Stormwater Report

for

Veterans Memorial Drive Extension Subdivision Franklin, MA

Date: April 3, 2024

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Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands Program Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Longterm Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

New development



Mix of New Development and Redevelopment



LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

	No disturbance to any Wetland Resource Areas
	Site Design Practices (e.g. clustered development, reduced frontage setbacks)
	Reduced Impervious Area (Redevelopment Only)
\boxtimes	Minimizing disturbance to existing trees and shrubs
	LID Site Design Credit Requested:
	Credit 1
	Credit 2
	Credit 3
	Use of "country drainage" versus curb and gutter conveyance and pipe
	Bioretention Cells (includes Rain Gardens)
	Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
	Treebox Filter
\boxtimes	Water Quality Swale
\boxtimes	Grass Channel
	Green Roof
	Other (describe):

Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

Calculations provided to show that post-development peak discharge rates do not exceed predevelopment rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24hour storm.

Standard 3: Recharge

Soil Analysis provided.

- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.

\bowtie	Static
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Dynamic Field¹

 \boxtimes Runoff from all impervious areas at the site discharging to the infiltration BMP.

Simple Dynamic

- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

Recharge BMPs have been sized to infiltrate the Required Recharge Volume only to the maximum
extent practicable for the following reason:

- Site is comprised solely of C and D soils and/or bedrock at the land surface
- M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- Solid Waste Landfill pursuant to 310 CMR 19.000
- Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- \boxtimes Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Standard 3: Recharge (continued)

The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
- Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
- The Required Water Quality Volume is reduced through use of the LID site Design Credits.
- Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Sta	Indard 4: Water Quality (continued)
\boxtimes	The BMP is sized (and calculations provided) based on:
	The ½" or 1" Water Quality Volume or
	The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
	The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
	A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.
Sta	Indard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)
	The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report
	The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted prior to the discharge of stormwater to the post-construction stormwater BMPs.
	The NPDES Multi-Sector General Permit does <i>not</i> cover the land use.
	LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
	All exposure has been eliminated.
	All exposure has <i>not</i> been eliminated and all BMPs selected are on MassDEP LUHPPL list.
	The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.
Sta	Indard 6: Critical Areas
	The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

Critical areas and BMPs are identified in the Stormwater Report.



Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

	Limited	Pro	ject
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- Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- Bike Path and/or Foot Path
- Redevelopment Project
- Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has *not* been included in the Stormwater Report but will be submitted *before* land disturbance begins.
- The project is *not* covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is *not* the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted *prior to* the discharge of any stormwater to post-construction BMPs.

Table of Contents

- Narrative
- Stormwater Design Parameters
- Massachusetts Stormwater Management Standards 1-10

Attachments

Pre and Post Watershed Development Condition

- Hydro CAD Calculations (Pre-Post Development Conditions 2, 10, 25, 100-Year Storm Events)
- Street Drain Calculations Rational Method and Catchment Area Calculation
- NCRS Soil Survey
- Basin Drawdown Tabulation for (100-Yr)
- TSS Removal Calculations
- Contech worksheet

NARRATIVE

This report was prepared on behalf of the applicant, Franklin Municipal Affordable Housing Trust Fund. The land to be subdivided and developed encompasses an area of 736,120 +/- sf. (16.90 +/-Ac.) owned and to be developed by the applicant. The property is bordered by a residential neighborhood to the north, Franklin High School to the east, Eaton Place to the southeast, condominiums/apartments to the south, and a solar farm associated with Tri-County High School to the west. The site is located within the Rural Residential II zoning district and has primary site access from Veterans Memorial Drive, and secondary access is possible from Irondequoit Road. Portions of the site contain bordering vegetated wetlands and their associated jurisdictional buffers, and the site is not located within the Franklin water resource district. The site is presently undeveloped. A 40B Development, "Franklin Ridge Senior Housing", is in the permitting phase for construction on Lot 1A by the developer JNJuhl and Assoc., LLC. Due to the interconnected nature of these two projects, the site and drainage design for Franklin Ridge is included within this project's stormwater report and site plans so that the full buildout of the site is more easily understood.

PROJECT DESCRIPTION

The Applicant is proposing to construct a town owned extension to Veterans Memorial Drive, approximately 1110' in length, starting from Eaton Place and extending northwest across the project parcel to connect to the existing stub of Irondequoit Road. The connection to Irondequoit Road is to be gated and for emergency use only. The new road is proposed to service the 40B "Franklin Ridge Senior Housing" residential development and two additional lots. Drainage infrastructure associated with the new development will also be constructed. The topography consists of slopes ranging from 0% to 25% grade.

DESCRIPTION OF EXISTING DRAINAGE

The pre-developed site drains principally from west to east, with portions of the site draining to the south. The pre-development drainage area is modeled as four hydrologic areas. These hydrologic areas are shown on the Pre-Development Watershed Plan attached to this report and are denoted as EX-1 through EX-4.

EX-1 contains approximately 136,828 square feet of contributing area, consisting primarily of woodland located in the southwest of the property. Runoff from this hydrologic area flows overland to the "GC-series" wetlands, where it is conveyed by a natural wooded swale to the southern abutting condominium property, AP-1.

EX-2 contains approximately 506,133 square feet of contributing area, consisting of woodland and rear yards of several lots fronting on Mucciarone Road (roof, lawn, and woodland). Runoff from this hydrologic area flows overland from west to northeast to the northeastern property line, where it is collected by an offsite natural swale and is conveyed to the Franklin High School property, AP-2.

EX-3 contains approximately 204,248 square feet of contributing area, consisting primarily of woodland located in the south and middle of the property. Runoff from this hydrologic area flows overland to the east, where it is captured by the existing drainage infrastructure on the Eaton Place site, AP-3.

EX-4 contains approximately 4,999 square feet of contributing area, consists primarily of grass and is located to the north, adjacent to the Irondequoit Rd stub. Runoff from this hydrologic area flows overland to the north, where it is captured by the existing drainage infrastructure within the roadway, AP-4.

discharging to the catch basins. Additionally, 0.94 acres of contributing area from the fields and existing house west of the project area drains to the wetlands located in the southwest corner of the project parcel.

DESCRIPTION OF PROPOSED DRAINAGE FACILITIES

Due to the interconnected nature of the sites, the drainage for the proposed roadway and for the 40B development were analyzed together within the HydroCAD model. The proposed drainage system to manage stormwater from the roadway construction and 40B development consists of Deep Sump Hooded Catch Basins, Sediment Forebays, Infiltration Basins, Subsurface Chamber Systems, and Detention Basins. Stormwater from sidewalks, driveways, and roadways are collected and conveyed by a conventional catch basin and drain manhole system to the sediment forebays, infiltration basins, chamber systems, and detention basins for treatment, detention, and infiltration. Stormwater from the roof of the proposed building is directed to the proposed detention basin or chambers prior to being conveyed to the forebays/infiltration basins for infiltration.

In the Post-Development condition, ten hydrologic areas were considered. These watershed areas consider the pavement, lawns, sidewalks, roofs, and drainage facilities proposed to be constructed. These hydrologic areas are shown on the Post-Development Watershed Plan attached to this report and are denoted as PR-1 through PR-10.

PR-1 contains approximately 133,315 square feet of contributing area and includes all land which drains directly to Infiltration Basin #1. Runoff is captured by catch basins and is conveyed to the East and then discharged to the sediment forebay and infiltration basin for treatment, detention, and infiltration.

PR-2 contains approximately 59,024 square feet of contributing area and includes all land which drains directly to Chamber System #1 & Infiltration Basin #2. Runoff is captured by catch basins and is conveyed to the East and then discharged to the chamber system, sediment forebay and infiltration basin for treatment, detention, and infiltration.

PR-3 contains approximately 82,428 square feet of contributing area and includes all land which drains directly to Chamber System #2 & Infiltration Basin #3. Runoff is captured by catch basins and is conveyed to the East and then discharged to the chamber system, sediment forebay and infiltration basin for treatment, detention, and infiltration.

PR-4 contains approximately 16,000 square feet of contributing area and includes all land which drains directly to Detention Basin #1, including the northern half of the roof of the proposed building. Runoff is conveyed to the East and then discharged to the detention basin for detention prior to being conveyed to Infiltration Basin #2.

PR-5 contains approximately 19,916 square feet of contributing area and includes all land which drains directly to Detention Basin #2. Runoff flows overland to the east directly to the basin detention prior to being conveyed to Infiltration Basin #2.

PR-6 contains approximately 12,492 square feet of contributing area and includes the southern half of the roof of the proposed building, discharging directly to Detention Basin #3. Runoff is conveyed to the East and then discharged to Infiltration Basin #3.

PR-7 contains approximately 49,112 square feet of contributing area and includes all land not captured by the proposed drainage improvements flowing directly to Eaton Place to the east. Runoff flows overland to the existing drainage infrastructure of Eaton Place.

PR-8 contains approximately 137,043 square feet of contributing area and includes all land east of the proposed road not captured by the proposed drainage improvements, flowing to Franklin High School to the east. Runoff flows overland to the northeastern property line and the existing drainage infrastructure of Franklin High School.

PR-9 contains approximately 136,727 square feet of contributing area and drains southerly from the wetlands on the western portion of the site to the abutting residential condominiums.

PR-10 contains approximately 206,274 square feet of contributing area and includes all land west of the proposed roadway which is captured by proposed headwalls 1& 2. Runoff is conveyed under the proposed roadway by a conventional pipe and manhole system, where it is discharged overland to the northeastern property line and the existing drainage infrastructure of Franklin High School.

This report documents design compliance with the applicable sections of the Massachusetts Stormwater Management Standards 1-10.

Stormwater Design Parameter:

The stormwater management system was designed to control the post-development rate of peak rainfall runoff from the site by keeping it below the post-development peak rate of rainfall runoff as stated as the objective in the Massachusetts Stormwater Handbook. The calculations were performed using the HydroCAD hydraulic program, developed by applied Microcomputer System. The HydroCAD software is based upon the Soil Conservation Service, "Technical Release 55 – Urban Hydrology for Small Watersheds" and is generally accepted industry methodology.

The analysis was performed for the 2-year, 10-year, 25-year, and 100-year 24-hour storm events.

The following data was required for input:

- Watershed Area: Areas of each watershed were calculated and expressed in square feet for these calculations.
- SCS Curve Number (Cn): Based on the cover type and hydrologic soil group, a weighted curve number (CN) was determined for each of the existing watersheds utilizing Table 2-2a-*Runoff Curve Numbers For Urban Areas* and *Worksheet 2, Runoff Curve Number and Runoff* from the Soil Conservation Service Technical Release 55 Urban Hydrology for Small Watersheds.
- Time of Concentration, Tc (Minutes): The time of concentration for each watershed was determined by finding the time necessary for runoff to travel from the hydraulically most distant point in the watershed to the point of analysis. This was calculated by using a minimum time of 6 minutes for runoff to reach the most distant catch basin.
- SCS 24-Hour Storm Type: For the greater New England region, a Type III storm rainfall distribution is recommended for drainage calculations and was used for this project.
- Rainfall Precipitation: Rainfall precipitations used the Atlas-14 Volume 10, Version 3 rainfall estimates for the site, obtained from the NOAA Precipitation Frequency Data Server (PFDS) for the 2, 10, 25, and 100 year storm events and are as follows:

2-year storm event:	3.39 inches
10-year storm event:	5.25 inches
25-year storm event:	6.41 inches
100-year storm event:	8.19 inches

An on-site conventional storm drainage collection system is designed based on the "Rational Method" using Manning's equation to carry a minimum 25-year storm event and underground culverts to carry a minimum 50-year storm event through the site (See Pipe Sizing Attachments). The proposed drainage pipes will be Reinforced Concrete Pipe (RCP), unless otherwise noted on the plans.

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

All runoff from impervious areas will sheet flow across the pavement areas, accumulate into hooded catch basins, connect with drain pipe to a chamber system with separator row or sediment forebay, and discharge to the infiltration basins. No new untreated stormwater discharges are proposed.

Standard 2: Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

To meet Standard 2, the post-development peak discharge rate must be equal to or less than predevelopment rates to prevent storm damage and downstream and offsite flooding from the 2-year and the 10-year 24-hour storm events.

Peak discharge rates volumes were calculated and evaluated at four analysis points. The point of evaluation is shown on the accompanying watershed plans.

In summary of the attached drainage analysis (HydroCAD), the peak discharge rates at the point of evaluation in cubic feet per second (cfs) are as follows;

		Run off		
	Storm	Pre-dev.	Proposed	Change
	Events	(cfs)[af]	(cfs)[af]	(cfs)[af]
Analysis Point 1	2-year	(1.74)[0.246]	(1.74)[0.246]	(-0.00)[-0.000]
(AP-1)	10-year	(4.48)[0.582]	(4.47)[0.582]	(-0.01)[-0.000]
	25-year	(6.38)[0.820]	(6.38)[0.820]	(-0.00)[-0.000]
	100-year	(9.46)[1.211]	(9.46)[1.211]	(-0.00)[-0.000]
			Run off	
	Storm	Pre-dev.	Proposed	Change
	Events	(cfs)[af]	(cfs)[af]	(cfs)[af]
Analysis Point 2	2-year	(3.87)[0.718]	(3.59)[0.675]	(-0.28)[-0.043]
(AP-2)	10-year	(11.53)[1.840]	(10.89)[1.816]	(-0.64)[-0.024]
	25-year	(17.08)[2.661]	(16.52)[2.630]	(-0.56)[-0.031]
	100-year	(26.22)[4.032]	(24.99)[3.969]	(-1.23)[-0.063]
		ſ		
			Run off	
	Storm	Pre-dev.	Proposed	Change
	Events	(cfs)[af]	(cfs)[af]	(cfs)[af]
Analysis Point 3	2-year	(1.84)[0.237]	(0.40)[0.140]	(-1.44)[-0.097]
(AP-3)	10-year	(6.25)[0.652]	(2.14)[0.470]	(-4.11)[-0.182]
	25-year	(9.53)[0.964]	(3.84)[0.802]	(-5.69)[-0.162]
	100-year	(15.00)[1.492]	(14.28)[1.462]	(-0.72)[-0.030]

			Run off	
	Storm	Pre-dev.	Proposed	Change
	Events	(cfs)[af]	(cfs)[af]	(cfs)[af]
Analysis Point 4	2-year	(.09)[0.011]	(0.00)[0.000]	(-0.09)[-0.011]
(AP-4)	10-year	(0.20)[0.025]	(0.00)[0.000]	(-0.20)[-0.025]
	25-year	(0.28)[0.034]	(0.00)[0.000]	(-0.28)[-0.034]
	100-year	(0.32)[0.036]	(0.00)[0.000]	(-0.32)[-0.036]

Standard 3: Loss of annual recharge to ground water shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post- development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Soil Evaluation

Soil evaluation is broken down into two stages. Stage 1 identifies the underlying soils just beneath the surface that contribute to how much runoff is generated as stormwater falls and moves across the surface. Stage 2 evaluates the soils in direct contact with the proposed infiltration BMPs. The attachments section includes the NRCS Soil Survey used for Stage 1 while the site plan set includes the on-site soil textural analysis in the specific locations that infiltration is proposed. The information from the NRCS Soil Survey is included on the Pre and Post Development Watershed Plans.

Recharge Volume

Soils underlying the site are defined as map unit 300B Montauk fine sandy loam, 3 to 8 percent slopes, and map unit 422C Canton fine sandy loam, 8 to 15 percent slopes. We have estimated the soil as a mix of hydrologic group "B" for the westerly portion of the site and "C" for the easterly portion of the site of the site based on Web Soil Survey USDA/NRCS Soil Map. Test Pits throughout the site depicted the underlying soil C layer material to be a mix of loamy sand and sandy loam, with an area of Sand present near the entrance to the site. The infiltration design is based on a Type A Soil "1982 Rawls Rates" of 2.41 in/hr for the proposed roadway Infiltration Basin, and 1.02 in/hr for the proposed 40B Infiltration Basins. See Soil Data in Attachment Section.

	Recharge	Impervious	Volume
Hydrologic Group	(in/sqft)	(sqft)	(cf)
A - sand	0.60	None	0
B - loam	0.35	40,554.4	1182.8 cf
C - silty loam	0.25	75,968.6	1582.7 cf
\mathbf{D} - $clay$	0.10	None	0
Required Recharge Volume Total 2,765.5 cf			2,765.5 cf

Table 2: Basin #1 Required Recharge Volume Calculation

Stormwater Basin Sizing

There are three ways of determining the recharge volume provided by a storm water basin (Static, Simple Dynamic, and Dynamic Field). The Static Method, used here, includes the volume of water that can be stored beneath the lowest outlet of the basin. This, the most conservative method of determining the recharge volume, doesn't account for any infiltration that takes place while the basin is filling with water and is less dependent on maintenance of the basin since the only way for the water below the lowest invert can leave the basin is though infiltration. The following table summarizes the recharge volume provided by the infiltration chambers. Detailed volume calculations for the basin are included in the attachments.

	Recharge Volume
Basin 1 @ 323.75	3,637 cf
Basin 2 @ 358.20	3,579 cf
Basin 3 @ 358.90	6.269 cf
Total	13,485 cf

Table 3: Basin Recharge Volumes

72-hour Drawdown

When using the conservative Static Method to determine infiltration volume provided, the Rawls Rate is used to represent the infiltration rate in place of a hydraulic conductivity rate. The specific rate chosen is based on the textural analysis of the in-site soil performed by a competent soil professional.

A Massachusetts Certified Soil Evaluator performed an evaluation of the soil at the proposed infiltration BMP. The soil textural analysis for the infiltration BMP is listed below with the associated Rawls Rate used in the HydroCAD calculations. Where textural analysis varied within any single BMP, the most restrictive textural evaluation and Rawls Rate were used. Soil logs of the in situ soil evaluation are included within the Site Plan set.

Table 4: Rawls Rate

	Most Restrictive Soil Texture	Rawls Rate (in/hour)
Infiltration Basin 1	Sand/Loamy Sand	2.41 in/hr
Infiltration Basins 2 & 3	Sandy Loam	1.02 in/hr

Drawdown time for the infiltration chamber systems is modeled by HydroCAD and included in the attachments. The following table summarizes the drawdown time for the basin to show it will drawdown within the 72-hour maximum.

	Time for Drawdown
Infiltration Basin 1	34 hours
Infiltration Basin 2	47 hours
Infiltration Basin 3	51 hours

Table 5: Basin Drawdown

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

- a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
- b) Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and
- c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

The Water Quality Volume requiring 80% TSS removal, is calculated as follows:

The required water quality volume is based on 1.0" as the soil recharge rate is 2.41 in/hr, meeting the threshold rate of 2.4 in/hr or greater. The water quality volume equals 1.0 inches of runoff times the increased impervious area of the post-development site.

Basin #1 Required Water Quality Volume:

Existing Site Impervious Area	=	0 sf
Proposed Site Impervious Area	=	40,403 sf
Total Site Impervious Area Increase	=	40,403 sf
Impervious area to be treated	=	40,403 sf

Total volume to be treated: 1.0" x 1'/12" x 40,403 sf = 3,367.0 cf Water Quality Volume Required

Basin #1 Provided Water Quality Volume:

Infiltration Basin 1 Treatment volume: (Storage below lowest invert @ 323.75) = 3,637 cf

Basin #2 Required Water Quality Volume:

Existing Site Impervious Area	=	0 sf
Proposed Site Impervious Area	=	42,689 sf
Total Site Impervious Area Increase	=	42,689 sf
Impervious area to be treated	=	42,689 sf

Total volume to be treated: 1.0" x 1'/12" x 42,689 sf = 3,557.4 cf Water Quality Volume Required

Basin #2 Provided Water Quality Volume:

Infiltration Basin 2 Treatment volume: (Storage below lowest invert @ 358.20) = 3,579 cf

Basin #3 Required Water Quality Volume:

Existing Site Impervious Area	=	0 sf
Proposed Site Impervious Area	=	33,367 sf
Total Site Impervious Area Increase	=	33,367 sf
Impervious area to be treated	=	33,367 sf

Total volume to be treated: 1.0" x 1'/12" x 33,367 sf = 2,780.6 <u>cf Water Quality Volume Required</u> <u>Basin #3 Provided Water Quality Volume:</u>

Infiltration Basin 3 Treatment volume: (Storage below lowest invert @ 358.90) = 14,210 cf

Forebay Sizing

All the stormwater from the impervious pavement is collected and discharged to the proposed sediment forebay which is sized to treat 0.1" of runoff from the 42,732.4-sf impervious area contributing to the basin. Detailed calculations for the sediment forebay are included in Appendix 5 / Stage-Area-Storage Calculations.

 $0.1^{"}/12^{"}$ per foot x 42,732.4 sf = 356.1 cf of storage required

Table 6: Sediment Forebay Sizing

	Impervious Area	Required Volume	Provided Volume
	being Discharged		
Forebay 1 @ Inv.=324.0	40,403 cf	337 c.f.	1,856 c.f.
Forebay 2 @ Inv. = 359.0	42,689 cf	356 c.f.	2,060 c.f.
Forebay 3 @ Inv. = 358.0	33,367 cf	278 c.f.	2,025 c.f.

See TSS Removal Calculations in Attachment Section.

MS4 Bylaw Compliance:

Based on the Town of Franklin MS4 stormwater bylaw as specified in § 153-16 (B)(1)(a), new developments require the on-site stormwater management systems to be designed to retain the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area, and/or remove 90% of the average annual load of Total Suspended Solids (TSS) generated from the total post construction impervious area on site and 60% of the average annual load of Total Phosphorous (TP) generated from the post construction impervious surface area on site..

The total impervious area, including roofs, is 116,459 square feet. The equivalent 1" of runoff from these surfaces is 9,705 cubic feet. The total storage provided below the lowest inverts out are as follows. See Appendix 5 -Stage -Area-Storage calculations.

Basin 1 @ Elev. 323.75 = 3,637 cf	
Basin 2 @ Elev. 358.20 = 3,579 cf	
Basin 3 @ Elev. 358.90 = 14,210 cf	

Total Storage Volume Required = 9,705 cf Total Storage Volume Provided = 21,426 cf

Standard 4: requires the development and implementation of suitable practices for source control and pollution prevention. These measures must be identified in a long-term pollution prevention plan.

The long-term pollution prevention plan is incorporated into the Operation and Maintenance Plan required by Standard 9.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The proposed project is not a use with higher potential pollutant loads.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The subject property does not discharge stormwater within the Franklin Water Resource District. Due to the presence of soils with rapid recharge rates in the area of the infiltration basin, the Water Quality Volume is calculated using the required 1.0" rule, and 44% TSS removal is achieved prior to discharge to the infiltration basin. See Standard 4 for computations. The design utilizes stormwater BMPs designated as suitable for critical areas within the Massachusetts Stormwater Handbook. No metal roof is proposed.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable:

This project is not a redevelopment project and meets all applicable stormwater standards.

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

During land disturbance and construction activities, project proponents must implement controls that prevent erosion, control sediment movement, and stabilize exposed soils to prevent pollutants from moving offsite or entering wetlands or waters. Land disturbance activities include demolition, construction, clearing, excavation, grading, filling, and reconstruction.

Construction Period Pollution Prevention Plan and Erosion and Sedimentation Control. EPA NPDES – Storm Water Pollution Prevention Plan (SWPPP)

A. Names of Persons or Entities Responsible for Plan Compliance

Franklin Municipal Affordable Housing Trust c/o Bryan Taberner 355 East Central Street Franklin, MA 02038 Tel: 508-553-4846

- B. Construction Period Pollution Prevention Measures
 - 1. Inventory materials to be present on-site during construction.
 - 2. Train employees and subcontractors in prevention and clean up procedures.
 - 3. All materials stored on site will be stored in their appropriate containers and if possible, under a roof or covered.
 - 4. Follow manufacturer's recommendation for disposal of used containers.
 - 5. Store only enough product on site to do the job.
 - 6. On site equipment, fueling and maintenance measures:
 - a. Inspect on-site vehicles and equipment daily for leaks.
 - b. Conduct all vehicle and equipment maintenance and refueling in front of building, away from storm drains.
 - c. Perform major repairs and maintenance off site.
 - d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
 - e. Collect spent fuels and remove from site, per Local and State regulations.
 - f. Maintain a clean construction entrance where truck traffic is frequent to reduce soil compaction constant sweeping is required and limit tracking of sediment into streets, sweeping street when silt is observed on street.
 - 7. Stockpile materials and maintain Erosion Control around the materials where it can easily be accessed. Maintain easy access to clean up materials to include brooms, mops, rags gloves, goggles, sand, sawdust, plastic and metal trash containers.
 - 8. Clean up spills.
 - a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean up methods (sawdust, cat litter and/or rags and absorbent pads).
 - b. Sweep up dry materials immediately. Never wash them away or bury them.
 - c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil in a certified container and notify a certified hauler for removal.
 - d. Report significant spills to the Fire Department.

- 9. It is the responsibility of the site superintendent or employees designated by the Applicant to inspect erosion control and repair as needed, also to inspect all on site vehicles for leaks and check all containers on site that may contain hazardous materials daily.
- C. <u>Construction Erosion and Sedimentation Control Plan.</u> See "Definitive Subdivision Plan of Land, Veterans Memorial Drive Extension, Franklin, Massachusetts" prepared by Guerriere & Halnon, Inc. Dated 03/15/24
- <u>Site Development Plans</u>.
 See "Definitive Subdivision Plan of Land, Veterans Memorial Drive Extension, Franklin, Massachusetts" prepared by Guerriere & Halnon, Inc. Dated 03/15/24
- E. <u>Construction Sequencing Plan</u>
 - a. Record Order of Conditions The site superintendent shall be aware of all the Conditions contained within the Order including inspection schedules
 - b. Install DEP File # Sign.
 - c. Prior to any work on the site including tree/brush clearing, the approved limit of clearing as well as the location of the proposed erosion control devices (such as silt fence/straw bales, etc.) must be staked on the ground under the direction of a Massachusetts registered Professional Land Surveyor.
 - d. Install silt fence/hay bales at locations
 - e. Strip off top and subsoil. Stockpile material to be reused away from the wetland, remove excess material from the site. Install and maintain erosion control barrier around stockpile.
 - f. Rough grade site, maintaining a temporary low area/sediment trap away from the wetland.
 - g. Construct drainage outfalls and stilling basin. Stabilize side slopes with loam, seed and mulch.
 - h. Install underground utilities; protect all open drainage structures with erosion/siltation control devices.
 - i. Install binder course of bituminous asphalt.
 - j. Install wearing course of asphalt, and striping (where required).
 - k. Maintain all erosion control devices until site is stabilized and a Certificate of Compliance is issued by the Conservation Commission.
 - 1. The Contractor shall be responsible to schedule any required inspections of his/her work.
- F. Construction Waste Management Plan
 - a. Dumpster for trash and bulk waste collection shall be provided separately for construction.
 - b. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
 - c. Segregate and provide containers for disposal options for waste.
 - d. Do not bury waste and debris on site.
 - e. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
 - f. The sewer system is only for disposal of human waste, and substances permitted for disposal in the site sewer permit with the Town B.O.H.

G. Operation and Maintenance of Erosion and Sedimentation Controls

- The operation and maintenance of sedimentation control shall be the responsibility of the contractor. The inspection and maintenance of the stormwater component shall be performed as noted below. The contractor shall have erosion control in place at all times. The contractor, based on future weather reports, shall prepare and inspect all erosion control devices; cleaning, repairing and upgrading is a priority so that the devices perform as per design. Inspect the site during rain events. Do not stay away from the site. At a minimum there should be inspection to assure the devices are not clogged or plugged, or that devices have not been destroyed or damaged during the rain event. After a storm event inspection is required to clean and repair any damage components. Immediate repair is required.
- H. Inspection and Maintenance Schedules
 - 1. Inspection must be conducted at least once every 7 days and within 24 hours of the end of a storm event 0.5 inches or greater.
 - 2. Inspection frequency can be reduced to once a month if:
 - a. The site is temporarily stabilized.
 - b. Runoff is unlikely due to winter conditions when site is covered with snow or ice.
 - 3. Inspections must be conducted by qualified personnel, "qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls and who possess the skills to assess the conditions and take measures to maintain and ensure proper operation, also to conclude if the erosion control methods selected are effective.
 - 4. For each inspection, the inspection report must include: (See attached inspection and maintenance log)
 - a. The inspection date.

I.

- b. Names, titles of personnel making the inspection.
- c. Weather information for the period since the last inspection.
- d. Weather information at the time of the inspection.
- e. Locations of discharges of sediment from the site, if any.
- f. Locations of BMP's that need to be maintained.
- g. Locations where additional BMP's may be required.
- h. Corrective action required or any changes to the SWPPP that may be necessary.
- 5. The owner, or their representative, such as the contractor, shall inspect the following inplace work.

Inspection Schedule:Erosion ControlWeeklyCatch BasinsWeeklyTemporary Sedimentation Traps/BasinsWeeklyStreet SweepingWeeklyPlease Note: Special inspections shall also be made after a significant rainfall event.

Maintenance Schedule	
Erosion Control Devices Failure	Immediately
Catch Basins	Sump 1/4 full of sediment
Temporary Sedimentation Trap/Basin	As needed
Street Sweeping	14 days minimum and prior to any
	significant rain event.

Please Note: Special maintenance shall also be made after a significant rainfall event. Inspection and Maintenance Log Form. (Log Form Follows)

Standard 9: A Long – Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that storm water management systems function as designed.

The following shall serve as the (O&M) Plan required by Standard 9, as well as the Long-Term Pollution Prevention Plan required by Standard 4.

A. Names of Persons or Entities Responsible for Plan Compliance;

Franklin Municipal Affordable Housing Trust c/o Bryan Taberner 355 East Central Street Franklin, MA 02038 Tel: 508-553-4846

B. Stormwater Management System Owner

Franklin Municipal Affordable Housing Trust c/o Bryan Taberner 355 East Central Street Franklin, MA 02038 Tel: 508-553-4846

C. Good housekeeping practices

- 1. Maintain site, landscaping and vegetation.
- 2. Sweep and pick up litter on pavements and grounds.
- 3. Deliveries shall be monitored by owners or representative to ensure that if any spillage occurs, it shall be contained and cleaned up immediately.
- 4. Maintain pavement and curbing in good repair.

D. Requirements for routine inspections and maintenance of stormwater BMPs

- 1. Plans: The stormwater Operation and Maintenance Plan shall consist of all Plans, documents and all local state and federal approvals as required for the subject property.
- 2. Record Keeping:
 - a. Maintain a log of all operation and maintenance activities for at least three years following construction, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location).
 - b. Make this log available to MassDEP and the Conservation Commission upon request; and
 - c. Allow MassDEP and the Conservation Commission to inspect each BMP to determine whether the responsible party is implementing the Operation and Maintenance Plan.
- 3. Descriptions and Designs: The Best Management Practices (BMP) incorporated into the design include the following.
 - a. Street Sweeping Stipulated within the Construction Period Pollution Prevention Plan, the Long-Term Pollution Prevention Plan, and the Operation and Maintenance Plan. As the amount of TSS removal is discretionary, no credit was taken within the calculations for this BMP.
 - b. Deep Sump Catch Basins with Hoods Installed to promote TSS Removal of solids and control floatable pollutants. This BMP has a design rate of 25% TSS Removal.

- c. Subsurface Detention Chambers subsurface detention BMP provides the required groundwater recharge and has a design rate of 80% TSS Removal. Refer to TSS Removal Worksheet included in the Attachments.
- d. Infiltration basin and Sediment Forebay provided to promote the required 80% TSS Removal. Refer to TSS Removal Worksheet in Standard 4 for treatment train.
- e. Safety Fencing Provide 6-FT high chain link fence with lockable gates around detention basin for public safety.
- f. Spill Containment Kit to contain and clean-up spills that could occur on site.
- 4. BMP Maintenance: After construction it is the responsibility of the owner to perform maintenance. The cleaning of the components of the stormwater management system shall generally be as follows:
 - a. Roadway: The owner shall keep the roadway swept with a mechanical sweeper or hand swept semi-annually at a minimum.
 - b. Catch Basins: Shall be cleaned by excavating, pumping or vacuuming four times per year and at the end of foliage and snow removal seasons. The sediment shall be disposed of off-site by the Owner. Inspect quarterly, remove silt when ¹/₄ full.
 - c. Sediment Forebay: Inspect monthly. Clean forebay 4 times per year.
 - d. Subsurface Chambers: Inspect after 2 years of commission using the inspection port via a CCTV and inspect every year thereafter or as needed depending on rainfall and site conditions. Cleaning with high pressure water through culvert cleaning nozzle when sediment accumulation reaches a depth of 3 inches or more. A maintenance log shall be kept for all maintenance activities.
 - e. Infiltration Basins: Preventative maintenance shall be performed at least twice per year. Inspection shall be performed after every major storm for the first three months and twice a year thereafter and when there are discharges through the high outlet orifice. Mowing of the buffer area, and bottom of basin; removal of trash and debris; removal of grass clippings and organic matter to be performed at least twice per year. Pretreatment devices shall be inspected every other month and a least twice a year and after every major storm event.
- 5. Access Provisions: All of the components of the storm water system shall be accessible by the Owner

E. Spill prevention and response plans

- 1. Inventory materials to be present on-site during construction.
- 2. Train employees and subcontractors in prevention and clean up procedures.
- 3. All materials stored on site will be stored in their appropriate containers under a roof.
- 4. Follow manufacturers recommendation for disposal of used containers.
- 5. Store only enough product on site to do the job.
- 6. On site equipment, fueling and maintenance measures:
 - a. Inspect on-site vehicles and equipment daily for leaks.
 - b. Conduct all vehicle and equipment maintenance and refueling in one location, away from storm drains.
 - c. Perform major repairs and maintenance off site.
 - d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
 - e. Collect spent fuels and remove from site.
- 7. Clean up spills.
 - a. Spill Containment Kit to contain and clean-up spills that could occur on site

- b. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean up methods (sawdust, cat litter and/or rags and absorbent pads).
- c. Sweep up dry materials immediately. Never wash them away or bury them.
- d. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil.
- e. Report significant spills to the Fire Department, Conservation Commission and Board of Health.
- <u>F.</u> Provisions for maintenance of lawns, gardens, and other landscaped areas
 Use only organic fertilizer. Dispose of clippings outside of the 100-foot buffer zone to the adjacent wetland.
- <u>G.</u> Requirements for storage and use of herbicides, and pesticides The application of herbicides or pesticides will be done by professional certified contractor.
- <u>H.</u> Provisions for operation and management of septic system Site to be serviced by private on-site sewer.
- I. Requirements for handling of pet waste

Pet waste should never be dumped or washed into the local storm drain system. Waste shall be picked up immediately and placed in bags and properly disposed of in the garbage to be collected and taken to a landfill.

J. Provisions for washing of vehicles

Washing of vehicles shall be done in an area away from sensitive areas and drainage inlets, so as to eliminate wash water from being directly discharged to the local storm drain system. Vehicles should be washed in areas where wash water can be held prior to discharging to the sanitary sewer system or in areas where infiltration precludes runoff to storm drains. Avoid using detergents whenever possible.

- K. Provisions for solid waste management
 - 1. <u>Waste Management Plan</u>
 - a. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
 - b. Do not bury waste and debris on site.
 - c. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
- <u>L.</u> Snow disposal and plowing plans relative to Wetland Resource Areas
 Snow storage is adequate around the site for large storm events. Storage of snow shall not be placed directly near areas adjacent to the proposed infiltration basin.
- <u>M.</u> Winter Road Salt and/or Sand Use and Storage restrictions No sand, salt, or chemicals for de-icing will be stored outside.
- N. Street sweeping schedules

Sweeping, the act of cleaning pavement can be done by mechanical sweepers, vacuum sweeper or hand sweeper. The quantity of sand is a direct correlation with the treatment of ice and snow

and the types of chemicals and spreaders that are being used on site to manage snow. If a liquid de-icer such as calcium chloride is used as a pretreatment to new events the amount of sand is minimized. Sweeping for this site should be done semi-annually at a minimum. Collecting the particulate before it enters the catch basins is cheaper and more environmentally friendly than in a catch basin mixing with oils and greases in the surface water runoff in catch basins.

- O. Provisions for prevention of illicit discharges to the stormwater management system The discharge into the stormwater system is not being violated, see attachment for illicit discharges compliance.
- <u>P.</u> Training the staff or personnel involved with implementing Long-Term Pollution Prevention <u>Plan</u>

The owner shall develop policies and procedures for containing the illicit spilling of oils, soda, beer, paper and litter. These wastes provide a degrading of the water quality. The placement of signs and trash barrels with lids around the site would contribute to a clean water quality site condition.

Q. List of Emergency contacts for implementing Long-Term Pollution Prevention Plan:

Franklin Municipal Affordable Housing Trust c/o Bryan Taberner 355 East Central Street Franklin, MA 02038 Tel: 508-553-4846

This shall be the contact until such time as the project is sold.

R. Estimated BMP Maintenance Costs

The following prices are estimates of the costs associated with maintenance of the proposed site BMPs. Costs provided are only estimates and may not reflect actual costs to perform the work. Actual costs may vary depending on company/personnel performing the work. Actual costs may increase over time.

<u>BMP</u> Pavement sweeping Catch basin cleaning Infiltration Basin Spill Containment Kit Estimated Maintenance Cost \$ 400 per year \$ 200 per catch basin per cleaning \$ 200 per cleaning \$ 750 purchase price

Standard 10: All illicit discharges to the stormwater management system are prohibited.

Standard 10 prohibits illicit discharges to stormwater management systems. The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site, including stormwater best management practices and any pipes intended to transport stormwater to the ground water, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated ground water, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

Illicit Discharge Compliance Statement

It is the intent of the Applicant, Franklin Municipal Affordable Housing Trust c/o Bryan Taberner, 355 East Central Street, Franklin, MA 02038 to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. There will be no connection to the storm water system to inadvertently direct other types of liquids, chemicals or solids into the storm drainage system. The Owner will also promote a clean Green Environment by mitigating spills onto pavements; oils, soda, chemicals, pet waste, debris and litter.

Respectfully Acknowledged,

ATTACHMENTS

Pre- Post Drainage Plans





Hydro CAD Calculations



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2-Year	Event Name		Conditio by Guerri 10.20-4b
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8.19	6.41	5.25	3.39	(inches)	Depth	
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ons LLC		

Area Listing (all nodes)

19.564	12.104	6.124	0.115	1.221	(acres)	Area
66	70	55	74	80		сN
TOTAL AREA	Woods, Good, HSG C (EX-1, EX-2, EX-3)	Woods, Good, HSG B (EX-2, EX-3)	>75% Grass cover, Good, HSG C (EX-4)	1/2 acre lots, 25% imp, HSG C (EX-2)	(subcatchment-numbers)	Description

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Soil Listing (all nodes)

19.564	0.000	0.000	13.440	6.124	0.000	(acres)	Area
	Other	HSG D	HSG C	HSG B	HSG A	Group	Soil
TOTAL AREA			EX-1, EX-2, EX-3, EX-4	EX-2, EX-3		Numbers	Subcatchment

TOTAL AREA

	TOTAL AREA	19.564	0.000	0.000	13.440	6.124	0.000
EX-2, EX-3							
EX-1,	Woods, Good	18.228	0.000	0.000	12.104	6.124	0.000
EX-4	>75% Grass cover, Good	0.115	0.000	0.000	0.115	0.000	0.000
EX-2	1/2 acre lots, 25% imp	1.221	0.000	0.000	1.221	0.000	0.000
Numbers	Cover	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Subcatchment	Ground	Total	Other	HSG-D	HSG-C	HSG-B	HSG-A
		nodes)	overs (all r	Ground C			
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Inflow=0.09 cfs_0.011 a Primary=0.09 cfs_0.011 a	Pond 1P: AP-4
Runoff Area=4,999 sf 0.00% Impervious Runoff Depth=1.16" Flow Length=846' Tc=23.4 min CN=74 Runoff=0.09 cfs 0.011 at	Subcatchment EX-4: EX-4
Runoff Area=204,248 sf 0.00% Impervious Runoff Depth=0.61* Flow Length=464' Tc=15.8 min CN=63 Runoff=1.84 cfs 0.237 af	Subcatchment EX-3: EX-3
Runoff Area=506,133 sf 2.63% Impervious Runoff Depth=0.74" Flow Length=1,199' Tc=35.0 min CN=66 Runoff=3.87 cfs 0.718 af	Subcatchment EX-2: EX-2
Runoff Area=136,828 sf 0.00% Impervious Runoff Depth=0.94" Flow Length=660' Tc=25.8 min CN=70 Runoff=1.74 cfs 0.246 af	Subcatchment EX-1: EX-1
e span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points ff by SCS TR-20 method, UH=SCS, Weighted-CN Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method	Tim Runo Reach routing by
NOAA10 24-hr D 2-Year Rainfall=3.39" non Inc © 2023 HydroCAD Software Solutions LLC Page 6	Existing Conditions rev1 Prepared by Guerriere & Hal HydroCAD® 10.20-4b s/n 00417

Total Runoff Area = 19.564 ac Runoff Volume = 1.212 af Average Runoff Depth = 0.74" 98.44% Pervious = 19.259 ac 1.56% Impervious = 0.305 ac

Pond AP-1: AP-1

Pond AP-2: AP-2

Inflow=3.87 cfs 0.718 af Primary=3.87 cfs 0.718 af

Inflow=1.84 cfs 0.237 af Primary=1.84 cfs 0.237 af Inflow=1.74 cfs 0.246 af Primary=1.74 cfs 0.246 af

Pond AP-3: AP-3
,	
Page 8	HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
Printed 3/13/2024	Prepared by Guerriere & Halnon Inc
D 2-Year Rainfall=3.39"	Existing Conditions rev1 NOAA10 24-h

Summary for Subcatchment EX-2: EX-2

Runoff = 3.87 cfs @ 12.53 hrs, Volume= Routed to Pond AP-2 : AP-2 0.718 af, Depth= 0.74"

Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	1.22	0.0600	455	6.2
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.50	0.0100	274	9 <u>.</u> 1
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.79	0.0250	420	8.9
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.08	0.0300	50	10.8
(S)	(ft/sec) (ct	(ft/ft)	(feet)	(min)
ity Description	Velocity Capac	Slope	Length	Tc
Area	63% Impervious /	2.6	13,300	
rea	.37% Pervious A	97	92,833	4
	eighted Average	66 W	06,133	сл
mp, HSG C	2 acre lots, 25% i	80 1/2	53,200	
3B	oods, Good, HSC	55 W	66,119	-
3C	oods, Good, HSC	70 W	86,814	N
	escription	CN De	rea (sf)	A
ighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	od, UH=SCS, W∈ ainfall=3.39"	R-20 meth 2-Year Ra	y SCS TF 24-hr D	Runoff b NOAA10

35.0 1,199 Total





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ins LLC Page 10	Printed 3/13/2024	VOAA10 24-hr D 2-Year Rainfall=3.39"

Summary for Subcatchment EX-3: EX-3

Runoff = 1.84 cfs @ 12.27 hrs, Volume= 0.237 af, Depth= 0.61" Routed to Pond AP-3 : AP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 2-Year Rainfall=3.39"

2		15.8	1.7	2.6	0.7	10.8	(min)	Tc	20	10	Are
		464	165	214	35	50	(feet)	Length)4,248)4,248)3,604)0,644	ea (sf)
		Tota	0.1000	0.0750	0.0300	0.0300	(ft/ft)	Slope	63	55	CN I
	S		1.58	1.37	0.87	0.08	(ft/sec)	Velocity C	Neighted Ave 100.00% Perv	Noods, Good Noods, Good	Description
Hydro	ubcatcl						(cfs)	apacity	rage vious Are	, HSG C , HSG B	
ograph	chment EX-3: EX-3		Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"		/ Description	ea	ω ()	



Flow (cfs)

		Total	846	23.4
Woodland Kv= 5.0 fps	30	0.1000	N C	2.3
Woodland Kv= 5.0 fps	1 100	0 1000	2	ა ა
Shallow Concentrated Flow,	1.87	0.1400	175	1.6
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	1.12	0.0500	197	2.9
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	1.12	0.0500	113	1.7
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.74	0.0220	96	2.2
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.07	0.0200	50	12.7
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
pacity Description	Velocity Ca	Slope	Length	Tc
us Area	00.00% Pervic	10	4,999	
/er, Good, HSG C	75% Grass co	74 >	4,999	
	escription		ea (sf)	Ą
	all liall-0.09	2-1 cal 14		
Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	od, UH=SCS,	R-20 meth	SCS TF	Runoff by
	4	d 1 ייר ב איי: אר	d to Pond	Route
, Volume= 0.011 af, Depth= 1.16"	@ 12.35 hr	0.09 cfs	; ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Runoff
for Subcatchment EX-4: EX-4	Summarv			
/droCAD Software Solutions LLC Page 11	417 © 2023 H	4b s/n 00	<u>D® 10.20-</u>	HydroCAI
Printed 3/13/2024	Halnon Inc	erriere &	d bv Gue	Prepare
NOAA10 24-hr D 2-Year Rainfall=3.39"	2	tione re	Condi	Evictin

0.095	Ì		HydroCAD® 10.2	Prepared by Gu	Existing Cond
	Hydrograph	Subcatchment EX-4: EX-4	20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC	uerriere & Halnon Inc	Iditions rev1 NOAA10 2
- Runoff			Page 12	Printed 3/13/2024	24-hr D 2-Year Rainfall=3.39"





C



Summary for Pond AP-1: AP-1

[40] Hint: Not Described (Outflow=Inflow)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-1: AP-1





HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software So	Prepared by Guerriere & Halnon Inc	Existing Conditions rev1
lutions LLC Page 16	Printed 3/13/2024	NOAA10 24-hr D 2-Year Rainfall=3.39"

Summary for Pond AP-3: AP-3

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
1.84 cfs @	1.84 cfs @	4.689 ac,
12.27 hrs, Volume=	12.27 hrs, Volume=	0.00% Impervious, Inflow
0.237 af, Atten= 0%, Lag= 0.0 min	0.237 af	Depth = 0.61" for 2-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-3: AP-3



Flow (cfs)

vrea = 19.564 ac Runoff Volume = 3.099 af Average Runoff Depth = 1.90"	Total Runoff A
Inflow=6.25 cfs 0.652 af Primary=6.25 cfs 0.652 af	Pond AP-3: AP-3
Inflow=11.53 cfs 1.840 af Primary=11.53 cfs 1.840 af	Pond AP-2: AP-2
Inflow=4.48 cfs 0.582 af Primary=4.48 cfs 0.582 af	Pond AP-1: AP-1
Inflow=0.20 cfs 0.025 af Primary=0.20 cfs 0.025 af	Pond 1P: AP-4
Runoff Area=4,999 sf 0.00% Impervious Runoff Depth=2.57" Flow Length=846' Tc=23.4 min CN=74 Runoff=0.20 cfs 0.025 af	Subcatchment EX-4: EX-4
Runoff Area=204,248 sf 0.00% Impervious Runoff Depth=1.67" Flow Length=464' Tc=15.8 min CN=63 Runoff=6.25 cfs 0.652 af	Subcatchment EX-3: EX-3
Runoff Area=506,133 sf 2.63% Impervious Runoff Depth=1.90" Flow Length=1,199' Tc=35.0 min CN=66 Runoff=11.53 cfs 1.840 af	Subcatchment EX-2: EX-2
Runoff Area=136,828 sf 0.00% Impervious Runoff Depth=2.22" Flow Length=660' Tc=25.8 min CN=70 Runoff=4.48 cfs 0.582 af	Subcatchment EX-1: EX-1
ne span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points off by SCS TR-20 method, UH=SCS, Weighted-CN y Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method	Tir Run Reach routing b
NOAA10 24-hr D 10-Year Rainfall=5.25" alnon Inc Printed 3/13/2024 7 © 2023 HydroCAD Software Solutions LLC Page 17	Existing Conditions rev1 Prepared by Guerriere & Ha HydroCAD® 10.20-4b s/n 0041

98.44% Pervious = 19.259 ac 1.56% Impervious = 0.305 ac ٩

		Summ	ary for Su	ıbcatchn	ient EX-1:	EX-1	
Runoff = Routed to Pon	4.48 cfs d AP-1 : /	; @ 12.37 AP-1	7 hrs, Volu	ne=	0.582 af,	Depth= 2.22	19
Runoff by SCS TF NOAA10 24-hr D	R-20 meth 10-Year I	ıod, UH=S Rainfall=5	CS, Weight	ed-CN, Tir	ne Span= 0.	00-72.00 hrs	, dt= 0.05 hrs
Area (sf)	CN D	escription					
136,828	70 W	loods, Goo	od, HSG C				
136,828	10	00.00% P∈	ervious Area	1			
Tc Length (min) (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Descriptio	n		
10.8 50	0.0300	0.08		Sheet Flo	¥,		
1.3 70	0.0300	0.87		Woods: L Shallow C	ght underbr	ush n= 0.40 d Flow,	10 P2= 3.02"
8.7 260	0.0100	0.50		Woodland	Oncentrate	d Flow,	
50 280	0 0350	0 04		Shallow (oncentrate	d Flow	

Existing Conditions rev1 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC

NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 utions LLC Page 18

ograph	Hydro				1
hment EX-1: EX-1	Subcato				
			Total	660	25.8
Shallow Concentrated Flow, Woodland Kv= 5.0 fps		0.94	0.0350	280	5.0
Woodland Kv= 5.0 fps					1
Shallow Concentrated Flow,		0.50	0.0100	260	8.7
Woodland Kv= 5.0 fps					
Shallow Concentrated Flow,		0.87	0.0300	70	1 <u>.</u> 3
Woods: Light underbrush n= 0.400 P2= 3.02"					
Sheet Flow,		0.08	0.0300	50	10.8
	(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
Description	Capacity	Velocity	Slope	Length	Tc
ä	ervious Are	00.00% Pe	<u> </u>	36.828	<u>ــ</u>



		Total	1,199	35.0
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.22	0.0600	455	6.2
Woodland Kv= 5.0 fps)		1))
Shallow Concentrated Flow,	0.50	0.0100	274	9 <u>.</u> 1
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.79	0.0250	420	8.9
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.08	0.0300	50	10.8
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
Capacity Description	Velocity (Slope	Length	Тс
vious Area	163% Imper	N	13,300	
ous Area	17.37% Pervi	0 0	92,833	4
erage	Veighted Av	66 V	06,133	СЛ
25% imp, HSG C	/2 acre lots,	80 1	53,200	
1, HSG B	Voods, Good	55 V	66,119	-
1, HSG C	Voods, Good	70 V	86,814	N
	escription	CN	rea (sf)	A
c				
S, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	hod, UH=SC	ק-20 metl ח-Vear	y SCS TF	Runoff b
	7-14			
hrs, Volume= 1.840 af, Depth= 1.90"	s@ 12.50	11.53 cf		Runoff
ry for Subcatchment EX-2: EX-2	Summa			
HydroCAD Software Solutions LLC Page 19	0417 © 2023	4b s/n 0	D® 10.20	HydroCA
Printed 3/13/2024	⊊v i Halnon Inc	erriere &		Prepare
NOAAA 24-hr D 10-Vear Rainfall=5 25"	ž	+:>>>> ====	2 7222	E victin

Existing Conditions rev1 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Flow (cfs) ņ 1 12 00 ŝ 11.53 cfs Subcatchment EX-2: EX-2 Hydrograph Runoff Volume=1.840 af Runoff Area=506,133 sf 10-Year Rainfall=5.25" NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 utions LLC Page 20 NOAA10 24-hr D



28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	6 18 20 22 24 2	10 12 14 1	2468	0
Hydrograph NOAA10 24-hr D 10-Year Rainfall=5.25" Runoff Area=204,248 sf Runoff Volume=0.652 af Runoff Depth=1.67" Flow Length=464' Tc=15.8 min CN=63		02 25 85		Flow (cfs)
bcatchment EX-3: EX-3	S	lota	464	15.8
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.58	0.1000	165	1.7
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.37	0.0750	214	2.6
Shallow Concentrated Flow, Woodland Kv= 5.0 five	0.87	0.0300	35	0.7
pacity Description (cfs) Sheet Flow, Woode: Linkt underbruch n= 0.400 B2= 3.02"	Velocity C (ft/sec) 0.08	Slope (ft/ft) 0.0300	Length (feet) 50	Tc (min) 10.8
HSG B age sus Area	/oods, Good /eighted Ave)0.00% Perv	63 V	00,644 04,248 04,248	2 2 4
HSG C	escription /oods, Good	70 D	ea (sf))3,604	_ ≥
Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	od, UH=SC: Rainfall=5.2	₹-20 meth 10-Year	/ SCS TF 24-hr D	Runoff by NOAA10
s, Volume= 0.652 af, Depth= 1.67"	; @ 12.25 h AP-3	6.25 cfs d AP-3 : /	= d to Ponc	Runoff Route
for Subcatchment EX-3: EX-3	Summar			
NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 ydroCAD Software Solutions LLC Page 21	∾1 Halnon Inc ¹⁴ 17 © 2023	tions re erriere & 4b_s/n_00	g Condi d by Gue 0® 10.20-	Existin Prepare HydroCA

Summary for Subcatching	HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Sc	Prepared by Guerriere & Halnon Inc	Existing Conditions rev1
nt EY_1: EY_1	olutions LLC		NOAA10 24-hr D
	Page 22	Printed 3/13/2024	10-Year Rainfall=5.25"

Summary for Subcatchment EX-4: EX-4

Runoff = 0.20 cfs @ 12.34 hrs, Volume= 0.025 af, Depth= 2.57" Routed to Pond 1P : AP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 10-Year Rainfall=5.25"

Woodland Kv= 5.0 fps				202
Shallow Concentrated Flow.	1.58	0.1000	215	2.3
Woodland Kv= 5.0 fps				
Woodland Kv= 5.0 tps Shallow Concentrated Flow	1 87	0 1400	175	16
Shallow Concentrated Flow,	1.12	0.0500	197	2.9
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	1.12	0.0500	113	1.7
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.74	0.0220	96	2.2
Woods: Light underbrush n= 0.400 P2= 3				
Sheet Flow,	0.07	0.0200	50	12.7
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
acity Description	Velocity Cap	Slope	Length	Тс
s Area	0.00% Perviou	10	4,999	
Ir, Good, HSG C	5% Grass cove	74 >7	4,999	
	scription	CN De	ea (sf)	Ar

Existing Conditions rev1 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 Page 23

Subcatchment EX-4: EX-4



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Summary for Pond 1P: AP-4

[40] Hint: Not Described (Outflow=Inflow)

^o rimary =	nflow =	nflow Area
		П
0.20 cfs @	0.20 cfs @	0.115 ac,
12.34 hrs, Volume=	12.34 hrs, Volume=	0.00% Impervious, Inflov
0.025 af, Atten= 0%, Lag= 0.0 min	0.025 af	v Depth = 2.57" for 10-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond 1P: AP-4







Summary for Pond AP-2: AP-2

[40] Hint: Not Described (Outflow=Inflow)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-2: AP-2



0	Flow (cfs)	6 · · · ·	7	Routing t	Inflow Ar Inflow Primary	[40] Hint:		Existinį Prepare HydroCAI
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)		6.25 ofs	Pond AP-3: AP-3 Hydrograph	y Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	ea = 4.689 ac, 0.00% Impervious, Inflow Depth = 1.67" for 10-Year event = 6.25 cfs @ 12.25 hrs, Volume= 0.652 af = 6.25 cfs @ 12.25 hrs, Volume= 0.652 af, Atten= 0%, Lag= 0.0 min	Not Described (Outflow=Inflow)	Summary for Pond AP-3: AP-3	g Conditions rev1 d by Guerriere & Halnon Inc <u>90 10.20-4b</u> s/n 00417 @ 2023 HydroCAD Software Solutions LLC Page 27

Primary=6.36 cts 0.85 Inflow=17.08 cts 2.66 Primary=17.08 cts 2.66	Pond AP-2: AP-2
Inflow=6.38 cfs	Pond AP-1: AP-1
Inflow=0.28 cfs(Primary=0.28 cfs(Pond 1P: AP-4
Runoff Area=4,999 sf 0.00% Impervious Runoff Dept Flow Length=846' Tc=23.4 min CN=74 Runoff=0.28 cfs (Subcatchment EX-4: EX-4
Runoff Area=204,248 sf 0.00% Impervious Runoff Dept Flow Length=464' Tc=15.8 min CN=63 Runoff=9.53 cfs 0	Subcatchment EX-3: EX-3
Runoff Area=506,133 sf 2.63% Impervious Runoff Dept Flow Length=1,199' Tc=35.0 min CN=66 Runoff=17.08 cfs 2	Subcatchment EX-2: EX-2
Runoff Area=136,828 sf 0.00% Impervious Runoff Dept Flow Length=660' Tc=25.8 min CN=70 Runoff=6.38 cfs (Subcatchment EX-1: EX-1
span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points f by SCS TR-20 method, UH=SCS, Weighted-CN Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method	Time Runof Reach routing by
NOAA10 24-hr D 25-Year Rainfall on Inc © 2023 HydroCAD Software Solutions LLC	Existing Conditions rev1 Prepared by Guerriere & Halr HydroCAD® 10.20-4b s/n 00417

 Total Runoff Area = 19.564 ac
 Runoff Volume = 4.479 af
 Average Runoff Depth = 2.75"

 98.44% Pervious = 19.259 ac
 1.56% Impervious = 0.305 ac

Inflow=9.53 cfs 0.964 af Primary=9.53 cfs 0.964 af

Pond AP-3: AP-3

0 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)) 12 14 16 18 2	2 4 6 8 10	0
NOAA10 24-hr D 25-Year Rainfall=6.41" Runoff Area=136,828 sf Runoff Volume=0.820 af Runoff Depth=3.13" Flow Length=660' Tc=25.8 min CN=70			Flow (cfs)
Subcatchment EX-1: EX-1			
	otal	660 Ti	25.8
0.94 Shallow Concentrated Flow, Woodland Kv= 5.0 fps	0350	280 0.	5.0
0.50 Shallow Concentrated Flow, Woodland Kv= 5.0 fps	0100	260 0.	8.7
0.87 Shallow Concentrated Flow, Woodland Ky=50 frs	0300	70 0.	1.3
0.08 Sheet Flow, Woode: Licht underbrich n= 0.400 B2- 3.02"	0300	50 0.	10.8
scity Capacity Description	Slope Velo (ft/ft) (ft/;	Length (feet)	(min)
ption <u>, Good, HSG C</u>)% Pervious Area	N Descri 70 Woods 100.00	ea (sf) C 6,828 7 6,828	Are 13 13
JH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs fall=6.41"	0 method, U -Year Raint	SCS TR-2 24-hr D 25	Runoff by NOAA10 2
12.37 hrs, Volume= 0.820 af, Depth= 3.13"	. 38 cfs @ ∖P-1 : AP-1	= 6 I to Pond A	Runoff Routec
Immary for Subcatchment EX-1: EX-1	S		
NOAA10 24-hr D 25-Year Rainfall=6.41" non Inc © 2023 HydroCAD Software Solutions LLC Page 29	ons rev1 iere & Halr s/n 00417	Conditic by Guerri ® 10.20-4b	Existing Prepared HydroCAD

Page 30	HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
Printed 3/13/2024	Prepared by Guerriere & Halnon Inc
D 25-Year Rainfall=6.41"	Existing Conditions rev1 NOAA10 24-hr

Summary for Subcatchment EX-2: EX-2

Runoff = 17.08 cfs @ 12.49 hrs, Volume= Routed to Pond AP-2 : AP-2 2.661 af, Depth= 2.75"

Runoff by SCS NOAA10 24-h	8 TR-2(r D 25) meth -Year F	od, UH=S(Rainfall=6.	CS, Weight 41"	ad-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Area (s	f) CI	N De	escription		
286,81	4 7	0 W	oods, Goc	od, HSG C	
166,11	95	თ ≶	oods, Goc	od, HSG B	
53,20	0 8	0 1/:	2 acre lots	, 25% imp,	HSG C
506,13	ພ ດ	6 ∀	eighted Av	verage	
492,83	ŵ	97	.37% Pen	vious Area	
13,30	ō	2.0	53% Impe	rvious Area	
Tc Leng	gth o	lope	Velocity	Capacity	Description
(min) (fe	et)	(ft/ft)	(ft/sec)	(cfs)	
10.8	50 0.1	0300	0.08		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.02"
8.9 4	20 0.1	0250	0.79		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
9 <u>.</u> 1 2	74 0.1	0100	0.50		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
6.2 4	55 0.1	0600	1.22		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps

35.0 1,199 Total



Subcatchment EX-2: EX-2



Existing Conditions rev1 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC NOAA10 24-hr D 25-Year Rainfall=6.41" Printed 3/13/2024

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Summary for Subcatchment EX-3: EX-3

Runoff = 9.53 cfs @ 12.25 hrs, Volume= Routed to Pond AP-3 : AP-3 0.964 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 25-Year Rainfall=6.41"

		15.8	1.7	2.6	0.7	10.8	(min)	Tc	20	20	1	1	Ą
		464	165	214	35	50	(feet)	Length	04,248	04,248	00,644	03,604	ea (sf)
		Total	0.1000	0.0750	0.0300	0.0300	(ft/ft)	Slope		63 /	55 /	70 /	CN
			1.58	1.37	0.87	0.08	(ft/sec)	Velocity	100.00% Pe	Neighted A	Noods, Goo	Noods, Goo	Description
Hydro	Subcatcl						(cfs)	Capacity	ervious Area	verage	od, HSG B	od, HSG C	
ograph	shment EX-3: EX-3		Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"		Description	20				



		Total	846	23.4
Woodland Kv= 5.0 fps				ľ
Woodland Kv= 5.0 Tps Shallow Concentrated Flow	1 72	n 1000	217	2
Shallow Concentrated Flow,	0 1.87	0.1400	175	1.6
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0 1.12	0.0500	197	2.9
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0 1.12	0.0500	113	1.7
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.74	0.0220	96	2.2
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.07	0.0200	50	12.7
(cfs)) (ft/sec	(ft/ft	(feet)	(min)
Capacity Description	elocity	Slope	Length	Tc
Pervious Area	100.00% F		4,999	
ss cover, Good, HSG C	>75% Gra	74	4,999	
	Descriptio	CN	rea (sf)	A
SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs 6.41"	sthod, UH= ar Rainfall=	₹-20 me 25-Yea	y SCS TF 24-hr D	Runoff b
	лр <u>-</u> 4	d 1P : A	ed to Pon	Route
34 hrs, Volume= 0.034 af, Depth= 3.53"	ofs @ 12.	0.28 0		Runoff
narv for Subcatchment EX-4: EX-4	Sumi			
023 HydroCAD Software Solutions LLC Page 33	00417 © 21	-4b s/n (D® 10.20	HydroCA
Inc Printed 3/13/2024	& Halnon	erriere	d by Gu	Prepare
NOAA10 24-hr D 25-Year Rainfall=6 41"		itione	2 Cond	Evictin

HydroCAD® 10.20-4b s/n 0041/ © 2023 HydroCAD Sottware :	Prepared by Guerriere & Halnon Inc	Existing Conditions rev1
Solutions LLC	Pri	NOAA10 24-hr D 25-Year
Page 34	inted 3/13/2024	Rainfall=6.41"

Subcatchment EX-4: EX-4





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olutions LLC		NOAA10 24-hr D
Page 36	Printed 3/13/2024	25-Year Rainfall=6.41"

Summary for Pond AP-1: AP-1

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
6.38 cfs @	6.38 cfs @	3.141 ac,
12.37 hrs, Vo	12.37 hrs, Vo	0.00% Imperv
olume=	olume=	vious, Inflow D
0.820 af, Atte	0.820 af	epth = 3.13"
en= 0%, Lag= 0.0 m		for 25-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-1: AP-1





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	olutions LLC		NOAA10 24-hr D
,	Page 38	Printed 3/13/2024	25-Year Rainfall=6.41"

Summary for Pond AP-3: AP-3

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
9.53 cfs @	9.53 cfs @	4.689 ac,
12.25 hrs, Volume=	12.25 hrs, Volume=	0.00% Impervious, Inflow I
0.964 af, Atten= 0%, Lag= 0.0 min	0.964 af	Depth = 2.47" for 25-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-3: AP-3



rea = 19.564 ac Runoff Volume = 6.784 af Average Runoff Depth = 4.16"	Total Runoff A
Inflow=15.00 cfs 1.492 af Primary=15.00 cfs 1.492 af	Pond AP-3: AP-3
Inflow=26.22 cfs 4.032 af Primary=26.22 cfs 4.032 af	Pond AP-2: AP-2
Inflow=9.46 cfs 1.211 af Primary=9.46 cfs 1.211 af	Pond AP-1: AP-1
Inflow=0.40 cfs 0.049 af Primary=0.40 cfs 0.049 af	Pond 1P: AP-4
Runoff Area=4,999 sf 0.00% Impervious Runoff Depth=5.10" Flow Length=846' Tc=23.4 min CN=74 Runoff=0.40 cfs 0.049 af	Subcatchment EX-4: EX-4
Runoff Area=204,248 sf 0.00% Impervious Runoff Depth=3.82" Flow Length=464' Tc=15.8 min CN=63 Runoff=15.00 cfs 1.492 af	Subcatchment EX-3: EX-3
Runoff Area=506,133 sf 2.63% Impervious Runoff Depth=4.16" Flow Length=1,199' Tc=35.0 min CN=66 Runoff=26.22 cfs 4.032 af	Subcatchment EX-2: EX-2
Runoff Area=136,828 sf 0.00% Impervious Runoff Depth=4.63" Flow Length=660' Tc=25.8 min CN=70 Runoff=9.46 cfs 1.211 af	Subcatchment EX-1: EX-1
ie span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points iff by SCS TR-20 method, UH=SCS, Weighted-CN 'Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method	Tin Runc Reach routing by
NOAA10 24-hr D 100-Year Rainfall=8.19" Inon Inc Printed 3/13/2024 © 2023 HydroCAD Software Solutions LLC Page 39	Existing Conditions rev1 Prepared by Guerriere & Ha HydroCAD® 10.20-4b s/n 00417

98.44% Pervious = 19.259 ac 1.56% Impervious = 0.305 ac ŋ

	NOAA10 24-hr D Solutions LLC ment EX-1: EX-1	Summary for Subcatchi	HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software	Prepared by Guerriere & Halnon Inc	Existing Conditions rev1
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5

Runoff = 9.46 cfs @ 12.36 hrs, Volume= Routed to Pond AP-1 : AP-1 1.211 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 100-Year Rainfall=8.19"

/drograph	H.			
atchment EX-1: EX-1	Subca			
		Total	660	25.8
Snallow Concentrated Flow, Woodland Kv= 5.0 fps	0.94	0.0350	780	5.0
Woodland Kv= 5.0 fps			200	r D
Shallow Concentrated Flow,	0.50	0.0100	260	8.7
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.87	0.0300	70	1.3
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.08	0.0300	50	10.8
(S)	(ft/sec) (cf.	(ft/ft)	(feet)	(min)
ity Description	Velocity Capaci	Slope	Length	Тс
		ġ	00,000	
Area	0.00% Pervious /	100	36.828	_
3C	ods, Good, HSG	70 Wo	36,828	
	scription	CN De	rea (sf)	A



		Total	1,199	35.0
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.22	0.0600	455	6.2
Woodland Kv= 5.0 fps				•
Shallow Concentrated Flow,	0.50	0.0100	274	9 <u>.</u> 1
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	0.79	0.0250	420	8.9
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.08	0.0300	50	10.8
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
apacity Description	Velocity C	Slope	Length	Tc
ous Area	163% Imperv	N	13,300	
us Area	17 37% Pervic		92,833	4
age	Veighted Ave	V 99	06,133	СЛ
5% imp, HSG C	/2 acre lots, 2	80 1	53,200	
HSG B	Voods, Good	55 <	66,119	-
HSG C	Voods, Good	70 V	86,814	2
	Description	CN	rea (sf)	A
, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs g ^r	hod, UH=SCS	₹-20 met	y SCS TF	Runoff b
	AP-2	d AP-2 :	ed to Pon	Route
rs, Volume= 4.032 af, Depth= 4.16"	s@ 12.49 h	26.22 cf	II	Runoff
v for Subcatchment EX-2: EX-2	Summar			
HydroCAD Software Solutions LLC Page 41	0417 © 2023	4b s/n 0	D® 10.20	HydroCA
Printed 3/13/2024	, Halnon Inc	erriere 8	d by Gu	Prepare
NOAA10 24-hr D 100-Year Rainfall=8.19"	9V1	itions re	a Condi	Existin





18 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	3 18 20 22 24 26	10 12 14 16	2468	0
	ļ			°
		7		2
CN=63				4 6
Tc=15.8 min				<u>σ</u> c
Flow Length=464'				F 8 7
Runoff Depth=3.82"				low (
Runoff Volume=1.492 af				cfs) φ_ີ
Runoff Area=204,248 sf				-1
100-Year Rainfall=8.19"				12 13
NOAA10 24-hr D				14
- Runoff		15.00 cfs		5 6
Hydrograph				÷
bcatchment EX-3: EX-3	S			
		Total	464	15.8
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.58	0.1000	165	1.7
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.37	0.0750	214	2.0
Woodland Kv= 5.0 fps	201	00750	2	5
Shallow Concentrated Flow,	0.87	0.0300	35	0.7
Sheet Flow,	0.08	0.0300	50	10.8
pacity Description (cfs)	Velocity ((ft/sec)	Slope (ft/ft)	Length (feet)	Tc (min)
ge us Area	eighted Ave 00.00% Perv	63 10 W)4,248)4,248	2 2
HSG C HSG B	oods, Good	55 /0 W W)3,604)0,644	
	escription		ea (sf)	A
Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs }"	od, UH=SC: Rainfall=8	₹-20 meth 100-Year	/ SCS TF 24-hr D	Runoff by NOAA10
s, Volume= 1.492 af, Depth= 3.82"	@ 12.25 h \P-3	15 00 cfs d AP -3 : A	= d to Pond	Runoff Route
for Subcatchment EX-3: EX-3	Summa			
Printed 3/13/2024 Printed 3/13/2024 Page 43	Halnon Inc 417 © 2023	erriere & 4b_s/n_00	d by Gue	Prepare HydroCAI
NOAA10 24-hr D 100-Year Rainfall=8.19"	4	tions re	y Condi	Existing

HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software	Prepared by Guerriere & Halnon Inc	Existing Conditions rev1
Solutions LLC	٩	NOAA10 24-hr D 100-Yea
Page 44	⁹ rinted 3/13/2024	ar Rainfall=8.19"

Summary for Subcatchment EX-4: EX-4

Runoff = 0.40 cfs @ 12.33 hrs, Volume= 0.049 af, Depth= 5.10" Routed to Pond 1P : AP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 100-Year Rainfall=8.19"

Area (sf) CN Description 4.999 74 >75% Grass cover, Good, HSG C 4.999 100.00% Pervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) Sheet Flow, 12.7 50 0.0200 0.07 Wheet Flow, Woods: Light underbrush n=0.400 P2= 3.02" 12.7 50 0.0220 0.74 Shallow Concentrated Flow, Woodland Kv= 5.0 fps 1.7 113 0.0500 1.12 Shallow Concentrated Flow, Woodland Kv= 5.0 fps 2.9 197 0.0500 1.12 Shallow Concentrated Flow, Woodland Kv= 5.0 fps Woodland Kv= 5.0 fps How, 1.6 175 0.1400 1.87 Woodland Kv= 5.0 fps 2.3 215 0.1000 1.58 Shallow Concentrated Flow, Woodland Kv= 5.0 fps Moodland Kv= 5.0 fps Moodland Kv= 5.0 fps 2.3 215 0.1000 1.58 Shallow Concentrated Flow,				Total	846	23.4
Area (sf) CN Description 4.999 74 >75% Grass cover, Good, HSG C 4.999 100.00% Pervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) Sheet Flow, 12.7 50 0.0220 0.74 Woods: Light underbrush n=0.400 P2= 3.02" 1.7 113 0.0500 1.12 Shallow Concentrated Flow, Voodland Kv= 5.0 fps 2.9 197 0.0500 1.12 Shallow Concentrated Flow, Voodland Kv= 5.0 fps 1.6 175 0.1400 1.87 Shallow Concentrated Flow, Woodland Kv= 5.0 fps 1.6 175 0.1400 1.87 Woodland Kv= 5.0 fps How,	Shallow Concentrated Flow,		1.58	0.1000	215	2.3
Area (sf) CN Description 4.999 74 >75% Grass cover, Good, HSG C 4.999 74 >75% Grass cover, Good, HSG C Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) Sheet Flow, 12.7 50 0.0200 0.07 Sheet Flow, Voods: Light underbrush n=0.400 P2= 3.02" 2.2 96 0.0220 0.74 Shallow Concentrated Flow, Woodland Kv= 5.0 fps 1.7 113 0.0500 1.12 Woodland Kv= 5.0 fps Shallow Concentrated Flow, 2.9 197 0.0500 1.12 Woodland Kv= 5.0 fps Woodland Kv= 5.0 fps Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps		1 <u>.</u> 87	0.1400	175	1.6
Area (sf) CN Description 4.999 74 >75% Grass cover, Good, HSG C 4.999 100.00% Pervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) Image: Concentrated Flow, 12.7 50 0.0220 0.74 Sheet Flow, Shallow Concentrated Flow, 2.2 96 0.0220 0.74 Shallow Concentrated Flow, Woodland Kv= 5.0 fps 1.7 113 0.0500 1.12 Woodland Kv= 5.0 fps Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps		1.12	0.0500	197	2.9
Area (sf) CN Description 4,999 74 >75% Grass cover, Good, HSG C 4,999 74 >75% Grass cover, Good, HSG C Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/scc) (cfs) Sheet Flow, 12.7 50 0.0200 0.07 Woods: Light underbrush n=0.400 P2= 3.02" 2.2 96 0.0220 0.74 Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps		1.12	0.0500	113	1.7
Area (sf) CN Description 4,999 74 >75% Grass cover, Good, HSG C 4,999 100.00% Pervious Area Tc Length Slope (min) (feet) (ft/h) (12.7 50 0.0200 0.07 Sheet Flow, Woods: Light underbrush n= 0.400	Shallow Concentrated Flow, Woodland Kv= 5.0 fps		0.74	0.0220	96	2.2
Area (sf) CN Description 4,999 74 >75% Grass cover, Good, HSG C 4,999 100.00% Pervious Area Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"		0.07	0.0200	50	12.7
Area (sf) CN Description 4,999 74 >75% Grass cover, Good, HSG C 4,999 100.00% Pervious Area	Description	Capacity (cfs)	Velocity (ft/sec)	Slope (ft/ft)	Length (feet)	Tc (min)
Area (sf) CN Description 4,999 74 >75% Grass cover, Good, HSG C	ŭ	ervious Are	00.00% P€	-	4,999	
Area (sf) CN Description	ood, HSG C	s cover, Go	75% Gras	74 >	4,999	
			escription	CN D	rea (sf)	A



Subcatchment EX-4: EX-4



Existing Conditions rev1 NOAA10 2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024

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Summary for Pond 1P: AP-4

[40] Hint: Not Described (Outflow=Inflow)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond 1P: AP-4





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olutions LLC		NOAA10 24-hr D
Page 48	Printed 3/13/2024	100-Year Rainfall=8.19"

Summary for Pond AP-2: AP-2

[40] Hint: Not Described (Outflow=Inflow)

³ rimary = 26.22 cfs	nflow = 26.22 cfs	nflow Area = 11.619 a
3 @ 12.49 hrs	3@ 12.49 hrs	₃c, 2.63% Im
s, Volume=	s, Volume=	pervious, Inf
4.032 af, Atte	4.032 af	low Depth = 4.16"
n= 0%, Lag= 0.0 min		for 100-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-2: AP-2



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Multi-Event Tables Printed 3/13/2024 Page 50

Events for Subcatchment EX-1: EX-1

100-Year	25-Year	10-Year	2-Year	Event Rai (incl
8 <u>.</u> 19	6.41	5.25	3.39	nfall hes)
9.46	6.38	4.48	1.74	Runoff (cfs)
1 <u>.</u> 211	0.820	0.582	0.246	Volume (acre-feet) (
4 <u>.</u> 63	<u>3.</u> 13	2.22	0.94	Depth (inches)

4 <u>.</u> 16	4.032	26 <u>.</u> 22	8 <u>.</u> 19	100-Year
2.75	2.661	17.08	6.41	25-Year
1.90	1.840	11.53	5.25	10-Year
0.74	0.718	3.87	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event
Subcatchr	Events for			
CAD Softwa	Ilnon Inc 7 © 2023 Hydrol	tions rev1 prriere & Ha 4b_s/n 00417	g Condit d by Gue 0® 10.20-/	Existing Prepared HydroCAI

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nment EX-2: EX-2

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Events for Subcatchment EX-3: EX-3

<u>3.82</u>	1.492	15.00	8 <u>.</u> 19	100-Year
2.47	0.964	9.53	6.41	25-Year
1.67	0.652	6.25	5.25	10-Year
0.61	0.237	1.84	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event

5.10	0.049	0.40	8 <u>.</u> 19	100-Year
3.53	0.034	0.28	6.41	25-Year
2.57	0.025	0.20	5.25	10-Year
1.16	0.011	0.09	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event
Subcatchment EX-4: EX-	Events for \$			
AD Software Solutions LLC	non Inc © 2023 Hydro(iere & Hal s/n 00417	d by Guerr 10.20-4b	Existing Preparec HydroCAE

ent EX-4: EX-4

· —	Rainfall (inches) 3.39	Runoff (cfs) 0.09	Volume (acre-feet) 0.011	
	3.39	0.09	0.011	
	5.25	0.20	0.025	
	6.41	0.28	0.034	

Existing Conditions rev1 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Events for Pond 1P: AP-4

Event	Inflow	Primary	Elevation	Storage
	(cfs)	(cfs)	(feet)	(acre-feet)
2-Year	0.09	0.09	0.00	0.000
10-Year	0.20	0.20	0.00	0.000
25-Year	0.28	0.28	0.00	0.000
100-Year	0.40	0.40	0.00	0.000

Multi-Event Tables Printed 3/13/2024 Page 54

0.000	0.00	9.46	<u>9.46</u>	100-Year
0.000	0.00	6.38	6 <u>.</u> 38	25-Year
0.000	0.00	4.48	4.48	10-Year
0.000	0.00	1.74	1.74	2-Year
(acre-feet)	(feet)	(cfs)	(cfs)	
Storage	Elevation	Primary	Inflow	Event
for Pond AP-1: AP-1	Events t			
AD Software Solutions LLC	2023 HydroC,	n 00417 ©	10.20-4b s/	HydroCAD®
	5	s rev1	Condition	Existing

0.000	0.00	26.22	26.22	100-Year
0.000	0.00	17.08	17.08	25-Year
0.000	0.00	11.53	11.53	10-Year
0.000	0.00	3.87	3.87	2-Year
(acre-feet)	(feet)	(cfs)	(cfs)	
Storage	Elevation	Primary	Inflow	Event
for Pond AP-2: AP-2	Events			
AD Software Solutions LLC	in Inc 2023 HydroC	s rev1 e & Halno h 00417 ©	Sondition: by Guerrier 10.20-4b s/	Existing C Prepared b HydroCAD®

Multi-Event Tables Printed 3/13/2024 Page 56

0.000	0.00	9.53	9.53	25-Year	
0.000	0.00	6.25	6.25	10-Year	
0.000	0.00	1.84	1.84	2-Year	
acre-feet)	(feet) (i	(cfs)	(cfs)		
Storage	Elevation	Primary	Inflow	Event	
· Pond AP-3: AP-3	Events for				
Software Solutions LLC	2023 HydroCAD	'n 00417 ©	10.20-4b s	HydroCAD®	
)) 	in Inc	e & Halnc	by Guerrier	Prepared b	
		s rev1	Condition	Existing (

100-Year

15.00

1<u>5.</u>00

0.00

0.000

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Existing Conditions rev1 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC

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 48 Pond AP-2: AP-3

 49 Pond AP-3: AP-3

`onditions rev1 y Guerriere & Halnon Inc 10.20-4b s/n 00417	HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions L	Prepared by Guerriere & Halnon Inc	Existing Conditions rev1
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50 51 52	I-Event Tables Subcat EX-1: EX-1 Subcat EX-2: EX-2 Subcat EX-3: EX-3
5 Z	Subcat EX-3: EX-3
53	Subcat EX-4: EX-4
54	Pond 1P: AP-4
55	Pond AP-1: AP-1
50	Pond AP-2: AP-2

57 Pond AP-3: AP-3

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Event# Event 4 ω N - 1 2-Year NOAA10 24-hr D 2 10-Year NOAA10 24-hr D 3 25-Year NOAA10 24-hr D 4 100-Year NOAA10 24-hr D Name Storm Type Rainfall Events Listing (selected events) Curve Mode Default Default Default Default Duration B/B (hours) 24.00 1 24.00 1 24.00 1 24.00 1 24.00 1 Depth AMC (inches) 3.39 2 5.25 2 6.41 2 8.19 2

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Area Listing (all nodes)

19.567	8.697	2.388	0.000	0.530	0.000	0.556	0.049	1.188	0.882		1.763	2.273	0.002	1.238	(acres)	Area
73	70	55	86	86	86	86	86	86	86		74	61	0	80		СХ
TOTAL AREA	Woods, Good, HSG C (PR-1, PR-10, PR-2, PR-3, PR-8, PR-9)	Woods, Good, HSG B (PR-1, PR-3, PR-7, PR-8)	Water Surface, HSG C (PR-5)	Water Surface, HSG B (PR-1, PR-2, PR-3, PR-4, PR-5)	Unconnected pavement, HSG B (PR-3)	Roofs, HSG C (PR-4, PR-5, PR-6)	Roofs, HSG B (PR-2, PR-4, PR-6)	Paved parking, HSG C (PR-1, PR-2, PR-3, PR-4, PR-5)	Paved parking, HSG B (PR-1, PR-2, PR-3, PR-4, PR-5, PR-7, PR-8)	PR-9)	>75% Grass cover, Good, HSG C (PR-1, PR-10, PR-2, PR-3, PR-4, PR-5, PR-8,	>75% Grass cover, Good, HSG B (PR-1, PR-2, PR-3, PR-4, PR-5, PR-7, PR-8)	>75% Grass cover, Good (PR-5)	1/2 acre lots, 25% imp, HSG C (PR-10)	(subcatchment-numbers)	Description

19.567	0.002 Other	0.000 HSG D	13.442 HSG C	6.122 HSG B	0.000 HSG A	(acres) Group	Area Soil		Proposed Conditions re Prepared by Guerriere & H HydroCAD® 10.20-4b s/n 004:
TOTAL AREA	PR-5		PR-1, PR-10, PR-2, PR-3, PR-4, PR-5, PR-6, PR-8, PR-9	PR-1, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8		Numbers	Subcatchment	Soil Listing (all nodes)	√2 Ialnon Inc Printed 3/13/2024 17 © 2023 HydroCAD Software Solutions LLC Page 4

0.00		0.00	0.00	0.00	0.00	(acre 0.00	Propose Prepared HydroCAD
8		8	00	0	0		@ 10.20
6 <u>.</u> 122		2.388	0.000	0.049	0.882	acres) 0.000 2.273	erriere &
13.442		8.697	0.000	0.556	1.188	(acres) 1.238 1.763	rev2 Halnon In)417 © 202
0.000		0 <u>.</u> 000	0.000	0.000	0.000	(acres) 0.000 0.000	c <u>3 HydroCAD</u> Ground C
0.002		0 <u>000</u>	0.000	0.000	0.000	(acres) 0.000 0.002	Software Sc overs (all I
19 <u>.</u> 567		11.086	0.000 0.530	0.605	2.070	(acres) 1.238 4.039	nodes)
TOTAL AREA		Woods, Good	Unconnected pavement Water Surface	Roofis	Paved parking	Cover 1/2 acre lots, 25% imp >75% Grass cover, Good	Printed
	PR-10, PR-2, PR-3, PR-7, PR-8, PR-8,	PR-2, PR-3, PR-4, PR-5,	PR-4, PR-6, PR-6, PR-1,	PR-2, PR-4, 3, 9 PR-4, 4, 2, 9 PR-7, 5, 4, 3, 2, 9 PR-2, 8	PR-10, PR-2, PR-4, PR-4, PR-7, PR-7, PR-7, PR-9, PR-9, PR-9, PR-1,	Numbers PR-10 PR-1,	3/13/2024 Page 5

Propos Prepared HydroCAL	ed Condit d by Guerri 0® 10.20-4b	ions rev2 ere & Haln s/n 00417 (on Inc © 2023 Hydro(CAD Softw	are Solutic	ons LLC		Printed 3	3/13/2024 Page 6	
			Pipe	Listing (all nodes	<u>s</u>				
Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	Þ	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	PR-1	0.00	0.00	293.0	0.0610	0.013	0.0	12.0	0.0	
2	PR-2	0.00	0.00	336.0	0.0075	0.013	0.0	18.0	0.0	
ω	4P	355.00	354.00	200.0	0.0050	0.013	0.0	12.0	0.0	
4	6P	354.00	346.00	68.3	0.1171	0.013	0.0	12.0	0.0	
5	7P	357.57	357.42	30.0	0.0050	0.013	0.0	12.0	0.0	
6	8P	359.18	358.75	86.0	0.0050	0.010	0.0	12.0	0.0	
7	10P	320.00	318.00	60.0	0.0333	0.013	0.0	18.0	0.0	
8	12P	359.60	358.94	131.1	0.0050	0.013	0.0	15.0	0.0	
6	14P	358.80	358.65	15.3	0.0098	0.013	0.0	18.0	0.0	

Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 Hyc	NOAA10 24-hr D 2-Year Rainfall=3.39" Printed 3/13/2024 roCAD Software Solutions LLC Page 7
Time span=0.00 Runoff by SCS T Reach routing by Dyn-Stor-In	J-72.00 hrs, dt=0.05 hrs, 1441 points R-20 method, UH=SCS, Weighted-CN d method - Pond routing by Dyn-Stor-Ind method
Subcatchment PR-1: To Basin #1	Runoff Area=133,315 sf 34.47% Impervious Runoff Depth=1.35" Flow Length=819' Tc=17.4 min CN=77 Runoff=3.27 cfs 0.344 af
Subcatchment PR-10: WESTERN	Runoff Area=206,274 sf 6.53% Impervious Runoff Depth=1.11" Flow Length=756' Tc=29.2 min CN=73 Runoff=2.99 cfs 0.437 af
Subcatchment PR-2: To Basin #2	Runoff Area=59,024 sf 41.78% Impervious Runoff Depth=1.69" Flow Length=472' Tc=14.3 min CN=82 Runoff=2.01 cfs 0.191 af
Subcatchment PR-3: To Infiltration Basin	Runoff Area=82,428 sf 33.99% Impervious Runoff Depth=1.48" Tc=6.0 min CN=79 Runoff=3.37 cfs 0.234 af
Subcatchment PR-4: To Detention Basin	#1Runoff Area=16,000 sf 92.34% Impervious Runoff Depth=2.83" Tc=6.0 min CN=95 Runoff=1.15 cfs 0.087 af
Subcatchment PR-5: To Detention Basin	#2Runoff Area=19,916 sf 68.53% Impervious Runoff Depth=2.17" Tc=6.0 min CN=88 Runoff=1.18 cfs 0.083 af
Subcatchment PR-6: ROOF SOUTH	Runoff Area=12,492 sf 100.00% Impervious Runoff Depth=3.16" Tc=6.0 min CN=98 Runoff=0.94 cfs 0.075 af
Subcatchment PR-7: UNCAPTURED TO	Runoff Area=49,112 sf 0.09% Impervious Runoff Depth=0.41" Flow Length=275' Tc=8.6 min CN=58 Runoff=0.29 cfs 0.039 af
Subcatchment PR-8: UNCAPTURED TO	Runoff Area=137,043 sf 0.01% Impervious Runoff Depth=0.52" Flow Length=301' Tc=11.3 min CN=61 Runoff=1.15 cfs 0.137 af
Subcatchment PR-9: UNCAPTURED TO	Runoff Area=136,727 sf 0.00% Impervious Runoff Depth=0.94" Flow Length=660' Tc=25.8 min CN=70 Runoff=1.74 cfs 0.246 af
Pond 1P: AP-4	Primary=0.00 cfs 0.000 af
Pond 4P: Infiltration Basin #2 Discarded=0.13 (Peak Elev=358.37' Storage=4,204 cf Inflow=1.60 cfs 0.348 af xfs 0.247 af Primary=0.35 cfs 0.101 af Outflow=0.48 cfs 0.348 af
Pond 6P: Infiltration Basin #3 Discarded=0.15	Peak Elev=357.15' Storage=4,796 cf Inflow=3.82 cfs 0.303 af xfs 0.303 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.303 af
Pond 7P: Detention Basin #1	Peak Elev=361.90' Storage=900 cf Inflow=1.15 cfs 0.087 af Outflow=0.95 cfs 0.087 af
Pond 8P: Detention Basin #2	Peak Elev=360.51' Storage=1,728 cf Inflow=1.18 cfs 0.083 af Outflow=0.07 cfs 0.079 af
Pond 10P: Infiltration Basin #1 Discarded=0.16 (Peak Elev=324.20' Storage=4.826 cf Inflow=3.27 cfs 0.344 af sfs 0.243 af Primary=0.56 cfs 0.101 af Outflow=0.72 cfs 0.344 af

Pond AP-3: AP-3	Pond AP-2: AP-2	Pond AP-1: AP-1	Pond 14P: CULTEC CHAMBER SYSTEM #2 F	Pond 12P: CULTEC CHAMBER SYSTEM #1 F	Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10:20-4b s/n 00417 © 2023 HydroCAI
Inflow=0.40 cfs 0.140 af Primary=0.40 cfs 0.140 af	Inflow=3.59 cfs 0.675 af Primary=3.59 cfs 0.675 af	Inflow=1.74 cfs 0.246 af Primary=1.74 cfs 0.246 af	Peak Elev=361.31' Storage=0.055 af Inflow=3.37 cfs 0.234 af Outflow=2.88 cfs 0.228 af	Peak Elev=360.70' Storage=2,095 cf Inflow=2.01 cfs 0.191 af Outflow=0.87 cfs 0.182 af	NOAA10 24-hr D 2-Year Rainfall=3.39" Printed 3/13/2024 D Software Solutions LLC Page 8

Total Runoff Area = 19.567 ac Runoff Volume = 1.872 af Average Runoff Depth = 1.15" 82.04% Pervious = 16.053 ac 17.96% Impervious = 3.514 ac

)	112()	1	1	
	ion	Descript	CN	\rea (sf)	
3d-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	H=SCS, Weighted =3.39"	method, U⊦ ∋ar Rainfall=	ΓR-20 Ο 2-Υε	oy SCS T 0 24-hr E	Runoff NOAA1
ne= 0.344 af, Depth= 1.35"	2.27 hrs, Volume n Basin #1	?7 cfs @ 1; ⊃ : Infiltratio	3.2 Ind 10F	ed to Po	Runoff Rout
tchment PR-1: To Basin #1	ary for Subcat	Summa			
NOAA 10 24-01 D. 2- Year Raintall=3,39 Printed 3/13/2024 Software Solutions LLC Printed Page 9	in Inc 2023 HydroCAD S	in 00417 ©	uerrie	ed by G	Prepar HydroC/
		,		,	,

NUAA10 24-hr	D 2-Yea	r Raintall=3.3	39.	
Area (sf) CN	Description		
14,74	3 74	>75% Gras:	s cover, Go	od, HSG C
17,10	86 2	Paved parki	ing, HSG C	
31,79	3 70	Woods, Go	od, HSG C	
5,56	86 7	Water Surfa	ace, HSG B	
35,82	8 61	>75% Gras	s cover, Go	od, HSG B
23,28	86 0	Paved parki	ing, HSG B	
4,99;	2 55	Woods, Go	od, HSG B	
133,31	5 77	Weighted A	verage	
87,36	_	65.53% Per	vious Area	
45,95	01	34.47% Imp	ervious Are	ß
Tc Leng	th Slop	Velocity	Capacity	Description
				2
12.7	0.020	0.07		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.02"
3.5 22	23 0.045	1.06		Shallow Concentrated Flow, B-C
0.1	25 0.330	4.02		Shallow Concentrated Flow. C-D
				Short Grass Pasture Kv= 7.0 fps
0.7 22	28 0.075	5.56		Shallow Concentrated Flow, D-E
0.4 29	93 0.061	0 11.20	8.80	Pipe Channel, E-F
				12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'

17.4

819 Total



Subcatchment PR-1: To Basin #1



Proposed Conditions rev2 NOAA10 24-hr D 2-Year Rainfall=3.39" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 11

Summary for Subcatchment PR-10: WESTERN WETLANDS AND OFFSITE

Runoff = 2.99 cfs @ 12.42 hrs, Volume= 0.437 af, Depth= 1.11" Routed to Pond AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 2-Year Rainfall=3.39"

				_	
			Tota	756	29.2
Woodland Kv= 5.0 fps					
Shallow Concentrated Flow,	0.50	8	0.01	286	9.5
Woodland Kv= 5.0 fps					
Shallow Concentrated Flow,	0.79	50	0.02	420	8.9
Woods: Light underbrush n= 0.400 P2= 3.02"					
Sheet Flow,	0.08	00	0.03	50	10.8
(S)	/sec) (cfs	ft) (ft	(ft	(feet)	(min)
ity Description	locity Capaci	pe Ve	Slo	Length	Tc
Vrea	6 Impervious A	6.53%		13,480	
'ea	% Pervious Ar	93.47		192,794	
	hted Average	Weig	73	206,274	
mp, HSG C	cre lots, 25% ir	1/2 a	80	53,920	
Good, HSG C	Grass cover,	>75%	74	4,153	
0C	1s, Good, HSG	Wood	70	148,201	
	ription	Desc	сN	rea (sf)	Þ

Subcatchment PR-10: WESTERN WETLANDS AND OFFSITE



			Total	472	14.3
18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections					
Pipe Channel,	9.10	5.15	0.0075	336	1.1
Shallow Concentrated Flow, Daved Ky= 20.3 free		2.87	0.0200	27	0.2
Unpaved Kv= 16.1 fps				2	0
Shallow Concentrated Flow,		2.28	0.0200	21	0.2
Unpaved Kv= 16.1 fps					
Shallow Concentrated Flow.		11.38	0.5000	38	0 <u>.</u> 1
Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"		0.07	0.0200	50	12.7
2 Description	Capacity (cfs)	(ft/sec)	Slope (ft/ft)	Length (feet)	(min)
) :		2		ł
a rea	rvious Area	8.22% Pen 1.78% Imp	4 07	34,366 24,658	
	/erage	Veighted Av	82 - V	59,024	
	B	toofs, HSG	88 80	358	
, עד	na HSG I	aved narki	980 P •	2 825	
	DA HSU	Vater Surfa	80.	6 240	
innd HSG B	COVEL G	75% Grass	61 >	6 582	
	d, HSG (Voods, Goc	70 V	6,901	
C	ng, HSG (aved parki	98 P	15,236	
bood, HSG C	cover, G	75% Grass	74 >	20,883	
		escription	CN	rea (sf)	A
hted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	9" 9"	hod, UH=St Rainfall=3.3	R-20 meth 2-Year F	y SCS TF 24-hr D	Runoff b NOAA10
ume= 0.191 af, Depth= 1.69" SYSTEM #1	hrs, Voli IAMBER	8 @ 12.23	2.01 cfs d 12P : C	= ed to Pon	Runoff Route
catchment PR-2: To Basin #2	for Subo	ummary :	S		
AD Software Solutions LLC Page 12	3 HydroC/)417 © 202	4b s/n 00	D® 10.20-	HydroCA
NOAA10 24-hr D 2-Year Kaintaii=3,39"	\$	rev2		ed Con	Propos
		,	:		ł







0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 66 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	
Tc=6.0 min	
Runoff Volume=0.234 af Runoff Depth=1.48"	
337 rds NOAA10 24-hr D 2-Year Rainfall=3.39"	
Hydrograph	
Subcatchment PR-3: To Infiltration Basin #3	
6.0 Direct Entry,	
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	1
82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected	
7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	I I
15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B	
26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C	
Area (sf) CN Description	1
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 2-Year Rainfall=3.39"	zπ
Runoff = 3.37 cfs @ 12.13 hrs, Volume= 0.234 af, Depth= 1.48" Routed to Pond 14P : CULTEC CHAMBER SYSTEM #2	R
Summary for Subcatchment PR-3: To Infiltration Basin #3	
Proposed Conditions rev2 NOAA10 24-hr D 2-Year Rainfall=3.39" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 14	ס ס בן



0 12 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (nours)	
NOAA10 24-hr D 2-Year Rainfall=3.39" Runoff Area=19,916 sf Runoff Depth=2.17" Tc=6.0 min CN=88	Flow (cfs)
Hydrograph	
Subcatchment PR-5: To Detention Basin #2	
6.0 Direct Entry,	ი
Tc Length Slope Velocity Capacity Description min) (feet) (ft/ft) (ft/sec) (cfs)	(mi
19,916 88 Weighted Average 6.267 31.47% Pervious Area 13,649 68.53% Impervious Area	
2,770 r4 770% Grass cover, Good, HSG B 2,383 61 >75% Grass cover, Good, HSG B 6,664 98 Paved parking, HSG B 2,577 98 Water Surface, HSG B 108 0 >75% Grass cover, Good	*
3,739 98 Paved parking, HSG C 654 98 Roofs, HSG C 15 98 Water Surface, HSG C 3 776 74 >76%, Grass Giver Good HSG C	
Area (sf) CN Description	
noff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs AA10 24-hr D 2-Year Rainfall=3.39"	Runof NOA/
noff = 1.18 cfs @ 12.13 hrs, Volume= 0.083 af, Depth= 2.17" Routed to Pond 8P : Detention Basin #2	Runot Rc
Summary for Subcatchment PR-5: To Detention Basin #2	
oposed Conditions rev2 NOAA10 24-hr D 2-Year Rainfall=3.39" pared by Guerriere & Halnon Inc Printed 3/13/2024 IroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 16	Prop Prepa Hydro

Area (s) CN Description Area (s) CN Description 1,727 98 Roofs, HSG B 1,2492 98 Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Area (s) CN Description 1,2492 98 Weighted Average 12,492 100.00% Impervious Area TC Length Slope Velocity Capacity Description (tel) (th) (tt/sec) (cfs) Direct Entry, Bubcatchment PR-6: ROOF SOUTH Hydroganh CN Part Rainfall=3.39" Runoff Area=12,492 sf Runoff Area=12,492 sf Runoff Depth=3.16" TC=6.0 min CN=98 0 2 4 6 8 10 21 4 16 19 22 24 32 30 32 34 68 39 40 24 44 95 92 54 56 86 07 26 46 86 97 72	Flow (cfs)
off = 0.94 cfs @ 12.13 hrs, Volume= 0.075 af, Depth= 3.16" ?outed to Pond 6P : Infiltration Basin #3	Runoff Rout
posed Conditions rev2 NOAA10 24-hr D 2-Year Rainfall=3.39" pared by Guerriere & Halnon Inc Printed 3/13/2024 roCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 17 Summary for Subcatchment PR-6: ROOF SOUTH	Propos Prepare HydroC∕

		Tota	275	0 <u>.</u> 8
Woodland Kv= 5.0 fps	ur	0.010	Ū	
Woodland Kv= 5.0 tps	1 22		132	17
Shallow Concentrated Flow,	2.00	0.1600	40	0.3
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	2.06	0.1700	50	0.4
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0 0.13	0.1200	50	6.2
(cfs)	:) (ft/sec)	(ft/ft	(feet)	(min)
Sapacity Description	e Velocity (Slope	Length	Тс
ious Area	0.09% Imperv		44	
ous Area	99.91% Pervi		49,069	
rage	Weighted Ave	58	49,112	
a, HSG B	Paved parking	86	44	
cover, Good, HSG B	>75% Grass	61	25,375	
, HSG B	Woods, Good	55	23,694	
	Description	CN	\rea (sf)	
s, weighted-c.n, itime span= 0.00-72.00 hts, dt= 0.05 hts	Rainfall=3.39	<-∠∪ me 2-Year	0 24-hr D	NOAA1
D Maintain ON Times Constant O OD 70 00 km die O OF km				
rrs, Volume= 0.039 af, Depth= 0.41"	cfs @ 12.191 AP-3	0.29 d d AP-3	= ed to Pon	Runoff Rout
	ing in our			
catchment PR-7: IINCAPTURED TO AP#3	harv for Sub	Silmn		
HydroCAD Software Solutions LLC Page 18	00417 © 2023	-4b s/n	AD® 10.20	HydroC/
Printed 3/13/2024	& Halnon Inc	erriere	ed by Gu	Prepar
NOAA10 24-hr D 2-Year Rainfall=3.39"	s rev2	dition	sed Con	Propo

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Solutions LLC Page 19	Printed 3/13/2024	NOAA10 24-hr D 2-Year Rainfall=3.39

Subcatchment PR-7: UNCAPTURED TO AP#3


0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	
Flow (cfs) NOAA10 24-hr D 2-Year Rainfall=3.39" Runoff Volume=0.137 af Runoff Depth=0.52" Flow Length=301' Tc=11.3 min CN=61	Flow (cfs)
Subcatchment PR-8: UNCAPTURED TO AP-2 Hydrograph	
11.3 301 Total	<u> </u>
o.2 SU 0.0000 O.10 Sitest Flow, 3.1 251 0.0730 1.35 Shallow Concentrated Flow, Woodland Kv= 5.0 fps	
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	(m)
137,043 61 Weighted Average 137,033 99.99% Pervious Area 10 0.01% Impervious Area	
45,852 70 Woods, Good, HSG C 6,421 74 >75% Grass cover, Good, HSG C 72,303 55 Woods, Good, HSG B 12,457 61 >75% Grass cover, Good, HSG B 10 98 Paved parking, HSG B	
unoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs IOAA10 24-hr D 2-Year Rainfall=3.39" Area (sf) CN Description	Runc NOA
unoff = 1.15 cfs @ 12.21 hrs, Volume= 0.137 af, Depth= 0.52" Routed to Pond AP-2 : AP-2	Runo R
Summary for Subcatchment PR-8: UNCAPTURED TO AP-2	
roposed Conditions rev2 NOAA10 24-hr D 2-Year Rainfall=3.39" repared by Guerriere & Halnon Inc Printed 3/13/2024 ydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 20	Prop Prep Hydro

Runoff = 1.74 cfs @ 12.38 hrs, Volume= 0.246 af, Depth= 0.94" Routed to Pond AP-1 : AP-1 Rescale November 1: AP-1 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 2-Year Rainfall=3.39" Area (sf) CN Description 136,638 70 Woods, Good, HSG C 89 74 >75% Grass cover, Good, HSG C 136,727 70 Weighted Average 136,727 70 Weighted Average
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 2-Year Rainfall=3.39" Area (sf) CN Description 136,638 70 Woods, Good, HSG C 89 74 >75% Grass cover, Good, HSG C 136,727 70 Weighted Average
Area (sf) CN Description 136,638 70 Woods, Good, HSG C 89 74 >75% Grass cover, Good, HSG C 136,727 70 Weighted Average 136,727 400,000 Boxetica Avera
136,638 70 Woods, Good, HSG C 89 74 >75% Grass cover, Good, HSG C 136,727 70 Weighted Average 136.727 400,000 Boxten Average
136,727 70 Weighted Average
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)
10.8 50 0.0300 0.08 Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.02"
1.3 70 0.0300 0.87 Shallow Concentrated Flow, B-C Woodland Ky= 5.0 fps
8.7 260 0.0100 0.50 Shallow Concentrated Flow, C-D Woodland Ky= 5.0 fps
5.0 280 0.0350 0.94 Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
25.8 660 Total
Subcatchment PR-9: UNCAPTURED TO AP-1
- Runoff
NOAA10 24-hr D 2-Year Rainfall=3.39" Runoff Area=136.727 sf
(cfs) Runoff Volume=0.246 af
Flow Flow Length=660' Tc=25 8 min

CN=70

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	Flow (cfs)		Primar	[40] Hii		Propc Prepa HydroC
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 5 Time (hours)		Pond 1P: AP-4 Hydrograph	Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dyna	[40] Hint: Not Described (Outflow=Inflow)	Summary for Pond 1P: AP-4	Proposed Conditions rev2 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
58 60 62 64 66 68 70 72			nic Tailwater)			14-hr D 2-Year Rainfall=3 Printed 3/13/2 Pag
	Terror Street					3.39" /2024 <u>ge 22</u>

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e Solutions LLC Page 23	Printed 3/13/2024	NOAA10 24-hr D 2-Year Rainfall=3.39"

Summary for Pond 4P: Infiltration Basin #2

Routed to Pon	Primary =	Discarded =	Outflow =	Inflow =	Inflow Area =
d AP-3 : AP-3	0.35 cfs @	0.13 cfs @	0.48 cfs @	1.60 cfs @	2.180 ac, 5
	13.58 hrs, Volume= 0.101 af	13.58 hrs, Volume= 0.247 af	13.58 hrs, Volume= 0.348 af, Atten= 70%, Lag	12.19 hrs, Volume= 0.348 af	55.91% Impervious, Inflow Depth = 1.92" for 2-Year e
			= 82.9 min		/ent

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 358.37' @ 13.58 hrs Surf.Area= 3,677 sf Storage= 4,204 cf Flood Elev= 360.25' Surf.Area= 5,468 sf Storage= 12,765 cf

	hrs HW=358.37' (Free Discharge)	s@ 13.58	Max=0.13 cf	ed OutFlow	Discard
Phase-In= 0.01'	o weir flow at low neacs I hr Exfiltration over Surface area Ivity to Groundwater Elevation = 354.90'	Limited to 1.020 in/h Conductiv	357.00'	Discarded	#4
	o weir flow at low heads 8.0" Horiz. Orifice/Grate C= 0.600	48.0" x 48	360.00'	Device 1	#3
low Area= 0.79 st	x 6.0" H Vert. Orifice/Grate C= 0.600	n= 0 013 18 0" W x	358.20'	Device 1	#2
'/' Cc= 0.900	" KCP, sq.cut end projecting, Ke= 0.500 utlet Invert= 355.00' / 354.00' S= 0.0050	L= 200.0			
•	ound Culvert	12.0" Ro	355.00'	Primary	#1
	evices	Outlet De	Invert	Routing	Device
	26 17,156	5,72	6,240	8	361.0
	35 11,430	8,53	5,211	0	360.0
	2,895	2,89	3,324	8	358.(
	0	_	2,466	00	357.(
	<u>st) (cubic-feet)</u>	(cubic-feet	(sq-ft)	t)	(fee
	re Cum.Store	Inc.Store	rf.Area	on Su	Elevatio
v (Recalc)	stom Stage Data (Prismatic) Listed belo	56 cf Cus	17,1:	357.00'	#
	rage Description	rage Stor	Avail.Sto	Invert	Volume
	ted for 0.348 af (100% of inflow) .6 - 965.0)	nin calculat nin (1,241.	ime= 276.6 r lime= 276.6 r	w detention t of-Mass det. t	Plug-Flc Center-c
	י ש, ער די אין שעוימעפיי די, בעיד עו Storage= 12,765 cf	5,468 sf S	Surf.Area= :	ev= 360.25	Flood E





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Summary for Pond 6P: Infiltration Basin #3

Inflow Area :	= 2.179 ac, ·	42.68% Imp	ervious, Inflow D	epth = 1.67" for 2-Year event
Inflow =	: 3.82 cfs @	12.17 hrs,	Volume=	0.303 af
Outflow =	: 0.15 cfs @	19.83 hrs,	Volume=	0.303 af, Atten= 96%, Lag= 459.4 min
Discarded =	: 0.15 cfs @	19.83 hrs,	Volume=	0.303 af
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Routed to	Pond AP-3 : AP-3			

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 357.15' @ 19.83 hrs Surf.Area= 4,644 sf Storage= 4,796 cf Flood Elev= 359.25' Surf.Area= 6,440 sf Storage= 16,409 cf

Plug-Flow d Center-of-M	etention tim lass det. tim	e= 381.3 m e= 381.3 m	in calcul in (1,34	lated for 3.1 - 96	0.303 af (100% of inflow) 1.9)
Volume	Invert	Avail.Stor:	age St	orage De	escription
#1	356.00'	21,49	0 cf C	ustom St	tage Data (Prismatic) Listed below (Recalc)
Elevation	Surf./	Area	Inc.St	ore	Cum.Store
(feet)	s)	q-ft) (cubic-fe	et)	(cubic-feet)
356.00	ω	,731		0	0
358.00	ر ت	,325	9,0)56	9,056
360.00	7	,109	12,4	134	21,490
Device Ro	outing	Invert	Outlet [Devices	
#1 Pr	imary	354.00'	12 <u>.0"</u> F	Round C	ulvert
			L= 68.3 Inlet / C	utlet Inv	sq.cut end projecting, Ke= 0.500 ert= 354.00' / 346.00' S= 0.1171 '/' Cc= 0.900
			n= 0.01	3 Concr	ete pipe, bends & connections, Flow Area= 0.79 sf
#2 De	evice 1	358.90'	48.0" x	48.0" Ho	riz. Orifice/Grate C= 0.600
5			Limited	to weir f	low at low heads
#3 Di	scarded	356.00	1 020 ir	vhr Exfi	tration over Surface area
			Conduc	tivity to (Froundwater Elevation = 353.50 Phase-In= 0.01

Discarded OutFlow Max=0.15 cfs @ 19.83 hrs HW=357.15' (Free Discharge)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=356.00' TW=0.00' (Dynamic Tailwater) —1=Culvert (Passes 0.00 cfs of 4.63 cfs potential flow) —2=Orifice/Grate (Controls 0.00 cfs)





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Summary for Pond 7P: Detention Basin #1

nflow Area =	0.367 ac, 92.34% Impervious, Inflow Depth = 2.83" for 2-Year event
nflow =	1.15 cfs @ 12.13 hrs, Volume= 0.087 af
Dutflow =	0.95 cfs @ 12.18 hrs, Volume= 0.087 af, Atten= 18%, Lag= 3.2 min
rimary =	0.95 cfs @ 12.18 hrs, Volume= 0.087 af
Routed to Pon	nd 4P : Infiltration Basin #2
nflow = Dutflow = Primary = Routed to Pon	1.15 cfs @ 12.13 hrs, Volume= 0.087 af 0.95 cfs @ 12.18 hrs, Volume= 0.087 af, Atten= 18%, Lag= 3.2 min 0.95 cfs @ 12.18 hrs, Volume= 0.087 af, Atten= 18%, Lag= 3.2 min 0.95 cfs @ 12.18 hrs, Volume= 0.087 af 0.42 crister 0.1087 af 12.18 hrs, Volume= 0.42 crister 0.087 af 12.18 hrs, Volume=

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 361.90' @ 12.18 hrs Surf.Area= 747 sf Storage= 900 cf

Plug-Flow detention time= 89.1 min calculated for 0.087 af (100% of inflow) Center-of-Mass det. time= 89.4 min (879.3 - 789.9)

Driman, OutElow May	#3 Device 1	#2 Device 1		#1 Primary	Device Routing	363.00 1	362.00	360.00	(feet) (t	Elevation Surf.	#1 360.00'	<u>Volume</u> Invert
	360.00'	361.80'		357.57'	Invert	I,153	775	198	sq-ft)	Area	1,93	Avail.Stor
	1.5" Vert. Orifi	n= 0.013 Conc 24 0" x 24 0" H	L= 30.0' RCP, Inlet / Outlet Inv	12.0" Round C	Outlet Devices	964	973	0	(cubic-feet)	Inc.Store	7 cf Custom S	age Storage D
	:e/Grate C=0.600 Limited to weir flow at low heads	rete pipe, bends & connections, Flow Area= 0.79 sf oriz. Orfice/Grate C= 0.600	sq.cut end projecting, Ke= 0.500 /ert= 357.57 / 357.42' S= 0.0050 '/' Cc= 0.900	ulvert		1,937	973	0	(cubic-feet)	Cum.Store	tage Data (Prismatic) Listed below (Recalc)	escription

Primary OutFlow Max=0.09 Uis @ 1.0.0000 —1=Culvert (Passes 0.89 cfs of 7.40 cfs potential flow) —2=Ortifice/Grate (Weir Controls 0.81 cfs @ 1.03 fps) —3=Ortifice/Grate (Ortifice Controls 0.08 cfs @ 6.52 fps)



Pond 7P: Detention Basin #1



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Summary for Pond 8P: Detention Basin #2

Inflow Are	а 11	0.457 ac, 68	3.53% Impe	rvious, Inflow D	epth = 2.17" for 2-Year ever	nt
Inflow	П	1.18 cfs @	12.13 hrs,	Volume=	0.083 af	
Outflow	П	0.07 cfs @	13.61 hrs,	Volume=	0.079 af, Atten= 94%, Lag= 8	38.9 min
Primary	11	0.07 cfs @	13.61 hrs,	Volume=	0.079 af	
Routec	to Pond	4P : Infiltratic	n Basin #2			
Routing b	/ Dvn_Str	hr-Ind method	Time Snar	n 00 52-00 0 =r	s dt= 0 05 bre	

Peak Elev= 360.51' @ 13.61 hrs Surf Area= 1,439 sf Storage= 1,728 cf

Plug-Flow detention time= 327.9 min calculated for 0.079 af (95% of inflow) Center-of-Mass det. time= 303.3 min (1,138.8 - 835.5)

Volume	Invert /	Avail.Storage	Storage [Description
#1	359.00'	6,675 cf	Custom :	Stage Data (Prismatic) Listed below (Recalc)
Elevation	Surf.An	ea Inc	c.Store	Cum.Store
(feet)	-bs)	ft) (cubi	ic-feet)	(cubic-feet)
359.00	8	73	0	0
360.00	1,2	18	1,046	1,046
362.00	2,0	77	3,295	4,341
363.00	2,5	92	2,335	6,675

#3	#2				#1	Device
Device 1	Device 1				Primary	Routing
362.20'	359.00'				359.18'	Invert
24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads	n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf	Inlet / Outlet Invert= 359.18' / 358.75' S= 0.0050 '/' Cc= 0.900	L= 86.0' RCP, sq.cut end projecting, Ke= 0.500	12.0" Round Culvert	Outlet Devices

Primary OutFlow Max=0.07 cfs @ 13.61 hrs HW=360.51' TW=358.37' (Dynamic Tailwater) -1=Culvert (Passes 0.07 cfs of 3.13 cfs potential flow) -2=Orifice/Grate (Orifice Controls 0.07 cfs @ 5.56 fps) -3=Orifice/Grate (Controls 0.00 cfs)





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Summary for Pond 10P: Infiltration Basin #1

Routed to Pon	Primary =	Discarded =	Outflow =	Inflow =	Inflow Area =
id AP-2 : AP-2	0.56 cfs @ 12.78 hrs, Volume= 0.	0.16 cfs @ 12.78 hrs, Volume= 0.	0.72 cfs @ 12.78 hrs, Volume= 0.	3.27 cfs @ 12.27 hrs, Volume= 0.	3.060 ac, 34.47% Impervious, Inflow Dept
	101 af	.243 af	344 af, Atten= 78%, Lag= 30.7 min	.344 af	th = 1.35" for 2-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 324.20' @ 12.78 hrs Surf.Area= 2,808 sf Storage= 4,826 cf

Plug-Flow detention time= 248.0 min calculated for 0.344 af (100% of inflow) Center-of-Mass det. time= 248.2 min (1,144.2 - 896.0)

12.78 hrs HW=324.19' (Free Discharge) s 0.16 cfs)	1ax=0.16 cfs @ Itration Control	ed OutFlow N filtration (Exf	Discard
0 ^r long x 10.0 ^r breadth Broad-Crested Rectangular Weir ad (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 ef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64	327.15' 10 He Cc	Primary	#6
nined to weir now at tow riseds 0" x 24.0" Horiz. Orifice/Grate C= 0.600 nifed to weir flow at low beads	326.90' 24 Lir	Device 1	#5
W x 8.0" H Vert. Orifice/Grate C= 0.600	325.35 8.0	Device 1	巷
10 in/hr Exfiltration over Surface area Phase-In= 0.01' Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads	322 00' 2 4	Discarded Device 1	#3 #2
(9) Round Culvert 60.0° RCP, sq.cut end projecting, Ke= 0.500 et / Outlet Invert= 320.00° / 318.00° S= 0.0333 /° Cc= 0.900 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf	320.00' 18 L= n=	Primary	#1
tlet Devices	Invert Ou	Routing	Device
6,663 10,953 9,544 20,497	5,982 5,562	00	326.0 328.0
4,290 4,290	2,681	8	324.0
0	1,609	0	322.0
pic-feet) (cubic-feet)	sq-ft) (cu	it) ((fee
ic.Store Cum.Store	.Area li	on Surf	Elevatic
Custom Stage Data (Prismatic) Listed below (Recalc)	20,497 c	322.00'	#1
Storage Description	Avail.Storage	Invert	Volume
1,144.2 - 896.0)	ne= 248.2 min (of-Mass det. tir	Center-c

|--|--|

-**⊳**⊤

H=Orrfice/Grate (Controls 0.00 cfs)
 S=Orrfice/Grate (Controls 0.00 cfs)
 Broad-Crested Rectangular Weir (Controls 0.00 cfs)



Pond 10P: Infiltration Basin #1



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Summary for Pond 12P: CULTEC CHAMBER SYSTEM #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

(1,000 0 1,000 0

Plug-Flow detention time= 82.0 min calculated for 0.182 af (95% of inflow) Center-of-Mass det. time= 58.7 min (930.7 - 871.9)

	n-Indas det. III		
Volume	Invert	Avail.Storage	Storage Description
#1A	359.10'	1,442 cf	41.25'W x 45.00'L x 3.21'H Field A
#2A	359.60'	2,350 cf	5,955 cf Overall - 2,350 cf Embedded = 3,606 cf x 40.0% Voids Cultec R-280HD x 54 Inside #1
			Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 9 rows
		3,792 cf	Total Available Storage
Stora	ge Group A cr	eated with Cham	iber Wizard
Device	Routing	Invert Out	let Devices
#1	Primary	359.60' 15.0)" Round Culvert

Device 1	Device 1				Primary
359.60'	361.30'				359.60'
6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)	n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf	Inlet / Outlet Invert= 359.60' / 358.94' S= 0.0050 '/ Cc= 0.900	L= 131.1' CPP, square edge headwall, Ke= 0.500	15.0" Round Culvert

Primary OutFlow Max=0.87 cfs @ 12.45 hrs HW=360.70' TW=357.73' (Dynamic Tailwater) —1=Culvert (Passes 0.87 cfs of 3.34 cfs potential flow) —2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs) —3=Orifice/Grate (Orifice Controls 0.87 cfs @ 4.45 fps)

	54 Chambers 220.6 cy Field 133.5 cy Stone
0 2	Chamber Storage + Stone Storage = 3,792.0 cf = 0.087 af Overall Storage Efficiency = 63.7% Overall System Size = 45.00' x 41.25' x 3.21'
	5,955.5 cf Field - 2,349.8 cf Chambers = 3,605.7 cf Stone x 40.0% Voids = 1,442.3 cf Stone Storage
	54 Chambers x 42.5 cf +1.00 Row Adjustment x 6.07 sf x 9 Rows = 2,349.8 cf Chamber Storage
Flow (cfs)	6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +12.0" End Stone x 2 = 45.00' Base Length 9 Rows x 47.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 41.25' Base Width 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height
	47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing
. 2 .	Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 9 rows
	Pond 12P: CULTEC CHAMBER SYSTEM #1 - Chamber Wizard Field A
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Pond 14P: CULTEC CHAMBER SYSTEM #2 - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 5 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length

Base Length 5 Rows x 47.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 23.58' Base Width 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

35 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 5 Rows = 1,517.9 cf Chamber Storage

3,934.5 cf Field - 1,517.9 cf Chambers = 2,416.5 cf Stone x 40.0% Voids = 966.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,484.6 cf = 0.057 af Overall Storage Efficiency = 63.1% Overall System Size = 52.00' x 23.58' x 3.21'

35 Chambers 145.7 cy Field 89.5 cy Stone

K				
Б				

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Pond 14P: CULTEC CHAMBER SYSTEM #2



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Summary for Pond AP-1: AP-1

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
1.74 cfs @	1.74 cfs @	3.139 ac,
12.38 hrs, Volume=	12.38 hrs, Volume=	0.00% Impervious, Inf
0.246 af, Atten= 0%, Lag= 0.0 min	0.246 af	flow Depth = 0.94" for 2-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-1: AP-1





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Summary for Pond AP-3: AP-3

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
0.40 cfs @ 13.54 hrs, Volume= 0.140 af, Atten= 0%	0.40 cfs @ 13.54 hrs, Volume= 0.140 af	5.486 ac, 39.18% Impervious, Inflow Depth = 0.31" for 2
, Lag= 0.0 min		Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-3: AP-3



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Time span=0.0 Runoff by SCS T Reach routing by Dyn-Stor-Ir	0-72.00 hrs, dt=0.05 hrs, 1441 points R-20 method, UH=SCS, Weighted-CN id method - Pond routing by Dyn-Stor-Ind method
Subcatchment PR-1: To Basin #1	Runoff Area=133,315 sf 34.47% Impervious Runoff Depth=2.83" Flow Length=819' Tc=17.4 min CN=77 Runoff=6.99 cfs 0.723 af
Subcatchment PR-10: WESTERN	Runoff Area=206,274 sf 6.53% Impervious Runoff Depth=2.48" Flow Length=756' Tc=29.2 min CN=73 Runoff=7.05 cfs 0.978 af
Subcatchment PR-2: To Basin #2	Runoff Area=59,024 sf 41.78% Impervious Runoff Depth=3.30" Flow Length=472' Tc=14.3 min CN=82 Runoff=3.93 cfs 0.373 af
Subcatchment PR-3: To Infiltration Basir	Runoff Area=82,428 sf 33.99% Impervious Runoff Depth=3.02" Tc=6.0 min CN=79 Runoff=6.84 cfs 0.476 af
Subcatchment PR-4: To Detention Basin	#1Runoff Area=16,000 sf 92.34% Impervious Runoff Depth=4.67" Tc=6.0 min CN=95 Runoff=1.84 cfs 0.143 af
Subcatchment PR-5: To Detention Basin	#2Runoff Area=19,916 sf 68.53% Impervious Runoff Depth=3.91" Tc=6.0 min CN=88 Runoff=2.06 cfs 0.149 af
Subcatchment PR-6: ROOF SOUTH	Runoff Area=12.492 sf 100.00% Impervious Runoff Depth=5.01" Tc=6.0 min CN=98 Runoff=1.47 cfs 0.120 af
Subcatchment PR-7: UNCAPTURED TO	Runoff Area=49,112 sf 0.09% Impervious Runoff Depth=1.31" Flow Length=275' Tc=8.6 min CN=58 Runoff=1.46 cfs 0.123 af
Subcatchment PR-8: UNCAPTURED TO	Runoff Area=137,043 sf 0.01% Impervious Runoff Depth=1.52" Flow Length=301' Tc=11.3 min CN=61 Runoff=4.42 cfs 0.399 af
Subcatchment PR-9: UNCAPTURED TO	Runoff Area=136,727 sf 0.00% Impervious Runoff Depth=2.22" Flow Length=660' Tc=25.8 min CN=70 Runoff=4.47 cfs 0.582 af
Pond 1P: AP-4	Primary=0.00 cfs_0.000 af
Pond 4P: Infiltration Basin #2 Discarded=0.15	Peak Elev=358.72' Storage=5,532 cf Inflow=4.04 cfs 0.652 af cfs 0.305 af Primary=1.79 cfs 0.347 af Outflow=1.94 cfs 0.652 af
Pond 6P: Infiltration Basin #3 Discarded=0.25	Peak Elev=358.63' Storage=12,568 cf Inflow=8.58 cfs 0.590 af cfs 0.590 af Primary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.590 af
Pond 7P: Detention Basin #1	Peak Elev=361.96' Storage=945 cf Inflow=1.84 cfs 0.143 af Outflow=1.82 cfs 0.143 af
Pond 8P: Detention Basin #2	Peak Elev=361.51' Storage=3,371 cf Inflow=2.06 cfs 0.149 af Outflow=0.09 cfs 0.145 af
Pond 10P: Infiltration Basin #1 Discarded=0.21	Peak Elev=325.61' Storage=9,464 of Inflow=6.99 cfs 0.723 af cfs 0.284 af Primary=2.37 cfs 0.439 af Outflow=2.58 cfs 0.723 af

Pond 14P: CULTEC CHAMBER SYSTEM #	Pond 12P: CULTEC CHAMBER SYSTEM #	Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 Hydro
Peak Elev=361.57' Storage=0.057 af Inflow=6.84 cfs 0.476 af Outflow=7.12 cfs 0.470 af	Peak Elev=361.57' Storage=3,219 cf Inflow=3.93 cfs 0.373 af Outflow=3.44 cfs 0.364 af	NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 CAD Software Solutions LLC Page 43

Pond AP-2: AP-2	Pond AP-1: AP-1
Inflow=10.89 cfs 1	Inflow=4.47 cfs
Primary=10.89 cfs 1	Primary=4.47 cfs
.816 af	.582 af
.816 af	582 af

Total Runoff Area = 19.567 ac Runoff Volume = 4.065 af Average Runoff Depth = 2.49" 82.04% Pervious = 16.053 ac 17.96% Impervious = 3.514 ac

Inflow=2.14 cfs 0.470 af Primary=2.14 cfs 0.470 af

Pond AP-3: AP-3

Inflow=4.47 cfs 0.582 af rimary=4.47 cfs 0.582 af

		Total	819	17.4
12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections			ľ	4
AU Dine Channel E-E	11 20 8 8	0.0610	203	04
Shallow Concentrated Flow, D-E	5.56	0.0750	228	0.7
Short Grass Pasture Kv= 7.0 fps	1			ı I
Shallow Concentrated Flow, C-D	4.02	0.3300	25	0.1
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow, B-C	1.06	0.0450	223	<u>а</u> 5
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow, A-B	0.07	0.0200	50	12.7
ty Description s)	locity Capaci /sec) (cfs	Slope Ve (ft/ft) (ft	Length (feet)	(min)
Area	% Impervious .	34.47	45,955	
ēΔ	nted Average % Pervious Ar	77 Weig 65.53	33,315 87,361	_
Œ	ls, Good, HSG	55 Wood	4,992	
3B	d parking, HSG	98 Pave	23.286	
Good HSG B	Grass cover	61 >75%	35 828	
GB	r Surface. HSC	98 Wate	5.562	
õ	ls, Good, HSG	70 Wood	31,793	
3C	d parking, HSG	98 Pave	17,107	
Good, HSG C	Grass cover,	74 >75%	14,748	
	iption	CN Desc	ea (sf)	A
וטַווופע-טע, וווופ טעמור טיטט-רביטט וווט, ער טיטט וווט	00-303, ער 1fall=5.25"	10-Year Rair	24-hr D	NOAA10
internal CNI Timos Channel 0 00 70 00 km dt- 0 05 km				
olume= 0.723 af, Depth= 2.83"	12.26 hrs, Vo ation Basin #1	6.99 cfs @ 10P : Infiltra	= d to Pond	Runoff Route
bcatchment PR-1: To Basin #1	mary for Sut	Sum		
	© 2020 Hydrox		0.20-	
CAD Software Solutions LLC Dece 14	non Inc	rriere & Hal	d by Gue	Prepare
NUAA10 24-hr D 10-Year Kaintali=5.25"		litions rev	ed Cond	Propos



Subcatchment PR-1: To Basin #1



24 26 28 30 22 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)) 12 14 16 18 20 2	2 4 6 8 10	o
Tc=29.2 min CN=73			.1
Runoff Depth=2.48" Flow Length=756'			Flow (c
Runoff Volume=0.978 af			്ന
NOAA10 24-hr D 10-Year Rainfall=5.25"			ი -
- Runoff	7.05 cfs		7
Hydrograph			'n
PR-10: WESTERN WETLANDS AND OFFSITE	bcatchment	Su	
	otal	756 T	29.2
) Shallow Concentrated Flow, Woodland Ky= 5.0 fps	0100 0.5	286 0	9.5
Shallow Concentrated Flow, Woodand Kv= 50 fns	0250 0.7	420 0	8.9
3 Sheet Flow, Woods: Light underbrush $n=0.400$ D2=3.02"	0300 0.0	50 0	10.8
/ Capacity Description) (cfs)	Slope Veloci (ft/ft) (ft/se	Length : (feet)	Tc (min)
Average ervious Area pervious Area	73 Weightei 93.47% 6.53% n	12,794 3,480	10
iood, HSG C iss cover, Good, HSG C its, 25% imp, HSG C	70 Woods, 74 >75% Gr 30 1/2 acre	8,201 4,153 3,920 8	10 14
5	N Descripti	ea (sf) C	An
-SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs -5.25"	0 method, UH I-Year Rainfall	SCS TR-2 24-hr D 10	Runoff by NOAA10
41 hrs, Volume= 0.978 af, Depth= 2.48"	.05 cfs @ 12 \P-2 ∶ AP-2	= 7 to Pond <i>F</i>	Runoff Router
hment PR-10: WESTERN WETLANDS AND OFFSITE	for Subcat	Summary	(0
NOAA10 24-hr D 10-Year Rainfall=5.25" Inc Printed 3/13/2024 023 HydroCAD Software Solutions LLC Page 46	i ons rev2 iere & Halnov s/n 00417 ©	ed Condit I by Guerr ® 10.20-4b	Propose Preparec HydroCAE

14.3

472 Total

				10	
18.0" Round Area= 1.8 st Perim= 4.7 r= 0.38 n= 0.013 Concrete pipe, bends & connections					
Pipe Channel,	9.10	<u>5.</u> 15	0.0075	336	1.1
Paved Kv= 20.3 fps					
Shallow Concentrated Flow,		2.87	0.0200	27	0.2
Unpaved Kv= 16.1 fps					
Shallow Concentrated Flow,		2.28	0.0200	21	0.2
Unpaved Kv= 16.1 fps					
Shallow Concentrated Flow,		11.38	0.5000	38	0 <u>.</u> 1
Woods: Light underbrush n= 0.400 P2= 3.02"					
Sheet Flow,		0.07	0.0200	50	12.7
	(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
Description	Capacity	Velocity	Slope	Length	Тс
ea	ervious Ar	1.78% Imp	4	24,658	
	vious Area	8.22% Per	נח	34,366	
	verage	Veighted Av	82 V	59,024	
	σ	oofs, HSG	я 98	358	
	ng, HSG B	'aved parki	98 F	2,825	
	ce, HSG E	Vater Surfa	V 86	6,240	
ood, HSG B	cover, Go	75% Grass	61 >	6,582	
	od, HSG C	Voods, Goo	70 V	6,901	
	ng, HSG C	aved parki	H 86	15,236	
ood, HSG C	; cover, Go	75% Grass	74 >	20,883	
)escription	CN	rea (sf)	A
	2	Nail Itali-0.			
Ited-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	כS, Weigh אהיי	nod, UH=SI	R-20 met	y SCS TF	Runoff b
me= 0.373 af, Depth= 3.30" }YSTEM #1	hrs, Volu IAMBER S	S @ 12.22	3.93 cf d 12P : C	= ed to Pon	Runoff Route
		·			
atchment PR-2: To Basin #2	for Subc	ummary .	S		

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NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 utions LLC Page 47



Proposed Conditions rev2







0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 38 38 40 42 44 46 48 50 52 54 56 56 60 62 64 66 68 70 72 Time (hours)
Flow (cfs) 10-Year Rainfall=5.25" Runoff Volume=0.143 af Runoff Depth=4.67" Tc=6.0 min CN=95
2- 199 d6 NOAA10 24-hr D
Subcatchment PR-4: To Detention Basin #1
6.0 Direct Entry,
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)
16,000 95 Weighted Average 1,225 7.66% Pervious Area 14,775 92.34% Impervious Area
12,807 98 Roofs, HSG C 353 74 >75% Grass cover, Good, HSG C 292 98 Paved parking, HSG B 872 61 >75% Grass cover, Good, HSG B 47 98 Roofs, HSG B 1,588 98 Water Surface, HSG B
Area (sf) CN Description 42 98 Paved barking, HSG C
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 10-Year Rainfall=5.25"
Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.143 af, Depth= 4.67" Routed to Pond 7P : Detention Basin #1
Summary for Subcatchment PR-4: To Detention Basin #1
Proposed Conditions rev2 NOAA10 24-hr D 10-Year Rainfall=5.25" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 50

Flow (efs)	Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry,	Area (sf) CN Description 3,739 98 Paved parking, HSG C 654 98 Roots, HSG C 15 98 Water Surface, HSG C 2,383 61 >75% Grass cover, Good, HSG B 6,664 98 Paved parking, HSG B 2,577 98 Water Surface, HSG B 3,147% Pervious Area 13,649 68.53% Impervious Area	Proposed Conditions rev2 INCANING 24-III D. INC. For inclusion For inclusion Printed 3/13/2024 Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 @ 2023 HydroCAD Software Solutions LLC Printed 3/13/2024 Summary for Subcatchment PR-5: To Detention Basin #2 Runoff Routed to Pond 8P : Detention Basin #2 0.149 af, Depth= 3.91" Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 10-Year Rainfall=5.25"
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0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 49 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	Flow (cfs) 10-Year Rainfall=5.25" Runoff Area=12,492 sf Runoff Depth=5.01" Tc=6.0 min CN=98	Subcatchment PR-6: ROOF SOUTH	6.0 Direct Entry,	Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	10,772 98 Roofs, HSG C 1,720 98 Roofs, HSG B 12,492 98 Weighted Average 12,492 100.00% Impervious Area	Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 10-Year Rainfall=5.25" Area (sf) CN Description	$\begin{array}{llllllllllllllllllllllllllllllllllll$	Summary for Subcatchment PR-6: ROOF SOUTH	Proposed Conditions rev2 NOAA10 24-hr D 10-Year Rainfall=5 Prepared by Guerriere & Halnon Inc Printed 3/13/2 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page
		Runoff							∥=5.25" 13/2024 [⊃] age 52

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	utions LLC		NOAA10 24-hr D
,	Page 53	Printed 3/13/2024	10-Year Rainfall=5.25"

Summary for Subcatchment PR-7: UNCAPTURED TO AP#3

Runoff = 1.46 cfs @ 12.17 hrs, Volume= Routed to Pond AP-3 : AP-3 0.123 af, Depth= 1.31"

NR

		Total	275	8.6
Woodland Kv= 5.0 fps	1.32	0.0700	1.00	
Woodland Kv= 5.0 fps	2 2 2	0 0700	100	4 7
Shallow Concentrated Flow,	2.00	0.1600	40	0.3
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	2.06	0.1700	50	0.4
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.13	0.1200	50	6.2
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
apacity Description	Velocity C	Slope	Length	Tc
ous Area	.09% Imperv	0	44	
us Area	9.91% Pervic	9	49,069	
age	/eighted Ave	58 M	49,112	
, HSG B	aved parking	98 P	44	
over, Good, HSG B	75% Grass c	61 ×	25,375	
HSG B	/oods, Good	55 M	23,694	
	escription	CN D	rea (sf)	A
, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs "	nod, UH=SC: Rainfall=5.2	₹-20 meth 10-Year	y SCS TF 24-hr D	Runoff b NOAA10





>75% Grass cover, Good, HSG C	74	6,421
Woods, Good, HSG C	70	45,852
Description	CN	Area (sf)
hod, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs · Rainfall=5.25"	₹-20 me 10-Yea	Runoff by SCS TF NOAA10 24-hr D
s @ 12.20 hrs, Volume= 0.399 af, Depth= 1.52" AP-2	4.42 c d AP-2 :	Runoff = Routed to Pond
ary for Subcatchment PR-8: UNCAPTURED TO AP-2	Summ	
rev2 NOAA10 24-hr D 10-Year Rainfall=5.25" k Halnon Inc Printed 3/13/2024 0417 © 2023 HydroCAD Software Solutions LLC Page 55	ditions erriere 4b s/n (Proposed Conu Prepared by Gue HydroCAD® 10.20-

		Total	301	11.3
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.35	0.0730	251	3.1
Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"	0.10	0.0600	50	8.2
apacity Description (cfs)	velocity ((ft/sec)	Slope (ft/ft)	Length (feet)	(min)
ious Area	0.01% Imperv	_	10	
us Area	99.99% Pervi	~	37,033	_
rage	Weighted Ave	61 \	37,043	
I, HSG B	Paved parkin	98	10	
over, Good, HSG B	>75% Grass	61	12,457	
, HSG B	Woods, Good	55	72,303	
over, Good, HSG C	>75% Grass	74	6,421	
, HSG C	Woods, Gooc	70 /	45,852	
	Description	CN	rea (sf)	A

Subcatchment PR-8: UNCAPTURED TO AP-2



io 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	5 18 20 22 24 26 28	8 10 12 14 16	2-4-6-8-	0
]			°
Tc=25.8 min CN=70				<u> </u>
Runoff Depth=2.22" Flow Length=660'				Flow (cfs)
10-Year Rainfall=5.25" Runoff Area=136,727 sf				ω
NOAA10 24-hr D		4.47 cfs		4
- ydrograph				5
PR-9: UNCAPTURED TO AP-1	ubcatchmen	Ś		
		Total	660	25.8
Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps	0.94	0.0350	280	5.0
Woodland Kv= 5.0 fps	0.50	0.0100	260	8.7
Woodland Kv= 5.0 free	0.87	0.0300	70	1.3
Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.02"	0.08	0.0300	50	10.8
city Description cfs)	Velocity Cap; (ft/sec)	Slope (ft/ft)	Length (feet)	(min)
Area	eighted Averag 00.00% Perviou	70 W	36,727 36,727	<u> </u>
G C r, Good, HSG C	oods, Good, H: 75% Grass cove	70 74 vi	36,638 89	
	escription	CN De	ea (sf)	₽
eighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	od, UH=SCS, V Rainfall=5.25"	R-20 meth 10-Year f	/ SCS TF 24-hr D	Runoff by NOAA10
Volume= 0.582 af, Depth= 2.22"	@ 12.37 hrs, ,P-1	4 47 cfs d AP-1 : A	= d to Pon	Runoff Route
chment PR-9: UNCAPTURED TO AP-1	ry for Subcat	Summa		
NOAA10 24-hr D 10-Year Rainfall=5.25' Printed 3/13/2024 Page 56	·ev2 Halnon Inc 417 © 2023 Hyc	ditions r erriere & -4b_s/n_00	ed Con d by Gue 0® 10.20-	Propos Prepare HydroCA

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olutions LLC		NOAA10 24-hr D
Page 57	Printed 3/13/2024	10-Year Rainfall=5.25"

Summary for Pond 1P: AP-4

[40] Hint: Not Described (Outflow=Inflow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

Pond 1P: AP-4



1.01'

 Proposed Conditions rev2
 NOAA10 24-hr D
 10-Year Rainfall=5.25"

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 Pond 4P: Infiltration Basin #2



Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=356.00' TW=0.00' (Dynamic Tailwater) 	Discarded OutFlow Max=0.25 cfs @ 18.14 hrs HW=358.63' (Free Discharge) — 3=Exfiltration (Controls 0.25 cfs)	#3 Discarded 356.00' 1.020 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 353.50' Pha	L= cos.3 rxc-r, sq.cut rend projecting, rxe= 0.000 Intet / Outlet Invert= 354.00' / 346.00' S= 0.1171 /' C, n= 0.013 Concrete pipe, bends & connections, Flow A #2 Device 1 358.90' 48.0'' Horiz Orifice/Grate C= 0.600 Limited to woir flow at low boads	Device Routing Invert Outlet Devices #1 Primary 354.00 12.0" Round Culvert	(1957) (1977) (1977) (1977) (1977) 0 0 0 356.00 3,731 0 0 0 358.00 5,325 9,056 9,056 9,056 360.00 7,109 12,434 21,490	Elevation Surf.Area Inc.Store Cum.Store (feet) (so-ff) (subic-feet) (subic-feet)	Volume Invert Avail.Storage Storage Description #1 356.00' 21,490 cf Custom Stage Data (Prismatic) Listed below (Re	Plug-Flow detention time= 623.9 min calculated for 0.590 af (100% of inflow) Center-of-Mass det. time= 623.9 min (1,530.9 - 907.0)	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 358.63' @ 18.14 hrs Surf Area= 5,884 sf Storage= 12,568 cf Flood Elev= 359.25' Surf Area= 6,440 sf Storage= 16,409 cf	Inflow Area = 2.179 ac, 42.68% Impervious, Inflow Depth = 3.25" for 10-Year events Inflow = 8.58 cfs @ 12.14 hrs, Volume= 0.590 af Outflow = 0.25 cfs @ 18.14 hrs, Volume= 0.590 af, Atten= 97%, Lag= Discarded = 0.25 cfs @ 18.14 hrs, Volume= 0.590 af Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.590 af Routed to Pond AP-3 : AP-3 0.00 hrs, Volume= 0.000 af	Summary for Pond 6P: Infiltration Basin #3	Proposed Conditions rev2 NOAA10 24-hr D 10-Yea Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
Dynamic Tailwater)	ischarge)	e area on = 353.50' Phase-In= 0.01'	J, Ke= ∪.300 Y S=0.1171 // Cc= 0.900 onnections, Flow Area= 0.79 sf C= 0.600				c) Listed below (Recalc)	flow)	8 cf	5" for 10-Year event Atten= 97%, Lag= 360.3 min	asin #3	0 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 Page 60





Primary OutFlow Max=1.77 cfs @ 12.14 hrs HW=361.96' TW=358.14' -1=Culvert (Passes 1.77 cfs of 7.40 cfs potential flow) -2=Orifice/Grate (Weir Controls 1.69 cfs @ 1.31 fps) -3=Orifice/Grate (Orifice Controls 0.08 cfs @ 6.63 fps)	Limited to weir flow at low neads #3 Device 1 360.00' 1.5" Vert. Orifice/Grate C= 0.600 [Inter / Outlet Inverte 357.577 / 357.42° Inter / Outlet Inverte 357.577 / 357.42° n= 0.013 Concrete pipe, bends & con #2 Device 1 361.80° 24.0° × 24.0° Horiz. Orifice/Grate C	Device Routing Invert Outlet Devices #1 Primary 357.57' 12.0" Round Culvert	360.00 198 0 0 362.00 775 973 973 363.00 1,153 964 1,937	Elevation Surf.Area Inc.Store Cum.Store (feet) (sq-ft) (cubic-feet) (cubic-feet)	Volume Invert Avail.Storage Storage Description #1 360.00' 1,937 cf Custom Stage Data (Prismatic)	Plug-Flow detention time= 83.4 min calculated for 0.143 af (100% of inflo Center-of-Mass det. time= 83.6 min (857.6 - 774.0)	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hr Peak Elev= 361.96' @ 12.14 hrs Surf.Area= 765 sf Storage= 945 cf	Inflow Area = 0.367 ac, 92.34% Impervious, Inflow Depth = 4.67 Inflow = 1.84 cfs @ 12.13 hrs, Volume= 0.143 af Outflow = 1.82 cfs @ 12.14 hrs, Volume= 0.143 af Primary = 1.82 cfs @ 12.14 hrs, Volume= 0.143 af Primary = 1.82 cfs @ 12.14 hrs, Volume= 0.143 af Routed to Pond 4P : Infiltration Basin #2 0.143 af 1.143 af	Summary for Pond 7P: Detention Bas	Proposed Conditions rev2 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
3.14' (Dynamic Tailwater)	00 Limited to weir flow at low heads	.42' S= 0.050 /' Cc= 0.900 (connections, Flow Area= 0.79 sf ₃ C= 0.600				atic) Listed below (Recalc)	inflow)	55 hrs of	4.67" for 10-Year event f f, Atten= 1%, Lag= 0.9 min lf	Basin #1	410 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 LLC Page 62





Primary OutFlow Max=0.09 cfs @ 15.03 hrs HW=361.51' TW=358.37' (Dynamic Tailwater) _1=Culvert (Passes 0.09 cfs of 4.75 cfs potential flow) _2=Orifice/Grate (Orifice Controls 0.09 cfs @ 7.35 fps) _3=Orifice/Grate (Controls 0.00 cfs)	 He / Outer Invert 359.18' / 358.75' Se 0.060 '/ Cc= 0.900 Inlet / Outer Invert= 359.18' / 358.75' Se 0.060 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf Device 1 359.00' 1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads 	Device Routing Invert Outlet Devices #1 Primary 359.18' 12.0" Round Culvert	360.00 1,218 1,046 1,046 362.00 2,077 3,295 4,341 363.00 2,592 2,335 6,675	Elevation Surf.Area Inc.Store Cum.Store (feet) (sq-ft) (cubic-feet) 350 00 873 0 0	Volume Invert Avail.Storage Storage Description #1 359.00' 6,675 cf Custom Stage Data (Prismatic) Listed below (Recalc)	Plug-Flow detention time= 458.4 min calculated for 0.145 af (97% of inflow) Center-of-Mass det. time= 442.9 min (1,255.5 - 812.7)	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 361.51' @ 15.03 hrs Surf.Area= 1,866 sf Storage= 3,371 cf	Inflow = 2.06 cfs @ 12.13 hrs, Volume= 0.149 af Outflow = 0.09 cfs @ 15.03 hrs, Volume= 0.145 af, Atten= 96%, Lag= 174.1 min Primary = 0.09 cfs @ 15.03 hrs, Volume= 0.145 af, Atten= 96%, Lag= 174.1 min Primary = 0.09 cfs @ 15.03 hrs, Volume= 0.145 af Routed to Pond 4P : Infiltration Basin #2 0.145 af 112 af	Inflow Area = 0.457 ac, 68.53% Impervious, Inflow Depth = 3.91" for 10-Year event	Summary for Pond 8P: Detention Basin #2	Proposed Conditions rev2 NOAA10 24-hr D 10-Year Rainfall=5.25" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 64
			0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 7 Time (hours)			Flow (cfs)	Storage=3,371 cf	2. Inflow Area=0.457 ac	Hydrograph	Pond 8P: Detention Basin #2	Proposed Conditions rev2 NOAA10 24-hr D 10-Yea Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC



Primary OutFlow Max=2.36 cfs @ 12.56 hrs HW=325.61' TV -=Culvert (Passes 2.36 cfs of 18.76 cfs potential flow) -3=Orifice/Grate (Orifice Controls 2.08 cfs @ 5.95 fps) -4=Orifice/Grate (Orifice Controls 0.29 cfs @ 1.64 fps) -5=Orifice/Grate (Orifice Controls 0.00 cfs) -6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)	scarded OutFlow Max=0.21 cfs @ 12.56 hrs HW=325.61' (Fr -2=Exfiltration (Exfiltration Controls 0.21 cfs)	#6 Primary 327.15' 10.0' long x 10.0' breadth Broa Head (feet) 0.20 0.40 0.60 0.8 Coef. (English) 2.49 2.56 2.70	Limited to weir flow at low heads #5 Device 1 326.90' 24.0" x 24.0" Horiz. Orifice/Gra	#2 Discarded 322.00' 2.410 in/hr Exfiltration over Su #3 Device 1 323.75' 8.0" Vert. Orifice/Grate C=0.1 #4 Device 1 325.35' 8.0" W x 8.0" H Vert. Orifice/Grate C=0.1	#1 Primary 320.00' 18.0" Round Culvert L= 60.0' RCP, sq.cut end proje Inlet / Outlet Invert= 320.00' / 31 n= 0.01'3 Concrete pipe, bends	Device Routing Invert Outlet Devices	322.00 1,609 0 0 324.00 2,681 4,290 4,290 326.00 3,982 6,663 10,953 328.00 5,562 9,544 20,497	Elevation Surf.Area Inc.Store Cum.Store (feet) (sq-ft) (cubic-feet) (cubic-feet)	Volume Invert Avail.Storage Storage Description #1 322.00' 20,497 cf Custom Stage Data (Prisr	Plug-Flow detention time= 147.9 min calculated for 0.723 af (100% Center-of-Mass det. time= 147.9 min (1,014.5 - 866.6)	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0 Peak Elev= 325.61' @ 12.56 hrs Surf.Area= 3,731 sf Storage= 9,	Inflow Area = 3.060 ac, 34.47% Impervious, Inflow Depth = Inflow = 6.99 cfs @ 12.26 hrs, Volume= 0.723 Outflow = 2.58 cfs @ 12.56 hrs, Volume= 0.723 Discarded = 0.21 cfs @ 12.56 hrs, Volume= 0.723 Primary = 2.37 cfs @ 12.56 hrs, Volume= 0.284 Primary = 2.37 cfs @ 12.56 hrs, Volume= 0.439 Routed to Pond AP-2 : AP-2 AP-2 12.56 12.56 hrs, Volume=	Summary for Pond 10P: Infiltratio	Proposed Conditions rev2 NO/ Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions
(Dynamic Tailwater)	ischarge)	rested Rectangular Weir 1.00 1.20 1.40 1.60 39 2.68 2.69 2.67 2.64	C= 0.600	e area Phase-In= 0.01' Limited to weir flow at low heads C= 0.600	g, Ke= 0.500 3' S= 0.0333 '/ Cc= 0.900 onnections. Flow Area= 1.77 sf				c) Listed below (Recalc)	nflow)	.cf	∖3" for 10-Year event Atten= 63%, Lag= 18.0 min	asin #1	0 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 C Page 66





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D 10-Year Rainfall=5.25"	roposed Conditions rev2 NOAA10 24-hr

Pond 12P: CULTEC CHAMBER SYSTEM #1 - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 9 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +12.0" End Stone x 2 = 45.00' Base Length

9 Rows x 47.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 41.25' Base Width 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

54 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 9 Rows = 2,349.8 cf Chamber Storage

5,955.5 cf Field - 2,349.8 cf Chambers = 3,605.7 cf Stone x 40.0% Voids = 1,442.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,792.0 cf = 0.087 af Overall Storage Efficiency = 63.7% Overall System Size = 45.00' x 41.25' x 3.21'

54 Chambers 220.6 cy Field 133.5 cy Stone





Proposed Conditions rev2 NOAA10 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC NOAA10 24-hr D 10-Year Rainfall=5.25" Printed 3/13/2024 Page 70

Pond 12P: CULTEC CHAMBER SYSTEM #1



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Summary for Pond 14P: CULTEC CHAMBER SYSTEM #2

[93] Warning: Storage range exceeded by 0.07'[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Routed to Po	Primary =	Outflow =	Inflow =	Inflow Area =
Pond 6P : Infiltration Basin #3	7.12 cfs @ 12.14 hrs, Volume= 0.470 af	7.12 cfs @ 12.14 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.6 mir	6.84 cfs @ 12.13 hrs, Volume= 0.476 af	1.892 ac, 33.99% Impervious, Inflow Depth = 3.02" for 10-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 361.57' @ 12.14 hrs Surf Area= 0.028 ac Storage= 0.057 af

Plug-Flow detention time= 105.6 min calculated for 0.470 af (99% of inflow) Center-of-Mass det. time= 98.3 min (947.1 - 848.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	358.30'	0.022 af	23.58'W x 52.00'L x 3.21'H Field A
			0.090 af Overall - 0.035 af Embedded = 0.055 af x 40.0% Voids
#2A	358.80'	0.035 af	Cultec R-280HD x 35 Inside #1
			Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
			Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
			Row Length Adjustment= +1.00' x 6.07 sf x 5 rows
		0.057 af	Total Available Storage
Storage	Group A c	reated with Char	nber Wizard
otorage	S A dhole	reated with Char	nder wizard

	#3	#2	#1	Device
	Primary	Device 3	Device 3	Routing
	358.80'	358.80'	361.00'	Invert
L= 15.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.80' / 358.65' S= 0.0098 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf	18.0" Round Culvert	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)	Outlet Devices

Primary OutFlow Max=6.82 cfs @ 12.14 hrs HW=361.56' TW=357.25' (Dynamic Tailwater) -3=Culvert (Passes 6.82 cfs of 12.05 cfs potential flow) -1=Sharp-Crested Rectangular Weir (Weir Controls 6.65 cfs @ 2.44 fps) -2=Orifice/Grate (Orifice Controls 0.17 cfs @ 7.87 fps)

Proposed Conditions rev2 NOAA10 24-hr D 10-Year Rainfall=5.25" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b sin 00417 @ 2023 HydroCAD Software Solutions LLC Page 72 Prond 14P: CULTEC CHAMBER SYSTEM #2 - Chamber Wizard Field A Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00"L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00"L with 1.00' Overlap Row Length Adjustment= +1.00" x 6.07 sf x 5 rows 47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing 7 Chambers/Row x 7.00'L long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length 5.0" Stone Base + 26.5" Chamber Height + 6.0" Stone cover = 3.21' Field Height 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone cover = 3.21' Field Height 35 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 5 Rows = 1,517.9 cf Chamber Storage 3,934.5 cf Field - 1,517.9 cf Chambers = 2,446.5 cf Stone x 40.0% Voids = 966.6 cf Stone Storage	Proposed Conditions rev2 // Prepared by Guerriere & Halnon Inc Pond 14P: CUL TEC CHAMBER Inflow Flow (cfs)
Kow Length Adjustment= +1.00' x 6.0/ st x 5 rows 47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing	Pea
7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length 5 Rows x 47.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 23.58' Base Width 6.0" Stone Base + 26.5" Chamber Heidht + 6.0" Stone Cover = 3.21' Field Heidht	
35 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 5 Rows = 1,517.9 cf Chamber Storage	
3,934.5 cf Field - 1,517.9 cf Chambers = 2,416.5 cf Stone x 40.0% Voids = 966.6 cf Stone Storage	
Chamber Storage + Stone Storage = 2,484.6 cf = 0.057 af Overall Storage Efficiency = 63.1% Overall System Size = 52.00' x 23.58' x 3.21'	
35 Chambers 145.7 cy Field 89.5 cy Stone	Time (hours)











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utions LLC		NOAA10 24-hr D
Page 75	Printed 3/13/2024	10-Year Rainfall=5.25"

Summary for Pond AP-2: AP-2

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
10.89 cfs @	10.89 cfs @	10.942 ac,
12.38 hrs,	12.38 hrs,	12.47% Impe
Volume=	Volume=	rvious, Inflc
1.816 af, Atte	1.816 af	w Depth = 1.99"
en= 0%, Lag= 0.0 min		for 10-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-2: AP-2



0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 36 46 66 68 70 72 Pond 1P: AP-4 Pond 1P: AP-4 Peak Elev=359.10' S Discarded=0.18 cfs 0.343 af Primary=2.8	Subcatchment PR-9: UNCAPTURED TO Runoff Area=136,727 s 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 52 64 66 68 70 72 Time (hours) Time (hours) Time (hours)	0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72		Subcatchment PR-8: UNCAPTURED TO Runoff Area=137.043 s Flow Length=301' Tc=11	Subcatchment PR-7: UNCAPTURED TO Runoff Area=49,112 s Flow Length=275 Tc=8	Flow (cfs Subcatchment PR-6: ROOF SOUTH Tc=6	Subcatchment PR-5: To Detention Basin #2Runoff Area=19,916 sf	² Inflow Area=5.486 ac Subcatchment PR4: To Detention Basin #1 Runoff Area=16,000 sf To=6	2.14 cts Control of the second se	Pond AP-3: AP-3 Flow Length=472' Tc=14	Prinnary = 2.14 cis @ 12.46 nrs, volume= 0.470 ar, Atten= 0%, Lag= 0.0 min Subcatchment PR-10: WESTERN Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Flow Length=756' Tc=29	Inflow Area = 5.486 ac, 39.18% Impervious, Inflow Depth = 1.03" for 10-Year event Inflow = 2.14 cfs @ 12.46 hrs, Volume= 0.470 af Flow Length=819" Tc=17	Time span=0.00-72.00 hrs, dt=0.05 hrs, Runoff by SCS TR-20 method, UH=SCS, [40] Hint: Not Described (Outflow=Inflow)	Proposed Conditions rev2 NOAA10 24-hr D 10-Year Rainfall=5.25" Proposed Conditions rev2 NO. Prepared by Guerriere & Halnon Inc Printed 3/13/2024 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b sin 00417 © 2023 HydroCAD Software Solutions Prepared 76 HydroCAD® 10.20-4b HydroCAD Software Solutions
Peak Elev=359.10' Stora ofs 0.343 af Primary=2.89 cfs			Runoff Area=136,727 sf 0.00% In	Runoff Area=137,043 sf 0.01% Im Flow Length=301' Tc=11.3 min CN=	Runoff Area=49,112 sf 0.09% lm Flow Length=275' Tc=8.6 min CN=	Runoff Area=12,492 sf 100.00% Imp Tc=6.0 min CN=5	#2 Runoff Area=19,916 sf 68.53% Imp Tc=6.0 min CN=8	#1 Runoff Area=16,000 sf 92.34% Imp Tc=6.0 min CN=5	Runoff Area=82,428 sf 33.99% Imp Tc=6.0 min CN=7	Runoff Area=59,024 sf 41.78% Impe Flow Length=472' Tc=14.3 min CN=8	Runoff Area=206,274 sf 6.53% Impe Flow Length=756' Tc=29.2 min CN=7	Runoff Area=133,315 sf 34.47% Imp Flow Length=819' Tc=17.4 min CN=7	0-72.00 hrs, dt=0.05 hrs, 1441 points R-20 method, UH=SCS, Weighted-C nd method - Pond routing by Dyn-Std	NOAA10 24-hr roCAD Software Solutions LLC

 Pond 10P: Infiltration Basin #1
 Peak Elev=326.27'
 Storage=12,072 cf
 Inflow=9.45 cfs
 0.979 af

 Discarded=0.23 cfs
 0.302 af
 Primary=4.11 cfs
 0.677 af
 Outflow=4.34 cfs
 0.979 af
 Pond 8P: Detention Basin #2 Pond 7P: Detention Basin #1 Peak Elev=362.08' Storage=4,518 cf Inflow=2.60 cfs 0.191 af Outflow=0.10 cfs 0.188 af Peak Elev=361.99' Storage=965 cf Inflow=2.27 cfs 0.178 af Outflow=2.24 cfs 0.178 af nflow=10.83 cfs 0.780 af utflow=0.96 cfs 0.780 af

Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10:20-4b s/n 00417 @ 2023 HydroC	NOAA10 24-hr D 25-Year Rainfall=6.41" Printed 3/13/2024 AD Software Solutions LLC Page 78
Pond 12P: CULTEC CHAMBER SYSTEM #1	Peak Elev=361.71' Storage=3,343 cf Inflow=5.14 cfs 0.493 af Outflow=5.42 cfs 0.484 af
Pond 14P: CULTEC CHAMBER SYSTEM #2	Peak Elev=361.68' Storage=0.057 af Inflow=9.09 cfs 0.638 af Outflow=9.03 cfs 0.633 af
Pond AP-1: AP-1	Inflow=6.38 cfs_0.820 af Primary=6.38 cfs_0.820 af
Pond AP-2: AP-2	Inflow=16.52 cfs 2.630 af Primary=16.52 cfs 2.630 af
Pond AP-3: AP-3	Inflow=3.84 cfs_0.802 af Primary=3.84 cfs_0.802 af

Total Runoff Area = 19.567 ac Runoff Volume = 5.590 af Average Runoff Depth = 3.43" 82.04% Pervious = 16.053 ac 17.96% Impervious = 3.514 ac

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olutions LLC		NOAA10 24-hr D 25
Page 79	Printed 3/13/2024	-Year Rainfall=6.41"

Summary for Subcatchment PR-1: To Basin #1

[47] Hint: Peak is 107% of capacity of segment #5

Routed to P	Runoff =
ond 10P : Infiltration Basin #1	9.45 cfs @ 12.26 hrs, Volume=
	0.979 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 25-Year Rainfall=6.41"

NOAA10) 24-hr D	25-Yea	ar Raintall=6	.41"	
A	rea (sf)	CN	Description		
	14,748	74	>75% Gras	s cover, Go	od, HSG C
	17,107	86	Paved park	ing, HSG C	
	31,793	70	Woods, Go	od, HSG C	
	5,562	86	Water Surfa	ace, HSG B	
	35,828	61	>75% Gras	s cover, Go	od, HSG B
	23,286	86	Paved park	ing, HSG B	
	4,992	55	Woods, Go	od, HSG B	
_	33,315	77	Weighted A	verage	
	87,361		65.53% Per	vious Area	
	45,955		34.47% Imp	pervious Are	33
Tc	Length	Slope	e Velocity	Capacity	Description
(min)	(feet)	(ft/ft	:) (ft/sec)	(cfs)	
12.7	50	0.020	0 0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.02"
3.5	223	0.0450	0 1.06		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
0.1	25	0.3300	0 4.02		Shallow Concentrated Flow, C-D
					Short Grass Pasture Kv= 7.0 fps
0.7	228	0.0750	0 5.56		Shallow Concentrated Flow, D-E
					Paved Kv= 20.3 fps
0.4	293	0.0610	0 11.20	8.80	Pipe Channel, E-F
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
					n= 0.013 Concrete pipe, bends & connections

17.4

819 Total



Hydrograph



c

Proposed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall=6.41" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 81

Summary for Subcatchment PR-10: WESTERN WETLANDS AND OFFSITE

Runoff = 9.82 cfs @ 12.41 hrs, Volume= 1.354 af, Depth= 3.43" Routed to Pond AP-2 : AP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 25-Year Rainfall=6.41"

22			1	(m							
9.2	9.5	8.9	0.8	lin) c	ا 	19	20	5		14	Are
756	286	420	50	Length (feet)	3,480	2,794	16,274	3,920	4,153	8,201	ea (sf)
Total	0.0100	0.0250	0.0300	Slope (ft/ft)	2	6	73 /	80	74 >	70 /	CN
	0.50	0.79	0.08	Velocity (ft/sec)	5.53% Impe	93.47% Per	Neighted A	1/2 acre lots	>75% Grass	Noods, Goo	Description
				Capacity (cfs)	rvious Area	vious Area	verage	s, 25% imp,	s cover, Go	od, HSG C	
	Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Shallow Concentrated Flow, Woodland Kv= 5.0 fps	Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"	Description				, HSG C	bod, HSG C		

Subcatchment PR-10: WESTERN WETLANDS AND OFFSITE



		Total	472	14.3
18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections				
9.10 Pipe Channel,	5.15	0.0075	336	1.1
Snallow Concentrated Flow, Daved Ky= 20.3 free	2.87	0.0200	21	0.2
Unpaved Kv= 16.1 fps	007		24	2
Shallow Concentrated Flow,	2.28	0.0200	21	0.2
Unpaved Kv= 16.1 fps				
Shallow Concentrated Flow,	11.38	0.5000	38	0.1
Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"	0.07	0.0200	50	12.7
	(ft/sec)	(ft/ft)	(feet)	(min)
apacity Description	Velocity C	Slope	Length	Тс
ious Area	11.78% Imperv	4	24,658	
age Js Area	Veighted Aver 38.22% Pervio	82 5 <	59,024 34.366	
	Roofs, HSG B	98 F	358	
HSG B	³ aved parking,	98 F	2,825	
HSG B	Vater Surface	A 86	6,240	
ver, Good, HSG B	-75% Grass co	61 ×	6,582	
HSG C	Voods, Good,	70 V	6,901	
HSG C	³ aved parking,	98 F	15,236	
ver, Good, HSG C	-75% Grass co	74 >	20,883	
	Description	CN	rea (sf)	A
Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	hod, UH=SCS Rainfall=6.41	₹-20 metl 25-Year	y SCS TF) 24-hr D	Runoff b NOAA10
s, volume= 0.493 ar, Deptn= 4.37" /IBER SYSTEM #1	S @ 12.22 h	5.14 ct d 12P : C	= ed to Pon	Runott Route
)	1) 2
 Subcatchment PR-2: To Basin #2 	ummary fo	S		
lydroCAD Software Solutions LLC Page 82	0417 © 2023 H	4b s/n 0	D® 10.20	HydroCA
NOAA10 24-hr D 25-Year Raintall=6.41" Printed 3/13/2024	rev2 Halnon Inc	ditions erriere &	ied Con	Prenare Prenare
	•		•	I



Subcatchment PR-2: To Basin #2



0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	
Flow (rfs) NOAA10 24-hr D 25-Year Rainfall=6.41" Runoff Area=82,428 sf Runoff Depth=4.05" Tc=6.0 min CN=79	
Subcatchment PR-3: To Infiltration Basin #3	
6.0 Direct Entry,	
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	L
82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected	
9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paven Grass cover, Good, HSG C	
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs VOAA10 24-hr D 25-Year Rainfall=6.41"	
Runoff = 9.09 cfs @ 12.13 hrs, Volume= 0.638 af, Depth= 4.05" Routed to Pond 14P : CULTEC CHAMBER SYSTEM #2	Ru
Summary for Subcatchment PR-3: To Infiltration Basin #3	
Proposed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall=6.41" Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 84	



0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 56 60 62 64 66 68 70 72 Time (hours)
Flow (cfs)
Hydrograph
Subcatchment PR-5: To Detention Basin #2
6.0 Direct Entry,
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)
19,916 88 Weighted Average 6,267 31.47% Pervious Area 13,649 68.53% Impervious Area
6,664 98 Paved parking, HSG B 2,577 98 Water Surface, HSG B * 108 0 >75% Grass cover, Good
15 98 Water Surface, HSG C 3,776 74 >75% Grass cover, Good, HSG C 2,383 61 >75% Grass cover, Good, HSG B
3,739 98 Paved parking, HSG C 654 98 Roofs, HSG C
Area (sf) CN Description
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 25-Year Rainfall=6.41"
Runoff = 2.60 cfs @ 12.13 hrs, Volume= 0.191 af, Depth= 5.02" Routed to Pond 8P : Detention Basin #2
Summary for Subcatchment PR-5: To Detention Basin #2
Proposed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall=6.41" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 86

0 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 56 60 62 64 66 68 70 72 Time (hours)	Flow (cfs) 25-Year Rainfall=6.41" Runoff Area=12,492 sf Runoff Volume=0.147 af Tc=6.0 min CN=98		Subcatchment PR-6: ROOF SOUTH	6.0 Direct Entry,	Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	12,492 98 Weighted Average 12,492 100.00% Impervious Area	Area (sf) CN Description 10,772 98 Roofs, HSG C 1,720 98 Roofs, HSG B	Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 25-Year Rainfall=6.41"	Runoff = 1.80 cfs @ 12.13 hrs, Volume= 0.147 af, Depth= 6.17" Routed to Pond 6P : Infiltration Basin #3	Summary for Subcatchment PR-6: ROOF SOUTH	Proposed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall= Prepared by Guerriere & Halnon Inc Printed 3/13. HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Painted 3/13.
8 70 72		- Runoff						0.05 hrs			ar Rainfall=6.41" ^p rinted 3/13/2024 Page 87

	otal	275 T	8 <u>.</u> 6
1.32 Shallow Concentrated Flow, Woodland Kv= 5.0 fps	0700	135 0	1.7
2.00 Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1600	40 0	0.3
2.00 Sriallow Concentrated Flow, Woodland Kv= 5.0 fps		00	0.4
Woods: Light underbrush n= 0.400 P2= 3.02"	1700		2
0.13 Sheet Flow,	1200	50 0	6.2
locity Capacity Description l/sec) (cfs)	Slope Velu (ft/ft) (ft/	Length (feet)	Tc (min)
6 Impervious Area	0.09%	44	
% Pervious Area	58 Weigh	9,112 9.069	~ ~
d parking, HSG B	98 Paved	44	
o Grass cover, Good, HSG B	61 >75%	5,375	N
ds, Good, HSG B	55 Wood	3,694	N
ription	N Descri	a (sf) C	Are
UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs nfall=6.41"	0 method, l -Year Rain	SCS TR-2 24-hr D 25	Runoff by NOAA10
12.16 hrs, Volume= 0.190 af, Depth= 2.02" 3	: 38 cfs @ ∿P-3 : AP-3	= 2 I to Pond /	Runoff Router
or Subcatchment PR-7: UNCAPTURED TO AP#3	ımmary fo	SL	
Inon Inc Printed 3/13/2/24 © 2023 HydroCAD Software Solutions LLC Page 88	s/n 00417	By Guerr ® 10.20-4b	Preparec HydroCAD
NOAA10 24-hr D 25-Year Rainfall=6.41"	ions rev2	d Condi	Propose





26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	14 16 18 20 22 2	8 10 12	0246	c
	\int			o -
CN=61				2
Tiow Leight-301				ώ
Runoff Depth=2.28"				Flow
Runoff Volume=0.599 af				(cfs)
Runoff Area=137,043 sf				ά
25-Year Rainfall=6.41"				ņ
NOAA10 24-hr D				
Runoff	cfs	<mark>6.88</mark>		7
Hydrograph		-		
ment PR-8: UNCAPTURED TO AP-2	Subcatch			
	_	Tota	301	11.3
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	30 1.35	0.07	251	3.1
Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"	00 0.10	0.06	50	8.2
Capacity Description (cfs)	pe Velocity /ft) (ft/sec)	(ft	Length (feet)	Tc (min)
verage vious Area rvious Area	Weighted A 99.99% Per 0.01% Impr	61	137,043 137,033 10	
ng, HSG B	Paved park	86	12,437 10	
d, HSG B	Woods, Go	s 55	12,303	
d, HSG C s cover, Good, HSG C	Woods, Go >75% Gras	70 74	45,852 6,421	
	Description	CN	Area (sf)	
CS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs 41"	nethod, UH=S ear Rainfall=6	R-20 n 25-Yi	by SCS TI 0 24-hr D	Runoff NOAA1
hrs, Volume= 0.599 af, Depth= 2.28"	3 cfs @ 12.2 2 : AP-2	6.88 AP	= ed to Por	Runoff Rou
bcatchment PR-8: UNCAPTURED TO AP-2	imary for Si	Sum		
ואטראר ערביין ערביין אינעראר ערביין אינער אין אינער אין אינערע אין אינערע אין אינערע אין אינערע אין אינערע אין אינעראראר אין אינערע אין אינערע אין אין אינערע אין	e & Halnon I n 00417 © 20:	ierrier)-4b_s/	ed by Gu	Prepar HydroC,
NOAAO 24-br D 25-Voar Rainfall=6 41"	55 555)) 2)) 2)) 2))	3

		6.38 cfs		
Hydrograph				
ent PR-9: UNCAPTURED TO AP-1	Subcatchn	Ś		
		Total	660	25.8
Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps	0.94	0.0350	280	5.0
Shallow Concentrated Flow, C-D	0.50	0.0100	260	8.7
Woodand Kv=5.0 free	0.87	0.0300	70	1.3
Sheet Flow, A-B	0.08	0.0300	50	10.8
apacity Description (cfs)	Velocity ((ft/sec)	Slope (ft/ft)	Length (feet)	Tc (min)
ious Area	eighted Ave 00.00% Per	70 W	36,727 36,727	
NSG C over, Good, HSG C	oods, Good 75% Grass	70 W	36,638 89	
	escription	CN D	rea (sf)	Þ
3, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	od, UH=SC Rainfall=6.4	₹-20 meth 25-Year f	y SCS TF 24-hr D	Runoff b NOAA10
rs, Volume= 0.820 af, Depth= 3.13"	@ 12.37 \P-1	6 38 cfs d AP 1 : A	= ed to Pon	Runoff Route
catchment PR-9: UNCAPTURED TO AP-1	ry for Sub	Summa		

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NOAA10 24-hr D 25-Year Rainfall=6.41" Printed 3/13/2024 utions LLC Page 91


	Flow (cfs)		Prima	[40] H		Prop Prepa Hydro
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)		Pond 1P: AP-4	n ary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)	Hint: Not Described (Outflow=Inflow)	Summary for Pond 1P: AP-4	posed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall=6.41' pared by Guerriere & Halnon Inc Printed 3/13/2024 roCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 92
						10 4 1

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	Solutions LLC		NOAA10 24-hr D
,	Page 93	Printed 3/13/2024	25-Year Rainfall=6.41"

Summary for Pond 4P: Infiltration Basin #2

Routed to Pon	Primary =	Discarded =	Outflow =	Inflow =	Inflow Area =
Pond AP-3 : AP-3	2.89 cfs @ 12.43 hrs, Volume= 0.507 af	0.18 cfs @ 12.43 hrs, Volume= 0.343 af	3.07 cfs @ 12.43 hrs, Volume= 0.850 af, Atten= 52%, Lag= 10.4 min	6.42 cfs @ 12.26 hrs, Volume= 0.850 af	2.180 ac, 55.91% Impervious, Inflow Depth = 4.68" for 25-Year event

Surf.Area Inc.Store Cum.Store (sq-ft) (cubic-feet) 0 2,466 0 0 3,324 2,895 2,895 5,211 8,535 11,430 6,240 5,726 17,156 7y 355.00' 12.0" Round Culvert L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Devices 11.430 at 358.20' 18.0" W × 6.0" H Vert. Orifice/Grate Limited to weir flow at low heads 2.0000 V × 48.0" Horiz. Orifice/Grate Limited to weir flow at low heads C= 0.600	ation (ffeet) 57.00 58.00 51.0	世 世 世 世 で 3 3 5 一 ビ で 3 5 一 で 5 5 5 5 5 5 5 5 5 5 5 5 5
 Stor-Ind method, Itime Span= 0.00-72.00 hrs, dr= 0.05 hrs (10' @ 12.43 hrs Surf.Area= 4,362 sf Storage= 7,124 cf (25' Surf.Area= 5,468 sf Storage= 12,765 cf (100% of inflow) det. time= 166.1 min calculated for 0.850 af (100% of inflow) det. time= 166.1 min (1,135.9 - 969.8) (100' Avail.Storage Storage Description (17.00' 17,156 cf Custom Stage Data (Prismatic) Listed below (F 	i, Elev= 365 1 Elev= 36 F-Flow deter er-of-Mass me li 35	Routi Peak Plug- Cente #1

Primary OutFlow Max=2.89 cfs @ 12.43 hrs HW=359.10' TW=0.00' (Dynamic Tailwater) -1=Culvert (Passes 2.89 cfs of 4.57 cfs potential flow) -2=Orifice/Grate (Orifice Controls 2.89 cfs @ 3.85 fps) -3=Orifice/Grate (Controls 0.00 cfs)

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Pond 4P: Infiltration Basin #2



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Summary for Pond 6P: Infiltration Basin #3

Routed to F	Primary =	Discarded =	Outflow =	Inflow =	Inflow Area =
ond AP-3 : AP-3	0.69 cfs @ 13.04 hrs, Volu	0.27 cfs @ 13.04 hrs, Volu	0.96 cfs @ 13.04 hrs, Volu	10.83 cfs @ 12.13 hrs, Volu	2.179 ac, 42.68% Imperviou
	ume= 0.105 af	ume= 0.675 af	ume= 0.780 af, Atten= 91%, L	ume= 0.780 af	ous, Inflow Depth = 4.30" for 25-Ye
			_ag= 54.5 min		ar event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 358.96' @ 13.04 hrs Surf.Area= 6,177 sf Storage= 14,552 cf Flood Elev= 359.25' Surf.Area= 6,440 sf Storage= 16,409 cf

Plug-Flov Center-o	v detention tin f-Mass det. tir	ne= 576.5 m ne= 576.4 m	nin calo nin (1,	culated for 460.6 - 88⁄	0.780 af (100% of inflow) 1.2)
Volume	Invert	Avail.Stor	age	Storage De	escription
Ŧ	356.00'	21,49	10 cf	Custom Si	tage Data (Prismatic) Listed below (Recalc)
Elevatio	n Surf	Area	Inc.	Store	Cum.Store
(fee	t) (sq-ft)	(cubic	-feet)	(cubic-feet)
356.0	0	3,731		0	0
358.0	0	5,325	~	9,056	9,056
360.0	0	7,109	1	2,434	21,490
Device	Routing	Invert	Outle	t Devices	
#1	Primary	354.00'	12.0"	Round C	ulvert
			L= 68 Inlet /	Outlet Inv	sq.cut end projecting, Ke= 0.500 ert= 354.00' / 346.00' S= 0.1171 // Cc= 0.900
			n= 0.0	013 Concr	ete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	358.90'	48.0"	x 48.0" Ho	oriz. Orifice/Grate C= 0.600
# 3	Discarded	356.00'	1.020	in/hr Exfil	tration over Surface area
			Cond	uctivity to (Groundwater Elevation = 353.50' Phase-In= 0.01'

Discarded OutFlow Max=0.27 cfs @ 13.04 hrs HW=358.96' (Free Discharge)

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Pond 6P: Infiltration Basin #3



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Summary for Pond 7P: Detention Basin #1

'8 af	e= 0.17	, Volum	12.14 hrs ion Basin #	2.24 cfs @ nd 4P : Infiltrat	= d to Por	Primary Route
78 af, Atten= 1%, Lag= 0.8 r	e= 0.17	, Volum	12.14 hrs	2.24 cfs @	н	Outflow
'8 af	e= 0.17	, Volum	12.13 hrs	2.27 cfs @	П	Inflow
= 5.82" for 25-Year even	, Inflow Depth	pervious	92.34% Imj	0.367 ac, 1	9a =	Inflow An

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 361.99' @ 12.14 hrs Surf.Area= 772 sf Storage= 965 cf

Plug-Flow detention time= 82.4 min calculated for 0.178 af (100% of inflow) Center-of-Mass det. time= 81.6 min (849.4 - 767.7)

,	#3 Dev	#2 Dev	#1 Prir	Device Rou	363.00	362.00	360.00	(feet)	Elevation	#1	Volume
	vice 1 360.00'	vice 1 361.80'	mary 357.57'	uting Invert	1,153	775	198	(sq-ft)	Surf.Area	360.00' 1,9	Invert Avail.Sto
	Limited to weir flow at low heads 1.5" Vert. Orifice/Grate C= 0.600	net / Uutet Invert= 357.577.357.4 n= 0.013 Concrete pipe, bends & c 24.0" x 24.0" Horiz. Orifice/Grate	12.0" Round Culvert L= 30.0' RCP, sq.cut end projectin	Outlet Devices	964 1,937	973 973	0 0	(cubic-feet) (cubic-feet)	Inc.Store Cum.Store)37 cf Custom Stage Data (Prismati	prage Storage Description
	Limited to weir flow at low heads	27: S= 0.0050 7: Cc= 0.900 connections, Flow Area= 0.79 sf C= 0.600	g, Ke= 0.500							ic) Listed below (Recalc)	

(Dynamic Tailwater)



Pond 7P: Detention Basin #1



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Summary for Pond 8P: Detention Basin #2

Inflow Area =	0.457 ac, 68.53% Impervious, Inflow Depth = 5.02" for 25-Year event
Inflow =	2.60 cfs @ 12.13 hrs, Volume= 0.191 af
Outflow =	0.10 cfs @ 15.10 hrs, Volume= 0.188 af, Atten= 96%, Lag= 178.0 min
Primary =	0.10 cfs @ 15.10 hrs, Volume= 0.188 af
Routed to Por	nd 4P : Infiltration Basin #2
	74- 1-4 mathed Time Onen 0.00 70.00 here at 0.05 here

Peak Elev= 362.08' @ 15.10 hrs Surf.Area= 2,121 sf Storage= 4,518 cf

Plug-Flow detention time= 538.0 min calculated for 0.188 af (98% of inflow) Center-of-Mass det. time= 525.6 min (1,328.9 - 803.3)

费	#2 D		#1 P	Device R	363.00	362.00	360.00	359.00	(feet)	Elevation	#1	Volume
)evice 1)evice 1		rimary	Routing						SL	359.00'	Invert
362.20'	359.00'		359.18	Invert	2,592	2,077	1,218	873	(sq-ft)	ırf.Area	6,6,	Avail.Sto
24.0	n= 0	L= 8 Inlet	12.0	Outle					(cubic	Inc	75 cf	rage
" x 24.0" H	Vert Orific	/ Outlet Inv	" Round C	et Devices	2,335	3,295	1,046	0	:-feet)	Store	Custom S	Storage D
oriz. Orifice/Grate C= 0.600 flow at low heads	smooth interior, Flow Area= 0.79 sf ce/Grate C= 0.600 Limited to weir flow at low heads	sq.cut end projecting, Ke= 0.500 'ert= 359.18' / 358.75' S= 0.0050 '/' Cc= 0.900	ulvert		6,675	4,341	1,046	0	(cubic-feet)	Cum.Store	tage Data (Prismatic) Listed below (Recalc)	escription



Pond 8P: Detention Basin #2



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Summary for Pond 10P: Infiltration Basin #1

Routed to Por	Primary =	Discarded =	Outflow =	Inflow =	Inflow Area =
5 Pond AP-2 : AP-2	= 4.11 cfs @ 12.50 hrs, Volume= 0.677 af	 0.23 cfs @ 12.50 hrs, Volume= 0.302 af 	4.34 cfs @ 12.50 hrs, Volume= 0.979 af, Atten= 54%, Lag= 14.3	9.45 cfs @ 12.26 hrs, Volume= 0.979 af	= 3.060 ac, 34.47% Impervious, Inflow Depth = 3.84" for 25-Year event
			min		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 326.27' @ 12.50 hrs Surf.Area= 4,198 sf Storage= 12,072 cf

Plug-Flow detention time= 121.7 min calculated for 0.979 af (100% of inflow) Center-of-Mass det. time= 122.0 min (976.5 - 854.5)

; @ 12.50 hrs HW=326.27' (Free Discharge) trols 0.23 cfs)	Max=0.23 cfs (filtration Con	ed OutFlow filtration (Ex	Discard
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.68 2.68 2.67 2.64	327.15	Primary	#6
24.0° x 24.0° Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low beads	326.90'	Device 1	费
 8.0" W x 8.0" H Vert. Orfice/Grate C= 0.600 Lipsitud to woir flow of low boods 	325.35	Device 1	¥3
2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'	322.00'	Discarded	#2
'18.0" Kound Cuived and Conjecting, Ke= 0.500 L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 320.00' / 318.00' S= 0.0333 /' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf	320.00	Primary	#1
Outlet Devices	Invert	Routing	Device
9,544 20,497	5,562	80	328.0
4,290 4,290 6 663 10 953	2,681 3.982	58	324.0 326.0
0 0	1,609	0	322.0
(cubic-feet) (cubic-feet)	(sq-ft)	t) :	(fee
Inc. Store Cum. Store	rf Area	on Sui	Elevatio
7 cf Custom Stage Data (Prismatic) Listed below (Recalc)	20,49	322.00'	#1
age Storage Description	Avail.Stor	Invert	Volume
iin (976.5 - 854.5)	ime= 122.0 n	of-Mass det. ti	Center-c

ailwater)

	ļ	Ţ			
(Orifice Controls				-4=Orifice/Grate	
2.49 cfs @ 7 13 fps) 1.62 cfs @ 3.64 fps)		4. I I CTS OT ZU UU CTS potential flow)	(Orifice Controls 2.49 cfs @ 7.13 fps)	(Orifice Controls 1.62 cfs @ 3.64 fps)	

−5=Orifice/Grate (Controls 0.00 cfs) **−5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Pond 10P: Infiltration Basin #1



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Summary for Pond 12P: CULTEC CHAMBER SYSTEM #1

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Routed to Pon	Primary =	Outflow =	Inflow =	Inflow Area =
nd 4P : Infiltration Basin #2	5.42 cfs @ 12.26 hrs, Volume= 0.484 af	5.42 cfs @ 12.26 hrs, Volume= 0.484 af, Atten= 0%, Lag= 2.5 min	5.14 cfs @ 12.22 hrs, Volume= 0.493 af	1.355 ac, 41.78% Impervious, Inflow Depth = 4.37" for 25-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 361.71' @ 12.26 hrs Surf.Area= 1,856 sf Storage= 3,343 cf

Plug-Flow detention time= 50.2 min calculated for 0.484 af (98% of inflow) Center-of-Mass det. time= 40.6 min (875.0 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	359.10'	1,442 cf	41.25'W x 45.00'L x 3.21'H Field A
			5,955 cf Overall - 2,350 cf Embedded = 3,606 cf x 40.0% Voids
#2A	359.60'	2,350 cf	Cultec R-280HD x 54 Inside #1
			Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
			Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
			Row Length Adjustment= +1.00' x 6.07 sf x 9 rows
		3,792 cf	Total Available Storage
2			

Storage Group A created with Chamber Wizard

#3 #2	#1	Device
Device 1 Device 1	Primary	Routing
361.30' 359.60'	359.60'	Invert
L= 131.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 359.60' / 358.94' S= 0.0050 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf 5.0' Iong Sharp-Crested Rectangular Weir 2 End Contraction(s) 6.0'' Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads	15.0" Round Culvert	Outlet Devices

Proposed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall=6.41" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 104	Proposed Conditions rev2 NOA Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions I
Pond 12P: CULTEC CHAMBER SYSTEM #1 - Chamber Wizard Field A	Pond 12P: CULTEC CHAMBER SY
Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf	6. Hydrograph
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 9 rows	
47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing	Peak
6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +12.0" End Stone x 2 = 45.00'	s)
base Lengun 9 Rows x 47.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 41.25' Base Width 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height	Flow (cfs
54 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 9 Rows = 2,349.8 cf Chamber Storage	2
5,955.5 cf Field - 2,349.8 cf Chambers = 3,605.7 cf Stone x 40.0% Voids = 1,442.3 cf Stone Storage	
Chamber Storage + Stone Storage = 3,792.0 cf = 0.087 af Overall Storage Efficiency = 63.7% Overall System Size = 45.00' x 41.25' x 3.21'	
54 Chambers 220.6 cy Field 133.5 cy Stone	Time (nous)









Primary OutFlow Max=8.65 cfs @ 12.13 hrs HW=361.66' TW=357.82' (Dynamic Tailwater) 	 #1 Device 3 361.00" 5.0" long Sharp-Crested Rectangular Weir 2 End Contraction(s) #2 Device 3 358.80" 2.0" Vert. Orifice/Grate C = 0.600 Limited to weir flow at low heads #3 Primary 358.80" 18.0" Round Culvert L= 15.3" CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.80" / 358.65" S= 0.0098 / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf 	Device Routing Invert Outlet Devices	U.US7 at Total Available Storage	#2A 358.80' 0.035 af Cultec R-280HD x 35 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 5 rows	#1A 358.30' 0.022 af 23.58'W × 52.00'L × 3.21'H Field A 0.090 af Overall - 0.035 af Embedded = 0.055 af × 40.0% Voids	Volume Invert Avail.Storage Storage Description	Plug-Flow detention time= 84.8 min calculated for 0.633 af (99% of inflow) Center-of-Mass det. time= 79.1 min (916.3 - 837.2)	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 361.68' @ 12.13 hrs Surf.Area= 0.028 ac Storage= 0.057 af	Inflow Area = 1.892 ac, 33.99% Impervious, Inflow Depth = 4.05" for 25-Year event Inflow = 9.09 cfs @ 12.13 hrs, Volume= 0.638 af Outflow = 9.03 cfs @ 12.13 hrs, Volume= 0.633 af, Atten= 1%, Lag= 0.0 min Primary = 9.03 cfs @ 12.13 hrs, Volume= 0.633 af Routed to Pond 6P : Infiltration Basin #3	[93] Warning: Storage range exceeded by 0.17'	Summary for Pond 14P: CULTEC CHAMBER SYSTEM #2	Proposed Conditions rev2 NOAA10 24-hr D 25-Year Rainfall=6.41" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 106
		89.5 C	35 Cha 145.7 c	Chamt Overal Overal	3,934.(35 Cha	6.0" St	7 Char Base L 5 Row	Cirecui Overal Row L¢ 47.0" V	Chamb		Propc Prepa HydroC

 oposed Conditions rev2
 NOAA10 24-hr D
 25-Year Rainfall=6.41"

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Pond 14P: CULTEC CHAMBER SYSTEM #2 - Chamber Wizard Field A

hamber Model = Cultec R-280HD (Cultec Recharger® 280HD) ffective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf verall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap ow Length Adjustment= +1.00' x 6.07 sf x 5 rows

7.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

′ Chambers/Row x 7.00′ Long +1.00′ Row Adjustment = 50.00′ Row Length +12.0″ End Stone x 2 = 52.00′ 3ase Length

Rows x 47.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 23.58" Base Width 0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

35 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 5 Rows = 1,517.9 cf Chamber Storage

3,934.5 cf Field - 1,517.9 cf Chambers = 2,416.5 cf Stone x 40.0% Voids = 966.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,484.6 cf = 0.057 af Overall Storage Efficiency = 63.1% Overall System Size = 52.00' x 23.58' x 3.21'

35 Chambers 145.7 cy Field 89.5 cy Stone

 Proposed Conditions rev2
 NOAA10 24-hr D
 25-Year Rainfall=6.41"

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Pond 14P: CULTEC CHAMBER SYSTEM #2



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Summary for Pond AP-1: AP-1

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
6.38 cfs @	6.38 cfs @	3.139 ac,
12.37 hrs, Volume=	12.37 hrs, Volume=	0.00% Impervious, Inflow
0.820 af, Atten= 0%, Lag= 0.0 min	0.820 af	Depth = 3.13" for 25-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-1: AP-1





 Proposed Conditions rev2
 NOAA10 24-hr D
 25-Year Rainfall=6.41"

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Summary for Pond AP-3: AP-3

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
3.84 cfs @ 12.22 hrs, Volume=	3.84 cfs @ 12.22 hrs, Volume=	5.486 ac, 39.18% Impervious, Inflow De
0.802 af, Atten= 0%, Lag= 0.0 min	0.802 af	epth = 1.75" for 25-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-3: AP-3



Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 Hy	NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024 droCAD Software Solutions LLC Page 112
Time span=0.0 Runoff by SCS 1 Reach routing by Dyn-Stor-I	0-72.00 hrs, dt=0.05 hrs, 1441 points R-20 method, UH=SCS, Weighted-CN rd method - Pond routing by Dyn-Stor-Ind method
Subcatchment PR-1: To Basin #1	Runoff Area=133,315 sf 34.47% Impervious Runoff Depth=5.45" Flow Length=819 Tc=17.4 min CN=77 Runoff=13.30 cfs 1.390 af
Subcatchment PR-10: WESTERN	Runoff Area=206,274 sf 6.53% Impervious Runoff Depth=4.98" Flow Length=756' Tc=29.2 min CN=73 Runoff=14.23 cfs 1.965 af
Subcatchment PR-2: To Basin #2	Runoff Area=59,024 sf 41.78% Impervious Runoff Depth=6.04" Flow Length=472' Tc=14.3 min CN=82 Runoff=7.02 cfs 0.682 af
Subcatchment PR-3: To Infiltration Basi	N Runoff Area=82,428 sf 33.99% Impervious Runoff Depth=5.69" Tc=6.0 min CN=79 Runoff=12.59 cfs 0.896 af
Subcatchment PR-4: To Detention Basin	#1Runoff Area=16,000 sf 92.34% Impervious Runoff Depth=7.59" Tc=6.0 min CN=95 Runoff=2.92 cfs 0.232 af
Subcatchment PR-5: To Detention Basin	#2Runoff Area=19,916 sf 68.53% Impervious Runoff Depth=6.75" Tc=6.0 min CN=88 Runoff=3.44 cfs 0.257 af
Subcatchment PR-6: ROOF SOUTH	Runoff Area=12,492 sf 100.00% Impervious Runoff Depth=7.95" Tc=6.0 min CN=98 Runoff=2.30 cfs 0.190 af
Subcatchment PR-7: UNCAPTURED TO	Runoff Area=49,112 sf 0.09% Impervious Runoff Depth=3.25" Flow Length=275' Tc=8.6 min CN=58 Runoff=3.96 cfs 0.305 af
Subcatchment PR-8: UNCAPTURED TO	Runoff Area=137,043 sf 0.01% Impervious Runoff Depth=3.59" Now Length=301' Tc=11.3 min CN=61 Runoff=11.04 cfs 0.941 af
Subcatchment PR-9: UNCAPTURED TO	Runoff Area=136,727 sf 0.00% Impervious Runoff Depth=4.63" Flow Length=660' Tc=25.8 min CN=70 Runoff=9.46 cfs 1.211 af
Pond 1P: AP-4	Primary=0.00 cfs_0.000 af
Pond 4P: Infiltration Basin #2 Discarded=0.22	Peak Elev=359.70' Storage=9,891 cf Inflow=8.19 cfs 1.159 af cfs 0.376 af Primary=4.02 cfs 0.783 af Outflow=4.24 cfs 1.159 af
Pond 6P: Infiltration Basin #3 Discarded=0.29	Peak Elev=359.17' Storage=15,910 cf Inflow=15.04 cfs 1.081 af cfs 0.707 af Primary=7.42 cfs 0.374 af Outflow=7.71 cfs 1.081 af
Pond 7P: Detention Basin #1	Peak Elev=362.03' Storage=993 cf Inflow=2.92 cfs 0.232 af Outflow=2.89 cfs 0.232 af
Pond 8P: Detention Basin #2	Peak Elev=362.29' Storage=4,963 cf Inflow=3.44 cfs 0.257 af Outflow=0.80 cfs 0.254 af
Pond 10P: Infiltration Basin #1 Discarded=0.27	Peak Elev=327.06' Storage=15,641 cf Inflow=13.30 cfs 1.390 af cfs 0.327 af Primary=7.16 cfs 1.063 af Outflow=7.43 cfs 1.390 af

Pond 14P: CULTEC CHAMBER SYSTEM #2	Pond 12P: CULTEC CHAMBER SYSTEM #1	Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroC
'eak Elev=361.86' Storage=0.057 af Inflow=12.59 cfs 0.896 af Outflow=12.74 cfs 0.891 af	Peak Elev=362.08' Storage=3,620 cf Inflow=7.02 cfs 0.682 af Outflow=6.34 cfs 0.673 af	NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024 AD Software Solutions LLC Page 113

Total Runoff Area = 19.567 ac Runoff Volume = 8.070 af Average Runoff Depth = 4.95" 82.04% Pervious = 16.053 ac 17.96% Impervious = 3.514 ac

Inflow=14.28 cfs 1.462 af Primary=14.28 cfs 1.462 af Inflow=24.99 cfs 3.969 af Primary=24.99 cfs 3.969 af

Inflow=9.46 cfs 1.211 af Primary=9.46 cfs 1.211 af

Pond AP-3: AP-3

Pond AP-2: AP-2

Pond AP-1: AP-1

	otal	0 7	81:	17.4
n= 0.013 Concrete pipe, bends & connections				
1.20 8.80 Pipe Channel, E-F	0610 1	3	29	0.4
Paved Kv= 20.3 fps				
5.56 Shallow Concentrated Flow, D-E	0750	80.0	22	0.7
Short Grass Pasture Kv= 7.0 fps				
4.02 Shallow Concentrated Flow, C-D	3300	0.0	22	0.1
Woodland Kv= 5.0 fps				
1.06 Shallow Concentrated Flow, B-C	0450	ω 0.1	22	3.5
Woods: Light underbrush n= 0.400 P2= 3.02"				
0.07 Sheet Flow, A-B	0200	0.0	5	12.7
sec) (cfs)	(ft/ft) (ft		(feet	(min)
ocity Capacity Description	Slope Vel	ۍ س	Lengt	5
% Impervious Area	34.47		45,955	
ited Average % Pervious Area	7 Weigh 65.53	7	133,315 87,361	
s, Good, HSG B	5 Wood	5.6	4,992	
Inarking HSG R		00	23,020	
Grass cover. Good. HSG B	1 >75%	ი [,]	35.828	
Surface, HSG B	8 Water	9	5,562	
s, Good, HSG C	0 Wood	7	31,793	
parking, HSG C	8 Paved	9	17,107	
Grass cover, Good, HSG C	4 >75%	7	14,748	
ption	N Descr	Ω	Area (sf)	
UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs nfall=8.19"	0 method, 0-Year Ra	TR-20 D 10	by SCS 0 24-hr I	Runoff NOAA1
12.26 hrs, Volume= 1.390 af, Depth= 5.45" tion Basin #1	.30 cfs @ 0P : Infiltra	13. ond 10	= ted to Pc	Runoff Rou
city of segment #5	l% of capa	is 151	ıt: Peak i	[47] Hir
nary for Subcatchment PR-1: To Basin #1	Sumi			
© 2023 HydroCAD Software Solutions LLC Page 114	s/n 00417	<u>2</u> 0-4b	AD® 10.2	HydroC,
non Inc Printed 3/13/2024	ere & Hal	uerri	ed by G	Prepar
NOAA10 24-hr D 100-Year Rainfall=8.19"	ions rev:	nditi	sed Co	Propo

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Subcatchment PR-1: To Basin #1



34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 me (hours)	26 28 30 32 34 Tim	6 18 20 22 24	10 12 14 1	2468	0
					> - 1
			>		2 3
Tc=29.2 min					4 J
Flow Length=756'					F م -
Runoff Depth=4.98"					Flow (0
Runoff Volume=1.965 af					ofs)
Runoff Area=206,274 sf					1 1
100-Year Rainfall=8.19"					12
NOAA10 24-hr D					13
- Runoff			14.23 cfs		15
ograph	Hydrog	-	-		1
ESTERN WETLANDS AND OFFSITE	R-10: WE	hment P	Subcato		
			Total	756	29.2
Shallow Concentrated Flow, Woodland Kv= 5.0 fps		0.50	0.0100	286	9.5
Shallow Concentrated Flow, Woodland Ky= 5.0 fps		0.79	0.0250	420	8.9
Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.02"		0.08	0.0300	50	10.8
Description	Capacity (cfs)	Velocity (ft/sec)	Slope (ft/ft)	Length (feet)	Tc (min)
2	verage vious Area rvious Area	Veighted A 3.47% Per 53% Impe	73 6 9 V	06,274 92,794 13,480	<u> </u>
ood, HSG C , HSG C	od, HSG C s cover, Go <u>s, 25% imp,</u>	Voods, Goo 75% Grass /2 acre lots	70 74 v 80 1	48,201 4,153 53,920	_
)escription	CN	ea (sf)	A
hted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	CS, Weight 8 19"	nod, UH=S r Rainfall≕	२-20 metl 100-Yea	/ SCS TF 24-hr D	Runoff b NOAA10
ume= 1.965 af, Depth= 4.98"	l hrs, Volur	s @ 12.4 AP-2	14.23 cf d AP-2	= d to Pon	Runoff Route
-10: WESTERN WETLANDS AND OFFSITE	nent PR-	ubcatch	Iry for S	Summa	
AD Software Solutions LLC Printed 3/13/2024 Printed 3/13/2024	nc 13 HydroCAE	Halnon Ir 0417 © 202	erriere & 4b s/n 0	d by Gu 0® 10.20	Prepare HydroCA
NOAA10 24-hr D 100-Year Rainfall=8 19"		10V3	ditions	Pd Con	

14.3

472 Total

			1	110	2
18.0" Round Area= 1.8 st Perim= 4.7' r= 0.38 n= 0.013 Concrete pipe, bends & connections					
Pipe Channel,	9.10	5.15	0.0075	336	1.1
Paved Kv= 20.3 fps					
Shallow Concentrated Flow,		2.87	0.0200	27	0.2
Unpaved Kv= 16.1 fps					
Shallow Concentrated Flow,		2.28	0.0200	21	0.2
Unpaved Kv= 16.1 fps					
Shallow Concentrated Flow,		11.38	0.5000	38	0.1
Woods: Light underbrush n= 0.400 P2= 3.02"					
Sheet Flow,		0.07	0.0200	50	12.7
	(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
Description	Capacity	Velocity	Slope	Length	Тс
rea	ervious Ar	1.78% Imp	4	24,658	
a	vious Area	8 22% Per	. J	34,366	
	/erage	Veighted A	82 V	59,024	
	B	loofs, HSG	98 R	358	
B	ng, HSG E	'aved parki	98 P	2,825	
B	ce, HSG E	Vater Surfa	A 86	6,240	
lood, HSG B	cover, G	75% Grass	61 ×	6,582	
	od, HSG C	Voods, Goo	70 V	6,901	
C	ng, HSG (aved parki	98 P	15,236	
lood, HSG C	; cover, G	75% Grass	74 >	20,883	
)escription	CND	rea (sf)	A
Illed-CN, TIME Span= 0.00-72.00 Ms, dt= 0.05 Ms	сэ, vveigi 3.19"	r Rainfall=8	100-Yea	9 24-hr D	NOAA10
Had ON Time Share 0.00 70 00 km dte 0.05 km					
SYSTEM #1	IAMBER (ULTEC CH	d 12P : C	ed to Pond	Route
ume≡ 0.682 af Denth≡ 6.04"	hrs Voli	s @ 12.22	7 02 cfs	II	Runoff
catchment PR-2: To Basin #2	for Subc	ummary	s		

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Subcatchment PR-2: To Basin #2



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Runoff = 12.59 cfs @ 12.13 hrs, Volume= 0.896 af, Depth= 5.69" Routed to Pond 14P : CULTEC CHAMBER SYSTEM #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 100-Year Rainfall=8.19"

	Area (sf) CN Description	26,370 74 >75% Grass cover, Good, HSG C	82,428 79 Weighted Average	54,408 66.01% Pervious Area	28,020 33.99% Impervious Area	0 0.00% Unconnected	Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	6.0 Direct Entry,	Subcatchment PR-3: To Infiltration Basin #3	Area (sf) 26,370 15,6370 15,524 15,524 5,303 7,109 3,049 82,428 54,408 54,408 28,020 0 Tc Length (fieet) 6.0	CN 74 74 79 79 79 79 79 79 79 79	Description >75% Grass cover, Good, HSG C Paved parking, HSG C s75% Grass cover, Good, HSG B Paved parking, HSG B Water Surface, HSG B Woods, Good, HSG B Unconnected pavement, HSG B Weighted Average 66.01% Pervious Area 0.00% Unconnected 0.00% Unconnected
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C	26,370 74 >75% Grass cover, Good, HSG C		9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average	9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area	9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	9,464 70 Words, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0,00% Unconnected	9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66,01% Pervious Area 28,020 33.99% Impervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry,	15,608	86	Paved parking, HSG C
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C	26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C	15,608 98 Paved parking, HSG C	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 0.00% Unconnected	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,008 66.01% Pervious Area 28,020 33.99% Impervious Area 28,020 33.99% Unconnected 7C Length Slope Velocity Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)	15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 0.00% Unconnected 7 Length 1 Converted 7 Velocity Capacity Description (min) (ft/ft) (ft/sc) (cfs) 0 Direct Entry,	9,464	70	Woods, Good, HSG C
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C	26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C	15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C	5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	5,303 98 Paved parking, HSG B 7,109 98 Water Surface, B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average	5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area	5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 0.00% Unconnected	5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	5,303 98 Paved parking, HSC B 7,109 98 Water Surface, HSC B 3,049 55 Woods, Good, HSC B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry,	15,524	61	>75% Grass cover, Good, HSG B
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B	26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B	15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B	7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average	7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area	7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	7,109 98 Water Surface, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected	7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)	7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (ft/ft) (ft/sec) (cfs) Direct Entry,	5,303	86	Paved parking, HSG B
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG B 5,303 98 Paved parking, HSG B	26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B	5,508 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B	0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B	0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average	0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area	0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected	0 98 Unconnected pavement, HSG B 3,049 55 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	0 98 Unconnected pavement, HSG B 3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry,	7,109	86	Water Surface, HSG B
Area (sf) CN Description 26.370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B	26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B	15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B	3,049 55 Woods, Good, HSG B	3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average	3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area	3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected	3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	3,049 55 Woods, Good, HSG B 82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) 6.0 Direct Entry,	0	86	Unconnected pavement, HSG B
Area (sf) CN Description 26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B	26,370 74 >75% Grass cover, Good, HSG C 15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B	15,608 98 Paved parking, HSG C 9,464 70 Woods, Good, HSG C 15,524 61 >75% Grass cover, Good, HSG B 5,303 98 Paved parking, HSG B 7,109 98 Water Surface, HSG B 0 98 Unconnected pavement, HSG B		82,428 79 Weighted Average	82,428 79 Weighted Average 54,408 66.01% Pervious Area	82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area	82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 33.99% Impervious Area 0 0.00% Unconnected	82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 3.3.99% Impervious Area 0 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	82,428 79 Weighted Average 54,408 66.01% Pervious Area 28,020 3.39% Impervious Area 0 0.00% Unconnected Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs) Direct Entry,	3,049	55	Woods, Good, HSG B



0 0 2 4 6 8 10 12 14 16 19 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 55 50 62 54 66 68 70 72 Time (hours)	
Flow (cfs)	Flow (cfs)
Subcatchment PR-4: To Detention Basin #1	
6.0 Direct Entry,	~
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	(m
16,000 95 Weighted Average 1,225 7.66% Pervious Area 14,775 92.34% Impervious Area	
42 98 Paved parking, HSG C 12,807 98 Roofs, HSG C 353 74 >75% Grass cover, Good, HSG C 292 98 Paved parking, HSG B 872 61 >75% Grass cover, Good, HSG B 47 98 Roofs, HSG B 47 98 Roofs, HSG B 1,588 98 Water Surface, HSG B	
Area (sf) CN Description	
unoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs OAA10 24-hr D 100-Year Rainfall=8.19"	Runc
unoff = 2.92 cfs @ 12.13 hrs, Volume= 0.232 af, Depth= 7.59" Routed to Pond 7P : Detention Basin #1	Runo R
Summary for Subcatchment PR-4: To Detention Basin #1	
roposed Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" repared by Guerriere & Halnon Inc Printed 3/13/2024 ydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 120	Prop Prep Hydro

0 2 4 6 8 10 12 14 16 18 20 22 24 26 23 03 03 23 43 63 80 42 24 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)
C2
Flow Tc=6.0 min
Construction of the second sec
Runoff Area=19,916 sf
3 NOAA10 24-hr D
-Runoff
Hydrograph
Subcatchment PR-5: To Detention Basin #2
6.0 Direct Entry,
Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)
6.267 31.47% Pervious Area 13,649 68.53% Impervious Area
19,916 88 Weighted Average
* 2,577 98 Water Surface, HSG B * 108 0 >75% Grass cover, Good
6,664 98 Paved parking, HSG B
3,776 74 >75% Grass cover, Good, HSG C
15 98 Water Surface, HSG C
3,739 98 Paved parking, HSG C 654 98 Roofs. HSG C
Area (sf) CN Description
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 100-Year Rainfall=8.19"
Runoff = 3.44 cfs @ 12.13 hrs, Volume= 0.257 af, Depth= 6.75" Routed to Pond 8P : Detention Basin #2
Summary for Subcatchment PR-5: To Detention Basin #2
Proposed Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 121

HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Softwar	Prepared by Guerriere & Halnon Inc	Proposed Conditions rev2
• Solutions LLC	Printed	NOAA10 24-hr D 100-Year Rain
Page 123	3/13/2024	fall=8.19"

Summary for Subcatchment PR-7: UNCAPTURED TO AP#3

Runoff = 3.96 cfs @ 12.16 hrs, Volume= Routed to Pond AP-3 : AP-3 0.305 af, Depth= 3.25"

NR

		Tota	275	8.6
Woodland Kv= 5.0 fps	- - -	0.0100	-00	
Woodland Kv= 5.0 fps Shallow Concentrated Flow	1 30	0 0700	137	17
Shallow Concentrated Flow,	2.00	0.1600	40	0.3
Woodland Kv= 5.0 fps				
Shallow Concentrated Flow,	2.06	0.1700	50	0.4
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.13	0.1200	50	6.2
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
Capacity Description	Velocity	Slope	Length	Tc
	,			
vious Area	.09% Imper	0	44	
ous Area	9.91% Perv	9	49,069	
erage	/eighted Av	58 V	49,112	
g, HSG B	aved parkin	98 P	44	
cover, Good, HSG B	75% Grass	61 >	25,375	
1, HSG B	/oods, Good	55 V	23,694	
	escription	CN D	rea (sf)	A
S, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs 19"	nod, UH=SC r Rainfall=8	₹-20 metr 100-Yea	y SCS TH 24-hr D	Runoff b NOAA10



Subcatchment PR-7: UNCAPTURED TO AP#3



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Summary for Subcatchment PR-8: UNCAPTURED TO AP-2

Runoff = 11.04 cfs @ 12.19 hrs, Volume= Routed to Pond AP-2 : AP-2 0.941 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs NOAA10 24-hr D 100-Year Rainfall=8.19"

		Total	301	11.3
Shallow Concentrated Flow, Woodland Kv= 5.0 fps	1.35	0.0730	251	<u></u> Δ
Woods: Light underbrush n= 0.400 P2= 3.02"				
Sheet Flow,	0.10	0.0600	50	8.2
(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
pacity Description	Velocity Ca	Slope	Length	Tc
		0	ō	
	01% Imporvio	_	15	
is Area	9.99% Perviou	9	37,033	_
ige	Veighted Avera	61 V	37,043	_
HSG B	aved parking,	98 P	10	
ver, Good, HSG B	75% Grass co	61 >	12,457	
HSG B	Voods, Good, I	55 V	72,303	
ver, Good, HSG C	75% Grass co	74 >	6,421	
HSG C	Voods, Good, I	70 V	45,852	
	escription	CN	rea (sf)	A

Subcatchment PR-8: UNCAPTURED TO AP-2



28 30 32 34 38 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 Time (hours)	5 18 20 22 24 2	10 12 14 1	2468	0
tydrograph tydrog	Subcatch			Flow (cfs)
		Total	660	25.8
Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps	0.94	0.0350	280	5.0
Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps	0.50	0.0100	260	8.7
Shallow Concentrated Flow, B-C Woodland Ky= 5.0 fps	0.87	0.0300	70	1.3
apacity Description (cfs) Sheet Flow, A-B Woods, Lister underbrack and apple 2,00%	(ft/sec) 0.08	0.0300	Length (feet) 50	10.8
ious Area	/eighted Av 00.00% Per	70 W	36,727 36,727	,
, HSG C over, Good, HSG C	/oods, Goo 75% Grass	70 W 74 >	36,638 89	<u> </u>
	escription	C N D	ea (sf)	₽
5, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs 19"	nod, UH=SC - Rainfall=8	₹-20 meth 100-Year	/ SCS TF 24-hr D	Runoff b
rrs, Volume= 1.211 af, Depth= 4.63"	;@ 12.36 AP-1	9.46 cfs d AP-1 : /	= d to Pond	Runoff Route
catchment PR-9: UNCAPTURED TO AP-1	ry for Sul	Summa		
NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024 HydroCAD Software Solutions LLC Page 126	rev2 Halnon In 417 © 2023	ditions erriere & 4b_s/n_00	ed Con d by Gue 0® 10.20-	Propos Prepare HydroCA

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Solutions LLC		NOAA10 24-hr D
Page 127	Printed 3/13/2024	100-Year Rainfall=8.19"

Summary for Pond 1P: AP-4

[40] Hint: Not Described (Outflow=Inflow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)





Primary OutFlow Max=4.02 cfs @ 12.45 hrs HW=359.70' TW=0.00' (Dynamic Tailwater) -1=Culvert (Passes 4.02 cfs of 4.90 cfs potential flow) -2=Ortifice/Grate (Ortifice Controls 4.02 cfs @ 5.37 fps) -3=Ortifice/Grate (Controls 0.00 cfs)	Discarded OutFlow Max=0.22 cfs @ 12.45 hrs HW=359.70' (Free Discharge) —4=Exfiltration (Controls 0.22 cfs)	#4 Discarded 357.00' 1.020 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 354.90' Phase-In= 0.01'	#3 Device 1 360.00' 48.0" Horiz. Orifice/Grate C= 0.600	#2 Device 1 358.20' 18.0'' W x 6.0'' H Vert. Orifice/Grate C= 0.600	#1 Primary 355.00' 12.0" Round Culvert L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 355.00' / 354.00' S= 0.0050 '/ Cc= 0.900	Device Routing Invert Outlet Devices	357.00 2,466 0 0 358.00 3,324 2,895 2,895 360.00 5,211 8,535 11,430 361.00 6,240 5,726 17,156	Elevation Surf.Area Inc.Store Cum.Store (feet) (sq-ft) (cubic-feet)	Volume Invert Avail.Storage Storage Description #1 357.00' 17,156 cf Custom Stage Data (Prismatic) Listed below (Recalc)	Plug-Flow detention time= 139.1 min calculated for 1.158 af (100% of inflow) Center-of-Mass det. time= 139.1 min (1,081.7 - 942.6)	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Peak Elev= 359.70' @ 12.45 hrs Surf.Area= 4,925 sf Storage= 9,891 cf Flood Elev= 360.25' Surf.Area= 5,468 sf Storage= 12,765 cf	Inflow Area = 2.180 ac, 55.91% Impervious, Inflow Depth = 6.38" for 100-Year event Inflow = 8.19 cfs @ 12.20 hrs, Volume= 1.159 af Outflow = 4.24 cfs @ 12.45 hrs, Volume= 1.159 af, Atten= 48%, Lag= 15.3 min Discarded = 0.22 cfs @ 12.45 hrs, Volume= 0.376 af Primary = 4.02 cfs @ 12.45 hrs, Volume= 0.376 af Routed to Pond AP-3 : AP-3 0.783 af 0.783 af	Summary for Pond 4P: Infiltration Basin #2	Proposed Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 128
		= 0.01').79 sf	00							nin		<i>ifall=8.19"</i> 3/13/2024 Page 128

Proposed Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Printed 3/13/2024 Pond 4P: Infiltration Basin #2



Proposed Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 131 Pond 6P- Infiltration Rasin #3



Primary C	#3 [#2	Device F #1 F	360.00 362.00 363.00	Elevation (feet)	Volume #1	Plug-Flow Center-of-	Routing by Peak Elev	Inflow Are Inflow Outflow Primary Routed		Propose Prepared HydroCAD
• OutFlow Max=2.80 cfs @ 12.14 h Ilvert (Passes 2.80 cfs of 6.73 cfs =Orifice/Grate (Weir Controls 2.72 =Orifice/Grate (Orifice Controls 0.0	Device 1 360.00' 1.5'' Ve	Inlet / C n= 0.01 Device 1 361.80' 24.0'' x	Routing Invert Outlet E Primary 357.57' 12.0" F L= 30.0 L= 30.0 L= 30.0 L= 30.0	00 198 00 775 9 00 1,153 9	on Surf.Area Inc.St st) (sq-ft) (cubic-fe	Invert Avail.Storage St 360.00' 1,937 cf Cu	ow detention time= 79.3 min calcula of-Mass det. time= 78.5 min (839.4	by Dyn-Stor-Ind method, Time Spa ev= 362.03' @ 12.14 hrs Surf.Are	rea = 0.367 ac, 92.34% Imp = 2.92 cfs @ 12.13 hrs, = 2.89 cfs @ 12.14 hrs, = 2.89 cfs @ 12.14 hrs, = 2.89 cfs @ 12.14 hrs, ed to Pond 4P : Infiltration Basin #2	Summary for	sed Conditions rev2 ad by Guerriere & Halnon Inc 10® 10.20-4b s/n 00417 © 2023 Hyd
hrs HW=362.02' TW=358.85' (Dynamic Tailwater) potential flow) : cfs @ 1.54 fps) 38 cfs @ 6.74 fps)	rt. Orifice/Grate C= 0.600 Limited to weir flow at low heads	Jutlet Invert= 357.57' / 357.42' S= 0.0050 '/' Cc= 0.900 3 Concrete pipe, bends & connections, Flow Area= 0.79 sf 24.0'' Horiz. Orifice/Grate C= 0.600 table for the bulker/Grate C= 0.600	Devices Cound Culvert RCP. sa.cut end projecting. Ke= 0.500	0 0 973 973 964 1,937	ore Cum.Store <u>set) (cubic-feet)</u>	iorage Description ustom Stage Data (Prismatic) Listed below (Recalc)	ated for 0.232 af (100% of inflow) t - 760.9)	an= 0.00-72.00 hrs, dt= 0.05 hrs a= 785 sf Storage= 993 cf	ervious, Inflow Depth = 7.59" for 100-Year event Volume= 0.232 af Volume= 0.232 af, Atten= 1%, Lag= 0.8 min Volume= 0.232 af Volume= 0.232 af	r Pond 7P: Detention Basin #1	NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024 Page 132





Flow (cfs)

Primary OutFlow Ma: =Culvert (Passes 	#2 Device 1 #3 Device 1	Device Routing #1 Primary	359.00 360.00 362.00 363.00	Elevation Surf (feet) (Volume Invert #1 359.00'	Plug-Flow detention tir Center-of-Mass det. tir	Routing by Dyn-Stor-Ir Peak Elev= 362.29' @	Inflow Area = 0. Inflow = 3.4 Outflow = 0.8 Primary = 0.8 Routed to Pond 4P		Proposed Conditic Prepared by Guerrie HydroCAD® 10.20-4b s
x=0.79 cfs (0.79 cfs of (Orifice Cc (Weir Con	359.00' 362.20'	Invert 359.18'	873 1,218 2,077 2,592	Area sq-ft)	Avail.Sto 6,6	ne= 480 7 r ne= 471 1 r	nd method, 12.35 hrs	457 ac, 68. 4 cfs @ 1 0 cfs @ 1 0 cfs @ 1 . Infiltration	Sum	ons rev2 re & Halnc /n 00417_©
@ 12.35 hrs HW 5.71 cfs potentia ontrols 0.10 cfs @ trols 0.69 cfs @ (Inlet / Outlet In n= 0.010 PVC, 1.5" Vert. Orifi 24.0" x 24.0" H Limited to weir	Outlet Devices	0 1,046 3,295 2,335	Inc.Store (cubic-feet)	rage Storage D 75 cf Custom S	nin calculated for nin (1,263.9 - 79	Time Span= 0.00 Surf Area= 2,22	53% Impervious, 2.13 hrs, Volume 2.35 hrs, Volume 2.35 hrs, Volume 2.35 hrs, Volume 1 Basin #2	mary for Pond	on Inc 2023 HydroCAD \$
=362.29' TW=359.59' (Dynamic Tailwater) al flow) ፬ 7.92 fps) 0.97 fps)	vert= 359.181 / 387.751 SE 0.0050 // Cc= 0.900 , smooth interior, Flow Area= 0.79 sf ce/Grate C= 0.600 Limited to weir flow at low heads loriz. Orifice/Grate C= 0.600 flow at low heads	and and projecting Ko- 0.500	0 1,046 4,341 6,675	Cum.Store (cubic-feet)	Description Stage Data (Prismatic) Listed below (Recalc)	r0.254 af (99% of inflow) 22.7)	-72.00 hrs, dt= 0.05 hrs 6 sf Storage= 4,963 cf	, Inflow Depth = 6.75" for 100-Year event e= 0.257 af e= 0.254 af, Atten= 77%, Lag= 13.1 min e= 0.254 af	8P: Detention Basin #2	NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024 Software Solutions LLC Page 134





Flow (cfs)

Proposed Conditions rev2 NOAA10 2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC

NOAA10 24-hr D 100-Year Rainfall=8.19" Printed 3/13/2024 olutions LLC Page 137

Pond 10P: Infiltration Basin #1



L= 131.1'. CPP, square edge headwall, Ke= 0.000 Inlet / Outlet Invert= 359.60' / 358.94'. S= 0.0050 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf 361.30' 5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 359.60' 6.0'' Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads 6.30 cfs @ 12.27 hrs HW=362.05' TW=359.37' (Dynamic Tailwater) introls 6.30 cfs @ 5.13 fps) Rectangular Weir (Passes < 10.39 cfs potential flow) Passes < 1.40 cfs potential flow)	Device 1 Device 1 DutFlow Max= OutFlow Max= Ilvert (Barrel Cc Sharp-Crested Sharp-Crested	Prima 55 1=Cu 3=
359.60' 15.0" Round Culvert	Primary	#1
Invert Outlet Devices	Routing	Device
ated with Chamber Wizard	tge Group A crea	Stora
3,792 cf Total Available Storage		
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 9 rows		
2,350 cf Cultec R-280HD x 54 Inside #1	359.60'	#2A
1,442 cf 41.25W x 45.00'L x 3.21'H Field A	359 <u>.</u> 10'	#1A
Avail Storage Storage Description	Invert	Volume
⊭ 42.3 min calculated for 0.673 af (99% of inflow) ⊭ 35.3 min (857.3 - 821.9)	w detention time of-Mass det. time	Plug-Flo Center-c
method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs 2.27 hrs Surf.Area= 1,856 sf Storage= 3,620 cf	by Dyn-Stor-Ind ev= 362.08' @ 1:	Routing Peak Elé
5 ac, 41.78% Impervious, Inflow Depth = 6.04" for 100-Year event cfs @ 12.22 hrs, Volume= 0.682 af cfs @ 12.27 hrs, Volume= 0.673 af, Atten= 10%, Lag= 3.2 min cfs @ 12.27 hrs, Volume= 0.673 af nfltration Basin #2	rea = 1.35 = 7.02 = 6.34 = 6.34 ed to Pond 4P : 1	Inflow A Inflow Outflow Primary Route
mary for Pond 12P: CULTEC CHAMBER SYSTEM #1	Sum	
s rev2 NOAA10 24-hr D 100-Year Raintali=8.19" & Halnon Inc Printed 3/13/2024 00417 © 2023 HydroCAD Software Solutions LLC Page 138	ad by Guerriere	Propos Prepare <u>HydroCA</u>
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Page 139	lydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
Printed 3/13/2024	Prepared by Guerriere & Halnon Inc
D 100-Year Rainfall=8.19"	Proposed Conditions rev2 NOAA10 24-hr

Pond 12P: CULTEC CHAMBER SYSTEM #1 - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 9 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +12.0" End Stone x 2 = 45.00' Base Length

9 Rows x 47.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 41.25' Base Width 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height

54 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 9 Rows = 2,349.8 cf Chamber Storage

5,955.5 cf Field - 2,349.8 cf Chambers = 3,605.7 cf Stone x 40.0% Voids = 1,442.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,792.0 cf = 0.087 af Overall Storage Efficiency = 63.7% Overall System Size = 45.00' x 41.25' x 3.21'

54 Chambers 220.6 cy Field 133.5 cy Stone



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Pond 12P: CULTEC CHAMBER SYSTEM #1



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Summary for Pond 14P: CULTEC CHAMBER SYSTEM #2

[93] Warning: Storage range exceeded by 0.35'[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Routed to I	Primary =	Outflow =	Inflow =	Inflow Area =
Pond 6P : Infiltration Basin #3	12.74 cfs @ 12.13 hrs, Volume= 0.891 af	12.74 cfs @ 12.13 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.2 min	12.59 cfs @ 12.13 hrs, Volume= 0.896 af	1.892 ac, 33.99% Impervious, Inflow Depth = 5.69" for 100-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00~hrs,~dt=0.05~hrs Peak Elev= 361.86' @ 12.13 hrs $\,$ Surf Area= 0.028~ac $\,$ Storage= 0.057~af

Plug-Flow detention time= 64.1 min calculated for 0.890 af (99% of inflow) Center-of-Mass det. time= 60.9 min (884.9 - 823.9)

0.057 af Total Available Storage	Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00 Row Length Adjustment= +1.00' x 6.07 sf x 5 row	#2A 358.80' 0.035 af Cultec R-280HD x 35 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00	#1A 358.30' 0.022 af 23.58'W x 52.00'L x 3.21'H Field A 0.090 af Overall - 0.035 af Embedded = 0.055 af	Volume Invert Avail.Storage Storage Description
	H x 8.00'L with 1.00' Overlap 00' x 6.07 sf x 5 rows	#1)"H => 6.07 sf x 7.00'L = 42.5 cf	eld A nbedded = 0.055 af x 40.0% Voids	

	#3	#2	#1	Device
	Primary	Device 3	Device 3	Routing
	358.80'	358.80'	361.00'	Invert
L= 15.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 358.80' / 358.65' S= 0.0098 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf	18.0" Round Culvert	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)	Outlet Devices

35 Chambers 145.7 cy Field 89.5 cy Stone	Chamber Storage + Stone Storage = 2,484.6 cf = 0.057 af Overall Storage Efficiency = 63.1% Overall System Size = 52.00' x 23.58' x 3.21'	3,934.5 cf Field - 1,517.9 cf Chambers = 2,416.5 cf Stone x 40.0% Voids = 966.6 cf Stone Storage	35 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 5 Rows = 1,517.9 cf Chamber Storage	7 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 50.00' Row Length +12.0" End Stone x 2 = 52.00' Base Length 5 Rows x 47.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 23.58' Base Width 6.0" Stone Base + 26.5" Chamber Height + 6.0" Stone Cover = 3.21' Field Height	47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing	Chamber Model = Cultec R-280HD (Cultec Recharger® 280HD) Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 5 rows	Pond 14P: CULTEC CHAMBER SYSTEM #2 - Chamber Wizard Field A	Proposed Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" Prepared by Guerriere & Halnon Inc Printed 3/13/2024 HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 142
	0 0 0 2	ω	4 5	Flow (cfs) ගු ැ ද අ	10	12 13		Propose Prepared HydroCAD€



Pond 14P: CULTEC CHAMBER SYSTEM #2



\triangleright				

Flow (cfs)		Routing by	Inflow Area Inflow Primary	[40] Hint: N		Proposed Prepared t HydroCAD®
4 6 8 10 12 14 16 18 20 22 24 28 28 30 40 42 44 46 48 50 52 54 56 58 00 62 64 66 68 70 72	Pond AP-1: AP-1 Hydrograph	Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	 3.139 ac, 0.00% Impervious, Inflow Depth = 4.63" for 100-Year event 9.46 cfs @ 12.36 hrs, Volume= 1.211 af 9.46 cfs @ 12.36 hrs, Volume= 1.211 af, Atten= 0%, Lag= 0.0 min 	ot Described (Outflow=Inflow)	Summary for Pond AP-1: AP-1	I Conditions rev2 NOAA10 24-hr D 100-Year Rainfall=8.19" yy Guerriere & Halnon Inc Printed 3/13/2024 10:20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Page 144

HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Softwa	Prepared by Guerriere & Halnon Inc	Proposed Conditions rev2
e Solutions LLC		NOAA10 24-hr D
Page 145	Printed 3/13/2024	100-Year Rainfall=8.19"

Summary for Pond AP-2: AP-2

[40] Hint: Not Described (Outflow=Inflow)

Primary =	Inflow =	Inflow Area =
24.99 cfs @	24.99 cfs @	10.942 ac,
12.40 hrs,	12.40 hrs,	12.47% Impe
Volume=	Volume=	ervious, Inflo
3.969 af, Atten= 0%, Lag= 0.0 min	3.969 af	ow Depth = 4.35" for 100-Year event

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond AP-2: AP-2



Flow (cfs) 10 10 10 10 10 10 10 10 10 10	Pond AP-3: AP-3 Hydrograph	Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs	Inflow Area 5.486 ac, 38.18% Impervious, Inflow Depth 3.20" for 100-Year event Inflow = 14.28 cfs @ 12.22 hrs, Volume= 1.462 af Primary = 14.28 cfs @ 12.22 hrs, Volume= 1.462 af	[40] Hint: Not Described (Outflow=Inflow)	Summary for Pond AP-3: AP-3	Proposed Conditions rev2 NOAA10 24-hr D 100-Year Ra Prepared by Guerriere & Halnon Inc Printed HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC
- Inflow Primary			nin (†			<i>iinfall=8.19"</i> d 3/13/2024 Page 146

	5.45	1.390	13 <u>.</u> 30	8 <u>.</u> 19	100-Year
	3.84	0.979	9.45	6.41	25-Year
	2.83	0.723	6 <u>.</u> 99	5.25	10-Year
	1.35	0.344	3.27	3.39	2-Year
	(inches)	(acre-feet)	(cfs)	(inches)	
	Depth	Volume	Runoff	Rainfall	Event
ent PR-1: To Bas	ocatchm	vents for Sut	ŋ		
ware Solutions LLC	CAD Soft	2 Inon Inc © 2023 Hydro	riere & Hal b s/n 00417	ed Cond d by Guer 0® 10.20-4	Propos Prepared HydroCAL

4	Page 1.	Printed 3/13/20;	Multi-Event Tabl
	9147	2024	bles

nt PR-1: T	0.979 3.04 1.390 5.45	0.344 1.35 0.723 2.83 0.979 3.84	Volume Depth (acre-feet) (inches)	nts for Subcatchment PR-1: Tr
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OFFSITE

4.98	1.965	14.23	8 <u>.</u> 19	100-Year
3.43	1.354	9.82	6.41	25-Year
2.48	0.978	7.05	5.25	10-Year
1.11	0.437	2.99	3 <u>.</u> 39	2-Year
ches)	(acre-feet) (in	(cfs)	(inches)	
Depth	Volume [Runoff	Rainfall	Event

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Events for Subcatchment PR-2: To Basin #2

100-Year	25-Year	10-Year	2-Year		Event	
8.19	6.41	5.25	3.39	(inches)	Rainfall	
7.02	5.14	3.93	2.01	(cfs)	Runoff	
0.682	0.493	0.373	0.191	(acre-feet)	Volume	
<u>6.</u> 04	4.37	<u>3.</u> 30	1.69	(inches)	Depth	

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4.05	0.638	9.09	6.41	25-Year
3.02	0.476	6.84	5.25	10-Year
1.48	0.234	3.37	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event
ment PR-3: To Infiltratio	or Subcatch	Events fo		
AD Software Solutions LLC	© 2023 HydroC	s/n 00417 ()® 10.20-4t	HydroCAE
	ion Inc	iere & Haln	d by Gueri	Prepared
		tions rev2	∌d Condi	Propose

100-Year

8<u>.</u>19

12<u>.</u>59

0.896

5.69

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To Infiltration Basin #3

catch	Iment PR-3: I	b Infiltration Basin #3		
olume	Depth			ш
-feet)	(inches)			
0.234	1.48			2-
0.476	3.02			10-
859 0	4 05			27-

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Events for Subcatchment PR-4: To Detention Basin #1

100-Year	25-Year	10-Year	2-Year	Event	
8.19	6.41	5.25	3 <u>.</u> 39	Rainfall (inches)	
2.92	2.27	1.84	1.15	Runoff (cfs)	
0.232	0.178	0.143	0.087	Volume (acre-feet)	
7.59	5.82	4.67	2.83	Depth (inches)	

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6.75	0.257	3.44	8 <u>.</u> 19	100-Year
5.02	0.191	2.60	6.41	25-Year
3.91	0.149	2.06	5.25	10-Year
2.17	0.083	1.18	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event
ment PR-5: To Detentior	for Subcatch	Events f		
CAD Software Solutions LLC	non Inc © 2023 HydroC	iere & Halr s/n 00417	1 by Guerr 0® 10.20-4b	Preparec <u>HydroCAE</u>
		tions rev2	∋d Condit	Propose

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52	24	es

To Detention Basin #2

7.95	0.190	2 <u>.</u> 30	8 <u>.</u> 19	100-Year
6.17	0.147	1.80	6.41	25-Year
5.01	0.120	1.47	5.25	10-Year
3.16	0.075	0.94	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event
Jaronnien				
Depth (inches) 3.16 5.01	Volume (acre-feet) 0.075 0.120	Runoff (cfs) 1.47	Rainfall (inches) 5.25	Event 2-Year)-Year

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<u>53</u>	es

Events for Subcatchment PR-6: ROOF SOUTH

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2.02	0.190	2 <u>.</u> 38	6.41	25-Year
1.31	0.123	1.46	5.25	10-Year
0.41	0.039	0.29	3.39	2-Year
(inches)	(acre-feet)	(cfs)	(inches)	
Depth	Volume	Runoff	Rainfall	Event
ment PR-7: UNCAPTURE	r Subcatchr	Events fo		
				·
CAD Software Solutions LLC	© 2023 Hydro(o s/n 00417	0® 10.20-4t	HydroCAE
	ion Inc	riere & Halr	d by Gueri	Prepared
		tions rev2	ed Condi	Propose

	Page 154	Printed 3/13/2024	Multi-Event Tables
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7: UNCAPTURED TO AP#3

0.039 0.123 0.190 0.305

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Events for Subcatchment PR-8: UNCAPTURED TO AP-2

<u>3</u>	0.941	11.04	8 <u>.</u> 19	100-Year
	0.599	6.88	6.41	25-Year
	0.399	4.42	5.25	10-Year
	0.137	1.15	3.39	2-Year
÷	(acre-feet)	(cfs)	(inches)	
	Volume	Runoff	Rainfall	Event

3.13		0.820	6.38	6.41	25-Year
2.22		0.582	4.47	5.25	10-Year
0.94	_	0.246	1.74	3.39	2-Year
thes)	(inc	(acre-feet)	(cfs)	(inches)	
epth	ō	Volume	Runoff	Rainfall	Event
nt PR-9: UNCAPTURE	hmer	for Subcatcl	Events		
Software Solutions LLC	CAD	' © 2023 Hydri	4b_s/n_00417	0® 10.20-4	HydroCAE
		Inon Inc	rriere & Ha	d by Gue	Prepared
		Ň	litions rev	ed Conc	Propos

	Page 156	Printed 3/13/2024	Multi-Event Tables
	56	24	es
ļ	156)24	les

9: UNCAPTURED TO AP-1

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Events for Pond 1P: AP-4

	9,891	359 <u>.</u> 70	4 <u>.</u> 02	0.22	4.24	8 <u>.</u> 19	100-Year
	7,124	359 <u>.</u> 10	2.89	0.18	3.07	6.42	25-Year
	5,532	358.72	1.79	0.15	1.94	4.04	10-Year
	4,204	358.37	0.35	0.13	0.48	1.60	2-Year
	(cubic-feet)	(feet)	(cfs)	(cfs)	(cfs)	(cfs)	
	Storage	Elevation	Primary	Discarded	Outflow	Inflow	Event
	sin #2	Itration Bas	nd 4P: Infi	ents for Po	Ē		
Page 158	Ċ	e Solutions LL	AD Software	2023 HydroC	/n 00417 ©	10.20-4b s	<u>HydroCAD®</u>
Printed 3/13/2024				n Inc	re & Halno	y Guerrier	Prepared t
Multi-Event Tables					ns rev2	Conditio	Proposed

Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Events for Pond 6P: Infiltration Basin #3

15,910	359 <u>.</u> 17	7.42	0.29	7.71	15.04	100-Year
14,552	358.96	0.69	0.27	0.96	10.83	25-Year
12,568	358.63	0.00	0.25	0.25	8.58	10-Year
4,796	357.15	0.00	0.15	0.15	3.82	2-Year
Storage (cubic-feet)	Elevation (feet)	Primary (cfs)	Discarded (cfs)	Outflow (cfs)	Inflow (cfs)	Event

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965	361.99	2.24	2.27	25-Year
945	361.96	1.82	1.84	10-Year
900	361.90	0.95	1.15	2-Year
ibic-feet)	(feet) (cu	(cfs)	(cfs)	
Storage	Elevation	Primary	Inflow	Event
P: Detention Basin	ents for Pond 7	ų		
oftware Solutions LLC	n Inc 2023 HydroCAD S	ns rev2 e & Halnoi <u>n 00417</u> ©	Conditio y Guerrier 10.20-4b s	Proposed Prepared t HydroCAD®

100-Year

<u>2.92</u>

2<u>.</u>89

362<u>.</u>03

993

asin #1

_				
25-Year 100-Year	2-Year 10-Year	Event		Proposed (Prepared by HydroCAD® 1
2 60 3 44	1.18 2.06	Inflow (cfs)		Condition Guerriere 0.20-4b s/r
0.10 0.80	0.07 0.09	Primary (cfs)	Ēv	ns rev2 & Halnor 1 00417 © :
362.08 362.29	360.51 361.51	Elevation (feet)	ents for Po	n Inc 2023 HydroC
4,518 4,963	1,728 3,371	Storage (cubic-feet)	nd 8P: Detention Basin #2	AD Software Solutions LLC

	10,641	327.00	01.10	0.27	1 <u>.</u> 45	1 <u>3.</u> 30	100-Year
			1 :		1 : 0	10.00	
	12.072	326 27	4 11	0 23	4 34	9 45	25-Year
	9,464	325.61	2.37	0.21	2.58	6.99	10-Year
	4,826	324.20	0.56	0.16	0.72	3.27	2-Year
	(cubic-feet)	(feet)	(cfs)	(cfs)	(cfs)	(cfs)	
	Storage	Elevation	Primary	Discarded	Outflow	Inflow	Event
	ısin #1	iltration Ba	d 10P: Inf	ents for Pon	Eve		
	<u>c</u>	e Solutions L	AD Software	2023 HydroC.	/n 00417 ©	10.20-4b s	HydroCAD®
P				n Inc	e & Halno	y Guerriei	Prepared b
Mui					ns rev2	Conditio	Proposed

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Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Events for Pond 12P: CULTEC CHAMBER SYSTEM #1

100-Year 7.02 6.34 362.08	25-Year 5.14 5.42 361.71	10-Year 3.93 3.44 361.57	2-Year 2.01 0.87 360.70	(cfs) (cfs) (feet) (cub	Event Inflow Primary Elevation S
3,620	3,343	3,219	2,095	(cubic-feet)	Storage
0.057	361.86	12.74	12 <u>.</u> 59	100-Year	
------------------------	-------------------------	-------------------------------------	---------------------------------------	--	
0.057	361.68	9.03	9.09	25-Year	
0.057	361.57	7.12	6.84	10-Year	
0.055	361.31	2.88	3.37	2-Year	
acre-feet)	(feet) (a	(cfs)	(cfs)		
Storage	Elevation	Primary	Inflow	Event	
ULTEC CHAMBER S	or Pond 14P: Cl	Events fo			
Software Solutions LLC	on Inc 2023 HydroCAD	ns rev2 re & Halno /n 00417 ©	Conditic by Guerrier 10.20-4b s	Proposed Prepared t HydroCAD®	

R SYSTEM #2

nt	Inflow	Primary	Elevation	Storage
	(cfs)	(cfs)	(feet)	(acre-feet)
ar	3.37	2.88	361.31	0.055
ar	6.84	7.12	361.57	0.057
ar	9.09	9.03	361.68	0.057
ar	12 <u>.</u> 59	12 <u>.</u> 74	361.86	0.057

Proposed Conditions rev2 Prepared by Guerriere & Halnon Inc HydroCAD® 10.20-4b s/n 00417 © 2023 HydroCAD Software Solutions LLC Events for Pond AP-1: AP-1

100-Year	25-Year	10-Year	2-Year		Event
9 <u>.</u> 46	6.38	4.47	1.74	(cfs)	Inflow
9.46	6.38	4.47	1.74	(cfs)	Primary
0.00	0.00	0.00	0.00	(feet)	Elevation
0.000	0.000	0.000	0.000	(acre-feet)	Storage

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0.000	0.00	<u>24.99</u>	24 <u>.</u> 99	100-Year
0.000	0.00	16.52	16.52	25-Year
0.000	0.00	10.89	10.89	10-Year
0.000	0.00	3.59	3.59	2-Year
(acre-feet)	(feet)	(cfs)	(cfs)	
Storage	Elevation	Primary	Inflow	Event
r Pond AP-2: AP-2	Events fo			
D Software Solutions LLC	n Inc 2023 HydroCAI	e & Halno n 00417 ©	y Guerrier 10.20-4b s/	Prepared t HydroCAD®
		ns rev2	Conditio	Proposed

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0.000	0.00	14 <u>.</u> 28	14.28	100-Year
0.000	0.00	3.84	3.84	25-Year
0.000	0.00	2.14	2.14	10-Year
0.000	0.00	0.40	0.40	2-Year
(acre-feet)	(feet)	(cfs)	(cfs)	
Storage	Elevation	Primary	Inflow	Event
or Pond AP-3: AP-3	Events fo			
D Software Solutions LLC	on Inc 2023 HydroCA	ns rev2 e & Halno h 00417 ©	Conditio y Guerrier 10.20-4b s	Proposed Prepared t HydroCAD®

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Guerriere	Conditions
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Subcat PR-10: WESTERN WETLANDS AND OFFSITE

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 - Pond 8P: Detention Basin #2

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Pipe Sizing Calculations

Land Use Coefficients "C"

 Pave
 0.90

 Gravel
 0.80

 Wetland
 0.72

 Grass
 0.30

 Woods
 0.25

 Roof
 0.90

Drainage	Land Use Area							Weighted
Area	Impervious	Gravel	Wetland	Pervious	Woods	Roof	Total	"C"
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	
CB-A	0.080			0.039	0.000	0.000	0.119	0.70
CB-B	0.053			0.057	0.000	0.000	0.110	0.59
CB-C	0.096			0.069	0.575	0.000	0.741	0.34
CB-D	0.064			0.044	0.000	0.000	0.108	0.66
CB-E	0.305			0.374	0.175	0.000	0.854	0.50
CB-F	0.071			0.137	0.000	0.000	0.209	0.51
CB-G	0.080			0.166	0.095	0.000	0.341	0.43
CB-H	0.058			0.031	0.000	0.000	0.089	0.69
CB-I	0.057			0.000	0.000	0.000	0.057	0.90
CB-J	0.043			0.012	0.000	0.000	0.055	0.77
HW-2	0.202			0.260	0.776	0.000	1.238	0.37
HW-3	0.000			0.045	3.360	0.000	3.404	0.25
CB-1	0.238			0.342	0.155	0.000	0.735	0.48
CB-2	0.031			0.105	0.003	0.000	0.139	0.43
CB-3	0.080			0.032	0.000	0.000	0.112	0.73
CB-6	0.227			0.320	0.040	0.000	0.587	0.53
CB-7	0.188			0.380	0.152	0.000	0.720	0.45
CB-8	0.065			0.064	0.000	0.000	0.129	0.60
CB-9	0.065			0.039	0.008	0.000	0.112	0.64
ROOF NORTH	H 0.000			0.000	0.000	0.294	0.294	0.90
ROOF SOUTH	H 0.000			0.000	0.000	0.287	0.287	0.90

SUBTOTAL	2.003	2.517	0.581	10.439
OVERALL				
TOTALS	2.003	2.517	0.581	10.439

Guerriere & Haln	on, Inc.										Project				Veteran	s Memorial	Drive Extens	ion Subdivis	ion					
55 West Central S	Steet										Job No.			4598										
Franklin, MA 017	757-0235					1		1		I	1				1									
		1			FOLON					D OTO							Prepared By	MAH	Date	3/15/	/2024	Revise	d	
				D	ESIGN	COMI	PUTA	ATIO	NS FO	R STO	RM DR	AINS					Checked By		Date			Revise	bd	
																	Í							
																Invert I	Elevation	Rim	Elev					
				rat		8	r		ent	п	. =		of *		=									
Drainage Area			Sum of	e of cent	fall isity	[] Flc	nete	0	ghn ffici	gn / Fu	city / Fu	city	(L) gth	н.	l Fa							Destin	ation	
	Upper	Lower	CA's	U D U	tain nter I)	Actu eak	ipe	lop	tou Doel	low (Jow	/elo 'low V)	V)	eng	ipe	ota	Flev	Flev	Flev	Elev					
	Structure	Structure	(sf)	(min)	(in/hr)	(cfs)	(in)	(ft/ft)	HOU	(cfs)	(fps)	(fps)	(ft)	(min)	(ft)	Upper End	Lower End	Upper End	Lower End					
CB-A	CB-A		0.11	6.00	5.80	0.66	12	0.007	0.013	2.90	3.69	0.84	15.1	0.07	0.10	368 30	368.20	371.42	371 97					
CD D		DMILA	0.00	0.00	5.00	0.00	40	0.007	0.010	2.00	0.00	0.40	14.0	0.07	0.10	000.00	000.20	074.40	074.07					
СВ-В	СВ-В	DIVIH-A	0.06	0.00	5.80	0.38	12	0.007	0.013	2.93	3.73	0.48	14.8	0.07	0.10	308.30	308.20	371.43	371.97					
	DMH-A	DMH-B	0.18	6.07	5.80	1.04	12	0.005	0.013	2.52	3.21	1.32	116.1	0.60	0.58	368.10	367.52	3/1.9/	374.13					
	DMH-B	DMH-C	0.18	6.67	5.69	1.02	12	0.005	0.013	2.52	3.21	1.30	199.8	1.04	1.00	367.42	366.42	374.13	373.74					
	DMH-C	DMH-D	0.18	7.71	5.49	0.98	12	0.037	0.013	6.86	8.73	1.25	74.8	0.14	2.77	366.32	363.55	373.74	371.89					
	DMH-D	DMH-E	0.18	7.85	5.49	0.98	12	0.033	0.013	6.43	8.19	1.25	84.7	0.17	2.76	363.55	360.79	371.89	366.99					
CB-C	CB-C	DMH-E	0.25	6.00	5.80	1.46	12	0.005	0.013	2.43	3.10	1.85	15.0	0.08	0.07	360.76	360.69	367.39	366.99					
CB-D	CB-D	DMH-E	0.07	6.00	5.80	0.41	12	0.005	0.013	2.46	3.13	0.53	14.7	0.08	0.07	360.76	360.69	367.39	366.99					
	DMH-E	DMH-F	0.50	8.02	5.39	2.70	12	0.075	0.013	9.76	12.42	3.44	189.0	0.25	14.17	360.59	346.42	366.99	352.74			Infiltration	Basin #1	
	DMH-F	DMH-G	0.50	8.28	5.39	2.70	12	0.075	0.013	9.75	12.42	3.44	58.6	0.08	4.39	346.32	341.93	352.74	348.34					
CB-E	CB-E	DMH-G	0.43	6.00	5.80	2.50	12	0.005	0.013	2.53	3.22	3.18	13.9	0.07	0.07	342.00	341.93	348.64	348.34					
CB-F	CB-F	DMH-G	0.11	6.00	5.80	0.61	12	0.005	0.013	2.51	3.20	0.78	14.1	0.07	0.07	342.00	341.93	348.64	348.34					
	DMH-G	DMH-H	1.04	8.36	5.39	5.59	18	0.080	0.013	29.70	16.81	3.16	115.9	0.11	9.27	341.43	332.16	348.34	339.61					
	DMH-H	DMH-I	1.04	8.47	5.39	5.59	18	0.065	0.013	26.77	15.15	3.16	85.0	0.09	5.52	332.06	326.54	339.61	333.49					
CB-G	CB-G	DMH-I	0.15	6.00	5.80	0.84	12	0.005	0.013	2.44	3.11	1.07	14.9	0.08	0.07	327.11	327.04	339.79	333.49					
CB-H	CB-H	DMH-I	0.06	6.00	5.80	0.36	12	0.005	0.013	2.44	3.11	0.45	14.9	0.08	0.07	327.11	327.04	333.79	333.49					
0.0 11	DMH-I	FFS-1	1.24	8.57	5.00	6.57	18	0.006	0.013	7.89	4 47	3.72	77.9	0.29	0.44	326.44	326.00	333.49	0.00					
CRI	CRI		0.05	6.00	5.90	0.20	12	0.005	0.012	2.46	2.12	0.29	19.0	0.10	0.00	224 50	224.50	227.17	227.50					
CB-I		DIVITI-J	0.05	0.00	5.60	0.30	12	0.005	0.013	2.40	3.13	0.30	10.9	0.10	0.09	324.39	324.30	327.17	327.39			Infiltration	Pagin #1	
CB-J			0.04	0.00	5.60	0.25	12	0.005	0.013	2.00	3.20	0.31	9.0	0.05	0.05	324.00	324.00	327.19	327.39			minuation	Dasin #1	
	DIVIH-J	FEO-2	0.09	0.05	5.60	0.34	12	0.005	0.013	2.32	3.20	0.09	00.2	0.42	0.40	324.40	324.00	327.39	0.00					
HW2	HW-2	DMH-K	0.45	6.00	5.80	2.63	15	0.005	0.013	4.51	3.67	2.14	84.3	0.38	0.41	359.64	359.23	362.50	364.20					
HW3	HW-3	DMH-L	0.85	6.00	5.80	4.95	18	0.005	0.013	7.35	4.16	2.80	14.3	0.06	0.07	358.72	358.65	362.10	362.15			Headw	all #4	
	DMH-K	DMH-L	0.45	6.38	5.80	2.63	12	0.005	0.013	2.54	3.24	3.35	9.8	0.05	0.05	358.70	358.65	362.10	361.60					
	DMH-L	HW-4	1.31	6.43	5.80	7.58	24	0.005	0.013	15.96	5.08	2.41	116.5	0.38	0.58	359.13	358.55	364.20	362.15			1		_
CB-1	CB-1	DMH-1	0.36	6.00	5.80	2.06	12	0.005	0.013	2.53	3.23	2.62	73.2	0.38	0.37	359.97	359.60	363.05	364.10					
	DMH-1	DMH-10	0.36	6.38	5.80	2.06	12	0.000	0.013			2.62	48.0		0.00	359.97	359.97	361.10	363.50					
CB-2	CB-2	DMH-2	0.06	6.00	5.80	0.35	12	0.005	0.013	2.53	3.22	0.44	39.6	0.20	0.20	359.80	359.60	362.20	363.10					
CB-3	CB-3	DMH-2	0.08	6.00	5.80	0.47	12	0.005	0.013	2.57	3.27	0.60	34.7	0.18	0.18	359.78	359.60	362.20	363.10			Infiltration	Basin #2	
	DMH-10	DMH-3	0.50	6.38	5.80	2.88	15	0.005	0.013	4.58	3.74	2.35	131.1	0.58	0.66	359.60	358.94	363.50	363.00					
	DMH-3	DMH-4	0.50	6.96	5.69	2.83	15	0.005	0.013	4.53	3.69	2.31	36.6	0.16	0.18	358.93	358.75	363.00	362.00					
	DMH-4	BASIN 2	0.50	7.13	5.59	2.78	15	0.005	0.013	4.55	3.71	2.27	62.4	0.28	0.31	358.75	358.44	362.00						
CB-6	CB-6	DMH-5	0.31	6.00	5.80	1.80	12	0.005	0.013	2.55	3.25	2.29	44.9	0.23	0.23	359.78	359.55	363.05	364.20					
	DMH-5	DMH-6	0.31	6.23	5.80	1.80	12	0.005	0.013	2.53	3.22	2.29	59.5	0.31	0.30	359.55	359.25	364.20	362.75					
CB-7	CB-7	DMH-6	0.32	6.00	5.80	1.86	12	0.005	0.013	2.62	3.33	2.37	20.4	0.10	0.11	359.36	359.25	362.40	362.75			Infiltration	Basin #3	
	DMH-6	DMH-8	0.63	6.54	5.69	3.60	15	0.005	0.013	4.63	3.78	2.93	68.0	0.30	0.35	359.25	358.90	362.75	363.40			in initiation	500mm	
CB-8	CB-8	DMH-9	0.08	6.00	5.80	0.45	12	0.005	0.013	2.61	3.32	0.57	28.0	0.14	0.15	358.95	358.80	362.70	362.50					
	DMH-7	BASIN 3	0.71	6.84	5.69	4.04	15	0.005	0.013	4.35	3.54	3.29	33.2	0.16	0.15	358.80	358.65	362.75						
CB-9	CB-9	BASIN 2	0.07	6.00	5.80	0.42	12	0.005	0.013	2.51	3.20	0.53	114.4	0.60	0.57	359.32	358.75	363.00				Infiltration	Basin #2	
	NORTH ROOF		0.26	6.00	5.80	1.53	12	0.005	0.013	2.59	3.30	1.95	28.3	0.14	0.15	361.15	361.00							
	SOUTH ROOF	DMH-11	0.26	6.00	5.80	1.50	12	0.005	0.013	2.41	3.07	1.91	54.6	0.30	0.25	359.10	358.85	L				Infiltration	Basin #3	
1	DMH-11	BASIN 2	0.26	6.00	5.80	1.50	12	0.005	0.013	2.40	3.05	1.91	44.2	0.24	0.20	358.85	358.65	1						

Basin Drawdown Tabulation

Hydrograph for Pond 7P: Detention Basin #1

Time	Inflow	Storage	Elevation	Primary
0.00	0.00	0	360.00	0.00
1.00	0.00	19	360.00	0.00
2.00	0.02	10	360.09	0.01
3.00 4.00	0.03	40	360.20	0.02
4.00 5.00	0.04	132	360.34	0.03
6.00	0.05	102	360.45	0.04
7.00	0.00	262	360.83	0.05
8.00	0.07	343	361.00	0.00
9.00	0.09	434	361 18	0.06
10.00	0.13	620	361.50	0.07
11.00	0.21	845	361.83	0.21
12.00	1.43	918	361.93	1.28
13.00	0.24	848	361.83	0.24
14.00	0.14	836	361.82	0.14
15.00	0.12	834	361.81	0.12
16.00	0.09	828	361.81	0.09
17.00	0.08	826	361.80	0.08
18.00	0.08	824	361.80	0.08
19.00	0.07	808	361.78	0.08
20.00	0.06	771	361.73	0.08
21.00	0.06	716	361.65	0.07
22.00	0.05	646	361.54	0.07
23.00	0.04	562	361.40	0.07
24.00	0.04	468	361.24	0.06
25.00	0.00	269	360.84	0.05
20.00	0.00	109	300.42	0.04
27.00	0.00	22	360.10	0.01
20.00	0.00	03	360.03	0.00
30.00	0.00	2	360.02	0.00
31.00	0.00	2	360.01	0.00
32.00	0.00	1	360.01	0.00
33.00	0.00	1	360.01	0.00
34.00	0.00	1	360.00	0.00
35.00	0.00	1	360.00	0.00
36.00	0.00	1	360.00	0.00
37.00	0.00	1	360.00	0.00
38.00	0.00	1	360.00	0.00
39.00	0.00	1	360.00	0.00
40.00	0.00	1	360.00	0.00
41.00	0.00	0	360.00	0.00
42.00	0.00	0	360.00	0.00
43.00	0.00	0	360.00	0.00
44.00	0.00	0	360.00	0.00
45.00	0.00	0	360.00	0.00
40.00	0.00	0	300.00	0.00
47.00	0.00	0	300.00	0.00
40.00 10.00	0.00	0	300.00	0.00
50.00	0.00	0	360.00	0.00
51.00	0.00	0	360.00	0.00

Hydrograph for Pond 7P: Detention Basin #1 (continued)

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)
52.00	0.00	0	360.00	0.00
53.00	0.00	0	360.00	0.00
54.00	0.00	0	360.00	0.00
55.00	0.00	0	360.00	0.00
56.00	0.00	0	360.00	0.00
57.00	0.00	0	360.00	0.00
58.00	0.00	0	360.00	0.00
59.00	0.00	0	360.00	0.00
60.00	0.00	0	360.00	0.00
61.00	0.00	0	360.00	0.00
62.00	0.00	0	360.00	0.00
63.00	0.00	0	360.00	0.00
64.00	0.00	0	360.00	0.00
65.00	0.00	0	360.00	0.00
66.00	0.00	0	360.00	0.00
67.00	0.00	0	360.00	0.00
68.00	0.00	0	360.00	0.00
69.00	0.00	0	360.00	0.00
70.00	0.00	0	360.00	0.00
71.00	0.00	0	360.00	0.00
72.00	0.00	0	360.00	0.00

Hydrograph for Pond 8P: Detention Basin #2

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)
0.00	0.00	0	359.00	0.00
1.00	0.00	0	359.00	0.00
2.00	0.00	0	359.00	0.00
3.00	0.01	9	359.01	0.00
4.00	0.02	64	359.07	0.00
5.00	0.04	168	359.19	0.00
6.00	0.05	279	359.30	0.02
7.00	0.06	393	359.42	0.03
8.00	0.08	527	359.55	0.04
9.00	0.09	083	359.69	0.04
10.00	0.13	950	309.92	0.05
12.00	0.23	1,300 2 712	300.24	0.00
12.00	0.20	2,712	362.24	0.00
14.00	0.16	4 806	362.24	0.30
15.00	0.10	4,000	362.22	0.17
16.00	0.10	4 776	362.22	0.10
17.00	0.10	4,769	362.20	0.10
18.00	0.09	4,749	362.19	0.10
19.00	0.09	4.702	362.17	0.10
20.00	0.08	4,628	362.14	0.10
21.00	0.07	4,527	362.09	0.10
22.00	0.06	4,401	362.03	0.10
23.00	0.05	4,250	361.96	0.10
24.00	0.04	4,075	361.87	0.10
25.00	0.00	3,746	361.71	0.09
26.00	0.00	3,414	361.53	0.09
27.00	0.00	3,094	361.36	0.09
28.00	0.00	2,787	361.18	0.08
29.00	0.00	2,492	361.01	0.08
30.00	0.00	2,212	360.83	0.08
31.00	0.00	1,945	360.66	0.07
32.00	0.00	1,694	360.49	0.07
33.00	0.00	1,459	360.32	0.06
34.00	0.00	1,240	360.16	0.06
35.00	0.00	1,039	359.99	0.05
30.00	0.00	000	359.04	0.05
37.00	0.00	093	359.70	0.04
30.00	0.00	420	359.57	0.04
40.00	0.00	320	350 35	0.00
40.00	0.00	252	359.27	0.02
42.00	0.00	202	359 23	0.02
43.00	0.00	190	359 21	0.00
44.00	0.00	183	359.20	0.00
45.00	0.00	179	359.20	0.00
46.00	0.00	176	359.19	0.00
47.00	0.00	175	359.19	0.00
48.00	0.00	173	359.19	0.00
49.00	0.00	172	359.19	0.00
50.00	0.00	171	359.19	0.00
51.00	0.00	171	359.19	0.00

Hydrograph for Pond 8P: Detention Basin #2 (continued)

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)
52.00	0.00	170	359.19	0.00
53.00	0.00	169	359.19	0.00
54.00	0.00	169	359.19	0.00
55.00	0.00	169	359.19	0.00
56.00	0.00	168	359.19	0.00
57.00	0.00	168	359.19	0.00
58.00	0.00	168	359.19	0.00
59.00	0.00	168	359.19	0.00
60.00	0.00	167	359.18	0.00
61.00	0.00	167	359.18	0.00
62.00	0.00	167	359.18	0.00
63.00	0.00	167	359.18	0.00
64.00	0.00	167	359.18	0.00
65.00	0.00	166	359.18	0.00
66.00	0.00	166	359.18	0.00
67.00	0.00	166	359.18	0.00
68.00	0.00	166	359.18	0.00
69.00	0.00	166	359.18	0.00
70.00	0.00	166	359.18	0.00
71.00	0.00	166	359.18	0.00
72.00	0.00	166	359.18	0.00

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Hydrograph for Pond 10P: Infiltration Basin #1

Time	Inflow	Storage	Elevation	Outflow	Discarded	Primary
0.00	0.00	0	322.00	0.00	0.00	0.00
1.00	0.00	0	322.00	0.00	0.00	0.00
2.00	0.00	0	322.00	0.00	0.00	0.00
3.00	0.00	0	322.00	0.00	0.00	0.00
4.00	0.00	0	322.00	0.00	0.00	0.00
5.00	0.03	4	322.00	0.02	0.02	0.00
6.00	0.10	1/	322.01	0.09	0.09	0.00
7.00	0.17	170	322.10	0.09	0.09	0.00
8.00	0.25	585	322.34	0.10	0.10	0.00
9.00	0.33	1,260	322.70	0.11	0.11	0.00
10.00	0.56	2,501	323.28	0.13	0.13	0.00
11.00	0.98	4,369	324.03	0.40	0.15	0.25
12.00	3.94	6,690	324.81	1.62	0.18	1.44
13.00	1.95	11,745	326.20	4.17	0.23	3.94
14.00	1.03	7,603	325.09	1.88	0.19	1.69
15.00	0.93	5,642	324.48	1.22	0.17	1.05
16.00	0.68	4,882	324.22	0.76	0.16	0.60
17.00	0.64	4,742	324.17	0.66	0.16	0.50
18.00	0.59	4,673	324.14	0.61	0.15	0.45
19.00	0.54	4,607	324.12	0.56	0.15	0.41
20.00	0.49	4,538	324.09	0.51	0.15	0.36
21.00	0.44	4,467	324.07	0.46	0.15	0.31
22.00	0.39	4,392	324.04	0.41	0.15	0.26
23.00	0.34	4,312	324.01	0.37	0.15	0.22
24.00	0.29	4,226	323.98	0.32	0.15	0.17
25.00	0.00	3,697	323.77	0.14	0.14	0.00
26.00	0.00	3,193	323.57	0.14	0.14	0.00
27.00	0.00	2,711	323.37	0.13	0.13	0.00
28.00	0.00	2,251	323.17	0.12	0.12	0.00
29.00	0.00	1,813	322.97	0.12	0.12	0.00
30.00	0.00	1,396	322.77	0.11	0.11	0.00
31.00	0.00	1,001	322.57	0.11	0.11	0.00
32.00	0.00	628	322.37	0.10	0.10	0.00
33.00	0.00	276	322.17	0.09	0.09	0.00
34.00	0.00	0	322.00	0.00	0.00	0.00
35.00	0.00	0	322.00	0.00	0.00	0.00
36.00	0.00	0	322.00	0.00	0.00	0.00
37.00	0.00	0	322.00	0.00	0.00	0.00
38.00	0.00	0	322.00	0.00	0.00	0.00
39.00	0.00	0	322.00	0.00	0.00	0.00
40.00	0.00	0	322.00	0.00	0.00	0.00
41.00	0.00	0	322.00	0.00	0.00	0.00
42.00	0.00	0	322.00	0.00	0.00	0.00
43.00	0.00	0	322.00	0.00	0.00	0.00
44.00	0.00	0	322.00	0.00	0.00	0.00
45.00	0.00	0	322.00	0.00	0.00	0.00
46.00	0.00	0	322.00	0.00	0.00	0.00
47.00	0.00	0	322.00	0.00	0.00	0.00
48.00	0.00	0	322.00	0.00	0.00	0.00
49.00	0.00	0	322.00	0.00	0.00	0.00
50.00	0.00	0	322.00	0.00	0.00	0.00
51.00	0.00	0	322.00	0.00	0.00	0.00

Hydrograph for Pond 10P: Infiltration Basin #1 (continued)

Time	Inflow	Storage	Elevation	Outflow	Discarded	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)	(cfs)	(cfs)
52.00	0.00	0	322.00	0.00	0.00	0.00
53.00	0.00	0	322.00	0.00	0.00	0.00
54.00	0.00	0	322.00	0.00	0.00	0.00
55.00	0.00	0	322.00	0.00	0.00	0.00
56.00	0.00	0	322.00	0.00	0.00	0.00
57.00	0.00	0	322.00	0.00	0.00	0.00
58.00	0.00	0	322.00	0.00	0.00	0.00
59.00	0.00	0	322.00	0.00	0.00	0.00
60.00	0.00	0	322.00	0.00	0.00	0.00
61.00	0.00	0	322.00	0.00	0.00	0.00
62.00	0.00	0	322.00	0.00	0.00	0.00
63.00	0.00	0	322.00	0.00	0.00	0.00
64.00	0.00	0	322.00	0.00	0.00	0.00
65.00	0.00	0	322.00	0.00	0.00	0.00
66.00	0.00	0	322.00	0.00	0.00	0.00
67.00	0.00	0	322.00	0.00	0.00	0.00
68.00	0.00	0	322.00	0.00	0.00	0.00
69.00	0.00	0	322.00	0.00	0.00	0.00
70.00	0.00	0	322.00	0.00	0.00	0.00
71.00	0.00	0	322.00	0.00	0.00	0.00
72.00	0.00	0	322.00	0.00	0.00	0.00

Hydrograph for Pond 4P: Infiltration Basin #2

Time (bours)	Inflow (cfs)	Storage	Elevation (feet)	Outflow	Discarded	Primary (cfs)
0.00	0.00	0	357.00	0.00	0.00	0.00
1 00	0.00	0	357.00	0.00	0.00	0.00
2 00	0.00	3	357.00	0.00	0.00	0.00
3.00	0.01	9	357.00	0.01	0.01	0.00
4 00	0.02	13	357.00	0.02	0.02	0.00
5.00	0.03	16	357.01	0.03	0.03	0.00
6.00	0.04	30	357.01	0.04	0.04	0.00
7.00	0.07	168	357.01	0.00	0.00	0.00
8.00	0.13	634	357.07	0.00	0.00	0.00
0.00	0.20	1 205	357.48	0.07	0.07	0.00
10.00	0.23	2 213	357 70	0.00	0.00	0.00
11.00	0.41	2,213	358 10	0.10	0.10	0.00
12.00	2 27	5,000	358 60	134	0.12	1 20
12.00	2.27	5,042	350.00	2.00	0.15	2 9 2
14.00	1.05	4 940	358 57	1 22	0.10	1 08
14.00	0.78	4,540	359.07	0.83	0.14	0.70
16.00	0.78	4,002	259 /1	0.03	0.14	0.70
17.00	0.54	4,324	259.29	0.59	0.13	0.45
12.00	0.49	4,229	250.30	0.50	0.13	0.37
10.00	0.40	4,107	359.37	0.47	0.13	0.34
19.00	0.43	4,107	250.30	0.44	0.13	0.31
20.00	0.41	4,127	300.30	0.42	0.13	0.29
21.00	0.39	4,095	300.34	0.39	0.13	0.20
22.00	0.30	4,001	300.33	0.37	0.13	0.24
23.00	0.33	4,020	300.3Z	0.34	0.13	0.21
24.00	0.30	3,900	300.31	0.31	0.13	0.19
25.00	0.18	3,845	308.27	0.23	0.13	0.10
20.00	0.14	3,723	300.24	0.10	0.12	0.04
27.00	0.10	3,032	308.22	0.13	0.12	0.01
20.00	0.09	3,323	330.10	0.12	0.12	0.00
29.00	0.00	3,400	300.10	0.12	0.12	0.00
30.00	0.06	3,203	300.11	0.12	0.12	0.00
31.00	0.07	3,121	358.07	0.11	0.11	0.00
32.00	0.07	2,970	330.02	0.11	0.11	0.00
33.00	0.06	2,012	357.90	0.11	0.11	0.00
34.00	0.06	2,047	357.92	0.11	0.11	0.00
35.00	0.05	2,474	357.07	0.10	0.10	0.00
30.00	0.05	2,293	307.01	0.10	0.10	0.00
37.00	0.04	2,103	257.60	0.10	0.10	0.00
30.00	0.04	1,900	357.09	0.09	0.09	0.00
39.00	0.03	1,099	337.02	0.09	0.09	0.00
40.00	0.02	1,403	357.55	0.09	0.09	0.00
41.00	0.02	1,209	357.47	0.00	0.00	0.00
42.00	0.01	1,021	357.39	0.06	0.00	0.00
43.00	0.00	700	357.30	0.07	0.07	0.00
44.00	0.00	520 297	337.20	0.07	0.07	0.00
45.00	0.00	287	357.11	0.06	0.06	0.00
40.00	0.00	69	301.03	0.00	0.00	0.00
41.00	0.00	U	351.00	0.00	0.00	0.00
40.00	0.00	0	351.00	0.00	0.00	0.00
49.00	0.00	0	357.00	0.00	0.00	0.00
	0.00	0	357.00	0.00	0.00	0.00
01.UU	0.00	0	JU./CC	0.00	0.00	0.00

Hydrograph for Pond 4P: Infiltration Basin #2 (continued)

Time	Inflow	Storage	Elevation	Outflow	Discarded	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)	(cfs)	(cfs)
52.00	0.00	0	357.00	0.00	0.00	0.00
53.00	0.00	0	357.00	0.00	0.00	0.00
54.00	0.00	0	357.00	0.00	0.00	0.00
55.00	0.00	0	357.00	0.00	0.00	0.00
56.00	0.00	0	357.00	0.00	0.00	0.00
57.00	0.00	0	357.00	0.00	0.00	0.00
58.00	0.00	0	357.00	0.00	0.00	0.00
59.00	0.00	0	357.00	0.00	0.00	0.00
60.00	0.00	0	357.00	0.00	0.00	0.00
61.00	0.00	0	357.00	0.00	0.00	0.00
62.00	0.00	0	357.00	0.00	0.00	0.00
63.00	0.00	0	357.00	0.00	0.00	0.00
64.00	0.00	0	357.00	0.00	0.00	0.00
65.00	0.00	0	357.00	0.00	0.00	0.00
66.00	0.00	0	357.00	0.00	0.00	0.00
67.00	0.00	0	357.00	0.00	0.00	0.00
68.00	0.00	0	357.00	0.00	0.00	0.00
69.00	0.00	0	357.00	0.00	0.00	0.00
70.00	0.00	0	357.00	0.00	0.00	0.00
71.00	0.00	0	357.00	0.00	0.00	0.00
72.00	0.00	0	357.00	0.00	0.00	0.00

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Hydrograph for Pond 6P: Infiltration Basin #3

Time	Inflow	Storage	Elevation	Outflow	Discarded	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)	(cfs)	(cfs)
0.00	0.00	0	356.00	0.00	0.00	0.00
1.00	0.01	4	356.00	0.01	0.01	0.00
2.00	0.03	11	356.00	0.03	0.03	0.00
3.00	0.04	15	356.00	0.04	0.04	0.00
4.00	0.04	18	356.00	0.04	0.04	0.00
5.00	0.05	21	356.01	0.05	0.05	0.00
6.00	0.06	24	356.01	0.06	0.06	0.00
7.00	0.11	65	356.02	0.09	0.09	0.00
8.00	0.15	216	356.06	0.09	0.09	0.00
9.00	0.18	473	356.13	0.09	0.09	0.00
10.00	0.25	922	356.24	0.10	0.10	0.00
11.00	0.91	2,699	356.67	0.13	0.13	0.00
12.00	6.58	8,545	357.90	0.20	0.20	0.00
13.00	1.30	14,673	358.98	1.35	0.28	1.08
14.00	0.74	14,478	358.94	0.75	0.27	0.48
15.00	0.68	14,453	358.94	0.68	0.27	0.41
16.00	0.50	14,373	358.93	0.50	0.27	0.23
17.00	0.46	14,357	358.92	0.47	0.27	0.19
18.00	0.43	14,338	358.92	0.43	0.27	0.16
19.00	0.39	14,319	358.92	0.40	0.27	0.12
20.00	0.35	14,297	358.91	0.36	0.27	0.09
21.00	0.32	14,273	358.91	0.33	0.27	0.05
22.00	0.28	14,243	358.91	0.29	0.27	0.02
23.00	0.24	14,192	358.90	0.27	0.27	0.00
24.00	0.21	14,038	358.87	0.27	0.27	0.00
25.00	0.13	13,602	358.80	0.26	0.26	0.00
26.00	0.11	13,085	358.71	0.26	0.26	0.00
27.00	0.09	12,516	358.62	0.25	0.25	0.00
28.00	0.07	11,901	358.51	0.24	0.24	0.00
29.00	0.05	11,245	358.40	0.24	0.24	0.00
30.00	0.03	10,549	358.27	0.23	0.23	0.00
31.00	0.01	9,819	358.14	0.22	0.22	0.00
32.00	0.01	9,083	358.01	0.21	0.21	0.00
33.00	0.00	8,365	357.87	0.20	0.20	0.00
34.00	0.00	7,673	357.73	0.19	0.19	0.00
35.00	0.00	7,007	357.60	0.18	0.18	0.00
36.00	0.00	6,369	357.47	0.17	0.17	0.00
37.00	0.00	5,758	357.35	0.17	0.17	0.00
38.00	0.00	5,175	357.23	0.16	0.16	0.00
39.00	0.00	4,617	357.11	0.15	0.15	0.00
40.00	0.00	4,085	356.99	0.14	0.14	0.00
41.00	0.00	3,578	356.88	0.14	0.14	0.00
42.00	0.00	3,094	356.77	0.13	0.13	0.00
43.00	0.00	2,634	356.66	0.13	0.13	0.00
44.00	0.00	2,195	356.56	0.12	0.12	0.00
45.00	0.00	1,///	356.45	0.11	0.11	0.00
40.00	0.00	1,380	350.30	0.11	0.11	0.00
47.00	0.00	1,003	356.26	0.10	0.10	0.00
48.00	0.00	644	356.17	0.10	0.10	0.00
49.00	0.00	303	350.08	0.09	0.09	0.00
50.00	0.00	8	356.00	0.02	0.02	0.00
51.00	0.00	0	356.00	0.00	0.00	0.00

Hydrograph for Pond 6P: Infiltration Basin #3 (continued)

Time	Inflow	Storage	Elevation	Outflow	Discarded	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)	(cfs)	(cfs)
52.00	0.00	0	356.00	0.00	0.00	0.00
53.00	0.00	0	356.00	0.00	0.00	0.00
54.00	0.00	0	356.00	0.00	0.00	0.00
55.00	0.00	0	356.00	0.00	0.00	0.00
56.00	0.00	0	356.00	0.00	0.00	0.00
57.00	0.00	0	356.00	0.00	0.00	0.00
58.00	0.00	0	356.00	0.00	0.00	0.00
59.00	0.00	0	356.00	0.00	0.00	0.00
60.00	0.00	0	356.00	0.00	0.00	0.00
61.00	0.00	0	356.00	0.00	0.00	0.00
62.00	0.00	0	356.00	0.00	0.00	0.00
63.00	0.00	0	356.00	0.00	0.00	0.00
64.00	0.00	0	356.00	0.00	0.00	0.00
65.00	0.00	0	356.00	0.00	0.00	0.00
66.00	0.00	0	356.00	0.00	0.00	0.00
67.00	0.00	0	356.00	0.00	0.00	0.00
68.00	0.00	0	356.00	0.00	0.00	0.00
69.00	0.00	0	356.00	0.00	0.00	0.00
70.00	0.00	0	356.00	0.00	0.00	0.00
71.00	0.00	0	356.00	0.00	0.00	0.00
72.00	0.00	0	356.00	0.00	0.00	0.00

Hydrograph for Pond 12P: CULTEC CHAMBER SYSTEM #1

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)
0.00	0.00	0	359.10	0.00
1.00	0.00	0	359.10	0.00
2.00	0.00	0	359.10	0.00
3.00	0.00	0	359.10	0.00
4.00	0.01	9	359.11	0.00
5.00	0.05	113	359.25	0.00
6.00	0.08	346	359.57	0.00
7.00	0.12	623 727	359.75	0.07
0.00	0.10	706	309.03	0.14
9.00	0.20	790 024	359.00	0.10
11.00	0.51	1 006	360.05	0.20
12.00	2 33	2 184	360 76	0.90
13.00	0.87	2,790	361.20	1.10
14.00	0.47	1.776	360.49	0.76
15.00	0.43	1.221	360.13	0.50
16.00	0.31	987	359.98	0.34
17.00	0.29	942	359.95	0.30
18.00	0.27	915	359.94	0.28
19.00	0.25	888	359.92	0.26
20.00	0.23	861	359.90	0.23
21.00	0.20	833	359.88	0.21
22.00	0.18	804	359.87	0.19
23.00	0.16	773	359.85	0.16
24.00	0.13	742	359.83	0.14
25.00	0.00	545	359.71	0.03
20.00	0.00	473	359.00	0.01
27.00	0.00	444	359.04	0.01
20.00	0.00	420	350.63	0.00
30.00	0.00	412	359.62	0.00
31.00	0.00	407	359.62	0.00
32.00	0.00	403	359.62	0.00
33.00	0.00	400	359.62	0.00
34.00	0.00	397	359.62	0.00
35.00	0.00	395	359.61	0.00
36.00	0.00	394	359.61	0.00
37.00	0.00	392	359.61	0.00
38.00	0.00	391	359.61	0.00
39.00	0.00	390	359.61	0.00
40.00	0.00	389	359.61	0.00
41.00	0.00	388	359.61	0.00
42.00	0.00	387	359.61	0.00
43.00	0.00	386	359.61	0.00
44.00	0.00	380	359.61	0.00
45.00	0.00	300	359.01	0.00
40.00	0.00	200 200	350 61	0.00
48.00	0.00	304 381	350 61	0.00
49.00	0.00	383	359 61	0.00
50.00	0.00	383	359.61	0.00
51.00	0.00	382	359.61	0.00

Hydrograph for Pond 12P: CULTEC CHAMBER SYSTEM #1 (continued)

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)
52.00	0.00	382	359.61	0.00
53.00	0.00	382	359.61	0.00
54.00	0.00	381	359.61	0.00
55.00	0.00	381	359.61	0.00
56.00	0.00	381	359.61	0.00
57.00	0.00	381	359.61	0.00
58.00	0.00	380	359.61	0.00
59.00	0.00	380	359.61	0.00
60.00	0.00	380	359.61	0.00
61.00	0.00	380	359.61	0.00
62.00	0.00	380	359.61	0.00
63.00	0.00	379	359.60	0.00
64.00	0.00	379	359.60	0.00
65.00	0.00	379	359.60	0.00
66.00	0.00	379	359.60	0.00
67.00	0.00	379	359.60	0.00
68.00	0.00	379	359.60	0.00
69.00	0.00	378	359.60	0.00
70.00	0.00	378	359.60	0.00
71.00	0.00	378	359.60	0.00
72.00	0.00	378	359.60	0.00

Hydrograph for Pond 14P: CULTEC CHAMBER SYSTEM #2

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(acre-feet)	(feet)	(cfs)
0.00	0.00	0.000	358.30	0.00
1.00	0.00	0.000	358.30	0.00
2.00	0.00	0.000	358.30	0.00
3.00	0.00	0.000	358.30	0.00
4.00	0.00	0.000	358.30	0.00
5.00	0.04	0.002	358.44	0.00
6.00	0.09	0.007	358.85	0.00
7.00	0.14	0.014	359.13	0.05
8.00	0.19	0.022	359.47	0.08
9.00	0.24	0.032	309.91	0.11
11.00	0.40	0.050	300.00	0.13
12.00	5.83	0.055	361.11	5.73
13.00	1 11	0.057	361 15	1 1 2
14.00	0.63	0.052	361.10	0.63
15.00	0.58	0.002	361.09	0.58
16.00	0.42	0.052	361.07	0.42
17.00	0.39	0.052	361.06	0.40
18.00	0.36	0.052	361.06	0.37
19.00	0.33	0.052	361.05	0.34
20.00	0.30	0.052	361.04	0.30
21.00	0.27	0.052	361.04	0.27
22.00	0.24	0.052	361.03	0.24
23.00	0.21	0.052	361.02	0.21
24.00	0.18	0.051	361.01	0.18
25.00	0.00	0.041	360.36	0.13
26.00	0.00	0.031	359.90	0.11
27.00	0.00	0.024	359.55	0.09
28.00	0.00	0.017	359.28	0.07
29.00	0.00	0.013	359.09	0.05
30.00	0.00	0.009	358.96	0.03
31.00	0.00	0.008	358.89	0.01
32.00	0.00	0.007	358.80	0.01
24.00	0.00	0.007	300.00	0.00
34.00	0.00	0.007	358.83	0.00
36.00	0.00	0.000	358.83	0.00
37.00	0.00	0.000	358.82	0.00
38.00	0.00	0.000	358.82	0.00
39.00	0.00	0.006	358.82	0.00
40.00	0.00	0.006	358.82	0.00
41.00	0.00	0.006	358.81	0.00
42.00	0.00	0.006	358.81	0.00
43.00	0.00	0.006	358.81	0.00
44.00	0.00	0.006	358.81	0.00
45.00	0.00	0.006	358.81	0.00
46.00	0.00	0.006	358.81	0.00
47.00	0.00	0.006	358.81	0.00
48.00	0.00	0.006	358.81	0.00
49.00	0.00	0.006	358.81	0.00
50.00	0.00	0.006	358.81	0.00
51.00	0.00	0.006	358.81	0.00

Hydrograph for Pond 14P: CULTEC CHAMBER SYSTEM #2 (continued)

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(acre-feet)	(feet)	(cfs)
52.00	0.00	0.006	358.81	0.00
53.00	0.00	0.006	358.81	0.00
54.00	0.00	0.006	358.81	0.00
55.00	0.00	0.006	358.81	0.00
56.00	0.00	0.006	358.81	0.00
57.00	0.00	0.006	358.81	0.00
58.00	0.00	0.006	358.81	0.00
59.00	0.00	0.006	358.81	0.00
60.00	0.00	0.006	358.81	0.00
61.00	0.00	0.006	358.81	0.00
62.00	0.00	0.006	358.81	0.00
63.00	0.00	0.006	358.80	0.00
64.00	0.00	0.006	358.80	0.00
65.00	0.00	0.006	358.80	0.00
66.00	0.00	0.006	358.80	0.00
67.00	0.00	0.006	358.80	0.00
68.00	0.00	0.006	358.80	0.00
69.00	0.00	0.006	358.80	0.00
70.00	0.00	0.006	358.80	0.00
71.00	0.00	0.006	358.80	0.00
72.00	0.00	0.006	358.80	0.00

NRCS Soils Report

TESTING INFORMATION SOIL EVALUATOR: MICHAEL HASSETT TESTING DATES: 8/8/19 DTH #1-#17 8/9/19 DTH #18-#23

327.10

326.77

325.60

321.60

317.10

DTH# 3

А

S.L

10YR 3/3

в

S.L

10YR 5/6

C1

SAND

2.5Y 5/4

C L.S.

2.5Y 5/2

0"

4"

18"

66"

120"



PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© N/A** MOTTLES **© N/A** SOIL CLASS I WATER **© N/A** REFUSAL @ SOIL CLASS



PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 60"** MOTTLES **© N/A** SOIL CLASS I WATER **© N/A**



PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 18"** MOTTLES **© N/A** SOIL CLASS I WATER **© N/A**

0" A S.L. 10YR 3/3 326.47 4" в S.L 10YR 5/6 324.80 24" C1 SAND 2.5Y 5/4 317.80 108" С L.S. 2.5Y 5/2 315.30 138"

DTH# 2

326.80

365.80

365.47

363.30

359.80

357.50

357.17

355.50

353.50



0"

4"

30"

72"

0"

4"

24"

48"

DTH**# 6**

S.L

10YR 3/3

в

S.L.

10YR 5/6

С

L.S. 2.5Y 5/2

LEDGE

PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 72[°]** MOTTLES **© N/A** SOIL CLASS I WATER **© N/A**

DTH# 10

S.L 10YR 3/3

B

S.L.

10YR 5/6

С

S.L.

2.5Y 5/2

LEDGE

PERC DEPTH **(ID)N/A WEEPING (ID)N/A** REFUSAL **(ID) 48"** MOTTLES **(ID)N/A** SOIL CLASS **II** WATER **(ID)N/A**







PERC DEPTH **@N/A WEEPING @ N/A** REFUSAL **@ 72"** MOTTLES **@ N/A** SOIL CLASS I WATER **@ N/A**

PERC DEPTH ON/A WEEPING ON/A REFUSAL O 72" MOTTLES ON/A SOIL CLASS L WATER @ N/A



PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 18"** MOTTLES **© N/A** SOIL CLASS I WATER **© N/A** Т



PERC DEPTH @N/A WEEPING @ N/A REFUSAL @ 54" MOTTLES @ N/A SOIL CLASS I WATER @ N/A



10YR 5/6 364.20 С L.S. 2.5Y 5/4 361.20 LEDGE

367.20





DTH#8

DTH<u>**# 4**</u>

A/B S.L.

LEDGE

0"

18"

0"

72"

366.30

364.80







361.10 DTH**# 16** 0" Α S.L. 10YR 3/3 360.77 4" в S.L. 10YR 5/6 359.10 24" LEDGE

PERC DEPTH **©N/A WEEPING @** REFUSAL **@** 24" MOTTLES **@** SOIL CLASS II WATER **@**





PTH @N/A WEEPING @ N/A @ 84" MOTTLES @ N/A .SS I WATER @ N/A

PERC DEPTH **@N/A WEEPING @ N/A** REFUSAL **@ 60"** MOTTLES **@ N/A** SOIL CLASS I WATER **@ N/A**



PERC DEPTH **©N/A** WEEPING **@** REFUSAL **@ 84**" MOTTLES **@** SOIL CLASS I WATER **@**



PTH @N/A WEEPING @ N/A @ 60" MOTTLES @ N/A .SS I WATER @ N/A

357.50 DTH# 22 0" Α S.L. 10YR 3/3 357.17 4" в S.L. 10YR 5/6 355.00 30" С L.S. 2.5Y 5/4 349.50 96" LEDGE

PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 96"** MOTTLES **© N/A** SOIL CLASS I WATER **© N/A**



PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 84"** MOTTLES **© N/A** SOIL CLASS II WATER **© N/A**





PERC DEPTH **@N/A WEEPING @ N/A** REFUSAL **@ 54"** MOTTLES **@ N/A** SOIL CLASS II WATER **@ N/A**

PERC DEPTH **©N/A WEEPING © N/A** REFUSAL **© 72"** MOTTLES **© N/A** SOIL CLASS II WATER **© N/A** PERC DEPTH **@N/A WEEPING @ N/A** REFUSAL **@ 66"** MOTTLES **@ N/A** SOIL CLASS II WATER **@ N/A**



United States Department of Agriculture

NKCS

Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Norfolk and Suffolk Counties, Massachusetts

Veteran's Memorial Drive Extension



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/? cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



	MAP LEGEND			MAP INFORMATION
Area of Int	erest (AOI) Area of Interest (AOI)	₩ ¢	Spoil Area Stony Spot	The soil surveys that comprise your AOI were mapped at 1:25,000.
Soils	Soil Map Unit Polygons	<i>1</i> 15 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Very Stony Spot	Warning: Soil Map may not be valid at this scale.
~	Soil Map Unit Lines Soil Map Unit Points	v ∧	Other	Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil
Special (Special Point Features	→ Special Line Features Water Features		line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.
×	Borrow Pit	~~ Transport	Streams and Canals	Please rely on the bar scale on each man sheet for man
≭ ○	Clay Spot Closed Depression		Rails	measurements.
X	Gravel Pit	~	Interstate Highways Source of Map: Natural Web Soil Survey URL: Coordinate System: We Image: Major Roads Major Roads Image: Local Roads Maps from the Web Soil Survey URL: Coordinate System: We Image: Background Maps from the Web Soil Survey URL: Coordinate System: We Image: Aerial Photography Albers equal-area conic p accurate calculations of coordinate Soil Survey Area: Norfor Survey Area: Norfor Survey Area Data: Version	Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)
* 87	Landfill	~		Maps from the Web Soil Survey are based on the Web Mercator
یل بله	Lava Flow Marsh or swamp	Backgrou		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
т. Ж	Mine or Quarry			accurate calculations of distance or area are required.
¢ ¢	Perennial Water			This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.
~~ +-	Rock Outcrop Saline Spot			Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts Survey Area Data: Version 19, Sep 10, 2023
, , , ,	Sandy Spot			Soil map units are labeled (as space allows) for map scales 1:50.000 or larger.
÷	Sinkhole			Date(s) aerial images were photographed: May 22, 2022—Jun
ž.	Slide or Slip Sodic Spot			5, 2022
				compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Veteran's Memorial Drive Exension)

Map Unit Symbol Map Unit Name		Acres in AOI	Percent of AOI				
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	0.6	1.4%				
300B	Montauk fine sandy loam, 3 to 8 percent slopes	21.6	51.6%				
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	0.0	0.0%				
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	15.8	37.7%				
602	Urban land, 0 to 15 percent slopes	2.3	5.5%				
654	Udorthents, loamy	1.6	3.8%				
Totals for Area of Interest		42.0	100.0%				

Map Unit Descriptions (Veteran's Memorial Drive Exension)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas
are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Norfolk and Suffolk Counties, Massachusetts

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs Elevation: 0 to 1,290 feet Mean annual precipitation: 36 to 71 inches Mean annual air temperature: 39 to 55 degrees F Frost-free period: 140 to 240 days Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Merrimac

Setting

Landform: Kames, outwash plains, outwash terraces, moraines, eskers Landform position (two-dimensional): Summit, shoulder, backslope, footslope Landform position (three-dimensional): Crest, side slope, riser, tread Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam Bw1 - 10 to 22 inches: fine sandy loam Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand 2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 2s Hydrologic Soil Group: A Ecological site: F145XY008MA - Dry Outwash Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent Landform: Deltas, terraces, outwash plains Landform position (two-dimensional): Footslope Landform position (three-dimensional): Tread, dip Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent Landform: Deltas, kames, eskers, outwash plains Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, side slope, head slope, nose slope, rise Down-slope shape: Convex Across-slope shape: Convex, linear Hydric soil rating: No

Windsor

Percent of map unit: 3 percent Landform: Outwash terraces, dunes, deltas, outwash plains Landform position (two-dimensional): Shoulder Landform position (three-dimensional): Tread, riser Down-slope shape: Linear, convex Across-slope shape: Linear, convex Hydric soil rating: No

Agawam

Percent of map unit: 2 percent Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames Landform position (three-dimensional): Rise Down-slope shape: Convex Across-slope shape: Convex Hydric soil rating: No

300B—Montauk fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyrh Elevation: 0 to 1,030 feet Mean annual precipitation: 36 to 71 inches Mean annual air temperature: 39 to 55 degrees F Frost-free period: 140 to 240 days Farmland classification: All areas are prime farmland

Map Unit Composition

Montauk and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Montauk

Setting

Landform: Recessionial moraines, ground moraines, hills, drumlins Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Side slope, crest Down-slope shape: Convex, linear Across-slope shape: Convex Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 4 inches: fine sandy loam Bw1 - 4 to 26 inches: fine sandy loam Bw2 - 26 to 34 inches: sandy loam 2Cd - 34 to 72 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 2s Hydrologic Soil Group: C Ecological site: F144AY007CT - Well Drained Dense Till Uplands Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 6 percent Landform: Ground moraines, hills, drumlins Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Canton

Percent of map unit: 5 percent Landform: Hills Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Side slope, crest Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Ridgebury

Percent of map unit: 4 percent Landform: Depressions, ground moraines, hills, drainageways Landform position (two-dimensional): Footslope, toeslope Landform position (three-dimensional): Base slope, head slope Down-slope shape: Concave Across-slope shape: Concave Hydric soil rating: Yes

422B—Canton fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w818 Elevation: 0 to 1,180 feet Mean annual precipitation: 36 to 71 inches Mean annual air temperature: 39 to 55 degrees F Frost-free period: 145 to 240 days Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 80 percent *Minor components:* 20 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, nose slope, side slope Down-slope shape: Convex, linear Across-slope shape: Convex Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material *A - 2 to 5 inches:* fine sandy loam *Bw1 - 5 to 16 inches:* fine sandy loam *Bw2 - 16 to 22 inches:* gravelly fine sandy loam *2C - 22 to 67 inches:* gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent Surface area covered with cobbles, stones or boulders: 9.0 percent

Custom Soil Resource Report

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 7s Hydrologic Soil Group: B Ecological site: F144AY034CT - Well Drained Till Uplands Hydric soil rating: No

Minor Components

Scituate, extremely stony

Percent of map unit: 6 percent Landform: Hills, ground moraines, drumlins Landform position (two-dimensional): Summit, backslope, footslope Landform position (three-dimensional): Crest, side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 6 percent Landform: Ridges, ground moraines, hills Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 4 percent Landform: Recessionial moraines, ground moraines, hills, drumlins Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Swansea

Percent of map unit: 4 percent Landform: Marshes, depressions, bogs, swamps, kettles Down-slope shape: Concave Across-slope shape: Concave Hydric soil rating: Yes

422C—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w815 Elevation: 0 to 1,310 feet Mean annual precipitation: 36 to 71 inches Mean annual air temperature: 39 to 55 degrees F Frost-free period: 145 to 240 days Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 80 percent *Minor components:* 20 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, nose slope, side slope Down-slope shape: Convex, linear Across-slope shape: Convex Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material *A - 2 to 5 inches:* fine sandy loam *Bw1 - 5 to 16 inches:* fine sandy loam *Bw2 - 16 to 22 inches:* gravelly fine sandy loam *2C - 22 to 67 inches:* gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s Hydrologic Soil Group: B Ecological site: F144AY034CT - Well Drained Till Uplands Hydric soil rating: No

Minor Components

Scituate, extremely stony

Percent of map unit: 6 percent Landform: Hills, drumlins, ground moraines Landform position (two-dimensional): Backslope, footslope Landform position (three-dimensional): Side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 5 percent Landform: Ridges, ground moraines, hills Landform position (two-dimensional): Backslope Landform position (three-dimensional): Side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 5 percent Landform: Recessionial moraines, ground moraines, hills, drumlins Landform position (two-dimensional): Backslope Landform position (three-dimensional): Side slope Down-slope shape: Convex, linear Across-slope shape: Convex Hydric soil rating: No

Hollis, extremely stony

Percent of map unit: 4 percent Landform: Ridges, hills Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Crest, nose slope, side slope Down-slope shape: Convex Across-slope shape: Linear, convex Hydric soil rating: No

602—Urban land, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: vkyj Mean annual precipitation: 32 to 50 inches Mean annual air temperature: 45 to 50 degrees F Frost-free period: 120 to 200 days Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 99 percent *Minor components:* 1 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Rock outcrops

Percent of map unit: 1 percent Hydric soil rating: Unranked

654—Udorthents, loamy

Map Unit Setting

National map unit symbol: vkyb Elevation: 0 to 3,000 feet Mean annual precipitation: 45 to 54 inches Mean annual air temperature: 43 to 54 degrees F Frost-free period: 145 to 240 days Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 80 percent Minor components: 20 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform position (two-dimensional): Shoulder, summit Landform position (three-dimensional): Riser, tread Down-slope shape: Convex, linear Across-slope shape: Convex, linear Parent material: Excavated and filled coarse-loamy human transported material

Typical profile

H1 - 0 to 6 inches: variable H2 - 6 to 60 inches: variable

Properties and qualities

Slope: 0 to 25 percent Depth to restrictive feature: More than 80 inches Runoff class: Low Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr) Depth to water table: More than 80 inches Frequency of flooding: None Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 6s Hydrologic Soil Group: A Hydric soil rating: Unranked

Minor Components

Udorthents, sandy

Percent of map unit: 8 percent Hydric soil rating: Unranked

Udorthents,wet substr.

Percent of map unit: 8 percent Hydric soil rating: Unranked

Urban land

Percent of map unit: 4 percent Hydric soil rating: Unranked

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Veteran's Memorial Drive Exension)

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.





Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI		
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	0.6	1.4%		
300B	Montauk fine sandy loam, 3 to 8 percent slopes	С	21.6	51.6%		
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	В	0.0	0.0%		
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	В	15.8	37.7%		
602	Urban land, 0 to 15 percent slopes		2.3	5.5%		
654	Udorthents, loamy	A	1.6	3.8%		
Totals for Area of Inter	est	•	42.0	100.0%		

Table—Hydrologic Soil Group (Veteran's Memorial Drive Exension)

Rating Options—Hydrologic Soil Group (Veteran's Memorial Drive Exension)

Aggregation Method: Dominant Condition Component Percent Cutoff: None Specified Tie-break Rule: Higher

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HHOG



%DMH26, PUHU\ 6RXUFH 886 10WL RODO DS



TSS Removal Worksheet

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table

- 2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
- 3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
- 4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
- 5. Total TSS Removal = Sum All Values in Column D



1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table

- 2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
- 3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
- 4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
- 5. Total TSS Removal = Sum All Values in Column D



Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed 1. From MassDEP Stormwater Handbook Vol. 1

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table

- 2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
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- 2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
- 3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
- 4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
- 5. Total TSS Removal = Sum All Values in Column D



Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed 1. From MassDEP Stormwater Handbook Vol. 1

Inspection Forms

Post Construction Inspection Report Veteran's Memorial Drive Extension, Franklin, Massachusetts

Person Inspecting		Weather	1			Other Personnel Present
· •						
		Clear				
ltem	N/A*	sat.**	NMR***	CAM**	MCA*	Comments:
Pavement Swept						
Catch Basins						
Road Extention						
CB #A						
CB #B						
CB #C						
CB #D						
CB #E						
CB #F						
CB #G						
CB #H						
CB #I						
CB #J						
CB #K						
40B Development						
CB #1						
CB #2						
CB #3						
CB #4						
CB #5						
CB #6						
CB #7						
CB #8						
CB #9						
HEADWALLS/OUTLETS						
ROAD EXTENTION						
HW #1						
HW #4						
HW #5						
40B DEVELOPMENT						
HW #2						
HW #3						
Infiltration Basin #1						
Sediment Forebay						
Infiltration Basin						
FES-1						
FES-2						
OCS-1						
				1	1	

Post Construction Inspection Report Veteran's Memorial Drive Extension, Franklin, Massachusetts

INSPECTION DATE:						
Dereen keeneding	<u> </u>	10/ a ath an				Other Deressies Dresset
Person inspecting		vveatner				Other Personnel Present
		Clear				
Item	N/A*	sat.**	NMR***	CAM**	MCA*	Comments:
Infiltration Basin #2						
Sediment Forebay						
Infiltration Basin						
INLET 1 (15")						
INLET 2 (12")						
INLET 3 (12")						
OCS-2						
Infiltration Basin #3						
Sediment Forebay						
INLET 1 (15)						
003-3						
Detention Basin #1						
Detention Basin #2						
NMR* normal maintenance r	equested					
N/A* not applicable at the tim	ne of insp	ection				
CAM* corrective action - min	or					
SAT* satisfactory conditions	as compl	iant				
MCA* Major corrective action	า					

The Recharger® 280HD is a 26.5" (673 mm) tall, mid-size chamber and is typically used for installations with depth restrictions or when a larger infiltrative area is required. The Recharger® 280HD has the side portal internal manifold feature. HVLV® FC-24 Feed Connectors are inserted into the side portals to create the internal manifold.

Size (L x W x H)	8' x 47" x 26.5"		
	2.44 m x 1194 mm x 673 mm		
Installed Length	7'		
	2.13 m		
Length Adjustment per Run	1'		
	0.30 m		
Chamber Storage	6.08 ft³/ft		
	0.56 m³/m		
	42.55 ft³/unit		
	1.21 m³/unit		
Min. Installed Storage	9.21 ft³/ft		
	0.86 m³/m		
	64.46 ft³/unit		
	1.83 m³/unit		
Min. Area Required	30.33 ft ²		
	2.82 m ²		
Chamber Weight	64.0 lbs		
	29.03 kg		
Shipping	35 chambers/skid		
	2,345 lbs/skid		
	12 skids/48' flatbed		
Min. Center-to-Center Spacing	4.33'		
	1.32 m		
Max. Allowable Cover	12'		
	3.66 m		
Max. Inlet Opening in End Wall	21" HDPE, PVC		
	525 mm HDPE, PVC		
Max. Allowable O.D.	10" HDPE, 12" PVC		
in Side Portal	250 mm HDPE, 300 mm PVC		
Compatible Feed Connector	HVLV FC-24 Feed Connector		

Calculations are based on installed chamber length.

All above values are nominal.

Min. installed storage includes 6" (152 mm) stone base, 6" (152 mm) stone above crown of chamber and typical stone surround at 52"(1321 mm) center-to-center spacing.

	Stone Foundation Depth				
	6"	12"	18"		
	152 mm	305 mm	457 mm		
Chamber and Stone Storage Per	64.46 ft ³	70.53 ft ³	76.59 ft ³		
Chamber	1.83 m ³	2.00 m ³	2.17 m ³		
Min. Effective Depth	3.21'	3.71'	4.21'		
	0.98 m	1.13 m	1.28 m		
Stone Required Per Chamber	2.03 yd ³	2.59 yd ³	3.15 yd ³		
	1.55 m³	1.98 m ³	2.41 m ³		

Calculations are based on installed chamber length. Includes 6" (305 mm) stone above crown of chamber and typical stone surround at 52"(1321 mm) center-to-center spacing and stone foundation as listed in table. Stone void calculated at 40%.



Recharger® 280HD Bare Chamber Storage Volumes

Elevation		Inc	rement Vol	tal Sto ume	rage	Cumu Stor	lative rage
in.	mm	ft³/ft	m³/m	ft³	m³	ft³	m ³
26.5	686	0.000	0.000	0.000	0.000	42.553	1.205
26	660	0.018	0.002	0.126	0.004	42.553	1.205
25	635	0.047	0.004	0.329	0.009	42.427	1.202
24	609	0.100	0.009	0.700	0.020	42.098	1.192
23	584	0.134	0.012	0.938	0.027	41.398	1.172
22	559	0.159	0.015	1.113	0.032	40.460	1.146
21	533	0.179	0.017	1.253	0.035	39.347	1.114
20	508	0.195	0.018	1.365	0.039	38.094	1.079
19	483	0.209	0.019	1.463	0.041	36.729	1.040
18	457	0.221	0.021	1.547	0.044	35.266	0.999
17	432	0.232	0.022	1.624	0.046	33.719	0.955
16	406	0.241	0.022	1.687	0.048	32.095	0.909
15	381	0.249	0.023	1.743	0.049	30.408	0.861
14	356	0.263	0.024	1.841	0.052	28.665	0.812
13	330	0.267	0.025	1.869	0.053	26.824	0.760
12	305	0.271	0.025	1.897	0.054	24.955	0.707
11	279	0.275	0.026	1.925	0.055	23.058	0.653
10	254	0.279	0.026	1.953	0.055	21.133	0.598
9	229	0.287	0.027	2.009	0.057	19.180	0.543
8	203	0.292	0.027	2.044	0.058	17.171	0.486
7	178	0.294	0.027	2.058	0.058	15.127	0.428
6	152	0.305	0.028	2.135	0.060	13.069	0.370
5	127	0.306	0.028	2.142	0.061	10.934	0.310
4	102	0.308	0.029	2.156	0.061	8.792	0.249
3	76	0.310	0.029	2.170	0.061	6.636	0.188
2	51	0.312	0.029	2.184	0.062	4.466	0.126
1	25	0.326	0.030	2.282	0.065	2.282	0.065
То	tal	6.079	0.565	42.553	1.205	42.553	1.205

Calculations are based on installed chamber length.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.



Three View Drawing



Typical Interlock Installation





Plan View Drawing



Typical Cross Section for Traffic Application





CULTEC Recharger® 280HD Specifications

GENERAL

CULTEC Recharger[®] 280HD chambers are designed for underground stormwater management. The chambers may be used for retention, recharging, detention or controlling the flow of on-site stormwater runoff.

CHAMBER PARAMETERS

- 1. The chambers shall be manufactured in the U.S.A. by CULTEC, Inc. of Brookfield, CT (cultec.com, 203-775-4416).
- 2. The chamber shall be vacuum thermoformed of polyethylene with a black interior and blue exterior.
- 3. The chamber shall be arched in shape.
- 4. The chamber shall be open-bottomed.
- 5. The chamber shall be joined using an interlocking overlapping rib method. Connections must be fully shouldered overlapping ribs, having no separate couplings or separate end walls.
- 6. The nominal chamber dimensions of the CULTEC Recharger[®] 280HD shall be 26.5 inches (673 mm) tall, 47 inches (1194 mm) wide and 8 feet (2.44 m) long. The installed length of a joined Recharger[®] 280HD shall be 7 feet (2.13 m).
- 7. Maximum inlet opening on the chamber end wall is 21 inches (525 mm) HDPE, PVC.
- 8. The chamber shall have two side portals to accept CULTEC HVLV[®] FC-24 Feed Connectors to create an internal manifold. Maximum allowable O.D. in the side portal is 10 inches (250 mm) HDPE, 12 inches (300 mm) PVC.
- 9. The nominal chamber dimensions of the CULTEC HVLV® FC-24 Feed Connector shall be 12 inches (305 mm) tall, 16 inches (406 mm) wide and 24.2 inches (614 mm) long.
- 10. The nominal storage volume of the Recharger[®] 280HD chamber shall be 6.079 ft³ / ft (0.565 m³ / m) without stone. The nominal storage volume of a single Recharger 280RHD Stand Alone unit shall be 48.63 ft³ (1.38 m³) without stone. The nominal storage volume of a joined Recharger[®] 280IHD Intermediate unit shall be 42.553 ft³ (1.205 m³) without stone. The nominal storage volume of the length adjustment amount per run shall be 6.08 ft³ (0.56 m³) without stone.
- 11. The nominal storage volume of the HVLV[®] FC-24 Feed Connector shall be 0.913 ft³ / ft (0.085 m³ / m) without stone.
- 12. The Recharger[®] 280HD chamber shall have seventy-two discharge holes bored into the sidewalls of the unit's core to promote lateral conveyance of water.
- 13. The Recharger[®] 280HD chamber shall have 15 corrugations.
- 14. The end wall of the chamber, when present, shall be an integral part of the continuously formed unit. Separate end plates cannot be used with this unit.
- 15. The Recharger[®] 280RHD Stand Alone unit must be formed as a whole chamber having two fully formed integral end walls and having no separate end plates or separate end walls.
- 16. The Recharger[®] 280SHD Starter unit must be formed as a whole chamber having one fully formed integral end wall and one partially formed integral end wall with a lower transfer opening of 9 inches (229 mm) high x 35 inches (889 mm) wide.
- 17. The Recharger[®] 280IHD Intermediate unit must be formed as a whole chamber having one fully open end wall and one partially formed integral end wall with a lower transfer opening of 9 inches (229 mm) high x 35 inches (889 mm) wide.
- 18. The Recharger[®] 280EHD End unit must be formed as a whole chamber having one fully formed integral end wall and one fully open end wall and having no separate end plates or end walls.
- 19. The HVLV® FC-24 Feed Connector must be formed as a whole chamber having two open end walls and having no separate end plates or separate end walls. The unit shall fit into the side portals of the Recharger® 280HD and act as cross feed connections.
- 20. Chambers must have horizontal stiffening flex reduction steps between the ribs.
- 21. The chamber shall have a raised integral cap at the top of the arch in the center of each unit to be used as an optional inspection port or clean-out.
- 22. The units may be trimmed to custom lengths by cutting back to any corrugation on the large rib end.
- 23. The chamber shall be manufactured in an ISO 9001:2015 certified facility.
- 24. The chamber shall be designed and manufactured to meet the material and structural requirements of IAPMO PS 63-2019, including resistance to AASHTO H-10 and H-20 highway live loads, when installed in accordance with CULTEC's installation instructions.
- 25. Maximum allowable cover over the top of the chamber shall be 12' (3.66 m).
- 26. The chamber shall be designed to withstand traffic loads when installed according to CULTEC's recommended installation instructions.

OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

- (203-775-4416 OR 1-800-428-5832)

- CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS OR SEPARATE END WALLS.
- INSTALLED LENGTH OF A JOINED RECHARGER 280HD SHALL BE 7 FEET (2.13 m).
- CONNECTORS TO CREATE AN INTERNAL MANIFOLD. NOMINAL INSIDE DIMENSIONS OF THE SIDE PORTAL SHALL HAVE A WIDTH OF 11.25" [286 mm] AND HEIGHT OF 11.5" [292 12.25 INCHES [311 mm].
- LONG

- INTO THE SIDEWALLS OF THE UNIT'S CORE TO PROMOTE LATERAL CONVEYANCE OF
- CONTINUOUSLY FORMED UNIT. SEPARATE END PLATES CANNOT BE USED WITH THIS
- HAVING TWO FULLY FORMED INTEGRAL ENDWALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS.
- HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE PARTIALLY FORMED
- WITH A LOWER TRANSFER OPENING OF 9 INCHES (229 mm) HIGH X 35 INCHES (889 mm) WIDE.
- NO SEPARATE END PLATES OR END WALLS.
- TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT WILL FIT INTO THE SIDE PORTALS OF THE RECHARGER 280HD AND ACT AS CROSS FEED CONNECTIONS.
- THE RIBS.
- CENTER OF EACH UNIT TO BE USED AS AN OPTIONAL INSPECTION PORT OR CLEAN-OUT.
- CORRUGATION.
- FACILITY
- ACCORDING TO CULTEC'S INSTALLATION INSTRUCTIONS.
- STRUCTURAL REQUIREMENTS OF IAPMO PS 63-2019, INCLUDING RESISTANCE TO CULTEC'S INSTALLATION INSTRUCTIONS.

- RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD
- RECOMMENDED INSTALLATION INSTRUCTIONS

- TESTING METHOD.
- METHOD

- METHOD.

- THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
- D4632 TESTING METHOD.
- **TESTING METHOD**
- THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 5,070 X 5,070 LBS/FT
- (14 X 16 KN/M) PER ASTM D4595 TESTING METHOD.
- THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 10% STRAIN OF 4,800 X
- 9. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,700 LBS (7,560 N) PER ASTM

- THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 11.5 GPM/FT2 (470 LPM/M2) PER ASTM



PROJECT	NO:	DATE:	2019	
DRAWN BY	CULTEC, INC	CHECKED BY:	TECH	
SCALE:	N.T.S.	SHEET NO:	1 OF 1	

CULTEC RECHARGER® 280HD SPECIFICATIONS

GENERAL CULTEC RECHARGER 280HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

CHAMBER PARAMETERS

- 1. THE CHAMBERS WILL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
- 2. THE CHAMBER SHALL BE VACUUM THERMOFORMED OF HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE) WITH A BLACK INTERIOR AND BLUE EXTERIOR.
- 3. THE CHAMBER WILL BE ARCHED IN SHAPE.
- 4. THE CHAMBER WILL BE OPEN-BOTTOMED.
- 5. THE CHAMBER WILL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS OR SEPARATE END WALLS.
- 6. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER 280HD SHALL BE 26.5 INCHES (673 mm) TALL, 47 INCHES (1194 mm) WIDE AND 8 FEET (2.44 m) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER 280HD SHALL BE 7 FEET (2.13 m).
- 7. MAXIMUM INLET OPENING ON THE CHAMBER ENDWALL IS 18 INCHES (450 mm) HDPE.
- THE CHAMBER WILL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV® FC-24 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. NOMINAL INSIDE DIMENSIONS OF THE SIDE PORTAL SHALL HAVE A WIDTH OF 11.25" [286 mm] AND HEIGHT OF 11.5" [292 mm]. THE SIDE PORTAL CAN ACCEPT A MAXIMUM OUTER DIAMETER (O.D.) PIPE SIZE OF 12.25 INCHES [311 mm].
- THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV® FC-24 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 24.2 INCHES (614 mm) 3. THE GEOTEXTILE SHALL HAVE A TYPICAL WEIGHT OF 4.5 OZ/SY (142 G/M). LONG
- 10. THE NOMINAL STORAGE VOLUME OF THE RECHARGER 280HD CHAMBER WILL BE 6.079 FT3 / FT (0.565 m³ / m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER 280HD SHALL BE 42.553 FT³ / UNIT (1.205 m³ / UNIT) - WITHOUT STONE.
- 11. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-24 FEED CONNECTOR WILL BE 0.913 FT³ / FT (0.085 m³ / m) - WITHOUT STONE.
- 12. THE RECHARGER 280HD CHAMBER WILL SEVENTY-TWO DISCHARGE HOLES BORED INTO THE SIDEWALLS OF THE UNIT'S CORE TO PROMOTE LATERAL CONVEYANCE OF WATER.
- 13. THE RECHARGER 280HD CHAMBER SHALL HAVE 15 CORRUGATIONS.
- 14. THE ENDWALL OF THE CHAMBER, WHEN PRESENT, WILL BE AN INTEGRAL PART OF THE CONTINUOUSLY FORMED UNIT. SEPARATE END PLATES CANNOT BE USED WITH THIS
- 15. THE RECHARGER 280RHD STAND ALONE UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO FULLY FORMED INTEGRAL ENDWALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS.
- 16. THE RECHARGER 280SHD STARTER UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE PARTIALLY FORMED INTEGRAL ENDWALL WITH A LOWER TRANSFER OPENING OF 9 INCHES (229 mm) HIGH X 35 INCHES (889 mm) WIDE.
- 17. THE RECHARGER 280IHD INTERMEDIATE UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY OPEN ENDWALL AND ONE PARTIALLY FORMED INTEGRAL ENDWALL WITH A LOWER TRANSFER OPENING OF 9 INCHES (229 mm) HIGH X 35 INCHES (889 mm) WIDE.
- 18. THE RECHARGER 280EHD END UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE FULLY OPEN END WALL AND HAVING NO SEPARATE END PLATES OR END WALLS.
- 19. THE HVLV FC-24 FEED CONNECTOR MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT WILL FIT INTO THE SIDE PORTALS OF THE RECHARGER 280HD AND ACT AS CROSS FEED CONNECTIONS.
- 20. CHAMBERS MUST HAVE HORIZONTAL STIFFENING FLEX REDUCTION STEPS BETWEEN THE RIBS.
- 21. THE CHAMBER WILL HAVE A RAISED INTEGRAL CAP AT THE TOP OF THE ARCH IN THE CENTER OF EACH UNIT TO BE USED AS AN OPTIONAL INSPECTION PORT OR CLEAN-OUT
- 22. THE UNITS MAY BE TRIMMED TO CUSTOM LENGTHS BY CUTTING BACK TO ANY CORRUGATION.
- 23. THE CHAMBER SHALL BE MANUFACTURED IN AN IN AN ISO 9001:2015 CERTIFIED FACILITY

<u>280HD</u>

- 24. THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S INSTALLATION INSTRUCTIONS.
- 25. THE CHAMBER SHALL BE DESIGNED AND MANUFACTURED TO MEET THE MATERIAL AND STRUCTURAL REQUIREMENTS OF IAPMO PS 63-2019, INCLUDING RESISTANCE TO AASHTO H-10 AND H-20 HIGHWAY LIVE LOADS, WHEN INSTALLED IN ACCORDANCE WITH CULTEC'S INSTALLATION INSTRUCTIONS.
- 26. MAXIMUM ALLOWED COVER OVER TOP OF UNIT SHALL BE 12 FEET (3.65 m).

www.cultec.com

CULTEC HVLV® FC-24 FEED CONNECTOR PRODUCT SPECIFICATIONS

- CULTEC HVLV FC-24 FEED CONNECTORS ARE DESIGNED TO CREATE AN INTERNAL MANIFOLD FOR CULTEC RECHARGER 280HD STORMWATER CHAMBERS
- CHAMBER PARAMETERS
- 1. THE CHAMBERS WILL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832) 2. THE CHAMBER SHALL BE VACUUM THERMOFORMED OF HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE) WITH A BLACK INTERIOR AND BLUE EXTERIOR.
- 3. THE CHAMBER WILL BE ARCHED IN SHAPE
- 4. THE CHAMBER WILL BE OPEN-BOTTOMED
- 5. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV FC-24 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 24.2 INCHES (614 mm) LONG
- 6. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-24 FEED CONNECTOR WILL BE 0.913 FT 3 / FT (0.085 m 3 / m) WITHOUT
- 7. THE HVLV FC-24 FEED CONNECTOR CHAMBER SHALL HAVE 2 CORRUGATIONS
- 8. THE HVLV FC-24 FEED CONNECTOR MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT WILL FIT INTO THE SIDE PORTALS OF THE CULTEC RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD
- 9. THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS
- 10. THE CHAMBER SHALL BE MANUFACTURED IN AN ISO 9001:2015 CERTIFIED FACILITY

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE CULTEC NO. 410[™] NON-WOVEN GEOTEXTILE MAY BE USED WITH CULTEC CONTACTOR® AND RECHARGER® STORMWATER INSTALLATIONS TO PROVIDE A BARRIER THAT PREVENTS SOIL INTRUSION INTO THE STONE.

GEOTEXTILE PARAMETERS

- 1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832) THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
- 4. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH VALUE OF 120 LBS (533 N) PER ASTM D4632 TESTING METHOD.
- 5. THE GEOTEXTILE SHALL HAVE AN ELONGATION @ BREAK VALUE OF 50% PER ASTM D4632 TESTING
- METHOD 6. THE GEOTEXTILE SHALL HAVE A MULLEN BURST VALUE OF 225 PSI (1551 KPA) PER ASTM D3786 TESTING
- METHOD
- 7. THE GEOTEXTILE SHALL HAVE A PUNCTURE STRENGTH VALUE OF 65 LBS (289 N) PER ASTM D4833 TESTING METHOD
- 8. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE VALUE OF 340 LBS (1513 N) PER ASTM D6241 TESTING METHOD.
- 9. THE GEOTEXTILE SHALL HAVE A TRAPEZOID TEAR VALUE OF 50 LBS (222 N) PER ASTM D4533 TESTING
- MFTHOD. 10. THE GEOTEXTILE SHALL HAVE A AOS VALUE OF 70 U.S. SIEVE (0.212 MM) PER ASTM D4751 TESTING
- METHOD. 11. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY VALUE OF 1.7 SEC-1 PER ASTM D4491 TESTING METHOD. 12. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATE VALUE OF 135 GAL/MIN/SF (5500 L/MIN/SM) PER
- ASTM D4491 TESTING METHOD. 13. THE GEOTEXTILE SHALL HAVE A UV STABILITY @ 500 HOURS VALUE OF 70% PER ASTM D4355 TESTING
- CULTEC NO. 4800[™] WOVEN GEOTEXTILE

CULTEC NO. 4800 WOVEN GEOTEXTILE IS DESIGNED AS A UNDERLAYMENT TO PREVENT SCOURING CAUSED BY WATER MOVEMENT WITHIN THE CULTEC CHAMBERS AND FEED CONNECTORS UTILIZING THE CULTEC MANIFOLD FEATURE. IT MAY ALSO BE USED AS A COMPONENT OF THE CULTEC SEPARATOR ROW TO ACT AS A BARRIER TO PREVENT SOIL/CONTAMINANT INTRUSION INTO THE STONE WHILE ALLOWING FOR MAINTENANCE

GEOTEXTILE PARAMETERS

METHOD

- THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
- THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
- THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH OF 550 X 550 LBS (2,448 X 2,448 N) PER ASTM D4632 TESTING METHOD.
- THE GEOTEXTILE SHALL HAVE A ELONGATION @ BREAK RESISTANCE OF 20 X 20% PER ASTM D4632 **TESTING METHOD**
- THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 5,070 X 5,070 LBS/FT (74 X 74 KN/M) PER ASTM D4595 TESTING METHOD.
- THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 2% STRAIN OF 960 X 1,096 LBS/FT (14 X 16 KN/M) PER ASTM D4595 TESTING METHOD.
- THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 5% STRAIN OF 2,740 X 2, 740 LBS/FT (40 X 40 KN/M) PER ASTM D4595 TESTING METHOD.
- THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE @ 10% STRAIN OF 4,800 X 4,800 LBS/FT (70 X 70 KN/M) PER ASTM D4595 TESTING METHOD.
- 9. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,700 LBS (7,560 N) PER ASTM D6241 TESTING METHOD.
- 10. THE GEOTEXTILE SHALL HAVE A TRAPEZOIDAL TEAR RESISTANCE OF 180 X 180 LBS (801 X 801 N) PER ASTM D4533 TESTING METHOD
- 11. THE GEOTEXTILE SHALL HAVE AN APPARENT OPENING SIZE OF 40 US STD. SIEVE (0.425 MM) PER ASTM D4751 TESTING METHOD.
- 12. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY RATING OF 0.15 SEC-1 PER ASTM D4491 TESTING METHOD
- THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 11.5 GPM/FT2 (470 LPM/M2) PER ASTM D4491 TESTING METHOD.
- 14. THE GEOTEXTILE SHALL HAVE A UV RESISTANCE OF 80% @ 500 HRS. PER ASTM D4355 TESTING METHOD

FINISHED GRADE NATURALLY COMPACTED FILL CULTEC NO. 410 NON-WOVEN GEOTEXTILE AROUND STONE. TOP AND SIDES MANDATORY, BOTTOM PER ENGINEER'S DESIGN PREFERENCE CULTEC HVLV FC-24 FEED CONNECTOR WHERE SPECIFIED 6.0 INCH [152 mm] MIN. DEPTH OF 1-2 INCH [25-50 mm] WASHED CRUSHED STONE ABOVE CHAMBERS 7.5' [2.29 m] MIN. CULTEC NO. 4800 WOVEN GEOTEXTILE CULTEC RECHARGER 280HD BENEATH FEED CONNECTORS HEAVY-DUTY CHAMBER 10.0' [3.0 m] MIN. CULTEC NO. 4800 WOVEN GEOTEXTILE 6.0 INCH [152 mm] MIN. DEPTH OF BENEATH INLET PIPES 1-2 INCH [25-50 mm] WASHED CRUSHED STONE BENEATH CHAMBERS 12.0 INCH [305 mm] MIN. WIDTH OF 1-2 INCH [25-51 mm] WASHED, CRUSHED STONE BORDER SURROUNDING ALL CHAMBERS PIPE PER ENGINEER DESIGN. PIPE TO BE INSERTED 12.0 INCHES [305 mm] MIN. INTO CHAMBER. MAXIMUM PIPE SIZE 21" [525 mm] HDPE 21" [525 mm] PVC 280HD **CULTEC RECHARGER 280HD HEAVY DUTY PLAN VIEW CULTEC**, Inc. Subsurface Stormwater Management Systems PH: (203) 775-4416 P.O. Box 280 PH: (800) 4-CULTEC 878 Federal Road FX: (203) 775-1462 Brookfield, CT 06804 CULTEC

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GENERAL NOTES



SEPARATOR ROW™ SPECIFICATIONS

GENERAL

1. CULTEC'S SEPARATOR ROW IS USED AS AN INEXPENSIVE MEANS OF REMOVING TOTAL SUSPENDED SOLIDS FROM THE CHAMBER SYSTEM, AS WELL AS PROVIDING EASIER ACCESS FOR INSPECTION AND MAINTENANCE.

2. THE SEPARATOR ROW PERFORMANCE SHALL BE TESTED AND VERIFIED TO THE PROTOCOLS AND PROCEDURES AS DEFINED BY ENVIRONMENTAL TECHNOLOGY VERIFICATION (ETV) CANADA TO ACHIEVE 80% TSS REMOVAL

INSTALLATION INSTRUCTIONS

A SEPARATOR ROW IS INSTALLED ON A 1-2 INCH [25-51 mm] WASHED, CRUSHED STONE BASE. TYPICALLY, THE CULTEC CHAMBER MODEL USED FOR THE SEPARATOR ROW IS THE SAME CHAMBER USED THROUGHOUT THE ENTIRE CHAMBER BED.

STORMWATER IS DISTRIBUTED TO THE SEPARATOR ROW BY A PRIMARY FEED SYSTEM THAT DIVERTS FLOW TO THE SEPARATOR ROW AND A SECONDARY BYPASS FEED SYSTEM THAT DIVERTS THE FLOW OF CLEAN WATER TO THE OTHER PARTS OF THE UNDERGROUND STORMWATER MANAGEMENT SYSTEM. THE DISTRIBUTION SYSTEM MAY BE BY PIPES SET AT A LOWER ELEVATION THAT PERMIT THE FIRST FLUSH TO THE SEPARATOR ROW VERSUS OTHER PARTS OF THE UNDERGROUND STORMWATER SYSTEM. THIS INITIAL FLOW MAY BE MANAGED BY A BAFFLE OR WEIR. THE SIZING OF THE PIPE(S) THAT PROVIDE STORM WATER TO THE SEPARATOR ROW IS TO BE DETERMINED BY THE DESIGN ENGINEER AND IS BASED UPON THE REQUIREMENT TO ACCOMMODATE THE DESIGN FLOW AND SERVICE CONVENIENCE.

THE CHAMBERS UTILIZED IN THE SEPARATOR ROW ARE TO BE COMPLETELY WRAPPED WITH CULTEC NO. 410 NON-WOVEN GEOTEXTILE. THIS CREATES A PASS-THROUGH FILTER ARRANGEMENT TO SEPARATE TOTAL SUSPENDED SOLIDS IN THE TRANSFER OF STORM WATER TO OTHER CHAMBERS THROUGHOUT THE UNDERGROUND STORMWATER MANAGEMENT SYSTEM.

ONCE WRAPPED, THE SEPARATOR ROW IS TO THEN PLACED ENTIRELY OVER 1 LAYER OF CULTEC No. 4800 WOVEN GEOTEXTILE. THIS WOVEN GEOTEXTILE PROVIDES A DURABLE SURFACE WITHIN THE ROW FOR MAINTENANCE PROCEDURES AS WELL AS TO PREVENT ANY SCOURING OF THE STONE BASE DURING HIGH PRESSURE JETTING.

THE RECOMMENDED INSTALLATION OF SEPARATOR ROW CHAMBERS, IN REGARD TO STONE SEPARATION AND STONE ABOVE THE UNIT, ALONG WITH OTHER MINIMUM BURIAL, MATERIALS AND METHOD SPECIFICATIONS DETAILED FOR THE PROPER INSTALLATION, IS THE SAME AS CULTEC'S REQUIREMENT DETAILED IN THE COMPANY'S INSTALLATION GUIDELINES WITH THE EXCEPTION OF THE PLACEMENT OF THE REQUIRED FILTERING FABRICS. PLEASE REFER TO CULTEC'S CURRENT INSTALLATION INSTRUCTIONS FOR STORMWATER CHAMBERS AS A GUIDE.

MAINTENANCE PROCEDURES

CULTEC RECOMMENDS INSPECTIONS OF THE SEPARATOR ROW TO BE PERFORMED EVERY SIX MONTHS FOR THE FIRST YEAR. THE FREQUENCY OF INSPECTION CAN THEN BE ADJUSTED BASED UPON PREVIOUS OBSERVATION OF SEDIMENT DEPOSITION.

WHILE CLEANING IS POSSIBLE FROM A SINGLE MANHOLE IN SHORTER LINES, A CLEAN-OUT OPTION FROM EITHER END OF A LINE IS PREFERABLE, PARTICULARLY FOR LONGER RUNS. CLEANING INVOLVES FLUSHING SEDIMENT FROM THE BASE FABRIC OF THE SEPARATOR ROW.

ACCESS WILL BE PROVIDED VIA A MANHOLE(S) LOCATED AT THE END(S) OF THE ROW FOR CLEAN OUT.

MAINTENANCE OF THE SEPARATOR ROW IS TO BE ACCOMPLISHED WITH A JETVAC PROCESS.

THE JETVAC IS TO BE SENT DOWN THE ENTIRE LENGTH OF THE SEPARATOR ROW. AS THE HIGH PRESSURE WATER NOZZLE IS RETRIEVED, THE CAPTURED SEDIMENTS ARE PUSHED BACK INTO THE MANHOLE FOR VACUUMING.



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Subsurface Stormwater Management Systems

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THIS DRAWING WAS PREPARED TO SUPPORT THE PROJECT ENGINEER OF RECORD FOR THE PROPOSED SYSTEM. IT IS THE ULTIMATE RESPONSIBILITY OF THE PROJECT ENGINEER OF RECORD TO ENSURE THAT THE CULTEC SYSTEM'S DESIGN IS IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS. IT IS THE PROJECT ENGINEER OF RECORD'S RESPONSIBILITY TO ENSURE THAT THE CULTEC PRODUCTS ARE DESIGNED IN ACCORDANCE WITH CULTEC'S MINIMUM REQUIREMENTS. CULTEC DOES NOT APPROVE PLANS, SIZING, OR SYSTEM DESIGNS.







TYPICAL SEPARATOR ROW CONFIGURATION INLET CONNECTION

CULTEC CHAMBER MODEL						
PTION	CONTACTOR	RECHARGER	RECHARGER	RECHARGER	RECHARGER	
	100HD	150XLHD	280HD	330XLHD	902HD	
ASE	6"	6"	6"	6"	9"	
	152 mm	152 mm	152 mm	152 mm	229 mm	
	12.5"	18.5"	26.5"	30.5"	48"	
	318 mm	470 mm	673 mm	775 mm	1219 mm	
EQUIRED ABOVE	6"	6"	6"	6"	12"	
LICATIONS	152 mm	152 mm	152 mm	152 mm	305 mm	
DF 95% COMPACTED	8"	8"	8"	10"	12"	
	203 mm	203 mm	203 mm	254 mm	305 mm	
ALLOWED ABOVE	12'	12'	12'	12'	8.3'	
	3.65 m	3.65 m	3.65 m	3.65 m	2.53 m	
1BER	10"	12"	18"	24"	24"	
	250 mm	300 mm	450 mm	600 mm	600 mm	

NOTE¹: STONE ABOVE AND BELOW UNITS MAY VARY PER SYSTEM. SEE SYSTEM LAYOUT FOR STONE REQUIREMENTS

CROSS SECTION TABLE REFERENCE

TYPICAL SEPARATOR ROW CONFIGURATION CROSS SECTION

ENTIRE SEPARATOR ROW TO BE COVERED WITH -CULTEC NO.410 NON-WOVEN GEOTEXTILE

PLACE 1 LAYER OF CULTEC No. 4800 WOVEN -GEOTEXTILE (7.5' [2.29m] WIDE ROLL) UNDER ALL SEPARATOR ROW CHAMBERS

- INLET STRUCTURE 24.0" [609 mm] MIN. SUMP 4

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SEPARATOR ROW DETAIL SHEET TRAFFIC APPLICATION



TYPICAL SEPARATOR ROW CONFIGURATION PLAN VIEW



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PROJECT NO:	-	DATE:	08/2018
DESIGNED BY:	CULTEC, INC	CHECKED BY:	TECH
SCALE:	N.T.S.	SHEET NO:	-