



15 KING STREET
PEABODY, MA

LOCUS MAP

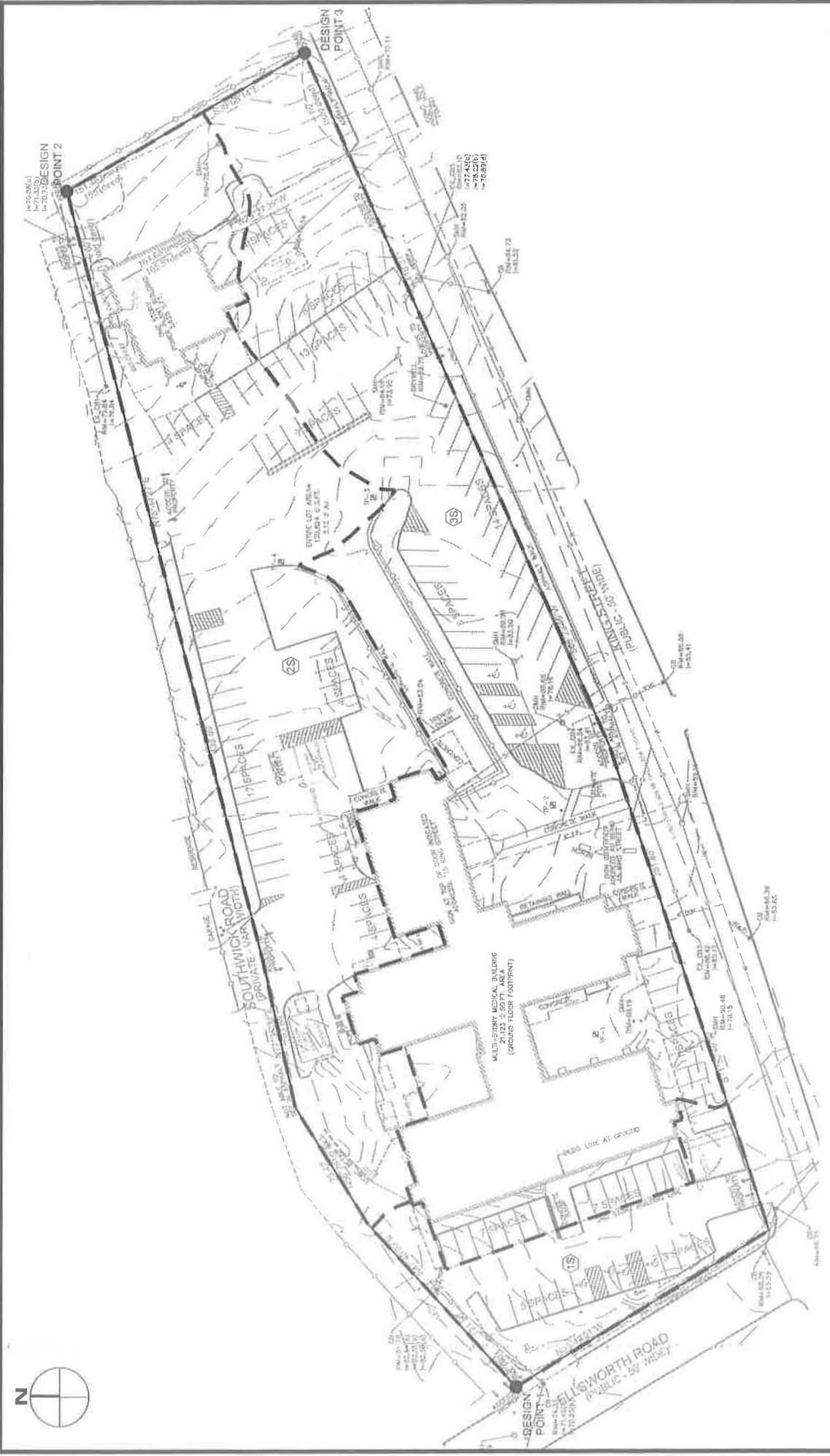
PROJECT NO.: 2019-053

DATE: 1/12/2021

SCALE: 1"=500'

DR BY: CS
CHK BY: WK

Appendix B: Existing Drainage Area Plan



DR BY: WK
 CHK BY: WK
 PROJ NO.: 2019-053
 DATE: 1/1/21
 SCALE: 1"=50'

SUB_EX

EXISTING DRAINAGE AREA PLAN

SITE NAME/ADDRESS
 KINGS RESIDENCES
 15 KING STREET
 PEABODY, MA

DEVELOPER
 HDG KING STREET LLC
 BOSTON, MA

DCI
 Design Consultants, Inc.
 200 State Street
 Peabody, MA 01960
 www.dci-ma.com

SHEET #

SHEET NAME

SITE NAME/ADDRESS

PROJECT TEAM

Appendix C: FEMA Flood Insurance Rate Map

National Flood Hazard Layer FIRMette



12°31'57.42"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

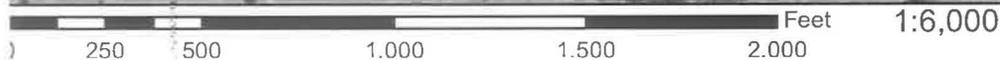
SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone C
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		8 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
OTHER FEATURES		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/5/2020 at 9:53:43 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

USGS The National Map: Orthoimagery. Data refreshed April, 2019.



42°31'30.90"N

70°55'58.04"W

Appendix D: Site Soils

Soil Map—Essex C Massachusetts, Southern Part



Soil Map may not be valid at this scale.

Map Scale: 1:2,000 if printed on A landscape (11" x 8.5") sheet.



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 1:15,800.

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: Essex County, Massachusetts, Southern Part
Survey Area Data: Version 15, Sep 7, 2018

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

Date(s) aerial images were photographed: Aug 10, 2014—Sep 19, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
602	Urban land	19.1	100.0%
Totals for Area of Interest		19.1	100.0%



Commonwealth of Massachusetts

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

6. Current Water Resource Conditions (USGS) _____ Range: Above Normal Normal Below Normal
Month/Year

7. Other references reviewed: _____

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: ___1___ Date ___12/10/20___ Time ___9:00 am___ Weather ___50___

1. Location

Ground Elevation at Surface of Hole ___90.0' approx. ___

Location (Identify on Plan) ___TP-1___

2. Land Use: ___lawn area___ Surface Stones ___ Slope (%) ___
(e.g. woodland, agricultural field, vacant lot, etc.)
Vegetation ___mowed grass___ Landform ___drumlin___ Position on landscape (attach sheet) ___top___

3. Distances from: Open Water Body ___>200___ feet Drainage Way ___ feet Possible Wet Area ___>200___ feet
Property Line ___>40___ feet Drinking Water Well ___>100___ feet Other ___ feet

4. Parent Material: ___sandy loam___ Unsuitable Materials Present: Yes No

If Yes: Disturbed Soil Fill Material Impervious Layer(s) Weathered/Fractured Rock Bedrock

5. Groundwater Observed: Yes No

If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Estimated Depth to High Groundwater: ___72"___ inches ___84.0'___ elevation approx. _____



Commonwealth of Massachusetts

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: _____ TP-1 _____

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-60	FILL										
60-65	Apb	10YR2/2				FSL			Massive, friable		
65-72	Bw	10YR6/8				FSL			Massive, friable		
72-120	C	5Y6/6	72"	2.5Y7/2 7.5YR5/8		SL			Massive, friable		

Additional Notes _____



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: _____ TP-2 _____

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-60	FILL										
60'66	Apb	10YR2/2				FSL			Massive, friable		
66-120	C	5Y76/6	66"	2.5Y7/2 7.5YR5/8		SL			Massive, friable		

Additional Notes _____



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method used:
- Depth observed standing water in observation hole A. _____ B. _____
inches inches
 - Depth weeping from side of observation hole A. _____ B. _____
inches inches
 - Depth to soil redoximorphic features (mottles) A. 72 B. 66
inches inches
 - Groundwater adjustment (USGS methodology) A. _____ B. _____
inches inches
2. Index Well Number _____ Reading Date _____ Index Well Level _____
Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes No
 - b. If yes, at what depth was it observed? Upper boundary: 72" Lower boundary: 120"
inches inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

James M. Kavanagh
Signature of Soil Evaluator

James M. Kavanagh
Typed or Printed Name of Soil Evaluator

Will Pavlitz
Name of Board of Health Witness

12/10/20
Date

7/26/95 #13253
*Date of Soil Evaluator Exam

Peribody - City Engineer
Board of Health

Note: This form must be submitted to the approving authority with Percolation Test Form 12



Commonwealth of Massachusetts

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

6. Current Water Resource Conditions (USGS) _____ Range: Above Normal Normal Below Normal
Month/Year

7. Other references reviewed: _____

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole Number: ___3___ Date 12/10/20 Time 9:00 am Weather 50

1. Location

Ground Elevation at Surface of Hole ___88.0'___ approx. _____

Location (Identify on Plan) ___TP-3___

2. Land Use: ___bit. pavement___ Surface Stones _____ Slope (%) _____
(e.g. woodland, agricultural field, vacant lot, etc.)
Vegetation _____ drumlin Landform _____ top _____ Position on landscape (attach sheet)

3. Distances from: Open Water Body ___>200___ feet Drainage Way _____ feet Possible Wet Area ___>200___ feet
Property Line ___>40___ feet Drinking Water Well ___>100___ feet Other _____ feet

4. Parent Material: ___sandy loam___ Unsuitable Materials Present: Yes No

If Yes: Disturbed Soil Fill Material Impervious Layer(s) Weathered/Fractured Rock Bedrock

5. Groundwater Observed: Yes No

If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Estimated Depth to High Groundwater: ___72"___ inches ___82.0'___ approx. _____ elevation



Commonwealth of Massachusetts

City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: TP-3

Depth (In.)	Soil Horizon/Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-60	FILL										
60-120	C	5Y6/6	72"	2.5Y7/2 7.5YR5/8		SL			Massive, friable		

Additional Notes _____



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole Number: _____ TP-4 _____

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-54	FILL										
54-120	C	5Y6/6	54"	2.5Y7/2 7.5YR5/8		SL			Massive, friable		

Additional Notes _____



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method used:
- Depth observed standing water in observation hole A. _____ inches B. _____ inches
 - Depth weeping from side of observation hole A. _____ inches B. _____ inches
 - Depth to soil redoximorphic features (mottles) A. 72 inches B. 54 inches
 - Groundwater adjustment (USGS methodology) A. _____ inches B. _____ inches
2. Index Well Number _____ Reading Date _____ Index Well Level _____
 Adjustment Factor _____ Adjusted Groundwater Level _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
- a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes No
 - b. If yes, at what depth was it observed? Upper boundary: 54" inches Lower boundary: 120" inches

F. Certification

I certify that I have passed the soil evaluator examination* approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017.

[Signature]
 Signature of Soil Evaluator
James M. Kavanagh
 Typed or Printed Name of Soil Evaluator
Will Pavlitz
 Name of Board of Health Witness

12/10/20
 Date
7/28/95 #13253
 *Date of Soil Evaluator Exam
Perbody - City Engineer
 Board of Health

Note: This form must be submitted to the approving authority with Percolation Test Form 12

SURVEY NOTES

1. THE TOPOGRAPHIC FEATURES, UTILITIES, AND PROPERTY LINES AND SURVEY NOTES ARE TAKEN FROM A PLAN ENTITLED "ALTANSIPS LAND TITLE SURVEY", PREPARED BY HAWK CONSULTING, INC., DATED AUGUST 26, 2016.
2. BEARINGS ARE BASED ON CONTROL POINTS WITH REFERENCE TO RECORDED STREETS RIGHTS OF WAY.
3. THIS PROPERTY HAS DIRECT ACCESS TO KING STREET, ELLSWORTH ROAD, AND SOUTHWICK ROAD.
4. AT THE TIME OF THE SURVEY THERE WAS NO EVIDENCE OF ROADWAY CONSTRUCTION.
5. AT THE TIME OF THE SURVEY THERE WAS NO OBSERVED EVIDENCE SITE USE AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.
6. THERE IS NO KNOWLEDGE OF IMPENDING RIGHTS OF WAY CHANGES AND NO OBSERVED STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
7. THERE APPEARS TO BE NO WETLANDS WITHIN 100' OF THIS PROPERTY.
8. CITY OF PEABODY ZONING ID# 074-228.
9. NO CEMETERY OR BURIAL GROUNDS WERE OBSERVED ON THIS PROPERTY.
10. ALL FIELD MEASUREMENTS MATCHED RECORD DIMENSIONS WITHIN THE PRECISION REQUIREMENTS OF ALTANSIPS (2016) SPECIFICATIONS.
11. ERROR OF CLOSURE CONFORMS TO ALTANSIPS (2016) TOTAL TRAVERSE CLOSURE = 0.1' WITH AN ADJUSTED POSITIONAL TOLERANCE OF MORE THAN 95%.
12. NO APPARENT WETLANDS OR WETLAND FLAGS WERE OBSERVED ON THIS SITE.
13. ALL VISIBLE UTILITIES REQUIRED FOR THE OPERATION OF THE PROPERTY EITHER ENTER THE PROPERTY THROUGH ADJOINING PUBLIC STREETS OR THE SURVEY SHOWS THE POINT OF ENTRY AND LOCATION OF ANY EASEMENTS FOR UTILITIES WHICH PASS THROUGH OR ARE LOCATED ON ADJOINING PRIVATE LAND.
14. THE J. B. THOMAS HOSPITAL (MASSACHUSETTS HISTORICAL COMMISSION INVENTORY NO. 78A.230) WAS PREVIOUSLY DEDICATED PRIOR TO THE CONSTRUCTION OF THE BUILDING CURRENTLY OCCUPYING THE SITE.
15. THE SITE IS LOCATED IN ZONE X, AREA OF MINIMAL FLOODING HAZARD AS SHOWN ON FIRM PANEL NUMBER 25099C0414F WITH EFFECTIVE DATE OF 1/3/2012 AND FIRM PANEL NUMBER 25099C0418G WITH EFFECTIVE DATE OF 7/16/2014.

12/10/20

LOCUS MAP



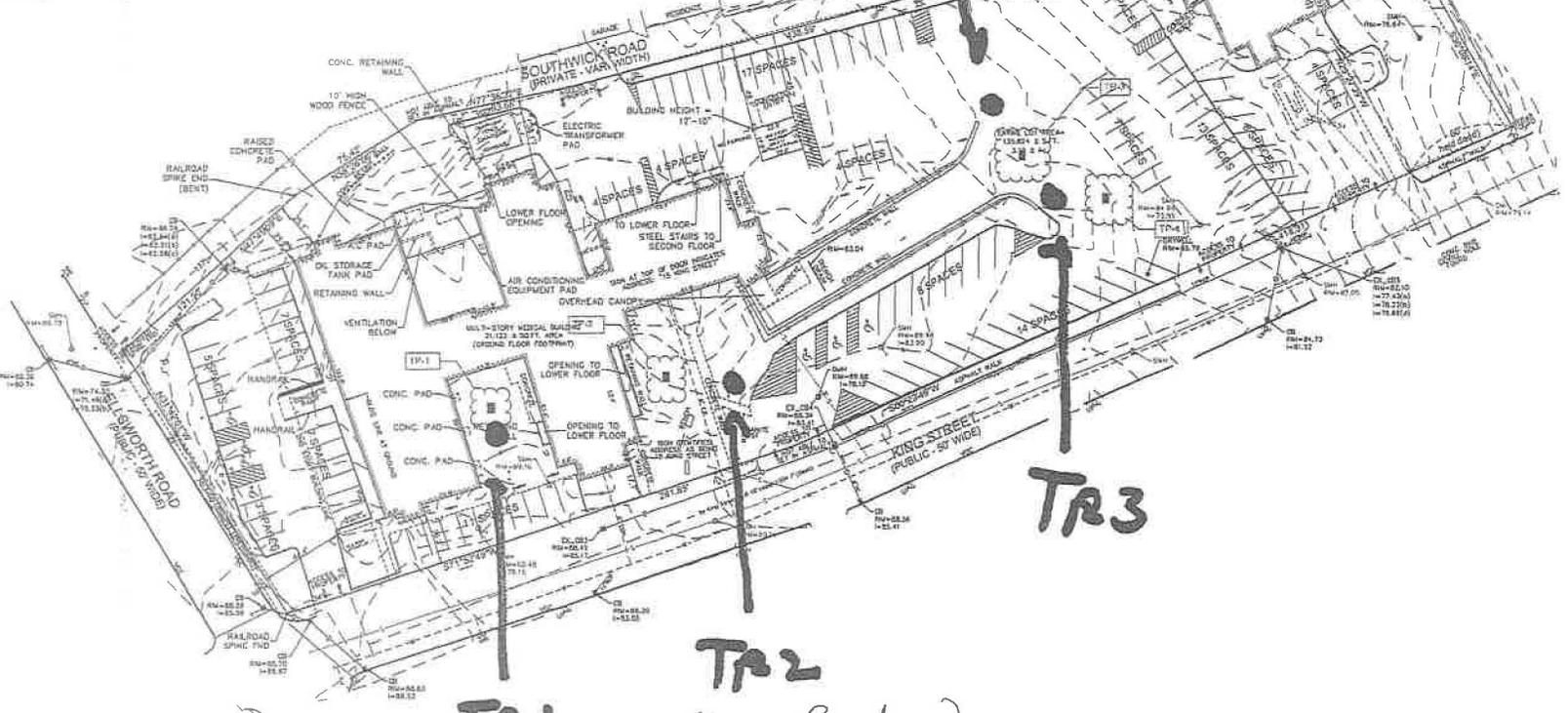
TR-4

TR-3

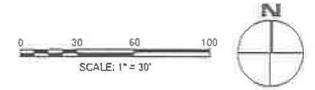
TR-2

TR-1

(Temp. fix draw)



- LEGEND**
- S — SANITARY SEWER
 - W — WATER LINE
 - E — ELECTRIC LINE
 - G — GAS LINE
 - T — TELEPHONE LINE
 - SANITARY MANHOLE
 - DRAIN MANHOLE
 - ELECTRIC MANHOLE
 - TELEPHONE MANHOLE
 - VCC VERTICAL GRANITE CURB
 - CATCH BASIN
 - DECIDUOUS TREE
 - CONIFEROUS TREE
 - DATE VALVE
 - WATER VALVE
 - FIRE HYDRANT
 - WATER GATE
 - GAS GATE
 - UTILITY POLE
 - SPOT GRADE



PROJECT NAME
King's Residences

PROJECT ADDRESS
15 King Street
Peabody, MA 01960

CLIENT
HDG KING STREET LLC

ARCHITECT
DESIGN
KHALSA

17 WALDO STREET SUITE 400
SOMERVILLE, MA 02143
TELEPHONE 978-688-6008 FAX 978-688-6009

CONSULTANTS:
DCI
Design Consultants Inc.

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Project Number	2019-053
Date	3.16.20
Client by	WJK
Checked by	WJK
Scale	1" = 30'

REVISIONS

No.	Description	Date

EXISTING CONDITIONS PLAN
V-101
King's Residences

11/15/2019 10:11:43 AM \\server\shared\103065-1\peabody\king_street_residences\103065-1\DCI\DCI_2019-053.dwg [2019-11-15 10:11:43 AM] User: jg

Appendix E: Checklist for Stormwater Report



Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

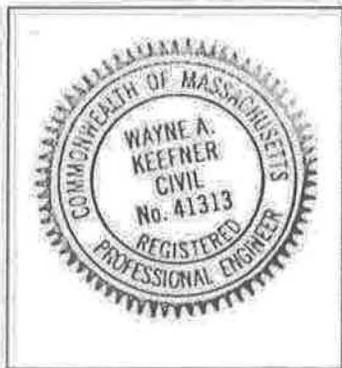
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature




Signature and Date

2/6/20

Checklist

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

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



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

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

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

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

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

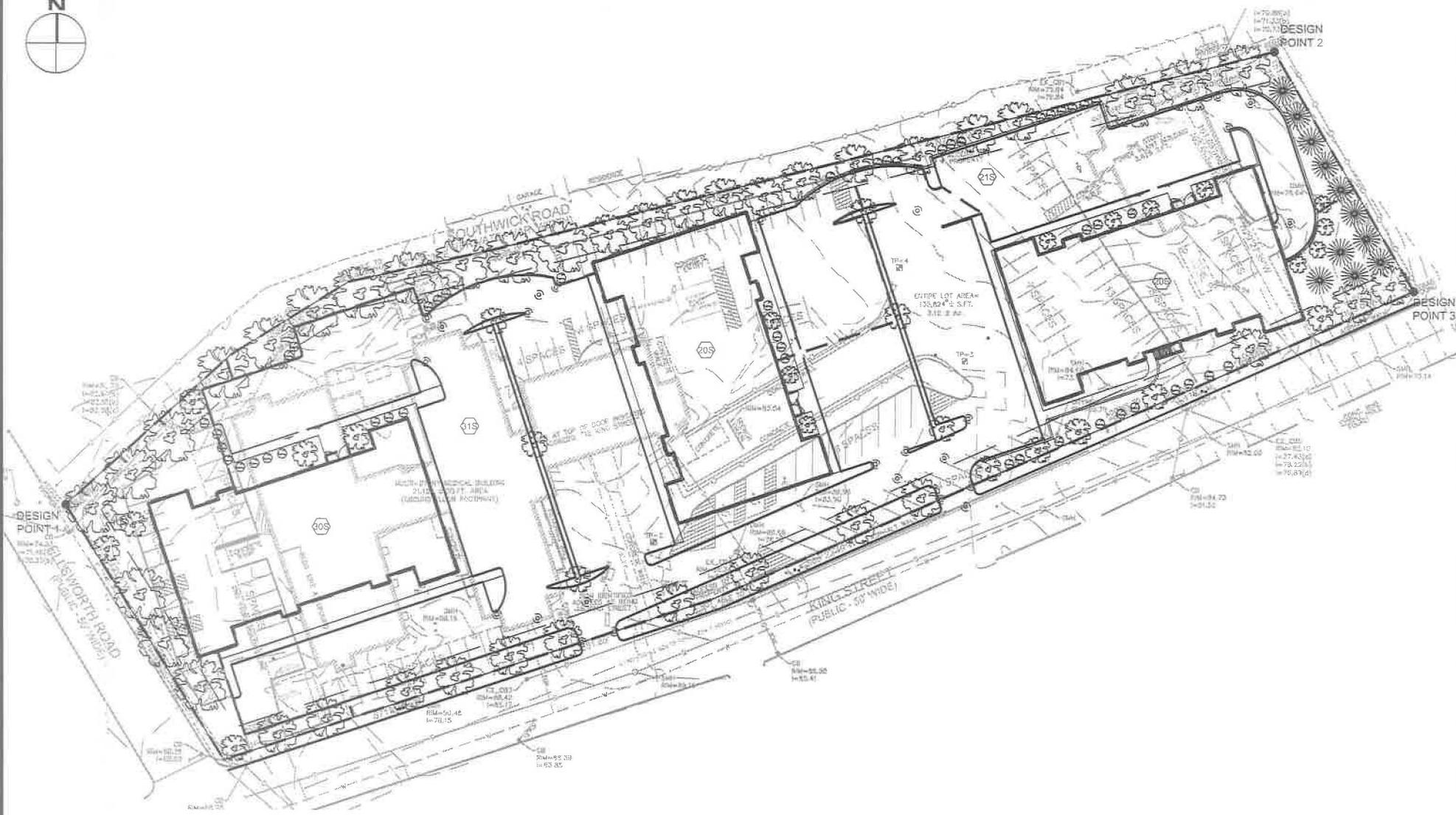
Standard 9: Operation and Maintenance Plan

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

Standard 10: Prohibition of Illicit Discharges

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

**Appendix F: Proposed Drainage Area Plan and
Preliminary Grading & Drainage Plan**



DEVELOPER
HDG KING STREET LLC
BOSTON, MA

PROJECT TEAM

KING'S RESIDENCES
15 KING STREET
PEABODY, MA

SITE NAME/ADDRESS

PROPOSED DRAINAGE
AREA PLAN

SHEET NAME

SUB_PR

SHEET #

DR BY: WK
CHK BY: WK
PROJ NO.: 2019-053
DATE: 1/12/21
SCALE: 1"=50'

GENERAL NOTES

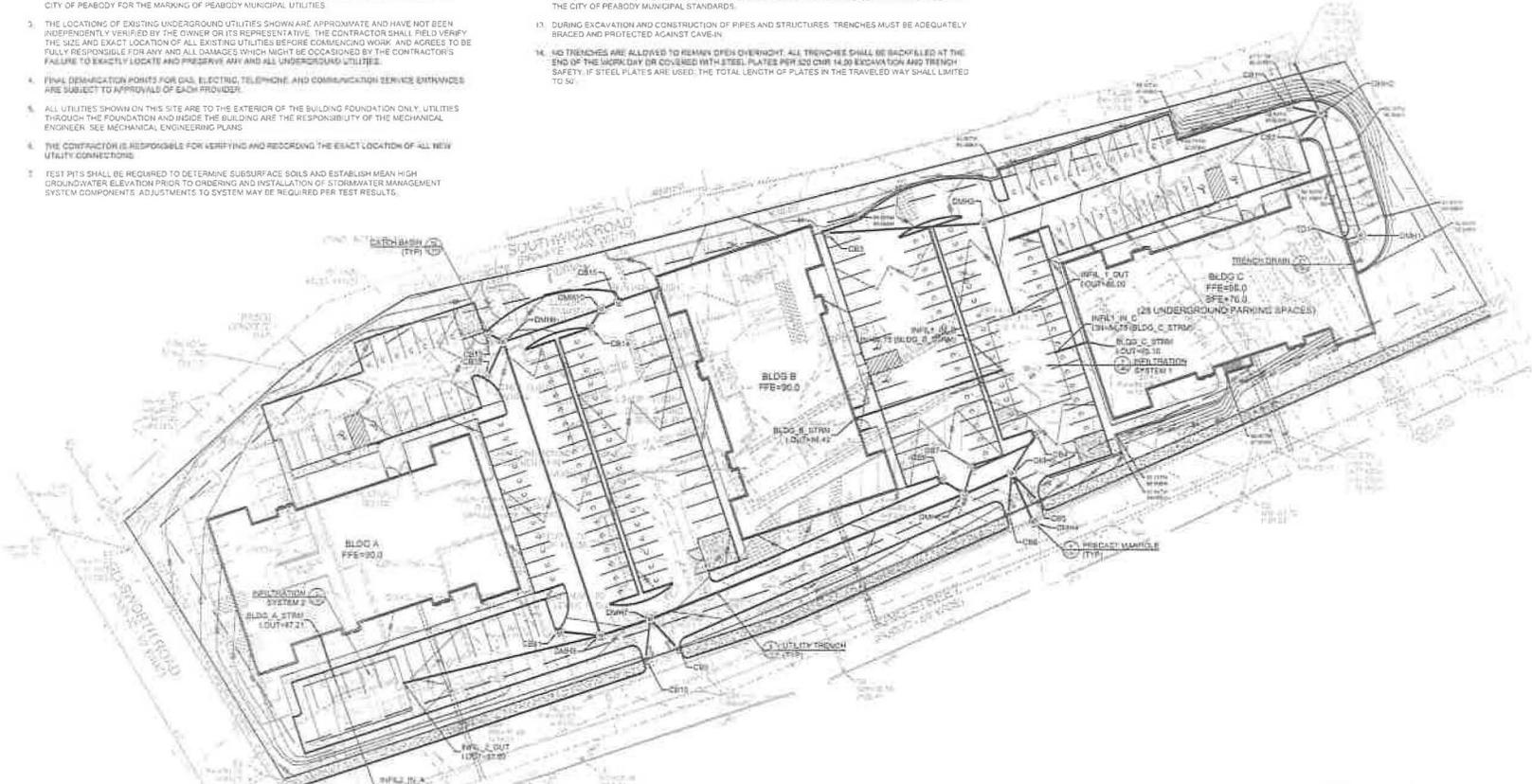
CONTRACTOR TO MAINTAIN WORK AREA IN A CLEAN CONDITION. NO CONSTRUCTION DEBRIS SHALL BE ALLOWED TO ACCUMULATE WITHIN THE WORKSITE AND NO DIRT, GRAVEL, ETC. SHALL BE ALLOWED TO ACCUMULATE ON THE PUBLIC RIGHT-OF-WAY.

AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.

UTILITY & DRAINAGE NOTES

- THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATION AND SIZE OF ALL UTILITIES WHICH MAY EXIST AT THIS TIME INSIDE OR OUTSIDE OF EXISTING OR PROPOSED BUILDINGS, ON THE SUBJECT PROPERTY, WITHIN THE STREET ROW, OR ON ADJUTING LOTS.
- CONTACT DIG-SAFE AT 1-888-364-7232 OR 1-800-327-4644 AT LEAST 72 HOURS PRIOR TO EXCAVATION. THE CITY OF PEABODY MUNICIPAL UTILITIES (WATER, SEWER & DRAIN) ARE PART OF DIG-SAFE. CONTACT THE CITY OF PEABODY FOR THE MARKING OF PEABODY MUNICIPAL UTILITIES.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL FIELD VERIFY THE SIZE AND EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- FINAL DEMARKATION POINTS FOR GAS, ELECTRIC, TELEPHONE, AND COMMUNICATION SERVICES ENTRANCES ARE SUBJECT TO APPROVAL OF EACH PROVIDER.
- ALL UTILITIES SHOWN ON THIS SITE ARE TO THE EXTERIOR OF THE BUILDING FOUNDATION ONLY. UTILITIES THROUGH THE FOUNDATION AND INSIDE THE BUILDING ARE THE RESPONSIBILITY OF THE MECHANICAL ENGINEER. SEE MECHANICAL ENGINEERING PLANS.
- THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING AND RECORDING THE EXACT LOCATION OF ALL NEW UTILITY CONNECTIONS.
- TEST PIT'S SHALL BE REQUIRED TO DETERMINE SUBSURFACE SOILS AND ESTABLISH MEAN HIGH GROUNDWATER ELEVATION PRIOR TO ORDERING AND INSTALLATION OF STORMWATER MANAGEMENT SYSTEM COMPONENTS. ADJUSTMENTS TO SYSTEM MAY BE REQUIRED PER TEST RESULTS.

- THE CONTRACTOR SHALL SUPPLY ALL PIPING FOR THE UTILITY SERVICES AND SHALL SUPPLY ALL ASSOCIATED APPURTENANCES, FITTINGS AND VALVES UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL PERFORM ALL WET AND DRY TAPS AS PART OF HIS/HER CONTRACT.
- CITY OF PEABODY RESERVES THE RIGHT TO INSPECT ALL FACILITIES DISCHARGING TO THE CITY OF PEABODY DRAIN AND SEWER SYSTEMS. A DYE TEST SHALL BE PERFORMED PRIOR TO THE ISSUANCE OF AN OCCUPANCY PERMIT.
- PRIOR TO CONSTRUCTION OF NEW SANITARY SEWER AND STORM DRAIN LINES, CONTRACTOR SHALL PERFORM TEST PITS AT LOCATIONS OF EXISTING LATERAL CONNECTIONS FOR SANITARY SEWER AND STORM DRAINS TO CONFIRM INVERTS OF LATERALS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION SHALL BE FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- TRENCH AREAS FOR THE CONSTRUCTION OF THE UNDERGROUND UTILITIES ARE TO BE REPAVEMENT WITH SAME MATERIALS AT THE SAME DEPTH AS THE EXISTING MATERIAL. THE AREAS OF TRENCHING SHALL BE NEATLY SAW-CUT AND THE NEW PATCHING MATERIAL SHALL BE PROPERLY SEALED IN ACCORDANCE WITH THE CITY OF PEABODY MUNICIPAL STANDARDS.
- DURING EXCAVATION AND CONSTRUCTION OF PIPES AND STRUCTURES, TRENCHES MUST BE ADEQUATELY BRACED AND PROTECTED AGAINST CAVE-IN.
- NO TRENCHES ARE ALLOWED TO REMAIN OPEN OVERNIGHT. ALL TRENCHES SHALL BE BACKFILLED AT THE END OF THE WORK DAY OR COVERED WITH STEEL PLATES PER 300 CMH 14.00 EXCAVATION AND TRENCH SAFETY. IF STEEL PLATES ARE USED, THE TOTAL LENGTH OF PLATES IN THE TRAVELED WAY SHALL LIMITED TO 20'.



LEGEND

- EXISTING**
- 1" = 1" (WATER)
 - 1" = 1" (SEWER)
 - 1" = 1" (GAS)
 - 1" = 1" (DOMESTIC WATER)
 - 1" = 1" (ELECTRIC, TEL & CABLE)
 - 1" = 1" (SPRINKLER)
 - 1" = 1" (FIRE SUPPRESSION)
 - 1" = 1" (TOP OF WALL)
 - 1" = 1" (BOTTOM OF WALL)
 - 1" = 1" (FOUNDATION)
 - 1" = 1" (CONCRETE WALK)
- PROPOSED:**
- WATER GATE
 - SEWER LINE
 - GAS LINE
 - DOMESTIC WATER LINE
 - FIRE SUPPRESSION LINE
 - ELECTRIC, TEL & CABLE LINE
 - SPRINKLER LINE
 - SPOT GRADE
 - CONTOUR
 - TOP OF WALL, BOTTOM OF WALL, FOUNDATION
 - CONCRETE WALK

NAME	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT
CS1	84.36	118.50(DM#2)	118.50(DM#2)
CS2	84.50	118.50(DM#2)	118.50(DM#2)
CS3	88.75	118.47(DM#3)	118.47(DM#3)
CS4	88.90	118.45(DM#3)	118.45(DM#3)
CS5	88.81	118.50(DM#3)	118.50(DM#3)
CS6	90.36	118.50(DM#3)	118.50(DM#3)
CS7	88.75	118.47(DM#3)	118.47(DM#3)

NAME	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT
CS8	88.90	118.50(DM#3)	118.50(DM#3)
CS9	89.41	118.50(DM#3)	118.50(DM#3)
CS10	88.34	118.50(DM#3)	118.50(DM#3)
CS11	90.19	118.50(DM#3)	118.50(DM#3)
CS12	87.75	118.50(DM#3)	118.50(DM#3)
CS13	87.75	118.50(DM#3)	118.50(DM#3)
CS14	88.40	118.50(DM#3)	118.50(DM#3)

NAME	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT
DM#1	78.30	117.84(DM#1)	117.74(DM#2)
DM#2	84.10	117.26(DM#1)	117.26(DM#1)
DM#3	90.10	118.47(DM#1_OUT)	118.47(DM#1_OUT)
DM#4	88.82	118.50(DM#3)	118.47(DM#3)
DM#5	88.50	118.50(DM#3)	118.15(DM#4)
DM#6	88.10	118.41(DM#3)	118.15(DM#4)

NAME	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT
DM#7	88.18	118.06(CB1)	118.06(CB1)
DM#8	90.10	118.47(DM#1_OUT)	118.47(DM#1_OUT)
DM#9	87.00	118.06(DM#1)	118.06(DM#1)
DM#10	88.50	118.06(CB1)	118.06(CB1)

PIPE MATERIALS:
 SANITARY SEWER: 6" PVC ASTM D2688-SDR35
 WATER: DOMESTIC TO BE CONFIRMED BY PLUMBING ENGINEER, FIRE TO BE CONFIRMED BY FIRE PROTECTION ENGINEER.
 ALL WATER LINES SHALL HAVE A MINIMUM OF 6 FEET OF COVER



PROJECT NAME

King's Residences

PROJECT ADDRESS

15 King Street
Peabody, MA 01960

CLIENT

HDC KING STREET LLC

ARCHITECT



17 WALDO STREET SUITE 400
SOMERVILLE, MA 02143
TELEPHONE: 617-648-6662 FAX: 617-591-0296

CONSULTANTS:



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REGISTRATION



Project Number	2019-003
Date	3.18.20
Scale	1"=30'
Sheet	11 of 30

REVISIONS

No.	Description	Date
1	Revised Drainage	11/22/19

PRELIMINARY GRADING & DRAINAGE PLAN
C-102
 King's Residences

Appendix G: Existing and Proposed Hydrology and Pipe Sizing



INFIL_1



INFIL_2



Routing Diagram for 19-053_HYD

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.358	69	50-75% Grass cover, Fair, HSG B (1S, 2S, 3S, 10S, 21S, 31S)
3.396	98	Paved parking, HSG B (1S, 2S, 3S, 21S, 31S)
1.482	98	Roofs, HSG B (2S, 3S, 20S, 30S)
6.236	92	TOTAL AREA

19-053_HYD

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
6.236	HSG B	1S, 2S, 3S, 10S, 20S, 21S, 30S, 31S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
6.236		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.358	0.000	0.000	0.000	1.358	50-75% Grass cover, Fair	1S, 2S, 3S, 10S, 21S, 31S
0.000	3.396	0.000	0.000	0.000	3.396	Paved parking	1S, 2S, 3S, 21S, 31S
0.000	1.482	0.000	0.000	0.000	1.482	Roofs	2S, 3S, 20S, 30S
0.000	6.236	0.000	0.000	0.000	6.236	TOTAL AREA	

19-053_HYD

Type III 24-hr 2-Yr Rainfall=3.15"

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Page 5

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S:	Runoff Area=12,332 sf 72.83% Impervious Runoff Depth=2.12" Tc=5.0 min CN=90 Runoff=0.72 cfs 0.050 af
Subcatchment2S:	Runoff Area=50,049 sf 82.63% Impervious Runoff Depth=2.40" Tc=5.0 min CN=93 Runoff=3.24 cfs 0.230 af
Subcatchment3S:	Runoff Area=73,443 sf 83.78% Impervious Runoff Depth=2.40" Tc=5.0 min CN=93 Runoff=4.76 cfs 0.337 af
Subcatchment10S:	Runoff Area=7,620 sf 0.00% Impervious Runoff Depth=0.75" Tc=5.0 min CN=69 Runoff=0.14 cfs 0.011 af
Subcatchment20S:	Runoff Area=23,003 sf 100.00% Impervious Runoff Depth=2.92" Tc=5.0 min CN=98 Runoff=1.67 cfs 0.128 af
Subcatchment21S:	Runoff Area=26,329 sf 57.33% Impervious Runoff Depth=1.79" Tc=5.0 min CN=86 Runoff=1.32 cfs 0.090 af
Subcatchment30S:	Runoff Area=11,502 sf 100.00% Impervious Runoff Depth=2.92" Tc=5.0 min CN=98 Runoff=0.84 cfs 0.064 af
Subcatchment31S:	Runoff Area=67,370 sf 75.76% Impervious Runoff Depth=2.21" Tc=5.0 min CN=91 Runoff=4.09 cfs 0.285 af
Reach 33R:	Inflow=1.32 cfs 0.123 af Outflow=1.32 cfs 0.123 af
Reach 34R:	Inflow=4.09 cfs 0.285 af Outflow=4.09 cfs 0.285 af
Pond 31P: INFIL_1	Peak Elev=86.32' Storage=2,371 cf Inflow=1.67 cfs 0.128 af Discarded=0.04 cfs 0.095 af Primary=0.43 cfs 0.033 af Outflow=0.47 cfs 0.128 af
Pond 39P: INFIL_2	Peak Elev=87.48' Storage=1,297 cf Inflow=0.84 cfs 0.064 af Discarded=0.04 cfs 0.064 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.064 af

Total Runoff Area = 6.236 ac Runoff Volume = 1.195 af Average Runoff Depth = 2.30"
21.77% Pervious = 1.358 ac 78.23% Impervious = 4.879 ac

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Page 6

Summary for Subcatchment 1S:

Runoff = 0.72 cfs @ 12.07 hrs, Volume= 0.050 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

Area (sf)	CN	Description
0	98	Roofs, HSG B
8,982	98	Paved parking, HSG B
3,350	69	50-75% Grass cover, Fair, HSG B
12,332	90	Weighted Average
3,350		27.17% Pervious Area
8,982		72.83% Impervious Area

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

Summary for Subcatchment 2S:

Runoff = 3.24 cfs @ 12.07 hrs, Volume= 0.230 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

Area (sf)	CN	Description
3,625	98	Roofs, HSG B
37,732	98	Paved parking, HSG B
8,692	69	50-75% Grass cover, Fair, HSG B
50,049	93	Weighted Average
8,692		17.37% Pervious Area
41,357		82.63% Impervious Area

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

Summary for Subcatchment 3S:

Runoff = 4.76 cfs @ 12.07 hrs, Volume= 0.337 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

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Page 7

Area (sf)	CN	Description
26,443	98	Roofs, HSG B
35,090	98	Paved parking, HSG B
11,910	69	50-75% Grass cover, Fair, HSG B
73,443	93	Weighted Average
11,910		16.22% Pervious Area
61,533		83.78% Impervious Area

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

Summary for Subcatchment 10S:

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
7,620	69	50-75% Grass cover, Fair, HSG B
7,620	69	Weighted Average
7,620		100.00% Pervious Area

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

Summary for Subcatchment 20S:

Runoff = 1.67 cfs @ 12.07 hrs, Volume= 0.128 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

Area (sf)	CN	Description
23,003	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	69	50-75% Grass cover, Fair, HSG B
23,003	98	Weighted Average
23,003		100.00% Impervious Area

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

19-053_HYD

Type III 24-hr 2-Yr Rainfall=3.15"

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Page 8

Summary for Subcatchment 21S:

Runoff = 1.32 cfs @ 12.07 hrs, Volume= 0.090 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

Area (sf)	CN	Description
0	98	Roofs, HSG B
15,094	98	Paved parking, HSG B
11,235	69	50-75% Grass cover, Fair, HSG B
26,329	86	Weighted Average
11,235		42.67% Pervious Area
15,094		57.33% Impervious Area

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

Summary for Subcatchment 30S:

Runoff = 0.84 cfs @ 12.07 hrs, Volume= 0.064 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

Area (sf)	CN	Description
11,502	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	69	50-75% Grass cover, Fair, HSG B
11,502	98	Weighted Average
11,502		100.00% Impervious Area

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

Summary for Subcatchment 31S:

Runoff = 4.09 cfs @ 12.07 hrs, Volume= 0.285 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Yr Rainfall=3.15"

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Page 9

Area (sf)	CN	Description
0	98	Roofs, HSG B
51,042	98	Paved parking, HSG B
16,328	69	50-75% Grass cover, Fair, HSG B
67,370	91	Weighted Average
16,328		24.24% Pervious Area
51,042		75.76% Impervious Area

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

Summary for Reach 33R:

Inflow Area = 1.133 ac, 77.23% Impervious, Inflow Depth = 1.31" for 2-Yr event
 Inflow = 1.32 cfs @ 12.07 hrs, Volume= 0.123 af
 Outflow = 1.32 cfs @ 12.07 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach 34R:

Inflow Area = 1.811 ac, 79.30% Impervious, Inflow Depth = 1.89" for 2-Yr event
 Inflow = 4.09 cfs @ 12.07 hrs, Volume= 0.285 af
 Outflow = 4.09 cfs @ 12.07 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Pond 31P: INFIL_1

Inflow Area = 0.528 ac, 100.00% Impervious, Inflow Depth = 2.92" for 2-Yr event
 Inflow = 1.67 cfs @ 12.07 hrs, Volume= 0.128 af
 Outflow = 0.47 cfs @ 12.39 hrs, Volume= 0.128 af, Atten= 72%, Lag= 19.4 min
 Discarded = 0.04 cfs @ 8.94 hrs, Volume= 0.095 af
 Primary = 0.43 cfs @ 12.39 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 86.32' @ 12.39 hrs Surf.Area= 1,601 sf Storage= 2,371 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 363.4 min (1,119.2 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.25'	1,365 cf	30.50'W x 52.50'L x 3.54'H Field A 5,671 cf Overall - 2,258 cf Embedded = 3,413 cf x 40.0% Voids
#2A	84.75'	2,258 cf	Cultec R-330XLHD x 42 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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Page 10

3,623 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	86.00'	12.0" Round Culvert L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 86.00' / 84.96' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	84.25'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 8.94 hrs HW=84.29' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.43 cfs @ 12.39 hrs HW=86.32' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.43 cfs @ 1.94 fps)**Summary for Pond 39P: INFIL_2**

Inflow Area =	0.264 ac, 100.00% Impervious, Inflow Depth = 2.92" for 2-Yr event
Inflow =	0.84 cfs @ 12.07 hrs, Volume= 0.064 af
Outflow =	0.04 cfs @ 10.86 hrs, Volume= 0.064 af, Atten= 95%, Lag= 0.0 min
Discarded =	0.04 cfs @ 10.86 hrs, Volume= 0.064 af
Primary =	0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 87.48' @ 14.40 hrs Surf.Area= 1,601 sf Storage= 1,297 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 285.7 min (1,041.5 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	86.25'	1,365 cf	30.50'W x 52.50'L x 3.54'H Field A 5,671 cf Overall - 2,258 cf Embedded = 3,413 cf x 40.0% Voids
#2A	86.75'	2,258 cf	Cultec R-330XLHD x 42 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

3,623 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	88.25'	12.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 88.25' / 86.25' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	86.25'	1.020 in/hr Exfiltration over Surface area

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Page 11

Discarded OutFlow Max=0.04 cfs @ 10.86 hrs HW=86.29' (Free Discharge)

↳2=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=86.25' TW=0.00' (Dynamic Tailwater)

↳1=Culvert (Controls 0.00 cfs)

19-053_HYD

Type III 24-hr 10-Yr Rainfall=4.83"

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Page 12

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S:	Runoff Area=12,332 sf 72.83% Impervious Runoff Depth=3.71" Tc=5.0 min CN=90 Runoff=1.23 cfs 0.088 af
Subcatchment2S:	Runoff Area=50,049 sf 82.63% Impervious Runoff Depth=4.03" Tc=5.0 min CN=93 Runoff=5.30 cfs 0.386 af
Subcatchment3S:	Runoff Area=73,443 sf 83.78% Impervious Runoff Depth=4.03" Tc=5.0 min CN=93 Runoff=7.78 cfs 0.566 af
Subcatchment10S:	Runoff Area=7,620 sf 0.00% Impervious Runoff Depth=1.83" Tc=5.0 min CN=69 Runoff=0.38 cfs 0.027 af
Subcatchment20S:	Runoff Area=23,003 sf 100.00% Impervious Runoff Depth=4.59" Tc=5.0 min CN=98 Runoff=2.58 cfs 0.202 af
Subcatchment21S:	Runoff Area=26,329 sf 57.33% Impervious Runoff Depth=3.31" Tc=5.0 min CN=86 Runoff=2.40 cfs 0.167 af
Subcatchment30S:	Runoff Area=11,502 sf 100.00% Impervious Runoff Depth=4.59" Tc=5.0 min CN=98 Runoff=1.29 cfs 0.101 af
Subcatchment31S:	Runoff Area=67,370 sf 75.76% Impervious Runoff Depth=3.82" Tc=5.0 min CN=91 Runoff=6.88 cfs 0.492 af
Reach 33R:	Inflow=3.98 cfs 0.262 af Outflow=3.98 cfs 0.262 af
Reach 34R:	Inflow=6.88 cfs 0.495 af Outflow=6.88 cfs 0.495 af
Pond 31P: INFIL_1	Peak Elev=86.75' Storage=2,847 cf Inflow=2.58 cfs 0.202 af Discarded=0.04 cfs 0.107 af Primary=1.86 cfs 0.095 af Outflow=1.90 cfs 0.202 af
Pond 39P: INFIL_2	Peak Elev=88.31' Storage=2,359 cf Inflow=1.29 cfs 0.101 af Discarded=0.04 cfs 0.098 af Primary=0.02 cfs 0.003 af Outflow=0.06 cfs 0.101 af

Total Runoff Area = 6.236 ac Runoff Volume = 2.029 af Average Runoff Depth = 3.90"
21.77% Pervious = 1.358 ac 78.23% Impervious = 4.879 ac

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Type III 24-hr 10-Yr Rainfall=4.83"

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Page 13

Summary for Subcatchment 1S:

Runoff = 1.23 cfs @ 12.07 hrs, Volume= 0.088 af, Depth= 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

Area (sf)	CN	Description
0	98	Roofs, HSG B
8,982	98	Paved parking, HSG B
3,350	69	50-75% Grass cover, Fair, HSG B
12,332	90	Weighted Average
3,350		27.17% Pervious Area
8,982		72.83% Impervious Area

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

Summary for Subcatchment 2S:

Runoff = 5.30 cfs @ 12.07 hrs, Volume= 0.386 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

Area (sf)	CN	Description
3,625	98	Roofs, HSG B
37,732	98	Paved parking, HSG B
8,692	69	50-75% Grass cover, Fair, HSG B
50,049	93	Weighted Average
8,692		17.37% Pervious Area
41,357		82.63% Impervious Area

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

Summary for Subcatchment 3S:

Runoff = 7.78 cfs @ 12.07 hrs, Volume= 0.566 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

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Page 14

Area (sf)	CN	Description
26,443	98	Roofs, HSG B
35,090	98	Paved parking, HSG B
11,910	69	50-75% Grass cover, Fair, HSG B
73,443	93	Weighted Average
11,910		16.22% Pervious Area
61,533		83.78% Impervious Area

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

Summary for Subcatchment 10S:

Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.027 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

Area (sf)	CN	Description
0	98	Roofs, HSG B
0	98	Paved parking, HSG B
7,620	69	50-75% Grass cover, Fair, HSG B
7,620	69	Weighted Average
7,620		100.00% Pervious Area

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

Summary for Subcatchment 20S:

Runoff = 2.58 cfs @ 12.07 hrs, Volume= 0.202 af, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

Area (sf)	CN	Description
23,003	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	69	50-75% Grass cover, Fair, HSG B
23,003	98	Weighted Average
23,003		100.00% Impervious Area

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

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Type III 24-hr 10-Yr Rainfall=4.83"

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Page 15

Summary for Subcatchment 21S:

Runoff = 2.40 cfs @ 12.07 hrs, Volume= 0.167 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

Area (sf)	CN	Description
0	98	Roofs, HSG B
15,094	98	Paved parking, HSG B
11,235	69	50-75% Grass cover, Fair, HSG B
26,329	86	Weighted Average
11,235		42.67% Pervious Area
15,094		57.33% Impervious Area

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

Summary for Subcatchment 30S:

Runoff = 1.29 cfs @ 12.07 hrs, Volume= 0.101 af, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

Area (sf)	CN	Description
11,502	98	Roofs, HSG B
0	98	Paved parking, HSG B
0	69	50-75% Grass cover, Fair, HSG B
11,502	98	Weighted Average
11,502		100.00% Impervious Area

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

Summary for Subcatchment 31S:

Runoff = 6.88 cfs @ 12.07 hrs, Volume= 0.492 af, Depth= 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Yr Rainfall=4.83"

19-053_HYD

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Page 16

Area (sf)	CN	Description
0	98	Roofs, HSG B
51,042	98	Paved parking, HSG B
16,328	69	50-75% Grass cover, Fair, HSG B
67,370	91	Weighted Average
16,328		24.24% Pervious Area
51,042		75.76% Impervious Area

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

Summary for Reach 33R:

Inflow Area = 1.133 ac, 77.23% Impervious, Inflow Depth = 2.78" for 10-Yr event
 Inflow = 3.98 cfs @ 12.10 hrs, Volume= 0.262 af
 Outflow = 3.98 cfs @ 12.10 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach 34R:

Inflow Area = 1.811 ac, 79.30% Impervious, Inflow Depth = 3.28" for 10-Yr event
 Inflow = 6.88 cfs @ 12.07 hrs, Volume= 0.495 af
 Outflow = 6.88 cfs @ 12.07 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Pond 31P: INFIL_1

Inflow Area = 0.528 ac, 100.00% Impervious, Inflow Depth = 4.59" for 10-Yr event
 Inflow = 2.58 cfs @ 12.07 hrs, Volume= 0.202 af
 Outflow = 1.90 cfs @ 12.14 hrs, Volume= 0.202 af, Atten= 26%, Lag= 4.0 min
 Discarded = 0.04 cfs @ 7.31 hrs, Volume= 0.107 af
 Primary = 1.86 cfs @ 12.14 hrs, Volume= 0.095 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 86.75' @ 12.14 hrs Surf.Area= 1,601 sf Storage= 2,847 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 272.1 min (1,019.7 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	84.25'	1,365 cf	30.50'W x 52.50'L x 3.54'H Field A 5,671 cf Overall - 2,258 cf Embedded = 3,413 cf x 40.0% Voids
#2A	84.75'	2,258 cf	Cultec R-330XLHD x 42 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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Page 17

3,623 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	86.00'	12.0" Round Culvert L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 86.00' / 84.96' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	84.25'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 7.31 hrs HW=84.29' (Free Discharge)

↳2=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.86 cfs @ 12.14 hrs HW=86.75' TW=0.00' (Dynamic Tailwater)

↳1=Culvert (Inlet Controls 1.86 cfs @ 2.95 fps)

Summary for Pond 39P: INFIL_2

Inflow Area =	0.264 ac, 100.00% Impervious, Inflow Depth = 4.59" for 10-Yr event
Inflow =	1.29 cfs @ 12.07 hrs, Volume= 0.101 af
Outflow =	0.06 cfs @ 14.52 hrs, Volume= 0.101 af, Atten= 96%, Lag= 146.9 min
Discarded =	0.04 cfs @ 9.48 hrs, Volume= 0.098 af
Primary =	0.02 cfs @ 14.52 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 88.31' @ 14.52 hrs Surf.Area= 1,601 sf Storage= 2,359 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 511.6 min (1,259.3 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	86.25'	1,365 cf	30.50'W x 52.50'L x 3.54'H Field A 5,671 cf Overall - 2,258 cf Embedded = 3,413 cf x 40.0% Voids
#2A	86.75'	2,258 cf	Cultec R-330XLHD x 42 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

3,623 cf Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	88.25'	12.0" Round Culvert L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 88.25' / 86.25' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	86.25'	1.020 in/hr Exfiltration over Surface area

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Page 18

Discarded OutFlow Max=0.04 cfs @ 9.48 hrs HW=86.29' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=0.02 cfs @ 14.52 hrs HW=88.31' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.02 cfs @ 0.87 fps)

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Type III 24-hr 25-Yr Rainfall=6.16"

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Page 19

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S:	Runoff Area=12,332 sf 72.83% Impervious Runoff Depth=5.00" Tc=5.0 min CN=90 Runoff=1.64 cfs 0.118 af
Subcatchment2S:	Runoff Area=50,049 sf 82.63% Impervious Runoff Depth=5.34" Tc=5.0 min CN=93 Runoff=6.91 cfs 0.511 af
Subcatchment3S:	Runoff Area=73,443 sf 83.78% Impervious Runoff Depth=5.34" Tc=5.0 min CN=93 Runoff=10.14 cfs 0.750 af
Subcatchment10S:	Runoff Area=7,620 sf 0.00% Impervious Runoff Depth=2.84" Tc=5.0 min CN=69 Runoff=0.60 cfs 0.041 af
Subcatchment20S:	Runoff Area=23,003 sf 100.00% Impervious Runoff Depth=5.92" Tc=5.0 min CN=98 Runoff=3.30 cfs 0.261 af
Subcatchment21S:	Runoff Area=26,329 sf 57.33% Impervious Runoff Depth=4.56" Tc=5.0 min CN=86 Runoff=3.27 cfs 0.230 af
Subcatchment30S:	Runoff Area=11,502 sf 100.00% Impervious Runoff Depth=5.92" Tc=5.0 min CN=98 Runoff=1.65 cfs 0.130 af
Subcatchment31S:	Runoff Area=67,370 sf 75.76% Impervious Runoff Depth=5.11" Tc=5.0 min CN=91 Runoff=9.07 cfs 0.659 af
Reach 33R:	Inflow=5.69 cfs 0.378 af Outflow=5.69 cfs 0.378 af
Reach 34R:	Inflow=9.07 cfs 0.685 af Outflow=9.07 cfs 0.685 af
Pond 31P: INFIL_1	Peak Elev=86.98' Storage=3,067 cf Inflow=3.30 cfs 0.261 af Discarded=0.04 cfs 0.112 af Primary=2.63 cfs 0.148 af Outflow=2.67 cfs 0.261 af
Pond 39P: INFIL_2	Peak Elev=88.51' Storage=2,589 cf Inflow=1.65 cfs 0.130 af Discarded=0.04 cfs 0.105 af Primary=0.29 cfs 0.026 af Outflow=0.33 cfs 0.130 af

Total Runoff Area = 6.236 ac Runoff Volume = 2.701 af Average Runoff Depth = 5.20"
21.77% Pervious = 1.358 ac 78.23% Impervious = 4.879 ac