STONEFIELD

STORMWATER MANAGEMENT PLAN

297 DEXTER STREET HOLDINGS, LLC.

PROPOSED MULTI-FAMILY DEVELOPMENT
A.P. 31 | LOTS 125, 523, 524 & 525
309 DEXTER STREET
CITY OF PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

PREPARED FOR:
297 DEXTER HOLDINGS LLC
1 WATERMAN STREET, SUITE 205
NORTH PROVIDENCE, RI 20911

PREPARED BY:
STONEFIELD ENGINEERING & DESIGN, LLC
56 PINE STREET, 3RD FLOOR
PROVIDENCE, RI 02903

REPORT DATE:
DECEMBER 15, 2025

JOSHUA H. KLINE, PE
RI PE LICENSE # 13607

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REPORT CONTENTS

APPENDICES

1.0 PROJECT DESCRIPTION

297 Dexter Street Holdings, LLC is proposing to redevelop Assessor's Plat 31, Lots 125, 523, 524 & 525, commonly known as 309 Dexter Street, Providence, Rhode Island to accommodate the construction of a 24,668 GSF multi-family development, comprised of 48 total dwelling units. Additional improvements for the development include off-street parking, lighting, landscaping, utility services, and stormwater management infrastructure.

The property is located within the M-MU-75 Mixed-Use Industrial district of the City of Providence. The proposed development has residential to the north, south, and west, as well as light industrial uses to the east. The site will be accessed via one (1) full-movement driveway off Hanover Street. Refer to **APPENDIX A** for project maps of the subject site.

The project site is 16,919 SF (0.39 acres), the extent of land disturbance is 19,222 SF (0.44 acres), and 4,191 SF (0.10 acres) of new impervious area will be created as a result of the project. The overall onsite drainage analysis area was modeled at 16,919 SF (0.39 acres).

This Stormwater Management Plan has been prepared to analyze the drainage measures to be implemented for controlling and conveying runoff associated with the on-site improvements and has been prepared in accordance with the standards of the City of Providence, the Rhode Island Department of Environmental Management (RIDEM) Standards, and the Rhode Island Soil Erosion and Sediment Control Handbook.

2.0 EXISTING CONDITIONS

EXISTING SITE DEVELOPMENT

The project site fronts Hanover Street to the north and Dexter Street to the east. The site is currently a vacant parking area and will be cleared as a part of the proposed redevelopment. An Aerial Map depicting the existing site conditions can be found in **APPENDIX A**.

EXISTING TOPOGRAPHY

The high point of the project site is located at the southwest corner of the property at an elevation of ± 71. Sheet flow from this location drains overland to the east of the site toward Dexter Street, ultimately discharging to the Narragansett Bay Commission (NBC) combined system. Overall, on-site topography generally slopes east toward Dexter Street. Grades on site generally range from 1% to 5% within the previously developed areas and remains consistent as it approaches Dexter Street.

PROJECT SITE SOILS

Soil mapping was obtained from the National Resource Conservation Service (NRCS) for the project site and immediate area. Generally, the project site is underlain with one (1) major soil group: fine sandy loam. Overall, the soil is somewhat excessively drained, and runoff flows overland in the direction of Dexter Street. The table below provides a summary of soils for the project site:

TABLE 1: NRCS SOIL MAPPING RESULTS

Soil Unit Code	Soil Description	Approximate Project Coverage	Drainage Class	Hydrologic Soil Group
MU	Merrimac-Urban land complex 0% to 8% Slopes	100%	Somewhat Excessively Drained	A

Additional information regarding the NRCS soil mapping can be found in **APPENDIX B**.

Based on the evaluation of the NRCS soil mapping, the entirety of the site lies within hydrologic soil group 'A', as such, it was determined that infiltration practices would be practical for this site. A design infiltration rate of 2.41 in/hr., corresponding to the Rawls Rates defined in Table 5-3 of the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual, was utilized in the stormwater analysis.

WATERSHED / RECEIVING WATERS – TMDL DESIGNATION

Under existing conditions, the site drains to groundwater and to the combined Narragansett Bay Commission conveyance system, understood to ultimately discharge toward Mashapaug Pond (State Waterway ID: RI0006017L-06). The watershed for the development is part of the Pawtuxet River Watershed (State Watershed ID:

010900040609) as defined by the United States Environmental Protection Agency Community Waterway Mapping. Per the waterway designation provided by the United States Environmental Protection Agency and the Rhode Island Impaired Waters Report, Mashapaug Pond is identified as an impaired water for chlorophyll-A, dissolved oxygen, total phosphorus, PCBS in fish tissue and fecal coliform.

EXISTING ENVIRONMENTAL INVENTORY

Based on the effective FEMA flood insurance rate mapping (FEMA Map #44007C0316G effective date March 2, 2009), the entirety of the site is not located within the 100-year flood plain. The FEMA Map can be found in **APPENDIX A** of this Plan.

There are no federal (US Army Corps of Engineers) or state (RIDEM) regulated freshwater wetlands or associated buffers within the limits of the development area. Impacts to nearby freshwater wetlands are not anticipated with the proposed development. Per the RIDEM Natural Heritage Areas mapping, no records of endangered or threatened species sightings or suitable habitats are located within the vicinity of the proposed improvements.

3.0 PROPOSED CONDITIONS

PROPOSED SITE DEVELOPMENT

The proposed redevelopment will consist of a 24,668 GSF multi-family building with 48 dwelling units. Additional improvements for the development include off-street parking lots, bicycle parking, lighting, landscaping, utility services, and stormwater management infrastructure and conveyance systems. The site will be accessed via one (1) full-movement driveway off Hanover Street. Refer to **APPENDIX D** for a Site Plan depicting the proposed project improvements.

PROPOSED TOPOGRAPHY

Project site topography and drainage patterns will generally remain similar to existing conditions, and the ultimate discharge to the NBC combined system in Dexter Street shall be maintained. The subject site has been designed to provide residentially friendly, ADA compliant grades throughout the site.

4.0 STORMWATER MANAGEMENT METHODOLOGY & PARAMETERS

HYDROLOGIC METHODOLOGY

The analysis program "HydroCAD" Version 10.20 by HydroCAD Software Solutions was utilized to calculate and plot the runoff hydrographs. The program incorporates the time of concentration, C values, rainfall data, and project drainage areas to calculate the runoff characteristics. The existing and proposed drainage areas have been analyzed utilizing the design rainfall amounts for Rhode Island as outlined in Table 3-1 of the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual for the project area; specifics of the rainfall distribution can be found in **APPENDIX C.** Additional key variables utilized in the analysis include:

TABLE 2: HYDROCAD DESIGN VARIABLES

Variable	Input	Variable	Input
Runoff Calculation Method	SCS TR-20	NRCS Rainfall Frequency Data Set	Providence
Pervious/Impervious CN Calculations	Separate	Storm Intervals (Year Events)	1, 2, 10, 25, 100
Stage-Storage Relationship	Dynamic	Storm Duration	24 Hours
Minimum time of concentration	6 minutes	Storm Curve	Type III

Additional information regarding hydrologic calculations can be found in **APPENDIX C**.

5.0 STORMWATER ANALYSIS

EXISTING DRAINAGE AREAS

Under existing conditions, the project area is comprised of one (1) drainage area discharging to one (1) point of interest (POI). POI-1 is the ultimate point of interest identified as the Narragansett Bay Commission (NBC) combined system located along the north and east property lines, within Hanover Street and Dexter Street, respectively. POI-1, comprised of drainage area EX-1, receives runoff via sheet flow from the entirety of the subject site. See below for a brief summary of existing drainage areas:

TABLE 3: SUMMARY OF EXISTING DRAINAGE AREAS

Drainage Area	Description	Area Extents	Impervious Area	Time of Concentration
EX-1 (POI-1)	Ultimate Point of Interest: Discharge to Municipal Combined System	**16,919 SF**	**10,559 SF**	6 Minutes*

***The minimum time of concentration was utilized due to the high level of impervious coverage.**

All existing drainage areas were delineated based on field surveying data and onsite observation. Hydrologic calculations and parameters for each drainage area can be found in **APPENDIX C**; specific drainage area delineations and land cover can be found in **APPENDIX F.**

PROPOSED DRAINAGE AREAS

Under proposed conditions, the general drainage patterns and ultimate point of interest will be maintained. The intent behind the proposed delineations is to reduce the amount of direct runoff to the point of interest identified as the NBC combined system. The area associated with drainage area P-1A is designed to be diverted to a subsurface infiltration system within the parking area to meet the Rhode Island Department of Environmental Management (RIDEM) and City of Providence Stormwater Management Standards as outlined in the next Report section. Area P-1B is comprised of vegetated cover that will bypass the subsurface systems and discharge undetained to the NBC Combined System. The proposed infiltration system has been designed to compensate for undetained discharge. The table below provides a brief summary of the proposed drainage areas analyzed:

TABLE 4: SUMMARY OF PROPOSED DRAINAGE AREAS

Drainage Area	Description	Area Extents	Impervious Area	Time of Concentration
P-1A	Proposed Discharge to Subsurface Infiltration Basin B-1	16,095 SF	14,841 SF	6 Minutes*
P-1B	Undetained Bypass to Municipal System	824 SF	0 SF	6 Minutes*
POI-1	Ultimate Point of Interest: Discharge to Municipal Combined System	**16,919 SF**	**14,841 SF**	--

***The minimum time of concentration was utilized due to the high level of impervious coverage and proximity to the corresponding discharge point.**

All proposed drainage areas were delineated based on the proposed grading design overlain on field survey data. Hydrologic calculations and parameters for each drainage area can be found in **APPENDIX C**; specific drainage area delineations and land cover can be found in **APPENDIX F.**

STORMWATER MANAGEMENT DESIGN PARAMETERS

The extent of the project improvements proposes to disturb 10,000 SF or more of existing impervious area of an existing vacant commercial lot and therefore is classified as a redevelopment project. The current site has 10,559 SF of existing impervious coverage which is 62.4% of the total site area. As the existing impervious surface is more than 40% of the total site area, it is subject to Stormwater Standards as defined in the City of Providence Ordinances and Standards 2, 3, and 7-11 of the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual for Redevelopment Projects. The project has been designed to meet all standards to the maximum extent practicable. See below for a summary of each design parameter and compliance requirements:

TABLE 5: STORMWATER DESIGN STANDARDS SUMMARY

Design Parameter	Design Target for Compliance
Standard 1: LID Site Planning and Design Strategies	The project is **exempt** from implementing LID practices as the project is defined as a redevelopment project with over 40% existing impervious coverage. However, the project demonstrates LID practices have been implemented to the maximum extent practicable per the RIDEM Appendix A Stormwater Management Plan Checklist.
Standard 2: Groundwater Recharge	Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater measures provide the required groundwater recharge for at least 50% of the redevelopment area and that adequate volume reductions are achieved.
Standard 3: Water Quality	Stormwater management measures shall be designed to treat the required water quality volume for the following minimum removal efficiencies: 85% of total suspended solids (TSS) and 60% of pathogens of the anticipated load from at least 50% of the existing and proposed impervious coverage onsite.
Standard 4: Conveyance and Natural Channel Protection	The project is **exempt** from conveyance and natural channel protection as the project is defined as a redevelopment project with over 40% existing impervious coverage and the project has a peak discharge less than 2 CFS for the 1-year, 24-hour Type III design storm event without attenuation.
Standard 5: Overbank Flood Protection	The project is **exempt** from overbank flood protection as the project is defined as a redevelopment project with over 40% existing impervious coverage. However, the project has been designed to demonstrate that the post-development peak discharge rate does not exceed the pre-development levels for the 10-year and 100-year, 24-hour Type III design storm events.

PROPOSED STORMWATER MANAGEMENT CONTROLS

The following structural BMP devices have been implemented and designed in accordance with the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual in order to meet the Rhode Island Department of Environmental Management (RIDEM) and City of Providence Stormwater Management Standards:

1. **Underground Infiltration Basin B-1:** An underground infiltration basin (B-1), comprised of 36 ADS StormTech SC-800 Chambers, is proposed within parking area to the rear of the site, to provide treatment, recharge, and quantity control of stormwater runoff. The basin is designed to fully capture and infiltrate the 25-year storm and is equipped with an overflow device to safely convey and discharge runoff from rainfall events up to and including the 100-year storm event.

STANDARD 1 – LID SITE PLANNING AND DESIGN STRATEGIES

The project site is **exempt** from the use of low impact development (LID) strategies as the project proposes to disturb more than 10,000 SF of existing impervious that makes up more than 40% of the coverage of the site area. Although the project is exempt, the proposed development implements several LID strategies, including infiltrating runoff as close to the source as site conditions allow, implementation of vegetated drainage channel and planting of native vegetation. A Stormwater Management Plan checklist (Appendix A) has been included in this Report as **APPENDIX G** and outlines compliance of this standard.

STANDARD 2 – GROUNDWATER RECHARGE

Groundwater recharge is required for the project site and has been calculated using the recharge criterion provided in Section 3.3.2 of the RISDIS Manual. The recharge criterion (Re_v) is a function of the hydrologic soil group and impervious area and is calculated for each sub-watershed. Groundwater recharge is provided via Basin B-1 for P-1A. The proposed development is classified as a redevelopment, and as such, only 50% of impervious area is required to be recharged; however, the project has been designed to recharge 100% of the proposed impervious areas. The required and proposed recharge volumes for each sub-watershed are shown below:

TABLE 6: SUMMARY OF GROUNDWATER RECHARGE VOLUMES

Drainage Area	Hydrologic Soil Group (HSG)	Recharge Factor (F)	Impervious Area (SF) *	Required Groundwater Recharge Volume (CF)	Proposed Groundwater Recharge Volume (CF)
P-1A	A	0.60	14,841 SF	742 CF	3,180 CF
P-1B	A	0.60	0 SF	0 CF	0 CF
POI-1	**--**	**--**	**14,841 SF**	**742 CF**	**3,180 CF**

***Only 50% of the redevelopment impervious area must be recharged, however the proposed system has been designed to account for 100% of the redevelopment impervious area in the calculations.**

As shown in Table 6, the proposed stormwater management controls capture, and recharge adequate impervious area in accordance with RIDEM regulations. The proposed design will provide a significant improvement to groundwater recharge, and as such complies with Standard 2.

STANDARD 3 – WATER QUALITY

Water Quality is required for the project site and has been calculated using the water quality volume requirement provided in section 3.3.3 of the RISDIS Manual. The required water quality volume (WQ_v) results in the capture and treatment of the entire runoff volume for 90% of average annual storm events. Water quality is provided via one (1) ADS StormTech subsurface infiltration chamber system. The proposed development is classified as a redevelopment, and as such, only 50% of impervious area is required to be treated. The required and proposed water quality volumes for each sub-watershed are shown below:

TABLE 7: SUMMARY OF WATER QUALITY VOLUMES

Drainage Area	Drainage Area (SF)	Minimum WQ Volume (CF)	Impervious Area (SF)	Required WQ Volume (CF) (*)	Proposed WQ Volume (CF)
P-1A	16,095 SF	268 CF	14,841 SF	1,237 CF	3,181 CF
P-1B	824 SF	14 CF	0 SF	0 CF	0 CF
POI-1	16,919 SF	1,758 CF	14,841 SF	1,237 CF	3,181 CF

***Only 50% of the redevelopment impervious area must be treated, however the proposed system has been designed to account for 100% of the redevelopment impervious area in the calculations.**

The proposed subsurface infiltration system is equipped with a StormTech Isolator Row Plus to provide pretreatment of the water quality volume prior to infiltration. The Isolator Row for Basin B-1 is comprised of six (6) chambers. Per manufacturer specifications within the Alternative Stormwater Technology Certification issued by RIDEM, the ADS Isolator Row Plus is certified for a maximum treatment flow rate of 0.25 cfs per chamber and a maximum impervious treatment area of 0.231 acres per chamber. The proposed Isolator Row Plus provides the following maximum capacity for water quality flow entering each of the systems and impervious area to be treated:

Basin B-1:

Maximum Treatment Flow Rate = 0.25 cfs / Chamber * 6 Chambers = 1.5 cfs

Maximum Impervious Treatment Area = 0.231 AC / Chamber * 6 Chambers = 1.386 AC Impervious

The calculated WQ_f of 0.37 cfs for Basin B-1, is less than the 1.5 cfs maximum capacity of the 6 Chamber Isolator Row Plus and therefore, the Isolator Row Plus is adequately sized to accommodate the water quality flow rate entering the system. Further, the systems have been designed to capture and treat 14,841 SF (0.34 acres) of impervious area, less than the allowable 1.386 acres. Refer to **APPENDIX E** for manufacturer specifications of the proposed system.

As shown above, the proposed development has been designed to comply with Standard 3 for water quality in its entirety.

STANDARD 4 – CONVEYANCE AND NATURAL CHANNEL PROTECTION

The project site is **exempt** from providing conveyance and natural channel protection as the project is defined as a redevelopment project with over 40% existing impervious coverage. Although the project is exempt due to existing impervious coverage, it is also exempt as the impervious cover for the entirety of the site is 14,841 SF (0.34 AC) which is below the one acre limit, and additionally, the post-development peak discharge without attenuation is 0.89 CFS which is less than the 2.0 CFS limit for the 1-year, 24-hour Type III design storm event.

Although the project is exempt from conveyance and natural channel protection, it has been designed to satisfy the requirements for conveyance and natural channel protection. The onsite pipe conveyance system has been designed for the 10-year, 24-hour Type III design storm event and is able to safely convey runoff to the proposed stormwater management facilities without overflow or bypass in accordance with the City of Providence and RIDEM Stormwater Management Standard 4. Detailed hydraulic calculations for the conveyance system can be found in **APPENDIX C**. The table below summarizes the point of interest during the 10-year storm event:

TABLE 8: SUMMARY OF 10-YEAR STORM

Tributary Area	Existing Flow Rate	Proposed Flow Rate	Flow Rate Difference	Existing Volume	Proposed Volume	Volume Difference
POI-1 (EX-1/P-1)	**1.16 CFS**	**0.00 CFS**	**-1.16 CFS**	**4,199 CF**	**12 CF**	**-4,187 CF**

The runoff flow rates and volumes directly tributary to the existing stormwater pipe conveyance system within Dexter Street are significantly reduced under proposed conditions. As such, no adverse impacts to the existing stormwater infrastructure are anticipated.

STANDARD 5 – OVERBANK FLOOD PROTECTION

The project site is **exempt** from providing overbank flood protection as the project is defined as a redevelopment project with over 40% existing impervious coverage; however, the project has been designed to provide peak flow attenuation for the 10-year and 100-year 24-hour Type III design storm in accordance with the Overbank Flood Protection Standard (Standard 5) of the RISDIS and meet Standard 5 in its entirety. The 1-, 2-, and 25-year, 24-hour Type III design storms were also analyzed as a part of the development design. One (1) discharge point (POI-1) was analyzed for the project site, identified as the discharge to the NBC combined system. Multiple sub watersheds discharging to the analysis point were utilized in the proposed conditions to account for the discharge to the proposed mitigation systems prior to ultimate outfall. One (1) ADS StormTech subsurface infiltration chamber system is proposed with the development to attenuate peak stormwater runoff rates for the 1-, 2-, 10-, 25- and 100-year, 24-hour type III design storm events. The table below summarizes the various drainage areas for the POI used for the pre vs. post peak flow analysis.

TABLE 9: QUANTITY COMPARISON POINTS OF INTEREST

Point of Interest	Area Description	Existing Tributary Drainage Areas	Proposed Tributary Drainage Areas
POI-1	Discharge to Discharge to Municipal Combined System	EX-1	P-1A & P-1B

Under post-development conditions, the runoff flow rates and volumes are reduced to below those in existing conditions. Diverted runoff from post development drainage areas are collected in the on-site stormwater management system for runoff attenuation and water quality treatment. The table below outlines the regulatory compliance parameters for runoff quantity on the project site:

TABLE 10: STORMWATER RUNOFF QUANTITY COMPLIANCE SUMMARY – FLOW RATES

Rainfall Event	Existing Flow Rate	Proposed Flow Rate	Proposed % Reduction
1-Year Storm	0.63 CFS	0.00 CFS	100.00%
2-Year Storm	0.78 CFS	0.00 CFS	100.00%
10-Year Storm	1.16 CFS	0.00 CFS	100.00%
25-Year Storm	1.45 CFS	0.00 CFS	100.00%
100-Year Storm	2.24 CFS	2.21 CFS	1.34%

TABLE 11: STORMWATER RUNOFF QUANTITY COMPLIANCE SUMMARY – VOLUMES

Rainfall Event	Existing Volumes	Proposed Volume	Proposed % Reduction
1-Year Storm	2,173 CF	0 CF	100.00%
2-Year Storm	2,700 CF	0 CF	100.00%
10-Year Storm	4,199 CF	12 CF	99.71%
25-Year Storm	5,409 CF	33 CF	99.39%
100-Year Storm	8,220 CF	1,758 CF	78.61%

The proposed subsurface infiltration systems provide sufficient flow rate attenuation to ensure that no adverse impacts are anticipated downstream of the project site. Detailed hydrologic calculations for each drainage area can be found in **APPENDIX C**.

STANDARD 6 – REDEVELOPMENT AND INFILL PROJECTS

The extent of the project improvements proposes to disturb 10,000 SF or more of existing impervious area of an existing development and therefore is classified as a redevelopment project. The current site has 10,559 SF of existing impervious coverage which is 62.4% of the total site area. As the existing impervious surface is more than 40% of the total site area, it is subject to Stormwater Standards for a redevelopment as defined in the City Ordinances and Standards 2, 3, and 7-11 of the Rhode Island Stormwater Design and Installation Standards (RISDIS) Manual. The project has been designed to comply with all regulations to the maximum extent practicable.

STANDARD 7 – POLLUTION PREVENTION

A stormwater pollution prevention plan will be provided to the City and RIDEM for review and approval. Any necessary easements or covenants associated with the stormwater improvements will be recorded prior to the start of construction.

STANDARD 8 – LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

The proposed use for the development is multi-family residential which is not considered a Land Use with Higher Potential Pollutant Loads (LUHPPL) by the RIDEM and therefore is exempt from Standard 8 requirements.

STANDARD 9 – ILLICIT DISCHARGES

There are no known or suspected illicit discharges to or from the existing subject site or proposed use and associated stormwater management conveyance and treatment system. Per the RIDEM Stormwater Design & Installation Standards Manual, illicit discharges include but are not limited to, discharges from onsite wastewater treatment systems (OWTS), direct septic connections to storm drain systems, septic tank overflow, car wash wastewater, laundry wastewater and disposal of household or automobile products. No illicit discharges are intended to occur at the proposed development location upon installation of the stormwater management improvements in accordance with Standard 9. All discharge to the system shall be comprised solely of stormwater.

STANDARD 10 – CONSTRUCTION ACTIVITY EROSION, RUNOFF, SEDIMENTATION, AND POLLUTION PREVENTION CONTROL MEASURE REQUIREMENTS

A Soil Erosion & Sediment Control Plan has been prepared by Stonefield Engineering & Design in accordance with the latest edition of the Rhode Island Soil Erosion & Sediment Control Handbook and Section 3.3.7 of the Rhode Island Stormwater Design and Installation Standards Manual and has been included as a document supplemental to this Plan. Proposed temporary measures during construction include but are not limited to stabilized construction entrances, inlet filters, and silt fencing. No land disturbance will occur until certification and permits have been obtained. Details for all proposed control measures have also been provided.

STANDARD 11 – STORMWATER SYSTEM OPERATION AND MAINTENANCE

A Stormwater Operations & Maintenance Manual will be provided to the City and RIDEM for review and approval. Any necessary easements or covenants associated with the stormwater improvements will be recorded prior to the start of construction.

6.0 CONCLUSIONS

As demonstrated in this Report, the increase in runoff flow rate generated by the proposed redevelopment will be satisfactorily mitigated by the introduction of one (1) StormTech subsurface infiltration system and on-site stormwater conveyance system. The proposed infiltration system will provide treatment to remove total suspended solids to a satisfactory regulatory level, as well as provide groundwater recharge exceeding the recharge under existing conditions.

The proposed project complies with all applicable stormwater management regulations and standards. As such, the project is not anticipated to have any adverse drainage impacts on neighboring properties, downstream watercourses, or adjoining conveyance systems.

7.0 REFERENCES

1. Rhode Island Stormwater Design and Installation Standards Manual, last amended March 2015

   https://dem.ri.gov/sites/g/files/xkgbur861/files/pubs/regs/regs/water/swmanual15.pdf

2. Regulations for the Rhode Island Pollutant Discharge Elimination System

   https://rules.sos.ri.gov/regulations/part/250-150-10-1

3. Rhode Island Soil Erosion & Sediment Control Handbook, last Amended 2016

   https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/bnatres/water/pdf/riesc-handbook16.pdf

4. City of Providence, RI Municipal Zoning Code

   https://www.providenceri.gov/wp-content/uploads/2025/09/25.07.09-Official-Zoning-Ordinance.pdf

APPENDIX A
PROJECT FIGURES

INVENTORY

FIGURE 1: TAX & ZONING MAP

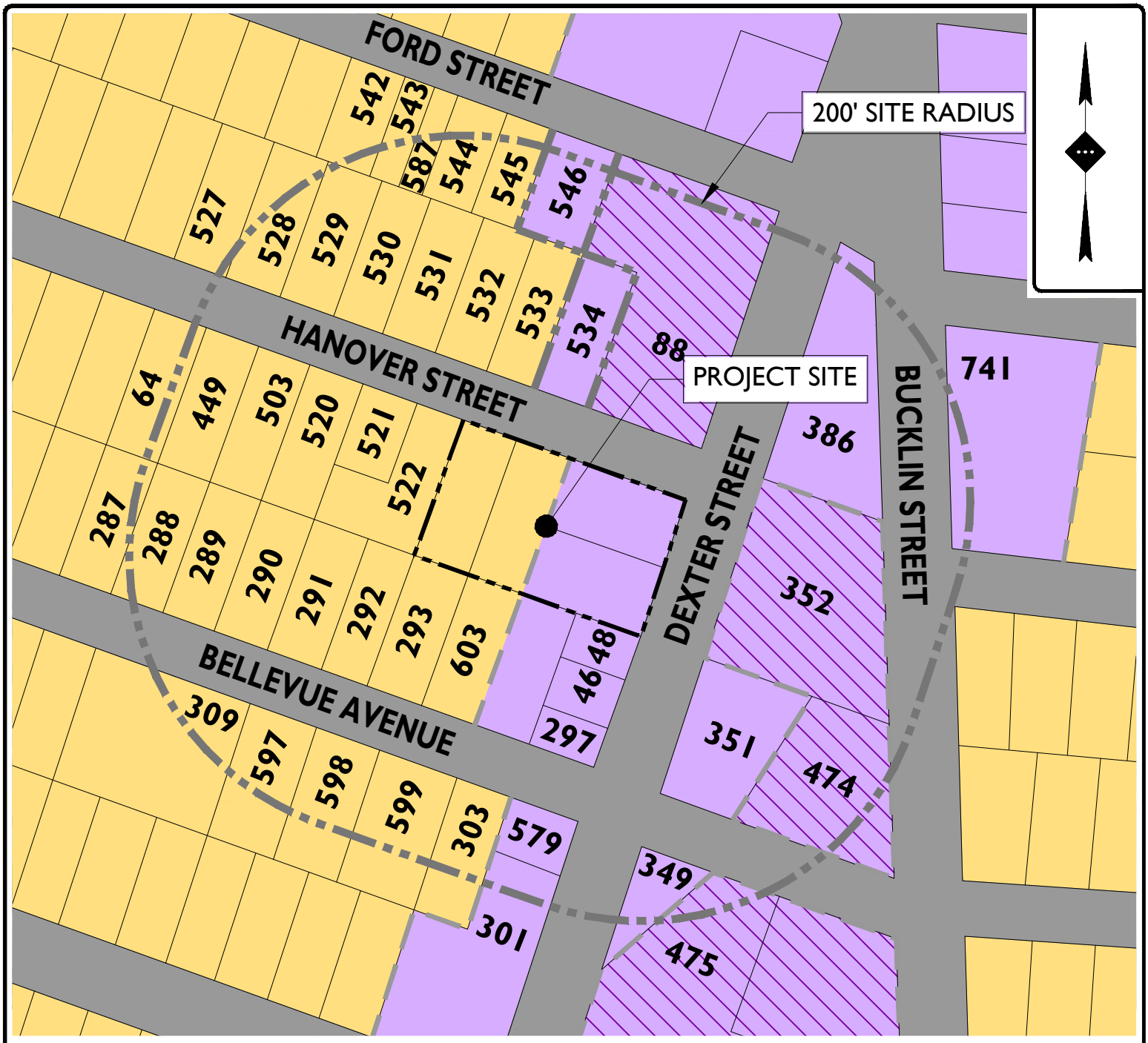
FIGURE 2: USGS MAP

FIGURE 3: AERIAL LOCATION MAP

FIGURE 4: FEMA MAP

FIGURE 5: SOIL SURVEY MAP

FIGURE 6: RIDEM GROUNDWATER CLASSIFICATION MAP



ZONING LEGEND

R-3 RESIDETIAL DISTRICT

M-MU-75 MIXED USE INDUSTRIAL DISTRICT

HISTORIC DISTRICT OVERLAY

TAX & ZONING MAP

100' 0' 100' 200'

GRAPHIC SCALE IN FEET

1" = 100'

SOURCE: PROVIDENCE, RI ARC GIS TAX & ZONING MAP, RETRIEVED NOVEMBER 15, 2025

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PROPOSED MULTI-FAMILY DEVELOPMENT

A.P.: 31 LOTS: 125, 523, 524 & 525
309 DEXTER STREET, PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

DRAWN BY:	SCL
CHECKED BY:	JHK
DATE:	11/20/2025
SCALE:	1" = 100'
PROJECT ID:	BOS-250101

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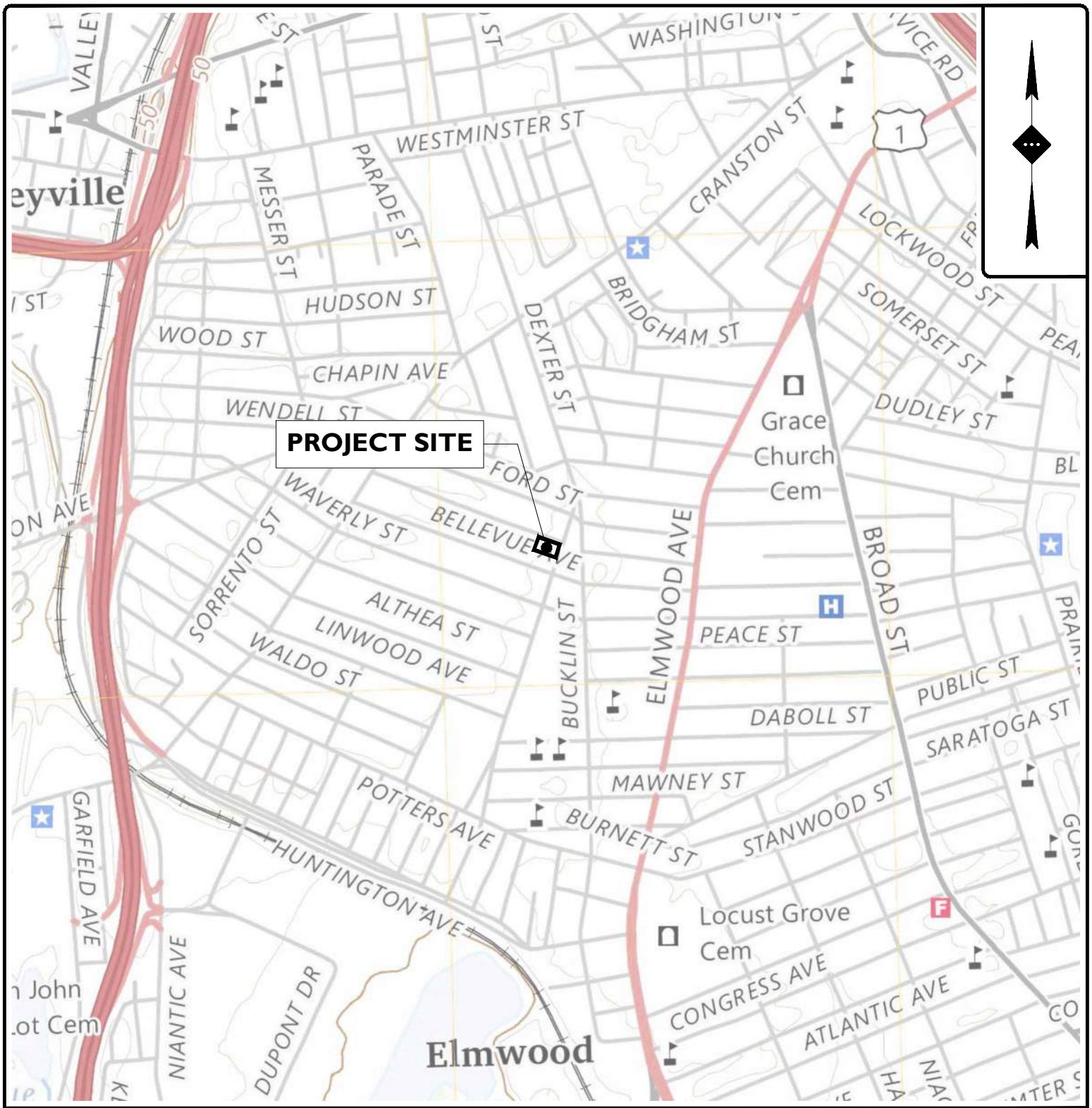

USGS QUAD MAP

1000' 0' 1000' 2000'

GRAPHIC SCALE IN FEET

1"=1000'

SOURCE: USGS PROVIDENCE QUADRANGLE RHODE ISLAND 7.5-MINUTE SERIES 2024

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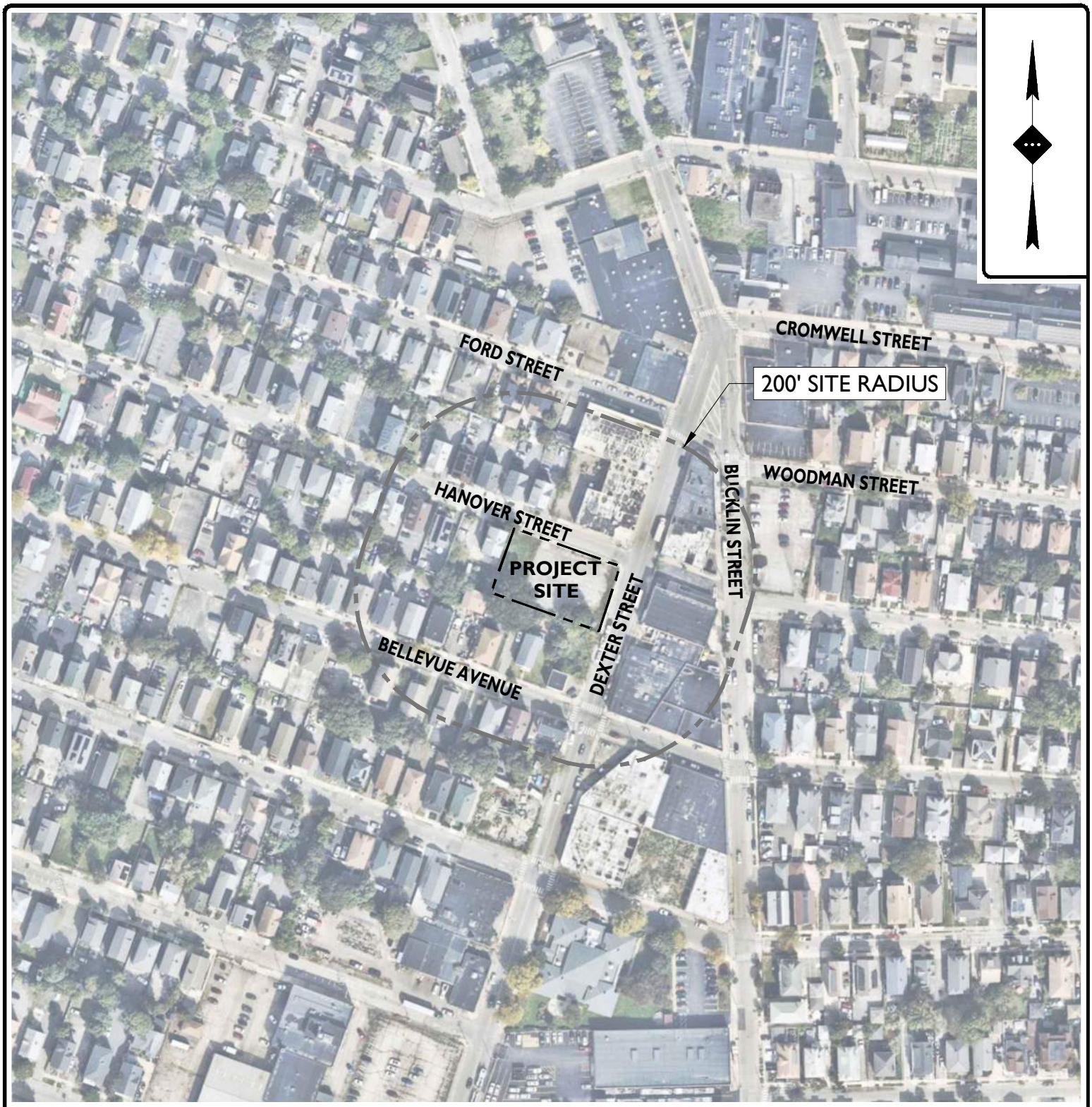

AERIAL MAP

200' 0' 200' 400'

GRAPHIC SCALE IN FEET

1" = 200'

SOURCE: NEARMAP AERIAL IMAGERY, DATED SEPTEMBER 28, 2025

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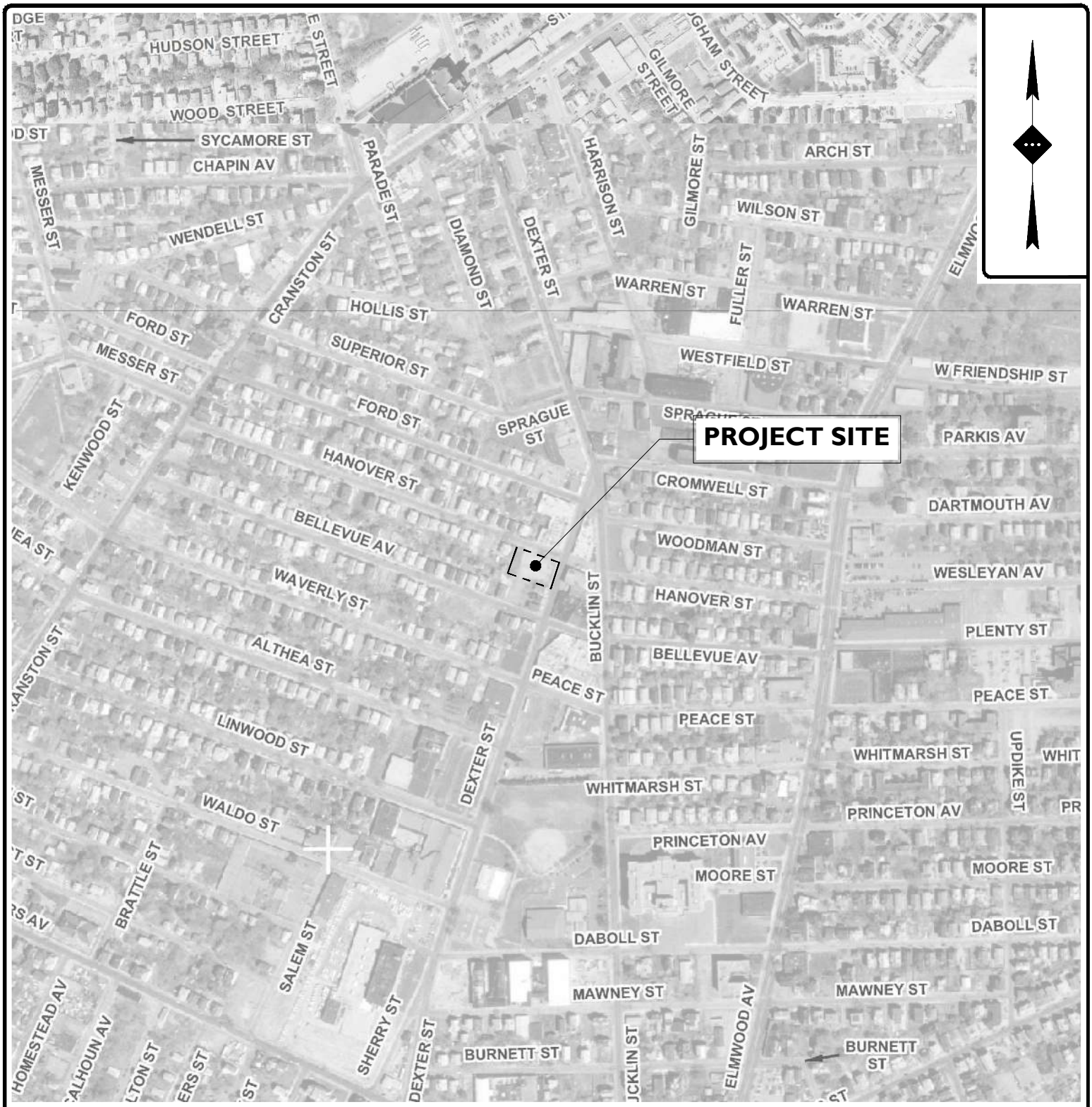


FEMA FLOOD MAP

500' 0' 500' 1000'

GRAPHIC SCALE IN FEET

1"=500'

SOURCE: FEMA FLOOD MAP NUMBER 44007C0316G & 44007C0308J, EFFECTIVE DATED MARCH 2, 2009 & OCTOBER 2, 2015

297 DEXTER STREET HOLDINGS, LLC

PROPOSED MULTI-FAMILY DEVELOPMENT

A.P.: 31 LOTS: 125, 523, 524 & 525
309 DEXTER STREET, PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

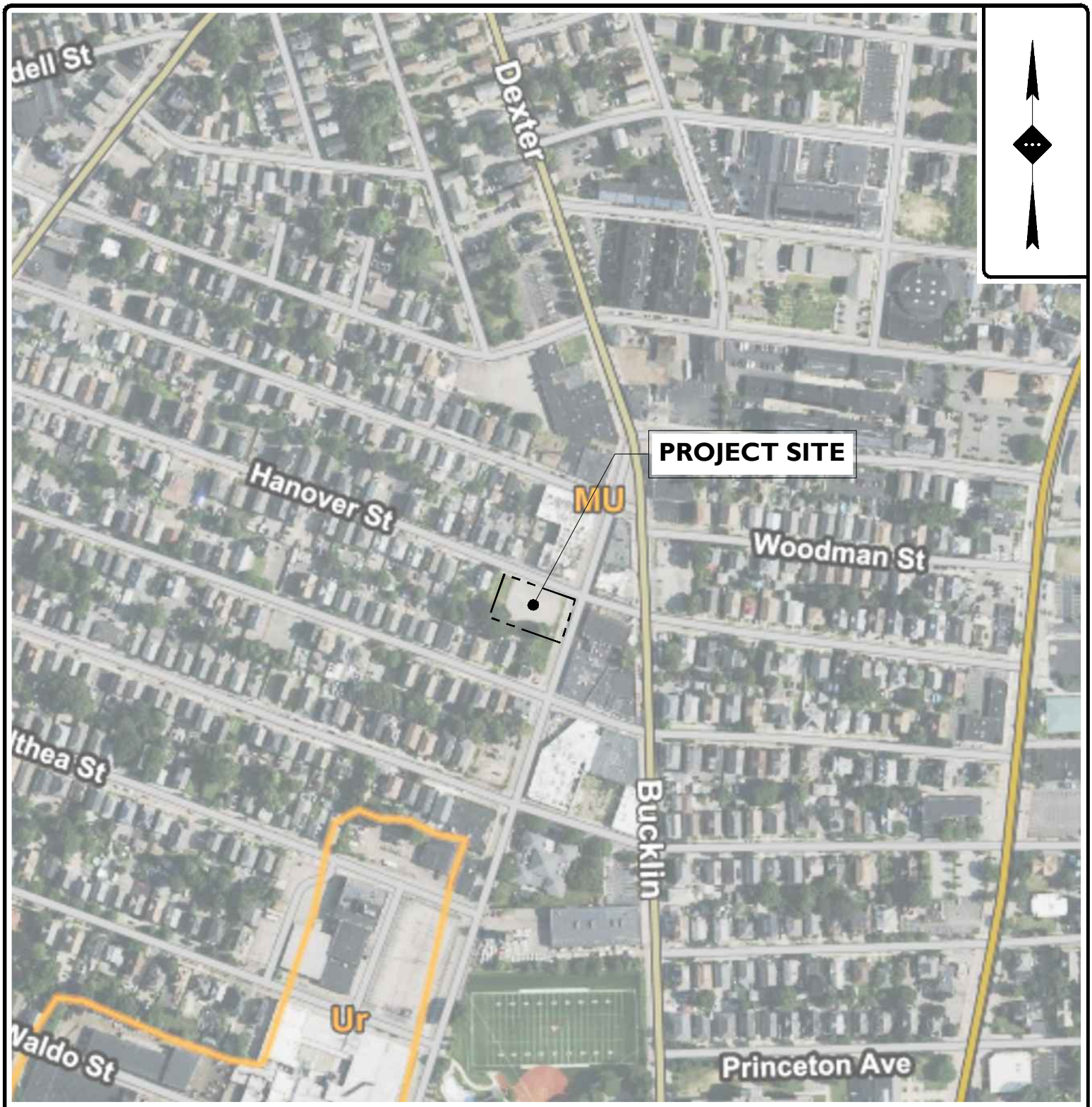
DRAWN BY:	SCL
CHECKED BY:	JHK
DATE:	11/20/2025
SCALE:	1" = 500'
PROJECT ID:	BOS-250101

STONEFIELD engineering & design

Rutherford, NJ · New York, NY · Salem, MA · Providence, RI
Princeton, NJ · Tampa, FL · Birmingham, MI
www.stonefieldeng.com

56 Pine Street, Providence, RI 02903
Phone 617.203.2076

Z:\Boston\BOS\2025\BOS-250101 ZDS - 309 Dexter Street, Providence, RI\CADD\Exhibits\Project Maps\2025-11-20_Project Maps.dwg



SOILS MAP

MU: MERRIMAC-URBAN LAND COMPLEX

UR: URBAN LAND

300' 0' 300' 600'

GRAPHIC SCALE IN FEET

1"=300'

SOURCE: USDA: NATURAL RESOURCES CONSERVATION SERVICE RETRIEVED NOVEMBER 20, 2025

297 DEXTER STREET HOLDINGS, LLC
PROPOSED MULTI-FAMILY DEVELOPMENT

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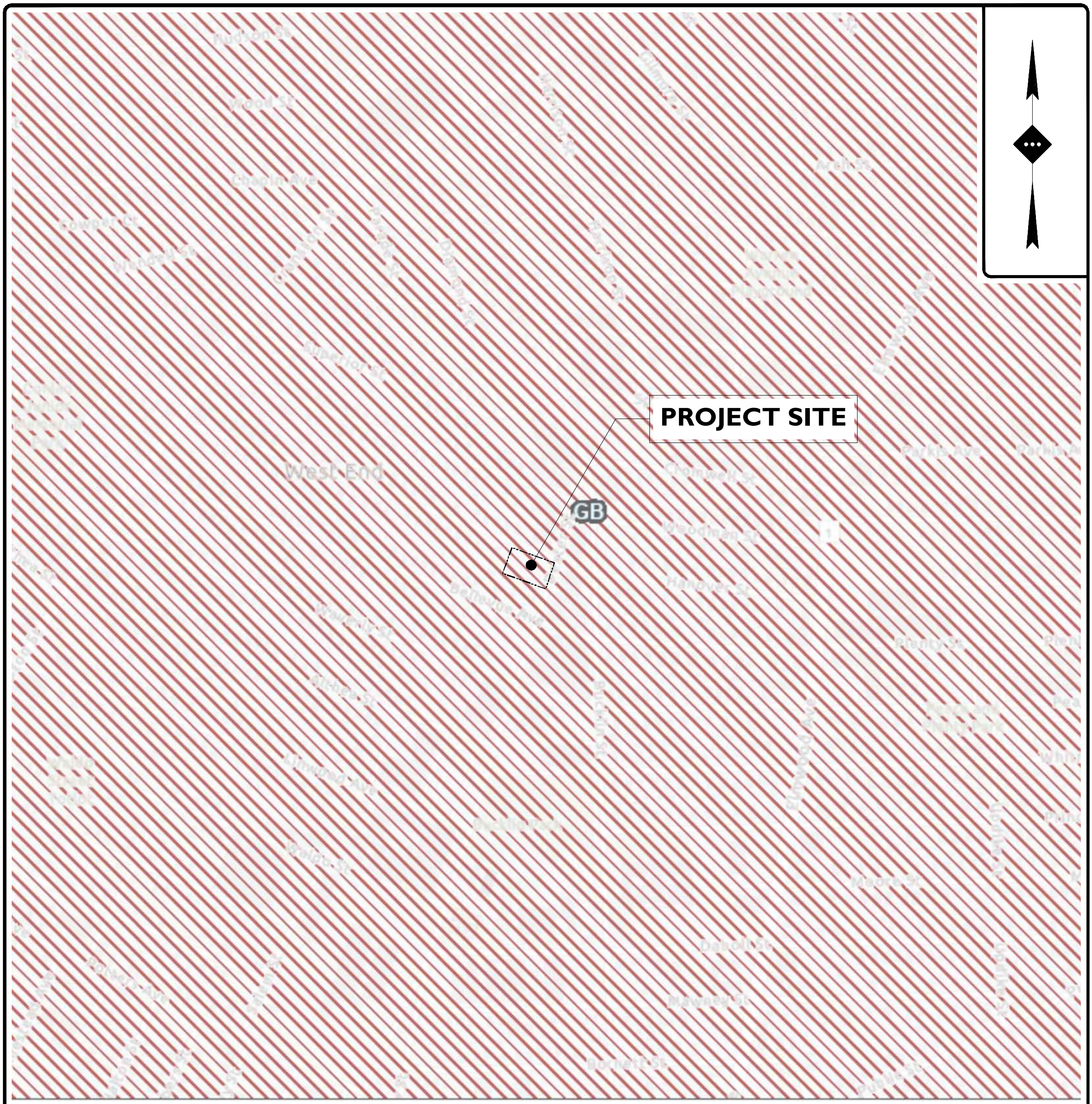

RIDEM GROUNDWATER CLASSIFICATION MAP

GB - UNSUITABLE FOR DRINKING WATER USE WITHOUT TREATMENT

500' 0' 500' 1000'

GRAPHIC SCALE IN FEET

1"=500'

SOURCE: RIGIS: GROUNDWATER QUALITY STANDARD RETRIEVED NOVEMBER 20, 2025

297 DEXTER STREET HOLDINGS, LLC

PROPOSED MULTI-FAMILY DEVELOPMENT

A.P.: 31 LOTS: 125, 523, 524 & 525
309 DEXTER STREET, PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

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APPENDIX B
NRCS SOIL REPORT

Custom Soil Resource Report
Soil Map

Map Scale: 1:509 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
Survey Area Data: Version 25, Sep 3, 2025

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

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MU	Merrimac-Urban land complex, 0 to 8 percent slopes	0.6	100.0%
Totals for Area of Interest		**0.6**	**100.0%**

Map Unit Descriptions

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

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

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

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

State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties

MU—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

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

Properties and qualities

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

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Outwash plains, deltas, kames, eskers
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Sudbury

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

Windsor

Percent of map unit: 5 percent
Landform: Deltas, outwash plains, dunes, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No


71° 25' 46" W
71° 25' 41" W
41° 48' 30" N
41° 48' 27" N
298190
298200
298210
298220
298230
298240
298250
298260
298270
298280
298290
4631350
4631340
4631330
4631320
4631310
4631300
4631290
4631340
4631330
4631320
4631310
4631300
4631290
4631280
Hanover St
MU
Dexter St
Soil Map may not be valid at this scale.
298180
298190
298200
298210
298220
298230
298240
298250
298260
298270
298280
Map Scale: 1:509 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 5 10 20 30
Feet
0 20 40 80 120
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

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Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

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Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MU	Merrimac-Urban land complex, 0 to 8 percent slopes	A	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

Rating Options—Hydrologic Soil Group

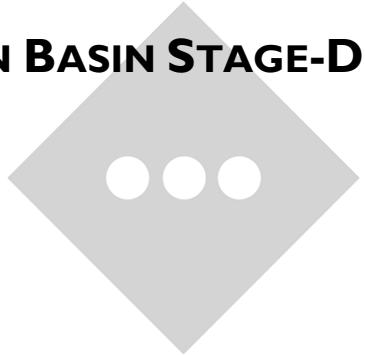
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

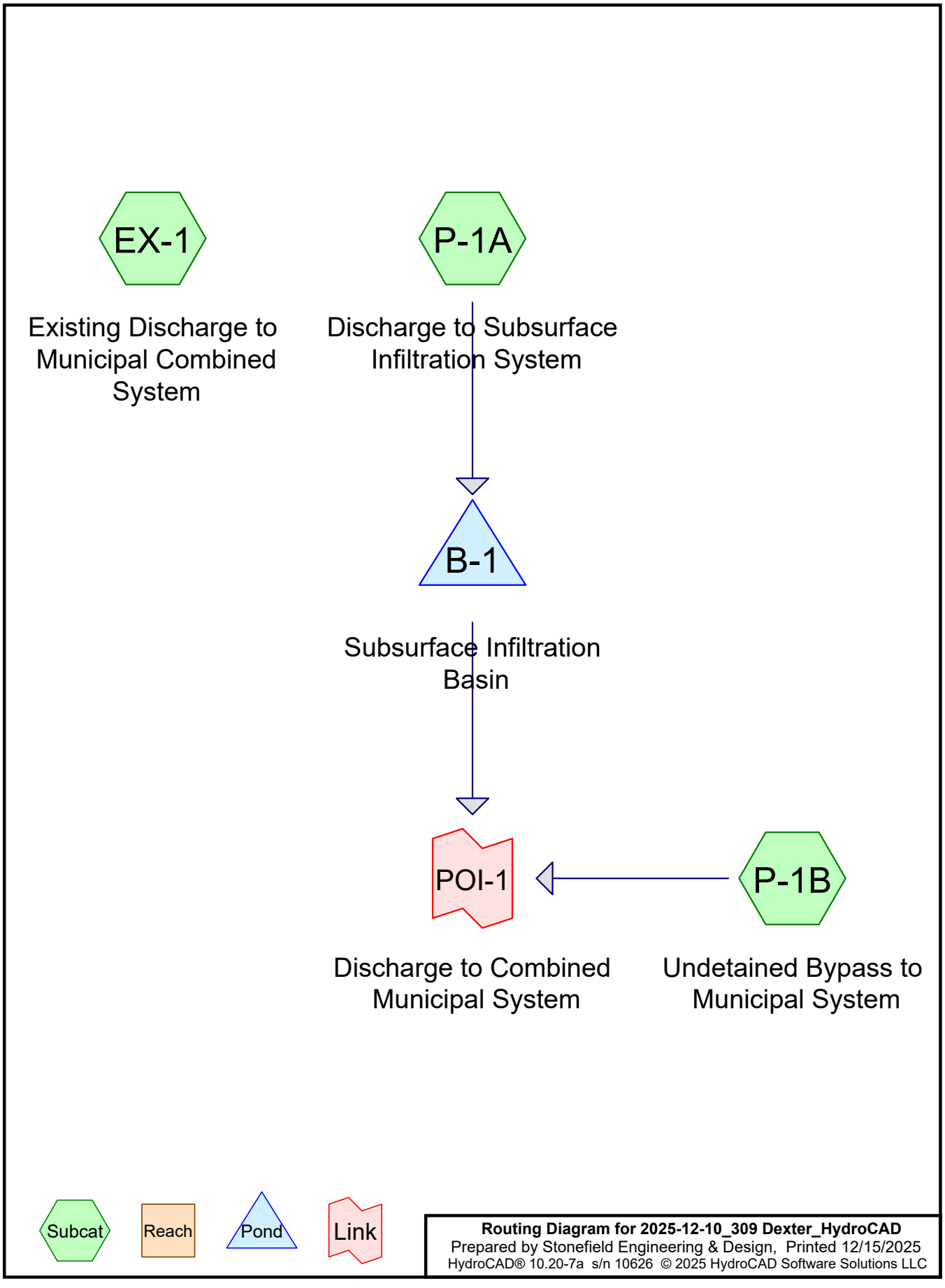
Tie-break Rule: Higher

APPENDIX C
HYDROLOGIC & HYDRAULIC CALCULATIONS

INVENTORY



APPENDIX C-1
HydroCAD Node Schematic Diagram



Routing Diagram for 2025-12-10_309 Dexter_HydroCAD
Prepared by Stonefield Engineering & Design, Printed 12/15/2025
HydroCAD® 10.20-7a s/n 10626 © 2025 HydroCAD Software Solutions LLC

APPENDIX C-2
WQ_v STORM EVENT HYDROGRAPHS

Summary for Subcatchment EX-1: Existing Discharge to Municipal Combined System

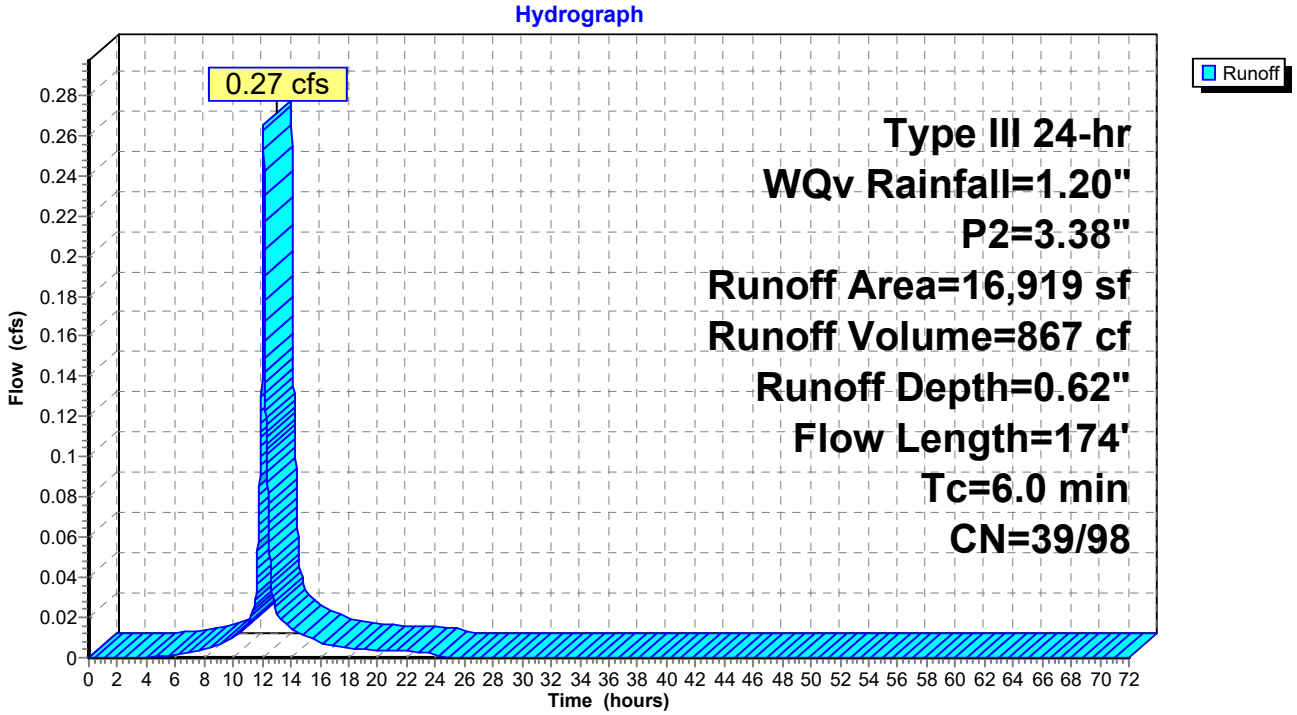
Runoff = 0.27 cfs @ 12.08 hrs, Volume= 867 cf, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Rainfall=1.20", P2=3.38"

	Area (sf)	CN	Description
*	10,559	98	Impervious Area
	6,360	39	>75% Grass cover, Good, HSG A
	16,919	76	Weighted Average
	6,360	39	37.59% Pervious Area
	10,559	98	62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: Existing Discharge to Municipal Combined System



Hydrograph for Subcatchment EX-1: Existing Discharge to Municipal Combined System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
2.00	0.02	0.00	0.00	0.00
4.00	0.05	0.00	0.00	0.00
6.00	0.09	0.00	0.01	0.00
8.00	0.14	0.00	0.03	0.00
10.00	0.23	0.00	0.09	0.01
12.00	0.60	0.00	0.41	**0.16**
14.00	0.97	0.00	0.76	**0.01**
16.00	1.06	0.00	0.85	0.01
18.00	1.11	0.00	0.90	0.00
20.00	1.15	0.00	0.94	0.00
22.00	1.18	0.00	0.96	0.00
24.00	**1.20**	0.00	**0.99**	0.00
26.00	1.20	0.00	0.99	0.00
28.00	1.20	0.00	0.99	0.00
30.00	1.20	0.00	0.99	0.00
32.00	1.20	0.00	0.99	0.00
34.00	1.20	0.00	0.99	0.00
36.00	1.20	0.00	0.99	0.00
38.00	1.20	0.00	0.99	0.00
40.00	1.20	0.00	0.99	0.00
42.00	1.20	0.00	0.99	0.00
44.00	1.20	0.00	0.99	0.00
46.00	1.20	0.00	0.99	0.00
48.00	1.20	0.00	0.99	0.00
50.00	1.20	0.00	0.99	0.00
52.00	1.20	0.00	0.99	0.00
54.00	1.20	0.00	0.99	0.00
56.00	1.20	0.00	0.99	0.00
58.00	1.20	0.00	0.99	0.00
60.00	1.20	0.00	0.99	0.00
62.00	1.20	0.00	0.99	0.00
64.00	1.20	0.00	0.99	0.00
66.00	1.20	0.00	0.99	0.00
68.00	1.20	0.00	0.99	0.00
70.00	1.20	0.00	0.99	0.00
72.00	1.20	0.00	0.99	0.00

Summary for Subcatchment P-1A: Discharge to Subsurface Infiltration System

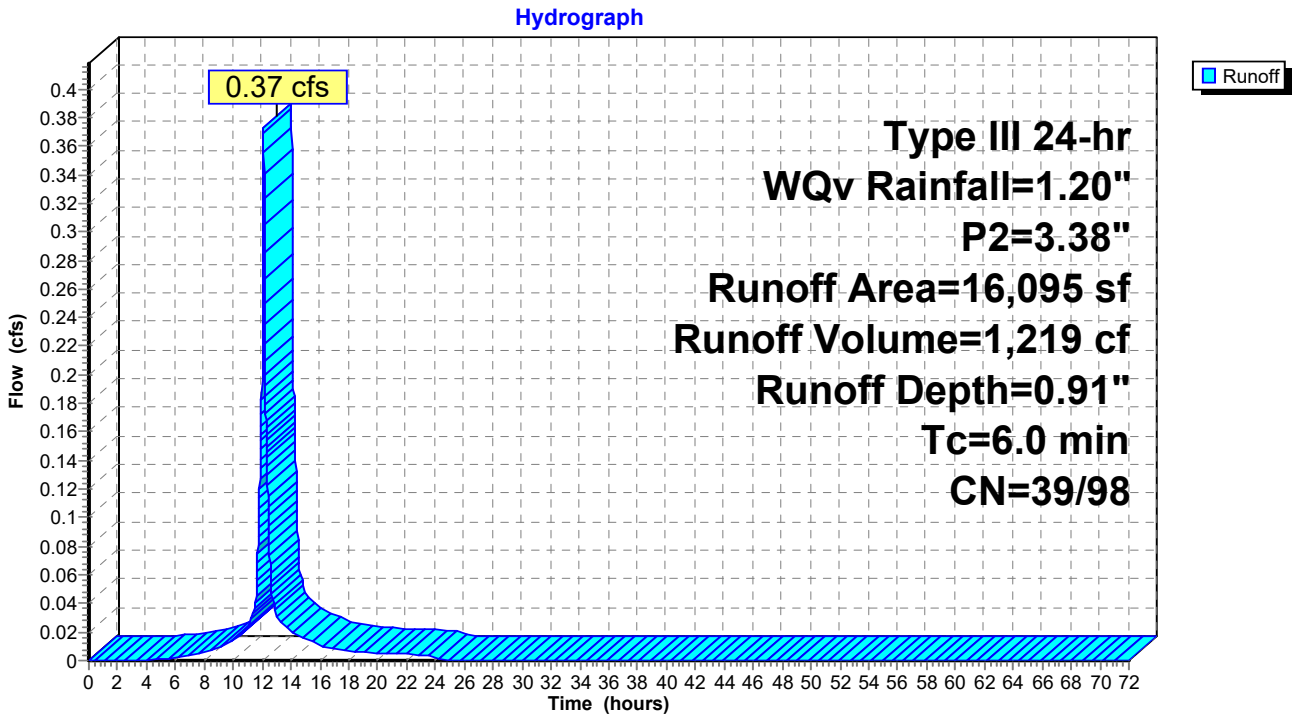
Runoff = 0.37 cfs @ 12.08 hrs, Volume= 1,219 cf, Depth= 0.91"
Routed to Pond B-1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Rainfall=1.20", P2=3.38"

	Area (sf)	CN	Description
*	5,200	98	Roof Area
*	9,641	98	Impervious Area
	1,254	39	>75% Grass cover, Good, HSG A
	16,095	93	Weighted Average
	1,254	39	7.79% Pervious Area
	14,841	98	92.21% Impervious Area

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

Subcatchment P-1A: Discharge to Subsurface Infiltration System



Hydrograph for Subcatchment P-1A: Discharge to Subsurface Infiltration System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
2.00	0.02	0.00	0.00	0.00
4.00	0.05	0.00	0.00	0.00
6.00	0.09	0.00	0.01	0.00
8.00	0.14	0.00	0.03	0.01
10.00	0.23	0.00	0.09	0.01
12.00	0.60	0.00	0.41	**0.23**
14.00	0.97	0.00	0.76	**0.02**
16.00	1.06	0.00	0.85	0.01
18.00	1.11	0.00	0.90	0.01
20.00	1.15	0.00	0.94	0.01
22.00	1.18	0.00	0.96	0.00
24.00	**1.20**	0.00	**0.99**	0.00
26.00	1.20	0.00	0.99	0.00
28.00	1.20	0.00	0.99	0.00
30.00	1.20	0.00	0.99	0.00
32.00	1.20	0.00	0.99	0.00
34.00	1.20	0.00	0.99	0.00
36.00	1.20	0.00	0.99	0.00
38.00	1.20	0.00	0.99	0.00
40.00	1.20	0.00	0.99	0.00
42.00	1.20	0.00	0.99	0.00
44.00	1.20	0.00	0.99	0.00
46.00	1.20	0.00	0.99	0.00
48.00	1.20	0.00	0.99	0.00
50.00	1.20	0.00	0.99	0.00
52.00	1.20	0.00	0.99	0.00
54.00	1.20	0.00	0.99	0.00
56.00	1.20	0.00	0.99	0.00
58.00	1.20	0.00	0.99	0.00
60.00	1.20	0.00	0.99	0.00
62.00	1.20	0.00	0.99	0.00
64.00	1.20	0.00	0.99	0.00
66.00	1.20	0.00	0.99	0.00
68.00	1.20	0.00	0.99	0.00
70.00	1.20	0.00	0.99	0.00
72.00	1.20	0.00	0.99	0.00

Summary for Subcatchment P-1B: Undetained Bypass to Municipal System

[45] Hint: Runoff=Zero

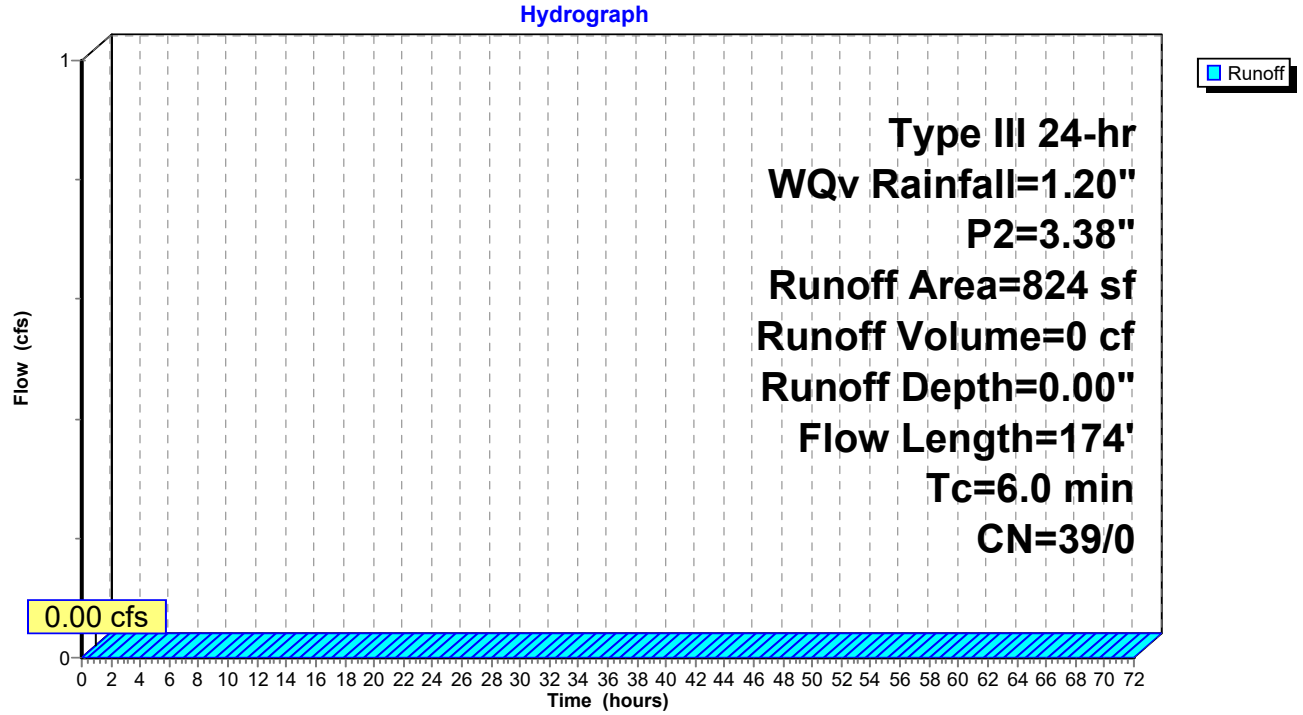
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link POI-1 : Discharge to Combined Municipal System

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr WQv Rainfall=1.20", P2=3.38"

Area (sf)	CN	Description
824	39	>75% Grass cover, Good, HSG A
824	39	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment P-1B: Undetained Bypass to Municipal System



Hydrograph for Subcatchment P-1B: Undetained Bypass to Municipal System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	**0.00**	**0.00**
2.00	0.02	0.00	0.00	0.00
4.00	0.05	0.00	0.00	0.00
6.00	0.09	0.00	0.00	0.00
8.00	0.14	0.00	0.00	0.00
10.00	0.23	0.00	0.00	0.00
12.00	0.60	0.00	0.00	0.00
14.00	0.97	0.00	0.00	0.00
16.00	1.06	0.00	0.00	0.00
18.00	1.11	0.00	0.00	0.00
20.00	1.15	0.00	0.00	0.00
22.00	1.18	0.00	0.00	0.00
24.00	**1.20**	0.00	0.00	0.00
26.00	1.20	0.00	0.00	0.00
28.00	1.20	0.00	0.00	0.00
30.00	1.20	0.00	0.00	0.00
32.00	1.20	0.00	0.00	0.00
34.00	1.20	0.00	0.00	0.00
36.00	1.20	0.00	0.00	0.00
38.00	1.20	0.00	0.00	0.00
40.00	1.20	0.00	0.00	0.00
42.00	1.20	0.00	0.00	0.00
44.00	1.20	0.00	0.00	0.00
46.00	1.20	0.00	0.00	0.00
48.00	1.20	0.00	0.00	0.00
50.00	1.20	0.00	0.00	0.00
52.00	1.20	0.00	0.00	0.00
54.00	1.20	0.00	0.00	0.00
56.00	1.20	0.00	0.00	0.00
58.00	1.20	0.00	0.00	0.00
60.00	1.20	0.00	0.00	0.00
62.00	1.20	0.00	0.00	0.00
64.00	1.20	0.00	0.00	0.00
66.00	1.20	0.00	0.00	0.00
68.00	1.20	0.00	0.00	0.00
70.00	1.20	0.00	0.00	0.00
72.00	1.20	0.00	0.00	0.00

Summary for Pond B-1: Subsurface Infiltration Basin

Inflow Area = 16,095 sf, 92.21% Impervious, Inflow Depth = 0.91" for WQv event
Inflow = 0.37 cfs @ 12.08 hrs, Volume= 1,219 cf
Outflow = 0.09 cfs @ 12.46 hrs, Volume= 1,219 cf, Atten= 76%, Lag= 22.8 min
Discarded = 0.09 cfs @ 12.46 hrs, Volume= 1,219 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POI-1 : Discharge to Combined Municipal System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 63.48' @ 12.46 hrs Surf.Area= 1,394 sf Storage= 268 cf

Plug-Flow detention time= 15.9 min calculated for 1,219 cf (100% of inflow)
Center-of-Mass det. time= 15.9 min (797.9 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.00'	1,346 cf	**30.00'W x 46.47'L x 3.75'H Field A** 5,228 cf Overall - 1,862 cf Embedded = 3,365 cf x 40.0% Voids
#2A	63.50'	1,862 cf	**ADS_StormTech SC-800 +Cap** x 36 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 36 Chambers in 6 Rows Cap Storage= 3.4 cf x 2 x 6 rows = 41.0 cf
		3,208 cf	Total Available Storage

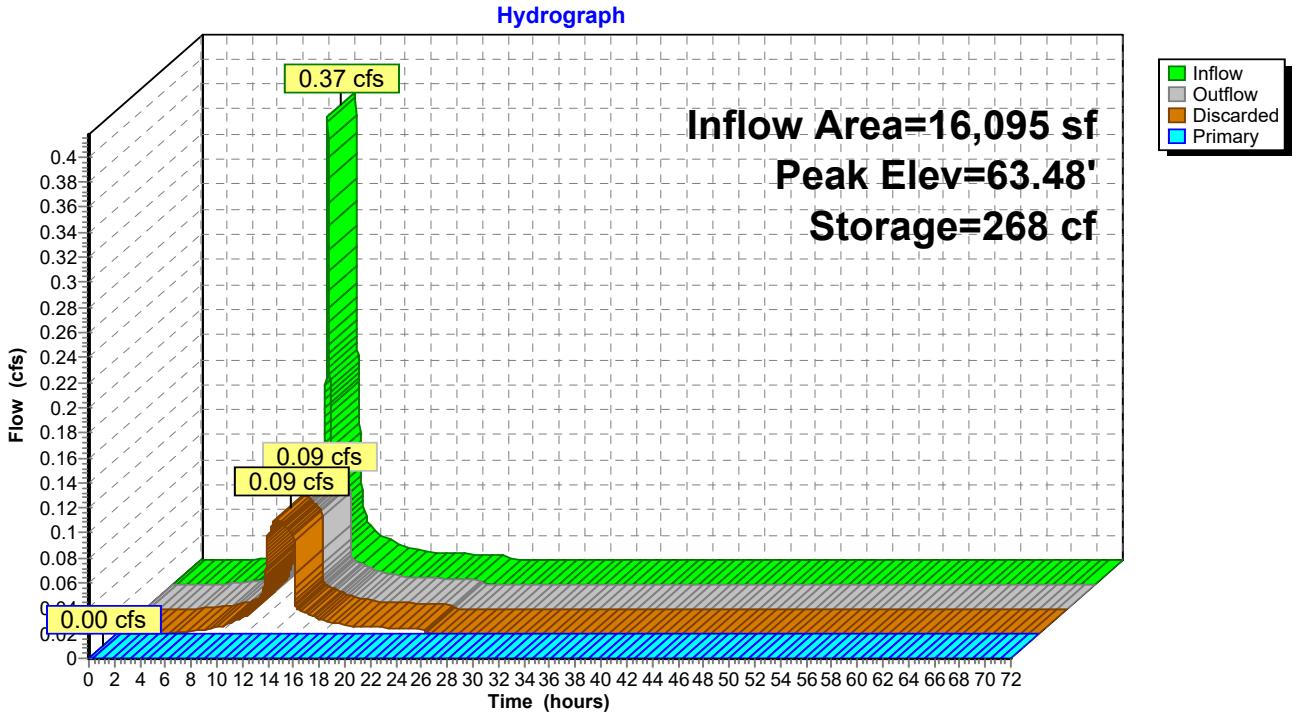
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	66.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.00'	**2.410 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 59.00' Phase-In= 0.01'

Discarded OutFlow Max=0.09 cfs @ 12.46 hrs HW=63.48' (Free Discharge)
↑**1=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.00' TW=0.00' (Dynamic Tailwater)

Pond B-1: Subsurface Infiltration Basin



Hydrograph for Pond B-1: Subsurface Infiltration Basin

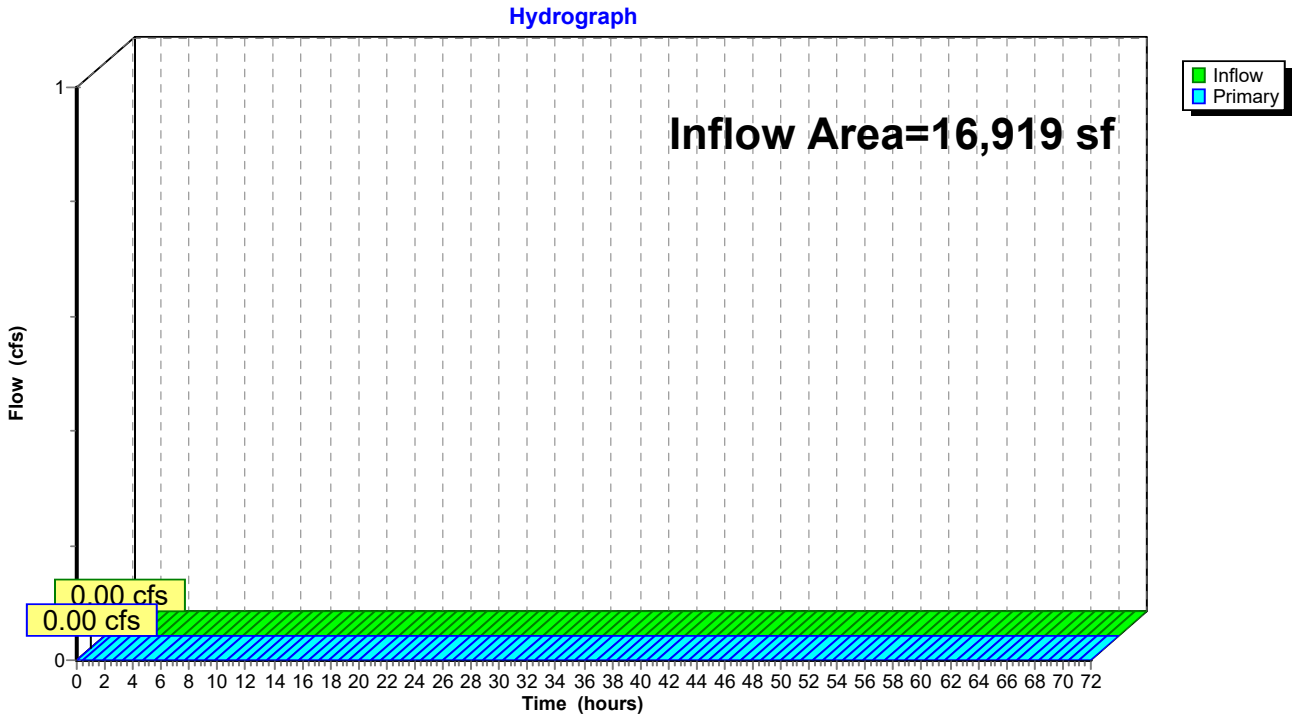
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	63.00	0.00	0.00	**0.00**
2.00	0.00	0	63.00	0.00	0.00	0.00
4.00	0.00	0	63.00	0.00	0.00	0.00
6.00	0.00	0	63.00	0.00	0.00	0.00
8.00	0.01	0	63.00	0.01	0.01	0.00
10.00	0.01	1	63.00	0.01	0.01	0.00
12.00	**0.23**	**61**	**63.11**	**0.08**	**0.08**	0.00
14.00	**0.02**	**1**	**63.00**	**0.02**	**0.02**	0.00
16.00	0.01	1	63.00	0.01	0.01	0.00
18.00	0.01	0	63.00	0.01	0.01	0.00
20.00	0.01	0	63.00	0.01	0.01	0.00
22.00	0.00	0	63.00	0.00	0.00	0.00
24.00	0.00	0	63.00	0.00	0.00	0.00
26.00	0.00	0	63.00	0.00	0.00	0.00
28.00	0.00	0	63.00	0.00	0.00	0.00
30.00	0.00	0	63.00	0.00	0.00	0.00
32.00	0.00	0	63.00	0.00	0.00	0.00
34.00	0.00	0	63.00	0.00	0.00	0.00
36.00	0.00	0	63.00	0.00	0.00	0.00
38.00	0.00	0	63.00	0.00	0.00	0.00
40.00	0.00	0	63.00	0.00	0.00	0.00
42.00	0.00	0	63.00	0.00	0.00	0.00
44.00	0.00	0	63.00	0.00	0.00	0.00
46.00	0.00	0	63.00	0.00	0.00	0.00
48.00	0.00	0	63.00	0.00	0.00	0.00
50.00	0.00	0	63.00	0.00	0.00	0.00
52.00	0.00	0	63.00	0.00	0.00	0.00
54.00	0.00	0	63.00	0.00	0.00	0.00
56.00	0.00	0	63.00	0.00	0.00	0.00
58.00	0.00	0	63.00	0.00	0.00	0.00
60.00	0.00	0	63.00	0.00	0.00	0.00
62.00	0.00	0	63.00	0.00	0.00	0.00
64.00	0.00	0	63.00	0.00	0.00	0.00
66.00	0.00	0	63.00	0.00	0.00	0.00
68.00	0.00	0	63.00	0.00	0.00	0.00
70.00	0.00	0	63.00	0.00	0.00	0.00
72.00	0.00	0	63.00	0.00	0.00	0.00

Summary for Link POI-1: Discharge to Combined Municipal System

Inflow Area = 16,919 sf, 87.72% Impervious, Inflow Depth = 0.00" for WQv event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POI-1: Discharge to Combined Municipal System



Hydrograph for Link POI-1: Discharge to Combined Municipal System

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.00**	**0.00**
2.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
12.00	0.00	0.00	0.00
14.00	0.00	0.00	0.00
16.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00
52.00	0.00	0.00	0.00
54.00	0.00	0.00	0.00
56.00	0.00	0.00	0.00
58.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00
62.00	0.00	0.00	0.00
64.00	0.00	0.00	0.00
66.00	0.00	0.00	0.00
68.00	0.00	0.00	0.00
70.00	0.00	0.00	0.00
72.00	0.00	0.00	0.00

APPENDIX C-3
1-YEAR STORM EVENT HYDROGRAPHS

Summary for Subcatchment EX-1: Existing Discharge to Municipal Combined System

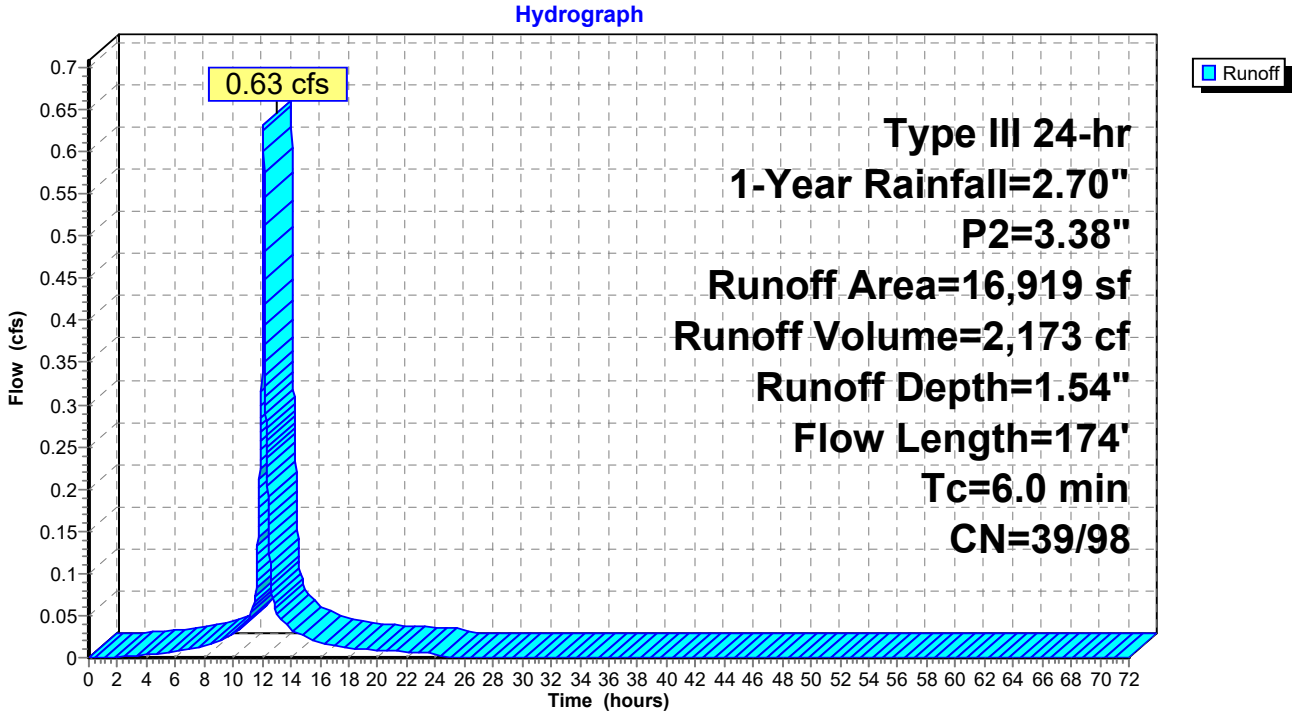
Runoff = 0.63 cfs @ 12.08 hrs, Volume= 2,173 cf, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.70", P2=3.38"

	Area (sf)	CN	Description
*	10,559	98	Impervious Area
	6,360	39	>75% Grass cover, Good, HSG A
	16,919	76	Weighted Average
	6,360	39	37.59% Pervious Area
	10,559	98	62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: Existing Discharge to Municipal Combined System



Hydrograph for Subcatchment EX-1: Existing Discharge to Municipal Combined System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
2.00	0.05	0.00	0.00	0.00
4.00	0.12	0.00	0.02	0.00
6.00	0.19	0.00	0.07	0.01
8.00	0.31	0.00	0.15	0.01
10.00	0.51	0.00	0.33	0.03
12.00	1.35	0.00	1.13	**0.40**
14.00	2.19	0.00	1.96	**0.03**
16.00	2.39	0.00	2.16	0.02
18.00	2.51	0.00	2.28	0.01
20.00	2.58	0.00	2.35	0.01
22.00	2.65	0.00	2.42	0.01
24.00	**2.70**	0.00	**2.47**	0.01
26.00	2.70	0.00	2.47	0.00
28.00	2.70	0.00	2.47	0.00
30.00	2.70	0.00	2.47	0.00
32.00	2.70	0.00	2.47	0.00
34.00	2.70	0.00	2.47	0.00
36.00	2.70	0.00	2.47	0.00
38.00	2.70	0.00	2.47	0.00
40.00	2.70	0.00	2.47	0.00
42.00	2.70	0.00	2.47	0.00
44.00	2.70	0.00	2.47	0.00
46.00	2.70	0.00	2.47	0.00
48.00	2.70	0.00	2.47	0.00
50.00	2.70	0.00	2.47	0.00
52.00	2.70	0.00	2.47	0.00
54.00	2.70	0.00	2.47	0.00
56.00	2.70	0.00	2.47	0.00
58.00	2.70	0.00	2.47	0.00
60.00	2.70	0.00	2.47	0.00
62.00	2.70	0.00	2.47	0.00
64.00	2.70	0.00	2.47	0.00
66.00	2.70	0.00	2.47	0.00
68.00	2.70	0.00	2.47	0.00
70.00	2.70	0.00	2.47	0.00
72.00	2.70	0.00	2.47	0.00

Summary for Subcatchment P-1A: Discharge to Subsurface Infiltration System

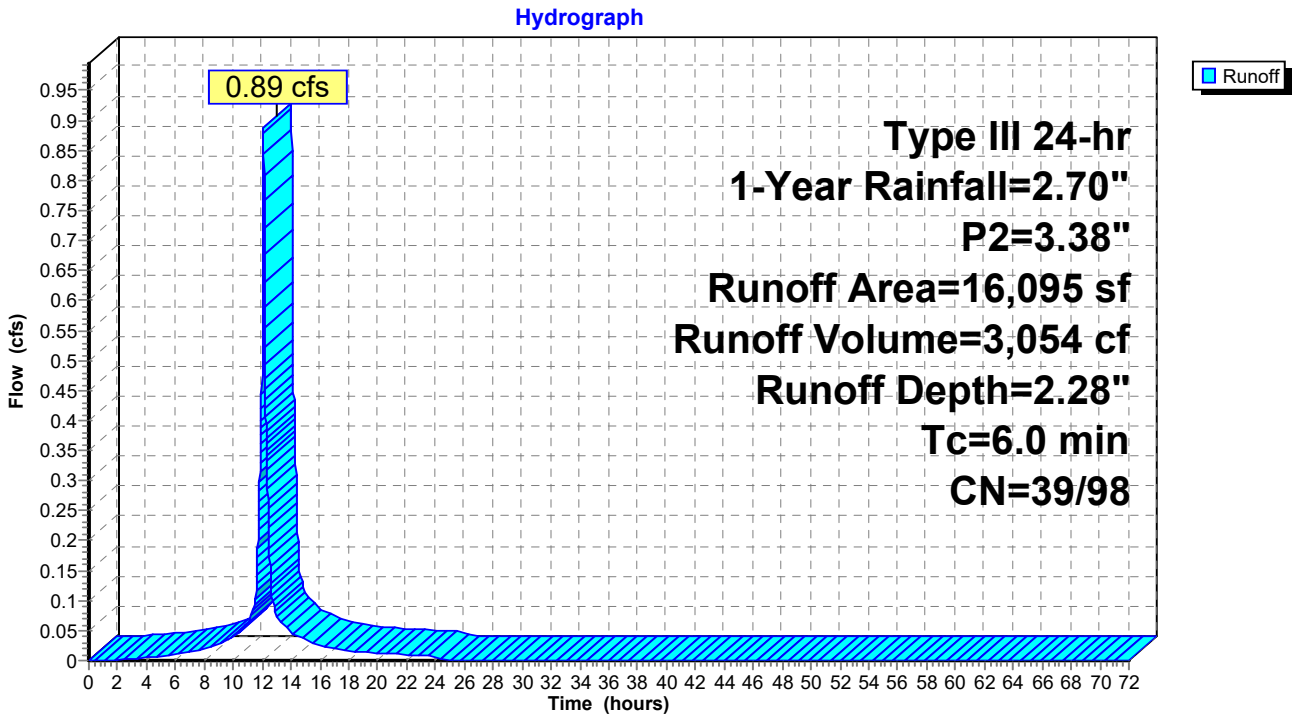
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 3,054 cf, Depth= 2.28"
Routed to Pond B-1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.70", P2=3.38"

	Area (sf)	CN	Description
*	5,200	98	Roof Area
*	9,641	98	Impervious Area
	1,254	39	>75% Grass cover, Good, HSG A
	16,095	93	Weighted Average
	1,254	39	7.79% Pervious Area
	14,841	98	92.21% Impervious Area

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

Subcatchment P-1A: Discharge to Subsurface Infiltration System



Hydrograph for Subcatchment P-1A: Discharge to Subsurface Infiltration System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	0.00	0.00
2.00	0.05	0.00	0.00	0.00
4.00	0.12	0.00	0.02	0.01
6.00	0.19	0.00	0.07	0.01
8.00	0.31	0.00	0.15	0.02
10.00	0.51	0.00	0.33	0.04
12.00	1.35	0.00	1.13	**0.56**
14.00	2.19	0.00	1.96	**0.05**
16.00	2.39	0.00	2.16	0.02
18.00	2.51	0.00	2.28	0.02
20.00	2.58	0.00	2.35	0.01
22.00	2.65	0.00	2.42	0.01
24.00	**2.70**	0.00	**2.47**	0.01
26.00	2.70	0.00	2.47	0.00
28.00	2.70	0.00	2.47	0.00
30.00	2.70	0.00	2.47	0.00
32.00	2.70	0.00	2.47	0.00
34.00	2.70	0.00	2.47	0.00
36.00	2.70	0.00	2.47	0.00
38.00	2.70	0.00	2.47	0.00
40.00	2.70	0.00	2.47	0.00
42.00	2.70	0.00	2.47	0.00
44.00	2.70	0.00	2.47	0.00
46.00	2.70	0.00	2.47	0.00
48.00	2.70	0.00	2.47	0.00
50.00	2.70	0.00	2.47	0.00
52.00	2.70	0.00	2.47	0.00
54.00	2.70	0.00	2.47	0.00
56.00	2.70	0.00	2.47	0.00
58.00	2.70	0.00	2.47	0.00
60.00	2.70	0.00	2.47	0.00
62.00	2.70	0.00	2.47	0.00
64.00	2.70	0.00	2.47	0.00
66.00	2.70	0.00	2.47	0.00
68.00	2.70	0.00	2.47	0.00
70.00	2.70	0.00	2.47	0.00
72.00	2.70	0.00	2.47	0.00

Summary for Subcatchment P-1B: Undetained Bypass to Municipal System

[45] Hint: Runoff=Zero

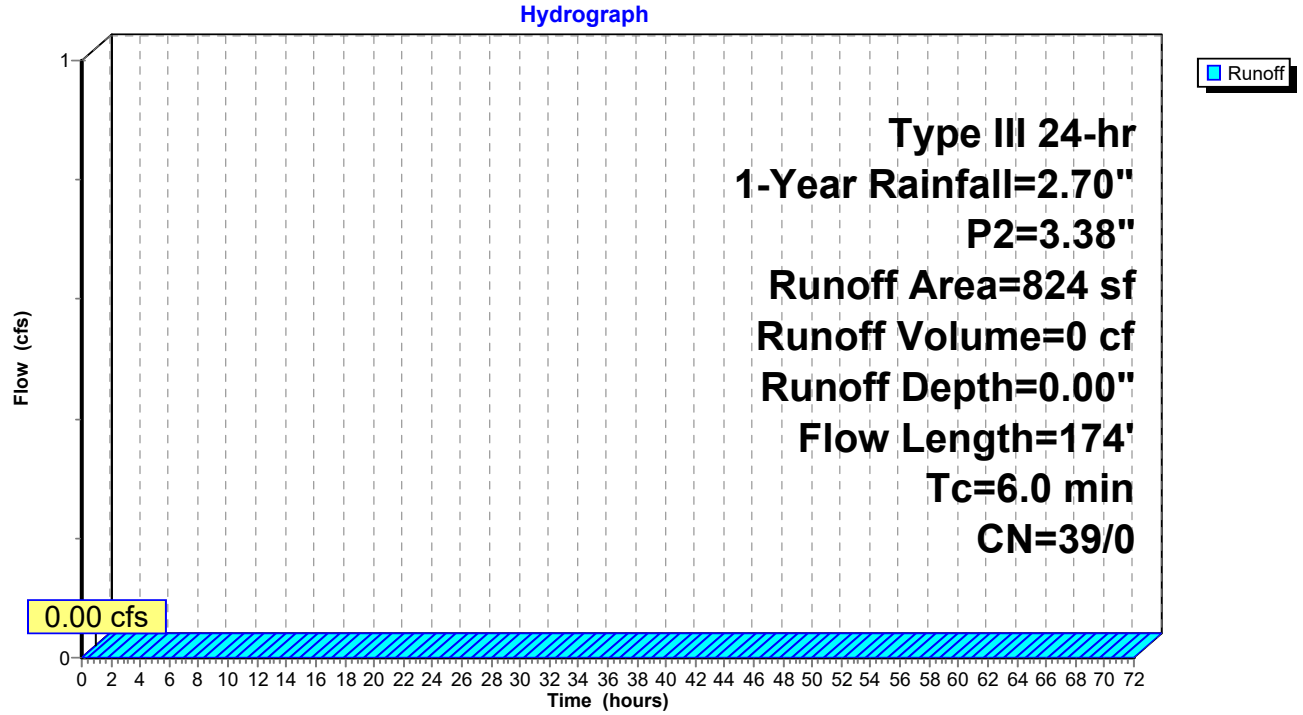
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link POI-1 : Discharge to Combined Municipal System

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.70", P2=3.38"

Area (sf)	CN	Description
824	39	>75% Grass cover, Good, HSG A
824	39	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment P-1B: Undetained Bypass to Municipal System



Hydrograph for Subcatchment P-1B: Undetained Bypass to Municipal System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	**0.00**	**0.00**	**0.00**
2.00	0.05	0.00	0.00	0.00
4.00	0.12	0.00	0.00	0.00
6.00	0.19	0.00	0.00	0.00
8.00	0.31	0.00	0.00	0.00
10.00	0.51	0.00	0.00	0.00
12.00	1.35	0.00	0.00	0.00
14.00	2.19	0.00	0.00	0.00
16.00	2.39	0.00	0.00	0.00
18.00	2.51	0.00	0.00	0.00
20.00	2.58	0.00	0.00	0.00
22.00	2.65	0.00	0.00	0.00
24.00	**2.70**	0.00	0.00	0.00
26.00	2.70	0.00	0.00	0.00
28.00	2.70	0.00	0.00	0.00
30.00	2.70	0.00	0.00	0.00
32.00	2.70	0.00	0.00	0.00
34.00	2.70	0.00	0.00	0.00
36.00	2.70	0.00	0.00	0.00
38.00	2.70	0.00	0.00	0.00
40.00	2.70	0.00	0.00	0.00
42.00	2.70	0.00	0.00	0.00
44.00	2.70	0.00	0.00	0.00
46.00	2.70	0.00	0.00	0.00
48.00	2.70	0.00	0.00	0.00
50.00	2.70	0.00	0.00	0.00
52.00	2.70	0.00	0.00	0.00
54.00	2.70	0.00	0.00	0.00
56.00	2.70	0.00	0.00	0.00
58.00	2.70	0.00	0.00	0.00
60.00	2.70	0.00	0.00	0.00
62.00	2.70	0.00	0.00	0.00
64.00	2.70	0.00	0.00	0.00
66.00	2.70	0.00	0.00	0.00
68.00	2.70	0.00	0.00	0.00
70.00	2.70	0.00	0.00	0.00
72.00	2.70	0.00	0.00	0.00

Summary for Pond B-1: Subsurface Infiltration Basin

Inflow Area = 16,095 sf, 92.21% Impervious, Inflow Depth = 2.28" for 1-Year event
Inflow = 0.89 cfs @ 12.08 hrs, Volume= 3,054 cf
Outflow = 0.11 cfs @ 12.63 hrs, Volume= 3,054 cf, Atten= 88%, Lag= 32.9 min
Discarded = 0.11 cfs @ 12.63 hrs, Volume= 3,054 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POI-1 : Discharge to Combined Municipal System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 64.13' @ 12.63 hrs Surf.Area= 1,394 sf Storage= 993 cf

Plug-Flow detention time= 62.5 min calculated for 3,054 cf (100% of inflow)
Center-of-Mass det. time= 62.5 min (822.7 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.00'	1,346 cf	**30.00'W x 46.47'L x 3.75'H Field A** 5,228 cf Overall - 1,862 cf Embedded = 3,365 cf x 40.0% Voids
#2A	63.50'	1,862 cf	**ADS_StormTech SC-800 +Cap** x 36 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 36 Chambers in 6 Rows Cap Storage= 3.4 cf x 2 x 6 rows = 41.0 cf
		3,208 cf	Total Available Storage

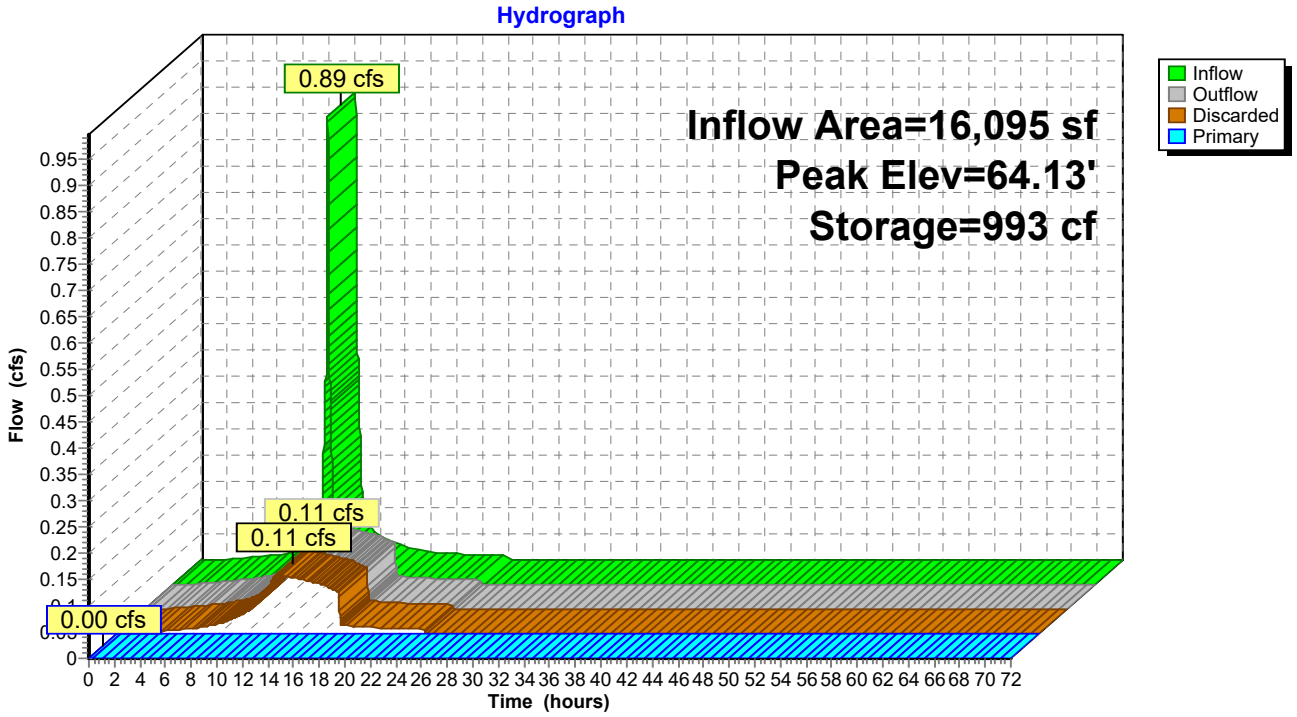
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	66.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.00'	**2.410 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 59.00' Phase-In= 0.01'

Discarded OutFlow Max=0.11 cfs @ 12.63 hrs HW=64.13' (Free Discharge)
↑└**1=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.00' TW=0.00' (Dynamic Tailwater)

Pond B-1: Subsurface Infiltration Basin



Hydrograph for Pond B-1: Subsurface Infiltration Basin

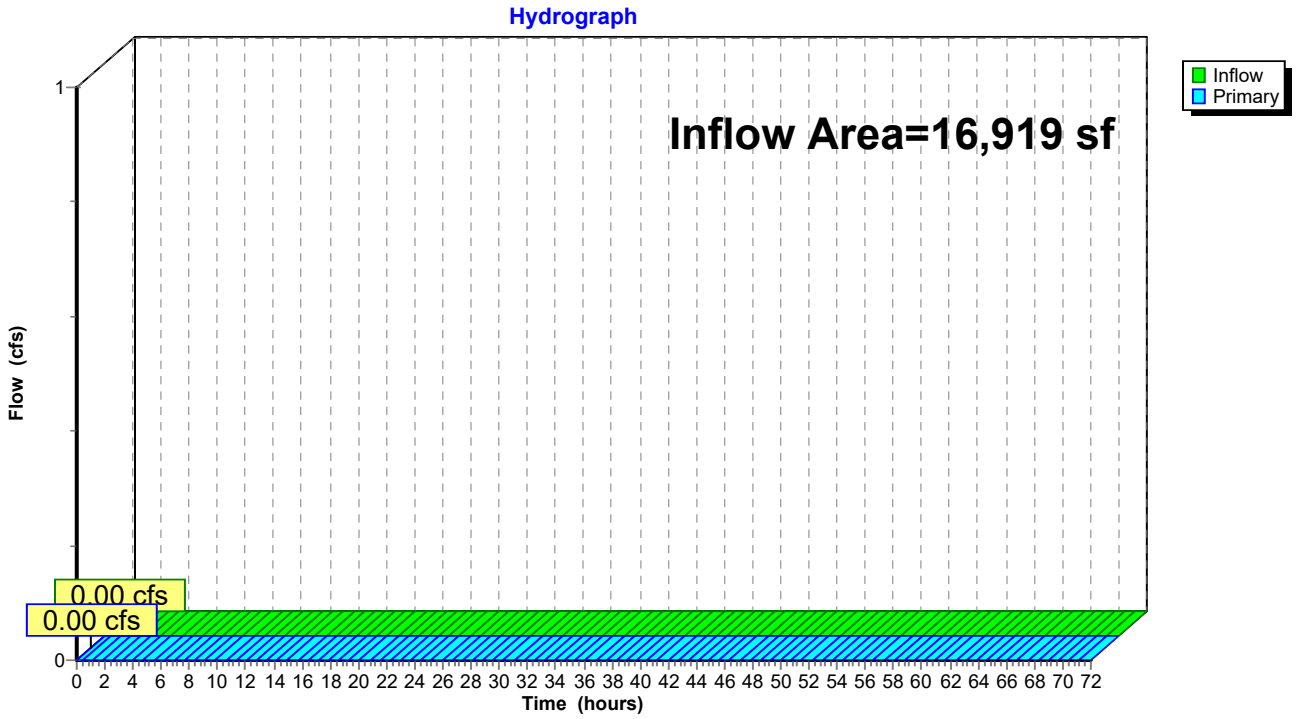
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	63.00	0.00	0.00	**0.00**
2.00	0.00	0	63.00	0.00	0.00	0.00
4.00	0.01	0	63.00	0.01	0.01	0.00
6.00	0.01	1	63.00	0.01	0.01	0.00
8.00	0.02	1	63.00	0.02	0.02	0.00
10.00	0.04	3	63.01	0.04	0.04	0.00
12.00	**0.56**	**303**	**63.52**	**0.09**	**0.09**	0.00
14.00	**0.05**	**790**	**63.95**	**0.11**	**0.11**	0.00
16.00	0.02	330	63.55	0.09	0.09	0.00
18.00	0.02	1	63.00	0.02	0.02	0.00
20.00	0.01	1	63.00	0.01	0.01	0.00
22.00	0.01	1	63.00	0.01	0.01	0.00
24.00	0.01	1	63.00	0.01	0.01	0.00
26.00	0.00	0	63.00	0.00	0.00	0.00
28.00	0.00	0	63.00	0.00	0.00	0.00
30.00	0.00	0	63.00	0.00	0.00	0.00
32.00	0.00	0	63.00	0.00	0.00	0.00
34.00	0.00	0	63.00	0.00	0.00	0.00
36.00	0.00	0	63.00	0.00	0.00	0.00
38.00	0.00	0	63.00	0.00	0.00	0.00
40.00	0.00	0	63.00	0.00	0.00	0.00
42.00	0.00	0	63.00	0.00	0.00	0.00
44.00	0.00	0	63.00	0.00	0.00	0.00
46.00	0.00	0	63.00	0.00	0.00	0.00
48.00	0.00	0	63.00	0.00	0.00	0.00
50.00	0.00	0	63.00	0.00	0.00	0.00
52.00	0.00	0	63.00	0.00	0.00	0.00
54.00	0.00	0	63.00	0.00	0.00	0.00
56.00	0.00	0	63.00	0.00	0.00	0.00
58.00	0.00	0	63.00	0.00	0.00	0.00
60.00	0.00	0	63.00	0.00	0.00	0.00
62.00	0.00	0	63.00	0.00	0.00	0.00
64.00	0.00	0	63.00	0.00	0.00	0.00
66.00	0.00	0	63.00	0.00	0.00	0.00
68.00	0.00	0	63.00	0.00	0.00	0.00
70.00	0.00	0	63.00	0.00	0.00	0.00
72.00	0.00	0	63.00	0.00	0.00	0.00

Summary for Link POI-1: Discharge to Combined Municipal System

Inflow Area = 16,919 sf, 87.72% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POI-1: Discharge to Combined Municipal System



Hydrograph for Link POI-1: Discharge to Combined Municipal System

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	**0.00**	**0.00**	**0.00**
2.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
12.00	0.00	0.00	0.00
14.00	0.00	0.00	0.00
16.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00
52.00	0.00	0.00	0.00
54.00	0.00	0.00	0.00
56.00	0.00	0.00	0.00
58.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00
62.00	0.00	0.00	0.00
64.00	0.00	0.00	0.00
66.00	0.00	0.00	0.00
68.00	0.00	0.00	0.00
70.00	0.00	0.00	0.00
72.00	0.00	0.00	0.00

APPENDIX C-4
2-YEAR STORM EVENT HYDROGRAPHS

Summary for Subcatchment EX-1: Existing Discharge to Municipal Combined System

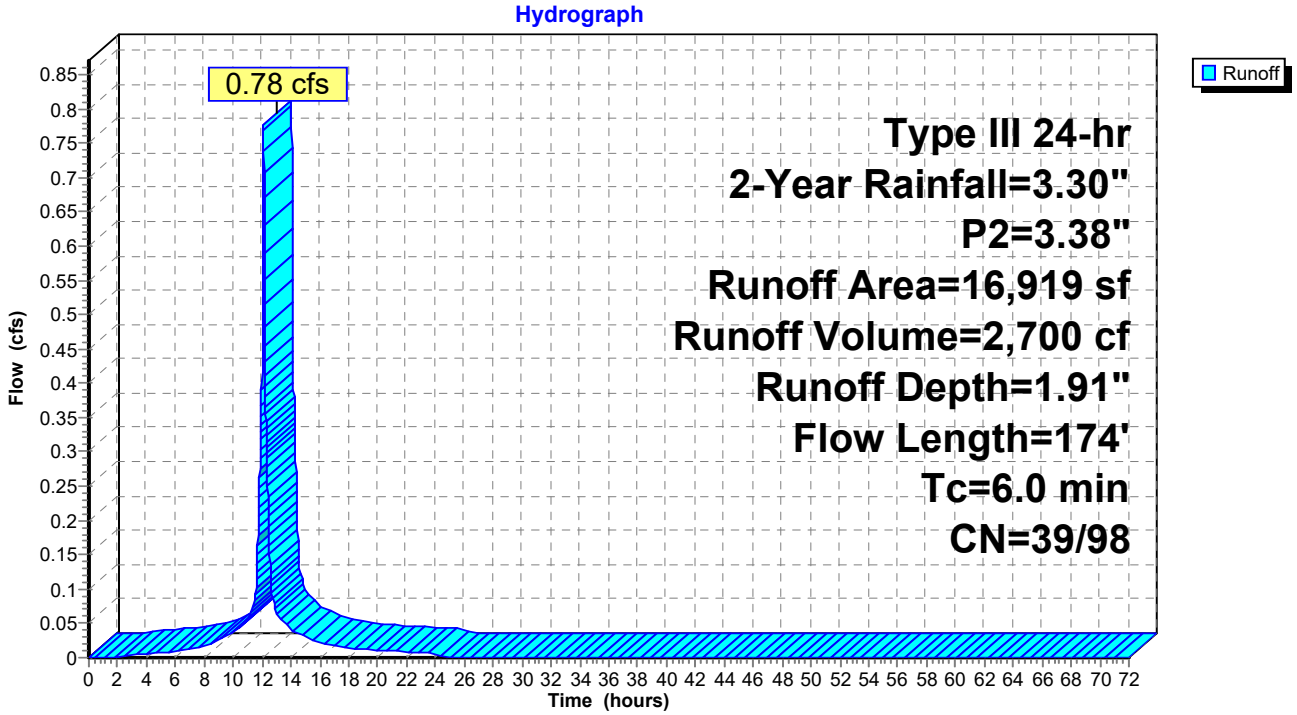
Runoff = 0.78 cfs @ 12.08 hrs, Volume= 2,700 cf, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.30", P2=3.38"

	Area (sf)	CN	Description
*	10,559	98	Impervious Area
	6,360	39	>75% Grass cover, Good, HSG A
	16,919	76	Weighted Average
	6,360	39	37.59% Pervious Area
	10,559	98	62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: Existing Discharge to Municipal Combined System



Hydrograph for Subcatchment EX-1: Existing Discharge to Municipal Combined System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.07	0.00	0.00	0.00
4.00	0.14	0.00	0.03	0.01
6.00	0.24	0.00	0.10	0.01
8.00	0.38	0.00	0.21	0.02
10.00	0.62	0.00	0.43	0.04
12.00	1.65	0.00	1.43	**0.49**
14.00	2.68	0.00	2.45	**0.04**
16.00	2.92	0.00	2.69	0.02
18.00	3.06	0.00	2.83	0.01
20.00	3.16	0.00	2.93	0.01
22.00	3.24	0.00	3.00	0.01
24.00	**3.30**	**0.00**	**3.07**	0.01
26.00	3.30	0.00	3.07	0.00
28.00	3.30	0.00	3.07	0.00
30.00	3.30	0.00	3.07	0.00
32.00	3.30	0.00	3.07	0.00
34.00	3.30	0.00	3.07	0.00
36.00	3.30	0.00	3.07	0.00
38.00	3.30	0.00	3.07	0.00
40.00	3.30	0.00	3.07	0.00
42.00	3.30	0.00	3.07	0.00
44.00	3.30	0.00	3.07	0.00
46.00	3.30	0.00	3.07	0.00
48.00	3.30	0.00	3.07	0.00
50.00	3.30	0.00	3.07	0.00
52.00	3.30	0.00	3.07	0.00
54.00	3.30	0.00	3.07	0.00
56.00	3.30	0.00	3.07	0.00
58.00	3.30	0.00	3.07	0.00
60.00	3.30	0.00	3.07	0.00
62.00	3.30	0.00	3.07	0.00
64.00	3.30	0.00	3.07	0.00
66.00	3.30	0.00	3.07	0.00
68.00	3.30	0.00	3.07	0.00
70.00	3.30	0.00	3.07	0.00
72.00	3.30	0.00	3.07	0.00

Summary for Subcatchment P-1A: Discharge to Subsurface Infiltration System

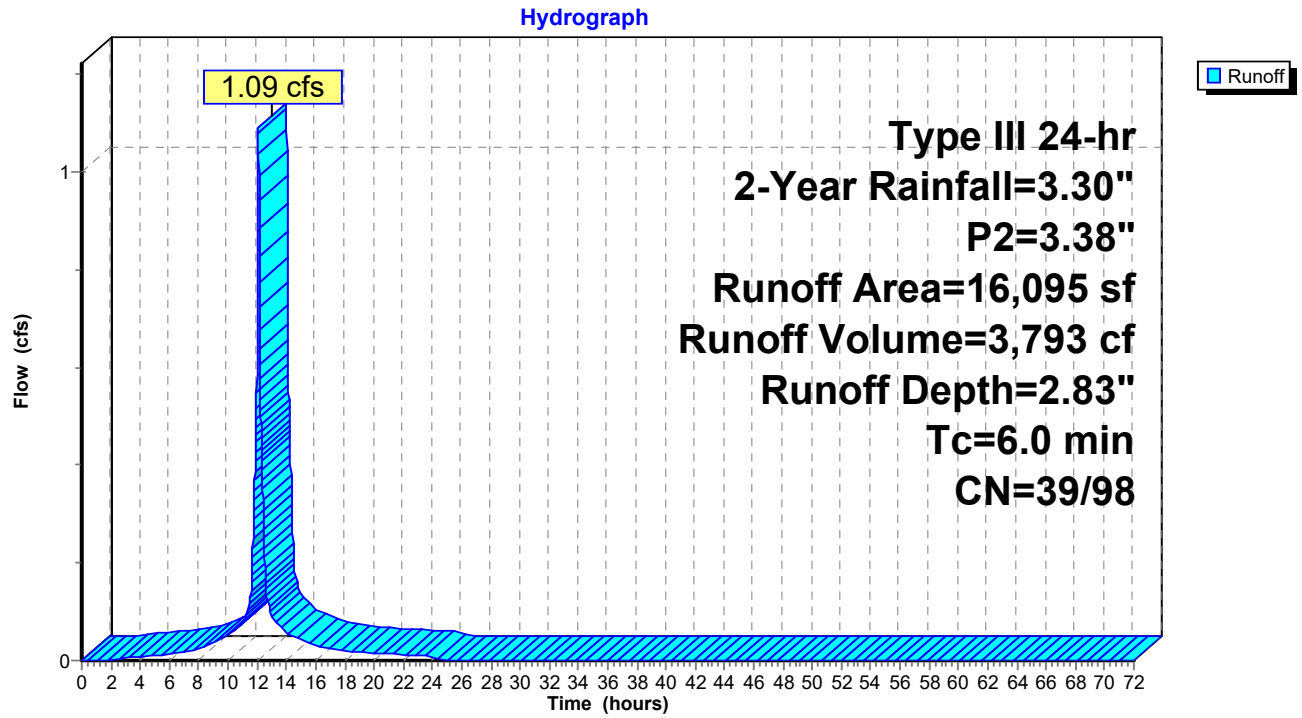
Runoff = 1.09 cfs @ 12.08 hrs, Volume= 3,793 cf, Depth= 2.83"
Routed to Pond B-1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.30", P2=3.38"

	Area (sf)	CN	Description
*	5,200	98	Roof Area
*	9,641	98	Impervious Area
	1,254	39	>75% Grass cover, Good, HSG A
	16,095	93	Weighted Average
	1,254	39	7.79% Pervious Area
	14,841	98	92.21% Impervious Area

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

Subcatchment P-1A: Discharge to Subsurface Infiltration System



Hydrograph for Subcatchment P-1A: Discharge to Subsurface Infiltration System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.07	0.00	0.00	0.00
4.00	0.14	0.00	0.03	0.01
6.00	0.24	0.00	0.10	0.01
8.00	0.38	0.00	0.21	0.02
10.00	0.62	0.00	0.43	0.05
12.00	1.65	0.00	1.43	**0.69**
14.00	2.68	0.00	2.45	**0.06**
16.00	2.92	0.00	2.69	0.03
18.00	3.06	0.00	2.83	0.02
20.00	3.16	0.00	2.93	0.01
22.00	3.24	0.00	3.00	0.01
24.00	**3.30**	**0.00**	**3.07**	0.01
26.00	3.30	0.00	3.07	0.00
28.00	3.30	0.00	3.07	0.00
30.00	3.30	0.00	3.07	0.00
32.00	3.30	0.00	3.07	0.00
34.00	3.30	0.00	3.07	0.00
36.00	3.30	0.00	3.07	0.00
38.00	3.30	0.00	3.07	0.00
40.00	3.30	0.00	3.07	0.00
42.00	3.30	0.00	3.07	0.00
44.00	3.30	0.00	3.07	0.00
46.00	3.30	0.00	3.07	0.00
48.00	3.30	0.00	3.07	0.00
50.00	3.30	0.00	3.07	0.00
52.00	3.30	0.00	3.07	0.00
54.00	3.30	0.00	3.07	0.00
56.00	3.30	0.00	3.07	0.00
58.00	3.30	0.00	3.07	0.00
60.00	3.30	0.00	3.07	0.00
62.00	3.30	0.00	3.07	0.00
64.00	3.30	0.00	3.07	0.00
66.00	3.30	0.00	3.07	0.00
68.00	3.30	0.00	3.07	0.00
70.00	3.30	0.00	3.07	0.00
72.00	3.30	0.00	3.07	0.00

Summary for Subcatchment P-1B: Undetained Bypass to Municipal System

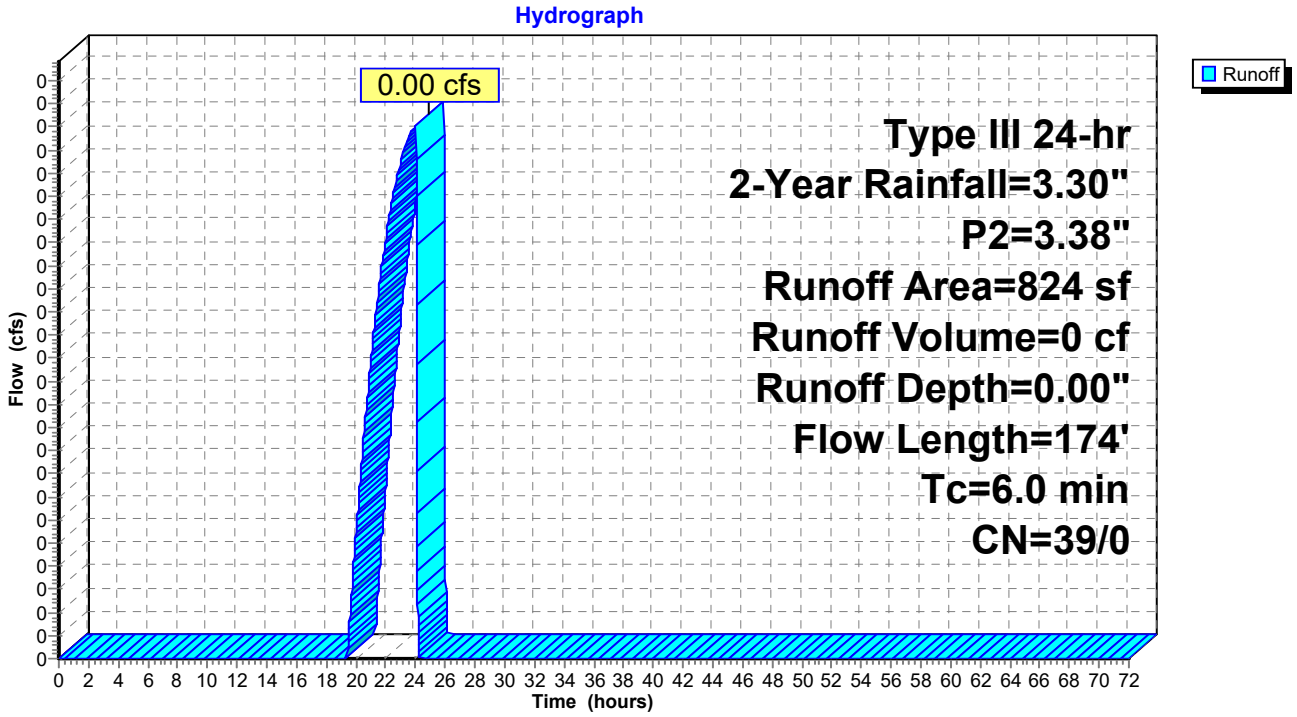
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link POI-1 : Discharge to Combined Municipal System

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.30", P2=3.38"

Area (sf)	CN	Description
824	39	>75% Grass cover, Good, HSG A
824	39	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment P-1B: Undetained Bypass to Municipal System



Hydrograph for Subcatchment P-1B: Undetained Bypass to Municipal System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
2.00	0.07	0.00	0.00	0.00
4.00	0.14	0.00	0.00	0.00
6.00	0.24	0.00	0.00	0.00
8.00	0.38	0.00	0.00	0.00
10.00	0.62	0.00	0.00	0.00
12.00	1.65	0.00	0.00	0.00
14.00	2.68	0.00	0.00	0.00
16.00	2.92	0.00	0.00	0.00
18.00	3.06	0.00	0.00	0.00
20.00	3.16	0.00	0.00	0.00
22.00	3.24	0.00	0.00	0.00
24.00	**3.30**	**0.00**	0.00	**0.00**
26.00	3.30	0.00	0.00	**0.00**
28.00	3.30	0.00	0.00	0.00
30.00	3.30	0.00	0.00	0.00
32.00	3.30	0.00	0.00	0.00
34.00	3.30	0.00	0.00	0.00
36.00	3.30	0.00	0.00	0.00
38.00	3.30	0.00	0.00	0.00
40.00	3.30	0.00	0.00	0.00
42.00	3.30	0.00	0.00	0.00
44.00	3.30	0.00	0.00	0.00
46.00	3.30	0.00	0.00	0.00
48.00	3.30	0.00	0.00	0.00
50.00	3.30	0.00	0.00	0.00
52.00	3.30	0.00	0.00	0.00
54.00	3.30	0.00	0.00	0.00
56.00	3.30	0.00	0.00	0.00
58.00	3.30	0.00	0.00	0.00
60.00	3.30	0.00	0.00	0.00
62.00	3.30	0.00	0.00	0.00
64.00	3.30	0.00	0.00	0.00
66.00	3.30	0.00	0.00	0.00
68.00	3.30	0.00	0.00	0.00
70.00	3.30	0.00	0.00	0.00
72.00	3.30	0.00	0.00	0.00

Summary for Pond B-1: Subsurface Infiltration Basin

Inflow Area = 16,095 sf, 92.21% Impervious, Inflow Depth = 2.83" for 2-Year event
Inflow = 1.09 cfs @ 12.08 hrs, Volume= 3,793 cf
Outflow = 0.12 cfs @ 12.73 hrs, Volume= 3,793 cf, Atten= 89%, Lag= 39.1 min
Discarded = 0.12 cfs @ 12.73 hrs, Volume= 3,793 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POI-1 : Discharge to Combined Municipal System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 64.43' @ 12.73 hrs Surf.Area= 1,394 sf Storage= 1,314 cf

Plug-Flow detention time= 82.0 min calculated for 3,793 cf (100% of inflow)
Center-of-Mass det. time= 82.0 min (837.8 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.00'	1,346 cf	**30.00'W x 46.47'L x 3.75'H Field A** 5,228 cf Overall - 1,862 cf Embedded = 3,365 cf x 40.0% Voids
#2A	63.50'	1,862 cf	**ADS_StormTech SC-800 +Cap** x 36 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 36 Chambers in 6 Rows Cap Storage= 3.4 cf x 2 x 6 rows = 41.0 cf
		3,208 cf	Total Available Storage

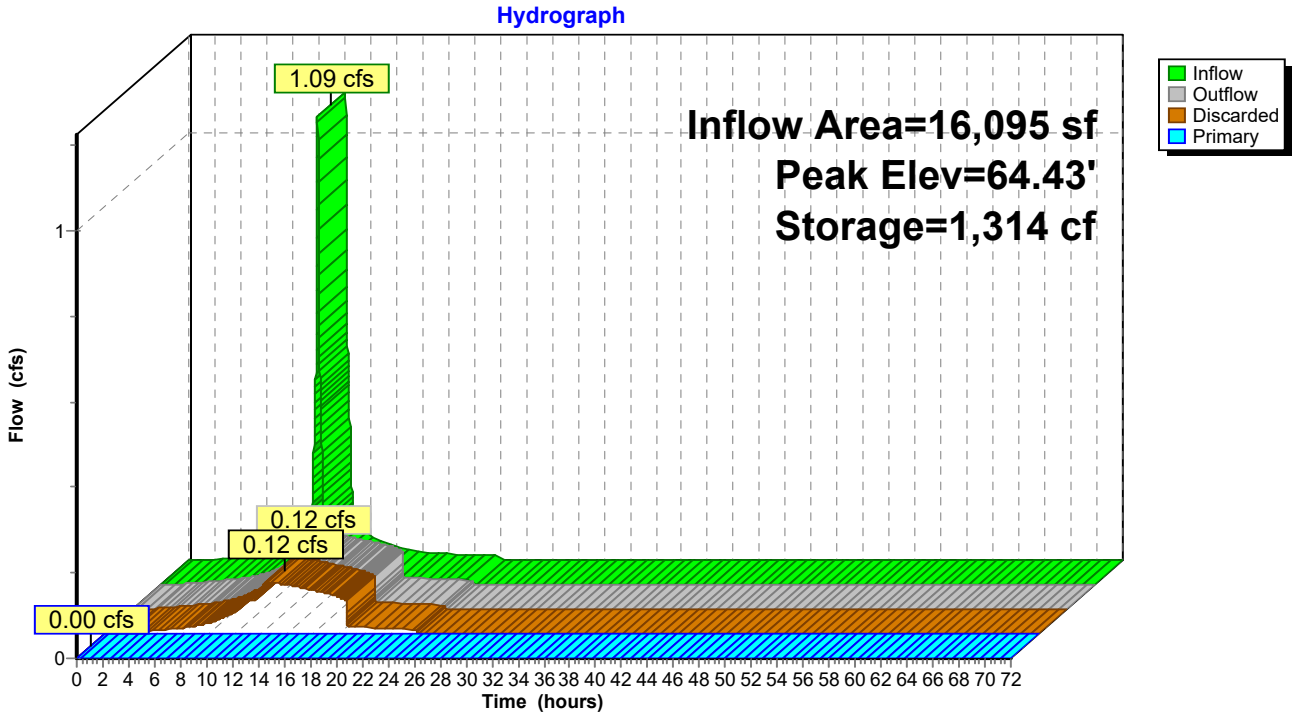
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	66.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.00'	**2.410 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 59.00' Phase-In= 0.01'

Discarded OutFlow Max=0.12 cfs @ 12.73 hrs HW=64.43' (Free Discharge)
↑**1=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.00' TW=0.00' (Dynamic Tailwater)

Pond B-1: Subsurface Infiltration Basin



Hydrograph for Pond B-1: Subsurface Infiltration Basin

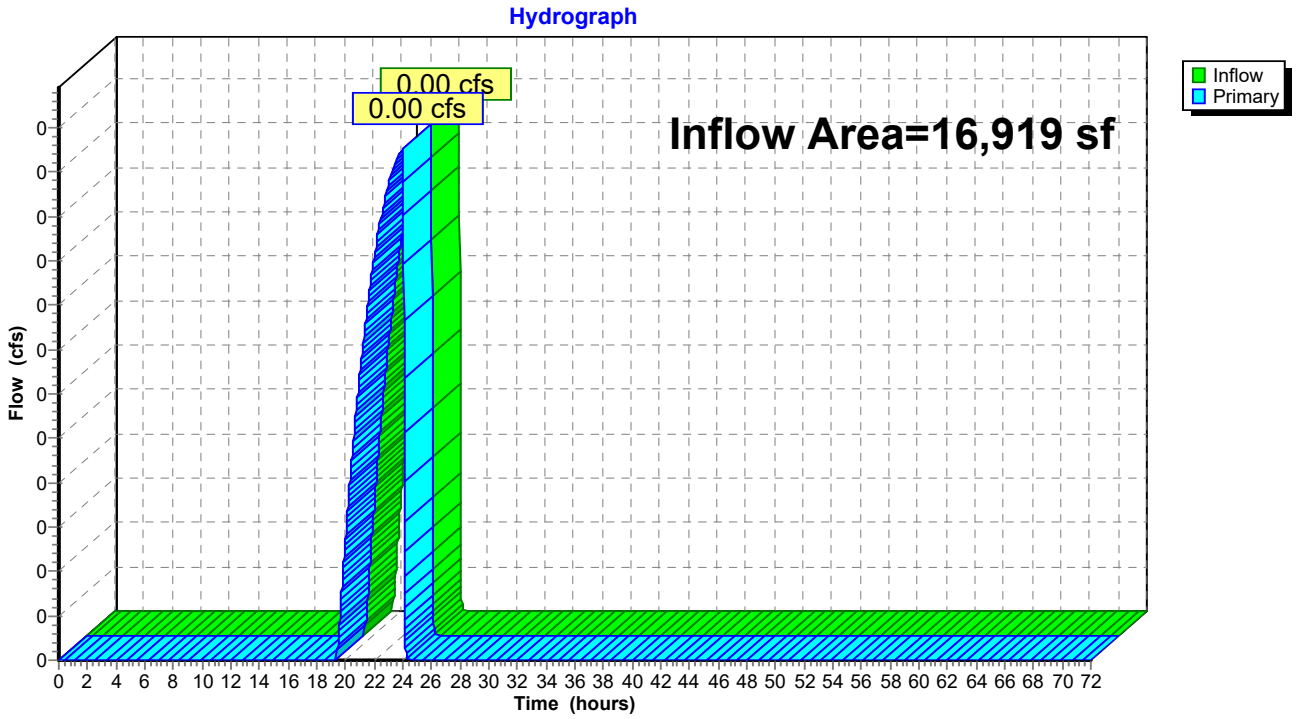
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	63.00	0.00	0.00	**0.00**
2.00	0.00	0	63.00	0.00	0.00	0.00
4.00	0.01	1	63.00	0.01	0.01	0.00
6.00	0.01	1	63.00	0.01	0.01	0.00
8.00	0.02	2	63.00	0.02	0.02	0.00
10.00	0.05	4	63.01	0.05	0.05	0.00
12.00	**0.69**	**425**	**63.63**	**0.10**	**0.10**	0.00
14.00	**0.06**	**1,137**	**64.26**	**0.11**	**0.11**	0.00
16.00	0.03	669	63.84	0.10	0.10	0.00
18.00	0.02	159	63.29	0.09	0.09	0.00
20.00	0.01	1	63.00	0.01	0.01	0.00
22.00	0.01	1	63.00	0.01	0.01	0.00
24.00	0.01	1	63.00	0.01	0.01	0.00
26.00	0.00	0	63.00	0.00	0.00	0.00
28.00	0.00	0	63.00	0.00	0.00	0.00
30.00	0.00	0	63.00	0.00	0.00	0.00
32.00	0.00	0	63.00	0.00	0.00	0.00
34.00	0.00	0	63.00	0.00	0.00	0.00
36.00	0.00	0	63.00	0.00	0.00	0.00
38.00	0.00	0	63.00	0.00	0.00	0.00
40.00	0.00	0	63.00	0.00	0.00	0.00
42.00	0.00	0	63.00	0.00	0.00	0.00
44.00	0.00	0	63.00	0.00	0.00	0.00
46.00	0.00	0	63.00	0.00	0.00	0.00
48.00	0.00	0	63.00	0.00	0.00	0.00
50.00	0.00	0	63.00	0.00	0.00	0.00
52.00	0.00	0	63.00	0.00	0.00	0.00
54.00	0.00	0	63.00	0.00	0.00	0.00
56.00	0.00	0	63.00	0.00	0.00	0.00
58.00	0.00	0	63.00	0.00	0.00	0.00
60.00	0.00	0	63.00	0.00	0.00	0.00
62.00	0.00	0	63.00	0.00	0.00	0.00
64.00	0.00	0	63.00	0.00	0.00	0.00
66.00	0.00	0	63.00	0.00	0.00	0.00
68.00	0.00	0	63.00	0.00	0.00	0.00
70.00	0.00	0	63.00	0.00	0.00	0.00
72.00	0.00	0	63.00	0.00	0.00	0.00

Summary for Link POI-1: Discharge to Combined Municipal System

Inflow Area = 16,919 sf, 87.72% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 24.01 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POI-1: Discharge to Combined Municipal System



Hydrograph for Link POI-1: Discharge to Combined Municipal System

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
2.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
12.00	0.00	0.00	0.00
14.00	0.00	0.00	0.00
16.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
24.00	**0.00**	0.00	**0.00**
26.00	**0.00**	0.00	**0.00**
28.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00
52.00	0.00	0.00	0.00
54.00	0.00	0.00	0.00
56.00	0.00	0.00	0.00
58.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00
62.00	0.00	0.00	0.00
64.00	0.00	0.00	0.00
66.00	0.00	0.00	0.00
68.00	0.00	0.00	0.00
70.00	0.00	0.00	0.00
72.00	0.00	0.00	0.00

APPENDIX C-5
10-YEAR STORM EVENT HYDROGRAPHS

Summary for Subcatchment EX-1: Existing Discharge to Municipal Combined System

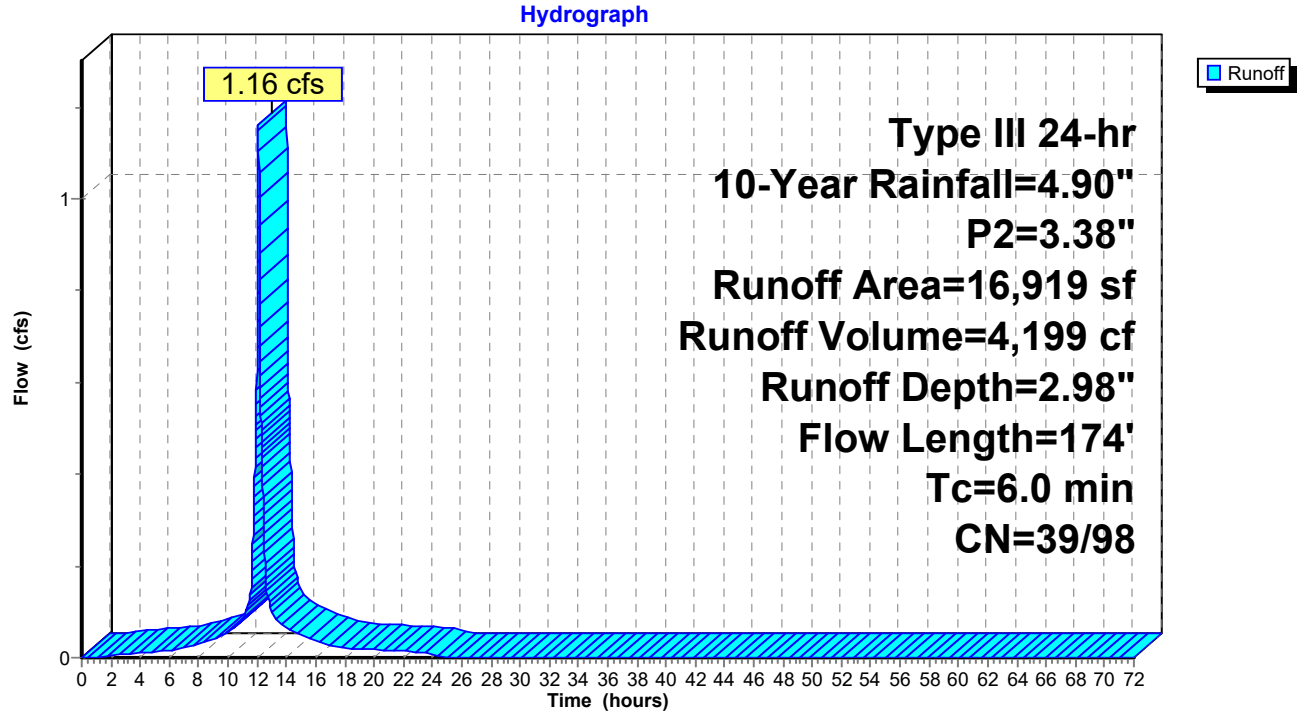
Runoff = 1.16 cfs @ 12.08 hrs, Volume= 4,199 cf, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.90", P2=3.38"

	Area (sf)	CN	Description
*	10,559	98	Impervious Area
	6,360	39	>75% Grass cover, Good, HSG A
	16,919	76	Weighted Average
	6,360	39	37.59% Pervious Area
	10,559	98	62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: Existing Discharge to Municipal Combined System



Hydrograph for Subcatchment EX-1: Existing Discharge to Municipal Combined System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.10	0.00	0.01	0.00
4.00	0.21	0.00	0.08	0.01
6.00	0.35	0.00	0.19	0.02
8.00	0.56	0.00	0.37	0.03
10.00	0.93	0.00	0.72	0.06
12.00	2.45	0.00	2.22	**0.73**
14.00	3.97	0.04	3.74	**0.06**
16.00	4.34	0.09	4.11	0.04
18.00	4.55	0.12	4.31	0.02
20.00	4.69	0.14	4.45	0.02
22.00	4.81	0.16	4.57	0.01
24.00	**4.90**	**0.18**	**4.66**	0.01
26.00	4.90	0.18	4.66	0.00
28.00	4.90	0.18	4.66	0.00
30.00	4.90	0.18	4.66	0.00
32.00	4.90	0.18	4.66	0.00
34.00	4.90	0.18	4.66	0.00
36.00	4.90	0.18	4.66	0.00
38.00	4.90	0.18	4.66	0.00
40.00	4.90	0.18	4.66	0.00
42.00	4.90	0.18	4.66	0.00
44.00	4.90	0.18	4.66	0.00
46.00	4.90	0.18	4.66	0.00
48.00	4.90	0.18	4.66	0.00
50.00	4.90	0.18	4.66	0.00
52.00	4.90	0.18	4.66	0.00
54.00	4.90	0.18	4.66	0.00
56.00	4.90	0.18	4.66	0.00
58.00	4.90	0.18	4.66	0.00
60.00	4.90	0.18	4.66	0.00
62.00	4.90	0.18	4.66	0.00
64.00	4.90	0.18	4.66	0.00
66.00	4.90	0.18	4.66	0.00
68.00	4.90	0.18	4.66	0.00
70.00	4.90	0.18	4.66	0.00
72.00	4.90	0.18	4.66	0.00

Summary for Subcatchment P-1A: Discharge to Subsurface Infiltration System

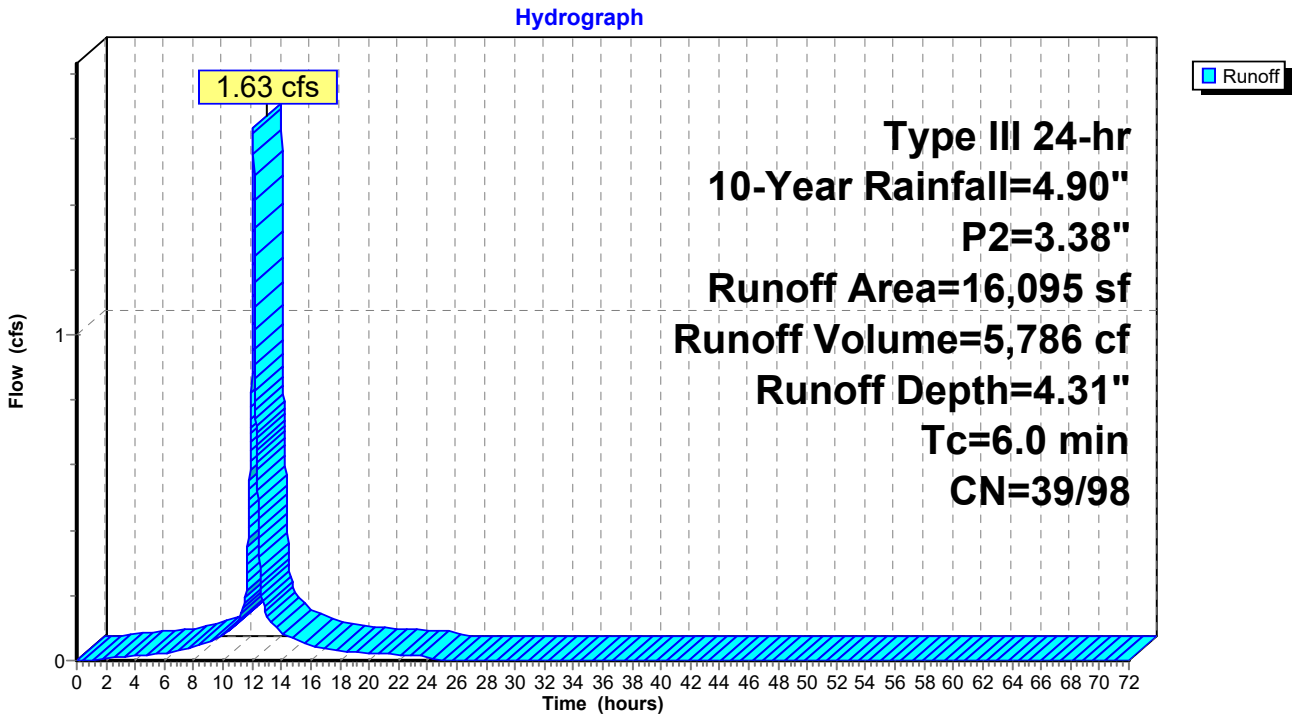
Runoff = 1.63 cfs @ 12.08 hrs, Volume= 5,786 cf, Depth= 4.31"
Routed to Pond B-1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.90", P2=3.38"

	Area (sf)	CN	Description
*	5,200	98	Roof Area
*	9,641	98	Impervious Area
	1,254	39	>75% Grass cover, Good, HSG A
	16,095	93	Weighted Average
	1,254	39	7.79% Pervious Area
	14,841	98	92.21% Impervious Area

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

Subcatchment P-1A: Discharge to Subsurface Infiltration System



Hydrograph for Subcatchment P-1A: Discharge to Subsurface Infiltration System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.10	0.00	0.01	0.01
4.00	0.21	0.00	0.08	0.01
6.00	0.35	0.00	0.19	0.02
8.00	0.56	0.00	0.37	0.04
10.00	0.93	0.00	0.72	0.08
12.00	2.45	0.00	2.22	**1.03**
14.00	3.97	0.04	3.74	**0.09**
16.00	4.34	0.09	4.11	0.05
18.00	4.55	0.12	4.31	0.03
20.00	4.69	0.14	4.45	0.02
22.00	4.81	0.16	4.57	0.02
24.00	**4.90**	**0.18**	**4.66**	0.01
26.00	4.90	0.18	4.66	0.00
28.00	4.90	0.18	4.66	0.00
30.00	4.90	0.18	4.66	0.00
32.00	4.90	0.18	4.66	0.00
34.00	4.90	0.18	4.66	0.00
36.00	4.90	0.18	4.66	0.00
38.00	4.90	0.18	4.66	0.00
40.00	4.90	0.18	4.66	0.00
42.00	4.90	0.18	4.66	0.00
44.00	4.90	0.18	4.66	0.00
46.00	4.90	0.18	4.66	0.00
48.00	4.90	0.18	4.66	0.00
50.00	4.90	0.18	4.66	0.00
52.00	4.90	0.18	4.66	0.00
54.00	4.90	0.18	4.66	0.00
56.00	4.90	0.18	4.66	0.00
58.00	4.90	0.18	4.66	0.00
60.00	4.90	0.18	4.66	0.00
62.00	4.90	0.18	4.66	0.00
64.00	4.90	0.18	4.66	0.00
66.00	4.90	0.18	4.66	0.00
68.00	4.90	0.18	4.66	0.00
70.00	4.90	0.18	4.66	0.00
72.00	4.90	0.18	4.66	0.00

Summary for Subcatchment P-1B: Undetained Bypass to Municipal System

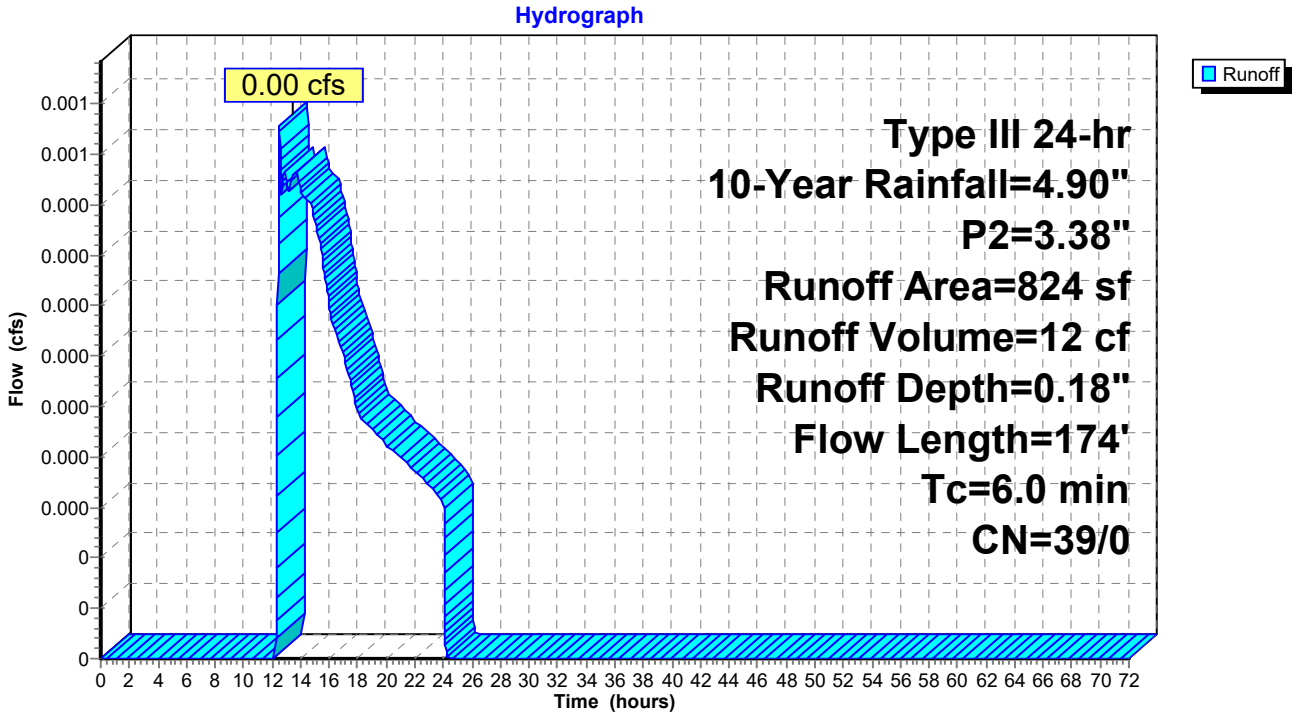
Runoff = 0.00 cfs @ 12.50 hrs, Volume= 12 cf, Depth= 0.18"
Routed to Link POI-1 : Discharge to Combined Municipal System

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.90", P2=3.38"

Area (sf)	CN	Description
824	39	>75% Grass cover, Good, HSG A
824	39	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment P-1B: Undetained Bypass to Municipal System



Hydrograph for Subcatchment P-1B: Undetained Bypass to Municipal System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
2.00	0.10	0.00	0.00	0.00
4.00	0.21	0.00	0.00	0.00
6.00	0.35	0.00	0.00	0.00
8.00	0.56	0.00	0.00	0.00
10.00	0.93	0.00	0.00	0.00
12.00	2.45	0.00	0.00	**0.00**
14.00	3.97	0.04	0.00	**0.00**
16.00	4.34	0.09	0.00	0.00
18.00	4.55	0.12	0.00	0.00
20.00	4.69	0.14	0.00	0.00
22.00	4.81	0.16	0.00	0.00
24.00	**4.90**	**0.18**	0.00	0.00
26.00	4.90	0.18	0.00	0.00
28.00	4.90	0.18	0.00	0.00
30.00	4.90	0.18	0.00	0.00
32.00	4.90	0.18	0.00	0.00
34.00	4.90	0.18	0.00	0.00
36.00	4.90	0.18	0.00	0.00
38.00	4.90	0.18	0.00	0.00
40.00	4.90	0.18	0.00	0.00
42.00	4.90	0.18	0.00	0.00
44.00	4.90	0.18	0.00	0.00
46.00	4.90	0.18	0.00	0.00
48.00	4.90	0.18	0.00	0.00
50.00	4.90	0.18	0.00	0.00
52.00	4.90	0.18	0.00	0.00
54.00	4.90	0.18	0.00	0.00
56.00	4.90	0.18	0.00	0.00
58.00	4.90	0.18	0.00	0.00
60.00	4.90	0.18	0.00	0.00
62.00	4.90	0.18	0.00	0.00
64.00	4.90	0.18	0.00	0.00
66.00	4.90	0.18	0.00	0.00
68.00	4.90	0.18	0.00	0.00
70.00	4.90	0.18	0.00	0.00
72.00	4.90	0.18	0.00	0.00

Summary for Pond B-1: Subsurface Infiltration Basin

Inflow Area = 16,095 sf, 92.21% Impervious, Inflow Depth = 4.31" for 10-Year event
Inflow = 1.63 cfs @ 12.08 hrs, Volume= 5,786 cf
Outflow = 0.15 cfs @ 12.93 hrs, Volume= 5,786 cf, Atten= 91%, Lag= 50.7 min
Discarded = 0.15 cfs @ 12.93 hrs, Volume= 5,786 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POI-1 : Discharge to Combined Municipal System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 65.36' @ 12.93 hrs Surf.Area= 1,394 sf Storage= 2,249 cf

Plug-Flow detention time= 130.6 min calculated for 5,785 cf (100% of inflow)
Center-of-Mass det. time= 130.6 min (879.9 - 749.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.00'	1,346 cf	**30.00'W x 46.47'L x 3.75'H Field A** 5,228 cf Overall - 1,862 cf Embedded = 3,365 cf x 40.0% Voids
#2A	63.50'	1,862 cf	**ADS_StormTech SC-800 +Cap** x 36 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 36 Chambers in 6 Rows Cap Storage= 3.4 cf x 2 x 6 rows = 41.0 cf
		3,208 cf	Total Available Storage

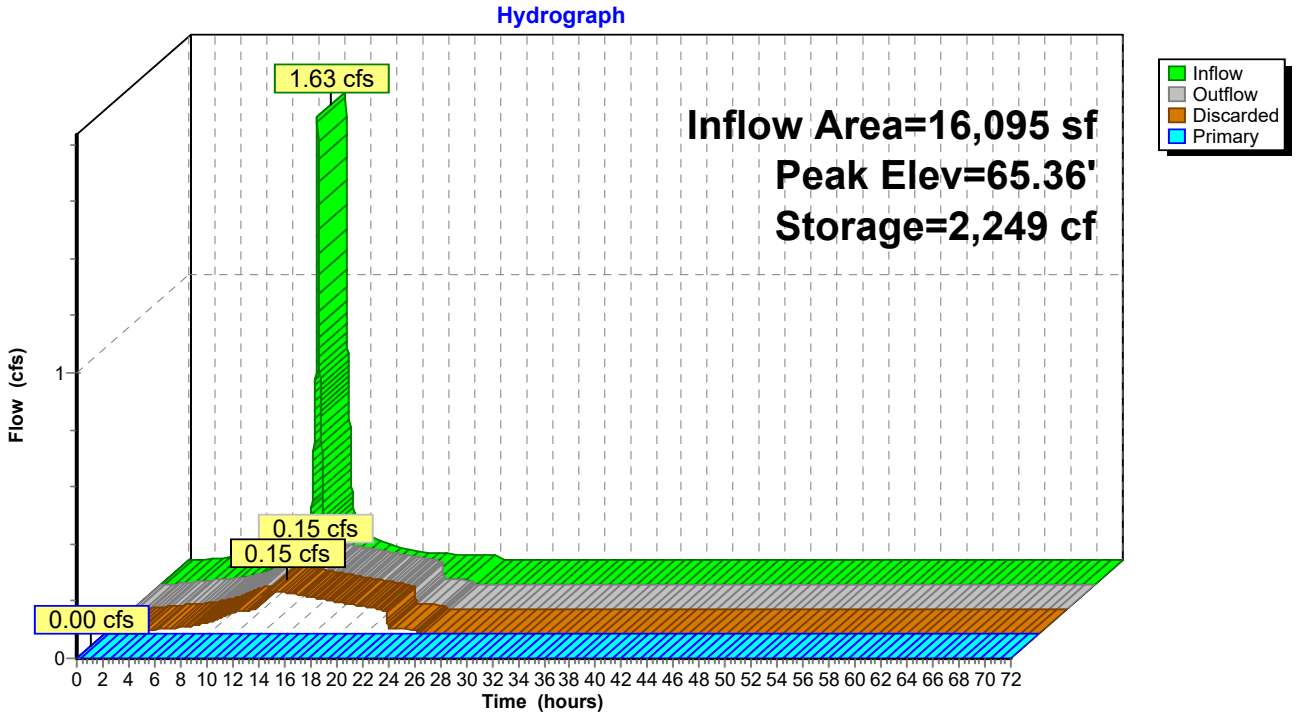
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	66.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.00'	**2.410 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 59.00' Phase-In= 0.01'

Discarded OutFlow Max=0.15 cfs @ 12.93 hrs HW=65.36' (Free Discharge)
↑**1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.00' TW=0.00' (Dynamic Tailwater)

Pond B-1: Subsurface Infiltration Basin



Hydrograph for Pond B-1: Subsurface Infiltration Basin

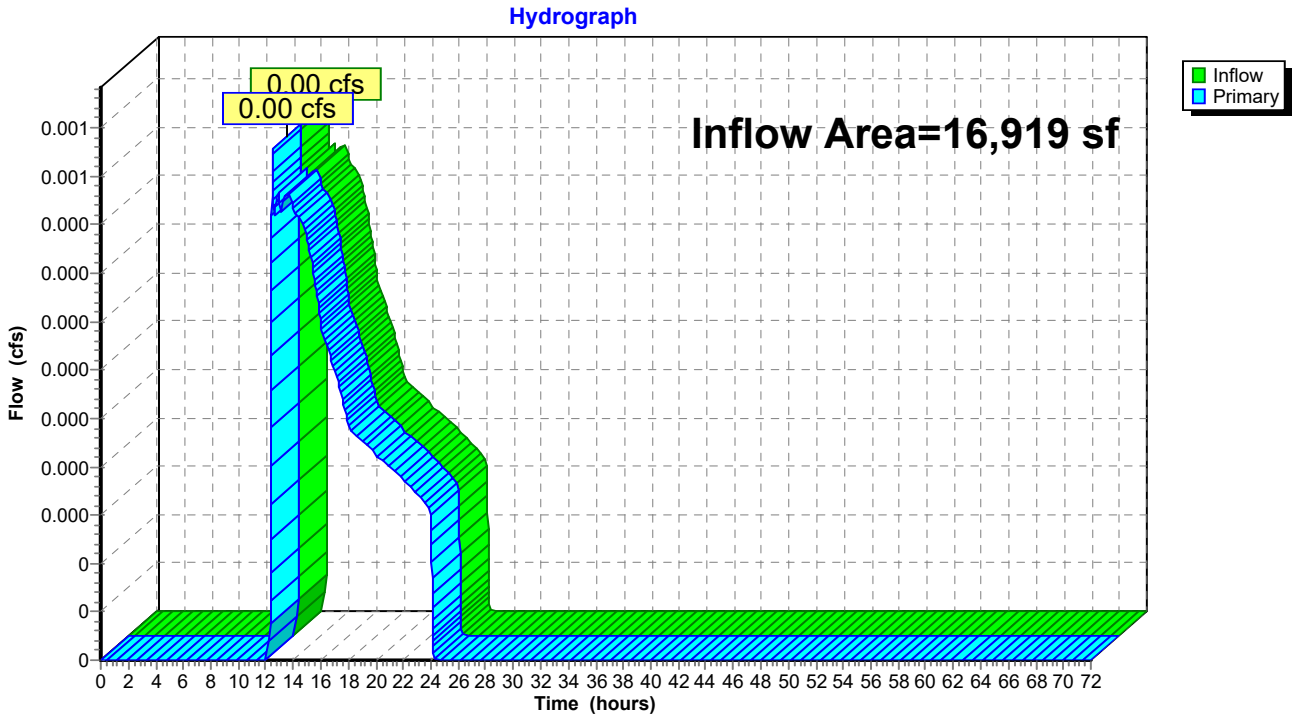
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	63.00	0.00	0.00	**0.00**
2.00	0.01	0	63.00	0.01	0.01	0.00
4.00	0.01	1	63.00	0.01	0.01	0.00
6.00	0.02	2	63.00	0.02	0.02	0.00
8.00	0.04	3	63.01	0.04	0.04	0.00
10.00	0.08	6	63.01	0.08	0.08	0.00
12.00	**1.03**	**824**	**63.98**	**0.11**	**0.11**	0.00
14.00	**0.09**	**2,107**	**65.21**	**0.14**	**0.14**	0.00
16.00	0.05	1,598	64.70	0.13	0.13	0.00
18.00	0.03	1,002	64.14	0.11	0.11	0.00
20.00	0.02	438	63.64	0.10	0.10	0.00
22.00	0.02	1	63.00	0.02	0.02	0.00
24.00	0.01	1	63.00	0.01	0.01	0.00
26.00	0.00	0	63.00	0.00	0.00	0.00
28.00	0.00	0	63.00	0.00	0.00	0.00
30.00	0.00	0	63.00	0.00	0.00	0.00
32.00	0.00	0	63.00	0.00	0.00	0.00
34.00	0.00	0	63.00	0.00	0.00	0.00
36.00	0.00	0	63.00	0.00	0.00	0.00
38.00	0.00	0	63.00	0.00	0.00	0.00
40.00	0.00	0	63.00	0.00	0.00	0.00
42.00	0.00	0	63.00	0.00	0.00	0.00
44.00	0.00	0	63.00	0.00	0.00	0.00
46.00	0.00	0	63.00	0.00	0.00	0.00
48.00	0.00	0	63.00	0.00	0.00	0.00
50.00	0.00	0	63.00	0.00	0.00	0.00
52.00	0.00	0	63.00	0.00	0.00	0.00
54.00	0.00	0	63.00	0.00	0.00	0.00
56.00	0.00	0	63.00	0.00	0.00	0.00
58.00	0.00	0	63.00	0.00	0.00	0.00
60.00	0.00	0	63.00	0.00	0.00	0.00
62.00	0.00	0	63.00	0.00	0.00	0.00
64.00	0.00	0	63.00	0.00	0.00	0.00
66.00	0.00	0	63.00	0.00	0.00	0.00
68.00	0.00	0	63.00	0.00	0.00	0.00
70.00	0.00	0	63.00	0.00	0.00	0.00
72.00	0.00	0	63.00	0.00	0.00	0.00

Summary for Link POI-1: Discharge to Combined Municipal System

Inflow Area = 16,919 sf, 87.72% Impervious, Inflow Depth = 0.01" for 10-Year event
Inflow = 0.00 cfs @ 12.50 hrs, Volume= 12 cf
Primary = 0.00 cfs @ 12.50 hrs, Volume= 12 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POI-1: Discharge to Combined Municipal System



Hydrograph for Link POI-1: Discharge to Combined Municipal System

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
2.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
12.00	**0.00**	0.00	**0.00**
14.00	**0.00**	0.00	**0.00**
16.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00
52.00	0.00	0.00	0.00
54.00	0.00	0.00	0.00
56.00	0.00	0.00	0.00
58.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00
62.00	0.00	0.00	0.00
64.00	0.00	0.00	0.00
66.00	0.00	0.00	0.00
68.00	0.00	0.00	0.00
70.00	0.00	0.00	0.00
72.00	0.00	0.00	0.00

APPENDIX C-6
25-YEAR STORM EVENT HYDROGRAPHS

Summary for Subcatchment EX-1: Existing Discharge to Municipal Combined System

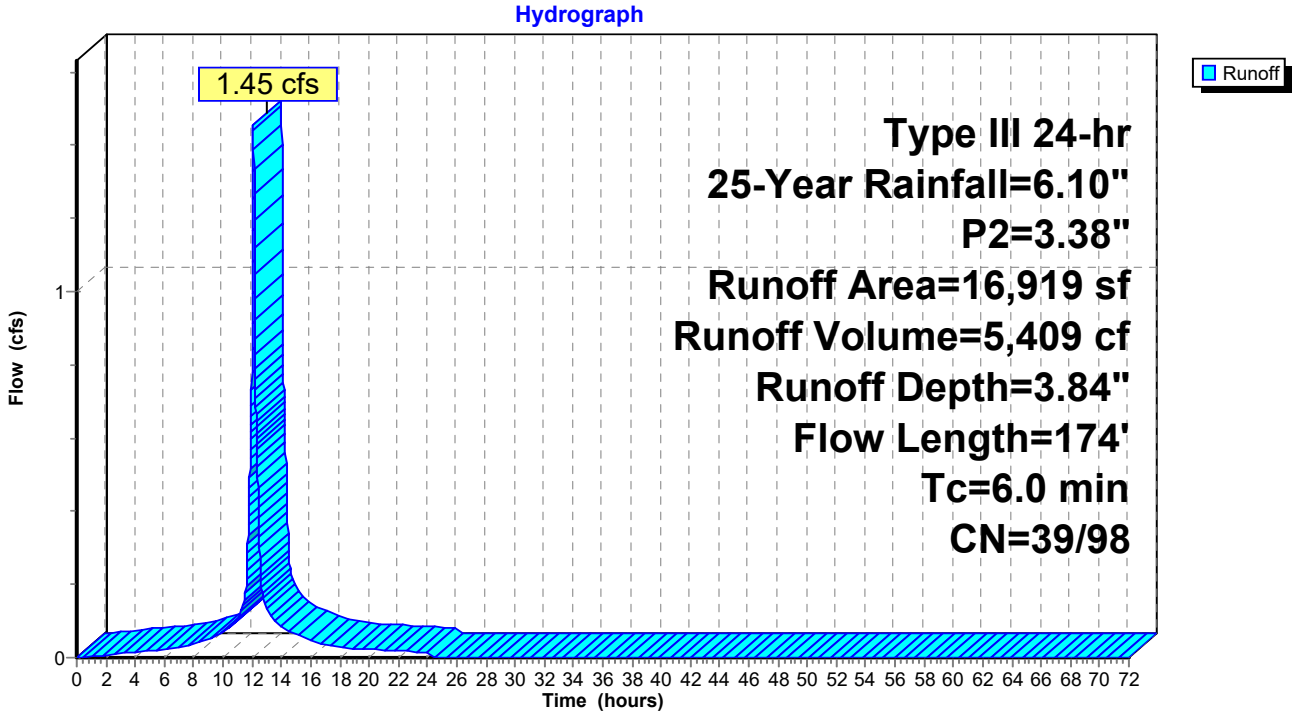
Runoff = 1.45 cfs @ 12.08 hrs, Volume= 5,409 cf, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.10", P2=3.38"

	Area (sf)	CN	Description
*	10,559	98	Impervious Area
	6,360	39	>75% Grass cover, Good, HSG A
	16,919	76	Weighted Average
	6,360	39	37.59% Pervious Area
	10,559	98	62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: Existing Discharge to Municipal Combined System



Hydrograph for Subcatchment EX-1: Existing Discharge to Municipal Combined System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.12	0.00	0.02	0.01
4.00	0.26	0.00	0.12	0.01
6.00	0.44	0.00	0.26	0.02
8.00	0.70	0.00	0.50	0.04
10.00	1.15	0.00	0.94	0.07
12.00	3.05	0.00	2.82	**0.91**
14.00	4.95	0.19	4.71	**0.09**
16.00	5.40	0.29	5.17	0.05
18.00	5.66	0.35	5.42	0.03
20.00	5.84	0.40	5.60	0.02
22.00	5.98	0.44	5.74	0.02
24.00	**6.10**	**0.47**	**5.86**	0.02
26.00	6.10	0.47	5.86	0.00
28.00	6.10	0.47	5.86	0.00
30.00	6.10	0.47	5.86	0.00
32.00	6.10	0.47	5.86	0.00
34.00	6.10	0.47	5.86	0.00
36.00	6.10	0.47	5.86	0.00
38.00	6.10	0.47	5.86	0.00
40.00	6.10	0.47	5.86	0.00
42.00	6.10	0.47	5.86	0.00
44.00	6.10	0.47	5.86	0.00
46.00	6.10	0.47	5.86	0.00
48.00	6.10	0.47	5.86	0.00
50.00	6.10	0.47	5.86	0.00
52.00	6.10	0.47	5.86	0.00
54.00	6.10	0.47	5.86	0.00
56.00	6.10	0.47	5.86	0.00
58.00	6.10	0.47	5.86	0.00
60.00	6.10	0.47	5.86	0.00
62.00	6.10	0.47	5.86	0.00
64.00	6.10	0.47	5.86	0.00
66.00	6.10	0.47	5.86	0.00
68.00	6.10	0.47	5.86	0.00
70.00	6.10	0.47	5.86	0.00
72.00	6.10	0.47	5.86	0.00

Summary for Subcatchment P-1A: Discharge to Subsurface Infiltration System

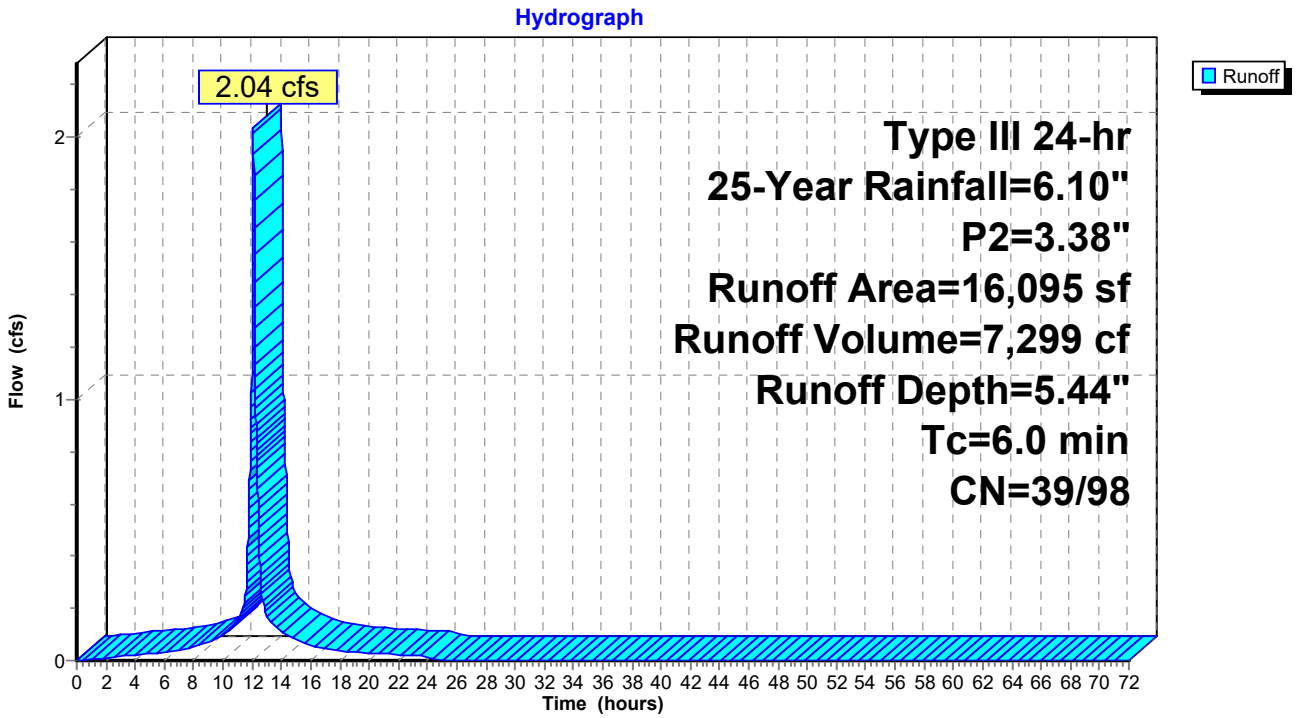
Runoff = 2.04 cfs @ 12.08 hrs, Volume= 7,299 cf, Depth= 5.44"
Routed to Pond B-1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.10", P2=3.38"

	Area (sf)	CN	Description
*	5,200	98	Roof Area
*	9,641	98	Impervious Area
	1,254	39	>75% Grass cover, Good, HSG A
	16,095	93	Weighted Average
	1,254	39	7.79% Pervious Area
	14,841	98	92.21% Impervious Area

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

Subcatchment P-1A: Discharge to Subsurface Infiltration System



Hydrograph for Subcatchment P-1A: Discharge to Subsurface Infiltration System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.12	0.00	0.02	0.01
4.00	0.26	0.00	0.12	0.02
6.00	0.44	0.00	0.26	0.03
8.00	0.70	0.00	0.50	0.05
10.00	1.15	0.00	0.94	0.10
12.00	3.05	0.00	2.82	**1.28**
14.00	4.95	0.19	4.71	**0.11**
16.00	5.40	0.29	5.17	0.06
18.00	5.66	0.35	5.42	0.04
20.00	5.84	0.40	5.60	0.03
22.00	5.98	0.44	5.74	0.02
24.00	**6.10**	**0.47**	**5.86**	0.02
26.00	6.10	0.47	5.86	0.00
28.00	6.10	0.47	5.86	0.00
30.00	6.10	0.47	5.86	0.00
32.00	6.10	0.47	5.86	0.00
34.00	6.10	0.47	5.86	0.00
36.00	6.10	0.47	5.86	0.00
38.00	6.10	0.47	5.86	0.00
40.00	6.10	0.47	5.86	0.00
42.00	6.10	0.47	5.86	0.00
44.00	6.10	0.47	5.86	0.00
46.00	6.10	0.47	5.86	0.00
48.00	6.10	0.47	5.86	0.00
50.00	6.10	0.47	5.86	0.00
52.00	6.10	0.47	5.86	0.00
54.00	6.10	0.47	5.86	0.00
56.00	6.10	0.47	5.86	0.00
58.00	6.10	0.47	5.86	0.00
60.00	6.10	0.47	5.86	0.00
62.00	6.10	0.47	5.86	0.00
64.00	6.10	0.47	5.86	0.00
66.00	6.10	0.47	5.86	0.00
68.00	6.10	0.47	5.86	0.00
70.00	6.10	0.47	5.86	0.00
72.00	6.10	0.47	5.86	0.00

Summary for Subcatchment P-1B: Undetained Bypass to Municipal System

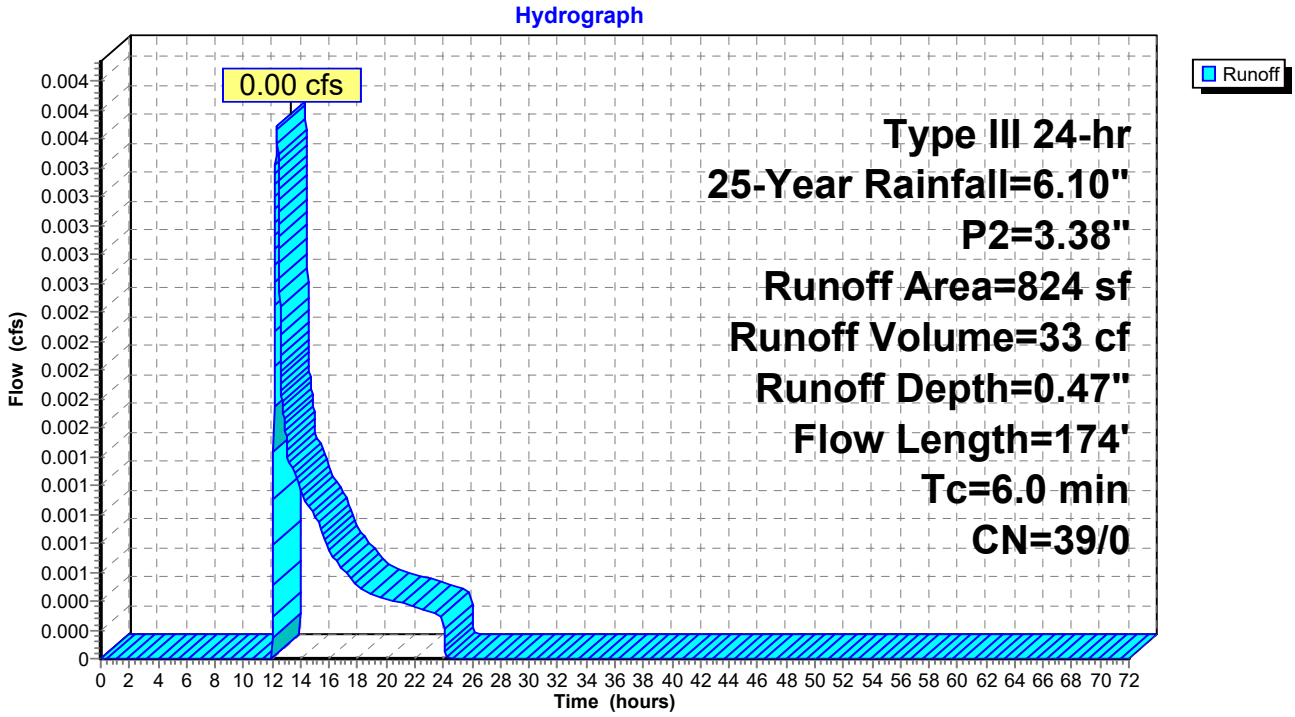
Runoff = 0.00 cfs @ 12.33 hrs, Volume= 33 cf, Depth= 0.47"
Routed to Link POI-1 : Discharge to Combined Municipal System

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.10", P2=3.38"

Area (sf)	CN	Description
824	39	>75% Grass cover, Good, HSG A
824	39	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment P-1B: Undetained Bypass to Municipal System



Hydrograph for Subcatchment P-1B: Undetained Bypass to Municipal System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
2.00	0.12	0.00	0.00	0.00
4.00	0.26	0.00	0.00	0.00
6.00	0.44	0.00	0.00	0.00
8.00	0.70	0.00	0.00	0.00
10.00	1.15	0.00	0.00	0.00
12.00	3.05	0.00	0.00	**0.00**
14.00	4.95	0.19	0.00	**0.00**
16.00	5.40	0.29	0.00	0.00
18.00	5.66	0.35	0.00	0.00
20.00	5.84	0.40	0.00	0.00
22.00	5.98	0.44	0.00	0.00
24.00	**6.10**	**0.47**	0.00	0.00
26.00	6.10	0.47	0.00	0.00
28.00	6.10	0.47	0.00	0.00
30.00	6.10	0.47	0.00	0.00
32.00	6.10	0.47	0.00	0.00
34.00	6.10	0.47	0.00	0.00
36.00	6.10	0.47	0.00	0.00
38.00	6.10	0.47	0.00	0.00
40.00	6.10	0.47	0.00	0.00
42.00	6.10	0.47	0.00	0.00
44.00	6.10	0.47	0.00	0.00
46.00	6.10	0.47	0.00	0.00
48.00	6.10	0.47	0.00	0.00
50.00	6.10	0.47	0.00	0.00
52.00	6.10	0.47	0.00	0.00
54.00	6.10	0.47	0.00	0.00
56.00	6.10	0.47	0.00	0.00
58.00	6.10	0.47	0.00	0.00
60.00	6.10	0.47	0.00	0.00
62.00	6.10	0.47	0.00	0.00
64.00	6.10	0.47	0.00	0.00
66.00	6.10	0.47	0.00	0.00
68.00	6.10	0.47	0.00	0.00
70.00	6.10	0.47	0.00	0.00
72.00	6.10	0.47	0.00	0.00

Summary for Pond B-1: Subsurface Infiltration Basin

Inflow Area = 16,095 sf, 92.21% Impervious, Inflow Depth = 5.44" for 25-Year event
Inflow = 2.04 cfs @ 12.08 hrs, Volume= 7,299 cf
Outflow = 0.18 cfs @ 12.96 hrs, Volume= 7,299 cf, Atten= 91%, Lag= 52.4 min
Discarded = 0.18 cfs @ 12.96 hrs, Volume= 7,299 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POI-1 : Discharge to Combined Municipal System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 66.36' @ 12.96 hrs Surf.Area= 1,394 sf Storage= 2,992 cf

Plug-Flow detention time= 159.8 min calculated for 7,298 cf (100% of inflow)
Center-of-Mass det. time= 159.8 min (906.1 - 746.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.00'	1,346 cf	**30.00'W x 46.47'L x 3.75'H Field A** 5,228 cf Overall - 1,862 cf Embedded = 3,365 cf x 40.0% Voids
#2A	63.50'	1,862 cf	**ADS_StormTech SC-800 +Cap** x 36 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 36 Chambers in 6 Rows Cap Storage= 3.4 cf x 2 x 6 rows = 41.0 cf
		3,208 cf	Total Available Storage

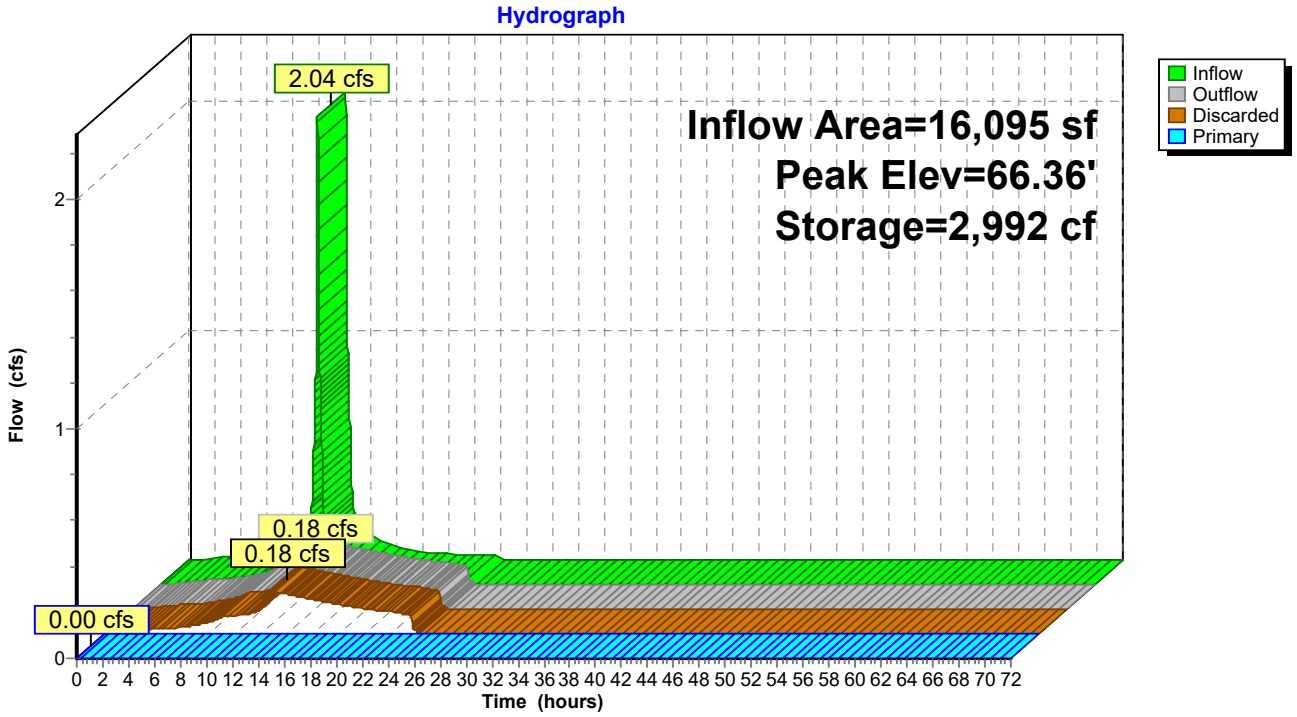
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	66.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.00'	**2.410 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 59.00' Phase-In= 0.01'

Discarded OutFlow Max=0.18 cfs @ 12.96 hrs HW=66.36' (Free Discharge)
↑**1=Exfiltration** (Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=63.00' TW=0.00' (Dynamic Tailwater)

Pond B-1: Subsurface Infiltration Basin



Hydrograph for Pond B-1: Subsurface Infiltration Basin

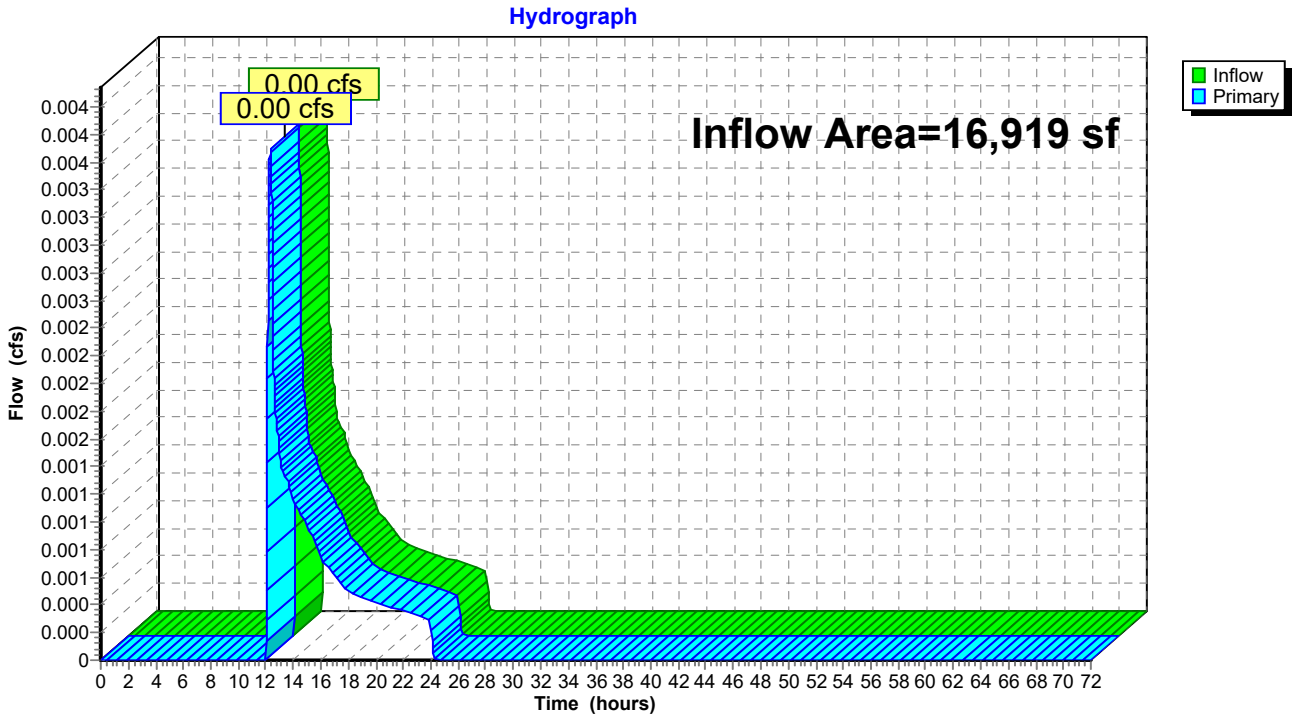
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	63.00	0.00	0.00	**0.00**
2.00	0.01	1	63.00	0.01	0.01	0.00
4.00	0.02	1	63.00	0.02	0.02	0.00
6.00	0.03	2	63.00	0.03	0.03	0.00
8.00	0.05	4	63.01	0.05	0.05	0.00
10.00	0.10	33	63.06	0.08	0.08	0.00
12.00	**1.28**	**1,175**	**64.30**	**0.12**	**0.12**	0.00
14.00	**0.11**	**2,838**	**66.09**	**0.17**	**0.17**	0.00
16.00	0.06	2,272	65.38	0.15	0.15	0.00
18.00	0.04	1,605	64.71	0.13	0.13	0.00
20.00	0.03	975	64.12	0.11	0.11	0.00
22.00	0.02	421	63.62	0.10	0.10	0.00
24.00	0.02	1	63.00	0.02	0.02	0.00
26.00	0.00	0	63.00	0.00	0.00	0.00
28.00	0.00	0	63.00	0.00	0.00	0.00
30.00	0.00	0	63.00	0.00	0.00	0.00
32.00	0.00	0	63.00	0.00	0.00	0.00
34.00	0.00	0	63.00	0.00	0.00	0.00
36.00	0.00	0	63.00	0.00	0.00	0.00
38.00	0.00	0	63.00	0.00	0.00	0.00
40.00	0.00	0	63.00	0.00	0.00	0.00
42.00	0.00	0	63.00	0.00	0.00	0.00
44.00	0.00	0	63.00	0.00	0.00	0.00
46.00	0.00	0	63.00	0.00	0.00	0.00
48.00	0.00	0	63.00	0.00	0.00	0.00
50.00	0.00	0	63.00	0.00	0.00	0.00
52.00	0.00	0	63.00	0.00	0.00	0.00
54.00	0.00	0	63.00	0.00	0.00	0.00
56.00	0.00	0	63.00	0.00	0.00	0.00
58.00	0.00	0	63.00	0.00	0.00	0.00
60.00	0.00	0	63.00	0.00	0.00	0.00
62.00	0.00	0	63.00	0.00	0.00	0.00
64.00	0.00	0	63.00	0.00	0.00	0.00
66.00	0.00	0	63.00	0.00	0.00	0.00
68.00	0.00	0	63.00	0.00	0.00	0.00
70.00	0.00	0	63.00	0.00	0.00	0.00
72.00	0.00	0	63.00	0.00	0.00	0.00

Summary for Link POI-1: Discharge to Combined Municipal System

Inflow Area = 16,919 sf, 87.72% Impervious, Inflow Depth = 0.02" for 25-Year event
Inflow = 0.00 cfs @ 12.33 hrs, Volume= 33 cf
Primary = 0.00 cfs @ 12.33 hrs, Volume= 33 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POI-1: Discharge to Combined Municipal System



Hydrograph for Link POI-1: Discharge to Combined Municipal System

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
2.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
12.00	**0.00**	0.00	**0.00**
14.00	**0.00**	0.00	**0.00**
16.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00
52.00	0.00	0.00	0.00
54.00	0.00	0.00	0.00
56.00	0.00	0.00	0.00
58.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00
62.00	0.00	0.00	0.00
64.00	0.00	0.00	0.00
66.00	0.00	0.00	0.00
68.00	0.00	0.00	0.00
70.00	0.00	0.00	0.00
72.00	0.00	0.00	0.00

APPENDIX C-7
100-YEAR STORM EVENT HYDROGRAPHS

Summary for Subcatchment EX-1: Existing Discharge to Municipal Combined System

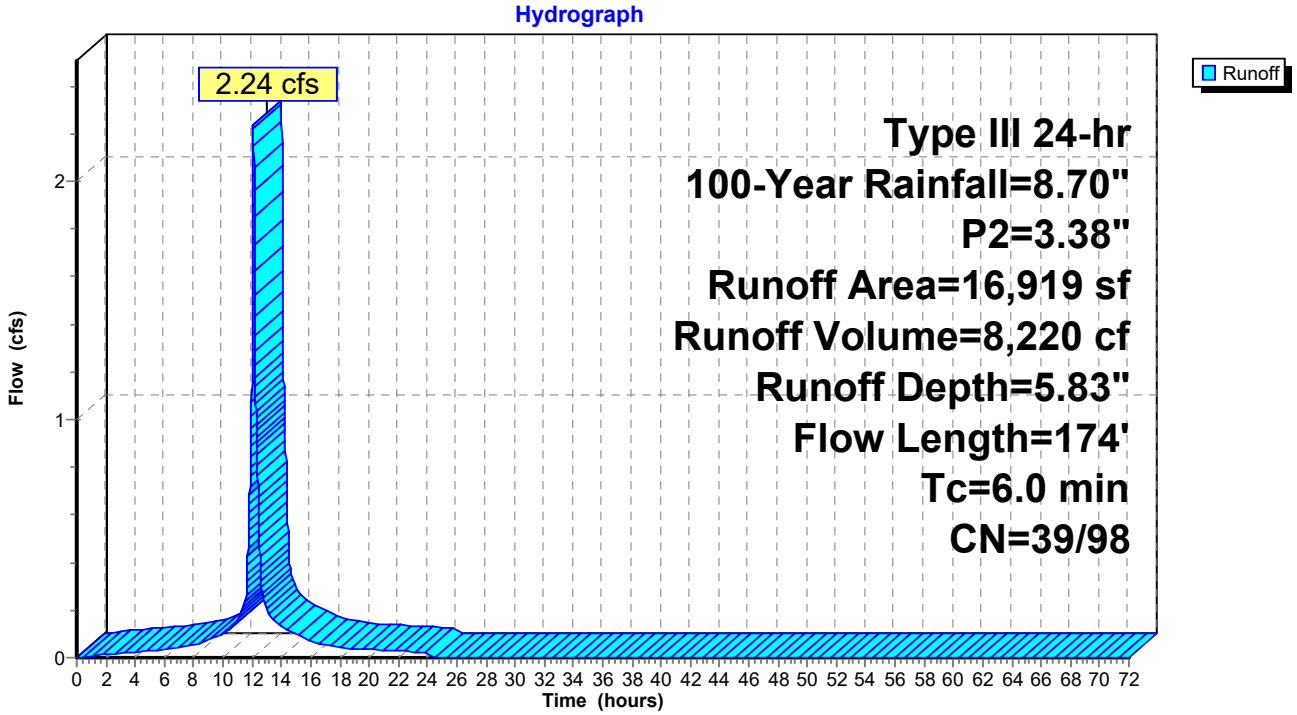
Runoff = 2.24 cfs @ 12.09 hrs, Volume= 8,220 cf, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70", P2=3.38"

	Area (sf)	CN	Description
*	10,559	98	Impervious Area
	6,360	39	>75% Grass cover, Good, HSG A
	16,919	76	Weighted Average
	6,360	39	37.59% Pervious Area
	10,559	98	62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment EX-1: Existing Discharge to Municipal Combined System



Hydrograph for Subcatchment EX-1: Existing Discharge to Municipal Combined System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.17	0.00	0.05	0.01
4.00	0.37	0.00	0.21	0.02
6.00	0.63	0.00	0.43	0.03
8.00	0.99	0.00	0.78	0.05
10.00	1.64	0.00	1.42	0.10
12.00	4.35	0.09	4.11	**1.36**
14.00	7.06	0.79	6.82	**0.13**
16.00	7.71	1.04	7.47	0.07
18.00	8.07	1.19	7.83	0.04
20.00	8.33	1.30	8.09	0.04
22.00	8.53	1.39	8.29	0.03
24.00	**8.70**	**1.46**	**8.46**	0.02
26.00	8.70	1.46	8.46	0.00
28.00	8.70	1.46	8.46	0.00
30.00	8.70	1.46	8.46	0.00
32.00	8.70	1.46	8.46	0.00
34.00	8.70	1.46	8.46	0.00
36.00	8.70	1.46	8.46	0.00
38.00	8.70	1.46	8.46	0.00
40.00	8.70	1.46	8.46	0.00
42.00	8.70	1.46	8.46	0.00
44.00	8.70	1.46	8.46	0.00
46.00	8.70	1.46	8.46	0.00
48.00	8.70	1.46	8.46	0.00
50.00	8.70	1.46	8.46	0.00
52.00	8.70	1.46	8.46	0.00
54.00	8.70	1.46	8.46	0.00
56.00	8.70	1.46	8.46	0.00
58.00	8.70	1.46	8.46	0.00
60.00	8.70	1.46	8.46	0.00
62.00	8.70	1.46	8.46	0.00
64.00	8.70	1.46	8.46	0.00
66.00	8.70	1.46	8.46	0.00
68.00	8.70	1.46	8.46	0.00
70.00	8.70	1.46	8.46	0.00
72.00	8.70	1.46	8.46	0.00

Summary for Subcatchment P-1A: Discharge to Subsurface Infiltration System

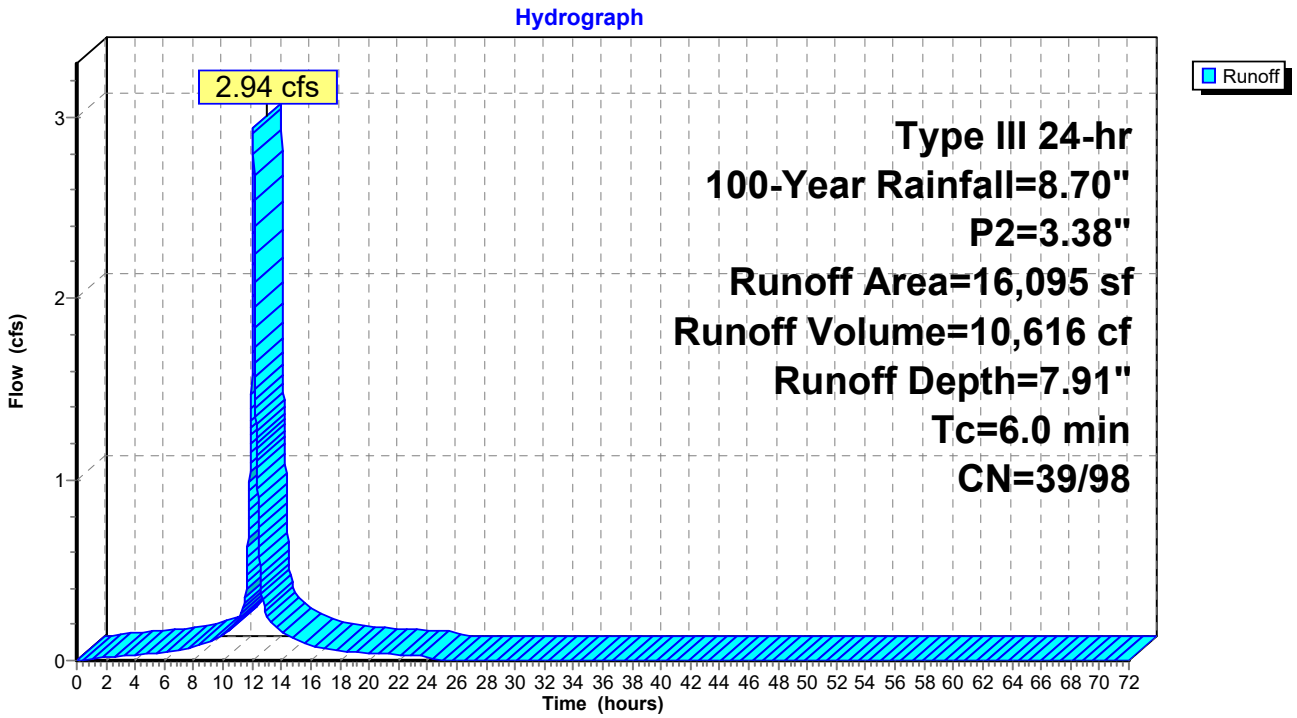
Runoff = 2.94 cfs @ 12.08 hrs, Volume= 10,616 cf, Depth= 7.91"
Routed to Pond B-1 : Subsurface Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70", P2=3.38"

	Area (sf)	CN	Description
*	5,200	98	Roof Area
*	9,641	98	Impervious Area
	1,254	39	>75% Grass cover, Good, HSG A
	16,095	93	Weighted Average
	1,254	39	7.79% Pervious Area
	14,841	98	92.21% Impervious Area

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

Subcatchment P-1A: Discharge to Subsurface Infiltration System



Hydrograph for Subcatchment P-1A: Discharge to Subsurface Infiltration System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
2.00	0.17	0.00	0.05	0.02
4.00	0.37	0.00	0.21	0.03
6.00	0.63	0.00	0.43	0.04
8.00	0.99	0.00	0.78	0.07
10.00	1.64	0.00	1.42	0.14
12.00	4.35	0.09	4.11	**1.85**
14.00	7.06	0.79	6.82	**0.16**
16.00	7.71	1.04	7.47	0.08
18.00	8.07	1.19	7.83	0.05
20.00	8.33	1.30	8.09	0.04
22.00	8.53	1.39	8.29	0.03
24.00	**8.70**	**1.46**	**8.46**	0.03
26.00	8.70	1.46	8.46	0.00
28.00	8.70	1.46	8.46	0.00
30.00	8.70	1.46	8.46	0.00
32.00	8.70	1.46	8.46	0.00
34.00	8.70	1.46	8.46	0.00
36.00	8.70	1.46	8.46	0.00
38.00	8.70	1.46	8.46	0.00
40.00	8.70	1.46	8.46	0.00
42.00	8.70	1.46	8.46	0.00
44.00	8.70	1.46	8.46	0.00
46.00	8.70	1.46	8.46	0.00
48.00	8.70	1.46	8.46	0.00
50.00	8.70	1.46	8.46	0.00
52.00	8.70	1.46	8.46	0.00
54.00	8.70	1.46	8.46	0.00
56.00	8.70	1.46	8.46	0.00
58.00	8.70	1.46	8.46	0.00
60.00	8.70	1.46	8.46	0.00
62.00	8.70	1.46	8.46	0.00
64.00	8.70	1.46	8.46	0.00
66.00	8.70	1.46	8.46	0.00
68.00	8.70	1.46	8.46	0.00
70.00	8.70	1.46	8.46	0.00
72.00	8.70	1.46	8.46	0.00

Summary for Subcatchment P-1B: Undetained Bypass to Municipal System

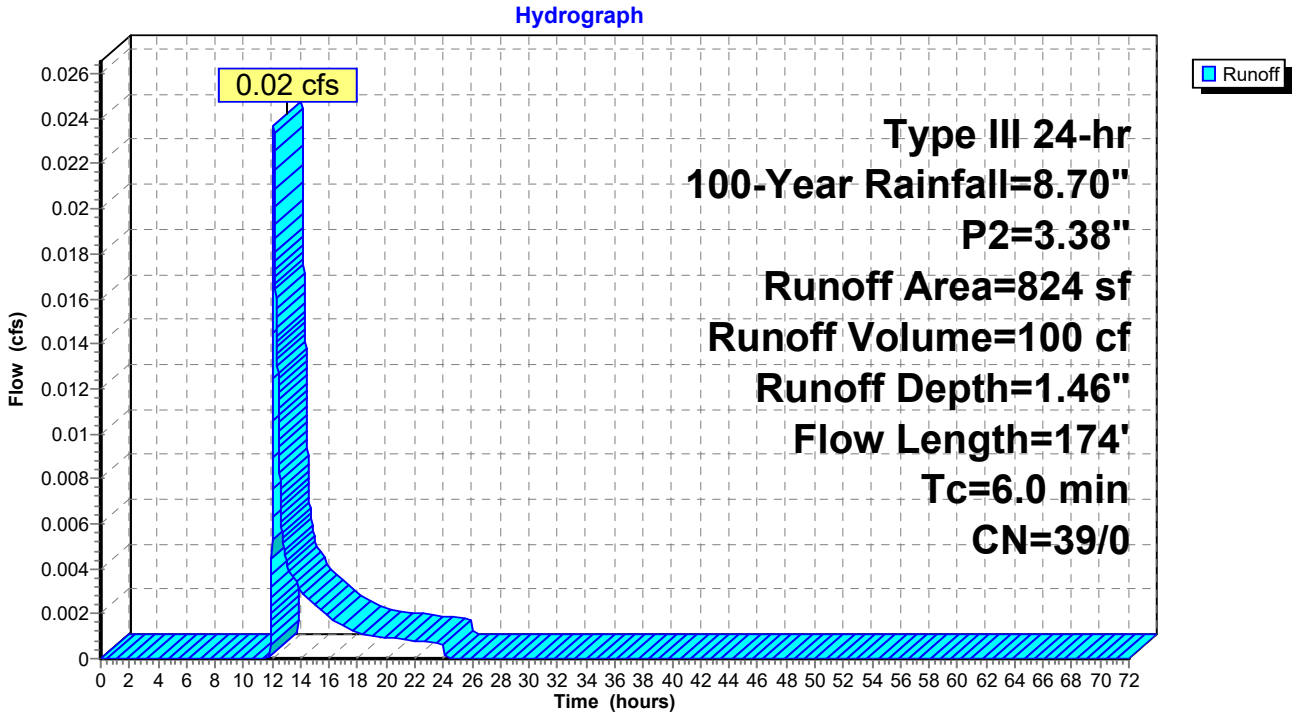
Runoff = 0.02 cfs @ 12.11 hrs, Volume= 100 cf, Depth= 1.46"
Routed to Link POI-1 : Discharge to Combined Municipal System

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.70", P2=3.38"

Area (sf)	CN	Description
824	39	>75% Grass cover, Good, HSG A
824	39	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	51	0.0392	0.20		**Sheet Flow, 1-2** Grass: Short n= 0.150 P2= 3.38"
0.6	110	0.0227	3.06		**Shallow Concentrated Flow, 2-3** Paved Kv= 20.3 fps
0.2	13	0.0227	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	174	Total, Increased to minimum Tc = 6.0 min			

Subcatchment P-1B: Undetained Bypass to Municipal System



Hydrograph for Subcatchment P-1B: Undetained Bypass to Municipal System

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	**0.00**	0.00
2.00	0.17	0.00	0.00	0.00
4.00	0.37	0.00	0.00	0.00
6.00	0.63	0.00	0.00	0.00
8.00	0.99	0.00	0.00	0.00
10.00	1.64	0.00	0.00	0.00
12.00	4.35	0.09	0.00	**0.01**
14.00	7.06	0.79	0.00	**0.00**
16.00	7.71	1.04	0.00	0.00
18.00	8.07	1.19	0.00	0.00
20.00	8.33	1.30	0.00	0.00
22.00	8.53	1.39	0.00	0.00
24.00	**8.70**	**1.46**	0.00	0.00
26.00	8.70	1.46	0.00	0.00
28.00	8.70	1.46	0.00	0.00
30.00	8.70	1.46	0.00	0.00
32.00	8.70	1.46	0.00	0.00
34.00	8.70	1.46	0.00	0.00
36.00	8.70	1.46	0.00	0.00
38.00	8.70	1.46	0.00	0.00
40.00	8.70	1.46	0.00	0.00
42.00	8.70	1.46	0.00	0.00
44.00	8.70	1.46	0.00	0.00
46.00	8.70	1.46	0.00	0.00
48.00	8.70	1.46	0.00	0.00
50.00	8.70	1.46	0.00	0.00
52.00	8.70	1.46	0.00	0.00
54.00	8.70	1.46	0.00	0.00
56.00	8.70	1.46	0.00	0.00
58.00	8.70	1.46	0.00	0.00
60.00	8.70	1.46	0.00	0.00
62.00	8.70	1.46	0.00	0.00
64.00	8.70	1.46	0.00	0.00
66.00	8.70	1.46	0.00	0.00
68.00	8.70	1.46	0.00	0.00
70.00	8.70	1.46	0.00	0.00
72.00	8.70	1.46	0.00	0.00

Summary for Pond B-1: Subsurface Infiltration Basin

Inflow Area = 16,095 sf, 92.21% Impervious, Inflow Depth = 7.91" for 100-Year event
Inflow = 2.94 cfs @ 12.08 hrs, Volume= 10,616 cf
Outflow = 2.38 cfs @ 12.15 hrs, Volume= 10,616 cf, Atten= 19%, Lag= 4.2 min
Discarded = 0.19 cfs @ 12.14 hrs, Volume= 8,958 cf
Primary = 2.19 cfs @ 12.15 hrs, Volume= 1,658 cf
Routed to Link POI-1 : Discharge to Combined Municipal System

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 66.75' @ 12.14 hrs Surf.Area= 1,394 sf Storage= 3,208 cf

Plug-Flow detention time= 146.4 min calculated for 10,614 cf (100% of inflow)
Center-of-Mass det. time= 146.4 min (889.0 - 742.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.00'	1,346 cf	**30.00'W x 46.47'L x 3.75'H Field A** 5,228 cf Overall - 1,862 cf Embedded = 3,365 cf x 40.0% Voids
#2A	63.50'	1,862 cf	**ADS_StormTech SC-800 +Cap** x 36 Inside #1 Effective Size= 45.0"W x 33.0"H => 7.11 sf x 7.12'L = 50.6 cf Overall Size= 51.0"W x 33.0"H x 7.55'L with 0.43' Overlap 36 Chambers in 6 Rows Cap Storage= 3.4 cf x 2 x 6 rows = 41.0 cf
		3,208 cf	Total Available Storage

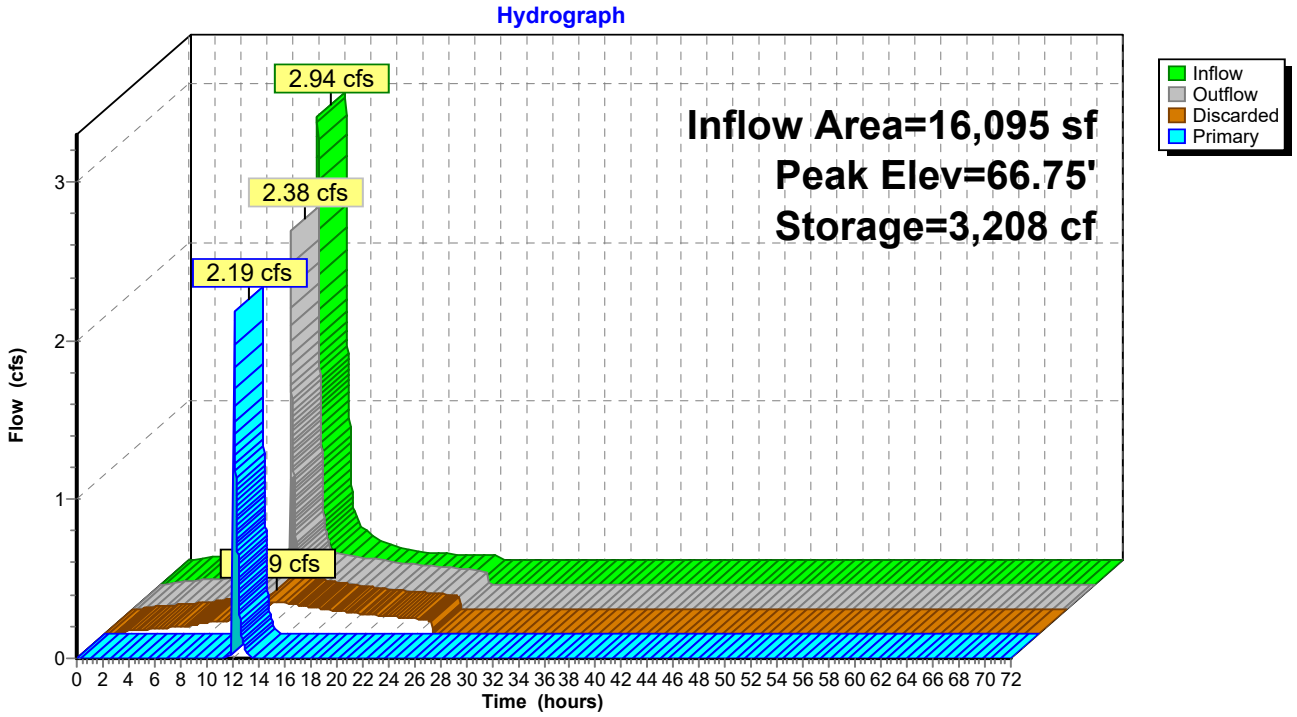
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	66.75'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	63.00'	**2.410 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 59.00' Phase-In= 0.01'

Discarded OutFlow Max=0.19 cfs @ 12.14 hrs HW=66.75' (Free Discharge)
↑└**1=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 12.15 hrs HW=66.75' TW=0.00' (Dynamic Tailwater)

Pond B-1: Subsurface Infiltration Basin



Hydrograph for Pond B-1: Subsurface Infiltration Basin

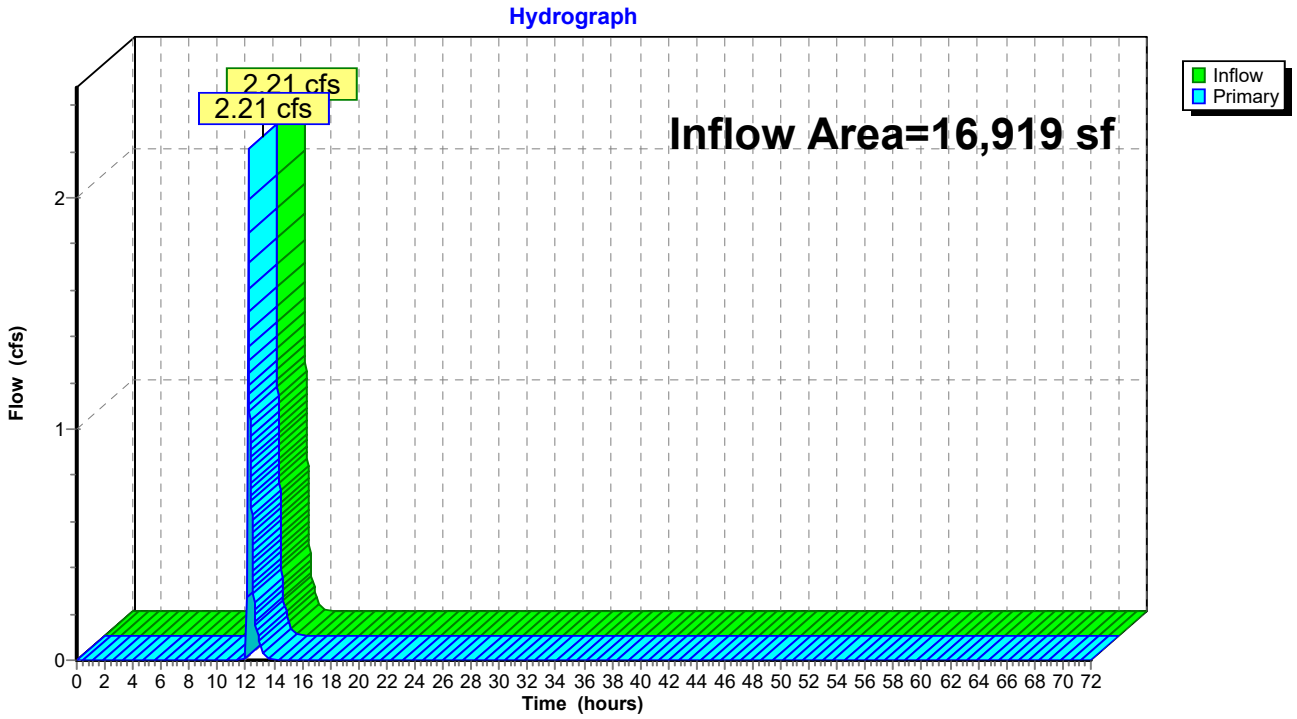
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	63.00	0.00	0.00	0.00
2.00	0.02	1	63.00	0.02	0.02	0.00
4.00	0.03	2	63.00	0.03	0.03	0.00
6.00	0.04	3	63.01	0.04	0.04	0.00
8.00	0.07	5	63.01	0.07	0.07	0.00
10.00	0.14	192	63.34	0.09	0.09	0.00
12.00	**1.85**	**2,025**	**65.12**	**0.14**	**0.14**	**0.00**
14.00	**0.16**	**3,177**	**66.69**	**0.19**	**0.19**	**0.00**
16.00	0.08	2,731	65.93	0.17	0.17	0.00
18.00	0.05	2,094	65.19	0.14	0.14	0.00
20.00	0.04	1,461	64.57	0.12	0.12	0.00
22.00	0.03	895	64.05	0.11	0.11	0.00
24.00	0.03	384	63.59	0.09	0.09	0.00
26.00	0.00	0	63.00	0.00	0.00	0.00
28.00	0.00	0	63.00	0.00	0.00	0.00
30.00	0.00	0	63.00	0.00	0.00	0.00
32.00	0.00	0	63.00	0.00	0.00	0.00
34.00	0.00	0	63.00	0.00	0.00	0.00
36.00	0.00	0	63.00	0.00	0.00	0.00
38.00	0.00	0	63.00	0.00	0.00	0.00
40.00	0.00	0	63.00	0.00	0.00	0.00
42.00	0.00	0	63.00	0.00	0.00	0.00
44.00	0.00	0	63.00	0.00	0.00	0.00
46.00	0.00	0	63.00	0.00	0.00	0.00
48.00	0.00	0	63.00	0.00	0.00	0.00
50.00	0.00	0	63.00	0.00	0.00	0.00
52.00	0.00	0	63.00	0.00	0.00	0.00
54.00	0.00	0	63.00	0.00	0.00	0.00
56.00	0.00	0	63.00	0.00	0.00	0.00
58.00	0.00	0	63.00	0.00	0.00	0.00
60.00	0.00	0	63.00	0.00	0.00	0.00
62.00	0.00	0	63.00	0.00	0.00	0.00
64.00	0.00	0	63.00	0.00	0.00	0.00
66.00	0.00	0	63.00	0.00	0.00	0.00
68.00	0.00	0	63.00	0.00	0.00	0.00
70.00	0.00	0	63.00	0.00	0.00	0.00
72.00	0.00	0	63.00	0.00	0.00	0.00

Summary for Link POI-1: Discharge to Combined Municipal System

Inflow Area = 16,919 sf, 87.72% Impervious, Inflow Depth = 1.25" for 100-Year event
Inflow = 2.21 cfs @ 12.15 hrs, Volume= 1,758 cf
Primary = 2.21 cfs @ 12.15 hrs, Volume= 1,758 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link POI-1: Discharge to Combined Municipal System



Hydrograph for Link POI-1: Discharge to Combined Municipal System

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
2.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
12.00	**0.01**	0.00	**0.01**
14.00	**0.00**	0.00	**0.00**
16.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00
52.00	0.00	0.00	0.00
54.00	0.00	0.00	0.00
56.00	0.00	0.00	0.00
58.00	0.00	0.00	0.00
60.00	0.00	0.00	0.00
62.00	0.00	0.00	0.00
64.00	0.00	0.00	0.00
66.00	0.00	0.00	0.00
68.00	0.00	0.00	0.00
70.00	0.00	0.00	0.00
72.00	0.00	0.00	0.00

APPENDIX C-8
INFILTRATION BASIN STAGE-STORAGE TABLES

Stage-Area-Storage for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
63.00	1,394	0
63.10	1,409	56
63.20	1,425	112
63.30	1,440	167
63.40	1,455	223
63.50	1,470	279
63.60	1,486	393
63.70	1,501	507
63.80	1,516	620
63.90	1,532	733
64.00	1,547	845
64.10	1,562	956
64.20	1,578	1,066
64.30	1,593	1,175
64.40	1,608	1,283
64.50	1,623	1,390
64.60	1,639	1,495
64.70	1,654	1,600
64.80	1,669	1,703
64.90	1,685	1,805
65.00	1,700	1,905
65.10	1,715	2,004
65.20	1,730	2,100
65.30	1,746	2,195
65.40	1,761	2,288
65.50	1,776	2,378
65.60	1,792	2,466
65.70	1,807	2,550
65.80	1,822	2,631
65.90	1,838	2,708
66.00	1,853	2,777
66.10	1,868	2,841
66.20	1,883	2,901
66.30	1,899	2,957
66.40	1,914	3,013
66.50	1,929	3,069
66.60	1,945	3,125
66.70	**1,960**	**3,181**

Stage-Area-Storage for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
63.00	1,394	0
63.10	1,409	56
63.20	1,425	112
63.30	1,440	167
63.40	1,455	223
63.50	1,470	279
63.60	1,486	393
63.70	1,501	507
63.80	1,516	620
63.90	1,532	733
64.00	1,547	845
64.10	1,562	956
64.20	1,578	1,066
64.30	1,593	1,175
64.40	1,608	1,283
64.50	1,623	1,390
64.60	1,639	1,495
64.70	1,654	1,600
64.80	1,669	1,703
64.90	1,685	1,805
65.00	1,700	1,905
65.10	1,715	2,004
65.20	1,730	2,100
65.30	1,746	2,195
65.40	1,761	2,288
65.50	1,776	2,378
65.60	1,792	2,466
65.70	1,807	2,550
65.80	1,822	2,631
65.90	1,838	2,708
66.00	1,853	2,777
66.10	1,868	2,841
66.20	1,883	2,901
66.30	1,899	2,957
66.40	1,914	3,013
66.50	1,929	3,069
66.60	1,945	3,125
66.70	**1,960**	**3,181**

Stage-Area-Storage for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
63.00	1,394	0
63.10	1,409	56
63.20	1,425	112
63.30	1,440	167
63.40	1,455	223
63.50	1,470	279
63.60	1,486	393
63.70	1,501	507
63.80	1,516	620
63.90	1,532	733
64.00	1,547	845
64.10	1,562	956
64.20	1,578	1,066
64.30	1,593	1,175
64.40	1,608	1,283
64.50	1,623	1,390
64.60	1,639	1,495
64.70	1,654	1,600
64.80	1,669	1,703
64.90	1,685	1,805
65.00	1,700	1,905
65.10	1,715	2,004
65.20	1,730	2,100
65.30	1,746	2,195
65.40	1,761	2,288
65.50	1,776	2,378
65.60	1,792	2,466
65.70	1,807	2,550
65.80	1,822	2,631
65.90	1,838	2,708
66.00	1,853	2,777
66.10	1,868	2,841
66.20	1,883	2,901
66.30	1,899	2,957
66.40	1,914	3,013
66.50	1,929	3,069
66.60	1,945	3,125
66.70	**1,960**	**3,181**

Stage-Area-Storage for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
63.00	1,394	0
63.10	1,409	56
63.20	1,425	112
63.30	1,440	167
63.40	1,455	223
63.50	1,470	279
63.60	1,486	393
63.70	1,501	507
63.80	1,516	620
63.90	1,532	733
64.00	1,547	845
64.10	1,562	956
64.20	1,578	1,066
64.30	1,593	1,175
64.40	1,608	1,283
64.50	1,623	1,390
64.60	1,639	1,495
64.70	1,654	1,600
64.80	1,669	1,703
64.90	1,685	1,805
65.00	1,700	1,905
65.10	1,715	2,004
65.20	1,730	2,100
65.30	1,746	2,195
65.40	1,761	2,288
65.50	1,776	2,378
65.60	1,792	2,466
65.70	1,807	2,550
65.80	1,822	2,631
65.90	1,838	2,708
66.00	1,853	2,777
66.10	1,868	2,841
66.20	1,883	2,901
66.30	1,899	2,957
66.40	1,914	3,013
66.50	1,929	3,069
66.60	1,945	3,125
66.70	**1,960**	**3,181**

Stage-Area-Storage for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
63.00	1,394	0
63.10	1,409	56
63.20	1,425	112
63.30	1,440	167
63.40	1,455	223
63.50	1,470	279
63.60	1,486	393
63.70	1,501	507
63.80	1,516	620
63.90	1,532	733
64.00	1,547	845
64.10	1,562	956
64.20	1,578	1,066
64.30	1,593	1,175
64.40	1,608	1,283
64.50	1,623	1,390
64.60	1,639	1,495
64.70	1,654	1,600
64.80	1,669	1,703
64.90	1,685	1,805
65.00	1,700	1,905
65.10	1,715	2,004
65.20	1,730	2,100
65.30	1,746	2,195
65.40	1,761	2,288
65.50	1,776	2,378
65.60	1,792	2,466
65.70	1,807	2,550
65.80	1,822	2,631
65.90	1,838	2,708
66.00	1,853	2,777
66.10	1,868	2,841
66.20	1,883	2,901
66.30	1,899	2,957
66.40	1,914	3,013
66.50	1,929	3,069
66.60	1,945	3,125
66.70	**1,960**	**3,181**

Stage-Area-Storage for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
63.00	1,394	0
63.10	1,409	56
63.20	1,425	112
63.30	1,440	167
63.40	1,455	223
63.50	1,470	279
63.60	1,486	393
63.70	1,501	507
63.80	1,516	620
63.90	1,532	733
64.00	1,547	845
64.10	1,562	956
64.20	1,578	1,066
64.30	1,593	1,175
64.40	1,608	1,283
64.50	1,623	1,390
64.60	1,639	1,495
64.70	1,654	1,600
64.80	1,669	1,703
64.90	1,685	1,805
65.00	1,700	1,905
65.10	1,715	2,004
65.20	1,730	2,100
65.30	1,746	2,195
65.40	1,761	2,288
65.50	1,776	2,378
65.60	1,792	2,466
65.70	1,807	2,550
65.80	1,822	2,631
65.90	1,838	2,708
66.00	1,853	2,777
66.10	1,868	2,841
66.20	1,883	2,901
66.30	1,899	2,957
66.40	1,914	3,013
66.50	1,929	3,069
66.60	1,945	3,125
66.70	**1,960**	**3,181**

APPENDIX C-9
INFILTRATION BASIN STAGE-DISCHARGE TABLES

Stage-Discharge for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
63.00	0.00	0.00	**0.00**
63.10	0.08	0.08	0.00
63.20	0.08	0.08	0.00
63.30	0.09	0.09	0.00
63.40	0.09	0.09	0.00
63.50	0.09	0.09	0.00
63.60	0.09	0.09	0.00
63.70	0.10	0.10	0.00
63.80	0.10	0.10	0.00
63.90	0.10	0.10	0.00
64.00	0.11	0.11	0.00
64.10	0.11	0.11	0.00
64.20	0.11	0.11	0.00
64.30	0.12	0.12	0.00
64.40	0.12	0.12	0.00
64.50	0.12	0.12	0.00
64.60	0.12	0.12	0.00
64.70	0.13	0.13	0.00
64.80	0.13	0.13	0.00
64.90	0.13	0.13	0.00
65.00	0.14	0.14	0.00
65.10	0.14	0.14	0.00
65.20	0.14	0.14	0.00
65.30	0.15	0.15	0.00
65.40	0.15	0.15	0.00
65.50	0.15	0.15	0.00
65.60	0.16	0.16	0.00
65.70	0.16	0.16	0.00
65.80	0.16	0.16	0.00
65.90	0.17	0.17	0.00
66.00	0.17	0.17	0.00
66.10	0.17	0.17	0.00
66.20	0.18	0.18	0.00
66.30	0.18	0.18	0.00
66.40	0.18	0.18	0.00
66.50	0.19	0.19	0.00
66.60	0.19	0.19	0.00
66.70	**0.19**	**0.19**	0.00

Stage-Discharge for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
63.00	0.00	0.00	**0.00**
63.10	0.08	0.08	0.00
63.20	0.08	0.08	0.00
63.30	0.09	0.09	0.00
63.40	0.09	0.09	0.00
63.50	0.09	0.09	0.00
63.60	0.09	0.09	0.00
63.70	0.10	0.10	0.00
63.80	0.10	0.10	0.00
63.90	0.10	0.10	0.00
64.00	0.11	0.11	0.00
64.10	0.11	0.11	0.00
64.20	0.11	0.11	0.00
64.30	0.12	0.12	0.00
64.40	0.12	0.12	0.00
64.50	0.12	0.12	0.00
64.60	0.12	0.12	0.00
64.70	0.13	0.13	0.00
64.80	0.13	0.13	0.00
64.90	0.13	0.13	0.00
65.00	0.14	0.14	0.00
65.10	0.14	0.14	0.00
65.20	0.14	0.14	0.00
65.30	0.15	0.15	0.00
65.40	0.15	0.15	0.00
65.50	0.15	0.15	0.00
65.60	0.16	0.16	0.00
65.70	0.16	0.16	0.00
65.80	0.16	0.16	0.00
65.90	0.17	0.17	0.00
66.00	0.17	0.17	0.00
66.10	0.17	0.17	0.00
66.20	0.18	0.18	0.00
66.30	0.18	0.18	0.00
66.40	0.18	0.18	0.00
66.50	0.19	0.19	0.00
66.60	0.19	0.19	0.00
66.70	**0.19**	**0.19**	0.00

Stage-Discharge for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
63.00	0.00	0.00	**0.00**
63.10	0.08	0.08	0.00
63.20	0.08	0.08	0.00
63.30	0.09	0.09	0.00
63.40	0.09	0.09	0.00
63.50	0.09	0.09	0.00
63.60	0.09	0.09	0.00
63.70	0.10	0.10	0.00
63.80	0.10	0.10	0.00
63.90	0.10	0.10	0.00
64.00	0.11	0.11	0.00
64.10	0.11	0.11	0.00
64.20	0.11	0.11	0.00
64.30	0.12	0.12	0.00
64.40	0.12	0.12	0.00
64.50	0.12	0.12	0.00
64.60	0.12	0.12	0.00
64.70	0.13	0.13	0.00
64.80	0.13	0.13	0.00
64.90	0.13	0.13	0.00
65.00	0.14	0.14	0.00
65.10	0.14	0.14	0.00
65.20	0.14	0.14	0.00
65.30	0.15	0.15	0.00
65.40	0.15	0.15	0.00
65.50	0.15	0.15	0.00
65.60	0.16	0.16	0.00
65.70	0.16	0.16	0.00
65.80	0.16	0.16	0.00
65.90	0.17	0.17	0.00
66.00	0.17	0.17	0.00
66.10	0.17	0.17	0.00
66.20	0.18	0.18	0.00
66.30	0.18	0.18	0.00
66.40	0.18	0.18	0.00
66.50	0.19	0.19	0.00
66.60	0.19	0.19	0.00
66.70	**0.19**	**0.19**	0.00

Stage-Discharge for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
63.00	0.00	0.00	**0.00**
63.10	0.08	0.08	0.00
63.20	0.08	0.08	0.00
63.30	0.09	0.09	0.00
63.40	0.09	0.09	0.00
63.50	0.09	0.09	0.00
63.60	0.09	0.09	0.00
63.70	0.10	0.10	0.00
63.80	0.10	0.10	0.00
63.90	0.10	0.10	0.00
64.00	0.11	0.11	0.00
64.10	0.11	0.11	0.00
64.20	0.11	0.11	0.00
64.30	0.12	0.12	0.00
64.40	0.12	0.12	0.00
64.50	0.12	0.12	0.00
64.60	0.12	0.12	0.00
64.70	0.13	0.13	0.00
64.80	0.13	0.13	0.00
64.90	0.13	0.13	0.00
65.00	0.14	0.14	0.00
65.10	0.14	0.14	0.00
65.20	0.14	0.14	0.00
65.30	0.15	0.15	0.00
65.40	0.15	0.15	0.00
65.50	0.15	0.15	0.00
65.60	0.16	0.16	0.00
65.70	0.16	0.16	0.00
65.80	0.16	0.16	0.00
65.90	0.17	0.17	0.00
66.00	0.17	0.17	0.00
66.10	0.17	0.17	0.00
66.20	0.18	0.18	0.00
66.30	0.18	0.18	0.00
66.40	0.18	0.18	0.00
66.50	0.19	0.19	0.00
66.60	0.19	0.19	0.00
66.70	**0.19**	**0.19**	0.00

Stage-Discharge for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
63.00	0.00	0.00	**0.00**
63.10	0.08	0.08	0.00
63.20	0.08	0.08	0.00
63.30	0.09	0.09	0.00
63.40	0.09	0.09	0.00
63.50	0.09	0.09	0.00
63.60	0.09	0.09	0.00
63.70	0.10	0.10	0.00
63.80	0.10	0.10	0.00
63.90	0.10	0.10	0.00
64.00	0.11	0.11	0.00
64.10	0.11	0.11	0.00
64.20	0.11	0.11	0.00
64.30	0.12	0.12	0.00
64.40	0.12	0.12	0.00
64.50	0.12	0.12	0.00
64.60	0.12	0.12	0.00
64.70	0.13	0.13	0.00
64.80	0.13	0.13	0.00
64.90	0.13	0.13	0.00
65.00	0.14	0.14	0.00
65.10	0.14	0.14	0.00
65.20	0.14	0.14	0.00
65.30	0.15	0.15	0.00
65.40	0.15	0.15	0.00
65.50	0.15	0.15	0.00
65.60	0.16	0.16	0.00
65.70	0.16	0.16	0.00
65.80	0.16	0.16	0.00
65.90	0.17	0.17	0.00
66.00	0.17	0.17	0.00
66.10	0.17	0.17	0.00
66.20	0.18	0.18	0.00
66.30	0.18	0.18	0.00
66.40	0.18	0.18	0.00
66.50	0.19	0.19	0.00
66.60	0.19	0.19	0.00
66.70	**0.19**	**0.19**	0.00

Stage-Discharge for Pond B-1: Subsurface Infiltration Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
63.00	0.00	0.00	**0.00**
63.10	0.08	0.08	0.00
63.20	0.08	0.08	0.00
63.30	0.09	0.09	0.00
63.40	0.09	0.09	0.00
63.50	0.09	0.09	0.00
63.60	0.09	0.09	0.00
63.70	0.10	0.10	0.00
63.80	0.10	0.10	0.00
63.90	0.10	0.10	0.00
64.00	0.11	0.11	0.00
64.10	0.11	0.11	0.00
64.20	0.11	0.11	0.00
64.30	0.12	0.12	0.00
64.40	0.12	0.12	0.00
64.50	0.12	0.12	0.00
64.60	0.12	0.12	0.00
64.70	0.13	0.13	0.00
64.80	0.13	0.13	0.00
64.90	0.13	0.13	0.00
65.00	0.14	0.14	0.00
65.10	0.14	0.14	0.00
65.20	0.14	0.14	0.00
65.30	0.15	0.15	0.00
65.40	0.15	0.15	0.00
65.50	0.15	0.15	0.00
65.60	0.16	0.16	0.00
65.70	0.16	0.16	0.00
65.80	0.16	0.16	0.00
65.90	0.17	0.17	0.00
66.00	0.17	0.17	0.00
66.10	0.17	0.17	0.00
66.20	0.18	0.18	0.00
66.30	0.18	0.18	0.00
66.40	0.18	0.18	0.00
66.50	0.19	0.19	0.00
66.60	0.19	0.19	0.00
66.70	**0.19**	**0.19**	0.00

APPENDIX D
SITE PLAN SHEETS

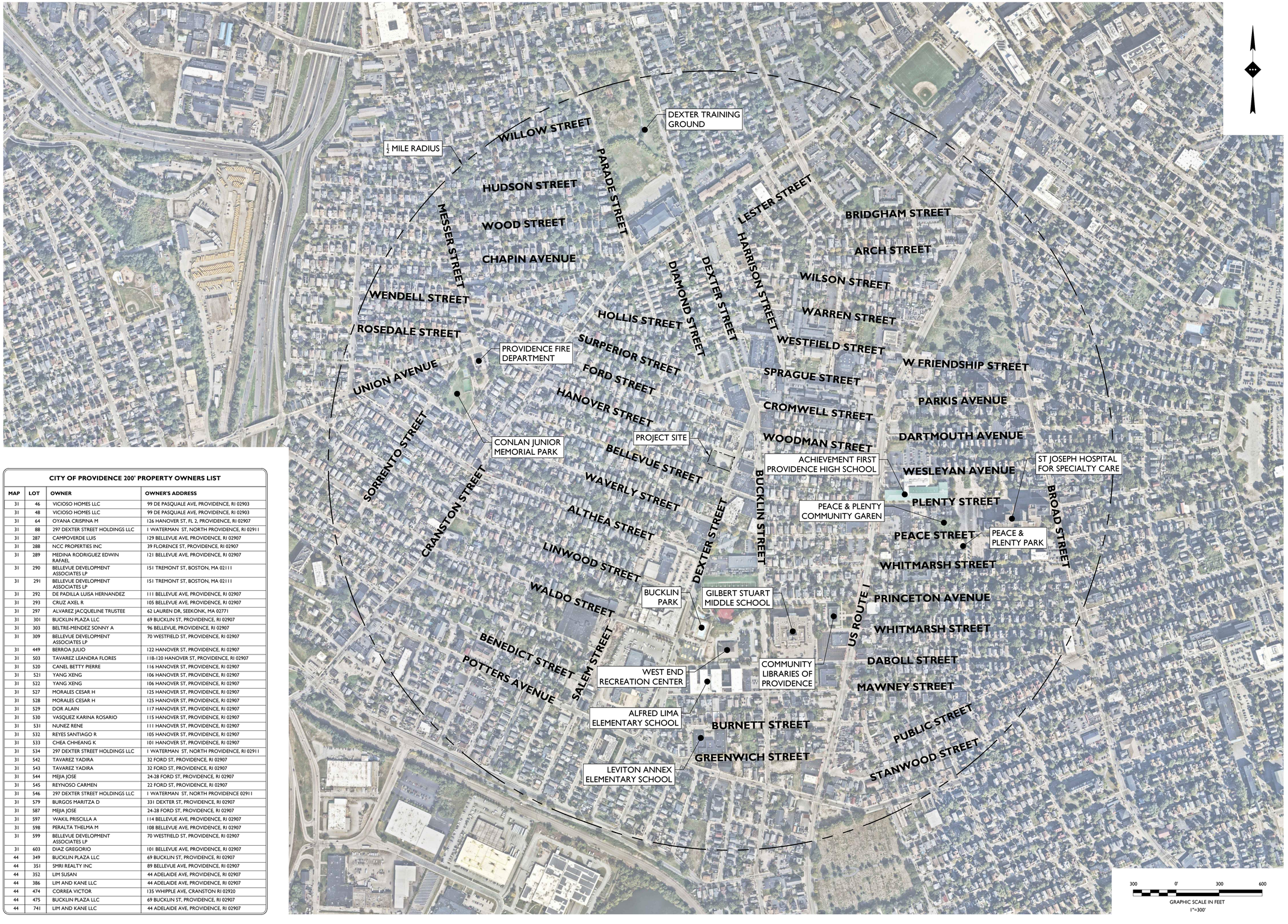
INVENTORY

FIGURE 1: RADIUS MAP

FIGURE 2: SITE PLANS

FIGURE 3: STORMWATER MANAGEMENT PLAN

FIGURE 4: SOIL EROSION & SEDIMENT CONTROL PLANS



CITY OF PROVIDENCE 200' PROPERTY OWNERS LIST

MAP	LOT	OWNER	OWNER'S ADDRESS
31	46	VICIOSO HOMES LLC	99 DE PASQUALE AVE, PROVIDENCE, RI 02903
31	48	VICIOSO HOMES LLC	99 DE PASQUALE AVE, PROVIDENCE, RI 02903
31	64	OYANA CRISPINA M	126 HANOVER ST, FL 2, PROVIDENCE, RI 02907
31	88	297 DEXTER STREET HOLDINGS LLC	1 WATERMAN ST, NORTH PROVIDENCE, RI 02911
31	287	CAMPOVERDE LUIS	129 BELLEVUE AVE, PROVIDENCE, RI 02907
31	288	NCC PROPERTIES INC	39 FLORENCE ST, PROVIDENCE, RI 02907
31	289	MEDINA RODRIGUEZ EDWIN RAFAEL	121 BELLEVUE AVE, PROVIDENCE, RI 02907
31	290	BELLEVUE DEVELOPMENT ASSOCIATES LP	151 TREMONT ST, BOSTON, MA 02111
31	291	BELLEVUE DEVELOPMENT ASSOCIATES LP	151 TREMONT ST, BOSTON, MA 02111
31	292	DE PADILLA LUISA HERNANDEZ	111 BELLEVUE AVE, PROVIDENCE, RI 02907
31	293	CRUZ AXEL R	105 BELLEVUE AVE, PROVIDENCE, RI 02907
31	297	ALVAREZ JACQUELINE TRUSTEE	62 LAUREN DR, SEEKONK, MA 02771
31	301	BUCKLIN PLAZA LLC	69 BUCKLIN ST, PROVIDENCE, RI 02907
31	303	BELTRE-MENDEZ SONNY A	96 BELLEVUE, PROVIDENCE, RI 02907
31	309	BELLEVUE DEVELOPMENT ASSOCIATES LP	70 WESTFIELD ST, PROVIDENCE, RI 02907
31	449	BERROA JULIO	122 HANOVER ST, PROVIDENCE, RI 02907
31	503	TAVAREZ LEANDRA FLORES	118-120 HANOVER ST, PROVIDENCE, RI 02907
31	520	CANEL BETTY PIERRE	116 HANOVER ST, PROVIDENCE, RI 02907
31	521	YANG XENG	106 HANOVER ST, PROVIDENCE, RI 02907
31	522	YANG XENG	106 HANOVER ST, PROVIDENCE, RI 02907
31	527	MORALES CESAR H	125 HANOVER ST, PROVIDENCE, RI 02907
31	528	MORALES CESAR H	125 HANOVER ST, PROVIDENCE, RI 02907
31	529	DOR ALAIN	117 HANOVER ST, PROVIDENCE, RI 02907
31	530	VASQUEZ KARINA ROSARIO	115 HANOVER ST, PROVIDENCE, RI 02907
31	531	NUNEZ RENE	111 HANOVER ST, PROVIDENCE, RI 02907
31	532	REYES SANTIAGO R	105 HANOVER ST, PROVIDENCE, RI 02907
31	533	CHEA CHHEANG K	101 HANOVER ST, PROVIDENCE, RI 02907
31	534	297 DEXTER STREET HOLDINGS LLC	1 WATERMAN ST, NORTH PROVIDENCE, RI 02911
31	542	TAVAREZ YADIRA	32 FORD ST, PROVIDENCE, RI 02907
31	543	TAVAREZ YADIRA	32 FORD ST, PROVIDENCE, RI 02907
31	544	MEJIA JOSE	24-28 FORD ST, PROVIDENCE, RI 02907
31	545	REYNOSO CARMEN	22 FORD ST, PROVIDENCE, RI 02907
31	546	297 DEXTER STREET HOLDINGS LLC	1 WATERMAN ST, NORTH PROVIDENCE 02911
31	579	BURGOS MARITZA D	331 DEXTER ST, PROVIDENCE, RI 02907
31	587	MEJIA JOSE	24-28 FORD ST, PROVIDENCE, RI 02907
31	597	WAKIL PRISCILLA A	114 BELLEVUE AVE, PROVIDENCE, RI 02907
31	598	PERALTA THELMA M	108 BELLEVUE AVE, PROVIDENCE, RI 02907
31	599	BELLEVUE DEVELOPMENT ASSOCIATES LP	70 WESTFIELD ST, PROVIDENCE, RI 02907
31	603	DIAZ GREGORIO	101 BELLEVUE AVE, PROVIDENCE, RI 02907
44	349	BUCKLIN PLAZA LLC	69 BUCKLIN ST, PROVIDENCE, RI 02907
44	351	SMRI REALTY INC	89 BELLEVUE AVE, PROVIDENCE, RI 02907
44	352	LIM SUSAN	44 ADELAIDE AVE, PROVIDENCE, RI 02907
44	386	LIM AND KANE LLC	44 ADELAIDE AVE, PROVIDENCE, RI 02907
44	474	CORREA VICTOR	135 WHIPPLE AVE, CRANSTON RI 02920
44	475	BUCKLIN PLAZA LLC	69 BUCKLIN ST, PROVIDENCE, RI 02907
44	741	LIM AND KANE LLC	44 ADELAIDE AVE, PROVIDENCE, RI 02907

Z:\BOS\PROJ\2025\BOS-250101 ZDS - 309 DEXTER STREET, PROVIDENCE, RI\CAD\DWG\PLOT\LDP-01-COVER.DWG

ISSUE	DATE	BY	DESCRIPTION
1	11/18/2025	SCL	FOR MINOR LAND DEVELOPMENT

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design

Rutherford, NJ · New York, NY · Salem, MA · Providence, RI
Princeton, NJ · Tampa, FL · Birmingham, MI
www.stonefieldeng.com

56 Pine Street, Providence, RI 02903
Phone 617.203.2076

MINOR LAND DEVELOPMENT PLAN

MICHAEL LEMOI

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

A.P. 31 | LOTS 125, 523, 524 & 525
A.P. 44 | LOTS 65, 67, 68, 69
309 DEXTER STREET
CITY OF PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.
RHODE ISLAND LICENSE No. 13607
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: AS SHOWN | PROJECT ID: BOS-250101

TITLE:

RADIUS MAP

DRAWING:

C-2

LAND USE AND ZONING

309 DEXTER STREET
A.P. 31 | LOTS 125, 523, 524 & 525
M-MU-75 MIXED-USE INDUSTRIAL DISTRICT

PROPOSED USE
MULTI-FAMILY DWELLING — PERMITTED USE

ZONING REQUIREMENT	REQUIRED	EXISTING	PROPOSED
MINIMUM LOT AREA	0 SF	8,816 SF (0.20 AC) (*)	NO CHANGE
MAXIMUM BUILDING HEIGHT	75 FT	-	56.3 FT
MINIMUM FRONT YARD SETBACK	0 FT	-	0 FT
MINIMUM INTERIOR SIDE YARD SETBACK	10 FT	-	102.9 FT
MINIMUM CORNER SIDE YARD SETBACK	0 FT	-	0 FT
MINIMUM REAR YARD SETBACK	0 FT	-	3.8 FT
MAXIMUM LOT WIDTH	NOT SPECIFIED	101.0 FT	NO CHANGE
MAXIMUM IMPERVIOUS COVERAGE	NOT SPECIFIED	80.7% (7,117 SF) (*)	87.3% (7,696 SF) (*)

R-3 RESIDENTIAL DISTRICT

PROPOSED USE
ACCESSORY PARKING LOT — PERMITTED USE

MINIMUM LOT AREA	3,500 SF	8,103 SF (0.19 AC) (*)	NO CHANGE
MAXIMUM IMPERVIOUS SURFACE COVERAGE - REAR YARD	33%	42.5% (3,441 SF) (*)	88.6% (7,183 SF) (V) (*)
TOTAL MAXIMUM IMPERVIOUS SURFACE COVERAGE	65%	42.5% (3,441 SF) (*)	88.6% (7,183 SF) (V) (*)

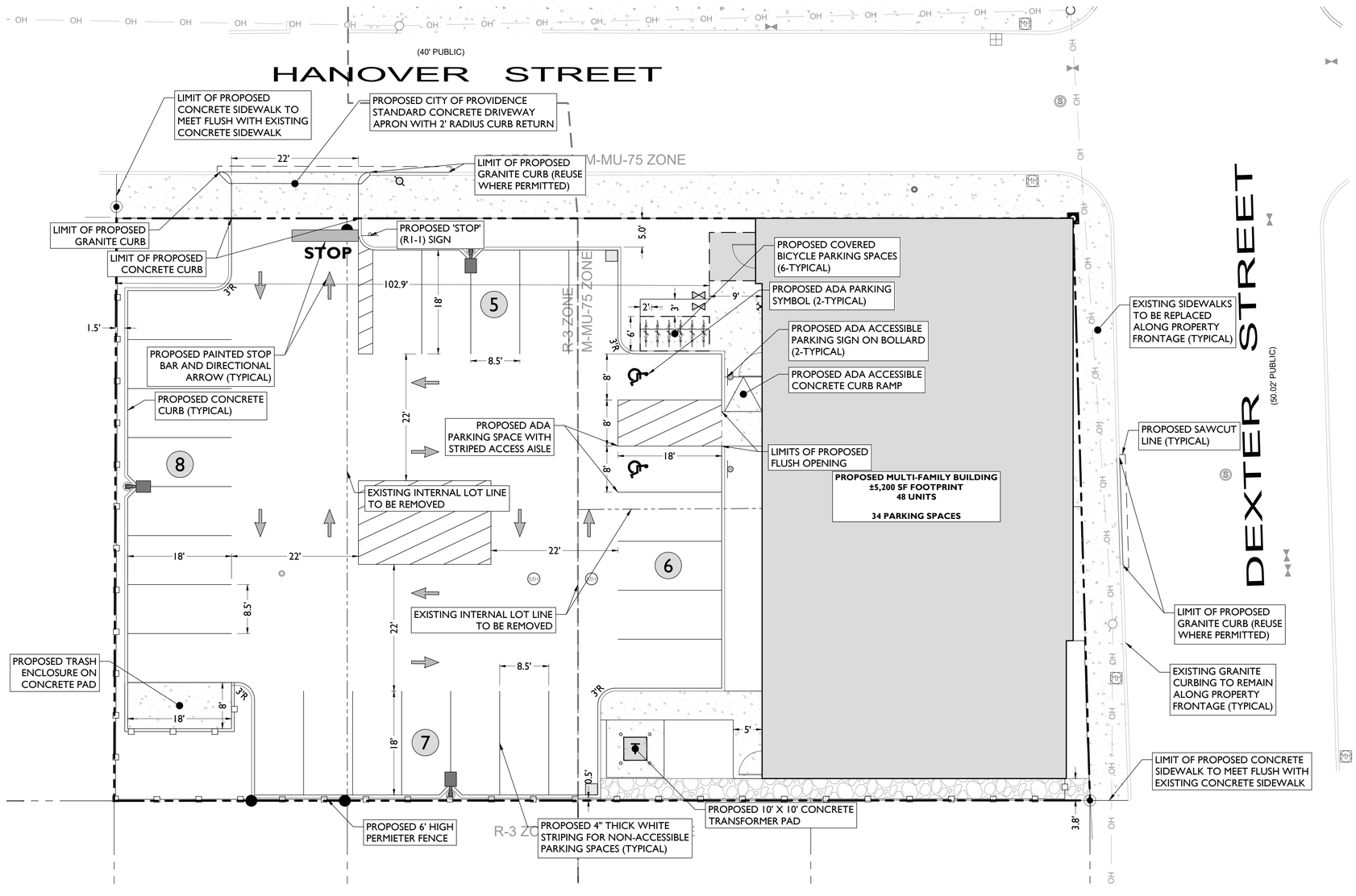
(V) VARIANCE
(*) VALUE NOTED INICATES THE AREA OF THE SITE THAT IS WITHIN THE RESPECTIVE ZONE. TOTAL SITE AREA IS 16,919 SF, TOTAL EXISTING IMPERVIOUS COVERAGE IS 62.4%, AND TOTAL PROPOSED IMPERVIOUS COVERAGE IS 87.9%

OFF-STREET PARKING & LOADING REQUIREMENTS

309 DEXTER STREET

CODE SECTION	REQUIRED	PROPOSED
TABLE 14-1	MINIMUM REQUIRED PARKING SPACES MULTI-FAMILY DWELLING: 1 SPACE / DWELLING 48 DWELLINGS = 48 PARKING SPACES	LOT 546: 8 SPACES LOTS 523 & 524: 26 SPACES **TOTAL: 34 SPACES (DA)**
TABLE 14-1	MINIMUM REQUIRED BICYCLE PARKING: 1 SPACE / 5 DWELLINGS 80% TO BE LONG TERM SPACES 48 DWELLINGS = 8 LONG TERM SPACES 10 SPACES TOTAL	 COMPLIES (*)
FIGURE 14-1	STANDARD PARKING DIMENSIONS: 8.5 FT X 18 FT MINIMUM AISLE WIDTH: 22 FT	 8.5 FT X 18 FT 22 FT
§ 1405 B.1.	BICYCLE PARKING DIMENSIONS: 2 FT X 6 FT	COMPLIES (*)
§ 1405 B.2.	LONG-TERM BICYCLE PARKING SHALL BE LOCATED INDOORS OR FULLY COVERED	COMPLIES (*)
§ 1407 A.2.	MAXIMUM TWO-WAY DRIVEWAY WIDTH: 24 FT	22 FT
§ 1407 B.3.	MAXIMUM 1 CURB CUT PER FRONTAGE	COMPLIES
§ 1504 A.	RIGHT-OF-WAY LANDSCAPE BUFFER: 5 FT	5 FT

(DA) DIMENSIONAL ADJUSTMENT UNDER SECTION 1904
(*) SEE ARCHITECTURAL PLANS FOR SPECIFICATIONS



SYMBOL	DESCRIPTION
	PROPERTY LINE
	ZONING DISTRICT BOUNDARY
	PROPOSED CURB
	PROPOSED FLUSH OPENING
	PROPOSED BUILDING
	PROPOSED CONCRETE
	PROPOSED HANDRAIL
	PROPOSED PERIMETER FENCE
	PROPOSEDS SIGNS
	PROPOSED BUILDING DOORS

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS AND THE PROPOSED SCOPE OF WORK (INCLUDING DIMENSIONS, LAYOUT, ETC.) PRIOR TO INITIATING THE IMPROVEMENTS IDENTIFIED WITHIN THESE DOCUMENTS. SHOULD ANY DISCREPANCY BE FOUND BETWEEN THE EXISTING SITE CONDITIONS AND THE PROPOSED WORK THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC. AND ITS SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEY'S FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
4. THE CONTRACTOR SHALL NOT DEVIATE FROM THE PROPOSED IMPROVEMENTS IDENTIFIED WITHIN THIS PLAN SET UNLESS APPROVAL IS PROVIDED IN WRITING BY STONEFIELD ENGINEERING & DESIGN, LLC.
5. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
6. THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
7. THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTORS EXPENSE.
8. CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC. WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
9. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
10. THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
11. THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
12. SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC. BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.

10' 0' 10' 20'
GRAPHIC SCALE IN FEET
1" = 10'

ISSUE	DATE	BY	DESCRIPTION
1	02/04/2026	SCL	FOR MINOR LAND DEVELOPMENT SUBMISSION

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Princeton, NJ · Tampa, FL · Birmingham, MI
www.stonefieldeng.com
56 Pine Street, Providence, RI 02903
Phone 617.203.2076

MINOR LAND DEVELOPMENT PLAN

297 DEXTER STREET HOLDINGS, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

A.P. 31 | LOTS 125, 523, 524 & 525
M-MU-75 & R-3 DISTRICTS
309 DEXTER STREET, 67, 68, 69
CITY OF PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.
RHODE ISLAND LICENSE No. 13607
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 10' | PROJECT ID: BOS-250101

TITLE: SITE PLAN

DRAWING: C-4

Z:\BOSTON\BOS2025\BOS-250101 - 309 DEXTER STREET, PROVIDENCE, RI\CAD\DWG\PLOT\LP-04-SITE.DWG

EXCAVATION & UTILITY VERIFICATION NOTE:

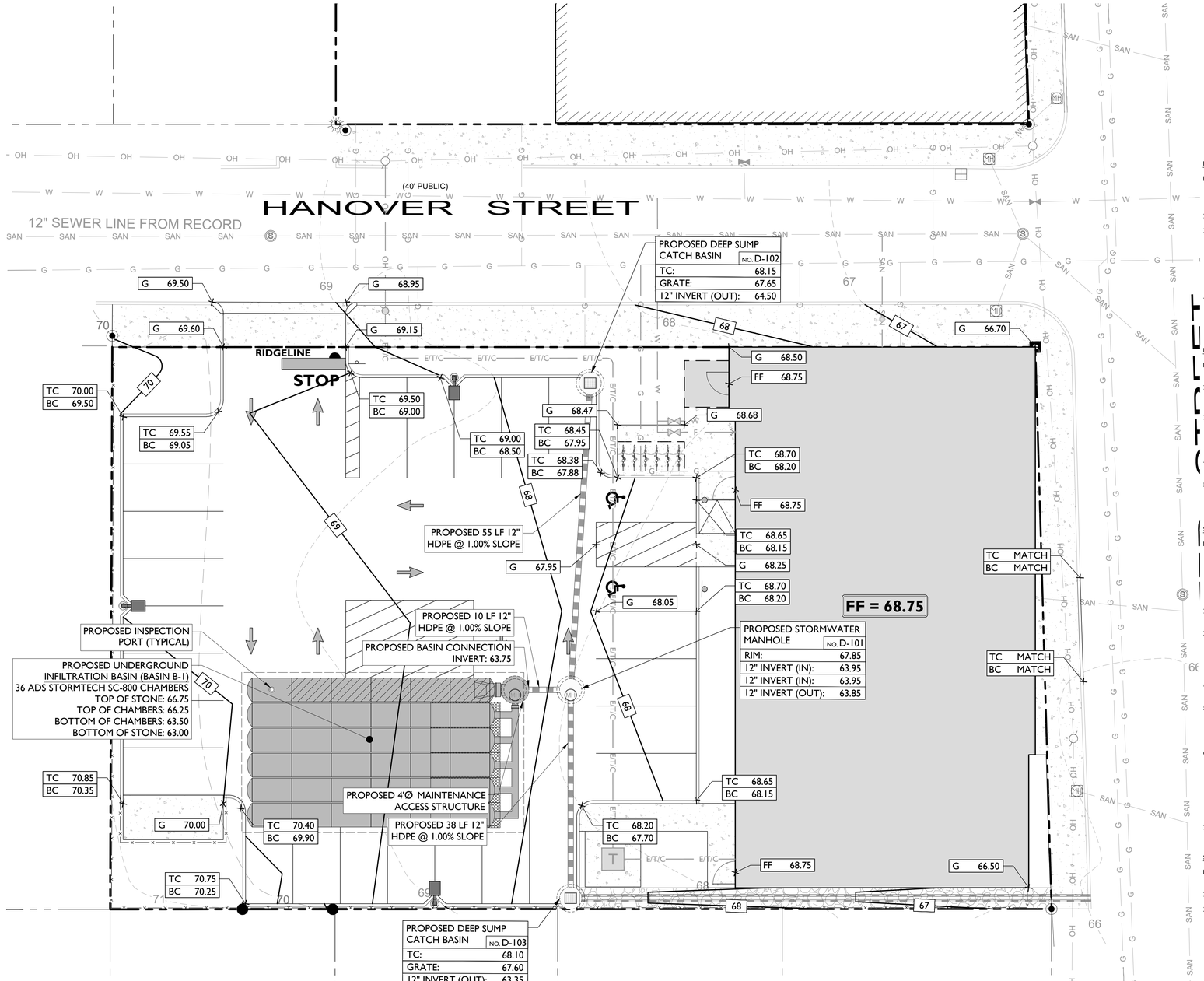
PRIOR TO THE START OF CONSTRUCTION (RECOMMENDED 30 DAYS PRIOR) THE CONTRACTOR SHALL PERFORM EXPLORATORY TEST PITS AT LOCATIONS OF UTILITY / DRAINAGE CROSSINGS OR CONNECTIONS WITH EXISTING UTILITY OR STORMWATER INFRASTRUCTURE. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ANY NECESSARY ROAD OPENING PERMITS TO PERFORM SAID EXPLORATORY WORK. SHOULD A CONFLICT BE DISCOVERED WITH THE INFORMATION CONTAINED WITHIN THESE PLANS THE CONTRACTOR SHALL IMMEDIATELY NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IN WRITING.

SANITARY / STORMWATER CONSTRUCTION NOTE:

THE CONTRACTOR SHALL START CONSTRUCTION OF ALL GRAVITY SANITARY AND STORMWATER INFRASTRUCTURE AT THE DOWNSTREAM CONNECTION POINT (E.G. LOWEST INVERT) AND WORK UP-GRADIENT.

PROVIDENCE WATER INSPECTION NOTE:

ALL SERVICE LINES INSTALLED AS A PART OF THIS PROJECT MUST BE INSPECTED BY THE PROVIDENCE WATER SUPPLY BOARD (PWSB) PRIOR TO BACKFILLING. SERVICE LINES WILL NOT BE TURNED ON UNTIL ALL LINES ARE INSPECTED BY PWSB. CONTRACTOR SHALL SCHEDULE SERVICE INSPECTIONS AT LEAST 24 HOURS IN ADVANCE OF INSTALLATION BY CALLING PWSB CONSTRUCTION SERVICES DIVISION AT (401) 521-6300, EXT. 7102.



SYMBOL	DESCRIPTION
	PROPERTY LINE
100	PROPOSED GRADING CONTOUR
RIDGELINE	PROPOSED GRADING RIDGELINE
	PROPOSED DIRECTION OF DRAINAGE FLOW
G 100.00	PROPOSED GRADE SPOT SHOT
TC 100.50 BC 100.00	PROPOSED TOP OF CURB / BOTTOM OF CURB SPOT SHOT
	PROPOSED STORMWATER STRUCTURES
	PROPOSED STORMWATER PIPING

DRAINAGE AND UTILITY NOTES

1. THE CONTRACTOR TO PERFORM A TEST PIT PRIOR TO CONSTRUCTION (RECOMMEND 30 DAYS PRIOR) AT LOCATIONS OF EXISTING UTILITY CROSSINGS FOR STORMWATER IMPROVEMENTS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IN WRITING.
2. CONTRACTOR SHALL START CONSTRUCTION OF STORM LINES AT THE LOWEST INVERT AND WORK UP-GRADIENT.
3. THE CONTRACTOR IS REQUIRED TO CALL THE APPROPRIATE AUTHORITY FOR NOTICE OF CONSTRUCTION/EXCAVATION AND UTILITY MARK OUT PRIOR TO THE START OF CONSTRUCTION IN ACCORDANCE WITH STATE LAW. CONTRACTOR IS REQUIRED TO CONFIRM THE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES IN THE FIELD. SHOULD A DISCREPANCY EXIST BETWEEN THE FIELD LOCATION OF A UTILITY AND THE LOCATION SHOWN ON THE PLAN SET OR SURVEY, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IMMEDIATELY IN WRITING.
4. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN A RECORD OF THE AS-BUILT LOCATIONS OF ALL PROPOSED UNDERGROUND INFRASTRUCTURE. THE CONTRACTOR SHALL NOTE ANY DISCREPANCIES BETWEEN THE AS-BUILT LOCATIONS AND THE LOCATIONS DEPICTED WITHIN THE PLAN SET. THIS RECORD SHALL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF WORK.

EXCAVATION, SOIL PREPARATION, AND DEWATERING NOTES

1. THE CONTRACTOR IS REQUIRED TO REVIEW THE REFERENCED GEOTECHNICAL DOCUMENTS PRIOR TO CONSTRUCTION, THESE DOCUMENTS SHALL BE CONSIDERED A PART OF THE PLAN SET.
2. THE CONTRACTOR IS REQUIRED TO PREPARE SUBGRADE SOILS BENEATH ALL PROPOSED IMPROVEMENTS AND BACKFILL ALL EXCAVATIONS IN ACCORDANCE WITH RECOMMENDATIONS BY THE GEOTECHNICAL ENGINEER OF RECORD.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SHORING FOR ALL EXCAVATIONS AS REQUIRED. CONTRACTOR SHALL HAVE THE SHORING DESIGN PREPARED BY A QUALIFIED PROFESSIONAL. SHORING DESIGNS SHALL BE SUBMITTED TO STONEFIELD ENGINEERING & DESIGN, LLC. AND THE OWNER PRIOR TO THE START OF CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL OPEN EXCAVATIONS ARE PERFORMED AND PROTECTED IN ACCORDANCE WITH THE LATEST OSHA REGULATIONS.
5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DEWATERING DESIGN AND OPERATIONS, AS REQUIRED, TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FOR DEWATERING OPERATIONS AND GROUNDWATER DISPOSAL.

STORMWATER INFILTRATION BMP CONSTRUCTION NOTES

1. PRIOR TO THE START OF CONSTRUCTION, ANY AREA DESIGNATED TO BE USED FOR AN INFILTRATION BMP (E.G. BASIN, BIORETENTION AREA, ETC.) SHALL BE FENCED OFF AND SHALL NOT BE UTILIZED AS STORAGE FOR CONSTRUCTION EQUIPMENT OR AS A STOCKPILE AREA FOR CONSTRUCTION MATERIALS. NO ACTIVITY SHALL BE PERMITTED WITHIN THE INFILTRATION BASIN AREA UNLESS RELATED TO THE CONSTRUCTION OF THE INFILTRATION BASIN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ALL SUBCONTRACTORS OF BASIN AREA RESTRICTIONS.
2. THE CONTRACTOR SHALL MAKE EVERY EFFORT, WHERE PRACTICAL, TO AVOID SUBGRADE SOIL COMPACTION IN THE AREAS DESIGNATED TO BE USED FOR AN INFILTRATION BMP.
3. ALL EXCAVATION WITHIN THE LIMITS OF ANY INFILTRATION BMP SHALL BE PERFORMED WITH THE LIGHTEST PRACTICAL EXCAVATION EQUIPMENT. ALL EXCAVATION EQUIPMENT SHALL BE PLACED OUTSIDE THE LIMITS OF THE BASIN WHERE FEASIBLE. THE USE OF LIGHT-WEIGHT, RUBBER-TIRED EQUIPMENT (LESS THAN 8 PSI APPLIED TO THE GROUND SURFACE) IS RECOMMENDED WITHIN THE BASIN LIMITS.
4. THE SEQUENCE OF SITE CONSTRUCTION SHALL BE COORDINATED WITH BASIN CONSTRUCTION TO ADHERE TO SEQUENCING LIMITATIONS.
5. DURING THE FINAL GRADING OF AN INFILTRATION BASIN, THE BOTTOM OF THE BASIN SHALL BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW AND THEN SMOOTHED OUT WITH A LEVELING DRAW OR EQUIVALENT GRADING EQUIPMENT. ALL GRADING EQUIPMENT SHALL BE LOCATED OUTSIDE OF THE BASIN BOTTOM WHERE FEASIBLE.
6. FOLLOWING CONSTRUCTION OF AN INFILTRATION BASIN, SOIL INFILTRATION TESTING BY A LICENSED GEOTECHNICAL ENGINEER IS REQUIRED TO CERTIFY COMPLIANCE WITH THE DESIGN INFILTRATION RATES IN ACCORDANCE WITH APPENDIX E OF THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION'S BEST MANAGEMENT PRACTICES MANUAL, LATEST EDITION. IF THE FIELD INFILTRATION RATES ARE LOWER THAN THE RATE USED DURING DESIGN, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IN WRITING IMMEDIATELY TO DETERMINE THE APPROPRIATE COURSE OF ACTION.
7. THE CONTRACTOR SHALL NOTIFY THE MUNICIPALITY TO DETERMINE IF WITNESS TESTING IS REQUIRED DURING INFILTRATION BASIN EXCAVATION AND/OR SOIL INFILTRATION TESTING.

STORMWATER UNDERGROUND BMP CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL INSTALL AND BACKFILL THE UNDERGROUND BMP IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
2. UNDERGROUND BASINS SHALL UTILIZE A STONE BACKFILL WITH A MINIMUM VOID RATIO OF 40%.
3. NO CONSTRUCTION LOADING OVER UNDERGROUND BASINS IS PERMITTED UNTIL BACKFILL IS COMPLETE PER THE MANUFACTURER'S SPECIFICATIONS. NO VEHICLES SHALL BE STAGED OR OPERATE FROM A FIXED POSITION OVER THE BASIN.

GRADING NOTES

1. ALL SOIL AND MATERIAL REMOVED FROM THE SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS. ANY GROUNDWATER DE-WATERING PRACTICES SHALL BE PERFORMED UNDER THE SUPERVISION OF A QUALIFIED PROFESSIONAL. THE CONTRACTOR IS REQUIRED TO OBTAIN ALL NECESSARY PERMITS FOR THE DISCHARGE OF DE-WATERED GROUNDWATER. ALL SOIL IMPORTED TO THE SITE SHALL BE CERTIFIED CLEAN FILL. CONTRACTOR SHALL MAINTAIN RECORDS OF ALL FILL MATERIALS BROUGHT TO THE SITE.
2. THE CONTRACTOR IS REQUIRED TO PROVIDE TEMPORARY AND/OR PERMANENT SHORING WHERE REQUIRED DURING EXCAVATION ACTIVITIES, INCLUDING BUT NOT LIMITED TO UTILITY TRENCHES, TO ENSURE THE STRUCTURAL INTEGRITY OF NEARBY STRUCTURES AND STABILITY OF THE SURROUNDING SOILS.
3. PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 4 INCHES TO 7 INCHES ABOVE EXISTING GRADES UNLESS OTHERWISE NOTED. THE CONTRACTOR WILL SUPPLY ALL STAKEOUT CURB GRADE SHEETS TO STONEFIELD ENGINEERING & DESIGN, LLC FOR REVIEW AND APPROVAL PRIOR TO POURING CURBS.
4. THE CONTRACTOR IS RESPONSIBLE TO SET ALL PROPOSED UTILITY COVERS AND RESET ALL EXISTING UTILITY COVERS WITHIN THE PROJECT LIMITS TO PROPOSED GRADE IN ACCORDANCE WITH ANY APPLICABLE MUNICIPAL, COUNTY, STATE AND/OR UTILITY AUTHORITY REGULATIONS.
5. MINIMUM SLOPE REQUIREMENTS TO PREVENT PONDING SHALL BE AS FOLLOWS:
   - CURB GUTTER: 0.50%
   - CONCRETE SURFACES: 1.00%
   - ASPHALT SURFACES: 1.00%
6. A MINIMUM SLOPE OF 1.00% SHALL BE PROVIDED AWAY FROM ALL BUILDINGS. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE FROM THE BUILDING IS ACHIEVED AND SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC. IF THIS CONDITION CANNOT BE MET.
7. FOR PROJECTS WHERE BASEMENTS ARE PROPOSED, THE DEVELOPER IS RESPONSIBLE TO DETERMINE THE DEPTH TO GROUNDWATER AT THE LOCATION OF THE PROPOSED STRUCTURE. IF GROUNDWATER IS ENCOUNTERED WITHIN THE BASEMENT AREA, SPECIAL CONSTRUCTION METHODS SHALL BE UTILIZED AND REVIEWED/APPROVED BY THE CONSTRUCTION CODE OFFICIAL. IF SUMP PUMPS ARE UTILIZED, ALL DISCHARGES SHALL BE CONNECTED DIRECTLY TO THE PUBLIC STORM SEWER SYSTEM WITH APPROVAL FROM THE GOVERNING STORM SEWER SYSTEM AUTHORITY.

ADA NOTES

1. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 2.00% SLOPE IN ANY DIRECTION WITHIN THE ADA PARKING SPACES AND ACCESS AISLES.
2. THE CONTRACTOR SHALL PROVIDE COMPLIANT SIGNAGE AT ALL ADA PARKING AREAS IN ACCORDANCE WITH STATE GUIDELINES.
3. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 5.00% RUNNING SLOPE AND A MAXIMUM OF 2.00% CROSS SLOPE ALONG WALKWAYS WITHIN THE ACCESSIBLE PATH OF TRAVEL (SEE THE SITE PLAN FOR THE LOCATION OF THE ACCESSIBLE PATH). THE CONTRACTOR IS RESPONSIBLE TO ENSURE THE ACCESSIBLE PATH OF TRAVEL IS 36 INCHES WIDE OR GREATER UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
4. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 2.00% SLOPE IN ANY DIRECTION AT ALL LANDINGS. LANDINGS INCLUDE, BUT ARE NOT LIMITED TO, THE TOP AND BOTTOM OF AN ACCESSIBLE RAMP, AT ACCESSIBLE BUILDING ENTRANCES, AT AN AREA IN FRONT OF A WALK-UP ATM, AND AT TURNING SPACES ALONG THE ACCESSIBLE PATH OF TRAVEL. THE LANDING AREA SHALL HAVE A MINIMUM CLEAR AREA OF 60 INCHES BY 60 INCHES UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
5. THE CONTRACTOR SHALL MAINTAIN A MAXIMUM 8.33% RUNNING SLOPE AND A MAXIMUM 2.00% CROSS SLOPE ON ANY CURB RAMPS ALONG THE ACCESSIBLE PATH OF TRAVEL. WHERE PROVIDED, CURB RAMP FLARES SHALL NOT HAVE A SLOPE GREATER THAN 10.00% IF A LANDING AREA IS PROVIDED AT THE TOP OF THE RAMP. FOR ALTERATIONS, A CURB RAMP FLARES SHALL NOT HAVE A SLOPE GREATER THAN 8.33% IF A LANDING AREA IS NOT PROVIDED AT THE TOP OF THE RAMP. CURBS RAMPS SHALL NOT RISE MORE THAN 6 INCHES IN ELEVATION WITHOUT A HANDRAIL. THE CLEAR WIDTH OF A CURB RAMP SHALL BE NO LESS THAN 36 INCHES WIDE.
6. ACCESSIBLE RAMPS WITH A RISE GREATER THAN 6 INCHES SHALL CONTAIN COMPLIANT HANDRAILS ON BOTH SIDES OF THE RAMP AND SHALL NOT RISE MORE THAN 30" IN ELEVATION WITHOUT A LANDING AREA IN BETWEEN RAMP RUNS. LANDING AREAS SHALL ALSO BE PROVIDED AT THE TOP AND BOTTOM OF THE RAMP.
7. A SLIP RESISTANT SURFACE SHALL BE CONSTRUCTED ALONG THE ACCESSIBLE PATH AND WITHIN ADA PARKING AREAS.
8. THE CONTRACTOR SHALL ENSURE A MAXIMUM OF ¼ INCHES VERTICAL CHANGE IN LEVEL ALONG THE ACCESSIBLE PATH. WHERE A CHANGE IN LEVEL BETWEEN ¼ INCHES AND ½ INCHES EXISTS, CONTRACTOR SHALL ENSURE THAT THE TOP ½ INCH CHANGE IN LEVEL IS BEVELED WITH A SLOPE NOT STEEPER THAN 1 UNIT VERTICAL AND 2 UNITS HORIZONTAL (2:1 SLOPE).
9. THE CONTRACTOR SHALL ENSURE THAT ANY OPENINGS (GAPS OR HORIZONTAL SEPARATION) ALONG THE ACCESSIBLE PATH SHALL NOT ALLOW PASSAGE OF A SPHERE GREATER THAN ½ INCH.

10' 0' 10' 20'
GRAPHIC SCALE IN FEET
1" = 10'

ISSUE	DATE	BY	DESCRIPTION
1	02/04/2026	SCL	FOR MINOR LAND DEVELOPMENT SUBMISSION

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Princeton, NJ · Tampa, FL · Birmingham, MI
www.stonefieldeng.com
56 Pine Street, Providence, RI 02903
Phone 617.203.2076

MINOR LAND DEVELOPMENT PLAN

297 DEXTER STREET HOLDINGS, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

A.P. 31 | LOTS 125, 523, 524 & 525
RECORDED AS LOTS 67, 68, 69
297 DEXTER STREET
CITY OF PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.
RHODE ISLAND LICENSE No. 13607
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 10' | PROJECT ID: BOS-250101

TITLE: GRADING & DRAINAGE PLAN

DRAWING: C-6

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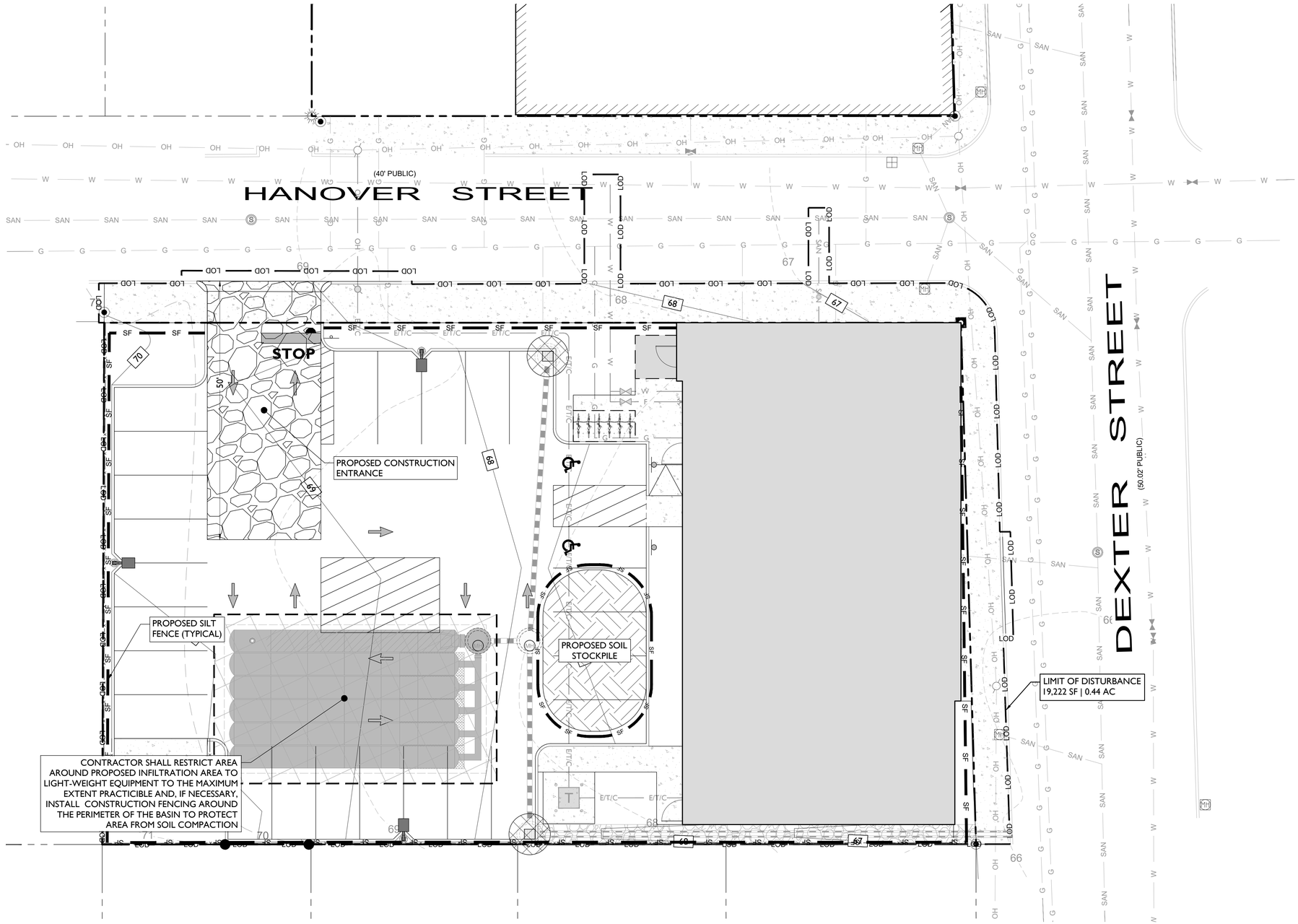

SYMBOL	DESCRIPTION
	PROPERTY BOUNDARY
	ADJACENT PROPERTY BOUNDARY
LOD	PROPOSED LIMIT OF DISTURBANCE
SF	PROPOSED SILT FENCE
TPF	PROPOSED TREE PROTECTION FENCE
	PROPOSED STOCKPILE & EQUIPMENT STORAGE
	PROPOSED STABILIZED CONSTRUCTION ENTRANCE
	AREA TO BE PROTECTED FROM SOIL COMPACTION
	PROPOSED INLET PROTECTION FILTER

SOIL EROSION AND SEDIMENT CONTROL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR SOIL EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL AIR QUALITY STANDARDS.
3. THE CONTRACTOR IS RESPONSIBLE TO INSPECT ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES WEEKLY AND AFTER A PRECIPITATION EVENT GREATER THAN 1 INCH. THE CONTRACTOR SHALL MAINTAIN AN INSPECTION LOG ON SITE AND DOCUMENT CORRECTIVE ACTION TAKEN THROUGHOUT THE COURSE OF CONSTRUCTION AS REQUIRED.

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JOSHUA H. KLINE, P.E.
RHODE ISLAND LICENSE No. 13607
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 10' | PROJECT ID: BOS-250101

TITLE:
SOIL EROSION & SEDIMENT CONTROL PLAN

DRAWING:
C-9

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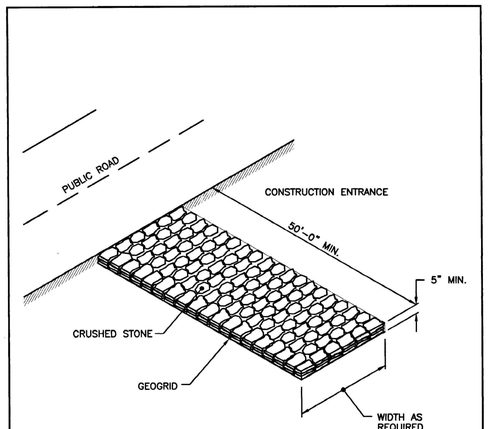


NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 211 OF THE R.I. STANDARD SPECIFICATIONS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

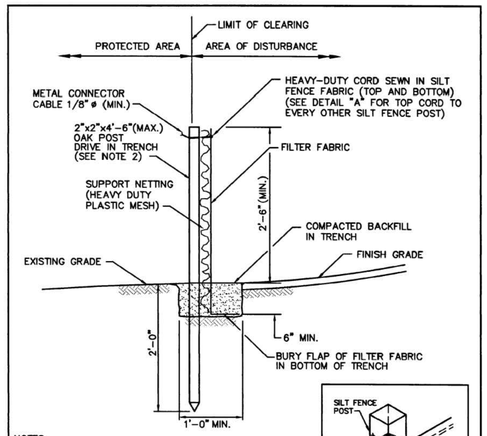
REVISIONS		
NO.	BY	DATE

CONSTRUCTION ACCESS

JUNE 15, 1998 (ISSUE DATE)

R.I. STANDARD 9.9.0

1



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 206 OF THE R.I. STANDARD SPECIFICATIONS.
2. 2"x2"x4'-6"(MAX.) OAK POSTS FOR SILT FENCE SHALL BE LOCATED 8'-0" (MAX.) O.C. IN WETLAND AREAS AND 4'-0" (MAX.) O.C. IN WETLAND RAVINE, GULLY OR DROP-OFF AREAS AS SHOWN ON PLANS.
3. 1"x1"x4'-6"(MIN.) POSTS PERMITTED FOR PRE-FABRICATED SILT FENCE.
4. SILT FENCE SHALL BE INSTALLED BEFORE ANY GRUBBING OR EARTH EXCAVATION TAKES PLACE.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

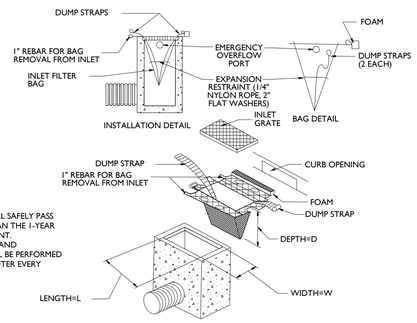
REVISIONS		
NO.	BY	DATE

SILT FENCE DETAIL

JUNE 15, 1998 (ISSUE DATE)

R.I. STANDARD 9.2.0

2

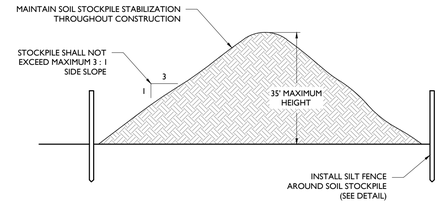


NOTES:
1. THE FILTER BAG SHALL SAFELY PASS FLOWS GREATER THAN THE 1-YEAR 24-HOUR STORM EVENT.
2. SEDIMENT REMOVAL AND MAINTENANCE SHALL BE PERFORMED FREQUENTLY AND AFTER EVERY STORM EVENT.

INLET FILTER BAG DETAIL

NOT TO SCALE

3



NOTES:
1. STOCKPILES SHALL BE SITUATED SO AS NOT TO OBSTRUCT NATURAL DRAINAGE OR CAUSE OFF-SITE ENVIRONMENTAL DAMAGE.
2. STOCKPILES SHALL BE STABILIZED IN ACCORDANCE WITH THE STANDARDS FOR PERMANENT OR TEMPORARY VEGETATIVE COVER FOR SOIL STABILIZATION, AS APPROPRIATE (SEE SOIL EROSION NOTES).

SOIL STOCKPILE DETAIL

NOT TO SCALE

4

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1	02/04/2026	SCL	FOR MINOR LAND DEVELOPMENT SUBMISSION

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LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 10' | PROJECT ID: BOS-250101

TITLE:
SOIL EROSION & SEDIMENT CONTROL DETAILS

DRAWING:
C-10

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APPENDIX E
ADS STORMTECH MANUFACTURER SPECIFICATIONS

INVENTORY

E-1: STORMTECH SC-800 FIELD GUIDE

E-2: STORMTECH ISOLATOR ROW PLUS MANUAL

APPENDIX E-1
STORMTECH SC-800 FIELD GUIDE

SC-160LP, SC-310, SC-740, DC-780 & SC-800

Design Manual

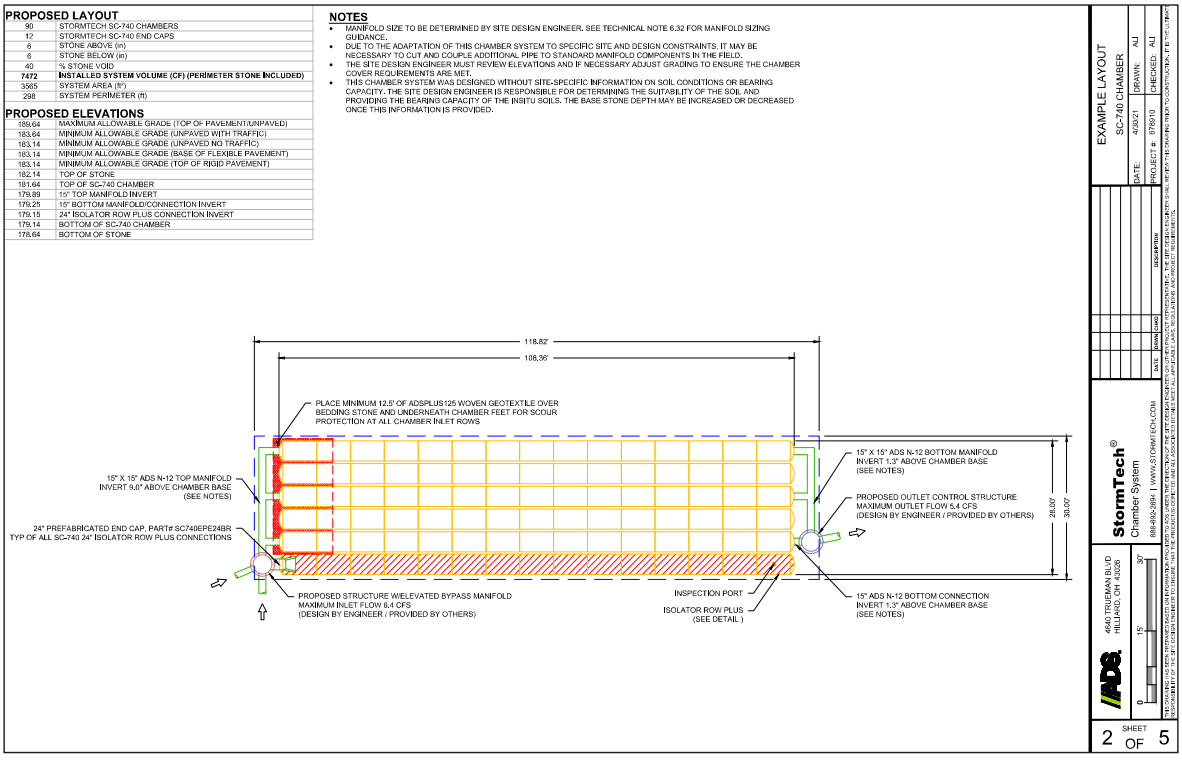
StormTech® Chamber Systems for Stormwater Management

ADS StormTech™

Table of Contents

* For MC-3500 and MC-7200 designs, please refer to the MC-3500/MC-7200 Design Manual.

The StormTech Technical Services Department assists design professionals in specifying StormTech storm water systems. This assistance includes the layout of chambers to meet the engineer's volume requirements and the connections to and from the chambers. The Technical Department can also assist converting and cost engineering projects currently specified with ponds, pipe, concrete and other manufactured storm water detention/retention products. Please note that it is the responsibility of the design engineer to ensure that the chamber bed layout meets all design requirements and is in compliance with applicable laws and regulations governing this project.



This manual is exclusively intended to assist engineers in the design of subsurface stormwater systems using StormTech chambers.

1.0 Introduction

1.1 Introduction

StormTech stormwater management systems allow storm water professionals to create more profitable, environmentally sound developments. Compared with other subsurface systems, StormTech systems offer lower overall installed cost, superior design flexibility and enhanced performance. Applications include commercial, residential, agricultural and highway drainage.

StormTech has invested millions of dollars and many years in the development of StormTech chambers. These innovative products exceed the rigorous requirements of the standards governing the design of thermoplastic structures.

1.2 Gold Standard in Stormwater Management

The advanced designs of StormTech chambers were created by implementing an aggressive research, development, design and manufacturing protocol. StormTech chamber products establish the new gold standard in stormwater management through:

- Collaborations with experts in the field of buried plastic structures and polyolefin materials
- The development and utilization of new testing methods and proprietary test methods
- The use of thermoformed prototypes to verify engineering models, perform in-ground testing and install observation sites
- The investment in custom-designed, injection molding equipment
- The utilization of polypropylene and polyethylene as manufacturing materials
- The design of molded-in features not possible with traditional thermoformed chambers

Section 3.0 of this design manual, Structural Capabilities, provides a detailed description of the research, development and design process.

Many of StormTech's unique chamber features can benefit a site developer, stormwater system designer, and installer. Where applicable, StormTech Product Specifications are referenced throughout this design manual. If StormTech's unique product benefits are important to a stormwater system design, consider including the applicable StormTech Product Specifications on the site plans. This can prevent substitutions with inferior products. Refer to Section 14.0, *StormTech Product Specifications*.

1.3 Product Quality and Design to International Standards

StormTech chambers are designed to meet the full scope of design requirements of Section 12.12 of the AASHTO LRFD Bridge Design Specifications and produced to the requirements of the American Society of Testing Materials (ASTM) International specifications F2418 (polypropylene chambers) and F2922 (polyethylene chambers).

StormTech chambers provide the full AASHTO safety factors for live loads and permanent earth loads. The two ASTM standards mentioned previously are linked to the AASHTO LRFD Bridge Design Specifications Section 12.12 design standard. Both ASTM standards require that the safety factors included in the AASHTO guidance are achieved as a prerequisite to meeting either ASTM F2418 or ASTM F2922. StormTech chambers are also designed in accordance with ASTM F2787, Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers which provides specific guidance on how to design thermoplastic chambers in accordance with AASHTO Section 12.12. These standards provide both the assurance of product quality and safe structural design.

For non-proprietary specifications for public bids that ensure high product quality and safe design, consider including the specification in Section 15.0 Chamber Specifications for Contract Documents.

1.4 Technical Support for Plan Reviews

ADS's engineering staff is available to review proposed plans that incorporate StormTech chamber systems. They are also available to assist with plan conversions from existing products to StormTech. Not all plan sheets are necessary for StormTech's review. Required sheets include plan view sheet(s) with design contours, cross sections of the stormwater system including catch basins and drainage details.

When specifying StormTech chambers it is recommended that the following items are included in project plans: StormTech chamber system General Notes, applicable StormTech chamber illustrations and StormTech chamber system Product Specifications. These items are available in various formats and can be obtained by contacting StormTech at **800-821-6710** or may be downloaded at **adspipe.com**.

StormTech's plan review is limited to the sole purpose of determining whether plans meet StormTech chamber systems' minimum requirements. **It is the ultimate responsibility of the design engineer to assure that the stormwater system's design is in full compliance with all applicable laws and regulations.** StormTech products must be designed and installed in accordance with StormTech's minimum requirements.

Email plans to:
info@adspipe.com.

2.0 Product Information

2.1 Product Applications

StormTech chamber systems may function as stormwater detention, retention, first-flush storage, or some combination of these. The StormTech chambers can be used for commercial, municipal, industrial, recreational, and residential applications especially for installations under parking lots and commercial roadways.

One of the key advantages of the StormTech chamber system is its design flexibility. Chambers may be configured into beds or trenches of various sizes or shapes. They can be centralized or decentralized, and fit on nearly all sites. Chamber lengths enhance the ability to develop on both existing and pre-developed projects. The systems can be designed easily and efficiently around utilities, natural or man-made structures and any other limiting boundaries.

2.2 Chambers for Stormwater Detention

Chamber systems have been used effectively for storm water detention for over 20 years. A detention system temporarily holds water while it is released at a defined rate through an outlet. While some infiltration may occur in a detention system, it is often considered an environmental benefit and a storage safety factor. Over 70% of StormTech's installations are non-watertight detention systems. There are only a few uncommon situations where a detention system might need to limit infiltration: the subgrade soil's bearing capacity is significantly affected by saturation such as with expansive clays or karst soils, and; in sensitive aquifer areas where the depth to groundwater does not meet local guidelines. Adequate pretreatment could eliminate concerns for the latter case. A thermoplastic liner may be considered for both situations to limit infiltration.

2.3 Stone Porosity Assumption

A StormTech chamber system requires the application of clean, crushed, angular stone below, between and above the chambers. This stone serves as a structural component while allowing conveyance and storage of stormwater. Storage volume examples throughout this Design Manual are calculated with an assumption that the stone has an industry standard porosity of 40%. Actual stone porosity may vary. Contact StormTech for information on calculating storm water volumes with varying stone porosity assumptions.

2.4 Chamber Selection

Primary considerations when selecting between the SC-160LP, SC-310, SC-740, DC-780 & SC-800 chambers are the depth to restrictive layer, available area for subsurface storage, cover height and outfall restrictions.

StormTech systems can be integrated into retrofit and new construction projects.

The StormTech SC-160LP chamber shown on page 4 is the smallest of the chamber family and has been optimized to fit in the shallowest of applications. This extra low profile chamber allows for storage of 1.01 ft^3/ft^2 (0.3m^3/m^2) [minimum] of storage.

The StormTech SC-310 chamber shown on page 6 is ideal for systems requiring low-rise and wide-span solutions. This low profile chamber allows the storage of large volumes, 1.3 ft^3/ft^2 (0.40 m^3/m^2) [minimum], at minimum depths.

Like the Stormtech SC-310, the StormTech SC-310-3 found on page 8 allows for a design option for sites with both limited cover and limited space. With only 3 of spacing between the chambers, the SC-310-3 still provides 1.3 ft^3/ft^2 (0.40 m^3/m^2) [minimum] of storage.

The StormTech SC-740 chamber shown on page 10 optimizes storage volumes in relatively small footprints. By providing 2.2 ft^3/ft^2 (0.67 m^3/m^2) [minimum] of storage, the SC-740 chambers can minimize excavation, backfill and associated costs.

The DC-780 chamber shown on page 12 has been developed for those applications which exceed the maximum 8 ft (2.44 m) burial depth of the SC-740 and SC-310 chambers. The DC-780 is a modified version of the SC-740 allowing it to reach a maximum burial depth of 12 ft (3.66 m). The design of the DC-780 chamber, like other StormTech chambers, is designed and manufactured in accordance with the AASHTO LRFD Bridge Design Specifications as well as ASTM F 2418 and ASTM F 2787 ensuring structural adequacy for deeper systems.

StormTech SC-800 improves upon the SC-740 adding more storage in the same vertical depth. The SC-800 is 3 inches taller than the SC-740 but only requires 15" of cover (measured to bottom of flexible pavement / top of rigid pavement). Developed for applications where depth available depth space are limited.

The end corrugations of the DC-780 chamber have not been modified in order to allow connections to the SC-740 chamber. This will allow hybrid systems utilizing both chambers in one system design.

SC-800 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

StormTech SC-800 Chamber (not to scale)

Nominal Specifications

Size (Lx W x H)	85.4” x 51” x 33” (2169 x 1295 x 838 mm)
Chamber Storage	50.6 ft^3 (1.43 m^3)
Min. Installed Storage*	81.0 ft^3 (2.29 m^3)
Weight	81.8 lbs (37.1 kg)

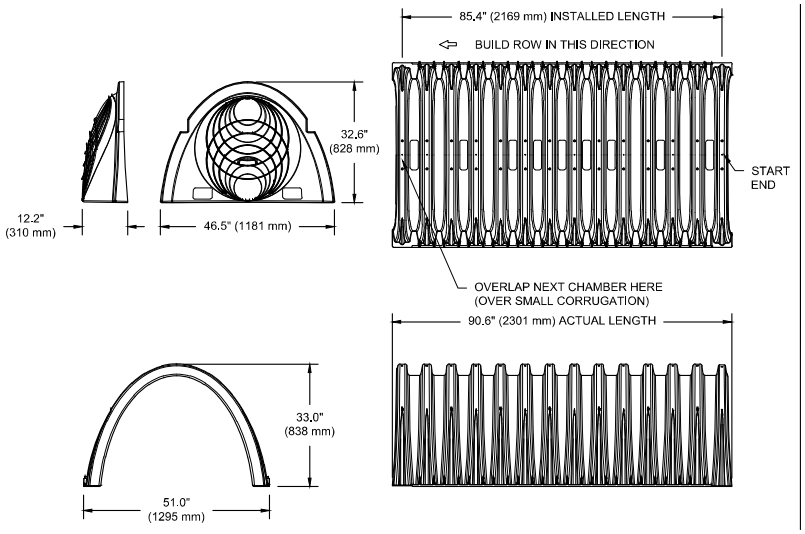
*Assumes 6” (150 mm) stone above, below and between chambers and 40% stone porosity.

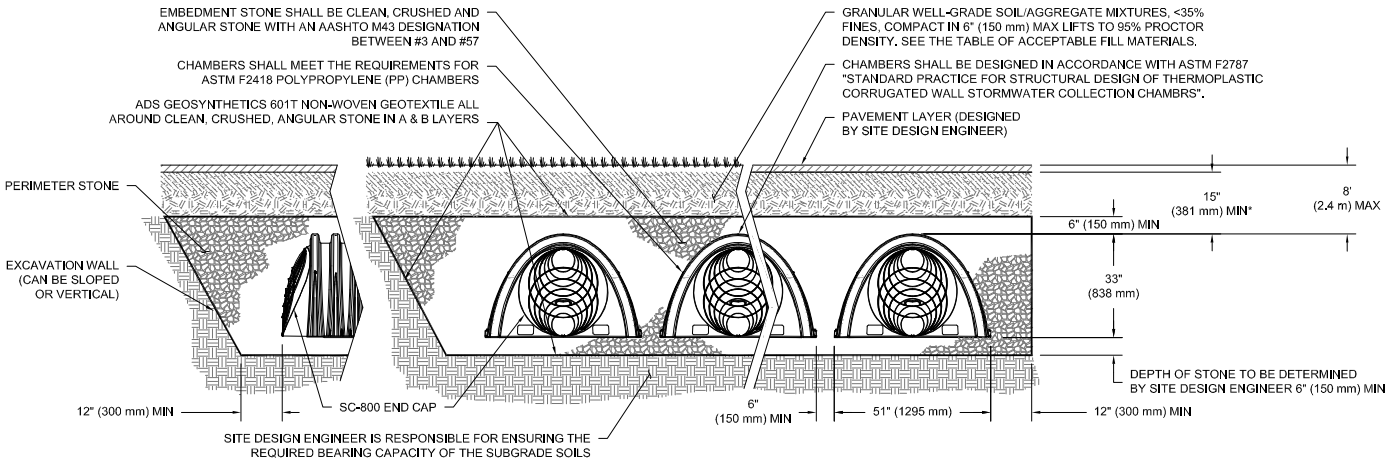
Shipping

30 chambers/pallet

60 end caps/pallet

12 pallets/truck





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 21" (533 mm).

The installed chamber system shall provide the load factors specified in the AASHTO LRFD bridge design specifications section 12.12 for earth and live loads, with consideration for impact and multiple vehicle presences.

Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6” (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
45 (1143)	50.62 (1.433)	81.08 (2.296)
44 (1118)	50.62 (1.433)	79.96 (2.264)
43 (1092)	Stone 50.62 (1.433)	78.83 (2.232)
42 (1067)	Cover 50.62 (1.433)	77.70 (2.200)
41 (1041)	50.62 (1.433)	76.57 (2.168)
40 (1016)	50.62 (1.433)	75.44 (2.136)
39 (991)	50.62 (1.433)	74.31 (2.104)
38 (965)	50.55 (1.431)	73.14 (2.071)
37 (940)	50.35 (1.426)	71.90 (2.036)
36 (914)	50.07 (1.418)	70.60 (1.999)
35 (889)	49.56 (1.403)	69.17 (1.959)
34 (864)	48.82 (1.382)	67.60 (1.914)
33 (838)	47.93 (1.357)	65.94 (1.867)
32 (813)	46.91 (1.328)	64.20 (1.818)
31 (787)	45.79 (1.297)	62.40 (1.767)
30 (762)	44.58 (1.262)	60.55 (1.715)
29 (737)	43.28 (1.226)	58.65 (1.661)
28 (711)	41.91 (1.187)	56.70 (1.606)
27 (686)	40.47 (1.146)	54.71 (1.549)
26 (660)	38.96 (1.103)	52.68 (1.492)
25 (635)	37.40 (1.059)	50.61 (1.433)
24 (610)	35.78 (1.013)	48.51 (1.374)
23 (584)	34.10 (0.966)	46.38 (1.313)
22 (559)	32.38 (0.917)	44.22 (1.252)
21 (533)	30.61 (0.867)	42.03 (1.190)
20 (508)	28.80 (0.816)	39.82 (1.128)
19 (483)	26.95 (0.763)	37.58 (1.064)
18 (457)	25.06 (0.710)	35.32 (1.000)
17 (432)	23.13 (0.655)	33.04 (0.936)
16 (406)	21.17 (0.599)	30.74 (0.870)
15 (381)	19.17 (0.543)	28.42 (0.805)
14 (356)	17.14 (0.485)	26.08 (0.739)
13 (330)	15.09 (0.427)	23.72 (0.672)
12 (305)	13.00 (0.368)	21.34 (0.604)
11 (279)	10.89 (0.308)	18.95 (0.537)
10 (254)	8.76 (0.248)	16.54 (0.468)
9 (229)	6.60 (0.187)	14.12 (0.400)
8 (203)	4.42 (0.125)	11.69 (0.331)
7 (178)	2.22 (0.063)	9.24 (0.262)
6 (152)	0 (0)	6.78 (0.192)
5 (127)	0 (0)	5.65 (0.160)
4 (102)	Stone 0 (0)	4.52 (0.128)
3 (76)	Foundation 0 (0)	3.39 (0.096)
2 (51)	0 (0)	2.26 (0.064)
1 (25)	0 (0)	1.13 (0.032)

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-800 Chamber	50.6 (1.43)	81.0 (2.29)	87.8 (2.48)	94.6 (2.6)

Note: Assumes 6” (150 mm) stone above chambers, 6” (150 mm) row spacing and 40% stone porosity.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth		
	6”	12”	18”
SC-800	3.9 (2.8)	4.8 (3.4)	5.7 (4.1)
Metric Kilograms (m³)	**150 mm**	**300 mm**	**450 mm**
SC-800	3580 (2.2)	4380 (2.6)	5170 (3.1)

Note: Assumes 6” (150 mm) of stone above and between chambers.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6” (150 mm)	12” (300 mm)	18” (450 mm)
SC-800	5.6 (4.3)	6.3 (4.8)	6.9 (5.3)

Note: Assumes 6” (150 mm) of row separation and 18” (450 mm) of cover. The volume of excavation will vary as depth of cover increases.

2.0 Product Information

2.5 StormTech Chambers

StormTech chamber systems have unique features to improve site optimization and reduce product waste. The SC-160LP, SC-310, SC-740, DC-780 and SC-800 chambers can be cut at the job site in approximately 6.5 (165 mm) increments to shorten a chamber's length. Designing and constructing chamber rows around site obstacles is easily accomplished by including specific cutting instructions or a well placed cut to fit note on the design plans. The last chamber of a row can be cut in any of its corrugation's valleys. An end cap placed into the trimmed corrugation's crest completes the row. The trimmed-off piece of a StormTech chamber may then be used to start the next row.

To assist the contractor, StormTech chambers are molded with simple assembly instructions and arrows that indicate the direction in which to build rows. Rows are formed by overlapping the next chamber's Start End corrugation with the previously laid chamber's end corrugation. Two people can safely and efficiently form rows of chambers without complicated connectors, special tools or heavy equipment.

Product Specifications: 2.2, 2.4, 2.5, 2.9 and 3.2.

2.6 StormTech End Caps

The StormTech end cap has features which make the chamber system simple to design, easy to build and more versatile than other products. StormTech end caps can be easily secured within any corrugation's crest. A molded-in handle makes attaching the end cap a oneperson operation. Tools or fasteners are not required.

StormTech end caps are required at each end of a chamber row to prevent stone intrusion (two per row). The SC-740, DC-780 and SC-800 end caps will accept up to a 24 (600 mm) HDPE inlet pipe. The SC-310 end cap will accept up to a 12 (300 mm) HDPE inlet pipe. The SC-160LP will accept either a 6 or 8 (150 mm or 200 mm) HDPE inlet Pipe.

Product Specifications: 3.1, 3.2, 3.3 and 3.4

3.0 Structural Capabilities

3.1 Structural Design Approach

When installed per StormTech's minimum requirements, StormTech products are designed to exceed American Association of State Highway and Transportation Officials (AASHTO) LRFD recommended design factors for Earth loads and Vehicular live loads. AASHTO Vehicular live loads (previously HS-20) consist of two heavy axle configurations, that of a single 32 (142 kN) kip axle and that of tandem 25 (111 kN) kip axles. Factors for impact and multiple presences of vehicles ensure a conservative design where structural adequacy is assumed for a wide range of street legal vehicle weights and axle configurations.

Computer models of the chambers under shallow and deep conditions were developed. Utilizing design forces from computer models, chamber sections were evaluated using AASHTO procedures that consider thrust and moment, and check for local buckling capacity. The procedures also considered the time-dependent strength and stiffness properties of polypropylene and polyethylene. These procedures were developed in a research study conducted by the National Cooperative Highway Research Program (NCHRP) for AASHTO, and published as NCHRP Report 438 Recommended LRFD Specifications for Plastic Pipe and Culverts. *Product Specifications: 2.12.*

StormTech does not recommend installing StormTech products underneath buildings or parking garages. When specifying the StormTech products in close proximity to buildings, it is important to ensure that the StormTech products are not receiving any loads from these structures that may jeopardize the long term performance of the chambers.

3.2 Full Scale Testing

After developing the StormTech chamber designs, the chambers were subjected to rigorous full-scale testing. The test programs verified the predicted safety factors of the designs by subjecting the chambers to more severe load conditions than anticipated during service life. Capacity under live loads and deep fill was investigated by conducting tests with a range of cover depths. Monitoring of long term deep fill installations has been done to validate the long term performance of the StormTech products.

3.3 Independent Expert Analysis

StormTech worked closely with the consulting firm Simpson Gumpertz & Heger Inc. (SGH) to develop and evaluate the SC-160LP, SC-310, SC-740, and DC-780 chamber designs. SGH has world-renowned expertise in the design of buried drain age structures. The firm was the principal investigator for the NCHRP research program that developed the structural analysis and design methods adopted by AASHTO for thermoplastic culverts. SGH conducted design calculations and computer simulations of chamber performance under various installation and live load conditions. They worked with StormTech to design the full-scale test programs to verify the structural capacity of the chambers. SGH also observed all full-scale tests and inspected the chambers after completion of the tests.

3.0 Structural Capabilities

3.4 Injection Molding

To comply with both the structural and design requirements of AASHTO's LRFD specifications and ASTM F2787 as well as the product requirements of ASTM F2418 or ASTM F2922, StormTech uses proprietary injection molding equipment to manufacture the chambers and end caps.

In addition to meeting structural goals, injection molding allows StormTech to design added features and advantages into StormTech's parts including:

- Precise control of wall thickness throughout parts
- Precise fit of joints and end caps
- Molded-in inspection port fitting
- Molded-in handles on end caps
- Molded-in pipe guides with blade starter slots
- Repeatability for Quality Control (See Section 3.6)

Product Specifications: 2.1, 3.1 and 3.3

3.5 Polypropylene and Polyethylene

StormTech chambers are injection molded from polypropylene and polyethylene. Polypropylene and polyethylene chambers are inherently resistant to chemicals typically found in stormwater run-off. StormTech chambers maintain a greater portion of their structural stiffness through higher installation and service temperatures.

StormTech polypropylene and polyethylene are virgin materials specially designed to achieve a high 75-year creep modulus that is necessary to provide a sound long-term structural design. Since the modulus remains high well beyond the 75-year value, StormTech chambers can exhibit a service life in excess of 75 years.

3.6 Quality Control

StormTech chambers are manufactured under tight quality control programs. Materials are routinely tested in an environmentally controlled lab that is verified every six months via the external ASTM Proficiency Testing Program. The chamber material properties are measured and controlled with procedures following ISO 9001:2000 requirements.

Statistical Process Control (SPC) techniques are applied during manufacturing. Established upper and lower control limits are maintained on key manufacturing para - meters to maintain consistent product.

Product Specifications: 2.13 and 3.6

4.0 Foundation for Chambers

4.1 Foundation Requirements

StormTech chamber systems and embedment stone may be installed in various native soil types. The subgrade bearing capacity and chamber cover height determine the required depth of clean, crushed, angular stone for the chamber foundation. The chamber foundation is the clean, crushed, angular stone placed between the subgrade soils and the feet of the chamber.

As cover height increases (top of chamber to top of finished grade) the chambers foundation requirements increase. Foundation strength is the product of the subgrade soils bearing capacity and the depth of clean, crushed, angular stone below the chamber foot. **Table 1** for the SC-160LP, **Table 2** for the SC-800, SC-740 and SC-310, **Table 3** for the SC-310-3, and **Table 4** for the DC-780 specify the required minimum foundation depth for varying cover heights and subgrade bearing capacities. For additional guidance on foundation stone design please see our Technical Note 6.22 - StormTech Subgrade Performance.

4.2 WEAKER SOILS

For sub-grade soils with allowable bearing capacity less than 2000 pounds per square foot [(2.0 ksf) (96 kPa)], a geotechnical engineer should evaluate the specific conditions. These soils are often highly variable, may contain organic materials and could be more sensitive to moisture. A geotechnical engineer's recommendations may include increasing the stone foundation, improving the bearing capacity of the sub-grade soils through compaction, replacement, or other remedial measures including the use of geogrids. The use of a thermoplastic liner may also be considered for systems installed in subgrade soils that are highly affected by moisture. The project engineer is responsible for ensuring overall site settlement is within acceptable limits. A geotechnical engineer should always review installation of StormTech chambers on organic soils.

4.3 CHAMBER SPACING OPTION

No spacing is required between the SC-160LP chambers. StormTech requires a minimum of 6 (150 mm) clear spacing between the feet of chambers rows for the SC-310, SC-740, DC-780 and SC-800 chambers. However, increasing the spacing between chamber rows may allow the application of StormTech chambers with either less foundation stone or with weaker subgrade soils. This may be a good option where a vertical restriction on site prevents the use of a deeper foundation. Contact StormTech's Technical Service Department for more information on this option. In all cases, StormTech recommends consulting a geotechnical engineer for subgrade soils with a bearing capacity less than 2.0 ksf (96 kPa).

Table 1 - SC-160LP Bearing Capacity Table

(Assumes no spacing) Minimum Required Foundation Depth in Inches (mm)

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																		
	4.4-3.8 (211 to 182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (95)
1.0 (0.31)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)
1.2 (0.46)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)
1.5 (0.46)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)
2.0 (0.61)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)
2.5 (0.76)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)
3.0 (0.91)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)
3.5 to 6.0 (1.07 to 1.86)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)
6.5 (1.98)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)
7.0 (2.13)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)
7.5 (2.30)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)
8.0 (2.44)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)
8.5 (2.59)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)
9.0 (2.74)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	**9 (230)**
9.5 (2.89)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	**9 (230)**
10.0 (3.05)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	3 (75)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)

Note: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

4.0 Foundations for Chambers

Table 6 - SC-800 Minimum Required Foundation Depth in inches (millimeters)

Cover Hgt. ft (m)	Minimum Required Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
1.25 (0.38)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)
1.5 (0.46)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)
2.0 (0.61)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)
2.5 (0.76)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)
3.0 (0.91)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)
3.5 (1.07)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)
4.0 (1.22)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)
4.5 (1.37)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)
5.0 (1.52)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)
5.5 (1.68)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)
6.0 (1.83)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)
6.5 (1.98)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)
7.0 (2.13)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)
7.5 (2.30)	6 (150)	6 (150)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)
8.0 (2.44)	6 (150)	6 (150)	6 (150)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)

Note: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

5.0 Cumulative Storage Volumes

Tables 7, 8, 9, 10, and 11 provide cumulative storage volumes for the SC-160LP, SC-310, SC-740 and DC-780 chamber systems. This information may be used to calculate a detention/retention system's stage storage volume. A spreadsheet is available at **www.adspipe.com/stormtech** in which the number of chambers can be input for quick cumulative storage calculations.
Product Specifications: 1.1, 2.2, 2.3, 2.4, and 2.6

Table 7 - SC-160LP Cumulative Storage Volumes Per Chamber
Assumes 40% Stone Porosity. Calculations are Based Upon a 4" (100 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
22 (559)	6.85 (0.194)	14.98 (0.424)
21 (533)	6.85 (0.194)	14.49 (0.410)
20 (508)	Stone Cover 6.85 (0.194)	14.00 (0.396)
19 (483)	6.85 (0.194)	13.50 (0.382)
18 (457)	6.85 (0.194)	13.01 (0.368)
17 (432)	6.85 (0.194)	12.51 (0.354)
16 (406)	6.85 (0.194)	12.02 (0.340)
15 (381)	6.80 (0.193)	11.49 (0.325)
14 (356)	6.67 (0.189)	10.92 (0.309)
13 (330)	6.38 (0.181)	10.25 (0.290)
12 (305)	5.94 (0.168)	9.49 (0.269)
11 (279)	5.40 (0.153)	8.67 (0.246)
10 (254)	4.78 (0.135)	7.81 (0.221)
9 (229)	4.10 (0.116)	6.91 (0.196)
8 (203)	3.36 (0.095)	5.97 (0.169)
7 (178)	2.58 (0.073)	5.01 (0.142)
6 (152)	1.76 (0.050)	4.02 (0.114)
5 (127)	0.89 (0.025)	3.01 (0.085)
4 (102)	0 (0)	1.98 (0.056)
3 (76)	Stone Foundation 0 (0)	1.48 (0.042)
2 (51)	0 (0)	0.99 (0.028)
1 (25)	0 (0)	0.49 (0.014)

Note: Add 0.49 ft³ (0.014 m³) of storage for each additional inch (25 mm) of stone foundation.

Table 8 - SC-310 Cumulative Storage Volumes Per Chamber
Assumes 40% Stone Porosity. Calculations are Based Upon a 6 (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
28 (711)	14.70 (0.416)	31.00 (0.878)
27 (686)	14.70 (0.416)	30.21 (0.855)
26 (680)	Stone Cover 14.70 (0.416)	29.42 (0.833)
25 (635)	14.70 (0.416)	28.63 (0.811)
24 (610)	14.70 (0.416)	27.84 (0.788)
23 (584)	14.70 (0.416)	27.05 (0.766)
22 (559)	14.70 (0.416)	26.26 (0.748)
21 (533)	14.64 (0.415)	25.43 (0.720)
20 (508)	14.49 (0.410)	24.54 (0.695)
19 (483)	14.22 (0.403)	23.58 (0.668)
18 (457)	13.68 (0.387)	22.47 (0.636)
17 (432)	12.99 (0.368)	21.25 (0.602)
16 (406)	12.17 (0.345)	19.97 (0.566)
15 (381)	11.25 (0.319)	18.62 (0.528)
14 (356)	10.23 (0.290)	17.22 (0.488)
13 (330)	9.15 (0.260)	15.78 (0.447)
12 (305)	7.99 (0.227)	14.29 (0.425)
11 (279)	6.78 (0.192)	12.77 (0.362)
10 (254)	5.51 (0.156)	11.22 (0.318)
9 (229)	4.19 (0.119)	9.64 (0.278)
8 (203)	2.83 (0.081)	8.03 (0.227)
7 (178)	1.43 (0.041)	6.40 (0.181)
6 (152)	0	4.74 (0.134)
5 (127)	0	3.95 (0.112)
4 (102)	Stone Foundation 0	3.16 (0.090)
3 (76)	0	2.37 (0.067)
2 (51)	0	1.58 (0.046)
1 (25)	0	0.79 (0.022)

Note: Add 0.79 ft³ (0.022 m³) of storage for each additional inch (25 mm) of stone foundation.

5.0 Cumulative Storage Volumes

Table 11 - SC-800 Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
45 (1143)	50.62 (1.433)	81.08 (2.296)
44 (1118)	50.62 (1.433)	79.96 (2.264)
43 (1092)	50.62 (1.433)	78.83 (2.232)
42 (1067)	50.62 (1.433)	77.70 (2.200)
41 (1041)	50.62 (1.433)	76.57 (2.168)
40 (1016)	50.62 (1.433)	75.44 (2.136)
39 (991)	50.62 (1.433)	74.31 (2.104)
38 (965)	50.55 (1.431)	73.14 (2.071)
37 (948)	50.35 (1.426)	71.90 (2.036)
36 (914)	50.07 (1.418)	70.60 (1.999)
35 (889)	49.56 (1.403)	69.17 (1.959)
34 (864)	48.82 (1.382)	67.60 (1.914)
33 (838)	47.93 (1.357)	65.94 (1.867)
32 (813)	46.91 (1.328)	64.20 (1.818)
31 (787)	45.79 (1.297)	62.40 (1.767)
30 (762)	44.58 (1.262)	60.55 (1.715)
29 (737)	43.28 (1.226)	58.65 (1.661)
28 (711)	41.91 (1.187)	56.70 (1.606)
27 (686)	40.47 (1.146)	54.71 (1.549)
26 (660)	38.96 (1.103)	52.68 (1.492)
25 (635)	37.40 (1.059)	50.61 (1.433)
24 (610)	35.78 (1.013)	48.51 (1.374)
23 (584)	34.10 (0.966)	46.38 (1.313)
22 (559)	32.38 (0.917)	44.22 (1.252)
21 (533)	30.61 (0.867)	42.03 (1.190)
20 (508)	28.80 (0.816)	39.82 (1.128)
19 (483)	26.95 (0.763)	37.58 (1.064)
18 (457)	25.06 (0.710)	35.32 (1.000)
17 (432)	23.13 (0.655)	33.04 (0.936)
16 (406)	21.17 (0.599)	30.74 (0.870)
15 (381)	19.17 (0.543)	28.42 (0.805)
14 (356)	17.14 (0.485)	26.08 (0.739)
13 (330)	15.09 (0.427)	23.72 (0.672)
12 (305)	13.00 (0.368)	21.34 (0.604)
11 (279)	10.89 (0.308)	18.95 (0.537)
10 (254)	8.76 (0.248)	16.54 (0.468)
9 (229)	6.60 (0.187)	14.12 (0.400)
8 (203)	4.42 (0.125)	11.69 (0.331)
7 (178)	2.22 (0.063)	9.24 (0.262)
6 (152)	0 (0)	6.78 (0.192)
5 (127)	0 (0)	5.65 (0.160)
4 (102)	0 (0)	4.52 (0.128)
3 (76)	0 (0)	3.39 (0.096)
2 (51)	0 (0)	2.26 (0.064)
1 (25)	0 (0)	1.13 (0.032)

Stone Cover

Stone Foundation

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

6.0 Required Materials/Row Separation

6.1 Chamber Row Separation

StormTech SC-740, SC-310, DC-780, and SC-800 chambers must be specified with a minimum 6 (150 mm) space between the feet of adjacent parallel chamber rows. No spacing is required between the SC-160LP chambers. Increasing the space between rows is acceptable. This will increase the storage volume due to additional stone voids.

6.2 Stone Surrounding Chambers

Refer to **Table 8** for acceptable stone materials. StormTech requires clean, crushed, angular stone below, between and above chambers as shown in **Figure 4**. Acceptable gradations are listed in **Table 8**. Subrounded and rounded stone are not acceptable.

6.3 Geotextile Separation Requirement

A non-woven geotextile that meets AASHTO M288 Class 2 Separation requirements must be applied as a separation layer to prevent soil intrusion into the clean, crushed, angular stone as shown in **Figure 4**.

The geotextile is required between the clean, crushed, angular stone and the subgrade soils, the excavation's sidewalls and the fill materials. The geotextile should completely envelope the clean, crushed, angular stone. Overlap adjacent geotextile rolls per AASHTO M288 separation guidelines. Contact StormTech for a list of acceptable geotextiles.

6.4 Fill Above Chambers

Refer to **Table 8** and **Figure 4** for acceptable fill material above the 6" (150 mm) of clean, crushed, angular stone. Minimum and maximum fill requirements for the SC-160LP, SC-740, SC-310, DC-780, and SC-800 chambers are shown in **Figure 4** below. StormTech requires 6" (150 mm) of fill material in addition to the chamber specific minimum cover requirements in non-paved installations where rutting from vehicles may occur. **Table 8** provides details on soil class and compaction requirements for suitable fill materials.

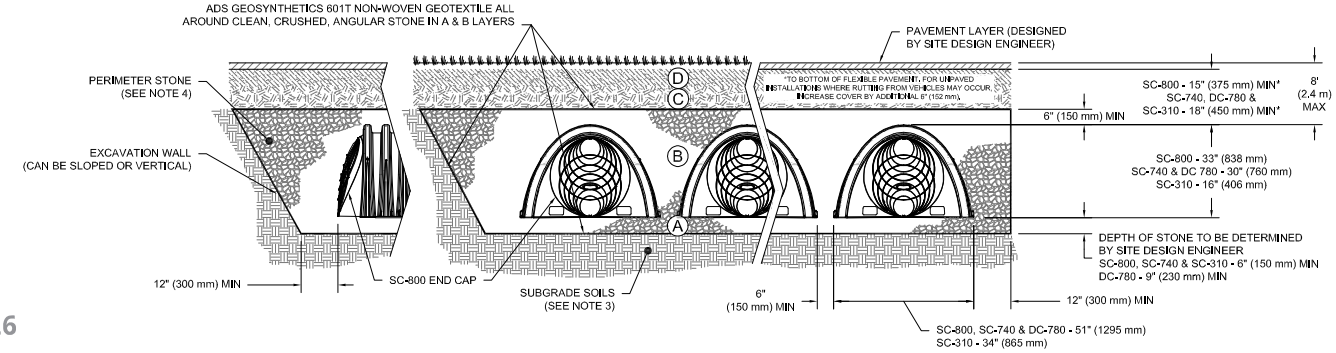
Table 8 – Acceptable Fill Materials

	Material Location	Description	AASHTO Material Classifications	Compaction / Density Requirement
D	**Final Fill:** Fill material for layer 'D' starts from the top of the 'C' layer to the bottom of the flexible pavement to unpaved finished grade above. Note that pavement subbase may be part of the 'D' layer.	Any soil/rock material, native soils, or per Engineer's plans. Check plans for pavement subgrade requirements	N/A	Prepare per site design Engineer's plans. Paved installations may have stringent material and preparation requirements.
C	**Initial Fill:** Fill material for layer 'C' starts form the top of the embedment stone ('B' Layer) to 18 (450 mm) above the top of the chamber. Note that pavement subbase may be a part of the 'C' layer.	Granular well-graded soil/ aggregate mixtures, <35% fines or processed aggregate Most pavement subbase materials can be used in lieu of this layer	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin Compactions after 12 (300 mm) of material over the chambers is reached. Compact additional layers in 6 (150 mm) max lifts to a min. 95% proctor density for well graded material and 95% relative Density for processed aggregate materials. Roller gross vehicle weight not to exceed 12,000 lbs (53 kN). Dynamic force not to exceed 20,000 lbs (89 kN)
B	**Embedment stone:** Fill surrounding the chambers from the foundation stone ('A' layer) to the 'C' layer above	Clean, crushed, angular stone or recycled concrete[4]	AASHTO M145[1] 3, 357, 4, 467, 5, 56, 57	No compaction required.
A	Foundation stone: Fill below chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone or recycled concrete[4]	AASHTO M145[1] 3, 357, 4, 467, 5, 56, 57	Plate compact or roll to achieve a flat surface. [2 3]

Please Note:
1. The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 Stone would state: clean, crushed, angular No. 4 (AASHTO M43) Stone.
2. StormTech compaction requirements are met for 'A' location materials when placed and compacted in 6 (150 mm) (MAX) Lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be compromised by compaction, for standard design load conditions, a flat surface may be achieved by raking of dragging without compaction equipment. For special load designs, contact StormTech for compaction requirements.
4. Where recycled concrete aggregate is used in layers 'A' or 'B' the material should also meet the acceptable criteria outlined in ADS Technical Note 6.20 "Recycled Concrete Structural Backfill".

Figure 4 – Fill Material Locations

Once 'C' is placed any soil/material can be placed in layer 'D' up to the finished grade. Most pavement subbase soils can be used to replace the materials requirements of 'C' or 'D' at the design engineer's discretion.



7.0 Inletting the Chambers

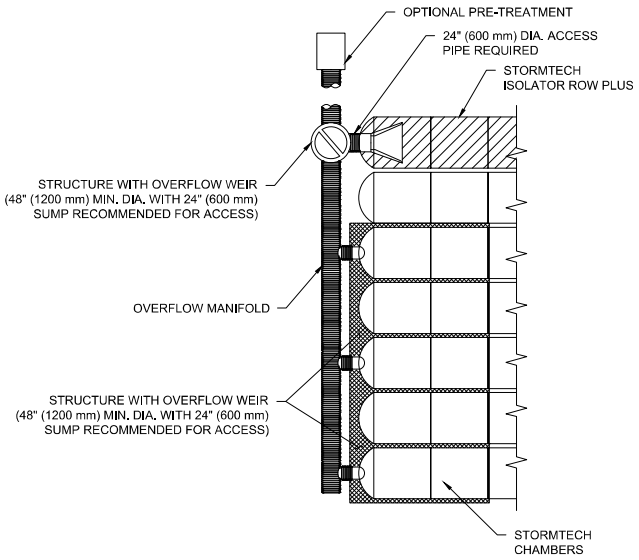
The design flexibility of a StormTech chamber system includes many inletting possibilities. Contact StormTech's Technical Service Department for guidance on designing an inlet system to meet specific site goals.

7.1 Treatment Train

A properly designed inlet system can ensure good water quality, easy inspection and maintenance, and a long system service life. StormTech recommends a treatment train approach for inletting an underground stormwater management system under a typical commercial parking area. Treatment train is an industry term for a multi-tiered water quality network. As shown in **Figure 5**, a StormTech recommended inlet system can inexpensively have tiers of treatment upstream of the StormTech chambers:

Tier 1 – Pre-treatment (BMP)
Tier 2 - StormTech Isolator® Row Plus
Tier 3 - Enhanced Treatment (BMP)

Figure 5 - Typical StormTech Treatment Train Inlet System



7.2 Pre-Treatment (BMP) – Treatment Tier 1

In some areas pre-treatment of the stormwater is required prior to entry into a stormwater system. By treating the stormwater prior to entry into the system, the service life of the system can be extended, pollutants such as hydrocarbons may be captured, and local regulations met. Pre-treatment options are often described as a Best Management Practice or simply a BMP.

Pre-treatment devices differ greatly in complexity, design and effectiveness. Depending on a site's characteristics and treatment goals, the simple, least expensive pretreatment solutions can sometimes be just as effective as the complex systems. Options include a simple deep sumped manhole with a 90° bend on its outlet, baffle boxes, swirl concentrators, and devices that combine these processes. Some of the most effective pretreatment options combine engineered site grading with vegetation such as bio-swales or grassy strips.

The type of pretreatment device specified as the first level of treatment up-stream of a StormTech chamber system can vary greatly throughout the country and from site-to-site. It is the responsibility of the design engineer to understand the water quality requirements and design a stormwater treatment system that will satisfy local regulators and follow applicable laws. A design engineer should apply their understanding of local weather conditions, site topography, local maintenance requirements, expected service life, etc. to select an appropriate stormwater pre-treatment system.

7.3 StormTech Isolator Row Plus – Treatment Tier 2

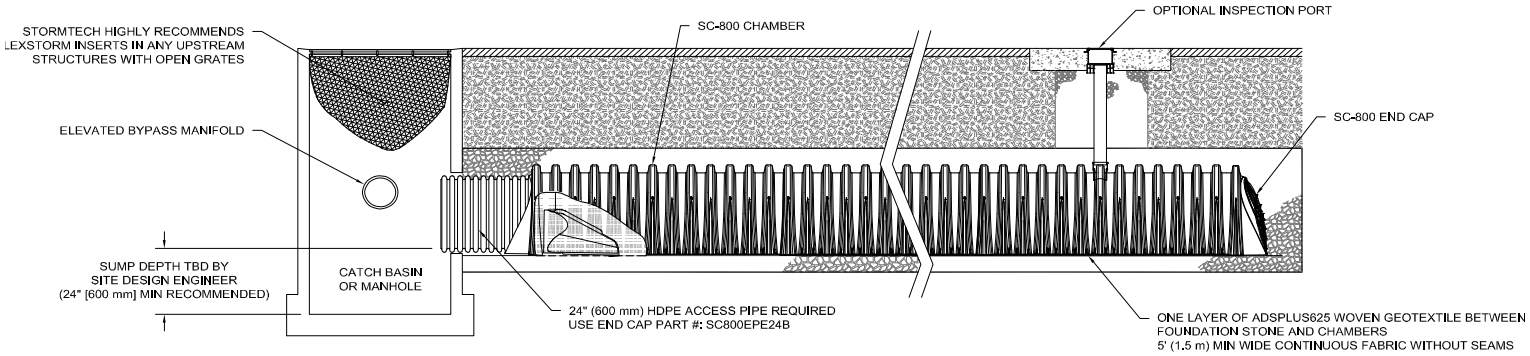
StormTech has a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance. The StormTech Isolator Row Plus is a row of standard StormTech chambers surrounded with appropriate filter fabrics and connected to a manhole for easy access. This application basically creates a filter/detention basin that allows water to egress through the surrounding filter fabric while sediment is trapped within. It may be best to think of the Isolator Row Plus as a first-flush treatment device. First-Flush is a term typically used to describe the first 1/2 to 1 (13-25 mm) of rainfall or runoff on a site. The majority of stormwater pollutants are carried in the sediments of the firstflush, therefore the Isolator Row Plus is an effective component of a treatment train.

The StormTech Isolator Row Plus should be designed with a manhole with an overflow weir at its upstream end. The diversion manhole is multi-purposed. It can provide access to the Isolator Row Plus for both inspection and maintenance and acts as a diversion structure. The manhole is connected to the Isolator Row Plus with a short length of 8 (200mm) pipe for the SC-160LP chambers, 12 (300 mm) pipe for the SC-310 chamber and 24 (600 mm) pipe for the SC-740, DC-780 and SC-800 chambers. These pipes are connected to the Isolator Row Plus with an 8 (200mm) precored end cap for the SC-160LP, a 12 (300 mm) fabricated end cap for the SC-310 chamber and a 24 (600 mm) fabricated end cap for the SC-740, DC-780 and SC-800 chambers. The overflow weir typically has its crest set between the top of the chamber and its midpoint. This allows storm water in excess of the Isolator Row Plus's storage/conveyance capacity to bypass into the chamber system through the downstream manifold system.

Specifying and installing proper geotextiles is essential for efficient operation and to prevent damage to the system during the JetVac

7.0 Inletting the Chambers

Figure 6 – StormTech Isolator Row PLUS Detail



maintenance process. In a typical configuration, a single layer of ADS Plus fabric is placed between the chambers and stone foundation. This fabric traps and filters sediments as well as protects the stone base during cleaning and maintenance. **Figure 6** is a detail of the Isolator Row Plus that shows proper application of the geotextiles. Contact StormTech for a table of acceptable geotextiles.

For SC-310, SC-740 and SC-800 Isolator Plus Rows, a FLAMP (flared end ramp) is attached to the inlet pipe on the inside of the chamber end cap to provide a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance over time by distributing sediment and debris that would otherwise collect at the inlet. It also serves to improve the fluid and solid flow back into the inlet pipe during maintenance and cleaning, and to guide cleaning and inspection equipment back into the inlet pipe when complete.

Inspection is easily accomplished through the upstream manhole or optional inspection ports. Maintenance of an Isolator Row Plus is fast and easy using the JetVac process through the upstream manhole. Section 12.0 explains the inspection and maintenance process in more detail.

Isolator Plus Rows can be sized to accommodate either a water quality volume or a water quality flow rate requirement. The use of filter fabric around the Isolator Row Plus chambers allows stormwater to egress out of the row during and between storm events. The rate of egression for design is dependent upon the chamber model and sediment accumulation on the geotextile. Contact StormTech's Technical Services Department for more information on Isolator Row Plus sizing.

7.4 Enhanced Treatment (BMP) – Treatment Tier 3

As regulations have become more stringent, requiring higher levels of containment removal, water quality systems may be required to treat higher flow rates, greater volumes or to provide a higher level of filtration or other more sophisticated treatment process. StormTech systems can easily be configured with enhanced treatment techniques located either upstream or downstream of the retention or detention chamber system. Located upstream of an infiltration bed, between the pretreatment device and the Isolator Row Plus, enhanced treatment provides a high level of contaminant removal which protects groundwater or better preserves the infiltration surface. Located downstream of detention, enhanced treatment provides a higher level of contaminant removal prior to discharge to a receiving body.

Enhanced treatment BMPs are normally applied where specific regulations and specific water quality product approvals are in place. StormTech works closely with providers of enhanced treatment technologies to meet local requirements.

7.5 TREATMENT TRAIN CONCLUSION

The treatment train is a highly effective water-quality approach that may not add significant cost to a StormTech system being installed under commercial parking areas. The StormTech Isolator Row Plus adds a significant level of treatment, easy inspection and maintenance, while maintaining storage volume credit for the cost of a modest amount of geotextile. Finally where higher levels of treatment are required, StormTech can integrate other technologies into the treatment train to provide the most cost effective treatment approach. This treatment train concept provides three levels of treatment, inspection and maintenance upstream and downstream of the StormTech detention/retention bed.

7.0 Inletting the Chambers

7.6 Other Inlet Options

While the three-tiered treatment train approach is the recommended method of inletting StormTech chambers for typical under-commercial parking applications, there are other effective inlet methods that may be considered. For instance, the Isolator Row PLUS, while adding an inexpensive level of confidence, are not always necessary. A header system with fewer inlets can be designed to further minimize the cost of a StormTech system. There may be applications where stormwater pre-treatment may not be necessary at all and the system can be inlet directly from the source. Contact StormTech's Technical Service Department to discuss inlet options.

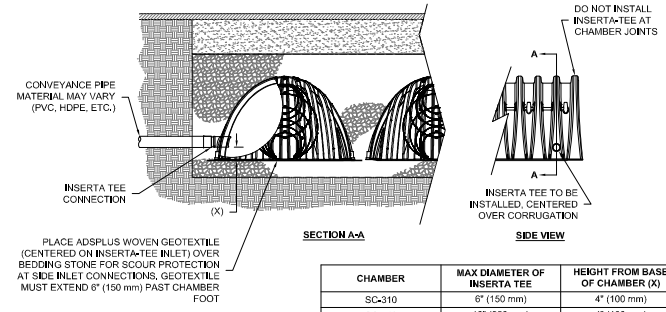
7.7 Lateral Flow Rates

The embedment stone surrounding the StormTech chambers allows the rapid conveyance of stormwater between chamber rows. Stormwater will rise and fall evenly within a bed of chambers. A single StormTech SC-740 chamber is able to release or accept stormwater at a rate of at least 0.5 cfs (14.2 l/s) through the surrounding stone.

7.8 Inletting Perpendicular to a Row of Chambers with Inserta Tee

There is an easy, inexpensive method to perpendicularly inlet a row of chambers. Simply connect the inlet directly to the chamber with an Inserta Tee. Figure 7 shows a typical detail along with the standard sizes offered for each chamber model.

Figure 7 – Inserta Tee Side Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
SC-800	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTES:
- PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.
- CONTACT ADS ENGINEERING SERVICES IF INSERTA TEE INLET MUST BE RAISED AS NOT ALL INVERTS ARE POSSIBLE.

NOTE: Side Inserta Tees Cannot be used on SC-160LP Chambers.

7.9 Maximum Inlet Pipe Velocities to prevent Scouring of the Stone Foundation

The primary function of the inlet manifold is to convey and distribute flows to a sufficient number of rows in the chamber bed such that there is ample conveyance capacity to pass the peak flows without creating an unacceptable backwater condition in upstream piping or scour the foundation stone under the chambers.

Manifolds are connected to the end caps either at the top or bottom of the end cap. High inlet flow rates from either connection location produce a shear scour potential of the foundation stone. Inlet flows from top inlets also produce impingement scour potential. Scour potential is reduced when standing water is present over the foundation stone. However, for safe design across the wide range of applications, StormTech assumes minimal standing water at the time the design flow occurs.

To minimize scour potential, StormTech recommends the installation of woven scour protection fabric at each inlet row. This enables a protected transition zone from the concentrated flow coming out of the inlet pipe to a uniform flow across the entire width of the chamber for both top and bottom connections. Allowable flow rates for design are dependent upon: the elevation of inlet pipe, foundation stone size and scour protection. An appropriate scour protection geotextile is installed from the end cap to at least 10.5' (3.2 m) for the SC-310, SC- 740, DC 780 and SC-800 chambers for both top and bottom feeding inlet pipes.

See StormTech's Tech Note 6.32 for guidance on manifold sizing. ADS's Technical Services department can also assist with sizing inlet manifolds for the StormTech chamber systems.

7.0 Inletting the Chambers

Table 9A – Standard Distances from Base of Chamber to Invert of Inlet and Outlet Manifolds on StormTech End Caps

SC-160LP End Caps			
Pipe Diameter	Inv. (in)	Inv. (ft)	Inv. (mm)
6 (150 mm)	0.66	0.05	16
8 (200 mm)	0.80	0.07	20
8 (200 mm) Cored	0.96	0.08	24

SC-310 End Caps				
Pipe Diameter		Inv. (in)	Inv. (ft)	Inv. (mm)
TOP	6 (150 mm)	5.8	0.48	146
	8 (200 mm)	3.5	0.29	88
	10 (250 mm)	1.4	0.12	37
BOTTOM	6 (150 mm)	0.5	0.04	12
	8 (200 mm)	0.6	0.05	15
	10 (250 mm)	0.7	0.06	18
	12 (300 mm)	0.9	0.08	24

SC-740 / DC-780 End Caps				
Pipe Diameter		Inv. (in)	Inv. (ft)	Inv. (mm)
TOP	6 (150 mm)	18.5	1.54	469
	8 (200 mm)	16.5	1.38	421
	10 (250 mm)	14.5	1.21	369
	12 (300 mm)	12.5	1.04	317
	15 (375 mm)	9	0.75	229
	18 (450 mm)	5	0.42	128
BOTTOM	6 (150 mm)	0.5	0.04	12
	8 (200 mm)	0.6	0.05	15
	10 (250 mm)	0.7	0.06	18
	12 (300 mm)	1.2	0.10	30
	15 (375 mm)	1.3	0.11	34
	18 (450 mm)	1.6	0.13	40
	24 (600 mm)	0.1	0.01	3

SC-800 End Caps				
Pipe Diameter		Inv. (in)	Inv. (ft)	Inv. (mm)
TOP	6 (150 mm)	0.9	0.08	23
	8 (200 mm)	1.0	0.08	25
	10 (250 mm)	1.2	0.10	30
	12 (300 mm)	1.6	0.13	41
	15 (375 mm)	1.7	0.14	43
	18 (450 mm)	2.0	0.17	51
BOTTOM	6 (150 mm)	21.4	1.78	544
	8 (200 mm)	19.2	1.60	488
	10 (250 mm)	17.0	1.42	432
	12 (300 mm)	14.4	1.20	366
	15 (375 mm)	11.3	0.94	287
	18 (450 mm)	8.0	0.67	203
	24 (600 mm)	2.3	0.19	58

See StormTech's Tech Note 6.32 for manifold sizing guidance

8.0 Outlets for Chambers

8.0 Outlets for StormTech Chamber Systems

The majority of StormTech installations are detention systems and have some type of outlet structure. An outlet manifold is generally designed to ensure that peak flows can be conveyed to the outlet structure.

To drain the system completely, an underdrain system is located at or below the bottom of the foundation stone. Some beds may be designed with a pitched base to ensure complete drainage of the system. A grade of ½% is usually satisfactory.

An outlet pipe may be located at a higher invert within a bed. This allows a designed volume of water to infiltrate while excess volumes are outlet as necessary. This is an excellent method of recharging groundwater, replicating a site's pre-construction hydraulics.

Depending on the bed layout and inverts, outlet pipes should be placed in the embedment stone along the bed's perimeter as shown in **Figures 8** and **9**. Solid outlet pipes should also be used to penetrate the StormTech end caps at the designed outlet invert as shown in **Figure 10**. An Isolator Row PLUS should not be directly penetrated with an outlet pipe. For systems requiring higher outlet flow rates, a combination of connections may be utilized as shown in **Figure 11**.

In detention and retention applications the discharge of water from the stormwater management system is determined based on the hydrology of the area and the hydraulic design of the system. It is the design engineer's responsibility to design an outlet system that meets their hydraulic objectives while following local laws and regulations.

Table 9B – Maximum Outlet Flow Rate Capacities from StormTech Manifolds

Outlet Flow		
Pipe Diameter	**Flow (CFS)**	**Flow (L/S)**
6 (150 mm)	0.4	11.3
8 (200 mm)	0.7	19.8
10 (250 mm)	1.0	28.3
12 (300 mm)	2.0	56.6
15 (375 mm)	2.7	76.5
18 (450 mm)	4.0	113.3
24 (600 mm)	7.0	198.2
30 (750 mm)	11.0	311.5
36 (900 mm)	16.0	453.1
42 (1050 mm)	22.0	623.0
48 (1200 mm)	28.0	792.9

Figure 8 – Underdrain Parallel

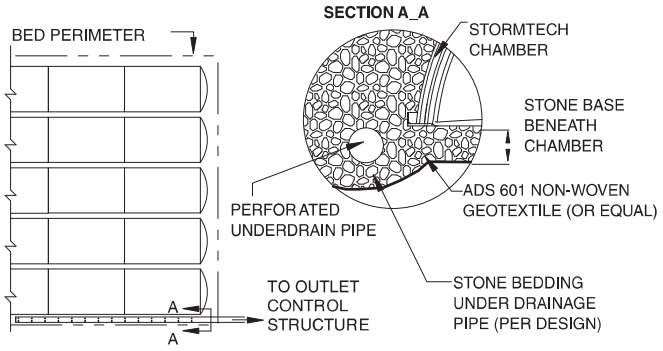


Figure 9 – Underdrain Perpendicular

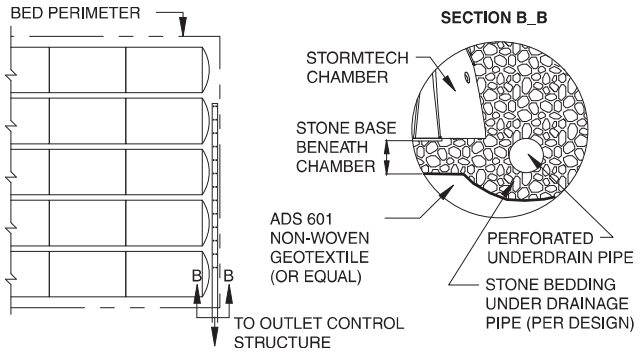


Figure 10 – Outlet Manifold

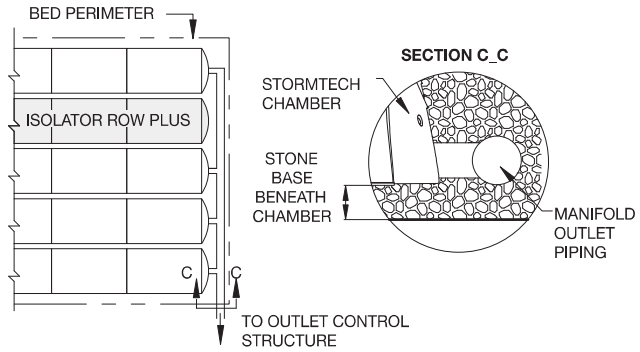
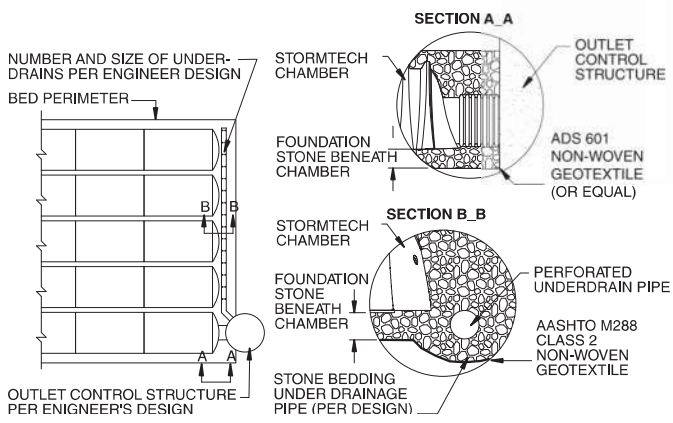


Figure 11 – Combination Outlet



9.0 Other Considerations

9.1 Erosion Control

Erosion and sediment control measures must be integrated into the plan to protect the stormwater system both during and after construction. These practices may have a direct impact on the system's infiltration performance and longevity. Vegetation, temporary sediment barriers (silt fences, hay bales, fabric-wrapped catch basin grates), and strategic stormwater runoff management may be used to control erosion and sedimentation. StormTech recommends the use of pipe plugs on the inlet pipe until the system is in service.

9.2 SITE IMPROVEMENT TECHNIQUES

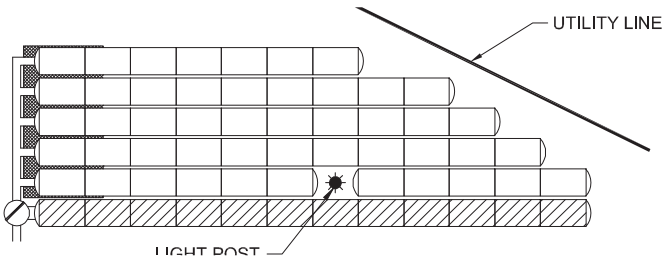
When site conditions are less than optimal, StormTech recognizes many methods for improving a site for construction. Some techniques include the removal and replacement of poor materials, the use of engineered subgrade materials, aggregates, chemical treatment, and mechanical treatments including the use of geosynthetics. StormTech recommends referring to AASHTO M 288 guidelines for the appropriate use of geotextiles.

StormTech also recognizes geogrid as a potential component of an engineered solution to improve site conditions or as a construction tool for the experienced contractor. StormTech chamber systems are compatible with the use of geosynthetics. The use of geosynthetics or any other site improvement method does not eliminate or modify any of StormTech's requirements. **It is the ultimate responsibility of the design engineer to ensure that site conditions are suitable for a StormTech chamber system.**

9.3 CONFORMING TO SITE CONSTRAINTS

StormTech chambers have the unique ability to conform to site constraints such as utility lines, light posts, large trees, etc. Rows of chambers can be ended short or interrupted by placing an end cap at the desired location, leaving the required number of chambers out of the row to get by the obstruction, then starting the row of chambers again with another end cap. See **Figure 12** for an example.

Figure 12 – Ability to Conform to Site Constraints



9.4 LINERS

StormTech chambers offer the distinct advantage and versatility that allow them to be designed as an open bottom detention or retention system. In fact, the vast majority of StormTech installations and designs are open bottom detention systems. Using an open bottom system enables treatment of the storm water through the underlying soils and provides a volume safety factor based on the infiltrative capacity of the underlying soils.

In some applications, however, open bottom detention systems may not be allowed. StormTech's Tech Sheet #2 provides guidance for the design and installation of thermoplastic liners for detention systems using StormTech chambers. The major points of the memo are:

- Infiltration of stormwater is generally a desirable stormwater management practice, often required by regulations. Lined systems should only be specified where unique site conditions preclude significant infiltration.
- Thermoplastic liners provide cost effective and viable means to contain stormwater in StormTech subsurface systems where infiltration is undesirable.
- PVC and LLDPE are the most cost effective, installed membrane materials.
- Enhanced puncture resistance from angular aggregate on the water side and from protrusions on the soil side can be achieved by placing a non-woven geotextile reinforcement on each side of the geomembrane. A sand underlayment in lieu of the geotextile reinforcement on the soil side may be considered when cost effective.
- StormTech does not design, fabricate, sell or install thermoplastic liners. StormTech recommends consulting with liner professionals for final design and installation advice.

Figure 13 – Chamber bed placed around light post.

10.0 System Sizing

For quick calculations, refer to the Site Calculator on StormTech's website at **www.adspipe.com/stormtech**.

10.1 System Sizing

The following steps provide the calculations necessary to size a system. If you need assistance determining the number of chambers per row or customizing the bed configuration to fit a specific site, call StormTech's Technical Services Department at **1-888-892-2694**.

1) Determine the amount of storage volume (V_s) required.

It is the design engineer's sole responsibility to determine the storage volume required by local codes.

Table 10 - Storage Volume Per Chamber

	Bare Chamber Storage	Chamber and Stone Foundation Depth in. (mm)		
	ft³ (m³)	6 (150)	12 (300)	18 (450)
SC-160LP	6.85 (0.19)	16 (0.42)	18.9 (0.51)	21.9 (0.6)
SC-310	14.7 (0.4)	31 (0.9)	35.7 (1)	40.4 (1.1)
SC-740	45.9 (1.3)	74.9 (2.1)	81.6 (2.3)	88.4 (2.5)
SC-800	50.6 (1.4)	81 (2.3)	87.8 (2.4)	94.6 (2.6)
	ft³ (m³)	9 (230)	12 (300)	18 (450)
DC-780	46.2 (1.3)	78.4 (2.2)	81.8 (2.3)	88.6 (2.5)

Note: Assumes 40% porosity for the stone plus the chamber volume.

2) Determine the number of chambers (C) required.

To calculate the number of chambers needed for adequate storage, divide the storage volume (V_s) by the volume of the selected chamber, as follows:
C = V_s / Volume per Chamber

3) Determine the required bed size (S).

To find the size of the bed, multiply the number of chambers needed (C) by either:

StormTech SC-160LP
bed area per chamber = 14.8 ft² (1.3 m²)

StormTech SC-310
bed area per chamber = 23.7 ft² (2.2 m²)

StormTech SC-740 / DC-780 / SC-800
bed area per chamber = 33.8 ft² (3.1 m²)

S = (C x bed area per chamber) +
[1 foot (0.3 m) x bed perimeter in feet (meters)]
NOTE: It is necessary to add one foot (0.3 m) around the perimeter of the bed for end caps and working space.

4) Determine the amount of clean, crushed, angular stone (Vst) required.

To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) by the selected weight of stone from **Table 11**.

Table 11 – Amount of Stone Per Chamber

	Stone Foundation Depth		
ENGLISH tons (yd³)	6	12	18
SC-160LP	1.3 (0.9)	1.7 (1.2)	2 (1.4)
SC-310	2.3 (1.6)	2.8 (2)	3.4 (2.4)
SC-740	3.8 (2.7)	4.8 (3.4)	5.6 (4)
SC-800	4.1 (2.9)	4.9 (3.5)	5.8 (4.1)
METRIC kg (m³)	150 mm	300 mm	450 mm
SC-160LP	1162 (0.7)	1495 (0.9)	1827 (1.1)
SC-310	1993 (1.2)	2491 (1.5)	3156 (1.9)
SC-740	3488 (2.1)	4319 (2.6)	5149 (3.1)
SC-800	3654 (2.2)	4485 (2.7)	5315 (3.2)
ENGLISH tons (yd³)	9	12	18
DC-780	4.2 (3)	4.7 (3.3)	5.6 (4)
METRIC kg (m³)	230 mm	300 mm	450 mm
DC-780	3986 (2.4)	4319 (2.6)	5149 (3.1)

Note: Assumes 6 (150 mm) of stone above, and between chambers. For SC-310, SC-740, DC-780 and SC-800 Chambers only.

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

5) Determine the volume of excavation (Ex) required.
6) Determine the area of filter fabric (F) required.

Each additional foot of cover will add a volume of excavation of 1.3 yds³ (1.0 m³) per SC-740 / DC-780 / SC-800, 0.9 yds³ (0.7 m³) per SC-310 chamber and 0.55 yds³ (0.4m³) per SC-160LP chamber.

Table 12 – Volume of Excavation Per Chamber

	Stone Foundation Depth yd³ (m³)		
	6 (150 mm)	12 (300 mm)	18 (450 mm)
SC-160LP	1.6 (1.3)	1.9 (1.5)	2.2 (1.7)
SC-310	2.9 (2.2)	3.4 (2.6)	3.8 (2.9)
SC-740	5.6 (4.3)	6.3 (4.8)	6.9 (5.3)
SC-800	5.9 (4.5)	6.6 (5.0)	7.2 (5.5)
	9 (230 mm)	12 (300 mm)	18 (450 mm)
DC-780	5.9 (4.6)	6.3 (4.8)	6.9 (5.3)

Note: Assumes 6" (150 mm) of separation between chamber rows (no spacing for the SC-160LP) and 18" (450 mm) of cover. The volume of excavation will vary as the depth of the cover increases.

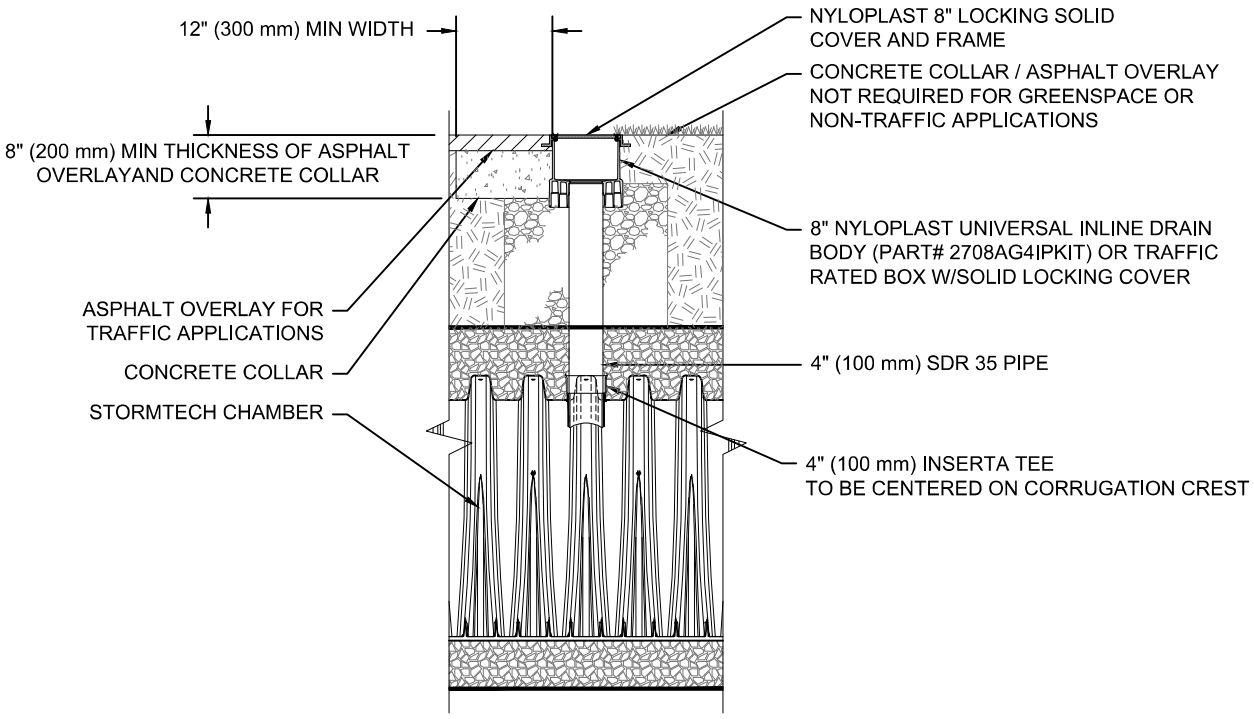
The bottom and sides of the bed and the top of the embedment stone must be covered with ADS 601 (or equal) a non-woven geotextile (filter fabric). The area of the sidewalls must be calculated and a 2 foot (0.6 m) overlap must be included where two pieces of filter fabric are placed side-by-side or end-to-end. Geotextiles typically come in 15 foot (4.6 m) wide rolls.

7) Determine the number of end caps (E_c) required.

Each row of chambers requires two end caps.
E_c = number of rows x 2

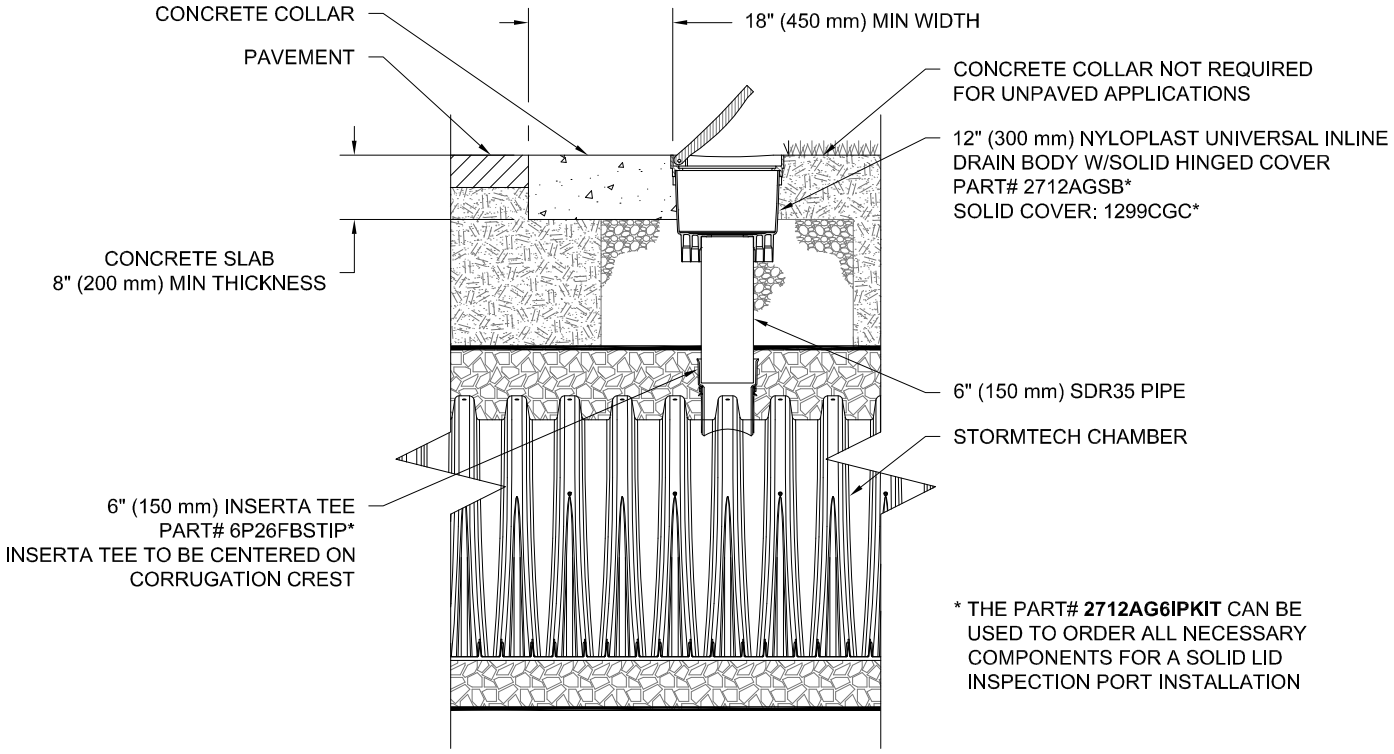
11.0 Detail Drawings

Figure 14 – 4” (100 mm) PVC Inspection Port Detail (SC Series Chamber)



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

Figure 15 – 6” (150 mm) Inspection Port Detail



* THE PART# **2712AG6IPKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

11.0 Detail Drawings

Figure 16 – Under Drain Detail

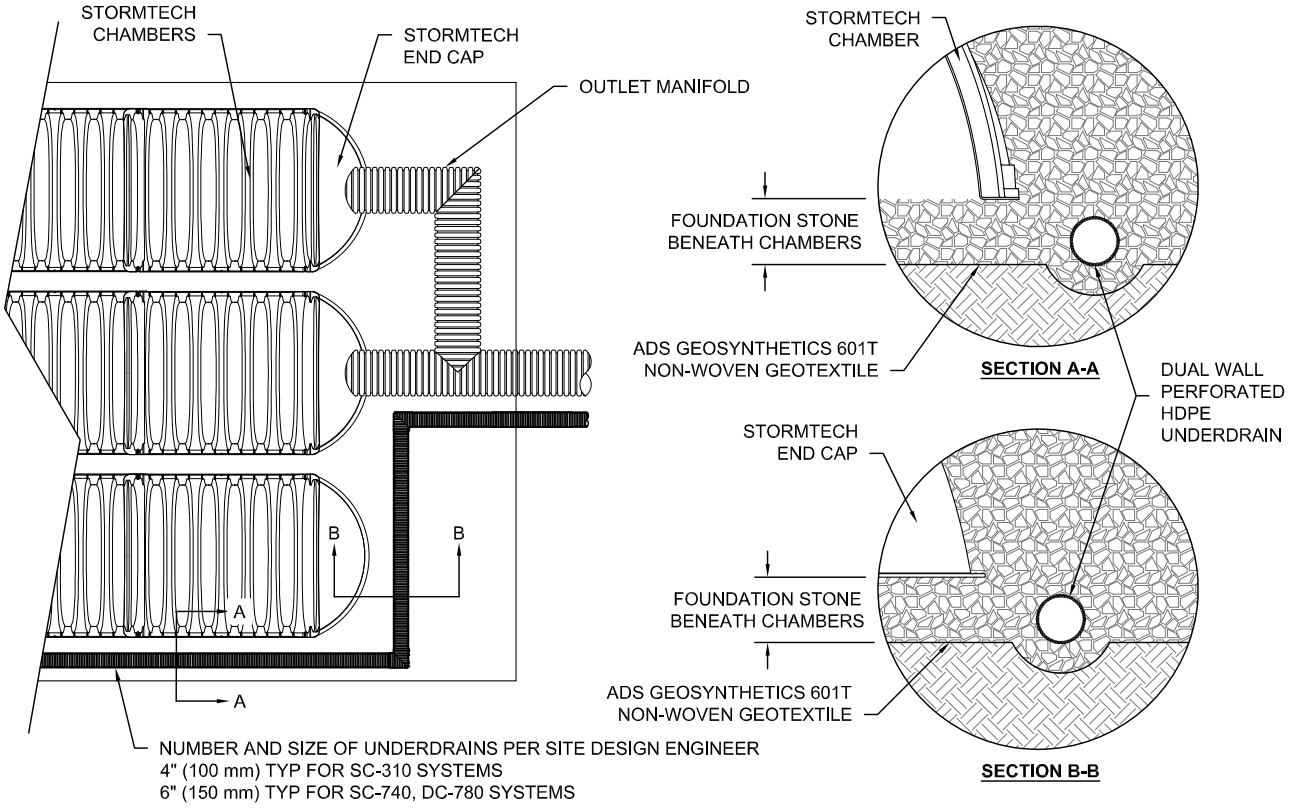
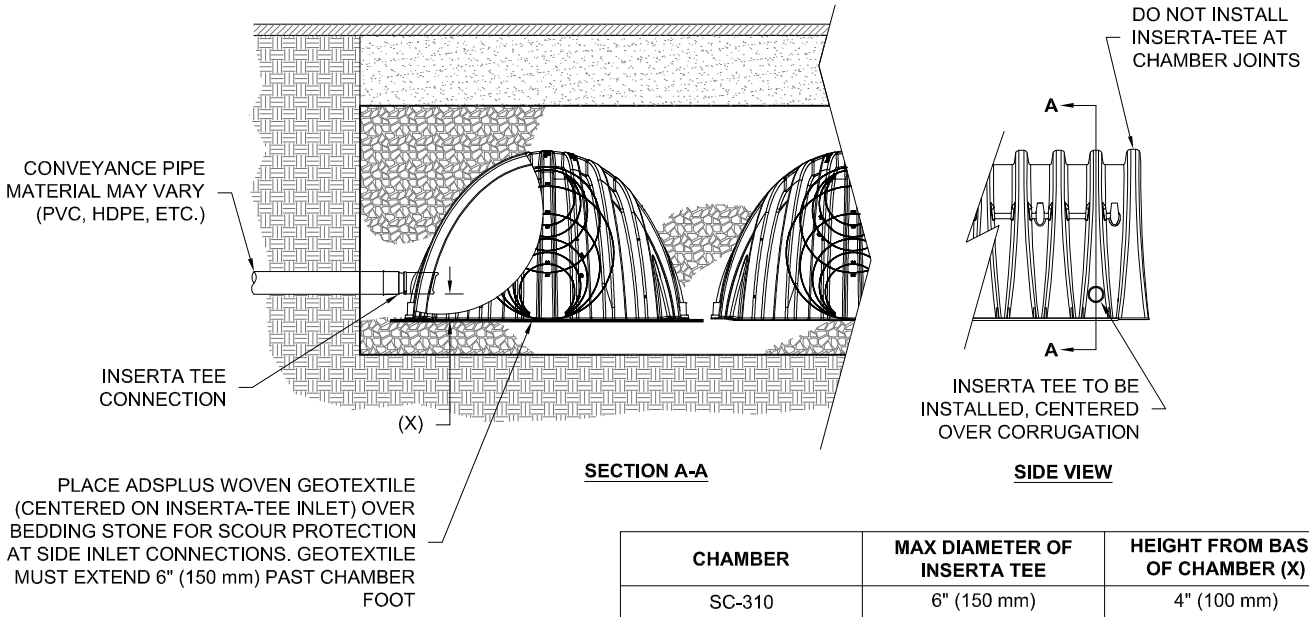


Figure 17 – Inserta Tee Side Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
SC-800	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTES:

- PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.
- CONTACT ADS ENGINEERING SERVICES IF INSERTA TEE INLET MUST BE RAISED AS NOT ALL INVERTS ARE POSSIBLE.

NOTE: Side Inserta Tees Cannot be used on SC-160LP Chambers.

12.0 Inspection and Maintenance

12.1 Isolator Row Plus Inspection

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row PLUS. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a confined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3" (75 mm), cleanout is required.

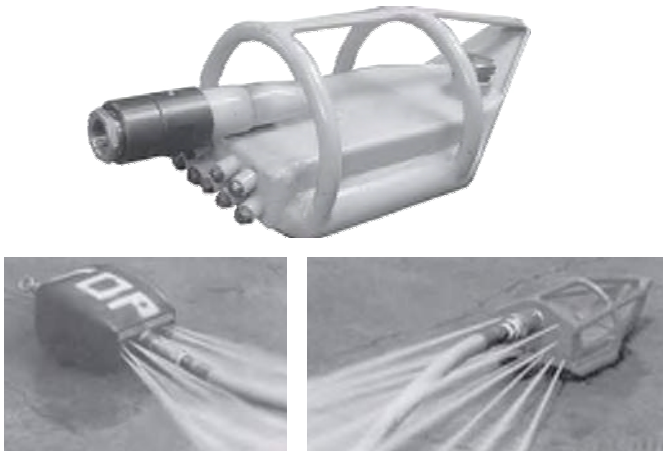
A StormTech Isolator Row PLUS should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site's owner. Once in normal service, a StormTech Isolator Row PLUS should be inspected bi-annually until an understanding of the sites characteristics is developed. The site's maintenance manager can then revise the inspection schedule based on experience or local requirements.

12.2 Isolator Row Plus Maintenance

JetVac maintenance is recommended if sediment has been collected to an average depth of 3" (75 mm) inside the Isolator Row PLUS. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row PLUS. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row PLUS while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/ JetVac combination vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" (1125 mm) are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. The JetVac process shall only be performed on StormTech Rows that have ADS PLUS fabric over the foundation stone.

Looking down the Isolator Row PLUS

A typical JetVac truck (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row PLUS maintenance. (These are not StormTech products).

12.0 Inspection & Maintenance

StormTech Isolator Row Plus - Step-by-Step Maintenance Procedures

Step 1: Inspect Isolator Row PLUS for sediment

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod, measure depth of sediment
   iv. If sediment is at, or above, 3" (76 mm) depth proceed to Step 2. If not proceed to Step 3.

B) All Isolator Plus Rows
   i. Remove cover from manhole at upstream end of Isolator Row PLUS
   ii. Using a flashlight, inspect down Isolator Row PLUS through outlet pipe
      1. Follow OSHA regulations for confined space entry if entering manhole
      2. Mirrors on poles or cameras may be used to avoid a confined space entry
   iii. If sediment is at or above the lower row of sidewall holes [approximately 3" (76 mm)]proceed to Step 2. If not proceed to Step 3.

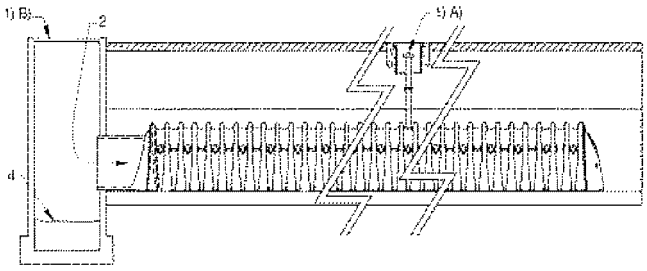
Step 2: Clean out Isolator Row PLUS using the JetVac process

A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45" (1125 mm) or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required during jetting

Step 3: Replace all caps, lids and covers

Step 4: Inspect and clean catch basins and manholes upstream of the StormTech system following local guidelines.

Figure 18 – StormTech Isolator Row Plus (not to scale)



12.3 Eccentric Pipe Header Inspection

Theses guidelines do not supercede a pipe manufacturer's recommended I&M procedures. Consult with the manufacturer of the pipe header system for specific I&M procedures. Inspection of the header system should be carried out quarterly. On sites which generate higher levels of sediment more frequent inspections may be necessary. Headers may be accessed through risers, access ports or manholes. Measurement of sediment may be taken with a stadia rod or similar device. Cleanout of sediment should occur when the sediment volume has reduced the storage area by 25% or the depth of sediment has reached approximately 25% of the diameter of the structure.

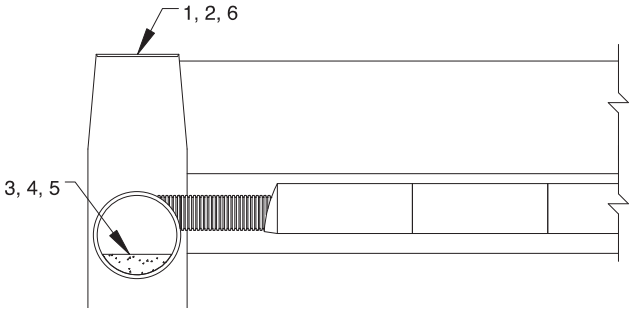
12.4 Eccentric Pipe Manifold Maintenance

Cleanout of accumulated material should be accomplished by vacuum pumping the material from the header. Cleanout should be accomplished during dry weather. Care should be taken to avoid flushing sediments out through the outlet pipes and into the chamber rows.

Eccentric Header Step-by-Step Maintenance Procedures

1. Locate manholes connected to the manifold system
2. Remove grates or covers
3. Using a stadia rod, measure the depth of sediment
4. If sediment is at a depth of about 25% pipe volume or 25% pipe diameter proceed to step 5. If not proceed to step 6.
5. Vacuum pump the sediment. Do not flush sediment out inlet pipes.
6. Replace grates and covers
7. Record depth and date and schedule next inspection

Figure 19 – Eccentric Manifold Maintenance



Please contact StormTech's Technical Services Department at 888-892-2894 for a spreadsheet to estimate cleaning intervals.

13.0 General Notes

1. StormTech requires installing contractors to use and understand StormTech's latest Installation Instructions prior to beginning system installation.

2. Our Technical Services Department offers installation consultations to installing contractors. Contact our Technical Service Representatives at least 30 days prior to system installation to arrange a preinstallation consultation. Our representatives can then answer questions or address comments on the StormTech chamber system and inform the Installing contractor of the minimum installation requirements before beginning the system's construction. Call **800-821-6710** to speak to a Technical Service Representative or visit **www.adspipe.com/stormtech** to receive a copy of our Installation Instructions.

3. StormTech's requirements for systems with pavement design (asphalt, concrete pavers, etc.): Minimum cover for the SC-740, DC-780 and SC-310 chambers is 18" (457 mm) not including pavement; Minimum cover for the SC-160LP chamber is 14 (350 mm); Minimum Cover for the SC-800 chamber is 15" (381 mm); Maximum cover for the SC-800, SC-740 and SC-310 chambers is 96" (2.4 m) including pavement design; Maximum cover for the SC-160LP chamber is 10' (3.0 m); Maximum cover for the DC-780 chamber is 12' (3.6 m) including pavement design. For installations that do not include pavement, where rutting from vehicles may occur, minimum required cover is 24" (610 mm), maximum cover is as stated above.

4. The contractor must report any discrepancies with the bearing capacity of the chamber foundation materials to the design engineer.

5. AASHTO M288 Class 2 non-woven geotextile (filter fabric) must be used as indicated in the project plans.

6. Stone placement between chamber rows and around perimeter must follow instructions as indicated in the most current version of StormTech's Installation Instructions.

7. Backfilling over the chambers must follow requirements as indicated in the most current version of StormTech's Installation Instructions.

8. The contractor must refer to StormTech's Installation Instructions for a Table of Acceptable Vehicle Loads at various depths of cover. This information is also available at StormTech's website: **www.adspipe.com/stormtech**. The contractor is responsible for preventing vehicles that exceed StormTech's requirements from traveling across or parking over the stormwater system. Temporary fencing, warning tape and appropriately located signs are commonly used to prevent unauthorized vehicles from entering sensitive construction areas.

9. The contractor must apply erosion and sediment control measures to protect the stormwater system during all phases of site construction per local codes and design engineer's specifications.

10. STORMTECH PRODUCT WARRANTY IS LIMITED. Contact StormTech for warranty information.

14.0 StormTech Product Specifications

1.0 General

1.1 StormTech chambers are designed to control storm water runoff. As a subsurface retention system, StormTech chambers retain and allow effective infiltration of water into the soil. As a subsurface detention system, StormTech chambers detain and allow for the metered flow of water to an outfall.

2.0 Chamber Parameters

2.1 The Chamber shall be injection molded of an impact modified polypropylene or polyethylene copolymer to maintain adequate stiffness through higher temperatures experienced during installation and service.

2.2 The nominal chamber dimensions of the SC-800 shall be 33.0" (838 mm) tall, 51" (1295 mm) wide, and 90.7" (2304 mm) long. The nominal chamber dimensions of the StormTech SC-740 and DC-780 shall be 30.0 (762 mm) tall, 51.0 (1295 mm) wide and 90.7 (2304 mm) long. The nominal chamber dimensions of the StormTech SC-310 shall be 16.0 (406 mm) tall, 34.0 (864 mm) wide and 90.7 (2304 mm) long. SC-160LP shall be 12(305mm) tall, 25 (635 mm) wide and 90.7 (2304mm) long. The installed length of a joined chamber shall be 85.4 (2169 mm).

2.3 The chamber shall have a continuously curved section profile.

2.4 The chamber shall be open-bottomed.

2.5 The chamber shall incorporate an overlapping corrugation joint system to allow chamber rows of almost any length to be created. The overlapping corrugation joint system shall be effective while allowing a chamber to be trimmed to shorten its overall length.

2.6 The nominal storage volume of all StormTech chambers includes the volume of the clean, crushed, angular stone with an assumed 40% porosity. The nominal storage volume of a joined StormTech SC-800 chamber shall be 81.0 ft^3 (2.29 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 2.39 ft^3/ft^2 (0.72 m^3/m^2). The nominal storage volume of a joined StormTech SC-740 chamber shall be 74.9 ft^3 (2.1 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 2.2 ft^3/ft^2 (0.67 m^3/m^2). The nominal storage volume of a joined StormTech DC-780 chamber shall be 78.4 ft^3 (2.2 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 2.3 ft^3/ft^2 (0.70 m3/m2). The nominal storage volume of a joined StormTech SC-310 chamber shall be 31.0 ft^3 (0.88 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 1.3 ft^3/ft2 (0.40 m^3/m^2). The nominal storage volume of a joined StormTech SC-160LP chamber shall be 15 ft^3 (0.42 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 1.0 ft^3/ft^3 (0.30 m^3/m^3).

2.7 The chamber shall have two orifices near its top to allow for equalization of air pressure between its interior and exterior.

2.8 The chamber shall have both of its ends open to allow for unimpeded hydraulic flows and visual inspections down a row's entire length.

2.9 The chamber shall have 14 corrugations.

2.10 The chamber shall be analyzed and designed using AASHTO methods for thermoplastic culverts contained in the LRFD Bridge Design Specifications, 2nd Edition, including Interim Specifications through 2001. Design live load shall be the AASHTO design truck. Design shall consider earth and live loads as appropriate for the minimum to maximum specified depth of fill.

2.11 The chamber shall be manufactured in an ISO 9001:2000 certified facility.

3.0 End Cap Parameters

3.1 The end cap shall be designed to fit into any corrugation of a chamber, which allows: capping a chamber that has its length trimmed; segmenting rows into storage basins of various lengths.

3.2 The end cap shall have saw guides to allow easy cutting for various diameters of pipe that may be used to inlet the system.

3.3 The end cap shall have excess structural adequacies to allow cutting an orifice of any size at any invert elevation.

3.4 The primary face of an end cap shall be curved outward to resist horizontal loads generated near the edges of beds.

3.5 The end cap shall be manufactured in an ISO 9001:2000 certified facility.

15.0 Chamber Specifications for Contract Documents

SC-800 StormTech Chamber Specifications

1. Chambers shall be Stormtech SC-800.
2. Chambers shall be arch-shaped and shall be manufactured from virgin, impact-modified polypropylene copolymers.
3. Chambers shall meet the requirements of ASTM F2418-16A, Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers
4. Chamber rows shall provide continuous, unobstructed internal space with no internal supports that would impede flow or limit access for inspection.
5. The structural design of the chambers, the structural backfill, and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD bridge design specifications, Section 12.12, are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO design truck with consideration for impact and multiple vehicle presences.
6. Chambers shall be designed, tested and allowable load configurations determined in accordance with ASTM F2787, Standard practice for structural design of Thermoplastic Corrugated Wall Stormwater Collection Chambers. Load configurations shall include: 1) instantaneous (<1 min) AASHTO design truck live load on minimum cover 2) maximum permanent (75-yr) cover load and 3) allowable cover with parked (1-week) AASHTO design truck.
7. Requirements for handling and installation:
   - To maintain the width of chambers during shipping and handling, chambers shall have integral, interlocking stacking lugs.
   - To ensure a secure joint during installation and backfill, the height of the chamber joint shall not be less than 2.
   - To ensure the integrity of the arch shape during installation, a) the arch stiffness constant as defined in Section 6.2.8 of ASTM F2418 shall be greater than or equal to 550 lbs/in/in. And b) to resist softening during hot, sunny installation conditions, chambers shall be produced from light, reflective gold or yellow colors.
8. Only chambers that are approved by the site design engineer will be allowed. The chamber manufacturer shall submit the following upon request to the site design engineer for approval before delivering chambers to the project site:
   - A structural evaluation sealed by a registered professional engineer that demonstrates that the safety factors are greater than or equal to 1.95 for dead load and 1.75 for live load, the minimum required by ASTM F2787 and by AASHTO for thermoplastic pipe.
   - A structural evaluation sealed by a registered professional engineer that demonstrates that the load factors specified in the AASHTO LRDF bridge design specifications, Section 12.12, are met. The 50 year creep modulus data specified in ASTM F2418 must be used as part of the AASHTO structural evaluation to verify long-term performance.

Chambers and end caps shall be produced at an ISO 9001 certified manufacturing facility.

APPENDIX E-2
STORMTECH ISOLATOR ROW PLUS MANUAL

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS), Total Phosphorus (TP), Total Petroluem Hydrocarbons (TPH) and Total Nitrogen (TN) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, SC-800, MC-3500, MC-4500 or MC-7200 models, are lined with filter fabric and connected to a closely located manhole for easy access. The fabric lined chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers allow stormwater to flow vertically out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

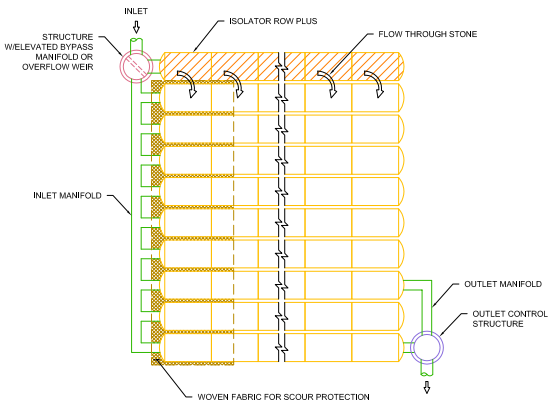
The Isolator Row Plus Flamp™ is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end, or more difficult to remove and require confined space entry into the chamber area. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row Plus from the manhole opening, ADS Plus Fabric is shown between the chamber and stone base.

StormTech Isolator Row Plus with Overflow Structure (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

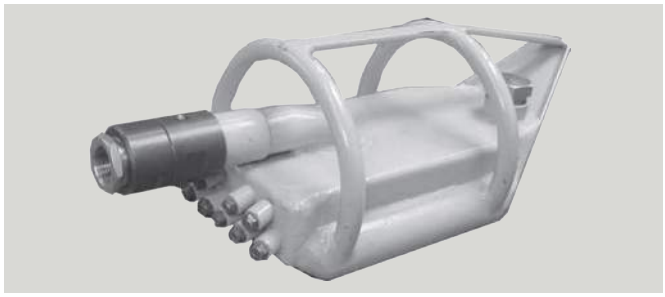
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3" (75 mm) throughout the length of the Isolator Row Plus, clean-out should be performed.

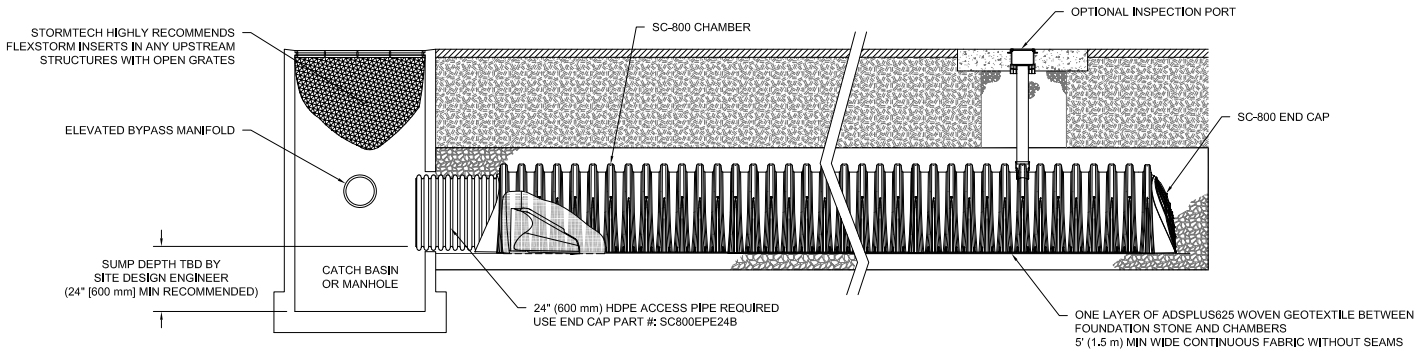
Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entry.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row Plus (*not to scale*)



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
- i. Remove lid from floor box frame
- ii. Remove cap from inspection riser
- iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
- iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
- i. Remove cover from manhole at upstream end of Isolator Row Plus
- ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
  1. Mirrors on poles or cameras may be used to avoid a confined space entry
  2. Follow OSHA regulations for confined space entry if entering manhole
- iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
  If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

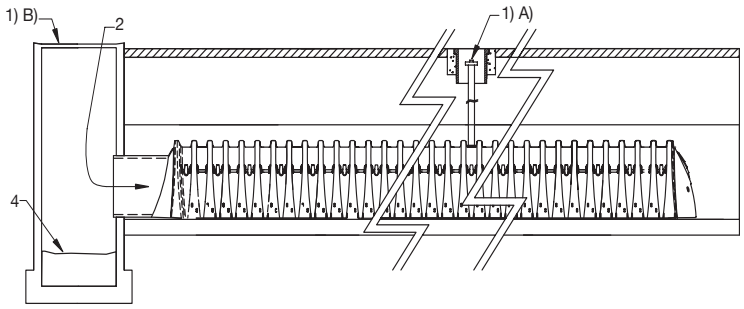
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row Plus, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

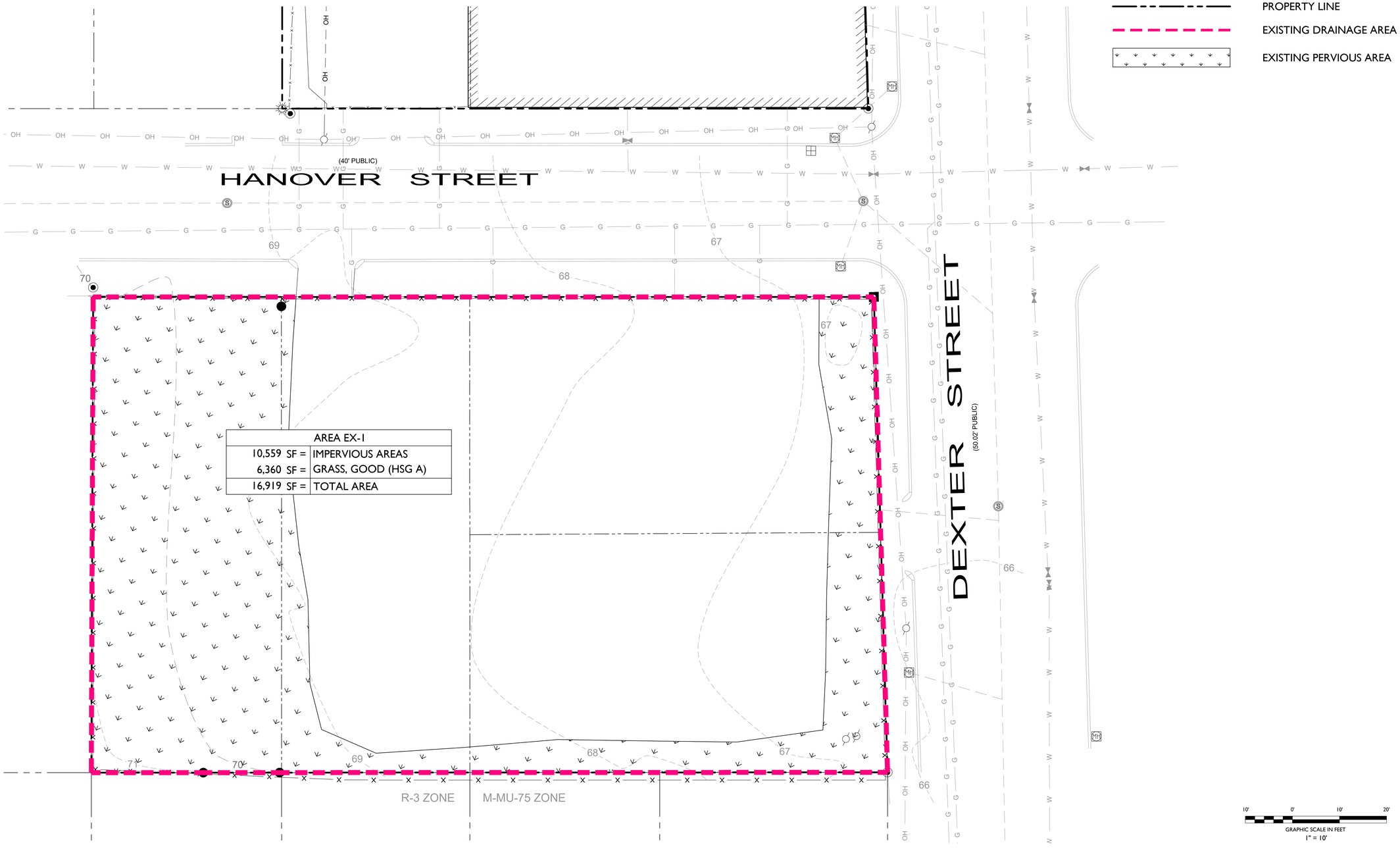
adspipe.com
800-821-6710

APPENDIX F
DRAINAGE AREA MAPS

INVENTORY

SHEET 1 OF 2: EXISTING DRAINAGE AREA MAP

SHEET 2 OF 2: PROPOSED DRAINAGE AREA MAP



ISSUE	DATE	BY	DESCRIPTION
1	12/15/2025	SCL	FOR MINOR LAND DEVELOPMENT

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Rutherford, NJ · New York, NY · Salem, MA · Providence, RI
Princeton, NJ · Tampa, FL · Birmingham, MI
www.stonefieldeng.com
56 Pine Street, Providence, RI 02903
Phone 617.203.2076

MINOR LAND DEVELOPMENT PLAN

297 DEXTER STREET HOLDINGS, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

A.P. 31 | LOTS 125, 523, 524 & 525
A.P. 60 | LOTS 66, 67, 68, 69
309 DEXTER STREET
CITY OF PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.
RHODE ISLAND LICENSE No. 13607
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 30' | PROJECT ID: BOS-250101

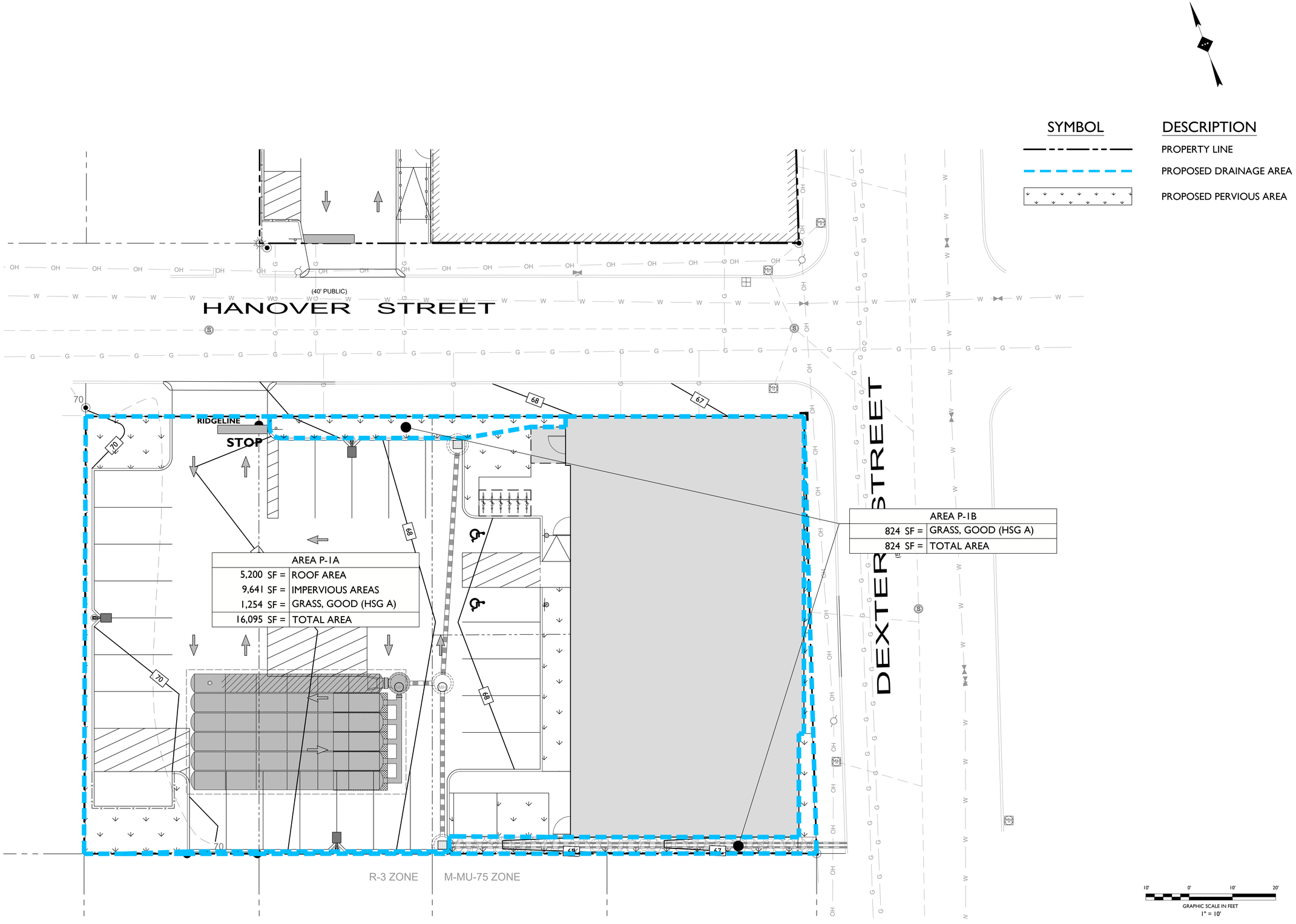
TITLE:

EXISTING DRAINAGE AREA MAP

DRAWING:

1 OF 2

Z:\BOSTON\BOS2025\BOS-250101 - 295 - 309 DEXTER STREET, PROVIDENCE, RI\CAD\SHEETS\DRAINAGE AREA MAP\250101-10-1 EXISTING DRAINAGE AREA MAP.DWG



ISSUE	DATE	BY	DESCRIPTION
1	12/15/2025	SCL	FOR MINOR LAND DEVELOPMENT

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Princeton, NJ · Tampa, FL · Birmingham, MI
www.stonefieldeng.com
56 Pine Street, Providence, RI 02903
Phone 617.203.2076

MINOR LAND DEVELOPMENT PLAN

297 DEXTER STREET HOLDINGS, LLC

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

A.P. 31 | LOTS 125, 523, 524 & 525
RECORDED AS LOTS 65, 67, 68, 69
297 DEXTER STREET
CITY OF PROVIDENCE
PROVIDENCE COUNTY, RHODE ISLAND

JOSHUA H. KLINE, P.E.
RHODE ISLAND LICENSE No. 13607
LICENSED PROFESSIONAL ENGINEER

STONEFIELD engineering & design

SCALE: 1" = 10' | PROJECT ID: BOS-250101

TITLE:

PROPOSED DRAINAGE AREA MAP

DRAWING:

2 OF 2

Z:\BOSTON\BOS\2025\BOS-250101 - ZDS - 309 DEXTER STREET, PROVIDENCE, RI\CAD\SHEET\[DRAINAGE AREA MAP-2025-12-15_DRAINAGE AREA MAP.DWG

APPENDIX G
RIDEM APPENDIX A STORMWATER MANAGEMENT PLAN CHECKLIST

APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

PROJECT NAME **Proposed Multi-Family Residential Development**	**(RIDEM USE ONLY)**
TOWN **Providence**	**STW/WQC File #:**
BRIEF PROJECT DESCRIPTION: Proposed redevelopment of 309 Dexter Street, Providence, RI to accommodate the construction of a 48 dwelling unit building and associated parking, vehicle circulation, utilities, landscaping, lighting, stormwater infrastructure and other associated site improvements.	**Date Received:**

Stormwater Management Plan (SMP) Elements – Minimum Standards

When submitting a SMP,[1] submit four separately bound documents: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to Suggestions to Promote Brevity.

Note: **All stormwater construction projects must create a Stormwater Management Plan (SMP). However, not every element listed below is required per the RIDEM Stormwater Rules and the RIPDES Construction General Permit (CGP). This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.**

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

☒ Residential	☐ Commercial	☐ Federal	☐ Retrofit	☐ Restoration
☐ Road	☐ Utility	☐ Fill	☐ Dredge	☐ Mine
☐ Other (specify):				

SITE INFORMATION

☒ Vicinity Map

INITIAL DISCHARGE LOCATION(S): The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)

☒ **Groundwater**	☐ **Surface Water**	☐ **MS4**
☐ GAA	☐ Isolated Wetland	☐ RIDOT
☐ GA	☐ Named Waterbody	☐ RIDOT Alteration Permit is Approved
☒ GB	☐ Unnamed Waterbody Connected to Named Waterbody	☐ Town
		☐ Other (specify):

ULTIMATE RECEIVING WATERBODY LOCATION(S): Include pertinent information that applies to both WQ_v and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

☐ Groundwater or Disconnected Wetland	☐ SRWP		
☒ Waterbody Name: Mashapaug Pond	☐ Coldwater	☐ Warmwater	☐ Unassessed
☒ Waterbody ID: RI0006017L-06	☐ 4th order stream of pond 50 acres or more		
☒ TMDL for: Excess Algal Growth (Completed 09/27/2007), Dissolved Oxygen (Completed 09/27/2007), Phosphorus (Total) (Completed 09/27/2007), Fecal Coliform (Completed 09/22/2011)	☐ Watershed of flood prone river (e.g., Pocasset River)		
☐ Contributes to a priority outfall listed in the TMDL	☐ Contributes stormwater to a public beach		
☒ 303(d) list – Impairment(s) for: Excess Algal Growth, Dissolved Oxygen, Phosphorus (Total), Fecal Coliform	☐ Contributes to shellfishing grounds		

[1] Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

PROJECT HISTORY		
☐ RIDEM Pre- Application Meeting	Meeting Date:	☐ Minutes Attached
☐ Municipal Master Plan Approval	Approval Date:	☐ Minutes Attached
☐ Subdivision Suitability Required	Approval #:	
☐ Previous Enforcement Action has been taken on the property	Enforcement #:	

FLOODPLAIN & FLOODWAY See Guidance Pertaining to Floodplain and Floodways	
☐ Riverine 100-year floodplain: **FEMA FLOODPLAIN FIRMETTE** has been reviewed and the 100-year floodplain is on site	
☐ Delineated from FEMA Maps	
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional	
☐ Calculated by Professional Engineer	
☐ Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):
	Amount of Cut (CY):
☐ Restrictions or modifications are proposed to the flow path or velocities in a floodway	
☐ Floodplain storage capacity is impacted	
☒ Project area is not within 100-year floodplain as defined by RIDEM	

CRMC JURISDICTION
☐ CRMC Assent required
☐ Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP:
☐ Sea level rise mitigation has been designed into this project

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:			
1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)			
	☐ Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations))		**RIDEM CONTACT:**
	☐ Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials)		
	☐ This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities		**SITE ID#:**
		☐ CERCLIS/Superfund (NPL)	
		☐ State Hazardous Waste Site (SHWS)	
		☐ Environmental Land Usage Restriction (ELUR)	
		☐ Leaking Underground Storage Tank (LUST)	
		☐ Closed Landfill	
Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSMM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration.			
2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:			
	☐ Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php		
	☐ Auto Fueling Facility (e.g., gas station)		
	☐ Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area		

	☐ Road Salt Storage and Loading Areas (exposed to rainwater)	
	☐ Outdoor Storage and Loading/Unloading of Hazardous Substances	
3.	**STORMWATER INDUSTRIAL PERMITTING**	
	☐ The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C)	Activities: Sector:
	☐ Construction is proposed on a site that is subject to THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.	MSGP permit #
	☐ Additional stormwater treatment is required by the MSGP Explain:	

REDEVELOPMENT STANDARD – MINIMUM STANDARD 6		
☒ Pre Construction Impervious Area		
	☒ Total Pre-Construction Impervious Area (**TIA**) 10,559 SF (0.24 acres)	
	☒ Total Site Area (**TSA**) 16,919 SF (0.38 acres)	
	☐ Jurisdictional Wetlands (**JW**) 0 SF	
	☐ Conservation Land (**CL**) 0 SF	
☒ Calculate the Site Size (defined as contiguous properties under same ownership)		
	☒ Site Size (**SS**) = (**TSA**) – (**JW**) – (**CL**) = 16,919 SF (0.38 acres)	
	☒ (**TIA**) / (**SS**) = 10,559 SF / 16,919 SF = 62.4%	☒ (**TIA**) / (**SS**) >**0.4**?
☒ YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)
This section may be deleted if not required.

Note: A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include:

- Town requires … (state the specific local requirement)
- Meets Town's dimensional requirement of …
- Not practical for site because …
- Applying for waiver/variance to achieve this (pending/approved/denied)
- Applying for wavier/variance to seek relief from this (pending/approved/denied)

A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS	**IF NOT IMPLEMENTED, EXPLAIN HERE**
☒ Sensitive resource areas and site constraints are identified (required) ☒ Local development regulations have been reviewed (required) ☐ All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction ☐ Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. **Note:** If Conservation Development has been used, check box and skip to Subpart C ☒ As much natural vegetation and pre-development hydrology as possible has been maintained	

B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS ☐ Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies ☒ Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) ☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) ☒ Development sites and building envelopes have been positioned outside of floodplains ☐ Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features ☒ Development sites and building envelopes have been located to minimize impacts to steep slopes (≥15%) ☐ Other (describe):	
C) MINIMIZE CLEARING AND GRADING ☒ Site clearing has been restricted to minimum area needed for building footprints, development activities, construction access, and safety. ☒ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) ☐ Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s) ☐ Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent	
D) REDUCE IMPERVIOUS COVER ☒ Reduced roadway widths (≤22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) ☒ Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) ☐ Reduced building footprint: Explain approach: ☐ Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) ☐ Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) ☐ Reduced parking lot area: Explain approach ☐ Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. ☒ Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) ☐ Other (describe):	
E) DISCONNECT IMPERVIOUS AREA ☐ Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible ☐ Residential street edges allow side-of-the-road drainage into vegetated open swales ☐ Parking lot landscaping breaks up impervious expanse AND accepts runoff ☐ Other (describe):	
F) MITIGATE RUNOFF AT THE POINT OF GENERATION ☒ Small-scale BMPs have been designated to treat runoff as close as possible to the source	

G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION ☒ Low-maintenance landscaping has been proposed using native species and cultivars ☒ Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan ☒ Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots	
H) RESTORE STREAMS/WETLANDS ☐ Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands ☐ Removal of invasive species ☐ Other	N/A – no streams or wetlands on or near site to restore.

PART 3. SUMMARY OF REMAINING STANDARDS

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	**NO**	
☒	☐	The project has been designed to meet the groundwater recharge standard.
☐	☐	If "No," the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D);
☐	☐	Your waiver request has been explained in the Narrative, if applicable.
☐	☒	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
☐	☐	If "Yes," has approval for infiltration by the OLRSMM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)
(Add or Subtract Rows as Necessary)

Design Point	Impervious Area Treated (sq ft)	Total Re_v Required (cu ft)	LID Stormwater Credits (see RISDISM Section 4.6.1)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
			Portion of Re_v directed to a QPA (cu ft)		
DP-1:	14,841	742	0 CF	742	3,180
TOTALS:	14,841	742	0 CF	742	3,180

Notes:
1. Only BMPs listed in RISDISM Table 3-5 "List of BMPs Acceptable for Recharge" may be used to meet the recharge requirement.
2. Recharge requirement must be satisfied for each waterbody ID.

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):
Stormwater Management Report: Narrative & Appendix C.

WATER QUALITY – MINIMUM STANDARD 3		
YES	**NO**	
☒	☐	Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)?
☒	☐	Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)?
☒	☐	If "Yes," either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or,
☐	☐	If "Yes," either TR-55 or TR-20 was used to calculate WQv; and,
☐	☐	If "No," the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.
☐	☐	Not Applicable
☒	☐	Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)?
☒	☐	Does this project propose an increase of impervious cover to a receiving water body with impairments? If "Yes," please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water. Proposed ADS subsurface infiltration basin utilizes an isolator row plus for pretreatment.
☐	☒	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
☒	☐	The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable.
☒	☐	BMPs are proposed that are on the approved technology list . If "Yes," please provide all required worksheets from the manufacturer.
☐	☒	Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements. If "Yes," please describe:

TABLE 3-1: Summary of Water Quality (see RICR 8.9)

Design Point and WB ID	Impervious area treated (sq ft)	Total WQ_v Required (cu ft)	LID Stormwater Credits (see RICR 8.18) WQv directed to a QPA (cu ft)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
DP-1:	14,841	1,237	0 CF	1,237	3,181
TOTALS:	14,841	1,237	0 CF	1,237	3,181

Notes:
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.

☒ YES ☐ NO	This project has met the setback requirements for each BMP. If "No," please explain:

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):
Stormwater Management Report: Narrative & Appendix C

CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4			
YES	**NO**		
☒	☐	Is this standard waived? If "Yes," please indicate one or more of the reasons below:	
		☐	The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
		☒	The project is a small facility with impervious cover of less than or equal to 1 acre.
		☒	The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (Note: LID design strategies can greatly reduce the peak discharge rate).
☒	☐	Conveyance and natural channel protection for the site have been met. If "No,' explain why:	

TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10)					
Design Point	**Receiving Water Body Name**	**Coldwater Fishery? (Y/N)**	**Total CPv Required (cu ft)**	**Total CPv Provided (cu ft)**	**Average Release Rate Modeled in the 1-yr storm (cfs)**
DP-1:					
DP-2:					
DP-3:					
DP-4:					
TOTALS:					
Note: The Channel Protection Volume Standard must be met in each waterbody ID.					
☐ YES ☐ NO	The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM).				
☐ YES ☐ NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If "Yes," please indicate restrictions and solutions below.				
☐ Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).					

OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5			
YES	**NO**		
☒	☐	Is this standard waived? If yes, please indicate one or more of the reasons below:	
		☐	The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
		☐	A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks).
☐	☒	Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows:	
		☐	RIDOT
		☐	Other (specify):
Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be **less** than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.			
		Indicate below which model was used for your analysis. ☐ TR-55 ☐ TR-20 ☒ HydroCAD ☐ Bentley/Haestad ☐ Intellisolve ☐ Other (Specify):	
YES	**NO**		
☒	☐	Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If "No," please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.):	
☐	☒	Do off-site areas contribute to the sub-watersheds and design points? If "Yes,"	
☐	☐	Are the areas modeled as "present condition" for both pre- and post-development analysis?	
☐	☐	Are the off-site areas shown on the subwatershed maps?	
☒	☐	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?	
☐	☒	Is a Downstream Analysis required (see RICR 8.11.E.1)?	
☒	☐	Calculate the following:	
		☐	Area of disturbance within the sub-watershed (areas) 19,222 SF (0.44 acres)
		☐	Impervious cover (%) 14,841 SF / 19,222 SF = 77.2% (within Limit of Disturbance; 87.7% of Total Site)
☐	☒	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?	
☒	☐	Does this project meet the overbank flood protection standard?	

Table 5-1 Hydraulic Analysis Summary								
Subwatershed (Design Point)	**1.2" Peak Flow** (cfs) **		**1-yr Peak Flow** (cfs)		**10-yr Peak Flow** (cfs)		**100-yr Peak Flow** (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
DP-1: POI-1	0.27	0.00	0.63	0.00	1.16	0.00	2.24	2.21
TOTALS:	0.27	0.00	0.63	0.00	1.16	0.00	2.24	2.21

** Utilize modified curve number method or split pervious /impervious method in HydroCAD.

Note: The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.

Indicate as follows where the pertinent calculations and/or information for the items above are provided	**Name of report/document, page numbers, appendices, etc.**
Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations.	
Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations.	
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.	
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).	

Table 5-2 Summary of Best Management Practices											
BMP ID	**DP #**	**BMP Type** (e.g., bioretention, tree filter)	**BMP Functions**					**Bypass Type**	**Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4**		
			Pre-Treatment (Y/N/ NA)	Re_v	WQ_v	CP_v (Y/N/ NA)	Overbank Flood Reduction (Y/N/NA)	External (E) Internal (I) or NA	Yes/ No	Technical Justification (Design Report page number)	Distance Provided
B-1	POI-1	Infiltration Chambers	Yes	Yes	Yes	Yes	Yes	E	Yes	Appendix C	>12
		TOTALS:									

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	**BMP ID**	**BMP Type** (e.g., bioretention, tree filter)	**Soils Analysis for Each BMP**						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
		TOTALS:							

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	**NO**	**N/A**	
☐	☐	☒	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
☐	☐	☒	Are these activities already covered under an MSGP? If "No," please explain if you have applied for an MSGP or intend to do so?
☐	☐	☒	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, "Acceptable BMPs for Use at LUHPPLs." Please list BMPs:
☐	☐	☒	Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	**NO**	**N/A**	
☐	☒	☐	Have you checked for illicit discharges?
☐	☐	☒	Have any been found and/or corrected? If "Yes," please identify.
☒	☐	☐	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10				
YES	**NO**	**N/A**		
☒	☐	☐	Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?	
☐	☒	☐	Have you provided a **separately-bound** document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).	
			If "No," include a document with your submittal that addresses the following elements of an SESC Plan:	
			☒	Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
			☒	Provide Natural Buffers and Maintain Existing Vegetation
			☒	Minimize Area of Disturbance
			☒	Minimize the Disturbance of Steep Slopes
			☒	Preserve Topsoil
			☒	Stabilize Soils
			☒	Protect Storm Drain Inlets
			☒	Protect Storm Drain Outlets
			☒	Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
			☒	Establish Perimeter Controls and Sediment Barriers
			☒	Divert or Manage Run-On from Up-Gradient Areas
			☒	Properly Design Constructed Stormwater Conveyance Channels
			☒	Retain Sediment On-Site
			☒	Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
			☒	Apply Construction Activity Pollution Prevention Control Measures
			☒	Install, Inspect, and Maintain Control Measures and Take Corrective Actions
			☒	Qualified SESC Plan Preparer's Information and Certification
			☐	Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
			☒	Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	**NO**	
☒	☐	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
☒	☐	Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
☒	☐	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not?
☒	☐	Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
☐	☒	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them:

☐	☒	Is stormwater being directed from public areas to private property? If "Yes," note the following: Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		
☐	☒	Designated snow stockpile locations?
☐	☒	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
☒	☐	Asphalt-only based sealants?
☐	☒	Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
☐	☒	Regular sweeping? Please describe:
☒	☐	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
☒	☐	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)			
YES	**NO**		
☒	☐		Existing and proposed drainage area delineations
☒	☐		Locations of all streams and drainage swales
☒	☐		Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K)
☒	☐		Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
☒	☐		Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
☒	☐		Mapped seasonal high-water-table test pit locations
☒	☐		Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs
☒	☐		Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans
☒	☐		Mapped bedrock outcrops adjacent to any infiltration BMP
☐	☒		Soils were logged by a:
		☐	DEM-licensed Class IV soil evaluator Name:
		☐	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	**First Receiving Water ID or MS4**	**Area Disturbed (units)**	**Existing Impervious (units)**	**Proposed Impervious (units)**
DP-1: POI-1	Groundwater	19,222 SF	10,559 SF	14,841 SF
DP-2:				
DP-3:				
DP-4:				
TOTALS:				

Site Construction Plans (Indicate that the following applicable specifications are provided)		
YES	**NO**	
☒	☐	Existing and proposed plans (scale not greater than 1" = 40') with North arrow
☒	☐	Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas
☒	☐	Boundaries of existing predominant vegetation and proposed limits of clearing
☒	☐	Site Location clarification
☒	☐	Location and field-verified boundaries of resource protection areas such as: ▸ freshwater and coastal wetlands, including lakes and ponds ▸ coastal shoreline features Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs)
☒	☐	All required setbacks (e.g., buffers, water-supply wells, septic systems)
☒	☒	Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include: ▸ Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2; ▸ Design water surface elevations (applicable storms); ▸ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▸ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▸ Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain; ▸ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting
☐	☒	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables
☐	☒	Mapping of any OLRSMM-approved remedial actions/systems (including ELURs)
☒	☐	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; ▸ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▸ Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.); ▸ Cross sections of roadways, with edge details such as curbs and sidewalks; ▸ Location and dimensions of channel modifications, such as bridge or culvert crossings
☐	☒	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization