

CIVIL ENVIRONMENTAL CONSULTANTS LLC
ENGINEERS AND LAND SURVEYORS

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November 19, 2019

Boston Conservation Commission
Boston City Hall
1 City Hall Square, Room 709
Boston, MA 02201-2031
Attn: Nicholas Moreno

Re: 874 East Sixth Street So. Boston

Dear Nick,

We have revised the proposed conservation site plan as follows:
We have revised the driveway/parking area in the rear of the building with an at-grade lawn and landscape area with a surface elevation of 18.9+/- (BCB), which is within 1 foot of the original grade. The stormwater infiltrators have been revised to Cul-Tec infiltrators and have been relocated from under the garage to the rear landscape area, raising them well above groundwater levels. The driveway has been revised to create a high point of over elevation 17.5 (BCB) / Elevation 11+ (NAVD88) at the front of the building. All meters, save the water meters, will be located outside along the side of the building, above the 100-yr flood levels. The water meters will be raised well above the basement floor level.

We have enclosed the following:
Two copies of the devised site plans and two copies of the revised Stormwater Management Report.

Please call 978-290-1781 or e-mail me for any additional information that you may need.

Very truly yours,

Frederick J. Geisel

Frederick J. Geisel, PE

encl:

STORMWATER MANAGEMENT REPORT

FOR

874 EAST SIXTH STREET

IN

SO. BOSTON , MASS

BY

CIVIL ENVIRONMENTAL CONSULTANTS

NOVEMBER 19,2019



FREDERICK J. GEISEL, PE

STORMWATER MANAGEMENT REPORT – NOVEMBER 19, 2019

874 EAST SIXTH ST. SO. BOSTON, MA

Background:

The property is located at 874 East sixth St. in South Boston, MA. This is a redevelopment site. The total area of property to be redeveloped consists of 6250 sq. ft. of land. The site previously contained a multi-family house. The project proponent proposes to construct a six-unit dwelling in a single structure. The project is a full redevelopment of the site.

Soil Conditions

The soils are classified as Merrimac Urban Land Complex. The soils are classified as Class A soils, for drainage purposes.

Flood Plain

The project site is within the Special Flood Hazard Areas designated by FEMA, for the 100-yr storm, with a flood elevation of AE-11 / 17.5 (BCB)

Stormwater Management

As a redevelopment site, the project is required to meet Stormwater Standards to the maximum Extent Practicable. Roof and driveway ramp runoff will be infiltrated by 10 Cul-Tec infiltrators surrounded by crushed stone, which hold and infiltrate all design storms. Based on our analysis and design, the post-development flow rates and volume will be reduced from the pre-development flows for the analyzed frequency storms – 2-yr, 10-yr and 25-yr. Flooding will not be increased for the 100-yr storm. All storm events will be infiltrated by the infiltrator systems. All Stormwater Management Standards will be met for the site.

All peak flows from the proposed roof areas will be attenuated by storage and infiltration through infiltration chambers that will store and infiltrate stormwater. These chambers will be as shown on the proposed site plan with the galleries located in the rear of the building.

Land in the rear will be landscaped with loam and grass, mulch, shrubs, and trees that will all serve to adsorb rainfall and reduce runoff.

Frederick J. Geisel, PE

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.

Checklist for Stormwater Report

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.

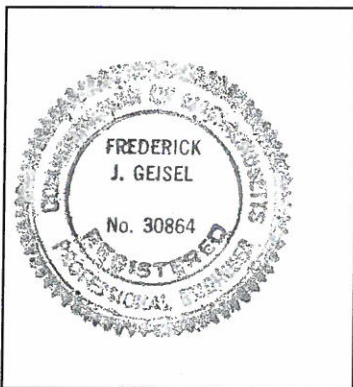
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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 Long-term 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



 9/11/19

Signature and Date

Checklist

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

- New development
- Redevelopment
- Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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)
- 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
- Water Quality Swale
- 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.

Checklist for Stormwater Report

Checklist (continued)

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 pre-development 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 24-hour 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.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- 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.
- 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.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 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.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- 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 proprietary 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.

Standard 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 *not* 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 *not* 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.

Standard 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.

Checklist for Stormwater Report

Checklist (continued)

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 Project
 - 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.

Checklist for Stormwater Report

Checklist (continued)

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.

NARRATIVE

874 EAST SIXTH ST. SO. BOSTON, MA - NOVEMBER 19, 2019

Wetlands Narrative

The site is approximately 350 feet from the beach and other coastal wetlands resource areas. The site is within wetlands resource area of Land Subject to Coastal Storm Flowage (LSCSF), within the FEMA Flood Zone. A small portion (500 sq. ft.) of the site is within FEMA Flood Zone AE Elevation 11. (NAVD88) / 17.5 (BCB)

The existing grade at the sidewalk at the right front corner of the property is at elevation 10.2 (NAVD88) and will remain so. A ramp to the basement level garage will start from that sidewalk elevation of 10.2 and ramp up to above elevation 11 and then slope down to the garage floor elevation of 4.7. Only parking and utility meters will be in the basement level. No significant alteration of the land subject to coastal storm flowage will occur with the construction of this building. The first floor of the building will be at elevation 13.54 (NAVD88), 20.0 BCB.

Mitigation to flooding of the basement has been achieved by raising the top of the driveway ramp above the 100-yr. flood level to prevent flood waters from the 100-yr storm from entering the driveway ramp. No cars will be allowed to enter the garage when a severe storm is forecast.

As indicated in the COASTAL RESILIENCE SOLUTIONS FOR SOUTH BOSTON, only regional solutions are effective for protection against rising sea levels and coastal flooding.

PRE & POST DEVELOPMENT STORMWATER FLOWS

874 EAST SIXTH STREET

SO. BOSTON, MA

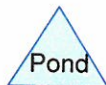
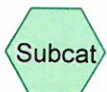
**PROPOSED
FLOWS**

FREQ. STORM <u>(YR)</u>	PRE DEVEL. EXIST FLOWS <u>(CFS)</u>	POST. DEVEL. FLOWS <u>(CFS)</u>	POST. INFIL. FLOWS <u>(CFS)</u>
2YR	0.00	0.26	0.00
10YR	0.07	0.47	0.00
25 YR	0.16	0.64	0.00
100 YR	0.41	0.99	0.15

EXISTING CONDITIONS- HYDROCAD



874 E 6th Existing



Routing Diagram for 3793-874 east sixth-REV11-18-19
Prepared by Civil Environmental Consultants LLC, Printed 11/19/2019
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3793-874 east sixth-REV11-18-19

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874 E. Sixth Street-pre

Printed 11/19/2019
Page 2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.117	39	>75% Grass cover, Good, HSG A (1S)
0.008	98	Paved parking, HSG A (1S)
0.018	98	Roofs, HSG A (1S)
0.143	50	TOTAL AREA

3793-874 east sixth-REV11-18-19

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Page 3

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.143	HSG A	1S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.143		TOTAL AREA

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Page 4

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.117	0.000	0.000	0.000	0.000	0.117	>75% Grass cover, Good	1S
0.008	0.000	0.000	0.000	0.000	0.008	Paved parking	1S
0.018	0.000	0.000	0.000	0.000	0.018	Roofs	1S
0.143	0.000	0.000	0.000	0.000	0.143	TOTAL AREA	

Hydrograph for Subcatchment 1S: 874 E 6th Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	2.26	0.01	0.00
0.25	0.01	0.00	0.00	13.00	2.33	0.01	0.00
0.50	0.02	0.00	0.00	13.25	2.39	0.01	0.00
0.75	0.04	0.00	0.00	13.50	2.45	0.02	0.00
1.00	0.05	0.00	0.00	13.75	2.49	0.02	0.00
1.25	0.06	0.00	0.00	14.00	2.53	0.03	0.00
1.50	0.07	0.00	0.00	14.25	2.57	0.03	0.00
1.75	0.09	0.00	0.00	14.50	2.60	0.03	0.00
2.00	0.10	0.00	0.00	14.75	2.63	0.04	0.00
2.25	0.11	0.00	0.00	15.00	2.66	0.04	0.00
2.50	0.12	0.00	0.00	15.25	2.69	0.04	0.00
2.75	0.14	0.00	0.00	15.50	2.71	0.05	0.00
3.00	0.15	0.00	0.00	15.75	2.74	0.05	0.00
3.25	0.17	0.00	0.00	16.00	2.76	0.05	0.00
3.50	0.18	0.00	0.00	16.25	2.79	0.06	0.00
3.75	0.20	0.00	0.00	16.50	2.81	0.06	0.00
4.00	0.21	0.00	0.00	16.75	2.83	0.06	0.00
4.25	0.23	0.00	0.00	17.00	2.85	0.07	0.00
4.50	0.24	0.00	0.00	17.25	2.87	0.07	0.00
4.75	0.26	0.00	0.00	17.50	2.89	0.07	0.00
5.00	0.27	0.00	0.00	17.75	2.91	0.08	0.00
5.25	0.29	0.00	0.00	18.00	2.92	0.08	0.00
5.50	0.30	0.00	0.00	18.25	2.94	0.08	0.00
5.75	0.32	0.00	0.00	18.50	2.96	0.08	0.00
6.00	0.34	0.00	0.00	18.75	2.97	0.09	0.00
6.25	0.35	0.00	0.00	19.00	2.99	0.09	0.00
6.50	0.37	0.00	0.00	19.25	3.00	0.09	0.00
6.75	0.39	0.00	0.00	19.50	3.02	0.09	0.00
7.00	0.41	0.00	0.00	19.75	3.03	0.10	0.00
7.25	0.43	0.00	0.00	20.00	3.05	0.10	0.00
7.50	0.45	0.00	0.00	20.25	3.06	0.10	0.00
7.75	0.47	0.00	0.00	20.50	3.08	0.11	0.00
8.00	0.50	0.00	0.00	20.75	3.09	0.11	0.00
8.25	0.52	0.00	0.00	21.00	3.11	0.11	0.00
8.50	0.55	0.00	0.00	21.25	3.12	0.11	0.00
8.75	0.57	0.00	0.00	21.50	3.14	0.12	0.00
9.00	0.60	0.00	0.00	21.75	3.15	0.12	0.00
9.25	0.63	0.00	0.00	22.00	3.16	0.12	0.00
9.50	0.66	0.00	0.00	22.25	3.17	0.12	0.00
9.75	0.69	0.00	0.00	22.50	3.19	0.13	0.00
10.00	0.73	0.00	0.00	22.75	3.20	0.13	0.00
10.25	0.77	0.00	0.00	23.00	3.21	0.13	0.00
10.50	0.81	0.00	0.00	23.25	3.22	0.13	0.00
10.75	0.87	0.00	0.00	23.50	3.24	0.14	0.00
11.00	0.93	0.00	0.00	23.75	3.25	0.14	0.00
11.25	1.00	0.00	0.00	24.00	3.26	0.14	0.00
11.50	1.09	0.00	0.00				
11.75	1.23	0.00	0.00				
12.00	1.56	0.00	0.00				
12.25	2.03	0.00	0.00				
12.50	2.17	0.00	0.00				

Summary for Subcatchment 1S: 874 E 6th Existing

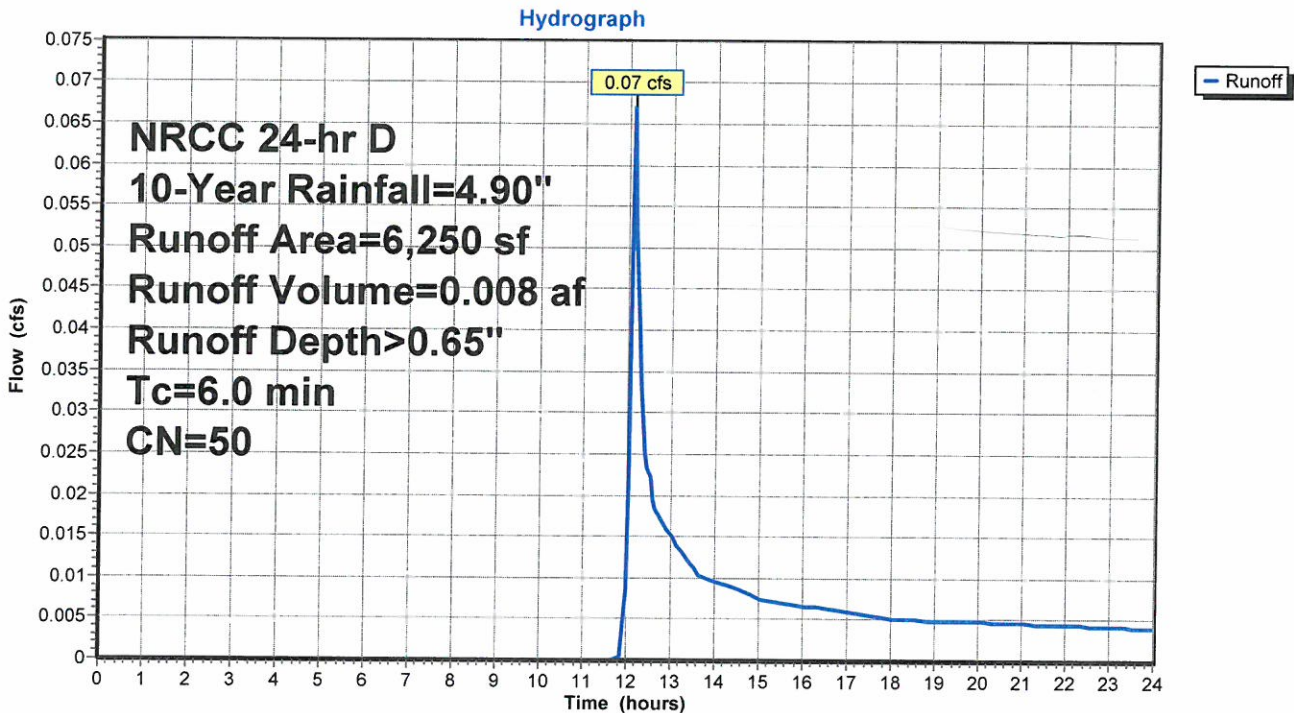
Runoff = 0.07 cfs @ 12.15 hrs, Volume= 0.008 af, Depth> 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.90"

Area (sf)	CN	Description
796	98	Roofs, HSG A
350	98	Paved parking, HSG A
5,104	39	>75% Grass cover, Good, HSG A
6,250	50	Weighted Average
5,104		81.66% Pervious Area
1,146		18.34% Impervious Area

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

Subcatchment 1S: 874 E 6th Existing



3793-874 east sixth-REV11-18-19

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874 E. Sixth Street-pre
NRCC 24-hr D 10-Year Rainfall=4.90"

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Hydrograph for Subcatchment 1S: 874 E 6th Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	3.39	0.17	0.02
0.25	0.02	0.00	0.00	13.00	3.51	0.20	0.02
0.50	0.04	0.00	0.00	13.25	3.60	0.22	0.01
0.75	0.05	0.00	0.00	13.50	3.68	0.24	0.01
1.00	0.07	0.00	0.00	13.75	3.74	0.26	0.01
1.25	0.09	0.00	0.00	14.00	3.80	0.27	0.01
1.50	0.11	0.00	0.00	14.25	3.86	0.29	0.01
1.75	0.13	0.00	0.00	14.50	3.91	0.31	0.01
2.00	0.15	0.00	0.00	14.75	3.96	0.32	0.01
2.25	0.17	0.00	0.00	15.00	4.00	0.33	0.01
2.50	0.19	0.00	0.00	15.25	4.04	0.35	0.01
2.75	0.21	0.00	0.00	15.50	4.08	0.36	0.01
3.00	0.23	0.00	0.00	15.75	4.12	0.37	0.01
3.25	0.25	0.00	0.00	16.00	4.15	0.38	0.01
3.50	0.27	0.00	0.00	16.25	4.19	0.39	0.01
3.75	0.29	0.00	0.00	16.50	4.22	0.40	0.01
4.00	0.32	0.00	0.00	16.75	4.25	0.41	0.01
4.25	0.34	0.00	0.00	17.00	4.28	0.42	0.01
4.50	0.36	0.00	0.00	17.25	4.31	0.43	0.01
4.75	0.38	0.00	0.00	17.50	4.34	0.44	0.01
5.00	0.41	0.00	0.00	17.75	4.37	0.45	0.01
5.25	0.43	0.00	0.00	18.00	4.40	0.46	0.01
5.50	0.46	0.00	0.00	18.25	4.42	0.47	0.01
5.75	0.48	0.00	0.00	18.50	4.44	0.48	0.00
6.00	0.50	0.00	0.00	18.75	4.47	0.49	0.00
6.25	0.53	0.00	0.00	19.00	4.49	0.50	0.00
6.50	0.56	0.00	0.00	19.25	4.52	0.51	0.00
6.75	0.59	0.00	0.00	19.50	4.54	0.51	0.00
7.00	0.62	0.00	0.00	19.75	4.56	0.52	0.00
7.25	0.65	0.00	0.00	20.00	4.58	0.53	0.00
7.50	0.68	0.00	0.00	20.25	4.61	0.54	0.00
7.75	0.71	0.00	0.00	20.50	4.63	0.55	0.00
8.00	0.75	0.00	0.00	20.75	4.65	0.56	0.00
8.25	0.78	0.00	0.00	21.00	4.67	0.56	0.00
8.50	0.82	0.00	0.00	21.25	4.69	0.57	0.00
8.75	0.86	0.00	0.00	21.50	4.71	0.58	0.00
9.00	0.90	0.00	0.00	21.75	4.73	0.59	0.00
9.25	0.94	0.00	0.00	22.00	4.75	0.59	0.00
9.50	0.99	0.00	0.00	22.25	4.77	0.60	0.00
9.75	1.04	0.00	0.00	22.50	4.79	0.61	0.00
10.00	1.10	0.00	0.00	22.75	4.81	0.62	0.00
10.25	1.16	0.00	0.00	23.00	4.83	0.62	0.00
10.50	1.22	0.00	0.00	23.25	4.85	0.63	0.00
10.75	1.30	0.00	0.00	23.50	4.86	0.64	0.00
11.00	1.39	0.00	0.00	23.75	4.88	0.64	0.00
11.25	1.51	0.00	0.00	24.00	4.90	0.65	0.00
11.50	1.64	0.00	0.00				
11.75	1.85	0.00	0.00				
12.00	2.35	0.01	0.01				
12.25	3.05	0.10	0.04				
12.50	3.26	0.14	0.02				

Summary for Subcatchment 1S: 874 E 6th Existing

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 1.23"

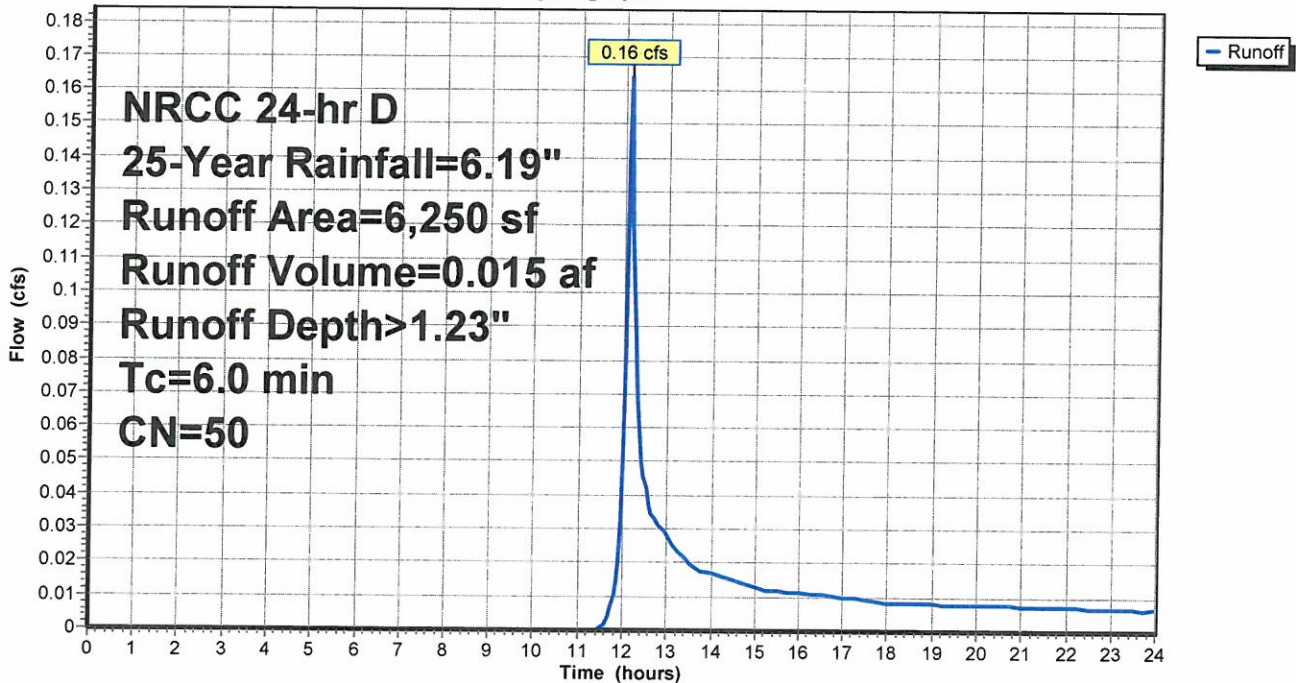
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=6.19"

Area (sf)	CN	Description
796	98	Roofs, HSG A
350	98	Paved parking, HSG A
5,104	39	>75% Grass cover, Good, HSG A
6,250	50	Weighted Average
5,104		81.66% Pervious Area
1,146		18.34% Impervious Area

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

Subcatchment 1S: 874 E 6th Existing

Hydrograph



Hydrograph for Subcatchment 1S: 874 E 6th Existing

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	4.29	0.43	0.03
0.25	0.02	0.00	0.00	13.00	4.43	0.48	0.03
0.50	0.04	0.00	0.00	13.25	4.55	0.52	0.02
0.75	0.07	0.00	0.00	13.50	4.64	0.55	0.02
1.00	0.09	0.00	0.00	13.75	4.73	0.58	0.02
1.25	0.11	0.00	0.00	14.00	4.80	0.61	0.02
1.50	0.14	0.00	0.00	14.25	4.87	0.64	0.02
1.75	0.16	0.00	0.00	14.50	4.94	0.67	0.02
2.00	0.19	0.00	0.00	14.75	5.00	0.69	0.01
2.25	0.21	0.00	0.00	15.00	5.05	0.71	0.01
2.50	0.24	0.00	0.00	15.25	5.10	0.74	0.01
2.75	0.26	0.00	0.00	15.50	5.15	0.76	0.01
3.00	0.29	0.00	0.00	15.75	5.20	0.78	0.01
3.25	0.32	0.00	0.00	16.00	5.25	0.80	0.01
3.50	0.34	0.00	0.00	16.25	5.29	0.81	0.01
3.75	0.37	0.00	0.00	16.50	5.33	0.83	0.01
4.00	0.40	0.00	0.00	16.75	5.37	0.85	0.01
4.25	0.43	0.00	0.00	17.00	5.41	0.87	0.01
4.50	0.46	0.00	0.00	17.25	5.45	0.88	0.01
4.75	0.49	0.00	0.00	17.50	5.49	0.90	0.01
5.00	0.51	0.00	0.00	17.75	5.52	0.92	0.01
5.25	0.54	0.00	0.00	18.00	5.55	0.93	0.01
5.50	0.58	0.00	0.00	18.25	5.58	0.95	0.01
5.75	0.61	0.00	0.00	18.50	5.61	0.96	0.01
6.00	0.64	0.00	0.00	18.75	5.65	0.97	0.01
6.25	0.67	0.00	0.00	19.00	5.68	0.99	0.01
6.50	0.70	0.00	0.00	19.25	5.70	1.00	0.01
6.75	0.74	0.00	0.00	19.50	5.73	1.02	0.01
7.00	0.78	0.00	0.00	19.75	5.76	1.03	0.01
7.25	0.82	0.00	0.00	20.00	5.79	1.04	0.01
7.50	0.86	0.00	0.00	20.25	5.82	1.06	0.01
7.75	0.90	0.00	0.00	20.50	5.85	1.07	0.01
8.00	0.94	0.00	0.00	20.75	5.87	1.08	0.01
8.25	0.99	0.00	0.00	21.00	5.90	1.09	0.01
8.50	1.04	0.00	0.00	21.25	5.93	1.11	0.01
8.75	1.09	0.00	0.00	21.50	5.95	1.12	0.01
9.00	1.14	0.00	0.00	21.75	5.98	1.13	0.01
9.25	1.19	0.00	0.00	22.00	6.00	1.14	0.01
9.50	1.25	0.00	0.00	22.25	6.03	1.16	0.01
9.75	1.32	0.00	0.00	22.50	6.05	1.17	0.01
10.00	1.39	0.00	0.00	22.75	6.08	1.18	0.01
10.25	1.46	0.00	0.00	23.00	6.10	1.19	0.01
10.50	1.55	0.00	0.00	23.25	6.12	1.20	0.01
10.75	1.64	0.00	0.00	23.50	6.15	1.21	0.01
11.00	1.76	0.00	0.00	23.75	6.17	1.23	0.01
11.25	1.90	0.00	0.00	24.00	6.19	1.24	0.01
11.50	2.07	0.00	0.00				
11.75	2.34	0.01	0.01				
12.00	2.97	0.08	0.05				
12.25	3.85	0.29	0.09				
12.50	4.12	0.37	0.04				

Summary for Subcatchment 1S: 874 E 6th Existing

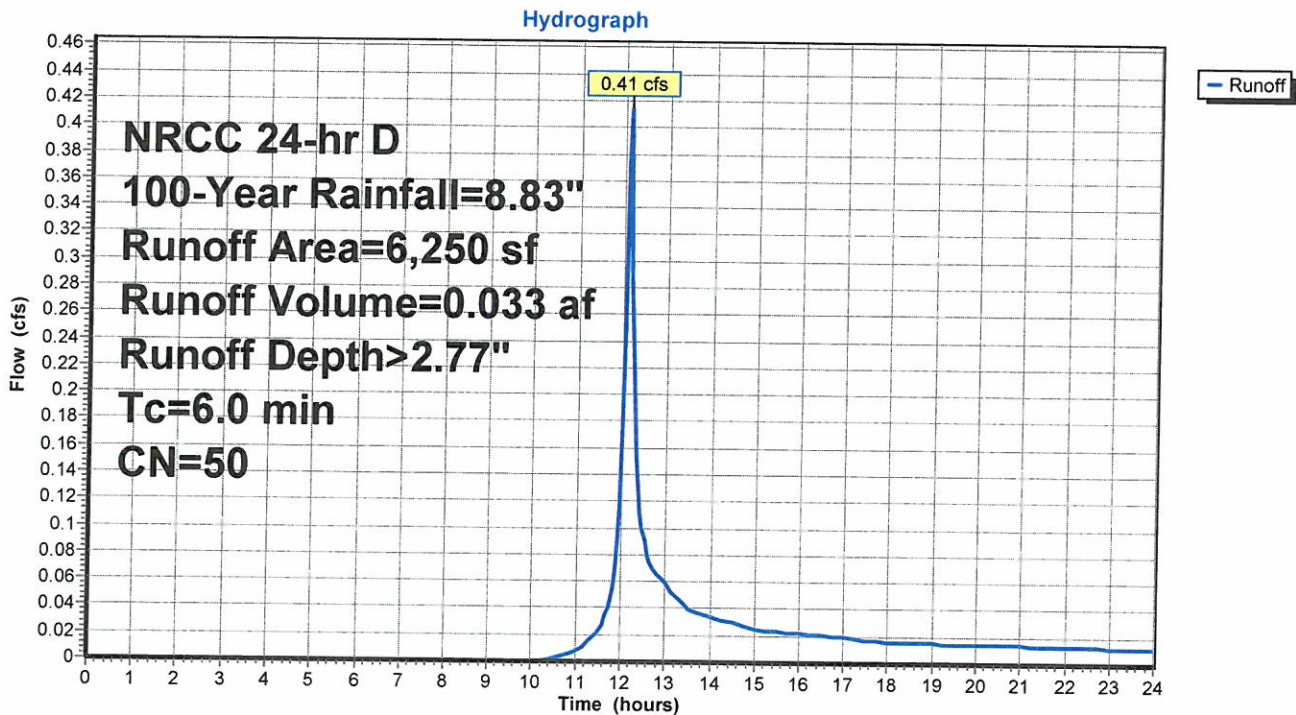
Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.033 af, Depth> 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.83"

Area (sf)	CN	Description
796	98	Roofs, HSG A
350	98	Paved parking, HSG A
5,104	39	>75% Grass cover, Good, HSG A
6,250	50	Weighted Average
5,104		81.66% Pervious Area
1,146		18.34% Impervious Area

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

Subcatchment 1S: 874 E 6th Existing



Hydrograph for Subcatchment 1S: 874 E 6th Existing

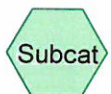
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	6.12	1.20	0.07
0.25	0.03	0.00	0.00	13.00	6.32	1.30	0.06
0.50	0.06	0.00	0.00	13.25	6.49	1.39	0.05
0.75	0.10	0.00	0.00	13.50	6.62	1.46	0.04
1.00	0.13	0.00	0.00	13.75	6.74	1.52	0.04
1.25	0.16	0.00	0.00	14.00	6.85	1.58	0.03
1.50	0.20	0.00	0.00	14.25	6.95	1.64	0.03
1.75	0.23	0.00	0.00	14.50	7.05	1.69	0.03
2.00	0.27	0.00	0.00	14.75	7.13	1.74	0.03
2.25	0.30	0.00	0.00	15.00	7.21	1.78	0.03
2.50	0.34	0.00	0.00	15.25	7.28	1.83	0.02
2.75	0.38	0.00	0.00	15.50	7.35	1.87	0.02
3.00	0.41	0.00	0.00	15.75	7.42	1.90	0.02
3.25	0.45	0.00	0.00	16.00	7.48	1.94	0.02
3.50	0.49	0.00	0.00	16.25	7.55	1.98	0.02
3.75	0.53	0.00	0.00	16.50	7.61	2.01	0.02
4.00	0.57	0.00	0.00	16.75	7.67	2.05	0.02
4.25	0.61	0.00	0.00	17.00	7.72	2.08	0.02
4.50	0.65	0.00	0.00	17.25	7.77	2.11	0.02
4.75	0.69	0.00	0.00	17.50	7.83	2.14	0.02
5.00	0.73	0.00	0.00	17.75	7.87	2.17	0.02
5.25	0.78	0.00	0.00	18.00	7.92	2.20	0.02
5.50	0.82	0.00	0.00	18.25	7.97	2.23	0.02
5.75	0.86	0.00	0.00	18.50	8.01	2.26	0.02
6.00	0.91	0.00	0.00	18.75	8.05	2.28	0.02
6.25	0.96	0.00	0.00	19.00	8.10	2.31	0.02
6.50	1.00	0.00	0.00	19.25	8.14	2.33	0.02
6.75	1.06	0.00	0.00	19.50	8.18	2.36	0.01
7.00	1.11	0.00	0.00	19.75	8.22	2.39	0.01
7.25	1.16	0.00	0.00	20.00	8.26	2.41	0.01
7.50	1.22	0.00	0.00	20.25	8.30	2.44	0.01
7.75	1.28	0.00	0.00	20.50	8.34	2.46	0.01
8.00	1.35	0.00	0.00	20.75	8.38	2.48	0.01
8.25	1.41	0.00	0.00	21.00	8.42	2.51	0.01
8.50	1.48	0.00	0.00	21.25	8.45	2.53	0.01
8.75	1.55	0.00	0.00	21.50	8.49	2.56	0.01
9.00	1.62	0.00	0.00	21.75	8.53	2.58	0.01
9.25	1.70	0.00	0.00	22.00	8.56	2.60	0.01
9.50	1.78	0.00	0.00	22.25	8.60	2.62	0.01
9.75	1.88	0.00	0.00	22.50	8.63	2.65	0.01
10.00	1.98	0.00	0.00	22.75	8.67	2.67	0.01
10.25	2.09	0.00	0.00	23.00	8.70	2.69	0.01
10.50	2.21	0.00	0.00	23.25	8.73	2.71	0.01
10.75	2.34	0.01	0.00	23.50	8.77	2.73	0.01
11.00	2.51	0.02	0.01	23.75	8.80	2.75	0.01
11.25	2.71	0.05	0.01	24.00	8.83	2.77	0.01
11.50	2.96	0.08	0.02				
11.75	3.34	0.16	0.04				
12.00	4.23	0.41	0.17				
12.25	5.49	0.90	0.20				
12.50	5.87	1.08	0.10				

PROPOSED CONDITIONS - HYDROCAD



874 E 6th proposed

10 CULTEC 330XLHD



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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.037	39	>75% Grass cover, Good, HSG A (2S)
0.015	98	Paved parking, HSG A (2S)
0.091	98	Roofs, HSG A (2S)
0.143	83	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.143	HSG A	2S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.143		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.037	0.000	0.000	0.000	0.000	0.037	>75% Grass cover, Good	2S
0.015	0.000	0.000	0.000	0.000	0.015	Paved parking	2S
0.091	0.000	0.000	0.000	0.000	0.091	Roofs	2S
0.143	0.000	0.000	0.000	0.000	0.143	TOTAL AREA	

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Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3P	17.00	14.00	150.0	0.0200	0.010	6.0	0.0	0.0

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874 E. Sixth Street-post
NRCC 24-hr D 2-Year Rainfall=3.26"

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Summary for Subcatchment 2S: 874 E 6th proposed

Runoff = 0.26 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 1.66"

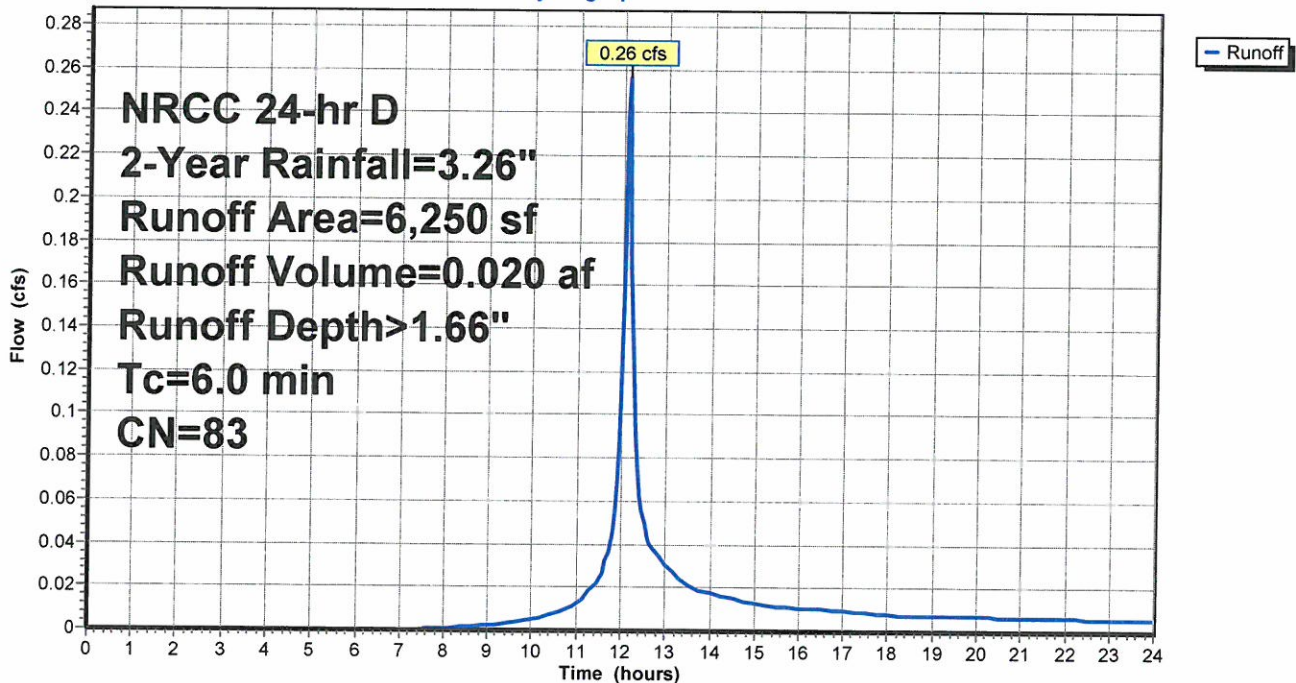
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.26"

Area (sf)	CN	Description
3,972	98	Roofs, HSG A
664	98	Paved parking, HSG A
1,614	39	>75% Grass cover, Good, HSG A
6,250	83	Weighted Average
1,614		25.82% Pervious Area
4,636		74.18% Impervious Area

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

Subcatchment 2S: 874 E 6th proposed

Hydrograph



3793-874 east sixth-REV11-18-19

Prepared by Civil Environmental Consultants LLC

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874 E. Sixth Street-post
NRCC 24-hr D 2-Year Rainfall=3.26"

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Hydrograph for Subcatchment 2S: 874 E 6th proposed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	2.26	0.88	0.04
0.25	0.01	0.00	0.00	13.00	2.33	0.93	0.03
0.50	0.02	0.00	0.00	13.25	2.39	0.98	0.03
0.75	0.04	0.00	0.00	13.50	2.45	1.01	0.02
1.00	0.05	0.00	0.00	13.75	2.49	1.05	0.02
1.25	0.06	0.00	0.00	14.00	2.53	1.08	0.02
1.50	0.07	0.00	0.00	14.25	2.57	1.11	0.02
1.75	0.09	0.00	0.00	14.50	2.60	1.13	0.02
2.00	0.10	0.00	0.00	14.75	2.63	1.16	0.01
2.25	0.11	0.00	0.00	15.00	2.66	1.18	0.01
2.50	0.12	0.00	0.00	15.25	2.69	1.20	0.01
2.75	0.14	0.00	0.00	15.50	2.71	1.22	0.01
3.00	0.15	0.00	0.00	15.75	2.74	1.24	0.01
3.25	0.17	0.00	0.00	16.00	2.76	1.26	0.01
3.50	0.18	0.00	0.00	16.25	2.79	1.28	0.01
3.75	0.20	0.00	0.00	16.50	2.81	1.29	0.01
4.00	0.21	0.00	0.00	16.75	2.83	1.31	0.01
4.25	0.23	0.00	0.00	17.00	2.85	1.33	0.01
4.50	0.24	0.00	0.00	17.25	2.87	1.34	0.01
4.75	0.26	0.00	0.00	17.50	2.89	1.36	0.01
5.00	0.27	0.00	0.00	17.75	2.91	1.37	0.01
5.25	0.29	0.00	0.00	18.00	2.92	1.39	0.01
5.50	0.30	0.00	0.00	18.25	2.94	1.40	0.01
5.75	0.32	0.00	0.00	18.50	2.96	1.41	0.01
6.00	0.34	0.00	0.00	18.75	2.97	1.42	0.01
6.25	0.35	0.00	0.00	19.00	2.99	1.44	0.01
6.50	0.37	0.00	0.00	19.25	3.00	1.45	0.01
6.75	0.39	0.00	0.00	19.50	3.02	1.46	0.01
7.00	0.41	0.00	0.00	19.75	3.03	1.47	0.01
7.25	0.43	0.00	0.00	20.00	3.05	1.49	0.01
7.50	0.45	0.00	0.00	20.25	3.06	1.50	0.01
7.75	0.47	0.00	0.00	20.50	3.08	1.51	0.01
8.00	0.50	0.00	0.00	20.75	3.09	1.52	0.01
8.25	0.52	0.01	0.00	21.00	3.11	1.53	0.01
8.50	0.55	0.01	0.00	21.25	3.12	1.54	0.01
8.75	0.57	0.01	0.00	21.50	3.14	1.56	0.01
9.00	0.60	0.02	0.00	21.75	3.15	1.57	0.01
9.25	0.63	0.02	0.00	22.00	3.16	1.58	0.01
9.50	0.66	0.03	0.00	22.25	3.17	1.59	0.01
9.75	0.69	0.03	0.00	22.50	3.19	1.60	0.01
10.00	0.73	0.04	0.01	22.75	3.20	1.61	0.01
10.25	0.77	0.05	0.01	23.00	3.21	1.62	0.01
10.50	0.81	0.07	0.01	23.25	3.22	1.63	0.01
10.75	0.87	0.08	0.01	23.50	3.24	1.64	0.01
11.00	0.93	0.10	0.01	23.75	3.25	1.65	0.01
11.25	1.00	0.13	0.02	24.00	3.26	1.66	0.01
11.50	1.09	0.17	0.02				
11.75	1.23	0.24	0.04				
12.00	1.56	0.41	0.12				
12.25	2.03	0.71	0.12				
12.50	2.17	0.81	0.05				

Summary for Pond 3P: 10 CULTEC 330XLHD

Inflow Area = 0.143 ac, 74.18% Impervious, Inflow Depth > 1.66" for 2-Year event
 Inflow = 0.26 cfs @ 12.13 hrs, Volume= 0.020 af
 Outflow = 0.09 cfs @ 12.00 hrs, Volume= 0.020 af, Atten= 64%, Lag= 0.0 min
 Discarded = 0.09 cfs @ 12.00 hrs, Volume= 0.020 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 14.18' @ 12.30 hrs Surf.Area= 481 sf Storage= 98 cf

Plug-Flow detention time= 4.5 min calculated for 0.020 af (100% of inflow)
 Center-of-Mass det. time= 4.2 min (860.1 - 855.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.50'	420 cf	12.17'W x 39.50'L x 4.04'H Field A 1,942 cf Overall - 544 cf Embedded = 1,398 cf x 30.0% Voids
#2A	14.50'	544 cf	Cultec R-330XLHD x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		963 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	13.50'	8.270 in/hr Exfiltration over Surface area
#2	Primary	17.00'	6.0" Round Culvert L= 150.0' Ke= 0.500 Inlet / Outlet Invert= 17.00' / 14.00' S= 0.0200 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.09 cfs @ 12.00 hrs HW=13.56' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=13.50' (Free Discharge)
 ↑2=Culvert (Controls 0.00 cfs)

Pond 3P: 10 CULTEC 330XLHD - Chamber Wizard Field A

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

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

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

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

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

5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +18.0" End Stone x 2 = 39.50' Base Length

2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 18.0" Side Stone x 2 = 12.17' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

1,942.4 cf Field - 543.9 cf Chambers = 1,398.4 cf Stone x 30.0% Voids = 419.5 cf Stone Storage

Chamber Storage + Stone Storage = 963.5 cf = 0.022 af

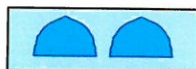
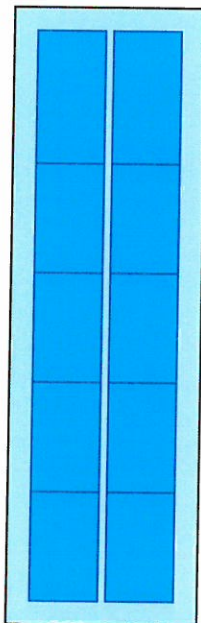
Overall Storage Efficiency = 49.6%

Overall System Size = 39.50' x 12.17' x 4.04'

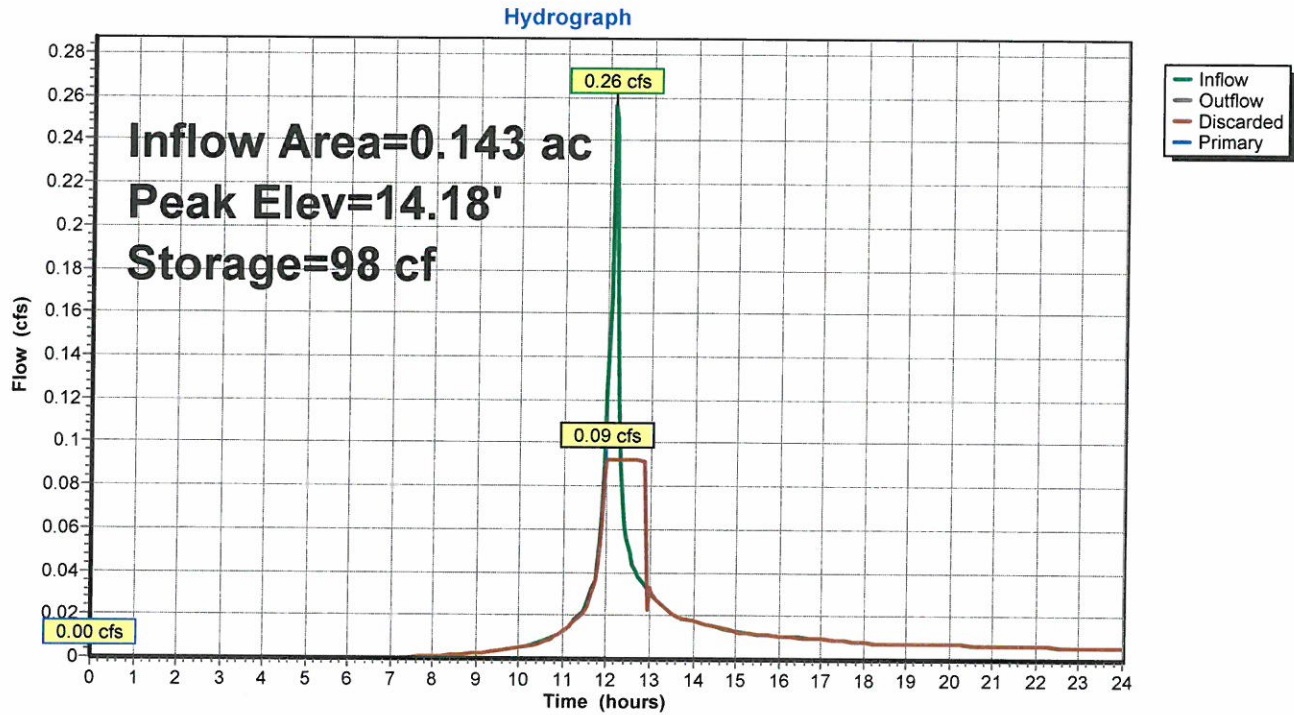
10 Chambers

71.9 cy Field

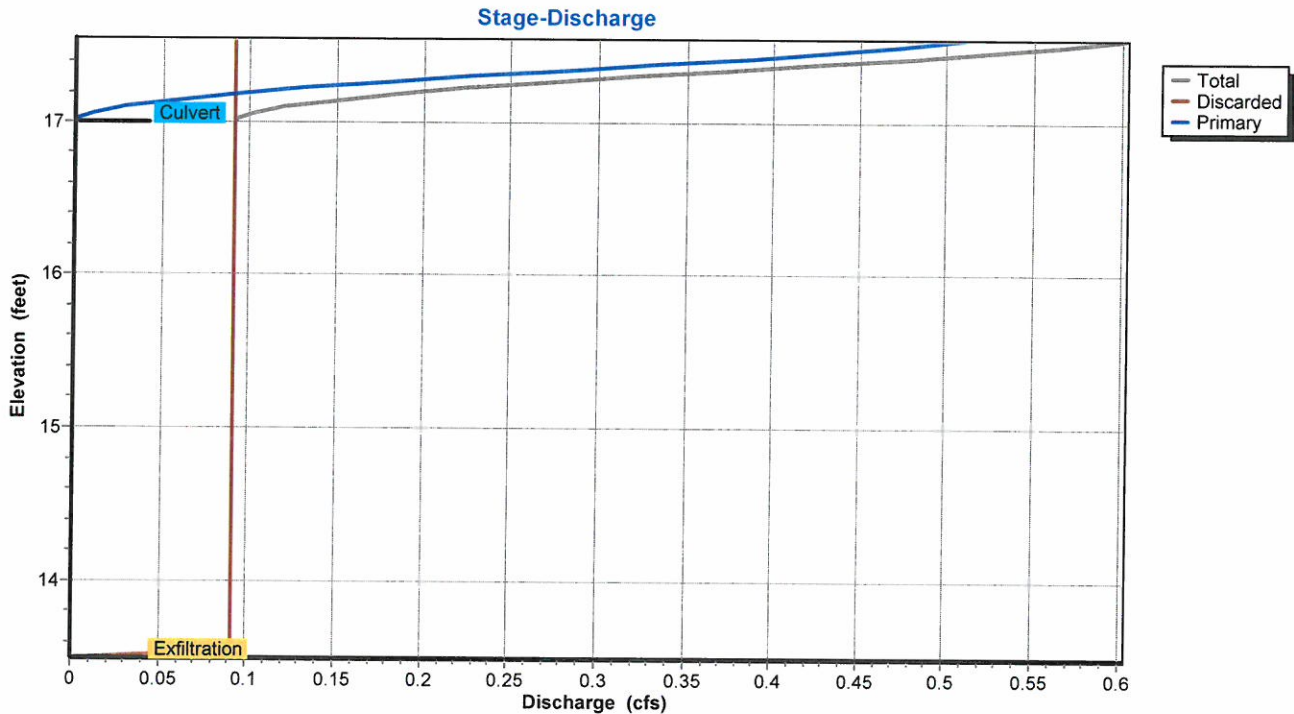
51.8 cy Stone



Pond 3P: 10 CULTEC 330XLHD



Pond 3P: 10 CULTEC 330XLHD



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Hydrograph for Pond 3P: 10 CULTEC 330XLHD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	13.50	0.00	0.00	0.00
0.50	0.00	0	13.50	0.00	0.00	0.00
1.00	0.00	0	13.50	0.00	0.00	0.00
1.50	0.00	0	13.50	0.00	0.00	0.00
2.00	0.00	0	13.50	0.00	0.00	0.00
2.50	0.00	0	13.50	0.00	0.00	0.00
3.00	0.00	0	13.50	0.00	0.00	0.00
3.50	0.00	0	13.50	0.00	0.00	0.00
4.00	0.00	0	13.50	0.00	0.00	0.00
4.50	0.00	0	13.50	0.00	0.00	0.00
5.00	0.00	0	13.50	0.00	0.00	0.00
5.50	0.00	0	13.50	0.00	0.00	0.00
6.00	0.00	0	13.50	0.00	0.00	0.00
6.50	0.00	0	13.50	0.00	0.00	0.00
7.00	0.00	0	13.50	0.00	0.00	0.00
7.50	0.00	0	13.50	0.00	0.00	0.00
8.00	0.00	0	13.50	0.00	0.00	0.00
8.50	0.00	0	13.50	0.00	0.00	0.00
9.00	0.00	0	13.50	0.00	0.00	0.00
9.50	0.00	0	13.50	0.00	0.00	0.00
10.00	0.01	0	13.50	0.01	0.01	0.00
10.50	0.01	0	13.50	0.01	0.01	0.00
11.00	0.01	1	13.51	0.01	0.01	0.00
11.50	0.02	1	13.51	0.02	0.02	0.00
12.00	0.12	9	13.56	0.09	0.09	0.00
12.50	0.05	80	14.05	0.09	0.09	0.00
13.00	0.03	2	13.51	0.03	0.03	0.00
13.50	0.02	1	13.51	0.02	0.02	0.00
14.00	0.02	1	13.51	0.02	0.02	0.00
14.50	0.02	1	13.51	0.02	0.02	0.00
15.00	0.01	1	13.51	0.01	0.01	0.00
15.50	0.01	1	13.51	0.01	0.01	0.00
16.00	0.01	1	13.50	0.01	0.01	0.00
16.50	0.01	1	13.50	0.01	0.01	0.00
17.00	0.01	1	13.50	0.01	0.01	0.00
17.50	0.01	1	13.50	0.01	0.01	0.00
18.00	0.01	0	13.50	0.01	0.01	0.00
18.50	0.01	0	13.50	0.01	0.01	0.00
19.00	0.01	0	13.50	0.01	0.01	0.00
19.50	0.01	0	13.50	0.01	0.01	0.00
20.00	0.01	0	13.50	0.01	0.01	0.00
20.50	0.01	0	13.50	0.01	0.01	0.00
21.00	0.01	0	13.50	0.01	0.01	0.00
21.50	0.01	0	13.50	0.01	0.01	0.00
22.00	0.01	0	13.50	0.01	0.01	0.00
22.50	0.01	0	13.50	0.01	0.01	0.00
23.00	0.01	0	13.50	0.01	0.01	0.00
23.50	0.01	0	13.50	0.01	0.01	0.00
24.00	0.01	0	13.50	0.01	0.01	0.00

Stage-Discharge for Pond 3P: 10 CULTEC 330XLHD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
13.50	0.00	0.00	0.00	16.05	0.09	0.09	0.00
13.55	0.09	0.09	0.00	16.10	0.09	0.09	0.00
13.60	0.09	0.09	0.00	16.15	0.09	0.09	0.00
13.65	0.09	0.09	0.00	16.20	0.09	0.09	0.00
13.70	0.09	0.09	0.00	16.25	0.09	0.09	0.00
13.75	0.09	0.09	0.00	16.30	0.09	0.09	0.00
13.80	0.09	0.09	0.00	16.35	0.09	0.09	0.00
13.85	0.09	0.09	0.00	16.40	0.09	0.09	0.00
13.90	0.09	0.09	0.00	16.45	0.09	0.09	0.00
13.95	0.09	0.09	0.00	16.50	0.09	0.09	0.00
14.00	0.09	0.09	0.00	16.55	0.09	0.09	0.00
14.05	0.09	0.09	0.00	16.60	0.09	0.09	0.00
14.10	0.09	0.09	0.00	16.65	0.09	0.09	0.00
14.15	0.09	0.09	0.00	16.70	0.09	0.09	0.00
14.20	0.09	0.09	0.00	16.75	0.09	0.09	0.00
14.25	0.09	0.09	0.00	16.80	0.09	0.09	0.00
14.30	0.09	0.09	0.00	16.85	0.09	0.09	0.00
14.35	0.09	0.09	0.00	16.90	0.09	0.09	0.00
14.40	0.09	0.09	0.00	16.95	0.09	0.09	0.00
14.45	0.09	0.09	0.00	17.00	0.09	0.09	0.00
14.50	0.09	0.09	0.00	17.05	0.10	0.09	0.01
14.55	0.09	0.09	0.00	17.10	0.12	0.09	0.03
14.60	0.09	0.09	0.00	17.15	0.16	0.09	0.07
14.65	0.09	0.09	0.00	17.20	0.20	0.09	0.11
14.70	0.09	0.09	0.00	17.25	0.26	0.09	0.17
14.75	0.09	0.09	0.00	17.30	0.32	0.09	0.23
14.80	0.09	0.09	0.00	17.35	0.39	0.09	0.30
14.85	0.09	0.09	0.00	17.40	0.45	0.09	0.36
14.90	0.09	0.09	0.00	17.45	0.52	0.09	0.43
14.95	0.09	0.09	0.00	17.50	0.56	0.09	0.47
15.00	0.09	0.09	0.00				
15.05	0.09	0.09	0.00				
15.10	0.09	0.09	0.00				
15.15	0.09	0.09	0.00				
15.20	0.09	0.09	0.00				
15.25	0.09	0.09	0.00				
15.30	0.09	0.09	0.00				
15.35	0.09	0.09	0.00				
15.40	0.09	0.09	0.00				
15.45	0.09	0.09	0.00				
15.50	0.09	0.09	0.00				
15.55	0.09	0.09	0.00				
15.60	0.09	0.09	0.00				
15.65	0.09	0.09	0.00				
15.70	0.09	0.09	0.00				
15.75	0.09	0.09	0.00				
15.80	0.09	0.09	0.00				
15.85	0.09	0.09	0.00				
15.90	0.09	0.09	0.00				
15.95	0.09	0.09	0.00				
16.00	0.09	0.09	0.00				

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NRCC 24-hr D 10-Year Rainfall=4.90"

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Summary for Subcatchment 2S: 874 E 6th proposed

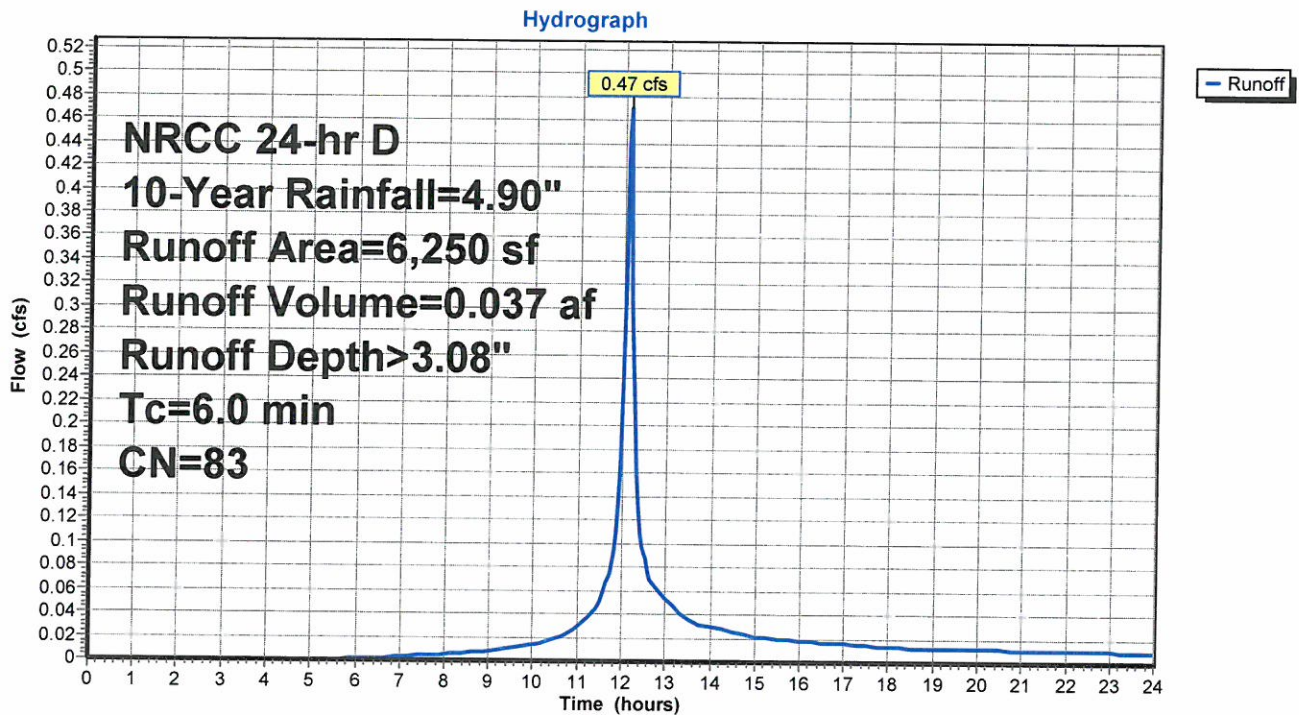
Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.037 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.90"

Area (sf)	CN	Description
3,972	98	Roofs, HSG A
664	98	Paved parking, HSG A
1,614	39	>75% Grass cover, Good, HSG A
6,250	83	Weighted Average
1,614		25.82% Pervious Area
4,636		74.18% Impervious Area

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

Subcatchment 2S: 874 E 6th proposed



Hydrograph for Subcatchment 2S: 874 E 6th proposed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	3.39	1.77	0.06
0.25	0.02	0.00	0.00	13.00	3.51	1.87	0.05
0.50	0.04	0.00	0.00	13.25	3.60	1.94	0.04
0.75	0.05	0.00	0.00	13.50	3.68	2.01	0.04
1.00	0.07	0.00	0.00	13.75	3.74	2.06	0.03
1.25	0.09	0.00	0.00	14.00	3.80	2.11	0.03
1.50	0.11	0.00	0.00	14.25	3.86	2.16	0.03
1.75	0.13	0.00	0.00	14.50	3.91	2.21	0.03
2.00	0.15	0.00	0.00	14.75	3.96	2.25	0.02
2.25	0.17	0.00	0.00	15.00	4.00	2.29	0.02
2.50	0.19	0.00	0.00	15.25	4.04	2.32	0.02
2.75	0.21	0.00	0.00	15.50	4.08	2.36	0.02
3.00	0.23	0.00	0.00	15.75	4.12	2.39	0.02
3.25	0.25	0.00	0.00	16.00	4.15	2.42	0.02
3.50	0.27	0.00	0.00	16.25	4.19	2.45	0.02
3.75	0.29	0.00	0.00	16.50	4.22	2.48	0.02
4.00	0.32	0.00	0.00	16.75	4.25	2.51	0.02
4.25	0.34	0.00	0.00	17.00	4.28	2.53	0.02
4.50	0.36	0.00	0.00	17.25	4.31	2.56	0.02
4.75	0.38	0.00	0.00	17.50	4.34	2.59	0.01
5.00	0.41	0.00	0.00	17.75	4.37	2.61	0.01
5.25	0.43	0.00	0.00	18.00	4.40	2.63	0.01
5.50	0.46	0.00	0.00	18.25	4.42	2.65	0.01
5.75	0.48	0.00	0.00	18.50	4.44	2.68	0.01
6.00	0.50	0.00	0.00	18.75	4.47	2.70	0.01
6.25	0.53	0.01	0.00	19.00	4.49	2.72	0.01
6.50	0.56	0.01	0.00	19.25	4.52	2.74	0.01
6.75	0.59	0.01	0.00	19.50	4.54	2.76	0.01
7.00	0.62	0.02	0.00	19.75	4.56	2.78	0.01
7.25	0.65	0.02	0.00	20.00	4.58	2.80	0.01
7.50	0.68	0.03	0.00	20.25	4.61	2.82	0.01
7.75	0.71	0.04	0.00	20.50	4.63	2.84	0.01
8.00	0.75	0.05	0.01	20.75	4.65	2.86	0.01
8.25	0.78	0.06	0.01	21.00	4.67	2.88	0.01
8.50	0.82	0.07	0.01	21.25	4.69	2.90	0.01
8.75	0.86	0.08	0.01	21.50	4.71	2.92	0.01
9.00	0.90	0.09	0.01	21.75	4.73	2.93	0.01
9.25	0.94	0.11	0.01	22.00	4.75	2.95	0.01
9.50	0.99	0.13	0.01	22.25	4.77	2.97	0.01
9.75	1.04	0.15	0.01	22.50	4.79	2.99	0.01
10.00	1.10	0.17	0.01	22.75	4.81	3.00	0.01
10.25	1.16	0.20	0.02	23.00	4.83	3.02	0.01
10.50	1.22	0.23	0.02	23.25	4.85	3.04	0.01
10.75	1.30	0.27	0.02	23.50	4.86	3.05	0.01
11.00	1.39	0.32	0.03	23.75	4.88	3.07	0.01
11.25	1.51	0.38	0.04	24.00	4.90	3.08	0.01
11.50	1.64	0.46	0.05				
11.75	1.85	0.60	0.08				
12.00	2.35	0.94	0.24				
12.25	3.05	1.49	0.21				
12.50	3.26	1.66	0.09				

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NRCC 24-hr D 10-Year Rainfall=4.90"

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Summary for Pond 3P: 10 CULTEC 330XLHD

Inflow Area = 0.143 ac, 74.18% Impervious, Inflow Depth > 3.08" for 10-Year event
 Inflow = 0.47 cfs @ 12.13 hrs, Volume= 0.037 af
 Outflow = 0.09 cfs @ 11.85 hrs, Volume= 0.037 af, Atten= 80%, Lag= 0.0 min
 Discarded = 0.09 cfs @ 11.85 hrs, Volume= 0.037 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 14.98' @ 12.50 hrs Surf.Area= 481 sf Storage= 311 cf

Plug-Flow detention time= 17.5 min calculated for 0.037 af (100% of inflow)

Center-of-Mass det. time= 17.3 min (850.3 - 833.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.50'	420 cf	12.17'W x 39.50'L x 4.04'H Field A 1,942 cf Overall - 544 cf Embedded = 1,398 cf x 30.0% Voids
#2A	14.50'	544 cf	Cultec R-330XLHD x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		963 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	13.50'	8.270 in/hr Exfiltration over Surface area
#2	Primary	17.00'	6.0" Round Culvert L= 150.0' Ke= 0.500 Inlet / Outlet Invert= 17.00' / 14.00' S= 0.0200 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.09 cfs @ 11.85 hrs HW=13.55' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=13.50' (Free Discharge)

↑2=Culvert (Controls 0.00 cfs)

Pond 3P: 10 CULTEC 330XLHD - Chamber Wizard Field A

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

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

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

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

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

5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +18.0" End Stone x 2 = 39.50' Base Length

2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 18.0" Side Stone x 2 = 12.17' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

1,942.4 cf Field - 543.9 cf Chambers = 1,398.4 cf Stone x 30.0% Voids = 419.5 cf Stone Storage

Chamber Storage + Stone Storage = 963.5 cf = 0.022 af

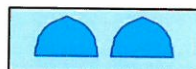
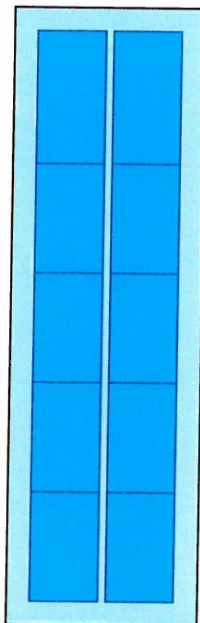
Overall Storage Efficiency = 49.6%

Overall System Size = 39.50' x 12.17' x 4.04'

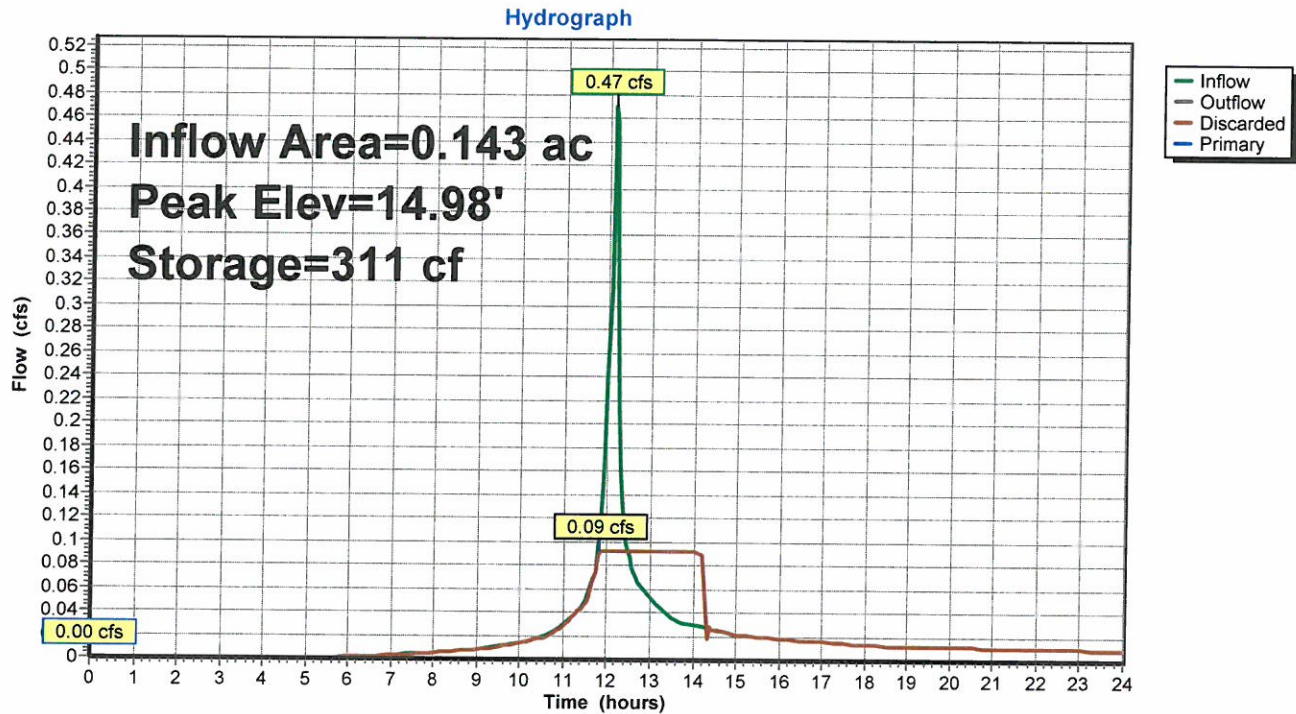
10 Chambers

71.9 cy Field

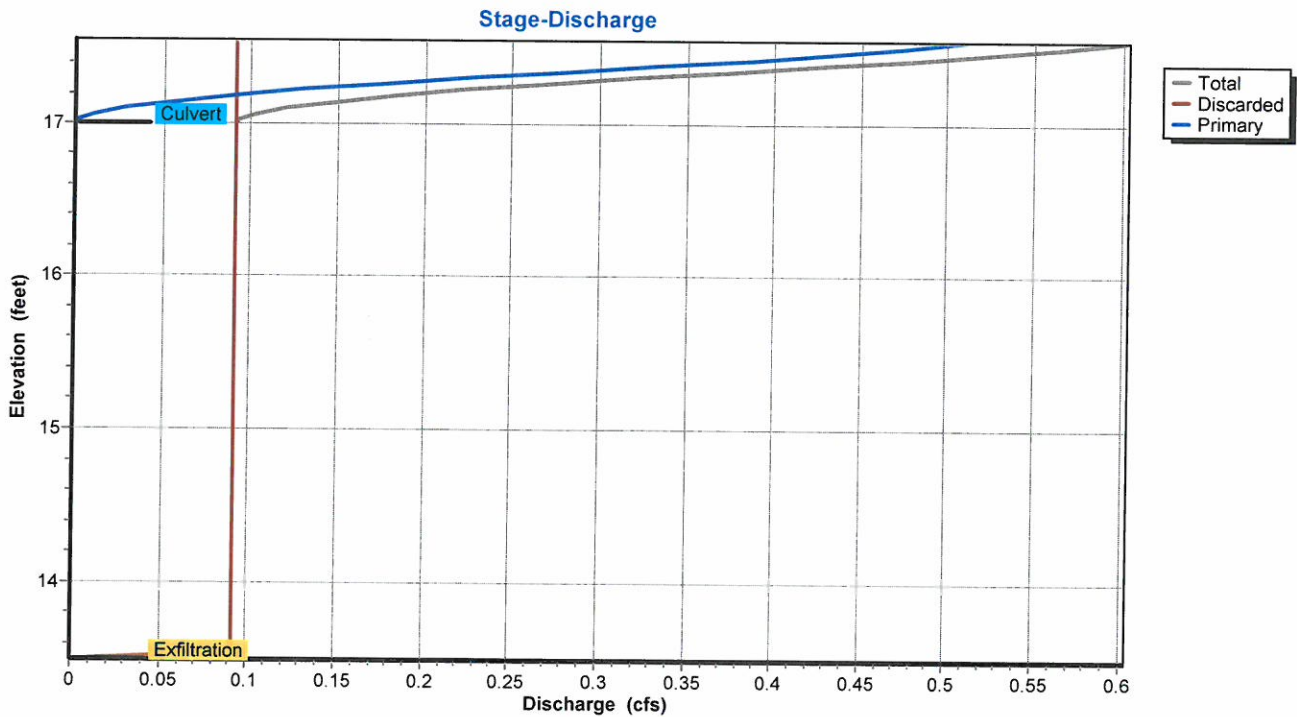
51.8 cy Stone



Pond 3P: 10 CULTEC 330XLHD



Pond 3P: 10 CULTEC 330XLHD



Hydrograph for Pond 3P: 10 CULTEC 330XLHD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	13.50	0.00	0.00	0.00
0.50	0.00	0	13.50	0.00	0.00	0.00
1.00	0.00	0	13.50	0.00	0.00	0.00
1.50	0.00	0	13.50	0.00	0.00	0.00
2.00	0.00	0	13.50	0.00	0.00	0.00
2.50	0.00	0	13.50	0.00	0.00	0.00
3.00	0.00	0	13.50	0.00	0.00	0.00
3.50	0.00	0	13.50	0.00	0.00	0.00
4.00	0.00	0	13.50	0.00	0.00	0.00
4.50	0.00	0	13.50	0.00	0.00	0.00
5.00	0.00	0	13.50	0.00	0.00	0.00
5.50	0.00	0	13.50	0.00	0.00	0.00
6.00	0.00	0	13.50	0.00	0.00	0.00
6.50	0.00	0	13.50	0.00	0.00	0.00
7.00	0.00	0	13.50	0.00	0.00	0.00
7.50	0.00	0	13.50	0.00	0.00	0.00
8.00	0.01	0	13.50	0.01	0.01	0.00
8.50	0.01	0	13.50	0.01	0.01	0.00
9.00	0.01	0	13.50	0.01	0.01	0.00
9.50	0.01	1	13.50	0.01	0.01	0.00
10.00	0.01	1	13.51	0.01	0.01	0.00
10.50	0.02	1	13.51	0.02	0.02	0.00
11.00	0.03	2	13.51	0.03	0.03	0.00
11.50	0.05	3	13.52	0.05	0.05	0.00
12.00	0.24	45	13.81	0.09	0.09	0.00
12.50	0.09	311	14.98	0.09	0.09	0.00
13.00	0.05	267	14.86	0.09	0.09	0.00
13.50	0.04	180	14.60	0.09	0.09	0.00
14.00	0.03	73	14.00	0.09	0.09	0.00
14.50	0.03	2	13.51	0.03	0.03	0.00
15.00	0.02	1	13.51	0.02	0.02	0.00
15.50	0.02	1	13.51	0.02	0.02	0.00
16.00	0.02	1	13.51	0.02	0.02	0.00
16.50	0.02	1	13.51	0.02	0.02	0.00
17.00	0.02	1	13.51	0.02	0.02	0.00
17.50	0.01	1	13.51	0.01	0.01	0.00
18.00	0.01	1	13.51	0.01	0.01	0.00
18.50	0.01	1	13.51	0.01	0.01	0.00
19.00	0.01	1	13.51	0.01	0.01	0.00
19.50	0.01	1	13.51	0.01	0.01	0.00
20.00	0.01	1	13.51	0.01	0.01	0.00
20.50	0.01	1	13.50	0.01	0.01	0.00
21.00	0.01	1	13.50	0.01	0.01	0.00
21.50	0.01	1	13.50	0.01	0.01	0.00
22.00	0.01	1	13.50	0.01	0.01	0.00
22.50	0.01	1	13.50	0.01	0.01	0.00
23.00	0.01	1	13.50	0.01	0.01	0.00
23.50	0.01	1	13.50	0.01	0.01	0.00
24.00	0.01	1	13.50	0.01	0.01	0.00

Stage-Discharge for Pond 3P: 10 CULTEC 330XLHD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
13.50	0.00	0.00	0.00	16.05	0.09	0.09	0.00
13.55	0.09	0.09	0.00	16.10	0.09	0.09	0.00
13.60	0.09	0.09	0.00	16.15	0.09	0.09	0.00
13.65	0.09	0.09	0.00	16.20	0.09	0.09	0.00
13.70	0.09	0.09	0.00	16.25	0.09	0.09	0.00
13.75	0.09	0.09	0.00	16.30	0.09	0.09	0.00
13.80	0.09	0.09	0.00	16.35	0.09	0.09	0.00
13.85	0.09	0.09	0.00	16.40	0.09	0.09	0.00
13.90	0.09	0.09	0.00	16.45	0.09	0.09	0.00
13.95	0.09	0.09	0.00	16.50	0.09	0.09	0.00
14.00	0.09	0.09	0.00	16.55	0.09	0.09	0.00
14.05	0.09	0.09	0.00	16.60	0.09	0.09	0.00
14.10	0.09	0.09	0.00	16.65	0.09	0.09	0.00
14.15	0.09	0.09	0.00	16.70	0.09	0.09	0.00
14.20	0.09	0.09	0.00	16.75	0.09	0.09	0.00
14.25	0.09	0.09	0.00	16.80	0.09	0.09	0.00
14.30	0.09	0.09	0.00	16.85	0.09	0.09	0.00
14.35	0.09	0.09	0.00	16.90	0.09	0.09	0.00
14.40	0.09	0.09	0.00	16.95	0.09	0.09	0.00
14.45	0.09	0.09	0.00	17.00	0.09	0.09	0.00
14.50	0.09	0.09	0.00	17.05	0.10	0.09	0.01
14.55	0.09	0.09	0.00	17.10	0.12	0.09	0.03
14.60	0.09	0.09	0.00	17.15	0.16	0.09	0.07
14.65	0.09	0.09	0.00	17.20	0.20	0.09	0.11
14.70	0.09	0.09	0.00	17.25	0.26	0.09	0.17
14.75	0.09	0.09	0.00	17.30	0.32	0.09	0.23
14.80	0.09	0.09	0.00	17.35	0.39	0.09	0.30
14.85	0.09	0.09	0.00	17.40	0.45	0.09	0.36
14.90	0.09	0.09	0.00	17.45	0.52	0.09	0.43
14.95	0.09	0.09	0.00	17.50	0.56	0.09	0.47
15.00	0.09	0.09	0.00				
15.05	0.09	0.09	0.00				
15.10	0.09	0.09	0.00				
15.15	0.09	0.09	0.00				
15.20	0.09	0.09	0.00				
15.25	0.09	0.09	0.00				
15.30	0.09	0.09	0.00				
15.35	0.09	0.09	0.00				
15.40	0.09	0.09	0.00				
15.45	0.09	0.09	0.00				
15.50	0.09	0.09	0.00				
15.55	0.09	0.09	0.00				
15.60	0.09	0.09	0.00				
15.65	0.09	0.09	0.00				
15.70	0.09	0.09	0.00				
15.75	0.09	0.09	0.00				
15.80	0.09	0.09	0.00				
15.85	0.09	0.09	0.00				
15.90	0.09	0.09	0.00				
15.95	0.09	0.09	0.00				
16.00	0.09	0.09	0.00				

Summary for Subcatchment 2S: 874 E 6th proposed

Runoff = 0.64 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 4.26"

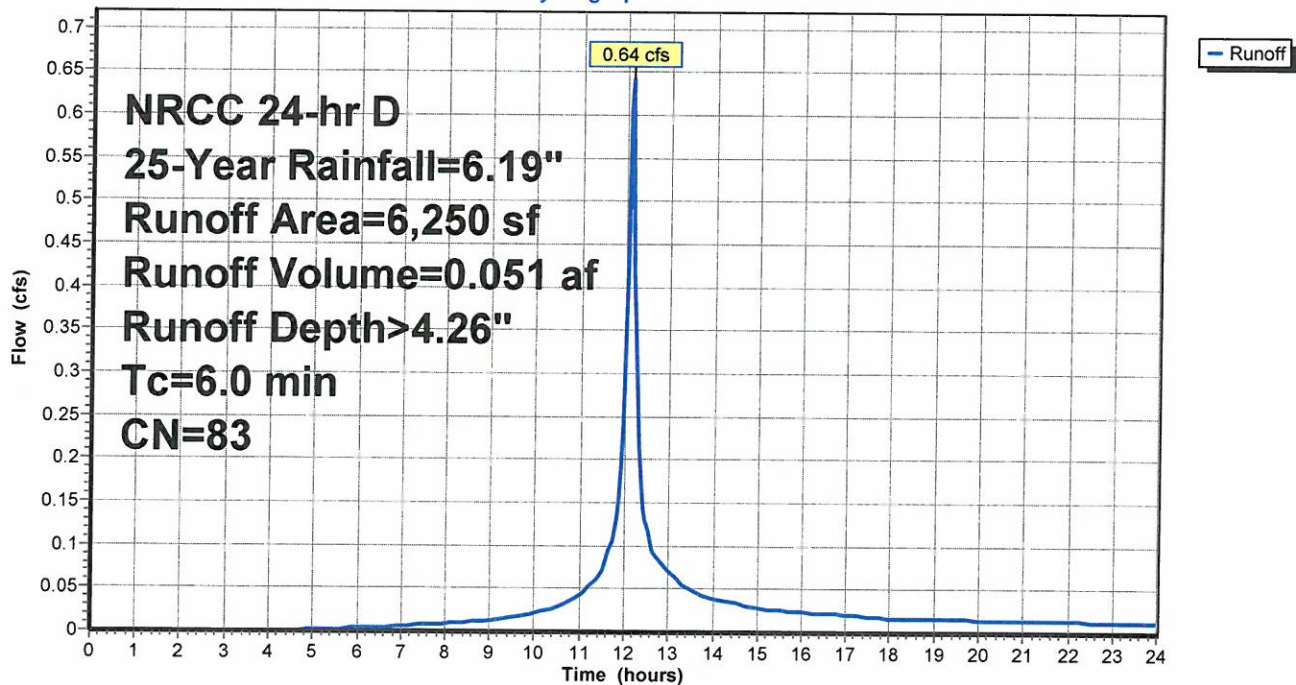
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=6.19"

Area (sf)	CN	Description
3,972	98	Roofs, HSG A
664	98	Paved parking, HSG A
1,614	39	>75% Grass cover, Good, HSG A
6,250	83	Weighted Average
1,614		25.82% Pervious Area
4,636		74.18% Impervious Area

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

Subcatchment 2S: 874 E 6th proposed

Hydrograph



3793-874 east sixth-REV11-18-19

Prepared by Civil Environmental Consultants LLC

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874 E. Sixth Street-post
NRCC 24-hr D 25-Year Rainfall=6.19"

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Hydrograph for Subcatchment 2S: 874 E 6th proposed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	4.29	2.54	0.09
0.25	0.02	0.00	0.00	13.00	4.43	2.66	0.07
0.50	0.04	0.00	0.00	13.25	4.55	2.77	0.06
0.75	0.07	0.00	0.00	13.50	4.64	2.85	0.05
1.00	0.09	0.00	0.00	13.75	4.73	2.93	0.04
1.25	0.11	0.00	0.00	14.00	4.80	3.00	0.04
1.50	0.14	0.00	0.00	14.25	4.87	3.06	0.04
1.75	0.16	0.00	0.00	14.50	4.94	3.12	0.03
2.00	0.19	0.00	0.00	14.75	5.00	3.17	0.03
2.25	0.21	0.00	0.00	15.00	5.05	3.22	0.03
2.50	0.24	0.00	0.00	15.25	5.10	3.27	0.03
2.75	0.26	0.00	0.00	15.50	5.15	3.31	0.03
3.00	0.29	0.00	0.00	15.75	5.20	3.36	0.02
3.25	0.32	0.00	0.00	16.00	5.25	3.40	0.02
3.50	0.34	0.00	0.00	16.25	5.29	3.44	0.02
3.75	0.37	0.00	0.00	16.50	5.33	3.48	0.02
4.00	0.40	0.00	0.00	16.75	5.37	3.51	0.02
4.25	0.43	0.00	0.00	17.00	5.41	3.55	0.02
4.50	0.46	0.00	0.00	17.25	5.45	3.58	0.02
4.75	0.49	0.00	0.00	17.50	5.49	3.62	0.02
5.00	0.51	0.01	0.00	17.75	5.52	3.65	0.02
5.25	0.54	0.01	0.00	18.00	5.55	3.68	0.02
5.50	0.58	0.01	0.00	18.25	5.58	3.71	0.02
5.75	0.61	0.02	0.00	18.50	5.61	3.74	0.02
6.00	0.64	0.02	0.00	18.75	5.65	3.76	0.02
6.25	0.67	0.03	0.00	19.00	5.68	3.79	0.02
6.50	0.70	0.04	0.00	19.25	5.70	3.82	0.02
6.75	0.74	0.05	0.01	19.50	5.73	3.85	0.02
7.00	0.78	0.06	0.01	19.75	5.76	3.87	0.02
7.25	0.82	0.07	0.01	20.00	5.79	3.90	0.02
7.50	0.86	0.08	0.01	20.25	5.82	3.92	0.01
7.75	0.90	0.09	0.01	20.50	5.85	3.95	0.01
8.00	0.94	0.11	0.01	20.75	5.87	3.97	0.01
8.25	0.99	0.13	0.01	21.00	5.90	4.00	0.01
8.50	1.04	0.15	0.01	21.25	5.93	4.02	0.01
8.75	1.09	0.17	0.01	21.50	5.95	4.05	0.01
9.00	1.14	0.19	0.01	21.75	5.98	4.07	0.01
9.25	1.19	0.22	0.02	22.00	6.00	4.09	0.01
9.50	1.25	0.25	0.02	22.25	6.03	4.12	0.01
9.75	1.32	0.28	0.02	22.50	6.05	4.14	0.01
10.00	1.39	0.32	0.02	22.75	6.08	4.16	0.01
10.25	1.46	0.36	0.02	23.00	6.10	4.18	0.01
10.50	1.55	0.41	0.03	23.25	6.12	4.21	0.01
10.75	1.64	0.46	0.03	23.50	6.15	4.23	0.01
11.00	1.76	0.54	0.04	23.75	6.17	4.25	0.01
11.25	1.90	0.63	0.06	24.00	6.19	4.27	0.01
11.50	2.07	0.75	0.07				
11.75	2.34	0.94	0.11				
12.00	2.97	1.42	0.33				
12.25	3.85	2.16	0.29				
12.50	4.12	2.39	0.12				

3793-874 east sixth-REV11-18-19

Prepared by Civil Environmental Consultants LLC

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874 E. Sixth Street-post
NRCC 24-hr D 25-Year Rainfall=6.19"

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Summary for Pond 3P: 10 CULTEC 330XLHD

Inflow Area = 0.143 ac, 74.18% Impervious, Inflow Depth > 4.26" for 25-Year event
 Inflow = 0.64 cfs @ 12.13 hrs, Volume= 0.051 af
 Outflow = 0.09 cfs @ 11.65 hrs, Volume= 0.051 af, Atten= 86%, Lag= 0.0 min
 Discarded = 0.09 cfs @ 11.65 hrs, Volume= 0.051 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.64' @ 12.67 hrs Surf.Area= 481 sf Storage= 528 cf

Plug-Flow detention time= 33.7 min calculated for 0.051 af (100% of inflow)
 Center-of-Mass det. time= 33.5 min (854.5 - 821.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.50'	420 cf	12.17'W x 39.50'L x 4.04'H Field A 1,942 cf Overall - 544 cf Embedded = 1,398 cf x 30.0% Voids
#2A	14.50'	544 cf	Cultec R-330XLHD x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		963 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	13.50'	8.270 in/hr Exfiltration over Surface area
#2	Primary	17.00'	6.0" Round Culvert L= 150.0' Ke= 0.500 Inlet / Outlet Invert= 17.00' / 14.00' S= 0.0200 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.09 cfs @ 11.65 hrs HW=13.54' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=13.50' (Free Discharge)
 ↑2=Culvert (Controls 0.00 cfs)

Pond 3P: 10 CULTEC 330XLHD - Chamber Wizard Field A

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

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

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

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

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

5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +18.0" End Stone x 2 = 39.50' Base Length

2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 18.0" Side Stone x 2 = 12.17' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

1,942.4 cf Field - 543.9 cf Chambers = 1,398.4 cf Stone x 30.0% Voids = 419.5 cf Stone Storage

Chamber Storage + Stone Storage = 963.5 cf = 0.022 af

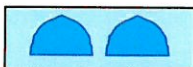
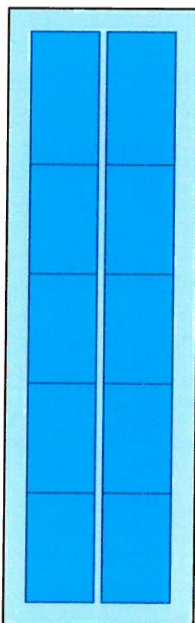
Overall Storage Efficiency = 49.6%

Overall System Size = 39.50' x 12.17' x 4.04'

10 Chambers

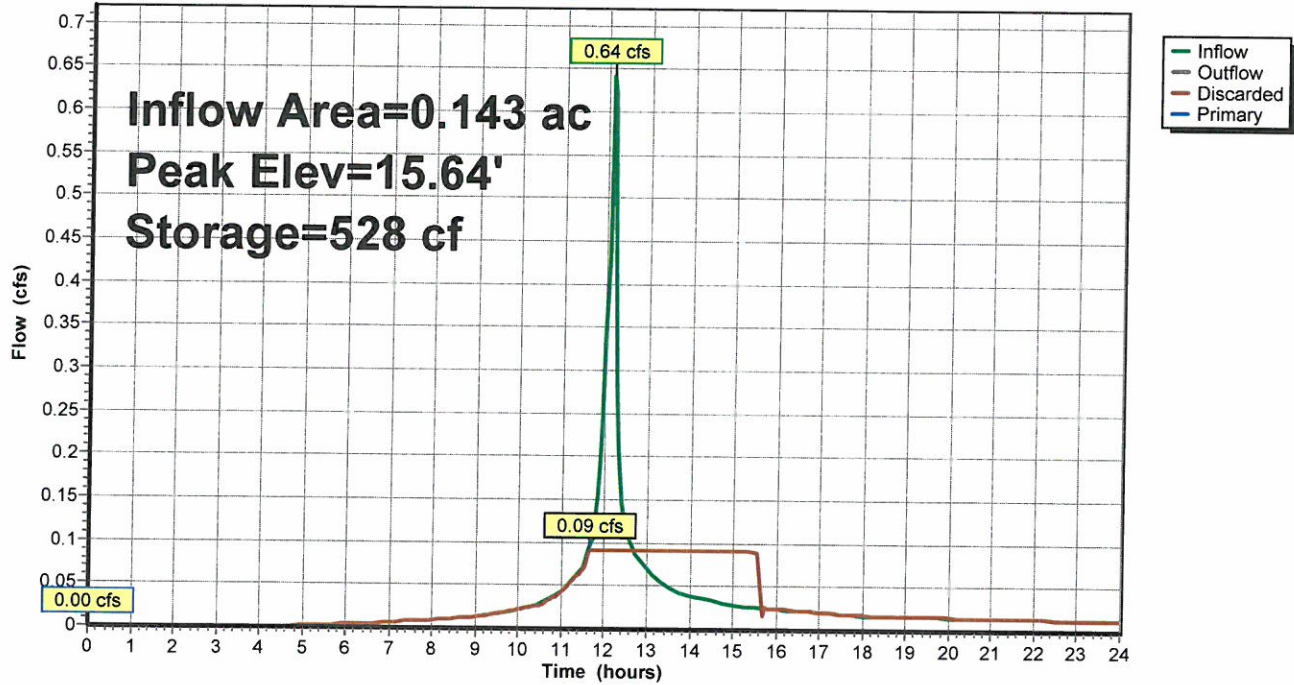
71.9 cy Field

51.8 cy Stone



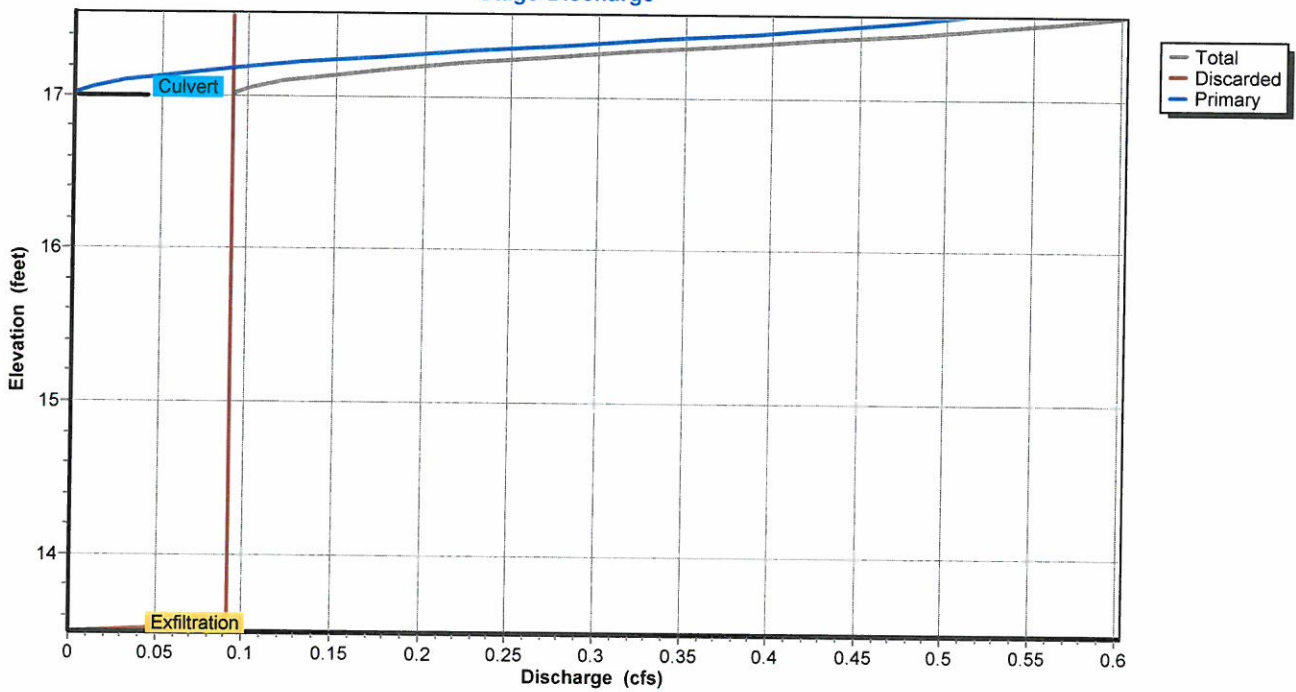
Pond 3P: 10 CULTEC 330XLHD

Hydrograph



Pond 3P: 10 CULTEC 330XLHD

Stage-Discharge



Hydrograph for Pond 3P: 10 CULTEC 330XLHD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	13.50	0.00	0.00	0.00
0.50	0.00	0	13.50	0.00	0.00	0.00
1.00	0.00	0	13.50	0.00	0.00	0.00
1.50	0.00	0	13.50	0.00	0.00	0.00
2.00	0.00	0	13.50	0.00	0.00	0.00
2.50	0.00	0	13.50	0.00	0.00	0.00
3.00	0.00	0	13.50	0.00	0.00	0.00
3.50	0.00	0	13.50	0.00	0.00	0.00
4.00	0.00	0	13.50	0.00	0.00	0.00
4.50	0.00	0	13.50	0.00	0.00	0.00
5.00	0.00	0	13.50	0.00	0.00	0.00
5.50	0.00	0	13.50	0.00	0.00	0.00
6.00	0.00	0	13.50	0.00	0.00	0.00
6.50	0.00	0	13.50	0.00	0.00	0.00
7.00	0.01	0	13.50	0.01	0.01	0.00
7.50	0.01	0	13.50	0.01	0.01	0.00
8.00	0.01	1	13.50	0.01	0.01	0.00
8.50	0.01	1	13.50	0.01	0.01	0.00
9.00	0.01	1	13.51	0.01	0.01	0.00
9.50	0.02	1	13.51	0.02	0.02	0.00
10.00	0.02	1	13.51	0.02	0.02	0.00
10.50	0.03	2	13.51	0.03	0.03	0.00
11.00	0.04	3	13.52	0.04	0.04	0.00
11.50	0.07	4	13.53	0.07	0.07	0.00
12.00	0.33	96	14.17	0.09	0.09	0.00
12.50	0.12	518	15.61	0.09	0.09	0.00
13.00	0.07	515	15.60	0.09	0.09	0.00
13.50	0.05	455	15.42	0.09	0.09	0.00
14.00	0.04	366	15.15	0.09	0.09	0.00
14.50	0.03	266	14.85	0.09	0.09	0.00
15.00	0.03	157	14.54	0.09	0.09	0.00
15.50	0.03	39	13.77	0.09	0.09	0.00
16.00	0.02	2	13.51	0.02	0.02	0.00
16.50	0.02	1	13.51	0.02	0.02	0.00
17.00	0.02	1	13.51	0.02	0.02	0.00
17.50	0.02	1	13.51	0.02	0.02	0.00
18.00	0.02	1	13.51	0.02	0.02	0.00
18.50	0.02	1	13.51	0.02	0.02	0.00
19.00	0.02	1	13.51	0.02	0.02	0.00
19.50	0.02	1	13.51	0.02	0.02	0.00
20.00	0.02	1	13.51	0.02	0.02	0.00
20.50	0.01	1	13.51	0.01	0.01	0.00
21.00	0.01	1	13.51	0.01	0.01	0.00
21.50	0.01	1	13.51	0.01	0.01	0.00
22.00	0.01	1	13.51	0.01	0.01	0.00
22.50	0.01	1	13.51	0.01	0.01	0.00
23.00	0.01	1	13.51	0.01	0.01	0.00
23.50	0.01	1	13.51	0.01	0.01	0.00
24.00	0.01	1	13.51	0.01	0.01	0.00

Stage-Discharge for Pond 3P: 10 CULTEC 330XLHD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
13.50	0.00	0.00	0.00	16.05	0.09	0.09	0.00
13.55	0.09	0.09	0.00	16.10	0.09	0.09	0.00
13.60	0.09	0.09	0.00	16.15	0.09	0.09	0.00
13.65	0.09	0.09	0.00	16.20	0.09	0.09	0.00
13.70	0.09	0.09	0.00	16.25	0.09	0.09	0.00
13.75	0.09	0.09	0.00	16.30	0.09	0.09	0.00
13.80	0.09	0.09	0.00	16.35	0.09	0.09	0.00
13.85	0.09	0.09	0.00	16.40	0.09	0.09	0.00
13.90	0.09	0.09	0.00	16.45	0.09	0.09	0.00
13.95	0.09	0.09	0.00	16.50	0.09	0.09	0.00
14.00	0.09	0.09	0.00	16.55	0.09	0.09	0.00
14.05	0.09	0.09	0.00	16.60	0.09	0.09	0.00
14.10	0.09	0.09	0.00	16.65	0.09	0.09	0.00
14.15	0.09	0.09	0.00	16.70	0.09	0.09	0.00
14.20	0.09	0.09	0.00	16.75	0.09	0.09	0.00
14.25	0.09	0.09	0.00	16.80	0.09	0.09	0.00
14.30	0.09	0.09	0.00	16.85	0.09	0.09	0.00
14.35	0.09	0.09	0.00	16.90	0.09	0.09	0.00
14.40	0.09	0.09	0.00	16.95	0.09	0.09	0.00
14.45	0.09	0.09	0.00	17.00	0.09	0.09	0.00
14.50	0.09	0.09	0.00	17.05	0.10	0.09	0.01
14.55	0.09	0.09	0.00	17.10	0.12	0.09	0.03
14.60	0.09	0.09	0.00	17.15	0.16	0.09	0.07
14.65	0.09	0.09	0.00	17.20	0.20	0.09	0.11
14.70	0.09	0.09	0.00	17.25	0.26	0.09	0.17
14.75	0.09	0.09	0.00	17.30	0.32	0.09	0.23
14.80	0.09	0.09	0.00	17.35	0.39	0.09	0.30
14.85	0.09	0.09	0.00	17.40	0.45	0.09	0.36
14.90	0.09	0.09	0.00	17.45	0.52	0.09	0.43
14.95	0.09	0.09	0.00	17.50	0.56	0.09	0.47
15.00	0.09	0.09	0.00				
15.05	0.09	0.09	0.00				
15.10	0.09	0.09	0.00				
15.15	0.09	0.09	0.00				
15.20	0.09	0.09	0.00				
15.25	0.09	0.09	0.00				
15.30	0.09	0.09	0.00				
15.35	0.09	0.09	0.00				
15.40	0.09	0.09	0.00				
15.45	0.09	0.09	0.00				
15.50	0.09	0.09	0.00				
15.55	0.09	0.09	0.00				
15.60	0.09	0.09	0.00				
15.65	0.09	0.09	0.00				
15.70	0.09	0.09	0.00				
15.75	0.09	0.09	0.00				
15.80	0.09	0.09	0.00				
15.85	0.09	0.09	0.00				
15.90	0.09	0.09	0.00				
15.95	0.09	0.09	0.00				
16.00	0.09	0.09	0.00				

Summary for Subcatchment 2S: 874 E 6th proposed

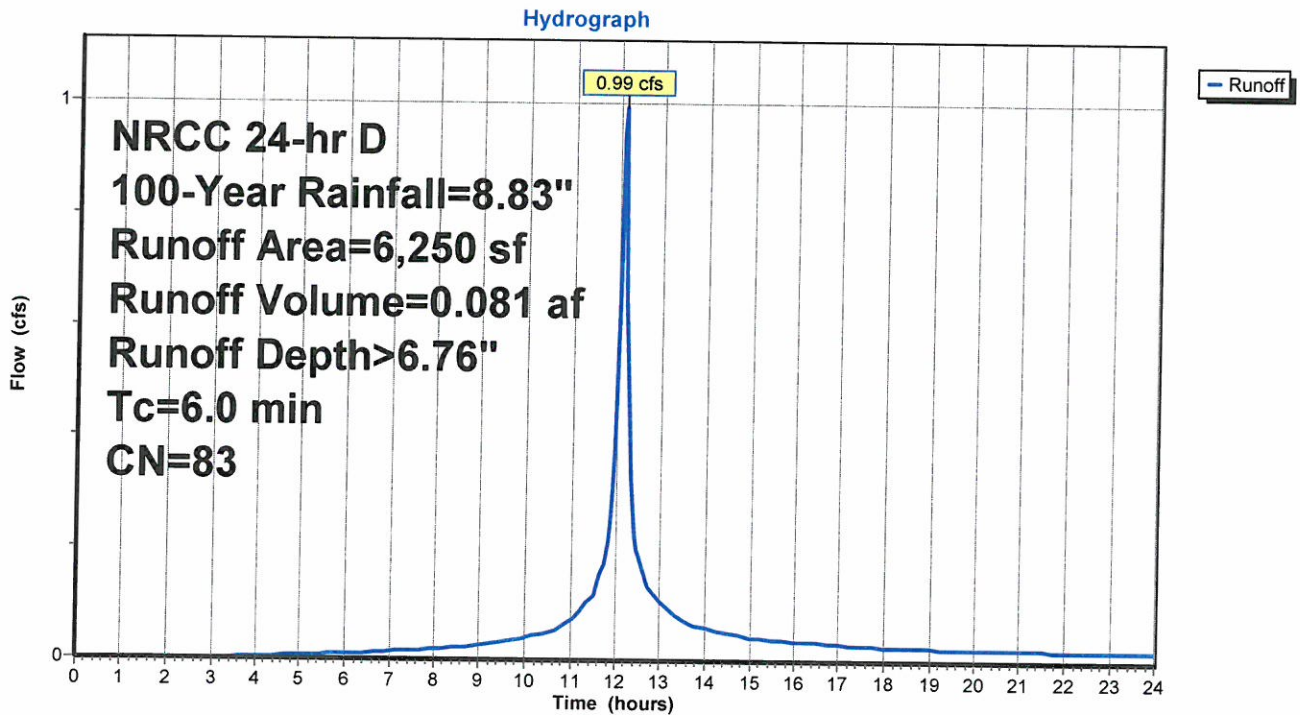
Runoff = 0.99 cfs @ 12.13 hrs, Volume= 0.081 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.83"

Area (sf)	CN	Description
3,972	98	Roofs, HSG A
664	98	Paved parking, HSG A
1,614	39	>75% Grass cover, Good, HSG A
6,250	83	Weighted Average
1,614		25.82% Pervious Area
4,636		74.18% Impervious Area

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

Subcatchment 2S: 874 E 6th proposed



3793-874 east sixth-REV11-18-19

Prepared by Civil Environmental Consultants LLC

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874 E. Sixth Street-post
NRCC 24-hr D 100-Year Rainfall=8.83"

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Hydrograph for Subcatchment 2S: 874 E 6th proposed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	12.75	6.12	4.20	0.13
0.25	0.03	0.00	0.00	13.00	6.32	4.39	0.11
0.50	0.06	0.00	0.00	13.25	6.49	4.54	0.09
0.75	0.10	0.00	0.00	13.50	6.62	4.67	0.07
1.00	0.13	0.00	0.00	13.75	6.74	4.78	0.06
1.25	0.16	0.00	0.00	14.00	6.85	4.89	0.06
1.50	0.20	0.00	0.00	14.25	6.95	4.98	0.05
1.75	0.23	0.00	0.00	14.50	7.05	5.07	0.05
2.00	0.27	0.00	0.00	14.75	7.13	5.15	0.05
2.25	0.30	0.00	0.00	15.00	7.21	5.23	0.04
2.50	0.34	0.00	0.00	15.25	7.28	5.29	0.04
2.75	0.38	0.00	0.00	15.50	7.35	5.36	0.04
3.00	0.41	0.00	0.00	15.75	7.42	5.42	0.04
3.25	0.45	0.00	0.00	16.00	7.48	5.49	0.04
3.50	0.49	0.00	0.00	16.25	7.55	5.55	0.03
3.75	0.53	0.01	0.00	16.50	7.61	5.60	0.03
4.00	0.57	0.01	0.00	16.75	7.67	5.66	0.03
4.25	0.61	0.02	0.00	17.00	7.72	5.71	0.03
4.50	0.65	0.03	0.00	17.25	7.77	5.76	0.03
4.75	0.69	0.03	0.01	17.50	7.83	5.81	0.03
5.00	0.73	0.04	0.01	17.75	7.87	5.86	0.03
5.25	0.78	0.06	0.01	18.00	7.92	5.90	0.03
5.50	0.82	0.07	0.01	18.25	7.97	5.94	0.02
5.75	0.86	0.08	0.01	18.50	8.01	5.99	0.02
6.00	0.91	0.10	0.01	18.75	8.05	6.03	0.02
6.25	0.96	0.12	0.01	19.00	8.10	6.07	0.02
6.50	1.00	0.13	0.01	19.25	8.14	6.11	0.02
6.75	1.06	0.15	0.01	19.50	8.18	6.15	0.02
7.00	1.11	0.18	0.01	19.75	8.22	6.19	0.02
7.25	1.16	0.20	0.01	20.00	8.26	6.23	0.02
7.50	1.22	0.23	0.02	20.25	8.30	6.27	0.02
7.75	1.28	0.26	0.02	20.50	8.34	6.30	0.02
8.00	1.35	0.29	0.02	20.75	8.38	6.34	0.02
8.25	1.41	0.33	0.02	21.00	8.42	6.38	0.02
8.50	1.48	0.37	0.02	21.25	8.45	6.41	0.02
8.75	1.55	0.41	0.02	21.50	8.49	6.45	0.02
9.00	1.62	0.45	0.03	21.75	8.53	6.48	0.02
9.25	1.70	0.50	0.03	22.00	8.56	6.52	0.02
9.50	1.78	0.55	0.03	22.25	8.60	6.55	0.02
9.75	1.88	0.61	0.04	22.50	8.63	6.58	0.02
10.00	1.98	0.68	0.04	22.75	8.67	6.62	0.02
10.25	2.09	0.76	0.04	23.00	8.70	6.65	0.02
10.50	2.21	0.84	0.05	23.25	8.73	6.68	0.02
10.75	2.34	0.94	0.06	23.50	8.77	6.71	0.02
11.00	2.51	1.06	0.07	23.75	8.80	6.74	0.02
11.25	2.71	1.22	0.09	24.00	8.83	6.77	0.02
11.50	2.96	1.41	0.12				
11.75	3.34	1.72	0.18				
12.00	4.23	2.49	0.53				
12.25	5.49	3.62	0.44				
12.50	5.87	3.97	0.19				

Summary for Pond 3P: 10 CULTEC 330XLHD

Inflow Area = 0.143 ac, 74.18% Impervious, Inflow Depth > 6.76" for 100-Year event
 Inflow = 0.99 cfs @ 12.13 hrs, Volume= 0.081 af
 Outflow = 0.24 cfs @ 12.40 hrs, Volume= 0.081 af, Atten= 76%, Lag= 16.2 min
 Discarded = 0.09 cfs @ 11.30 hrs, Volume= 0.076 af
 Primary = 0.15 cfs @ 12.40 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 17.24' @ 12.40 hrs Surf.Area= 481 sf Storage= 919 cf

Plug-Flow detention time= 62.0 min calculated for 0.081 af (100% of inflow)
 Center-of-Mass det. time= 61.8 min (866.2 - 804.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.50'	420 cf	12.17'W x 39.50'L x 4.04'H Field A 1,942 cf Overall - 544 cf Embedded = 1,398 cf x 30.0% Voids
#2A	14.50'	544 cf	Cultec R-330XLHD x 10 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		963 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	13.50'	8.270 in/hr Exfiltration over Surface area
#2	Primary	17.00'	6.0" Round Culvert L= 150.0' Ke= 0.500 Inlet / Outlet Invert= 17.00' / 14.00' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.09 cfs @ 11.30 hrs HW=13.54' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.15 cfs @ 12.40 hrs HW=17.23' (Free Discharge)
 ↑2=Culvert (Inlet Controls 0.15 cfs @ 1.65 fps)

Pond 3P: 10 CULTEC 330XLHD - Chamber Wizard Field A

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

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

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

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

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

5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +18.0" End Stone x 2 = 39.50' Base Length

2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 18.0" Side Stone x 2 = 12.17' Base Width

12.0" Base + 30.5" Chamber Height + 6.0" Cover = 4.04' Field Height

10 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 543.9 cf Chamber Storage

1,942.4 cf Field - 543.9 cf Chambers = 1,398.4 cf Stone x 30.0% Voids = 419.5 cf Stone Storage

Chamber Storage + Stone Storage = 963.5 cf = 0.022 af

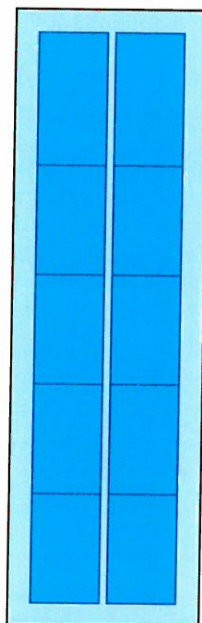
Overall Storage Efficiency = 49.6%

Overall System Size = 39.50' x 12.17' x 4.04'

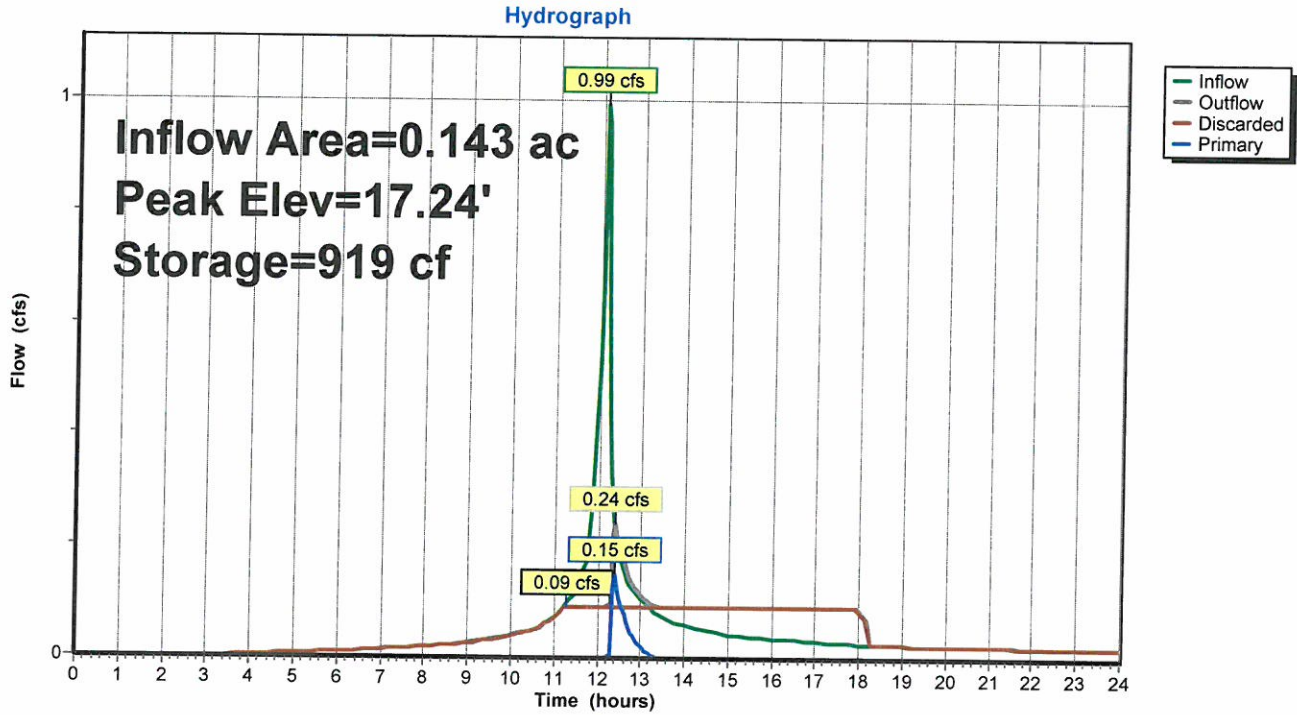
10 Chambers

71.9 cy Field

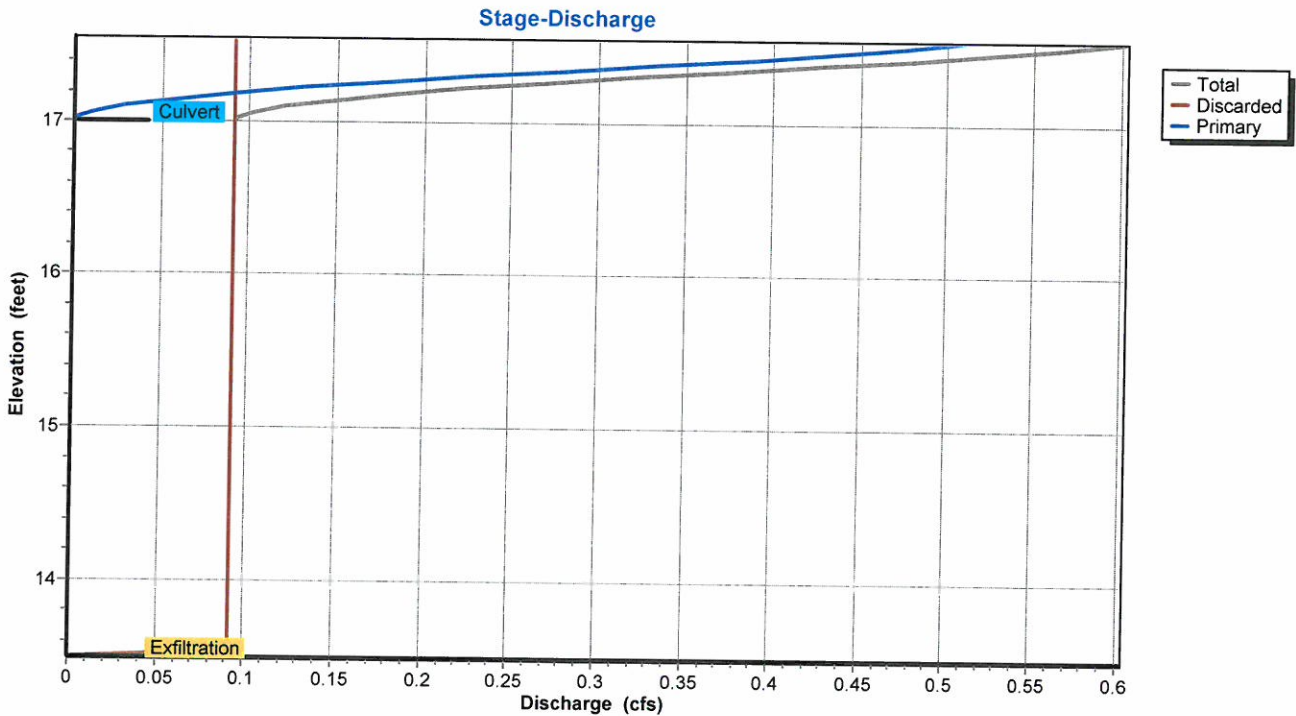
51.8 cy Stone



Pond 3P: 10 CULTEC 330XLHD



Pond 3P: 10 CULTEC 330XLHD



Hydrograph for Pond 3P: 10 CULTEC 330XLHD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	13.50	0.00	0.00	0.00
0.50	0.00	0	13.50	0.00	0.00	0.00
1.00	0.00	0	13.50	0.00	0.00	0.00
1.50	0.00	0	13.50	0.00	0.00	0.00
2.00	0.00	0	13.50	0.00	0.00	0.00
2.50	0.00	0	13.50	0.00	0.00	0.00
3.00	0.00	0	13.50	0.00	0.00	0.00
3.50	0.00	0	13.50	0.00	0.00	0.00
4.00	0.00	0	13.50	0.00	0.00	0.00
4.50	0.00	0	13.50	0.00	0.00	0.00
5.00	0.01	0	13.50	0.01	0.01	0.00
5.50	0.01	0	13.50	0.01	0.01	0.00
6.00	0.01	1	13.50	0.01	0.01	0.00
6.50	0.01	1	13.50	0.01	0.01	0.00
7.00	0.01	1	13.51	0.01	0.01	0.00
7.50	0.02	1	13.51	0.02	0.02	0.00
8.00	0.02	1	13.51	0.02	0.02	0.00
8.50	0.02	1	13.51	0.02	0.02	0.00
9.00	0.03	2	13.51	0.02	0.02	0.00
9.50	0.03	2	13.51	0.03	0.03	0.00
10.00	0.04	3	13.52	0.04	0.04	0.00
10.50	0.05	3	13.52	0.05	0.05	0.00
11.00	0.07	5	13.53	0.07	0.07	0.00
11.50	0.12	17	13.62	0.09	0.09	0.00
12.00	0.53	255	14.82	0.09	0.09	0.00
12.50	0.19	913	17.19	0.20	0.09	0.11
13.00	0.11	897	17.08	0.11	0.09	0.02
13.50	0.07	879	16.96	0.09	0.09	0.00
14.00	0.06	828	16.69	0.09	0.09	0.00
14.50	0.05	761	16.42	0.09	0.09	0.00
15.00	0.04	679	16.12	0.09	0.09	0.00
15.50	0.04	585	15.81	0.09	0.09	0.00
16.00	0.04	485	15.51	0.09	0.09	0.00
16.50	0.03	382	15.19	0.09	0.09	0.00
17.00	0.03	273	14.87	0.09	0.09	0.00
17.50	0.03	160	14.55	0.09	0.09	0.00
18.00	0.03	43	13.80	0.09	0.09	0.00
18.50	0.02	2	13.51	0.02	0.02	0.00
19.00	0.02	2	13.51	0.02	0.02	0.00
19.50	0.02	1	13.51	0.02	0.02	0.00
20.00	0.02	1	13.51	0.02	0.02	0.00
20.50	0.02	1	13.51	0.02	0.02	0.00
21.00	0.02	1	13.51	0.02	0.02	0.00
21.50	0.02	1	13.51	0.02	0.02	0.00
22.00	0.02	1	13.51	0.02	0.02	0.00
22.50	0.02	1	13.51	0.02	0.02	0.00
23.00	0.02	1	13.51	0.02	0.02	0.00
23.50	0.02	1	13.51	0.02	0.02	0.00
24.00	0.02	1	13.51	0.02	0.02	0.00

Stage-Discharge for Pond 3P: 10 CULTEC 330XLHD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
13.50	0.00	0.00	0.00	16.05	0.09	0.09	0.00
13.55	0.09	0.09	0.00	16.10	0.09	0.09	0.00
13.60	0.09	0.09	0.00	16.15	0.09	0.09	0.00
13.65	0.09	0.09	0.00	16.20	0.09	0.09	0.00
13.70	0.09	0.09	0.00	16.25	0.09	0.09	0.00
13.75	0.09	0.09	0.00	16.30	0.09	0.09	0.00
13.80	0.09	0.09	0.00	16.35	0.09	0.09	0.00
13.85	0.09	0.09	0.00	16.40	0.09	0.09	0.00
13.90	0.09	0.09	0.00	16.45	0.09	0.09	0.00
13.95	0.09	0.09	0.00	16.50	0.09	0.09	0.00
14.00	0.09	0.09	0.00	16.55	0.09	0.09	0.00
14.05	0.09	0.09	0.00	16.60	0.09	0.09	0.00
14.10	0.09	0.09	0.00	16.65	0.09	0.09	0.00
14.15	0.09	0.09	0.00	16.70	0.09	0.09	0.00
14.20	0.09	0.09	0.00	16.75	0.09	0.09	0.00
14.25	0.09	0.09	0.00	16.80	0.09	0.09	0.00
14.30	0.09	0.09	0.00	16.85	0.09	0.09	0.00
14.35	0.09	0.09	0.00	16.90	0.09	0.09	0.00
14.40	0.09	0.09	0.00	16.95	0.09	0.09	0.00
14.45	0.09	0.09	0.00	17.00	0.09	0.09	0.00
14.50	0.09	0.09	0.00	17.05	0.10	0.09	0.01
14.55	0.09	0.09	0.00	17.10	0.12	0.09	0.03
14.60	0.09	0.09	0.00	17.15	0.16	0.09	0.07
14.65	0.09	0.09	0.00	17.20	0.20	0.09	0.11
14.70	0.09	0.09	0.00	17.25	0.26	0.09	0.17
14.75	0.09	0.09	0.00	17.30	0.32	0.09	0.23
14.80	0.09	0.09	0.00	17.35	0.39	0.09	0.30
14.85	0.09	0.09	0.00	17.40	0.45	0.09	0.36
14.90	0.09	0.09	0.00	17.45	0.52	0.09	0.43
14.95	0.09	0.09	0.00	17.50	0.56	0.09	0.47
15.00	0.09	0.09	0.00				
15.05	0.09	0.09	0.00				
15.10	0.09	0.09	0.00				
15.15	0.09	0.09	0.00				
15.20	0.09	0.09	0.00				
15.25	0.09	0.09	0.00				
15.30	0.09	0.09	0.00				
15.35	0.09	0.09	0.00				
15.40	0.09	0.09	0.00				
15.45	0.09	0.09	0.00				
15.50	0.09	0.09	0.00				
15.55	0.09	0.09	0.00				
15.60	0.09	0.09	0.00				
15.65	0.09	0.09	0.00				
15.70	0.09	0.09	0.00				
15.75	0.09	0.09	0.00				
15.80	0.09	0.09	0.00				
15.85	0.09	0.09	0.00				
15.90	0.09	0.09	0.00				
15.95	0.09	0.09	0.00				
16.00	0.09	0.09	0.00				

**STORMWATER
TREATMENT &
FACILITIES
OPERATION &
MAINTENANCE**

LONG TERM POLLUTION PREVENTION PLAN

- Good housekeeping practices will be standard operating procedures in order to maintain occupancy requirements including regular scheduled cleaning and maintenance
- Requirements for routine inspection and maintenance of stormwater BMP's are included in the O & M section of this report.
- No hazardous chemicals or petroleum products will be stored on site.
- A professional lawn and yard maintenance company will be hired for all exterior maintenance.
- No herbicides, high nitrogen fertilizers, or pesticides will be stored or used on the premises.
- Sanitary waste will be handled by connection to the municipal sewer.
- Trash removal will be by private hauler.
- Only non-toxic Calcium Chloride or similar snow melt materials will be used on parking lots and walks. Sand use will be professionally applied only as necessary under icy conditions.
- An Operation and Maintenance Manual and Pollution Prevention Plan will be prepared and made part of the training for all personnel (employees and contractors) who will have responsibility O & M and Pollution Prevention.
- A list of emergency contacts will be included in the O & M and Pollution Prevention Manual.

APPENDIX O & M

<u>FACILITY</u>	<u>SCHEDULE</u>	<u>RESPONSIBILITY</u>
<ul style="list-style-type: none"> • CLEAN SEDIMENT FROM INFILTRATORS (2) 	APRIL & NOVEMBER	
<ul style="list-style-type: none"> • MOW LAWNS (1) 	APRIL & NOVEMBER	
<ul style="list-style-type: none"> • TRIM TREES & SHRUBS (1) 	AS NECESSARY - WITH SEDIMENT OR DEBRIS BUILD-UP	
<ul style="list-style-type: none"> • SWEEP PARKING LOT/ DRIVEWAY(2) 		
<ul style="list-style-type: none"> • INSPECT CATCHBASINS 	WEEKLY IN SEASON	
<ul style="list-style-type: none"> • CLEAN CATCHBASINS (2) 	SPRING & FALL	LANDSCAPE MAINTENANCE CO.
<ul style="list-style-type: none"> • ADSORB FLOATING OIL & DISPOSAL (3) 	APRIL & NOVEMBER	LANDSCAPE MAINTENANCE CO.
	4 TIMES / YEAR	LANDSCAPE MAINTENANCE CO.
<ul style="list-style-type: none"> • PUMP OUT SEDIMENT (2) 	4 TIMES / YEAR INCLUDING APRIL & NOVEMBER	LANDSCAPE MAINTENANCE CO.
<ul style="list-style-type: none"> • INSPECT INFILTRATORS 	4 TIMES /YEAR	VACUUM PUMPING CO.
	APRIL & NOVEMBER	VACUUM PUMPING CO.

VACUUM PUMPING CO.

ON LAWN TO
REDUCE NEED FOR
FERTILIZER EXCESS
GRASS AND TREE &
SHRUB CLIPPINGS
TO BE DISPOSED OF
AT A COMPOST
FACILITY

VACUUM PUMPING CO.

VACUUM PUMPING CO.

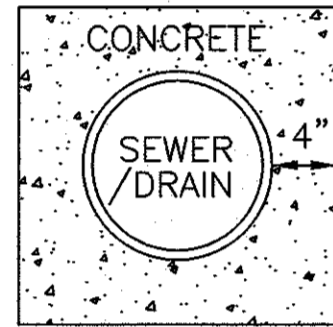
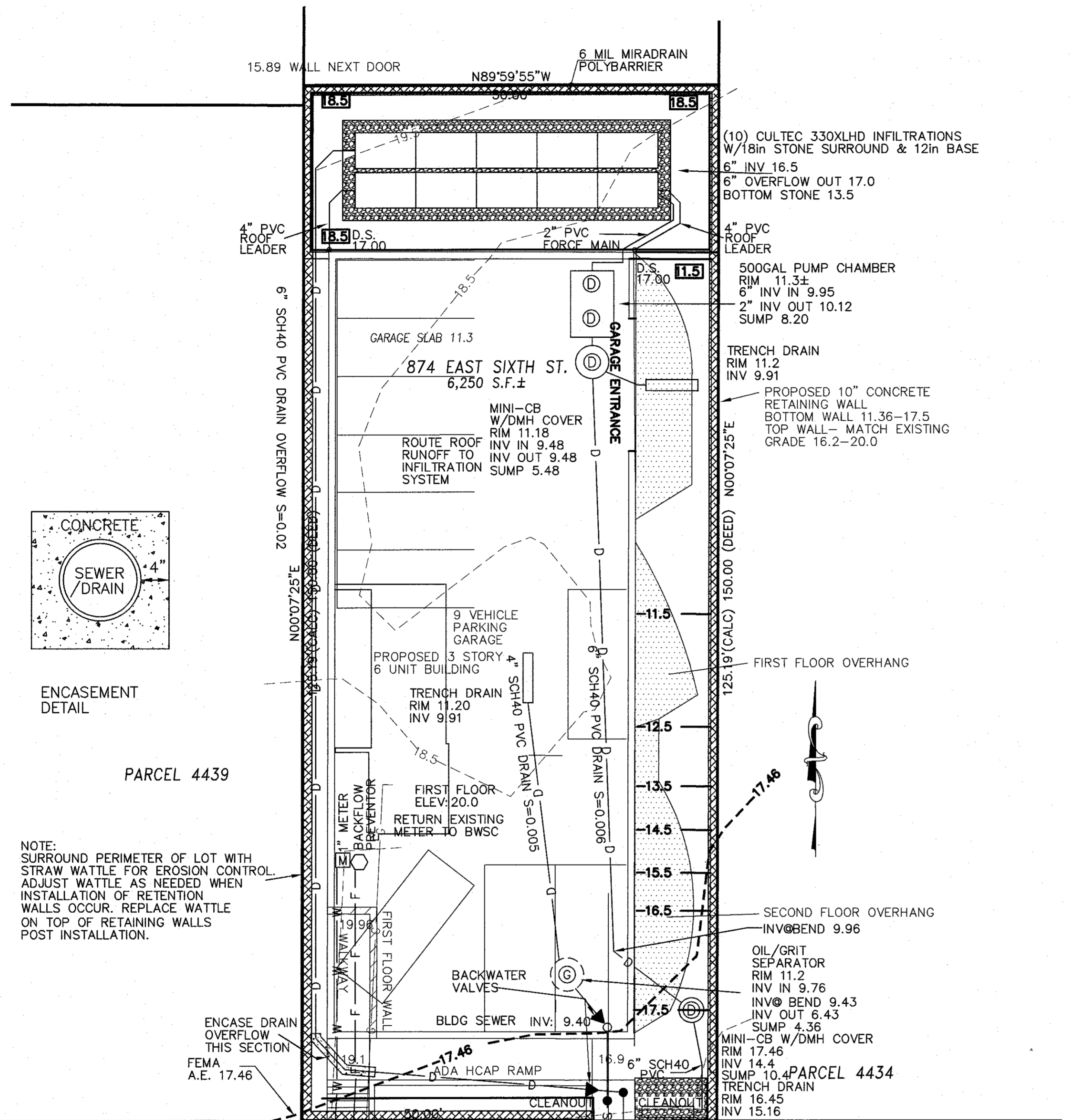
VACUUM PUMPING CO.

(2) INFILTRATOR
SEDIMENT TO BE
DISPOSED OF AT A
LANDFILL

(3) ADSORBED OIL TO
BE DISPOSED OF BY
A LIQUID WASTE
HAULER

(1) LAWN CLIPPINGS TO
BE MULCHED & LEFT

ELEVATIONS SHOWN BASED UPON BOSTON CITY DATUM TO ADJUST ELEVATIONS SHOWN TO NAVD88 BASE DATUM SUBTRACT 6.46 TO ALL ELEVATIONS: NAVD88 ELEV 0.00=6.46 CITY OF BOSTON

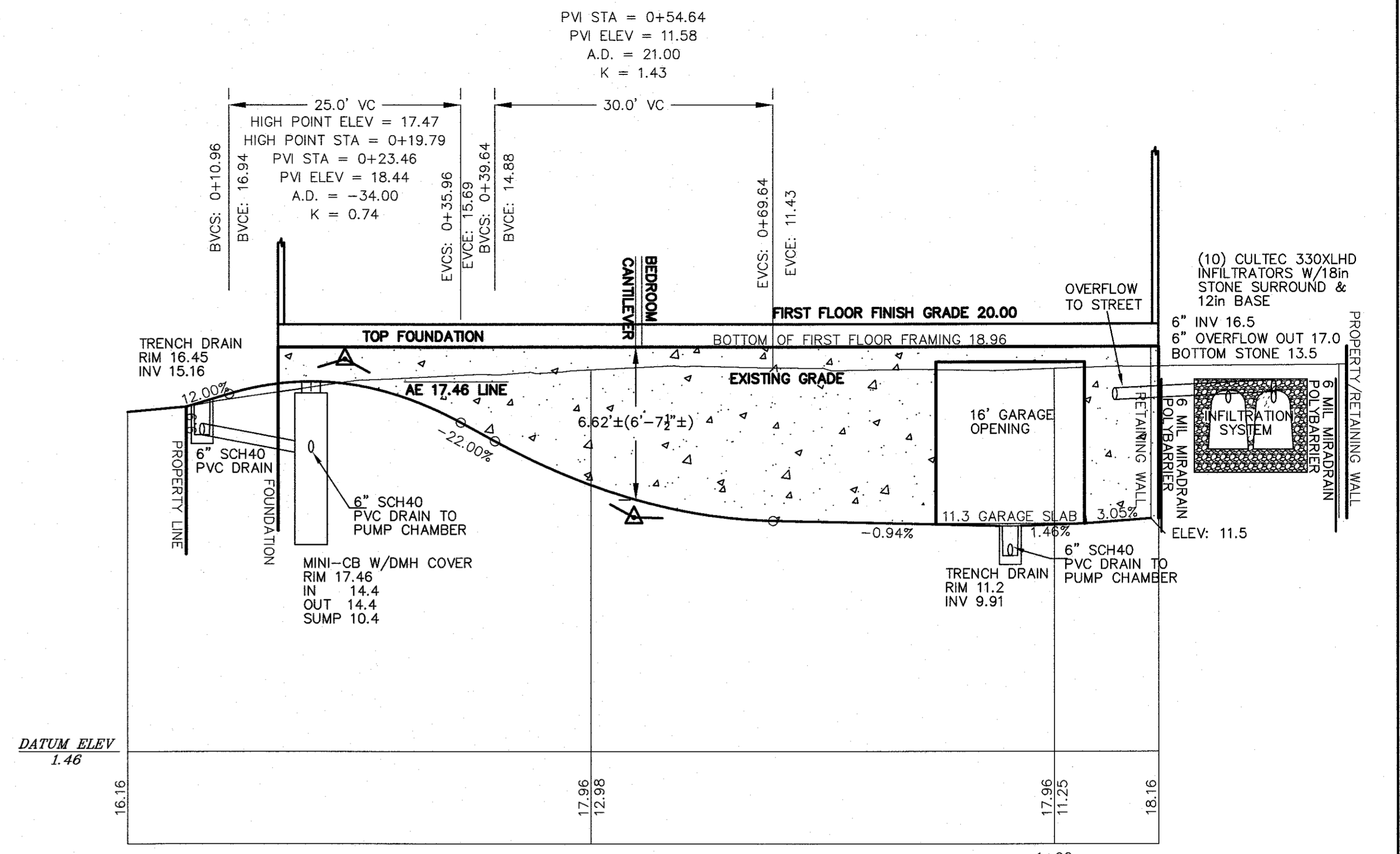
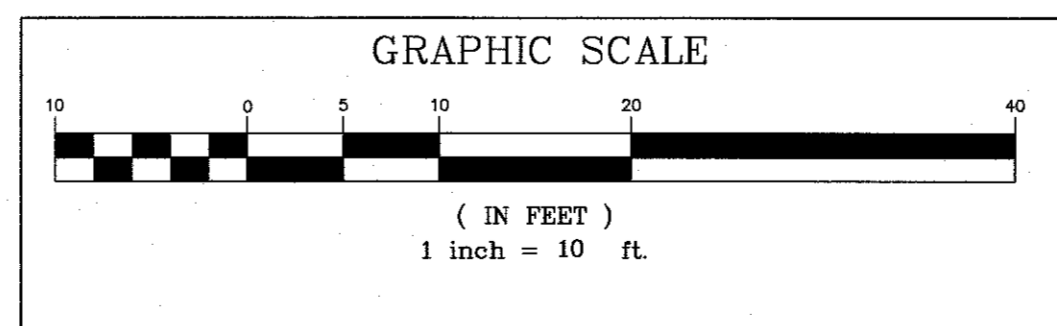
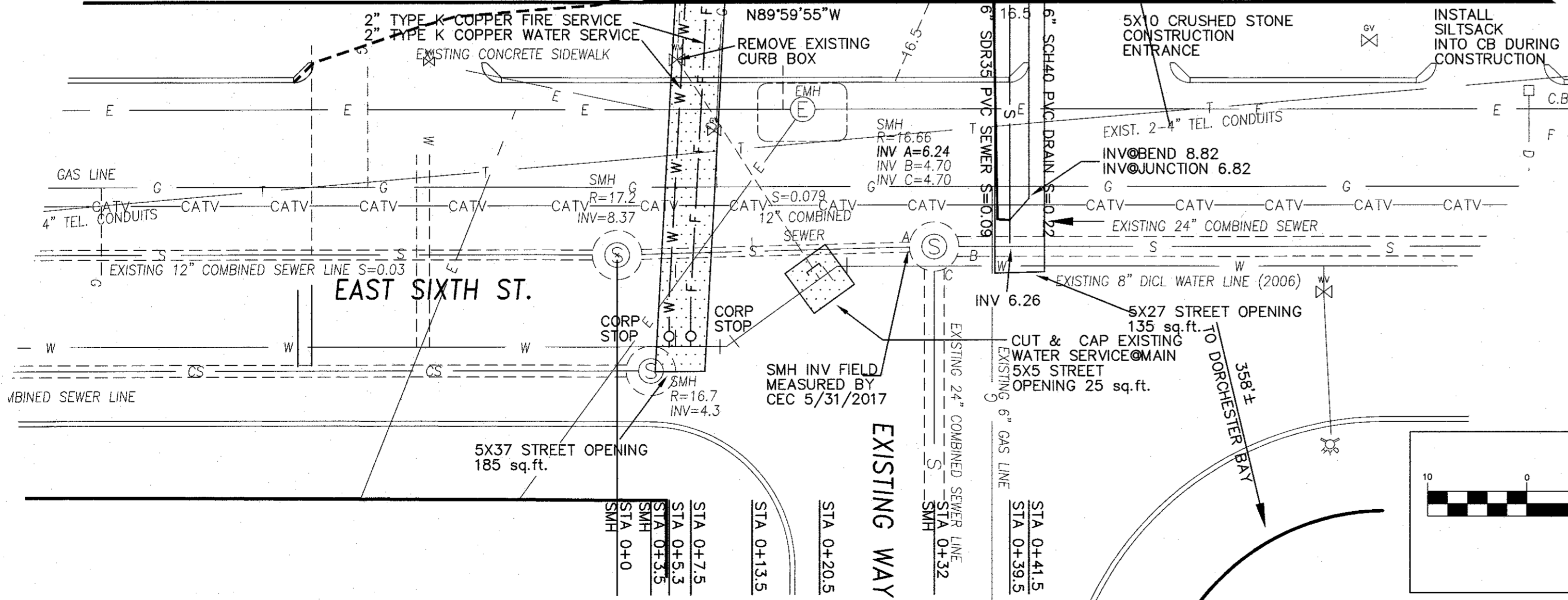


ENCASEMENT DETAIL

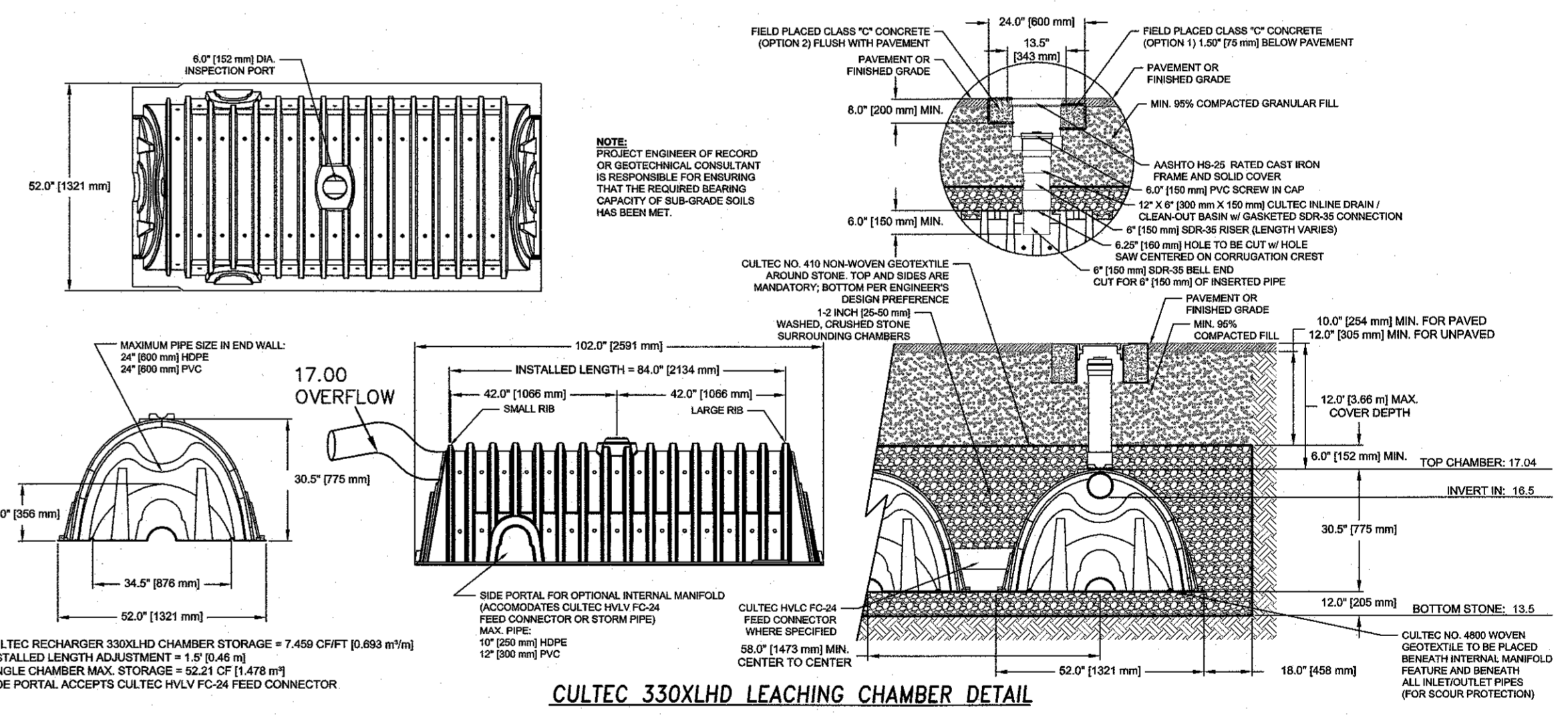
PARCEL 4439

NOTE: SURROUND PERIMETER OF LOT WITH STRAW WATTLE FOR EROSION CONTROL. ADJUST WATTLE AS NEEDED WHEN INSTALLATION OF RETENTION WALLS OCCUR. REPLACE WATTLE ON TOP OF RETAINING WALLS POST INSTALLATION.

ENCASE DRAIN OVERFLOW THIS SECTION FEMA A.E. 17.46

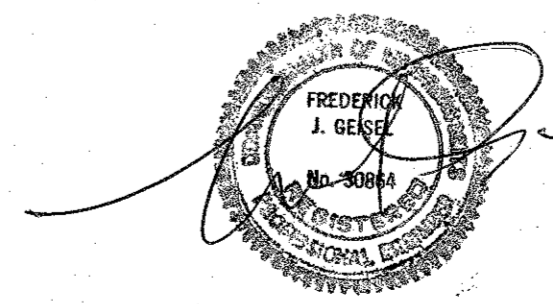


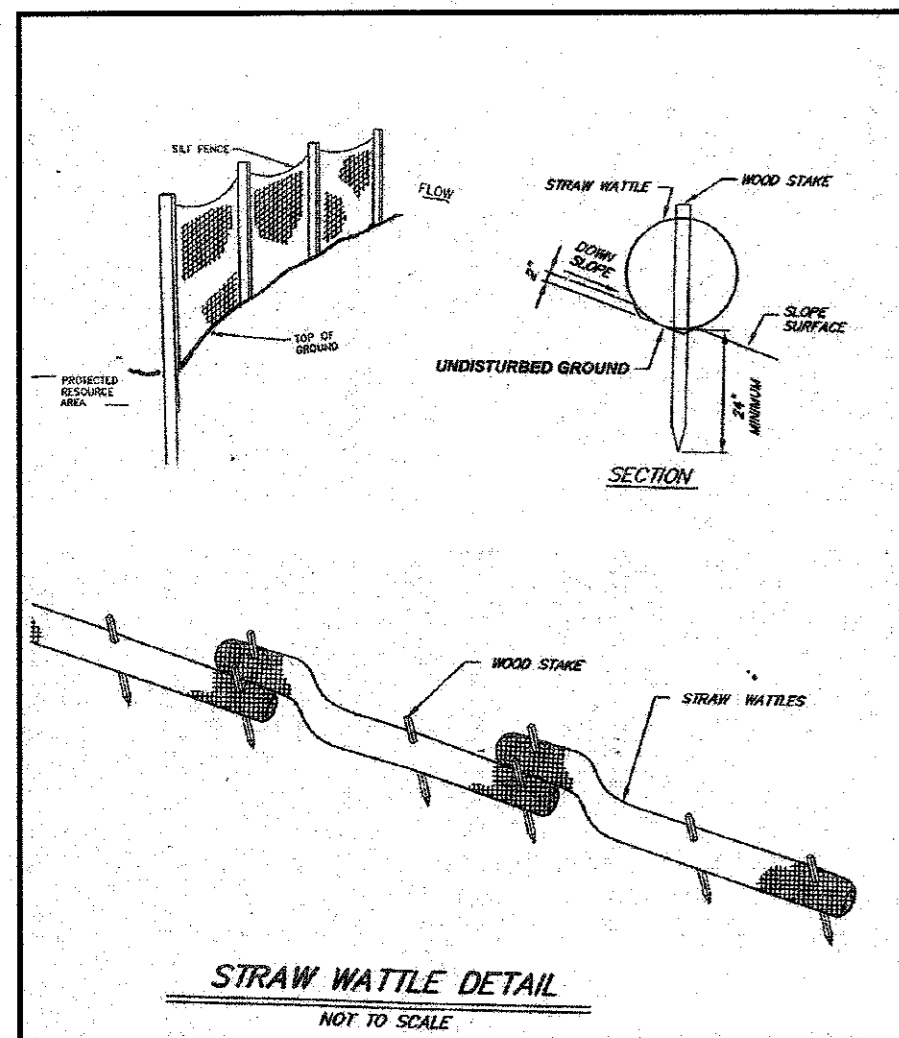
DRIVEWAY PROFILE HORIZONTAL SCALE: 1"=10' VERTICAL SCALE 1"=4'



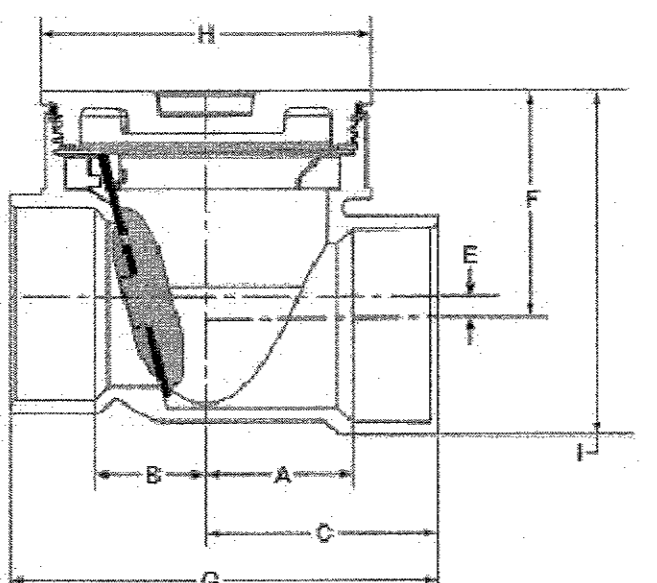
CULTEC 330XLHD LEACHING CHAMBER DETAIL

REVISION AND DRIVEWAY CONFIGURATION	L.J.B.	11/19/2019
<p>CONSERVATION PLAN-B.C.B. 874 EAST SIXTH STREET SOUTH BOSTON, MA FOR 874 EAST SIXTH STREET LLC CIVIL ENVIRONMENTAL CONSULTANTS 8 OAK STREET PEABODY, MA 01960 978-531-1191</p>		
SHEET NO: 1 OF 2	DATE: 9/4/2019	JOB: 3793
DRAWN BY: L.J.B.		





STANDARD VALVE



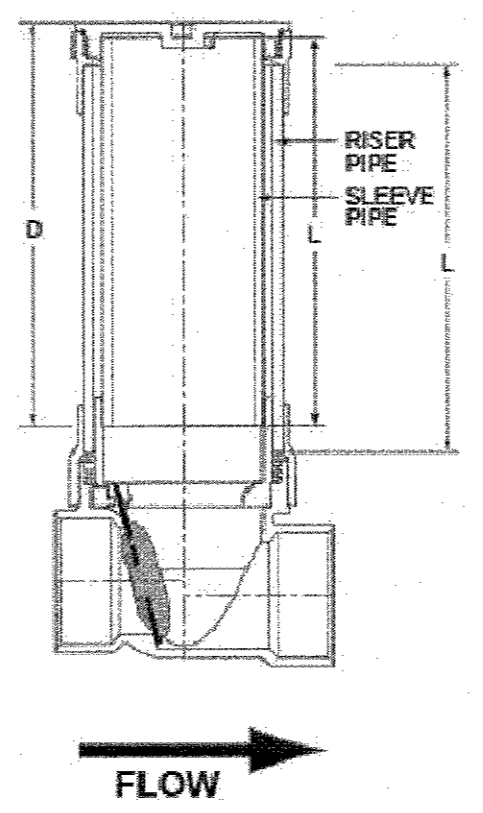
Standard Valve Dimensions (Inches)

Size	A	B	C	E	F	G	H	I
2	1-13/16	1-3/4	2-5/8	5/16	3-1/4	5-9/32	4-3/16	4-9/16
3	2-5/8	2	4-3/16	13/32	4-1/8	7-3/4	6	6-1/8
4	3-5/8	3-3/4	5-7/16	23/32	5-7/16	10-15/16	8-1/4	7-15/16
6	4-3/4	4-5/8	7-3/4	13/16	7-3/16	15-3/8	11-1/4	10-13/16

VALVE WITH EXTENSION KIT

Valve with Extension Kit Dimensions (Inches)

HEIGHT-D	Valve Size			
	2	3	4	6
	L	L	L	L
12	10-3/4	10-7/8	10-1/4	10-1/4
16	14-3/4	14-7/8	14-1/4	14-1/4
20	18-3/4	18-7/8	18-1/4	18-1/4
24	22-3/4	22-7/8	22-1/4	22-1/4
36	34-3/4	34-7/8	34-1/4	34-1/4
48	46-3/4	46-7/8	46-1/4	46-1/4

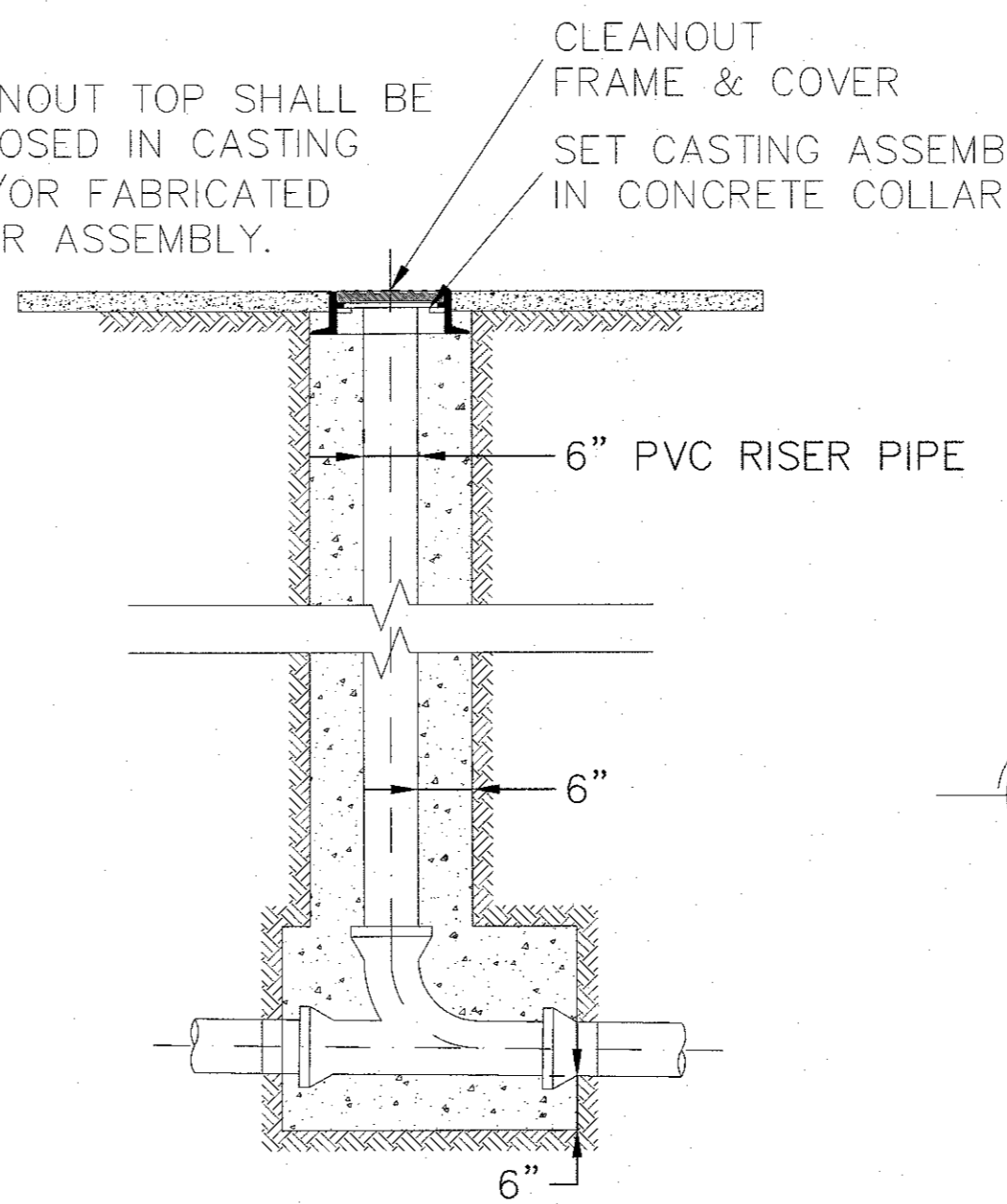


D = Top of plug Standard Valve to top of plug with Extension

Note: Riser Pipe & Sleeve Pipe are the same length.

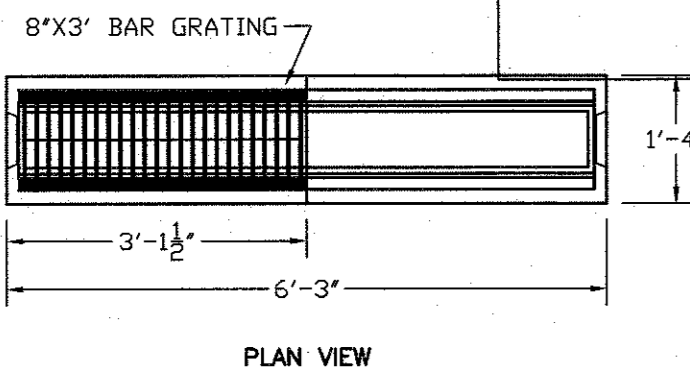
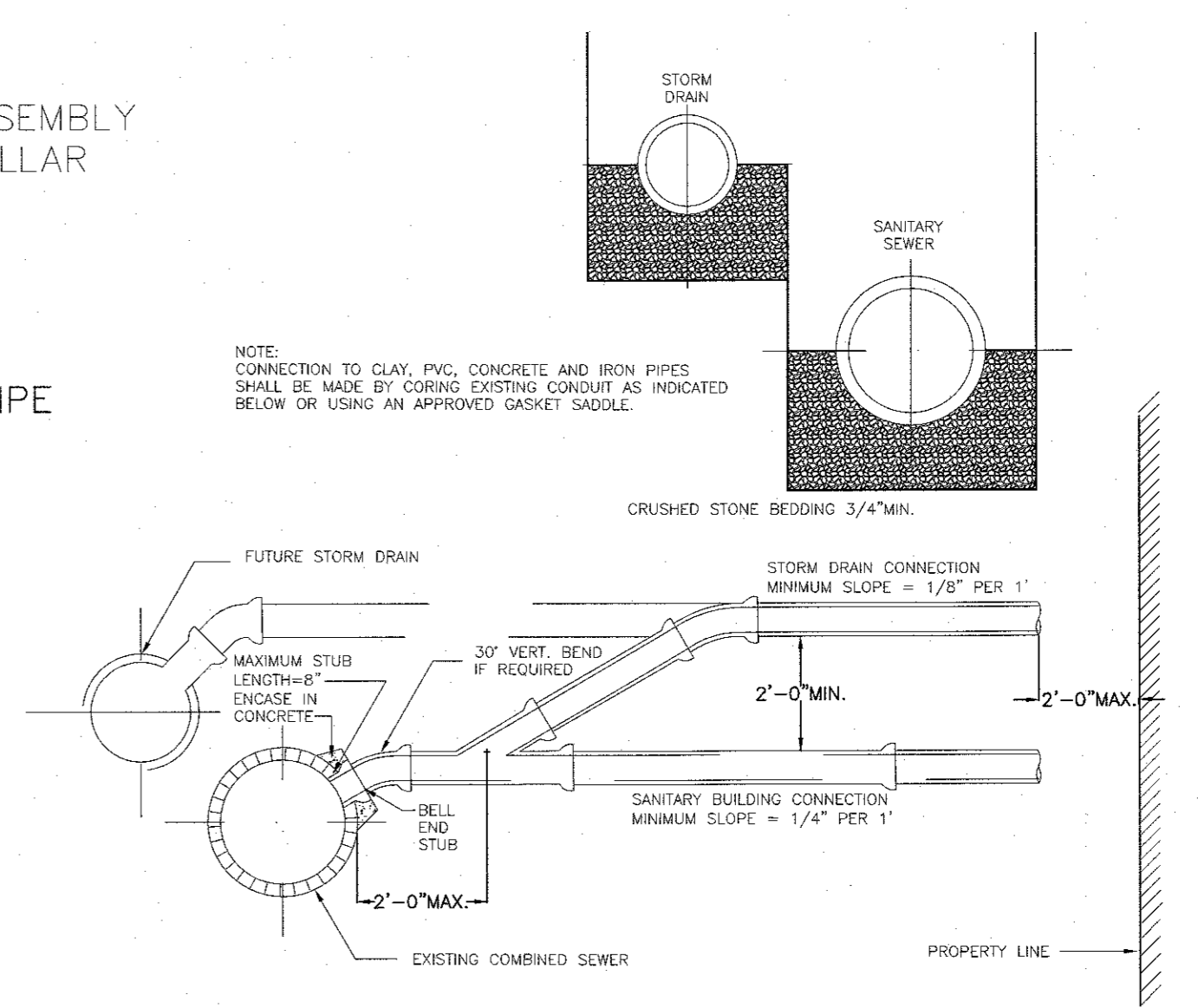
NOTE:

CLEANOUT TOP SHALL BE ENCLOSED IN CASTING AND/OR FABRICATED COVER ASSEMBLY.

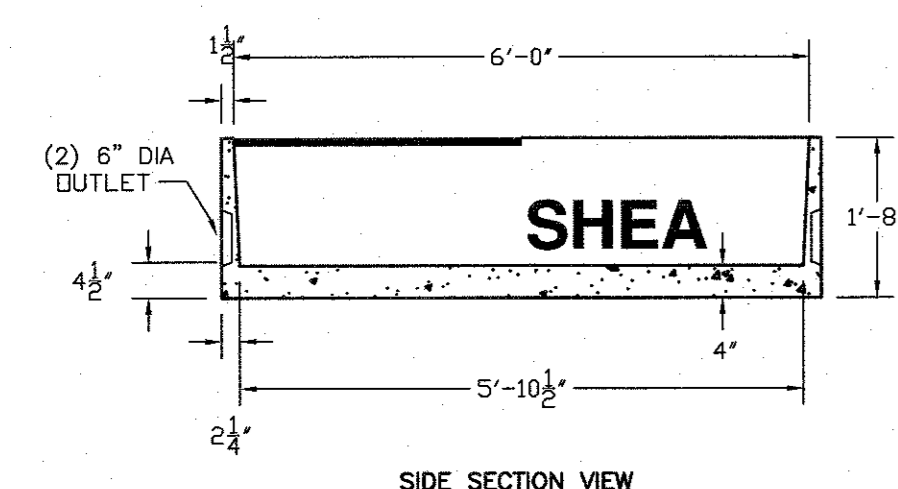


IN-LINE CLEANOUT DETAIL

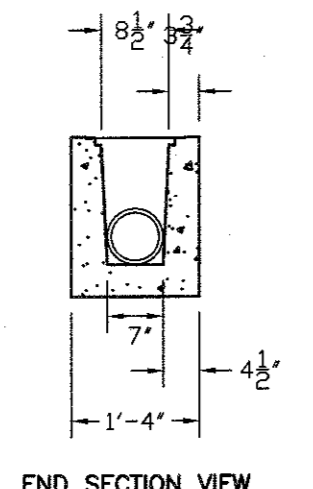
NOTE: CONNECTION TO CLAY, PVC, CONCRETE AND IRON PIPES SHALL BE MADE BY CORING EXISTING CONDUIT AS INDICATED BELOW OR USING AN APPROVED GASKET SADDLE.



PLAN VIEW



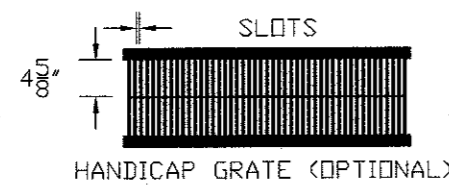
SIDE SECTION VIEW



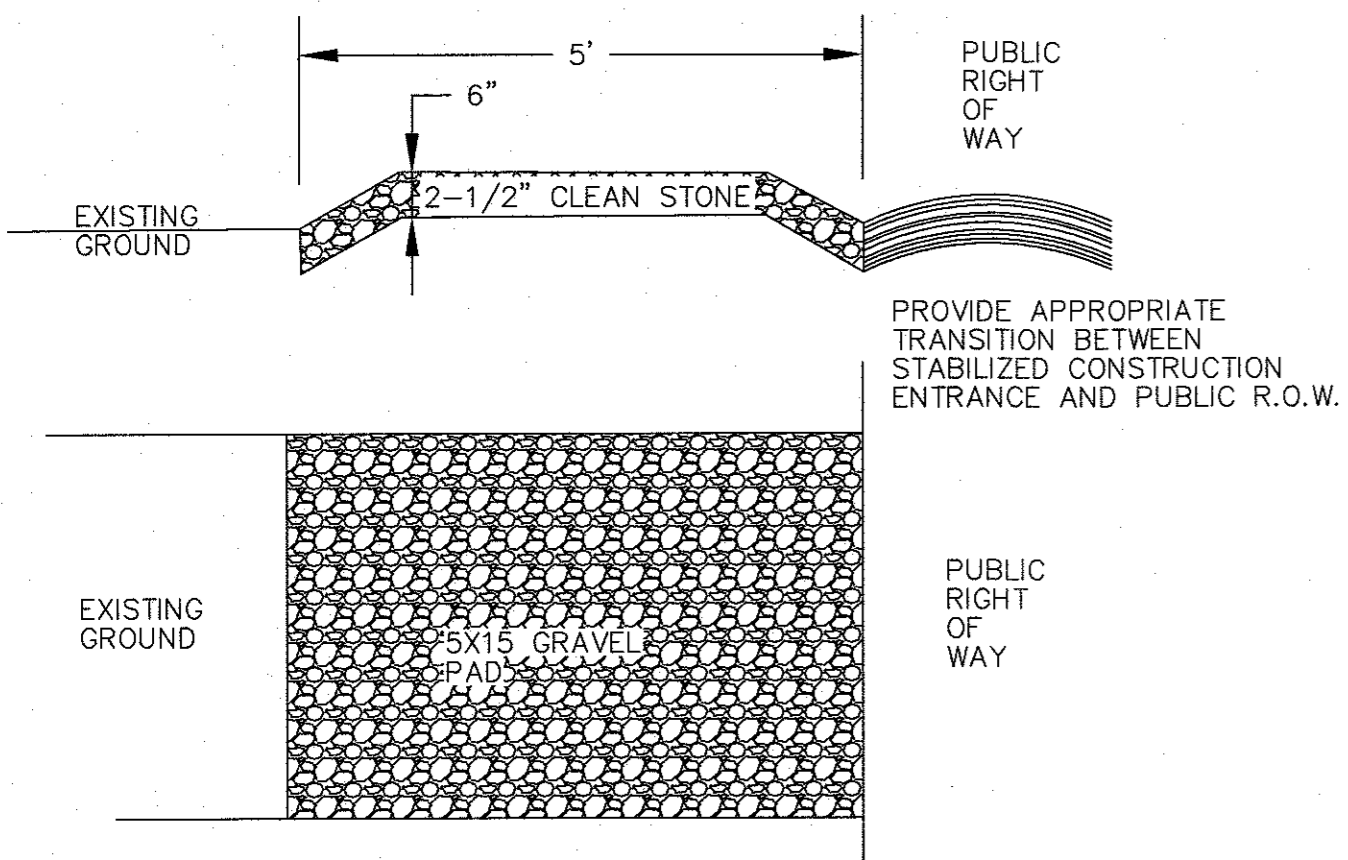
END SECTION VIEW

ITEM NO.	DESCRIPTION	WEIGHT
M-T06	6' SECTION 1,315#	
M-T03	3' SECTION 711#	

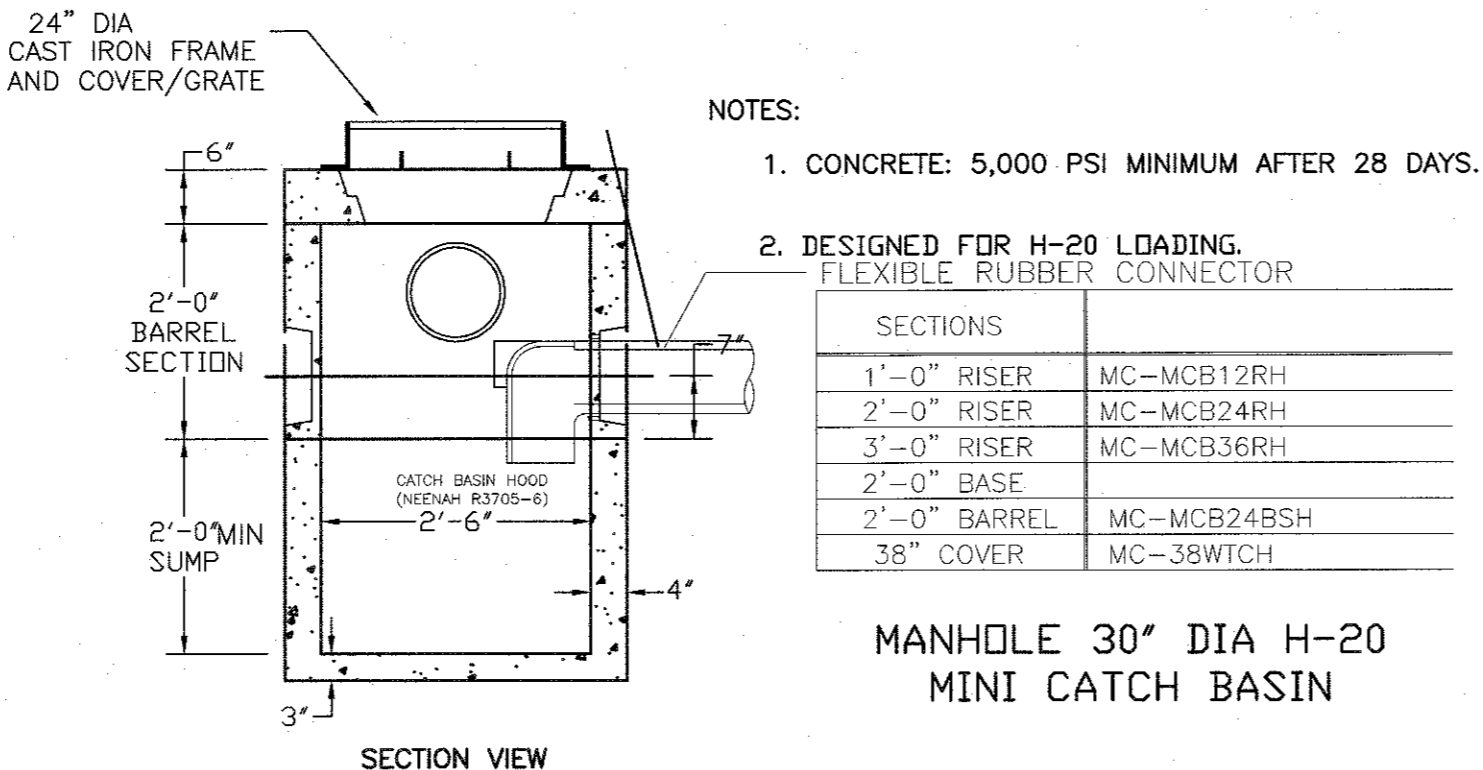
- NOTES:**
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
 2. AVAILABLE IN 3' AND 6' SECTIONS.
 3. AVAILABLE IN END OR MIDDLE SECTIONS.
 4. CONFORMS TO H-20 LOADING.



TRENCH DRAIN



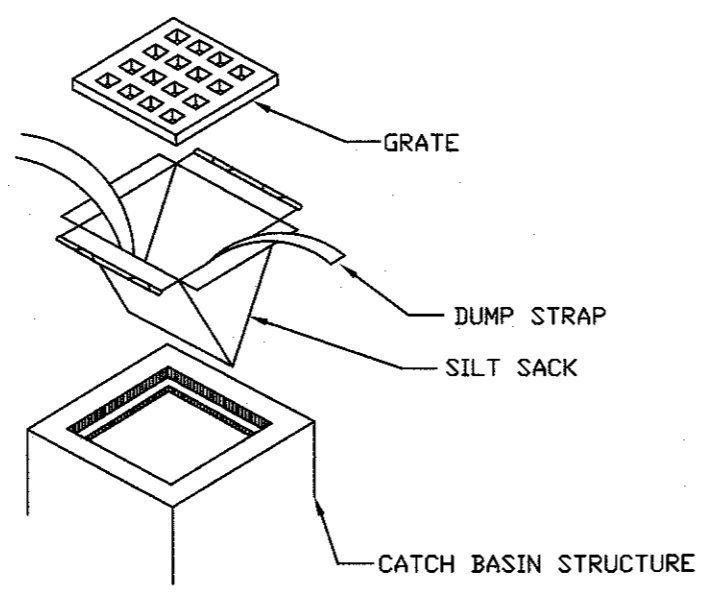
STABILIZED CONSTRUCTION ENTRANCE (N.T.S.)



- NOTES:**
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
 2. DESIGNED FOR H-20 LOADING. FLEXIBLE RUBBER CONNECTOR.

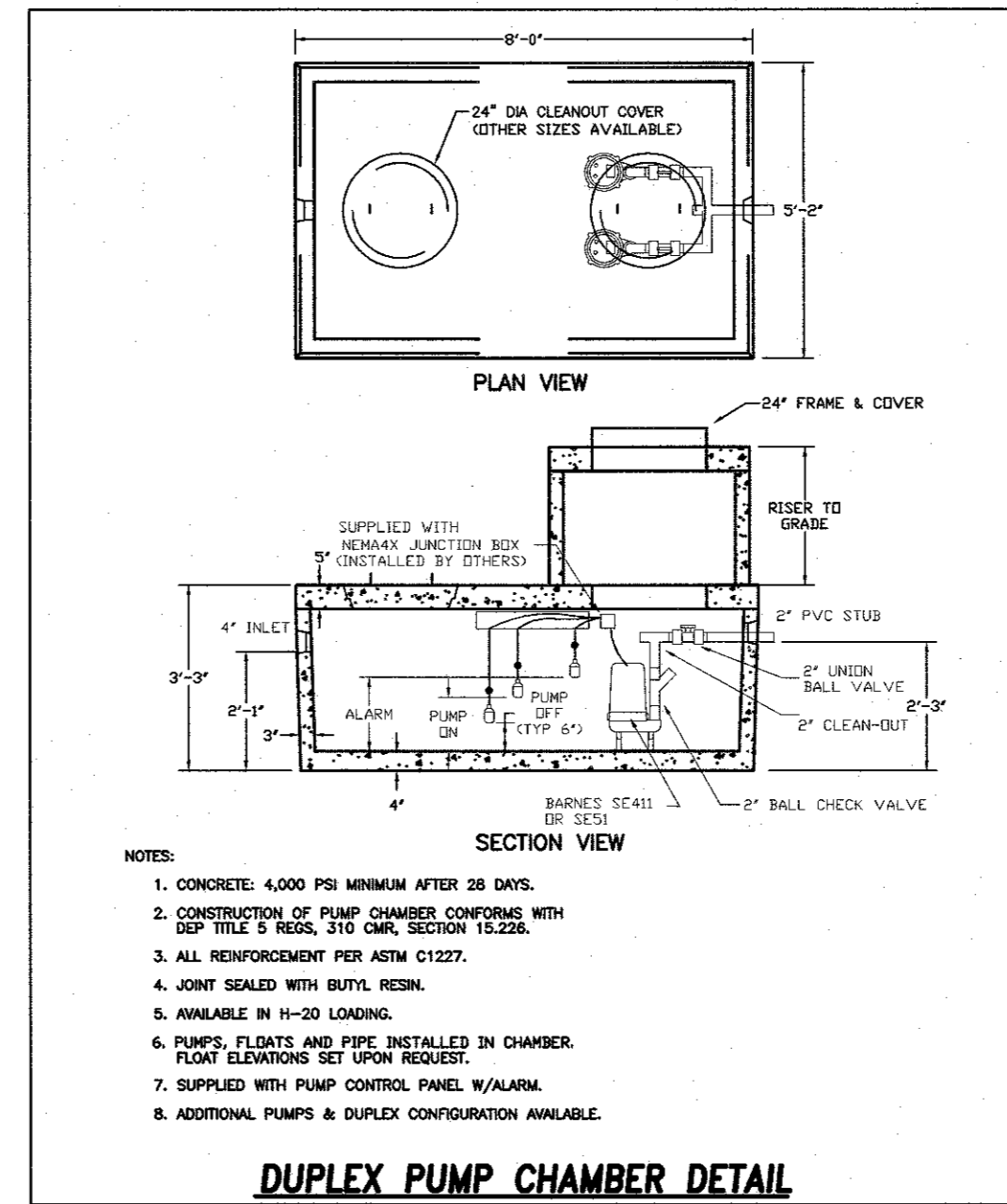
SECTIONS	
1'-0" RISER	MC-MCB12RH
2'-0" RISER	MC-MCB24RH
3'-0" RISER	MC-MCB36RH
2'-0" BASE	MC-MCB36RH
2'-0" BARREL	MC-MCB24BSH
3/8" COVER	MC-3BWTCH

MANHOLE 30" DIA H-20 MINI CATCH BASIN



- NOTES:**
1. INSTALL SILTSACKS PER MANUFACTURER'S INSTRUCTIONS. EMPTY OR REMOVE SEDIMENT FROM SILTSACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE. CLEAN, RINSE, AND REPLACE AS NEEDED.
 2. SILTSACKS TO BE INSTALLED DURING CONSTRUCTION OPERATIONS WHEN THE POTENTIAL FOR SEDIMENT TO ENTER EXISTING AND PROPOSED BASINS EXISTS.

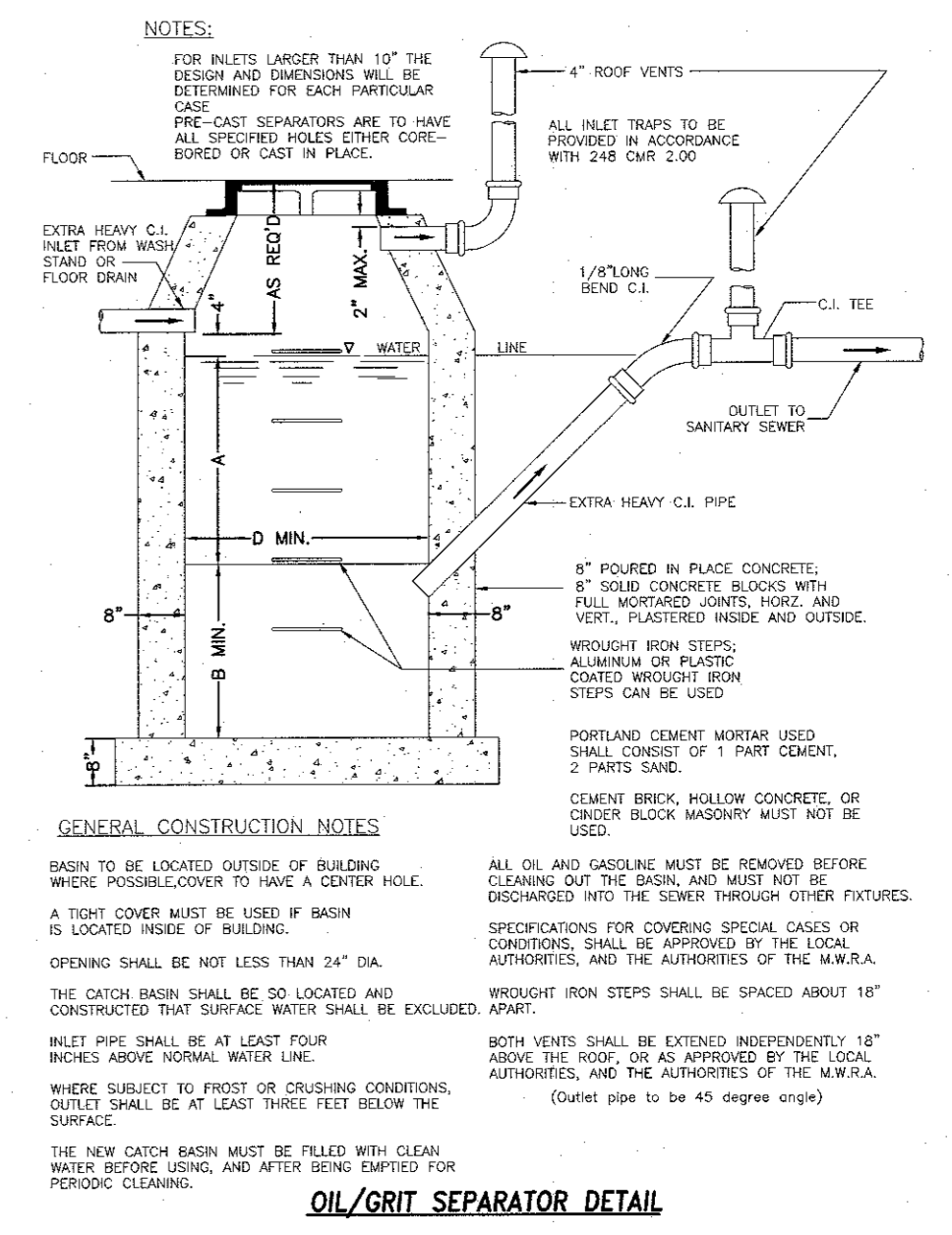
SILTSACK INSTALLATION DETAIL



- NOTES:**
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
 2. CONSTRUCTION OF PUMP CHAMBER CONFORMS WITH SDP TITLE 9, REGS. 310 CMR, SECTION 15.222.
 3. ALL REINFORCEMENT PER ASTM C1227.
 4. JOINT SEALED WITH BUTYL RESIN.
 5. AVAILABLE IN H-20 LOADING.
 6. PUMPS, FLOATS AND PIPE INSTALLED IN CHAMBER. FLOAT ELEVATIONS SET UP REQUEST.
 7. SUPPLIED WITH PUMP CONTROL PANEL W/ALARM.
 8. ADDITIONAL PUMPS & DUPLEX CONFIGURATION AVAILABLE.

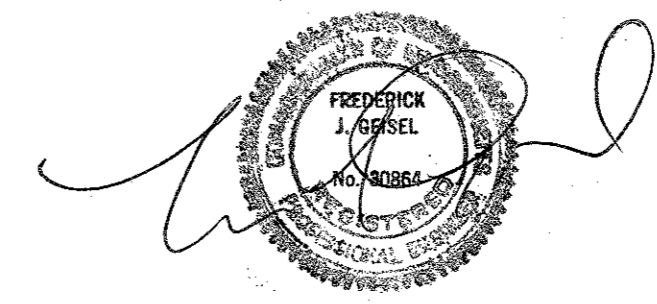
DUPLEX PUMP CHAMBER DETAIL

INLET	D	A	B	INLET	D	A	B
4"	3'-6 1/2"	3'-0"	2'-0"	8"	5'-0 1/2"	6'-0"	5'-0"
5"	3'-6 1/2"	3'-0"	2'-0"	8"	5'-0 1/2"	6'-0"	5'-0"
6"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"
8"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"
10"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"
12"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"
15"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"
18"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"
24"	4'-0 1/2"	3'-0"	2'-0"	10"	5'-8 1/2"	7'-0"	6'-0"



- GENERAL CONSTRUCTION NOTES:**
- BASIN TO BE LOCATED OUTSIDE OF BUILDING WHERE POSSIBLE/COVER TO HAVE A CENTER HOLE.
 - A TIGHT COVER MUST BE USED IF BASIN IS LOCATED INSIDE OF BUILDING. COVERINGS SHALL BE APPROVED BY THE LOCAL AUTHORITIES AND THE AUTHORITIES OF THE M.W.R.A.
 - THE CATCH BASIN SHALL BE SO LOCATED AND CONSTRUCTED THAT SURFACE WATER SHALL BE EXCLUDED FROM THE BASIN.
 - INLET PIPE SHALL BE AT LEAST FOUR INCHES ABOVE NORMAL WATER LINE.
 - WHERE SUBJECT TO FROST OR CRUSHING CONDITIONS, COVER SHALL BE AT LEAST THREE FEET BELOW THE SURFACE.
 - THE NEW CATCH BASIN MUST BE FILLED WITH CLEAN WATER BEFORE USING, AND AFTER BEING EMPTIED FOR PERIODIC CLEANING.
- ALL OIL AND CASING MUST BE REMOVED BEFORE CLEANING OUT THE BASIN, AND MUST NOT BE DISCHARGED INTO THE SEWER THROUGH OTHER FIXTURES.**
- SPECIFICATIONS FOR COVERING SPECIAL CASES OR CONDITIONS SHALL BE APPROVED BY THE LOCAL AUTHORITIES AND THE AUTHORITIES OF THE M.W.R.A.**
- BROUGHT IRON STEPS SHALL BE SPACED ABOUT 18" ON CENTER.**
- BOTH VENTS SHALL BE EXTENDED INDEPENDENTLY 18" ABOVE THE ROOF, OR AS APPROVED BY THE LOCAL AUTHORITIES, AND THE AUTHORITIES OF THE M.W.R.A. (Outlet pipe to be 45 degree slope).**

OIL/GRIT SEPARATOR DETAIL



REVISION INfiltration AND DRIVEWAY CONFIGURATION	L.J.B.	11/19/2019
CONSERVATION PLAN-DETAILS		
874 EAST SIXTH STREET		
SOUTH BOSTON, MA		
FOR		
874 EAST SIXTH STREET LLC		
CIVIL ENVIRONMENTAL CONSULTANTS		
8 OAK STREET PEABODY, MA 01960 978-531-1191		
SHEET NO: 2 OF 2	DATE: 9/4/2019	JOB: 3793
DRAWN BY: L.J.B.		