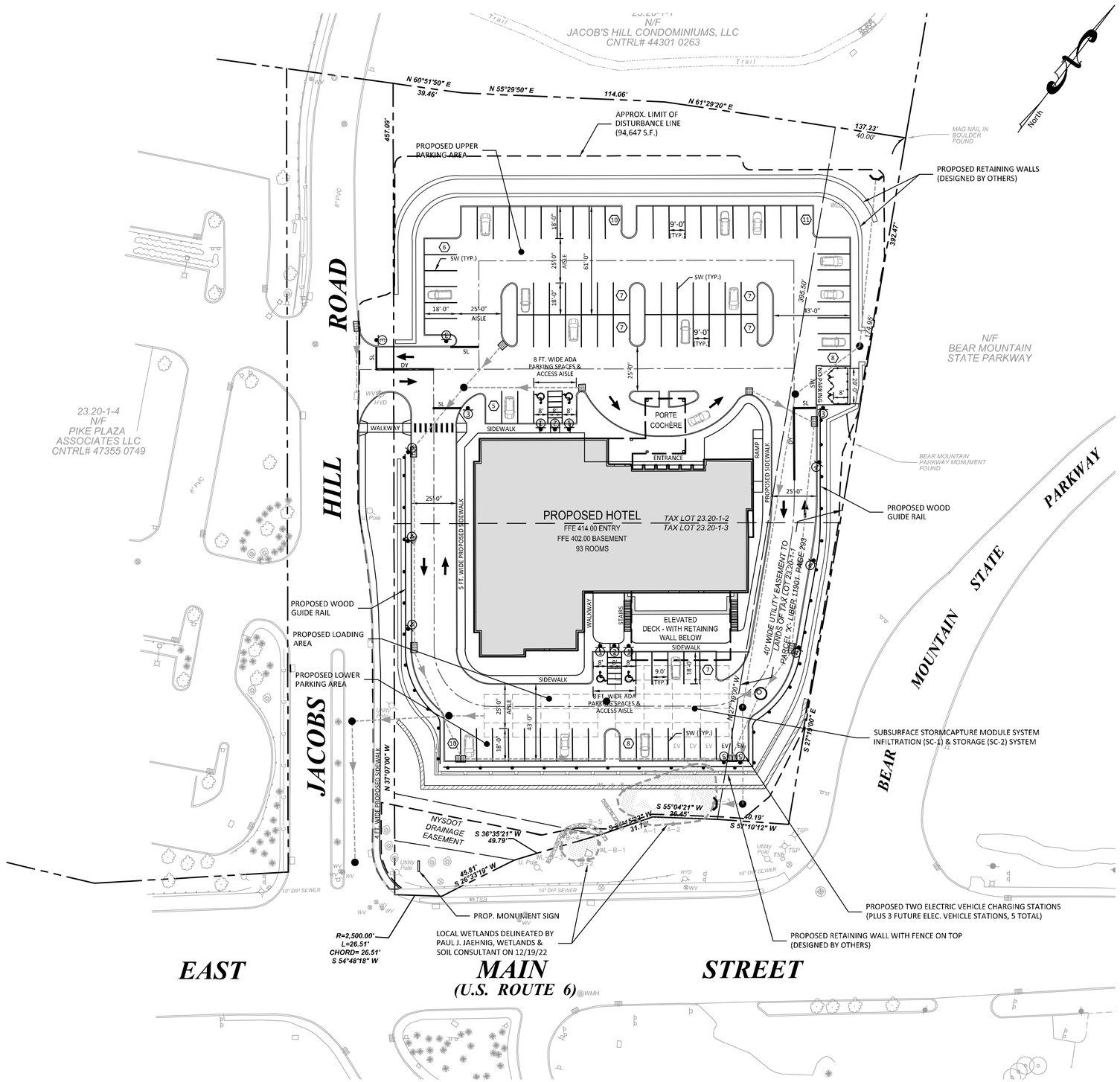
copied:
Bilal Ahmad (via email)
Keplinger Freeman Associates (via email)
GTS (via email)
DTS Provident (via email)
Phil Hersh, Esq. (via email)

SIGN LEGEND			
PLAN LEGEND	MUTCD	SIZE	SIGN LEGEND
1	R7-8X	12" x 18"	RESERVED PARKING (SYMBOL)
2	R7-8P	12" x 9"	VAN ACCESSIBLE
3	R1-1	12" x 18"	STOP
4	R7-1	12" x 18"	NO PARKING ANY TIME <--->
5	NA	12" x 18"	ELECTRIC VEHICLE CHARGING

NOTES:

1. ALL SIGNS SHALL CONFORM TO THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS AND THE NEW YORK STATE SUPPLEMENT, LATEST REVISION.
2. A MINIMUM OF TWO CROSS BRACES SHALL BE PROVIDED ON ALL SINGLE CHANNEL SIGNS HAVING ANY DIMENSION GREATER THAN 24 INCHES.
3. ALL SIGNS SHALL HAVE A MOUNTING HEIGHT OF 7'-0" TO THE BOTTOM OF THE SIGN.
4. ALL SIGNS SHALL UTILIZE A CHANNEL-TYPE MOUNTING.
5. ALL SIGNS SHALL BE REFLECTORIZED.
6. SIGNS NO. 6 & 7 SHALL HAVE A RED LEGEND WITH WHITE BACKGROUND.

TOWN OF CORTLANDT	
SCHEDULE OF PARKING REQUIREMENTS AS PER SECTION 301-29	
USE:	MINIMUM NUMBER OF SPACES
HOTEL	1 PER ROOM PLUS 1 PER EMPLOYEE ON MAXIMUM SHIFT
NUMBER OF PROPOSED ROOMS = 93 NUMBER OF EMPLOYEES ON MAXIMUM SHIFT = 7	
REQUIRED NUMBER OF SPACES 93 SPACES + 7 SPACES 100 SPACES REQUIRED	
NUMBER OF PROPOSED PARKING SPACES: 93 SPACES WITH 4 ACCESSIBLE SPACES* - *VARIANCE REQUIRED	
TOTAL AREA OF PERIMETER OF PARKING AREA = 15,282 S.F. 5% OF TOTAL OF PARKING AREA = 765 S.F.	
LANDSCAPE AREA PROVIDED AROUND PARKING AREA = 5,624 S.F.	



NO.	REVISION	DATE
1	PLANNING BOARD REVIEW	5/31/2023

STRIPING & SIGN PLAN LEGEND

SW	SOLID WHITE LINE, 4 " WIDE
SL	STOP LIMIT LINE, WHITE, 12 " WIDE
DY	DOUBLE YELLOW, 2 LINES, 4 " WIDE
20	NO. OF PARKING STALLS PER BAY LINE
2	PROPOSED TRAFFIC SIGN LOCATION AND DESIGNATION
	ADA PAVEMENT MARKING (BLUE)
	PAINTED DIRECTIONAL ARROW (WHITE)
EV	ELECTRIC VEHICLE CHARGING STATION (2 TOTAL)
EV	FUTURE ELECTRIC VEHICLE CHARGING STATION (3 TOTAL)

30 20 10 0 30 60
SCALE IN FEET

Attorney: Zarin & Steinmetz, LLP, 81 Main Street, Suite 415, White Plains, NY 10601, Tel: 914-682-7800

Architect: Rod A. VanDerWater Architect, p.c., 7301 Barberry Lane, Manlius, NY 13104, Tel: 315-415-9988

Landscape Architect: Keplinger Freeman Associates, LLC, 6320 Fly Road, Suite 109, East Syracuse, NY 13057, Tel: 315-445-7980

Surveyor: Donald R. Stedge, P.L.S., 112 Murray Avenue, Goshen, NY 10924, Tel: 845-325-9734

Owner/applicant: Bilal Ahmad, 116 Courtyard Drive, Oneonta, NY 13820, Tel: 315-219-2156

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CORTLANDT MANOR HOTEL
2054 EAST MAIN STREET
TOWN OF CORTLANDT, NY
Section 23.20, Block: 1, Lots: 2 & 3

TITLE:
STRIPING & SIGN PLAN

Seal: STATE OF NEW YORK · PETER J. GREGORY · LICENSED PROFESSIONAL ENGINEER · NO. 071226

Scale:	1"=30'
Date:	04/26/2023
Drawn By:	KMM
Checked By:	PJG
Project No.:	1021
Sheet No.:	6 of 12
Dwg. No.:	C-301

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Cortlandt Manor Hotel
2054 East Main Street
Town of Cortlandt, NY
Stormwater Summary Report
5/31/2023

A. Project Description

1. Project Scope

The proposed Project encompasses the construction of a new four-story plus basement hotel and site improvements to be located on two (2) parcels of property designated on the Town of Cortlandt Tax Maps as Section 23.20, Block 1, Lot 3 and Section 23.20, Block 1, Lot 2, with a location address of 2054 East Main Street. The two existing parcels will be consolidated into a single site with a total area of 106,591 square feet (sf or ft^2), or 2.45 acres (ac). The Project Site fronts on the north side of East Main Street (aka US Route 6), just west of the entry/exit ramp from the eastbound Bear Mountain Parkway. Jacobs Hill Road abuts the site to the west.

Proposed site improvements include: a single ingress and egress driveway from Jacobs Hill Road, retaining walls around the perimeter of the developed site, front (lower level) and rear (upper level) parking areas with internal circulation to accommodate 93 cars, sidewalks for pedestrian access, site landscaping, utility services (water, sanitary sewer, electric, gas, cable), and construction of subsurface drainage collection and stormwater management facilities.

2. Existing Site and Runoff Conditions

The Project Site is about 280 feet wide (in the east west direction) and 445 feet deep. The current predominant land cover onsite consists of lawn and meadow areas with a scattering of trees and a short section of paved driveway from Jacobs Hill Road, and woodland borders on the northeastern and eastern edges of the site. A residence and car port previously located in the northwest-central portion of the site were removed and the land was re-graded around 2018 or 2019. There are two (2) small wetland areas interconnected with existing drainage pipes receiving and discharging stormwater runoff from the site, East Main Street, and the Bear Mountain Parkway entry/exit ramp within the southern front yard of the property.

The site generally slopes down from north to south, with elevations ranging from about 440 to 456 feet along the north end to 382 feet along the south end. Many portions of the site have topography formed by past man-made grading of the land, carried-out as part of past development activities on the site. The northern edge of the site is steep-sloped (up to 30 percent). The slopes on the northwest-central portion of the site, where the residence was situated, range from very gently sloped to nearly level. The central and southern portions of the site are moderately to gently sloped.

Under existing drainage conditions, stormwater runoff from the site is conveyed overland via sheet and/or shallow concentrated flow south and east towards the on-site wetland areas. Runoff is then conveyed from the wetland areas via storm piping connecting into municipal storm drain systems flowing south and west from the site, with ultimate discharge to the Hudson River approximately 2.5 miles to the west.

3. Stormwater Management (SWM) Plan

   a. Objectives and Methodology

   The SWM plan has been developed and will be implemented so that the quality and quantity of stormwater runoff during construction and after development are not significantly altered from preconstruction conditions. Primary stormwater management objectives are to replicate as close as possible pre-development hydrology, to avoid causing downstream flooding and flood damage, and to employ all means practicable to mitigate increases in pollutant (total suspended solids, metals, and nutrients) loads that will occur because of the proposed Project development.

   Post-construction stormwater management practices (SMPs) have been designed to meet the stormwater quality and quantity control requirements of:

   - Part III of the New York State Department of Environmental Conservation (NYSDEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity GP-0-20-001 ("General Permit"), effective January 29, 2020, and
   - The *New York State Storm Water Management Design Manual* (NYSSMDM), January 2015.
   - Chapter 262 of the Town of Cortlandt Code titled, "Stormwater Management and Erosion and Sediment Control."

   The 24-hour rainfall data value used in the hydrologic analysis and computations is based on the updated isohyetal maps from the Northeast Regional Climate Center (NRCC). Current 24-hour NRCC rainfall precipitation and distribution data were used to compute runoff hydrographs for the 1, 10, 25 and 100-year storm events. The existing and post development runoff rates for the specified storm events were calculated using HydroCAD® Version 10.0 computer software program. HydroCAD® incorporates the methodology used in NRCS TR-20 and TR-55 to compute and route flood hydrographs.

   b. Existing Conditions

   Under pre-development conditions, a single drainage area (PRE-DA) was identified on the site. The USDA Web Soil Survey indicates that there are two (2) soil types – Paxton fine sandy loam and Leicester loam - present on the site. The soils' characteristics are summarized in a table on Drawing C-101, "Existing Conditions and Constraints Plan."

   The pre-development drainage area is shown on Figure DA-101, Pre-Development Drainage Map in Appendix D1. Runoff from the existing drainage areas drains by way of

overland sheet and/or shallow concentrated flow. The drainage area size is 121,060 sf (2.78 ac.). Table 3-1 summarizes the characteristics of the existing drainage area.

Table 3-1
Summary of Existing Drainage Areas

Area ID	Area (sf/ac.)	Impervious Area (sf/ac.)	CN	Tc (min.)
PRE-DA	121,060/2.78	1,209/0.03	82	21.7

c. Proposed/Post-Development Conditions

The proposed Project disturbance is estimated at 98,400 sf, or 2.26 acres.

Under post development conditions, three (3) drainage areas (PST-DA1, DA2, and DA3) were identified as discharging to the same design point as under pre-development conditions. Runoff from Drainage Area PST-DA1, which is upland (i.e., north) of the proposed hotel development, will be diverted and conveyed via a proposed storm drain system under the proposed hotel development to the southern site frontage. Runoff from Drainage Area PST-DA2, the proposed hotel development, will be captured by the site storm drain system and directed to the proposed stormwater management practices (SMPs). Runoff from Drainage Area PST-DA3, located adjacent to the eastern and southern limits of development, drains south and west via overland flow towards the site frontage.

The post development drainage areas are shown on Figure DA-102, Post-Development Drainage Map in Appendix D1. Table 3-2 summarizes the proposed drainage area characteristics.

Table 3-2
Summary of Proposed Drainage Areas

Area ID	Area (sf/ac.)	Impervious Area (sf/ac.)	CN	Tc (min.)
PST-DA1	18,107/0.42	0/0.00	73	6.0
PST-DA2	82,027/1.88	70,003/1.61	95	6.0
PST-DA3	31,546/0.72	1,040/0.02	83	21.7

d. Subsurface Soils Investigation

Subsurface geotechnical investigation and testing was performed by DTS Provident staff (see Appendix D2 for data sheets) on April 20, 2023. Subsurface soils profile data was obtained from seven (7) test pits (locations DTP 1 through DTP 7 as shown on Drawing C-201) dug to depths ranging between 1.5 feet and 8 feet below the existing ground surface.

Data from DTP 1 and DTP 2 shows 0.5 foot of topsoil over a layer of fine sandy loam with traces of silt extending to 2 feet below existing grade. A layer of moderately compacted fine to medium sands and loam with cobbles was observed below the sandy loam extending from 2 to approximately 4 feet below, where ledge rock was encountered. Data from DTP 3 shows 0.33 foot of topsoil over a layer of fine sandy loam extending to 1.5 feet below existing

grade before encountering ledge rock. No groundwater was observed, and no site-specific soil infiltration testing was performed at these locations.

The data from DTPs 4, 5 and 7 shows 0.5 feet of topsoil over layers of brown sandy loam from 2.5 to 3.5 feet below existing grade, and compacted sands and loams to approximately six (6) feet below grade. Ledge rock was encountered in DTP 4 at 6.5 feet below existing grade. In DTPs 5 and 7, deeper layers of fine to medium sands with some silt/silty loam were observed at from 6 to approximately 8 feet below existing grade. Groundwater was observed at 7.5 feet below existing grade for DTPs 5 and 7. No site-specific soil infiltration testing was performed at these locations.

Data from DTP 6 shows 0.5 feet of topsoil over layers of loose fine sandy loam to 1.5 feet below existing grade, and moderately compacted fine to medium sandy loam with a few boulders to a depth of approximately 6.2 feet (74 inches) before encountering ledge rock.

A percolation/soil infiltration test (P1) was performed adjacent to DTP 6. The test hole was excavated to a depth of 58 inches (4.83 feet). In accordance with NYSSMDM Appendix D, a 6-inch diameter PVC pipe casing 30 inches in length was installed at the bottom of the test hole. Three (3) one-hour tests were conducted at a starting water depth of 24 inches within the casing, with each test returning a stabilized field infiltration rate of 22 inches per hour (in/hr).

e. Water Quality Volume (WQv)

Using the 90% Rainfall Event (P) value of 1.45 inches for the northwestern part of Westchester County, New York (Figure 4.1 of the NYSSMDM), the target WQv for the proposed hotel development that is required to be captured and reduced/treated is summarized in Table 3.3 below, with calculations provided in Appendix D3.

Table 3-3
Water Quality Volume (WQv)

Area ID	Water Quality Volume (WQv)	
	Acre-ft	Cubic Feet (ft^3)
PST-DA2	0.186	8,108

f. Runoff Reduction

Runoff reduction is the reduction of WQv achieved through application of green infrastructure (GI) techniques and/or standard SMPs having runoff reduction volume (RRv) capacity. While Section 3.6 of NYSSMDM ideally requires projects to provide total (100%) reduction of WQv, projects that have site limitations as documented in Section 3d above must meet runoff reduction requirements by providing a targeted, or minimum, RRv for the newly constructed impervious surfaces. The minimum RRv for the proposed hotel development, which is calculated using the formula as described in Section 4.3 of the NYSSMDM, is summarized in Table 3-4 below, with calculations provided in Appendix D3.

Table 3-3 Minimum Runoff Reduction Volume (RRv)		
Area ID	**$(RRv)_{min}$**	
	Acre-ft	Cubic Feet (ft^3)
PST-DA2	0.050	2,190

g. GI/SMP Application

Total (100%) reduction of the Target WQv from the proposed Project (8,108 cubic feet) will be achieved through the construction and operation of a subsurface infiltration and detention system using precast StormCapture® rectangular concrete modules (i.e., chambers) manufactured by Oldcastle Infrastructure. The system will be comprised of two components: a lower-stage subsystem consisting of StormCapture® SC1 modules with open bottoms that will provide infiltration and buffer storage for attenuation of the 1-and 10-year storm events, and an upper-stage subsystem consisting of StormCapture® SC2 modules with closed bottoms that will provide buffer storage for attenuation of the 25-and 100-year storm events. The two subsystems will be interconnected with a 12-inch diameter HDPE pipe. The primary outlet for the entire system will be a 15-inch diameter HDPE pipe from the lower-stage subsystem. Design section views of the proposed system are provided Figures DA-103 and DA-104 in Appendix D1.

As shown in the sizing computations provided in Appendix D4, compliance with the requirements of Section 3.6, Step 3 of the NYSSMDM will be achieved with the system designed to contain 100% WQv below the invert of the primary outlet pipe without taking credit for the rate of exfiltration (i.e., no discharge) as required by Section 6.3 of the NYSSMDM. Table 3-4 summarizes the RRv provided.

Table 3-4 Runoff Reduction Volume (RRv) Provided		
Area ID	**RRv**	
	Acre-ft	Cubic Feet (ft^3)
PST-DA2	0.186	8,111

As shown in the post-development hydrologic computations provided in Appendix D6, the subsurface infiltration and detention system will also meet the Stream Channel Protection Volume Requirements (CPv) as stated in Section 4.4 of the NYSSMDM by providing 100% reduction of the CPv generated during the 1-year storm from the proposed hotel development. A design infiltration rate of 8 inches/hour was used in the post-development hydrologic model.

Pretreatment of post-development runoff entering the system will be achieved through the installation of a Contech Stormwater Solutions' Cascade Separator® Model CS-6 hydrodynamic separator, sized to capture and treat the target water quality peak discharge rate (Qwq) calculated using the methodology in Chapter 4 and Appendix B.2 of the NYSSMDM (see WQv calculation in Appendix D3).

h. SMP and Peak Rate Control Summary

Table 3-5, SMP Summary Table, indicates the inflow, outflow, storage volume, water surface elevation, and freeboard of the SMPs in area PST-DA2 for the 1-, 10-, 25-, and 100-year design storms.

Table 3-5 - SMP Summary Table – Area PST-DA2

Design Storm	Peak Inflow(1) (cfs)	Peak Outflow(2) (cfs)	SC-1(4) Volume (ft^3)	SC-1 WSEL (ft.)	SC-2(5) Volume (ft^3)	SC-2 WSEL (ft.)	SC-2 Freeboard(6) (ft.)
1-Year	4.98	0.33(3)	5,989	387.21	1,756	390.07	5.63
10-Year	9.70	2.72	9,465	389.65	4,061	391.11	4.59
25-Year	12.39	4.22	9,928	389.98	5,626	391.81	3.89
100-Year	17.88	6.24	10,674	390.52	9,836	393.70	2.00

(1) Flow into upper stage Storage System SC-2.
(2) Primary discharge from lower stage Infiltration System SC-1.
(3) Flow is "discarded", i.e., infiltrated back into the subsoil. Pipe (primary) discharge = 0 cfs.
(4) Active storage volume above stone bedding bottom elevation of 382.50 for Infiltration System SC-1.
(5) Active storage volume above the chamber bottom elevation of 388.70 for Storage System SC-2.
(6) Height from Water Surface Elevation to Top of Chamber Elevation for SC-2 @ 395.70.

A summary of the pre-development and post-development runoff rates is presented in Table 3-6, Peak Discharge Rate Comparison Table. Based on the implementation of the stormwater management measures, the peak runoff rates under the post-development conditions will be less than the peak runoff rates for the pre-development conditions.

Table No. 3-6 - Peak Discharge Rate Comparison Table – Design Pt. 1

Design Storm Event	24-Hour Rainfall (in.)	Peak Runoff Rate(cfs)	
		Pre-Dev.	**Post-Dev.**
1-Year	2.78	2.14	**0.84**
10-Year	5.13	6.25	**4.28**
25-Year	6.49	8.79	**7.04**
100-Year	9.28	14.08	**12.31**

The calculations for pre- and post-development drainage conditions are included in Appendices D5 and D6, respectively.

4. Municipal Separate Stormwater Sewer Systems (MS4) & Consultants

The Town of Cortlandt is the designated MS4 agency/entity for the proposed Project. The Town's NYSDEC MS4 SPDES Permit Number is NYR20A181.

B. Construction Program

1. Duration of Activity

   The construction activity for the proposed hotel development is expected to be completed over approximately a 24-month period and will involve the grading and construction of new retaining walls, utilities, stormwater management measures, parking lots, driveways, landscaping, and other physical improvements.

2. Construction Refuse Control

   All contractors working on the site will provide adequate trash containment services for the construction site at the start of work to maintain a clean, debris-free work area. Typical facilities may be covered containers with openings three inches or smaller or approved equal and will be emptied on a regular basis. Refuse will be removed from site via a solid-waste contractor and be recycled or disposed of per Federal, State, and local requirements. Refuse will not be disposed on site.

C. Erosion and Sediment Control

1. Temporary Practices

   Temporary structures and practices, as described and shown on the Erosion & Sediment Control Plan drawings, will be installed and maintained throughout the duration of the project's construction. As required by the General Permit, structures and practices located in disturbed areas of the site will be inspected by a Qualified Inspector at least once every seven calendar days. Areas of the site that have been finally stabilized will be inspected at least every month until the entire site has been finally stabilized. Following each inspection, the Qualified Inspector is required to document their inspection in a certified inspection report as outlined in the General Permit. Based on the results of the inspections, appropriate revisions to the SWPPP and its implementation will be completed within seven calendar days following the inspection.

2. Permanent Structures

   Permanent structures and measures implemented and maintained daily to control the project's quantity and/or the quality of the stormwater will require regular inspections and maintenance. These include permanent erosion control practices (soil stabilization), water quality control practices (i.e., subsurface infiltration and detention system, including pretreatment structure), and related stormwater flow controlling structures (i.e., catch basins). The project sponsor will be responsible for inspecting and maintaining permanent stormwater management structures and practices.

3. Inspection and Maintenance Procedures

   A Trained Contractor is required to ensure that the erosion and sediment control practices and pollution prevention measures are being implemented daily within the active work area. As required in the General Permit, site observations are to be performed by a Qualified Inspector at least once every seven (7) calendar days when soil disturbance is less than five (5) acres, and twice every seven (7) calendar days when soil disturbance in greater than five (5) acres. A minimum

of two (2) full calendar days must separate regular inspections. Proposed site disturbance for the proposed hotel development will not exceed 5 acres.

Compliance with the General Permit includes, but is not limited to, completing the following activities:

a. Retaining a copy of the SWPPP including text, appendices, and drawings at the site until the date of final stabilization;
b. Posting a copy of the NOI and a project description at the construction site for public viewing;
c. Maintaining the SWPPP current;
d. Submitting a certified Notice of Termination (NOT) when the site has finally been stabilized and discharges from construction activities have been eliminated;
e. Maintaining a copy of the SWPPP by the operator for three years following the date of final stabilization.

D. Appendices

1. Drainage Area Maps – Pre- and Post-Development Conditions; SMP Design Sections
2. DTS Provident Subsurface Soils Investigation – Stormwater Management Area Evaluation – April 20, 2023
3. Calculations – Water Quality Volume (WQv), Minimum Runoff Reduction Volume (RRv)
4. Sizing Calculations – Subsurface Infiltration and Detention System, SMP WQv Provided
5. HydroCAD Report – Pre-Development Conditions
6. HydroCAD Report – Post -Development Conditions

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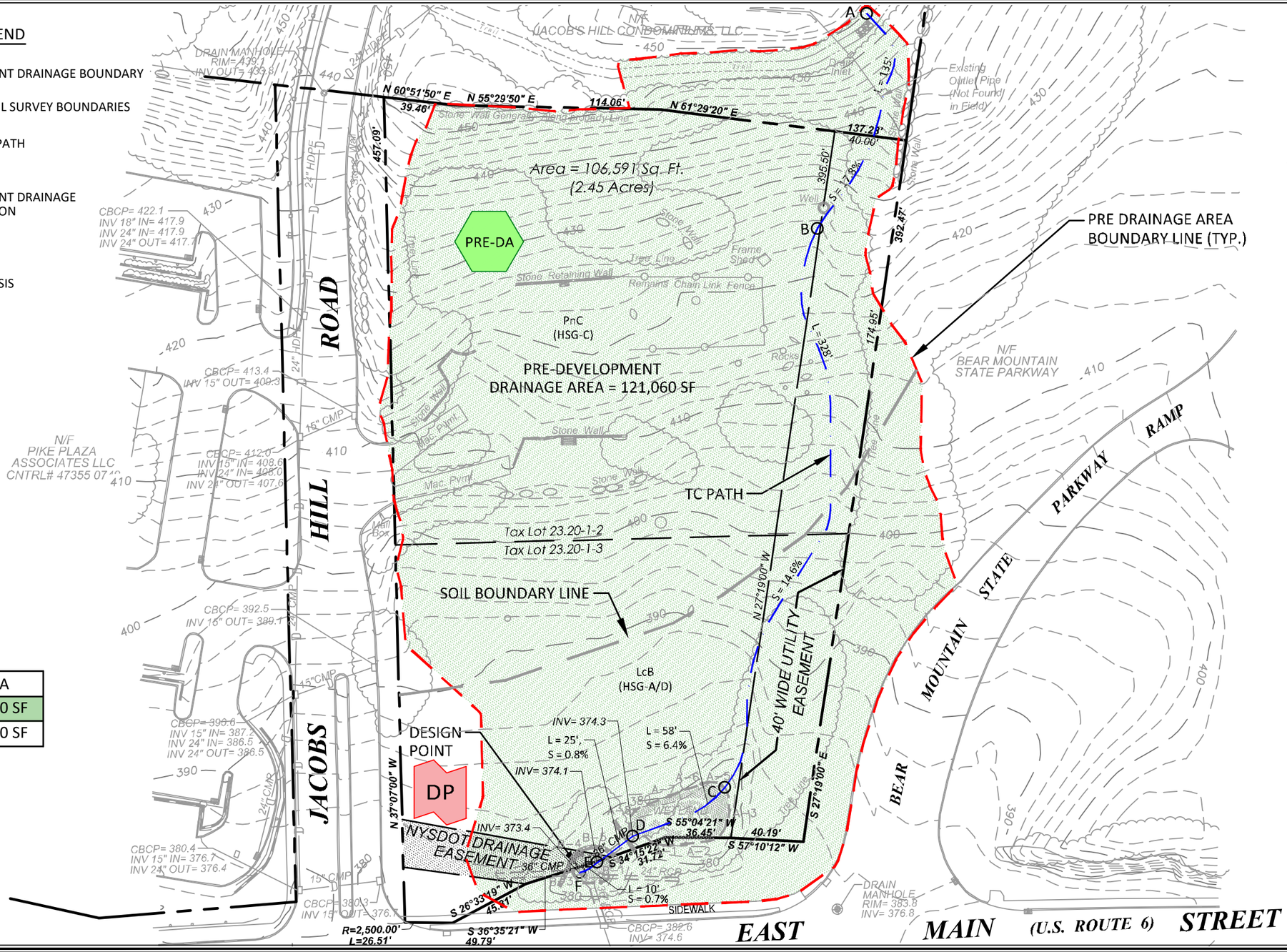
APPENDIX D1

DRAINAGE AREA MAPS - PRE- AND POST-DEVELOPMENT CONDITIONS
SMP DESIGN SECTIONS

PRE DRAINAGE MAP LEGEND

- PRE DEVELOPMENT DRAINAGE BOUNDARY
- SITE SPECIFIC SOIL SURVEY BOUNDARIES
- LONGEST FLOW PATH
- PRE-DA — PRE DEVELOPMENT DRAINAGE AREA DESIGNATION
- DP — POINT OF ANALYSIS

CATEGORY	AREA
PRE-DEV D.A.	121,060 SF
TOTAL	121,060 SF



DTS PROVIDENT Intelligent Land Use

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Pre-Development Drainage Map
Cortlandt Manor Hotel
2054 East Main Street
Town of Cortlandt

Project No. 1021
Scale: 1" = 60'
May 2023

Pre-Development Drainage Map
Figure No. DA-101

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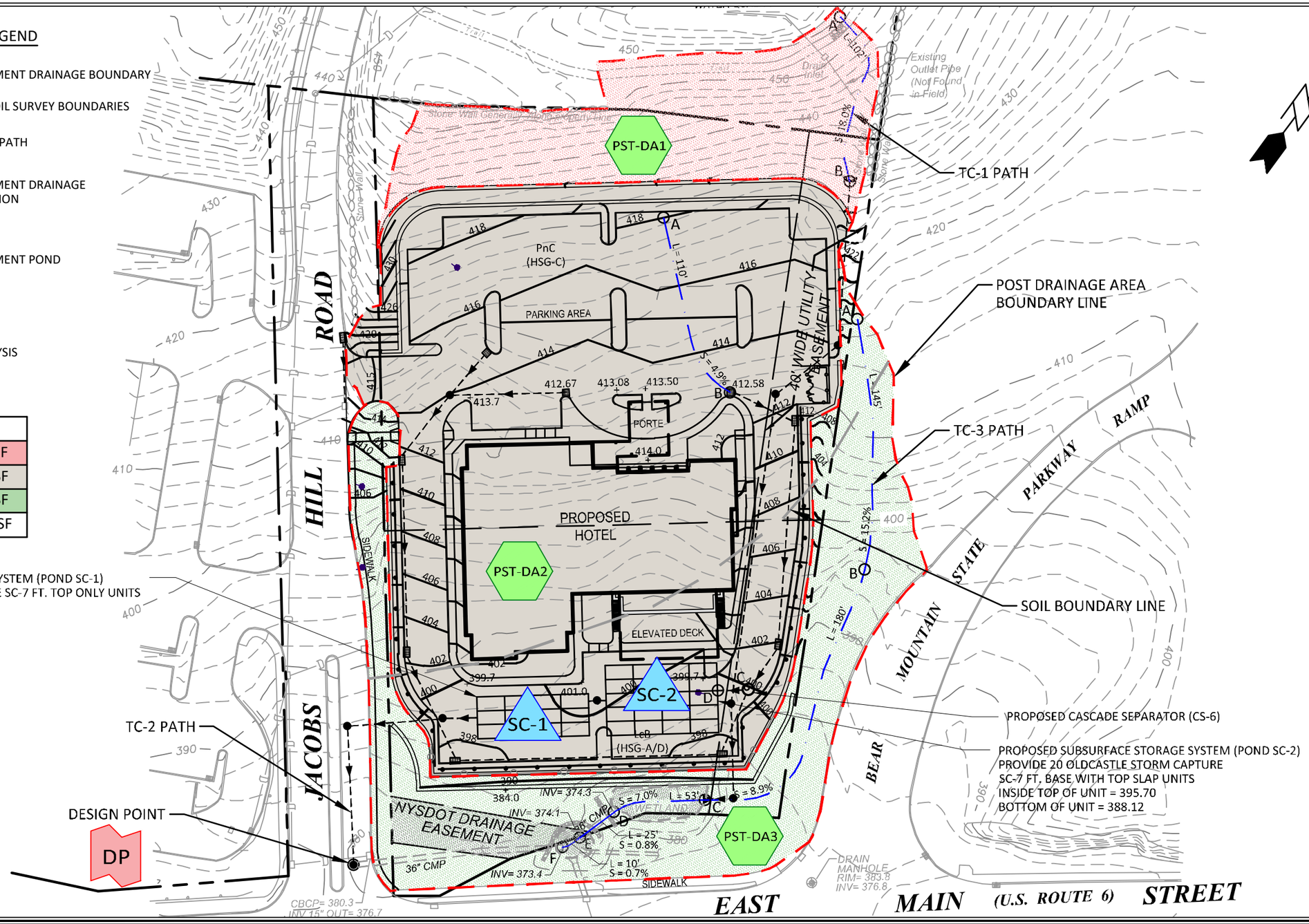
POST-DRAINAGE MAP LEGEND

- POST-DEVELOPMENT DRAINAGE BOUNDARY
- SITE SPECIFIC SOIL SURVEY BOUNDARIES
- LONGEST FLOW PATH
- PST-DA — POST-DEVELOPMENT DRAINAGE AREA DESIGNATION
- SC — POST-DEVELOPMENT POND DESIGNATION
- DP — POINT OF ANALYSIS

CATEGORY	AREA
POST-DEV D.A.-1	18,107 SF
POST-DEV D.A.-2	82,027 SF
POST-DEV D.A.-3	31,546 SF
TOTAL	131,680 SF

PROPOSED SUBSURFACE INFILTRATION SYSTEM (POND SC-1)
PROVIDE 12 OLDCASTLE STORM CAPTURE SC-7 FT. TOP ONLY UNITS
INSIDE TOP OF UNIT = 390.50
BOTTOM OF UNIT = 383.50
BOTTOM OF GRAVEL BED = 382.50



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DTS Provident Design Engineering, LLP
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Post-Development Drainage Map
Cortlandt Manor Hotel
2054 East Main Street
Town of Cortlandt

Project No. 1021
Scale: 1" = 60'
May 2023

Post-Development Drainage Map
Figure No. DA-102

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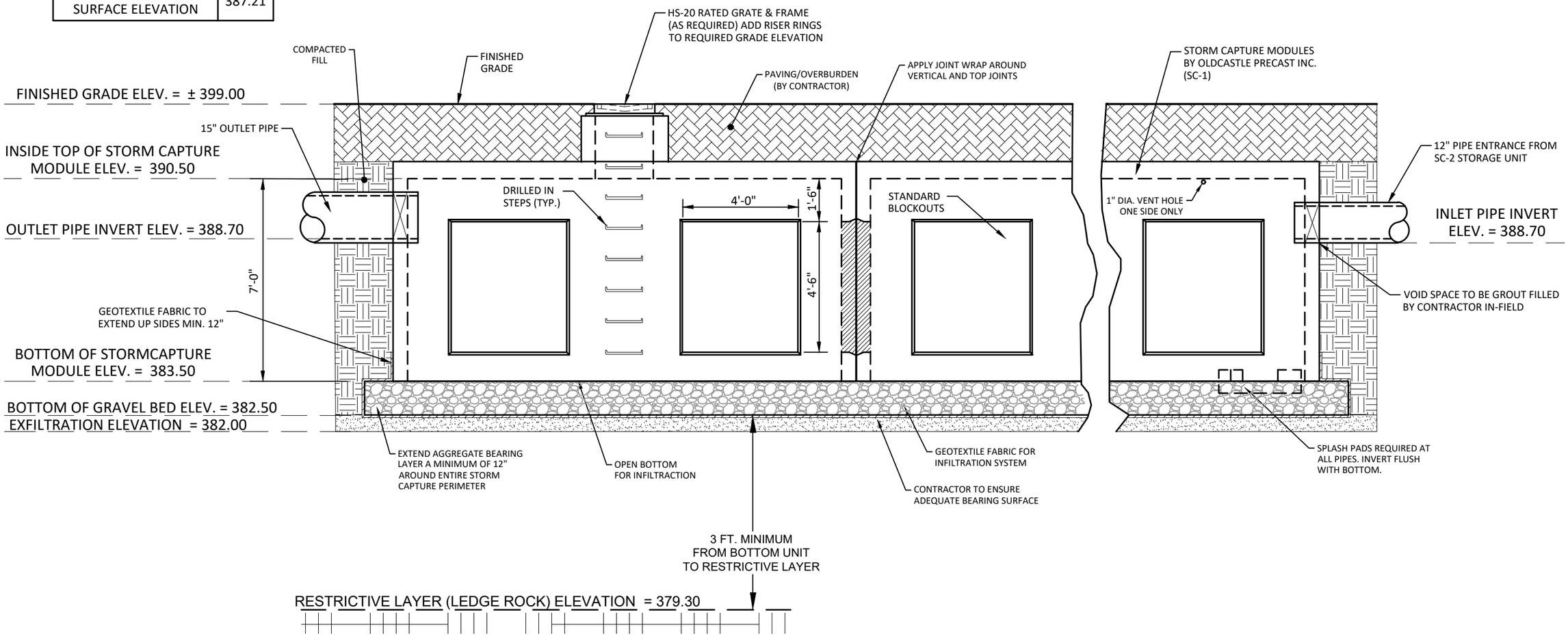
POST-DEVELOPMENT	
100 YEAR PEAK WATER SURFACE ELEVATION	390.50
10 YEAR PEAK WATER SURFACE ELEVATION	389.65
1 YEAR PEAK WATER SURFACE ELEVATION	387.21



STORMCAPTURE © EXFILTRATION (SC-1) SECTION DETAIL

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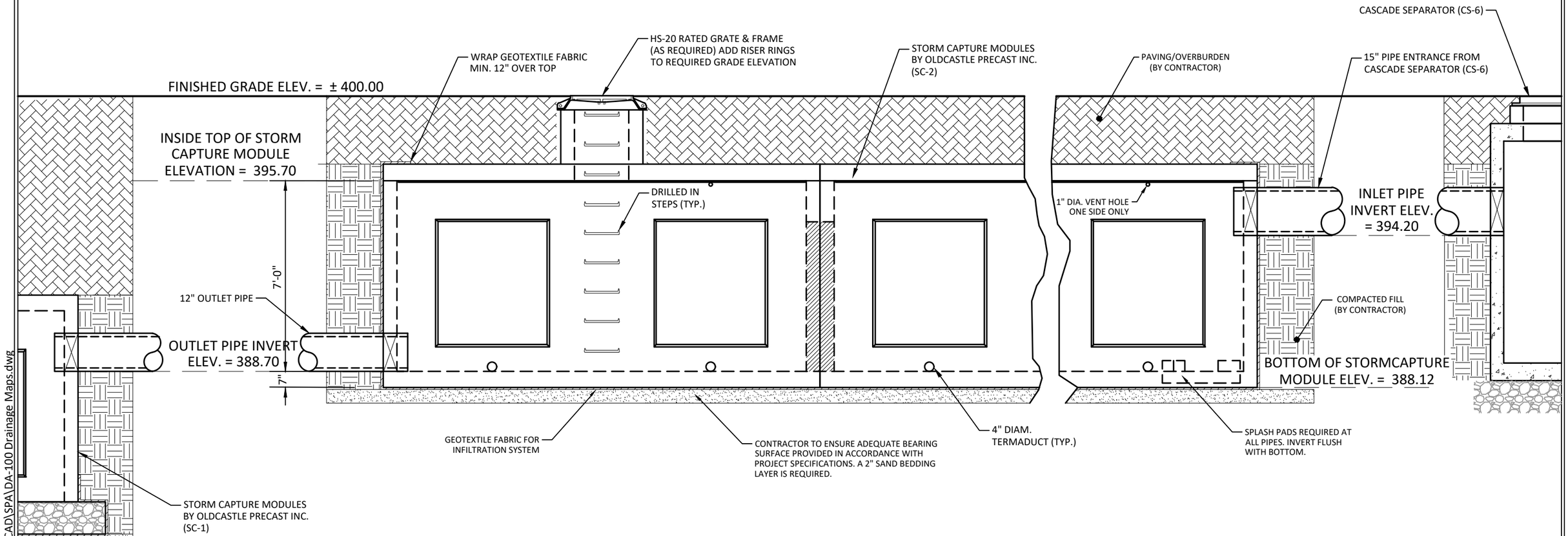
Cortlandt Manor Hotel
2054 East Main Street
Town of Cortlandt

Project No. 1021
Scale: N.T.S.
May 2023

Post-Development Condition
for Stormwater System
Figure No. DA-103

POST-DEVELOPMENT	
100 YEAR PEAK WATER SURFACE ELEVATION	393.70
10 YEAR PEAK WATER SURFACE ELEVATION	391.11
1 YEAR PEAK WATER SURFACE ELEVATION	390.07

NOTE:
TERMADUCT INSERTS TO BE KNOCKED OUT AT SPECIFIED LOCATIONS ONLY



STORMCAPTURE © STORAGE (SC-2)
SECTION DETAIL

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Cortlandt Manor Hotel
2054 East Main Street
Town of Cortlandt

Project No. 1021
Scale: N.T.S.
May 2023

Post-Development Condition
for Stormwater System
Figure No. DA-104

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APPENDIX D2

DTS PROVIDENT SUBSURFACE SOILS INVESTIGATION
STORMWATER MANAGEMENT AREA EVALUATION – APRIL 20, 2023

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTENERED IN TEST HOLE

DEPTH	HOLE NO: DTP - 1	HOLE NO: DTP-2	HOLE NO: DTP-3	HOLE NO: DTP-4
G.L	Lawn	Lawn	Lawn	Lawn
0'-6"	Topsoil	Topsoil	Topsoil	Topsoil
1'-0"	Loose Comp Fine Sand & Loam	Fine Sandy Loam w/Traces of Silts	Fine Sandy Loam	Brown Sandy Loam
1'-6"	|	|	Total Depth = 18"	|
2'-0"	Mod Comp Sandy Fine Sands w/ Cobbles	Mod Comp Fine to Med Sandy Loam	Ledge	|
2'-6"	I	|		Gray Tightly Comp Loamy Sand & Silt
3'-0"	I	|		|
3'-6"	Total Depth = 40"	|		|
4'-0"	Ledge	Total Depth = 50"		|
4'-6"		Ledge		Mod Comp Fine to Med Sandy Loam
5'-0"				|
5'-6"				|
6'-0"				|
6'-6"				Total Depth = 80"
7'-0"				Ledge
7'-6"				
8'-0"				
8'-6"				
9'-0"				
9'-6"				
10'-0"				

WAS GROUND WATER ENCOUNTERED? No

INDICATE LEVEL AT WHICH GROUND WATER WAS ENCOUNTERED: N/A

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED: N/A

DEEP TEST MADE BY: **DTS Provident Design Engineering LLP** DATE OF DEEP TESTS: **4/20/2023**

PROJECT NAME: **Cortlandt Manor Hotel** LOCATION: **Cortlandt (T)**

Design Professional Name: **Peter J. Gregory, P.E.** Signature: _____

Address: **One North Broadway, Suite 1407**

White Plains, New York 10601 Seal:

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION

DESCRIPTION OF SOILS ENCOUNTENERED IN TEST HOLE

DEPTH	HOLE NO: DTP - 5	HOLE NO: DTP-6	HOLE NO: DTP-7	
G.L	Lawn	Lawn	Lawn	
0'-6"	Topsoil	Topsoil	Topsoil	
1'-0"	Loose Brown Loam & Fine Sands w/Rock Fragments	Loose Fine Sandy Loam	Mod Comp Sandy Loam w/Rock Fragments	
1'-6"	I	Mod Comp Fine to Med Sandy Loam w/Few Boulders	I	
2'-0"	I	I	I	
2'-6"	I	I	I	
3'-0"	I	I	I	
3'-6"	I	I	I	
4'-0"	Gray Compacted Sand	I	I	
4'-6"	Mod Comp Fine to Med Sand w/Some Silt	I	I	
5'-0"	I	I	I	
5'-6"	I	I	I	
6'-0"	I	Total Depth = 74"	Brown Silty Loam w/Fine Sands	
6'-6"	I	Ledge	I	
7'-0"	I		I	
7'-6"	Ground Water		I	
8'-0"	Total Depth = 96"		Total Depth = 100"	
8'-6"				
9'-0"				
9'-6"				
10'-0"				

WAS GROUND WATER ENCOUNTERED? Yes

INDICATE LEVEL AT WHICH GROUND WATER WAS ENCOUNTERED: 90"

INDICATE LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED: 90"

DEEP TEST MADE BY:	**DTS Provident Design Engineering LLP**	DATE OF DEEP TESTS:	**4/20/2023**
PROJECT NAME:	**Cortlandt Manor Hotel**	LOCATION:	**Cortlandt (T)**

Design Professional Name: **Peter J. Gregory, P.E.**

Address: **One North Broadway, Suite 1407**
White Plains, New York 10601

Signature: _____

Seal:

INFILTRATION TESTING
DATA SHEET

Project Name:	**Cortlandt Manor Hotel**	Municipality:	**Town of Cortlandt**
Owner:	**Bilal Ahmad**	Watershed:	**Hudson River Basin**
Address:	**116 Courtyard Drive, Oneonta NY 13820**	Sec/Bl/Lot:	**23.20 / 1 / 2 & 3**
Date:	**April 20, 2023**	Weather:	**Sunny, 55° F**
Notes:	**Percolation Test performed at 34"**		

TEST #		CLOCK TIME				INFILTRATION RATE			
	Run #	Start	Stop	Elapse Time		Depth to Water from Top of Casing		Drop	Infiltration Rate
		HH:MM	HH:MM	Mins	Hours	Start In.'s	Stop In's	Inches	Inches/Hour
	1	11:13	12:13	60	1.000	34	57	23	23.00
PT-1	2	12:14	13:14	60	1.000	34	56	22	22.00
	3	13:14	14:14	60	1.000	34	56	22	22.00
Depth of Infiltration Testing: 24"									

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APPENDIX D3

CALCULATIONS
WATER QUALITY VOLUME (WQV)
MINIMUM RUNOFF REDUCTION VOLUME (RRV)

DTS Provident Design Engineering, LLP

Project:	**Cortlandt Manor Hotel**	**Project No.:**	**1021**
		Date:	**5/30/2023**
Subject:	**Water Quality Volume**		
	NYSDEC Methodology	**Comp. By:**	**PJG**
	Drainage Area: PST-DA2		
		Chckd. By:	**CSH**

Water Quality Volume, WQv

$$WQv = \frac{(P)\,(Rv)\,(A)}{12}$$

Where:

P	=	90% Rainfall Event Number (Figure 4.1, NYSDEC Design Manual)	
A	=	Site area in acres (onsite)	= 82,027 S.F.
Ai	=	Site impervious area in acres (onsite)	= 70,003 S.F.
I	=	Percent of impervious cover, proposed	
Rv	=	0.05 + 0.009 * I	
WQv	=	Required water quality volume (acre-feet)	

Parameter						
P (in.)	**Ai (acres)**	**A (acres)**	**I (%)**	**Rv**	**Water Quality Volume**	
					(Acre-ft)	**(Cu. Ft.)**
1.45	1.61	1.88	85.3	0.82	0.186	8,108

Peak Water Quality Discharge Rate

Where:

Runoff (Qa)	=	WQv/Area
CN	=	1000/[10 + 5P + 10Qa - 10(Qa^2 + 1.25*Qa*P)^1/2]
Ia	=	200/CN - 2
Tc	=	Time of Concentration
qu	=	From Fig. 15 - Peak Discharge Curves for NRCC Distribution - NY EFH-2 Supplement 2
Qwq	=	qu*A*Qa

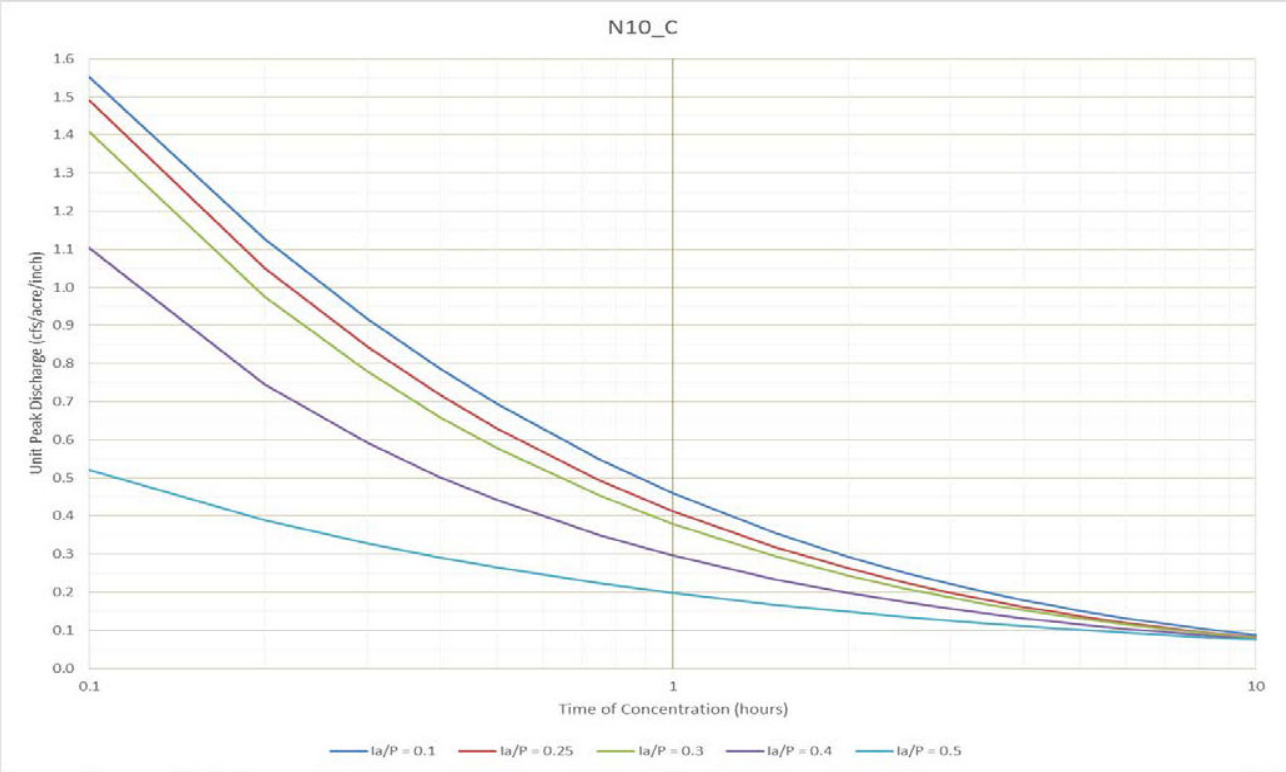
Runoff (Qa) (in.)	**CN**	**Ia**	**Ia/P**	**Tc (hrs)**	**qu (cfs/ac/in)**	**qu (csm/in)**	**Qwq (cfs)**
1.19	97.5	0.050	0.035	0.10	1.53	979	3.42

Reference: NYSDEC Stormwater Management Design Manual

Hydrodynamic Device Selection/Specs (for Pretreatment)

Structure I.D.	**Manufacturer/Model No.**	**Max Treated Flow Rate (cfs)**	**Qwq as % of Max Treated**	**Avg. TSS Removal (%)**	**Annual TSS Removal (%)**
WQS-1	**CES/Cascade Separator CS-6**	4.05	84%	50%	
	Total	4.05	> Qwq =	3.42	

Figure 15: EFH-2 Peak Discharge Curves for N10_C



N10_C Rainfall Distribution Coefficients Database

Ia/p	Coeff 1	Coeff 2	Coeff 3
0.1	2.4686	-0.623	-0.0944
0.25	2.4218	-0.6325	-0.0746
0.3	2.3858	-0.624	-0.0551
0.4	2.2776	-0.5792	-0.0077
0.5	2.1034	-0.4198	-0.0001

Ref: New York Engineeering Field Handbook-2 Supplement Number 2 (August 24, 2016)

Multiply Unit Peak Discharge (cfs/acre/inch) by 640 acre/mi^2 for UPD (cfs/mi^2/inch)

Table 4-1 I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	70	0.857
41	2.878	71	0.817
42	2.762	72	0.778
43	2.651	73	0.740
44	2.545	74	0.703
45	2.444	75	0.667
46	2.348	76	0.632
47	2.255	77	0.597
48	2.167	78	0.564
49	2.082	79	0.532
50	2.000	80	0.500
51	1.922	81	0.469
52	1.846	82	0.439
53	1.774	83	0.410
54	1.704	84	0.381
55	1.636	85	0.353
56	1.571	86	0.326
57	1.509	87	0.299
58	1.448	88	0.273
59	1.390	89	0.247
60	1.333	90	0.222
61	1.279	91	0.198
62	1.226	92	0.174
63	1.175	93	0.151
64	1.125	94	0.128
65	1.077	95	0.105
66	1.030	96	0.083
67	0.985	97	0.062
68	0.941	98	0.041
69	0.899		

Ref: Table 4.1 TR-55- Urban Hydrology for Urban Watersheds

DTS Provident Design Engineering, LLP

Project:	**Cortlandt Manor Hotel**	**Project No.:**	**1021**
		Date:	**5/30/2023**
Subject:	**Minimum (Target) Runoff Reduction Volume $(RRv)_{min}$**	**Comp. By:**	**CSH**
		Chckd. By:	**PJG**

Minimum Runoff Reduction Volume

$$(RRv)_{min} = \frac{(P)(Rv^*)(Aic)(S)}{12}$$

Where:

P = 90% Storm Rainfall = 1.45 in

(A*ic*) = Total area of new impervious cover

Rv* = 0.05 + 0.009 * I where I is 100% impervious = 0.95

S = Hydrologic Soil Group (HSG) Specific Reduction Factor (S)

Drainage Area	Soil Type	S	Proposed Impervious Area (acres)	Existing Impervious Area (acres)	A*ic* (1) (acres)	(A*ic*)(S)	Total A*ic* (1) (acres)	Weighted S	Total (A*ic*)(S)(2)	Minimum RRv(1)	
										(Acre-ft)	(Cu. Ft.)
PST-DA2	A	0.55	0.00	0.00	0.00	0.00	1.58	0.28	0.44	0.050	2,190
	B	0.40	0.00	0.00	0.00	0.00					
	C	0.30	1.25	0.03	1.22	0.37					
	D	0.20	0.36	0.00	0.36	0.07					
Totals			**1.61**	**0.03**	**1.58**	**0.44**	**1.58**	**-**	**0.44**	**0.050**	**2,190**

Notes:

(1) Negative Values for the subarea denote a reduction (i.e. NO increase) in impervious area from existing conditions to proposed conditions.

(2) Negative Values for the subarea default to zero, i.e. no $(RRv)_{min}$ required for the subarea.

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APPENDIX D4

SIZING CALCULATIONS
SUBSURFACE INFILTRATION AND DETENTION SYSTEM
SMP WQV PROVIDED

Summary for Pond SC-1: Infiltration System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 2.24" for 1-Year C event
Inflow = 2.85 cfs @ 12.21 hrs, Volume= 15,280 cf
Outflow = 0.33 cfs @ 11.29 hrs, Volume= 15,280 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.33 cfs @ 11.29 hrs, Volume= 15,280 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 387.21' @ 13.43 hrs Surf.Area= 1,782 sf Storage= 5,989 cf

Plug-Flow detention time= 137.6 min calculated for 15,275 cf (100% of inflow)
Center-of-Mass det. time= 137.5 min (931.2 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	382.50'	1,459 cf	**27.00'W x 66.00'L x 8.58'H Field A** 15,295 cf Overall - 11,648 cf Embedded = 3,647 cf x 40.0% Voids
#2A	383.50'	9,270 cf	**Oldcastle StormCapture SC1 7'** x 12 Inside #1 Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf 3 Rows adjusted for 198.0 cf perimeter wall
		10,729 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.55' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	382.50'	**8.000 in/hr Exfiltration over Surface area from 382.00' - 382.50'** Excluded Surface area = 0 sf Phase-In= 0.01'

Discarded OutFlow Max=0.33 cfs @ 11.29 hrs HW=382.59' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=382.50' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond SC-1: Infiltration System - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 7' (Oldcastle StormCapture® SC1)
Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf
Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf
3 Rows adjusted for 198.0 cf perimeter wall

96.0" Wide + 6.0" Spacing = 102.0" C-C Row Spacing

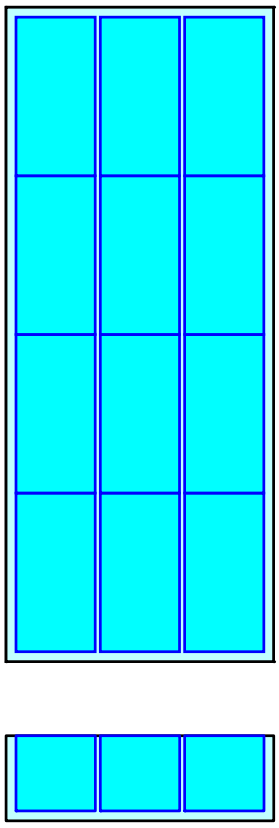
4 Chambers/Row x 16.00' Long = 64.00' Row Length +12.0" End Stone x 2 = 66.00' Base Length
3 Rows x 96.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 27.00' Base Width
12.0" Base + 91.0" Chamber Height = 8.58' Field Height

18.0 cf Sidewall x 4 x 2 + 9.0 cf Endwall x 3 x 2 = 198.0 cf Perimeter Wall
12 Chambers x 789.0 cf - 198.0 cf Perimeter wall = 9,270.0 cf Chamber Storage
12 Chambers x 970.7 cf = 11,648.0 cf Displacement

15,295.5 cf Field - 11,648.0 cf Chambers = 3,647.5 cf Stone x 40.0% Voids = 1,459.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,729.0 cf = 0.246 af
Overall Storage Efficiency = 70.1%
Overall System Size = 66.00' x 27.00' x 8.58'

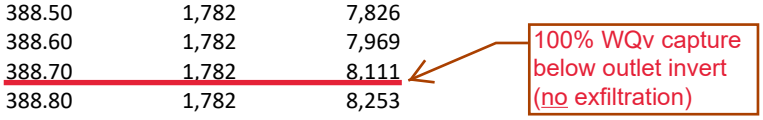
12 Chambers
566.5 cy Field
135.1 cy Stone



Stage-Area-Storage for Pond SC-1: Infiltration System

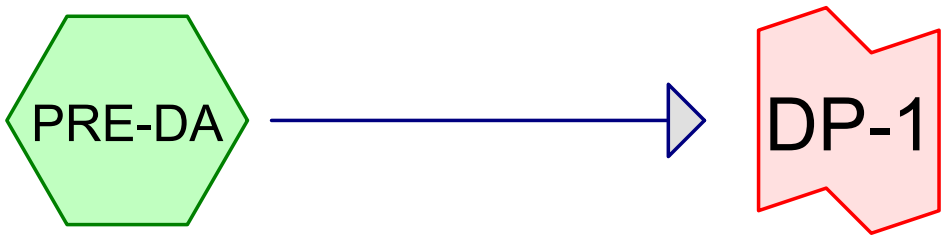
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
382.50	**1,782**	0
382.60	1,782	71
382.70	1,782	143
382.80	1,782	214
382.90	1,782	285
383.00	1,782	356
383.10	1,782	428
383.20	1,782	499
383.30	1,782	570
383.40	1,782	642
383.50	1,782	713
383.60	1,782	855
383.70	1,782	997
383.80	1,782	1,140
383.90	1,782	1,282
384.00	1,782	1,424
384.10	1,782	1,566
384.20	1,782	1,709
384.30	1,782	1,851
384.40	1,782	1,993
384.50	1,782	2,135
384.60	1,782	2,278
384.70	1,782	2,420
384.80	1,782	2,562
384.90	1,782	2,705
385.00	1,782	2,847
385.10	1,782	2,989
385.20	1,782	3,131
385.30	1,782	3,274
385.40	1,782	3,416
385.50	1,782	3,558
385.60	1,782	3,700
385.70	1,782	3,843
385.80	1,782	3,985
385.90	1,782	4,127
386.00	1,782	4,270
386.10	1,782	4,412
386.20	1,782	4,554
386.30	1,782	4,696
386.40	1,782	4,839
386.50	1,782	4,981
386.60	1,782	5,123
386.70	1,782	5,265
386.80	1,782	5,408
386.90	1,782	5,550
387.00	1,782	5,692
387.10	1,782	5,834
387.20	1,782	5,977
387.30	1,782	6,119
387.40	1,782	6,261
387.50	1,782	6,404
387.60	1,782	6,546
387.70	1,782	6,688
387.80	1,782	6,830
387.90	1,782	6,973

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
388.00	1,782	7,115
388.10	1,782	7,257
388.20	1,782	7,399
388.30	1,782	7,542
388.40	1,782	7,684
388.50	1,782	7,826
388.60	1,782	7,969
388.70	1,782	8,111
388.80	1,782	8,253
388.90	1,782	8,395
389.00	1,782	8,538
389.10	1,782	8,680
389.20	1,782	8,822
389.30	1,782	8,964
389.40	1,782	9,107
389.50	1,782	9,249
389.60	1,782	9,391
389.70	1,782	9,533
389.80	1,782	9,676
389.90	1,782	9,818
390.00	1,782	9,960
390.10	1,782	10,103
390.20	1,782	10,245
390.30	1,782	10,387
390.40	1,782	10,529
390.50	1,782	10,672
390.60	1,782	10,681
390.70	1,782	10,691
390.80	1,782	10,701
390.90	1,782	10,711
391.00	1,782	**10,721**



APPENDIX D5

HYDROCAD REPORT – PRE-DEVELOPMENT CONDITIONS



Pre-Development Drainage Area

Design Point #1

Subcat Reach Pond Link

Routing Diagram for Pre Development
Prepared by DTS Provident Design Engineering, LLP, Printed 5/30/2023
HydroCAD® 10.00-25 s/n 06251 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment PRE-DA: Pre-Development Drainage Area

Runoff = 2.14 cfs @ 12.32 hrs, Volume= 10,394 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 1-Year C Rainfall=2.78"

	Area (sf)	CN	Description
	27,613	73	Woods, Fair, HSG C
	19,243	79	Woods, Fair, HSG D
	52,413	79	50-75% Grass cover, Fair, HSG C
	19,218	84	50-75% Grass cover, Fair, HSG D
*	1,364	98	Wetlands, HSG D
*	28	98	Shed
*	1,181	98	Driveway Remains
	121,060	79	Weighted Average
	118,487		97.87% Pervious Area
	2,573		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Link DP-1: Design Point #1

Inflow Area = 121,060 sf, 2.13% Impervious, Inflow Depth = 1.03" for 1-Year C event
Inflow = 2.14 cfs @ 12.32 hrs, Volume= 10,394 cf
Primary = 2.14 cfs @ 12.32 hrs, Volume= 10,394 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment PRE-DA: Pre-Development Drainage Area

Runoff = 6.25 cfs @ 12.32 hrs, Volume= 29,396 cf, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 10-Year C Rainfall=5.13"

	Area (sf)	CN	Description
	27,613	73	Woods, Fair, HSG C
	19,243	79	Woods, Fair, HSG D
	52,413	79	50-75% Grass cover, Fair, HSG C
	19,218	84	50-75% Grass cover, Fair, HSG D
*	1,364	98	Wetlands, HSG D
*	28	98	Shed
*	1,181	98	Driveway Remains
	121,060	79	Weighted Average
	118,487		97.87% Pervious Area
	2,573		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Link DP-1: Design Point #1

Inflow Area = 121,060 sf, 2.13% Impervious, Inflow Depth = 2.91" for 10-Year C event
Inflow = 6.25 cfs @ 12.32 hrs, Volume= 29,396 cf
Primary = 6.25 cfs @ 12.32 hrs, Volume= 29,396 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment PRE-DA: Pre-Development Drainage Area

Runoff = 8.79 cfs @ 12.32 hrs, Volume= 41,566 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 25-Year C Rainfall=6.49"

	Area (sf)	CN	Description
	27,613	73	Woods, Fair, HSG C
	19,243	79	Woods, Fair, HSG D
	52,413	79	50-75% Grass cover, Fair, HSG C
	19,218	84	50-75% Grass cover, Fair, HSG D
*	1,364	98	Wetlands, HSG D
*	28	98	Shed
*	1,181	98	Driveway Remains
	121,060	79	Weighted Average
	118,487		97.87% Pervious Area
	2,573		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Link DP-1: Design Point #1

Inflow Area = 121,060 sf, 2.13% Impervious, Inflow Depth = 4.12" for 25-Year C event
Inflow = 8.79 cfs @ 12.32 hrs, Volume= 41,566 cf
Primary = 8.79 cfs @ 12.32 hrs, Volume= 41,566 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment PRE-DA: Pre-Development Drainage Area

Runoff = 14.08 cfs @ 12.31 hrs, Volume= 67,689 cf, Depth= 6.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 100-Year C Rainfall=9.28"

	Area (sf)	CN	Description
	27,613	73	Woods, Fair, HSG C
	19,243	79	Woods, Fair, HSG D
	52,413	79	50-75% Grass cover, Fair, HSG C
	19,218	84	50-75% Grass cover, Fair, HSG D
*	1,364	98	Wetlands, HSG D
*	28	98	Shed
*	1,181	98	Driveway Remains
	121,060	79	Weighted Average
	118,487		97.87% Pervious Area
	2,573		2.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

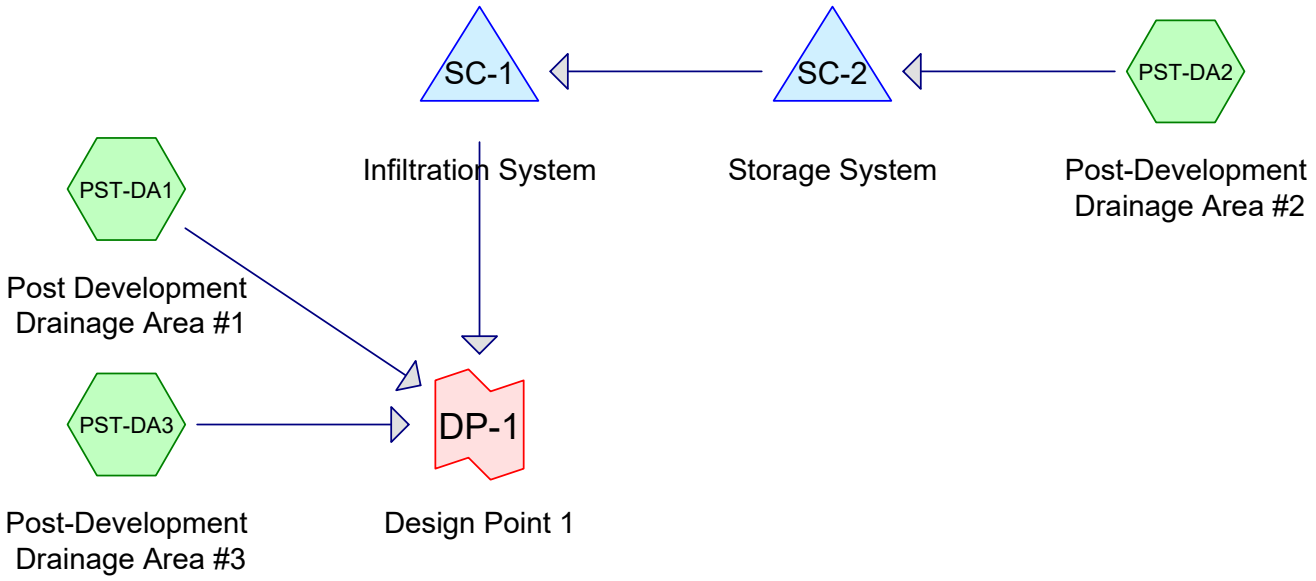
Summary for Link DP-1: Design Point #1

Inflow Area = 121,060 sf, 2.13% Impervious, Inflow Depth = 6.71" for 100-Year C event
Inflow = 14.08 cfs @ 12.31 hrs, Volume= 67,689 cf
Primary = 14.08 cfs @ 12.31 hrs, Volume= 67,689 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

APPENDIX D6

HYDROCAD REPORT – POST-DEVELOPMENT CONDITIONS



Subcat Reach Pond Link

Routing Diagram for Post Development
Prepared by DTS Provident Design Engineering, LLP, Printed 5/30/2023
HydroCAD® 10.00-25 s/n 06251 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment PST-DA1: Post Development Drainage Area #1

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 1,094 cf, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 1-Year C Rainfall=2.78"

Area (sf)	CN	Description
16,950	73	Woods, Fair, HSG C
1,157	79	50-75% Grass cover, Fair, HSG C
18,107	73	Weighted Average
18,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.1800	2.12		**Shallow Concentrated Flow, AB**
					Woodland Kv= 5.0 fps
2.4	57	0.1930	0.39		**Sheet Flow, BC**
					Grass: Short n= 0.150 P2= 3.41"
3.2	157	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA2: Post-Development Drainage Area #2

Runoff = 4.98 cfs @ 12.13 hrs, Volume= 15,277 cf, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 1-Year C Rainfall=2.78"

	Area (sf)	CN	Description
*	14,883	98	Roofs, HSG C
*	2,291	98	Roofs, HSG D
*	33,315	98	Paved parking & driveways, HSG C
*	11,560	98	Paved parking & driveways, HSG D
*	4,102	98	Sidewalks & ramps, HSG C
*	1,146	98	Sidewalks & ramps, HSG D
*	1,888	98	Concrete Walls, HSG C
*	818	98	Concrete Walls, HSG D
	8,045	79	50-75% Grass cover, Fair, HSG C
	3,979	84	50-75% Grass cover, Fair, HSG D
	82,027	95	Weighted Average
	12,024		14.66% Pervious Area
	70,003		85.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	110	0.0490	4.49		**Shallow Concentrated Flow, AB**
					Paved Kv= 20.3 fps
0.2	212	0.0550	16.05	19.69	**Pipe Channel, BC**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.0	9	0.0100	6.84	8.40	**Pipe Channel, CD**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.6	331	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA3: Post-Development Drainage Area #3

Runoff = 0.71 cfs @ 12.32 hrs, Volume= 3,343 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 1-Year C Rainfall=2.78"

	Area (sf)	CN	Description
	9,532	79	Woods, Fair, HSG D
	1,468	73	Woods, Fair, HSG C
	15,304	84	50-75% Grass cover, Fair, HSG D
	2,422	79	50-75% Grass cover, Fair, HSG C
*	1,202	98	Wetlands/Water Surface, HSG D
*	1,040	98	Concrete Walkway, HSG C
*	578	98	Concrete Wall
	31,546	83	Weighted Average
	28,726		91.06% Pervious Area
	2,820		8.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Pond SC-1: Infiltration System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 2.24" for 1-Year C event
Inflow = 2.85 cfs @ 12.21 hrs, Volume= 15,280 cf
Outflow = 0.33 cfs @ 11.29 hrs, Volume= 15,280 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.33 cfs @ 11.29 hrs, Volume= 15,280 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 387.21' @ 13.43 hrs Surf.Area= 1,782 sf Storage= 5,989 cf

Plug-Flow detention time= 137.6 min calculated for 15,275 cf (100% of inflow)
Center-of-Mass det. time= 137.5 min (931.2 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	382.50'	1,459 cf	**27.00'W x 66.00'L x 8.58'H Field A** 15,295 cf Overall - 11,648 cf Embedded = 3,647 cf x 40.0% Voids
#2A	383.50'	9,270 cf	**Oldcastle StormCapture SC1 7'** x 12 Inside #1 Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf 3 Rows adjusted for 198.0 cf perimeter wall
		10,729 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.55' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	382.50'	**8.000 in/hr Exfiltration over Surface area from 382.00' - 382.50'** Excluded Surface area = 0 sf Phase-In= 0.01'

Discarded OutFlow Max=0.33 cfs @ 11.29 hrs HW=382.59' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=382.50' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond SC-1: Infiltration System - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 7' (Oldcastle StormCapture® SC1)
Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf
Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf
3 Rows adjusted for 198.0 cf perimeter wall

96.0" Wide + 6.0" Spacing = 102.0" C-C Row Spacing

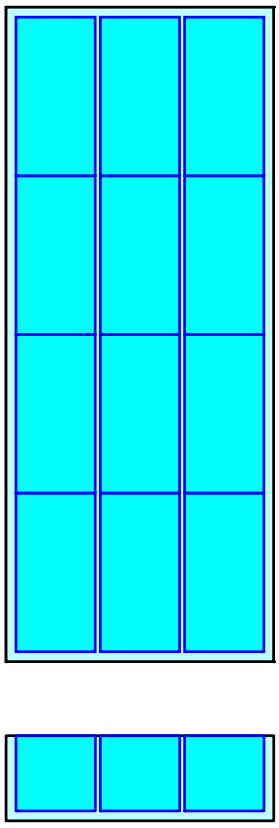
4 Chambers/Row x 16.00' Long = 64.00' Row Length +12.0" End Stone x 2 = 66.00' Base Length
3 Rows x 96.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 27.00' Base Width
12.0" Base + 91.0" Chamber Height = 8.58' Field Height

18.0 cf Sidewall x 4 x 2 + 9.0 cf Endwall x 3 x 2 = 198.0 cf Perimeter Wall
12 Chambers x 789.0 cf - 198.0 cf Perimeter wall = 9,270.0 cf Chamber Storage
12 Chambers x 970.7 cf = 11,648.0 cf Displacement

15,295.5 cf Field - 11,648.0 cf Chambers = 3,647.5 cf Stone x 40.0% Voids = 1,459.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,729.0 cf = 0.246 af
Overall Storage Efficiency = 70.1%
Overall System Size = 66.00' x 27.00' x 8.58'

12 Chambers
566.5 cy Field
135.1 cy Stone



Summary for Pond SC-2: Storage System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 2.23" for 1-Year C event
Inflow = 4.98 cfs @ 12.13 hrs, Volume= 15,277 cf
Outflow = 2.85 cfs @ 12.21 hrs, Volume= 15,280 cf, Atten= 43%, Lag= 4.7 min
Primary = 2.85 cfs @ 12.21 hrs, Volume= 15,280 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 390.07' @ 12.21 hrs Surf.Area= 2,560 sf Storage= 1,756 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.3 min (793.7 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1B	388.70'	0 cf	**40.00'W x 64.00'L x 8.17'H Field B** 20,907 cf Overall - 20,907 cf Embedded = 0 cf x 40.0% Voids
#2B	388.70'	15,606 cf	**Oldcastle StormCapture SC2 7'** x 20 Inside #1 Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf 5 Rows adjusted for 254.0 cf perimeter wall
		15,606 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.70' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.85 cfs @ 12.21 hrs HW=390.07' TW=384.70' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 2.85 cfs @ 3.63 fps)

Pond SC-2: Storage System - Chamber Wizard Field B

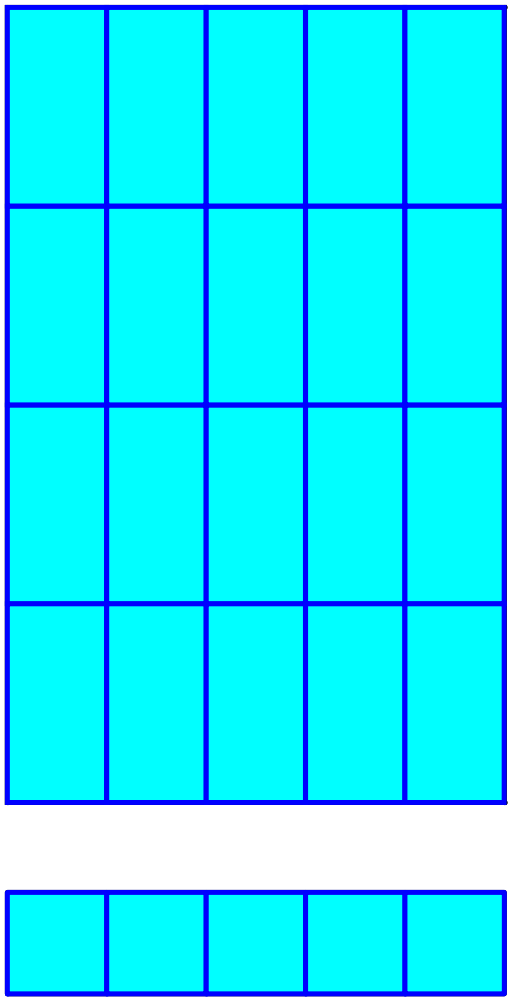
Chamber Model = Oldcastle StormCapture SC2 7' (Oldcastle StormCapture® SC2)
Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf
Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf
5 Rows adjusted for 254.0 cf perimeter wall

4 Chambers/Row x 16.00' Long = 64.00' Row Length
5 Rows x 96.0" Wide = 40.00' Base Width
98.0" Chamber Height = 8.17' Field Height

18.0 cf Sidewall x 4 x 2 + 11.0 cf Endwall x 5 x 2 = 254.0 cf Perimeter Wall
20 Chambers x 793.0 cf - 254.0 cf Perimeter wall = 15,606.0 cf Chamber Storage
20 Chambers x 1,045.3 cf = 20,906.7 cf Displacement

Chamber Storage = 15,606.0 cf = 0.358 af
Overall Storage Efficiency = 74.6%
Overall System Size = 64.00' x 40.00' x 8.17'

20 Chambers
774.3 cy Field



Summary for Link DP-1: Design Point 1

Inflow Area = 131,680 sf, 55.30% Impervious, Inflow Depth = 0.40" for 1-Year C event
Inflow = 0.84 cfs @ 12.30 hrs, Volume= 4,437 cf
Primary = 0.84 cfs @ 12.30 hrs, Volume= 4,437 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment PST-DA1: Post Development Drainage Area #1

Runoff = 1.26 cfs @ 12.13 hrs, Volume= 3,595 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 10-Year C Rainfall=5.13"

Area (sf)	CN	Description
16,950	73	Woods, Fair, HSG C
1,157	79	50-75% Grass cover, Fair, HSG C
18,107	73	Weighted Average
18,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.1800	2.12		**Shallow Concentrated Flow, AB**
					Woodland Kv= 5.0 fps
2.4	57	0.1930	0.39		**Sheet Flow, BC**
					Grass: Short n= 0.150 P2= 3.41"
3.2	157	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA2: Post-Development Drainage Area #2

Runoff = 9.70 cfs @ 12.13 hrs, Volume= 31,090 cf, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 10-Year C Rainfall=5.13"

	Area (sf)	CN	Description
*	14,883	98	Roofs, HSG C
*	2,291	98	Roofs, HSG D
*	33,315	98	Paved parking & driveways, HSG C
*	11,560	98	Paved parking & driveways, HSG D
*	4,102	98	Sidewalks & ramps, HSG C
*	1,146	98	Sidewalks & ramps, HSG D
*	1,888	98	Concrete Walls, HSG C
*	818	98	Concrete Walls, HSG D
	8,045	79	50-75% Grass cover, Fair, HSG C
	3,979	84	50-75% Grass cover, Fair, HSG D
	82,027	95	Weighted Average
	12,024		14.66% Pervious Area
	70,003		85.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	110	0.0490	4.49		**Shallow Concentrated Flow, AB**
					Paved Kv= 20.3 fps
0.2	212	0.0550	16.05	19.69	**Pipe Channel, BC**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.0	9	0.0100	6.84	8.40	**Pipe Channel, CD**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.6	331	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA3: Post-Development Drainage Area #3

Runoff = 1.83 cfs @ 12.32 hrs, Volume= 8,654 cf, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 10-Year C Rainfall=5.13"

	Area (sf)	CN	Description
	9,532	79	Woods, Fair, HSG D
	1,468	73	Woods, Fair, HSG C
	15,304	84	50-75% Grass cover, Fair, HSG D
	2,422	79	50-75% Grass cover, Fair, HSG C
*	1,202	98	Wetlands/Water Surface, HSG D
*	1,040	98	Concrete Walkway, HSG C
*	578	98	Concrete Wall
	31,546	83	Weighted Average
	28,726		91.06% Pervious Area
	2,820		8.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Pond SC-1: Infiltration System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 4.55" for 10-Year C event
Inflow = 5.22 cfs @ 12.21 hrs, Volume= 31,093 cf
Outflow = 3.05 cfs @ 12.51 hrs, Volume= 31,093 cf, Atten= 42%, Lag= 17.7 min
Discarded = 0.33 cfs @ 10.12 hrs, Volume= 23,524 cf
Primary = 2.72 cfs @ 12.51 hrs, Volume= 7,570 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 389.65' @ 12.51 hrs Surf.Area= 1,782 sf Storage= 9,465 cf

Plug-Flow detention time= 166.3 min calculated for 31,083 cf (100% of inflow)
Center-of-Mass det. time= 166.3 min (942.1 - 775.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	382.50'	1,459 cf	**27.00'W x 66.00'L x 8.58'H Field A** 15,295 cf Overall - 11,648 cf Embedded = 3,647 cf x 40.0% Voids
#2A	383.50'	9,270 cf	**Oldcastle StormCapture SC1 7'** x 12 Inside #1 Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf 3 Rows adjusted for 198.0 cf perimeter wall
		10,729 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.55' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	382.50'	**8.000 in/hr Exfiltration over Surface area from 382.00' - 382.50'** Excluded Surface area = 0 sf Phase-In= 0.01'

Discarded OutFlow Max=0.33 cfs @ 10.12 hrs HW=382.59' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=2.72 cfs @ 12.51 hrs HW=389.65' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 2.72 cfs @ 3.76 fps)

Pond SC-1: Infiltration System - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 7' (Oldcastle StormCapture® SC1)
Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf
Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf
3 Rows adjusted for 198.0 cf perimeter wall

96.0" Wide + 6.0" Spacing = 102.0" C-C Row Spacing

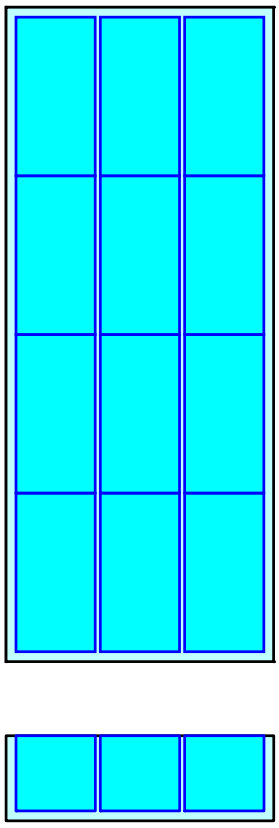
4 Chambers/Row x 16.00' Long = 64.00' Row Length +12.0" End Stone x 2 = 66.00' Base Length
3 Rows x 96.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 27.00' Base Width
12.0" Base + 91.0" Chamber Height = 8.58' Field Height

18.0 cf Sidewall x 4 x 2 + 9.0 cf Endwall x 3 x 2 = 198.0 cf Perimeter Wall
12 Chambers x 789.0 cf - 198.0 cf Perimeter wall = 9,270.0 cf Chamber Storage
12 Chambers x 970.7 cf = 11,648.0 cf Displacement

15,295.5 cf Field - 11,648.0 cf Chambers = 3,647.5 cf Stone x 40.0% Voids = 1,459.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,729.0 cf = 0.246 af
Overall Storage Efficiency = 70.1%
Overall System Size = 66.00' x 27.00' x 8.58'

12 Chambers
566.5 cy Field
135.1 cy Stone



Summary for Pond SC-2: Storage System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 4.55" for 10-Year C event
Inflow = 9.70 cfs @ 12.13 hrs, Volume= 31,090 cf
Outflow = 5.22 cfs @ 12.21 hrs, Volume= 31,093 cf, Atten= 46%, Lag= 5.1 min
Primary = 5.22 cfs @ 12.21 hrs, Volume= 31,093 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 391.11' @ 12.21 hrs Surf.Area= 2,560 sf Storage= 4,061 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.1 min (775.8 - 770.7)

Volume	Invert	Avail.Storage	Storage Description
#1B	388.70'	0 cf	**40.00'W x 64.00'L x 8.17'H Field B** 20,907 cf Overall - 20,907 cf Embedded = 0 cf x 40.0% Voids
#2B	388.70'	15,606 cf	**Oldcastle StormCapture SC2 7'** x 20 Inside #1 Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf 5 Rows adjusted for 254.0 cf perimeter wall
		15,606 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.70' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.22 cfs @ 12.21 hrs HW=391.10' TW=387.53' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.22 cfs @ 6.64 fps)

Pond SC-2: Storage System - Chamber Wizard Field B

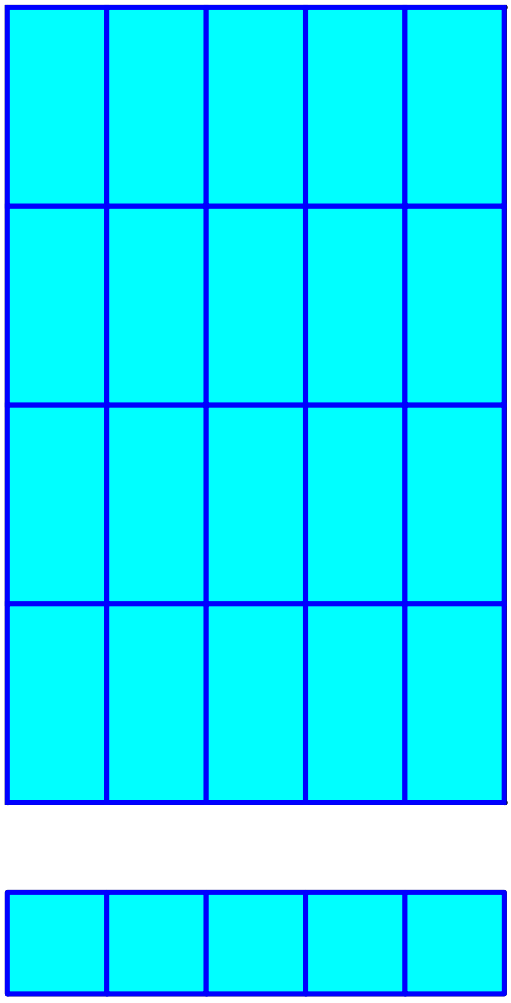
Chamber Model = Oldcastle StormCapture SC2 7' (Oldcastle StormCapture® SC2)
Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf
Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf
5 Rows adjusted for 254.0 cf perimeter wall

4 Chambers/Row x 16.00' Long = 64.00' Row Length
5 Rows x 96.0" Wide = 40.00' Base Width
98.0" Chamber Height = 8.17' Field Height

18.0 cf Sidewall x 4 x 2 + 11.0 cf Endwall x 5 x 2 = 254.0 cf Perimeter Wall
20 Chambers x 793.0 cf - 254.0 cf Perimeter wall = 15,606.0 cf Chamber Storage
20 Chambers x 1,045.3 cf = 20,906.7 cf Displacement

Chamber Storage = 15,606.0 cf = 0.358 af
Overall Storage Efficiency = 74.6%
Overall System Size = 64.00' x 40.00' x 8.17'

20 Chambers
774.3 cy Field



Summary for Link DP-1: Design Point 1

Inflow Area = 131,680 sf, 55.30% Impervious, Inflow Depth = 1.81" for 10-Year C event
Inflow = 4.28 cfs @ 12.46 hrs, Volume= 19,819 cf
Primary = 4.28 cfs @ 12.46 hrs, Volume= 19,819 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment PST-DA1: Post Development Drainage Area #1

Runoff = 1.85 cfs @ 12.13 hrs, Volume= 5,280 cf, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 25-Year C Rainfall=6.49"

Area (sf)	CN	Description
16,950	73	Woods, Fair, HSG C
1,157	79	50-75% Grass cover, Fair, HSG C
18,107	73	Weighted Average
18,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.1800	2.12		**Shallow Concentrated Flow, AB**
					Woodland Kv= 5.0 fps
2.4	57	0.1930	0.39		**Sheet Flow, BC**
					Grass: Short n= 0.150 P2= 3.41"
3.2	157	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA2: Post-Development Drainage Area #2

Runoff = 12.39 cfs @ 12.13 hrs, Volume= 40,320 cf, Depth= 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 25-Year C Rainfall=6.49"

	Area (sf)	CN	Description
*	14,883	98	Roofs, HSG C
*	2,291	98	Roofs, HSG D
*	33,315	98	Paved parking & driveways, HSG C
*	11,560	98	Paved parking & driveways, HSG D
*	4,102	98	Sidewalks & ramps, HSG C
*	1,146	98	Sidewalks & ramps, HSG D
*	1,888	98	Concrete Walls, HSG C
*	818	98	Concrete Walls, HSG D
	8,045	79	50-75% Grass cover, Fair, HSG C
	3,979	84	50-75% Grass cover, Fair, HSG D
	82,027	95	Weighted Average
	12,024		14.66% Pervious Area
	70,003		85.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	110	0.0490	4.49		**Shallow Concentrated Flow, AB**
					Paved Kv= 20.3 fps
0.2	212	0.0550	16.05	19.69	**Pipe Channel, BC**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.0	9	0.0100	6.84	8.40	**Pipe Channel, CD**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.6	331	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA3: Post-Development Drainage Area #3

Runoff = 2.50 cfs @ 12.31 hrs, Volume= 11,957 cf, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 25-Year C Rainfall=6.49"

	Area (sf)	CN	Description
	9,532	79	Woods, Fair, HSG D
	1,468	73	Woods, Fair, HSG C
	15,304	84	50-75% Grass cover, Fair, HSG D
	2,422	79	50-75% Grass cover, Fair, HSG C
*	1,202	98	Wetlands/Water Surface, HSG D
*	1,040	98	Concrete Walkway, HSG C
*	578	98	Concrete Wall
	31,546	83	Weighted Average
	28,726		91.06% Pervious Area
	2,820		8.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Pond SC-1: Infiltration System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 5.90" for 25-Year C event
Inflow = 6.12 cfs @ 12.22 hrs, Volume= 40,322 cf
Outflow = 4.55 cfs @ 12.41 hrs, Volume= 40,322 cf, Atten= 26%, Lag= 11.5 min
Discarded = 0.33 cfs @ 9.48 hrs, Volume= 26,248 cf
Primary = 4.22 cfs @ 12.41 hrs, Volume= 14,074 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 389.98' @ 12.41 hrs Surf.Area= 1,782 sf Storage= 9,928 cf

Plug-Flow detention time= 149.8 min calculated for 40,308 cf (100% of inflow)
Center-of-Mass det. time= 149.8 min (920.7 - 771.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	382.50'	1,459 cf	**27.00'W x 66.00'L x 8.58'H Field A** 15,295 cf Overall - 11,648 cf Embedded = 3,647 cf x 40.0% Voids
#2A	383.50'	9,270 cf	**Oldcastle StormCapture SC1 7'** x 12 Inside #1 Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf 3 Rows adjusted for 198.0 cf perimeter wall
		10,729 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.55' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	382.50'	**8.000 in/hr Exfiltration over Surface area from 382.00' - 382.50'** Excluded Surface area = 0 sf Phase-In= 0.01'

Discarded OutFlow Max=0.33 cfs @ 9.48 hrs HW=382.59' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=4.22 cfs @ 12.41 hrs HW=389.98' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 4.22 cfs @ 4.18 fps)

Pond SC-1: Infiltration System - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 7' (Oldcastle StormCapture® SC1)
Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf
Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf
3 Rows adjusted for 198.0 cf perimeter wall

96.0" Wide + 6.0" Spacing = 102.0" C-C Row Spacing

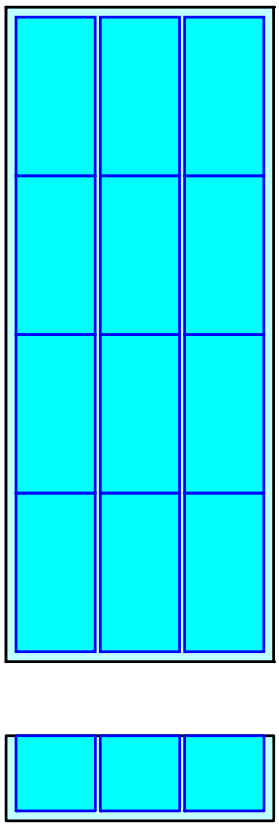
4 Chambers/Row x 16.00' Long = 64.00' Row Length +12.0" End Stone x 2 = 66.00' Base Length
3 Rows x 96.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 27.00' Base Width
12.0" Base + 91.0" Chamber Height = 8.58' Field Height

18.0 cf Sidewall x 4 x 2 + 9.0 cf Endwall x 3 x 2 = 198.0 cf Perimeter Wall
12 Chambers x 789.0 cf - 198.0 cf Perimeter wall = 9,270.0 cf Chamber Storage
12 Chambers x 970.7 cf = 11,648.0 cf Displacement

15,295.5 cf Field - 11,648.0 cf Chambers = 3,647.5 cf Stone x 40.0% Voids = 1,459.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,729.0 cf = 0.246 af
Overall Storage Efficiency = 70.1%
Overall System Size = 66.00' x 27.00' x 8.58'

12 Chambers
566.5 cy Field
135.1 cy Stone



Summary for Pond SC-2: Storage System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 5.90" for 25-Year C event
Inflow = 12.39 cfs @ 12.13 hrs, Volume= 40,320 cf
Outflow = 6.12 cfs @ 12.22 hrs, Volume= 40,322 cf, Atten= 51%, Lag= 5.2 min
Primary = 6.12 cfs @ 12.22 hrs, Volume= 40,322 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 391.81' @ 12.23 hrs Surf.Area= 2,560 sf Storage= 5,626 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.7 min (771.0 - 764.3)

Volume	Invert	Avail.Storage	Storage Description
#1B	388.70'	0 cf	**40.00'W x 64.00'L x 8.17'H Field B** 20,907 cf Overall - 20,907 cf Embedded = 0 cf x 40.0% Voids
#2B	388.70'	15,606 cf	**Oldcastle StormCapture SC2 7'** x 20 Inside #1 Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf 5 Rows adjusted for 254.0 cf perimeter wall
		15,606 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.70' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.02 cfs @ 12.22 hrs HW=391.80' TW=389.26' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.02 cfs @ 7.67 fps)

Pond SC-2: Storage System - Chamber Wizard Field B

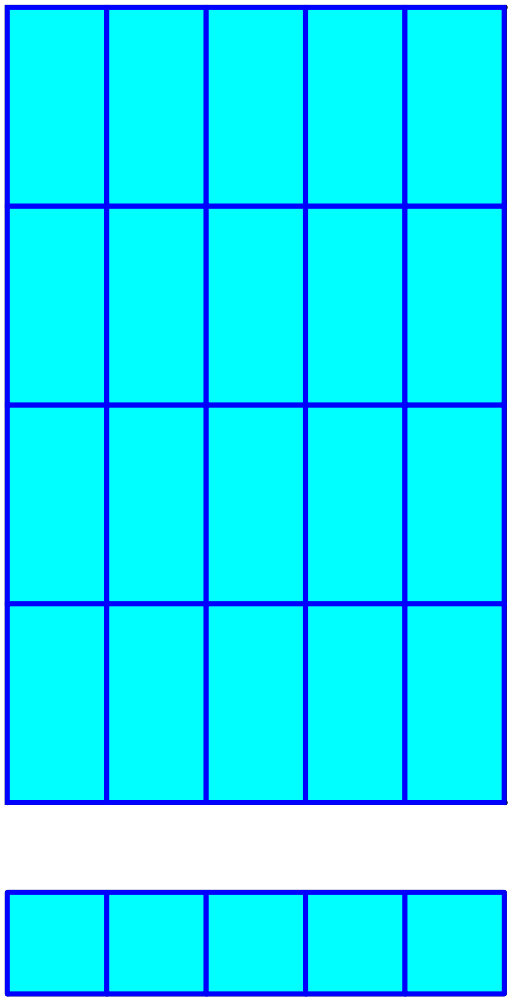
Chamber Model = Oldcastle StormCapture SC2 7' (Oldcastle StormCapture® SC2)
Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf
Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf
5 Rows adjusted for 254.0 cf perimeter wall

4 Chambers/Row x 16.00' Long = 64.00' Row Length
5 Rows x 96.0" Wide = 40.00' Base Width
98.0" Chamber Height = 8.17' Field Height

18.0 cf Sidewall x 4 x 2 + 11.0 cf Endwall x 5 x 2 = 254.0 cf Perimeter Wall
20 Chambers x 793.0 cf - 254.0 cf Perimeter wall = 15,606.0 cf Chamber Storage
20 Chambers x 1,045.3 cf = 20,906.7 cf Displacement

Chamber Storage = 15,606.0 cf = 0.358 af
Overall Storage Efficiency = 74.6%
Overall System Size = 64.00' x 40.00' x 8.17'

20 Chambers
774.3 cy Field



Summary for Link DP-1: Design Point 1

Inflow Area = 131,680 sf, 55.30% Impervious, Inflow Depth = 2.85" for 25-Year C event
Inflow = 7.04 cfs @ 12.35 hrs, Volume= 31,311 cf
Primary = 7.04 cfs @ 12.35 hrs, Volume= 31,311 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment PST-DA1: Post Development Drainage Area #1

Runoff = 3.09 cfs @ 12.13 hrs, Volume= 8,992 cf, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 100-Year C Rainfall=9.28"

Area (sf)	CN	Description
16,950	73	Woods, Fair, HSG C
1,157	79	50-75% Grass cover, Fair, HSG C
18,107	73	Weighted Average
18,107		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	100	0.1800	2.12		**Shallow Concentrated Flow, AB**
					Woodland Kv= 5.0 fps
2.4	57	0.1930	0.39		**Sheet Flow, BC**
					Grass: Short n= 0.150 P2= 3.41"
3.2	157	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA2: Post-Development Drainage Area #2

Runoff = 17.88 cfs @ 12.13 hrs, Volume= 59,312 cf, Depth= 8.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 100-Year C Rainfall=9.28"

	Area (sf)	CN	Description
*	14,883	98	Roofs, HSG C
*	2,291	98	Roofs, HSG D
*	33,315	98	Paved parking & driveways, HSG C
*	11,560	98	Paved parking & driveways, HSG D
*	4,102	98	Sidewalks & ramps, HSG C
*	1,146	98	Sidewalks & ramps, HSG D
*	1,888	98	Concrete Walls, HSG C
*	818	98	Concrete Walls, HSG D
	8,045	79	50-75% Grass cover, Fair, HSG C
	3,979	84	50-75% Grass cover, Fair, HSG D
	82,027	95	Weighted Average
	12,024		14.66% Pervious Area
	70,003		85.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	110	0.0490	4.49		**Shallow Concentrated Flow, AB**
					Paved Kv= 20.3 fps
0.2	212	0.0550	16.05	19.69	**Pipe Channel, BC**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.0	9	0.0100	6.84	8.40	**Pipe Channel, CD**
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.010 PVC, smooth interior
0.6	331	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment PST-DA3: Post-Development Drainage Area #3

Runoff = 3.88 cfs @ 12.31 hrs, Volume= 18,944 cf, Depth= 7.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 100-Year C Rainfall=9.28"

	Area (sf)	CN	Description
	9,532	79	Woods, Fair, HSG D
	1,468	73	Woods, Fair, HSG C
	15,304	84	50-75% Grass cover, Fair, HSG D
	2,422	79	50-75% Grass cover, Fair, HSG C
*	1,202	98	Wetlands/Water Surface, HSG D
*	1,040	98	Concrete Walkway, HSG C
*	578	98	Concrete Wall
	31,546	83	Weighted Average
	28,726		91.06% Pervious Area
	2,820		8.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	135	0.1780	0.12		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.41"
2.0	328	0.1460	2.67		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
0.3	58	0.0640	3.79		**Shallow Concentrated Flow, CD**
					Grassed Waterway Kv= 15.0 fps
0.1	25	0.0080	4.39	31.02	**Pipe Channel, DE**
					36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
					n= 0.025 Corrugated metal
0.1	10	0.0070	1.25		**Shallow Concentrated Flow, EF**
					Grassed Waterway Kv= 15.0 fps
21.7	556	Total			

Summary for Pond SC-1: Infiltration System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 8.68" for 100-Year C event
Inflow = 6.92 cfs @ 12.23 hrs, Volume= 59,313 cf
Outflow = 6.57 cfs @ 12.35 hrs, Volume= 59,313 cf, Atten= 5%, Lag= 7.6 min
Discarded = 0.33 cfs @ 7.65 hrs, Volume= 30,411 cf
Primary = 6.24 cfs @ 12.35 hrs, Volume= 28,902 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 390.52' @ 12.35 hrs Surf.Area= 1,782 sf Storage= 10,674 cf

Plug-Flow detention time= 128.0 min calculated for 59,313 cf (100% of inflow)
Center-of-Mass det. time= 128.0 min (893.3 - 765.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	382.50'	1,459 cf	**27.00'W x 66.00'L x 8.58'H Field A** 15,295 cf Overall - 11,648 cf Embedded = 3,647 cf x 40.0% Voids
#2A	383.50'	9,270 cf	**Oldcastle StormCapture SC1 7'** x 12 Inside #1 Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf 3 Rows adjusted for 198.0 cf perimeter wall
		10,729 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.55' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	382.50'	**8.000 in/hr Exfiltration over Surface area from 382.00' - 382.50'** Excluded Surface area = 0 sf Phase-In= 0.01'

Discarded OutFlow Max=0.33 cfs @ 7.65 hrs HW=382.59' (Free Discharge)
↳**2=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=6.23 cfs @ 12.35 hrs HW=390.52' TW=0.00' (Dynamic Tailwater)
↳**1=Culvert** (Barrel Controls 6.23 cfs @ 5.07 fps)

Pond SC-1: Infiltration System - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 7' (Oldcastle StormCapture® SC1)
Inside= 84.0"W x 84.0"H => 49.31 sf x 16.00'L = 789.0 cf
Outside= 96.0"W x 91.0"H => 60.67 sf x 16.00'L = 970.7 cf
3 Rows adjusted for 198.0 cf perimeter wall

96.0" Wide + 6.0" Spacing = 102.0" C-C Row Spacing

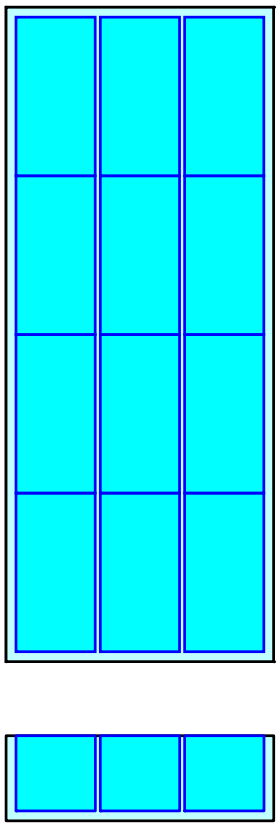
4 Chambers/Row x 16.00' Long = 64.00' Row Length +12.0" End Stone x 2 = 66.00' Base Length
3 Rows x 96.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 27.00' Base Width
12.0" Base + 91.0" Chamber Height = 8.58' Field Height

18.0 cf Sidewall x 4 x 2 + 9.0 cf Endwall x 3 x 2 = 198.0 cf Perimeter Wall
12 Chambers x 789.0 cf - 198.0 cf Perimeter wall = 9,270.0 cf Chamber Storage
12 Chambers x 970.7 cf = 11,648.0 cf Displacement

15,295.5 cf Field - 11,648.0 cf Chambers = 3,647.5 cf Stone x 40.0% Voids = 1,459.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,729.0 cf = 0.246 af
Overall Storage Efficiency = 70.1%
Overall System Size = 66.00' x 27.00' x 8.58'

12 Chambers
566.5 cy Field
135.1 cy Stone



Summary for Pond SC-2: Storage System

Inflow Area = 82,027 sf, 85.34% Impervious, Inflow Depth = 8.68" for 100-Year C event
Inflow = 17.88 cfs @ 12.13 hrs, Volume= 59,312 cf
Outflow = 6.92 cfs @ 12.23 hrs, Volume= 59,313 cf, Atten= 61%, Lag= 5.9 min
Primary = 6.92 cfs @ 12.23 hrs, Volume= 59,313 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 393.70' @ 12.26 hrs Surf.Area= 2,560 sf Storage= 9,836 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.4 min (765.3 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1B	388.70'	0 cf	**40.00'W x 64.00'L x 8.17'H Field B** 20,907 cf Overall - 20,907 cf Embedded = 0 cf x 40.0% Voids
#2B	388.70'	15,606 cf	**Oldcastle StormCapture SC2 7'** x 20 Inside #1 Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf 5 Rows adjusted for 254.0 cf perimeter wall
		15,606 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	388.70'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 388.70' / 388.70' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.89 cfs @ 12.23 hrs HW=393.65' TW=390.33' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 6.89 cfs @ 8.77 fps)

Pond SC-2: Storage System - Chamber Wizard Field B

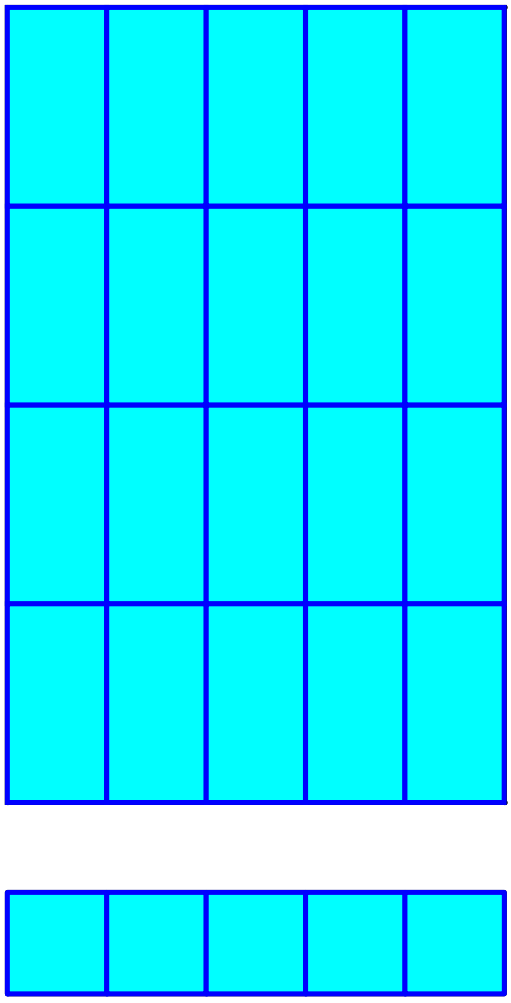
Chamber Model = Oldcastle StormCapture SC2 7' (Oldcastle StormCapture® SC2)
Inside= 84.0"W x 84.0"H => 49.56 sf x 16.00'L = 793.0 cf
Outside= 96.0"W x 98.0"H => 65.33 sf x 16.00'L = 1,045.3 cf
5 Rows adjusted for 254.0 cf perimeter wall

4 Chambers/Row x 16.00' Long = 64.00' Row Length
5 Rows x 96.0" Wide = 40.00' Base Width
98.0" Chamber Height = 8.17' Field Height

18.0 cf Sidewall x 4 x 2 + 11.0 cf Endwall x 5 x 2 = 254.0 cf Perimeter Wall
20 Chambers x 793.0 cf - 254.0 cf Perimeter wall = 15,606.0 cf Chamber Storage
20 Chambers x 1,045.3 cf = 20,906.7 cf Displacement

Chamber Storage = 15,606.0 cf = 0.358 af
Overall Storage Efficiency = 74.6%
Overall System Size = 64.00' x 40.00' x 8.17'

20 Chambers
774.3 cy Field



Summary for Link DP-1: Design Point 1

Inflow Area = 131,680 sf, 55.30% Impervious, Inflow Depth = 5.18" for 100-Year C event
Inflow = 10.91 cfs @ 12.31 hrs, Volume= 56,839 cf
Primary = 10.91 cfs @ 12.31 hrs, Volume= 56,839 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs